

Administration Guide

Dynamic File Services 2.2

September 2014

Novell.

Legal Notices

Novell, Inc., makes no representations or warranties with respect to the contents or use of this documentation, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. Further, Novell, Inc., reserves the right to revise this publication and to make changes to its content, at any time, without obligation to notify any person or entity of such revisions or changes.

Further, Novell, Inc., makes no representations or warranties with respect to any software, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. Further, Novell, Inc., reserves the right to make changes to any and all parts of Novell software, at any time, without any obligation to notify any person or entity of such changes.

Any products or technical information provided under this Agreement may be subject to U.S. export controls and the trade laws of other countries. You agree to comply with all export control regulations and to obtain any required licenses or classification to export, re-export or import deliverables. You agree not to export or re-export to entities on the current U.S. export exclusion lists or to any embargoed or terrorist countries as specified in the U.S. export laws. You agree to not use deliverables for prohibited nuclear, missile, or chemical biological weaponry end uses. See the [Novell International Trade Services Web page \(http://www.novell.com/info/exports/\)](http://www.novell.com/info/exports/) for more information on exporting Novell software. Novell assumes no responsibility for your failure to obtain any necessary export approvals.

Copyright © 2009–2014 Novell, Inc. All rights reserved. No part of this publication may be reproduced, photocopied, stored on a retrieval system, or transmitted without the express written consent of the publisher.

Novell, Inc.
1800 South Novell Place
Provo, UT 84606
U.S.A.
www.novell.com

Online Documentation: To access the latest online documentation for this and other Novell products, see the [Novell Documentation Web page \(http://www.novell.com/documentation/\)](http://www.novell.com/documentation/).

Novell Trademarks

For Novell trademarks, see the [Novell Trademark and Service Mark list \(http://www.novell.com/company/legal/trademarks/tmlist.html\)](http://www.novell.com/company/legal/trademarks/tmlist.html).

Third-Party Materials

All third-party trademarks are the property of their respective owners.

This product includes Amazon Web Services (AWS) Software Developers Kit (SDK) for Microsoft .NET open source software that is developed by AWS. For information, see [Amazon Web Services \(http://aws.amazon.com/sdkfornet/\)](http://aws.amazon.com/sdkfornet/).

This product includes Apache Tika toolkit open source software that is developed by the Apache Tika project. For information, see [Apache Tika \(http://tika.apache.org/\)](http://tika.apache.org/) on The Apache Software Foundation Web site at [Apache.org \(http://www.apache.org\)](http://www.apache.org).

This product includes DotNetZip open source software that is developed by the DotNetZip Library open source project. For information, see [DotNetZip Library \(http://dotnetzip.codeplex.com/\)](http://dotnetzip.codeplex.com/) on CodePlex.com.

This product includes Glacial ListView open source software that is developed by Glacial Components Software and the C# ListView open source project. For information, see [C# ListView \(http://www.codeproject.com/KB/list/aa_listview.aspx\)](http://www.codeproject.com/KB/list/aa_listview.aspx) on CodeProject.com.

This product includes Hammock open source software that is developed by the Hammock open source project. For information, see [Hammock \(https://github.com/danielcrenna/hammock\)](https://github.com/danielcrenna/hammock) on GitHub.com.

This product includes IKVM.NET open source software that is developed by the IKVM.NET open source project. For information, see the [IKVM.NET Wiki \(http://sourceforge.net/apps/mediawiki/ikvm/index.php?title=Main_Page\)](http://sourceforge.net/apps/mediawiki/ikvm/index.php?title=Main_Page) on SourceForge.net.

This product includes the Newtonsoft.Json.dll library in the Json.NET open source software that is developed by the Json.NET open source project. For information, see [Json.NET \(http://json.codeplex.com\)](http://json.codeplex.com) on CodePlex.com.

This product includes log4net open source software that is developed as part of the Apache Logging Services open source project. For information, see [log4net \(http://logging.apache.org/log4net/\)](http://logging.apache.org/log4net/) on Apache.org.

This product includes Plossum open source software that is developed by the Plossum open source project. For information, see [Plossum \(http://sourceforge.net/projects/plossum\)](http://sourceforge.net/projects/plossum) on SourceForge.net.

This product includes SharpBox open source software that is developed by SharpBox open source project. For information, see [SharpBox \(http://sharpbox.codeplex.com/\)](http://sharpbox.codeplex.com/) on CodePlex.com.

This product includes TweetSharp open source software that is developed by Aplitize and the TweetSharp open source project. For information, see [TweetSharp \(https://github.com/danielcreenna/tweetsharp\)](https://github.com/danielcreenna/tweetsharp) on GitHub.com.

This product includes ZedGraph open source software that is developed by the ZedGraph open source project. For information, see [ZedGraph \(http://sourceforge.net/projects/zedgraph/\)](http://sourceforge.net/projects/zedgraph/) on SourceForge.net.

Contents

About This Guide	15
1 Overview of Dynamic File Services	17
1.1 Benefits of Dynamic File Services	19
1.1.1 Store Data Efficiently by Tiering Data	19
1.1.2 Offload Retention Data to Less Expensive Storage	20
1.1.3 Integrate Network Attached Storage with Ease	20
1.1.4 Store Retention Data in the Cloud	20
1.1.5 Tier Data across Local Storage, Filers, and Cloud Storage	20
1.1.6 Access Files in a Merged View Securely and Transparently	22
1.1.7 Review Retention Data to Keep, Purge, or Restore Files	23
1.1.8 Move Data Seamlessly between the Two Paths	23
1.1.9 Run Policies Whenever You Want	23
1.1.10 Reduce Backup Time	24
1.2 Deployment Scenarios	24
1.2.1 Students: Essential versus Non-Essential Files	24
1.2.2 Healthcare: Active versus Historical Files	25
1.2.3 Social Networks: Collaboration Applications	26
1.2.4 Business: Retaining Inactive Files	27
1.3 Key Components of Dynamic File Services	28
2 What's New for Pairs and Policies Management	33
2.1 What's New for Dynamic File Services 2.2	33
2.2 What's New for Dynamic File Services 2.1	33
2.2.1 Administration	34
2.2.2 Service	34
2.2.3 Pairs	34
2.2.4 Policies	35
2.2.5 Cloud	35
2.2.6 Retention Reviews	35
2.2.7 Notification Service	35
2.2.8 Audit Tracking Service	36
2.3 What's New for Dynamic File Services 2.0	36
2.3.1 Administration	36
2.3.2 Service	37
2.3.3 Pairs	37
2.3.4 Policies	37
2.3.5 Policy Schedules	38
2.3.6 Retention Reviews	38
2.3.7 Notification Service	38
2.3.8 Auditing	38
2.3.9 Repair Tool	38
2.3.10 Filter Driver Diagnostics	38
2.4 What's Next	39
3 Getting Started	41
3.1 Installing and Setting Up Dynamic File Services	41
3.2 Connecting to the Dynamic File Services Server	42
3.3 Creating a Dynamic File Services Pair	42

3.4	Creating a Policy	43
3.5	Associating the Pair and Policy	44
3.6	Creating More Policies and Pairs	44
3.7	Enforcing Policies	45
3.8	Viewing the Merged File Tree for a Standard Pair	47
3.9	Reviewing Retained Data in a Retention Pair	48
3.10	Backing Up Files in the Pair	49

4 Planning for Pairs and Policies 51

4.1	Server-Centric Management	52
4.2	Management Groups	52
4.3	Reviewers for Retention Pairs	52
4.4	Active Directory Domain Configuration for Remote Shares	53
4.4.1	Default Domain Configuration	53
4.4.2	Dynamic File Services Storage Rights Domain Group	54
4.4.3	NDFS- <i>servername</i> Domain Proxy User	55
4.4.4	Security Implications of the Default Domain Configuration	56
4.5	Server Configuration Requirements	56
4.5.1	SMB	56
4.5.2	UTF-8	56
4.6	Storage Requirements	57
4.6.1	File Systems	57
4.6.2	Local Storage	57
4.6.3	Remote Storage	57
4.6.4	Cloud Storage	58
4.7	Pair Requirements	58
4.7.1	Only 16 Pairs Per Server	58
4.7.2	Primary and Secondary Paths	58
4.7.3	Administrator Access	59
4.7.4	User Access	60
4.8	Access Rights for a Standard Pair	60
4.9	Using Remote Shares in an Active Directory Domain	60
4.9.1	Server Requirements in a Domain	60
4.9.2	Remote Share Requirements in a Domain	61
4.9.3	Remote Path Requirements in a Domain	61
4.10	Using Remote Shares in a Workgroup	61
4.10.1	Server Requirements in a Workgroup	62
4.10.2	Workgroup Configuration Requirements	62
4.10.3	Remote Share Requirements in a Workgroup	63
4.10.4	Remote Path Requirements in a Workgroup	63
4.11	Using Cloud Storage as the Secondary Path in a Retention Pair	63
4.11.1	Supported Cloud Storage Providers	63
4.11.2	Cloud Credentials	64
4.11.3	Maximum Storage Size for Cloud Storage	64
4.11.4	Maximum File Size for Uploads to Cloud Storage	64
4.12	Naming Conventions for Pairs and Policies	65
4.13	File Name Path Length	65
4.14	Merged View for Standard Pairs	65
4.15	File and Folder Attributes and ACL Permissions in a Standard Pair	66
4.16	Duplicate Folders in a Standard Pair	66
4.17	Duplicate Files in a Standard Pair	67
4.17.1	Restoring Files from Backup Media	67
4.17.2	Accessing Files Outside the Merged View	67
4.17.3	Losing a Media Connection when Moving Files	68
4.18	Orphan (Ownerless) Files	68
4.18.1	Moving Ownerless Files	68

4.18.2	How Ownerless Files Are Managed in a Retention Pair	69
4.18.3	How in Ownerless Files Are Handled in Workgroups	70
4.19	System Files and Other Files that Are Not Moved	70
4.20	Policy Schedules	71
4.21	Time Displays	72
4.22	Event Logging	72
4.23	Using Antivirus Software with Pairs	72
4.24	Using Backup Software with Pairs	72
4.25	Using Compression with Pairs	72
4.26	Using Disk Quotas with Pairs	72
4.27	Disk Space Availability and Moving Files	73
4.28	Using Encryption with Pairs	73
4.28.1	Windows File and Folder Encryption	73
4.28.2	Hardware-Level Disk Encryption	73
4.29	Using Microsoft Distributed File System with Pairs	74
4.29.1	Example: Single-Server MS-DFS Namespace with Links to DynamicFS Pairs on Different Servers	75
4.29.2	Example: Single-Server DFS Namespace with Links to DynamicFS Pairs on the Same Server	77
4.29.3	Example: MS-DFS Namespace and Replication with DynamicFS Pairs	78
4.30	Using Dynamic File Services in a Windows Cluster	80
4.30.1	Management Console	80
4.30.2	Service Controller	80
4.30.3	Merged View	80
4.30.4	Executable Files	81
4.30.5	Standard Policy Engine and Registry Information	81
4.30.6	Moving the Service Cluster Resource Between Nodes	81
4.31	Using Dynamic File Services in Windows Safe Mode	82

5 Using the Management Tools 83

5.1	Service Controller	83
5.1.1	Accessing the Service Controller	83
5.1.2	Service Controller Tasks Quick Reference	85
5.1.3	Starting the Service Controller	85
5.1.4	Stopping the Service Controller	86
5.2	Management Console	86
5.2.1	Accessing the Management Console	86
5.2.2	Management Console Wizards	87
5.2.3	Management Console Tasks Quick Reference	88
5.3	Repair Tool	95
5.4	Filter Driver Diagnostics	95
5.5	Command Line Interface and Utilities	95

6 Configuring and Managing the Service 97

6.1	Requirements for Administering the Service	97
6.2	Registering the License Key	97
6.2.1	Obtaining a License Key	98
6.2.2	Using the Controller to Register a License Key	98
6.2.3	Using the Management Console to Remotely Register a License Key	100
6.2.4	Using the Command Line to Register the Key	101
6.3	Configuring Administrators for Pair Management	102
6.3.1	Understanding the Dynamic File Services Group	102
6.3.2	Setting Up Administrators in a Domain	104
6.3.3	Setting Up Administrators in a Workgroup	104
6.4	Starting and Stopping the Service	105

6.4.1	Viewing the Service Status	105
6.4.2	Starting the Dynamic File Service	106
6.4.3	Stopping the Dynamic File Service	106
6.5	Configuring Audit Tracking Events	108
6.6	Configuring the Notification Service	108
6.6.1	Understanding Notification and Audit Events	109
6.6.2	Setting Up Email Notifications	110
6.7	Configuring the Logging Level for Engines	114
6.8	Configuring a Certificate for Secure Remote Management Sessions	116
6.8.1	Understanding the Certificate	116
6.8.2	Viewing the Dynamic File Services SSL Certificate	117
6.8.3	Prerequisites for Creating, Modifying, or Unbinding the Certificate	118
6.8.4	Creating a Dynamic File Services Self-Signed Certificate	118
6.8.5	Configuring a Signed Certificate for Dynamic File Services	119
6.8.6	Unbinding a Signed Certificate from Dynamic File Services	120
6.8.7	Handling Expiring Certificates	121
6.9	Configuring Firewall Access for the Service Port	122
6.9.1	Understanding Remote Access	122
6.9.2	Enabling or Disabling the Windows Firewall Access	123
6.10	Configuring Ports for the Service and Retention Review	124
6.11	Viewing the Product Version and Build Information	125
6.12	What's Next	126

7 Managing Servers in the Management Console 127

7.1	Setting Up a Server in the Management Console	127
7.1.1	Understanding the Server List	128
7.1.2	Prerequisites for Connecting to a Server	128
7.1.3	Setting Up the Server	129
7.2	Accepting a Dynamic File Services Certificate	130
7.2.1	Importing a Certificate to the Default Location	130
7.2.2	Importing the Certificate to a Specified Location	131
7.3	Connecting to a Server	131
7.4	Viewing a List of Servers and Their Connection Status	132
7.5	Viewing Server Properties	132
7.5.1	Accessing the Server Properties	132
7.5.2	Viewing General Server Information	133
7.5.3	Viewing Disk Details for the Server	133
7.5.4	Viewing Log Files for the Server	134
7.5.5	Viewing Logging Levels for the Server	135
7.6	Disconnecting from a Server	135
7.7	Recovering a Lost Connection to a Server	135
7.8	Exporting and Importing a Server List	136
7.8.1	Exporting a Server List	136
7.8.2	Importing a Server List	136
7.9	Removing a Server from the List	137
7.10	What's Next	137

8 Creating and Managing Pairs 139

8.1	Understanding Pairs	139
8.1.1	Pair Paths	140
8.1.2	Standard Pairs	140
8.1.3	Retention Pairs	141
8.2	Creating a Pair	142
8.3	Preparing Remote Shares for Use in a Pair	146
8.3.1	Creating a Network Share on the Remote Device	146

8.3.2	Publishing the Remote Share	146
8.3.3	Adding the Dynamic File Services Storage Rights Group to the Remote Share	147
8.4	Providing Users with a Merged View of the Files in a Standard Pair	147
8.5	Including or Excluding Folders from a Pair's Policy Runs	147
8.6	Viewing a List of Pairs	149
8.7	Viewing the Pair Status	149
8.8	Viewing Properties for a Pair	149
8.9	Moving Selected Files or Folders	152
8.10	Scheduling the Pair History Scan	153
8.11	Reporting Conflicts for Attributes and ACL Permissions on Folders	153
8.12	Reporting Conflicts for Duplicate Files	154
8.12.1	Viewing Errors in the Policy Execution History	154
8.12.2	Generating a Duplicate Files Report	154
8.13	Unlinking the Paths in a Pair	155
8.14	What's Next	155

9 Creating and Managing Policies 157

9.1	Understanding Policies	157
9.1.1	Policy Name and Description	158
9.1.2	Policy Direction	158
9.1.3	Policy Filter Options	159
9.1.4	Schedule to Policy Association	162
9.1.5	Pair to Policy Associations	162
9.2	Creating a Policy	162
9.2.1	Creating a Policy with the Policy Wizard	162
9.2.2	Creating a Policy with the Setup Wizard	165
9.3	Customizing the File Types Filter	167
9.3.1	Viewing MIME Types and Perceived Types for Installed Applications in the Windows Registry	167
9.3.2	Configuring File Extensions and Categories for the File Types Filter	168
9.3.3	Configuring MIME Types and Categories for the Content Filter	169
9.3.4	Using Apache Tika to Find the MIME Type of a File	172
9.4	Viewing a List of Policies	172
9.5	Viewing Properties for a Policy	173
9.6	Associating or Disassociating Pairs and Policies	174
9.6.1	Viewing a List of Pairs Associated with a Policy	174
9.6.2	Viewing a List of Policies Associated with a Pair	174
9.6.3	Associating or Disassociating Pairs with a Policy	174
9.6.4	Associating or Disassociating Policies with a Pair	175
9.7	Modifying Policy Filters	177
9.8	Starting a Policy Run	178
9.8.1	Scheduling a Policy Run	178
9.8.2	Running a Policy on Demand for a Selected Pair	178
9.9	Previewing a Policy Run	179
9.9.1	Starting a Policy Preview	179
9.9.2	Viewing the Preview Results	180
9.10	Stopping an In-Progress Policy Run	180
9.11	Exporting and Importing Policies on a Dynamic File Services Server	180
9.11.1	Exporting a Policy	181
9.11.2	Importing a Policy	181
9.11.3	Importing a Policy from a Previous Release	181
9.12	Deleting a Policy	181
9.13	Troubleshooting Policy Conflicts	182
9.14	Examples of Policy Rules	182
9.14.1	Example: Moving All Files Larger than 10 Megabytes	183
9.14.2	Example: Moving All MP3 Files Larger than 10 Megabytes	183

9.14.3	Example: Moving All MP3 Files Larger than 10 Megabytes That Were Last Modified More than 6 Months Ago	184
9.14.4	Example: Moving All Files	184
9.14.5	Example: Separating Files Based on Last Modified Dates	185
9.14.6	Example: Moving All Files from Older to Newer Storage	186
9.15	What's Next	187

10 Creating and Managing Policy Schedules 189

10.1	Understanding Policy Schedules	189
10.1.1	Scheduled or Unscheduled Policies	189
10.1.2	Schedule Frequency Options	190
10.2	Creating a Policy Schedule	192
10.3	Viewing Properties for a Schedule	193
10.4	Modifying Policy Schedules	193
10.4.1	Understanding How Changes Affect the Scheduled Run Interval	193
10.4.2	Modifying a Policy Schedule	195
10.5	Unscheduled Policies	195
10.5.1	Removing a Schedule from Multiple Policies	196
10.5.2	Removing a Schedule from a Single Policy	196
10.5.3	Disabling the Schedule for Selected Pairs	196
10.6	Associating or Disassociating Schedules and Policies	196
10.6.1	Viewing the Schedule Associated with a Policy	197
10.6.2	Viewing a List of Policies Associated with a Schedule	197
10.6.3	Associating or Disassociating a Schedule with a Policy	197
10.6.4	Associating or Disassociating Policies with a Schedule	198
10.7	Deleting a Schedule	198

11 Creating and Managing Cloud Accounts 199

11.1	Understanding Cloud Storage	199
11.1.1	Supported Cloud Storage Providers	199
11.1.2	Maximum Storage Size for Cloud Storage	200
11.1.3	Maximum File Size for Uploads to Cloud Storage	200
11.1.4	Cloud Credentials	200
11.1.5	Types of Cloud Access Authentication Credentials	201
11.2	Setting Up Cloud Access Credentials and Folders for Your Cloud Storage Provider	201
11.2.1	Setting Up Cloud Storage for Amazon S3	202
11.2.2	Setting Up Cloud Storage for CloudMe	204
11.2.3	Setting Up Cloud Storage for Dropbox	204
11.3	Creating a Cloud Account	206
11.4	Viewing Properties for a Cloud Account	209
11.5	Viewing a List of the Retention Pairs That Use a Cloud Account	210
11.6	Modifying the Access Credentials for a Cloud Account	211
11.6.1	Modifying Access Credentials for Amazon S3 and CloudMe Cloud Accounts	211
11.6.2	Modifying Access Credentials for Dropbox Cloud Accounts	212
11.7	Deleting a Cloud Account	212

12 Managing Retention Reviews 213

12.1	Understanding the Retention Repository	213
12.1.1	Managing Policies for Retention Pairs	214
12.1.2	Configuring Non-Administrator Reviewers	214
12.1.3	Reviewing Retained Data	214
12.1.4	Navigating the Retention Repository	214
12.1.5	Supported Web Browsers	215
12.2	Configuring Reviewers for a Retention Pair	215

12.2.1	Adding or Removing Reviewers for a Retention Pair	216
12.2.2	Adding or Removing Reviewers to the Dynamic File Services Retention Review Group	217
12.3	Configuring Reviewers to Receive Email Notifications	220
12.4	Scheduling Notification Reviews for a Retention Pair	220
12.4.1	Understanding the Notification Review Schedule	221
12.4.2	Configuring the Notification Review Schedule	222
12.5	Configuring the Review Notification Check Timer	223
12.6	Reviewing Files in the Retention Repository	223
12.6.1	Understanding the Review Process	224
12.6.2	Accessing the Retention Review Service	224
12.6.3	Deleting Files or Folders	225
12.6.4	Restoring Files or Folders	226
12.6.5	Ending a Review Session	226
12.7	Viewing the Review Transaction History	226
12.8	Generating a Report for Retention Review Logs	227
12.9	Archiving the Retention Review Logs	227

13 Monitoring Pairs and Policies **229**

13.1	Viewing the Pair Statistics	229
13.2	Viewing the Policy Execution History for a Pair	230
13.3	Viewing a Policy Run History of Files Moved	232
13.4	Viewing a Policy Run History of Files that Failed to Move	234
13.5	Viewing the Pair History	235
13.6	Viewing the Server Disk Capacity and Used Space History	237
13.6.1	Viewing Disk Details and History	237
13.6.2	Sample Disk History for a Primary Disk	238
13.6.3	Sample Disk History for a Secondary Disk	239
13.7	Viewing Logged Events	239
13.8	Viewing Service Events	241
13.9	Auditing Management Events	241
13.9.1	Viewing Audit Log Events	241
13.9.2	Detecting and Resolving a Corrupted Audit Log	242
13.10	Generating a DynamicFs Configuration Report	242

14 Repairing the Pair, Policy, and Schedule Databases **245**

14.1	Understanding Repair Options	245
14.1.1	What Are the Database Files?	246
14.1.2	Taking Daily Snapshots of the Database Files	247
14.1.3	What Causes Errors in the Database Files?	247
14.1.4	Automatically Repairing the Database Files at Service Start	248
14.1.5	Manually Repairing the Database Files	248
14.2	Reporting the Status of the Databases	249
14.3	Taking a Snapshot of the Databases	250
14.4	Restoring a Snapshot of the Databases	251
14.5	Troubleshooting Repair Issues	252
14.5.1	What If a Pair's Secondary Data Location Appears to Be Missing After a Snapshot Rollback Repair?	252
14.5.2	What If an Old Pair's Secondary Data Appears After a Snapshot Rollback Repair?	252
14.5.3	What If Policies Run or Don't Run as Expected After a Snapshot Rollback Repair?	253
14.5.4	What If Review Notifications Are Sent or Not Sent as Expected After a Snapshot Rollback Repair?	253
14.5.5	What If a Pair Database Error Cannot Be Fixed?	254
14.5.6	What If a Policy Database Error Cannot Be Fixed?	254
14.5.7	What If a Schedule Database Error Cannot Be Fixed?	255

15 Security Considerations	257
15.1 Security Features	257
15.1.1 Authentication	258
15.1.2 User Access to Pairs	259
15.1.3 Retention Reviewer Access to Pairs	259
15.1.4 SSL Certificate	259
15.1.5 Service Port	260
15.1.6 Windows Firewall Access	261
15.1.7 Dynamic File Services Group	261
15.1.8 Dynamic File Services Retention Review Group	261
15.1.9 Reviewers for a Retention Pair	261
15.1.10 Windows User Account Control	262
15.1.11 Network Connections	262
15.1.12 Network Shares	262
15.1.13 Remote Shares	262
15.1.14 Auditing Management Events	262
15.1.15 Event Logging	263
15.2 Registry Settings	263
15.3 Service Configuration File	263
15.4 Server Management Configuration File	263
15.5 Database Files	263
15.6 Notification Service Configuration Files	264
15.7 Log Files and Logging Control Files	264
16 FAQs and Troubleshooting	267
16.1 Why can't I log in to the Dynamic File Services server?	267
16.2 Can I cancel a policy that is running?	268
16.3 How do I configure a policy to not run without disassociating it from the pair?	268
16.4 How do I see what policies are running or what files have been moved?	268
16.5 What can I do if the Service is not running?	268
16.6 Why can't I start the Service after using the Repair tool?	268
16.7 Why can't users see the data on a remote share?	269
16.8 Access Denied error when modifying a file at the root of a secondary path	269
16.9 Path Too Long Exception error in the Standard Policy log	269
16.10 Pair Is Busy error for pair with a remote share as secondary	269
16.11 File Transfer Size Exceeded Error	269
16.12 Certificate error for the Retention Review Service	270
16.13 Invalid File Handle error for a policy run	270
16.14 How do I find event ID information?	270
16.14.1 Where are event IDs reported?	270
16.14.2 Reporting error events to Novell	270
16.14.3 Event ID categories and sources	271
16.15 Diagnosing a Filter Driver failure	272
A Using iSCSI Targets in a Cloud Storage Environment	273
A.1 Guidelines for Using iSCSI Targets in the Cloud	274
A.1.1 Secure Connections in the Cloud	274
A.1.2 Secure Access to iSCSI Target Devices	274
A.1.3 Backup in the Cloud	274
A.1.4 Costs for Cloud Services	274
A.2 Don't Have an Existing Amazon EC2 Account?	275
A.3 Already Have an Existing Amazon EC2 Account?	275
A.4 Launching an openSUSE Linux VM Instance	276

A.5	Setting Up an Elastic IP Address	276
A.6	Creating an Elastic Block Store Volume	277
A.7	Opening Ports for iSCSI Communications	277
A.8	Connecting to the iSCSI Target Virtual Machine via SSH	278
A.8.1	Getting the SSH Syntax Information	278
A.8.2	Using SSH on Windows	278
A.8.3	Using SSH on Linux	281
A.9	Installing the iSCSI Target Software on the openSUSE Linux VM	281
A.10	Configuring the iSCSI Target Device	282
A.11	Configuring the iSCSI Initiator Software on a Windows Server	283
A.12	Formatting the iSCSI Device as NTFS on the Windows Server	284
A.13	Creating a Dynamic File Services Pair with the Cloud-Based iSCSI Device	284
A.14	Additional Information	285
A.14.1	openSUSE 11 SP2 Linux	285
A.14.2	Linux iSCSI Target Software Documentation	285
A.14.3	PuTTY	285
A.14.4	Microsoft iSCSI Software Initiator Version 2.08	285
A.14.5	IETF RFC 3220: Internet Small Computer Systems Interface	285
A.14.6	Amazon EC2 Cloud Services Costs	286
B	Setting Up a Merged View for Collaboration Applications: Novell Vibe OnPrem	287
B.1	Verify that the Application can support using a Microsoft network share to store files	287
B.2	Understand how the application stores, names, and versions files so useful policies can be created	288
B.3	Create a Microsoft Share for the application to use	288
B.4	Configure the application to use the Microsoft Networking share	288
B.5	Install Dynamic File Services on the Windows Server where the share will be created for the primary path	289
B.6	Create a pair	289
B.7	Create a policy	289
C	Keyboard Shortcuts	291
C.1	Using Keyboard Shortcuts	291
C.2	Quick Reference for Keyboard Shortcuts	291
C.3	Navigating with Keyboard Shortcuts	292
C.3.1	Toolbars	292
C.3.2	Wizards	292
C.3.3	Dialog Boxes	293
D	Sample Event Notification Messages	295
E	Documentation Updates	303

About This Guide

This guide describes how to create and manage Novell Dynamic File Services (DynamicFS) 2.2 pairs and policies in a Microsoft Windows Workgroup or an Active Directory Domain environment.

- ◆ [Chapter 1, “Overview of Dynamic File Services,” on page 17](#)
- ◆ [Chapter 2, “What’s New for Pairs and Policies Management,” on page 33](#)
- ◆ [Chapter 3, “Getting Started,” on page 41](#)
- ◆ [Chapter 4, “Planning for Pairs and Policies,” on page 51](#)
- ◆ [Chapter 5, “Using the Management Tools,” on page 83](#)
- ◆ [Chapter 6, “Configuring and Managing the Service,” on page 97](#)
- ◆ [Chapter 7, “Managing Servers in the Management Console,” on page 127](#)
- ◆ [Chapter 8, “Creating and Managing Pairs,” on page 139](#)
- ◆ [Chapter 9, “Creating and Managing Policies,” on page 157](#)
- ◆ [Chapter 10, “Creating and Managing Policy Schedules,” on page 189](#)
- ◆ [Chapter 11, “Creating and Managing Cloud Accounts,” on page 199](#)
- ◆ [Chapter 12, “Managing Retention Reviews,” on page 213](#)
- ◆ [Chapter 13, “Monitoring Pairs and Policies,” on page 229](#)
- ◆ [Chapter 14, “Repairing the Pair, Policy, and Schedule Databases,” on page 245](#)
- ◆ [Chapter 15, “Security Considerations,” on page 257](#)
- ◆ [Chapter 16, “FAQs and Troubleshooting,” on page 267](#)
- ◆ [Appendix A, “Using iSCSI Targets in a Cloud Storage Environment,” on page 273](#)
- ◆ [Appendix B, “Setting Up a Merged View for Collaboration Applications: Novell Vibe OnPrem,” on page 287](#)
- ◆ [Appendix C, “Keyboard Shortcuts,” on page 291](#)
- ◆ [Appendix D, “Sample Event Notification Messages,” on page 295](#)
- ◆ [Appendix E, “Documentation Updates,” on page 303](#)

Audience

This guide is designed to help storage solutions administrators understand how to do the following:

- ◆ Make planning decisions for implementing pairs and policies as part of the overall storage solution strategy.
- ◆ Configure and manage the Service.
- ◆ Create and manage pairs and policies.
- ◆ Monitor the pair statistics, policy execution history, and disk history for each pair.
- ◆ Monitor the review transaction history for each retention pair.

The [Security Considerations](#) section provides information of interest for security administrators or administrator users who are responsible for the security of the system.

Some background knowledge of the host operating system, file system, Workgroup, and Active Directory is assumed.

Feedback

We want to hear your comments and suggestions about this manual and the other documentation included with this product. Please use the User Comments feature at the bottom of each page of the online documentation.

Documentation Updates

For the most recent version of the *Novell Dynamic File Services Administration Guide*, visit the [Novell Dynamic File Services 2.2 documentation Web site \(http://www.novell.com/documentation/dynamic_file_services/\)](http://www.novell.com/documentation/dynamic_file_services/).

Additional Documentation

See the following guides at the [Novell Dynamic File Services 2.2 documentation Web site \(http://www.novell.com/documentation/dynamic_file_services/\)](http://www.novell.com/documentation/dynamic_file_services/):

- ◆ *Readme*
- ◆ *Installation Guide*
- ◆ *Retention Review Quick Start*
- ◆ *Client Commands and Utilities Reference*

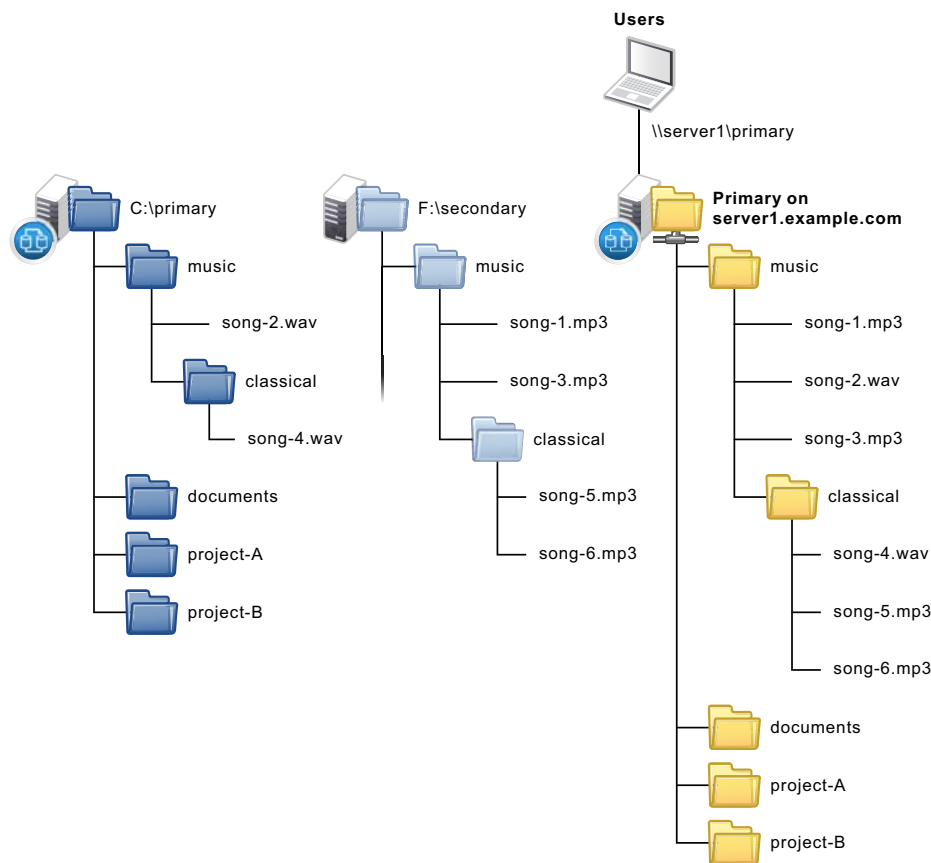
1 Overview of Dynamic File Services

Novell Dynamic File Services is an information life-cycle management technology. It makes your essential data readily available to users, while tiering files efficiently across a pair of paths, referred to as a *pair*. You create policies to control how the files are distributed between the two paths.

A Dynamic File Services pair consists of two independent share paths in the same Active Directory domain, or on the same server in a Workgroup. Dynamic File Services provides two pair types to address your storage needs: *standard* pair and *retention* pair.

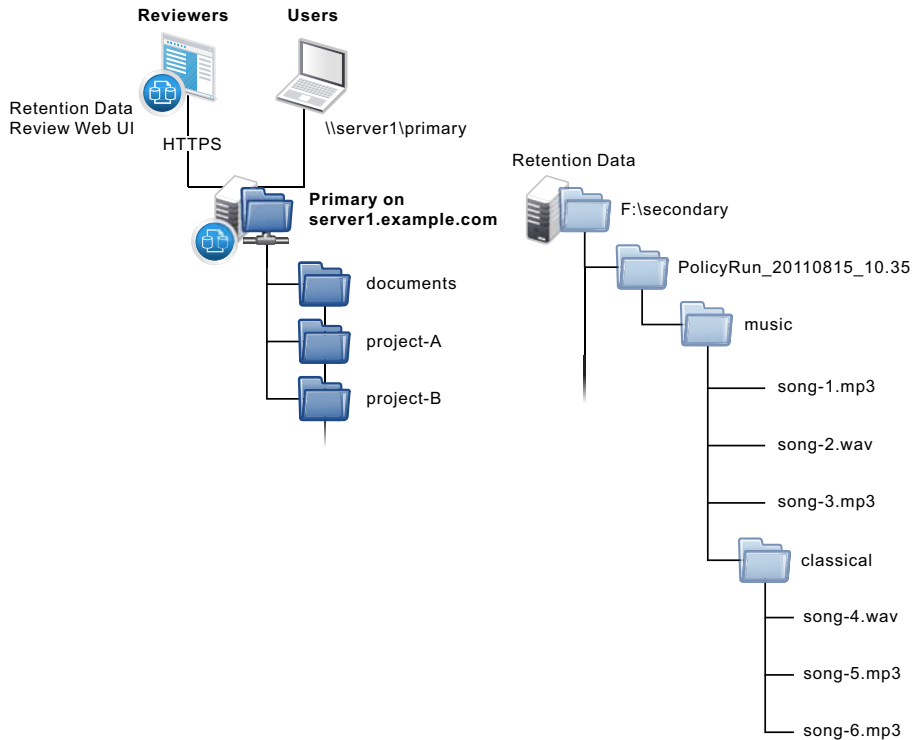
The Dynamic File Services *standard* pair allows you to efficiently manage your storage across a pair of paths while giving users access to files on both. When users connect to a network share on the primary path, they see merged view of files. Users are not aware of where the files physically reside. Files on both paths are equally accessible to users. Dynamic File Services pulls data directly to the user from the primary path or the secondary path, depending on where the file is located.

Figure 1-1 Merged View Access to Files in a Standard Pair



The Dynamic File Services *retention* pair allows you to keep data that is actively used on the primary path, and to move static data that might occasionally need to be accessed to a retention repository on the secondary path. For example, the repository can store files that are not needed for everyday operations but must be retained for historical reference, or to comply with contractual or legal requirements. Files in the repository are not generally available to users. Only designated reviewers can access them via a Web-based Retention Review tool. You can schedule retention review events and notify multiple recipients about them. Reviewers determine the disposition of retained files in accordance with your company's data retention policy. All retention review actions are audited.

Figure 1-2 Reviewer and User Access to Files in a Retention Pair



Depending on the type of Dynamic File Services pair, you can combine paths on local, remote, and cloud locations:

- ◆ **Local drives:** Local drives are the devices mounted as a drive letter on the DynamicFS server.
- ◆ **Remote shares:** Remote shares reside on network attached storage (such as NetApp and EMC filers) and on supported Windows server platforms. Shares must be located in the same Active Directory domain or Workgroup as the Dynamic FS server.
- ◆ **Cloud storage:** Cloud storage resides on your storage account on a supported cloud provider site, such as Amazon Simple Storage Service, CloudMe, or Dropbox.

A standard pair combines a local drive as the primary path with a local drive or remote share as the secondary path. A retention pair combines a local drive or remote share as the primary path with a local drive, remote share, or cloud storage as the secondary path.

A Dynamic File Services policy determines what files are moved between the two paths. A policy schedule determines when the files are moved. You can specify one or more conditions to be met, such as frequency of use, file name patterns, file types, file size, and file owners. Policy enforcement is automated with scheduled and on-demand policy runs. You can run multiple policies concurrently on a pair. You can also specify a list of files or folders to be moved during a one-time move from the primary path to the secondary path in a pair.

You can separately back up each path of a pair, which helps to narrow the time window needed for backing up critical data. For example, Dynamic File Services can seamlessly tier files between high-performance and lower-performance storage devices. You can establish policies that keep frequently used mission-critical data on high-performance storage devices, and move seldom-used less-essential data to lower-performance storage devices. Backing up essential files takes less time because the seldom-used files are stored on the secondary path, where they can be backed up separately and less frequently.

- ♦ [Section 1.1, “Benefits of Dynamic File Services,” on page 19](#)
- ♦ [Section 1.2, “Deployment Scenarios,” on page 24](#)
- ♦ [Section 1.3, “Key Components of Dynamic File Services,” on page 28](#)

1.1 Benefits of Dynamic File Services

Unstructured data is growing faster, consuming more space, and being retained longer than ever before. Novell Dynamic File Services enables you to manage your unstructured data with intelligent tiering in Microsoft Active Directory and Workgroup environments.

Dynamic File Services can help reduce storage infrastructure costs, save work hours, enhance existing investments in storage hardware and software, and improve retention compliance. Its many benefits are described in the following sections:

- ♦ [Section 1.1.1, “Store Data Efficiently by Tiering Data,” on page 19](#)
- ♦ [Section 1.1.2, “Offload Retention Data to Less Expensive Storage,” on page 20](#)
- ♦ [Section 1.1.3, “Integrate Network Attached Storage with Ease,” on page 20](#)
- ♦ [Section 1.1.4, “Store Retention Data in the Cloud,” on page 20](#)
- ♦ [Section 1.1.5, “Tier Data across Local Storage, Filers, and Cloud Storage,” on page 20](#)
- ♦ [Section 1.1.6, “Access Files in a Merged View Securely and Transparently,” on page 22](#)
- ♦ [Section 1.1.7, “Review Retention Data to Keep, Purge, or Restore Files,” on page 23](#)
- ♦ [Section 1.1.8, “Move Data Seamlessly between the Two Paths,” on page 23](#)
- ♦ [Section 1.1.9, “Run Policies Whenever You Want,” on page 23](#)
- ♦ [Section 1.1.10, “Reduce Backup Time,” on page 24](#)

1.1.1 Store Data Efficiently by Tiering Data

A standard pair allows you to tier data between two storage locations. Users access a merged view of the files.

- ♦ Frequently accessed data is stored on the primary path. Its high-performance storage system ensures that users remain productive. You can define policies to move data to the secondary path based on the date the file was last modified or accessed.
- ♦ Store your mission-critical data on the primary path. Store less-important data on the secondary path. For example, if users store personal music files on the system, you can define policies that transparently move files based on their file extension or file type to the secondary location, where the cost to store the data is less. The file content can be scanned to ensure that file types are moved regardless of how a file is named.
- ♦ Allocate files between the primary and secondary paths based on their file size. This allows you to distribute files between two disks to make the most of the storage capacity that you have. Large files that rarely or never change can be available to users without consuming expensive storage.

1.1.2 Offload Retention Data to Less Expensive Storage

A retention pair allows you to tier data between an active storage location and a retention repository. Users access only the files on the primary location. Reviewers can view retained data by using a Retention Review Service.

- ◆ Store active data on the primary path that resides on your high-performance storage. Store files that do not change, but need to be retained for historical or legal reasons in a retention repository on the secondary path.
- ◆ Create policies to relocate files to the retention repository based on the date it was last modified. You can further narrow the selection by applying other filters such as the file owner or file type.

1.1.3 Integrate Network Attached Storage with Ease

Dynamic File Services supports using remote paths in a pair, such as published shares on network attached storage (NAS).

- ◆ Create a standard pair with a secondary path on a remote device such as a network filer. You can take advantage of lower-cost secondary storage solutions and seamlessly expand storage capacity without affecting users. Users see a merged view of the files.
- ◆ Create a retention pair on the DynamicFS server that uses a primary path and secondary path on different remote network filers. You can move files into a retention repository while allowing users to access files on the primary path.

1.1.4 Store Retention Data in the Cloud

Dynamic File Services supports using a path on your cloud storage account as the secondary path in a retention pair. You set up credentials to authorize Dynamic File Services to access files stored there on your behalf. Supported cloud providers include Amazon Simple Storage Service (Amazon S3), CloudMe, and Dropbox.

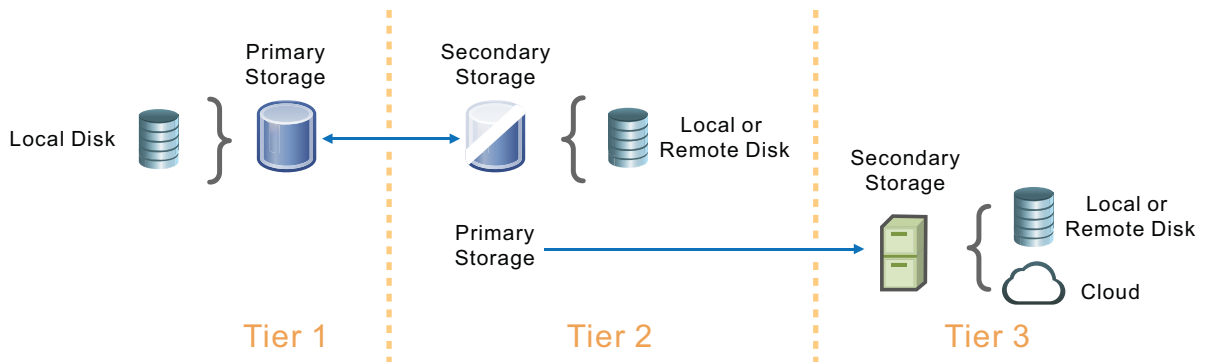
1.1.5 Tier Data across Local Storage, Filers, and Cloud Storage

Pair tiering can be used to move data from local storage to filers to cloud storage at different stages of its life cycle. Dynamic File Services allows you to tier your storage solution by using the secondary path of a standard pair as the primary path of a retention pair, as shown in [Figure 1-3](#). The standard pair and retention pair can reside on the same or different server.

For a tiered data solution, the first tier is the primary path of a standard pair. The second tier is the secondary path of the standard pair. The same share is also used as the primary path of a retention pair. The third tier is the secondary path of the retention pair. A tiered solution can use any combination of supported devices for the standard pair and retention pair.

Figure 1-3 illustrates the possible device types that you can use for your tiering solution.

Figure 1-3 Tiering Data with a Standard Pair and a Retention Pair



In Figure 1-4, the secondary path of the standard pair is a remote share on a network filer. The primary path of the retention pair uses the same path. The secondary path of the retention pair is a path on cloud storage.

Figure 1-4 Tiering Data with Local, Filer, and Cloud Storage

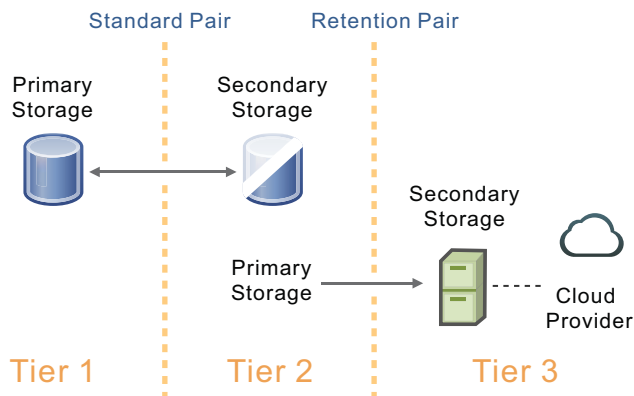
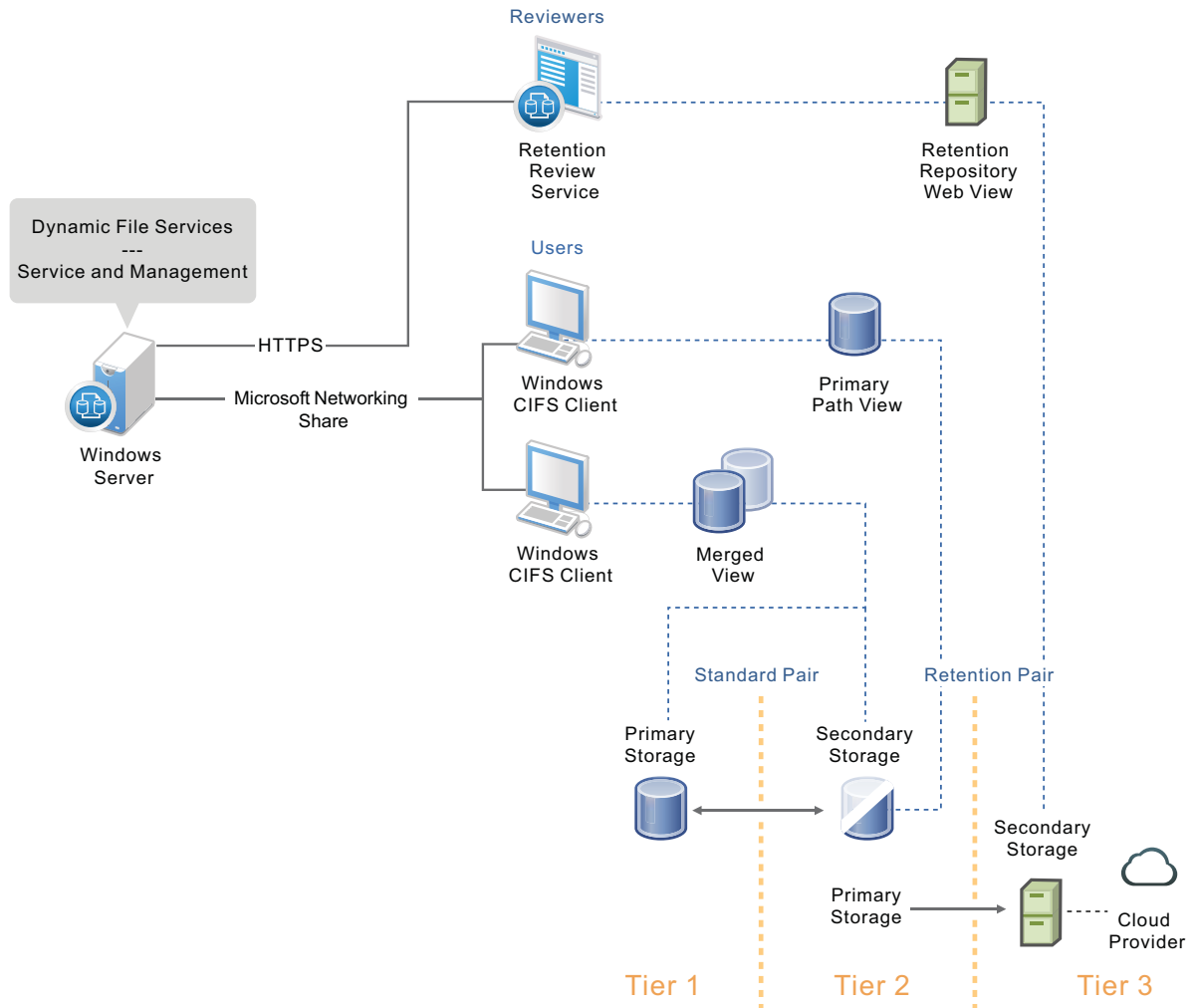


Figure 1-5 shows how users view the tiered data. Typically, all users access files via a share on the primary path of the standard pair. They see a merged view of the files on its primary and secondary path. The remote share used on the secondary path also serves as the primary path of the retention pair. Users accessing the remote share can see only the data on the secondary storage location. In a tiering configuration, you should prevent users from directly accessing the remote share. Users who are assigned as reviewers for the retention pair can use the Retention Review Service to determine whether to keep, permanently delete, or restore the data stored in the retention repository in the cloud.

Figure 1-5 User View of Tiered Pairs



As files on the first tier age, you can execute policies on the standard pair to move the older files to the second tier of storage on a network file. When files in the second tier are rarely used, you can execute policies on the retention pair to move the files to a retention repository in cloud storage. Files moved from the second tier into the repository are no longer available to users via the merged view of the standard pair. The files in the retention repository are at the end of their life cycle. Reviewers determine how long files are retained in the repository.

1.1.6 Access Files in a Merged View Securely and Transparently

Dynamic File Services allows you to manage storage without impacting users.

- Users can transparently access files on both paths of a standard pair via a network share on the primary path.
- The native access control for the underlying file systems controls user access to the data.
- In a merged file view, all access to the secondary path is made via DynamicFS as if the data were located on the primary path. DynamicFS does not need to relocate the data to give the user access to data on the secondary path.
- Administrators can access the merged view of the data to configure user access to files and directories on both locations in a standard pair.

1.1.7 Review Retention Data to Keep, Purge, or Restore Files

- ♦ A reviewer can be granted review rights on all retention pairs, or only on specified pairs.
- ♦ Data in the repository is retained indefinitely. The Retention Review Service allows authorized reviewers to keep, purge, or restore retained files. Reviewers cannot read or modify a file's contents.
- ♦ A reviewers' actions are guided by external constraints as defined in your company's data retention policy. All actions taken during a review session are audited.

1.1.8 Move Data Seamlessly between the Two Paths

Dynamic File Services allows you to create policies that automatically move unstructured files between the two paths.

- ♦ A single policy can move data in one direction: from the primary path to the secondary path, or from the secondary path to the primary path.
- ♦ You can include paths or exclude paths for a pair's primary path. Including folders allows you to apply policies only to some folders in a pair. Excluding folders allows you to apply policies to all folders except the excluded ones. The include or exclude setting applies to all policies for a pair.
- ♦ Policy rules are based on the file size, last modified date, last accessed date, file name patterns, file type, and file owner (by user or group).
- ♦ You can apply a policy to multiple pairs.
- ♦ You can apply multiple policies to a pair.
- ♦ You can define one-time moves of files or folders from the primary path to the secondary path.
- ♦ You can use policies and one-time moves to help migrate data to new storage with minimal end-user impact.

1.1.9 Run Policies Whenever You Want

Policies allow you to control what type of files are moved and when they are moved.

- ♦ Every policy runs independently and has its own schedule. A policy's schedule applies to all pairs associated with it.
- ♦ You can run a single policy at a time on a pair to enforce the policy's rules for moving data. A file is moved if it meets all of the filter options specified in the rule.
- ♦ You can configure multiple policies to run at the same time on a pair to enforce alternative rules for moving data. A file is moved if it satisfies the rules in any one of the concurrently scheduled policies.
- ♦ You can schedule the window of time when you want a policy to run by specifying the start time and duration of the run.
- ♦ You can schedule a policy to run hourly, daily, weekly, monthly, quarterly, yearly, or on custom dates.
- ♦ You can start and stop policies manually. Scheduled and unscheduled policies can be run manually for one or more of their associated pairs.

1.1.10 Reduce Backup Time

By moving inactive or little used data to a secondary location, you reduce the time necessary to back up the system.

- ♦ Less data needs to be scanned for the daily backup of the primary path.
- ♦ You can back up the secondary path less frequently, without affecting user access to the data they use most often.

1.2 Deployment Scenarios

Novell Dynamic File Services can help solve key storage problems. The scenarios in this section are intended as examples to represent a few ways that DynamicFS can be applied in your environment.

- ♦ [Section 1.2.1, “Students: Essential versus Non-Essential Files,” on page 24](#)
- ♦ [Section 1.2.2, “Healthcare: Active versus Historical Files,” on page 25](#)
- ♦ [Section 1.2.3, “Social Networks: Collaboration Applications,” on page 26](#)
- ♦ [Section 1.2.4, “Business: Retaining Inactive Files,” on page 27](#)

1.2.1 Students: Essential versus Non-Essential Files

Abraham works for a large university system with thousands of students each semester. Students have home directories to use as a central storage location for their personal files and homework. The storage device is nearing capacity. Abraham needs to expand capacity for students without disrupting access to their essential academic files.

- ♦ [“Understanding the Data” on page 24](#)
- ♦ [“The Dynamic File Services Solution” on page 24](#)

Understanding the Data

The student home directories contain numerous media files for music and photos that consume large portions of the available storage. The files have a variety of file extensions.

The Dynamic File Services Solution

Abraham creates a Dynamic File Services standard pair on the server where the primary path is a folder that contains all user home directories. As the secondary path in the pair, he uses a UNC path on a remote filer storage device. He creates a policy that moves certain file types from the primary path to the secondary path every night between 2:00 a.m. to 4:00 a.m. Abraham specifies the file types as audio, video, and images, in order to move a broad range of files based on a file extension’s MIME file type or perceived file type.

Relocating the media files helps free the needed space on the primary path while allowing users to access their media files via a merged view of the data. Users are not aware of the physical location of their files.

1.2.2 Healthcare: Active versus Historical Files

Joe works for a research hospital that recently completed a multiple-year effort to digitize its patient records from 1900 to the present. Joe wants to assure that there is sufficient storage capacity for the current and future patient records while still making the older records available to researchers in the hospital and its affiliated university.

- ♦ [“Understanding the Data” on page 25](#)
- ♦ [“The Dynamic File Services Solution” on page 25](#)

Understanding the Data

The patient records are generated in the regular course of health care delivery. The individual patient files contain a broad spectrum of documents, including patient histories, diagnostic test results, inpatient and outpatient notes, operative notes, discharge summaries, follow-up reports, patient photographs, medical drawings, graphs, and treatment-related correspondence.

Since 1975, all patient records from the hospital’s specialty clinics and units are merged in a centralized record-keeping system. Prior to 1975, each specialty clinic separately maintained its own patient record system, and the hospital units maintained their own centralized patient record system.

Current and active patient records from all specialty clinics and hospital units must be available on demand. The historical records should be available to medical researchers in the hospital and its affiliated university, but these records do not require the same immediate availability as the records for the hospital’s current patients.

The Dynamic File Services Solution

Joe plans a solution that is responsive to the access needs of the healthcare users for active files and the needs of the research users for the historical files.

- ♦ [“Historical Files” on page 25](#)
- ♦ [“Active Files” on page 26](#)

Historical Files

Joe creates a Dynamic File Services standard pair for each of the pre-1975 records for the specialty clinics and hospital. A policy for each pair is tailored to move the largest image files daily between 12:15 a.m and 5:30 a.m. After the large files are migrated, Joe modifies the policy to move other file types and sizes. Over time, the entire file set is migrated to the secondary location. Users are able to access the files throughout the process and afterwards without being aware of the physical location of the data.

Relocating the historical files helps free needed space on the primary storage location to allow for the growth of current and active medical records, which have a higher frequency of use and higher performance requirements. Both old and current medical records are easily available to users via a merged view of the files.

Active Files

Joe studies the current centralized patient record system to understand the types of files and their usage. Working with the medical staff, he determines that the image files that are more than a year old can be moved to a secondary storage location. He creates a Dynamic File Services standard pair where the secondary location is used to store the less frequently accessed images.

Joe creates a policy that moves images to the secondary location if they have not been modified in more than one year. Initially, the policy runs daily in non-peak hours between 1:00 a.m. and 4:00 a.m. After the desired files have been relocated, Joe modifies the policy to run monthly.

Relocating the images helps free more space for the primary storage area. The reduced size of the data on the primary location helps shorten the needed backup window for weekly and incremental backups. The secondary storage area can use less expensive storage and be backed up monthly after the policy run. The users are able to access files throughout the migration process and are not aware of the physical location of the files.

1.2.3 Social Networks: Collaboration Applications

Hiroko works for an international marketing firm that provides employees a dynamic collaboration environment. She needs to manage the growing storage needs without disrupting the collaborative environment.

- ♦ [“Understanding the Data” on page 26](#)
- ♦ [“The Dynamic File Services Solution” on page 26](#)
- ♦ [“Additional Information” on page 27](#)

Understanding the Data

The company uses a collaboration application that allows team workspaces to be created dynamically as teams are formed to work on a variety of marketing projects. Users upload documents and images to their team sites for projects. The files are stored as unstructured data in the application’s file repository.

The Dynamic File Services Solution

Hiroko studies the collaboration application’s unstructured file repositories to understand the types of files and where the application stores them. She creates a Dynamic File Services standard pair where the primary path is the folder for the application’s image file repository. She modifies the application to access the files via a network share so that the application accesses the files via a merged view of the files in the pair.

Hiroko creates a policy that moves image files to the secondary location. Thumbnail images for the files remain on the primary location. Initially, the policy runs daily in non-peak hours between 1:00 a.m. and 4:00 a.m. After most of the images have been moved, Hiroko modifies the policy to run weekly during non-peak hours.

The application accesses the files via the merged view and presents the view to users. When a user clicks a thumbnail image to open the file, the file is transparently retrieved from the secondary location and displayed in the collaboration environment. The application and the users are not aware of the physical location of the data.

This Dynamic File Services solution allows Hiroko to better control the storage environment and backup requirements for the collaboration application.

Additional Information

An example of how to set up a merged view for applications is available in [Appendix B, “Setting Up a Merged View for Collaboration Applications: Novell Vibe OnPrem,”](#) on page 287.

1.2.4 Business: Retaining Inactive Files

Samuel works for a small business. He needs to manage the growing storage needs, while retaining inactive files for administrative, fiscal, legal, or historical reasons.

- ♦ [“Understanding the Data”](#) on page 27
- ♦ [“The Dynamic File Services Solution”](#) on page 27

Understanding the Data

The company has active records for the organization’s current functions, projects, and initiatives. Generally, active files are referred to often in the regular course of business, such as creation, distribution, and use. The files become inactive when they are no longer needed to carry out current activities. However, these files must be kept as long as required to meet the organization’s administrative, fiscal, legal, and historical requirements.

Managing inactive files is a question of space, value, and use. Generally, inactive files are no longer required to carry out the administrative or operational functions for which they were created. It is not efficient to retain the files on premium storage space. As the volume of files increases, performance suffers, and timely retrieval of active files becomes increasingly difficult and time-consuming. Routine disposition of inactive files to lower-cost storage is a cost-effective solution to file bloat.

The Dynamic File Services Solution

Samuel studies the organization’s data to understand the types of files and their usage. Working with managers, he determines what files need to be retained and when they are considered inactive. He creates a Dynamic File Services retention pair where the secondary location is used store inactive files in a retention repository.

Samuel creates a policy that moves inactive files to the retention repository on the secondary location if they have not been modified in more than one year. The policy runs monthly on the last day of the month, during non-peak hours. Users see the files disappear from their file space.

Samuel sets up reviewers for the retained data. He schedules a review reminder to be sent to reviewers on the first day of each month. Reviewers can access the retention repository via the Dynamic File Services Retention Review Web tool. The tool allows them to review all files that were moved during a policy run. They can delete a file from the repository (which purges it from storage), restore a file to its original location on the primary storage (which removes it from the repository), or leave a file in the repository for later consideration.

Relocating the inactive files helps free more space for the primary storage area, which improves performance for the users. The reduced size of the data on the primary location helps shorten the needed backup window for weekly and incremental backups.

This Dynamic File Services solution allows Samuel to better control the storage environment and backup requirements for the active data. It allows files to be retained in a secure data retention repository where they can be reviewed periodically by designated reviewers to determine when inactive files are no longer needed and can be purged. Or, if a file needs to be returned to the active data, it can be restored to its original file location on the primary storage.

1.3 Key Components of Dynamic File Services

Novell Dynamic File Services has two major components as illustrated in [Figure 1-6](#):

- ♦ **Management:** The Management component provides the graphical user interface and client command line tools for managing pairs and policies on DynamicFS servers.
- ♦ **Service:** The Service component provides the main engine for DynamicFS. It provides several features that enforce policies, provide users with a merged view of files, provides reviewers with a way to manage files in a retention repository, and provide utilities for configuring and controlling the Service.

Figure 1-6 Dynamic File Services Software Components

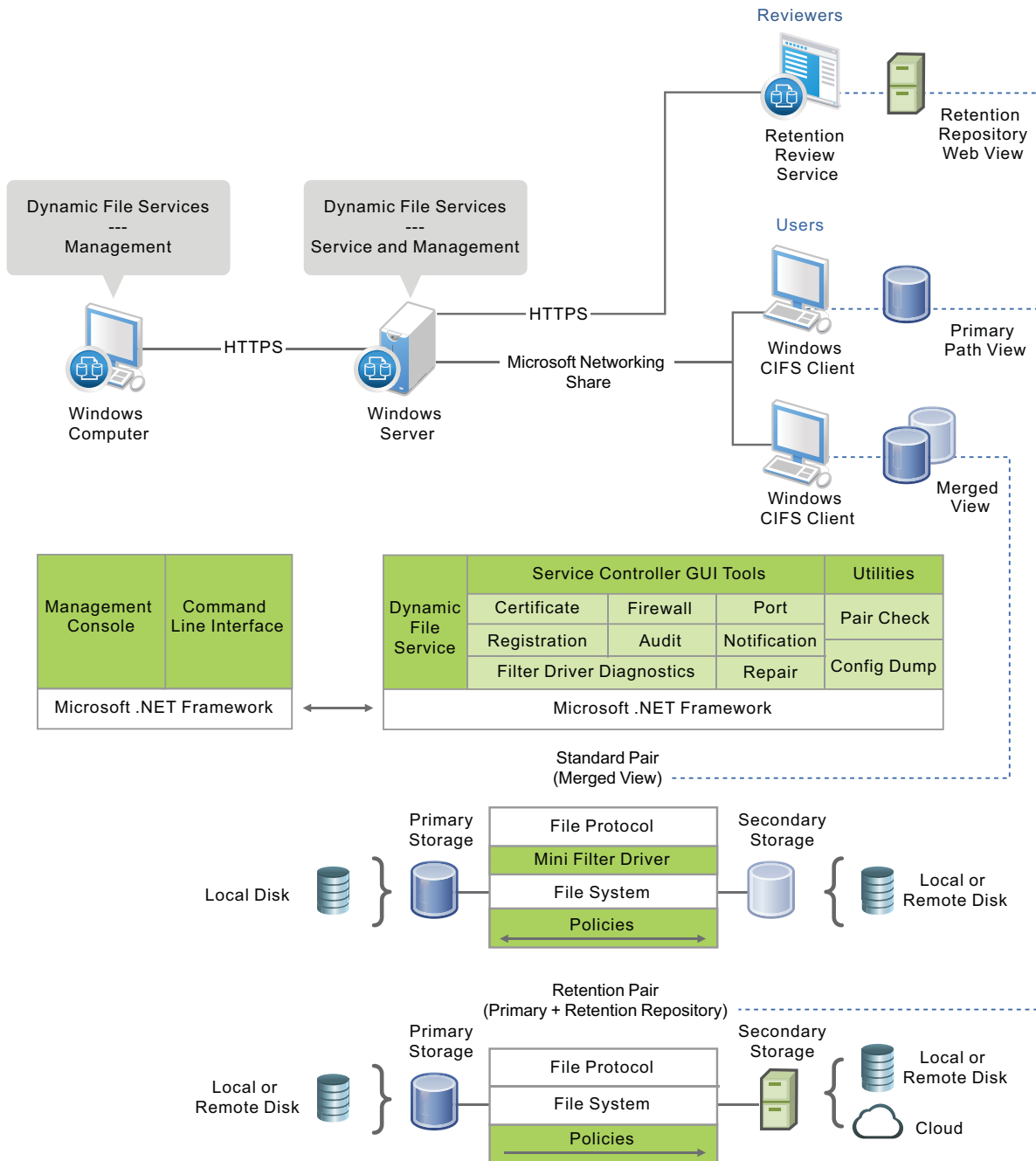


Table 1-1 describes the subcomponents that run automatically after the install.

Table 1-1 *Dynamic File Services Components That Run Automatically*


Component	Description
Dynamic File Services software	The software is installed in the C:\Program Files\Dynamic File Services folder by default.
Service	<p>The Dynamic File Service is the engine for all of the Dynamic File Services components. On a server, the Service automatically starts and runs in the background.</p> <p>You can verify that the Service is running by viewing the Service status in the Dynamic File Service Controller. You can also look for the DswService.exe process in the Windows Task Manager.</p>
Service Controller	<p>The Service Controller allows the Administrator user or users with Administrator privileges to enable, disable, or configure the Dynamic File Service or use the Repair tool. You can also launch the Management Console.</p> <p>The <i>Service Controller</i> icon () is displayed in the Windows notification area of the server desktop. It starts automatically when a user logs in to the server desktop. The application is DswServiceController.exe.</p>
Filter Driver	<p>The Filter Driver is a Windows File System filter driver that is managed by the Dynamic File Service. It runs whenever the Service is running, and works with the network share on the primary path to provide a merged view to users of the files in both paths of a standard pair.</p> <p>The Filter Driver is installed in the C:\Dynamic File Services\dswflt folder.</p>
Management Console	<p>The Management Console is a GUI management tool that allows the Administrator user and members of the Dynamic File Services group to create, manage, and monitor pairs and policies.</p> <p>You can open the Management Console from the Install tool to immediately begin setting up pairs and policies.</p> <p>A shortcut to the Management Console is placed on the desktop, in the <i>Control Panel</i>, and in the <i>Start</i> menu in <i>Dynamic File Services > Dynamic File Services Management Console</i>. It launches the DswMgmtConsole.exe application.</p>
Retention Review Service	<p>The Retention Review Service gives designated reviewers access to the retention repository of a retention pair. The Retention Review Web view of the retention repository is available after you create a retention pair.</p> <p>For information about using the tool, see Section 12.6, "Reviewing Files in the Retention Repository," on page 223.</p>

Table 1-2 describes other Dynamic File Services components that run when they are called by the Service or Service Controller. Commands and utilities can be run as needed.

Table 1-2 *Dynamic File Services Components that Run as Needed*

Component	Description
Certificate Configuration tool	<p>The Dynamic File Services Certificate Configuration utility automatically creates a self-signed SSL (Secure Sockets Layer) certificate during the install. The <i>Certificate Configuration</i> option in the <i>Service Controller</i> menu provides a way to create and manage the certificate after the install.</p> <p>You can also use a signed certificate that you have obtained from a certification authority. For information, see Section 6.8.5, “Configuring a Signed Certificate for Dynamic File Services,” on page 119.</p> <p>Access this utility only through the <i>Service Controller</i> menu. The application is <code>DswCert.exe</code>.</p>
CLI	<p>The Dynamic File Services Command Line Interface (CLI) application allows you to create and manage pairs and policies on the server by issuing commands in the Windows command prompt console. The application runs only when you issue the command.</p> <p>For information, see “Using Client Commands for Pair and Policy Management” in the <i>Dynamic File Services 2.2 Client Commands and Utilities Reference</i>.</p> <p>The application is <code>DswCLI.exe</code>.</p>
Cloud engine	<p>The Cloud engine runs policies for a retention pair that is using a cloud-based storage location as the secondary path. You can configure accounts for supported cloud providers. Afterwards, you can specify paths on cloud-based storage as the secondary path in a retention pair.</p> <p>The Dynamic File Service controls when the Cloud engine runs. The application is <code>DswCloudEngine.exe</code>.</p> <p>For information, see Chapter 11, “Creating and Managing Cloud Accounts,” on page 199.</p>
Configuration Dump tool	<p>The Dynamic File Services Configuration Dump utility aggregates information about the current server settings for pairs, policies, and logs, and outputs the information to a file. This tool is available to help with record keeping and troubleshooting when working with Novell Support.</p> <p>For information, see “Dynamic File Services Configuration Dump Utility” in the <i>Dynamic File Services 2.2 Client Commands and Utilities Reference</i>.</p> <p>The application is <code>DswDump.exe</code>.</p>
File System Inventory	<p>The Dynamic File Services File System Inventory utility automatically runs a Pair History Scan on a pair each day at 4:00 a.m. by default. It scans the pairs to gather statistics about the data stored on the primary and secondary locations, such as the file sizes, number of files, and file types.</p> <p>The time and frequency of pair history scanning is configurable. For information, see Section 8.10, “Scheduling the Pair History Scan,” on page 153.</p> <p>For information on the utility, see “Dynamic File Services File System Inventory Utility” in the <i>Dynamic File Services 2.2 Client Commands and Utilities Reference</i>.</p> <p>The Dynamic File Service controls when the File System Inventory runs. The application is <code>DswInventory.exe</code>.</p>

Component	Description
Notification Service	<p>The notification service allows you to configure notifications to be sent about DynamicFS events via email. Events are configured separately for each email address.</p> <p>For information, see Section 6.6, “Configuring the Notification Service,” on page 108.</p>
Pair Check utility	<p>The Dynamic File Services Pair Check utility detects duplicate files in the pair structure or detects folders with attribute or ACL permission differences. It can generate reports in CSV and XML format.</p> <p>The files in the primary and secondary locations are rarely duplicated. Such conditions might occur, for example, after recovering files in the two locations of a standard pair from backup media. For information, see Section 4.17, “Duplicate Files in a Standard Pair,” on page 67.</p> <p>For information about running the utility, see “Dynamic File Services Pair Check Utility” in the <i>Dynamic File Services 2.2 Client Commands and Utilities Reference</i>.</p> <p>The application is <code>DswPairCheck.exe</code>.</p>
Registration tool	<p>The Register License Key allows you to enter a key code and create a license for the DynamicFS server.</p> <p>For information, see Section 6.2, “Registering the License Key,” on page 97.</p>
Repair tool	<p>The Dynamic File Services Repair utility verifies that the databases are valid. It runs automatically each time the Service is started. The repair tool can be run as needed to repair corrupted databases.</p> <p>You can start the Repair tool from the <i>Service Controller</i> menu when the Service is not running. The application is <code>DswRepair.exe</code>.</p> <p>For information, see Chapter 14, “Repairing the Pair, Policy, and Schedule Databases,” on page 245.</p>
Retention engine	<p>The Retention engine runs selected policies for a retention pair when you select <i>Execute Now</i> or when the policy is scheduled to run. It also provides an option to preview policy run results without actually moving the files.</p> <p>The Dynamic File Service controls when the Retention engine runs. The application is <code>DswRetentionEngine.exe</code>.</p>
Standard engine	<p>The Standard engine runs selected policies for a standard pair when you select <i>Execute Now</i> or when the policy is scheduled to run. It also provides an option to preview policy run results without actually moving the files.</p> <p>The Dynamic File Service controls when the Standard engine runs. The application is <code>DswStandardEngine.exe</code>.</p>

2 What's New for Pairs and Policies Management

This section describes the new features and changes for managing the Service, pairs, and policies in Novell Dynamic File Services (DynamicFS) since version 2.0.

- ♦ [Section 2.1, "What's New for Dynamic File Services 2.2," on page 33](#)
- ♦ [Section 2.2, "What's New for Dynamic File Services 2.1," on page 33](#)
- ♦ [Section 2.3, "What's New for Dynamic File Services 2.0," on page 36](#)
- ♦ [Section 2.4, "What's Next," on page 39](#)

2.1 What's New for Dynamic File Services 2.2

For the version 2.2. release, Novell did the following:

- ♦ Made bug fixes.
- ♦ Added support for the following:
 - ♦ The Management Console on Window 8 and 8.1.
 - ♦ The Service and Management console on Windows Server 2012 R2 and Windows Server 2012 R2 with update.
- ♦ Added code to assist Novell's compliance team with usage tracking.
- ♦ Added code to not allow more than 16 standard pairs to be created.
- ♦ Updated the UI with the new Novell look and feel.
- ♦ Removed support for the following:
 - ♦ 32-bit platforms
 - ♦ Box.net Cloud connections
 - ♦ Twitter notifications
 - ♦ Windows XP
 - ♦ Windows Server 2003

2.2 What's New for Dynamic File Services 2.1

In addition to bug fixes, Novell Dynamic File Services 2.1 provides the following new features and changes for the Service and management tools:

- ♦ [Section 2.2.1, "Administration," on page 34](#)
- ♦ [Section 2.2.2, "Service," on page 34](#)
- ♦ [Section 2.2.3, "Pairs," on page 34](#)

- ♦ [Section 2.2.4, “Policies,” on page 35](#)
- ♦ [Section 2.2.5, “Cloud,” on page 35](#)
- ♦ [Section 2.2.6, “Retention Reviews,” on page 35](#)
- ♦ [Section 2.2.7, “Notification Service,” on page 35](#)
- ♦ [Section 2.2.8, “Audit Tracking Service,” on page 36](#)

2.2.1 Administration

- ♦ **Dynamic File Services Group:** The user that installs Dynamic File Services is automatically added to the `Dynamic File Services` group. This allows the user to create and manage pairs, policies, and schedules. Other user names can be added to the group. For information, see [Section 6.3, “Configuring Administrators for Pair Management,” on page 102](#).
- ♦ **Retention Reviewers:** The `Dynamic File Services Retention Review` group is automatically assigned as a reviewer of a retention pair. You can remove it from the Reviewers list, if desired. For information, see [Section 12.2.1, “Adding or Removing Reviewers for a Retention Pair,” on page 216](#).

2.2.2 Service

- ♦ **Cloud Engine:** You can use your cloud storage as the secondary path of a retention pair. The Cloud Engine allows Dynamic File Services to read and write files to cloud storage, while preserving the ACLs and metadata for the files. See [Section 4.11, “Using Cloud Storage as the Secondary Path in a Retention Pair,” on page 63](#)
- ♦ **Cloud Database:** The Cloud database stores information about the cloud accounts you have defined on the Dynamic File Services server, including credentials and retention pair associations. See [“Cloud Database Files” on page 247](#).
- ♦ **Cloud Engine Logging Levels:** You can configure the logging levels for the Cloud Engine. See [Section 6.7, “Configuring the Logging Level for Engines,” on page 114](#).
- ♦ **Policy Database:** The policy database definitions and associations are now managed in a single database file. The default location is:

```
C:\Program Data\Dynamic File Services\Policies\DswPolicyDatabase_v2.xml
```

See [“Policy Database Files” on page 246](#).
- ♦ **Pair Check Utility:** The Synchronize Pair utility was renamed as the Pair Check utility. For information, see [“Dynamic File Services Pair Check Utility” in the *Dynamic File Services 2.2 Client Commands and Utilities Reference*](#).

2.2.3 Pairs

- ♦ **Pair Tiering:** Dynamic File Services allows you to tier your storage solution by using the secondary path of a standard pair as the primary path of a retention pair. The standard pair and retention pair can reside on the same or different server. Previously, tiering was allowed only if the standard pair and retention pair were on different Dynamic File Services servers.

Pair tiering can be used to move data from local storage to filers to cloud storage at different stages of its life cycle. See [Section 1.1.5, “Tier Data across Local Storage, Filers, and Cloud Storage,” on page 20](#).
- ♦ **Cloud Storage:** You can specify a path on cloud storage as the secondary path of a retention pair.

- ♦ **Retention Pair Reviewers:** You can use the *Reviewers* tab in a retention pair's Properties dialog box to add and remove reviewers for pair. See [Section 12.2.1, "Adding or Removing Reviewers for a Retention Pair,"](#) on page 216.

2.2.4 Policies

- ♦ **Policy Database:** The policy database definitions and associations are now managed in a single database file. The default location is:

```
C:\Program Data\Dynamic File Services\Policies\DswPolicyDatabase_v2.xml
```

When you upgrade to version 2.1, your existing policy database files are consolidated into this single file. Any policies saved in the *Snapshots* folder are also converted to the new database format.

- ♦ **Use File Content to Determine Type:** For a File Types policy, you can determine file types based on actual file content format. See ["File Types" on page 160.](#)
- ♦ **Moving Ownerless Files:** A {No owners} entry is available in the Select a User browser dialog box for the File Owners policy option. See ["File Owners" on page 161.](#)
- ♦ **File Types Configuration File:** The following changes were made to the definitions in the *DswFileTypes.cfg* file:
 - ♦ The application category is used for non-binary application files.
 - ♦ The octet-stream category is used for binary, executable files, such as .dll, .exe, and .bin.
- ♦ **MIME Types Configuration File:** The *DswMimeTypeTypes.cfg* file allows you to add, remove, or modify MIME type mappings to file extensions. For information, see [Section 9.3.3, "Configuring MIME Types and Categories for the Content Filter,"](#) on page 169.

2.2.5 Cloud

- ♦ You can set up your cloud storage provider as a cloud account in Dynamic File Services. See [Chapter 11, "Creating and Managing Cloud Accounts,"](#) on page 199.
- ♦ You can specify a path on a cloud account as the secondary path for a retention pair. See [Section 4.11, "Using Cloud Storage as the Secondary Path in a Retention Pair,"](#) on page 63.

2.2.6 Retention Reviews

- ♦ Performance enhancements were made for the Web-based Retention Review Service.
- ♦ The *Reviewers* tab on the Pair Properties page allows you to specify users and groups as reviewers of a specific retention pair. See [Section 12.2.1, "Adding or Removing Reviewers for a Retention Pair,"](#) on page 216.

2.2.7 Notification Service

The following event types have been added to the Notification Service events:

- ♦ Pair Modified
- ♦ Cloud Account Created
- ♦ Cloud Account Deleted
- ♦ Cloud Account Modified

- ♦ Cloud Path Included in a Pair
- ♦ Change Logging Options

If you upgrade, these events are deselected by default. After the server restart, you can configure these events for email addresses and Twitter accounts. For information, see [Section 6.6, “Configuring the Notification Service,”](#) on page 108.

2.2.8 Audit Tracking Service

The following event types have been added to Audit Tracking events:

- ♦ Pair Modified
- ♦ Cloud Account Created
- ♦ Cloud Account Deleted
- ♦ Cloud Account Modified
- ♦ Cloud Path Included in a Pair
- ♦ Change Logging Options

If you upgrade, these events are deselected by default. After the server restart, you can configure these events for audit tracking. For information, see [Section 6.5, “Configuring Audit Tracking Events,”](#) on page 108.

2.3 What’s New for Dynamic File Services 2.0

In addition to bug fixes, Novell Dynamic File Services 2.0 provides the following new features and changes for the Service and management tools:

- ♦ [Section 2.3.1, “Administration,”](#) on page 36
- ♦ [Section 2.3.2, “Service,”](#) on page 37
- ♦ [Section 2.3.3, “Pairs,”](#) on page 37
- ♦ [Section 2.3.4, “Policies,”](#) on page 37
- ♦ [Section 2.3.5, “Policy Schedules,”](#) on page 38
- ♦ [Section 2.3.6, “Retention Reviews,”](#) on page 38
- ♦ [Section 2.3.7, “Notification Service,”](#) on page 38
- ♦ [Section 2.3.8, “Auditing,”](#) on page 38
- ♦ [Section 2.3.9, “Repair Tool,”](#) on page 38
- ♦ [Section 2.3.10, “Filter Driver Diagnostics,”](#) on page 38

2.3.1 Administration

The Dynamic File Services Retention Review group is used to configure reviewers to manage the retained data in a retention pair. For information, see [Section 12.2, “Configuring Reviewers for a Retention Pair,”](#) on page 215.

2.3.2 Service

- ◆ License Key registration is required to create multiple pairs and policies. A single pair and policy are available in evaluation mode. See [Section 6.2, “Registering the License Key,” on page 97](#).
- ◆ `C:\ProgramData\Dynamic File Services` is used as the default location for storing program data files on the Windows Server 2008/2008 R2 and Windows Vista/7 operating systems.

2.3.3 Pairs

- ◆ Pairs that provide a merged view are now referred to as *standard pairs*.
- ◆ *Retention pairs* are a new type of pair that allows you to specify a primary path that contains active files, and a secondary path where a retention repository is used to store inactive files. Files can be moved from the primary path to the repository by using policies, the *Execute Now* option, and the *Manual Move* option for a pair. For information, see [Section 12.1, “Understanding the Retention Repository,” on page 213](#).

The following new capabilities support retention pairs:

- ◆ Policy engine creates a retention repository on the secondary path
- ◆ Remote primary path and secondary path support
- ◆ Non-administrator reviewers via the Dynamic File Services Retention Review group
- ◆ Retention Review events
- ◆ Notification review schedule
- ◆ Retention Review Service provides a Web UI for retention data review
- ◆ Review Transaction History records delete and restore actions during retention reviews
- ◆ Export review actions as reports in `.csv` and `.html` format
- ◆ Username-SID database so files do not become orphaned if owners become invalid

2.3.4 Policies

- ◆ The Frequency option for policies is replaced by the Schedule feature. A schedule can be associated with and disassociated from a policy. For information, see [Chapter 10, “Creating and Managing Policy Schedules,” on page 189](#).
- ◆ An identity-based filter option is available for Groups. For information, see [“File owners” on page 164](#).
- ◆ The File Types filter option has been expanded to include a list of perceived type associations that are defined in the `..\Dynamic File Services\DswFiletypes.cfg` file. For information, see [“File Types” on page 160](#).
- ◆ Policy names can be modified.

2.3.5 Policy Schedules

Policy schedules are now available as a separate manageable unit. Schedules determine when automated policy runs are executed. A schedule can be associated with and disassociated from a policy. You can use the same schedule for multiple policies. For information, see [Chapter 10, “Creating and Managing Policy Schedules,”](#) on page 189.

Policy schedule frequency has been expanded to include quarterly and custom dates. See [Section 10.1.2, “Schedule Frequency Options,”](#) on page 190.

2.3.6 Retention Reviews

The Retention Review Web interface is available for viewing and managing data that has been moved to the retention repository in a retention pair. For information, see [Section 12.6, “Reviewing Files in the Retention Repository,”](#) on page 223. Instructions for non-administrator reviewers are available in the *Novell Dynamic File Services 2.0 Retention Review Quick Start* (http://www.novell.com/documentation/dynamic_file_services/dynamic_review_win/data/dynamic_review_win.html).

2.3.7 Notification Service

- ♦ The Twitter notification add-on for the Notification Service allows you to Tweet notifications to configured Twitter accounts.
- ♦ Events can be configured separately for each email address and Twitter account. Previously, events were set globally for all recipients. See [Section 12.3, “Configuring Reviewers to Receive Email Notifications,”](#) on page 220.
- ♦ Retention review events are available in the Notification Service. See [“Retention Review Events”](#) on page 110.
- ♦ Schedule events are available in the Notification Service. See [“Policy Schedule Management Events”](#) on page 109.
- ♦ Registration events are available in the Notification Service. See [“Registration Events”](#) on page 110.

2.3.8 Auditing

The *Audit Configuration* option in the Controller allows you to specify which Dynamic File Services events are audited. For information, see [Section 6.5, “Configuring Audit Tracking Events,”](#) on page 108.

2.3.9 Repair Tool

The Repair tool was revised to allow you to apply the last-known-to-be-valid snapshot of the databases. You can also manually take a snapshot of the databases. See [Chapter 14, “Repairing the Pair, Policy, and Schedule Databases,”](#) on page 245.

2.3.10 Filter Driver Diagnostics

The Filter Driver Diagnostics tool allows you to capture information about your configuration and runtime errors to help troubleshoot merged view problems. See [Section 16.15, “Diagnosing a Filter Driver failure,”](#) on page 272.

2.4 What's Next

For information to help you plan your Dynamic File Services deployment, see [Chapter 4, "Planning for Pairs and Policies,"](#) on page 51.

For information about installing or upgrading to Dynamic File Services 2.2, see the [Dynamic File Services 2.2 Installation Guide](#).

3 Getting Started

Novell Dynamic File Services (DynamicFS) is a powerful and dependable tool to help you effectively manage your storage. Getting started is easy! This section describes common tasks to help you quickly set up and use DynamicFS.

- ◆ [Section 3.1, “Installing and Setting Up Dynamic File Services,” on page 41](#)
- ◆ [Section 3.2, “Connecting to the Dynamic File Services Server,” on page 42](#)
- ◆ [Section 3.3, “Creating a Dynamic File Services Pair,” on page 42](#)
- ◆ [Section 3.4, “Creating a Policy,” on page 43](#)
- ◆ [Section 3.5, “Associating the Pair and Policy,” on page 44](#)
- ◆ [Section 3.6, “Creating More Policies and Pairs,” on page 44](#)
- ◆ [Section 3.7, “Enforcing Policies,” on page 45](#)
- ◆ [Section 3.8, “Viewing the Merged File Tree for a Standard Pair,” on page 47](#)
- ◆ [Section 3.9, “Reviewing Retained Data in a Retention Pair,” on page 48](#)
- ◆ [Section 3.10, “Backing Up Files in the Pair,” on page 49](#)

3.1 Installing and Setting Up Dynamic File Services

The Dynamic File Service and the Management Console are installed on the servers where you want to create pairs and policies. You can also install the Management Console on workstations. You can manage the pairs and policies on multiple servers from any computer where the Management Console is installed.



The Dynamic File Service controls the pairs and policies that you create on a server. After the install or after a server restarts, the Service automatically starts and runs in the background. Each server's pairs and policies are unique on the server, and their related configuration files are stored locally.

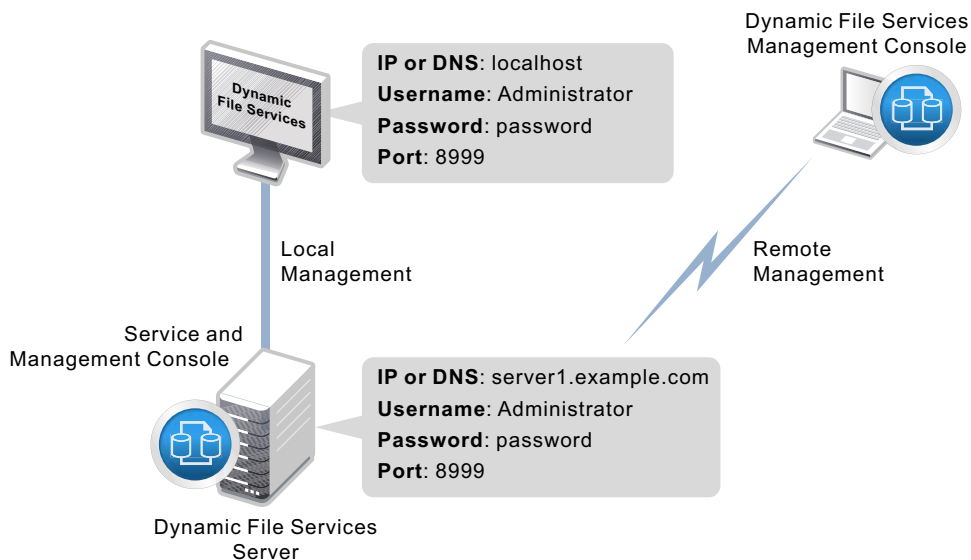
The `Dynamic File Services` group is created when the Service is installed, but no members are automatically assigned to it. Before you can manage DynamicFS, you must log in to the DynamicFS server as a user with Administrator privileges (server Administrator, Domain Admin, or a user with equivalent privileges) to [add members to the Dynamic File Services group](#). Only the Administrator user and members of the `Dynamic File Services` group can manage the Service.

On DynamicFS servers, the Service Controller starts automatically when the Administrator user or a member of the Dynamic File Services group logs in. The Service Controller allows you to manually start and stop the Dynamic File Service. You can manage the Service settings, such as the [Service Port Access](#), [Windows Firewall Access](#), [Certificate Configuration](#), [Audit Configuration](#), and [Notification Configuration](#). You can also use it to launch the Management Console or Repair Tool.

3.2 Connecting to the Dynamic File Services Server

Open the Dynamic File Services Management Console, then [set up the server you want to manage](#). You can set up multiple servers to be managed in the same console. To connect to a server, provide the login credentials of the Administrator user or a member of the Dynamic File Services group on the target server.

You can run the Management Console on the server, or from another computer where the Management Console is installed. For remote connections, the [Dynamic File Services Windows Firewall Access option must be enabled on the target server](#) so that an exception in the Windows Firewall is allowed for [the configured port](#). Remote management communications are secured with SSL (HTTPS).



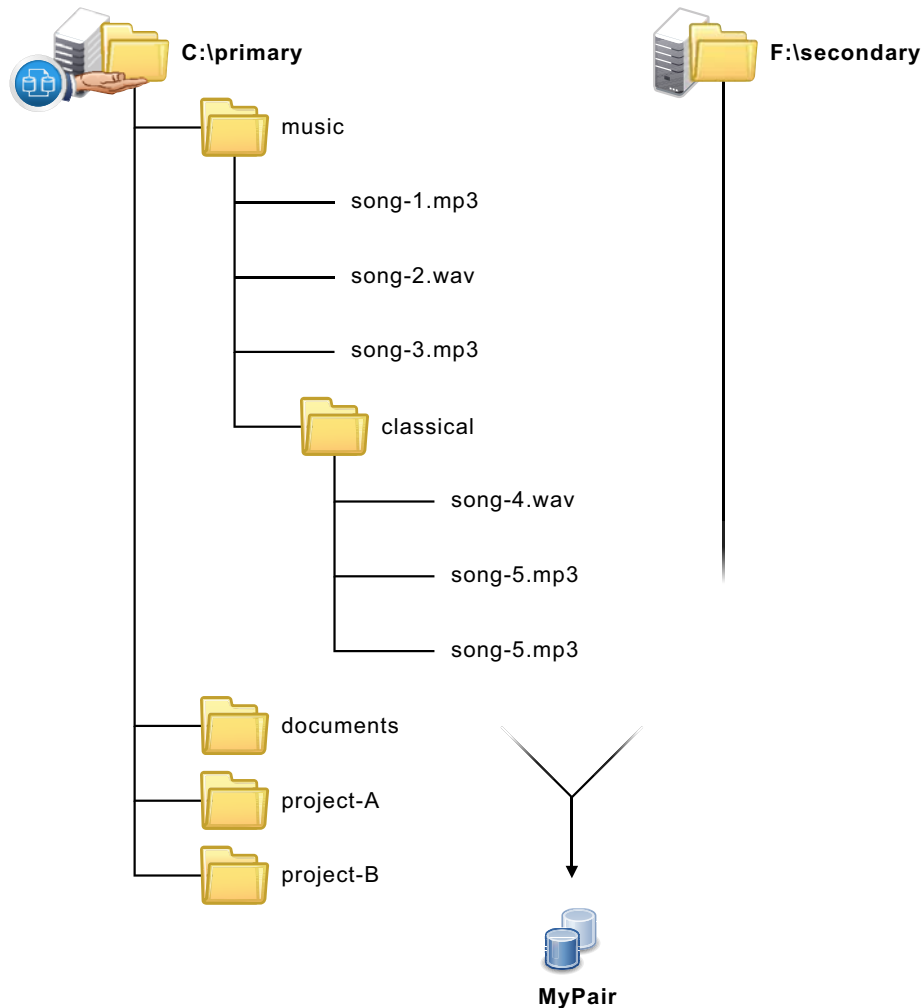
3.3 Creating a Dynamic File Services Pair

A Dynamic File Services pair consists of two independent paths on different disks, referred to as the primary path and secondary path. You can use a [remote share as the secondary path](#). Initially, the primary path contains files and the secondary path is empty. [Pair names](#) must be unique on the server.

[Create a pair](#) on the server by specifying the primary path and the secondary path to use for the pair. If no pairs exist on the target server, the [Setup Wizard](#) automatically opens and guides you through the process of [creating a pair](#) and [creating a policy](#). The wizard automatically [associates](#) the pair and the policy. Other pairs can be created with the [Pair Wizard](#).

After you create a pair, you can specify folders in the primary location that can be [included or excluded from policy runs](#). You can include folders or exclude folders, but not both.

A Windows network share must be set up on the primary path so that users can access data on the pair. For a standard pair, users see data on both paths in a [merged view](#). Use the Windows Network Sharing feature to [set up the network share](#) before or after you create the pair. The merged view is also shown if you begin your access from other network shares above and below the share on the primary path. To ensure that users access files on the secondary path only via the merged view, do not create a network share that gives users direct access to files on the secondary path of a standard pair.



3.4 Creating a Policy

A policy specifies the rules that determine what files are moved between the primary path and the secondary path, the direction files are moved, and when the policy is enforced.

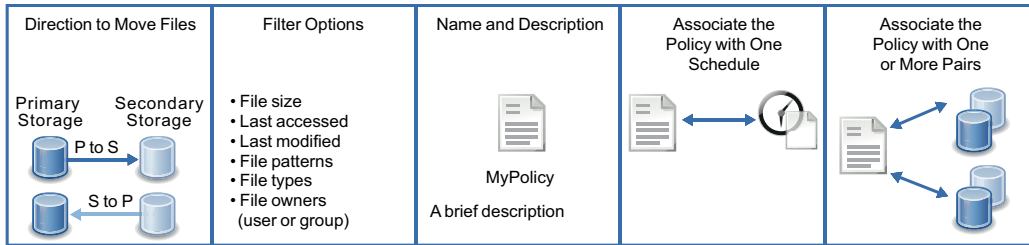
[Create a policy](#) that determines what data to move and when to move it. A rule defines the direction to move files and at least one of the following [filter options](#):

- ◆ [File size](#)
- ◆ [Last accessed time](#)
- ◆ [Last modified time](#)
- ◆ [File name patterns](#)

- ♦ File types (MIME types and perceived types)
- ♦ File owners (users or groups)

A policy can have **no schedule**, or it can be **scheduled** to run hourly, daily, weekly, monthly, quarterly, yearly, or on custom dates. Scheduled and unscheduled policies can be **run manually**.

If no pairs exist on the target server, the Setup Wizard automatically opens and guides you through the process of **creating a pair** and **creating a policy**. The wizard automatically **associates** the pair and the policy. Other policies can be created with the Policy Wizard. **Policy names** must be unique on the server.



3.5 Associating the Pair and Policy

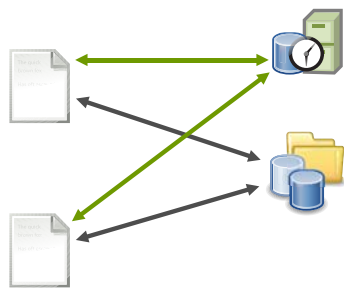
An association links a Dynamic File Services pair and policy so that the policy is enforced for the pair. No files are moved between the primary path and secondary path in a pair until a policy is associated with the pair. Policy runs are enforced against all pairs that are associated with the policy.

An **association between a policy and a pair** occurs automatically when you use the Setup Wizard to create a pair and a policy at the same time. The **Policy Wizard** allows you to select the pairs you want to associate with a new policy. The **Pair Wizard** allows you to select the policies you want to associate with a new pair. You can also associate (or disassociate) pairs and policies at any time by selecting the Properties dialog box of the pair or policy, and modifying its associations.

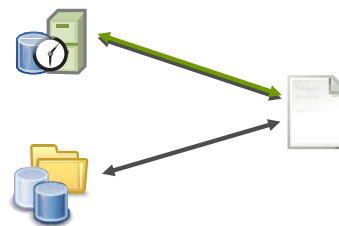


3.6 Creating More Policies and Pairs

You can create additional Dynamic File Services pairs and policies and associate them. A pair can be associated with multiple policies. A policy can be associated with multiple pairs.



Associate one or more policies with a given pair of any type.



Associate one or more pairs of any type with a given policy.

Use any of the following methods to create additional pairs and policies and associate them:

- ♦ **Pair:** Right-click *Pairs* under the server in the left panel, then select *Pair Wizard*.
- ♦ **Policy:** Right-click *Policies* under the server in the left panel, then select *Policy Wizard*.
- ♦ **Pair and Policy:** Right-click the server in the left panel, then select *Setup Wizard*.

Use either of the following methods to associate existing pairs and policies:

- ♦ Select a policy and associate it to one or more pairs.
- ♦ Select a pair and associate it to one or more policies.

3.7 Enforcing Policies

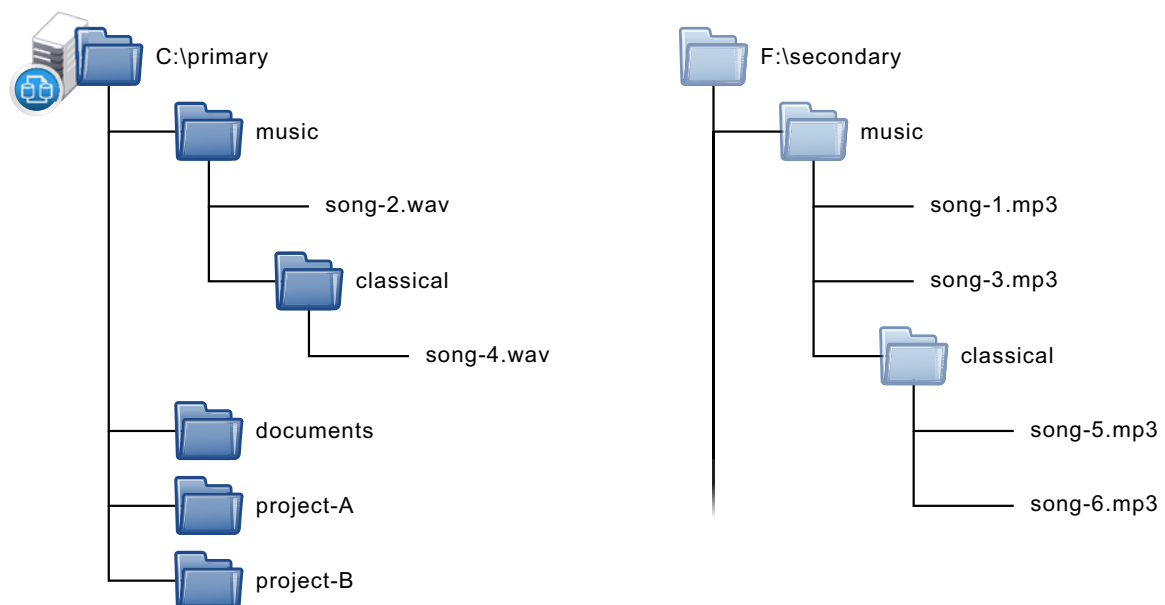
In a policy run, a policy is enforced separately for each of the pairs associated with the policy. A policy can run [on demand](#) or when it is [scheduled](#). Each policy is associated to a schedule. Multiple policies can be scheduled to run at the same time. Scheduled and unscheduled policies can be run manually.

Run a single policy at a time on a pair to enforce the policy's rules for moving data. A file is moved if it meets all of the filter options specified in the rule.

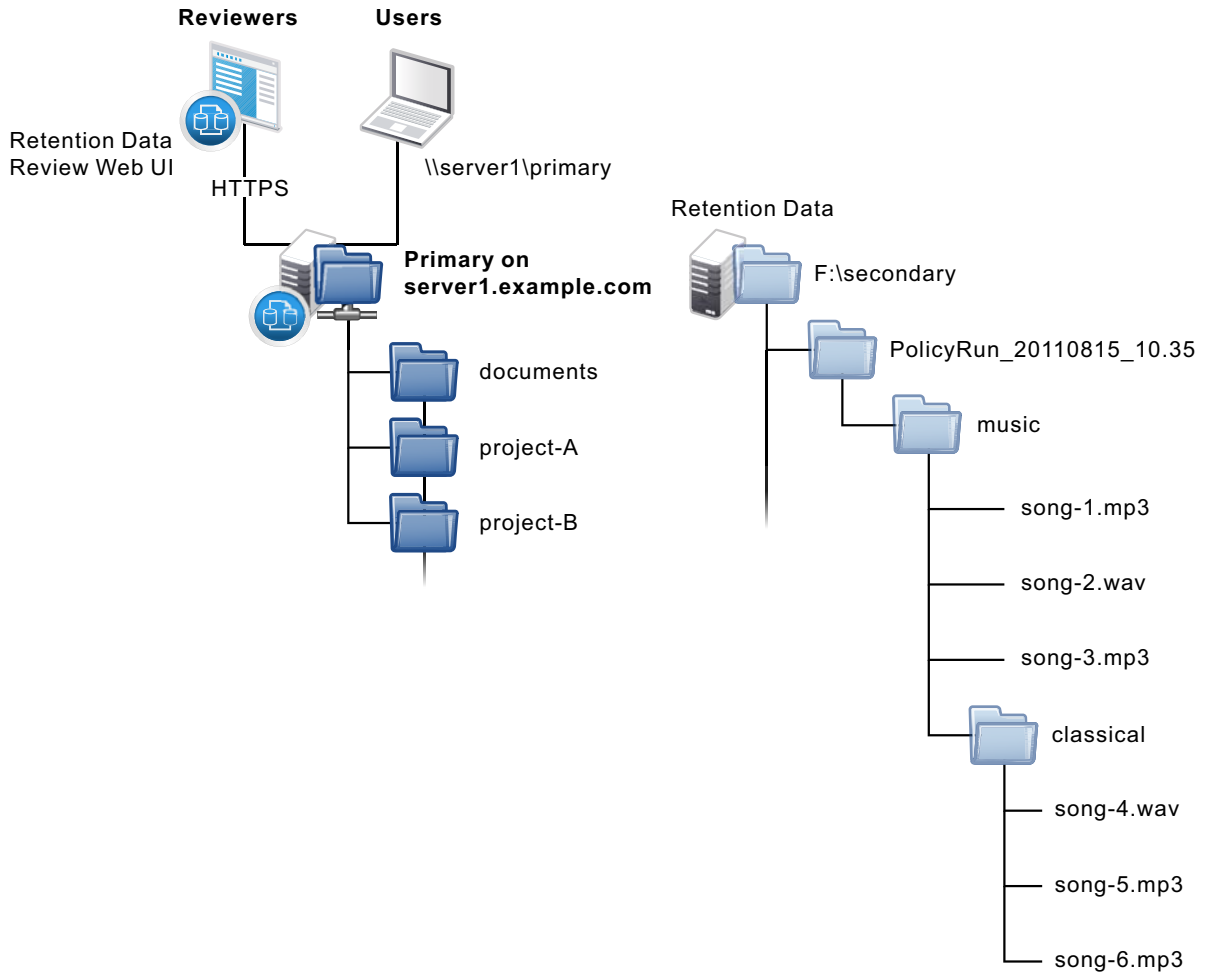
Configure multiple policies to run at the same time on a pair to enforce alternative rules for moving data. When the group of policies moves files in both directions, the primary-to-secondary policies are grouped and enforced, then the secondary-to-primary policies are grouped and enforced. A file is moved if it meets the rules for any one of the policies that are run together.

For example, a policy run for a standard pair might move all files with extensions of `.mp3` from the primary location to the secondary location.

Example: Move *.mp3 files from Primary → Secondary.



For a retention pair, policies move data only from primary to a repository on the secondary. A folder is created and named with "PolicyRun" a time stamp, such as PolicyRun_20110815_10.35. Files are moved to the folder, keeping the data structure relative to the root of the primary location.



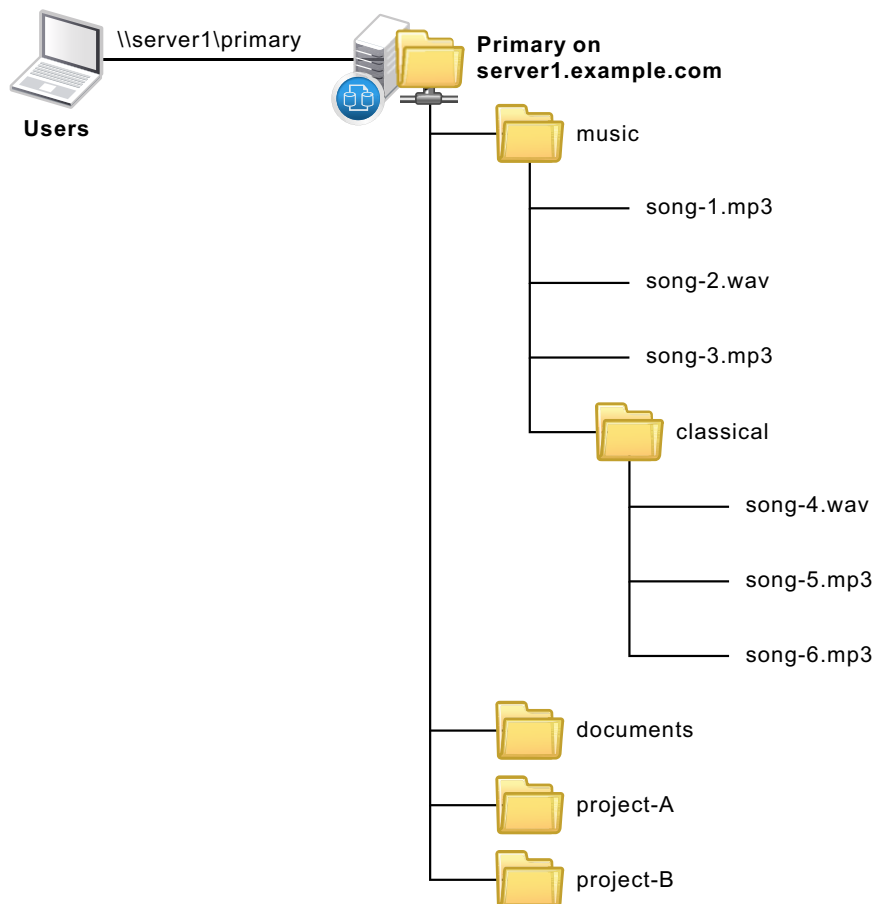
3.8 Viewing the Merged File Tree for a Standard Pair

Users access the primary path on a standard pair via a [network share](#) (`\\servername\sharename`). They see a merged view of the data on both paths as if the files are all stored on a single device.

The native access control of the underlying file systems determines the user access to the data. All access to the secondary path is made via DynamicFS as if the data were located on the primary path. DynamicFS does not need to relocate the data to give the user access to data on the secondary path.

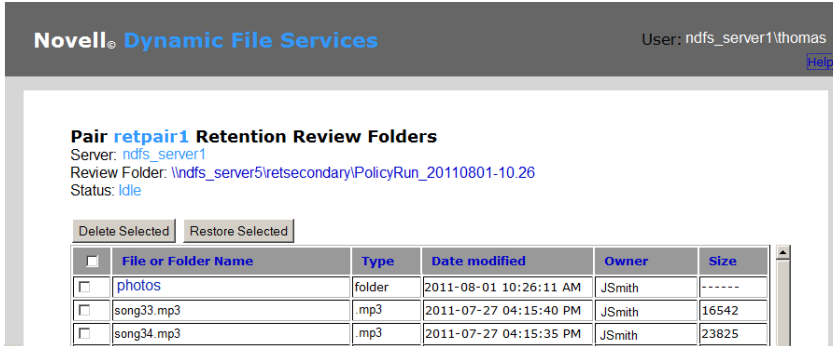
To set [ACLs and attributes on files and folders](#), you should access the merged view of the data via the network share on the primary path, then set the access control for files and folders as you normally would. If direct access to the path is necessary to set ACLs, make the changes to the folder instance that resides on the primary path.

In a merged view, the users are not aware that the `.mp3` files are now located on a different disk than their other files. There is no performance impact for the user.



3.9 Reviewing Retained Data in a Retention Pair

The Novell Dynamic File Services Retention Review Service provides a Web interface for reviewing files in a retention repository. Reviewers determine the disposition of retained files in accordance your company’s data retention policy. A reviewer can take no action, delete files from the repository, or move files from the repository back to their original location.



<input type="checkbox"/>	File or Folder Name	Type	Date modified	Owner	Size
<input type="checkbox"/>	photos	folder	2011-08-01 10:26:11 AM	JSmith	-----
<input type="checkbox"/>	song33.mp3	.mp3	2011-07-27 04:15:40 PM	JSmith	16542
<input type="checkbox"/>	song34.mp3	.mp3	2011-07-27 04:15:35 PM	JSmith	23825

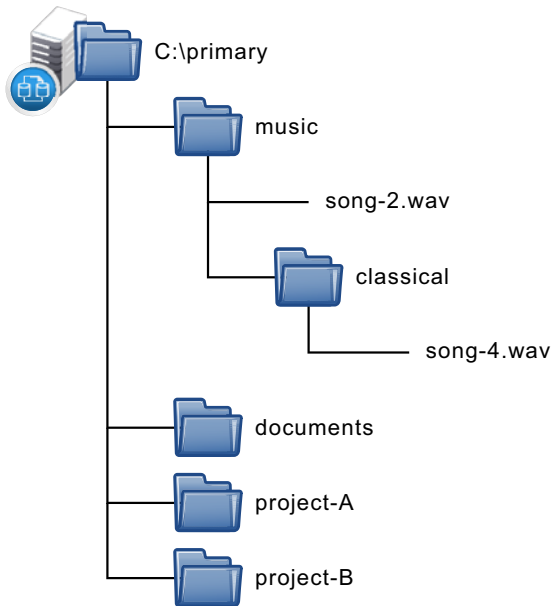
Members of the Dynamic File Services Retention Review group can review retention data by using the Retention Review Web interface. Administrator privileges on the server are not required for membership. When reviewers work in the Web interface, they have all of the file access privileges necessary to access the retained files.

3.10 Backing Up Files in the Pair

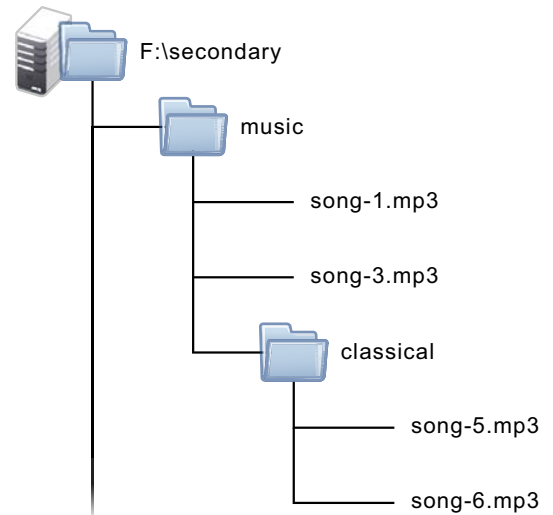
The administrator can perform backup and restore operations independently on the two locations in the Dynamic File Services pair. Backups can be scheduled to run at different frequencies on each path. Having less data to back up can help shorten the backup window.

For example, if data changes more frequently on the primary path, it can be backed up more frequently than the secondary path.

The primary location contains frequently used and volatile files, so it is backed up incrementally and weekly.



The secondary location contains static or less important files, so it is backed up less often.



4 Planning for Pairs and Policies

Novell Dynamic File Services (DynamicFS) pairs and policies are easy to set up and manage. Before you begin, it is important to take time to plan and design your overall storage solution. This section provides information to help you plan an effective implementation in your Windows environment.

IMPORTANT: For information about supported configurations and installation requirements, see “Planning the Installation” in the *Dynamic File Services 2.2 Installation Guide*.

- ◆ Section 4.1, “Server-Centric Management,” on page 52
- ◆ Section 4.2, “Management Groups,” on page 52
- ◆ Section 4.3, “Reviewers for Retention Pairs,” on page 52
- ◆ Section 4.4, “Active Directory Domain Configuration for Remote Shares,” on page 53
- ◆ Section 4.5, “Server Configuration Requirements,” on page 56
- ◆ Section 4.6, “Storage Requirements,” on page 57
- ◆ Section 4.7, “Pair Requirements,” on page 58
- ◆ Section 4.8, “Access Rights for a Standard Pair,” on page 60
- ◆ Section 4.9, “Using Remote Shares in an Active Directory Domain,” on page 60
- ◆ Section 4.10, “Using Remote Shares in a Workgroup,” on page 61
- ◆ Section 4.11, “Using Cloud Storage as the Secondary Path in a Retention Pair,” on page 63
- ◆ Section 4.12, “Naming Conventions for Pairs and Policies,” on page 65
- ◆ Section 4.13, “File Name Path Length,” on page 65
- ◆ Section 4.14, “Merged View for Standard Pairs,” on page 65
- ◆ Section 4.15, “File and Folder Attributes and ACL Permissions in a Standard Pair,” on page 66
- ◆ Section 4.16, “Duplicate Folders in a Standard Pair,” on page 66
- ◆ Section 4.17, “Duplicate Files in a Standard Pair,” on page 67
- ◆ Section 4.18, “Orphan (Ownerless) Files,” on page 68
- ◆ Section 4.19, “System Files and Other Files that Are Not Moved,” on page 70
- ◆ Section 4.20, “Policy Schedules,” on page 71
- ◆ Section 4.21, “Time Displays,” on page 72
- ◆ Section 4.22, “Event Logging,” on page 72
- ◆ Section 4.23, “Using Antivirus Software with Pairs,” on page 72
- ◆ Section 4.24, “Using Backup Software with Pairs,” on page 72
- ◆ Section 4.25, “Using Compression with Pairs,” on page 72
- ◆ Section 4.26, “Using Disk Quotas with Pairs,” on page 72
- ◆ Section 4.27, “Disk Space Availability and Moving Files,” on page 73
- ◆ Section 4.28, “Using Encryption with Pairs,” on page 73

- [Section 4.29, “Using Microsoft Distributed File System with Pairs,”](#) on page 74
- [Section 4.30, “Using Dynamic File Services in a Windows Cluster,”](#) on page 80
- [Section 4.31, “Using Dynamic File Services in Windows Safe Mode,”](#) on page 82

4.1 Server-Centric Management

Management of Dynamic File Services servers, pairs, policies, and schedules is server-centric. DynamicFS does not use a centralized LDAP directory repository. The pair, policy, and schedule configuration files are stored in subfolders in the `C:\ProgramFiles\Dynamic File Services` folder on the server where the Service is installed and running. Import and export features of DynamicFS make it possible to copy a policy to multiple servers.

The Service login can validate the administrator user identity in Workgroup environments and in Active Directory domain environments.

4.2 Management Groups

The Administrator user of the server and the Domain Admin users in the same Active Directory domain are automatically allowed to manage all aspects of Dynamic File Services. Two management groups are created automatically at install time to allow you to set up non-administrator users to perform management tasks. It is not necessary to explicitly add the Administrator user and Domain Admin users to these groups, but it is okay to add them.

Table 4-1 *Dynamic File Services Management Groups*

Management Group	Description	To add or remove members, see
Dynamic File Services group	Group members can manage pairs, policies, schedules, and cloud accounts on a DynamicFS server. The user identity used when you install Dynamic File Services is automatically added to this group. You can assign other members after the installation.	Section 6.3, “Configuring Administrators for Pair Management,” on page 102.
Dynamic File Services Retention Review group	Group members can review retained data in all retention pairs. The group has no default members. The group is automatically assigned as a reviewer when the retention pair is created.	Section 12.2, “Configuring Reviewers for a Retention Pair,” on page 215

4.3 Reviewers for Retention Pairs

Members of the `Dynamic File Services Retention Review` group can review the retained data for all pairs. You can also assign individual users and groups to be reviewers for a given retention pair by using the Reviewers tab on the pair’s Properties page. For information, see [Section 12.2, “Configuring Reviewers for a Retention Pair,”](#) on page 215.

4.4 Active Directory Domain Configuration for Remote Shares

In an Active Directory environment, Dynamic File Services configures a special domain group and user in order to support the use of remote shares in a pair.

- ♦ [Section 4.4.1, “Default Domain Configuration,” on page 53](#)
- ♦ [Section 4.4.2, “Dynamic File Services Storage Rights Domain Group,” on page 54](#)
- ♦ [Section 4.4.3, “NDFS-servername Domain Proxy User,” on page 55](#)
- ♦ [Section 4.4.4, “Security Implications of the Default Domain Configuration,” on page 56](#)

4.4.1 Default Domain Configuration

When you install the Service component on a domain controller or member server in an Active Directory environment, the installation sets up the following security features:

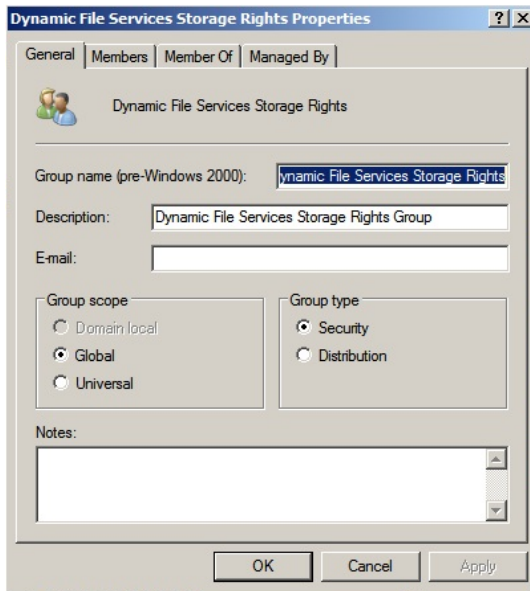
- ♦ Creates a domain user called `NDFS-servername`.
- ♦ Creates a domain group called `Dynamic File Services Storage Rights`.
- ♦ Adds the `NDFS-servername` user to the `Dynamic File Services Storage Rights` group.
- ♦ Gives the `NDFS-servername` user the *Log on as a service* right.
- ♦ Sets up the Dynamic File Service to log on as the `NDFS-<servername>` user.
- ♦ Makes the `Dynamic File Services Storage Rights` group a Member of the Domain Admins group.

This setup requires that the installation is done by a domain user that has local Administrator privileges and Domain Administrator rights.

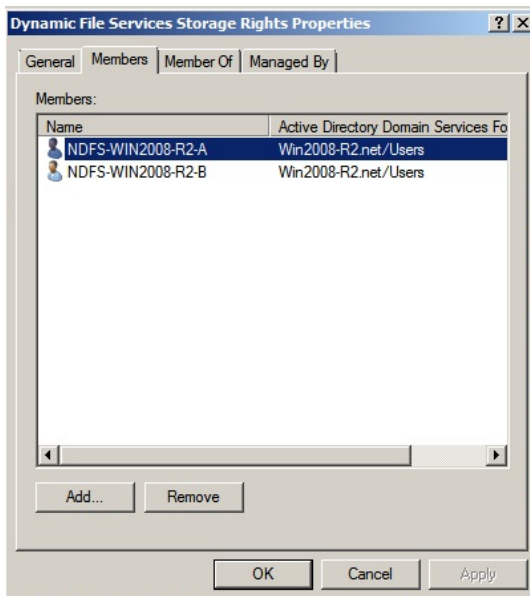
4.4.2 Dynamic File Services Storage Rights Domain Group

The `Dynamic File Services Storage Rights` group is an Active Directory domain group that is used to allow Dynamic File Services to manage traffic between the Service running on the server and the remote share. In Active Directory, you must add the group to the primary share and secondary share, and grant it all permissions.

The `Dynamic File Services Storage Rights` group is created automatically during the installation of the Service component if the computer is a domain controller or a member server in an Active Directory environment. The group scope is *Global* and the group type is *Security*.

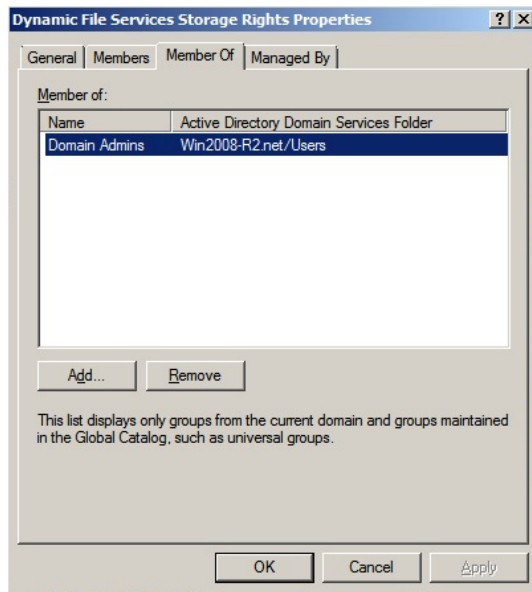


Members of the `Dynamic File Services Storage Rights` group include the `NDFS-servername` proxy users for the Dynamic File Services servers in the same Active Directory domain/forest. The members are automatically added to the group when the Service component is installed on a server in the domain.



A server's `NDFS-servername` proxy user is automatically removed as a member of the `Dynamic File Services Storage Rights` group if Dynamic File Services is uninstalled from the server. The group is not deleted by the uninstall unless the server's proxy user is the only member of the group.

The `Dynamic File Services Storage Rights` group is a member of the `Domain Admins` group. This gives the group equivalent rights to the `Domain Admins` group. Alternatives to the default domain configuration are described in [“Security Implications of the Default Domain Configuration” on page 56](#).



4.4.3 NDFS-servername Domain Proxy User

The `NDFS-servername` user is an Active Directory domain user that serves as a proxy user in communications between the Service on a server that is running Dynamic File Services and a remote share that is being used as the secondary path in a pair on that server. The user is created automatically during the installation of the Service component if the computer is a domain controller or a member server in an Active Directory environment.

The `NDFS-servername` proxy user is automatically added as a member of the `Dynamic File Services Storage Rights` group in the same domain as the server. The user is given the *Log on as a service* right. As a group member, this user automatically has the same access rights granted to the group.

The password for the `NDFS-servername` user is created automatically, and can be modified by using the Active Directory tool for modifying user passwords.

4.4.4 Security Implications of the Default Domain Configuration

The default configuration gives the `Dynamic File Services Storage Rights` domain group equivalent rights to the `Domain Admins` group. In some situations, this can be undesirable. The following describes two options to tighten security:

- ◆ Remove the `Dynamic File Services Storage Rights` group from the `Domain Admins` group, and give only the specific rights needed to the `Dynamic File Services Storage Rights` group. Then give the group share-level rights or the NTFS security rights to the share used for the primary path and the share used for the secondary path.
- ◆ Delete the `Dynamic File Services Storage Rights` group, and add only the specific rights needed directly to the `NDFS-servername` proxy user. Then give the `NDFS-servername` user share-level rights or the NTFS security rights to the share used for the primary path and the share used for the secondary path.

Whichever approach you use, ensure that you grant the group or user the same access rights to the primary share and the secondary share.

You can manage domain groups and users by using the Active Directory Users and Computers snap-in in the Microsoft Management Console. The specific rights needed are as follows:

- ◆ Allow log on locally
- ◆ Restore file and directories
- ◆ Backup files and directories
- ◆ Load and unload device drivers
- ◆ Log on as a service
- ◆ Manage auditing and security log
- ◆ Take ownership of files or other objects

4.5 Server Configuration Requirements

Consider the server configuration requirements in this section when using Dynamic File Services:

- ◆ [Section 4.5.1, “SMB,” on page 56](#)
- ◆ [Section 4.5.2, “UTF-8,” on page 56](#)

4.5.1 SMB

Dynamic File Services supports SMB2 and SMB1. You should use the same SMB version on the server, clients, and remote file systems.

4.5.2 UTF-8

The servers and filers used with Dynamic File Services must be Unicode capable and must be set up for UTF-8 (8-bit Unicode Transformation Format) encoding and character sets.

4.6 Storage Requirements

Consider the requirements in this section before you configure Dynamic File Services pairs:

- ◆ [Section 4.6.1, “File Systems,” on page 57](#)
- ◆ [Section 4.6.2, “Local Storage,” on page 57](#)
- ◆ [Section 4.6.3, “Remote Storage,” on page 57](#)
- ◆ [Section 4.6.4, “Cloud Storage,” on page 58](#)

4.6.1 File Systems

Dynamic File Services supports the NTFS file system for the primary and secondary locations in pairs.

For cloud storage, Dynamic File Services works with the native storage technology used by the provider. It maintains information about the ACLs and other metadata for files stored on secondary cloud storage locations in retention pairs.

4.6.2 Local Storage

Devices that the system considers to be native storage devices can be used for the primary path and the secondary path. This includes Fibre Channel, iSCSI, and direct-attached storage devices (internal or external). The devices must be online and available to the Dynamic File Services server when you create, manage, and use the pair.

For iSCSI devices that are hosted in a cloud, we recommend that the device be used only for secondary paths.

The native storage devices used in a pair must have a static drive letter assigned so that the drive letter remains the same through server restarts. If you plan to change the drive letters or modify paths, you must unlink the paths by removing the pair definition, and create a new pair that uses the new locations.

Dynamic File Services does not support using CDs, DVDs, floppy drives, or flash drives in a pair. It also does not support using mapped drives.

4.6.3 Remote Storage

Remote storage is supported for the following pair configurations:

- ◆ **Standard Pair:** Secondary path. A local path is required for the primary in order to provide merged access to the files.
- ◆ **Retention Pair:** Primary path or secondary path.

The remote path can be a network share on either of the following target storage locations. It is not necessary for Dynamic File Services to be running on the target location.

- ◆ Any Windows Server running an operating system that is supported by DynamicFS
- ◆ Network attached storage or a network filer (such as NetApp and EMC)

IMPORTANT: To avoid potential data loss and conflicts, use only dedicated volumes when using remote paths.

A remote share must be online and available to the Dynamic File Services server when you create, manage, and use the pair.

For an Active Directory environment, the remote share must be published in Active Directory and must reside in the same domain/forest as the Dynamic File Services server. For configuration requirements, see [Section 4.9, “Using Remote Shares in an Active Directory Domain,” on page 60](#).

For a Workgroup environment, the remote share must exist in the same workgroup as the Dynamic File Services server. For configuration requirements, see [Section 4.10, “Using Remote Shares in a Workgroup,” on page 61](#).

4.6.4 Cloud Storage

Cloud storage is supported as the secondary path in a retention pair. You must set up an account with your preferred cloud provider and authorize the Dynamic File Services software to interact with the files stored there on your behalf. For information, see [Chapter 11, “Creating and Managing Cloud Accounts,” on page 199](#).

4.7 Pair Requirements

A Dynamic File Services pair consists of a primary path and a secondary path that DynamicFS manages as a unit through its filter driver.

Before forming a pair, ensure that you have prepared the storage areas that you want to use as the primary and secondary locations by verifying that your storage setup meets the requirements in this section. Then gather the information you need about the paths that you want to use as the primary path and secondary path.

- ♦ [Section 4.7.1, “Only 16 Pairs Per Server,” on page 58](#)
- ♦ [Section 4.7.2, “Primary and Secondary Paths,” on page 58](#)
- ♦ [Section 4.7.3, “Administrator Access,” on page 59](#)
- ♦ [Section 4.7.4, “User Access,” on page 60](#)

4.7.1 Only 16 Pairs Per Server

The filter driver only supports 16 standard pairs per server. (There is no limit to retention pairs.)

To see a list of pairs that the filter driver is managing, do the following:

- 1 Right click on the Novell Dynamic File Services Controller
- 2 Select *Filter Driver Diagnostics > Save Filter Driver Configuration*.

The saved file contains a list of pairs that are currently managed by the filter driver.

4.7.2 Primary and Secondary Paths

Consider the following guidelines when choosing paths to use for pairs:

- ♦ [“Paths for Standard Pairs” on page 59](#)
- ♦ [“Paths for Retention Pairs” on page 59](#)
- ♦ [“Using Remote Paths” on page 59](#)
- ♦ [“Using Cloud Paths” on page 59](#)

Paths for Standard Pairs

A standard pair's primary path can reside on any local device. The path should be unique among the pairs defined on the same Dynamic File Services server.

A standard pair's secondary path can reside on a local device or a remote share. Avoid conflicts related to primary paths for the same or different pairs on the same server. The file structure that is built under the secondary path's folder is the same as the file structure under the primary path's folder.

IMPORTANT: Do not nest the paths used by standard pairs. That is, when creating a standard pair, do not specify a path that contains or is contained by any path that is used by another standard pair.

The secondary path is usually empty when you create a standard pair. Both paths can contain data, but if there are duplicate files, only the instance of the file in the primary path is available to the user in the merged view. As an Administrator user (or as a user with Administrator privileges) on the server, you can access the secondary path to rename the duplicate file, which makes it available to users in the merged view.

Paths for Retention Pairs

A retention pair's primary path can reside on any local device or on a remote share. Avoid conflicts related to primary paths for the same or different pairs on the same server. You can tier files from a standard pair to a retention pair by using the secondary path of a standard pair as the primary path of a retention pair.

A retention pair's secondary path can reside on any local device, a remote share, or in cloud storage. The path should be unique among the pairs defined on all Dynamic File Services servers in the same tree. The path is a destination folder for the files that are moved to the retention repository via policies or via a manual move. The file structure built under the destination folder is different than that for the pair's primary path.

Using Remote Paths

The pair setup does not prevent you from using the paths on one Dynamic File Services server as remote share paths for pairs that you create on a different Dynamic File Services server. If you re-use paths, ensure that users can see only the data you intend them to see.

Using Cloud Paths

The cloud storage provider's site must be available when you create a retention pair, and when policies and manual moves are run for the pair.

4.7.3 Administrator Access

The Administrator user that creates and manages pairs must have the same file access permissions and credentials on both the primary path and secondary path in each pair.

4.7.4 User Access

All user access to a pair must be made through a network share on the pair's primary path. Use Microsoft Network Sharing to create the share.

For standard pairs, users see a merged view of files in both locations. You can add network shares on the primary device above or below the network share on the primary path. The merged view for a standard pair works from the primary path and downward in the file tree structure. Do not give users direct access to the secondary path, or to any shares on, above, or below the secondary path.

For retention pairs, users see files only on the primary location. The retention data reviewers manage files in the retention repository by using the Web-based Retention Review Service. For information, see [Section 12.2, "Configuring Reviewers for a Retention Pair," on page 215](#).

4.8 Access Rights for a Standard Pair

For a standard pair, access rights settings must be the same for the primary path and the secondary path. After the pairs are linked, the Administrator manages the access rights by accessing the files via the merged view. When the standard policy engine moves files from the primary location to the secondary location, the engine automatically sets the access rights that are needed on the secondary path and files.

4.9 Using Remote Shares in an Active Directory Domain

In an Active Directory domain, you can specify UNC (Universal Naming Convention) paths when you create a pair. This allows a remote storage target to be a network share on third-party network filers (such as EMC and NetApp) or Windows Server 2008/2008 R2 servers. The remote share must be published in the same Active Directory domain and forest as the Dynamic File Services server.

A UNC path describes the location of a volume or folder. The format for a UNC path is `\\server\volume\folder` and is case-sensitive. For example:

```
\\my_iscsi_svr1\Engineering\ProjectA
```

Ensure that your setup meets the requirements in the following sections:

- ♦ [Section 4.9.1, "Server Requirements in a Domain," on page 60](#)
- ♦ [Section 4.9.2, "Remote Share Requirements in a Domain," on page 61](#)
- ♦ [Section 4.9.3, "Remote Path Requirements in a Domain," on page 61](#)

4.9.1 Server Requirements in a Domain

The pair must be hosted on a Dynamic File Services server that is located in the same Active Directory domain and forest as the remote shares.

Install Dynamic File Services on a supported Windows server in an Active Directory domain. The server can be a domain controller or a member server. For information, see ["Supported Platforms"](#) in the [Dynamic File Services 2.2 Installation Guide](#).

An Active Directory domain user that has Domain Admin rights must perform the installation. The following user and group are created in the domain to allow remote shares to be used:

- ♦ NDFS-*servername* proxy user
- ♦ Dynamic File Services Storage Rights group

For details and alternate security setup options, see [Section 4.4, “Active Directory Domain Configuration for Remote Shares,”](#) on page 53.

In addition the DynamicFS management groups are created on the server, as described in [Section 4.2, “Management Groups,”](#) on page 52. To add members to the Dynamic File Services group on the server, see [Section 6.3.2, “Setting Up Administrators in a Domain,”](#) on page 104.

4.9.2 Remote Share Requirements in a Domain

The remote shares must be hosted in the same Active Directory domain/forest as the Dynamic File Services server that hosts the pair.

You must publish the remote share in Active Directory. The remote share can be published in any container in the domain where the NDFS-*<servername>* proxy user or Dynamic File Services Storage Rights group has browse rights.

Use Microsoft Networking to create a share on the remote location, and then publish the network share in Active Directory. For information, see [Section 8.3, “Preparing Remote Shares for Use in a Pair,”](#) on page 146.

You must add the Dynamic File Services Storage Rights group to the remote share in Active Directory, and grant it all permissions to the share. For information, see [Section 4.4, “Active Directory Domain Configuration for Remote Shares,”](#) on page 53.

Users must not have direct access to the files in a remote share that is used as the secondary path in a pair.

4.9.3 Remote Path Requirements in a Domain

The remote path can be a network share on either of the following target storage locations. It is not necessary for Dynamic File Services to be running on the remote location.

- ♦ Any Windows Server running an operating system that is supported by DynamicFS
- ♦ Network attached storage or a network filer (such as NetApp and EMC)

To avoid potential data loss and conflicts, use only dedicated volumes when using remote paths.

Users must access files in the pair via a network share on the primary path. Users must not have direct access to the files in a path that is used as a remote path in a pair.

4.10 Using Remote Shares in a Workgroup

In a Windows Workgroup, you can specify UNC paths when you create a pair. This allows a remote storage target to be a network share on third-party network filers (such as EMC and NetApp) or Windows Server 2008/2008 R2 servers. The remote share must be created in the same Workgroup as the Dynamic File Services server.

A UNC path describes the location of a volume or folder. The format for a UNC path is `\\server\volume\folder` and is case-sensitive. For example:

\\my_iscsi_svr1\Engineering\ProjectA

Ensure that your setup meets the requirements in the following sections:

- ♦ [Section 4.10.1, “Server Requirements in a Workgroup,” on page 62](#)
- ♦ [Section 4.10.2, “Workgroup Configuration Requirements,” on page 62](#)
- ♦ [Section 4.10.3, “Remote Share Requirements in a Workgroup,” on page 63](#)
- ♦ [Section 4.10.4, “Remote Path Requirements in a Workgroup,” on page 63](#)

4.10.1 Server Requirements in a Workgroup

The pair must be hosted on a Dynamic File Services server that is located in the same Windows Workgroup as the remote shares.

In a Windows Workgroup, install Dynamic File Services on a supported Windows server. For information, see [“Supported Platforms”](#) in the *Dynamic File Services 2.2 Installation Guide*.

The installation must be done by a user that has Administrator rights on the server. This allows the DynamicFS management groups to be created on the server, as described in [Section 4.2, “Management Groups,” on page 52](#). To add members to the Dynamic File Services group on the server, see [Section 6.3.3, “Setting Up Administrators in a Workgroup,” on page 104](#).

4.10.2 Workgroup Configuration Requirements

Your Workgroup setup must meet the following requirements:

- ♦ The host name of each computer in the Workgroup must be unique.
- ♦ On the Dynamic File Services server, the Service must be run as the Administrator user. The Administrator user password must be the same on each participating computer or filer. This user must have all file system rights to the primary share and the secondary share.

On a Windows XP computer, all computers in the workgroup must have the same user account with the same password. The user account must have all share access rights to all of the shares that you plan to use. The Service must run as this user account. The user must be granted the Logon as a Service right. If you set the Service to run as a user, then the Windows service controller sets this right for you.

- ♦ On Windows Server 2008 and 2008 R2, the following services must be running and be configured to start for every boot in order for Dynamic File Services to work with remote paths:
 - ♦ Function Discovery Resource Publication
 - ♦ Simple Service Discovery Protocol (SSDP)
 - ♦ Universal Plug and Play (UPnP)
 - ♦ Computer Browser

After these services are started, go to the *Control Panel > Network and Internet > Network and Sharing Center > Sharing and Discovery* option, then turn on *Network Discovery*.

4.10.3 Remote Share Requirements in a Workgroup

The remote shares must be in the same Windows Workgroup as the Dynamic File Services server that hosts the pair.

Use Microsoft Networking to create a share on the remote location. You must make the share available to the DynamicFS server, and give rights to the Administrator user as described in [Section 4.10.2, “Workgroup Configuration Requirements,”](#) on page 62.

Users must not have direct access to the files in a remote share that is used as the secondary path in a pair.

4.10.4 Remote Path Requirements in a Workgroup

The remote path can be a network share on either of the following target storage locations. It is not necessary for Dynamic File Services to be running on the remote location.

- ♦ Any Windows Server running an operating system that is supported by DynamicFS
- ♦ Network attached storage or a network filer (such as NetApp and EMC)

To avoid potential data loss and conflicts, use only dedicated volumes when using remote paths.

Users must access files in the pair via a network share on the primary path. Users must not have direct access to the files in a path that is used as a remote path in a pair.

4.11 Using Cloud Storage as the Secondary Path in a Retention Pair

Dynamic File Services supports the use of cloud storage as the secondary location in a retention pair. Your cloud storage must be configured and available to the retention pair whenever actions are performed that involve the secondary path, such as the initial setup of the pair, policy moves, manual moves, and retention reviews.

- ♦ [Section 4.11.1, “Supported Cloud Storage Providers,”](#) on page 63
- ♦ [Section 4.11.2, “Cloud Credentials,”](#) on page 64
- ♦ [Section 4.11.3, “Maximum Storage Size for Cloud Storage,”](#) on page 64
- ♦ [Section 4.11.4, “Maximum File Size for Uploads to Cloud Storage,”](#) on page 64

4.11.1 Supported Cloud Storage Providers

Dynamic File Services 2.2 supports the following cloud storage providers. You create an account with the provider.

- ♦ [Amazon Simple Storage Service \(http://aws.amazon.com/s3/\)](http://aws.amazon.com/s3/) (Amazon S3)
- ♦ [CloudMe \(http://www.cloudme.com/\)](http://www.cloudme.com/)
- ♦ [Dropbox \(http://www.dropbox.com/\)](http://www.dropbox.com/)

4.11.2 Cloud Credentials

On the DynamicFS server, you set up cloud accounts to store your credentials for the cloud locations that you want to use in retention pairs. The credentials are stored securely. The Service uses the credentials to connect to the cloud when it performs actions on the files on your behalf, such as for policy moves, manual moves, and retention reviews.

For information about the types of credentials used by cloud providers, see [Section 11.1.5, “Types of Cloud Access Authentication Credentials,”](#) on page 201.

For information about how to get credentials and allow Dynamic File Services to access the account, see [Section 11.2, “Setting Up Cloud Access Credentials and Folders for Your Cloud Storage Provider,”](#) on page 201.

4.11.3 Maximum Storage Size for Cloud Storage

The maximum amount of space that your files can consume in the cloud is governed by the service level agreement with your cloud storage provider. The storage quota is enforced by your provider. If you reach the set quota, files cannot be uploaded until you remove files to make space available, or unless you increase the quota. For example, you can remove files from the retention repository by using the Delete and Restore features of the Retention Review Service. For information, see [Section 12.6, “Reviewing Files in the Retention Repository,”](#) on page 223.

4.11.4 Maximum File Size for Uploads to Cloud Storage

The maximum size per file that can be uploaded to cloud storage is governed by the service level agreement with your cloud storage provider. The storage quota and file size limit is enforced by your provider. In addition, a file must be smaller than the remaining available space below your quota.

[Table 4-2](#) provides information about the known file size restrictions for the supported cloud providers. Refer to your cloud storage provider’s documentation for information about the maximum file size allowed for uploads.

Table 4-2 Cloud Provider Upload File Size Restrictions

Cloud Provider	Upload File Size Restrictions
Amazon S3	Amazon S3 allows upload file sizes from 1 byte to 5 terabytes per file. For information, see FAQs: How much data can I store? (http://aws.amazon.com/s3/faqs/#How_much_data_can_I_store).
CloudMe	Cloudme limits the upload file size for free and basic accounts to 150 MB per file. For information see CloudMe Price Plan and Accounts (http://www.cloudme.com/en/pricing).
Dropbox	Dropbox limits the upload file size for developer applications to 150 MB per file. For information, see the developer documentation for Dropbox REST APIs (https://www.dropbox.com/developers/reference/api#files_put). Larger file sizes require the Dropbox client application or the Dropbox Web browser interface. For information, see Help Center: Is there a limit or maximum to how big my files can be? (https://www.dropbox.com/help/5).

4.12 Naming Conventions for Pairs and Policies

Dynamic File Services pair names and policy names can be up to 32 characters long. The characters in the name must be compatible with the share naming scheme for the file system. Character restrictions for the pair or policy name exclude the following:

```
"*\ / [] : | <> += ; , ?
```

Control characters (less than 0x20) are also invalid. All other ASCII characters, including extended ASCII, are valid.

If a policy name or pair name contains a space, you must delimit multiple entries with a comma when working from the command line interface.

4.13 File Name Path Length

Dynamic File Services uses the .NET Framework, which has length restrictions for folder paths and file names. It allows a maximum of 248 characters in a folder name. The fully qualified file name must be less than 260 characters. For information, see *Long Paths in .NET* (<http://blogs.msdn.com/bclteam/archive/2007/02/13/long-paths-in-net-part-1-of-3-kim-hamilton.aspx>) in Microsoft Developers Network Blogs. If a file's folder path or fully qualified file name is too long, the Policy Engine cannot move the file during a policy run, and logs a `PathTooLongException` error.

4.14 Merged View for Standard Pairs

Dynamic File Services leverages Microsoft Network Sharing to provide the merged view of a standard pair to users. See the official Microsoft Windows documentation in the [Microsoft TechNet Library](http://technet.microsoft.com/en-us/library/cc732793.aspx) (<http://technet.microsoft.com/en-us/library/cc732793.aspx>) for information about how to set up network sharing on the computers where the Service is running.

To see the merged view of the two storage locations in a standard pair, users access the files through a Windows network share that you set up on the pair's primary path. You can have additional network shares nested above and below the primary path. When a user navigates the file tree by using a share above the primary path, the merged view is shown when the primary folder is opened to access the files in the pair. When a user navigates the file tree by using a share below the primary path, the merged view is automatically shown.

For secure access and authentication, users should access the data in the pair only via the network shares that are set up on the primary path. If users directly access files on the primary path or secondary path, potential issues can arise with duplicate files or with access rights and attributes being out of synchronization between primary and secondary folders.

To avoid these potential conflicts:

- ◆ Restrict direct access to the primary path and secondary path to administrative activities such as backup and restore.
- ◆ Use the merged view when changing ACL permissions and attributes for files and folders whenever possible as described in [Section 4.15, "File and Folder Attributes and ACL Permissions in a Standard Pair,"](#) on page 66.
- ◆ Remove (or strictly limit access to) network shares for the secondary path.
- ◆ Do not create nested shares above or below the secondary path.

In a Windows cluster, always use the Windows cluster management tool and not Windows Explorer to manage file shares to folders on shared drives. Otherwise, changes to share information made by using Windows Explorer are lost when these file shares fail over to other nodes in the cluster. Workstations should be in an Active Directory domain to access the cluster-managed file shares.

4.15 File and Folder Attributes and ACL Permissions in a Standard Pair

For a standard pair, Dynamic File Services automatically synchronizes the attributes and ACL (access control list) permissions on files and folders that it moves, whether the move is triggered by a policy or by a user that accesses the data via the merged view.

After creating a standard pair, ensure that you use the merged view of the pair's file tree when modifying the attributes and ACL permissions on files and folders in the pair. To make changes, access the pair via the network share on the primary path, then modify the settings.

- ♦ **Files:** When a file's ACLs are modified via the merged view, DynamicFS sets the permissions for the file on the primary path or secondary path, depending on where the file is currently stored.
- ♦ **Folders:** When a folder's attributes or ACLs are modified via the merged view, DynamicFS sets the permissions for a folder on both the primary and secondary paths, because folders have an instance in both locations.

To add user name entries to a folder's ACL list, you must make the changes directly for the instance of the folder on the primary path. Windows does not allow user names to be added to the ACL list when you are working in the merged view. DynamicFS monitors for security changes on the primary path and automatically synchronizes the ACL settings on the instance of the folder on the secondary path.

WARNING: Modifying the attributes and ACLs on folders when you are working outside of a merged view can cause conflicts for these values between the two folder instances on the primary path and secondary path.

To identify conflicts caused by mismatched attributes or ACL settings on a folder, you can run the DynamicFS Pair Check utility (`DswPairCheck.exe`) to manually detect and report the attribute and ACL differences between the two instances of the folder. For information, see [Section 8.11, "Reporting Conflicts for Attributes and ACL Permissions on Folders,"](#) on page 153.

4.16 Duplicate Folders in a Standard Pair

In a Dynamic File Services standard pair, a second instance of a folder is created on a target path as files are moved between the primary and secondary locations. In a merged view, users are not aware that two instances of a folder exist. If a folder is empty in one of the locations, the empty folder is not removed. If a user deletes a folder, both instances of the folder are removed.

Dynamic File Services automatically synchronizes the metadata information (such as ACLs and attributes) from the primary location instance of the folder to its secondary instance when the folders are accessed via the merged view or during a policy run. Because some metadata cannot be modified through a network share, DynamicFS also monitors instances of folders on the primary path for changes to metadata. For information about setting ACLs and attributes for folders, see [Section 4.15, "File and Folder Attributes and ACL Permissions in a Standard Pair,"](#) on page 66.

The attributes and ACL settings for the two folder instances can become out of synchronization if you modify a folder's metadata by accessing a folder directly instead of via the merged view. Accessing a folder instance directly on the secondary path creates a conflict because the attributes or permissions are changed only on that instance of the folder, but not on its matching instance on the primary path.

For information about detecting and reporting conflicts in metadata on folders, see [Section 8.11, "Reporting Conflicts for Attributes and ACL Permissions on Folders,"](#) on page 153.

4.17 Duplicate Files in a Standard Pair

In a Dynamic File Services standard pair, each file is intended to have a single instance on either the primary path or the secondary path. When a file is created, modified, or deleted through the merged view, DynamicFS automatically manages the file so that a single instance of a file exists. When policies are enforced, DynamicFS moves the single instance of a file between the two paths, and deletes the original copy of the file after the move is successfully completed.

Duplicate files are those where two instances the file have the same name and relative path in both locations. The content of the files might differ. If two instances of a file occurs only the file instance on the primary is visible and accessible to the user. Users are not aware if duplicate files are present. However, a message is logged for the administrator. If a policy run attempts to move a file that has a duplicate in the target location, the move fails, and the error is logged in the *Statistics > Policy execution history > Files not moved* report.

Duplicate files are not intended to occur, but the situation can arise when you restore files from backup media, if files are accessed outside the merged view, or if the media becomes unavailable during a policy run and a file move is incomplete. Each of these situations is described in more detail below. For information about detecting and reporting duplicate files, see [Section 8.12, "Reporting Conflicts for Duplicate Files,"](#) on page 154.

- ♦ [Section 4.17.1, "Restoring Files from Backup Media,"](#) on page 67
- ♦ [Section 4.17.2, "Accessing Files Outside the Merged View,"](#) on page 67
- ♦ [Section 4.17.3, "Losing a Media Connection when Moving Files,"](#) on page 68

4.17.1 Restoring Files from Backup Media

Duplicate files can occur when you restore files from backup media if different instances of a file are copied to the primary storage location and the secondary storage location. Backups for the primary and secondary are typically made at different times. Whether a file is captured in both backups depends on which policies were run in between the two backups. If you back up the primary path more frequently than the secondary path, the instance of the file that is restored on the primary storage area should be the most current of the two instances of the file.

4.17.2 Accessing Files Outside the Merged View

Duplicate files can also occur if users are allowed to access files directly instead of via the merged view. For example, a duplicate file can be created if a user has direct access to the two paths and manually copies a file from one path to the other. Users should always use the merged view of files in the pair when performing actions on them.

4.17.3 Losing a Media Connection when Moving Files

Duplicate files might occur if the source location or the target location of a file move becomes unavailable during a policy run. For example, if a connection is lost between the server and the secondary storage media, the file move that is in progress at that time cannot be completed, and the policy run is stopped. An `Invalid File Handle` error for the file is reported in the policy move log in the *Statistics > Policy execution history > Files not moved > Comment* field.

For file moves, Windows creates a sparse file in the target location that has the same file name and size as the original, and then copies the bits to the file. The original instance of the file is not deleted until all bits have been successfully copied to the new file instance. If the file move is interrupted, the information in the target location might be incomplete, and two instances of the file remain, which creates a duplicate file.

When duplicate files are caused by an incomplete move, the valid file is the instance on the source location of the move, and the invalid file is the instance on the target location. If the incomplete file resides on the primary location, users see only the corrupted file. However, the valid file instance remains on the secondary location, and no data is actually lost.

To resolve this duplicate file situation, you must identify the duplicate files and delete the invalid instance of the file. Your knowledge of the policy direction setting for the policy run where the duplicate file was created can help to determine which instance of the file is valid. You can review the *Statistics > Policy execution history > Files not moved* report for the policy run to identify the duplicate file and the target location of the policy run. You can also run the Pair Check (`dswPairCheck.exe`) utility to find the duplicate file. For information about using the Pair Check utility to identify duplicate files, see “[Dynamic File Services Pair Check Utility](#)” in the *Dynamic File Services 2.2 Client Commands and Utilities Reference*.

4.18 Orphan (Ownerless) Files

In a Windows server or Active Directory domain, a unique value called a *Security Identifier* (SID) is associated with a user name. When a user creates a file, the default owner is normally the SID for the user that creates the file. If the user is a member of the Administrators group or the Domain Admins group, the default owner is the SID for the group, not the SID for the individual user account. If a user’s user name is deleted from the server or Active Directory, the user name becomes invalid. The user’s files contain the user’s SID, but the SID is no longer associated with a valid user name. This document refers to those files as *orphan* files, or *ownerless* files.

- ◆ [Section 4.18.1, “Moving Ownerless Files,” on page 68](#)
- ◆ [Section 4.18.2, “How Ownerless Files Are Managed in a Retention Pair,” on page 69](#)
- ◆ [Section 4.18.3, “How in Ownerless Files Are Handled in Workgroups,” on page 70](#)

4.18.1 Moving Ownerless Files

To move orphan files between paths in a pair, you can use any policy rule, including File Owners. Dynamic File Services adds a `{No owners}` user that you can select when you set up a File Owners policy. In a policy with a File Owner rule, the policy engine checks that the users and groups in the policy are valid each time the policy runs. It also checks the current membership of the valid groups. The File Owner policy normally moves only those files associated with valid user names, valid group names, and current members of valid groups. It can also move ownerless files if you select the user `{No owner}` for the policy.

The manual move process moves any file that you specify in the list of files to be moved. The owner is not a consideration in whether the file is moved.

4.18.2 How Ownerless Files Are Managed in a Retention Pair

For retention pairs, Dynamic File Services keeps a UserName-SID database (`DswUserDB.xml`) that contains information about the user names or group names associated with the file owners' SIDs. The file is located in the `C:\Program Files\Dynamic File Services\` directory, or in the custom install location.

As a file is moved to a retention repository, an entry is added to the UserName-SID database if the name is valid. For example, the following is an entry for a local Administrators group's SID in the `DswUserDB.xml` file:

```
<TrackerEntry>
<SID>S-1-5-32-544</SID>
<Name>Administrators</Name>
<IsValid>true</IsValid>
</TrackerEntry>
```

An entry is kept until there are no more files with the SID in any repositories of the retention pairs on the server. Because the user name is known to Dynamic File Services, the user's files do not become orphaned in the repository if the user name is deleted from the server or from Active Directory, even though the files might be orphaned from the file system point of view.

The user names and group names in the database are validated daily (at 0030 hours by default) against the users and groups for the server and for the Active Directory domain (if present). The name's validity status is set to *false* if a name becomes invalid. If an invalid user name becomes valid again (such as through an Active Directory restore action), the validity setting is set to *true* when the database is next validated.

Dynamic File Services validates the user names and group names against the information stored in the Active Directory domain controller for the server. After you remove a user name or group name from Active Directory, the following must occur before Dynamic File Services is aware of the change:

1. Active Directory synchronizes the invalid status of the name with the domain controller for the Dynamic File Services server. When this update occurs depends on Active Directory.
2. Dynamic File Services runs the daily validation check for the Username-SID database on the server.

During a retention review, a reviewer sees the name as valid until the Username-SID database has been updated. The Retention Review Service displays a file owner's name with a strikethrough if the name is marked as invalid in the Username-SID database. This allows you to sort files by file owners, even if user names become invalid.

If an orphan file is moved to the repository, a new entry for its SID cannot be created in the UserName-SID database file because the user name is unknown to the file system. The Retention Review Service displays the file owner as *Unknown*. However, if other files in any repository on the server were moved there when the user name was valid, an entry exists for that relationship in the database, and the Retention Review Service can display the file owner's name with a strikethrough.

If you restore an orphan file to the primary location, the owner information is not known to the NTFS file system. Only the SID is known from the file's metadata. If the restored orphan file is the last file with that SID in any of the pairs' repositories, its SID information is also removed from the UserName-SID database. If you move the orphan file back to the repository, the user name is now unknown to the Retention Review Service.

When a SID is not found for any of the remaining files in any of the pairs' retention repositories, the SID's entry is removed from the UserName-SID database. The entry is removed whether the user name information is valid or invalid at that time.

4.18.3 How in Ownerless Files Are Handled in Workgroups

In a Windows Workgroup, each individual server maintains its own list of user names. Each server assigns a unique Security Identifier to the user name. Even though a user is given the same user name on different servers, the user's files show different SIDs as the file owner, depending on which server is hosting them. This is not an issue in an Active Directory domain, because a user's user name and SID are the same for all servers in the same tree or forest.

When you use Dynamic File Services in a Windows Workgroup, a file owner's user name is lost when a file is moved from one server (primary or secondary) to another server (secondary or primary) for any type of pair. The file owner is the SID that is associated with the user name on the server where the file was created, or where the file ownership was last set. The relocated file is considered ownerless on the destination server, because the system cannot find a matching user name for the SID. The original SID is stored with the file. If the file is moved back to its original server, such as through a policy run or a retention review restore, the file owner is known on that server, assuming that the user name is still valid.

Although SIDs are unique on a given server (or across all servers in the same domain or forest), it is remotely possible (if statistically unlikely) that two servers in a Workgroup might generate the same SID. In that case, the SID on the original server might match a SID for a user name on the destination server, but it is highly unlikely that the SID represents the same user name or user.

4.19 System Files and Other Files that Are Not Moved

The policy engine ignores files in the Windows system folder and other system files in the root folder, such as the System Volume Information and Recycling Bin folders. The system files are not moved.

The policy engine also ignores files with the following file attributes:

- ♦ **System:** The file is part of the operating system, or is used exclusively by it.
- ♦ **Device:** The file is reserved for system use. It indicates the file is an interface for a device driver for peripheral devices, such as printers (PRN) and serial ports (COM).
- ♦ **Encrypted:** The folder or file is encrypted by the NTFS Encrypting File System (EFS). For a file, this means that all data in the file is encrypted. For a folder, this means that encryption is the default for newly created files and subdirectories.
- ♦ **Offline:** The data of the file is not immediately available. This attribute indicates that the file data has been physically moved to offline storage, such as by hierarchical storage management (HSM) software.
- ♦ **Temporary:** The file is being used for temporary storage. File systems attempt to keep all of the data in memory for quicker access rather than flushing the data back to mass storage. A temporary file is usually deleted by the application as soon as it is no longer needed.

4.20 Policy Schedules

Policies can be scheduled, unscheduled, and executed on demand. A policy run scans the pair's path, then moves the files that satisfy the criteria for the move. While policy runs are in progress, performance is slower. It is best to schedule policy runs in off-peak hours so that the user experience is not adversely affected.

Multiple policies can be scheduled to run at the same time. The policies are grouped for the run according to the direction files are to be moved: Primary to Secondary, then Secondary to Primary. When policies are run in combination, a file is moved if its conditions meet the rules defined in any one of the policies. That is, the different policies are enforced with an OR condition. The rules within an individual policy are enforced as an AND condition.

Only one scanning action can be performed on a pair at any given time. Actions include the following:

- ♦ Running one or more policies on a pair.
- ♦ Previewing one or more policies on a pair by doing a test run that reports what files would be moved if the policy were enforced at that time.
- ♦ Scanning the pair to collect file statistics for the pair history. The history scan runs once daily by default. You can set it to run hourly or weekly. For information, see [Section 8.10, "Scheduling the Pair History Scan,"](#) on page 153.

Dynamic File Services does not queue the requests for activities. If the pair is busy, the pending action might not run.

For interval-based policies, the policy can start whenever the pair is available during the specified interval. If the pair is busy at the beginning of the interval, the pending action retries to start itself until the end of the interval. After it starts, the policy runs until complete, or until the end of the interval, depending on which event occurs first.

For policies that begin at a given start time and run until complete, if the pair is busy at the scheduled start time, the pending action retries to start itself for up to 20 minutes beyond the scheduled start time. If you schedule the policies to start at the same time, they can run concurrently. If you schedule policies to begin at different times, there must be sufficient time available for one policy to complete before another is scheduled to begin.

For example, if PolicyA and PolicyB are scheduled to run on the same pair at 12:00 a.m. and 12:05 a.m. respectively, and each policy takes 30 minutes to complete, PolicyB probably never runs. However, if you schedule the two policies to start at the same time, both policies are run in combination.

To avoid scheduling conflicts, we recommend that you use one of the following approaches when scheduling policies for a pair:

- ♦ **Same Schedule:** Schedule the pair's assigned policies to start and stop at the same time. This allows the Standard Policy engine to run them concurrently, which is the most efficient way to enforce policies. Policies can be run manually at other times if needed.
- ♦ **Non-Overlapping Schedule:** Schedule the pair's policies so that each policy runs in its own window of time, making sure that the start times and stop times do not overlap. Policies can be run manually as needed at unscheduled times. This approach makes it more difficult to predict idle times to run policies manually on the pair.

For information about how scheduling works, see [Section 10.4.1, "Understanding How Changes Affect the Scheduled Run Interval,"](#) on page 193.

4.21 Time Displays

All time stamps are stored and displayed in the server's time zone, regardless of where the client is located. That is, all time stamp viewing and configuration is relative to the Dynamic File Services server you are managing.

4.22 Event Logging

Dynamic File Services uses the Microsoft Event Viewer for logging the Dynamic File Service start/stop events and fatal errors such as application exceptions.

4.23 Using Antivirus Software with Pairs

Dynamic File Services can be used on servers running antivirus software. There are two common scenarios:

- ♦ Map a drive to the network share for the primary path, and run your antivirus software on the share. This scans both primary and secondary files through the merged view.
- ♦ Run your antivirus software separately on each drive, or run it separately on the primary path and secondary path.

4.24 Using Backup Software with Pairs

Dynamic File Services can be used with backup software. The administrator separately backs up the primary path and secondary path. Backup frequency typically differs between the two locations, with the frequency determined by data volatility and importance. The primary location is typically backed up more often than the secondary.

4.25 Using Compression with Pairs

Dynamic File Services supports using compression in a pair. DynamicFS behavior complies with the expected behavior for copying or moving compressed files:

- ♦ If the user copies or moves a compressed file to an uncompressed folder, the file is decompressed.
- ♦ If the user copies or moves an uncompressed file to a compressed folder, the file is compressed.

4.26 Using Disk Quotas with Pairs

Dynamic File Services supports using disk quotas on the primary path, secondary path, or both paths. If the primary and secondary locations are on the same disk, the disk quota applies across both areas. Quotas are enforced by the NTFS file system.

In a typical configuration, different disks are used for the primary and secondary locations. If the disk quota is enforced on the primary disk and a user reaches the set quota, the user is no longer able to create new files. DynamicFS also cannot move the user's files from the secondary disk to the primary disk. However, if a policy moves some or all of the user's files to the secondary location, the freed space on the primary location is again available to the user.

If you also apply a disk quota on the secondary disk, you are dealing with two separate quotas: one for the primary path, and one for the secondary path. There are two conditions to consider:

- ♦ **User Reaches the Primary Quota:** If the user reaches the quota on the primary path but not on the secondary path, the effect is the same as if the second quota does not exist.
- ♦ **User Reaches the Secondary Quota:** If the user reaches the quota on the secondary path but not on the primary path, the user can create files because new files are created on the primary location. However, DynamicFS cannot enforce policies to move the user's files from the primary to the secondary.

Depending on where the user's files are located, the user's effective quota is somewhere between the minimum quota you set on the primary or secondary path up to the potential maximum, which is the sum of the two quotas.

4.27 Disk Space Availability and Moving Files

For policy runs and manual file moves, a file can be moved only if there is enough free space available in the destination location. For retention pairs, a policy run's manifest is saved on the secondary path at the end of the run. If the secondary disk is full at the time that the manifest is being written out, the write fails, and the manifest cannot be saved.

4.28 Using Encryption with Pairs

Dynamic File Services treats all files and folders as if they are not encrypted.

WARNING: If an encrypted file or folder is moved by a policy, the encryption key changes and the data is no longer accessible to the user. The data is effectively lost.

- ♦ [Section 4.28.1, "Windows File and Folder Encryption," on page 73](#)
- ♦ [Section 4.28.2, "Hardware-Level Disk Encryption," on page 73](#)

4.28.1 Windows File and Folder Encryption

Dynamic File Services does not support using file or folder encryption for pairs.

To prevent possible data loss, ensure that your pair does not use file and folder encryption by doing the following:

- ♦ Choose nonencrypted folders for the primary path and secondary path for the pair. The folders should not contain encrypted files or folders.
- ♦ Do not encrypt files or folders in the primary path and the secondary path of the pair.
- ♦ Do not encrypt parent folders above the pair's primary path and secondary path.

4.28.2 Hardware-Level Disk Encryption

Dynamic File Services supports using some third-party hardware-level disk encryption for drives that are used in pairs. The file moves are not affected by hardware-level disk encryption because the encryption operates at a level beneath the file system.

4.29 Using Microsoft Distributed File System with Pairs

Dynamic File Services supports using Microsoft Distributed File System (MS-DFS) to connect to a pair. The target folder of an MS-DFS link should be the network share on the primary path of the pair. Pairs should not be created for the MS-DFS namespace or links therein. Both single-server and domain-based MS-DFS Namespace configurations are supported. The primary path in a pair can be set up in an MS-DFS Replication configuration on multiple servers.

Users can map a drive on their workstations to the MS-DFS Namespace share. The target link takes users to the network share on the pair's primary path. The users see the same merged view of the pair as if they connect directly to the network share on the pair's primary path. This does not prohibit other users from mapping directly to the network share on the pair's primary path. It is up to you which share path you give to your users.

It does not matter in which order you create pairs and MS-DFS links. The target share path of an existing MS-DFS link can be the primary path for a new pair. The network share on the primary path of an existing pair can be the target of a new MS-DFS link.

In a Windows cluster, you must select the cluster resource group that contains the file system instead of selecting the server when you set up the MS-DFS namespace and MS-DFS links to shares on that resource. The cluster resource group contains the folder that is used as the primary path in the pair.

Do not create a pair for the MS-DFS Namespace folder and its contents. The MS-DFS Namespace folder should not be nested above or below any path that contains a DynamicFS primary path or secondary path.

IMPORTANT: For all issues related to configuring and managing Microsoft Distributed File System, see the official Microsoft documentation for your Windows Server operating system in the [Microsoft TechNet Library \(http://technet.microsoft.com/en-us/library/cc753479\(WS.10\).aspx\)](http://technet.microsoft.com/en-us/library/cc753479(WS.10).aspx).

The deployment scenarios in the following sections provide general guidelines for using Dynamic File Services and Microsoft Distributed File System in a Windows environment.

- ♦ [Section 4.29.1, "Example: Single-Server MS-DFS Namespace with Links to DynamicFS Pairs on Different Servers," on page 75](#)
- ♦ [Section 4.29.2, "Example: Single-Server DFS Namespace with Links to DynamicFS Pairs on the Same Server," on page 77](#)
- ♦ [Section 4.29.3, "Example: MS-DFS Namespace and Replication with DynamicFS Pairs," on page 78](#)

4.29.1 Example: Single-Server MS-DFS Namespace with Links to DynamicFS Pairs on Different Servers

Figure 4-1 illustrates a configuration in an Active Directory environment where the Microsoft Distributed File System server links to the primary share paths for Dynamic File Services pairs on different servers. DynamicFS is installed on the servers where you create the pairs, but it is not installed on the MS-DFS Server. Users connect to the MS-DFS namespace shares, which link to the shares on the primary path of the pairs.

Figure 4-1 Using MS-DFS with Dynamic File Services Pairs on Different Servers

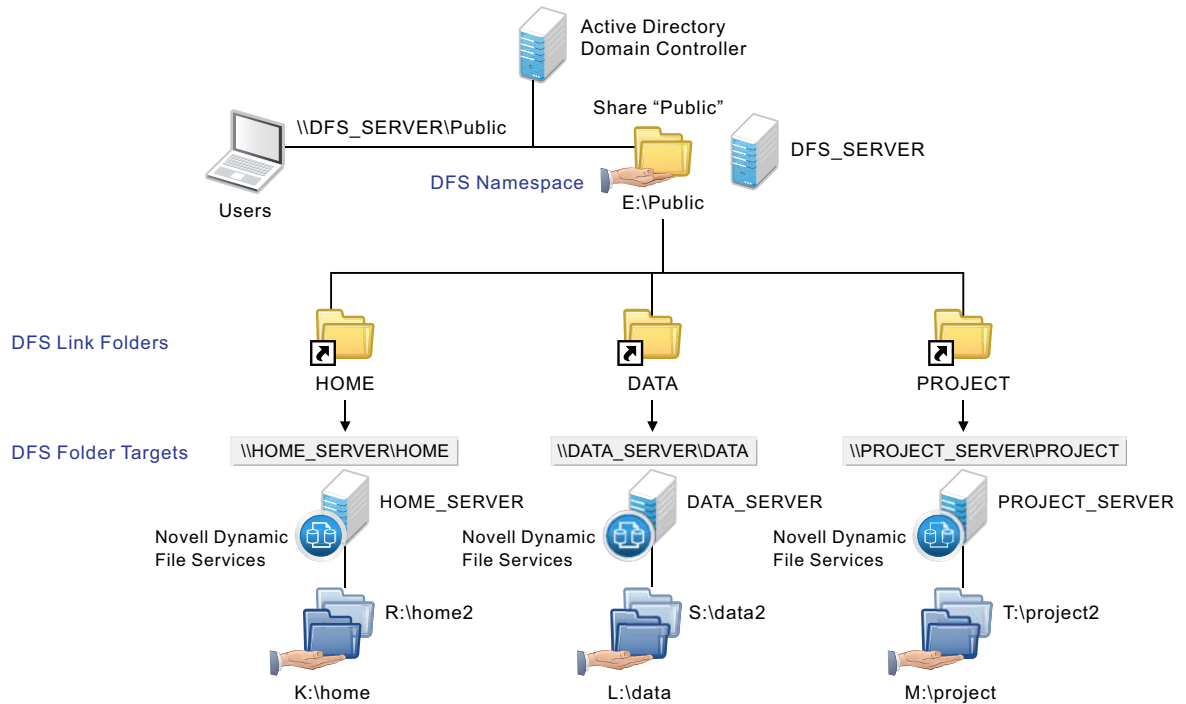
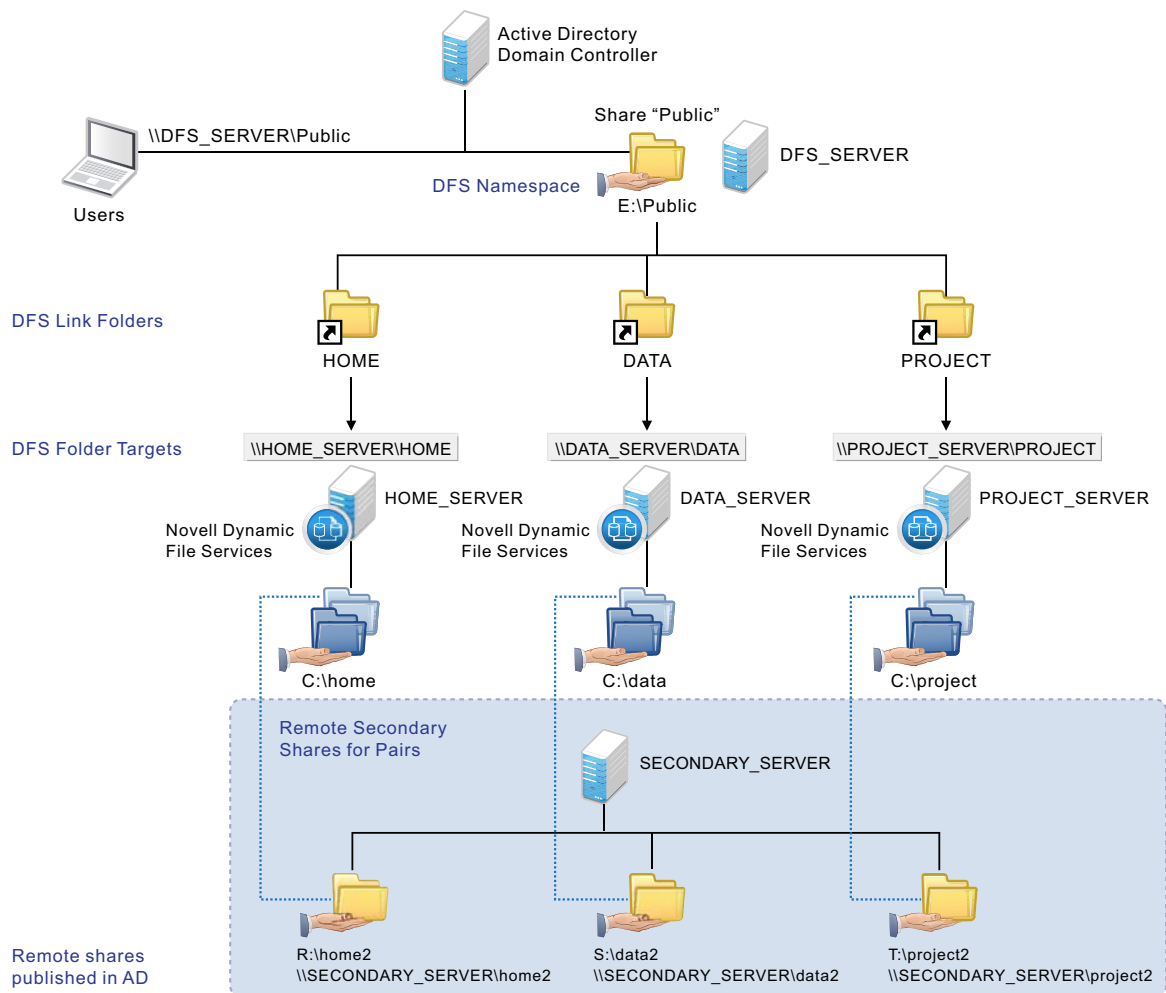


Figure 4-2 illustrates a configuration similar to Figure 4-1, where the MS-DFS links point to pairs on different servers. In this example, the pairs use remote secondary paths. The remote share paths are published in Active Directory, but are not visible to users. All access to pair data is made via MS-DFS links that point to the primary paths on the pairs. The MS-DFS links should never point to the remote secondary paths.

Figure 4-2 Using MS-DFS with Dynamic File Services Pairs on Different Servers with Remote Secondary Paths



4.29.2 Example: Single-Server DFS Namespace with Links to DynamicFS Pairs on the Same Server

Figure 4-3 illustrates a configuration where the Microsoft Distributed File System links point to shares on the same server. In this case, DynamicFS is installed on the MS-DFS Server. The MS-DFS links point to the network shares on the primary paths of the pairs. The MS-DFS Namespace folder is not configured as a pair, and it is not nested with any of the primary paths and secondary paths that are used in the pairs. Users connect to the MS-DFS namespace shares, which link to the shares on the primary path of the pairs.

Figure 4-3 Using MS-DFS and Dynamic File Services on the Same Server

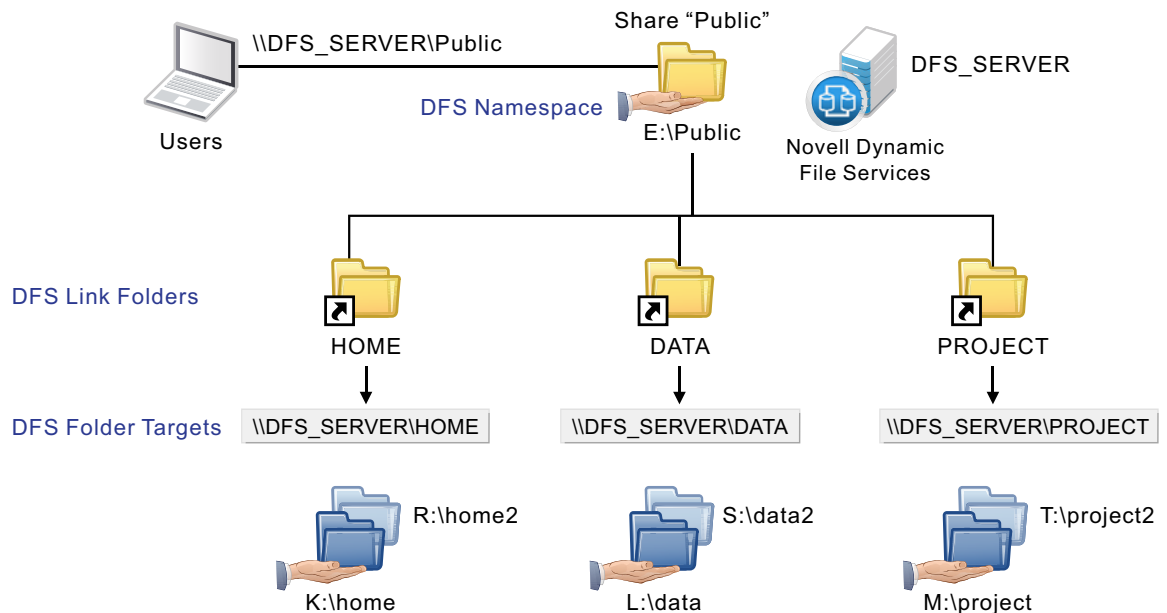
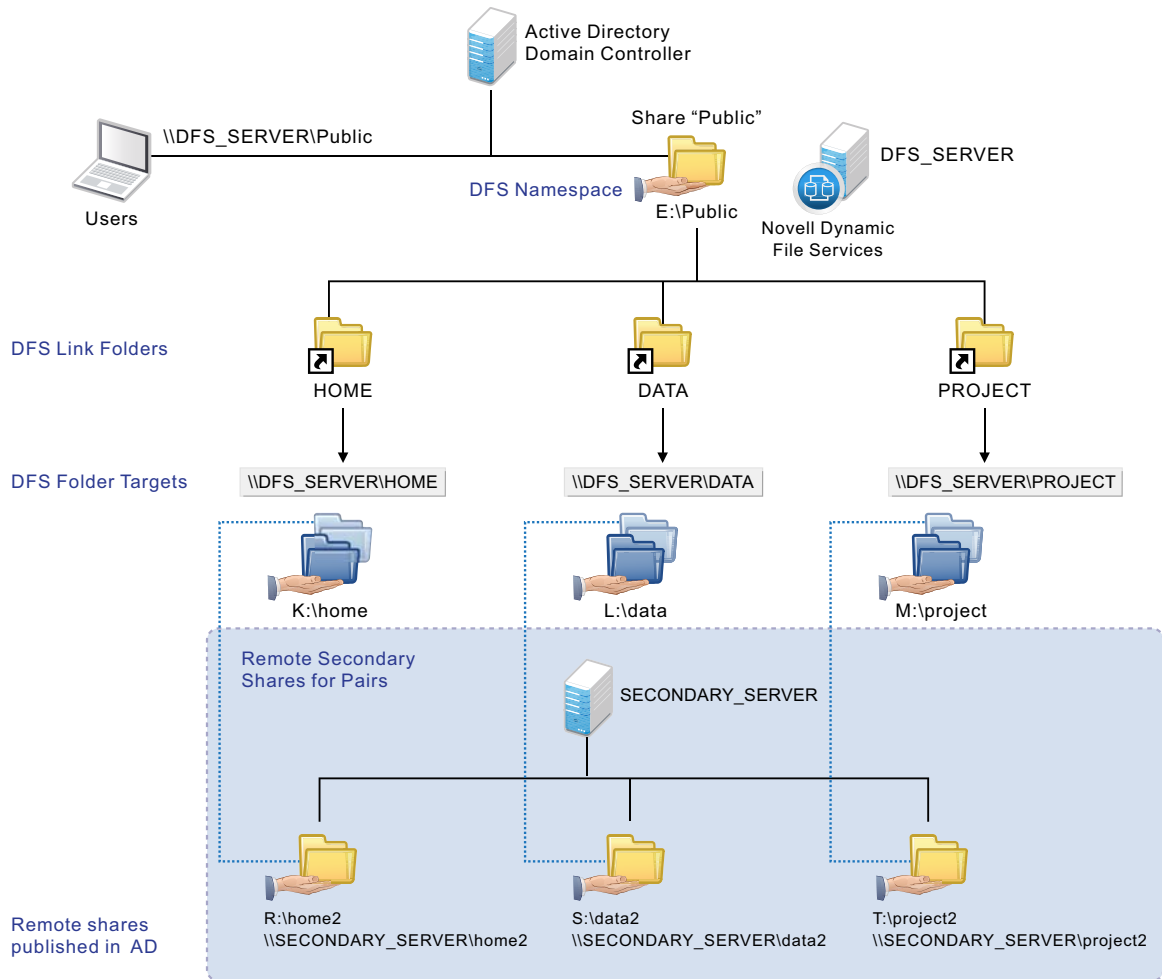


Figure 4-4 illustrates a configuration similar to Figure 4-3, where the MS-DFS links point to shares on the same server. In this example, the pairs use remote secondary paths. The remote share paths are published in Active Directory, but are not visible to users. All access to pair data is made via MS-DFS links that point to the primary paths on the pairs. The MS-DFS links should never point to the remote secondary paths.

Figure 4-4 Using MS-DFS with Dynamic File Services Pairs on the Same Server with Remote Secondary Paths



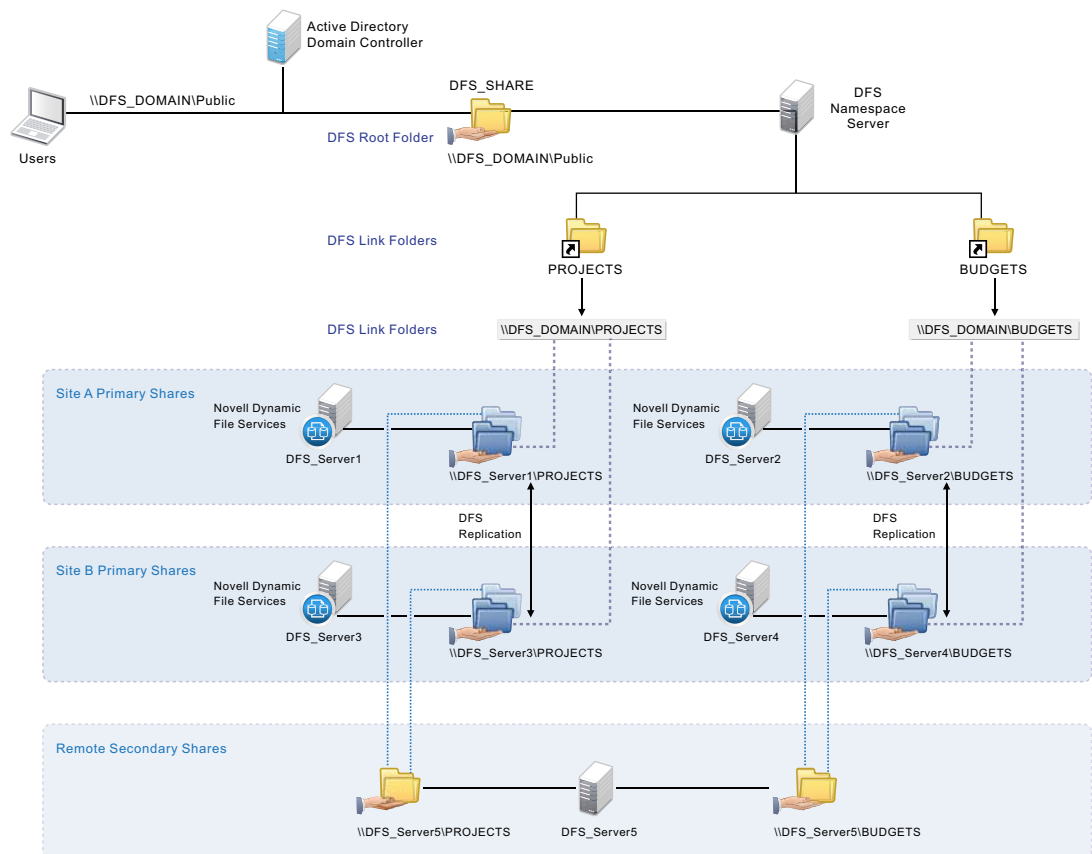
4.29.3 Example: MS-DFS Namespace and Replication with DynamicFS Pairs

Dynamic File Services supports using Microsoft Distributed File System links to DynamicFS pairs on different servers where the pair's primary path is replicated between the two servers by MS-DFS Replication. DynamicFS is installed only on the servers where you create pairs. In this configuration,

any MS-DFS namespace server can respond to a client mapped to the share `\\DFS_DOMAIN\Public` or other shares in the namespace. The target folder uses MS-DFS Replication to synchronize the target folder's contents across multiple servers. MS-DFS can send requests to any of the member folders in that group. MS-DFS connects a user to the server that is physically closest to the user's location.

In [Figure 4-5](#), the `\\DFS_Server1\PROJECTS` folder is replicated to `\\DFS_Server3\PROJECTS` by using an MS-DFS Replication Group. Requests for the `\\DFS_DOMAIN\Public\PROJECTS` folder can go to either of the replicated folders.

Figure 4-5 Using an MS-DFS Namespace and Replication with Dynamic File Services



To use a replicated folder as a primary path, you must create a DynamicFS pair on each of the servers and specify the replicated folder as the primary path. Each of the pairs use the same remote secondary path. For example, you create a DynamicFS pair on the `DFS_Server1` server by using the `\\DFS_Server1\PROJECTS` folder as the primary path, and specifying the `\\DFS_Server5\PROJECTS` share as its remote secondary path. You also create a DynamicFS pair on the `DFS_Server3` server by using the `\\DFS_Server3\PROJECTS` folder as the primary path, and specifying the `\\DFS_Server5\PROJECTS` share as its remote secondary path.

You can configure policies on one or any of the primary DynamicFS servers that host the replicated folder. DynamicFS policies are server-centric and are not stored in Active Directory, so the policies defined on a server run only on that server. If you want to run a policy on different instances of the pair, you must create or import the policy on each server in the replication group. It is not necessary to use the same policies on each of the servers.

IMPORTANT: Ensure that you run policies on only one instance of the pair at a time.

When a policy runs on one of the servers, the MS-DFS Replication service automatically synchronizes the policy actions made to that server's primary folder with the other folders in the replication group. When a DynamicFS policy run moves a file from the primary path to the secondary path, it is a copy-then-delete action. MS-DFS Replication sees the deletion and automatically deletes the file on the other primary paths. When a policy run moves a file from the secondary path to the primary path, MS-DFS Replication sees a new file and automatically copies the file to the other primary paths.

4.30 Using Dynamic File Services in a Windows Cluster

Dynamic File Services supports using pairs and policies in a Windows failover cluster. However, the software is not cluster aware.

This section describes known issues for using Dynamic File Services in a Windows cluster. For information about installing Dynamic File Services in a cluster, see the [Dynamic File Services 2.2 Installation Guide](#).

- ♦ [Section 4.30.1, "Management Console," on page 80](#)
- ♦ [Section 4.30.2, "Service Controller," on page 80](#)
- ♦ [Section 4.30.3, "Merged View," on page 80](#)
- ♦ [Section 4.30.4, "Executable Files," on page 81](#)
- ♦ [Section 4.30.5, "Standard Policy Engine and Registry Information," on page 81](#)
- ♦ [Section 4.30.6, "Moving the Service Cluster Resource Between Nodes," on page 81](#)

4.30.1 Management Console

When you use the Management Console to manage the Dynamic File Service in a cluster, use the cluster resource IP address of the Service to connect to the cluster instead of the server node's IP address.

When you create pairs and policies, ensure that the primary path and secondary path of each pair reside on shared storage that can be failed over together between the cluster nodes.

4.30.2 Service Controller

The Service Controller starts automatically at the beginning of each session when you log in to the active node where the disk that contains the Novell Dynamic File Services software is currently mounted. The controller does not start if you log in to the failover node because the shared disk is not mounted there.

4.30.3 Merged View

In a Windows cluster, always use the Windows cluster management tool and not Windows Explorer to manage file shares to folders on shared drives. Otherwise, changes to share information made by using Windows Explorer are lost when these file shares fail over to other nodes in the cluster. Workstations should be in an Active Directory domain to access the cluster-managed file shares.

4.30.4 Executable Files

The Dynamic File Service is started automatically by the Windows cluster management tool when it brings the Dynamic File Service cluster resource online. The Service is stopped when the Windows cluster management tool brings the resource offline. Ensure that you use the Windows cluster management tool to start and stop the Service, and not the Dynamic File Service Controller.

Other DynamicFS executable files are called from the Service, or can be started manually when you are logged in on the active nodes as user in the `Dynamic File Services` group (or as the Administrator user on that node). Conversely, you cannot start the executable files on the failover node because the cluster drive resource that contains the files is not attached to it.

4.30.5 Standard Policy Engine and Registry Information

Policy moves and previews should work correctly on the active node, regardless of which node is active, if the installation location is correct in the registry. If policy runs and preview runs do not work after you set up your DynamicFS cluster resource group, ensure that the node's registry contains the right installation location.

4.30.6 Moving the Service Cluster Resource Between Nodes

Before initiating a non-failover move of the Dynamic File Service cluster resource from the active node to a failover node, ensure that you have quiesced the Service as described in [“Prerequisites for Stopping or Restarting the Service” on page 106](#).

If a policy is running when the move is initiated, the resource enters an *Offline Pending* state until DynamicFS can gracefully complete the in-progress file copies, shut down the policy run, and go offline for the move. This process can take up to 10 minutes. During this time, the failover cluster File Server and IP address for the Service are unavailable, and users are unable to access the files.

If the active node crashes when a policy run is in progress, the Service also crashes. The Service cluster resource immediately goes offline and fails over to the failover node. The following issues must be addressed after the Service cluster resource is back online:

- ♦ The policy run does not automatically resume or start over after the failover.
- ♦ There is no ability to gracefully complete any file copies that are in progress for the policy run.

There is no data loss, but duplicate files might exist, where the original file is good but the instance of the file in the target location is only a sparse file.

To resolve this problem:

1. Check for duplicate files in the pairs where the policy was running by running the `Pair Check` utility on each pair. For information, see [Section 8.12, “Reporting Conflicts for Duplicate Files,” on page 154](#).
2. For each reported duplicate file conflict, delete the instance of the file in the target location of the policy move.
3. After all duplicate file conflicts have been resolved, the policy run can be started manually, or the policy runs at its next scheduled time.

4.31 Using Dynamic File Services in Windows Safe Mode

The Dynamic File Service does not load or run in Windows Safe Mode.

The Service Controller can be used in Windows Safe Mode to modify the Service settings. However, you cannot start the Service while the computer is in Safe Mode.

The `DswDump.exe` and `DswPairCheck.exe` utilities can be used in Safe Mode to gather and report information from the Dynamic File Services databases. For details about using these commands, see the [Dynamic File Services 2.2 Client Commands and Utilities Reference](#).

If networking is enabled in Safe Mode, the Dynamic File Services Management Console can be used to connect to and manage other Dynamic File Services servers.

5 Using the Management Tools

Novell Dynamic File Services (DynamicFS) provides management tools to help you manage the service, create and manage pairs and policies, and repair the pair, policy, and schedule databases. This section describes how to access the tools and where to find information about the tasks you can perform with them.

- ♦ [Section 5.1, “Service Controller,” on page 83](#)
- ♦ [Section 5.2, “Management Console,” on page 86](#)
- ♦ [Section 5.3, “Repair Tool,” on page 95](#)
- ♦ [Section 5.4, “Filter Driver Diagnostics,” on page 95](#)
- ♦ [Section 5.5, “Command Line Interface and Utilities,” on page 95](#)


5.1 Service Controller

The Service Controller allows the Administrator user or users with Administrator privileges to view or configure the settings for the Dynamic File Service and to start or stop the Service. It displays the current Service status (enabled or disabled). You can launch the [Management Console](#) to create and manage pairs on the same server or on different DynamicFS servers.

The Service Controller can be used in Windows Safe Mode to modify the Service settings. However, you cannot start the Service while the computer is in Safe Mode.


- ♦ [Section 5.1.1, “Accessing the Service Controller,” on page 83](#)
- ♦ [Section 5.1.2, “Service Controller Tasks Quick Reference,” on page 85](#)
- ♦ [Section 5.1.3, “Starting the Service Controller,” on page 85](#)
- ♦ [Section 5.1.4, “Stopping the Service Controller,” on page 86](#)

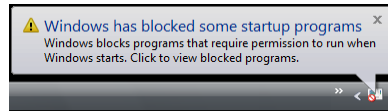
5.1.1 Accessing the Service Controller

The Service Controller attempts to start automatically when any user logs in to the desktop of a server where the Service component is installed. Administrator privileges are required to start the Service Controller. When the Service Controller is running, an icon () is displayed in the Windows notification area (the lower right corner of the computer screen).

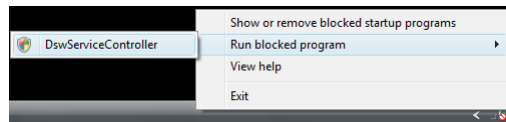
- 1 Log in to the DynamicFS server.

IMPORTANT: You must log in as a user with Administrator privileges to configure the Service settings, to start or stop the Service, and to use the Repair Tool.


- 2 If the login user name is other than the Administrator user, the Service Controller is blocked from starting. Do the following to unblock the program and allow it to run as Administrator:
- 2a Click the “Windows has blocked some startup programs” message that appears in the Notification area, or click on its *Blocked Program* icon () to open the menu.



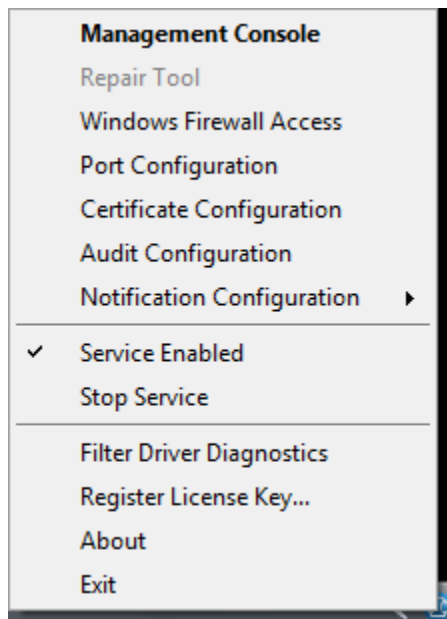
- 2b In the *Blocked Program* menu, select *Run Blocked Program*.
- 2c From the list of blocked startup programs, select *DswServiceController*.



- 2d In the Windows permission window, click *Allow* to confirm that you want to run the program as Administrator.

The Service Controller starts and displays the *Service Controller* icon () in the notification area.

- 3 Right-click the *Service Controller* icon to access the menu.



For information about the options, see [Section 5.1.2, “Service Controller Tasks Quick Reference,” on page 85](#).


5.1.2 Service Controller Tasks Quick Reference

Use the quick reference in this section to find information about the tasks you can perform from the Service Controller. Administrator privileges are required to start and stop the Service, to modify the configuration of the Service, or to use the Repair Tool.

Table 5-1 *Service Controller Menu Options*

Menu Option	For information, see
Management Console	Section 5.2, “Management Console,” on page 86
Repair Tool	Chapter 14, “Repairing the Pair, Policy, and Schedule Databases,” on page 245
Windows Firewall Access	Section 6.9, “Configuring Firewall Access for the Service Port,” on page 122
Port Configuration	Section 6.10, “Configuring Ports for the Service and Retention Review,” on page 124
Certificate Configuration	Section 6.8, “Configuring a Certificate for Secure Remote Management Sessions,” on page 116
Audit Configuration	Section 6.5, “Configuring Audit Tracking Events,” on page 108
Notification Configuration > Email	Section 6.6, “Configuring the Notification Service,” on page 108 Section 6.6.2, “Setting Up Email Notifications,” on page 110
Service Enabled or Service Disabled	Section 6.4.1, “Viewing the Service Status,” on page 105
Start Service	Section 6.4.2, “Starting the Dynamic File Service,” on page 106
Stop Service	Section 6.4.3, “Stopping the Dynamic File Service,” on page 106
Filter Driver Diagnostics	Section 16.15, “Diagnosing a Filter Driver failure,” on page 272
Register License Key	Section 6.2, “Registering the License Key,” on page 97
About	Section 6.11, “Viewing the Product Version and Build Information,” on page 125
Exit	Section 5.1.4, “Stopping the Service Controller,” on page 86

5.1.3 Starting the Service Controller

If the Dynamic File Service component is installed on the computer, the Service Controller should start automatically when you log in to the computer. If the Service Controller is not running, the Service Controller icon () is not displayed in the notification area. The most common reasons that the Service Controller might not be running are that you exited the tool, or that it was blocked from starting automatically when you logged in as a user other than the Administrator user.

You can log out and log back in to the DynamicFS server as a user with Administrator privileges:

- 1 Log out of the DynamicFS server.
- 2 Log in to the DynamicFS server.

The Service Controller starts automatically if you are logged in as the Administrator user. The program is blocked if you log in as any other user. Follow the instructions in [Step 2](#) in [Section 5.1.1, “Accessing the Service Controller,”](#) on page 83 to start the program.

The Service Controller starts and its icon () appears in the Windows notification area.

You can also manually start the Service Controller. Administrator privileges are required.

- 1 In a Windows Explorer browser, navigate to the folder where you installed the Dynamic File Services software.

The default location is the `C:\Program Files\Dynamic File Services` folder.

- 2 Right-click the `DswServiceController.exe` file, then select *Run as Administrator*.

If you are prompted for permission to run the program, click *Allow*.

The Service Controller starts and its icon () appears in the Windows notification area.

5.1.4 Stopping the Service Controller

The Dynamic File Service runs independently of the Service Controller. Although it is not necessary to do so, you can stop the Service Controller during a login session if you are not modifying the configuration or status of the Dynamic File Service at that time.

- 1 Right-click the *Service Controller* icon in the Windows notification area.
- 2 Select *Exit*.

5.2 Management Console

The Dynamic File Services Management Console is a GUI-based management tool that allows you to configure and manage pairs, policies, and schedules on servers in the same local area network. In an Active Directory environment, the computer must also be in the same domain as the servers you want to manage.

The Management Console can be installed on a server or workstation. For information, see [“Supported Platforms”](#) in the [Dynamic File Services 2.2 Installation Guide](#).

You use the Manage Console to manage pairs, policies, and schedules on one or more servers where the Dynamic File Service is installed and running. Each server’s pairs and policies are unique to that server, and the related pair, policy, and schedule configuration files are stored locally in the `..\Dynamic File Services` folder on the server that is being managed. This folder also contains the history and statistics information about policy runs on the server.

- ♦ [Section 5.2.1, “Accessing the Management Console,”](#) on page 86
- ♦ [Section 5.2.2, “Management Console Wizards,”](#) on page 87
- ♦ [Section 5.2.3, “Management Console Tasks Quick Reference,”](#) on page 88

5.2.1 Accessing the Management Console

When you installed Dynamic File Services, a Management Console icon was placed in the following locations:

- ♦ The computer desktop

- ♦ The *Start* menu under *Dynamic File Services > Dynamic File Services Management Console*
- ♦ The *Control Panel* menu under *Additional Options*

An option to launch the tool is also included in the [Service Controller](#) menu.

To access the Management Console:

- 1 Log in to the DynamicFS server or client where the Management Console is installed.
- 2 Use any of the following methods to launch the Management Console:
 - ♦ Double-click the Management Console icon on the desktop.
 - ♦ In the *Start* menu, select *All Programs > Dynamic File Services > Dynamic File Services Management Console*.
 - ♦ In the *Start* menu, select *Control Panel*, then select *Additional Options > Novell Dynamic File Services* in the Control Panel dialog box.
 - ♦ Right-click the *Service Controller* icon in the desktop notification area, then select *Management Console*.
- 3 If you have not already done so, set up the Dynamic servers you want to manage as described in [Section 7.1, “Setting Up a Server in the Management Console,” on page 127](#).

If different administrator users log in to the same computer to use the Management Console, each user must configure a list of servers to manage.

5.2.2 Management Console Wizards

The Management Console provides the following configuration wizards to help you set up servers to manage and to create pairs, policies, schedules, and cloud accounts on them:

Table 5-2 Configuration Wizard Descriptions

Wizard	Description	For information, see
Server Wizard	Helps you set up a DynamicFS server that you want to manage.	Section 7.1, “Setting Up a Server in the Management Console,” on page 127
Setup Wizard	Helps you create a pair and a policy, and associates them automatically.	Section 8.2, “Creating a Pair,” on page 142 Section 9.2, “Creating a Policy,” on page 162
Pair Wizard	Helps you create a standard pair or a retention pair. You can associate the pair with none, one, or multiple policies. You can associate a retention pair with a review schedule.	Section 8.2, “Creating a Pair,” on page 142
Policy Wizard	Helps you create a policy and associate it with none, one, or multiple pairs. You can associate the policy with a policy schedule.	Section 9.2, “Creating a Policy,” on page 162

Wizard	Description	For information, see
Policy Schedule Wizard	Helps you create a policy schedule or a review schedule. You can associate a policy schedule with none, one, or multiple policies. You can associate a review schedule with none, one, or multiple retention pairs.	Section 10.2, “Creating a Policy Schedule,” on page 192
Cloud Wizard	Helps you create a cloud account to store the access credentials for your preconfigured cloud storage provider account.	Section 11.3, “Creating a Cloud Account,” on page 206

5.2.3 Management Console Tasks Quick Reference

You can use the following quick reference to find information about the tasks you can perform from the Management Console. You must be able to provide the login credentials of the Administrator user or a member of the `Dynamic File Services` group on the DynamicFS server you want to manage.

- ◆ [“Server Management Tasks” on page 88](#)
- ◆ [“Pair Management Tasks” on page 89](#)
- ◆ [“Policy Management Tasks” on page 91](#)
- ◆ [“Policy Schedule Management Tasks” on page 92](#)
- ◆ [“Cloud Management Tasks” on page 93](#)
- ◆ [“Monitoring Tasks” on page 93](#)

Server Management Tasks

[Table 5-3](#) helps you find the management tasks for DynamicFS servers:

Table 5-3 *Server Task Descriptions*

Server Options	Description	For information, see
Server Wizard	Lets you provide the authentication credentials needed to connect to a DynamicFS server.	Section 7.1, “Setting Up a Server in the Management Console,” on page 127
Connect to a server	Lets you log in to the DynamicFS server that you want to manage.	Section 7.3, “Connecting to a Server,” on page 131
Disconnect from a server	Lets you disconnect from a DynamicFS server that you are managing.	Section 7.6, “Disconnecting from a Server,” on page 135
Servers container	Lets you view a list of servers and their current status.	Section 7.4, “Viewing a List of Servers and Their Connection Status,” on page 132
Export a server list	Lets you export a list of servers that are configured in the Management Console to an XML file in a local folder.	Section 7.8, “Exporting and Importing a Server List,” on page 136

Server Options	Description	For information, see
Import a server list	Lets you import a previously exported list of servers from a local folder to add the servers to the Management Console.	Section 7.8, “Exporting and Importing a Server List,” on page 136
Register license key	Lets you remotely register a license key for a server.	Section 6.2.3, “Using the Management Console to Remotely Register a License Key,” on page 100
Remove a server	Lets you remove a server from the list	Section 7.9, “Removing a Server from the List,” on page 137
Server Properties	Lets you view information about a DynamicFS server.	Section 7.5, “Viewing Server Properties,” on page 132
Server Properties > Disk details	Lets you view disk details and the disk capacity and used space history for server disks on a DynamicFS server	Section 13.6, “Viewing the Server Disk Capacity and Used Space History,” on page 237
Server Properties > Log files	Lets you view the logged events for the Service, Standard Policy engine, and other components.	Section 13.7, “Viewing Logged Events,” on page 239
Server Properties > Logging levels	Lets you set the logging levels for the Service and Standard Policy engine components.	Section 6.7, “Configuring the Logging Level for Engines,” on page 114

Pair Management Tasks

[Table 5-4](#) summarizes the pair management tasks:

Table 5-4 *Pair Task Descriptions*

Pair Options	Description	For Information
Setup Wizard	Helps you create a standard pair or a retention pair, create a policy, and associates them automatically. You can create and associate a policy schedule for the policy. For a retention pair, you can also create or associate a review schedule.	Section 8.2, “Creating a Pair,” on page 142 Section 9.2, “Creating a Policy,” on page 162 Chapter 10, “Creating and Managing Policy Schedules,” on page 189
Pair Wizard	Helps you configure a pair on a specified server, and associate it with none, one, or multiple policies.	Section 8.2, “Creating a Pair,” on page 142
Pairs container	Lets you view a list of pairs and their current status (<i>Running</i> or <i>Idle</i>).	Section 8.6, “Viewing a List of Pairs,” on page 149 Section 8.7, “Viewing the Pair Status,” on page 149
Pair Properties	Lets you view configuration information for a pair.	Section 8.8, “Viewing Properties for a Pair,” on page 149
Modify description	Lets you modify the description for a pair.	Section 8.8, “Viewing Properties for a Pair,” on page 149

Pair Options	Description	For Information
Pair Properties > Policies	Lets you view, add, or remove policy associations for a pair.	Section 9.6.4, "Associating or Disassociating Policies with a Pair," on page 175
Policy Properties > Pairs	Lets you view, add, or remove pair associations for a policy.	Section 9.6.3, "Associating or Disassociating Pairs with a Policy," on page 174
Retention Pair Properties > Notification Review	Lets you specify the frequency for triggering retention review events. The Notification Service and notifications must be set up separately.	Section 12.4, "Scheduling Notification Reviews for a Retention Pair," on page 220 Section 6.6, "Configuring the Notification Service," on page 108
Retention Pair Properties > Reviewers	Lets you specify the users and groups that review the retained data.	Section 12.2, "Configuring Reviewers for a Retention Pair," on page 215
Pair Properties > Include/Exclude	Lets you specify whether to include folders or exclude folders from policy runs on a pair, and add or remove folders from the list.	Section 8.5, "Including or Excluding Folders from a Pair's Policy Runs," on page 147
Pair Properties > Pair history	Lets you schedule the pair history scan on a pair.	Section 8.10, "Scheduling the Pair History Scan," on page 153
Pair Statistics	Lets you view statistics about a pair's status and last policy run. You can also add or remove associated policies.	Section 13.1, "Viewing the Pair Statistics," on page 229 Section 9.6.4, "Associating or Disassociating Policies with a Pair," on page 175
Pair Statistics > Pair history	Lets you view statistics about the disk space consumed over time for each path in a pair.	Section 13.5, "Viewing the Pair History," on page 235
Pair Statistics > Policy execution history	Lets you view statistics about policy runs on a pair, including the run history of files moved or not moved.	Section 13.2, "Viewing the Policy Execution History for a Pair," on page 230
Preview now	Lets you preview the results of a policy run on a selected pair without running the policy.	Section 9.9, "Previewing a Policy Run," on page 179
Execute now	Lets you run a policy on demand for a selected pair.	Section 9.8, "Starting a Policy Run," on page 178
Manual move	Lets you move selected files or folders for a one-time move event on a selected pair.	Section 8.9, "Moving Selected Files or Folders," on page 152
Stop running process	Lets you stop a currently running policy on a pair.	Section 9.10, "Stopping an In-Progress Policy Run," on page 180
Server Properties > Disk details	Lets you view disk details and the disk capacity history for server disks that are used in a pair on a DynamicFS server that you are managing.	Section 13.6, "Viewing the Server Disk Capacity and Used Space History," on page 237
Unlink the paths in a pair	Lets you remove a pair relationship between two paths.	Section 8.13, "Unlinking the Paths in a Pair," on page 155

Policy Management Tasks

Table 5-5 summarizes the policy management tasks:

Table 5-5 Policy Task Descriptions

Policy Options	Description	For Information
Setup Wizard	Helps you create a standard pair or a retention pair, create a policy, and associates them automatically. You can create and associate a policy schedule for the policy. For a retention pair, you can also create or associate a review schedule.	Section 8.2, “Creating a Pair,” on page 142 Section 9.2, “Creating a Policy,” on page 162 Chapter 10, “Creating and Managing Policy Schedules,” on page 189
Policy Wizard	Helps you create a policy and associate it with none, one, or multiple pairs.	Section 9.2, “Creating a Policy,” on page 162
Policies container	Lets you view a list of policies and their current status (<i>Running</i> or <i>Idle</i>).	Section 9.4, “Viewing a List of Policies,” on page 172
Edit or modify a policy	Lets you modify the policy direction, frequency, filter options, or description.	Section 9.7, “Modifying Policy Filters,” on page 177 Section 10.4, “Modifying Policy Schedules,” on page 193
Export a policy	Lets you export a policy’s configuration information to an XML file in a local folder on the computer that is running the Management Console.	Section 9.11, “Exporting and Importing Policies on a Dynamic File Services Server,” on page 180
Import a policy	Lets you import a previously exported policy from a local folder to add it to a DynamicFS server that you are managing in the Management Console.	Section 9.11, “Exporting and Importing Policies on a Dynamic File Services Server,” on page 180
Preview now	Lets you preview the results of a policy run on a selected pair without running the policy.	Section 9.9, “Previewing a Policy Run,” on page 179
Execute now	Lets you run a policy on demand for a selected pair.	Section 9.8, “Starting a Policy Run,” on page 178
Manual move	Lets you move selected files or folders for a one-time move event on a selected pair.	Section 8.9, “Moving Selected Files or Folders,” on page 152
Stop running process	Lets you stop a currently running policy on a pair.	Section 9.10, “Stopping an In-Progress Policy Run,” on page 180
Policy Properties	Lets you view configuration information for a policy. You can also modify the policy direction, frequency, filter options, or description.	Section 9.5, “Viewing Properties for a Policy,” on page 173 Section 9.7, “Modifying Policy Filters,” on page 177 Section 10.4, “Modifying Policy Schedules,” on page 193

Policy Options	Description	For Information
Policy Properties > Pairs	Lets you view, add, or remove pair associations for a policy.	Section 9.6.3, "Associating or Disassociating Pairs with a Policy," on page 174
Pair Properties > Policies	Lets you view, add, or remove policy associations for a pair.	Section 9.6.4, "Associating or Disassociating Policies with a Pair," on page 175
Policy Properties > Schedule	Lets you view, add, or remove a policy schedule association for a policy.	Section 10.6.3, "Associating or Disassociating a Schedule with a Policy," on page 197
Policy Schedule Properties > Policies	Lets you view, add, or remove policy associations for a policy schedule.	Section 10.6.4, "Associating or Disassociating Policies with a Schedule," on page 198
Pair Statistics	Lets you view statistics about a pair's status and last policy run, including the policy run history of files moved or not moved. You can also add or remove associated policies.	Section 13.1, "Viewing the Pair Statistics," on page 229 Section 9.6.4, "Associating or Disassociating Policies with a Pair," on page 175
Pair Statistics > Policy execution history	Lets you view statistics about policy runs on a pair, including the run history of files moved or not moved.	Section 13.2, "Viewing the Policy Execution History for a Pair," on page 230
Server Properties > Log files > DswStandardPolicy.log	Lets you view the events for policy runs in the Standard Policy engine's log.	Section 13.7, "Viewing Logged Events," on page 239
Delete a policy	Lets you remove a policy.	Section 9.12, "Deleting a Policy," on page 181

Policy Schedule Management Tasks

[Table 5-6](#) helps you find the management tasks for DynamicFS schedules:

Table 5-6 *Policy Schedule Task Descriptions*

Server Options	Description	For information, see
Setup Wizard	Helps you create a standard pair or a retention pair, create a policy, and associates them automatically. You can create and associate a policy schedule for the policy. For a retention pair, you can also create or associate a review schedule.	Section 8.2, "Creating a Pair," on page 142 Section 9.2, "Creating a Policy," on page 162 Chapter 10, "Creating and Managing Policy Schedules," on page 189
Schedule Wizard	Helps you create a policy schedule or a review schedule. You can associate a policy schedule with none, one, or multiple policies. You can associate a review schedule with none, one, or multiple retention pairs.	Chapter 10, "Creating and Managing Policy Schedules," on page 189

Server Options	Description	For information, see
Schedule Properties	Lets you view information about a DynamicFS schedule.	Section 10.3, “Viewing Properties for a Schedule,” on page 193
Policy Schedule Properties > Policies	Lets you view and modify a list of the policies associated with a policy schedule.	Section 10.6.3, “Associating or Disassociating a Schedule with a Policy,” on page 197
Policy Properties > Schedule	Lets you view, add, or remove a policy schedule association for a policy.	Section 10.6.4, “Associating or Disassociating Policies with a Schedule,” on page 198
Retention Pair Properties > Schedule	Lets you view, schedule or unschedule review notifications for a retention pair.	Section 12.4, “Scheduling Notification Reviews for a Retention Pair,” on page 220
Delete a policy schedule	Lets you delete a schedule.	Section 9.12, “Deleting a Policy,” on page 181

Cloud Management Tasks

[Table 5-7](#) helps you find the management tasks for DynamicFS cloud accounts:

Table 5-7 *Cloud Account Task Descriptions*

Server Options	Description	For information, see
Cloud Wizard	Helps you create a cloud account to store credentials for the cloud provider account.	Section 11.3, “Creating a Cloud Account,” on page 206
Cloud Properties	Lets you view the provider type and credentials for a cloud account. If you modify the credentials on the cloud provider’s site, you can specify new credentials for an Amazon S3 or CloudMe account.	Section 11.4, “Viewing Properties for a Cloud Account,” on page 209 Section 11.6, “Modifying the Access Credentials for a Cloud Account,” on page 211
Cloud Properties > Pairs	Lets you view a list of the retention pairs that are using the cloud account, and the path of the subfolder used by the pair.	Section 11.5, “Viewing a List of the Retention Pairs That Use a Cloud Account,” on page 210

Monitoring Tasks

[Table 5-8](#) summarizes the monitoring tasks for DynamicFS servers, pairs, and policies:

Table 5-8 *Monitoring Task Descriptions*

Monitoring Options	Description	For Information
Servers container	Lets you view a list of servers and their current status, such as <i>Connected</i> (green icon) or <i>Disconnected</i> (dimmed icon).	Section 7.4, “Viewing a List of Servers and Their Connection Status,” on page 132

Monitoring Options	Description	For Information
Pairs container	Lets you view a list of pairs and their current status (<i>Running</i> or <i>Idle</i>).	Section 8.6, "Viewing a List of Pairs," on page 149 Section 8.7, "Viewing the Pair Status," on page 149
Policies container	Lets you view a list of policies and their current status (<i>Running</i> or <i>Idle</i>).	Section 9.4, "Viewing a List of Policies," on page 172
Server Properties	Lets you view information about a DynamicFS server that you are managing.	Section 7.5, "Viewing Server Properties," on page 132
Pair Properties	Lets you view configuration information for a pair.	Section 8.8, "Viewing Properties for a Pair," on page 149
Policy Properties	Lets you view configuration information for a policy. You can also modify the policy direction, frequency, filter options, or description.	Section 9.5, "Viewing Properties for a Policy," on page 173 Section 9.7, "Modifying Policy Filters," on page 177 Section 10.4, "Modifying Policy Schedules," on page 193
Pair Statistics	Lets you view statistics about a pair's status and last policy run, including the policy run history of files moved or not moved.	Section 13.1, "Viewing the Pair Statistics," on page 229
Pair Statistics > Pair history	Lets you view statistics about the disk space consumed over time for each path in a pair.	Section 13.5, "Viewing the Pair History," on page 235
Pair Statistics > Policy execution history	Lets you view statistics about policy runs on a pair, including the run history of files moved or not moved.	Section 13.2, "Viewing the Policy Execution History for a Pair," on page 230
Pair Statistics > Review transaction history	Lets you view statistics about the delete and restore actions made during reviews of the retained data on retention pairs	Section 12.7, "Viewing the Review Transaction History," on page 226
Server Properties > Disk details	Lets you view disk details and the disk capacity history for server disks on a DynamicFS server that you are managing.	Section 13.6, "Viewing the Server Disk Capacity and Used Space History," on page 237
Viewing Service events	Lets you view error events for the Dynamic File Service.	Section 13.8, "Viewing Service Events," on page 241
Viewing logged events	Lets you view the logged events for the Service, Standard Policy engine, and other components.	Section 13.7, "Viewing Logged Events," on page 239
Audit log	Lets you view the logged management events for the Service, pairs, policies, and repair.	Section 13.9, "Auditing Management Events," on page 241

5.3 Repair Tool

The Dynamic File Services Repair tool is used to restore a corrupted database by rolling back to the last known-to-be-valid copy of the pair, policy, and schedule database files. For information, see [Chapter 14, “Repairing the Pair, Policy, and Schedule Databases,” on page 245](#).

5.4 Filter Driver Diagnostics

The Dynamic File Services Filter Driver Diagnostics tool is used to capture information about current pairs to help troubleshoot issues with the merged view of standard pairs. For information, see [Section 16.15, “Diagnosing a Filter Driver failure,” on page 272](#).

5.5 Command Line Interface and Utilities

Dynamic File Services provides a command line interface (CLI) that can be used to create and manage pairs and policies. The CLI is a text interface that can be used in scripts. DynamicFS also provides utilities for troubleshooting, such as for synchronizing files and folders in a pair and for dumping the current configuration settings. For information, see the [Dynamic File Services 2.2 Client Commands and Utilities Reference](#).

6 Configuring and Managing the Service

An administrator can configure and manage the Dynamic File Service by logging in to the server where the Service is installed. This section describes the Service configuration options.

- ◆ [Section 6.1, “Requirements for Administering the Service,” on page 97](#)
- ◆ [Section 6.2, “Registering the License Key,” on page 97](#)
- ◆ [Section 6.3, “Configuring Administrators for Pair Management,” on page 102](#)
- ◆ [Section 6.4, “Starting and Stopping the Service,” on page 105](#)
- ◆ [Section 6.5, “Configuring Audit Tracking Events,” on page 108](#)
- ◆ [Section 6.6, “Configuring the Notification Service,” on page 108](#)
- ◆ [Section 6.7, “Configuring the Logging Level for Engines,” on page 114](#)
- ◆ [Section 6.8, “Configuring a Certificate for Secure Remote Management Sessions,” on page 116](#)
- ◆ [Section 6.9, “Configuring Firewall Access for the Service Port,” on page 122](#)
- ◆ [Section 6.10, “Configuring Ports for the Service and Retention Review,” on page 124](#)
- ◆ [Section 6.11, “Viewing the Product Version and Build Information,” on page 125](#)
- ◆ [Section 6.12, “What’s Next,” on page 126](#)

6.1 Requirements for Administering the Service

The Administrator user and users with Administrator privileges on the Dynamic File Services server have all the permissions necessary to administer the Dynamic File Service configuration. The user logs in to the server desktop in order to administer the Service.

For information about managing pairs, policies, and schedules, see [Section 6.3, “Configuring Administrators for Pair Management,” on page 102](#).

6.2 Registering the License Key

Registering a Dynamic File Services License Key allows you to use all of the product features. A user with Administrator privileges must register a license key on each computer where the Service component is installed.

A License Key is not required to evaluate Dynamic File Services. Most product features will function normally. However, you are restricted to using one pair and one policy at a time until a License Key is registered on the system.

You can enter a License Key at any time after you install Dynamic File Services. After a successful key registration, all features of the product are immediately available. You do not need to reinstall the product. The policy and pair created during evaluation remain in effect, as do any configuration settings you have made to the Service.

6.2.1 Obtaining a License Key

You can obtain a License Key from the [Novell Customer Center \(http://www.novell.com/customercenter/\)](http://www.novell.com/customercenter/). The key code is delivered via a Web link in a file named <GUID>.html, such as 4add-adf2-62b8-4296-ab0e-ce6f-1234-1234.html.

- 1 In a Web browser, go to the [Novell Customer Center \(http://www.novell.com/customercenter/\)](http://www.novell.com/customercenter/) and obtain a License Key.

The file contains the serial number (the GUID in the file name) and the complete key code. The complete key code includes the series of equal signs that precede the *Begin Key* label to the end of the series of equal signs that follow the *End Key* label.

```
===== Novell DFS =====
===== SN 4add-adf2-62b8-4296-ab0e-ce6f-1234-1234 =====
===== BEGIN KEY =====
abcdefghijklmnopqrstuvwxyz1E9NeA2VELNvfmGTRIpwFmw1j00/Ma61w81iCp11FBqu3iwQX/8PQvX1FgAR9TmG+KaVF/SIXxkP08OzNlwenXug0T07faYv9e0rV1bs13XWV1ryYZk629E4cYtyIvpOEBglN/Ja/0oPMq0=TfawbpHENM7pkI1gJSkkRU+nLrs3ScDcGsyT1yFRRAxG989R0hLj0tBLPK+w/W1iVMUFX9yxGu1AP2QHGKJ8dalbXC3ALH7QvudCmNae50msHBp8tNoSnd2F+gNGFGLXveRX4Gxb/vr1HRP0gu88vccxa2FVV2Z0HB0j5pfsSc=ZqkoPSjzhaBx5V38B6PVTR1S1jFTEauTph4go36x2ixGTabR7/xCJ8W6KsUw19/2wDhXcIw8gtppydrczFymMiSUD/y4R8cJUz68FUMdc3iEGxabHuSm6IpaDocDRYdRugKJ6gYvQ172AeyEOORSGN2arA2kLewQKcqiNkXAFE=DYvCvCFZ730Ubjvrtux12R6D343R6mfwGQn2+Nw/LRrbsKbupgF5YegB6ScLC1kwtvpD0o9UuSMSV4LUVJuk3HjNNfLmFoIYeH116Acv5ajA62M4adtHlqNRqvw6mFkaIIJ1nW8Lxhc7dw+3zFFfg6bNw2o2MbiaggDpRTHk=i5khuUQeki3Jz75SxduRt0H4haa7h09w7G2rIG42z+vWiyQyS/7n0MYOhUl3k3UpUnFNw+11fHN6x17007IAKu4Yxm7CqhAvE7BuotzcTLJ+VopwJg7KzuK+NM9enS2r80HduYrLiR4+u4sQCtE3VixedB2JkXdeSXLXhvu2vdgqU8WvBY2NBt1XDAI2gStMxxu1qYm4o2INwURVYLn8Mch05+AtvHJZETreyTq5Ljhsfpp4cyRr55/FxTnfgTFpYg1Y4Fc7AypcmLWuyT4hdG3U/K+90aPj sW/ExEucHKAs2X42z+XIU7/7bAs3HihpPcDcT0wQUV/n/CGpa=N59XkCe5e7ARVGN1Bx0e4wuSHnGUMUPART9AP1PcKFFVCpwJ2TSG8FEMc9pCokngmLLxDrYv0qyT823T5dDO+d3TKcKq+VTGr6JQ50wP7y1yi+39iXH8UKAVC665HNAASbcakxUJjM1XyuPYOQ2pXqPL5NM3GnkS+GT1/qGK+Lluq04f5UXsq0LmLxPY6hSNvsLPfa7uCl.JakaUmj3eM4Y1wvNFBAu2LIR2R/D9YhrteQTKtLQnVFnBFGHLJIX2xFEquDw0Uz513SRRMc+qrs3q1LFWHvKruX30npeR88VHUESsyW3pEC2jaDagPo1Q6ut4or1VdSbLaFPC4=S4bgeaHMaEpuocpN4sTnx5gmXkRfs9yy51YB911jnv+Qz2z4enCUsdEYKuyAtACu074fg11FZKN+N8SoCq4p21e0EN3n5y3j1SyhEpToVbbzVIA/KLLK1ae7VtKrHmUCzN6WJ0gwdvMeNjBzegximpU57XXOq365GagMq8TkVuo=IEcID2En+IgpzTCCcLLSmvhXPx3ovCWK6Cz7dtPufXm7RuAmhbDD3w3P+4eJkV+T1ImSghh8ycN7AAV5XthOrdUBovyrvaUogTYW8MypC4KfydOT0vmpKHlQIbQESppz6Vip2UzbaLJ1mJ7TLjC1jmdv4P9NOWhER2q0Ja=lxqdKDBQ7/wjjsNFzGz9sqNwLlpyJphvdyaaGCY2Bc0wn4K4pKRkK03teMFBhwBJZxwELa+dkEjTj9xL1V6uyKop4Rn1Zv/LTqjhK/T70K0e61Aj3eCE18Ew/bGtLC71VAnd33ASZeghJ0eDoegDloYNSRaR19Sv6aZNM+kbNw=fnWmJx4Lx1MGQm6EeOfLgV/74zqgbH7ZhuUjAyp9U0JZC9qul9bKSz9kmZrGr0cEgfpB5xBSegWKGedLy9p50PZEXmV3mR1vTwJChif1vJTRcqvthQKqUcAaAtk5w4BhXwZLz7NcZQqVp9yY56Fg1f8iDjXj+SQYETE-E+1WfQ3MANFVAUF5nJgYvYv09IVAE81aev62NLiYr21jL4n9LwRQVuhXpY8mCuQ04Hj0+5p451MfRHAdSDgnDwugvT02ohnjUL72+BEV3z8skYu/3U+YHruNcV4WRJoc0H0451ut+e8oDSY4RccZvRdsM31ehELvD+mE=NMWnzk/SMPHR1gyy/5H+OFPx4Jua09XH09s805ImzLpJ004sBJqcm66FJ2LduHM5oYXUBeY616QUJNRXBY9wKZjYfF2C2hWEXF40c6nSKND4qXfMaRaasvzFyGNFz1p6pYBq7Ze1nieKfdN7IpIq19o0uaKng3/zjVFOaWeC21Ubl7VozE/zTzUVzajJVUMz4/fTQwZdppC1m/AonHqvo0bvtKAEuqgQ8cQvaJzd1/ZXyoEBFA4EknngQp2/Nb69W0yXbPYSQ8PueTYrGpEWSHL/4ImS/CaeIM00FvXfJ1bjhncZGJF5ynxFBCGTcoIrcchKA10f90+E=Kp31cYUWQZJC8+n4TGzqBjUcV57CceX91WcCqka9enxgl5Qvzgt0DrsEUUlp/04A0SSPdU1IMZnHLd6qDqeTTDga+08d9FincL15sgWzdgH5JcKF7R/OL6SSUL/S+Ahakpx8kf9xdr4Qj3jq96EaHD9UshK5cMNGKvW4nI-hJVFqnlYDpm6wnWkdoAyaAfZpmLOfbdIDkR2M5w2Cofb2JM1le2SM/L6tzcqe+cc61obhtDzFw7agF5z8hgopyLo5dV08v7gM0Z2Gu2Mbu1aJ0Xr8CLCj0e8xBmAJ/AQsrq+ZjphqEfmWZR7Jdcd9n0AZ2cpE9LG0XmRjUv=ZDeFDIy3YDArTa//AQ8dS/bpDgOV22U0C41H10y1+JOCDE9jjae091K60wmh0G9pTsemHX8JxpSKp6RQFIN/1l9m+KXcZqaz2z9FAN27V6B/2/lnMz9155c7NXXMuSpMZeasVE49uPHmNHCH9n+Wq4zeBJOBT5yNkXJG3KRm=Jz7+VWm17qE5cckmYhczghnsFxdw10j3R8sb6G3da9w1p050NsUfM7Kq/4+Sd0FWK6QRbRv7600LxUpBr4zGfzNLjBgc9qVc/QsTCgw+T1njAKYPucMeIdgU5ocpu+1Thyn1aYw1GgBcABCDEFHJIKLMMOPQRSTUVWXYZ=
===== END KEY =====
```

- 2 Save a copy of the <GUID>.html file.

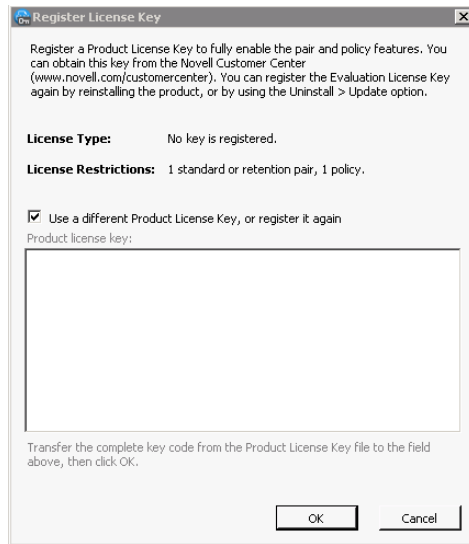
The default file name is the key's GUID, but you can assign a friendly name. The GUID is stored in the file as the serial number. You can also copy the displayed information to a text file.

6.2.2 Using the Controller to Register a License Key

- 1 Log in to the Dynamic File Services server as a user with Administrator privileges.
- 2 Save your License Key file to a location on the server.
- 3 Open the key file in a text editor or Web browser, then copy the complete key code from the file to the computer clipboard.

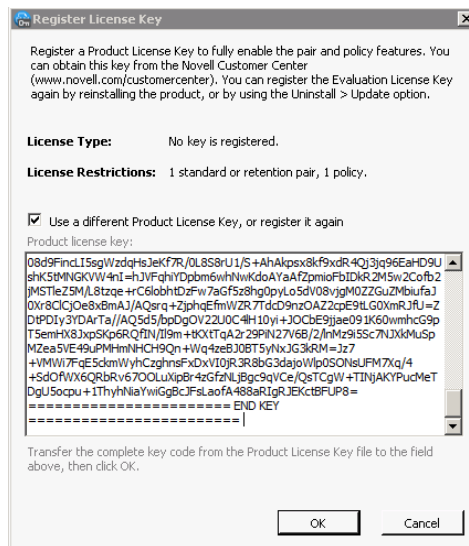
You can copy the entire contents of the file. At a minimum, you must copy the complete key code, which includes the series of equal signs that precede the *Begin Key* label to the end of the series of equal signs that follow the *End Key* label.

- 4 Right-click the *Service Controller* icon, then select *Register License Key* to open the dialog box.



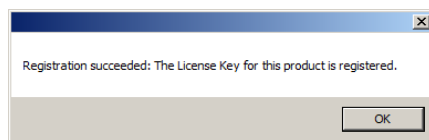
If a license key is already registered on the server, the information on the page states “This product is already registered”. Continue only if you want to use a different license key or to re-register a key.

- 5 In the Register License Key dialog box, right-click anywhere in the *License key* field, then select *Paste* from the pop-up menu.



- 6 Click *OK* to register the license key.

A confirmation message lets you know whether the registration succeeded or failed.

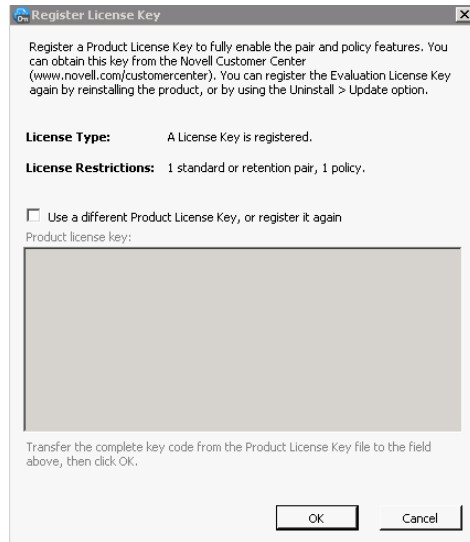


- 7 Click *OK* to dismiss the confirmation message.

If the registration is successful, all product features are now available to you.


If the registration is not successful, check that the key is valid and that you transferred the complete key code to the box, then try again.

- 8 Right-click the *Service Controller* icon, then select *Register License Key* to view the number of pairs and policies supported by the installed license.




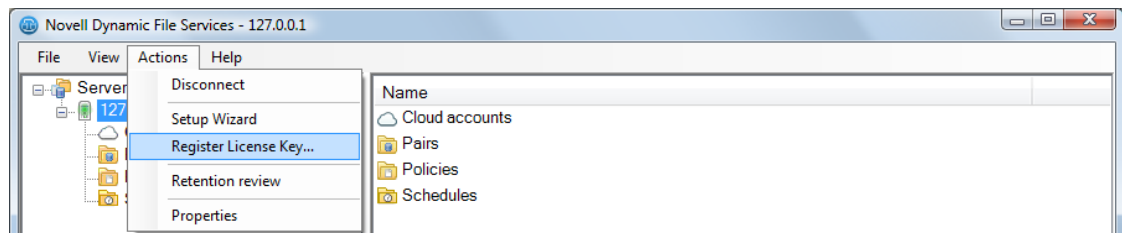
6.2.3 Using the Management Console to Remotely Register a License Key

The Register License Key option is also available as a server action in the Management Console. This allows you to remotely register a license key for a Dynamic File Services server. You can perform the registration on only one server at a time.

- 1 Log in to a computer where the Dynamic File Service Management component is installed.
- 2 Save your License Key file to a location on the computer.
- 3 Launch the Management Console.
- 4 In the left panel, right-click the Dynamic File Services server () that you want to manage, click *Connect*, then log in as a user with Administrator privileges.

If you have not set up the server in the Management Console, you must set up the server and log in as described in [Section 7.1, "Setting Up a Server in the Management Console,"](#) on page 127.

- 5 After you are successfully connected to the server (), select the server name again.
- 6 In the toolbar, select *Actions > Register License Key* to open the dialog box.



You can also right-click the server name and select *Register License Key*.

If a license key is already registered on the server, the information on the page states “This product is already registered”. Continue only if you want to use a different license key or to re-register a key.

- 7 Open the key file in a text editor or browser, then copy the complete key code to the computer clipboard.

You can copy the entire contents of the file. At a minimum, you must copy the complete key code, which includes the series of equal signs that precede the *Begin Key* label to the end of the series of equal signs that follow the *End Key* label.

- 8 In the Register License Key dialog box, right-click anywhere in the *License key* field, then select *Paste* from the pop-up menu.
- 9 Click *OK* to register the license key.

A confirmation message lets you know whether the registration succeeded or failed.

- 10 Click *OK* to dismiss the confirmation message.

If the registration is successful, all product features are now available to you.

If the registration is not successful, check that the key is valid and that you transferred the complete key code to the box, then try again.

6.2.4 Using the Command Line to Register the Key

You can register the Dynamic File Services License Key from the command line by using the `DswCLI.exe -registration` command. For details about the command options, see “[Registration Actions](#)” in the *Dynamic File Services 2.2 Client Commands and Utilities Reference*.

- 1 Log in to the Dynamic File Services server as a user with Administrator privileges.
- 2 Save your License Key file to a location on the computer.
- 3 Open a Windows Command Prompt console, then navigate to the Dynamic File Services folder where you installed the software.
- 4 At the console prompt, enter

```
DswCli.exe
-registration
-regfilepath=" \path\
```

Replace *key_file_name* with the actual file name that you used when you saved the key file.

Provide the authentication parameters if needed. For information, see “[Authentication Parameters](#)” in the *Dynamic File Services 2.2 Client Commands and Utilities Reference*.

For example, if the `c2f0-4875-bf83-45d4-8a4f-5ebb-b329-1234.html` file is located on the G: drive and you need to provide the authentication credentials, enter the command with all parameters:

```
DswCli.exe
-registration
-keyfilepath="G:\c2f0-4875-bf83-45d4-8a4f-5ebb-b329-1234.html"
-servername="10.10.10.102"
-port="8999"
-username="Administrator"
-password="novell"
```

5 To verify that the key is registered, enter

```
DswCli.exe
-registration
[-servername={"ip_address" | "DNS_name"}]
[-port=<"portnumber">]
[-username=<"admin_user_name">]
[-password=<"admin_user_password">]
```

6.3 Configuring Administrators for Pair Management

Pair management refers to the management actions taken on Dynamic File Services objects, such as pairs, policies, schedules, and cloud accounts. Any user with sufficient rights can manage the objects. The Administrator user of the server automatically has rights to manage any aspect of Dynamic File Services. In an Active Directory domain, Domain Admins also have these rights across all servers in the domain.

You can allow administrator and non-administrator users to manage pairs, policies, and schedules by adding them as members of the `Dynamic File Services` group. Any user that is a member of this group has all rights that are needed to create, delete, and manage pairs, policies, schedules, and cloud accounts. The user that installs Dynamic File Services software on the computer is automatically added to the group.

This section describes the `Dynamic File Services` group and how to add and remove members.

- ♦ [Section 6.3.1, “Understanding the Dynamic File Services Group,” on page 102](#)
- ♦ [Section 6.3.2, “Setting Up Administrators in a Domain,” on page 104](#)
- ♦ [Section 6.3.3, “Setting Up Administrators in a Workgroup,” on page 104](#)

6.3.1 Understanding the Dynamic File Services Group

You can set up a group of users to manage pairs and policies on Dynamic File Services servers by adding them as a member of the `Dynamic File Services` group. The nature of the group and its setup are different, depending on whether the server is located in an Active Directory domain or in a Workgroup. This section describes their purpose and differences.

- ♦ [“How is the group created?” on page 102](#)
- ♦ [“Who controls membership in the group?” on page 103](#)
- ♦ [“Who can be a member of the group?” on page 103](#)
- ♦ [“How is the group removed?” on page 103](#)

How is the group created?

The `Dynamic File Services` group is created automatically during the installation of Dynamic File Services. The user that installs Dynamic File Services software on the computer is automatically added to the group.

- ♦ **Active Directory Domain:** The group is created in the Active Directory *Users* area when Dynamic File Services is first installed on a server that is a domain controller or member server in an Active Directory domain. The group is used by all DynamicFS servers that are subsequently installed in the same domain.

The user that installs the first instance of Dynamic File Services in the domain must have sufficient domain privileges to create groups and manage members of groups. Otherwise, the group creation fails and a user with Domain Admin privileges must set up the group manually.

- ♦ **Workgroup:** The group is created locally in the Windows *Local Users and Groups > Groups* area. The user that installs Dynamic File Services must have sufficient Administrator privileges to create groups on the server. Otherwise, the group creation fails and a user with Administrator privileges must set up the group manually in the appropriate location.

Who controls membership in the group?

The login identity of the user who installs Dynamic File Services is automatically added to the `Dynamic File Services` group. After the installation, administrators control which users are added or removed as members of the `Dynamic File Services` group.

- ♦ **Active Directory Domain:** The Domain Admin user or a domain user with Domain Admin privileges can add or remove members. Launch the Active Directory Users and Computers tool, then add or remove members for the group in the *Users* folder. For information, see [Section 6.3.2, “Setting Up Administrators in a Domain,”](#) on page 104.
- ♦ **Workgroup:** The Administrator user or a local user with Administrator privileges can add or remove members. Launch the Microsoft Management Console on the server, then add or remove members for the group in the *Users and Groups > Groups* folder. For information, see [Section 6.3.3, “Setting Up Administrators in a Workgroup,”](#) on page 104.

Who can be a member of the group?

The `Dynamic File Services` group has one default member, which is the user who installs the Dynamic File Services software on the computer. Other users can be members in the group, depending on whether the DynamicFS server is in an Active Directory or Workgroup environment:

- ♦ **Active Directory Domain:** Members of the Domain Admins group automatically have rights to manage Dynamic File Services on any server in the same tree or forest. Any domain user in the same tree or forest as the DynamicFS server can be added to the group. A domain user does not need Domain Admin privileges in order to be a member, and it is not necessary to explicitly add a Domain Admin user to the group. The members can manage pairs, policies, and schedules on any DynamicFS server in the same domain.
- ♦ **Workgroup:** The Administrator user and members of the Administrators group automatically have rights to manage Dynamic File Services on the server. Any local user can be added to the group. A local user does not need Administrator privileges in order to be a member, and it is not necessary to explicitly add the Administrator user to the group. The members can manage pairs, policies, and schedules on the DynamicFS server.

How is the group removed?

The `Dynamic File Services` group should not be removed while the product is installed. The following sections describe how the group is removed in an Active Directory or Workgroup environment:

- ♦ **Active Directory** The group is used by all DynamicFS servers that are subsequently installed in the same domain. The group is removed when you uninstall the last instance of Dynamic File Services in the domain.

The user that uninstalls Dynamic File Services must have sufficient domain privileges to delete groups. Otherwise, the group deletion fails and a user with Domain Admin privileges must manually remove the group.

- ♦ **Workgroup** The group is automatically removed from the server if you uninstall Dynamic File Services.

The user that uninstalls Dynamic File Services must have sufficient Administrator privileges to delete groups on the server. Otherwise, the group deletion fails and a user with Administrator privileges must manually remove the group.

6.3.2 Setting Up Administrators in a Domain

In a domain environment, members of the `Dynamic File Services` group can manage pairs, policies, and schedules on any of the DynamicFS servers in the domain.

To add or remove domain users as members of the domain-based `Dynamic File Services` group:

- 1 Log in to the DynamicFS server as a Domain Admin.
- 2 Open the Active Directory Users and Computers utility by selecting *Administrator Tools > Users and Computers*.
- 3 Select the domain, then select *Users > Groups*.
- 4 Open the group's Properties dialog box by double-clicking the `Dynamic File Services` group. You can also right-click the group and select *Properties*. Current domain users that are members of the group appear in the list.
- 5 In the Properties dialog box, click the *Members* tab.
- 6 Configure the members of the group by doing either or both of the following tasks:
 - ♦ **Add a member:** Click *Add*, use the *Enter the object names to select* field to specify the users you want to manage DynamicFS in the domain, then click *OK* to save and apply your changes.
 - ♦ **Remove a member:** Select one or more user names from the member list, click *Remove*, then click *OK* to save and apply your changes.
- 7 Click *OK* to close the `Dynamic File Services` group Properties dialog box.

6.3.3 Setting Up Administrators in a Workgroup

In a Workgroup environment, members of the server-based `Dynamic File Services` group can manage pairs, policies, and schedules for a Dynamic File Services server.

To add or remove local users as members of the server-based `Dynamic File Services` group:

- 1 Log in to the DynamicFS server as the Administrator user or as a user with Administrator privileges.
- 2 Open the Windows Computer Management tool.
Right-click the Computer icon on the desktop, then select *Manage*.
- 3 Select *Local Users and Groups > Groups*, then double-click the `Dynamic File Services` group to open the group's Properties dialog box.
Current members appear in the list.

- 4 Configure the members of the group by doing either or both of the following tasks:
 - ♦ **Add a member:** Click *Add*, use the *Enter the object names to select* field to specify the users you want to manage DynamicFS on that server, then click *OK* to save and apply your changes.
 - ♦ **Remove a member:** Select one or more user names from the member list, click *Remove*, then click *OK* to save and apply your changes.
- 5 Click *OK* to close the *Dynamic File Services* group *Properties* dialog box.

6.4 Starting and Stopping the Service

The Dynamic File Service is the engine that manages the various components. It starts automatically after the install and on system boot in Windows Normal Mode. The Service does not run in Windows Safe Mode. A user with Administrator privileges on the DynamicFS server can also start and stop the Dynamic File Service as needed by using the Service Controller.

The Service component must be installed and running on the server in order to connect to the server from the Management Console, or to use commands and some utilities. The *DswDump.exe* and *DswPairCheck.exe* utilities can be used when the service is running or not running in order to gather and report information from the Dynamic File Services databases. The Repair Tool can be used only when the service is not running.

- ♦ [Section 6.4.1, “Viewing the Service Status,” on page 105](#)
- ♦ [Section 6.4.2, “Starting the Dynamic File Service,” on page 106](#)
- ♦ [Section 6.4.3, “Stopping the Dynamic File Service,” on page 106](#)

6.4.1 Viewing the Service Status

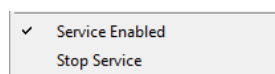
The Dynamic File Service has two possible states: *Enabled* (running) and *Disabled* (not running). Its current status is displayed in the Service Controller menu. The Service status is also displayed in the Microsoft Management Console.

- 1 Log in to the DynamicFS server.

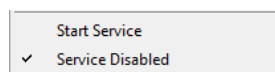
The Service Controller starts automatically and places an icon in the notification area.
- 2 In the notification area, right-click the *Service Controller* icon (🔧) to display the menu.
- 3 View the status of the Service.

The following combinations of options convey the current status and options to start or stop the Service accordingly:


- ♦ *Service Enabled* and *Stop Service*



- ♦ *Service Disabled* and *Start Service*



6.4.2 Starting the Dynamic File Service

- 1 Log in to the DynamicFS server as the Administrator user or as a user with Administrator privileges.
- 2 Right-click the *Service Controller* icon () in the notification area, then select *Start service* from the pop-up menu.
- 3 Verify that the Service is running by right-clicking the *Service Controller* icon.
In the pop-up menu, the options are now *Service enabled* and *Stop service*.

6.4.3 Stopping the Dynamic File Service

Special steps should be taken before you stop the service in order to ensure a graceful shutdown of the Service and user actions on the pairs. You must stop the Dynamic File Service before taking the following management actions:

- ♦ Modifying, repairing, or uninstalling the Dynamic File Services software.
- ♦ Modifying the Service configuration settings. The Service is automatically restarted if you modify the configuration settings for its ports and certificate.
- ♦ Performing system maintenance on the DynamicFS server.

It is also a good idea to stop the Service if you are performing maintenance on a remote server or filer with paths used in pairs on the DynamicFS server. Alternatively, you can unlink the pair, and re-create it when the remote storage is back online.

- ♦ [“Prerequisites for Stopping or Restarting the Service” on page 106](#)
- ♦ [“Stopping the Service” on page 107](#)

Prerequisites for Stopping or Restarting the Service

Do not stop or restart the Dynamic File Service while the Service is busy processing data. Use [Table 6-1](#) as a checklist for making sure the Service is not processing data so that you can stop it without introducing potential data loss. After the Service activities are quiescent, you can continue with stopping the Service or with activities that automatically restart the Service, such as changing the port or certificate.


Table 6-1 Checklist for Quiescing the Dynamic File Service

Service	Verify the following to quiesce activity in the Service
Policy runs	You should wait until all pairs on the server are in the <i>Idle</i> state. If the pair state is <i>Running</i> , wait until the policy run is complete, or you can manually stop the run by using the <i>Actions > Stop running process</i> option from the pair's Statistics dialog box.
Scans	You should consider the schedules for the daily snapshots of the pair and policy databases , the pair history scan , and the retention review check timer to avoid stopping the Service when a pair is busy with a scan. If a scan is in progress, wait until the scan is complete. If the Service is disabled at the scan's scheduled start time, the scan is not run for that day.

Service	Verify the following to quiesce activity in the Service
Merged View	All clients accessing files through the merged view must log out. Gracefully close user connections to each of the standard pairs so that the merged view is inactive. This allows users time to save their changes and close the files.
Retention Review Service	All users accessing retained data through the Retention Review Service must log out. Gracefully close user connections and allow sufficient time for the queued actions to run.
Management sessions	Discontinue use of any Management Console sessions, client commands, and utilities.

Stopping the Service

IMPORTANT: Before you begin, ensure that you have met the requirements in [“Prerequisites for Stopping or Restarting the Service”](#) on page 106.

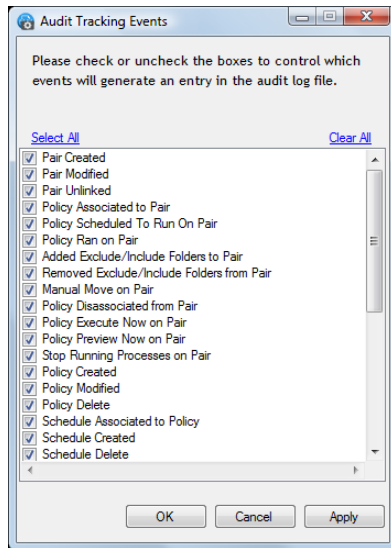
- 1 Log in to the DynamicFS server as the Administrator user or as a user with Administrator privileges.
- 2 In the notification area, right-click the *Service Controller* icon () , then select *Stop service* from the menu.
- 3 If you are prompted to confirm the Service stop, click *Yes* to continue.
- 4 Verify that the Service has stopped by right-clicking the *Service Controller* icon in the notification area.

When the service has stopped, Service Controller menu displays *Service disabled* and *Start service* options.

6.5 Configuring Audit Tracking Events

The Dynamic File Services Audit Configuration tool allows you to configure which events are audited and logged for the Service. The settings apply globally to all pairs, policies, and schedules on the Dynamic File Services server. All events are logged by default. For a list of event types, see [Section 6.6.1, “Understanding Notification and Audit Events,” on page 109](#).

- 1 Log in to the DynamicFS server as the Administrator user or as a user with Administrator privileges.
- 2 In the notification area, right-click the *Service Controller* icon (🔗), then select *Audit Configuration* to open the Audit Tracking Events dialog box.



- 3 Select the check boxes next to the events that you want to track in the audit log.
- 4 Deselect the check boxes next to the events that you do not want to track in the audit log.
- 5 Click *Apply* to save your changes, or click *OK* to save your changes and close the dialog box.

6.6 Configuring the Notification Service

Storage or system administrators might want to receive notices for Dynamic File Services pair and policy management events or for policy run events. The Notification Service allows you to configure which events trigger notifications and where the notification messages are sent. The notification messages include information about the event, such as the server name, pair name, policy name, a brief description of the event, and the event time stamp.

The Email notification add-on lets you set up one or more email addresses, then separately configure which events trigger messages to be sent for the address.

The selected notification events apply globally to all of the pairs and policies on a server.

The Dynamic File Service can be running or not running when you configure notifications. It is not necessary to restart the Service to apply the changes.

- ♦ [Section 6.6.1, “Understanding Notification and Audit Events,” on page 109](#)
- ♦ [Section 6.6.2, “Setting Up Email Notifications,” on page 110](#)

6.6.1 Understanding Notification and Audit Events

You can specify which event types trigger notifications to be sent for each configured recipient. Notification messages for the selected events are sent to the configured recipients only when the Notification Service is enabled.

- ♦ [“Pair Management Events” on page 109](#)
- ♦ [“Policy Management Events” on page 109](#)
- ♦ [“Policy Schedule Management Events” on page 109](#)
- ♦ [“Cloud Account Management Events” on page 110](#)
- ♦ [“Retention Review Events” on page 110](#)
- ♦ [“Registration Events” on page 110](#)
- ♦ [“Service Events” on page 110](#)

Pair Management Events

The following pair management events can be configured for notification and auditing:

Pair Created
Pair Modified
Pair Unlinked
Added Exclude/Include Folders to Pair
Removed Exclude/Include Folders from Pair
Stop Running Processes on Pair
Manual Move on Pair

Policy Management Events

The following policy management events can be configured for notification and auditing:

Policy Created
Policy Modified
Policy Delete
Policy Associated to Pair
Policy Disassociated from Pair
Policy Execute Now on Pair
Policy Preview Now on Pair
Policy Scheduled to Run on Pair
Policy Ran on Pair

Policy Schedule Management Events

The following policy schedule management events can be configured for notification and auditing:

Schedule Created
Schedule Modified
Schedule Delete
Schedule Associated to Policy
Schedule Disassociated from Policy

Cloud Account Management Events

The following cloud account management events can be configured for notification and auditing:

- Cloud Account Created
- Cloud Account Deleted
- Cloud Account Modified
- Cloud Path Included in a Pair

Retention Review Events

The following retention review management events can be configured for notification and auditing:

- Retention Review Notification
- Retention Review Check (Audit only)
- Retention Review Delete on Pair
- Retention Review Move Files Back to Primary
- Retention Pair Review Modification

Registration Events

The following registration event can be configured for notification and auditing:

- Registration

Service Events

The following service event can be configured for notification and auditing:

- Change Logging Options

6.6.2 Setting Up Email Notifications

The Email add-on for the Dynamic File Services Notification Service allows you to set up email addresses where you want to send notifications about pair and policy events. For each address, you configure which events trigger a message.

- ♦ [“Setting Up the Outgoing Mail Server” on page 110](#)
- ♦ [“Setting Up the Email Address and Events to Send” on page 112](#)
- ♦ [“Removing or Modifying an Email Address” on page 114](#)
- ♦ [“Viewing or Modifying the Events for an Email Address” on page 114](#)

Setting Up the Outgoing Mail Server

Before you configure email notifications, the following setup is required:

- ♦ **Outgoing Mail Service:** You must have an outgoing email service to relay email alerts and notifications.

The Email add-on supports the Simple Mail Transfer Protocol (SMTP), a standard server-to-server protocol that is used to transfer mail between computers. You need the DNS name of the SMTP mail server to use. You can also use an IPv4 IP address if your mail service provider allows it. The SMTP server must have Internet access if you want to send messages to external email addresses.

- ♦ **Mail Relay:** You must configure the outgoing email service to support and allow mail relay.

The Email add-on supports using either authenticated or anonymous SMTP relay. Your email service provider must support and allow the method you choose.

When you use authenticated mail relay, you must provide a valid email address and password to use for the notification sender. The email address does not need to be the address of a specific individual. It can be a friendly address that is recognizable to recipients, such as `ndfs_administrator@example.com`.

The email address is authenticated against the authentication mechanisms each time notification emails are sent. If the password changes for this account, you must update the password in the Email add-on.

- ♦ **Port:** You must specify the port number of the message submission port to use for the outgoing email service. Typical outgoing ports are 25 and 587. If you have a firewall protecting your perimeter network, you must enable an exception for the port to ensure that the traffic is allowed to pass.
- ♦ **SSL:** Determine if your outgoing email service provider requires SSL. Security-enhanced communication uses SSL to encrypt the SMTP session, including the user name, the password, and the message data.

- 1 Log in to the DynamicFS server as the Administrator user or as a user with Administrator privileges.
- 2 Right-click the *Service Controller* icon (🔗) in the notification area, then select *Notification Configuration > Email*.
- 3 In the Mail Configuration dialog box, click the *Enable* check box to enable the add-on.
- 4 Specify the *Outgoing Mail Server* settings.

Use the following sample values as a guide. Ensure that you use the values for your outgoing mail server.

Mail Server Parameter	Description	Sample Value
Mail (SMTP) server	Specify the DNS name or IP address (IPv4 format) of the outgoing SMTP mail server used by your email service provider.	smtp.example.com

Mail Server Parameter	Description	Sample Value
Use anonymous	You can use anonymous mail relay only if it is supported by your mail service provider. The <i>Use Anonymous</i> option disables the fields for using an authenticated email address.	Select the <i>Use Anonymous</i> check box.
Account name and password	If you use authenticated mail relay, specify an email address and password for a valid account with the email service provider. This address is used as the sender of outgoing email messages.	itadmin@example.com password
Port	Specify the port number to use for outgoing email messages. The number is required by your outgoing email service provider. (Default: 587)	587
Enable SSL	Specify this option if your service provider requires SSL.	Select the <i>Enable SSL</i> check box.
Subject	Specify the text to use as the default portion of the subject in your outgoing email notification messages. The server name and notification event type are automatically appended to this text. (Default: NDFS Notification)	SiteA NDFS Notification


5 Click *Apply* or *OK* to save and apply the changes.

The changes take effect without restarting the Service.

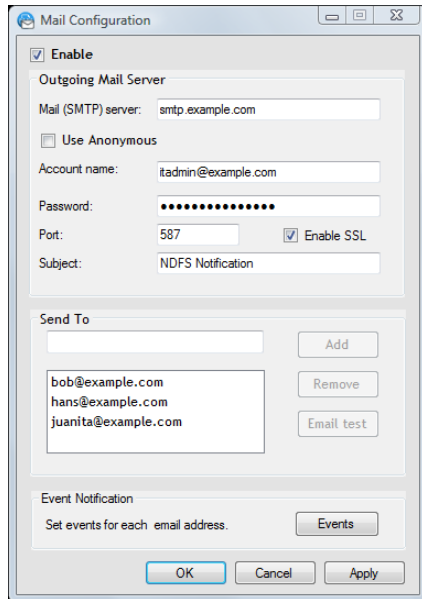
6 To configure notifications, continue with [“Setting Up the Email Address and Events to Send”](#) on page 112.

Setting Up the Email Address and Events to Send

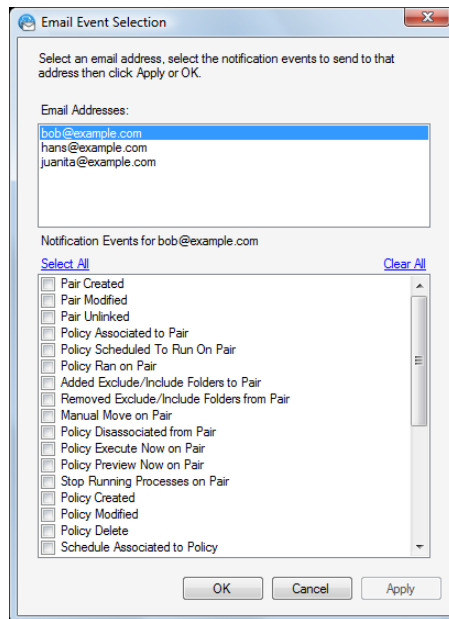
After you have enabled Email notifications and set up the outgoing mail server information, you can set up email addresses and events to send.

- 1 Log in to the DynamicFS server as the Administrator user or as a user with Administrator privileges.
- 2 Right-click the *Service Controller* icon () in the notification area, then select *Notification Configuration > Email*.

- 3 Under *Send To*, specify one to nine email addresses that receive email notifications:
- ◆ **Add:** Type an email address (such as bob@example.com), then click *Add*.
 - ◆ **Remove:** Select an email address in the list, then click *Remove*.



- 4 For each recipient, use the Events dialog box to set which events trigger messages to be sent to the user. No events are configured by default.
- 4a After you have entered the email addresses, click *Events*.
 - 4b Select an email address.
 - 4c Select the check box next to the events that will trigger messages to be sent to the selected address, or click *Select all* to choose all events.



- 4d Click *Apply* to save the settings.
- 4e Repeat this process for each email address.
- 5 (Optional) Select an email address in the list, then click *Email Test* to send a test message.
- 6 Click *Apply* or *OK* to save and apply the changes.
The changes take effect without restarting the Service.

Removing or Modifying an Email Address

You can remove an email address from the Notification Service by using the Email Configuration dialog box. You cannot modify an email address for a user. To use a different email address for the user, you must remove the old email address, then configure the new email address and assign events for it.

- 1 Log in to the DynamicFS server as an Administrator user or Domain Admin user.
- 2 Right-click the *Service Controller* icon, then select *Notifications > Email*.
- 3 In the Email Configuration dialog box, select the old email address, then click *Remove*.
- 4 Specify the new email address, click *Add*, then click *Apply* to accept the changes.
- 5 Click *Events*, select the new email address, set the events for the address, then click *OK*.
- 6 (Optional) Select an email address in the list, then click *Email Test* to send a test message.
- 7 Click *Apply* or *OK* to save and apply the changes.
The changes take effect without restarting the Service.

Viewing or Modifying the Events for an Email Address

You can modify the events selected for an email address by using the *Events* option in the Email Configuration dialog box.

- 1 Log in to the DynamicFS server as an Administrator user or Domain Admin user.
- 2 Right-click the *Service Controller* icon, then select *Notifications > Email*.
- 3 In the Email Configuration dialog box, select *Events*.
- 4 In the Email Event Selection dialog box, select an email address, then view or change the events that are selected.
- 5 Click *OK* to accept the changes and return to the Email Configuration dialog box.
- 6 Click *Apply* or *OK* to save and apply the changes.
The changes take effect without restarting the Service.

6.7 Configuring the Logging Level for Engines

Log level settings determine the type of events that are logged. The Server Properties dialog box allows you to set the logging levels for the following log files:

- ♦ Service (DswMcpCore.log)
- ♦ Standard Engine (DswStandardEngine.log)
- ♦ Retention Engine (DswRetentionEngine.log)
- ♦ Cloud Engine (DswCloudEngine.log)

The settings are written to the corresponding log configuration files:

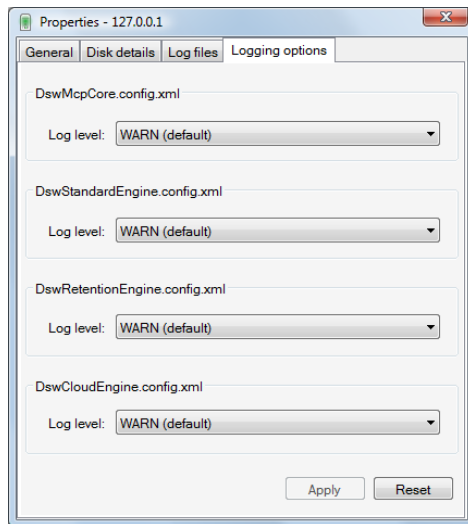
- ◆ Service (*DswMcpCore.config.xml*)
- ◆ Standard Engine (*DswStandardEngine.config.xml*)
- ◆ Retention Engine (*DswRetentionEngine.config.xml*)
- ◆ Cloud Engine (*DswCloudEngine.config.xml*)

The log level options are listed in order from the most information reported to no information reported. Each level includes the events specified, plus the events of the levels below it. The messages are listed from bottom to top in the order of increasing priority.

Log Level Option	Description
All	Records all events in the specified log file. (This is the same output as for the DEBUG level.)
DEBUG	Records debug, information, warning, error, and fatal events in the specified log file.
INFO	Records information, warning, error, and fatal events in the specified log file.
WARN	(Default) Records warning, error, and fatal events in the specified log file.
ERROR	Records error and fatal events in the specified log file.
FATAL	Records fatal events in the specified log file.
OFF	No events are recorded in the specified log file.

To view or change the Log Levels options:

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Right-click the server, then select *Properties* to open the Server Properties dialog box.
- 3 Click the *Log options* tab.



- 4 From the *DswMcpCore.config.xml* drop-down list, select a logging level for the Service log.
- 5 From the *DswStandardEngine.config.xml* drop-down list, select a logging level for the Standard Engine log.

- 6 From the *DswRetentionEngine.config.xml* drop-down list, select a logging level for the Retention Engine log.
- 7 From the *DswCloudEngine.config.xml* drop-down list, select a logging level for the Cloud Engine log.
- 8 Click *OK* to apply the changes.
- 9 Close the Server Properties dialog box.

6.8 Configuring a Certificate for Secure Remote Management Sessions

A Dynamic File Services Secure Sockets Layer (SSL) certificate is required to support secure remote sessions between a DynamicFS server and a computer running the Management Console. A self-signed certificate is automatically configured. You can also use the *Certificate Configuration* option in the Serviced Controller to create a new self-signed SSL certificate, or to specify your own signed certificate that you have acquired from a certification authority and added to the Local Computer Personal Store.

- ♦ [Section 6.8.1, “Understanding the Certificate,” on page 116](#)
- ♦ [Section 6.8.2, “Viewing the Dynamic File Services SSL Certificate,” on page 117](#)
- ♦ [Section 6.8.3, “Prerequisites for Creating, Modifying, or Unbinding the Certificate,” on page 118](#)
- ♦ [Section 6.8.4, “Creating a Dynamic File Services Self-Signed Certificate,” on page 118](#)
- ♦ [Section 6.8.5, “Configuring a Signed Certificate for Dynamic File Services,” on page 119](#)
- ♦ [Section 6.8.6, “Unbinding a Signed Certificate from Dynamic File Services,” on page 120](#)
- ♦ [Section 6.8.7, “Handling Expiring Certificates,” on page 121](#)

6.8.1 Understanding the Certificate

During remote management sessions, a Dynamic File Services SSL certificate is required in order for successful authentication to occur when connecting from the client to the server. The certificate helps assure the client that the server is the intended target. Dynamic File Services supports using self-signed and signed certificates. The remote connection uses standard RSA SHA-1 encryption with a 2048-bit key size.

- ♦ [“Self-Signed Certificate” on page 116](#)
- ♦ [“Signed Certificate” on page 117](#)

Self-Signed Certificate

Dynamic File Services automatically creates a self-signed certificate during the install, and provides a Certificate Configuration option where you can create a new self-signed certificate.

The Dynamic File Services installation automatically sets up SSL support by doing the following:

- ♦ Creates a Dynamic File Services self-signed certificate (*servername-DynamicFileServicesSSLCertificate*).
- ♦ Stores the certificate in the My personal certificate store on the local machine.
- ♦ Binds the certificate for SSL use to the configured Dynamic File Service port (default 8999).

- ◆ Configures the following Windows Registry keys for Dynamic File Services in the `HKEY_LOCAL_MACHINE/Software/Novell/Dynamic File Services/Setup/` folder:

Windows Registry Key	Description
<code>DswSelfSignedCertEnabled</code>	Indicates to the Dynamic File Service whether a signed DynamicFS SSL certificate is in use (value of 0), or if a DynamicFS self-signed SSL certificate is in use (value of 1). Valid values are 0 or 1. The default value is 1.
<code>DswSSLCertThumbprint</code>	Indicates to the Dynamic File Service the current configured certificate. Valid values are a 20-character hex value associated to the certificate. No spaces are permitted. This thumbprint must match the thumbprint of the certificate bound to the configured Dynamic File Service port.
<code>DswSSEnabled</code>	Indicates to the Dynamic File Service whether SSL is enabled or disabled for the configured Dynamic File Service port. Valid values are 0 (disabled) or 1 (enabled). The default value is 1.

Signed Certificate

Dynamic File Services also supports using a signed certificate that you have acquired from a certification authority and added to the Local Computer Personal Store.

6.8.2 Viewing the Dynamic File Services SSL Certificate

You can view the Dynamic File Services SSL certificate (`servername-DynamicFileServicesSSLCertificate`) by using the Certificates snap-in for the Microsoft Management Console (MMC).

- 1 Log in to the DynamicFS server as an Administrator user or as a user with Administrator privileges.
- 2 From the *Start* menu, click *Run*, then type `mmc` and click *OK* to launch the MMC.
- 3 Add the Certificates snap-in to the MMC console and configure it to manage Computer Account certificates:
 - 3a On the *Console* menu, click *Add/Remove Snap-in*.
 - 3b Select *Certificates* in the *Snap-in* list, click *Add*, select *Computer Account* as the type of certificate you want to manage, then click *Finish* or *Close*.
 - 3c Click *OK* to close the Add/Remove Snap-in dialog box.

The *Certificates* folder is now added to the MMC console.
- 4 In the Certificates management console, expand the certificate store, then click the *Certificates* folder to see the list of certificates in the store.
- 5 Right-click `servername-DynamicFileServicesSSLCertificate`, then click *Open* to open the Certificate dialog box.

You can also view a certificate by double-clicking it.

6 The Certificate dialog box is organized into three tabs:

Tab	Description
<i>General</i>	Identifies the certificate's intended use.
<i>Details</i>	Displays the ITU-T X.509 standard fields, extensions, and properties of the certificate.
<i>Certification Path</i>	The certification path to the source where the certificate was issued.

7 Close the MMC console when you are done.

6.8.3 Prerequisites for Creating, Modifying, or Unbinding the Certificate

The Service is automatically restarted to apply changes made to the Dynamic File Services certificate. Before you attempt to create a new self-signed certificate, modify a signed certificate, or unbind a certificate, ensure that you have satisfied all of the requirements for stopping the Service in [“Prerequisites for Stopping or Restarting the Service” on page 106](#).

6.8.4 Creating a Dynamic File Services Self-Signed Certificate

You can use the *Dynamic File Services Certificate Configuration* option to create a new Dynamic File Services self-signed SSL certificate to replace the one created during the install. You might need to do this in the following situations:

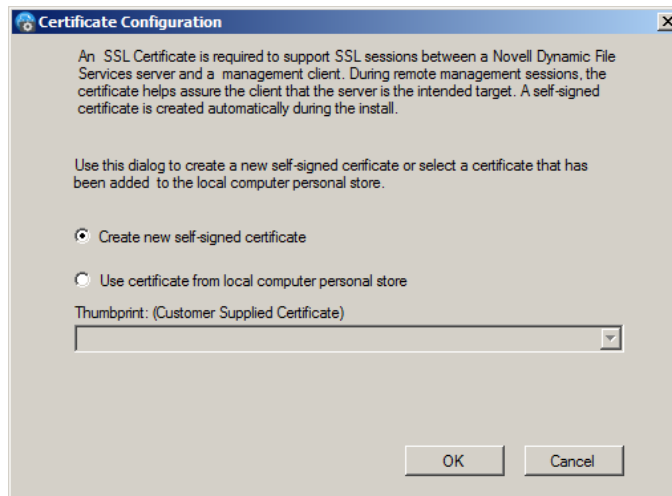
- ♦ The current certificate is expiring.
- ♦ You unbind a signed certificate and want to replace it with a self-signed certificate.

IMPORTANT: The Service is automatically restarted to apply certificate changes. Before you begin, ensure that you have met the requirements in [“Prerequisites for Stopping or Restarting the Service” on page 106](#).

To generate a self-signed certificate:

- 1 Log in to the DynamicFS server as the Administrator user or as a user with Administrator privileges.
- 2 Ensure that no policy runs are in progress on the server, then stop the Dynamic File Service by right-clicking the *Service Controller* icon in the notification area and selecting *Stop Service*.
For information, see [Section 6.4.3, “Stopping the Dynamic File Service,” on page 106](#).
- 3 Confirm that the Dynamic File Service is stopped by right-clicking the *Service Controller* icon and verifying that the Service option reads *Service disabled*.

- 4 Open the Certificate Configuration dialog box by right-clicking the *Service Controller* icon and selecting *Certificate Configuration*.



- 5 In the Certificate Configuration dialog box, select *Create a new self-signed certificate*.
- 6 Click *OK* to save and apply your changes.

The Service restarts automatically to apply the changes.
- 7 If you are prompted to confirm the Service restart, ensure that all users accessing files with the merged view have logged out, then click *Yes* to continue with the Service restart.

If you click *No*, the certificate is not created.
- 8 View the message that confirms whether the configuration succeeded or failed, then click *OK* to close the message.
- 9 After a successful configuration, start the Dynamic File Service by right-clicking the *Service Controller* icon in the notification area, then selecting *Start Service*.
- 10 (Optional) Verify that the certificate was successfully bound to a particular port by using the Microsoft Management Console (MMC) to view the certificate as described in [Section 6.8.2, “Viewing the Dynamic File Services SSL Certificate,”](#) on page 117.

You can also enter one of the following Windows commands in a command prompt console that has administrator privileges. Select *Start > All Programs > Accessories*, right-click *Command Prompt*, then select *Run as Administrator*.

Windows Server 2008:

```
netsh http show sslcert
```

If the certificate was successfully bound to the port, there is an entry for the certificate in the output response from this command.

6.8.5 Configuring a Signed Certificate for Dynamic File Services

You can use the *Dynamic File Services Certificate Configuration* option to replace the DynamicFS self-signed SSL certificate with one that you have obtained from a certification authority. Use this option if your enterprise security policy requires this level of security.

Additional steps are required when using a signed certificate. You must first generate a certificate signing request, import the certificate from the certification authority into the Local Computer Personal store, then assign the signed certificate to Dynamic File Services.

IMPORTANT: The Service is automatically restarted to apply certificate changes. Before you begin, ensure that you have met the requirements in [“Prerequisites for Stopping or Restarting the Service” on page 106](#).

After you have obtained the certificate from the certification authority and imported it into the Local Computer Personal store:

- 1 Log in to the DynamicFS server as the Administrator user or as a user with Administrator privileges.
- 2 Ensure that no policy runs are in progress on the server, then stop the Dynamic File Service by right-clicking the *Service Controller* icon in the notification area and selecting *Stop Service*.
For information, see [Section 6.4.3, “Stopping the Dynamic File Service,” on page 106](#).
- 3 Confirm that the Dynamic File Service is stopped by right-clicking the *Service Controller* icon and verifying that the Service option reads *Service disabled*.
- 4 Open the Certificate Configuration dialog box by right-clicking the *Service Controller* icon and selecting *Certificate Configuration*.
- 5 In the Certificate Configuration dialog box, select *Use your own SSL certificate from the local computer personal store*, select a certificate thumbprint from the drop-down list.
- 6 Click *OK* to save and apply your changes.

The Service restarts automatically to apply the changes.

- 7 If you are prompted to confirm the Service restart, ensure that all users accessing files with the merged view have logged out, then click *Yes* to continue with the Service restart.
If you click *No*, the certificate change is not done.
- 8 View the message that confirms whether the configuration succeeded or failed, then click *OK* to close the message.
- 9 After a successful configuration, start the Dynamic File Service by right-clicking the *Service Controller* icon in the notification area, then selecting *Start Service*.
- 10 (Optional) Verify that the certificate was successfully bound to a particular port by using the Microsoft Management Console (MMC) to view the certificate.

You can also enter one of the following Windows commands in a command prompt console that has administrator privileges. Select *Start > All Programs > Accessories*, right-click *Command Prompt*, then select *Run as Administrator*.

Windows Server 2008:

```
netsh http show sslcert
```

If the certificate was successfully bound to the port, there is an entry for the certificate in the output response from this command.

6.8.6 Unbinding a Signed Certificate from Dynamic File Services

You can use the *Certificate Configuration* option in the Dynamic File Service Controller to unbind a signed certificate from the Service. You can create a new self-signed certificate or specify another signed certificate to replace the one currently in use.

IMPORTANT: The Service is automatically restarted to apply certificate changes. Before you begin, ensure that you have met the requirements in [“Prerequisites for Stopping or Restarting the Service” on page 106](#).

- 1 Log in to the DynamicFS server as the Administrator user or as a user with Administrator privileges.
- 2 Ensure that no policy runs are in progress on the server, then stop the Dynamic File Service by right-clicking the *Service Controller* icon in the notification area and selecting *Stop Service*.
For information, see [Section 6.4.3, “Stopping the Dynamic File Service,” on page 106](#).
- 3 Confirm that the Dynamic File Service is stopped by right-clicking the *Service Controller* icon and verifying that the Service option reads *Service disabled*.
- 4 Open the DynamicFS Certificate Configuration dialog box by right-clicking the *Service Controller* icon and selecting *Certificate Configuration*.
- 5 In the DynamicFS Certificate Configuration dialog box, do one of the following:
 - ♦ Select *Create a new self-signed certificate*.
 - ♦ Select *Use your own SSL certificate from the local computer personal store*, select a different certificate thumbprint from the drop-down list.
- 6 Click *OK* to save and apply your changes.
The Service restarts automatically to apply the changes.
- 7 If you are prompted to confirm the Service restart, ensure that all users accessing files with the merged view have logged out, then click *Yes* to continue with the Service restart.
If you click *No*, the certificate change is not done.
- 8 View the message that confirms whether the configuration succeeded or failed, then click *OK* to close the message.
- 9 After a successful configuration, start the Dynamic File Service by right-clicking the *Service Controller* icon in the notification area, then selecting *Start Service*.
- 10 (Optional) Verify that the certificate was successfully bound to a particular port by using the Microsoft Management Console (MMC) to view the certificate.
You can also use one of the following Windows commands in a command prompt console that has administrator privileges. Select *Start > All Programs > Accessories*, right-click *Command Prompt*, then select *Run as Administrator*.

Windows Vista or Windows Server 2008:

```
netsh http show sslcert
```

If the certificate was successfully bound to the port, there will be an entry for the certificate in the output response from this command.

6.8.7 Handling Expiring Certificates

A Dynamic File Services self-signed SSL certificate is valid for five years from its creation date. As the date of expiration for a configured certificate nears, DynamicFS provides a notification message as you log in to the server from the Management Console. To replace the expiring certificate, use the *Certificate Configuration* option in the Service Controller to [create a new self-signed certificate](#), or to [set up a signed certificate](#) that you have obtained from a certification authority.

6.9 Configuring Firewall Access for the Service Port

Dynamic File Services allows you to manage the pairs and policies on a server from a different computer when the *Windows Firewall Access* option is enabled (the default). When the option is enabled, Dynamic File Services configures an exception for the configured Service port in the Windows Firewall. When the option is disabled, it removes the firewall exception and the Service cannot be accessed remotely. Firewall access is not required for local management of pairs and policies.

- ♦ [Section 6.9.1, “Understanding Remote Access,” on page 122](#)
- ♦ [Section 6.9.2, “Enabling or Disabling the Windows Firewall Access,” on page 123](#)

6.9.1 Understanding Remote Access

The Windows Firewall allows you to specify exceptions to allow programs to communicate through the firewall. Inbound connections that do not have an exception are blocked. Exceptions to the Windows Firewall allow unsolicited inbound communications through the firewall. Use the *Dynamic File Service Controller* > *Windows Firewall Access* option to control whether an exception for the configured Service port is allowed in the firewall.

- ♦ [“Allowing Remote Management” on page 122](#)
- ♦ [“Denying Remote Management” on page 123](#)

Allowing Remote Management

You enable the *Windows Firewall Access* option to allow remote management of pairs and policies. This is the default setting after install. DynamicFS automatically adds an exception for the configured Dynamic File Service port to the *Windows Firewall* > *Exceptions* list. The Windows Firewall allows unsolicited inbound communications through the firewall on the configured port. This allows you to manage pairs and policies from another computer through the firewall on the configured Service port.

IMPORTANT: On Windows Server 2008 or later, DynamicFS creates a firewall exception for the *Domain* and *Private* network profiles. The network should be marked as *Private*, or both computers need to be part of a single domain.

For example, in the *Windows Firewall with Advanced Security* > *Inbound Rules*, the entry might look like this:

```
DswAccessPort
Profile: Domain
Enabled: Yes
Action: Allow
Override: No
DswAccessPort
Profile: Private
Enabled: Yes
Action: Allow
Override: No
```

To mark the network as *Private*, log in as a user with Administrator privileges on the machine, go to the *Network and Sharing Center*, click *Customize*, select *Private*, then click *OK*.

Dynamic File Services uses TCP communications over the configured Service port. You must specify the configured port when connecting to the server. If you modify the port number, DynamicFS automatically updates the firewall exception settings to use the new port. For information about changing the port to use, see [Section 6.10, “Configuring Ports for the Service and Retention Review,”](#) on page 124.

By default, Dynamic File Services sets the scope of the port exception to *Any computer (including on the Internet)*. You can modify the scope option by going to the *Windows Firewall > Exceptions* page, double-clicking the *Dynamic File Services* exception, then selecting *Change Scope*. Alternative manual settings are *My network (subnet) only* and *Custom list*.

To allow remote management, enable the *Windows Firewall Access* option as described in [Section 6.9.2, “Enabling or Disabling the Windows Firewall Access,”](#) on page 123.

Denying Remote Management

You disable the *Windows Firewall Access* option to deny remote management of pairs and policies. DynamicFS automatically removes any firewall exceptions from the *Windows Firewall > Exceptions* list that it created for the configured Dynamic File Service port. When the exception is removed, Windows Firewall denies unsolicited inbound communications on the configured port. This prevents you from connecting to the server for remote management sessions.

For security reasons, you might want to disable the exception when you are not actively managing the Dynamic File Service from another computer.

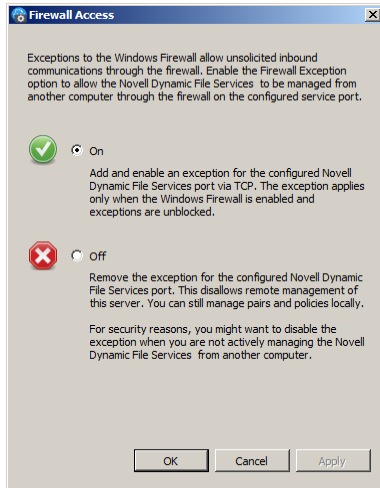
To deny remote management, disable the *Windows Firewall Access* option as described in [Section 6.9.2, “Enabling or Disabling the Windows Firewall Access,”](#) on page 123.

6.9.2 Enabling or Disabling the Windows Firewall Access

IMPORTANT: Before you disable the Windows Firewall Access, close any remote Management Console or command line management sessions with the server.

To enable or disable the firewall exception for the configured Dynamic File Service port:

- 1 Log in to the DynamicFS server as the Administrator user or as a user with Administrator privileges.
- 2 In the notification area, right-click the *Service Controller* icon, then select *Windows Firewall Access* to open the Firewall Access dialog box.



- 3 In the Firewall Access dialog box, select one of the following:
 - ♦ **On (default):** Adds and enables an exception for the configured Dynamic File Service port via TCP. The exception applies only when the Windows Firewall is enabled and exceptions are unblocked.
 - ♦ **Off:** Removes the exception for the configured Dynamic File Service port. This disallows remote management of this server. You can still manage pairs and policies locally.
- 4 Click *OK* to save and apply your changes.

6.10 Configuring Ports for the Service and Retention Review

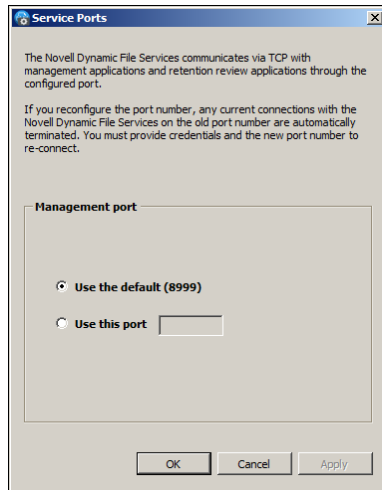
The Dynamic File Service communicates via TCP with management and retention review applications through the Service port. The default port number is 8999.

You can modify the ports used by the Service. If you reconfigure the port number, any current connections with the Service on the old port number are automatically terminated. You must provide credentials and the new port number to re-connect.

IMPORTANT: The Service is automatically restarted to apply changes to the Management port setting. Before you modify the port, ensure that you have quiesced the Service as described in [“Prerequisites for Stopping or Restarting the Service”](#) on page 106.

- 1 Log in to the DynamicFS server as the Administrator user or as a user with Administrator privileges.
- 2 If you plan to modify the Management port, close the user connections to the data in the pairs on the server as described in [“Prerequisites for Stopping or Restarting the Service”](#) on page 106.

- 3 In the notification area, right-click the *Service Controller* icon, then select *Port Configuration*.



- 4 Select *Use the default port*, or click *Use this port* and specify the port number you want to use.
- 5 Click *OK* to save and apply your changes.

The Service restarts automatically to apply the changes.

- 6 If you are prompted to confirm the Service restart, ensure that all users accessing files with the merged view have logged out, then click *Yes* to continue.

If you click *No*, the port change is not made.

- 7 After a successful port change, the next time that you connect to the DynamicFS server from the Management Console or the command line interface, you must use the new configured port number when logging in.

The new configured port is saved in the server's settings.

6.11 Viewing the Product Version and Build Information

The About box contains information about the software version and build.

- 1 Log in to the DynamicFS server.
- 2 Right-click the *Service Controller* icon in the notification area.
- 3 Select *About*.
- 4 View the following information:
 - ◆ Company
 - ◆ Company link
 - ◆ Product
 - ◆ Build number
 - ◆ Installation directory
 - ◆ Language
 - ◆ Product version
 - ◆ License
 - ◆ Copyright

6.12 What's Next

- ♦ Configure and log in to a DynamicFS server. For information, see [Chapter 7, “Managing Servers in the Management Console,”](#) on page 127.
- ♦ Configure pairs on the server. For information, see [Chapter 8, “Creating and Managing Pairs,”](#) on page 139.
- ♦ Configure policies to run on the pair. For information, see [Chapter 9, “Creating and Managing Policies,”](#) on page 157.
- ♦ Configure policy schedules and associate them with policies. This determines when policies run on the pairs. For information, see [Chapter 10, “Creating and Managing Policy Schedules,”](#) on page 189.
- ♦ Review retained data for retention pairs and monitor the review transaction history. For information, see [Chapter 12, “Managing Retention Reviews,”](#) on page 213.
- ♦ Monitor the health and history of server disks that are used in pairs, the pairs, and the policy run history for pairs. For information, see [Chapter 13, “Monitoring Pairs and Policies,”](#) on page 229.

7 Managing Servers in the Management Console

You can set up one or more Novell Dynamic File Services (DynamicFS) servers in the Management Console. The Management Console can be running on the same or different computer than the server you want to manage. The configuration settings for the Service, pairs, and policies are stored locally on the server that you are managing. The information is available through the Management Console after you connect to the target server.

This section describes how to set up and manage the DynamicFS servers in the Management Console.

- ◆ [Section 7.1, “Setting Up a Server in the Management Console,” on page 127](#)
- ◆ [Section 7.2, “Accepting a Dynamic File Services Certificate,” on page 130](#)
- ◆ [Section 7.3, “Connecting to a Server,” on page 131](#)
- ◆ [Section 7.4, “Viewing a List of Servers and Their Connection Status,” on page 132](#)
- ◆ [Section 7.5, “Viewing Server Properties,” on page 132](#)
- ◆ [Section 7.6, “Disconnecting from a Server,” on page 135](#)
- ◆ [Section 7.7, “Recovering a Lost Connection to a Server,” on page 135](#)
- ◆ [Section 7.8, “Exporting and Importing a Server List,” on page 136](#)
- ◆ [Section 7.9, “Removing a Server from the List,” on page 137](#)
- ◆ [Section 7.10, “What’s Next,” on page 137](#)

7.1 Setting Up a Server in the Management Console

The Dynamic File Services Management Console is used to manage pairs and policies for the servers where the Dynamic File Service is installed. The console can run on the same computer or a different computer in the same local area network.

- ◆ [Section 7.1.1, “Understanding the Server List,” on page 128](#)
- ◆ [Section 7.1.2, “Prerequisites for Connecting to a Server,” on page 128](#)
- ◆ [Section 7.1.3, “Setting Up the Server,” on page 129](#)

7.1.1 Understanding the Server List

The Management Console keeps a list of the DynamicFS servers that you manage from a computer. If different administrator users log in to the same computer to use the Management Console, each user configures a list of servers to manage.

The list of configured servers (`DswUIServers.xml` file) is stored in the local application data folder for the currently logged-in user on the computer where the Management Console is running. This folder location is based on the operating system as follows:

Operating System	Server List Location
Windows Server 2008	<code>C:\Users\username\AppData\Local\Dynamic File</code>
Windows 7	<code>Services\DswUIServers.xml</code>
Windows 8	
Windows 8.1	

You can use the import and export features of the Management Console to set up the same server list for multiple administrator users on the same computer, or to set up the same list on different computers. For information, see [Section 7.8, “Exporting and Importing a Server List,” on page 136](#).

7.1.2 Prerequisites for Connecting to a Server

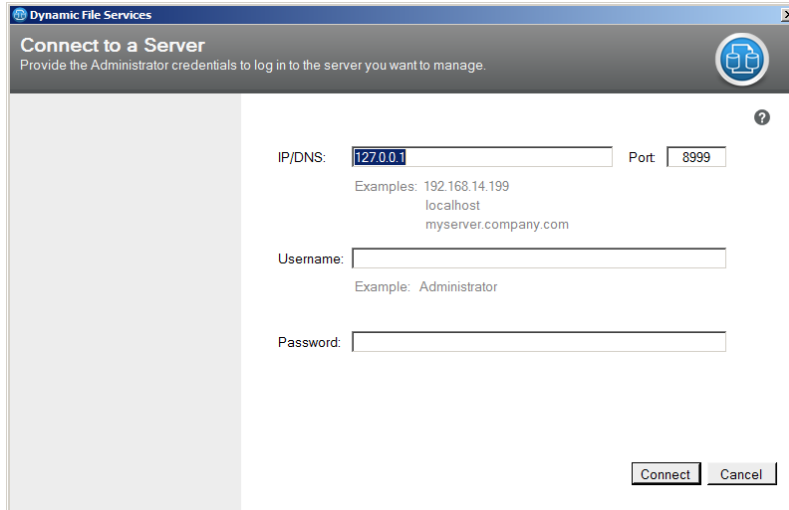
In order to connect to a Dynamic File Services server that you want to manage:

- ♦ The Dynamic File Service must be installed and running on the server you want to manage.
For information, see [Section 6.4, “Starting and Stopping the Service,” on page 105](#).
- ♦ You must be able to provide the following information:
 - ♦ **Authentication Credentials:** You must log in to the server as a user that is a member of the `Dynamic File Services` group on the target DynamicFS server, or log in as the Administrator user on that server.
For information about assigning users to the `Dynamic File Services` group, see [Section 6.3.3, “Setting Up Administrators in a Workgroup,” on page 104](#).
 - ♦ **DNS Name or IP Address:** You must provide the DNS name or IP address of the server. For local management, you can use `localhost` or `127.0.0.1` (the loop-back address).
 - ♦ **Service Port:** You must specify the port number that is configured on the server you want to manage. The default is port 8999.
- ♦ For remote management, an exception for the Dynamic File Service port must be enabled in the Windows Firewall on the server you want to manage.
For information, see [Section 6.9, “Configuring Firewall Access for the Service Port,” on page 122](#).

7.1.3 Setting Up the Server

Use the Server Wizard to set up the connection and credentials information for the DynamicFS servers you want to manage.

- 1 In the Management Console, select *Servers* in the left panel, then click *Actions > Server Wizard*.
You can also right-click *Servers* and select *Server Wizard*, or select *Servers*, then click *File > New > Dynamic File Services Server*.



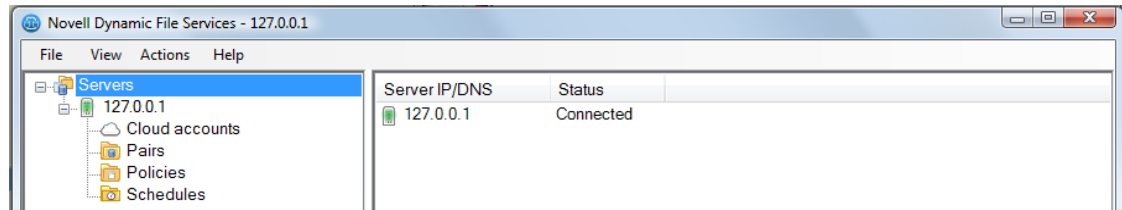
- 2 In the Server Wizard, provide the credentials of the Administrator user or a user that is a member of the `Dynamic File Services` group on the DynamicFS server that you want to manage.

Option	Description
IP/DNS	Specify the IP address or the Domain Name Service (DNS) name of the DynamicFS server where you want to create a pair. The IPv4 format is supported for the IP address. DNS names are case sensitive.
User name	Specify the user name of the Administrator user or a user that is a member of <code>Dynamic File Services</code> group on the target server.
Password	Specify the password of the user you specified in the <i>User name</i> field. Passwords are case sensitive.
Port	Specify the port number that is configured for the server that you want to manage. The default Dynamic File Service port is 8999.

- 3 Click *Connect* to connect to the server.
- 4 If you are prompted to accept the Dynamic File Services SSL certificate, view the certificate, then accept it if it is valid.

For information, see [Section 7.2, “Accepting a Dynamic File Services Certificate,”](#) on page 130.

- 5 Verify that the server appears in the left panel under the *Servers* container.



You can disconnect from the server when you are not actively managing it. The server remains in the list.

7.2 Accepting a Dynamic File Services Certificate

The default name of the Dynamic File Services self-signed SSL certificate is *servername-DynamicFileServicesSSLCertificate*. A self-signed certificate is valid for five years from the date it is created.

The first time that you connect to a target DynamicFS server from the Management Console, you are prompted to accept the certificate for the target server. If the server is in a Windows cluster, you are prompted the first time that a connection is made to each node in the cluster.

The accepted certificate is added to your personal local computer certificates on the management computer.

Each user that manages pairs and policies on the target server is prompted to accept the certificate when connecting for the first time to the server.

- ♦ [Section 7.2.1, “Importing a Certificate to the Default Location,” on page 130](#)
- ♦ [Section 7.2.2, “Importing the Certificate to a Specified Location,” on page 131](#)

7.2.1 Importing a Certificate to the Default Location

By default, the SSL certificate is imported to the current user’s *Personal* local computer store.

- 1 In the Certificate Validation dialog box, view the issuer information:
 - ♦ Issued to
 - ♦ Issued by
 - ♦ Valid from MM/DD/YYYY to MM/DD/YYYY
- 2 Click *View* to view detailed information about the certificate.
- 3 In the Certificate Information dialog box, review the information on the *General*, *Details*, and *Certification Path* tabs.
- 4 Close the Certificate Information dialog box.
- 5 In the Certificate Validation dialog box, click *Accept* to automatically install the certificate to your *Personal* local computer store.

7.2.2 Importing the Certificate to a Specified Location

You can specify an alternate location to store the SSL certificate.

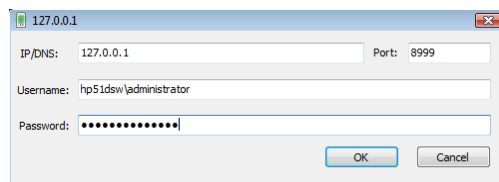
- 1 In the Certificate Validation dialog box, view the issuer information:
 - ◆ Issued to
 - ◆ Issued by
 - ◆ Valid from MM/DD/YYYY to MM/DD/YYYY
- 2 Click *View* to view detailed information about the certificate.
- 3 In the Certificate Information dialog box, review the information on the *General*, *Details*, and *Certification Path* tabs.
- 4 If the certificate is valid, on the *General* tab, click *Install certificate* to import the certificate on the local computer.
- 5 In the Certificate Import Wizard, follow the on-screen instructions to import the certificate.
- 6 Click *OK* to dismiss the Certificate Information dialog box.
- 7 Click *Accept* to close the Certificate Validation dialog box.

7.3 Connecting to a Server

After you set up a Dynamic File Services server to be managed as described in [Section 7.1, “Setting Up a Server in the Management Console,” on page 127](#), you can connect to the server whenever you want to manage its pairs and policies. Only one administrator at a time should be logged in to a DynamicFS server to manage its pairs and policies.

- 1 In the Management Console under *Servers*, select the IP address or DNS name of the server that you want to manage, then select *Actions > Connect*. You can also right-click the server name and select *Connect*, or double-click the server name.

The DynamicFS Login dialog box opens for the server.




- 2 If the configured Dynamic File Service port has changed on the target server, specify the configured port.
- 3 Specify the user name and password of the Administrator user or a user that is a member of the Dynamic File Services group on the target server.
- 4 Click *OK* to connect to the server.




When the server is connected, the *Server* icon () has a green glow in the upper half of the icon.

7.4 Viewing a List of Servers and Their Connection Status

The *Servers* container in the left panel of the Management Console lists all of the servers that you have previously set up on the computer where the Management Console is running. If different administrator users log in to the same computer to use the Management Console, each user configures a personal list of servers to manage. You might see different computers in the list, depending on the user name you use when you log in to the desktop.

- 1 In the Management Console, select the *Servers* container () in the left panel to expand the list. You must log in to a server to view the pairs and policies listed below an individual server's container.
- 2 View the current connection status of the servers.

The Server icon next to a server's IP address or DNS name indicates its connection status:

Server Connection State	Icon	Description
Disconnected		A gray server icon indicates that you are currently disconnected from the target DynamicFS server.
Connected		A green glow on the upper half of the server icon indicates that you are currently connected to the target DynamicFS server.
Connection is lost		A red glow on the lower half of the server icon indicates that you were connected to the server, but the connection has been lost. You must disconnect from the server, then connect to the server again.

7.5 Viewing Server Properties

The Server Properties dialog box in the Management Console retrieves and displays information about the Dynamic File Services servers that you are managing.

- ♦ [Section 7.5.1, "Accessing the Server Properties," on page 132](#)
- ♦ [Section 7.5.2, "Viewing General Server Information," on page 133](#)
- ♦ [Section 7.5.3, "Viewing Disk Details for the Server," on page 133](#)
- ♦ [Section 7.5.4, "Viewing Log Files for the Server," on page 134](#)
- ♦ [Section 7.5.5, "Viewing Logging Levels for the Server," on page 135](#)

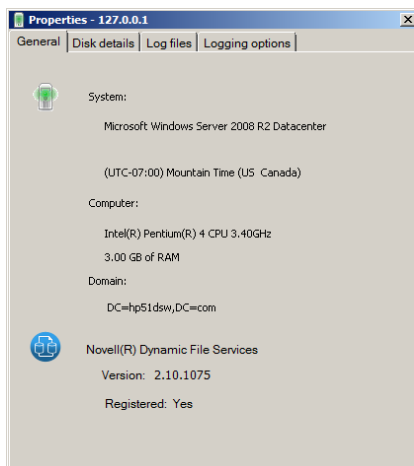
7.5.1 Accessing the Server Properties

- 1 In the Management Console, [connect to the DynamicFS server you want to manage](#).
- 2 In the left panel, select the server, then select *Actions > Properties*. You can also right-click the server, then select *Properties*.
The Server Properties dialog box opens.
- 3 Continue with [Section 7.5.2, "Viewing General Server Information," on page 133](#).

7.5.2 Viewing General Server Information

- 1 In the Server Properties dialog box, select the *General* tab to view information about the server operating system and hardware:

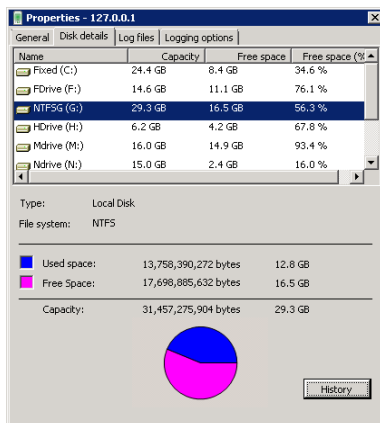
Property	Description
System	The operating system and server time zone of the server.
Computer	Server processor and RAM on the server.
Domain	The fully distinguished name of the Active Directory domain, if the server is a member server or controller server in an Active Directory environment. For example: DC=novell1,DC=com
Version	The release version of the Dynamic File Services software.



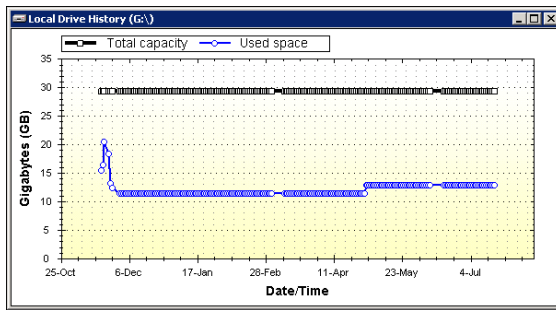
- 2 Continue with [Section 7.5.3, “Viewing Disk Details for the Server,”](#) on page 133.

7.5.3 Viewing Disk Details for the Server

- 1 In the Server Properties dialog box, select the *Disk Details* tab to view a list of disks on the server and the *Used Space*, *Free Space*, and *Capacity* of each disk.



- (Optional) For each disk, select the disk, then click *History* to view the history of the disk capacity and used space.

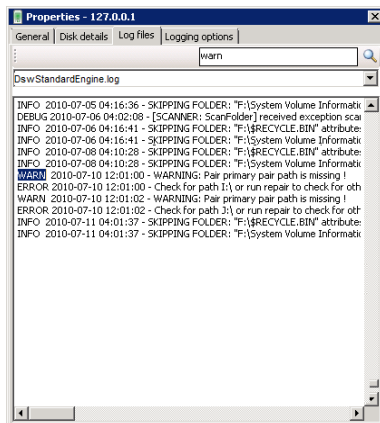


- (Optional) Save the graphic display by right-clicking anywhere in a graphical area and selecting any of the following options:
 - ◆ **Copy:** Copies the selected graph as an image to the clipboard. Open a graphics editor, paste the image, and save the file.
 - ◆ **Save Image As:** Opens a Windows Save As dialog box where you can specify a location and file name for the image, select a file format, then save the file.
 - ◆ **Page Setup:** Set up the page orientation (portrait or landscape) and printer information for printing the graph.
 - ◆ **Print:** Print the selected graph.
- Continue with [Section 7.5.4, “Viewing Log Files for the Server,”](#) on page 134.

7.5.4 Viewing Log Files for the Server

- In the Server Properties dialog box, select the *Log Files* tab to view log information for the following components on the target server:
 - ◆ Dynamic File Service component (*DswMpcCore.log*)
 - ◆ Standard Policy engine component (*DswStandardPolicy.log*)
 - ◆ Install utility (*install.log*)
 - ◆ Pair Check utility (*DswPairCheck.exe*)
 - ◆ File Inventory utility (*DswInventory.exe*)

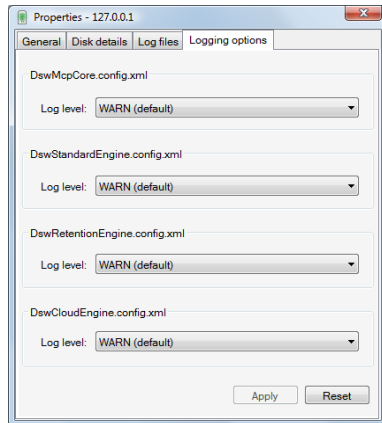
Logs for the utilities are available after the utility has been run manually at least one time.



- 2 (Optional) Search for words in messages by using the Search feature. Type the word or characters, then click the Search icon to jump to each instance of the word in the log file.
- 3 Continue with [Section 7.5.5, “Viewing Logging Levels for the Server,”](#) on page 135.

7.5.5 Viewing Logging Levels for the Server

- 1 In the Server Properties dialog box, select the *Logging options* tab to view the logging level settings for the Service and Standard Policy logs on the server.



- 2 If you want to modify the logging levels, continue with [Section 6.7, “Configuring the Logging Level for Engines,”](#) on page 114.



7.6 Disconnecting from a Server

You can disconnect the Dynamic File Services Management Console from the target servers when you are not actively monitoring or managing pairs and policies on them. You might also need to disconnect from a server in order to reconnect to it if the connection is lost during a management session.

- 1 In the Management Console, if a wizard is open, complete the setup or click *Cancel* to gracefully close the in-progress setup process.
- 2 In the Management Console under *Servers*, select the DynamicFS server that you want to manage.
- 3 Select *Actions > Disconnect*. You can also right-click the server name and select *Disconnect*.

When the server is disconnected, the Server icon is dimmed (). All open Properties or Statistics windows for that server are automatically closed.

7.7 Recovering a Lost Connection to a Server


If a connection is lost while you are managing a Dynamic File Services server, the server status changes from Connected (with a green glow on the server icon ) to Connection Lost (with a red glow on the server icon ). Possible reasons for a lost connection are:

- ♦ The Service is disabled on the target server.
- ♦ The configured Service port is modified on the target server.

- ♦ The Windows Firewall exception is disabled on the target server, which denies remote connections.
- ♦ A network outage occurs for a remote connection.
- ♦ The user name that was used to establish the connection is removed from the `Dynamic File Services` group on the target server.

You must disconnect from the server, then connect to the server again to start a new management session. Restart any management tasks that were in progress.

- 1 In the Management Console under *Servers*, select the DynamicFS server that you want to manage.
- 2 Select *Actions > Disconnect*. You can also right-click the server name and select *Disconnect*.

When the server is disconnected, the Server icon is dimmed (). All open Properties or Statistics windows for that server are automatically closed.

- 3 Select *Actions > Connect*. You can also right-click the server name and select *Connect*.
- 4 Provide the login credentials, then click *OK*.

7.8 Exporting and Importing a Server List

The Dynamic File Services Management Console allows you to export and import a server list. This allows you to set up the same list of servers on multiple computers or for multiple administrator users on the same computer.

The *Export server list* option allows you to export a server list to an `.xml` file in a local folder. The default file name is `DswServersList.xml`.

The *Import server list* option allows a currently logged-in administrator user to import an exported server list to add the servers to a server list that is stored in the user's personal local application data folder. You can also copy an exported list to another computer where the Management Console is installed, then import the server list for use on that computer.

- ♦ [Section 7.8.1, "Exporting a Server List," on page 136](#)
- ♦ [Section 7.8.2, "Importing a Server List," on page 136](#)

7.8.1 Exporting a Server List

- 1 In the left panel of the Management Console, select the *Servers* container.
- 2 Select *File > Import/Export > Export server list*.
- 3 Browse to the location on the computer where you want to save the file, specify a name for the file, then click *Save*.
By default, the list of servers is exported in the `DswServersList.xml` file.
- 4 (Optional) Copy the file to portable storage media that can be used on different computers, then continue with [Section 7.8.2, "Importing a Server List," on page 136](#) to use the list as a different user on the same computer or on a different computer.

7.8.2 Importing a Server List

- 1 Log in to the Windows server or client where the Management Console is installed.
Log in with the same user name that you will use to log in to the Management Console.


- 2 Place a copy of the exported servers list (`DswServersList.xml`) on the computer where you are managing DynamicFS.
- 3 In the left panel of the Management Console, select the *Servers* container.
- 4 Select *File > Import/Export > Import server list*.
- 5 Browse to the location on the computer where you placed the `DswServersList.xml` file, then click *Open*.

The list of imported servers is added to the *Servers* container in the left panel. The servers are added to the server list (`DswUIServers.xml` file) that is stored in the local application data folder for the currently logged-in user.

7.9 Removing a Server from the List

You can remove DynamicFS servers from the *Servers* list. You might need to remove a server from the list if the target server is no longer running Dynamic File Services, or if you are no longer responsible for managing pairs and policies on the server.

- 1 In the Management Console, if a wizard is open, complete the setup or click *Cancel* to gracefully close the in-progress setup process.
- 2 In the Management Console under *Servers*, select the DynamicFS server that you want to manage.
- 3 If you are connected to the server, disconnect from it by selecting *Actions > Disconnect*. You can also right-click the server name and select *Disconnect*.

When the server is disconnected, the Server icon is dimmed ().

- 4 Select the server, then select *Actions > Remove server*. You can also right-click the server name and select *Remove server*.

The server no longer appears in *Servers* list for the currently-logged-in user.

7.10 What's Next

- ♦ Configure pairs on the server. For information, see [Chapter 8, "Creating and Managing Pairs," on page 139](#).
- ♦ Configure policies to run on the pair. For information, see [Chapter 9, "Creating and Managing Policies," on page 157](#).
- ♦ Monitor the health and history of server disks that are used in pairs, the pairs, and the policies. For information, see [Chapter 13, "Monitoring Pairs and Policies," on page 229](#).

8 Creating and Managing Pairs

Novell Dynamic File Services (DynamicFS) transparently manages two storage locations as a single logical data storage repository referred to as a *pair*. This section describes how to create and manage pairs.

- ◆ [Section 8.1, “Understanding Pairs,” on page 139](#)
- ◆ [Section 8.2, “Creating a Pair,” on page 142](#)
- ◆ [Section 8.3, “Preparing Remote Shares for Use in a Pair,” on page 146](#)
- ◆ [Section 8.4, “Providing Users with a Merged View of the Files in a Standard Pair,” on page 147](#)
- ◆ [Section 8.5, “Including or Excluding Folders from a Pair’s Policy Runs,” on page 147](#)
- ◆ [Section 8.6, “Viewing a List of Pairs,” on page 149](#)
- ◆ [Section 8.7, “Viewing the Pair Status,” on page 149](#)
- ◆ [Section 8.8, “Viewing Properties for a Pair,” on page 149](#)
- ◆ [Section 8.9, “Moving Selected Files or Folders,” on page 152](#)
- ◆ [Section 8.10, “Scheduling the Pair History Scan,” on page 153](#)
- ◆ [Section 8.11, “Reporting Conflicts for Attributes and ACL Permissions on Folders,” on page 153](#)
- ◆ [Section 8.12, “Reporting Conflicts for Duplicate Files,” on page 154](#)
- ◆ [Section 8.13, “Unlinking the Paths in a Pair,” on page 155](#)
- ◆ [Section 8.14, “What’s Next,” on page 155](#)

8.1 Understanding Pairs

A Dynamic File Services pair is a logical combination of two independent storage locations that are managed as one. There are two pair types to address your storage needs: a *standard pair* and a *retention pair*. These concepts are described in more detail below.

- ◆ [Section 8.1.1, “Pair Paths,” on page 140](#)
- ◆ [Section 8.1.2, “Standard Pairs,” on page 140](#)
- ◆ [Section 8.1.3, “Retention Pairs,” on page 141](#)

8.1.1 Pair Paths

A pair consists of two independent share paths. The two paths in a pair are referred to as *primary* and *secondary*. The primary location typically contains the most important and most used files. The secondary location typically contains less critical or seldom-used files, very large files, or files that change infrequently. The administrator determines what files should reside in each location.

Paths are supported on the following devices:

Pair Type	Primary Path	Secondary Path
Standard pair	Local device	Local device Remote share
Retention pair	Local device Remote share	Local device Remote share Cloud storage

The primary location typically resides on higher-performance storage hardware than the secondary location. The secondary path can even be connected over lower-speed connections such as cloud-based iSCSI. Retention pairs also support cloud storage for the secondary location. Local devices include drives that are attached directly to the server or are attached via Fibre Channel and iSCSI connections. Remote shares can reside on network attached storage (such as NetApp and EMC filers) and supported Windows server platforms. Remote shares must reside in the same Active Directory domain or the same workgroup as the DynamicFS server. Cloud storage involves your accounts with a cloud provider that you have configured to allow the Dynamic File Services application to access files.

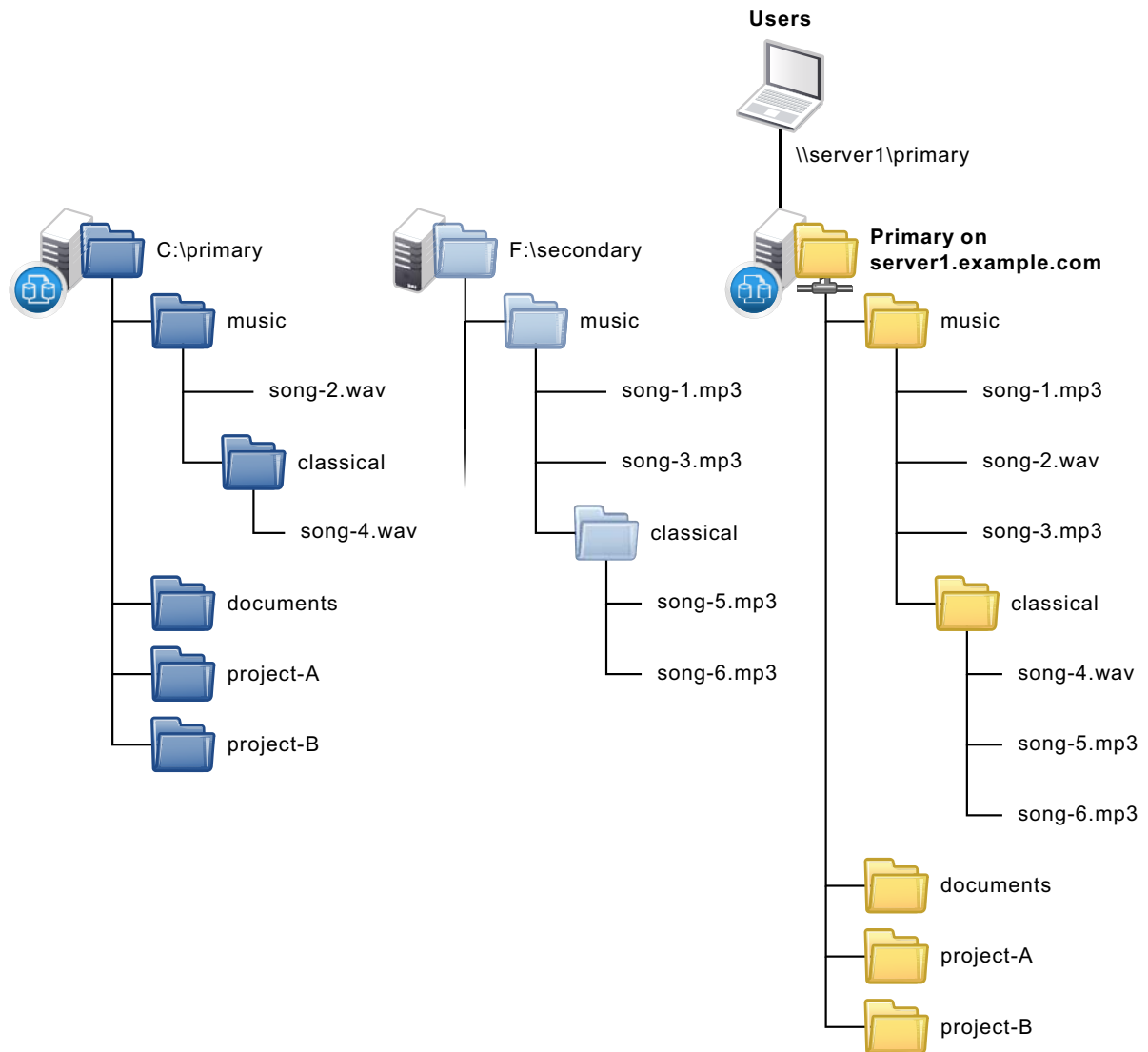
8.1.2 Standard Pairs

The Dynamic File Services standard pair allows you to efficiently manage your storage across a pair of paths while giving users access to files on both. When users connect to a network share on the primary path, they see merged view of files. Users are not aware of where the files physically reside. Files on both paths are equally accessible to users. Dynamic File Services pulls data directly to the user from the primary path or the secondary path, depending on where the file is located.

For the standard pair, the Dynamic File Services filter driver works with a network share on the primary path to give users a merged view of the files on both the primary and secondary locations.

For example, [Figure 8-1](#) shows a primary path of C:\primary, a secondary path of F:\secondary, and the merged view of the files in the pair as seen by the users via the network share.

Figure 8-1 Merged View of the Primary and Secondary Paths



The merged view is not automatically presented to users of a pair. To enable users to see the merged view, you must use the Microsoft Network Share tool to create a network share on the primary path. For requirements and guidelines, see [Section 4.14, "Merged View for Standard Pairs,"](#) on page 65.

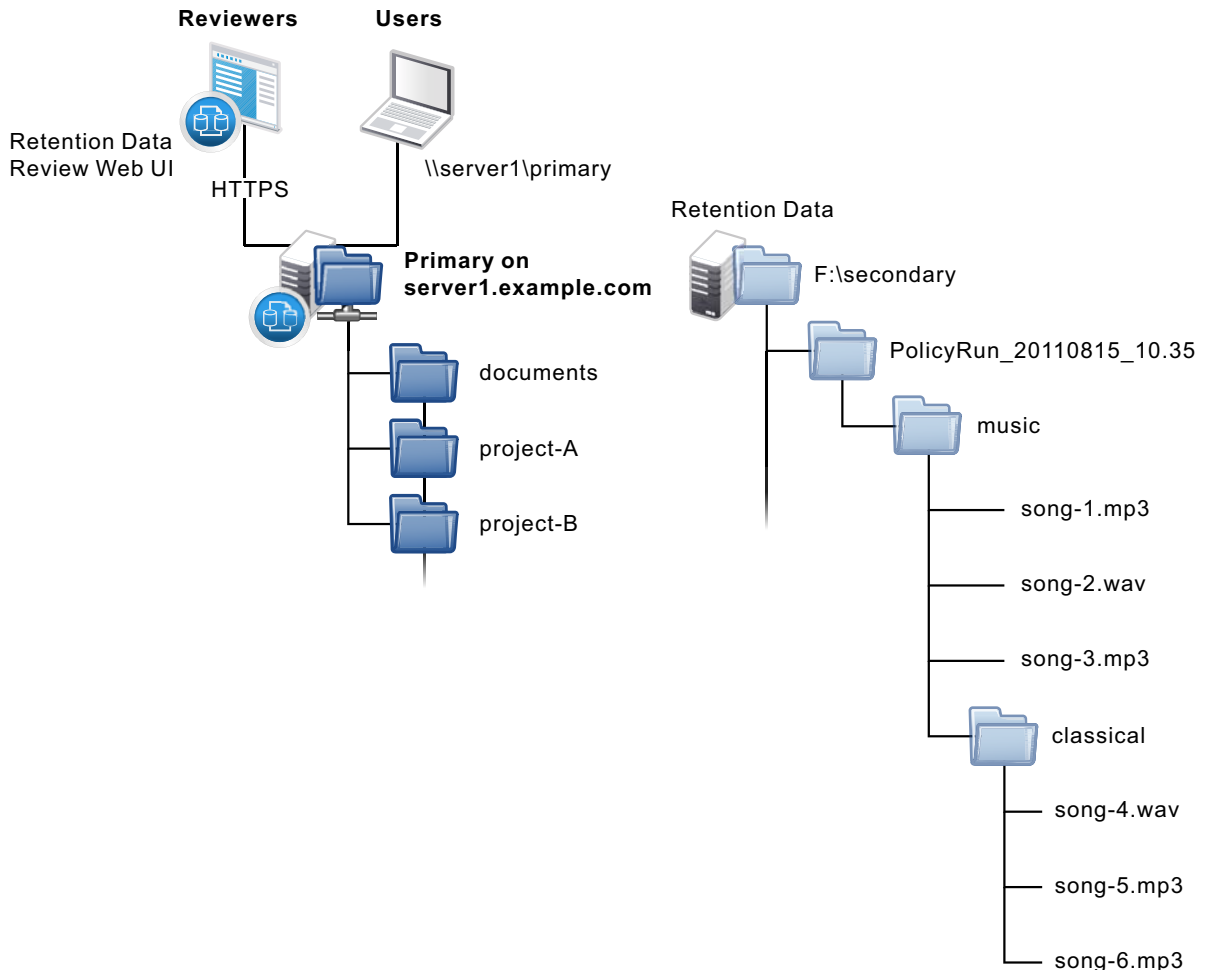
8.1.3 Retention Pairs

The Dynamic File Services retention pair allows you to keep data that is actively used on the primary path, and to move static data that you rarely need to access to a retention repository on the secondary path. For example, you can use the repository to store files that are not needed for everyday operations but must be retained for historical reference, or to comply with contractual or legal requirements. Files in the repository are not generally available to users. Only designated reviewers

can access them via a Web-based Retention Review Service. You can schedule retention review events and notify multiple recipients about them. Reviewers determine the disposition of retained files in accordance with your company's data retention policy. All retention review actions are audited.

For example, [Figure 8-2](#) shows a primary path of `C:\primary`, a secondary path of `F:\secondary`. The retention repository contains folders with files that were moved during a particular policy run or pair *Move Files* option.

Figure 8-2 Retention Repository as the Secondary Path



8.2 Creating a Pair

Two wizards are available for configuring Dynamic File Services pairs:

- ♦ **Setup Wizard:** Sets up a new pair, a new policy, and a new policy schedule. It automatically associates the pair to the policy, and the policy schedule to the policy. The pair, policy, and schedule are configured when you click *Finish*. The associated policy is enforced for the pair at its next scheduled run, or you can start policy runs manually by using *Execute now*.

The Setup Wizard opens automatically when you connect to a DynamicFS server if there are no pairs or policies currently defined for the server. The Setup Wizard is convenient to use when you want to create a new pair and its policy at the same time. You can associate additional policies at any time.

- ♦ **Pair Wizard:** Sets up a new pair and allows you to select none, one, or multiple existing policies to associate with the pair. The associated policies are enforced for the pair at their next scheduled runs, or you can start policy runs manually by using *Execute now*. You can associate additional policies at any time.

IMPORTANT: No data is moved between the primary and secondary locations in a pair until you set up policies to do so. You can also use the *Manual Move* option for the pair.

- 1 If you plan to use a remote share when creating a pair, create the share in the secondary location.

Shares in an Active Directory Domain: You must publish the share as described in [Section 8.3, “Preparing Remote Shares for Use in a Pair,”](#) on page 146. Ensure that your system meets the requirements in [Section 4.9, “Using Remote Shares in an Active Directory Domain,”](#) on page 60.

Shares in a Workgroup: Ensure that your system meets the requirements in [Section 4.10, “Using Remote Shares in a Workgroup,”](#) on page 61.

- 2 Launch the Management Console, then connect to the DynamicFS server that you want to manage.

- 3 Launch the Setup Wizard or the Pair Wizard:

- ♦ **Setup Wizard:** Select the server, then select *Actions > Setup Wizard*. You can also right-click the server, then select *Setup Wizard*.

If no pairs or policies exist on the server when you connect to it, the Setup Wizard opens automatically to an overview of benefits. Review them, then click *Start*.

- ♦ **Pair Wizard:** Select the *Pairs* folder, then select *Actions > Pair Wizard*. You can also right-click the *Pairs* folder, then select *Pair Wizard*.

The wizard opens to the Pair Type page.

- 4 Specify the pair type as *Standard pair* or *Retention pair*, then click *Next*.

- 5 On the Pair Paths page, specify the primary and secondary paths to use for the pair:

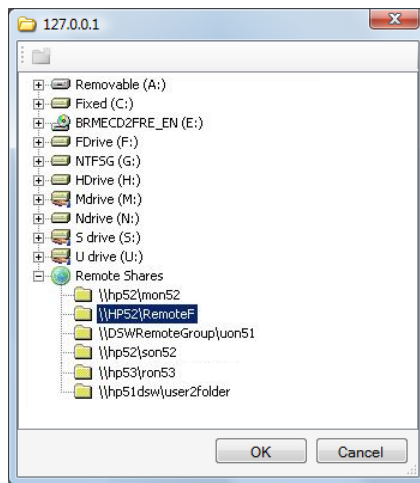
- 5a Browse to select the primary path, then click *OK*:

- ♦ **Local path:**

Browse the local drives on the DynamicFS server. You can right-click a folder, then select *Create Folder* to add a folder if the path is on a local device, and not on a remote share.

- ♦ **Remote share path:**

Remote shares are available if you are specifying the primary path for a retention pair. Browse the remote shares that have been published in Active Directory. For information, see [Section 8.3, “Preparing Remote Shares for Use in a Pair,”](#) on page 146.



You can alternately type the UNC path of a local or remote share. The path name entry is case-insensitive for local paths, but it is case-sensitive for remote paths.

5b Browse to select a secondary path, then click *OK*:

- ◆ **Local path:**

Browse the local drives on the DynamicFS server. You can right-click a folder, then select *Create Folder* to add a folder if the path is on a local device, and not on a remote share.

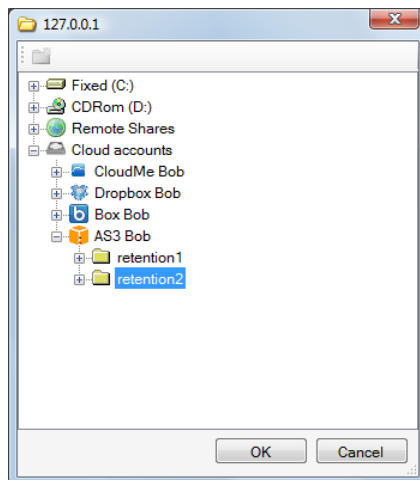
- ◆ **Remote share path:**

Browse the remote shares that have been published in Active Directory. For information, see [Section 8.3, “Preparing Remote Shares for Use in a Pair,”](#) on page 146.

You can alternately type the UNC path of a local or remote share. The path name entry is case-insensitive for local paths, but it is case-sensitive for remote paths.

- ◆ **Cloud storage path:**

For a retention pair, if you have predefined the cloud account, you can browse the cloud accounts to select a path in your cloud storage.



5c Click *Next* to continue.

6 If a network share does not exist on the primary path of a standard pair, a message pops up to remind you that the share is required for users to access files on the pair via the merged view. Click *OK* to dismiss the message.

You can create the share at any time before you give users access to the files. For information, see [Section 8.4, “Providing Users with a Merged View of the Files in a Standard Pair,”](#) on page 147.

- 7 On the Pair Name page, specify a unique name (up to 32 characters) for the pair on the selected server, then click *Next*.

For information, see [Section 4.12, “Naming Conventions for Pairs and Policies,”](#) on page 65.

- 8 If you are using the Setup Wizard, create a policy for the pair and a schedule for the policy. Otherwise, skip this step and go to [Step 9](#).

8a Create a new policy.

For details, see [Section 9.2, “Creating a Policy,”](#) on page 162. The new policy is automatically associated with the pair.

- 8a1** On the Policy Direction page, specify the direction that files are to be moved, then click *Next*.

Retention pairs are allowed to move files only from primary to secondary.

- 8a2** On the Policy Filters page, specify one or more filter options to apply for this policy, then click *Next*.

- 8a3** On the Policy Name and Description page, specify a unique name for the policy on the selected DynamicFS server, optionally add a more detailed description for the policy, then click *Next* to continue.

8b Create a new policy schedule.

For details, see [Section 10.2, “Creating a Policy Schedule,”](#) on page 192. The new schedule is automatically associated with the policy.

- 8b1** On the Policy Schedule page, select a frequency option from the drop-down list.

- 8b2** Specify when the policy will run, then click *Next*.

- 8b3** On the Schedule Name and Description page, specify a unique name for the schedule on the selected DynamicFS server, optionally add a more detailed description for the schedule, then click *Next*.

8c Review the setup summary for the *Pair*, *Policy*, and *Policy Schedule*, then click *Finished*.

In the Management Console, the newly created pair, policy, and schedule are listed under the appropriate folders under the server. The policy is automatically associated with the pair. The schedule is automatically associated with the policy. The policy rules are enforced for the pair at the next scheduled run time of the policy. You can also run the policy manually by using the *Execute Now* option.

8d Skip [Step 9](#), and continue with [Step 10](#).

- 9 If you are using the Pair Wizard, click *Add* to select one or more existing policies to associate them with the pair, click *OK*, then click *Finished*.

The pair is created and appears in the *Pairs* list for the server. The selected policies are associated with the pair. If the policy is associated with a schedule, the policy rules are enforced for the pair at the next scheduled run time of the policy. Unscheduled and scheduled policies can be run manually by using the *Execute Now* option.

- 10 (Optional) After you have configured the pair, you can use any of the following methods to associate the pair with other policies:

- ♦ **Policy Wizard:** Use the Policy Wizard to create a new policy and associate it with the pair.
- ♦ **Pair Properties > Policies:** Use the *Pair Properties > Policies* tab to select one or more policies to associate with a selected pair. For information, see [Section 9.6.4, “Associating or Disassociating Policies with a Pair,”](#) on page 175.

- ♦ **Policy Properties > Pairs:** Use the *Policy Properties > Pairs* tab to select one or more pairs to associate with a selected policy. For information, see [Section 9.6.3, “Associating or Disassociating Pairs with a Policy,”](#) on page 174.
- 11 If a network share does not exist on the primary path of a standard pair, continue with [Section 8.4, “Providing Users with a Merged View of the Files in a Standard Pair,”](#) on page 147.

8.3 Preparing Remote Shares for Use in a Pair

In an Active Directory environment, Dynamic File Services allows you to use a remote share as the secondary path in a file. A remote share must be published in Active Directory before you can specify it as the secondary path in a pair. To do this, you must share the folder as a network share, publish the remote share in Active Directory, then add the Dynamic File Services Storage Rights group to the share and grant it all permissions.

IMPORTANT: For requirements and guidelines for using remote pairs, see [Section 4.9, “Using Remote Shares in an Active Directory Domain,”](#) on page 60.

- ♦ [Section 8.3.1, “Creating a Network Share on the Remote Device,”](#) on page 146
- ♦ [Section 8.3.2, “Publishing the Remote Share,”](#) on page 146
- ♦ [Section 8.3.3, “Adding the Dynamic File Services Storage Rights Group to the Remote Share,”](#) on page 147

8.3.1 Creating a Network Share on the Remote Device

- 1 On the remote device, locate the folder you want to use as the secondary path.
- 2 Right-click the folder, then choose *Sharing*.
- 3 Configure the share properties as needed to control access to the share.
- 4 If the share resides on an NTFS volume, configure the NTFS permissions for the share and any subfolders to fine-tune security as needed.
- 5 Continue with [Section 8.3.2, “Publishing the Remote Share,”](#) on page 146.

8.3.2 Publishing the Remote Share

After the folder is shared on the remote device, you can publish it in Active Directory.

- 1 Open the Active Directory Users And Computers tool on the server that will host your primary path.
- 2 Select the *Computers* link to view the member servers in your Active Directory environment.
- 3 Locate the container in which you want to publish the folder, right-click the container, and choose *New > Shared Folder*.
- 4 Specify the resource name.
The resource name is the name by which the shared folder is listed in the folder and the name Dynamic File Services sees when it accesses the folder.
- 5 Specify the share name in UNC form, such as `\\servername\sharename`.
- 6 Verify that publishing the share worked:
Net Use a drive to the server with the remote share.

```
net use * \\servername\sharename
```

- 7 Continue with [Section 8.3.3, “Adding the Dynamic File Services Storage Rights Group to the Remote Share,”](#) on page 147.

8.3.3 Adding the Dynamic File Services Storage Rights Group to the Remote Share

After you create the remote share and publish it in Active Directory, you must add the `Dynamic File Services Storage Rights` group to the remote share and grant the group all permissions. Alternately, you can use the `NDFS-<servername>` proxy user described in [Section 4.4.4, “Security Implications of the Default Domain Configuration,”](#) on page 56.

- 1 In the Active Directory Users and Computers tool, add the `Dynamic File Services Storage Rights` group to the remote share.
- 2 Grant the group all permissions.

8.4 Providing Users with a Merged View of the Files in a Standard Pair

Dynamic File Services allows users to access files on both the primary and secondary paths via a network share that you create for the primary path. When users access the share, they see a merged view of the file trees for the primary path and the secondary path. The merged view gives users access to all of their files in a pair.

Use *Windows Network Sharing and Security* to create a network share on a Dynamic File Services pair’s primary storage location. When users map a drive on their computers to the share, they can see a merged view of the files stored on the pair.

- ♦ A network share is needed on the primary path in order to provide a merged view of the pair. You can add shares above or below the network share for the primary path.
- ♦ Network shares on, above, or below the secondary path must be removed, or restricted from direct access by users.

To create a network share:

- 1 Use *Windows Network Sharing and Security* to create a network share on the primary storage location.
See the Microsoft Windows documentation for information about how to set up network sharing on the computers where DynamicFS is running.
- 2 Map a drive to the network share, and verify that the users can see a merged view of the two locations that make up the pair.

8.5 Including or Excluding Folders from a Pair’s Policy Runs

For a Dynamic File Services pair, you can specify one or more folders in the pair’s primary path that you want to include or to exclude from the policy runs. For a given pair, you can include folders, or you can exclude folders, but not both. The Include/Exclude setting should be set on subfolders and not the root of the primary path.

IMPORTANT: The primary path must reside on a device that is attached to the Dynamic File Services server. The Include/Exclude option does not support remote primary paths.

The Include/Exclude setting applies only to the policies for the pair that are run against the primary path. That is, the Include/Exclude feature applies to policies that are moving data with a *Direction* setting of *Primary to Secondary*.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Right-click the pair that you want to manage, then select *Properties* to open the Pair Properties dialog box.
- 3 Select the *Include/Exclude* tab.
- 4 In *Options*, select only one of the following restriction options per pair:

The options are dimmed and not selectable if the pair has a remote primary path.

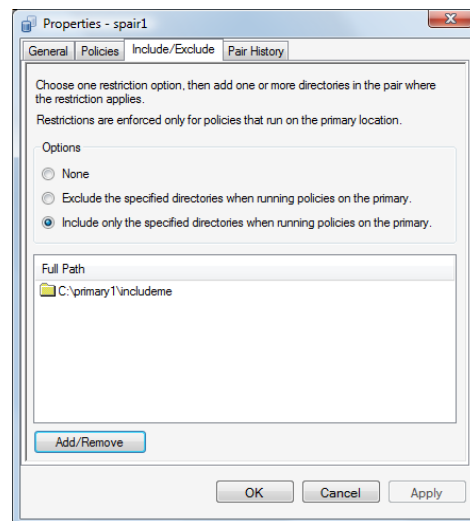
None: The *Include/Exclude* option is disabled for the pair. Existing paths in the *Include/Exclude* list are not deselected, and remain available if you later re-enable *Include* or *Exclude*.

Exclude: Enable the *Exclude* option. Policies that run on the primary path (primary to secondary) do not act on content in the specified folders on the primary path.

Include: Enable the *Include* option. Policies that run on the primary path (primary to secondary) act only on content in the specified folders on the primary path.

- 5 Create a list of folders where you want to apply the *Include/Exclude* setting when it is enabled.
 - 5a Click *Add/Remove* to open a file browser dialog box.
 - 5b Select the check box next to a folder to add it to the list.
 - 5c Click *OK* to return to the *Include/Exclude* tab.
 - 5d On the *Include/Exclude* tab, click *Apply* to save and apply the changes.

In the following example, the *Include* setting is enabled. Primary-to-secondary policies apply only to the C:\primary1\includeme folder.



- 6 (Optional) Remove folders from the *Include/Exclude* list.
 - 6a Click *Add/Remove* to open a file browser dialog box.
 - 6b Deselect the check box next to a folder to remove it from the list.

- 6c Click *OK* to return to the *Include/Exclude* tab.
- 6d On the *Include/Exclude* tab, click *Apply* to save and apply the changes.
- 7 Click *OK* to save your changes and close the Pair Properties dialog box.

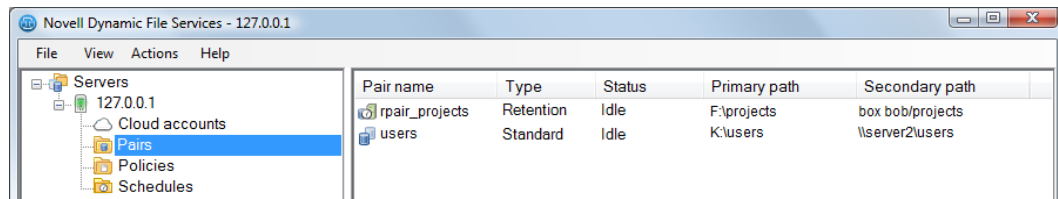
8.6 Viewing a List of Pairs

You can use the Dynamic File Services Management Console to view a list of all of the pairs that are defined for a server.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 In the left panel, select the *Pairs* folder (📁) for the server, then view the list of pairs (📄) in the right panel.

The *Pairs* list reports the following information for each pair:

- ◆ *Pair name*
- ◆ *Type (Retention, Standard)*
- ◆ *Status (Idle, Running)*
- ◆ *Primary Path*
- ◆ *Secondary Path*



- 3 Click a column heading to sort the list by that parameter.

8.7 Viewing the Pair Status

The pair status indicates whether a Dynamic File Services file scan is being run against the pair at that time. Status conditions are reported as *Idle* or *Running*. Scans that might be in progress include scans for policy runs and the disk history. Only one scan at a time can be run against a pair.

Some actions, such as stopping the Service, require that all pairs be idle before you perform the action.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 In the left panel, select the *Pairs* folder (📁) for the server, then view the list of pairs in the right panel.

A pair's status (*Idle*, *Running*) appears to the right of the pair name.

8.8 Viewing Properties for a Pair

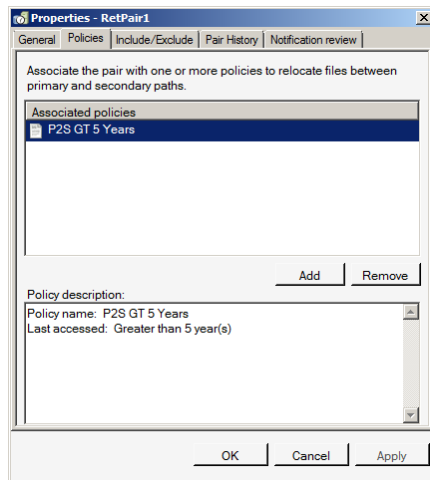
- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Select the *Pairs* folder for the server, then view the list of pairs that are defined.

3 Right-click a pair, then select *Properties*.

The Properties dialog box opens to the *General* tab. It reports the following information:

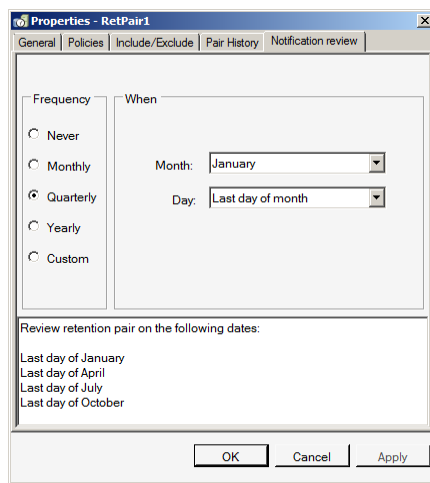
- ◆ *Pair name*
- ◆ *Primary*
 - ◆ *Type* (the device type)
 - ◆ *Primary path*
 - ◆ *Share name*
- ◆ *Secondary*
 - ◆ *Type* (the device type)
 - ◆ *Secondary path*

4 Click the *Policies* tab to view a list of the policies that are currently associated with the pair. Select a policy to view information about it. You can also add and remove policies from the *Associated policies* list.



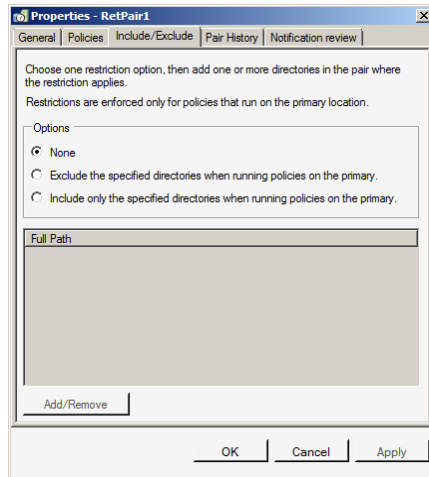
5 Click the *Notification Review* tab to specify a schedule for notifications to be sent.

This requires that the Notification Service has already been configured. You must also have selected Review Events to be sent to an email address. Otherwise, notifications are not sent.



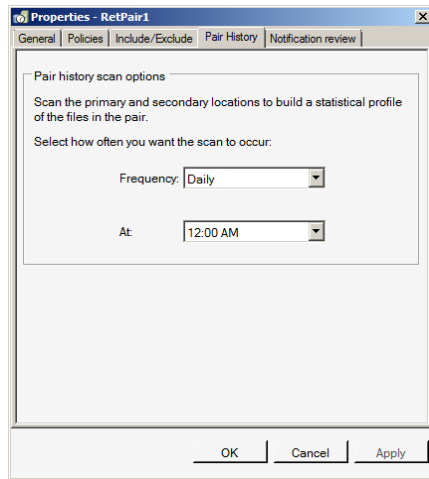
- 6 Click the *Include/Exclude* tab to view a list of directories on the primary path of the pair that are either included or excluded from policy runs.

You can also add and remove directories from the include or exclude list. For information, see [Section 8.5, “Including or Excluding Folders from a Pair’s Policy Runs,”](#) on page 147.



- 7 Click the *Pair history* tab to view or modify the frequency and time that the pair history scan is run.

For information, see [Section 8.10, “Scheduling the Pair History Scan,”](#) on page 153.



- 8 If you modify the settings, click *Apply* or *OK* to save the settings. Otherwise, click *Cancel* to close the dialog box when you are done.

8.9 Moving Selected Files or Folders

The Manual Operations option for a pair allows you to build a list of files and folders that you want to move between the two paths. The specified files or folders are moved immediately. This is a one-time selection and move of the specified files. The display for selection supports up to 50,000 files in a folder, and shows them in groups of 10,000 at a time.

- 1 In the Management Console, connect to the server you want to manage.
- 2 In the Pairs list, right-click the pair, then select *Manual move* to open the Manual Move dialog box.

You can also select the pair, then select *Actions > Manual move*.

- 3 At the top of the page, specify the direction that you want to move the files and folders that you will add to the list.

The manual operation moves for a retention pair moves files only from the primary path to the secondary path.

- 4 Create a list of the files and folders that you want to move manually:

- 4a Click *Add* to open a file browser interface for the selected pair.

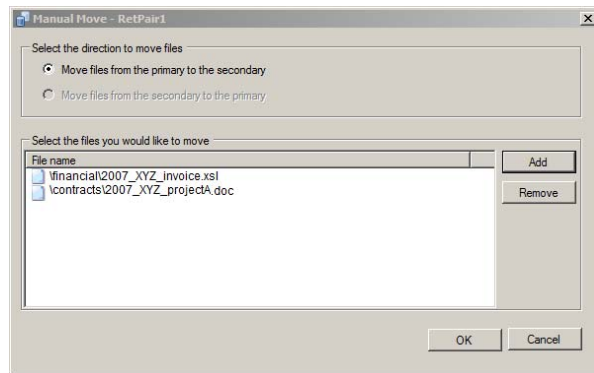
If you selected Primary to Secondary as the direction, only files on the primary path are presented. For Secondary to Primary, only files on the secondary path are presented.

- 4b Browse to locate a file or folder you want to move, then select the check box next to it.

You can select multiple files and folders. If you select a folder, the folder's entire contents are moved, including any subfolders in it.

- 4c Click *OK* to add the selected folders to the list.

The selected files and folders are appended to the list as you add them.



- 4d You can remove files or folders from the move list by selecting the entry in the list, then clicking *Remove files*.
 - 4e Review the compiled list of files and folders to ensure that it is accurate, and repeat the *Add* and *Remove* options as needed.
- 5 Do one of the following:
 - ♦ **OK:** Click *OK* to move the specified files and folders now. A one-time policy is created for the manual move, and it is queued to run at the earliest available time.
 - ♦ **Cancel:** Click *Cancel* to abandon the procedure. The list you created is not retained.

8.10 Scheduling the Pair History Scan

The Dynamic File Services File System Inventory utility scans each pair on the server to collect file statistics for the pair history. History scans can be run hourly, daily, or weekly. By default, the history scan runs once daily at 4:00 a.m. The scans run until completion. You can configure the scan to run more or less often on a given pair by configuring the pair's Pair History Scan.

To change the frequency and time of day for the Pair History Scan on a given pair:

- 1 In the Management Console, connect to the server you want to manage.
- 2 Select the pair, then select *Actions > Properties* to open the Pair Properties dialog box.
- 3 Select the *Pair History* tab.
- 4 Specify the frequency and the time to run.

Hourly: The scan runs every hour on the hour.

Daily: The scan runs once daily at the specified starting hour. Select a time between midnight and 11:00 p.m. The default is 4:00 a.m.

Weekly: The scan runs once weekly on the specified day and starting hour. Select a time between midnight and 11:00 p.m. The default is Sunday at 4:00 a.m.

8.11 Reporting Conflicts for Attributes and ACL Permissions on Folders

You should use the merged view when setting attributes and ACL (access control list) permissions on folders in a Dynamic File Services pair. In a pair, an instance of each folder is stored in both the primary path and the secondary path as files are moved between the two paths.

For information about how metadata on the two folder instances can become out of synchronization, see [Section 4.16, "Duplicate Folders in a Standard Pair," on page 66](#).

To identify conflicts for attributes and ACL settings on folders, you can run the DynamicFS Pair Check utility (*DswPairCheck.exe*) with the `-folders` option to detect the metadata differences between the two instances of a folder and report them. You must log in as a user with rights to all of the paths in the pair. For information, see "[Dynamic File Services Pair Check Utility](#)" in the *Dynamic File Services 2.2 Client Commands and Utilities Reference*.

The Pair Check utility is typically used for standard pairs to verify ACLs folders in the two paths. The Pair Check utility does not support being run on a retention pair that uses cloud storage as the secondary path. In the cloud, the ACLs metadata is stored in a database and not with the files.

- 1 Log in to the DynamicFS server as a user with file system rights on the primary and secondary paths in the pair you want to manage.
If remote shares are being used, ensure that you have sufficient access rights on the secondary locations.
- 2 Open the Management Console, select the pair, then verify that the pair status is in the Idle state.
Policies must not be running against the pair when you start the Pair Check utility. If policies are running, wait until they are done, or stop them manually. Wait until the pair status is idle before continuing.
- 3 Open an Administrator Command Prompt console. Select *Start > All Programs > Accessories*, right-click *Command Prompt*, then select *Run as Administrator*.
- 4 Change directory to go to the `C:\Program Files\Dynamic File Services` folder (or the folder where you installed Dynamic File Services).

5 At the command prompt, enter:

```
DswPairCheck.exe -pair="<pairname | guid>" -folders [-xml="reportname"]  
[-csv="reportname"]
```

For example, to identify mismatches for the attributes and ACLs for the folders in a pair named MyPair and to create an output report named myXmlReport in XML format, enter the following command:

```
DswPairCheck.exe -pair="MyPair" -folders -xml="myXmlReport"
```

This command looks in the pair database for the source and target paths of the pair named MyPair. It checks for folders that have mismatched attributes and ACLs on the source and target paths. It produces a report in XML format in the myXmlReport.folders.xml file.

6 When you are prompted, enter the user name of a user with rights to all of the paths in the pair.

8.12 Reporting Conflicts for Duplicate Files

You should always use the merged view when creating, modifying, or deleting files in a pair. Dynamic File Services manages a file so that a single instance of it exists on either the primary or secondary location.

For information about how duplicate files can occur and how Dynamic File Services handles them, see [Section 4.17, “Duplicate Files in a Standard Pair,” on page 67](#).

- ♦ [Section 8.12.1, “Viewing Errors in the Policy Execution History,” on page 154](#)
- ♦ [Section 8.12.2, “Generating a Duplicate Files Report,” on page 154](#)

8.12.1 Viewing Errors in the Policy Execution History

If a policy run is interrupted because one or both of the media become unavailable during the policy run, you can check the policy run history to find out which file move might not have been completed. An `Invalid File Handle` error is reported in the policy move log in the *Statistics > Policy execution history > Files not moved > Comment* field for the file. The valid file is the instance on the source location of the move.

8.12.2 Generating a Duplicate Files Report

The Pair Check utility is typically used for standard pairs to detect duplicate files that are hidden by the merged view. Duplicate files do not occur in a retention pair because the retention repository in the secondary location has a different file structure than the primary path.

To identify duplicate file conflicts, you can run a duplicate files report by using the Dynamic File Services Pair Check utility (`DswPairCheck.exe`). The `-files` option detects duplicate instances of a file that exist on the primary and secondary paths, and reports them. You must log in as a user with rights to all of the paths in the pair. For information, see [“Dynamic File Services Pair Check Utility”](#) in the *Dynamic File Services 2.2 Client Commands and Utilities Reference*.

To generate a duplicate files report:

- 1 Log in to the Dynamic File Services server as a user with file system rights on the primary and secondary paths in the pair you want to manage.

If remote shares are being used, ensure that you have sufficient access rights on the secondary locations.

- 2 Open the Management Console, select the pair, then verify that the pair status is in the Idle state. Policies must not be running against the pair when you start the Pair Check utility. If policies are running, wait until they are done, or stop them manually. Wait until the pair status is idle before continuing.
- 3 Open an Administrator Command Prompt console. Select *Start > All Programs > Accessories*, right-click *Command Prompt*, then select *Run as Administrator*.
- 4 Change directory to go to the `C:\Program Files\Dynamic File Services` folder (or the folder where you installed Dynamic File Services).
- 5 At the command prompt, enter:

```
DswPairCheck.exe -pair="<pairname | guid>" -files [-xml="reportname"]
[-csv="reportname"]
```

For example, to identify duplicate files in a pair named `MyPair` and to create an output report named `myXmlReport` in XML format, enter the following command:

```
DswPairCheck.exe -pair="MyPair" -files -xml="myXmlReport"
```

This command looks in the pair database for the source and target paths of the pair named `MyPair`. It checks for files that have same path and file name in the source and target paths. It produces a report in XML format in the `myXmlReport.files.xml` file.

- 6 When you are prompted, enter the user name of a user with rights to all of the paths in the pair.

8.13 Unlinking the Paths in a Pair

Unlinking a Dynamic File Services pair removes the pair relationship between the primary path and the secondary path. When the two locations are unlinked, the files in the two locations remain where they are on the primary path or secondary path. Removing the link automatically disassociates the policies from the pair; it does not delete the policies.

You might want to unlink a pair for any of the following reasons:

- ◆ You no longer need the pair.
- ◆ You want to modify one of the paths used in the pair.
You cannot modify the paths that define the pair. Instead, you unlink the current pair, and create a new pair that uses the desired paths.

To unlink the paths in a pair:

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Create one or more policies to move data between the primary and secondary locations so that the data is where you want it to be when you remove the link between the two locations.
- 3 Run the policies, then verify that the files have moved by viewing the *Statistics > Policy Execution History > Run History*, or by using the Windows Explorer to browse the file paths.
- 4 Select *Pairs*, right-click the pair, then select *Unlink*.

8.14 What's Next

- ◆ Configure policies to run on the pair. For information, see [Chapter 9, "Creating and Managing Policies,"](#) on page 157.

- ♦ For retention pairs, manage reviews of the retained data. For information, see [Chapter 12, “Managing Retention Reviews,”](#) on page 213.
- ♦ Monitor the health and history of the pairs, the policies, and the server disks that are used in pairs. For information, see [Chapter 13, “Monitoring Pairs and Policies,”](#) on page 229.

9 Creating and Managing Policies

Novell Dynamic File Services (DynamicFS) policies control which data is moved, what direction the data moves, and when the policy is enforced. No data is moved between the primary and secondary location for a pair unless you assign a policy to it. The policy can be scheduled to run automatically, or you can run it on demand. You can assign multiple policies to a pair. A policy can be assigned to multiple pairs.

- ♦ [Section 9.1, “Understanding Policies,” on page 157](#)
- ♦ [Section 9.2, “Creating a Policy,” on page 162](#)
- ♦ [Section 9.3, “Customizing the File Types Filter,” on page 167](#)
- ♦ [Section 9.4, “Viewing a List of Policies,” on page 172](#)
- ♦ [Section 9.5, “Viewing Properties for a Policy,” on page 173](#)
- ♦ [Section 9.6, “Associating or Disassociating Pairs and Policies,” on page 174](#)
- ♦ [Section 9.7, “Modifying Policy Filters,” on page 177](#)
- ♦ [Section 9.8, “Starting a Policy Run,” on page 178](#)
- ♦ [Section 9.9, “Previewing a Policy Run,” on page 179](#)
- ♦ [Section 9.10, “Stopping an In-Progress Policy Run,” on page 180](#)
- ♦ [Section 9.11, “Exporting and Importing Policies on a Dynamic File Services Server,” on page 180](#)
- ♦ [Section 9.12, “Deleting a Policy,” on page 181](#)
- ♦ [Section 9.13, “Troubleshooting Policy Conflicts,” on page 182](#)
- ♦ [Section 9.14, “Examples of Policy Rules,” on page 182](#)
- ♦ [Section 9.15, “What’s Next,” on page 187](#)

9.1 Understanding Policies

Policies define what files to move and the direction to move them. You can associate a policy schedule with a policy to specify an automatic run time. You can also run the policy manually by using the *Execute now* option.

You can associate a policy with one or more pairs. You can associate a pair with none, one, or more policies. Dynamic File Services moves files between the primary path and the secondary path when its associated policies are enforced. When a file is moved, it remains in the destination location until a policy moves it in the other direction.

The rules defined in the policy are enforced when the policy is run. By creating different policies for a pair, you can move files that meet different conditions. If you configure multiple policies for a pair to run at the same time, the policy engine does the following:

1. Groups the policies according to the direction that the data is being moved: From primary to secondary or from secondary to primary.

2. Scans the primary path, and enforces policies that move files to the secondary path.
3. Scans the secondary path, and enforces policies that move files to the primary path.

The following sections describe the policy settings:

- ◆ [Section 9.1.1, “Policy Name and Description,” on page 158](#)
- ◆ [Section 9.1.2, “Policy Direction,” on page 158](#)
- ◆ [Section 9.1.3, “Policy Filter Options,” on page 159](#)
- ◆ [Section 9.1.4, “Schedule to Policy Association,” on page 162](#)
- ◆ [Section 9.1.5, “Pair to Policy Associations,” on page 162](#)

9.1.1 Policy Name and Description

Each policy name must be unique to the DynamicFS server. If you plan to export a policy for use across multiple DynamicFS servers, the name should be unique across all of the servers.

Table 9-1 Policy Name and Description Options

Option	Description
Policy Name	Policy names can be up to 32 characters. For information about naming restrictions, see Section 4.12, “Naming Conventions for Pairs and Policies,” on page 65 .
Description	If desired, you can add a more detailed human-interpretable description of the policy.

9.1.2 Policy Direction

The *Policy Direction* option determines whether the policy is enforced against files on the primary path or the secondary path. The policy run scans the original location to discover files that meet the filter criteria, then moves those files to the destination location. If all of the specified filter options in the policy are true for a file, the file is moved in the specified direction.

For example, if you are moving data from primary to secondary, the policy is enforced against the files on the primary path. If all of the selected filter options are true for a file, the file is moved from the primary path to the secondary path.

Table 9-2 Policy Direction Options

Option	Description
Primary to Secondary	The policy is enforced against the files in the primary location. Files that match the policy rules are moved from the primary path to the secondary path. This is the default.
Secondary to Primary	The policy is enforced against the files in the secondary location. Files that match the policy rules are moved from the secondary path to the primary path.

At run time, the policies for a pair are grouped by direction. The primary-to-secondary group of policies are run on the primary location, and then the secondary-to-primary group of policies are run on the secondary location. It is possible for a file to move from primary to secondary based on rules in the first group of policies, then move from secondary to primary based on rules in the second group of policies.

9.1.3 Policy Filter Options

The *Policy Filter* options specify the rules that determine which files are to be moved by the policy. The filters in a policy apply to all files unless you enable the *File patterns* option or the *File types* option.

When a policy is enforced, a file is moved only if it satisfies all of the filter options set for that policy. (That is, the filters in a given policy are enforced as AND operations.)

When multiple policies are enforced in a single run, a file is moved if it satisfies the rules in any one of the policies in that group. (That is, multiple concurrently scheduled policies are enforced as OR operations.)

There are no default policy filters. You must enable and configure at least one of the following filter options in each policy. For examples of how to create policy rules to achieve your storage goals, see [Section 9.14, “Examples of Policy Rules,” on page 182](#).

- ♦ [“File Size” on page 159](#)
- ♦ [“Last Accessed” on page 159](#)
- ♦ [“Last Modified” on page 159](#)
- ♦ [“File Patterns” on page 159](#)
- ♦ [“File Types” on page 160](#)
- ♦ [“File Owners” on page 161](#)

File Size

You can use the *File size* option to move a file only if its size is greater than or less than the specified file size. File size is specified in bytes, kilobytes, megabytes, or gigabytes.

Last Accessed

You can use the *Last accessed* option to move a file only if the elapsed time since it was last accessed is greater than or less than the specified time period. Time is specified in days, weeks, months, or years.

Last Modified

You can use the *Last modified* option to move a file only if the elapsed time since it was last modified is greater than or less than the specified time period. Time is specified in days, weeks, months, or years.

File Patterns

You can use the *File patterns* option to evaluate the file name and extension of files in the pair. The rule moves a file only if the file matches any one of the specified file patterns. If you specify other filter options, only files that satisfy the pattern and that also meet the other criteria are moved.

IMPORTANT: The *File patterns* option and the *File types* option cannot be used together.

Regular expressions that you use in the *File patterns* field work like expressions you might use in the `dir` function on the Windows command line. The asterisk (*) is a wildcard character can be used to represent a sequence of any number of characters in the name. The question mark (?) character can be used to represent a single character.

The pattern search is case insensitive.

Separate multiple file patterns with a comma and no spaces. If you include spaces in a pattern, the spaces are interpreted as part of the pattern you seek.

Examples

These two search patterns find the same files:

```
*aBa_*  
*ABA_*
```

In the following patterns, spaces within a pattern are considered part of the file name. The spaces after a comma are part of the next pattern.

```
test many files*, many*, 12??*, dsw*.?2*
```

In the following patterns, the asterisk is used for the file name to indicate that files with a specified extension should be moved:

```
*.mp3, *.png, *.jpg
```

To move all files with and without extensions, specify `All files (*.*)` in the *File patterns* field.

To move files with no extension, specify `*.*` in the *File patterns* field.

[Table 9-3](#) shows examples of regular expressions that are used as file patterns and the files found:

Table 9-3 Sample File Patterns

File Pattern	File Found
jpg	testjpg.txt
test.?	test.1
proc*test.jpg	procisatest.jpg
*?.text	p_1.text
ap.???	apache.aaa

File Types

Applications typically use different file extensions for the same logical types of file content, such as videos, images, and documents. The *File types* option allows you to move files based on a file type rather than exhaustively listing every file extension that fits that profile. You can specify one or more file types in a policy.

IMPORTANT: The *File types* option and the *File patterns* option cannot be used together.

A file types policy moves a file only if the file's extension matches one of the extensions associated with any one of the specified types. Because an extension can be altered by a user to avoid detection, you can alternatively read the file's content information to determine its type by selecting the *Use file content to determine type* check box.

IMPORTANT: Checking the file content increases the time needed to process the files during a policy run.

In Dynamic File Services, the File Types filter uses categories based on MIME types and Microsoft perceived types. You can also define categories to suit your environment. When a policy is run, Dynamic File Services considers the following resources to identify the file type categories and their related file extensions:

- ♦ **Windows Registry:** Server applications store information in the Windows Registry about the MIME types and perceived types for their file extensions. For information, see [Section 9.3.1, “Viewing MIME Types and Perceived Types for Installed Applications in the Windows Registry,”](#) on page 167.
- ♦ **File Types Configuration File:** Dynamic File Services maps well-known file extensions to file type categories in the File Types configuration file (`.\Dynamic File Services\DswFileTypes.cfg`). You can customize the file to add, remove, or modify the extensions and their associated file type categories to suit your environment. For information, see [Section 9.3.2, “Configuring File Extensions and Categories for the File Types Filter,”](#) on page 168.
- ♦ **MIME Types Configuration file:** Dynamic File Services maps well-known MIME types to file extensions in the MIME Types configuration file (`.\Dynamic File Services\DswMimeTypes.cfg`). You can customize the file to add, remove, or modify the MIME types and their associated file type categories to suit your environment. For information, see [Section 9.3.3, “Configuring MIME Types and Categories for the Content Filter,”](#) on page 169.

File Owners

You can move files based on file ownership. In the Users and Groups browse view, you can select the user names and group names to add to the policy. The user names, group names, and group memberships are verified before each run. Only user names and group names that are valid when the run begins are used for the run. For groups, only user names that are members of the group when the run begins are used for the run.

Dynamic File Services can also move ownerless files. Files are considered to be ownerless if the user name or group name has been removed from the Active Directory domain or the server's Users and Groups list. A file retains the Security Identifier (SID) of that user or group even after the associated name becomes invalid. You can move ownerless files by selecting the {No owners} entry in the *Select Users > Users or Groups* dialog box.

In the pre-run check, Dynamic File Services uses the metadata status that is known to the NTFS file system at that time to verify which names are valid, and then uses the valid names for the policy run. It does not re-verify the names during the run. If name and membership changes are synchronized to NTFS while the policy is running, the changes are not considered until the next policy run.

9.1.4 Schedule to Policy Association

The policy can be scheduled to run periodically, or you can execute it on demand. A single policy can be associated with single schedule. A single schedule can be associated with multiple policies. When multiple policies are scheduled to run at the same time, they are enforced as a group for each pair that is associated with them.

For information about creating policy schedules and associating them with policies, see [Chapter 10, “Creating and Managing Policy Schedules,”](#) on page 189.

9.1.5 Pair to Policy Associations

No data is moved between the primary and secondary locations in a pair until you associate it with at least one policy. A policy must be associated with at least one pair before it can be run. A policy is enforced only for its associated pairs. A single policy can be associated with multiple pairs. A single pair can be associated with multiple policies. For instructions, see [Section 9.6, “Associating or Disassociating Pairs and Policies,”](#) on page 174.

IMPORTANT: A retention pair can be associated with a policy only if the direction is Primary to Secondary. You must use the Review Service to restore a file from the retention repository on the secondary path to its original location on the primary path.

You can configure the Include Folders setting for a pair to specify folders in the pair where its associated policies apply. You can configure the Exclude Folders setting for a pair to specify folders in the pair where its associated policies do not apply. For a given pair, you can include folders or exclude folders, but not both. For information, see [Section 8.5, “Including or Excluding Folders from a Pair’s Policy Runs,”](#) on page 147.

9.2 Creating a Policy

The policy must be associated with at least one pair before it can be run. A policy is enforced only for its associated pairs. For information on the policy parameters, see [Section 9.1, “Understanding Policies,”](#) on page 157.

You can configure a policy by using the Policy Wizard or the Setup Wizard. The Setup Wizard allows you to create a pair, a policy, and a policy schedule at the same time that are automatically associated.

- ♦ [Section 9.2.1, “Creating a Policy with the Policy Wizard,”](#) on page 162
- ♦ [Section 9.2.2, “Creating a Policy with the Setup Wizard,”](#) on page 165

9.2.1 Creating a Policy with the Policy Wizard

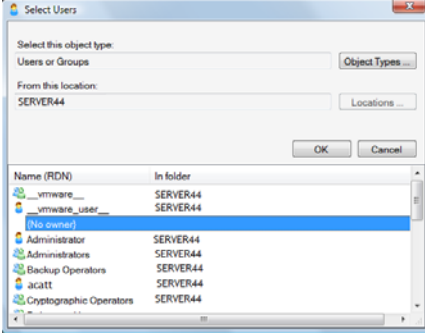
- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Right-click the *Policies* folder, then select *Policy Wizard*.
You can also select the *Policies* folder, then select *Actions > Policy Wizard* from the toolbar.
- 3 On the Policy Direction page, specify which direction to move files.
 - ♦ Primary to secondary
 - ♦ Secondary to primary

For information about each option, see [Section 9.1.2, “Policy Direction,”](#) on page 158.

- 4 On the Policy Filter page, specify the search criteria to use to identify the files to be moved when the policy is enforced.

You must enable and configure at least one of the following filter options. For information about each option, see [Section 9.1.3, “Policy Filter Options,”](#) on page 159.

Filter Option	Description
File size	Select the check box, then create a rule that moves a file only if its size is greater than or less than the specified file size.
Last accessed	Select the check box, then create a rule that moves a file only if the elapsed time since it was last accessed is greater than or less than the specified time period.
Last modified	Select the check box, then create a rule that moves a file only if the elapsed time since it was last modified is greater than or less than the specified time period.
File patterns	Select the check box, then create a rule that moves a file only if its file name uses one of the specified file patterns. Separate multiple file patterns with a comma and no spaces. If you include spaces in a pattern, the spaces are interpreted as part of the pattern you seek. Restriction: The <i>File patterns</i> option cannot be used in combination with the <i>File types</i> option
File types	Select the check box to enable the option, then create a rule that moves a file based on file types. <ul style="list-style-type: none">◆ Add: Click <i>Add</i>, select one or more file types from the <i>File types</i> list, then click <i>OK</i>.◆ Remove: Select a file type from the list, then click <i>Remove</i>.◆ Use file content to determine type: (Optional) Select the <i>Use file content to determine type</i> check box to move files only if the file content matches one of the specified file types. This option increases the run time of the policy. Restriction: The <i>File types</i> option cannot be used in combination with the <i>File patterns</i> option

Filter Option	Description
File owners	<p>Specify one or more user names or group names. Only files owned by the specified users or groups are moved. User names or group names that are invalid at run time are ignored.</p> <ul style="list-style-type: none"> ♦ Add: Click <i>Add</i>, select one or more user names or group names from the <i>Users and Groups</i> list, then click <i>OK</i>. You can move ownerless files by selecting the {No owners} entry in the <i>Select Users > Users or Groups</i> dialog box.  <ul style="list-style-type: none"> ♦ Remove: Select a user name or group name from the list, then click <i>Remove</i>.

5 On the Policy Name and Description page, specify the following parameters, then click *Next*.

Name Option	Description
Name	<p>Specify a unique name for the policy on the DynamicFS server.</p> <p>A policy name can be up to 32 characters. For information about naming restrictions, see Section 4.12, "Naming Conventions for Pairs and Policies," on page 65.</p> <p>If you plan to export the policy, the name must be unique on all of the servers.</p>
Description	<p>Optionally specify a more detailed description for the policy. This is a friendly description that provides context and meaning to the administrators.</p>

6 On the Policy Schedule page, click *Add*, select an available schedule, click *OK*, then click *Next*.

Only one schedule can be associated to a policy at a time. To remove an associated schedule from the policy, select it, then click *Remove*.

You can click *Next* to skip this step if you do not want to schedule the policy or if the schedule has not been created. You can create a schedule later and associate it with the policy.

For information about managing schedule and policy associations, see [Section 10.6, "Associating or Disassociating Schedules and Policies,"](#) on page 196.

7 On the Pair to Policy Association page, click *Add* to view a list of the available pairs, select one or more pairs to associate with the policy, then click *OK*.

The policy must be associated with at least one pair to be able to run. The policy is enforced only for its associated pairs. To remove an associated pair from the policy, select it, then click *Remove*.

You can click *Next* to skip this step if you do not want to associate the policy with pairs at this time or if the pairs have not been created. You can create pairs later and associate them with the policy.

For information about managing pair and policy associations, see [Section 9.6, “Associating or Disassociating Pairs and Policies,”](#) on page 174.

- 8 Click *Finished* to create the policy, or click *Cancel* exit without creating the policy.

If a pair and schedule are associated with the policy, the policy is enforced at its next scheduled run time, or you can run it at any time by using *Execute now*.

9.2.2 Creating a Policy with the Setup Wizard

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.

- 2 Right-click the *Server* folder, then select *Setup Wizard*.

You can also select the *Server* folder, then select *Actions > Setup Wizard* from the toolbar. If no pairs or policies exist on the server when you connect to it, the Setup Wizard opens automatically.

- 3 On the Pair Type page, select the pair type, then follow the steps to [create a pair](#), then click *Next*.

- 4 On the Policy Direction page, specify which direction to move files.

- ♦ Primary to secondary
- ♦ Secondary to primary

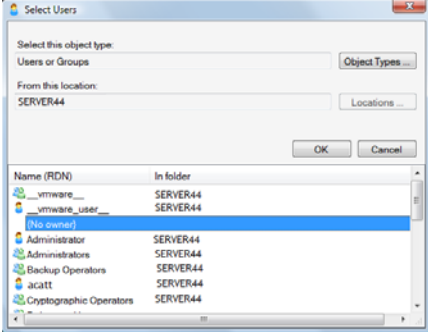
This direction is not available (dimmed) if the specified pair type is a retention pair.

For information about each option, see [Section 9.1.2, “Policy Direction,”](#) on page 158.

- 5 On the Policy Filter page, specify the search criteria to use to identify the files to be moved when the policy is enforced.

You must enable and configure at least one of the following filter options. For information about each option, see [Section 9.1.3, “Policy Filter Options,”](#) on page 159.

Filter Option	Description
File size	Select the check box, then create a rule that moves a file only if its size is greater than or less than the specified file size.
Last accessed	Select the check box, then create a rule that moves a file only if the elapsed time since it was last accessed is greater than or less than the specified time period.
Last modified	Select the check box, then create a rule that moves a file only if the elapsed time since it was last modified is greater than or less than the specified time period.
File patterns	Select the check box, then create a rule that moves a file only if its file name uses one of the specified file patterns. Separate multiple file patterns with a comma and no spaces. If you include spaces in a pattern, the spaces are interpreted as part of the pattern you seek. Restriction: The <i>File patterns</i> option cannot be used in combination with the <i>File types</i> option

Filter Option	Description
File types	<p>Select the check box to enable the option, then create a rule that moves a file based on file types.</p> <ul style="list-style-type: none"> ♦ Add: Click <i>Add</i>, select one or more file types from the <i>File types</i> list, then click <i>OK</i>. ♦ Remove: Select a file type from the list, then click <i>Remove</i>. ♦ Use file content to determine type: (Optional) Select the <i>Use file content to determine type</i> check box to move files only if the file content matches one of the specified file types. This option increases the run time of the policy. <p>Restriction: The <i>File types</i> option cannot be used in combination with the <i>File patterns</i> option</p>
File owners	<p>Specify one or more user names or group names. Only files owned by the specified users or groups are moved. User names or group names that are invalid at run time are ignored.</p> <ul style="list-style-type: none"> ♦ Add: Click <i>Add</i>, select one or more user names or group names from the <i>Users and Groups</i> list, then click <i>OK</i>. <p>You can move ownerless files by selecting the {No owners} entry in the <i>Select Users > Users or Groups</i> dialog box.</p>  <ul style="list-style-type: none"> ♦ Remove: Select a user name or group name from the list, then click <i>Remove</i>.

- 6 On the Policy Name and Description page, specify the following parameters, then click *Next*.

Name Option	Description
Name	<p>Specify a unique name for the policy on the DynamicFS server.</p> <p>A policy name can be up to 32 characters. For information about naming restrictions, see Section 4.12, "Naming Conventions for Pairs and Policies," on page 65.</p> <p>If you plan to export the policy, the name must be unique on all of the servers.</p>
Description	<p>Optionally specify a more detailed description for the policy. This is a friendly description that provides context and meaning to the administrators.</p>

- 7 On the Policy Schedule page, [create the schedule](#), then click *Next*.
The schedule is automatically associated with the policy.

- 8 On the Summary page, review the settings for the pair, policy, and policy schedule, then click *Finished* to create them, or click *Cancel* exit without creating them.

If a pair and schedule are associated with the policy, the policy is enforced at its next scheduled run time, or you can run it at any time by using *Execute now*.

9.3 Customizing the File Types Filter

The File Types filter considers the MIME type and perceived types defined on the Dynamic File Services server in the Windows Registry, the File Types configuration file (`DswFileTypes.cfg`), and the MIME Types configuration file (`DswMimeTypes.cfg`). This section explains how these files are used, and how to customize them to improve the effectiveness of the File Type filter.

- [Section 9.3.1, “Viewing MIME Types and Perceived Types for Installed Applications in the Windows Registry,” on page 167](#)
- [Section 9.3.2, “Configuring File Extensions and Categories for the File Types Filter,” on page 168](#)
- [Section 9.3.3, “Configuring MIME Types and Categories for the Content Filter,” on page 169](#)
- [Section 9.3.4, “Using Apache Tika to Find the MIME Type of a File,” on page 172](#)

9.3.1 Viewing MIME Types and Perceived Types for Installed Applications in the Windows Registry

The Windows Registry contains information about each installed application’s file extensions and the related perceived type or MIME type. The types vary, depending on what applications are installed on a server. Before you use the File Types filter, ensure that you understand what file types are in use on the server and what file extensions are associated with them in the server’s Windows Registry.

An application maps file extensions to content types by adding an entry in the server’s Windows Registry under the `HKEY_CLASSES_ROOT\<file_extension>` key. For example:

```
HKEY_CLASSES_ROOT\.gif
Content Type = "image/gif"
```

Content types are also listed in the Windows Registry under `HKEY_CLASSES_ROOT\MIME\Content Type\<type>\<subtype>` key.

Applications can also specify a `Perceived_Type` parameter for the file extensions it uses.

Common file types and a list of the file extensions that are typically associated with them are provided in [Table 9-4](#). The list is not intended to be exhaustive.

Table 9-4 Common MIME Types and Their Associated File Extensions

MIME Type	Sample of the Associated File Extensions		
application	.accdb	.docx	.pps
	.ai	.gz	.ppt
	.ani	.odp	.pptx
	.csv	.odt	.xls
	.doc	.pdf	.zip
audio	.aiff	.mmv	.wav
	.mid	.mp3	.wma

MIME Type	Sample of the Associated File Extensions		
compressed (perceived type)	.arc	.cab	.zip
image	.bmp	.jpeg	.png
	.gif	.jpg	.tiff
message	.mht	.mhtml	.nws
model	.iges	.mesh	.vrml
system	.386	.chk	
text	.css	.rtf	.txt
	.htm	.sgm	.xml
	.html	.sgml	.xms
video	.avi	.mp4	.qt
	.mp3	.mpeg	.wmv

9.3.2 Configuring File Extensions and Categories for the File Types Filter

Perceived file types provide a similar function as the standard MIME types, except that they refer to broad categories of file format types rather than specific file types. They are defined by use and general acceptance.

Dynamic File Services uses the `C:\Program Files\Dynamic File Services\DswFileTypes.cfg` file to associate well-known file extensions for the following [Microsoft Perceived Types \(http://msdn.microsoft.com/en-us/library/cc144150\(v=vs.85\).aspx\)](http://msdn.microsoft.com/en-us/library/cc144150(v=vs.85).aspx):

```
application
audio
certificate
compressed
document
image
message
model
octet-stream
system
text
video
```

Each line in the `DswFileTypes.cfg` file contains a file extension and its perceived type or category in following format:

```
.<file_extension>/<file_type_category>
```

For example:

```
.doc/document
```

You can customize the file to add, remove, or modify the file extension entries. This allows you to define new file extensions and categories, or to associate a file extension with your preferred category. Ensure that each file extension is associated with only one category. The entries can be listed in any order.

To customize the `DswFileTypes.cfg` file:

- 1 Log in to the Dynamic File Services server as a user with Administrator privileges.
- 2 In a file browser, navigate to the folder where you installed Dynamic File Services.
The default installation location is `C:\Program Files\Dynamic File Services`.
- 3 Make a copy of the default `DswFileTypes.cfg` file, and give it a different name.
- 4 Open the working copy of the `DswFileTypes.cfg` file in a text editor.
- 5 Add, remove, or modify the definitions.

Place each entry on a separate line in following format. The entries can appear in any order.

```
.<file_extension>/<file_type_category>
```

For example:

```
.ext/example
```

- 6 Save the file.

The revised definitions are applied for the next run of a file types policy.

After you modify the file, you can expect the following changes in the policies and wizards:

- ♦ New or modified file extensions are considered in future policy runs for the specified category.
- ♦ New or modified categories appear as options in the File Types dialog box when you create or modify a file types policy.

For example, if you add the following line to the `DswFileTypes.cfg` file, `other` appears as a valid category the next time you edit or add file types for a policy:

```
.new/other
```

- ♦ If a file extension is removed from the file and it is not otherwise defined in the server's Windows Registry, a file types policy does not move files with that extension.
- ♦ If all instances of a category are removed from the file and the category is not otherwise defined as a MIME type or perceived type in the server's Windows Registry, the category no longer appears as an option in the File Types dialog box when you create or modify a file types policy.

For existing policies, the category is considered an invalid category in future policy runs, and a file types policy does not move files based on the category.

9.3.3 Configuring MIME Types and Categories for the Content Filter

Dynamic File Services uses the `C:\Program Files\Dynamic File Services\DswMimeTypes.cfg` file to associate well-known MIME content types with file extensions.

Each line in the `DswMimeTypes.cfg` file contains a MIME content type and file extension in following format:

```
<mime_type>/<mime_subtype>:.<file_extension>
```

For example:

```
application/msword:.doc
```

When the file content is used to determine the type, the file content filter reads the file content from each file, ignoring the file's extension.

Continuing the example, if a file's content type is the MIME type/subtype of `application/msword`, then the file is the same as a `.doc` file. The filter looks up the `.doc` file extension in the `DswFileTypes.cfg` file to determine its assigned category, such as `.doc/document`. The file is moved if the category is specified in the file types policy.

You can customize the `DswMimeTypeypes.cfg` file to add, remove, or modify the MIME Type definitions. This allows you to define new MIME types and associate them with file extensions, or to associate a file extension with your preferred MIME type. Ensure that each MIME type is associated with only one file extension. The entries can be listed in any order. Ensure that the new or modified MIME types have been mapped to a file extension in the `DswMimeTypeypes.cfg` file, and the file extension is mapped to a file type category in the `DswFileTypes.cfg` file.

To customize the `DswMimeTypeypes.cfg` file:

- 1 Log in to the Dynamic File Services server as a user with Administrator privileges.
- 2 In a file browser, navigate to the folder where you installed Dynamic File Services.
The default installation location is `C:\Program Files\Dynamic File Services`.
- 3 Make a copy of the default `DswMimeTypeypes.cfg` file, and give it a different name.
- 4 Open the working copy of the `DswMimeTypeypes.cfg` file in a text editor.
- 5 Add, remove, or modify the definitions.

Place each entry on a separate line in following format. The entries can appear in any order.

```
<mime_type>/<mime_subtype>:.<file_extension>
```

For example:

```
other/x-new:.new
```

- 6 Save the file.
- 7 Edit the `DswFileTypes.cfg` file to ensure that the file extension is assigned to a category, then save the file.

For example:

```
.new/custom
```

After you modify the files, you can expect the following changes in the policies and wizards:

- ♦ Files with a content type that matches the new or modified MIME types can be moved by content filter policies that use the category mapped to its file extension.
- ♦ If a MIME type definition is removed from the file and it is not otherwise defined in the server's Windows Registry, a content filter policy does not move the file.

See the following examples for how the MIME Type settings affect your file types policies:

- ♦ [“Example 1: New MIME Type” on page 171](#)
- ♦ [“Example 2: Files with No Extensions” on page 171](#)
- ♦ [“Example 3: Unexpected MIME Types” on page 171](#)

Example 1: New MIME Type

If a file is not being moved as expected, you can assess its file content type by using the Apache Tika open source application as described in [Section 9.3.4, “Using Apache Tika to Find the MIME Type of a File,” on page 172](#). If Tika returns a new file content type, you should modify the `DswMimeTypes.cfg` file to add a new `<mime_type>/<mime_subtype>:.<file_extension>` entry, then add the file extension and category to the `DswFileTypes.cfg` file.

Assume that Tika returns a content type of `other/x-new` for a file with the `.new` extension. You modify the `DswMimeTypes.cfg` file to add the following line:

```
other/x-new: .new
```

You modify the `DswFileTypes.cfg` file to add an entry for the new file extension with a category called `custom`:

```
.new/custom
```

The next time that you edit or create a file types policy, the `custom` category appears as an option in the File Types dialog box. If you select the option, the category is applied the next time you run the policy.

Example 2: Files with No Extensions

In this example, the following line is in the `DswFileTypes.cfg` file:

```
.pdf/document
```

The following line is in the `DswMimeTypes.cfg` file:

```
application/pdf: .pdf
```

Suppose that a file named `unknown` has no extension, but it is really a PDF file.

You create a file types policy with `document` as one of the categories. The following outcome is expected, depending on whether you enable the *Use file content to determine type* option:

- ◆ **Do not enable Use File Content to Determine Type:** The filter matches the category based on a file's file extension. Since the file has no file extension, the file does not match the `document` category.
- ◆ **Enable Use File Content to Determine Type:** The filter looks at the file content to determine the files type and returns `application/pdf` as its MIME type. Based on the matching entry in the `DswMimeTypes.cfg` file, the `unknown` file is treated the same as if it has a `.pdf` extension. Since the file extension is mapped to the `document` category, the filter matches the file to the category, and moves the file.

Example 3: Unexpected MIME Types

Assume that Apache Tika returns a file content type of `application/x-document-special` for a file with no extension that you think is a document file type. You modify the `DswMimeType.cfg` file to add the following line that maps the MIME type to the `.doc` file extension.

```
application/x-document-special: .doc
```

Since `.doc` is already mapped to the `document` category with the following line in the `DswFileTypes.cfg` file, you do not need to modify that file.

```
.doc/document
```

9.3.4 Using Apache Tika to Find the MIME Type of a File

To effectively use the *File Types* filter option with the *Use file content to determine type* option, you should know the MIME type of the files you are trying to move. Choose a representative file, then use any available utility to determine its actual MIME type based on its content. Use this information to choose the appropriate File Types category in the policy.

Apache Tika 1.1 provides a standalone, runnable application jar (`tika-app-1.1.jar`) that you can use to discover the MIME type that Tika will identify for a file.

To download the Tika 1.1 application jar file to a Dynamic File Services server:

- 1 Dynamic File Services 2.2 supports Apache Tika 1.1.
Go to the [Tika archives \(http://archive.apache.org/dist/tika/\)](http://archive.apache.org/dist/tika/) and download the Tika 1.1 version of the application file.
- 2 Ensure that a version of Java is installed on the Windows server.

For information about running the Tika 1.1 application with Java, see “Using Tika as a Command Line Utility” on the [Getting Started with Apache Tika documentation Web page \(http://tika.apache.org/1.1/gettingstarted.html\)](http://tika.apache.org/1.1/gettingstarted.html).

To use the Apache Tika application jar file with Java to determine the MIME type of a sample file:

- 1 On the Dynamic File Services server, open an Administrator Command Prompt console (right-click the *Command Prompt* icon, then select *Run as Administrator*).
- 2 At the prompt, navigate to the folder where you downloaded the Apache Tika application.
- 3 Start the Apache Tika application by entering



```
java -jar tika-app-1.1.jar -g
```
- 4 Drag and drop the sample file on the Apache Tika GUI.
- 5 Select *View > Metadata* to view the file’s metadata information.

The Content-Type line shows the file’s MIME type based on content. For example, the following is an example of the file’s metadata:

```
Content-Length: 15898
Content-Type: application/vnd.oasis.opendocument.spreadsheet
Creation-Date: 2011-09-20T10:31:00.43
Edit-Time: P38DT9H18M1S
Object-Count: 0
Table-Count: 3
date: 2012-01-04T16:49:10.35
editing-cycles: 44
generator: LibreOffice/3.4$Win32 LibreOffice_project/340m1$Build-1219
nbObject: 0
nbTab: 3
resourceName: Intlab IPaddress assignments.ods
```

9.4 Viewing a List of Policies

You can view a list of all of the policies that are defined for a server by using the Dynamic File Services Management Console.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 In the left panel, select the *Policies* folder () for the server, then view the list of policies () that are defined.

The *Policies* list reports the following information for each policy:

- ◆ *Policy name*
- ◆ *Status (Idle, Running)*
- ◆ *Direction (Primary to Secondary, Secondary to Primary)*
- ◆ *Frequency (None (not scheduled), Hourly, Daily, Weekly, Monthly, Yearly)*

3 (Optional) Click a column heading to sort the list by that parameter.

9.5 Viewing Properties for a Policy

You can view the settings for an existing policy in its Policy Properties dialog box.

- 1 In the Management console, connect to the DynamicFS server that you want to manage.
- 2 In the left panel, select the *Policies* folder (📁) for the server, then view the list of policies that are defined.
- 3 Right-click a policy, then select *Properties*.

You can also double-click the policy to open its Policy Properties dialog box.

- 4 View the information on the *General* tab. If you make changes, click *Apply* before continuing, or click *OK* to save changes and exit.

The *General* tab in the Policy Properties dialog box reports the following information:

- ◆ *Policy name*
- ◆ *Direction*
- ◆ *Filter options*
Unused filter options are dimmed and marked as n/a.
- ◆ *Description*

For information about the fields, see [Section 9.1, “Understanding Policies,” on page 157](#).

- 5 View the policy schedule information on the *Schedule* tab. If you make changes, click *Apply* before continuing, or click *OK* to save changes and exit.

The *Schedule* tab lists the schedule that is currently associated with the policy. You can also remove the schedule, then add a new one. Only one schedule can be associated with the policy at a time.

- 6 View the pair information on the *Pairs* tab. If you make changes, click *Apply* before continuing, or click *OK* to save changes and exit.

The *Pairs* tab lists the pairs that are currently associated with the policy. You can also add and remove pairs from the list.

- 7 Click *OK* to save your changes and exit, or click *Cancel* to abandon changes on the currently displayed page.

9.6 Associating or Disassociating Pairs and Policies

Dynamic File Services pairs and policies must be associated before any data can be moved between the primary and secondary paths. A single pair can be associated with multiple policies. A single policy can be associated with multiple pairs.

IMPORTANT: A retention pair can be associated with a policy only if the direction is Primary to Secondary. You must use the Review Service to restore a file from the retention repository on the secondary path to its original location on the primary path. For information, see [Section 12.6.4, “Restoring Files or Folders,”](#) on page 226.

- ♦ [Section 9.6.1, “Viewing a List of Pairs Associated with a Policy,”](#) on page 174
- ♦ [Section 9.6.2, “Viewing a List of Policies Associated with a Pair,”](#) on page 174
- ♦ [Section 9.6.3, “Associating or Disassociating Pairs with a Policy,”](#) on page 174
- ♦ [Section 9.6.4, “Associating or Disassociating Policies with a Pair,”](#) on page 175

9.6.1 Viewing a List of Pairs Associated with a Policy

You can view a list of the pairs associated with a policy in the Policy Properties dialog box.

- 1 In the Management console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Policies* folder under the server to view the list of policies for the server in the right panel.
- 3 Right-click a policy, then select *Properties*.
- 4 Click the *Pairs* tab to view a list of the pairs that are currently associated with the policy.
- 5 Click *OK* or *Cancel* to exit.

9.6.2 Viewing a List of Policies Associated with a Pair

You can view a list of the policies associated with a pair in the Pair Properties dialog box or in the Statistics dialog box.

- 1 In the Management console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Pairs* folder under the server to view the list of pairs for the server in the right panel.
- 3 Use either of the following methods to see a list of policies associated with a pair:
 - ♦ Right-click a pair, select *Properties*, then select the *Policies* tab to view a list of the policies that are currently associated with the pair.
 - ♦ Right-click a pair, select *Statistics*, then view a list of the policies that are currently associated with the pair in the *Policies associated to pair* area.

This view has the added benefit of showing the current state of the policy and information about the last time the policy was run.

- 4 Click *OK* or *Cancel* to exit.

9.6.3 Associating or Disassociating Pairs with a Policy

You can associate or disassociate pairs with a selected policy by using the Policy Properties dialog box.

IMPORTANT: When you disassociate a pair from a policy, the policy must not be running on the pair.

- 1 In the Management console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Policies* folder under the server to view the list of policies for the server in the right panel.
- 3 Right-click a policy and select *Properties* to open its Policy Properties dialog box, then select the *Pairs* tab.
- 4 (Optional) Associate one or more pairs to the selected policy:
 - 4a On the *Pairs* tab, click *Add* to open the Select Pairs dialog box.

The Select Pairs dialog box displays a list of all pairs that are defined on the server that are not already associated with the selected policy.
 - 4b Select one or more pairs that you want to add to the *Pairs* list, then click *OK*.
 - 4c Click *Apply*.
- 5 (Optional) Disassociate one or more pairs from the selected policy:
 - 5a Ensure that the selected policy is not currently running on any of the pairs you want to disassociate from it.

The policy should both report an *Idle* state in the Management Console window. You can wait until the policy run ends, or you can [manually stop the running process](#).
 - 5b Select one or more pairs that you want to remove from the *Pairs* list for the policy, then click *Remove*.
 - 5c Click *Apply*.
- 6 Click *OK* to save changes made on the current page, or click *Cancel* to exit.

The policy is enforced for its associated pairs at the policy's next [scheduled run time](#). Scheduled and unscheduled policies that are associated with a pair can be run manually by using the [Execute now option](#).

9.6.4 Associating or Disassociating Policies with a Pair

You can associate or disassociate policies with a pair by using the Pair Properties dialog box or the Statistics dialog box.

IMPORTANT: When you disassociate a policy from a pair, the policy must not be running on the pair.

- ♦ [“Using the Pair Properties Dialog Box to Add or Remove Policy Associations” on page 175](#)
- ♦ [“Using the Pair Statistics Dialog Box to Add or Remove Policy Associations” on page 176](#)

Using the Pair Properties Dialog Box to Add or Remove Policy Associations

- 1 In the Management console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Pairs* folder under the server to view the list of pairs for the server in the right panel.
- 3 Right-click a pair and select *Properties* to open its Pair Properties dialog box, then select the *Policies* tab.

- 4 (Optional) Associate one or more policies to the selected pair:
 - 4a On the *Pairs* tab, click *Add* to open the Select Policies dialog box.
The Select Policies dialog box displays a list of all policies that are defined on the server that are not already associated with the selected pair.
 - 4b Select one or more policies that you want to add to the *Pairs* list, then click *OK*.
 - 4c Click *Apply*.
- 5 (Optional) Disassociate one or more policies from the selected pair:
 - 5a Ensure that the policies that you want to disassociate from the pair are not currently running on the pair.
The policy should both report an *Idle* state in the Management Console window. You can wait until the policy run ends, or you can [manually stop the running process](#).
 - 5b Select one or more policies that you want to remove from the *Pairs* list for the pair, then click *Remove*.
 - 5c Click *Apply*.
- 6 Click *OK* to save changes made on the current page, or click *Cancel* to exit.
The policies associated with the pair are enforced at each policy's next [scheduled run time](#). Scheduled and unscheduled policies that are associated with a pair can be run manually by using the [Execute now option](#).

Using the Pair Statistics Dialog Box to Add or Remove Policy Associations

- 1 In the Management console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Pairs* folder under the server to view the list of pairs for the server in the right panel.
- 3 Double-click the pair to open its Statistics dialog box.
- 4 (Optional) Add a new policy association:
 - 4a Use either of the following methods to open the Select Policies dialog box:
 - ♦ In the Statistics dialog box toolbar, select *Actions > Add policy association*.
 - ♦ Right-click in the *Policies associated to pair* area, then select *Add policy association* from the pop-up menu.

The Select Policies dialog box displays a list of all policies that are defined on the server that are not already associated with the selected pair.
 - 4b In the Select Policies dialog box, select one or more policies to associate with the pair, then click *OK*.
The policies are enforced for the selected pair at the each policy's next [scheduled run time](#). Scheduled and unscheduled policies that are associated with a pair can be run manually by using the [Execute now option](#).
- 5 (Optional) Remove a policy association:
 - 5a Ensure that the policy is not currently running on the pair.
You can wait until the policy run ends, or you can [manually stop the running process](#).
 - 5b In the *Policies associated to pair* area, select one or more idle policies that you want to disassociate from the pair.

- 5c Use either of the following methods to remove the association between the selected policies and the selected pair:
 - ♦ In the Statistics dialog box toolbar, select *Actions > Remove policy association*
 - ♦ Right-click and select *Remove policy association*.
- 6 When you are done, close the Statistics dialog box.

9.7 Modifying Policy Filters

Policy rules govern what files are moved and in which direction. You configure the policy rules when you create the policy. You can modify the policy rules and policy name later.

For information the different fields in the policy, see [Section 9.1, “Understanding Policies,” on page 157](#).

- 1 In the Management console, connect to the DynamicFS server that you want to manage.
- 2 Select the *Policies* folder for the server, then view the list of policies that are defined.
- 3 Right-click the policy that you want modify, then select *Properties*.
- 4 On the *General* tab under *Direction*, specify the direction to move data by selecting *Primary to Secondary* or *Secondary to Primary*, then click *Apply* to save the change.

The direction determines whether the policy is enforced against files on the primary location or the secondary location.

If retention pairs are associated with the policy, changing the direction from *Primary to Secondary* to *Secondary to Primary* automatically disassociates the retention pair from the policy.

- 5 On the *General* tab under *Filter options*, click *Edit* to open the Modify filter dialog box.
- 6 Specify one or more filter options to apply for this policy.

For details, see [Section 9.1.3, “Policy Filter Options,” on page 159](#).

Filter Option	Description
File size	Select the check box, then create a rule that moves a file only if its size is greater than or less than the specified file size.
Last accessed	Select the check box, then create a rule that moves a file only if the elapsed time since it was last accessed is greater than or less than the specified time period.
Last modified	Select the check box, then create a rule that moves a file only if the elapsed time since it was last modified is greater than or less than the specified time period.
File patterns	Select the check box, then create a rule that moves a file only if its file name uses one of the specified file patterns. Separate multiple file patterns with a comma and no spaces. If you include spaces in a pattern, the spaces are interpreted as part of the pattern you seek. Restriction: The <i>File patterns</i> option cannot be used in combination with the <i>File types</i> option

Filter Option	Description
File types	<p>Select the check box to enable the option, then create a rule that moves a file based on the specified file types.</p> <ul style="list-style-type: none"> ♦ Add: Click <i>Add</i>, select one or more file types from the <i>File types</i> list, then click <i>OK</i>. ♦ Remove: Select a file type from the list, then click <i>Remove</i>. ♦ Use File Content: (Optional) Select the <i>Use file content</i> check box to move files only if the file content matches one of the specified file types. This option increases the run time of the policy. <p>Restriction: The <i>File types</i> option cannot be used in combination with the <i>File patterns</i> option</p>
File owners	<p>Specify one or more user names or group names. Only files owned by the specified users or groups are moved. User names or group names that are invalid at run time are ignored.</p> <ul style="list-style-type: none"> ♦ Add: Click <i>Add</i>, select one or more user names or group names from the <i>Users and Groups</i> list, then click <i>OK</i>. You can also move ownerless files by selecting the {No owners} entry in the Users and Groups browse view. ♦ Remove: Select a user name or group name from the list, then click <i>Remove</i>.

- 7 Click *OK* to save your changes and close the Modify filter dialog box, then click *OK* to save your changes.

The policy rule changes apply when the policy runs at its next scheduled interval. For information, see [Section 10.4.1, “Understanding How Changes Affect the Scheduled Run Interval,”](#) on page 193.

9.8 Starting a Policy Run

Policies can be enforced automatically based on the schedule that is associated with the policy, or they can be run on demand.

- ♦ [Section 9.8.1, “Scheduling a Policy Run,”](#) on page 178
- ♦ [Section 9.8.2, “Running a Policy on Demand for a Selected Pair,”](#) on page 178

9.8.1 Scheduling a Policy Run

For information about scheduling a policy to run, see [Section 10.6, “Associating or Disassociating Schedules and Policies,”](#) on page 196.

9.8.2 Running a Policy on Demand for a Selected Pair

To manually start a policy run for a selected pair:

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Pairs* folder under the server to view the list of pairs for the server in the right panel.
- 3 Ensure that the pair is in the *Idle* state.

If other policies are running, you can wait until the policy run ends, or you can [manually stop the policy run](#).

- 4 Double-click the pair name to open the Statistics dialog box.
- 5 Select one or more policies, then right-click and select *Execute now*.

To select multiple policies, hold down the Shift key or Control key while selecting policies. The policy run applies only for the selected pair.

- 6 Monitor the policy run by viewing the progress in the *Scan Progress* bar.
- 7 After the run is complete, you can view statistical information about the run by clicking the *Policy Execution History* tab and pressing F5 to refresh the screen.

You can also close the Statistics dialog box and re-open it to get the updated view of the policy run.

9.9 Previewing a Policy Run

The *Preview now* option allows you to test a policy run against a Dynamic File Services pair without moving any files. It scans the files to determine which files would be moved if the policy were to be enforced. It reports statistics about the move, such as how many megabytes would be moved and a list of files that would be moved.

- ♦ [Section 9.9.1, “Starting a Policy Preview,” on page 179](#)
- ♦ [Section 9.9.2, “Viewing the Preview Results,” on page 180](#)

9.9.1 Starting a Policy Preview

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Pairs* folder under the server to view the list of pairs for the server in the right panel.
- 3 Ensure that the pair is in the *Idle* state.

If other policies are running, you can wait until the policy run ends, or you can [manually stop the policy run](#).

- 4 Use either of the following methods to start the preview:
 - ♦ Double-click the pair you want to manage to open its Statistics dialog box, select one or more policies, then select *Preview now*.
 - ♦ Under the *Pairs* folder, right-click the pair name, select *Preview now*, then select one or more policies to run for the preview. The *Status* for the policies changes to *Running*, but the pair’s Statistics dialog box does not open automatically.
- 5 When the preview run is completed, double-click the pair to open the Statistics dialog box, then click *View > Preview results* to open the Preview dialog box.

If the Statistics dialog box is already open, press F5 to refresh the page.
- 6 Click the *Files to be moved* link to see a list of the files.
- 7 Use the left-arrow and right-arrow to page through the list of files. You can also specify a sequence of letters in the *Filter* field to find a specific file.
- 8 Close the Preview dialog box when you are done.

9.9.2 Viewing the Preview Results

The latest run of a policy preview for a pair can be viewed until another policy preview is started for the same pair.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Double-click the pair you want to manage to open its Statistics dialog box.
- 3 Select *View > Preview results* to see information about the last preview results.
- 4 Click the *Files to be moved* link to see a list of the files.
- 5 Use the left-arrow and right-arrow to page through the list of files. You can also specify a sequence of letters in the *Filter* field to find a specific file.
- 6 Close the Preview dialog box when you are done.

9.10 Stopping an In-Progress Policy Run

You can stop a policy run that is in progress by using the *Actions > Stop running process* option from the pair's Statistics dialog box. This gracefully stops all policy runs that are currently in progress on the pair. After a policy run is stopped, the data that has already moved remains in the new location. The unmoved data remains in the old location. The next time the policy runs, the scan begins the policy enforcement process at the beginning.

To stop a policy run that is in progress:

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Select the pair you want to manage to open its Statistics dialog box.
- 3 Select the policy, then select *Actions > Stop running process*.

To ensure that a policy is not run again, go to the policy's Properties dialog box and unschedule it by removing the schedule that is currently associated with it. For information, see:

- ♦ [Section 10.5.2, "Removing a Schedule from a Single Policy," on page 196](#)
- ♦ [Section 10.5.3, "Disabling the Schedule for Selected Pairs," on page 196.](#)

9.11 Exporting and Importing Policies on a Dynamic File Services Server

Dynamic File Services allows you to export and import a policy configuration to make it easier to set up management on multiple computers. You can set up multiple policies in the Management Console on one computer, then export them to `.xml` files. The default name of the exported file is the same as the policy name.

You can import a policy on another computer to automatically set it up there. If you manage the two computers from the same Management Console, the file is easily exported and imported between the multiple computers by exporting to a local folder. You can also copy the exported `.xml` file to a different computer and import it there.

- ♦ [Section 9.11.1, "Exporting a Policy," on page 181](#)
- ♦ [Section 9.11.2, "Importing a Policy," on page 181](#)
- ♦ [Section 9.11.3, "Importing a Policy from a Previous Release," on page 181](#)

9.11.1 Exporting a Policy

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Under the *Policies* folder for the server, right-click the policy, then select *Export*.
You can also select the policy, then select *File > Import/Export > Export policy*.
- 3 Browse to the location on the local computer where you want to save the file, specify a name for the file, then click *Save*.
By default, the policy is exported as a .xml file and the file name is the same as the policy name.
- 4 Continue with [Section 9.11.2, “Importing a Policy,”](#) on page 181.

9.11.2 Importing a Policy

- 1 Place a copy of the exported policy on the computer where you are managing DynamicFS.
For information, see [Section 9.11.1, “Exporting a Policy,”](#) on page 181.
- 2 In the Management Console, connect to the DynamicFS server where you want to import the policy.
- 3 Right-click the *Policies* folder for the server, then select *Import policy*.
You can also select the *Policies* folder, then select *File > Import/Export > Import policy*.
- 4 Browse to the locate and select the exported policy file, then click *Open*.
The Policy Wizard opens to the Policy Rules page.
- 5 On the Policy Rules page, verify or modify the *Direction* and *Filter options* settings, then click *Next*.
- 6 On the Policy Schedule page, verify or modify the schedule *Frequency* and *When* settings, then click *Next*.
- 7 On the Policy Name and Description page, specify a unique name for the policy on this server, then click *Next*.
- 8 On the Pair to Policy Association page, select one or more pairs on the selected server that you want to associate with the policy, then click *Finished*.
The policy is added to the *Policies* list for the selected server.

9.11.3 Importing a Policy from a Previous Release

You can import policies that were created in an earlier major release, such as from Dynamic File Services 1.6 to 2.0. Policy schedules are configured separately in Dynamic File Services 2.0 and later versions. The Frequency settings for an imported policy are ignored. After you import the policy, ensure that you assign a policy schedule to it if you want the policy to run automatically.

9.12 Deleting a Policy

You can delete policies when you no longer need them.

IMPORTANT: A policy must be idle before it can be deleted.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Open the *Policies* folder for the server.

- 3 If the policy is in a *Running* state, do one of the following:
 - ♦ Wait until the policy completes the run and returns to the *Idle* state.
 - ♦ Stop the policy run on each of the pairs that are associated with the policy.
For instructions, see [Section 9.10, “Stopping an In-Progress Policy Run,”](#) on page 180.
- 4 After the policy is in the *Idle* state, right-click the policy, then select *Delete*.

9.13 Troubleshooting Policy Conflicts

There is no automated check to determine if the policies associated with a pair are moving files back and forth in the same or different runs. When you plan policies for a pair, consider the file extensions and types that occur in the pair and how the filter options are enforced. Ensure that the policies assigned to a pair move files where you expect them to be moved, and that they are not counter-productive.

For example, if one policy moves files to the secondary path based on the file extension, and another policy moves files to the primary path based on the last modified time, some files might move both ways.

You can use the following methods to understand what files are moved during a policy run:

- ♦ **Preview Now:** You can use the *Preview Now* option to view the files that would be moved in a run without actually moving any files. For information, see [Section 9.9, “Previewing a Policy Run,”](#) on page 179.
- ♦ **Policy Execution History:** You can inspect the Policy Execution History for a pair to examine lists that show what files were moved in the last several runs. For information, see [Section 13.2, “Viewing the Policy Execution History for a Pair,”](#) on page 230.

Use this information to refine the policies as needed to achieve your storage goals.

9.14 Examples of Policy Rules

The examples in this section can help you understand how to configure policy rules to achieve your desired outcome for moving data in a pair:

- ♦ [Section 9.14.1, “Example: Moving All Files Larger than 10 Megabytes,”](#) on page 183
- ♦ [Section 9.14.2, “Example: Moving All MP3 Files Larger than 10 Megabytes,”](#) on page 183
- ♦ [Section 9.14.3, “Example: Moving All MP3 Files Larger than 10 Megabytes That Were Last Modified More than 6 Months Ago,”](#) on page 184
- ♦ [Section 9.14.4, “Example: Moving All Files,”](#) on page 184
- ♦ [Section 9.14.5, “Example: Separating Files Based on Last Modified Dates,”](#) on page 185
- ♦ [Section 9.14.6, “Example: Moving All Files from Older to Newer Storage,”](#) on page 186

9.14.1 Example: Moving All Files Larger than 10 Megabytes

In this example, the filter identifies files with sizes of at least 10 megabytes. All files that meet this file size criterion are moved in a specified direction, such as from primary to secondary. The file access and modification times and file patterns are not considered.

Table 9-5 Policy to Move All Files Larger than 10 Megabytes

Option	Setting
Direction	Primary to secondary
File size	<ol style="list-style-type: none">1. Select the check box.2. Select <i>Greater than (>)</i> from the drop-down list.3. Specify 10 in the unit field.4. Select <i>Megabytes</i> from the drop-down list.
Last accessed	Not selected.
Last modified	Not selected.
File patterns	Not selected.
File types	Not selected.
File owners	Not selected.

9.14.2 Example: Moving All MP3 Files Larger than 10 Megabytes

In this example, the filter identifies files with sizes of at least 10 megabytes and with a file extension of `.mp3`. Only the files that meet both the size and extension criteria are moved in the specified direction, such as from primary to secondary. The file access and modification times are not considered.

Table 9-6 Policy to Move All MP3 Files Larger than 10 Megabytes

Option	Setting
Direction	Primary to secondary
File size	<ol style="list-style-type: none">1. Select the check box.2. Select <i>Greater than (>)</i> from the drop-down list.3. Specify 10 in the unit field.4. Select <i>Megabytes</i> from the drop-down list.
Last accessed	Not selected.
Last modified	Not selected.
File patterns	<ol style="list-style-type: none">1. Select the check box.2. Specify <code>*.mp3</code> in the field.
File types	Not selected.
File owners	Not selected.

9.14.3 Example: Moving All MP3 Files Larger than 10 Megabytes That Were Last Modified More than 6 Months Ago

In this example, the filter identifies files with sizes of at least 10 megabytes, with a Last Modified setting that is at least 6 months ago, and with a file extension of .mp3. Only the files that meet all three criteria are moved in a specified direction, such as from primary to secondary. The file modification times are not considered.

Table 9-7 Policy to Move All MP3 Files Larger than 10 Megabytes That Were Last Modified More than 6 Months Ago

Option	Setting
Direction	Primary to secondary
File size	<ol style="list-style-type: none">1. Select the check box.2. Select <i>Greater than (>)</i> from the drop-down list.3. Specify 10 in the unit field.4. Select <i>Megabytes</i> from the drop-down list.
Last accessed	Not selected.
Last modified	<ol style="list-style-type: none">1. Select the check box.2. Select <i>Greater than (>)</i> from the drop-down list.3. Specify 6 in the unit field.4. Select <i>Months</i> from the drop-down list.
File patterns	<ol style="list-style-type: none">1. Select the check box.2. Specify *.mp3 in the field.
File types	Not selected.
File owners	Not selected.

9.14.4 Example: Moving All Files

In this example, the filter identifies all files with any extension and moves them in the specified direction, such as from primary to secondary. All files are moved because there are no other filters to be considered.

Table 9-8 Policy to Move All Files

Option	Setting
Direction	Primary to secondary
File size	Not selected.
Last accessed	Not selected.
Last modified	Not selected.
File patterns	<ol style="list-style-type: none">1. Select the check box.2. Specify *.* in the field to move all files with and without file extensions. To move only files with no extensions, specify *. in the field.

Option	Setting
File types	Not selected.
File owners	Not selected.

9.14.5 Example: Separating Files Based on Last Modified Dates

In this example, assume that you want to keep recently modified files on the faster storage where the primary path resides. You separate the files in a pair based on the file Last Modified dates, with recently modified files on the primary path and the static files on the secondary path. As noted elsewhere, files are served to users directly from whichever location the file resides when the file is accessed via the network share on the primary path. If a file is modified on the secondary path, its Last Modified date changes, but it is not automatically moved back to the primary path.

To achieve the goal, you set up one policy to move static files from the primary path to the secondary path, and one policy to recently modified files from the secondary path to the primary path.

- ♦ [“Moving Files That Were Last Modified More than 1 Year Ago from Primary to Secondary” on page 185](#)
- ♦ [“Moving Files That Were Last Modified Less than 1 Week Ago from Secondary to Primary” on page 186](#)

Moving Files That Were Last Modified More than 1 Year Ago from Primary to Secondary

In this policy, specify a direction of primary to secondary, and a last modified date of greater than 1 year. Run this policy monthly (or at a preferred frequency) during non-peak hours (such as Sunday at 12:00 a.m. until complete) to locate and move static files to the secondary path.

Table 9-9 Policy to Move Files That Were Last Modified More than 1 Year Ago from Primary to Secondary

Option	Setting
Direction	Primary to secondary
File size	Not selected.
Last accessed	Not selected.
Last modified	<ol style="list-style-type: none"> 1. Select the check box. 2. Select <i>Greater than (>)</i> from the drop-down list. 3. Specify 1 in the unit field. 4. Select <i>Years</i> from the drop-down list.
File patterns	Not selected.
File types	Not selected.
File owners	Not selected.

Moving Files That Were Last Modified Less than 1 Week Ago from Secondary to Primary

In this policy, specify a direction of secondary to primary, and a last modified date of less than 1 week. Run this policy weekly during non-peak hours (such as Sunday at 12:00 a.m. until complete) to move recently modified files back to the primary path.

Table 9-10 Policy to Move Files That Were Last Modified Less than 1 Week Ago from Secondary to Primary

Option	Setting
Direction	Secondary to primary
File size	Not selected.
Last accessed	Not selected.
Last modified	<ol style="list-style-type: none">1. Select the check box.2. Select <i>Less than (<)</i> from the drop-down list.3. Specify 1 in the unit field.4. Select <i>Weeks</i> from the drop-down list.
File patterns	Not selected.
File types	Not selected.
File owners	Not selected.

9.14.6 Example: Moving All Files from Older to Newer Storage

In this example, suppose that you have existing storage and you want to move all files to a newer, faster storage disk. You do not plan to keep the existing storage after the move.

To achieve the goal, you set up a pair where the primary path is on the new disk, and the secondary path is on the old disk. The network share is configured (or reconfigured) for the primary path, which gives users access to all of the files via the merged view while DynamicFS migrates the files in off-peak hours.

You set up a policy with `*.*` (Move all files) in the *File patterns* filter option, and specify a direction of secondary to primary. This moves files with and without file extensions. Run the policy nightly during non-peak hours (such as at 12:00 a.m. for 4 hours). After all of the files have been moved to the primary location, the pair can be unlinked.

Table 9-11 Policy to Move All Files from Older to Newer Storage

Option	Setting
Direction	Secondary to primary
File size	Not selected.
Last accessed	Not selected.
Last modified	Not selected.

Option	Setting
File patterns	<ol style="list-style-type: none">1. Select the check box.2. Specify * . * in the field.
File types	Not selected.
File owners	Not selected.

9.15 What's Next

For information about monitoring the health and history of server disks that are used in pairs, the pairs, and the policies, see [Chapter 13, "Monitoring Pairs and Policies,"](#) on page 229.

10 Creating and Managing Policy Schedules

Novell Dynamic File Services allows you to create and manage policy schedules separately from policies.

- ♦ [Section 10.1, “Understanding Policy Schedules,” on page 189](#)
- ♦ [Section 10.2, “Creating a Policy Schedule,” on page 192](#)
- ♦ [Section 10.3, “Viewing Properties for a Schedule,” on page 193](#)
- ♦ [Section 10.4, “Modifying Policy Schedules,” on page 193](#)
- ♦ [Section 10.5, “Unscheduler Policies,” on page 195](#)
- ♦ [Section 10.6, “Associating or Disassociating Schedules and Policies,” on page 196](#)
- ♦ [Section 10.7, “Deleting a Schedule,” on page 198](#)

10.1 Understanding Policy Schedules

A policy schedule specifies the frequency, start time, and stop time or duration that a policy runs. It can be associated with none, one, or multiple policies. A policy can have only one policy schedule associated with it at a time. When the schedule is created, an administrator specifies a unique descriptive name for the schedule, and Dynamic File Services allocates a GUID for the life of the schedule.

IMPORTANT: For information about planning policy schedules, see [Section 4.20, “Policy Schedules,” on page 71](#).

- ♦ [Section 10.1.1, “Scheduled or Unscheduled Policies,” on page 189](#)
- ♦ [Section 10.1.2, “Schedule Frequency Options,” on page 190](#)

10.1.1 Scheduled or Unscheduled Policies

Associating a schedule with a policy causes it to be scheduled for periodic policy enforcement. Disassociating a schedule from a policy unschedules the policy. The policy schedule applies for all pairs that are associated with the policy. Unscheduled policies are not enforced unless you run them manually by using *Execute now*. Scheduled and unscheduled policies can be run at any time by using *Execute now*.

The policies associated with a given pair can use all use the same schedule or different schedules. If policies are not run together, ensure that you allow sufficient time for a policy run to complete before the start time of another policy.

10.1.2 Schedule Frequency Options

For each policy schedule, you must specify its frequency, start time, and stop time or duration. A policy can be enforced hourly, daily, weekly, monthly, quarterly, yearly, or on custom dates. Select one frequency option, then specify when to run it.

Table 10-1 Policy Schedule Frequency Options

Frequency Option	Description
Hourly	Runs the policy every hour at hh:00:00.
Daily	Runs the policy once a day at the specified the time. <i>Start</i> determines at what time on that day the run should begin. Start times are available in 15-minute increments (hh:00, hh:15, hh:30, hh:45). The default is 12:00 a.m. <i>Duration</i> specifies how long to run the policy in one-hour increments, or until complete. The default is <i>Until complete</i> .
Weekly	Runs the policy once a week on the specified day of the week, start time, and duration. <i>Day</i> determines which day of the week to enforce the policy. The default is <i>Sunday</i> . <i>Start</i> determines at what time on that day the run should begin. Start times are available in 15-minute increments (hh:00, hh:15, hh:30, hh:45). The default is 12:00 a.m. <i>Duration</i> specifies how long to run the policy in one-hour increments, or until complete. The default is <i>Until complete</i> .
Monthly	Runs the policy monthly on the specified calendar day of the month, start time, and duration. <i>Day</i> determines which calendar day of the month to enforce the policy. Options are 1 to 31. The default is day 15. Specify <i>Last day of the month</i> to run the policy on the last calendar day of each month, including February 29th in leap years. <i>Start</i> determines at what time on that day the run should begin. Start times are available in 15-minute increments (hh:00, hh:15, hh:30, hh:45). The default is 12:00 a.m. <i>Duration</i> specifies how long to run the policy in one-hour increments, or until complete. The default is <i>Until complete</i> .

Frequency Option	Description
Quarterly	<p>Runs the policy quarterly, beginning in the specified month, on the calendar day of the month, start time, and duration.</p> <p><i>Month</i> determines in which calendar month is the first month to begin the policy. Options are the 12 months of the Gregorian calendar year. You must specify the month; no default is defined.</p> <p><i>Day</i> determines which calendar day of the month to enforce the policy. Options are 1 to 31. The default is day 15. Specify <i>Last day of the month</i> to run the policy on the last calendar day of each quarter, including February 29th in leap years, beginning with the specified month.</p> <p><i>Start</i> determines at what time on that day the run should begin. Start times are available in 15-minute increments (hh:00, hh:15, hh:30, hh:45). The default is 12:00 a.m.</p> <p><i>Duration</i> specifies how long to run the policy in one-hour increments, or until complete. The default is <i>Until complete</i>.</p>
Yearly	<p>Runs the policy yearly in the month, on the calendar day of the month, start time, and duration.</p> <p><i>Month</i> determines in which calendar month to enforce the policy. Options are the 12 months of the Gregorian calendar year. You must specify the month; no default is defined.</p> <p><i>Day</i> determines which calendar day of the month to enforce the policy. Options are 1 to 31. You must specify the day; no default is defined.</p> <p><i>Start</i> determines at what time on that day the run should begin. Start times are available in 15-minute increments (hh:00, hh:15, hh:30, hh:45). The default is 12:00 a.m.</p> <p><i>Duration</i> specifies how long to run the policy in one-hour increments, or until complete. The default is <i>Until complete</i>.</p>
Custom	<p>Runs the policy on the custom dates at the specified start time, and duration. Only future dates can be specified.</p> <p>Click a day once to add it to the list of dates. Click it again to remove it from the list.</p> <p>Click the calendar year to select years and months, or to jump around through the calendar. You can also use the right-arrow to navigate forward from the current month to future months, then use the left-arrow to navigate back one month at a time.</p> <p><i>Start</i> determines at what time on that day the run should begin. Start times are available in 15-minute increments (hh:00, hh:15, hh:30, hh:45). The default is 12:00 a.m.</p> <p><i>Duration</i> specifies how long to run the policy in one-hour increments, or until complete. The default is <i>Until complete</i>.</p>

10.2 Creating a Policy Schedule

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Use either of the following methods to launch the Schedule Wizard.
 - ♦ Select *Schedules*, then select *Actions > Schedule Wizard*.
 - ♦ Right-click *Schedules*, then select *Schedule Wizard*.
- 3 From the *Frequency* drop-down list, select the schedule frequency, then specify the required calendar day, start time, and duration values as required for the frequency. For information, see [Section 10.1, “Understanding Policy Schedules,” on page 189](#).

Frequency Option	Description
Hourly	Select <i>Hourly</i> from the <i>Frequency</i> drop-down menu to run the policy every hour at hh:00:00.
Daily	Select <i>Daily</i> from the <i>Frequency</i> drop-down menu, then specify the time of day to start the policy and how long you want it to run.
Weekly	Select <i>Weekly</i> from the <i>Frequency</i> drop-down menu, then specify the day of the week, the start time, and duration to run the policy.
Monthly	Select <i>Monthly</i> from the <i>Frequency</i> drop-down menu, then specify the calendar day of the month, the start time, and duration to run the policy.
Quarterly	Select <i>Quarterly</i> from the <i>Frequency</i> drop-down menu, then specify the starting month, the calendar day of the month, the start time, and duration to run the policy.
Yearly	Select <i>Yearly</i> from the <i>Frequency</i> drop-down menu, then specify the month, the calendar day of the month, the start time, and duration to run the policy. The month and day are required to be set.
Custom	Select <i>Custom</i> from the <i>Frequency</i> drop-down menu, then select dates from the calendar and specify the start time and duration to run the policy.

- 4 On the Schedule Name and Description page, specify the following parameters, then click *Next*.

Name Option	Description
Name	Specify a unique name for the schedule on the DynamicFS server.
Description	Optionally specify a more detailed description for the schedule. This is a friendly description that provides context and meaning to the administrators.

- 5 On the Policy Associations page, click *Add*, select one or more available policies, click *OK*, then click *Next*.


Any number of policies can be associated to a schedule at a time. To remove an associated policy from the schedule, select the policy, then click *Remove*.

You can click *Next* to skip this step if you do not want to associate the schedule with policies at this time, or if policies have not been created. You can create a policy later and associate it with the schedule.

- 6 Click *Finished* to create the schedule, or click *Cancel* to exit the wizard without creating the schedule.

10.3 Viewing Properties for a Schedule

You can view the settings for an existing policy in its Schedule Properties dialog box.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 In the left panel, select the *Schedules* folder () for the server, then view the list of schedules that are defined.
- 3 Right-click a schedule, then select *Properties*.

You can also double-click the schedules to open its Schedule Properties dialog box.

- 4 View the information on the *General* tab. If you make changes, click *Apply* before continuing, or click *OK* to save changes and exit.

The *General* tab in the Schedule Properties dialog box reports the following information:

- ◆ *Schedule name*
- ◆ *Frequency*
- ◆ *Month, Day, Start Time, Duration*
- ◆ *Description*

For information about the fields, see [Section 10.1, “Understanding Policy Schedules,” on page 189](#).

- 5 View the policy associations on the *Policies* tab. If you make changes, click *Apply* before continuing, or click *OK* to save changes and exit.
- 6 Click *OK* to save your changes and exit, or click *Cancel* to abandon changes on the currently displayed page.

10.4 Modifying Policy Schedules

You can use the Dynamic File Services Management Console to modify how often a policy runs. Schedule changes do not affect any currently running instances of the policy. If a schedule is enabled, the policy runs at its next scheduled interval for each pair. You can also use *Execute Now* to run the edited policy as needed for its associated pairs.

- ◆ [Section 10.4.1, “Understanding How Changes Affect the Scheduled Run Interval,” on page 193](#)
- ◆ [Section 10.4.2, “Modifying a Policy Schedule,” on page 195](#)

10.4.1 Understanding How Changes Affect the Scheduled Run Interval

When you change the schedule that is associated with a policy, the next scheduled run interval depends on the current run state for the policy and the frequency setting.

For example, a policy runs daily at 10:00 a.m. At 10:15 a.m., you modify the policy to run daily at 11:00 a.m. The policy has already run for that day, so its next scheduled run occurs the following day at 11:00 a.m.

For another example, a policy runs monthly on day 15 at 2:00 a.m. At 8:00 a.m. you modify the policy to run monthly on day 30. The policy has already run for that month, so its next scheduled run occurs the following month at 2:00 a.m. on day 30. If you need to run the policy a second time in the current month, you can manually run the policy on day 30 of the current month by using *Execute Now*.

Table 10-2 describes the behavior of DynamicFS when determining the next scheduled interval for the policy.

Table 10-2 *Determining the Next Scheduled Run Interval*

Run State	Next Scheduled Run Interval
The run is in progress.	<p>The current run finishes. The next scheduled run is:</p> <p>Hourly: The next hour.</p> <p>Daily: Tomorrow at the new time.</p> <p>Weekly: The new time and day of the week in the following week.</p> <p>Monthly: The new time and day of the month in the following month.</p> <p>Yearly: The new time and day of the year in the following year.</p>
The run is completed for the current hour or day.	<p>The next scheduled run is:</p> <p>Hourly: The next hour.</p> <p>Daily: Tomorrow at the new time.</p> <p>Weekly: The new time and day of the week in the following week.</p> <p>Monthly: The new time and day of the month in the following month.</p> <p>Yearly: The new time and day of the year in the following year.</p>
The run has not started, and it is within 20 minutes after the scheduled start time.	<p>The next scheduled run is:</p> <p>Hourly: The current hour if possible. If the pair is busy, the run is scheduled for the next hour.</p> <p>Daily: As scheduled if possible. If the pair is busy, the run is scheduled for tomorrow at the new time.</p> <p>Weekly: As scheduled if possible. If the pair is busy, the next run is scheduled for the new time and day of the week in the following week.</p> <p>Monthly: As scheduled if possible. If the pair is busy, the next run is scheduled for the new time and day of the month in the following month.</p> <p>Yearly: As scheduled if possible. If the pair is busy, the next run is scheduled for the new time and day of the year in the following year.</p>
The run has not started, and it is more than 20 minutes after the scheduled start time.	<p>The next scheduled run is:</p> <p>Hourly: The next hour.</p> <p>Daily: Tomorrow at the new time.</p> <p>Weekly: The new time and day of the week in the following week.</p> <p>Monthly: The new time and day of the month in the following month.</p> <p>Yearly: The new time and day of the year in the following year.</p>

10.4.2 Modifying a Policy Schedule

Modifying the schedule applies the changes for all policies associated with it. The associated policies run at their next scheduled time.

For information about the different fields in the policy, see [Section 10.1, “Understanding Policy Schedules,”](#) on page 189.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Select *Schedules* in the left panel to view a list of schedules in the right panel.
- 3 Right-click the schedule you want modify, then select *Properties* to open its Schedule Properties dialog box.

You can also double-click the schedule to open its Schedule Properties dialog box.

- 4 On the *General* tab, view the current frequency and other schedule information.
- 5 (Optional) From the *Frequency* drop-down list, select the new schedule frequency, then specify the required calendar day, start time, and duration values as required for the frequency.

You can also modify any of the settings for the current frequency.

Option	Description
Hourly	Runs the policy every hour at hh:00:00.
Daily	Runs the policy once a day at the specified the time.
Weekly	Runs the policy once a week on the specified day of the week, start time, and duration.
Monthly	Runs the policy monthly on the specified calendar day of the month, start time, and duration.
Quarterly	Runs the policy quarterly, beginning in the specified month, on the calendar day of the month, start time, and duration.
Yearly	Runs the policy yearly in the month, on the calendar day of the month, start time, and duration.
Custom	Runs the policy on the custom dates at the specified start time, and duration. Only future dates can be specified.

- 6 (Optional) In the *Name* field, rename the schedule.
- 7 Click *Apply* or *OK* to save your changes.

The policy runs at its next scheduled interval. For information, see [Section 10.4.1, “Understanding How Changes Affect the Scheduled Run Interval,”](#) on page 193.

10.5 Uncheduling Policies

To unschedule a policy, disassociate the policy from the schedule. Other options are available depending on your intended outcome.

When you disassociate a policy and schedule from each other, the policy does not run again until you associate a schedule with it, or unless you run it manually.

Disassociating a schedule from a policy does not stop an in-progress policy run. To stop an in-progress policy run, see [Section 9.10, “Stopping an In-Progress Policy Run,”](#) on page 180.

- ♦ [Section 10.5.1, “Removing a Schedule from Multiple Policies,”](#) on page 196
- ♦ [Section 10.5.2, “Removing a Schedule from a Single Policy,”](#) on page 196
- ♦ [Section 10.5.3, “Disabling the Schedule for Selected Pairs,”](#) on page 196

10.5.1 Removing a Schedule from Multiple Policies

You can disassociate one or more policies from a schedule by using the Schedule Properties dialog box.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Schedules* folder under the server to view the list of schedules for the server in the right panel.
- 3 Right-click a schedule and select *Properties* to open its Schedule Properties dialog box, then select the *Policies* tab.
- 4 Disassociate the policies from the schedule by selecting the policies, then clicking *Remove*.
- 5 Click *Apply* or *OK* to save and apply your changes.

The policies are now unscheduled. You can run them manually by using the [Execute now option](#).

10.5.2 Removing a Schedule from a Single Policy

You disable a policy’s schedule for all of its associated pairs by disassociating the policy schedule from the policy.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Right-click the policy you want modify, then select *Schedule*.
- 3 Select the associated policy schedule, then click *Remove*.
- 4 Click *OK* to save your changes.

The policy does not run automatically. You can use *Execute Now* option to run the policy as needed. For information, see [Section 9.8, “Starting a Policy Run,”](#) on page 178.

10.5.3 Disabling the Schedule for Selected Pairs

To disable the policy’s schedule from running on some pairs, you can disassociate the pair from the policy. Re-associate the pair and policy when you are ready for the policy to run on the pair again. For information, see [Section 9.6.3, “Associating or Disassociating Pairs with a Policy,”](#) on page 174.

10.6 Associating or Disassociating Schedules and Policies

Dynamic File Services schedules and policies must be associated in order to enable policies to run automatically. A single schedule can be associated with multiple policies. A single policy can be associated with only one schedule at a time.

- ♦ [Section 10.6.1, “Viewing the Schedule Associated with a Policy,”](#) on page 197
- ♦ [Section 10.6.2, “Viewing a List of Policies Associated with a Schedule,”](#) on page 197

- ♦ [Section 10.6.3, “Associating or Disassociating a Schedule with a Policy,”](#) on page 197
- ♦ [Section 10.6.4, “Associating or Disassociating Policies with a Schedule,”](#) on page 198

10.6.1 Viewing the Schedule Associated with a Policy

You can view the schedule associated with a policy in the Policy Properties dialog box.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Policies* folder under the server to view the list of policies for the server in the right panel.
- 3 Right-click a policy, then select *Properties*.
- 4 Click the *Schedule* tab to view the schedule that is currently associated with the policy.
- 5 Click *Cancel* to close the dialog box.

10.6.2 Viewing a List of Policies Associated with a Schedule

You can view a list of the policies associated with a schedule in the schedule’s Properties dialog box.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Schedules* folder under the server to view the list of schedules for the server in the right panel.
- 3 Use either of the following methods to see a list of policies associated with a schedule:
 - ♦ Right-click a schedule, select *Properties*, then select the *Policies* tab to view a list of the policies that are currently associated with it.
 - ♦ Double-click a schedule to open the Properties dialog box, then select the *Policies* tab to view a list of the policies that are currently associated with it.
- 4 Click *Cancel* to close the dialog box.

10.6.3 Associating or Disassociating a Schedule with a Policy

You can associate or disassociate a schedule with a policy by using the policy’s Properties dialog box.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Policies* folder under the server to view the list of policies for the server in the right panel.
- 3 Right-click a policy and select *Properties* to open its Policy Properties dialog box, then select the *Schedule* tab.
- 4 (Optional) Disassociate the current schedule from the policy. Select the schedule in the *Schedule* list, click *Remove*, then click *Apply*.
- 5 (Optional) Associate a schedule with the policy:
 - 5a Click *Add* to open the Select Schedule dialog box.
The Select Schedule dialog box displays a list of all schedules that are defined on the server.
 - 5b Select the schedule that you want to add, then click *OK*.
 - 5c Click *Apply*.
- 6 Click *OK* to save and exit.

10.6.4 Associating or Disassociating Policies with a Schedule

You can associate or disassociate multiple policies with a schedule by using the schedule's Properties dialog box.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Schedules* folder under the server to view the list of schedules for the server in the right panel.
- 3 Right-click a schedule and select *Properties* to open its Schedule Properties dialog box, then select the *Policies* tab.
- 4 (Optional) Associate one or more policies to the schedule:
 - 4a On the *Policies* tab, click *Add* to open the Select Policies dialog box.

The *Select Policies* dialog box displays a list of all policies that are defined on the server that are not already associated with the schedule.
 - 4b Select one or more policies that you want to add to the *Policies* list, then click *OK*.
 - 4c Click *Apply*.
- 5 (Optional) Disassociate one or more policies from the schedule:
 - 5a On the *Policies* tab, select one or more policies that you want to remove from the *Policies* list for the schedule, then click *Remove*.
 - 5b Click *Apply*.
- 6 Click *OK* to save and exit.

10.7 Deleting a Schedule

You can delete schedules when you no longer need them. Deleting a schedule automatically disassociates the schedule from its associated policies. A policy does not run automatically until you associate it with a schedule.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Open the *Schedules* folder for the server.
- 3 Right-click the schedule, then select *Delete*.

11 Creating and Managing Cloud Accounts

Novell Dynamic File Services allows you to use cloud storage as the secondary location for retention pairs. This section describes how to set up a cloud account in Dynamic File Services that enables it to access files stored in the cloud on your behalf.

- ♦ [Section 11.1, “Understanding Cloud Storage,” on page 199](#)
- ♦ [Section 11.2, “Setting Up Cloud Access Credentials and Folders for Your Cloud Storage Provider,” on page 201](#)
- ♦ [Section 11.3, “Creating a Cloud Account,” on page 206](#)
- ♦ [Section 11.4, “Viewing Properties for a Cloud Account,” on page 209](#)
- ♦ [Section 11.5, “Viewing a List of the Retention Pairs That Use a Cloud Account,” on page 210](#)
- ♦ [Section 11.6, “Modifying the Access Credentials for a Cloud Account,” on page 211](#)
- ♦ [Section 11.7, “Deleting a Cloud Account,” on page 212](#)

11.1 Understanding Cloud Storage

Dynamic File Services supports the use of cloud storage as the secondary location in a retention pair. Your cloud storage must be configured and available to the retention pair whenever actions are performed that involve the secondary path, such as the initial setup of the pair, policy moves, manual moves, and retention reviews.

- ♦ [Section 11.1.1, “Supported Cloud Storage Providers,” on page 199](#)
- ♦ [Section 11.1.2, “Maximum Storage Size for Cloud Storage,” on page 200](#)
- ♦ [Section 11.1.3, “Maximum File Size for Uploads to Cloud Storage,” on page 200](#)
- ♦ [Section 11.1.4, “Cloud Credentials,” on page 200](#)
- ♦ [Section 11.1.5, “Types of Cloud Access Authentication Credentials,” on page 201](#)

11.1.1 Supported Cloud Storage Providers

Dynamic File Services 2.2 supports the following cloud storage providers. You create an account with the provider.

- ♦ [Amazon Simple Storage Service \(http://aws.amazon.com/s3/\)](http://aws.amazon.com/s3/) (Amazon S3)
- ♦ [CloudMe \(http://www.cloudme.com/\)](http://www.cloudme.com/)
- ♦ [Dropbox \(http://www.dropbox.com/\)](http://www.dropbox.com/)

11.1.2 Maximum Storage Size for Cloud Storage

The maximum amount of space that your files can consume in the cloud is governed by the service level agreement with your cloud storage provider. The storage quota is enforced by your provider. If you reach the set quota, files cannot be uploaded until you remove files to make space available, or unless you increase the quota. For example, you can remove files from the retention repository by using the Delete and Restore features of the Retention Review Service. For information, see [Section 12.6, “Reviewing Files in the Retention Repository,” on page 223](#).

11.1.3 Maximum File Size for Uploads to Cloud Storage

The maximum size per file that can be uploaded to cloud storage is governed by the service level agreement with your cloud storage provider. The storage quota and file size limit is enforced by your provider. In addition, a file must be smaller than the remaining available space below your quota.

[Table 11-1](#) provides information about the known file size restrictions for the supported cloud providers. Refer to your cloud storage provider’s documentation for information about the maximum file size allowed for uploads.

Table 11-1 Cloud Provider Upload File Size Restrictions

Cloud Provider	Upload File Size Restrictions
Amazon S3	Amazon S3 allows upload file sizes from 1 byte to 5 terabytes per file. For information, see FAQs: How much data can I store? (http://aws.amazon.com/s3/faqs/#How_much_data_can_I_store) .
CloudMe	Cloudme limits the upload file size for free and basic accounts to 150 MB per file. For information see CloudMe Price Plan and Accounts (http://www.cloudme.com/en/pricing) .
Dropbox	Dropbox limits the upload file size for developer applications to 150 MB per file. For information, see the developer documentation for Dropbox REST APIs (https://www.dropbox.com/developers/reference/api#files_put) . Larger file sizes require the Dropbox client application or the Dropbox Web browser interface. For information, see Help Center: Is there a limit or maximum to how big my files can be? (https://www.dropbox.com/help/5) .

11.1.4 Cloud Credentials

On the DynamicFS server, you set up cloud accounts to store your credentials for the cloud locations that you want to use in retention pairs. The credentials are stored securely. The Service uses the credentials to connect to the cloud when it performs actions on the files on your behalf, such as for policy moves, manual moves, and retention reviews.

For information about the types of credentials used by cloud providers, see [Section 11.1.5, “Types of Cloud Access Authentication Credentials,” on page 201](#).

For information about how to get credentials and allow Dynamic File Services to access the account, see [Section 11.2, “Setting Up Cloud Access Credentials and Folders for Your Cloud Storage Provider,” on page 201](#).

11.1.5 Types of Cloud Access Authentication Credentials

The Dynamic File Services application must provide credentials to your cloud provider when it accesses files on your behalf. [Table 11-2](#) describes the types of credentials that you might be asked to provide. The values should conform to the format rules that are set by your cloud provider. For information about which credentials are required by your provider, see [Section 11.2, “Setting Up Cloud Access Credentials and Folders for Your Cloud Storage Provider,”](#) on page 201.

Table 11-2 *Types of Cloud Access Credentials*

Cloud Parameter	Description
Account name	Your login user name for the cloud provider's site.
Account password	The password for the login user name that you provided as the cloud account name.
Application key	A text string that uniquely identifies the Dynamic File Services application to your Dropbox cloud storage account.
Application secret	A secret character string that is used as a password for the application key that is used to access your DropBox cloud storage account.
Application secret token	A text string that is retrieved from your Dropbox cloud provider by Dynamic File Services as part of a two-phase OAuth authentication process. The token helps to form a URL where you log in to authorize Dynamic File Services to access your files.
Access key ID	An alphanumeric secret text string that uniquely identifies the user who owns the Amazon S3 account. The ID is 20 characters long.
Secret access key	A secret character string that is used as a password for the access key ID for your Amazon S3 account. The key is 40 characters long.
Bucket name	A container for objects stored in Amazon S3. A single account can have multiple buckets. For example, if the object named <code>photos/puppy.jpg</code> is stored in the <code>johnsmith</code> bucket, then it is addressable by using the URL <code>http://johnsmith.s3.amazonaws.com/photos/puppy.jpg</code> .
Region name	Select the region the bucket was created in.

11.2 Setting Up Cloud Access Credentials and Folders for Your Cloud Storage Provider

Before you can use cloud storage as the secondary location in a retention pair, you must set up the cloud storage with any of the supported cloud providers. You can use the root of the cloud storage area, or create subfolders to use as secondary locations in retention pairs. Use the cloud provider's Web interface to create subfolders in the account, as desired. Ensure that you have your access

credentials when you set up the cloud account instance on the Dynamic File Services server. If you want to use subfolders as secondary locations, you must create them before you attempt to create the retention pair.

The following sections identify the cloud access credentials that are required by each of the supported cloud providers, and information about how to set up folders for that provider.

- ♦ [Section 11.2.1, “Setting Up Cloud Storage for Amazon S3,” on page 202](#)
- ♦ [Section 11.2.2, “Setting Up Cloud Storage for CloudMe,” on page 204](#)
- ♦ [Section 11.2.3, “Setting Up Cloud Storage for Dropbox,” on page 204](#)

11.2.1 Setting Up Cloud Storage for Amazon S3

For each cloud account instance that you set up for your [Amazon Simple Storage Service \(Amazon S3\) \(http://aws.amazon.com/s3/\)](#) cloud storage, Dynamic File Services requires the following authentication credentials:

- ♦ Cloud access key ID
- ♦ Cloud secret access key
- ♦ Bucket name
- ♦ Region name

The access key ID and secret access key that Dynamic File Services uses to authenticate to Amazon S3 are your Amazon Web Services (AWS) identifiers.

A bucket is a container for objects stored in Amazon S3. The secondary path of a retention pair can be at the root of a bucket, or it can be on a folder in the bucket. You can access multiple buckets in a single Amazon S3 cloud storage service by creating a cloud account instance in Dynamic File Services for each bucket. A cloud account for a single bucket can use unique paths in the bucket for each retention pair.

It is possible that your Amazon S3 cloud storage account can have one access key ID and more than one secret access key so that the account can be accessed by other administrator users, to whom the subscriber wants to give access permissions. If multiple Amazon S3 users can access the same bucket, you can specify the access credentials (key ID and secret key) for only one of those users in a given cloud account instance in Dynamic File Services. Only the folders created with the specified access credentials are visible when Dynamic File Services accesses data on your behalf.

Use the following procedures to set up Amazon S3 cloud storage:

- ♦ [“Getting the Access Credentials for Amazon S3” on page 202](#)
- ♦ [“Creating a Bucket and Folder in Amazon S3” on page 203](#)

Getting the Access Credentials for Amazon S3

To find your AWS identifiers:

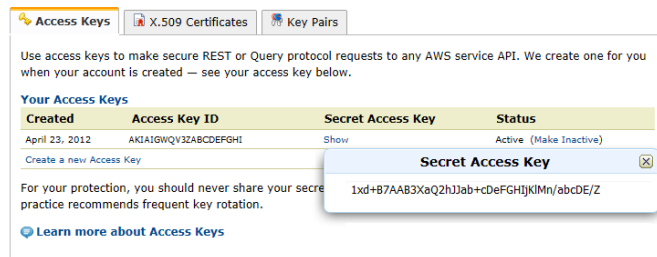
- 1 Log in to your Amazon S3 account by providing the email address and password for Amazon S3 account, then clicking *Sign in using our secure server*.

If you have multiple users set up in the Amazon S3 account, ensure that you log in as the user identity that matches the access credentials that you provide to Dynamic File Services.

- 2 From the Account page, select *Security Credentials* in the left panel, then scroll down to view your *Access Credentials*.

Access Credentials

There are three types of access credentials used to authenticate your requests to AWS services: (a) access keys, (b) X.509 certificates, and (c) key pairs. Each access credential type is explained below.



- 3 Click *Show* to view the *Secret Access Key*.
- 4 Make a note of the *Access Key ID* and the *Secret Access Key*.

These are the access credentials you need to set up a cloud account in Dynamic File Services.

Creating a Bucket and Folder in Amazon S3

In a retention pair, the secondary path can be at the root of a bucket, or it can be on a subfolder in the bucket. The bucket must exist in Amazon S3 before you can set up a cloud account for it in Dynamic File Services. A subfolder (if used) must exist in Amazon S3 before you can use it as a secondary path in a retention pair.

You use the Amazon Web Services (AWS) Management Console to create buckets and folders (if desired) in your Amazon S3 cloud storage account, as described in the following procedure:

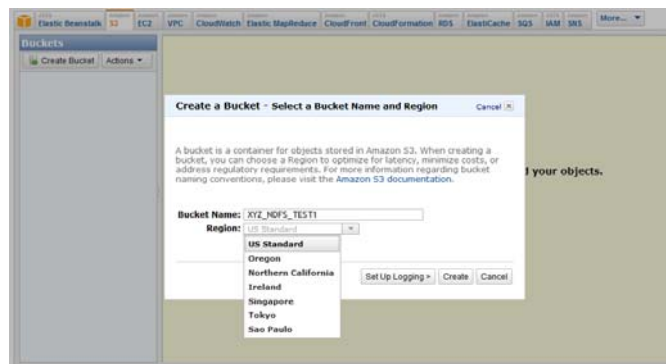
- 1 Log in to your Amazon S3 account by providing the email address and password for Amazon S3 account, then clicking *Sign in using our secure server*.

If you have multiple users set up in the Amazon S3 account, ensure that you log in as the user identity that matches the access credentials that you provide to Dynamic File Services.

- 2 In the left panel, click *AWS Management Console*.
- 3 Select the *Amazon S3* tab.
- 4 Create one or more buckets in your Amazon S3 account.

- 4a In the left panel, click *Create Bucket*, then specify a unique name for the bucket.

The bucket name must be unique across all existing bucket names in Amazon S3. One way to do that is to prefix your bucket names with your company's name, such as XYZ-NDFS_TEST1.



4b Select the region from the drop-down list, such as *US Standard*.

The bucket's assigned region controls the geographical or political region where Amazon S3 physically stores your files in the cloud. You can choose a region to optimize for latency, minimize costs, or address regulatory requirements. For information, see the [Amazon S3 Working with Amazon S3 Buckets documentation \(http://docs.amazonwebservices.com/AmazonS3/latest/dev/UsingBucket.html?r=3588\)](http://docs.amazonwebservices.com/AmazonS3/latest/dev/UsingBucket.html?r=3588).

4c Click *Create*.

4d (Optional) Repeat [Step 4a](#) to [Step 4c](#) to create additional buckets.

5 (Optional) Create one or more folders in a bucket.

5a In the left panel, select the bucket you want to manage.

5b Click *Create Folder*.

5c Specify a name for the folder that is unique within the bucket.



5d (Optional) Repeat [Step 5a](#) to [Step 5c](#) to create another folder in the bucket.

11.2.2 Setting Up Cloud Storage for CloudMe

[CloudMe \(http://www.cloudme.com/\)](http://www.cloudme.com/) requires the following authentication credentials:

- ♦ Cloud account name
- ♦ Cloud account password

Use your CloudMe account user name and password.

To create one or more folders in your CloudMe account:

- 1 Log in to your CloudMe account, then click the *Cloud Drive* tab.
- 2 Click the *New Folder* icon, specify a name for the folder, then click *OK*.



11.2.3 Setting Up Cloud Storage for Dropbox

[Dropbox \(https://www.dropbox.com/\)](https://www.dropbox.com/) requires the following authentication credentials:

- ♦ Cloud application key

- ◆ Cloud application secret
- ◆ Cloud application secret token (retrieved by Dynamic File Services)

Dropbox uses a two-phase OAuth authorization process to establish a connection between Dynamic File Services and your Dropbox account. When you set up the cloud account in Dynamic File Services, the Cloud Account Wizard uses the application key and secret to retrieve a secret token. The token is part of a URL where you go to confirm the access authorization for Dynamic File Services.

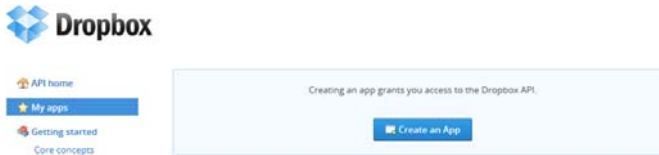
To get an OAuth application key and secret for Dynamic File Services to use:

- 1 Go to [Dropbox Developers \(https://www.dropbox.com/developers/apps\)](https://www.dropbox.com/developers/apps), then log in to your Dropbox account.

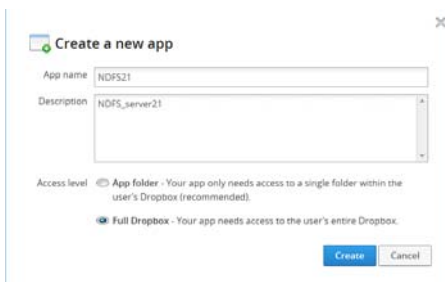
You can also log in, scroll to the bottom of the page, then click *Developers* to go to the API Home page.



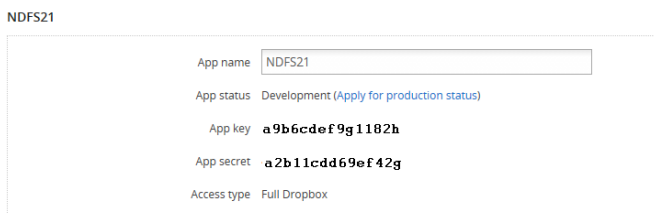
- 2 In the left panel, click *My Apps*.



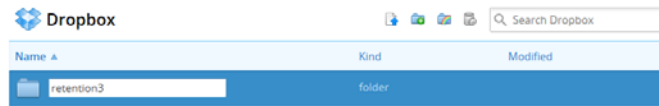
- 3 On the My Apps page, click *Create an App*, then set up an application entry for Dynamic File Services, granting it *Full Dropbox* access.



- 4 Make a note of the *App Key* and *App Secret* that are created for Dynamic File Services.



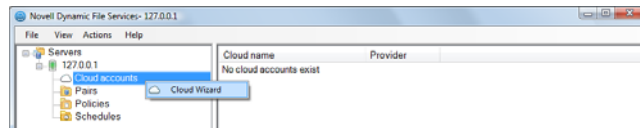
- (Optional) Create one or more folders in the Dropbox account. On your account home page, click the *New Folder* icon, then specify a name for the folder.



11.3 Creating a Cloud Account

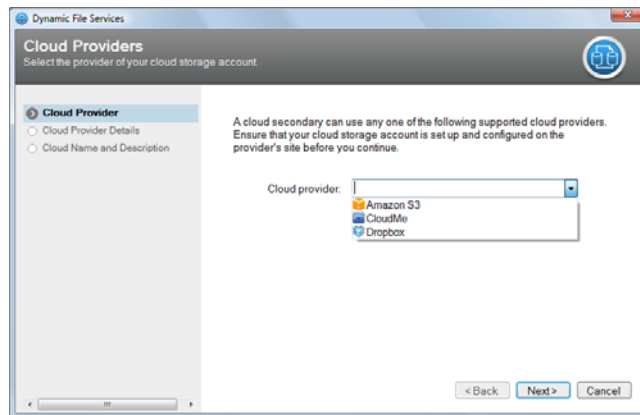
Dynamic File Services must submit cloud access credentials to your cloud provider when it accesses files in the cloud on your behalf. It stores these credentials locally and securely on the Dynamic File services server as attributes of a cloud account.

- Ensure that your cloud storage account is set up, and that you know the required cloud access credentials as described in [Section 11.2, “Setting Up Cloud Access Credentials and Folders for Your Cloud Storage Provider,”](#) on page 201.
- In the Management Console, launch the Cloud Wizard by right-clicking *Cloud accounts*, then selecting *Cloud Wizard*.



You can also select *Cloud Accounts*, then select *Actions > Cloud Wizard*.

- On the Cloud Providers page, select one of the following providers from the drop-down list, then click *Next*.
 - ◆ Amazon S3
 - ◆ CloudMe
 - ◆ Dropbox



- On the Cloud Provider Details page, specify the cloud access credentials that are required by the cloud provider that you selected in [Step 3](#).

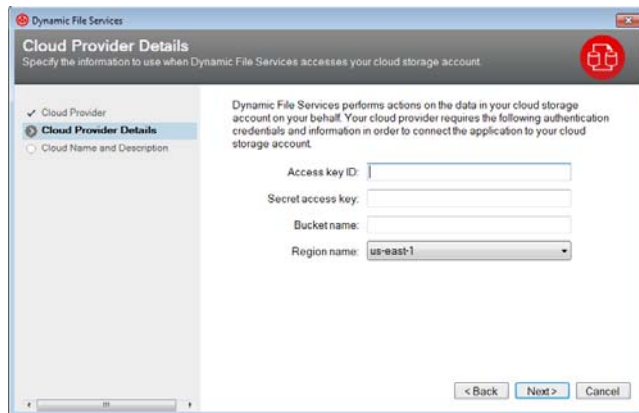
Your account on the cloud provider’s site must already exist, and the specified credentials must be valid. For information, see [Section 11.2, “Setting Up Cloud Access Credentials and Folders for Your Cloud Storage Provider,”](#) on page 201.

Cloud Provider

Cloud Provider Details

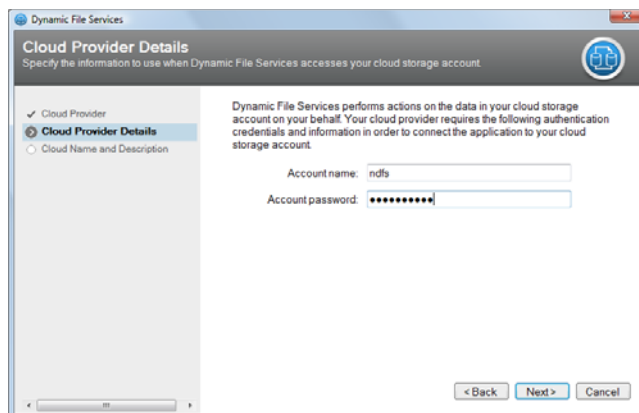
Amazon S3:

Cloud access key ID
Cloud secret access key
Bucket name
Region name



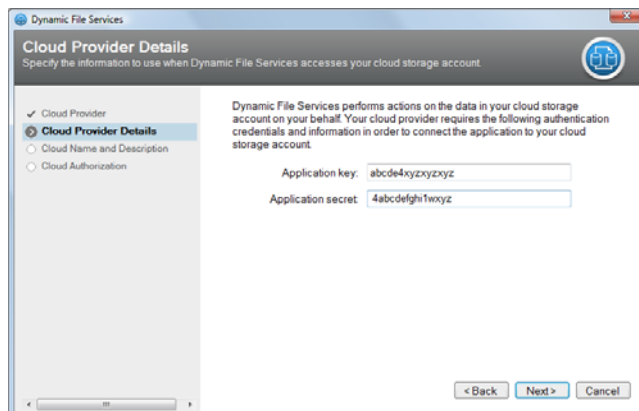
CloudMe:

Cloud account name
Cloud account password



Dropbox:

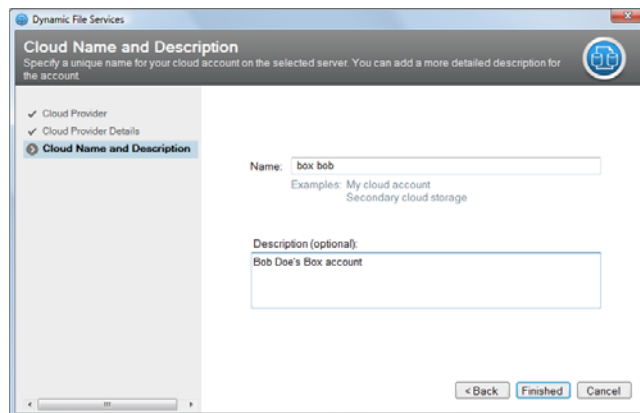
Cloud application key
Cloud application secret



This is the first phase of the two-phase OAuth authentication process. After you name the cloud account, you are prompted to complete the second phase in [Step 6](#).

- 5 On the Cloud Name and Description page, specify a name and description (optional) for the cloud account.

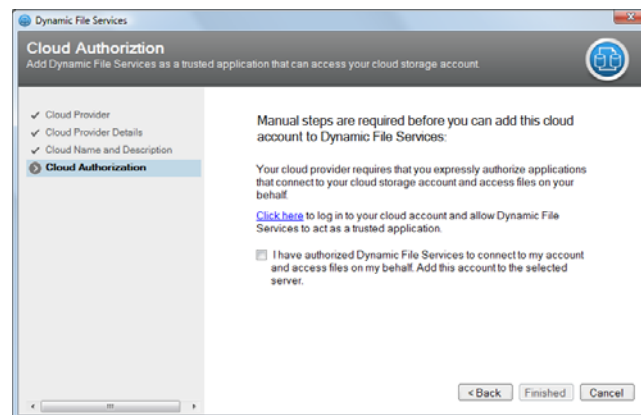
The name must be unique on the Dynamic File Services server.



- 6 If Dropbox is the specified cloud provider, perform the following manual steps to authorize Dynamic File Services to access your account:

- 6a On the Cloud Authorization page, click the *Click here* link to open a Web browser and go to your cloud account.

The URL includes a secret token that Dynamic File Services has retrieved from Dropbox as part of the two-phase OAuth authentication process.



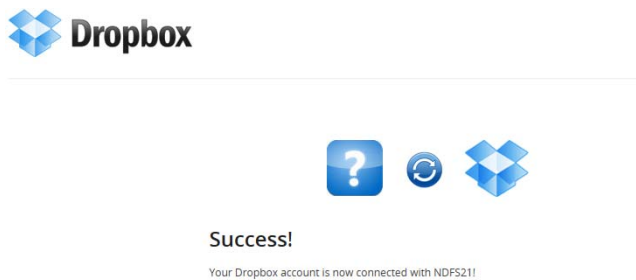
- 6b On the Dropbox login page, type the email address that is associated with your Dropbox account, type your password for the Dropbox account, then click *Login*.



- 6c** On the Dropbox Application Authorization page, click *Allow* to authorize Dynamic File Services to connect to your account.



- 6d** On the confirmation page, verify that the connection succeeded.



The authorization might fail if the application key and secret have expired. You must create a new application instance in your Dropbox account in order to generate a new key and secret. For information, see [Section 11.2.3, “Setting Up Cloud Storage for Dropbox,” on page 204.](#)

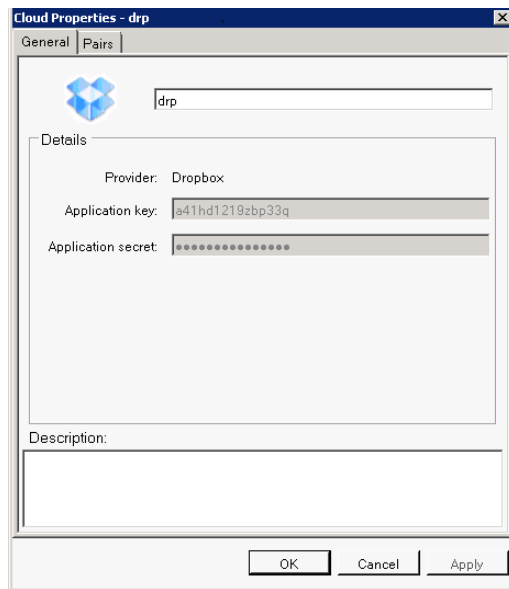
In the Cloud Account Wizard, go back to the Cloud Provider Details page to specify the new key and secret, then repeat [Step 6a](#) to [Step 6d](#).

- 6e** After you have successfully authorized access for Dynamic File Services in your Dropbox account, go to the Cloud Account Wizard’s Cloud Authorization page in [Step 6a](#), click the check box to confirm that you have completed the manual authorization steps.
- 7** Click *Finished* to create the cloud account.
- The cloud account is listed on the Cloud accounts page in the Management Console.

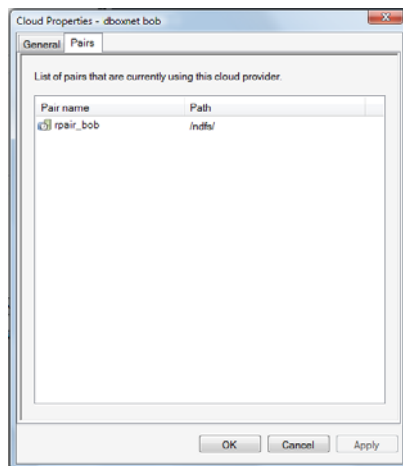
11.4 Viewing Properties for a Cloud Account

You can view information about a Dynamic File Services cloud account on its Properties page.

- 1** In the Management Console, click *Cloud accounts* in the left panel to view a list of cloud accounts on the server.
- 2** Right-click the cloud account name, then select *Properties*.
- 3** On the *General* tab, you can view the account’s name, cloud provider, access credentials, and description.



- 4 Click the *Pairs* tab to view a list of retention pairs that have secondary paths assigned to subfolders in the cloud account.

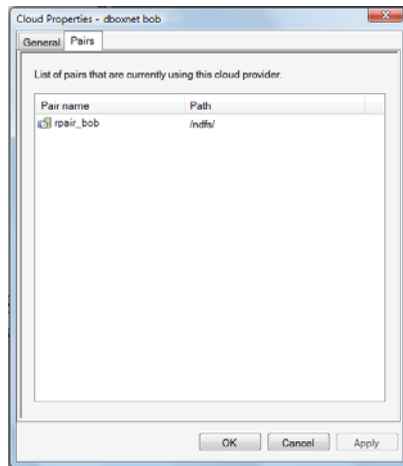


- 5 Click *Cancel* to exit the Properties dialog box.

11.5 Viewing a List of the Retention Pairs That Use a Cloud Account

A list of the retention pairs that are using a Dynamic File Services cloud account is provided on the *Pairs* page of the Cloud Account Properties dialog box. The list provides the name of the retention pair and the folder in the cloud storage location that is used by the pair.

- 1 In the Management Console, click *Cloud accounts* in the left panel to view a list of cloud accounts on the server.
- 2 Right-click the cloud account name, then select *Properties*.
- 3 Click the *Pairs* tab to view a list of retention pairs that have secondary paths assigned to subfolders in the cloud account.



- 4 Click *Cancel* to exit the Properties dialog box.

11.6 Modifying the Access Credentials for a Cloud Account

You might need to modify the access credentials that are stored for a cloud account if you change the password or application access keys and secrets on your cloud provider's site. For example, if the administrator who set up the cloud account leaves the company, you might change the account credentials for security reasons.

If you modify the credentials on the cloud storage provider's site, Dynamic File Services can no longer access the files stored there. Policy runs, manual moves, and retention reviews cannot be performed on the retention pair until you update the credentials for the cloud account on the Dynamic File Services server. You can use the Cloud Account Properties page to update the credentials for the cloud provider.

IMPORTANT: Modifying the credentials for a Cloud Account in Dynamic File Services does not modify the credentials on the cloud provider's site.

Do not use the Cloud Account Properties page to change the account to a different cloud provider. To configure a retention pair's secondary location for a different cloud provider's site, you must unlink the retention pair from the old cloud account, and create a new retention pair with the new cloud account.

- ♦ [Section 11.6.1, "Modifying Access Credentials for Amazon S3 and CloudMe Cloud Accounts,"](#) on page 211
- ♦ [Section 11.6.2, "Modifying Access Credentials for Dropbox Cloud Accounts,"](#) on page 212

11.6.1 Modifying Access Credentials for Amazon S3 and CloudMe Cloud Accounts

- 1 In the Management Console, click *Cloud accounts* in the left panel to view a list of cloud accounts on the server.
- 2 Right-click the cloud account name, then select *Properties*.
- 3 On the *General* tab, specify the new credentials, including the Region name.

- 4 Click *Apply* or *OK* to apply and save the changes.

The new credentials are used when a new connection is started for a policy run, a manual move, or a retention review.

11.6.2 Modifying Access Credentials for Dropbox Cloud Accounts

Because Dropbox uses a two-phase OAuth authentication process to connect the Dynamic File Services application to your Dropbox account, you cannot modify the cloud account's *App Key* and *App Secret* values. You must create a new cloud account with the new settings.

- 1 Create a new cloud account for the Dropbox account.
For information, see [Section 11.2.3, "Setting Up Cloud Storage for Dropbox,"](#) on page 204.
- 2 Unlink each of the retention pairs that use paths in the old Dropbox cloud account.
For information, see [Section 8.13, "Unlinking the Paths in a Pair,"](#) on page 155.
- 3 Re-create the retention pairs with the new Dropbox cloud account.
For information, see [Section 8.2, "Creating a Pair,"](#) on page 142.

11.7 Deleting a Cloud Account

Deleting a cloud account removes the locally stored credentials that are needed by Dynamic File Services to access your cloud storage. It does not delete your service with the cloud storage provider. It also does not delete any special account keys and secrets that you created for the application.

- 1 In the Management Console, right-click the cloud account, then click *Properties*.
- 2 In the Properties dialog box, select the *Pairs* tab to view a list of pairs that use the cloud account.
- 3 Unlink the retention pairs that are using a secondary location in the cloud account.
For information, see [Section 8.13, "Unlinking the Paths in a Pair,"](#) on page 155.
- 4 Right-click the cloud account, then click *Delete*.

12 Managing Retention Reviews

The Novell Dynamic File Services retention pair allows you to keep data that is actively used on the primary path, and to move data to a retention repository on the secondary path that is not needed for everyday operations but might occasionally need to be accessed. For example, retained files might be kept for historical reference, or to comply with contractual or legal requirements.

Data in the repository is retained indefinitely. Only an authorized reviewer can determine whether to keep a file in the repository, to purge a file from storage, or to restore a file to its original location. The action is based external constraints set by your company's data retention policy.

This section describes the retention repository and how to manage the data in it.

- ◆ [Section 12.1, "Understanding the Retention Repository," on page 213](#)
- ◆ [Section 12.2, "Configuring Reviewers for a Retention Pair," on page 215](#)
- ◆ [Section 12.3, "Configuring Reviewers to Receive Email Notifications," on page 220](#)
- ◆ [Section 12.4, "Scheduling Notification Reviews for a Retention Pair," on page 220](#)
- ◆ [Section 12.5, "Configuring the Review Notification Check Timer," on page 223](#)
- ◆ [Section 12.6, "Reviewing Files in the Retention Repository," on page 223](#)
- ◆ [Section 12.7, "Viewing the Review Transaction History," on page 226](#)
- ◆ [Section 12.8, "Generating a Report for Retention Review Logs," on page 227](#)
- ◆ [Section 12.9, "Archiving the Retention Review Logs," on page 227](#)

12.1 Understanding the Retention Repository

The Dynamic File Services retention pair consists of a primary path and a secondary path where files are stored but are not visible to users via a merged view. You specify policies to move files between the primary path and this repository. You determine how long to keep files for historical reference and to comply with contractual or legal requirements.

- ◆ [Section 12.1.1, "Managing Policies for Retention Pairs," on page 214](#)
- ◆ [Section 12.1.2, "Configuring Non-Administrator Reviewers," on page 214](#)
- ◆ [Section 12.1.3, "Reviewing Retained Data," on page 214](#)
- ◆ [Section 12.1.4, "Navigating the Retention Repository," on page 214](#)
- ◆ [Section 12.1.5, "Supported Web Browsers," on page 215](#)

12.1.1 Managing Policies for Retention Pairs

Policies for retention pairs can move files only from the primary path to the secondary path. The files that are moved during a policy run are stored in a time-stamped folder. The data structure in a policy-run folder is relative to the root of the primary path, and is structurally the same.

For information, see [Chapter 9, “Creating and Managing Policies,”](#) on page 157.

12.1.2 Configuring Non-Administrator Reviewers

Members of the `Dynamic File Services Retention Review` group can review retention data by using the Web-based Retention Review Service. Administrator privileges on the server are not required for membership. When reviewers work in the Web interface, they have all of the file access privileges necessary to restore or delete the retained files. They cannot open or use the files from the Web interface.

The [Novell Dynamic File Services 2.2 Retention Review Quick Start](http://www.novell.com/documentation/dynamic_file_services/dynamic_review_win/data/dynamic_review_win.html) (http://www.novell.com/documentation/dynamic_file_services/dynamic_review_win/data/dynamic_review_win.html) provides an overview of the review process for non-administrator reviewers. It familiarizes them with the Retention Review Service and the review process without requiring them to understand Dynamic File Services and how the retention pair is created or managed.

12.1.3 Reviewing Retained Data

You can schedule reviews for the repository that meet your company’s compliance needs, such as monthly, quarterly, yearly, or by custom dates. Reviewers access the retained files via the Web-based Retention Review Service. Reviewers can delete files, keep files, and generate a report about the review. All retention review actions are audited.

12.1.4 Navigating the Retention Repository

A Dynamic File Services retention pair stores retained data in retention review folders. Each folder contains a set of files that were moved in a single policy run or a manual run for the primary location in a retention pair. A review folder’s name includes the date and time of that policy run.

The data structure in a review folder is relative to the root of the primary path, and is structurally the same. You can click a folder’s name link to navigate down through the file tree. The path for the *Review Folder* is displayed at the top of the page to help you keep track of where you are in the structure. You can click a previous directory in the path to navigate back up the tree, or you can click any directory in the path to jump directly to it. Click the pair name to return to the top of its repository.

Folders and files in the structure are paged to display 1000 entries at a time. The files are listed alphabetically as you might see them in a Windows Explorer browser, with the folders grouped above the files. Use the *Next* and *Previous* buttons to move from page to page. Click a page number to jump directly to a page.

For example, the first page displays the first 1000 storage objects in the folder, according to the alphabetical listing in the source folder. The second page displays the second 1000 storage objects, and so on.

On each page, the list provides information about the files and folders. Each row includes the name, the type as file extension or folder, the last date modified, the file owner, and the file size. Folder sizes are not reported (that is, the cell contains dashes (---) instead of a value).

Pair *retpair1* Retention Review FoldersServer: *ndfs_server1*Review Folder: *\\ndfs_server5\retsecondary\PolicyRun_20110801-10.26*Status: *Idle*

Delete Selected

Restore Selected

<input type="checkbox"/>	File or Folder Name	Type	Date modified	Owner	Size
<input type="checkbox"/>	<i>photos</i>	folder	2011-08-01 10:26:11 AM	JSmith	-----
<input type="checkbox"/>	<i>song33.mp3</i>	.mp3	2011-07-27 04:15:40 PM	JSmith	16542
<input type="checkbox"/>	<i>song34.mp3</i>	.mp3	2011-07-27 04:15:35 PM	JSmith	23825

Dynamic File Services keeps a database of user names and their Security Identifiers (SIDs) as files are moved to a retention repository. A strikethrough for an owner name indicates that the user name is invalid and no longer exists as a user or group on the server or in the Active Directory domain (if present). If the file is restored to its original location, the NTFS file system sees the SID, but the file is an orphan file without a valid owner. An owner name of *Unknown* indicates that the file was an orphan file when it was moved to the repository, and the SID is unknown to the UserName-SID database.

The default sort order per page is alphabetical by the *File or Folder Name* column. You can click a column heading to sort the displayed files in ascending order (click once) or descending order (click again). The sort order changes only for the files and folders that are currently displayed on the page. Numbers in file names are sorted as text, not as numbers.

A subfolder is automatically removed from the repository and display when all of the files in it have been permanently deleted or have been restored to the primary. A policy run or manual move folder is also removed when it no longer contains files.

12.1.5 Supported Web Browsers

The Dynamic File Services Retention Review Service has been tested with the latest versions of the following Web browsers:

- ◆ Microsoft Internet Explorer 9
- ◆ Mozilla Firefox 12
- ◆ Google Chrome 19

12.2 Configuring Reviewers for a Retention Pair

Reviewers are designated users who review files in the retention repository to determine which files to delete, keep, or restore to the primary location. The Administrator user of the server has the necessary permissions to review files in the retention repository on the secondary location. In an Active Directory domain, Domain Admin users also have these rights across all servers in the domain.

Reviewers have the permissions needed to perform reviews, but they do not have rights to perform any other administrative actions. They automatically have file system rights to all paths in a retention repository when they access the files via the Retention Review Web UI.

You can assign users and groups as reviewers of a given retention pair. You can also add reviewers to the Dynamic File Services Retention Review group to allow them to review multiple pairs. The Retention Review group is automatically added as the default reviewer for a retention pair at create time. You can remove the group if you want to restrict review tasks to a few specific users and groups.

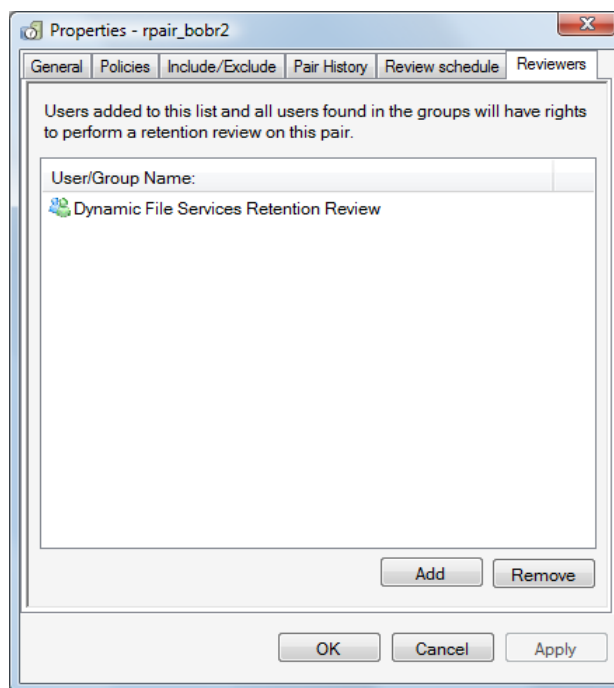
- ♦ [Section 12.2.1, “Adding or Removing Reviewers for a Retention Pair,” on page 216](#)
- ♦ [Section 12.2.2, “Adding or Removing Reviewers to the Dynamic File Services Retention Review Group,” on page 217](#)

12.2.1 Adding or Removing Reviewers for a Retention Pair

You can use the *Reviewers* tab on the Pair Properties dialog box to add users and groups as reviewers of the retained data in a retention pair. The Dynamic File Services Retention Review group is assigned as a default reviewer when you create the pair. You can remove the group if you want to restrict access to a few specific users or groups.

- 1 In the Management Console, right-click the pair, then select *Properties*.
- 2 In the Pair Properties dialog box, click the *Reviewers* tab.

The Dynamic File Services Retention Review group is a default reviewer.



- 3 Add reviewers by clicking *Add*, then browse to select the desired users and groups.
- 4 Remove reviewers by selecting the user or group name, then clicking *Remove*.
- 5 Click *Apply* or *OK* to save your changes.

12.2.2 Adding or Removing Reviewers to the Dynamic File Services Retention Review Group

You can more conveniently allow users to review the retention data for multiple pairs by adding them as members of the `Dynamic File Services Retention Review` group.

When you create a retention pair, the `Dynamic File Services Retention Review` group is automatically added as a reviewer for the pair. You can remove the group if you want to restrict review tasks to a few specific users and groups.

This section describes the `Dynamic File Services Retention Review` group and how to add and remove members.

- ♦ [“Understanding the Dynamic File Services Retention Review Group” on page 217](#)
- ♦ [“Setting Up Members for the Retention Review Group in a Domain” on page 219](#)
- ♦ [“Setting Up Members for the Retention Review Group in a Workgroup” on page 219](#)

Understanding the Dynamic File Services Retention Review Group

You can set up a group of users to review the retention data for multiple pairs by adding them as a member of the `Dynamic File Services Retention Review` group. The nature of the group and its setup are different, depending on whether the server is located in an Active Directory domain or in a Workgroup.

- ♦ [“How is the group created?” on page 217](#)
- ♦ [“Who controls membership in the group?” on page 218](#)
- ♦ [“Who can be a member of the group?” on page 218](#)
- ♦ [“How is the group removed?” on page 218](#)

How is the group created?

The `Dynamic File Services Retention Review` group is created automatically during the installation of Dynamic File Services.

- ♦ **Active Directory Domain:** The group is created in the Active Directory *Users* area when Dynamic File Services is first installed on a server that is a domain controller or member server in an Active Directory domain. The group is used by all DynamicFS servers that are subsequently installed in the same domain.

The user that installs the first instance of Dynamic File Services in the domain must have sufficient domain privileges to create groups. Otherwise, the group creation fails and a user with Domain Admin privileges must manually set up the group in the appropriate location.

- ♦ **Workgroup:** The group is created locally in the Windows *Local Users and Groups > Groups* area. The user that installs Dynamic File Services must have sufficient Administrator privileges to create groups on the server. Otherwise, the group creation fails and a user with Administrator privileges must manually set up the group in the appropriate location.

Who controls membership in the group?

Administrators control which users are added or removed as members of the Dynamic File Services Retention Review group.

- ♦ **Active Directory Domain:** The Domain Admin user or a domain user with Domain Admin privileges can add or remove members. For information, see [Section 6.3.2, “Setting Up Administrators in a Domain,”](#) on page 104.
- ♦ **Workgroup:** The Administrator user or a local user with Administrator privileges can add or remove members. For information, see [Section 6.3.3, “Setting Up Administrators in a Workgroup,”](#) on page 104.

Who can be a member of the group?

The Dynamic File Services Retention Review group has no default members. Other users can be members of the group:

- ♦ **Active Directory Domain:** For a domain group, any domain user can be added to the group. A domain user does not need Domain Admin privileges in order to be a member, and it is not necessary to explicitly add a Domain Admin user to the group. The members can review the retained data on any retention pair on any DynamicFS server in the same domain by using the Retention Review Web UI.
- ♦ **Workgroup:** Any local user can be added to the group. A local user does not need Administrator privileges in order to be a member, and it is not necessary to explicitly add the Administrator user to the group. The members can review the retained data on any retention pair on the DynamicFS server by using the Retention Review Web UI.

How is the group removed?

The Dynamic File Services group is removed as follows:

- ♦ **Active Directory:** The group is used by all DynamicFS servers that are subsequently installed in the same domain. The group is removed when you uninstall the last instance of Dynamic File Services in the domain, and select the option to *Remove all files created by Dynamic File Services*.

The user that uninstalls Dynamic File Services must have sufficient domain privileges to delete groups. Otherwise, the group deletion fails and a user with Domain Admin privileges must manually remove the group.

- ♦ **Workgroup:** The group is automatically removed from the server if you uninstall Dynamic File Services and select the option to *Remove all files created by Dynamic File Services*.

The user that uninstalls Dynamic File Services must have sufficient Administrator privileges to delete groups on the server. Otherwise, the group deletion fails and a user with Administrator privileges must manually remove the group.

Setting Up Members for the Retention Review Group in a Domain

In a domain environment, members of the `Dynamic File Services Retention Review` group can review the retained data on any of the DynamicFS servers in the domain by using the Retention Review Web UI.

To add or remove domain users as members of the domain-based `Dynamic File Services Retention Review` group:

- 1 Log in to the DynamicFS server as a Domain Admin.
- 2 Open the Active Directory Users and Computers utility by selecting *Administrator Tools > Users and Computers*.
- 3 Select the domain, then select *Users > Groups*.
- 4 Open the group's Properties dialog box by double-clicking the `Dynamic File Services Retention Review` group.
You can also right-click the group and select *Properties*. Current domain users that are members of the group appear in the list.
- 5 In the Properties dialog box, click the *Members* tab.
- 6 Configure the members of the group by doing either or both of the following tasks:
 - ♦ **Add a member:** Click *Add*, use the *Enter the object names to select* field to specify the users you want to manage DynamicFS in the domain, then click *OK* to save and apply your changes.
 - ♦ **Remove a member:** Select one or more user names from the member list, click *Remove*, then click *OK* to save and apply your changes.
- 7 Click *OK* to close the `Dynamic File Services Retention Review` group's Properties dialog box.

Setting Up Members for the Retention Review Group in a Workgroup

In a workgroup environment, members of the server-based `Dynamic File Services Retention Review` group can review the retained data in any pair on the DynamicFS server by using the Retention Review Web UI.

To add or remove local users as members of the server-based `Dynamic File Services Retention Review` group:

- 1 Log in to the DynamicFS server as the Administrator user or as a user with Administrator privileges.
- 2 Open the Windows Computer Management tool. Right-click the *Computer* icon on the desktop and select *Manage*.
- 3 Select *Local Users and Groups > Groups*, then double-click the `Dynamic File Services Retention Review` group to open the group's Properties dialog box.
Current members appear in the list.
- 4 Configure the members of the group by doing either or both of the following tasks:
 - ♦ **Add a member:** Click *Add*, use the *Enter the object names to select* field to specify the users you want to manage DynamicFS on that server, then click *OK* to save and apply your changes.

- ♦ **Remove a member:** Select one or more user names from the member list, click *Remove*, then click *OK* to save and apply your changes.
- 5 Click *OK* to close the `Dynamic File Services Retention Review` group's Properties dialog box.

12.3 Configuring Reviewers to Receive Email Notifications

You can configure the following retention review management events to send messages to the email addresses that are configured in the Notification Service:

Retention Review Notification
Retention Review Delete on Pair
Retention Review Move Files Back to Primary

For information about setting up email notifications, setting up email addresses, and configuring events for it, see [Section 6.6.2, "Setting Up Email Notifications,"](#) on page 110

12.4 Scheduling Notification Reviews for a Retention Pair

Dynamic File Services allows you to automatically notify multiple recipients that a scheduled review is needed for a retention pair's retained data. In order for notifications to be sent:

- ♦ If the reviewer is a non-administrator user, you must add the user name to the `Dynamic File Services Retention Review` group. It is not necessary to add the server Administrator user and Domain Admins to this group.

For information, see [Section 12.2, "Configuring Reviewers for a Retention Pair,"](#) on page 215.

- ♦ The Notification Service must be enabled, and the reviewers (or notification recipients) must be configured to receive Retention Review Notification events by using the Notifications tool. Each reviewer can be configured separately to receive notifications by email.

For information, see [Section 12.3, "Configuring Reviewers to Receive Email Notifications,"](#) on page 220.

- ♦ The retention pair must be configured with a Notification Review schedule that specifies when to trigger the Retention Review Notification events. This section describes this task.

The following sections describe the how the notification review schedule works and how to enable or disable the schedule.

- ♦ [Section 12.4.1, "Understanding the Notification Review Schedule,"](#) on page 221
- ♦ [Section 12.4.2, "Configuring the Notification Review Schedule,"](#) on page 222

12.4.1 Understanding the Notification Review Schedule

For a retention pair, the Notification Review schedule specifies when review notification events are triggered. The ability to trigger review events can be enabled for a retention pair by setting the schedule, or disabled by setting the frequency to *Never*. Notices are sent only to users that are configured in the Notification Service to be notified about the Retention Review events.

The review notification schedule can be set to one of the following frequencies:

Frequency	When Notification Review Events Are Triggered
Never	Disables events. This effectively unschedules review notifications for the retention pair.
Monthly	Every month on the specified day. The interval begins on the specified month and day, and continues indefinitely.
Quarterly	Every three months on the specified day. The interval begins on the specified month and day, and continues indefinitely.
Yearly	Every year on the specified month and day. The interval begins on the specified month and day, and continues indefinitely.
Custom dates	Each day specified in the list. After the specified dates are past, no more events are triggered.

The 12-month Gregorian calendar is used. Months and days are considered to be future dates beyond the day the policy is created. If the day has passed in the current month, set the values for the next expected interval.

You can configure notifications to be triggered on the last day of any month by choosing *Last day* as the *Day* value. The trigger occurs on day 28, 29, 30, or 31, depending on the month and whether it is a leap year.

Setting days to values of 29, 30, and 31 has the following effect:

Day	Actual Days
29	Day 29 in all months except February, which is day 28 in non-leap years.
30	Day 30 in all months except February, which is day 28 in non-leap years, and 29 in leap years.
31	Day 28, 29, 30, or 31, depending on the month and whether it is a leap year. Same as choosing <i>Last day</i> .

No run time is associated with these schedules. The time of day that the review notification is sent is controlled by the Retention Review Check Timer settings in the `DswCore.xml` config file, which runs by default daily at 0010 hours (00:10 a.m.). For information, see [Section 12.5, “Configuring the Review Notification Check Timer,”](#) on page 223.

12.4.2 Configuring the Notification Review Schedule

- 1 Prepare to send notifications:
 - 1a Add reviewers to the `Dynamic File Services Retention Review` group.
For information, see [Section 12.2, “Configuring Reviewers for a Retention Pair,”](#) on page 215.
 - 1b Enable the Notification Service, and configure users to receive notifications via email.
For information, see [Section 6.6, “Configuring the Notification Service,”](#) on page 108.
 - 1c For each user, configure the user to receive Review Notification events.
For information, see [Section 6.6.2, “Setting Up Email Notifications,”](#) on page 110.
- 2 In the Management Console, connect to the DynamicFS server, then open the *Pairs* folder.
- 3 Right-click the retention pair, then select *Properties*.
- 4 Select the *Notification review* tab.
The schedule options are available only if you completed [Step 1](#).
- 5 Select the *Frequency*, then specify when to trigger review notification events:

Frequency	When
Never	Disables the schedule so that review notifications are not triggered.
Monthly	Specify the month and day. The review notification events are triggered every month on the same day.
Quarterly	Specify the month and day to start the intervals. Review notification events are triggered on the same day of every third month.
Yearly	Specify the month and day. Review notification events are triggered on the same month and day each year.
Custom	Specify one or more dates by selecting days in the calendar. Use the arrows to navigate month-by-month through the calendar. Click the year, then select a year to jump to it. Click the month, then select a month to jump directly to it. Only future dates can be selected.

- 6 Click *OK* to save and apply the changes.

12.5 Configuring the Review Notification Check Timer

The Retention Notification Check Timer checks each retention pair to see if a review notification is scheduled for the current day. If the condition is true for a pair, a review event is triggered for the Notification Service. Notifications are emailed or Tweeted to users that are configured to be notified about review events.

The check timer runs by default at 0010 hours daily. The run time for the Retention Notification Check Timer is set in the `DswCore.xml` configuration file in the `C:\Program Files\Dynamic File Services\` directory, or the custom installation directory. An Administrator user (or user with Administrator privileges) can change the check time by stopping the Service, editing the XML file, and then restarting the Service.

- 1 Log in to the DynamicFS server as a user with Administrator privileges.
- 2 Stop the Service gracefully as described in [Section 6.4.3, “Stopping the Dynamic File Service,” on page 106](#).
- 3 In a text editor, open the `DswCore.xml` file, and modify the following settings:

```
<RetentionReviewHour>0</RetentionReviewHour>
<RetentionReviewMinute>10</RetentionReviewMinute>
<RetentionReviewInterval>30</RetentionReviewInterval>
```

- 4 Save the file.
- 5 Right-click the *Service Controller* icon, then select *Start service*.

If the Check Timer has already run for the current day, the Check Timer runs the next day at the new scheduled time.

12.6 Reviewing Files in the Retention Repository

The Novell Dynamic File Services Retention Review Service provides a Web interface for reviewing files in a retention repository. Reviewers determine the disposition of retained files in accordance your company’s data retention policy. A reviewer can take no action, delete files from the repository, or move files from the repository back to their original location.

The *Novell Dynamic File Services 2.2 Retention Review Quick Start* (http://www.novell.com/documentation/dynamic_file_services/dynamic_review_win/data/dynamic_review_win.html) provides an overview of the review process for non-administrator reviewers. It familiarizes them with the Retention Review Service and the review process without requiring them to understand Dynamic File Services and how the retention pair is created or managed.

- ♦ [Section 12.6.1, “Understanding the Review Process,” on page 224](#)
- ♦ [Section 12.6.2, “Accessing the Retention Review Service,” on page 224](#)
- ♦ [Section 12.6.3, “Deleting Files or Folders,” on page 225](#)
- ♦ [Section 12.6.4, “Restoring Files or Folders,” on page 226](#)
- ♦ [Section 12.6.5, “Ending a Review Session,” on page 226](#)

12.6.1 Understanding the Review Process

The Retention Review group can have any number of members. Each reviewer assesses retained files independently of the other reviewers. If multiple reviewers concurrently access the repository, their actions are processed on a first-come, first-served basis.

A reviewer's restore and delete actions are not executed immediately. The Retention Review Service creates a one-time action job for the selected files and folders, then queues the job to be executed in turn with any other actions taken for the retained data. The files are removed immediately from the reviewer's display when the page refreshes, but the action might not be processed until several seconds or minutes later.

Because the review actions are queued, it is possible that a prior action in the queue can override a subsequent action or some portion of an action. For example, if one reviewer deletes a file, and another restores the same file at almost the same time, the resulting action depends on which request is processed first.

The review page is refreshed every 10 seconds to display the current status of the repository. The following states are reported:

- ♦ **Idle:** No policies are running. New actions are queued to run within seconds.
- ♦ **Policy run (or Manual Move) is in progress:** A normal policy run or a manual move is in progress, which can take several minutes to several hours. Any number of previous actions might be queued behind it.
- ♦ **Restore/Move file job (or Delete file job) is in progress:** A restore action job is busy moving files from the repository to their original location in the primary path, or a delete action is deleting files from the repository. The job might be one that was submitted by any of the current or previous reviewers.

When the repository status returns to an idle state, the reviewer knows that all action jobs are complete.

It is not necessary to remain logged in after your actions are queued. It is not possible to stop queued actions.

12.6.2 Accessing the Retention Review Service

The Retention Review Service is available on the server where Dynamic File Services is installed and running. Reviewers can access the review site via a Web browser. The Retention Review Service has been tested with the latest versions of these browsers:

- ♦ Microsoft Internet Explorer 9
- ♦ Mozilla Firefox 12
- ♦ Google Chrome 19

Before you begin a retention review session, modify your Web browser settings to allow pop-up messages for the target site.

The Retention Review Notification message provides a link to the Web interface for a specific retention pair. The connection is made via the secure HTTP protocol (HTTPS). The URL is in the form:

```
https://<ndfs_ip_or_dns_name>:<ndfs_port>/folders.html?pair=<retention_pair_name>
```

Administrators or users with Administrator privileges on the server can initiate a review session from the Management Console.

To access the Retention Review site:

- 1 Use any of the following methods to initiate your Retention Review session:
 - ♦ Users with Administrator privileges can use the Management Console. Right-click the server and select *Retention Review* to view a list of all retention pairs on the server. Right-click the retention pair and select *Retention Review* to go directly to the pair's retained data.
 - ♦ Members of the `Dynamic File Services Retention Review` group can follow the link in their notification messages. Launch a Web browser, then click the link in the Review Notification message to open the Retention Review Web interface.

You can also copy the URL and paste it in the Location field of your Web browser.

- 2 If you are prompted to do so, accept and install the Dynamic File Services certificate in your Local Computer certificate store.
- 3 In the Login dialog box, type your user name and password, then click *OK*.

In an Active Directory domain, use your domain credentials. In a Workgroup, use your server credentials for the target server.

On successful login, the *Retention Review Folders* list is displayed.

Access is denied if the login identity is not an authorized reviewer. Ensure that your user name is added as a reviewer in the `Dynamic File Services Retention Review` group, then try again. To log in with a different identity, clear the browser cache to remove your old credentials, then refresh the Retention Review page to access the Login dialog box.

12.6.3 Deleting Files or Folders

The Delete function purges selected files or folders from a selected retention review folder. The file is no longer available on the storage media, and you cannot use the Restore function to restore it.

A reviewer can delete one or more files, folders, or review folders at a time. Deleting a folder also recursively deletes its contents. It can take a few minutes to completely delete the contents of a folder, depending on how many files and folders it contains.

- 1 On a page in the Retention Review Web interface, select the check box next to one or more files, folders, or review folders.
- 2 Click *Delete Selected*.
- 3 When you are prompted, click *OK* to confirm the deletion, or click *Cancel* to abandon the action.

All delete actions are logged in the Review Transaction History for the retention pair. The history is available to the Dynamic File Services administrators. Contact your administrator if you need a copy of the log files.

12.6.4 Restoring Files or Folders

The Restore function moves selected files or folders from a retention review folder back to the original path on the primary location. The restored file or folder is no longer available in the review folder.

A reviewer can restore one or more files or folders at a time. Each object returns to its original path on the primary location. Restoring a folder also recursively restores its contents. It can take a few minutes to complete the move, depending on how many files and folders are involved, and the size of the files to be moved.

- 1 On a page in the Retention Review Web interface, select the check box next to one or more files, folders, or review folders.
- 2 Click *Restore Selected*.
- 3 When you are prompted, click *OK* to confirm the restore, or click *Cancel* to abandon the action.

All restore actions are logged in the Review Transaction History for the retention pair. The history is available to the Dynamic File Services administrators. Contact your administrator if you need a copy of the log files.

12.6.5 Ending a Review Session

When you are done with a retention review.

- 1 Click *Log out* to end the session with the Retention Review Service.
- 2 Close the browser window to ensure that your login information is not cached.
Firefox and Chrome do not automatically close the browser.

12.7 Viewing the Review Transaction History

In addition to normal pair statistics described in [Chapter 13, “Monitoring Pairs and Policies,”](#) on [page 229](#), each retention pair has statistics available for the review transaction history. Each *Restore* or *Delete* action is logged to a file that contains information, such as the user name of the reviewer that performed the action, the date and time, the size, and the full path of each file that was acted upon.

If files cannot be moved in a restore action, a matching entry is created as a *Files Failed to Move* action. For example, files are not restored if a file with the same name exists in the original folder on the primary path. To restore the older version, you must rename the file in the target folder, then try again.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Pairs* folder under the server to view the list of pairs for the server in the right panel.
- 3 Double-click the retention pair to open its Statistics dialog box.
- 4 Click the *Review Transaction History* tab to view a list of the Retention Review log files.
The list contains logs of the Restore actions, Delete actions, or failed actions that were made by all reviewers of the retained data for the retention pair.
- 5 Click the number of files link for an entry to view a list of folders and files that were involved in a single action.
- 6 (Optional) From an open log file, select *File > Save as* to save the file in `.csv` format.

- 7 (Optional) Generate a report of one or more actions taken by selecting the actions and exporting them in .csv or .html format. See [Section 12.8, “Generating a Report for Retention Review Logs,”](#) on page 227.
- 8 (Optional) Archive the oldest actions and remove them from the active history. See [Section 12.9, “Archiving the Retention Review Logs,”](#) on page 227.

12.8 Generating a Report for Retention Review Logs

You can generate a report of the actions performed during review sessions by using the *Export* option on *Review Transaction History* tab of the retention pair’s Statistics dialog box. Select one or more entries in the list that you want to include in a report. The contents of the selected entries are exported together in .html (default) or .csv format. The default save location is at the root of the C:\ drive. The default file name is `review_transaction.html` or `review_transaction.csv`. You can specify a different location or file name when you export the report.

To generate a report for one or more Retention Review log entries:

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Pairs* folder under the server to view the list of pairs for the server in the right panel.
- 3 Double-click the retention pair to open its Statistics dialog box.
- 4 Click the *Review Transaction History* tab to view a list of the Retention Review log files.
- 5 Select one or more logs that you want to include in the report, then click *Export*.

You can customize the report by choosing files by dates, reviewers, or the delete and restore actions.

Only the contents of the log files are exported to the report. The entries are not removed from the Retention Review log.

- 6 In the pop-up browser, specify the following options, then click *Save*:
 - ♦ **Export format:** Choose .html (default) or .csv.
 - ♦ **Location:** Browse to the location on the computer where you want to save the file. The default save location is at the root of the C:\ drive.
 - ♦ **File name:** Specify a name for the file. The default file name is `review_transaction.html` or `review_transaction.csv`.
- 7 (Optional) In an file browser, go to the location you specified to verify that the file was exported.

12.9 Archiving the Retention Review Logs

You can archive the logs of Retention Review actions by using the *Archive* option on *Review Transaction History* tab of the retention pair’s Statistics dialog box. You might want to archive the logs in order to free disk space. Archived logs are saved in a compressed .zip format.

The selected log files are zipped together, and the archive file is stored in the `C:\ProgramData\Dynamic File Services\Pairs\<guid>\Reviews\` folder. The default file name is `ReviewHistoryArchive` plus a time stamp of when the archive file is created:

```
ReviewHistoryArchiveYYYYMMDD-hh.mm.ss.zip
```

The time stamp gives the year, month, day, hour, minute, and second information. The year is based on the Gregorian calendar of 12 months. Time is given in a 24-hour clock based on the computer time.

To archive one or more Retention Review log files:

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Click the *Pairs* folder under the server to view the list of pairs for the server in the right panel.
- 3 Double-click the retention pair to open its Statistics dialog box.
- 4 Click the *Review Transaction History* tab to view a list of the Retention Review log files.
- 5 Select one or more logs that you want to archive, then click *Archive*.

The archive file is automatically created and saved. The log entries no longer appear in the *Review Transaction History* list.

- 6 (Optional) In a file browser, go to the C:\ProgramData\Dynamic File Services\Pairs*<guid>*\Reviews\ folder to verify that the .zip file was created.

You can restore an archived log file to the C:\ProgramData\Dynamic File Services\Pairs*<guid>*\Reviews\ folder in order to make the log available for viewing again on the *Review Transaction History* tab of the Statistics dialog box. Export the desired log from the .zip file to the C:\ProgramData\Dynamic File Services\Pairs*<guid>*\Reviews\ folder. To view the log file's information, open the retention pair's Statistics dialog box and go to the *Review Transaction History* tab, then select the number-of-files link for the log.

13 Monitoring Pairs and Policies

Novell Dynamic File Services (DynamicFS) provides several monitoring features that can help you understand the current and historical status of pairs and policies. This section describes the statistics, history, logging, and auditing features and how to use the information they provide to monitor your DynamicFS solution.

- ♦ [Section 13.1, “Viewing the Pair Statistics,” on page 229](#)
- ♦ [Section 13.2, “Viewing the Policy Execution History for a Pair,” on page 230](#)
- ♦ [Section 13.3, “Viewing a Policy Run History of Files Moved,” on page 232](#)
- ♦ [Section 13.4, “Viewing a Policy Run History of Files that Failed to Move,” on page 234](#)
- ♦ [Section 13.5, “Viewing the Pair History,” on page 235](#)
- ♦ [Section 13.6, “Viewing the Server Disk Capacity and Used Space History,” on page 237](#)
- ♦ [Section 13.7, “Viewing Logged Events,” on page 239](#)
- ♦ [Section 13.8, “Viewing Service Events,” on page 241](#)
- ♦ [Section 13.9, “Auditing Management Events,” on page 241](#)
- ♦ [Section 13.10, “Generating a DynamicFs Configuration Report,” on page 242](#)

13.1 Viewing the Pair Statistics

The Dynamic File Service scans each pair hourly and reports information about the pair’s status, such as statistics for the last policy that was run and the status of policies assigned to a pair. This information can be viewed in the pair’s Statistics dialog box. Each pair’s Statistics dialog box opens in a separate window.

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 In the left panel, select the *Pairs* folder to view the list of pairs in the right panel.
- 3 Double-click the pair name to open its Statistics dialog box.
- 4 On the *General* tab, view the status of the pair and the statistics for the last policy run.

The *Pair Status* area reports the following information. If a scan is currently running, the *Current Status* bar shows activity for that policy run.

Statistic	Description
Current status	Provides the status of whether a scan is currently running against the pair, or if it is idle.
Last run task	Indicates whether the last scan was initiated by a health check, a manual policy run of selected policies, or a scheduled run of selected policies.
Start time	Specifies the date and time that the last scan was started.
Elapsed time	Specifies the time elapsed for the scan in hours, minutes, and seconds.

Statistic	Description
Files scanned	Specifies the number of files scanned across both the primary and secondary locations.
Files moved	Specifies the number of files that are waiting to be moved.
Total KB moved	Specifies the combined size of the files that are waiting to be moved.

5 View information about the policies that are associated with the pair.

The *Policies associated to pair* area lists the policies that are associated with the pair and reports the following information about them:

Statistic	Description
Name	Specifies the name given to the policy by the administrator.
Status	Indicates the current status of the policy, such as <i>Idle</i> or <i>Running</i> .
Last run	Specifies the date (MM/DD/YYYY) and time (HH:MM:SS AM or PM) that the policy was last run.
Elapsed time	Specifies the elapsed time for the scan in hours, minutes, and seconds.

6 Continue with the following tasks to view more statistical information for the pair:

- ◆ [Section 13.2, “Viewing the Policy Execution History for a Pair,” on page 230](#)
- ◆ [Section 13.3, “Viewing a Policy Run History of Files Moved,” on page 232](#)
- ◆ [Section 13.4, “Viewing a Policy Run History of Files that Failed to Move,” on page 234](#)
- ◆ [Section 13.5, “Viewing the Pair History,” on page 235](#)

13.2 Viewing the Policy Execution History for a Pair

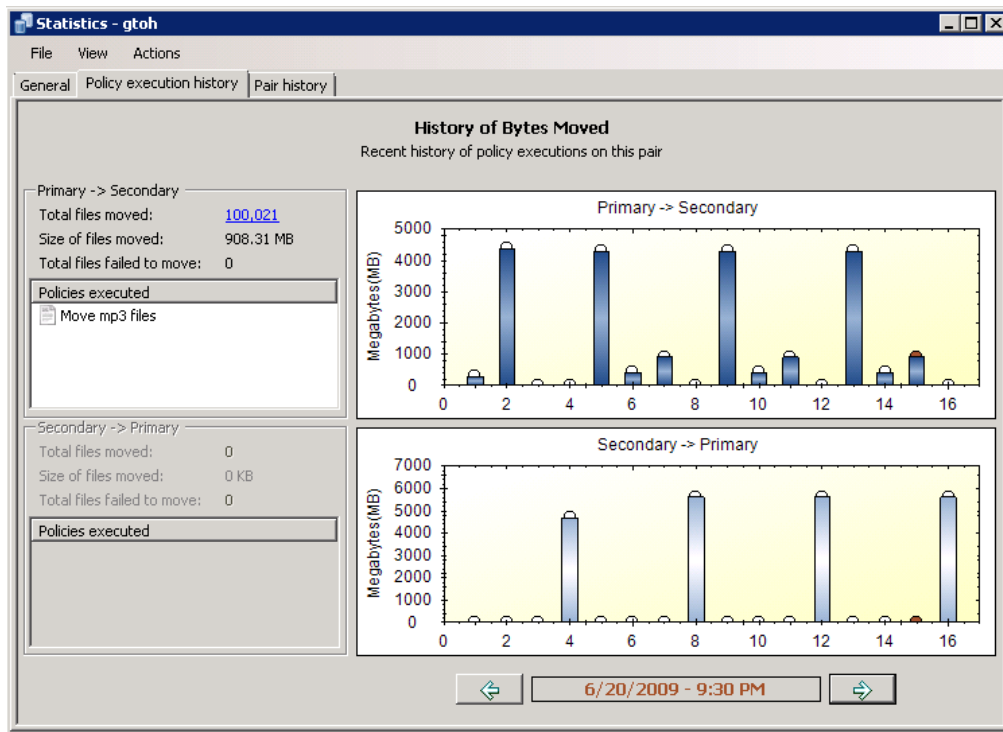
The *Policy Execution History* tab in a pair’s Statistics dialog box provides information about the most-recent 16 runs of policies on the pair. You can examine which policies were run and when. For each policy run, you can view lists of which files were moved and which files should have moved but did not move. This helps you to understand if policies are moving the files you expect to be moved.

When policies are run at the same time, the policies are grouped and run together by direction: *Primary to Secondary* and *Secondary to Primary*. Statistics for a policy run are aggregated based on the two direction categories, not by individual policies.

To view and explore the policy execution history for a pair:

- 1** In the Management Console, connect to the DynamicFS server that you want to manage.
- 2** In the left panel, select the *Pairs* folder to view a list of pairs in the right panel.

- 3 Double-click the pair name to open its Statistics dialog box, then select the *Pair execution history* tab.



- 4 In the *Date and Time* area at the bottom of the page, use the left-arrow and right-arrow to select the run you want to explore.
The selected run is highlighted with a red disk at the top of its bar in the graph.
- 5 View the summary on the left that shows the policies that were run and the number of files that were moved or not moved.

Statistic	Description
History of bytes moved	The <i>History of bytes moved</i> area graphically displays the statistics for the last policy run, highlighted in red at the top of the bar. The bar charts display the number of megabytes moved from <i>Primary to Secondary</i> and <i>Secondary to Primary</i> by the policies being enforced in each policy run.
Date and time	The <i>Date and time</i> area shows when the policy run occurred. Use the left-arrow and right-arrow to navigate between the runs. Information about the currently selected policy run is displayed in the left panel.
Policies executed	The <i>Policies executed</i> area lists the policies that were enforced in that run.
Primary to secondary	The <i>Primary to secondary</i> area shows information about the files moved from the primary path to the secondary path for the specified policies. This area is dimmed if no policies in that run were configured to move data in that direction.
Secondary to primary	The <i>Secondary to primary</i> area shows information about the files moved from the secondary path to the primary path for the specified policies. This area is dimmed if no policies in that run were configured to move data in that direction.

Statistic	Description
Total files moved	<p>The <i>Total files moved</i> field provides a link that opens the Run History dialog box if the value is non-zero. The run history lists each file that was moved in the specified direction. It provides the full path of the file name, the file extension, the file size, and any error messages for each file.</p> <p>For information, see Section 13.3, “Viewing a Policy Run History of Files Moved,” on page 232.</p>
Total files failed to move	<p>The <i>Total files failed to move</i> field provides a link that opens the Run History dialog box if the value is non-zero. The run history lists each file that should have moved in the specified direction, but did not move. It provides the full path of the file name, the file extension, the file size, and any error messages for each file.</p> <p>For information, see Section 13.4, “Viewing a Policy Run History of Files that Failed to Move,” on page 234.</p>

- 6 (Optional) Save the graphic display by right-clicking anywhere in a graphical area and selecting any of the following options:
 - ◆ **Copy:** Copies the selected graph as an image to the clipboard. Open a graphics editor, paste the image, and save the file.
 - ◆ **Save Image As:** Opens a Windows Save As dialog box where you can specify a location and file name for the image, select a file format, then save the file.
 - ◆ **Page Setup:** Set up the page orientation (portrait or landscape) and printer information for printing the graph.
 - ◆ **Print:** Print the selected graph.
- 7 (Optional) Click the link for *Total files moved* to open the Run History dialog box where you can view a list of the files moved in a particular direction.

For information, see [Section 13.3, “Viewing a Policy Run History of Files Moved,” on page 232.](#)
- 8 (Optional) Click the link for *Total files failed to move* to open the Run History dialog box where you can view a list of the files that should have moved in a particular direction, but that failed to move.

For information, see [Section 13.4, “Viewing a Policy Run History of Files that Failed to Move,” on page 234.](#)

13.3 Viewing a Policy Run History of Files Moved

During a policy run, the Standard Policy engine records information about any file that is moved between the primary and secondary locations in a pair. A file is moved if it meets all of the filter options in a policy.

When policies are run at the same time, the policies are grouped and run together by direction: *Primary to Secondary* and *Secondary to Primary*. Statistics about the files that moved are aggregated based on the two direction categories, and not by the individual policies in the same policy run.

The *Total files moved* run history statistics for a policy run lists the files that moved in a given direction. For each file, the Run History report includes the full path of the file name, the file extension, the file size, and a comment for any error messages.

A file can appear to not move if you schedule policies to run at the same time that move a file in opposite directions. If the file is not listed in the *Total files failed to move* run history, look for it in the *Total files moved* run histories for the *Primary to secondary* and *Secondary to primary* statistics for the policy run.

To view the run history for files that moved in a policy run:

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 In the left panel, select the *Pairs* folder to view a list of pairs in the right panel.
- 3 Double-click the pair name to open the pair's Statistics dialog box, then select the *Pair execution history* tab.
- 4 In the *Date and Time* area at the bottom of the Pair Execution History page, use the left-arrow and right-arrow to select the run you want to explore.

The selected run is highlighted with a red disk at the top of its bar in the graph.

- 5 In the left panel under *Primary to secondary* or *Secondary to primary*, click the link for *Total files moved*.

The Run History dialog box opens with a list of files that were moved in the selected direction.

- 6 Use any of the following options to view information or to locate a file of interest:

Scroll: The list is paged to show up to 1000 files at a time. On each page, scroll down to see up to 1000 file names listed.

Page: Click the left-arrow and right-arrow to move page-by-page through the run history. You can also use the *Page* drop-down list to jump directly to a page.

Sort: Click the heading of a column to sort the list by file name, file extension, file size, or comment.

IMPORTANT: The sorting is text-based, so it lists the information alphabetically, not numerically.

Filtering: Use the filter option in the upper right corner to type a sequence of letters to find specific files in the list. Specify the sequence in the field, then click the magnifying glass to apply the filter.

In the example below, the files are sorted by file name, and the search has filtered out files that do not contain the sequence of characters "test118".

File name	Extension	Size	Comment
G:\secondary\100kfiles\Test118.txt	.txt	10 KB	
G:\secondary\100kfiles\Test1180.txt	.txt	10 KB	
G:\secondary\100kfiles\Test11800.txt	.txt	10 KB	
G:\secondary\100kfiles\Test11801.txt	.txt	10 KB	
G:\secondary\100kfiles\Test11802.txt	.txt	10 KB	
G:\secondary\100kfiles\Test11803.txt	.txt	10 KB	
G:\secondary\100kfiles\Test11804.txt	.txt	10 KB	
G:\secondary\100kfiles\Test11805.txt	.txt	10 KB	
G:\secondary\100kfiles\Test11806.txt	.txt	10 KB	
G:\secondary\100kfiles\Test11807.txt	.txt	10 KB	
G:\secondary\100kfiles\Test11808.txt	.txt	10 KB	
G:\secondary\100kfiles\Test11809.txt	.txt	10 KB	
G:\secondary\100kfiles\Test1181.txt	.txt	10 KB	
G:\secondary\100kfiles\Test11810.txt	.txt	10 KB	
G:\secondary\100kfiles\Test11811.txt	.txt	10 KB	

- 7 When you are done viewing the list, close the Run History dialog box. (Click the X in the upper right corner, or press Alt+F4.)

13.4 Viewing a Policy Run History of Files that Failed to Move

During a policy run, the Standard Policy engine records information about any file that should move but fails to move. A file should move if it meets all of the filter options in a policy. Reasons that a file might fail to move during a policy run include the following:

- ♦ The source file is open and in use.
- ♦ Free space on the target disk is insufficient for the file size.
- ♦ A file with the same file name is present in the same folder on the target location.
- ♦ The source location or the target location of a file move becomes unavailable.
- ♦ The Dynamic File Services Storage Rights group or `NDFS-servername` proxy user has insufficient permissions on the remote share or file system in a pair.
- ♦ Exceptions caused by timing issues with the Windows file system.

When policies are run at the same time, the policies are grouped and run together by direction: *Primary to Secondary* and *Secondary to Primary*. Statistics about the files that failed to move are aggregated based on the two direction categories, and not by the individual policies in the same run.

The *Total files failed to move* run history statistics for a policy run lists the files that failed to move in a given direction. For each file, the Run History report includes the full path of the file name, the file extension, the file size, and a comment for any error messages.

A file can appear to fail to move if you schedule policies to run at the same time that move files in opposite directions. If the file is not listed in the *Total files failed to move* run history, look for it in the *Total files moved* run histories for the *Primary to secondary* and *Secondary to primary* statistics for the policy run as described in [Section 13.3, “Viewing a Policy Run History of Files Moved,” on page 232](#).

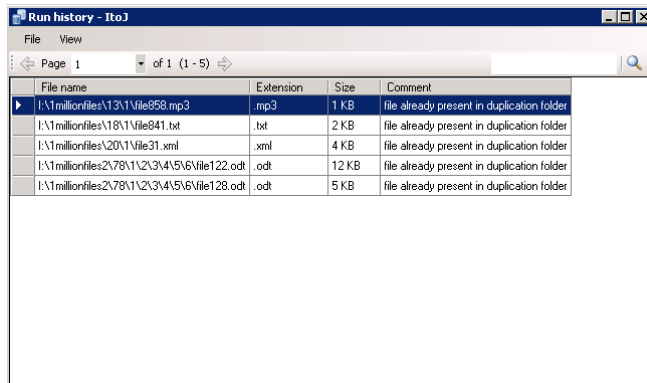
To view the run history for files that failed to move in a policy run:

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 In the left panel, select the *Pairs* folder to view a list of pairs in the right panel.
- 3 Double-click the pair name to open the pair’s Statistics dialog box, then select the *Pair execution history* tab.
- 4 In the *Date and Time* area at the bottom of the Pair Execution History page, use the left-arrow and right-arrow to select the run you want to explore.

The selected run is highlighted with a red disk at the top of its bar in the graph.

- 5 In the left panel under *Primary to Secondary* or *Secondary to Primary*, click the link for *Total files failed to move*.

The Run History dialog box opens with a list of files that should have moved in the selected direction but did not move.



The screenshot shows a window titled "Run history - ItoJ" with a menu bar (File, View) and a search icon. Below the menu bar is a pagination control showing "Page 1 of 1 (1 - 5)". The main area contains a table with the following data:

File name	Extension	Size	Comment
I:\1millionfiles\13\1\file858.mp3	.mp3	1 KB	file already present in duplication folder
I:\1millionfiles\18\1\file841.txt	.txt	2 KB	file already present in duplication folder
I:\1millionfiles\20\1\file31.xml	.xml	4 KB	file already present in duplication folder
I:\1millionfiles\2\78\1\2\3\4\5\6\file122.odt	.odt	12 KB	file already present in duplication folder
I:\1millionfiles\2\78\1\2\3\4\5\6\file128.odt	.odt	5 KB	file already present in duplication folder

- 6 Use any of the following options to view information or locate a file of interest:

Scroll: The list is paged to show up to 1000 files at a time. On each page, scroll down to see up to 1000 file names listed.

Page: Click the left-arrow and right-arrow to move page-by-page through the run history. You can also use the *Page* drop-down list to jump directly to a page.

Sort: Click the heading of a column to sort the list by file name, file extension, file size, or comment.

IMPORTANT: The sorting is text-based, so it lists the information alphabetically, not numerically.

Filter: Use the filter option in the upper right corner to type a sequence of letters to find specific files in the list. Specify the sequence in the field, then click the magnifying glass to apply the filter.

- 7 When you are done viewing the list, close the Run History dialog box. (Click the X in the upper right corner, or press Alt+F4.)

13.5 Viewing the Pair History

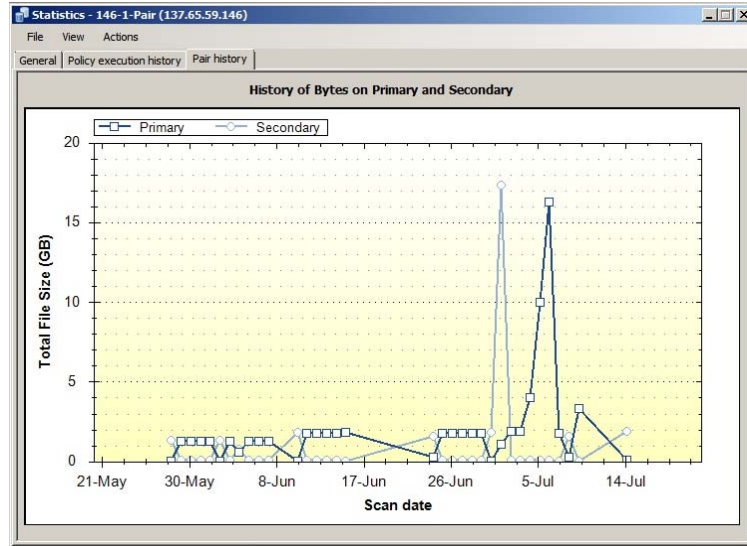
The *Pair History* tab in a pair's Statistics dialog box shows the amount of space consumed over time on the devices that are used in a pair. You can view a summary of a particular scan event by the file extension, file size, last modified, and creation time. You can display each of these graphs by total size consumed or by the number of files. Each scan event opens in a separate window so that you view and compare multiple events. Sizes are reported in binary units (for example, 1 MB is 1024 bytes).

By default, the pair history scan runs once daily at 4:00 a.m. This setting is configurable. For information, see [Section 8.10, "Scheduling the Pair History Scan," on page 153](#).

For information about the storage status and history for the disks that are used in a pair, see [Section 13.6, "Viewing the Server Disk Capacity and Used Space History," on page 237](#).

- 1 In the Management Console, connect to the DynamicFS server that you want to manage.
- 2 Under the *Pairs* folder, double-click the pair name to open the Statistics dialog box, then select the *Pair history* tab.

The Pair History graph shows the total file size over time for the primary location (a dark blue square icon) and the secondary location (a light blue circle icon). A scan event is recorded for each time that the Pair History scan is run.



- 3 Double-click the scan event for the primary (a dark blue square icon) location or the secondary location (a light blue circle icon) to open a graphical summary of the scan in a separate dialog box.

A graph of the scan is displayed by file extension and total file size of all the files moved in that category.
- 4 In a Summary dialog box, modify the display parameters to view the information of interest:
 - 4a Select *Total Size* (default) to view the information organized by file size in the categories.
 - 4b Select *Number of Files* to view the information organized by number of files in the categories.
 - 4c In the *Graph Option* drop-down box, select one of the following parameters to modify the information that is displayed:
 - ◆ Creation
 - ◆ Accessed
 - ◆ Modified
 - ◆ File Size
 - ◆ Extension (default)
- 5 (Optional) Save a graphic display by right-clicking anywhere in a graphical area and selecting one of the following options:
 - ◆ **Copy:** Copies the selected graph as an image to the clipboard. Open a graphics editor, paste the image, and save the file.
 - ◆ **Save Image As:** Opens a Windows Save As dialog box where you can specify a location and file name for the image, select a file format, then save the file.
 - ◆ **Page Setup:** Set up the page orientation (portrait or landscape) and printer information for printing the graph.
 - ◆ **Print:** Print the selected graph.
- 6 (Optional) Compare multiple scan events by opening their Summary dialog boxes side-by-side.

13.6 Viewing the Server Disk Capacity and Used Space History

You can view the capacity and used space information about the disks on a Dynamic File Services server. Viewing the server's disk history can help you understand space usage patterns for a disk for planning purposes. Sizes are reported in binary units (for example, 1 MB is 1024 bytes).

IMPORTANT: You can view the pair history (as described in [Section 13.5, "Viewing the Pair History,"](#) on page 235) for each pair to determine how much space is being used by the primary path or secondary path on a disk.

You can also view the policy run history for a pair (as described in [Section 13.2, "Viewing the Policy Execution History for a Pair,"](#) on page 230) to determine how much data is being moved by different policy runs on the pair.

- ♦ [Section 13.6.1, "Viewing Disk Details and History,"](#) on page 237
- ♦ [Section 13.6.2, "Sample Disk History for a Primary Disk,"](#) on page 238
- ♦ [Section 13.6.3, "Sample Disk History for a Secondary Disk,"](#) on page 239

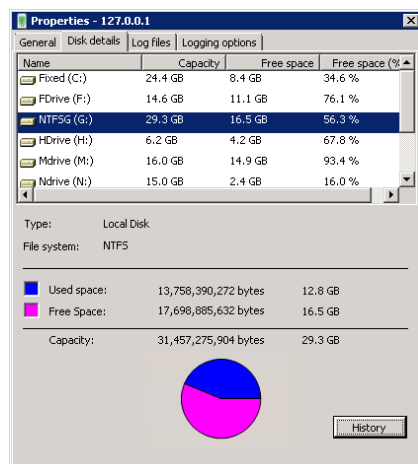
13.6.1 Viewing Disk Details and History

- 1 In the Management Console, connect to the DynamicFS server you want to manage.
- 2 Right-click the server, then select *Properties*.
- 3 Select the *Disk Details* tab to view the following information for local disks on the target server:

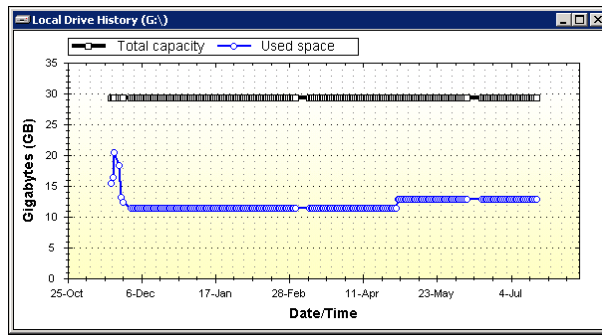
Property	Description
Disks	List of the disks attached as local drives on the server. It shows their capacity, free space in gigabytes, and free space as a percentage.
File system	The file system type, such as NTFS.
Graphical display	A graph of the used space and free space on the selected disk.

Information is displayed by default about the C:\ drive.

- 4 Select a disk to view its file system, capacity, and used space information.



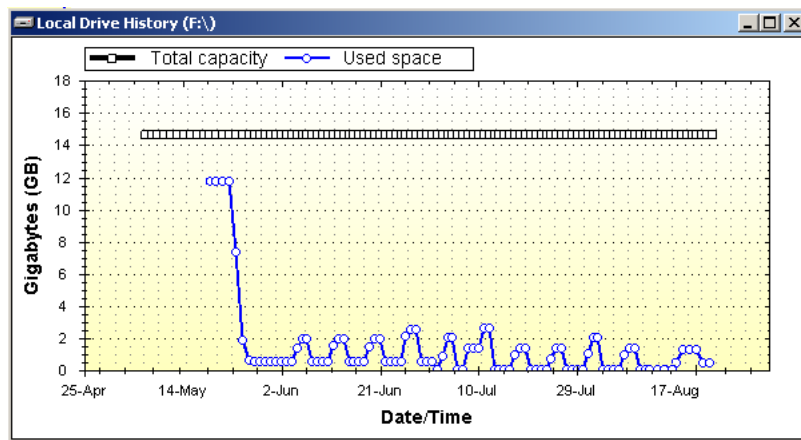
- 5 Select a disk and click *History* to view information about how the used space has changed over time.



- 6 (Optional) Save the graphic display by right-clicking anywhere in a graphical area and selecting any of the following options:
- ◆ **Copy:** Copies the selected graph as an image to the clipboard. Open a graphics editor, paste the image, and save the file.
 - ◆ **Save Image As:** Opens a Windows Save As dialog box where you can specify a location and file name for the image, select a file format, then save the file.
 - ◆ **Page Setup:** Set up the page orientation (portrait or landscape) and printer information for printing the graph.
 - ◆ **Print:** Print the selected graph.

13.6.2 Sample Disk History for a Primary Disk

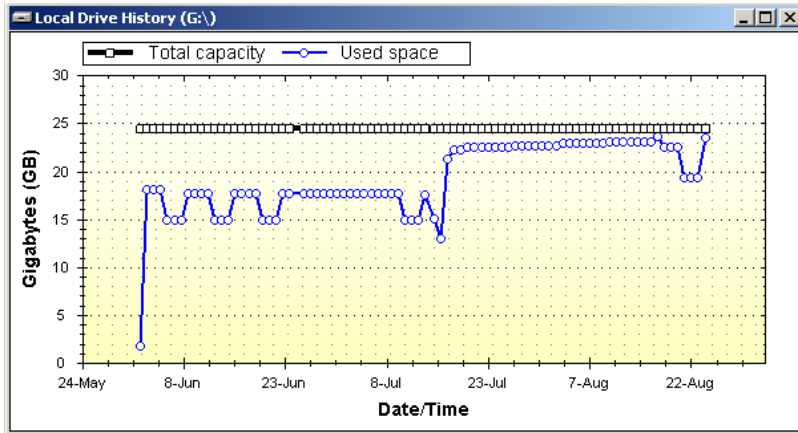
The following sample Local Drive History graph displays the capacity history for a disk that is managed by Dynamic File Services, where the disk contains one or more primary paths of pairs. Policies were scheduled to run during non-peak hours so that the data could be moved over a period of days or weeks, depending on the amount of data to be moved, while allowing users to continue working with the data.



Initially, policies were run daily during non-peak traffic times on each pair to move files by type, size, or date last modified from the primary disk to a secondary disk (not pictured). Thereafter, the policy schedule was modified to run weekly during non-peak traffic times to move any new files that match the specified criteria from the primary disk to the secondary disk.

13.6.3 Sample Disk History for a Secondary Disk

The following sample Local Drive History graph shows a disk that contains one or more secondary paths of pairs. Initially, the disk contained little or no data. Over time, the disk capacity is being consumed by files that are moved by policies from primary paths on one or more other disks (not pictured) to their secondary paths on this disk.



Because the disk capacity is near its maximum, you might need to take one or more of the following actions:

- ♦ Stop some policies from running by disabling their schedules, or by disassociating them from some pairs.
- ♦ Create new policies to move some data back to the primary paths.
- ♦ Stop using the disk as the secondary location for some pairs. This involves the following tasks:
 1. Disassociate a pair from its current policies.
 2. Create a new policy for the pair to move all of the files on the secondary path to the primary path. The policy can be scheduled to run in non-peak hours over several days or weeks, depending on how much data needs to be moved.
 3. After all of the data has been returned to the primary location, unlink the primary path and the secondary path to remove the pair relationship between the two locations. This automatically disassociates the pair from any policies.
 4. Create a new pair that links the primary path to a secondary path on a different disk.
 5. Associate the pair with one or more policies to move specified file types to the new secondary location.

To help determine which pairs need to be modified, you can view the pair history (as described in [Section 13.5, "Viewing the Pair History," on page 235](#)) for each pair to determine how much space is being consumed by each pair's secondary path. You can also view the policy run history for the pair (as described in [Section 13.2, "Viewing the Policy Execution History for a Pair," on page 230](#)) to determine if a policy is moving more data than you intended to be moved, and to understand how the policy might be modified to better meet your goals.

13.7 Viewing Logged Events

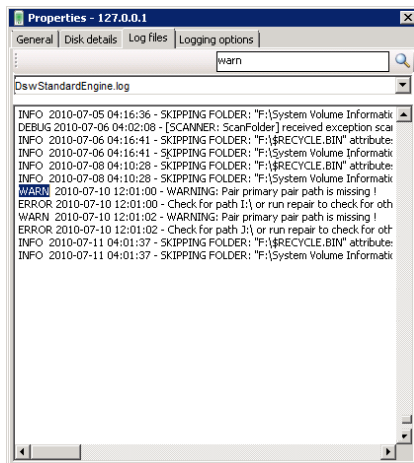
Event logs for the following Dynamic File Services components can be viewed in the *Server Properties* > *Log Files* page in the Management Console:

Event Log File	Component	Description
DswMpcCore.log	Dynamic File Service	Logs events for the core engine.
DswStandardEngine.log	Standard pair engine	Logs events for the creation, deletion, modification, and policy runs for standard pairs.
DswRetentionEngine.log	Retention pair engine	Logs events for creation, deletion, modification, and policy runs for retention pairs.
DswCloudEngine.log	Cloud engine	Logs events for policy runs on retention pairs with cloud storage as the secondary.
install.log	Installation	Logs events during the install about setting up the Dynamic File Services group and Dynamic File Services Retention Review group on the local server or in Active Directory. It also logs the creation of the Dynamic File Services Storage Rights group in Active Directory.
DswPairCheck.log	Pair Check utility	Logs events each time you manually run the Pair Check utility. The log is created the first time the utility runs.
DswInventory.log	File Inventory utility	Logs events each time you manually run the File Inventory utility. The log file is created the first time the utility runs.

You can modify the logging level for the Service, Standard, Retention, and Cloud logs to change the types of events that are logged. For information, see [Section 6.7, “Configuring the Logging Level for Engines,” on page 114](#).

- 1 In the Management Console, connect to the DynamicFS server you want to manage.
- 2 Right-click the server, then select *Properties*.
- 3 Select the *Log files* tab.
The available log files are listed in the drop-down list.
- 4 From the drop-down list, select a log file to view its messages.
Messages are listed in chronological order in the display window. Scroll down to view the most recent messages.

- 5 (Optional) In the *Search* field, type a sequence of characters that you want to find, then click the *Search* icon to jump to instances of those characters in the log.



13.8 Viewing Service Events

Dynamic File Services uses Microsoft Event Viewer for logging events like starting and stopping the Service, and application execution errors. See the [Microsoft TechNet Library \(http://technet.microsoft.com/en-us/library/ee624055\(WS.10\).aspx\)](http://technet.microsoft.com/en-us/library/ee624055(WS.10).aspx) for documentation on viewing events with the Event Viewer snap-in for Microsoft Management Console (MMC).

13.9 Auditing Management Events

Auditing the management events for the Dynamic File Service, pairs, and policies is integrated with DynamicFS and is provided as a basic benefit. The purpose of the audit log is to record which logged-in user performs major management operations, such as create, delete, and modify (which includes association and disassociation of the policies with pairs).

All Dynamic File Services management actions are audited. All authentication and authorization events are audited, including both authorized and non-authorized management actions. No sensitive information is placed in the audit log. The audit log also reports when the Service is stopped and started.

The audit log reports the user's IP address, name, and the time of access for management events. It reports *System* as the user when scheduled policies are run.

The audit file is protected so that it cannot be deleted or accessed by unauthorized users.

- ♦ [Section 13.9.1, "Viewing Audit Log Events," on page 241](#)
- ♦ [Section 13.9.2, "Detecting and Resolving a Corrupted Audit Log," on page 242](#)

13.9.1 Viewing Audit Log Events

Dynamic File Services automatically audits the management tasks for creating and managing the Service, pairs, and policies. The following files are used for auditing:

File	Description
C:\ProgramData\Dynamic File Services\audit\DswAuditLog.xml	Logs the management events for the Dynamic File Service, pairs, and policies.
AuditAndNotificationControl.xml in the C:\Program Files\Dynamic File Services\ folder, or in the folder where you installed the software.	Controls the logging behavior for the audit log.

There is no special way to view this `DswAuditLog.xml` file. It is an XML file, and most HTTP browsers can display well-formed XML in a readable form. You can also view the file in a text editor.

It is necessary to review information about the audited management events in combination with information reported in the Service log (`DswMpcCore.log`). There might be related Service events that are automatically generated from a single management task. For information about viewing the Service log, see [Section 13.8, “Viewing Service Events,” on page 241](#).

For example, if a pair is deleted, the deletion event is recorded in the audit log, and the related automatic disassociations of policies from the deleted pair are recorded in the Service log. The logged disassociation message lists all of the policies with a Boolean `true` or `false` indication for each of whether the disassociation occurred for that policy. You would expect a previously associated policy to report a value of `true` after a successful disassociation.

13.9.2 Detecting and Resolving a Corrupted Audit Log

If the audit log file becomes corrupted so that it contains malformed XML, scheduled policies might not run or the local drive history might not function.

Dynamic File Services automatically checks that the audit log file contains well-formed XML whenever an audited event is added to the Audit log file. If malformed XML is detected, the following events automatically occur:

1. The corrupted audit log is renamed by adding a GUID to the end of the file name.
This allows for multiple instances of the file to be saved in the `...\Dynamic File Services` folder.
2. A new audit log file is started.
3. An entry is added in the new log stating that the audit log was detected to have a problem and a new one was started.
4. An event is sent to the Windows Event Logger stating that an improperly formatted audit log file was detected, and providing the name of the renamed log file.
5. The audited event is written to the new audit log file.

If you are notified of a corrupted audit log event in the Windows Event Logger, you can view the old renamed audit log file in a text editor to assess the extent of the corruption. No further administrator action is required.

13.10 Generating a DynamicFs Configuration Report

To help with record-keeping and troubleshooting, you can generate a report about the Dynamic File Services configuration on the server. The Configuration Dump utility (`DswDump.exe` command) collects information about the settings for the Service, pairs, policies, schedules, and logs on a server,

and dumps the information to a file called `Config.txt` in the `C:\Program Files\Dynamic File Services` folder (or the folder where you installed DynamicFS). The command can be run at any time, whether the Service is running or not running.

- 1 Log in to the DynamicFS server as the Administrator user, or as a user in the Dynamic File Services group.
- 2 Open a command prompt console. Select *Start > All Programs > Accessories*, then click *Command Prompt*.
- 3 Use the Change Directory (`cd`) command to go to the `C:\Program Files\Dynamic File Services` folder (or the folder where you installed Dynamic File Services).
- 4 At the command prompt, enter

```
dswDump.exe
```

The results are written to the `Config.txt` file in the `C:\Program Files\Dynamic File Services` folder (or the folder where you installed Dynamic File Services).

The following progress messages are output to the screen:

```
... starting
... output file = Config.txt

... Configuration Information
... Active Directory Information
... Files Information
... Pairs Information
... Policies Information
... Schedules Information
... Cloud Information
... Audit Information
... Microsoft Event Logger
... Log Files
... flushing output file
... perform cleanup
... finished
```

- 5 View the `Config.txt` report in a text editor such as Notepad.

14 Repairing the Pair, Policy, and Schedule Databases

Novell Dynamic File Services (DynamicFS) requires that the pair, policy, and schedule databases be valid in order for the Service to run. The Repair feature helps ensure that valid copies of the database files are always available to the Service. It runs automatically each time the Service starts. In addition, it takes daily snapshots of the pair, policy, and schedule databases. If a database becomes corrupted, DynamicFS rolls the database back to its last known-to-be-valid snapshot.

The Repair tool allows you to manually check the validity of the databases, create snapshots, and restore snapshots. You can access the Repair tool from the *Service Controller* menu when the Service is not running.

- ♦ [Section 14.1, “Understanding Repair Options,” on page 245](#)
- ♦ [Section 14.2, “Reporting the Status of the Databases,” on page 249](#)
- ♦ [Section 14.3, “Taking a Snapshot of the Databases,” on page 250](#)
- ♦ [Section 14.4, “Restoring a Snapshot of the Databases,” on page 251](#)
- ♦ [Section 14.5, “Troubleshooting Repair Issues,” on page 252](#)

14.1 Understanding Repair Options

The Dynamic File Service Repair feature provides the following options to help ensure that a valid copy of the database files are available to the Service. Each of these functions is described in more detail later in this section.

- ♦ **Run a Report:** Checks the consistency of configuration information in the pair, policy, and schedule database files. It reports health information and errors.
- ♦ **Take a Snapshot:** Saves a snapshot of valid pair, policy, and schedule database files.
- ♦ **Restore a Snapshot:** Replaces the current versions of the pair, policy, and schedule database files with the most recent snapshot that is available and valid.

When the Service starts, it automatically uses the Report capability to check the consistency of the pair, policy, and schedule database files. If fatal errors are detected, the Service rolls back to the most recent snapshot that is available and valid. The Service also runs the Snapshot function daily at a scheduled time to save a valid snapshot of the database files. These actions are performed only if the Service is running.

The *Repair Tool* option in the Service Controller menu allows an administrator to manually run the report, snapshot, and restore options as needed. The Dynamic File Service must be stopped before you can use the tool.

See the following sections to understand how the repair capability is used to detect problems in the pair, policy, and schedule database files.

- ◆ [Section 14.1.1, “What Are the Database Files?” on page 246](#)
- ◆ [Section 14.1.2, “Taking Daily Snapshots of the Database Files,” on page 247](#)
- ◆ [Section 14.1.3, “What Causes Errors in the Database Files?” on page 247](#)
- ◆ [Section 14.1.4, “Automatically Repairing the Database Files at Service Start,” on page 248](#)
- ◆ [Section 14.1.5, “Manually Repairing the Database Files,” on page 248](#)

14.1.1 What Are the Database Files?

The Dynamic File Services database files contain configuration information about the pairs, policies, schedules, and cloud accounts that you create on a server. The schedule information for the daily snapshot is also verified with the database files. Database files are stored by default in the `C:\ProgramData\Dynamic File Services` folder.

- ◆ [“Pair Database Files” on page 246](#)
- ◆ [“Policy Database Files” on page 246](#)
- ◆ [“Schedule Database Files” on page 246](#)
- ◆ [“Cloud Database Files” on page 247](#)
- ◆ [“Database Snapshot Schedule File” on page 247](#)

Pair Database Files

The `Pairs` folder contains the pairs database file (`DswPairDatabase.xml`) and a separate subfolder for each pair that you create on the server. The database file contains the configuration information for all of the pairs on the server. Each pair’s information begins with the `<DswPairEntry>` XML tag and ends with the `</DswPairEntry>` XML tag.

The subfolder for each pair is named with the pair’s GUID (globally unique identifier), such as `f59058ea-ae9a-4352-bf3c-cc3a7d7fc443`. In this subfolder, a `PairSummaryHistoryTable.xml` file and the `PairRunHistoryTable.xml` file store historical information for the individual pair. The repair capability does not check or repair a pair’s folder and historical information files.

Policy Database Files

The `Policies` folder contains the policy database file (`DswPolicyDatabase_v2.xml`). The database contains the configuration information for all of the policies that you create on the server. It also contains the configuration files for two global policies that you should not alter: the Global Conflict policy and the Global Remove Pair policy. Each policy’s configuration information appears between the `<DswPolicyEntry>` XML tag and `</DswPolicyEntry>` XML tag.

Schedule Database Files

The `Schedules` folder contains the schedule database file (`DswScheduleDatabase.xml`).

The database contains the configuration information for all of the policy schedules on the server. Each schedule’s information begins with the `<DswScheduleEntry>` XML tag and ends with the `</DswScheduleEntry>` XML tag.

Cloud Database Files

The `Clouds` folder contains the cloud account database file (`DswCloudDatabase.xml`).

The database contains the configuration information for all of the cloud accounts on the server. Each schedule's information begins with the `<DswCloudEntry>` XML tag and ends with the `</DswCloudEntry>` XML tag.

Database Snapshot Schedule File

The `..\Program Files\Dynamic File Services\DswCore.xml` file contains the schedule information for the repair Snapshot function that is run daily by the Dynamic File Service. The default time is 23:30 hours (11:30 p.m.).

14.1.2 Taking Daily Snapshots of the Database Files

Dynamic File Services provides the Snapshot function as a precautionary measure to help resolve fatal errors that might rarely occur in the pair, policy, or schedule database files. If it is necessary, the Repair function can roll back the files to the most recent set of known-to-be-valid set of snapshot files. The Dynamic File Service has all of the permissions and rights necessary to run the Snapshot function.

The snapshots are taken by default between 11:30 p.m. and midnight daily. The time values for when the snapshot is taken are stored in the `..\Dynamic File Services\DswCore.xml` file. There is no graphical interface option to change the time when the snapshots are taken. The Service must be running in order for the snapshot service to be called at its scheduled time and while the snapshot is being taken.

Each day at the scheduled time, the Dynamic File Service automatically calls the Snapshot function to take a snapshot of the pair database file, the policy database file the individual policy configuration files, and the schedule database file. For information about which files comprise the set of files that are saved in a snapshot, see [Section 14.1.1, "What Are the Database Files?"](#) on page 246.

Before a snapshot is taken, the database files are checked for consistency to ensure that they are valid. The known-to-be-valid set of files are stored in the `C:\ProgramData\Dynamic File Services\Snapshot\day_of_the_week` folder. If any one of the database files is found to have fatal errors, a snapshot is not saved.

Only one snapshot for each day of the week is kept at any given time. The snapshots are retained on a seven-day rotation.

14.1.3 What Causes Errors in the Database Files?

Errors in the database files are expected to occur rarely, if at all. Common causes for corruption might be:

- ♦ If a connection to the server is lost when you are creating a pair, a policy, or a schedule
- ♦ If the server crashes while you are creating a pair, a policy, or a schedule
- ♦ If the server crashes while you are modifying a policy or a schedule
- ♦ If the file system where the database files are stored becomes corrupted
- ♦ If you introduce errors by attempting to manually modify the content of a database file

14.1.4 Automatically Repairing the Database Files at Service Start

When the Dynamic File Service starts, it automatically uses the repair capability to check the consistency of the pair, policy, schedule, and cloud account database files. The Service has all of the permissions and rights necessary to roll back to the last known-to-be-valid snapshot if necessary.

The database check on Service start performs the following tasks:

1. The Report function opens the pair, policy, and schedule database files and checks the consistency of information in them.
2. If errors are detected, all databases automatically roll back to the last known-to-be-valid snapshot.

The restore checks for recent database files in the same day's folder first in case snapshots have been taken manually, or the Service is starting between 2300 and 0000 hours.

For information about the database snapshot process, see [Section 14.1.2, "Taking Daily Snapshots of the Database Files,"](#) on page 247.

3. If a snapshot rollback repair effort fails, the Service does not start. An error message is logged in the Windows Event Logger.

Two failure events trigger an entry in the Windows Event Logger:

- ◆ The repair capability does not respond when it is called by the Service to begin the database check.
- ◆ A snapshot rollback fails because there is no snapshot available to roll back to.

14.1.5 Manually Repairing the Database Files

The Repair tool allows you to manually run a report, take a snapshot, and restore the databases. The Service must be stopped in order to run the Repair tool.

When it is running, the Service keeps a copy of each of the databases in memory, and writes them to the database files when the Service stops. You stop the Service to access the Repair tool, which allows the changes to be made in the files, and not in memory. The changes apply when you restart the Service.

The Repair tool runs with the identity of the user that is logged in to the server's desktop. This user needs file permissions on the Dynamic File Services software and data paths, including any remote shares used in pairs. If the user does not have access to all of the paths necessary, you get errors.

IMPORTANT: Typically, the user has Administrator privileges on the DynamicFS server, rights on the remote share, and NTFS file system access rights on the primary path and secondary path. Otherwise, the secondary location is reported as missing. One way to give the user the necessary rights is to add the user name as a member of the Dynamic File Services Storage Rights group. It does not matter if the user is also a member of the Dynamic File Services group.

14.2 Reporting the Status of the Databases

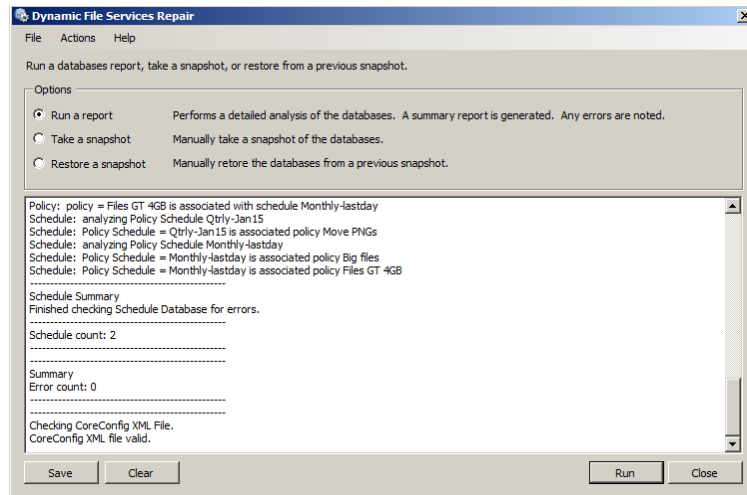
In the Repair tool, you can run a report to check the consistency of the database files. You might need to generate a report if the Service cannot open a pair, policy, schedule, or cloud account. You should also verify their status if a database error is reported in the Windows Event Logger after a Service start.

- 1 Log in to the DynamicFS server as a user with file system rights on both the primary and secondary paths of the pair you want to manage.

If remote shares are being used, ensure that you have sufficient access rights on the secondary locations.

- 2 Stop the Service as described in [Section 6.4.3, “Stopping the Dynamic File Service,”](#) on page 106.
- 3 On the server, start the Repair tool by right-clicking the *Service Controller* icon in the notification area and selecting *Repair Tool* from the menu.
- 4 Select *Run a Report*, then click *Run*.

The output of the report is printed to the data window.



- 5 View the report.

A full report includes the following:

- ◆ Policy database status and errors
- ◆ Pair database status and errors
- ◆ Schedule and schedule association errors
- ◆ Cloud account errors
- ◆ `DswCore.xml` file status and errors

- 6 (Optional) Save the report by using one of the following methods:

- ◆ Click *Save*, browse to locate the folder where you want to save the file, specify a file name, then click *Save*.

The default file name is `..\Dynamic File Services\dswrepair.log`.

- ◆ Select the file output, right-click and select *Copy* to save the content to the Windows clipboard, then paste the information in any text file.

- 7 (Optional) Click *Clear* to erase the report from the data window.

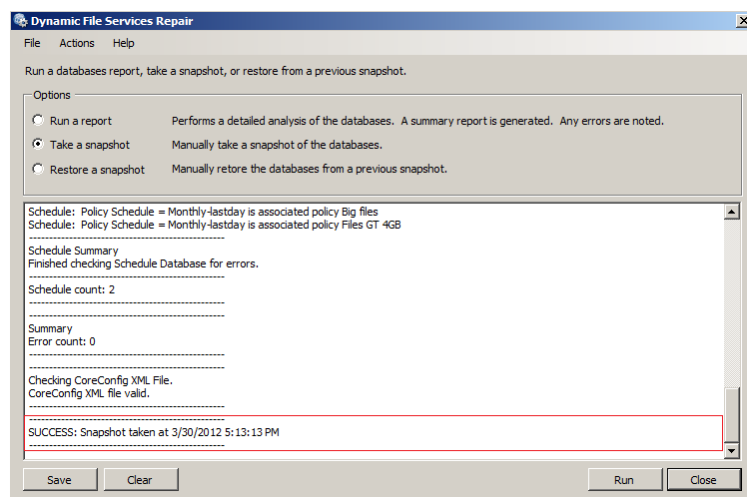
- 8 When you are done, click *Close* to close the Repair tool.
You cannot restart the Service while the Repair tool dialog box is open.
- 9 Right-click the *Service Controller* icon, select *Start Service*, then click *Yes* to run Service as Administrator.

14.3 Taking a Snapshot of the Databases

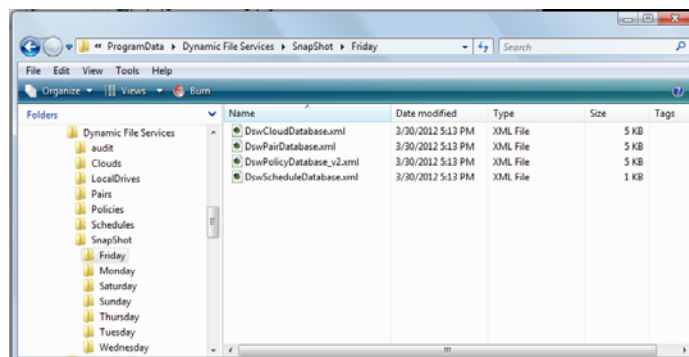
In the Repair tool, you can manually take a snapshot at any time. You might want to take a snapshot after you have completed several configuration additions or changes to the pair, policy, schedule, or cloud account databases. This ensures that those changes are immediately saved to a snapshot. Otherwise, the snapshot is not taken until the next scheduled time.

- 1 Log in to the DynamicFS server as a user with Administrator privileges.
- 2 Stop the Service as described in [Section 6.4.3, “Stopping the Dynamic File Service,”](#) on page 106.
- 3 On the server, start the Repair tool by right-clicking the *Service Controller* icon in the notification area and selecting *Repair Tool* from the menu.
- 4 Select *Take a Snapshot*, then click *Run*.

A confirmation is printed to the data window. The snapshot data is saved by default to `C:\ProgramData\Dynamic File Services\SnapShot\<day_of_the_week>`.



- 5 (Optional) In a file browser, navigate to the `Snapshot\<day_of_the_week>` folder, and visually verify that the snapshot files have been saved.



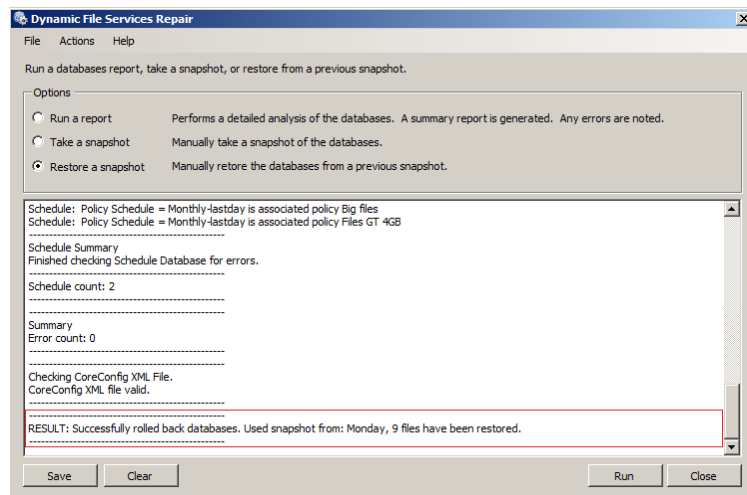
- 6 When you are done, click *Close* to close the Repair tool.
You cannot restart the Service while the Repair tool dialog box is open.
- 7 Right-click the *Service Controller* icon, select *Start Service*, then click *Yes* to run Service as Administrator.

14.4 Restoring a Snapshot of the Databases

In the Repair tool, you can restore the most recent snapshot of the database. You might want to restore a snapshot of the databases if a report indicates that the current database contains errors. For information about the rights needed to perform this action, see [Section 14.1.5, “Manually Repairing the Database Files,”](#) on page 248.

- 1 Log in to the DynamicFS server as a user with Administrator privileges.
- 2 Stop the Service as described in [Section 6.4.3, “Stopping the Dynamic File Service,”](#) on page 106.
- 3 On the server, start the Repair tool by right-clicking the *Service Controller* icon in the notification area and selecting *Repair Tool* from the menu.
- 4 Select *Restore a Snapshot*, then click *Run*.

A confirmation is printed to the data window. The last known-to-be-valid version of the databases are restored to the `Pairs`, `Policies`, and `Schedules` folders.



- 5 When you are done, click *Close* to close the Repair tool.
You cannot restart the Service while the Repair tool dialog box is open.
- 6 Right-click the *Service Controller* icon, select *Start Service*, then click *Yes* to run Service as Administrator.

14.5 Troubleshooting Repair Issues

If a snapshot rollback repair occurs, you should use the Management Console to review the recovered pairs, policies, schedules, and cloud accounts to ensure that they reflect any recent configuration changes that you made. This section provides information about what to do after a snapshot rollback repair.

- ♦ [Section 14.5.1, “What If a Pair’s Secondary Data Location Appears to Be Missing After a Snapshot Rollback Repair?”](#) on page 252
- ♦ [Section 14.5.2, “What If an Old Pair’s Secondary Data Appears After a Snapshot Rollback Repair?”](#) on page 252
- ♦ [Section 14.5.3, “What If Policies Run or Don’t Run as Expected After a Snapshot Rollback Repair?”](#) on page 253
- ♦ [Section 14.5.4, “What If Review Notifications Are Sent or Not Sent as Expected After a Snapshot Rollback Repair?”](#) on page 253
- ♦ [Section 14.5.5, “What If a Pair Database Error Cannot Be Fixed?”](#) on page 254
- ♦ [Section 14.5.6, “What If a Policy Database Error Cannot Be Fixed?”](#) on page 254
- ♦ [Section 14.5.7, “What If a Schedule Database Error Cannot Be Fixed?”](#) on page 255

14.5.1 What If a Pair’s Secondary Data Location Appears to Be Missing After a Snapshot Rollback Repair?

When a rollback repair occurs, the pair database file rolls back to the latest known-to-be-valid version of the file. The recovered file might not contain pair information for a recently created pair. When users access the share on the primary location, they see only the data on the primary location because the pair definition is not available.

To resolve this problem, you can create the pair again as described in [Section 8.2, “Creating a Pair,”](#) on page 142. This adds the pair configuration information to the recovered pair database file. The merged view begins to work, and users see data on both the primary and secondary locations.

14.5.2 What If an Old Pair’s Secondary Data Appears After a Snapshot Rollback Repair?

When a rollback repair occurs, the pair database file rolls back to the latest known-to-be-valid version of the file. The recovered file might not contain pair information for a recently unlinked pair. When users access a share on the primary location, they see a merged view that includes the old pair’s secondary location.

To resolve this problem, you can unlink the pair again as described in [Section 8.13, “Unlinking the Paths in a Pair,”](#) on page 155. This removes the pair configuration information from the recovered pair database file. Users see data only on the primary location.

14.5.3 What If Policies Run or Don't Run as Expected After a Snapshot Rollback Repair?

When a rollback repair occurs, the policy database file and the related policy files and schedule files roll back to the latest known-to-be-valid version of the files. The recovered files might not contain recent changes that were made to the policies or their associations. As a result, policies might run or not run as expected.

After a rollback repair occurs, you should review the recovered policies in the Management Console to verify that the recovered policies reflect any recent changes, such as the following:

- ◆ New policy
- ◆ Deleted policy
- ◆ Added or removed pair-to-policy association
- ◆ Added or removed policy-schedule-to-policy association
- ◆ Modified filter options
- ◆ Modified direction
- ◆ Renamed policy

To resolve this problem, you can make the changes again.

14.5.4 What If Review Notifications Are Sent or Not Sent as Expected After a Snapshot Rollback Repair?

When a full rollback repair occurs, the pair, policy, and schedule databases roll back to their latest known-to-be-valid versions. The recovered files might not contain recent changes that were made to schedules and their associations. As a result, review notifications might run or not run as expected.

After a rollback repair occurs, you should review the recovered schedules in the Management Console to verify that the recovered schedules reflect any recent changes, such as the following:

- ◆ New schedule
- ◆ Deleted schedule
- ◆ Added or removed review-schedule-to-retention-pair association
- ◆ Added or removed policy-schedule-to-policy association
- ◆ Modified frequency
- ◆ Renamed schedule

To resolve this problem, you can make the changes again.

14.5.5 What If a Pair Database Error Cannot Be Fixed?

If the fatal errors in the pair database file cannot be repaired because no snapshot files are available, you can try to clean up the database file, then re-create the pair. However, if the pairs database file is totally corrupted, you must delete the `...\Dynamic File Services\Pairs\DswPairDatabase.xml` file and re-create all pairs.

To clean up the pairs database file and re-create selected pairs:

- 1 Identify where the pair errors occurred:
 - 1a Open the `...\Dynamic File Services\DswRepair.log` in a text editor.
 - 1b From the log, note the GUID and name of each pair where fatal errors occurred.
 - 1c Close the file.
- 2 Clean up the pair database file:
 - 2a Open the `...\Dynamic File Services\Pairs\DswPairDatabase.xml` file in an XML editor.
A pair's information begins with the `<DswPairEntry>` XML tag and ends with the `</DswPairEntry>` XML tag. Remove the tags and the information about the pair in between them.
 - 2b Save the edited file.
- 3 In the `Pairs` folder, delete the pair history subfolders that correspond to the pairs you deleted from the database.
You need the pair's GUID to recognize which subfolder belongs to a pair.
- 4 Re-create the pair as described in [Section 8.2, "Creating a Pair," on page 142](#).
- 5 Associate each re-created retention pair with a review schedule.
- 6 Associate each re-created pair to one or more policies.

14.5.6 What If a Policy Database Error Cannot Be Fixed?

If the fatal errors in the policy database files cannot be repaired because no snapshot files are available, you can clean up the policy database and individual policy files, then re-create the policies. However, if the files are totally corrupted, you must delete the `...\Dynamic File Services\Policies\DswPolicyDatabase_v2.xml` file and re-create all policies.

To clean up the policies database files and re-create selected policies:

- 1 Identify where the policy errors occurred:
 - 1a Open the `...\Dynamic File Services\DswRepair.log` in a text editor.
 - 1b From the log, note the GUID and name of each policy where fatal errors occurred.
 - 1c Close the file.
- 2 Clean up the policy database files:
 - 2a Open the `...\Dynamic File Services\Policies\DswPolicyDatabase_v2.xml` file in an XML editor.
 - 2b For each policy that has corrupted information, remove the policy's configuration information from the file.
 - 2c Save the edited file.

- 3 Use either of the following methods to re-create the policy:
 - ♦ Re-create the policy as described in [Section 9.2, “Creating a Policy,”](#) on page 162.
 - ♦ If you previously exported a policy, you can import the policy to add it back in the database.
- 4 Associate a policy schedule to the re-created policy if you want it to run automatically.
- 5 Associate one or more pairs to the policy.

14.5.7 What If a Schedule Database Error Cannot Be Fixed?

If the fatal errors in the schedule database files cannot be repaired because no snapshot files are available, you can clean up the database file, then re-create the schedules and associate them again with policies. However, if the file is totally corrupted, you must delete the `...\Dynamic File Services\Schedules\DswScheduleDatabase.xml` file and re-create all of the schedules.

To clean up the schedules database files and re-create selected schedules:

- 1 Identify where the schedule errors occurred:
 - 1a Open the `...\Dynamic File Services\DswRepair.log` in a text editor.
 - 1b From the log, note the GUID and name of each schedule where fatal errors occurred.
 - 1c Close the file.
- 2 Clean up the schedule database files:
 - 2a Open the `...\Dynamic File Services\Schedules\DswSchedulesDatabase.xml` file in an XML editor.
 - 2b For each schedule that has corrupted information, remove its information from the file.
 - 2c Save the edited file.
- 3 Re-create the schedule as described in [Chapter 10, “Creating and Managing Policy Schedules,”](#) on page 189.
- 4 Associate each of the re-created policy schedules with one or more policies.

15 Security Considerations

This section describes security issues and recommendations for Novell Dynamic File Services (DynamicFS). It is intended for security administrators or anyone who is responsible for the security of the system. It requires a basic understanding of DynamicFS. It also requires the organizational authorization and the administrative rights to carry out the configuration recommendations.

- ♦ [Section 15.1, “Security Features,” on page 257](#)
- ♦ [Section 15.2, “Registry Settings,” on page 263](#)
- ♦ [Section 15.3, “Service Configuration File,” on page 263](#)
- ♦ [Section 15.4, “Server Management Configuration File,” on page 263](#)
- ♦ [Section 15.5, “Database Files,” on page 263](#)
- ♦ [Section 15.6, “Notification Service Configuration Files,” on page 264](#)
- ♦ [Section 15.7, “Log Files and Logging Control Files,” on page 264](#)

15.1 Security Features

There are a number of security measures available in Dynamic File Services, such as user access via the primary path and enforcement of user access there.

- ♦ [Section 15.1.1, “Authentication,” on page 258](#)
- ♦ [Section 15.1.2, “User Access to Pairs,” on page 259](#)
- ♦ [Section 15.1.3, “Retention Reviewer Access to Pairs,” on page 259](#)
- ♦ [Section 15.1.4, “SSL Certificate,” on page 259](#)
- ♦ [Section 15.1.5, “Service Port,” on page 260](#)
- ♦ [Section 15.1.6, “Windows Firewall Access,” on page 261](#)
- ♦ [Section 15.1.7, “Dynamic File Services Group,” on page 261](#)
- ♦ [Section 15.1.8, “Dynamic File Services Retention Review Group,” on page 261](#)
- ♦ [Section 15.1.9, “Reviewers for a Retention Pair,” on page 261](#)
- ♦ [Section 15.1.10, “Windows User Account Control,” on page 262](#)
- ♦ [Section 15.1.11, “Network Connections,” on page 262](#)
- ♦ [Section 15.1.12, “Network Shares,” on page 262](#)
- ♦ [Section 15.1.13, “Remote Shares,” on page 262](#)
- ♦ [Section 15.1.14, “Auditing Management Events,” on page 262](#)
- ♦ [Section 15.1.15, “Event Logging,” on page 263](#)

15.1.1 Authentication

Consider the authentication requirements in this section for setting up and managing Novell Dynamic File Services.

- ♦ [“Installing Dynamic File Services in an Active Directory Environment” on page 258](#)
- ♦ [“Configuring and Managing the Service” on page 258](#)
- ♦ [“Creating Pairs and Policies” on page 258](#)
- ♦ [“Using Remote Shares in a Pair” on page 258](#)
- ♦ [“Using a Cloud Account as the Secondary Path in a Retention Pair” on page 259](#)
- ♦ [“Using the Repair Tool GUI and Pair Check Utility” on page 259](#)

Installing Dynamic File Services in an Active Directory Environment

In Active Directory domains, the installation must be done by a domain user that has local Administrator privileges and Active Directory Administrator rights. This allows the setup of the Dynamic File Services Storage Rights domain group and the `NDFS-servername` domain user. For information, see [Section 4.4, “Active Directory Domain Configuration for Remote Shares,” on page 53](#).

The domain user is automatically removed if you uninstall the Service component. The domain group is also removed if the domain user is the last member of the group.

Configuring and Managing the Service

In order to modify the configuration settings for the Dynamic File Service or to stop and start the Service, you must be logged in to the server desktop as the Administrator user or as a user with Administrator privileges. It does not matter if the user is a member of the Dynamic File Services group.

Creating Pairs and Policies

To connect to a Dynamic File Services server from the Management Console or when issuing pair, policy, and schedule commands at the command line, you must provide the login credentials (user name and password) of a user that is a member of the Dynamic File Services group on the target server, or as the Administrator user account of that server. Users with Administrator privileges (not the Administrator user account) must be added to the Dynamic File Services group. You can add the Administrator user account as a member of the group.

The DynamicFS administrator user identity can be validated in Workgroup and Active Directory Domain environments.

Using Remote Shares in a Pair

In an Active Directory environment, Dynamic File Services supports the use of remote shares as the secondary location in a pair. The remote share must be published in Active Directory. In addition, you must allow the default setup of the Dynamic File Services Storage Rights domain group and the `NDFS-servername` domain user, or manually set up an equivalent secure domain configuration. For information, see [Section 4.4, “Active Directory Domain Configuration for Remote Shares,” on page 53](#).

Using a Cloud Account as the Secondary Path in a Retention Pair

Dynamic File Services supports the use of cloud storage as the secondary location in a retention pair. The cloud account must be configured and available to the retention pair whenever actions are performed that involve the secondary path, such as the initial setup of the pair, policy moves, manual moves, and retention reviews.

The authentication credentials that are required by the cloud provider are stored securely by Dynamic File Services so that the software can access the files stored in the cloud on your behalf. For information about the supported cloud providers and the credentials required, see [Section 4.11, “Using Cloud Storage as the Secondary Path in a Retention Pair,”](#) on page 63.

Using the Repair Tool GUI and Pair Check Utility

The Repair Tool GUI and Pair Check utility require that you be logged in as the Administrator user or as a user with Administrator privileges. If remote shares are used in pairs, the administrator user must also have access rights on the remote share and file system permissions on the secondary storage location. Otherwise, the secondary location is reported as missing. One way to assign the necessary rights is to add the administrator user as a member of the `Dynamic File Services Storage Rights` group.

15.1.2 User Access to Pairs

In order to see the merged view of the two storage locations, users access the Dynamic File Services pair through a Windows network share that you set up on the primary location. Access to data is governed by file system access rights that are set by an administrator while viewing the merged view of the data.

Users should not access data stored in the pair via the secondary location, so you must not allow users to access the secondary location directly or via a network share. Network shares on, above, or below the secondary path should be removed, or they must be restricted from access by users.

In a Windows cluster, use cluster-managed network shares instead of server-based network shares.

15.1.3 Retention Reviewer Access to Pairs

Retention reviewers have rights to read all files on the secondary path. For example, assume that a file on server A is moved to server B by a policy run on the retention pair. The reviewer can view the file at server B during a Retention Review, even if that individual never had rights to access the file on server A.

15.1.4 SSL Certificate

The Dynamic File Services remote connection feature supports server-side SSL certificates. You can use a self-signed certificate (the default) or a signed certificate from a certification authority.

- ♦ [“Self-Signed Certificates”](#) on page 260
- ♦ [“Signed Certificates”](#) on page 260
- ♦ [“Self-Signed Certificates in a Cluster”](#) on page 260
- ♦ [“Accepting Certificates”](#) on page 260

Self-Signed Certificates

By default, remote communications between the Management Console running on a client and the Dynamic File Service running on a server are secured by using the SSL protocol. During the installation, DynamicFS creates and configures a self-signed certificate (*servername-DynamicFileServicesSSLCertificate*) for SSL communications to use. The DynamicFS SSL connection uses standard RSA SHA1 encryption with a 2048-bit key size. It binds the SSL connection to the configured Dynamic File Service port (default 8999).

You can also generate a new self-signed certificate after the install by using the *Certificate Configuration* option in the Dynamic File Service Controller. For information, see [Section 6.8.4, “Creating a Dynamic File Services Self-Signed Certificate,”](#) on page 118.

Signed Certificates

Signed SSL certificates that you acquire through a certification authority are also supported. Use this option if your enterprise security policy requires this level of security. You can set up a signed certificate by using the *Certificate Configuration* option in the Dynamic File Service Controller after the install. For information, see [Section 6.8.5, “Configuring a Signed Certificate for Dynamic File Services,”](#) on page 119.

Self-Signed Certificates in a Cluster

When you install DynamicFS on a cluster node, a self-signed SSL certificate is created for the Dynamic File Service on that node. You do not associate the SSL certificate with the Dynamic File Service cluster resource because each node of the cluster has a different self-signed SSL certificate.

When the Management Console connects to a Dynamic File Service cluster resource for remote management, DynamicFS uses the SSL certificate that is configured on the active node in the cluster. You are prompted to accept the certificate for the active server if it has not been previously accepted.

Accepting Certificates

The first time that an authorized administrator connects to a target DynamicFS server from the Management Console, the user is prompted to accept the DynamicFS SSL certificate for the target server. If the server is in a Windows cluster, the user is prompted the first time that a connection is made to each node in the cluster.

The accepted certificate is added to the user’s personal local computer certificates on the management computer.

Each user that manages DynamicFS on a target server is prompted to accept the certificate when connecting for the first time to the server.

15.1.5 Service Port

During the install, Dynamic File Services provides an option to modify the port to use for remote management of the Dynamic File Service. By default, DynamicFS uses port 8999. This port can be modified during or after the install. For information, see [Section 6.10, “Configuring Ports for the Service and Retention Review,”](#) on page 124.

15.1.6 Windows Firewall Access

During the install, Dynamic File Services provides an option to enable an exception in the server firewall for the configured Dynamic File Service port (default 8999). The firewall exception is enabled by default. Disabling the firewall exception effectively disables the remote management capability for the Dynamic File Service. You can also enable and disable the firewall exception after the install. For information, see [Section 6.9, “Configuring Firewall Access for the Service Port,” on page 122](#).

When the *Windows Firewall Access* option is enabled, DynamicFS automatically configures an exception for the configured Dynamic File Service port (default 8999) in the Windows Firewall. By default, the scope of the exception is set as *Any computer (including on the Internet)*. You can modify this manually by using the Windows Firewall dialog box. Other scope options can be found by going to the *Windows Firewall > Exceptions* page, double-clicking the exception to edit it, then selecting *Change Scope*. The alternative manual settings are *My network (subnet) only* and *Custom list*.

15.1.7 Dynamic File Services Group

During the install, a new administrator user group called `Dynamic File Services` is created on computers where you install Service component, or in Active Directory in a Domain. The user name you use to log in to the server when you install the software is automatically assigned as a member of the group. Other members can be added after the installation. Only members of the `Dynamic File Services` group and the Administrator user account on the machine are allowed to manage DynamicFS. In an Active Directory Domain, Domain Admins can also manage DynamicFS for the server. For information, see [Section 4.2, “Management Groups,” on page 52](#).

In a Workgroup, if you use Dynamic File Services in a Windows cluster, ensure that you assign the same users in the `Dynamic File Services` group on each node so they can log in on whatever node is active.

Logins to the Dynamic File Service are authenticated by using Kerberos in a Windows domain, or by using NTLM (NT LAN Manager) if a Windows domain is not present.

15.1.8 Dynamic File Services Retention Review Group

During the install, a group called `Dynamic File Services Retention Review` is created on computers where you install Service component, or in Active Directory in a Domain. Initially, there are no members assigned to the group. Members of the `Dynamic File Services Retention Review` group are allowed to perform reviews of data in the retention repository of all retention pairs. For information, see [Section 4.2, “Management Groups,” on page 52](#).

In a Workgroup, if you use Dynamic File Services in a Windows cluster, ensure that you assign the same users in the `Dynamic File Services Retention Review` group on each node so they can log in on whatever node is active.

Logins to the Dynamic File Service are authenticated by using Kerberos in a Windows domain, or by using NTLM (NT LAN Manager) if a Windows domain is not present.

15.1.9 Reviewers for a Retention Pair

You can assign individual users and groups to be reviewers of a given retention pair. Use the *Reviewers* tab on the pair's Properties page. It is not necessary for the reviewers assigned to a pair to also be members of the `Dynamic File Services Retention Review` group. The `Dynamic File Services Retention Review` group is assigned to the Reviewers list by default when you create the retention pair. You can remove the group from the list in order to restrict access to a few specific users and groups.

15.1.10 Windows User Account Control

Windows User Account Control is available on some Windows platforms. If it is enabled, Windows User Account Control typically prompts you for permission to run an application when the application starts. If you are prompted for an administrator password or confirmation, specify the user name and password of the Administrator user or a user with Administrator privileges.

15.1.11 Network Connections

You can run the Management Console on the same server where you are configuring pairs, or from a different Windows server or workstation. If you use a different computer to manage pairs, you must have an IP-based network connection set up between the two computers.

DynamicFS supports connections for IP addresses that use the IPv4 format. It also supports the use of DNS (Domain Name Service) names.

15.1.12 Network Shares

You must create a single network share on the primary folder of the pair in order to give users a merged view of the data. Users map a drive on their computers to the network share.

For secure access and authentication, users should access the data in the pair only via the network share that is set up on the primary path. If users directly access the primary path or secondary path, potential issues can arise with duplicate files or with access rights and attributes being out of synchronization between primary and secondary folders.

To prevent these issues, ensure that you remove network shares for the secondary path. In addition, shares must not be nested above or below the primary path or secondary path.

In an Windows cluster, always use the Windows cluster management tool and not Windows Explorer to manage file shares to folders on shared drives. Otherwise, changes made by using Windows Explorer are lost when these file shares fail over to other nodes in the cluster. Workstations should be in an Active Directory domain to access the cluster-managed file shares.

15.1.13 Remote Shares

You must publish a remote share in Active Directory in order to use it as the secondary location in a pair. For requirements, see [Section 4.9, “Using Remote Shares in an Active Directory Domain,” on page 60](#). For setup information, see [Section 8.3, “Preparing Remote Shares for Use in a Pair,” on page 146](#).

15.1.14 Auditing Management Events

Auditing of the management of the Dynamic File Service, pairs, and policies is integrated with DynamicFS and is provided as a basic benefit. The following files are used for auditing:

Table 15-1 Auditing Log File and Logging Control File

File	Description
C:\ProgramData\Dynamic File Services\audit\DswAuditLog.xml	Logs the management events for the Dynamic File Service, pairs, and policies

File	Description
AuditAndNotificationControl.xml in the C:\Program Files\Dynamic File Services\ folder, or in the folder where you installed the software.	Controls the logging behavior for the audit log

All Dynamic File Services management actions are audited, including authorized and non-authorized management actions. All authentication and authorization events for DynamicFS are also audited. No sensitive information is placed in the audit log.

15.1.15 Event Logging

DynamicFS uses Microsoft Event Viewer for logging the Dynamic File Service start/stop events and fatal errors such as application exceptions. See the [Microsoft TechNet Library \(http://technet.microsoft.com/en-us/library/ee624055\(WS.10\).aspx\)](http://technet.microsoft.com/en-us/library/ee624055(WS.10).aspx) for documentation on viewing events with the Event Viewer snap-in for Microsoft Management Console (MMC).

15.2 Registry Settings

The Dynamic File Services configuration settings are stored in the Windows registry in the following location:

```
HKEY_LOCAL_MACHINE\Software\Novell\Dynamic File Services
```

15.3 Service Configuration File

By default, Dynamic File Services stores configuration information about the Dynamic File Service in the following .xml file:

```
C:\Program Files\Dynamic File Services\DswCore.xml
```

15.4 Server Management Configuration File

By default, Dynamic File Services stores configuration information about the servers set up in the Management Console in the following .xml file:

```
C:\Program Files\Dynamic File Services\DswServers.xml
```

15.5 Database Files

By default, Dynamic File Services stores configuration information about its management objects in the following .xml files in the C:\ProgramData\Dynamic File Services folder:

Table 15-2 Database Files

Database	Configuration File
Cloud accounts	..\Clouds\DswCloudDatabase.xml
Pairs	..\Pairs\DswPairDatabase.xml

Database	Configuration File
Policies	..\Policies\DswPolicyDatabase_v2.xml
Schedules	..\Schedules\DswScheduleDatabase.xml

Snapshots of the pair, policy, schedule, and cloud account database files are saved in the ..\Snapshots*<day_of_the_week>* folder. The schedule for taking snapshots of the database files is stored in the C:\Program Files\Dynamic File Services\DswCore.xml file.

15.6 Notification Service Configuration Files

By default, Dynamic File Services stores configuration information about the email notification set up in the following .xml file:

C:\Program Files\Dynamic File Services\Plugins\EmailConfig.xml

15.7 Log Files and Logging Control Files

Dynamic File Services provides log files for monitoring the software, management, and policy enforcement events. The default location of log files is the C:\Program Files\Dynamic File Services folder.

Table 15-3 Component Log Files and Logging Control Files

Component	Log File	Logging Control File
Cloud Engine	DswCloudEngine.log	DswCloudEngine.config.xml
File System Inventory	DswInventory.log	DswInventory.config.xml
Pair Check	DswPairCheck.log	DswPairCheck.config.xml
Retention Policy	DswRetentionEngine.log	DswRetentionEngine.config.xml
Service	DswMcpCore.log	DswMcpCore.config.xml
Standard Policy	DswStandardEngine.log	DswStandardEngine.config.xml

DynamicFS uses Apache log4net open source software to provide logging for the Service. It is installed automatically with DynamicFS.

DynamicFS automatically configures the recommended logging settings for each of the logging control files with the information contained in the <log4net></log4net> XML tags within each file. The default logging level is the WARN level.

IMPORTANT: If you modify the log4net settings in a logging control file, do not modify information that is outside of the <log4net></log4net> XML tags.

The log4net software supports the following logging levels in order of increasing priority:

ALL
DEBUG
INFO

WARN (default setting for the Dynamic File Services logs)

ERROR

FATAL

OFF

For information about log4net software and the logging levels, see the *Apache Logging Services: log4net Manual* (<http://logging.apache.org/log4net/release/manual/configuration.html>).

16 FAQs and Troubleshooting

This section answers frequently asked questions about Novell Dynamic File Services (DynamicFS). It also describes workarounds for any known issues.

- ♦ [Section 16.1, “Why can’t I log in to the Dynamic File Services server?,” on page 267](#)
- ♦ [Section 16.2, “Can I cancel a policy that is running?,” on page 268](#)
- ♦ [Section 16.3, “How do I configure a policy to not run without disassociating it from the pair?,” on page 268](#)
- ♦ [Section 16.4, “How do I see what policies are running or what files have been moved?,” on page 268](#)
- ♦ [Section 16.5, “What can I do if the Service is not running?,” on page 268](#)
- ♦ [Section 16.6, “Why can’t I start the Service after using the Repair tool?,” on page 268](#)
- ♦ [Section 16.7, “Why can’t users see the data on a remote share?,” on page 269](#)
- ♦ [Section 16.8, “Access Denied error when modifying a file at the root of a secondary path,” on page 269](#)
- ♦ [Section 16.9, “Path Too Long Exception error in the Standard Policy log,” on page 269](#)
- ♦ [Section 16.10, “Pair Is Busy error for pair with a remote share as secondary,” on page 269](#)
- ♦ [Section 16.11, “File Transfer Size Exceeded Error,” on page 269](#)
- ♦ [Section 16.12, “Certificate error for the Retention Review Service,” on page 270](#)
- ♦ [Section 16.13, “Invalid File Handle error for a policy run,” on page 270](#)
- ♦ [Section 16.14, “How do I find event ID information?,” on page 270](#)
- ♦ [Section 16.15, “Diagnosing a Filter Driver failure,” on page 272](#)

16.1 Why can’t I log in to the Dynamic File Services server?

If you are having trouble logging in to the Dynamic File Services server from the Management Console, check the following configuration settings that are required for login:

- ♦ **Dynamic File Services Group:** The Administrator user account and users that have been added as members of the `Dynamic File Services` group are the only authorized administrators for pairs and policies on the target server. See [Section 6.3, “Configuring Administrators for Pair Management,” on page 102](#)
- ♦ **Service Port:** The port number (default 8999) must match the configured port on the target server. See [Section 6.10, “Configuring Ports for the Service and Retention Review,” on page 124](#).
- ♦ **Windows Firewall Access:** For remote sessions, the `Windows Firewall Access` option must be enabled on the target server to allow an exception in the Windows Firewall for the configured Dynamic File Service port. See [Section 6.9, “Configuring Firewall Access for the Service Port,” on page 122](#).

- ♦ **SSL Certificate:** For remote sessions, you must accept the valid DynamicFS certificate for the target server in order to set up a secure SSL connection between the client and the target server. See [Section 7.2, “Accepting a Dynamic File Services Certificate,”](#) on page 130.

The DynamicFS certificate on the target server must be a valid certificate. See [Section 6.8, “Configuring a Certificate for Secure Remote Management Sessions,”](#) on page 116.

16.2 Can I cancel a policy that is running?

You can stop a running policy by selecting the pair in the Management Console, then selecting *Actions > Stop running process*. This stops all policies currently running on the pair.

To ensure that a policy does not run at its next scheduled time, go to the policy’s Properties dialog box and uncheck it. For information, see [Section 10.5.2, “Removing a Schedule from a Single Policy,”](#) on page 196.

To stop the policy from running for a given pair, you can disassociate the policy from the pair. For information, see [Section 9.6, “Associating or Disassociating Pairs and Policies,”](#) on page 174.

16.3 How do I configure a policy to not run without disassociating it from the pair?

You can modify the policy’s schedule to change the schedule for all pairs without disassociating the policy from the pairs. For information, see [Section 10.5.2, “Removing a Schedule from a Single Policy,”](#) on page 196.

16.4 How do I see what policies are running or what files have been moved?

In the Management Console, double-click the Dynamic File Services pair to open the Statistics dialog box to see information about what policies are running, the policy execution history, and what files were moved or not moved by each run. For information, see [Section 13.2, “Viewing the Policy Execution History for a Pair,”](#) on page 230.

16.5 What can I do if the Service is not running?

The Dynamic File Service must be running before you can connect to and manage the server with the Management Console and the `DswCLI.exe` command. The Service starts automatically after the install and when you restart the server, except when the server starts in Windows Safe Mode. You can verify that the Service is running by viewing the status displayed in the Service Controller menu in the notification area or by looking for the `DswService.exe` process in the Windows Task Manager or the Windows Computer Management tool.

To start the Service, see [Section 6.4, “Starting and Stopping the Service,”](#) on page 105.

16.6 Why can’t I start the Service after using the Repair tool?

The Service cannot run while the Repair tool is open. Close the Repair tool dialog box, then try again to start the Service.

16.7 Why can't users see the data on a remote share?

If you are using a remote share as a secondary location in a pair and users cannot see the data on the secondary location, it might be because you have not properly set up the remote share.

To troubleshoot the problem, verify the following settings:

- ♦ The correct UNC path for the remote share is published in Active Directory.
- ♦ The `Dynamic File Services Storage Rights` group has all share permissions on the remote share.
- ♦ The `Dynamic File Services Storage Rights` group has all NTFS file system rights to the remote share location.
- ♦ The Service is running as the `NDFS-servername` proxy user that was created during the install, and this user is a member of the `Dynamic File Services Storage Rights` group.
- ♦ The `Dynamic File Services Storage Rights` group is a member of the Domain Admins group.
- ♦ As a Domain Admins user, you can access the UNC path to the secondary location from the DynamicFS server.

16.8 Access Denied error when modifying a file at the root of a secondary path

For a standard pair, a user can get an Access Denied error when modifying a file at the root of the secondary path if the `CreateFiles/WriteData` right is not set on the secondary path. For information, see [Section 4.8, "Access Rights for a Standard Pair,"](#) on page 60.

16.9 Path Too Long Exception error in the Standard Policy log

The Standard Policy engine gives a `PathTooLongException` error if a specified path, file name, or both are too long. It cannot move the file during a policy run if this error occurs. For information, see [Section 4.13, "File Name Path Length,"](#) on page 65.

16.10 Pair Is Busy error for pair with a remote share as secondary

If a pair uses a remote share as the secondary path, you might get a message that the pair is busy if the `Dynamic File Services Storage Rights` group has not been added as a user and granted all permissions for the remote share. For information, see [Section 4.9, "Using Remote Shares in an Active Directory Domain,"](#) on page 60.

16.11 File Transfer Size Exceeded Error

A `File Transfer Size Exceeded` error can occur if a policy or manual move attempts to upload a file that exceeds the maximum file size allowed by your cloud provider.

The maximum size per file that can be uploaded to cloud storage is governed by the service level agreement with your cloud storage provider. The storage quota and file size limit is enforced by your provider. In addition, a file must be smaller than the remaining available space below your quota. For information, see [Section 4.11.4, "Maximum File Size for Uploads to Cloud Storage,"](#) on page 64.

16.12 Certificate error for the Retention Review Service

When you connect to the Retention Review Service, some Web browsers report a certificate error if the Dynamic File Service uses a self-signed certificate. The error might continue to be reported even if the reviewers accept and install the certificate on their computers. This is a function of the Web browser and is unrelated to Dynamic File Services.

You can avoid getting this error by using a signed certificate that you have acquired from a certification authority. For information, see [Section 6.8.5, “Configuring a Signed Certificate for Dynamic File Services,”](#) on page 119.

16.13 Invalid File Handle error for a policy run

An Invalid File Handle error is reported for a policy run if the connection to either of the storage locations is lost when a file move is in progress. The move is incomplete. Two instances of the file appear in both locations, but only the file instance in the original location is valid. You must delete the invalid instance of the file.

To resolve this duplicate file situation, you can review the *Statistics > Policy execution history > Files not moved* report for the policy run to identify the duplicate file and the target location of the policy run. You can also run the Pair Check (`dswPairCheck.exe`) utility to find the duplicate file. Your knowledge of the policy direction setting for the policy run where the duplicate file was created can be used to determine which instance of the file is valid.

For information about how this occurs, see [Section 4.17.3, “Losing a Media Connection when Moving Files,”](#) on page 68. For information about reporting and resolving duplicate files, see [Section 8.12, “Reporting Conflicts for Duplicate Files,”](#) on page 154.

16.14 How do I find event ID information?

Dynamic File Services provides event identification codes (event IDs) to help the administrator understand the event that occurred. For error events, you can use event IDs to help identify possible sources and actions for a resolution or for a workaround.

- ♦ [Section 16.14.1, “Where are event IDs reported?,”](#) on page 270
- ♦ [Section 16.14.2, “Reporting error events to Novell,”](#) on page 270
- ♦ [Section 16.14.3, “Event ID categories and sources,”](#) on page 271

16.14.1 Where are event IDs reported?

Event IDs are currently reported for events for Dynamic File Services that are logged in the Microsoft Event Viewer. When an error event is reported, it usually indicates that a software or hardware error has occurred that does not allow a component of Dynamic File Services to continue processing.

16.14.2 Reporting error events to Novell

To improve the information that Novell has about resolving error events, we need to know when and how users are seeing them occur. Please help us gather this information by doing the following:

- 1 Record the event ID number.
- 2 Record the circumstances in which the error event occurred.

- 3 If you were able to resolve the error event on your own, record what you did to resolve the problem, and share the information with us.

Get It Documented

You can post your resolution by using the User Comments feature at the bottom of this online page, or go to www.novell.com/documentation/feedback.html and enter your comments there.

Report the Bug

If the event is one that needs to be fixed in the product, you can also report the problem and your resolution in [Novell Bugzilla \(https://bugzilla.novell.com\)](https://bugzilla.novell.com).

Before filing a bug, use the *Search* option to see if the problem has already been reported.

To create a new bug, select *New*, select *Novell Products* from the *Classification (Product Line)* drop-down list, select *Dynamic Storage Technology* from the *Product* drop-down list, click *Use This Product*, then complete the report form and submit it.

- 4 Search the [Novell Support Knowledgebase \(http://www.novell.com/support/\)](http://www.novell.com/support/) for more information about the error.

You can also find answers to your problem in the [Novell Product Support Forum for Novell Dynamic File Services \(https://forums.novell.com/novell-product-discussions/file-networking-services/dynamic-file-services/\)](https://forums.novell.com/novell-product-discussions/file-networking-services/dynamic-file-services/). The forums provide free peer-to-peer and volunteer technical support for Novell Products.

- 5 If you are unable to resolve the problem and need technical support, please contact a [Novell Support Provider \(http://support.novell.com/support_options.html\)](http://support.novell.com/support_options.html).

16.14.3 Event ID categories and sources

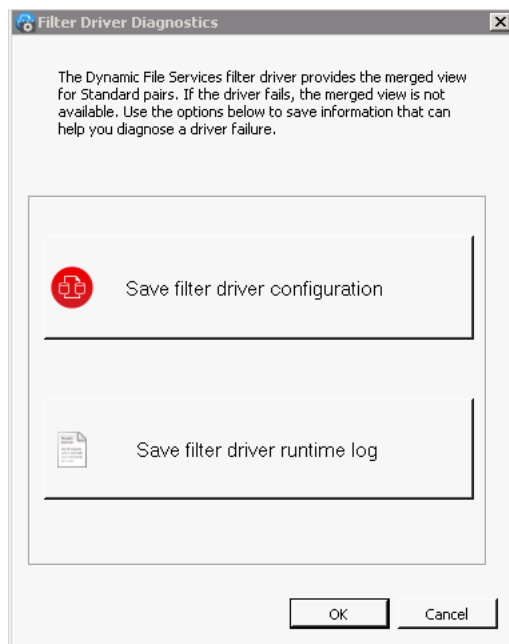
Event ID Category	Event Source
100	DswApi
200	DswBuiltIn
300	DswCertificateLib
400	DswCLI
500	DswStandardPolicy
600	DswIoctlLib
700	DswIpcClient
800	DswIpcCore
900	DswIpcListener
1000	DswLib
1100	DswMcpCore
1200	DswMcpDatabase
1300	DswMcpService
1400	DswMcpServiceController
1500	DswRepair

Event ID Category	Event Source
1600	DswPairCheck
1700	DswCert
1800	DswDump
1900	DswUpgrade
3000	DswInventory

16.15 Diagnosing a Filter Driver failure

The Dynamic File Services filter driver provides the merged view for Standard pairs. If the driver fails, the merged view is not available. Use the Filter Driver Diagnostics tool to save information that can help you diagnose a driver failure. Be prepared to provide the driver configuration and runtime log files to [Novell Support \(http://www.novell.com/support/\)](http://www.novell.com/support/).

- 1 Log in to the DynamicFS server as an Administrator user or Domain Admin user.
- 2 Right-click the *Service Controller* icon in the notification area, then select *Filter Driver Diagnostics*.



- 3 Click *Save filter driver configuration*, navigate to a location, specify a file name, then click *OK*.
- 4 Click *Save filter driver runtime log*, navigate to a location, specify a file name, then click *OK*.
- 5 Click *OK* to close the dialog box.

A Using iSCSI Targets in a Cloud Storage Environment

You can use a cloud-based iSCSI target device as the secondary location for Novell Dynamic File Services pairs. Novell supports multiple cloud storage and IaaS (Infrastructure as a Service) solution providers.

IMPORTANT: Refer to the third-party vendor documentation for detailed information about how to subscribe to and use cloud-based computing and storage resources.

This section provides one example of how to set up a Linux iSCSI Target server and storage devices in the cloud. The iSCSI target devices are connected to a Windows Server 2008 server running iSCSI Initiator software in your local network. After you attach the iSCSI devices to your local server, you can use them as the secondary storage location in a Dynamic File Services pair.

The example iSCSI target solution is based on the following components:

- ♦ Amazon Elastic Compute Cloud (Amazon EC2) environment, including the following:
 - ♦ [A Linux virtual machine instance \(http://aws.amazon.com/ec2/#instance\)](http://aws.amazon.com/ec2/#instance)
 - ♦ [An Elastic Block Store volume \(http://aws.amazon.com/ebs/\)](http://aws.amazon.com/ebs/)
 - ♦ [An Elastic IP address \(http://aws.amazon.com/ec2/#features\)](http://aws.amazon.com/ec2/#features)
- ♦ openSUSE 11 SP2 Linux server operating system on the virtual machine
- ♦ Linux iSCSI Target software installed on the virtual machine
- ♦ Microsoft iSCSI Software Initiator Version 2.08 installed on your Windows Server 2008 computer
- ♦ Microsoft iSCSI CLI command line tool

Use the following procedures to set up the cloud-based Linux iSCSI Target server and target devices:

- ♦ [Section A.1, “Guidelines for Using iSCSI Targets in the Cloud,” on page 274](#)
- ♦ [Section A.2, “Don’t Have an Existing Amazon EC2 Account?,” on page 275](#)
- ♦ [Section A.3, “Already Have an Existing Amazon EC2 Account?,” on page 275](#)
- ♦ [Section A.4, “Launching an openSUSE Linux VM Instance,” on page 276](#)
- ♦ [Section A.5, “Setting Up an Elastic IP Address,” on page 276](#)
- ♦ [Section A.6, “Creating an Elastic Block Store Volume,” on page 277](#)
- ♦ [Section A.7, “Opening Ports for iSCSI Communications,” on page 277](#)
- ♦ [Section A.8, “Connecting to the iSCSI Target Virtual Machine via SSH,” on page 278](#)
- ♦ [Section A.9, “Installing the iSCSI Target Software on the openSUSE Linux VM,” on page 281](#)
- ♦ [Section A.10, “Configuring the iSCSI Target Device,” on page 282](#)
- ♦ [Section A.11, “Configuring the iSCSI Initiator Software on a Windows Server,” on page 283](#)
- ♦ [Section A.12, “Formatting the iSCSI Device as NTFS on the Windows Server,” on page 284](#)

- ♦ [Section A.13, “Creating a Dynamic File Services Pair with the Cloud-Based iSCSI Device,”](#) on page 284
- ♦ [Section A.14, “Additional Information,”](#) on page 285

A.1 Guidelines for Using iSCSI Targets in the Cloud

Consider the following guidelines for your cloud-based iSCSI target solution:

- ♦ [Section A.1.1, “Secure Connections in the Cloud,”](#) on page 274
- ♦ [Section A.1.2, “Secure Access to iSCSI Target Devices,”](#) on page 274
- ♦ [Section A.1.3, “Backup in the Cloud,”](#) on page 274
- ♦ [Section A.1.4, “Costs for Cloud Services,”](#) on page 274

A.1.1 Secure Connections in the Cloud

In this example, access to files occurs across the public Internet. A production environment typically requires a more secure cloud solution. Other IaaS cloud environments provide secure solutions.

For example, the Amazon Virtual Private Cloud (Amazon VPC) extends your own network segment into the cloud across a VPN (virtual private network) connection. This allows you to use your own IP address ranges and keeps all communications secure in a VPN tunnel as files travel across the public Internet.

In a production environment, you should use IPSec for connections (or use a secure solution like the Amazon VPC) to ensure that your data cannot be snooped on the wire.

A.1.2 Secure Access to iSCSI Target Devices

In this example, authentication is not configured for the iSCSI target device. In a production environment, you should configure and require authentication for each iSCSI target device so no one else can attach to your iSCSI target.

A.1.3 Backup in the Cloud

The Amazon EBS solution provides a snapshot option that you can enable to create snapshots in the cloud for your EBS volume.

You can also create a snapshot of your configured VM instance. It is easier to restore the VM from a snapshot than to re-create it.

A.1.4 Costs for Cloud Services

Refer to the pricing information on the [Amazon EC2 Web site \(http://aws.amazon.com/ec2/#pricing\)](http://aws.amazon.com/ec2/#pricing) to determine your potential costs for the cloud-based openSUSE Linux VM, EBS volumes, and the related traffic.

A.2 Don't Have an Existing Amazon EC2 Account?

If you do not have an Amazon EC2 account, you need to sign up for one. You must provide credit card information, provide a phone number where you can enter a confirmation PIN number, and sign up for an Amazon Web Services (AWS) account. You must also create an X.509 certificate. AWS uses the private certificate and key to verify and authenticate your identity as you manage your cloud resources.

- 1 In a Web browser, go to the [Amazon EC2 Web Services page \(http://aws.amazon.com/ec2/\)](http://aws.amazon.com/ec2/), then select *Sign up for an Amazon EC2*.
- 2 Provide your identity information.
- 3 Provide your credit card information.
- 4 Provide your phone contact information.
- 5 When you receive an automated phone call that asks you for a confirmation PIN number, enter the number that appears on the computer screen.
- 6 Follow the on-screen instructions to sign up for an Amazon Web Services account.

When the sign-up is complete, you receive the following message on the screen, and you receive an email stating that you have signed up for the Service.

Thank you for signing up for Amazon EC2.

We will email you a confirmation when the web services are available for you to use. In order to begin using this service, you will need a X.509 certificate. You can [Create a New X.509 Certificate](#) or [Upload Your X.509 Certificate](#) on the [Security Credentials](#) page.

- 7 On the Thank You page, select *Create a New X.509 Certificate*, then click *Yes* to create the new certificate and key files.

You can access this page later by opening the [Amazon EC2 Web Services page \(http://aws.amazon.com/ec2/\)](http://aws.amazon.com/ec2/) in a Web browser, logging in to your account, then selecting *Account > Security Credentials > Access Credentials > X.509 Certificates > Create a New X.509 Certificate*.

- 8 On the Certificate page, save the `certxxxxxxx.pem` and `pk-xxxxxxxxxxxxx.pem` files to a secure location on your local computer.
- 9 Continue with [Section A.3, "Already Have an Existing Amazon EC2 Account?,"](#) on page 275

A.3 Already Have an Existing Amazon EC2 Account?

- 1 In a Web browser, go to the [Amazon Web Services console \(https://console.aws.amazon.com/ec2/home\)](https://console.aws.amazon.com/ec2/home), then log in with your AWS identity and credentials.
- 2 Create a key pair:
 - 2a In the left pane under *Networking and Security*, click *Key Pairs*.
 - 2b Click *Create a Key Pair*.
 - 2c Type a name for the key (such as `xxxkey`), then click *Create*.
 - 2d Save the `xxxkey.pem` file to a secure location on your local computer.

This key is used later to connect via SSH (Secure Shell) to the Linux iSCSI Target virtual machine.

- 3 Continue with [Section A.4, "Launching an openSUSE Linux VM Instance,"](#) on page 276.

A.4 Launching an openSUSE Linux VM Instance

- 1 Continuing in the Amazon Web Services console, in the left pane under *Instances*, click *Instances*.
- 2 Click *Launch Instance* to start the Request Instances Wizard.
- 3 Under *Community AMIs*, search all images for openSUSE AMIs. (Select *All Images*, type SUSE in the *Search* field, then press Enter.)
- 4 Click *Select* next to an AMI for the openSUSE 11 SP2 Linux virtual machine that you want to use. For example, we selected AMI 37b9555e, which created the following instance:

```
ID= "ami-37b9555e" Manifest= elihullc/ami/openSuSE-11.2-ec2-server.i386-1.0.0.ami.manifest
```

- 5 In *Number of Instances*, select 1.
- 6 Specify the *Availability Zone*. For example, select *us-east-1b*.

IMPORTANT: Ensure that you choose the same availability zone later for the volume you create for the iSCSI NTFS file system.

- 7 Select the *Instance Type*. For example, select *Small(m1.small,1.7GB)*.
- 8 Select *Launch Instances*, then click *Continue*.
- 9 Specify the following settings for the openSUSE Linux Server VM instance, then click *Continue*:

Instance Settings	Sample Value
Kernel ID	Select <i>Use Default</i> .
RAM Disk ID	Select <i>Use Default</i> .

- 10 Select *Choose from your existing key pairs*, choose the key you created (`xxxkey.pem`) from the dropdown menu, then click *Continue*.
- 11 In *Security Groups*, select *Default* or your preferred setting, then click *Continue*.
- 12 Click *Launch*.
- 13 Close the Request Instances Wizard, then wait until the instance of your openSUSE 11 SP2 Linux virtual machine is started and running.
- 14 Continue with [Section A.5, "Setting Up an Elastic IP Address,"](#) on page 276.

A.5 Setting Up an Elastic IP Address

An Elastic IP address is a public IP address that allows you to access this virtual machine via the public Internet.

- 1 Continuing in the Amazon Web Services console, in the left pane under *Networking and Security*, click *Elastic IPs*.
- 2 Click *Allocate New Address*, then click *Yes, allocate*.
A newly assigned public IP address appears in the list. Keep a record of this IP address.
- 3 Select the check box next to the new IP address, then click *Associate*.
- 4 Select the instance ID for the openSUSE Linux VM (the currently running AMI instance), then click *Associate*.
- 5 Continue with [Section A.6, "Creating an Elastic Block Store Volume,"](#) on page 277.

A.6 Creating an Elastic Block Store Volume

- 1 Continuing in the Amazon Web Services console, in the left pane under *Elastic Block Store*, click *Volumes*.
- 2 Click *Create Volume*, then specify the volume settings:

Volume Setting	Sample Value
<i>Size</i>	Specify 100 GiB (gibibyte, the IEC standard unit).
<i>Availability Zone</i>	From the drop-down menu, select <i>us-east-1b</i> . IMPORTANT: Use the same same value that you specified for the virtual machine.
<i>Snapshot</i>	Select <i>No Snapshot</i> .

- 3 Click *Create*, then wait for the volume to be created.
This might take several minutes. The time varies according to the size of the EBS volume. The volume appears in the list with a status of *creating* (yellow icon). Click *Refresh* periodically until the volume status shows a status of *available* (blue icon)
- 4 Select the check box next to the newly created volume.
- 5 Click *Attach Volume*.
- 6 Select the openSUSE Linux VM (the currently running AMI instance).
- 7 In *Device*, specify the device path.
The default path is `/dev/sdf`. You can use the default path if it is the first volume you are attaching to the VM. If you add more EBS volumes, specify a different path for each one.
- 8 Click *Attach*.
The EBS volume is attached to the openSUSE Linux VM (the running AMI instance). The status changes to *in use* (green icon).
- 9 Continue with [Section A.7, “Opening Ports for iSCSI Communications,”](#) on page 277.

A.7 Opening Ports for iSCSI Communications

- 1 Continuing in the Amazon Web Services console, in the left pane under *Networking and Security*, click *Security Groups*, then click *Default*.
- 2 Scroll to the bottom of the page to view the *Connection Methods* table.
- 3 From the *Connection Methods* drop-down menu, select *SSH*, specify 22 as the *From Port* and the *To Port*, set the *Source IP* to `0.0.0.0/0`, then click *Save*.
The `0.0.0.0/0` setting for the *Source IP* leaves the SSH connection open to access from any IP address. To be more secure, set the *Source IP* to the IP address of the Windows server from which you use SSH to access the VM.
- 4 Create a custom port 3260 for the iSCSI communications.

To be more secure, set the *Source IP* to the IP address of the Windows server that will be accessing the iSCSI targets.

- 4a** From the *Connection Methods* drop-down menu, select *Custom*, select *TCP*, specify 3260 as the *From Port* and the *To Port*, set the *Source IP* to 0.0.0.0/0, then click *Save*.
- 4b** From the *Connection Methods* drop-down menu, select *Custom*, select *UDP*, specify 3260 as the *From Port* and the *To Port*, set the *Source IP* to 0.0.0.0/0, then click *Save*.
- 5** Continue with [Section A.8, “Connecting to the iSCSI Target Virtual Machine via SSH,”](#) on page 278.

A.8 Connecting to the iSCSI Target Virtual Machine via SSH

To manage the newly created virtual machine, connect to the server via SSH from the local computer where you downloaded the `xxxkey.pem` file. In the initial SSH session, you connect as the `root` user. Later, you can create other identities on the server for administration purposes and log in to the session with a different user name.

- ♦ [Section A.8.1, “Getting the SSH Syntax Information,”](#) on page 278
- ♦ [Section A.8.2, “Using SSH on Windows,”](#) on page 278
- ♦ [Section A.8.3, “Using SSH on Linux,”](#) on page 281

A.8.1 Getting the SSH Syntax Information

The syntax to use for your SSH connection is provided by the *Instances* option in the Amazon Web Services console.

- 1** Continuing in the Amazon Web Services console, in the left pane under *Instances*, click *Instances*, then select the check box next to the openSUSE Linux VM (the currently running AMI instance).
- 2** From the *Instance Actions* drop-down menu, select *Connect*.

The pop-up dialog box provides the syntax information you need to connect via SSH to your virtual machine.

The general syntax to SSH is:

```
ssh -i xxxkey.pem root@ec2-xxx-xxx-xxx-xxx-xx.xxxxxxx-x.amazonaws.com
```

- 3** Use one of the following methods to connect via SSH to the virtual machine:
 - 3a** [Section A.8.2, “Using SSH on Windows,”](#) on page 278
 - 3b** [Section A.8.3, “Using SSH on Linux,”](#) on page 281

A.8.2 Using SSH on Windows

When you work with the key file (`xxxkey.pem`) on a Windows machine, you need to convert the key to use a file format that is compatible with the SSH connection method you plan to use.

This section describes how to use PuTTY software for the SSH connection. PuTTY cannot directly open PEM key files. You must convert the key file to PPK format. The setup is a one-time process. After you set up an SSH session in PuTTY, you can easily connect to the VM at any time.

- ♦ [“Downloading the PuTTY Software”](#) on page 279
- ♦ [“Converting the PEM Key File to PPK Format”](#) on page 279
- ♦ [“Setting Up the Key File and Passphrase in the Pageant Authentication Agent”](#) on page 279

- ♦ “Configuring an SSH Session in PuTTY” on page 280
- ♦ “Connecting via SSH with PuTTY” on page 280

Downloading the PuTTY Software

- 1 In a Web browser, go to the [PuTTY Download page \(http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html\)](http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html).
- 2 Download the following software to your Windows machine:

Software	File Name	Description
PuTTY	putty.exe	A Telnet and SSH client
PuTTYgen	puttygen.exe	An RSA and DSA key generation utility
Pageant	pageant.exe	An SSH authentication agent for PuTTY

- 3 Continue with “[Converting the PEM Key File to PPK Format](#)” on page 279.

Converting the PEM Key File to PPK Format

- 1 Launch the PuTTYgen software by double-clicking the `puttygen.exe` file, or by right-clicking the file and selecting *Run as administrator*.
- 2 In the PuTTY Key Generator window, click *Load*, then select the `xxxkey.pem` file that you downloaded to your local computer in [Section A.3, “Already Have an Existing Amazon EC2 Account?”](#) on page 275.

- 3 After the key information is loaded, specify a key comment and passphrase.

The *Key passphrase* and *Confirm passphrase* fields allow you to choose a passphrase for your key that is used to encrypt the key on the disk. Use a strong passphrase for a more secure solution. Do not forget your passphrase. There is no way to recover it.

You must enter the passphrase when you use the key to connect via SSH to the virtual server. To avoid entering the passphrase each time you start an SSH session, you can set up the key and passphrase in Pageant, as described in “[Setting Up the Key File and Passphrase in the Pageant Authentication Agent](#)” on page 279.

- 4 Save the private key in `.ppk` format.

The converted key is saved as `xxxkey.ppk`. Ensure that you store the `xxxkey.pem` and `xxxkey.ppk` key files in a secure location on your local computer.

- 5 Continue with “[Setting Up the Key File and Passphrase in the Pageant Authentication Agent](#)” on page 279.

Setting Up the Key File and Passphrase in the Pageant Authentication Agent

Pageant is an SSH authentication agent. It holds an authentication key in memory, already decoded, so that you can start SSH sessions often, without needing to type a passphrase each time. PuTTY automatically retrieves the decoded key from Pageant when you start your SSH session with the virtual machine. When you stop the Pageant from running, the decoded key is removed from memory.

- 1 Launch the Pageant software by double-clicking the `pageant.exe` file, or by right-clicking the file and selecting *Run as administrator*.

The Pageant authentication agent starts running and places an icon in the notification area.

- 2 In the notification area, right-click the *Pageant PuTTY authentication agent* icon, then select *Add Key*.
- 3 In the Select Private Key File dialog box, browse to locate and select the `xxxkey.ppk` file you created in [“Converting the PEM Key File to PPK Format” on page 279](#), then click *Open*.
- 4 When you are prompted, specify the passphrase for the `xxxkey.ppk` file.

The key appears in the *Pageant Key List*.

The Pageant authentication agent must be running when you connect to the virtual machine with a PuTTY SSH session in order for Pageant to provide decoded key information.

- 5 Continue with [“Configuring an SSH Session in PuTTY” on page 280](#).

Configuring an SSH Session in PuTTY

- 1 Launch the PuTTY software by right-clicking the `putty.exe` file, then selecting *Run as Administrator*.
- 2 In the left pane, select *Session*.
- 3 In *Host Name (or IP address)*, specify the Elastic IP address that you set up for the virtual machine.

You can alternately use the public DNS name of the virtual machine. You can find the DNS name by looking at the virtual machine instance in the Amazon AWS Management Console.

- 4 In *Protocol*, select *SSH*.
- 5 Set up the authentication settings:
 - 5a In the left pane, select *Connection > SSH*.
 - 5b In the left pane, select *Connection > SSH > Auth*.
 - 5c Under *Authentication methods*, select *Attempt authentication using Pageant*. This is selected by default.
 - 5d In *Private key file for authentication*, browse to locate and select the `xxxkey.ppk` file you converted in [“Converting the PEM Key File to PPK Format” on page 279](#), then click *Open*.
- 6 In the left pane, select *Session*.
- 7 Under *Saved Sessions*, specify a name for this connection (such as `iSCSI_Target_VM`), then click *Save*.

The name appears in the list under *Saved Sessions*.

- 8 Close PuTTY.

The PuTTY SSH session setup is complete. You can use PuTTY to connect to the virtual machine with your saved SSH session at any time.
- 9 Continue with [“Connecting via SSH with PuTTY” on page 280](#).

Connecting via SSH with PuTTY

After you have set up the SSH session in PuTTY, you can use PuTTY to run the authenticated SSH session at any time.

- 1 Launch the PuTTY software by double-clicking the `putty.exe` file, or by right-clicking the file, then selecting *Run as Administrator*.
- 2 In the PuTTY window, double-click the saved SSH session for the virtual machine, or select the session and click *Open*.

If you are not running Pageant, you are prompted for the passphrase for the authentication key. Provide the passphrase to continue.

A Login dialog box pops up for your OpenSSH session.

- 3 When you are prompted, log in as the `root` user.

After you are successfully connected, you are presented with a terminal console prompt for the virtual machine.

- 4 Continue with [Section A.9, “Installing the iSCSI Target Software on the openSUSE Linux VM,”](#) on page 281.

A.8.3 Using SSH on Linux

- 1 On the local machine, open a terminal console, then log in as the `root` user.

- 2 Go to the folder where you saved the `xxxkey.pem` file. At the terminal console prompt, enter

```
cd /path_to_key_file_folder
```

- 3 Connect via SSH to the virtual machine.

The general syntax to SSH is:

```
ssh -i xxxkey.pem root@ec2-xxx-xxx-xxx-xxx-xx.xxxxxxx-x.amazonaws.com
```

- 4 Click *Yes* to connect to the virtual machine.

- 5 Keep the console open and do not terminate the SSH session.

- 6 Continue with [Section A.9, “Installing the iSCSI Target Software on the openSUSE Linux VM,”](#) on page 281.

A.9 Installing the iSCSI Target Software on the openSUSE Linux VM

Use YaST2 to install the iSCSI Target software. This step is done only once to set up the software on the VM.

- 1 Continuing in your SSH session with the virtual machine, launch YaST2 by entering

```
yast2
```

The AMI image instance has no GUI installed by default.

- 2 Go to *Software Management*.

- 3 If you are prompted with the *Update License* message, select *Import* to accept and import the GNU Key.

- 4 Wait until the Package Manager is loaded.

It takes a few minutes to load the Package Manager and to download the package list.

- 5 In the Package Manager, search for the iSCSI packages. (In the *Search* field, type `iscsi`, then press Enter.)

- 6 From the list of iSCSI packages, select the following iSCSI Target software packages:

```
iscsitarget  
yast2-iscsi-server
```

- 7 Select *Accept* (lower right corner), then select *OK* to continue with the install.

Wait until the install is complete.

- 8 Select *Quit* to exit YaST, which allows the installation of the iSCSI Target management plug-in to YaST2.
- 9 Keep the console open and do not terminate the SSH session.
- 10 Continue with [Section A.10, “Configuring the iSCSI Target Device,”](#) on page 282.

A.10 Configuring the iSCSI Target Device

- 1 Continuing in your SSH session with the virtual machine, launch YaST2 by entering

```
yast2
```
- 2 In YaST2, go to *Network Services > iSCSI Target*.
YaST opens to the iSCSI Target Overview page with the *Service* tab selected.
- 3 Under *Service Start*, select *When booting*.
This option is needed to automatically start the Linux iSCSI Initiator service on subsequent server restarts.
- 4 Press Alt+G to go to the *Global* section.
- 5 In the *Global* section, leave the target device open for anonymous connections by selecting *No Authentication*.
In a production environment, you can set credentials to make the connection more secure.
- 6 Press Alt+T to go to the *Target* section.
- 7 In the *Target* section, press Alt+A to select *Add*.
An example iSCSI target device (`iqn.2001-04.com.example:storage.disk2.sys1.xyz`) appears in the list. This is not your device. Each iSCSI target device has a unique IQN (iSCSI qualified name).
- 8 Press Alt+A to add a new iSCSI target.
- 9 Specify the *LUN* settings for the iSCSI target device:
 - 9a Specify the LUN value. The default is 0.
 - 9b Specify *Type* as *fileio*. This is the default.
 - 9c Specify the *Path* as `/dev/sdf` (or the path value you specified in the EBS setup).
 - 9d Select *OK* to continue.
- 10 Select *Next*, select *OK*, then select *Yes* when you are prompted to restart the iSCSI Target service with the following command:

```
rciscsitarget restart
```
- 11 Select *Quit* to exit YaST.
- 12 Use either of the following methods to view the IQN for the iSCSI device you created:
 - ♦ Launch YaST2, and go to *Network Services > iSCSI Target*.
 - ♦ View the device entry in the `/etc/ietdf.conf` file by using the `cat` command.The target device’s IQN has a fixed syntax that looks like the following:

```
iqn.yyyy-mm.<reversed domain name>:unique_id
```
- 13 (Optional) Modify the IQN by opening the `/etc/ietdf.conf` file in a `vi` text editor to specify a `unique_id` value that satisfies your company naming conventions. The name must be globally unique within your network.

For example:

iqn.2010-04.com.amazonaws.xxxxxx-1.ec2-xxx-xxx-xxx-xx.:storage.disk2.sys1.xyz

- 14 Record the IQN of the target device.

You need the IQN later to connect the target device to the Windows server.

- 15 Exit the SSH session.

- 16 Continue with [Section A.11, “Configuring the iSCSI Initiator Software on a Windows Server,”](#) on page 283.

A.11 Configuring the iSCSI Initiator Software on a Windows Server

- 1 On a Windows Server 2008 server, open a Web browser and go to the [Microsoft Downloads Center \(http://www.microsoft.com/downloads/details.aspx?familyid=12cb3c1a-15d6-4585-b385-befd1319f825&displaylang=en\)](http://www.microsoft.com/downloads/details.aspx?familyid=12cb3c1a-15d6-4585-b385-befd1319f825&displaylang=en), then download and install the Microsoft iSCSI Software Initiator Version 2.08.
- 2 Launch the iSCSI Initiator.
- 3 Open a command prompt console with administrator privileges. Select *Start > All Programs > Accessories*, right-click *Command Prompt*, then select *Run as Administrator*.
- 4 At the command prompt, use the `iscsicli` command to add a target device by entering:

```
iscsicli QAddTarget iqn_target_device elastic_ip_address
```

Parameter	Description
<code>iqn_target_device</code>	Use the IQN of the iSCSI target device that you set up in Section A.10, “Configuring the iSCSI Target Device,” on page 282.
<code>elastic_ip_address</code>	Use the public Elastic IP address that you set up for the openSUSE Linux VM in Section A.5, “Setting Up an Elastic IP Address,” on page 276.

You must use the command line method to set up the cloud-based iSCSI target device rather than the iSCSI Initiator GUI. This step is required because of the address translation that occurs between the public Elastic IP address and private IP address on the openSUSE Linux VM behind the Amazon AWS firewall. The *Discovery* option in the iSCSI Initiator GUI finds the Amazon AWS private IP address for the openSUSE Linux VM, and not the public IP address that you set up for it. If the private IP address is associated with the target device, you are unable to connect to the device across the public Internet.

- 5 Close the command prompt console.
- 6 In the iSCSI Initiator Properties window, click the *Targets* tab.
- 7 Select the IQN of the target device, then click *Connect*.
- 8 Select the check box next to *Add this connection to the Favorites List* to enable the automatic restart.
- 9 Click *Advanced*.
- 10 On the *General* tab of the Advanced Settings page, from the *Target portal IP* drop-down list, select the IP address you entered in [Step 4](#), which is the Elastic IP address for the iSCSI Target server in the cloud.
- 11 Click *OK* to apply the changes.
- 12 Click *OK* to connect to the target device.

- 13 Click *OK* again to exit the iSCSI Initiator Properties page.
- 14 Continue with [Section A.12, “Formatting the iSCSI Device as NTFS on the Windows Server,”](#) on page 284.

A.12 Formatting the iSCSI Device as NTFS on the Windows Server

- 1 On the Windows server, launch the iSCSI Initiator software.
- 2 In the iSCSI Initiator Properties page, click the *Volume and Devices* tab.
- 3 Click *Auto Configure*.
- 4 Click *OK* to apply the changes and exit.
- 5 Go to the Windows Disk Management to view the disk.
- 6 Select the disk and set it to *Online*.
- 7 Initialize the disk.

For information, see “[Overview of Disk Management](http://technet.microsoft.com/en-us/library/dd163558.aspx)” (<http://technet.microsoft.com/en-us/library/dd163558.aspx>) in the *Microsoft TechNet Library*.

- 8 Create a volume on the disk and format it as NTFS.

For information, see “[Partitions and Volumes](http://technet.microsoft.com/en-us/library/dd163559.aspx)” (<http://technet.microsoft.com/en-us/library/dd163559.aspx>) in the *Microsoft TechNet Library*.

The target device is ready to use on your local server. You can use the disk as if it is a local disk.

- 9 Continue with [Section A.13, “Creating a Dynamic File Services Pair with the Cloud-Based iSCSI Device,”](#) on page 284.

A.13 Creating a Dynamic File Services Pair with the Cloud-Based iSCSI Device

You can use the volume for the secondary path in a Dynamic File Services pair. Because of potential latency issues with the public Internet, cloud-based devices should not be used as the primary location in a pair.

- 1 On a Windows server or workstation, launch the Dynamic File Services Management Console.
- 2 Connect to the Windows Server 2008 server where you attached the cloud-based iSCSI target device.

For information, see [Section 7.3, “Connecting to a Server,”](#) on page 131.

- 3 Select the server, then create a pair as described in [Section 8.2, “Creating a Pair,”](#) on page 142.

Specify the primary path as a location on a device running in the local network (non-cloud-based device). Specify the secondary path as a location on the cloud-based iSCSI target device that is attached to the Windows server.

- 4 Associate the pair with one or more existing policies by using the methods described in [Section 9.6, “Associating or Disassociating Pairs and Policies,”](#) on page 174.

A.14 Additional Information

- Section A.14.1, “openSUSE 11 SP2 Linux,” on page 285
- Section A.14.2, “Linux iSCSI Target Software Documentation,” on page 285
- Section A.14.3, “PuTTY,” on page 285
- Section A.14.4, “Microsoft iSCSI Software Initiator Version 2.08,” on page 285
- Section A.14.5, “IETF RFC 3220: Internet Small Computer Systems Interface,” on page 285
- Section A.14.6, “Amazon EC2 Cloud Services Costs,” on page 286

A.14.1 openSUSE 11 SP2 Linux

Refer to the [openSUSE Linux 11 SP2 documentation](http://www.novell.com/documentation/opensuse112/) (<http://www.novell.com/documentation/opensuse112/>) for information about how to manage the Linux operating system.

A.14.2 Linux iSCSI Target Software Documentation

For information about using iSCSI Target software on openSUSE Linux, see “Mass Storage over IP Networks: iSCSI” (http://www.novell.com/documentation/sles11/stor_admin/data/cha_inst_system_iscsi.html) in the *SUSE Linux Enterprise Server 11 Storage Administration Guide* (http://www.novell.com/documentation/sles11/stor_admin/data/bookinfo.html).

A.14.3 PuTTY

To download PuTTY products, go to the [PuTTY Download page](http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html) (<http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>).

For information about using PuTTY, see the *PuTTY User Manual* (<http://the.earth.li/~sgtatham/putty/0.58/html/doc/index.html>).

A.14.4 Microsoft iSCSI Software Initiator Version 2.08

For information about the Microsoft iSCSI Software Initiator Version 2.08, see the [Microsoft Downloads Center](http://www.microsoft.com/downloads/details.aspx?familyid=12cb3c1a-15d6-4585-b385-befd1319f825&displaylang=en) (<http://www.microsoft.com/downloads/details.aspx?familyid=12cb3c1a-15d6-4585-b385-befd1319f825&displaylang=en>).

For information about using the Microsoft iSCSI Initiator software, see *Microsoft iSCSI Initiator Step-by-Step Guide* ([http://technet.microsoft.com/en-us/library/ee338476\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/ee338476(WS.10).aspx)) in the Microsoft TechNet Library (<http://technet.microsoft.com/en-us/library/default.aspx>).

For information about using the iSCSI command line interface (`iscsicli.exe`) for the Microsoft iSCSI Initiator software, open a command prompt console on your Windows desktop, then enter

```
iscsicli.exe help
```

A.14.5 IETF RFC 3220: Internet Small Computer Systems Interface

For information about the iSCSI protocol, see the *IETF RFC 3220: Internet Small Computer Systems Interface* (<http://www.ietf.org/rfc/rfc3720.txt>).

A.14.6 Amazon EC2 Cloud Services Costs

For current pricing for your cloud-based iSCSI Target server and storage device implementation, refer to the [Amazon EC2 Web site \(http://aws.amazon.com/ec2/#pricing\)](http://aws.amazon.com/ec2/#pricing).

B Setting Up a Merged View for Collaboration Applications: Novell Vibe OnPrem

Novell Dynamic File Services 1.6 can also be used with applications that store unstructured files to the file system. One example application environment is Novell Vibe OnPrem (formerly named Novell Teaming). This section describes how to set up Dynamic File Services pairs and policies for Novell Vibe OnPrem so that users see the merged view of files stored in an application environment.

Steps and requirements to use the merged view with Novell Dynamic File Services are:

- ♦ [Section B.1, “Verify that the Application can support using a Microsoft network share to store files,” on page 287](#)
- ♦ [Section B.2, “Understand how the application stores, names, and versions files so useful policies can be created,” on page 288](#)
- ♦ [Section B.3, “Create a Microsoft Share for the application to use,” on page 288](#)
- ♦ [Section B.4, “Configure the application to use the Microsoft Networking share,” on page 288](#)
- ♦ [Section B.5, “Install Dynamic File Services on the Windows Server where the share will be created for the primary path,” on page 289](#)
- ♦ [Section B.6, “Create a pair,” on page 289](#)
- ♦ [Section B.7, “Create a policy,” on page 289](#)

B.1 Verify that the Application can support using a Microsoft network share to store files

Novell Vibe OnPrem supports Microsoft network shares on the same Windows Server that the product is installed on. To enable the application to use a share, you must edit the `ssf-ext.properties` file. By default, Novell Vibe OnPrem creates a folder called `C:\Novell\Teaming` to store files.

IMPORTANT: The file structure for the initial release of Novell Vibe OnPrem uses the same file structure as previous releases of Novell Teaming.

B.2 Understand how the application stores, names, and versions files so useful policies can be created

The more you understand about how an application stores files, the more opportunities you can create for integrating the application with Dynamic File Services.

This example focuses on one way that Novell Vibe OnPrem stores photos. When you upload a photo to Vibe OnPrem, it creates a thumbnail file for the photo in the `cachefilestore` subfolder structure and places the photo image in the `filerrepository` subfolder structure. Because photos can be large, we want to set up a pair and policy so that photos are moved to a secondary storage location.

- 1 Create a pair where the primary path is on the `filerrepository` folder.

B.3 Create a Microsoft Share for the application to use

By default, Novell Vibe OnPrem creates a folder called `C:\Novell\Teaming` to store files. This is where you should create the network share for Vibe OnPrem to use.

- 1 Use the Microsoft Network Sharing feature to create a share to be used by Novell Vibe OnPrem.
For this example, the share is called `NovellTeaming` and the Share path should be on the `C:\Novell` path.

B.4 Configure the application to use the Microsoft Networking share

- 1 Stop the Novell Vibe OnPrem application.
- 2 Modify the `C:\Program Files\Novell\Teaming\apache-tomcat-6.0.18\webapps\ssf\WEB-INF\classes\config\ssf-ext.properties` file as follows:

```
##data.root.dir=C:/Novell/Teaming
##data.simplefilerrepository.root.dir=C:/Novell/Teaming
##data.simplefilerrepository.root.dir=C:/Novell/Teaming
##data.jackrabbitrepository.root.dir=C:/Novell/Teaming
##data.extension.root.dir=C:/Novell/Teaming
##data.archivestore.root.dir=C:/Novell/Teaming
##data.luceneindex.root.dir=C:/Novell/Teaming
##cache.file.store.dir=C:/Novell/Teaming/cachefilestore
##temp.dir=C:/Novell/Teaming/temp
##filtering.failed.dir=C:/Novell/Teaming/filteringfailed
##fi.work.dir=C:/Novell/Teaming/fi/work

data.root.dir=//<ServerIP>/NovellTeaming/teaming
data.simplefilerrepository.root.dir=//<ServerIP>/NovellTeaming/teaming
data.jackrabbitrepository.root.dir=//<ServerIP>/NovellTeaming/teaming
data.extension.root.dir=//<ServerIP>/NovellTeaming/teaming
data.archivestore.root.dir=//<ServerIP>/NovellTeaming/teaming
data.luceneindex.root.dir=//<ServerIP>/NovellTeaming/teaming
cache.file.store.dir=//<ServerIP>/NovellTeaming/teaming/cachefilestore
temp.dir=//<ServerIP>/NovellTeaming/teaming/temp
filtering.failed.dir=//<ServerIP>/NovellTeaming/teaming/filteringfailed
fi.work.dir=//<ServerIP>/NovellTeaming/teaming/fi/work
```

- 3 Restart the Novell Vibe OnPrem application.

B.5 Install Dynamic File Services on the Windows Server where the share will be created for the primary path

- 1 Install Dynamic File Services on the Windows Server that is running Novell Vibe OnPrem where you have created the share.

B.6 Create a pair

- 1 Create another Microsoft network share at `C:\Novell\Teaming\filerepository` and call it `filerepository`.
- 2 Add a Novell Dynamic File Services pair with `C:\Novell\Teaming\filerepository` as the primary path and set the secondary path where you prefer.

B.7 Create a policy

- 1 Create a policy to move all JPG files.
- 2 Associate a policy schedule with the policy.
- 3 When the policy runs, the JPG files move to the secondary path.

Now when the Novell Vibe OnPrem Application uses the `NovellTeaming` share to read files from `filerepository`, the Vibe OnPrem application gets a merged view instead of showing that the files are at two different storage locations.

C Keyboard Shortcuts

If your mouse is unavailable or if you prefer to use your keyboard, you can use keyboard shortcuts to navigate within the Novell Dynamic File Services (DynamicFS) Management Console and the Repair tool.

- ♦ [Section C.1, “Using Keyboard Shortcuts,” on page 291](#)
- ♦ [Section C.2, “Quick Reference for Keyboard Shortcuts,” on page 291](#)
- ♦ [Section C.3, “Navigating with Keyboard Shortcuts,” on page 292](#)

C.1 Using Keyboard Shortcuts

For keyboard shortcuts in which you press two or more keys simultaneously, the keys to press are separated by a plus sign (+). For keyboard shortcuts in which you press one key immediately followed by another key, the keys to press are separated by a greater-than symbol (>).

NOTE: The keyboard shortcuts that are described in this section refer to the U.S. keyboard layout. Keys on other layouts might not correspond exactly to the keys on a U.S. keyboard.

C.2 Quick Reference for Keyboard Shortcuts

To do this	Press
Cancel changes.	Esc
Close a dialog box or wizard without saving changes.	Alt+F4
Close a selected drop-down list.	
Display a selected drop-down list.	Alt+Down-arrow
Display <i>Help</i> .	F1
Display the <i>Actions</i> menu in the toolbar.	Alt+A
Display the <i>File</i> menu in the toolbar.	Alt+F
Display the <i>Help</i> menu in the toolbar.	Alt+H
Finished; apply the changes and close the wizard.	Alt+F
Go back to the previous pane in a wizard.	Alt+B
Go to the next pane in a wizard.	Alt+N
Apply the changes and close the wizard (when there is no <i>Next</i> button).	

To do this	Press
Jump to the beginning of a list.	Ctrl+Home
Jump to the end of a list.	Ctrl+End
Move between options in an open menu, drop-down list, or between options in a group of options.	Arrow keys
Move down one topic in a displayed menu.	Down-arrow
Move down to the next option in a radio-button selection.	
Move to the next option or option group in a pane.	Tab
Move to the previous option or option group in a pane	Shift+Tab
Move up one topic in a displayed menu.	Up-arrow
Move up to the previous option in a radio-button selection.	
Select (check) or deselect (clear) a check box.	Spacebar
Perform the action assigned to the selected button.	
Refresh the display in Statistics dialog boxes.	F5
Run the selected command or action.	Enter
Scroll through a displayed list.	Up-arrow or Down-arrow
Select an option.	Alt+ the letter underlined in an option
Switch to the next tab in the dialog box.	Ctrl+Tab
Switch to the previous tab in the dialog box.	Ctrl+Shift+Tab
Underscore the keyboard shortcut options for items in the toolbar.	Alt

C.3 Navigating with Keyboard Shortcuts

- ♦ [Section C.3.1, “Toolbars,” on page 292](#)
- ♦ [Section C.3.2, “Wizards,” on page 292](#)
- ♦ [Section C.3.3, “Dialog Boxes,” on page 293](#)

C.3.1 Toolbars

Pressing Alt underlines a character in each toolbar option to open the option’s menu. For example, pressing Alt+F opens the *File* menu in the toolbar. In an open menu, use the Up-arrow and Down-arrow keys to select an item from the menu, then press Enter to execute the action.

C.3.2 Wizards

In the Dynamic File Services wizards, use the following keyboard navigation methods:

- ♦ Press the Tab key to navigate to the different fields and buttons on each page in the wizard.

- ♦ For a check box, press the Spacebar like a toggle switch to select or deselect the option.
- ♦ For a radio button, press the Up-arrow or Down-arrow key to select a different radio button, then press Tab to continue to the next option.
- ♦ For a drop-down list, press Alt+Down-arrow key to open a drop-down box, use the Up-arrow or Down-arrow key to select an item in the list, then press Enter to select it.
- ♦ In a data field, type the information, then tab to the next field.
- ♦ When you are done on a page, tab to the appropriate button (such as *Next*, *OK*, *Apply*, or *Finish*) then press Enter.
- ♦ Press Esc to exit the wizard without applying unsaved changes. You can also tab to the *Cancel* button and press Enter to close without saving.

C.3.3 Dialog Boxes

To open the Pair Statistics dialog box, use the Tab key to navigate to the pair, then press Enter.

To open the Pair Properties dialog box, use the Tab key to navigate to the pair, press Alt+A to open the *Actions* menu, use the Down-arrow key to navigate to *Properties*, then press Enter to choose the option.

To open the Policy Properties dialog box, use the Tab key to navigate to the policy, press Alt+A to open the *Actions* menu, use the Down-arrow key to navigate to *Properties*, then press Enter to choose the option.

In a dialog box, press Ctrl+Tab to navigate between the page tabs, and press the Tab key to navigate within a page.

D Sample Event Notification Messages

This section provides example notification messages for the Email add-on to the Novell Dynamic File Services Notification Services.

NOTE: If a *Description* field is empty, the *Description* line is omitted from the message.

- ◆ “Event: Pair Created” on page 296
- ◆ “Event: Pair Unlinked” on page 296
- ◆ “Event: Policy Created” on page 297
- ◆ “Event: Policy Modified” on page 297
- ◆ “Event: Policy Delete” on page 297
- ◆ “Event: Policy Associated to Pair” on page 297
- ◆ “Event: Policy Disassociated from Pair” on page 298
- ◆ “Event: Added Exclude/Include Folders to Pair” on page 298
- ◆ “Event: Removed Exclude/Include Folders from Pair” on page 298
- ◆ “Event: Policy Execute Now on Pair” on page 298
- ◆ “Event: Policy Preview Now on Pair” on page 299
- ◆ “Event: Policy Scheduled to Run on Pair” on page 299
- ◆ “Event: Policy Ran on Pair” on page 299
- ◆ “Event: Stop Running Processes on Pair” on page 300
- ◆ “Event: Manual Move on Pair” on page 300
- ◆ “Event: Schedule Created” on page 300
- ◆ “Event: Schedule Modified” on page 300
- ◆ “Event: Schedule Delete” on page 300
- ◆ “Event: Schedule Associated to Policy” on page 301
- ◆ “Event: Schedule Disassociated from Policy” on page 301
- ◆ “Event: Notification Review Modification” on page 301
- ◆ “Event: Retention Review Notification” on page 301
- ◆ “Event: Registration” on page 302
- ◆ “Event: Log Level Change on Pair” on page 302

Event: Pair Created

Standard Pair Example

Subject: NDFS Notification - EXAMPLE-SERVER1: Pair Created

Operation Successful
Date/Time: 05/02/2011 12:34:29 PM
Identity: EXAMPLE-SERVER1\Administrator

Pair Name: HOMEPAIR
Pair Type: Standard
Primary Path: F:\home
Secondary Path: \\nas1\home_secondary
Description: Home folders on server1 to nas1 appliance.

Retention Pair Example

Subject: NDFS Notification - EXAMPLE-SERVER2: Pair Created

Operation Successful
Date/Time: 5/02/2011 12:35:30 PM
Identity: EXAMPLE-SERVER2\Administrator

Pair Name: MyRetentionPair
Pair Type: Retention
Primary Path: G:\finance
Secondary Path: \\server44\finance_retention
Description: Description of MyRetentionPair.

Use the following URL to complete the retention review: <https://server44.example.com:8999/folders.html?pair=MyRetentionPair>

Event: Pair Unlinked

Standard Pair Example

Subject: NDFS Notification -EXAMPLE-SERVER1: Pair Unlinked

Operation Successful
Date/Time: 10/30/2011 12:41:22 PM
Identity: EXAMPLE-SERVER1\Administrator

Pair Name: HOMEPAIR
Pair Type: Standard
Primary Path: F:\home
Secondary Path: \\nas1\home_secondary
Description: Home folders on server1 to nas1 appliance.

Retention Pair Example

Subject: NDFS Notification -EXAMPLE-SERVER2: Pair Unlinked

Operation Successful
Date/Time: 10/30/2011 12:41:22 PM
Identity: EXAMPLE-SERVER2\Administrator

Pair Name: MyRetentionPair
Pair Type: Retention
Primary Path: G:\finance
Secondary Path: \\server44\finance_retention
Description: Description of MyRetentionPair.

Event: Policy Created

Subject: NDFS Notification - EXAMPLE-SERVER1: Policy Created

Operation Successful
Date/Time: 6/28/2011 12:34:30 PM
Identity: EXAMPLE-SERVER1\Administrator

Policy Name: BigFiles
Policy Direction: PrimaryToSecondary
Description: Files GT 1GB.

Event: Policy Modified

Subject: NDFS Notification - EXAMPLE-SERVER1: Policy Modified

Operation Successful
Date/Time: 6/28/2011 12:34:30 PM
Identity: EXAMPLE-SERVER1\Administrator

Policy Name: BigFiles
Policy Direction: PrimaryToSecondary
Description: Files GT 2GB.

Event: Policy Delete

Subject: NDFS Notification - EXAMPLE-SERVER1: Policy Delete

Operation Successful
Date/Time: 6/28/2011 12:34:30 PM
Identity: EXAMPLE-SERVER1\Administrator

Policy Name: BigFiles
Policy Direction: PrimaryToSecondary
Description: Files GT 2GB.

Event: Policy Associated to Pair

Subject: NDFS Notification - EXAMPLE-SERVER1: Policy Associated to Pair

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Policy Name: BigFiles
Policy Direction: PrimaryToSecondary
Description: Files GT 2GB.

Pair Name: HOMEPAIR
Pair Type: Standard
Primary Path: F:\home
Secondary Path: \\nas1\home_secondary
Description: Home folders on server1 to nas1 appliance.

Event: Policy Disassociated from Pair

Subject: NDFS Notification - EXAMPLE-SERVER1: Policy Disassociated from Pair

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Policy Name: BigFiles
Policy Direction: PrimaryToSecondary
Description: Files GT 2GB.

Pair Name: HOMEPAIR
Pair Type: Standard
Primary Path: F:\home
Secondary Path: \\nas1\home_secondary
Description: Home folders on server1 to nas1 appliance.

Event: Added Exclude/Include Folders to Pair

Subject: NDFS Notification - EXAMPLE-SERVER1: Added Exclude/Include Folders to Pair

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Pair Name: HOMEPAIR
Pair Type: Standard
Primary Path: F:\home
Secondary Path: \\nas1\home_secondary
Description: Home folders on server1 to nas1 appliance.
Current Exclude List:
F:\home\bob\project1;F:\home\bob\project2

Event: Removed Exclude/Include Folders from Pair

Subject: NDFS Notification - EXAMPLE-SERVER1: Removed Exclude/Include Folders from Pair

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Pair Name: HOMEPAIR
Pair Type: Standard
Primary Path: F:\home
Secondary Path: \\nas1\home_secondary
Description: Home folders on server1 to nas1 appliance.
Current Include/Exclude is set to None

Event: Policy Execute Now on Pair

Subject: NDFS Notification - EXAMPLE-SERVER1: Policy Execute Now on Pair

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Policy Name: BigFiles
Policy Direction: PrimaryToSecondary
Description: Files GT 2GB.

Pair Name: HOMEPAIR
Pair Type: Standard
Primary Path: F:\home
Secondary Path: \\nas1\home_secondary
Description: Home folders on server1 to nas1 appliance.

Event: Policy Preview Now on Pair

Subject: NDFS Notification - EXAMPLE-SERVER1: Policy Preview Now on Pair

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Policy Name: BigFiles
Policy Direction: PrimaryToSecondary
Description: Files GT 2GB.

Pair Name: HOMEPAIR
Pair Type: Standard
Primary Path: F:\home
Secondary Path: \\nas1\home_secondary
Description: Home folders on server1 to nas1 appliance.

Event: Policy Scheduled to Run on Pair

Subject: NDFS Notification - EXAMPLE-SERVER1: Policy Scheduled to Run on Pair

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: Dswservice

Policy Name: BigFiles
Policy Direction: PrimaryToSecondary
Description: Files GT 2GB.

Pair Name: HOMEPAIR
Pair Type: Standard
Primary Path: F:\home
Secondary Path: \\nas1\home_secondary
Description: Home folders on server1 to nas1 appliance.

Event: Policy Ran on Pair

Subject: NDFS Notification - EXAMPLE-SERVER1: Policy Ran on Pair

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Policy Name: BigFiles
Policy Direction: PrimaryToSecondary
Description: Files GT 2GB.

Pair Name: HOMEPAIR
Pair Type: Standard
Primary Path: F:\home
Secondary Path: \\nas1\home_secondary
Description: Home folders on server1 to nas1 appliance.

Total Files Moved to Primary = 2022
Total Files of Files Failed to Move to Primary = 0
Total Files Moved to Secondary = 0
Total Files Failed to Move to Secondary = 0

Event: Stop Running Processes on Pair

Subject: NDFS Notification - EXAMPLE-SERVER1: Stop Running Processes on Pair

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Pair Name: HOMEPAIR
Pair Type: Standard
Primary Path: F:\home
Secondary Path: \\nas1\home_secondary
Description: Home folders on server1 to nas1 appliance.

Event: Manual Move on Pair

Subject: NDFS Notification - EXAMPLE-SERVER1 Manual Move on Pair

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Pair Name: HOMEPAIR
Pair Type: Standard
Primary Path: F:\home
Secondary Path: \\nas1\home_secondary
Description: Home folders on server1 to nas1 appliance.

Event: Schedule Created

Subject: NDFS Notification - EXAMPLE-SERVER1: Schedule Created

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Schedule Name: Weekly on Sunday
Review Frequency: Weekly
Description: Every Sunday at 12:00 AM until complete

Event: Schedule Modified

Subject: NDFS Notification - EXAMPLE-SERVER1: Schedule Modified

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Schedule Name: Weekly on Saturday
Review Frequency: Weekly
Description: Every Saturday at 2:00 AM until complete

Event: Schedule Delete

Subject: NDFS Notification - EXAMPLE-SERVER1: Schedule Delete

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Schedule Name: Weekly on Saturday
Review Frequency: Weekly
Description: Every Saturday at 2:00 AM until complete

Event: Schedule Associated to Policy

Subject: NDFS Notification - EXAMPLE-SERVER1: Schedule Associated to Policy

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Schedule Name: Weekly on Saturday
Review Frequency: Weekly
Description: Every Saturday at 2:00 AM until complete

Policy Name: BigFiles
Policy Direction: PrimaryToSecondary
Description: Files GT 2GB.

Event: Schedule Disassociated from Policy

Subject: NDFS Notification - EXAMPLE-SERVER1: Schedule Disassociated from Policy

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Schedule Name: Weekly on Saturday
Review Frequency: Weekly
Description: Every Saturday at 2:00 AM until complete

Policy Name: Big Files
Policy Direction: PrimaryToSecondary
Description: Files GT 2GB.

Event: Notification Review Modification

Subject: NDFS Notification - EXAMPLE-SERVER1: Notification Review Modified

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Review Frequency: Quarterly

Event: Retention Review Notification

Subject: NDFS Notification - EXAMPLE-SERVER2: Retention Review Notification

Use the following URL to complete the retention review: <https://server2.example.com:8999/folders.html?pair=MyRetentionPair>

Operation Successful
Date/Time: 10/28/2011 1:01:21 AM
Identity: EXAMPLE-SERVER1\Administrator

Schedule Name: Qtrly-Jan-lastday
Review Frequency: Quarterly

Pair Name: MyRetentionPair
Pair Type: Retention
Primary Path: G:\finance
Secondary Path: \\server44\finance_retention
Description: Description of MyRetentionPair.

Event: Registration

Subject: NDFS Notification - EXAMPLE-SERVER2: Registration

Operation Successful

Date/Time: 10/28/2011 1:01:21 AM

Identity: Dynamic File Services Controller

Event: Log Level Change on Pair

Subject: NDFS Notification - EXAMPLE-SERVER1: Log Level Change on Pair

Operation Successful

Date/Time: 10/28/2011 1:01:21 AM

Identity: EXAMPLE-SERVER1\Administrator

Pair Name: HOMEPAIR

Pair Type: Standard

Primary Path: F:\home

Secondary Path: \\nas1\home_secondary

Description: Home folders on server1 to nas1 appliance.

Current Log Level on DswMcpCore: Debug

Current log level on DswStandardEngine: Debug

E Documentation Updates

There have been no changes made to the *Novell Dynamic File Services Administration Guide* since the initial version 2.2 release.

