Nortel Business Ethernet Switch 100/200 Series

Using the Nortel Business Ethernet Switch 100/200 Series

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Contents

Preface

This guide provides information about administering and configuring the Nortel Business Ethernet Switch 100 (BES100) and 200 (BES200) Series devices. This guide describes the features of the following Nortel switches:

- Nortel Business Ethernet Switch 110-24T
- Nortel Business Ethernet Switch 110-48T
- Nortel Business Ethernet Switch 120-24T PWR
- Nortel Business Ethernet Switch 120-48T PWR
- Nortel Business Ethernet Switch 210-24T
- Nortel Business Ethernet Switch 210-48T
- Nortel Business Ethernet Switch 220-24T PWR
- Nortel Business Ethernet Switch 220-48T PWR

The term BES100 and BES200 Series switch is used in this document to describe the features common to the switches listed above.

A switch is referred to by its specific name when the feature that is being described is exclusive to that switch.

The term BES110 is used to describe only the features common to the BES110-24T and BES110-48T.

The term BES120 is used to describe only the features common to the BES120-24T and BES120-48T.

The term BES210 is used to describe only the features common to the BES210-24T and BES210-48T.

The term BES220 is used to describe only the features common to the BES220-24T and BES220-48T.

Before you begin

This guide is intended for individuals who have the following background:

- basic knowledge of networks, Ethernet bridging, and IP routing
- familiarity with networking concepts and terminology
- basic knowledge of network topologies

Text conventions

This guide uses the following text conventions.

> ***Note:*** Not all of the text conventions in the following table appear in this document.

angle brackets (< >)	Indicate that you choose the text to enter based on the description inside the brackets. Do not type the brackets when you enter the command. Example: If the command syntax is
	`ping <ip_address>`
	you enter
	`ping 192.32.10.12`

bold body text	Indicates objects such as window names, dialog box names, and icons, as well as user interface objects such as buttons, tabs, and menu items.
braces ({})	Indicate required elements in syntax descriptions where there is more than one option. You must choose only one of the options. Do not type the braces when you enter the command. Example: If the command syntax is **`show ip {alerts|routes}`** you must enter either **`show ip alerts`** or **`show ip routes`** but not both.

brackets ([ ])	Indicate optional elements in syntax descriptions. Do not type the brackets when you enter the command. Example: If the command syntax is
	`show ip interfaces [-alerts]`
	you can enter either
	`show ip interfaces`
	or
	`show ip interfaces -alerts`

italic text	Indicates variables in command syntax descriptions. Also indicates new terms and book titles. Where a variable is two or more words, the words are connected by an underscore. Example: If the command syntax is **`show at`** <*valid_route*>, *valid_route* is one variable and you substitute one value for it.
`plain Courier text`	Indicates command syntax and system output, for example, prompts and system messages. Example: **`Set Trap Monitor Filters`**
separator (>)	Shows menu paths. Example: **Protocols > IP** identifies the **IP** command on the **Protocols** menu.
vertical line (|)	Separates choices for command keywords and arguments. Enter only one of the choices. Do not type the vertical line when you enter the command. Example: If the command syntax is **`show ip {alerts|routes}`** you enter either **`show ip alerts`** or **`show ip routes`** but not both.

Related publications

For more information about using the BES100 or BES200 Series switch, see the following publication:

- *Quick Installation Guide for the Nortel Business Ethernet Switch 100/200 Series* (NN47925-301)

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If you purchased a Nortel service program, contact Nortel Technical Support.

The following information is available online:

- contact information for Nortel Technical Support
- information about the Nortel Technical Solutions Centers
- information about the Express Routing Code (ERC) for your product

An ERC is available for many Nortel products and services. When you use an ERC, your call is routed to a technical support person who specializes in supporting that product or service. You can locate the ERC for your product or service online.

The Nortel Support Web page is here:
www.nortel.com

New in this release

The following section details what is new in *Using the Nortel Business Ethernet Switch 100/200 Series* for hardware and software release 1.0: BES100 is version 1.1; BES200 is 1.2.

Features

See the following sections for information about feature changes:

Addition of BES200 content

This document was updated to provide all required information on how to use the BES200 series switch.

Introduction

The Business Ethernet Switch 100 and 200 series switches are used in small and medium business (SMB) applications. The BES100/200 series is a family of 1U rack mountable Ethernet switches capable of supporting wire speed connections on 24 or 48 fast Ethernet ports. These products are designed to be either rack-mounted or physically stacked on a bench.

All BES100/200 series switches are equipped with two 10/100/1000 Mb/s copper ports, a serial port, and SNMP and Web management interfaces compatible with both the BEM and a simple Web browser. Up to four BES200 Series switches can be connected together using stacking ports and accessed through a single Web user interface screen.

The BES100/200 family is not equipped with DHCP client. Instead, BOOTP is invoked at startup to obtain an IP address for the user interface. If the solution provider wishes to configure the user interface IP address manually, they can power the BES without BOOTP server present and browse to the factory default address for the user interface.

Navigation

- To set up the Web-based user interface for use with the BES100 or BES200, see "Using the Web-based user interface" (page 19)
- To set up the basic BES100 or BES200 management features with the Web-based user interface, see "BES100 or BES200 basic configuration using the Web-based user interface" (page 31)
- To set up the Business Element Manager user interface for use with the BES100 or BES200, see "Using the Element Manager" (page 57)
- To set up the BES100 or BES200 management features with the Business Element Manager user interface, see "BES100 or BES200 basic configuration using Element Manager" (page 63)
- To reset the system, to change the IP address, to view system details, or to manage BES100 or BES200 firmware, see "BES100 or BES200 administration " (page 79)

- To learn about the BES100 or BES200 management features, see "Business Ethernet Switch 100 or 200 Series fundamentals" (page 183)
- For system defaults, specifications, compliances, and other reference information related to the BES100 or BES200, see "BES reference information" (page 227)

Using the Web-based user interface

Use the information in this chapter to understand how to use the Web-based user interface to view and configure information about the BES100 and BES200 Series switches.

Prerequisites for using the Web-based user interface

To use the Web-based user interface, you need the following items:

- a computer connected to a network port that is a member of the management VLAN
- the following Web browser or one of the following Web engines installed on the computer :
  - Windows 95™, Windows 98™, Windows 2000™, Windows XP™, or Windows NT™ 5.1; en-US; rv:1.8.0.3, rv:1.7.5, and UNIX installed on the computer
  - Internet Explorer™ 6.0 and later

> **ATTENTION**
> Web browser capabilities such as page bookmarking, refresh, and page forward and page back, function as they would in any other Web site. However, these capabilities do not enhance the functionality of the Web-based user interface. Nortel recommends that you use only the navigation tools provided in the management interface.

- IP address of the BES100 or BES200 Series switches. For information about setting the IP address of the switch, see "Configuring initial settings by using the Quick Start feature" (page 31).

> **ATTENTION**
> To use some of the BES100 or BES200 Series switch Web-based user functionality, such as downloading software, you must connect your TFTP server to a BES100 or BES200 Series switch.

Navigation

- "Setting up the Web-based user interface" (page 20)

Setting up the Web-based user interface

Nortel recommends that you follow the procedures in this section regarding Web-based user interface prerequisites before you use the management features of your switch for the first time.

Procedure steps

Step **Action**

1 Check that Java Runtime Environment (JRE) version 1.50_07-b03 or later is installed on your PC. Download the latest version from www.java.com if required.

> **ATTENTION**
> The menu on the left side of the Web-based user interface may not appear if the Java Runtime Environment (JRE) is not installed.

2 Ensure the software programs on your PC enable Java script, Java applets, and Web browser pop-up dialog boxes. Refer to the corresponding software documentation for instructions. Software programs include but are not limited to:

- Web browser
- firewall
- software that controls Java behavior

> **ATTENTION**
> The menu on the left-hand side of the Web-based user interface may not appear if Java script, Java applets are disabled, and some management features do not work properly if pop-up dialog boxes are disabled.

—End—

Logging on to the Web-based user interface

Use this procedure to log on to the Web-based user interface.

Before you log on to the Web-based user interface, verify the VLAN port assignments and ensure that your switch and computer are on the same network. If the devices are not connected to the same VLAN, the IP address does not display the home page. The default VLAN ID is 1.

The Default IP address is 192.168.1.132, and the security default is ON. The default Username is: **nnadmin**; the default Password is: **PlsChgMe!**

The user name and password are case sensitive.

Procedure steps

Step	Action
1	Start your Web browser.
2	In the Web-based user interface address bar, type the IP address for your host switch. For example, enter **http://192.168.1.132**.
3	If prompted, enter the user name and password, and click **OK**. (Default user name: **nnadmin**. Default password: **PlsChgMe!**) The user name and password are case sensitive.

—End—

Network security is enabled by default.

Logging off from the Web-based user interface

Use this procedure to log off from the Web-based user interface.

Procedure steps

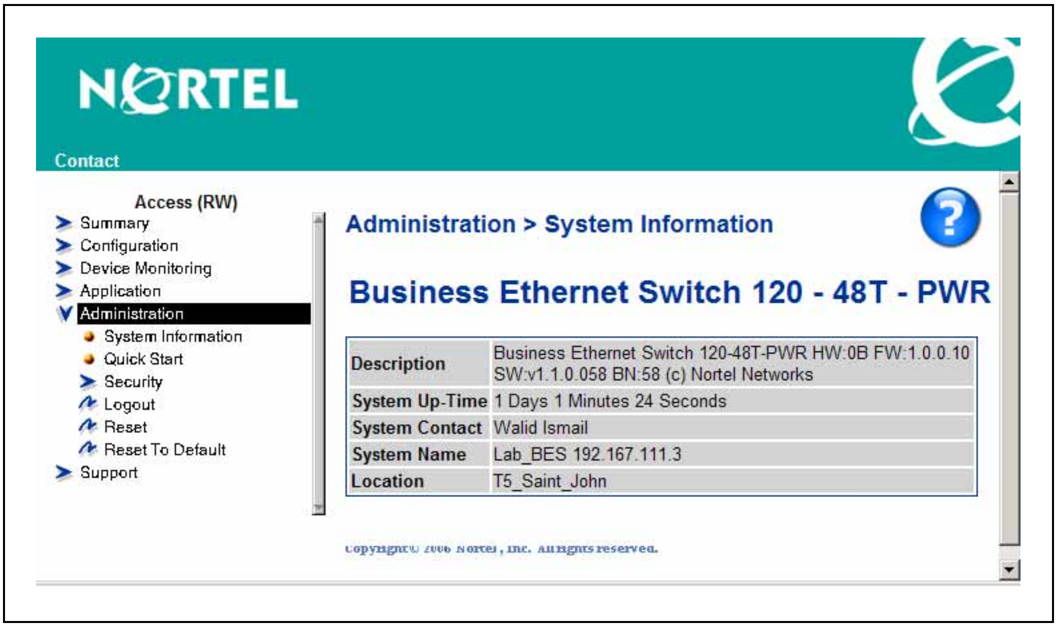
Step	Action
1	From the main menu, choose **Administration > Logout**. A logout message appears.
2	Click **OK** to log off or click **Cancel** to cancel the request.

—End—

Navigating the Web-based user interface

When your Web browser connects with the switch Web agent, the home page appears as shown in the figure . The home page displays the main menu on the left side of the screen and System information on the right side. Use the main menu links to navigate to other menus and display configuration parameters and statistics.

Home page



Administration > System Information

Business Ethernet Switch 120 - 48T - PWR

Description	Business Ethernet Switch 120-48T-PWR HW:0B FW:1.0.0.10 SW:v1.1.0.058 BN:58 (c) Nortel Networks
System Up-Time	1 Days 1 Minutes 24 Seconds
System Contact	Walid Ismail
System Name	Lab_BES 192.167.111.3
Location	T5_Saint_John

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The figure shows the home page for the BES120-48T PWR 48-port switch. Other than the number of fixed ports, there are no major differences between the 24-port and 48-port switch user interface. The home page for the BES200 Series switch shows content similar to what is shown in this figure, however the content is specific to the BES200 series switch.

Menu and management pages

Using the Web-based user interface, you can define system parameters, manage and control the switch and all its ports, or monitor network conditions. The menu is the same for all pages. It contains a list of six main headings. To navigate the Web-based user interface menu, click a menu title and then click one of its options. When you click an option, the corresponding page appears.

The first five headings provide options for viewing and configuring switch parameters. The Support heading provides options to open the online Help file and the Nortel Web site. Tools are provided in the menu to assist you in navigating the Web-based user interface.

Menu icons

Icon	Description
➤	This icon identifies a menu title. Click on this icon to display its options.
●	This icon identifies a menu title option. Click on this icon to display the corresponding page.
◒	This icon identifies a menu title option that has a hyperlink to related pages.
↗	This icon is linked to an action, for example, logout, reset, or reset to system defaults.

When you click a menu option, the corresponding management page appears. A page is composed of one or more items.

Management page items

Item	Description
Tables and input forms	Gray cells are read only. White cells are input fields.
Check boxes	Enable or disable a selection by clicking a check box. When a check mark is displayed in the box, that selection is enabled. You disable a selection by clicking the checked box.
Icons and buttons	Icons and buttons perform an action concerning the displayed page or the switch. Some pages include a button that opens another page or updates the values shown on the current page. Some pages include icons that initiate an action, such as reformatting the current displayed data as a bar or pie chart.

Configuration options

Configurable parameters have a dialog box or a drop-down list. After you make a configuration change on a page, be sure to click the Submit button to confirm the new setting. The following table summarizes some of the common configuration buttons that appear throughout the Web-based user interface pages.

Web Page configuration buttons

Button	Action
Submit	Saves specified values to the system.
Reload	Refreshes the page with current values.
Add	Adds the selected parameter to the configuration.
Delete	Deletes the selected parameter from the configuration.
Remove	Removes the selected parameter from the configuration.
Help	Links directly to Web Help.

ATTENTION

To ensure proper screen refresh, in the Internet Explorer menu, choose **Tools > Internet Options > General > Temporary Internet Files > Settings** and select **Every visit to the page** as the setting for Check for newer versions of stored pages.

Setting the IP address

Use this procedure to configure an IP address for the switch.

To use the BES100 or BES200 management features, you must first configure the switch with an IP address that is compatible with the network where it is being installed. For simplicity, configure the IP address before you permanently install the switch.

Procedure steps

Step	Action
1	Place your switch close to the PC that you will use to configure it. It helps if you can see the front panel of the switch while you work on your PC.
2	Connect the Ethernet port of your PC to any port on the front panel of your switch.
3	Insert the power adapter into the DC power socket in front of the switch.
4	Plug the other end of the power adapter into a grounded, 3-pin socket, AC power source.

5 Check the front-panel LEDs as the device powers on to confirm that the PWR LED is green. If not, check that the power cable is correctly plugged in.

6 If the PC IP address is different from the switch but is on the same subnet, go to the next step. (For example, if the PC and switch both have addresses that start with 192.168.1.x.) Otherwise, manually set the IP address for the PC. See "Changing a PC IP address" (page 79). The default IP address of the switch is 192.168.1.132, the default subnet mask is 255.255.255.0, and the default gateway is 0.0.0.0.

7 Open your Web browser and enter the address **http://192.168.1.132**. If you do not see the logon page, check your IP address and repeat step 3.

8 If prompted, enter the default user name **nnadmin** and default password **PlsChgMe!**, and click **Login**.

9 From the main menu, click **Configuration > IP**.

10 On the **IP Settings** page, select a BootP request mode.

11 Enter a stack IP address followed by the new switch IP address, subnet mask, default gateway.

12 Enter an IP address to Ping and test connectivity.

13 Choose whether to perform the Ping test at this time by selecting **Yes** or **No**.

14 Click **Submit**.

—End—

No other configuration changes are required at this stage, but Nortel recommends that you change the administrator password and enable password authentication before you log off.

Setting the IP address automatically

You can use an IP address to manage access to the switch over your network. By default, the switch invokes BootP at startup to obtain an IP address for the user interface. If you want to configure the user interface IP address manually, you can power the BES without a BootP server present and browse to the factory default address for the user interface.

Prerequisites

- To configure the switch dynamically, the network must provide BOOTP services.

Procedure steps

Step	Action
1	From the main menu, choose **Configuration > IP**.
2	In the **BootP Request Mode** box, choose the type of BootP mode you want.
3	Click **Submit**. If BOOTP is enabled, the switch broadcasts a request for IP configuration settings on each power reset.

—End—

Variable definitions

Variable	Value
BootP Request Mode	Choose from: • BootP or Default IP • BootP always • BootP Disabled • BootP or Last Address
	BootP or Default IP: This setting sends a BootP request when the switch IP address stored in nonvolatile memory is the factory default value. If the stored IP address differs from the factory default value, the switch uses the stored network parameters. If the switch cannot find a BootP server, it tries five more times to find one and then defaults to the factory settings.
	BootP Always: This setting ignores the stored network parameters and sends a BootP request each time the switch boots. If the BootP request fails, the switch boots with the factory default IP configuration. This setting disables remote management if no BootP server is set up for the switch, but it lets the switch boot normally.
	BootP Disabled:

Variable	Value
	This setting uses the IP configuration parameters stored in nonvolatile memory each time the switch boots. If a BootP configuration is in progress when you issue this command, the BootP configuration stops.
	BootP or Last Address: This setting obtains the IP configuration using BootP at each start up. If the BootP request fails, the switch uses the network parameters stored in its nonvolatile memory. ***Note:*** Valid parameters obtained in using BootP always replace current information stored in the nonvolatile memory.
	Note: Whenever the switch broadcasts BootP requests, the BootP process times out if a reply is not received within approximately 60 seconds. When the process times out, the BootP request mode automatically changes to BootP Disabled mode. To restart the BootP process, change the BootP request mode to any of the two following modes: BootP Always, or to BootP or Last Address.
Stack IP Address	Type a new stack IP address in the appropriate format. The format is: XXX.XXX.XXX.XXX
Switch IP Address	Type a new switch IP address in the appropriate format. The default switch IP address is 192.168.1.32 ***Note:*** When the IP address is entered in the In-Band IP Address field, and the In-Band Subnet Mask field value is not present, the software provides an in-use default value for the In-Band Subnet Mask field that is based on the class of the IP address entered in the In-Band IP Address field.
Subnet Mask	Type a new subnet mask in the appropriate format. The default subnet mask value is 255.255.255.0.
Default Gateway	Type an IP address for the default gateway in the appropriate format. The default gateway value is 0.0.0.0.
Administration	username: nnadmin password: PlsChgMe!
Ping IP	Type an IP address to ping.
Ping Host	Choose Yes or No.
Ping Result (if ping issued)	Displays the results of the ping operation.

Changing the administrator password

Use the Passwords page to change access passwords.

Procedure steps

Step	Action
1	From the main menu, choose **Administration > Security > Passwords**.
2	In the Switch Password Setting table, type a new password in the Read-Write Switch Password field to provide read and write access. **OR** To provide read-only access, type a new password in the Read-Only Switch Password field.
3	Click **Submit**.

—End—

ATTENTION

If the Web Switch Password Type parameter is set to Off, you are not asked for a user name and password from the Web interface.

Enabling password authentication

You can control whether you need a user name and password to gain access to the switch.

Procedure steps

Step	Action
1	From the main menu, choose **Administration > Security > Passwords**.
2	In the Web Switch Password Type list, select On to set a user name and password for Web-based access to the switch.
3	In the Console Switch Password Type list, select On to set a user name and password for Console-based access to the switch.
4	Click **Submit**.

—End—

Configuring system information

Use the System page to provide a descriptive name, location, and contact information to the system.

Procedure steps

Step	Action
1	From the main menu, choose **Configuration > System**.
2	Type a contact name, system name, and system location information.
3	Click **Submit**.

—End—

Variable	Value
System Description	Description of the switch.
System Up Time	Length of time the management agent has been operational. This is a read-only value.
System Contact	Administrator responsible for the system.
System Name	Name assigned to the switch system.
System Location	The system location.

BES100 or BES200 basic configuration using the Web-based user interface

Use the procedures in this chapter to manage the basic configuration of your BES100 or BES200 Series switch with the Web-based user interface.

Navigation

Configuring initial settings by using the Quick Start feature

Use the Quick Start feature to quickly set up BES100 or BES200 features including consolidating multiple setup pages into a single page. The Quick Start screen is used to configure the following information:

- switch IP address
- subnet mask
- default gateway
- default (Management VLAN)
- Web passwords

During the initial setup mode, all ports in the switch are assigned to the new default VLAN.

A port-based Quick Start VLAN is created if the new default VLAN does not exist. All ports are removed from the current default VLAN and assigned to the Quick Start VLAN. The PVIDs for all ports are changed to the Quick Start VLAN. The Quick Start VLAN is also designated as the management VLAN.

Procedure steps

Step	Action
1	From the main menu, choose **Administration > Quick Start**.
2	Type the IP address, subnet mask, and gateway IP address.
3	Click **Submit**.
4	Close the Web-based user interface and start a new session. The IP address you were connected to is no longer valid.

ATTENTION

If the IP address you gave the switch is on a network subnet that is different from what your computer is using, you need to change the IP address of your PC to be on the same subnet as the switch, before you can reconnect.

—End—

Variable definitions

Variable	Value
Switch IP Address	Specify a new IP address for the switch.
Subnet Mask	Enter a new subnet mask.
Default Gateway	Specify an IP address for the default gateway.
Default (Management) VLAN	Specify the VLAN ID (number) of the port-based default management VLAN.
Web Switch Password Type	Enables (ON) or disables (OFF) password for access to the Web interface.
Read-Only Switch Password	Specifies the read-only password for access to the Web interface.
Read-Write Switch Password	Specifies the read/write password for access to the Web interface.

Configuring Simple Network Management Protocol (SNMP)

Configure SNMPv1 to modify read/write and read-only community strings, enable or disable trap mode settings, and enable or disable the autotopology feature.

Procedure steps

Step Action

1 From the main menu, choose **Configuration > SNMP**.

The SNMP page appears.

2 In the **Read-Only Community String** box, type the case-sensitive read-only password.

3 In the **Read-Write Community String** box, type the case-sensitive read-write password.

4 In the **Authentication Trap** list, choose a selection.

5 Click **Submit** in any section to save your changes.

—End—

Variable	Value
Read-Only Community String	Type a character string to identify the community string for the SNMPv1 read-only community. The default value is PlsChgMe!RO. 1 to 32 characters in length. Read-Write Community String Type a character string to identify the community string for the SNMPv1 read-write community. The default value is PlsChgMe!RW. 1 to 32 characters in length.
Authentication Trap	Choose to enable or disable the authentication trap. (1) Enable (2) Disable

Configuring an SNMP trap receiver

Configure an SNMP trap receiver to configure an IP address and community string. An SNMP trap receiver notifies you of significant events.

Procedure steps

Step Action

1 From the main menu, choose **Configuration > SNMP Trap**.

The SNMP Trap Receiver page appears.

2 In the **Trap Receiver Creation** section, type information in the text boxes, or select from a list.

3 Click **Submit**.

The new entry is displayed in the Trap Receiver Table.

—End—

Variable definitions

Variable	Value
☒	Deletes the row
Trap Receiver Index	Choose the number of the trap receiver to create or modify. The range is from 1 to 4.
IP Address	Type the network address for the SNMP manager that is to receive the specified trap. XXX.XXX.XXX.XXX
Community	Type the community string for the specified trap receiver. The range is from 0 to 32.

Deleting an SNMP trap receiver configuration

Delete SNMP trap receiver configurations you no longer need.

Procedure steps

Step Action

1 From the main menu, choose **Configuration > SNMP Trap**.

The SNMP Trap Receiver page appears.

2 In the **Trap Receiver Table**, click **Delete** for the entry you want to delete.

A message appears prompting you to confirm your request.

3 Click **Yes**.

—End—

Configuring VLANs

Use the procedures in this section to create, modify, or delete a port-based VLAN, or select a management VLAN.

Navigation

- "Creating a port-based VLAN" (page 35)

- "Modifying a port-based VLAN" (page 35)
- "Selecting a management VLAN" (page 36)
- "Deleting a VLAN configuration " (page 37)

Creating a port-based VLAN

Use this procedure to create port-based VLANs for your BES100 or BES200 Series switch.

Procedure steps

Step	Action
1	From the main menu choose **Application > VLAN > VLAN Configuration**. The VLAN Configuration page appears.
2	Click **Create VLAN**. The VLAN Configuration: Port based page appears.
3	In the VLAN field, type an ID number for the VLAN. The range is from 1 to 4094.
4	In the VLAN Name field, type a name to assign to the VLAN.
5	Click **Submit**.

—End—

Modifying a port-based VLAN

Modify an existing port-based VLAN to change the VLANID of the port.

Procedure steps

Step	Action
1	From the main menu, choose **Application > VLAN > VLAN Configuration**. The VLAN Configuration page appears.
2	Click the **Modify** icon next to the VLAN you want to define ports for.
3	Click the ports you want to include in the current VLAN.
4	To enable all ports, select the **All** check box.
5	Click **Submit**.

The modified VLAN configuration is displayed in the VLAN - Port based Setting table.

—End—

Variable definitions

Variable	Value
VLAN	The number of the currently selected VLAN. The range is from 1 to 4094.
VLAN Name	Enter up to 16 printable characters.
Port	Number of the port included in the VLAN. Choose: Yes or No

Selecting a management VLAN

Select any VLAN to perform as the management VLAN. VLAN 1 is the default management VLAN for the switch.

> **ATTENTION**
>
> AutoPVID is enabled as soon as you move the port connected to the management station to a new VLAN, causing you to lose management of the switch. To regain management of the switch, you must physically change the connection to a port which still has a PVID that is equal to the VID of the management VLAN.

Prerequisites

- The VLAN State field value must be active.

Procedure steps

Step	Action
1	From the main menu, choose **Application > VLAN > VLAN Configuration**. The VLAN Configuration page appears.
2	In the **VLAN Setting** section, choose the VLAN to assign as your management VLAN.
3	Click **Submit**.

—End—

Deleting a VLAN configuration

Delete a VLAN configuration that you no longer require.

Procedure steps

Step	Action
1	From the main menu, choose **Application > VLAN > VLAN Configuration**. The VLAN Configuration page appears.
2	In the **VLAN Table**, click **Delete** for the entry you want to delete. A message appears prompting you to confirm your request.
3	Click **Yes** to delete the VLAN configuration.

—End—

Configuring LACP ports

You can configure link aggregation control protocol (LACP) to use link aggregation (LA) to create and manage a trunk group. LACP lets a switch learn the presence and capabilities of a remote switch by exchanging information with the remote switch before a trunk group is formed.

Procedure steps

Step	Action
1	From the main menu, choose **Application > Link Aggregation Protocol > Port Configuration**. The Port Configuration page appears.
2	Set the values for each parameter as indicated in the table below.
3	Click **Submit**.

—End—

Variable definitions

Variable	Value
Port	Lists each port on the switch. This is a read-only value.
Priority	Lists the priority number of each port.

Variable	Value
LACP mode	Select to enable or disable the LACP mode.
Admin key	Enter the same value for ports that belong to the same link aggregation group. The range is from 0 to 65535. The default is 1.
Operational Key	The current operational value of the key. This is a read-only value.
Aggregator ID	The identifier value of the aggregator that this Aggregation Port has currently selected. This is a read-only value.
Trunk ID	The ID of the LAG. The possible values are: 1 to 6. This is a read-only value.
Partner Port	The index of the port from the partner switch. This is a read-only value.
Status	Status of the selected port. This is a read-only value.

Displaying PoE information

Display Power over Ethernet (PoE) parameters for the BES100 or BES200 Series switch using the Web-based management system to gather information on power usage.

Procedure steps

Step Action

1 From the main menu, choose **Configuration > PoE Management > Global Power Mgmt**.

The Global Power Management page appears.

2 Click **Update** to refresh the Global Power Mgmt page.

—End—

Variable definitions

Variable	Value
Available PoE Power	Displays the amount of power available to powered devices from the switch: 168 watt

Variable	Value
PoE Power Status	Displays the status of the PoE feature: • Normal - all power functioning correctly • Error - PoE failed
PoE Power Consumption	Displays total power use on all devices currently drawing power.

Configuring a PoE Port

Configure the Power over Ethernet (PoE) properties for a port.

Procedure steps

Step Action

1 From the main menu, choose **Configuration > PoE Management > Port Property**.

2 In the **Admin Status** list, make a selection.

3 Click **Submit**.

—End—

Variable definitions

Variable	Value
Port	The PoE port.
Admin. Status	Displays the status of the PoE feature: • Enabled - all power functioning correctly • Disabled - PoE unavailable
Current Status	The state of the device.
Power (Watt)	Displays the amount of power available to powered devices from the switch: 168 watt

Configuring a Spanning Tree Port

Use the Spanning Tree port information page to configure the spanning tree port to prevent undesirable loops in the network.

Procedure steps

Step	Action
1	From the main menu, choose **Application > Spanning Tree > Port Information**. The Port Information page appears.
2	Select a value in the Admin Edge Status field.
3	Click **Submit**.

—End—

Spanning Tree Port Information page items

Item	Description
Port	The port number.
Path Cost	This read-only field displays the lowest path cost to the root.
Admin Edge Status	Because end nodes cannot cause forwarding loops, they can pass directly through to the spanning tree forwarding state. A value of True indicates that the spanning tree can assume this port as an edge-port and a value of False indicates that the spanning tree can assume this port as a non-edge-port.
Oper Edge Status	A value of True indicates that the spanning tree can assume this port as an edge-port and a value of False indicates that the spanning tree can assume this port as a non-edge-port. The switch software sets this object to false on reception of a BPDU.
OperP2P Status	The administrative point-to-point status of the LAN segment attached to this port. A value of True indicates that the spanning tree treats this port as if it is connected to a point-to-point link. A value of False indicates that the spanning tree treats this port as having a shared media connection. A value of Auto indicates that this port is considered to have a point-to-point link if it is an aggregator and all of its members are aggregatable, or if the MAC entity is configured for full-duplex operation, either through autonegotiation or by management means.
Oper Protocol Version	Indicates the STP version in which the port is participating.
Role	Indicates the role of the port in the Spanning Tree instance.
State	Used to identify the RSTP port state. Port state is cataloged as Discarding, Learning, or Forwarding.

Configuring a stack

Use this procedure to stack BES200 units so they can handle more traffic and be managed as a single IP address.

Procedure steps

Step	Action
1	Access the bottom switch in the stack. Typically, this is the base unit that serves to connect any other units in the stack.
2	At the back of the unit you have chosen as the base unit, position the slide switch to the position labeled as Base.
3	For the other units in the stack, move the slide switches for the units to the unlabeled position.
4	Adjacent to the slide switch on the units, are two RJ-45 ports labeled Cascade up and Cascade down. Plug one end of a cable into the Cascade up port on the base unit, and then plug the other end into the Cascade down port on the first stacked unit. The top unit in the stack has one end of a cable plugged into the Cascade up port and the other end plugged into the Cascade down port of the base unit and completes the loop.
5	Repeat Step 4 on successively stacked units until the stack is complete.

—End—

BES100 or BES200 advanced features configuration

Use these procedures to set up the BES100 or BES200 advanced management features.

Navigation

Configuring Simple Network Time Protocol (SNTP)

Configure the SNTP feature to synchronize the system clock. With this feature, the system can obtain the time from any RFC 2030-compliant NTP/SNTP server.

Procedure steps

Step	Action
1	From the main menu, choose **Configuration > SNTP**.
2	In the **Primary Server Address** field, type an IP address for the primary SNTP server.
3	In the **Secondary Server Address** field, type an IP address for the secondary SNTP server.
4	In the **Sync Interval (hours 0..168)** field, type a value to set the synchronization interval. The values range from 0 to 168 hours.
5	In the **Synchronize now** field, choose **Yes** from the Synchronize now list if you want to synchronize your settings immediately, or choose **No** from the Synchronize now list if you want to perform the synchronization later.
6	In the **SNTP status** field, choose **Enabled** or **Disabled** from the SNTP status list.

—End—

SNTP page items

Variable	Value
Primary Server Address	The IP address of the primary SNTP server. Secondary Server Address The IP address of the secondary SNTP server.
Secondary Server Address	The IP address of the secondary SNTP server.
Sync Interval (hours 0..168)	Controls the frequency, in hours, that the device attempts to synchronize with the NTP servers.
Last Sync Source	Specifies the IP source address of the NTP server with which this device last synchronized.
System LocationPrimary server sync failures	Specifies the number of times the switch failed to synchronize with the primary server address. However, synchronization with the secondary server address can still occur.
System LocationSecondary server sync failures	Specifies the number of times the switch failed to synchronize with the secondary server address.

Variable	Value
Last Sync Time	Specifies the Coordinated Universal Time (UTC) when the device last synchronized with an NTP server.
Next Sync Time	Specifies the UTC at which the next synchronization is scheduled.
Current Time	Specifies the current UTC of the switch.
Synchronize now	Lets you perform an immediate synchronization with the SNTP server.
SNTP status	Indicates either Disabled or Enabled.

Configuring Quality of Service (QoS) settings

Configure differentiated services code point (DSCP) to 802.1p mapping using Web-based management so that transmitted packets are classified according to priority values.

Procedure steps

Step **Action**

1 From the main menu, choose **Application > Quality of Service > QoS Settings**.

The QoS Settings page appears.

2 In the **DSCP to 802.1p mapping status** section, select from the list to enable or disable DSCP to 802.1p mapping.

3 Click **Submit**.

The modified configuration appears in the DSCP to 802.1p mapping Status Table.

4 To configure the second QoS Egress Map Table, make configuration changes in the first QoS Egress Map.

5 Click **Submit**.

The changes are populated in the last table on the page.

—End—

Variable definitions

Variable	Value
DSCP to 802.1p mapping	Choose whether to enable or disable DSCP to 802.1p mapping.

Variable	Value
DSCP value	The attribute used internally to determine the appropriate Layer 2 cost of service (CoS) mappings. Range of values is 0 to 63.
802.1p priority associated	Choose the 802.1p priority to use with the specified DSCP value. Range of values is 0 to 7.

Configuring Internet Group Management Protocol (IGMP) snooping

Configure IGMP snooping to enable the switch to selectively forward multicast traffic only on those ports where particular IP multicast streams are expected.

Procedure steps

Step	Action
1	From the main menu, choose **Application > IGMP > IGMP Configuration**.
2	To enable or disable IGMP on a VLAN, click the **Action** button in the VLAN row. The IGMP: VLAN Configuration page appears.
3	In the **Snooping** field, choose **Enabled** or **Disabled**.
4	Click **Submit**.

—End—

Adding MAC addresses

Add MAC addresses to the MAC address-based security system to allow access to the switch.

Prerequisites

- When you use the Security Table page, you instruct the switch to allow the specified MAC address access only through the specified port or port list.

ATTENTION

Be certain to include the MAC address for the default LAN router as an allowed source MAC address.

Procedure steps

Step	Action
1	In the main menu, choose **Application > MAC Address Security > Security Table**. It may take some time for the required addresses to be learned. Then, the Security Table page appears.
2	Complete fields as described in the table.

—End—

Variable definitions

Variable	Value
Action	Lets you delete a MAC address.
MAC Address	Displays the MAC address.
Allowed source	Displays the entry through which the MAC address is allowed.
MAC Address Security Table Entry Creation	Enter the MAC address you want to allow to access the switch. Select the Port or port list through which the MAC address is allowed.

Locating a specific MAC address

Locate a specific MAC address among all the MAC addresses learned from all the VLANs to determine if a switch has learned a particular address.

Procedure steps

Step	Action
1	From the main menu, choose **Configuration > Find MAC Address**. The Find MAC Address page appears.
2	Type the MAC Address Setting you want to search for.
3	Click **Submit** to enter the request. If the address is located, it is shown in the first row in the MAC Address Table section. If the address is not located, the system response *Not Found* is shown to the right of the **Find MAC Address** input field.

—End—

Variable definitions

Variable	Value
MAC Address	The unicast MAC address for which the bridge has either forwarding or filtering information, or both.
Source	The source of the discovered MAC address.

Configuring MAC address-based security

Configure MAC address security to enable or disable security features on the switch.

Prerequisites

- Ensure that you do not enter the MAC address of the switch you are working on.
- After configuring the switch for MAC address-based security, you must enable the ports you want, by using the Port Configuration page.

Procedure steps

Step **Action**

1 From the main menu, choose **Application > MAC Address Security > Security Configuration**.

The Security Configuration page appears.

2 On the **MAC Address Security** field, select **Enabled** or **Disabled** from the list.

3 Click **Submit**.

—End—

Filtering MAC destination addresses

Filter MAC destination addresses to drop all packets from a specified MAC Destination Address (DA).

Procedure steps

Step **Action**

1 From the main menu, choose **Application > MAC Address Security > DA MAC Filtering.**

The DA MAC Filtering page appears.

2 In the **DA MAC Filtering Entry Creation** area, enter the MAC DA you want to filter.

You can list up to 10 MAC DAs to filter. The address format is XX:XX:XX:XX:XX:XX

ATTENTION
Ensure that you do not enter the MAC address of the management station.

3 Click **Submit**.

The system returns you to the DA MAC Filtering page with the new DA listed in the table.

—End—

Variable definitions

Variable	Value
Action	Lets you delete a MAC DA you are filtering.
Index	The number of the MAC address.
MAC Address The range is 1 -10.	Displays the MAC address.
DA MAC Filtering Entry Creation	Enter the MAC DA you want to filter. DA MAC Address xx:xx:xx:xx:xx:xx

Deleting MAC destination addresses

Delete a MAC destination address to remove a MAC address you have filtered.

Procedure steps

Step **Action**

1 From the main menu, choose **Application > MAC Address Security > DA MAC Filtering**.

The DA MAC Filtering page appears.

2 In the **Destination MAC Address Filtering** Table, click the **Delete** icon for the entry you want to delete.

A message appears prompting you to confirm your request.

3 Click **Yes** to delete the target parameter configuration.

—End—

Configuring port management properties

Configure management properties to allow control of the port.

Procedure steps

Step Action

1 From the main menu, choose **Configuration > Port Management**.

The Port Management page appears.

2 In the port row of your choice, select from the lists.

3 Click **Submit**.

—End—

Variable definitions

Variable	Value
Port	The switch port number of the corresponding row. The values that you set in each switch row affect all switch ports (except the GBIC port or fiber optic ports when installed).
Alias	Port name.
Trunk	The trunk group that the switch port belongs to as specified in the Trunk Member fields on the MultiLink Trunk page.
Link	The current link state of the corresponding port as follows: Up: The port is connected and operational. Down: The port is not connected or is not operational.
Link Trap	Choose to control whether link up/down traps are sent to the configured trap receiver from the switch. The default setting is On.
Speed / Duplex	The Ethernet speed the port supports. The default setting is 100 Mb/s half-duplex for ports 1-48 when autonegotiation is disabled. Gigabit speed is available on ports 25 and 26.

Configuring Remote Access

Configure remote access to allow a user at a remote console terminal to communicate with the switch and configure the BES100 or BES200.

Procedure steps

Step	Action
1	From the main menu, choose **Configuration > Remote Access**.
2	In the Access list, choose **Allowed** or **Disallowed**.
3	In the Use List, choose **Yes** or **No**.
4	Click **Submit**.
5	To grant access to a source IP address and source mask, type the addresses in their respective fields.
6	Click **Submit**.

—End—

Variable definitions

Variable	Value
SNMP	Specifies if SNMP access is allowed. SNMP access includes the Element Manager. To limit SNMP access to the IP addresses in the table, choose **Yes** in the **Use List** field.
WEB Page	Specifies from what IP addresses access to the Web-based management system is allowed (access is always allowed). To limit Web access to the IP addresses in the table, choose **Yes** in the **Use List** field.
Allowed Source IP	Specifies up to 10 user-assigned host IP addresses that are allowed Web and, if specified, SNMP access to the switch. The default value is 0.0.0.0 (no IP address assigned). The range is four-octet dotted-decimal notation, in which each octet is represented as a decimal value, separated by a decimal point.
Allowed Source Mask	Specifies up to 10 user-assigned allowed source address masks. The remote IP address is masked with the Allowed Source Mask and, if the resulting value equals the Allowed Source IP address, the connection is allowed. For example, a connection is allowed with the following settings: • Remote IP address = 192.0.1.5

Variable	Value
	• Allowed Source IP Address = 192.0.1.0 • Allowed Source Mask = 255.255.255.0 • The default value is 0.0.0.0 (no IP mask assigned) • The range is four-octet dotted-decimal notation, in which each octet is represented as a decimal value, separated by a decimal point.

Configuring Link Layer Discovery Protocol (LLDP) transmission properties

Configure LLDP transmission properties to set transmission intervals.

Procedure steps

Step Action

1 From the main menu, choose **Application > 802.1ab > LLDP Configuration**.

2 In the **Tx Interval** field, type a numeric value for the interval time in seconds.

3 In the **Tx Hold Multiplier** field, type a numeric value to set the multiplier transmission interval.

4 In the **Re Init Delay** field, type a numeric value to indicate the number of seconds to delay before attempting reinitialization.

5 In the **Notification Interval** field, type a numeric value for the interval between LLDP notifications.

6 In the **Tx Delay** field, type a numeric value to specify the amount of time between transmissions.

7 Click **Submit**.

—End—

Variable definitions

Variable	Value
Tx Interval	Sets the interval between successive transmission cycles. The range is from 5 to 32768 seconds.
Tx Hold Multiplier	Sets the multiplier for the tx interval that computes the Time To Live value for the TTL TLV. The range is from 2 to 10.

Variable	Value
Re Init Delay	Sets the delay for reinitialization attempt if the adminStatus is disabled. The range is from 1 to 10 seconds.
Notification Interval	Sets the interval between successive transmissions of LLDP notifications. The range is from 5 to 3600 seconds.
Tx Delay	Sets the minimum delay between successive LLDP frame transmissions. The range is from 1 to 8192 seconds.

Configuring LLDP port status

Configure LLDP port status from the LLDP Local Management page.

Procedure steps

Step	Action
1	From the main menu, choose **Application > 802.1ab > LLDP Local Management** .
2	In the **Admin Status** field, select a status from the list to indicate receive and transmit capabilities.
3	In the **Config Notification Enable** field, select a value of True or False.

—End—

LLDP port status page items

Item	Description
Link Layer Discovery Management	
Mgmt Addr	The string value used to identify the management address component associated with the local system. The purpose of this address is to contact the management entity.
Mgmt AddrIfId	The integer value used to identify the interface number regarding the management address component associated with the local system
Mgmt Addr OID	The OID value used to identify the type of hardware component or protocol entity associated with the management address advertised by the local system agent.
Link Layer Discovery Protocol Port System Data	
Port	Port number.

Item	Description
AdminStatus	The desired status for the administrator of the local LLDP agent: • TxOnly: the LLDP agent transmits LLDP frames on this port and does not store any information about the remote systems connected. • RxOnly: the LLDP agent receives, but does not transmit, LLDP frames on this port. • txAndRx: the LLDP agent transmits and receives LLDP frames on this port. • Disabled: the LLDP agent does not transmit or receive LLDP frames on this port. If the port receives remote systems information, which is stored in other tables before AdminStatus becomes disabled, the information ages out.
Config Notification Enable	Controls, for each port, whether notifications from the agent are enabled. • True: indicates that notifications are enabled • False: indicates that notifications are disabled

Configuring LLDP Tx - TLV transmit status

Use the LLDP Tx - time, length, value (TLV) page to configure the transmit status for TLVs.

Procedure steps

Step	Action
1	From the main menu, choose **Application > 802.1ab > LLDP Tx - TLV**.
2	Select the required setting values for each port.
3	Click **Submit** .

—End—

LLDP Tx - TLV page items

Item	Description
PortDesc	Port Description TLV
SysName	System Name TLV
SysDesc	System Description TLV
SysCap	System Capabilities TLV
MgmtAddr	Management Address TLV

Configuring console port communication speed

Configure the console port communication speed so you can match the console port baud rate to the baud rate of the console terminal.

Procedure steps

Step	Action
1	From the main menu, choose **Configuration > Console Port**. The Console Port page appears.
2	Select the console port speed from the list.
3	Click **Submit**.

—End—

Variable definitions

Variable	Value
Console Port Data Bits	The current console communication port data bit setting.
Console Port Parity	The current console communication port parity setting.
Console Port Stop Bits	The current console communication port stop bit setting.
Console Port Speed	Choose the console port speed baud rate. ***Note:*** The default setting is 9600. 2400 4800 9600 19200 38400

Configuring port lists

Configure the port list feature to create a list of ports, and add ports to, or delete ports from, each list.

Procedure steps

Step	Action
1	From the main menu, choose **Application > MAC Address Security > Port List**. The Port List page appears.
2	To add or delete ports to a list, click in the **Action** column in the list row you want.

3 Click the ports you want included in the port list.

4 Click **Submit**.

The Port List page appears.

5 Click **Submit**.

—End—

Enabling security on ports

Enable or disable MAC address-based security to change access to the port.

Step Action

1 From the main menu, choose **Application > MAC Address Security > Port Configuration**.

2 In the **Security** list, make a selection.

3 Click **Submit**.

—End—

Variable definitions

Variable	Value
Port	Lists each port on the switch from 1 to 50.
Trunk	Displays the MultiLink Trunk that the port belongs to. The field can be blank, or display 1 to 6 depending on the configuration.
Security	Enables MAC address-based security on that port. **ATTENTION** You must configure the port for MAC address-based security before enabling the security. (1) Enabled (2) Disabled

Using the Element Manager user interface

Use the information in this chapter to understand how to use the Element Manager user interface to view and configure information about the BES100 or BES200 Series switches.

Navigation

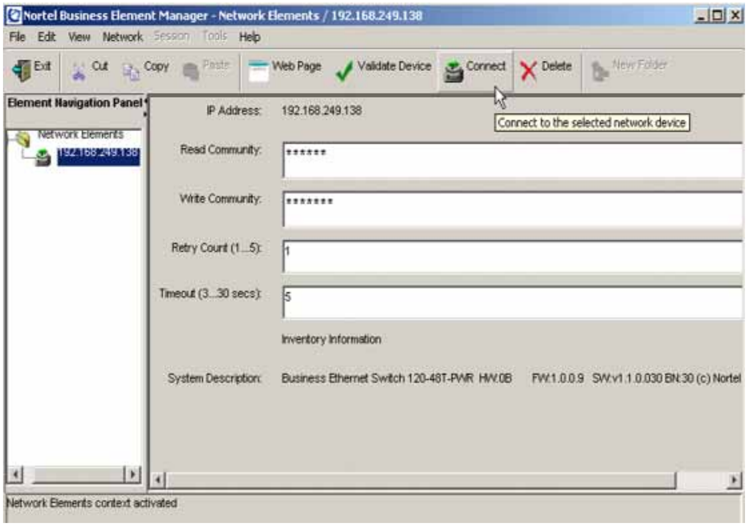
Setting up the Element Manager user interface

Procedure steps

Step	Action
1	Start the Element Manager.
2	From the Element Manager menu, choose **Network > Find Network Elements > Business Ethernet Switch**. The Network Device Search dialog box appears.
3	By default, the **Start of IP Address range** field is populated with 192.168.1.0 and the **End of IP Address range** field is populated with 192.168.1.255. Check that the Read and Write community strings are set properly. If these values represent the private subnet of the SMB devices, click **OK**; otherwise update the IP address range fields to match the private subnet for your SMB devices, and then click **OK**. A progress bar appears in the Network Device Search dialog box during the search of the private subnet.

If no devices are found, an information dialog box appears to inform you of this fact. If devices are found within the starting and ending IP address range for the SMB device family specified, they are added to the Network Element tree, as shown in the Network Elements window that follows.

Network Elements window


Nortel Business Element Manager - Network Elements / 192.168.249.138
File Edit View Network Session Tools Help
Exit Cut Copy Paste Web Page Validate Device Connect Delete New Folder
Connect to the selected network device
Element Navigation Panel
Network Elements
192.168.249.138

IP Address: 192.168.249.138

Read Community: ******

Write Community: *******

Retry Count (1...5): 1

Timeout (3...30 secs): 5

Inventory Information

System Description: Business Ethernet Switch 120-48T-PWR HW:0B FW:1.0.0.9 SW:v1.1.0.030 BN:30 (c) Nortel

Network Elements context activated

4 From the Network Element Tree, select the BES device.

5 Verify that the Read Community and the Write Community strings are set properly.

6 From the Element Manager menu, click the **Connect** button.

—End—

Setting the IP address

Use this procedure to configure an IP address for the switch.

To use the BES100 or BES200 management features, you must first configure the switch with an IP address that is compatible with the network where it is being installed. For simplicity, configure the IP address before you permanently install the switch.

Procedure steps

Step	Action
1	Place your switch close to the PC that you will use to configure it. It helps if you can see the front panel of the switch while you work on your PC.

2 Connect the Ethernet port of your PC to any port on the front panel of your switch.

3 Insert the power adapter into the DC power socket on the back of the switch.

4 Plug the other end of the power adapter into a grounded, 3-pin socket, AC power source.

5 Check the front-panel LEDs as the device powers on to confirm that the PWR LED is green. If not, check that the power cable is correctly plugged in.

This step can take a few minutes to complete.

6 If the PC IP address is different from the switch but is on the same subnet, go to the next step. (For example, if the PC and switch both have addresses that start with 192.168.1.x.) Otherwise, manually set the IP address for the PC. See Changing a PC IP address. The default IP address of the switch is 192.168.1.132, the default subnet mask is 255.255.255.0, and the default gateway is 0.0.0.0.

7 From the **Task Navigation Panel**, **Configuration > System > Quick Start**.

The Quick Start tab appears.

8 Type a Management VLAN ID and select a Boot mode for the next switch boot.

9 Type a switch IP address followed by the subnet mask, default gateway.

10 Select a ReBoot mode.

By default the switch is in the Running mode.

11 If you want to enable SNMP traps for SNMP authentication, select the AuthenticationTraps check box.

12 Click **Apply**.

—End—

No other configuration changes are required at this stage, but Nortel recommends that you change the administrator password before you log off. See .

Working with configuration files

Access the Config/Image/Diag file to view information and to upload or download the configuration and image files.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > File System**. The **Config/Image/Diag file** tab appears.
2	In the **TFTPServerIpAddress** box, type the IP address for the file you are file you are using.
3	In the **BinaryConfigFileName** box, type the name of the configuration file.
4	In the **ImageFileName** box, type the name of the image file.
5	In the **FwFileName (Diagnostics)** box, type the name of the diagnostics file.
6	Click an **Action** option to download or upload the file.
7	Click **Apply**.

—End—

Variable definitions

Variable	Value
TFTPServerIpAddress	The IP address of the TFTP server for the configuration file, the image file, or the diagnostics firmware file. If not used, then the value is 0.0.0.0.
BinaryConfigFileName	Name of the configuration file.
ImageFileName	Name of the image file.
FwFileName (Diagnostics)	Specifies the diagnostics firmware file name.

Variable	Value
Action	You can specify one of the following: • dnldConfig (download the configuration file) • dnldImg (download the image file) • upldConfig (upload the config file) • dnldFw (download the diagnostics firmware file). The newly downloaded configuration, image, or diagnostics firmware file does not take effect until the next boot cycle of the device.
Status	This object is used to get the status of the latest file system action. The values that can be read are • other -- if no action taken since the boot • upinProgress -- the operation is in progress • success -- the operation succeeded • fail -- the operation failed

BES100 or BES200 basic configuration using Element Manager

Use these procedures to manage the configuration of your BES100 or BES200 Series switch with the Element Manager.

Prerequisites

- The Element Manager must be installed before you can perform these procedures.

Navigation

- "QoS configuration" (page 163)
- "RMON configuration " (page 164)
- "Enabling Ethernet statistics gathering" (page 166)
- "Configuring RMON alarms" (page 168)
- "Creating an RMON Event" (page 170)
- "Deleting an RMON Event" (page 170)
- "Disabling RMON history statistics" (page 180)
- "Disabling Ethernet statistics gathering" (page 171)

Configuring VLAN properties

A Virtual LAN (VLAN) is a collection of ports on one or more switches that define a broadcast domain. The BES100 and BES200 Series switches support port-based VLANs.

Use Element Manager to configure the VLAN properties on your BES100 or BES200 Series switch.

Navigation

- "Creating a port-based VLAN" (page 64)
- "Modifying a VLAN" (page 65)
- "Deleting a VLAN" (page 65)

Creating a port-based VLAN

Use this procedure to create port-based VLANs for your BES100 or BES200 Series switch.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > Data Services > VLANs**. The VLAN tab appears.
2	Click **Insert**. The VLAN, Insert VLAN dialog box appears.
3	Type the VLAN ID. The value can be from 1 to 4094, if it is not already in use. (The default VLAN has a VID=1.)

4 Type the VLAN name (optional).

If no name is entered, a default name is created.

5 Click **Insert**.

The new VLAN appears in the VLAN tab.

6 Double-click on the **Port Member** field.

The PortMembers dialog box appears.

7 Click the ports you want to include in the VLAN.

8 Click **OK**.

9 Click **Apply**.

—End—

Modifying a VLAN

After a VLAN is created, you can modify the VLAN properties from the VLAN tab.

Procedure steps

Step Action

1 From the **Task Navigation Panel**, choose **Configuration > Data Services > VLANs**

The VLAN tab appears.

2 Type the VLAN name (optional).

If no name is entered, a default name is created.

3 To modify the Port Members double-click the PortMembers field and adjust the port members you want to use

4 Click **Ok** .

The VLAN tab appears.

5 Click **Apply**.

—End—

Deleting a VLAN

Delete a VLAN configuration that you no longer require.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > Data Services > VLANs**. The VLAN tab appears.
2	Click the row for the VLAN configuration you want to delete.
3	Click **Delete**

—End—

Configuring VLAN properties

A Virtual LAN (VLAN) is a collection of ports on one or more switches that define a broadcast domain. The BES100 and BES200 Series switches support port-based VLANs.

Use Element Manager to configure the VLAN properties on your BES100 or BES200 Series switch.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > Data Services > VLANs**.
2	In the **Name** field, type a name for the VLAN.
3	In the **PortMembers** field, double-click the field to access the PortMembers list. The PortMembers page appears.
4	Click the ports you want to configure.
5	Click **Ok**. To select all the ports, click **All**. The VLAN page appears.
6	Click **Apply**.

—End—

Port-based VLAN tab

The Port option **VLAN** tab lets you display the properties of port-based VLANs.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > System > Port**.
2	Click a port.
3	Click the **VLAN** tab.

—End—

Setting the Element Manager SNMP properties

The Element Manager communicates with the BES100 and BES200 Series switches using Simple Network Management Protocol (SNMP). The software is shipped with default values set for important communication parameters, such as the polling interval, timeout, and retry count. You can set the parameters after you open a device to manage.

Use this procedure to set the SNMP properties.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > Administrator Access > SNMP**. The SNMP window appears in the information panel.
2	In the **Status Interval** field, type a number for the interval you want.
3	In the **Hotswap Detect every** field, type a number for the interval you want.
4	If you want the device to periodically poll for information updates select the **Enable** check box.
5	If you want to enable tracing, select the **Trace** check box.
6	If you want Element Manager to listen for traps, select the **Listen for Traps** check box.
7	If you want to change the number of traps, type a value in the **Max Traps in Log** field.

8 If you want to delete a row, select the **Confirm row deletion** check box.

9 Click **Ok** to apply your changes.

—End—

Variable definitions

Variable	Value
Status Interval	The interval at which status information is gathered (default is 20 seconds).
(If Traps, Status Interval)	The interval at which statistics and status information are gathered when traps are enabled. The default is 60.
Hotswap Detect every	The interval at which Element Manager detects the module information. The default is 1.
Enable	Enables (true) or disables (false) periodic polling of the device for updated status. If polling is disabled, the chassis status is updated only when the SNMP window is displayed in the information panel and you click Refresh current task on the Element Manager tool bar.
Retry Count	The number of times Element Manager sends the same polling request if a response is not returned to Element Manager. Set this field to three.
Timeout	The length of each retry of each polling waiting period. When you access the device through a slow link, you may need to increase the timeout interval and then change the Retransmission Strategy to superlinear.
Trace	The trace field is used to enable and disable SNMP tracing. When Trace is selected, SNMP protocol data units (PDUs) are displayed.

Variable	Value
Listen for Traps	When selected (enabled), Element Manager listens for traps from the device. Note: The Element Manager provides only one port to receive traps (port 162); therefore, you can select the Listen for Traps option for only one BES100 or BES200 Series switch device at a time.
Max Traps in Log	The specified number of traps that may exist in the trap log. The default is 500.
Trap Port	Specifies the UDP port that Element Manager listen to receive SNMP traps.
Confirm row deletion	A dialog box appears when checked, before deleting a row.

Configuring SNMP Trap Receivers

Use the **Trap Receivers** tab to view and configure a maximum of four (4) trap receivers for the BES100 or BES200 Series switch.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Hardware Inventory**. The System tab appears in the information panel.
2	Click the **Trap Receivers** tab. The Trap Receivers tab appears.
3	Click **Insert**. The Chassis, Insert Trap Receivers dialog box appears.
4	Complete the fields as described in the Variable definitions table.
5	Click **Insert**. The new entry appears in the Trap Receivers tab.

—End—

Variable definitions

Variable	Value
Index	Choose the number of the trap receiver to create or modify.
IPAddress	Type the network address for the SNMP manager that is to receive the specified trap.
Community	Type the community string for the specified trap receiver.

Configuring Link Aggregation Control Protocol (LACP) ports

Use this procedure to configure LACP ports for your BES100 or BES200 Series switch.

Procedure steps

Step **Action**

1 From the **Task Navigation Panel**, choose **Configuration > System > Port**.

2 Click a port.

The Interface tab appears.

3 Choose the **LACP** tab.

The LACP tab appears.

4 Set the desired values for the configurable parameters.

5 Click **Apply**.

—End—

LACP tab

Variable	Value
AdminEnabled	Enables or disables LACP on the port.
OperEnabled	Displays the current operational status of LACP on the port. A value of true means the port is participating in LACP. A value of false means the port is not participating in LACP.
ActorAdminKey	The current administrative value of the Key for the Aggregator.

Variable	Value
ActorOperKey	The current operational value of the Key for the Aggregator.
AttachedAggID	The identifier value of the Aggregator that this Aggregation Port is currently attached to. Zero indicates that the Aggregation Port is not currently attached to an Aggregator. This value is read-only.
ActorPort	The port number locally assigned to the Aggregation Port.
ActorPortPriority	The priority value assigned to this Aggregation Port. This 16-bit value is read-write.
ActorAdminState	A string of eight bits, corresponding to the administrative values of Actor_State.
TrunkID	The ID of the trunk associated with this aggregator.
PartnerOperPort	The current operational value of the port for the Partner.

Configuring port settings

You can use the Element Manager to view and edit port configurations on a BES100 or BES200 Series switch.

Navigation

- "Viewing and editing port configurations" (page 71)
- "Interface tab" (page 72)
- "VLAN tab" (page 73)
- "PoE tab" (page 74)

Viewing and editing port configurations

Use this procedure to view the basic configuration and status of a single port or multiple ports..

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > System > Port**. The switch view appears in the information panel.
2	Select the single or multiple ports that you want to view or edit.

To select multiple ports, press **Ctrl**, and select the ports that you want to view or edit. A yellow outline appears around the selected ports, and the information panel updates with the information for all selected ports.

3 Click the tab for the port information that you wish to view or edit.

—End—

Interface tab

The Interface tab shows the basic configuration and status of a single port.

Interface tab

Variable	Value
Index	Specifies the port number.
Alias	Specifies a name for the port.
Descr	The type of switch and number of ports.
Type	The media type of this interface.
Mtu	The size of the largest packet, in octets, that can be sent on the interface.
PhysAddress	The MAC address assigned to a particular interface.
AdminStatus	The current administrative state of the device, which can be one of the following: • up • down When a managed system is initialized, all interfaces start with AdminStatus in the up state. AdminStatus changes to the down state (or remains in the up state) as a result of either management action or the configuration information available to the managed system.

Variable	Value
OperStatus	The current operational state of the interface, which can be one of the following: • up • down • testing If AdminStatus is up, then OperStatus should be up if the interface is ready to transmit and receive network traffic. If AdminStatus is up the OperStatus should remain in the down state if and only if a physical or other network-impeding condition prevents the link from entering the UP state. The testing state indicates that no operational packets can be passed.
LastChange	The time the interface entered its current operational state.
LinkTrap	Specifies whether linkUp/linkDown traps should be generated for this interface
OperDuplex	The current duplex mode of the port (half duplex or full duplex).
OperSpeed	The current operating speed of the port.

VLAN tab

The VLAN tab displays the properties of port-based VLANs for the selected port.

VLAN tab

Variable	Value
Untagged Priority	
EgressTagging	Choose whether to enable or disable tagging for the port.
VlanIds	Displays the port VLAN membership.
DefaultVlanId	The VLAN ID assigned to untagged frames received on a trunk port. The default value is 1.

PoE tab

The PoE tab displays the power information for the selected port.

PoE tab

Variable	Value
AdminEnable	Lets you enable or disable PoE on this port. By default, the value of PoE is true.
DetectionStatus	Displays the operational status of the power-device detecting mode on the specified port: • disabled--detecting function disabled • searching--detecting function is enabled and the system is searching for a valid powered device on this port • deliveringPower--detection found a valid powered device and the port is delivering power • fault--power-specific fault detected on port • test--detecting device in test mode • otherFault--detecting function is idle due to fault

BES100 or BES200 advanced features configuration using Element Manager

Use these procedures to set up the BES100 or BES200 switch advanced management features.

Navigation

Configuring Simple Network Time Protocol (SNTP)

The Simple Network Time Protocol (SNTP) feature allows the switch to set its internal clock based on periodic updates from a time server. With this feature, the system can obtain the time from any RFC 2030-compliant NTP/SNTP server.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > System > SNTP**. The Simple Network Time Protocol page appears.
2	In the **PrimaryServerAddress** box, type an IP address for the primary SNTP server.
3	In the **SecondaryServerAddress** box, type an IP address for the secondary SNTP server.
4	In the **State** box, click the **disabled** or **enabled** option button.
5	In the **SyncInterval** box, type a numeric value from 0 to 168.

6 In the **ManualSyncRequest** box, click the **synchronizeNow** option button if you want to immediately synchronize the clock with the SNTP server.

7 Click **Apply**.

—End—

SNTP tab

Variable	Value
PrimaryServerAddress	The IP address of the primary SNTP server. Secondary Server Address The IP address of the secondary SNTP server.
SecondaryServerAddress	The IP address of the secondary SNTP server.
State	Controls whether the device uses the Simple Network Time Protocol (SNTP), to synchronize the device clock to the Coordinated Universal Time (UTC). If the value is disabled, the device does not synchronize its clock using SNTP. If the value is enabled, the device synchronizes shortly after boot time when network access becomes available, and periodically thereafter.
SyncInterval (hours 0..168)	Controls the frequency, in hours, that the device attempts to synchronize with the NTP servers.
ManualSyncRequest	Lets you perform an immediate synchronization with the SNTP server.
LastSyncTime	Specifies the Coordinated Universal Time (UTC) when the device last synchronized with an NTP server.
LastSyncSource	Specifies the IP source address of the NTP server with which this device last synchronized.
NextSyncTime	Specifies the UTC at which the next synchronization is scheduled.
PrimaryServerSyncFailures	Specifies the number of times the switch failed to synchronize with the primary server address. However, synchronization with the secondary server address can still occur.
SecondaryServerSyncFailures	Specifies the number of times the switch failed to synchronize with the secondary server address.
CurrentTime	Specifies the current UTC of the switch.

Configuring Quality of Service (QoS) Settings

Use this procedure to configure DSCP to 802.1p mapping on your BES100 or BES200 Series switch using the Element Manager.

Procedure steps

Step Action

1 From the **Task Navigation Panel**, choose **Configuration > Data Services > QoS > QoS Settings**.

The Globals tab appears.

2 Before you choose the **DSCP Mapping** tab, enable or disable the DSCP to 802.1p priority.

3 Choose the **DSCP Mapping** tab.

The DSCP Mapping tab appears.

4 In the **802.1pPriority** field, double-click a row and choose the priority to use with the specified DSCP value.

5 Click **Apply**.

The modified configuration appears in the DSCP Mapping tab.

—End—

Variable definitions

Variable	Value
DSCP	The attribute within the range of 0 to 63 to use internally to determine the appropriate Layer 2 cost of service (CoS) mappings.
802.1pPriority	Choose the 802.1p priority, from 0 to 7, to use with the specified DSCP value.

Configuring Internet Group Management Protocol (IGMP) snooping

Use this procedure to configure IGMP snooping for your BES100 or BES200 Series switch so that multicast packets are only forwarded to interfaces associated with IP multicast devices.

Procedure steps

Step Action

1 From the **Task Navigation Panel**, choose **Configuration > Data Services > VLANs**.

The VLAN tab appears.

2 Click the **IGMP Snoop** tab.

The IGMP Snoop tab appears.

3 Select the VLAN row for the IGMP snoop value you want to modify.

4 Double-click the SnoopEnable variable.

5 To enable IGMP on a VLAN, choose **true** from the **SnoopEnable** field. To disable IGMP on a VLAN, choose **false** from the **SnoopEnable** field.

6 Click **Apply**.

—End—

Configuring MAC address learning

Use this procedure to configure the aging time for MAC addresses that the BES100 or BES200 Series switch has learned.

Procedure steps

Step Action

1 From the **Task Navigation Panel**, choose **Configuration > System > MAC Address Table**.

The Setting tab appears.

2 In the **Aging Time** box, type a value to assign for the MAC address table entries.

3 Click **Apply**.

—End—

Variable definitions

Variable	Value
Aging Time	Type the timeout period, in seconds, for aging out dynamically learned forwarding information. If the entry is inactive for a period of time that exceeds the specified aging time, the address is removed. Note: Nortel recommends that you use the default value of 300.

BES100 or BES200 administration

Use the procedures in this chapter to understand how to use the Web-based user interface or the Element Manager to administer your system.

Navigation

Changing a PC IP address

Use the procedures in this section to change the IP address of your PC.

For users of systems other than Windows 2000™ or Windows XP™, refer to your system documentation for information about changing the PC IP address.

Procedure steps to change the IP address of a Windows 2000 PC

Step	Action
1	From the PC start menu, choose **Start > Settings > Network > Dial-up Connections**.
2	For the IP address you want to change, right-click the network connection icon, and then click **Properties**.
3	In the list of components used by this connection on the **General** tab, select **Internet Protocol (TCP/IP)**, and then click **Properties**.

4 In the Internet Protocol (TCP/IP) Properties dialog box, click **Use the following IP address**. Then type your intended IP address, subnet mask, and default gateway in the provided boxes.

5 Click **OK** to save the changes.

—End—

Procedure steps to change the IP address of a Windows XP PC

Step	Action
1	From the PC start menu, choose **Start > Control Panel > Network Connections**.
2	For the IP address you want to change, right-click the network connection icon, and then click **Properties**.
3	In the list of components used by this connection on the **General** tab, select **Internet Protocol (TCP/IP)**, and then click **Properties**.
4	In the Internet Protocol (TCP/IP) Properties dialog box, click **Use the following IP address**. Then type your intended IP address, subnet mask, and default gateway in the provided boxes.
5	Click **OK** to save the changes.

—End—

System administration using the Web-based user interface

Use these procedures to display system or switch information from the Web-based user interface.

Navigation

- "Managing the BES System Software" (page 81)
- "Configuring rate limiting" (page 86)
- "Viewing LACP Bridge configuration" (page 87)
- "Viewing LACP port statistics" (page 98)
- "Displaying multicast group membership" (page 88)
- "Viewing the QoS Traffic Control configuration" (page 89)
- "Viewing the system log" (page 90)
- "Viewing statistics" (page 91)

Managing the BES System Software

Use these procedures to manage the BES100 or BES200 system software.

Navigation

Downloading switch images

Download the BES100 or BES200 Series switch software image to non-volatile flash memory to save the image on the device.

Prerequisites

- Take care not to interrupt the download process until after it runs to completion (the process can take up to 10 min, depending on network conditions).

CAUTION
Do not interrupt power to the device during the software download process. A power interruption can corrupt the firmware image.

- The policy switch must have an IP address. For information about configuring the switch IP address, see Initial configuration.
- The policy switch needs a configured Trivial File Transfer Protocol (TFTP) server in your network. For information about TFTP, see "Storing and retrieving a switch configuration file from a TFTP server" (page 84).

Procedure steps

Step **Action**

1 From the main menu, choose **Configuration > Software Download**.

The Software Download page appears.

2 In the **Software Image Filename** box, type a name for the software image.

3 In the **Diagnostics Image Filename** box, type a name for the diagnostics image.

4 In the **TFTP Server IP Address**box, type the IP address for the TFTP load host.

5 In the **Start TFTP Load of New Image** list, choose a selection.

6 Click **Submit**.

The switch downloads the new software image and programs it. When the download completes, the switch resets and the new software image initiates the switch self-test.

ATTENTION
The LEDs display various patterns to indicate that the tests are in progress.

—End—

Variable definitions

Variable	Value
Current Running Version	The version of the current running software.
Software Image Filename	Type the software image file name.
Diagnostics Image Filename	Type the diagnostics file name. 1 to 30 characters in length.
TFTP Server IP Address	Type the IP address of your TFTP load host. The format of the IP address is XXX.XXX.XXX.XXX
Start TFTP Load of New Image	Choose the software image to load. (1) No image (2) Software Image (3) Diagnostics

Rebooting the BES100 and BES200 Series switches

Reboot a standalone switch without erasing any configured switch parameters. While rebooting, the switch initiates a self-test that comprises various diagnostic routines and subtests. The LEDs display various patterns to indicate that the subtests are in progress.

Procedure steps

Step	Action
1	From the main menu, choose **Administration > Reset**. The Reset page appears. The reset warning message appears.
2	Click **OK** to reset or **Cancel** to cancel the request.

ATTENTION

If you have not configured system password security, a reset returns you to the home page. If you have configured system password security, a reset returns you to a log on page.

—End—

Rebooting the BES100 and BES200 Series switches to system defaults

Reboot the switch to replace all configured switch parameters with the factory default values. During the process of changing to default settings, the switch initiates a self-test that comprises various diagnostic routines and subtests.

Prerequisites

- Ensure that you want to replace configured settings with factory default settings before performing this procedure.

CAUTION
If you choose change to default settings, all configured settings are replaced with factory default settings when you click Submit. For more information about factory default settings, see Initial configuration.

Procedure steps

Step	Action
1	From the main menu, choose **Administration**
2	Choose **Reset to Default** The reset to default warning message appears

—End—

The LEDs display various patterns to indicate that the subtests are in progress.

Storing and retrieving a switch configuration file from a TFTP server

Store switch configuration parameters on a Trivial File Transfer Protocol (TFTP) server so you can retrieve the configuration parameters of a switch and use the retrieved parameters to automatically configure a replacement switch.

You must set up the file on your TFTP server and set the filename read/write permission to enabled to store a switch configuration.

A properly configured TFTP server must be present in your network, and the BES100 or BES200 Series switch must have an IP address to download the BES100 or BES200 Series switches configuration file.

Prerequisites

- The Configuration File feature can only be used to copy standalone switch configuration parameters to other standalone switches.

- A configuration file obtained from a standalone switch can be used only to configure other standalone switches that have the same firmware revision and model type as the donor standalone switch.

Configuration File page items

These parameters are not saved	Configured in this Web page	See
Switch IP Address	**IP** page	"Configuring initial settings by using the Quick Start feature" (page 31)
Subnet Mask		
Default Gateway		
Configuration Image Filename	**Configuration File** page	"Storing and retrieving a switch configuration file from a TFTP server" (page 84)
TFTP Server IP Address		
Read-Only Switch Password	**Passwords** page	Configuring initial settings using the Quick Start feature
Read-Write Switch Password		
Console Switch Password Type		
Web Switch Password Type		

Procedure steps

Step	Action
1	From the main menu, choose **Configuration > Configuration File**. The Configuration File page appears.
2	In the **Configuration Image Filename** box, type a filename.
3	In the **TFTP Server IP Address** box, type an IP address for the TFTP load host.
4	In the **Copy Configuration Image to Server** list, choose a selection.
5	In the **Retrieve Configuration Image from Server** list, choose a selection.
6	Click **Submit**.

—End—

Variable definitions

Variable	Value
Configuration Image Filename	Type the configuration file name. The range is 1 to 30 characters.
TFTP Server IP Address	Type the IP address of the TFTP load host.
Copy Configuration Image to Server	Choose whether to copy the configuration image to the server. Possible values: Yes, No
Retrieve Configuration Image from Server	Choose whether to retrieve the configuration image from a server. If you choose Yes, the download process begins immediately and, when completed, causes the switch to reset with the new configuration parameters. Possible values: Yes, No

Configuring rate limiting

Configure rate limiting on this page for the BES100 or BES200 Series switch to limit the forwarding rate of broadcast and multicast packets on each interface You can view the current forwarding rate of broadcast and multicast packets. When you configure rate limiting, you set the percentage of port bandwidth allowed for a packet type. When the threshold is exceeded, additional packets are discarded.

ATTENTION

To avoid broadcast storms (when the volume of a particular packet type is excessive, placing severe strain on the network), set the forwarding rate of the broadcast packets to not exceed a lower percentage of the total available bandwidth.

Procedure steps

Step	Action
1	From the main menu, choose **Application > Rate Limiting**.
2	In the **Packet Type** list, choose a packet type to view.
3	In the **Limit** list, choose an amount to allocate for the bandwidth percentage.
4	Click **Submit**.

—End—

Rate Limiting page items

Item	Description
Port	Port number. Use the range from 1 to 50
Packet Type	Choose the packet type to view on the table. The default setting is Both. Multicast Broadcast Both
Limit	Choose the percentage, if any, of bandwidth allowed for forwarding the packet type specified in the Packet Type field. When the threshold is exceeded, any additional packets are discarded. Choose None or 1-10%
Last 5 Minutes	The percentage of packets received by the port in the last 5 minutes (min). This field provides a running average of network activity and is updated every 15 seconds (s). 0-100%
Last Hour	The percentage of packets received by the port in the last hour. This field provides a running average of network activity and is updated every 5 min. 0-100%
Last 24 Hours	The percentage of packets received by the port in the last 24 hours. This field provides a running average of network activity and is updated every 15 min.
Note: The Last 5 Minutes, Last Hour, and Last 24 Hours fields indicate the receiving port's view of network activity regardless of the rate limiting setting.	

Viewing LACP Bridge configuration

You can view the LACP bridge configuration to monitor LACP activity.

Procedure steps

Step	Action
1	From the main menu, choose **Application**.
2	Choose **Link Aggregation Protocol**.
3	Choose **Bridge Configuration**. The Bridge Configuration page appears.

—End—

Variable definitions

Variable	Value
Aggregator ID	The unique identifier that the local system assigns to this aggregator. This attribute identifies an aggregator instance among the subordinate managed objects of the containing object.
Trunk ID	The ID of the trunk associated with this aggregator.
Operate	Indicates whether the aggregation port can aggregate or can operate only as an individual link.
Actor Lag ID	The combined information of Actor System Priority, Actor System ID, and Actor Operational Key in ActorSystemPriority-ActorSystemID-ActorOperationalKey hexadecimal format.
Actor System ID	The MAC address value that defines the value of the System ID for the system that contains this aggregation port.
Actor Operational Key	The current operational value of the key for the aggregation port.
Actor Administrative Key	The current administrative value of the key for the aggregation port.
Partner Lag ID	The combined information of Partner System Priority, Partner System ID, and Partner Operational Key in PartnerSystemPriority-PartnerSystemID-PartnerOperationalKey hexadecimal format.
Partner System Priority	The value that indicates the priority value associated with the Partner System ID.
Partner System ID	The MAC address value consisting of the unique identifier for the current protocol partner of this aggregator.
Partner Operational Key	The current operational value of the key for the current protocol partner of this aggregator.

Displaying multicast group membership

Display the Multicast Group Membership screen to view configured IP Multicast group addresses for specific VLANs. The screen displays the IP Multicast group addresses associated with ports that are configured within the switch. The displayed addresses are dynamic and can change as clients join (or leave) the various IP Multicast groups. You can have up to 128 multicast groups with the BES100 or BES200 Series switch.

Procedure steps

Step Action

1 From the main menu, choose **Application > IGMP > Multicast Group**.

The Multicast Group page appears.

2 To view multicast groups for a VLAN, in the **VLAN** field, choose the desired VLAN and click **Submit**.

—End—

Variable definitions

Variable	Value
VLAN	Lets you view multicast group addresses on specified VLANs. Select an existing VLAN from the list to view Multicast group addresses associated with the VLAN.
Multicast Group Address	Displays all of the IP Multicast group addresses that are currently active on the associated port.
Port	Displays the port numbers that are associated with the IP Multicast group addresses displayed in the IP Multicast group address field.

Viewing the QoS Traffic Control configuration

View the QoS Traffic Control configuration to monitor performance.

Procedure steps

Step **Action**

1 From the main menu, choose **Application**.

2 Choose **Quality of Service**.

3 Choose **Traffic Control**.

4 In the **Policy Type** list, make a selection.

5 Click **Submit**.

6 In the **Traffic Class** list, make a selection.

7 Click **Submit**.

—End—

The following table explains the parameters you will see on the Traffic Control page.

Variable definitions

Variable	Value
Policy Type	Specifies the policy type to use: Strict or Weighted Round-Robin scheduling
User Priority	This read-only value lists the eight priority levels.
Traffic Class	Specifies the traffic class associated with each user priority. Choose from: • Highest • High • Med • Low

Viewing the system log

View the system log to see a display of messages contained in Non-Volatile Random Access Memory (NVRAM) or Dynamic Random Access Memory (DRAM) and NVRAM.

Procedure steps

Step Action

1 From the main menu, choose **Device Monitoring > System Log**.

The System Log page appears.

2 To update the window with the latest system log messages, click **Update**.

3 To clear the system log messages, click **Clear messages**.

The results of your request are displayed in the System Log section.

—End—

Variable definitions

Variable	Value
System Log (View By)	
Display Messages From	Specifies that the system log displays messages from Volatile (DRAM) and Non Volatile memory.
System Log	

Variable	Value
Index	The number of the event.
Time Stamp	The time, in hundredths of a second, between system initialization and the time the log messages entered the system.
Message Type	The type of message. The options are: (1) Critical (2) Serious (3) Informational
Message	A character string that identifies the origin of the message and the reason why the message was generated.

Viewing statistics

View statistics to monitor system statistical data. The options available to monitor system statistical data using Web-based management are:

- "Viewing port statistics" (page 91)
- "Viewing all port errors" (page 93)
- "Viewing interface statistics" (page 94)
- "Viewing Ethernet error statistics" (page 95)
- "Viewing transparent bridging statistics" (page 97)
- "Viewing LACP port statistics" (page 98)

Viewing port statistics

View port statistics to see detailed statistics about a selected switch port. Both received and transmitted statistics are displayed so that you can compare throughput or other port parameters.

Procedure steps

Step	Action
1	From the main menu, choose **Device Monitoring > Statistics > Port**. The Port page appears.
2	In the **Port Statistics** section, choose the port number.
3	Click **Submit**. The Port Statistics Table is updated with information about the selected device and port.
4	To update the statistical information, click **Update**.

—End—

Variable definitions

Variable	**Value**
Port Statistics (View By) Port	Choose the port number of the switch to monitor.
Port Statistics table	**Value**
Packets	The number of valid-size packets received on this port with proper framing but discarded because of cyclic redundancy check (CRC) errors.
Multicasts	The number of good multicast packets received/transmitted on this port, excluding broadcast packets.
Broadcasts	The number of good broadcast packets received/transmitted on this port.
Total Octets	The number of octets of data received/transmitted on this port, including data in bad packets and FCS octets, and framing bits.
Pause Frames	The number of pause frames received/transmitted on this port.
FCS/Frame Errors	The number of valid-size packets received on this port with proper framing but discarded because of cyclic redundancy check (CRC) errors.
Undersized Packets	The number of packets received on this port with fewer than 64 bytes and with proper CRC and framing (also known as short frames or runts).
Oversized Packets	The number of packets received on this port with proper CRC and framing that met the following requirements: 1518 bytes if no VLAN tag exists 1522 bytes if a VLAN tag exists
Filtered Packets	The number of packets discarded on this port when the capacity of the port transmit buffer was exceeded.
Collisions	The number of collisions detected on this port.
Single Collisions	The number of packets transmitted successfully on this port after a single collision.
Multiple Collisions	The number of packets transmitted successfully on this port after more than one collision.
Excessive Collisions	The number of packets lost on this port due to excessive collisions.

Variable	Value
Deferred Packets	The number of frames delayed on the first transmission attempt, without incurring a collision.
Late Collisions	The number of packets collisions occurring after a total length of time that exceeds 512 bit-times of packet transmission.
Packets Received and Transmitted	**Value**
64 bytes 65-127 bytes 128-255 bytes 256-511 bytes 512-1023 bytes 1024-1518 bytes	The number of packets the specified size range received/transmitted successfully on this port.

Zeroing ports

Use the Zero Port button to clear the statistical information for the currently displayed port.

Procedure steps

Step Action

1 From the main menu, choose **Device Monitoring > Statistics > Port**.

The Port page appears.

2 Click the **Zero Port**button at the bottom of the page.

The page refreshes and the Port page reappears.

3 To clear the statistical information for all ports in a switch configuration, click **Zero All Ports** (if necessary).

—End—

Viewing all port errors

View all ports in the switch that have an error. If a particular port has no errors, it is not displayed.

Use this procedure to view a summary of the port errors for the switch.

Procedure steps

Step	Action
1	From the main menu, choose **Device Monitoring > Statistics > Port Error Summary**. The Port Error Summary page appears.
2	To refresh the page with the latest information, click **Update**.

—End—

Variable definitions

Variable	Value
Port	Displays the number of the port that received the error.
Status	Displays the status of the port (Enabled/Disabled).
Link	Displays the link status of the port (Up/Down).
Speed/Duplex	Displays the speed at which the port is operating, as well as whether it is in half- or full-duplex mode.
FCS/Frame Errors	Displays the number of frame errors and frame check sequence (FCS) errors received on this port.
Collisions	Displays the number of collisions errors received on this port.
Single Collisions	Displays the number of single collisions errors received on this port.
Multiple Collisions	Displays the number of multiple collisions errors received on this port.
Excessive Collisions	Displays the number of excessive collisions errors received on this port.
Late Collisions	Displays the number of late collisions errors received on this port.

Viewing interface statistics

View interface statistics on a selected switch to gather information about the port.

Procedure steps

Step	Action
1	From the main menu, choose **Device Monitoring > Statistics > Interface**. The Interface page appears.

2 To update the statistical information, click **Update**.

—End—

Variable definitions

Variable	Value
Port	The port number corresponding to the selected switch.
In Octets	The number of octets received on the interface, including framing characters.
Out Octets	The number of octets transmitted out of the interface, including framing characters.
In Unicast	The number of unicast packets ingressing the port.
Out Unicast	The number of unicast packets destined to be sent out this port, including those that were discarded or not sent.
In Non-Unicast	The number of non-unicast (broadcast and multicast) packets, ingressing the port.
Out Non-Unicast	The number of non-unicast (broadcast and multicast) packets destined to be sent out this port, including those that were discarded or not sent.
In Discards	The number of inbound packets that are selected to be discarded even though no errors were detected to prevent their being delivered to a higher-layer protocol. Packet discarding is not arbitrary. One reason for discarding packets is to provide more buffer space.
Out Discards	The number of outbound packets that are selected to be discarded even though no errors were detected to prevent their being transmitted. Packet discarding is not arbitrary. One reason for discarding packets is to provide more buffer space.
In Errors	The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.
Out Errors	The number of outbound packets that could not be transmitted because of errors.
In Unknown Protos	The number of packets received through the interface which were discards due to an unknown or unsupported protocol.

Viewing Ethernet error statistics

View Ethernet error statistics for each monitored interface linked to the BES100 or BES200 Series switch to gather port information.

Procedure steps

Step	Action
1	From the main menu, choose **Device Monitoring > Statistics > Ethernet Errors**. The Ethernet Errors page appears.
2	To refresh the statistical information, click **Update**.

—End—

Variable definitions

Variable	Value
Port	The port number corresponding to the selected switch.
FCS/Frame Errors	The number of frames received on a particular interface that are an integral number of octets in length, but do not pass the FCS check.
Internal MAC Transmit Errors	The number of frames for which transmission on a particular interface fails due to an internal MAC sublayer transmit error. A frame only is counted by an instance of this object if it is not counted by the corresponding instance of either the dot3StatsLateCollisions object, the dot3StatsExcessiveCollisions object, or the dot3StatsCarrierSenseErrors object.
Internal MAC Receive Errors	The number of frames for which reception on a particular interface fails due to an internal MAC sublayer transmit error. A frame only is counted by an instance of this object if it is not counted by the corresponding instance of either the dot3StatsLateCollisions object, the dot3StatsExcessiveCollisions object, or the dot3StatsCarrierSenseErrors object.
Carrier Sense Errors	The number of times that the carrier sense condition was lost or never asserted when attempting to transmit a frame on a particular interface.
SQE Test Errors	The number of times that the SQE TEST ERROR message is generated by the PLS sublayer for a particular interface. The SQE TEST ERROR is defined in section 7.2.2.2.4 of ANSI/IEEE 802.3-1985, and its generation is described in section 7.2.4.6 of the same document.

Variable	Value
Deferred Transmissions	The number of frames for which the first transmission attempt on a particular interface is delayed because the medium is busy.
Single Collision Frames	The number of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision.
Multiple Collision Frames	The number of successfully transmitted frames on a particular interface for which transmission is inhibited by a single collision.
Late Collisions	The number of times a collision is detected on a particular interface later than 512 bit-times into the transmission of a packet.
Excessive Collisions	The number of frames for which transmission on a particular interface fails due to excessive collisions.

Viewing transparent bridging statistics

View the transparent bridging statistics measured for each monitored interface on the device to gather information about the port.

Procedure steps

Step	Action
1	From the main menu, choose **Device Monitoring > Statistics > Transparent Bridging**. The Transparent Bridging page appears.
2	To refresh the statistical information, click **Update**.

—End—

Variable definitions

Variable	Value
Port	The port number that corresponds to the selected switch.

Variable	Value
In Frames	The number of frames that have been received by this port from its segment. A frame received on the interface corresponding to this port is counted only if it is for a protocol being processed by the local bridging function, including bridge management errors.
Out Frames	The number of frames that have been transmitted by this port from its segment. A frame received on the interface corresponding to this port is counted only if it is for a protocol being processed by the local bridging function, including bridge management errors.
In Discards	The number of valid frames received which were discarded by the forwarding process.

Viewing LACP port statistics

View LACP port statistics to monitor a trunk group.

Procedure steps

Step	Action
1	From the main menu, choose **Device Monitoring**.
2	Choose **Statistics**.
3	Choose **Link Aggregation Port Statistics**. The Link Aggregation Port Statistics page appears.

—End—

Variable definitions

Variable	Value
LACPDUs Rx	The number of valid LACPDUs received on the aggregation port.
MarkerPDUs Rx	The number of valid MarkerPDUs received on the aggregation port.
Marker ResponsePDUs Rx	The number of valid MarkerResponsePDUs received on the aggregation port.

Variable	Value
UnknownPDUs Rx	The number of frames received that: • can carry the Slow Protocols Ethernet Type value, but contain an unknown PDU • are addressed to the Slow Protocols group MAC Address, but do not carry the Slow Protocols Ethernet Type
IllegalPDUs Rx	The number of frames received that carry the Slow Protocols Ethernet Type value, but contain a badly formed PDU or an illegal value of Protocol Subtype.
LACPDUs Tx	The number of LACPDUs transmitted on the aggregation port.
MarkerPDUs Tx	The number of MarkerPDUs transmitted on the aggregation port.
MarkerResponsePDUs Tx	The number of MarkerResponsePDUs transmitted on the aggregation port.

Viewing VLAN port information

View VLAN port information to monitor the name assigned, type, and number for the VLAN.

Procedure steps

Step Action

1 From the main menu, choose **Application > VLAN > Port Information**.

The VLAN Port Information page appears.

2 In the **Port** list, choose a selection.

3 Click **Submit**.

—End—

Variable definitions

Variable	Value
VLAN Port Information (View By)	Select the port number from the list.
Port	The range is 1 to 50.
Port Name	The name assigned to the Port.
PVID	The number of the VLAN ID assigned to untagged frames received on this trunk port.
VLAN Port Information Table	The number assigned to the VLAN when the VLAN was created.

Variable	Value
VLAN	The range is 1 to 4094.
VLAN Name	The name assigned to the VLAN when the VLAN was created.
VLAN Type	The type of the VLAN.

Viewing the RMON fault event log

Remote monitor (RMON) events and alarms work together to notify you when values in your network go out of a specified range. When values pass the specified ranges, the alarm triggers and fires. The event specifies how the activity is recorded.

An event specifies whether a trap, a log, or a trap and a log are generated due to alarm activity. When RMON is globally enabled, two default events are generated:

- Rising Event
- Falling Event

Default events specify that when an alarm goes out of range, the firing of the alarm is tracked in both a trap and a log. For example, when an alarm fires at the rising threshold, the rising event specifies that this information be sent to both a trap and a log. The RMON Event Log page works in conjunction with the RMON Threshold page to enable you to view a history of RMON fault events.

Procedure steps

Step Action

1 From the main menu, choose **Device Monitoring**.

2 Choose **Events**.

3 Choose **RMON Event Log**.

The RMON Event log page appears.

—End—

RMON Event Log page items

Item	Description
Time Stamp	The time the event occurred.
Description	A description of the event that activated this log entry.

Item	Description
Triggered By	A comment describing the source of the event.
ID	The event that generated this log entry.

Viewing RMON Ethernet statistics

View the RMON Ethernet statistics page to gather and graph Ethernet statistics in a variety of formats.

Procedure steps

Step	Action
1	From the main menu, choose **Device Monitoring > Events > RMON Ethernet**. The RMON Ethernet page appears.
2	Click **Update** to refresh the page.

—End—

RMON Ethernet page items

Item	Description
Port	The port number that corresponds to the selected switch.
Drop Events	The number of events in which packets were dropped by the interface due to a lack of resources.
Octets	The number of octets of data (including those in bad packets) received on the network (excluding framing bits, but including Frame Check Sequence [FCS] octets).
Packets	The number of packets received/transmitted on a port, including bad, broadcast and multicast packets.
Broadcast	The number of good packets received that were directed to the broadcast address. This does not include multicast packets.
Multicast	The number of good packets received that were directed to the multicast address. This does not include packets sent to the broadcast address.
CRC Align Errors	The number of packets received that had a length (excluding and 1518 octets, inclusive), but had either a bad Frame FCS with an integral number of octets (FCS errors) with a nonintegral number of octets (alignment error).
Undersize	The number of packets received that were less than 64 octets long (excluding framing bits, but including FCS octets) and were otherwise well formed.

Item	Description
Fragments	The number of packets received that were less than 64 octets in length (excluding framing bits, but including FCS octets) and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).
Collisions	The best estimate number of collisions on this Ethernet segment.
Jabbers	The number of packets received that were longer than 1522 octets in length (excluding framing bits, but including FCS octets), and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).
Packets < = 64 bytes 65-127 bytes 128-255 bytes 256-511 bytes 512-1023 bytes 1024-1518 bytes 1522-9216 bytes	The number of octets received (including bad packets) in length (excluding framing bits, but including FCS octets).

Viewing RMON history

View RMON history to see a periodic statistical sampling of data from various types of networks.

Procedure steps

Step	Action
1	From the main menu, choose **Device Monitoring > Events > RMON History**. The RMON History page appears.
2	In the **Port** list, choose a port to monitor.
3	Click **Submit**.

—End—

RMON History page items

Item	Description
RMON History Statistics Table	
Port	Choose the port number to be monitored.

Item	Description
Start	The value of the sysUPTime at the start of the interval over which this sample was measured.
Drop Events	The number of events in which packets were dropped by the interface due to a lack of resources.
Octets	The number of octets of data (including those in bad packets) received on the network (excluding framing bits, but including Frame Check Sequence [FCS] octets).
Packets	The number of packets received or transmitted on a port, including bad, broadcast, and multicast packets.
Broadcast	The number of good packets received that were directed to the broadcast address. This does not include multicast packets.
Multicast	The number of good packets received that were directed to the multicast address. This does not include packets sent to the broadcast address.
CRC Align Errors	The number of packets received that had a length (excluding and 1518 octets, inclusive, but had a bad Frame FCS with an integral number of octets (FCS errors) with a nonintegral number of octets (alignment error).
Undersize	The number of packets received that were less than 64 octets long (excluding framing bits, but including FCS octets) and were otherwise well formed.
Oversize	The number of packets received that were longer than 1518 octets long (excluding framing bits, but including FCS octets) and were otherwise well formed.

Viewing LLDP local system data

Use the LLDP local system data page to view LLDP local system data.

Procedure steps

Step	Action
1	From the main menu, choose **Application > 802.1ab > LLDP Local System Data**. The LLDP Local System Data page appears.
2	Click **Update** to refresh the page.

—End—

LLDP Local System Data page items

Item	Description
Link Layer Discovery Protocol Configuration	
ChassisIdSubtype	The type of encoding used to identify the local system chassis: • chassisComponent • interfaceAlias • portComponent • macAddress • networkAddress • interfaceName • local
LocChassisId	Chassis ID.
LocSysName	Local system name.
LocSysDesc	Local system description.
LocSysCapSupported	Specifies the system capabilities that are supported on the local system.
LocSysCapEnabled	Specifies the system capabilities that are enabled on the local system.
Link Layer Discovery Protocol Port System Data	
Port	The port number.
PortIdSubtype	The type of port identifier encoding used in the associated PortId object.
PortId	The string value used to identify the port component associated with a given port in the local system.
PortDesc	The string value used to identify the 802 LAN station’s port description associated with the local system. If the local agent supports IETF RFC 2863, PortDesc object should has the same value of ifDescr object.

Displaying LLDP statistics

Display received and transmitted LLDP statistics on the LLDP Rx - Tx Statistics page.

Procedure steps

Step	Action
1	From the main menu, choose **Application > 802.1ab > LLDP Rx - Tx Statistics**. The LLDP Rx - Tx Statistics page appears.

2 Click **Update** to refresh the page.

—End—

LLDP statistics page items

Item	Description
General TLV Statistics	
Rx Inserted	The number of LLDP frames received.
Rx Deleted	The number of LLDP frames deleted.
Rx Droped	The number of dropped LLDP frames.
Age Out	The number of LLDP frames that exceeded their time limit.
Link Layer Discovery Protocol Port System Data	
Port	The port number.
Tx Frames	The number of transmitted LLDP frames.
Rx Frames Discarded	The number of received LLDP frames that were discarded.
Rx Frames Errors	The number of received LLDP frames that had errors.
Rx Frames Total	The total number of LLDP frames received.
Rx Frames TLVs Discarded	The number of LLDP time, length, value (TLV) frames that were discarded.
Rx Frames TLVs Unrecognized	The number of received LLDP TLV frames that were unrecognized.
Rx Frames Age Out	The number of received LLDP frames that exceeded their time limit.

Displaying LLDP Neighbor properties

Display the LLDP properties for the switch neighbor.

Procedure steps

Step	Action
1	From the main menu, choose **Application**.
2	Choose **802.1ab**.
3	Choose **LLDP Neighbor**. The LLDP Neigbor page appears.

—End—

LLDP Neighbor page items

Item	Description
Port	Identifies the local port on which the remote system information is received.
Time	The TimeFilter for this entry. See the TimeFilter textual convention in IETF RFC 2021 for details about TimeFilter.
Index	An arbitrary local integer value used by this agent to identify a particular connection instance, unique only for the indicated remote system. An agent is encouraged to assign increasing index values to new entries, starting with one, after each reboot. It is unlikely that the Index wraps between reboots.
ChassisIdSubtype	The type of encoding used to identify the remote system chassis: • chassisComponent • interfaceAlias • portComponent • MacAddress • networkAddress • interfaceName • local
ChassisId	Remote chassis ID.
PortIdSubtype	The type of port identifier encoding used in the associated PortId object.
PortId	The string value used to identify the port component associated with a given port in the local system.
SysCapSupported	Identifies the system capabilities supported on the remote system.
SysName	Remote system name.
PortDesc	The remote port description.
SysDesc	Remote system description.

Displaying LLDP Neighbor Management properties

Display the LLDP management properties for the switch neighbor.

Procedure steps

Step Action

1 From the main menu, choose **Application**.

2 Choose **802.1ab** .

3 Choose **LLDP Neighbor Management**.

The LLDP Neigbor Management page appears.

—End—

LLDP Neighbor Management page items

Item	Description
Port	Identifies the local port on which the remote system information is received.
Time	The time stamp for the entry.
Index	MAC service access point (MAC SAP) identifier.
ChassisIdSubtype	The type of encoding used to identify the remote system chassis: • chassisComponent • interfaceAlias • portComponent • macAddress • networkAddress • interfaceName • local
ChassisId	Remote chassis ID.
PortIdSubtype	The type of port identifier encoding used in the associated PortId object.
PortId	The string value used to identify the port component associated with a given port in the local system.
Mgmt Addr	The management address associated with the remote system.
MgmtIf	The OID value used to identify the type of hardware component or protocol entity associated with the management address advertised by the remote system agent.
Mgmt Addr OID	The object identifier (OID) for the management address associated with the remote system.

System administration using the Element Manager

Use these procedures to display system or switch information from the Element Manager.

Navigation

- "Viewing switch power information" (page 108)
- "Viewing device properties" (page 109)
- "Viewing the trap log" (page 115)

- "Viewing VLAN properties" (page 66)
- "Viewing switch IP information" (page 117)
- "Viewing learned MAC addresses by VLAN" (page 119)
- "Viewing Unit information" (page 120)
- "Displaying STP properties" (page 121)
- "Viewing Security settings" (page 123)
- "Displaying LACP" (page 129)
- "Viewing statistics" (page 130)
- "Graphing Chassis statistics" (page 130)
- "Graphing port statistics" (page 135)
- "Viewing Rmon history statistics" (page 176)
- "Viewing Rmon Events" (page 144)
- "Graphing ports using the Rmon Ether Stats tab " (page 145)
- "Viewing alarm settings" (page 149)
- "Configuring LLDP" (page 153)

Viewing switch power information

Access the Unit option to view Power over Ethernet (PoE) information for the BES100 or BES200 switch.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > System > Unit**.
2	Select the switch by clicking on something other than a port, and then click the **PoE** tab.

—End—

PoE tab

Variable	Value
Power	Displays the total power available to the switch in watts.

Variable	Value
OperStatus	Displays the Power-Over-Ethernet state of the switch: • on • off • faulty
ConsumptionPower	Displays the power being used by the switch in watts.

Viewing device properties

Access the Hardware Inventory option to view device properties.

- System - use the System tab to configure device properties, such as system name, system contact, and so on.
- Base Unit Info - use the Base Unit Info tab to view read-only information about the operating status of the hardware.
- Stack - use the Stack Info tab (BES200 series only) to view read-only information about the operating status of a BES200 series unit.
- Trap Receivers - use the Trap Receivers tab to display configuration information for trap receivers.
- PowerSupply- use the PowerSupply tab to display read-only information about the operating status of the switch power supplies.
- Fan - use the Fan tab to view read-only information about the operating status of the switch fans. Fan 3 and Fan 4 are for BES120-48T-PWR, BES120-24T-PWR, and BES110-48T units and BES220-48T-PWR, BES220-24T-PWR, and BES210-48T only.

System tab

The System tab displays device properties, such as system name, system contact, and so on.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Hardware Inventory**. The System page appears.
2	To configure System information, click the **System** tab.
3	In the **SystemContact**box, type the name of the system administrator.

4 In the **SystemName** box, type a name for the system.

5 In the **Location** box, type a location for the device.

6 In the **SwitchIpAddress** box, type the IP address for the switch.

7 In the **SubnetMask** box, type the subnet mask number for the switch.

8 In the **DefaultGateway** box, type the default IP address for the switch.

9 In the **ManagementVlanId** box, type the current VLAN ID.

10 Click the **BootMode**option button to set the mode for the next switch boot.

11 To reboot the switch, click the **reboot** option button.

By default, the switch is in the running mode.

12 To send SNMP traps to trap receivers for all SNMP access authentication, select the **Authentication Traps** check box.

13 Click **Apply**.

—End—

System tab

Variable	Value
SystemDescription	The assigned system name.
SystemUpTime	The time since the system was last booted.
SystemContact	Type the contact information (in this case, an e-mail address) for the system administrator.
SystemName	Type the name of this device.
Location	Type the physical location of this device.
CurrentImageVersion	The version number of the agent image that is currently used on the switch.
SwitchIpAddress	The IP address for the switch.
SubnetMask	The subnet mask. The value is 255.255.255.0
DefaultGateway	The default IP address for the switch.
ManagementVlanId	The current management VLAN ID.

Variable	Value
BootMode	Sets the BootP mode to use at the next switch boot: • bootpDisabled • bootpAlways • bootpOrDefaultIp • bootpOrLastAddress
ReBoot	By default, the switch is in the Running mode. Selecting this option lets you reboot the switch.
AuthenticationTraps	Click to enable or disable. When you enable, SNMP traps are sent to trap receivers for all SNMP access authentication. When you disable, no traps are sent. To view traps, from the **Task Navigation Panel**, choose **Administration > Logs > Trap Log**.

Base Unit Info tab

The Base Unit Info tab provides read-only information about the operating status of the hardware.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Hardware Inventory**. The System page appears.
2	Click the **Base Unit Info** tab. The Base Unit Info page appears.
3	Click **Refresh** to update the page.

—End—

Base Unit Info tab

Variable	Value
Description	A description of the switch hardware, including number of ports and IP address.
Version	The switch hardware version number.
SerialNumber	The switch serial number.

Variable	Value
LastChange	The value of sysUpTime at the time the interface entered its current operational state.
OperState	The operational state of the switch.
TotalNumPorts	The total number of ports on the switch.
IpAddress	The unit IP address.

Stack Info tab

The Stack Info tab provides read-only information about the operating status of a BES200 series unit only.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Hardware Inventory**. The System page appears.
2	Click the **Stack Info** tab. The Stack Info page appears.
3	Click **Update** to refresh the page.

—End—

Stack Info tab

Value	Variable
Indx	The unit number.
Description	A description of the unit hardware, including number of ports and transmission speed.
Version	The unit hardware version number.
SerialNumber	The unit serial number.
LastChange	The value of sysUpTime when it was detected that the component/sub-component was added to the chassis. If the component/sub-component has not been added since the cold/warm start of the agent, then the value is zero.
OperState	The operational state of the unit.

Value	Variable
TotalNumPorts	The total number of ports on the unit.
IpAddress	The unit IP address.

Trap Receivers tab

The Trap Receivers tab displays configuration information for trap receivers.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Hardware Inventory**. The System page appears.
2	Click the **Trap Receivers** tab. The Trap Receivers page appears.
3	Click **Insert**. The Chassis, Insert Trap Receivers page appears.
4	In the **Index** box, type a numeric value to assign to the trap receiver.
5	In the **IPAddress** box, type the address of the SNMP manager that receives the trap.
6	In the **Community** box, type the string that will act as the password.
7	Click **Insert**.
8	To delete an entry, click the appropriate row, and click **Delete**.

—End—

Trap Receivers tab

Variable	Value
Index	The number of the trap receiver to create or modify.
IPAddress	The network address for the SNMP manager that is to receive the specified trap.
Community	The community string for the specified trap receiver.

Power Supply tab

The PowerSupply tab provides read-only information about the operating status of the switch power supplies.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Hardware Inventory**. The System page appears.
2	Click the **PowerSupply** tab. The PowerSupply page appears.
3	Click **Refresh** to update the page.

—End—

Power Supply tab

Variable	Value
Chassis 1 Primary Power Supply	Provides the operational state of the specified power supply. Possible values include • other: Some other state. • notAvail: State not available. • removed: Component was removed. • disabled: Operation disabled. • normal: State is in normal operation • resetInProg: There is a reset in progress. • testing: System is doing a self test. • warning: System is operating at a warning level. • nonFatalErr: System is operating at error level • fatalErr: A fatal error stopped operation. • notConfig: A module needs to be configured. The allowable values are determined by the component type.

Fan tab

The Fan tab provides read-only information about the operating status of the switch fans.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Hardware Inventory**. The System page appears.
2	Click the **Fan**tab. The Fan page appears.

—End—

Fan tab

Variable	Value
Chassis 1 Fan 1 (For BES110-24T and BES210-24T only)	The operational state of the fan. Values include • other: Some other state. • notAvail: This state is not available. • removed: Fan was removed. • disabled: Fan is disabled. • normal: Fan is operating in normal operation. • resetInProg: A reset of the fan is in progress. • testing: Fan is doing a self test. • warning: Fan is operating at a warning level. • nonFatalErr: Fan is operating at error level. • fatalErr: An error stopped the fan operation. • notConfig: Fan needs to be configured. The allowable values are determined by the component type.
Chassis 1 Fan 2 (For BES110-24T and BES210-24T only)	
Chassis 1 Fan 3 (For BES120-48T-PWR, BES120-24T-PWR and BES110-48T)	
Chassis 1 Fan 4 (For BES220-48T-PPWR, BES220-24T-PWR and BES210-48T)	

Viewing the trap log

Traps are sent in SNMP V2c format and recorded in the trap log to a preset maximum number of entries. The default number of trap log entries is 500.

The Element Manager provides only one port to receive traps (port 162); therefore, you can only view the Element Manager trap log for one BES100 or BES200 Series switch device at a time.

Use this procedure to view the trap log.

Prerequisites

- The BES100 or BES200 Series switch must be configured to send SNMP traps.
- The Element Manager must be running.
- If you are operating the Element Manager from a UNIX platform, you must be logged in as root.

ATTENTION

The Element Manager receives traps on port 162. If this port is being used by another application, you can not view the trap log until the other application is disabled and Element Manager is restarted.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose**Administration > Logs > Trap Log**.
2	To save a trap entry, click **Export** . The Export dialog box appears.
3	Enter a file name for the trap.
4	Choose **Save as type** to save the file as a different type.
5	Click **Save** to create the file or **Cancel** to quit without saving your changes.

—End—

Variable	Value
Node	Displays the address where the trap occurred.
Time	Displays the time the trap occurred.
Type	Displays the type of trap.
Description	Describes the trap findings.

Viewing switch IP information

Access the IP Subsystem option to view Internet Protocol (IP) address information for the BES100 and BES200 Series switch. The following tabs are available:

- Address - use the addresses tab to display the IP address information for the device.
- Address Resolution Protocol (ARP) - use the ARP tab to display the MAC addresses and their associated IP addresses for the switch.

Addresses tab

The Addresses tab displays the IP address information for the device.

Procedure steps

Step Action

1 From the **Task Navigation Panel**, choose **Configuration > System > IP Subsystem**.

The Address tab appears.

2 To send the information from the fields in this page to a text file, click the **Export data** icon.

3 In the File name field, type a file name.

4 Choose **Save as type** to save the file as a different type.

5 Click **Save** to create the file or **Cancel** to quit without saving your changes.

6 To update the page, click **Refresh**.

—End—

Addresses tab

Variable	Value
Address	The device IP address.
NetMask	The subnet mask address.

Variable	Value
BcastAddr	The value of the least-significant bit in the IP broadcast address used for sending datagrams on the (logical) interface associated with the IP address of this entry. When the Internet standard all-ones broadcast address (255.255.255.255) is used, the value is 1. This value applies to both the subnet and network broadcasts addresses used by the entity on this (logical) interface.
ReasmMaxSize	The size of the largest IP datagram that this entity can reassemble from incoming IP fragmented datagrams received on this interface.

ARP tab

The ARP tab shows the MAC addresses and their associated IP addresses for the switch.

Procedure steps

Step Action

1 From the **Task Navigation Panel**, choose **Configuration > System > IP Subsystem**

The Address tab appears.

2 Click the **ARP** tab.

3 To send the information from the fields in this page to a text file, click the **Export data** icon.

The Device Manager dialog box appears.

4 In the File name field, type a file name.

5 Choose **Save as type** to save the file as a different type.

6 Click **Save** to create the file or **Cancel** to quit without saving your changes.

7 To update the page, click **Refresh**.

—End—

ARP tab

Variable	Value
Interface	The unit and port number.
MacAddress	The unique hardware address of the device.

Variable	Value
IpAddress	The Internet Protocol address of the device.
Type	The type of mapping.

Viewing learned MAC addresses by VLAN

Access the MAC Address Table option to view the MAC addresses that the switch has learned, listed by the associated VLAN port.

The MAC Address Table displays status, address, and port information for the VLAN.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > System > MAC Address Table**. The Setting tab appears.
2	Click the **MAC Address Table** tab.
3	To send the information from the fields in this page to a text file, click the **Export data** icon. The Device Manager dialog box appears.
4	In the File name field, type a file name.
5	Choose **Save as type** to save the file as a different type.
6	Click **Save** to create the file or **Cancel** to quit without saving your changes.
7	To update the page, click **Refresh**.

—End—

MAC address table

Variable	Value
Status	The values of this field include: invalid: Entry is no longer valid, but has not been removed from the table. learned: The MAC address entry was learned by the switch. self: The MAC address entry is an internal MAC address of the BES100 and BES200 switch.

Variable	Value
	mgmt: The MAC address entry is for the management address of the BES100 and BES200 switch. other: none of the preceding. This would include where some other MIB object (not the corresponding instance of dot1dTpFdbPort or an entry in the dot1dStaticTable) is being used to determine if a frames addressed to the value of dot1dTpFdbAddress are being forwarded.
Address	The unicast MAC address for which the bridge has forwarding and/or filtering information.
Port	The port number on which a frame has been seen. A value of "0" indicates this is an internal MAC address.

Viewing Unit information

Access the Unit option to view the description, version and serial number for the switch.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > System > Unit**.
2	Select the switch by clicking anything except a port. The **Unit** tab appears.
3	Click **Refresh** to update the page.

—End—

Unit tab

Variable	Value
Description	Specifies the type of switch.
Version	Specifies the hardware version number of the switch.
SerialNumber	Specifies the serial number of the switch.

Displaying STP properties

You can use the Element Manager to display system parameters for Spanning Tree Protocol (STP), the industry standard for avoiding loops in switched networks.

STP resolves duplicate paths in networks and is not necessary for ports that have workstations directly attached to the switch. When STP is enabled on these ports (the default), workstations are unable to attach to servers for a few seconds while STP goes through its learning steps (listening, learning, and forwarding).

The BES100 and BES200 Series switches support the following Spanning Tree Protocol modes:

- nortelStpg
- RSTP (1EEE 802.1w)

Use the following tabs to display STP properties:

- Bridge Information
- Port Information

Bridge Information

Use the Bridge Information tab to display details about how efficiently the bridge is working.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > Data Services > Spanning Tree**. The Bridge Information tab appears.
2	Click **Refresh** to update the page.

—End—

Bridge Information tab page items

Variable	Value
StpPriority	The priority value of the bridge ID in hexadecimal notation, which is the most significant two bytes of the bridge ID. The Spanning Tree Algorithm uses this parameter to determine the root bridge (or designated bridge).

Variable	Value
	For example, the bridge with the lowest bridge ID becomes the root bridge, with Bridge Priority values compared first, followed by the hardware addresses. The values displayed for Bridge Priority are in decimal.
StpVersion	The version of STP running on the switch.
BridgeMaxAge	The value that all bridges use for the maximum age of a bridge when it is acting as the root.
BridgeHelloTime	The value that all bridges use for HelloTime when this bridge is acting as the root.
BridgeForwardDelay	The value that all bridges use for ForwardDelay when this bridge is acting as the root.
TxHoldCount	The maximum number of bridge protocol data units transmitted in any BridgeHelloTime.
PathCostDefault	The default path cost for this bridge. The default is 16 bit, which applies to the IEEE Std.
RootPathCost	The cost of the path to the root as seen from this bridge.

Port Information

Use the Port Information tab to display details about the port.

Procedure steps

Step Action

1 From the **Task Navigation Panel**, choose **Configuration > Data Services > Spanning Tree**.

The Bridge Information tab appears.

2 Click the **Port Information** tab.

3 To send the information from the fields in this page to a text file, click the **Export data** icon.

The Device Manager dialog box appears.

4 In the File name field, type a file name.

5 Choose **Save as type** to save the file as a different type.

6 Click **Save** to create the file or **Cancel** to quit without saving your changes.

7 Click **Refresh** to update the page.

—End—

Port Information tab

Variable	Value
Port	The port number.
Path Cost	The bridge spanning tree parameter that determines the lowest path cost to the root.
Oper Edge Port	A value of true indicates that the spanning tree can assume this port as an edge-port and a value of false indicates that the spanning tree can assume this port as a non-edge-port. The switch software sets this object to false on reception of a BPDU.
Oper Point To Point	The administrative point-to-point status of the LAN segment attached to this port: A value of True indicates that the spanning tree treats this port as if it is connected to a point-to-point link. A value of False indicates that the spanning tree treats this port as having a shared media connection. A value of Auto indicates that this port is considered to have a point-to-point link if it is an aggregator and all of its members are aggregatable, or if the MAC entity is configured for full-duplex operation, either through autonegotiation or by management means.
Oper Protocol Version	Indicates the STP version in which the port is participating.
Role	Indicates the role of the port in the Spanning Tree instance.
State	Used to identify the STP and RSTP port states. Port state is cataloged as Discarding, Learning, or Forwarding.

Viewing Security settings

You can use the MAC Address Security option to set the security features for a switch so that the right actions are performed by the software when a violation occurs. The security actions you specify are applied to all ports of the switch.

Navigation

- "General " (page 124)
- "Security List" (page 124)
- "Security Table " (page 126)
- "Security Status" (page 127)
- "Security Violation " (page 128)

General

You can use the General tab to set and view general security information for the switch.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, select **Configuration > Data Services > MAC Address Security**. The General tab appears.
2	To enable MAC address-based security, select the **MacAddressSecurity** check box, and then click **Apply**.
3	To update the page, click **Refresh**.

—End—

General tab

Variable	Value
MacAddressSecurity	Specifies whether MAC Address-based security is enabled (selected) or disabled (cleared).
PortConfiguration	Displays the ports for which security is enabled.
CurrSecurityLists	Current number of security entries listed in the SecurityList tab.

Security List

Use the Security List tab to access a list of Security port fields. You can also manage this list from this location. See"Adding items to the Security List" (page 125) and "Deleting a Security List entry" (page 125).

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, select **Configuration > Data Services > MAC Address Security**. The General tab appears.
2	Click the **Security List** tab. The Security List page appears.
3	To send the information from the fields in this page to a text file, click the **Export data** icon.

The Device Manager dialog box appears.

4 In the File name field, type a file name.

5 Choose **Save as type** to save the file as a different type.

6 Click **Save** to create the file or **Cancel** to quit without saving your changes.

7 Click **Refresh** to update the page.

—End—

Security List tab

Variable	Value
SecurityListIndx	An index of the security list. This corresponds to the Security port list that can be used as an index into AuthConfig tab.
SecurityListMembers	The set of ports that are currently members in the Port list.

Deleting a Security List entry

Use the MAC Address Security option to delete a Security List entry.

Procedure steps

Step Action

1 From the **Task Navigation Panel**, select **Configuration > Data Services > MAC Address Security** and click the **Security List** tab.

2 In the **Security List** tab, select the entry to delete.

3 Click **Delete**.

—End—

Adding items to the Security List

You can use the **MacSecurity, Insert SecurityList** dialog box to add items to the security list.

Procedure steps

Step Action

1 From the **Task Navigation Panel**, select **Configuration > Data Services > MAC Address Security**.

The General tab appears in the information panel.

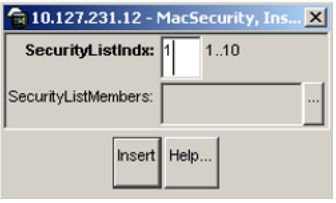
2 Click the **Security List** tab.

The Security List tab appears.

3 Click **Insert**.

The MacSecurity, Insert Security List dialog box appears. (See the "MacSecurity - Insert SecurityList dialog box" (page 126)MacSecurity, Insert SecurityList dialog box.

MacSecurity - Insert SecurityList dialog box



10.127.231.12 - MacSecurity, Ins...

SecurityListIndx: 1 1..10

SecurityListMembers:

4 Refer to the"Security List tab" (page 125) table for information about completing the fields.

5 Click **Insert**.

The new entry appears in the Security List tab.

—End—

Security Table

Use the Security Table tab to set and view general security information for the switch.

Procedure steps

Step **Action**

1 From the **Task Navigation Panel**, select **Configuration > Data Services > MAC Address Security** and click the **Security Table** tab.

The Security Table page appears.

2 To add items to the Security Table, click **Insert**.

The MacSecurity, Insert Security List dialog box appears.

3 Refer to the"Security Table tab" (page 127) for information about completing the fields.

4 Click **Insert**.

5 To delete items from the Security Table, select the row and click **Delete**.

6 To send the information from the fields in this page to a text file, click the **Export data** icon.

The Device Manager dialog box appears.

7 In the File name field, type a file name.

8 Choose **Save as type** to save the file as a different type.

9 Click **Save** to create the file or **Cancel** to quit without saving your changes.

10 Click **Refresh** to update the page.

—End—

Security Table tab

Variable	Value
Unit	Index of the unit where the port is located. If you specify SecureList this field must be 0.
Port	Index of the port on the switch. If you specify SecureList this field must be 0.
MacAddress	MAC Addresses that are designated as allowed (station).
SecureList	The index of the security list. This value is meaningful only if Unit and Port values are set to zero. For other Unit and port index values, it should have the value of zero. The corresponding MAC address of the entry is allowed or blocked on all ports of this port list.

Security Status

Use the Security Status tab to display authorization information for ports.

Procedure steps

Step Action

1 From the **Task Navigation Panel**, select **Configuration > Data Services > MAC Address Security** and click the **Security Status** tab.

The Security Status page appears.

2 Click **Refresh** to update the page.

3 To send the information from the fields in this page to a text file, click the **Export data** icon.

The Device Manager dialog box appears.

4 In the File name field, type a file name.

5 Choose **Save as type** to save the file as a different type.

6 Click **Save** to create the file or **Cancel** to quit without saving your changes.

—End—

Security Status tab

Variable	Value
Unit	The unit number.
Port	The port number on the switch.
MacAddress	The MAC address on the port.
CurrentAccessCtrlType	Displays whether the node entry is allowed or blocked type. In this case the value is always allowed.
CurrentActionMode	Displays the action taken for the port.
CurrentPortSecurStatus	Displays whether the port has a secure status.

Security Violation

Use the Security Violation tab to see a list of ports where network access violations have occurred, and see the offending MAC addresses.

Procedure steps

Step Action

1 From the **Task Navigation Panel**, select **Configuration > Data Services > MAC Address Security** and click the **Security Violation** tab.

The Security Violation page appears.

2 Click **Refresh** to update the page.

3 To send the information from the fields in this page to a text file, click the **Export data** icon.

The Device Manager dialog box appears.

4 In the File name field, type a file name.

5 Choose **Save as type** to save the file as a different type.

6 Click **Save** to create the file or **Cancel** to quit without saving your changes.

—End—

Security Violation tab

Variable	Value
Unit	The unit number.
Port	The number of the port that has experienced a security violation.
MACAddress	The MAC address of the device attempting unauthorized network access (MAC address-based security).

Displaying LACP

Use this procedure to view the Link Aggregation Control Protocol (LACP) bridge configuration information.

Procedure steps

Step Action

1 From the **Task Navigation Panel**, choose **Configuration > Data Services > LACP**.

The LACP page appears.

2 Click **Refresh** to update the page.

—End—

LACP tab

Variable	Value
Index	The unique identifier that the local system assigns to this aggregator. This attribute identifies an aggregator instance among the subordinate managed objects of the containing object.
MacAddress	The MAC address used by this bridge when it must be referred to in a unique fashion.
AggregateOrIndividual	Indicates whether the aggregation port can aggregate or can operate only as an individual link.

Variable	Value
ActorLagID	The combined information of Actor System Priority, Actor System ID, and Actor Operational Key in ActorSystemPriority-ActorSystemID-ActorOperationalKey hexadecimal format.
ActorSystemPriority	A 2-octet read-write value used to define the priority value associated with the Actor's System ID.
ActorSystemID	The MAC address value that defines the value of the System ID for the system that contains this aggregation port.
ActorOperKey	The current operational value of the key for the aggregation port.
ActorAdminKey	The current administrative value of the key for the aggregation port.
PartnerLagID	The combined information of Partner System Priority, Partner System ID, and Partner Operational Key in PartnerSystemPriority -PartnerSystemID-PartnerOperationalKey hexadecimal format.
PartnerSystemPriority	A 2-octet read-only value that indicates the priority value associated with the Partner's System ID.
PartnerSystemID	The MAC address value consisting of the unique identifier for the current protocol partner of this aggregator. A value of zero indicates that there is no known Partner.
PartnerOperKey	The current operational value of the key for the current protocol partner of this aggregator.

Viewing statistics

Use Element Manager to configure system logging and to display chassis and port statistics for the BES100 or BES200 Series switch.

Navigation

- "Graphing Chassis statistics" (page 130)
- "Graphing port statistics" (page 135)

Graphing Chassis statistics Use the Chassis Metrics option to graph statistics for SNMP and IP.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > System Metrics > Chassis Metrics**. The SNMP tab appears.
2	Select the numeric data you wish to graph.
3	To view a graphical representation of statistics, choose a Line chart icon, a Bar Chart icon, or an Area Chart icon.
4	To send the information from the fields in this page to a text file, click the **Export data** icon. The Device Manager dialog box appears.
5	In the File name field, type a file name.
6	Choose **Save as type** to save the file as a different type.
7	Click **Save** to create the file or **Cancel** to quit without saving your changes.

—End—

SNMP tab

Variable	Value
InPkts	The total number of messages delivered to SNMP from the transport service.
OutPkts	The total number of SNMP messages passed from the SNMP protocol to the transport service.
InTotalReqVars	The total number of MIB objects retrieved successfully by the SNMP protocol as the result of receiving valid SNMP Get-Request and Get-Next PDUs.
InTotalSetVars	The total number of MIB objects altered successfully by the SNMP protocol as the result of receiving valid SNMP Set-Request PDUs.
InGetRequests	The total number of SNMP Get-Request PDUs that have been accepted and processed by the SNMP protocol.
InGetNexts	The total number of SNMP Get-Next PDUs accepted and processed by the SNMP protocol.
InSetRequests	The total number of SNMP Set-Request PDUs accepted and processed by the SNMP protocol.

Variable	Value
InGetResponses	The total number of SNMP Get-Response PDUs accepted and processed by the SNMP protocol.
OutTraps	The total number of SNMP Trap PDUs generated by the SNMP protocol.
OutTooBigs	The total number of SNMP PDUs generated by the SNMP protocol for which the value of the error-status field is tooBig.
OutNoSuchNames	The total number of SNMP PDUs generated by the SNMP protocol for which the value of the error-status field is noSuchName.
OutBadValues	The total number of SNMP PDUs generated by the SNMP protocol for which the value of the error-status field is badValue.
OutGenErrs	The total number of SNMP PDUs generated by the SNMP protocol for which the value of the error-status field is genErr.
InBadVersions	The total number of SNMP messages delivered to the SNMP protocol for an unsupported SNMP version.
InBadCommunityNames	The total number of SNMP messages delivered to the SNMP protocol that used an unknown SNMP community name.
InBadCommunityUses	The total number of SNMP messages delivered to the SNMP protocol that represented an SNMP operation not allowed by the SNMP community named in the message.
InASNParseErrs	The total number of ASN.1 or BER errors encountered by the SNMP protocol when decoding received SNMP messages.
InTooBigs	The total number of SNMP PDUs delivered to the SNMP protocol for which the value of the error-status field is tooBig.
InNoSuchNames	The total number of SNMP PDUs delivered to the SNMP protocol for which the value of the error-status field is noSuchName.
InBadValues	The total number of SNMP PDUs delivered to the SNMP protocol for which the value of the error-status field is badValue.

Variable	Value
InReadOnlys	The total number of SNMP PDUs delivered to the SNMP protocol for which the value of the error-status field is readOnly. It is a protocol error to generate an SNMP PDU containing the value readOnly in the error-status field. This object is provided to detect incorrect implementations of the SNMP.
InGenErrs	The total number of SNMP PDUs delivered to the SNMP protocol for which the value of the error-status field is genErr.

IP tab You can use the IP tab to graph IP statistics.

IP tab

Variable	Value
InReceives	The total number of input datagrams received from interfaces, including those received in error.
InHdrErrors	The number of input datagrams discarded due to errors in their IP headers, including bad checksums, version number mismatch, other format errors, time-to-live exceeded, errors discovered in processing their IP options.
InAddrErrors	The number of input datagrams discarded because the IP address in the IP header destination field was not a valid address. This count includes invalid addresses (for example, 0.0.0.0) and addresses of unsupported Classes (for example, Class E). For addresses that are not IP Gateways and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.
ForwDatagrams	The number of input datagrams for which this entity was not their final IP destination, as a result of which an attempt was made to find a route to forward them to that final destination. For addresses that do not act as IP Gateways, this counter includes only those packets that were Source-Routed by way of this address and had successful Source-Route option processing.
InUnknownProtos	The number of locally addressed datagrams received successfully but discarded because of an unknown or unsupported protocol.

Variable	Value
InDiscards	The number of input IP datagrams for which no problems were encountered to prevent their continued processing but that were discarded (for example, for lack of buffer space). Note that this counter does not include any datagrams discarded while awaiting reassembly.
InDelivers	The total number of input datagrams successfully delivered to IP user-protocols (including ICMP).
OutRequests	The total number of IP datagrams that local IP user-protocols (including ICMP) supplied to IP in requests for transmission. Note that this counter does not include any datagrams counted in ipForwDatagrams.
OutDiscards	The number of output IP datagrams for which no problem was encountered to prevent their transmission to their destination, but that were discarded (for example, for lack of buffer space). Note that this counter would include datagrams counted in ipForwDatagrams if any such packets met this (discretionary) discard criterion.
OutNoRoutes	The number of IP datagrams discarded because no route could be found to transmit them to their destination. Note that this counter also includes any packets counted in ipForwDatagrams that have no route. Note that this includes any datagrams a host cannot route because all of its default gateways are down.
FragOKs	The number of IP datagrams that have been successfully fragmented at this entity.
FragFails	The number of IP datagrams that have been discarded because they needed to be fragmented at this entity but could not be, for example, because their Don’t Fragment flag was set.
FragCreates	The number of IP datagram fragments that have been generated as a result of fragmentation at this entity.
ReasmReqds	The number of IP fragments received that needed to be reassembled at this entity.

Variable	Value
ReasmOKs	The number of IP datagrams successfully reassembled.
ReasmFails	The number of failures detected by the IP reassembly algorithm (for whatever reason: timed out, or errors, for example). Note that this is not necessarily a count of discarded IP fragments because some algorithms (notably the algorithm in RFC 815) can lose track of the number of fragments by combining them as they are received.

Graphing port statistics

You can graph statistics for either a single port or multiple ports from the Port Metrics window:

- AbsoluteValue
- Cumulative
- Average/sec
- Minimum/sec
- Maximum/sec
- LastVal/sec

The following table describes what is found in each column. These column entries are common to each tab that has a statistics graphing capability.

System Metrics - columns- for graphing ports

Variable	Value
Absolute	The total count since the last time counters were reset. A system reboot resets all counters.
Cumulative	The total count since the statistics tab was first opened. The elapsed time for the cumulative counter is displayed at the lower right-hand corner of the information panel.
Average/sec	The cumulative count divided by the cumulative elapsed time.
Minimum/sec	The minimum average for the counter for a given polling interval over the cumulative elapsed time.

Variable	Value
Maximum/sec	The maximum average for the counter for a given polling interval over the cumulative elapsed time.
LastVal/sec	The average for the counter over the last polling interval.

The windows displayed when you configure a single port differ from the ones displayed when you configure multiple ports. However, the options are similar.

When either single or multiple ports are displayed, you can specify the desired polling interval from the Poll Interval list.

When multiple ports are displayed, only the AbsoluteValue statistics are initially displayed. Choose from the Show list to modify the type of statistics to display.

Use this procedure to access the Port Metrics option.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > System Metrics > Port Metrics**. The switch view appears in the information panel.
2	Select the single or multiple ports that you want to graph. To select multiple ports, press **Ctrl** and select the ports that you want to configure. A yellow outline appears around the selected ports.

—End—

Interface tab

The Interface tab shows interface parameters for graphing a port or ports.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > System Metrics > Port Metrics**. The switch view appears in the information panel.
2	Click the **Interface** tab.

3 To view a graphical representation of statistics, click the numeric data you wish to graph and choose a Line chart icon, a Bar Chart icon, or an Area Chart icon.

4 To send the information from the fields in this page to a text file, click the **Export data** icon.

The Device Manager dialog box appears.

5 In the File name field, type a file name.

6 Choose **Save as type** to save the file as a different type.

7 Click **Save** to create the file or **Cancel** to quit without saving your changes.

8 To erase information from all the columns *except* the AbsoluteValue column, click **Clear Counters**.

9 In the **Poll Interval** list, choose a selection.

—End—

Interface tab

Variable	Value
InOctets	The total number of octets received on the interface, including framing characters.
OutOctets	The total number of octets transmitted out of the interface, including framing characters.
InUcastPkts	The number of unicast packets ingressing the port.
OutUcastPkts	The number of unicast packets egressing the port.
InNUcastPkts	The number of non-unicast (broadcast or multicast) packets ingressing the port.
OutNUcastPkts	The number of non-unicast (broadcast or multicast) packets egressing the port.
InDiscards	The number of inbound packets that were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. One possible reason for discarding such a packet could be to free up buffer space.

Variable	Value
OutDiscards	The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet could be to free up buffer space.
InErrors	For packet-oriented interfaces, the number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol. For character-oriented or fixed-length interfaces, the number of inbound transmission units that contained errors preventing them from being deliverable to a higher-layer protocol.
OutErrors	For packet-oriented interfaces, the number of outbound packets that could not be transmitted because of errors. For character-oriented or fixed-length interfaces, the number of outbound transmission units that could not be transmitted because of errors.
InUnknownProtos	For packet-oriented interfaces, the number of packets received via the interface that were discarded because of an unknown or unsupported protocol. For character-oriented or fixed-length interfaces that support protocol multiplexing, the number of transmission units received via the interface that were discarded because of an unknown or unsupported protocol. For any interface that does not support protocol multiplexing, this counter is always zero.

Ethernet Errors tab

The Ethernet Errors tab shows port Ethernet Errors statistics.

Procedure steps

Step **Action**

1 From the **Task Navigation Panel**, choose **Administration > System Metrics > Port Metrics**.

The switch view appears in the information panel.

2 Click the **Ethernet Errors** tab.

3 To view a graphical representation of statistics, click the numeric data you wish to graph and choose a Line chart icon, a Bar Chart icon, or an Area Chart icon.

4 To send the information from the fields in this page to a text file, click the **Export data** icon.

The Device Manager dialog box appears.

5 In the File name field, type a file name.

6 Choose **Save as type** to save the file as a different type.

7 Click **Save** to create the file or **Cancel** to quit without saving your changes.

8 To erase information from all the columns *except* the AbsoluteValue column, click **Clear Counters**.

9 In the **Poll Interval** list, choose a selection.

—End—

Ethernet Errors tab items

Variable	Value
AlignmentErrors	A count of frames received on a particular interface that are not an integral number of octets in length and do not pass the FCS check. The count represented by an instance of this object is incremented when the alignmentError status is returned by the MAC service to the LLC (or other MAC user). Received frames for which multiple error conditions occur are, according to the conventions of IEEE 802.3 Layer Management, counted exclusively according to the error status presented to the LLC.

Variable	Value
FCSErrors	A count of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check. The count represented by an instance of this object is incremented when the frameCheckError status is returned by the MAC service to the LLC (or other MAC user). Received frames for which multiple error conditions occur are, according to the conventions of IEEE 802.3 Layer Management, counted exclusively according to the error status presented to the LLC.
InternalMacTransmitErrors	A count of frames for which transmission on a particular interface fails due to an internal MAC sublayer transmit error. A frame is only counted by an instance of this object if it is not counted by the corresponding instance of either the LateCollisions object, the ExcessiveCollisions object, or the CarrierSenseErrors object.
InternalMacReceiveErrors	A count of frames for which reception on a particular interface fails due to an internal MAC sublayer receive error. A frame is only counted by an instance of this object if it is not counted by the corresponding instance of either the FrameTooLongs object, the AlignmentErrors object, or the FCSErrors object. The precise meaning of the count represented by an instance of this object is implementation specific. In particular, an instance of this object may represent a count of receive errors on a particular interface that are not otherwise counted.
CarrierSenseErrors	The number of times that the carrier sense condition was lost or never asserted when attempting to transmit a frame on a particular interface. The count represented by an instance of this object is incremented at most once per transmission attempt, even if the carrier sense condition fluctuates during a transmission attempt.

Variable	Value
FrameTooLongs	A count of frames received on a particular interface that exceed the maximum permitted frame size. The count represented by an instance of this object is incremented when the frameTooLong status is returned by the MAC service to the LLC (or other MAC user). Received frames for which multiple error conditions occur are, according to the conventions of IEEE 802.3 Layer Management, counted exclusively according to the error status presented to the LLC.
SQETestErrors	A count of times that the SQE TEST ERROR message is generated by the PLS sublayer for a particular interface. The SQE TEST ERROR message is defined in section 7.2.2.2.4 of ANSI/IEEE 802.3-1985 and its generation is described in section 7.2.4.6 of the same document.
DeferredTransmissions	A count of frames for which the first transmission attempt on a particular interface is delayed because the medium is busy. The count represented by an instance of this object does not include frames involved in collisions.
SingleCollisionFrames	A count of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision. A frame that is counted by an instance of this object is also counted by the corresponding instance of either the ifOutUcastPkts, ifOutMulticastPkts, or ifOutBroadcastPkts, and is not counted by the corresponding instance of the MultipleCollisionFrames object.
MultipleCollisionFrames	A count of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision. A frame that is counted by an instance of this object is also counted by the corresponding instance of either the ifOutUcastPkts, ifOutMulticastPkts, or ifOutBroadcastPkts, and is not counted by the corresponding instance of the SingleCollisionFrames object.

Variable	Value
LateCollisions	The number of times that a collision is detected on a particular interface later than 512 bit-times into the transmission of a packet. Five hundred and twelve bit-times corresponds to 51.2 microseconds on a 10 Mb/s system. A (late) collision included in a count represented by an instance of this object is also considered as a (generic) collision for purposes of other collision-related statistics.
ExcessiveCollisions	A count of frames for which transmission on a particular interface fails due to excessive collisions.

Bridge tab

The Bridge tab displays port frame statistics

Procedure steps

Step Action

1 From the **Task Navigation Panel**, choose **Administration > System Metrics > Port Metrics**.

The switch view appears in the information panel.

2 Click the **Bridge** tab.

3 To view a graphical representation of statistics, click the numeric data you wish to graph and choose a Line chart icon, a Bar Chart icon, or an Area Chart icon.

4 To send the information from the fields in this page to a text file, click the **Export data** icon.

The Device Manager dialog box appears.

5 In the File name field, type a file name.

6 Choose **Save as type** to save the file as a different type.

7 Click **Save** to create the file or **Cancel** to quit without saving your changes.

8 To erase information from all the columns *except* the AbsoluteValue column, click **Clear Counters**.

9 In the **Poll Interval** list, choose a selection.

—End—

Bridge tab items

Variable	Value
DelayExceededDiscards	Number of frames discarded by the port due to excessive transit delays through the bridge. It is incremented by transparent bridges.
MtuExceededDiscards	Number of frames discarded by the port due to an excessive size. The number is incremented by transparent bridges.
InFrames	The number of frames that have been received by this port from its segment.
OutFrames	The number of frames that have been received by this port from its segment.
InDiscards	Count of valid frames received which were discarded (filtered) by the Forwarding Process.

LACP tab

The LACP tab displays LACP diagnostics statistics.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > System Metrics > Port Metrics**. The switch view appears in the information panel.
2	Click the **LACP** tab.
3	To view a graphical representation of statistics, click the numeric data you wish to graph and choose a Line chart icon, a Bar Chart icon, or an Area Chart icon.
4	To send the information from the fields in this page to a text file, click the **Export data** icon. The Device Manager dialog box appears.
5	In the File name field, type a file name.
6	Choose **Save as type** to save the file as a different type.
7	Click **Save** to create the file or **Cancel** to quit without saving your changes.
8	To erase information from all the columns *except* the AbsoluteValue column, click **Clear Counters**.

9 In the **Poll Interval** list, choose a selection.

—End—

LACP statistics tab items

Variable	Value
LACPDUsRX	Denotes the number of valid LACPDUs received on this Aggregation Port. This value is read-only.
MarkerPDUsRX	Signifies the number of valid Marker PDUs received on this Aggregation Port. This value is read-only.
MarkerResponsePDUsRX	The number of valid Marker Response PDUs received on this Aggregation Port. This value is read-only.
UnknownRX	Indicates the number of frames received that: can carry the Slow Protocols Ethernet Type value (43B.4), but contain an unknown PDU. are addressed to the Slow Protocols group MAC Address (43B.3), but do not carry the Slow Protocols Ethernet Type. This value is read-only.
IllegalRX	Denotes the number of frames received that carry the Slow Protocols Ethernet Type value (43B.4), but contain a badly formed PDU or an illegal value of Protocol Subtype (43B.4). This value is read-only.
LACPDUsTX	Signifies the number of LACPDUs that are transmitted on this Aggregation Port. This value is read-only.
MarkerPDUsTX	Displays the number of Marker PDUs transmitted on this Aggregation Port. This value is read-only.
MarkerResponsePDUsTX	Indicates the number of Marker Response PDUs that are transmitted on this Aggregation Port. This value is read-only.

Viewing Rmon Events

Access the Alarms option to view a table of Rmon events. The Events tab provides a detailed list of notifications that values have fallen outside of the specified range for the Element Manager.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Alarms**.
2	Click the **Events** tab.

—End—

Events tab items

Variable	Value
Index	This index uniquely identifies an entry in the event table. Each entry defines one event that is to be generated when the appropriate conditions occur.
Description	Specifies whether the event is a rising or a falling event.
Type	The type of notification that the Element Manager provides about this event. In the case of log, an entry is made in the log table for each event. In the case of trap, an SNMP trap is sent to one or more management stations. Possible notifications are as follows: none log trap log-and-trap
Community	The SNMP community string acts as a password. Only those management applications with this community string can view the alarms.
LastTimeSent	The value of sysUpTime at the time this event entry last generated an event. If this entry has not generated any events, this value is zero.
Owner	If traps are specified to be sent to the owner, then this is the name of the machine that receives alarm traps.

Graphing ports using the Rmon Ether Stats tab

Element Manager gathers Ethernet statistics that you can have graphed in a variety of formats, or you can save them to a file and export the statistics to an outside presentation or graphing application.

Viewing statistics

Use the following procedure to save and graph Ethernet statistics.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > System Metrics > Port Metrics**. The switch view appears in the information panel.
2	Select the single or multiple ports that you want to graph. The Interface tab appears in the information panel.
3	Click the **Rmon Ether Stats** tab. The Rmon Ether Stats tab appears.
4	To view a graphical representation of statistics, click the numeric data you wish to graph and choose a Line chart icon, a Bar Chart icon, or an Area Chart icon.
5	To send the information from the fields in this page to a text file, click the **Export data** icon. The Device Manager dialog box appears.
6	In the File name field, type a file name.
7	Choose **Save as type** to save the file as a different type.
8	Click **Save** to create the file or **Cancel** to quit without saving your changes.
9	To erase information from all the columns *except* the AbsoluteValue column, click **Clear Counters**.
10	In the **Poll Interval** list, choose a selection.

—End—

Rmon tab for graphing ports

Variable	Value
Octets	The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets). You can use this object as a reasonable estimate of Ethernet utilization. For greater precision, sample the etherStatsPkts and etherStatsOctets objects before and after a common interval.
Pkts	The total number of packets (including bad packets, broadcast packets, and multicast packets) received.
BroadcastPkts	The total number of good packets received that were directed to the broadcast address. Note that this does not include multicast packets.
MulticastPkts	The total number of good packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.
CRCAlignErrors	The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).
UndersizePkts	The total number of packets received that were less than 64 octets long (excluding framing bits but including FCS octets) and were otherwise well formed.
Fragments	The total number of packets received that were less than 64 octets in length (excluding framing bits but including FCS octets) and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error). It is entirely normal for etherStatsFragments to increment because it counts both runts (which are normal occurrences due to collisions) and noise hits.
Collisions	The best estimate of the total number of collisions on this Ethernet segment.

Variable	Value
Jabbers	The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error). Jabber is defined as the condition where any packet exceeds 20 ms. The allowed range to detect jabber is between 20 ms and 150 ms. In this case the packet length of more than 1522 is recorded in the Jabber field and the length is between 1518 and 1522 (1518>Packet length>=1522). The length is recorded in the field of >1518.
1..64	The total number of packets (including bad packets) received that were greater than 1 but less than 64 octets in length (excluding framing bits but including FCS octets).
65..127	The total number of packets (including bad packets) received that were greater than 64 octets in length (excluding framing bits but including FCS octets), but less than 127.
128..255	The total number of packets (including bad packets) received that were greater than 127 octets in length (excluding framing bits but including FCS octets), but less than 255.
256..511	The total number of packets (including bad packets) received that were greater than 255 octets in length (excluding framing bits but including FCS octets), but less than 511.
512..1023	The total number of packets (including bad packets) received that were greater than 511 octets in length (excluding framing bits but including FCS octets), but less than 1023.
1024..1518	The total number of packets (including bad packets) received that were greater than 1023 octets in length (excluding framing bits but including FCS octets), but less than 1518.
>1518	The total number of packets received that were greater than 1518 octets (excluding framing bits but including FCS octets) and were otherwise well formed.

Viewing alarm settings

Use the Element Manager to view alarms and alarm settings.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Alarm Settings**.
2	In the **Variable** list, choose a selection.
3	In the **Sample Type** field, click an option.
4	In the **Index** box, type a value.
5	In the **Value** box, type a threshold value for the rising and falling values.
6	In the **Event Index** box, type a value to assign to the index of the rising and falling thresholds.
7	Click **Insert**.

—End—

Navigation

- "Alarm settings window" (page 149)
- "Alarms tab" (page 150)

Alarm settings window

Field	Description
Variable	Name and type of alarm--indicated by the format: alarmname.x, where x=0 indicates a chassis alarm. alarmname. An alarm where the user must specify the index. This will be a card number for module-related alarms, an STG ID for spanning tree group alarms (the default STG is 1, other STG IDs are user-configured), or the Ether Statistics Control Index for RMON Stats alarms An alarmname with no dot or index is a port-related alarm and results in the display of the port selection tool.

Field	Description
Sample Type	Can be either absolute or delta. For more information about sample types, see RMON alarms.
Sample Interval	Time period (in seconds) over which the data is sampled and compared with the rising and falling thresholds.
Index	Uniquely identifies an entry in the alarm table. Each such entry defines a diagnostic sample at a particular interval for an object on the device.

Threshold type	Rising value	Falling value
Value	When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, generates a single event.	When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, generates a single event.
Event Index	Index of the event entry that is used when a rising threshold is crossed. The event entry identified by a particular value of this index is the same as identified by the same value of the event index object. (Generally, accept the default that is already filled in.)	Index of the event entry that is used when a falling threshold is crossed. The event entry identified by a particular value of this index is the same as identified by the same value of the event index object. (Generally, accept the default that is already filled in.)

Alarms tab The Alarms tab displays the RMON statistics and history for the port for which you have created an alarm.

Procedure steps

Step	Action
1	From the **Task Navigation Panel,** choose **Administration**.
2	Choose **General**.
3	Choose **Alarms**.
4	Type information in the fields as described in the table below.
5	To send the information from the fields in this page to a text file, click the **Export data** icon.
6	To delete an entry, click a row and then click **Delete.**

7 Click **Refresh** to update the page.

—End—

Alarms tab

Variable	**Value**
Index	Uniquely identifies an entry in the alarm table. Each such entry defines a diagnostic sample at a particular interval for an object on the device
Interval	The interval in seconds over which data is sampled and compared with the rising and falling thresholds. When setting this variable, note that in the case of deltaValue sampling, you should set the interval short enough so that the sampled variable is very unlikely to increase or decrease by more than 2^31 - 1 during a single sampling interval.
Variable	The object identifier of the particular variable to be sampled. Only variables that resolve to an ASN.1 primitive type of INTEGER (INTEGER, Counter, Gauge, or TimeTicks) can be sampled.
Sample Type	The method of sampling the selected variable and calculating the value to be compared against the thresholds. If the value of this object is absoluteValue(1), the value of the selected variable is compared directly with the thresholds at the end of the sampling interval. If the value of this object is deltaValue(2), the value of the selected variable at the last sample is subtracted from the current value, and the difference compared with the thresholds.
Value	The value of the statistic during the last sampling period. For example, if the sample type is deltaValue, this value is the difference between the samples at the beginning and end of the period. If the sample type is absoluteValue, this value is the sampled value at the end of the period. This is the value that is compared with the rising and falling thresholds. The value during the current sampling period is not made available until the period is completed and remains available until the next period completes.

Variable	Value
StartupAlarm	The alarm that may be sent when this entry is first set to valid. If the first sample after this entry becomes valid is greater than or equal to the risingThreshold and alarmStartupAlarm is equal to risingAlarm(1) or risingOrFallingAlarm(3), then a single rising alarm is generated. If the first sample after this entry becomes valid is less than or equal to the fallingThreshold and alarmStartupAlarm is equal to fallingAlarm(2) or risingOrFallingAlarm(3), then a single falling alarm is generated.
RisingThreshold	A threshold for the sampled statistic. When the current sampled value is greater than or equal to this threshold, and the value at the last sampling interval was less than this threshold, a single event is generated. A single event is also generated if the first sample after this entry becomes valid is greater than or equal to this threshold and the associated alarmStartupAlarm is equal to risingAlarm(1) or risingOrFallingAlarm(3). After a rising event is generated, another such event is not generated until the sampled value falls below this threshold and reaches the alarmFallingThreshold.
RisingEventIndex	The index of the eventEntry that is used when a rising threshold is crossed. The eventEntry identified by a particular value of this index is the same as identified by the same value of the eventIndex object. If there is no corresponding entry in the eventTable, then no association exists. In particular, if this value is zero, no associated event is generated, because zero is not a valid event index.
FallingThreshold	A threshold for the sampled statistic. When the current sampled value is less than or equal to this threshold, and the value at the last sampling interval was greater than this threshold, a single event is generated. A single event is also generated if the first sample after this entry becomes valid is less than or equal to this threshold and the associated alarmStartupAlarm is equal to fallingAlarm(2) or risingOrFallingAlarm(3).

Variable	Value
	After a falling event is generated, another such event is not generated until the sampled value rises above this threshold and reaches the alarmRisingThreshold.
FallingEventIndex	The index of the eventEntry that is used when a falling threshold is crossed. The eventEntry identified by a particular value of this index is the same as identified by the same value of the eventIndex object. If there is no corresponding entry in the eventTable, then no association exists. In particular, if this value is zero, no associated event is generated, because zero is not a valid event index.
Owner	The network management system which created this entry.
Status	The status of this alarm entry.

Configuring LLDP

Use the 802.1ab option to configure the Link Layer Discovery Protocol (LLDP) (IEEE 802.1ab).

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Diagnostics > 802.1ab**.
2	Click the tab related to the information that you want to view.

—End—

802.1ab - Globals tab

With the 802.1ab - Globals tab, you can configure LLDP transmit properties and view remote table statistics.

802.1ab - Globals tab

Variable	Value
lldpMessageTxInterval	Sets the interval between successive transmission cycles.

Variable	Value
lldpMessageTxHoldMultiplier	Sets the multiplier for tx-interval used to compute the Time To Live value for the TTL TLV.
lldpReinitDelay	Sets the delay for reinitialization attempt if the adminStatus is disabled.
lldpTxDelay	Sets the minimum delay between successive LLDP frame transmissions.
lldpNotificationInterval	Sets the interval between successive transmissions of LLDP notifications.
RemTablesLastChangeTime	The value of sysUpTime object (defined in IETF RFC 3418) at the time an entry is created, modified, or deleted in tables associated with the lldpRemoteSystemsData objects and all LLDP extension objects associated with remote systems. An NMS can use this object to reduce polling of the lldpRemoteSystemsData objects.
RemTablesInserts	The number of times the complete set of information advertised by a particular MSAP has been inserted into tables contained in lldpRemoteSystemsData and lldpExtensions objects. The complete set of information received from a particular MSAP should be inserted into related tables. If partial information cannot be inserted for a reason such as lack of resources, all of the complete set of information should be removed. This counter must be incremented only once after the complete set of information is successfully recorded in all related tables. Any failures during inserting information set which result in deletion of previously inserted information should not trigger any changes in lldpStatsRemTablesInserts because the insert is not completed yet or in lldpStatsRemTablesDeletes, because the deletion would only be a partial deletion. If the failure was the result of lack of resources, the lldpStatsRemTablesDrops counter must be incremented once.

Variable	Value
RemTablesDeletes	The number of times the complete set of information advertised by a particular MSAP has been deleted from tables contained in lldpRemoteSystemsData and lldpExtensions objects. This counter should be incremented only once when the complete set of information is completely deleted from all related tables. Partial deletions, such as deletion of rows associated with a particular MSAP from some tables, but not from all tables are not allowed, thus should not change the value of this counter.
RemTablesDrops	The number of times the complete set of information advertised by a particular MSAP could not be entered into tables contained in lldpRemoteSystemsData and lldpExtensions objects because of insufficient resources.
RemTablesAgeouts	The number of times the complete set of information advertised by a particular MSAP has been deleted from tables contained in lldpRemoteSystemsData and lldpExtensions objects because the information timeliness interval has expired. This counter should be incremented only once when the complete set of information is completely invalidated (aged out) from all related tables. Partial aging, similar to deletion case, is not allowed, and thus, should not change the value of this counter.

802.1ab - Port tab

With the 802.1ab - Port tab, you can set the optional TLVs to include in the LLPDUs transmitted by each port.

802.1ab - Port tab

Variable	Value
PortNum	Port number.

Variable	Value
AdminStatus	The administratively desired status of the local LLDP agent: • txOnly: the LLDP agent transmits LLDP frames on this port and does not store any information about the remote systems connected. • rxOnly: the LLDP agent receives, but does not transmit LLDP frames on this port. • txAndRx: the LLDP agent transmits and receives LLDP frames on this port. disabled: the LLDP agent does not transmit or receive LLDP frames on this port. If the port receives remote systems information which is stored in other tables before AdminStatus becomes disabled, then the information ages out
NotificationEnable	Controls, on a per port basis, whether notifications from the agent are enabled. • true: indicates that notifications are enabled • false: indicates that notifications are disabled
TLVsTxEnable	Sets the optional Management time, length, value (TLV) to include in the transmitted LLDPDUs: • portDesc: Port Description TLV • sysName: System Name TLV • sysDesc: System Description TLV • sysCap: System Capabilities TLV

802.1ab - TX Stats tab

With the 802.1ab - TX Stat tab, you can view LLDP transmit statistics by port.

802.1ab - TX Stats tab

Variable	Value
PortNum	Port number.
FramesTotal	The number of LLDP frames transmitted by this LLDP agent on the indicated port.

802.1ab - RX Stats tab

With the 802.1ab - RX Stats tab, you can view LLDP receive statistics by port.

802.1ab - RX Stats tab

Variable	Value
PortNum	Port number.
FramesDiscardedTotal	The number of LLDP frames received on the port and discarded for any reason. This counter can provide an indication that LLDP header formatting problems may exist with the local LLDP agent in the sending system or that LLDPDU validation problems may exist with the local LLDP agent in the receiving system.
FramesErrors	The number of invalid LLDP frames received on the port while the LLDP agent is enabled.
FramesTotal	The number of valid LLDP frames received on the port, while the LLDP agent is enabled.
TLVsDiscardedTotal	The number of LLDP TLVs discarded for any reason on the port.
TLVsUnrecognizedTotal	The number of LLDP TLVs received on the given port that are not recognized by this LLDP agent on the indicated port. An unrecognized TLV is referred to as the TLV whose type value is in the range of reserved TLV types (000 1001 - 111 1110) in Table 9.1 of IEEE 802.1AB-2004. An unrecognized TLV may be a basic management TLV from a later LLDP version.
AgeoutsTotal	The counter that represents the number of age-outs that occurred on a given port. An age-out is the number of times the complete set of information advertised by a particular MSAP has been deleted from tables contained in lldpRemoteSystemsData and lldpExtensions objects because the information timeliness interval has expired. This counter is similar to lldpStatsRemTables Ageouts, except that the counter is on a per port basis. This enables NMS to poll tables associated with the lldpRemoteSystemsData objects and all LLDP extension objects associated with remote systems on the indicated port only. This counter is set to zero during agent initialization.

Variable	Value
	When a ports admin status changes from ’disabled’ to rxOnly, txOnly or txAndRx, the counter associated with the same port is reset to 0. The agent also flushes all remote system information associated with the same port. This counter is incremented only once when the complete set of information is invalidated (aged out) from all related tables on a particular port. Partial aging is not allowed, and thus, does not change the value of this counter.

802.1ab - Local System tab

With the 802.1ab - Local System tab, you can view LLDP properties for the local system.

802.1ab - Local System tab

Variable	Value
ChassisIdSubtype	The type of encoding used to identify the local system chassis: • chassisComponent • interfaceAlias • portComponent • macAddress • networkAddress • interfaceName • local
ChassisId	Chassis ID.
SysName	Local system name.
SysDesc	Local system description.
SysCapSupported	Identifies the system capabilities supported on the local system.
SysCapEnabled	Identifies the system capabilities that are enabled on the local system.

802.1ab - Local Port tab

With the 802.1ab - Local Port tab, you can view LLDP port properties for the local system.

802.1ab - Local Port tab

Variable	Value
PortNum	Port number.
PortIdSubtype	The type of port identifier encoding used in the associated PortId object.

Variable	Value
PortId	The string value used to identify the port component associated with a given port in the local system.
PortDesc	The string value used to identify the 802 LAN station’s port description associated with the local system. If the local agent supports IETF RFC 2863, PortDesc object should have the same value of ifDescr object.

802.1ab - Local Management tab

With the 802.1ab - Local Management tab, you can view LLDP management properties for the local system.

802.1ab - Local Management tab

Variable	Value
AddrSubtype	The type of management address identifier encoding used in the associated Addr object.
Addr	The string value used to identify the management address component associated with the local system. The purpose of this address is to contact the management entity.
AddrIfId	The integer value used to identify the interface number regarding the management address component associated with the local system.
AddrOID	The OID value used to identify the type of hardware component or protocol entity associated with the management address advertised by the local system agent.
AddrPortsTxEnable	Identifies the ports on which the local system management address TLVs are transmitted in the LLPDUs.

802.1ab - Neighbor tab

With the 802.1ab - Neighbor tab, you can view LLDP properties for the remote system.

802.1ab - Neighbor tab

Variable	Value
TimeMark	The TimeFilter for this entry. The TimeFilter is used for the index to a table. It lets an application download only those rows changed since a particular time. A row is considered changed if the value of any object in the row changes or if the row is created or deleted.

Variable	Value
LocalPortNum	Identifies the local port on which the remote system information is received.
Index	An arbitrary local integer value used by this agent to identify a particular connection instance, unique only for the indicated remote system. An agent is encouraged to assign increasing index values to new entries, starting with one, after each reboot. It is unlikely that the Index wraps between reboots.
ChassisIdSubtype	The type of encoding used to identify the remote system chassis: • chassisComponent • interfaceAlias • portComponent • macAddress • networkAddress • interfaceName • local
ChassisId	Remote chassis ID.
SysCapSupported	Identifies the system capabilities supported on the remote system.
SysCapEnabled	Identifies the system capabilities that are enabled on the remote system.
SysName	Remote system name.
SysDesc	Remote system description.
PortIdSubtype	The type of encoding used to identify the remote port.
PortId	Remote port ID.
PortDesc	Remote port description.

802.1ab - Neighbor Mgmt Address tab

With the 802.1ab - Neighbor Mgmt Address tab, you can view LLDP management properties for the remote system.

802.1ab - Neighbor Mgmt Address tab

Variable	Value
TimeMark	The TimeFilter for this entry. The TimeFilter is used for the index to a table. It lets an application download only those rows changed since a particular time. A row is considered changed if the value of any object in the row changes or if the row is created or deleted.

Variable	Value
LocalPortNum	Identifies the local port on which the remote system information is received.
Index	An arbitrary local integer value used by this agent to identify a particular connection instance, unique only for the indicated remote system. An agent is encouraged to assign increasing index values to new entries, starting with one, after each reboot. It is unlikely that the Index wraps between reboots.
AddrSubtype	The type of encoding used in the associated Addr object.
Addr	The management address associated with the remote system.
AddrIfSubtype	Identifies the numbering method used for defining the interface number, associated with the remote system.
AddrIfId	The integer value used to identify the interface number regarding the management address component associated with the remote system
AddrOID	The OID value used to identify the type of hardware component or protocol entity associated with the management address advertised by the remote system agent.

Deleting a Trap Receivers entry

Use this procedure to delete a Trap Receiver from the BES100 or BES200 Series Switch.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Hardware Inventory.** The System tab appears in the information panel.
2	Click the Trap Receivers tab. The Trap Receivers tab appears.
3	In the **Trap Receivers** tab, select the entry to delete.
4	Click **Delete**.

—End—

Configuring RMON events

The Remote Network Monitoring (RMON) MIB is an interface between the RMON agent on a BES100 or BES200 Series switch and an RMON management application, such as the Element Manager.

The RMON agent defines objects that are suitable for the management of any type of network, but some groups are targeted for Ethernet networks in particular.

The RMON agent continuously collects statistics and proactively monitors switch performance. You can view this data through the Element Manager.

RMON has three major functions:

- Creating and displaying alarms for user-defined events
- Gathering cumulative statistics for Ethernet interfaces
- Tracking a history of statistics for Ethernet interfaces

How events work

An event specifies whether a trap, a log, or a trap and a log is generated to view alarm activity. When RMON is globally enabled, two default events are generated:

- RisingEvent
- FallingEvent

The default events specify that when an alarm goes out of range, the firing of the alarm is tracked in both a trap and a log. For example, when an alarm fires at the rising threshold, the rising event specifies that this information be sent to both a trap and a log. Likewise, when an alarm passes the falling threshold, the falling event specifies that this information be sent to a trap and a log.

Configuring rate limiting

You can view the current forwarding rate of broadcast and multicast packets, and configure the BES100 and BES200 Series switches to limit the forwarding rate of broadcast and multicast packets on each interface. When you configure rate limiting, you set the percentage of port bandwidth allowed for a packet type. When the threshold is exceeded, additional packets are discarded.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > System > Port**.
2	Click a port. The Interface tab appears.
3	Click the **Rate Limit** tab.

4 Set the desired values for the multicast and broadcast boxes by double- clicking the configurable boxes

5 To send the information from the fields in this page to a text file, click the **Export data** icon.

The Device Manager dialog box appears.

6 In the File name field, type a file name.

7 Choose **Save as type** to save the file as a different type.

8 Click **Save** to create the file or **Cancel** to quit without saving your changes.

9 To update the page, click **Refresh**.

—End—

Rate Limit tab

Variable	Value
TrafficType	The traffic type.
AllowedRate	Choose the percentage, if any, of bandwidth allowed for forwarding the packet type specified in the TrafficType field. When the threshold is exceeded, any additional packets are discarded. To avoid broadcast storms (when the volume of a particular packet type is extreme, placing severe strain on the network), set the forwarding rate of the packet type to not exceed a lower percentage of the total available bandwidth.
Enable	Enables (true) or disables (false) rate limiting for the specified traffic type on the port.

QoS configuration

Use these procedures to configure the QoS on your BES100 or BES200 Series switch using the Element Manager.

Navigation

- "Enabling QoS mapping" (page 163)
- "Configuring Quality of Service (QoS) Settings" (page 76)

Enabling QoS mapping

Use this procedure to enable DSCP to 802.1p mapping on your BES100 or BES200 Series switch using the Element Manager.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Configuration > Data Services > QoS > QoS Settings**. The Globals tab appears.
2	To enable QoS mapping, select the **DscpTo802.1pMappingEnabled** check box. **OR** To disable QoS mapping, clear the **DscpTo802.1pMappingEnabled** check box.
3	Click **Apply**.

—End—

RMON configuration

This section details the procedures for configuring the RMON as it relates to the Element Manager.

Navigation

- "Configuring RMON history" (page 164)
- "Enabling Ethernet statistics gathering" (page 166)
- "Configuring RMON alarms" (page 168)
- "Creating an RMON Event" (page 170)
- "Deleting an RMON Event" (page 170)
- "Disabling Ethernet statistics gathering" (page 171)

Configuring RMON history

Ethernet history records periodic statistical samples from a network. A sample is called a history and is gathered in time intervals referred to as ‘buckets’. Histories establish a time-dependent method for gathering RMON statistics on a port. The default values for history are

- buckets are gathered at 30-minute intervals
- number of buckets gathered is 50

Both the time interval and the number of buckets is configurable. However, when the last bucket is reached, bucket 1 is dumped and recycled to hold a new bucket of statistics. Then bucket 2 is dumped, and so forth.

You can use RMON to collect statistics at intervals. For example, if you want RMON statistics to be gathered over the weekend, you will want enough buckets to cover two days. To do this, set the history to gather one bucket each hour, thus covering a 48-hour period. After you set history characteristics, you cannot modify them; you must delete the history and create another one.

Use this procedure to establish a history for a port and set the bucket interval.

Procedure steps

Step Action

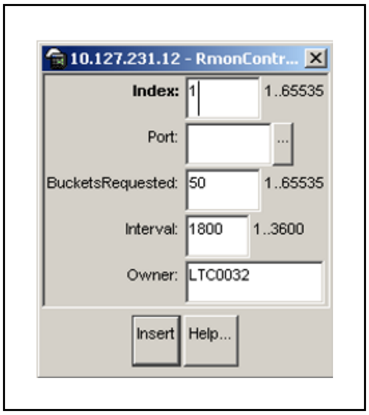
1 From the **Task Navigation Panel**, choose **Administration > General > Alarm Control**.

The History tab appears.

2 Click **Insert**.

The RmonControl, Insert History dialog box appears ("RmonControl, Insert History dialog box" (page 165)).

RmonControl, Insert History dialog box



10.127.231.12 - RmonContr...

Index: 1 1..65535

Port:

BucketsRequested: 50 1..65535

Interval: 1800 1..3600

Owner: LTC0032

3 Select the port from the port list or type the port number.

4 Set the number of buckets.

The default is 50.

5 Set the interval.

The default is 1800 (seconds).

6 Type the owner, the network management system that created this entry.

7 Click **Insert**.

RMON collects statistics using the index, port, bucket, and interval that you specified.

—End—

Variable definitions

Variable	Value
Index	A unique value assigned to each interface. An index identifies an entry in a table.
Port	Any Ethernet interface on the device.
BucketsRequested	The requested number of discrete time intervals over which data is to be saved in the part of the media-specific table associated with this entry.
BucketsGranted	The number of discrete sampling intervals over which data is saved in the part of the media-specific table associated with this entry. There are instances when the actual number of buckets associated with this entry is less than the value of this object. In this case, at the end of each sampling interval, a new bucket is added to the media-specific table.
Interval	The interval in seconds over which the data is sampled for each bucket in the part of the media-specific table associated with this entry. You can set this interval to any number of seconds between 1 and 3600 (1 hour). Because the counters in a bucket may overflow at their maximum value with no indication, note the possibility of overflow in any of the associated counters. It is important to consider the minimum time in which any counter could overflow on a particular media type and set the historyControlInterval object to a value less than this interval. This is typically most important for the ’octets’ counter in any media-specific table. For example, on an Ethernet network, the etherHistoryOctets counter could overflow in about one hour at the Ethernet’s maximum utilization.
Owner	The network management system that created this entry.

Enabling Ethernet statistics gathering

You can use RMON to gather Ethernet statistics.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Alarm Control**. The History tab appears.

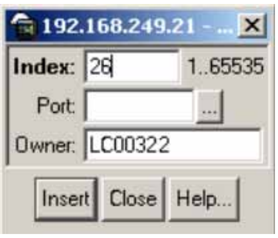
2 Click the **Ether Stats** tab.

The Ether Stats tab appears.

3 Click **Insert**.

The RmonControl, Insert Ether Stats dialog box appears ("RmonControl, Insert Ether Stats dialog box" (page 167)).

RmonControl, Insert Ether Stats dialog box



192.168.249.21 - ...

Index: 26 1..65535

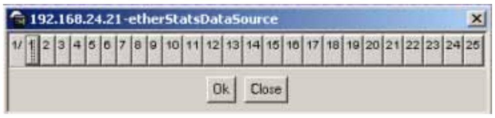
Port:

Owner: LC00322

4 Select the port.

Enter the port number you want or select the port from the list menu ("RmonControl, Insert Ether Stats dialog box port list" (page 167)). Element Manager assigns the index.

RmonControl, Insert Ether Stats dialog box port list



192.168.24.21-etherStatsDataSource

5 Click **OK**.

6 Click **Insert**.

The new Ethernet Statistics entry is displayed in the Ether Stats tab.

—End—

Variable definitions

Variable	Value
Index	A unique value assigned to each interface. An index identifies an entry in a table.
Port	Any Ethernet interface on the device.
Owner	The network management system which created this entry.

Configuring RMON alarms

Navigation

- "Creating an alarm" (page 168)
- "Deleting an alarm" (page 169)

Creating an alarm

The example alarm described in the following procedure generates at least one alarm every five minutes. The example is intended only to demonstrate how alarms fire; it is not a useful alarm. Because of the high frequency, you may want to delete this alarm and replace it with a practical setting.

Use this procedure to create an alarm to receive statistics and history using default values.

Navigation

- "Alarm settings window" (page 149)
- "Procedure job aid" (page 168)

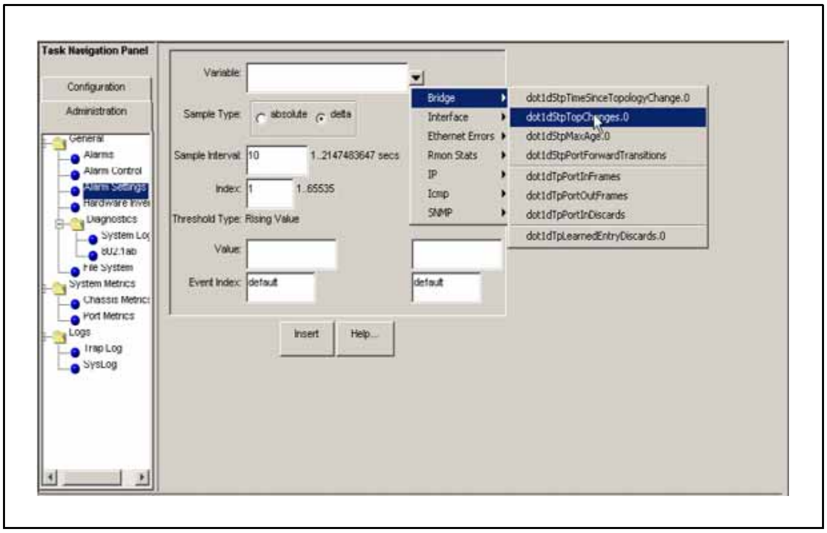
Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Alarm Settings**. The Alarm Settings window appears.
2	In the variable field, select a variable for the alarm from the list and a port (or other ID) on which you want to set an alarm (See "Procedure job aid" (page 168)).
3	For this example, select Bridge > dot1dStpTopChanges.0 from the variable list. This example is a chassis alarm, indicated by the “.0” in the variable. For this example, select a rising value of 4 and a falling value of 0.
4	Leave the remaining fields at their default values, including a sample type of Delta.
5	Click **Insert**.

—End—

Procedure job aid The following job aid provides information about the alarm variable formats.

Alarm variable list



Variable:

Sample Type: ○ absolute ● delta

Sample Interval: 10 1..2147483647 secs

Index: 1 1..65535

Threshold Type: Rising Value

Value:

Event Index: default default

Alarm variables are in three formats:

- A chassis alarm ends in .x where the x index is hard-coded. No further information is required.
- A Spanning Tree Group (STG) or EtherStat alarm ends with a dot (.). You must enter an STG ID, IP address, or EtherStat information.
- A port alarm ends with no dot or index and requires using the port shortcut menu. An example of a port alarm would be ifInOctets (interface incoming octet count).

For this example, select Bridge > dot1dStpTopChanges.0 from the variable list. This example is a chassis alarm, indicated by the ".0" in the variable.

Deleting an alarm

Use this procedure to delete an alarm from the configuration.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Alarms**. The Alarms tab appears.
2	Click any field for the alarm that you want to delete to select it.
3	Click **Delete**.

—End—

Creating an RMON Event

Use this procedure to create an RMON event.

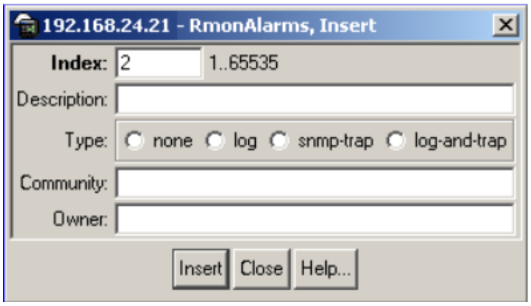
Procedure steps

Step **Action**

1 In the **Events** tab (Events tab), click **Insert**.

The RmonAlarms, Insert Events dialog box appears ("RmonAlarms Insert Events dialog box" (page 170)).

RmonAlarms Insert Events dialog box



192.168.24.21 - RmonAlarms, Insert

Index: 2 1..65535

2 In the **Description** field, type a name for the event.

3 Select the type of event you want.

You can set the event type to log to save memory or to snmp-trap to reduce traffic from the switch or for better CPU utilization.

If you select snmp-trap or log-and-trap, you must set trap receivers.

4 Click **Insert.**

The new event is displayed in the Events tab.

—End—

Deleting an RMON Event

Use this procedure to delete an event.

Procedure steps

Step **Action**

1 From the **Navigation Panel**, choose **Administraion > General > Alarms**

2 Click the **Events** tab.

3 Highlight an event **Description**.

4 Click **Delete**.

The event is removed from the table.

—End—

Disabling Ethernet statistics gathering

Use this procedure to disable set Ethernet statistics gathering parameters.

Procedure steps

Step **Action**

1 From the **Task Navigation Panel**, choose **Administration > General > Alarm Control**.

The History tab appears.

2 Click the **Ether Stats** tab.

The Ether Stats tab appears.

3 Highlight the row that contains the port ID you want to delete.

4 Click **Delete**.

The Ether Stats entry is removed from the table.

—End—

Fault management

Use this information to learn how to isolate and diagnose problems with your BES100 or BES200 Series switch.

Navigation

- "Viewing RMON history" (page 176)

Interpreting the LEDs

For information about interpreting the LEDs for the BES100 or BES200, see "LED display panel" (page 188).

Port connection problems

You can usually trace port connection problems to either a poor cable connection or an improper connection of the port cables at either end of the link. To remedy these types of problems, make sure that the cable connections are secure and that the cables connect to the correct ports at both ends of the link. Port connection problems are also traceable to the autonegotiation mode or the port interface.

Autonegotiation modes Port connection problems can occur when a port (or station) is connected to another port (or station) that is not operating in a compatible mode (for example, connecting a full-duplex port on one station to a half-duplex port on another station).

The BES100 and BES200 Series switches negotiate port speeds according to the IEEE 802.3u autonegotiating standard. The switch adjusts (autonegotiates) its port speed and duplex mode to match the best service provided by the connected station. Autonegotiation is a two-way protocol that requires participation from both ends of the link to operate properly. If both ends of the link are not configured for autonegotiation, the switch autosenses. When it is in autosense mode, the switch can determine the proper speed (100 Mb/s or 10 Mb/s) but not the duplex. As a result it defaults to half-duplex mode:

- If autonegotiation is enabled on the switch port and the end station, the switch successfully negotiates the best port speed and duplex mode available from the connected station, up to 100 Mb/s in full-duplex mode.
- If the connected station uses a form of autonegotiation that is not compatible with the IEEE 802.3u autonegotiating standard, the BES100 or BES200 Series switch cannot negotiate a compatible mode for correct operation, and reverts to auto-sensing.
- If the autonegotiation feature is not present or not enabled at the connected station, the BES100 or BES200 Series switch reverts to autosensing.

Correcting mode mismatches If the autonegotiation feature is not present or not enabled, or If the connected station uses a form of autonegotiation that is not compatible, you can correct the mode mismatch problem.

Procedure steps

Step	Action
1	Disable the autonegotiation feature at the connected station.
2	Manually set the speed/duplex mode of the connected station to the same speed/duplex mode set for the BES100 or BES200 Series switch port.

—End—

Port interface Ensure that the devices are connected using the appropriate crossover or straight-through cable, see "Connector and pin assignments " (page 231), and that autonegotiation is active.

Diagnosing and correcting problems

Before you execute the problem-solving steps described in this section, cycle the power to the BES100 or BES200 Series switch (disconnect and then reconnect the AC power cord); then verify that the switch follows the normal power-up sequence.

CAUTION
To avoid injury from hazardous electrical current, do not remove the top cover of the device. There are no user-serviceable components inside.

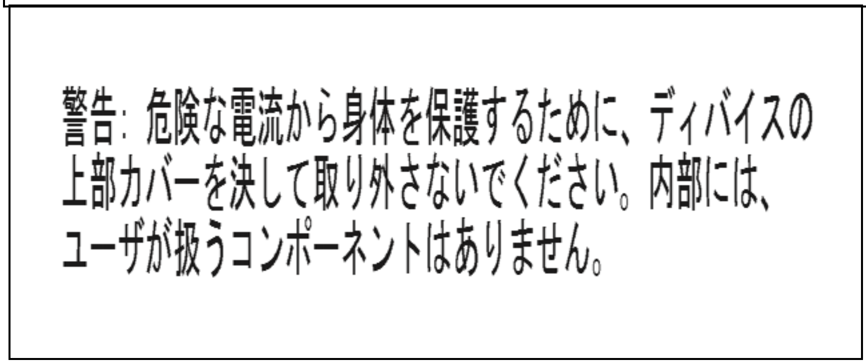
Vorsicht
Um Verletzungsgefahr durch einen elektrischen Stromschlag auszuschließen, nehmen Sie niemals die obere Abdeckung vom Gerät ab. Im Geräteinnern befinden sich keine Komponenten, die vom Benutzer gewartet werden können.

Avertissement
Pour éviter tout risque d'électrocution, ne jamais retirer le capot de l'appareil. Cet appareil ne contient aucune pièce accessible par l'utilisateur.

Advertencia
A fin de evitar daños personales por corrientes eléctricas peligrosas, no desmonte nunca la cubierta superior de este dispositivo. Los componentes internos no son reparables por el usuario.

Avvertenza
Per evitare lesioni fisiche dovute a scariche pericolose di corrente, non rimuovere mai il coperchio superiore del dispositivo. I componenti interni non possono essere manipolati dall'utente.

Caution:



警告: 危険な電流から身体を保護するために、ディバイスの上部カバーを決して取り外さないでください。内部には、ユーザが扱うコンポーネントはありません。

Normal power-up sequence In a normal power-up sequence, the LEDs appear as follows:

Procedure steps

Step	Action
1	After power is applied to the switch, the Pwr (Power) LED turns on within 5 seconds (s).
2	The switch initiates a self-test, during which the port LEDs display various patterns to indicate the progress of the self-test.
3	After the self-test, the remaining port LEDs indicate their operational status, as described in the following table.

—End—

In a normal power-up sequence, the LEDs appear as follows:

Corrective actions

Symptom	Probable cause	Corrective action
All LEDs are off.	The switch is not receiving AC power.	Verify that the AC power cord is fastened securely at both ends and that power is available at the AC power outlet.
	The fans are not operating or the airflow is blocked, causing the unit to overheat.	Verify that there is sufficient space for adequate airflow on both sides of the switch. Note: The operating temperature for the switch must not exceed 40°C (104°F). Do not place the switch in

Symptom	Probable cause	Corrective action
		areas where it can be exposed to direct sunlight or near warm air exhausts or heaters.
The Activity LED for a connected port is off or does not blink (and you have reason to believe that traffic is present).	The switch is experiencing a port connection problem.	See Port connection problems.
	The switch's link partner is not autonegotiating properly.	

Creating an RMON fault threshold

Create the RMON threshold parameters to get notified of fault conditions (alarms). RMON threshold configurations are not modifiable. They must be deleted and the information recreated.

Procedure steps

Step	Action
1	From the main menu, choose **Device Monitoring > Events > RMON Threshold**. The RMON Threshold page appears.
2	In the **RMON Threshold Creation** section, type information in the text boxes, or select from a list.
3	Click **Submit**. The new configuration is displayed in the RMON Threshold Table.

—End—

Deleting an RMON threshold configuration

Delete an existing RMON threshold configuration to create new threshold information.

Procedure steps

Step	Action
1	In the **RMON Threshold** table, click the **Delete** icon for the entry you want to delete. A message appears prompting you to confirm your request.
2	Do one of the following: Click **OK** to delete the RMON threshold configuration. Click **Cancel** to return to the RMON Threshold page without making changes.

3 From the main menu, choose **Device Monitoring > Events > RMON Threshold**. The RMON Threshold page appears.

—End—

Viewing RMON history

View a periodic statistical sampling of data from the network.

Procedure steps

Step	Action
1	From the main menu, choose **Device Monitoring > Events > RMON History**. The RMON History page appears.
2	In the **RMON History Statistics** section, choose the port number to be monitored.
3	Click **Submit**. The RMON History Statistics Table is updated with information about the selected device and port.

—End—

Viewing Rmon history statistics

Use the Business Element Manager to view Rmon history statistics.

Procedure steps

Step	Action
1	rom the **Task Navigation Panel**, choose **Administration > General > Alarm Control**.
2	Click the **History** tab, highlight an entry, and then click the **Graph** button. The Rmon History tab appears.

—End—

Rmon History tab

Variable	Value
SampleIndex	An index that uniquely identifies the particular sample this entry represents among all the samples associated with the same entry. This index starts at 1 and increases by one as each new sample is taken.
Utilization	The best estimate of the mean physical layer network utilization on this interface during the sampling interval (in hundredths of a percent).
Octets	The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets). You can use this object as a reasonable estimate of Ethernet utilization. For greater precision, sample the etherStatsPkts and etherStatsOctets objects before and after a common interval.
Pkts	The total number of packets (including bad packets, broadcast packets, and multicast packets) received.
BroadcastPkts	The total number of good packets received that were directed to the broadcast address. Note that this does not include multicast packets.
MulticastPkts	The total number of good packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.
DropEvents	The total number of events in which packets were dropped by the switch due to lack of resources during this sampling. This number is not necessarily the number of packets dropped. It is the number of times this condition has been detected.
CRCAlignErrors	The total number of packets received that had a length (excluding framing bits, but including FCS octets) between 64 and 1518 octets, inclusive, but had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).
UndersizePkts	The total number of packets received that were less than 64 octets long (excluding framing bits but including FCS octets) and were otherwise well formed.

Variable	Value
OversizePkts	The total number of packets received that were longer than 1518 octets (excluding framing bits but including FCS octets) and were otherwise well formed.
Fragments	The number of packets received during the sampling interval were less than 64 octets long (including FCS octets, but not framing bits. The packets had a bad FCS with either an integral number of octets (FCS Error), or a non-integral number of octets (Alignment Error).
Collisions	The best estimate of the number of collisions on an Ethernet segment during a sampling interval.

Installing SFPs

CAUTION
SFPs are keyed to prevent incorrect insertion. If an SFP resists pressure, do not force it; turn it over, and reinsert it.

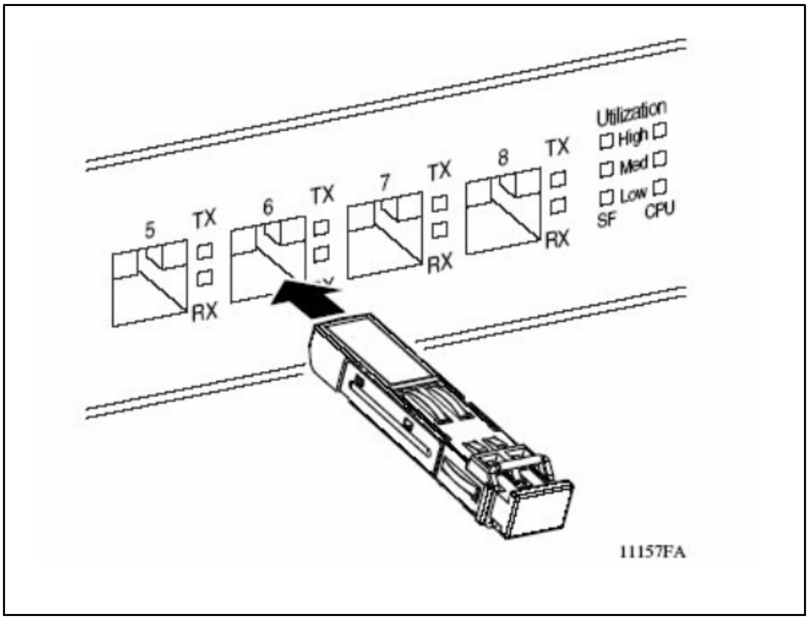
Use this procedure to install an SFP. For more information, see the"SFP transceiver" (page 197) section.

Procedure steps

Step	Action
1	Remove the SFP from its protective packaging.
2	Verify that the SFP is the correct model for your network configuration. See "1000BASE-SFP models" (page 200) for information about the SFPs models supported.
3	Grasp the SFP between your thumb and forefinger.
4	Insert the SFP into the SFP slot on the module. See "Inserting an SFP" (page 179). Apply light pressure to the SFP until the device clicks and locks into position in the module.

—End—

Inserting an SFP



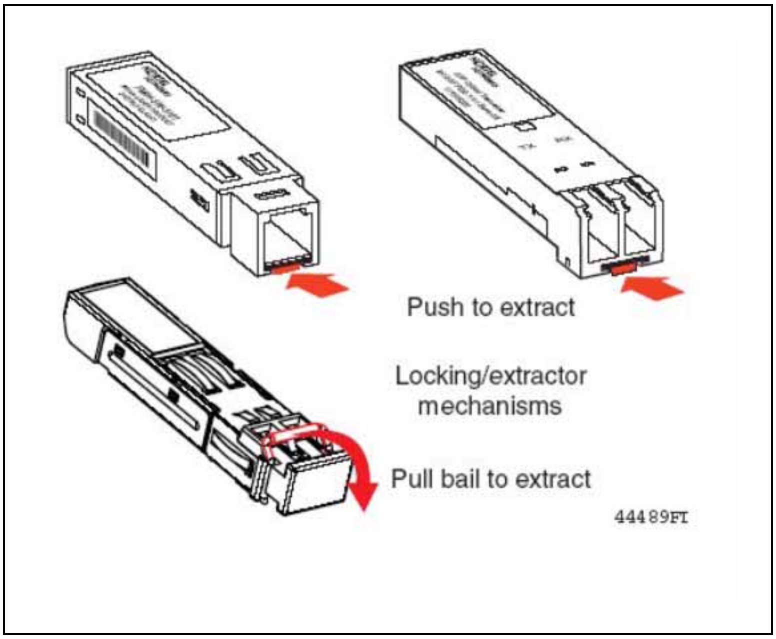
Removing an SFP

Use this procedure to remove an SFP.

Procedure steps

Step	Action
1	Disconnect the network fiber cable from the SFP connector. Depending on your SFP model, press the locking/extractor mechanism on the SFP to release the SFP. Your SFP locking/extractor mechanism may be different than the models shown.

Removing an SFP



2 Slide the SFP out of the module SFP slot.

3 If the SFP does not slide easily from the module slot, use a gentle side-to-side rocking motion while firmly pulling the SFP from the slot.

4 Attach a dust cover over the fiber optic bores and store the SFP in a safe place until needed.

—End—

Disabling RMON history statistics

Use this procedure to disable RMON history on a port.

Procedure steps

Step	Action
1	From the **Task Navigation Panel**, choose **Administration > General > Alarm Control**. The History tab appears.
2	Highlight the row that contains the port ID you want to delete.
3	Click **Delete**. The entry is removed from the table.

—End—

BES100 or 200 Series fundamentals

Use this information to understand the Business Ethernet Switch 100 or 200 Series hardware and software release 1.0.

You can manage the switch using one of the following methods:

- Console interface–The console interface (CI) lets you access only the quick start menu to initially configure and manage the switch locally. Access the CI menus and screens locally through a console terminal that is attached to the Ethernet switch.
- Web-based management– Access the Web-based graphical user interface (GUI) through the HTML-based browser on your network. The GUI lets you configure, monitor, and maintain your network through Web browsers. You can also download software by using the Web-based management option.
- Business Element Manager–The Element Manager is a client-based management application that runs on a Microsoft Windows-based computer. With the Element Manager, you can connect to BES100 and BES200 Series switch devices over an IP network. The Element Manager is used to configure, administer, and monitor BES100 and BES200 Series switch devices.

Version 1.0 of the BES100 Series switch software supports the following devices:

- BES110-24T
- BES110-48T
- BES120-24T PWR
- BES120-48T PWR

Version 1.0 of the BES200 Series switch software supports the following devices:

- BES210-24T
- BES210-48T
- BES220-24T PWR

- BES220-48T PWR

Navigation

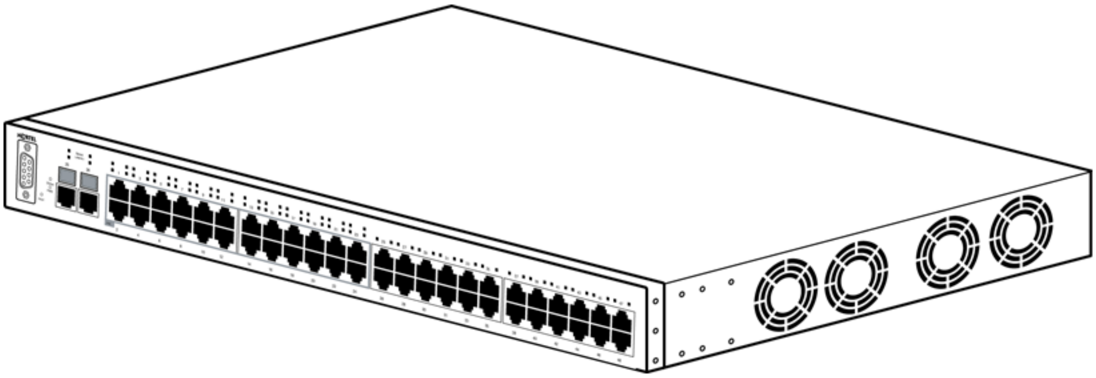
Hardware components of the BES100 and BES200 Series switch

Hardware components found in the BES100 and BES200 Series switch are described within the information that follows.

Front panel

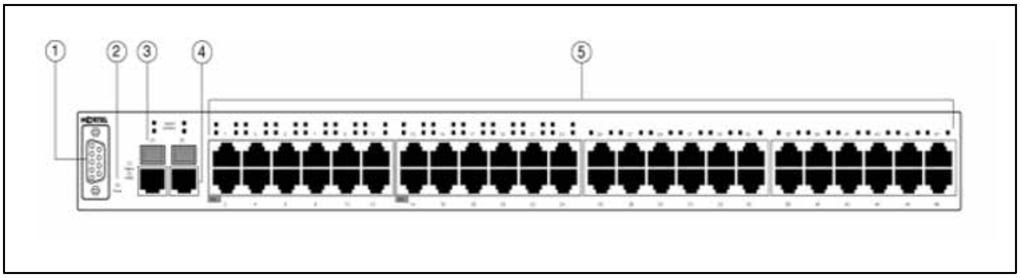
"BES120-48T PWR/BES220-48T PWR" (page 185) shows the front and side views of the BES120-48T PWR/BES220-48T PWR.

BES120-48T PWR/BES220-48T PWR



"BES120-48T PWR/BES220-48T PWR front panel" (page 185) shows the configuration of the front panel on the BES120-48T PWR. Note that you can identify the PoE ports by the red lines surrounding them. "Components on the BES100 or BES200 Series switch front panel" (page 185) describes the components on the front panel of all BES100 or 200 Series switches.

BES120-48T PWR/BES220-48T PWR front panel



Components on the BES100 or BES200 Series switch front panel

Item	Description
1	Console port
2	Reset button—resets the switch to factory defaults
3	SFP GBIC slots
4	1000 BaseT RJ-45 connector ports
5	10/100 RJ-45 port connectors

Console port

The console port lets you access only the quick start CI screens and initially customize your network using the console menu and screens. The actual management and configuration is performed either by the BEM or the Web-based management interface.

The Console port is a DB-9, RS-232-D male serial port connector. You can use this connector to connect a management station, console, or terminal to the BES100 and BES200 Series switch by using a straight-through DB-9 to DB-9 standard serial port cable. You must use a VT100/ANSI-compatible terminal (for cursor control and to enable cursor and functions keys) to use the console port.

> ***Note:*** The console port is configured as a Data Communications Equipment (DCE) connector. Ensure that your RS-232 cable pinouts are configured for DCE connections. For more information, see "Connector and pin assignments " (page 231).

The default settings of the Console port are:

- 9600 baud with eight data bits
- one stop bit
- no parity as the communications format
- flow control set to disabled

Reset button - for reset to factory default

The reset button resets the switch and sets all switch properties to the factory default values.

SFP gigabit interface converters

Small form factor pluggable gigabit interface converters (SFP GBIC) are input/output enhancement components that are hot-swappable. SFP GBICs are designed for use with Nortel products to allow gigabit Ethernet ports to link with other gigabit Ethernet ports over various media types, including fiber optics.

The BES100 and BES200 Series switch supports the following SFPs:

- 1000Base-SX SFP GBIC (mini-GBIC, connector type: LC)
- 1000Base-SX SFP GBIC (mini-GBIC, connector type: MT-RJ)
- 1000Base-LX SFP GBIC (mini-GBIC, connector type: LC)

For more information about the SFP GBICs, see "SFP transceiver" (page 197).

10 and 100 RJ-45 port connectors

The BES100 and BES200 Series switches use 10BASE-T/100BASE-TX RJ-45 (8-pin modular) port connectors.

The 10BASE-T/100BASE-TX port connectors are configured as MDI-X (Media Dependent Interface-crossover), which means that the port connectors are used to enable connections between like devices. The ports are connected by straight cables to the network interface card (NIC) in a node or a server.

The BES100 and 200 Series switch uses autosensing ports designed to operate at 10 megabits per second (Mbits/s) or at 100 megabits per second (Mbits/s), depending on the connecting device. These ports support the IEEE 802.3u autonegotiation standard, which means that when a port is connected to another device that also supports the IEEE 802.3u standard, the two devices negotiate the best speed and duplex mode

The 10BASE-T/100BASE-TX switch ports also support half- and full-duplex mode operation.

The 10BASE-T/100BASE-TX RJ-45 switch ports can connect to 10 Mb/s or 100 Mb/s Ethernet segments or nodes.

The 1000 BaseT RJ-45 connector ports can operate at 10/100/1000M.

> ***Note:*** Use Category 3, 4, or 5 copper unshielded twisted pair (UTP) cable connections when connecting 10BASE-T/100BASE-TX ports.

For more information about RJ-45 port connectors, see "Connector and pin assignments " (page 231).

Stacking capability on the BES200

For the BES200 switch, a stack must have only one base unit. You can use the back panel switch to determine the base unit. The selected base unit uses a discovery process to determine how many units are cabled together.

You can use Cat 5 cables to connect the switches, but you must use redundant cables and cable your stack(s) in a ring topology to have the stack work properly. Only when all stacking cables are connected is a ring topology supported.

If a stack has more than one unit with its base selection switch in the base position, the unit discovery process fails. Conversely, if none of the units have their base selection switch in the base position, the stack does not join.

A maximum of four units are supported for stacking. You can add or remove a unit from the stack, without requiring a stack reset. After a stack is formed, if the base unit stops communicating, the stack fails. When a stack fails, the units recalculate their unicast and broadcast forwarding tables for standalone operation.

Auto-MDI and MDI-X

The 10/100BASE-TX port connectors support auto-MDI/MDI-X. Typical MDI-X ports connect straight-through cables to the NIC in a node or server, similar to a conventional Ethernet repeater hub. However, with the auto-MDI/MDI-X feature and autonegotiation enabled, you can still use straight-through cables while connecting to an Ethernet hub or switch.

Power over Ethernet on BES120 or BES220

The BES120 and BES220 provide IEEE 802.3af-compliant power over the PoE-labeled front-panel RJ-45 ports. The PoE ports are encapsulated by a red line. The switch provides power discovery and power management on a per port basis. You can use the BES120 or BES220 to provide power to network appliances, such as IP telephones, wireless access points, and video devices.

The BES120 provides 12 or 24 ports with Power over Ethernet respectively on 24 and 48 port models. The BES switches only support PoE on the first half of the ports (identified by the red border around the ports) on the PWR models. PoE-compliant Ethernet devices derive their power supply from the Cat5 cable connection. These devices have no need for an external power adaptor. Adequate power is available to supply 7.5 Watts per port on average, and up to 15.4 Watts per port for any given device.

By default, power is allocated based on real time measurement. If the total Ethernet power budget for the BES120 is exceeded, the switch sheds load by shutting down ports, starting with the highest numbered port. The BES120 attempts to restore power to uppermost ports at regular

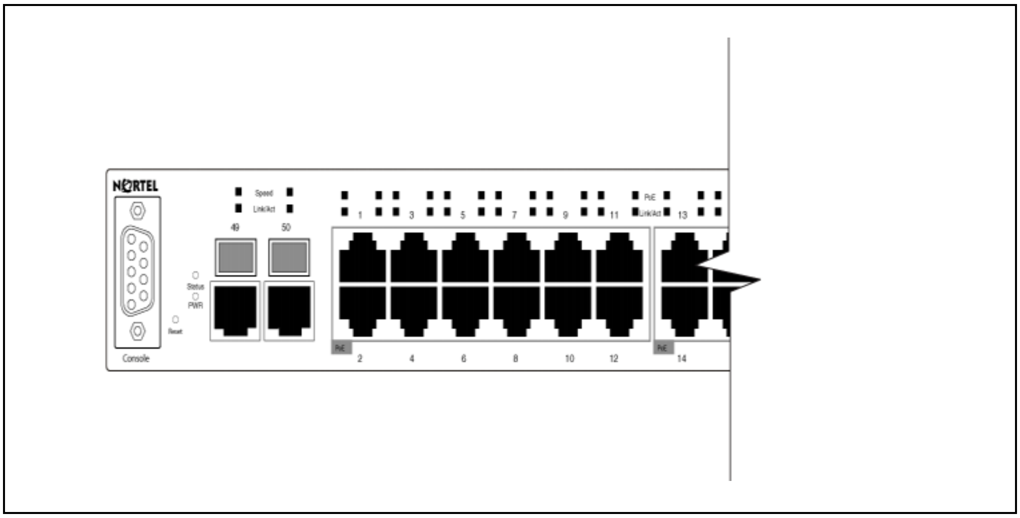
You can enable or disable power to an individual port using the Web-based management interface. For more information about PoE, see "Configuring PoE Management" (page 38) and "Viewing switch power information" (page 108).

LED display panel

"BES120-48T PWR/BES220-48T PWR" (page 185) shows a sample display of the LED panel for the BES120-48T PWR/BES220-48T PWR. See "BES100 and BES200 Series switch LED descriptions" (page 189) for a description of the BES100 and BES200 Series switch LEDs.

> ***Note:*** The Speed LED is present only for gigabit ports (25 and 26 for 24T units and 49 and 50 for 48T units).

BES120-48T PWR/BES220-48T PWR LED display panel



BES100 and BES200 Series switch LED descriptions

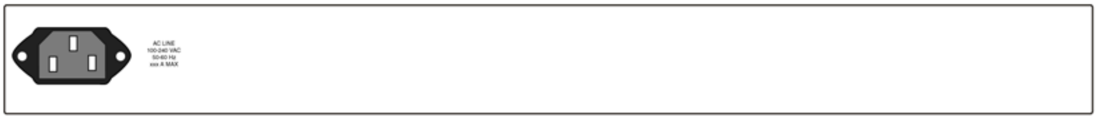
Label	Color/Status	Meaning
Speed	Green/steady	This port is set to operate at 100 Mb/s, and the link is good.
	Amber/steady	This port has been disabled by software.
	Off	The link is bad, or nothing is connected to this port.
Link/Act	Green	Station connected at 100 Mbps.
	Amber	Station connected at 10 Mbps.
	Green/Flashing	Traffic activity at 100 Mbps.
	Amber/Flashing	Traffic activity at 10 Mbps
	Off	No link/No traffic.
PoE (applicable to BES120 PWR models only)	Green	Power is being supplied to the port.
	Off	No power is being supplied to the port.
Status	Green/Flashing	The switch is booting up and performing a self-test.
	Green	Self-test passed and switch is operational.
	Off	The switch failed the self-test.
PWR	Green	Power on.

Label	Color/Status	Meaning
	Off	Switch is not connected to a power source.
Stackable Port (Up/Down)	Green	The Cascade Up/Down port has a physical connection to another unit.
	Amber/Flashing	The Cascade Up/Down port has detected an error.
	Off	The switch is in standalone mode, or there is no link in the Cascade Up/Down port.
Base Unit	Green	This switch is the stack base unit.
	Green/Flashing	There is a stack configuration error. Either multiple base units or no base units are configured in the stack.
	Off	This switch is not the stack base unit, or it is operating in standalone mode.

Back panel

The back panel of the BES100 and BES200 Series switch is shown in BES100 Series switch back panel and BES200 Series switch back panel.

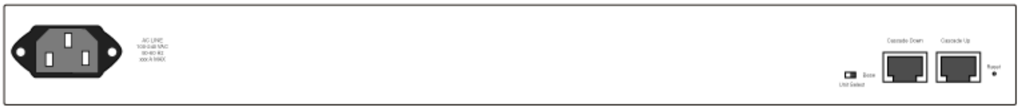
BES100 Series switch back panel



Components on the BES100 Series switch back panel

Item	Description
1	AC power receptacle

BES200 Series switch back panel



Components on the BES200 Switch Series back panel

Item Description	
1	AC power receptacle
2	Stacking ports

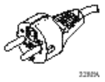
Cooling fans

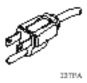
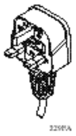
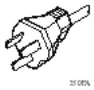
Two cooling fans are located on one side of the BES110-24T and BES210-24T units in the BES100 and 200 Series switches to provide cooling for the internal components. Other models in the BES100 and BES200 Series switch have four cooling fans. See "BES120-48T PWR/BES220-48T PWR" (page 185). When you install the switch, be sure to allow enough space on both sides of the switch for adequate ventilation. For more information about installing the BES100 or 200 Series switch, see the *Business Ethernet Switch 100 or 200 Series Quick Install Guide* (NN47920-400)

AC power receptacle

The AC power receptacle accepts the AC power cord, which is supplied with the switch. For installation outside North America, make sure that you have the proper power cord for your region. Any cord used must have a CEE-22 standard V female connector on one end and must meet the IEC 320-030 specifications. "International power cord specifications" (page 191).

International power cord specifications

Country/Plug description	Specifications	Typical plug
Continental Europe: CEE7 standard VII male plug Harmonized cord (HAR marking on the outside of the cord jacket to comply with the CENELEC Harmonized Document HD-21)	220 or 230 VAC 50 Hz Single phase	

Country/Plug description	Specifications	Typical plug
U.S./Canada/Japan: NEMA5-15P male plug UL recognized (UL stamped on cord jacket) CSA certified (CSA label secured to the cord)	100 or 120 VAC 50–60 Hz Single phase	
United Kingdom: BS1363 male plug with fuse Harmonized cord	240 VAC 50 Hz Single phase	
Australia: AS3112-1981 Male plug	240 VAC 50 Hz Single phase	

CAUTION
Please read immediately.

Inspect the power cord and determine if it provides the proper plug and is appropriately certified for use with your electrical system. Immediately discard this power cord if it is inappropriate for your country’s electrical system and obtain the proper cord as required by your national electrical codes or ordinances.

Refer to this product’s technical documentation for detailed installation procedures to be followed by qualified service personnel.

Vorsicht: Bitte sofort lesen.
Sehen Sie nach, ob dieses Netzkabel über den richtigen Stecker verfügt und für die Verwendung in Ihrem Stromversogungsnetz zertifiziert ist. Falls dieses Kabel nicht für das Stromversorgungsnetz in Ihrem Land geeignet ist, darf es nicht verwendet werden. Besorgen Sie sich ein Kabel, das die Vorschriften der Zulassungsbehörden in Ihrem Land erfüllt.

Die technische Dokumentation dieses Produkts enthält ausführliche Installationsanweisungen, die nur von qualifiziertem Kundendienstpersonal ausgeführt werden dürfen.

Attention: Lisez ceci immédiatement.
Examinez ce cordon d’alimentation pour déterminer s’il dispose de la fiche appropriée et s’il est bien agréé pour utilisation sur votre installation électrique. Débarrassez-vous en immédiatement s’il ne convient pas à l’utilisation sur le secteur électrique en usage dans votre pays et procurez-vous un cordon conforme à la réglementation nationale en vigueur.

Reportez-vous à la documentation technique de ce produit pour obtenir des instructions détaillées d’installation, destinées à un technicien qualifié.

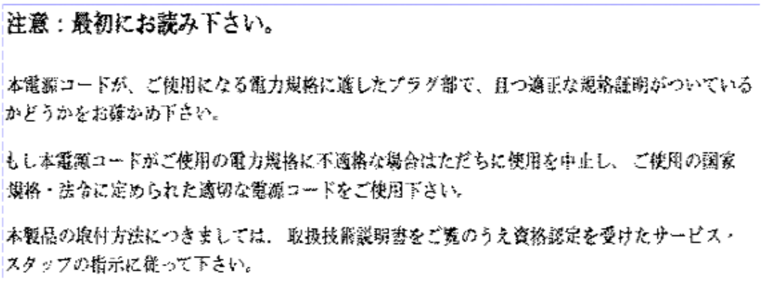
Attenzione: Leggere attentamente.
Controllare questo cavo di alimentazione, verificarne il collegamento con la presa appropriata nonché la certificazione per l’uso nell’impianto elettrico posseduto. Non utilizzare assolutamente in caso tale cavo non sia adatto al sistema elettrico del paese in cui viene utilizzato e richiederne un altro certificato dall’ente nazionale di fornitura elettrica.

Per le procedure di installazione che devono essere seguite dal personale di servizio, consultare questa documentazione tecnica del prodotto.

Advertencia: Sírvase leer inmediatamente.
Inspeccione este cable de alimentación eléctrica y determine si viene con el enchufe apropiado y está debidamente certificado para el uso con su sistema eléctrico. Si no cumple con los reglamentos del sistema eléctrico de su país, despójese de este cable de alimentación inmediatamente y obtenga el cable requerido, según las ordenanzas y códigos eléctricos nacionales.

Inspeccione este cable de alimentación eléctrica y determine si viene con el enchufe apropiado y está debidamente certificado para el uso con su sistema eléctrico. Si no cumple con los reglamentos del sistema eléctrico de su país, despójese de este cable de alimentación inmediatamente y obtenga el cable requerido, según las ordenanzas y códigos eléctricos nacionales.

Caution:



注意：最初にお読み下さい。

本電源コードが、ご使用になる電力規格に適したプラグ部で、且つ適正な規格証明がついているかどうかをお確かめ下さい。

もし本電源コードがご使用の電力規格に不適格な場合はただちに使用を中止し、ご使用の国家規格・法令に定められた適切な電源コードをご使用下さい。

本製品の取付方法につきましては．取扱技術説明書をご覧のうえ資格認定を受けたサービス・スタッフの指示に従って下さい。

WARNING
Removal of the power cord is the only way to turn off power to this device. The power cord must always be connected in a location that can be accessed quickly and safely in case of an emergency.

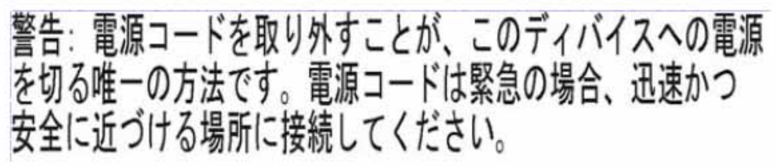
Vorsicht:
Die Stromzufuhr zu diesem Gerät kann nur durch Ziehen des Netzstromkabels unterbrochen werden. Die Netzsteckdose, an die das Netzstromkabel angeschlossen ist, muß sich stets an einem Ort befinden, der bei einem Notfall schnell und einfach zugänglich ist

Avertissement
Le débranchement du cordon d’alimentation constitue le seul moyen de mettre cet appareil hors tension. Le cordon d’alimentation doit donc toujours être branché dans une prise accessible pour faciliter la mise hors tension en cas d’urgence.

Advertencia:
La única forma de desconectar la alimentación de este dispositivo es desenchufar el cable de alimentación. El cable de alimentación siempre debe estar conectado en una ubicación que permita acceder al cable de forma rápida y segura en caso de emergencia

Avvertenza:
Estrarre il cavo di alimentazione è l’unico sistema per spegnere il dispositivo. Il cavo di alimentazione deve essere sempre collegato in una posizione che permetta l’accesso facile e sicuro in caso di emergenza.

Warning



警告：電源コードを取り外すことが、このディバイスへの電源を切る唯一の方法です。電源コードは緊急の場合、迅速かつ安全に近づける場所に接続してください。

Network configuration examples

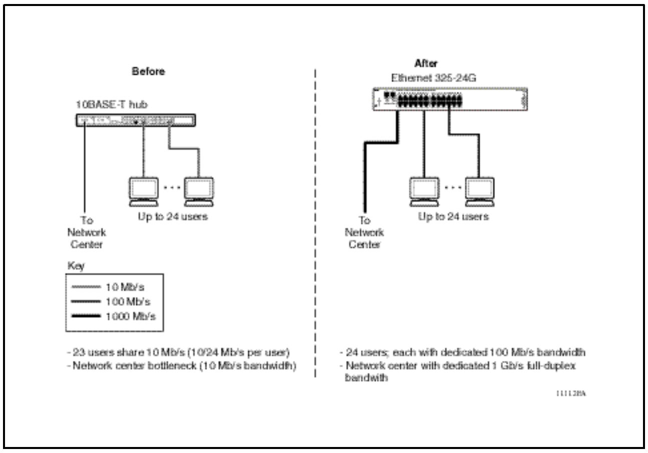
This section provides network configuration examples using the BES100 or BES200 Series switch. In these examples, the packet classification feature can be used to prioritize the traffic of the network to ensure uninterrupted traffic of critical applications. The examples are:

- "Desktop switch application" (page 195)
- "Segment switch application" (page 195)
- "High-density switched workgroup application" (page 196)

Desktop switch application

"BES100 and BES200 Series switch used as a desktop switch" (page 195) shows the BES100 and BES200 Series switch used as a desktop switch. The desktop workstations are connected directly to switch ports.

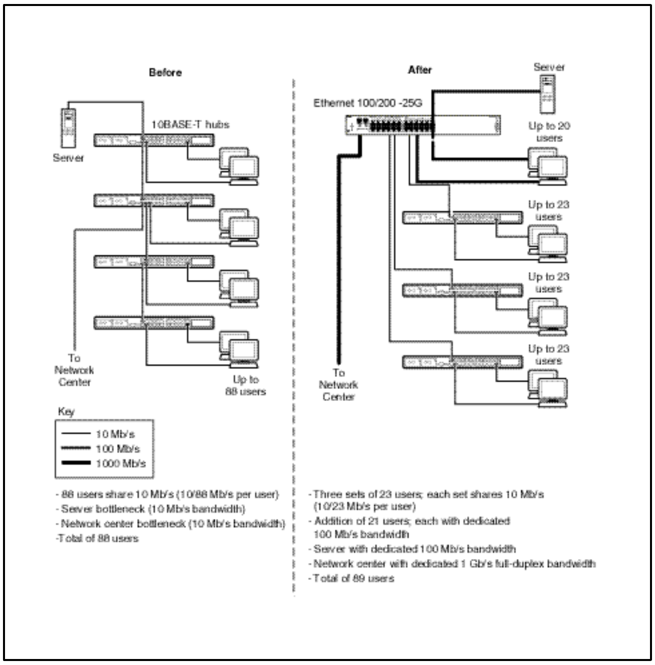
BES100 and BES200 Series switch used as a desktop switch


Before
10BASE-T hub
To Network Center
Up to 24 users
Key
10 Mb/s
100 Mb/s
1000 Mb/s
- 23 users share 10 Mb/s (10/24 Mb/s per user)
- Network center bottleneck (10 Mb/s bandwidth)
After
Ethernet 325-24G
To Network Center
Up to 24 users
- 24 users; each with dedicated 100 Mb/s bandwidth
- Network center with dedicated 1 Gb/s full-duplex bandwith
11112BA

Segment switch application

"BES100 and BES200 Series switch used as a segment switch" (page 196) shows the BES100 and BES200 Series switch used as a segment switch to alleviate user contention for bandwidth and eliminate server and network congestion. Before segmentation, 88 users had a total bandwidth of only 10 Mb/s available. After segmentation, 92 users have 40 Mb/s, four times the previous bandwidth; the segment switch has added 22 dedicated 100 Mb/s connections. This configuration can be extended to add more segments without degrading performance.

BES100 and BES200 Series switch used as a segment switch



- 88 users share 10 Mb/s (10/88 Mb/s per user)
- Server bottleneck (10 Mb/s bandwidth)
- Network center bottleneck (10 Mb/s bandwidth)
- Total of 88 users

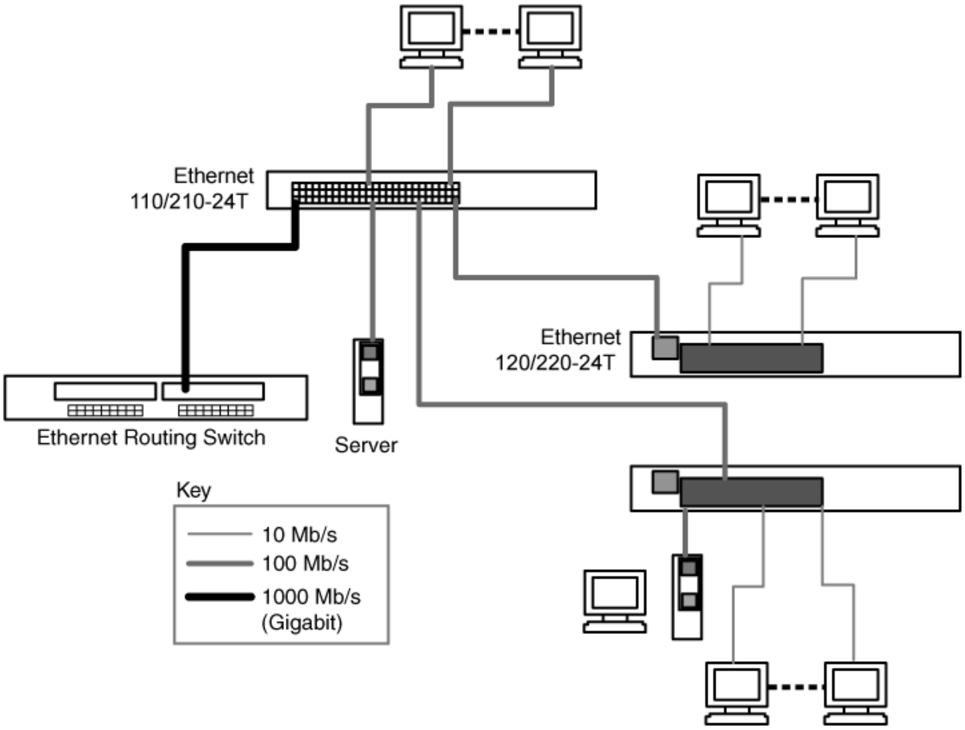
- Three sets of 23 users; each set shares 10 Mb/s (10/23 Mb/s per user)
- Addition of 21 users; each with dedicated 100 Mb/s bandwidth
- Server with dedicated 100 Mb/s bandwidth
- Network center with dedicated 1 Gb/s full-duplex bandwidth
- Total of 89 users

High-density switched workgroup application

"Configuring power workgroups and a shared media hub" (page 197) shows an example of using an Ethernet Switch 110 with a high-speed (gigabit) connection to a Nortel Ethernet Routing Switch. Ethernet Switch 110 and Ethernet Switch 120 are also shown in this example of a high-density switched workgroup.

As shown in "Configuring power workgroups and a shared media hub" (page 197), the Ethernet Routing Switch is used as a backbone switch, connecting to the Ethernet Switch 110-24T with an optional (1000BASE-SX) GBIC for maximum bandwidth. The Ethernet Switch 110-24T and the Ethernet Switch 120-24T have 100 Mb/s connections to the Ethernet Switch 120-24T, a 100BASE-TX hub, and a 100 Mb/s server as well as 10 Mb/s connections to data terminal equipment (DTE).

Configuring power workgroups and a shared media hub



SFP transceiver

This section describes technical specifications and installation instructions on Small Form Factor Pluggable (SFP) transceivers, which includes the Coarse Wavelength Division Multiplexed (CWDM) SFPs, that are supported by the BES100 and BES200 Series switches.

SFPs are hot-swappable, input and output enhancement products that allow Gigabit Ethernet ports to link to Short Wavelength (SX), Long Wave length (LX), and Coarse Wavelength Division Multiplexed (CWDM) fiber optic networks. The BES100 and BES200 Series switches have two front-panel ports. They are port numbers 25 and 26 on the 24T models and port numbers 49 and 50 on the 48T models. The SPF GBIC ports operate at gigabit (1000 Megabits per second Mbits/s) speed when an appropriate SFP GBIC is inserted. If an SFP GBIC is not inserted, then the 1000 BaseT RJ-45 connector ports can be used, and operate at 10/100/1000M.

> ***Note:*** The term SFP is used in this chapter to describe features or technical specifications of an SFP and a CWDM SFP.

Guidelines

Before installing an SFP, read the following guidelines:

- SFP GBICs are static sensitive.

  To prevent damage from ElectroStatic Discharge (ESD), follow your normal board and component handling procedures.

- SFP GBICs are dust sensitive.

  When you store an SFP GBIC, or when you disconnect it from a fiber optic cable, always keep the dust cover over the SFP GBIC optical bore.

- To clean contaminants from the optical bores of a SFP GBIC, use an alcohol swab or equivalent to clean the ferrules of the optical connector.
- Dispose this product (if necessary) according to all national laws and regulations.

WARNING
Fiber-optic equipment can emit laser or infrared light that can injure your eyes. Never look into an optical fiber or connector port. Always assume that fiber-optic cables are connected to a light source.

Product description

This section describes the SFP and label, and provides a model list for 1000BASE-SX SFPs and 1000BASE-LX SFPs.

This section also describes the Nortel Coarse Wavelength Division Multiplexed (CWDM) SFPs and provides a CWDM SFP model list.

This section includes the following topics:

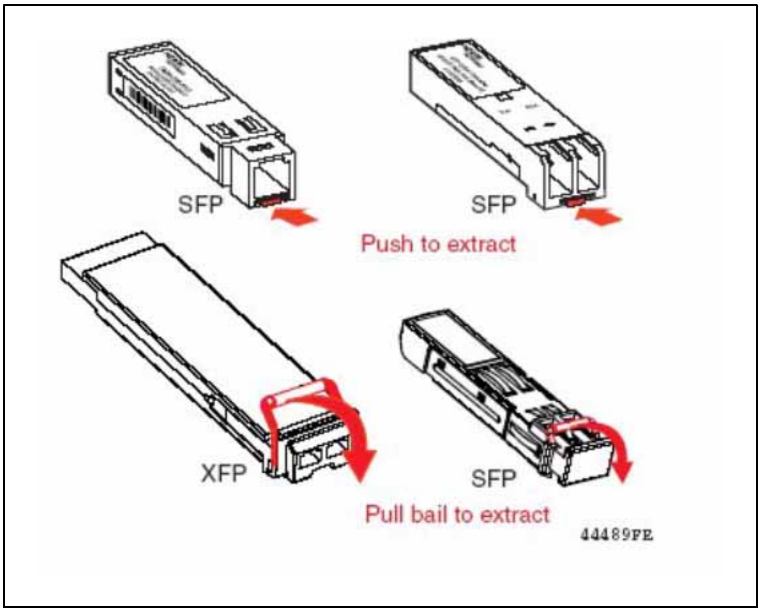
- "Locking and extractor mechanisms" (page 198)
- "SFP labeling" (page 199)
- "SFP models" (page 200)

Locking and extractor mechanisms

Depending on the transceiver manufacturer, an SFP transceiver can have various types of locking and extractor mechanisms.

"Locking and extracting mechanisms" (page 199) shows two types of locking/extractor mechanisms used on SFP and XFP transceivers.

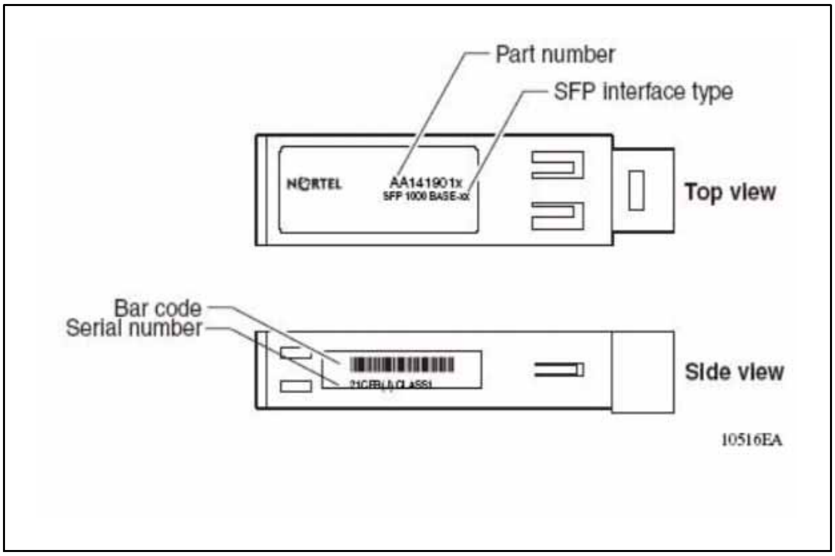
Locking and extracting mechanisms



SFP labeling

The Nortel label on a typical SFP contains a Nortel serial number, a bar code, a manufacturer's code, an interface type, and a part number. See "Nortel SFP label" (page 199).

Nortel SFP label



SFP models

SFPs are hot-swappable products that enhance input and output and allow gigabit Ethernet ports to link with other gigabit Ethernet ports over various media types. "1000BASE-SFP models" (page 200) lists and describes the Nortel SFP models that are supported by the BES100 and BES200 Series switches.

1000BASE-SFP models

Model number	Product number	Description
1000Base-SX SFP GBIC (mini-GBIC, connector type: LC).	AA1419013	Small Form Factor Pluggable, short wavelength 550 m
1-port 1000Base-SX SFP GBIC (mini-GBIC, connector type: MT-RJ).	AA1419014	Small Form Factor Pluggable, short wavelength 550 m
1-port 1000Base-LX SFP GBIC (mini-GBIC, connector type: LC).	AA1419015	Small Form Factor Pluggable, long wavelength 5 km

SNMP

Simple Network Management Protocol (SNMP) is the standard for network management that uses a common software agent to manage local and wide area network equipment from different vendors; part of the Transmission Control Protocol/Internet Protocol (TCP/IP) suite and defined in RFC115. SNMPv1 is version one, or the original standard protocol. BES100 and BES200 series products support SNMPv1 and SNMPv2c.

MAC address-based security

The MAC address-based security feature lets you set up network access control, based on source MAC addresses of authorized stations

- create a list of up to 5 MAC addresses per port, and specify which addresses are authorized to connect to your switch
- specify which of your switch ports each MAC address is allowed to access.

  The options for allowed port access include: NONE, ALL, and single or multiple ports that are specified in a list.
- specify optional actions to be exercised by your switch if the software detects a security violation.

  The response can be to turn on destination address (DA) filtering, disable the specific port, or any combination of these three options.

The MAC address-based security feature is based on Nortel BaySecure LAN Access for Ethernet, a real-time security system that safeguards Ethernet networks from unauthorized surveillance and intrusion.

SNTP

The BES100 and BES200 series switches support Simple Network Time Protocol (SNTP). The SNTP feature allows the switch to get its date and time from an NTP/SNTP server. SNTP also enables Networks administrators to get accurate time stamps when they use network management tools to gather information or statistics.

> ***Note:*** If you have trouble using this feature, try various NTP servers. Some NTP servers may be overloaded or currently inoperative.

The system retries connecting with the NTP server a maximum of 3 times, with 5 min between each retry. If the connection fails after the 3 attempts, the system waits for the next synchronization time (the default is 24 hours [hr]) and begins the process again.

Using SNTP provides a real-time timestamp for the software, shown as Greenwich mean time (GMT).

If SNTP is enabled (the default value is disabled), the system synchronizes with the configured NTP server at boot-up and at user-configurable periods thereafter (the default sync interval is 24 hr). The first synchronization is not performed until network connectivity is established.

SNTP supports primary and secondary NTP servers. The system tries connecting to the secondary NTP server only if the primary NTP server is unresponsive.

VLANs

This chapter contains information about the following topics:

Virtual local area networks

A virtual LAN (VLAN) is a collection of switch ports that make up a single broadcast domain. A VLAN can control traffic flow and ease the administration of moves, adds, and changes on the network, by eliminating the need to change physical cabling. You can use the Web-based management interface or the BEM to configure port-based VLANs for a single switch or for multiple switches.

Port-based VLANs

A port-based VLAN is a VLAN in which the ports are explicitly configured to be in the VLAN. When you create a port-based VLAN on a switch, you assign a VLAN identification number (VLAN ID) and specify which ports belong to the VLAN. The VLAN ID is used to coordinate VLANs across multiple switches.

In a traditional shared-media network, traffic generated by a station is transmitted to all other stations on the local segment. Segments joined together by bridges form broadcast domains. The local segment is also the broadcast domain because any broadcast is sent to all stations on the local segment.

A collision domain is a logical area on a network where packets can collide with each other. The local segment is the collision domain because traffic on the segment has the potential to cause an Ethernet collision. Although BES100 and BES200 Series switches divide a network into smaller collision domains, they do not affect the broadcast domain. A virtual local area network provides a mechanism to fine-tune broadcast domains.

The BES100 or BES200 Series switch lets you create port-based VLANs:

- IEEE 802.1Q port-based VLANs

  A port-based VLAN is a VLAN in which the ports are explicitly configured to be in the VLAN. When you create a port-based VLAN, you assign a port VLAN identifier (PVID) and specify which ports belong to the VLAN. The PVID is used to coordinate VLANs across multiple switches.

VLAN support

The BES100 and BES200 Series switches support 32 port-based VLANs, under the 802.1d bridging model.

The AutoPVID option automatically assigns PVIDs to all the ports. These ports are the members of the VLAN that has just been created.

> ***Note:*** When the BES100 or BES200 Series switch is installed for the first time, all ports are assigned to the default VLAN (PVID = 1). The default management VLAN is VLAN 1.

You can configure VLANs on each port through the user interface or the configuration file.

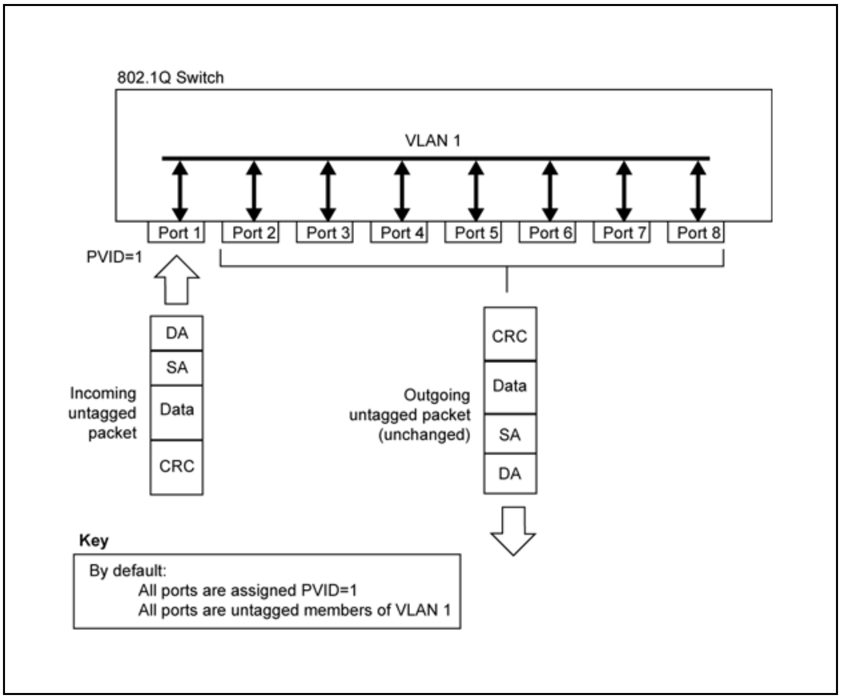
IEEE 802.1Q tagging

The BES100 and BES200 Series switches operate in accordance with the IEEE 802.1Q tagging rules. Important terms used with the 802.1Q tagging feature are:

- VLAN identifier (VID)—the 12-bit portion of the VLAN tag in the frame header that identifies an explicit VLAN. When other types of VLANs are enabled, this default value can be overridden by the values enabled in the Web-based management interface.
- Port VLAN identifier (PVID)—a classification mechanism that associates a port with a specific VLAN. For example, a port with a PVID of 3 (PVID =3) assigns all untagged frames received on this port to VLAN 3.
- Tagged frame— the 32-bit field (VLAN tag) in the frame header that identifies the frame as belonging to a specific VLAN. Untagged frames are marked (tagged) with this classification as they leave the switch through a port that is configured as a tagged port.
- Untagged frame— a frame that does not carry any VLAN tagging information in the frame header.
- VLAN port members— a set of ports that form a broadcast domain for a specific VLAN. A port can be a member of one or more VLANs.
- Untagged member—a port that has been configured as an untagged member of a specific VLAN. When an untagged frame exits the switch through an untagged member port, the frame header remains unchanged. When a tagged frame exits the switch through an untagged member port, the tag is stripped and the tagged frame is changed to an untagged frame.
- Tagged member—a port that has been configured as a member of a specific VLAN. When an untagged frame exits the switch through a tagged member port, the frame header is modified to include the 32-bit tag associated with the PVID. When a tagged frame exits the switch through a tagged member port, the frame header remains unchanged (original VID remains).
- User priority—a three-bit field in the header of a tagged frame. The field is interpreted as a binary number, therefore it has a value of 0 - 7. With this field you can use the tagged frame to carry the user-priority across bridged LANs.
- Port priority—the priority level assigned to untagged frames received on a port. This value becomes the user priority for the frame. Tagged packets get their user priority from the value contained in the 802.1Q frame header.
- Unregistered packet—a tagged frame that contains a VID where the receiving port is not a member of that VLAN.

The default configuration settings for the BES100 and BES200 Series switch have all ports set as untagged members of VLAN 1 with all ports configured as PVID = 1. Every VLAN is assigned a unique VLAN identifier (VID) that distinguishes it from all other VLANs. In the default configuration example shown in "Default VLAN settings" (page 204), all incoming packets are assigned to VLAN 1 by the default port VLAN identifier (PVID =1). Untagged packets enter and leave the switch unchanged.

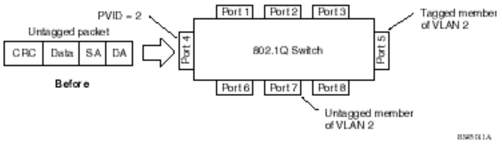
Default VLAN settings



When you configure VLANs, you configure the switch ports as tagged or untagged members of specific VLANs (see "Port-based VLAN assignment" (page 205) through "802.1Q tagging - after 802.1Q tag assignment " (page 206)).

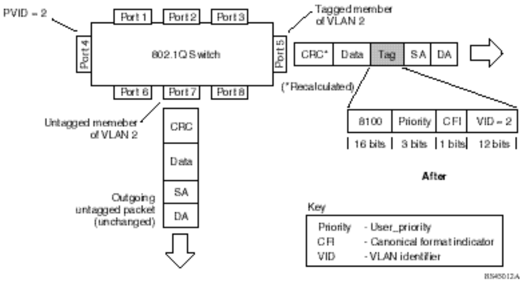
In "Port-based VLAN assignment" (page 205), untagged incoming packets are assigned directly to VLAN 2 (PVID = 2). Port 5 is configured as a tagged member of VLAN 2, and port 7 is configured as an untagged member of VLAN 2.

Port-based VLAN assignment



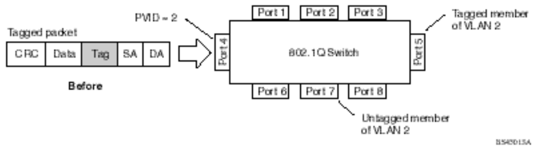
As shown in "802.1Q tagging (after port-based VLAN assignment)" (page 205), the untagged packet is marked (tagged) as it leaves the switch through port 5, which is configured as a tagged member of VLAN 2. The untagged packet remains unchanged as it leaves the switch through port 7, which is configured as an untagged member of VLAN 2.

802.1Q tagging (after port-based VLAN assignment)



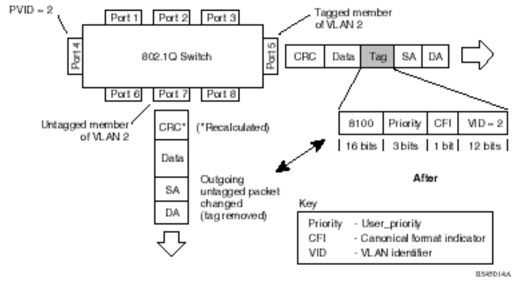
In "802.1Q tag assignment" (page 206), tagged incoming packets are assigned directly to VLAN 2 because of the tag assignment in the packet. Port 5 is configured as a tagged member of VLAN 2, and port 7 is configured as an untagged member of VLAN 2.

802.1Q tag assignment



As shown in "802.1Q tagging - after 802.1Q tag assignment " (page 206), the tagged packet remains unchanged as it leaves the switch through port 5, which is configured as a tagged member of VLAN 2. However, the tagged packet is stripped (untagged) as it leaves the switch through port 7, which is configured as an untagged member of VLAN 2.

802.1Q tagging - after 802.1Q tag assignment



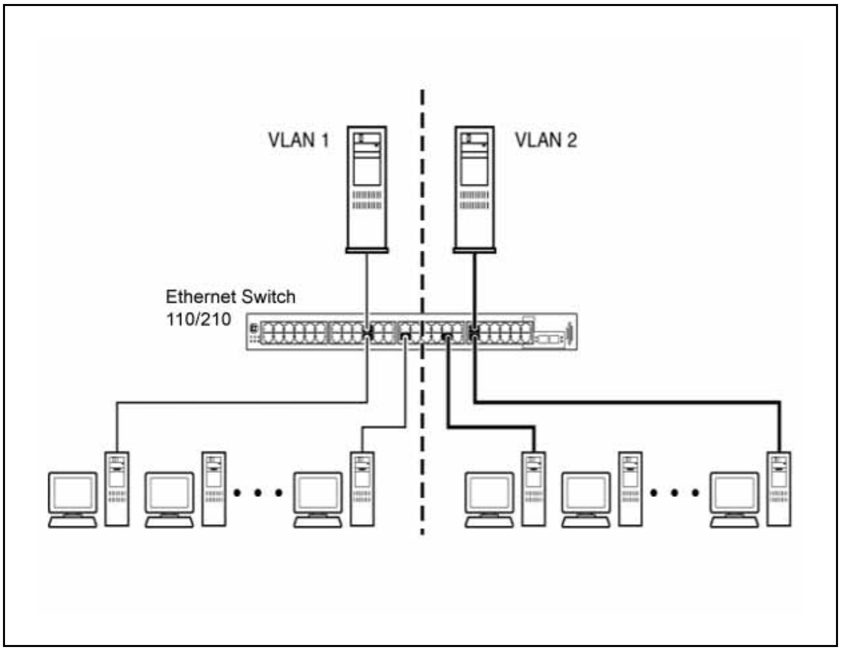
IEEE 802.1Q VLAN workgroups

The BES100 and BES200 Series switches support up to 32 VLANs and IEEE 802.1Q tagging on a per-port basis. Ports are grouped into broadcast domains by assigning them to the same VLAN. Frames received in one VLAN can only be forwarded within that VLAN. Multicast frames and unknown unicast frames are flooded only to ports in the same VLAN.

Setting up virtual LANs (VLAN) is a way to segment networks to increase network capacity and performance without changing the physical network topology ("Port-based VLAN example" (page 207)). With network segmentation, each switch port connects to a segment that is a single collision domain. Adding to VLANs defines broadcast domains, and having a switch instead of a hub segments the network into individual collision domains.

With the BES100 and BES200 Series switches you can assign ports to VLANs using the Web-based management, or the Element Manager. By assigning ports (and therefore the devices attached to these ports) to different VLANs, you create individual broadcast domains per VLAN. This feature provides network flexibility because you can reassign VLANs to accommodate network moves, additions, and changes, eliminating the need to change physical cabling.

Port-based VLAN example



VLAN workgroup example

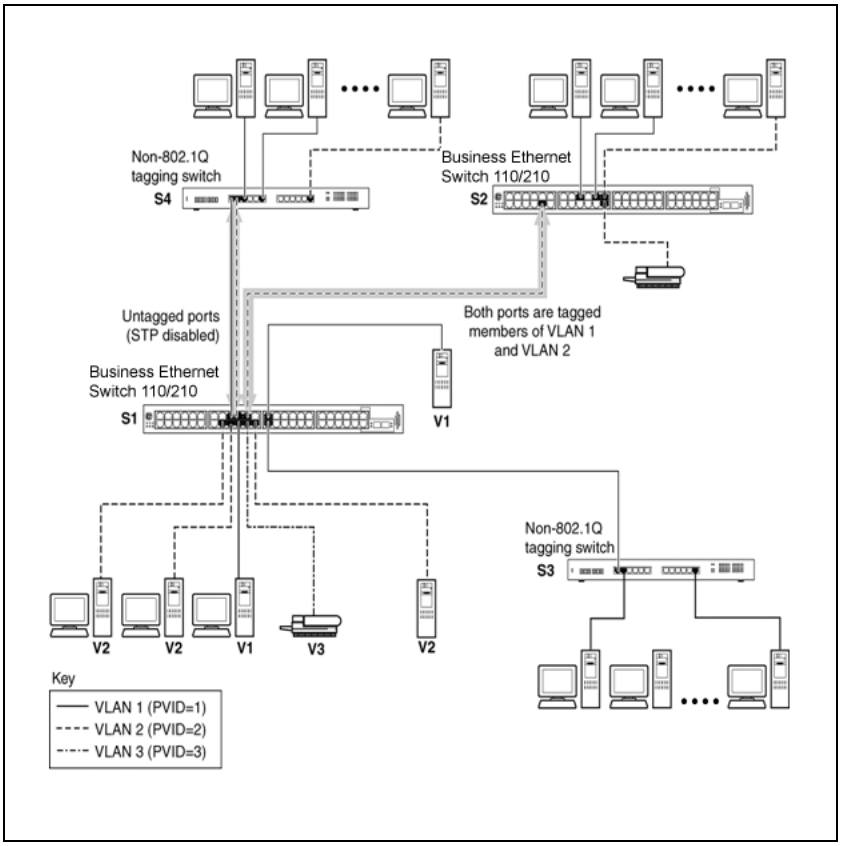
As shown in "VLAN configuration spanning multiple switches" (page 208), Switch S1 (BES100 and BES200 Series switch) is configured with multiple VLANs:

- Ports 17, 20, 25, and 26 are in VLAN 1.
- Ports 16, 18, 19, 21, and 23 are in VLAN 2.
- Port 22 is in VLAN 3.

Because S4 does not support 802.1Q tagging, a single switch port on each switch must be used for each VLAN (see "VLANS spanning multiple untagged switches" (page 209)).

The connection to S2 requires only one link between the switches because S1 and S2 are both BES100 or BES200 Series switches that support 802.1Q tagging (see "VLANs spanning multiple 802.1Q tagged switches" (page 209)).

VLAN configuration spanning multiple switches



VLANs spanning multiple switches

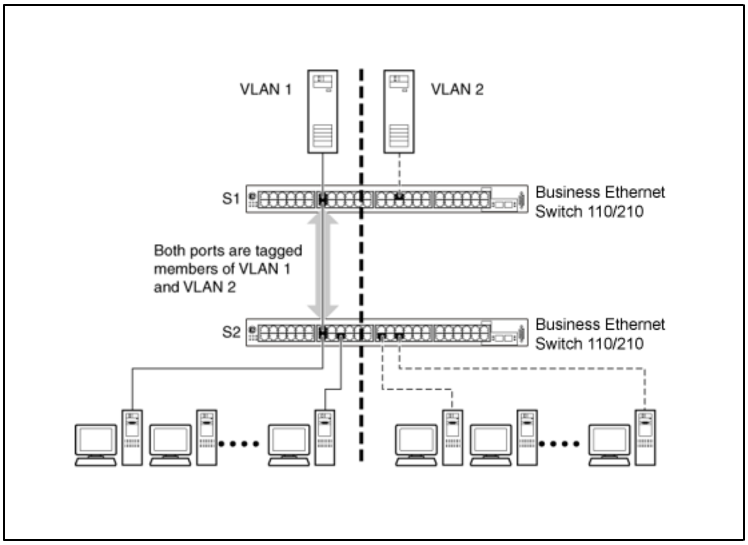
You can use VLANs to segment a network within a switch. When you connect multiple switches, it is possible to connect users of one VLAN with users of the same VLAN in another switch. However, the configuration guidelines depend on whether both switches support 802.1Q tagging.

With 802.1Q tagging enabled on a port for a VLAN, all frames leaving the port for that VLAN are marked as belonging to that specific VLAN. You can assign specific switch ports as members of one or more VLANs that span multiple switches, without interfering with the Spanning Tree Protocol.

VLANs spanning multiple 802.1Q tagged switches

"VLANs spanning multiple 802.1Q tagged switches" (page 209) shows VLANs spanning two BES100 Series switches. The 802.1Q tagging is enabled on S1, port 2 and on S2, port 1 for VLAN 1 and VLAN 2. Both ports are tagged members of VLAN 1 and VLAN 2.

VLANs spanning multiple 802.1Q tagged switches

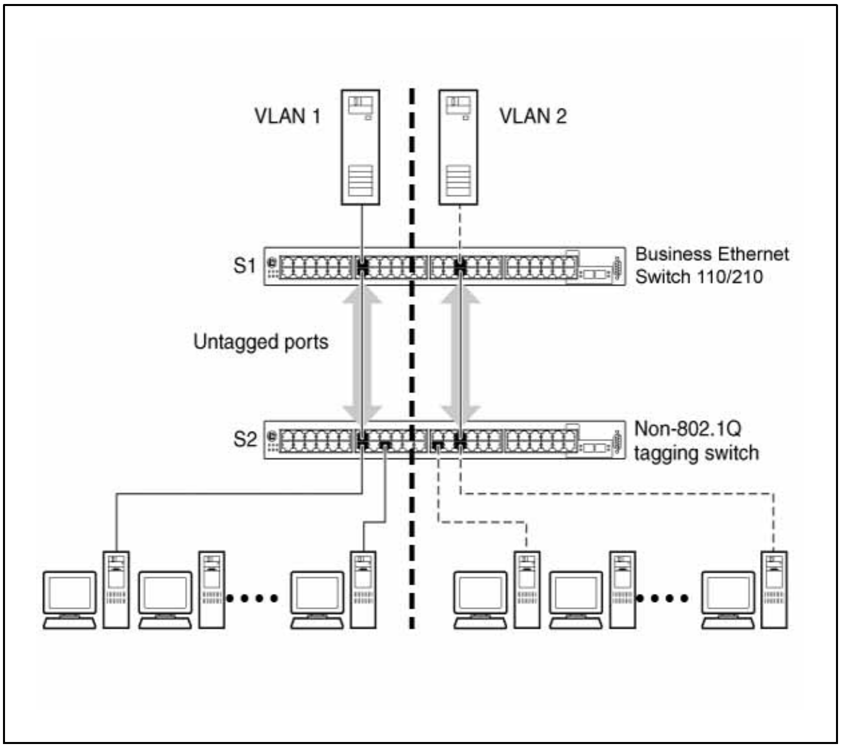

VLAN 1
VLAN 2
S1
Business Ethernet Switch 110/210
Both ports are tagged members of VLAN 1 and VLAN 2
S2
Business Ethernet Switch 110/210

Because there is only one link between the two switches, the Spanning Tree Protocol (STP) treats this configuration as any other switch-to-switch connection. For this configuration to work properly, both switches must support the 802.1Q tagging protocol.

VLANS spanning multiple untagged switches

"VLANs spanning multiple untagged switches" (page 210) shows VLANs spanning multiple untagged switches. In this configuration, Switch S2 does not support 802.1Q tagging and you must use a single switch port on each switch for each VLAN.

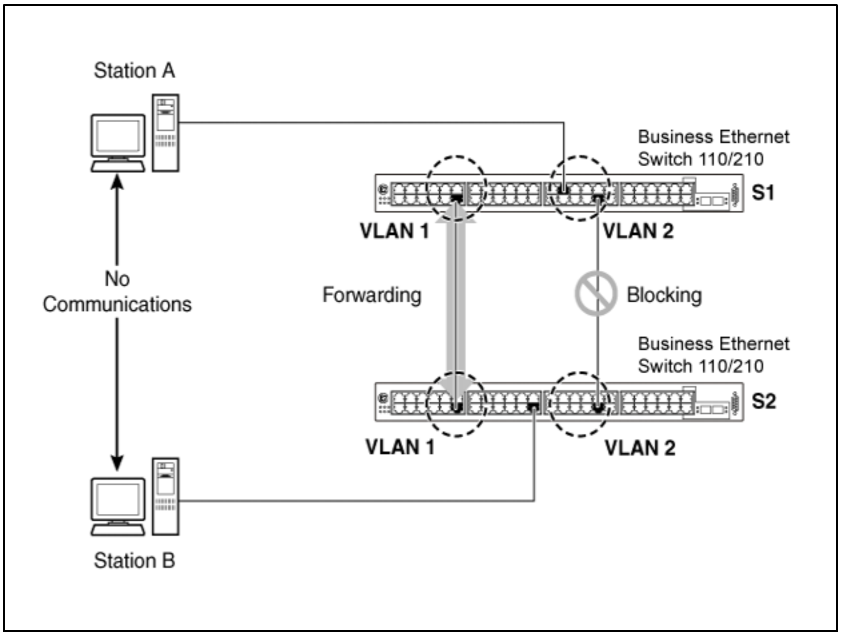
VLANs spanning multiple untagged switches



When the STP is enabled on these switches, only one link between each pair of switches forwards traffic. Because each port belongs to only one VLAN at a time, connectivity on the other VLAN is lost. Exercise care when configuring the switches to ensure that the VLAN configuration does not conflict with the spanning tree configuration.

To connect multiple VLANs across switches with redundant links, you must disable the STP on all participating switch ports. "Possible problems with VLANs and Spanning Tree Protocol" (page 211) shows possible consequences of enabling the STP when using VLANs between untagged (802.1Q that are not tagged) switches.

Possible problems with VLANs and Spanning Tree Protocol



As shown in "Possible problems with VLANs and Spanning Tree Protocol" (page 211), with STP enabled, only one connection between Switch S1 and Switch S2 is forwarding at any time. Communications failure occurs between VLAN 2 of S1 and VLAN 2 of S2, blocking communications between Stations A and B.

The STP selects the link connecting VLAN 1 on Switches S1 and S2 as the forwarding link based on port speed, duplex-mode, and port priority. Because the other link connecting VLAN 2 is in Blocking mode, stations on VLAN 2 in Switch S1 cannot communicate with stations in VLAN 2 on Switch S2. With multiple links only one link forwards.

VLAN configuration rules

VLAN configuration steps have specific configuration rules. When creating VLANs, consider the following rules before making changes:

- If a port is a trunk group member, adding or removing that port from a VLAN results in all other port members of that trunk group being added or removed from the VLAN.
- Auto PVID can be activated by creating a VLAN and enabling Auto PVID for it.

Spanning Tree Protocol

The BES100 and BES200 Series switches supports the Spanning Tree Protocol (STP) as defined in IEEE 802.1D and the Rapid Spanning Tree Protocol (RSTP) as defined in IEEE 802.1w. The Spanning Tree Protocol detects and eliminates logical loops in a bridged or switched network. When multiple paths exist, the spanning tree algorithm configures the network so that a bridge or switch uses only the most efficient path. If that path fails, the protocol automatically configures the network to make another path become active, thus sustaining network operations.

The following sections describe in detail how STP and RSTP function. However, all spanning tree configuration on the BES100 or BES200 Series switch is performed automatically by the switch. You do not need to perform any switch configuration for STP and RSTP.

For detailed information about STP and RSTP, refer to the following sections:

- "Spanning Tree Protocol - IEEE 802.1D" (page 212)
- "Rapid Spanning Tree Protocol - IEEE 802.1w" (page 214)

Spanning Tree Protocol - IEEE 802.1D

The BES100 and BES200 Series switches support transparent bridging by implementing the IEEE 802.1D standard. This is also known as the Spanning Tree Protocol (STP) and Algorithm (STA) standards. STP runs on all ports to provide automatic network configuration of a loop-free topology, letting you configure redundant links to provide network fault tolerance.

Port states

A port is always in one of the following five spanning tree states:

- Disabled - A network administrator can manually disable a port.
- Blocking - A port that causes a switching loop; no user data is sent or received but it may go into forwarding mode if the trunk line in use fails. BPDU data is still sent and received in blocking mode.
- Listening - The switch processes BPDUs and determines the network topology.
- Learning - The switch builds a switching table that maps MAC addresses to port numbers.
- Forwarding - A port that receives and sends data. A normal operation.

After a switch is powered-up or reset and the initialization process is completed, all the ports are transformed from the Disabled state to the Blocking state.

If a port is not connected, the port remains in the Forwarding state until it is connected.

If you connect a station to a port, the port does not start forwarding packets immediately. You will have to wait for the port to transit through the Listening and Learning states to have access to any resources located on another segment.

If you connect a hub or another bridging device to a port, it could potentially create a loop in the network topology and a broadcast storm can occur. This is because one of the ports causing the loop might be in the Forwarding state instead of the Blocking state. The loop should be eliminated after this port receives a BPDU frame from a higher priority port.

You can use the MIB variable dot1dStpPortEnable to disable or enable a port. A port is enabled by default. In this mode of operation, the port is in one of the following STP states:

- Blocking
- Listening
- Learning
- Forwarding

If you disable Spanning Tree on a port, it will not forward any frames and will not participate in the Spanning Tree Algorithm and Protocol.

Aging of Dynamic Entries in Forwarding Database

Dynamic MAC address entries are automatically removed from the Forwarding Database after a specified time.

If the network topology has not undergone any change, the aging time-out value is specified by the dot1dTpAgingTime MIB variable. This can be configured through the user interface console. The range of applicable values specified in the IEEE standard is 10-1000000 (seconds) whereas the default value recommended is 300.

If the root bridge notifies topology changes to other bridging devices, a short aging time-out value is used. The time-out value is set equal to the Forward Delay parameter contained in BPDUs originating from the root. The range of values for the Forward Delay parameter specified in the IEEE standard is 4 to 30 (seconds). The recommended default value is 15.

Port path cost

With the BES100 and BES200 Series switches, the path cost associated with a port is automatically calculated by the switch. The cost of a given link is specified to be inversely proportional to the data rate of the link: thus, a 10 Mb/s Ethernet has a link cost of 100.

"Path cost values" (page 215) describes the default values that have a nonlinear relationship between link cost and data rate for very high-speed LANs.

Path cost values

Data rate	Default link cost value
10 Mbps	100
100 Mbps	19
1 Gbps	4
10 Gbps	2

Rapid Spanning Tree Protocol - IEEE 802.1w

The Rapid Spanning Tree Protocol (RSTP or IEEE 802.1w) prevents loops, is faster to converge than STP, and is backwards compatible with STP.

Interoperability with legacy STP

RSTP provides for backward compatibility with legacy STP. An RSTP port transmits and receives only RSTP BPDU. If an RSTP port receives an STP BPDU, it becomes an STP port. If the STP port receives an RSTP BPDU, it reverts back to RSTP operation. This process is called Port Protocol Migration.

Differences in port roles

RSTP is an enhanced version of STP. These two protocols have almost the same set of parameters.

The "Differences in port roles for STP and RSTP" table (page 66) lists the differences in port roles for STP and RSTP. STP supports 2 port roles while RSTP supports four port roles.

Differences in port roles for STP and RSTP

Port Role	STP	RSTP	Description
Root	Yes	Yes	This port is receiving a lower cost BPDU than its own and it has the best path to reach the Root. Root port is in Forwarding state.

Port Role	STP	RSTP	Description
Designated	Yes	Yes	This port has the lower cost BPDU on the segment. Designated port is in Forwarding state.
Alternate	No	Yes	This port is receiving a lower cost BPDU than its own BPDU and there is a Root port within the same switch. Alternate port is in Discarding state.
Backup	No	Yes	This port is receiving a lower cost BPDU than its own BPDU and this BPDU is from another port within the same switch. Backup port is in Discarding state.

Edge Port

Edge Port is a new parameter that is supported by RSTP. When a port is connected to a nonswitch device such as a PC or a workstation, it must be configured as an Edge port. An active Edge port goes directly to Forwarding state without any delay. An Edge port becomes a non Edge port if it receives a BPDU

Path cost values

RSTP recommends new path cost values that support a wide range of link speeds. The Recommended path cost values table lists the recommended path cost values.

Recommended path cost values

Link speed	Default value

Less than or equal 100 Kb/s
1 Mb/s
10 Mb/s
100 Mb/s
	200 000 000
	20 000 000
	2 000 000
	200 000

1 Gb/s
10 Gb/s
100 Gb/s
	20 000
	2 000
	200

1 Tb/s 10 Tb/s	20 2

Rapid convergent

In RSTP, the root port or the designated port can ask its peer for permission for going to the Forwarding State. If the peer agrees, the root port can move to the Forwarding State without any delay. This procedure is called Negotiation Process.

With RSTP, information that is received on a port is sent immediately, if the port becomes inoperative, instead of waiting for the Maximum Age time. The following example illustrates how an RSTP port moves rapidly to Forwarding state without the risk of creating a loop in the network.

Port 2 on switches A, B, and C, are configured as edge ports because they connect to PC end-stations.

Switch A is the Root.

Negotiation process

After power up, all ports assume the role as Designated ports. All ports are in the Discarding state except Edge ports. Edge ports go directly to Forwarding state without delay.

Switch A port 1 and switch B port 1 exchange BPDUs and switch A knows that it is the Root and switch A port 1 is the Designated port. Switch B learns that switch A has better priority. Switch B port 1 becomes Root port. Both switch A port 1 and switch B port 1 are still in Discarding state.

Switch A starts the negotiation process by sending a BPDU with the proposal bit set.

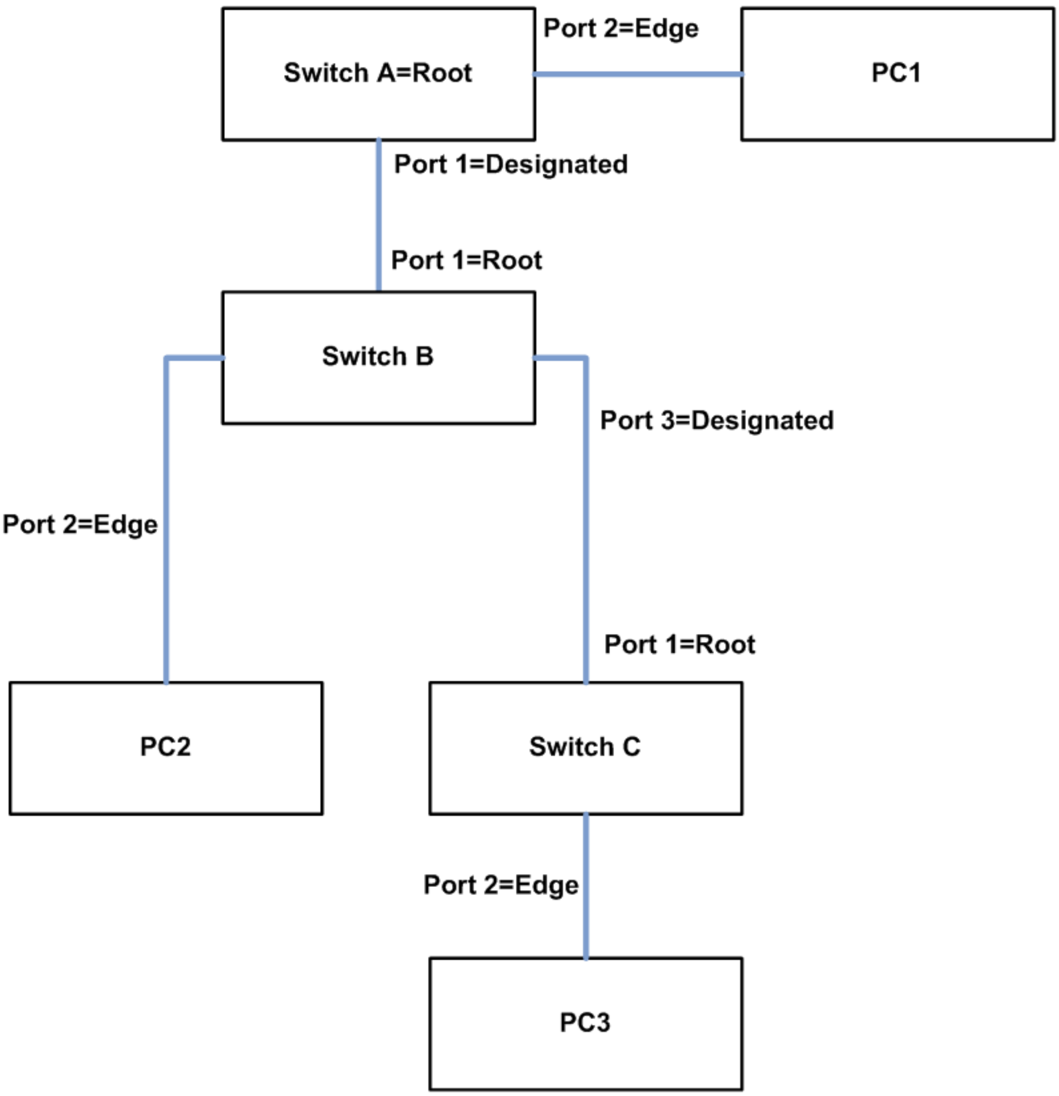
Switch B receives a proposal BPDU and it sets its non Edge ports to Discarding state. This operation is the sync process.

Switch B sends a BPDU with the agreement bit set to switch A.

Switch A sets port 1 to Forwarding and switch B sets port 1 to Forwarding state. PC 1 and PC 2 can talk to each other.

- The negotiation process now moves down to switch B port 3 and its partner port.
- PC 3 cannot talk to either PC 1 or PC 2 until the negotiation process between switch B and switch C complete.

Negotiation process



802.1p Class of Service support

The BES100 /200 Series switch enables 802.1p Traffic Class by mapping the 8 priority levels into 4 internal Class of Service (CoS) queues. The priorities can range from Low to Highest. You can specify this mapping through the Web-based management interface.

CoS queues are scheduled based on the following policy:

- Weighted Round-Robin Scheduling

You can change the policy at runtime.

IEEE 802.3ad Link Aggregation

IEEE 802.3ad-based link aggregation lets you aggregate one or more links together to form Link Aggregation Groups (LAG), so a MAC client can treat the Link Aggregation Group as if it were a single link. .

Link Aggregation Control Protocol (LACP), defined by the IEEE 802.3ad standard, lets a switch learn the presence and capabilities of a remote switch by exchanging information with the remote switch before a trunk group is formed. Either switch can accept or reject the aggregation request with the far end on a per port basis. A link that cannot join a trunk group operates as an individual link.

The main purpose of LACP is to manage switch ports and their port memberships to link LAGs. LACP can dynamically add or remove LAG ports, depending on their availability and states. By default, only uplink ports (Gigabit ports) are set to enabled on all ports.

Link aggregation employs the following principles and concepts:

- A MAC client communicates with a set of ports through an Aggregator, which presents a standard IEEE 802.3 service interface to the MAC client. The Aggregator binds to one or more ports within a system.
- It is the responsibility of the Aggregator to distribute frame transmissions from the MAC client to the various ports, and to collect received frames from the ports and pass them to the MAC client transparently.
- A system can contain multiple aggregators, serving multiple MAC clients. A given port binds to (at most) a single Aggregator at any time. A MAC client is served by a single Aggregator at a time.
- The Link Aggregation Control function manages the binding of ports to aggregators within a system. The link aggregation control function is responsible for determining which links can be aggregated, aggregating them, binding the ports within the system to an appropriate Aggregator, and monitoring conditions to determine when a change in aggregation is needed.

  The network manager can manipulate the state variables of Link Aggregation (for example, keys), to directly control the determination and binding. In addition, automatic determination, configuration, binding, and monitoring can occur through the use of a Link Aggregation Control Protocol (LACP).

  The LACP uses peer exchanges across the links to determine, on an ongoing basis, the aggregation capability of the various links, and continuously provides the maximum level of aggregation capability achievable between a given pair of systems.
- Each port is assigned a unique, globally administered MAC address.

The MAC address is used as the source address for frame exchanges that are initiated by entities within the Link Aggregation sublayer itself (for example, LACP and Marker protocol exchanges).

- Each Aggregator is assigned a unique, globally administered MAC address, which is used as the MAC address of the aggregation from the perspective of the MAC Client, both as a source address for transmitted frames and as the destination address for received frames.

  The MAC address of the Aggregator may be one of the MAC addresses of a port in the associated Link Aggregation Group.

Link aggregation rules

The BES100 and BES200 Series switches link aggregation groups operate under the following rules:

- Link aggregation groups are formed using LACP.
- All ports in a link aggregation group must be connected to the same far-end system.
- All ports in a link aggregation group must be operating in full-duplex mode.
- All ports in a link aggregation group must be configured to the same port speed.
- All ports in a link aggregation group must be in the same VLANs.
- LACPDUs are transmitted and received on all ports in the link aggregation group.
- Link aggregation is compatible with the Spanning Tree Protocol (STP).
- STP BPDUs are transmitted and received only on the first link in the group.
- A maximum of 6 link aggregation groups are supported.
- A maximum of 4 active links are supported per LAG.
- A maximum of 1 standby link is supported per LAG.

The maximum number of LAGs is 32, and the maximum number of active links per group is 8. Link Aggregation lets more than eight links be configured in one LAG. The first eight high-priority links are active links and together they form a trunk group. The ninth low-priority link remains in standby mode. When one of the active links goes down, the standby link becomes active and is added to the trunk group.

LACP supports only one standby link.

The failover process is as follows:

- The down link is removed from the trunk group.

- The standby link is added to the trunk group.

There may be a temporary delay in traffic flow due to the switching of links. If the active link goes down and there is no standby link, the traffic is rerouted to the remaining active links with a minimal delay in time.

Configure IP and gateway settings

You can configure IP and gateway settings to modify the switch IP address and subnet mask parameters, and configure the IP address of your default gateway. For more information, see "Configure IP and gateway settings" (page 220).

Configuring Remote Access

Use the Remote Access page to allow a user at a remote console terminal to communicate with the switch and configure the BES100 or BES200. For more information, see "Configuring Remote Access" (page 51).

Accessing the Web-based management interface

For information about logging on to the Web-based management interface, see "Logging on to the Web-based management interface" (page 21).

For information about logging off from the Web-based management interface, see "Logging off from the Web-based management interface" (page 21).

For information about accessing the Web-based management interface to use the application, see Accessing the management interface.

Accessing the Element Manager-based interface

You can connect to the BES100 or BES200 Series switch using the Element Manager. For information about accessing the Element Manager-based interface, see Connecting to a BES100 or BES200 Series switch using the Element Manager

Accessing the switch using SNMP

You can use Simple Network Management Protocol (SNMP) to communicate with the BES100 or BES200 Series switches. For more information, see Setting the Element Manager SNMP properties.

Internet Group Management Protocol (IGMP) Snooping

IP multicast is directly mapped to broadcast transmissions in a bridged Ethernet environment. In a layer 2 device such as the BES100 and BES200 Series switch, every IP multicast packet is forwarded on all the links. These IP multicast packets are delivered to all the segments of an extended LAN. As the network carries more broadcast traffic, the Network performance degrades. End stations are indiscriminately offered the same load as the rest of the network, even though they are not interested in particular IP multicast streams.

IGMP is a protocol used by the IP hosts. IGMP is used to report the multicast group memberships of the IP hosts to any of their immediately neighboring multicast routers.

When multicasting is used on more than one physical network and multicast datagrams have to pass through routers, the IGMP protocol is useful.

IGMP snooping is supported by the BES100 and BES200 Series switch for both, version 1 and 2 of the IGMP protocol. The IGMP snooping technique enables the switch to selectively forward multicast traffic only on those ports where particular IP multicast streams are expected.

By snooping for IGMP communication between routers and hosts, a switch can identify those ports.

Quality of Service (QoS) settings

You can configure DSCP to 802.1p mapping using Web-based management. For more information, see Configuring Quality of Service (QoS) settings.

BootP configuration

Use this information to manage the BES100 and BES200 Series switch.

Navigation

BootP Configuration Requirements

To use the BootP protocol, you need a BootP server that adheres to the IETF standard RFC 951.

That BootP server must be accessible through the Management VLAN. If the BootP server is not located on the same subnet as the BES100 or BES200 Series switch, but is located on another IP subnet, there must be a router on the local subnet (the subnet with which the BES100 or BES200 Series switch is associated) that provides BootP Relay functionality as defined in RFC 1532.

BootP configuration Parameters

The BootP implementation on BES100 or BES200 Series switches enables BootP to operate in the following modes:

- BootP or Default IP
- BootP Always
- BootP Disabled
- BootP or Last Address

BootP or Default IP

Selecting this parameter lets the switch to request an IP address if one has not already been set. When selected, this mode operates as follows:

- When the static IP data is manually entered, the data becomes the in-use address of the switch and BootP requests are not broadcast. The switch can be managed using this in-band IP address.
- When the in-band IP address is not manually set, the switch broadcasts BootP requests until it receives a BootP reply containing an IP address. If the switch does not receive a BootP reply that contains an IP address, the switch cannot be managed in-band.

If an IP address is not currently in use, these actions take effect immediately. If an IP address is currently in use, these actions take effect only after the switch is reset or power cycled.

BootP Always

Selecting this parameter requires the switch to obtain its IP address from the BootP server. If a static IP address is defined, it is ignored. When this option selected, the switch operates as follows:

- The switch continues to broadcast BootP requests, regardless of whether an in-band IP address is set from the console terminal.
- If the switch receives a BootP reply that contains an in-band IP address, the switch uses this new in-band IP address
- If the switch does not receive a BootP reply, the switch cannot be managed using the in-band IP address set from the console terminal.
-

If an IP address is *not* currently in use, these actions take effect immediately. If an IP address *is* currently in use, these actions take effect only after the switch is reset or power cycled.

BootP Disabled

When this mode is selected, the switch does not use BootP. The switch operates in the following manner:

- The switch does not broadcast BootP requests, regardless of whether a static IP address is set.
- The switch can be managed only by using the in-band switch static IP address.

These actions take effect after the switch is reset or power cycled, even if an IP address is not currently in use.

BootP or Last Address

Selecting this parameter lets the switch to use the last IP address received from the BootP server if the BootP server becomes unreachable. When selected, this mode operates as follows:

- When the IP data is entered from the console terminal, the data becomes the in-band address of the switch and BootP requests are not broadcast. The switch can be managed using this in-band IP address.
- When the in-band IP address is not set from the console terminal, the switch broadcasts BootP requests until it receives a BootP reply containing an in-band IP address. If the switch does not receive a BootP reply that contains an in-band IP address within 10 minutes (min), the switch uses the last in-band IP address it received from a BootP server. This IP information is displayed in the Last BootP column.

If an IP address is not currently in use, these actions take effect immediately. If an IP address is currently in use, these actions take effect only after the switch is reset or power cycled.

Troubleshooting

Execute the following steps to diagnose your system if it should have issues obtaining an IP address using the BootP protocol:

- Check if the BootP server is accessible to the switch through the management VLAN.
- Check if the BootP server is configured with the proper MAC address of the device.
- Review the last BootP settings on the Console Interface.
- Place a packet analyzer on the network to investigate the problem.

Flash memory storage

Switch software image storage

The BES100 and BES200 Series switches use flash memory to store the switch software image. The flash memory lets you update the software image with a newer version without changing the switch hardware. An in-band connection between the switch and the TFTP load host is required to download the software image.

Autosensing and autonegotiation

The BES100 and BES200 Series switches are autosensing and autonegotiating devices:

- The term autosense refers to the ability of a port to sense the speed of an attached device.
- The term autonegotiation refers to a standardized protocol (IEEE 802.3u) that exists between two IEEE 802.3u-capable devices. Autonegotiation lets the switch select the best of speed and duplex modes.

Autosensing is used when the attached device is not capable of autonegotiation or is using a form of autonegotiation that is not compatible with the IEEE 802.3u standard. In this case, because it is not possible to sense the duplex mode of the attached device, the BES100 or BES200 Series switch reverts to half-duplex mode.

When autonegotiation-capable devices are attached to the BES100 or BES200 Series switch, the ports negotiate down from 100 Mb/s speed and full-duplex mode until the attached device acknowledges a supported speed and duplex mode.

For more information about autosensing and autonegotiation modes, see "Autonegotiation modes" (page 172).

RFCs

For more information about networking concepts, protocols, and topologies, consult the following RFCs:

- RFC 1213 (MIB-II)
- RFC 1493 (Bridge MIB)
- RFC 1573 (Interface MIB)
- RFC 1643 (Ethernet MIB)
- RFC 2849 (RMON)
- RFC 1157 (SNMP)

Standards

The following IEEE Standards also contain information germane to the BES100 or BES200 Series switch:

- IEEE 802.1D (Standard for Spanning Tree Protocol)
- IEEE 802.1ab (LLDP support)
- IEEE 802.3 (Ethernet)
- IEEE 802.1Q (VLAN Tagging)
- IEEE 802.3ad (Link Aggregation)

Configuration and switch management

The BES100 and BES200 Series switches that are shipped directly from the factory are ready to operate in any 10BASE-T or 100BASE-TX standard network.

You can manage the switch using one of the following:

- Console interface

  The console interface lets you configure and manage the switch locally. Access the CI menus and screens locally through a console terminal attached to the BES100 or BES200 Series switch.

- Web-based management

  You can manage the network from the World Wide Web. Access the Web-based graphical user interface (GUI) through the HTML-based browser located on your network. The GUI lets you configure, monitor, and maintain your network through Web browsers. You can also download software using the Web.

- Business Element Manager

  The Element Manager is a client-based management application that runs on a Microsoft Windows computer. With the Element Manager you can connect to BES100 Series or BES200 switch devices over an IP network. It is used to configure, administer, and monitor BES100 or BES200 Series switch devices.

BES reference information

This chapter provides technical specifications and reference information for the BES100 and BES200 Series switches.

Navigation

System defaults

The following table lists some of the BES100 and BES200 basic system defaults.

Feature	Parameter	Default
Administration	User Name	nnadmin
	Password	PlsChgMe!
Console Switch	Password Type	ON
Switch	User ID (Read Only)	nnadminRO
	Password (Read Only)	PlsChgMe!RO
	User ID (Read/Write)	nnadmin
	Password (Read/Write)	PlsChgMe!
Web Switch	Password Type	ON
TCP/IP	IP Address	192.168.1.132
SNMP	Community (Read Only)	PlsChgMe!RO
	Community (Read/Write)	PlsChgMe!RW

QoS defaults

For information about QoS defaults weights, see the following table.

QoS default weights	Value
Low	32
Medium	64
High	96
Highest	128

Technical specifications

This section includes the following topics:

- "SFP physical specifications" (page 228)
- "Specifications for LC type 1000BASE-SX connectivity" (page 229)
- "Specifications for LC type 1000BASE-LX connectivity" (page 229)
- "Specifications for MT-RJ Type 1000BASE-SX connectivity" (page 230)

SFP physical specifications

This section provides technical specifications for the following SFP models:

- 1000BASE-SX
- 1000BASE-LX

"Technical specifications for 1000BASE-SX, and 1000BASE-LX SFPs" (page 228) describes general specifications for 1000BASE-SX, and 1000BASE-LX SFPs.

Technical specifications for 1000BASE-SX, and 1000BASE-LX SFPs

Specification	Description
Dimensions (H x W x D)	13.4 x 8.5 x 56.4 mm (0.53 x 0.33 x 2.22 in.)
Connectors	Multimode fiber optic: LC or MT-RJ Single-mode fiber optic: LC or MT-RJ Single-fiber LC fiber optic connector

Specifications for LC type 1000BASE-SX connectivity

The Model 1000BASE-SX SFP provides 1000BASE-SX (850 nm, short wavelength, Gigabit Ethernet) connectivity using LC duplex multimode fiber connectors. The Model 1000BASE-SX SFP supports full-duplex operation only."1000BASE-SX SFP specifications" (page 229) describes standards, connectors, cabling, and distance for the Model 1000BASE-SX SFP.

1000BASE-SX SFP specifications

Type	Specification
Standards	Conforms to the following standards: 802.3z, 1000BASE-SX
Connectors	Duplex LC fiber optic connector
Cabling	62.5 µm MMF optic cable 50 µm MMF optic cable
Distance	902 ft. (275 m) using 62.5 µm MMF optic cable 1804 ft. (550 m) using 50 µm MMF optic cable
Wavelength	850 nm
Optical budget	7 dB
Laser Transmitter characteristics	
Minimum launch power	-10 dBm
Maximum launch power	-4 dBm
Receiver characteristics	
Minimum receiver sensitivity	-17 dBm
Maximum power input	0 dBm

Specifications for LC type 1000BASE-LX connectivity

The Model 1000BASE-LX SFP provides 1000BASE-LX (1310 nm, long wavelength, Gigabit Ethernet) connectivity using LC duplex fiber connectors. The long wavelength optical transceivers used in the LX model provide variable distance ranges using both multimode and single-mode fiber optic cabling. The Model 1000BASE-LX supports full-duplex operation only.

"1000BASE-LX SFP specifications" (page 229) describes standards, connectors, cabling, and distance for the Model 1000BASE-LX SFPs.

1000BASE-LX SFP specifications

Type	Specification
Standards	Conforms to the following standards: 802.3z, 1000BASE-LX
Connectors	Duplex LC fiber optic connector

Type	Specification
Cabling	62.5 µm MMF optic cable 50 µm MMF optic cable 10 µm SMF optic cable
Distance	1804 ft. (550 m) using 62.5 µm MMF optic cable 1804 ft. (550 m) using 50 µm MMF optic cable 16405 ft. (5 km) using 10 µm SMF optic cable
Wavelength	1310 nm
Optical budget	10.5 dB
Laser Transmitter characteristics	
Minimum launch power	-9.5 dB
Maximum launch power	-3.0 dB
Receiver characteristics	
Minimum receiver sensitivity	-20.0 dBm
Maximum power input	-3.0 dBm

Specifications for MT-RJ Type 1000BASE-SX connectivity

The Model 1000BASE-SX (MT-RJ Type) SFP GBIC provides Gigabit Ethernet connectivity using MT-RJ multi-mode fiber connectors. "1000BASE-SX MT-RJ type SFP specifications" (page 230) describes standards, connectors, cabling, and distance for the Model 1000BASE-SX (MT-RJ Type) SFP GBIC.

1000BASE-SX MT-RJ type SFP specifications

Type	Specification
Standards	Conforms to the following standards: 802.3z, Ethernet full duplex
Connectors	Duplex MT-RJ fiber optic connector
Cabling	62.5 µm MMF optic cable 50 µm MMF optic cable
Distance	902 ft. (275 m) using 62.5 µm MMF optic cable 1804 ft. (550 m) using 50 µm MMF optic cable
Laser Transmitter characteristics	
Wavelength	850 nm
Maximum spectral width	0.85 nm
Minimum launch power	-9.5 dB
Maximum launch power	-4.0 dB
Receiver characteristics	

Type	Specification
Minimum receiver sensitivity	-17.0 dBm
Maximum power input	0 dBm

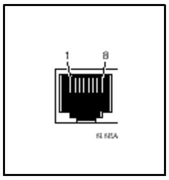
Connector and pin assignments

This section describes port connectors and pin assignment for the BES100 and BES200 Series switch

RJ-45 (10BASE-T/100BASE-TX) port connectors

The RJ-45 port connectors (see "RJ-45 (8-pin modular) port connector" (page 231)) are wired as MDI-X ports to connect end stations without using crossover cables. (For more information, see "MDI and MDI-X devices" (page 231)). For 10BASE-T connections, use Category 3 (or higher) UTP cable. For 100BASE-TX connections, use only Category 5 UTP cable.

RJ-45 (8-pin modular) port connector



Pin descriptions for RJ-45 pinouts

Pin	Signal	Description
1	RX+	Receive Data +
2	RX-	Receive Data -
3	TX+	Transmit Data +
4	Not applicable	Not applicable
5	Not applicable	Not applicable
6	TX-	Transmit Data -
7	Not applicable	Not applicable
8	Not applicable	Not applicable

MDI and MDI-X devices

Media dependent interface (MDI) is the Institute of Electrical and Electronics Engineers (IEEE) standard for the interface to unshielded twisted pair (UTP) cable.

For two devices to communicate, the transmitter of one device must connect to the receiver of the other device. The connection is established through a crossover function, which can be a crossover cable or a port that implements the crossover function internally.

Ports that implement the crossover function internally are known as MDI-X ports, where X refers to the crossover function

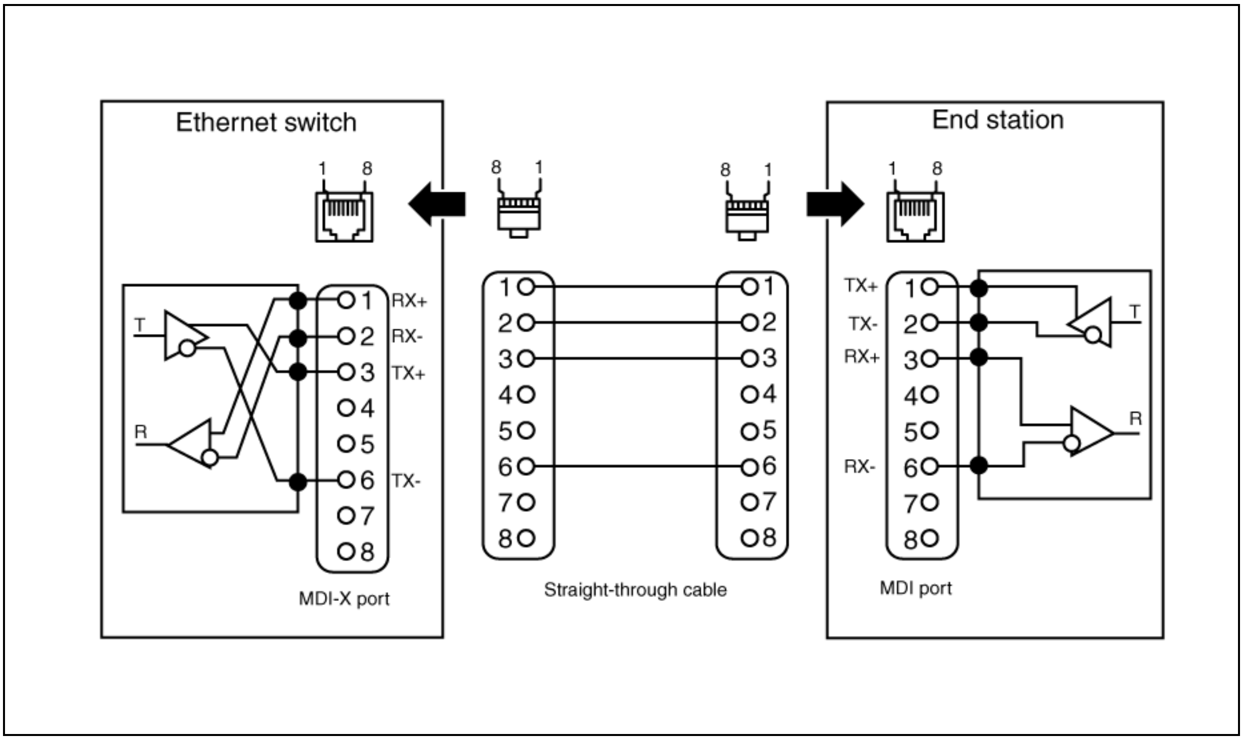
> ***Note:*** For the transmitter of one device to connect to the receiver of another device, the total number of crossovers must always be an odd number.

The following sections describe the use of straight-through and crossover cables for connecting MDI and MDI-X devices.

MDI-X to MDI cable connections

BES100 and BES200 Series switches use MDI-X ports that allow you to connect directly to end stations without using crossover cables ("MDI-X to MDI cable connections" (page 232)).

MDI-X to MDI cable connections

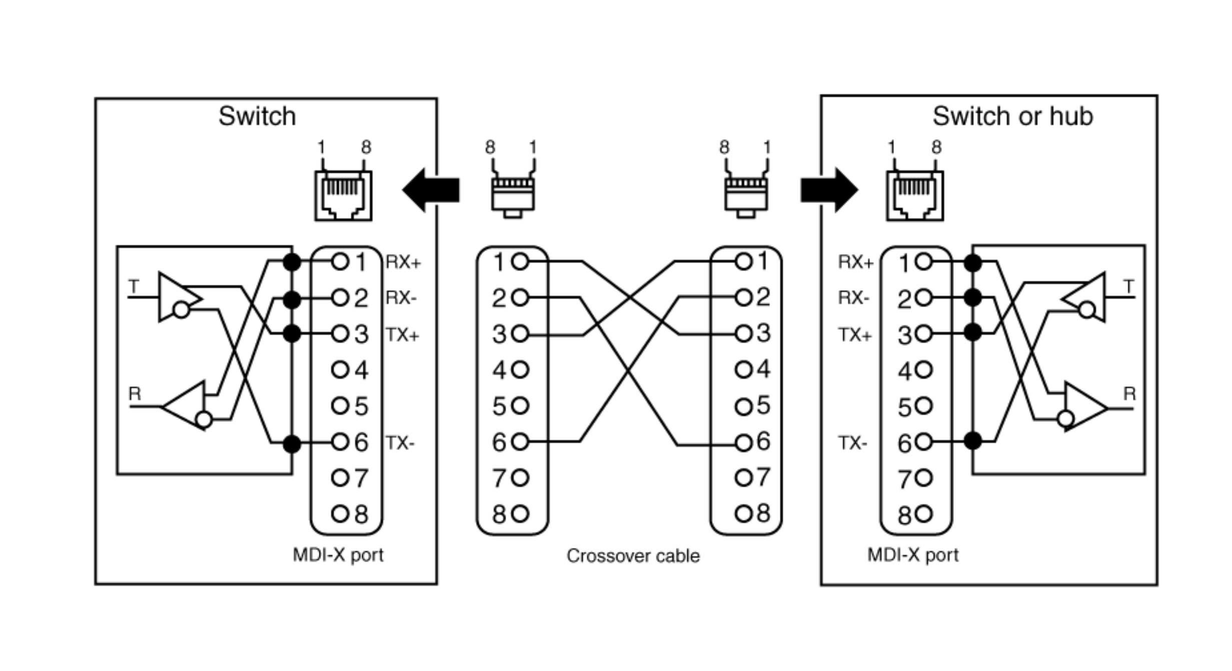


MDI-X to MDI-X cable connections

If you are connecting the BES100 or BES200 Series switch to a device that also implements MDI-X ports, use a crossover cable ("DB-9 console/comm port connector" (page 233)).

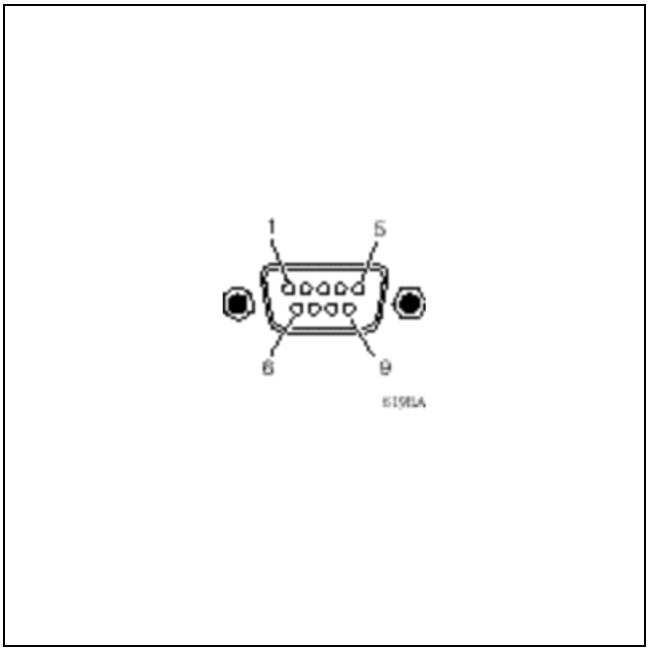
DB-9 (RS-232-D) console/comm port connector

DB-9 console/comm port connector



The DB-9 console/comm port connector ("DB-9-console port connector" (page 234)) is configured as a data communications equipment (DCE) connector. The DSR and CTS signal outputs are always asserted; the CD, DTR, RTS, and RI signal inputs are not used. This configuration enables a management station (a PC or console terminal) to connect directly to the switch using a straight-through cable.

DB-9-console port connector



"DB-9 console port connector pin assignments " (page 234) lists the DB-9 console port connector pin assignments.

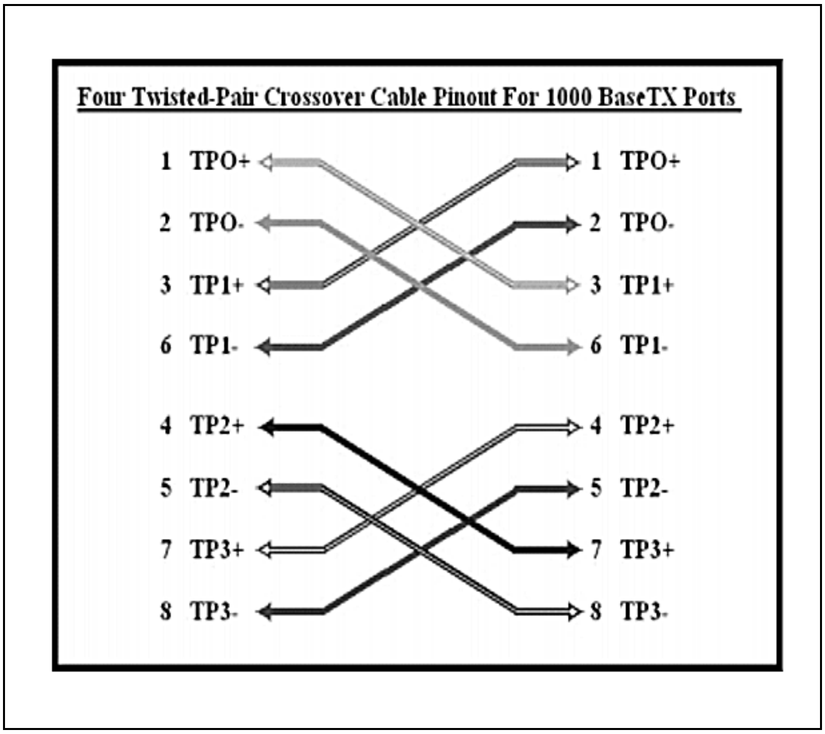
DB-9 console port connector pin assignments

Pin	Signal	Description
1	CD	Carrier detect (not used)
2	TXD	Transmit data (output)
3	RXD	Receive data (input)
4	DTR	Data terminal ready (not used)
5	GND	Signal ground
6	DSR	Not used
7	RTS	Request to send (not used)
8	CTS	Not used
9	RI	Ring indicator (not used)
Shell	—	Chassis ground

1000Base-T pinouts for the BES100 or BES200 Series switch

The 1000Base-T pinouts are illustrated and described in the following section.

1000Base-T pinouts



Pin descriptions for 1000Base-T pinouts

Pin	MDI	MDI-X
1	BI_DA+	BI_DB+
2	BI_DA-	BI_DB-
3	BI_DB+	BI_DA+
4	BI_DC+	BI_DD+
5	BI_DC-	BI_DD-
6	BI_DB-	BI_DA-
7	BI_DD+	BI_DC+
8	BI_DD-	BI_DC-

System information page

Use the System information page to view an image of the BES100 or BES200 switch configuration, to get information about the host device and, if provided, the contact person or manager for the switch.

The System Information page is also the home page for the Web-based user interface.

Procedure steps

Step	Action
1	From the main menu, choose **Administration**.
2	Choose **System Information**. The System Information page appears.

—End—

QoS Traffic Control page

Use the Quality of Service (QoS) Traffic Control page to monitor performance.

Procedure steps

Step	Action
1	From the main menu, choose **Application**.
2	Choose **Quality of Service > Traffic Control**. The Traffic Control page appears.

—End—

QoS Traffic Control page items

Item	Description
Policy Configuration	Specifies the policy type to use.
Policy Type	Strict/Weighted Round-Robin scheduling
Traffic Class Priority Configuration	Lists the eight user priority levels.
User Priority	The name created by the network administrator to identify the switch, for example, Finance Group.
Traffic Class	Specify the traffic class associated with each user priority.

Spanning Tree Bridge Information page

Use the Spanning Tree Bridge information page to see bridge information.

Procedure steps

Step	Action
1	From the main menu, choose **Application**.
2	Choose **Spanning Tree**.
3	Choose **Bridge Information**. The Bridge Information page appears.

—End—

Spanning Tree Bridge Information page items

Item	Description
STP Priority	Select the priority value of the bridge ID in hexadecimal notation, which is the most significant byte of the bridge ID. The Spanning Tree Algorithm uses this parameter to determine the root bridge (or designated bridge). For example, the bridge with the lowest bridge ID becomes the root bridge, with Bridge Priority values compared first, followed by the hardware addresses. The values displayed for Bridge Priority are in hexadecimal
Stp Version	The version of STP running on the switch.
Bridge Max Age	The value that all bridges use for the maximum age of a bridge when it is acting as the root. BridgeHelloTime The value that all bridges use for HelloTime when this bridge is acting as the root.
Bridge Hello Time	The value that all bridges use for HelloTime when this bridge is acting as the root.
Bridge Forward Delay Time	The value that all bridges use for ForwardDelay when this bridge is acting as the root
Tx Hold Count	The maximum number of bridge protocol data units transmitted in any BridgeHelloTime.
PathCost Default type	The default path cost for this bridge. The default can be either 16 bit, which applies to the IEEE Std. 802.1D-1998 standard, or 32 bit, which applies to the IEEE Std. 802.1t standard.
Root Path Cost	The cost of the path to the root as seen from this bridge.

LACP Port statistics page

Use the Link Aggregation Control Protocol (LACP) Port Statistics page to monitor a trunk group.

Procedure steps

Step	Action
1	From the main menu, choose **Device Monitoring**.
2	Choose **Statistics**.
3	Choose **Link Aggregation Port Statistics**. The Link Aggregation Port Statistics page appears.

—End—

LACP Port Statistics page items

Item	Description
LACPDUs Rx	The number of valid LACPDUs received on the aggregation port.
MarkerPDUs Rx	The number of valid MarkerPDUs received on the aggregation port.
Marker ResponsePDUs Rx	The number of valid MarkerResponsePDUs received on the aggregation port.
UnknownPDUs Rx	The number of frames received that: • can carry the Slow Protocols Ethernet Type value, but contain an unknown PDU • are addressed to the Slow Protocols group MAC Address, but do not carry the Slow Protocols Ethernet Type
IllegalPDUs Rx	The number of frames received that carry the Slow Protocols Ethernet Type value, but contain a badly formed PDU or an illegal value of Protocol Subtype.
LACPDUs Tx	The number of LACPDUs transmitted on the aggregation port.
MarkerPDUs Tx	The number of MarkerPDUs transmitted on the aggregation port.
MarkerResponsePDUs Tx	The number of MarkerResponsePDUs transmitted on the aggregation port.

Summary Switch Information page

On the Summary Switch Information page, view summary information about the switch. For example, from this page you can obtain the physical description and serial number of the switch.

Procedure steps

Step	Action
1	From the main menu, choose **Summary**.
2	Choose **Switch Information**. The Switch Information page appears.

—End—

Summary Switch Information page items

Item	Description
Module Description	The factory default description of the switch.
SFP Installed 49	Indicates if SFP is installed on port 49.
SFP Installed 50	Indicates if SFP is installed on port 50.
Firmware Version	The firmware version of the policy switch.
Software Version	The version of the running software.
Manufacturing Date Code	The date of manufacture of the board in ASCII format.
Hardware Version	The hardware version of the policy switch.
Serial #	The serial number of the policy switch.
Mac Address	The MAC address of the switch.
IP Address	The IP address of the switch.
Fans Status	The fan status of the switch.

RMON Fault threshold page

Use the RMON Fault threshold page to view alarms that tell you when the value of a variable goes out of range. RMON alarms can be defined on any MIB variable that resolves to an integer value. String variables (such as system description) cannot be used as alarm variables.

Accessing the management interface

Access the management interface to log on to the Web-based management interface and use the application. With Web access enabled, the switch can support a maximum of five concurrent Web page users. Two predefined user levels are available and each user level has a corresponding user name and password.

The password for the Read-Only Community String is: **PlsChgMe!RO**; the password for the Read-Write Community String is: **PlsChgMe!RW** The passwords are case-sensitive.

Procedure steps

Step Action

1 In the **Username** text box, type a valid user name.
Default values are **`nnadminRO`** [lowercase] for read-only access or **`nnadmin`** [lowercase] for read/write access.

2 In the **Password** text box, type your password.
Default values are **`PlsChgME!RO`** for read-only access or **`PlsChgMe!`** for read/write access.

3 Click **Log On**.

The System Information page appears.

—End—

Nortel Business Ethernet Switch 100/200 Series

Using the Nortel Business Ethernet Switch 100/200 Series

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