eSpace UC
V100R002C01SPC100
Solution Description

Issue   02

Date   2012-07-04

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1 Introduction to the eSpace UC Solution

About This Chapter

This topic describes the concepts, structure, and advantages of the eSpace UC solution.

1.1 Overview

The eSpace UC integrates multiple communication methods such as text, voice, data, and video.

1.2 eSpace UC Solution Components

The eSpace UC solution provides a variety of services and applications, and supports multiple access terminals.

1.3 Highlights

The eSpace UC solution has many architectural, integration, and security highlights.

1.1 Overview

The eSpace UC integrates multiple communication methods such as text, voice, data, and video.

The eSpace UC integrates IM, video conferencing, SoftConsole agents, and various mobile terminals, improving communication efficiency and cross-regional communication capability and allowing users to obtain office information from any place and any time.

Table 1-1 describes the eSpace user capacity in the eSpace UC solution.

Table 1-1 eSpace UC configurations

Device	eSpace User Capacity
eSpace UC300	300
eSpace UC1000	1000
eSpace UC3000	3000
eSpace UC10000	10000

1.2 eSpace UC Solution Components

The eSpace UC solution provides a variety of services and applications, and supports multiple access terminals.

The eSpace UC solution meets the diversified communication requirements of small, medium, and large enterprises in different industries, and helps these enterprises optimize communication and operating modes and improve competitiveness.

The eSpace UC solution contains the following systems:

- Service layer

  The Meeting Server, eServer, mobile access agent (MAA), Console Server, CDRServer, and unified messaging system (UMS) are deployed at the service layer and provide the following functions:

  - Virtual contact centers. Different services can be deployed in one contact center
  - Multi-media conferences
  - CDR management
- Call control layer

  Being a core device, eSpace U1900 functions as a gateway and provides a variety of calling services, including voice, fax, web, and short message service (SMS)
- Terminal access layer

  The eSpace UC solution provides rich communications methods for online collaborative office, and supports various terminals, including the eSpace Desktop, eSpace Mobile, analog phones, and IP phones. Various services, such as IM, status presentation, corporate directory, voice mailbox, and conference, are available to these terminals.
- Management layer

  The BMU and EMS are management devices in the eSpace UC solution.

  - The BMU manages numbers, accounts, conferences, CDRs, SoftConsole, and self services.
  - The EMS monitors, upgrades, and configures NEs including the unified gateway, IAD, SBC, and IP phones in batches.

1.3 Highlights

The eSpace UC solution has many architectural, integration, and security highlights.

Table 1-2 lists the eSpace UC highlights.

Table 1-2 eSpace UC solution highlights

Highlights	Description
Convenient service management	The eSpace UC provides convenient service management functions for enterprise administrators to access web pages to manage enterprise services and for users to customize services to meet personal

Highlights	Description
	requirements.
Full set of services	In addition to basic voice services, the eSpace UC solution provides supplementary services, multimedia services, and unified messaging services.
Open system architecture	The eSpace UC uses abundant application developing interfaces to connect to third-party systems.
High performance and reliability	• The eSpace UC supports two-node cluster backup. Data on the active and standby eSpace U1980s are synchronized to ensure that the calling function is not affected during the switchover between the active and standby eSpace U1980s. The eServer, BMU and Oracle also support two-node backup. • The eSpace UC supports local regeneration. • The IAD in the eSpace UC solution supports network interruption survival and power-off survival.
Quality of service (QoS) guarantee	The eSpace UC provides comprehensive QoS guarantees. • The eSpace UC provides multiple encoding and decoding modes, and the average time for dynamic voice encoding switching is less than 60 milliseconds. • The eSpace UC supports anti-jitter caching, echo cancellation, silence compression, comfort noise generation, automatic gain control, and packet loss compensation.

2 UC Solution Architecture

About This Chapter

The eSpace UC solution consists of the terminal access layer, call control layer, service layer, and management layer.

2.1 System Architecture

The eSpace UC solution involves multiple types of devices such as terminals, access devices, bearer devices, network management devices, and service management devices. These devices provide an end-to-end solution for enterprises.

Figure 2-1shows the system architecture of the eSpace UC solution.

Figure 2-1 System architecture diagram
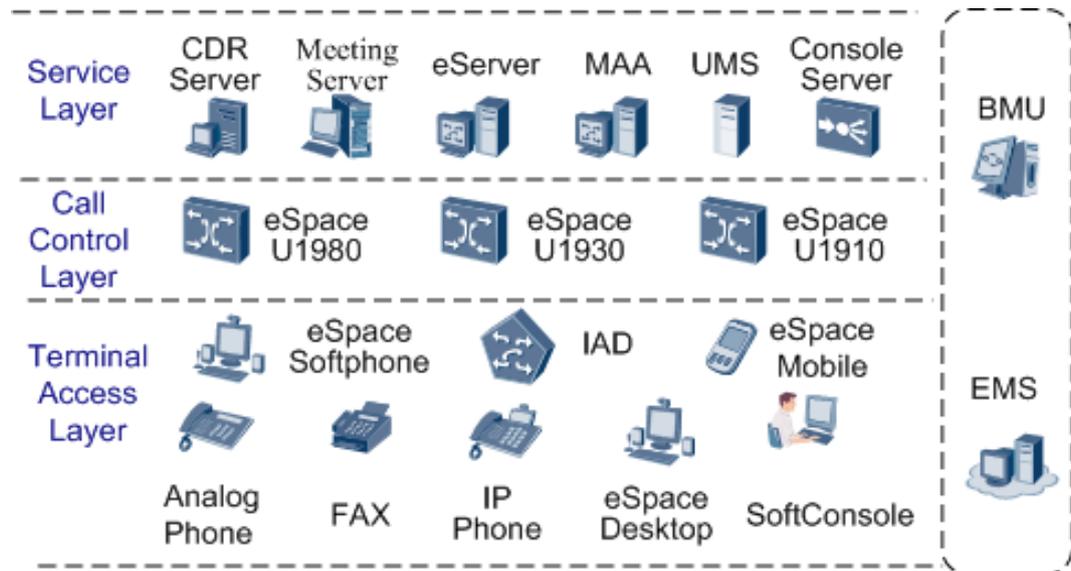
2.2 Terminal Access Layer

Terminals such as IADs, IP phones, analog phones, eSpace Desktop, eSpace Softphone and eSpace Mobile are deployed at the terminal access layer.

Table 2-1 describes functions of each terminal.

Table 2-1 Functions of each terminal

Terminal	Function
IAD	By adopting standard voice codec and compression techniques, the IAD encodes voice signals, encapsulates them into IP packets, and sends the IP packets to a specified media gateway through the IP network.
eSpace Desktop	An eSpace Desktop integrates multiple communication modes and provides the self, call, SMS, instant messaging, and conferencing services.
IP phone	An IP phone is a SIP-based terminal that supports various voice and video communication services.
eSpace SoftPhone	An eSpace SoftPhone is a soft terminal that supporting various voice and video communication services.
Analog phone	An analog phone supports common voice

Terminal	Function
	communication services.
eSpace Mobile	An eSpace Mobile provides voice services and instant message services to implement mobile office.

2.3 Call Control Layer

The eSpace U1900 series gateways are deployed at the call control layer.

The eSpace U1900 series are equipped with advanced software and hardware and provide rich services and flexible networking. The eSpace U1900 series provide reliable and high-quality voice services for enterprise networks and industry networks in different scales.

Table 2-2 describes the models and application scenarios of the eSpace U1900 series. For details, see the *eSpace U1900 Unified Gateway Product Documentation*.

Table 2-2 Product models and application scenarios of the eSpace U1900 series

Product Model	Application Scenario
eSpace U1910	A group of smaller than 100 UC users.
eSpace U1930	A group of more than 100 and smaller than 300 UC users.
eSpace U1980	A group of more than 300 UC users.

2.4 Service Layer

This topic describes the components at the service layer in the eSpace UC solution.

Table 2-3 describes the components at the service layer.

Table 2-3 Components at the service layer

Component	Description
eServer	The eServer provides login, instant message (IM), and group services.
CDRServer	The CDRServer converts Unified Gateway CDRs into binary CDR files and stores them in a specified directory. The CDRServer provides an FTP interface to transfer binary CDR files to the BMU server or third-party charging software.

Component	Description
Console Server	The Console Server communicates with the unified gateway to provide console functions.
Meeting Server	The Meeting Server provides the multimedia conference function.
UMS	The UMS stores and manages messages from different sources in a unified manner, and provides voice mailbox and fax mailbox services.
MAA	MAA allows eSpace mobile clients to connect to the MAA server.

2.5 Management Layer

This topic describes the BMU and eSpace EMS at the management layer in the eSpace UC solution.

Table 2-4 describes the components at the management layer.

Table 2-4 Components at the management layer

Component	Function
BMU	After accessing the BMU on web pages, an enterprise administrator can manage accounts and services, and synchronize contact information from a third-party corporate directory to the BMU, which facilitates unified management of enterprise services.
EMS	The eSpace EMS provides alarm, performance, configuration, and security management functions for NEs. NEs include the Unified Gateway, IAD, SBC, IP phone, storage device (disk array), database, router, switch, firewall, and load balancer.

3 eSpace UC Solution Network

The VoIP communication solution is implemented with the Unified Gateway as the core voice switch , the IAD as the peripheral access gateway, and the eSpace desktop, IP phone and SoftConsole as the terminal access device. With the feature of no area restriction, this solution is applicable not only to small enterprises, but also to medium and large enterprises, industries, and government offices with branches all over a country or the world.

Network

Figure 3-1 shows the eSpace UC network.

Figure 3-1 eSpace UC network
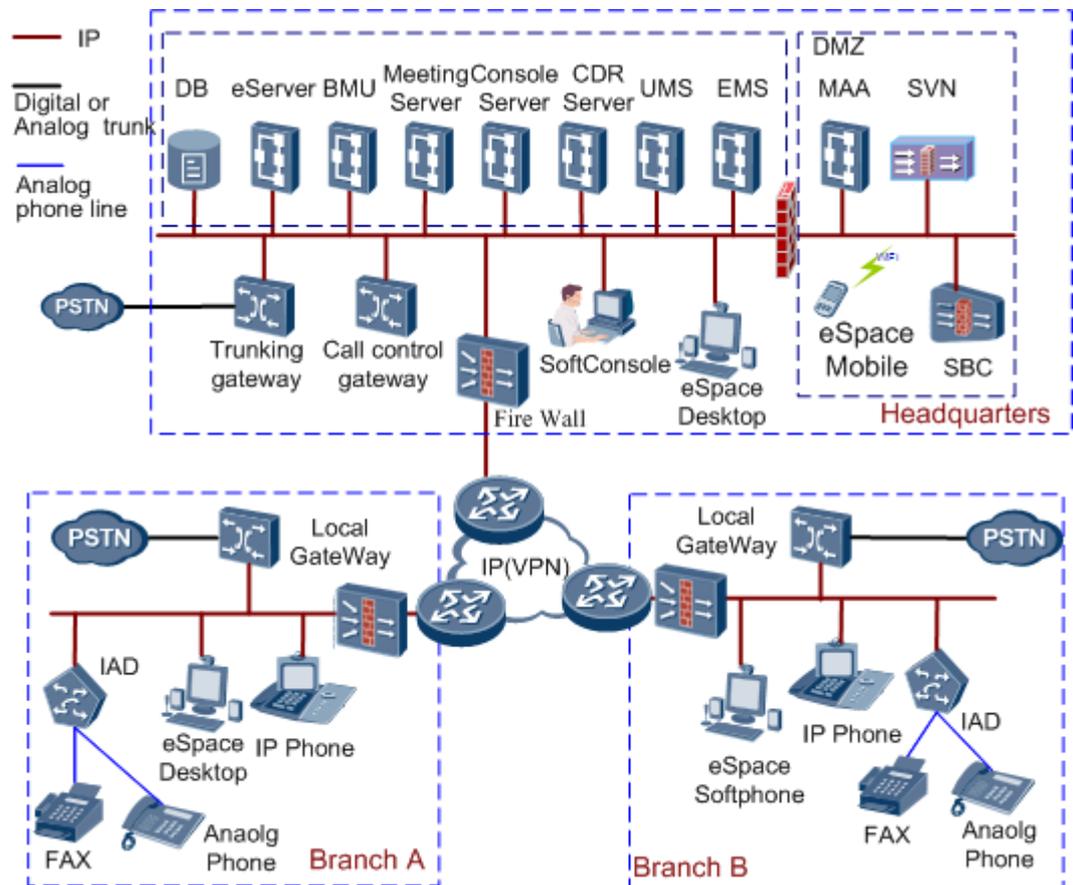
Application Description

- At the headquarters, application servers are deployed to provide services on the entire network. The application servers include the Meeting server, eServer, MAA, UMS, EMS, CDRServer, and Console server. The BMU manages enterprise services in a unified manner. The EMS manages various NEs such as the eSpace U1900, IAD, IP phone, and SBC in a unified manner.
- At the headquarters, eSpace U1900 series are deployed to function as the call control gateway. In branches, eSpace U1900 series are deployed to function as the local gateway to provide outgoing call routing and local switch.
- The supported terminals are analog phones, IP phones, eSpace Desktop, eSpace Softphone and eSpace Mobile.
- Security access devices such as SBC and SVN can be configured between the MAA and external networks to enable communication between eSpace Mobile and intranet clients.

Table 3-1 describes NEs on the eSpace UC network.

Table 3-1 NE description

NE	Function
Call control gateway	An eSpace U1900 is used as the call control gateway based on the site requirements. It provides SIP registration, voice control, and conference control services for eSpace clients.
Trunking gateway	The trunking gateway connects the enterprise intranet and the carrier's PSTN. It uses eSpace U1900 series based on site requirements.
Local gateway	An eSpace U1900 is used as the local gateway based on the site requirements. It is used to route outgoing voice calls.
eServer	The eServer provides login, instant message (IM), and group services. It includes the following components: • eSpaceEnteMonitor: a monitor that monitors the running status of eSpaceEntIMServer and eSpaceEntIMGServer. • eSpaceEntIMServer: a messaging server that provides the login, IM, image and signature setting, status presenting, file transfer, and address book services for eSpace. • eSpaceEntIMGServer: a group messaging server that provides group services for eSpace.
Meeting Server	The Meeting Server is deployed to provide

NE	Function
	multimedia conferences.
MAA	Mobile access agent is for eSpace mobile clients to the MAA server.
UMS	After being connected to eSpace U1900 series using SIP, the UMS stores and manages messages from different sources in a unified manner, and provides voice mailbox and fax mailbox services.
CDRServer	The CDRServer converts Unified Gateway CDRs into binary CDR files and stores them in a specified directory. The CDRServer provides an FTP interface to transfer binary CDR files to the BMU server or third-party charging software.
Console Server	The Console server communicates with the Unified Gateway to implement console system functions.
IP Phone	IP phones connect to the IP network, not the traditional switching telephone network. IP phone set models used in the UC solution are eSpace6800s and eSpace7800s.
SoftConsole	The SoftConsole functions as an attendant system in the eSpace UC solution. Using the SoftConsole, an attendant can answer and transfer calls.
eSpace Desktop	An eSpace Desktop integrates multiple communication modes and provides the self, call, SMS, instant messaging, and conferencing services.
eSpace Mobile	An eSpace Mobile provides voice services and instant message services to implement mobile office.
eSpace SoftPhone	An eSpace SoftPhone is a soft terminal that supporting various voice and video communication services.
IAD	As the media access gateway of VOIP, the IAD converts analog voice data into IP packets and transmits data through the IP network.
BMU	Using the Browser/Server structure, the business management unit (BMU) provides functions such as service configuration, phone conferencing, and CDR management. Users can configure complicated services on the BMU graphical user interfaces (GUIs).

NE	Function
EMS	As the local NMS for eSpace UC products in the network, the EMS implements operations and maintenance requirements such as deployment, routine maintenance, troubleshooting, upgrade, and expansion.

4 Services and Functions

About This Chapter

The eSpace UC solution provides various services and functions including IPT, UC, UMS, and multimedia conference services.

The eSpace UC solution provides basic IPT services including the basic voice, CDR, and SoftConsole services.

The eSpace UC solution provides basic UC services including the phone linkage, eSpace Desktop, eSpace Mobile, and Huawei telepresence conference connection services.

The eSpace UC supports unified messaging services, including voice and fax mailbox services. With the unified messaging services, users can access the system to retrieve voice or fax messages using a phone, fax, mobile phone, or personal computer anywhere and anytime.

In addition to the functions provided by voice conferences, multimedia conferences provide collaboration functions including video, desktop sharing, file transfer, electronic whiteboard, and text exchange.

The eSpace UC solution provides various services for terminals including eSpace Desktop, eSpace Mobile, eSpace Softphone, IP phones, and IADs.

4.1 IPT Services

The eSpace UC solution provides basic IPT services including the basic voice, CDR, and SoftConsole services.

4.1.1 Voice Services

The eSpace UC solution provides basic, supplementary, and advanced voice services.

Table 4-1 describes the voice services in the eSpace UC solution.

Table 4-1 Voice services

Voice Service	Description	
Basic Voice Services	Voice call	Calls between intra-office users
		PSTN incoming and outgoing calls
		IP incoming and outgoing calls
	Point-to-point video communication	
	Call right control	
	Number analysis and processing	
	Voice processing, encoding, and decoding	
	SNTP	
	Faxing	

Supplementary Services	Local number query service	
	Calling line identification (CLI) services	Calling line identification presentation (CLIP) service
		Calling line identification restriction (CLIR) service
		Calling party name display service
		Forcible display of calling number service
	Call forwarding services	Call forwarding unconditional (CFU)
		Call forwarding no reply (CFNR) service
		Call forwarding busy (CFB) service
		Call forwarding offline (CFO) service
		Call forwarding conditional (CFC) service
	Call transfer service	
	Call hold services	

Call park service		
Call waiting service		
Three-party calling service		
Password change service		
Simultaneous ringing service		
Sequential ringing service		
Distinctive ring tone service		
Pickup service	Group pickup service	
	Designated pickup service	
Multi-number service		
Number change service	Number change on the same phone	
	Number change on different phones	
Call busy service	Registered call on busy (RCB) service	
	Call back on busy (CBB) service	
Secretary services	Secretary service	
	Secretary station service	
	Advanced manager secretary service	
Do not disturb (DND) service		
Absent user service		
Alarm clock service		
Hotline service	Non-immediate hotline service	
	Immediate hotline service	
Privilege services	Break-in service	
	Forced release service	
	Listening service	
	Privileged user service	
Direct inward dialing (DID) service		
Automatic switchboard service		
PBX group line selection service		

	Remote activation service	
	Canceling all services	
Advanced Services	User right level management	Right levels for supplementary services
		Outgoing-call right levels by time segment
		Trunk preemption for higher-right-level users
	Call barring policies	Call barring by calling number
		Call barring by called number
		Call barring by blacklist or whitelist
		Call barring by VoIP domain
		Call barring by password
		Call barring by card number and password
		Calling number authentication
		Call barring by location
		Anonymous call barring
		Time-limited out-office calls
	Intelligent route	Route by time segment
		Route by charge rate
		Route by percentage
		Reroute on call failures
		Route load balancing
		Route by user right level
		Trunk link balancing

4.1.2 CDR

In the eSpace UC solution, the CDR management system consists of the CDR server, and the CDR management modules on the Unified Gateway and BMU.

Network

Figure 4-1 shows the CDR management system network.

Figure 4-1 CDR management system network
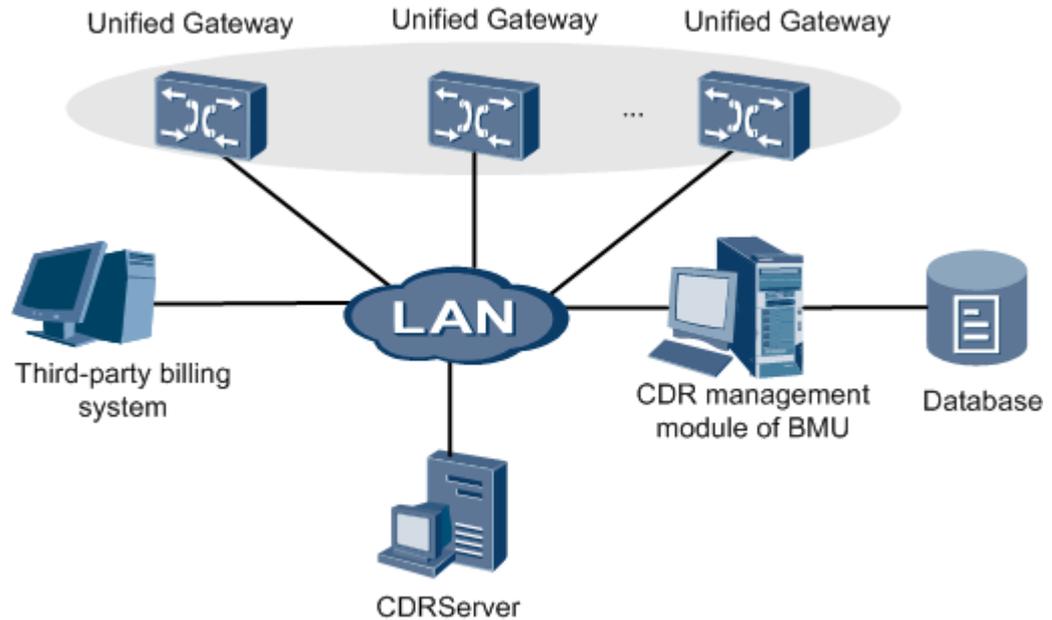
The CDR server converts Unified Gateway CDRs into binary CDR files and stores them in a specified directory. The CDR server provides an FTP interface to transfer binary CDR files to the BMU server or third-party billing software.

Functions

Table 4-2 describes the CDR management functions.

Table 4-2 CDR management functions

Function		Description
Provide a CDR FTP interface		The CDR FTP interface enables the Unified Gateway billing system to provide CDRs for third-party billing systems and billing centers openly and securely.
Integrate CDR console functions	Query CDRs	Users can use any of the following search criteria to query CDR files from the CDRServer: • Calling number • Called number • IP address of the device where CDRs are located • CDR generation time
	Delete historical CDRs	Users can delete CDR files from the CDRServer to free up disk space.
	View call record pool information	Users can view the call record pool status of a Unified Gateway host on the CDRServer

Function		Description
		according to the Unified Gateway host IP address.
	Control CDR transfer	Users can set the CDR transfer status. When new CDRs are generated in the Unified Gateway call record pool, the CDRServer determines whether to move CDR files to the original CDR folder according to the CDR transfer status.

4.1.3 Console System

The Console system communicates with the Unified Gateway to provide services and with the BMU to configure services and queries CDRs.

Table 4-3 describes the Console system functions.

Table 4-3 Console system functions

Function		Description
System configuration		The Console system supports configurations of connection information, special prefixes, audio, security, enterprise address books, and binding from phone numbers to hard phones such as IP phones.
Automatic call distribution		The Console system supports call distribution schemes including the automatic call distributor (ACD), virtual user (VU), direct call forwarding to night service, direct call forwarding to VU, forwarding to queue on all busy, and forwarding to queue on all agent busy and then to VU on timeout. The Console system also supports registration and deregistration of forcible forwarding to night service, night service number configuration, and queuing time configuration.
Basic call		The Unified Gateway uses SIP to communicate with the SoftConsole, and regards the SoftConsole as an SIP user. The Console system, like a common user, has the following basic call functions: • Answers and rejects incoming calls. • Initiates and ends calls. • Holds and unholds calls. • Breaks in calls. • Forcibly releases calls. • Performs second dialing.
Agent	Set personal agents to busy or idle	If an attendant who has joined a SoftConsole group does not want incoming calls to the SoftConsole group to be connected to the personal Console

Function		Description
		system, the attendant can set the personal agent to busy. If the attendant wants the incoming calls to be connected to the personal Console system, the attendant can set the personal agent to idle.
	Queue incoming calls	If all attendants in a SoftConsole group are busy, all calls to the SoftConsole group will be responded to with an RBT, and are queued in a time order for attendants to answer. When an attendant hangs up, the incoming call queued the earliest is connected to the attendant.
	Transfer calls	After answering a call, an attendant can transfer the call to another attendant as required by the calling party. The Console system supports call transfer, multi-call hold, specified-attendant answering, and multi-call quick transfer.
	Record calls	An attendant with recording rights can record local calls.
	Display agent status	The Console system obtains the status of attendants and agents in real time and displays the status in the busy/idle status area.
	Query attendant status	The Console system supports attendant status query.
	Bind to hardware terminals	The SoftConsole can be bound to hard phones so that calls can be answered on the hard phones and controlled on the SoftConsole. The call control functions include assistant dialing, call hold, call transfer, and specified-attendant answering.
Night service		Night service numbers can be configured for SoftConsole groups. When all attendants are busy or offline, or log out, calls are forwarded to night service attendants or VUs with announcements.
Enterprise address book		Enterprise address books on the Console server can be connected to, bound to, and disconnected from the LDAP server.
Call records		Call records can be displayed and maintained in the Console system. Phone numbers in call records can be clicked on to dial. Latest call records can be displayed on the SoftConsole home page in real time.
Calling party information display		When there is an incoming call, the Console system rings the phone, displays calling party information, plays announcements from the PC loudspeaker, and displays a dialog box if the web page is minimized to the tray.
Hotel	Set call rights	Call rights can be set for intra-office numbers. The

Function		Description
application management		rights include the local call right, national toll call right, and international toll call right.
	Set the DND service	If a user does not want to be disturbed by incoming calls, the user can set the DND service. Then other users who call the user will hear a DND announcement or a busy tone.
	Set the wake-up service	After the wake-up service is set for a user, the user's phone rings to wake up the user at the specified time, or a message is sent to an attendant, asking the attendant to determine whether to wake up the user.
	Use one key to restore services	All services configured for a specified number can be restored to initial services using one key.
	Set the night service	After the night service is set, all calls to the Console system will be forwarded to a preset night service extension.
	Query CDRs	Call information about specified numbers can be queried. The information includes the call type, call duration, call time, and called number.
	Modify user information	Detailed user information in the enterprise book can be modified.

4.1.4 Voice Conference

Two or more users can use phones to hold voice conferences.

Table 4-4 describes the voice conference services.

Table 4-4 Voice conference services

Service		Description
Scheduled conference	Dialing in	Participants dial the preset access code and password to join conferences.
	System convening	The eConference calls participants at the scheduled time. The participants pick up phones to join the conference.
	Moderator convening	The conference moderator calls participants to join the conference.
Instant conference		When no conference is reserved, the conference moderator can call participants to hold an instant conference.

4.2 UC Services

The eSpace UC solution provides basic UC services including the phone linkage, eSpace Desktop, eSpace Mobile, and Huawei telepresence conference connection services.

4.2.1 Linkage Between eSpace Desktop and an IP Phone

The eSpace UC solution supports the linkage between eSpace Desktop and an IP phone to improve the voice quality.

Table 4-5 describes the functions of eSpace Desktop when linked with an IP phone.

Table 4-5 Functions of eSpace Desktop when linked with an IP phone

Function	Description
Binding	eSpace Desktop can be bound to an IP phone during the deployment. eSpace Desktop can be bound to only one IP phone and uses the same phone number as the IP phone.
Enabling/Disabling the linkage	A user can enable or disable the linkage with an IP phone on eSpace Desktop.
Status synchronization	After an IP phone and eSpace Desktop are bound, the eSpace Desktop shows the talking status when either of them is in a conversation.
Call information display	eSpace Desktop bound to an IP phone displays a notification page displaying the IP phone operation information, including the call status, incoming call notification, calling number, and call process.
Call control	Users can control the bound IP phone on eSpace Desktop to hang up, hold, or transfer calls, and invite contacts to join a voice conference.
Assistant dialing	When a user enters a contact number or selects a contact number from the corporate directory on eSpace Desktop, a call interface is displayed on eSpace Desktop. Meanwhile, the bounded IP phone automatically picks up and connects the call with the called party. The call interface displays the call status as talking on eSpace Desktop.
Controlling the called IP phone	eSpace Desktop displays the call control page when the bound IP phone is called, displaying the incoming call information and the call control icons for users to answer, forward, or reject the incoming call.

4.2.2 eSpace Mobile Client

The eSpace UC solution provides eSpace mobile clients to implement mobile office.

eSpace mobile clients are connected to the BMU to provide self services for users, and are connected to the MAA to provide the following functions for users:

- Receive and send instant messages
- CTD call
- Manage contacts and display contact status
- Display enterprise and personal address books

4.2.3 eSpace PC Client

The eSpace PC client provides functions such as status display, instant messaging, and calling.

Table 4-6 describes the eSpace PC client services.

Table 4-6 eSpace PC client services

Service		Description
Basic call	Audio call	eSpace PC clients support basic audio calls, including calls between eSpace PC client or between eSpace PC client and phones. eSpace PC clients provide the following functions: • Initiates calls. • Hangs up outgoing or incoming calls. • Answers incoming calls. • Displays calling party information.
	Video call	eSpace PC clients support point-to-point video calls, including calls between eSpace PC client or between eSpace PC client and video phones.
	Call transfer	eSpace PC client users can press **Hookflash** after answering a call or enter a transfer-to number when receiving a call to transfer the call to a third party.
	Call hold/unhold	eSpace PC clients can hold calling and called parties in calls. eSpace PC client can also unhold calls.
	Second dialing	eSpace PC clients support the second dialing function during calls.
	Call recording	eSpace PC clients can communicate with any terminals and record calls.
	Calling party information display	A window will be displayed in the lower right corner on an eSpace PC client when there is an incoming call. The window provides operation buttons and calling party information such as the calling party's name, phone number, and home area.
	Historical records	eSpace PC clients can store historical message records, call records, and SMS message records.
	Integration with USB phones	eSpace PC clients can be integrated with USB phones. Users can use their USB PC client phones to answer eSpace calls. USB phones include

Service		Description
		common phones and cordless telephone sets.
	Status-based incoming call routing	eSpace PC clients support status-based incoming call routing. For example, incoming calls to a user in the **Away** state are automatically forwarded to the user's mobile number, and incoming calls to a user in the **Idle** state are automatically forwarded to the user's phone number.
	MWI	The message waiting indicator (MWI) blinks when an eSpace PC client receives a voice or fax message.
	Call redirection	eSpace PC clients redirect incoming calls to other phone numbers (internal extensions or external numbers) or voice mailboxes.
	Call back when busy	User B calls user A when user A is in the busy state. When user A finishes the call, the system automatically calls user B and asks user B to call user A.
	Call forwarding	Calls to PC clients are forwarded to specified phone numbers.
	Linking phones	IP phones are linked to eSpace PC clients to improve conversation quality.
Status display		The status of users' contacts is updated in real time. The default status includes online, busy, away, offline, and DND.
Instant messaging	Two-party conversation	eSpace PC clients support point-to-point message sending and receiving. Users can receive messages from or send messages to contacts.
	Group messaging	eSpace PC client users can create groups or join other groups after being approved. After joining a group, users can send group instant messages or SMS messages, view group message records, or leave the group.
	File transfer	eSpace PC clients support point-to-point file transfer. Users can send files to contacts.
	Emoticon or image sending and receiving	eSpace PC clients can send or receive emoticons or images.
	Historical message records	eSpace PC clients save historical message records when the number of message records exceeds a specified value. Historical message records contain contact names, message sending or receiving time, and message content.
Temporary group		eSpace PC client users can select multiple contacts to initiate a temporary group message.
Instant	Instant voice	eSpace PC client users can select multiple contacts

| Service		Description
conference	conference	and click the call icon to hold an instant voice conference.
	Instant multimedia conference	eSpace PC client users can select multiple contacts and click the multimedia conference icon to hold an instant multimedia conference.
Scheduled multimedia conference		eSpace PC clients support the following scheduled multimedia conferencing functions: • Reserve conferences, join or leave conferences, control participants' speaking and data operation rights, and display the participant status • Share PC client, and documents, draw or write on the electronic whiteboard, initiate voting, raise hands, take notes, communicate by text, and release bulletins
ONLY number		eSpace PC clients support the ONLY function, in which the same calling number (ONLY number) is displayed for the calls made by different extensions. When the ONLY number is called, the extensions to which the ONLY number is bound ring simultaneously or sequentially.
SMS message or email		eSpace PC clients can: • Receive SMS messages. • Send SMS messages to a single recipient or a group of recipients. • Send conference notifications by SMS message. • Use an SMS modem or MAS to send SMS messages. eSpace PC client users can query SMS message records on eSpace PC client. • Send conference notifications by email. After the Simple Mail Transfer Protocol (SMTP) service is configured, scheduled-conference notifications are sent to specified users by email when scheduled conferences are reserved.
Mobility		eSpace PC client users' personal and contact information remain the same on different eSpace PC client. The information includes contacts, groups, signatures, and images.
Telepresence conference		eSpace PC client users can join Telepresence conferences.
Enterprise address book		Enterprise address books are deployed on the BMU server and managed by the enterprise administrator.
Personal address book		Personal address books store users' contact

Service		Description
		information, including name, phone number, department, mobile number, office phone number, fax number, position, email address, contact address, and postal code.
Enterprise bulletin		eSpace PC clients support historical bulletin records and exporting.
Self services	Conference management	eSpace PC client users can reserve and manage voice conferences, and view information about the voice conferences that the users reserved or will join.
	Service registration	eSpace PC client users can view their own registered services and register other services that have been enabled but have not been registered, for example, the call hold and DND services.
	CDR	eSpace PC client users can query detailed CDR information based on search criteria and export query results to excel files.
	ONLY setting	eSpace PC clients manage ONLY information, including the operations of viewing and modifying ONLY information, and viewing, adding, modifying, and deleting terminal binding.
	Personal account maintenance	eSpace PC client users can release personal information on the enterprise address book server, and update and maintain personal information.
My Workbench		eSpace PC client users can add files, applications, and website or customized links to My Workbench.

4.2.4 Connection with Huawei Telepresence Conference

eSpace UC can connect to Huawei Telepresence Conference.

The unified gateway connects eSpace UC and Huawei Telepresence Conference using the SIP trunk, as shown in Figure 4-2.

Figure 4-2 Connection with Huawei Telepresence conference
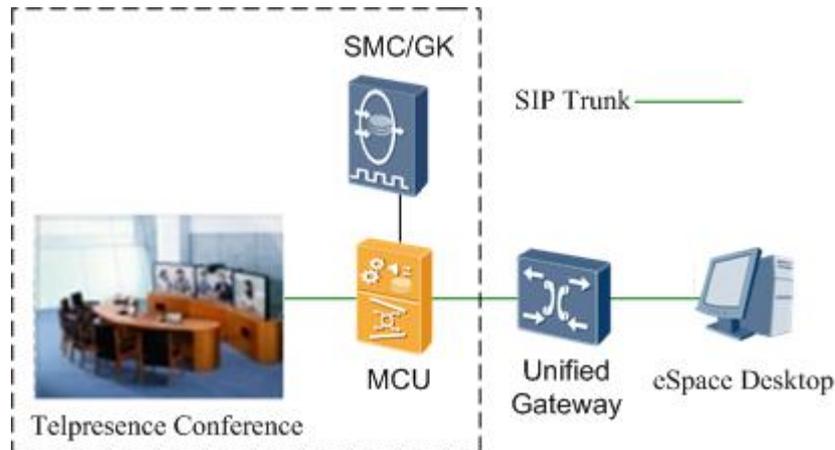
When eSpace UC connects to Huawei Telepresence Conference:

- The administrator can configure access numbers for Telepresence conferences on the BMU.
- Users can join Telepresence conferences on eSpace clients.
- Users in Telepresence conferences can invite eSpace clients to join the conferences.

4.2.5 ONLY Service

The One Number Link You (ONLY) service refers to a service in which a user's multiple terminals share the same number and supplementary services.

Table 4-7 describes the ONLY service.

Table 4-7 ONLY service

Service	Description
ONLY service	An ONLY number is a shared number among multiple intra-office terminals. One intra-office terminal is a primary terminal and can be specified by a user. For example, when user B dials user A's ONLY number, user A's terminals ring based on preset rules, and user A can select a terminal to answer the call.

4.3 Unified Messaging Services

The eSpace UC supports unified messaging services, including voice and fax mailbox services. With the unified messaging services, users can access the system to retrieve voice or fax messages using a phone, fax, mobile phone, or personal computer anywhere and anytime.

Table 4-8 describes the unified messaging services.

Table 4-8 Unified messaging services

Service		Description
Voice mailbox services	Call transfer to voice mailbox unconditional (CTVMU)	When the CTVMU service is registered for a user, all incoming calls are forwarded to the UMS unconditionally. Calling parties can leave messages as prompted by the UMS.
	Call transfer to voice mailbox on no reply (CTVMNR)	When the CTVMNR service is registered for a user, incoming calls are forwarded to the UMS if the user does not answer the calls within 20 seconds. Calling parties can leave messages as prompted by the UMS.
	Call transfer to voice mailbox on busy (CTVMB)	When the CTVMB service is registered for a user, incoming calls are forwarded to the UMS if the user is busy. Calling parties can leave messages as prompted by the UMS.
Fax mailbox services	One-terminal-one-number fax mailbox	When the one-terminal-one-number fax mailbox service is registered for a user, calls to the user's fax extension number are forwarded to the UMS. Calling parties can send fax messages as prompted by the UMS.
	Fax mailbox with a unified access code	When a user dials a unified access code on a fax machine, the call is forwarded to the UMS. The user can send fax messages as prompted by the UMS.
Voice message forwarding in the UMS web system	Users can forward voice messages retrieved from the UMS web system to other users' fax or voice mailboxes.	

4.4 Multimedia Conference

In addition to the functions provided by voice conferences, multimedia conferences provide collaboration functions including video, desktop sharing, file transfer, electronic whiteboard, and text exchange.

Table 4-9 describes the multimedia conferencing functions.

Table 4-9 Multimedia conferencing functions

Function	Description
Document sharing	Participants can view shared documents and comments in real time, improving communication efficiency.
Desktop sharing	Participants can share their desktops, remotely control the operations on

Function	Description
	the screen, and annotate the screen.
Electronic whiteboard	Participants can draw structural diagrams and write on an electronic whiteboard. Participants can also create blank pages, and copy or delete the whiteboard.
Voting	Participants can collect feedback, initiate online votes, and send questionnaires.
File transfer	Participants can transfer local files to other participants.
Notes	Participants can take and save notes.
Bulletin	Participants can release information, such as the latest conference information, as a bulletin for other participants.
Text communication	Participants can exchange ideas with each other by text.
Video conference	Participants can watch real-time videos shared by other participants in different locations.

4.5 Supported Terminals

The eSpace UC solution provides various services for terminals including eSpace Desktop, eSpace Mobile, eSpace Softphone, IP phones, and IADs.
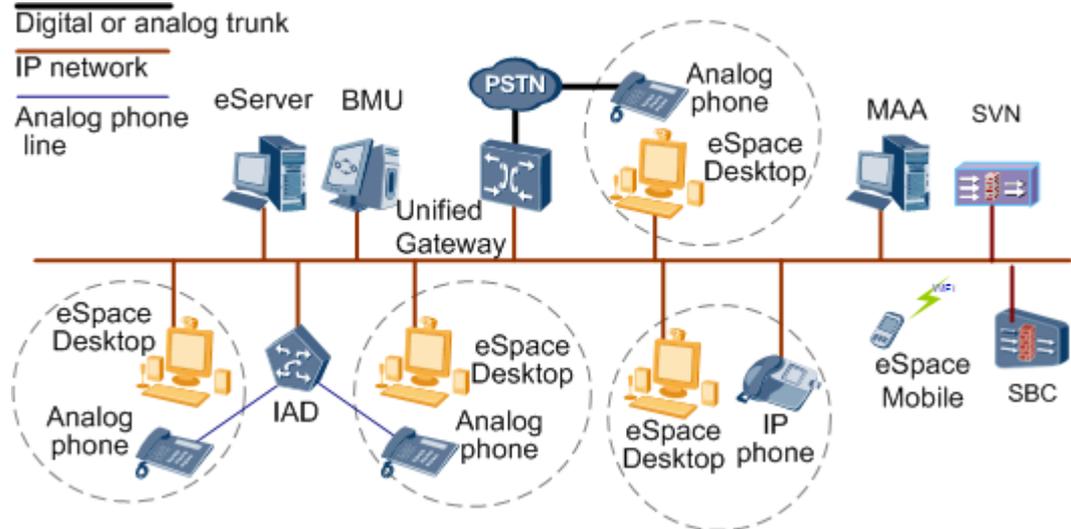
4.5.1 eSpace Client

An eSpace Client integrates multiple communication modes and provides the self, call, SMS, instant messaging, and conferencing services.

There are two types of eSpace client: eSpace Desktop and eSpace Mobile.

Network

Figure 4-3 shows the eSpace client network.

Figure 4-3 eSpace client network

eSpace Desktops connect to the BMU to provide self services, and connect to the eSpace server to provide the instant messaging service, image and signature customization, status display, group message, and point-to-point file transfer.

Main Functions (eSpace Desktop)

The eSpace Desktop integrates the functions of the software terminal and the One Number Link You (ONLY) service. The ONLY number is used to log in to the eSpace Desktop. Users can bind their eSpace Desktops with multiple types of terminals such as analog phones, IP phones, and mobile phones. A user can dial the ONLY number of an eSpace Desktop user to connect to the eSpace Desktop user.

In addition to the basic call functions of a software terminal, the eSpace Desktop provides the following functions:

- Dialing for another terminal

  A user can use an eSpace Desktop instead of a terminal bound to the eSpace Desktop to make a call. The call is routed to the terminal that is bound to the eSpace Desktop first. When the call is answered by the bound terminal, the call is routed to the called party and the called party's terminal rings. When the called party answers the call, the calling and called parties can talk with each other. The calling party's status is displayed on the eSpace Desktop in real time.

- Sending instant messages

  Users can use their eSpace Desktops to send instant messages and files to other online users.

- Sending SMS messages

  Users can use their eSpace Desktop to send SMS messages to one or more contacts. This function is available only when the BMU server connects to an SMS modem through a serial port or to the Mobile Agent Server (MAS).

- Holding instant conferences

  A user can select participants from the eSpace contact list to initiate an instant conference with these participants. After receiving the requests, the participants join the conference.

- Using self services

  After logging in to the BMU, eSpace Desktop users can use self services to manage their ONLY numbers, reserve conferences, customize services, and query CDRs.

- Managing address books

  An eSpace Desktop provides a personal address book and an enterprise address book to help users manage contact information including names and phone numbers. Users can also directly make calls and send SMS and instant messages to the contacts in their address books.

- Linking phones

  After IP phones are linked to an eSpace Desktop, IP phones are used as the priority communication devices, which ensures conversation quality.

Main Functions (eSpace Mobile)

eSpace mobile connect to the Mobile Access Agent (MAA) to provide services for users anytime and anywhere.

- Managing contact lists

  Users can add contacts to and delete contacts from contact lists.

- Making calls

  eSpace mobiles supports **Click to Dialog**.

- Sending IMs

  Users can send and receive instant messages, and view instant message history.

4.5.2 eSpace SoftPhone

In addition to audio and video calls, eSpace SoftPhone provides robust service management functions.

eSpace SoftPhone provides the following functions:

- Call: audio and video calls
- Address book: local address book, and group management
- Call records: missed, received, and dialed calls
- Personal settings: GUI color and language

4.5.3 eSpace IAD

An Integrated Access Device (IAD) is a voice over IP (VoIP) and fax over IP (FoIP) media access gateway. The IAD provides voice services of high efficiency and high quality.

By adopting standard voice codec and compression techniques, the IAD encodes voice signals, encapsulates them into IP packets, and sends the IP packets to a specified media gateway through the IP network. After the IP packets reach the destination, the destination IAD performs reverse processing to restore the IP packets into voice signals. The VoIP and FoIP functions are implemented. The eSpace UC solution uses the following models of IADs:

- IAD102H, IAD104H
- IAD208E(M)
- IAD132E(T)
- IAD1224

Features of IAD

By adopting standard voice codec and compression techniques, the IAD encodes voice signals, encapsulates them into IP packets, and sends the IP packets to a specified media gateway through the IP network. After the IP packets reach the destination, the destination IAD performs reverse processing to restore the IP packets into voice signals. The VoIP and FoIP functions are implemented.The eSpace UC solution uses the following models of IADs:

- IAD102H&104H
- IAD208E(M)
- IAD132E(T)
- IAD1224

Table 4-10shows the features of IAD. For details see *eSpace IAD Product Documentation*.

Table 4-10 Features of IAD

IAD	Model-Specific Functionality	Functionality for All Models
IAD102H&IAD104H	- Jitter Buffer (JB) - Network Address Translation (NAT) - Power failure survival (only for IAD102H)	- Voice activity detection (VAD) - Comfort noise generation (CNG) - Echo cancellation (EC) - Detecting and generation of the Dual-Tone Multi-Frequency (DTMF) code - Three-party call - G.711 and G.729 - RFC2833 - Anti-jitter delay (the delay is longer than 80ms) - Cooperating with the SoftSwitch/NGN/IMS - Adjustable packaging duration - Packet loss compensation (PLC) - Voice coder conversion time is shorter than 60ms - Registration with multiple servers and making calls between multiple servers - T.30 transparent transmission of faxes and T.38 fax
IAD208E(M)	Jitter Buffer (JB) Local switch	
IAD132E(T)	- Multiple-country adaptation for announcements of Foreign Exchange Office (FXO) - Jitter Buffer (JB) - Local switch	
IAD1224	Multiple-country	

IAD	Model-Specific Functionality	Functionality for All Models
	adaptation for announcements of Foreign Exchange Office (FXO) • iLBC • Power-off survival with the OSU • Local switch	

Typical Network

The IAD registers with the unified gateway to implement voice services. Figure 4-4 shows the typical network for Session Initiation Protocol (SIP) services on the IAD.

Figure 4-4 Typical network

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Copyright © Huawei Technologies Co., Ltd.
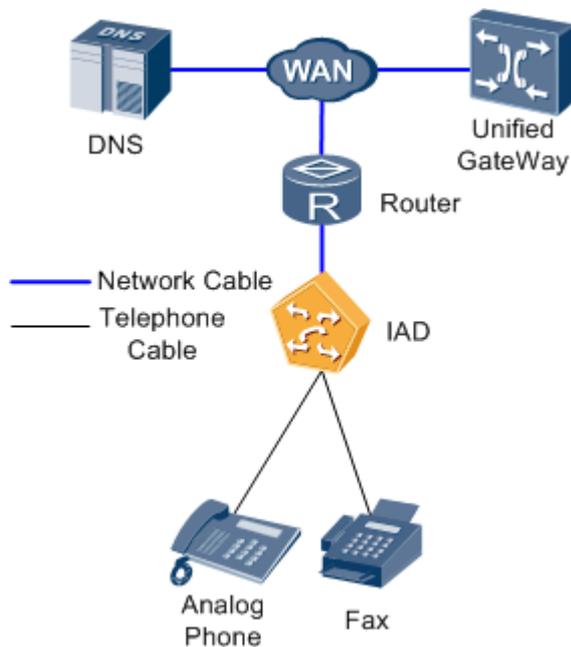
4.5.4 IP Phone

An IP phone is a multimedia terminal device that complies with the Session Initiation Protocol (SIP) and connects to the IP network instead of the PSTN.

An IP phone consists of an IP phone set and an expansion board.

- IP phone set models used in the eSpace UC solution are eSpace 6830, eSpace 6850, eSpace 6870, eSpace 7810,eSpace 7820, eSpace 7830, eSpace 7850 and eSpace 7870.
- Expansion board are eSpace 6801X and eSpace 7803X.

eSpace 6830, eSpace 6850, and eSpace 6870

eSpace 6830, eSpace 6850, and eSpace 6870 are a series of easy-to-use IP phones. Each eSpace 6830, eSpace 6850, or eSpace 6870 provides high-quality voice calling services and allows registration of multiple users. Each phone provides multiple Extensible Markup Language (XML) programmable soft keys and Busy Line Field (BLF) keys, and supports the connection of network devices to provide high-speed Internet services. Table 4-11 describes eSpace 6830, eSpace 6850, and eSpace 6870 functionality.

Table 4-11 Functionality of eSpace 6830, eSpace 6850, and eSpace 6870

IP Phone Model	Number of Allowable Registered Users	Model-Specific Functionality	Functionality for All Models
eSpace 6830	4	Provides three soft keys and seven progammable keys.	• Provides basic voice services. • Provides supplementary services such as call hold, call waiting, call transfer, call forwarding, hotline, DND, manager secretary service, distinctive ring tone, and three-party conversation. • Provides three types of customized ring tones that can be assigned to specified numbers. • Supports automatic gain control, acoustic echo cancellation, and comfort noise generation. • Provides a local address book. A local address book can contain a maximum of 200 records. Users can manually edit records in a local address book or download an address book from the server to an IP phone. • Enables users to set and obtain the IP address of the phone.
eSpace 6850	4	Provides three soft keys and eighteen progammable keys.	
eSpace 6870	6	Provides four soft keys and seven progammable keys.	

IP Phone Model	Number of Allowable Registered Users	Model-Specific Functionality	Functionality for All Models
			Users can specify a fixed IP address for an IP phone or enable the IP phone to obtain a dynamic IP address through the Dynamic Host Configuration Protocol (DHCP) or Point-to-Point Protocol over Ethernet (PPPoE). • Supports power over Ethernet (PoE). • Supports automatic upgrade. An IP phone can automatically detect the new version and complete the upgrade by itself. • Supports display of the following languages on the screen of an IP phone: Chinese (simplified and traditional), English, French, German, Italian, Japanese, Korean, Portuguese, and Spanish.

eSpace 7810, eSpace 7820, eSpace 7830, eSpace 7850, and eSpace 7870

eSpace 7810, eSpace 7820, eSpace 7830, eSpace 7850, and eSpace 7870 are a series of easy-to-use IP phones. Each eSpace 7810, eSpace 7820, eSpace 7830, eSpace 7850, or eSpace 7870 provides high-quality voice calling services and allows the registration of multiple users. Each phone supports multiple types of system ring tones, supplementary services, and languages. Table 4-12 describes eSpace 7810, eSpace 7820, eSpace 7830, eSpace 7850, and eSpace 7870 functionality.

Table 4-12 Functionality of eSpace 7810, eSpace 7830, eSpace 7850, and eSpace 7870

IP Phone Model	Number of Allowable Registered Users	Model-Specific Functionality	Functionality for All Models
eSpace 7810	2	• Provides four soft keys. • Provides eight types of system ring tones. • Supports a maximum of 300 records in a local	• IP phones are linked to eSpace PC clients • Provides basic voice services. • Provides supplementary services such as call hold, call waiting,

IP Phone Model	Number of Allowable Registered Users	Model-Specific Functionality	Functionality for All Models
		address book.	call transfer, call forwarding, DND, designated pickup, anonymous call rejection, automatic answer, emergency call, distinctive ring tone, and group pickup.
eSpace 7820	3	• Provides four soft keys. • Provides six types of system ring tones. • Supports a maximum of 300 records in a local address book.	• The customized ring tones that can be selected for specified numbers
eSpace 7830	3	• Provides four soft keys. • Provides 10 progammable keys. • Provides six types of system ring tones. • Supports a maximum of 300 records in a local address book.	• Supports voice activity detection (VAD), comfort noise generation, echo cancellation, packet loss compensation, adaptive jitter buffer, automatic gain control, and sidetone cancellation.
eSpace 7850	6	• Provides four soft keys. • Provides 10 progammable keys. • Provides six types of system ring tones. • Supports a maximum of 300 records in a local address book.	• Provides a local address book. A local address book can contain a maximum of 200 records. Users can manually edit records in a local address book or download an address book from the server to an IP phone.
eSpace 7870	6	• Provides four soft keys. • Provides 10 progammable keys. • Provides eight types of system ring tones. • Supports a maximum of 1000 records in a local address book.	• Enables users to set and obtain the IP address of the phone. Users can specify a fixed IP address for an IP phone or enable the IP phone to obtain a dynamic IP address through the Dynamic Host

IP Phone Model	Number of Allowable Registered Users	Model-Specific Functionality	Functionality for All Models
			Configuration Protocol (DHCP) or Point-to-Point Protocol over Ethernet (PPPoE). • Supports power over Ethernet (PoE). • Supports automatic upgrade. An IP phone can automatically detect the new version and perform the upgrade. • Supports display of the following languages on the screen of an IP phone: English, French, German, Italian, Polish, Portuguese, Turkish, and Spanish.

eSpace 6801X

eSpace 6801X can be installed on eSpace 6850 and eSpace 6870.

eSpace 6801X provides:

- 56 expansion keys
- Red and green light emitting diodes (LEDs)
- BLF keys
- Speed dialing

eSpace 7803X

eSpace 7803X can be installed on eSpace 7830, eSpace 7850, and eSpace 7870.

eSpace 7803X provides:

- BLF keys
- Basic voice services
- Supplementary services such as speed dialing, call reservation, call hold, call transfer, call forwarding, DND, and group pickup

5 Openness

About This Chapter

Components in the eSpace UC network use standard signaling and protocols to communicate with each other. The eSpace UC supports multiple types of signaling and protocols and has powerful and flexible networking capabilities.

5.1 Signaling and Protocol Distribution

The eSpace UC supports standard signaling such as Signaling System 7 (SS7), Primary Rate Adaptation (PRA), QSIG and R2, and standard Session Initiation Protocol (SIP) protocol.

5.2 Signaling

The eSpace UC supports signaling such as Signaling System 7 (SS7), Primary Rate Adaptation (PRI), and R2.

5.3 Protocol

The eSpace UC supports Session Initiation Protocol (SIP).

5.1 Signaling and Protocol Distribution

The eSpace UC supports standard signaling such as Signaling System 7 (SS7), Primary Rate Adaptation (PRA), QSIG and R2, and standard Session Initiation Protocol (SIP) protocol.

Figure 5-1 shows the signaling and protocols supported by the eSpace UC.

Figure 5-1 Signaling and protocols supported by the eSpace UC
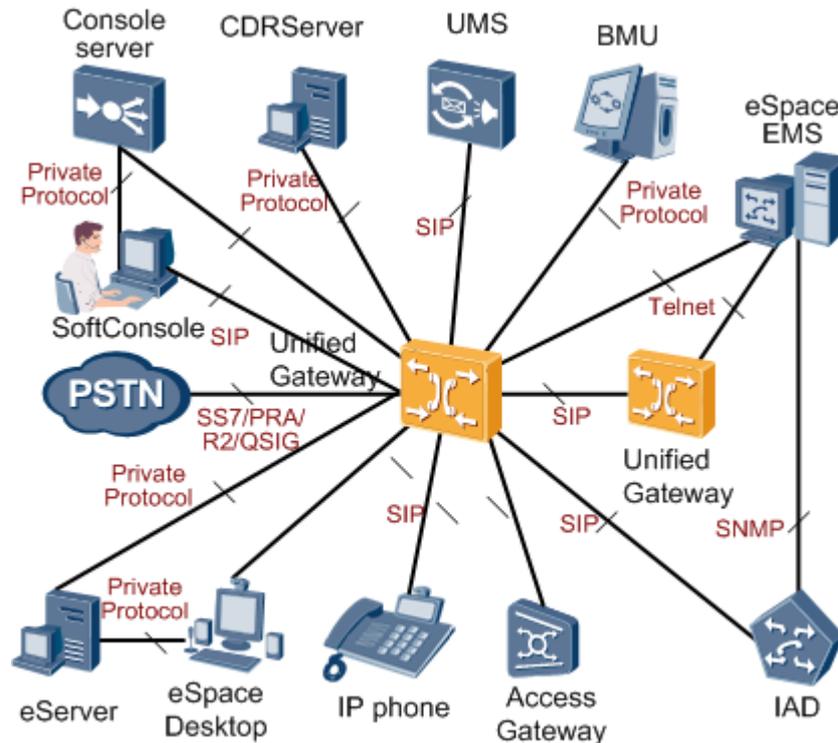
5.2 Signaling

The eSpace UC supports signaling such as Signaling System 7 (SS7), Primary Rate Adaptation (PRI), and R2.

SS7

SS7 is a common channel signaling system that complies with international standards. It has the following advantages:

- High speed transmission
- Large signaling capacity
- Powerful functionality
- High flexibility and reliability

SS7 meets the requirements of the Public Switched Telephone Network (PSTN) and intelligent network (IN). The SS7 signaling consists of the user part and message transfer part (MTP).

Figure 5-2 shows the typical application of SS7 on the eSpace UC network.

Figure 5-2 Typical application of SS7 on the eSpace UC network
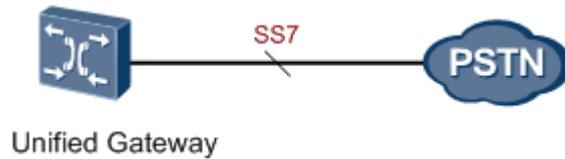
Through SS7 (ISUP/TUP), the Unified Gateway communicates with the switches that support SS7 on the PSTN network. The Unified Gateway can access the E1 digital trunk provided by the switches.

PRI

PRI refers to the control signal between terminal devices and networks. The signaling structure is 30B+D (used in Europe and China) or 23B+D (used in North America and Japan).

> **NOTE**
>
> The B channel is a voice or data channel at the rate of 64 kbit/s. The D channel is a signaling channel at the rate of 16 kbit/s or 64 kbit/s.

Figure 5-3 shows the typical application of PRI on the eSpace UC network.

**Figure 5-3** Typical application of PRI on the eSpace UC network
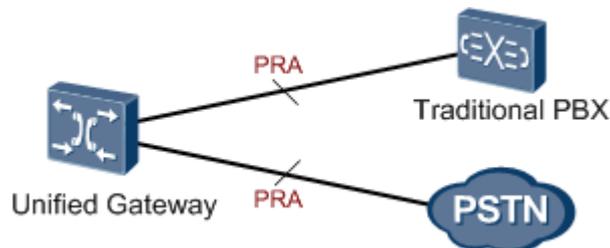
Through PRI, the Unified Gateway communicates with the traditional Private Branch Exchanges (PBXs) and Integrated Services Digital Network (ISDN) switches on the PSTN network. The Unified Gateway can access the E1 digital trunk provided by the PBXs and ISDN switches.

R2

R2 is a type of channel-associated signaling. R2 was previously applicable to the international telecommunication network and telecommunication networks in many countries. The China No.1 (CNo.1) signaling is a type of R2. R2 consists of line signaling and register signaling. The definitions of the line signaling and register signaling, however, vary according to the country.

Figure 5-4 shows the typical application of R2 on the eSpace UC network.

Figure 5-4 Typical application of R2 on the eSpace UC network
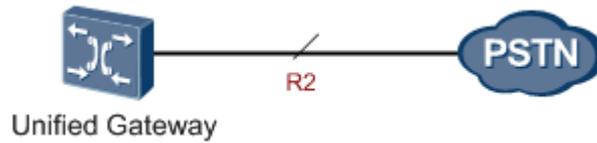
Through R2, the Unified Gateway communicates with the switches that support R2. The Unified Gateway can access the E1 digital trunk provided by the switches.

5.3 Protocol

The eSpace UC supports Session Initiation Protocol (SIP).

Defined by the Internet Engineering Task Force (IETF), SIP is a protocol at the application layer, which is used to set up, modify, and end multimedia sessions on the IP network.

Figure 5-5 shows the typical application of SIP on the eSpace UC network.

Figure 5-5 Typical application of SIP on eSpace UC network
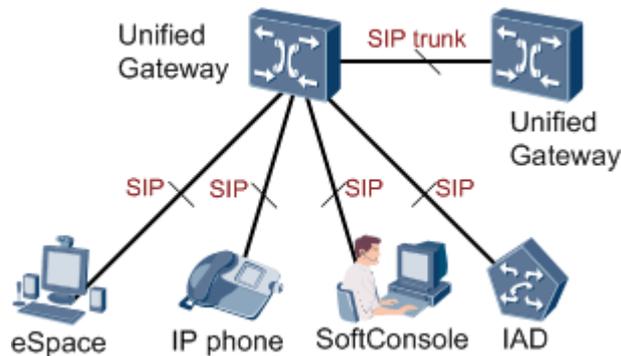
Through SIP, the Unified Gateway controls the communication between each two SIP terminals. Two Unified Gateway can communicate with each other through the SIP trunk.

6 Integration

About This Chapter

The eSpace UC solution provides interfaces for third-party applications to integrate with these applications, implement their functions and provide integrated industry application solutions.

6.1 Hotel Voice Communication Solution

The Unified Gateway connects to the existing hotel management system through an interface server to provide a hotel with plentiful voice communication services.

6.2 Recording Solution

When user terminals that require recording are located in different places or in an enterprise's branches, the SBC-based IP recording solution is required.

6.3 AD Integration

The eSpace UC solution can be integrated with enterprise ADs. ADs can synchronize the corporate directory to the BMU.

6.4 OCS Integration Solution

In the OCS integration solution, Huawei Unified Gateway and Microsoft OCS are integrated and communicate with each other through TCP and SIP trunks.

6.5 Outlook Integration Solution

In the Outlook integration solution, eSpace and Outlook are integrated. Users can use Outlook to make calls to contacts, reserve conferences, and synchronize contact information.

## 6.1 Hotel Voice Communication Solution

The Unified Gateway connects to the existing hotel management system through an interface server to provide a hotel with plentiful voice communication services.

The Unified Gateway processes the service management commands of guest calls from the hotel management system and sends information such as charging and room status to the hotel management system.

System Network

Figure 6-1 shows the system network for the hotel voice communication solution.

Figure 6-1 System network for the hotel voice communication solution
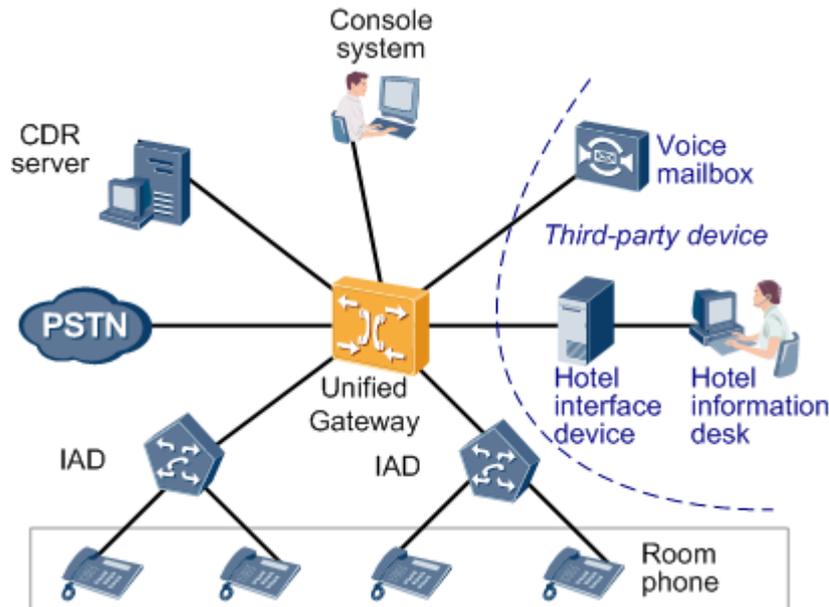
Application Description

- The IADs support access for common phone users.

- The CDRServer can transmit CDRs to the hotel charging system, including the call attribute, outgoing mode, calling and called parties, response time, call prefix, and call duration of a guest. The hotel charging system provides personalized and flexible charging policies and charging modes.

- The Console system can improve the completion rate of hotel calls and the customer satisfaction level. The Console system supports multiple functions, such as call control, phone book management, and information query.

- When a guest checks in, the receptionist allocates a voice mailbox and the phone call permission according to the guest's requirements. When the guest checks out, the receptionist cancels the guest's permission of making national toll calls and disables other related services.

- When a call to a guest room is not answered or the guest is busy, the call will be forwarded to the voice mailbox automatically. After off-hook, the guest hears a voice notification. The guest can log in to the voice mailbox to hear the voice messages.

- In addition to the common wake-up service, the Unified Gateway provides a VIP wake-up service. Before the wake-up time, the Unified Gateway calls the attendant, and then the attendant wakes up guests.

- The Unified Gateway provides the mini bar function. The hotel staff member presses the code and number of a guest's consumption items on the phone in the guest's room. Then the Unified Gateway transmits the consumption information to the hotel reception desk and records the information in the guest bill.

- The Unified Gateway supports room status update. A hotel staff member can access the Unified Gateway through a phone in a guest room to update the room status at the hotel reception desk.

6.2 Recording Solution

When user terminals that require recording are located in different places or in an enterprise's branches, the SBC-based IP recording solution is required.

In this solution, an SBC functions as a convergence point for voice streams, and a high performance Ethernet switch with port mirroring is required for the convergence of voice streams.

System Network

Figure 6-2 shows the system network for the SBC-based IP recording solution.

Figure 6-2 System network for the SBC-based IP recording solution
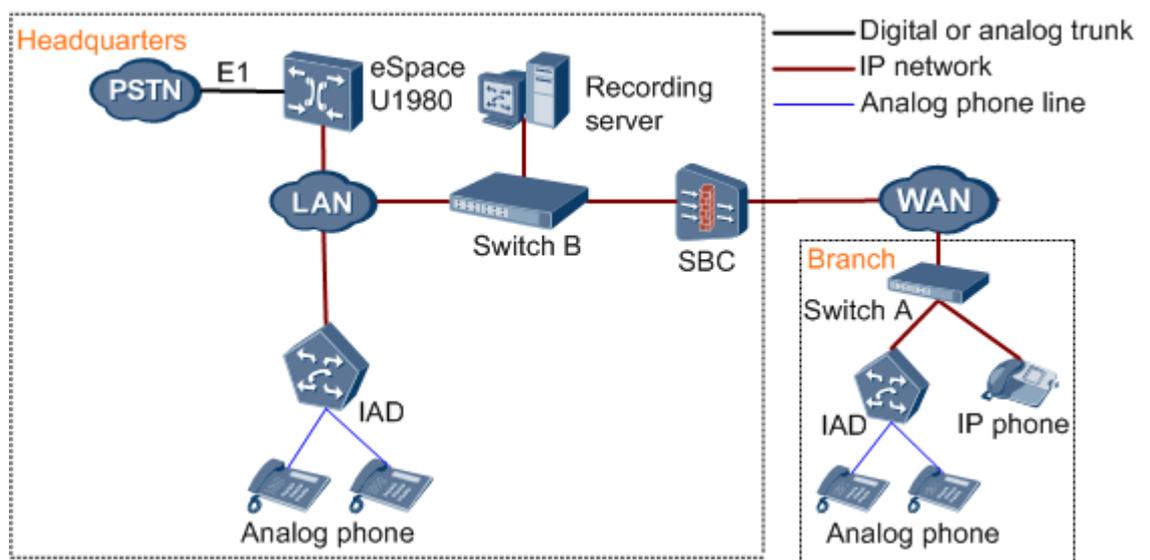
Application Description

The convergence and media agent functions are used for SBC-based IP recording. The SBC converges all voice data and forwards the data to the Unified Gateway. The recording server only needs to connect to a switch. The mirroring function of the switch enables the Unified Gateway to monitor media and signaling streams into and out of the SBC, and record calls.

Since only media and signaling streams are converged on the SBC and then forwarded to the recording server, normal data flows are not affected. In addition, the network performance and device configuration are not affected because traffic on all interfaces is not converged at the core.

6.3 AD Integration

The eSpace UC solution can be integrated with enterprise ADs. ADs can synchronize the corporate directory to the BMU.

The corporate directory can be synchronized in manual or periodic mode. After the corporate directory is synchronized to the UC server, the UC server, instead of the AD server, processes all client operations on the corporate directory.

Users can view the latest corporate directory on the eSpace client only after the latest corporate directory is synchronized to the BMU. The integration of the eSpace UC solution and the enterprise AD has the following features:

- The enterprise administrator can use the AD corporate directory system to maintain the current enterprise's corporate directory.
- After being deployed in an enterprise, the UC platform uses the periodic synchronization module to connect to the current enterprise's corporate directory and periodically synchronizes the corporate directory in the incremental mode.
- After logging in to the eSpace client, the enterprise user can view the latest corporate directory.

6.4 OCS Integration Solution

In the OCS integration solution, Huawei Unified Gateway and Microsoft OCS are integrated and communicate with each other through TCP and SIP trunks.

System Network

shows the OCS integration solution network.

Figure 6-3 OCS integration solution network
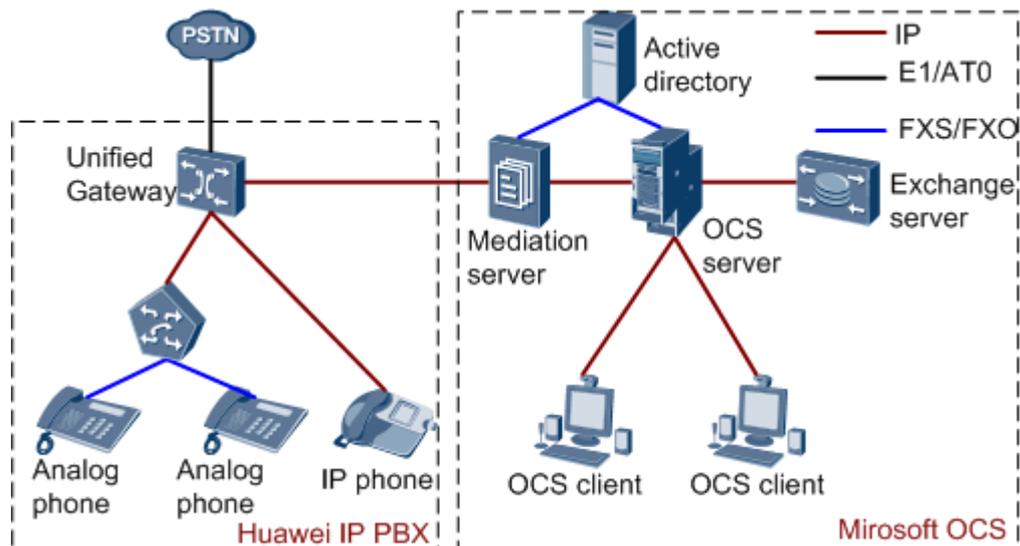
Application

- Huawei Unified Gateway registers and manages IADs and IP phones, and functions as a voice gateway to connect to the PSTN and Microsoft OCS.
- The mediation server of Microsoft OCS converts signaling and media streams to enable the communication between Huawei Unified Gateway and Microsoft OCS.
- Users registered with Huawei Unified Gateway can use Microsoft OCS functions.
- Microsoft OCS users connect to the PSTN through Huawei Unified Gateway.

6.5 Outlook Integration Solution

In the Outlook integration solution, eSpace and Outlook are integrated. Users can use Outlook to make calls to contacts, reserve conferences, and synchronize contact information.

After being integrated with Microsoft Office Outlook 2007, the eSpace UC:

- Recognizes eSpace users automatically, and enables users to make voice and video calls and send instant and SMS messages using Outlook.
- Synchronizes the user status set in an Outlook appointment to the user's eSpace PC client.
- Creates scheduled conferences in the Outlook Calendar.
- Recognizes phone numbers contained in Outlook emails and enables users to directly make calls to the numbers.

7 Reliability

About This Chapter

The eSpace UC solution supports two-node cluster backup, local regeneration, and power-off survival, which ensures high reliability of the system.

The eSpace UC solution provides a high level of security for the unified gateway, server, and database.

The IAD in the eSpace UC solution supports power-off survival and network interruption survival.

7.1 Two-Node Cluster Backup and Local Regeneration

The eSpace UC solution provides a high level of security for the unified gateway, server, and database.

The unified gateway supports:

- Power module backup

  The eSpace U1980's power module supports hot swap and 2+1 backup, the eSpace U1910 and eSpace U1930 are power module supports hot swap and 1+1 backup.

- Hot backup for main control boards

  eSpace U1980 supports 1+1 hot backup for main control boards. When the active board fails, the standby board takes over services automatically. The takeover process is free from service interruption, which improves the mean time between failures (MTBF).

- Disaster redundancy for eSpace U1980

  Data is synchronized between the active and standby nodes in real time. When the active node fails, the standby node takes over services without the services being interrupted to ensure smooth system operation. When the central nodes fail, the local gateways control and route local calls to improve system reliability.

The eServer, BMU, and Oracle support two-node cluster backup. Server supports 1+1 cold backup, when the active server fails, the standby server takes over services without the services being interrupted to ensure smooth system operation.

7.2 IAD Power-Off Survival and Network Interruption Survival

The IAD in the eSpace UC solution supports power-off survival and network interruption survival.

When an IAD is connected to the PSTN network through an analog trunk, some analog phone users can connect to the PSTN network through the Foreign Exchange Office (FXO) analog trunk to make calls even when the IAD is powered off. The following IADs support power-off survival:

- IAD102H
- IAD132E(T)
- IAD1224

Network interruption survival is also called emergency standalone. When an IAD are disconnected from softswitches, POTS users under the same IAD can still make calls to each other, and users can make outgoing calls. The following IADs support network interruption survival:

- IAD208E(M)
- IAD132E(T)
- IAD1224

8 Maintainability

About This Chapter

The eSpace UC solution has a high level of maintainability in terms of NE configuration, NE upgrade, and UC service configuration.

The Business Management Unit (BMU) manages services, numbers, accounts, and conferences in a centralized manner.

The eSpace Element Management System (eSpace EMS) serves as the eSpace UC network management system to configure network elements (NEs) in batches. The NEs include Unified Gateway, Integrated Access Device (IAD), Session Border Controller (SBC), and IP phone.

The eSpace EMS monitors NEs by managing their performance and alarms.

The eSpace EMS upgrades NEs in batches. The NEs include Unified GateWay,IAD, SBC and IP phones.

8.1 Centralized Management

The Business Management Unit (BMU) manages services, numbers, accounts, and conferences in a centralized manner.

As the BMU core component, the BMU connects to the following servers to manage services, number allocations, address books, or conferences individually or in batches or Self service: Unified GateWays, CDRServer, eServer, Console server, eSpace Meeting server, and Mobile Agent Access (MAA). Table 8-1 provides batch management details.

Table 8-1 Batch management details

Item	Operation
Numbers	• Configure number allocation policies. • Add, modify, and delete Session Initiation Protocol (SIP) numbers, Plain Old Telephone Service (POTS) numbers, and H.248 numbers in batches.
Accounts	Allocate passwords and roles to accounts; add, modify, and delete accounts in batches.
Number permissions	Configure permissions for numbers in batches.
Conferences	Configure conference notification templates and prefix to conference.
Service maintenance	Configure the IP addresses and types of the services connected to the BMU.
Self Service	Provides various services, such as ONLY service, Service, CDR, and conference reservation and query.

8.2 Batch NE Configuration

The eSpace Element Management System (eSpace EMS) serves as the eSpace UC network management system to configure network elements (NEs) in batches. The NEs include Unified Gateway, Integrated Access Device (IAD), Session Border Controller (SBC), and IP phone.

Table 8-2 provides part of batch NE configuration details.

Table 8-2 Batch NE configuration details

NE	Function
Unified Gateway	• Session Initiation Protocol (SIP) trunk • Active and standby services • Call forwarding on offline
IAD	• Network parameters settings • Proxy server settings • Network management settings
SBC	• Device restart • Softswitch • Port settings
IP phone	Batch restart

8.3 Centralized NE Monitoring

The eSpace EMS monitors NEs by managing their performance and alarms.

Performance Management

Network management and maintenance personnel can check the network or service operating status during a specified period, learn about network performance trends, and optimize network performance to ensure that the network is normal.

The eSpace EMS collects and provides NE performance data for users. The users can generate reports and display the data in charts. The reports and charts help the users predict potential network risks and take proper measures to minimize the risks. The eSpace EMS monitors the performance of the following NEs:

- IAD

  CPU usage
- Unified Gateway

  E1 resource usage, Digital Signal Processing (DSP) resource usage, board's CPU usage, memory usage, transmitted bandwidth, and received bandwidth
- Server, storage device (such as disk array), database, router, switch, firewall, and load balancer
  - Hardware, such as the CPU and memory
  - Performance, such as memory usage, disk usage, and process status
  - Third-party applications, such as the database and the disk array connected to the server

The eSpace EMS displays monitor results in bar or line charts for users to easily learn about performance trends. The users then can take proper measures before a performance counter reaches the threshold to avoid potential risks.

Alarm Management

The eSpace EMS monitors network alarms in topology views, alarm panels, and alarm bar charts.

Once the eSpace EMS detects an alarm, maintenance personnel can view alarm details, acknowledge the alarm, locate the alarm, and clear the alarm. The eSpace EMS provides the following functions:

- Alarm reporting

  Maintenance personnel can trigger an alarm on an NE, and check whether the eSpace EMS can receive the alarm.
- Remote alarm notification

  Maintenance personnel can set remote alarm notification rules, including the notification condition, time, and mode. The eSpace EMS then notifies the maintenance personnel of the alarms that meet the rules through the SMS or email servers. The maintenance personnel can know the alarms on the eSpace EMS server in real time and take measures accordingly even when they are not on site. The maintenance personnel can also configure templates for the notifications sent by the SMS and email servers.
- Alarm mask

Maintenance personnel can set mask rules in the eSpace EMS for the eSpace EMS to mask alarms that they do not need.

- Alarm overflow dump

  The eSpace EMS provides the alarm overflow dump function to ensure that the database tablespace is sufficient. The eSpace EMS checks whether alarm overflow occurs according to certain conditions every day. If alarm overflow occurs, the eSpace EMS transfers and stores alarms to a specified path.

8.4 Batch NE Upgrade

The eSpace EMS upgrades NEs in batches. The NEs include Unified GateWay,IAD, SBC and IP phones.

The eSpace EMS upgrades:

- Unified GateWay

  A maximum of five gateways can be upgraded in batches.
- IADs in batches

  The eSpace EMS can upgrade the complex programmable logical device (CPLD) version (available only to the IAD132E(T) device) and NE software.
- SBC main programs
- IP phones

  IP phones connect to the Dynamic Host Configuration Protocol (DHCP) server to load version and configuration files in batches. The IP phones then are restarted on the eSpace EMS for the upgrade to take effect.

9 Security

About This Chapter

The eSpace UC solution provides multi-layer and multi-dimension security counters and have SBC and SVN deployed to ensure access security from external networks.

9.1 Multi-Level Security Management

The eSpace UC solution has multi-level security counters that can be classified into different categories.

9.2 Access Security

The SBC and SVN can be deployed in the eSpace UC solution to ensure access security.

9.1 Multi-Level Security Management

The eSpace UC solution has multi-level security counters that can be classified into different categories.

Security counters can be classified into the following categories according to network layers:

- Application layer security counters
- System layer security counters
- Network layer security counters
- Management layer security counters

Figure 9-1 shows the security maintenance layers, which are subject to different threats.

Figure 9-1 Security maintenance layers
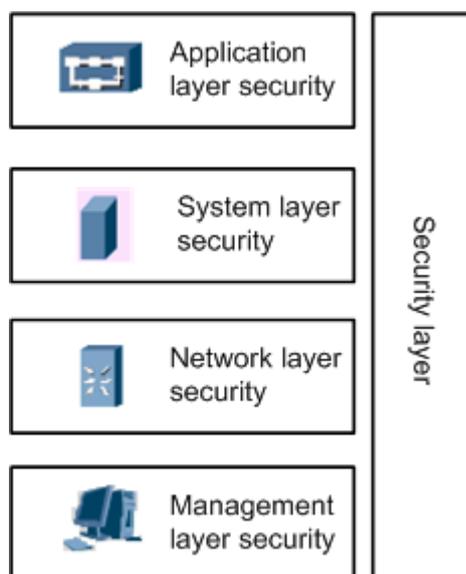
Management Layer Security

The following measures ensure the management layer security:

- Account right management

  Only the required rights are assigned to each account and an account is assigned to only one person.

- Log check and audit

  Operation and security logs for the eSpace UC solution are stored in a memory with special protection. Only the system administrator is allowed to view and audit these logs.

- System backup

  The Unified Gateway software, Unified Gateway data files, and IAD software are backed up, and the backups are stored in the flash memory of their respective boards. Users can back up and restore data manually or in the command line window. The Console system automatically backs up all enterprise address books to ensure that services are running properly.

Network Layer Security

The network layer uses the TLS1.0 and SSL3.0 protocols. The following measures ensure the network layer security:

- (Mandatory) Firewalls are configured for the eSpace UC solution.

- (Mandatory) Virtual Private Network (VPN) technology is deployed between the enterprise headquarters and its branches to ensure transmission security.

- (Optional) Signaling and media packets are encrypted when they are transmitted to ensure transmission security.

- (Mandatory) The HTTPS protocol is used to ensure application layer security.

- (Optional) Professional security solutions are deployed based on the enterprise's intranet network to ensure network security. The solutions include intrusion detection, network security scanning, and network security management.

System Layer Security

The following measures ensure the system layer security:

- Operating system security
  - Security hardening for the Windows operating system
  - Security hardening for the SuSE Linux operating system
- Database system security
  - Security hardening for the SQL Server database to protect database services
  - Security hardening for the Oracle database to protect database services
- Antivirus software deployment

  The OfficeScan software is used to protect the Windows operating system from viruses and malicious software.

Application Layer Security

The following measures ensure the application layer security:

- Password policy

  The BMU and IP phones in the eSpace UC solution comply with password policies.
- Authentication and session control

  The BMU supports identity authentication and session management.
- Password encryption and decryption

  Passwords in the BMU are encrypted and decrypted using a public encryption library. A password is encrypted cyclically 128 times using the SHA256 encryption algorithm.
- Authentication rules

  The eSpace UC complies with the principle of least privilege.
- Security log audit

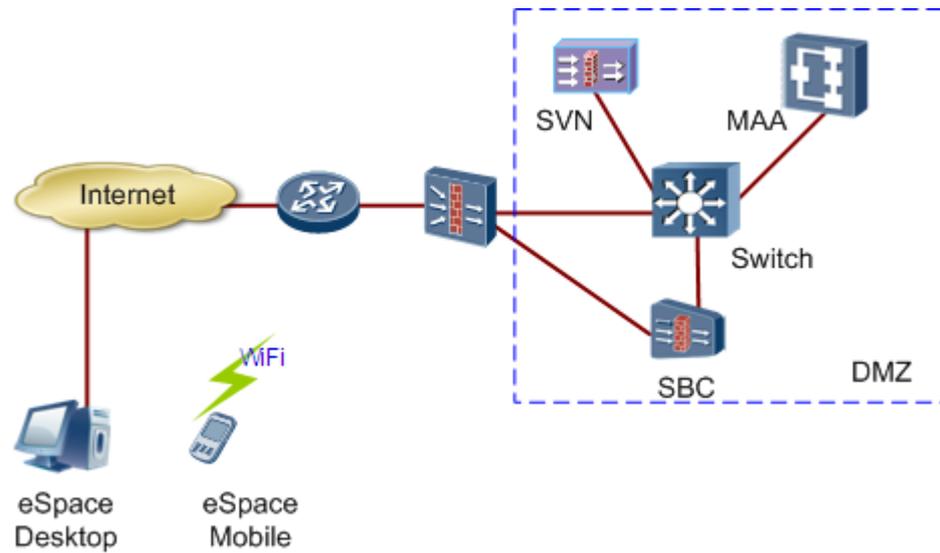 The BMU records logs about login, logout, and account management. The logs can be used for security auditing.

9.2 Access Security

The SBC and SVN can be deployed in the eSpace UC solution to ensure access security.

Network Diagram

shows the location of SBC and SVN on the eSpace UC network.

Figure 9-2 Network diagram

SBC and SVN Functions

- The SBC connects remote IP sessions and converges traffic for VoIP services in different IP domains, which ensures network security.
- The SVN provides secure channels that allow users to access the enterprise intranet from the Internet using the eSpace Desktop.

10 Technical Specifications

Technical specifications refer to performance counters related to the system processing capability.

Table 10-1, Table 10-2, Table 10-3, and Table 10-4 describe the UC capacity, Unified Gateway capacity counters, voice conference capacity counters, and data conference capacity counters.

Table 10-1 UC capacity

Capacity	eSpace UC300	eSpace UC1000	eSpace UC3000	eSpace UC10000
Max. registered users	300	1,000	3,000	10,000
Max. CDRs in a month	3,000,000	3,000,000	3,000,000	1,000,000
Max. records in an address book	30,000	30,000	30,000	30,000
Max. messages in the unified message inbox	• SIP UMS: 8,000 • Movius: 2,000,000			
Max. connections between a Console server and a Unified Gateway	30	30	30	30

Table 10-2 Unified Gateway capacity counters

Capacity Counter	eSpace U1980	eSpace U1910	eSpace U1930
Max. users	10,000	100	300

Capacity Counter	eSpace U1980	eSpace U1910	eSpace U1930
Max. concurrent intra-office calls	2,000	30	60
Max. capacity of digital trunks	900	30	60
Max. capacity of SIP trunks	2,000	30	60

Table 10-3 Voice conference capacity counters

Capacity Counter	eSpace U1980	eSpace U1910	eSpace U1930
Max. conference participants	960	12	12
Max. conferences	320	4	4
Max. participants of a conference	120	12	12

Table 10-4 Multimedia conference capacity counters

Parameter	Parameter Value
Max. concurrent data conferences	400 participants in data conferences + 400 SD video channels or 100 HD video channels in data conferences
Max. parties of a conference	Equal to or smaller than the number of concurrent participants.
Max. concurrent conferences	100