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OmniSwitch AOS Release 8 Specifications Guide

8.5R02

Alcatel·Lucent Enterprise

www.al-enterprise.com

This user guide documents AOS Release 8.5R1 for the OmniSwitch 6465, OmniSwitch 6560, OmniSwitch 6860, OmniSwitch 6865, OmniSwitch 6900 and OmniSwitch 9900.
The functionality described in this guide is subject to change without notice.

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Contents

About This Guide

This *OmniSwitch AOS Release 8 Specifications Guide* provides Specification tables for all the OmniSwitch AOS Release 8 Products.

Supported Platforms

The information in this guide applies only to the following products:

- OmniSwitch 6465 Series
- OmniSwitch 6560 Series
- OmniSwitch 6860 Series
- OmniSwitch 6865 Series
- OmniSwitch 6900 Series
- OmniSwitch 9900 Series

Who Should Read this Manual?

The audience for this user guide are network administrators and IT support personnel who need to configure, maintain, and monitor switches and routers in a live network.

When Should I Read this Manual?

Read this guide as soon as you are ready to integrate your OmniSwitch into your network. You should already be familiar with the basics of managing a single OmniSwitch as described in the *OmniSwitch AOS Release 8 Switch Management Guide*.

The information provided in the Specification tables in this guide assume a basic understanding of OmniSwitch administration commands and procedures.

What is Not in this Manual?

Procedures for switch management methods, such as CLI, web-based (WebView or OmniVista) or SNMP, are outside the scope of this guide.

For information on WebView and SNMP switch management methods consult the *OmniSwitch AOS Release 8 Switch Management Guide.* Information on using WebView and OmniVista can be found in the context-sensitive on-line help available with those network management applications.

This guide is designed to provide feature specification information only and is not intended as a reference for any CLI commands or configuration information. Refer to the Documentation Roadmap for a list of available user guides.

How is the Information Organized?

Each chapter in this guide corresponds to an OmniSwitch software user manual:

- Chapter 1, "Switch Management Specifications," applies to the features described in the *OmniSwitch AOS Release 8 Switch Management Guide*.
- Chapter 2, "Network Configuration Specifications," applies to the features described in the *OmniSwitch AOS Release 8 Network Configuration Guide*.
- Chapter 3, "Advanced Routing Configuration Specifications," applies to the features described in the *OmniSwitch AOS Release 8 Advanced Routing Configuration Guide*.
- Chapter 4, "Data Center Switching Specifications," applies to the features described in the *OmniSwitch AOS Release 8 Data Center Switching Guide*.

Documentation Roadmap

The OmniSwitch user documentation suite was designed to supply you with information at several critical junctures of the configuration process.The following section outlines a roadmap of the manuals that will help you at each stage of the configuration process. Under each stage, we point you to the manual or manuals that will be most helpful to you.

Stage 1: Using the Switch for the First Time

Pertinent Documentation: *OmniSwitch Hardware Users Guide*
Release Notes

This guide provides all the information you need to get your switch up and running the first time. It provides information on unpacking the switch, rack mounting the switch, installing NI modules, unlocking access control, setting the switch's IP address, and setting up a password. It also includes succinct overview information on fundamental aspects of the switch, such as hardware LEDs, the software directory structure, CLI conventions, and web-based management.

At this time you should also familiarize yourself with the Release Notes that accompanied your switch. This document includes important information on feature limitations that are not included in other user guides.

Stage 2: Gaining Familiarity with Basic Switch Functions

Pertinent Documentation: *OmniSwitch Hardware Users Guide*
OmniSwitch AOS Release 8 Switch Management Guide

Once you have your switch up and running, you will want to begin investigating basic aspects of its hardware and software. Information about switch hardware is provided in the *Hardware Guide*. This guide provide specifications, illustrations, and descriptions of all hardware components, such as chassis, power supplies, Chassis Management Modules (CMMs), Network Interface (NI) modules, and cooling fans. It also includes steps for common procedures, such as removing and installing switch components.

The *OmniSwitch AOS Release 8 Switch Management Guide* is the primary users guide for the basic software features on a single switch. This guide contains information on the switch directory structure, basic file and directory utilities, switch access security, SNMP, and web-based management. It is recommended that you read this guide before connecting your switch to the network.

Stage 3: Integrating the Switch Into a Network

Pertinent Documentation: *OmniSwitch AOS Release 8 Network Configuration Guide*
OmniSwitch AOS Release 8 Advanced Routing Configuration Guide
OmniSwitch AOS Release 8 Data Center Switching Guide

When you are ready to connect your switch to the network, you will need to learn how the OmniSwitch implements fundamental software features, such as 802.1Q, VLANs, Spanning Tree, and network routing protocols. The *OmniSwitch AOS Release 8 Network Configuration Guide* contains overview information, procedures, and examples on how standard networking technologies are configured on the OmniSwitch.

The *OmniSwitch AOS Release 8 Advanced Routing Configuration Guide* includes configuration information for networks using advanced routing technologies (OSPF and BGP) and multicast routing protocols (DVMRP and PIM-SM).

The *OmniSwitch AOS Release 8 Data Center Switching Guide* includes configuration information for data center networks using virtualization technologies (SPBM, VXLAN, UNP), Data Center Bridging protocols (PFC, ETC, and DCBX), and FCoE/FC gateway functionality.

Anytime

The *OmniSwitch AOS Release 8 CLI Reference Guide* contains comprehensive information on all CLI commands supported by the switch. This guide includes syntax, default, usage, example, related CLI command, and CLI-to-MIB variable mapping information for all CLI commands supported by the switch. This guide can be consulted anytime during the configuration process to find detailed and specific information on each CLI command.

Related Documentation

The following are the titles and descriptions of all the related OmniSwitch user manuals:

- *OmniSwitch 6465/6560/6860/6865/6900/9900 Hardware Users Guides*

  Describes the hardware and software procedures for getting an OmniSwitch up and running as well as complete technical specifications and procedures for all OmniSwitch chassis, power supplies, fans, and Network Interface (NI) modules.

- *OmniSwitch AOS Release 8 CLI Reference Guide*

  Complete reference to all CLI commands supported on the OmniSwitch. Includes syntax definitions, default values, examples, usage guidelines and CLI-to-MIB variable mappings.

- *OmniSwitch AOS Release 8 Switch Management Guide*

  Includes procedures for readying an individual switch for integration into a network. Topics include the software directory architecture, image rollback protections, authenticated switch access, managing switch files, system configuration, using SNMP, and using web management software (WebView).

- *OmniSwitch AOS Release 8 Network Configuration Guide*

  Includes network configuration procedures and descriptive information on all the major software features and protocols included in the base software package. Chapters cover Layer 2 information (Ethernet and VLAN configuration), Layer 3 information (routing protocols, such as RIP and IPX), security options (authenticated VLANs), Quality of Service (QoS), link aggregation, and server load balancing.

- *OmniSwitch AOS Release 8 Advanced Routing Configuration Guide*

  Includes network configuration procedures and descriptive information on all the software features and protocols included in the advanced routing software package. Chapters cover multicast routing (DVMRP and PIM-SM), Open Shortest Path First (OSPF), and Border Gateway Protocol (BGP).

- *OmniSwitch AOS Release 8 Data Center Switching Guide*

  Includes and introduction to the OmniSwitch data center switching architecture as well as network configuration procedures and descriptive information on all the software features and protocols that support this architecture. Chapters cover Shortest Path Bridging MAC (SPBM), Data Center Bridging (DCB) protocols, Virtual Network Profile (vNP), and the Edge Virtual Bridging (EVB) protocol.

- *OmniSwitch AOS Release 8 Transceivers Guide*

  Includes SFP and XFP transceiver specifications and product compatibility information.

- *OmniSwitch AOS Release 8 Specifications Guide*

  Includes Specifications table information for the features documented in the Switch Management Guide, Network Configuration Guide, Advanced Routing Guide, and Data Center Switching Guide.

- Technical Tips, Field Notices

  Includes information published by Alcatel-Lucent's Customer Support group.

- *Release Notes*

  Includes critical Open Problem Reports, feature exceptions, and other important information on the features supported in the current release and any limitations to their support.

Technical Support

An Alcatel-Lucent service agreement brings your company the assurance of 7x24 no-excuses technical support. You'll also receive regular software updates to maintain and maximize your Alcatel-Lucent product's features and functionality and on-site hardware replacement through our global network of highly qualified service delivery partners.

With 24-hour access to Alcatel-Lucent's Enterprise Service and Support web page, you'll be able to view and update any case (open or closed) that you have reported to Alcatel-Lucent Enterprise technical support, open a new case or access helpful release notes, technical bulletins, and manuals.

Access additional information on Alcatel-Lucent Enterprise Service Programs:

Web: businessportal2.alcatel-lucent.com

Phone: 1-800-995-2696

Email: ebg_global_supportcenter@al-enterprise.com

1 Switch Management Specifications

This chapter provides Specifications tables for the following switch management applications and procedures that are used for readying an individual OmniSwitch for integration into a network:

- The switch directory structure, basic file and directory utilities, switch access security, SNMP, and web-based management.
- The software directory architecture.
- Image rollback protections.
- Authenticated switch access.
- Managing switch files.
- System configuration.
- Using SNMP.
- Using web management software (WebView).

Note. The maximum limit values provided in the Specifications tables included in this chapter are subject to available system resources.

For information about how to configure switch management applications, refer to the *OmniSwitch AOS Release 8 Switch Management Guide*.

In This Chapter

This chapter contains the following switch management Specifications tables:

Getting Started Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Standalone Configuration Files	N/S	N/S	N/S	N/S	boot.cfg	N/S
Virtual Chassis Configuration Files	vcboot.cfg vcsetup.cfg	vcboot.cfg vcsetup.cfg	vcboot.cfg vcsetup.cfg	vcboot.cfg vcsetup.cfg	vcboot.cfg vcsetup.cfg	vcboot.cfg vcsetup.cfg
Image Files	Nos.img	Nos.img	Uos.img	Uos.img	Tos.img Yos.img (V72/C32)	Mhost.img Mos.img Meni.img
Notes:						
N/A						

Login Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Login Methods	Telnet, SSH, HTTP, SNMP					
Number of concurrent Telnet sessions	6					
Number of concurrent SSH sessions	8					
Number of concurrent HTTP (WebView) sessions	4					
Secure Shell public key authentication	Password DSA/RSA Public Key					
RFCs Supported for SSHv2	RFC 4253 - SSH Transport Layer Protocol RFC 4418 - UMAC: Message Authentication Code using Universal Hashing					
Notes:						
N/A						

File Management Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
File Transfer Methods	FTP (v4/v6), SFTP (v4/v6), SCP (v4/v6), TFTP					
Client/Server Support	FTP—Client (IPv4 Only) or Server SFTP—Client or Server SCP—Client or Server TFTP—Client					
Number of concurrent FTP/ SFTP sessions	4					
Configuration Recovery	The **flash**/**certified** directory holds configurations that are certified as the default start-up files for the switch. They will be used in the event of a non-specified reload.					
Default Switch Directory - / **flash**	Contains the **certified**, **working, switch, network,** and user-defined directories.					
File/Directory Name Metrics	255 character maximum. File and directory names are case sensitive.					
File/Directory Name Characters	Any valid ASCII character except '/'.					
Sub-Directories	Additional user-defined directories created in the /**flash** directory.					
Text Editing	Standard Vi editor					
System Clock	Set local date, time and time zone, Universal Time Coordinate (UTC), Daylight Savings (DST or summertime).					
Notes:						
N/A						

CMM Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Compact Flash Memory	1 GB	2 GB	2 GB	2 GB	2 GB X72 - 4GB	2 GB
RAM Memory	1 GB	2 GB	2 GB	2 GB	4 GB (X/T) 8 GB (Q32) 8 GB (X72) 16 GB (V72) 16 GB (C32)	16 GB
Maximum Length of File Names (in Characters)	255					
Maximum Length of Directory Names (in Characters)	255					
Maximum Length of System Name (in Characters)	32					
Notes:						

N/A

USB Flash Drive Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
USB Flash Drive Support	Alcatel-Lucent Enterprise Certified USB Flash Drive					
Automatic Software Upgrade	Supported					
Disaster Recovery	**Nrescue.img** file required	**Nrescue.img** file required	**Urescue.img** file required	**Urescue.img** file required	**Trescue.img** file required	**Mrescue.img** file required
Notes:						
The format of the Alcatel-Lucent certified USB Flash Drive must be FAT32. To avoid file corruption issues, the USB Drive should be stopped before removing from a PC. Directory names are case sensitive and must be lower case.						

CLI Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Configuration Methods	• Online configuration via real-time sessions using CLI commands. • Offline configuration using text file containing CLI commands.					
Command Capture Feature	Snapshot feature captures switch configurations in a text file.					
User Service Features	• Command Line Editing • Command Prefix Recognition • CLI Prompt Option • Command Help • Keyword Completion • Command Abbreviation • Command History • Command Logging • Syntax Error Display • More Command					
Notes:						
N/A						

Configuration File Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Methods for Creating Configuration Files	• Create a text file on a word processor and upload it to the switch. • Invoke the switch's snapshot feature to create a text file. • Create a text file using the switch's text editor.					
Timer Functions	Files can be applied immediately or by setting a timer on the switch.					
Command Capture Feature	Snapshot feature captures switch configurations in a text file.					
Error Reporting	Snapshot feature includes error reporting in the text file.					
Text Editing on the Switch	Vi standard editor.					
Default Error File Limit	1					
Notes:						
N/A						

User Database Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Maximum number of alphanumeric characters in a username	63					
Maximum number of alphanumeric characters in a user password	30					
Maximum number of local user accounts	50					
Notes:						
N/A						

WebView Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Supported Browsers	Internet Explorer for Windows Firefox for Windows, Linux, and Solaris SunOS					
Notes:						
N/A						

SNMP Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported for SNMPv2	1902 through 1907 - SNMPv2c Management Framework 1908 - Coexistence and transitions relating to SNMPv1 and SNMPv2c					
RFCs Supported for SNMPv3	2570—Version 3 of the Internet Standard Network Management Framework 2571—Architecture for Describing SNMP Management Frameworks 2572—Message Processing and Dispatching for SNMP 2573—SNMPv3 Applications 2574/3414—User-based Security Model (USM) for version 3 SNMP 2575—View-based Access Control Model (VACM) for SNMP 2576—Coexistence between SNMP versions 3586—The Advanced Encryption Standard (AES) Cipher Algorithm in the SNMP User-based Security Model					
SNMPv1, SNMPv2, SNMPv3	The SNMPv3 protocol is ascending compatible with SNMPv1 and v2 and supports all the SNMPv1 and SNMPv2 PDUs					
SNMPv1 and SNMPv2 Authentication	Community Strings					
SNMPv1, SNMPv2 Encryption	None					
SNMPv1 and SNMPv2 Security requests accepted by the switch	Sets and Gets					
SNMPv3 Authentication	SHA, MD5					
SNMPv3 Encryption	DES, AES					
SNMPv3 Security requests accepted by the switch	Non-authenticated Sets, Non-authenticated Gets and Get-Nexts, Authenticated Sets, Authenticated Gets and Get-Nexts, Encrypted Sets, Encrypted Gets and Get-Nexts					
SNMP traps	For a list and description of system MIBs and Traps refer to Appendix B, “SNMP Trap Information,” in the *OmniSwitch AOS Release 8 Switch Management Guide*.					
Notes:						

Web Services Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Configuration Methods	• HTTP/HTTPS • Python API					
Response Formats	• Extensible Markup language (XML) • JavaScript Object Notation (JSON)					
Maximum Web Services Sessions	4					
Alcatel-Lucent Example Python Library	consumer.py (Python version 2.X/3.X compatible) This file is available on the Service & Support Website. It is being provided as an example application to help with Web Services familiarization but is not an officially supported part of the Web Services solution.					
Embedded Python /Event based CLI Scripting	Python 3					
Notes:						

OpenFlow Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Modes Supported	N/S	N/S	Normal Hybrid (API)	N/S	Normal Hybrid (API)	N/S
Versions Supported	N/S	N/S	1.0/ 1.3.1	N/S	1.0/ 1.3.1	N/S
Maximum number of logical switches	N/S	N/S	3	N/S	3	N/S
Maximum number of controllers per logical switch	N/S	N/S	3	N/S	3	N/S
Maximum number of logical switches in Hybrid mode	N/S	N/S	1	N/S	1	N/S
Support for Virtual Chassis	N/S	N/S	Supported	N/S	Supported	N/S
OpenFlow 1.0/1.3.1 TCP port.	N/S	N/S	6633	N/S	6633	N/S
Flow Matching Table	N/S	N/S	1535	N/S	Q32 - 1279 X72 - 1279 other - 511	N/S
MAC Table	N/S	N/S	48K	N/S	Q32 - 224K X72 - 224K other - 128K	N/S
Notes:						
Not supported on OS6900-V72/C32.						

Virtual Chassis Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Maximum number of physical switches in a Virtual Chassis	4	8	8	8	6 V72/C32 - 2	2
Valid chassis identifier	1-4	1–8	1–8	1–8	1–6	1 or 2
Valid chassis group identifier	0-255	0-255	0–255	0-255	0–255	0-255
Valid chassis priority	0-255	0-255	0–255	0-255	0–255	0-255
Maximum number of Virtual Fabric Link peers per chassis	2	1	2	1	5	1
Maximum number of member ports per Virtual Fabric Link	TBD	8	8	8	16	2
Valid Virtual Fabric Link identifier	0 or 1	0 or 1	0 or 1	0	0–4	0
VFL Supported Port Types	SFP/SFP+	Dedicated VFL ports or 10G SFP+ ports	Dedicated 20G VFL ports or 10G SFP+ ports	10G SFP+ ports	10G SFP+ or 40G QSFP	10G SFP+ or 40G QSFP or 100G QSFP28
Valid control VLAN	2-4049					
Valid Virtual Chassis protocol hello interval	1-65535					
LEDs	Refer to the appropriate hardware guide.					
Remote Chassis Detection (RCD)	TBD	N/S	N/S	N/S	Supported	Supported

Notes:

- Different OS6900 models can be mixed in a Virtual Chassis.
- OS6900-V72/C32 support a VC of 2 only. These two models can be mixed in a VC of 2 only with each other.
- MAC Learning Mode is not supported on OS6900 Virtual Chassis.
- OS6860 and OS6865 models can be mixed in Virtual Chassis.
- OS6465-P6/P12 and OS6465-P28 models can be mixed in Virtual Chassis using the 1G SFP ports.

Automatic Remote Configuration Specifications

	OS65465	OS6560	OS6860	OS6865	OS6900	OS9900
DHCP Specifications	DHCP Server required DHCP Client on: - VLAN 1 - Tagged VLAN 127 - LLDP Management VLAN - Automatic LACP (tagged VLAN 127, untagged VLAN 1)					
File Servers	TFTP FTP/SFTP					
Clients supported	TFTP FTP/SFTP					
Instruction file	Maximum length of: • Pathname: 255 characters • Filename: 63 characters					
Maximum length of username for FTP/SFTP file server.	15 characters					
Maximum DHCP lease tries	6					
Unsupported Features	• ISSU and IPv6 are not supported. • Upgrade of uboot, miniboot, or FPGA files is not supported.					
OK LED	Flashing amber during Automatic Remote Configuration process					
Notes:						
Not supported on OS6900-V72/C32.						

Automatic Fabric Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Ports Supported	Any switch port that is not already configured in such a way as to prevent the port from participating in the Automatic Fabric discovery and configuration process.					
IP Protocols Supported for Automatic IP Configuration	OSPFv2, OSPFv3, IS-IS IPv4, IS-IS IPv6					
Notes:						
Advanced routing protocols not supported on the OS6465 or OS6560. Not supported on OS6900-V72/C32.						

NTP Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900

RFCs supported	5905–Network Time Protocol v4
NTP Key File Location	**/flash/network**
Maximum number of NTP servers per client	12
Notes:	
N/A	

2 Network Configuration Specifications

This chapter provides Specifications tables for the following OmniSwitch network configuration applications and procedures that are used for readying a switch for integration into a live network environment:

- Layer 2 features (Ethernet, source learning, and VLAN configuration).
- Layer 3 features (routing protocols, such as IP and RIP)
- Security options (MAC and 802.1x authentication)
- Quality of Service (QoS)
- Link aggregation
- Server load balancing.

Note. The maximum limit values provided in the Specifications tables included in this chapter are subject to available system resources.

For information about how to implement the fundamental software features and protocols for network configuration, refer to the *OmniSwitch AOS Release 8 Network Configuration Guide*.

In This Chapter

This chapter contains the following network configuration Specifications tables:

Ethernet Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
IEEE Standards Supported	802.3 Carrier Sense Multiple Access with Collision Detection (CSMA/CD) 802.3u (100BaseTX) 802.3ab (1000BaseT) 802.3z (1000Base-X) 802.3ae (10GBase-X) 802.3ba (40GBase-X) 802.3az (Energy Efficient Ethernet)					
Ports Supported	Ethernet (10 Mbps) Fast Ethernet (100 Mbps) Gigabit Ethernet (1 Gbps) 10/40/100 Gigabit Ethernet (10/40/100 Gbps)					
802.1Q Hardware Tagging	Supported					
Jumbo Frame Configuration	1/10/40/100 Gigabit Ethernet ports					
Maximum Frame Size	1553 bytes (10/100 Mbps) 9216 bytes (1/10/40/100 Gbps)					
MACSec	1G/10G ports	N/S	1G/10G ports	N/S	N/S	1G/10G ports
Notes:						
• Supported port speeds are chassis and module dependent. • OS6860/6865 does not support 10/100 half-duplex (CSMA/CD) • OS6860(E) - All models support MACSec on 10G ports • OS6860-P24 - MACSec supported on 1G/10G ports. • OS6860-P24Z8 - MACSec supported on 1G/10G ports (not supported on 2.5G ports)						

UDLD Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Maximum number of UDLD ports per system	Up to maximum physical ports per system.					
Notes:						
Not supported on OS6900-V72/C32 models.						

Source Learning Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	2674—Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering and Virtual LAN Extensions					
Maximum number of learned MAC addresses when centralized MAC source learning mode is enabled	16K	16K	48K	48K	X20 - 128K X40 - 128K T20 - 128K T40 - 128K Q32 - 228K X72 - 228K (SM) X72 - 32K (RM) V72 - 104K (SM) V72 - 8K (RM) C32 - 104K (SM) C322 - 8K (RM)	128K
Notes:						
SM = Switch Mode RM = Router Mode						

VLAN Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	2674 - Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering and Virtual LAN Extensions					
IEEE Standards Supported	802.1Q - Virtual Bridged Local Area Networks 802.1D - Media Access Control Bridges					
Maximum VLANs per switch	4094	4094	4094	4094	4094	4092
Maximum Tagged VLANs per Port	4092	4093	4093	4093	4093	4091
Maximum Untagged VLANs per Port	One untagged VLAN (default VLAN) per port.					
Maximum number of ports or link aggregates per PVLAN supported	N/S	N/S	1	1	1	N/S
Maximum Number of Secondary VLANs ped with a Primary VLAN that can co-exist on a port	N/S	N/S	1	1	1	N/S
Maximum number of IPCL and EPCL rules per VLAN	N/S	N/S	256	256	256	N/S
Maximum number of PVLAN per promiscuous port	N/S	N/S	1	1	1	N/S

Notes:

High Availability VLANs Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Maximum high availability VLANs per switch	N/S	N/S	16	32	16	N/S
Notes:						
Not supported on OS6900-V72/C32 models.						

Spanning Tree Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
IEEE Standards supported	802.1d—Media Access Control (MAC) Bridges 802.1s—Multiple Spanning Trees 802.1w—Rapid Spanning Tree Protocol					
Spanning Tree operating modes supported	Flat mode—one spanning tree instance per switch Per-VLAN mode—one spanning tree instance per VLAN					
Spanning Tree port eligibility	Fixed ports 802.1Q tagged ports Link aggregate of ports					
Maximum VLAN Spanning Tree instances per switch.	100	100	100	100	128	128
Maximum flat mode Multiple Spanning Tree Instances (MSTI) per switch	16 MSTI, in addition to the Common and Internal Spanning Tree instance (also referred to as MSTI 0).					
Notes:						
Maximum VLAN Spanning Tree instances per switch—values based on per-VLAN mode.						

Shortest Path Bridging Specifications

The following Specifications table contains information for the OmniSwitch implementation of Shortest Path Bridging (SPB). Note that any maximum limits provided in the table are subject to available system resources.

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
IEEE Standards Supported	802.1aq/D3.6: Draft February 10, 2011—*Virtual Bridged Local Area Networks-Amendment 9: Shortest Path Bridging* 802.1ah/D4.2: DRAFT March 26, 2008— *Virtual Bridged Local Area Networks–Amendment 6: Provider Backbone Bridging*					
IETF Internet-Drafts Supported	draft-ietf-isis-ieee-aq-05.txt—*ISIS Extensions Supporting IEEE 802.1aq Shortest Path Bridging* IETF draft—*IP/IPVPN services with IEEE 802.1aq SPBB networks* IETF draft—*IP/IPVPN services with IEEE 802.1aq SPB networks*					
SPB mode supported	SPBM (MAC-in-MAC)					
IP over SPBM	IPv4 (VPN-Lite and L3 VPN) VRF-to-ISID mapping (one-to-one, one-to-many)					
Maximum number of ISIS-SPB instances per switch.	1					
Maximum number of BVLANs per switch	16					
Number of equal cost tree (ECT) algorithm IDs supported.	16 (Can select any ID between 1 and 16 to assign to a BVLAN)					
Maximum number of service instance identifiers (I-SIDs) per switch	N/S	N/S	2K	2K	1K Q32 - 8K X72 - 8K	1K
Maximum number of VLANs or SVLANs per I-SID	N/S	N/S	2K	2K	4K	4K
Maximum number of SAPs	N/S	N/S	2K	2K	X20 - 4K X40 - 4K T20 - 8K T40 - 8K Q32 - 8K X72 - 8K	8K
Maximum Transmission Unit (MTU) size for SPB services.	9K (not configurable at this time)					

Maximum number of Remote Fault Propagation (RFP) domains.	N/S	N/S	N/S	N/S	N/S	8 (or less if there are other Ethernet OAM domains already configured on the switch)
Notes:						
- SPB is not supported on the OS6465 or OS6560. - In a VC with OS6900-X models, the maximum number of SAPs is 4K.						

Loopback Detection Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Edge (Bridge)	N/S	N/S	Supported	Supported	N/S	Supported
SAP (Access)	N/S	N/S	Supported	Supported	Supported	N/S
Transmission Timer	5–600 seconds					
Auto-recovery Timer	30–86400 seconds					
Notes:						
Not supported on OS6900-V72/C32 models.						

Static Link Aggregation Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Maximum number of link aggregation groups	32	32	128	128	256	253
Maximum number of ports per link aggregate group	8	8	16	16	16	16
Notes:						
On an OS9900 linkagg IDs 0, 126, and 127 are reserved						

Dynamic Link Aggregation Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
IEEE Specifications Supported	802.1ax/802.3ad—Aggregation of Multiple Link Segments					
Maximum number of link aggregation groups	32	32	128	128	256	253
Maximum number of ports per link aggregate group	8	8	16	16	16	16
Notes:						
On an OS9900 linkagg IDs 0, 126, and 127 are reserved.						

Dual-Home Link Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
DHL sessions supported	1	1	1	1	1	N/S
Notes:						
Not supported on OS6900-V72/C32 models.						

ERP Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
ITU-T G.8032 03/2010	Ethernet Ring Protection version 2 (Multi Rings and Ladder networks supported) (Hold off timer, Lockout, Signal degrade SD, RPL Replacement, Forced Switch, Manual Switch, Clear for Manual/Forced Switch, Dual end blocking not supported)					
ITU-T Y.1731/IEEE 802.1ag	ERP packet compliant with OAM PDU format for CCM					
Maximum number of rings per node	64					
Maximum number of nodes per ring	16 (recommended)					
Maximum number of VLANs per port	4094					
Range for ring ID	1–2147483647					
Range for remote MEPID	1–8191					
Range for wait-to-restore timer	1–12 minutes					
Range for guard timer	1–200 centi-seconds					
Notes:						
ERP is not supported on the OS6560 or OS9900. Not supported on OS6900-V72/C32 models.						

MVRP Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
IEEE Standards Supported	IEEE 802.1ak-2007 Amendment 7: Multiple Registration Protocol IEEE 802.1Q-2005 Corrigendum 2008					
Maximum MVRP VLANs	-	512	512	512	512	512
Notes:						
Not supported on OS6900-V72/C32 models.						

802.1AB Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
IEEE Specification	IEEE 802.1AB-2005 Station and Media Access Control Connectivity Discovery					
Maximum number of network policies that can be associated with a port	8	8	8	8	8	8
Maximum number of network policies that can be configured on the switch	8	32	32	32	32	32
Nearest Edge MAC Address	01:20:da:02:01:73					
Nearest Bridge MAC Address	01:80:c2:00:00:0e					
Nearest Customer MAC Address	01:80:C2:00:00:00					
Non-TPMR Address	01:80:C2:00:00:03					
Notes:						
N/A						

SIP Snooping Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	N/S	N/S	3261–SIP session initiation protocol 6337–SIP USAGE of offer/ answer model 4566–SDP session description Protocol 3551–RTP profile for audio and video conferences with minimal control 3311–The Session Initiation Protocol (SIP) UPDATE Method 3262–Reliability of Provisional Responses in SIP	N/S	N/S	N/S
Notes:						
N/A						

IP Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	791–Internet Protocol 792–Internet Control Message Protocol 826–An Ethernet Address Resolution Protocol 2784–Generic Routing Encapsulation (GRE) 2890–Key and Sequence Number Extensions to GRE (extensions defined are not supported) 1701–Generic Routing Encapsulation (GRE) 1702–Generic Routing Encapsulation over IPV4 Networks 2003-IP Encapsulation within IP					
Maximum router interfaces per system	8	128	4K	4K	4K	4K
Maximum router interfaces per VLAN	8	8	16	16	16	16
Maximum HW routes	8	256	12K	12K	X20 - 16K X40 - 16K T20 - 16K T40 - 16K Q32 - 12K X72 - 12K (SM) X72 - 128K (RM) V72 - 12K (SM) V72 - 128K (RM) C32 - 12K (SM) C32 - 128K (RM)	128K
Maximum HW ARP entries per module	256	256	16K	16K	X20 - 8K X40 - 8K T20 - 16K T40 - 16K Q32 - 48K X72 - 48K (SM) X72 - 16K (RM) V72 - 32K (SM) V72 - 8K (RM) C32 - 32K (SM) C32 - 8K (RM)	8K
Maximum HW ARP entries in VC of OS6900s (Distributed ARP not enabled)	N/A	N/A	N/A	N/A	Equal to capacity of module with lowest number of supported ARPs.	N/A
Maximum HW ARP entries in VC of OS6900s (Distributed ARP enabled)	N/A	N/A	N/A	N/A	VC of 4 or more (Q32 or X72) - 192K.	N/A
Maximum number of GRE tunnel interfaces per switch	N/S	N/S	127	127	127	N/S

Maximum number of IPIP tunnel interfaces per switch	N/S	N/S	127	127	127	N/S
Maximum ECMP gateways	4	4	16	16	16	16
Notes:						
SM - Switch mode. RM - Router mode. The OmniSwitch can support a higher number of routes than what is documented in the hardware routing limits. This is done by moving older unused routes into software and more recent active routes into hardware. The total number of routes supported is dependent upon the switch configuration and the total amount of memory available. Exceeding the maximum hardware routes will result in some traffic being routed in software.						

VRF Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Routing Protocols Supported	N/S	N/S	Static, IPv4, RIPv2, OSPFv2, BGP4			
Maximum number of MAX profile VRF instances per switch (no LOW profiles)	N/S	N/S	64	64	64	64
Maximum number of LOW profile VRF instances per switch (no MAX profiles)	N/S	N/S	128	128	128	300
Maximum VRF instances per VLAN	N/S	N/S	1	1	1	1
Maximum OSPFv2 VRF routing instances per switch	N/S	N/S	16	16	16	16
Maximum RIPv2 VRF routing instances per switch	N/S	N/S	16	16	16	16
Maximum BGP VRF routing instances per switch	N/S	N/S	32	32	32	32
Notes:						

IPv6 Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	1981—Path MTU Discovery for IP version 6 2375—IPv6 Multicast Address Assignments 2460—Internet Protocol, Version 6 (IPv6) Specification 2464—Transmission of IPv6 Packets over Ethernet Networks 2465—Management Information Base for IP Version 6: Textual Conventions and General Group 2466—Management Information Base for IP Version 6: ICMPv6 Group 2711—IPv6 Router Alert Option 3056—Connection of IPv6 Domains via IPv4 Clouds 3484—Default Address Selection for Internet Protocol version 6 (IPv6) 3493—Basic Socket Interface Extensions for IPv6 3542—Advanced Sockets Application Program Interface (API) for IPv6 3587—IPv6 Global Unicast Address Format 3595—Textual Conventions for IPv6 Flow Label 3596— DNS Extensions to Support IP Version 6 4007—IPv6 Scoped Address Architecture 4022—Management Information Base for the Transmission Control Protocol (TCP) 4113—Management Information Base for the User Datagram Protocol (UDP) 4193—Unique Local IPv6 Unicast Addresses 4213—Basic Transition Mechanisms for IPv6 Hosts and Routers 4291—IP Version 6 Addressing Architecture 4294—IPv6 Node Requirements 4443—Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification 4861—Neighbor Discovery for IP version 6 (IPv6) 4862—IPv6 Stateless Address Autoconfiguration 5095—Deprecation of Type 0 Routing Headers in IPv6 5453—Reserved IPv6 Interface Identifiers 5722—Handling of Overlapping IPv6 Fragments 3315—Dynamic Host Configuration Protocol for IPv6 (DHCPv6)					
Maximum IPv6 interfaces	4	16	4096	4096	4096	4096
Maximum 6to4 tunnels	N/S	N/S	1	1	1	1
Maximum Configured tunnels	N/S	N/S	255	255	255	255
Maximum IPv6 global unicast or anycast addresses	4	16	10K	10K	10K	10K
Maximum IPv6 global unicast addresses per IPv6 interface	-	-	50	50	50	50

Maximum IPv6 hardware routes when there are no IPv4 routes present (includes dynamic and static routes)	64	128	1K (prefix >= 65) 6K (prefix <= 64)	1K (prefix >= 65) 6K (prefix <= 64)	256 (prefix >= 65) X20/X40 - 8K (prefix <= 64) T20/T40 - 8K (prefix <= 64) Q32/X72 - 6K (prefix <=64)	32K
Maximum IPv6 static route prefixes per switch	4	128	500	500	500	500
Maximum number of RIPng Peers	4	10	20	20	20	20
Maximum number of RIPng Interfaces	4	10	20	20	20	20
Maximum number of RIPng Routes	40	128	5K	5K	5K	5K
Maximum ECMP gateways	4	4	16	16	16	16
DHCPv6 implementation	N/S	N/S	multi-VRF		N/S	multi-VRF
Maximum IPv6 relay destinations supported for each interface	N/S	N/S	5	5	N/S	-
Maximum number of relay hops for each relay	N/S	N/S	32	32	N/S	-

Notes:

- RFC 3315 is not supported on the OS6900 switches.
- Exceeding the maximum IPv6 hardware routes or having IPv4 routes will result in some traffic being routed in software.

IPsec Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
IP Version Supported	IPv6					
RFCs Supported	4301—Security Architecture for the Internet Protocol 4302—IP Authentication Header (AH) 4303—IP Encapsulating Security Payload (ESP) 4305—Cryptographic Algorithm Implementation Requirements for ESP and AH 4308—Cryptographic Suites for IPsec					
Encryption Algorithms Supported for ESP	NULL, 3DES-CBC, and AES-CBC					
Key lengths supported for Encryption Algorithms	3DES-CBC - 192 bits AES-CBC - 128, 192, or 256 bits					
Authentication Algorithms Supported for AH	HMAC-SHA1-96, HMAC-MD5-96, and AES-XCBC-MAC-96					
Key lengths supported for Authentication Algorithms	HMAC-MD5 - 128 bits HMAC-SHA1 - 160 bits AES-XCBC-MAC - 128 bits					
Master Security Key formats	Hexadecimal (16 bytes) or String (16 characters)					
Priority value range for IPsec Policy	1–1000 (1=highest priority, 1000=lowest priority)					
Index value range for IPsec Policy Rule	1–10					
SPI Range	256–999999999					
Modes Supported	Transport					
Notes:						
• IPSec not supported on the OS6465 or OS6560.						

RIP Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	RFC 1058–RIP v1 RFC 2453–RIP v2 RFC 1722–RIP v2 Protocol Applicability Statement RFC 1724–RIP v2 MIB Extension					
Maximum Number of Interfaces	8	10	10	10	10	16
Maximum Number of Peers	8	8	100	100	100	16
Maximum Number of Routes	128	256 (1024*)	10K	10K	10K	10K
Notes:						
* With ECMP						

BFD Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	N/S	N/S	5880—Bidirectional Forwarding Detection 5881—Bidirectional Forwarding Detection for IPv4 and IPv6 (Single Hop) 5882—Generic Application of Bidirectional Forwarding Detection			
Maximum Number of BFD Sessions	N/S	N/S	Chassis - 32 VC - 100	Chassis - 32 VC - 100 -	Chassis - 32 VC - 100	-
Protocols Supported	N/S	N/S	BGP, OSPF, VRRP Remote Address Tracking only, and Static Routes. IPv6 protocols not supported.			
Modes Supported	N/S	N/S	Asynchronous Echo (Demand Mode not supported)			
Notes:						
• BFD is not supported on the OS6465 or OS6560.						

DHCP Relay Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	0951–Bootstrap Protocol 1534–Interoperation between DHCP and BOOTP 1541–Dynamic Host Configuration Protocol 1542–Clarifications and Extensions for the Bootstrap Protocol 2132–DHCP Options and BOOTP Vendor Extensions 3046–DHCP Relay Agent Information Option, 2001					
DHCP Relay Implementation	Global DHCP Per-VLAN DHCP					
DHCP Relay Service	BOOTP/DHCP (Bootstrap Protocol/Dynamic Host Configuration Protocol)					
UDP Port Numbers	67 for Request 68 for Response					
IP addresses supported for each Relay Service	256	256	1536	1536	1536	1536
IP addresses supported for the Per-VLAN service	256	256	1536	1536	1536	1536
Maximum number of UDP relay services allowed per switch	30					
Maximum number of VLANs to which forwarded UDP service port traffic is allowed	256					
Maximum VLAN level IP source filtering entries	N/S	24-port models: 32 VLANs with 96 clients 48-port models: 32 VLANs with 96 clients	32 VLANs with 160 clients	32 VLANs with 160 clients	-	32 VLANs with 160 clients
Maximum port level IP source filtering entries	N/S	24-port models: 127 clients 48-port models: 127 clients	226 clients	253 clients	-	253 clients
Maximum total IP source filtering entries per module	N/S	129	228	113	-	113
Notes:						
N/A						

DHCP Server Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	RFC 2131—Dynamic Host Configuration Protocol RFC 3315—Dynamic Host Configuration Protocol for IPv6 RFC 950—Internet Standard Subnetting Procedure RFC 868—Time Protocol RFC 1035—Domain Implementation and Specification RFC 1191—Path MTU Discovery					
DHCP Server Implementation	BOOTP/DHCP					
UDP Port Numbers	67 for Request and Response (IPv4) 547 for Request (IPv6) 546 for Response (IPv6)					
IP address lease allocation mechanisms: **BootP** **DHCP**	**Static BootP:** IP address is allocated using the BootP configuration when the MAC address of the client is defined. **Static DHCP:** The network administrator assigns an IP address to the client. DHCP conveys the address assigned by the DHCP server to the client. **Dynamic DHCP:** The DHCP server assigns an IP address to a client for a limited period of time or until the client explicitly releases the address.					
OmniSwitch IPv4 Configuration Files	**dhcpd.conf** **dhcpd.pcy** **dhcpsrv.db**					
OmniSwitch IPv6 Configuration Files	**dhcpdv6.conf** **dhcpdv6.pcy** **dhcpv6srv.db**					
Maximum number of leases	8000					
Maximum lease information file size	375K					
Notes:						

VRRP Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	RFC 3768—Virtual Router Redundancy Protocol RFC 2787—Definitions of Managed Objects for the Virtual Router Redundancy Protocol					
Maximum number of VRRPv2 and VRRPv3 virtual routers	N/S	255	255	255	255	134
Maximum number of IP addresses per instance	N/S	16	16	16	16	-
Notes:						

Server Load Balancing Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Maximum number of clusters	32					
Maximum number of physical servers per cluster	32					
Layer-3 classification	Destination IP address QoS policy condition					
Layer-2 classification	QoS policy condition					
Server health checking	Ping, link checks					
High availability support	Hardware-based failover, VRRP, Chassis Management Module (CMM) redundancy					
Networking protocols supported	Virtual IP (VIP) addresses					
Notes:						
• SLB is not supported on the OS6465, OS6560 or OS9900. • Not supported on OS6900-V72/C32 models.						

IPMS Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	RFC 1112—Host Extensions for IP Multicasting RFC 2236—Internet Group Management Protocol, Version 2 RFC 2710—Multicast Listener Discovery (MLD) for IPv6 RFC 2933—Internet Group Management Protocol MIB RFC 3019—IP Version 6 Management Information Base for The Multicast Listener Discovery Protocol RFC 3376—Internet Group Management Protocol, Version 3 RFC 3810—Multicast Listener Discovery Version 2 (MLDv2) for IPv6 RFC 4541—Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches RFC 4604—Using Internet Group Management Protocol Version 3 (IGMPv3) and Multicast Listener Discovery Protocol Version 2 (MLDv2) for Source-Specific Multicast					
IGMP Versions Supported	IGMPv1, IGMPv2, IGMPv3					
Maximum number of IPv4 multicast flows (switched)	16K	16K	12K	12K	X20 - 4K X40 - 4K T20 - 8K T40 - 8K Q32 - 40K X72 - 40K C32 - 20K V72 - 20K	128K
Maximum number of IPv4 multicast flows (*,G routed)	N/S	N/S	12K	12K	X20 - 4K X40 - 4K T20 - 8K T40 - 8K Q32 - 40K X72 - 40K C32 - 20K V72 - 20K	16K
Maximum number of IPv4 multicast flows (S,G routed)	N/S	N/S	12K	12K	X20 - 4K X40 - 4K T20 - 8K T40 - 8K Q32 - 40K X72 - 40K C32 - 20K V72 - 20K	16K
Notes:						
N/A						

IPMSv6 Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	RFC 2710—Multicast Listener Discovery for IPv6 RFC 3019—IPv6 MIB for Multicast Listener Discovery Protocol RFC 3306—Unicast-Prefix-based IPv6 Multicast Addresses RFC 3810—Multicast Listener Discovery Version 2 for IPv6 RFC 4541—Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches RFC 4604—Using Internet Group Management Protocol Version 3 (IGMPv3) and Multicast Listener Discovery Protocol Version 2 (MLDv2) for Source-Specific Multicast					
MLD Versions Supported	MLDv1, MLDv2					
MLD Query Interval	1–65535 in seconds					
MLD Router Timeout	1–65535 in seconds					
MLD Source Timeout	1–65535 in seconds					
MLD Query Response Interval	1–65535 in milliseconds					
MLD Last Member Query Interval	1–65535 in milliseconds					
Maximum number of IPv6 multicast flows (switched)	16K	16K	6K	6K	X20 - 2K X40 - 2K T20 - 4K T40 - 4K Q32 - 20K X72 - 20K C32 - 10K V72 - 10K	128K
Maximum number of IPv6 multicast flows (*,G routed)	N/S	N/S	6K	6K	X20 - 2K X40 - 2K T20 - 4K T40 - 4K Q32 - 20K X72 - 20K C32 - 10K V72 - 10K	16K
Maximum number of IPv6 multicast flows (S,G routed)	N/S	N/S	6K	6K	X20 - 2K X40 - 2K T20 - 4K T40 - 4K Q32 - 20K X72 - 20K C32 - 10K V72 - 10K	16K
Notes:						
N/A						

QoS Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Maximum number of policy rules hardware	128	256	3072	3072	1024 Q32 - 2560 X72 - 2560 V72 - 512 C32 - 512	1024
Maximum number of policy conditions hardware	128	256	3072	3072	1024	1024
Maximum number of policy actions hardware	128	256	3072	3072	1024	1024
Maximum number of groups (network, MAC, service, port)	Port - 5 Others - 128	369	1024	1023	2047	1023
Maximum number of group entries	128	369	1024 per group (256 per service group)	1024 per group (256 per service group)	1024 per group (256 per service group)	1024 per group (256 per service group)
Maximum number of Class of Service (CoS) queues per port.	8	8	8	8	8	8
Queue Set Profiles (QSP)	2	2	4	4	4	4
Weighted Random Early Detection profiles (WRED)	N/S	N/S	N/S	N/S	TCP traffic only Q32- N/S X72 - N/S	-
Maximum number of QoS policy lists per switch	32 (includes the default list)					
Maximum number of QoS policy lists per Universal Network Profile (UNP)	1					
Notes:						
N/A						

LDAP Policy Server Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	RFC 2251–Lightweight Directory Access Protocol (v3) RFC 3060–Policy Core Information Model—Version 1 Specification					
Maximum number of policy servers (supported on the switch)	5					
Maximum number of policy servers (supported by PolicyView)	1					
Notes:						
N/A						

Authentication Server Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RADIUS RFCs Supported	RFC 2865–Remote Authentication Dial In User Service (RADIUS) RFC 2866–RADIUS Accounting RFC 2867–RADIUS Accounting Modifications for Tunnel Protocol Support RFC 2868–RADIUS Attributes for Tunnel Protocol Support RFC 2809–Implementation of L2TP Compulsory Tunneling through RADIUS RFC 2869–RADIUS Extensions RFC 2548–Microsoft Vendor-specific RADIUS Attributes RFC 2882–Network Access Servers Requirements: Extended RADIUS Practices					
TACACS+ RFCs Supported	RFC 1492–An Access Control Protocol					
LDAP RFCs Supported	RFC 1789–Connectionless Lightweight X.5000 Directory Access Protocol RFC 2247–Using Domains in LDAP/X.500 Distinguished Names RFC 2251–Lightweight Directory Access Protocol (v3) RFC 2252–Lightweight Directory Access Protocol (v3): Attribute Syntax Definitions RFC 2253–Lightweight Directory Access Protocol (v3): UTF-8 String Representation of Distinguished Names RFC 2254–The String Representation of LDAP Search Filters RFC 2256–A Summary of the X.500(96) User Schema for Use with LDAPv3					
Other RFCs	RFC 2574–User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3) RFC 2924–Accounting Attributes and Record Formats RFC 2975–Introduction to Accounting Management RFC 2989–Criteria for Evaluating AAA Protocols for Network Access					
Maximum number of authentication servers in single authority mode	8					
Maximum number of authentication servers in multiple authority mode	8					

Maximum number of servers per Authenticated Switch Access type	8
Notes:	
N/A	

UNP Specifications

	OS6465	**OS6560**	**OS6860**	**OS6865**	**OS6900**	**OS9900**
Number of UNPs per switch	4K	4K	4K	4K	4K	1K
Number of UNP users per switch	64	256	2K	2K	2K	1K
Authentication type	MAC and 802.1x authentication					
Profile type	VLAN		VLAN and SPB service		VLAN, SPB and VXLAN service	VLAN
UNP port type	bridge		bridge and SPB access			bridge
Number of QoS policy lists per switch	32 (includes the default list)					
Number of QoS policy lists per UNP	1					
Notes:						
Number of UNPs per switch includes static and dynamic profiles.						

Access Guardian Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	RFC 2284–PPP Extensible Authentication Protocol (EAP) RFC 2865–Remote Authentication Dial In User Service (RADIUS) RFC 2866–RADIUS Accounting RFC 2867–RADIUS Accounting Modifications for Tunnel Protocol Support RFC 2868–RADIUS Attributes for Tunnel Protocol Support RFC 2869–RADIUS Extensions RFC 3576--Change of Authorization-Request (COA) and Disconnect request (DM) for BYOD. RFC support is limited to ClearPass solution. RFC 3579–RADIUS Support for EAP					
IEEE Standards Supported	IEEE 802.1X-2001–Standard for Port-based Network Access Control 802.1X RADIUS Usage Guidelines					
Authentication methods supported	-	-	802.1X, MAC address, Captive Portal		-	-
Maximum number of Access Guardian users	-	-	1K (includes quarantined and Captive Portal users)		-	-
Maximum number of users quarantined by QMR	-	-	1K	1K	-	-
Average number of users allowed to login to Captive portal Web pages at any given time	-	-	40	40	-	-
Maximum number of Captive Portal profiles	-	-	8	8	-	-
Maximum number of AAA profiles	-	-	8	8	-	-
Maximum number of authentication servers	-	-	4 per authentication type (MAC, 802.1X, Captive Portal)	4 per authentication type (MAC, 802.1X, Captive Portal)	-	-
Maximum number of accounting servers	-	-	4 per authentication type (MAC, 802.1X, Captive Portal)	4 per authentication type (MAC, 802.1X, Captive Portal)	-	-

BYOD Solution Server	-	-	ClearPass Policy Manager (CPPM)	ClearPass Policy Manager (CPPM)	-	-
mDNS GRE Tunnel Supported Protocol	-	-	IPv4	IPv4	-	-
SSDP GRE Tunnel Supported Protocol	-	-	IPv4	IPv4	--	-
Maximum L2 GRE Tunnels	TBD	TBD	750 - TBD	750 - TBD	Q32/X72 - 1K	TBD
Notes:						
• Access Guardian BYOD related features are only supported on the OS6860/6865.						

AppMon Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Packet types sampled	N/S	N/S	TCP and UDP		N/S	N/S
Notes:						
• AppMon is supported in a virtual chassis of OmniSwitch 6860 and OmniSwitch 6860E platforms where at least one OmniSwitch 6860E is mandatory for the feature to work.						

Application Fingerprinting Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Packet sampling rate	N/S	N/S	N/S	N/S	50K packets-per-second on each module.	N/S
Packet types sampled	N/S	N/S	N/S	N/S	IPv4 and IPv6 (no fragmented, encrypted, control, or protocol packets. For example, ICMP, LLDP, BPDU packets not scanned).	N/S

Notes:
• AFP is supported on the OS6900 only. • Not supported on OS6900-V72/C32 models.

Port Mapping Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Port Mapping Sessions	8					
Notes:						

Learned Port Security Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Ports eligible for Learned Port Security	Fixed and 802.1Q tagged					
Ports not eligible for Learned Port Security	Link aggregate ports. 802.1Q (trunked) link aggregate ports.					
Minimum number of learned MAC addresses allowed per LPS port	1					
Maximum number of learned MAC addresses allowed per LPS port	1000					
Maximum number of filtered MAC addresses allowed per LPS port	100					
Maximum number of configurable MAC address ranges per LPS port	1					
Notes:						
Not supported on OS6900-V72/C32 models.						

Port Mirroring Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Mirroring Sessions Supported	2	2	2	2	2	2
Combined Mirroring/ Monitoring Sessions per Chassis	2	2	2	3	2	3
N-to-1 Mirroring Supported	128 to 1	128 to 1	128 to 1	128 to 1	128 to 1	128 to 1
Number of RPMIR VLANs per session	1	1	1	1	1	1
Notes:						
RPMIR over linkagg is not supported for 9900, 6560 and 6465.						

Port Monitoring Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Monitoring Sessions Supported	1	1	1	1	1	1
Combined Mirroring/ Monitoring Sessions per Chassis	1	1	2	2	2	3
File Type Supported	ENC file format (Network General Sniffer Network Analyzer Format)					
Notes:						
N/A						

sFlow Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	3176—sFlow Management Information Base					
Receiver/Sampler/Polling Instances	2					
Sampling	length of packet type of frame source and destination MACs source and destination VLANs source and destination priorities source and destination IP addresses source and destination ports tcp flags and tos					
Polling	In octets Out octets Number of Rx Unicast packets Number of Tx Unicast packets Number of Rx Multicast packets Number of Tx Multicast packets Number of Rx Broadcast packets Number of Tx Broadcast packets In Errors Out Errors					
Notes:						
N/A						

RMON Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	2819 - Remote Network Monitoring Management Information Base					
RMON Functionality Supported	Basic RMON 4 group implementation –Ethernet Statistics group –History (Control and Statistics) group –Alarms group –Events group					
RMON Functionality Not Supported	RMON 10 group* RMON2* –Host group –HostTopN group –Matrix group –Filter group –Packet Capture group (*An external RMON probe that includes RMON 10 group and RMON2 be used where full RMON probe functionality is required.)					
Flavor (Probe Type)	Ethernet/History/Alarm					
Status	Active/Creating/Inactive					
History Control Interval (seconds)	1–3600					
History Sample Index Range	1–65535					
Alarm Interval (seconds)	1–2147483647					
Alarm Startup Alarm	Rising Alarm/Falling Alarm/ RisingOrFalling Alarm					
Alarm Sample Type	Delta Value/Absolute					
RMON Traps Supported	RisingAlarm/FallingAlarm These traps are generated whenever an Alarm entry crosses either its Rising Threshold or its Falling Threshold and generates an event configured for sending SNMP traps.					
Notes:						
Not supported on OS6900-V72/C32 models.						

Switch Health Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Health Functionality Supported	–Switch level CPU Utilization Statistics (percentage); –Switch/module/port level Input Utilization Statistics (percentage); –Switch/module/port level Input/Output Utilization Statistics (percentage); –Switch level Memory Utilization Statistics (percentage); –Device level (for example, Chassis/CMM) Temperature Statistics (Celsius).					
Monitored Resource Utilization Levels	–Most recent utilization level; –Average utilization level during last minute; –Average utilization level during last hour; –Maximum utilization level during last hour.					
Resource Utilization Raw Sample Values	Saved for previous 60 seconds.					
Resource Utilization Current Sample Values	Stored.					
Resource Utilization Maximum Utilization Value	Calculated for previous 60 seconds and stored.					
Utilization Value = 0	Indicates that none of the resources were measured for the period.					
Utilization Value = 1	Indicates that a non-zero amount of the resource (less than 2%) was measured for the period.					
Percentage Utilization Values	Calculated based on Resource Measured During Period/Total Capacity.					
Resource Threshold Levels	Apply automatically across all levels of switch (switch/module/port).					
Rising Threshold Crossing	A Resource Threshold was exceeded by its corresponding utilization value in the current cycle.					
Falling Threshold Crossing	A Resource Threshold was exceeded by its corresponding utilization value in the previous cycle, but is not exceeded in the current cycle.					
Threshold Crossing Traps Supported	Device, module, port-level threshold crossings.					
Notes:						
N/A						

VLAN Stacking Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
IEEE Standards supported	IEEE 802.1Q, 2003 Edition, IEEE Standards for Local and Metropolitan Area Networks—Virtual Bridged Local Area Networks P802.1ad/D6.0 (C/LM) Standard for Local and Metropolitan Area Networks—Virtual Bridged Local Area Networks–Amendment 4: Provider Bridges N/S					
Maximum number of services	N/S	N/S	4	4	4	N/S
Maximum number of SVLANs	N/S	N/S	4K	4K	4K	N/S
Maximum number of SAPs	N/S	N/S	8K	8K	8K	N/S
Maximum number of SAP profiles	N/S	N/S	8K	8K	8K (1K if profiles assign priority or bandwidth)	N/S
Maximum number of SAP profile VLAN translation or double tagging rules	N/S	N/S		-	8K	N/S
Maximum number of customer VLANs (CVLANs) associated with a SAP	N/S	N/S	4K	4K	4K	N/S
Maximum number of service-to-SAP associations	N/S	N/S	1K	1K		N/S
Notes:						
VLAN Stacking is not supported on the OS6465, OS6560 or OS9900. Not supported on OS6900-V72/C32 models.						

Switch Logging Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	RFC-5424 Syslog Protocol					
Functionality Supported	High-level event logging mechanism that forwards requests from applications to enabled logging devices.					
Number of Syslog Servers Supported	12					
Logging Devices	Flash Memory/Console/IP Address					
Severity Levels/Types Supported	2 (Alarm - highest severity), 3 (Error), 4 (Alert), 5 (Warning) 6 (Info - default), 7 (Debug 1), 8 (Debug 2), 9 (Debug 3 - lowest severity)					
Notes:						
N/A						

Ethernet OAM Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Standards Supported	IEEE 802.1ag Version 8.1–*Connectivity Fault Management* IEEE 802.1D–*Media Access Control (MAC) Bridges* IEEE 802.1Q–*Virtual Bridged Local Area Networks* ITU-T Y.1731–*OAM Functions and Mechanisms for Ethernet-Based Networks*					
Maximum Maintenance Domains (MD) per Bridge	8					
Maximum Maintenance Associations (MA) per Bridge	128					
Maximum Maintenance End Points (MEP) per Bridge	256					
Maximum MEP CMM Database Size	1K					
Minimum CCM interval	100ms					
Notes:						
Ethernet OAM is not supported on the OS6465, OS6560 or OS9900. Not supported on OS6900-V72/C32 models.						

SAA Specifications

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
Platforms Supported	Supported	N/S	Supported	Supported	Supported	N/S
Notes:						
Not supported on OS6900-V72/C32 models.						

3 Advanced Routing Configuration Specifications

This chapter provides Specifications tables for the following OmniSwitch features that are used to set up and monitor advanced routing protocols for operation in a live network environment:

- Routing technologies.
  - Open Shortest Path First (OSPF), version 2 and version 3.
  - Intermediate System-to-Intermediate System (IS-IS).
  - Border Gateway Protocol (BGP).
- Multicast routing protocols.
  - Multicast boundaries that are used to confine scoped multicast addresses to a specific domain.
  - Distance Vector Multicast Routing Protocol (DVMRP)
  - Protocol-Independent Multicast (PIM)
  - Multicast Border Router (MBR) functionality as defined in the PIM-SM specification (RFC 4601)

Note: The OmniSwitch can support a higher number of routes than what is documented in the protocol routing tables. The values documented are based on typical scenarios and validated during the AOS test phase. The total number of routes supported is dependent upon the switch configuration and the total amount of memory available.

For information about how to configure advanced routing protocols, refer to the *OmniSwitch AOS Release 8 Advanced Routing Configuration Guide*.

In This Chapter

This chapter contains the following Advanced Routing Specifications tables:

OSPF Specifications

The following Specifications table contains information for the OmniSwitch implementation of Open Shortest Path First (OSPF) routing protocol. Note that any maximum limits provided in the table are subject to available system resources.

	OS6465	**OS6560**	**OS6860**	**OS6865**	**OS6900**	**OS9900**
RFCs supported	1370—Applicability Statement for OSPF 4750—OSPF Version 2 Management Information Base 2328—OSPF Version 2 5250—The OSPF Opaque LSA Option 3101—The OSPF Not-So-Stubby Area (NSSA) Option 3623—Graceful OSPF Restart					
Maximum number of areas	N/S	N/S	4	4	10	10
Maximum number of interfaces	N/S	N/S	128	128	128	128
Maximum number of passive interfaces	N/S	N/S	200	200	200	200
Maximum number of Link State Database entries	N/S	N/S	20K	20K	100K	-
Maximum number of neighbors per router	N/S	N/S	128	128	254	254
Maximum number of routes	N/S	N/S	32K	32K	32K	64K
Maximum number of ECMP next hop entries	N/S	N/S	16	16	16	2
Notes:						
- The maximum number of routes value may vary depending on the number of interfaces/neighbors.						

OSPFv3 Specifications

The following Specifications table contains information for the OmniSwitch implementation of Open Shortest Path First version 3 (OSPFv3) routing protocol. Note that any maximum limits provided in the table are subject to available system resources.

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs supported	RFC 1826—IP Authentication Header RFC 1827—IP Encapsulating Security Payload RFC 2553—Basic Socket Interface Extensions for IPv6 RFC 2373—IPv6 Addressing Architecture RFC 2374—An IPv6 Aggregatable Global Unicast Address Format RFC 2460—IPv6 base specification RFC 2740—OSPF for IPv6					
Maximum number of areas	N/S	N/S	4	4	5	5
Maximum number of interfaces	N/S	N/S	128	128	20	20
Maximum number of Link State Database entries	N/S	N/S	20K	20K	20K	20K
Maximum number of neighbors	N/S	N/S	128	128	128	128
Maximum number of routes	N/S	N/S	32K	32K	10K	10K
Maximum number of ECMP next hop entries	N/S	N/S	16	16	16	16
Notes:						
- The maximum number of routes per router value may vary depending on the number of interfaces/neighbors.						

IS-IS Specifications

The following Specifications table contains information for the OmniSwitch implementation of the Intermediate System-to-Intermediate System (IS-IS) routing protocol. Note that any maximum limits provided in the table are subject to available system resources.

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	1142-OSI IS-IS Intra-domain Routing Protocol 1195-OSI IS-IS for Routing in TCP/IP and Dual Environments 3373-Three-Way Handshake for Intermediate System to Intermediate System (IS-IS) Point- to-Point Adjacencies 3567-Intermediate System to Intermediate System (IS-IS) Cryptographic Authentication 2966-Prefix Distribution with two-level IS-IS (Route Leaking) support 2763-Dynamic Host name exchange support 3719-Recommendations for Interoperable Networks using IS-IS 3787-Recommendations for Interoperable IP Networks using IS-IS 5308-IS-IS support for IPv6 (Routing IPv6 with IS-IS)					
IETF Internet-Drafts Supported	draft-ietf-isis-igp-p2p-over-lan-05.txt-Point-to-point operation over LAN in link-state routing protocols					
Maximum number of areas (per router)	N/S	N/S	3	3	3	-
Maximum number of L1 adjacencies per interface (per router)	N/S	N/S	70	70	70	-
Maximum number of L2 adjacencies per interface (per router)	N/S	N/S	70	70	70	-
Maximum number of IS-IS interfaces (per router)	N/S	N/S	70	70	70	-
Maximum number of Link State Packet entries (per adjacency)	N/S	N/S	255	255	255	-
Maximum number of IS-IS routes	N/S	N/S	24000	24000	24000	-
Maximum number of IS-IS L1 routes	N/S	N/S	12000	12000	12000	-
Maximum number of IS-IS L2 routes	N/S	N/S	12000	12000	12000	-
Notes:						

BGP Specifications

The following Specifications table contains information for the OmniSwitch implementation of the Border Gateway Protocol (BGP) routing protocol. Note that any maximum limits provided in the table are subject to available system resources.

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	1771/4271–A Border Gateway Protocol 4 (BGP-4) 2439–BGP Route Flap Damping 3392/5492–Capabilities Advertisement with BGP-4 2385–Protection of BGP Sessions via the TCP MD5 Signature Option 1997–BGP Communities Attribute 4456–BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP) 3065–Autonomous System Confederations for BGP 4273–Definitions of Managed Objects for BGP-4 4486–Subcodes for BGP Cease Notification 4760–Multiprotocol Extensions for BGP-4 2545–Use of BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing 2918 - Route Refresh Capability for BGP-4 4724 - Graceful Restart Mechanism for BGP 6793 - BGP 4-octet ASN 5668 - 4-Octet AS Specific BGP Extended Community 2042 - Registering New BGP Attribute Types 5396 -Textual Representation of Autonomous System (AS) Numbers					
BGP Attributes Supported	Origin, AS Path, Next Hop (IPv4), MED, Local Preference, Atomic Aggregate, Aggregator (IPv4), Community, Originator ID, Cluster List, Multiprotocol Reachable NLRI (IPv6), Multiprotocol Unreachable NLRI (IPv6), AS4 Path, AS4 Aggregator (IPv4), and AS Specific Extended Community.					
Maximum number of peers per switch (32 peers per VRF)	N/S	N/S	512	512	512	512
Maximum number of networks	N/S	N/S	4K	4K	4K	4K
Maximum number of aggregation addresses	N/S	N/S	2K	2K	2K	-
Maximum number of routes	N/S	N/S	64K	64K	128K	256K
Maximum number of policies	N/S	N/S	1K	1K	1K	1K
Notes:						

Multicast Boundary Specifications

The following Specifications table contains information for the OmniSwitch implementation of multicast address boundary functionality. Note that any maximum limits provided in the table are subject to available system resources.

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	2365—Administratively Scoped IP Multicast 5132 - IP Multicast MIB					
Valid Scoped Address Range	239.0.0.0 to 239.255.255.255					
Valid extended Multicast route boundary Address Range	224.0.0.0 to 239.255.255.255					
Notes:						
- If software routing is used, the number of total flows supported is variable, depending on the number of flows and the number of routes per flow. - Multicast boundary is not supported on the OS6465 or OS6560.						

DVMRP Specifications

The following Specifications table contains information for the OmniSwitch implementation of the Distance Vector Multicast Routing Protocol (DVMRP). Note that any maximum limits provided in the table are subject to available system resources.

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	1075—Distance Vector Multicast Routing Protocol, Version1 4087—IP Tunnel MIB 2715—Interoperability Rules for Multicast Routing Protocols					
IETF Internet-Drafts Supported	draft-ietf-idmr-dvmrp-v3-09.txt - Distance Vector Multicast Routing Protocol, Version 3					
DVMRP version supported	DVMRPv3.255					
DVMRP attributes supported	Reverse Path Multicasting, Neighbor Discovery, Multicast Source Location, Route Report Messages, Distance metrics, Dependent Downstream Routers, Poison Reverse, Pruning, Grafting, DVMRP Tunnels					
DVMRP timers supported	Flash update interval, Graft retransmissions, Neighbor probe interval, Neighbor timeout, Prune lifetime, Prune retransmission, Route report interval, Route hold-down, Route expiration timeout					
Maximum number of interfaces	384 (Maximum 384 combined Multicast Interfaces between PIMv4, PIMv6 and DVMRP.)					
Multicast protocols per interface	1 (PIM and DVMRP cannot be enabled on the same interface.)					
Notes:						
DVMRP is not supported on the OS6465, OS6560 or OS9900.						

PIM Specifications

The following Specifications table contains information for the OmniSwitch implementation of the Protocol-Independent Multicast (PIM) routing protocol. Note that any maximum limits provided in the table are subject to available system resources.

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	2365—Administratively Scoped IP Multicast 4601—Protocol Independent Multicast-Sparse Mode (PIM-SM) Protocol Specification 4007—IPv6 Scoped IP Multicast 5060—Protocol Independent Multicast MIB 5132—IP Multicast MIB 3569—An Overview of Source-Specific Multicast (SSM) 3973—Protocol Independent Multicast-Dense Mode (PIM-DM) 5015 - Bidirectional Protocol Indpendent Multicast (BIDIR-PIM) 5059—Bootstrap Router (BSR) Mechanism for PIM 5240—Protocol Independent Multicast (PIM) Bootstrap Router MIB 2715—Interoperability Rules for Multicast Routing Protocols					
PIM-SM version supported	PIM-SMv2					
PIM attributes supported	Shared trees (also referred to as RP trees) Designated Routers (DRs) Designated Forwarders (DFs) Bootstrap Routers (BSRs) Candidate Bootstrap Routers (C-BSRs) Rendezvous Points (RPs) (applicable only for PIM-SM) Candidate Rendezvous Points (C-RPs)					
PIM timers supported	C-RP expiry, C-RP holdtime, C-RP advertisement, Join/Prune, Probe, Register suppression, Hello, Expiry, Assert, Neighbor liveness, DF Election Timer					
Maximum PIM interfaces	384 **(**Maximum 384 combined Multicast Interfaces between PIMv4, PIMv6 and DVMRP.) 100 (OS9900)					
Maximum Rendezvous Point (RP)	100					
Maximum Bootstrap Routers (BSRs)	1					
Multicast Protocols per Interface	1 (PIM and DVMRP cannot be enabled on the same IP interface)					
Reserved SSM IPv4 Address Ranges	232.0.0.0 to 232.255.255.255					
Reserved SSM IPv6 Address Ranges	FF3x::/32					
Notes:						
PIM is not supported on the OS6465 or OS6560.						

MBR Specifications

The following Specifications table contains information for the OmniSwitch implementation of the multicast border router (MBR) functionality defined in the PIM-SM specification (RFC 4601). Note that any maximum limits provided in the table are subject to available system resources.

	OS6465	OS6560	OS6860	OS6865	OS6900	OS9900
RFCs Supported	4601—Protocol Independent Multicast-Sparse Mode (PIM-SM) Protocol Specification 3973—Protocol Independent Multicast-Dense Mode (PIM-DM) 2715—Interoperability Rules for Multicast Routing Protocols					
IETF Internet-Drafts Supported	draft-ietf-idmr-dvmrp-v3-09.txt - Distance Vector Multicast Routing Protocol, Version 3					
MBR Interoperability	DVMRP interoperability with IPv4 PIM (PIM-SM and PIM-DM only).					
Notes:						
MBR is not supported on the OS6465 or OS6560.						

4 Data Center Switching Specifications

The OmniSwitch implementation of data center switching capabilities helps enterprises address the challenges and ongoing transformation of data center networks. This chapter provides Specifications tables for the following OmniSwitch data center switching applications:

- Data Center Bridging (DCB) protocols to convert Ethernet into a lossless transport to support a reliable storage area network fabric within the data center mesh.
- Shortest Path Bridging MAC (SPBM), including SPBM support of Provider Backbone Bridging (PBB) encapsulation and services.
- Virtual eXtensible Local Area Network (VXLAN) to transparently extend Layer 2 networks over a Layer 3 infrastructure.
- VXLAN Snooping to detect and identify VXLAN traffic on the network.
- Fibre Channel over Ethernet (FCoE) Initialization Protocol (FIP) snooping to ensure the security of an FCoE network.
- FCoE/FC gateway functionality to converge FC over Ethernet and FC-to-FC over Ethernet through an OmniSwitch gateway.
- Edge Virtual Bridging (EVB) for managing virtual machines created and managed on servers also running the EVB protocol..

Note. The maximum limit values provided in the Specifications tables included in this chapter are subject to available system resources.

For information about how to configure data center switching applications, refer to the *OmniSwitch AOS Release 8 Data Center Switching Guide*.

In This Chapter

This chapter contains the following data center Specifications tables:

Data Center Bridging Specifications

The following Specifications table contains information for the OmniSwitch implementation of Data Center Bridging (DCB). Note that any maximum limits provided in the table are subject to available system resources.

	OS6900
OmniSwitch Software License	Data Center
IEEE Standards Supported	802.1Qbb—*Priority-based Flow Control* 802.1Qaz D2.5—*Enhanced Transmission Selection* 802.1Qaz D2.5—*Data Center Bridging Exchange Converged Enhanced Ethernet DCBX v.1.01* 802.1Q-REV/D1.5—*Media Access Control (MAC) Bridges and Virtual Bridged Local Area Networks*
Maximum number of DCB profiles	128 profiles: • Profiles 1–11 are predefined, with profile 8 serving as the default profile for all ports. • Profiles 12–128 are reserved for user-defined (custom) profiles.
Maximum number of lossless queues (priorities)	110
DCB TLVs supported	ETS Configuration ETS Recommendation PFC Configuration Application Priority
Notes:	
- DCB is only supported on the OS6900 (except V72/C32 models)..	

VXLAN Specifications

The following Specifications table contains information for the OmniSwitch implementation of the Virtual eXtensible LAN (VXLAN) feature. Note that any maximum limits provided in the table are subject to available system resources.

	OS6900
RFCs Supported	7348—*VXLAN: A Framework for Overlaying Layer 2 Virtualized Networks over Layer 3 Networks.*
VXLAN segments (L2 overlay networks)	16 million
VXLAN service instances	8K
VXLAN Tunnel End Points in a VXLAN network.	500
VXLAN UDP destination ports	8 (including the default UDP port number, which is 4789).
VXLAN Service Access Points (SAPs)	8K (per device or per Virtual Chassis)
VXLAN SAPs with a VLAN ID range	8 SAPs per service access port
Service access ports with SAPs that contain a VLAN ID range	255
VXLAN Network IDs (VNIs)	4K
Multicast Groups	500
Multicast protocol supported	Bidirectional PIM (BIDIR-PIM)
Notes:	
VXLAN is only supported on the OmniSwitch 6900-Q32 and OmniSwitch 6900-X72.	

VXLAN Snooping Specifications

The following Specifications table contains information for the OmniSwitch implementation of VXLAN Snooping. Note that any maximum limits provided in the table are subject to available system resources.

	OS6900
RFCs Supported	7348—*VXLAN: A Framework for Overlaying Layer 2 Virtualized Networks over Layer 3 Networks.*
Packet sampling rate	1K packets-per-second on each module.
Notes:	
- VXLAN Snooping is only supported on the OS6900 (except V72/C32 models).	

FIP Snooping Specifications

The following Specifications table contains information for the OmniSwitch implementation of FIP Snooping and FCoE. Note that any maximum limits provided in the table are subject to available system resources.

	OS6900
OmniSwitch Software License	Data Center
INCITS Standards Supported	• T11 Fibre Channel Backbone - 5 (FC-BB-5) Rev 2.00 June 4, 2009 • FC-BB-5 Annex C: Increasing FC-BB_E Robustness Using Access Control Lists • T11 Switch Fabric - 5 (FC-SW-5) Rev 8.5 June 3, 2009
Maximum number of FIP Snooping Sessions	128 Maximum number of FIP Snooping Sessions
Required port types	10G or faster Ethernet with DCB profile and DCBx enabled with PFC/ ETS active (ports and link aggregates)
Notes:	
- FIP Snooping is only supported on the OS6900 (except V72/C32 models).	

FCoE/FC Gateway Specifications

The following Specifications table contains information for the OmniSwitch FCoE/FC Gateway. Note that any maximum limits provided in the table are subject to available system resources.

	OS6900
OmniSwitch Software License	Data Center
INCITS Standards Supported	• FC-PI-4 Fibre Channel T11/08-138v1 • FC-PI-5 Fibre Channel T11 2118-D/Rev 6.10 • FC-BB-5 Backbone 5 T11/1871-D • FC-BB-6 Backbone 6 T11/2159-D (CNA switching only)
Fibre Channel functionality supported	• FCoE transit bridge - FCoE tunneling of encapsulated FC frames - FCoE initialization protocol (FIP) snooping • FCoE/FC gateway switch - N_Port proxy (NPIV) - F_Port proxy (Reverse-NPIV) - E_Port proxy (E2E-tunnel)
Supported port types	• Fibre Channel for FCoE/FC gateway—OS-XNI-U12E module with SFP-FC-SR transceiver • Ethernet for FCoE/FIP snooping—10G or faster with DCB profile, DCBx enabled with PFC/ETS active (ports and link aggregates)
OmniSwitch 64-bit World Wide Node Name (WWNN)	10:00:xx:xx:xx:xx:xx:xx (where xx = next available increment of the switch base MAC address)
OmniSwitch 64-bit World Wide Port Name (WWPN) for each Fibre Channel port	10:00:xx:xx:xx:xx:xx:xx (where xx = port MAC address)
VSAN–FC port associations	Multiple FC port assignments per VSAN allowed. Only one VSAN assignment per FC port allowed.
VSAN–FCoE VLAN mapping	One-to-one
VSAN scalability per switch	Based on the number of FC ports (for example, if switch has 12 FC ports, then 12 VSANs; one for each FC port). Note that an FC port configured as an E2E tunnel endpoint does not use up a VSAN assignment.
Maximum number of VSANs per network	4094
E2E tunnel scalability	One tunnel termination per FC port up to the number of available FC ports on the switch or virtual chassis.
Maximum frame size supported	2180
Load Balancing	NP_Port load balancing only: • Dynamic • Dynamic-reorder • ENode-based • Static
Notes:	

- Only an OmniSwitch 6900 with the supported port types can serve as an FCoE/FC Gateway switch. - Not supported on OS6900-V72/C32 models.

Edge Virtual Bridging Specifications

The following Specifications table contains information for the OmniSwitch implementation of Edge Virtual Bridging (EVB). Note that any maximum limits provided in the table are subject to available system resources.

	OS6900
OmniSwitch Software License	Data Center
IEEE Standards Supported	P802.1Qbg Standard Draft, Revision D2.2. February 18, 2012—*Virtual Bridged Local Area Networks–Amendment 21: Edge Virtual Bridging*
EVB mode	Bridging (virtual machines request the required CVLAN ID tag)
Edge Relay (ER) support	Single ER per switch port. The ER can operate as a Virtual Ethernet Port Aggregator (VEPA) or as a Virtual Ethernet Bridge (VEB).
Notes:	
- EVB is only supported on the OS6900 (except V72/C32 models).	

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