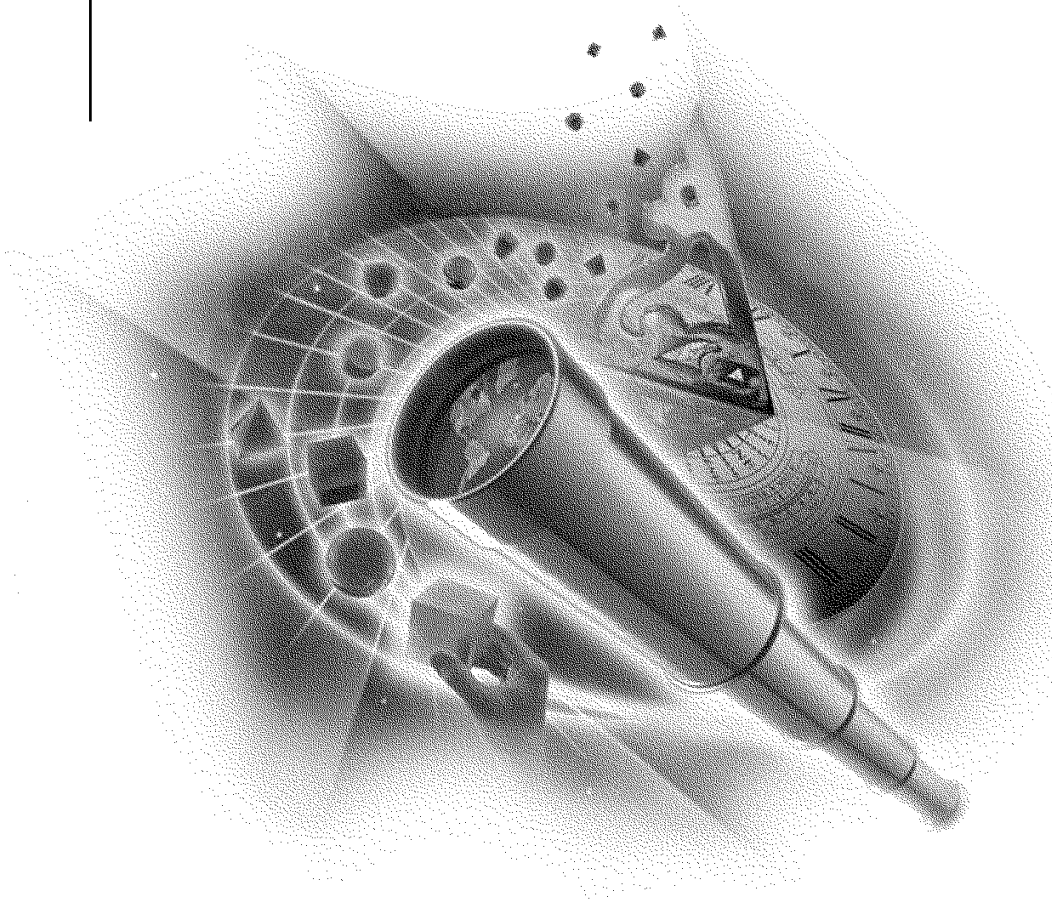


NDS Schema

Management



NDS[™] 7

Novell[®]

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NDS Schema Management

The NDS™ schema is managed using the Schema Manager utility. Schema Manager is an enhancement to the NDS Manager utility (ndsmgr32.exe). It allows those with supervisor rights to a tree to customize the schema of that tree.

1

Understanding

This section gives overview information on how to use Schema Manager.

What's New for NetWare 5

Schema Manager has been updated for NetWare[®] 5. Some enhancements include:

- ♦ A container object can contain itself (as long as containment includes at least one other object).
- ♦ Extensions to the schema can be shown against either the NetWare 4.11 base schema or the NetWare 5.0 base schema.
- ♦ Several bug fixes have been made in support of new extensions to the base schema.

Understanding the Schema

The schema defines what will become an NDS object (such as users, printers and groups) and which information is required or optional at the time that NDS object is created. Every NDS object has a schema class that has been defined for that type of object.

Base Schema

The schema that originally shipped with the product is called the base schema.

Once the base schema has been modified in any way--such as adding a new class or a new attribute, then it is considered the extended schema.

You don't need to extend the schema, but you now have the ability to do so. The Schema Manager utility allows the schema to be extended as needed to meet organizational needs. For example, you may want to extend your schema if your organization requires special footwear for employees and you need to keep track of employee shoe sizes. You might want to create a new attribute called Shoe Size and then add it to the User class.

Schema Manager Utility

Use this utility to extend the schema. It is available from the Object menu in the NDS Manager™ utility after you select a partition.

For more information on Schema Manager, see “Understanding Schema Manager” on page 10.

Understanding Schema Manager

Schema Manager is an enhancement to NDS™ Manager™ (a Windows*-based utility that allows for partition management). It allows those with supervisor rights to a tree to customize the schema of that tree. Schema Manager is available from the Object menu in NDS Manager after you select a partition.

Use Schema Manager to:

- ◆ View a list of all classes and attributes in the schema.
- ◆ View information on an attribute such as its syntax and flags.
- ◆ Extend the schema by adding a class or an attribute to the existing schema.
- ◆ Create a class by naming it and specifying applicable attributes, flags, containers to which it can be added, and parent classes from which it can inherit attributes.
- ◆ Create an attribute by naming it and specifying its syntax and flags.
- ◆ Add an attribute to an existing class.
- ◆ Compare the schemas of two trees and print the results.
- ◆ View or print a report on a selected class, attribute, or the entire schema.
- ◆ View or print the extensions to the schema.
- ◆ Delete a class that is not in use or that has become obsolete.

- ♦ Delete an attribute that is not in use or that has become obsolete.
- ♦ Identify and resolve potential problems.

Understanding Schema Classes, Attributes, and Syntaxes

Classes

A class is like a skeleton for a Directory object. A Directory object is a class that has been instantiated with data. In other words:

CLASS + DATA = DIRECTORY OBJECT

Network supervisors select a class as a starting point in defining a Directory object. The class is like a request form for a specific type of Directory object. Once the class is selected, the supervisor, in a sense, completes the 'request form' in order to provide essential and specific information on the new Directory object.

The class has a class name, an inheritance class (unless it is at the top of the class hierarchy), class flags, and a group of attributes. Classes are named like Directory objects--User, Printer, Queue, Server--yet they are just structure, no content.

The inheritance class is a class that is used as a starting point. All of the attributes granted to the inheritance class are inherited by the classes that come below it in the class hierarchy.

Attributes

Attributes are the data fields in a database. If a class is like a form, then the attribute would be one question blank on the form. When an attribute is created, it is named (such as 'surname' or 'employee number') and given a syntax type (such as 'string A-Z, 0-9' or 'number -999 to 999'). From then on, it is available in the attribute list.

Syntaxes

There are 29 syntax options from which to choose (available through a drop down box provided), such as 'Case Exact String' and 'Alpha-numeric.' These are used to specify how you want data entered for each attribute. The syntax can only be specified when an attribute is created. You cannot modify it later.

Available syntaxes include;

- ♦ Alpha-numeric
- ♦ Case Exact String
- ♦ Number -999 to 999
- ♦ String A-Z, 0-9

Understanding Mandatory and Optional Attributes

Every NDS object has a schema class that has been defined for that type of object, and a class is a group of attributes organized in a meaningful way. Some of these attributes are mandatory and some are optional.

Mandatory Attributes

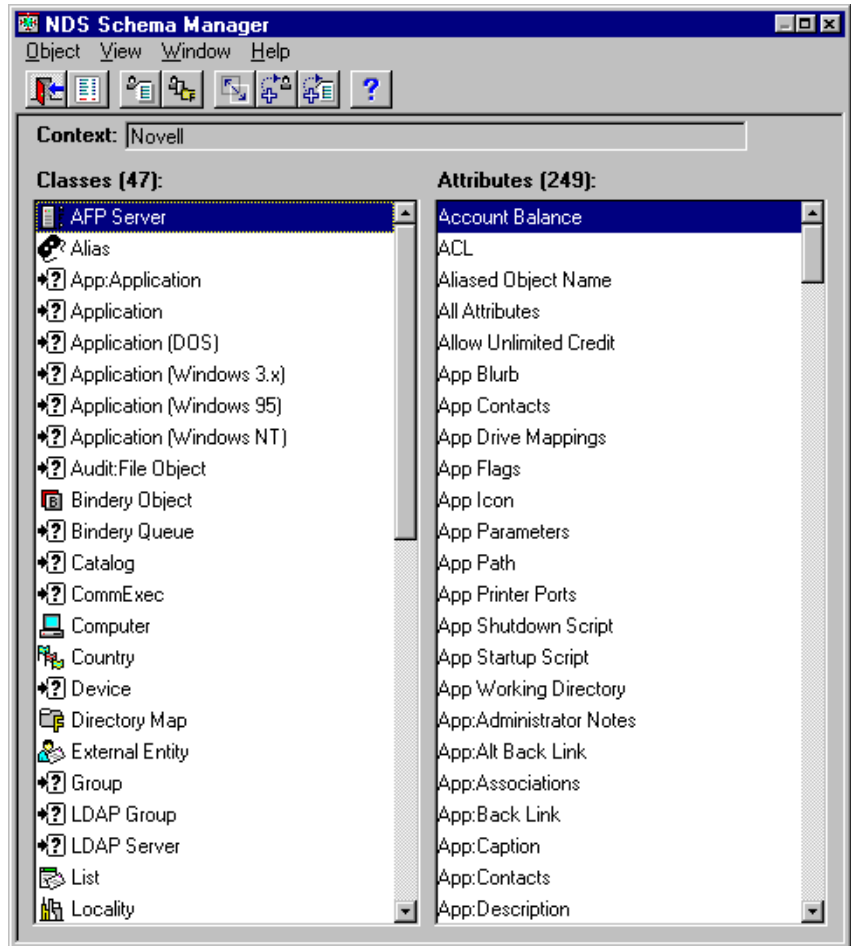
A mandatory attribute is one that must be completed when an object is being created. For instance, if a new user is being created using the User class, which has the employee number as a mandatory attribute, then the new User object cannot be created without providing the employee number.

Optional Attributes

An optional attribute is one that can be completed if desired but can be left without content. For instance, if a new User object is being created using the User class, which has Other names as an optional attribute, then the new User object can be created with or without data provided for that attribute--depending on whether the new user is known by other names. However, when an optional attribute is used for naming, the attribute then becomes mandatory.

Sample Schema

The following screen is a sample of part of a schema. Your base schema may appear similar, with the exception of the classes with the question mark icon. This icon is assigned to all classes which are extensions to the base schema.



2

Planning

This section gives guidelines for customizing your NDS™ Schema.

Designing the Schema

Designing your schema initially can save you time and effort in the long run. You can view the base schema and determine if it will meet your needs or if modifications are required. If changes are needed, use Schema Manager to complete the following tasks.

“Understanding Class Inheritance Hierarchy” on page 15

“Determining Required Changes” on page 16

“Extending the Schema” on page 21

“Managing the Schema Classes and Attributes” on page 23

Understanding Class Inheritance Hierarchy

What Is an Inheritance Hierarchy?

A class hierarchy shows how a class is associated with a parent class. This is a way of associating similar classes and allowing attributes to be inherited. It also defines the types of containers in which the class is valid.

The schema has several attributes and classes and a fundamental class hierarchy. (To view the current class hierarchy, click Object > Class Manager and see Class Manager.)

When creating a new class, the network supervisor can use the class hierarchy and the additional attributes available to customize each class. The supervisor

can specify an inheritance class (which will allow the new class to inherit all of the attributes and flags of a class higher in the hierarchy) and can then customize the new class by selecting one or more attributes to add to those which were inherited. The additional attributes can be selected as mandatory, naming, or optional attributes.

Network supervisors can also modify existing classes by adding optional attributes.

Determining Required Changes

Review the existing classes and attributes and determine what, if any, changes you need to make to your existing schema. Ensure that the existing classes and their associated attributes meet your informational needs.

A class hierarchy will help identify where you can make use of the inheritance feature found in the Create Class Wizard.

3

Viewing and Printing the Schema

This section gives instructions on how to view and print your NDS™ schema using Schema Manager.

Viewing and Printing the Schema Overview

You might want to view or print the schema to evaluate how well the schema meets your organization's informational needs. The larger and more complex your organization, the more likely it is that you will want to customize the schema, but even small organizations may have unique tracking needs. Viewing or printing the schema can help you determine what, if any, extensions you need to make to the base schema.

- ♦ View a class

You can see which attributes have been specified as mandatory, naming, and optional attributes for each class by viewing the class. You can also see what types of container objects can contain this class and see which class flags have been set.

- ♦ View an attribute

You can view information about a selected attribute, including the specified syntax, which attribute flags are set, and which classes are currently using this attribute.

NOTE: You cannot modify an attribute once it has been created.

- ♦ View and print schema extensions

You can generate and view the extensions made to any tree. You can also print the results.

- ♦ View and print a schema report

You can generate and view a schema report on a selected class, a selected attribute, or on the entire schema. You can also print the report.

- ♦ Compare schemas

You can compare the schemas of any two trees to identify the differences between their classes or attributes. This is helpful when you are preparing to merge two trees.

View a Class

You can see which attributes have been specified as mandatory, naming, and optional attributes for each class by viewing the class. You can also see

- ♦ Class inheritance hierarchy
- ♦ What types of container objects can contain this class
- ♦ Which class flags have been set

- 1 From the NDS Schema Manager window, double-click a class.

The Class Manager window displays.

- 2 To view the inheritance hierarchy for this class, click Class Inheritance, view it, and then click Close.

- 3 When you are finished viewing the class information, click Close.

View an Attribute

You can view information about a selected attribute, including

- ♦ The specified syntax
- ♦ Which attribute flags are set
- ♦ Which classes are currently using the attribute

NOTE: You cannot modify an attribute once it has been created, but you may want to delete it and recreate it. However, if you do so, the classes in the Classes Using this Attribute list will become unknown until you recreate the attribute.

- 1 From the NDS Schema Manager window, double-click an attribute.

The classes in the Classes Using this Attribute list will become unknown if you choose later to delete this attribute.

- 2 When you are finished viewing the attribute information, click Close.

View and Print Schema Extensions

You can view the extensions made to the schema of any tree. This includes all classes and attributes added to the base schema (the schema that shipped with the product). You might want to do this to determine what types of classes and attributes have been added. It might also be useful while troubleshooting to help you narrow your focus to the extensions only.

Some schema extensions are made apparent when icons display next to class names in class lists: When a class is added to the schema, it is automatically assigned the Unknown class icon.

NOTE: The Unknown class is part of the base schema.

- 1 Click Object > Schema Extensions.
- 2 Click the tree icon, select a tree, and then click OK.
Your current tree is the default, but you can select another tree.
- 3 Click OK.
- 4 If you want to print the results, click Print, complete the Print dialog box, and then click OK.
- 5 When finished viewing the results, click Close.

View and Print a Schema Report

You can view or print a schema report on a selected class, a selected attribute, or the entire schema. Each report has unique content.

- ♦ A report on a selected class includes a list of attributes for that class.
- ♦ A report on a selected attribute includes a list of classes using that attribute.
- ♦ A report on the entire schema includes lists of classes and attributes.

To View or Print a Schema Report on a Selected Class or Attribute

- 1 From the NDS Schema Manager window, highlight a class or an attribute.
- 2 Click Object > Schema Reports.
- 3 Click Generate Report on Selected Item.

- 4** Ensure the class or attribute you selected appears in the window, and then click OK.
- 5** If you want to print the report, click Print, complete the Print dialog box, and then click OK.
- 6** When you are finished viewing the report, click Close.

To View or Print a Schema Report on the Entire Schema

- 1** Click Object > Schema Reports.
- 2** Click Generate report on entire schema.
NOTE: The report will be generated by default on your current tree's schema.
- 3** If you want to print the report, click Print, complete the Print dialog box, and then click OK.
- 4** When you are finished viewing the report, click Close.

Compare Schemas

You can compare the schemas of any two trees to identify the differences between their classes or attributes. This is helpful when you are preparing to merge two trees.

- 1** Click Object > Compare Schema.
- 2** Click the top tree icon, click a tree, and then click OK.
Your current tree is the default, but you can choose another tree.
- 3** Click the bottom tree icon, choose a second tree, and then click OK.
- 4** Click OK.
- 5** If you have not logged in to the second tree, use the dialog box provided to do so now.
- 6** If you want to print the comparison, click Print, complete the Print dialog box, and then click OK.
- 7** When finished viewing the results, click Close.

4

Extending the Schema

This section gives instructions on how to extend your NDS™ schema using Schema Manager.

Extending the Schema Overview

You can extend the schema of a tree by creating a new class or attribute.

You don't need to extend the schema, but you can do so with Schema Manager. You can extend the schema as needed to meet organizational needs. For example, you may want to extend your schema if your organization requires special footwear for employees and you need to keep track of employee shoe sizes. You might want to create a new attribute called Shoe Size and then add it to the User class.

Creating a Class

The Create Class Wizard helps you create new classes quickly and accurately. The wizard prompts you to

- ♦ Name the new class
- ♦ Specify the class inheritance--if you want the new class to inherit class flags and attributes from one or more classes.
- ♦ Set class flags
- ♦ Select mandatory attributes
- ♦ Select optional attributes
- ♦ Select naming attributes
- ♦ Select container classes

Creating an Attribute

The Create Attribute Wizard helps you create new attributes quickly and accurately. The wizard prompts you to

- ♦ Name the new attribute
- ♦ Select the attribute's syntax
- ♦ Set attribute flags

Create a Class

You can add a class to your existing schema as your organizational needs change. The Create Class Wizard helps you accomplish this task correctly.

- 1** Click Object > Create New Class.
- 2** Follow the steps outlined in the Create a Class Wizard.

Help is available throughout the wizard. You can cancel or back up at any time prior to clicking Finish found on the last screen.

Create an Attribute

You can create a new attribute for your existing schema as your organization's informational needs change. The Create an Attribute Wizard helps you accomplish this task correctly.

- 1** Click Object > Create New Attribute.
- 2** Follow the steps outlined in the Create an Attribute Wizard.

Help is available throughout the wizard. You can cancel or back up at any time prior to clicking Finish found on the last screen.

5

Managing the Schema Classes and Attributes

This section gives instructions on how to manage your NDS™ schema classes and attributes using Schema Manager.

Managing the Schema Overview

You might need to make changes to your schema as your organization's informational needs change. For instance, if you never required a fax number before on your User object, but now you need to, you can create a new User class that has Fax Number as a mandatory attribute, and then begin using the new User class to create User objects.

You can modify an existing class by adding one or more optional attributes. You can modify an existing schema by either extending the schema or by deleting classes or attributes.

- ♦ Adding an attribute to a class

You can add mandatory attributes to a class only while creating a new class.

You can add optional attributes to existing classes anytime your organization's needs change or when you are preparing to merge trees.

- ♦ Extending the schema

You can extend the schema of a tree by creating a new class or attribute.

You don't need to extend the schema, but you can do so with Schema Manager. You can extend the schema as needed to meet organizational needs. For example, you may want to extend your schema if your organization requires special footwear for employees and you need to

keep track of employee shoe sizes. You might want to create a new attribute called Shoe Size and then add it to the User class.

- ♦ Deleting a class

You can delete a class anytime a class has become obsolete, but prior to deleting it, you should first make sure the class is not being used by any NDS object. You cannot delete a class until all instantiated objects using the class have been deleted

- ♦ Deleting an attribute

You can delete an attribute anytime an attribute has become obsolete, but you should make sure the class is not being used by any NDS object. You cannot delete an attribute that is in use by any class.

Add an Optional Attribute to a Class

You can add optional attributes to existing classes. This may be necessary if

- ♦ A report on a selected class includes a list of attributes for that class.
- ♦ You are preparing to merge trees

NOTE: Mandatory attributes can only be defined while initially creating a class.

1 Click Object > Add Optional Attribute to Class.

2 Highlight an attribute in the Available Attributes list, and then click the right arrow.

The attribute you chose will now display in the Current Attributes list as a bolded entry.

3 Repeat Step 2 as needed.

4 If you add an attribute by mistake, highlight the attribute in the Current Attributes list, and then click the left arrow.

5 Choose OK.

Delete a Class

- ♦ You might want to delete a class from the schema
 - ♦ After merging two trees and resolving class differences
 - ♦ Anytime a class has become obsolete
- 1** Ensure that the class you want to delete is not in use by any object.

Since determining where a class is in use is tricky (you must check this on the local servers), we recommend you delete only classes that you have created and that you are relatively certain that no one has used.

You cannot delete a base schema class because a non-removable flag is set by NDS.

You cannot delete a class until all instantiated objects using the class have been deleted.

- 2** From the NDS Schema Manager window, highlight the class.
- 3** Click Object > Delete Class.
- 4** Verify that the class you want to delete appears in the Delete Class window, and then click Yes.

Delete an Attribute

You might want to delete an attribute from the schema

- ♦ After merging two trees and resolving attribute differences
- ♦ Anytime an attribute has become obsolete

NOTE: Note: You cannot remove an attribute from an existing class. You can remove an attribute only if you don't save your changes while adding optional attributes.

- 1** Ensure that the attribute you want to delete is not in use by any object.

NOTE: NDS Schema Manager will not allow you to delete an attribute that is in use by any class.

- 1a** From the NDS Schema Manager window, double-click the attribute.
- 1b** In the Attribute Information window, view the Classes Using Attribute list.
- 1c** When you are finished viewing the attribute information, choose Close.

- 2** From the NDS Schema Manager window, highlight the attribute.
- 3** Click Object > Delete Attribute.
- 4** Verify that the attribute you want to delete appears in the Delete Attribute window, and then click Yes.



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