



Atlas-6x/i6x

Much more than just a Router

“The Atlas-6x/i6x is, in the current concept of a router, both innovative and revolutionary. Innovative due to its depth of modularity and potency permitting you to locate it in practically any connectivity scenario regarding offices/branches regardless of size, integrating traditional elements such as switch, telephony and security. And revolutionary because the same device (without any additional electronics), includes a secure applications server based on standards. And the final touch is its cloud service for router management and applications.”

After more than 25 years of experience designing routers that correspond to our customer needs, Teldat has taken yet another step forward: to reinvent the concept of a router. The Atlas-6x/i6x combines power through versatility, an ideal answer for scenarios of 100Mbps and adaptable to complex scenarios when integrating communication elements that are usually crucial in branch offices such as switch, security, telephony, WiFi and mobile backup. The benefits are outstanding, firstly economically by combining the functions in a single device with the obvious saving in costs, maintenance and management, which are no longer necessary and secondly, security, reliability and user friendly management.

However, the Atlas-6x/i6x goes even further. It also permits the integration of other requirements where the remote offices are traditionally covered by dedicated servers such as advanced security, traffic acceleration, file server, Digital Signage, etc. The enormous advantage the Atlas-6x/i6x has over competitors is that it DOES NOT require additional hardware (obviously you can add a hard disk if you want), and this gives the Atlas-6x/i6x the competitive edge.

Additionally, the Atlas-6x/i6x is an innovative concept and due to this requires cutting edge management. In Teldat we know this and have worked to the limit, side by side with our most demanding clients to capture their needs and with them designed a tool for the cloud needed to integrately manage the communications and the applications.

After the Atlas-6x/i6x, routers will never be the same again.

Hardware Architecture and Interfaces

800MHz double core processor

2 x Gigabit Ethernet

8 x Fast Ethernet (expandable to 16 ports with PoE option in all of them)

3 x Slots for voice or data cards

1 x USB 2.0 port (3G, 4G)

1 x Internal slot WiFi 802.11 a/b/g/n @ double band 2,4 GHz and 5GHz

1 x Internal slot for WWAN modules (3G/4G)

1 x Internal slot for a hard disk (needed to execute applications)

KEY CHARACTERISTICS

State of the art in hardware and software

The Atlas-6x/i6x is in fact two devices in one. One part is a powerful modular router and the other a versatile applications server. This is due to its advanced hardware architecture with a double core processor where two different Operating Systems run; the CIT (Teldat's Internetworking Code which runs in all the Teldat routers) Operating System and the Linux Debian Operating System. Both Systems run simultaneously, parallel and asynchronous in each core as if they were two processors in two different machines without compromising either performance or stability.

Models with and without applications server

The activation of the applications core is optional. You only require a license and internal storage (hard disk, solid state disk or flash disk).

Devices without an applications core are known as **Atlas-6x (currently this is only the Atlas-60 model)**.

Devices with an applications core are known as **Atlas-i6x (Atlas-i60, Atlas-i61, ...)**.

- **"Router" characteristics:** The powerful processor allows the i60/i61 to exceed a 100Mbps switch throughput bidirectional sustained flow under normal operating conditions (IMIX with active services). The device additionally incorporates encryption hardware and surprising possibilities for LAN, WAN, WLAN and WWAN expansion.
- **"Server" characteristics:** Both independently and simultaneously to the routing core, the other core supports a standard S.O. Linux (Debian) over which any application can be executed. Communications from the S.O. Linux are carried out through a virtual driver connected with the router so behavior for the applications is exactly the same as a typical server with an Ethernet card.

Modularity

This is certainly another key aspect to the Atlas-6x/i6x; endowing it with a versatility as a communications device almost unequaled in price and quality, thus allowing it to expand from a minimum double connectivity Gigabit and an 8 port integrated switch to almost any configuration needed in a branch office, thanks to the 5 slot expansion possibilities.

Routing software orientated towards enterprises

The Atlas-6x/i6x uses CIT (Teldat's Internetworking Code) which runs in all the Teldat routers, and is widely regarded as a point of reference for professional routing and borne out by the hundreds of thousands of devices operating for clients and in the most demanding environments. The following are just a few of the outstanding characteristics:

- Enormous emphasis is placed on security, incorporating firewall features (Stateful firewall) and IPSec with all its variants (RC4, DES, 3DES, RSA, SHA-1, MD5 algorithms, digital certificates, DMVPN, GETVPN, etc...)
- Supports IP Telephony with Media Gateway features (MGCP, SIP, H323) and IP Telephony integrated server capable of managing up to 300 telephones with SIP, H323, Alcatel NOE or SCCP (Skinny) protocols.
- Quality of Service, with CBWFQ, LLQ and WRED algorithms supporting hierarchical system with 32 different traffic classes per interface, traffic marking and profiling as well as traffic preclassification contained in VPNs and integrating QoS with MPPP and fragmentation.
- Necessary routing protocols adapted to corporate networks and MPLS in general (RIP-2, BGP-4 and OSPF in addition to Policy Routing, routing activating based on polls, HSRP, VRRP, VRF, etc.)
- Management adapted to needs of carriers and large enterprises through powerful command lines (CLI), access controlled through RADIUS/TACACS+, SNMPv3, ample level of debugs and statistics, integrated analyzer compatible with ethereal/wireshark, etc., in addition to Teldat's own management platform (Colibri) for proactive management for a large pool of devices.

ATLAS-i6x AS AN APPLICATIONS SERVER

Simply active a license and include an internal storage system (internal slot dedicated for a hard disk, solid states disk or a flash disk) to activate the Linux in the second core where the applications are executed (when you activate the device license, the device now becomes the Atlas-i6x).

The applications core executes a Linux Debian over which any application developed for Linux can run, simply by adapting it in order to be managed from the management platform in the Teldat cloud (Colibri) and logically stacking it for the Atlas-i6x hardware platform. The adaptation to manage this from the service in the cloud is necessary given that an individualized management of the applications would be unmanageable (and not proactive) in scenarios with a high number of points, which is what the Atlas-i6x is designed for.

Teldat also places at the disposition of their users some Linux applications already adapted to the Atlas i6x such as the Cache web (Squid), flow analyzer (Ntop), OSSIM sensor, antivirus (ClamAV), antispam (SpamAssassin), URL filtering (SquidGuard), Video Proxy (reproducing video streams), Digital Signage and File Server repeated in the network (NAS).

Below you can see some scenarios showing the Atlas-i6x with its applications:

■ **Application example number 1: Acceleration through Proxy web cache (available).**

In scenarios where there is a heavy demand for web traffic, the local storing of pages and the rest of the cache contents provide a much quicker response for the user, at the same time as downloading the redundant traffic communications line. This scenario is particularly useful in those environments where simultaneous and/or periodical access to the same contents occurs; such as colleagues or company training/seminar rooms, and generally in those environments where there is heavy use of web browsing and/or where communication lines are limited.

In addition to speeding up web browsing, the web proxy cache integrated in the Atlas-i6x/i6x permits you to activate content filters at different layers (users, domains, URLs, expressions, etc.), and provide detailed information on the use of the connection in order to browse the web (sites visited, user statistics, etc.)

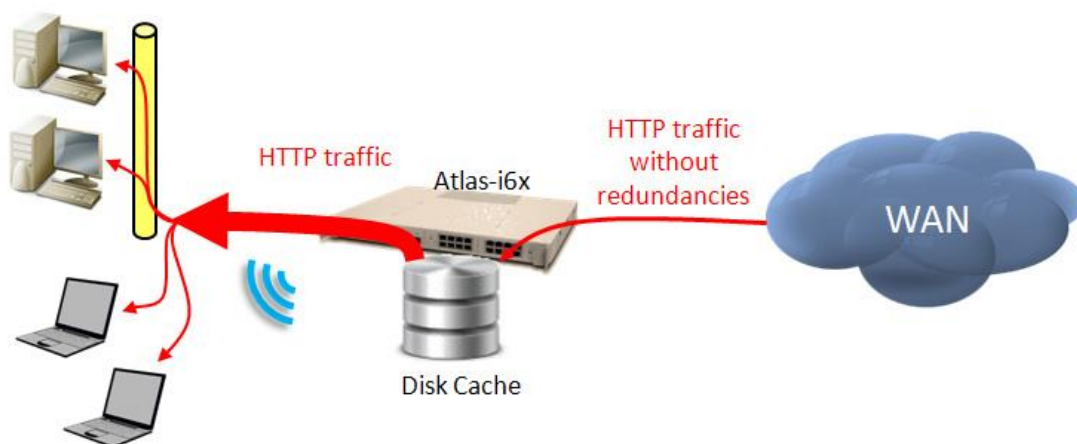


Illustration 1: Atlas-i6x/i6x with integrated web proxy cache

■ **Application example number 2: Acceleration through Videoproxy (available)**

Due to the lack of Multicast protocols in the MPLS networks and in the branch office infrastructure, the view of the same video by different users in the office imply the (repetitive) transmission in the WAN in as many video flows as users who are viewing, which makes this impractical to view the events in real time or synchronized in large networks. The Video Proxy application makes this possible thanks to the replication in the LAN from a single video flow received in the WAN thus drastically reducing the traffic in each branch office WAN line, in the central point and in the number of flows that the transmitter needs to support.

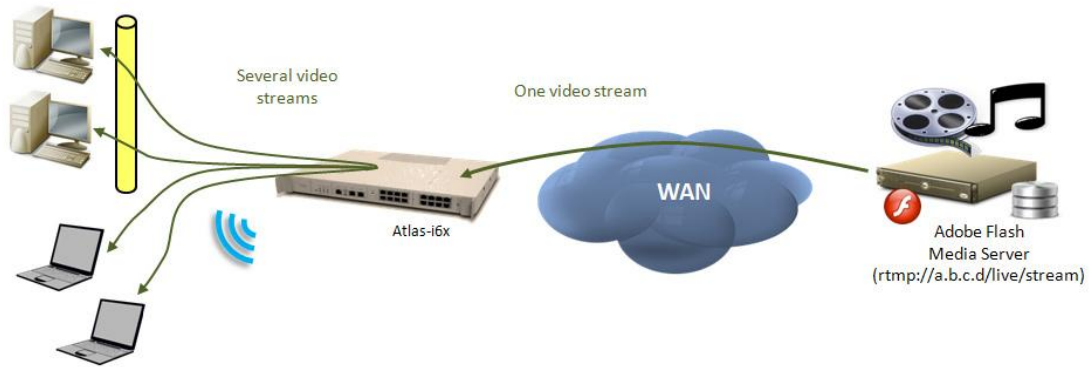


Illustration 2: Atlas-i6x with Video proxy application

■ **Application example number 3: Files and printer server (available)**

Maintaining dedicated servers to simply store contents or as a printer connection device (IP faxes, scanners, etc.) isn't economically worthwhile, as the process capacity or the user interface, which servers include, are wasted. In these scenarios the Atlas-i60/i61 provide a very simple solution and the integrated management that means you can dispense with the server as you are using in addition to providing a high performance environment where you can easily generate applications that provide added value in branches, e.g. automatic printing from a USB, document scanning with storage and transmission when the network has little traffic, etc.

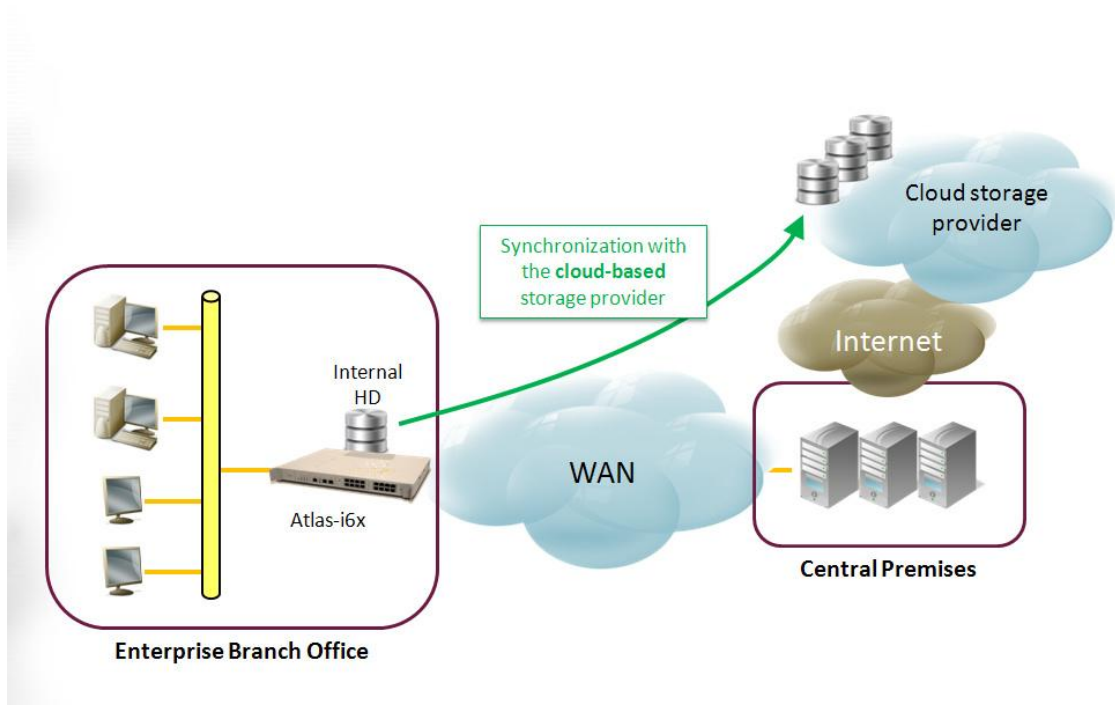


Illustration 3: Atlas-i6x with File Server application

■ **Application example number 4: Digital Signage / Virtual billboard (available)**

If you have an Atlas-i6x you do not need anything more than the TV screen in order to launch a Digital Signage / Virtual billboard solution in order to substitute your advertising posters for information on TV screens. It's really not necessary to enumerate the multiple advantages that this provides, both at a marketing level (more attractive to the user, the adaptation of messages to the potential public through dates/times, more content per time unit, etc.) as well as at an operating level (the speed at which the messages are deployed, simple management, paper saving and logistics, etc.).

Installation is as simple as connecting the TV screens (mass consumption as they already incorporate Ethernet/WiFi) to the branch office’s local network. The Atlas-i6x does the rest of the work and through the “Virtual Billboard” management, fully developed by Teldat, you only have to create the contents (using .jpg images which can be created from any information application such as Power Point) and program these in the selected screens.

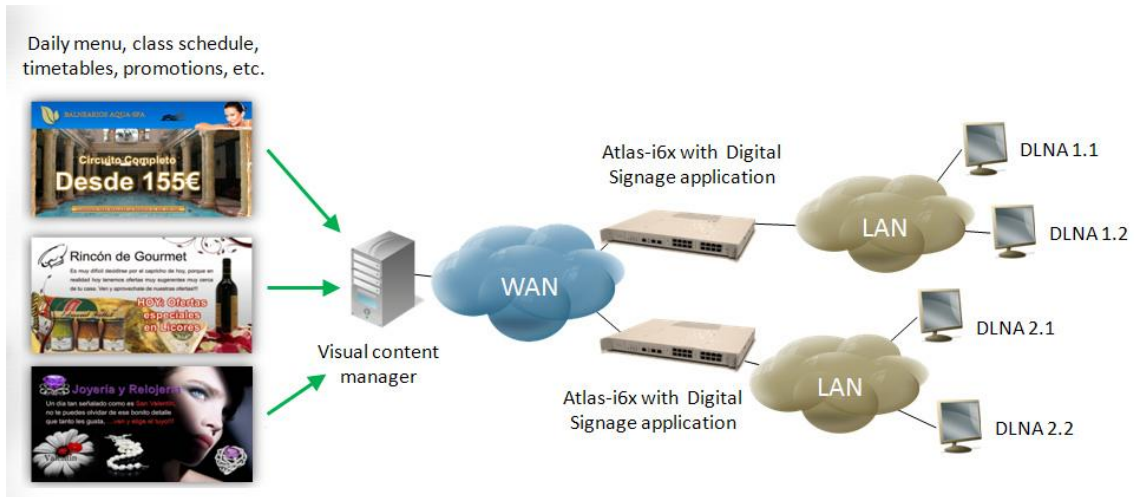


Illustration 4: Atlas-i6x with Virtual board application

■ **Application example number 5: Security (antivirus, antispam, URL filtering) (available)**

This has a security system in the office that permits you to distribute the processing load in many devices with respect to a centralized version in addition to being efficient against internal threats. The Atlas i6x is a perfect support for this given that all the traffic that reaches the office forcible via the device.

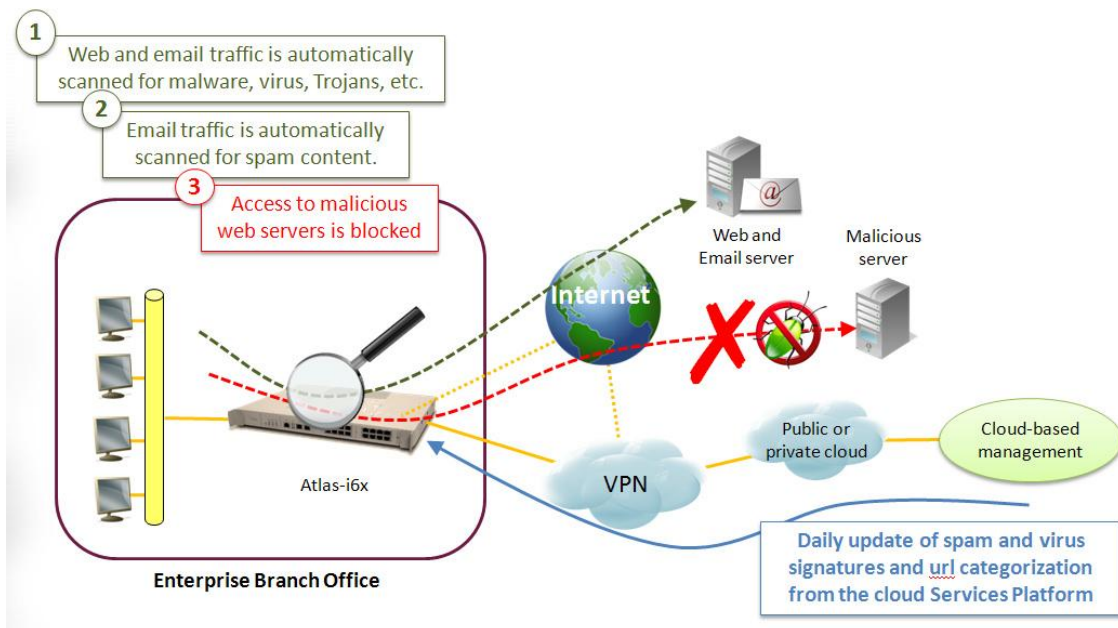


Illustration 5: Atlas-i6x with Security application

Application example number 6: Traffic characterization (available).

The knowledge of the traffic flows and the patterns of these in the network are vital to ensure correct router parameterization, which provide the necessary user experience for each application. The Atlas-i6x is a perfect ally for this given that it unites the office traffic (LAN+WiFi) sent to the WAN.

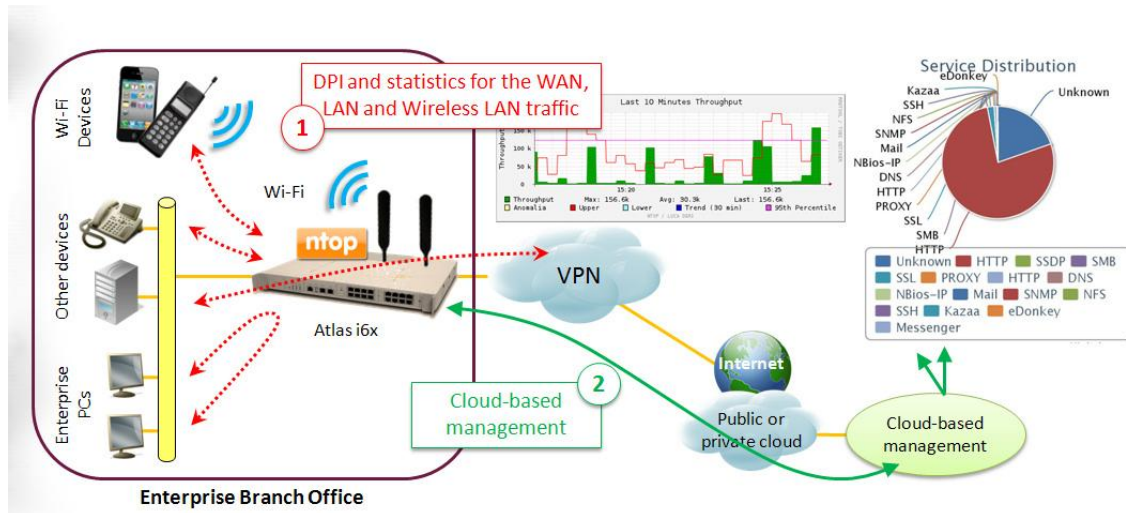


Illustration 6: Atlas-i6x with NTOP application

Application example number 7: Recording of IP telephone conversations.

The centralized solutions for recording telephone conversations in an extensive network not appropriately scaled, not only adds to the network load and the devices with unnecessary traffic: The Atlas-i6x permits you to locally and efficiently record the conversations without affecting the rest of the network. The recordings are stored in the device itself and downloaded out of work hours to a central point for security purposes and so the management for consulting the recordings is easier.

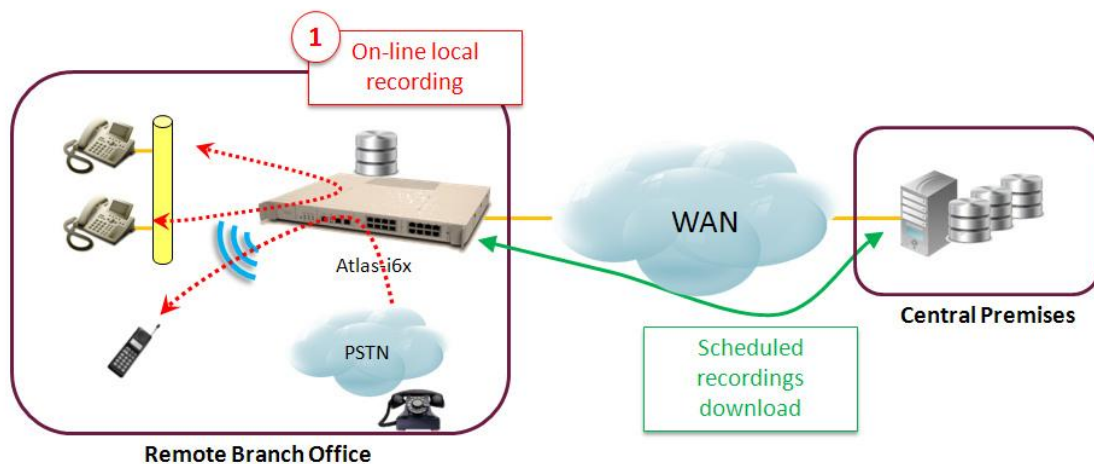


Illustration 7: Atlas-i6x with ToIP call recordings application

■ **Application example number n: Open platform for third party applications.**

There are innumerable applications where the Atlas-i6x provides added value such as facilitating a platform that integrates communications and services simplifying both management and implementation. The integration of a standard Unix Operating System and internal hard disk guarantee the success of any requirement.

These characteristics allow third parties to develop applications that can be executed in the device without interfering with other running programs or compromising routing processes. Consequently this converts into an open platform where the implementation and execution of lots of types of remotely administrated applications are carried out such as landline-mobile convergence, domotic, surveillance, etc. All of this is possible thanks to the powerful double core process which allows these applications to be organized and executed in parallel with other 'normal' tasks of routing and IP telephony without compromising speed etc.



TECHNICAL SPECIFICATIONS

SYSTEM SUMMARY

System	Boot time	Cold boot time: approximately 22 sec. Warm re-boot time: approximately 15 sec.
	Dual IOS image on flash	Supported
Hardware	CPU	Freescale P1020E dual core (800MHz)
	BUS	330 MHz (660 MHz data clock)
	Memory	512 Mbytes (DDR3)
	Flash	64 Mbytes
	PHY	Marvell 88E1322
	Clock	Real time clock chip M41T00S
	Power Supply	Internal AC: 100v – 240v; 47/63Hz
	Interfaces (according to model and license)	2 x Gigabit Ethernet 1 x 8 Port Switch Gigabit Ethernet (expandable to 16) 1 x WLAN 1 x WWAN 1 x USB 1 x Console 1 x Slot for DSL daughter cards 1 x Slot for DSL or PMC daughter cards 1 x Slot for Switch expansion or PMC daughter cards
	Front Panel LEDs	Power USB HD activity 3G status WIFI status Expansion slot status xDSL status Gigabit Ethernet Interfaces: 2 status LEDs per port: link, speed and activity Fast Switch Ethernet Interfaces: 2 status LEDs per port: link, speed and activity
	Cooling	2 controlled fans
19 Rack mount	Supported	
Environmental Specifications	Temperature: 0°C to 40 °C Relative Humidity: 5% to 85% Barometric pressure: 860 mbar to 1060 mbar	
Dimensions and weight	Length x Width x Height: 440 x 348 x 47 mm Approximate weight: 4.5 Kg Format: 19" rack and 1U	
Ethernet Interfaces	Physical ports	2 x Routed ports (WAN) 8 or 16 x Switched ports (LAN)
	Connector type	Routed ports: 10/100/1000BASE-T copper ports: RJ-45 Switched ports: 10/100BASE-T copper ports: RJ-45
	Connections supported	802.3i (10BaseT) 802.3u (100BaseT) 802.3ab (1000BaseT) (only motherboard)
	Cable supported	Cat5 Cat5e Cat6 Cat6e
	Maximum cable distance	10Mbps speed: 180 meters on copper 100Mbps speed: 100 meters on copper 1000Mbps speed: 100 meters on copper (only motherboard)
	Duplex Mode support	On all lan ports (half/full/auto).

	Auto-negotiation	Supported according IEEE 802.3u
	Crossover	Yes
	IEEE 802.1Q (VLAN)	4096 VLANs supported
	PoE	802.3 af (classes 0,1,2,3,4) optional on all switch ports
WLAN Interface	Hardware type	Internal module (1 module supported).
	Connector	Two detachable external antennas (SMA male connector)
	MIMO	2x2
	Wifi Modes	802.11 a/b/g/n modes
	Dual Band	Supported
	Radio Modules	1
	Channel Selection	Manual or automatic channel selection
	Speed Selection	Manual or automatic
	Power Selection	Configurable power transmission
	Power Save	Legacy power-save mode as well as U-APSD
	Turbo Mode (108 Mbps)	Not supported
	Operational Modes	Access Point or Client
	WPS	Supported
	Encryption Options	None. WEP-40: WEP encryption with 40 bit keys. WEP-104: WEP encryption with 104 bit keys. WEP-128: WEP encryption with 128 bit keys. TKIP AES-CCMP
Quality of Service	AIFS, Cwmin, Cwmax	
Frame capture	Not supported	
WWAN Interface	Hardware type	Internal module (1 module supported).
	Connector	Two detachable external antennas (SMA female connector).
	Standards and Bands for LTE	Supported Standard 3GPP release 8 Diversity MIMO - American chipset: Band 2 (1900 MHz), Band 4(AWS) (1700 / 2100 MHz), Band 5 (850 MHz), Band 13 (700 MHz), Band 17 (700 MHz), Band 25 (1900 MHz) - Rest of the World SKU: Band 1 (2100 MHz), Band 3 (1800 MHz), Band 7 (2600 MHz), Band 8 (900 MHz) and Band 20 (DD800 MHz)
	Standards and Bands for UMTS (WCDMA), HSDPA, HSUPA, HSPA+	DC-HSPA Supported Standards 3GPP Release 5,6,7 y 8 Diversity - American chipset: Band 1 (2100 MHz), Band 2 (1900 MHz), Band 4 (1700 Mhz), Band 5 (850 Mhz), Band 8 (900 MHz) - Rest of the World SKU: Band 1 (2100 MHz), Band 2 (1900 MHz), Band 5 (850 MHz), Band 6 (1700 MHz) and Band 8 (900 MHz)
	Standards and Bands for GSM, GPRS, EDGE	Supported Standard 3 GPP Release 99 NO Diversity GSM 850 (850MHz), GSM 900 (900 MHz), DCS 1800 (1800 MHz), PCS 1900 (1900 MHz)
Standards and Bands for CDMA, TD-SCDMA	TIA-EIA.95-A/B, TIA-EIA-IS-2000, TIA-EIA-856 Diversity 3GPP TDD (TD-SCDMA, NO Diversity) Cellular (800 MHz) PCS (1900 MHz) TD-SCDMA (1880-1920/2010-2025 MHz) GPRS (900,1800 MHz) CDMA bands BC0, BC1, BC10	

	Interface Failure Detection	Passive (analyzing received traffic) Active (polling)
	Automatic Handover	Yes
	Over the air firmware upgrade	Yes
	Signal Quality Analysis	Supported
	Theoretical Maximum Bandwidth	EDGE Upload 236 Kbps /Download 236 Kbps UMTS Upload 384 Kbps/Download 384 Kbps HSUPA/HSDPA Upload 5.76 Mbps/ Download 14.4 Mbps HSPA+ Upload 5.76 Mbps/Download 21 Mbps DC-HSPA Upload 12 Mbps/Download 42 Mbps LTE Upload 50 Mbps/Download 100 Mbps CDMA-EVDO Upload 1.8 Mbps / Download 3.1 Mbps TD-SC DMA Upload 384 Kbps / Download 2.8 Mbps
<u>USB Interface</u>	Type	USB 2.0
	Interface Failure Detection	Passive (analyzing received traffic) Active (polling)
	Signal Quality Analysis	Supported
	Theoretical Maximum Bandwidth	EDGE Upload 236 Kbps /Download 236 Kbps UMTS Upload 384 Kbps/Download 384 Kbps HSUPA/HSDPA Upload 5.76 Mbps/ Download 14.4 Mbps HSPA+ Upload 5.76 Mbps/Download 21 Mbps DC-HSPA Upload 12 Mbps/Download 42 Mbps LTE Upload 50 Mbps/Download 100 Mbps CDMA-EVDO Upload 1.8 Mbps / Download 3.1 Mbps TD-SC DMA Upload 384 Kbps / Download 2.8 Mbps
	USB modems supported	Huawei: K3520, K3715, K4605(HSPA+), EC122(CDMA) SierraWireless: Compass885, USB307 ZTE: MF110ZTE, MF180, MF190
	Theoretical Maximum Bandwidth	EDGE Upload 236 Kbps /Download 236 Kbps UMTS Upload 384 Kbps/Download 384 Kbps HSUPA/HSDPA Upload 5.76 Mbps/ Download 14.4 Mbps HSPA+ Upload 5.76 Mbps/Download 21 Mbps DC-HSPA Upload 12 Mbps/Download 42 Mbps LTE Upload 50 Mbps/Download 100 Mbps CDMA-EVDO Upload 1.8 Mbps / Download 3.1 Mbps TD-SC DMA Upload 384 Kbps / Download 2.8 Mbps
<u>Fiber Transceiver (Daughter Card)</u>	Physical ports	1 or 2 SFP port
	Cards supported	Up to 2 cards
	SFP-100 support	No
	SFP-1000 support	Yes
<u>ADSL2+/VDSL2 (Annex-A daughter Card and Annex-B daughter Card)</u>	Physical ports	1 port
	Cards supported	Up to 2 cards
	Connector type	2-wire female RJ11 connector
	Supported Technologies	VDSL/ADSL/ADSL2/ADSL2+
	Supported Standards VDSL	G.993.2 VDSL2 (Annex A, B and loop diagnostic included) VDSL2 band plan: 997 and 998 Profiles: 8a, 8b, 8c, 8d, 12a, 12b, 17a EFM encapsulation IEEE 802.3 2BASE-TL (aka 802.3ah) OAM IEEE 802.3 chapter 57

	Supported Standards ADSL	<p>Annex-A card:</p> <ul style="list-style-type: none"> ansi-t1.413 annex A. g.dmt (ITU G.992.1) annex A. g.dmt.bis (ITU G.992.3-ADSL2) annex A, L, M. g.dmt.bis-plus (ITU G.992.5-ADSL2+) annex A, M. g.lite ITU G.992.2 <p>Annex-B card:</p> <ul style="list-style-type: none"> ansi-t1.413 annex B. g.dmt (ITU G.992.1) annex B(ISDN), B-PT(Portugal) g.dmt.bis (ITU G.992.3-ADSL2) annex B(ISDN) g.dmt.bis-plus (ITU G.992.5-ADSL2+) annex B(ISDN), J(RDSI) u-r2 ITU G.992.1 Annex B for German Telecom(ISDN) ETSI 101-388 (Over ISDN)
	DSL interoperability	<p>Lucent Stinger FS interop Siemens Xpresslink DSLAM interop</p> <p>DSLAMs:</p> <ul style="list-style-type: none"> ALCATEL ISAM: NVLT-C, NVLT-G, NVLT-P HUAWEI: H805VDSA, H805VDSF, H805VDMF ALCATEL ASAM: ABLT-D, ADLT-F, ADLT-K, ADLT-N, ADLT-E, ADLT-J, ADLT-L, ABLT-F LUCENT: LIM24, LIM 48, LIM72, LIM72 –A2P HBi
	Bandwidth	<p>ADSL2+ downstream: up to 27Mbps (ADSL+ Annex A) ADSL2+ upstream: up to 3 Mbps (ADSL+ Annex M,J) VDSL2 downstream: up to 100Mbps VDSL2 upstream: up to 50 Mbps</p>
	Other characteristics	<p>PTM Transmission Convergence (PTM-TC) G.993.2 Annex K Dual-Latency supported Power spectral density (PSD) mask complying with G.993.2 Minimum protection to impulsive noise to 2 Dying Gasp. ITU G.991.2 standard recommendation</p>
	Card chipsets	ADSL: Broadcom 963168
<u>G.SHDSL (Daughter Card)</u>	Physical ports	1 RJ11 port with 2-pair support (4 wires)
	2 wire / 4 wire	Yes, with auto synchronization
	Cards supported	Up to 2 cards
	ITU-T standards	G.SHDSL (G.991.2), G.Handshake (G.994.1)
	16-TCPAM and 32TCPAM	Yes
	Supported annexes	Annex A (US) & Annex B (EU) = up to 2.304Mbps 2 copper pairs
	Dying Gasp	Yes (section 7.1.2.5.3 of G.991.2)
	Transport Mode	ATM AAL5 , SAR sublevel 31 PVCs
	OAM	Yes
	Inverse MUX	Yes, MPPP over different cards
<u>G.SHDSL bis (Daughter Card)</u>	Physical ports	1 RJ45 port with 4-pair support (8 wires)
	Cards supported	Up to 1 card
	2 wire / 4 wire / 8 wire	Yes, with auto synchronization
	ITU-T standards	G.SHDSL (G.991.2), G.Handshake (G.994.1) G.SHDSL bis
	16-TCPAM and 32TCPAM	Yes
	Supported annexes	Annex A (US) & Annex B (EU) = up to 2.304Mbps 2 copper pairs
	M-pair	Annex F/G, M = 2, 3, or 4, 768kps up to 5.696Mbps each pair
	EFM bonding	Yes
	Dying Gasp	Yes (section 7.1.2.5.3 of G.991.2)
	Wetting current	Yes (section A.5.3.3 of G.991.2)

	Transport Mode	ATM and EFM (auto detect)
	OAM	Yes, ATM and EFM
	ATM PVCs	31
	Inverse MUX	Yes, MPPP over different cards
<u>Serial (Daughter Card)</u>	Physical ports	1 or 3 ports
	Cards supported	Up to 2 cards
	Connector type	1 port card: DB25 female 3 port card: SCASI-II 68 pin
	Signaling Standards	X.21, V.35, EIA-232C
	DCE/DTE Operation	Supported
	Modes	Synchronous/Asynchronous
	Bandwidth	Up to 2Mbps with V.35
	Supported Protocols	PPP, MLPPP, FRL, HDLC, SDLC, X.25, ASDP, SCADA
	Ignore Signals	Configurable
<u>E1/T1 - Data (Daughter Card)</u>	Physical ports	1 or 4 ports
	Cards supported	Up to 2 cards
	Connector type	RJ45 4 wire female connector
	Framing	E1 or T1 (data only, voice not supported)
	Modes	Clear-Channel (only on E1 interface) Fractional Channelized
	E1 Supported Standards	ITU-T G.703, G.704
	E1 Framing	crc4, no-crc4, unframed-2048
	E1 Line Codes	Ami, hdb3
	T1 Supported Standards	ANSI T1. 403
	T1 Framing	SF, ESF, SLC-96
	T1 Line Codes	AMI, B8ZS
	Bandwidth	Up to 2Mbps per E1 interface Up to 1,544 Mbps per T1 interface
	Data Supported Protocols	PPP, MLPPP, FRL, HDLC.
	Signaling Standards	NET5 (Euro ISDN), NI (National ISDN 2), 4ESS, 5ESS S100, QSIG
	ISDN PRI Features	T1 CAS - Not Supported E1 R2 CAS - ITU-T Q.400-Q.490 recommendations NT or TE
<u>E1 - Voice (Daughter Card)</u>	Physical ports	1 port
	Cards supported	Up to 2 cards
	Connector type	RJ45 4 wire female connector and (2) coaxial
	DSPs	Included. Up to 30 simultaneous calls with any codec
	Codecs	G.711, G.729A and G.723.1
	Voice features	Echo cancellation, VAD (Voice Activity Detection), DTMF detection, CNG (Comfort Noise Generation)
	Framing	E1 voice
	E1 Supported Standards	ITU-T G.703, G.704
	E1 Framing	crc4, no-crc4, unframed-2048
	E1 Line Codes	Ami, hdb3
	Signaling Standards	NET5 (Euro ISDN), NI (National ISDN 2), 4ESS, 5ESS S100, QSIG

	ISDN PRI Features	E1 R2 CAS - ITU-T Q.400-Q.490 recommendations NT or TE
<u>ISDN-BRI - Data (Daughter Card)</u>	Physical ports	2 ports
	Cards supported	Up to 2 cards
	Connector type	RJ45 4 wire female connector
	Signaling Standards	CTR3/Euro-ISDN/Euro-numeric compliant
	Operational Modes	NT (Network mode) S0 or T0
	D-channel mode	Point-to-point and multipoint (TE mode)
	Channel bonding	Yes, up to 128Kbps
	Data Supported Protocols	PPP, MLPPP, FRL
<u>FXS/FXO (Daughter Card)</u>	Physical ports	4 ports
	Cards supported	Up to 2 cards
	Connector type	RJ11 2 wire female connector
	DSPs	Included. Up to 4 simultaneous calls with any codec
	Codecs	G.711, G.729A and G.723.1
	Voice features	Echo cancellation, VAD (Voice Activity Detection), DTMF detection, CNG (Comfort Noise Generation)
	Operational Modes	FXS or FXO (soft configurable)
	FXS features	Loop start caller-id support (DTMF and FSK)/Bellcore, ETSI, DTMF-based (Nor-Europe) T.38 support for faxes DTMF and loop disconnect dialing REN of 4 CLASS features Configurable ring frequency & cadence
FXO features	Address signaling support -- In-band DTMF, Signaling format -- Loop start and Ground start Call disconnect on progress tone of less than 600 Hz	
<u>ISDN-BRI - Voice/Data (Daughter Card)</u>	Physical ports	2 ports + 1 bypass port
	Cards supported	Up to 2 cards
	Connector type	RJ45 4 wire female connector
	DSPs	Included. Up to 4 simultaneous calls with any codec
	Codecs	G.711, G.729A and G.723.1
	Voice features	VAD (Voice Activity Detection), CNG (Comfort Noise Generation)
	Data Supported Protocols	PPP, MLPPP, FRL
	Signaling Standards	CTR3/Euro-ISDN/Euro-numeric compliant
	Operational Modes	NT (Network mode) or TE (User mode) S0 or T0
	D-channel mode	Point-to-point and multipoint (TE mode)
<u>E&M (Daughter Card)</u>	Physical ports	2 ports
	Cards supported	Up to 2 cards
	Connector type	RJ45 4 wire female connector
	DSPs	Included. Up to 4 simultaneous calls with any codec
	Codecs	G.711, G.729A and G.723.1
	Voice features	Echo cancellation, VAD (Voice Activity Detection), DTMF detection, CNG (Comfort Noise Generation)
	Operational Modes	E&M types I, II, III & 4
<u>Console</u>	Interface	RJ45

Type	RS232
Speed	Default: 9600 bps Maximum: 115200 bps

LAYER 2 PROTOCOL SUMMARY

Ethernet

802.1Q (VLAN)	Yes
802.1P	Yes
Q-in-Q	Yes
Port Mirroring	In Gigabit Ethernet Switch ports

ATM over xDSL

AAL5 type	VC-multiplexing, LLC-multiplexing
ATM Class of Service	UBR, UBR+, VBR-nrt, VBR-rt, CBR with traffic shaping
PVCs	Up to 31
OAM cells	Yes
Encapsulation	Routed IP, PPPoE, PPPoA (AAL5-mux), Ethernet Bridged over ATM, Classical IP over ATM, MLPPP Encap for support of xDSL multi-access

WLAN

Authentication Options	None, Open, Shared Key, WEP, WPA-PSK, WPA2-PSK (WPA Personal), WPA-802.1x, WPA2-802.1x (WPA Enterprise).
Security Options	WEP, WPA, WPA2
MAC Filtering	Supported
Multi SSID(ESSID)	Yes .Max. 4 SSIDs.
WMM QoS	Supported
Country Codes	Supported

WWAN

Automatic handover	Yes
Interface failure detection	Active and passive
Dual Context	Yes
SMS management	Yes
SIM selection criteria	Signal level, Radio technology (UMTS, LTE, ...), IP probes (availability, latency, jitter), Time Schedule, Manual configuration
GPS support	Yes
Module upgrade	Yes

Bridge

Interfaces	Ethernet, Frame Relay, PPP, ATM, HDLC, IP tunnel
Methods	Source Transparent Bridging (STB), Source Route Bridging (SRB), Adaptive Source Route Transparent Bridging (ASRT), Integrated Routing and Bridging (IRB)
STP protocols	Spanning Tree Protocol (STP) IEEE 802.1d Rapid Spanning Tree Protocol (RSTP) IEEE 802.1w Per VLAN Spanning Tree Protocol (PVST+)

SDLC

Functionalities	Primary and negotiable mode, Point to point/Multipoint, Half/Full duplex mode, MTU from 576 to 18.000 bytes
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HDLC

Protocols over HDLC	IP, ARP
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PPP

Base Interface	Synchronous serial line, Asynchronous serial line (AT commands), ISDN, ATM (PPPoA/PPPoE), G.703, L2TP, Frame Relay (PPPoFR) PVC, Internal port (GPRS, UMTS)
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PPPoE

Base Interface	ATM, Ethernet (subinterfaces included)
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Frame Relay

LMI protocols	LMI Rev 1, NSI Annex D, Q.933 Annex A
Others	FRF.9 Compression, FRF.12 Fragmentation, LFI - Link Frame interleaving

X.25

IP integration	X.25 over TCP/IP: XOT IP over X.25
Channels	SVC and PVCs. Up to 300 channels

Supervisory Control And Data Acquisition (SCADA)

Serial Interface	RS-232 / RS-485
Protocols	MODBUS-RTU MODBUS-ASCII IEC 60870-5-101 UNBALANCED IEC 60870-5-101 BALANCED
SCADA TCP/IP Modes	MODBUS CLIENT MODBUS SERVER IEC-101 PROPRIETARY CLIENT IEC-101 PROPRIETARY SERVER

IPv4 PROTOCOL

IPv4 summary

Basic features	IPv4 stack and dual stack IPv4/IPv6 ARP and Local Proxy ARP Path MTU discovery NAT (static, dynamic, NATP, ALG, PAT firewalling) Equal Cost Multi-Path Routing (ECMP)
Routing protocols	Static routing Policy Based Routing (PBR) RIP OSPF BGP
Others	VRF support IP SLA TVRP (HSRP compatible) / VRRP

RIP

Supported versions	RIP-I, RIP-II
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OSPF

Supported versions	OSPF-2
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BGP

Supported versions	BGP-4
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VRF

Maximum VRFs	255
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IP SLA (SAA)

Supported features	NSM (Network Service Monitor) feature for measures or operations NSLA (Network Service Level Advisor) feature for advisors.
Controlled protocols	IP routes, SIP Server, UA-NOE Server, route/maps, ToIP
IPSLA probes	Response time through Echo IP/ICMP Web page download time. Jitter measurement between two routers. Connection status through a BFD session

Multicast

Features	IGMP (v1,v2, v3), PIM-SM, MSDP, MLD
IGMP versions	IGMPv1, v2, v3
MLD version	Multicast Listener Discovery Version 2 (MLDv2)

IPv6 PROTOCOL

IPv6 summary

Basic Features	Dual Stack IPv4/IPv6 Neighbor Discovery Default Address Selection Unique Local IPv6 Unicast Addresses (ULA) ICMPv6 SLAAC
Routing protocols	Static Routing RIPng OSPFv3 MP-BGP (IPv6 e IPv4 unicast)
Transition mechanism	IPv6 over IPv4 (Manual, automatic 6to4, 6rd) IPv4/IPv6 over IPv6 GRE IPv4/IPv6 all combinations

IPv6 over IPv4 tunnels

Types	Manually configured IPv6 over IPv4 tunnels Automatic 6to4 Tunnels Automatic 6rd Tunnels (Rapid Deployment)
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IPv6 Tunnels

Types	IPv4 over IPv6 IPv6 over IPv6
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NETWORK SERVICES

Summary of Network Services

Supported Services	DHCP Server, Relay, Client. NTP Client. DNS Server, Client, DNS Client Lookup. DDNS. FTP Server/Client, SFTP Server/Client. SSH Server and Client. Telnet Server/Client. TFTP Server. AAA: Local, Radius and TACACS+ LDAP Client Syslog Client Proxy ARP. SCP Client. ICMP Ping and Traceroute. CDP (partial support)
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AAA (Authentication, Authorization and Accounting)

Services supported	Console, Telnet, SSH, FTP, PPP
Server support	RADIUS, TACACS+

LDAP for IPv4

Version	LDAP version 2
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VPN (VIRTUAL PRIVATE NETWORKS)

VPN Summary

Protocols	L2TP, IPSec, GRE, DMVPN (NHRP), GDOI (GETVPN)
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IPSec

Security services	ESP, AH
Modes	Transport and Tunnel Mode
IKE	Main and Aggressive mode
Authentication	Preshared Key Signatures RSA public key Certificates (CSR, SCEP, Revocation Lists from LDAP Servers, X.509v3, PKIX) MD5 SHA-1
Encryption	DES (56-bit) 3DES (168-bit) AES encryption (128, 192, 256 bit)

QoS (QUALITY OF SERVICE)

QoS General

Available interfaces	Frame Relay and FRL Subinterfaces X.25 Lines PPP and MLPPP Lines HDLC Lines ATM Subinterfaces Ethernet Interfaces and Subinterfaces Wireless LAN Interfaces TNIP Interfaces BVI Interfaces
Scope	Traffic classification Traffic marking (Diffserv) Distributing bandwidth Prioritization Traffic shaping
Number of classes	32
Priority queues	16 priority queues per interface (4 Intraclass x 4 interclass)
Policies	Strict Priority Low Latency Queue (LLQ) Weighted fair queuing(WFQ) CBWFQ, (Class based weighted fair queuing)

TRAFFIC CLASSIFICATION

Access List (ACL)

Services using ACL	Filters Security/Firewall purposes Routing protocols QoS data flows VPN data encryption
ACL limit	Up to 7000 ACL

Prefix List

Services using Prefix List	RIP OSPF BGP
Prefix List limit	Up to 199 prefix list

SECURITY AND FIREWALL

Security and Firewall

Level 2 security	MAC Filtering 802.1X Authentication (802.11i for Wifi connections)
Stateful inspection (stateful firewall)	Filtering Denial of Service Web Content Filtering Filtered content in user data Filtering P2P sessions RTP traffic filtering Filtering ICMP-echo to the WAN interface Rate-Limit for specific trades (Ping-flood attack) Filtering denied addresses (RFC1918)

MANAGEMENT

Management

Management options	CONF or AUX serial port SNMP v1, v2c and v3. Telnet SSH1/2
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SNMP

Version supported	SNMP v1, v2c, v3
RMON	Supported (group Alarm and group Event)

Netflow

Version supported	Netflow version 5 and version 9
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Sniffer

Capture from	Selected interface or all interfaces
File format	Wireshark compatible

TELEPHONY OVER IP

General

Protocols	SIP (UDP and TCP), SIPoTLS, H.323, UA-NOE, MGCP, SRTP, Media Encoding, SCCP (Skinny)
Survival terminals support	SIP, UA-NOE, SCCP (Skinny), H.323

Telephony survival features	<ul style="list-style-type: none"> Basic call incoming & outgoing call Block dialing for outgoing call DDI Calling line / name identification presentation (CLIP/CNIP) Calling Line Identification Restriction (CLIR) Connected (COLP) party number identification Connected line /name identification restriction (COLR) Call forwarding unconditional (CFU) Call forwarding on Busy (CFB) Call Hold (CH) Enquiry call Broker call Conference call Transfer
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SNA

General

Encapsulation over LAN/IP	<ul style="list-style-type: none"> LLC2 DLSw (SNA over IP)
Encapsulation over serial port	<ul style="list-style-type: none"> SDLC QLLC BAN (SNA over FR) X25 (QLLC)

DATA ACCELERATION

Data Compression

Support	IP, X.25 and PPP
Standards	Van Jacobson STA LZS

HIGH AVAILABILITY

General

H.A. Protocols	<ul style="list-style-type: none"> Fault Recovery: BFD ECMP(Equal Cost Multipath) for RIP, OSPF and BGP VRRP and Interface Tracking TVRP (HSRP compatible) WRR(Wan Reroute) (Internal feature for interface backup)
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BFD

Version	Version 0, version 1
Key Authentication	MD5, SHA1

PRODUCT IMAGES

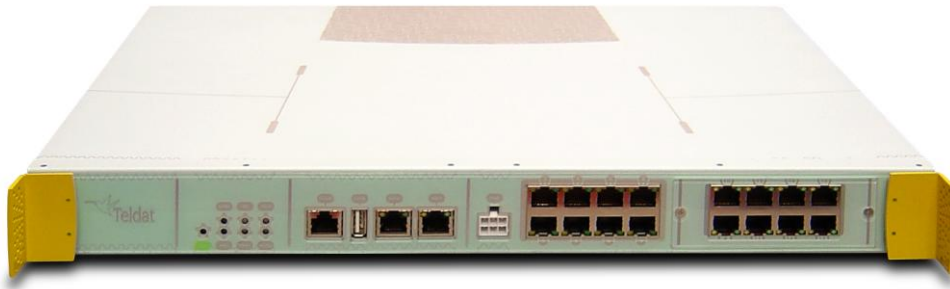


Illustration 8: Atlas-6x/i6x router front panel



Illustration 9: Atlas-6x/i6x rear panel

TELDAT DOCUMENTATION

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* No crypto part numbers are available to comply with international export/import regulations. Part numbers with -NC suffix have all encryption capabilities disabled.