

Cisco Catalyst 6800 Series 10 Gigabit and Gigabit Ethernet Modules for Cisco Catalyst 6500 Series Switch

Features and Benefits

Q. What are the new Cisco® Catalyst® 6800 Series 10 Gigabit and Gigabit Ethernet modules and their features?

A. Table 1 lists the 6800 Series 10 Gigabit and Gigabit Ethernet modules.

Table 1. 6800 Series 10 Gigabit and Gigabit Ethernet Modules and Supported Features

Product	Ports/Interface	Port Density/Chassis	Queues per Port	Scheduler	Hardware-Based Multicast Replication	Buffer Size per Port
WS-X6816-10G-2T/2TXL	The 10 Gigabit Ethernet fiber module supports 10GBASE-CX4, -SR, -LRM, -LX4, -LR, -ZR and -ER X2 fiber modules to provide operational distances up to 80 km over single-mode fiber	176 ports/6513-E 128 ports/6509-E	Oversubscription mode: <ul style="list-style-type: none"> Receive: 1p7q2t per port Transmit: 1p7q4t per port group Performance mode: <ul style="list-style-type: none"> Receive: 8q4t per port Transmit: 1p7q4t per port 	Oversubscription mode: <ul style="list-style-type: none"> Deficit Weighted Round Robin (DWRR) Weighted Random Early Detection (WRED) Performance mode: <ul style="list-style-type: none"> DWRR WRED Shaped Round Robin (SRR) at egress 	L2 multicast: ~ 20 Gbps per replication engine L3 multicast: ~ 20 Gbps per replication engine 2 replication engines per module	Oversubscription mode: <ul style="list-style-type: none"> 90 MB per port group Performance mode: <ul style="list-style-type: none"> 256 MB per port (128 MB for ingress and 128 MB for egress)
WS-X6816-10T-2T/2TXL	The 10 Gigabit Ethernet copper module supports RJ-45 connectors and provides operational distance of up to 55 m over Category 6 UTP copper cabling; 100 meters over Category 6 STP copper cabling, 100 meters over Category 6A UTP & STP copper cabling, and 100 meters over Category 7 STP copper cabling	176 ports/6513-E 128 ports/6509-E	Oversubscription mode: <ul style="list-style-type: none"> Receive: 1p7q2t per port Transmit: 1p7q4t per port group Performance mode: <ul style="list-style-type: none"> Receive: 8q4t per port Transmit: 1p7q4t per port 	Oversubscription mode: <ul style="list-style-type: none"> Deficit Weighted Round Robin (DWRR) Weighted Random Early Detection (WRED) Performance mode: <ul style="list-style-type: none"> DWRR WRED Shaped Round Robin (SRR) at egress 	L2 multicast: ~ 20 Gbps per replication engine L3 multicast: ~ 20 Gbps per replication engine 2 replication engines per module	Oversubscription mode: <ul style="list-style-type: none"> 90 MB per port group Performance mode: <ul style="list-style-type: none"> 256 MB per port (128 MB for ingress and 128 MB for egress)
WS-X6848-TX-2T/2TXL	48-port, RJ-45, 100m, over Category 5, 5E and 6 UTP copper cabling	528 ports/6513-E 384 ports/6509-E	Receive: 2q8t Transmit: 1p3q8t	Deficit Weighted Round Robin (DWRR)	L2 multicast: ~ 20 Gbps per replication engine L3 multicast: ~ 10 Gbps per replication engine 2 replication engines per module	Ingress: 166 KB Egress: 1.17 MB

Product	Ports/ Interface	Port Density/ Chassis	Queues per Port	Scheduler	Hardware-Based Multicast Replication	Buffer Size per Port
WS-X6848-SFP-2T/2TXL	48 port; 1000BASE-SX, LX/LH, -ZX, -T; 1000BASE- CWDM; LC connector	528 ports/6513-E 384 ports/6509-E	Receive: 2q8T Transmit: 1p3q8T	DWRR	L2 multicast: ~ 20 Gbps per replication engine L3 multicast: ~ 10 Gbps per replication engine 2 replication engines per module	Ingress: 166KB Egress: 1.17MB
WS-X6824-SFP-2T/2TXL	24-port; 1000BASE-SX, LX/LH, -ZX, -T; 1000BASE- CWDM; LC connector	264 ports/6513-E 192 ports/6509-E	Receive: 2q8T Transmit: 1p3q8T	DWRR	L2 multicast: ~ 20 Gbps per replication engine L3 multicast: ~ 10 Gbps per replication engine 1 replication engine per module	Ingress: 166KB Egress: 1.17MB
All of the above modules ship with 1 GB of onboard memory.						
The maximum frame size for all of the above modules is 9216 bytes.						

Specifications

Q. What are the power requirements of the 6800 Series 10 Gigabit and Gigabit Ethernet modules?

A. The power requirements are as follows:

- 16-port 10 Gigabit Ethernet Fiber Module with DFC4 and DFC4XL (WS-X6816-10G-2T and 2TXL): 488.5 Watts and 503.5 Watts respectively
- 16-port 10 Gigabit Ethernet Copper Module with DFC4 and DFC4XL (WS-X6816-10T-2T and 2TXL): 514.96 Watts and 529.96 Watts respectively
- 24-port Gigabit Ethernet Fiber Module with DFC4 and DFC4XL (WS-X6824-SFP-2T and 2TXL): 204.66 atts and 209.66 Watts respectively
- 48-port Gigabit Ethernet Fiber Module with DFC4 and DFC4XL (WS-X6848-SFP-2T and 2TXL): 334.44 Watts and 339.44 Watts respectively
- 48-port Gigabit Ethernet Copper Module with DFC4 and DFC4XL (WS-X6848-TX-2T and 2TXL): 405 Watts and 410 Watts respectively

Q. What is the performance of the new 6800 Series 10 Gigabit and Ethernet modules?

A. The new 6800 Series 10 Gigabit and Gigabit Ethernet modules have two 20-Gbps connections to the fabric. The Distributed Forwarding Card 4 (DFC4) can forward traffic up to 60 mpps. Therefore the total forwarding performance of a fully loaded 6513-E chassis with 6800 Series 10 Gigabit and Gigabit Ethernet modules is 720 mpps (11 available slots for line cards with slots 7 and 8 reserved for Supervisor Engine 2T).

Q. What is oversubscription mode, and what is performance mode, and how can I enable them for the new 6800 Series 16-Port 10 Gigabit Ethernet Copper Module?

A. The 16-port 10 Gigabit Ethernet module consists of 4 port groups of 4 ports each:

Port group 1: ports 1-4; port 1 is enabled in performance mode.

Port group 2: ports 5-8; port 5 is enabled in performance mode.

Port group 3: ports 9-12; port 9 is enabled in performance mode.

Port group 4: ports 13-16; port 13 is enabled in performance mode.

Figure 1 shows how the port group maps to the front panel of the 16-port 10 Gigabit Ethernet copper module. Similar port group maps apply to the 16-port 10 Gigabit fiber module.(Figure 2).

Figure 1. Port Group Mappings on Front Panel of 16-Port 10 Gigabit Ethernet Copper Module

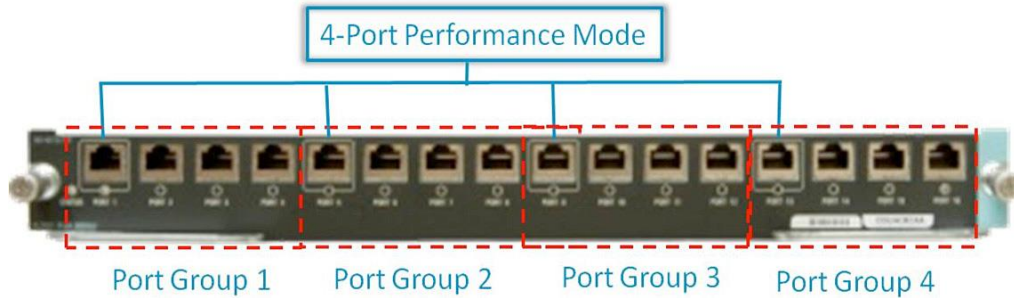
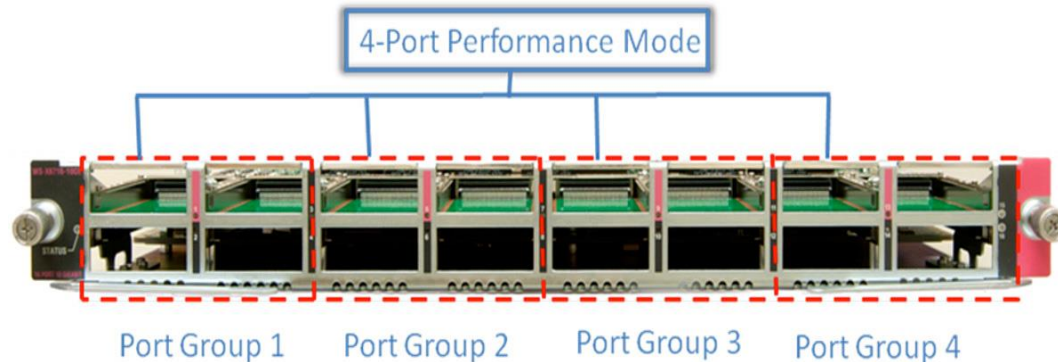


Figure 2. Port Group Mappings on Front Panel of 16-Port 10 Gigabit Ethernet Fiber Module



Each port group can operate in either oversubscription mode or performance mode. In oversubscription mode, you can use up to 4 ports in the port group. In performance mode, only the first port of the port group is enabled, and that port comes with enhanced buffering and quality-of-service (QoS) functionality. The other 3 ports in the port group will be administratively shut down. The 16-port 10 Gigabit Ethernet module works in oversubscription mode by default.

The software command `Cat6500(config)#[no] hw-module slot x oversubscription port-group y` will put port group y (1, 2, 3, or 4) in performance mode and administratively disable the oversubscribed ports (ports 2-4 in port group 1, ports 6-8 in port group 2, ports 10-12 in port group 3, and ports 14-16 in port group 4) and put them in shutdown state. In this mode, the user cannot do “no shut” on the disabled ports.

The following command will display the current configuration of all the port groups in slot x. The output of this command will be something like that shown in Table 2.

Table 2. Cat6500# show hw-module slot x Oversubscription

Port Group	Oversubscription Mode
1	Enabled
2	Disabled
3	Enabled
4	Disabled

Q. What is the size of default DRAM on the 6800 Series 10 Gigabit and Gigabit Ethernet modules?

A. All the 6800 Series 10 Gigabit and Gigabit Ethernet modules come with 1 GB DRAM by default, and no upgrade is available.

Q. What is the difference between DFC4 and DFC4XL?

- A.** DFC4XL offers more scalability in terms of IPv4/IPv6 FIB entries, ACL entries, and NetFlow entries compared with DFC4 (see Table 3). Other than those hardware scalability differences, there are no feature differences between DFC4 and DFC4XL.

Table 3. Feature Differences Between DFC4 and DFC4XL

Feature	DFC4	DFC4XL
IPv4 unicast/MPLS forwarding entries	256K	1024K
IPv6 unicast/IPV4 multicast forwarding entries	128K	512K
NetFlow entries	512K	1024K
ACL and QoS TCAM size	64K	256K

1K = 1024.

Q. Can we mix these 6800 Series 10 Gigabit and Gigabit Ethernet modules and other modules with Centralized Forwarding Card (CFC) or other DFCs in the same chassis?

- A.** You can mix 67XX Series modules with CFCs in the same chassis with the 6800 Series 10 Gigabit and Gigabit Ethernet modules. The 6800 Series 10 Gigabit and Gigabit Ethernet modules are only compatible with Supervisor Engine 2T. Therefore, any other DFCs in the chassis must be either DFC4 or DFC4XL.

Q. What happens if I mix DFC4 and DFC4XL in the same chassis? Is this supported?

- A.** Yes, this is supported. When mixing DFC4 and DFC4XL, the system will operate in lower common denominator mode. This means that it will operate in PFC4 mode to match the lesser capabilities of the DFC4. The consequences of this are that the larger FIB, ACL, and NetFlow tables of the DFC4XL will not be utilized as they will need to be programmed to match the smaller DFC4 tables for consistency within the chassis. See the Cisco IOS® Software Release 12.2(50)SY notes for further details (Put the URL).

Q. What happens if I use the 6800 Series 10 Gigabit and Gigabit Ethernet modules with 6100 Series modules? Is this supported?

- A.** Yes, this is supported. Since the 6800 Series 10 Gigabit and Gigabit Ethernet modules have a DFC4 or DFC4XL, there are no consequences for these line cards should there be a 6100 Series module in the chassis. The DFC4 or DFC4XL will handle all packet forwarding operations at up to 60 mpps and send the packet to its final destination over the fabric.

Q. What new functions does DFC4 support?

- A.** DFC4 supports extensive new features: Native VPLS, Cisco TrustSec® security, Flexible NetFlow, Enhanced MPLS, Adv Control Plane Policing (CoPP), ACL Dry Run, ACL Hitless Commit, and more. For more details, refer to the Supervisor Engine 2T, 6900 Series Ethernet modules, and 6800 Series Ethernet Module data sheets (put the URL).

Chassis/Supervisor/Software Interoperability**Q. Which chassis supports the new 6800 Series 10 Gigabit and Gigabit Ethernet modules? Are there any limitations?**

- A.** All Cisco Catalyst 6500 E-Series chassis support the new 6800 Series 10 Gigabit and Gigabit Ethernet modules. In addition, all the following 61XX modules and service modules are compatible with all Cisco Catalyst 6500 E-Series chassis together with the 6800 Series 10 Gigabit and Gigabit Ethernet modules when deployed with the new Supervisor Engine 2T: WS-X6148A-RJ-45, WS-X6148A-45AF, WS-X6148-FE-SFP, WS-X6148A-GE-TX, WS-X6148A-GE-45AF, WS-X6148E-GE-AT; service modules: FWSM, ASA SM, ACE 30, ACE 20, WiSM, and WiSM2.

- Q. Which supervisor engine supports the new 6800 Series 10 Gigabit and Gigabit Ethernet modules?**
- A.** The new 6800 Series 10 Gigabit and Gigabit Ethernet modules work only with the new Supervisor Engine 2T, and they work in VSS system.
- Q. Which of the new 6800 Series 10 Gigabit and Gigabit Ethernet modules support VSL?**
- A.** Only 6800 Series 16-Port 10 Gigabit Ethernet Fiber and Copper Module supports VSL in performance mode.
- Q. Which software supports the new 6800 Series 10 Gigabit and Gigabit Ethernet modules?**
- A.** It is supported with Cisco IOS Software Release 12.2(50)SY and higher (put the URL).
- Q. What optics are available for the new 6800 Series 10 Gigabit and Gigabit Ethernet Fiber modules at FCS?**
- A.** See Table 4 and 5 for the supported optics for the 6800 Series 10 Gigabit and Gigabit Ethernet Fiber modules respectively at FCS.

Table 4. 6800 Gigabit Ethernet Fiber Modules Supported Optics

Module	SFP	Wavelength (nm)	Fiber/Cable Type	CoreSize (micron)	Model Bandwidth (MHz/km)	Cable Distance
WS-X6848-SFP-2T/2TXL WS-X6824-SFP-2T/2TXL	1000BASE-SX	850	MMF	<ul style="list-style-type: none"> • 62.5 • 62.5 • 50.0 • 50.0 	<ul style="list-style-type: none"> • 160 • 200 • 400 • 500 	<ul style="list-style-type: none"> • 220m (722 ft) • 275m (902 ft) • 500m (1640 ft) • 550m (1804 ft)
WS-X6848-SFP-2T/2TXL WS-X6824-SFP-2T/2TXL	1000BASE-LX/LH	1300	<ul style="list-style-type: none"> • MMF* • SMF 	<ul style="list-style-type: none"> • 62.5 • 50.0 • 50.0 • 9/10 	<ul style="list-style-type: none"> • 500 • 400 • 500 	<ul style="list-style-type: none"> • 550 m (1804 ft) • 550 m (1804 ft) • 550 m (1804 ft) • 10 km (32,810 ft)
WS-X6848-SFP-2T/2TXL WS-X6824-SFP-2T/2TXL	1000BASE-ZX	1550	SMF	9/10	-	43.4 to 62 miles (70 to 100 km)**
WS-X6848-SFP-2T/2TXL WS-X6824-SFP-2T/2TXL	1000BASE-T	-	Category 5	-	-	100 m (328 ft)

Table 5. 6800 10 Gigabit Ethernet Fiber Modules Supported Optics

X2 Part Number	Transceiver Type	Wavelength	IEEE Standard	Maximum Distance and Cable Type
X2-10GB-LRM	10GBASE-LRM	1310 nm serial	IEEE 802.3aq	220m over multimode fiber
X2-10GB-SR	10GBASE-SR	850 nm serial	IEEE 802.3ae	<ul style="list-style-type: none"> • 26m over 62.5-micron FDDI-grade multimode fiber • 33m over 62.5-micron 200 MHz x km multimode fiber • 66m over 50-micron 400 MHz x km multimode fiber • 82m over 50-micron 500 MHz x km multimode fiber • 300m over 50-micron 2000 MHz x km multimode fiber
X2-10GB-LR	10GBASE-LR	1310 nm serial	IEEE 802.3ae	10 km over single-mode fiber
X2-10GB-ER	10GBASE-ER	1550 nm serial	IEEE 802.3ae	40 km over single-mode fiber
X2-10GB-LX4	10GBASE-LX4	WWDM 1310 nm	IEEE 802.3ae	<ul style="list-style-type: none"> • 300m over 62.5-micron FDDI grade multimode fiber • 240m over 50-micron 400 MHz x km multimode fiber • 300m over 50-micron 500 MHz x km multimode fiber
X2-10GB-CX4	10GBASE-CX4	Copper	IEEE 802.3ak	15m over 8 pair 100-Ohm InfiniBand cable
X2-10GB-ZR	10GBASE-ZR	1550 nm serial	-	80 km over single-mode fiber

X2 Part Number	Transceiver Type	Wavelength	IEEE Standard	Maximum Distance and Cable Type
X2-10G-DWDM	DWDM	32 different wavelengths; C band	100 GHz ITU grid	32 wavelengths over single strand of single-mode fiber; 80 km
CVR-X2-SFP10G	SFP+ converter for X2 ports			
SFP-H10GB-CU1M1 (With CVR-X2-SFP10G converter for X2 ports)	Cisco 10GBASE-CU SFP+ cable	Copper	SFP+ MSA SFF-8431	1-m 10G SFP+ Twinax cable assembly, passive
SFP-H10GB-CU3M1 (With CVR-X2-SFP10G converter for X2 ports)	Cisco 10GBASE-CU SFP+ cable	Copper	SFP+ MSA SFF-8431	3-m 10G SFP+ Twinax cable assembly, passive
SFP-H10GB-CU5M1 (With CVR-X2-SFP10G converter for X2 ports)	Cisco 10GBASE-CU SFP+ cable	Copper	SFP+ MSA SFF-8431	5-m 10G SFP+ Twinax cable assembly, passive
SFP-10G-SR (With CVR-X2-SFP10G converter for X2 ports)	10GBASE-SR SFP+ transceiver module	850nm MMF	IEEE 802.3ae	<ul style="list-style-type: none"> • 26m over 62.5-micron FDDI-grade multimode fiber • 33m over 62.5-micron 200 MHz x km multimode fiber • 66m over 50-micron 400 MHz x km multimode fiber • 82m over 50-micron 500 MHz x km multimode fiber • 300m over 50-micron 2000 MHz x km multimode fiber
SFP-10G-LRM (With CVR-X2-SFP10G converter for X2 ports)	10GBASE-LRM SFP+ transceiver module	1310 nm MMF and SMF	IEEE 802.3aq	<ul style="list-style-type: none"> • 220m on standard Fiber Distributed Data Interface (FDDI) grade MMF

Q. Will there be a CFC option available on 6800 Series line cards?

A. No.

Q. Does the Supervisor Engine 2T help in doubling the performance of our 68xx Series Ethernet modules?

A. No.

For More Information

For more information about Cisco Catalyst 6500 Series Switches, visit

<http://www.cisco.com/en/US/products/hw/switches/ps708/index.html> or contact your local account representative.



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