ALCATEL-LUCENT OMNISWITCH 6400
STACKABLE GIGABIT LAN SWITCH FAMILY

The Alcatel-Lucent® OmniSwitch™ 6400 Stackable LAN Switch is a layer 2+ Gigabit Ethernet LAN switch addressing the small and medium-sized business needs for converged voice, data and video networks as well as residential and business Ethernet access service providers' requirements. With an optimized design for flexibility and scalability as well as low power consumption, the OmniSwitch 6400 runs the field-proven Alcatel-Lucent Operating Software (AOS), providing an outstanding edge solution for highly available, self-protective, easily managed and eco-friendly networks.

OS6400

OS6400-24

The OmniSwitch 6400 addresses the fixed managed LAN switch segment and expands the current enterprise portfolio, fitting between the Alcatel-Lucent OmniStack™ 6200 Stackable LAN Switch (layer 2 Fast Ethernet LAN switch) and the Alcatel-Lucent OmniSwitch 6850 Stackable LAN Switch (Advanced layer 3 Gigabit LAN switch with 10G interfaces) in terms of speed and software features.

Solutions that will benefit from these versatile LAN switches are:

- Small-to-medium business (SMB) converged networks
- Branch office workgroups
- Metro Ethernet access for residential/ metro triple-play applications

KEY FEATURES	KEY BENEFITS
Availability and performance: • Wire rate switching and routing performance • High availability with redundant stacking links, primary/secondary unit failover, hot swappable power options and configuration rollback	• Always-on robust infrastructure, optimal response time for users and applications, investment protection
Security and quality of service • Auto-sensing network access control through Access Guardian framework (802.1X, MAC, rules) • Advanced quality of service (QoS) and access control lists (ACLs) for traffic control • Automated containment and quarantine with Alcatel Quarantine Manager	• Edge network security and control allowing business continuity and preventing network outages
Unmatched flexibility and simplified manageability: • Choice of 24 ports, 48 ports power over Ethernet (PoE) or non-PoE, and fiber models. • Scalable from 24 to 384 ports via high speed stacking • AOS management through web interface (Webview) • Supported by Alcatel-Lucent 2500/2700 Network Management System (NMS) and 5620 Service Aware Manager (SAM)* applications.	• Scalable and versatile configuration with effortless deployment meeting SMB, branch office or service providers preferences

* Contact for availability

IPv6 READY

ACCESS GUARDIAN

AQM

MEF METRO ETHERNET FORUM

ALCATEL-LUCENT OMNISWITCH 6400 FAMILY

The Alcatel-Lucent OmniSwitch 6400 Stackable LAN switch family offers a variety of PoE, non-PoE Gigabit and fiber models.

All models in the Alcatel-Lucent OmniSwitch 6400 family are stackable, fixed configuration chassis in a 1U form factor. They can be optionally equipped with Alcatel-Lucent approved pluggable SFP transceivers supporting short, long and very long distances.

Table 1 indicates the OmniSwitch 6400 models available.

CHASSIS	10/100/1000 OR GIGABIT	1 GIG COMBO PORTS	10 GIG STACKING PORTS	POWER SUPPLIES SUPPORTED	BACKUP POWER SUPPLIES SUPPORTED
Non-PoE Models					
OS6400-24	20 10/100/1000	4	2	Internal AC supply	External AC or DC
OS6400-48	44 10/100/1000	4	2	Internal AC supply	External AC or DC
OS6400-U24	22 Gig SFP **	2	2	Internal AC supply	External AC or DC
OS6400-U24D	22 Gig SFP **	2	2	Internal DC supply	External AC or DC
PoE Models					
OS6400-P24	20 10/100/1000	4	2	360 W AC or 510 W AC	360 W AC or 510 W AC
OS6400-P48	44 10/100/1000	4	2	360 W AC or 510 W AC	360 W AC or 510 W AC

* Combo ports are ports individually configurable to be 10/100/1000Base-T or 1000Base-X that can support SFP transceivers for short, long and very long distances.
** Gigabit fiber interfaces support Gigabit SFP or 100BaseX SFP optical transceivers.

COMPLIANCY

Alcatel-Lucent has been a leader in terms of compliance with various "green" initiatives including:

- RoHS – The Alcatel-Lucent OmniSwitch family was among the first to be in compliance with the European Community's directive – Restriction on Hazardous Substances in Electrical and Electronic Equipment
- WEEE – Waste Electrical and Electronic Equipment

PRODUCT SPECIFICATIONS

Features

Performance

Interfaces and speeds

- 24 and 48 ports 10/100/1000, 24 ports 100/1000BaseX
- Wire rate at layer 2 and layer 3 on all ports
- Two built-in 10 Gbps full-duplex stacking ports
- OS6400-24, -P24, -48, -P48 support four Gigabit Ethernet (GigE) SFP combo ports
- OS6400-U24, -U24D support two GigE SFP combo ports
- PoE: IEEE 802.3af supported on "P" PoE models (15.4 W per port)
- Switching capacity:
  - ¬ 24 port: 96 Gbps
  - ¬ 48 port: 192 Gbps
- Switching throughput:
  - ¬ 24 port: 35.7 Mpps
  - ¬ 48 port: 71.4 Mpps
- Stacking capacity:
  - ¬ 2x10 Gig full duplex
  - ¬ 29.8 Mpps
- Jumbo Frame size: 9216 bytes

QoS

- Priority queues: eight hardware-based queues per port
- Traffic prioritization: Flow-based QoS with internal and external (a.k.a., re-marking) prioritization
- Bandwidth management: flow-based bandwidth management, ingress policing shaping and port-based egress shaping
- Queue management: Random Early Detect/ Discard (RED), configurable de-queuing algorithm; Strict Priority, Weighted and Deficit Round Robin
- 1000 ACL policy rules
- Layer 2 to layer 4 classifications

High availability

System

- Two built-in stacking ports to provide fault-tolerant looped stacking configurations
- Redundant 1:1 power provided by the OS6400-BPS
- Dual image and dual configuration file storage provides backup

Layer 2 switching

- Up to 16,000 MACs
- Up to 4000 VLANs
- Ring Rapid Spanning Tree Protocol (RRSTP) optimized for ring topology to provide less than 100 ms convergence time
- 802.1s Multiple Spanning Tree Protocol for loop free topology and link redundancy
- 802.1w Rapid Reconfiguration of Spanning Tree allows sub second failover to redundant link
- Alcatel-Lucent per-VLAN spanning tree (1x1)
- 802.1D Spanning Tree Protocol for loop free topology and link redundancy
- Static and 802.3ad dynamic link aggregation that supports automatic configuration of link aggregates with other switches

Layer 3 switching

- Static routing IPv4 and IPv6
- RIP v1 & v2 for IPv4, RIPng for IPv6
- Up to 1000 IPv4/ 512 IPv6 static and RIP routes:
- Up to 128 IPv4 and 16 IPv6 interfaces

Multicast

- Internet Group Management Protocol (IGMP) v1/v2/v3 snooping to optimize multicast traffic
- Up to 1000 multicast groups

Network protocols

- TCP/IP stack
- Address Resolution Protocol (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

Simplified manageability

User interface

- Intuitive Alcatel-Lucent CLI with familiar interface, reducing training costs
- Extensive user manuals with examples
- Easy to use, point-and-click web-based element manager (WebView) with built-in help for easy configuration of new technology features
- Remote Telnet management or Secure Shell access using SSH
- File upload using Trivial File Transfer Protocol (TFTP) and FTP
- Human-readable ASCII-based config files for off-line editing and bulk configuration
- BootP/DHCP client allows auto configuration of switch IP information to simplify deployment
- Auto-negotiating 10/100/1000 ports automatically configure port speed and duplex setting
- Auto medium-dependent interface (MDI/MDIX) automatically configures transmit and receive signals to support straight-through and crossover cabling
- Simple Network Management Protocol (SNMP) v1/v2/v3
- Integration with SNMP manager Alcatel-Lucent OmniVista for network-wide management

Network monitoring and troubleshooting

- Supports RFC 2819 Remote Network Monitoring (RMON) group (1-Statistics, 2-History, 3-Alarm & 9-Events)
- Port-based mirroring for troubleshooting and lawful interception supports four sessions with multiple sources-to-one destination configuration
- Policy-based mirroring - allows selection of the type of traffic to mirror by using QoS policies
- Remote port mirroring
- Port monitoring feature that allows capture of Ethernet packets to a file, or for on-screen display to assist in troubleshooting
- Local (on the flash) and remote logging (Syslog)
- Unidirectional Link Detection (UDLD) for detecting one-way connections
- Dying Gasp support via SNMP and syslog messages
- Digital Diagnostic Monitoring (DDM): Real-time diagnostics of fiber connections for early detection of optical signal deterioration
- Link Monitoring: link flap detection and link error counts to identify bad connections and automatically make adjustments to use the links that are good
- Time Domain Reflectometry (TDR): used for locating break or other discontinuity in copper cables.

Network configuration

- 802.1AB – Link Layer Discovery Protocol with MED extensions
- Alcatel-Lucent Mapping Adjacency Protocol (AMAP) for building topology maps within OmniVista product family
- GARP VLAN Registration Protocol (GVRP) for 802.1Q-compliant VLAN pruning and dynamic VLAN creation
- Fast-forwarding mode on user ports to bypass 30-second delay for spanning tree
- Auto QoS for switch management traffic as well as traffic from Alcatel-Lucent IP phones
- Network Time Protocol (NTP) for network-wide time synchronization
- BOOTP/DHCP client with option 60 allows auto-configuration of the switch for simplified deployment
- DHCP v4/v6 relay to forward client requests to a DHCP server

Advanced security

Access control

- 802.1X multi-client, multi-VLAN support for per-client authentication and VLAN assignment
- 802.1X with group mobility
- 802.1X with MAC-based authentication, group mobility or "guest" VLAN support
- MAC-based authentication for non-802.1X host
- Authenticated VLAN that challenges users with username and password and supports dynamic VLAN access based on user
- Captive Portal – a new Access Guardian policy that uses embedded web portal for user authentication.*
- Public Key Infrastructure (PKI) authentication for SSH access
- Support for host integrity check* and remediation VLAN
- Learned Port Security (LPS) or MAC address lockdown allows only known devices to have network access preventing unauthorized network device access
- Support of Microsoft® Network Access Protection (NAP)*

Containment, monitoring and quarantine

- Support for Alcatel-Lucent OmniVista 2770 Quarantine Manager and quarantine VLAN
- ACLs to filter out unwanted traffic including denial of service attacks; flow-based filtering in hardware (Layer 1 to Layer 4)
- DHCP snooping, DHCP IP spoof protection
- Dynamic ARP protection and ARP poisoning detection
- Bridge Protocol Data Unit (BPDU) blocking – automatically shuts down switch ports being used as user ports if a spanning tree BPDU packet is seen. Prevents unauthorized spanning-tree-enabled attached bridges from operating
- sFlow v5 support to monitor and effectively control and manage the network usage

Secure management

- RADIUS and Lightweight Directory Access Protocol (LDAP) admin authentication prevents unauthorized switch management
- TACACS+ client allows for authentication, authorization and accounting with a remote TACACS+ server
- Secure Shell (SSH), Secure Socket Layer (SSL) for HTTPS access and SNMPv3 for encrypted remote management communication
- Secure file upload using Secure File Transfer Protocol (SFTP), or Secure Copy (SCP)
- Switch protocol security
  - ¬ MD5 for Routing Information Protocol (RIP) v2 and SNMPv3
  - ¬ SSH for secure CLI session with PKI support
  - ¬ SSL for secure HTTP session

Ethernet access services

- DHCP Option 82 – configurable relay agent information
- Q-in-Q (VLAN stacking)
- Ethernet OAM compliant with 802.1ag
- Alcatel-Lucent 5620 SAM support (5620 SAM release 6.1)
- Private VLAN feature
- IP Multicast VLAN (IPMVLAN)
- Ethernet services:
  - ¬ 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
- Customer provider edge (CPE) test head traffic generator and analyzer tool used in the metro Ethernet network to validate customer Service Level Agreements (SLA)
- TR-101 PPPoE Intermediate Agent allowing for the PPPoE network access method
- Private VLAN feature for user traffic segregation

- DHCP Option 82: Configurable relay agent information
- IP Multicast VLAN (IPMVLAN) for optimized multicast replication at the edge saving network core resources
- MEF 9 and 14 certified
- UDLD protection
- Up to 16,000 MAC address learning
- Up to 2000 QOS policy rules
- Up to 1000 ACL policy rules
- Up to 4096 VLANs per switch

Power supplies and power consumption

- Supports redundant hot-swappable power supplies
- AC supplies: 90 V to 220 V AC
- DC supplies: 36 V to 72 V DC

Non-PoE models

- Uses internal main power supplies and external backup power supplies directly connected to the rear of the unit or remotely mounted
- Backup power supplies use a power shelf to hold one 6400-BP (AC) or one 6400-BP-D (DC) supply

PoE models

- 360-W (AC) and 510-W (AC) power supplies only used with PoE models
- Power shelf holds one 510-W AC, or two 360-W AC power supplies
- Dynamic power for PoE with 360-W power supply: 240 W
- Dynamic power for PoE with 510-W power supply: 390 W

* NAP will be supported when available
** Contact for availability

Specifications

Indicators

Per-port LEDs

- 10/100/1000: PoE, link/activity
- SFP: link/activity
- Stacking: link/activity

System LEDs

- Switch ID (indicates the stack ID of the unit in the stack: 1 to 8)
- System (OK) (chassis HW/SW status)
- PWR (primary power supply status)
- PRI (virtual chassis primary)
- BPS (backup power status)

Physical dimensions (WxDxH)

Chassis size (without mounting brackets)

24-port non-PoE and fiber with internal power supply

- Height: 1.73 in. (4.4 cm)
- Width: 17.32 in. (44.0 cm)
- Depth: 10.63 in. (27.0 cm)

48-port non-PoE with internal power supply

- Height: 1.73 in. (4.4 cm)
- Width: 17.32 in. (44.0 cm)
- Depth: 13.0 in.(33.0 cm)

24-port PoE without power shelf

- Height: 1.73 in. (4.4 cm)
- Width: 17.32 in. (44.0 cm)
- Depth: 10.63 in. (27.0 cm)

48-port PoE without power shelf

- Height: 1.73 in. (4.4 cm)
- Width: 17.32 in.(44.0 cm)
- Depth: 10.63 in. (27.0 cm)

Total sizes including power supply shelf for PoE and backup supply

- 17.32 x 17.56 x 1.73 in (44.0 x 44.6 x 4.4 cm) for 10.63 inch chassis
- 17.32 x 19.93 x 1.73 in (44.0 x 50.6 x 4.4 cm) for 13.00 inch chassis

Note: All chassis are 19" (48.2 cm) wide with mounting brackets installed

Weight

Chassis

Non-PoE with internal supply

- OS6400-24 9.43 lbs (4.28 kg)
- OS6400-48 11.97 lbs (5.43 kg)
- OS6400-U24 9.76 lbs (4.43 kg)
- OS6400-U24D 9.23 lbs (4.189 kg)

PoE without internal power supply

- OS6400-P24 8.97 lb (4.07 kg)
- OS6400-P48 9.92 lb (4.50 kg)

Power supplies

- OS6400-BP 126W AC: 2.45 lb (1.11 kg)
- OS6400-BP-D 120W DC: 2.09 lb (0.95 kg)
- OS6400-BP-P 360W AC: 3.22 lb (1.46 kg)
- OS6400-BP-PH 510W AC: 5.71 lb (2.59 kg)
- Power shelf: 1.26 lb (0.57 kg)

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 marking for European countries (Class A Note: Class A with UTP cables)
- EN 55022: 1995 (Emission Standard)
- EN 61000-3-3: 1995
- EN 61000-3-2: 2000
- EN 55024: 1998 (Immunity Standards)
- EN 61000-4-2: 1995+A1: 1998
- EN 61000-4-3: 1996+A1: 1998
- EN 61000-4-4: 1995
- EN 61000-4-5: 1995
- EN 61000-4-6: 1996
- EN 61000-4-8: 1994
- EN 61000-4-11: 1994
- IEEE 802.3: Hi-Pot Test (2250 VDC on all Ethernet ports)

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
- NOM-019 SCFI, Mexico
- AS/NZ TS-001 and 60950:2000, Australia
- UL-AR, Argentina
- UL-GS Mark, Germany
- EN 60825-1 Laser, EN60825-2 Laser
- CDRH Laser
- China CCC

Environmental requirements

Operating temperature:

- 32° to 113°F (0° to 45°C)

Storage temperature:

- -40° to 167°F (-40° to 75°C)

Humidity (operating and storage):

- 5% to 95% non-condensing

IEEE standards

- IEEE 802.1D (STP)
- IEEE 802.1p (CoS)
- IEEE 802.1Q (VLANs)
- IEEE 802.1ad 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 (10BaseT)
- IEEE 802.3u (Fast Ethernet)
- IEEE 802.3x (Flow Control)
- IEEE 802.3z (Gigabit Ethernet)
- IEEE 802.3ab (1000BaseT)
- IEEE 802.3ac (VLAN Tagging)
- IEEE 802.3ad (Link Aggregation)
- IEEE 802.3af (Power-over-Ethernet)

IETF standards

IPV4

- RFC 2003 IP/IP tunneling
- RFC 2784 GRE tunneling

RIP

- RFC 1058 RIP v1
- RFC 1722/1723/2453/1724 RIP v2 & MIB
- RFC 1812/2644 IPv4 Router Requirement
- RFC 2080 RIPng

IP Multicast

- RFC 1112 IGMP v1
- RFC 2236/2933 IGMP v2 & MIB
- RFC 2365 Multicast
- RFC 3376 IGMPv3

IPV6

- RFC 1886 DNS for IPv6
- RFC 2292/2373/2374/2460/2462 IPv6
- RFC 2461 NDP
- RFC 2463/2466 ICMP v6 & MIB
- RFC 2452/2454 IPv6 TCP/UDP MIB
- RFC 2464/2553/2893/3493/3513 IPv6
- RFC 3056 IPv6 Tunneling
- RFC 3542/3587 IPv6

Manageability

- RFC 854/855 Telnet & Telnet options
- RFC 1155/2578-2580 SMI v1 & SMI v2
- RFC 1157/2271 SNMP
- RFC 1212/2737 MIB & 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 & HTML
- RFC 2667 IP Tunneling MIB
- RFC 2668/3636 IEEE 802.3 MAU MIB
- RFC 2674 VLAN MIB
- RFC 4251 Secure Shell Protocol architecture
- RFC 4252 The Secure Shell (SSH) Authentication Protocol

Security

- RFC 959/2640 FTP
- RFC 1321 MD5
- RFC 2104 HMAC Message Authentication
- RFC 2138/2865/2868/3575/2618 RADIUS Authentication & Client MIB
- RFC 2139/2866/2867/2620 RADIUS Accounting & Client MIB
- RFC 2228 step
- RFC 2284 PPP EAP
- RFC 2869/2869bis RADIUS Extension

Quality of Service

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

Others

- RFC 791/894/1024/1349 IP & IP / Ethernet
- RFC 792 ICMP
- RFC 768 UDP
- RFC 793/1156 TCP/IP & MIB
- RFC 826/903 ARP & 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 & Simple NTP
- RFC 1493 Bridge MIB
- RFC 1518/1519 CIDR
- RFC 1541/1542/2131/3396/3442 DHCP
- RFC 1757/2819 RMON & MIB
- RFC 2131/3046//3315/4649/6221 DHCP/BootP Relay
- RFC 2132 DHCP Options
- RFC 2251 LDAP v3
- RFC 3060 Policy Core
- RFC 3176 sFlow
- RFC 3021 Using 31-bit prefixes

PRODUCT	MTBF (HOURS)	POWER CONSUMPTION	HEAT DISSIPATION UNDER FULL LOAD (BTU/HOUR)	ACOUSTIC LEVEL (Db(A))**
Non-PoE Models				
OS6400-24	187,933	52	180	under 40 dB(A)
OS6400-48	162,844	79	351	under 40 dB(A)
OS6400-U24	189,983	80	272	under 40 dB(A)
OS6400-U24D	424,657	80	272	under 40 dB(A)
PoE Models* **				
OS6400-P24	149,166	69	235	under 44 dB(A)
OS6400-P48	158,837	103	351	under 44 dB(A)

* Power consumption measured under fully loaded traffic conditions
** Acoustic levels measured with a single power supply at room temperature
***Power consumption of the OS6400 PoE models tested under fully loaded traffic conditions using a 360W PoE supply.

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