Q&A

Cisco 3800 Series Integrated Services Routers

SYSTEM OVERVIEW

Q. What is the Cisco® 3800 Series?

A. The Cisco 3800 Series extends Cisco Systems' leadership in multiservice routing with a new family of routers that offers the network the agility, performance, and intelligence needed to meet customers' rapidly evolving network and business challenges. The Cisco 3800 Series is the flagship platform in a portfolio of next-generation routers that integrate advanced technologies, adaptive services, and secure enterprise communications. These new routers offer the performance and reliable packet delivery necessary to efficiently deliver mission-critical network capabilities, including real-time applications such as VoIP, business video, and collaborative communications. Architectural enhancements include embedded security processing, significant platform performance and memory improvements, and new high-density interface types. These design achievements complement the Cisco IOS® Software features and superior investment protection that this platform inherits from the Cisco 3700 Series. The Cisco 3800 Series, comprised of the Cisco 3825 and Cisco 3845 (Figures 1 and 2), serves as a catalyst for midsize organizations and enterprise branch offices that want to gracefully scale their enterprise edges and take advantage of converged business services, while minimizing the cost and complexity of network upgrades.

The Cisco 3800 Series offers two new modular platforms optimized for the secure delivery of concurrent voice, video, data, and wireless. The integrated services architecture of the Cisco 3800 Series builds on the highly successful Cisco 3700 Series design, and adds embedded security and voice processing to a highly modular system that is optimized for rapid deployment of intelligent network services and converged communications. The Cisco 3800 Series supports the bandwidth requirements for multiple Fast Ethernet interfaces per slot, time-division multiplexing (TDM) interconnections, and fully integrated power distribution to modules supporting 802.3af Power over Ethernet (PoE), while supporting the existing portfolio of modular interfaces. This helps to ensure continuing investment protection to accommodate network expansion or changes in technology as new services and applications are deployed. By integrating the functions of multiple separate devices into a single, compact unit, Cisco 3800 Series integrated services routers dramatically reduce the cost and complexity of managing remote networks.

Figure 1. Cisco 3825 Integrated Services Router

Figure 2. Cisco 3845 Integrated Services Router

Q. What are the product numbers for the Cisco 3800 Series?

A. Table 1 lists ordering information for Cisco 3825 and 3845 integrated services routers.

Table 1. Cisco 3800 Series Product Numbers and Descriptions

Product Number	Description
CISCO3825	Integrated services router with two Gigabit Ethernet fixed LAN ports, one Small Form-Factor Pluggable (SFP) slot, two enhanced network modules (NMEs), four high-speed WAN interface cards (HWICs), two Advanced Integration Module (AIM) slots, four PVDM slots, Cisco IP Base software, and AC power
CISCO3825-AC-IP	Integrated services router with two Gigabit Ethernet fixed LAN ports, one SFP slot, two NMEs, four HWICs, two AIM slots, four PVDM slots, Cisco IP Base software, and Inline Power
CISCO3825-DC	Integrated services router with two Gigabit Ethernet fixed LAN ports, one SFP slot, two NMEs, four HWICs, two AIM slots, four PVDM slots, Cisco IP Base software, and DC power
CISCO3845	Integrated services router with two Gigabit Ethernet fixed LAN ports, one SFP slot, four NMEs, four HWICs, two AIM slots, four PVDM slots Cisco IP Base software, and AC power
CISCO3845-AC-IP	Integrated services router with two Gigabit Ethernet fixed LAN ports, one SFP slot, four NMEs, four HWICs, two AIM slots, four PVDM slots, Cisco IP Base software, and Inline Power
CISCO3845-DC	Integrated services router with two Gigabit Ethernet fixed LAN ports, one SFP slot, four NMEs, four HWICs, two AIM slots, four PVDM slots, Cisco IP Base software, and DC power

Q. When will the Cisco 3800 Series be available?

A. The Cisco 3800 Series is planned to be available in October 2004.

Q. Which Cisco IOS Software Release does the Cisco 3800 Series support?

A. The minimum release supported is Cisco IOS Software Release 12.3(11)T.

Q. What are the Cisco IOS feature license upgrade product names for the 3800 Series?

A. See Table 2 below for detailed Cisco IOS feature upgrade license and description.

Table 2. Detailed Cisco IOS Feature Upgrade License and Description

Platform	Product Name	Product Description
Cisco 3825 and 3845	FL38-AISK9-AESK9=	Cisco 3800 Adv IP Service to Advanced Enterprise Service Upgrade SW feature license
Cisco 3825 and 3845	FL38-ASK9-AISK9=	Cisco 3800 Advanced Security to Advanced IP Service Upgrade SW feature license
Cisco 3825 and 3845	FL38-EB-ESK9=	Cisco 3800 Enterprise Base to Enterprise Service Upgrade SW feature license
Cisco 3825 and 3845	FL38-ESK9-AESK9=	Cisco 3800 Enterprise Service to Advanced Enterprise Service Upgrade SW feature license
Cisco 3825 and 3845	FL38-IPV-SPSK9=	Cisco 3800 IP Voice to SP Service Upgrade SW feature license
Cisco 3825 and 3845	FL38-SPSK9-AISK9=	Cisco 3800 SP Service to Advanced IP Service Upgrade SW feature license
Cisco 3825 and 3845	FL38-SPSK9-ESK9=	Cisco 3800 SP Service to Enterprise Service Upgrade SW feature license
Cisco 3825 and 3845	FL38-IPB-ASK9=	Cisco 3800 IP BASE to Advanced Security Upgrade SW feature license
Cisco 3825 and 3845	FL38-IPB-EB=	Cisco 3800 IP BASE to Enterprise Base Upgrade SW feature license
Cisco 3825 and 3845	FL38-IPB-IPV=	Cisco 3800 IP BASE to IP VOICE Upgrade SW feature license

Q. What are the main features of the new Cisco 3800 Series routers?

A. The main features available on the Cisco 3800 Series are outlined in Table 3.

Table 3. Performance and System Characteristics of the Cisco 3800 Series

Description	Specification
Flash Memory (Compact Flash)	64 MB (default), with 128 MB, 256 MB and 512 MB upgrade options
System Memory (double data rate synchronous dynamic RAM [DDR-SDRAM] with Error-Correcting Code [ECC])	256 MB (default), with 512 MB, 768 MB, and 1 GB upgrade options
NME Slots	• Cisco 3825: Two NME slots • Cisco 3845: Four NME slots
Integrated LAN Ports	Two 10/100/1000BASE-T (RJ-45)
Integrated HWIC Slots	Four
Onboard AIM Slots (internal)	Two
USB Port	Two
Console Port	One (up to 115.2 kbps)
Auxiliary Port	One (up to 115.2 kbps)
Integrated SFP Slots	One
Redundant Power Supply Support (optional)	• Cisco 3825: External AC or AC-IP using Cisco RPS 675 Redundant Power System • Cisco 3845: Internal AC, AC-IP, or DC
Phone Power	• 360W integrated inline power supply • Cisco 3825: Supports one AC-IP phone power supply for non-redundancy, and Cisco RPS 675 for redundancy • Cisco 3845: Supports one AC-IP phone power supply for non-redundancy, or two for redundancy
Rack Mounting	19 in. standard and NEBS/ETSI option

Q. How does the Cisco 3800 Series compare to the Cisco 2600XM, 2691, 2800, and 3700 platforms?

A. Table 4 offers a detailed feature comparison of these platforms.

Table 4. Feature Comparisons Between Cisco 2600XM, 2800, 2691, 3700, and 3800 Platforms

Feature Comparison	2600XM	2691	2800	3700	3800
Default/Maximum Flash Memory	48/128 MB	64/128 MB	64/128 to 64/256 MB	32/256 MB	64/512 MB
Default/Maximum DRAM	96/256 MB and 128/256 MB	128/256 MB	256/512 MB	128/256 MB	256 MB/1 GB
RAM Technology	SDRAM	SDRAM	DDR-SDRAM	SDRAM	DDR SDRAM with ECC
LAN Connectivity	One or two 10/100 interfaces	Two 10/100	Two 10/100 (2811) or two 10/100/1000 (2821, 2851)	Two 10/100	Two 10/100/1000
Integrated SFP Slots	No	No	No	No	Yes (one)
USB Ports	No	No	Yes (two)	No	Yes (two)
WAN Slots	2 WICs	3 WICs	4 HWICs	3 WICs	4 HWICs
AIM Slots	1	2	2	2	2
Network Module Slots	1 network module	1 network module	1 NME (2811, 2821, or 2851)	2 network modules	2 NMEs (3825) or 4 NMEs (3845)
Integrated Security	No (optional)	No (optional)	Yes	No (optional)	Yes
Encryption AIM	Yes (BPII)	Yes (EPII	Yes (BPII Plus)	Yes (EPII and HPII)	Yes (EPII Plus and HPII Plus)
Integrated Voice Capability	Requires AIM or network module	Requires AIM or network module	Yes (up to 3 T1s)	Requires AIM or network module	Yes (up to 4 T1s)
Optional Integrated Inline Power (PoE)	No	No	Yes (802.af and Cisco supported)	Yes (Cisco only)	Yes (802.af and Cisco supported)
Enhanced Voice/Fax Extension Module	No	No	Yes	No	Yes
Redundant Power Supply	No	External Cisco RPS 600	External Cisco RPS 675	External Cisco RPS 600 (3725) or internal (3745)	External Cisco RPS 675 (3825) or internal (3845)
1-Port Gigabit Ethernet HWIC/Network Module	No	Gigabit Ethernet network module	Gigabit Ethernet HWIC	Gigabit Ethernet network module	Gigabit Ethernet HWIC and Gigabit Ethernet network module
4- and 9-Port Cisco EtherSwitch® HWIC	No	No	Yes	No	Yes
Wireless HWIC	No	No	Yes	No	Yes
16- and 36-Port Cisco EtherSwitch Network Module	Yes (16-port only)	Yes (16-port only)	Yes (36 port on 2851 only)	Yes	Yes
OC-3 ATM	No	Yes	No	Yes	Yes
T3/E3 ATM	No	Yes	Yes	Yes	Yes
T3/E3	2650/51XM only	Yes	Yes	Yes	Yes
High-Speed Serial Interface (HSSI)	No	Yes	Yes	Yes	Yes
4-Port Serial (NM-4T)	No	Yes	No	Yes	Yes

PLATFORM POSITIONING

Q. Why did Cisco introduce these new routers?

A. As evidenced by Cisco 3700 Series sales, customers have shown tremendous demand for a single, resilient routing system that delivers converged data, security, and voice services. Cisco wanted to take this advanced, multiservice approach to the next level, providing customers with more power and more choices for basic and advanced services. Cisco 3800 Series routers were designed deliver increased performance, while running voice, security, quality of service (QoS), and routing services.

An important component of the Cisco Self-Defending Network, the Cisco 3800 Series features the industry's most comprehensive security services embedded within the router, providing customers with a single, resilient platform to rapidly deploy secure networks and applications. Features include built-in hardware encryption acceleration, IP Security (IPSec), VPN (Advanced Encryption Standard [AES], Triple Digital Encryption Standard [3DES], DES, and Multiprotocol Label Switching [MPLS]), stateful firewall protection, Cisco Intrusion Prevention System [IPS]), and URL filtering.

For voice applications, the Cisco 3800 Series features the highest analog and digital voice densities available, coupled with award-winning IP Communications Express software for call processing, auto attendant and voice mail. Each router includes embedded Digital Signal Processor (DSP) slots, making every router a voice-ready system. Customers can add the voice capabilities they want, when they need it, with the scalability and availability required for large enterprise branch offices. With embedded voice and security features; Cisco IOS Software-based VPN, firewall, and IPS; and optional VPN, Intrusion Detection System (IDS), Content Engine, and Network Analysis network modules, Cisco offers the industry's most robust and adaptable solution for branch offices.

Q. With the introduction of these new platforms, what are the plans for the current Cisco 3700?

A. There are no plans to End-of-Sale the Cisco 3700 for at least 18–24 months from the FCS date of these new platforms. Cisco is committed to continue to develop new features for the Cisco 3700 Series through Cisco IOS release 12.4T, with bug fix support through IOS 12.5 Mainline. Cisco IOS timelines are still being defined-however this should enable new feature development through the end of 2005.

Additionally, to promote the Cisco 3700 Series longevity, Cisco recently raised the default SDRAM memory (and reduced add-on memory pricing) on the of Cisco 3700 Series. These actions were taken to provide customers with investment protection on their current platforms while allowing them to evaluate these new chassis and transition at their own pace.

When Cisco decides to end-of-sale the Cisco 3700 Series, Cisco will provide notice prior to the end-of-sale date along with support plans for the Cisco 3700 Series in accordance with Cisco's standard end-of-life policy.

Q. How is the Cisco 3800 Series positioned against the Cisco 3700 Series?

A. The Cisco 3800 Series is recommended for customers that require higher levels of performance or higher density levels of voice, security, or integrated services such as switching, network analysis, content delivery, and wireless. The Cisco 3800 Series is ideal for process-intensive, higher-performance applications and intelligent network services that need to run concurrently. The Cisco 3800 Series can be used for midsize to large enterprises that want to securely and easily enable strategic business applications for improved productivity, reduced operating and capital expenses (OpEx/CapEx), and increased revenues. The special integrated services system design of the Cisco 3800 Series provides customers with the industry's most adaptive and resilient design for the rapid integration of new services and applications with the highest-possible performance and headroom for growth.

Q. What is the performance of the 3800 series?

A. The 3800 Series routers are designed to deliver multiple concurrent services at wire-speed performance of up to T3/E3 rates. The T3/E3 value represents IMIX packet sizes in higher than typical 3800 services configurations. In less service-intense environments, actual WAN throughput will be higher. In light service environments with 64 byte packets, the 3800 series can achieve between 350–500 Kpps. For a more detailed discussion on chassis, security, and voice performance, please reference the 1800/2800/3800 performance white paper at http://www.cisco.com/go/isr.

Q. How does the Cisco 3800 Series compare with the Cisco 7200 Series?

A. The Cisco 7200 Series features modular and upgradable CPU and hardware-based forwarding engines for maximum flexibility and performance scalability. The series continues to evolve, with the recent addition of the 1-Mpps-capable NPE-G1 processor, which includes three onboard Gigabit Ethernet interfaces and several new software and hardware enhancements. The series offers numerous connectivity options, many of which are not supported on the Cisco 3700 and 3800 series, including Channelized T3/E3, packet over SONET (POS), DPT OC-12, SS7, ESCON, T3/E3 and OC-3 Circuit Emulation, and FDDI. Like the Cisco 3700 Series, the Cisco 3800 Series targets midsize and large enterprise branch offices that require a high degree of service and application performance. Cisco 7200 Series routers are aggregation devices, positioned at sites with integrated applications that require a high density of midspeed connectivity or multiple high-speed connectivity, such as regional aggregation sites and corporate headend sites.

Table 5 provides a comparison of network modules and port adapters.

Table 5. Cisco 7200 and Cisco 3800 Series Product Comparison

Target Applications	7200	3800
POS	Yes	No
Channelized T1/E1	Yes	Yes
Channelized T3/E3	Yes	No
Clear Channel T3/E3	Yes	Yes
8-Port ATM Inverse Multiplexing over ATM (IMA)	Yes	No
T3/E3 ATM	Yes	Yes
OC-3 ATM	Yes	Yes
Direct IBM Mainframe Connectivity	Yes	No
High-Speed WAN Concentration	Yes	No
Integrated LAN Switching	No	Yes
Gigabit Ethernet	Yes	Yes
Digital and Analog Modem Dial	No	Yes
ISDN Primary Rate Interface (PRI) Dial (data, voice, and video)	Yes	Yes
Asynchronous Dial	No	Yes
Branch Office Customer Premises Equipment (CPE); T1 and Higher	Yes	Yes
Branch Office CPE; T1 and Lower	No	Yes

* OC-3 support will be available in mid-2005.

NETWORK MODULES, WAN INTERFACE CARDS (WICS), VOICE INTERFACE CARDS (VICS), AND ADVANCED INTEGRATION MODULES (AIM)S

Q. What are some of the built-in capabilities of the new Cisco 3800 Series?

A. Table 6 describes some of the capabilities of the Cisco 3800 Series.

Table 6. Features and Capabilities of the Cisco 3800 Series

Cisco 3800 Series Features	Cisco 3825	Cisco 3845
NME Support	**Network Module**	**Network Module**
Each Cisco 3800 Series network module slot can accommodate standard network modules, enhanced network modules (NME), high-density voice/fax extension module (EVM-HD), or enhanced extended network module (NME-X). NMEs have the same form factor as the standard network modules. When available, the NME-X will have a wider form factor then the NME. Two side-by-side NME slots can be combined to accommodate one double-wide network module (NMD) or, when available, a double-wide NME-X (NME-XD). **Note:** The top slot (Slot 2) of the Cisco 3825 can seat one network module, NME, NME-X, EVM-HD, NMD, or NME-XD.	• NME • NME-X • NMD • NME-XD • EVM-HD	• NME • NME-X • NMD • NME-XD • EVM-HD
HWIC Slots		
Each model can accommodate HWICs. These HWIC slots also support WICs, VICs, and voice and WAN interface cards (VWICs). Two side-by-side HWIC slots can be substituted to seat one double-wide HWIC (HWIC-D).	4	4
Fixed LAN Ports		
Two copper LAN ports are provided on all models with fixed RJ-45 ports	2 Gigabit Ethernet (10/100/1000)	2 Gigabit Ethernet (10/100/1000)
Fixed SFP Slots		
One fixed SFP slot is provided on all models	1	1
AIM Slots		
Two AIM slots are available on all models.	2	2
Packet voice/fax digital signal processor (DSP) module (PVDM2) slots	4	4
USB 1.1 Ports		
Two USB ports are provided for use with security tokens and other applications	2	2
High-Density Analog and Digital Extension Module for Voice and Fax	1	2
Power over Ethernet (PoE) Support		
Both 802.3af and Cisco proprietary inline power are supported	360 W/48 phones	360W/48 phones
Onboard VPN encryption acceleration	Yes	Yes
Default Memory		
Uses external Compact Flash and DDR	64 MB Compact Flash	64 MB Compact Flash
DDR-SDRAM with ECC		
Maximum capacity of 256 MB of Compact Flash memory on both models; maximum of 1024MB for both 3825 and 3845	256 MB DDR	256 MB DDR

Q. Which network modules and HWICs/WICs/VICs does the Cisco 3800 Series support?

A. The Cisco 3800 Series provides support for more than 80 percent of the current network modules, WICs, VICs, and AIMs currently supported on the Cisco 3700 Series. Table 21 in the Appendix lists supported interfaces on the Cisco 3800 Series.

Q. Which current Cisco 3700 Series network modules, WICs, and AIMs are not supported on the Cisco 3800 Series?

A. Table 7 lists the Cisco 3700 Series interfaces that are not supported on the Cisco 3800 Series.

Table 7. Interfaces Not Supported on the Cisco 3800 Series

Network Modules	WICs/VICs	AIMs
NM-8AM	WIC-1DSU-T1	AIM-ATM-VOICE-30
NM-16AM	WIC-1B-S/T	AIM-VOICE-30
NM-8AM-J	WIC-1B-U	AIM-COMPR2
NM-16AM-J	VIC-2BRI-NT/TE	AIM-VPN/BP
NM-1FE-FX	VIC-2BRI-S/T-TE	AIM-VPN/EP
NM-1FE-TX	VIC-2E/M	AIM-VPN/HP
NM-1FE-SMF	VIC-2FXO	AIM-VPN-BPII
NM-CE-BP-20G-K9	VIC-2FXO-EU	AIM-VPN-EPII
NM-1V	VIC-2FXO-MI	AIM-VPN-HPII
NM-2V	VIC-2FXO-M2	
NM-1CE1B	VIC-2FXO-M3	
NM-1CE1U	VIC-2FXS	
NM-1CT1		
NM-1CT1-CSU		
NM-2CE1B		
NM-2CE1U		
NM-2CT1		
NM-2CT1-CSU		
NM-1A-OC3MM		
NM-1A-OC3SMI		
NM-1A-OC3SML		
NM-1A-OC3MM-EP		
NM-1A-OC3SMI-EP		
NM-1A-OC3SML-EP		

Q. Why aren’t the modules in Table 6 supported on the Cisco 3800 Series?

A. The modules listed above are not supported because voice and encryption AIM capabilities have been integrated into the Cisco 3800 Series. For other older modules, they have been replaced by modules of newer versions with more features.

Q. Is OC-3 supported on the Cisco 3800 Series?

A. The ATM OC-3 network modules now are available on 3800. The part number is NM-1A-OC3-POM. Please refer to the following link for the product details http://www.cisco.com/en/US/prod/collateral/routers/ps5855/prod_qas0900aecd80300030.shtml.

NETWORK MODULES

Q. What is an NME?

A. The enhanced network module (NME) slot is the next generation of the network module slot available for the Cisco 2800 and 3800 series. It is available in three form factors↓single-wide (NME), extra-wide (NME-X), and extra-double-wide (NME-XD). The NME offers additional performance and improved density over the existing network modules. NME slots provide IEEE 802.3af-compliant PoE and Cisco inline power for IP phones and Cisco Aironet® access points.

Q. What is the difference between the Cisco 3800 Series NME slot and the network module slot on Cisco 3700 Series systems?

A. The NME slot connects to a faster PCI bus for greater throughput and performance. The NME slot can also support higher power to the modules, allowing for more service modules and increased density on the modules. The NME slot has the ability to support four different module form factors, giving customers the flexibility to install modules of specific densities appropriate for the local needs.

Q. Are NME and HWIC slots backward-compatible?

A. Yes. You can use current-generation network modules and WICs in the new slots, but they will not be able to take advantage of the higher throughput or PoE capabilities.

Q. Is online insertion and removal (OIR) supported for modules in the NME slot?

A. Yes. OIR of modules in the NME slot is supported on Cisco 3800 Series routers. OIR is used for replacement of like modules only, and limitations apply per module. Please check the documentation of the individual modules and the OIR procedures before executing this procedure.

Note: Cisco strongly recommends that all affected interfaces be administratively shut down prior to performing the OIR operation.

WICS

Q. What is a HWIC?

A. The high-speed WAN interface card (HWIC) is an updated and enhanced version of the current WIC in Cisco 2600 and 3700 series chassis. The HWIC offers greater speeds and higher port density than the current WIC. It has a third row of pins, providing both increased power to the cards and the ability to provide PoE and Cisco inline power. HWICs are available in two form factors—single-wide and double-wide. All Cisco 3800 Series routers can support four single-wide HWICs or two double-wide HWICs.

Q. What is the maximum throughput of the four onboard HWIC slots?

A. The maximum throughput per slot is up to 400 Mbps full duplex. The new Gigabit Ethernet HWIC and the 4- and 9-port Cisco EtherSwitch HWIC modules are able to take advantage of this performance improvement up to the switching capabilities of individual platforms.

Q. Can a HWIC be used on the WIC slots of Cisco 2600, 3600, and 3700 series systems?

A. No. HWICs cannot be used on the WIC slots of Cisco 2600, 3600, or 3700 series systems. HWIC connectors have an additional row of pins to support PoE, preventing the full insertion of the cards into legacy WIC slots.

Q. Is there any placement restriction of interfaces in any of the four integrated HWIC slots?

A. No. Any of the four available HWIC slots can be used for all supported VICs, VWICs, and WICs.

Q. Is OIR supported for modules in the HWIC slots?

A. No. OIR of modules in the HWIC slots is not supported.

Q. Are VICs supported in any of the four integrated HWIC slots?

A. Yes, but only the newer VICs (such as the VIC-4FXS/DID or VIC2-4FXO) are supported in any of the four integrated HWIC slots. PVDM2s are required on the motherboard or on the analog or digital voice network modules for DSP resources. The nonsupported VICs are listed in Table 6.

Q. Is there voice ISDN PRI support on the integrated onboard WIC slots using the VWICs?

A. Yes. The HWIC slots can be used for voice ISDN PRI. VWICs can be used in conjunction with digital voice PVDM2s to support up to four T1s of high-complexity voice channels.

Q. What is required for the chassis to support digital voice via the onboard HWIC slots?

A. The Cisco 3800 Series allows digital voice support via the new onboard PVDMs using the multiflex VWIC in the onboard WIC/VIC/HWIC slots or in the NM-2W, NM-1FE2W-V2, NM-2FE2W-V2, NM-1FE1R2W network modules.

Q. What is the new HWIC slot numbering scheme on the Cisco 3800 Series?

A. The Cisco 3800 Series adopts a new HWIC slot numbering scheme, which is common across the Cisco 1800 and 2800 series. This new numbering scheme enables ports on the interface modules to be assigned a fixed number depending on the physical slot that the module is plugged into. The reference number stays the same and the configuration remains intact when modules are plugged into or removed from other slots. All interfaces or voice ports on a modular HWIC/VIC/VWIC/WIC that are plugged into either the built-in HWIC slots or into any network modules are now referenced as follows:

- **interface** *type NME-slot-number/HWIC-slot-number/port-number*
- **voice-port** *NME-slot-number/HWIC-slot-number/port-number*

NM-slot-number equals “0” for HWIC slots built onto the chassis.

ADVANCED INTEGRATION MODULES (AIMS)

Q. How many AIMs does the Cisco 3800 Series support?

A. The Cisco 3800 Series has two built-in AIM slots on the motherboard. These slots allow CPU offload with hardware-accelerated VPN (3DES) encryption, with up to 50 percent higher performance levels than provided by the onboard hardware encryption acceleration module. The slots also allow hardware compression and ATM capability, leaving the network module slots available for additional capacity while freeing up CPU resources.

Q. What restrictions are there when using the AIMs?

A. Two AIM-ATMs and AIM-COMPR4s can be configured on the same platforms, but two encryption AIMs cannot be implemented concurrently.

ONBOARD GIGABIT ETHERNET PORTS

Q. How many Gigabit Ethernet ports are there on Cisco 3800 Series systems?

A. There are two Gigabit Ethernet ports on Cisco 3800 Series systems. Port 1 is a fixed 10/100/1000BASE-T RJ-45. Port 0 can choose between 10/100/1000BASE-T RJ-45 and an SFP module slot. SFP modules are optional.

Q. How can I choose between the RJ-45 and SFP module slot in Gigabit Ethernet Port 0?

A. A new command-line interface (CLI) allows you to choose between the two media types. The “SFP” option will only come up if there is a SFP module plugged into the slot. RJ-45 is the default.

```
Cisco3825#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Cisco3825(config)#interface gigabitEthernet 0/0
Cisco3825(config-if)#media-type ?
rj45    Use RJ45 connector
sfp Use SFP connector
<cr>
```

Q. Which SFPs are supported on Cisco 3800 Series?

A. Only SFPs made by Cisco are supported on the Cisco 3800 Series. SFPs from other vendors will not be enabled. Table 8 shows a list of all supported optical SFPs. Copper SFPs are not supported, as RJ-45 connectors are built into the platforms.

Table 8. SFP Part Numbers and Descriptions

Part Number	Description
GLC-LH-SM=	Gigabit Ethernet SFP, LC connector, LX/LH transceiver
GLC-SX-MM=	Gigabit Ethernet SFP, LC connector, SX transceiver
GLC-ZX-SM=	1000BASE-ZX SFP
CWDM-SFP-1470=	Coarse wavelength-division multiplexing (CWDM) 1470-nm SFP Gigabit Ethernet and 1G/2G Fibre Channel (FC)
CWDM-SFP-1490=	CWDM 1490-nm SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1510=	CWDM 1510-nm SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1530=	CWDM 1530-nm SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1550=	CWDM 1550-nm SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1570=	CWDM 1570-nm SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1590=	CWDM 1590-nm SFP Gigabit Ethernet and 1G/2G FC
CWDM-SFP-1610=	CWDM 1610-nm SFP Gigabit Ethernet and 1G/2G FC

Q. Is OIR supported on the SFP module slot?

A. Yes. OIR is supported on the SFP module slot.

Q. Can Auto-Negotiation be turned off for the on-board Gigabit Ethernet ports of Cisco 3800 ISRs when the speed is set to 1000?

A. Auto-Negotiation can be turned off in 1000BASE-X (SFP) operation but not in 1000BASE-T (RJ-45) mode. Annex 28D.5 Extensions within Clause 40 of IEEE 802.3 specification for 1000BASE-T requires auto-negotiation to be used in 1000BASE-T (RJ-45) operation. There are no standards defined for 1000BASE-T (RJ-45) operation without auto-negotiation. In order to comply with the standard, the auto-negotiation will always be enabled in 1000BASE-T (RJ-45) mode and speed and duplex can not be forced.

Q. Is Auto-Negotiation CLI “negotiation auto” still available on the Gigabit Ethernet ports of Cisco 3800 ISRs?

A. No, the original CLI “negotiation Auto” and “no negotiation auto” are no longer available on the two onboard Gigabit Ethernet ports starting from IOS release 12.4(4) and 12.4(2)T3. In order to turn on the auto negotiation, customers will have to set either speed or duplex to auto or set both speed and duplex to auto.

```
3845(config)#int gigabitEthernet 0/0
3845(config-if)#speed auto
3845(config-if)#duplex auto
```

Q. Is Cisco EtherChannel® supported on the two onboard Gigabit Ethernet ports?

A. No. Cisco EtherChannel is not supported on the onboard Gigabit Ethernet ports. Instead, Cisco EtherChannel can be configured on Gigabit Ethernet HWICs, Gigabit Ethernet network modules, and Fast Ethernet ports on Cisco EtherSwitch HWICs and network modules when the ports are in switchport mode.

Q. Is Auto-Negotiation supported on the two onboard Gigabit Ethernet ports?

A. The Auto-Negotiation CLI is supported on the two onboard Gigabit Ethernet ports, however, we detached the meaning of actually setting Auto-Negotiation Capability with this CLI. We did not remove the CLI itself since there are other uses of this CLI like turning off and on the FLOW Control. There are historical and legacy reasons NOT to remove this across all different FE/GE interfaces.

Auto Negotiation is the default configuration and could be turned on again by the following CLIs:

```
3845(config)#int gigabitEthernet 0/0
3845(config-if)#speed auto
3845(config-if)#duplex auto
```

We strongly recommend customers use Auto Negotiation, even when only one mode of operation is used (e.g., 1000Base-X full duplex). When negotiation mode to auto, the Gigabit Ethernet port attempts to negotiate the link (that is, both port speed and duplex setting) with the partner port. Turning off Auto Negotiation will lead to link configuration mismatches and hence link down situations.

Q. Do the on-board Gigabit Ethernet ports on the Cisco 3800 routers support jumbo frames?

A. Yes. The on-board GE ports on the Cisco 3800 routers support jumbo frame (frames up to 16351 bytes).

```
Cisco3825(config)#int g0/0
Cisco3825(config-if)#mtu ?
  <64-16351>  MTU size in bytes
```

Q. What VLAN trunking protocols are supported on the onboard Gigabit Ethernet interfaces?

A. The on-board Ethernet ports of the 3800 ISRs support 802.1Q VLAN trunking. They do not support Inter-Switch Link (ISL) ISL trunking.

SYSTEM POWER (AC, DC)

Q. What are the available system power supply options for the Cisco 3800 Series?

A. Both platforms come equipped with a single AC-only power supply. Optional integrated AC and IP inline power (AC-IP) and optional DC power supplies are available for both platforms.

Q. Is RPS supported on the Cisco 3825 Integrated Services Router?

A. Yes. RPS is supported externally on the Cisco 3825 by connecting to Cisco RPS 675. The RPS connector to the external RPS unit is built into the platform and can operate with or without the presence of a system power supply.

Q. Is there a separate SKU for RPS support on the Cisco 3825 (as there is for the Cisco 3725)?

A. No. The RPS connector is built into the platform and comes with the AC, AC-IP, or DC model of the Cisco 3825.

Q. Is RPS supported on the Cisco 3845 Integrated Services Router?

A. Yes. RPS is supported internally on the Cisco 3845 by installing another power supply in the chassis. The Cisco 3845 platform can be configured to operate in redundant mode on two identical power supplies of AC only, AC-IP or DC only, or a mix of any two.

Q. Are there any restrictions when using these power supplies?

A. There is a restriction when using these power supplies on the Cisco 3845. You will receive one AC system power supply for every -48V DC internal (integrated) power supply ordered for the integrated Cisco EtherSwitch module that requires inline IP phone power. This is because the -48V DC internal (integrated) power supplies are integrated into the AC system power supply.

Q. Are the AC, AC-IP, and DC power supplies field-upgradeable and field-serviceable?

A. Yes. The Cisco 3845 AC, AC-IP, and DC power supplies are field-upgradeable and orderable as spares. In addition, each power supply is hot-swappable and provides status signals for proper operation and installation. The Cisco 3825 AC power supply may also be replaced in the field, but the chassis must be removed from a rack, the top opened, the wiring harness unplugged, and the power supply mounting screws undone. Table 9 shows the part numbers for power supply options for the Cisco 3800 Series.

Table 9. Cisco 3800 Series Power Supply Spare Options

Product Number	Description
PWR-3825-AC=	Cisco 3825 AC power supply
PWR-3825-AC-IP=	Cisco 3825 AC-IP power supply
PWR-3825-DC=	Cisco 3825 DC power supply
PWR-3845-AC=	Cisco 3845 AC power supply
PWR-3845-AC-IP=	Cisco 3845 AC-IP power supply
PWR-3845-DC=	Cisco 3845 DC power supply
PWR675-AC-RPS-N1=	675W RPS with one connector cable
CAB-RPS-1614=	One Cisco RPS 675 connector cable 16/14

Q. Can Cisco 3800 systems be converted from an AC to a DC power supply and vice versa?

A. Yes. If you convert from an AC power supply to a DC power supply, you need to order the spare DC power supply and also order the DC power cable. If you convert from a DC power supply to an AC power supply, you need to order the spare AC power supply and also order the AC power cable.

Q. Can different power supplies be used together on a Cisco 3845 router?

A. Yes. You can mix system power supplies any way you want in the Cisco 3845 chassis, but DC system power supplies do not support the IP phone power supplies.

MEMORY

Q. What is the default memory configuration of the Cisco 3800 Series?

A. Table 10 lists the base memory that each configuration supports as a default when it ships from the factory.

Table 10. Cisco 3800 Series Base Memory Configuration

Product Name	Description
CISCO3825	One 64-MB Compact Flash, one 256-MB DDR-SDRAM with ECC
CISCO3845	One 64-MB Compact Flash, one 256-MB DDR-SDRAM with ECC

Q. Is the Cisco 3825 SDRAM memory compatible with the Cisco 3845 SDRAM memory?

A. Yes. The Cisco 3825 and Cisco 3845 use the same DDR-SDRAM with ECC.

Q. Does the default DRAM comes with one or two SDRAM DIMMs?

A. The default DRAM comes with one DIMM of 256 MB, leaving the second dual inline memory module (DIMM) slot open for future memory upgrades.

Q. What type of system Flash memory is used on Cisco 3800 Series?

A. The Cisco 3800 Series uses Compact Flash memory that conforms to the PC Card ATA specification with standard ATA register and command sets. This replaces both the system Flash memory and the PCMCIA Flash memory used on other Cisco routers.

Q. How many Compact Flash memory slots are available on Cisco 3800 Series routers?

A. Only one external slot is provided on Cisco 3800 systems. It accepts both Type I and Type II devices, and allows for hot insertion and hot removal.

Q. Which formats will be supported on the Cisco 3800 Series Compact Flash memory cards?

A. Both Class B low-end file system (LEFS) and Class C DOS (Cisco DOS) file systems are supported; Cisco DOS is the default.

Q. Can you partition the Compact Flash card?

A. No.

Q. Can you hot insert a Cisco 3800 Series Compact Flash card into the external slot without disrupting service?

A. Yes. You will get a console message when you insert or remove the Compact Flash card. If the CF LED is lit or blinking, do not remove the Compact Flash memory card. The router might reload, or the Compact Flash memory card can be damaged.

SECURITY SUPPORT

Q. How do I enable the onboard crypto accelerator?

A. The following Cisco IOS security feature sets are needed to enable the crypto accelerator.

- Advanced Enterprise Services
- Advanced IP Services
- Advanced Security

Q. What features are supported by the onboard crypto accelerator?

A. The crypto accelerator supports IPSec DES, 3DES, and AES (128, 192, 256).

Q. Will the onboard crypto accelerator work in conjunction with the VPN encryption AIMs?

A. No. Once a VPN encryption AIM is installed, the onboard crypto module will no longer operate. IPSec will be processed through the VPN encryption AIM.

Q. With the integrated crypto accelerator, is the Cisco 3800 Series under export control?

A. No. The export control depends on the Cisco IOS feature sets chosen. Cisco 3800 Series systems come default with IP Base software, which does not enable the crypto accelerator and therefore is not under export control. If a Cisco IOS security feature set is ordered with the system, then the export control guideline needs to be followed.

Q. Does the onboard crypto accelerator of 3800 process all encryption algorithms in hardware?

A. Yes but with a caveat. The simultaneous configuration/use of AH and ESP protocols causes the processing to shift to software only mode. This applies to any combination of ESP & AH transform sets used.

e.g.

- ESP-3DES AH-SHA-HMAC
- ESP-3DES ESP-SHA-HMAC AH-SHA-HMAC
- ESP-AES AH-MD5-HMAC
- ESP-AES ESP-SHA-HMAC AH-MD5-HMAC

Since this lowers the VPN performance of the router significantly, we recommend the use of the encryption AIM—especially if the encryption policy requires the simultaneous use of AH and ESP. This limitation does not apply to the AIM-VPN/EPII-Plus or AIM-VPN/HPII-Plus.

VOICE SUPPORT

Q. What types of voice network modules, VICs, and WICs are supported on the Cisco 3800 Series?

A. For analog voice, the supported voice network modules are NM-HD-1V, NM-HD-2V, NM-HD-2VE and NM-HDA. The supported VICs include: VIC2-2FXS, VIC2-2FXO, VIC2-2E/M, VIC-2-2BRI-NT/TE VIC-4FXS/DID, and the VIC2-4FXO. For digital voice, the supported network module are the NM-HDV and the new NM-HDV2. A complete list of the supported voice modules can be found in Appendix A.

Q. Can any of the VICs or WICs installed in the three onboard WIC slots support voice?

A. Yes. The newer VIC2 modules are supported in any of the four onboard WIC/VIC/HWIC slots to support analog voice. Onboard PVDM2s are required to terminate the voice call. For digital voice support, a T1/E1 VWIC is required in combination with the onboard PVDM2s.

Q. Are the AIM-VOICE-30 and AIM-ATM-VOICE-30 supported on the Cisco 3800 Series?

A. Neither of these AIMs is supported on the Cisco 3800 Series. Since the Cisco 3800 Series has integrated slots on the motherboard that support up to four PVDM2s support for the voice AIMs is not required.

Q. What is the EVM-HD-8FXS/DID?

A. The EVM-HD-8FXS/DID is a new high-density analog voice module, which can be run with DSPs on the onboard PVDM2s. One EVM will be supported on the Cisco 3825, and two will be supported on the Cisco 3845. The EVMs can be placed in any available network module slot.

Q. What is the maximum number of voice channels that can be supported on the Cisco 3800 Series?

A. The Cisco 3825 has two network module slots, which can accommodate two NM-HDVs, or four T1/E1s of packet voice. The Cisco 3845 has four network module slots, which can accommodate four NM-HDVs, or eight T1/E1s of packet voice. The maximum number of voice channels supported on the Cisco 3800 Series in Phase 1 is as follows:

- **Cisco 3825:** Up to 480 digital voice channels, 52 analog voice (FXS) channels
- **Cisco 3845:** Up to 720 digital voice channels, 88 analog voice (FXS) channels

Q. What voice encoding support is available with the onboard PVDM2s?

A. The Cisco 3800 Series has four onboard PVDM slots. Table 11 lists the codec capabilities and part numbers.

Table 11. PVDM Modules and Codec Capabilities

PVDM2 Module	Description	G.711 Channels	Medium-Complexity Channels	High-Complexity Channels
PVDM2-8	8-channel fax/voice DSP module	8	4	4
PVDM2-16	16-channel fax/voice DSP module	16	8	6
PVDM2-32	32-channel fax/voice DSP module	32	16	12
PVDM2-48	48-channel fax/voice DSP module	48	24	18
PVDM2-64	64-channel fax/voice DSP module	64	32	24

For more information on Cisco 3800 Series voice features and capabilities, review the Integrated Services Routers voice data sheet.

CISCO ETHERSWITCH SUPPORT

Q. Which integrated switching modules are supported on the Cisco 3800 Series?

A. The Cisco 3800 Series supports the 16- and 36-port Cisco EtherSwitch modules, and the new 4- and 9-port Cisco EtherSwitch HWICs. These modules allow Cisco 3800 Series customers to integrate high-performance Layer 2 switching into their routing chassis. All three network modules have autosensing 10/100 ports, and line-rate Layer 2 performance between ports. All three offer optional copper Gigabit Ethernet and inline power for IP phones and Cisco Aironet wireless base stations. Features such as port autosensing, QoS and VLAN support from 802.1p and 802.1Q standards, and 802.1D Spanning Tree protocols are also available.

Q. What are the part numbers for the new Cisco EtherSwitch modules?

A. Table 12 lists the part numbers for the new Cisco EtherSwitch modules.

Table 12. Product Numbers and Descriptions for Cisco EtherSwitch Modules

Product Number	Description
NM-16ESW	One 16-port 10/100 Cisco EtherSwitch network module
NM-16ESW-PWR	One 16-port 10/100 Cisco EtherSwitch network module with Cisco inline power support
NM-16ESW-1GIG	One 16-port 10/100 Cisco EtherSwitch network module with one Gigabit Ethernet (1000BASE-T) port
NM-16ESW-PWR-1GIG	One 16-port 10/100 Cisco EtherSwitch network module with Cisco inline power and Gigabit Ethernet
PPWR-DCARD-16ESW	One Cisco inline power daughter card for 16-port Cisco EtherSwitch network module
NMD-36-ESW	One 36-port 10/100 Cisco EtherSwitch high-density service module (HDSM)
NMD-36-ESW-PWR	One 36-port 10/100 Cisco EtherSwitch HDSM with Cisco inline power
NMD-36-ESW-2GIG	One 36-port 10/100 Cisco EtherSwitch HDSM with two Gigabit Ethernet (1000BASE-T) ports
NMD-36-ESW-PWR-2G	One 36-port 10/100 Cisco EtherSwitch HDSM with Cisco inline power and two Gigabit Ethernet ports
PPWR-DCARD-36ESW	One Cisco inline power daughter card for 36-port Cisco EtherSwitch HDSM
GE-DCARD-ESW	One Gigabit Ethernet (1000BASE-T) daughter card for Cisco EtherSwitch modules
HWIC-4ESW	4-port 10/100 Ethernet switch interface card
HWIC-4ESW-POE	4-port Ethernet switch HWIC with PoE
HWIC-D-9ESW	9-port 10/100 Ethernet switch interface card
HWIC-D-9ESW-POE	9-port Ethernet switch HWIC with PoE

Q. What do Cisco EtherSwitch modules offer the branch office?

A. Cisco EtherSwitch modules offer a cost-effective, integrated, single-device solution for enterprises deploying converged IP telephony, extending data, voice, and video by delivering IP routing, Ethernet switching, and fixed wireless solutions.

Q. How many Cisco EtherSwitch modules can be installed on a Cisco 3800 Series system?

A. Up to two modules. Configurations with two modules require that the Cisco EtherSwitch modules are stacked. A Cisco EtherSwitch HWIC can be stacked with a Cisco EtherSwitch network module by connecting the Gigabit Ethernet port of the network module to a Fast Ethernet port of a HWIC card. Similarly, two Cisco EtherSwitch HWICs or network modules can be stacked by connecting to each other.

Q. How many Fast Ethernet ports can be supported on a Cisco 3800 Series system?

A. The Cisco 3825 router supports up to 52 ports by using one 16-port and one 36-port Cisco EtherSwitch module. The Cisco 3845 router supports up to 72 ports by using two 36-port Cisco EtherSwitch modules. Cisco EtherSwitch HWICs may be installed in place of or in combination with Cisco EtherSwitch modules, but a maximum of two Cisco EtherSwitch devices are configurable per platform.

INTEGRATED INLINE POWER

Q. What are the part numbers for the internal and external power supplies and shelves?

A. Table 13 provides power supply and shelf part numbers.

Table 13. Power Supply Part Numbers

Part Number	Description
PPWR-PS-360W	One 48V (360W) power supply for Cisco EtherSwitch modules
PWR-3825-AC-IP	Cisco 3825 system AC + 48V IP phone power supply
PWR-3845-AC-IP	Cisco 3845 system AC + 48V IP phone power supply
PWR675-AC-RPS-N1=	Cisco 675W RPS with one connector cable
CAB-RPS-1614=	One Cisco RPS 675 connector cable 16/14
PPWR-PS-CHASSIS	One power supply chassis for Cisco 48V (360W) power supply
PWR-CHASSIS-360W	One power supply chassis and 48V power supply for Cisco EtherSwitch module
CAB-PPWR-PS1-1	Connects one Cisco EtherSwitch power supply to one Cisco EtherSwitch module
CAB-PPWR-PS1-2	Connects one Cisco EtherSwitch power supply to two Cisco EtherSwitch modules
CAB-PPWR-PS2-1	Connects two Cisco EtherSwitch power supplies to one Cisco EtherSwitch module

Q. What are the differences between inline power on the Cisco 3700 and 3800 series?

A. On the Cisco 3700 Series, the integrated inline power supply is a field-replaceable part that is separate from the system power. The Cisco 3700 Series supports the proprietary Cisco inline power scheme, which is not 802.3af-compliant. The Cisco 3800 Series has a common power supply for both inline phone power and system power. The AC-IP power supplies support either Cisco or 802.3af inline power, depending on the support of modules. Currently, only Cisco EtherSwitch HWICs support 802.3af.

Q. Can Cisco 3800 Series systems support inline power to both a Cisco EtherSwitch HWIC and a Cisco EtherSwitch network module in the same chassis?

A. Yes. The Cisco 3800 Series can provide inline power to both a Cisco EtherSwitch HWIC and a Cisco EtherSwitch network module in the same chassis. However, this can only be done through the Cisco proprietary power scheme. 802.3af-compliant mode cannot be operated when there is a mix of Cisco EtherSwitch HWICs and Cisco EtherSwitch network modules.

Q. Do the Cisco 3825 and 3845 routers have the same IP phone power supply?

A. No. The Cisco 3825 and 3845 router IP phone power supplies are different, and are not interchangeable.

Q. Is the 360W Cisco EtherSwitch power supply supported on Cisco 3800 Series routers?

A. The 360W Cisco EtherSwitch power supply is not supported internally on the Cisco 3800 Series—the IP power supply is integrated with the AC power supply. The 360W Cisco EtherSwitch power supply can still be connected externally to 16-port or 36-port Cisco EtherSwitch modules through the external IP phone power connectors on the modules.

Q. What inline power redundancy options are present in the Cisco 3825 router?

A. Since the Cisco 3825 router only supports one inline power supply, an external power supply is needed for redundancy. The external power supply can be either the Cisco RPS 675, or the external redundant inline power supply, the PWR-CHASSIS-360W, that contains a 360W power supply and one of the power supply cables offered with the Cisco EtherSwitch module. The Cisco RPS 675 supplies redundant system power as well as redundant inline power for Ethernet.

Q. Can I use a combination of internal and external -48V DC power supplies to get redundancy on the Cisco 3825 and/or to increase the number of redundant Cisco EtherSwitch ports on the Cisco 3845 platform?

A. Yes. There is a two power supply to one Cisco EtherSwitch module cable ratio, which connects two external power supplies to a single Cisco EtherSwitch module. This provides redundancy in the event that one of the power supplies fails. Software monitors the signals “PS1 Present,” “PS1 OK,” “PS2 Present,” and “PS2 OK” on this cable, and allocates up to 360W of power for this configuration. The part number for this cable is CAB-PPWR-PS1-2.

Q. If I have a system with both an integrated -48V DC internal power supply and an external -48V DC power supply, will the phone power be disturbed if I pull out the external power supply cable?

A. If the -48V DC load of all of the IP phones being powered is less than the 360W capability of the integrated internal power supply, pulling the external power supply will not disturb the IP phones in any way. You can insert and remove the external power supply cable without causing any problems.

SOFTWARE FEATURES AND NEW CISCO IOS COMMANDS

Q. What is the Interface Data Block (IDB) limit for the Cisco 3800 Series?

A. There are 1200 and 1400 IDBs supported on the Cisco 3825 and Cisco 3845, respectively (this is the same as Cisco 3700 Series).

Q. What are some of the new Cisco IOS features supported in Release 12.3(11)T?

A. Numerous new features are available in Cisco IOS Software Release 12.3(11)T on the Cisco 3800 Series. Please refer to the Feature Navigator at http://www.cisco.com/go/fn.

Q. Is the Cisco IOS SNA Switching feature set supported on the Cisco 3800 Series?

A. Yes. A single Cisco IOS SNA Switching feature set will be available for the Cisco 3800 Series called Advanced Enterprise Services with SNA Switching with 3DES, product names are: S382SNAK9 and S384SNAK9.

Q. Are there any platform-specific Cisco IOS commands that will be introduced with the Cisco 3800 Series?

A. Yes. There are some new Cisco IOS commands that will enhance the management of these platforms. They are:

- **Tftpdnld**—Trivial File Transfer Protocol (FTP) download is now supported on the Cisco 3800 Series in ROMMON mode.
- **facility-alarm {core-temperature|intake-temperature} <30-70>**—Configure temperature threshold for alarms
- **media-type {rj45 | sfp}**—Select between RJ-45 and SFP connector on onboard Gigabit Ethernet port 0.

TDM SUPPORT

Q. What time-division multiplexing (TDM) capabilities are supported on Cisco 3800 Series routers?

A. These routers support TDM Drop-and-Insert capability between AIMs, VWICs in built-in HWIC slots, or VWICs in network modules. The TDM bus connecting all interfaces is standard with these platforms.

Q. Is additional hardware required to support TDM capabilities?

A. No additional hardware is required. The TDM switch is integrated with the motherboard.

Q. What is the accuracy of the clock on the TDM blackplane?

A. Stratum 4E is standard on the Cisco 3825 and Cisco 3845 routers.

SERVICEABILITY

Q. What are the field-replaceable units (FRUs) on Cisco 3800 Series systems?

A. On the Cisco 3825:

- Power supplies (AC, AC-IP, and DC)
- Memory
- Compact Flash

On the Cisco 3845:

- Motherboard
- Power supplies (AC, AC-IP, and DC)
- Memory
- Compact Flash
- Fan tray and bezel

Q. Can you perform OIR on the fan tray?

A. Yes. The fan tray can be removed in a Cisco 3845 while the router is fully operational in order to service a redundant power supply. In high-temperature environments, the fan tray should be reinstalled in a few minutes.

CISCO SMARTnet® INFORMATION

Q. What Cisco SMARTnet options are available for the Cisco 3800 Series?

A. Table 14 provides Cisco SMARTnet information.

Table 14. Cisco SMARTnet Options for the Cisco 3800 Series

Product Number	Description
Cisco SMARTnet Maintenance	
CON-SNT-3825	Cisco SMARTnet 8 x 5 x NBD service, dual GigE 3825 2-slot Integrated Services router
Cisco SMARTnet Enhanced Maintenance	
CON-SNTE-3825	Cisco SMARTnet 8 x 5 x 4 service, dual GigE 3825 2-slot Integrated Services router
Cisco SMARTnet Premium Maintenance	
CON-SNTP-3825	Cisco SMARTnet 24 x 7 x 4 service, dual GigE 3825 2-slot Integrated Services router
Cisco Onsite Standard Maintenance	
CON-OS-3825	8 x 5 x NBD onsite service, dual GigE 3825 2-slot Integrated Services router
Cisco Onsite Enhanced Maintenance	
CON-OSE-3825	8 x 5 x 4 onsite service, dual GigE 3825 2-slot Integrated Services router
Cisco Onsite Premium Maintenance	
CON-OSP-3825	24 x 7 x 4 onsite service, dual GigE 3825 2-slot Integrated Services router
Cisco SMARTnet Maintenance	
CON-SNT-3845	Cisco SMARTnet 8 x 5 x NBD service, dual GigE 3845 4-slot Integrated Services router
Cisco SMARTnet Enhanced Maintenance	
CON-SNTE-3845	Cisco SMARTnet 8 x 5 x 4 service, dual GigE 3845 4-slot Integrated Services router

Product Number	Description
Cisco SMARTnet Premium Maintenance	
CON-SNTP-3845	Cisco SMARTnet 24 x 7 x 4 service, dual GigE 3845 4-slot Integrated Services router
Cisco Onsite Standard Maintenance	
CON-OS-3845	8 x 5 x NBD onsite service, dual GigE 3845 4-slot Integrated Services router
Cisco Onsite Enhanced Maintenance	
CON-OSE-3845	8 x 5 x 4 onsite service, dual GigE 3845 4-slot Integrated Services router
Cisco Onsite Premium Maintenance	
CON-OSP-3845	24 x 7 x 4 onsite service, dual GigE 3845 4-slot Integrated Services router

MISCELLANEOUS

Q. How do we calculate the line number for aysnc interfaces on a Cisco 3800?

A. The actual line number associated with each interface is determined by the following equations that vary according to the hardware setup (such as a network module, interface card or interface card in a network module).

- **X** = **Network-module-slot** and **slot**.
- **Y** = **Interface-card-slot** and **subslot**.
- **Z** = **Port Number.**

For port in a 3 tier format

```
Interface-number = slot/subslot/port
Line number = 2 + (X * 64) + (Y * 16) + Z
```

For port in a 2 tier format

```
Interface-number = slot/port
Line number = 2 + (X * 64) + Z
```

Example 1

```
The interface number of port 22 on an NM-32A in network module slot 1 will be 1/22.
X = 1 Z = 22
And the line number for this port will be
2 + 1 *  64 + 22 = 88

Router# show line 1/22
   Tty    Line Typ    Tx/Rx         A  Modem  Roty AccO AccI  Uses  Noise Overruns  Int
   1/22   88   TTY    9600/9600     -  -      -    -    -     0     0     0/0       -
   Line 1/22,  Location: "", Type: ""

!--- The remaining output has been deleted.
```

Example 2

```
The interface number of port 0 on a HWIC-8A/S in HWIC slot 3 will be 0/3/0.
X = 0 Y = 3 Z = 0
And the line number for this port will be
2 + 0 *  64 + 3 * 16  +0  = 50


Router# show line 0/3/0
   Tty     Line Typ    Tx/Rx         A  Modem  Roty AccO AccI  Uses  Noise Overruns  Int
   0/3/0   50   TTY    9600/9600     -  -      -    -    -     0     0     0/0       Se0/3/0
   Line 0/3/0,  Location: "", Type: ""

!--- The remaining output has been deleted.
```

Q. Is a rack-mount kit included with the Cisco 3800 Series?

A. Yes. A 19 in. rack-mount bracket kit is included (also available as a spare). A NEBS/ETSI rack mount bracket kit is optional available as a spare. See Table 15 for product numbers.

Table 15. Rack-Mount Bracket Kits

Product Number	Description
ACS-3825RM-19=	19 in. rack-mount bracket kit for the Cisco 3825
ACS-3845RM-19=	19 in. rack-mount bracket kit for the Cisco 3845
ACS-3825RM-NEBS/ETSI	NEBS/ETSI rack-mount bracket kit for 3825 ETSI
ACS-3845RM-NEBS/ETSI	NEBS/ETSI rack-mount bracket kit for the Cisco 3845

Q. Is the console cable included with the Cisco 3800 Series?

A. It is included (also available as a spare). See Table 16 for the product numbers.

Table 16. Console Cable Product Number

Product Number	Description
ACS-3825ASYN=	Auxiliary and console port cable kit for Cisco 3825
ACS-3845ASYN=	Auxiliary and console port cable kit for Cisco 3845

Q. Can I order replacement module faceplates, dividers, and network module adaptors?

A. Yes. Spare faceplates, dividers, and network module adaptors are orderable. Two kits are available—one has two sets of faceplates and dividers for WIC, VIC, and HWIC slots; the other has two sets of faceplates, dividers, and adaptors for network modules. The kits can be used on any Cisco access routers, from Cisco 1600 Series to Cisco 3800 Series. Table 17 lists product numbers.

Table 17. HWIC and Network Module Blank Kits

Product Number	Description
H/WIC-BLANK-KIT=	Blank H/WIC faceplate kit with spacer
NM/E-BLANK-KIT=	Blank NM/E faceplate kit with spacers

APPENDIX A: SUPPORTED INTERFACES

Table 18. Cisco 3800 Series Modules Product Numbers and Descriptions

Part Number	Description
Ethernet Switching Network Modules	
NM-16ESW	16-port 10/100 Cisco EtherSwitch network module
NM-16ESW-1GIG	16-port 10/100 Cisco EtherSwitch network module with 1 Gigabit Ethernet (1000BASE-T) port
NM-16ESW-PWR	16-port 10/100 Cisco EtherSwitch network module with inline power support
NM-16ESW-PWR-1GIG	16-port 10/100 Cisco EtherSwitch network module with inline power and 1 Gigabit Ethernet port
NMD-36ESW	36-port 10/100 Cisco EtherSwitch high-density services module (HDSM)
NMD-36ESW-2GIG	36-port 10/100 Cisco EtherSwitch HDSM with 1 Gigabit Ethernet (1000BASE-T) port
NMD-36ESW-PWR	36-port 10/100 Cisco EtherSwitch HDSM with inline power support
NMD-36ESW-PWR-2GIG	36-port 10/100 Cisco EtherSwitch HDSM with inline power and 1 Gigabit Ethernet port
LAN Network Modules	
NM-1FE-FX-V2	1-port Fast Ethernet, revision 2 (100BASE-FX interface)
NM-1GE	1-port Cisco Gigabit Ethernet network module
NM-2W	2-WIC-slot network module (no LAN)
NM-1FE1R2W	1-port 10/100 Ethernet 1-port 4/16 Token Ring 2-WIC-slot network module
NM-1FE2W	1-port 10/100 Ethernet 2-WIC-slot network module
NM-2FE2W	2-port 10/100 Ethernet 2-WIC-slot network module
NM-1FE2W-V2	1-port 10/100 Ethernet 2-WIC-slot network module, version 2
NM-2FE2W-V2	2-port 10/100 Ethernet 2-WIC-slot network module, version 2
Serial Connectivity Network Modules	
NM-1T3/E3	1-port clear-channel T3/E3 network module
NM-1HSSI	1-port High-Speed Serial Interface (HSSI) network module
NM-4T	4-port serial network module
NM-4A/S	4-port asynchronous/synchronous serial network module
NM-8A/S	8-port asynchronous/synchronous serial network module
NM-16A/S	16-port asynchronous/synchronous serial network nodule
NM-16A	16-port asynchronous serial network module
NM-32A	32-port asynchronous serial network module

Part Number	Description
Channelized T1/E1 and ISDN Network Modules	
NM-1CE1T1-PRI	1-port Channelized E1/T1/ISDN-PRI network module
NM-2CE1T1-PRI	2-port Channelized E1/T1/ISDN-PRI network module
NM-4B-S/T	4-port ISDN BRI network module (S/T interface)
NM-4B-U	4-port ISDN BRI network module with integrated Network Termination 1 (NT1) (U interface)
NM-8B-S/T	8-port ISDN BRI network module (S/T interface)
NM-8B-U	8-port ISDN BRI network module with integrated NT1 (U interface)
ATM Network Modules	
NM-1A-T3	1-port DS-3 ATM network module
NM-1A-E3	1-port E3 ATM network module
NM-4T1-IMA	4-port T1 ATM network module with Inverse Multiplexing over ATM (IMA)
NM-4E1-IMA	4-port E1 ATM network module with IMA
NM-8T1-IMA	8-port T1 ATM network module with IMA
NM-8E1-IMA	8-port E1 ATM network module with IMA
Digital Dialup and Remote-Access Network Modules	
NM-6DM	6-digital-modem network module
NM-12DM	12-digital-modem network module
NM-18DM	18-digital-modem network module
NM-24DM	24-digital-modem network module
NM-30DM	30-digital-modem network module
Analog Dialup and Remote-Access Network Modules	
NM-8AM-V2	8-port analog modem network module with v.92
NM-16AM-V2	16-port analog modem network module with v.92
Analog and ISDN Basic Rate Voice Network Modules and Accessories	
NM-HD-1V	1-slot IP communications voice/fax network module
NM-HD-2V	2-slot IP communications voice/fax network module
NM-HD-2VE	2-slot IP communications enhanced voice/fax network module
NM-HDA-4FXS	High-density analog voice/fax network module with 4-port FXS
EM-HDA-8FXS	8-port FXS voice/fax expansion
EM-HDA-4FXO	4-port FXO voice/fax expansion module
EVM-HD-8FXS/DID	High-density analog (FXS/FXO/DID) and digital (BRI S/T) voice network module
EM-4BRI-NT/TE	Digital voice expansion module
High-Density Voice Network Modules and Accessories	
NM-HDV2	IP communications high-density voice/fax network module
NM-HDV2-1T1/E1	1-port T1/E1 IP communications high-density voice/fax network module
NM-HDV2-2T1/E1	2-port T1/E1 IP communications high-density voice/fax network module
NM-HDV-1T1-12	• 1-port 12-channel T1 voice/fax network module • Bundle: NM-HDV with one (1) VWIC-1MFT-T1 and one (1) PVDM-12
NM-HDV-1T1-24	• 1-port 24-channel T1 voice/fax network module • Bundle: NM-HDV with one (1) VWIC-1MFT-T1 and two (2) PVDM-12

Part Number	Description
NM-HDV-1T1-24E	• Single-port 24 enhanced channel T1 voice/fax network module • Bundle: NM-HDV with one (1) VWIC-1MFT-T1 and four (4) PVDM-12
NM-HDV-2T1-48	• 2-port 48-channel T1 voice/fax network module • Bundle: NM-HDV with one (1) VWIC-2MFT-T1-DI and four (4) PVDM-12
NM-HDV-1E1-12	• 1-port 12-channel E1 voice/fax network module • Bundle: NM-HDV with one (1) VWIC-1MFT-E1 and one (1) PVDM-12
NM-HDV-1E1-30	• 1-port 30-channel E1 voice/fax network module • Bundle: NM-HDV with one (1) VWIC-1MFT-E1 and three (3) PVDM-12
NM-HDV-1E1-30E	• 1-port 30-enhanced-channel E1 voice/fax network module • Bundle: NM-HDV with one (1) VWIC-1MFT-E1 and five (5) PVDM-12
NM-HDV-2E1-60	• 2-port 60-channel E1 voice/fax network module • Bundle: NM-HDV with one (1) VWIC-2MFT-E1-DI and five (5) PVDM-12
NM-HDV-1J1-30	• 1-port 30-channel J1 high-density voice network module • Bundle: NM-HDV with three (3) PVDM-12 and one (1) VIC-1J1
NM-HDV-1J1-30E	• 1-port 30-enhanced-channel J1 high-density voice network module • Bundle: NM-HDV with five (5) PVDM-12 and one (1) VIC-1J1
NM-HDV-FARM-C36	• Network module 36-port DSP farm bundle • High Density Voice/Fax Transcoding/conferencing DSP farm equipped with two (2) DSP SIMMs
NM-HDV-FARM-C54	• Network module 54-port DSP farm bundle • HDV transcoding/conferencing DSP farm equipped with three (3) DSP SIMMs
NM-HDV-FARM-C90	• Network module 90-port DSP farm bundle • HDV transcoding/conferencing DSP farm equipped with five (5) DSP SIMMs
Application Network Modules	
NM-CE-BP-40G-K9	Cisco Content Engine network module, basic performance, 40-GB IDE hard disk
NM-CE-BP-80G-K9	Cisco Content Engine network module, basic performance, 80-GB IDE hard disk
NM-CE-BP-SCSI-K9	Cisco Content Engine network module, basic performance, SCSI controller (requires external SCSI disk array such as the Cisco SA-6)
NM-CIDS	Cisco Intrusion Detection System network module
NM-CUE	Cisco Unity™ Express voice mail network module
NM-NAM	Cisco 2600/3660/3700 series network analysis module
Alarm Monitoring and Control Network Modules and Accessories	
NM-AIC-64	Alarm monitoring and control network module
Circuit Emulation over IP (CEoIP) Network Modules	
NM-CES-4SER	4-port serial CEoIP network module
NM-CES-T1E1-4RJ48	4-port T1/E1 CEoIP network module

Table 19. Cisco 3800 Series Supported Interface Cards

Part Numbers	Description
Serial WAN Interface Cards	
WIC-1T	1-port high-speed serial WAN interface card
WIC-2T	2-port high-speed serial WAN interface card
WIC-2A/S	2-port async/sync serial WAN interface card
Channel Service Unit/Data Service Unit (CSU/DSU) WAN Interface Cards	
WIC-1DSU-T1-V2	1-port T1/fractional-T1 DSU/CSU WAN interface card
WIC-1DSU-56K4	1-port 4-wire 56/64-Kpbs CSU/DSU WAN interface card
ISDN BRI WAN Interface Cards	
WIC-1B-U-V2	1-port ISDN Basic Rate Interface (BRI) with integrated NT1 (U interface)
DSL WAN Interface Cards	
WIC-1ADSL	1-port asymmetric DSL (ADSL) over POTS WAN interface card
WIC-1ADSL-DG	1-port ADSL over POTS with dying gasp WAN interface card
WIC-1ADSL-I-DG	1-port ADSL over ISDN with dying gasp WAN interface card
WIC-1SHDSL	1-port G.shdsl WAN interface card (two-wire only)
WIC-1SHDSL-V2	1-port G.shdsl WAN interface card (two- or four-wire)
Analog Modem WAN Interface Cards	
WIC-1AM	1-port analog modem WAN interface card
WIC-2AM	2-port analog modem WAN interface card
T1, E1 and G.703 Multiflex Trunk Voice and WAN Interface Cards	
VWIC-1MFT-T1	1-port RJ-48 multiflex trunk (T1)
VWIC-2MFT-T1	2-port RJ-48 multiflex trunk (T1)
VWIC-2MFT-T1-DI	2-port RJ-48 multiflex trunk (T1 with drop and insert)
VWIC-1MFT-E1	1-port RJ-48 multiflex trunk (E1)
VWIC-1MFT-G703	1-port RJ-48 multiflex trunk (G.703)
VWIC-2MFT-E1	2-port RJ-48 multiflex trunk (E1)
VWIC-2MFT-E1-DI	2-port RJ-48 multiflex trunk (E1 with drop and insert)
VWIC-2MFT-G703	2-port RJ-48 multiflex trunk (G.703)
Voice Interface Cards	
VIC-2DID	2-port direct-inward-dialing (DID) voice/fax interface card
VIC-1J1	1-port digital voice interface card (J1) for Japan
VIC-4FXS/DID	4-port Foreign Exchange Station (FXS) or DID voice interface card
VIC2-2FXS	2-port voice interface card—FXS
VIC2-2FXO	2-port voice interface card—FXO (universal)
VIC2-4FXO	4-port voice interface card—FXO (universal)
VIC2-2E/M	2-port voice interface card—E and M
VIC2-2BRI-NT/TE	2-port voice interface card—BRI (NT and TE)

Part Numbers	Description
Ethernet Switch High-Speed WAN Interface Cards and Accessories	
HWIC-4ESW	4-port 10/100 Ethernet switch interface card
HWIC-4ESW-POE	4-port Ethernet switch HWIC with PoE
HWIC-D-9ESW	9-port 10/100 Ethernet switch interface card
HWIC-D-9ESW-POE	9-port Ethernet switch HWIC with PoE
Gigabit Ethernet High-Speed WAN Interface Card	
HWIC-1GE-SFP	Cisco Gigabit Ethernet high-speed interface card

Table 20. Wireless HWICs

Part Numbers	Description
• HWIC-AP-G-A • HWIC-AP-G-E • HWIC-AP-G-J	802.11b/g HWIC access point interface card (A-Americas; E-Europe; J-Japan)
• HWIC-AP-AG-A • HWIC-AP-AG-E • HWIC-AP-AG-J	802.11a/b/g HWIC access point interface card (A-Americas; E-Europe; J-Japan)

Table 21. Cisco 3800 Series Supported Advanced Integration Modules (AIMs)

Part Number	Description
AIM-ATM	High-performance ATM segmentation and reassembly (SAR) advanced integration module
AIM-COMPR4	Data compression advanced integration module
AIM-CUE	Cisco Unity Express voice mail advanced integration module
AIM-VPN/EPII-PLUS	Enhanced-performance DES/3DES/AES and compression VPN encryption advanced integration module
AIM-VPN/HPII-PLUS	High-performance DES/3DES/AES and compression VPN encryption advanced integration module

Table 22. Packet Voice Data Modules (PVDMs)

Part Number	Description
PVDM2-8	8-channel fax/voice DSP module
PVDM2-16	16-channel fax/voice DSP module
PVDM2-32	32-channel fax/voice DSP module
PVDM2-48	48-channel fax/voice DSP module
PVDM2-64	64-channel fax/voice DSP module

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