

Cisco Unified Border Element, Enterprise Edition—version 1.3

Product Overview

Cisco® Unified Communications is a comprehensive IP communications system of voice, video, data, and mobility products and applications. It enables more effective, secure, and personalized communications that directly affect both sales and profitability. It brings people together by enabling a new way of communicating: in which your business moves with you, security is everywhere, and information is always available whenever and wherever it is needed. Cisco Unified Communications is part of an integrated solution that includes network infrastructure, security, mobility, network management products, lifecycle services, flexible deployment and outsourced management options, and third-party communications applications.

The Cisco Unified Border Element is an intelligent unified communications network border element. Formerly known as the Cisco Multiservice IP-to-IP Gateway, the Cisco Unified Border Element, in addition to other Cisco IOS® Software features, includes session border controller (SBC) functions that help enable end-to-end IP-based transport of voice, video, and data between independent unified communications networks. SBCs are critical components for scaling unified communications networks, enabling them to grow from IP islands within a single customer network to an end-to-end IP community. One of the most significant uses of the Cisco Unified Border Element is to allow call control elements such as Cisco Unified Communications Manager to connect to service provider Session Initiation Protocol (SIP) trunks for public switched telephone network (PSTN) access offerings, generally known as SIP trunks.

The Cisco Unified Border Element is an integrated Cisco IOS Software application that runs on the Cisco 2900 and 3900 Series Integrated Services Routers, Cisco 2800 and 3800 Series Integrated Services Routers, Cisco 7200 Series Routers, Cisco 7301 Router, and Cisco AS5350XM and AS5400XM Universal Gateways. Previous versions of the software also ran on the Cisco 2600 Series Multiservice Platforms and Cisco 3700 Series Multiservice Access Routers. Today, the Cisco Unified Border Element is used as an IP-to-IP gateway by enterprises and commercial customers to interconnect SIP and H.323 voice and video networks.

The Cisco Unified Border Element is a simple and cost-effective solution that provides a network-to-network demarcation interface for signaling interworking, media interworking, address and port translations, billing, security, quality of service (QoS), and bandwidth management. The Cisco Unified Border Element enhances the PSTN-to-IP functions of a traditional Cisco gateway by adding the capability to join two voice-over-IP (VoIP) or video communications networks without the need for the PSTN.

Cisco IOS Software helps enable the simultaneous operation of the following:

- Cisco Unified Border Element: An application that terminates and reoriginates both signaling (H.323 and SIP) and media streams (Real-Time Transport Protocol [RTP] and RTP Control Protocol [RTCP]) while performing border interconnection services between IP networks
- Cisco IOS Software H.323 Gatekeeper: An application that acts as the point of control for a variety of voice and video components that can be attached to an IP network (such as IP telephony devices, IP-PSTN gateways, H.323 videoconferencing endpoints, and H.323 multipoint control units) while facilitating buildout of large-scale multimedia service networks
- Cisco TDM Gateway: An application that allows time-division multiplexing (TDM) switching between TDM interfaces or TDM-to-IP interfaces

The Cisco Unified Border Element provides numerous functions and services when interconnecting IP networks. Generally, these functions can be categorized into four basic types:

- Session management, the capability to count and manage the number of sessions flowing through a router
- Interworking, the capability to interconnect different signaling methods and variants
- Demarcation, the capability to act as a distinct demarcation point between the two networks
- Security, the capability to act as a Layer 7 device that intelligently allows or disallows traffic between networks

The Cisco Unified Border Element supports VoIP protocols such as H.323 and SIP. Video is also supported for both H.323 and SIP. Table 1 lists the features supported for voice and video.

Table 1. Cisco Unified Border Element Features

Feature	Support Details
Voice	
Protocols	H.323 and SIP
Protocol and signal interworking	<ul style="list-style-type: none"> • H.323 to H.323 (including Cisco Unified Communications Manager) • H.323 to SIP (including Cisco Unified Communications Manager) • SIP to SIP (including Cisco Unified Communications Manager) • SIP to SIP (including Cisco TelePresence™ calls)
Media support	<ul style="list-style-type: none"> • RTP and RTCP • Sub-RTCP for media statistics
Media interworking	<ul style="list-style-type: none"> • SIP delayed-offer to SIP early-offer interworking for audio calls
Media modes	<ul style="list-style-type: none"> • Media flow-through • Media flow-around
Transport mode	<ul style="list-style-type: none"> • TCP • User Datagram Protocol (UDP) • TCP-to-UDP interworking
Fax support	<ul style="list-style-type: none"> • T.38 fax relay • Fax passthrough • Cisco Fax Relay
Modem support	<ul style="list-style-type: none"> • Modem passthrough • Cisco Modem Relay
Dual-tone multifrequency (DTMF)	<ul style="list-style-type: none"> • H.245 alphanumeric • H.245 signal • RFC 2833 • SIP notify • Key Press Markup Language (KPML) <p>Interworking capabilities:</p> <ul style="list-style-type: none"> • H.323 to SIP • RFC 2833 to G.711 in-band DTMF* • Various SIP to H.323 DTMF interworking options
Supplementary services	<ul style="list-style-type: none"> • Call hold, call transfer, and call forwarding for H.323 networks using H.450 and transparent passing of Empty Capability Set (ECS) • SIP-to-SIP supplementary services (holds and transfers) support using REFER • SIP-to-SIP supplementary services (holds and transfers) support using REINVITE • H.323-to-SIP supplementary services for Cisco Unified Communications Manager with media termination point (MTP) on the H.323 trunk
Interworking	<ul style="list-style-type: none"> • Configurable SIP profiles to manipulate SIP messages • PAI, PPI, and RPID Interworking**** • Unsupported MIME-type attachment passthrough**** • Unsupported SIP header passthrough****
Call admission control (CAC)	<ul style="list-style-type: none"> • Resource Reservation Protocol (RSVP) • Maximum number of calls per trunk (maximum number of calls) • CAC based on IP circuits • CAC based on total calls, CPU use, or memory use threshold

Feature	Support Details
OPTIONS SIP message support	<ul style="list-style-type: none"> Support for response to OPTIONS-PING messages Support for generation of in-dialog OPTIONS-PING messages Support for generation of out-of-dialog OPTIONS-PING messages to control dial-peer status***
Virtual Route Forwarding (VRF) support	Single-voice VRF support
Voice-quality statistics	Packet loss, jitter, and round-trip time (RTT)
QoS	IP Precedence and differentiated services code point (DSCP) marking
Network Address Translation (NAT) traversal	<ul style="list-style-type: none"> NAT traversal support for SIP phones deployed behind non-Application Line Gateway (ALG) data routers Stateful NAT traversal
Network hiding	<ul style="list-style-type: none"> IP network privacy and topology hiding IP network security boundary Intelligent IP address translation for call media and signaling Back-to-back user agent, replacing all SIP-embedded IP addressing
Number translation	<ul style="list-style-type: none"> Number translation rules for VoIP numbers Electronic numbering (ENUM) support for E.164 number mapping into Domain Name System (DNS)
Codecs	<ul style="list-style-type: none"> G.711 mu-law and a-law G.722 G.723ar53, G.723ar63, G.723r53, and G.723r63 G.726r16, G.726r24, and G.726r32 G.728 G.729, G.729A, G.729B, and G.729AB Internet Low Bitrate Codec (iLBC)
Transcoding**	<p>Transcoding between any two different families of codecs from the following list:</p> <ul style="list-style-type: none"> G.711 a-law and mu-law G.729, G.729A, G.729B, and G.729AB G.723 (5.3 and 6.3 kbps) iLBC G.722
Security	<ul style="list-style-type: none"> IP Security (IPsec) Secure RTP (SRTP) Transport Layer Security (TLS) SRTP-to-RTP interworking****
Authentication, authorization, and accounting (AAA)	AAA with RADIUS
Voice media applications	<ul style="list-style-type: none"> Tool Command Language (Tcl) scripts support for application customization Voice XML (VoiceXML) 2.0 script support for application customization
Billing	<p>Standard call detail records (CDRs) for accurate billing available through:</p> <p>AAA records</p> <p>Syslog</p> <p>Simple Network Management Protocol (SNMP)</p>
Lawful intercept***	Provision of replicated packets to third-party mediation device
Video	
Protocols	H.323 and SIP
Cisco endpoints supported	Cisco Unified Video Advantage (UVA) and Cisco TelePresence endpoints
Rich media	Simultaneous support for data, audio, and video
Signaling interworking	SIP delayed-offer to SIP early-offer calls
Media	Support for multiplex RTP calls (for Cisco TelePresence solution)
H.323-enhanced features	<p>H.235 passthrough for secure calls</p> <p>H.239 passthrough for picture-in-picture feature</p>
CAC	RSVP, including audio and video reservation synchronization
QoS	DSCP markings to prioritize video streams as they traverse the network
Data support	T.120 data collaboration flow-around only

Feature	Support Details
Camera control	Far-end camera control (FECC)
Codecs	<ul style="list-style-type: none"> • H.261 • H.263 • H.264

* Requires digital signal processors (DSPs) and is available only on the Cisco 2900 and 3900 Series, Cisco 2800 and 3800 Series, Cisco 2600 Series, Cisco 2691, and Cisco 3700 Series

** Available on the Cisco 2900 and 3900 Series, Cisco 2800 and 3800 Series, Cisco 2600 Series, Cisco 3700 Series, Cisco 2691, and Cisco AS5350XM and AS5400XM.

*** Available on the Cisco 2951, 3925 and 3945 Integrated Services Routers, Cisco 2851, 3825 and 3845 Integrated Services Routers, Cisco 7200 Series, Cisco 7301, and Cisco AS5350XM and AS5400XM.

**** New feature in Cisco Unified Border Element 1.3

New Features in Cisco Unified Border Element 1.3

The new features provided in Cisco Unified Border Element 1.3 include:

- Support for configuration of SIP parameters through Dynamic Host Configuration Protocol (DHCP)
- Support for passthrough of unknown SIP headers
- Support for passthrough of unknown MIME body attachments
- Support for PAI, PPI, and RPID interworking
- Support for generation of OPTIONS PING messages to determine the status of dial peers

Overall, the new capabilities of Cisco Unified Border Element 1.3 enable additional interoperability with more devices and more service providers as well as enhanced security options with SRTP-to-RTP interworking. The new OPTIONS PING messages flexibility results in enhanced reliability of unified communications solutions.

Main Features and Benefits

The Cisco Unified Border Element delivers the following features and benefits:

- Network privacy by hiding the internal network structure from other administrative domains
- Capability to create interconnections between different VoIP network types (such as H.323-to-SIP interworking)
- DTMF interworking
- Capacity and call admissions control
- Better voice quality, cost, and space savings (including rack density), and a feature set comparable to back-to-back gateways
- Codec filtering by restriction of codecs advertised on outbound call legs; for example, restriction of high-bandwidth codecs is possible on the reorigination side of the Cisco Unified Border Element outbound dial peer
- Improved billing and settlement capabilities
- More control of calls routed between service providers and enterprises
- Software and hardware MTP functions for Cisco Unified Communications Manager (available on the Cisco 2900, 3900, 2800 and 3800 Series only)
- Critical services provided at the edge of the network for scalability
- Support for changing codecs during rotary-dial-peer selection
- Support for TDM voice
- Support for lawful intercept (LI) capabilities

- Support for PAI, PPI, and RPID interworking

Feature Availability

The Cisco Unified Border Element is built on Cisco IOS Software and runs on the following platforms:

- Cisco 3900 Series platforms (Cisco 3925 and 3945 platforms)
- Cisco 2900 Series Integrated Services Routers (Cisco 2901, 2911, 2921, and 2951 platforms)
- Cisco 3800 Series Integrated Services Routers (Cisco 3825 and 3845 Integrated Services Routers)
- Cisco 2800 Series Integrated Services Routers (Cisco 2801, 2811, 2821, and 2851 Integrated Services Routers)
- Cisco AS5400XM and AS5350XM Universal Gateways

Older versions of the functions are also available on the following routers:

- Cisco 2600 Series Multiservice Platforms (Cisco 2610XM , 2611XM, 2620XM, 2621XM, 2650XM, and 2651XM Multiservice Routers and the Cisco 2691 Multiservice Platform)
- Cisco 3700 Series Multiservice Access Routers (Cisco 3725 and 3745 Multiservice Access Routers)
- Cisco 7301 Router
- Cisco 7200VXR Series Routers

A minimum of 64 MB of flash memory and 256 MB of DRAM is required, and a minimum of one Fast Ethernet port for an external interface is required.

The Cisco Unified Border Element may require additional hardware for connectivity to the PSTN and WAN and for transcoding capabilities. If connected to the IP network through a WAN connection, the Cisco Unified Border Element supports all the WAN connectivity methods and interface cards that the underlying router platform supports.

Note: For transcoding, one of the following products and appropriate DSPs is required:

- Cisco IP Communications Voice/Fax Network Module (part number NM-HD-1V, NM-HD-2V, or NM-HD-2VE) on Cisco IP Communications High-Density Digital Voice/Fax Network Module (part number NM-HDV2, NM-HDV2-1T1/E1, or NM-HDV2-2T1/E1) and associated DSP cards
- DSP cards such as the PVDM2-8, PVDM2-16, PVDM2-32, PVDM2-48, and PVDM2-64
- DSP cards such as the PVDM3-16, PVDM3-32, PVDM3-64, PVDM3-128, PVDM3-192 and PVDM3-256

More information about transcoding is available at

http://www.cisco.com/en/US/products/ps5854/products_qanda_item0900aec8016c2c7.shtml.

Note: The Cisco 7200 Series Routers and Cisco 7301 Router do not support transcoding.

The Cisco IOS Software images listed in Table 4 later in this document allow the simultaneous operation of the Cisco Unified Border Element, Cisco IOS Software H.323 gatekeeper, and Cisco TDM gateway all on the same device.

Cisco Unified Border Element with Configurable SIP Profiles

Configurable SIP profiles on the Cisco Unified Border Element help customers by allowing SIP messages from entities in their networks to pass through the border element and enabling manipulation of header fields and the embedded Session Description Protocol (SDP). This configurability allows more endpoints to interconnect by acting as a middle layer to provide some interpretation. For example, if one network requires the presence of a certain

header in a SIP message, but your current SIP device, such as Cisco Unified Communications Manager, does not generate the header, the SIP profiles capability can be used to add this header.

Summary

The Cisco Unified Border Element provides direct IP interconnections with lower cost and greater flexibility than TDM interconnections. This gateway helps service providers and enterprises decrease VoIP latency, improve voice quality, and effectively support rich-media services, thereby allowing Cisco Unified Communications products to work transparently in both intrasite and intersite deployments.

Product Specifications

Table 2 shows platform memory specifications to support Cisco Unified Border Element 1.3.

Table 2. Platform Support and Product Specifications

Platform	Flash Memory	DRAM
Cisco 2951 Integrated Services Router Cisco 2921 Integrated Services Router Cisco 2911 Integrated Services Router Cisco 2901 Integrated Services Router	256 MB	512 MB
Cisco 3925 Integrated Services Router	256 MB	1 GB
Cisco 3945 Integrated Services Router	256 MB	1 GB
Cisco 2851 Integrated Services Router Cisco 2821 Integrated Services Router Cisco 2811 Integrated Services Router Cisco 2801 Integrated Services Router	64 MB	256 MB
Cisco 3825 Integrated Services Router	64 MB	256 MB
Cisco 3845 Integrated Services Router	64 MB	256 MB
Cisco AS5350XM Universal Gateway	128 MB	512 MB
Cisco AS5400XM Universal Gateway	128 MB	512 MB

Ordering Information

This product is orderable in three simple steps:

1. Select a Cisco router based on performance requirements.
2. Select a Cisco IOS Software image with Cisco Unified Border Element feature support (all images IPVoice and above support some components of the Cisco Unified Border Element). On the Cisco 2900 and 3900 Series platforms, which use a universal software image, select the Unified Communications package.
3. Select the appropriate Cisco IOS Software feature license.

To order software only, follow steps 2 and 3 and refer to Table 3 when selecting feature license part numbers.

To place an order, visit the Cisco Ordering homepage and refer to Table 3.

Table 3. Ordering Information for Feature Licenses

Part Number	Description
FL-CUBEE-5(=)	Feature license applicable to the Cisco 2900 and 3900 Series platforms for 5 simultaneous IP-to-IP Gateway sessions
FL-CUBEE-25(=)	Feature license applicable to the Cisco 2900 and 3900 Series platforms for 25 simultaneous IP-to-IP Gateway sessions
FL-CUBEE-100(=)	Feature license applicable to the Cisco 2900 and 3900 Series platforms for 100 simultaneous IP-to-IP Gateway sessions
FL-CUBEE-500(=)	Feature license applicable to the Cisco 2900 and 3900 Series platforms for 500 simultaneous IP-to-IP Gateway sessions
FL-CUBEE-1000(=)	Feature license applicable to the Cisco 3900 Series platforms for 1000 simultaneous IP-to-IP Gateway sessions

Part Number	Description
FL-GK-2901(=)	Cisco 2901 platform Gatekeeper license
FL-GK-2911(=)	Cisco 2911 platform Gatekeeper license
FL-GK-2921(=)	Cisco 2921 platform Gatekeeper license
FL-GK-2951(=)	Cisco 2951 platform Gatekeeper license
FL-GK-3925(=)	Cisco 3925 platform Gatekeeper license
FL-GK-3945(=)	Cisco 3945 platform Gatekeeper license
FL-CUBE-4(=)	Feature license applicable to the Cisco 2800 and 3800 Series platforms for 4 simultaneous IP-to-IP Gateway or Gatekeeper sessions
FL-CUBE-25(=)	Feature license applicable to the Cisco 2800 and 3800 Series platforms for 25 simultaneous IP-to-IP Gateway or Gatekeeper sessions
FL-CUBE-100(=)	Feature license applicable to the Cisco 2800 and 3800 Series platforms for 100 simultaneous IP-to-IP Gateway or Gatekeeper sessions
FL-INTVSRV-2801(=)	Cisco 2801 Integrated Voice Video License: IP-to-IP Gateway or Gatekeeper
FL-INTVSRV-2811(=)	Cisco 2811 Integrated Voice Video License: IP-to-IP Gateway or Gatekeeper
FL-INTVSRV-2821(=)	Cisco 2821 Integrated Voice Video License: IP-to-IP Gateway or Gatekeeper
FL-INTVSRV-2851(=)	Cisco 2851 Integrated Voice Video License: IP-to-IP Gateway or Gatekeeper
FL-INTVSRV-3825(=)	Cisco 3825 Integrated Voice Video License: IP-to-IP Gateway or Gatekeeper
FL-INTVSRV-3845(=)	Cisco 3845 Integrated Voice Video License: IP-to-IP Gateway or Gatekeeper
FL-INTVSRV-5X(=)	Cisco AS5350XM & AS5400XM Integrated Voice Video License: IP-to-IP Gateway or Gatekeeper

To Download the Software

After ordering a feature license, visit the Cisco Software Center to download the Cisco IOS Software. Table 4 provides the software image name and software feature set available with each platform.

Table 4. Cisco Unified Border Element Software Feature Set and Software File

Platform	Software Image Name	Software Feature Set
Cisco 2901, 2911, and 2921 platforms	c2900-universalk9-mz	Universal Image
Cisco 2951 platform	c2951-universalk9-mz	Universal Image
Cisco 3925 and 3945 platforms	c3900-universalk9-mz	Universal Image
Cisco 2811, 2821, and 2851 Integrated Services Router	c2800nm-adventerprisek9_ivs-mz	Cisco 2800 INT VOICE/VIDEO, IPIPGW, TDMIP GW AES
	c2800nm-ipvoice_ivs-mz	Cisco 2800 INT VOICE/VIDEO, IPIPGW, TDMIP GW
	c2800nm-adventerprisek9-mz	Cisco 2800 ADVANCED ENTERPRISE SERVICES
	c2800nm-advipservicesk9-mz	Cisco 2800 ADVANCED IP SERVICES
	c2800nm-spservicesk9-mz	Cisco 2800 SP SERVICES
	c2800nm-ipvoice-mz c2800nm-ipvoicek9-mz	Cisco 2800 IP VOICE
Cisco 2801 Integrated Services Router	c2801-adventerprisek9_ivs-mz	Cisco 2801 INT VOICE/VIDEO, IPIPGW, TDMIP GW AES
	c2801-ipvoice_ivs-mz	Cisco 2801 INT VOICE/VIDEO, IPIPGW, TDMIP GW
	c2801-adventerprisek9-mz	Cisco 2801 ADVANCED ENTERPRISE SERVICES
	c2801-advipservicesk9-mz	Cisco 2801 ADVANCED IP SERVICES
	c2801-spservicesk9-mz	Cisco 2801 SP SERVICES
	c2801-ipvoice-mz c2801-ipvoicek9-mz	Cisco 2801 IP VOICE
Cisco 3845 Integrated Services Router	c3845-adventerprisek9_ivs-mz	Cisco 3845 INT VOICE/VIDEO, IPIPGW, TDMIP GW AES
	c3845-ipvoice_ivs-mz	Cisco 3845 INT VOICE/VIDEO, IPIPGW, TDMIP GW
	c3845-adventerprisek9-mz	Cisco 3845 ADVANCED ENTERPRISE SERVICES

Platform	Software Image Name	Software Feature Set
	c3845-advipservicesk9-mz	Cisco 3845 ADVANCED IP SERVICES
	c3845-spservicesk9-mz	Cisco 3845 SP SERVICES
	c3845-ipvoice-mz c3845-ipvoicek9-mz	Cisco 3845 IP VOICE
Cisco 3825 Integrated Services Router	c3825-adventerprisek9_ivs-mz	Cisco 3825 INT VOICE/VIDEO, IPIPGW, TDMIP GW AES
	c3825-ipvoice_ivs-mz	Cisco 3825 INT VOICE/VIDEO, IPIP GW, TDMIP GW
	c3825-adventerprisek9-mz	Cisco 3825 ADVANCED ENTERPRISE SERVICES
	c3825-advipservicesk9-mz	Cisco 3825 ADVANCED IP SERVICES
	c3825-spservicesk9-mz	Cisco 3825 SP SERVICES
	c3825-ipvoice-mz c3825-ipvoicek9-mz	Cisco 3825 IP VOICE
Cisco AS5350XM Universal Gateway	c5350-jk9su2_ivs-mz	Cisco AS5350 Series IOS INT VOICE/VIDEO IPIPGW, TDMIP GW LI
	c5350-js_ivs-mz	Cisco AS5350 Series IOS INT VOICE/VIDEO IPIPGW, TDMIP GW EPLUS
Cisco AS5400XM Universal Gateway	c5400-jk9su2_ivs-mz	Cisco AS5400 Series IOS INT VOICE/VIDEO IPIPGW, TDMIP GW LI
	c5400-js_ivs-mz	Cisco AS5400 Series IOS INT VOICE/VIDEO IPIPGW, TDMIP GW EPLUS

Cisco and Partner Services for the Branch

Services from Cisco and our certified partners can help you transform the branch experience and accelerate business innovation and growth in the Borderless Network. We have the depth and breadth of expertise to create a clear, replicable, optimized branch footprint across technologies. Planning and design services align technology with business goals and can increase the accuracy, speed, and efficiency of deployment. Technical services help improve operational efficiency, save money, and mitigate risk. Optimization services are designed to continuously improve performance and help your team succeed with new technologies.

For More Information

For more information about the Cisco Unified Border Element, visit <http://www.cisco.com/go/cube> or contact your local Cisco account representative.



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