Waystream 7100 and 7300 series switch

FTTB access switch with 2.5G downlinks

Supports 2500BASE-T with 25G uplinks

The Waystream 7100 and 7300 series Ethernet switch is purpose built for FTTH/FTTB access to enable easy operation and deployment of services.

The 7300 provides you with 2.5Gbit/s downlink ports, which enables a fast and cost effective upgrade of existing in-building Ethernet networks. The 7100 support 1Gbit/s downlink speed.

Waystream FTTB switches feature set supports demanding business and residential services such as Internet, TV, wholesale capacity services and private networks at the same time as simplified and automated control of the network lets you reduce operational cost and save time when dealing with network issues.

The switches have built in Service Assurance functions to ensure maximum control of the network and with streaming telemetry upload it provides new insights into the performance and functionality of the network.

BENEFITS

- **FTTH Customer and Service VLAN topology support with advanced QoS**
- **Cost effective upgrade of in-building copper network**
- **Feature set for business and residential services**
- **Service Assurance and streaming telemetry**

Product overview

Waystrem 7100 and 7300 series consist of layer 2 and layer3 access switches designed for FTTx access networks.

The 7300 series is built technology that offers cost-effective support for 10Mbit/s to 2.5Gbit/s over RJ-45 TP cables. Category 5E cables or better is required for 2.5G operation.

The 7100 series support up to 1Gbit/s operation over Category 5 cables with a complete feature set for business and residential service offerings.

Waystream switches are filled with features to deliver voice, video and data services and to support the network team in daily troubleshooting and network operations, including streaming telemetry and service assurance features.

The Waystream FTTB switches can be used in a variety of network topologies such as

- Customer VLAN topology in combination with a Service Router/BNG with efficient multicast distribution and optional RADIUS based control of ingress traffic,
- Service VLAN topology where the Waystream switches performs service enforcement and isolates end-users securly using MACF Forced Forwarding.
- Layer3 routed access where the ASR 7300 performs BNG service enforcement
- TR-101 topologies with VLAN translation.
- PPPoE topologies with intermediate agent features for customer identification
- 802.1x port authenticated networks

Security features such as IP strict clients can be used with both dynamic and statically assigned addresses to prevent spoofing of IP traffic.

Extendable through the ScriBOS script language, the 7100 and 7300 series 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 the switch operation.

Benefits

Faster services

The 7300 series can deliver faster services on existing infrastructure. Many FTTB installations use Ethernet Category 5E or better cabling in the building. In such networks the 7300 series provides an immediate upgrade to 2.5Gbit/s - simply replace the existsing switch with a Waystream 7300 series switch and the upgrade is done. Modern WiFi 6 routers or home gateways support the faster uplink speed enabling users to instantly benefit from the higher network bandwidth. This is more cost effective than converting to fiber.

Advanced traffic classification/forwarding

Waystream FTTB switches provides advanced traffic classification and forwarding capabilities, including hierarchial QoS (HQoS) based on MEF-compatible rate-limiters to support wholesale and other complex services.

Automated deployment

The 7100 and 7300 series switches can be deployed into the network directly out of the box thanks to its Zero Touch Provisioning (ZTP) process. There is no need for pre-configuration of the switch before installation. Using standard protocols such as DHCP and BOOTP the switch can have its firmware upgraded and complete system configuration downloaded when connected to the network. The MS-models within the series even supports alternating between untagged and tagged VLAN 127 on the uplink during ZTP to allow a variety of network architectures to be used with the switches.

Connectors in the front

All connectors for network, administration and power are located in the front of the unit. Combined with the small for factor - only 24 cm depth - it simplifies installation and makes the Waystream FTTB switches fit into narrow spaces in apartment buildings as well as dense deployment in central office or wiring-closet sites.

An additional 12V DC power input connector is located in the rear enables dual external power sources if needed for maximum redundancy.

Customer and service VLAN topologies

Waystream switches are especially designed for a wide variety of layer2 network topologies and supports:

- Ethernet wholesale with C-VLAN and S-VLAN, supporting double-tagging for business services or open-access networks.
- Customer VLAN topologies with a central Service Router/BNG
- Service VLAN topologies using DHCP snooping for end-user and network security
- IP strict clients for anti-spoofing
- MAC Forced Forwarding prevents layer 2 interaction between clients in the VLAN, including ARP inspection for increased security

A major concern in BNG deployment topologies is how to protect the network from user upstream bandwidth attacks. The natural response is to use ingress rate-limiting on the access switch, but in BNG topologies this both increases the number of devices that need configuration and requires advanced rate-limiting functions to avoid a negative impact on traffic flows. Waystream switches can use RADIUS to automatically obtain configuration instructions for ingress rate-limiting of traffic, thereby contributing to network protection and improved user experience.

Multicast VLAN support and ability to create channel packages allows optimal bandwidth utilization in the access at the same time as maximum control of TV distribution is obtained.

Service Assurance - Quality inspection of TV and connectivity checks

Included in Waystream iBOS operating system are service assurance features to allow operators to verify service quality in the network. The 7100 and 7300 series can inspect multicast MPEG to measure the quality of TV. If an end user reports a problem with the TV service, the switches can provide immediate information if a problem is seen in the network, and if it affected the entire network or only a part of the network. The feature help network engineers to pinpoint the location of the problem in seconds.

In addition the switch can perform continuous connectivity checks to ensure that traffic is working, following the active network path. These checks provides insight into network performance over time and can also immediately notify network operations if service failure occurs.

Streaming telemetry

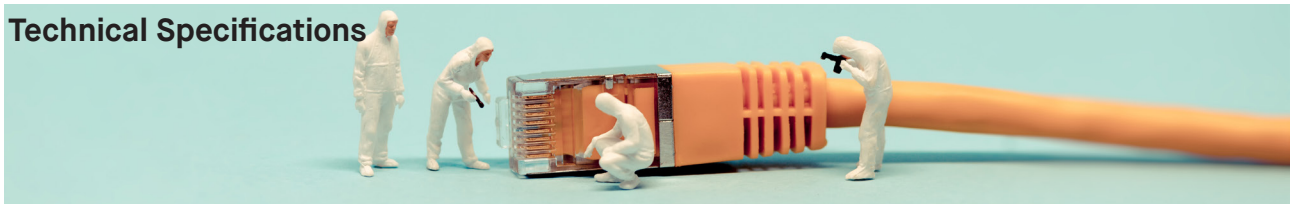
The 7300 supports streaming telemetry data to provide indepth information about system health and network performance. Telemety can be uploaded directly to an Influx timeseries database or any receiver that can accept JSON metrics. This allow commerical and open-source receivers to collect the telemetry data and visualisation and analysis tools to be applied.

Telemetry data visualized by Grafana

Environmental touch

The Waystream switches series has been adapted to meet Swedish legislation to reduce certain hazardous materials commonly used in electronics. The 7300 contains less bromide, phosphorous and chlorine compounds than comparable products which reduces the health risks associated with electronics.

Technical Specifications



Layer 2 switches (MS-Series)

Model	Uplinks	Downlinks	MAC table	IPv4/IPv6 routes
MS7124-AC	4x1/10G	24 x 10/100/1000 RJ-45	32K	64
MS7148-AC	4x1/10G	48 x 10/100/1000 RJ-45	32K	64
MS7324-AC	4x1/10/25G	24 x 10/100/1000/2500 RJ-45	32K	64
MS7348-AC	4x1/10/25G	48 x 10/100/1000/2500 RJ-45	32K	64

Layer 3 switches (ASR-series)

Model	Uplinks	Downlinks	MAC table	IPv4/IPv6 routes
ASR7124-AC	4x1/10G	24 x 10/100/1000 RJ-45	32K	32K/16K
ASR7148-AC	4x1/10G	48 x 10/100/1000 RJ-45	32K	32K/16K
ASR7324-AC	4x1/10/25G	24 x 10/100/1000/2500 RJ-45	32K	32K/16K
ASR7348-AC	4x1/10/25G	48 x 10/100/1000/2500 RJ-45	32K	32K/16K

All models

Physical	
Dimensions	43x441x240 mm (H x W x D)
Weight	24-port: 4.5 kg 48-port: 5 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 24-port: Typical <50dB, Max: 58 dB 48-port: Typical <50dB, Max: 65 dB
Cooling	Redundant fan. The switches have sufficient cooling capacity even with one fan failing. Front-to-side airflow

Environmental	
Operating temperature	0 to 45°C
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	One IEC 60320-1 C14, located on the front panel 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 Rear-panel 12V DC power input to mainboard
Power consumption	24-port switches 50 W (room temperature) 48-port switches 75 W (room temperature)
Safety	LVD (2014/35/EU) CE mark: EN62368-1:2014 + A11:2017 CB scheme: IEC/EN 62368-1:2014 (Second Edition)
EMC	CE EMC (2014/30/EU) Emission: EN55032:2015 + AC:2016 Class A Immunity: EN61000-3-2: 2014 Class A, EN61000-3-3: 2013, EN55035:2017, EN61000-4-2: 2009, EN61000-4-3: 2006 + A1:2008 + A2:2010, EN61000-4-4: 2012, EN61000-4-5: 2014, EN61000-4-6: 2014, EN61000-4-8: 2010, EN61000-4-11: 2004
RoHS, WEEE and REACH	RoHS 2015/863/EU, WEEE 2012/19/EU, REACH

Performance	
Switch ASIC performance	Forwarding bandwidth: 24-port 190 Gbps, 48-port 270 Gbps
CPU/NPU Performance	1500Mhz NPU with 4 cores, providing up to 10 Gbps throughput
VLAN table	1000 VLANs from full vlan range
Multicast S,G entries	2048 L2 multicast, 2000 IP multicast groups
Jumbo Frames	Up to 9 Kbyte
Classification	Layer 2 packet classification with filtering Access-list entry hit logging and packet counting 9K x 20 bytes TCAM yields apx. 500 services
Packet queuing	Weighted round robin (WRR) and strict priority (SP)
Policing ingress/egress	2000 policers with packet drop or recolor (64kbps-1000Mbit/s), TBM, TRTCM, MEF10.2
Shaping ingress/egress	511 egress shapers with packet drop or recolor (64kpbs – 1000Mbit/s)

Layer2 and Forwarding	
IEEE standards	IEEE 802.3z – Gigabit Ethernet IEEE 802.3bz - 2.5GBASE-T IEEE 802.3ae - 10Gbit/s over optical fibre IEEE 802.3by - 25Gbit/s operation 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 Static join of multicast groups

Other features	
System boot	BOOTP and DHCP client for address assignment and configuration download (Zero Touch Provisioning) MS-series Alternating untagged and tagged vlan 127
Flow export	Netflow version 9
Security	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 DHCPv4 snooping for anti-spoofing
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

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 PFNP customer premise equipment
System boot	BOOTP/DHCP client for address assignment and Zero Touch Provisioning
Time	NTP time synchronisation
Remote logging	Syslog
LLDP	Link Layer Discovery Protocol
Telemetry	Streaming telemetry as InfluxDB line-protocol 1.x over HTTP or JSON

Layer 3 switches (ASR)

The Waystream 7100 and 7300 ASR series is a layer3 switch. It supports BNG-like features and layer2 overlay functionality. The following additional features is available on all ASR models.

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	2048 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

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 Waystream FTTB switch

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

Article	Description
MS7124-AC	MS7124, 4 x 10G, 24 x 1G RJ-45, AC power, iBOS Standard
MS7148-AC	MS7148, 4 x 10G, 48 x 1G RJ-45, AC power, iBOS Standard
ASR7124-AC	ASR 7124, 4 x 10G, 24 x 1G RJ-45, AC power, iBOS Standard Layer 3
ASR7148-AC	ASR 7148, 4 x 10G, 48 x 1G RJ-45, AC power, iBOS Standard Layer 3
MS7324-AC	MS7324, 4 x 25G (SFP28), 24 x 1G/2.5G RJ-45, AC power, iBOS Standard
MS7348-AC	MS7348, 4 x 25G (SFP28), 48 x 1G/2.5G RJ-45, AC power, iBOS Standard
ASR7324-AC	ASR 7324, 4 x 25G (SFP28), 24 x 1G/2.5G RJ-45, AC power, iBOS Standard Layer 3
ASR7348-AC	ASR 7348, 4 x 25G (SFP28), 48 x 1G/2.5G RJ-45, AC power, iBOS Standard Layer 3
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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