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Installing the Web Switching Module for the 8600 Series Switch



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Contents

Preface	9
Before you begin	9
How this book is organized	10
Text conventions	11
Related publications	12
Hard-copy technical manuals	13
How to get help	13
Chapter 1	
Introducing the Web Switching Module	15
About the Web Switching Module	15
Installed ports	16
Basic Web OS 10.0 software features	17
Physical description	19
Faceplate	19
Ports	20
Front-facing ports 1-4	21
Rear-facing ports 5-8	22
BFM ports 1-4	23
Maintenance port	24
LEDs	24
Management processor	25
Automatic selection of redundant connections	25
Chapter 2	
Understanding the WSM	27
WSM initialization process	27
Default configuration	29

Trunk groups	32
8600 MLT groups	32
How MLTs are dynamically assigned	33
How an 8600 Series switch reset affects MLT assignment	34
WSM trunk groups	34
VLANs	35
VLAN recommended for client-server separation	35
WSM VLANs	35
8600 Series switch VLANs	36
8600 Series switch internal WSM management VLAN 4093	36
show mlt info command	37
Removing a WSM to delete VLAN 4093	37
Viewing MLT and VLAN membership in Device Manager	38
Boot process	39
WSM clock and password synchronization	40
WSM heartbeat mechanism	40
Spanning Tree Protocol	40
Spanning Tree configuration for the WSM	41
Bridge priority on the WSM	43
Spanning Tree configuration in the 8600 switch	45
Internal management VLAN 4093 and STG 64	45
Default STG bridge priority	47
Using Device Manager to configure the WSM	49
Chapter 3	
Installing the WSM	51
System requirements	51
Chassis	52
Chassis configuration requirements	52
Maximum port densities for the 8010 and 8010co chassis	53
Maximum port densities for the 8003 chassis	54
Maximum port densities for the 8006 chassis	55
Preparing for installation	56
Removing and installing a filler panel	57
Removing a filler panel	57

Installing a filler panel	58
Installing and replacing the WSM	59
Removing a WSM	60
Installing a WSM	64
Turning on the chassis power	68
Connecting a PC or terminal to the maintenance port	68
Connecting cables	70
Managing cables for the 8000 Series chassis	71
Chapter 4	
Initial Setup	75
Connecting to the WSM	75
8600 Series switch access policies	75
Logging into the 8600 Series switch	76
WSM access levels	77
Mapping access levels	78
Accessing the WSM	79
Configuring the WSM for the first time	80
Chapter 5	
Command reference	83
Extensions to the copy command	83
Copying files to a WSM	85
Flash to WSM	85
Image file	85
Configuration file	85
PCMCIA to WSM	86
Image file	86
Configuration file	86
TFTP server to WSM	86
Image file	86
Configuration file	86
Copying files from a WSM	86
WSM to Flash	86
Configuration file	86

WSM to PCMCIA	87
Configuration file	87
WSM to TFTP server	87
Image file	87
Configuration file	87
WSM commands	87
info command	88
info details	88
connect command	90
wsmreset command	92
setboot command	92
The Web OS menu system	92
Command Line history and editing	93
Idle time-out	93
Configuring SYSLOG on the WSM	94
Appendix A	
Specifications	95
WSM specifications	96
Pin assignments on port connectors	97
10/100 Mb/s Fast Ethernet	97
Maintenance port	97
Index	Index-99

Figures

Figure 1	The Web Switching Module	16
Figure 2	Web Switching Module faceplate	20
Figure 3	Web Switching Module Port Layout	21
Figure 4	WSM LEDs	24
Figure 5	Example of WSM initialization process	28
Figure 6	Default VLAN and MLT configuration for a single WSM	29
Figure 7	Sample 8600 Series switch show mlt info output showing dynamic MLTs	33
Figure 8	Sample WSM info trunk CLI output for pre-configured trunks	34
Figure 9	Sample WSM info vlan output showing preconcerted VLANs	36
Figure 10	show mlt info command output	37
Figure 11	Output message: VLAN 4093 in use	38
Figure 12	MLT dialog box	39
Figure 13	WSM STP default configuration output	42
Figure 14	WSM info/trunk output for default trunk groups and spanning trees	43
Figure 15	WSM output for changing the bridge priority	44
Figure 16	WSM cfg/stp output for disabling STP	45
Figure 17	8600 error message: STG 64 already in use	46
Figure 18	8600 switch default dynamic MLT and spanning tree group assignment	47
Figure 19	8600 switch default STG bridge priority output	48
Figure 20	Removing a filler panel: 8003, 8006, and 8010 Chassis	57
Figure 21	Removing a filler panel: 8010co Chassis	58
Figure 22	Loosening screws on the WSM: 8003, 8006, 8010 Chassis	61
Figure 23	Loosening screws on the WSM: 8010co Chassis	61
Figure 24	Ejecting the WSM from the chassis: 8003, 8006, and 8010 Chassis	62
Figure 25	Ejecting the WSM from the chassis: 8010co Chassis	62
Figure 26	Removing a WSM: 8003, 8006, and 8010 Chassis	63
Figure 27	Removing a WSM: 8010co Chassis	63
Figure 28	Installing a WSM: 8003, 8006, and 8010 Chassis	64
Figure 29	Installing a WSM: 8010co Chassis	65

Figure 30	Seating the backplane connectors: 8003, 8006, and 8010 Chassis	65
Figure 31	Seating the backplane connectors: 8010co Chassis	66
Figure 32	Securing the WSM in the chassis: 8003, 8006, and 8010 Chassis	66
Figure 33	Securing the WSM in the chassis: 8010co Chassis	67
Figure 34	Managing cables: 8010co chassis	72
Figure 35	Managing cables: 8010, 8006, 8003 chassis	73
Figure 36	Wrapping cables with sheet fiber and securing with lacing cord	74
Figure 37	Administrator main menu	81
Figure 38	WSM commands	87
Figure 39	info details command output	89
Figure 40	WSM connect command output	91
Figure 41	Administrator Main menu	93

Tables

Table 1	How this book is organized	10
Table 2	Installed ports	16
Table 3	WSM Web OS 10.0 software features	17
Table 4	Item description for Web Switching Module faceplate	20
Table 5	Item description for WSM LEDs	24
Table 6	WSM LED operation	25
Table 7	Defaults configured during WSM initialization or after a reset	30
Table 8	Chassis support for the WSM	52
Table 9	Maximum port densities for the 8010 and 8010co chassis	53
Table 10	Maximum port densities for the 8003 chassis	54
Table 11	Maximum port densities for the 8006 chassis	55
Table 12	PC and terminal parameters	69
Table 13	Connectors and cables	70
Table 14	8600 Series switch login access levels	76
Table 15	WSM access levels	77
Table 16	8600 Series switch to WSM access level mapping	78
Table 17	Access points for the WSM	79
Table 18	Copy command parameters	84
Table 19	Specifications for the WSM	96
Table 20	10/100 Mb/s Port Pinouts in the WSM	97
Table 21	Maintenance port pin assignments in the WSM	97

Preface

This guide describes how to install and use the Web Switching Module (WSM) with the Nortel Networks* 8600 Series switch. For information on integrating a WSM with a packetized SSL Acceleration Module (SAM) into an 8600 Series switch see *Using the SSL Acceleration Module with the Web Switching Module for the 8600 Series switch*.

Before you begin

This guide is intended for network administrators with knowledge of the following:

- Networks, Ethernet concepts, IP addressing
- IEEE 802.1d Spanning Tree Protocol
- SNMP configuration parameters
- Networking concepts and terminology
- Network topologies

How this book is organized

Table 1 lists the topics covered in this book.

Table 1 How this book is organized

Chapter/ Appendix	Topic	Description
1	“Introducing the Web Switching Module” on page 15	WSM hardware and software features.
2	“Understanding the WSM” on page 27	WSM default configuration. Make sure you understand the default configuration before installing the WSM into an 8600 series switch chassis.
3	“Installing the WSM” on page 51	WSM system requirements, and how to install the WSM into an 8600 series switch chassis.
4	“Initial Setup” on page 75	How to perform minimal startup configuration on the 8600 series switch and the WSM. It also describes the default configurations and how to prepare for installing the WSM.
5	“Command reference” on page 83	Commands in Passport software version 3.3.1 that are related to managing the WSM.
A	“Specifications” on page 95	Specifications for the WSM’s ports, LEDs, and more.

Text conventions

This guide uses the following text conventions:

angle brackets (< >)	Indicate that you choose the text to enter based on the description inside the brackets. Do not type the brackets when entering the command. Example: If the command syntax is <code>ping <ip_address></code> , you enter <code>ping 192.32.10.12</code>
bold Courier text	Indicates command names and options and text that you need to enter. Example: Use the info command. Example: Enter show ip {alerts routes} .
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 entering the command. Example: If the command syntax is <code>show ip {alerts routes}</code> , you must enter either <code>show ip alerts</code> or <code>show ip routes</code> , but not both.
brackets ([])	Indicate optional elements in syntax descriptions. Do not type the brackets when entering the command. Example: If the command syntax is <code>show ip interfaces [-alerts]</code> , you can enter either <code>show ip interfaces</code> or <code>show ip interfaces -alerts</code> .
ellipsis points (...)	Indicate that you repeat the last element of the command as needed. Example: If the command syntax is <code>ethernet/2/1 [<parameter> <value>]...</code> , you enter <code>ethernet/2/1</code> and as many parameter-value pairs as needed.

<i>italic text</i>	Indicates new terms, book titles, and variables in command syntax descriptions. Where a variable is two or more words, the words are connected by an underscore. Example: If the command syntax is <code>show at <valid_route>, valid_route</code> 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 entering the command. Example: If the command syntax is <code>show ip {alerts routes}</code> , you enter either <code>show ip alerts</code> or <code>show ip routes</code> , but not both.

Related publications

For more information about configuring the Web Switching Module, refer to the following publications:

- *Configuring the Web Switching Module using Device Manager*
Provides information for using the Nortel Networks* Device Manager graphical user interface (GUI) to configure the Web Switching Module. This document also presents specific WSM configuration examples using the Device Manager.
- *Web OS Switch Software 10.0 Application Guide*
Provides Web OS networking concepts and design guidelines using the command line interface. This document also presents specific Web OS configuration examples using the command line interface.

- *Web OS Switch Software 10.0 Command Reference*

Provides a reference for the Web OS command line interface.

For a list of related publications, see the release notes that accompany your software.

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Chapter 1

Introducing the Web Switching Module

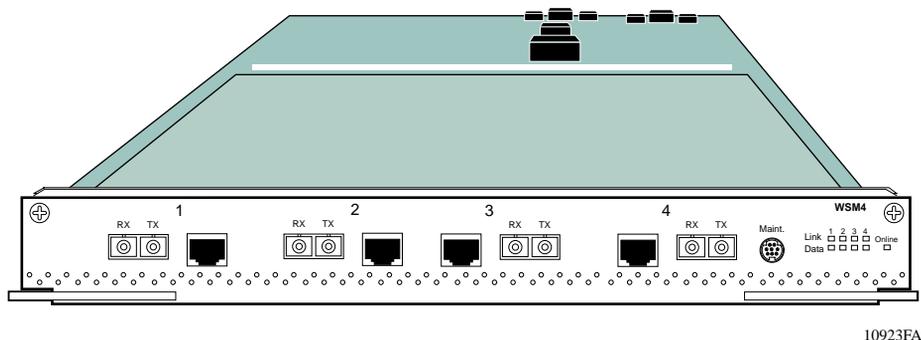
The Web Switching Module ([Figure 1](#)) for the 8600 series switch provides content-intelligent processing of Web-based traffic.

This chapter contains the following topics:

Topic	Page
About the Web Switching Module	15
Physical description	19

About the Web Switching Module

The Web Switching Module (WSM) and 8600 series I/O modules in a 8600 series switch provide a complete Layer 2 through 7 switching solution. You can aggregate large numbers of 10/100/1000 Ethernet connections to servers, routers, firewalls, and caches for switching and routing, load balancing, application redirection, and content-intelligent web switching. [Figure 1](#) shows the Web Switching Module.

Figure 1 The Web Switching Module

The WSM is unique among 8600 I/O modules because it functions as an intelligent switch within a switch.

The WSM consists of two entities:

- A web switching engine with its own management processor and the Web OS (operating system).
- A Backplane Fabric Module (BFM) that connects the switching module to the 8600 backplane.

You can connect to the WSM and Web OS using the 8600 Command Line Interface (CLI). The WSM is supported on the 8010 and 8010co (10-slot chassis), the 8006 (6-slot chassis), and the 8003 (3-slot chassis). It is also supported with many 8600 modules (see [“System requirements” on page 51](#)).

Installed ports

[Table 2](#) describes the ports on the WSM. For detailed descriptions of each port type, see [“Ports” on page 20](#).

Table 2 Installed ports

Ports	Quantity
10/100Base-T Fast Ethernet Ports (front-facing)	4
1000Base-SX Gigabit Ethernet Ports (front-facing)	4

Table 2 Installed ports (continued)

Ports	Quantity
Gigabit Ethernet Ports (rear-facing)	4
Gigabit BFM ports (internal connections to the 8600 series chassis)	4
Maintenance Port (DIN-8)	1



Note: Only 10/100BASE-T Fast Ethernet ports or 1000Base-SX Gigabit Ethernet ports can be active at a time.

Basic Web OS 10.0 software features

Table 3 lists the basic software features available with Web OS 10.0.

Table 3 WSM Web OS 10.0 software features

Feature	Description
Ethernet Switching	
IP Routing	Forwards frames between as many as 64 subnets.
255 IP routing interfaces	
Port Trunk Groups	Up to two trunk groups, each with 2 - 4 configured switch ports.
2048 filters	Includes port or VLAN filtering.
TCP Connections/Sec.	296,000
Concurrent connections	512,000
Multiple instances of STP	STGs 1 - 16, defined per VLAN
Jumbo frames	<p>Frame sizes of up to 9022 octets when connected to servers installed with Jumbo Frames-capable adapters.</p> <p>Enabling jumbo frames between the WSM and the 8600 switch is not supported. The WSM accepts only frame sizes of up to 9022 bytes. The WSM drops ingressing jumbo frame size exceeding 9022 bytes. The 8600 switch maximum transfer unit (MTU) size is 9600 bytes.</p>

Table 3 WSM Web OS 10.0 software features (continued)

Feature	Description
Port Mirroring	Multiple instances of n:1 port mirroring. A port can only belong to one instance.
246 VLANs (VLAN IDs 1 - 4092)	
Default Gateway per VLAN	
SNMP private MIB	Alteon WebSystems* Enterprise MIB supports the configuration and monitoring of all Alteon WebSystems-specific features.
SNMP support	<ul style="list-style-type: none"> • SNMP v1 • RFC 1213 MIB-II • RFC 1643 Ethernet-like MIB • RFC 1724 RIP2 MIB • RFC 1493 Bridge MIB • RFC 1398 Ethernet-like MIB • RFC 1757 RMON1 (groups 1-4) • RFC 1573 Interface Extensions MIB • RFC 2037 Entity MIB compliant
RMON	
Server Load Balancing	
Application Redirection	
Global Server Load Balancing (optional)	
Bandwidth Management (optional)	

For detailed information about WSM software features, see:

- *Web OS Switch Software 10.0 Command Reference*
- *Configuring the Web Switching Module using Device Manager*
- *Web OS Switch Software 10.0 Application Guide*

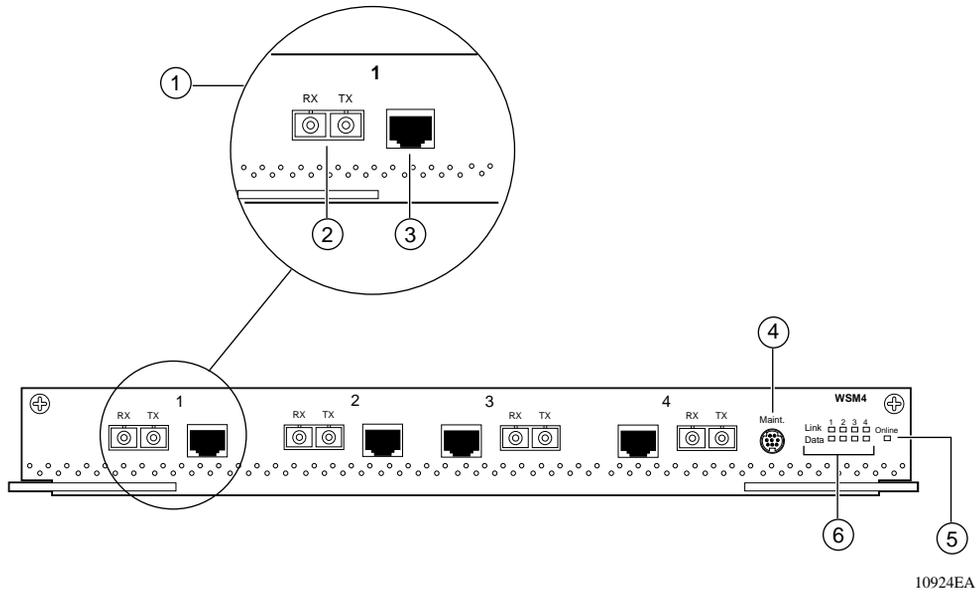
Physical description

The following sections describe the WSM's physical characteristics.

- [“Faceplate” on page 19](#)
- [“Ports” on page 20](#)
- [“LEDs” on page 24](#)
- [“Management processor” on page 25](#)
- [“Automatic selection of redundant connections” on page 25](#)

Faceplate

[Figure 2](#) shows the WSM faceplate. [Table 4](#) describes the items identified in [Figure 2](#).

Figure 2 Web Switching Module faceplate**Table 4** Item description for Web Switching Module faceplate

Item	Description
1	Front-facing ports with dual media connectors (x4)r
2	1000 Mb/s Fiber Optic SC connector
3	10/100 Mb/s Fast Ethernet RJ-45 connector
4	Maintenance port (DIN-8 connector)
5	Online LED
6	Link/Data LEDs for Front-facing ports 1-4

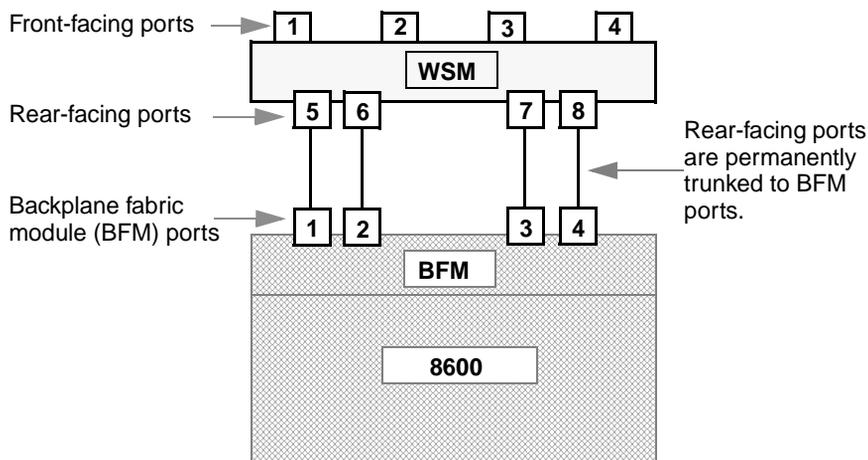
Ports

The Web Switching Module has the following three sets of ports ([Figure 3](#)), all enabled by default:

- Front-facing ports 1-4 with dual-media connectors (visible on the faceplate)
- Rear-facing ports 5-8 with no physical connectors

- Backplane Fabric Module (BFM ports) 1-4. BFM ports connect to the switch backplane and are permanently hard-wired to the rear-facing ports.

Figure 3 Web Switching Module Port Layout



Front-facing ports 1-4

Front-facing ports have dual-media 10/100 and 1000BaseSX physical connector jacks that you can connect to network devices such as a Layer-2 switch, another 8600 I/O module, a server, or an upstream router. You can configure ports 1-4 using the Web OS CLI or Device Manager.

Each front-facing port on the WSM has two connector jacks (Figure 2). The RJ-45 jack connects 10/100 Mb/s Fast Ethernet segments to the port, and the SC jack connects Gigabit Ethernet fiber optic segments. The ports auto-negotiate and support half- and full-duplex operation. Only one of the two jacks can be active at any given time. For a description of selection conditions, see [“Automatic selection of redundant connections” on page 25](#).

- Gigabit Ethernet fiber-optic SC connector (850 nm, short wavelength) ports for riser connections, server attachments, or interswitch links. The module’s short wavelength optical transceivers provide transmission ranges up to 275 meters (m) using 62.5 μ m multimode fiber cable or up to 550 m using 50 μ m multimode fiber cable. Each 1000BASE-SX port can operate in full- or half-duplex mode at distances up to 100m.

- RJ-45 10/100 Mb/s Fast Ethernet connector
Each port can operate in full- or half-duplex mode at distances up to 100m. Autonegotiation circuitry automatically negotiates the highest possible data rate and the duplex operation possible with the attached device. The WSM supports standards-based full-duplex and IEEE802.3 autonegotiation for PAUSE frames and remote fault identification when the connected device supports autonegotiation. The Online LED indicates module status. For details about port LEDs, see [“LEDs” on page 24](#).



Note: Avoid using the front facing ports unless absolutely necessary. They are limited in number and should be reserved for services that need them, such as stealth mode Intrusion Detection SLB or WAN Link SLB. Using the front-facing ports transfers the L2/3 processing to the WSM, and away from the 8600 Series switch where it is intended to be done.

Rear-facing ports 5-8

Rear-facing ports 5-8 have no physical connectors. They are located on the WSM's printed circuit board, and are permanently trunked to the BFM ports as shown in [Figure 3 on page 21](#). You can configure rear-facing ports 5-8 using the Web OS CLI or Device Manager. These rear-facing ports are used when connecting to other Passport I/O modules through the BFM ports. Rear-facing ports 5-8 operate at Gigabit Full-Duplex.

Rear-facing ports 5-8 only allow you to configure a few items. You can change the port name as well as the default VLAN ID (PVID).



Note: If you change the PVID on a rear-facing port, you must change it on all ports in the trunk group.

You can also configure the WSM backplane ports to accept IP-only packets and you can enable RMON on these ports. These ports are enabled by default and cannot be disabled. Because they belong to a trunk group, you cannot configure them with individual bandwidth contracts. 802.1Q tagging is enabled by default on these ports and cannot be disabled.



Note: Nortel Networks recommends using the WSM for IP-only applications. Although the WSM can transparently pass other protocol packets, such as IPX, from the 8600 using a Layer 2 switching engine, it is optimized for Layer 2 to Layer 7 TCP/IP operations.

BFM ports 1-4

The four single-gigabit BFM ports connect the WSM to the backplane of the 8600 Series switch chassis. BFM ports 1-4 are permanently trunked with the rear-facing ports 5-8 as shown in [Figure 3 on page 21](#). BFM ports (1-4) are referenced by slot/port.

When you insert a WSM into a slot, the 8600 Series switch CLI and Device Manager recognize the BFM ports. For example, when viewing WSM VLAN port membership, the 8600 Series switch CLI and Device Manager show the BFM ports. However, when viewing VLAN membership from the WSM, the CLI and Device Manager show the port numbers of the rear-facing ports to which the BFM ports are trunked.

As BFM ports provide WSM connectivity to the 8600 Series switch through the backplane, certain restrictions apply to their configuration:

- You can modify only the Name and the Link Trap settings on the BFM ports.
- You cannot create Brouter ports on BFM ports.
- You cannot disable BFM ports and you cannot disable 802.1Q on the BFM ports.
- Unknown-MAC-Discard is configurable but you cannot apply IP filters to BFM ports.

Maintenance port

The maintenance port is a DIN-8 connector. You can connect to the WSM with this port to perform a serial download of a Web OS software image. For information about establishing a serial connection to the WSM and performing a serial download of a software image, see *Upgrading to the 8600 Series Switch Software Release 3.3.1*. Nortel Networks provides a DB-9 to DIN-8 serial cable.

The maintenance port should be used only as a management port. You should access the WSM using the 8600 Series switch CLI. See [“Connecting to the WSM” on page 75](#) for more information about connecting to the WSM from the 8600 Series switch CLI.

LEDs

The WSM module has Link and Data LEDs ([Figure 4](#)) for each front-facing port, and an Online LED that indicates when the module is properly connected and running. [Table 5](#) describes the items shown in [Figure 4](#).

Figure 4 WSM LEDs

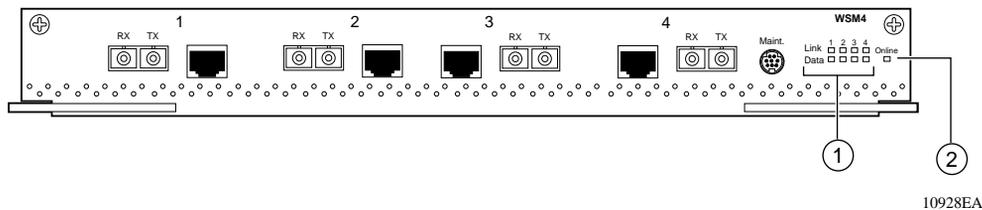


Table 5 Item description for WSM LEDs

Item	Description
1	Link and Data LEDs for front-facing ports 1-4
2	Module Online LED

Table 6 describes LED operation.

Table 6 WSM LED operation

Type	Label	Color/State	Description
Port	Link	Amber/Steady	Indicates a 10/100Base-T connection.
		Green/Steady	Indicates a 1000Base-SX connection.
		Off	The port has not detected a fault condition.
Port	Data	Off	The port has a signal but no link.
		Green/Blinking	The port is receiving data.
Module	Online	Off	The switch power is off, or the power has been turned on and the module is going through its power-on self-test and software initialization. A module in this state is not yet functional.
		Amber/Steady	The module failed its power-on self-test.
		Green/Steady	The module has completed its power-on self-test and software initialization and is operating normally.

Management processor

The WSM contains a central management processor (MP) that provides overall control of the module and stores the Web OS software.

Automatic selection of redundant connections

Because the WSM supports dual-media configuration on the front-facing ports 1-4, the module can automatically bring up and failover between the 10/100 Mb/s and 1000 Mb/s port-pairs. The order of precedence occurs as follows:

- If both the 10/100 Mb/s and 1000 Mb/s ports are inactive:
 - If the user activates the Gigabit Ethernet port first (by plugging a live cable into the SX-jack), the port immediately becomes active.

- If the user activates the 10/100 Mb/s port first, it remains inactive for a user-selectable time-out (default 1.5 seconds). If the Gigabit Ethernet port is activated prior to the time-out, it becomes the active port, otherwise the 10/100 Mb/s port becomes active.
- If the active Gigabit Ethernet link fails, the 10/100 Mb/s port becomes the active port.
- If the 10/100 Mb/s link is active and the Gigabit Ethernet link becomes viable (either because of a newly created connection or because of a repaired link), the 10/100 Mb/s link remains active until one of the following occurs:
 - The 10/100 Mb/s link fails or the user removes it.
 - The user forces the Gigabit Ethernet to become the active link from any management interface.

Chapter 2

Understanding the WSM

This chapter describes what you need to know before installing the WSM in an 8600 Series switch chassis. It assumes that an 8600 Series switch is already operating in your network environment.

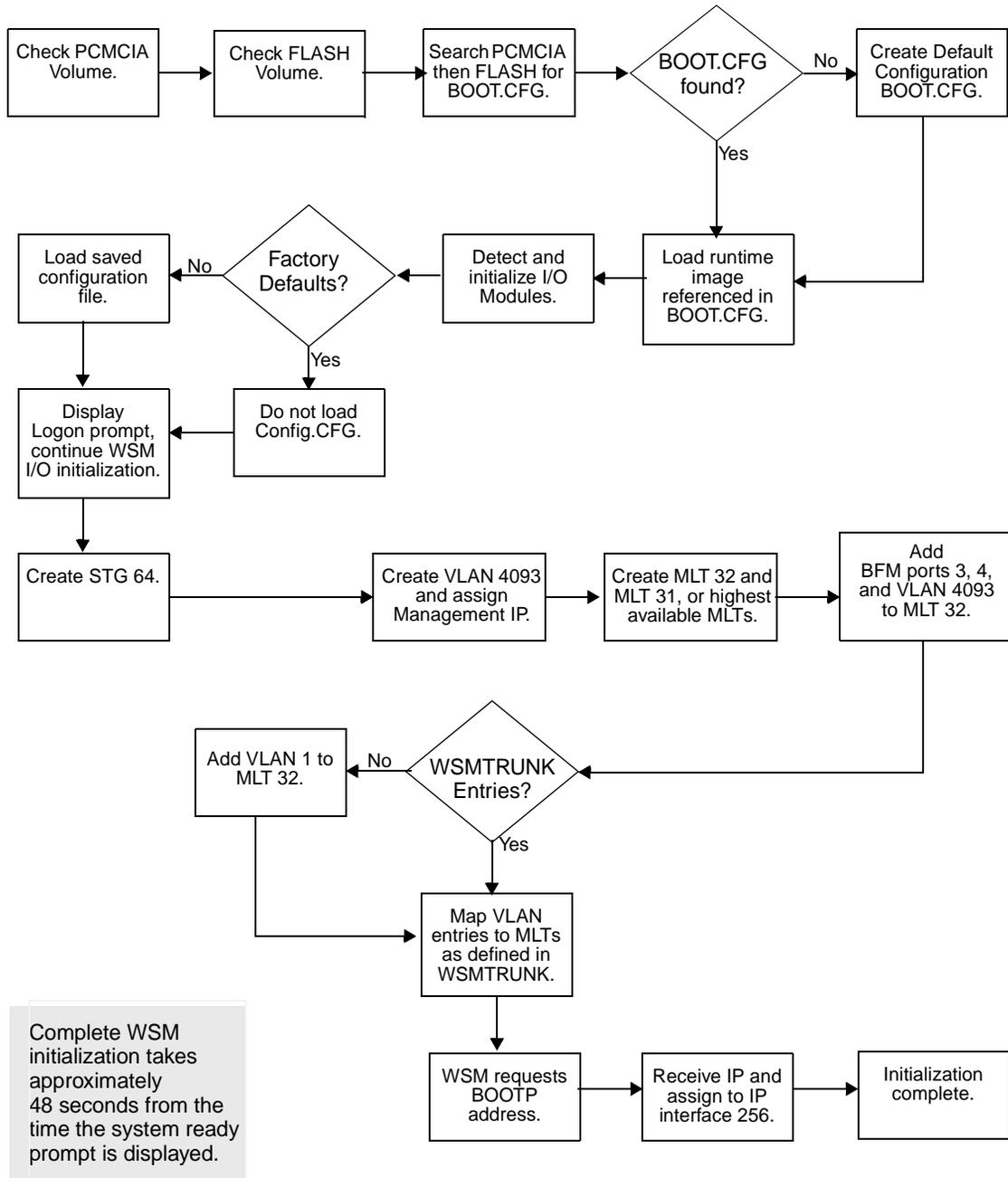
This chapter includes the following topics:

Topic	Page
WSM initialization process	27
Default configuration	29
Trunk groups	32
VLANs	35
Boot process	39
Spanning Tree Protocol	40
Using Device Manager to configure the WSM	49

WSM initialization process

Although you can configure parts of the boot process, [Figure 5](#) describes what generally occurs during WSM initialization.

Figure 5 Example of WSM initialization process



Default configuration

When a WSM initializes, some components are dynamically configured. The WSM uses the four rear-facing ports (5 - 8) to integrate into the backplane of the 8600 Series switch chassis.

The WSM is an intelligent module with self-configuration capabilities. Each WSM in the 8600 Series switch chassis uses two MLT IDs. For more information, see [“8600 MLT groups”](#) on page 32.

[Figure 6](#) illustrates the WSM default configuration for an 8600 Series switch chassis with a single WSM installed.

Figure 6 Default VLAN and MLT configuration for a single WSM

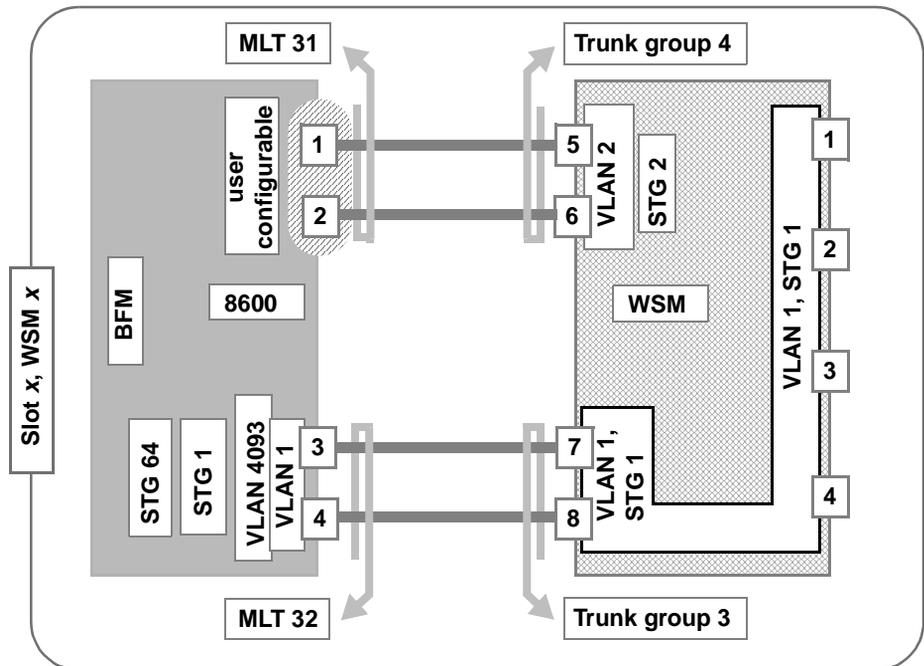


Table 7 describes the factory defaults that are automatically configured during initialization or during a factory reset of the 8600 switch and/or WSM.

Table 7 Defaults configured during WSM initialization or after a reset

Factory default	WSM	8600 switch
High Spanning Tree Group (64 for Passport 8600 and 16 for WSM)	WSM uses STP16 for internal operations. Rear-facing ports 7 and 8 are added to STP16 during initialization.	The 8600 switch uses STG64 for internal operation while inserting the WSM. BFM ports 3 and 4 are added to STG 64.
STG 1	STG 1 is created to hold default VLAN 1, front-facing ports 1- 4, and rear-facing ports 7- 8. By default, all newly created VLANs on the WSM are part of STG 1, until you assign them to another STG.	BFM ports 3 and 4 linked with the WSM are added to STG1. User can remove BFM Ports from default STG and add these to any STG and VLAN.
STG 2	STG 2 is created to hold VLAN 2 and rear-facing ports 5 and 6.	Not configured as part of the WSM initialization.
VLAN 1	Rear-facing ports 7 and 8 as well as front-facing ports 1 - 4 are added to VLAN 1. VLAN 1 provides server-side access. It is fully configurable and can have no defined port members. Since VLAN 1 is the default VLAN, it cannot be deleted. VLAN 1 is assigned to WSM trunk group 3.	BFM ports 3 and 4 from the WSM are added to the 8600 VLAN1. VLAN 1 is required for server-side traffic. It is fully configurable and is associated with the management trunk group (MLT32 by default in a single WSM configuration). By default VLAN 1 contains BFM ports 3 and 4 for each WSM. Since VLAN 1 is the default VLAN, it cannot be deleted and it contains any port on the system that does not have a VLAN assigned. Default Spanning Tree Group 1 is added to VLAN 1 and cannot be changed. Since BFM ports 3 and 4 from each WSM are added to VLAN 1, a broadcast in VLAN 1 causes a broadcast in all WSMs using the default configuration. To avoid this, modify the default VLAN structure.

Table 7 Defaults configured during WSM initialization or after a reset (continued)

Factory default	WSM	8600 switch
VLAN 2	<p>Rear-facing ports 5 and 6 are added to VLAN 2.</p> <p>VLAN 2 provides client-side access. It is fully configurable and can have no port members defined. VLAN 2 is assigned to WSM trunk group 4 and contains rear-facing ports 5 and 6.</p> <p>Although VLAN 2 is not part of the factory default on the 8600 Series switch, it is required on the WSM to support 8600 Series switch code versions prior to 3.2.2. For this reason, with every factory reset, the WSM rear-facing ports 5 and 6 are added to VLAN 2. Since the rear-facing ports are 802.1Q tagged links, they can belong to multiple VLANs so it is not necessary for you to remove these links from VLAN 2 prior to adding them to another VLAN, although it is recommended.</p>	<p>VLAN 2 is not configured by default.</p> <p>With release code 3.2.2 and later, VLAN2 is not a hard-coded system VLAN. This ensures that VLAN 2 is not added to non-IMC trunks as a default setting and gives you flexibility to assign a VLAN once the MLT group for WSM rear facing ports 5 and 6 is validated to the non-imc trunk list.</p>
VLAN 4093	<p>VLAN 4093 is configured as follows during initialization:</p> <ul style="list-style-type: none"> • Rear-facing ports 7 and 8 • IP address assigned in the range 172.31.255.246/28 - 172.31.255.253/28 • IP interface 256 • WSM trunk group 3 <p>VLAN 4093 manages the WSM connection to the 8600 Series switch backplane. It is completely hidden, is not configurable, and cannot be removed.</p> <p>If VLAN 4093 is already configured on your network, you must change that VLAN to use another VLAN ID before inserting the WSM.</p> <p>If you have an IP address conflict within your network, contact Customer Support. See “How to get help” on page 13 for more information.</p>	<p>VLAN 4093 is configured as follows during initialization:</p> <ul style="list-style-type: none"> • BFM ports 3 and 4 • IP address 172.31.255.245 / 28 • mask 255.255.255.240 • Default IP management subnet <p>VLAN 4093 is used for internal switch management. It belongs to the management MLT by default, is hidden, and will not appear in the ARP table or IP routing table. It cannot be removed or configured.</p> <p>If VLAN 4093 is already configured in the 8600 Series switch, you must reconfigure the system to free VLAN 4093 before inserting the WSM.</p>
MLT 32	Connects to Trunk Group 3 on the WSM.	BFM ports 3 and 4 are combined to make multi-link trunk group 32.
MLT 31	Connects to Trunk Group 4 on the WSM.	BFM ports 1 and 2 are combined to make multi-link trunk group 31

Table 7 Defaults configured during WSM initialization or after a reset (continued)

Factory default	WSM	8600 switch
Trunk group 4	WSM rear-facing ports 5 and 6 are combined to make trunk group 4.	Connects to MLT 31 on the 8600 switch.
Trunk group 3	WSM rear-facing ports 7 and 8 are combined to make trunk group 4.	Connects to MLT 32 on the 8600 switch.

Trunk groups

This section includes the following topics:

- [“8600 MLT groups” on page 32](#)
- [“WSM trunk groups” on page 34](#)

8600 MLT groups

The 8600 Series switch allows a total of 32 MLT groups. Each WSM installed in the 8600 Series switch chassis will be assigned two available MLT groups.

When inserted in the chassis, the WSM begins searching the available MLTs, from the highest-numbered to the lowest-numbered, for unused MLT IDs.

For example, if MLT IDs 1 - 32 are available on the 8600 Series switch, the WSM starts searching at MLT ID 32, then MLT 31, then MLT 30, and so on. MLT IDs 32 and 31 are assigned to the BFM ports linked with the WSM if the 8600 Series switch configuration does not already use these IDs. For more information, see [“How MLTs are dynamically assigned” on page 33](#).

All ports in the dynamically-created MLTs are 802.1Q-tagged.

[Figure 7](#) shows two WSMs, each using two MLTs. The WSM in slot 4 uses MLT31 and 32. The WSM in slot 2 uses MLT29 and 30.

Figure 7 Sample 8600 Series switch show mlt info output showing dynamic MLTs

```

8610:5# show mlt info
=====
                                Mlt Info
=====
                                PORT SVLAN MLT MLT PORT VLAN
MULTICAST
MLTID IFINDEX NAME TYPE      TYPE  ADMIN CURRENT MEMBERS  IDS DISTRIBUTION
-----
29      4124  MLT-29 trunk normal norm   norm   2/1-2/2 disable
30      4125  MLT-30 trunk normal norm   norm   2/3-2/4 4093 1 disable
31      4126  MLT-31 trunk normal norm   norm   4/1-4/2 disable
32      4127  MLT-32 trunk normal norm   norm   4/3-4/4 4093 1 disable
8610:5#

```

How MLTs are dynamically assigned

The IDs for 8600 Series switch Dynamic MLT links to the WSM are assigned automatically. After inserting a WSM into the chassis, the highest available MLT will be assigned to BFM ports 3 and 4, the second highest to BFM ports 1 and 2. Based on availability, MLT trunk group numbers will not necessarily be consecutive.

- If MLT 32 and 31 are not in use, MLT 32 and 31 are assigned.
- If MLT 32 and 31 are in use, MLT 30 and 29 are assigned.
- If MLT 31, 30 and 29 are in use, MLT 32 and 28 are assigned.



Note: During initialization, the WSM fails to boot if two unused MLTs are not available on the 8600 Series switch.

To take full advantage of the 8600 Series switch port capacity and other I/O modules in the chassis, configure and add a VLAN(s) to the 8600 switch MLT 31 and WSM trunk group 4 (ports 5 and 6).

If a WSM is installed in a 8600 Series switch chassis and MLTs are created dynamically for the WSM, you cannot set these MLTs to SMLT. For both CLI and JDM operation, the MLT is verified before it is set to SMLT. In Device Manager, if a MLT is the WSM MLT, then you cannot set the `mltType` to SMLT.

How an 8600 Series switch reset affects MLT assignment

When an 8600 Series switch is reset, the MLT dynamic assignments start first with the WSM installed in the lowest slot number. This can cause your initial trunk group assignments to change, for example:

Initial installation:

- 1 WSM 1 is first inserted in slot 8 and assigned MLT 31 and 32.
- 2 WSM 2 is then inserted in slot 1 and assigned MLT 29 and 30.

After a reset:

- 1 WSM 1 in slot 8 is assigned MLT 29 and 30.
- 2 WSM 2 in slot 1 is assigned MLT 31 and 32.

WSM trunk groups

The WSM has a total of four trunk groups. There are two user-configurable trunk groups—trunk groups 1 and 2. Trunk groups 3 and 4 are pre-configured as WSM factory defaults and provide connectivity to the 8600 Series switch through the backplane. You cannot add or delete ports from trunk groups 3 and 4.

[Figure 8](#) shows sample CLI output of pre-configured WSM trunk groups.

Figure 8 Sample WSM info trunk CLI output for pre-configured trunks

```
WSM_4 >> Information# /info/trunk
Trunk group 3, bw contract 1024, port state: <=== Pre-configured trunk
7: STG 1 forwarding
8: STG 1 forwarding
Trunk group 4, bw contract 1024, port state: <=== Pre-configured trunk
5: STG 2 forwarding
6: STG 2 forwarding
```

VLANs

This section includes the following topics:

- [“VLAN recommended for client-server separation” on page 35](#)
- [“WSM VLANs” on page 35](#)
- [“8600 Series switch VLANs” on page 36](#)

VLAN recommended for client-server separation

The 8600 switch ports which are connected to clients are associated with different VLANs than the 8600 switch ports which are connected to servers.

VLANs associated with 8600 switch ports which are connected to clients, are added to the MLT configured for BFM ports 3-4 and WSM trunk group 3. This VLAN association allows forwarding of traffic from clients to the WSM.

VLANs associated with 8600 Series switch ports which are connected to servers, are added to the MLT configured for BFM ports 1-2 and WSM trunk group 4. This VLAN association allows forwarding of traffic from servers to the WSM,

To separate client and server processing, Nortel Networks recommends that you add the second highest MLT (usually 31) to a unique VLAN<n>. Configure this VLAN on both the WSM and the 8600 Series switch.

On the 8600 switch-side, the unique VLAN<n> must match the WSM 2nd MLT Group. VLAN<n> on the 8600 switch enables Layer 4-7 processing through any I/O Module in the 8600 Series switch chassis.

WSM VLANs

On the WSM, you can configure 246 VLANs using VLAN IDs 1-4092. VLANs 1 and 2 are automatically created as part of the WSM default configuration.

You can change the port membership for VLAN 1 and VLAN 2. The default configuration adds trunk group 3 (ports 7 and 8) to VLAN 1 and trunk group 4 (ports 5 and 6) to VLAN 2. To avoid Layer 2 looping, do not add the two MLTs to the same VLAN. VLAN 2 is a place-holder for trunk group 4 in the factory default configuration. You can add other ports to VLANs in trunk groups 3 and 4. You can also remove trunk groups 3 and 4 from the default VLANs and add them to any other VLAN(s).

All rear-facing WSM ports in the default trunk groups are 802.1Q-tagged.

In WSM WebOS, VLAN 1 is a default VLAN and cannot be deleted. VLAN2 can be deleted as long as no port has its default VLAN ID (PVID) set to VLAN2. All other VLANs can be created and/or deleted.

Figure 9 shows CLI output listing the VLANs that are pre-configured during WSM initialization.

Figure 9 Sample WSM info vlan output showing preconcerted VLANs

```
WSM_4 >> Main# /info/vlan
VLAN Name Status Jumbo BWC Ports
-----
1 Default VLAN ena n 1024 1-4(7 8)
2 VLAN 2 ena n 1024(5 6)
```

8600 Series switch VLANs

The 8600 Series switch automatically creates VLAN 1 during default configuration. The WSM dynamic MLT with the higher MLT ID [Port members slot<number>/3 and slot<number>/4] is added to VLAN 1. The second dynamic MLT remains unassigned and is not added to any VLAN. You can add this MLT to any VLAN.

8600 Series switch internal WSM management VLAN 4093

The 8600 Series switch automatically creates VLAN 4093 for WSM internal management whenever one of the following occurs:

- You insert a WSM into an 8600 Series switch chassis.

- You restart an 8600 Series switch which has a WSM in one slot.

Since VLAN 4093 is used for internal management, its port membership is not saved in the 8600 Series switch configuration file. If all WSMs are removed from the 8600 Series switch chassis, VLAN 4093 is automatically removed. The WSM dynamic MLT with the higher MLT ID [Port members slot(x)/3 and slot(x)/4] is added to VLAN 4093. When a WSM is present in the 8600 Series switch chassis you cannot delete VLAN 4093 nor modify its port membership.



Note: If VLAN 4093 is in use on your 8600 Series switch, you must reconfigure the 8600 Series switch to free VLAN 4093 before inserting the WSM.

You can display the MLT trunk groups for each module, their member ports (based on the BFM port numbers), and VLAN IDs.

show mlt info command

Figure 10 shows CLI output for an 8600 Series switch with WSMs installed in slots 2 and 4.

Figure 10 show mlt info command output

```
8610:5# show mlt info
=====
                                Mlt Info
=====
```

MLTID	IFINDEX	NAME	PORT TYPE	PORT MEMBERS	VLAN IDS
29	4124	MLT-29	trunk	4/1-4/2	2
30	4125	MLT-30	trunk	4/3-4/4	4093 1
31	4126	MLT-31	trunk	2/1-2/2	2
32	4127	MLT-32	trunk	2/3-2/4	4093 1

Removing a WSM to delete VLAN 4093

Figure 11 shows the message that appears if you insert a WSM into an 8600 Series switch chassis in which VLAN 4093 is already in use.

Figure 11 Output message: VLAN 4093 in use

```
*****
VLAN 4093 HAS ALREADY BEEN USED
PLEASE CHANGE THE CONFIGURATION TO FREE VLAN 4093
SO VLAN 4093 CAN BE CONFIGURED FOR WSM
*****
8610:5# [09/05/02 01:15:16] ERROR Task=WsmPreConfigTask Failed to create IMC VLAN
8610:5# [09/05/02 01:15:16] Can not config card due to condition specified
8610:5# [09/05/02 01:15:16] Remove ALL the WSM blades. Correct problem.
8610:5# [09/05/02 01:15:16] Then re-insert WSM blades afterward
8610:5# [09/05/02 01:15:16] Failure to do so will cause incorrect behavior
```

You must remove the WSM before you can reconfigure the 8600 Series switch to free VLAN 4093.

To reconfigure the 8600 Series switch to free VLAN 4093:

- 1 Remove the WSM from the chassis.
- 2 Reconfigure the 8600 Series switch to free VLAN 4093.
- 3 Re-insert the WSM in the chassis.



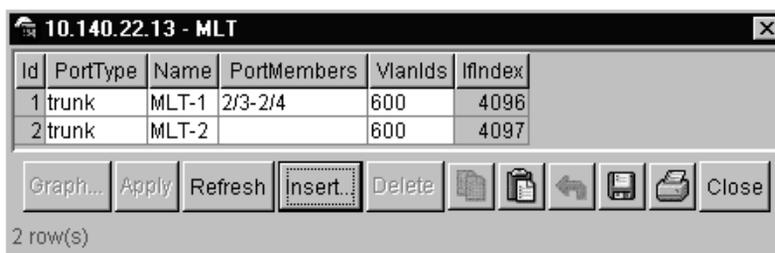
Note: You cannot delete or modify VLAN 4093 on the 8600 Series switch when a WSM is present.

Viewing MLT and VLAN membership in Device Manager

To view MLT VLAN membership in Device Manager:

- 1 From the Device View, choose VLAN > MLT.

The MLT dialog box ([Figure 12](#)) opens displaying the active MLTs.

Figure 12 MLT dialog box

Boot process

An 8600 Series switch chassis in which one or more WSMs are installed, boots in the following sequence.

- 1 The 8600 Series switch CPU boots and configures non-WSM 8600 Series switch I/O modules using the `config.cfg` file.
- 2 If a WSM is inserted into the chassis, it sends a bootp request to the 8600 Series switch CPU. VLAN 4093 is created and the management IP address is assigned to the CPU.
- 3 The 8600 Series switch CPU assigns and sends a Management IP address to the WSM using bootp response.
- 4 The 8600 Series switch CPU checks the MAC address of the WSM.
 - If the MAC address matches a previously known WSM, then it configures the VLANs on the associated BFM to the previous (saved) configuration using the `wsmtrunk.bin` file. The `wsmtrunk.bin` file is updated whenever you enter the 8600 Series switch command, `save config.cfg`.
 - If the MAC address does not match a previously known WSM, then the default configuration ([Figure 6 on page 29](#)) is applied to that slot.

WSM clock and password synchronization

During the boot process, the WSM clock and password are synchronized with the 8600 Series switch clock and password. Changes to the 8600 clock are immediately applied to the WSM.



Note: You can only change passwords from the 8600 CLI. WSM passwords are synchronized from the 8600 Series switch host and cannot be set on the WSM side. You cannot change passwords from Device Manager.

To synchronize the WSM with a newly installed 8600 Network Time Protocol (NTP) server, you need to reboot the WSM. If the 8600 Series switch points to a different NTP server or if the NTP server is enabled on the 8600 Series switch to point to a NTP server, you need to reboot the WSM to synchronize the new time.

WSM heartbeat mechanism

Once the WSM is up and running, it sends a heartbeat to the 8600 Series switch every 10 seconds. The 8600 switch monitors the heartbeats from the WSM every 15 seconds. If it misses six consecutive heartbeats, and the traffic level is zero, the 8600 switch sends the following message:

```
Warning: the WSM in slot 3 has missed 6 heartbeats,  
and control communication may have been lost.  
You may need to reset the WSM in slot 3
```

Spanning Tree Protocol

To prevent loops in the network topology, the WSM and 8600 Series switch support IEEE 802.1d Spanning Tree Protocol (STP). This section defines the factory default Spanning Tree configuration for 8600 Series switch and WSM for interoperability of the two devices. The WSM has fully optimized and functional Layer 2 to Layer 7 switching software. You can avoid Layer 2 loops with a carefully considered network design.

Spanning Tree configuration for the WSM

Spanning Tree Protocol is enabled by default on the WSM front-facing ports and rear-facing ports. The WSM supports a total of 15 Spanning Tree instances. By default all newly-created VLANs are members of STG 1. Two STP instances, STP 1 and STP 2, are created by default on the WSM.

- VLAN 1 belongs to STP 1
- VLAN 2 belongs to STP 2

[Figure 13](#) shows the WSM STP default configuration output.

Figure 13 WSM STP default configuration output

```

WSM_2 >> Information# /info/stp
-----
Spanning Tree Group 1: On
Current Root:          Path-Cost Port Hello MaxAge FwdDel Aging
8000 00:60:cf:81:54:01 1      8    2   20   15   15
Parameters: Priority Hello MaxAge FwdDel Aging
              49152   2    20   15   300
Port Priority Cost State Designated Bridge Des Port
-----
1 128 0 DISABLED
2 128 0 DISABLED
3 128 0 DISABLED
4 128 0 DISABLED
7 128 1 FORWARDING 8000-00:60:cf:81:54:01 32898 ←
8 128 1 FORWARDING 8000-00:60:cf:81:54:01 32898 ← trunk group 3
-----
Spanning Tree Group 2: On
Current Root:          Path-Cost Port Hello MaxAge FwdDel Aging
c000 00:60:cf:4a:6f:70 0      0 2   20   15   300
Parameters: Priority Hello MaxAge FwdDel Aging
              49152   2    20   15   300
Port Priority Cost State Designated Bridge Des Port
-----
5 128 1 FORWARDING c000-00:60:cf:4a:6f:70 32774 ←
6 128 1 FORWARDING c000-00:60:cf:4a:6f:70 32774 ← trunk group 4

```

All WSM VLANs are added to a Spanning Tree Group. All ports belonging to a VLAN are automatically added to the STP group to which the VLAN is added. In the default configuration, VLAN 1 (trunk group 3) belongs to Spanning Tree 1 and VLAN 2 (trunk group 4) belongs to Spanning Tree 2. You can remove trunk group ports from the default VLAN/STP and add them to new VLAN and Spanning tree groups. To avoid Layer 2 looping, Nortel Networks recommends that you use two different spanning tree groups for the WSM ports in rear-facing trunk groups. All WSM front-facing ports are part of STP 1 by default.

[Figure 14](#) shows the WSM default trunk group and spanning tree association output.

Figure 14 WSM info/trunk output for default trunk groups and spanning trees

```

WSM_2 >> Information# /info/trunk
Trunk group 3, bw contract 1024, port state:
7: STG 1 forwarding ←————— Trunk group 3 belongs to STG 1.
8: STG 1 forwarding
Trunk group 4, bw contract 1024, port state:
5: STG 2 forwarding ←————— Trunk group 4 belongs to STG 2.
6: STG 2 forwarding

```

Bridge priority on the WSM

Nortel Networks recommends that you use the 8600 Series switch as the root bridge when configuring STP on the WSM because it has the most powerful processing capacity. To ensure that the 8600 Series switch becomes the root bridge during default configuration, the WSM bridge priority is set to 49152. You can change the WSM bridge priority later using either Device Manager or the WSM CLI (`/cfg/stp <group#>/brg`). The 8600 Series switch default bridge priority is 32768 (lower value is higher priority).

The default bridge priority on the WSM is computed as follows:

$$\begin{aligned}
 \text{Bridge Priority} &= 8600_Default + (\text{LowestValue} - 8600_Default) / 2 \\
 &= 32768 + (65535 - 32768) / 2 \\
 &= 49151.5 \\
 &= 49152 \text{ (roundup)}
 \end{aligned}$$

If you want to make the WSM the root bridge, you can increase its bridge priority to 1, or a value lower than 32768 (the 8600 switch default bridge priority value).

[Figure 15](#) shows the WSM `/cfg/stp <group#>/brg` output.

Figure 15 WSM output for changing the bridge priority

```

WSM_2 >> Main# /cfg/stp 1/brg/
-----
[Bridge Spanning Tree Menu]
prior - Set bridge Priority (0-65535)
hello - Set bridge Hello Time (1-10 secs)
mxage - Set bridge Max Age (6-40 secs)
fwd - Set bridge Forward Delay (4-30 secs)
aging - Set bridge Aging Time (1-65535 secs, 0 to disable)
cur - Display current bridge parameters
WSM_2 >> Bridge Spanning Tree# prior 1
Current Bridge Priority: 49152
New pending Bridge Priority: 1 ←—————Make the WSM the Root Bridge.
WSM_2 >> Bridge Spanning Tree# apply

```

The WSM has one MAC address for the switch. All packets sourcing from the WSM use this MAC address as the source MAC address in their packets. All STP instances use the WSM switch MAC address as the STP bridge MAC address. All BPDUs for the default Spanning Tree (STP 1) on the WSM and the 8600 switch are always untagged. BPDUs from STP instances other than STP 1 are 802.1Q-tagged if tagging is enabled on the ports from which the BPDU is sourcing. 802.1Q-tagged VLAN ID is set to port PVID for tagged BPDUs.

STP instances can be globally disabled on the WSM using the `/cfg/stp 1/off` command. When STP is globally turned off for the WSM, it starts forwarding incoming BPDUs as normal Layer 2 packets.



Caution: To avoid Layer 2 loops in the network which can cause a broadcast storm, use caution when disabling STP globally.

Figure 16 shows the WSM `cfg/stp` output for disabling STP.

Figure 16 WSM cfg/stp output for disabling STP

```

WSM_2 >> Information# /cfg/stp 1
-----
[Spanning Tree Group 1 Menu]
brg - Bridge parameter menu
port - Port parameter menu
add - Add VLAN(s) to Spanning Tree Group
remove - Remove VLAN(s) from Spanning Tree Group
clear - Remove all VLANs from Spanning Tree Group
on - Globally turn Spanning Tree ON
off - Globally turn Spanning Tree OFF
default - Default Spanning Tree and Member parameters
cur - Display current bridge parameters
WSM_2 >> Spanning Tree Group 1# off ← Turn off STP 1.
Current Spanning Tree 1 setting: ON
New Spanning Tree 1 setting: OFF
WSM_2 >> Spanning Tree Group 1# apply
-----
Apply complete; don't forget to "save" updated configuration.

```

For more information, see *Configuring the Web Switching Module using Device Manager*.

Spanning Tree configuration in the 8600 switch

The 8600 Series switch 3.3 software release supports a total of 64 Spanning Tree IDs. In the default configuration, all 8600 Series switch ports are assigned to VLAN 1 and STG 1.

Internal management VLAN 4093 and STG 64

The 8600 Series switch internal WSM management VLAN 4093 belongs to STG 64. VLAN 4093 is created automatically when a WSM is inserted in an 8600 Series switch chassis. For more information about VLAN 4093, see [“8600 Series switch internal WSM management VLAN 4093” on page 36](#).

You cannot modify STG 64 parameters when a WSM is present in the 8600 chassis. Before inserting a WSM into an 8600 chassis, make sure that STG ID 64 is available and free for use by the WSM. If it is already in use, you must reconfigure the 8600 switch to free STG 64.

[Figure 17](#) shows the error message that results if STG ID 64 is already in use when you insert the WSM in an 8600 chassis.

Figure 17 8600 error message: STG 64 already in use

```
Initializing ALTEON WSM in slot #2 ...
*****
STG 64 HAS ALREADY BEEN USED
PLEASE CHANGE THE CONFIGURATION TO FREE STG 64
SO STG 64 CAN BE CONFIGURED FOR WSM
*****

ERROR Task=WsmPreConfigTask Failed to create STG for IMC VLAN
Can not config card due to condition specified
Remove ALL the WSM blades. Correct problem.
Then re-insert WSM blades afterward
Failure to do so will cause incorrect behavior
```

In the default configuration, the 8600 switch dynamic MLT link to the WSM which has the higher MLT ID goes to STG 64/VLAN 4093 and STG 1/VLAN 1. The dynamic MLT which has the lower MLT-ID does not go to any VLAN or STG. It is user-configurable and you can add it to any STG and VLAN. You can also remove the dynamic MLT ID with the higher MLT-ID from VLAN 1/STG 1 and configure it in any user-configurable VLAN and STG.

[Figure 18](#) shows the default dynamic MLT and spanning tree group assignment. In this example, a WSM is inserted in Slot 2 of an 8010 Chassis.

Figure 18 8600 switch default dynamic MLT and spanning tree group assignment

```

Passport-8610:5# show port info stg main 2/1-2/4
=====
Port Stg
=====
ENABLE FORWARD CHANGE
SID PORT_NUM PRIO STATE STP FASTSTART PATHCOST TRANSITION DETECTION
-----
1 2/3 128 forwarding true false 1 11 true
64 2/3 128 forwarding true false 1 0 true
1 2/4 128 forwarding true false 1 11 true
64 2/4 128 forwarding true false 1 0 true
Passport-8610:5#
Passport-8610:5# show mlt info
=====
Mlt Info
=====
PORT SVLAN MLT MLT PORT VLAN MULTICAST
MLTID IFINDEX NAME TYPE TYPE ADMIN CURRENT MEMBERS IDS DISTRIBUTION
-----
31 4126 MLT-31 trunk normal norm norm 2/1-2/2 disable
32 4127 MLT-32 trunk normal norm norm 2/3-2/4 4093 1 disable
Passport-8610:5#

```

Default STG bridge priority

The default STG bridge priority on the 8600 switch is 32768. Since the 8600 switch default bridge priority is higher than the WSM default bridge priority, the 8600 switch will always become the root bridge under default configuration when a WSM is present in the 8600 chassis.

[Figure 19](#) shows the 8600 switch default STG bridge priority output.

Figure 19 8600 switch default STG bridge priority output

```
Passport-8610:5/config/stg/1# info
Sub-Context:
Current Context:
add ports : 1/1-1/48,2/3-2/4,4/3-4/4
create : 1
delete : N/A
forward-delay : 1500
group-stp : true
hello-interval : 200
max-age : 2000
priority : 32768 ←————— Default Bridge Priority on 8600.
remove ports : N/A
trap-stp : true
type : normal
```

You can turn off STG instances on the 8600 switch globally or on a per-port basis. Nortel Networks recommends that you not turn off STG on the 8600 switch unless it is really necessary.



Caution: To avoid Layer 2 loops which can cause a broadcast storm, use caution when disabling STP globally.

Unlike the WSM, each STG instance on the 8600 switch has a unique bridge MAC address. All 8600 switch Ethernet ports also have a unique MAC address, and all packets coming from the 8600 switch carry Ethernet port MAC addresses as their source MAC.

For more information, see *Configuring Layer 2 Operations: VLANs, Spanning Tree, Multilink Trunking*.

For more detailed recommendations about configuring Spanning Tree for your network, contact the support organization, listed in [“How to get help” on page 13](#).

Using Device Manager to configure the WSM

The WSM is supported in Device Manager version 5.5.x and above.



Note: Using any earlier version of Device Manager can adversely affect automatic configuration of the WSM.

For information about using Device Manager to configure the WSM, see *Configuring the Web Switching Module using Device Manager*.

For information about installing Device Manager, see *Getting Started with the Management Software*.

Chapter 3

Installing the WSM

This chapter describes installing the WSM into an 8600 series chassis. It includes the following topics:

Topic	Page
System requirements	51
Preparing for installation	59
Removing and installing a filler panel	57
Installing and replacing the WSM	59
Turning on the chassis power	68
Connecting cables	70
Managing cables for the 8000 Series chassis	71

System requirements

The following sections describe the 8600 series chassis and I/O modules that currently interoperate with the WSM, and chassis configuration requirements.

- [“Chassis” on page 52](#)
- [“Chassis configuration requirements” on page 52](#)

Chassis

Table 8 lists the chassis that support the WSM.

Table 8 Chassis support for the WSM

Chassis	Total Number of slots	Number of slots for I/O modules	Number of slots for switch fabric modules
8003	3	2	1
8006	6	4	2
8010	10	8	2
8010co (carrier grade)	10	8	2

For more information, see *Installing and Maintaining the 8000 Series Chassis and Components*.



Note: The WSM with WebOS 10.0 does not interoperate with the 8100 series modules.

Chassis configuration requirements

Slots in the 8010, 8006, and 8003 chassis are numbered from the top down, starting with slot 1. Slots in the 8010co are numbered from left to right starting with slot 1.

In the 8010co, 8010, and 8006 chassis, slots 5 and 6 are reserved for the 8690SF or 8691SF Switch Fabric Module. In the 8003 chassis, slot 3 is reserved for the 8690SF or 8691SF.

You can install any of the supported 8600 modules in the remaining chassis slots. For information on the 8600 Series switch modules, see *Installing 8600 Switch Modules*.



Note: The WSM is a 32K records module. If one or more WSM modules are installed in the chassis, any 128K record modules installed in the chassis will be disabled if the chassis is configured to operate in MMode (128K records mode). To operate a WSM in a chassis that contains 128K records modules, you must disable MMode. For instructions on enabling or disabling MMode, see *Platform and System Management*.

The following tables list the maximum densities for each module:

- [“Maximum port densities for the 8010 and 8010co chassis” on page 53](#)
- [“Maximum port densities for the 8003 chassis” on page 54](#)
- [“Maximum port densities for the 8006 chassis” on page 55](#)

Maximum port densities for the 8010 and 8010co chassis

Table 9 shows the maximum port densities available for the 8010 and 8010co chassis with each type of module. For all other 8600 I/O modules, assume there is one WSM installed in the switch chassis.

Table 9 Maximum port densities for the 8010 and 8010co chassis

Module type	8010 and 8010co Chassis
WSM	8 modules X 4 dual-media ports = 32 1000BASE-SX (fiber) ports, or 8 modules X 4 dual-media ports = 32 10/100 Mb/s (copper) ports
8608GT	7 modules X 8 ports = 56 1000BASE-T (copper) ports
8608GBIC	7 modules X 8 ports = 56 Gigabit GBIC ports
8608SX	(7 modules X 8 ports) + 4 WSM ports = 60
8648TX	(7 modules X 48 ports) + 4 WSM ports = 400 10/100 Mb/s (copper) ports
8672ATM ¹	OC-3c MDA: 16 ports
	OC-12c MDA: 4 ports
8683POS ²	OC-3c MDA: 24 ports
	OC-12c MDA: 12 ports
8648TXE	7 modules X 48 ports = 336 10/100 Mb/s (copper) ports

Table 9 Maximum port densities for the 8010 and 8010co chassis (continued)

Module type	8010 and 8010co Chassis
8632TXE	7 modules X 32 ports = 224
8608SXE	7 modules X 8 ports = 56 1000BASE-SX (fiber) ports
8616SXE	7 modules X 16 port = 112 1000BASE-SX ports
8616GTE	7 modules X 16 = 112
8608GBE	7 modules X 8 ports = 56 1000BASE-SX (fiber) ports
8624FXE	7 modules X 24 ports = 158
8683POSE ²	OC-3c MDA: 24 ports
	OC-12c MDA: 12 ports
8672ATME ¹	OC-3c MDA: 16 ports
	OC-12c MDA: 4 ports

1 For information about MDA choices for the 8672ATM, see *Installing Media Dependent Adapters for the 8672ATME and 8672ATMM Modules*, Part number 313071-B.

2 For information about MDA choices for the 8683POS module, see *Installing Media Dependent Adapters for the 8683POSM Module*, Part number 313072-B.

Maximum port densities for the 8003 chassis

[Table 10](#) shows the maximum port densities available for the 8003 chassis with each type of module. For all other 8600 I/O modules, assume there is one WSM installed in the switch chassis.

Table 10 Maximum port densities for the 8003 chassis

Module type	8003 Chassis
WSM	2 modules X 4 dual-media ports = 8 1000BASE-SX (fiber) ports, or 2 modules X 4 dual-media ports = 8 10/100 Mb/s (copper) ports
8608GT	2 modules X 8 ports = 16 1000BASE-T (copper) ports
8608GBIC	2 modules X 8 ports = 16 Gigabit GBIC ports
8608SX	(2 modules X 8 ports) + 4 WSM ports = 20
8648TX	(2 modules X 48 ports) + 4 WSM ports = 100 10/100 Mb/s (copper) ports
8672ATM ¹	OC-3c MDA: 16 ports
	OC-12c MDA: 4 ports

Table 10 Maximum port densities for the 8003 chassis (continued)

Module type	8003 Chassis
8683POS ²	OC-3c MDA: 24 ports
	OC-12c MDA: 12 ports
8648TXE	2 modules X 48 ports = 96 10/100 Mb/s (copper) ports
8632TXE	2 modules X 32 ports = 64
8608SXE	2 modules X 8 ports = 16 1000BASE-SX (fiber) ports
8616SXE	2 modules X 16 port = 32 1000BASE-SX ports
8616GTE	2 modules X 16 ports = 32
8608GBE	2 modules X 8 ports = 16 1000BASE-SX (fiber) ports
8624FXE	2 modules X 24 = 48
8683POSE ²	OC-3c MDA: 24 ports
	OC-12c MDA: 12 ports
8672ATME ¹	OC-3c MDA: 16 ports
	OC-12c MDA: 4 ports

- 1 For information about MDA choices for the 8672ATM, see *Installing Media Dependent Adapters for the 8672ATME and 8672ATMM Modules*, Part number 313071-B.
- 2 For information about MDA choices for the 8683POS module, see *Installing Media Dependent Adapters for the 8683POSM Module*, Part number 313072-B.

Maximum port densities for the 8006 chassis

[Table 11](#) shows the maximum port densities available for the 8006 chassis with each type of module. For all other 8600 I/O modules, assume there is one WSM installed in the switch chassis.

Table 11 Maximum port densities for the 8006 chassis

Module type	8006 Chassis
WSM	4 modules X 4 dual-media ports = 16 1000BASE-SX (fiber) ports, or 4 modules X 4 dual-media ports = 16 10/100 Mb/s (copper) ports
8608GT	3 modules X 8 ports = 24 1000BASE-T (copper) ports
8608GBIC	3 modules X 8 ports = 24 Gigabit GBIC ports
8608SX	(3 modules X 8 ports) + 4 WSM ports = 28 1000BASE-SX (fiber) ports
8648TX	(3 modules X 48 ports) + 4 WSM ports = 148 10/100 Mb/s (copper) ports

Table 11 Maximum port densities for the 8006 chassis (continued)

Module type	8006 Chassis
8672ATM ¹	OC-3c MDA: 16 ports
	OC-12c MDA: 4 ports
8683POS ²	OC-3c MDA: 24 ports
	OC-12c MDA: 12 ports
8648TXE	3 modules X 48 ports = 144 10/100 Mb/s (copper) ports
8632TXE	3 modules X 32 = 96
8608SXE	3 modules X 8 ports = 24 1000BASE-SX (fiber) ports
8616SXE	3 modules X 16 ports = 48 1000BASE-SX ports
8616GTE	3 modules X 16 = 48
8608GBE	3 modules X 8 ports = 24 Gigabit GBIC ports
8624FXE	3 modules X 24 = 72
8683POSE ²	OC-3c MDA: 24 ports
	OC-12c MDA: 12 ports
8672ATME ¹	OC-3c MDA: 16 ports
	OC-12c MDA: 4 ports

1 For information about MDA choices for the 8672ATM, see *Installing Media Dependent Adapters for the 8672ATME and 8672ATMM Modules*, Part number 313071-B.

2 For information about MDA choices for the 8683POS module, see *Installing Media Dependent Adapters for the 8683POS Module*, Part number 313072-B.

Preparing for installation

Before installing a WSM into a 8600 series switch chassis:

- 1 Unpack the WSM from the box.
- 2 Turn the power switch on the switch chassis to the OFF (O) position.
- 3 If you are inserting a WSM into a chassis where another WSM is already installed, make sure that the first module is fully initialized prior to inserting the second. See [“Initial Setup” on page 75](#).

Removing and installing a filler panel

Nortel Networks ships the 8000 Series chassis with a filler panel covering each empty module slot.



Note: On a 8003, 8006, or 8010 Chassis, the filler panel covers an empty module slot. On the 8010co Chassis, the filler panel resembles a module and is installed in the empty module slot.

Before you can install a WSM, you must remove the appropriate filler panel, for instructions, see the next section

Removing a filler panel

To remove a filler panel:

- 1 Using a Phillips screwdriver, loosen the 2 captive screws that fasten the filler panel to the slot ([Figure 20](#) and [Figure 21](#)).

Figure 20 Removing a filler panel: 8003, 8006, and 8010 Chassis

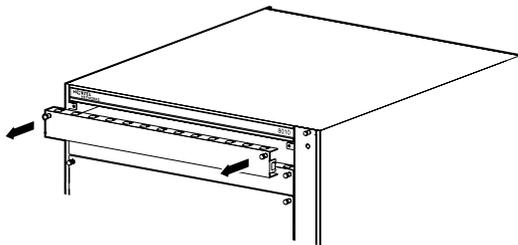
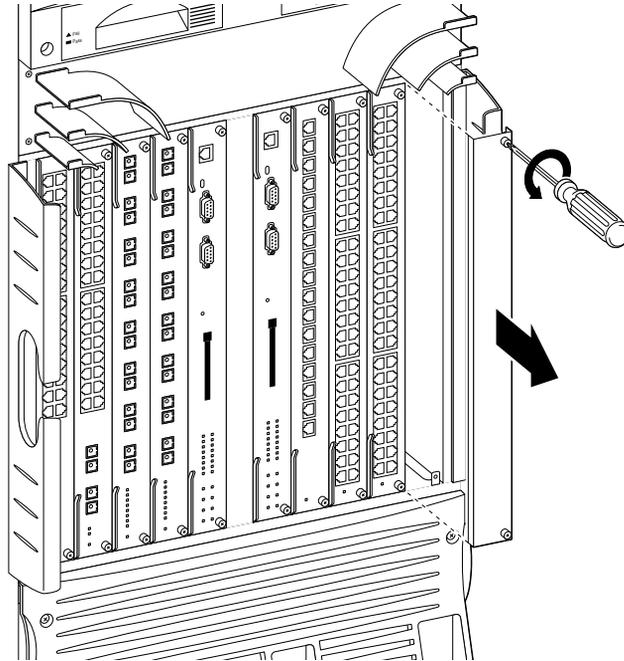


Figure 21 Removing a filler panel: 8010co Chassis



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- 2** Pull the filler panel out of the slot.

Installing a filler panel

If you plan to remove a WSM from the 8000 Series chassis without immediately replacing it, you must install a filler panel in the slot.

To install a filler panel:

- 1** Locate the slot where you want to install the filler panel.
- 2** Insert the filler panel into the slot (8010co Chassis), or place the filler panel over the slot (8003, 8006, or 8010 Chassis).
- 3** Tighten the 2 screws with a Phillips screwdriver.

Installing and replacing the WSM

- To prevent static discharge damage when you work with the WSM, place the WSM on a grounded antistatic mat until you are ready to install it. If you do not have an antistatic mat, wear a discharge leash or wrist strap to free yourself of static before you touch a module. You can also free yourself of static by touching the metal chassis before you handle the module.



Caution: Electrostatic discharge can damage hardware. Follow the procedures in this section to protect your equipment from damage.

- When handling modules, do not touch components on the circuit boards; always handle module by their edges. Store unused modules in their protective packaging.
- To maintain proper airflow and cooling, always cover unused module slots and power supply bays with filler panels.



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.



Vorsicht: Glasfaserkomponenten können Laserlicht bzw. Infrarotlicht abstrahlen, wodurch Ihre Augen geschädigt werden können. Schauen Sie niemals in einen Glasfaser-LWL oder ein Anschlußteil. Gehen Sie stets davon aus, daß das Glasfaserkabel an eine Lichtquelle angeschlossen ist.



Avertissement: L'équipement à fibre optique peut émettre des rayons laser ou infrarouges qui risquent d'entraîner des lésions oculaires. Ne jamais regarder dans le port d'un connecteur ou d'un câble à fibre optique. Toujours supposer que les câbles à fibre optique sont raccordés à une source lumineuse.



Advertencia: Los equipos de fibra óptica pueden emitir radiaciones de láser o infrarrojas que pueden dañar los ojos. No mire nunca en el interior de una fibra óptica ni de un puerto de conexión. Suponga siempre que los cables de fibra óptica están conectados a una fuente luminosa.



Avvertenza: Le apparecchiature a fibre ottiche emettono raggi laser o infrarossi che possono risultare dannosi per gli occhi. Non guardare mai direttamente le fibre ottiche o le porte di collegamento. Tenere in considerazione il fatto che i cavi a fibre ottiche sono collegati a una sorgente luminosa.



警告：光ファイバ措置は目に有害なレーザー光りや赤外線を放射することがあります。光ファイバやコネクタ・ポートを覗き込まないでください。光ファイバ・ケーブルは光源に接続されているものと思ってください。

Removing a WSM

You can remove any of the modules from an operating switch chassis without turning off power to the chassis. In all other cases, a module inserted into a 8600 series chassis is reset to factory defaults.



Note: Unseating a WSM when the traffic is about 60 to 70 percent of the line rate may prevent initialization of the gigabit link. Before unseating a WSM, stop the traffic and then insert the module.

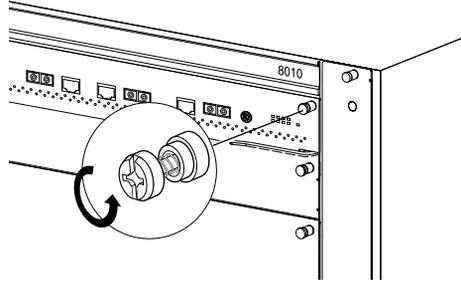
If you replace the switch fabric module, all the other non-WSM modules in the chassis reset and revert to their saved configuration settings. If configuration settings for a module have not been saved, the module reverts to its factory default settings.

The configuration is not reset when you remove the WSM or switch fabric modules from the chassis because the WSM stores its configuration in its own flash memory.

To remove a WSM:

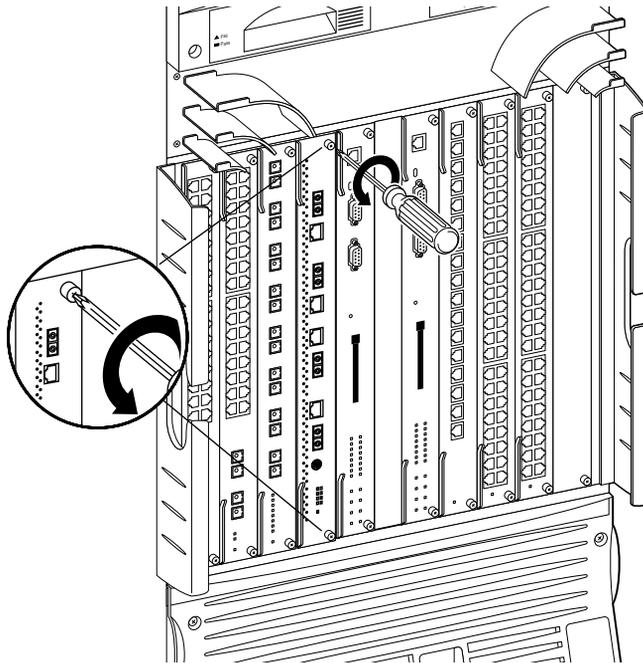
- 1 Disconnect any cables attached to the ports on the WSM.
- 2 Using a Phillips screwdriver, loosen the 2 captive screws that secure the WSM to the chassis ([Figure 22](#) and [Figure 23](#)).

Figure 22 Loosening screws on the WSM: 8003, 8006, 8010 Chassis



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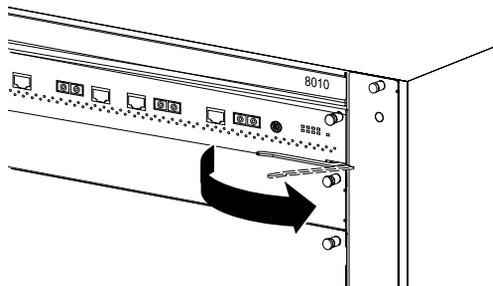
Figure 23 Loosening screws on the WSM: 8010co Chassis



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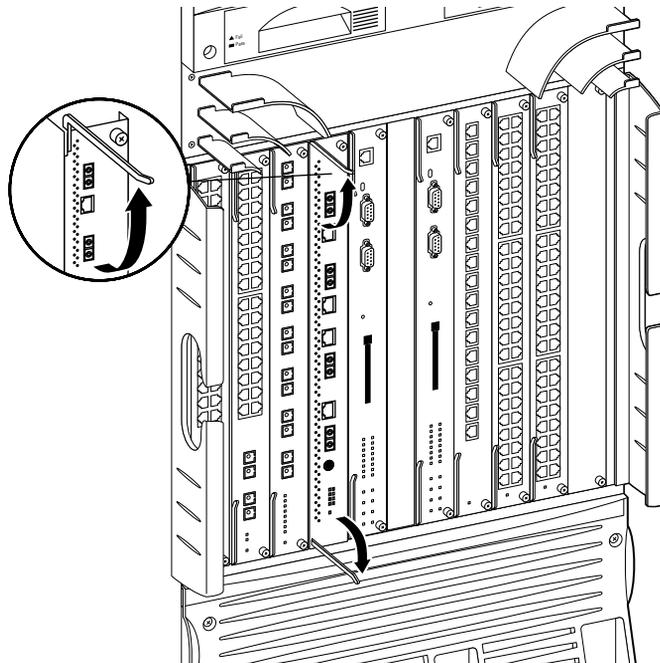
- 3 Rotate the inserter/extractor levers to eject the WSM from the backplane connectors (Figure 24 and Figure 25).

Figure 24 Ejecting the WSM from the chassis: 8003, 8006, and 8010 Chassis



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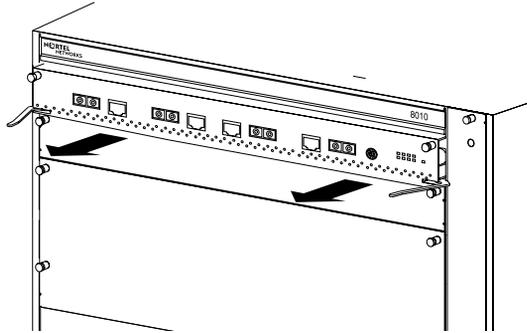
Figure 25 Ejecting the WSM from the chassis: 8010co Chassis



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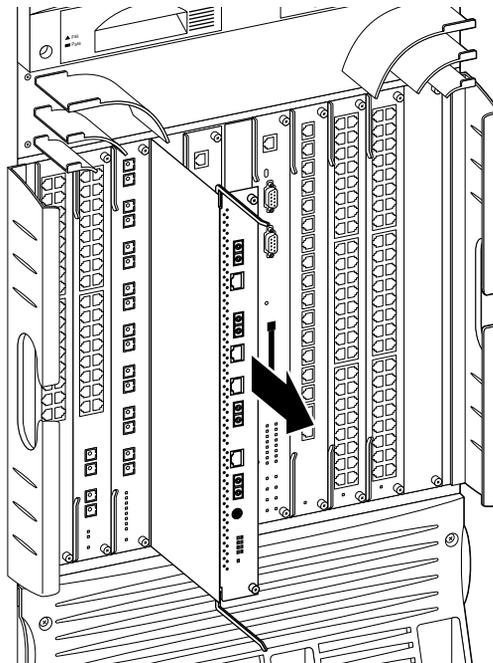
- Slide the WSM out of the chassis (Figure 26 and Figure 27).

Figure 26 Removing a WSM: 8003, 8006, and 8010 Chassis



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Figure 27 Removing a WSM: 8010co Chassis



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- 5 If you are installing a replacement WSM, go to the next section. Otherwise, install a filler panel (see [“Installing a filler panel”](#) on page 58).

Installing a WSM

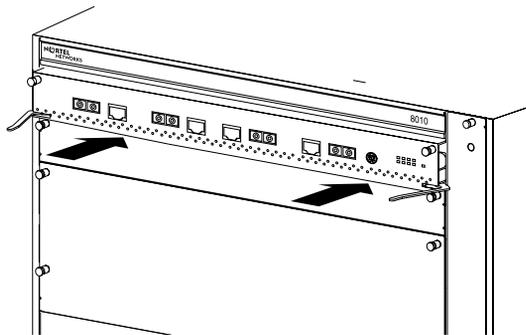
To install the WSM:

- 1 Locate the slot where you want to install the WSM.
- 2 Remove the installed module or the filler panel.

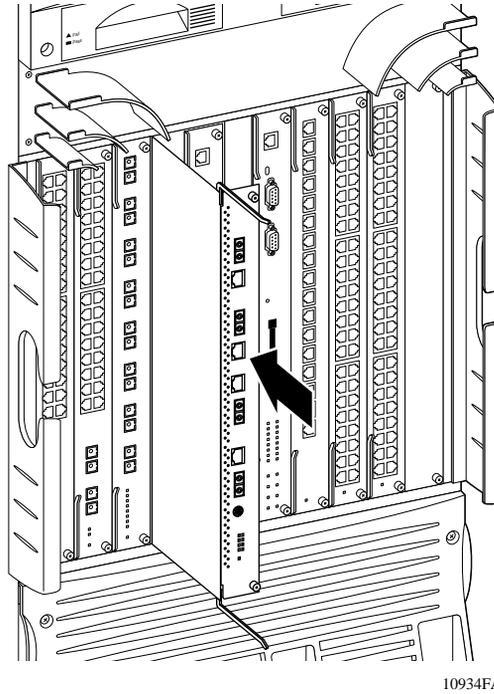
For instructions, see [“Removing a WSM”](#) on page 60 or [“Removing a filler panel”](#) on page 57.

- 3 Make sure the inserter/extractor levers are extended away from the WSM front panel ([Figure 28](#)).
- 4 Align the WSM circuit board with the card guides in the chassis.
- 5 Slide the WSM into the slot until the WSM connectors touch the chassis backplane ([Figure 28](#)).

Figure 28 Installing a WSM: 8003, 8006, and 8010 Chassis



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Figure 29 Installing a WSM: 8010co Chassis

- 6 Rotate the inserter/extractor levers to seat the backplane connectors (Figure 30).

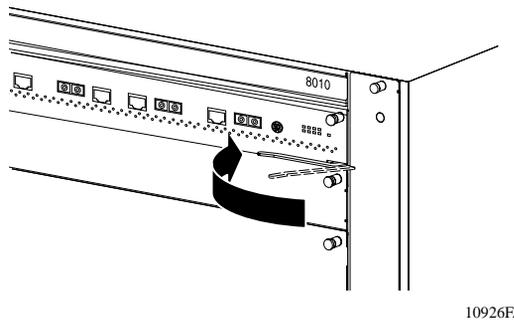
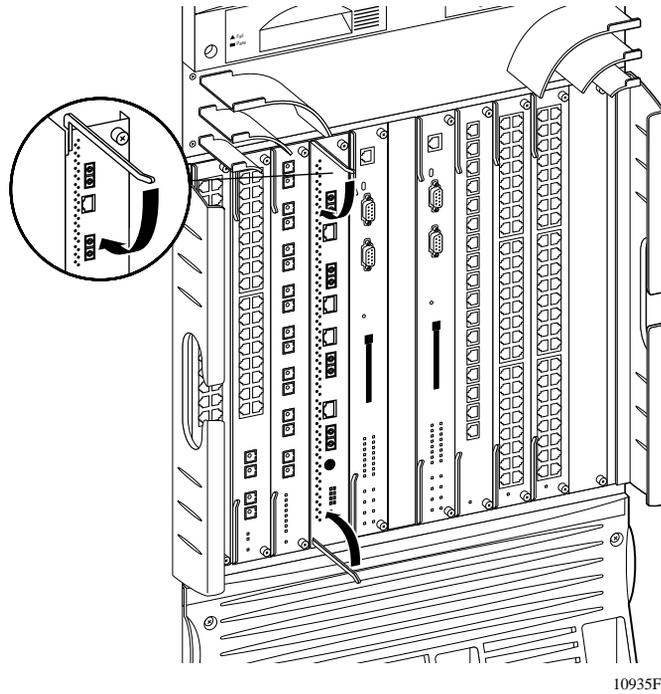
Figure 30 Seating the backplane connectors: 8003, 8006, and 8010 Chassis

Figure 31 Seating the backplane connectors: 8010co Chassis



- 7 Using a Phillips screwdriver, tighten the 2 captive screws to secure the WSM in the chassis (Figure 32 and Figure 33).

Figure 32 Securing the WSM in the chassis: 8003, 8006, and 8010 Chassis

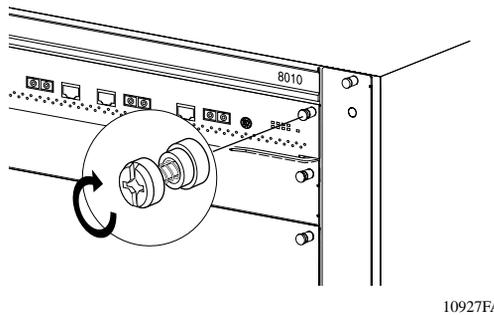
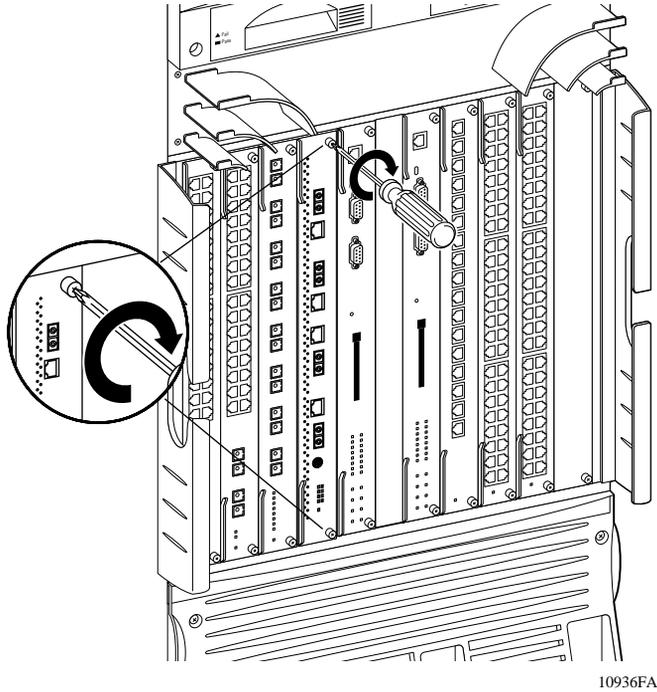


Figure 33 Securing the WSM in the chassis: 8010co Chassis

- 8 Configure the ports of the new WSM as necessary.

Turning on the chassis power

Although you can install or replace modules in an operating chassis, in a new installation you may prefer to install all the modules before turning on the chassis power.

To turn on the chassis power:

- 1 Verify that all power cords are connected properly, as described in the installation instructions for the power supplies.
- 2 Turn all the power switches to the On position.



Note: In a chassis with two power supplies in a nonredundant power configuration, you must turn on both power supply units within 2 seconds of each other. If you wait longer to turn on the second power supply, both power supplies will shut down. To correct this condition, turn off both power supplies, wait at least 30 seconds, and then turn on both power supplies again within 2 seconds.

Connecting a PC or terminal to the maintenance port

The port labeled “Maint” provides direct terminal access to the WSM. A serial connection is necessary when performing a serial download of a software image to the WSM, or when you cannot log into the WSM CLI using the 8600 switch CLI.

When connecting directly to the WSM using the maintenance port, you will have direct access to the Web OS CLI. You will not see the top level 8600 switch command line interface. For information about the Web OS CLI, see *Web OS Switch Software 10.0 Command Reference*.

To establish a console (DCE) connection with a WSM, you need the serial cable with the 9-pin receptacle connector (shipped with the WSM). See [“Pin assignments on Maintenance port”](#) on [page 36](#). for a list of pin assignments.

To connect a PC or terminal to the maintenance port:

- 1 Turn on and configure the terminal or a communications port on the PC, using the parameters in [Table 12](#).

See the PC or terminal user manual for instructions.

Table 12 PC and terminal parameters

Parameter	Value
Baud rate	9600
Data bits	8
Stop bits	1
Parity	None
Flow control	None



Note: If using a terminal server, turn OFF flow control at the server port that is connected to the WSM.

- 2 Insert the 9-pin receptacle end of the console cable into the maintenance connector on the WSM.
- 3 Attach the 8-pin plug end of the cable to the serial communications port on the back of the PC or terminal.
- 4 Press <Enter> on your terminal to establish the connection.



Note: Disconnect the serial cable from the console port after configuring the WSM.

Connecting cables

After you installed the modules and powered on the chassis, connect network cables. [Table 13](#) shows the connector types and recommended cables for the WSM. For information about connectors and cables for 8600 I/O modules, see *Installing 8600 switch modules*.

Table 13 Connectors and cables

Module	Port	Connector	Recommended Cable Type	Maximum Cable Length
WSM	1000BASE-SX Gigabit Ethernet Ports	Duplex SC fiber-optic connector	62.5 μ m multimode fiber-optic cable	722 ft. (220 m) @ 160 MHz/km bandwidth 902 ft. (275 m) @ 200 MHz/km bandwidth
	10/100 Mb/s Ethernet Ports	RJ-45 Wired as MDI-X	EIA Category 3, 4, or 5 unshielded twisted pair for 10 Mb/s operation; EIA Category 5 required for 100 Mb/s operation See Table 20 on page 97 for pin assignments.	328 ft. (100 m)
	Maintenance port	DB-9 to DIN-8	RS-232 See Table 21 on page 97 for pin assignments.	

Route all network cables through the supplied cable management brackets as described in [“Managing cables for the 8000 Series chassis”](#) on [page 71](#).

Managing cables for the 8000 Series chassis

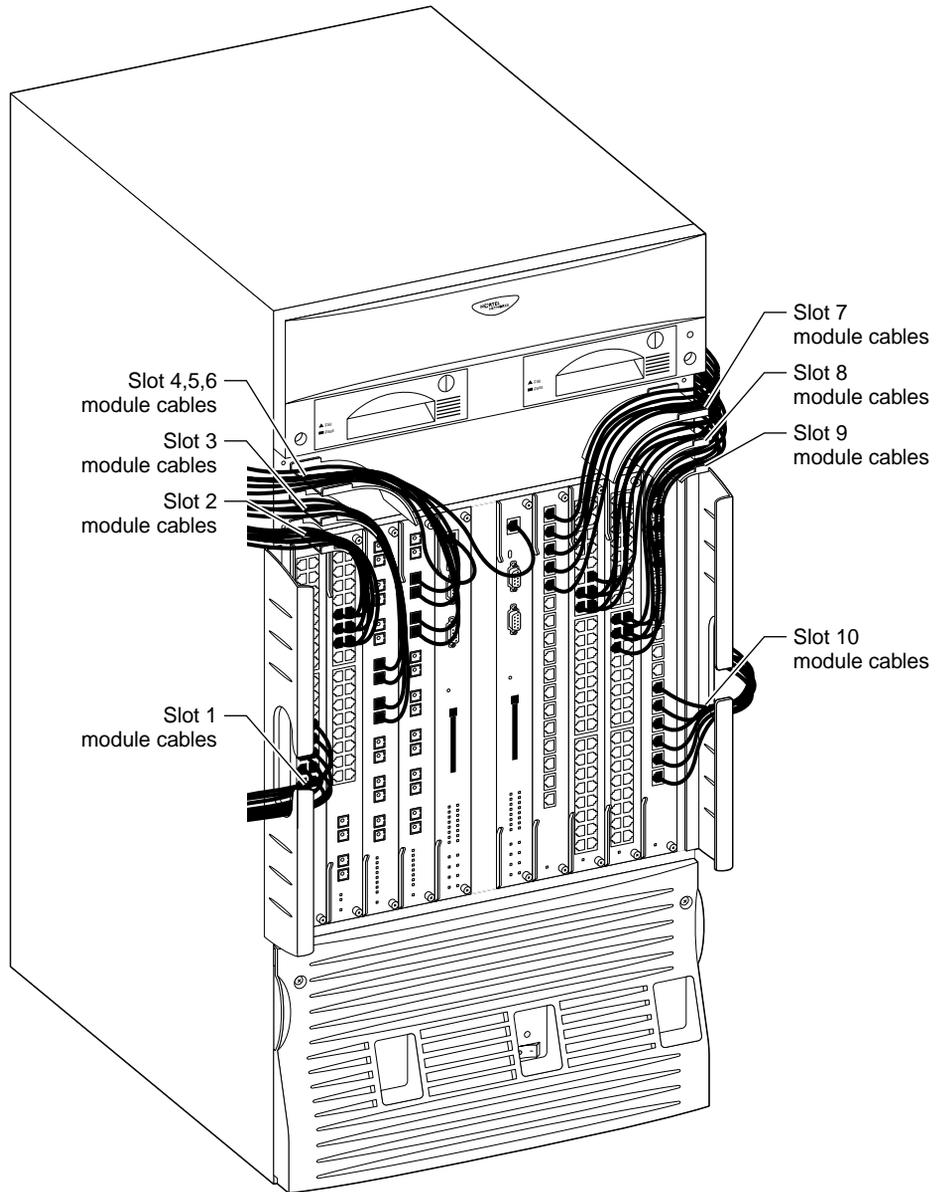
The 8000 Series chassis ship with cable management brackets. The cable management brackets keep groups of cable clusters fastened and out of the way, but accessible for maintenance.

To facilitate card installation and removal, bundle the cables for each slot. Connect, label, and bundle the cables for each module together, then use velcro straps or sheet fiber wrapped around the cables to organize them along the entire cable path before you connect cables to another module. Secure the velcro straps or sheet fiber to brackets with lacing cord or tie wrap.

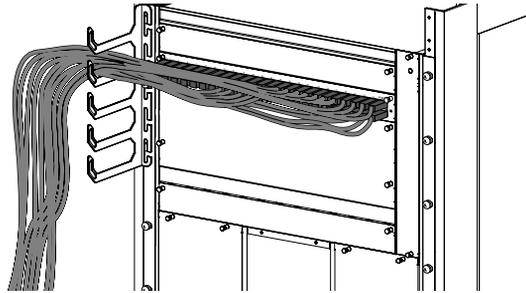
To manage cables for the 8000 Series chassis:

- 1 Connect the appropriate cable to the module.
- 2 Route the cable up to the appropriate cable management bracket and channel ([Figure 34](#) and [Figure 35](#)).

Figure 34 Managing cables: 8010co chassis



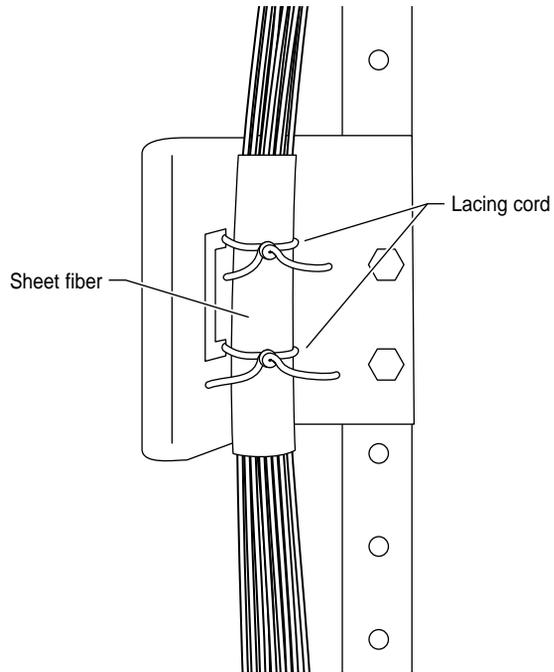
10520FA

Figure 35 Managing cables: 8010, 8006, 8003 chassis

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- 3** Route the cable to the termination panel, loosely fastening it with velcro straps or sheet fiber along the path.
- 4** Fasten the connector onto the termination panel end of the cable. Use the instructions supplied with the connector. If you are using cables manufactured by Nortel Networks, the connectors are already fastened to predetermined lengths of cable.
- 5** Label the unconnected end of the cable with the node identifier (from site records) and the shelf, cage, slot, and port number.
- 6** When all the transmitting cables from the same module are connected to the termination panel, use velcro straps or sheet fiber wrapped around the cables to manage them.
- 7** Using a scissors, cut a section of the sheet fiber that is wide enough to wrap around the cables.
- 8** Using a scissors, round the corners of the sheet fiber section.
- 9** Loosely wrap the sheet fiber and secure it using lacing cord or tie wraps ([Figure 36](#)).

Figure 36 Wrapping cables with sheet fiber and securing with lacing cord



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- 10** Secure the velcro straps or sheet fiber to brackets with lacing cord or tie wraps.

Chapter 4

Initial Setup

This chapter describes how to perform minimal setup configuration on the WSM. This chapter includes the following topics:

Topic	Page
Connecting to the WSM	75
Accessing the WSM	79
Configuring the WSM for the first time	80

Connecting to the WSM

To access the WSM, you must have already established a Telnet session or CLI access to the 8600 switch. For information about configuring the 8600 Series switch for Telnet access, see *Getting Started with the Management Software*.

To access the 8600 Series switch CLI remotely, the 8600 Series switch management port must have an IP address assigned and remote access enabled.

8600 Series switch access policies

You can control access to the 8600 Series switch by creating access policies that define whether network stations are explicitly allowed or explicitly forbidden to access the switch, or network stations. For each policy you can also specify the access level, such as read-only or read/write/all.

If you have configured access policies on your 8600 Series switch, you must create and enable an access policy permitting the WSM TFTP access to the 8600 Series switch CPU. This access policy must specify `read/write/all` (`rwa`) access, along with all of the WSM's management IP addresses installed in the 8600 chassis. If an access-policy for the WSM is not defined, image copy operation to the WSM will fail.

For more information, see *Configuring and Managing Security*.

Logging into the 8600 Series switch

Your login level in the 8600 Series switch CLI determines your access to the WSM module. [Table 14](#) describes the access levels available when you log into the 8600 Series switch.

Table 14 8600 Series switch login access levels

Access Level	Description
rwa	Read/write/all access—You have all the privileges of read-write access and the ability to change the security settings. The security settings include access passwords and the Web-based management user names and passwords.
rw	Read/write access—You can view and edit most device settings. You cannot change the security and password settings.
l3	Layer 3 read/write access—You can view and edit device settings related to layer 2 (bridging) and layer 3 (routing) functionality. You cannot change the security and password settings.
l2	Layer 2 read/write access—You can view and edit device settings related to layer 2 (bridging) functionality. The layer 3 settings (such as OSPF, DHCP) are not accessible. You cannot change the security and password settings.
l1	Layer 1 read/write access—You can view most switch configuration and status information and can change physical port parameters.

Table 14 8600 Series switch login access levels (continued)

Access Level	Description
ro	Read-only access—You can view the device settings, but you cannot change any of the settings.
l4admin slbadmin operator l4op slbop	On the 8600 switch, these access levels are equivalent to read-only access. <i>Use these logins only if you intend to connect to the WSM.</i> These added 8600 CLI levels provide the necessary granularity required for mapping 8600 to WSM access levels. Each level provides a different level of access to the Web OS command line interface. Table 15 on page 77 defines WSM access levels. Table 16 on page 78 defines how the access levels are mapped between the WSM and 8600 command line interfaces.

WSM access levels

[Table 15](#) describes the WSM access levels.

Table 15 WSM access levels

Access Level	Description
Administrator	The superuser Administrator has complete access to all menus, information, and configuration commands on the WSM, including the ability to change both the user and administrator passwords.
Layer 4 Administrator	The Layer 4 Administrator configures and manages traffic on the lines leading to the shared Internet services. In addition to SLB Administrator functions, the Layer 4 Administrator can configure all parameters on the Server Load Balancing menus, including filters and bandwidth management.
SLB Administrator	The SLB Administrator configures and manages Web servers and other Internet services and their loads. In addition to SLB Operator functions, the SLB Administrator can configure parameters on the Server Load Balancing menus, with the exception of not being able to configure filters or bandwidth management.
Operator	The Operator manages all functions of the switch. In addition to SLB Operator functions, the Operator can reset ports or the entire switch.

Table 15 WSM access levels (continued)

Access Level	Description
Layer 4 Operator	The Layer 4 Operator manages traffic on the lines leading to the shared Internet services. This user currently has the same access level as the SLB operator.
SLB Operator	The SLB Operator manages Web servers and other Internet services and their loads. In addition to being able to view all switch information and statistics, the SLB Operator can enable/disable servers using the Server Load Balancing operation menu.
User	The User has no direct responsibility for switch management. He or she can view all switch status information and statistics, but cannot make any configuration changes to the switch.

Mapping access levels



Note: With the exception of the admin user, access to each user level is disabled by setting the password to an empty value. By default, all user levels below admin are disabled (empty password) until they are enabled by the admin user. This avoids inadvertently leaving the WSM open to unauthorized users.

Table 16 shows how the access levels are mapped between the 8600 Series switch CLI and the Web OS CLI.

Table 16 8600 Series switch to WSM access level mapping

8600 access level	8600 default login	8600 default password	WSM access level
rwa	rwa	rwa	Administrator
rw	rw	rw	Administrator
l3	l3	l3	User
l2	l2	l2	User
l1	l1	l1	User
l4admin	l4admin	l4admin	Layer 4 Administrator
slbadmin	slbadmin	slbadmin	SLB Administrator

Table 16 8600 Series switch to WSM access level mapping (continued)

8600 access level	8600 default login	8600 default password	WSM access level
operator	oper	oper	Operator
l4oper	l4oper	l4oper	Layer 4 Operator
slbop	slboper	slboper	SLB Operator
ro	ro	ro	User



Note: You can only change passwords from the 8600 Series switch CLI. WSM passwords are synchronized from the 8600 host and cannot be set on the WSM side. You cannot change passwords from Device Manager.

Accessing the WSM

Once you have established a connection with the 8600 Series switch, you can access and manage the WSM from the access points described in [Table 17](#).

Table 17 Access points for the WSM

Access point	What are you managing?	Tasks you can perform
Switch login	Access to the switch and 8600 I/O modules	Log into the switch. Your login level at the 8600 Series switch CLI determines your access level in the WSM. For more information on login access levels, see Table 15 on page 77 .
Global commands in the 8600 Series switch CLI	The WSM as it appears to the 8600 Series switch: <ul style="list-style-type: none"> software upgrades configuration files 	<ul style="list-style-type: none"> Configure VLANs on the BFM ports of the WSM and other I/O modules Copy WSM configurations that you have saved, to and from a tftp server, a PCMCIA card on the 8600 Series switch chassis, 8600 Series switch Flash Memory, and WSM.

Table 17 Access points for the WSM (continued)

Access point	What are you managing?	Tasks you can perform
wsm commands	8600 Series switch interaction with the WSM	Connect to the WSM Setup Utility and the Web OS CLI (see Web OS CLI access point, below) <ul style="list-style-type: none"> • Select the software image from which to boot the WSM • Reset the WSM For more information on the WSM command branch, see Chapter 5, “Command reference,” on page 83.
Web OS CLI	Web switching features on the WSM	Configure the WSM for specific Web switching applications such as Server Load Balancing and Application Redirection via the Command Line Interface
Device Manager	Web switching features on the WSM	Configure the WSM for specific Web switching applications such as Server Load Balancing and Application Redirection. For more information, see <i>Configuring the Web Switching Module using Device Manager</i> .

Configuring the WSM for the first time

If you have logged into the 8600 Series switch with `rwa` access, you can connect to the Web OS software on the WSM with full administrative privileges.

After you have connected to the WSM, the Main Menu of the CLI appears.

[Figure 37](#) shows the Main Menu with administrator privileges.

Figure 37 Administrator main menu

```
[Main Menu]
info      - Information Menu
stats     - Statistics Menu
cfg       - Configuration Menu
oper      - Operations Command Menu
boot      - Boot Options Menu
maint     - Maintenance Menu
diff      - Show pending config changes [global command]
apply     - Apply pending config changes [global command]
save      - Save updated config to FLASH [global command]
revert    - Revert pending or applied changes [global command]
exit      - Exit [global command, always available]
```



Note: If you are accessing a user account or Layer 4 administrator account, some menu options are not available.

Chapter 5

Command reference

This chapter describes 8600 switch CLI and WebOS commands for configuring and managing the WSM. For more information about the 8600 Series switch CLI, see the *Command Line Reference for the 8000 Series Switch*.

This chapter includes the following topics:

Topic	Page
Extensions to the copy command	83
WSM commands	87
The Web OS menu system	92
Configuring SYSLOG on the WSM	94

Extensions to the copy command

The original 8600 switch CLI `copy` command transfers files between the CPU module, its internal flash, the PCMCIA card, and remote servers.

The 8600 Series Switch CLI `copy` command recognizes WSM as an acceptable source/destination.

Syntax:

```
copy <src file> <dest file>
```

Where:

```
<src file> = {a.b.c.d:|/pcmcia/|/flash/}<filename> | /wsm/  
{1..10}/[ {image1,image2,boot,cfg,ptdmp} ]
```

```
<dest file> = {a.b.c.d:|/pcmcia/|/flash/}<file> | /wsm/
{1..10}[/{image1,image2,boot,cfg}]
```

Table 18 describes the parameters used in the copy command.

Table 18 Copy command parameters

Parameter	Description
a.b.c.d	IP address of a TFTP server
pcmcia	PCMCIA card
flash	Flash memory
<file>	name of the file
wsm/{1..10}	Denotes the WSM in the specified slot number (1-10). WSM cannot be used in both the <src> and <dest file> in the same command.
image1, image2	WSM software image files
boot	boot image
cfg	a saved configuration file
ptdump	transfers a saved panic dump

To clear a panic dump on the WSM:

➔ At the Web OS command line, enter `/maint/cldump`.

Using the `copy` command, you can transfer all WSM configuration data and software images to and from a WSM on an 8600 Series switch.

Copying files to a WSM

The following examples assume that the WSM is in slot 1.

Flash to WSM

Image file

```
Passport-8610:5# copy /flash/wsm100273_mp.img /wsm/1/image1
```

The file, wsm100273_mp.img is a software image file for the WSM. The file wsm100273_bin.img is a binary image file for the WSM.



Note: To avoid time-out errors, when copying a new image to a WSM, first ensure that no traffic is passing through the module.

Note: You cannot copy files from the 8600 to multiple WSMs at the same time. Instead, copy one file at a time.

Note: You may require an access policy for connecting to the 8600 Series switch CPU. For more information, see [“8600 Series switch access policies” on page 75](#).

If you attempt to upgrade to a WSM image that is not compatible with the 8600 Series switch version, the WSM may not initialize correctly and may stall at booting state. If this happens, you must either reload the old image, or download the correct image to get the WSM back online. The port labeled Maint provides direct terminal access to the WSM. A serial connection is necessary when performing a serial download of a software image to the WSM, or when you cannot login to the WSM CLI using the 8600 Series switch CLI.

To perform a serial download for the WSM, you need the WSM binary image file. For information about performing a serial download for the WSM, see *Upgrading to the 8600 Series Switch Software Release 3.3.1*.

Configuration file

```
8610:5# copy /flash/simple_slb /wsm/1/cfg
```

The file, simple_slb is an example of a saved configuration.

PCMCIA to WSM

Image file

```
8610:5# copy /pcmcia/wsm100250_mp.img /wsm/1/image1
```

Configuration file

```
8610:5# copy /pcmcia/simple_slb /wsm/1/cfg
```

TFTP server to WSM

Image file

```
8610:5#  
copy 192.168.10.20:wsm100273_mp.img /wsm/1/image1
```

192.168.10.20 is a sample IP address for a TFTP server.

Configuration file

```
8610:5#  
copy 192.168.10.20/simple_slb /wsm/1/cfg
```

Copying files from a WSM

The following examples assume that the WSM is in slot 1.

WSM to Flash

Image file

```
8610:5# copy /wsm/1/image1 /flash/wsm100273_mp.img
```

Configuration file

```
8610:5# copy /wsm/1/cfg /flash/simple_slb
```

WSM to PCMCIA

Image file

```
8610:5# copy /wsm/1/image1 /pcmcia/wsm100273_mp.img
```

Configuration file

```
8610:5# copy /wsm/1/cfg /pcmcia/simple_slb
```

WSM to TFTP server

Image file

```
8610:5#
copy /wsm/1/image1 192.168.10.20:wsm100273_mp.img
```

Configuration file

```
8610:5# copy /wsm/1/cfg 192.168.10.20:simple_slb
```



Note: Before copying files to a TFTP server, you may have to create the filename on the TFTP server and assign the proper permissions.

WSM commands

The WSM commands manage and provide access to the WSMs that are installed in the switch chassis. Enter **wsm** from the 8600 Series switch CLI:

Figure 38 WSM commands

```
info [details]
connect <slots>
wsmreset <slotId>|"all">
setboot [<slotId>] [<image-choice>]
```

info command

The `info` command displays information about all WSMs that are installed in the switch chassis.

```
8610:5# wsm info
Card Info :
Slot#  Mgmt IP      FrontType  BackType   Status  Image  Severity  Version
      Assigned
   1      Yes    ALTEON_WSM  BFM4      up     image1    7     10.0.26
   4      Yes    ALTEON_WSM  BFM4      up     image1    0     10.0.26
```

The Image field displays the image that is available upon the next reset.

To view the current image:

➔ At the Web OS command line, enter `/boot/cur`.

You can also view the current image filename that is output after connecting to the WSM. For example, the following line in [Figure 40 on page 91](#) indicates that `image1` is software version 1.0.22:

```
Software Version 1.0.22 (FLASH image1), active
configuration.
```

info details

The `info details` command lets you view details about a WSM.

[Figure 40](#) shows representative output from the `info details` command.

Figure 39 info details command output

```
8610:5/wsm# info details

Card Info :

Slot 1 :

Front card type 24 back card type 7

Mgmt IP Assigned: Yes

FrontType      : ALTEON_WSM
FrontDescr     : Alteon WSM - 4 Port Web Switch
FrontAdminStatus: up
FrontOperStatus : up
FrontSerialNum  : PED0045476
FrontHwVersion  : 3
FrontPartNumber : 211876-A
FrontDateCode   : 6/1/01
FrontDeviations :

8610:5#
```

connect command

The `connect` command lets you access WSM modules installed in the 8600 Series switch.

Syntax:

```
8610:5/wsm# connect <slotId>
```

[Figure 40](#) shows representative output from the `connect` command.

Figure 40 WSM connect command output

```
8610:5/wsm# connect 4(Connecting to WSM in slot 4)
Connecting ...
Connection to WSM made
!
System Information at 16:21:27 Fri Aug 17, 2001

Alteon WSM

Switch is up 0 days, 23 hours, 6 minutes and 46 seconds.
Last boot: 17:14:30 Thu Aug 16, 2001 (power cycle)

MAC address: 00:60:cf:50:52:70    IP (If 1) address: 172.21.8.200
Hardware Revision: 0A
Hardware Part No: 200009A00
Software Version 1.0.22 (FLASH image2), active configuration.

-----
[Main Menu]
  info    - Information Menu
  stats   - Statistics Menu
  cfg     - Configuration Menu
  oper    - Operations Command Menu
  boot    - Boot Options Menu
  maint   - Maintenance Menu
  diff    - Show pending config changes [global command]
  apply   - Apply pending config changes [global command]
  save    - Save updated config to FLASH [global command]
  revert  - Revert pending or applied changes [global command]
  exit    - Exit [global command, always available]

WSM_4 >> Main#                               (You are now connected to the Web OS CLI)
```

wsmreset command

This command performs a hardware reset on one or all WSMs.

Syntax:

```
8610:5/wsm# wsmreset <slotId>/"all">
```



Note: When performing a WSM reset, turn off Device Manager polling. When the reset completes, turn polling on again. If Device Manager attempts to poll during a reset, it does not receive a response from the WSM and times out. This may also interrupt 8600 polling and cause distortion of the Device Manager graphic.

Note: When resetting a WSM, confirm that its back-facing ports (5-8) have entered the forwarding state before performing further resets.

setboot command

The `setboot` command sets the image specified (“image1” or “image2”) as the currently active boot image for the <slotID> you entered. If you do not specify an image, the `setboot` command will return the identity of the current boot image for all WSMs installed in the 8600 Series switch.

Syntax:

```
setboot [<slotId>] [<image-choice>]
```

The Web OS menu system

If you have logged into the 8600 Series switch with RWA access, you can connect to the Web OS software on the WSM with full administrative privileges.

[Figure 41](#) shows the Main menu with administrator privileges.

Figure 41 Administrator Main menu

```

[Main Menu]
  info      - Information Menu
  stats     - Statistics Menu
  cfg       - Configuration Menu
  oper      - Operations Command Menu
  boot      - Boot Options Menu
  maint     - Maintenance Menu
  diff      - Show pending config changes [global command]
  apply     - Apply pending config changes [global command]
  save      - Save updated config to FLASH [global command]
  revert    - Revert pending or applied changes [global command]
  exit      - Exit [global command, always available]

```



Note: If you are accessing a user account or Layer 4 administrator account, some menu options will not be available.

Command Line history and editing

For a description of global Web OS commands, shortcuts, and command line editing functions, see Chapter 3, *Menu Basics*, in the *Web OS Switch Software 10.0 Command Reference*.

Idle time-out

By default, you are disconnected from the WSM after 900 seconds (15 minutes) of inactivity. This function is controlled by the telnet time-out parameter (**config cli timeout**) in the 8600 CLI. You can set the telnet session timeout value from 30 to 65535 seconds. Generally, the time-out value that you set in the 8600 Series switch CLI will be the same for the WSM. However, if you configure the time-out value on the 8600 Series switch to be 3601 seconds or higher, the WSM will time out at its maximum value 3600 seconds (60 minutes).

Configuring SYSLOG on the WSM

To generate syslog messages from your WSM, configure SYSLOG facility in the Web OS CLI to match the value configured on your 8600 Series switch:

- 1 On the 8600 Series switch, set up a SYSLOG host and identify the local facility to be used.

Refer to the `config sys syslog` commands in *Configuring Network Management and Diagnostics*.

- 2 Connect to the WSM from the 8600 Series switch CLI. In this example, connect to the WSM in slot 4.

```
8610:5# wsm connect 4
```

- 3 In Web OS, select the SYSLOG menu.

```
WSM_4 >> Main# /cfg/sys/syslog
```

- 4 Specify the local facility 0 to 7.

Set the facility to match the facility defined on the 8600 Series switch in order for the messages to be sent to the system log.

```
WSM_4 >> Syslog# facil <syslog host local facility, 0-7>
```

- 5 Apply and Save.

```
WSM_4 >> Syslog# apply
```

```
WSM_4 >> Syslog# save
```

Appendix A Specifications

This appendix lists the following technical specifications for the WSM:

Topic	Page
WSM specifications	96
Pin assignments on port connectors	97

WSM specifications

Table 19 Specifications for the WSM

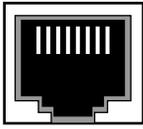
Item	Specification
Height:	1.5 in. (3.8 cm)
Width:	15.4 in. (39.1 cm)
Depth:	18.5 in. (47.0 cm)
Weight:	14.0 lb (6.4 kg)
Electrical Specifications	
Input Current:	120 W maximum
Thermal Rating:	340 BTU/hr maximum
MTBF Rating	79,273 hours (calculated)
Connector Type	Duplex SC and RJ-45 connector wired as MDI-X (Table 0-4)
10/100Base-T Cable Specifications	
Type:	Category 3, 4, or 5 UTP cable (10 Mb/s operation) Category 5 UTP cable (100 Mb/s operation)
Maximum Distance:	328 ft (100 m)
1000Base-SX Cable Specifications	
Types:	62.5 μm multimode fiber optic cable 50 μm multimode fiber optic cable
Distance:	62.5 μm multimode fiber optic cable: 722 ft (220 m) @ 160 MHz/km bandwidth 902 ft (275 m) @ 200 MHz/km bandwidth 50 μm multimode fiber optic cable: 1604 ft (500 m) @ 400 MHz/km bandwidth 1804 ft (550 m) @ 400 MHz/km bandwidth
Optical Specifications	
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 Input Power: 0 dBm

Pin assignments on port connectors

10/100 Mb/s Fast Ethernet

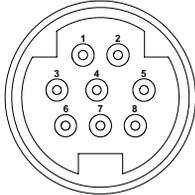
The Fast Ethernet ports on the WSM module are RJ-45 ports wired as MDI-X connectors ([Table 20](#)).

Table 20 10/100 Mb/s Port Pinouts in the WSM

Connector	Pin Number	Signal
	1	Input receive data + (RX+)
	2	Input receive data - (RX-)
	3	Output transmit data + (TX+)
	6	Output transmit data - (TX-)
	4, 5, 7, 8	Not used

Maintenance port

Table 21 Maintenance port pin assignments in the WSM

Connector	Pin number	Signal
	3	WSM TxD to Host RxD
	4	Serial Ground
	5	Host TxD to WSM RxD
	1,2,6,7,8	Not Used

Index

A

- access levels
 - defined 77
 - passport to wsm mapping 78
 - WSM 77
- administrator account 77

B

- backplane fabric module (BFM) 16
- BFM ports 17, 23
- boot process 39

C

- cable
 - connecting 70
 - fiber optic 96
 - lengths 70
 - UTP 96
- chassis configuration requirements 52
- chassis slots, dedicated 53
- clock synchronization 40
- command-line interface (CLI) 83–93
- configuring, syslog 94
- connecting
 - to the WSM 75
- conventions, text 11
- copy command
 - copying files from WSM 86
 - copying files to WSM 85
 - extensions to 83
- customer support 13

D

- default configuration 29–30, 30–32
 - factory settings 60
 - MLT groups 32
 - VLANs 35
- Device Manager 49
- disconnect idle timeout 93

F

- factory default
 - settings 60
- filler panels 59
- front-facing ports 16, 21, 22

H

- heartbeat mechanism 40
- hot-swapping modules 60

I

- idle timeout 93
- installation
 - modules 56
 - system requirements 51
 - WSM 51–67

J

- Java Device Manager 49
- JDM 49

L

- [l4admin](#) 77
- [l4op](#) 77
- [layer 1 access](#) 76
- [layer 2 access](#) 76
- [layer 3 access](#) 76
- [layer 4 administrator](#) 77
- [layer 4 operator](#) 78
- [LEDs](#)
 - [illustrated](#) 24
 - [operation](#) 25
- [length, cable](#) 70
- [logging into the passport switch](#) 76

M

- [Main Menu](#)
 - [Command-Line Interface \(CLI\)](#) 80
- [maintenance port](#) 24, 97
- [mapping access levels](#) 78
- [MLT groups](#)
 - [default configuration](#) 32
 - [dynamic assignment](#) 33
 - [viewing membership with VLANs](#) 36
- [modules, hot-swapping](#) 60

N

- [numbers, slot](#) 52

O

- [Online LED](#) 25
- [operator](#) 77

P

- [password](#)
 - [administrator account](#) 77
 - [synchronization](#) 40

- [pin assignments](#)

- [fast ethernet port](#) 97
 - [maintenance port](#) 97

- [ports](#)

- [BFM](#) 17, 23
 - [connectors](#) 97
 - [densities](#) 52
 - [front-facing](#) 16, 21, 22
 - [maintenance](#) 24
 - [rear-facing](#) 17, 29

- [power, turning on](#) 68

- [product support](#) 13

- [publications](#)

- [hard copy](#) 13
 - [related](#) 12

R

- [read/write access](#) 76
- [read-only access](#) 77
- [rear-facing ports](#) 17, 29
- [replacing modules](#) 60
- [requirements, chassis configuration](#) 52
- [restrictions](#)
 - [dual power supplies](#) 68

S

- [setting up](#) 75–81
- [slb administrator](#) 77
- [slb operator](#) 78
- [slbadmin](#) 77
- [slbop](#) 77
- [slots, chassis](#) 52
- [spanning tree protocol](#) 40
- [specifications](#) 95–97
- [support, Nortel Networks](#) 13
- [switch fabric](#)
 - [replacing](#) 60
- [synchronization](#)

- of password and clock 40
- syslog
 - configuring on WSM 94
- setboot 92
- wsmreset 92
- wsmtrunk.bin 39

T

- technical publications 13
- technical support 13
- text conventions 11
- timeout
 - idle connection 93
- trunk groups. See MLT groups

U

- user account 78

V

VLANs

- default configuration 35
- viewing membership with MLT 36

W

- web switching engine 16
- Web OS CLI
 - main menu 92
- WSM
 - access levels 77
 - boot process 39
 - clock and password synchronization 40
 - copying files from 86
 - copying files to 85
 - default configuration 29–30, 30–32
 - heartbeat mechanism 40
 - installing 51–67
 - replacing 60
 - specifications 95–97
- wsm commands 87
 - connect 90
 - info 88
 - info details 88

