FUJITSU

Data Sheet
FLASHWAVE® 5300

Ethernet Access and Aggregation Devices

Key Features

- Supports MEF CE 2.0 standard-based Ethernet Line (E-Line), Ethernet LAN (E-LAN), and Ethernet Access (E-Access) services
- Ethernet ring protection switching (G.8032 v2) and linear protection switching (G.8031)
- Synchronization source derived from SyncE Ethernet interfaces or 1588 v2 slave clock
- Fault and performance management with Y.1731, link trace, delay, jitter, and loss measurement
- Built-in RFC 2544 test methodology and ITU-T Y.1564 Service Activation Test (SAT)
- Multichassis LAG

Service providers can meet access and network growth challenges by upgrading legacy equipment to carrier-grade Ethernet platforms from Fujitsu. These Fujitsu platforms can be controlled by a common network management system.

The FLASHWAVE 5300 family is just part of a complete, proven, MEF 2.0–compliant Ethernet Services solution:

- The FLASHWAVE 5300 family of Ethernet access and aggregation devices comprises the FLASHWAVE 5305, FLASHWAVE 5310, FLASHWAVE 5321, and FLASHWAVE 5322 platforms
- The FLASHWAVE 7120 Micro Packet Optical Networking Platform provides core switching and DWDM
- The NETSMART® 1200 Ethernet Service Manager is a GUI-based network management system that provides service management, end-to-end provisioning, and open interfaces for the FLASHWAVE 7120 and FLASHWAVE 5310 platforms

Architecturally, this Fujitsu solution is a complete system that offers access devices, aggregation devices, core switching devices, and DWDM components for scaling. With the NETSMART 1200, the customer's service is managed end-to-end, from customer premises equipment to the core network, on a single, full-featured GUI management system.

Standards-Based Carrier Ethernet Delivery

Designed to support Metro Ethernet standards, the FLASHWAVE 5300 family delivers Ethernet line, Ethernet access, and Ethernet LAN connectivity in ring or star topologies. Integrated support for both Gigabit Ethernet and 10 GbE Ethernet connectivity creates an affordable, versatile, and seamless path to high-capacity business and 4G mobile backhaul applications.

FLASHWAVE 5300 series platforms provide Ethernet service scalability from 1 Mbps to 10 Gbps. With at least four SFP+ ports in each device supporting both 1 GbE and 10 GbE SFPs, these platforms offer flexible service delivery and high reliability for Ethernet services with ITU-T G.8031 or G.8032 v2 sub-50 millisecond ring protection, laddered rings, and multiple instances.

Applications	Technologies
■ Mobile backhaul	■ Carrier Ethernet
■ Business services delivery	■ G.8032 Ethernet Ring Protection
■ Ethernet aggregation	■ Y.1731 PMs
■ MEF services: EPL, EVPL, E-LAN, E-Line, E-Access	■ Y.1564 Birth Certificate
	■ Multichassis LAG

Fujitsu Ethernet Services Solution

Scalable, Flexible, and Reliable Services Platform

With a compact, low-power, temperature-resilient architecture, FLASHWAVE 5300 platforms are ready to be installed in wireless towers, customer premises, and aggregation points to solve space and power challenges, deliver high-performance, scalable services, and reduce operational costs.

- The FLASHWAVE 5305 is a 1/2 × 1RU, low-maintenance Ethernet access device designed to deliver Ethernet services support to enterprise business and mobile backhaul service applications. The platform provides up to four 1 GbE/10 GbE Ethernet ports, and its desktop form factor requires no cooling fans.

- The FLASHWAVE 5321 and 5322 are 1RU, rack-mount Ethernet aggregation devices designed to provide backhaul Layer 2 switching capabilities in multiple 10 GbE Ethernet metro core rings. Each platform provides Ethernet service demarcation, classification, traffic management, prioritization, aggregation, and service interworking in up to 64 Gbps or 120 Gbps switching fabrics, respectively. The 5321 device provides 24 ports that support 1 GbE operation and an additional four ports that can support either 1 GbE or 10 GbE operation. The 5322 device provides 12 ports that can support 1 GbE or 10 GbE operation.

Service-Level Provisioning, Monitoring, and Management

Graphical user interfaces based on Simple Network Management Protocol (SNMP) supported by in-band or out-of-band interface options, together with the NETSMART 1200 management system, provide a full network management view. The NETSMART 1200 system streamlines the process of deploying and maintaining an Ethernet network. The system uses MEF terms and concepts for provisioning and allocating resources, which greatly simplifies operations. The NETSMART 1200 determines flows based on service requirements and reduces complexity and the need to know the intricacies of the systems.

With dedicated hardware to monitor traffic performance, the FLASHWAVE 5300 family provides hardware-based ITU-T Y.1731 latency, jitter, and frame-loss ratio measurements. Hardware-based Media Access Control (MAC) address swapping enables support for station loopbacks, allowing centralized test sets to complete service turn-up and performance verification. Users can monitor tiered Ethernet services and service level performance for wireless backhaul through the Web-based SLA portal.

Network Growth and Scaling

As bandwidth grows in a metro Ethernet network, service providers must accommodate growth beyond 10G access rings. DWDM is an economical solution for scaling networks beyond 10G. Instead of relying on an overlaid DWDM solution, the Fujitsu Ethernet Services solution provides integrated DWDM capabilities in the FLASHWAVE 7120 core nodes. Each core node has core Ethernet switching and DWDM modules—an elegant and comprehensive solution with a single management system.
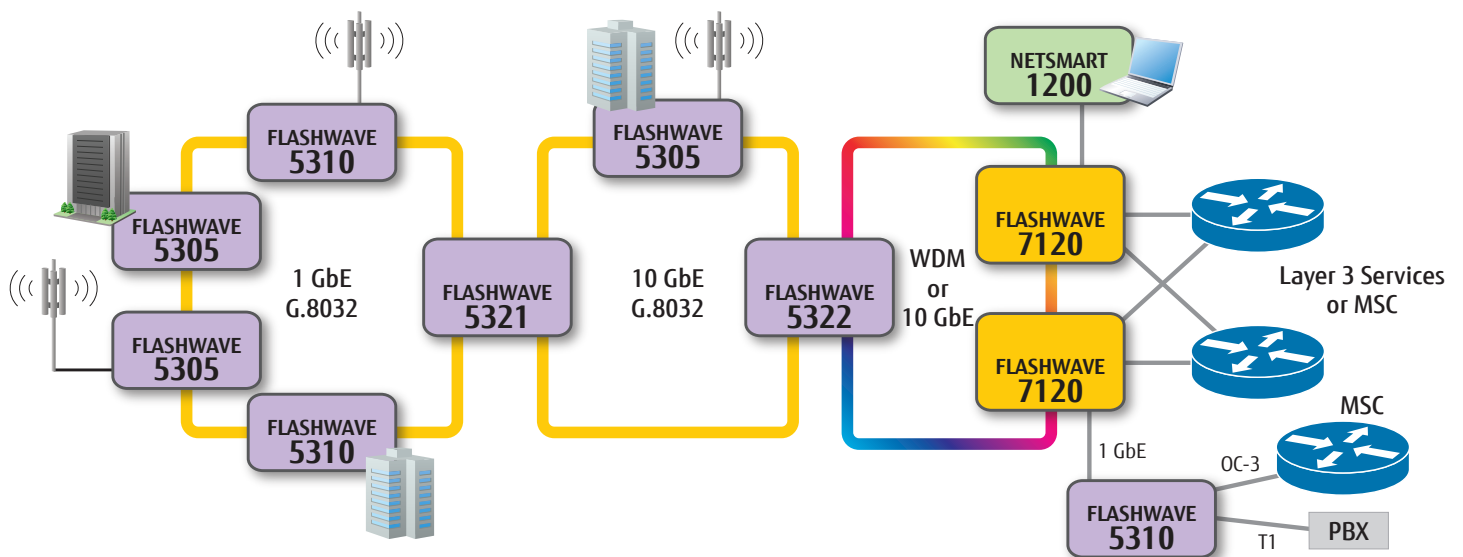
FLASHWAVE 5300 platforms are suitable for wireless towers, customer premises and aggregation points.

Features and Specifications

	FLASHWAVE 5305	FLASHWAVE 5321	FLASHWAVE 5322
Dimensions	½ × 1RU	1RU	1RU
1 GbE/10 GbE SFP+	4	4	12
1 GbE SFP	–	24	–

Base System Hardware

Ethernet Interfaces	FLASHWAVE 5305: 4 ports × 1 GbE/10 GbE SFP+ FLASHWAVE 5321: 24 ports × 1 GbE SFP and 4 ports × 1 GbE/10 GbE SFP+ FLASHWAVE 5322: 12 ports × 1 GbE/10 GbE SFP+
Serial Port	RJ-45 RS-232 Serial Port
Local LAN Port	10/100 Mbps Ethernet RJ-45
Front LEDs	• RED: Critical, Major, and Minor • Blue: Run
Fan	FLASHWAVE 5305: No FLASHWAVE 5321: Field-swappable FLASHWAVE 5322: Field-swappable
Power supply connectors	• Terminal block for –48 V DC/+24 V DC • AC via 12 V adapter
BITS-OUT	SMA Connector 10 MHz input & 1PPS output

Ethernet Switching

Switching Fabric	40 Gbps
MAC Address Table	32 K Table Entries
Jumbo Frames	9600 Bytes
VLAN Tagging 802.1Q	4094 C-VLANs
Provider Bridging 802.1ad	4094 S-VLANs with LACP
Tagging	CVLAN Translation & Double Tagging Tagging, De-tagging, Swapping

Synchronization

• ITU-T G.8261/G.8262/G.8264 SyncE on all interfaces
• SyncE status message support
• IEEE 1588 v2 ordinary clock (slave only)
• Internal Stratum-3 Clock with holdover to meet ITU-T G.813

Ethernet Services

MEF CE2.0* Carrier Ethernet E-Line, E-LAN, and E-Access

* MEF certification upcoming

Traffic Management

C-Tag and S-Tag	Push, Pop, and Swap
Priority Queues	8 queues per port
Traffic Classification	802.1P, Port, VLAN, ToS, DSCP
MEF Compliant Policer	CIR/CBS and PIR/PBS 2-rate 3-color (trTCM)

Supports large CBS up to 32,768 KB to guarantee SLA performance levels on bursts of frames which exceed the CIR

MEF 23.1 HBWF (Hierarchical Bandwidth Profile)

Hierarchical QoS for 3-stage shaping and 2-stage scheduling

Network Protection

Ethernet Ring Protection Switching	• <50 ms Protection Switching • 3.3 ms CCMs in hardware • Nonrevertive/Revertive • ITU-T G.8031/G.8032 v2 • Multiple Instances/Laddered Rings
Link Aggregation	• 0:N LAG with LACP (802.3ad) • 1:1 Active/Standby LAG • Multichassis LAG

Ethernet OAM

Fault Management	• 802.1ag CFM • 802.3ah EFM with Dying Gasp • Y.1731 FM and PM • RFC2544 Test Generator & Analyzer • Y.1564 Multi-Service Activation test • Ethernet Fault Propagation Shutdown (EFPSD)
Loopbacks	• Station Loopback: • Layer 1, 2 (MAC Swap) • Layer 3 (IP Swap) • Layer 4(TCP/UDP Port Swap) • Loopback based on Layer 2 and Layer 3 Filter • Station Loopback via inband requests • IEEE 802.1ah / Y.1731 LBM OAM LBK
Topology Discovery	Link Layer Discovery Protocol

Features and Specifications

Performance Monitoring	
Ethernet SLA PMs	• 24 hr, 15 min, and 5 min bins for PMs • Y.1731 Frame Delay • Y.1731 Loss Ratio • Y.1731 Delay Variation • One-Way Delay using IEEE 1588 v2 PTP
Ethernet Service PMs	• 24 hr, 15 min, and 5 min bins for PMs • Bytes declared Red, Yellow, and Green • Packets Received and Transmitted • Input & Output Rate per EVC • Service Utilization per CIR
Ethernet Port PMs	• 24 hr, 15 min, and 5 min bins for PMs • RX, TX and Error Statistics • Input and Output Utilization per Port

Security
• Telnet with SSH v2 • Remote Authentication via RADIUS • Access Control List (ACL) • IEEE 802.1x Port Authentication

Management
• SNMP v1/v2c Sets and Gets • FTP, SFTP • In-band and Out-of-band

Physical Characteristics	

Dimensions
(H × W × D)
	FLASHWAVE 5305: 1.73 × 7.32 × 7.32"
	      44 × 186 × 187 mm
	FLASHWAVE 5321: 1.73 × 17.32 × 9.44"
	      44 × 440 × 240 mm
	FLASHWAVE 5322: 1.73 × 17.32 × 9.44"
	      44 × 440 × 240 mm

Weight	FLASHWAVE 5305: 3.1 lb (1.4 kg) FLASHWAVE 5321: 5.3 lb (2.4 kg) FLASHWAVE 5322: 5.3 lb (2.4 kg)

Operation	
Operating Temperature	–40 to +65 ℃
Storage Temperature	–40 to +70 ℃
Humidity	Up to 85% noncondensing
Power Supply	FLASHWAVE 5305 • AC: via 12 VAC Adapter • DC: –48 VDC/+24 VDC FLASHWAVE 5321 and 5322 • Dual replaceable DC or single replaceable AC power supplies
Power Redundancy	• Redundant Feeds DC Power Supply • Single AC Power Supply
Nominal/Maximum Power	20 W/30 W

Regulatory
• FCC Part 15 Class A • EN 55022, EN 55024 Class A • UL 60950-1, IEC 60950-1, EN 61000 • NEBS Level 3 compliant • GR-63-CORE Issue 3 & GR-1089-CORE Issue 5 • CSA & CE Mark

Compliance
• RoHS 5/6: Compliance with Directive 2002/95/EC 6 • ETSI 300 019 Class 1-1, Class 2-32, Class 3-1

Standards Compliance
• IEEE 802.1Q, 802.1ag, 802.1ad (LLDP) and 802.1x • IEEE 802.3ah and 802.3ad (LACP) • ITU-T Y.1731, G.8032 v2, G.8261/8262/8264 • CE 2.0, MEF 6.1, 9, 10.2, 11, 14, 20, 23.1, 25, 26.1, 30, 33 & 35 • IETF RFC2544, RFC5357, RFC2863 (IF-MIB) • IETF RFC3418 (MIB for SNMP), RFC4188 (Bridge) • IETF RFC2922 (Physical Topology)

Fujitsu Network Communications, Inc.

2801 Telecom Parkway, Richardson, TX 75082
Tel: 888.362.7763

us.fujitsu.com/telecom

3.0/r2.2/07.16