FUJITSU

Data Sheet
FLASHWAVE® CDS
Micro Packet Optical Networking Platform

Flexible, high-density access to services up to 100G

In a changing communications industry, operators are enhancing networks to support Optical Transport Network (OTN) and packet-based services. As Ethernet becomes more prevalent, networks must evolve to deliver it efficiently, cost-effectively, and with 99.999% service availability. To meet these challenges, Fujitsu has developed the next generation of packet optical networking platforms (ONPs). These devices provide a smooth transition to an industry-standard transparent payload service with self-healing network protection switching, hardware redundancy, up to 100G demarcation or aggregation, extensive OA&M visibility, and Carrier Ethernet Layer 2 advanced traffic management.

A New Class of Optical Edge System

The carrier-class FLASHWAVE CDS Micro Packet Optical Networking Platform provides flexible, high-density access up to 100G for Ethernet, SONET, SDH, and OTN services. The platform can operate as a stand-alone, end-to-end solution or as an extension of the FLASHWAVE 9500 Packet ONP or the FLASHWAVE 7500 Metro/Regional Multiservice ROADM.

Service providers can employ the FLASHWAVE CDS architecture to enhance business services and optimize access networks. The compact FLASHWAVE CDS platform provides high-performance service delivery with modular one– and two–rack unit options. Fujitsu optimized both chassis for mobile backhaul and business applications. The 1RU chassis provides a one-slot customer premises demarcation platform for Gigabit Ethernet (GbE), 10 GbE, 40 GbE, 100 GbE, OC-3/12/48/192, STM-64, OTU1, OTU2, and OTU4 service delivery with optional network diversity protection. The 2RU chassis has two slots offering both hardware and network resiliency when high-availability service is required.

OTN-Based Services

A transition is occurring as network operators move from using OTN solely as a digital wrapper for enhanced DWDM performance to using it as a switching mechanism for the next generation of service grooming and aggregation. OTN provides fully transparent global transport for Ethernet, SONET, SDH, and wholesale service extensions. FLASHWAVE CDS OTN switching and multiplexing capabilities provide a transparent transport interface between these critical services and the OTN network.

The FLASHWAVE CDS platform incorporates a non-blocking OTN switch with multirate input/output to provide high-density OTN switching and multiplexing. Two-card operation with the Y-cable unit provides hardware resiliency for high-availability applications. Self-healing network facility protection is afforded by industry-standard SNC-Ne/S using sub-50 millisecond protection switching.

With standards-compliant OTN capability, the FLASHWAVE CDS platform has features that provide value across a range of applications.

- Optimized for CPE demarcation, fiber relief, or wholesale service extension
- Resilient, high-availability service delivery options
- Up to 400 Gbps OTN switching capability within a 2RU footprint

A New Class of Optical Edge System

Carrier Ethernet–Based Services

The FLASHWAVE CDS platform incorporates advanced rate shaping, traffic management, and aggregation supporting revenue-bearing services with guaranteed Ethernet service delivery. The platform provides a number of innovative features, including:

- 1 GbE and 10 GbE MEF 2.0 Carrier Ethernet-certified service delivery
- Dynamic bandwidth reuse that optimizes throughput and fiber assets for highly efficient transport
- Guaranteed bandwidth with dynamic buffer allocation enabled by advanced traffic management
- Sub-50 millisecond network resiliency
- Smooth migration from n × GbE network ports to 10 GbE transport for investment protection and flexible scaling

Simplified Network Operations

Network operations represent a significant portion of total cost of ownership (TCO). Network design, implementation, and maintenance all contribute to operating expenses. The Fujitsu NETSMART® 1500 Management System, compatible with all FLASHWAVE platforms, streamlines network deployment and maintenance through a centralized point-and-click GUI-based management system. The NETSMART 1500 system simplifies flexible, high-density access of 1/10/100 Gigabit Ethernet, OC-3/12/48/192 SONET, STM-64 SDH, and OTU1/OTU2/OTU4 OTN services.

Applications	Technologies
• Ethernet access and aggregation • Fiber relief • Ethernet/SONET/OTN demarcation • Enterprise services • Mobile backhaul • Outside-plant services	• OTN • Carrier Ethernet • Transparent legacy SONET

Technical Specifications

System Overview

- Carrier-class design
- Y-cable or cross-card protection with sub-50 millisecond switching
- No single point of failure
- Two high-density chassis
  - 1-slot, 1RU, CPE-optimized, AC modular chassis
  - 2-slot, 2RU, high-availability DC modular chassis
- Multiple pluggable optical modules
  - Wideband CFP4, SFP+, SFP, and XFP
  - Full-band tunable SFP+, SFP, and CFP
  - CWDM SFP, SFP+ and XFP
  - SFP BiDi
  - DWDM XFP

Interface Modules

Card Type	WAN Access Technology	1RU	2RU	Description

HD62
OTN Switch Aggregator Unit
	OTN	✓	✓	• 1 × 100G (OTU4) network port
				  • CFP4 interface
				  • 100G, OTU4
				  • NoFEC, RSFEC
				• 10 × 10G network or client ports
				  • Wideband 10G CWDM SFP+ interface
				  • 10 GbE, OC-192, STM-64, OTU2, OTU2e
				  • NoFEC, RSFEC, UFEC

HD32
OTN Switch Aggregator Unit
	OTN	✓	✓	• 2 × 10G (OTU2) network ports
				  • CWDM, DWDM, and full-band tunable XFP interfaces
				  • 10G, OTU2
				• 16 × 2.5G client ports
				  • Wideband, BiDi, CWDM SFP interfaces
				  • 1 GbE, OC-3/12/48, OTU1

TM61
OTU4 OTN Transponder Demarcation Unit
	OTN	✓	✓	• 1 × 100G (OTU4) network port
				  • Wideband CFP4 interface
				  • 100G, OTU4
				  • NoFEC, RSFEC
				or
				• 1 × 100G (OTU4) network port
				  • Full-band tunable coherent CFP interface
				  • 100G, OTU4
				  • NoFEC, SDFEC
				• 1 × 100 GbE client port
				  • Wideband CFP4 interface
				  • 100 GbE, OTU4
				  • NoFEC, RSFEC
				or
				• 1 × 40 GbE client port
				  • Wideband QSFP+ interface
				  • 40 GbE

Interface Modules (Continued)

Card Type	WAN Access Technology	1RU	2RU	Description

TM51
OTU2 OTN Transponder Demarcation Unit
	OTN	✓	✓	• 2 × 10G (OTU2) network ports
				  • Narrowband or wideband XFP interface
				  • OTU2, OTU2e
				  • Wideband, CWDM, and DWDM full-band tunable narrowband XFP interfaces
				  • 10G, OTU2
				  • No FEC, RSFEC, UFEC
				• 2 × 10G (OTU2) client ports
				  • Wideband XFP interface
				  • 10 GbE, OC-192, OTU2
				  • No FEC, RSFEC

TM41
OTU1 OTN Muxponder Demarcation Unit
	OTN	✓	✓	• 2 × 1G (OTU1) network ports
				  • Wideband, CWDM SFP interface
				  • OTU1
				• 4 × 1 GbE client ports
				  • Wideband SFP interface
				  • 1 GbE

HD12 10 GbE Data Unit	Carrier Ethernet		✓	• 2 × 10 GbE (XFP) with 12 × 1 GbE (SFP) network ports and/or • 12 × 10/100/1000Base-T (RJ-45) client ports
HDP1 10 GbE Data Unit	Carrier Ethernet		✓	• 2 × 10 GbE (XFP) with 12 × 1 GbE (SFP) network ports and/or • 12 × 10/100/1000Base-T (RJ-45) client ports
LDP1 1 GbE Data Unit	Carrier Ethernet		✓	• 12 × 1 GbE (SFP) network or client ports • 12 × 10/100/1000Base-T (RJ-45) client ports
LDP3 SONET Unit	SONET		✓	• 2 × OC-48 network ports • 2 × 1 GbE/OC-3/12 client ports

Technical Specifications

Ethernet Functions

- Ethernet Private Line and Ethernet Virtual Private Line services
- Hub and spoke topologies
- Ring and mesh topologies
- Automatic cross-card protection switching capabilities
- VLAN push, pop, translation
- Connection admission control
- IEEE 802.3ad Ethernet link aggregation (1:1 or 0:n)
- Jumbo frame support
- Advanced traffic classification
  - Port
  - VLAN
  - Ethernet priority bit (802.1p)
  - IP DSCP
- Strict priority & per-EVC queuing
- Hierarchical shaping with logical ports
- IEEE 802.3ah link EFM OA&M
- In-band VLAN management
- Large buffering for high burst tolerance
- G.8031 support
- Enhanced traffic management
- 2,000 flows
- Sync E
- Hardware-based 512 × 3.3 ms, 10 ms, 100 ms, or 1 s CCMs
- Line rate throughput at all frame sizes (10 Gbps @ 64-byte frame)
- Service OA&M – 802.1AG CFM, Y.1731
- ACL support
- MAC translation
- MAC swap loopback
- Port mirroring
- Enhanced security
- DS1 circuit emulation with special SFP

SONET Functions

- STS cross connects
- TDM multiplexing
- Ethernet over SONET
- GFP-F encapsulation
- HO VCAT
- SDCC support for remote access

OTN Functions

- Full-band tunable optics
- Non-blocking OTN switch fabric: 400G per two-card HD62 system, 200G per single-card HD62 system
- Non-blocking OTN switch fabric: 80G per two-card HD32 system, 40G per single-card HD32 system
- Cross-card switching capabilities
- Protection utilizing SNC-Ne/S
- Y-cable protection on client

Operating Environment

Operating temperature range		–40 to +65 °C (–40 to +149 °F)
Humidity range		5 to 95%
Maximum power consumption (heat dissipation)	Maximum power per system with TM51 interface module. Optics not included.	1RU chassis: 131 W (447 BTU/hr) 2RU chassis: 216 W (737 BTU/hr)
	Power input	• 1RU chassis: 110 V AC • 2RU chassis: –48 V DC

Physical Characteristics

Dimensions (H × W × D)	• 1RU chassis: 1.75 × 17.4 × 12" (44.5 × 442 × 305 mm) 1RU high, 19/23" with AC cord • 2RU chassis: 3.5 × 17.4 × 12" (89 × 442 × 305 mm) 15" (381 mm) deep with cabling 2RU high, 19/23" rack-mountable
Weight	• 1RU chassis: 7 lb/3.17 kg Monolithic design with fan. Supports all OTN interface cards. • 2RU chassis: 10.2 lb/4.6 kg No external fans or baffles required. Supports all OTN, Carrier Ethernet, and SONET cards.

Operations

- TL1 protocol over OSI/Ethernet
- IPv6 over LCN
- IP/PPP/OSPFv2 over GCC0
- NETSMART 500 Element Manager
- NETSMART 1500 Management System
- Software download and remote memory backup/restore
- Interoperable with FLASHWAVE 7500 and 9500 platforms
- Telcordia™ OSMINE compliant
- RADIUS support

Regulatory and Standards Compliance

- UL-certified
- NEBS Level 3 compliant
- MEF Certified to Carrier Ethernet 2.0

Fujitsu Network Communications, Inc.
2801 Telecom Parkway, Richardson, TX 75082
Tel: 888.362.7763
us.fujitsu.com/telecom

Walker and Associates, Inc.
PO Box 1029, 7129 Old Hwy 52
Welcome, NC 27374
Tel: 800.925.5371
www.walkerfirst.com

13.0/R8.2/12.16