

Cisco CWDM SFP Solution

Contents

Overview	3
Key features and benefits	3
Deployment scenarios	4
Warranty	8
Cisco environmental sustainability	8
Ordering information	9
Service and Support	9
Cisco Capital	9
For more information	9
Document history	10

Overview

The Cisco Coarse Wavelength-Division Multiplexing (CWDM) Small Form-Factor Pluggable (SFP) solution allows enterprise companies and service providers to provide scalable and easy-to-deploy Gigabit Ethernet and Fibre Channel services in their networks. The product set helps enable the flexible design of highly available, multiservice networks.

The Cisco CWDM SFP solution is a convenient and cost-effective solution for the adoption of Gigabit Ethernet and Fibre Channel in campus, data-center, and metropolitan-area access networks.

The Cisco CWDM SFP solution has two main components (Figure 1): a set of eight different pluggable transceivers (Cisco CWDM SFPs), and a set of different Cisco CWDM passive multiplexer/demultiplexer or optical add/drop multiplexers (OADMs). A Cisco CWDM chassis enables rack-mounting up to two of the Cisco CWDM passives. Both the transceivers and the passive multiplexers are compliant with the ITU-T G.694.2 standard defined CWDM grid.



Figure 1.
Cisco CWDM SFP Solution

Key features and benefits

Scalability

The Cisco CWDM SFP solution helps enable the transport of up to eight channels (Gigabit Ethernet or Fibre Channel) over single-mode fiber strands.

Easy Deployment and flexible implementation

The Cisco CWDM SFP fits into a standard SFP port supporting the IEEE 802.3z standard on the supported Cisco Systems platforms. The Cisco CWDM OADM is passive and requires no power. Neither the Cisco CWDM SFP nor the Cisco CWDM passives requires configuration.

The Cisco CWDM SFP solution allows for a variety of network configurations—from multichannel point-to-point to hub and meshed-ring configurations.

High availability

The Cisco CWDM SFP solution takes advantage of a multichannel architecture and the inherent protection of ring architectures. The solution helps enable:

- Use of Layer 2 and Layer 3 redundancy and failover mechanisms at the channel endpoints (Cisco CWDM SFP) to build highly available links
- Use of two-path link configurations in a ring architecture to provide protection from fiber cuts

Investment protection

The Cisco CWDM SFP solution helps enable enterprises and service providers to increase the bandwidth of an existing Gigabit Ethernet optical infrastructure without adding new fiber strands. The solution can be used in parallel with other Cisco SFP devices on the same platform.

Deployment scenarios

Point-to-point configuration

In a point-to-point configuration (Figure 2), two endpoints are directly connected through a fiber link. The Cisco CWDM SFP solution helps enable customers to add or drop as many as eight channels (Gigabit Ethernet or Fibre Channel) into a pair of single-mode fiber strands. As a result, the need for additional fiber is minimized. Redundant point-to-point links are possible by adding or dropping redundant channels into a second pair of single-mode fiber strands.

A single fiber point-to-point configuration also is possible (Figure 3). By using different wavelengths to transmit and receive signals, as many as four channels can be transported over a single fiber strand.

The main applications for the architecture are enterprise campus links and service provider Point-Of-Presence (POP) or hub interconnects across a metropolitan (metro) area.

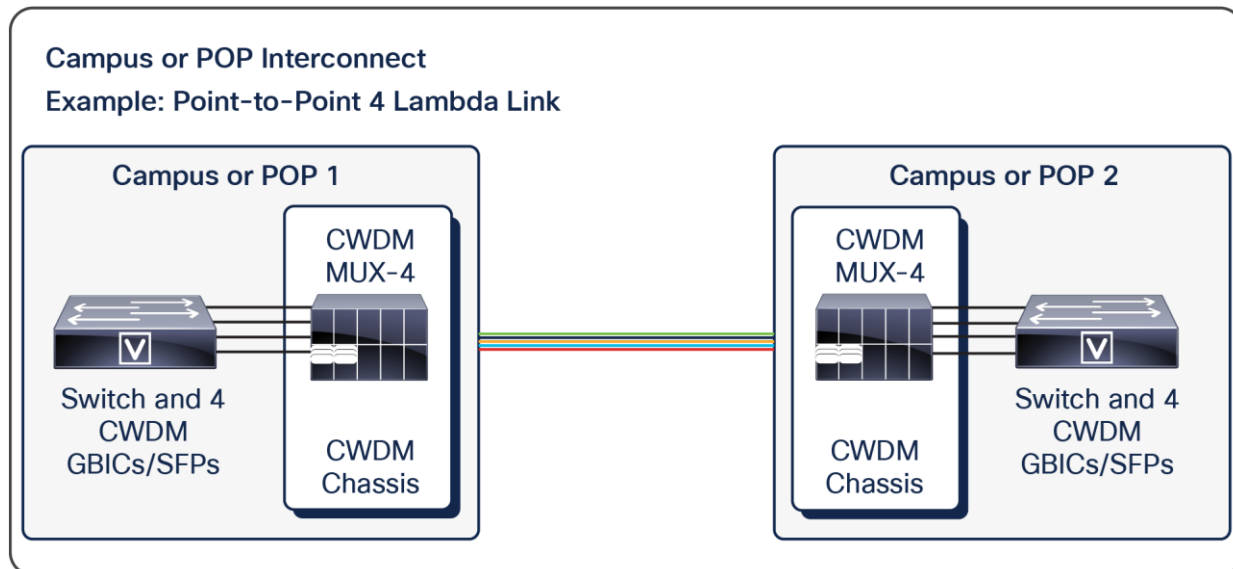


Figure 2.
Point-to-point architecture (dual-fiber link)

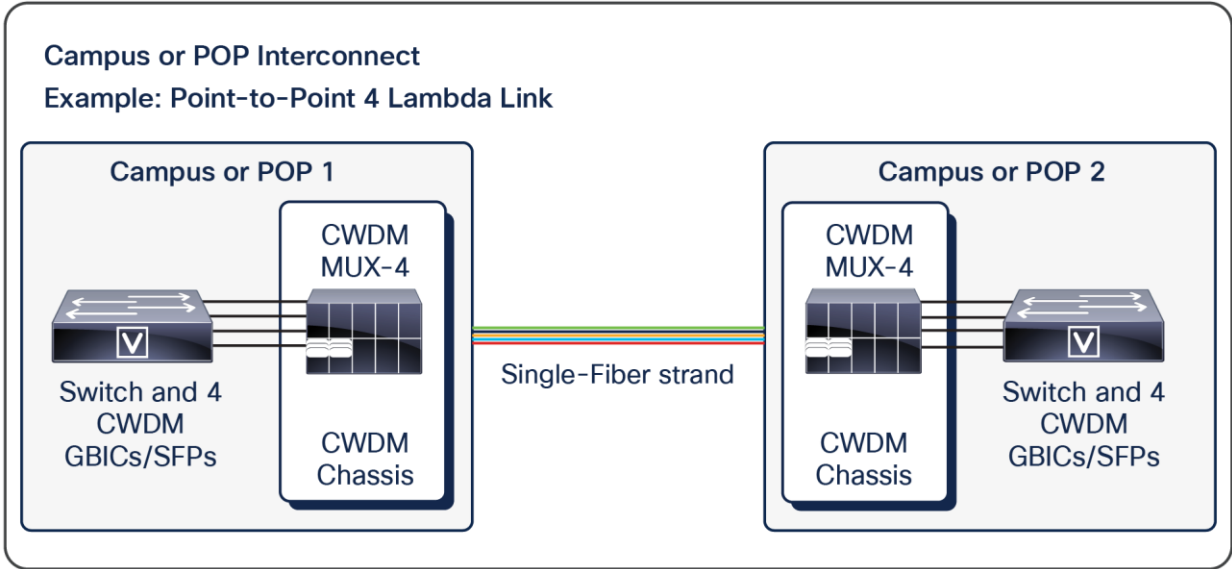


Figure 3.
 Point-to-point architecture (single-fiber link)

Hub-and-spoke (ring) configuration

In a hub-and-spoke configuration (Figure 4), multiple nodes (spokes) are connected with a hub location through a ring of single-mode fiber. Each hub-node connection can consist of a single or multiple channels. Protection from fiber cuts in the ring is achieved by connecting the hub and nodes through both directions of the optical ring. Service provider metro access rings are the main applications for this architecture.

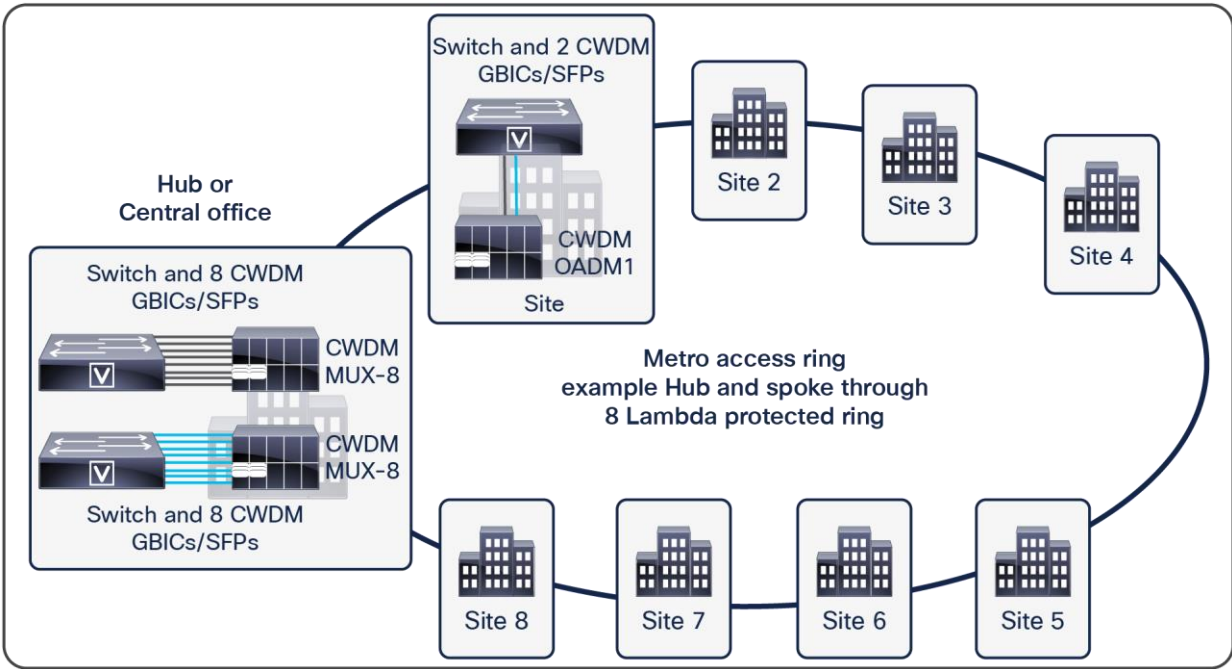


Figure 4.
 Hub-and-spoke (ring) architecture

Mesh (ring) configuration

Mesh deployments are a combination of hub-and-spoke and point-to-point or even multiple point-to-point connections in parallel on the same optical link. Deployment of the maximum eight wavelengths allows for different combinations of these scenarios.

Cisco CWDM SFPs

A Cisco CWDM SFP (Figure 5) is a hot-swappable input/output device that plugs into an SFP port or slot of a Cisco switch or router, linking the port with the fiber-optic network.

The Cisco CWDM SFPs are multirate parts that support both Gigabit Ethernet and Fibre Channel (1 gigabit and 2 gigabit).



Figure 5.
Cisco CWDM SFPs

Performance

- Gigabit Ethernet 1.25 Gbps full-duplex links with an optical link budget of 29 dB
- Fibre Channel 1.06 and 2.12 Gbps full-duplex links with an optical link budget of 28 dB

Platform support

The Cisco CWDM SFPs are supported across a variety of Cisco switches, routers, and optical transport devices. For more details, refer to the document Cisco CWDM SFP Compatibility Matrix.

Connectors and cabling

- Equipment: Standard SFP interface
- Network: Dual LC/PC connector

Note: Only connections with patch cords with PC or UPC connectors are supported. Patch cords with APC connectors are not supported.

Environmental conditions and power requirements

- Operating temperature range: 23 to 158°F (-5 to 70°C)
- Storage temperature range: -40 to 185°F (-40 to 85°C)

Table 1 describes the electrical power interface details, and Table 2 describes optical parameters.

Table 1. Electrical power interface data

Parameter	Symbol	Minimum	Typical	Maximum	Units
Supply Current	I _s		220	300	mA
Surge Current	I _{Surge}			+30	mA
Input Voltage	V _{max}	3.1	3.3	3.5	V

Table 2. Optical parameters

Parameter	Symbol	Minimum	Typical	Maximum	Units	Notes and Conditions
Transmitter Center Wavelength	wavelength _c	(x-4)		(x + 7)	nm	Available center wavelengths are 1470, 1490, 1510, 1530, 1550, 1570, 1590, and 1610 nm
Side-Mode Suppression Ratio	SMSR	30			dB	
Transmitter Optical Output Power	P _{out}	0		5.0	dBm	Average power coupled into single-mode fiber
Receiver Optical Input Power (BER <10 ⁻¹² with PRBS 2-7-1)	P _{in}	-28.0		-7.0	dBm	@ 2.12 Gbps, 140°F (60°C) case temperature
Receiver Optical Input Power (BER <10 ⁻¹² with PRBS 2-7-1)	P _{in}	-29.0		-7.0	dBm	@ 1.25 Gbps, 140°F (60°C) case temperature
Receiver Optical Input Wavelength	wavelength _{in}	1450		1620	nm	
Transmitter Extinction Ratio	OMI	9			dB	
Dispersion Penalty at 100 km				3	dB	@ 2.12 Gbps
Dispersion Penalty at 100 km				2	dB	@ 1.25 Gbps

Note: Parameters are specified over temperature and at end of life unless otherwise noted.

Note: When shorter distances of single-mode fiber are used, it may be necessary to insert an inline optical attenuator in the link to avoid overloading the receiver.

Warranty

- Standard warranty: 90 days
- Expedited replacement available via a Cisco SMARTnet Service support contract

Cisco environmental sustainability

Information about Cisco’s environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the “Environment Sustainability” section of Cisco’s [Corporate Social Responsibility](#) (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the “Environment Sustainability” section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

Cisco makes the packaging data available for informational purposes only. It may not reflect the most current legal developments, and Cisco does not represent, warrant, or guarantee that it is complete, accurate, or up to date. This information is subject to change without notice.

Ordering information

Refer to Table 3 for details about ordering Cisco CWDM SFPs.

Table 3. Cisco CWDM SFP product information

Product Number	Description	Color
CWDM-SFP-1470=	Cisco CWDM 1470-nm SFP; Gigabit Ethernet and 1 and 2 Gb Fibre Channel	Gray
CWDM-SFP-1490=	Cisco CWDM 1490-nm SFP; Gigabit Ethernet and 1 and 2 Gb Fibre Channel	Violet
CWDM-SFP-1510=	Cisco CWDM 1510-nm SFP; Gigabit Ethernet and 1 and 2 Gb Fibre Channel	Blue
CWDM-SFP-1530=	Cisco CWDM 1530-nm SFP; Gigabit Ethernet and 1 and 2-Gb Fibre Channel	Green
CWDM-SFP-1550=	Cisco CWDM 1550-nm SFP; Gigabit Ethernet and 1 and 2 Gb Fibre Channel	Yellow
CWDM-SFP-1570=	Cisco CWDM 1570-nm SFP; Gigabit Ethernet and 1 and 2 Gb Fibre Channel	Orange
CWDM-SFP-1590=	Cisco CWDM 1590-nm SFP; Gigabit Ethernet and 1 and 2 Gb Fibre Channel	Red
CWDM-SFP-1610=	Cisco CWDM 1610-nm SFP; Gigabit Ethernet and 1 and 2 Gb Fibre Channel	Brown

Regulatory and standards compliance

- Compliant with the ITU-T G.694.2 CWDM grid
- Compatible with 1000BASE-X standard as specified in IEEE 802.3z
- Compatible with Fibre Channel Draft Physical Interface Specification (FC-PI 10.0)
- Safety: Laser Class I 21CFR1040

Ordering information

To place an order, visit the [Cisco Ordering Home Page](#).

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, refer to [Cisco Technical Support Services](#) or [Cisco Advanced Services](#).

Cisco Capital

Flexible payment solutions to help you achieve your objectives

Cisco Capital makes it easier to get the right technology to achieve your objectives, enable business transformation and help you stay competitive. We can help you reduce the total cost of ownership, conserve capital, and accelerate growth. In more than 100 countries, our flexible payment solutions can help you acquire hardware, software, services and complementary third-party equipment in easy, predictable payments. [Learn more](#).

For more information

For more information about the Cisco CWDM products, visit https://www.cisco.com/en/US/products/hw/modules/ps4999/products_data_sheet09186a00801a557c.html or contact your local Cisco account representative.

Document history

New or revised topic	Described In	Date
Updated operating temperature	Page 7	December 2, 2022

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