

# Alcatel-Lucent OmniSwitch 6900

## STACKABLE LAN SWITCHES

The Alcatel-Lucent OmniSwitch™ 6900 Stackable LAN Switches are compact, high-density 10GbE and 40GbE platforms designed for the most demanding networks. These platforms offer unmatched versatility to actually deliver on the promise of the next-generation virtualized data center. With their modular approach, these platforms accommodate the exact rack configuration and exact oversubscription ratio required by the application flows. In addition to high performance and extremely low latency, the OmniSwitch 6900 platforms offer extensive QoS, Layer 2 and Layer 3 switching, as well as system- and network-level resiliency. They can be positioned as Top of Rack switches in a Data Center as well as core/aggregation switches in a converged campus network.



OmniSwitch 6900-X40 with OS-XNI-U12 – front view

Through the use of optional modules, the OmniSwitch 6900 can offer the highest 10GbE port density in its class, with up to 64 10GbE ports in a 1U form factor. This modularity also allows for

up to 6 40GbE uplink ports\*. With a leading power consumption model, the OS6900 product family is the most efficient and versatile switch in its class.

FEATURES	BENEFITS
High performance	Up to 1.28 terabits per second (Tbps) of wire-rate capacity, sub microsecond latency for high performance server and core connectivity
Redundant hardware system architecture. Internal, hot-swappable power supplies, fans. Front-to-back cooling	Resiliency maximizes uptime for converged mission-critical networks
High 10GigE port density in 1RU. <ul style="list-style-type: none"> <li>• up to 32 fixed SFP+ ports for the OS6900-X20</li> <li>• up to 64 fixed SFP+ ports for the OS6900-X40</li> </ul>	Increases density in a single rack and supports next-generation service densities with a very high port density in a 1U form factor. Modular slots offer versatility in terms of 40GbE uplinks and resulting oversubscription.
Lowest power consumption per 10GbE port in its class	Ensures efficient power management, reduces operating expenses and lowers total cost of ownership (TCO) through the low power consumption.
Virtual Network Profile	Building on the Alcatel-Lucent concept of Mobile VLAN, the OmniSwitch 6900 offers mobile network services for Virtual Machines that are added, moved and changed across the data center. Combined with very large MAC table the OmniSwitch 6900 provides support for virtualized data centers.
Wire-rate performance for switching and routing at 10G and gigabit speeds. Advanced services are incorporated in the operating system: QoS, access control lists (ACLs), L2/L3, VLAN stacking, and IPv6.	Outstanding performance when supporting real-time voice, data, and video applications for converged scalable networks
Hardware-based virtual routing and forwarding (VRF) support	Reduces cost across the enterprise through hardware consolidation that achieves network segmentation and security without additional hardware installation.

## Alcatel-Lucent OmniSwitch 6900 Models

The OmniSwitch 6900 family offers customers a high performance, very low latency Layer 2/Layer 3 10 Gigabit Ethernet switches. All models are in 1RU form factor with redundant power supplies and fan trays, and feature front-to-back airflow. A wide range of 40GbE\* and 10GbE optional modules are supported, allowing for maximum

flexibility and investment protection as customers migrate to 10GbE connectivity with 40GbE\* uplinks.

The OmniSwitch 6900-X40 has 40 fixed SFP+ ports and one expansion slot on the front panel. It also supports one expansion slot on the back of the device.

The OmniSwitch 6900-X20 has 20 fixed SFP+ ports and one expansion slot on the front panel.

## Power supplies

All OmniSwitch 6900 models support 1+1 redundant, hot-swappable AC and DC power supplies. The primary and backup power supply units are internal, but removable allowing for easier maintenance and replacement.

There is no interruption of service when a new power supply is installed or an old one replaced.

**Table 1. Product Matrix**

PRODUCT MATRIX	OS6900-X40	OS6900-X20
Port count (SFP+ )	40	20
Expansion slots	2 (front and back)	1 (front)
Out of Band 10/100/1000 port	1	1
USB port	1	1
Console port	1	1
AC/DC redundant PSU	Yes	Yes
Redundant fans	Yes (3+1)	Yes (3+1)
Flash	2 GB	2 GB
Memory	2 GB	2 GB
Maximum switching capacity (Gbps)	1,280 Gbps	640 Gbps
Maximum switching capacity (Mpps)	960 Mpps	480Mpps
Latency	Sub microsecond	Sub microsecond

**Table 2. Expansion Module Matrix**

EXPANSION MODULES	OS-XNI-U12	OS-XNI-U4
Port count ( SFP+)	12	4
Switching capacity	240 Gbps	80 Gbps
Hot swappable/ interchangeable	Yes	Yes
EXPANSION MODULES	OS-HNI-U6*	OS-QNI-U3*
Port count ( SFP+)	4	0
Port count ( QSFP+)	2	3
Switching capacity	240 Gbps	240 Gbps
Hot swappable/ interchangeable	Yes	Yes

## Technical Specifications

### Physical dimensions

- Width: 48.2 cm (19.00 in.)
- Depth: 55.9 cm (22.00 in.)
- Height: 4.4 cm (1.73 in.)

### Indicators

- Per-port LEDs
  - SFP+: link/activity
  - EMP: link/activity
- System LEDs
  - OK: green/yellow
  - PS1: green/yellow
  - PS2: green/yellow
  - PWR Save: green

### Environmental requirements

- Operating temperature: 0°C to 45°C (32°F to 113°F)
- Storage temperature: -10°C to +70°C (14°F to 158°F)
- Humidity (operating): 5% to 90% non-condensing
- Humidity (storage): 5% to 95% non-condensing

## Detailed product features

### Simplified manageability

- Intuitive Alcatel-Lucent Command Line Interface (CLI) in a BASH environment
- Full configuration and reporting using SNMPv1/2/3 across all OmniSwitch families to facilitate third-party network management
- Local (on the flash) and remote server logging: Syslog and command log
- Policy and port based mirroring
- Remote port mirroring
- sFlow v5 and RMON
- UDLD and DDM
- File upload using USB, TFTP, FTP, SFTP, or SCP
- BOOTP/DHCP client with option 60
- DHCP relay
- IEEE 802.1AB LLDP with MED extensions
- NTP

### Resiliency and high availability

- Multi-Chassis Link Aggregation (MC-LAG)
- ITU-T G.8032 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 Alcatel-Lucent 1x1 STP mode
- IEEE 802.3ad Link Aggregation Control Protocol (LACP) and static LAG groups across modules
- Dual-home link support for sub-second link protection without STP
- Virtual Router Redundancy Protocol (VRRP)
- Bidirectional Forwarding Detection (BFD)
- Redundant and hot-swappable power supplies
- Redundant fans (3+1)
- Hot swappable fan tray
- Hot swappable optional modules

### Data Center Networking

- Virtual Network Profiles (VNP)
- Priority Flow Control (PFC) – IEEE802.1Qbb\*
- Enhanced Transmission Selection (ETS) – IEEE802.1Qaz\*
- DCBX\*
- Shortest Path Bridging (SPB) – IEEE802.1aq\*
- Edge Virtual Bridging (EVB) – IEEE802.1Qbg\*

### Advanced security

#### Access control

- SSH with public key infrastructure (PKI) support
- TACACS+ client
- Centralized RADIUS and Lightweight Directory Access Protocol (LDAP) administrator authentication
- Learned Port Security (LPS) or MAC address lockdown
- Bridge Protocol Data Unit (BPDU) blocking
- STP Root Guard
- Access Control Lists (ACLs); flow-based filtering in hardware (layer 1 to layer 4)

### Quality of Service (QoS)

- Priority queues: 8 hardware-based queues per port
- Traffic prioritization: Flow-based QoS
- Flow-based bandwidth management
- Queue management with configurable scheduling algorithms
- RED, WRED
- DiffServ Architecture
- Congestion avoidance: Support for End-to-end Head-of-Line (E2E-HOL) blocking prevention and flow control

### IPv4 Routing

- Multiple Virtual and Forwarding (VRF)
- Static routing, Routing Information Protocol (RIP) v1 and v2
- Open Shortest Path First (OSPF) v2 with graceful restart
- Border Gateway Protocol (BGP) v4 with graceful restart
- Generic Routing Encapsulation (GRE) and IP/IP tunneling
- VRRP v2
- DHCP relay (including generic UDP relay)
- ARP

### IPv6 Routing

- Static routing
- Routing Information Protocol Next Generation (RIPng)
- OSPF v3
- BGP v4 (with extensions to IPv6 routing)
- Graceful restart extensions for OSPF and BGP
- VRRPv3
- NDP

### IPv4/IPv6 Multicast

- Internet Group Management Protocol (IGMP) v1/v2/v3 snooping
- Protocol Independent Multicast – Sparse Mode (PIM-SM)
- Distance Vector Multicast Routing Protocol (DVMRP)
- Multicast Listener Discovery (MLD) v1/v2 snooping

### Advanced Layer 2 services

- Ethernet services support per IEEE 802.1ad Provider Bridges (also known as Q-in-Q or VLAN stacking):
  - Service VLAN (SVLAN) and Customer VLAN (CVLAN) transparent LAN services
  - Ethernet network-to-network interface (NNI) and user network interface (UNI) services
  - Service Access Point (SAP) profile identification
  - CVLAN to SVLAN translation and mapping
- Port mapping
- DHCP Option 82: Configurable relay agent information
- Multicast VLAN Registration Protocol (MVRP)
- HA-VLAN

## Compliance and certifications

### Commercial

#### EMI/EMC

- FCC 47 CFR Part 15 Class A
- ICES-003 Class A
- 89/336/EEC EMC Directive
- EN55022:1998 Class A
- EN55024 :1998
- EN61000-4- 2,3,4,5,6,8,11
- EN61000-3-2,3
- CISPR22:1997 Class A
- VCCI (Class A)
- AS/NZS 3548 (Class A)
- IEEE 802.3 Hipot requirement & 1.5KV Surge on data port for copper interfaces

### Safety agency certifications

- US UL 60950
- IEC 60950-1:2001; all national deviations
- EN 60950-1: 2001; all deviations
- CAN/CSA-C22.2 No. 60950-1-03
- AS/NZ TS-001 and 60950:2000, Australia
- UL-AR, Argentina
- UL-GS Mark, Germany
- GOST, Russian Federation
- EN 60825-1 Laser
- EN 60825-2 Laser
- CDRH Laser

## Supported Standards

### IEEE standards

- IEEE 802.1D (STP)
- IEEE 802.1p (CoS)
- IEEE 802.1Q (VLANs)
- IEEE 802.1ad (Provider Bridges) (Q-in-Q/VLAN stacking)
- IEEE 802.1ak (Multiple VLAN Registration Protocol)
- IEEE 802.1aq (SPB)\*
- IEEE 802.1Qaz (ETS)\*
- IEEE 802.1Qbb (PFC)\*
- IEEE 802.1s (MSTP)
- IEEE 802.1w (RSTP)
- 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 (10G Ethernet)
- IEEE 802.3ba (40G Ethernet)\*

### ITU-T standards

- ITU-T G.8032: Draft (June 2007) Ethernet Ring Protection

### IETF standards

#### IPv4

- RFC 2003 IP/IP Tunneling
- RFC 2784 GRE Tunneling

#### OSPF

- RFC 1253/1850/2328 OSPF v2 and MIB
- RFC 1587/3101 OSPF NSSA Option
- RFC 1765 OSPF Database Overflow
- RFC 2154 OSPF MD5 Signature
- RFC 2370/3630 OSPF Opaque LSA
- RFC 3623 OSPF Graceful Restart

#### 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 BGP v3 & v4 MIB
- RFC 1403/1745 BGP/OSPF Interaction
- RFC 1771-1774/2842/2918/3392 BGP v4
- RFC 1965 BGP AS Confederations
- RFC 1966 BGP Route Reflection
- RFC 1997/1998 BGP Communities Attribute
- RFC 2042 BGP New Attribute
- RFC 2385 BGP MD5 Signature
- RFC 2439 BGP Route Flap Damping
- RFC 2545 BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing
- RFC 2796 BGP Route Reflection
- RFC 2858 Multiprotocol Extensions for BGP-4
- RFC 3065 BGP AS Confederations

#### IP multicast

- RFC 1075 DVMRP
- RFC 1112 IGMP v1
- RFC 2236/2933 IGMP v2 and MIB
- RFC 2362/4601 PIM-SM
- RFC 2365 Multicast
- RFC 2715/2932 Multicast Routing MIB
- RFC 2934 PIM MIB for IPv4
- RFC 3376 IGMPv3
- RFC 5060 Protocol Independent Multicast MIB
- RFC 5132 IP Multicast MIB
- RFC 5240 PIM Bootstrap Router MIB

#### IPv6

- RFC 1886/3596 DNS for IPv6
- RFC 2292/2553/3493/3542 IPv6 Sockets
- RFC 2373/2374/3513/3587 IPv6 Addressing
- RFC 4007 IPv6 Scoped Address Architecture
- RFC 4193 Unique Local IPv6 Unicast Addresses
- RFC 2460//2462/2464 Core IPv6
- RFC 2461 NDP
- RFC 2463/2466/4443 ICMP v6 and MIB

- RFC 2452/2454 IPv6 TCP/UDP MIB
- RFC 2893/4213 IPv6 Transition Mechanisms
- RFC 3056 IPv6 Tunneling
- RFC 3542/3587 IPv6
- RFC 3595 TC for Flow Label

#### Manageability

- RFC 959/2640 FTP
- RFC 1350 TFTP Protocol
- RFC 2131 DHCP server/client
- RFC 854/855 Telnet and Telnet options
- 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 1901-1908/3416-3418 SNMP v2c
- RFC 2096 IP MIB
- RFC 2570-2576/3411-3415 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 3414 User based Security model
- RFC 4251 Secure Shell Protocol architecture
- RFC 4252 The Secure Shell (SSH) 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
- RFC 2284 PPP EAP
- RFC 2869/2869bis RADIUS Extension

#### QoS

- 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 Subnetting
- RFC 951 BOOTP
- RFC 1151 RDP
- RFC 1191 Path MTU Discovery
- RFC 1256 ICMP Router Discovery
- RFC 1305/2030 NTP v3 and Simple NTP
- RFC 1493 Bridge MIB
- RFC 1518/1519 CIDR
- RFC 1541/1542/2131/3396/3442 DHCP
- RFC 1757/2819 RMON and MIB
- RFC 2131/3046 DHCP/BootP Relay
- RFC 2132 DHCP Options
- RFC 2251 LDAP v3
- RFC 2338/3768/2787 VRRP and MIB
- RFC 3021 Using 31-bit prefixes
- RFC 3060 Policy Core
- RFC 3176 sFlow

## Ordering information

**Table 3. OmniSwitch 6900 ordering information**

MODULES	
OS6900-X20-F	10Gigabit Ethernet L2/L3 fixed configuration chassis in a 1U form factor with 20 SFP+ ports, one optional module slot. The chassis includes a 450W AC power supply. A second power supply slot is supported for redundancy. Redundant power supply shall be ordered separately.
OS6900-X20D-F	10Gigabit Ethernet L2/L3 fixed configuration chassis in a 1U form factor with 20 SFP+ ports, one optional module slot. The chassis includes a 450W DC power supply. A second power supply slot is supported for redundancy. Redundant power supply shall be ordered separately.
OS6900-X40-F	10Gigabit Ethernet L2/L3 fixed configuration chassis in a 1U form factor with 40 SFP+ ports, two optional module slots. The chassis includes a 450W AC power supply. A second power supply slot is supported for redundancy. Redundant power supply shall be ordered separately.
OS6900-X40D-F	10Gigabit Ethernet L2/L3 fixed configuration chassis in a 1U form factor with 40 SFP+ ports, two optional module slots. The chassis includes a 450W DC power supply. A second power supply slot is supported for redundancy. Redundant power supply shall be ordered separately.
OS-XNI-U12	10Gigabit Ethernet Optional Module for the OS6900 series of switches. Supports 12 SFP+ ports.
OS-XNI-U4	10Gigabit Ethernet Optional Module for the OS6900 series of switches. Supports 4 SFP+ ports.
OS-HNI-U12*	Optional Module for the OS6900 series of switches. Supports 2 QSFP+ ports and 4 SFP+ ports.
OS-QNI-U3*	40Gigabit Ethernet Optional Module for the OS6900 series of switches. Supports 3 QSFP+ ports.
BACKUP POWER SUPPLIES	
OS6900-BP-F	Modular AC backup power supply. Front to back cooling. Provides backup system power to one 6900 switch
OS6900-BPD-F	Modular DC backup power supply. Front to back cooling. Provides backup system power to one 6900 switch
OS6900-FT-F	OS6900 replacement fan tray; front to back cooling.
SOFTWARE	
OS6900-SW-AR	Advanced routing software license. Includes BGP, OSPF, PIM-SM, DVMRP, IPv6 stack, MC-LAG
GBE TRANSCEIVERS	
SFP-GIG-T	1000Base-T Gigabit Ethernet Transceiver (SFP MSA). SFP works at 1000 Mbit/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.
10GBE TRANSCEIVERS	
SFP-10G-SR	10 Gigabit optical transceiver (SFP+). Supports multimode fiber over 850nm wavelength (nominal) with an LC connector. Typical reach of 300m
SFP-10G-LR	10 Gigabit optical transceiver (SFP+). Supports monomode fiber over 1310nm wavelength (nominal) with an LC connector. Typical reach of 10Km
SFP-10G-ER	10 Gigabit optical transceiver (SFP+). Supports monomode fiber over 1550nm wavelength (nominal) with an LC connector. Typical reach of 40Km
SFP-10G-LRM	10 Gigabit optical transceiver (SFP+). Supports multimode fiber over 1310nm wavelength (nominal) with an LC connector. Typical reach of 220m on FDDI-grade (62.5µm)
SFP+ DIRECT ATTACHED CABLES	
SFP-10G-C1M	10 Gigabit direct attached copper cable (1m, SFP+)
SFP-10G-C3M	10 Gigabit direct attached copper cable (3m, SFP+)
SFP-10G-C7M	10 Gigabit direct attached copper cable (7m, SFP+)

## Service and Support

### Warranty

Limited lifetime hardware warranty: Limited to the original owner, and will be provided for up to 5 years after the product's End-of-Sales announcement.

\* roadmap item

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