

CISCO CATALYST 6500 SERIES WITH CISCO IOS SOFTWARE MODULARITY

This product bulletin highlights the enhancements available with Cisco IOS® Software Modularity on the Cisco® Catalyst® 6500 Series switches (Figure 1).

The Cisco Catalyst 6500 Series with Cisco IOS Software Modularity boosts operational efficiency and minimizes downtime through evolutionary software infrastructure advancements. By enabling modular Cisco IOS subsystems to run in independent processes, this innovation:

- Minimizes unplanned downtime through self-healing processes
- Simplifies software changes through subsystem In-Service Software Upgrades (ISSU)
- Enables process-level, automated policy control by integrating Embedded Event Manager (EEM).

Figure 1. Cisco Catalyst 6500 Series with Cisco IOS Software Modularity

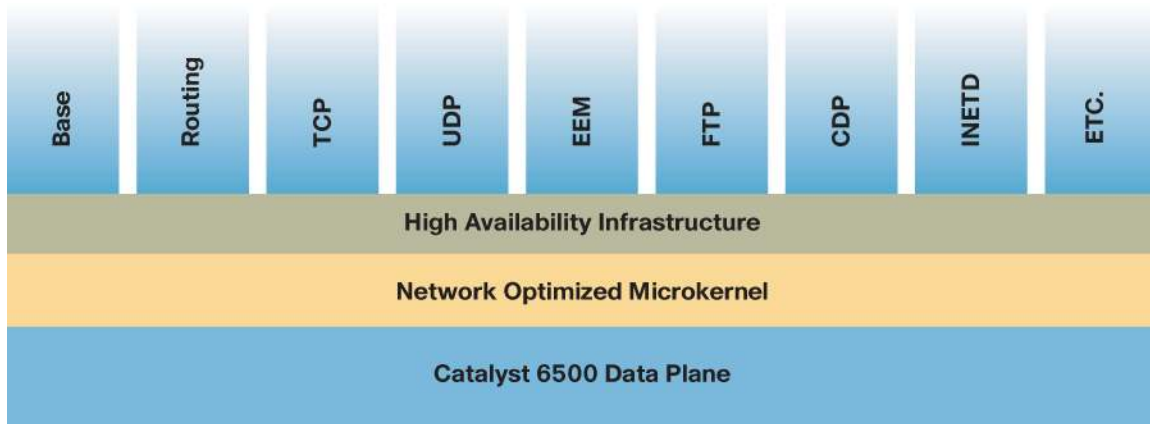


The Catalyst 6500 Series delivers hardware-based forwarding through Application-Specific Integrated Circuits (ASICs) on a central Policy Feature Card (PFC) or Distributed Forwarding Cards (DFC). The control plane functions on the Catalyst 6500 Series run on dedicated CPUs on the Multilayer Switch Forwarding Card (MSFC) complex.

- The *control plane* manages control traffic such as routing protocol updates and management traffic.
- The *data plane* is responsible for the actual forwarding of packets using ASICs.

A completely separate data plane ensures that traffic forwarding continues even if there is a disruption in the control plane, as long as the software is intelligent enough to program the hardware for nonstop operation. With redundant supervisor engines, the Non-Stop Forwarding (NSF) and Stateful Switchover (SSO) features available on the Catalyst 6500 Series provide a continuous data plane even in the event of a hardware failure on the active supervisor engine.

Figure 2. Architecture



Cisco IOS Software Modularity combines subsystems into individual processes and enhances the Cisco IOS Software memory architecture to provide process-level fault isolation and subsystem ISSU capability. These enhancements are delivered in Cisco IOS Software for the Catalyst 6500 Series Supervisor Engine 720 and Supervisor Engine 32, maintaining the feature richness and operational environment already familiar to network operators. Cisco IOS Software Modularity will first be delivered as an option in a build of Cisco IOS Software Release 12.2(18)SXF. For more details, please refer to the release notes at First Customer Shipment (FCS):

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

BENEFITS

Cisco IOS Software Modularity on the Cisco Catalyst 6500 Series provides the following benefits.

Operational Consistency

While Software Modularity adds many enhancements to Cisco IOS Software on the Catalyst 6500 Series, no changes from an operational point of view are necessary. CLI as well as management interfaces such as Simple Network Management Protocol (SNMP) or Syslog are the same as before. New commands to exec and configuration mode as well as show commands have been added to support the new functionality. Software releases and rebuilds are the same as before with additional support for patching.

Protected Memory

Software Modularity enables a memory architecture where processes make use of a protected address space. Each process and its associated subsystems “live” in an individual memory space. Using this paradigm, memory corruption across process boundaries becomes virtually impossible.

Fault Containment

The benefit of protected memory space is increased availability because problems occurring in one process cannot affect other parts of the system. For example, if a less critical system process fails or is not operating as expected, critical functions required to maintain packet forwarding are not affected.

Process Restartability

Building on the protected memory space and fault containment, the modular processes are now individually restartable. For test purposes or non-responding processes, a new CLI command is provided to manually restart processes. This allows fast recovery from transient errors without the need to disrupt forwarding. Integrated high-availability infrastructure constantly checks the state of processes and keeps track of how many times

a process restarted in a defined time interval. If a process restart does not restore the system, the high-availability infrastructure will take more drastic actions such as initiating a supervisor engine switchover or a system restart.

Modularized Processes

Several control plane functions have been modularized to cover the most commonly used features. Examples of modular processes include but are not limited to:

- Routing Process
- Internet Daemon
- Raw IP Processing
- TCP Process
- UDP Process
- Cisco Discover Protocol Process
- Syslog Daemon
- Any Embedded Event Manager components
- File Systems
- Media Drivers
- Install Manager

Subsystem In-Service Software Upgrades

Undoubtedly the most important benefit of the protected memory space and process restartability is the ability to make changes to software during runtime. Software Modularity enhances the Cisco IOS Software infrastructure to allow selective system maintenance through individual patches. (A patch is a single update that can affect one or multiple subsystems.) By providing versioning and patch-management capabilities, Software Modularity allows patches to be downloaded, verified, installed, and activated without the need to restart the system. Because packet forwarding is not affected during the patch process, the network operator now has the flexibility to introduce software changes at any time. A patch only affects the components required for the update, which means that a network administrator only has to re-certify the portion of the software associated with the update.

HARDWARE SPECIFICATIONS

Cisco IOS Software Modularity will be available as a software upgrade on the following Cisco Catalyst 6500 Series supervisor engines (Table 1):

Table 1. Supported Supervisor Engines

Supervisor Engine 720 (PFC3A, 3B, 3BXL)	Build of 12.2(18)SXF targeted for Q4 2005
Supervisor Engine 32 (PFC3B)	Build of 12.2(18)SXF targeted for Q1 2006

The 12.2(18)SXF build with Cisco IOS Software Modularity has certain minimum memory requirements (Table 2).

Table 2. Memory Requirements

Supervisor Engine	Minimum RP DRAM	Minimum SP DRAM	Minimum Compact Flash	Recommended Compact Flash
Supervisor Engine 720	512 MB	512 MB	256 MB	512 MB
Supervisor Engine 32	512 MB	512 MB	256 MB	512 MB

For more details, please refer to the release notes at FCS: <http://www.cisco.com/univercd/cc/td/doc/product/lan/cat6000/relnotes/index.htm>

Images with Cisco IOS Software Modularity support will be downloadable from Cisco.com and orderable with the following product IDs (Table 3):

Table 3. Product IDs

Image Product ID	Image Name	Description
S733ISK9M-12218SXF	s72033-ipservicesk9-vz	Cisco CAT6000-SUP720 IOS IP SERVICES SSH LAN ONLY (MODULAR)
S733ISK9M-12218SXF	s72033-ipservicesk9_wan-vz	Cisco CAT6000-SUP720 IOS IP SERVICES SSH (MODULAR)
S733ISM-12218SXF	s72033-ipservices_wan-vz	Cisco CAT6000-SUP720 IOS IP SERVICES (MODULAR)
S733AIK9M-12218SXF	s72033-advipservicesk9_wan-vz	Cisco CAT6000-SUP720 IOS ADVANCED IP SERVICES SSH (MODULAR)
S733ESK9M-12218SXF	s72033-entservicesk9_wan-vz	Cisco CAT6000-SUP720 IOS ENTERPRISE SERVICES SSH (MODULAR)
S733AEK9M-12218SXF	s72033-adventservicesk9_wan-vz	Cisco CAT6000-SUP720 IOS ADVANCED ENTERPRISE SERVICES SSH (MODULAR)
S323IBK9M-12218SXF	s3223-ipbasek9-vz	Cisco CAT6000-SUP32 IOS IP BASE SSH LAN ONLY (MODULAR)
S323IBM-12218SXF	s3223-ipbase_wan-vz	Cisco CAT6000-SUP32 IOS IP BASE (MODULAR)
S323IBK9M-12218SXF	s3223-ipbasek9_wan-vz	Cisco CAT6000-SUP32 IOS IP BASE SSH (MODULAR)
S323ISK9M-12218SXF	s3223-ipservicesk9_wan-vz	Cisco CAT6000-SUP32 IOS IP SERVICES SSH (MODULAR)
S323AIK9M-12218SXF	s3223-advipservicesk9_wan-vz	Cisco CAT6000-SUP32 IOS ADVANCED IP SERVICES SSH (MODULAR)
S323ESK9M-12218SXF	s3223-entservicesk9_wan-vz	Cisco CAT6000-SUP32 IOS ENTERPRISE SERVICES SSH (MODULAR)
S323AEK9M-12218SXF	s3223-adventservicesk9_wan-vz	Cisco CAT6000-SUP32 IOS ADVANCED ENTERPRISE SERVICES SSH (MODULAR)

ADDITIONAL INFORMATION

For additional information, please see the Release Notes at: <http://www.cisco.com/univercd/cc/td/doc/product/lan/cat6000/relnotes/index.htm>

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