Cisco SM-X-6X1G Gigabit Ethernet Service Module

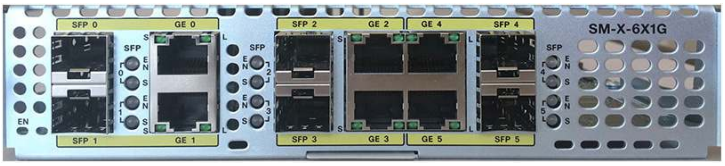
High-Density Small Form-Factor Pluggable (SFP) and Copper (RJ-45) Gigabit Ethernet (GE) connectivity for the Cisco 4400 Series Integrated Services Router (ISR).

Product Overview

Cisco SM-X-6X1G Gigabit Ethernet Service Module brings high density Small Form-Factor Pluggable (SFP) and copper (RJ-45) Gigabit Ethernet (GE) connectivity to the Cisco 4400 Series Integrated Services Routers (ISRs). It accelerates applications such as Ethernet WAN access, inter-VLAN routing, and high-speed connectivity to LAN switches and servers and provides maximum flexibility.

The ports on the Cisco SM-X-6X1G Service Module work as routed Layer 3 ports. Layer 2 switching between local ports on the module or between ports on the module and other ports within the router system is not possible. The port terminates Layer 2 trunks from externally connected switches, and Layer 2 trunk and VLAN information is not switched onto other ports in the system. The host router routes all traffic entering the Cisco SM-X-6X1G. **Figure 1** shows the Cisco SM-X-6X1G Service Module faceplate.

Figure 1. Cisco SM-X-6X1G Service Module Faceplate



Installation

You can install service modules and network modules either before or after mounting the router. The Cisco SM-X-6X1G supports hard online insertion and removal (OIR). You can insert it into the router while the router is working.

For important tips, safety warnings, and other information you need to know before and during installation of the Cisco SM-X-6X1G Service Module, refer to "Installing Cisco Network Modules and Service Modules in Cisco Access Routers"

Warning: To comply with the Telcordia GR-1089 Network Equipment Building Standards (NEBS) for electromagnetic compatibility and safety, connect the Gigabit Ethernet ports only to intra-building or unexposed wiring or cable. The intra-building cable must be shielded and the shield must be grounded at both ends. The intra-building port(s) of the equipment or subassembly must not be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only Type 2 or Type 4 ports as described in Telcordia GR-1089-CORE and they require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

Configuration

As previously mentioned, Cisco IOS XE Release 3.11S or later is required to operate the Cisco SM-X-6X1G.

For configuration instructions, refer to the “Configuring Ethernet, Fast Ethernet, or Gigabit Ethernet Interfaces” chapter of “Configuring LAN Interfaces”. The guidelines in this chapter apply to all Cisco modular access routers.

For more configuration instructions and other related documents, refer to the “Related Documents and Links” section on page 6 of that document.

Note: Use the **show diag** command to check the hardware information of the Cisco SM-X-6X1G Module.

EN LED Indicators

The Cisco SM-X-6X1G Service Module has several EN LEDs located on the right side of the SFP ports. The LEDs indicate that the module has passed its self-test and is available to the router. Table 1 lists the EN LED colors and their meanings.

Table 1. EN LED Colors and Their Meanings

EN LED Colors and What They Indicate	System Status
Off	Default is Off when module is powered on for the first time. It is persistent until changed by the host software.
Solid green	The module is powered on and is functioning correctly.
Solid amber	The module has some failure.

Platform Support

The Cisco SM-X-6X1G Service Module increases the SFP port density in the Cisco 4451-X ISRs. The maximum number of Cisco SM-X-6X1G Modules supported on Cisco 4451-X ISRs is 2 per chassis. Cisco IOS® XE Software Release 3.11S or later is required. Refer to the Software Advisor (available to registered customers only) to choose the appropriate software for your Cisco product.

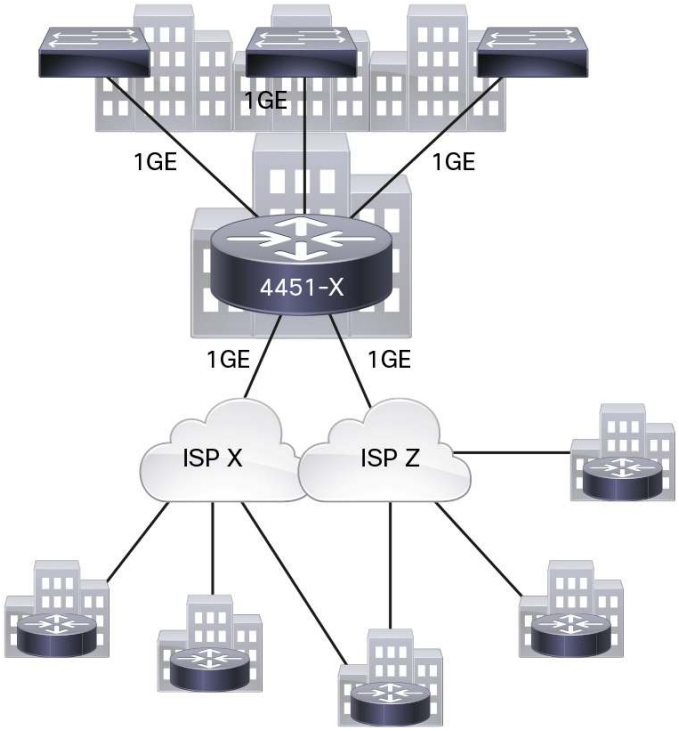
Deployment Examples

Cisco Intelligent WAN

The Cisco Intelligent WAN (IWAN) solution enables customers to deploy new services faster regardless of transport model, whether it is a private WAN using a Multiprotocol Label Switching (MPLS) offering, a common Internet connection, or hybrid WAN access consisting of both models. The Cisco IWAN solution furthermore allows organizations to realize significant cost benefits from using the common Internet as the underlying WAN infrastructure. Using the Cisco Integrated Services Router with Application Experience (ISR-AX) services, based on application, endpoint, and network conditions, you can dynamically route traffic over multiple WAN connections in order to deliver the best-quality experience.

Figure 2 demonstrates the use of the Cisco SM-X-6X1G as part of the Cisco IWAN solution. At the regional office, the Cisco SM-X-6X1G aggregates the sub-rate/gigabit WAN connections from different Internet service providers (ISPs). The remote branch-office routers connect to either one, or in some cases both, of those ISPs.

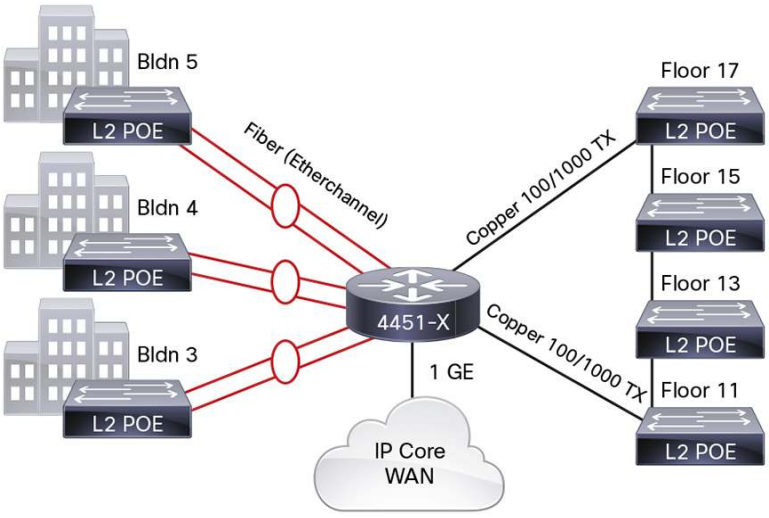
Figure 2. Cisco SM-X-6X1G Service Module as Part of Cisco IWAN Solution



Fiber and Copper Aggregation within Building and Intra-Campus

Figure 3 demonstrates the use of the Cisco SM-X-6X1G in a campus LAN environment with the mix of copper and fiber cabling options. The Cisco SM-X-6X1G provides great flexibility, eliminates the need for a separate switch, and increases network reliability. The combination of two Cisco SM-X-6X1G modules plus the 4 onboard ports can support up to 16 routed fiber ports in a single Cisco 4451-X chassis, adding superior scalability to intra-campus networking connections.

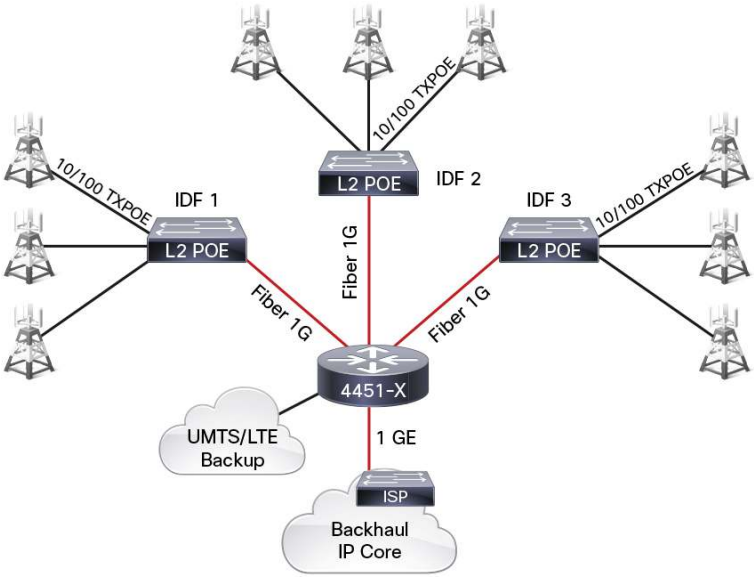
Figure 3. Cisco SM-X-6X1G Service Module for the Campus Network



Aggregation for Mobile Service Provider Picocell/Femtocell Network Deployment

Figure 4 demonstrates the use of the Cisco SM-X-6X1G in a typical mobile service provider's (MSP's) Picocell/Femtocell deployment. The Cisco SM-X-6X1G provides fiber aggregation to links from multiple intermediate distribution frames (IDFs), again eliminating the need for a separate switch and reducing the number of devices to provision and manage.

Figure 4. Cisco SM-X-6X1G Service Module for Aggregation in Picocell and Femtocell deployments



Features

The Cisco SM-X-6X1G Gigabit Ethernet Service Module is based on the technology of the onboard Gigabit Ethernet and SFP ports on the Cisco 4400 Series Integrated Services Router (ISR). Feature support is therefore identical to that of the onboard ports.

Physical Specifications

- Single-wide service module, no slot restrictions
- Dimensions (H x W x D): 1.55 x 7.10 x 7.2 in. (3.9 x 18.0 x 18.3 cm)

Environmental Specifications

- Operating temperature: 32 to 104℉ (0 to 4 0℃)
- Storage temperature: –38 to 150℉ (–40 to 70℃)
- Relative humidity: 5 to 95% relative humidity
- Operating humidity: 5 to 85% relative humidity

Additional References

References related to hardware installation, software configuration, and regulatory compliance information can be found using the following resources:

- Connecting the Cisco SM-X-6X1G
- Configuring SM-X-6X1G
- Hardware Installation Guide for the Cisco 4451-X Integrated Services Router
- Cisco 4451-X Integrated Services Routers Software Configuration Guide
- Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information
- Documentation Roadmap for the Cisco 4400 Series Integrated Services Routers

Ordering Information

See Table 2 for Cisco SM-X-6X1G Service Module ordering information.

Table 2. Ordering Information for Cisco SM-X-6X1G Service Module and Associated SFP's

Part Number	Description
SM-X-6X1G	6 port GE SFP Service Module
Standard SFPs	
GLC-LH-SM=	GE SFP, LC connector LX/LH transceiver
GLC-SX-MM=	GE SFP, LC connector SX transceiver
GLC-ZX-SM=	1000BASE-ZX SFP
GLC-T=	1000BASE-T SFP
GLC-BX-D=	1000BASE-BX SFP, 1490NM
GLC-BX-U=	1000BASE-BX SFP, 1310NM
GLC-FE-100FX=	100BASE-FX SFP for FE port
GLC-FE-100LX=	100BASE-LX SFP for FE port
GLC-FE-100EX	100BASE-EX SFP for FE port
GLC-FE-100ZX	100BASE-XX SFP for FE port
GLC-FE-100BX-U=	100BASE-BX10-U SFP
GLC-FE-100BX-D=	100BASE-BX10-D SFP
GLC-GE-100FX=	100BASE-FX SFP for GE SFP port on 3750, 3560, 2970, 2960
CWDM SFPs	
CWDM-SFP-1470=	CWDM 1470 NM SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1490=	CWDM 1490 NM SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1510=	CWDM 1510 NM SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1530=	CWDM 1530 NM SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1550=	CWDM 1550 NM SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1570=	CWDM 1570 NM SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1590=	CWDM 1590 NM SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1610=	CWDM 1610 NM SFP Gigabit Ethernet and 1G/2G FC
DWDM SFPs	
DWDM-SFP-3033=	DWDM SFP 1530.33 nm SFP (100 GHz ITU grid)
DWDM-SFP-3112=	DWDM SFP 1531.12 nm SFP (100 GHz ITU grid)

Part Number	Description
DWDM-SFP-3190=	DWDM SFP 1531.90 nm SFP (100 GHz ITU grid)
DWDM-SFP-3268=	DWDM SFP 1532.68 nm SFP (100 GHz ITU grid)
DWDM-SFP-3346=	DWDM SFP 1533.47 nm SFP (100 GHz ITU grid)
DWDM-SFP-3425=	DWDM SFP 1534.25 nm SFP (100 GHz ITU grid)
DWDM-SFP-3504=	DWDM SFP 1535.04 nm SFP (100 GHz ITU grid)
DWDM-SFP-3582=	DWDM SFP 1535.82 nm SFP (100 GHz ITU grid)
DWDM-SFP-3661=	DWDM SFP 1536.61 nm SFP (100 GHz ITU grid)
DWDM-SFP-3739=	DWDM SFP 1537.40 nm SFP (100 GHz ITU grid)
DWDM-SFP-3819=	DWDM SFP 1538.19 nm SFP (100 GHz ITU grid)
DWDM-SFP-3898=	DWDM SFP 1538.98 nm SFP (100 GHz ITU grid)
DWDM-SFP-3977=	DWDM SFP 1539.77 nm SFP (100 GHz ITU grid)
DWDM-SFP-4056=	DWDM SFP 1540.56 nm SFP (100 GHz ITU grid)
DWDM-SFP-4134=	DWDM SFP 1541.35 nm SFP (100 GHz ITU grid)
DWDM-SFP-4214=	DWDM SFP 1542.14 nm SFP (100 GHz ITU grid)
DWDM-SFP-4294=	DWDM SFP 1542.94 nm SFP (100 GHz ITU grid)

Technical Assistance

The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical problems with Cisco products and technologies.

To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) feeds.

Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.

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Printed in USA C78-730527-01 01/14