# Alcatel-Lucent OmniSwitch 6350

## Gigabit Ethernet LAN switch family

The Alcatel-Lucent OmniSwitch® 6350 Stackable family is a series of fixed-configuration Gigabit Ethernet switches available as 10-, 24- and 48-port, Power-over-Ethernet (PoE) and non-PoE models to create the exact network for your small business.

The network capabilities of the OmniSwitch 6350 family include advanced security, quality of service and high availability features for your business-class data, voice and wireless technologies. These switches are simple to deploy, configure and manage.

### OmniVista 2500 NMS C

All OmniSwitch 6350 switches use the field-proven Alcatel-Lucent Operating System (AOS) to deliver highly available, secure, self-protective, easily managed, and eco-friendly networks.

The OmniSwitch 6350 family is embedded with the latest technology innovations and offers maximum investment protection.

The following type of deployments benefit from the OmniSwitch 6350 family:
• Small business network solutions

OmniSwitch 6350-10
OmniSwitch 6350-P10

OmniSwitch 6350-24
OmniSwitch 6350-P24

OmniSwitch 6350-48
OmniSwitch 6350-P48

## Features
- 10-port PoE and non-PoE models with two RJ-45/SFP combo port uplinks
- 24-port and 48-port, PoE and non-PoE models, with four fixed small form-factor pluggable (SFP) Gigabit uplink interfaces
- 5 G/s stacking available on 24/48 port models up to 4 units using fixed SFP ports
- Provides up to 48 ports of PoE connectivity for simplified IP phones, wireless and IP surveillance deployments over a single Ethernet cable. All 6350 models are IEEE 802.3af as well as IEEE 802.3at PoE compliant
- Provides native IPv4 and IPv6 support for routing, Access Control Lists (ACLs) and Dynamic Host Configuration Protocol (DHCP) relay
- Advanced IPv6 threat protection (DHCP snooping, router advertisement protection and source address filter protection) providing protection against a wide range of address spoofing attacks
- Simplified Voice over IP (VoIP) deployments using the advanced Auto- Quality of Service (Auto-QoS) feature that configures the IP telephony devices into the proper virtual LAN (VLAN) with the correct QoS parameters to prioritize voice traffic

## Benefits
- Meets all customer configuration needs and offers excellent investment protection and flexibility with easy 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
- Field-upgradeable solution makes the network highly available and reduces OPEX
- Comprehensive security features for your small business network or campus edge at no additional cost
- Supports cost-effective installation and deployment with automated switch setup and configuration

## Management
- AOS field-proven software managed through a web interface (WebView), command line interface (CLI), and Simple Network Management Protocol (SNMP)
- Supported by Alcatel-Lucent OmniVista® 2500 Network Management System (NMS)*

## Security
- Flexible device and user authentication with Alcatel-Lucent Access Guardian (IEEE 802.1x/MAC)
- Advanced QoS and ACLs for traffic control, including an embedded denial of service (DoS) engine to filter out unwanted traffic attacks
- Protection of management sessions using radius, Terminal Access Controller Access-Control System Plus (TACACS+) and local database authentication as well as secure management sessions over Secure Sockets Layer (SSL), Secure Shell (SSH), and Simple Network Management Protocol version 3 (SNMPv3)
- Extensive support for user-oriented features, such as learned port security (LPS), port mapping, DHCP binding tables, and User Network Profile (UNP)

## Performance and redundancy

- Advanced layer-2+ features with basic layer-3 routing for both IPv4 and IPv6
- Triple-speed (10/100/1000) user interfaces and fiber interfaces (SFPs) supporting 1000Base-X optical transceivers
- Wire-rate switching and routing performance
- High availability with virtual chassis concept, redundant stacking and uplinks links, primary/secondary unit failover, hot-swappable SFP and configuration rollback

## Convergence

- Enhanced VoIP and video performance with policy-based QoS
- Support for multimedia applications with wire-rate multicast to help you prepare for the future
- IEEE 802.3at PoE+ support for IP phones, wireless LAN (WLAN) access points and video cameras

## OmniSwitch 6350 10-, 24- and 48-port models

All 10-port models ship with 2 RJ-45/SFP combo ports that operate at 1 Gb/s and have a 1/2 rack form factor. All 24 and 48 port models ship with four fixed SFP ports that operate at 1 Gb/s. All PoE and non-PoE models have a full-rack width, power-optimized, fixedconfiguration chassis in a 1U form factor.

| Chassis | 10/100/1000 RJ45 ports | Gigabit RJ456/ SFP combo | SFP uplink/ stacking ports | Primary power | Backup power |
|---------|---------|---------|---------|---------|---------|
| Non-PoE models | | | | | |
| OS6350-10 | 10 | 2 | 0 | Internal AC | N/A |
| OS6350-24 | 24 | 0 | 4 | Internal AC | N/A |
| OS6350-48 | 48 | 0 | 4 | Internal AC | N/A |
| PoE models | | | | | |
| OS6350-P10 | 10 | 2 | 0 | Internal AC | N/A |
| OS6350-P24 | 24 | 0 | 4 | Internal AC | N/A |
| OS6350-P48 | 48 | 0 | 4 | Internal AC | N/A |

Note: Minimum AOS 6.7.1R04 is reqiured for stacking capability

## Detailed product features

### Management

#### Configuration management interfaces

- Intuitive CLI with a familiar interface, reducing training costs
- Easy-to-use, point-and-click web-based element manager (WebView) with built-in help for easy configuration
- Integration with Alcatel-Lucent OmniVista 2500 for network management*
- Full configuration and reporting using SNMPv1/2/3 across all OmniSwitch families to facilitate third-party NMS integration
- Remote Telnet management or Secure Shell access using SSHv2
- File upload using USB, TFTP, FTP, SFTP, or SCP for faster configuration
- Human-readable ASCII-based configuration files for offline editing and bulk configuration

#### Monitoring and troubleshooting

- Local (on the Flash) and remote server logging: Syslog and command log
- Port-based mirroring for troubleshooting and lawful interception supports four sessions with multiple sources-to-one destination
- Policy-based mirroring that allows selecting the type of traffic to mirror using QoS policies
- Remote port mirroring that facilitates passing mirrored traffic through the network to a remotely connected device
- Port monitoring feature that allows capturing Ethernet packets to a file, or to an on-screen display to assist in troubleshooting
- sFlow v5 and Remote Network Monitoring (RMON) for advanced monitoring and reporting capabilities for statistics, history, alarms and events
- IP tools: Ping and trace route
- Digital Diagnostic Monitoring (DDM): Real-time diagnostics of fiber connections for early detection of optical signal deterioration
- Time Domain Reflectometry (TDR) for locating breaks or other discontinuity in copper cables

#### Network configuration

- Remote auto-configuration download
- Auto-negotiating: 10/100/1000 ports automatically configure port speed and duplex setting
- Automatic medium dependent interface/medium-dependent interface crossover (Auto-MDI/MDI-X) configuring to transmit and receive signals to support straightthrough and crossover cabling

- Bootstrap protocol (BOOTP)/DHCP client that allows auto-configuring switch IP information for simplified deployment
- DHCP relay for forwarding client requests to a DHCP server
- Alcatel-Lucent Mapping Adjacency Protocol (AMAP) for building topology maps
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP) with Media Endpoint Device (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 and traffic from Alcatel-Lucent IP phones
- Network Time Protocol (NTP) for networkwide time synchronization
- Stackable to four units

## Resiliency and high availability
- Ring Rapid Spanning Tree Protocol (RRSTP) optimized for ring topology to provide less than 100 ms convergence time
- IEEE 802.1s Multiple Spanning Tree Protocol: Encompasses IEEE 802.1D Spanning Tree Protocol (STP) and IEEE 802.1w Rapid Spanning Tree Protocol
- Per-VLAN spanning tree (PVST) and 1x1 STP mode
- Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP) and static Link Aggregation Groups (LAGs) across modules
- Broadcast and multicast storm control to avoid degradation in overall system performance
- Unidirectional Link Detection (UDLD) for detecting and disabling unidirectional links on fiber optic interfaces
- Hot-swappable transceiver modules offering uninterruptable service
- Dual-image and dual-configuration file storage provide backup

## Advanced security

### Access control
- Access Guardian framework in the AOS for comprehensive user-policy-based network access control (NAC)

- Auto-sensing IEEE 802.1X multi-client, multi-VLAN MAC-based authentication for non-802.1X hosts
- Group mobility rules and guest VLAN support
- User network profile (UNP): Simplifying NAC management and control by dynamically providing predefined policy configuration to authenticated clients (VLAN, ACL, BW)
- SSH for secure CLI session with public key infrastructure (PKI) support
- Centralized Remote Access Dial-In User Service (RADIUS) and Lightweight Directory Access Protocol (LDAP) user authentication

### Containment, monitoring and quarantine
- DHCP snooping, DHCP IP spoof protection
- TACACS+ client allowing authentication, authorization and accounting with a remote TACACS+ server
- Dynamic Address Resolution Protocol (ARP) protection and ARP poisoning detection
- ACLs for filtering out unwanted traffic including DoS attacks; flow-based filtering in hardware (L1 to L4)
- Bridge Protocol Data Unit (BPDU) blocking: Automatically shutting down user ports if an STP BPDU packet is seen to prevent topology loops
- STP Root Guard: Preventing edge devices from becoming Spanning Tree Protocol root nodes

## Converged networks

### PoE
- PoE models support Alcatel-Lucent IP phones and WLAN access points, as well as any IEEE 802.3af or IEEE 802.3at-compliant end devices
- Configurable per-port PoE priority and max power for power allocation
- Dynamic PoE allocation: Delivering only the amount of 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 (remarking) prioritization
- Bandwidth management: Flow-based bandwidth management, ingress rate limiting; egress rate shaping per port
- Queue management: Configurable scheduling algorithms, including Strict Priority Queuing (SPQ), Weighted Round Robin (WRR) and Deficit Round Robin (DRR)
- Congestion avoidance: Support for Endto- End Head-Of-Line (E2E-HOL) blocking protection
- Auto QoS for switch management traffic and traffic from Alcatel-Lucent IP phones
- Three-color marker: Single/dual rate policing with commit bandwidth (BW), excess BW and burst size

## Layer-2, Layer-3 Routing and Multicast

### Layer-2 switching
- Up to 16,000 MACs
- Up to 4000 VLANs
- Up to 1,000 ingress rules
- Up to 128 egress rules
- Latency: < 4 µs
- Max Frame: 9,216 bytes (jumbo)

### IPv4 and IPv6
- Static routing ( IPv4 and IPv6)
- Up to 8 IPv4 and 4 IPv6 interfaces
- Up to 8 IPv4 and 4 IPv6 static routes
- Up to 256 ARP entries

### Multicast
- IGMPv1/v2/v3 snooping for optimized multicast traffic
- Multicast Listener Discovery (MLD) v1/v2 snooping
- Up to 1000 multicast groups
- IP Multicast VLAN (IPMVLAN) supported

### Network protocols
- DHCP relay including generic User Datagram Protocol (UDP) relay
- ARP
- Dynamic Host Configuration Protocol (DHCP) relay
- DHCP relay to forward client requests to a DHCP server
- Generic UDP relay per VLAN
- DHCP Option 82: Configurable relay agent information

# Technical specifications

| Port | OS6350-10 | OS6350-P10 |
|---|---|---|
| RJ-45 10/100/1000 ports | 8 | 8 |
| RJ-45/SFP 10/100/1000 combo ports | 2 | 2 |
| PoE ports | 0 | 8 |
| Dimensions | OS6350-10 | OS6350-P10 |
| Switch width | 21.5 cm (8.50 in) | 21.5 cm (8.50 in) |
| Switch height | 4.4 cm (1.73 in) | 4.4 cm (1.73 in) |
| Switch depth | 29.21 cm (11.5 in) | 29.21 cm (11.5 in) |
| Performance (aggregated) | OS6350-10 | OS6350-P10 |
| Switch capacity (with 2GigE uplinks) | 20 Gb/s | 20 Gb/s |
| Max frame rate (2GigE uplinks) | 14.88 Mp/s | 14.88 Mp/s |
| Operating conditions | OS6350-10 | OS6350-P10 |
| Operating temperature | 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 +75°C -40°F to +167°F | -40°C to +75°C -40°F to +167°F |
| Humidity (operating and storage) | 5% – 95% | 5% – 95% |
| MTBF (hours) | 694,151 | 547,284 |
| Power supply efficiency | 89.7% | 85.6% |
| Fanless design (Yes/No) | Yes | Yes |
| Acoustic (dB) | 0 | 0 |
| System power consumption (watts/BTU) | OS6350-10 | OS6350-P10 |
| 100% traffic | 15.00 W/51.18 | 15.2 W/51.86 |
| PoE power budget | N/A | 120W |
| Max PoE power/port (up to the power budget) | N/A | 31 W |

| Port | OS6350-24 | OS6350-P24 | OS6350-48 | OS6350-P48 |
|---|---|---|---|---|
| RJ-45 10/100/1000 ports | 24 | 24 | 48 | 48 |
| Performance (Gigabit models) | OS6350-24 | OS6350-P24 | OS6350-48 | OS6350-P48 |
| Switch capacity with 4xGb/suplinks | 56 Gb/s | 56 Gb/s | 104 Gb/s | 104 Gb/s |
| Switch frame rate with 4xGb/s uplinks | 41.66 Mp/s | 41.66 Mp/s | 77.38 Mp/s | 77.38 Mp/s |
| Port | OS6350-24 | OS6350-P24 | OS6350-48 | OS6350-P48 |
| Gigabit SFP ports | 4 | 4 | 4 | 4 |
| Gigabit/5Gb/s Stacking Ports | 2/2 | 2/2 | 2/2 | 2/2 |
| PoE ports | 0 | 24 | 0 | 48 |
| Dimensions | OS6350-24 | OS6350-P24 | OS6350-48 | OS6350-P48 |
| Width | 44.0 cm (17.32 in) | 44.0 cm (17.32 in) | 44.0 cm (17.32 in) | 44.0 cm (17.32 in) |
| 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) |
| Depth | 25.2 cm (9.92 in) | 25.2 cm (9.92 in) | 25.2 cm (9.92 in) | 38.6 cm (15.2 in) |
| Weight | 4.08 kg (9.0 lb) | 5.05 kg (11.0 lb) | 5.44 kg (12.0 lb) | 6.8 kg (15.0 lb) |
| Operating conditions | OS6350-24 | OS6350-P24 | OS6350-48 | OS6350-P48 |
| 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 +75°C -40°F to +167°F | -40°C to +75°C -40°F to +167°F | -40°C to +75°C -40°F to +167°F | -40°C to +75°C -40°F to +167°F |

| Port | OS6350-24 | OS6350-P24 | OS6350-48 | OS6350-P48 |
|---|---|---|---|---|
| Humidity (operating and storage) | 5% – 95% | 5% – 95% | 5% – 95% | 5% – 95% |
| Fan (variable speed)* | Fanless | 3 fans | 1 fan | 4 fans |
| Acoustic (dB) at 27°C | 0 dB (A) | < 32 dB (A) | < 30 dB (A) | < 40dB (A) |
| Mean Time Between Failures (MTBF) at 25°C (hours) | 1,250,292 | 421,866 | 774,351 | 448,312 |
| System power consumption (W)** | 24 W | 30 W | 50 W | 58 W |

* Acoustic levels measured with the primary power supply at room temperature

** Power consumption measured with 64-byte packets at varied traffic conditions on all ports, including the 1 Gigabit Ethernet uplinks

## OmniSwitch 6350 power supply specifications

The OmniSwitch 6350 24/P24/48/P48 port models offer an internal supply configuration. A backup power supply option is not available on the OmniSwitch 6350 family of products.

| Specification | OS6350-24 | OS6350-P24 | OS6350-48 | OS6350-P48 |
|---|---|---|---|---|
| Internal/external | Internal | Internal | Internal | Internal |
| Nominal Input voltage | 90-220 V AC | 90-220 V AC | 90-220 V AC | 90-220 V AC |
| Output voltage | 12V DC | 12V DC/54V DC | 12V DC | 12V DC/53V DC |
| Wattage | 30 W | 525 W | 60 W | 900 W |
| PoE power budget | N/A | 380 W | N/A | 780 W |
| PoE device heat dissipation (BTU) | N/A | 1296 | N/A | 2661 |
| Power supply efficiency | 85% | 85% | 87% | 85% |

## Indicators

### System LEDs
System (OK1) (chassis HW/SW status)
PWR (primary power supply status) PRI (chassis primary)

### Per-port LEDs
• 10/100/1000: PoE, link/activity
• SFP: Link/activity

## Compliance and certifications

### Commercial
• EMI/EMC
• FCC CRF Title 47 Subpart B (Class A limits. Note: Class A with UTP cables)
• VCCI (Class A limits. Note: Class A with UTP cables)
• 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-Mark
  ¬ Low voltage Directive
  ¬ EMC Directive
  ¬ RoHS Directive
• EN 55022 (EMI and EMC requirement)
• EN 61000-3-3
• EN 61000-3-2 (Limits for harmonic current emissions)
• EN 55024: 2010 (ITE Immunity characteristics)
  ¬ 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)
• EN 50581: Standard for technical documentation for RoHS recast

### Safety agency certifications
• CB Scheme: Certification per IEC 60950/EN 60950 with all different country deviations
  ¬ UL 60950, United States
  ¬ IEC 60950-1, all national deviations
  ¬ EN 60950-1 (Eletric/Health & Safety), all national deviations
  ¬ CAN/CSA-C22.2 No. 60950-1-03
  ¬ NOM-019 SCFI, Mexico
  ¬ AS/NZ TS-001 and 60950, Australia
  ¬ UL-AR, Argentina
  ¬ UL-GS Mark, Germany
  ¬ IEC 60825-1 Laser, IEC 60825-2 Laser
  ¬ CDRH Laser

## Supported 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 802.3af (Power-over-Ethernet)
- IEEE 802.3at (Power-over-Ethernet)
- IEEE 802.3az (Energy Efficient 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 1981 Path MTU discovery
- RFC 1886 DNS for IPv6
- RFC 2292/2373/2374/2460/2462
- RFC 4861/2461 Neighbor discovery protocol
- RFC 4862/2462 IPv6 stateless address auto-configuration
- RFC 4443/2463/2466 ICMP v6 and MIB
- RFC 2452/2454 IPv6 TCP/UDP MIB
- RFC 2464/2553/2893/3493/3513
- RFC 3056 IPv6 Tunneling
- RFC 3484 Default Address Selection for IPv6
- RFC 3542/3587 IPv6 API support
- RFC 3595 Textual Conventions for IPv6 Flow Label
- RFC 4291/3315 – Dynamic Host Configuration Protocol for IPv6 (DHCPv6)

- RFC 4007 IPv6 Scoped Address Architecture
- RFC 4193 Unique Local IPv6 Unicast Addresses
- RFC 4291/3315 – Dynamic Host Configuration Protocol for IPv6 (DHCPv6)
- RFC 4649 – Dynamic Host Configuration Protocol for IPv6 (DHCPv6) Relay agent Remote-ID option
- RFC 6105 – Router Advertisement Guard
- RFC 6221 – Lightweight DHCPv6 Relay Agent

### Manageability
- RFC 854/855 Telnet and Telnet options
- RFC 959/2640 FTP
- 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 1350 TFTP Protocol
- RFC 1573/2233/2863 Private Interface MIB
- RFC 1643/2665 Ethernet MIB
- RFC 1901-1908/3416-3418 SNMP v2c
- RFC 2096 IP MIB
- RFC 2131 DHCP Server/Client
- RFC 2570-2576/3411-3415 SNMP v3
- RFC3414 User-based Security Model
- RFC 2616 /2854 HTTP and HTML
- RFC 2667 IP Tunneling MIB
- RFC 2668/3636 IEEE 802.3 MAU MIB
- RFC 2674 VLAN MIB
- RFC 2818 HTTPS over SSL
- RFC 4251 Secure Shell Protocol Architecture
- RFC 4252 The Secure Shell (SSH v2) Authentication Protocol

### Security
- RFC 1321 MD5
- 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 step
- RFC 2284 PPP EAP
- RFC 2869/3579 Radius Extension

### Quality of service
- RFC 896 Congestion control
- RFC 1122 Internet Hosts
- RFC 2474/2475/2597/3168/ 3246 DiffServ
- RFC 3635 Pause Control
- RFC 2697 srTCM
- RFC 2698 trTCM

### Others
- RFC 791/894/1024/1349 IP and IP/ Ethernet
- RFC 792 ICMP
- RFC 768 UDP
- RFC 793/1156 TCP/IP and MIB
- RFC 826/903 ARP and Reverse ARP
- RFC 919/922 Broadcasting Internet Datagram
- RFC 925/1027 Multi LAN ARP/Proxy ARP
- RFC 950 Sub-netting
- 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 3060 Policy Core
- RFC 3176 sFlow
- RFC 3021 Using 31-bit prefixes

# Ordering information

| Model Number | Description |
| --- | --- |
| OS6350-10 | Gigabit Ethernet standalone chassis in a 1U by 1/2 rack form factor with 8 10/100/1000 Base-T ports, 2 Gigabit RJ45/SFP ports. |
| OS6350-P10 | Gigabit Ethernet standalone chassis in a 1U by 1/2 rack form factor with 8 10/100/1000 Base-T ports, 2 Gigabit RJ45/SFP ports. |
| OS6350-24 | Gigabit Ethernet stackable chassis in a 1RU form factor with 24 10/100/1000 Base-T ports, 2 Gigabit SFP ports and 2 SFP uplink/stacking ports |
| OS6350-P24 | Gigabit Ethernet stackable chassis in a 1RU form factor with 24 10/100/1000 PoE Base-T ports, 2 Gigabit SFP ports and 2 SFP uplink/stacking ports |
| OS6350-48 | Gigabit Ethernet stackable chassis in a 1RU form factor with 48 10/100/1000 Base-T ports, 2 Gigabit SFP ports and 2 SFP uplink/stacking ports |
| OS6350-P48 | Gigabit Ethernet stackable chassis in a 1RU form factor with 48 10/100/1000 PoE Base-T ports, 2 Gigabit SFP ports and 2 SFP uplink/stacking ports |
| **Gigabit transceivers** | |
| SFP-GIG-LH70 | 1000Base-LH transceiver with an LC interface for single mode fiber over 1550 nm wavelength. Typical reach of 70 km. |
| SFP-GIG-LH40 | 1000Base-LH transceiver with an LC interface for single mode fiber over 1310 nm wavelength. Typical reach of 40 km. |
| SFP-GIG-LX | 1000Base-LX transceiver with an LC interface for single mode fiber over 1310 nm wavelength. Typical reach of 10 km. |
| SFP-GIG-SX | 1000Base-SX transceiver with an LC interface for multimode fiber over 850 nm wavelength. Typical reach of 300 m. |
| SFP-GIG-EXTND | 1000Base-SX transceiver with an LC interface for single mode fiber over 850 nm wavelength. Typical reach of 2 km. |
| SFP-GIG-T 1000 | Base-T Gigabit ethernet transceiver Supports category 5, 5E, and 6 copper cabling up to 100m. SFP supports 1000 Mbit/s ONLY on the OS6350 SFP ports. |
| **OS6350 stacking cables** | |
| OS6350-CBL-60CM | 60 centimeters long 5Gbs SFP+ direct stacking cable for OS6350 24 and 48 port models |
| OS6350-CBL-1M | 1M meter long 5Gbs SFP+ direct stacking cable for OS6350 24 and 48 port models |
| OS6350-CBL-3M | 3M meters long 5Gbs SFP+ direct stacking cable for OS6350 24 and 48 port models |
| OS6350-CBL-7M | 7M meters long 5Gbs SFP+ direct stacking cable for OS6350 24 and 48 port models |

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# Alcatel-Lucent OmniSwitch 6450

## Stackable Gigabit Ethernet LAN switch family

The Alcatel-Lucent OmniSwitch® 6450 Stackable Fast Ethernet and Gigabit Ethernet LAN value switch family offers versatile, 24/48-port fixed configuration switches with 10 GigE uplinks and provides upgrade paths for 10 Gigabit Ethernet (GigE) stacking, 10 GigE uplinks and metro Ethernet services.

Promoting a design optimized for flexibility, scalability, and low power consumption, the OmniSwitch 6450 is an outstanding edge solution. It uses the field-proven Alcatel-Lucent Operating System (AOS) to deliver highly available, secure, self-protective, easily managed and eco-friendly networks.

The OmniSwitch 6450 family is embedded with the latest technology innovations and offers maximum investment protection.

The following types of deployments benefit from the OmniSwitch 6450 family:
- Edge of small-to-mid-sized networks
- Branch office enterprise and campus workgroups
- Residential and commercially managed service applications
- Service provider network deployments

OmniSwitch 6450-24/P24/24X/P24X/24XM

OmniSwitch 6450-48/P48/48X/P48X

OmniSwitch 6450-U24/U24S/U24X/U24SXM

Alcatel·Lucent Enterprise

## Benefits

- Meets all customer configuration needs and offers excellent investment protection and flexibility with easy 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
- Field-upgradeable solution 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
- Simplifies metro Ethernet network OA&M for service providers

## Features

- 24-port and 48-port, Power over Ethernet (PoE), non-PoE, and 24-port fiber models with two fixed small form factor pluggable (SFP+) 10-G-ready interfaces ("X" models) and 10G-ready interfaces ("non-X" models)
- Scalability from 24 to 384 Fast Ethernet and gigabit ports with 16 10 GigE ports
- Optional SFP+ stacking or uplink module
- Optional 10 GigE uplink license option for "non-X" models
- Optional metro services feature license on "non-M" models for service provider deployments
- Support for IEEE 802.3af as well as IEEE 802.3at-compliant PoE
- Support for Precision Timing Protocol (PTP) through IEEE 1588v2 ("S" models only)
- Internal AC or DC -redundant power supplies

### Management

- AOS field-proven software managed through a web interface (WebView), command line interface (CLI), and Simple Network Management Protocol (SNMP)
- Support for programmable AOS OpenFlow for the creation of specialized services.
- Ethernet operations, administration and management (OA&M) support for service configuration and monitoring
- Supported by Alcatel-Lucent OmniVista® 2500 Network Management System (NMS)
- Alcatel-Lucent 5620 Service Aware Manager (SAM) applications for service providers

### Security

- Flexible device and user authentication with Alcatel-Lucent Access Guardian (IEEE 802.1x/MAC/captive portal) with Host Integrity Check (HIC) enforcement
- Enables deployment of comprehensive and secure bring your own device (BYoD) services in enterprise networks, such as guest management, device on-boarding, device posturing, application management, and dynamic change of authentication (CoA).
- Advanced Quality of Service (QoS) and Access Control Lists (ACLs) for traffic control, including an embedded denial of service (DoS) engine to filter out unwanted traffic attacks
- Extensive support for 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 basic layer-3 routing for both IPv4 and IPv6
- Triple speed (10/100/1000) user interfaces and fiber interfaces (SFPs) supporting 100Base X or 1000Base-X optical transceivers
- 10 G uplinks with all "X" models
- Wire-rate switching and routing performance
- High availability with virtual chassis concept, redundant stacking links, primary/secondary unit failover, hot-swappable power options 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 providing a consistent experience over wireless and wired networks
- IEEE 802.3at PoE+ support for IP phones, wireless LAN (WLAN) access points and video cameras

## Technical information

All models ship with two fixed SFP+ ports. "X"-models uplinks operate at 10 Gb/s by default and non-X models operate at 1Gb/s by default. Operation at 10 Gb/s for non-X models requires installation of the OS6450-SW-PERF license. These models also offer a two-port expansion slot for additional gigabit uplinks or 10 Gb/s stacking modules. Both PoE and non-PoE models are full rack width, power optimized, fixed configuration chassis in a 1U form factor. Any "M" models offer metro ethernet services enabled by default and any "non-M" requires the OS6450-SW-ME for metro ethernet services to be enabled. The "S" models support IEEE 1588v2 Precision Timing Protocol (PTP) through end-to-end Transparent Clock (TC) for network-wide time-synchronized applications.

### 24/48 port models

| Chassis | 10/100 RJ-45 ports | 10/100/1000 RJ45 ports | SFP+ Gigabit uplink SFP+ 10 Gigabit uplink | 10 Gb/S SFP+ stacking expansion module ports | Primary power | Backup power |
|---|---|---|---|---|---|---|
| **Non-PoE models** | | | | | | |
| OS6450-24L | 24 | 0* | 2** | 2 | Internal AC | Internal AC/DC |
| OS6450-48L | 24 | 0* | 2** | 2 | Internal AC | Internal AC/DC |
| OS6450-24 | 0 | 24 | 2** | 2 | Internal AC | Internal AC/DC |
| OS6450-24X | 0 | 24 | 2 | 2 | Internal AC | Internal AC/DC |
| OS6450-24XM | 0 | 24 | 2 | 2 | Internal AC | Internal AC/DC |
| OS6450-48 | 0 | 48 | 2** | 2 | Internal AC | Internal AC/DC |
| OS6450-48X | 0 | 48 | 2 | 2 | Internal AC | Internal AC/DC |
| **PoE models** | | | | | | |
| OS6450-P24L | 24 | 0* | 2** | 2 | Internal AC | External AC |
| OS6450-P48L | 24 | 0* | 2** | 2 | Internal AC | External AC |
| OS6450-P24 | 0 | 24 | 2 | 2 | Internal AC | External AC |
| OS6450-P24X | 0 | 24 | 2 | 2 | Internal AC | External AC |
| OS6450-P48 | 0 | 48 | 2 | 2 | Internal AC | External AC |
| OS6450-P48X | 0 | 48 | 2 | 2 | Internal AC | External AC |

- All "X" models SFP+ ports operate at 10 Gb/s by default.
- All "M" models have metro ethernet services enabled by default.
- All "P" models comply with both IEEE 802.3af/at standards.
- * All "L" user port speeds are upgradable to gigabit speeds with a license upgrade.
- ** Requires the OS6450-SW-PERF license to enable 10 G uplink capability.

| Chassis | 10/100/1000 SFP ports | 10/100/1000 combo ports | SFP+ Gigabit uplink SFP+ 10 Gigabit uplink | 10 Gb/S SFP+ stacking expansion module ports | Primary power | Backup power |
|---|---|---|---|---|---|---|
| **Fiber models** | | | | | | |
| OS6450-U24 | 22 | 2 | 2** | 2 | Internal AC | Internal AC/DC |
| OS6450-U24S | 22 | 2 | 2** | 2 | Internal AC | Internal AC/DC |
| OS6450-U24X | 22 | 2 | 2 | 2 | Internal AC | Internal AC/DC |
| OS6450-U24SXM | 22 | 2 | 2 | 2 | Internal AC | Internal AC/DC |

- Combo ports are individually configurable to be 10/100/1000Base-T or 100/1000Base-X based on SFP transceivers.
- SFP ports support 100/1000 Base-X SFP transceivers.
- All "X" models SFP+ ports operate at 10Gb/s by default.
- All "M" models have metro ethernet services enabled by default.
- "S" models only support 1588v2 Transparent Clock in non-stacking configuration.
- ** Requires the OS6450-SW-PERF license to enable 10 G uplink capability.

### Expansion port models

| Expansion model | Gigabit RJ45 ports | Gigabit SFP ports | 10 Gb/S SFP+ |
|---|---|---|---|
| OS6450-XNI-U2 | 0 | 0 | 2 |
| OS6450-GNI-U2 | 0 | 2 | 0 |
| OS6450-GNI-C2 | 2 | 0 | 0 |
| OS6450-XNI-U2X | 0 | 0 | 2 |

- Expansion modules are not 1588v2 capable.
- 1588v2 precision timing is disabled if expansion modules are installed.
- OS6450-XNI-U2 supports "stacking" mode only
- OS6450-XNI-U2X supports "uplink" mode only

## Detailed product features

### Simplified management

- Configuration management interfaces
  - ¬ Intuitive CLI with a familiar interface, reducing training costs
  - ¬ Easy-to-use, point-and-click web-based element manager (WebView) with built-in help for easy configuration
  - ¬ Integration with OmniVista 2500 for network management
  - ¬ Full configuration and reporting using SNMPv1/2/3 across all OmniSwitch families to facilitate third-party NMS integration
  - ¬ Remote Telnet management or Secure Shell access using SSHv2
  - ¬ File upload using USB, TFTP, FTP, SFTP, or SCP for faster configuration
  - ¬ Human-readable ASCII-based configuration files for offline editing and bulk configuration
  - ¬ Managed by Alcatel-Lucent 5620 Service Aware Manager

- Monitoring and troubleshooting
  - ¬ Local (on the Flash) and remote server logging: Syslog and command log
  - ¬ Port-based mirroring for troubleshooting and lawful interception supports four sessions with multiple sources-to-one destination
  - ¬ Policy-based mirroring that allows selecting the type of traffic to mirror using QoS policies
  - ¬ Remote port mirroring that facilitates passing mirrored traffic through the network to a remotely connected device
  - ¬ Port monitoring feature that allows capturing Ethernet packets to a file, or to an on-screen display to assist in troubleshooting
  - ¬ sFlow v5 and RMON for advanced monitoring and reporting capabilities for statistics, history, alarms, and events
  - ¬ IP tools: Ping and trace route

  - ¬ Digital Diagnostic Monitoring (DDM): Real-time diagnostics of fiber connections for early detection of optical signal deterioration
  - ¬ Time Domain Reflectometry (TDR) for locating breaks or other discontinuity in copper cables
- Network configuration
  - ¬ Remote auto-configuration download
  - ¬ Auto-negotiating: 10/100/1000 ports automatically configure port speed and duplex setting
  - ¬ Auto MDI/MDIX configuring transmit and receive signals to support straight-through and crossover cabling
  - ¬ BOOTP/DHCP client that allows auto-configuring switch IP information for simplified deployment
  - ¬ DHCP relay for forwarding client requests to a DHCP server

- ¬ Alcatel-Lucent Mapping Adjacency Protocol (AMAP) for building topology maps
- ¬ 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 and traffic from Alcatel-Lucent IP phones
- ¬ Network Time Protocol (NTP) for network-wide time synchronization
- ¬ IEEE 1588v2 Precision Timing Protocol (PTP) through end-to-end Transparent Clock (TC) for network-wide time synchronized applications: ("S" models only)
- ¬ Stackable to eight units

## Resiliency and high availability

- Ring Rapid Spanning Tree (RRSTP) optimized for ring topology to provide less than 100 ms convergence time
- IEEE 802.1s Multiple Spanning Tree Protocol: Encompasses IEEE 802.1D STP and IEEE 802.1w Rapid Spanning Tree Protocol • Per-VLAN spanning tree (PVST) and 1x1 STP mode
- Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP) and static LAG groups across modules
- Dual-home link (DHL) support for sub-second link protection without STP
- Virtual Router Redundancy Protocol (VRRP) providing highly available routed environments
- Broadcast and multicast storm control to avoid degradation in overall system performance
- Unidirectional Link Detection (UDLD) for detecting and disabling unidirectional links on fiber optic interfaces
- Layer-2 port loopback detection for preventing customer loops on Ethernet access ports
- Redundant and hot-swappable power supplies; transceiver modules offering uninterruptable service
- Dual image and dual configuration file storage provide backup

## Advanced security

- Access control
  - ¬ Alcatel-Lucent Access Guardian framework for comprehensive user-policy-based network access control (NAC)*
  - ¬ Auto-sensing IEEE 802.1X multi-client, multi-VLAN MAC-based authentication for non-802.1X hosts
  - ¬ Web-based authentication (Captive Portal): A customizable web portal residing on the switch that can be used for authenticating supplicants and non-supplicants
  - ¬ Group mobility rules and "guest" VLAN support
  - ¬ Host integrity check (HIC) agent on each switch acting as an HIC enforcer and facilitating endpoint device control for company policy compliance. Support for quarantine and remediation as required.
  - ¬ Support for dynamic change of authentication (CoA) and enforcing traffic remediation or restriction for non-compliant devices
  - ¬ User network profile (UNP): Simplifying NAC management and control by dynamically providing predefined policy configuration to authenticated clients (VLAN, ACL, BW, HIC)
  - ¬ SSH for secure CLI session with public key infrastructure (PKI) support
  - ¬ Centralized Remote Access Dial-In User Service (RADIUS) and LDAP user authentication
  - ¬ Private VLAN for user traffic segregation
- Containment, monitoring and quarantine
  - ¬ DHCP snooping, DHCP IP spoof protection
  - ¬ Terminal Access Controller Access Control System Plus (TACACS+) client allowing authentication, authorization and accounting with a remote TACACS+ server
  - ¬ Dynamic ARP protection and ARP poisoning detection
  - ¬ ACLs for filtering out unwanted traffic including DoS attacks; flow-based filtering in hardware (L1 to L4)
  - ¬ BPDU blocking: Automatically shutting down user ports if an STP BPDU packet is seen to prevent topology loops

- ¬ STP Root Guard: Preventing edge devices from becoming Spanning Tree Protocol root nodes

## Converged networks

- PoE
  - ¬ PoE models support Alcatel-Lucent IP phones and WLAN access points, as well as any IEEE 802.3af or IEEE 802.3at-compliant end devices
  - ¬ Configurable per-port PoE priority and max power for power allocation
  - ¬ Dynamic PoE allocation: Delivering only the amount of 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 (remarking) prioritization
  - ¬ Bandwidth management: Flow-based bandwidth management, ingress rate limiting; egress rate shaping per port
  - ¬ Queue management: Configurable scheduling algorithms, including Strict Priority Queuing (SPQ), Weighted Round Robin (WRR) and Deficit Round Robin (DRR)
  - ¬ Congestion avoidance: Support for End-to-End Head-Of-Line (E2E-HOL) blocking protection
  - ¬ Auto QoS for switch management traffic and traffic from Alcatel-Lucent IP phones
  - ¬ Three-color marker: Single/Dual Rate policing with commit BW, excess BW and burst size

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

- Layer-2 switching
  - ¬ Up to 16,000 MACs
  - ¬ Up to 4000 VLANs
  - ¬ Up to 2000 ACLs
  - ¬ Latency: < 4 µs
  - ¬ Max Frame: 9216 bytes (jumbo)
- IPv4 and IPv6
  - ¬ Static routing for IPv4 and IPv6
  - ¬ RIP v1 and v2 for IPv4; RIPng for IPv6
  - ¬ Up to 256 IPv4 and 128 IPv6 static and RIP routes

- ¬ Up to 128 IPv4 and 16 IPv6 interfaces
- ¬ Up to 1000 Arp entries
- Multicast
  - ¬ IGMPv1/v2/v3 snooping for optimized multicast traffic
  - ¬ Multicast Listener Discovery (MLD) v1/v2 snooping
  - ¬ Up to 1000 multicast groups per stack
  - ¬ IP Multicast VLAN (IPMVLAN) for optimized multicast replication at the edge, saving network core resources
- Network protocols
  - ¬ DHCP relay including generic UDP relay
  - ¬ ARP
  - ¬ Dynamic Host Configuration Protocol (DHCP) relay
  - ¬ DHCP relay to forward client requests to a DHCP server
  - ¬ Generic User Datagram Protocol (UDP) relay per VLAN
  - ¬ DHCP Option 82: Configurable relay agent information Metro Ethernet access (features available on "M" models or with metro license upgrade)

- Ethernet services support per IEEE 802.1ad Provider Bridge
  - ¬ Transparent LAN Services with Service VLAN (SVLAN) and Customer VLAN (CVLAN) concept
  - ¬ Ethernet network-to-network interface (NNI) and user network interface (UNI) services
  - ¬ Service Access Point (SAP) profile identification
  - ¬ CVLAN to SVLAN translation and mapping
  - • IEEE 802.1ag Ethernet OAM: Connectivity Fault Management (L2 ping and link trace)
- Ethernet OAM compliant with IEEE 802.3ah
- ITU-T G.8032 Ethernet Ring Protection designed for loop protection and fast convergence times (< 50 ms) in ring topologies
- Private VLAN for user traffic segregation
- Service Assurance Agent (SAA) for proactively measuring network health, reliability and performance. Four SAA tests including L2-MAC, IP, ETH-LB and ETH-DMM depending on network requirements

- Customer provider edge (CPE) test head traffic generator and analyzer tool used in the metro Ethernet network to validate customer Service Level Agreements (SLAs)
- IPMVLAN for optimized multicast replication at the edge, saving network core resources
- Layer-2 Multicast VLAN Replication (MVR) that allows users from different multicast VLANs to subscribe to a multicast group from an upstream trunk interface
- Three color marker: Single/Dual Rate policing with commit BW, excess BW and burst size
- TR-101 PPPoE Intermediate Agent allowing the PPPoE network access method
- MAC-Forced forwarding support according to RFC 4562
- Layer-2 Control Protocol (L2CP) for tunneling a customer's L2CP frames, through a-well known address, on a given UNI for Ethernet Private Line (EPL) and Ethernet Virtual Private Line (EVPL) services
- Dying Gasp through SNMP and Ethernet OAM delivery
- Metro Ethernet Forum CE 2.0 certified
- Managed by Alcatel-Lucent 5620 SAM

## Technical specifications

| Port | OS6450-24L/24/24X/24XM | OS6450-P24L/P24/P24X | OS6450-48L/48/48X | OS6450-P48L/P48/P48X | OS6450-U24/U24X/U24S/U24SXM |
|---|---|---|---|---|---|
| RJ-45 10/100 ports | 24 | 24 | 48 | 48 | 0 |
| Port | OS6450-24/24X/24XM | OS6450-P24/P24X | OS6450-48/48X | OS6450-P48/P48X | OS6450-U24/U24X/U24S/U24SXM |
| RJ-45 10/100/1000 ports | 24 | 24 | 48 | 48 | 0 |
| **Performance (Gigabit models)** | | | | | |
| Switch capacity (all ports) | 128 Gb/s | 128 Gb/s | 176 Gb/s | 176 Gb/s | 128 Gb/s |
| Switch frame rate (all ports) | 95.3 Mp/s | 95.3 Mp/s | 131.0 Mp/s | 131.0 Mp/s | 95.3 Mp/s |
| Stacking capacity (aggregated) | 40 Gb/s | 40 Gb/s | 40 Gb/s | 40 Gb/s | 40 Gb/s |

| Port | OS6450-24L/24/24X/24XM | OS6450-P24L/P24/P24X | OS6450-48L/48/48X | OS6450-P48L/P48/P48X | OS6450-U24/U24X/U24S/U24SXM |
|---|---|---|---|---|---|
| RJ-45/SFP 10/100/1000 combo ports | 0 | 0 | 0 | 0 | 2 |
| SFP 100/1000 ports | 0 | 0 | 0 | 0 | 22 |
| SFP+ Gigabit/10 Gigabit uplink ports | 2 | 2 | 2 | 2 | 2 |
| Ports per expansion module | 2 | 2 | 2 | 2 | 2 |
| PoE ports | 0 | 24 | 0 | 48 | 0 |
| Max 24/48-port models in a stack | 8 | 8 | 8 | 8 | 8 |
| **Dimensions** | | | | | |
| Width | 44.0 cm (17.32 in) | 44.0 cm (17.32 in) | 44.0 cm (17.32 in) | 44.0 cm (17.32 in) | 44.0 cm (17.32 in) |
| 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) |
| Depth | 31.24 cm (12.3 in) | 31.24 cm (12.3 in) | 39.1 cm (15.4 in) | 39.1 cm (15.4 in) | 31.24 cm (12.3 in) |
| Weight | 4.08 kg (9.0 lb) | 5.05 kg (11.0 lb) | 5.44 kg (12.0 lb) | 6.8 kg (15.0 lb) | 4.08 kg (9.0 lb) |
| **Operating conditions** | | | | | |
| 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) |
| Storage temperature | -40° C to +75° C (-40° F to +167° F) | -40° C to +75° C (-40° F to +167° F) | -40° C to +75° C (-40° F to +167° F) | -40° C to +75° C (-40° F to +167° F) | -40° C to +75° C (-40°F to +167° F) |
| Humidity (operating and storage) | 5% - 95% | 5% - 95% | 5% - 95% | 5% - 95% | 5% - 95% |
| Fan (variable speed)* | No fan | 3 fans | 3 fans | 4 fans | 2 fans |
| Acoustic (dB) | 0 db (A) | < 40db (A) | < 40db (A) | < 40db (A) | < 40db (A) |
| MTBF (hours) | 894,251 | 231,542 | 337,583 | 135,087 | 364,214 |
| **System power consumption (watts)**\*\* | | | | | |
| 0% traffic | 29.60 W/34.50 W | 31.4 W/ 1.84 W | 41.7 W/47.6 W | 48.26 W/59.55 W | 49.25 W/51.5 W |
| 50% traffic | 30.6 W/38.70 W | 32.52 W/40.49 W | 44.2 W/60.5 W | 50.64 W/76.09 W | 53.37 W/55.75 W |
| 100% traffic | 31.1 W/39.40 W | 32.79W/40.99W | 45.1 W/62.3 W | 52.38 W/77.23 W | 56.26 W/62.9 W |
| **System heat dissipation (Btus):** | | | | | |
| 0% traffic | 100.90/117.71 | 107.14/108.64 | 142.28/162.41 | 164.66/203.19 | 168.04/175.72 |
| 50% traffic | 104.41/132.04 | 110.96/138.15 | 150.81/206.43 | 50.64/172.79 | 182.10/190.22 |
| 100% traffic | 106.11/134.43 | 111.88/139.86 | 153.88/212.57 | 178.72/263.51 | 192/214.62 |
| PoE power budget (watts) | N/A | 390 | N/A | 780 | N/A |
| PoE device heat dissipation (BTU) | N/A | 1332 | N/A | 2663 | N/A |
| Power supply efficiency | 86.99% | 88.75% | 85.72% | 81.25% | 85.71% |

* Acoustic levels measured with a single power supply at room temperature

** Power consumption measured with 64-byte packets at varied  traffic conditions on all ports, including the 10GE stacking module (accounting for 8 watts).

## OmniSwitch 6450 backup supplies and specifications

The OmniSwitch 6450 24/24L/48/48L/U24/U24S-port models offer a 1RU internal backup supply configuration where the redundant supply is installed in a power supply bay at the back of the unit.

The OmniSwitch 6450 P24/48-port models offer a 2RU external backup supply configuration where the redundant supply/tray combination mounts above the switch and uses a remote cable for the switch/supply connection. All parts and accessories are included with the backup supply kit.

| Specification | OS6450-BP | OS6450-BP-PH | OS6450-BP-PX | OS6450-BP-D |
|---|---|---|---|---|
| Style | Framed | Framed | Framed | Framed |
| Internal/external | Internal | External | External | Internal |
| Input voltage | 90-220V AC | 90-220V AC | 90-220V AC | 36-72V DC |
| Output voltage | 12V DC | 12V DC/54V DC | 12V DC/54.5V DC | 12V DC |
| Wattage | 90 W | 530 W | 900 W | 90 W |
| PoE power budget | N/A | 410 W | 780 W | N/A |
| Power supply efficiency | 85% | 85% | 80% | 85% |
| Total RU with BPS | 1 RU | 2 RU | 2 RU | 1 RU |
| Supply dimension | N/A | 32 cm x 17.5 cm x 4.4cm (12.6 in x 6.9 in x 1.73 in) | 32 cm x 17.5 cm x 4.4cm (12.6 in x 6.9 in x 1.73 in) | N/A |
| Shelf dimension | N/A | 35.3 cm x 21 cm x 4.4cm (13.9 in x 8.3 in x 1.73 in) | 35.3 cm x 21 cm x 4.4cm (13.9in x 8.3 in x 1.73 in) | N/A |
| Models supported | OS6450-24L/24/24X/ 24XM/48L/48/48X/U24/ U24X/U24S/U24SXM | OS6450-P24L/P24/ P24X | OS6450-P48L/P48/ P48X | OS6450-24L/24/ 24X/24XM/48L/48/ 48X/U24/U24X/U24S/ U24SXM |

## Indicators

### System LEDs
- System (OK) (chassis HW/SW status)
- PWR (primary power supply status)
- PRI (virtual chassis primary)
- BPS (backup power status)
- LED segment display indicates the stack ID of the unit in the stack: 1 to 8 (24/48 port models)

### Per-port LEDs
- 10/100/1000: PoE, link/activity
- SFP: Link/activity
- Stacking: Link/activity

## Compliance and certifications

### Commercial
- EMI/EMC
- FCC CRF Title 47 Subpart B (Class A limits. Note: Class A with UTP cables)
- VCCI (Class A limits. Note: Class A with UTP cables)
- 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-Mark
  - ¬ Low Voltage Directive
  - ¬ EMC Directive
  - ¬ RoHS Directive
- EN 55022: 2010 (EMI and EMC requirement))
- EN 61000-3-3
- EN 61000-3-2 (Limits for harmonic current emissions)
- EN 55024 (ITE Immunity characteristics)
  - ¬ 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: HiPot Test (2250 V DC on all Ethernet ports)
- EN 50581: Standard for technical documentation for RoHS recast

### Safety agency certifications
- CB Scheme: Certification per IEC 60950/EN 60950 with all different country deviations
  - ¬ UL 60950, United States
  - ¬ IEC 60950-1, all national deviations
  - ¬ EN 60950-1 (Electric/Health & Safety), all national deviations
  - ¬ CAN/CSA-C22.2 No. 60950-1-03
  - ¬ NOM-019 SCFI, Mexico
  - ¬ AS/NZ TS-001 and 60950, Australia
  - ¬ UL-AR, Argentina
  - ¬ UL-GS Mark, Germany
- IEC 60825-1 Laser, IEC 60825-2 Laser
- CDRH Laser

### Supported standards
- IEEE 802.1D (STP)
- IEEE 802.1p (CoS)
- IEEE 802.1Q (VLANs)
- IEEE 802.1ad (Provider Bridge) Q-in-Q (VLAN stacking)

- IEEE 802.1ag
  (Connectivity Fault Management)
- 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.ah (Ethernet first mile)
- IEEE 802.3az (Energy Efficient
  Ethernet)
- IEEE 1588v2 Precision Timing
  Protocol (PTP) ("S" models only)
  - ¬ End-to-end Transparent Clock (TC)
  - ¬ IPv4 Unicast address or Ethernet
    Multicast Encapsulation

## ITU-T recommendations
- ITU-T Y.1731 OA&M fault and
  performance management
- ITU-T G.8032/Y.1344 2010: Ethernet
  Ring Protection (ERPv2)

## IETF RFCs

### RIP
- RFC 1058 RIP v1
- RFC 1722/1723/1724/2453 RIP v2
  and MIB
- RFC 1812/2644 IPv4 Router
  Requirement
- RFC 2080 RIPng for IPv6

### 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 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 1350 TFTP Protocol
- RFC 1573/2233/2863 Private
  Interface MIB
- RFC 1643/2665 Ethernet MIB
- RFC 1901-1908/3416-3418
  SNMP v2c
- RFC 2096 IP MIB
- RFC 2131 DHCP Server/Client
- RFC 2570-2576/3411-3415
  SNMP v3
- RFC3414 User-based Security Model
- RFC 2616 /2854 HTTP and HTML
- RFC 2667 IP Tunneling MIB
- RFC 2668/3636 IEEE 802.3
  MAU MIB
- RFC 2674 VLAN MIB
- RFC 2818 HTTPS over SSL
- RFC 4251 Secure Shell Protocol
  Architecture
- RFC 4252 The Secure Shell (SSH v2)
  Authentication Protocol

## Security
- RFC 1321 MD5
- 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 step
- RFC 2284 PPP EAP
- RFC 2869/3579 Radius Extension

## Quality of service
- RFC 896 Congestion control
- RFC 1122 Internet Hosts
- RFC 2474/2475/2597/3168/
  3246 DiffServ
- RFC 3635 Pause Control
- RFC 2697 srTCM
- RFC 2698 trTCM

## Other
- RFC 791/894/1024/1349
  IP and IP/Ethernet
- RFC 792 ICMP
- RFC 768 UDP
- RFC 793/1156 TCP/IP and MIB
- RFC 826/903 ARP and Reverse ARP
- RFC 919/922 Broadcasting Internet
  Datagram
- RFC 925/1027 Multi LAN ARP/
  Proxy ARP
- RFC 950 Sub-netting
- 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 3060 Policy Core
- RFC 3176 sFlow
- RFC 3021 Using 31-bit prefixes

# Ordering information

| Model number | Description |
|---|---|
| OS6450-24L | Fast Ethernet chassis in a 1U form factor with 24 10/100 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules. |
| OS6450-P24L | Fast Ethernet chassis in a 1U form factor with 24 PoE 10/100 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules. |
| OS6450-48L | Fast Ethernet chassis in a 1U form factor with 48 10/100 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules. |
| OS6450-P48L | Fast Ethernet chassis in a 1U form factor with 48 PoE 10/100 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules. |
| OS6450-24 | Gigabit Ethernet chassis in a 1U form factor with 24 10/100/1000 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules. |
| OS6450-24X | Gigabit Ethernet chassis in a 1U form factor with 24 10/100/1000 Base-T ports, 2 fixed SFP+ 10G ports enable by default and one expansion slot for optional stacking or uplink modules. |
| OS6450-24XM | Gigabit Ethernet chassis in a 1U form factor with 24 10/100/1000 Base-T ports, 2 fixed SFP+ 10G ports and one expansion slot for optional stacking or uplink modules.  Metro ethernet services enable by default. |
| OS6450-P24 | Gigabit Ethernet chassis in a 1U form factor with 24 PoE 10/100/1000 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules. |
| OS6450-P24X | Gigabit Ethernet chassis in a 1U form factor with 24 PoE 10/100/1000 Base-T ports, 2 fixed SFP+ 10G ports enable by default and one expansion slot for optional stacking or uplink modules. |
| OS6450-48 | Gigabit Ethernet chassis in a 1U form factor with 48 10/100/1000 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules. |
| OS6450-48X | Gigabit Ethernet chassis in a 1U form factor with 48 10/100/1000 Base-T ports, 2 fixed SFP+ 10G ports enable by default and one expansion slot for optional stacking or uplink modules |
| OS6450-P48 | Gigabit Ethernet chassis in a 1U form factor with 48 PoE 10/100/1000 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules. |
| OS6450-P48X | Gigabit Ethernet chassis in a 1U form factor with 48 PoE 10/100/1000 Base-T ports, 2 fixed SFP+ 10G ports enable by default and one expansion slot for optional stacking or uplink modules. |
| OS6450-U24 | Gigabit Ethernet chassis in a 1U form factor with 22 100/1000 Base-X SFP ports, 2 combo ports configurable to be 10/100/1000 Base-T or 100/1000 Base-X, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules. |
| OS6450-U24X | Gigabit Ethernet chassis in a 1U form factor with 22 100/1000 Base-X SFP ports, 2 combo ports configurable to be 10/100/1000 Base-T or 100/1000 Base-X, 2 fixed SFP+ 10G ports enable by default and one expansion slot for optional stacking or uplink modules. |
| OS6450-U24S | Gigabit Ethernet chassis in a 1U form factor with 22 100/1000 Base-X SFP ports, 2 combo ports configurable to be 10/100/1000 Base-T or 100/1000 Base-X, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules. Supports 1588v2 precision timing protocol. |
| OS6450-U24SXM | Gigabit Ethernet chassis in a 1U form factor with 22 100/1000 Base-X SFP ports, 2 combo ports configurable to be 10/100/1000 Base-T or 100/1000 Base-X, 2 fixed SFP+ 10G ports enable by default and one expansion slot for optional stacking or uplink modules.  Supports 1588v2 precision timing protocol and metro ethernet features by default.x |
| All models | All models above contain an internal AC power supply with a country-specific power cord, user manuals access card, and hardware for mounting in a 19" rack and RJ-45 to DB-9 adapter. Ethernet SFP optical transceivers, stacking module, and cables may be ordered separately. |
| All of the models above support the following license options: | |
| **License options** | |
| OS6450-SW-PERF | Performance software license enabling 10 gigabit speed on the fixed SFP+ ports of the 24- or 48-port models. |
| OS6450-SW-ME | Software license enabling the Metro Software features outlined in the Metro Ethernet Access section of this data sheet. |
| OS6450-24L-UPGD | Software license enabling gigabit speed on the RJ-45 user ports of OS6450-24L and OS6450-P24L. |
| OS6450-48L-UPGD | Software license enabling gigabit speed on the RJ-45 user ports of OS6450-48L and OS6450-P48L. |
| Expansion module | Gigabit Ethernet chassis in a 1U form factor with 24 10/100/1000 Base-T ports, 2 fixed SFP+ (1G/10G*) ports and one expansion slot for optional stacking or uplink modules. |
| OS6450-XNI-U2 | Optional 10 Gigabit SFP+ stacking module. Supports two SFP+ 10 Gigabit ports. Inserted into the OS6450 expansion slot at the rear of the OS6450 chassis. Stacking cables may be ordered separately. Uplink mode not supported. |

| Model number | Description |
|---|---|
| OS6450-XNI-U2X | Optional 10 Gigabit SFP+ uplink module. Supports two SFP+ 10 Gigabit uplink ports. Inserted into the OS6450 expansion slot at the rear of the OS6450 chassis. SFPs/cables may be ordered separately. Stacking mode not supported. |
| OS6450-GNI-U2 | Optional SFP Gigabit uplink module. Supports two SFP Gigabit ports. Inserts in the OS6450 expansion slot at the rear of the OS6450 chassis. SFPs may be ordered separately. |
| OS6450-GNI-C2 | Optional RJ-45 Gigabit uplink module. Supports two RJ-45 Gigabit ports. Inserts in the 6450 expansion slot at the rear of the OS6450 chassis. |
| **Power supply** | |
| OS6450-BP | 90 W power AC backup power supply. Provides backup power to one non-PoE switch. Inserted into the backup power supply bay at the rear of the chassis. Ships with country-specific power cord. |
| OS6450-BP-PH | 550 W AC backup power supply. Provides backup PoE power (390 W) to one 24-port PoE switch. Ships with a remote power connection cable, country-specific power cord, power shelf, and rack mounts for a 2RU configuration. |
| OS6450-BP-PX | 900 W AC backup power supply. Provides backup PoE power (780 W) to one 48-port PoE switch. Ships with a remote power connection cable, country-specific power cord, power shelf, and rack mounts for a 2RU configuration. |
| OS6450-BP-D | 90 W power DC backup power supply. Provides backup power to one non-PoE switch. Inserted into the backup power supply bay at the rear of the chassis. |
| **Cables** | |
| OS6450S-CBL-60 | 60 cm long SFP+ direct stacking cable for OS6450 24- and 48-port models |
| OS6450S-CBL-1M | 100 cm long SFP+ direct stacking cable for OS6450 24- and 48-port models |
| **Gigabit transceivers** | |
| 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 over 1310 nm wavelength (nominal) 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-LRM | 10 Gigabit optical transceiver (SFP+). Supports multimode fiber over 1310 nm wavelength (nominal) with an LC connector. Typical reach of 220 m on FDDI-grade (62.5μm). |
| SFP-10G-GIG-SR | Dual-speed SFP+ optical transceiver. Supports multimode fiber over 850 nm wavelength (nominal) with an LC connector. Supports 1000Base-SX and 10GBase-SR speeds. |
| SFP-GIG-LH70 | 1000Base-LH transceiver with an LC interface for single-mode fiber over 1550 nm wavelength. Typical reach of 70 km. |
| SFP-GIG-LH40 | 1000Base-LH transceiver with an LC interface for single-mode fiber over 1310 nm wavelength. Typical reach of 40 km |
| SFP-GIG-LX | 1000Base-LX transceiver with an LC interface for single-mode fiber over 1310 nm wavelength. Typical reach of 10 km. |
| SFP-GIG-SX | 1000Base-SX transceiver with an LC interface for multimode fiber over 850 nm wavelength. Typical reach of 300 m. |
| SFP-DUAL-BX-D | 1000Base-BX10-D transceiver with an LC-type interface for use over single-mode fiber on a single strand link up to 10 km. Operates at 100/1000 Mb speed, transmits 1500 nm and receives 1310 nm optical signal. |
| SFP-DUAL-BX-U | 1000Base-BX10-U transceiver with an LC type interface for use over single-mode fiber on a single strand link up to 10 km. Operates at 100/1000 Mb speed, transmits 1310 nm and receives 1550 nm optical signal. |
| SFP-GIG-BX-D | 1000Base-BX bidirectional transceiver with an LC type interface for use over single-mode fiber on a single strand link up to 10 km point to point. Transmits 1490 nm and receives 1310 nm optical signal. |
| SFP-GIG-BX-U | 1000Base-BX bidirectional transceiver with an LC type interface for use over single-mode fiber on a single strand link up to 10 km point to point. Transmits 1310 nm and receives 1490 nm optical signal. |
| SFP-GIG-BX-D20 | 1000Base-BX bidirectional transceiver with an LC type interface for use over single-mode fiber on a single strand link up to 20 km point to point. Transmits 1490 nm and receives 1310 nm optical signal. |
| SFP-GIG-BX-U20 | 1000Base-BX bidirectional transceiver with an LC type interface for use over single-mode fiber on a single strand link up to 20 km point to point. Transmits 1310 nm and receives 1490 nm optical signal. |
| SFP-GIG-EXTND | 1000Base-SX transceiver with an LC interface for single-mode fiber over 850 nm wavelength. Typical reach of 2 km |

| Model number | Description |
|---|---|
| **100 megabit transceivers** | |
| SFP-100-MM | 100Base-FX transceiver with an LC interface for multimode fiber optic cable. |
| SFP-100-SM15 | 100Base-FX transceiver with an LC type interface for single-mode fiber optic cable up to 15 km. |
| SFP-100-SM40 | 100Base-FX transceiver with an LC type interface for single-mode fiber optic cable up to 40 km. |
| SFP-100-BX-U | 100Base-BX bidirectional transceiver with an SC type interface for use over single-mode fiber optic on a single strand link up to 20KM point-to-point, where the client (ONU) transmits 1310nm and receives 1550nm optical signal. |
| SFP-100-BX-D | 100Base-BX bidirectional transceiver with an SC type interface for use over single-mode fiber optic on a single strand link up to 20KM point-to-point, where the client (OLT) transmits 1550nm and receives 1310nm optical signal. |

Alcatel·Lucent
Enterprise

# Alcatel-Lucent OmniSwitch 6860

## Stackable LAN switches for mobility, IoT and network analytics

The [Alcatel-Lucent OmniSwitch® 6860](#) is a family of advanced Stackable Gigabit and Multi-gigabit Ethernet switches offering high-performance, scalability, resiliency and security. With high-speed flexible uplinks, 200G stacking, industry leading 95W PoE, and high density 10G multi-gigabit ports ready for Wi-Fi 6, these platforms are the right choice for the next generation of enterprise switching networks.

**OS6860N-P48M**

**OS6860N-P48Z**

**OS6860E-P24Z8**

**OS6860N-U28**
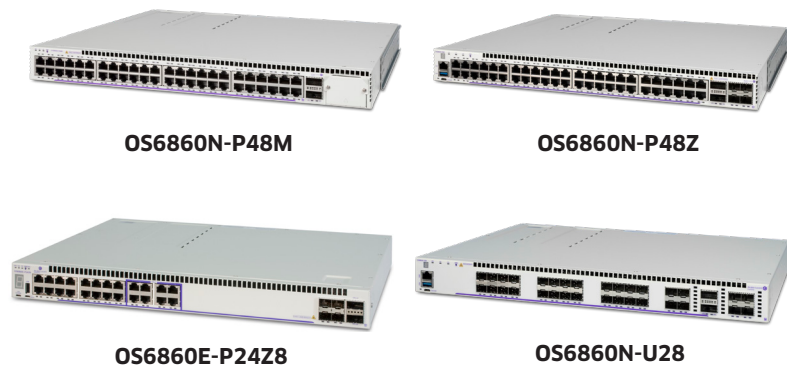
Alcatel-Lucent OmniSwitch 6860s are high performance and high availability switches that offer unmatched features in terms of quality of service (QoS), mobility, programmability and security for network edge deployments. The OmniSwitch 6860 family enables seamless mobility for users and devices with a high degree of integration between the wired and wireless LAN. The family includes support for next generation wireless LAN standards, Wi-Fi 6 and 802.11ac wave 2 and mix of uplink speeds up to 100G. With best-in-class 95W IEEE 802.3bt compliant support, OmniSwitch 6860 switches are ready for newest PoE and IoT devices, be it the pan-tilt-zoom camera or Wi-Fi 6 access points. The OmniSwitch 6860 family is the first in the industry to offer application monitoring and visibility for network analytics making it ready to meet the evolving business needs of enterprise networks. These switches run on the widely deployed and field-proven Alcatel-Lucent Operating System (AOS) offering programmability, industry leading network automation features and maximum investment protection.

These versatile LAN switches can be positioned:
- At the edge of mid- to large-sized converged enterprise networks
- At the aggregation layer
- In a small enterprise network core
- In the data center for GigE server connectivity and SDN applications

| Features | Benefits |
|---|---|
| • High-density Gigabit and multi-Gigabit (2.5/5/10 Gig) interface models | • With the variety of interfaces and models, the OmniSwitch 6860 family meets customer configuration needs and offers excellent investment protection and flexibility |
| • Virtual Chassis technology to create a single chassis-like entity with up to 32 x 10G/25G, 16 x 40G or 8 x 100 Gigabit uplinks and 384 multi-Gigabit ports | • Offers increased system redundancy, resiliency and high availability, while simplifying deployment, operations and management of the network |
| • Internal, hot-swappable power supplies, front-to-back cooling providing the lowest power consumption in its class | • Ensures efficient power management, thereby reducing operating expenses and lowering total cost of ownership. |
| • IEEE 802.3bt type 4 compliant PoE with up to 95W of PoE per port on select models<br>• IEEE 802.3af and 802.3at compliant PoE of 30W per port on all ports<br>• Support of high PoE (up to 75W per port) | • With its industry-leading PoE capabilities, high density of PoE ports and the best-in-class PoE budget of up to 3.4 kW, the OmniSwitch 6860 is ideal for converged campus deployments by simplifying the wiring, and reducing the time to deploy edge devices such as VoIP phones, surveillance cameras, Wi-Fi 6 access points, thin virtual desktop infrastructure (VDI) client, small cells, or even a small network switch. |
| • Application monitoring and enforcement | • Hardware driven network analytics can optimize the performance of your network and allows applying QoS policies to the individual application flows. |
| Advanced Unified Access features for converged campus network solutions in application fluent network<br>• Integrated policy with dynamic user network profiles<br>• Extensive security features for network access control (NAC), policy enforcement and attack containment<br>• SIP fluency to provision and monitor QoS treatment of SIP flows<br>• Airgroup Network Services for Bonjour and DLNA speaking devices | • Unified access and application fluent networks provide simplified network architecture with automated controls and enhanced security for both wired and wireless users. Offers enhanced management and security for reduced operational complexity costs<br>• User network profiles add intelligence to the network to automatically adapt as users move around the corporation without compromising the security<br>• With its advanced capabilities, the OmniSwitch 6860 shows outstanding performance when supporting real-time voice, data and video applications<br>• Improved user experience with the integration of services that enable employees to access the same applications and service, and have consistent experience across wired and wireless. |
| Enables deployment of comprehensive and secure BYOD services in enterprise networks:<br>• Advanced guest management capabilities<br>• Device on-boarding and automated IEEE 802.1x provisioning<br>• Device posture/health check and fingerprinting<br>• Application management | • The OmniSwitch 6860 offers flexible deployment options and enables the network for BYOD deployments and zero-touch guest management<br>• Supports dynamic change of authentication (CoA) and enforces traffic remediation or restriction for non-compliant devices<br>• Provides control and increased security over corporate data/applications for the mixed personal and corporate environment for improved visibility and control for IT. |
| • The OmniSwitch 6860 is SDN ready.<br>• Supporting programmable Alcatel-Lucent Operating System (AOS) RESTful APIs, OpenFlow and OpenStack allow the creation of specialized services | • Opens the door for fast deployment of new network services that meet employees' needs to continuously adopt new applications that support the business<br>• The support of SDN reassures customers that their investment is ready for the future and enables interoperability with third-party solutions. |
| • Shortest path bridging (SPB-M) for bridging and routed services | • Offers a solution that fits an enterprise's needs and delivers agile value-added services, while simplifying the transformation of campus networks to meet user needs: Allows for optimal link usage, fast convergence, and ease of configuration in large L2 topologies |
| • Multiple VLAN Registration Protocol (MVRP) and dynamic Virtual Network Profiles (VNP)<br>• Virtual Routing and Forwarding (VRF) | • Enterprise-wide cost reduction through hardware consolidation to achieve network segmentation and security without additional hardware installation. |

# Alcatel-Lucent OmniSwitch 6860 models

The OmniSwitch 6860 family offers customers an extensive selection of fixed-configuration switches with up to 95 watts of PoE per port and power supply options that can power a wide range of next-gen Ethernet edge PoE devices, be it pan-tilt-zoom cameras or Wi-Fi 6 devices. All compliant models are in a 1RU form factor and are 19-inch rack-mountable.

There are four basic models in the OmniSwitch 6860 family, six enhanced models, two advanced models and one premium model. Basic and enhanced models have four fixed 10 Gigabit SFP+ uplink ports. Advanced models have four fixed 10/25 Gigabit SFP28 uplink ports whereas the premium model has a modular uplink slot that can support 4x10G, 4x25G, 2x40G & 1x100G* uplinks.

For virtual chassis connections, basic and advanced models have two QSFP+ form-factor ports whereas premium and advanced models have two 100G QSFP28 ports. OmniSwitch 6860 Basic PoE models support up to 30 watts of PoE+ on all ports; the enhanced models in the family support up to 60/75 watts of PoE whereas the advanced and premium models support up to 95 watts of IEEE 802.3 bt compliant PoE. All OmniSwitch 6860 models have a USB port and a console port. The enhanced, premium and advanced models also have an Ethernet management port (EMP) port.

**Table 1. OmniSwitch 6860 Gigabit switch configurations**

| Gigabit models | Gigabit copper and fiber ports | Uplinks | Supported power supplies | PoE budget | |
|---|---|---|---|---|---|
| | | | | With 1 PS | With 2 PS |
| **Basic models** | | | | | |
| OS6860-24 | 24 RJ45 | 4 x 1/10G SFP+, MACsec | OS6860-BP OS6860-BP-D | N/A | N/A |
| OS6860-P24 | 24 PoE+ | 4 x 1/10G SFP+, MACsec | OS6860-BP-PH | 450W | 900W |
| OS6860-48 | 48 RJ45 | 4 x 1/10G SFP+, MACsec | OS6860-BP, OS6860-BP-D | N/A | N/A |
| OS6860-P48 | 48 PoE+ | 4 x 1/10G SFP+, MACsec | OS6860-BP-PX | 750W | 150 W |
| **Enhanced models** | | | | | |
| OS6860E-24 | 24 RJ45 | 4 x 1/10G SFP+, MACsec | OS6860-BP, OS6860-BP-D | N/A | N/A |
| OS6860E-P24 | 24 (20 PoE+, 4 x 60W PoE), MACsec | 4 x 1/10G SFP+, MACsec | OS6860-BP-PH | 450 W | 900W |
| OS6860E-48 | 48 RJ45 | 4 x 1/10G SFP+, MACsec | OS6860-BP, OS6860-BP-D | N/A | N/A |
| OS6860E-P48 | 48 (44 PoE+, 4 x 60W PoE) | 4 x 1/10G SFP+, MACsec | OS6860-BP-PX | 750W | 1500W |
| OS6860E-U28 | 28 100/1000 BaseX, SFP | 4 x 1/10G SFP+, MACsec | OS6860-BP, OS6860-BP-D | N/A | N/A |
| **Advanced models** | | | | | |
| OS6860N-U28 | 24 x 100/1000 BaseX, SFP, MACsec | 4 x 1/10G SFP+, MACsec, 4 x 10/25G SFP28, MACsec | OS6860-BP, OS6860-BP-D | N/A | N/A |

*Future

**Table 2. OmniSwitch 6860 multi-gigabit switch configurations**

| Gigabit models | Gigabit copper and fiber ports | Uplinks | Supported power supplies | PoE budget With 1 PS | With 2 PS |
|---|---|---|---|---|---|
| **Enhanced model** | | | | | |
| OS6860E-P24Z8 | 16 x 10/100/1000 PoE+, MACsec; 4 x 100/1G/2.5G, 75W PoE | 4 x 1/10G SFP+, MACsec | OS6860-BP-PX | 450W | 900W |
| | | | OS6860-BP-PH | 750W | 1500W |
| **Advanced model** | | | | | |
| OS6860N-P48Z | 36 x 10/100/1000 60W bt PoE; 12 x 100/1G/2.5G/5G, 95W bt PoE | 4 x 10/25G SFP28, MACsec | OS6860N-BP-PH | 360W | 900W |
| | | | OS6860N-BP-PX | 660W | 1500W |
| **Premium model** | | | | | |
| OS6860N-P48M | 36 x 100/1G/2.5G 95W bt PoE; 12 x 100/1G/2.5G/5G/10G, 95W bt PoE, MACsec | Modular | OS6860N-BP-PH | 300W | 845W |
| | | | OS6860N-BP-PX | 590W | 1425W |
| | | | OS6860N-BP-XL | 665W @115 VAC | 1570W @115 VAC |
| | | | | 1570W @230 VAC | 3390W @230 VAC |

**Table 3. OmniSwitch 6860 product specifications**

| Criteria | Basic and enhanced models (OS6860/OS6860E) | Advanced and premium models (OS6860N) |
|---|---|---|
| USB port | 1 | 1 |
| Out-of-band EMP port | Basic models: None Enhanced models: 1 | 1 |
| RS-232 port | 1 | 1 |
| Console port (micro-USB) | 1 | 1 |
| Fans | POE models: 1 Non-PoE model: 0 | 3 |
| Altitude | 13,000 ft | 13,000 ft |
| Operating temperature | 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) |
| Humidity (operating and storage) | 5% to 95% non-condensing | 5% to 95% non-condensing |
| Air flow | Front-to-back | Front-to-back |
| Dimensions (H x W x D) | 4.4 cm x 44 cm x 35 cm 1.73 in x 17.32 in x 13.78 in | **OS6860N-P48M / OS6860N-P48Z:** 4.4 cm x 44 cm x 44 cm 1.73 in x 17.32 in x 17.32 in  **OS6860N-U28:** 4.4 cm x 44 cm x 35 cm 1.73 in x 17.32 in x 13.78 in |
| Port LEDs | Single LED per port • Non-PoE ports - green: link/activity • PoE ports - amber: link/activity | • RJ45 ports: two LEDs per port ¬ PoE LED: amber: link/activity. Off: No PoE ¬ Speed LED: Solid: link, Blinking: activity Blue: 10G speed Magenta: 5G speed Green: 2.5G speed Amber: 100M/1G speed Off: Link down • Fiber ports: one LED per port ¬ Solid green: link. Blinking green: activity |

| Criteria | Basic and enhanced models (OS6860/OS6860E) | Advanced and premium models (OS6860N) |
|---|---|---|
| System LEDs | • OK1: green/yellow operational status of the switch<br>• OK2: green/yellow operational status of the external CPU. Not present in OS6860N<br>• VC: green/yellow master or slave role in VC configuration<br>• PS: green/yellow combined status for the primary and/or backup power supplies<br>• BPS: green/yellow status of the power coming from the Backup Power Shelf. Not present in OS6860N<br>• GRN: power saving mode<br>• 7-segment LED display for Virtual Chassis ID | • OK1: green/yellow operational status of the switch<br>• OK2: green/yellow operational status of the external CPU. Not present in OS6860N<br>• VC: green/yellow master or slave role in VC configuration<br>• PS: green/yellow combined status for the primary and/or backup power supplies<br>• GRN: power saving mode<br>• 7-segment LED display for Virtual Chassis ID |

## OmniSwitch 6860N uplink modules

The premium model on OS6860N support optional modules for uplinks. These modules are not included in the default switch configuration of OS6860N-P48M and should be purchased separately.



**OS68-XNI-U4**    **OS68-QNI-U2**    **OS68-VNI-U4**    **OS68-CNI-U1***

**Table 4. OmniSwitch 6860 uplink modules configuration**

| Uplink module | Description |
|---|---|
| OS68-XNI-U4 | 4 x 1G/10G SFP+, 256-bit MACsec capable ports |
| OS68-VNI-U4 | 4 x 10/25G SFP28, 256-bit MACsec capable ports |
| OS68-QNI-U2 | 2 x 10/40G QSFP+, 256-bit MACsec capable ports |
| OS68-CNI-U1* | 1 x 25/100G QSFP28 256-bit MACsec capable port |

*Future

**Table 5. OmniSwitch 6860 performance specifications**

| Criteria | Basic and enhanced models (OS6860/OS6860E) | Advanced and premium modes (OS6860N) |
|---|---|---|
| Max raw fabric capacity (Aggregated) | 24-port Gigabit models: 224 Gb/s<br>48-port Gigabit models: 264 Gb/s<br>24-port multi-gigabit model: 264 Gb/s | OS6860N-P48M: 1,120 Gb/s<br>OS6860N-P48Z: 1,120 Gb/s<br>OS6860N-U28 : 960 Gb/s |
| Switching capacity (Aggregated) | 24-port Gigabit copper models: 208 Gb/s<br>48-port Gigabit models: 256 Gb/s<br>24-port multi-gigabit model: 232 Gb/s<br>24-port Gigabit fiber model: 216 Gb/s | OS6860N-P48M: 1,020 Gb/s<br>OS6860N-P48Z: 792 Gb/s<br>OS6860N-U28: 728 Gb/s |
| Throughput | 24-port Gigabit copper models: 154.9 Mpps<br>48-port Gigabit models: 190.6 Mpps<br>24-port multi-gigabit model: 172.6 Mpps<br>24-port Gigabit fiber model: 160.9 Mpps | OS6860N-P48M: 758.9 Mpps<br>OS6860N-P48Z: 589.3 Mpps<br>OS6860N-U28 : 541.7 Mpps |
| File system flash | 2 GB | 16 GB |
| DRAM | 2 GB | 4 GB |
| VLANs | 4,000 | 4,000 |
| MAC addresses | 48 K | 64 K |
| Max IPv4 routes | 64 K | 144 K |
| Max IPv6 routes | 6 K | 72 K |

| Criteria | Basic and enhanced models (OS6860/OS6860E) | Advanced and premium modes (OS6860N) |
|---|---|---|
| Jumbo frames | 9216 bytes | 9216 bytes |
| VFL ports capacity | 42 GB/s or 84 GB/s aggregate | 200 Gb/s or 400 Gb/s aggregate |
| Maximum number of units in a virtual chassis | 8 | 8 |
| DAC cables for VC | OS6860-CBL-40<br>OS6860-CBL-100<br>OS6860-CBL-300 | OS6860-CBL-40<br>OS6860-CBL-100<br>OS6860-CBL-300<br>QSFP-100G-C1M<br>QSFP-100G-C3M<br>QSFP-100G-C5M |

## Power supplies

All OmniSwitch 6860 models support 1+1 redundant, hot-swappable, load-sharing power supplies. The primary and backup power supply units are internal but removable to allow for easier maintenance and replacement. The OmniSwitch 6860 family also supports power load-sharing for PoE between the primary and backup power supplies. OmniSwitch 6860 Basic and enhanced models provide up to 1500 watts of PoE per switch, whereas the Advance/Premium models can provide up to 3400W of PoE per switch. There is no interruption of service when a new power supply is installed or an existing one replaced.

**Table 6.1. OmniSwitch 6860 power supplies**

| PS models | OS6860-BP | OS6860-BP-D | OS6860-BP-PH | OS6860-BP-PX |
|---|---|---|---|---|
| Description | Modular AC power supply. Provides system power to one OS6860/E/N non-PoE switch | Modular DC power supply. Provides system power to one OS6860/E/Nnon-PoE switch | Modular 600-W AC PoE power supply. Provides system and PoE power to one 24-port OS6860/E PoE switch | Modular 920-W AC PoE power supply. Provides system and PoE power to one 48-port OS6860E PoE or one OS6860E-P24Z8 switch |
| Dimensions (H x W x L) | 3.9 cm x 5.05 cm x 18.5 cm (1.54 in x 1.99 in x 7.28 in) | 3.9 cm x 5.05 cm x 18.5 cm (1.54 in x 1.99 in x 7.28 in) | 4.0 cm x 7.3 cm x 18.5 cm (1.57 in x 2.87 in x 7.28 in) | 4.0 cm x 7.3 cm x 18.5 cm (1.57 in x 2.87 in x 7.28 in) |
| Weight | .7 kg (1.11 lb) | .88 kg (1.94 lb) | 1.04 kg (2 lb) | 1.05 kg ( 2.32 lb) |
| Max with 1 PSU | N/A | N/A | 450W | 750W |
| Max with 2 PSUs | N/A | N/A | 900W | 1500W |
| Input voltage/ current | 90 V to 136 VAC/3 A 180 V to 264 VAC/1.5 A | -36 V to-72 V DC/ 1.8 A to 6 A | 90 V to 136 VAC/8.5 A 180 V to 264 VAC/4.25 A | 90 V to 136 VAC/13 A 180 V to 264 VAC/6.5 A |
| Max output power/current | 150W/12.5 A | 150W/12.5 A | 600W/11 A | 920W/16.88 A |
| Fans | 1 | 1 | 1 | 1 |

OmniSwitch 6860N PoE models use a different set of power supplies than the OmniSwitch 6860 and 6860E PoE models. The PoE power supplies cannot be used interchangeably between OS6860N and OS6860/OS6860E models. OS6860N-BPXL requires 200-240VAC for 2000W output. At 100-120VAC the output is 1000W. It can be deployed only on a Premium switch.

**Table 6.2. OmniSwitch 6860N power supplies**

| PS models | OS6860N-BPXL | OS6860N-BPPX | OS6860N-BPPH |
|---|---|---|---|
| Description | Modular 2000W AC PoE power supply. Provides system and PoE power to one OS6860N-P48M switch | Modular 920W AC PoE power supply. Provides system and PoE power to one OS6860N-P48Z or OS6860N-P48M switch | Modular 600W AC PoE power supply. Provides system and PoE power to one OS6860N-P48Z or OS6860N-P48M switch |
| Dimensions (H x W x L) | 4.0 cm x 7.3 cm x 18.5 cm (1.57 in x 2.87 in x 7.28 in) | 4.0 cm x 7.3 cm x 18.5 cm (1.57 in x 2.87 in x 7.28 in) | 4.0 cm x 7.3 cm x 18.5 cm (1.57 in x 2.87 in x 7.28 in) |
| Weight | 1.37 kg (3.02 lb) | 1.05 kg (2.32 lb) | 1.04 kg (2 lb) |
| Max PoE budget with 1 PSU | 1570W @200-240 VAC 665W @100-120 VAC | 750W | 450W |
| Max PoE budget with 2 PSUs | 3390W @200-240 VAC 1570W @100-120 VAC | 1500W of PoE | 900W |
| Input voltage/ current | 100 V to 120 VAC/13.0 A 200 V to 240 VAC/13.0 A | 90 V to 132 VAC/12.0 A 180 V to 264 VAC/6.0 A | 90 V to 132 VAC/8.0 A 180 V to 264 VAC/4.0 A |
| Max output power/current | 1000W/18.35 A 2000W/36.7 A | 920W/16.88 A | 600W/11A |
| Fans | 1 | 1 | 1 |

# Detailed product features

## Simplified manageability and configuration

- 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
- Network Automation and Programmability Abstraction Layer with Multivendor (NAPALM) support
- 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
- 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
- Fully programmable OpenFlow 1.3.1 and 1.0 agent for control of native OpenFlow and hybrid ports
- Non-volatile memory for start-up configuration
- 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 VitalQIP® DNS/DHCP IP Address Management
- Access to the AOS console via USB Adapter with Bluetooth technology provides wireless management access to the OmiSwitch 6860, eliminating the use of console cables

## Cloud ready with Alcatel-Lucent OmniVista Cirrus

- OmniVista® Cirrus offers a secure, resilient and scalable cloud-based network management. It offers hassle free network deployment and easy service roll-out with advanced analytics for smarter decision making. It provides IT friendly Unified Access with secure authentication and policy enforcement for users and devices.

## Monitoring and troubleshooting

- Local (on the flash) and remote server logging (Syslog): event

and command logging
- IP tools: ping and trace route
- Dying Gasp support via SNMP and syslog messages
- Loopback IP address support for management per service
- Management virtual routing and forwarding (VRF) support
- Policy- and port-based mirroring
- Remote port mirroring
- sFlow v5 and Remote Monitoring (RMON)
- Unidirectional Link Detection (UDLD), Digital Diagnostic Monitoring (DDM), and Time Domain Reflectometry (TDR)

## 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
- ITU-T G.8032/Y1344 2010: Ethernet Ring Protection
- 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
- Virtual Router Redundancy Protocol (VRRP) with tracking capabilities
- IEEE protocol auto-discovery
- Bidirectional Forwarding Detection (BFD) for fast failure detection and reduced re-convergence times in a routed environment
- Redundant and hot-swappable power supplies
- 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 v4 and v6 Snooping, DHCP IP and Address Resolution Protocol (ARP) spoof protection
- DHCPv6 guard and DHCPv6 Client guard
- ARP poisoning detection
- IP v4 and v6 Source Filtering as a protective and effective mechanism against ARP attacks
- Bring Your Own Device (BYOD) provides on-boarding of Guest, IT/non-IT issued and silent devices. Restriction/Remediation of traffic from non-compliant devices. Uses RADIUS CoA to dynamically enforce User Network Profiles based on Authentication, Profiling, Posture check of devices.
- Role-based authentication for routed domains

### Switch software security

- AOS secured diversified code solution is available on OmniSwitch 6860, hardening it at both the software source code and binary executable levels to enhance overall network security.
- AOS secured diversified code protects networks from intrinsic vulnerabilities, code exploits, embedded malware, and potential back doors that could compromise mission critical operations.
- AOS secured diversified code is a proactive, defense approach toward network security that continuously defines and implements value-add capabilities to address both current and future threats.

## QoS

- Priority queues: Eight hardware-based queues per port for flexible QoS management
- Traffic prioritization: Flow-based QoS
- Flow-based traffic policing and bandwidth management
- 32-bit IPv4/128-bit IPv6 non-contiguous mask classification
- Egress traffic shaping
- DiffServ architecture

- Congestion avoidance: Support for end- to-end head-of-line (E2E-HOL) blocking prevention, and IEEE 802.3x Flow Control (FC)

## Layer-3 routing and multicast

### IPv4 routing

- Multiple VRF
- Static routing
- Routing Information Protocol (RIP) v1 and v2
- Open Shortest Path First (OSPF) v2 with Graceful Restart
- Intermediate System to Intermediate System (IS-IS) with Graceful Restart
- Border Gateway Protocol (BGP) v4 with Graceful Restart
- Generic Routing Encapsulation (GRE) and IP/IP tunneling
- Virtual Router Redundancy Protocol (VRRPv2)
- DHCP relay (including generic UDP relay)
- Address Resolution Protocol (ARP)
- Policy-based routing and server load balancing
- DHCPv4 server

### IPv6 routing

- Multiple VRF
- Internet Control Message Protocol version 6 (ICMPv6)
- Static routing
- Routing Information Protocol Next Generation (RIPng)
- Open Shortest Path First (OSPF) v3 with Graceful Restart
- Intermediate System to Intermediate System (IS-IS) with Graceful Restart
- Multi-Topology IS-IS
- BGP v4 multiprotocol extensions for IPv6 routing (MP-BGP)
- Graceful Restart extensions for OSPF and BGP
- Virtual Router Redundancy Protocol version 3 (VRRPv3)
- Neighbor Discovery Protocol (NDP)
- Policy-based routing and server load balancing
- DHCPv6 server
- DHCPv6 relay & UDPv6 relay

### IPv4/IPv6 multicast

- Internet Group Management Protocol (IGMP) v1/v2/v3 snooping
- Protocol Independent Multicast–Sparse-Mode (PIM-SM), Source Specific Multicast (PIM-SSM)
- Protocol Independent Multicast–Dense-Mode (PIM-DM), Bidirectional Protocol Independent Multicast (PIM-BiDir)
- Distance Vector Multicast Routing Protocol (DVMRP)
- Multicast Listener Discovery (MLD) v1/v2 snooping
- PIM to DVMRP gateway support

### Fluent network for voice, video and data

- Session Initiation Protocol (SIP) detection, session monitoring and tracking
- Provides real-time conversation quality information contained in the SIP packets concerning packet loss, delay, jitter, MOS score, R-Factor in real time
- SIP profile for QOS, priority tuning for end-to-end processing
- Multicast DNS Relay: Bonjour protocol support for wired Airgroup

### Advanced Layer-2 services

- Ethernet services support using IEEE 802.1ad Provider Bridges (also known as Q-in-Q or VLAN stacking)
- Ethernet OAM (802.1ag): Connectivity Fault Management (L2 ping & Link trace)
- Ethernet in First mile: Link OAM (802.3ah)
- Fabric virtualization services IEEE 802.1aq Shortest Path Bridging (SPB-M)
- In-band management for SPB-M
- Ethernet network-to-network interface (NNI) and user network interface (UNI)
- Service Access Point (SAP) profile identification
- Service VLAN (SVLAN) and Customer VLAN (CVLAN) support
- VLAN translation and mapping including CVLAN to SVLAN
- Port mapping
- DHCP Option 82: Configurable relay agent information

- Multiple VLAN Registration Protocol (MVRP)
- HA-VLAN for Layer 2 clusters such as MS-NLB and active-active Firewall clusters
- Jumbo frame support
- Bridge Protocol Data Unit (BPDU) blocking
- STP Root Guard

### Data center networking

- Dynamic Virtual Network Profiles (vNP)
- IEEE 802.1aq Shortest Path bridging (SPB-M)

### Software Defined Networking (SDN)

- Programmable AOS RESTful API
- Fully programmable OpenFlow 1.3.1 and 1.0 agent for control of native OpenFlow and hybrid ports
- OpenStack networking plug-in

## Supported standards

### IEEE standards

- IEEE 802.1D STP
- IEEE 802.1p CoS
- IEEE 802.1Q VLANs
- IEEE 802.1ab (LLDP)
- IEEE 802.1ag (OA&M)
- IEEE 802.1ad Provider Bridges Q-in-Q/VLAN stacking
- IEEE 802.1ak (Multiple VLAN Registration Protocol (MVRP)
- IEEE 802.1aq Shortest Path Bridging (SPB)
- IEEE 802.1s MSTP
- IEEE 802.3i 10BASE-T
- IEEE 802.1w RSTP
- IEEE 802.3x Flow Control
- IEEE 802.3z Gigabit Ethernet
- IEEE 802.3ab 1000Base-T
- IEEE 802.3ac VLAN Tagging
- IEEE 802.3ad/802.1AX Link Aggregation
- IEEE 802.3ae 10 GigE
- IEEE 802.3af Power over Ethernet
- IEEE 802.3at PoE Plus
- IEEE 802.3az Energy Efficient Ethernet (EEE)
- IEEE 802.3bz 2.5/5 GigE
- IEEE 802.3ba 40GBASE-X
- IEEE 802.1x-2004
- IEEE 802.1ae  MAC Security
- IEEE 1588-2008 (PTP)

### ITU-T recommendations

- ITU-T G.8032/Y.1344 2010: Ethernet Ring Protection (ERPv2)
- ITU-T Y.1731 OA&M fault and performance management

### IETF RFCs

#### IPv4

- RFC 2003 IP/IP Tunneling
- RFC 2131 Dynamic Host Configuration Protocol (DHCPv4)
- RFC 2784 GRE Tunneling
- RFC 4022/2452 MIB for IPv4 TCP
- RFC 4087 IP Tunnel MIB
- RFC 4113/2454 MIB for IPv4 UDP
- RFC 4292/4293 IPv4 MIBs

#### OSPF

- RFC 1765 OSPF Database Overflow
- RFC 1850/2328 OSPF v2 and MIB
- RFC 2154 OSPF MD5 Signature
- RFC 2370/3630 OSPF Opaque LSA
- RFC 2740/5340 OSPFv3 for IPv6
- RFC 3101 OSPF NSSA Option
- RFC 3623/5187 OSPF Graceful Restart
- RFC 5838 MIB for OSPFv3
- RFC 4552 Authentication for OSPFv3

#### RIP

- RFC 1058 RIP v1
- RFC 1722/1723/2453/1724 RIP v2 and MIB
- RFC 1812/2644 IPv4 Router Requirements
- RFC 2080 RIPng for IPv6

#### BGP

- RFC 1269/1657/4273 BGP v3 and v4 MIB
- RFC 1403/1745 BGP/OSPF Interaction
- RFC 1771-1774/2842/2918/ 3392/4271 BGP v4
- RFC 1965 BGP AS Confederations
- RFC 1966 BGP Route Reflection
- RFC 1997/1998/4360 BGP Communities Attribute
- RFC 2042/5396 BGP New Attribute
- RFC 2385 BGP MD5 Signature
- RFC 2439 BGP Route Flap Damping
- RFC 2545 BGP-4 Multiprotocol Extensions for IPv6 Routing
- RFC 2858/4760 Multiprotocol Extensions for BGP-4

- RFC 3065 BGP AS Confederations
- RFC 4456 BGP Route Reflection
- RFC 4486 Subcodes for BGP Cease Notification
- RFC 4724 Graceful Restart for BGP
- RFC 3392/5492/5668/6793 BGP 4-Octet ASN
- RFC 5082 Generalized TTL Security Mechanism (GTSM)

### IS-IS
- RFC 1142/1195/3719/3787/5308 IS-IS v4
- RFC 2763/2966/3567/3373 Adjacencies and route management
- RFC 5120 M-ISIS: Multi Topology IS-IS
- RFC 5306 Graceful Restart
- RFC 5309/draft-ietf-isis-igp-p2p-over-lan Point to point over LAN
- RFC 6329 IS-IS Extensions Supporting IEEE 802.1aq SPB
- RFC 5304 IS-IS Cryptographic Authentication
- RFC 5310 IS-IS Generic Cryptographic Authentication

### IP Multicast
- RFC 1075/draft-ietf-idmr-dvmrp-v3-11.txt DVMRP
- RFC 2362/4601/5059 PIM-SM
- RFC 2365 Multicast
- RFC 2710/3019/3810/MLD v2 for IPv6
- RFC 2715 PIM and DVMRP interoperability
- RFC 2933 IGMP MIB
- RFC 3376 IGMPv3 (includes IGMP v2/v1)
- RFC 3569 Source-Specific Multicast (SSM)
- RFC 3973 Protocol Independent Multicast- Dense Mode (PIM-DM)
- RFC 4541 Considerations for IGMP and MLD Snooping Switches
- RFC 5015 BiDIR PIM
- RFC 5060 Protocol Independent Multicast MIB
- RFC 5132 Multicast Routing MIB
- RFC 5240 PIM Bootstrap Router MIB

### IPv6
- RFC 1981 Path MTU Discovery
- RFC 2460 IPv6 Specification
- RFC 2461 NDP
- RFC 2464 IPv6 over Ethernet
- RFC 2465 MIB for IPv6: Textual Conventions (TC) and General Group
- RFC 2466 MIB for IPv6: ICMPv6 Group
- RFC 2711 Router Alert Option
- RFC 3056 6to4 Tunnels
- RFC 3315 Dynamic Host Configuration Protocol for IPv6 (DHCPv6)
- RFC 3484 Default Address Selection
- RFC 3493/2553 Basic Socket API
- RFC 3542/2292 Advanced Sockets API
- RFC 3587/2374 Global Unicast Address Format
- RFC 3595 TC for IPv6 Flow Label
- RFC 3596/1886 DNS for IPv6
- RFC 4007 Scoped Address
- RFC 4022/2452 MIB for IPv6 TCP
- RFC 4087 IP Tunnel MIB
- RFC 4113/2454 MIB for IPv6 UDP
- RFC 4193 Unique Local Addresses
- RFC 4213/2893 Transition Mechanisms
- RFC 4291/3513/2373 Addressing Architecture (uni/any/multicast)
- RFC 4292/4293 IPv6 MIBs
- RFC 4301/2401 Security Architecture
- RFC 4302/2402 IP Authentication Header
- RFC 4303/2406 IP Encapsulating Security Payload (ESP)
- RFC 4308 Cryptographic Suites for IPSec
- RFC 4443/2463 ICMPv6
- RFC 4861/2461 Neighbor Discovery
- RFC 4862/2462 Stateless Address Auto-configuration
- RFC 5095 Deprecation of Type 0 Routing Headers in IPv6

### Manageability
- RFC 854/855 Telnet and Telnet options
- RFC 959/2640 FTP
- RFC 1350 TFTP Protocol
- 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 4252 The Secure Shell (SSH) Authentication Protocol
- RFC 4253  SSH Transport Layer Protocol
- RFC 4254  SSH Connection 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 3576 Dynamic Authorization Extensions to RADIUS
- 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 3162 RADIUS and IPv6
- RFC 4301 Security Architecture for IP
- RFC 5517 Private VLAN

**QoS**
- RFC 896 Congestion Control
- RFC 1122 Internet Hosts
- RFC 2474/2475/2597/3168/3246
- DiffServ
- RFC 2697 srTCM
- RFC 2698 trTCM
- 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 2581 TCP Congestion Control
- 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 1305/2030/5905 NTP v4 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 4502 RMON MIB v2
- RFC 2131/3046 DHCP/BootP Relay
- RFC 2132 DHCP Options
- RFC 2251 LDAP v3
- RFC 2338/3768/2787 VRRP and MIB
- RFC 3021 Using 31-bit Prefixes
- RFC 3060 Policy Core
- RFC 3176 sFlow
- IETF draft "IP/IPVPN services with IEEE 802.1aq SPB networks"
- RFC 4562 MAC-Forced Forwarding

## OmniSwitch 6860 specifications

**Table 7. Power consumption, MTBF, Acoustics and weight**

| Switch module | Power consumption (idle) | Power consumption (full load) | Heat dissipation | Acoustic noise (dB) @ 25℃ | MTBF | Weight (chassis and fan) | Weight (fully populated) |
|---|---|---|---|---|---|---|---|
| OS6860-24 | 35.6W | 45.6W | 155.6 BTU/h | 45.8 | 408,614 h | 4.45 kg (9.8 lb) | 5.17 kg (11.4 lb) |
| OS6860-48 | 41.7W | 57.2W | 195.2 BTU/h | 45.8 | 385,181 h | 4.67 kg (10.3 lb) | 5.40 kg (11.9 lb) |
| OS6860-P24 | 61.9W | 75.2W | 256.6 BTU/h | 42 | 133,391 h | 4.58 kg (10.1 lb) | 6.03 kg (13.3 lb) |
| OS6860-P48 | 70.8W | 88.7W | 302.7 BTU/h | 43.5 | 127,594 h | 4.90 kg (10.8 lb) | 6.35 kg (14.0 lb) |
| OS6860E-24 | 38.9W | 48W | 163.8 BTU/h | 45.8 | 353,806 h | 4.58 kg (10.1 lb) | 5.26 kg (11.6 lb) |
| OS6860E-48 | 44.1W | 60W | 204.7 BTU/h | 45.8 | 336,101 h | 4.81 kg (10.6 lb) | 5.49 kg (12.1 lb) |
| OS6860E-P24 | 65W | 76.1W | 259.7 BTU/h | 42 | 126,601 h | 4.81 kg (10.6 lb) | 6.26 kg (13.8 lb) |
| OS6860E-P24Z8 | 87W | 91.6W | 312.7 BTU/h | 45.9 | 198,869 h | 4.81 kg (10.6 lb) | 6.26 kg (13.8 lb) |
| OS6860E-P48 | 72.9W | 93.2W | 318 BTU/h | 43.5 | 121,442 h | 5.03 kg (11.1 lb) | 6.49 kg (14.3 lb) |
| OS6860E-U28 | 70.1W | 72.2W | 246.4 BTU/h | 42.4 | 292,509 h | 4.58 kg (10.1 lb) | 5.26 kg (11.6 lb) |
| OS6860N-P48Z | 157.8W | 176.6 W | 602.6 BTU/h | 60 | 233,756 h | 6.04 kg (13.32 lb) | 7.76 kg (17.11 lb) |
| OS6860N-P48M | 179.9W | 261.1 W | 891 BTU/h | 69 | 216,393 h | 6.35 kg (13.99 lb) | 8.28 kg (18.25 lb) |
| OS6860N-U28 | 79W | 171W | 583.5 BTU/h | 52 | 138,559 h | 4.50 kg (9.92 lb) | 4.99 kg (11.0 lb) |

\* Power consumption measured at the 120 V AC outlet. The full L2 traffic load measurement for the 24- and 48-port PoE models was done with the 600W and 920W PSU respectively. Power consumption does not include PoE power. Heat dissipation is calculated for power consumption at full load. 1 watt ≈ 3.41214 BTU/h

\*\* Fully populated chassis includes two power supplies, mounting brackets and no transceivers

\*\*\* MTBF is measured 25 °C ambient temperature with one AC power supply, as per Telcordia SR-332 issue 4 standard

**Table 8. OmniSwitch 6860 compliance and certifications**

| Compliance type | Certification |
|---|---|
| Commercial EMI/EMC | • 47 CRF FCC Part 15: 2015 Subpart B (Class A)<br>• ICES–003:2012 Issue 5, Class A ANSI C63.4-2009<br>• VCCI (Class A, with UTP Cables)<br>• AS/NZS 3548 (Class A) – C-Tick CE marking for European countries (Class A, with UTP Cables)<br>• CE Emission<br>  ¬ EN 55032 (EMI & EMC)<br>  ¬ EN 55024 (Immunity)/EN 55035<br>  ¬ EN 50581 (RoHS Recast)<br>  ¬ EN 61000-3-2<br>  ¬ EN 61000-3-3<br>  ¬ EN 61000-4-2<br>  ¬ EN 61000-4-3<br>  ¬ EN 61000-4-4<br>  ¬ EN 61000-4-5<br>  ¬ EN 61000-4-6<br>  ¬ EN 61000-4-8<br>  ¬ EN 61000-4-11<br>• IEEE 802.3: Hi-Pot Test (2250 V DC on all Ethernet ports) |
| Safety | • UL 60950-1, 2nd Edition<br>• IEC 60950-1/EN 60950-1, all national deviations<br>• UL 62368-1/IEC 62368-1<br>• EN 60825-1 Laser<br>• EN 60825-2 Laser<br>• CDRH Laser<br>• CAN/CSA-C22.2 No. 60950-1-07, 2nd Edition<br>• NOM-019 SCFI, Mexico<br>• CAN/CSA 62368-1<br>• AS/NZ TS-001 and 60950:2000, Australia<br>• UL-AR, Argentina<br>• AS/NZ 62368-1<br>• UL-GS Mark, Germany<br>• CU, EAC, Russia<br>• CCC, China<br>• ANATEL, Brazil<br>• BSMI, Taiwan<br>• KCC, Korea<br>• RoHS & WEEE directives compliant<br>• C Mark, Morocco<br>• TEC, India |
| Federal | • FIPS 140-2<br>• Common Criteria EAL2<br>• Common Criteria NDcPP<br>• Joint Interoperability Test Command (JITC)<br>• Trade Agreements Act (TAA) |

# Ordering information

| Part number | Description |
|---|---|
| **OmniSwitch 6860  basic models** | |
| OS6860-24-xx | OS6860-24: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 24 RJ-45 10/100/1000 Base-T ports, four fixed SFP+ (1G/10G) ports, USB, and two VFL/stacking ports. The bundle includes one AC power supply, country-specific power cord, user manuals access card, hardware for mounting in a 19" rack and a micro-USB- to-USB console adapter. |
| OS6860-24D | OS6860-24: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 24 RJ-45 10/100/1000 Base-T ports, four fixed SFP+ (1G/10G) ports, USB, and two VFL/stacking ports. The bundle includes one DC power supply, user manuals access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter. |
| OS6860-P24-xx | OS6860-P24: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 24 10/100/1000 Base-T PoE ports, four fixed SFP+ (1G/10G) ports and two VFL/stacking ports. The bundle includes a mid-power AC PoE power supply, country-specific power cord, user manuals access card, hardware for mounting in a 19" rack and a USB-to-USB console adapter. |

| Part number | Description |
|---|---|
| OS6860-48-xx | OS6860-48: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 48 RJ-45 10/100/1000 Base-T ports, 4 fixed SFP+ (1G/10G) ports, USB, and two VFL/stacking ports. The bundle includes one AC power supply, country specific power cord, user manuals access card, hardware for mounting in a 19" rack and a micro-USB to USB console adapter. |
| OS6860-48D | OS6860-48: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 48 RJ-45 10/100/1000 Base-T ports, four fixed SFP+ (1G/10G) ports, USB, and two VFL/stacking ports. The bundle includes one DC power supply, user manuals access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter. |
| OS6860-P48-xx | OS6860-P48: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 48 RJ-45 10/100/1000 Base-T PoE+ ports, four fixed SFP+ (1G/10G) ports, USB, and two VFL/stacking ports. The bundle includes one 920-W AC PoE power supply, country-specific power cord, user manuals access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter. |
| **OmniSwitch 6860 enhanced models** | |
| OS6860E-24-xx | OS6860-24: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 24 RJ-45 10/100/1000 Base-T ports, four fixed SFP+ (1G/10G) ports, USB, and two VFL/stacking ports. The bundle includes one AC power supply, country-specific power cord, user manuals access card, hardware for mounting in a 19" rack and a micro-USB- to-USB console adapter. |
| OS6860E-24D | OS6860-24: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 24 RJ-45 10/100/1000 Base-T ports, four fixed SFP+ (1G/10G) ports, USB, and two VFL/stacking ports. The bundle includes one AC power supply, user manuals access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter. |
| OS6860E-P24-xx | OS6860E-P24: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 24 RJ-45 10/100/1000 Base-T PoE+ ports, four of them provide 60 W, four fixed SFP+ (1G/10G) ports, USB, EMP, and two VFL/stacking ports. Includes a built-in co-processor for Enhanced network services. The bundle includes one 600-W AC PoE power supply, country-specific power cord, user manuals access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter. |
| OS6860E-P24Z8xx | OS6860E-P24Z8: Multi-Gigabit L3 fixed configuration chassis in a 1U form factor chassis with 16 PoE+ 10/100/1000 RJ45, 8 multi-gigabit HPoE (75W PoE ), 4-fixed SFP+ (1G/10G) ports, USB, EMP, and two VFL/stacking ports. Includes a built-in co-processor for Enhanced network services. The bundle includes one 600W AC PoE power supply, country-specific power cord, user manuals access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter. |
| OS6860E-48-xx | OS6860E-48: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 48 RJ-45 10/100/1000 Base-T ports, four fixed SFP+ (1G/10G) ports, USB, EMP, and two VFL/stacking ports. Includes a built-in co-processor for Enhanced network services. The bundle includes one AC power supply, country-specific power cord, user manuals access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter. |
| OS6860E-48D | OS6860E-48: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 48 RJ-45 10/100/1000 Base-T ports, four fixed SFP+ (1G/10G) ports, USB, EMP, and two VFL/stacking ports. Includes a built-in co-processor for Enhanced network services. The bundle includes one DC power supply, user manuals access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter. |
| OS6860E-P48-xx | OS6860E-P48: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 48 RJ-45 10/100/1000 Base-T PoE+ ports, four of them provide 60 W, four fixed SFP+ (1G/10G) ports, USB, EMP, and two VFL/stacking ports. Includes a built-in co-processor for Enhanced network services. The bundle includes one 920-W AC PoE power supply, country-specific power cord, user manuals access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter. |
| OS6860E-U28-xx | OS6860E-U28: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 28 100/1000 Base-X SFP ports, four fixed SFP+ (1G/10G) ports, USB, EMP, and two VFL/stacking ports. Includes a built-in co-processor for Enhanced network services. The bundle includes one AC power supply, country-specific power cord, user manuals access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter. |
| OS6860E-U28D | OS6860E-U28: Gigabit Ethernet L3 fixed configuration chassis in a 1U form factor with 28 100/1000 Base-X SFP ports, four fixed SFP+ (1G/10G) ports, USB, EMP, and two VFL/stacking ports. Includes a built-in co-processor for Enhanced network services. The bundle includes one DC power supply, user manuals access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter. |

| Part number | Description |
|---|---|
| **OmniSwitch 6860 TAA certified switches** | |
| TA6860E-P48-US | TA6860E-P48-US Gigabit Ethernet L3 fixed configuration chassis in 1U form factor with 48 POE+ 10/100/1000 RJ-45 (four of them provide 60W PoE), 4 fixed SFP+ 1G/10G ports, 2 QSFP+ VFL/stacking stacking ports, Includes a built-in co-processor for Enhanced network services, Includes one 920W AC power supply, US power cord, user manuals access card, hardware for 19" rack mount and micro-USB to USB console adapter. Redundant PSU to be ordered separately. |
| **OmniSwitch 6860 power supplies** | |
| OS6860-BP-D | OS6860-BP modular 150-W DC backup power supply. Provides backup power to one non-PoE OS6860 or OS6860E or OS6860N switch |
| OS6860-BP-xx | OS6860-BP modular 150-W AC backup power supply. Provides backup power to one non-PoE OS6860 or OS6860E or OS6860N switch |
| OS6860-BP-PH-xx | OS6860-BP-PH modular 600-W AC PoE backup power supply. Provides system and PoE backup power to one 24-port PoE OS6860 or OS6860E switch |
| OS6860-BP-PX-xx | OS6860-BP-PX modular 920-W AC PoE backup power supply. Provides system and PoE backup power to one 48-port PoE OS6860/OS6860E or OS6860E-P24Z8 switch |
| **OmniSwitch 6860 advanced models** | |
| OS6860N-P48Z-xx | OS6860N-P48Z: Fixed-configuration chassis in a 1U form factor with 36x10/100/1000 Base-T 60W bt PoE ports, 12x100/1000/2500/5000 mbps multi-gigabit 95W bt PoE ports, four SFP28 (10G/25G) MACsec ports and 2x 100G QSFP28 Virtual Chassis link ports. All PoE ports are IEEE 802.3bt compliant. All SFP28 25G ports are MACSec capable. Bundle includes one 920W AC power supply, country-specific power cord, user manuals ac-cess card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter |
| OS6860N-U28-xx | OS6860N-U28: Fixed-configuration chassis in a 1U form factor with 24x100/1000 Base-X SFP ports, 4x 1G/10G SFP+ ports, four SFP28 (10G/25G) ports and 2 x 100G QSFP28 Virtual Chassis link ports. All ports are MACSec capable. The bundle includes one system AC power supply, country-specific power cord, user manuals, access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter |
| OS6860N-U28-D | OS6860N-U28-D: Fixed-configuration chassis in a 1U form factor with 24x100/1000 Base-X SFP ports, 4x 1G/10G SFP+ ports, four SFP28 (10G/25G) ports and 2 x 100G QSFP28 Virtual Chassis link ports. All ports are 256-bit MACSec capable. The bundle includes one system DC power supply, user manuals, access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter |
| **OmniSwitch 6860 Premium model** | |
| OS6860N-P48M-xx | OS6860N-P48M: Fixed-configuration chassis in a 1U form factor with 36x100/1000/2500 mbps multi-gigabit 95W bt PoE ports, 12x100/1000/2500/5000/10000 Mb/s multi-gigabit 95W bt PoE MACsec ports, 2x100G QSFP28 Virtual Chassis link ports with an uplink module expansion slot. All PoE ports are IEEE 802.3bt compliant.. The bundle includes one 920W AC power supply, country-specific power cord, user manuals access card, hardware for mounting in a 19" rack and a micro-USB-to-USB console adapter |
| **OmniSwitch 6860N uplink modules** | |
| OS68-XNI-U4 | OS68-XNI-U4: One uplink module for OS6860N-P48M with 4x1/10G SFP+ ports. All ports are 256-bit MACsec capable |
| OS68-VNI-U4 | OS68-VNI-U4: One uplink module for OS6860N-P48M with 4x10/25G SFP28 ports. All ports are 256-bit MACsec capable |
| OS68-QNI-U2 | OS68-QNI-U2: One uplink module for OS6860N-P48M with 2x10/40G QSFP+ ports. All ports are 256-bit MACsec capable |
| **OmniSwitch 6860N power supplies** | |
| OS6860N-BPPH-xx | OS6860N-BPPH modular 600W AC PoE backup power supply. Provides system and PoE backup power to one OS6860N PoE switch |
| OS6860N-BPPX-xx | OS6860N-BPPX modular 920W AC PoE backup power supply. Provides system and PoE backup power to one OS6860N PoE switch |
| OS6860N-BPXL-xx | OS6860N-BPXL modular 2000W AC PoE power supply. Provides system and PoE power to one OS6860N-P48M switch |
| **OmniSwitch 6860 software** | |
| OS-SW-MACSEC | Site license to enable MACSec on OS6860 models. One license per customer at no cost. |
| OS6860-SW-AR | OS6860-SW-AR: Advanced routing software license for AOS 8.3.1.R02 or earlier releases, support for VRF, IPv4 routing protocols BGP, OSPFv2, PIMSM/DM, DVMRP. Includes IPv6 Routing, RIPng, OSPFv3, as well as SPB-M |

| Part number | Description |
|---|---|
| **OmniSwitch 6860 accessories** | |
| OS6860-CBL-40 | OS6860 direct attached copper cable (40 cm, QSFP+) for Virtual Chassis connections |
| OS6860-CBL-100 | OS6860 direct attached copper cable (1m, QSFP+) for Virtual Chassis connections |
| OS6860-CBL-300 | OS6860 direct attached copper cable (3m, QSFP+) for Virtual Chassis connections |
| QSFP-40G-AOC20M | 40 Gigabit QSFP+ direct attached active optical cable. 20 m for Virtual Chassis connections |
| QSFP-40G-SR | Four channel 40 Gigabit QSFP+. Supports link lengths of up to 100m for Virtual Chassis connections |
| QSFP-4X10G-SR | 40 Gb to 4 x 10 Gb Multifiber Push-On (MPO) fiber splitter transceiver for Virtual Chassis connections |
| **1G 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 |
| SFP-DUAL-MM-N | Dual Speed 100Base-FX or 1000Base-X Ethernet optical transceiver (SFP MSA). Supports multimode fiber over 1310nm wavelength (nominal) with an LC connector. Typical reach of 550m at Gigabit speed and 2km at 100 Mb/t speed |
| SFP-GIG-EXTND | Extended 1000Base-SX Gigabit Ethernet optical transceiver(SFP MSA). Multimode fiber over 850nm wavelength (nominal) LC connector. Reach of up to 2 km on 62.5/125 m MMF and 50/125 m MMF. |
| SFP-GIG-BX-D | 1000Base-BX SFP bi-directional transceiver with an LC interface. Works on single mode fiber optic on a single strand link up to 10 km. Transmits 1490 nm and receives 1310 nm optical signal. |
| SFP-GIG-BX-U | 1000Base-BX SFP bi-directional transceiver with an LC interface. Works on single mode fiber optic on a single strand link up to 10 km. Transmits 1310 nm and receives 1490 nm optical signal. |
| SFP-GIG-BX-D## | 1000Base-BX SFP bi-directional transceiver with an LC interface. Works on single mode fiber optic on a single strand link. ## denotes length in KM. Available lengths are 20 & 40 Km. Transmits 1490 nm and receives 1310 nm optical signal. |
| SFP-GIG-BX-U## | 1000Base-BX SFP bi-directional transceiver with an LC interface. Works on single mode fiber optic on a single strand link. ## denotes length in KM. Available lengths 20 & 40 Km.. Transmits 1310 nm and receives 1490 nm optical signal. |
| **10G transceivers** | |
| 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 monomode fiber over 1310 nm wavelength (nominal) with an LC connector. Typical reach of 10 km |
| SFP-10G-ZR | 10 Gigabit optical transceiver (SFP+). Supports data transmission at 1550 nm over up to 80km single mode fiber. LC connector type. |
| SFP-10G-ER | 10 Gigabit optical transceiver (SFP+). Supports monomode fiber over 1550 nm wavelength (nominal) with an LC connector. Typical reach of 40 km |
| SFP-10G-LRM | 10 Gigabit optical transceiver (SFP+). Supports multimode fiber over 1310 nm wavelength (nominal) with an LC connector. Typical reach of 220 m on FDDI-grade (62.5 µm) |
| SFP-10G-GIG-SR | Dual-speed SFP+ optical transceiver. Supports multimode fiber over 850 nm wavelength (nominal) with an LC connector. Supports 1000Base-SX and 10GBase-SR |
| SFP-10G-GIG-LR | Dual-speed SFP+ optical transceiver. Supports monomode fiber over 1310 nm wavelength (nominal) with an LC connector. Typical reach of 10 Km. Supports 1000BASE-LX and 10GBASE-LR |
| SFP-10G-T | 10 Gigabit copper transceiver (SFP+). 10GBase-T 10 Gigabit ethernet Transceiver (SFP MSA) - Supports category 6a/7 cabling copper cabling up to 30m. This transceiver supports 10Gbs full-duplex mode only. |
| **SFP+ Direct attached cables** | |
| SFP-10G-C1M | 10 Gigabit direct attached copper cable (1 m, SFP+) |
| SFP-10G-C3M | 10 Gigabit direct attached copper cable (3 m, SFP+) |
| SFP-10G-C7M | 10 Gigabit direct attached copper cable (7 m, SFP+) |

| Part number | Description |
|---|---|
| **25G transceivers** | |
| SFP-25G-CLR | 25 Gigabit optical transceiver (SFP28). Supports link lengths of 2Km over singlemode fiber cables. Single MPO |
| SFP-25G-LR | 25 Gigabit optical transceiver (SFP28). Supports link lengths of 10Km over singlemode fiber cables. Single MPO |
| SFP-25G-SR | 25 Gigabit optical transceiver (SFP28). Supports link lengths of 70m on OM3 and 100m on OM4 multimode fiber cables. Single MPO |
| **25G SFP28 direct attached cables** | |
| QSFP-25G-A20M | 25 Gigabit SFP28 direct attached active optical cable. 20 m. |
| QSFP-25G-C1M | 25 Gigabit direct attached copper cable 1m, SFP28) |
| QSFP-25G-C3M | 25 Gigabit direct attached copper cable 3m, SFP28) |
| QSFP-25G-C5M | 25 Gigabit direct attached copper cable 7m, SFP28) |
| **40G transceivers** | |
| QSFP-40G-SR | Four channel 40 Gigabit optical transceiver QSFP+). Supports link lengths of 100m and 150m respectively on OM3 and OM4 multimode fiber cables. Single MPO receptacle |
| QSFP-40G-LR | Four channel 40 Gigabit optical transceiver QSFP+). Supports single mode fiber over 1310nm wavelength. Typical reach 10 km. Duplex LC receptacles |
| QSFP-40G-SR-BD | Dual channel 40 Gigabit optical transceiver QSFP+). Supports multimode fiber over 850nm wavelength nominal) with duplex LC connector. Supports link lengths up to 100 meters on OM3 MMF or 150 meters on OM4 MMF |
| **40G QSFP+ direct attached cables** | |
| QSFP-40G-AOC20M | 40 Gigabit QSFP+ direct attached active optical cable. 20 m. |
| QSFP-40G-C1M | 40 Gigabit direct attached copper cable 1m, QSFP+ |
| QSFP-40G-C3M | 40 Gigabit direct attached copper cable 3m, QSFP+ |
| QSFP-40G-C40CM | 40 Gigabit direct attached copper cable 40 cm, QSFP+ |
| QSFP-40G-C7M | 40 Gigabit direct attached copper cable 7m, QSFP+ |
| **100G transceivers** | |
| QSFP-100G-LR4 | 100 Gigabit optical transceiver QSFP28). Supports link lengths of 10Km over singlemode fiber cables. Single MPO |
| QSFP-100G-SR4 | 100 Gigabit optical transceiver QSFP28). Supports link lengths of 70m on OM3 and 100m on OM4 multimode fiber cables. Single MPO |
| QSFP-100G-CLR4 | 100 Gigabit optical transceiver QSFP28). Supports link lengths of 2Km over singlemode fiber cables. Single MPO |
| QSFP-100G-CWDM4 | 100 Gigabit optical transceiver QSFP28). Supports link lengths of 2Km over singlemode fiber cables. Single MPO. CWDM4 |
| **100G direct attach cables** | |
| QSFP-100G-A20M | 100 Gigabit QSFP28 direct attached active optical cable. 20 m. |
| QSFP-100G-C1M | 100 Gigabit direct attached copper cable 1m, QSFP28 |
| QSFP-100G-C3M | 100 Gigabit direct attached copper cable 3m, QSFP28 |
| QSFP-100G-C5M | 100 Gigabit direct attached copper cable 5m, QSFP28 |

Please replace the "-xx" in the part number ("xx in case of OS6860E-P24Z8) with the country-specific power cord (for example, OS6860-24-US/ OS6860E-P24Z8US will come with a power cord for the USA.) We offer 11 different power cord options. Please consult with the price list for the official power cord options offered.

**Warranty**

The OmniSwitch 6860 family comes with a Hardware Limited Lifetime Warranty.

**Services and support**

For more information about our Professional services, Support services, and Managed services, please go to https://www.al-enterprise.com/en/services.

Please visit our website to learn more:
https://www.al-enterprise.com/en/products/switches/omniswitch-6860

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