Cisco 2800 Series Integrated Services Routers

General

Q. What are the Cisco® 2800 Series Integrated Services Routers?

A. The Cisco 2800 Series comprises four new platforms: the Cisco 2801, 2811, 2821, and 2851 Integrated Services Routers. The Cisco 2800 Series provides significant additional value compared to prior generations of Cisco routers at similar price points by offering up to a fivefold improvement in chassis performance, up to a tenfold increase in security and voice performance, new embedded service options, and dramatically increased slot performance and density while maintaining support for most of the more than 90 existing Cisco 1700 Series Modular Access Routers, 2600 Series Multiservice Platform, 3700 Series Multiservice Access Routers, and 3800 Series Integrated Services Routers interface cards and modules.

The Cisco 2800 Series features fast, high-quality delivery of multiple, simultaneous services. Not only does the Cisco 2800 Series offer embedded encryption-acceleration and motherboard voice digital-signal-processor (DSP) slots, intrusion-protection and firewall functions, integrated call processing and voicemail, and high-density interfaces for a wide range of connectivity requirements, but it also offers sufficient performance and slot density headroom for future network expansion requirements and advanced applications.

The best-in-class Cisco 2800 Series architecture is specifically designed to meet the requirements of small and medium-sized businesses (SMBs), small and medium-sized enterprise branch offices, and service provider-managed services applications for concurrent services without compromise to router performance.

Q. Why did Cisco introduce the Cisco 2800 Series?

A. Cisco introduced the Cisco 2800 Series to allow the deployment of multiple integrated services running at wire speed, without compromising router performance. The integrated services router portfolio is specifically designed to provide excellent performance while running simultaneous services such as voice, security, quality of service (QoS), and other routing services in one integrated routing platform.

Q. What are the versions in the Cisco 2800 Series?

A. The Cisco 2800 Series includes the Cisco 2801, 2811, 2821, and 2851. The Cisco 2811, 2821, and 2851 share a single network module slot, four High-speed Wan Interface Card (HWIC) slots, and two advanced integration module (AIM) slots. The Cisco 2801 offers four interface card slots, where two of the four slots are HWIC slots; one slot is a WIC, voice WIC (VWIC), and voice interface card (VIC)–only slot; and the final slot is a voice-only VWIC/VIC slot. Additionally, the Cisco 2801 offers two AIM slots, but does not have network module slots. All versions have onboard hardware-based encryption for Digital Encryption Standard (DES), Triple DES (3DES), and Advanced Encryption Standard (AES) plus onboard slots for packet voice DSP modules (PVDMs), and they all include high-speed Ethernet interfaces. The Cisco 2801 supports two PVDMs and two Fast Ethernet connections, The Cisco 2811 also provides one single-width network module enhanced (NME) slot. The Cisco 2821 offers increased performance, support for an extended single-wide network module, an extension voice module (EVM) slot, support for a third PVDM, fixed LAN ports supporting Gigabit Ethernet, and support for up to 33 ports of Cisco Unified IP Phone power. The Cisco 2851 offers increased performance compared to the Cisco 2821, adds support for double-wide and

extended double-wide network modules, and offers increased IP phone power support for up to 50 Cisco Unified IP Phones. Table 2 later in this documents provides a comparison of the Cisco 2800 models.

Q. What are the plans for Cisco 1700, 2600XM, and 3700 Series modular access routers?

A. Cisco 1700, 2600XM and 3700 Series modular access routers' end-of-sale date was March 27, 2007. Customers with active service contracts will continue to receive support from the Cisco Technical Assistance Center (TAC) until March 25, 2012. The exception is Cisco 2621XM-DC. This model is still orderable and there are presently no EoS plans for it. For more details on the Cisco end-of-life policy, see http://www.cisco.com/en/US/products/products_end-of-life_policy.html.

Q. How does the Cisco 2800 Series compare to the Cisco 2600XM multiservice access routers?

A. The Cisco 2800 Series routers are the follow-on platforms to the Cisco 2600XM Series. The Cisco 2800 Series offers up to a fivefold chassis performance improvement, twice the default memory, and dramatically increased slot performance and services density, while maintaining support for most of the more than 90 existing Cisco 1700 and 2600 Series interface cards and network modules (on the Cisco 2811, 2821, and 2851 only).

Q. What is the performance of the Cisco 2800 Series?

A. The Cisco 2800 Series of integrated services routers are designed to deliver multiple concurrent services at wire-speed performance up to multiple T1/E1/xDSL speeds. Chassis performance has been increased up to fivefold, and security and voice performance has been increased up to tenfold. The multiple T1/E1/xDSL value quoted here represents IMIX packet sizes in higher-than-typical Cisco 2800 Series services configurations. In less service-heavy environments, actual WAN throughput will be higher. Table 1 shows recommended performance levels for the Cisco 2800 Series.

Table 1. Cisco 2800 Series Performance

Platform	Recommended Performance with Services Enabled (IMIX traffic)
Cisco 2801	Up to 1 T1/E1/xDSL
Cisco 2811	Up to 2 T1/E1s/xDSL
Cisco 2821	Up to 4 T1/E1s/xDSL
Cisco 2851	Up to 6 T1/E1s/xDSL

Q. Does the Cisco 2800 Series support a T3/E3 interface?

A. The Cisco NM-1T3E3 is supported on the Cisco 2811, 2821 and 2851 platforms. This module provides customers with a connectivity option for a DS3 interface, but only at sub-line rates. As shown Table 1, the Cisco 2800 Series routers are designed to be T1/E1 routers, not DS3 routers. Although some customers may achieve line rate or near line rate on a DS3 with no services, the addition of common services such as access control lists (ACLs), quality of service (QoS), and IP Security (IPSec) will each cause performance degradation. The recommended platform for T3/E3 connectivity is the Cisco 3800 Series.

Q. What are the basic specifications for the Cisco 2800 Series?

A. Table 2 gives the specifications of the Cisco 2800 Series.

Table 2. Specifications of Cisco 2800 Series

Cisco 2800 Series Features	Cisco 2801	Cisco 2811	Cisco 2821	Cisco 2851
Target deployments	Data, voice, and video	Data, voice, and video	Data, enhanced voice, and video	Data, enhanced voice, and video
Default memory Cisco 2800 uses external compact flash memory; Cisco 2801 uses non-error correction code (ECC) synchronous dynamic RAM (SDRAM), and Cisco 2811, 2821, and 2851 use Double Data Rate (DDR) ECC SDRAM	Default and maximum: • 64/128-MB compact flash memory • 128/384-MB SDRAM	Default and maximum: • 64/256-MB compact flash memory • 256/768-MB DDR SDRAM with ECC	Default and maximum: • 64/256-MB compact flash memory • 256-MB and 1-GB DDR SDRAM with ECC	Default and maximum: • 64/256-MB compact flash memory • 256-MB and 1-GB DDR SDRAM with ECC
Fixed LAN ports with an RJ-45 port	2 Fast Ethernet (10/100)	2 Fast Ethernet (10/100)	2 Gigabit Ethernet (10/100/1000)	2 Gigabit Ethernet (10/100/1000)
Fixed universal serial bus (USB) ports (USB Version 1.1)	1	2	2	2
AIM slots (internal)	2	2	2	2
PVDM slots for optional PVDM2	2	2	3	3
Onboard VPN encryption acceleration: IPSec DES, 3DES, AES128, AES192, and AES256 (Note: Requires Cisco IOS® Software Security feature set)	Yes	Yes	Yes	Yes
NME support: Cisco 2811, 2821, and 2851 can accommodate only one network module slot or one NME slot. The NME has the same form factor as the network module, but offers higher-density applications compared to the current network module. An NME extended version (NME-X) also can be substituted in the Cisco 2821 or 2851, which is a wider form of the NME that will enable future services and functions. The Cisco 2851 also can substitute one double-wide high-density network module (NMD) or one NME-X double-wide version (NME-XD).	0	• NM • NME	• NM • NME • NME-X	• NM • NME • NME-X • NMD • NME-XD
EVM slots: The EVM offers additional voice services in a module format, using a single slot on the Cisco 2821 or 2851. Network-module or NME versions are not supported in this slot on the Cisco 2800 Series models.	0	0	1	1
Interface card slots: Each version can accommodate HWICs. These HWIC slots also support VICs, VWICs, and WICs. Alternatively, two side-by-side HWIC slots can be substituted to seat one double-wide HWIC (HWIC-D).	4 slots total: 2 slots support HWIC, WIC, VIC, or VWIC type modules, where 1 of the 2 slots supports WIC, VIC, or VWIC type modules and the other slot (2 of 2) supports VIC or VWIC type modules	4 slots; each slot can support HWIC, WIC, VIC, or VWIC type modules	4 slots; each slot can support HWIC, WIC, VIC, or VWIC type modules	4 slots; each slot can support HWIC, WIC, VIC, or VWIC type modules

Applications

Q. What applications does the Cisco 2800 Series support?

A. The Cisco 2800 Series offers a comprehensive feature set ideal for applications and solutions requiring the following:

- **Integrated services:** With the optional integration of a wide array of services modules, the Cisco 2800 Series offers the capability to easily integrate the functions of standalone network appliances and components in a network-module form factor and support multiple services without compromising router performance. Many of these network modules, such

as the network analysis, voicemail, intrusion-detection, and content-engine modules, have embedded processors and hard drives that allow them to run mostly independent of the router.

- **Secure network connectivity for data, voice, and video:** The Cisco 2800 Series features advanced integrated, end-to-end security for the delivery of converged services and applications. The integration of security functions directly onto the router provides optimal performance for security applications such as network admission control (NAC), Dynamic Multipoint VPN (DMVPN) solutions, IPv6 for Cisco IOS Software, dynamic intrusion protection systems, and transparent Cisco IOS Firewall.
- **Converged IP Communications:** Cisco Unified Communications Manager Express (CME) is an optional solution embedded in Cisco IOS Software that provides call processing for Cisco Unified IP Phones. This solution is ideal for customers with data connectivity requirements interested in deploying a converged IP telephony solution for up to 96 phones. Customers can securely deploy data, voice, and IP telephony on a single platform for their small offices, helping them streamline their operations and lower their network costs.

Q. Can the Cisco 2800 Series provide inline power to IP phones and other devices?

A. With the optional AC plus inline power supply, the Cisco 2800 Series can provide either IEEE 802.3af–compliant Power over Ethernet (PoE) or Cisco prestandard inline power to devices. The platform is capable of providing up to 15 watts per port, to a total power limit of 120 watts on the Cisco 2801, 160 watts on the Cisco 2811, 240 watts on the Cisco 2821, and 360 watts on the Cisco 2851.

Q. Can the Cisco 2800 Series support both Cisco inline power and IEEE 802.3af PoE devices at the same time?

A. Yes, the Cisco 2800 Series supports up to the maximum total power available per model.

Network Modules: NM, NME, NMD, NME-X, and NME-XD

Q. What is an NME?

A. The NME slot is the next generation of the network module in the Cisco 2800 Series. NMEs are supported on the Cisco 2811, 2821, and 2851 routers only. The NME is available in three form factors: The single-wide (NME) is available on the Cisco 2811, 2821, and 2851 routers, the extra-wide (NME-X) is supported on the Cisco 2821 and 2851 routers, and only the extra-double-wide (NME-XD) is supported on the Cisco 2851. The NME offers additional performance over the existing network modules, as well as improved density. NME slots are also engineered to provide IEEE 802.3af–compliant PoE as well as Cisco product-based inline power for IP telephones and Cisco Aironet® access points. The Cisco 2851 also supports current high-density services modules (HDSMs) in the NME slot.

Q. Does the Cisco 2801 support an NME slot?

A. No, the Cisco 2801 does not support an NM or NME slot. It provides four modular card slots to support combinations of HWICs, VWWIC, WICs, and VICs.

Q. Are there any available modules specifically designed to the NME specifications?

A. Yes, the Cisco EtherSwitch® Service Modules are the first modules to support the NME specifications. These modules provide enhanced throughput, denser chipsets, IEEE 802.3af–compliant PoE, and higher interface densities than previously available with the original-

generation network modules. Additional NMEs will follow, providing more capabilities and services.

Q. Are NME and HWIC slots backward compatible?

A. Yes, you can use the current-generation network modules and WICs in the new slots, but they will not be able to take advantage of all the NME features. WICs, VWICs, and VICs are all supported in the HWIC slots.

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

A. No, OIR of modules is not supported on the Cisco 2800 Series.

Q. Do the Cisco 2811, 2821, and 2851 support all the current network modules?

A. Most existing modules are supported by the Cisco 2800 Series. Refer to the Cisco 2800 Series data sheet for a detailed list of all supported modules.

Q. Which network modules are not supported on the Cisco 2811, 2821, and 2851?

A. Table 3 shows the network modules that the Cisco 2811, 2821, and 2851 routers do not support.

Table 3. Network Modules Not Supported by Cisco 2811, 2821, and 2851 Routers

NM-1FE-FX	NM-2CE1U	NM-1A-OC3SMI-1V
NM-1FE-TX	NM-2CT1	NM-1A-OC3SML-1V
NM-1FE-SMF	NM-2CT1-CSU	NM-1A-OC3-MM-EP
NM-1FEFX-V2(MMF)	NM-1A-OC3MM	NM-1A-OC3SMI-EP
NM-1FE1R2W	NM-1A-OC3SMI	NM-1A-OC3SML-EP
NM-1FE2W	NM-1A-OC3SML	NM-4T
NM-1FE2W-V2	NM-1GE	NM-1V
NM-2FE2W	NM-1FE-MMF	NM-1CT1
NM-2FE2W-V2	NM-1FEFX-SMF	NM-8E1-IMA
NM-2W	NM-1CE1B	NM-8T1-IMA
NM-4E1-IMA	NM-1CE1U	NM-4T1-IMA
NM-1CT1-CSU	NM-2V	NM-1A-OC3-POM
NM-2CE1B	NM-1A-OC3MM-1V	

Q. Why are these network modules not supported on the Cisco 2811, 2821, and 2851 routers?

A. Many of these modules, such as the Primary Rate Interface (PRI) and ATM inverse-multiplexing-over-ATM (IMA) modules, have reached end-of-sale or have been replaced by newer modules that are supported. Others, such as the Fast Ethernet combination card (part number NM-xFExW) and OC-3 network modules (part number NM-1A-OC3), were not supported in the Cisco 2600 Series and are not supported on the Cisco 2811, 2821, and 2851 routers. Finally, some modules, such as the NM-2W, are no longer required because the Cisco 2800 Series has higher-density interfaces and slots. No functions have been removed by not supporting these modules.

Q. Why can some newer modules and cards not be configured with technology bundles?

A. Technology bundles are tied to a specific Cisco IOS Software release when they are created, and the Cisco IOS Software release is updated only periodically as the technology team deems necessary. To access the new interface cards, you need to upgrade the Cisco IOS

Software to the required minimum version. On the Options tab of the configuration tools are new Cisco IOS Software upgrade options that allow you to both change the release of the bundle and upgrade the image.

Interfaces Cards: WICS, VWICS, and HWICS

Q. What is an HWIC?

A. The HWIC is an updated and enhanced version of the current WIC in the Cisco 2600 chassis. The HWIC offers greater speeds and higher port density than the current WIC. HWIC slots can support modules that provide both Cisco product-based in-line power and PoE. HWICs are available in two form factors: a single-wide form factor that takes up one slot and a double-wide form factor that takes up two slots. **Note:** Two HWIC slots can be combined into one bigger slot (HWIC-D) by removing the center rail between two individual slots. The Cisco 2811, 2821, and 2851 routers can support four single-wide, the Cisco 2801 router can support two single-wide, and all versions can support two double-wide HWICs.

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

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

Q. Does the Cisco 2800 Series support all the current WICs?

A. Most existing modules are supported in the Cisco 2800 (refer to the Cisco 2800 Series data sheet for a detailed list of all supported modules).

Q. Which WICs are not supported in the Cisco 2800 Series?

A. The WICs listed in Table 4 have been replaced with newer versions that provide the same or increased functions.

Table 4. Unsupported WICs and Their Recommended Replacements for Cisco 2800 Series

WICs Not Supported	Replacement WICs
WIC-4ESW	HWIC-4ESW or HWIC-D-9ESW
WIC-1B-S/T	WIC-1B-S/T-V3
WIC-1B-U	WIC-1B-U-V2
WIC-1B-S/T-LL	WIC-1B-S/T-V3
WIC-1DSU-T1	WIC-1DSU-T1-V2

Q. Are any interface cards supported only on specific Cisco 2800 Series platforms?

A. Yes. Table 5 shows which interface cards are supported on which versions of the Cisco 2800 Series.

Table 5. Interface Card Support in Cisco 2800 Series by Version

Part Number	Cisco 2801	Cisco 2811	Cisco 2821	Cisco 2851
WIC-1SHDSL-V2	Yes (Cisco IOS Software Release 13.3(14)T)	Yes	Yes	Yes
HWIC-1GE-SFP	No	Yes	Yes	Yes

Q. Does the Cisco 2800 Series support Cisco 2-port Fast Ethernet Layer 3 HWIC?

A. No, the Cisco 2800 Series only supports the 1-port Fast Ethernet Layer 3 HWIC. The 2-port Fast Ethernet Layer 3 HWIC is only supported by the Cisco 3800 series.

Q. Does the Cisco 2800 Series support all the current multiflex trunk interface cards (VWICs)?

A. Yes, the Cisco 2800 Series supports all the current VWICs.

Q. Can the VWICs and VICs use the PVDMs that can be inserted into the PVDM slots on the motherboard for voice applications?

A. Yes, because of the integrated architecture of the Cisco 2800 Series, VWICs and VICs in integrated slots can use the onboard PVDMs.

Q. Is there ISDN PRI support for data on the onboard HWIC slots of the Cisco 2800 Series?

A. Yes, ISDN PRI HWICs for data are supported by the Cisco 2811, 2821, and 2851. ISDN E1/T1 PRI HWICs come in a 1-port model for up to 32 channels and a 2-port model for up to 64 channels. Both support clear and channelized T1/E1 and PRI on the same cards. A maximum of 4 cards per platform is supported. The Cisco 2801 does not support ISDN E1/T1 PRI HWICs. The 8-port ISDN E1/T1 PRI network module is not supported by the Cisco 2800 Series. Table 6 lists interface card support by Cisco 2800 Series platforms.

Table 6. Interface Card Support in Cisco 2800 Series by Platform

Part Number	Cisco 2801	Cisco 2811	Cisco 2821	Cisco 2851
HWIC-1CE1T1-PRI	No	Yes, 4 HWICs	Yes, 4 HWICs	Yes, 4 HWICs
HWIC-2CE1T1-PRI	No	Yes, 4 HWICs	Yes, 4 HWICs	Yes, 4 HWICs
NM-8CE1T1-PRI	No	No	No	No

Q. Is ISDN PRI support for data available on the Cisco 2800 Series using VWICS?

A. No, VWICs cannot be used for data ISDN PRI. VWICs can be used in conjunction with digital voice (part number NM-HDV) or onboard PVDMs for ISDN PRI voice, but not data. VWICs can support a two-channel group channelized configuration, but there are significant restrictions.

Voice Interface Cards

Q. Does the Cisco 2800 Series support all the current VICs?

A. Most existing VICs are supported in the Cisco 2800 Series. In addition, some new 4-port VICs are now supported in the Cisco 2800 Series. Refer to the Cisco 2800 Series data sheet for a detailed list of all supported VICs.

Q. Which VICs are not supported in the Cisco 2800 Series?

A. Table 7 lists the VICs that have been replaced with newer versions that provide the same or better functions.

Table 7. Unsupported VICs and Their Recommended Replacements for Cisco 2800 Series

VICs Not Supported	Replacement VICs
VIC-2FXO	VIC2-2FXO
VIC-2FXS	VIC2-2FXS
VIC-2BRI-NT/TE	VIC2-2BRI-NT/TE
VIC-2E/M	VIC2-2E/M

Q. Can the 1-port digital VIC for Japan (part number VIC-1J1) be used in an HWIC, WIC, VWIC, or VIC slot in the Cisco 2800 Series?

A. The VIC-1J1 is supported only on the Cisco 2811, 2821, and 2851 routers when inserted into the Cisco (part number NM-HDV) module. It is not supported on the Cisco 2801 router.

Q. Are the VICs supported in the integrated HWIC slots?

A. Yes, because the Cisco 2800 Series has PVDM slots on the motherboard, these DSPs are available to support VICs in the integrated HWIC slots.

Advanced Integration Modules

Q. What is an AIM?

A. An AIM is a card that can be plugged into the internal AIM slot of the Cisco 1800, 2600, 2800, 3700, and 3800 Series. The AIM slot provides a way of integrating additional functions and offloading the main CPU from processor-intensive functions without reducing the LAN or WAN density of the Cisco platform by otherwise occupying an external modular slot. The data-compression (part number AIM-COMPR-V2), encryption (part number AIM-VPN-EPII-Plus), ATM segmentation and reassembly (SAR; part number AIM-ATM), and voicemail AIM (part number AIM-CUE) cards are currently available for use in the Cisco 2811, 2821, and 2851 routers. The Cisco 2801 router currently supports only the encryption (part number AIM-VPN-EPII-Plus) and voicemail (part number AIM-CUE) AIM cards.

Q. Does the Cisco 2800 Series support all the current AIMs?

A. Most existing modules are supported in the Cisco 2800 Series. Refer to the Cisco 2800 Series data sheet for a detailed list of all supported modules.

Q. Which AIMs are not supported in the Cisco 2800 Series?

A. Table 8 lists the AIMs that are not supported in the Cisco 2800 Series with their respective successor AIMs. The AIMs that are not supported in the Cisco 2800 Series are either replaced with updated versions or their functions are now integrated into the Cisco 2800 Series motherboard.

Table 8. AIMs Not Supported in Cisco 2800 Series and Their Recommended Replacements by Platform

	Replacement AIM Supported				
AIMs Not Supported	Replacement AIMs	Cisco 2801	Cisco 2811	Cisco 2821	Cisco 2851
AIM-COMPR2	AIM-COMPR2-V2	No	Yes	Yes	Yes
AIM-VPN/BP	AIM-VPN-EPII-PLUS	Yes	Yes	Yes	Yes
AIM-VPN/EP	AIM-VPN-EPII-PLUS	Yes	Yes	Yes	Yes
AIM-ATM-VOICE-30	Onboard PVDMs for voice AIM-ATM for ATM SAR and IMA	No	Yes	Yes	Yes
AIM-VOICE-30	Onboard PVDMs	Yes	Yes	Yes	Yes
AIM-VPN-BPII	AIM-VPN-EPII-PLUS	Yes	Yes	Yes	Yes
AIM-VPN-EPII	AIM-VPN-EPII-PLUS	Yes	Yes	Yes	Yes
AIM-VPN-BPII-PLUS	AIM-VPN-EPII-PLUS	Yes	Yes	Yes	Yes

Q. How many internal AIM slots are available in the Cisco 2800 Series?

A. The Cisco 2800 Series has two AIM slots on the motherboard; that is, the Cisco 2800 Series supports a total of two AIM modules.

Q. Are there any limitations to the installation of two AIMs in the Cisco 2800 Series?

A. Yes, you cannot install two encryption AIMs or two voicemail AIMs. You can mix encryption AIMs with compression AIMs, but they must be configured to support different traffic patterns. Two ATM AIMs can be used for 8X T1 IMA, but they must be configured as two 4X T1 IMA groups. The only combination supported on the Cisco 2801 router is either one of the two AIM encryption cards (AIM-VPN/EPII-PLUS or AIM-VPN/SSL-2) in combination with the Cisco Unity™ Express Advanced Integration Module Card (AIM-CUE).

Extension Voice Module

Q. What is the EVM?

A. The EVM is an extension slot to allow higher density for time-division multiplexing (TDM) interfaces. This slot takes advantage of the PVDMs on the motherboard to provide additional density for analog and Basic Rate Interface (BRI) voice interfaces. The Cisco 2801 router does not support this EVM extension slot.

Q. Which models in the Cisco 2800 Series support the EVM?

A. The Cisco 2821 and 2851 routers both have a specific slot to support the EVM.

Q. The EVM slot looks like any other NME slot, so can I install a network module in it?

A. No, only an EVM module can be used in the EVM slot. The network module and NME will not seat in this slot, and attempting to do so may damage the module or the router. Also, an EVM module is not supported in the NME slot.

Q. I inserted the EVM into the NME slot and it seated, but the module is not recognized. Why?

A. Although the EVM module will indeed seat in the NME slot, it is not supported in that slot on any Cisco 2800 Series platform. For the Cisco 2821 and 2851 routers, the EVM is supported only in the EVM slot. The EVM is not supported at all on the Cisco 2801 and 2811.

Q. Why can I not configure the EM-HDA-6FXO with a voice bundle?

A. Bundles are created for technology-specific solutions. As a result, they are tied directly to a specific Cisco IOS Software release and cannot be configured. The EM-HAD-6FXO requires a later Cisco IOS Software release than currently used in the voice bundles, so it must be ordered as a spare.

Universal Serial Bus

Q. What are the USB ports for?

A. The Cisco 2811, 2821, and 2851 routers have two fixed USB host ports (Version 1.1), whereas the Cisco 2801 has one fixed USB host port (Version 1.1). The first applications for the USB ports were introduced in Cisco IOS Software Release 12.3(14)T. These applications are removable USB flash and Secure Credentials. The Secure Credentials application uses the eToken from Aladdin Knowledge Systems. For more details on the eToken, please visit http://www.alladin.com. For more details on USB applications, please see the USB Q&A at http://www.cisco.com/go/usb.

Q. For the USB removable flash memory application, can I use any USB memory stick?

A. No, only Cisco USB flash memory is supported for this application. All other flash memory is subject to the Cisco third-party memory policy. Other brands of USB flash memory may not work or may function improperly due to third-party reliance on Windows-based dynamic link libraries (DLLs). Part numbers for Cisco USB flash memory are MEMUSB-64FT for 64 MB, MEMUSB-128FT for 128 MB, and MEMUSB-256FT for 256 MB. Larger sizes of USB flash memory are not currently supported.

Q. Can I use the USB ports as a console port?

A. No, the USB ports are not available for use as a console port. If your computer has only a USB interface, you need to use a USB-to-serial conversion cable to access the console port.

Q. Can I load the Cisco IOS Software image from USB flash memory?

A. Yes, Cisco IOS Software images can be loaded from USB flash memory only if the common version is Cisco IOS Software Release 12.4(13r) or later.

Q. Can I boot a configuration file from USB flash memory?

A. No, booting a configuration file from USB flash memory is not supported.

Reliability and Environmental Factors

Q. What kind of reliability can I expect from the Cisco 2800 Series?

A. Reliability is a function of many factors, including network design, power design, and circuit design. Cisco has published many documents describing best practices for these elements. With proper design, the Cisco 2800 Series can provide 99.99 percent uptime, or four 9s reliability.

Q. Are the Cisco 2800 Series routers NEBS compliant?

A. NEBS compliance has been verified on the Cisco 2811, 2821, and 2851 platforms. Although these platforms meet all NEBS requirements, they are not 12 inches/30cm deep. The depth standard is a NEBS recommendation, not a requirement. This exception is noted on the NEBS certificate.

Q. Why are the Cisco 2801 and 2811 so much louder than the Cisco 1760 and the Cisco 2600 Series?

A. These new platforms provide much more value and many more services than the older routers. With integrated DSP slots, optional PoE, higher-density voice interface capability, and more AIM slots, the platforms require more cooling. Both the Cisco 2801 and 2811 have multispeed fans that adjust to different temperature conditions. Neither of these platforms is designed for office use or desktop mounting.

Q. Can the temperature threshold for high-speed fans be adjusted on these platforms?

A. For the Cisco 2811 platform, the temperature threshold was adjusted in Cisco IOS Software Release 12.4(3). With this Cisco IOS Software release, the fans will stay at low speed until the intake temperature reaches approximately 39°C/102°F. Prior to this release, the threshold was approximately 34°C/93°F. For the Cisco 2801, the temperature threshold is determined in hardware and no changes have been made. These trip points cannot be adjusted in the field.

Q. How does mean time between failure (MTBF) and mean time to repair (MTBR) on the Cisco 2800 Series compare to that of current models, such as the Cisco 2600 Series?

A. Calculated MTBF and MTBR for the Cisco 2800 Series is similar to that of currently shipping access router platforms.

Power Supply

Q. What type of power supplies does the Cisco 2800 Series use?

A. The Cisco 2800 Series has the following options for power supplies: AC and AC-IP (AC power supply with support for inline power distribution (PoE [IEEE 802.3af] and Cisco prestandard inline power capable). The Cisco 2811, 2821, and 2851 support DC power as well; DC power is not supported on the Cisco 2801. All these options are universal internal power supplies that are applicable for all countries. There are no country-specific power supplies. Refer to the Cisco 2800 Series data sheet for detailed information about the power supplies.

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

A. Yes, all three power supplies (AP, AP+IP, and DC) are field replaceable and field upgradeable.

Q. Can I convert the Cisco 2811, 2821, or 2851 router from an AC to a DC power supply in the field?

A. Yes, you can convert power sources in the field. To convert from AC to DC or DC to AC, you need to order the new power supply as a spare.

Q. Do I need to order a specific part number for a redundant power supply (RPS) model for the Cisco 2811, 2821, or 2851 routers?

A. No, the Cisco 2811, 2821, and 2851 routers have the RPS interface built in. No special part numbers are needed. You need to order the Cisco RPS-2300 as the second power source. The Cisco 2801 does not support RPS.

Q. Does the Cisco 2800 Series support an RPS?

A. Yes, the Cisco 2811, 2821, and 2851 routers have built-in RPS connectors. This connector is designed for a cable to connect to an external RPS. You do not need to remove the existing power supply to provide fully redundant power to the platforms. The Cisco 2801 does not support RPS.

Q. What type of RPS is supported?

A. Cisco 2811, 2821, and 2851 routers support RPS 2300 as well as its predecessor RPS 675. RPS-675 has, however, reached end-of-sale, with the last orderable date October 15, 2007.

Q. Can the RPS provide redundant inline power to IP phones and other powered devices?

A. Yes, the Cisco RPS 2300 can provide redundant power to both the chassis and powered devices. The Cisco 2801 does not support RPS.

Q. How many of the connected devices can be actively backed up with a single Cisco RPS 2300?

A. The number of devices actively backed up by the Cisco RPS 2300 depends on the number and capacity of power supply modules installed in the Cisco RPS 2300 system and the types of devices they are backing up (see Table 9).

Table 9. Number of Devices Actively Backed Up by the Cisco RPS 2300

	Cisco RPS 2300 Configuration			
	1X 750 watts (W)	2X 750W	1X 1150W	2X 1150W
Cisco 2811, 2821, 2851, and 3825 Integrated Services Routers	1	2	1	2
Cisco Catalyst® 3750-E or 3560-E Series Switches with 1150W power supply	Not supported	1	1	2
All other supported network devices	1	2	1	2

Q. Does the Cisco RPS 2300 offer enhanced management features when connected to Cisco Integrated Services Routers?

A. No, the Cisco RPS 2300 offers enhanced management capabilities only when attached to the Cisco Catalyst 3750-E and 3560-E Series Switches, which use the 22-pin connector (CAB-RPS2300-E=). Cisco Integrated Services Routers as well as Cisco Catalyst 3750, 3560, 3550, and 2950 Series Switches attach to Cisco RPS 2300 using a 14-pin connector (CAB-RPS2300=), which does not provide enhanced management capabilities.

Q. From a remote location, is it possible, using an RPS-protected Cisco Integrated Services Router, to put the Cisco RPS 2300 or individual RPS ports into active or standby mode?

A. No, this feature is an enhanced management feature and is supported only for Cisco Catalyst 3750-E and 3560-E Series Switches.

Q. Does RPS support automatic switchback for Cisco Integrated Services Routers?

A. No, automatic switchback is the capability to automatically fall back to the switch if the switch's own power supply comes back online. This process works only between the RPS and a Cisco Catalyst 3750-E or 3560-E Series Switch. The Cisco Catalyst 3750-E or 3560-E Series Switches have a 22-pin connector that allows a communication channel between the switch and RPS. This communication channel is for signaling to the RPS that the switch now has its own power back and the RPS can back off. The Cisco Catalyst 3750, 3560, 3550, and 2950 Series Switches are equipped with a 14-pin connector, which does not have this capability.

Q. What cable option should I choose when ordering a Cisco RPS 2300 for Cisco Integrated Services Routers?

A. Use the 14-pin Cisco RPS 2300 cable option (CAB-RPS2300=) for supported routers as well as for all other supported devices with the exception of the Cisco Catalyst 3560-E and 3750-E Series.

Q. Why are there two different RPS cable options when ordering a Cisco RPS 2300 on Cisco.com?

A. Two RPS cables are available for the Cisco RPS 2300. Both have a 22-pin connector on the RPS end. However, there are two types of connectors on the switch end: a 22-pin connector for the Cisco Catalyst 3750-E or 3560-E Series Switches (CAB-RPS2300-E=) that facilitates the additional management capabilities available with these switches, and a 14-pin connector for Cisco Integrated Services Routers and all other switches and routers (CAB-RPS2300=) that does not support enhanced management.

Q. What is IEEE 802.3af PoE?

A. The IEEE 802.3af standard, also known as Power over Ethernet, defines a way to build Ethernet power-sourcing equipment and powered terminals. The specification involves delivering 48 volts of AC power over unshielded twisted-pair wiring. It works with the existing cable plant, including Category 3, 5, 5e, or 6; horizontal and patch cables; patch panels; outlets; and connecting hardware, without requiring modification. The IEEE 802.3af standard specifies support for two power levels: low-power powered devices at 7 watts per port and high-power powered devices at 15 watts per port; both are supported on the Cisco 2800 Series.

Q. What is Cisco prestandard inline power?

A. Cisco implemented a prestandard version of inline power to Ethernet devices to support Cisco IP Phones and wireless access points in the years during which the IEEE developed an industry standard. The Cisco implementation uses the Cisco Discovery Protocol to determine how much power a device needs and can provide up to 10 watts per port, with most powered devices requiring only 7 watts. Devices that were developed to support the prestandard inline power cannot be powered by PoE-only power supplies.

Q. What is the difference between power consumption and power dissipation?

A. Power consumption values are important in determining how much power a device will draw from a circuit and, therefore, what size circuit should be provisioned for the device. Power

dissipation is a value important in determining cooling needs for the router. With no IP phone support, the power consumption will equal power dissipation. However, when IP phones are introduced into the equation, the power consumption will exceed the power dissipation because some of the power dissipation occurs at the IP phone.

Q. What is startup current?

A. The startup current is the surge in the input current during startup and lasts less than 10 milliseconds (ms). The router quickly settles to a much lower current level. This information is stated because a circuit breaker needs to be selected that can handle the startup current briefly without having what is called "nuisance tripping." No special circuit breakers are needed, but some circuit breakers may be inadequate, so the surge current is specified.

Memory

Q. What kind of memory does the Cisco 2800 Series use?

A. The Cisco 2811, 2821, and 2851 routers use DDR ECC SDRAM, whereas the Cisco 2801 Router uses SDRAM without ECC.

Q. What is ECC SDRAM?

A. ECC SDRAM is memory that can detect and correct some SDRAM errors without user intervention. ECC SDRAM replaced parity memory, which can only detect, but not correct, SDRAM errors.

Q. What kind of errors can ECC SDRAM correct?

A. Most ECC SDRAM can correct single bit errors, and detect-but not correct-larger errors. Thus, errors greater in size than 1 bit will still cause the computer to fail.

Q. What are the default and maximum memory in the Cisco 2800 Series?

A. Table 10 shows default and maximum memory in all platforms.

Table 10. Default and Maximum Memory in Cisco 2800 Series

Platform	Default DRAM Memory	Maximum DRAM Memory	Default Flash Memory	Maximum Flash Memory
Cisco 2801	128 MB	384 MB	64 MB	128 MB
Cisco 2811	256 MB	768 MB	64 MB	256 MB
Cisco 2821	256 MB	1 GB	64 MB	256 MB
Cisco 2851	256 MB	1 GB	64 MB	256 MB

Q. What kind of flash memory does the Cisco 2800 Series use?

A. The Cisco 2800 Series has a single, external compact flash memory. This is the only flash memory for the system and should never be removed during router operation.

Q. What is the flash memory used for?

A. Cisco IOS Software, configuration files, and other files required for router operation are stored in flash memory. Also, flash memory allows software upgrades to be downloaded over the WAN or LAN link to be stored in the onboard flash memory.

Q. Can the Cisco 2800 Series compact flash memory be used with other Cisco platforms?

A. Yes, the Cisco 2800 Series compact flash memory can be used in the Cisco 1800, 3700, and 3800 Series and Cisco 2691 Multiservice Platform compact flash memory slots.

Q. Can the Cisco 2811, 2821, and 2851 DRAM be used in other Cisco platforms?

A. No, the Cisco 2811, 2821, and 2851 DRAM cannot be used in other Cisco routers.

Q. Can the Cisco 2811, 2821, and 2851 router DRAM be used in the Cisco 2801 platform?

A. No, the Cisco 2811, 2821, and 2851 router DRAM is SDRAM DDR, whereas the Cisco 2801 router memory is SDRAM extended data output (EDO). The SDRAM DRR and SDRAM EDO are not compatible.

Q. What is the ROM monitor (rommon)?

A. The ROM monitor is a ROM-based program that is executed upon system power up or reset. It performs various functions, including the power-on confidence test, hardware initialization, system boot process, system failure debug, and file system support.

Q. Why are the maximum DRAM memory capacities of the Cisco 2800 Series so high (up to 1024 MB in the Cisco 2821 and 2851)?

A. Additional DRAM capacity is needed in certain advanced service deployments. For instance, when deploying Cisco IOS Intrusion Prevention System (IPS) services, the IPS signatures are expanded directly into the system DRAM upon router startup. When more than 700 signatures are used, additional DRAM is required. Other examples include the use of Voice Extensible Markup Language (VXML) scripts. The high levels of DRAM capacity help Cisco deliver maximum investment protection by helping ensure that the Cisco 2800 Series can run any Cisco IOS Software image that comes in the future plus any future additional services that are memory intensive.

Q. What is required to upgrade the ROM monitor?

A. The ROM monitor image can be upgraded by downloading new software. The first image in ROM is a read-only image and cannot be erased. The upgrade image is a read-write image that is stored in ROM flash memory as the second image. You can configure the router to boot from either ROM monitor image. To upgrade the ROM monitor in the Cisco 2800 Series, you need to have a ROM monitor image available to copy from a remote server or from the internal compact flash memory. ROM monitor upgrades can be executed only from Cisco IOS Software.

LAN Interfaces

Q. What LAN interfaces are integrated into the Cisco 2800 Series platforms?

A. The Cisco 2801 and 2811 routers have two onboard Fast Ethernet interfaces that support 10- or 100Mbps connections. The Cisco 2821 and 2851 routers have two onboard Gigabit Ethernet interfaces in an RJ-45 form factor. These interfaces are 10-, 100-, and 1000Mbps autosensing interfaces.

Q. Can the Gigabit Ethernet interfaces on the Cisco 2821 and 2851 routers support jumbo frames?

A. Yes, the Gigabit Ethernet interfaces can support frames up to 9000 Bytes.

Q. Do the LAN interfaces on the platforms support aggregation through Cisco EtherChannel® or PAGP technologies?

A. Yes, EtherChannel is supported on Cisco 2811, 2821 and 2851. Each physical port within the same EtherChannel does not have to be located on the same interface module but they must be of exact same module type. Etherchannel is not supported on Cisco 280. Table 11 lists all the components and first IOS release for the EtherChannel support.

Table 11. EtherChannel Hardware Support

Platforms	Modules/Interface	EtherChannel Support	First IOS Release Support for EtherChannel
Cisco 2811/2821/2851/3825/3845	Embedded FE/GE interfaces	YES	12.4(17.6)
Cisco 2811/2821/2851/3825/3845	HWIC-1GE-SFP	YES	12.3(8)T4
Cisco 2811/2821/2851/3825/3845	HWIC-1FE	YES	12.4(11) XJ
Cisco 1841/2801/2811/2821/2851/ 3825/3845	HWIC-4ESW	NO	
Cisco 2801/2811/2821/2851/3825/3845	HWICD-9ESW	NO	
Cisco 2811/2821/2851/3800	NM-16ESW	YES	12.3(8)T for 2800 and 12.3(11)T for 3800
Cisco 2851/3800	NMD-36ESW	YES	12.3(8)T for 2800 and 12.3(11)T for 3800
Cisco 2811/2821/2851/3825/3845	NME-16ES-1G-P	YES	12.3(14)T
Cisco 2811/2821/2851/3825/3845	NME-16ES-1G	YES	12.4(2)T
Cisco 2821/2851/3825/3845	NME-X-23ES-1G-P	YES	12.3(14)T
Cisco 2821/2851/3825/3845	NME-X-23ES-1G	YES	12.4(2)T
Cisco 2851/3800	NME-XD-48ES-2S-P, and NME-XD-24ES-1S-P	YES	12.3(14)T

Security Support

Q. What security functions are available for the Cisco 2800 Series?

A. Cisco IOS Software supports a wide range of security features. Standard features in base feature sets include access control lists (ACLs); authentication, authorization, and accounting (AAA) features such as Password Authentication Protocol (PAP) and Challenge Handshake Authentication Protocol (CHAP), TACACS+, RADIUS, and token authentication; and tunneling protocols such as generic routing encapsulation (GRE), Group Encrypted Transport, Layer 2 Forwarding (L2F), and Layer 2 Tunneling Protocol (L2TP). Optional features available with a Cisco IOS Software Security Feature Set include Cisco IOS Firewall, Cisco IOS IPS, IPSec encryption using DES, 3DES, or AES algorithms, and NAC.

Q. Can I use the Cisco 2800 Series as a firewall?

A. Yes, the Cisco IOS Firewall feature set is supported in the Cisco 2800 Series. Use of the Cisco IOS Firewall features requires the purchase of a Cisco IOS Security Feature Set. This feature set offers enhanced firewall functions, including context-based access control (CBAC), which enables securing of a network on a per-application basis. Additional firewall security features include Java applet blocking, denial-of-service (DoS) detection and prevention, and advanced logging capabilities.

Q. Does the Cisco 2800 Series support IPSec encryption without the encryption AIM?

A. The Cisco 2800 Series has an onboard encryption accelerator that provides hardware-based encryption without the AIM. Use of the onboard encryption accelerator requires the purchase of a Cisco IOS Security Feature Set. The onboard encryption accelerator supports IPSec DES, 3DES, and AES, offloading the encryption process from the CPU. The result is better IPSec VPN performance and lower overall router CPU use.

Q. How do the features and performance of the encryption AIM and the onboard encryption accelerator differ?

A. The encryption AIM offers more than double the performance of the onboard encryption accelerator and more than five times the number of remote VPN tunnels. The encryption AIMs also offer IP Payload Compression Protocol (IPPCP) and Layer 3 compression in hardware.

Table 12 shows IPSec performance and tunnel count. This performance is for both AES and 3DES encryption algorithms.

Table 12. IPSec Performance and Tunnel Count by Platform

Platform	IMIX Traffic Mbps	1400 Byte Mbps	Maximum Number of Tunnels
Cisco 2801 with embedded VPN	14 Mbps	50 Mbps	150
Cisco 2801 with AIM-VPN/EPII-PLUS	30 Mbps	100 Mbps	1500
Cisco 2811 with embedded VPN	20 Mbps	55 Mbps	200
Cisco 2811 with AIM-VPN/EPII-PLUS	35 Mbps	130 Mbps	1500
Cisco 2821 with embedded VPN	36 Mbps	56 Mbps	250
Cisco 2821 with AIM-VPN/EPII-PLUS	70 Mbps	140 Mbps	1500
Cisco 2851 with embedded VPN	53 Mbps	66 Mbps	300
Cisco 2851 with AIM-VPN/EPII-PLUS	100 Mbps	145 Mbps	1500

Q. Is the Cisco 2800 Series compatible with the Cisco VPN client?

A. Yes.

Q. Does the Cisco 2800 Series function with the Cisco Easy VPN remote client and server mode?

A. Yes, the term “Cisco Easy VPN server” denotes any headend model that supports the Cisco Unity workgroup specification for VPN servers. The term “Cisco Easy VPN client” denotes any customer premises equipment (CPE) that receives IPSec configuration from a Cisco Easy VPN server. The Cisco 2800 Series can serve as both a Cisco Easy VPN server and a Cisco Easy VPN client. That is, the Cisco 2800 Series can push IPSec configurations to a Cisco Easy VPN client and can receive IPSec configurations from another Cisco Easy VPN server. In addition, Extended Authentication (XAUTH) can optionally be configured, providing additional security measures for Cisco Easy VPN users.

Q. Can the Cisco 2800 Series perform software Lempel-Ziv Stac (LZS) compression with the AIM VPN encryption module?

A. Yes, the Cisco AIM VPN module supported in the Cisco 2800 Series (part number AIM-VPN-EPII-PLUS) performs IPPCP compression at Layer 3 in hardware prior to encryption, maximizing the use of bandwidth with security.

Q. Is Secure Sockets Layer (SSL) VPN (also known as WebVPN) supported on the Cisco 2800 Series?

A. Yes, SSL VPN is supported in Cisco 2800 Series. The Cisco DES, 3DES, and AES VPN encryption module supported in the Cisco 2800 Series (part number AIM-VPN/SSL-2) accelerates both IPSec encryption and SSL VPN in hardware.

Voice Support

Q. What voice features does the Cisco 2800 Series support?

A. The Cisco 2800 Series provides a full range of voice features. All platforms have onboard PVDM slots that can support voice, fax, and echo-cancellation functions. Increased performance while running QoS and other services, along with increased density and the capability to support voice interfaces in all slots, make the Cisco 2800 Series ideal for voice applications. The Cisco 2821 and 2851 support the EVM for enhanced analog density.

Q. What is the requirement for the chassis to support digital voice with the onboard HWIC slots?

A. The Cisco 2800 Series allows digital voice support through the new, onboard PVDMs using the multiflex VWIC in the onboard WIC, VIC, and HWIC slots.

Q. Is Cisco Unified CME with local call-processing features supported on the Cisco 2800 Series?

A. Yes, Cisco Unified CME is supported on the Cisco 2800 Series.

Q. How many phones can I support using Cisco Unified CME on a Cisco 2800 Series router?

A. The number of phones supported depends on the platform. Table 13 provides an overview of the number of phones supported per platform.

Table 13. Maximum Number of Phones and Directory Numbers (DN's) Supported Using Cisco Unified CME

Platform	Maximum Number of Phones with Cisco Unified CME 3.2	Maximum Number of DNs with Cisco Unified CME 3.2
Cisco 2801	24	120
Cisco 2811	36	144
Cisco 2821	48	144
Cisco 2851	96	288

Q. Is Cisco Survivable Remote Site Telephony (SRST) supported on the Cisco 2800 Series?

A. Yes, Cisco SRST is supported. Refer to the Cisco SRST documentation for a detailed feature description (http://www.cisco.com/warp/public/cc/pd/unco/srstl/prodlit/srstd_ds.pdf).

Q. How many phones can I support using Cisco SRST on a Cisco 2800 Series router?

A. The number of phones supported depends on the platform. Table 14 provides an overview of the number of phones supported per platform.

Table 14. Maximum Number of Phones and Directory Numbers (DN's) Supported Using Cisco SRST

Platform	Maximum Number of Phones with Cisco SRST 3.2	Maximum Number of DNs with Cisco SRST 3.2
Cisco 2801	24	120
Cisco 2811	36	144
Cisco 2821	48	192
Cisco 2851	96	384

Q. Does the Cisco 2800 Series support Cisco Unity Express?

A. Yes, all Cisco 2800 Series routers support the Cisco Unity Express AIM (part number AIM-CUE). Additionally, the Cisco 2811, 2821, and 2851 routers have a network-module form-factor option (part number NM-CUE).

Q. What are the part numbers for the PVDMs supported in the Cisco 2800 Series motherboard PVDM slots?

A. Table 15 lists the PVDM modules supported in the Cisco 2800 Series platforms.

Table 15. PVDM Voice Modules Supported in Cisco 2800 Series

Part Number	Description

PVDM2-8	8-channel fax and voice DSP module
PVDM2-16	16-channel fax and voice DSP module
PVDM2-32	32-channel fax and voice DSP module
PVDM2-48	48-channel fax and voice DSP module
PVDM2-64	64-channel fax and voice DSP module

Q. Are Session Initiation Protocol (SIP), Media Gateway Control Protocol (MGCP), and Voice Extensible Markup Language (VXML) supported in the Cisco 2800 Series?

A. SIP Version 2.0 and MGCP Version 1.0 as well as VXML are currently supported in the Cisco 2800 Series.

Q. Are there limits to the number of voice channels supported on any of the Cisco 2800 Series routers?

A. The only platform with a limitation less than the physical capacity of the DSP slots is the Cisco 2801. This platform can support a maximum of 30 channels of digital voice (voice channels terminated on a DS-1 interface) regardless of the codec selected. The Cisco 2801 can also support up to 12 channels of analog voice (voice channels terminated on Foreign Exchange Office (FXO), Foreign Exchange Station (FXS), or BRI interfaces) coincident with the digital voice channels. Other installed DSP resources may be allocated for conferencing and transcoding, echo cancellation, or Secure Real-Time Protocol (RTP.

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

A. Stratum 4E is standard on the Cisco 2811, 2821, and 2851 routers. The Cisco 2801 supports Stratum 4.

Network Management

Q. How is the Cisco 2800 Series managed?

A. Like all Cisco routers, the Cisco 2800 Series can be managed with Simple Network Management Protocol (SNMP), with a Telnet session, and through a directly connected terminal or PC running terminal emulator software.

Q. Does the Cisco 2800 Series router support the CiscoView and CiscoWorks platforms?

A. Yes, the Cisco 2800 Series supports CiscoWorks Resource Manager Essentials and CiscoView, both of which are part of the CiscoWorks family.

Q. Does the Cisco Router and Security Device Manager (SDM) support the Cisco 2800 Series?

A. Yes, Cisco SDM is supported on the Cisco 2800 Series starting with Version 2.0. Cisco SDM is included on all Cisco 2800 Series router–based Cisco IOS Software images.

Q. Does the Cisco 2800 Series router support the Cisco IP Service Level Agreement (SLA) and Cisco IOS Embedded Event Manager (EEM)?

A. Yes, the Cisco 2800 Series supports Cisco IOS Software embedded management capabilities including Cisco IP SLA and Cisco IOS EEM. The embedded self-management capabilities of Cisco IOS Software can greatly enhance fulfillment, validation, assurance, and troubleshooting activities. Refer to Cisco IOS Management Instrumentation documentation for more details (http://www.cisco.com/en/US/products/ps6555/products_ios_technology_home.html).

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