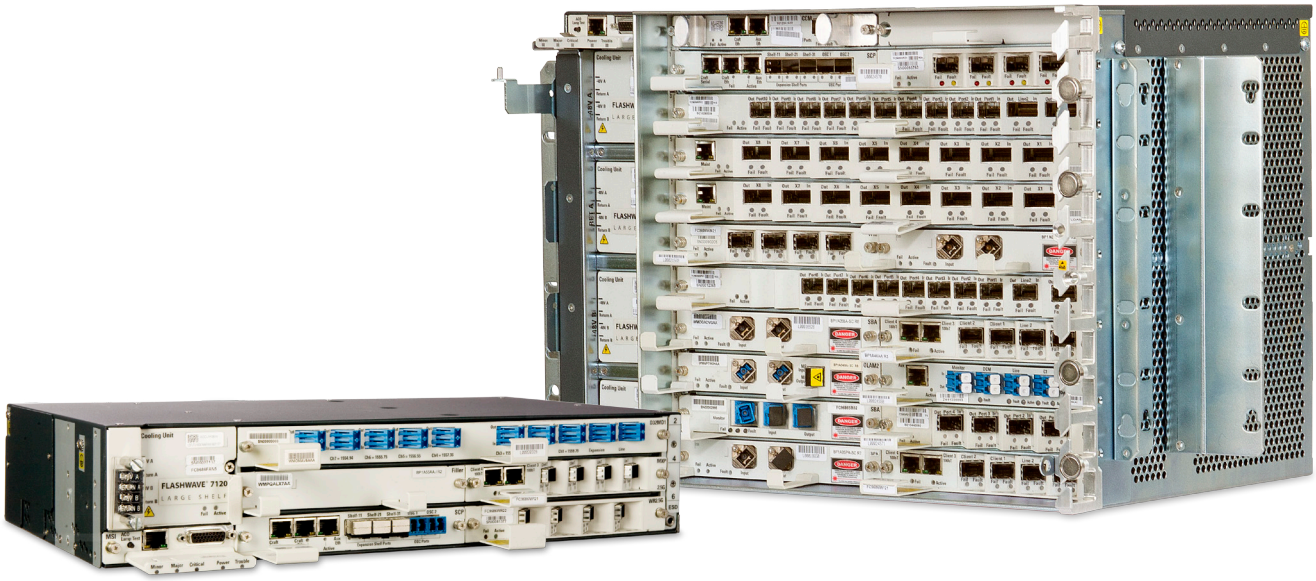
FUJITSU

shaping tomorrow with you

FLASHWAVE® 7120

Micro Packet Optical Networking Platform



The FLASHWAVE 7120 system is a combination access WDM and intelligent edge service delivery platform. Engineered for low-latency applications, this system's high density, compact size, and low power consumption make it ideal for solving bandwidth and fiber constraints.

FLASHWAVE® 7120

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Adapt to Emerging Demand

Today's business customers are widely dispersed and they demand an unpredictable mix of voice, data and video at competitive prices. Consequently, carriers must extend services while aggressively managing expenses, using infrastructure that adapts to emerging bandwidth and access backhaul demands.

Reduced Complexity, Extended Capabilities

The FLASHWAVE® 7120 Micro Packet Optical Networking Platform simplifies the process of providing bandwidth and intelligent services to the edge of the network. This compact solution is ideal for enterprise applications such as research and education, emerging healthcare, and utility companies. The platform is also an excellent fit for tier 1 customers seeking an integrated core-to-access Wavelength-Division Multiplexing (WDM)-based solution. The system addresses multiple network applications, including:

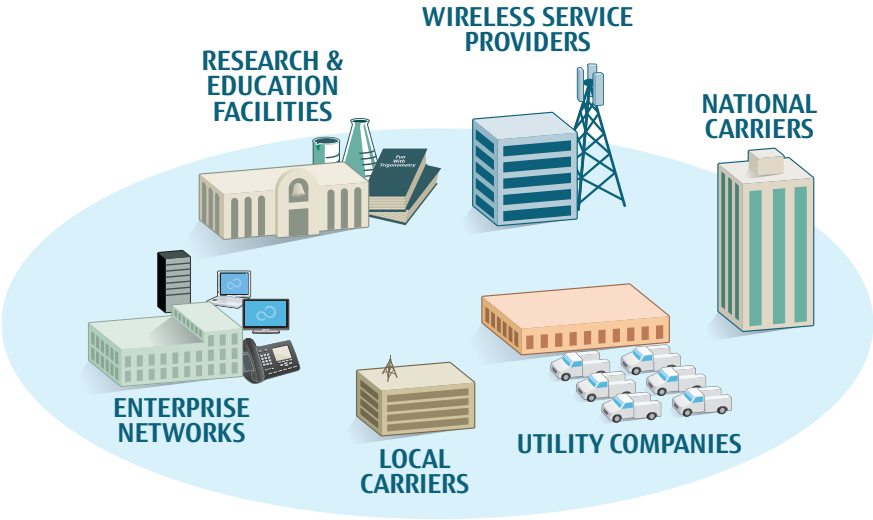
- Optical metro access and edge WDM networking
- Managed wavelength service delivery
- WDM, Optical Transport Network (OTN), Ethernet and SONET/SDH consolidation
- Metro Ethernet Forum (MEF)-certified services
- Optical reach extension and fiber relief

The FLASHWAVE 7120 platform offers a unique photonic layer solution that combines flexibility and cost-efficiency with the reliability and management of traditional optical transport systems. Its comprehensive suite of passive and active modules permits flexible customization. Cost reduction is consequently possible by mixing and matching components. As a result, you reach more customers more economically.

Options for Diverse Networks

The FLASHWAVE 7120 platform is available in two form factors: a 7RU shelf and a compact 2RU shelf. The platform supports:

- Cost-effective access CWDM and DWDM applications
- Tier 2/3 metro networks
- Fixed-filter and 2D ROADM options
- Integrated wavelength services from FLASHWAVE 7500 and 9500 systems
- Full suite of service interfaces including:
  - Dual transponders for 2.5, 4 & 10 Gbps private line services
  - Multirate, multiprotocol muxponders for service aggregation
  - MEF E-LAN solutions with bridged Ethernet interfaces
- Wide choice of amplifier options
- OTN support across all interfaces
- Capacity expansion of up to 60 service slots in one node
- Extended temperature operation



Reach More Customers

The FLASHWAVE 7120 platform provides cost-effective service delivery and WDM transport for access applications and tier 2/3 metro WDM networks. Whether providing high-capacity 2.5G and 10G private line wavelength services to end customers, backhaul for mobile cell sites, or general-purpose service aggregation and WDM transport, the FLASHWAVE 7120 enables small, scalable, economical C/DWDM solutions for carrier applications. Supporting a wide array of client services, integration with FLASHWAVE 7500/9500 core metro systems, full NETSMART 1500 and NETSMART 1200 management system support, the FLASHWAVE 7120 is an ideal platform for access WDM applications.

Manageable Flexibility

The FLASHWAVE 7120 architecture scales so that service slots from multiple shelves can be managed from a single CPU and TID. The NETSMART 1500 and NETSMART 1200 Management System allows the FLASHWAVE 7120 platform to be managed under the same Operations Support System (OSS) as other Fujitsu optical transport products. Transaction Language 1 (TL1) and Simple Network Management Protocol (SNMP) support integration into existing operating procedures and third-party management systems.

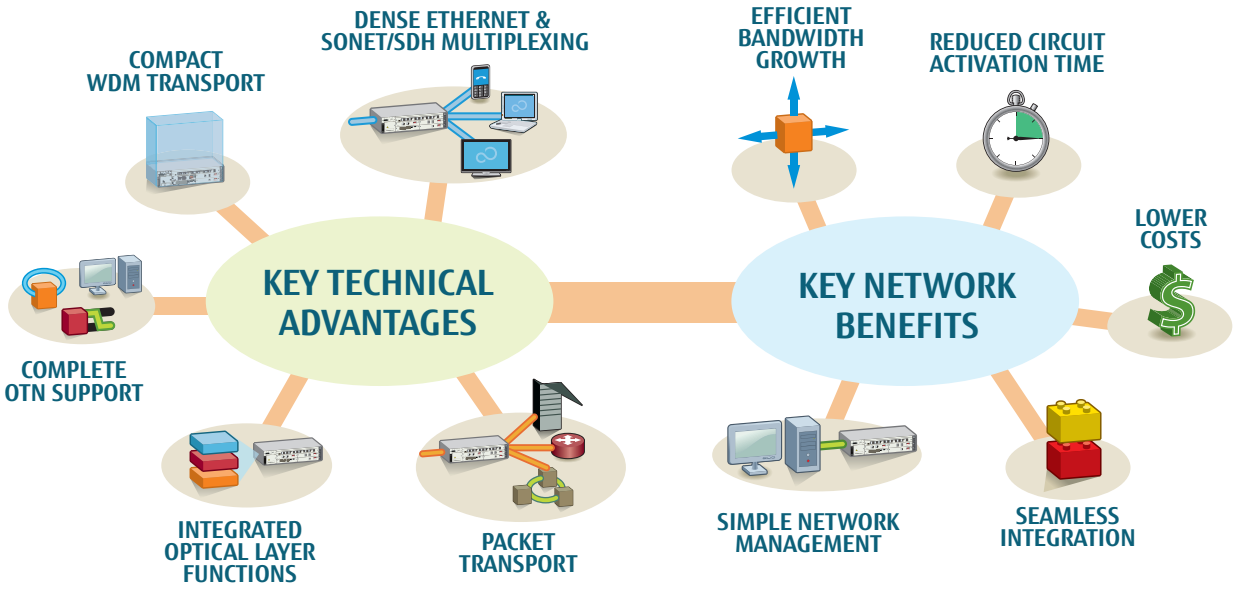
Reduce Demand and Rationalize Your Infrastructure

The FLASHWAVE 7120 system operates as a standalone WDM-based solution, or as part of an integrated Fujitsu solution. Core-to-edge deployments are possible in concert with other Fujitsu platforms, which can eliminate back-to-back transponders and separate management systems. These integrated solutions are possible via deployment with:

- Packet ONPs such as the FLASHWAVE 9500 platform
- ROADMs such as the FLASHWAVE 7500 system for core and transport
- MSPPs such as the FLASHWAVE 4500 and FLASHWAVE 4100 platforms for certified optical networking
- Micro Packet ONPs such as the FLASHWAVE 4100 ES and FLASHWAVE CDS systems for integrated access and backhaul
- Ethernet access platforms such as the FLASHWAVE 5310 and 5320 systems

Key Technical Advantages

The platform combines optical transport building blocks (multiplexing, amplification, signal conditioning and optical add/drop) with a complete service delivery and packet transport suite. As a result, the FLASHWAVE 7120 system delivers several technical advantages and network benefits.



FLASHWAVE® 7120
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Critical Network Applications

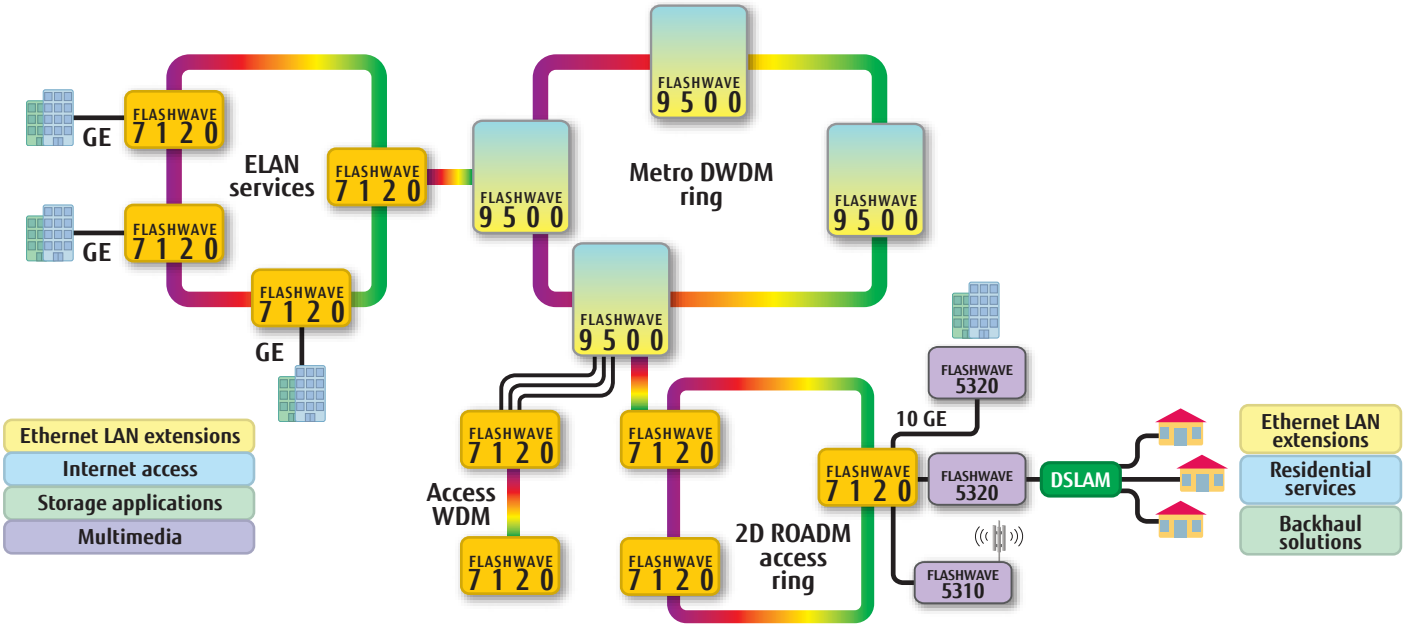
The FLASHWAVE 7120 Micro Packet Optical Networking Platform's flexible, broad-ranging optical services enable several key network applications.

Access WDM
- Scalable access solutions
- CWDM up to 16 wavelengths and DWDM up to 32 wavelengths
- 2D ROADM option supporting up to 40 wavelengths
- Multiservice solutions to the edge over WDM
- Point-to-point, hub-and-spoke, linear and ring access topologies
- Backhaul of Ethernet and Time-Division Multiplexing (TDM) services over WDM for Digital Subscriber Line (DSL) and wireless
- Wavelength service delivery
- 100 Mbps to 11 Gbps wavelength services
- Transparent wavelength applications with full OAM&P
- SONET/SDH, Ethernet, Fibre Channel, and video wavelength services

Business and Enterprise Services
- Native 1G/10G Ethernet transport and aggregation with ring-based protection options including OTN and IEEE G.8032 v2
- MEF-certified solutions for Ethernet Private Line and Virtual Private Line (EPL/EVPL) and multipoint (E-LAN, EVLAN) applications
- Managed EPL and EVPL applications
- IP multicast applications supporting broadcast and on-demand video services through bridged, connectionless Ethernet
- Ethernet business services with policing, bandwidth management, and end-to-end Service-Level Agreements (SLAs)
- Native Storage-Area Network (SAN) extension applications including 10G Fibre Channel

Optical Extension and Fiber Relief
- Wavelength service extension using CWDM or DWDM
- Cost-effective service extension from metro networks to end customer sites
- Passive and active WDM fiber relief applications

Flexible broad-ranging optical services



Network Services

Fujitsu offers a broad selection of professional services to assist at every stage in a network's evolution and operation. From planning through deployment and ongoing maintenance to future enhancements, Fujitsu Network Services are available whenever needed. Our comprehensive range of services includes network and system design, training, customized deployment, craft interface software, migration planning and more. Your Fujitsu sales representative can guide you in selecting the right service options for your business.

Popular planning and deployment services for the FLASHWAVE 7120 Micro Packet Optical Networking Platform include:

- ***Fiber Characterization and Test*** – Comprehensive verification and analysis of your installed fiber to improve current network performance, prepare you for new growth and identify potential faults and issues.
- ***Design Services for DWDM Networks*** – Our professional design staff works with you to prepare a complete, custom roadmap for success.
- ***Turn-Up and Test*** – We provide a range of options from on-site configuration and simple turn-up to rigorous, long-term testing.

Fujitsu Maintenance and Support Program

For a complete professional maintenance solution, the Fujitsu Maintenance and Support Program has the right combination of flexibility and comprehensive assurance. Choose the level and types of service you need to supplement your own resources. The Maintenance and Support Program helps keep your network running smoothly, provides critical care and protects the longevity of your investment.

Network Operations Center

With a full range of vendor-independent network fault and performance monitoring features, the Fujitsu Network Operations Center (NOC) offers guaranteed, round-the-clock system protection. Our reliable NOC facility is available as a primary or supplemental operations resource. This service not only helps you control costs and maintain high levels of customer satisfaction, it also provides trustworthy, reliable after-hours and emergency coverage.

FLASHWAVE® 7120

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Features and Specifications

Platforms	FLASHWAVE 7120 shelf
	• 2RU managed system with 6 interface slots
	  • Expandable up to 4 shelves (24 interface slots) under a single TID
	• 7RU shelf with 20 slots
	  • Expandable up to 3 shelves (60 slots)

	FLASHWAVE 7120 passive shelf • 1U passive-only system with 2 interface slots • 19", 23" and 500 mm ETSI rack mounts available
Architectures	• CWDM/DWDM • Point-to-point • Linear • 2D ROADM

Applications	• Access WDM (CWDM or DWDM)
	• Wavelength service delivery
	• Ethernet services
	  • Private line
	  • Virtual private line
	  • Multipoint (ELAN, EVLAN)
	• Fiber relief and reach extension
	• Multiservice backhaul

Transponder Interfaces	• Dual 2.5G multiprotocol transponder
	  • Rates: 125 Mbps to 2.7 Gbps
	  • Protocols: 100FX, OC-3/STM-1, OC-12/STM-4, OC-48/STM-16, ESCON, DVB-ASI, 1G & 2G FC/FICON, 1G Ethernet
	• Dual 4G multiprotocol transponder
	  • Rates: 1.0 to 4.0 Gbps
	  • Protocols: 1G, 2G, 4G FC/FICON, 1G Ethernet
	• Dual 10G multiprotocol OTN transponders
	  • Rates: 9.9 to 11.1 Gbps
	  • Protocols: OC-192/STM-64, 10 GigE WAN PHY, 10 GigE LAN PHY, OTU2, OTU2 10 GigE LAN, 10G FC/FICON

Muxponder Interfaces	• 2-port, 2.5G GigE muxponders
	  • Clients: 100BaseTX, 1G Ethernet
	  • Network: 2 x OC-48/STM-16
	  • Protection: UPSR/SNCP
	• 8-port, combo single 2.5G/dual 5G OTN muxponders
	  • Clients: OC-3, OC-12, 1G Ethernet, 1G, 2G FC/FICON
	• Network: 2 x OC-48, OTU1
	• 10-port, 10G OTN muxponders
	  • Clients: 1G Ethernet, 1G, 2G, 4G FC/FICON, OC-48/STM-16 Network: 2 x OC-192/STM-64, OTU2
	  • Protection: UPSR/SNCP, OTN facility

Native Bridged Ethernet Packet Interfaces	• 14-port Ethernet interface
	  • 12 x 1G Ethernet (10 x SFP, 2 x RJ45)
	  • 2 x 10G Ethernet (2 x XFP)
	• 28-port Ethernet interface
	  • 24 x 1G Ethernet (20 x SFP, 4 x RJ45)
	  • 4 x 10G Ethernet (4 x XFP)
	• 8-port Ethernet interface
	  • 8 x 10G Ethernet (8x XFP)

Protocols	• 100FX, 10/100/1000BaseTX • 1G Ethernet • 10G Ethernet LAN • OTU2 10G Ethernet LAN
Applications	• MEF EPL, EVPL, ELAN, EVLAN • IP services • Multipoint Ethernet services
Standards	• G.709 Digital Wrappers (OTN) • IEEE 802.1Q VLAN tagging • IEEE 802.1ad provider bridges • IEEE 802.3ad link aggregation • Ring protection MSTP and G. 8032 v2 • Y.1731

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Features	• Simplified Layer 2 Ethernet through connectionless bridging • 3-step service provisioning through embedded GUI • Aggregation and switching • Policing • Rate limiting per port • Bandwidth management per flow including CIR/EIR/CBS/EBS • Ethernet OAM&P including Y.1731 and RMON 2819 performance monitoring • Sub-50 ms guaranteed protection switching with G. 8032 v2 and OTN
Optical Components	• Single-channel/Sub-Band Pre- and Booster Amplifiers (SBA, SPA) • DWDM Pre- and Booster Amplifiers (OBA, OPA) • Line amplifier with mid-stage access (OLAM) • Dispersion compensation units: 30, 40, 60, 80 km compensating fiber
Operations and Management	• TL1 over TCP/IP (except native Ethernet interfaces) • SNMP over UDP/IP (all interfaces) • NETSMART 712 Craft GUI • NETSMART 1500 and NETSMART 1200 Management System • Telcordia OSMINE TIRKS and NMA • Communications via out-of-band OSC or in-band OTN GCC
Standards Compliance	• NEBS Level 3 compliant • RoHS compliant • ANSI and ETSI compliant • GR-63 and GR-1089 • MEF 9/14 compliant

Operating Environment	Temperature	–20 to +65 °C (–4 to +149 °F)	
	Humidity	5 to 90% (non-condensing)	
	Maximum power consumption	275 W per shelf	
	Maximum heat dissipation	938 BTU/hr	
	Power Input	–48 VDC, redundant feeds	
Physical Characteristics	**FLASHWAVE 7120 shelf (7RU)**	Weight (fully loaded)	80 lbs (36 kg)
		Dimensions (H x W x D)	12.2 x 17.3 x 11.0" (311 x 440 x 279 mm)
Physical Characteristics	**FLASHWAVE 7120 shelf (2RU)**	Weight (fully loaded)	16.5 lbs (7.5 kg)
		Dimensions (H x W x D)	3.5 x 17.3 x 11.0" (90 x 440 x 279 mm)
	FLASHWAVE 7120 passive shelf (1RU)	Weight (fully loaded)	9.1 lbs (4.1 kg)
		Dimensions (H x W x D)	1.73 x 17.3 x 11.0" (44 x 440 x 279 mm)

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