

# Alcatel-Lucent OmniSwitch 6360

## Stackable Gigabit Ethernet LAN Switch Family

The [Alcatel-Lucent OmniSwitch® 6360](#) Stackable Gigabit Ethernet LAN Switch Family is an industry leading, branch, campus workgroup, and enterprise, value access solution. These are simple, flexible, and secure switches ideal for out-of-the-wiring-closet workstation, access-point, IP telephony and critical Internet of Things (IoT) deployment.



OmniSwitch 6360 operates using the field proven Alcatel-Lucent Operating System (AOS) software supporting simple device management and network management with a Command-Line Interface (CLI) in addition to an in-box web browser graphical user interface (GUI). These switches deliver enhanced network security, reliability, and operational efficiency for Small- and Medium-sized Businesses (SMB) or Enterprise edge networks.

The Alcatel-Lucent OmniSwitch 6360 family is embedded with the latest technology innovations, and offers maximum investment protection.

Deployments that benefit from the OmniSwitch 6360 family include:

- Classroom and campus workgroups
- Small enterprise or branch office enterprise
- Small-to-mid-sized and enterprise edge networks

## Features

- 10, 24, and 48 Gigabit Ethernet data or PoE+ ports with line-rate performance
- Gigabit Ethernet SFP or SFP/RJ-45 combination uplink ports, or fixed 10 Gigabit Ethernet SFP+/RJ45 combination uplink ports (X models)
- 10 GigE virtual chassis bandwidth up to 8 units (stacking) or 416 ports
- Perpetual and fast PoE+ support across all PoE models
- Compact fanless models for co-location work environments

## Management

- AOS field-proven software with management through web interface (WebView 2.0), command line interface (CLI), and Simple Network Management Protocol (SNMP)
- Ethernet operations, administration and management (OA&M) support for service configuration and monitoring
- OmniSwitch Lightning Configuration technology to provide Easy, out-of-the-box OmniSwitch configuration and deployment for customers, business partners and service integrators.
- Cloud-enabled with Alcatel-Lucent OmniVista® Cirrus for secure, resilient, and scalable cloud-based network management
- Support by Alcatel-Lucent OmniVista 2500 Network Management System (NMS)

## Security

- Comprehensive 802.1X features to control access to the network
- Flexible device and user authentication with Alcatel-Lucent Access Guardian (IEEE 802.1x/MAC/captive portal)
- Protection from cyber-attacks with secure diversified AOS software image
- NDcPP (EAL1) certified
- Enables deployment of comprehensive and secure Bring Your Own Device (BYOD) services in enterprise networks such as guest management, device on-boarding, device posturing, , IoT device profiling, application management and dynamic change of authentication (CoA)
- Advanced Quality of Service (QoS) and Access Control Lists (ACLs) for IPv4 and IPv6 traffic control, including an embedded denial-of-service (DoS) engine to filter out unwanted traffic attacks
- Extensive support of user-oriented features such as learned port security (LPS), port mapping, Dynamic Host Configuration Protocol (DHCP) binding tables and User Network Profile (UNP)

## Performance and redundancy

- Advanced layer-2+ features with static routing for both IPv4 and IPv6
- Triple speed (10/100/1G) user interfaces and fiber interfaces (SFPs) supporting 1000Base-X
- Two Multi-Gigabit (10/100/1G/2.5) RJ-45 HPoE (95W IEEE802.3bt) user interfaces (-P48X)
- 10G uplinks ports supporting SFP+ or 10GBase-T (X models)

- Wire-rate switching and routing performance
- High availability with virtual chassis concept, remote/redundant stacking links, primary/secondary unit failover, in-service software upgrade and configuration rollback

## Convergence

- Enhanced Voice over IP (VoIP) and video performance with policy-based QoS
- Future-ready support for multimedia applications with wire-rate multicast
- AirGroup™ Network Services for Bonjour® speaking devices provides consistent experience over wireless and wired networks
- IEEE 802.3af, IEEE 802.3at and IEEE802.3bt (-P48X) PoE support for IP phones, wireless LAN (WLAN) access points, PTZ video cameras and IoT devices

## Benefits

- Meets any customer configuration need and offers excellent investment protection and flexibility, as well as ease of deployment, operation, and maintenance
- Provides outstanding performance when supporting real-time voice, data, and video applications for converged scalable networks
- Ensures efficient power management, reduces operating expenses (OPEX), and lowers total cost of ownership (TCO) through low power consumption and dynamic PoE allocation, which delivers only the power needed by the attached device

- A field-upgradeable solution that makes the network highly available and reduces OPEX
- Fully secures the network at the edge at no additional cost
- Enterprise-wide cost reduction through hardware consolidation to achieve network segmentation and security without additional hardware installation
- Supports cost-effective installation and deployment with automated switch setup and configuration and end-to-end virtual LAN (VLAN) provisioning
- OmniVista Cirrus powers a secure, resilient, and scalable cloud-based network management. It offers hassle free network deployment and easy service rollout with advanced analytics for smarter decision making. IT-friendly unified access with secure authentication and policy enforcement for users and devices.

10 Port models	User ports 1G RJ-45	1G RJ45 uplinks	1G SFP uplink	Power Supply/ PoE budget	Fan status
OS6360-10	8	2	2 x SFP uplink	Internal	Fanless
OS6360-P10	8	2	2 x SFP uplink	Internal (120W)	Fanless
24/48 Port models	User ports 1G RJ-45	1G RJ-45/SFP combo	1G SFP uplink 10G SFP+ uplink/VFL	Power supply/ PoE budget	Fan status
OS6360-24	24	2	2	Internal	Fanless
OS6360-P24	24	2	2	Internal (180W)	Fanless
OS6360-48	48	2	2	Internal	Variable speed
OS6360-P48	48	2	2	Internal (350W)	Variable speed
24/48 Port X models	User ports RJ-45	1G RJ-45/SFP combo 10G RJ-45/SFP+ combo	1G SFP uplink 10G SFP+ uplink/VFL	Power supply PoE budget	Fan status
OS6360-PH24	24	2*	2	Internal (380W)	Variable speed
OS6360-PH48	46 x 1G 2 x 1G/2.5G	2*	2	Internal (760W)	Variable speed
OS6360-P24X	24 x 1G	2	2	Internal (380W)	Variable speed
OS6360-P48X	46 x 1G 2 x 1G/2.5G	2	2	Internal (760W)	Variable speed

Notes:

- \*OS6360-PH24/PH48 RJ45/SFP ports are license upgradable to 10G speeds with the OS6360-SW-PERF license
- OS6360-P48X/PH48 Multi-Gigabit PoE ports comply with IEEE 802.3bt (95 W) and IEEE 2.5GE 802.3bz standards

## Technical specifications

Gigabit product matrix	OS6360-10	OS6360-P10	OS6360-24	OS6360-P24	OS6360-48	OS6360-P48
Gigabit RJ-45 ports	8	8 PoE+	24	24 PoE+	48	48 PoE+
Combo Gigabit RJ-45/ SFP ports	0	0	2	2	2	2
Fixed SFP/SFP+ uplink or VFL ports	2 x SFP uplink	2 x SFP uplink	2 x SFP+	2 x SFP+	2 x SFP+	2 x SFP+
Console port	1	1	1	1	1	1
USB/OoB management port	1	1	1	1	1	1
Primary power	Internal	Internal	Internal	Internal	Internal	Internal
Backup power	N/A	N/A	N/A	N/A	N/A	N/A
Fans	0	0	0	0	1	1
CPU	800MHz ARM v7	800MHz ARM v7	800MHz ARM v7	800MHz ARM v7	800MHz ARM v7	800MHz ARM v7
File system flash	1 GB	1 GB	1 GB	1 GB	1 GB	1 GB
RAM	1 GB	1 GB	1 GB	1 GB	1 GB	1 GB
Packet buffers	1.5MB	1.5MB	1.5MB	1.5MB	1.5MB	1.5MB
<b>Performance aggregated</b>						
Max switching ASIC capacity	40 Gb/s	40 Gb/s	92 Gb/S	92 Gb/S	140 Gb/S	140 Gb/S
Switching capacity	24 Gb/s	24 Gb/s	92 Gb/s	92 Gb/s	140 Gb/s	140 Gb/s
Throughput	17.9 Mpps	17.9 Mpps	68.5 Mpps	68.5 Mpps	104.2 Mpps	104.2 Mpps
2x10GE VFL capacity	N/A	N/A	40 Gb/s	40 Gb/s	40 Gb/s	40 Gb/s
System power consumption: - Idle - 100% traffic all ports (max)	13 W 15 W	13 W 18 W	21 W 24 W	21 W 28 W	46 W 49 W	47 W 54 W
System heat dissipation	51 (BTU/h)	61.5 (BTU/h)	82 (BTU/h)	95.5 (BTU/h)	167 (BTU/h)	184 (BTU/h)
Power consumption w/PoE	N/A	145 W	N/A	222 W	N/A	484 W
Heat dissipation w/PoE	N/A	495 (BTU/h)	N/A	758 (BTU/h)	N/A	1652 (BTU/h)
Power supply efficiency (max load)	89%	93.5%	87.3%	93.5%	89.4%	93.3%
Acoustics (dB) @27C*	0 db(A)	0 db(A)	0 db(A)	0 db(A)	<42 db(A)	<42 db(A)
# of fans	0	0	0	0	1	1
MTBF (hours) @ 25C	1,179 k	1,094 k	2,595 k	1,447 k	832 k	789 k
Height	4.4 cm (1.73 in)	4.4 cm (1.73 in)	4.4 cm (1.73 in)	4.4 cm (1.73 in)	4.4 cm (1.73 in)	4.4 cm (1.73 in)
Width	21.7 cm (8.5 in)	21.7 cm (8.5 in)	44 cm (17.33 in)	4.4 cm (17.33 in)	44 cm (17.33 in)	44 cm (17.33 in)
Depth	28 cm (11 in)	28 cm (11 in)	22 cm (8.66 in)	22 cm (8.66 in)	33 cm (13 in)	33 cm (13 in)
Weight	1.8 kg (3.9 lbs)	2.1 kg (4.6 lbs)	3.1 kg (6.9 lbs)	3.2 kg (7 lbs)	4.6 kg (10.1 lbs)	4.6 kg (10.1 lbs)
Operating temperature	0°C to 45°C (32°F to 113°F)	0°C to 45°C (32°F to 113°F)	0°C to 45°C (32°F to 113°F)	0°C to 45°C (32°F to 113°F)	0°C to 45°C (32°F to 113°F)	0°C to 45°C (32°F to 113°F)

Gigabit product matrix	OS6360-10	OS6360-P10	OS6360-24	OS6360-P24	OS6360-48	OS6360-P48
<b>Performance aggregated</b>						
Storage temperature	-40°C to 85°C (-40°F to 185°F)	-40°C to 85°C (-40°F to 185°F)	-40°C to 85°C (-40°F to 185°F)	-40°C to 85°C (-40°F to 185°F)	-40°C to 85°C (-40°F to 185°F)	-40°C to 85°C (-40°F to 185°F)
Humidity (operating)	5% to 95% non-condensing	5% to 95% non-condensing	5% to 95% non-condensing	5% to 95% non-condensing	5% to 95% non-condensing	5% to 95% non-condensing
Gigabit full PoE product matrix	OS6360-PH24	OS6360-P24X	OS6360-P48X	OS6360-PH48		
Gigabit RJ-45 user ports	24 PoE+	24 PoE+	46 PoE+	46 PoE+		
Multi-Gigabit (1G/2.5G) RJ-45 user ports	0	0	2 (HPoE+)	2 (HPoE+)		
Combo Gigabit RJ-45/SFP ports	2	0	0	0		
Combo 1G/10G RJ-45/SFP+ ports	2*	2	2	2*		
SFP+ ports: 1G/10G uplink or VFL	2	2	2	2		
Console port	1	1	1	1		
USB/OoB management port	1	1	1	1		
Primary power	Internal	Internal	Internal	Internal		
Backup power	N/A	N/A	N/A	N/A		
Fans	1	1	1	1		
CPU	800MHz ARM v7	800MHz ARM v7	800MHz ARM v7	800MHz ARM v7		
File system flash	1 GB	1 GB	1 GB	1GB		
RAM	1 GB	1 GB	1 GB	1GB		
Packet buffers	1.5MB	1.5MB	1.5MB	1.5MB		
<b>Performance aggregated</b>						
Max switching ASIC capacity	128 Gb/S	128 Gb/S	182 Gb/S	182 Gb/S		
Stacking capacity	92 Gb/s	128 Gb/s	182 Gb/s	146 Gb/s		
Throughput	68.5 Mpps	95.3 Mpps	135.4 Mpps	217 Mpps		
2x10GE VFL capacity	40 Gb/s	40 Gb/s	40 Gb/s	40 Gb/s		
System power consumption:						
• Idle	34 W	34 W	60 W	60 W		
• 100% traffic all ports (max)	46 W	46 W	76 W	76 W		
System heat dissipation (max)	157 (BTU/h)	157 (BTU/h)	269 (BTU/h)	269 (BTU/h)		
Power consumption w/PoE	446 W	446 W	879 W	879 W		
Heat dissipation w/PoE	1521 (BTU/h)	1521 (BTU/h)	2999 (BTU/h)	2999 (BTU/h)		
Power supply efficiency (max load)	95.7%	95.7%	95.6%	95.6%		
Acoustics db(A) @25C	38 db(A)	38 db(A)	41-49 db(A)	41-49 db(A)		
# of fans	1	1	1	1		
MTBF (hours) @ 25C	1,447 k	1,447 k	789 k	789 k		
Height	4.4 cm (1.73 in)	4.4 cm (1.73 in)	4.4 cm (1.73 in)	4.4 cm (1.73 in)		
Width	4.4 cm (17.33 in)	4.4 cm (17.33 in)	44 cm (17.33 in)	44 cm (17.33 in)		
Depth	30 cm (11.8 in)	30 cm (11.8 in)	30 cm (11.8 in)	30 cm (11.8 in)		
Weight	3.9 kg (8.5 lbs)	3.9 kg (8.5 lbs)	4.4 kg (9.7 lbs)	4.4 kg (9.7 lbs)		
Operating temperature	0°C to 45°C (32°F to 113°F)	0°C to 45°C (32°F to 113°F)	0°C to 45°C (32°F to 113°F)	0°C to 45°C (32°F to 113°F)		
Storage temperature	-40°C to 85°C (-40°F to 185°F)	-40°C to 85°C (-40°F to 185°F)	-40°C to 85°C (-40°F to 185°F)	-40°C to 85°C (-40°F to 185°F)		
Humidity (operating)	5% to 95% non-condensing	5% to 95% non-condensing	5% to 95% non-condensing	5% to 95% non-condensing		

## Commercial references

OmniSwitch 6360 models	
OS6360-10	Fixed 1RU ½ rack chassis 8 RJ-45 10/100/1G BaseT, 2 10/100/1G BaseT, 2 SFP ports. Fan-less, optional mounting.
OS6360-P10	Fixed 1RU ½ rack chassis 8 RJ-45 PoE 10/100/1G BaseT, 2 10/100/1G BaseT, 2 SFP ports. 120W power budget, fanless, optional mounting.
OS6360-24	Fixed 1RU chassis 24 RJ-45 10/100/1G BaseT, 2 fixed RJ45/SFP combo (1G), 2 SFP+ (1G/10G) uplink or VFL ports. Fanless.
OS6360-P24	Fixed 1RU chassis 24 RJ-45 PoE 10/100/1G BaseT, 2 RJ45/SFP combo (1G), 2 SFP+ (1G/10G) uplink or VFL ports. 180W power budget, fanless.
OS6360-48	Fixed 1RU chassis 48 RJ-45 10/100/1G BaseT, 2 RJ45/SFP combo (1G), 2 SFP+ (1G/10G) uplink or VFL ports.
OS6360-P48	Fixed 1RU chassis 48 RJ-45 PoE 10/100/1G BaseT, 2 RJ45/SFP combo (1G), 2 SFP+ (1G/10G) uplink or VFL ports. 350W power budget.
OS6360-PH24	Fixed 1RU chassis 24 RJ-45 PoE 10/100/1G BaseT, 2 1G* RJ45/SFP combo, 2 SFP+ (1G/10G) uplink or VFL ports. 380W power budget. *10G license upgradeable.
OS6360-PH48	Fixed 1RU chassis 46 RJ-45 PoE 10/100/1G BaseT, 2 RJ-45 PoE 1G/2.5G BaseT, 2 1G* RJ45/SFP combo, 2 SFP+ (1G/10G) uplink or VFL ports. 760W power budget. *10G license upgradeable.
OS6360-P24X	Fixed 1RU chassis 24 RJ-45 PoE 10/100/1G BaseT, 2 1G/10G RJ45/SFP combo, 2 SFP+ (1G/10G) uplink or VFL ports. 380W power budget.
OS6360-P48X	Fixed 1RU chassis 46 RJ-45 PoE 10/100/1G BaseT, 2 RJ-45 PoE 1G/2.5G BaseT, 2 1G/10G RJ45/SFP combo, 2 SFP+ (1G/10G) uplink or VFL ports. 760W power budget.
OmniSwitch 6360 license options	
OS6360-SW-PERF	Performance software license allowing the 2xRJ45/SFP combo ports of the OS6360-PH24/PH48 only to operate at 10G speed.
OmniSwitch 6360 10G transceivers and cables	
OS6360-CBL-60CM	10 Gigabit direct attached uplink/stacking copper cable (60 cm, SFP+).
OS6360-CBL-C1M	10 Gigabit direct attached uplink/stacking copper cable (1 m, SFP+).
OS6360-CBL-C3M	10 Gigabit direct attached uplink/stacking copper cable (3 m, SFP+).
SFP-10G-SR	10 Gigabit optical transceiver (SFP+). Supports multimode fiber over 850 nm wavelength (nominal) with an LC connector. Typical reach of 300 m.
SFP-10G-LR	10 Gigabit optical transceiver (SFP+). Supports single mode fiber with an LC connector. Typical reach of 10 Km.
SFP-10G-ER	10 Gigabit optical transceiver (SFP+). Supports single-mode fiber over 1550 nm wavelength (nominal) with an LC connector. Typical reach of 40 km.
SFP-10G-BX-D	10 Gigabit optical transceiver (SFP+) with an LC type of interface. This bi-directional transceiver is designed for use over single mode fiber optic on a single strand link up to 10 km. Transmits 1270 nm and receives 1330 nm optical signal.
SFP-10G-BX-U	10 Gigabit optical transceiver (SFP+) with an LC type of interface. This bi-directional transceiver is designed for use over single mode fiber optic on a single strand link up to 10 km. Transmits 1330 nm and receives 1270 nm optical signal.
OmniSwitch 6360 Gigabit transceivers	
SFP-GIG-T	1000Base-T Gigabit Ethernet Transceiver (SFP MSA). SFP works at 1000 Mb/s speed and full-duplex mode.
SFP-GIG-SX	1000Base-SX Gigabit Ethernet optical transceiver (SFP MSA).
SFP-GIG-LX	1000Base-LX Gigabit Ethernet optical transceiver (SFP MSA).
SFP-GIG-LH40	1000Base-LH Gigabit Ethernet optical transceiver (SFP MSA). Typical reach of 40 km on 9/125 µm SMF.
SFP-GIG-LH70	1000Base-LH Gigabit Ethernet optical transceiver (SFP MSA). Typical reach of 70 km on 9/125 µm SMF.
OmniSwitch 6360 10 port mounting options	
OS6360-RM-19-L	Simple L-bracket for mounting a single OS6360-10/-P10 switch in a 19 rack.
OS6360-WALL-MNT	Wall mounting kit for OS6360 products. Contains universal mounting brackets and screws for wall mounting a OS6360 switch.

## Warranty

The OmniSwitch 6360 family comes with a Limited Lifetime Warranty.

## Detailed product features

### Simplified management

- Intuitive CLI in a scriptable BASH environment via console, Telnet or Secure Shell (SSH) v2 over IPv4/IPv6
- Powerful WebView Graphical Web Interface via HTTP and HTTPS over IPv4/IPv6+
- Fully programmable RESTful web services interface with XML and JSON support. API enables access to CLI and individual mib objects.
- Integrated with Alcatel-Lucent OmniVista products for network management
- Full configuration and reporting using SNMPv1/2/3 to facilitate third-party network management over IPv4/IPv6
- File upload using USB, TFTP, FTP, SFTP or SCP using IPv4/IPv6
- Human-readable ASCII-based configuration files for off-line editing, bulk configuration and out-of-the-box auto-provisioning
- Multiple microcode image support with fallback recovery
- Dynamic Host Configuration Protocol (DHCP) relay for IPv4/IPv6
- IEEE 802.1AB Link Layer Discover Protocol (LLDP) with Media Endpoint Discover (MED) extensions
- Network Time Protocol (NTP)
- DHCPv4 and DHCPv6 server managed by Alcatel-Lucent DNS/DHCP IP address management

### Monitoring and troubleshooting

- Local (on the flash memory) and remote server logging (Syslog): event and command logging
- IP tools: ping and trace route
- Loopback IP address support for management per service
- Policy- and port-based mirroring
- Remote port mirroring
- sFlow v5 and Remote Monitoring (RMON)
- Unidirectional Link Detection (UDLD) and Digital Diagnostic Monitoring (DDM)
- Loopback Detection (LBD)

### Network configuration

- Zero-touch provisioning and provisioning based on templates using OV2500/OVCirrus
- Auto-negotiating 10/100/1000 ports automatically configure port speed and duplex setting
- Auto MDI/MDIX automatically configures transmit and receive signals to support straight-through and crossover cabling
- BOOTP/DHCP client allows auto-configuration of switch IP information for simplified deployment
- DHCP relay to forward client requests to a DHCP server
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP) with MED extensions for automated device discovery
- Multiple VLAN Registration Protocol (MVRP) for IEEE 802.1Q-compliant VLAN pruning and dynamic VLAN creation
- Auto QoS for switch management traffic as well as traffic from Alcatel-Lucent IP phones
- Network Time Protocol (NTP) for network-wide time synchronization
- Virtual chassis up to 4 units of 24 and 48 port models

### Resiliency and high availability

- Unified management, control, and virtual chassis technology
- Virtual Chassis 1+N redundant supervisor manager
- Virtual Chassis In-Service Software Upgrade (ISSU)
- Smart continuous switching technology
- IEEE 802.1s Multiple Spanning Tree Protocol (MSTP) encompasses IEEE 802.1D Spanning Tree Protocol (STP) and IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- Per-VLAN spanning tree (PVST+) and 1x1 STP mode
- IEEE 802.3ad/802.1AX Link Aggregation Control Protocol (LACP) and static LAG groups across modules
- Built-in CPU protection against malicious attacks

- Split Virtual Chassis protection: Auto-detection and recovery of Virtual Chassis splitting due to one or more VFL or stack element failures

### Advanced security

#### Access control

- Alcatel-Lucent Access Guardian framework for comprehensive user-policy-based NAC
- Autosensing IEEE 802.1X multi-client, multi-VLAN support
- MAC-based authentication for non-IEEE 802.1X hosts
- Web-based authentication (captive portal): a customizable web portal residing on the switch
- User Network Profile (UNP) simplifies NAC by dynamically providing pre-defined policy configuration to authenticated clients — VLAN, ACL, BW
- Secure Shell (SSH) with public key infrastructure (PKI) support
- Terminal Access Controller Access-Control System Plus (TACACS+) client
- Centralized Remote Access Dial-In User Service (RADIUS) and Lightweight Directory Access Protocol (LDAP) administrator authentication
- Centralized RADIUS for device authentication and network access control authorization
- Learned Port Security (LPS) or MAC address lockdown
- Access Control Lists (ACLs); flow-based filtering in hardware (Layer 1 to Layer 4)
- DHCP Snooping, DHCP IP and Address Resolution Protocol (ARP) spoof protection
- ARP poisoning detection
- IP source filtering as a protective and effective mechanism against ARP attacks
- BYOD provides on-boarding of guest, IT/non-IT issued and silent devices; restriction/remediation of traffic from non-compliant devices. RADIUS CoA dynamically enforces User Network Profiles based on authentication, profiling, posture check of devices using Unified Policy Access Manager (UPAM), or Aruba ClearPass Policy Access Manager (CPPM).

## Converged networks

### PoE

- PoE models support Alcatel-Lucent IP phones and WLAN access points, as well as any IEEE 802.3af, IEEE 802.3at, or 802.3bt compliant end device
- Configurable per-port PoE priority and max power for power allocation
- Dynamic PoE allocation: Delivers only the power needed by the powered devices (PD) up to the total power budget for most efficient power consumption

### QoS

- Priority queues: Eight hardware-based queues per port for flexible QoS management
- Traffic prioritization: Flow-based QoS with internal and external (also known as remarking) prioritization
- Bandwidth management: Flow-based bandwidth management; ingress rate limiting; egress rate shaping per port
- Queue management: Configurable scheduling algorithms — Strict Priority Queuing (SPQ), Weighted Round Robin (WRR)
- Congestion avoidance: Support for End-to-End Head-Of-Line (E2E-HOL) blocking protection
- Auto QoS for switch management traffic as well as traffic from Alcatel-Lucent IP phones

## Layer-2, Layer-3 routing and multicast

### Layer-2 switching

- Up to 16k MAC addresses
- Up to 4000 VLANs
- Up to 1.5k total system policies
- Latency: < 4 µs
- Max frame: 9216 bytes (jumbo)

### IPv4 and IPv6

- Static routing for IPv4 and IPv6
- Up to 256 IPv4 and 32 IPv6 static routes
- Up to 32 IPv4 and 4 IPv6 interfaces

### Multicast

- IGMPv1/v2/v3 snooping to optimize multicast traffic
- Multicast Listener Discovery (MLD) v1/v2 snooping
- Up to 1000 multicast groups

### Network protocols

- DHCP relay (including generic UDP relay)
- ARP

- Generic User Datagram Protocol (UDP) relay per VLAN
- DHCP Option 82 - configurable relay agent information

## Indicators

### System LEDs

- System (OK) (chassis HW/SW status)
- PWR (primary power supply status)
- VC (virtual chassis primary)

### Per-port LEDs

- 10/100/1000: PoE, link/activity
- 100/1000/2.5GE: link/activity/PoE status
- SFP: Link/activity
- Virtual Chassis (VFL): Link/activity

## Compliance and certifications

### Commercial EMI/EMC

- 47 CRF FCC Part 15: 2015 Subpart B (Class A)
- VCCI (Class A limits. Note: Class A with UTP cables)
- ICES-003: 2012 Issue 5, Class A
- AS/NZS 3548 (Class A) - C-Tick
- AS/NZS 3548 (Class A limits. Note: Class A with UTP cables)
- CE-Mark: Marking for European countries (Class A limits. Note: Class A with UTP cables)
- CE emission consists of:
  - EN 50581: Standard for technical documentation for Restriction on Hazardous Substances (RoHS) recast
  - EN 55022 (EMI and EMC requirement)
  - EN 55024: 2010 (ITE immunity characteristics)
  - EN 61000-3-2 (Limits for harmonic current emissions)
  - EN 61000-3-3
  - EN 61000-4-2
  - EN 61000-4-3
  - EN 61000-4-4
  - EN 61000-4-5
  - EN 61000-4-6
  - EN 61000-4-8
  - EN 61000-4-11
  - IEEE802.3: Hi-Pot Test (2250 V DC on all Ethernet ports)

### Safety agency certifications

- CDRH laser
- Compliant with RoHS and Waste Electrical and Electronic Equipment (WEEE) directives
- EN 60825-1 laser
- EN 60825-2 laser

- IEC 62368-1
- UL 60950-1, 2nd edition, Information Technology Equipment
- CAN/CSA C22.2 No. 60950-1-07, 2nd edition, Information Technology Equipment
- IEC 62368-1:2018, ICT and AV equipment safety, with all national deviations
- IEC 60950-1, with all national deviations
  - UL-AR, Argentina
  - AS/NZ TS-001 and 60950, Australia
  - ANATEL, Brazil
  - CCC, China
  - UL-GS Mark, Germany
  - KCC, Korea
  - NOM-019 SCFI, Mexico
  - CU, EAC, Russia
  - BSMI, Taiwan

## Supported standards

### IEEE standards

- IEEE 802.1D (STP)
- IEEE 802.1p (CoS)
- IEEE 802.1Q (VLANs)
- IEEE 802.1s (MSTP)
- IEEE 802.1w (RSTP)
- IEEE 802.1X (Port Based Network Access Protocol)
- IEEE 802.3i (10Base-T)
- IEEE 802.3u (Fast Ethernet)
- IEEE 802.3x (Flow Control)
- IEEE 802.3z (Gigabit Ethernet)
- IEEE 802.3ab (1000Base-T)
- IEEE 802.3ac (VLAN Tagging)
- IEEE 802.3ad (Link Aggregation)
- IEEE 802.3ae (10 Gigabit Ethernet)
- IEEE 802.3af (Power-over-Ethernet)
- IEEE 802.3at (Power-over-Ethernet)
- IEEE 802.3bt (Power-over-Ethernet)
- IEEE 802.3az (Energy Efficient Ethernet)
- IEEE 802.3bz (2.5GE Multi-Gigabit Ethernet)

### IETF RFCs

#### IP Multicast

- RFC 1112 IGMP v1
- RFC 2236/2933 IGMP v2 and MIB
- RFC 2365 Multicast
- RFC 3376 IGMPv3 for IPv6

#### IPv6

- RFC 1886 DNS for IPv6
- RFC 2292/2373/2374/2460/2462
- RFC 2461 NDP
- RFC 2463/2466 ICMP v6 and MIB
- RFC 2452/2454 IPv6 TCP/UDP MIB



- RFC 2464/2553/2893/3493/3513
- RFC 3056 IPv6 Tunneling
- RFC 3542/3587 IPv6
- RFC 4007 IPv6 Scoped Address Architecture
- RFC 4193 Unique Local IPv6 Unicast Addresses

### Manageability

- RFC 854/855 Telnet and Telnet options
- RFC 959/2640 FTP
- RFC 1350 TFTP
- RFC 1155/2578-2580 SMI v1 and SMI v2
- RFC 1157/2271 SNMP
- RFC 1212/2737 MIB and MIB-II
- RFC 1213/2011-2013 SNMP v2 MIB
- RFC 1215 Convention for SNMP Traps
- RFC 1573/2233/2863 Private Interface MIB
- RFC 1643/2665 Ethernet MIB
- RFC 1867 Form-based File Upload in HTML
- RFC 1901-1908/3416-3418 SNMP v2c
- RFC 2096 IP MIB
- RFC 2131 DHCP Server/Client
- RFC 2388 Returning Values from Forms: multipart/form-data
- RFC 2396 Uniform Resource Identifiers (URI): Generic Syntax
- RFC 2570-2576/3410-3415/3584 SNMP v3
- RFC 2616 /2854 HTTP and HTML
- RFC 2667 IP Tunneling MIB
- RFC 2668/3636 IEEE 802.3 MAU MIB

- RFC 2674 VLAN MIB
- RFC 3023 XML Media Types
- RFC 3414 User-based Security Model
- RFC 3826 (AES) Cipher Algorithm in the SNMP User-based Security Model
- RFC 4122 A Universally Unique Identifier (UUID) URN Namespace
- RFC 4234 Augmented BNF for Syntax Specifications: ABNF
- RFC 4251 Secure Shell Protocol Architecture
- RFC 4292/4293 IPv4 SNMP IP MIBs
- RFC 4252 The Secure Shell (SSH) Authentication Protocol
- RFC 4627 JavaScript Object Notation (JSON)
- RFC 5424 The Syslog protocol
- RFC 6585 Additional HTTP Status Codes

### Security

- RFC 1321 MD5
- RFC 1826/1827/4303/4305 Encapsulating Payload (ESP) and crypto algorithms
- RFC 2104 HMAC Message Authentication
- RFC 2138/2865/2868/3575/2618 RADIUS Authentication and Client MIB
- RFC 2139/2866/2867/2620 RADIUS Accounting and Client MIB
- RFC 2228 FTP Security Extensions
- RFC 2284 PPP EAP
- RFC 2869/2869bis RADIUS Extension
- RFC 4301 Security Architecture for IP

### Quality of service

- RFC 896 Congestion control
- RFC 1122 Internet hosts
- RFC 2474/2475/2597/3168/3246 DiffServ
- RFC 3635 Pause control

### Others

- RFC 791/894/1024/1349 IP and IP/Ethernet
- RFC 792 ICMP
- RFC 768 UDP
- RFC 793/1156 TCP/IP and MIB
- RFC 826 ARP
- RFC 919/922 Broadcasting Internet Datagram
- RFC 925/1027 Multi-LAN ARP/Proxy ARP
- RFC 950 Subnetting
- RFC 951 BOOTP
- RFC 1151 RDP
- RFC 1191 Path MTU Discovery
- RFC 1256 ICMP Router Discovery
- RFC 1305/2030 NTP v3 and Simple NTP
- RFC 1493 Bridge MIB
- RFC 1518/1519 CIDR
- RFC 1541/1542/2131/3396/3442 DHCP
- RFC 1757/2819 RMON and MIB
- RFC 2131/3046 DHCP/BootP Relay
- RFC 2132 DHCP Options
- RFC 2251 LDAP v3
- RFC 3021 Using 31-bit Prefixes
- RFC 3060 Policy Core
- RFC 3176 sFlow

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