



Cisco IOS Software Release 12.1(11b)EX1 for Supervisor Engines of the Cisco Catalyst 6500 Series Switches and Cisco 7600 Series Internet Routers

Use this publication if you have the Cisco IOS® Software for the Cisco Catalyst® 6500 Series Switches or the Cisco 7600 Series Internet Routers, which run Cisco IOS Software Release 12.1(11b)EX on the Supervisor Engine 1A and Supervisor Engine 2 with the Multilayer Switch Feature Card (MSFC or MSFC2)

Table 1 Software Release 12.1(11b)EX Hardware Features

Hardware Features	Hardware/Software Description
10GBASE-ER Serial 1550 nm Optical Interface Module	The new Cisco Catalyst 6500 Serial 1550 nm 10 Gigabit Ethernet module supports up to 40 km over single-mode fiber and is based on the current IEEE 802.3ae draft. It can interoperate with any module supporting the same serial 1550 nm specification in the current IEEE 802.3ae 10 Gigabit Ethernet draft. When deployed in a Cisco Catalyst 6500 or Cisco 7600, the serial 1550 nm 10 Gigabit Ethernet module is ideal for building economical, simple, and manageable intercampus and inter-POP connections. It provides a high-speed pipe for enterprises and service providers over metro distances (up to 40 km) at a lower cost of ownership.

Note: If you are running Cisco Catalyst software on the Supervisor Engine and Cisco IOS Software only on the MSFC, refer to the following release notes for MSFC publication:

<http://www.cisco.com/univercd/cc/td/doc/product/lan/cat6000/relnotes/index.htm>.



Other Hardware Supported

The system supports all cards previously supported by the Cisco IOS Software on the Cisco Catalyst 6500 Series Supervisor Engine 1A and the Supervisor Engine 2 for the Cisco Catalyst 6500 Series and Cisco 7600 Series Internet Routers.

Note: The Optical Services Modules (OSMs) for the Cisco 7600 and Cisco Catalyst 6500 Series require the Supervisor Engine 2 with MSFC 2.

Table 2 Software Release 12.1(11b)EX Software Features

Software Feature	Description
IEEE 802.3ad	<p>Link Aggregation Control Protocol (LACP) is defined in IEEE 802.3ad and allows Cisco switches to negotiate Ethernet channels with devices that conform to the 802.3ad specification.</p> <p>LACP is similar to the Cisco proprietary implementation of EtherChannel Port Aggregation Protocol (PAgP), which allows ports with similar characteristics to form a channel through dynamic negotiation with a partner system.</p>
Layer 2 EtherChannel interface configuration across multiple DFC-equipped switching modules	<p>Ability to create Layer 2 EtherChannels that include supervisor engine interfaces and interfaces on non- Distributed Forwarding Card (DFC)-equipped switching modules as well as DFC-equipped switching modules. Prior to introduction of this feature, Layer 2 EtherChannels that include interfaces on different DFC-equipped switching modules were not supported.</p>
Route Processor Redundancy Plus (RPR+)	<p>RPR+ is a Cisco innovation, designed for platforms with dual redundant routing processors, such as dual supervisor engines used in the Cisco Catalyst 6500 and Cisco 7600 Series. One supervisor is designated as the active route processor, while the second supervisor acts as the standby route processor. When the active route processor fails, RPR+ allows the standby supervisor to become active, without reloading the line cards in the system.</p> <p>RPR+ ensures:</p> <ul style="list-style-type: none">• The redundant supervisor is fully booted and has a parsed configuration• The Cisco IOS Software running on the primary supervisor is synchronized with the standby supervisor• There are no link flaps during failover to the secondary supervisor <p>WAN line card support for RPR+ will be supported in a future Cisco IOS maintenance release.</p>
Support for 4096 VLAN IDs	<p>Supports 4096 Layer 2 virtual LANs (VLANs) in accordance with the IEEE 802.1q standard. These VLANs are organized into several ranges that have different uses. Some of these VLANs are propagated to other switches in the network when VLAN Trunking Protocol (VTP) is used. However, extended-range VLANs are not propagated, and must be configured manually on each network. Maximum SVIs remain at 1000 within the range from 1 to 4094.</p>
IEEE 802.1w and 802.1s	<p>The IEEE 802.1w specification, Rapid Spanning Tree Protocol (RSTP), provides for subsecond reconvergence of the Spanning Tree Protocol after failure of one of the uplinks in a bridged environment. 802.1w provides the structure on which the IEEE 802.1s feature operates.</p> <p>The IEEE 802.1s specification, Multiple Spanning Tree (MST), allows a user to build multiple spanning trees over VLAN trunks. Fast convergence of the MST topology is achieved by using a modified version of RSTP.</p>



Table 2 Software Release 12.1(11b)EX Software Features

Software Feature	Description
PortFast for Trunks	PortFast can be configured for trunk/channel ports. On linkup state, the port immediately transitions into Spanning Tree forwarding mode, bypassing listening and learning states. This feature is useful for direct connections to routers or servers.
802.1q in 802.1q (802.1q Tag Stacking)	IEEE 802.1q tunneling allows multiple VLANs in other VTP domains to be carried by a single VLAN on the Cisco Catalyst 6000 Series Switch without losing their unique VLAN IDs. Customer originated traffic is double tagged prior to crossing the service provider's network. This feature allows service providers to offer L2 VPNs or Transparent LAN services.
Layer 2 Protocol Tunneling	The Layer 2 Protocol Tunneling feature allows the tunneling of control protocol PDUs such as STP, Cisco Discovery Protocol, and VTP. Equipment appears to be directly connected even though they may be several L2 hops apart.
802.1q tag stacking over EoMPLS	This feature allows the transport of 802.1Q Tag Stacked traffic over an EoMPLS circuit, allowing 802.1q traffic to be forwarded through the MPLS cloud.
Port-Based EoMPLS	Port-based Ethernet over MPLS (EoMPLS) enables the creation of EoMPLS circuits on a per port basis; augmenting the previous VLAN-based implementation.
SPAN destination ports configured as trunks	Allows SPAN traffic to be put into Inter Switch Link (ISL) or .1q frames. Destination Ports for SPAN sessions can now be configured as trunks.
Configurable MTU size on individual physical Layer 3 ports	Ability to configure a different MTU size on each physical Layer 3 port. Prior to this feature support, only a single larger-than-default MTU size on the switch for physical Layer 3 ports could be configured.
Any port in any VLAN VACL capture	VACL capture ports can now be configured on any port in any VLAN. The capture port only receives permitted traffic. No traffic can enter the switch through a capture port. With Cisco IOS Software Release 12.1(11b)E or earlier, only the Gigabit Ethernet monitor port on the Intrusion Detection System (IDS) module can be configured as a capture port.
Automatic creation of Layer 3 VLAN interfaces to support VACLs	Applying a VLAN access map to a VLAN without a Layer 3 VLAN interface creates an administratively down Layer 3 VLAN interface to support the VLAN access map. If creation of the Layer 3 VLAN interface fails, the VACL is inactive.
VACL for WAN interfaces/hidden VLANs	VACL support is extended to include WAN interfaces, including POS, ATM, serial, FlexWAN port adapters or Optical Services Modules. This allows you to monitor WAN traffic with an IDS module or via an external network analyzer. Previously, VACLs were only supported within a VLAN or as an interface that is routed into or out of a VLAN. Note: This feature is available in native mode operation only (Cisco IOS Software running on the Supervisor and the MSFC).
SMON-MIB VLAN Stats Support	Per-VLAN statistics (total packets, octets, nucast packets and nucast octets) are provided through the SMON VlanIdStatsTable of the SMON-MIB with Supervisor Engine 2 or MSFC2. SMON-MIB Enhancement <ul style="list-style-type: none"> • Add the following VLAN statistics tables support <ul style="list-style-type: none"> – smonVlanStatsControlTable – smonVlanIdStatsTable



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Software Feature	Description
Various Management Information Base (MIB) Support	CISCO-NDE-MIB SWITCH MIB (NDE filtering) ENTITY FRU CONTROL MIB CISCO-L2-TUNNEL-CONFIG-MIB CISCO-LAG-MIB IEEE8023 LAG MIB ENTITY SENSOR MIB CISCO-PAE-MIB IEEE8021-PAE-MIB CISCO-ENVMON-MIB CISCO-PROCESS-MIB CISCO-PAGP-MIB CISCO-CDP-MIB Enhancement BRIDGE-MIB Enhancement <ul style="list-style-type: none"> • Adds the following traps support: <ul style="list-style-type: none"> – newRoot – topology Change CISCO-RMON-CONFIG-MIB Enhancement <ul style="list-style-type: none"> • Adds the following MIB objects support: <ul style="list-style-type: none"> – portCopyLoVlanMask – portCopyHiVlanMask – portCopyDestLoVlanMask – portCopyDestHiVlanMask – portCopyOption – portCopySessionType CISCO-STACK-MIB Enhancement <ul style="list-style-type: none"> • adds 4k VLAN range support for the following MIB objects <ul style="list-style-type: none"> – moduleIPAddressVlan – vlanTable – vlanPortVlan in vlanPortTable CISCO-STP-EXTENSIONS-MIB Enhancement <ul style="list-style-type: none"> • Adds MIB tables and objects for the following features <ul style="list-style-type: none"> – supports 802.1s & 802.1w – stpxPVSTVlanTable – Root Guard config – Root Inconsistency – stpxLongStpPortPathCostTable – Loop Guard config – Loop Inconsistency – Fast Start – Fast Start Bpdu Filter – Fast Start Bpdu Guard



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Software Feature	Description
	<ul style="list-style-type: none">• Adds the following traps support:<ul style="list-style-type: none">stpxInconsistencyUpdatestpxRootInconsistencyUpdatestpxLoopInconsistencyUpdate CISCO-SWITCH-ENGINE-MIB <ul style="list-style-type: none">• Supports the following subset of cseL3Objects<ul style="list-style-type: none">cseL3VlanOutPktscseL3VlanOutOctetscseL3VlanInUnicastPktscseL3VlanInUnicastOctetscseL3VlanOutUnicastPktscseL3VlanOutUnicastOctetscseL3StatsTable• Supports cseL2Objects• Supports cseNetflowLS• Supports cseErrorStatsTable CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB Enhancement <ul style="list-style-type: none">• Adds 4k VLAN range support CISCO-VLAN-MEMBERSHIP-MIB Enhancement <ul style="list-style-type: none">• Adds MIB objects for supporting 4k VLANs range CISCO-VTP-MIB Enhancement <ul style="list-style-type: none">• Add 4k VLAN range support• Add 802.1q tunneling support ETHERLIKE-MIB (RFC1398)

Features Not Supported in Cisco IOS Software Release 12.1(11b)EX1

None. All features currently supported by previous Cisco IOS Supervisor software versions are also supported in Cisco IOS Software Release 12.1(11b)EX1.

Orderable Software Images

The following table lists the software versions and applicable ordering information for the Cisco Catalyst 6500 Series Supervisor Engine 1A and Cisco Catalyst 6500 Series and Cisco 7600 Supervisor Engine 2 software. Cisco IOS Software runs on the Distributed Forwarding Card (DFC) to provide distributed Cisco Express Forwarding support. This image is bundled as part of the c6sup22 image and is not released separately.

Caution: Always back up the switch configuration file before upgrading or downgrading the switch software to avoid losing all or part of the configuration stored in NVRAM. When downgrading switch software, you will lose your configuration. Back up your configuration to a Trivial File Transfer Protocol (TFTP) server or Flash device before proceeding.



Table 3

Orderable Product Number	Description	Image
S6S11AV-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC IOS Enterprise with Versatile Interface Processor (VIP), Software Release 12.1(11b)EX	c6sup11-jsv-mz.121-11b.EX1
S6S11AV-12111EX=	Spare, requires appropriate Feature License (s)	
S6S11AK2-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC IOS Enterprise with VIP, Secure Shell (SSH), and Triple Data Encryption Standard (3DES), Software Release 12.1(11b)EX	c6sup11-jk2sv-mz.121-11b.EX1
S6S11AK2-12111EX=	Spare, requires appropriate Feature License (s)	
S6S11BV-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC IOS Desktop with VIP, Software Release 12.1(11b)EX	c6sup11-dsv-mz.121-11b.EX1
S6S11BV-12111EX=	Spare, requires appropriate Feature License (s)	
S6S11DV-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC IOS IP/ IPX with VIP, Software Release 12.1(11b)EX	c6sup11-dsv-mz.121-11b.EX1
S6S11DV-12111EX=	Spare, requires appropriate Feature License (s)	
S6S11ZV-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC IOS Service Provider with VIP, Software Release 12.1(11b)EX	c6sup11-psv-mz.121-11b.EX1
S6S11ZV-12111EX=	Spare, requires appropriate Feature License (s)	
S6S11ZK2-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC IOS Service Provider with VIP, SSH, and 3DES. Software Release 12.1(11b)EX	c6sup11-pk2sv-mz.121-11b.EX1
S6S11ZK2-12111EX=	Spare, requires appropriate Feature License (s)	
S6S12AV-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC2 IOS Enterprise with VIP, Software Release 12.1(11b)EX	c6sup12-jsv-mz.121-11b.EX1
S6S12AV-12111EX=	Spare, requires appropriate Feature License (s)	
S6S12AK2-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC2 IOS Enterprise with VIP, SSH, and 3DES. Software Release 12.1(11b)EX	c6sup12-jk2sv-mz.121-11b.EX1
S6S12AK2-12111EX=	Spare, requires appropriate Feature License (s)	
S6S12AVH-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC2 IOS Enterprise with Firewall and VIP, Software Release 12.1(11b)EX	c6sup12-jo3sv-mz.121-11b.EX1
S6S12AVH-12111EX=	Spare, requires appropriate Feature License (s)	
S6S12AK2H-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC2 IOS Enterprise with Firewall, VIP, and 3DES. Software Release 12.1(11b)EX	c6sup12-jk2o3sv-mz.121-11b.EX1



Table 3

Orderable Product Number	Description	Image
S6S12AK2H-12111EX=	Spare, requires appropriate Feature License (s)	
S6S12BV-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC2 IOS Desktop with VIP, Software Release 12.1(11b)EX	c6sup12-dsv-mz.121-11b.EX1
S6S12BV-12111EX=	Spare, requires appropriate Feature License (s)	
S6S12DV-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC2 IOS IP/IPX with VIP, Software Release 12.1(11b)EX	c6sup12-dsv-mz.121-11b.EX1
S6S12DV-12111EX=	Spare, requires appropriate Feature License (s)	
S6S12ZV-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC2 IOS Service Provider with VIP, Software Release 12.1(11b)EX	c6sup12-psv-mz.121-11b.EX1
S6S12ZV-12111EX=	Spare, requires appropriate Feature License (s)	
S6S12ZK2-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC2 IOS Service Provider with VIP, SSH, and 3DES. Software Release 12.1(11b)EX	c6sup12-pk2sv-mz.121-11b.EX1
S6S12ZK2-12111EX=	Spare, requires appropriate Feature License (s)	
S6S12ZVH-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC2 IOS Service Provider with Firewall and VIP, Software Release 12.1(11b)EX	c6sup12-po3sv-mz.121-11b.EX1
S6S12ZVH-12111EX=	Spare, requires appropriate Feature License (s)	
S6S12ZK2H-12111EX	Cisco Catalyst 6000 Supervisor 1/MSFC2 IOS Service Provider with Firewall, VIP, and 3DES. Software Release 12.1(11b)EX	c6sup12-pk2o3sv-mz.121-11b.EX1
S6S12ZK2H-12111EX=	Spare, requires appropriate Feature License (s)	
S6S22AV-12111EX	Cisco Catalyst 6000 and Cisco 7600 Supervisor 2/MSFC2 IOS Enterprise with VIP, Software Release 12.1(11b)EX	c6sup22-jsv-mz.121-11b.EX1
S6S22AV-12111EX=	Spare, requires appropriate Feature License (s)	
S6S22AK2-12111EX	Cisco Catalyst 6000 and Cisco 7600 Supervisor 2/MSFC2 IOS Enterprise with VIP and 3DES. Software Release 12.1(11b)EX	c6sup22-jk2sv-mz.121-11b.EX1
S6S22AK2-12111EX=	Spare, requires appropriate Feature License (s)	
S6S22AVH-12111EX	Cisco Catalyst 6000 and Cisco 7600 Supervisor 2/MSFC2 IOS Enterprise with Firewall and VIP, Software Release 12.1(11b)EX	c6sup22-jo3sv-mz.121-11b.EX1
S6S22AVH-12111EX=	Spare, requires appropriate Feature License (s)	
S6S22AK2H-12111EX	Cisco Catalyst 6000 and Cisco 7600 Supervisor 2/MSFC2 IOS Enterprise with Firewall, VIP, and 3DES. Software Release 12.1(11b)EX	c6sup22-jk2o3sv-mz.121-11b.EX1



Table 3

Orderable Product Number	Description	Image
S6S22AK2H-12111EX=	Spare, requires appropriate Feature License (s)	
S6S22BV-12111EX	Cisco Catalyst 6000 and Cisco 7600 Supervisor 2/MSFC2 IOS Desktop with VIP, Software Release 12.1(11b)EX	c6sup22-dsv-mz.121-11b.EX1
S6S22BV-12111EX=	Spare, requires appropriate Feature License (s)	
S6S22DV-12111EX	Cisco Catalyst 6000 and Cisco 7600 Supervisor 2/MSFC2 IOS IP/IPX with VIP, Software Release 12.1(11b)EX	c6sup22-dsv-mz.121-11b.EX1
S6S22DV-12111EX=	Spare, requires appropriate Feature License (s)	
S6S22ZV-12111EX	Cisco Catalyst 6000 and Cisco 7600 Supervisor 2/MSFC2 IOS Service Provider with VIP. Software Release 12.1(11b)EX	c6sup22-psv-mz.121-11b.EX1
S6S22ZV-12111EX=	Spare, requires appropriate Feature License (s)	
S6S22ZK2-12111EX	Cisco Catalyst 6000 and Cisco 7600 Supervisor 2/MSFC2 IOS Service Provider with VIP, SSH, and 3DES. Software Release 12.1(11b)EX	c6sup22-pk2sv-mz.121-11b.EX1
S6S22ZK2-12111EX=	Spare, requires appropriate Feature License (s)	
S6S22ZVH-12111EX	Cisco Catalyst 6000 and Cisco 7600 Supervisor 2/MSFC2 IOS Service Provider with Firewall and VIP. Software Release 12.1(11b)EX	c6sup22-po3sv-mz.121-11b.EX1
S6S22ZVH-12111EX=	Spare, requires appropriate Feature License (s)	
S6S22ZK2H-12111EX	Cisco Catalyst 6000 and Cisco 7600 Supervisor 2/MSFC2 IOS Service Provider with Firewall, VIP, and 3DES. Software Release 12.1(11b)EX	c6sup22-pk2o3sv-mz.121-11b.EX1
S6S22ZK2H-12111EX=	Spare, requires appropriate Feature License (s)	

For more detailed information concerning this software release, refer to the Cisco Catalyst 6500 Series and Cisco 7600 Series release notes at:

<http://www.cisco.com/univercd/cc/td/doc/product/lan/cat6000/relnotes/index.htm>.

Review the Cisco Catalyst 6500 Series Switches documentation at:

<http://www.cisco.com/warp/public/cc/pd/si/casi/ca6000/> and

<http://www.cisco.com/univercd/cc/td/doc/product/lan/cat6000/>.

Review the Cisco 7600 Series Internet Routers documentation at:

<http://www.cisco.com/warp/public/cc/pd/rt/7600osr/>.

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