

CISCO IP COMMUNICATIONS SERVICES FOR CISCO INTEGRATED SERVICES ROUTER PLATFORMS

The Cisco Integrated Services Router is the ideal platform for delivering IP Communications in enterprise branch offices, commercial offices, and small or medium-sized business offices. Through the integration of security, voice gateway, call processing, voice mail, automated attendant, conferencing, and transcoding capabilities Cisco Integrated Services Router platforms deliver a complete office IP Communications solution.



PRODUCT OVERVIEW

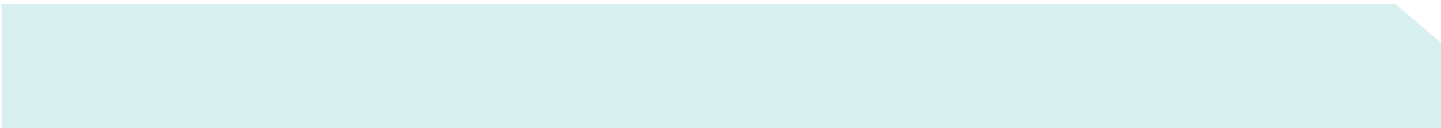
Customers of all sizes want opportunities to converge best-of-class data, voice, and security services into a single system that enables rapid services deployment, as well as opportunities to protect, grow, and optimize their businesses. With Cisco® Integrated Services Router platforms, enterprise branch, commercial offices and small or medium-sized offices can use the industry's broadest, most comprehensive voice and security services, directly embedded and integrated inside the industry's leading routing platform for maximum performance and resiliency. Cisco Integrated Services Router platforms (Cisco 2801, 2811, 2821, 2851, 3825, and 3845) provide the appropriate-sized solution for the smallest to largest customers, scaling to meet the most demanding enterprise environments while providing the performance and architecture for services available today and in the future.

The first company to offer a converged voice, security, and data solution engineered from the ground up for wire-speed concurrent services, Cisco Systems® delivers to customers of all sizes the IP Communications and security services and densities they need, specifically sized for their data requirements.

Cisco Integrated Services Router platforms embed voice and security functions directly inside the router, enabling customers to deploy advanced services simply by installing digital signal processors (DSPs) and advanced integration modules (AIMs) for IP telephony conferencing, voice gateways, Cisco Unity™ Express voice mail and automated attendant, as well as industry-standard security. For call processing, customers can enable the company's award-winning Cisco CallManager Express solution as part of Cisco IOS® Software, and easily reconfigure the same software at any time to support Cisco Survivable Remote Site Telephony (SRST) for centralized call processing with Cisco CallManager, the industry's leading solution for enterprise-class IP telephony.

By embedding proven voice technologies inside the platform, Cisco Integrated Services Router platforms free up integrated modular slots, enabling customers to take advantage of new high-speed slots such as the high speed WAN interface card (HWIC) and enhanced network module (NME) for additional services, interfaces, and densities.

The innovative extension voice module (EVM) slot on both the Cisco 2821 and 2851 routers provides significant increases in analog and Basic Rate Interface (BRI) voice densities within a single platform, scaling to as many as 24 foreign exchange station (FXS) interfaces and 12 foreign exchange



office (FXO) interfaces (these EVM modules also are supported on the Cisco 3825 and 3845 routers). All Cisco Integrated Services Router platforms natively support voice interface cards (VICs) in all HWIC slots and use the optional packet voice DSP modules (PVDMs), which are installable on the motherboard of the router itself. Figures 1 and 2 show IP Communications services available on the Cisco 2851 and Cisco 3845, respectively.

With Cisco Integrated Services Router platforms and Cisco’s systems approach to voice, security, and data services, enterprises easily can implement tiered services immediately or build voice services incrementally without sacrificing performance or room for future growth. Small and medium-sized businesses now can deploy data, security, and IP Communications requirements in a single system that is easy to install and configure for reduced cost and complexity. Service providers can extend managed voice and data services to customers of all sizes in a single routing system that scales as customer needs change.

Only Cisco provides customers with a complete, converged solution built on more than 20 years of IP innovation and leadership and proven data, voice, and security solutions.

Figure 1. IP Communications Services Available on a Cisco 2851 Integrated Services Router

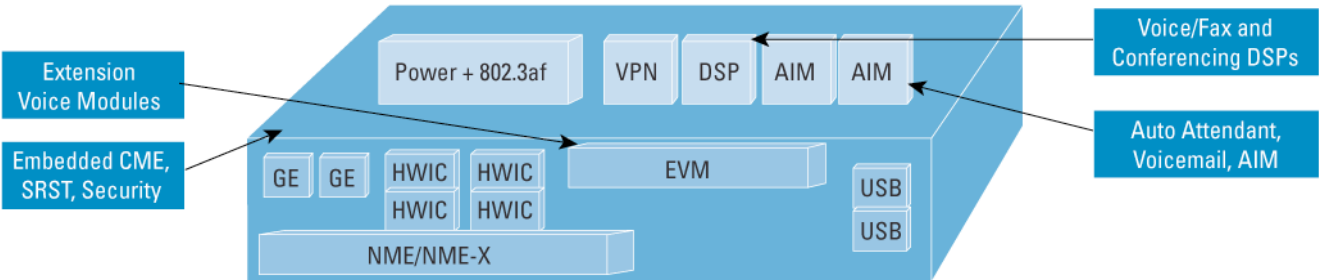
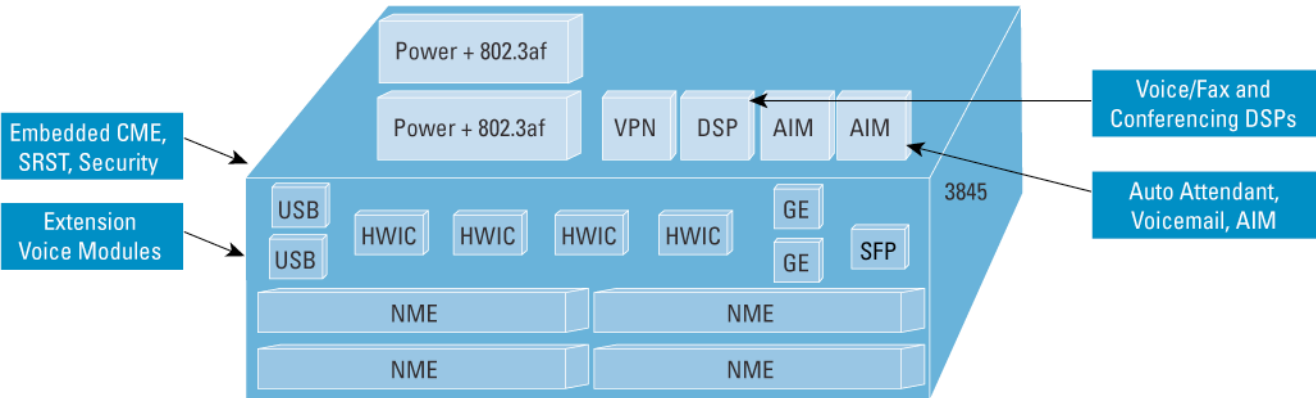


Figure 2. IP Communications Services Available on a Cisco 3845 Integrated Services Router



FEATURES TABLE

Cisco IP Communications features on Cisco Integrated Services Router platforms (Cisco 2801, 2811, 2821, 2851, 3825, and 3845) include advanced features and services for implementing networked, loosely-coupled, and semiautonomous business solutions. Some of these features include call processing, call control protocols, quality of service (QoS), analog and digital interfaces, queuing, scripting, voice mail, and automated attendant. Table 1 shows some of the key IP Communications features found on the Cisco Integrated Services Router platforms.

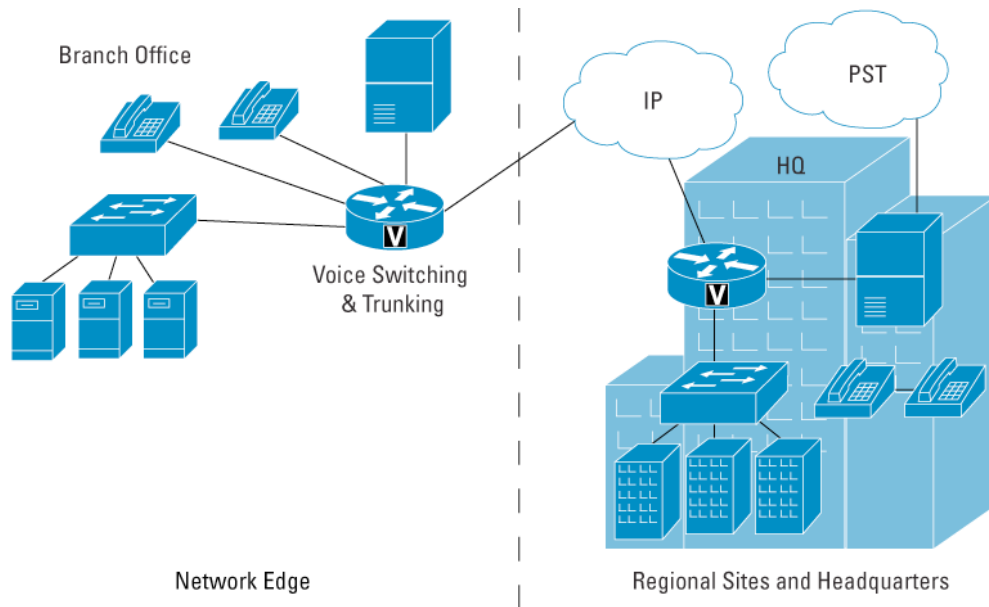
Table 1. Key IP Communications Features on Cisco Integrated Services Router Platforms

Telephony	Advanced Services	QoS, Queuing, Call Control	Cisco IP Communications
Analog FXS, FXO, E&M, Centralized Automated Message Accounting (CAMA) and direct inward dialing (DID) telephony interfaces	Motherboard-based DSP conferencing (up to 50 sessions)	Low Latency Queuing (LLQ), Class-Based Weighted Fair Queuing (WFQ), CB-WFQ, Class-Based CB-Weighted Random Early Detection	Cisco CallManager Express (24, 36, 48, 96, 168, and 240 phone support)
Digital T1, E1, and BRI telephony interfaces	Motherboard-based DSP transcoding (up to 128 sessions)	Media Gateway Control Protocol (MGCP), H.323, and Session Initiated Protocol (SIP) call control protocols	Cisco Unity Express (8 hour, 4 port AIM or 100 hour, 8 port network module)
Integrated analog to digital channel bank	Integrated access (data WAN and voice termination)	Advanced and local voice busy out (AVBO and LVBO)	Cisco CallManager gateway
Module line-powered Ethernet switch	Voice extensible markup language, Tool Command Language scripting support	Resource Reservation Protocol, Call Admission Control (CAC)	Cisco Automated Attendant on Cisco Unity Express
AVBO AND LVBO	Built-in support for future video capabilities	Class of service (COS) to type of service (TOS) mapping	Cisco SRST (24, 36, 48, 72, 96, 144, 480, 336, and 720 phone support)

APPLICATIONS

Cisco integrated services router platforms operate as toll bypass voice gateway routers for businesses to avoid telephony tolls by routing traditional private branch exchange (PBX) traffic across a corporation's IP network. This implementation also is the foundation for migration from a legacy PBX environment to a purely converged IP Communications network. Figure 3 shows Cisco Integrated Services Router platforms used in a voice toll bypass network.

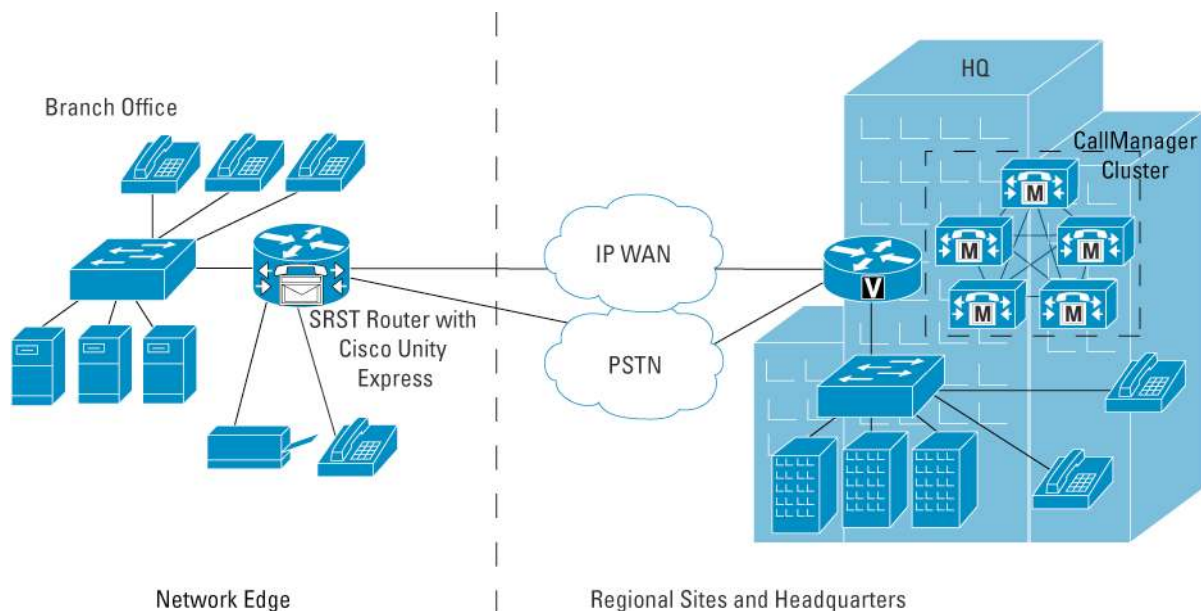
Figure 3. Cisco Integrated Services Router Platforms Used in a Voice Toll Bypass Network



Cisco Integrated Services Router platforms are the foundation for enterprise branch offices and commercial offices deploying IP telephony with SRST for failover call processing. In this deployment, voice mail and automated attendant services can be delivered directly inside the Cisco integrated services router using Cisco Unity Express or delivered centrally using Cisco Unity software. Customers can also implement Secure SRST to enable authentication and encryption support for both signaling and media transmission during a WAN outage.

Loosely coupled offices or semiautonomous offices are ideal locations for the “right size” IP telephony services within a Cisco integrated services router, which delivers the security and routing requirements for that same location. Integrating Cisco CallManager Express and Cisco Unity Express within the Cisco integrated services router management simplifies service and maintenance. Figure 4 shows the Cisco Integrated Services Router platforms used for IP telephony in branch, commercial or small offices. Cisco CallManager Express can also be transparently integrated with a central Cisco CallManager for maximum configuration flexibility.

Figure 4. Cisco Integrated Services Router Platforms Used for IP Telephony in Branch, Commercial or Small Offices



KEY FEATURES AND BENEFITS

PVDM Slots on Motherboard

Embedded modularity using any Cisco PVDM2 product (PVDM2-8, PVDM2-16, PVDM2-24, PVDM2-32, or PVDM2-64) on any Cisco integrated services router platform motherboard delivers conferencing, transcoding, and voice termination without the need to use a network module or AIM. Installing Cisco PVDM2 products inside the Cisco integrated services router provides these services for both voice over IP traffic along with time-division multiplexing (TDM) traffic. TDM interfaces can be terminated by using VICs, VWICs or an EVM (EVM is supported only on the Cisco 2821, 2851, 3825, and 3845 routers) installed natively on the Cisco integrated services router.

Dedicated EVM Slot on Cisco 2821 and Cisco 2851 Routers

Exceptional analog and BRI telephony densities are achieved through the use of a specialized EVM, which frees expansion network module slots for additional services and increased densities of voice, LAN and WAN interfaces.

Using PVDM slots on the motherboard in conjunction with the EVM card, customers have the option to offer voice services within the same platform that one would normally deploy for security and routing without the need to add a second router.

Media Authentication and Encryption

Media authentication and encryption features on Cisco's portfolio of Access Routers ensures that voice conversations terminating on either TDM or analog voice gateway ports are protected from eavesdropping. These reliable, scalable features provide a secure environment for IP communications over a LAN (local area network) or WAN (wide area network).

Dedicated Echo Cancellation Slot on 2nd Generation Multiflex Trunk Voice/WAN Interface Cards

The Cisco 2nd Generation 1 and 2 Port T1/E1 Multiflex Trunk Voice/WAN Interface Cards (VWIC2-MFT family) have an on-board slot for a Multiflex Trunk Dedicated Echo Cancellation Module (EC-MFT-32 and EC-MFT-64).

These optional daughter cards provide a dedicated hardware resource that runs Cisco's Enhanced ITU-T G.168 Echo Cancellation feature, which can be used in select network conditions when the existing voice resources are constrained. The Dedicated Echo Cancellation module's processing and memory resources enables the echo canceller to be configured with an extended 128ms echo tail buffer, providing a robust echo cancellation performance for demanding network environments.

Table 2 shows a list of IP Communications features available on Cisco Integrated Services Router platforms.

FEATURE AVAILABILITY

Table 2. IP Communications Feature Availability on Cisco Integrated Services Router Platforms

Feature	Platform Support	Availability	Cisco IOS Software (Internal Use Only)
Motherboard PVDM2 slots	• Cisco 2801 (two slots on board) • Cisco 2811(two slots on board) • Cisco 2821 (three slots on board) • Cisco 2851 (three slots on board) • Cisco 3825 (four slots on board) • Cisco 3845 (four slots on board)	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)
High-Density Analog and Digital Extension Module for Voice/Fax dedicated slots	Cisco 2821 and Cisco 2851 Note: The Cisco 3825 can support one EVM-HD in either NME slot and the Cisco 3845 can support up to two EVM-HD in any two NME slots	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)
Voice, Video, VPN (V3PN)	Cisco 2801, 2811, 2821, 2851, 3825, and 3845	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)
Cisco CallManager voice gateway	Cisco 2801, 2811, 2821, 2851, 3825, and 3845	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)
Cisco CallManager Express, Cisco Unity Express, Cisco SRST	Cisco 2801, 2811, 2821, 2851, 3825, and 3845	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)
Cisco CallManager Ad Hoc Conferencing and Transcoding	Cisco 2801, 2811, 2821, 2851, 3825, and 3845	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)
Digital T1, E1, BRI and analog FXS, FXO, E&M, CAMA, DID telephony interfaces	Cisco 2801, 2811, 2821, 2851, 3825, and 3845	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)
MGCP, H.323, SIP call control protocols	Cisco 2801, 2811, 2821, 2851, 3825, and 3845	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)

Feature	Platform Support	Availability	Cisco IOS Software (Internal Use Only)
EVM-HD-8FXS/DID, EM-HDA-8FXS, EM-4BRI-NT/TE, EM-HDA-3FXS/4FXO*, EM-HDA-6FXO*	Cisco 2821 and 2851 dedicated EVM slot (requires motherboard PVDM2 installed) Cisco 3825 can support one EVM-HD in either NME slot and Cisco 3845 can support up to two EVM-HD in any two NME slots (requires motherboard PVDM2 installed)	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)
NM-HDA-4FXS, EM-HDA-8FXS, NM-HDV (all combinations), NM-HDV2 (all combinations), NM-HD-1V, NM-HD-2V, NM-HD-2VE	Any NME slot on Cisco 2801, 2811, 2821, 2851, 3825, and 3845	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)
VIC-2DID, VIC-4FXS/DID, VIC2-4FXO (includes built-in CAMA support), VIC2-2FXO (includes built-in CAMA support), VIC2-2BRI-NT/TE, VIC2-E/M	Any native HWIC slot on Cisco 2801, 2811, 2821, 2851, 3825, and 3845 and any VIC slot on NM-HD or NM-HDV2	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)
VWIC-1MFT-T1, VWIC-2MFT-T1, VWIC-1MFT-E1, VWIC-2MFT-E1, VWIC-2MFT-T1-DI, VWIC-2MFT-E1-DI	Any native HWIC slot on Cisco 2801, 2811, 2821, 2851, 3825 and 3845 and any VIC slot on NM-HD-2VE, NM-HDV or NM-HDV2	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)
VIC2-1MFT-T1/E1, VIC2-2MFT-T1/E1, VWIC2-1MFT-T1/E1, VWIC2-2MFT-T1/E1, VWIC2-1MFT-G703, VWIC2-2MFT-G703	Any native HWIC slot on Cisco 2801, 2811, 2821, 2851, 3825 and 3845 and any VIC slot on NM-HDV, NM-HDV2, NM-HD-2VE, NM-2W, NM-1FE1R2W, NM-1FE2W-V2, NM-2FE2W-V2	Now	12.3(14)T
EC-MFT-32, EC-MFT-64	Optional Dedicated Echo Cancellation Card mounted on VIC2-1MFT-T1/E1, VIC2-2MFT-T1/E1, VWIC2-1MFT-T1/E1, VWIC2-2MFT-T1/E1, VWIC2-1MFT-G703, or VWIC2-2MFT-G703	Now	12.3(14)T
VIC-1J1	In VIC slot on NM-HDV or NM-HDV2 installed Cisco 2801, 2811, 2821, 2851, 3825, and 3845 (VIC-1J1 is not supported natively in any platform)	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)

Feature	Platform Support	Availability	Cisco IOS Software (Internal Use Only)
PVDM2-8, PVDM2-16, PVDM2-32, PVDM2-48, PVDM2-64 (suffix number refers to maximum G.711 channels supported)	Any PVDM2 is supported in any native PVDM slot Cisco 2801, 2811, 2821, 2851, 3825, and 3845 and on NM-HDV2 (only PVDM2s are supported natively, not first-generation PVDMs)	Now	12.3(8)T4 (Cisco 2800 Series) 12.3(11)T (Cisco 3800 Series)
Unsupported cards: NM-1V, NM-2V, AIM-VOICE-30, AIM-ATM-VOICE-30, VIC-2E/M, VIC-2FXS, VIC-2BRI-NT/TE, VIC-2BRI-S/T-TE, VIC-2FXO, VIC-2FXO-M1, VIC-2FXO-M3, VIC-2FXO-EU, VIC-2CAMA	None of these cards are supported on any Cisco 2800 or 3800 series (neither natively nor in network modules cards)	Never	N/A

* EM-HDA-3FXS/4FXO and EM-HDA-6FXO are planned for a future release.

SUMMARY

The Cisco Integrated Services Router platforms are ideal platforms for implementing IP Communications in enterprise branch offices and small and medium-sized businesses. Their ability to deliver wire-speed IP Communications are the result of a high-performing processor, specialized voice silicon, innovative analog and BRI interface capabilities, embedded modularity DSPs, and advanced telephony services such as Cisco CallManager Express, Cisco Unity Express, conferencing, and transcoding. With room for services growth and scalable options for integrated modularity, Cisco Integrated Services Router platforms are the platforms for IP Communications that protect future investments.

PRODUCT SPECIFICATIONS

Table 3 shows IP Communications product specifications for Cisco Integrated Services Router platforms.

Table 3. IP Communications Product Specifications for Cisco Integrated Services Router Platforms

Product Compatibility	Cisco Unity Express Release 1.1 and Later
Software Compatibility	Cisco IOS Software 12.3(8)T4 for Cisco 2801, 2811, 2821 and 2851 Cisco IOS Software 12.3(11)T for Cisco 3825 and 3845
Protocols	H.323, MGCP, SIP
Cards, Ports, and Slots	Cisco 2801: 2 HWIC slots, 2 VWIC slots, 2 PVDM slots, 2 AIM slots Cisco 2811: 4 HWIC slots, 1 expansion network module slot, 2 PVDM slots, 2 AIM slots Cisco 2821: 4 HWIC slots, 1 expansion network module slot, 1 extension voice/fax module slot, 3 PVDM slots, 2 AIM slots Cisco 2821: 4 HWIC slots, 1 expansion network module slot, 1 extension voice/fax module slot, 3 PVDM slots, 2 AIM slots Cisco 3825: 4 HWIC slots, 2 expansion network module slot, 4 PVDM slots, 2 AIM slots Cisco 3845: 4 HWIC slots, 4 expansion network module slot, 4 PVDM slots, 2 AIM slots
Options	Cisco CallManager Express, Cisco Unity Express, Cisco SRST, PVDM2-8, PVDM2-16, PVDM2-32, PVDM2-48, PVDM2-64

SYSTEM CAPACITY

Table 4 shows IP Communications service capacities for Cisco Integrated Services Router platforms.

Table 4. IP Communications Service Capacities for Cisco Integrated Services Router Platforms

Cisco Router	Cisco CallManager Express (Maximum Phones)	SRST (Maximum Phones)	Cisco Unity Express (Maximum Mailboxes)
2801	24	24	50 (8 hours storage) using Cisco Unity Express AIM
2811	36	36	100 (100 hours storage) using Cisco Unity Express network module, 50 (8 hours storage) using Cisco Unity Express AIM
2821	48	48	100 (100 hours storage) using Cisco Unity Express network module, 50 (8 hours storage) using Cisco Unity Express AIM
2851	96	96	100 (100 hours storage) using Cisco Unity Express network module, 50 (8 hours storage) using Cisco Unity Express AIM
3825	168	336	100 (100 hours storage) using Cisco Unity Express network module, 50 (8 hours storage) using Cisco Unity Express AIM
3845	240	720	100 (100 hours storage) using Cisco Unity Express network module, 50 (8 hours storage) using Cisco Unity Express AIM

Table 5 shows PVDM2 products supported natively on the Cisco Integrated Services Router platforms.

Table 5. PVDM2 Products Supported Natively on the Cisco Integrated Services Router Platforms

PVDM Module	Description	G.711 Channels	Medium Complexity Channels	High Complexity Channels
PVDM2-8	8-Channel Packet 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

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