Data Sheet

# Cisco Catalyst 6500 Family
# Supervisor Engines

The supervisor engines for Catalyst® 6500 Series switches deliver the latest advanced switching technology with proven Cisco software to power a new generation of scalable and intelligent multilayer switching solutions for both enterprise and service provider environments. Designed to bring data, voice, and video integration onto a single platform for fully integrated communications in the access, distribution, data center, core, and wan-edge layers of the network, the Catalyst 6500 Series Supervisor Engines provide a modular and flexible approach to building intelligent, resilient, scalable, and secure high performance multilayer switching solutions.

With a choice of 2 Supervisor ( Sup1A & Sup2-PFC2 ) families and a modular Multilayer Switch Feature Card2 (MSFC2), the Catalyst 6500 family is designed to enable an End-to-End Catalyst 6500 architecture for maximum operational consistency by enabling common sparing, single Operating System, uniform Command Line Interface, and minimized training requirements.

**Figure 1**
Sup1-2GE

**Figure**
2Sup2-PFC2

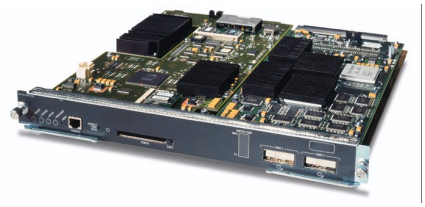

**Figure 3**
Sup2-MSFC2

The key deployment scenarios for these supervisors are outlined in Table 1.

**Table 1** Deployment Scenarios for Catalyst 6500 Supervisor Engines

| Supervisor Engine | Performance / Features | Recommended Deployments |
|---|---|---|
| **Supervisor 1A-2GE** | 15Mpps L2 Forwarding | Value Wiring Closet |
| **Supervisor 1A-PFC** | 15Mpps L2 Forwarding<br>Enhanced Security & QoS | Secure and Converged Wiring Closets |
| **Supervisor 2-PFC2** | 30Mpps L2 Forwarding<br>256Gb/s Fabric Enabled<br>Enhanced Security & QoS | Scalable, Secure and Converged Wiring Closets and Server Farms |
| **Supervisor1-PFC with MSFC2** | 15Mpps L2/3/4 Forwarding<br>Enhanced Security & QoS | Distribution and Backbone Deployments |
| **Supervisor2-PFC2 with MSFC2** | 30-210Mpps L2/3/4 Forwarding<br>256Gb/s Fabric Enabled<br>Enhanced Security & QoS | High Performance Distribution, Backbone & WAN Edge Applications |

For detailed overview of the Multilayer Switch Feature Card2 (MSFC2), refer to the MSFC2 Data Sheet at the following URL:

http://wwwin.cisco.com/cmc/cc/pd/si/casi/ca6000/prodlit/msfc2_ds.htm

The Table2 below highlights the key differences between the Catalyst 6500 Supervisor Engines

**Table 2**

| | Sup1A-2GE | Sup1A-PFC | Sup1A-PFC with MSFC2 | Sup2-PFC2 | Sup2-PFC2 with MSFC2 |
|---|---|---|---|---|---|
| **Chassis Supported** | Catalyst 6006, 6009, 6506, 6509, 6509-NEBS | Catalyst 6006, 6009, 6505, 6509, 6509-NEBS | Catalyst 6006, 6009, 6505, 6509, 6509-NEBS | Catalyst 6006, 6009, 6505, 6509, 6513, 6509-NEBS | Catalyst 6006, 6009, 6505, 6509, 6513, 6509-NEBS |
| **Redundancy** | Yes | Yes | Yes | Yes | Yes |
| **Multilayer Switching** | Layer 2 | Layer 2 | Layer 2/3/4 | Layer 2 | Layer 2/3/4 |
| **Performance** | 15 Mpps | 15 Mpps | 15 Mpps Layer 2/3/4 | 30 Mpps | 30–210 Mpps Layer2/3/4 |
| **Upgradeable to Multilayer Switching** | No | No | Multilayer Switching Ready | Yes | Multilayer Switching Ready |
| **Operating System** | Cisco Catalyst Operating System | Cisco Catalyst Operating System | Cisco Catalyst Operating System or Cisco IOS with Cisco IOS on MSFC2 | Cisco Catalyst Operating System | Cisco Catalyst Operating System or Cisco IOS with Cisco IOS on MSFC2 |
| **Modular Gigabit Uplinks** | 2 | 2 | 2 | 2 | 2 |
| **DRAM on Supervisor** | 64MB | 64MB | 64MB | 128MB, 256MB, 512MB | 128MB, 256MB, 512MB |
| **Onboard Flash (BootFlash) on Supervisor** | 16MB | 16MB | 16MB | 32MB | 32MB |
| **NVRAM** | 512KB | 512KB | 512KB | 512KB | 512KB |

### Catalyst 6500 Supervisor Engines for Maximum Network Uptime

Catalyst 6500 supervisors can be deployed in dual supervisor configurations in all Catalyst 6500 chassis (6503, 6506, 6509, and 6513) to provide industry leading network availability through sub 3 second failover. Catalyst 6500 supervisors achieve this by maintaining Synchronized protocol states between the primary and the redundant supervisor. To provide maximum network uptime, Catalyst 6500 supervisors are also designed to allow for hot-swapping of the standby supervisor.

Table below highlights the key High Availability Features of Catalyst 6500 Supervisor Family

**Table 3**

| Attribute | Cisco Catalyst 6500 Supervisor1A (Sup1A-2GE, Sup1A-PFC, Sup1A-PFC with MSFC2) | Cisco Catalyst 6500 Supervisor 2 (Sup2-PFC2, Sup2-PFC2 with MSFC2) |
|---|---|---|
| Supervisor Redundancy | Yes | Yes |
| Sub 3 Sec Stateful Failover | Yes | Yes |
| Sub 5 sec Stateful L3 IP Unicast Failover | Yes | Yes |
| Sub 5 Sec Stateful L3 IP Multicast Failover | Yes | Yes |
| Support for Switch Fabric Redundancy | No | Yes |
| Uplink Fast | Yes | Yes |
| HSRP | Yes | Yes |

### Enabling Scalable Performance with Catalyst 6500

Catalyst 6500 Supervisors engines enable scalable performance from 15 Mpps to 210 Mpps with bandwidth scaling from 32 Gbps to 256 Gbps. This scalability allows for deployment of Catalyst 6500 in 48 to 576 10/100 Ethernet ports configurations to high throughput 211 Mpps network cores supporting multi-gigabit trunks.

The Catalyst 6500 Supervisor2 Engines (Sup2-PFC2, Sup2-PFC2 with MSFC2) are based on Cisco Express Forwarding routing architecture which allows for very

high-speed lookups while also ensuring the stability and scalability necessary to meet the needs of future requirements. With 30 Mpps of centralized performance and 210 Mpps of distributed performance, the Catalyst 6500 Supervisor2 Engines can maintain these performance levels even with advanced Layer 3 services enabled and independent of the number of route entries. The table below summarizes the key scalability features of the Catalyst 6500 Supervisor Engines.

**Table 4**

| Attribute | Sup1A-2GE | Sup1A-PFC | Sup1A-PFC with MSFC2 | Sup2-PFC2 | Sup2-PFC2 with MSFC2 |
|---|---|---|---|---|---|
| Maximum Centralized Forwarding | 15 Mpps | 15 Mpps | 15 Mpps | 30 Mpps | 30 Mpps |
| Distributed Forwarding | N/A | N/A | N/A | N/A | 210 Mpps |
| Maximum Bandwidth without SFM | 32 Gig | 32 Gig | 32 Gig | 32 Gig | 32 Gig |
| Maximum Bandwidth with SFM | 32 Gig | 32 Gig | 32 Gig | 256 Gig | 3256 Gig |
| CEF Architecture | N/A | N/A | N/A | Yes | Yes |
| Hardware MAC Learning | Yes | Yes | Yes | Yes | Yes |
| Maximum MAC Addresses | 128 K | 128 K | 128 K | 128 K | 128 K |

### Enabling Comprehensive Security with Catalyst 6500 Supervisor Engines

With support for up to 32K ACL entries, IP/IPX Security ACLs in hardware, and advanced features such as Port Security, the Catalyst 6500 Supervisor Engines offer an unmatched set of network traffic security capabilities with highly deterministic performance characteristics. The table below highlights the advanced security capabilities of the Catalyst 6500 supervisor engines.

**Table 5**

| Attribute | Sup1A-2GE | Sup1A-PFC | Sup1A-PFC with MSFC2 | Sup2-PFC2 | Sup2-PFC2 with MSFC2 |
|---|---|---|---|---|---|
| IP Security ACLs in Hardware | N/A | Yes | Yes | Yes | Yes |
| IPX Security ACLs in Hardware | N/A | Yes | Yes | Yes | Yes |
| Security ACL Entries | N/A | 16K | 16K | 32K | 32K |
| IP, IPX, MAC VACLs | N/A | Yes | Yes | Yes | Yes |
| TCP Intercept Hardware Acceleration | N/A | N/A | Yes | N/A | Yes |
| URPF Check in Hardware | N/A | N/A | Yes | N/A | Yes |
| Reflexive ACLs | N/A | 512 | 128K | 128K | 128K |
| Port Security | Yes | Yes | Yes | Yes | Yes |
| 802.1X Port Authentication | N/A | Yes | Yes | Yes | Yes |
| 802.1X VLAN Assignment | N/A | Yes | Yes | Yes | Yes |

These security features highlighted above are very critical for providing highest levels of network availability and data security by reducing the threats of malicious attacks while enabling authentication, authorization, and accounting functionality. At Layer 2, the Catalyst 6500 forwarding engine can support security features such as Private VLANs and port security, to help the network architect properly partition and control the utilization of the switch resources. In addition, Layer 2, 3 and 4 filters can be set up in hardware to inspect each forwarded packet and permit or deny all the streams of traffic according to the network administrator's rules. These filters also allow the forwarding engine to work in conjunction with optional integrated services modules to provide more mission specific advanced services.

### Integration of Intelligent Network Services for Efficient Traffic Management

The Catalyst 6500 Supervisor engines, with wire rate intelligent features such as QoS and ACL policy enforcement, seamlessly integrate advanced services such as security and content into a converged network to optimize IT infrastructure utilization and maximize return on investment.

With the presence of the PFC daughter card, the Catalyst 6500 Supervisor engines enable Layer 2, 3, and 4 QoS and security features as part of their forwarding process. For instance, the PFC can be used to enable advanced QoS tools such as packet classification and marking, and congestion avoidance based on Layer 2, Layer 3 and Layer 4 header information. Multiple receive and transmit queues with thresholds can be configured and used according to the QoS scheduling rules configured in the switch. Rate limiting can be used to police traffic on a per-flow or aggregate basis

with a very fine granularity. These traffic management features enable efficient handling of converged networks that carry a mix of mission critical, time sensitive, and bandwidth-hungry mission multimedia applications. The table below highlights the advanced QoS capabilities of the Catalyst 6500 supervisor engines.

**Table 6**

| Attributes | Sup1A-2GE | Sup1A-PFC | Sup1A-PFC with MSFC2 | Sup2-PFC2 | Sup2-PFC2 with MSFC2 |
|---|---|---|---|---|---|
| COS based Ingress Scheduling | Yes | Yes | Yes | Yes | Yes |
| Ingress Strict Priority Queue | Yes | Yes | Yes | Yes | Yes |
| Ingress Tail-Drop Thresholds | Yes | Yes | Yes | Yes | Yes |
| COS based Classification/Marking | Yes | Yes | Yes | Yes | Yes |
| IP Precedence based Classification/Marking | No | Yes | Yes | Yes | Yes |
| DSCP based Classification/Marking | No | Yes | Yes | Yes | Yes |
| ACL based Classification/Marking | No | Yes | Yes | Yes | Yes |
| Egress Scheduling based on DSCP/TOS | No | Yes | Yes | Yes | Yes |
| Port Trust | Yes | Yes | Yes | Yes | Yes |
| Egress Strict Priority Queue | Yes | Yes | Yes | Yes | Yes |
| Total QoS Aggregate Policers | N/A | 1023 | 1023 | 1023 | 1023 |

### Powerful Management Options

The Catalyst 6500 family Supervisor Engines deliver a comprehensive set of management tools to provide the required visibility and control in the network. Managed with CiscoWorks2000, Catalyst family switches can be configured and managed to deliver end-to-end device, VLAN, traffic, and policy management. Coupled with CiscoWorks2000, Cisco Resource Manager is a Web-based management tool offering: automated inventory collection, software deployment, easy tracking of network changes, views into device availability, and quick isolation of error conditions.

Support for local or remote, out-of-band management is delivered through a terminal or modem attached to the console/auxiliary interface. This interface can be shared between the Supervisor Engine 2 and the MSFC2. Remote in-band management is available via SNMP, Telnet client, Bootstrap Protocol (BOOTP), and Trivial File Transfer Protocol (TFTP).

Support for the RSPAN feature allows traffic from multiple distributed hosts and switches to be aggregated and directed to a remotely located switch via trunk links, to enable centralized management and monitoring.

The Supervisor Engines 1A and 2 support a single slot for an optional PCMCIA Flash memory card to store Catalyst software images for backup and easy software upgrades. Supervisor Engine 2 also incorporates many other enhancements such as a tertiary cache, enhanced memory performance, and single console port usable for both MSFC2 and Supervisor Engine 2 for ease of management.

## Ordering Information

The table below lists the ordering information for the Catalyst 6500 Supervisor Engines.

**Table 7**

| Product Number | Description |
|---|---|
| WS-X6K-SUP1A-2GE | Catalyst 6000 Supervisor Engine1A, 2GE |
| WS-X6K-SUP1A-PFC | Catalyst 6000 Supervisor Engine1-A, 2GE, plus PFC |
| WS-X6K-S1A-MSFC2 | Catalyst 6000 Supervisor Engine1-A, 2GE, plus MSFC-2 and PFC |
| WS-X6K-S2-PFC2 | Catalyst 6500 Supervisor Engine-2, 2GE, plus PFC-2 |
| WS-X6K-S2-MSFC2 | Catalyst 6500 Supervisor Engine-2, 2GE, plus MSFC-2 / PFC-2 |


**Corporate Headquarters**
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

**European Headquarters**
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

**Americas Headquarters**
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

**Asia Pacific Headquarters**
Cisco Systems, Inc.
Capital Tower
168 Robinson Road
#22-01 to #29-01
Singapore 068912
www.cisco.com
Tel: +65 317 7777
Fax: +65 317 7799


**Cisco Systems has more than 200 offices in the following countries and regions. Addresses, phone numbers, and fax numbers are listed on the Cisco Web site at www.cisco.com/go/offices**

Argentina • Australia • Austria • Belgium • Brazil • Bulgaria • Canada • Chile • China PRC • Colombia • Costa Rica • Croatia Czech Republic • Denmark • Dubai, UAE • Finland • France • Germany • Greece • Hong Kong SAR • Hungary • India • Indonesia • Ireland Israel • Italy • Japan • Korea • Luxembourg • Malaysia • Mexico • The Netherlands • New Zealand • Norway • Peru • Philippines • Poland Portugal • Puerto Rico • Romania • Russia • Saudi Arabia • Scotland • Singapore • Slovakia • Slovenia • South Africa • Spain • Sweden Switzerland • Taiwan • Thailand • Turkey • Ukraine • United Kingdom • United States • Venezuela • Vietnam • Zimbabwe




LW3627 9/02