Cisco CallManager Express

Cisco® CallManager Express is a solution embedded in Cisco IOS® Software that provides call processing for Cisco IP phones. This solution enables the large portfolio of Cisco access routers to deliver telephony features similar to those that are commonly used by business users to meet the requirements of the small office, thereby enabling deployment of a cost-effective, highly reliable, IP Communications solution for the small office.

Customers can now scale IP telephony to a small site or branch office with a solution that is very simple to deploy, administer, and maintain. The Cisco CallManager Express solution is best suited for customers who are looking for a low-cost, reliable, feature-rich telephony solution up to 100 users.

Key Features and Benefits

IP telephony is currently undergoing tremendous growth, accelerated by access to value-added features and applications only IP telephony can provide to the end user. Additionally, the cost benefits of converging voice, video, and data onto a single network are fueling the rapid acceptance of this technology. Because it is integrated into a router, the Cisco CallManager Express solution enhances the advantages of convergence by offering the following unique benefits:

• Cost-effective operations through a single, integrated voice-and-data platform for all branch office needs—Highly reliable access routers such as the Cisco 1700, 2600XM, and 3700 series platforms already provide industry-leading features, including robust quality of service (QoS), network security, encryption, firewall, and network modules that deliver content networking and enhanced VPN services to address branch and small-office business needs. Now these routers can also deliver integrated IP telephony, voice mail, and automated attendant. This allows customers to deploy one device to address all their business needs, simplifying management, maintenance, operations, and delivering a lower total cost of ownership (TCO).

• Robust set of commonly used key system and low-end PBX capabilities—Small offices have different workflows and require specialized features to support their work practices. Cisco CallManager Express delivers a robust set of telephony features for the small office, and delivers unique value-added capabilities through Extensible Markup Language (XML) that enhance the productivity of the end user and of the business, that cannot be delivered by traditional solutions.

• Inter-operability with Cisco CallManager—Customers can deploy Cisco CallManager at larger sites and deploy Cisco CallManager Express at branch office locations where local call processing is required. Using H.323 or SIP trunking,
calls can be routed over the wide area network (WAN) with calling party name and number.

- Investment protection and ease of upgrade to centralized call-processing solutions—Through a simple software configuration change on the router, a system running Cisco CallManager Express can be converted to a highly available, robust voice gateway for a remote site in a centralized Cisco CallManager deployment architecture. This flexibility helps ensure full investment protection to successful businesses that might outgrow the system capacity.

- Remote maintenance and troubleshooting using Cisco IOS Software command-line interface (CLI) or Web-based Graphical User Interface (GUI)—Customers have the option of using the industry-standard Cisco IOS Software CLI or user-friendly GUI to configure and administer Cisco CallManager Express. Cisco CallManager Express comprises network intelligence integrated into Cisco IOS Software. This telephony service can act as a stand alone call-processing engine for IP phones located in the branch office (Figure 1).

![Cisco CallManager Express Deployment](image)

Cisco CallManager Express allows a Cisco access router to provide call processing for locally attached IP phones. All the necessary files and configurations for IP phones are stored internally on the router, so an external database or file server is not required. In addition, the solution offers a robust set of public switched telephone network (PSTN) interfaces, a wide selection of WAN interfaces, integrated voice mail and automated attendant, and a full phone portfolio. Cisco IOS Software offers a robust set of industry-leading voice features designed for IP-based systems, such as H.323 signaling, advanced QoS, SIP trunking, and interworking with a gatekeeper, all available for use in Cisco CallManager Express deployments. In addition, integrated functions such as channel service unit/digital service unit (CSU/DSU) and Network Termination 1 (NT1) devices are available on the PSTN interface cards to provide flexible and robust voice services.

**IP Phone Support**

While the Cisco CallManager Express is typically suitable for less than 100 users, a maximum of 120 IP phones can be supported across a choice of platforms with CallManager Express. IP phone operation is similar to Cisco CallManager allowing for ease of user training when customers migrate to a Cisco CallManager as they outgrow the Cisco CallManager Express solution. The maximum numbers of phones supported on each platform is listed in Table 1.

<table>
<thead>
<tr>
<th>Platform</th>
<th>Maximum phones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco IAD 24xx Series integrated access devices</td>
<td>24</td>
</tr>
</tbody>
</table>

**Table 1 IP Phone Support per Platform**

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Cisco CallManager Express Features

Cisco CallManager Express provides a robust set of commonly used key system and low-end PBX telephony features to locally connected IP phones. It also provides several industry-unique features that are not available from other traditional telephony solutions. Currently, the following features (Table 2) are available with Cisco CallManager Express Version 3.1. Please consult Feature Navigator on www.cisco.com for latest IOS version.

### Phone Features

- 120 phones per system
- Attendant console functionality using IP Phone 7960G and one or two 7914 expansion modules with 34 line appearances with Fast Transfer, Busy Lamp, and Silent Ringing options
- After-hours toll bar override
- Cisco Analog Terminal Adapter (ATA) 186/188
- Automatic line selection for outbound calls
- Call Forward, Busy, No Answer, All
- Call Forward All Soft Key Restriction Control
- Do Not Disturb
- Dual line appearances per button
- European date formats
- Hook flash pass through across analog PSTN trunks
- Idle URL—Periodically push messages on to the screen of a 7940G or 7960G phone
- Last number redial
- Local directory lookup
- On-hook dialing
- Station speed dial
- System speed dial
- Speed-dial configuration changes from IP phone

### Table 1 IP Phone Support per Platform

<table>
<thead>
<tr>
<th>Platform</th>
<th>Maximum phones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco 1751-V and 1760 access routers</td>
<td>24</td>
</tr>
<tr>
<td>Cisco 261xXM, 262xXM Series access routers</td>
<td>36</td>
</tr>
<tr>
<td>Cisco 265xXM Access Router</td>
<td>48</td>
</tr>
<tr>
<td>Cisco 2691 Access Router</td>
<td>72</td>
</tr>
<tr>
<td>Cisco 3725 Access Router</td>
<td>96</td>
</tr>
<tr>
<td>Cisco 3745 Access Router</td>
<td>120</td>
</tr>
</tbody>
</table>

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• Silent and feature ring options
• Support for analog phones and fax machines
• XML services on Cisco IP phones

Trunk Features
• Analog—FXO, DID, E&M
• BRI/PRI support—NI2, 4ESS, 5ESS, EuroISDN, DMS100, DMS250, and several other switch types currently supported in Cisco IOS Software.
• Caller ID, automatic number identification (ANI), calling name
• Digital trunk support—(T1/E1)
• Direct inward dial, direct outward dial
• E1 R2 support
• H.323 Trunks with H450 support
• H450.12 Automatic Detection of H450 support for remote H323 endpoints
• H.323 to H.323 Hairpin Call Routing for non-H.450 compliant H323 endpoints
• Session Initiation Protocol (SIP) trunks
• Account codes and call data record (CDR) field entry
• Call Back Busy Subscriber/Camp-On within Cisco CallManager Express system
• Call Hold, Pick and Retrieve
• Call Park—Personal and Directed
• Call Pickup explicit ringing extension
• Call Pickup local group ringing phone
• Call Pickup explicit group ringing phone
• Call Transfer—Consultative and Blind
• Call Waiting
• Conference
• Computer Telephony Integration (CTI) integration with Outlook and Interact ACT using Telephony Application Programming Interface (TAPI) “Lite”
• Directory services using XML
• GUI Customization
• Hunt Groups—Sequential, Circular, and Parallel
• Hunt Groups—Secondary Pilot Number
• Intercom—built in
• International language support: German, French, Italian, Spanish, Portuguese, Dutch, Danish, Norwegian, Swedish
• Music on Hold (MoH)—Internal or external source
• Night Service Bell
• Overlay extensions for enhanced call coverage
• Paging—built in or to external system
• Per-call caller ID blocking
• Secondary dial tone
• Standards-based Network Call Transfer and Call Forwarding through H450.2 and H450.3
• System speed dial option through XML service
• Time of Day, Day of Week, call blocking

**Voice Mail Features**

• Integrated Voice Mail Solution—Cisco Unity Express
• Integration with Cisco Unity voice mail or unified messaging
• Cisco CallManager Express third-party Voice Mail integration (H.323, SIP, or dual tone multifrequency [DTMF]) with Octel, Active Voice, Stonevoice, Comverse
• Message waiting indicator

**Management**

• Automatic assignment of extensions to IP phones
• Single GUI for system and integrated voice-mail setup
• Telephony-service setup wizard
• Web-based GUI for moves, adds, and changes
• Three levels of GUI Admin; System administrator, Customer Administrator, and User

Cisco IP Phones Supported by Cisco CallManager Express

Figure 2
Cisco CallManager Express supports a new generation of intelligent Cisco IP phones (Figure 2) with the following enhancements:

- Display based with easy to use soft keys
- Straightforward user customization based on changing needs
- Inline power accepted from a Cisco Catalyst switch or the Cisco EtherSwitch® Network Module available on the Cisco 2600XM and 3700 series routers
- Most offer integrated 2-port 10/100BASE-T switch interface with QoS which reduces cabling needs with a single wire to the desktop.

**Cisco IP Phone 7960G**

The Cisco IP Phone 7960G (Figure 3) is a second-generation, full-featured IP phone designed primarily for manager and executive needs. It provides six programmable lines or speed dial buttons and four interactive softkeys that guide a user through call features and functions. This Phone includes a Cisco two-port switch, making it suitable for work environments
where phone capability and a co-located Ethernet device, such as a PC, are needed. The Cisco IP Phone 7960G also features a large, pixel-based liquid crystal display (LCD). The display provides features such as date and time, caller name, caller number, digits dialed and XML applications for the displaying of database or web based data.

**Cisco IP Phone 7940G**

The Cisco IP Phone 7940G (Figure 4) is a second-generation, full-featured IP phone for low- to medium-traffic users who require a minimum of directory numbers. It provides two programmable lines or speed dial buttons and four interactive softkeys that guide a user through call features and functions. This Phone includes a Cisco two-port switch, making it suitable for work environments where phone capability and a co-located Ethernet device, such as a PC, are needed. The Cisco IP Phone 7940G also has a large, pixel-based LCD display. The display provides features such as date and time, caller name, caller party number, digits dialed, and XML applications for the displaying of database or web based data.
Cisco IP Phones 7910G+SW

Figure 5
Cisco IP Phones 7910G

The Cisco IP phones 7910G (Figure 5) and 7910G+SW are basic telephones designed for common use areas that require only basic features, such as lobbies, break rooms, and hallways. The Cisco IP Phone 7910G+SW includes a Cisco two-port switch, making it suitable for work environments where basic phone capability and a colocated Ethernet device, such as a PC, are needed.

This single-line phone also provides four dedicated feature buttons: line, hold, transfer, and settings, located prominently under the display. A cluster of six feature-access keys is located above the volume control rocker switch which supports messages (msgs), conference (conf), forward, speed dial (speed 1, speed 2), and redial features.

Cisco IP Conference Station 7935

Figure 6
Cisco IP Conference Station 7935

The Cisco IP Conference Station 7935 (Figure 6) is a full-featured, IP-based, full-duplex, hands-free conference station for use in offices and small to medium-sized conference rooms. Its full-duplex design offers superior voice quality, eliminating echoes, clipped words, and reverberations for more natural conversation. It features superior sound quality with a digitally tuned speaker and three microphones, allowing conference participants to move around while speaking. In addition to the regular telephony keypad, the Cisco IP Conference Station 7935 provides three softkeys and menu-navigation keys that guide a user through call features and functions. The conference station also features a pixel-based LCD display. The display provides features such as date and time, caller name, caller number, digits dialed, and feature and line status.
Cisco ATA 186 and 188 Analog Telephone Adaptors

The Cisco ATA 186 and 188 analog telephone adaptors connect regular analog phones and fax machines to IP-based telephony networks. Each of the two voice ports on the adaptors supports independent telephone numbers, providing two separate lines. In addition, the internal Ethernet switch allows for a direct connection to a 10/100BASE-T Ethernet network using an RJ-45 interface. The Cisco ATA 188 Analog Telephone Adaptor supports an additional Ethernet port to provide LAN connectivity for a colocated PC or other Ethernet-based device.

Cisco IP Phone Expansion Module 7914

The Cisco IP Phone Expansion Module 7914 (Figure 8) extends the capabilities of the Cisco IP Phone 7960G with additional buttons and an LCD display. The silent ring option for shared lines mapped to the expansion module can be used to provide attendant-console capability. This expansion module adds 14 buttons to the existing six buttons on the Cisco IP Phone 7960G, increasing the total number of buttons to 20 with one module or 34 with two modules. A Cisco IP Phone 7960G supports up to two modules. The module’s large LCD display allows for quick and easy identification of associated buttons. The settings menu of the Cisco IP Phone 7960G offers the option to adjust the contrast of the individual LCDs for the phone and expansion module according to preference. The 14 buttons on each module can be programmed as a directory number or speed-dial key, much like the phone. The Cisco IP Phone Expansion Module 7914 is supported by Cisco CallManager Express version 2.1 and later.
The Cisco IP Phone 7902G (Figure 9) is a single-line IP phone with fixed-feature keys that provide one-touch access to the redial, transfer, conference, and voice-mail access features. The Cisco IP Phone 7902 supports in-line power, which allows the phone to receive power over the LAN. The Cisco IP Phone 7902G is supported by Cisco CallManager Express Version 3.0 and later.

The Cisco IP Phone 7905G (Figure 10) provides single-line access and four interactive softkeys that guide a user through call features and functions using the pixel-based LCD. The graphic capability of the display provides a rich user experience by presenting calling information, intuitive access to features, and language localization options.

The Cisco IP Phone 7905G supports in-line power, which allows the phone to receive power over the LAN and XML applications for the displaying of database or web based data. The Cisco IP Phone 7905G is supported by Cisco CallManager Express Version 3.0 and later.
Cisco IP Phone 7912G

The Cisco IP Phone 7912G (Figure 10) provides core business features and addresses the communication needs of a cubicle worker who conducts low to medium telephone traffic. The Cisco IP Phone 7912G offers four dynamic softkeys that guide a user through call features and functions. The graphic capability of the display provides a rich user experience by providing calling information and intuitive access to features. The Cisco IP Phone 7912G supports an integrated Ethernet switch, providing LAN connectivity to a co-located PC. In addition, the Cisco IP Phone 7912G supports in-line power, which allows the phone to receive power over the LAN and XML applications for the displaying of database or web based data. The Cisco IP Phone 7912G is supported by Cisco CallManager Express Version 3.0 and later.

Cisco IP Phone 7920

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Cisco extends the power of IP communications throughout the enterprise by delivering a powerful converged wireless solution with intelligent wireless infrastructure and an innovative product with the Cisco Wireless IP Phone 7920 (Figure 11). The Cisco Wireless IP Phone 7920 is an easy-to-use IEEE 802.11b wireless IP phone that provides comprehensive voice communications in conjunction with Cisco CallManager Express and Cisco Aironet® 1200, 1100, 350, and 340 series of WiFi (IEEE 802.11b) access points. The Cisco Wireless IP Phone 7920 delivers intelligent services such as security, mobility, QoS, and management across a Cisco powered network.

**Voice Interface Cards**

The Cisco CallManager Express solution supports a variety of voice interface cards that can be used to service a customer’s voice access needs:

- VIC-2E/M—2-port E&M (“ear and mouth”) voice interface card (VIC)
- VIC-2FXS—2-port analog Foreign Exchange Station (FXS) voice interface card
- VIC-2FXO—2-port analog Foreign Exchange Office (FXO) voice interface card
- VIC-2FXO-EU—2-port analog FXO (for Europe) voice interface card
- VIC-2FXO-M1—2-port analog FXO with reversal (for United States) voice interface card
- VIC-2FXO-M2—2-port analog FXO with reversal (for Europe) voice interface card
- VIC-2FXO-M3—2-port analog FXO with reversal (for Australia) voice interface card
- VIC-2BRI-NT/TE—2-port Basic Rate Interface (BRI) (NT and TE) voice interface card
- VIC-2BRI-S/T-TE—2-port BRI (terminal) voice interface card
- VWIC-1MFT-T1—1-port T1/Primary Rate Interface (PRI) voice interface card
- VWIC-1MFT-E1—1-port E1/PRI voice interface card
- VWIC-2MFT-T1—2-port T1/PRI voice interface card
- VWIC-2MFT-E1—2-port E1/PRI 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)
- VIC4FXS/DID—4-port FXS or direct inward dialing (DID) VIC (DID is not supported on this module)
- VIC2-2E/M—2-port voice interface card—E&M
- VIC2-2BRI-NT/TE—2-port voice interface card—BRI
- NM-HD-1V—1-slot IP Communications Voice/Fax Network Module
- Up to 4 channels of analog/BRI voice
- NM-HD-2V—2-slot IP Communications Voice/Fax Network Module
- Up to 8 channels of analog/BRI voice
- NM-HD-2VE—2-slot IP Communications enhanced Voice/Fax Network Module
- Up to 48 channels of analog/BRI and digital voice if all calls are G.711. Up to 24 channels or analog/BRI and digital voice if calls are G.729A.

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1. Supported on Cisco 2600XM, 2691, 3725 and 3745 modular access router platforms only.
• NM-HDA-4FXS—4-port analog FXS expansion module
• NM-HDA-4FXS + EM-HDA-8FXS—12-port analog FXS expansion
• NM-HDA-4FXS + Two EM-HDA-4FXO—8-port analog FXO and 4-port analog FXS expansion
• NM-HDA-4FXS + EM-HDA-8FXS + EM-HDA-4FXO—12-port analog FXS and 4-port analog FXO expansion

WAN Interface Cards and Network Modules
Cisco CallManager Express is fully compliant with industry-leading Cisco WAN interface cards and network modules, allowing enhanced data connectivity to ATM, analog modem, channelized T1/E1, Ethernet, Frame Relay, Gigabit Ethernet, high-speed serial, ISDN-BRI, ISDN-PRI, and xDSL interfaces. These data interface cards can be mixed and matched with voice interface cards to provide converged data and voice services in a single platform. In addition, advanced network modules can add enhanced services such as VPN hardware encryption, content networking, and Ethernet in-line power to a router with the Cisco CallManager Express:
• VPN hardware encryption modules
• 20- or 40-GB content engine network module
• 16- or 36-port 10/100 EtherSwitch network module with inline power support for IP phones2

Cisco CallManager Express Platforms
Cisco Systems® has developed Cisco CallManager Express for all Cisco access routers that support voice. Currently, the Cisco 2400 Series integrated access devices, Cisco 1751-V and 1760-V modular access routers, Cisco 2600XM, 2691, and 3700 series routers support this capability. Table 3 compares the specifications for a small-office system using Cisco CallManager Express, represented by either the Cisco 1760-V or the Cisco 2621XM Router, and a mid-sized office system with the Cisco CallManager Express, represented by the Cisco 3745 Access Router. Any of the other routers listed above can be selected to best fit the deployment needs of the office.

Table 2 Typical System Specifications

<table>
<thead>
<tr>
<th></th>
<th>Cisco 1760-V</th>
<th>Cisco 2621XM Router small office</th>
<th>Cisco 3745 Access Router mid-sized office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum number of phones</td>
<td>24</td>
<td>36</td>
<td>120</td>
</tr>
<tr>
<td>Maximum number of lines</td>
<td>120</td>
<td>216</td>
<td>288</td>
</tr>
<tr>
<td>Maximum analog FXO trunks</td>
<td>16</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>Maximum E&amp;M trunks</td>
<td>8</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Maximum BRI trunks</td>
<td>8</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Maximum PRI/T1/E1 trunks</td>
<td>4</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Maximum analog FXS ports</td>
<td>16</td>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td>Maximum T1 DSP channels</td>
<td>24</td>
<td>72</td>
<td>240</td>
</tr>
</tbody>
</table>

2. 16-port version supported on Cisco 2600XM, 2691, 3725 and 3745 platforms only. 36 port etherswitch module only supported on 3725 and 3745 router platforms. Internal inline power available on 3725 and 3745 routers platforms.
Summary

Cisco CallManager Express delivers telephony features similar to those that are commonly used by business users to meet the requirements of the small office. It also uses an XML infrastructure to deliver value-added features that traditional systems cannot deliver. These features improve employee and business productivity and deliver a lower TCO. Because this solution is integrated into highly reliable access routers that offer advanced data capabilities such as content networking, VPN, firewall, encryption, dial access, and Ethernet switching, customers can meet all their voice and data needs for the small office with just one platform, simplifying their management, maintenance, and operations costs.

Cisco CallManager Express can be easily migrated to a large-scale IP telephony deployment should the feature-set or phone-count requirements of a customer expand. All hardware and software used by this solution is fully compatible with the Cisco CallManager and Cisco Survivable Remote Site Telephony (SRST) solution.

More information about Cisco CallManager Express can be found here;

http://www.cisco.com/go/ccme

If you have questions send e-mail to access-ccme-cue@cisco.com.

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Table 2  Typical System Specifications (Continued)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Cisco 1760-V</th>
<th>Cisco 2621XM Router small office</th>
<th>Cisco 3745 Access Router mid-sized office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum E1 DSP channels</td>
<td>30</td>
<td>90</td>
<td>300</td>
</tr>
<tr>
<td>Maximum integrated in-line power Ethernet ports</td>
<td>16 switch requires external power supply</td>
<td>16 switch requires external power supply</td>
<td>36</td>
</tr>
<tr>
<td>Data processing rate</td>
<td>16 kpps</td>
<td>30 kpps</td>
<td>225 kpps</td>
</tr>
<tr>
<td>Flash memory (default/maximum)</td>
<td>32 MB/64 MB</td>
<td>32 MB/48 MB</td>
<td>32 MB/128 MB</td>
</tr>
<tr>
<td>System memory (default/maximum)</td>
<td>96 MB/128 MB</td>
<td>96 MB/128 MB</td>
<td>128 MB/256 MB</td>
</tr>
<tr>
<td>Network module slots</td>
<td>—</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Integrated WAN interface slots</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

1. Supported on Cisco 2600XM, 2691, 3640/3640A, 3660, 3725 and 3745 modular access router platforms only.
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