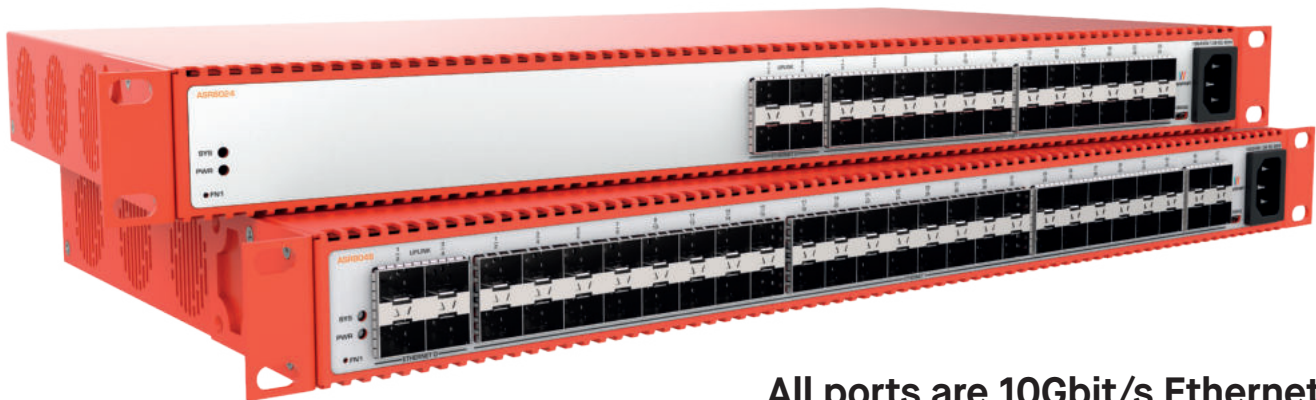## ASR 8000 Switch

10Gbit/s access switch for FTTH/FTTB

All ports are 10Gbit/s Ethernet

The ASR 8000 is a Layer 3 switch with up to 52 SFP+ ports that support 1/10Gbit/s speed and advanced service delivery of voice, video and Internet in broadband networks.

Using an onboard network processor, the ASR 8000 supports per client bandwidth ingress and egress shaping, weighted fair queuing scheduling, quality measurement of MPEG TV and RADIUS controlled service templates (broadband network gateway functionality). It can even terminate PPPoE sessions and provide layer2 overlay VPN services.

Using extended temperature ASR 8000 models you can deploy the switches in outdoor enclosures such as street cabinets.

Designed for FTTH networks the ASR 8000 has features to make network operation easier and enable more automation which lets you reduce operational cost and save time.

BENEFITS

- 28 or 52 10Gbit/s SFP+ ports with extended -20 to +70°C temperature models
- Superior rate-limiting and QoS features
- All connectors in the front and only 24 cm depth
- Efficient distribution of TV including quality measurement and telemetry

Product overview

The ASR 8000 is a Layer 3 access switch / mini-BNG designed for access network service control, network aggregation and traffic classification and prioritization to deliver the ultimate user experience. The ASR 8000 is filled with features to deliver voice, video and data services.

The ASR 8000 is built with modern technology allowing downlink ports to support 1/2.5/5/10Gbit/s operation.

Hybrid architecture

The ASR 8000 uses a switch-ASIC and network processor (NPU) hybrid architecture. This means that the platform has the full forwarding capacity of a switch-ASIC that delivers L2/L3 switching with up to wire-speed (128 byte packets) throughput on all ports including hardware policing and QoS.

In addition the NPU enables unique per client service features with advanced scheduling algorithms such as Weighted Fair Queueing and extended troubleshooting tools such as detailed multicast-TV monitoring and analysis and streaming telemetry. The network processor supports up to 10Gbit/s throughput.

The ASR 8000 can be controlled using the RADIUS protocol, which allows it to manage services for hundreds of users with a high degree of automation over both IP and PPPoE.

Layer 3 routing protocols ensures an redundant and reliable network topology over which service traffic is routed. IP addresses are efficiently used and distributed automatically throughout the network. The layer 3 topology also supports layer 2 overlay where layer 2 connectivity can be provides over the routed network.

In addition the ASR 8000 also supports layer2 switching network topologies such as

- Customer VLAN topology with efficient multicast distribution,
- Service VLAN topology with service enforcement and end-users securly using MACFF technology.
- TR-101 topologies with VLAN translation.

The ASR 8000 supports a mix of these features simultaneously which allows a smooth transition from e.g PPPoE to Service VLAN/Customer VLAN or even layer 3 with layer 2 overlay.

Security features such can be used with both dynamic and statically assigned addresses to prevent spoofing of IP traffic. The ASR 8000 behavior can be easily adapted to fit into a variety of service provisioning solutions using e.g. DHCP or RADIUS to signal service parameters. Industry standard CLI and SNMP support allows easy management and control of ASR8000 operation.

The ASR 8000 is available with either 24 SFP+ (ASR 8024) or 48 SFP+ (ASR 8048) 10Gbit/s Ethernet downlink ports. In addition there are four 10Gbit/s SFP+ uplink ports. The models are available as commerical or extended temperature range versions with AC or DC power options. This creates a versatile model programme that can be used in remote deployed street cabinets, building installations or central office sites for access and aggregation of traffic.

Benefits

Faster services and advanced traffic classification/forwarding
The ASR 8000 supports 1, 2.5, 5 and 10 Gbit/s port speeds which enable faster services to meet the needs of increasing bitrates from high-definition video, virtual reality application and other low latency/high bandwidth demanding applications. Accelerated traffic in the switch-ASIC provides up to full wire-speed throughput on all ports but also rate-limiting using policing and port queue egress shaping.

Using the onboard network processor (NPU) it is possible to do per client service control using advanced algorithms such as Weighted Fair Queuing (WFQ) for the best possible user experience - particularly for Internet services. Traffic through the NPU is flow-based allowing highly granular traffic control, traffic management and QoS rules and detailed insight into the traffic passing through the network.

Extended temperature range and front to side-back cooling
The ASR 8000 extended temperature range versions are designed to operate even in tough conditions with limited or no cooling. Supporting a temperature range between -20 and +70°C allows the ASR 8000 to be deployed into street cabinets or other exposed installation enclosures. The front-to-side airflow gives optimal cooling of all SFP cages even in the 48-port model. At the same time, exhausting air through the side allows installation close against a rear wall or in ETSI 300mm cabinets.

Zero touch deployment

The ASR 8000 can be deployed into the network directly out of the box. There is no need for pre-configuration of the switch before installation. Using standard protocols the switch can both receive firmware upgrade and complete configuration when connected to the network the first time. This reduce the need for pre-configuration or field engineers having to configure units in remote locations.

Connectors in the front

Connectors for network, administration and power are in the front panel of the unit for easy access and installation. The small form factor, only 24 cm depth, simplifies installation and makes the ASR 8000 fit into narrow spaces in multi-dwelling unit environments, street cabinets as well as dense deployment in central office or wiring-closet sites.

An additional 12V DC power input connector is located in the rear to support dual power sources to the unit to allow external power redundancy.

Quality improvements and inspection of TV

By shaping the traffic, the ASR 8000 can improve the overall quality of multicast TV if the playout generates a bursty media stream. This reduces quality issues experienced by the end-users.

The ASR 8000 can also inspect SD-TV and HD-TV multicast MPEG transport streams, supporting MPEG over RTP as well as UDP. The ASR 8000 collects and analyzes metrics at RTP level, Transport Stream level and Packetized Elementary Stream level for up tp 50 TV channels at the same time. Errors detected include sequence-errors, jitter, missing-sync-bytes and misaligned streams.

Streaming telemetry

The ASR8000 support streaming telemetry data from apx. 1300 data points. Local collection of data continues even if the link to the database is lost. The telemetry provides indepth information about the network and system performance and helps operators shorten troubleshooting time and prevent issues from affecting users.

Mini-BNG and PPPoE

The ASR 8000 network processor gives the switch the same capabilites as Broadband Network Gateways to handle and control services for IP over Ethernet and PPP over Ethernet. Customized and automated service control can be implemented using the RADIUS protocol. Service conditions and behavior can be adapted to fit any type of existing service deployment structure used by operators. Existing RADIUS based olutions, used for xDSL, can be reused by the ASR 8000 which reduces costs in the OSS system for service providers when new services are deployed in the network.

Layer 2 topologies

The ASR 8000 also supports common layer 2 topologies such as Customer-VLAN with separate multicast VLAN and MACFF based Service-VLAN with secure traffic separation of customer traffic.

Technical Specifications

Physical

Model	ASR 8024/8024E	ASR 8048/8048E
Port configuration	28 x 1000/10000baseX (SFP+)	52 x 1000/10000baseX (SFP+)
Dimensions	43x441x240 mm (H x W x D)	43x441x240 mm (H x W x D)
Weight	4 kg	4 kg
Indicators	Interface LED indicator for link and speed, dual color Power LED indicator System LED indicator	
Acoustic	Temperature controlled fans. At room temperature (22 degrees C) all units <50 dB ASR8024 Max: 58 dB ASR8048 Max: 65 dB ASR8024E Max: 62 dB ASR8048E Max: 67 dB	
Cooling	Redundant fan. The ASR 8000 has sufficient cooling capacity even with one fan failing. Commercial temp: Front-to-side airflow Extended temp: Front-to-side + back airflows	

Environmental

Operating temperature	Commercial temperature: 0 to 45°C Extended temperature: -20 to 70°C (E-models)
Operating humidity	10% to 90%, non-condensing
Storage temperature	-40 to 70°C
Storage humidity	5% to 95%, non-condensing
Rack mounting	Standard 19" rack mountable
Heat dissipation	See power consumption

Power and Safety

Power connector	AC: One IEC 60320-1 C14, located on the front panel DC: One four-pin female JK2EDGR-508-4 with dual power inputs One 12VDC connector located on the back panel for external power supply
Power	AC: Front-panel AC power input 100-240V, 50/60 Hz to internal PSU DC 24-port: Front-panel DC power input -38V~-57V to internal PSU DC 48-port: Front-panel DC power input -40V~-72V to internal PSU Rear-panel 12V DC power input to mainboard
Power consumption (typical using standard SFP)	ASR 8024 AC/DC: 35W, ASR 8024E AC/DC: 53W (room temperature) ASR 8048 AC/DC: 77W, ASR 8048E AC/DC: 87W (room temperature)
Safety	LVD (2014/35/EU) IEC/EN 60825-1, IEC/EN 60825-2 CE mark: EN 62368-1:2014+A11 CB scheme: IEC/EN 60950-1
EMC	CE EMC (2014/30/EU) Emission: EN55032:2015 Class B Immunity: EN61000-4-2:2009, EN61000-4-3:2006+A1:2008+A2:2010, EN61000-4-5:2014, EN61000-4-6:2014
RoHS, WEEE and REACH	RoHS 2017/2102/EU and 2015/863/EU, WEEE 2012/19/EU, SFS2016:1067, REACH

Performance

Switch ASIC performance	Forwarding bandwidth: 160 Gbps, 240Mpps
NPU Performance	1200Mhz NPU with 4 cores, providing up to 10 Gbps throughput
MAC table	16000 MAC addresses
VLAN table	4094 VLANs
Multicast S,G entries	2048 L2 multicast, 4000 IP multicast groups
Jumbo Frames	Up to 9 Kbyte
Classification	Layer 2-4 packet classification with filtering and remarking Per service packets and bytes accounting Access-list entry hit logging and packet counting
Packet queuing	Weighted round robin (WRR) Weighted fair queuing (WFQ)
Policing ingress/egress	2000 policers with packet drop or recolor (64kbps-10000Mbit/s)
Shaping ingress/egress	4095 shapers with packet drop or recolor (64kpbs – 10000Mbit/s)
IP routing entries	13K entries IPv4 / 3K entries IPv6

Layer2 and Forwarding

IEEE standards	IEEE 802.3z – Gigabit Ethernet IEEE 802.3ae - 10Gbit/s over optical fibre IEEE 802.1p and 802.1Q with full VLAN range including Q-in-Q IEEE 802.1s Multiple Spanning-tree IEEE 802.1w Rapid spanning-tree IEEE 802.1x Port authentication with RADIUS VLAN/Service template assignment
Link aggregation	Up to 16 groups, 4 interfaces per group
Multicast	IGMPv2 snooping

Other features

Flow export	Netflow version 9
Security	Per layer 3-interface packet shaper for packets destined to the control plane IP spoofing protection Up to 10 Gbps bandwidth IP fragment inspection in NPU Restricted multicast access with IGMP join-filter UNI isolated ports MAC Forced Forwarding for IPv4 including automatic gateway and server snooping DHCPv4 snooping for anti-spoofing Lawful interception X1 and X3 interface
Mirroring	Interface mirroring to local interface Interface mirroring over GRE to remote Wireshark or other packet capture tool
Programmable extension	ScriBOS script language for programmable extension

Virtual Private Networking

L3 tunnels	L2TPv3 with transparent Ethernet bridging and port forwarding (proprietary) GRE Up to 200 tunnel interfaces
L2CP	Layer2 Control Protocol Tunneling over VLANs
GRE	IP over GRE

IP Routing and Forwarding

Interfaces	600 layer 3 interfaces
ECMP	Up to 4 paths
Multicast	4096 S,G IPv4 multicast forwarding entries Per port and per VLAN replication PIM SM / SSM IGMPv2, IGMPv3 Static-join of multicast groups
Unicast	OSPFv2, OSPFv3, BGPv4, IS-IS, policy-routing

Management

Command Line Interface	Industry standard CLI with debugging, configuration and management Telnet SSH
Serial interface	RS232 console serial port to access CLI
SNMP	SNMPv1, v2c and v3
PFDP	PacketFront Device protocol exchange system information with other iBOS devices and selected customer premise equipment
System boot	BOOTP client for address assignment
Time	NTP time synchronisation
Remote logging	Syslog
LLDP	Link Layer Discovery Protocol
Telemetry	Streaming telemetry as InfluxDB line-protocol over HTTP or JSON over TCP

BNG features

RADIUS	RADIUS protocol based service control including Change of Authorization
PPPoE Server	Up to 576 users with PAP/CHAP authentication
IPoE	Up to 576 C-VLANs with services

Purchase your ASR 8000

To find out how you can join the growing number of networks using the ASR 8000, please contact your local parter or sales@waystream.com.

Article	Description
ASR8024-AC	ASR 8024, 28-port 1G/10G SFP+, commercial temperature, AC power, iBOS Standard
ASR8048-AC	ASR 8048, 52-port 1G/10F SFP+, commercial temperature, AC power, iBOS Standard
ASR8024-DC	ASR8024, 28-port 1G/10G SFP+, commercial temperature, DC power, iBOS Standard
ASR8048-DC	ASR8048, 52-port 1G/10F SFP+, commercial temperature, DC power, iBOS Standard
ASR8024E-AC	ASR8024, 28-port 1G/10G SFP+, -20C to +70C ext. temperature, AC power, iBOS Standard
ASR8048E-AC	ASR8048, 52-port 1G/10F SFP+, -20C to +70C ext. temperature, AC power, iBOS Standard
ASR8024E-DC	ASR8024, 28-port 1G/10G SFP+, -20C to +70C ext. temperature, DC power, iBOS Standard
ASR8048E-DC	ASR8048, 52-port 1G/10F SFP+, -20C to +70C ext. temperature, DC power, iBOS Standard
CBL-CONSOLE	Serial console cable (RJ-45 to DB9) (Note: MUSB adapter also needed)
CBL-CONSOLE-MUSB	Serial console cable adapter (Micro-USB to RJ-45 female)
PSU-12-180	External AC to DC power supply 12VDC, 15A, 180W

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Communication everywhere

ABOUT WAYSTREAM

Waystream provides products fit for FTTH that are reliable, easy to operate and delivers great services. This means that the network can be built faster with better return on investment, more satisfied end-users and a robust solution. We provide switches, routers and related accessories that lets business and residential services be delivered over fiber.

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