

Alcatel-Lucent 7330 ISAM FTTN

INTELLIGENT SERVICES ACCESS MANAGER FIBER-TO-THE-NODE | RELEASE 3.3 (ETSI)

The Alcatel-Lucent 7330 Intelligent Services Access Manager (ISAM) FTTN (Fiber-to-the-Node) is a compact (19 in.) full-service IP access node for cabinets and small central offices, designed to deliver a superior triple-play experience to all subscribers. It is capable of providing Very High Speed broadband services over copper (VDSL2/Multi-DSL) and fiber (Active Ethernet).

The Alcatel-Lucent 7330 ISAM FTTN is a flexible, high-density shelf, supporting 10 slots for DSL, P2P fiber, splitter, and voice line cards, and serving up to 480 subscribers. It can be extended with up to twelve 24-port VDSL2 Remote Expansion Modules. The Alcatel-Lucent 7330 ISAM FTTN offers multi-service support, including unsurpassed video quality, voice services with PSTN feature parity, business services, and mobile backhauling. The Alcatel-Lucent 7330 ISAM FTTN is a carrier-grade access platform, "5-nines" compliant and industrial hardened for outdoor deployments. It supports Dynamic Line Management to maximize DSL line stability, and offers comprehensive DSL line diagnostics capabilities, enabling fast and cost-efficient triple-play network operations.

FEATURES

- Non-blocking architecture with distributed processing
- Compact 19inch access node with 10 slots for a mix of LTs, voice cards, and splitters
- New line cards, including 48p VDSL2 (8/12/17 profiles and ADSL/ADSL2+ backwards compatibility) and 16p Active Ethernet
- Integrated VoIP Access Gateway on ISAM with the ISAM Voice Package
- High-stability clock and clock synchronization support with BITS and NTR
- NT, link, and voice gateway redundancy
- Extensive Dynamic Line Management and Line Diagnostics capabilities
- 2.5 Gbit backplane with front cabling for LTs

BENEFITS

- Very High Speed Broadband deployments for triple-play services over DSL and fiber
- Flexible, high-density multi-service deployments from cabinets and small COs
- Unsurpassed IPTV service offering
- Cost-effective voice modernization offering PSTN feature parity
- Optimal support for clock-sensitive services: leased lines, mobile backhauling, voice
- Carrier-grade high-availability, "5-nines" compliant
- Efficient and scalable access network management and operations
- Future-proof design; same shelf can host future higher density line cards



Full-Service Platform

- Multiservice access support
 - 48-port VDSL2 (very high speed DSL2) LT card for POTS and ISDN
 - 48-port multi-ADSL line cards: ADSL, ADSL2, ADSL2plus, reach extended ADSL2 (READSL2)
 - 24-port SHDSL LT cards
 - 48-port POTS LT cards
 - 24-port ISDN LT cards
- Network connectivity
 - Up to eight electrical or optical Gigabit/Fast Ethernet uplinks; ECNT-A: 7GE/FE, ECNT-C: 3GE + 5GE/FE
 - 4,095 VLAN IDs, VLAN stacking (Q in Q), 16,000 MAC addresses
 - Rapid spanning tree protocol support
 - 802.3ad trunking (link aggregation control protocol [LACP])
 - Ethernet ring connectivity
 - PPP connectivity to single or multiple systems
 - Optical connection through small form-factor pluggable (SFP) standards
 - Uplink redundancy
 - Network termination (NT) redundancy
 - ISAM Voice Packet Server (IVPS) 1+1 redundancy
 - Routing information protocol (RIP) version 2 and open shortest path first (OSPF) support for IP routing
- Service intelligence
 - Multicast, high-performance, distributed multistage IGMP processing, IGMP proxy, immediate leave
 - IP-aware bridging
 - Protocol-aware cross-connect
 - IP and MAC anti-spoofing
 - Malicious MAC-move protection
 - Protocol-based VLAN selection
 - IP QoS
 - IP operations, administration and maintenance (OAM)
 - Intelligent bridging with protocol handling
 - VLAN cross-connect forwarding
 - VLAN stacking for residential and business access
 - Protocol-based VLAN selection
 - DHCP relay with option 82
 - Ethernet 802.1x authentication
- PPP line identification: PPP relay
- Virtual broadband access server (VBAS) authentication
- PPP termination
- PPP over ATM (PPPoA) to PPP over Ethernet (PPPoE) translation with auto-detect
- Support for central broadband remote access server (BRAS) and distributed service-edge models
- Billing and accounting support
- Up to eight permanent virtual circuits (PVCs) per line
- Network processor-based line cards
- H.248 (Megaco) for voice traffic signaling
- Hubbing support
 - Up to 16,000 subscribers per system
 - Up to 5,000 subscribers per IVPS
 - Subtending Alcatel-Lucent 7330 ISAM FTTN
 - Subtending Alcatel-Lucent 7330 ISAM FTTN REMs
 - Subtending RUs:
 - Alcatel-Lucent 7324 RU
 - Alcatel-Lucent 7300 ASAM compact unit (ASAM-c)
 - Alcatel-Lucent 7300 -ASAM outdoor cabinet (ASAM-o-c)
 - Subtending other ISAMs and ASAMs via standard FE/GigE connections
- Multimedia service
 - Video multicast (near VoD, broadcast TV)
 - Internet multicast (PC-oriented multicast)
 - Interactive real-time video conference, voice over IP (VoIP), gaming
 - Video on demand (VoD)
 - Applications
 - Instant zapping (<200ms)
 - Picture-in-Picture (PiP)
 - Multi-Angle
 - Mosaic
 - Pay-per-View with preview mode
 - Management & Operations:
 - Service profiles (access to channel packages, bandwidth)
 - Call data records (CDR) track viewing behaviour
 - Call admission control for guaranteed QoE
 - Channel package management
- Voice
 - VoIP support (PSTN and ISDN line termination on ISAM) with ISAM voice package
 - Support of Telephony Supplementary Services:
 - Hold for inquiry and Call Hold
 - Call Waiting
 - Call Forwarding
 - Explicit Call Transfer
 - POTS splitters (DSL)
 - ISDN splitters (DSL)
- FE 100Base-FX optical SFP module with 29 dB optical link budget (40 km)
- GigE 1000Base-SX SFP LC full duplex 850 nm (500 m)
- GigE 1000Base-LX SFP LC full duplex 1,310 nm (10 km)
- GigE 1000Base-EX SFP LC full duplex 1,310 nm (40 km)
- GigE 1000Base-ZX SFP LC full duplex 1,550 nm (80 km)
- GigE, coarse wavelength division multiplexing (CWDM) SFP
- Electrical interfaces
 - FE 100Base-TX RJ-45 10/100 full duplex and adaptive duplex
 - GigE 1000Base-T RJ-45 full duplex
- Ethernet-uplink capabilities
 - Fully compliant with standards-based Ethernet equipment according to IEEE 802.3 (optical and electrical)
 - VLAN according to IEEE 802.1q
 - VLAN bridging/cross-connect
 - ISP and other service identification based on VLAN

Network Services

- High-speed Internet access (HSIA)
 - Cross-connect access model
 - PPPoE access based on intelligent bridging
 - PPPoA to PPPoE translation
 - PPPoE termination
 - IP over Ethernet (IPoE) and IP over ATM (IPoA) access model
- Business access
 - PPP-VPN service to one remote LAN (cross-connect); support for any Layer 3 protocol (e.g., IP, Internet protocol exchange [IPX], Appletalk)
 - Point-to-multipoint VPN service to one remote LAN (port-based VLAN)
 - Transparent VLAN service to virtual private LAN service (VPLS)/virtual leased line (VLL) aggregation

Network Interfaces

- First-mile interfaces
 - 24 ports with VDSL Ethernet-in-the-first-mile (EFM) line card, POTS and ISDN (ETSI)
 - 48 ports with multi-ADSL line cards, POTS and ISDN
 - ADSL2plus (G.selt)
 - ADSL2plus Annex M
 - ADSL2plus chip-level bonding, configurable INP
 - 24-port SHDSL LT cards
 - 48-port POTS cards
 - 24-port ISDN cards
- Optical interfaces
 - FE 100Base-FX multimode and single mode, full duplex

Packet Processing

- ATM over DSL connection
 - ATM adaptation Layer 5 (AAL-5) support
 - Logical link control (LLC)/subnetwork access protocol (SNAP) bridged (RFC 2684)
 - RFC 2684-rt
 - PPPoA encapsulation
- Auto configuration on DSL connection
 - Access Layer 1 signaling (DSL overhead) with embedded operations channel (CPE type and serial number)
- Layer 2 intelligent bridge mode
 - Up to 128 instances
 - PVC bridging with port-based VLAN
 - Broadcast storm control
 - MAC anti-spoofing
 - Port-based VLAN tagging mode (frames from DSL port without any VLAN tag)
 - MAC address learning and configuration
- IP-aware bridge mode
 - Up to 128 instances
 - MAC concentration

- IP-based service and VLAN selection
- Layer 3 QoS
- IP and MAC anti-spoofing
- Malicious MAC move protection
- Address resolution protocol (ARP) proxy
- IPoE and IPoA encapsulation support
- Layer 2 cross-connect mode
 - PVC-to-VLAN mapping
 - Port-based VLAN tagging mode (frames from DSL port without any VLAN tag)
 - VLAN stacking
- DHCP handling
 - DHCP relay (compliant with RFC 2131)
 - Option 82 support (RFC 3046)
 - Configurable option 82
 - Support of MAC unicast DHCP offer
 - Support of broadcast DHCP offer
 - VLAN-based DHCP server selection
 - DSL subscriber linerate info in DHCP
- IP routing
 - RIP and OSPF
 - RIPv2 toward the subscriber
- PPPoE termination
 - Authentication: both local and via remote authentication dial-in user service (RADIUS)
 - Redundant RADIUS server support
 - Dynamic IP-address assignment (local pool or RADIUS based)
 - Password authentication protocol (PAP) and challenge handshake authentication protocol (CHAP) support for user authentication
 - Billing and accounting support
 - User-traffic shaping per PPP session
 - DSL subscriber linerate info in PPPoE
- Multicast handling
 - Static and dynamic multicast root
 - Cross-VLAN multicast
 - IGMPv2
 - Multicast connection admission control (CAC):
 - controls number of streams and available bandwidth on user line
 - Immediate leave
 - controls selected multicast IP addresses against subscriber profile

- IGMP proxy:
 - 200-ms maximum zapping delay
 - 5 zaps/s per subscriber
 - 1,024 simultaneous channels
- Security
 - Upstream filtering: block control protocols from the user side
 - pause frame
 - spanning tree protocol (STP) (802.1q, 802.1w)
 - GARP multicast registration protocol (GMRP) (802.1d)
 - generic attribute registration protocol (GARP) (802.1d)
 - link aggregation control protocol (LACP) (802.3ad)
 - MAC address filtering
 - IP anti-spoofing
 - MAC anti-spoofing
 - Configurable maximum number of MAC addresses per PVC (up to 64)
 - Configurable MAC address filters
 - VBAS protocol for line identification
 - System security logs for all management interfaces
 - Alarm for uplink removal or breakdown

Layer 2 Ethernet Protocol Handling

- 802.1q support
- Auto-detection of half/full duplex for electrical interfaces
- Auto-detection of line speed for electrical FE/GigE
- 802.1p support for QoS
- 802.3ad link aggregation (trunking)
- 802.3x duplex flow control:
- back pressure half-duplex flow-control support on reception
- 802.1d spanning tree support
- 802.1w rapid spanning tree per trunk port

Voice Signaling and Call Control

- Megaco (RFC 3525)/H.248.1 (Version 2)
- Real-time transport protocol (RTP) and real time conferencing protocol (RTCP) (RFC 1889)
- RTP profile for audio (RFC 1890)
- RTP payload for dual-tone multifrequency (DTMF) digits, tones and signals (RFC 2833)
- ISDN user adaptation (IUA) (RFC 3057)
- Stream control transmission protocol (SCTP) (RFC 2960)

Voice Call Processing Features

- Media stream processing
 - G.711 (A- and Mu-law, with Appendix I, packet loss concealment [PLC])
 - G.729A/B
 - G.723.1 (5.3 kb/s and 6.3 kb/s)
- Signal processing
 - comfort noise generation
 - PLC
 - silence suppression
 - echo cancellation (G.168-2000 and G.165, 16-ms tail length)
- Silence suppression
 - G.711 Appendix II
 - G.729 Annex B
 - G.723.1 Annex A
- Jitter buffer
 - fixed value or adaptive to network conditions
 - dynamically configurable thresholds per call (0 ms to 200 ms)
- Frame size selected per call (5 ms, 10 ms, 20 ms or 30 ms) depending on CODEC
- Caller identification services
 - ETSI EN 300 659-1 (on hook)
 - ETSI EN 300 659-2 (off hook)
 - Telcordia GR-30 LSSGR Voiceband Data Transmission Interface, Section 6.6
- Digit collection
 - dual tone multifrequency (DTMF) and pulsed digits
 - flexible digit map configuration
- Call progress tones easily adapted to national specifications
- Fax and modem services
 - automatic fax/modem detection and activation of voice band data (transparent) mode
 - real-time fax over IP (T.38)

Quality of Service

- Per-subscriber, per-service queuing, scheduling, marking and policing
- IP-based traffic filtering via access control lists (Layer 2, 3 and/or 4)
- IP DiffServ Code Point (DFCP) marking
- IP flow-based ingress and egress policing
- IP type of service (ToS)
- Session profile support with RADIUS interface
- Upstream and downstream DSL traffic rate limiting
- Upstream and downstream policing per PVC

- Intelligent traffic handling per DSL port and traffic aggregate for:
 - VoIP
 - VoD and broadcast video
 - HSIA or best-effort mode
 - control management traffic on network level
- DSL connection upstream traffic handling per DSL:
 - Priority bit (p-bit) marking configurable per PVC or VLAN in upstream
 - DSCP marking
 - DSCP onto p-bit mapping
 - prioritization of voice and video traffic over HSIA traffic
 - configure eight priorities mapped to four queues
- DSL connection downstream QoS per DSL
 - prioritization of traffic (real-time and critical traffic over best-effort traffic)
 - scheduling techniques on packet level
- Ethernet uplink and hubbing traffic handling per interface:
 - classification and queue mapping based on p-bits
 - strict priority (SP) scheduling for delay-sensitive remote terminal (RT) traffic
 - weighted fair queuing (WFQ) scheduling
 - head-of-line (HOL) blocking prevention
- Fair share of resources between different DSL service subscribers
- Ethernet uplink downstream and upstream traffic shaping per interface:
 - 1 Mb/s bandwidth granularity
 - dynamic modification of parameters

Management

- Fully managed by the Alcatel-Lucent 5523 ADSL Work Station (AWS)/5526 Access Management System (AMS) via SNMP
- Cluster management
- Out-of-band management-ready via FE/GigE RJ-45 full-duplex auto-sense
- In-band management
- Full command line interface (CLI) support
- Full TL1 support
- Secured SNMPv3, secured shell (SSH), SFTP, RADIUS access
- Common management with Alcatel-Lucent 5523 AWS Element Manager
- Remote customer premises equipment (CPE) management

Deployment

- Power Spectrum Density (PSD) shaping, Downstream Power Back-Off (DPBO)
- Upstream PBO (UPBO)
- VDSL2 Virtual Noise
- Single-Ended Line Testing (SELT)
 - Dual-Ended Line Testing (DELT)

Standards Compliance

- ETS 300 019-1-1 storage – Class 1.1 weather-protected, partly temperature-controlled locations
- ETS 300 019-1-2 transport – Class 2.3 public transportation
- ETS 300 019-1-3 stationary use – Class 3.1E temperature-controlled locations
- Protection: ITU-T K.20E
- Safety: IEC 60950/EN60950 Class 1
- TNV-3 splitter and LT interfaces
- TNV-2 DC feeding
- ETS 300 386 V1.3.2 (2003-05) for telecommunications center installation environment
 - low pass filter (LPF):
 - outdoor DSL signal lines: table 2
 - indoor signal lines (narrow-band [NB] switch): table 3
 - LT: table 2 for outdoor signal lines
- DC feeding: table 5 for DC power ports
- Hot insertion and removal of boards
- European directive 2002/95/EC on the restriction of the use of certain hazardous substances (RoHS)

Power

- 48/60 V DC nominal
- Fully redundant power feeding (branch A and B)

EQUIPMENT PRACTICE	
Wire-speed line termination (LT) slots	8 to 10
Lines per shelf	480 splitter-less (48 ports x 10 slots)
	240 splitters
PHYSICAL SPECIFICATIONS	
	<i>Standard ETSI rack</i>
Height	355 mm
Width	445 mm
Depth	240 mm
NON-BLOCKING ARCHITECTURE	
Switching fabric	24 Gb/s
Backplane Capacity	2.5 Gb/s
Wire-speed packet processing	Yes
Guaranteed to each subscriber	20+Mb/s

www.alcatel-lucent.com

Alcatel, Lucent, Alcatel-Lucent and Alcatel-Lucent logo are trademarks of Alcatel-Lucent. All other trademarks are the property of their respective owners. The information presented is subject to change without notice. Alcatel-Lucent assumes no responsibility for inaccuracies contained herein. © 2007 Alcatel-Lucent. All rights reserved. 21727 (04)