



Release Notes for Cisco ONS 15540 ESPx for Cisco IOS Release 12.1(10)EV

This document describes caveats for Cisco IOS Release 12.1(10)EV for the Cisco ONS 15540 ESPx.

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Introduction

The Cisco ONS 15540 ESPx is an optical transport platform that employs DWDM (dense wavelength division multiplexing) technology. With the Cisco ONS 15540 ESPx, users can take advantage of the availability of dark fiber to build a common infrastructure that supports data, SANs (storage area networks), and TDM (time-division multiplexing) traffic. The system uses an enhanced chassis with front fiber-optic cable access for optical interconnections between transponders and optical mux/demux modules. For more information about DWDM technology and applications, refer to the [Introduction to DWDM Technology](#) publication and the [Cisco ONS 15540 ESPx Planning and Design Guide](#).

System Requirements

This section describes the system requirements for Cisco IOS Release 12.1(10)EV, and it includes the following sections:

- [Memory Requirements, page 2](#)
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Memory Requirements

The DRAM memory configuration is 128 MB, which is the default for the Cisco ONS 15540 ESPx.

Hardware Supported

Table 1 lists the hardware components supported on the Cisco ONS 15540 ESPx and the minimum software version required. See the [“Determining the Software Version” section on page 8](#) for information on determining your software version.

Table 1 *Cisco ONS 15540 ESPx Supported Hardware Modules and Minimum Software Requirements*

Component	Part Number	Description	Minimum Software Version Required
Chassis	15540-CHSB=	Chassis external connection system —19” RM, 14 U, 12 slot	
Power supplies and spare power supply cables	15540-PWR-AC	120 to 240 VAC power supply	
	15540-CAB-AC	Custom AC-input power entry cable	
	15500-CAB-AC	North America	
	15500-CAB-ACA	Australia	
	15500-CAB-ACE	Europe	
	15500-CAB-CU	UK	
	15500-CAB-ACI	Italy	
	15500-CAB-ACR	Argentina	
Blank motherboards and blank modules	15540-COV-07	Mux/demux motherboard blank panel	
	15540-COV-08	4 / 8 Ch. mux/demux blank panel	
	15540-COV-09	Line card motherboard blank panel	
	15540-COV-10	Transponder module blank panel	
Fans	15540-FTMP=	Fan tray module populated with eight fans	12.1(10)EV
Processor cards	15540-CPU	Processor card	12.1(10)EV
Flash PC Cards	15500-PCMCIA16=	PCMCIA Memory Card 16Mb	12.1(10)EV
	15500-PCMCIA20=	PCMCIA Memory Card 20Mb	12.1(10)EV
Mux/demux motherboards	15540-MMMB-1100	Supports mux/demux modules with OSC	12.1(10)EV
	15540-MMMB-1200	Supports mux/demux modules without OSC	12.1(10)EV

Table 1 *Cisco ONS 15540 ESPx Supported Hardware Modules and Minimum Software Requirements (continued)*

Component	Part Number	Description	Minimum Software Version Required
Mux/demux modules without OSC	15540-MDXC-04A0	4-channel Band A	12.1(10)EV
	15540-MDXC-04B0	4-channel Band B	12.1(10)EV
	15540-MDXC-04C0	4-channel Band C	12.1(10)EV
	15540-MDXC-04D0	4-channel Band D	12.1(10)EV
	15540-MDXC-04E0	4-channel Band E	12.1(10)EV
	15540-MDXC-04F0	4-channel Band F	12.1(10)EV
	15540-MDXC-04G0	4-channel Band G	12.1(10)EV
	15540-MDXC-04H0	4-channel Band H	12.1(10)EV
	15540-MDXC-08A0	8-channel Band AB	12.1(10)EV
	15540-MDXC-08B0	8-channel Band CD	12.1(10)EV
	15540-MDXC-08C0	8-channel Band EF	12.1(10)EV
	15540-MDXC-08D0	8-channel Band GH	12.1(10)EV
Mux/demux modules with OSC	15540-MDXD-04A0	4-channel Band A	12.1(10)EV
	15540-MDXD-04B0	4-channel Band B	12.1(10)EV
	15540-MDXD-04C0	4-channel Band C	12.1(10)EV
	15540-MDXD-04D0	4-channel Band D	12.1(10)EV
	15540-MDXD-04E0	4-channel Band E	12.1(10)EV
	15540-MDXD-04F0	4-channel Band F	12.1(10)EV
	15540-MDXD-04G0	4-channel Band G	12.1(10)EV
	15540-MDXD-04H0	4-channel Band H	12.1(10)EV
	15540-MDXD-08A0	8-channel Band AB	12.1(10)EV
	15540-MDXD-08B0	8-channel Band CD	12.1(10)EV
	15540-MDXD-08C0	8-channel Band EF	12.1(10)EV
	15540-MDXD-08D0	8-channel Band GH	12.1(10)EV
	15540-MDXD-32A0	32-channel AH	12.1(10)EV
Line card motherboards	15540-LCMB-1100	Supports four transponders with protection or four extended range transponders with protection	12.1(10)EV
	15540-LCMB-1200	Supports four transponders without protection or four extended range transponders without protection	12.1(10)EV

Table 1 *Cisco ONS 15540 ESPx Supported Hardware Modules and Minimum Software Requirements (continued)*

Component	Part Number	Description	Minimum Software Version Required
MM transponder modules	15540-TSP1-01A3	Ch 1-2 —1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-03A3	Ch 3-4 —1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-05A3	Ch 5-6 —1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-07A3	Ch 7-8 — 310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-09A3	Ch 9-10 — 1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-11A3	Ch 11-12 — 1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-13A3	Ch 13-14 — 1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-15A3	Ch 15-16 —1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-17A3	Ch 17-18 —1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-19A3	Ch 19-20 —1310nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-21A3	Ch 21-22 —1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-23A3	Ch 23- 24—1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-25A3	Ch 25-26—1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-27A3	Ch 27-28—1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-29A3	Ch 29-30—1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
	15540-TSP1-31A3	Ch 31-32—1310-nm MM 16 to 622 Mbps with SC	12.1(10)EV
SM transponder modules	15540-TSP1-01B3	Ch 1-2—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-03B3	Ch 3-4—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-05B3	Ch 5-6—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-07B3	Ch 7-8—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-09B3	Ch 9-10—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-11B3	Ch 11-12—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-13B3	Ch 13-14— 1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-15B3	Ch 15-16—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-17B3	Ch 17-18—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-19B3	Ch 19-20—1310nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-21B3	Ch 21-22—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-23B3	Ch 23- 24—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-23B3	Ch 23- 24—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-25B3	Ch 25-26—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-27B3	Ch 27-28—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-29B3	Ch 29-30 —1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV
	15540-TSP1-31B3	Ch 31-32—1310-nm SM 16 Mbps to 2.5 Gbps with SC	12.1(10)EV

Table 1 *Cisco ONS 15540 ESPx Supported Hardware Modules and Minimum Software Requirements (continued)*

Component	Part Number	Description	Minimum Software Version Required
Extended range transponder modules supporting SFP optics	15540-TSP2-0100	Ch 1-2	12.1(10)EV
	15540-TSP2-0300	Ch 3-4	12.1(10)EV
	15540-TSP2-0500	Ch 5-6	12.1(10)EV
	15540-TSP2-0700	Ch 7-8	12.1(10)EV
	15540-TSP2-0900	Ch 9-10	12.1(10)EV
	15540-TSP2-1100	Ch 11-12	12.1(10)EV
	15540-TSP2-1300	Ch 13-14	12.1(10)EV
	15540-TSP2-1500	Ch 15-16	12.1(10)EV
	15540-TSP2-1700	Ch 17-18	12.1(10)EV
	15540-TSP2-1900	Ch 19-20	12.1(10)EV
	15540-TSP2-2100	Ch 21-22	12.1(10)EV
	15540-TSP2-2300	Ch 23-24	12.1(10)EV
	15540-TSP2-2500	Ch 25-26	12.1(10)EV
	15540-TSP2-2700	Ch 27-28	12.1(10)EV
	15540-TSP2-2900	Ch 29-30	12.1(10)EV
	15540-TSP2-3100	Ch 31-32	12.1(10)EV
Pluggable SFP optics for extended range transponder modules	15500-XVRA-01A2	ESCON and OC-3 1310-nm MM MT-RJ	12.1(10)EV
	15500-XVRA-03B1	Gigabit Ethernet and Fibre Channel (1 Gbps) 1310-nm SM MTLC	12.1(10)EV
	15500-XVRA-02C1	Gigabit Ethernet and Fibre Channel (1 Gbps) 850-nm MM MTLC	12.1(10)EV
	15500-XVRA-02C2	Fibre Channel (2 Gbps) 850-nm MM MTLC	12.1(10)EV
	15500-XVRA-02C3	Fibre Channel (2 Gbps) 1310-nm SM MTLC	12.1(10)EV
	15500-XVRA-07B1	SONET OC-12 1310-nm SM MTLC	12.1(10)EV
	15500-XVRA-06B	SONET OC-12 1310-nm MTLC	12.1(10)EV
	15500-XVRA-07B1	SONET OC-48 1310-nm SM MTLC	12.1(10)EV
Optical cross connect	15500-CCDK01	ONS 15500 Cross Connect Drawer Kit	
	15500-CSDK01	ONS 15500 Cable Storage Drawer Kit	
	15500-VC GK01	ONS 15500 Vertical Cable Guide Kit	
	15500-CAB-MU-ADTR=	ONS 15540 MU-MU Insertion Adapter	
	15500-CAB-TL01=	Cable installation and removal tool. SFP removal tool.	
Optical cable kits	15500-CAB-KIT1	Cable Kit 1 - (order 1x for LCMB without splitter, order 2x for LCMB with splitter): 2x MTP-8MU, 2x MU Adaptor, 8x MU-MU	
MTP Cables	15500-CAB-MTP-01=	86" MTP to MTP cable - 2.5G Linecard Motherboard	

Table 1 Cisco ONS 15540 ESPx Supported Hardware Modules and Minimum Software Requirements (continued)

Component	Part Number	Description	Minimum Software Version Required
Optical trunk cables (symplex)	15500-CAB-MS01=	1.0m Tuned Low Loss MU to SC SM Patch Cable	
	15500-CAB-MS02=	3.0m Tuned Low Loss MU to SC SM Patch Cable	
	15500-CAB-MST03=	1.0m Tuned Low Loss MU to ST SM Patch Cable	
	15500-CAB-MST04=	3.0m Tuned Low Loss MU to ST SM Patch Cable	
Optical OADM and intra chassis cables (symplex)	15500-CAB-MMU-01=	0.25m (10") Tuned Low Loss MU to MU SM OADM Patch Cable	
	15500-CAB-MMU-02=	0.35m (14") Tuned Low Loss MU to MU SM OADM Patch Cable	
	15500-CAB-MMU-03=	0.45m (17") Tuned Low Loss MU to MU SM OADM Patch Cable	
	15500-CAB-MMU-04=	0.5m (20") Tuned Low Loss MU to MU SM OADM Patch Cable	
	15500-CAB-MMU-05=	1.0m (40") Tuned Low Loss MU to MU SM OADM Patch Cable	
	15500-CAB-MMU-09=	1.16m (46") Tuned Low Loss MU to MU SM OADM Patch Cable	
	15500-CAB-MMU-06=	1.5m (60") Tuned Low Loss MU to MU SM OADM Patch Cable	
	15500-CAB-MMU-07=	2.0m (79") Tuned Low Loss MU to MU SM OADM Patch Cable	
	15500-CAB-MMU-08=	2.5m (98") Tuned Low Loss MU to MU SM OADM Patch Cable	
Optical client cables (symplex)	15500-CAB-SC11=	1.0m SC to SC 62.5/125um MM Cable	
	15500-CAB-SC19=	1.0m SC to SC 50/125um MM Cable	
	15500-CAB-SC12=	1.0m SC to SC SM Cable	
	15500-CAB-SC13=	3.0m SC to SC 62.5/125um MM Cable	
	15500-CAB-SC20=	3.0m SC to SC 50/125um MM Cable	
	15500-CAB-SC14=	3.0m SC to SC SM Cable	
	15500-CAB-ST15=	1.0m SC to ST 62.5/125um MM Cable	
	15500-CAB-ST21=	1.0m SC to ST 50/125um MM Cable	
	15500-CAB-ST16=	1.0m SC to ST SM Cable	
	15500-CAB-ST17=	3.0m SC to ST 62.5/125um MM Cable	
	15500-CAB-ST22=	3.0m SC to ST 50/125um MM Cable	
	15500-CAB-ST18=	3.0m SC to ST SM Cable	

Table 1 *Cisco ONS 15540 ESPx Supported Hardware Modules and Minimum Software Requirements (continued)*

Component	Part Number	Description	Minimum Software Version Required
Optical y-cables	15500-CAB-YMM-SC=	50/125um Multimode Y Cable with SC for Channel Protection	
	15500-CAB-YMM2-SC=	62.5/125um Multimode Y Cable with SC for Channel Protection	
	15500-CAB-YSM-SC=	Single Mode Y Cable with SC for Channel Protection	
	15500-CAB-YMM-SC=	50/125um Multimode Y Cable with SC for Channel Protection	

Determining the Software Version



Note

We strongly recommend that you use the latest available software release for all Cisco ONS 15540 ESPx hardware.

To determine the version of Cisco IOS software currently running on a Cisco ONS 15540 ESPx system, log in to the system and enter the **show version EXEC** command.

Upgrading the System Image

To ensure proper system functioning, follow the system image upgrading procedure described in the *Cisco ONS 15540 ESPx Software Upgrade Guide*.



Note

Always set the configuration register to 0x2102 when upgrading the system image using the **config-reg 0x2102** command in configuration mode.



Caution

Improper system image upgrades can affect system functioning and redundancy. Always follow the recommended upgrade procedures.

Feature Set Table

The Cisco IOS Release software is packaged in feature sets (also called software images) depending on the platform. Each feature set contains a specific set of Cisco IOS features. [Table 2](#) lists the Cisco IOS software feature sets available for the Cisco ONS 15540 ESPx.

Table 2 *Feature Sets Supported by the Cisco ONS 15540 ESPx*

Feature Set	12.1(10)EV
Gigabit Ethernet	X
Fast Ethernet	X
Ethernet	X
ATM OC-3/STM-1, OC-12/STM-4, and OC-48/STM-16	X
SONET ¹ /SDH ²	X
POS ³	X
Fibre Channel (1 Gbps)	X
Fibre Channel (2 Gbps)	X
FDDI ⁴	X
ESCON ⁵ SM (200 Mbps)	X
FICON ⁶ (800 Mbps)	X
Token Ring	X
SNMP	X
CiscoView	X
Cisco Transport Manager	X
CDP ⁷	X
IP packets	X
OSCP ⁸	X
APS ⁹ protocol packets	X
Point-to-point	X
Hubbed ring	X
Meshed ring	X
Sysplex	X
GDPS ¹⁰	X
Unidirectional path switching	X
Bidirectional path switching	X

1. SONET = Synchronous Optical Networking
2. SDH = Synchronous Digital Hierarchy
3. POS = Packet over SONET
4. FDDI = Fiber Distributed Data Interface
5. ESCON = Enterprise Systems Connection
6. FICON = Fiber Connection
7. CDP = Cisco Discovery Protocol
8. OSCP = Optical Supervisory Channel Protocol
9. APS = Automatic Protection Switching
10. GDPS = Geographically Dispersed Parallel Sysplex

Caveats

This section lists the caveats and corrected caveats for each release. Use [Table 3](#) to determine the status of a particular caveat. In the tables, “C” indicates a corrected caveat, and “O” indicates an open caveat.

Table 3 *Caveat Matrix for the Cisco ONS 15540 ESPx*

DDTS Number	12.1(10)EV
CSCdv90351	O
CSCdx70683	O
CSCdx07666	O
CSCdx32438	O
CSCdx37144	O
CSCdx42463	O
CSCdx80804	C
CSCdx80175	O
CSCdx87061	O
CSCdx89540	O
CSCdy03076	O

This section describes the caveats in the Cisco ONS 15540 ESPx.

- [CSCdv90351](#)

Symptom: When there is a constant stream of loss of sync alarms, a port fail notification is not generated.

Although both signal failure and signal degrade thresholds are applied, only signal degrade is observed. The signal failure threshold is monitored by hardware registers. When the signal failure threshold is exceeded, the hardware normally generates a port fail notification. Because the loss of sync alarms are constant, the threshold exceeded cannot generate a port fail notification. The signal degrade is reported because it is monitored by software and does not need any notifications from hardware.

Workaround: Disable and reenabling monitoring once with the **no monitor/monitor enable** command sequence to generate the port fail notification.

- [CSCdx70683](#)

Symptom: The SRC reprogram for the standby processor card fails.

Workaround: Run the SRC reprogram on the active processor card, enable the processor switchover after switchover, and then run the SRC reprogram on the new active processor card. Remove and reinsert the processor card for the new FPGA to become effective.

- [CSCdx07666](#)

Symptom: Loss of signal might occur before SD (signal degrade) and SF (signal failure) thresholds are exceeded and traffic may still continue to pass transparently.

The loss of signal detection is taken from the OE (optical to electrical) conversion subsystem which is different from the source of the SD and SF counters. The loss of light sensitivity is a characteristic of the OE conversion unit and it may vary from unit to unit but is always < -30dBm.

Workaround: None.

- [CSCdx32438](#)

Symptom: When the Rx port fiber is removed from the transponder module, ingress alarms are reported and cleared repeatedly. The alarm should not clear and the alarm should be reported only once.

Workaround: None

- [CSCdx37144](#)

Symptom: Processor card gets into a nonresponsive state.

Workaround: None

- [CSCdx42463](#)

Symptom: Processor card gets into a nonresponsive state for an extended interval, during which time the active/standby LEDs may not indicate the correct active/standby state.

Workaround: If the processor card has not been reset by the redundant processor card, the non-responsive processor card can be removed and re-inserted in the chassis. This may cause a brief hit to data traffic, but the redundant processor card should take over and bring the system back up.

- [CSCdx80804](#)

Symptom: The **encapsulation fastethernet** command fails on multimode transponders. The **clock rate 100000** command succeeds but then pings over the signal fail intermittently.

Workaround: None.

- [CSCdx80175](#)

Symptom: The **show interface** command output for a wave interface displays an “up” state but the Signal Quality shows loss of sync.

Workaround: None.

- [CSCdx87061](#)

Symptom: CiscoView might display a different receive LED status on transponders from what is actually seen on the device.

Workaround: None.

- [CSCdx89540](#)

Symptom: Client transmit enabled upon insertion disrupts y-cable clients.

Workaround: Remove client transmit fiber (y-cable leg) from the standby transponder before reinserting. Connect it back a few seconds after re-insertion of the standby transponder.

- [CSCdy03076](#)

Symptom: The first time you OIR the OSC linecard, the card is brought admin down state.

Workaround: Enter the **no shutdown** command when the interface recovers.

Limitations and Restrictions

This section contains limitations and restrictions that apply to the Cisco ONS 15540 ESPx.

Transponder Modules

This section contains limitations and restrictions that apply to transponder modules.

- When you insert the standby transponder module in a y-cable protected configuration, remove the cable from the transponder module before inserting the transponder module into the shelf. Failure to remove the cable might result in errors that can affect the performance of the active signal received by the client equipment.
- CRC errors may occur with 2-Gbps Fibre Channel on single-mode transponders when high input power levels are received from the client laser sources.

Data errors or link-down conditions for 2-Gbps Fibre Channel might occur when used with certain client laser sources. Transmitters in some client GBIC and SFP transceiver units might send large overshoots in optical power with signal bit transitions, causing momentary overload conditions on the transponder client side receiver. The average transmitted power level from the GBIC does not violate the overload specification of the transponder client side receiver, so a power meter does not detect the overload.

The workaround is to attenuate the signal from the client equipment to a recommended level of -12 dBm when transmitting 2-Gbps Fibre Channel services.

- If both processor cards are removed, traffic through the system is affected as follows:
 - For Type 2 extended range transponder modules, traffic is shut down.
 - For 10-GE transponder modules, traffic is shut down.
 - Type 1 SM transponder modules and MM transponder modules do not operate reliably. The traffic might be affected.
 - In the shutdown state, the Status LED on the line card motherboard turns orange.



Note

Traffic on pass through optical channels (which passively pass through the mux/demux modules) are not affected by the removal of the processor cards.

Related Documentation

Refer to the following documents for more information about the Cisco ONS 15540 ESPx:

- [Cisco ONS 15540 ESPx Planning and Design Guide](#)
- [Regulatory Compliance and Safety Information for the Cisco ONS 15500 Series](#)
- [Cisco ONS 15540 ESPx Hardware Installation Guide](#)
- [Cisco ONS 15540 ESPx Configuration Guide and Command Reference](#)
- [Network Management for the Cisco ONS 15540 ESPx](#)
- [Cisco ONS 15540 ESPx Alarms and Error Messages](#)
- [Glossary of Optical Networking Terms](#)

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Technical Assistance Center

The Cisco TAC is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two types of support are available through the Cisco TAC: the Cisco TAC Web Site and the Cisco TAC Escalation Center.

Inquiries to Cisco TAC are categorized according to the urgency of the issue:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.

- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

Which Cisco TAC resource you choose is based on the priority of the problem and the conditions of service contracts, when applicable.

Cisco TAC Web Site

The Cisco TAC Web Site allows you to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC Web Site, go to the following URL:

<http://www.cisco.com/tac>

All customers, partners, and resellers who have a valid Cisco services contract have complete access to the technical support resources on the Cisco TAC Web Site. The Cisco TAC Web Site requires a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to the following URL to register:

<http://www.cisco.com/register/>

If you cannot resolve your technical issues by using the Cisco TAC Web Site, and you are a Cisco.com registered user, you can open a case online by using the TAC Case Open tool at the following URL:

<http://www.cisco.com/tac/caseopen>

If you have Internet access, it is recommended that you open P3 and P4 cases through the Cisco TAC Web Site.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses issues that are classified as priority level 1 or priority level 2; these classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer will automatically open a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to the following URL:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled; for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). In addition, please have available your service agreement number and your product serial number.

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