Web and Application Services Overview

Novell®
NetWare®

6.5 SP8

November 9, 2009

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Contents

About This Guide

Novell Open Enterprise Server (OES) includes a collection of open source and Novell products that let you build, deploy, host, and use Web sites and Web applications that speed up business processes without jeopardizing the security of business information. OES combines NetWare®, the trusted leader for secure networking services, and SUSE® Linux, a leading open platform for delivering business-level applications.

IMPORTANT: This book contains information for NetWare 6.5 SP8 and Novell Open Enterprise Server 2 SP1 Linux. For the latest information about using Web services on Linux, see the Novell Open Enterprise Server 2 SP2 Linux or later versions of the *OES 2 SP2: Web and Application Services Overview*.

Audience

This guide introduces you to Web and application services, and explains how you can begin using them to meet the demands of your business. It is intended for Web or network administrators who install and manage Web site content and applications. Developers who write Web-based applications to run in the OES environment might also find the information in this overview helpful.

The guide is divided into the following sections:

- Chapter 1, "OES Web and Application Services Overview," on page 9
- Chapter 2, "NetWare: Deploying Web and Application Services Components," on page 21
- Chapter 3, "Linux: Deploying Web and Application Services Components," on page 27
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Feedback

We want to hear your comments and suggestions about this guide and the other documentation included with Novell OES. Please use the User Comment feature at the bottom of each page of the OES online documentation.

Documentation Updates

For the most recent documentation, visit the Novell Documentation Web site (http://www.novell.com/documentation).

Additional Documentation

Each NetWare component discussed in this overview has its own administration guide. For details about how to configure and manage each component, refer to the following documentation:

- *NW 6.5 SP8: Apache Web Server Administration Guide*
- *NW 6.5 SP8: Tomcat Administration Guide*
- *NW 6.5 SP8: Novell MySQL Administration Guide*
- *NW 6.5 SP8 Novell QuickFinder Server 5.0 Administration Guide*

Corresponding Linux* components have documentation available on the Web:

- Apache 2.2 Documentation (http://httpd.apache.org/docs/2.2/)
- Tomcat 4 documentation (http://jakarta.apache.org/tomcat/tomcat-4.1-doc)
- MySQL* documentation (http://dev.mysql.com/doc)

Components that run on both NetWare and Linux also have additional documentation:

- *Novell exteNd™ Product Documentation* (http://www.novell.com/documentation-index/index.jsp?category=exteNd)

Documentation Conventions

In this documentation, a greater-than symbol (>) is used to separate actions within a step and items within a cross-reference path.

A trademark symbol ($^{®}$, ™, etc.) denotes a Novell trademark. An asterisk (*) denotes a third-party trademark.

When a single pathname can be written with a backslash for some platforms or a forward slash for other platforms, the pathname is presented with a backslash. Users of platforms that require a forward slash, such as Linux or UNIX*, should use forward slashes as required by your software.

OES Web and Application Services Overview

1

Novell® Open Enterprise Server (OES) includes a collection of open source and Novell products that let you build, deploy, host, and use Web sites and Web applications that speed up business processes without jeopardizing the security of business information. Using OES, you can use the full range of Web and application services on NetWare®, Linux, or both.

This section covers the following topics:

1.1 Introduction to Web and Application Services

The rise of the Internet and the World Wide Web sparked a revolution not only in network communications but also in application design and development. Programmers have encapsulated pieces of business functionality into distinct objects or components, and then made them available as self-contained Web services that can be accessed using Internet-based protocols and tools.

As network servers have become capable of supporting Internet-based services, software developers have devised new programming paradigms to take advantage of the widespread availability of these services. This new class of software is categorized as Web-based or Web-enabled applications.

This section introduces some basic concepts and technologies that are helpful to understand when working with Web services and Web applications.

1.1.1 What Are Web Services?

The term *Web services* can be confusing because it is used in many different ways. In most contexts, Web services are business logic components that can be connected together and exchange data to perform a useful task. The components can be internal or external to an organization, and they communicate using Internet-based protocols such as the HyperText Transfer Protocol (HTTP). In brief, Web services run on servers and process substantial amounts of data that users want to be able to access quickly and easily.

A popular programming model in which individual Web services are combined to create a functional whole is the *service-oriented architecture*. In this model, a service consumer sends requests to a service provider over a standard connection. The request and subsequent response are defined in a way that is understandable to both the consumer and provider.

Most Web services use Extensible Markup Language (XML) to define the format of request and response messages. XML features a tagged structure that provides the needed flexibility for exchanging data between disparate components. XML can also be used to define how data is stored in a database.

Simple Object Access Protocol (SOAP) provides a standard for enveloping and sending Web services messages. It is an XML messaging specification that describes a message format along with rules for exchanging data in the proper sequence between structured datatypes and arrays. SOAP generally uses HTTP, but it can use other standard Web protocols as well.

In the service-oriented architecture, service consumers can find available service providers through various discovery mechanisms. One such mechanism is the Universal Description, Discovery, and Integration (UDDI) registry. As Web services are developed, they can be added to the UDDI registry. The registry can then be searched in various ways to find the Web services available for a particular organization and obtain contact information.

1.1.2 What Are Web Applications?

In its simplest form, a Web application is an interactive system that allows its users to execute business logic that resides on a server and to view the results of that logic through a Web browser on a client workstation. The defining factor that makes the system a Web application is that the server and client communicate over the Internet. In brief, Web applications make the data processed by Web services available to users quickly and easily through their Web browsers.

Web applications are built on a client/server architecture. The business logic is contained in the application itself, which runs on a Web server and uses HTTP to communicate with clients over the Internet. The Web server manages the application, passes requests from clients to the application, and returns the application's responses to the client.

On the client side, the Web application is viewed with a browser. The application's user interface takes the form of HyperText Markup Language (HTML) pages that are interpreted and displayed by the browser. In addition to text, these HTML pages can contain Web forms, image files, audio and video clips, and other types of displayable data.

Although Web applications can use a Web site as the front end to their business logic, you can do many things in a Web application that you can't do with a static Web site, such as:

* Identify specific users and present a customized interface for each user
* Collect information from users and store that information on the server
* Perform tasks for users, such as retrieving information from a database, registering to access specific content, or placing an order for a product

1.1.3 Web Application Tools (Java and J2EE)

Java[*] has become a standard programming language for Web applications because it is simple and portable to various hardware platforms. All you need to run Java applications is a Java Virtual Machine (JVM*) for your particular platform. JVMs are available for almost every server platform in existence, including SUSE[®] Linux Enterprise Server, Novell NetWare, Sun[*] Solaris[*], Microsoft[*] Windows[*], and Apple[*] Macintosh* OS.

Java 2 Platform, Enterprise Edition (J2EE[*]) is a widely used environment for developing enterprise Web applications. J2EE offers a multitiered distributed application model, the ability to reuse components, integrated XML-based data interchange, a unified security model, and flexible transaction control. Best of all, applications developed for a J2EE application server are not tied to any one vendor's products or APIs.

The J2EE specification defines the following components:

- **Servlets:** A Java servlet is a server-side component that provides a simple, consistent mechanism for extending the functionality of a Web server and for accessing existing business systems. A servlet dynamically processes client requests and constructs responses. Servlets are commonly used to process forms, handle redirects or authenticate user names and passwords, and create dynamic content for a Web application.

- **JavaServer Pages:** JavaServer* Pages (JSPs) are text-based documents that execute as servlets but allow a more natural approach to creating Web content. JSPs allow Web developers to rapidly develop and easily maintain dynamic Web pages that leverage existing business systems. JSP technology separates the user interface from content generation, enabling the overall page layout to be changed without altering the underlying dynamic content.

- **Enterprise JavaBeans:** Enterprise JavaBeans* (EJBs) are the basic components of an architecture that allows developers to create objects that precisely model the structure and logic of a business application domain. The system-level details of building the distributed application are abstracted out, enabling domain experts to be developers who freely focus on solving business problems. EJB technology enables rapid development of distributed, transactional, secure, and portable Java-based applications.

1.1.4 Enabling Technologies

Web applications employ various enabling technologies to make their content dynamic and to create user interfaces into the business logic on the server.

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Scripting Languages

Foremost among the enabling technologies are scripting languages such as PHP and Perl.

PHP (PHP: Hypertext Preprocessor) is a powerful server-side scripting language that is easy to learn. It offers all of the power and flexibility of JSP, but does not require as much memory and processing power. You mix specially delimited PHP code in with regular HTML to create a dynamic Web page. PHP is commonly used to access Web databases such as MySQL. It also supports library extensions to leverage standard services such as LDAP, FTP, POP3, Java, and many others.

Perl (Practical Extraction and Report Language) is another server-side scripting language commonly used by Web programmers to create scripts for Web servers. It uses a syntax similar to C/C++ and its file-manipulation and text-manipulation facilities make it ideal for tasks involving software tools, database access, graphical programming, networking, and system management.

Servlet Containers

A complementary component for both servlets and JSPs is the *servlet container*. The container acts as a simple application server that executes Java servlets and renders Web pages that include JSP code. It provides necessary functions such as life cycle management and interaction with a Web server.

The official reference implementation of the Java servlet API is Jakarta-Tomcat, an open source project released under the Apache Software Foundation. Tomcat is typically used in conjunction with a Web server such as Apache.

Web Database Servers

MySQL is an open source, structured query language (SQL) Web database server that is often used by PHP and Perl developers because its syntax is similar to those languages. It offers fast performance and is designed to work well with Web servers. It is widely used in building basic database-driven Web applications.

PostgreSQL is another Web database server that offers more advanced features often found in commercial database systems, such as transactions, subselects, triggers, views, referential integrity, and sophisticated locking. It is often used to provide more complex database functionality for Web sites and Web applications.

Application Servers

In more sophisticated Web application models, an application server is added to enable the system to manage business logic and track the user's progress through the application. The application server software runs in a middle tier, between Web browser-based clients and back-end databases and business applications. The application server handles all of the application logic and connectivity that old-style client/server applications contained.

Examples of J2EE application servers are the open source JBoss application server and the commercial Novell exteNd™ Application Server.

1.1.5 General Web and Application Services Architecture

The following diagram shows the basic architecture of the Web components and services that are commonly used to host Web sites and build Web applications.

Figure 1-1 *Architecture of Key Web Components and Technologies*
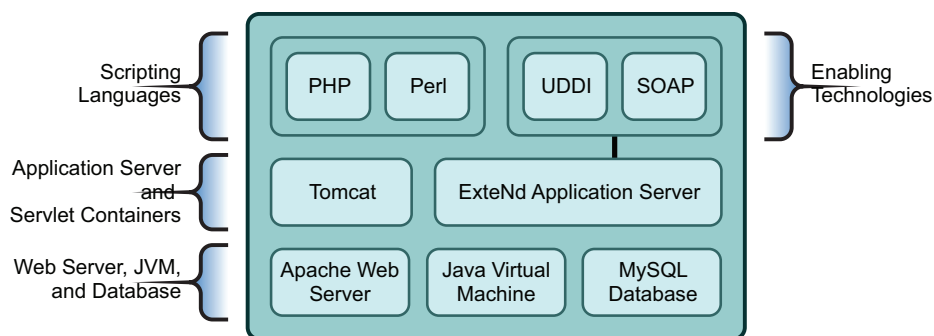
1.2 OES Components That Provide Web and Application Services

OES comes bundled with all of the Web and application services components you need to host dynamic Web content and deploy Web applications that you can either build yourself or download from the World Wide Web. Some of these components are developed by the open source software community, while others are developed by Novell. Each component offers an important building block that lets you build the solutions that best meet your business needs.

The following diagram illustrates how you can combine open source software and Novell software to provide Web-based business solutions for employees, customers, and partners.

Figure 1-2 *Open Source and Custom Built Solutions*

Open-Source Software
- Apache Web Server
- Tomcat Servlet Container
- MySQL Database Management

Novell Software
- QuickFinder Search Server
- Open Enterprise Server

OES Server
(Linux or
NetWare)

WWW

Intranet

Extranet
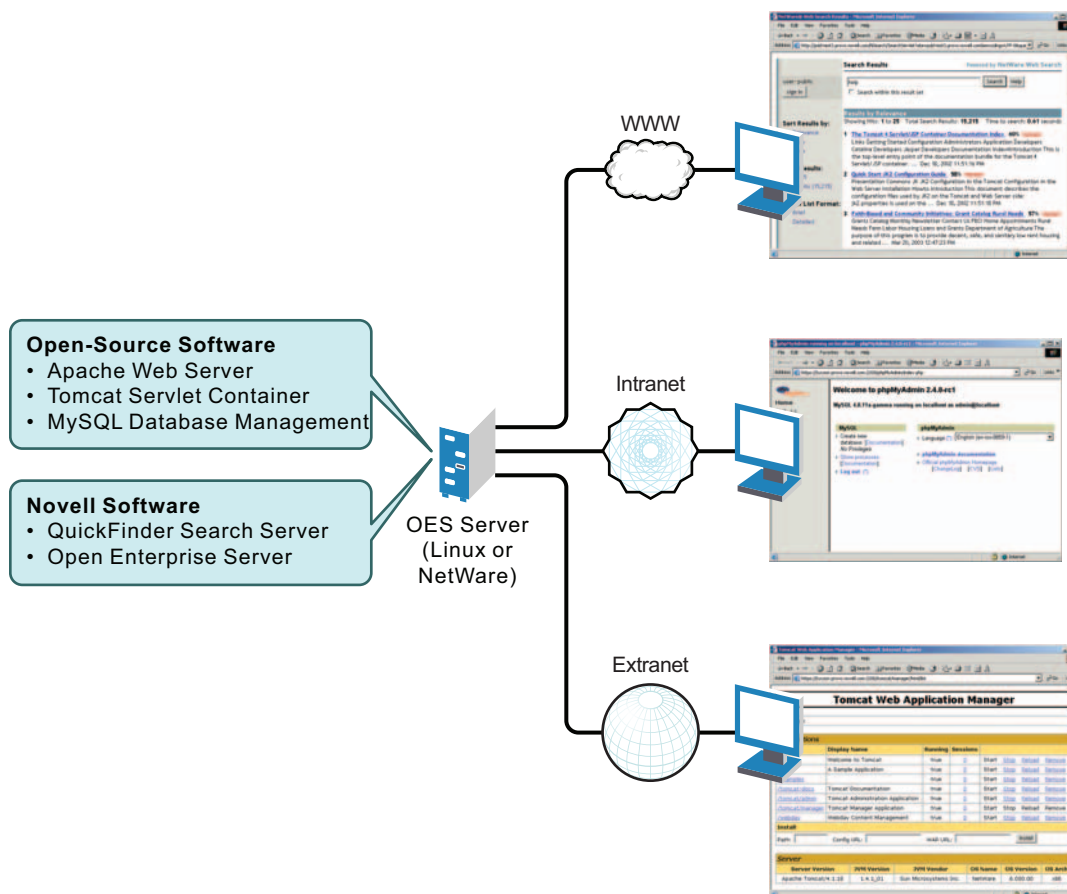
With the Web components available in OES, you can:

- Host multiple Web sites on a single OES server.

- Manage all instances of the Apache Web server from one interface using Apache Manager (regardless of what platform they are running on in your network).

- Choose from hundreds of free Web applications that can be downloaded from the Internet and run on your OES server.

- Build and host your own Web database applications.

- Choose from popular scripting languages to build your own dynamic Web content.

- Build powerful Web applications and services using the JBoss* or Novell exteNd Application Server, which includes SOAP and UDDI components, as well as rapid application development support and application deployment capabilities.

- Add search and print functionality to any Web site, anywhere on the World Wide Web or on a company intranet.

Some of the key benefits OES has to offer in the area of Web and applications services include the following:

- Open source components that help you steer away from vendor lock-in and proprietary solutions. Applications that you develop can run on any other J2EE compliant platform, including UNIX and Windows operating systems.

- Valuable services for end users that enhance personal and team productivity.

- A strong J2EE and open source development model.

- A broad range of industry standard API sets.

- A broad selection of development tools and deployment models for developers. This provides tremendous flexibility in those cases where IT organizations decide to repurpose their servers.

- Lower IT spending because open source products are free and platform independent.

The following sections introduce each Web and application services component included with OES:

1.2.1 Web Hosting: Apache Web Server 2.0

Apache is the most popular Web server being used on the World Wide Web today. Its popularity comes from the fact that it is the most reliable and secure Web server available. It runs on all major platforms, is capable of hosting even the most complex Web sites, and can scale to handle thousands of simultaneous connections.

The Apache Web Server 2.0 serves as the foundation Web server upon which you can build Web sites and host Web applications for use in your business.

Key uses and benefits of using Apache in OES include the following:

- It provides a highly reliable and fast Web server for hosting simple or complex Web sites.

- It is preconfigured to work with Jakarta-Tomcat, the servlet container created by the Apache Foundation, which can be used to host servlets and JavaServer Pages (JSPs) for automating business processes.

- It is ideal for Web application development and testing.

- It lets you set up multiple virtual hosts for hosting multiple Web sites (with their own domain names) all from a single installation of Apache.

Figure 1-3   *Apache Running on an OES Server and Hosting Multiple Web Site*
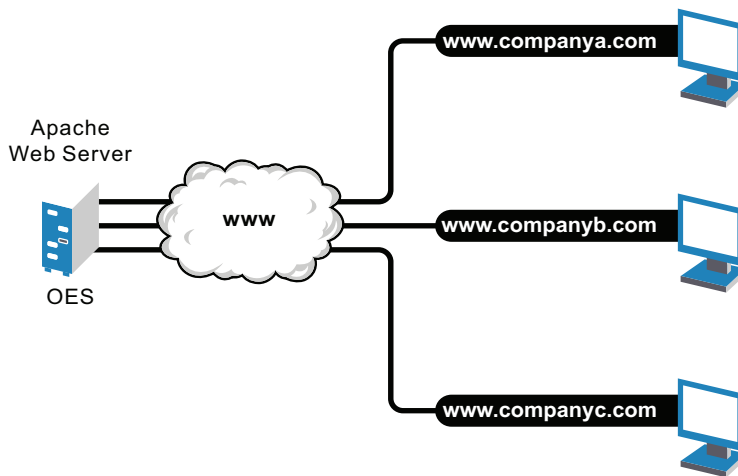
OES includes Apache Web Server 2.0 for both Linux and NetWare. It features a hybrid multi-process/multi-threaded implementation, filtering, simplified configuration, and a new API, along with extension modules to support Secure Sockets Layer (SSL), LDAP authentication, and multi-language error messages.

The NetWare version includes the following NetWare-specific features:

- Tight integration with Novell eDirectory™ and SSL through the use of a customized NetWare-specific Apache module, providing a highly secure method for sharing sensitive company information over the Internet.
- Compatible with the Novell exteNd Application Server for deploying Web applications and Web services.
- The Apache Manager tool that lets you configure a single Web server, or a host of Web servers running on multiple platforms, all from a single interface.

1.2.2 Servlet Support: Tomcat Servlet Container

OES includes a Jakarta-Tomcat container for both Linux and NetWare. Tomcat is ideal for running basic Java servlet and JSP applications on either operating system platform. Tomcat 4 is the default version on both platforms. OES also includes Tomcat 5 for both Linux and NetWare, which implements the Java Servlet 2.4 and JSP 2.0 specifications.

If you are relatively new to, or inexperienced with, Java programming and do not plan to build more advanced J2EE applications, the Tomcat container should satisfy your needs. It is very stable and includes all of the features of a commercial Web application container.

OES NetWare includes a mod_jk connector module for integrating Apache for NetWare and Tomcat for NetWare. This module identifies requests that require the use of Tomcat. These requests are passed through the mod_jk module on Apache to Tomcat, as shown in the following diagram.

Figure 1-4   *Tomcat and Apache Deliver Dynamic Web Content*
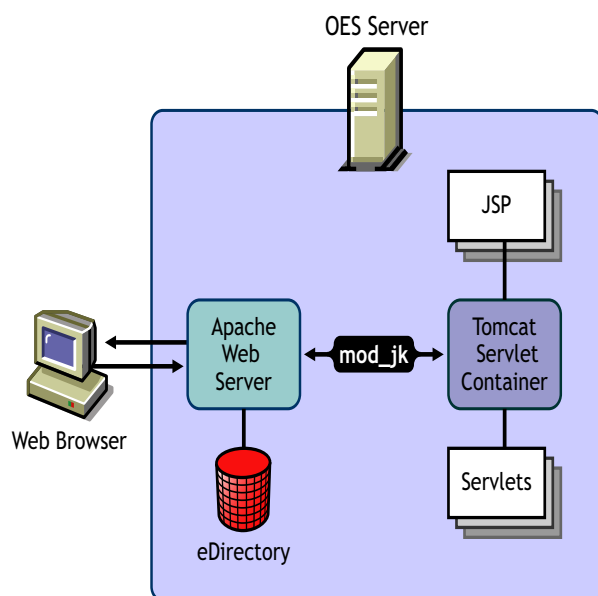
On NetWare, an administrative instance of Tomcat 4 is also installed for compatibility with other NetWare products and services.

1.2.3 Scripting: PHP, Perl, and Novell Script for NetWare

Scripting languages and visual builder tools have gained popularity in recent years because of their ease of use in delivering content to the Web. OES provides a choice of scripting languages and the engines to run them. You can use these tools to develop Web applications and administration utilities.

The scripting technologies integrated with OES for both Linux and NetWare include industry standard PHP and Perl.

NetWare includes additional scripting technologies that simplify the task of developing NetWare-based applications and is much easier than writing NetWare Loadable Module™ (NLM™) programs using C or C++.

- **Novell Script for NetWare (NSN):** NSN is an object-oriented development environment designed to emulate the server-side use of Visual Basic* (VB). It incorporates predefined NetWare components with a VBScript syntax-compatible scripting language. This syntax compatibility enables developers to run scripts built on other platforms.

  With NSN, you can write Common Gateway Interface (CGI) scripts, put intelligence into your Web pages, and build server-side task automation applications for NetWare. You can also develop Web pages using Microsoft FrontPage and publish them on a NetWare server.

- **Universal Component System (UCS):** The UCS kernel exposes NetWare services to scripting engines regardless of the underlying scripting language. It allows you to write solutions combining NSN components, JavaBeans, Perl scripts, and other popular scripting and component languages. This means that Universal Component eXtensions (UCX), Java classes, JavaBeans, and remote ActiveX* controls can be used with NSN or Perl.

◆ **Novell ScriptPages (NSP):** The NSP UCX component provides functionality similar to Microsoft Active Server Pages (ASP). NSP is a multi-object component that supports the Session, Request, and Response objects. NSP is currently supported only by Novell Script for NetWare.

1.2.4 Web Databases: MySQL

OES includes the open source MySQL database server on both the Linux and NetWare platforms. When combined with a Web application and a Web server, MySQL is a very reliable and scalable database for use in hosting eCommerce and business-to-business Web applications.

To manage your MySQL database, you can use the open source phpMyAdmin application written in the PHP language that provides a Web-based administration tool. NetWare installs a utility called MySQL Monitor by default when you install MySQL. This gives you access to the MySQL server through SQL commands.

The following diagram shows how MySQL can be used to host Web database applications such as eCommerce or inventory tracking.

Figure 1-5 *MySQL and phpMyAdmin: Hosting Several Web Database Applications*
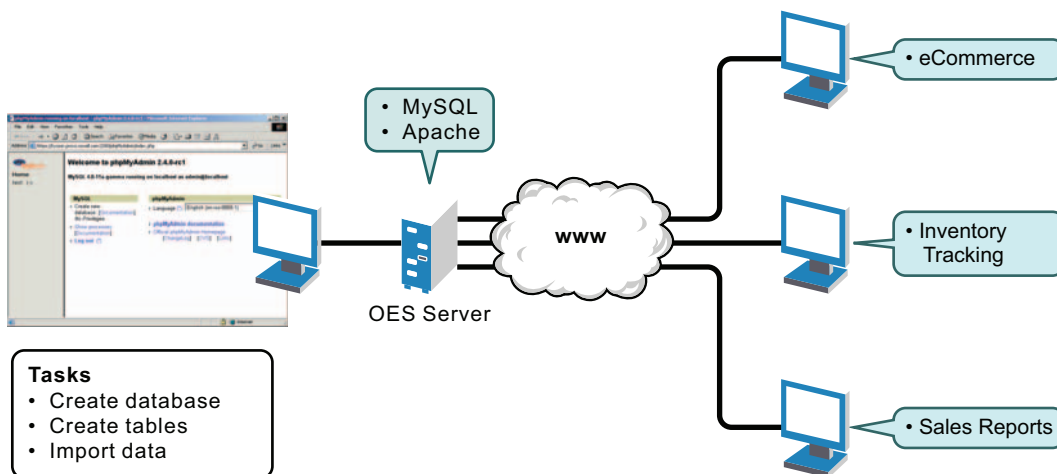
NOTE: The more powerful PostgreSQL database server comes with SUSE Linux Enterprise Server. It has been ported to the NetWare platform as well and is available separately as open source software.

1.2.5 Custom Web/J2EE Applications: JBoss and Novell exteNd Application Server

When you need greater processing power beyond what scripting or Web application hosting with Tomcat can offer, OES offers a choice of J2EE-certified application servers: JBoss and the Novell exteNd Application Server. These application servers are both comprehensive, J2EE-certified platforms for building and deploying enterprise-class Web applications. They support JSP, EJBs, and all other standard J2EE components and technologies.

◆ **JBoss:** Bundled with SLES 9, JBoss provides enterprise-class security, transaction support, resource management, load balancing, and clustering.

- **Novell exteNd Application Server:** On the NetWare side, the Novell exteNd Application Server provides the application hosting power you need to employ more sophisticated Web services using SOAP and UDDI. It includes high-end development tools such as the Novell exteNd Director™ or exteNd Composer™ products.

1.2.6 Web and Network Search Capability: QuickFinder Server

No Web solution is complete without capable searching functionality that provides users with a method for finding information they need, when they need it. That is why OES includes the Novell QuickFinder™ Server on both the Linux and NetWare platforms.

Novell QuickFinder Server lets you add search and print functionality to any Web site, anywhere on the World Wide Web or on a company intranet. You can use it on your own enterprise-wide Web site or to host search services for business partners or clients.

Visitors to your Web or intranet site enter search terms in the search form that you place on the pages of your Web site. The search term is used to find matches contained in indexes you create using the QuickFinder Server Manager, a Web-based management utility. Search results, including matching URLs, are sent back to the user's Web browser.

Figure 1-6 *How QuickFinder Server Handles a User's Search Query*
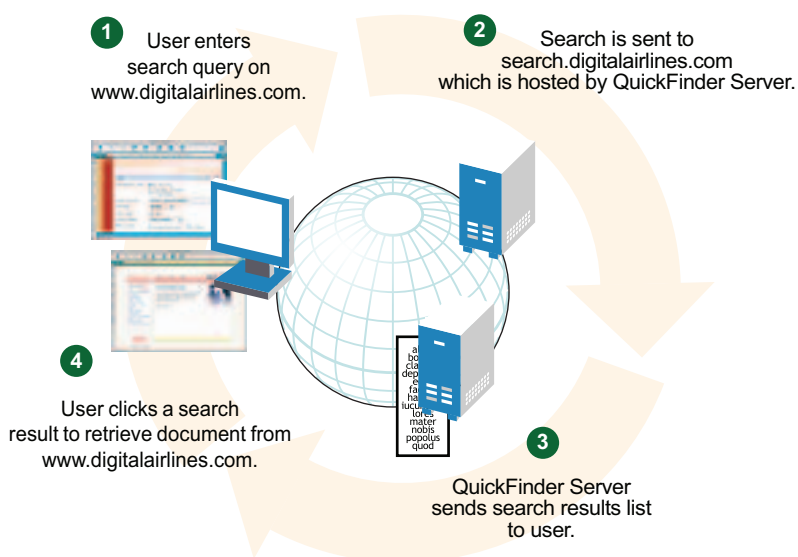
1.3 What's Next

- For information about installing one or more Web and application services components, see Chapter 2, "NetWare: Deploying Web and Application Services Components," on page 21.
- To learn more about developing Web applications for the OES environment, see the Novell Developer Web site (http://developer.novell.com).
- For general OES installation instructions for Linux, see the *OES 2 SP2: Installation Guide*.
- For general OES installation instructions for NetWare, see the *NW65 SP8: Installation Guide*.

# NetWare: Deploying Web and Application Services Components

2

Open Enterprise Server (OES) NetWare® components that provide Web and application services can be installed as part of a special-purpose server configuration that provides a combination of products for a specific use, or each component can be installed individually.

- Section 2.1, "Setting Up a Special Purpose NetWare Server," on page 21
- Section 2.2, "Installing Individual Web and Application Services Components to a NetWare Server," on page 24
- Section 2.3, "What's Next," on page 26

2.1 Setting Up a Special Purpose NetWare Server

NetWare includes several special purpose server installation options, some of which include Web and application services. For example, if you want to dedicate a server to hosting Web applications, you can select the exteNd™ J2EE Application Server install. Or, if you want to dedicate a server for hosting Web search services, you can select the QuickFinder™ Server install. When you select either install, only the required components, along with the NetWare operating system, are installed.

Figure 2-1 *Special-Purpose Web/Application Servers*
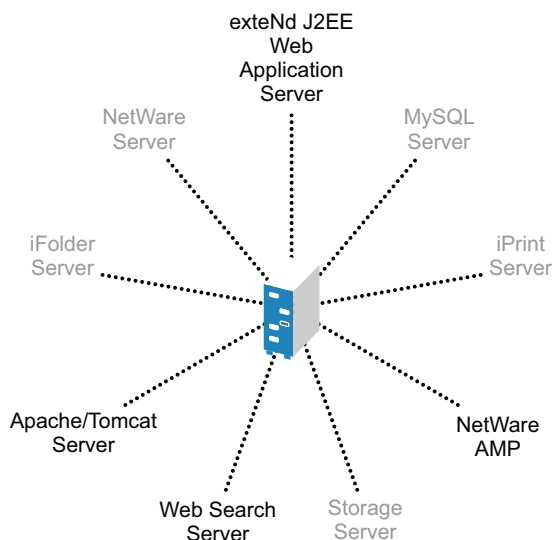
The special purpose servers that include Web and application services are:

- AMP (Apache, MySQL, PHP, Perl) Server
- Apache/Tomcat Server
- QuickFinder Server
- exteNd J2EE Web Application Server

2.1.1 AMP (Apache, MySQL, PHP, Perl) Server

The AMP (Apache, MySQL, PHP, and Perl) Server lets you host Web-based database applications on your NetWare server. Web database applications are available from the open source community. They can be downloaded from the World Wide Web and easily deployed to your AMP server. Or, if you are familiar with the structured query language (SQL) and PHP or Perl scripting languages, you can develop and host your own Web-based database applications.

AMP includes the following components:

- **Apache Web server:** The leading Web server on the Internet today.
- **MySQL:** A fast, easy-to-use, relational database management system.
- **phpMyAdmin:** A utility for managing MySQL from a Web browser.
- **PHP/Perl scripting engines:** Engines for processing PHP or Perl scripts.
- **Apache Manager:** A browser-based utility that lets you manage multiple Apache Web servers as eDirectory™ objects, regardless of the platform they are running on.

An AMP server is one of the quickest and simplest solutions you can use to meet many of the demands of your business because AMP combines the power of Apache with the database power of MySQL and the flexibility of PHP or Perl, enabling you to build very fast and functional Web applications. Even better, there are thousands of applications available for download from the World Wide Web. Most of the them are free and install quickly and easily to your NetWare server.

As shown in the following diagram, you can download open source AMP-based applications from the Web and, within minutes, install them to your Novell® AMP server and start benefiting from their use.

Figure 2-2   *Downloading, Installing, and Running AMP-ready Applications with Novell AMP*
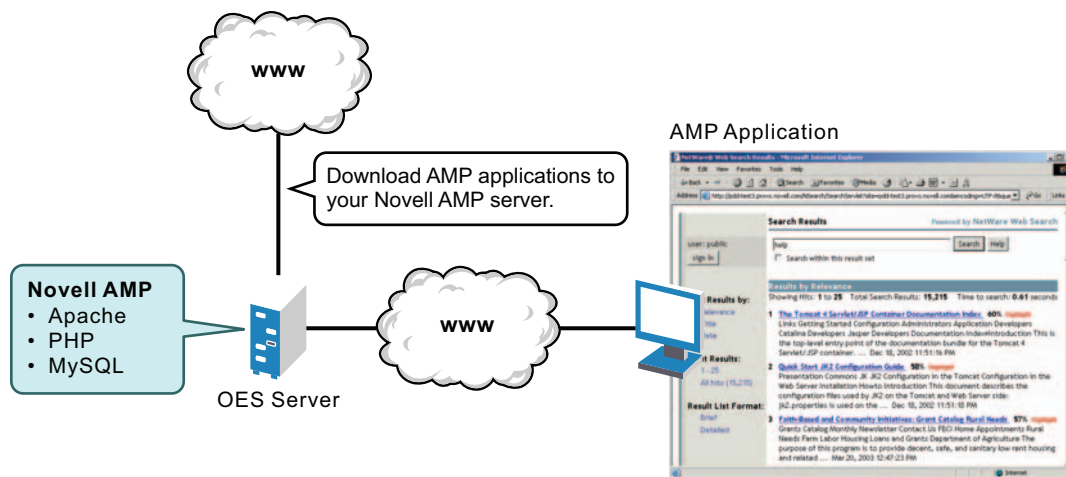
Some AMP-based applications might require simple scripting configuration changes for your environment, and some might require additional modules that are not currently available with the default Novell AMP installation. Many of these required Novell AMP modules are contributed by developers in the Open Source Software community. You can find most of these modules on Novell Forge (http://forge.novell.com). Novell Forge is also a great source of information about other open source activities involving Novell products. For more information about Novell AMP, refer to the Novell Developer Kit (http://developer.novell.com/ndk).

For a simple example of how to use the capabilities of an AMP server, continue with

Creating a Simple Web Application

Adding a Web log (sometimes called a *blog*) to your NetWare server is an example of a task that you could accomplish quickly and easily to help you learn about Web applications. A Web log functions as a public journal for a group of users where they can post thoughts and interact with each other quickly and easily. The sample open source blog used in this example is written in PGP and uses MySQL.

After you have installed and configured the AMP server, follow these steps to set up a simple blog:

1 Download the latest version of the Blog script from the Blog Development Home Page (http://www.pluggedout.com) to a temporary location.

The file you download is named `blognnn.zip`, where *nnn* is the Blog version number.

2 Expand the zip file in the `/apache2/htdocs` directory on your Web server.

This creates a subdirectory for the Blog application named `blognnn`, where *nnn* is the Blog version number.

3 Log in to Apache Manager, as described in "Using Apache Manager in Your Web Browser" in "Apache Installation and Configuration" in the *NW 6.5 SP8: Apache Web Server Administration Guide*

4 In the left panel, expand *Open Source*, then click *MySQL 4.0*.

5 Under *MySQL Links*, click *phpMyAdmin*.

You must log in to phpMyAdmin separately from logging in to Apache Manager. Typically, the phpMyAdmin username is root.

6 In the *Create New Database* field, specify a database name (for example, blogdata), then click *Create*.

7 Use the `database.sql` script provided with Blog to create the tables in the database:

   7a At the top of the main panel, click *SQL*.

   7b In the *Location of Text File* field, browse to and select the `database.sql` file in the `blognnn` subdirectory, then click Go to create the tables in the database.

8 Modify the `config.php` file in the `lib` subdirectory under the `blognnn` subdirectory to meet the specific needs of your environment.

9 In your browser, execute the Blog application by viewing the following URL:

http://*web_server_address*/blog*nnn*/index.php

By completing this task, you have successfully set up a Web application.

2.1.2 Apache/Tomcat Server

The Apache/Tomcat Server lets you deploy and host servlets and Java Server Pages (JSPs). It installs Apache Web Server 2.0 and the Tomcat Servlet Container 4.1 for use in hosting dynamic, application-driven Web sites.

eDirectory Java LDAP beans are also included to provide a broad range of eDirectory authentication and identity mechanisms that are customized for use in setting up browser-based access to protected information. For additional development and deployment power, install the Novell exteNd Workbench™ IDE from the *NetWare Client CD*.

If you need more functionality than you can get from servlets and JSPs, consider installing the special purpose exteNd J2EE Web Application Server instead.

For more information about the Apache Web Server, see the *NW 6.5 SP8: Apache Web Server Administration Guide*. For more information about Tomcat, see the *NW 6.5 SP8: Tomcat Administration Guide*.

2.1.3 QuickFinder Server

The Novell QuickFinder Server lets you add search and print functionality to any Web site, anywhere on the World Wide Web or on a company intranet. You can use it on your own enterprise-wide Web site or to host search services for business partners or clients.

Typically, you would dedicate a server to searching if you want to offload Web site traffic from your main Web server, or to provide failover for other Web search services.

For more information about the QuickFinder Server, see the *NW 6.5 SP8 Novell QuickFinder Server 5.0 Administration Guide*.

2.1.4 exteNd J2EE Web Application Server

The exteNd J2EE Web Application Server lets you deploy enterprise-class Web applications that take advantage of the full Java 2 Enterprise Edition standard: JSPs, Enterprise JavaBeans (EJBs), and all other J2EE 1.3 components and technologies. The Novell exteNd Web Application Server provides high performance, scalability, and reliability; support for rapid application development; application deployment facilities; and server management facilities. It is available only on the NetWare platform.

MySQL, Apache, and other software is installed also.

For more information about the Novell exteNd Web Application Server, see the Novell exteNd Application Server documentation (http://www.novell.com/documentation/lg/extendas/index.html).

2.2 Installing Individual Web and Application Services Components to a NetWare Server

If you want to install one or more individual Web/application server components during a NetWare installation, select the Customized NetWare Server option during the installation process.

This section describes each of the Web-related components available on the Components list during install.

Components available for individual installation include the following:

- ◆ Apache2 Web Server and Tomcat 4 Servlet Container
- ◆ Apache2 Admin Server
- ◆ Tomcat 4 Admin Container

- ◆ QuickFinder Server
- ◆ MySQL

2.2.1 Apache2 Web Server and Tomcat 4 Servlet Container

Selecting the Apache2 Web Server and Tomcat 4 Servlet Container component installs the Apache Web server 2.0 and the Tomcat Servlet Container 4.1 for your own use as a dedicated Web hosting solution. Tomcat is used for running Web servlets and JSPs.

For more information about installing Apache as your dedicated Web server, see "Apache Installation and Configuration" in the *NW 6.5 SP8: Apache Web Server Administration Guide*. For more information about installing Tomcat, see "Tomcat Installation and Configuration" in the *NW 6.5 SP8: Tomcat Administration Guide*.

2.2.2 Apache2 Admin Server

This component installs an administration instance of the Apache Web server. Apache is used on NetWare in two ways: as an administration server (Apache2 Admin Server) and as a dedicated Web server (Apache2 Web Server). The Apache2 Admin Server is installed by default and runs in protected address space on your NetWare server.

This component is available as a post-install option for instances where you are migrating an older NetWare server to a new server. After you complete the migration process and begin adding additional NetWare components, you can select this option to add the Apache administration server to your NetWare server.

For more information, see "Administration Instance vs. Public Instance of Apache on NetWare" in the *NW 6.5 SP8: Apache Web Server Administration Guide*.

2.2.3 Tomcat 4 Admin Container

This selection installs Tomcat Servlet Container 4.1, which is used for running Web servlets and JavaServer Pages. Typically, Tomcat is used with the Apache Web server.

For more information about installing and using Tomcat, see the *NW 6.5 SP8: Tomcat Administration Guide*.

2.2.4 QuickFinder Server

Novell QuickFinder Server lets you add search and print functionality to any Web site, anywhere on the World Wide Web or on a company intranet. You can use it on your own enterprise-wide Web site or to host search services for business partners or clients.

For more information about installing and using QuickFinder, see the *NW 6.5 SP8 Novell QuickFinder Server 5.0 Administration Guide*.

2.2.5 MySQL

MySQL is an open source, SQL database. When combined with a Web application, MySQL serves as a very reliable and scalable database for use in hosting business solutions such as eCommerce and business-to-business.

If you do not have Apache installed and you want to host Web servlets or applications, consider installing either the Apache2 Web Server and Tomcat 4 Servlet Container component or the special purpose Apache/Tomcat Server.

For more information about installing and using MySQL, see the *NW 6.5 SP8: Novell MySQL Administration Guide*.

2.3 What's Next

After you've installed the Web and application services components of NetWare, refer to their individual administration guides for more detailed information.

- *NW 6.5 SP8: Apache Web Server Administration Guide*
- *NW 6.5 SP8: Tomcat Administration Guide*
- *NW 6.5 SP8: Novell MySQL Administration Guide*
- *NW 6.5 SP8 Novell QuickFinder Server 5.0 Administration Guide*
- Novell exteNd Product Documentation (http://www.novell.com/documentation-index/index.jsp?category=exteNd)

If you are developing a Web solution and will be writing scripts or Java code, refer to the Novell Developer Kit (http://developer.novell.com/ndk).

In addition to the product documentation, you might benefit from the detailed, step-by-step instructions in the following NetWare Cool Solutions articles as you deploy Web services throughout your network:

- NetWare 6.5 Web Components Part 1: Fresh Install (http://www.novell.com/coolsolutions/feature/428.html)
- NetWare 6.5 Web Components Part 2: Upgrade (http://www.novell.com/coolsolutions/feature/440.html)

# Linux: Deploying Web and Application Services Components

3

Open Enterprise Server (OES) components that provide Web and application services on Linux can be installed during installation of the Linux operating system or they can be installed afterwards using YaST.

3.1 Setting Up a Simple Web Server on Linux

When installing Linux, select the Full Installation option.

Figure 3-1 *Installation Settings*
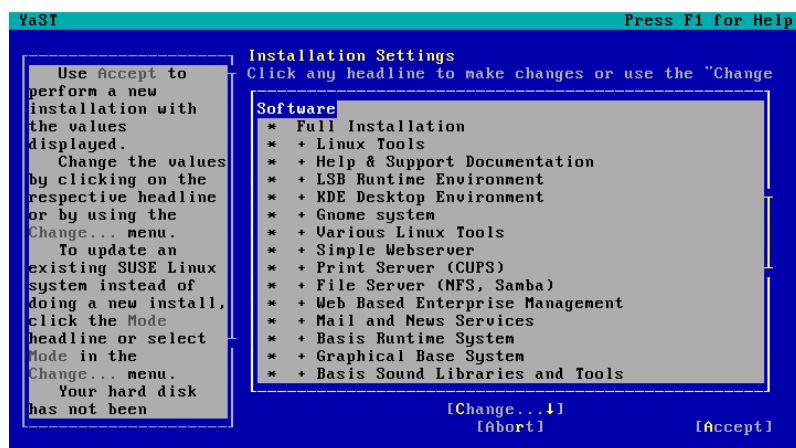
The Full Installation option includes the Apache and MySQL packages, while the Default System option does not. Perl is always included with Linux. PHP can be added to your Linux system after installation using YaST.

For complete instructions on installing Linux, see *OES 2 SP2: Installation Guide*.
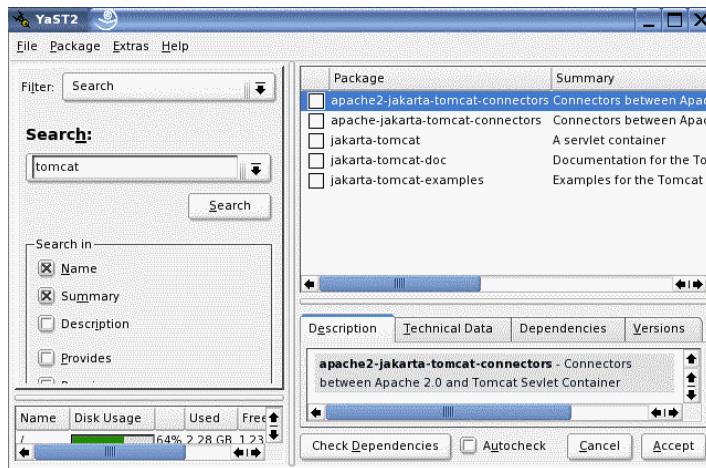
3.2 Installing Web and Application Services Packages in YaST

After you have installed Linux, you can use YaST to add more Web and application services to your system. For example, to install Tomcat:

1 In YaST, click *Software* in the left pane, then click *Install and Remove Software* in the right pane.
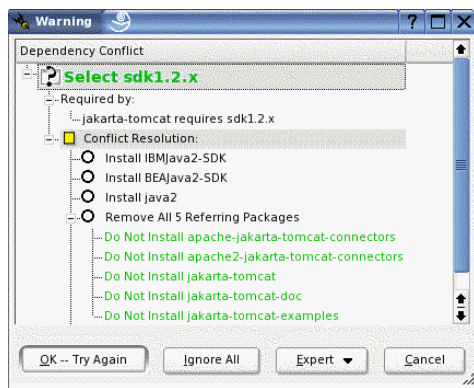
2 In the Search field, type `tomcat`, then click *Search*.

3 Select the five Tomcat packages, then click Accept.

You might receive a conflict dependency warning such as:

If you encounter a dependency conflict, select the package you want to install to resolve the conflict, then click *OK -- Try Again* to continue with the installation.

Use this process to add Web and application services packages to your Linux server as needed.

For more information about YaST, see "System Configuration with YaST" (http://www.novell.com/documentation/sles10/book_sle_reference/data/cha_yast2.html) in the *SUSE Linux Enterprise Server 10 SP3 Installation and Administration Guide* (http://www.novell.com/documentation/sles10/book_sle_reference/data/book_sle_reference.html).
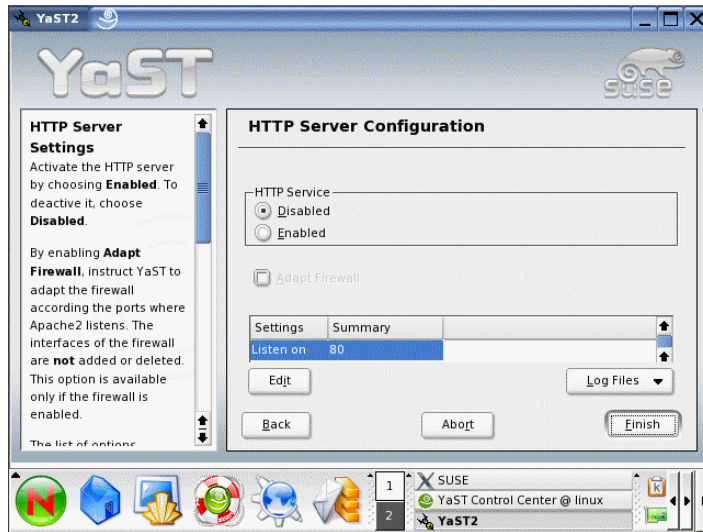
3.3 Managing Your Web Server on Linux

After you have installed and set up your Web server on Linux, you can configure and start Apache from YaST.

1 In YaST, click *Network Services* in the left pane, then click *HTTP Server* in the right pane.

Apache is referred to as the HTTP Server on Linux.

2 To start Apache, click *Enabled*, then click *Finish*.

3 To verify that Apache has started successfully, open a Web browser and view the following URL:

http://*Web_server_address*:*port_number*

where *Web_server_address* is the IP address or hostname of your Linux server and *port_number* is the Apache listen port, which is 80 by default. For example:

http://172.16.5.18:80

If Apache is correctly set up, you should see a Web page that starts with:
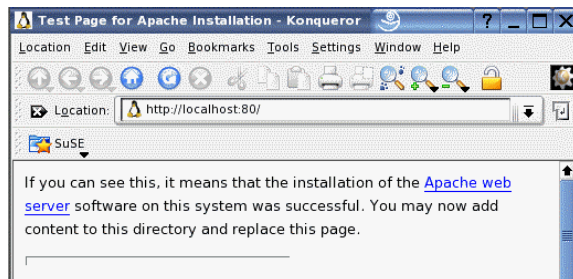
4 Replace the Apache test page (/apache2/htdocs/index.html) with your own home page and begin building your Web site.

For more information about Apache on Linux, see "The Apache HTTP Server " (http://www.novell.com/documentation/sles10/book_sle_reference/data/cha_apache2.html) in the *SUSE Linux Enterprise Server 10 SP3 Installation and Administration Guide* (http://www.novell.com/documentation/sles10/book_sle_reference/data/book_sle_reference.html).

3.4 What's Next

After you've installed the Web and application services packages of Linux, refer to their individual documentation sites for more detailed information.

◆ Apache 2.0 Documentation (http://httpd.apache.org/docs/2.2/)

- Tomcat 4 documentation (http://jakarta.apache.org/tomcat/tomcat-4.1-doc)
- MySQL documentation (http://dev.mysql.com/doc)
- PHP Hypertext Preprocessor documentation (http://www.php.net/docs.php)
- Perl documentation (http://www.perl.org/docs.html)

Multiplatform Coexistence and Migration of Web and Application Services

4

Because Novell® Open Enterprise Server (OES) includes both NetWare and Linux, its Web and application services can be deployed in a variety of combinations. You might have a long-standing network that has always run NetWare and you want to continue doing so. You might have a new network where you have chosen to deploy Linux. You might have a network that purposely includes both NetWare and Linux servers. You might be introducing Linux into a long-standing NetWare network with the intention of moving completely from NetWare to Linux over time.

If you are using both NetWare and Linux in your system, the following topics can help you handle any cross-platform issues that might arise:

* "Apache Coexistence and Migration Issues" in the *NW 6.5 SP8: Apache Web Server Administration Guide*
* "Tomcat Coexistence and Migration Issues" in the *NW 6.5 SP8: Tomcat Administration Guide*

Documentation Updates

A

This section contains information about documentation content changes made since the initial release of Novell® Open Enterprise Server. If you are an existing user, review the change entries to readily identify modified content. If you are a new user, simply read the guide in its current state.

Refer to the publication date, which appears on the front cover and the Legal Notices page, to determine the release date of this guide. For the most recent version, visit the Novell documentation Web site (http://www.novell.com/documentation/).

In this section, content changes appear in reverse chronological order, according to the publication date. Within a dated entry, changes are grouped and sequenced, according to where they appear in the document itself. Each change entry provides a link to the related topic and a brief description of the change.

This document was updated on the following dates:

A.1 November 9, 2009

This guide has been modified for publication on the NetWare 6.5 SP8 Documentation Web site.

A.2 December 2008

- Updated to the revised documentation standards

A.3 December 1, 2005

Page design reformatted to comply with revised Novell documentation standards.