eSpace UC
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eSpace UC Solution Description

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Contents

1 Overview

About This Chapter

This topic describes Huawei's eSpace Unified Communications (UC) solution (eSpace UC for short), including its basic concept, advantages, and benefits to customers.

1.1 Introduction

eSpace UC(Unified communications) provides enterprises with a new and expanded UC experience. It enables users to access integrated audio, video, instant messaging (IM), and conferencing functions from a variety of terminals, including fixed-line phones, mobile phones, PCs, and tablets.

1.2 Advantages and Benefits

Leveraging a wide range of services, eSpace UC meets enterprise customers' requirements for improved office efficiency and increased value for customers.

1.1 Introduction

eSpace UC(Unified communications) provides enterprises with a new and expanded UC experience. It enables users to access integrated audio, video, instant messaging (IM), and conferencing functions from a variety of terminals, including fixed-line phones, mobile phones, PCs, and tablets.

By integrating the computer technology and traditional telecommunications technology, UC simplifies and integrates multiple communications modes such as text, voice, data, and video, allowing users to communicate with each other using any device, through any network, anywhere, and anytime. This substantially improves the enterprise communication and decision-making efficiency, and reduces travel expenses.

Facing the growing demands for collaborative work, eSpace UC offers enterprises unified collaboration methods for a more cooperative working environment by integrating various mobile terminals and collaborative software, such as IM, social networking, and video conferencing. These collaboration methods help enterprises improve their competitiveness, cross-regional communication, information gathering and exchange, and overall work efficiency.

1.2 Advantages and Benefits

Leveraging a wide range of services, eSpace UC meets enterprise customers' requirements for improved office efficiency and increased value for customers.

eSpace UC has the following advantages compared with other communication software:

- Mobile client

  Unlike traditional communications methods that are based on the Internet and fixed PCs, eSpace UC has great mobility, delivering seamless communication between mobile phones and PC clients.

- One number for PC clients and mobile phones

  eSpace UC, when used in tandem with a virtual private network (VPN), provides the same number for both the PC client and mobile phone, allowing users to enjoy the call service, short message service (SMS), and conference using either their PCs or mobile phones. The one-key switch function is implemented for call switching between IP phones and mobile clients, achieving information communication technology (ICT).

- Customized communications solutions

  eSpace UC provides various communications capabilities, including voice, IM, and conferencing. Users can choose communications capabilities to suit their own needs.

- Intelligent information transfer

  eSpace UC intelligently transfers information based on the status and settings of enterprise users to communicate as efficiently and conveniently as possible.

- Integration with legacy IT systems

  eSpace UC provides open interfaces for integration with existing IT systems in enterprises.

2 Architecture

About This Chapter

This topic describes the system architecture of eSpace UC.

2.1   Architecture Overview

 This topic briefly describes the system architecture and eSpace UC components.

2.2   Terminal User Layer

 The terminal user layer involves eSpace integrated access devices (IADs), IP phones, analog phones, and eSpace soft terminals.

2.3   Gateway Access Layer

 The gateway access layer involves eSpace U2900, eSpace U1900, EGW1500E, and eSpace IAD series devices.

2.4   Session Control Layer

 The media gateway controller (MGC) is deployed at the session control layer to control sessions.

2.5   Service Application Layer

 The service application layer covers Call AS, Presence, Group, and Message (PGM), Access Agent (AA), Mobile Access Agent (MAA), eSpace Meeting, Unified Message System (UMS), and eSpace Audio Recorder. They provide functions such as user status management, address book, IM, group message, voice and multimedia conferences, unified messaging, and recording.

2.6   Integration and Interconnection Layer

 The open and integration layer provides the open business gateway (OBG) for integration with multiple third-party applications.

 2.7 Management and Maintenance Layer

 eSpace UC provides various management systems for functions such as operation and maintenance, service management, and personal operations. These management systems include the eSpace element management system (EMS), Business Management Platform (BMP), eSpace Portal and eSpace Meeting Portal.

2.1 Architecture Overview

This topic briefly describes the system architecture and eSpace UC components.

eSpace UC uses a comprehensive, open, and integrated architecture in which services, call control, and data bearer are independent of each other.

eSpace UC involves multiple device types including terminals, access devices, bearer devices, softswitches, network management devices, and service management devices. These devices cooperate with each other to provide an end-to-end solution for enterprises. Figure 2-1 illustrates the system architecture of eSpace UC.

Figure 2-1 System architecture
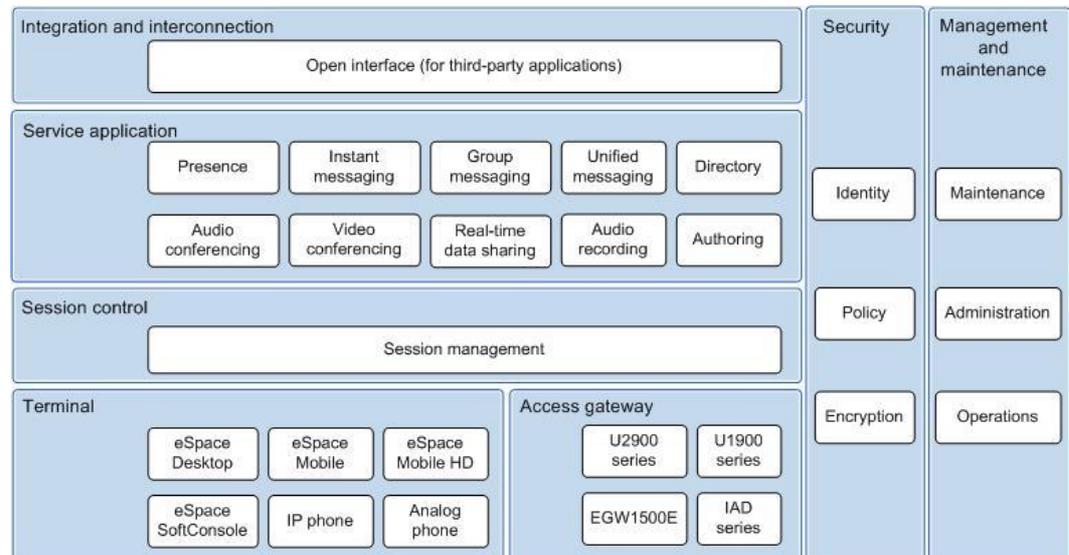
2.2 Terminal User Layer

The terminal user layer involves eSpace integrated access devices (IADs), IP phones, analog phones, and eSpace soft terminals.

eSpace Soft Terminal

An eSpace soft terminal integrates multiple communications modes, such as call, SMS, IM, instant conferencing, and self-services.

eSpace soft terminals include the following:

- eSpace Desktop

  An eSpace soft terminal used on a PC, providing services such as call, IM, and conferencing

- eSpace SoftConsole

  A type of console, through which calls from the enterprise switchboard are transferred to attendants for functions such as incoming call queuing, CLIP, and night service

- eSpace Mobile

An eSpace soft terminal used on a mobile phone, providing services such as IM, CTD, and conferencing

- eSpace Mobile HD

  An eSpace soft terminal used on an iPad, providing services such as IM, VoIP, group, and conferencing

IP Phone

An IP phone is a multimedia terminal that complies with the Session Initiation Protocol (SIP). It connects to an IP network instead of the public switched telephone network (PSTN). IP phones provide various easy-to-use functions and high-quality voice call services. An IP phone allows registration of multiple numbers and supports multiple system ring tones, supplementary services, and customizable language settings.

eSpace UC supports eSpace 7800 series IP phones. eSpace UC supports IP Phone which follow the standard SIP protocol to register by authorization code (pin code).

⚠ **CAUTION**

The eSpace 7800 series cannot be used for eSpace UC disaster recovery.

Analog Phone

An analog phone is a traditional phone that converts vibrations into an electrical frequency signal for transmission.

2.3 Gateway Access Layer

The gateway access layer involves eSpace U2900, eSpace U1900, EGW1500E, and eSpace IAD series devices.

eSpace U2900 Series

eSpace U2900 series include eSpace U2990 and eSpace U2980, and they function as access gateways in eSpace UC that provide service access, triggering, and routing functions for a large number of users. eSpace U2900 series provide users with highly efficient and reliable services based on the carrier-class highly-reliable software and hardware platforms.

eSpace U2900 series have the following features:

- Rich media resource functions, as described in Table 2-1

Table 2-1 eSpace U2900 media resource functions

Function	Description
Voice playback	Provides powerful voice playback functions and supports the following voice formats: OKI24k(VOX), OKI32k(VOX), PCMA/G711A, PCMU/G711U, G723.1, G729AB, AMR, and AMR2.

Function	Description
	Plays variable voice. The service logic specifies the types and values of variables in the voice to be played. eSpace U2900 then plays the variable voice to a user.
	Allows voice files to be loaded on a board or stored on a file server. The number of voice files that can be stored on a file server depends on the server's storage capacity.
Digit collection	Supports dual tone multiple frequency (DTMF) digit collection. eSpace U2900 can collect single- and multi-digit numbers, and support the functions of reporting the first digit, reporting a single digit, detecting timeout of the first digit, and detecting timeout between digits.
	Provides special functional keys delivered by the service logic and receives information entered by users on these functional keys to interact with users.
Digit sending	Sends DTMF digits. According to related service instructions, eSpace U2900 can send one or more DTMF digits to users.
Video	● Plays videos in Audio Video Interleave (AVI) and Third-Generation Platform (3GP) formats, and plays or records multimedia ring back tones (MRBTs). ● Supports H.263 and Moving Picture Experts Group-4 (MPEG-4), H.264 video codec formats, and Common Intermediate Format (CIF) and Quarter CIF (QCIF) image formats. The video bit rate ranges from 64 kbit/s to 384 kbit/s. ● Supports video recording, playback, pause, resume, and fast forward.
Fax	● Supports the T.30 fax service. ● Supports the T.38 fax service. ● Supports transparent fax transmission.
Conference	● Supports interactive voice response (IVR) conferences. ● Creates and deletes conferences. ● Provides conference operation interfaces, such as voice playback and recording, text to speech voice playback, and volume adjustment, for upper-layer ASs. ● Provides interfaces for upper-layer ASs to modify conference channel attributes. ● Provides interfaces for upper-layer ASs to dynamically modify the conference capacity and detect the conference speaker.

- Smooth expansion capability

  Fully scalable to customers' future expansion requirements in hardware and system capability design, and supports smooth capacity expansion.
- Energy saving and emission reduction

  Allows operators to customize policies (energy saving status, mode, and time) towards specific methods on energy saving practices. The system dynamically adjusts the

operating frequency of boards or even powers off the boards according to the call traffic, greatly reducing the system power consumption and meeting energy saving requirements.

eSpace U1900 Series

eSpace U1900 series include eSpace U1910, eSpace U1930, and eSpace SoftCo9500, which function as small- and medium-capacity access gateways in branches. Terminals in a branch are registered with eSpace U1900 series to use its basic call services when the branch disconnects from enterprise headquarters.

eSpace U1900 series have the following features:

- Different packet exchange protocols to allow IP-based terminals to connect to eSpace U1900 series: VoIP control protocols such as SIP, VoIP transmission protocols such as Real-time Transport Protocol (RTP), and T.30 and G.711 transparent transmission fax protocols.
- Rich embedded IVR resources for voice playback and two-stage dialing
- High quality voice and video data transmission with the support of various codecs, jitter buffer, echo cancellation (EC), silence suppression, comfort noise generation (CNG), automatic gain control, and packet loss compensation (PLC).
- Backup, and hot swapping for the power module, and hot swapping for boards

EGW1500E

As a part of eSpace UC, EGW1500E is deployed in small branches of enterprises. Functioning as the access gateway in the small branches, EGW1500E works with the central node of the enterprise headquarters to process eSpace UC services.

EGW1500E has the following features:

- Various port types and flexible network

  Provides multiple uplink ports for networks in different uplink modes, and also provide user ports to establish flexible office networks.
- High quality voice services

  Functions as a small IP private branch exchange (PBX) or FXO device to connect to voice devices such as analog phones, IP phones, IADs, and multimedia soft terminals, achieving voice functions inside enterprises. In addition, it can serve as agents to register users with the IP Multimedia Subsystem/Next Generation Network (IMS/NGN) or the PSTN network to implement outer-office calls.

  Support Voice Activity Detection (VAD), CNG, EC, packet loss compensation, and jitter buffer, providing users with highly efficient and high-quality voice services.
- Strong security

  Provides multiple technologies to enhance network security. These technologies include VPN (establishing secure connections between branches and the headquarters to ensure secure transmission of communication data), uniform resource locator (URL) filtering, network address translation (NAT, allowing users with private IP addresses to access the Internet, and prohibiting users with public IP addresses from accessing the private network to protect the intranet), and demilitarized zone (DMZ).
- High reliability

  Supports the following reliability specifications: reliability: > 99.99%; mean time between failures (MTBF): > 50 years; mean time to repair (MTTR): < 3 minutes.

● Easy maintenance

Supports configuration and management on web pages or in TR-069 mode.

eSpace IAD

An eSpace IAD is a voice over IP (VoIP) and fax over IP (FoIP) media access gateway. It connects analog phones to the eSpace UC voice network, and provides highly efficient and high quality voice services using the global IP network.

VoIP and FoIP functions are implemented by employing standard voice codec and compression techniques. The eSpace IAD encodes voice signals, encapsulates them into IP packets, and sends the IP packets to a specified media gateway through the IP network. When the IP packets reach the destination, the destination eSpace IAD performs reverse processing to restore the IP packets to voice signals.

eSpace UC provides the following eSpace IAD models to satisfy different customer needs:

● eSpace IAD102H

● eSpace IAD104H

● eSpace IAD208E(M)

● eSpace IAD132E(T)

● eSpace IAD1224

2.4 Session Control Layer

The media gateway controller (MGC) is deployed at the session control layer to control sessions.

The MGC is integrated into eSpace U2900 to control sessions. The MGC processes signaling and manages sessions for multimedia conferences.

2.5 Service Application Layer

The service application layer covers Call AS, Presence, Group, and Message (PGM), Access Agent (AA), Mobile Access Agent (MAA), eSpace Meeting, Unified Message System (UMS), and eSpace Audio Recorder. They provide functions such as user status management, address book, IM, group message, voice and multimedia conferences, unified messaging, and recording.

Call AS

eSpace UC uses the Call AS at the session control layer to provide enterprise terminals with basic call functions and supplementary services including advanced secretary, enterprise switchboard, and console services.

PGM

The PGM provides presence, group, and messaging capabilities and interacts with terminals to provide a rich service experience with functions including IM, user status display, and address book.

MAA

The MAA has the following functions:

- Interface conversion

  The MAA is the eSpace CC capability service interface and provides unified Transmission Control Protocol (TCP) access for mobile clients through interface conversion.

- Session maintenance for clients

  The MAA generates a session for each mobile client connected to it, and maintains the session status according to the status of mobile clients.

- Service processing

  The MAA processes service logic, such as the heartbeat mechanism, reconnection after a transient disconnection, and IM timeout processing.

eSpace Meeting

The eSpace Meeting provides conferencing functions, including voice and multimedia conferences.

- Voice conference

  The eSpace Meeting supports instant and scheduled voice conferences. It provides a distributed conference system to allow users to join a remote conference locally, which reduces the bandwidth usage.

- Multimedia conference

  The eSpace Meeting provides functions such as e-whiteboard, program sharing, document sharing, and e-voting. Video conferences can be held using terminals with cameras.

UMS

The UMS provides functions including voice mailbox, message waiting indicator (MWI), and message retrieval.

eSpace Audio Recorder

The eSpace Audio Recorder has the following features:

- Modular design. It has the following modules: Integrated Management Platform (IMP) module, recycle module, backup module, and alarm module. Users can select modules to suit their specific requirements.
- Hot backup redundancy for core components such as SIP servers and recording servers. If the active SIP server fails, the system automatically switches to the standby SIP server, ensuring the integrity of recorded data and improved system security. The recording server cluster employs load balancing so that the failure of a single recording server does not affect the recording in the cluster.

2.6 Integration and Interconnection Layer

The open and integration layer provides the open business gateway (OBG) for integration with multiple third-party applications.

eSpace UC is an open and integrated solution that offers enhanced voice and data capabilities. eSpace UC uses the OBG to support eSpace UC services, telecommunications capabilities (such as SMS service), and third-party applications for enterprises.

The OBG provides a standard software interface to develop applications without an in-depth understanding of the internal service processes on eSpace UC components.

2.7 Management and Maintenance Layer

eSpace UC provides various management systems for functions such as operation and maintenance, service management, and personal operations. These management systems include the eSpace element management system (EMS), Business Management Platform (BMP), eSpace Portal and eSpace Meeting Portal.

eSpace EMS

eSpace EMS is a lightweight and large-capacity network management system for both local and centralized management in enterprises. It provides comprehensive management functions, including topology, fault, and performance management, for all eSpace UC components.

Figure 2-2 shows the main eSpace EMS page.

Figure 2-2 eSpace EMS
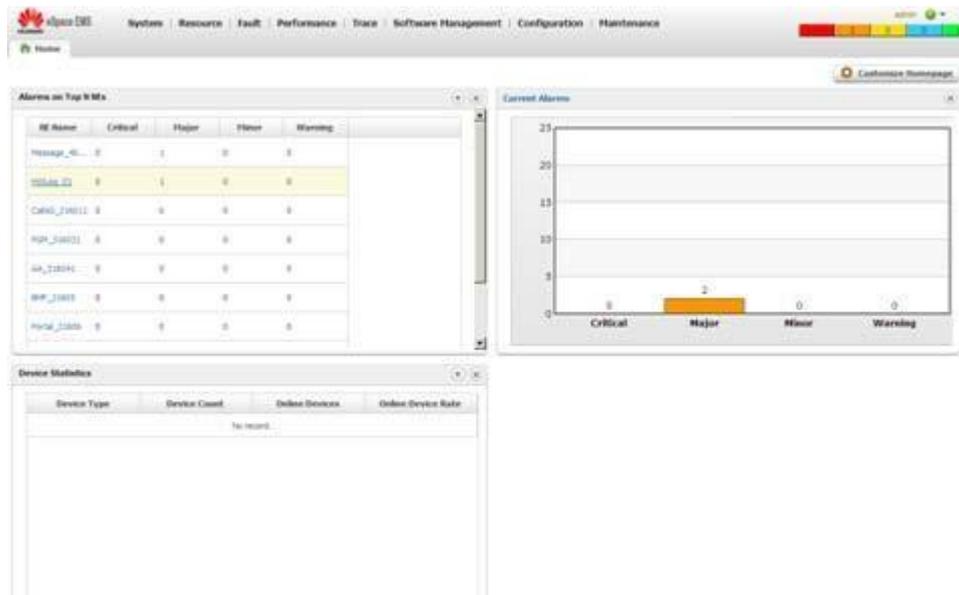
BMP

The BMP provides basic service management capabilities including rights management, data synchronization, and service provisioning.

The BMP allows enterprise administrators to maintain enterprise information, register and deregister enterprise members, configure enterprise services, and query call detail records (CDRs).

Figure 2-3 shows the main BMP page.

Figure 2-3 BMP
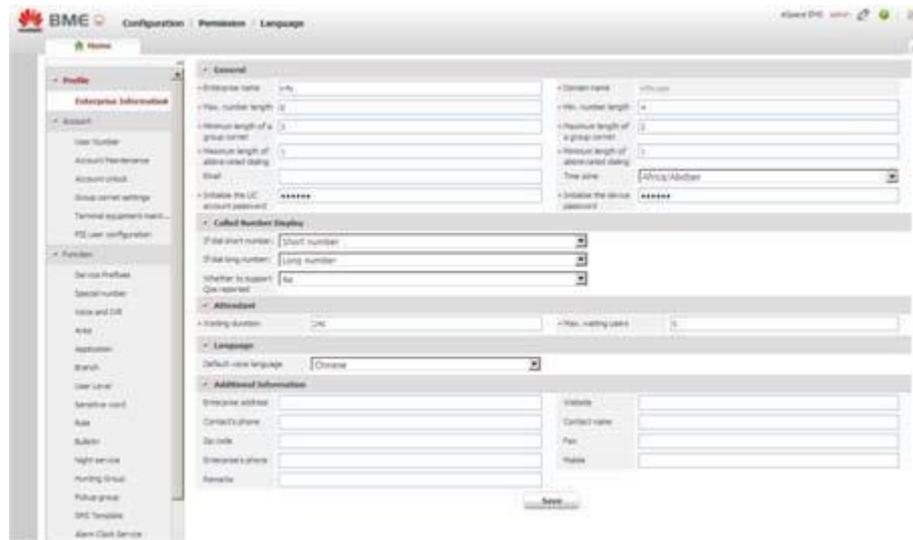
eSpace Portal

The eSpace Portal is provided for registered users in an enterprise.

A registered user can maintain personal information and set service functions such as Do-Not-Disturb (DND), call transfer, and advanced secretary after logging in to the eSpace Portal.

Figure 2-4 shows the main eSpace Portal page.

Figure 2-4 eSpace Portal
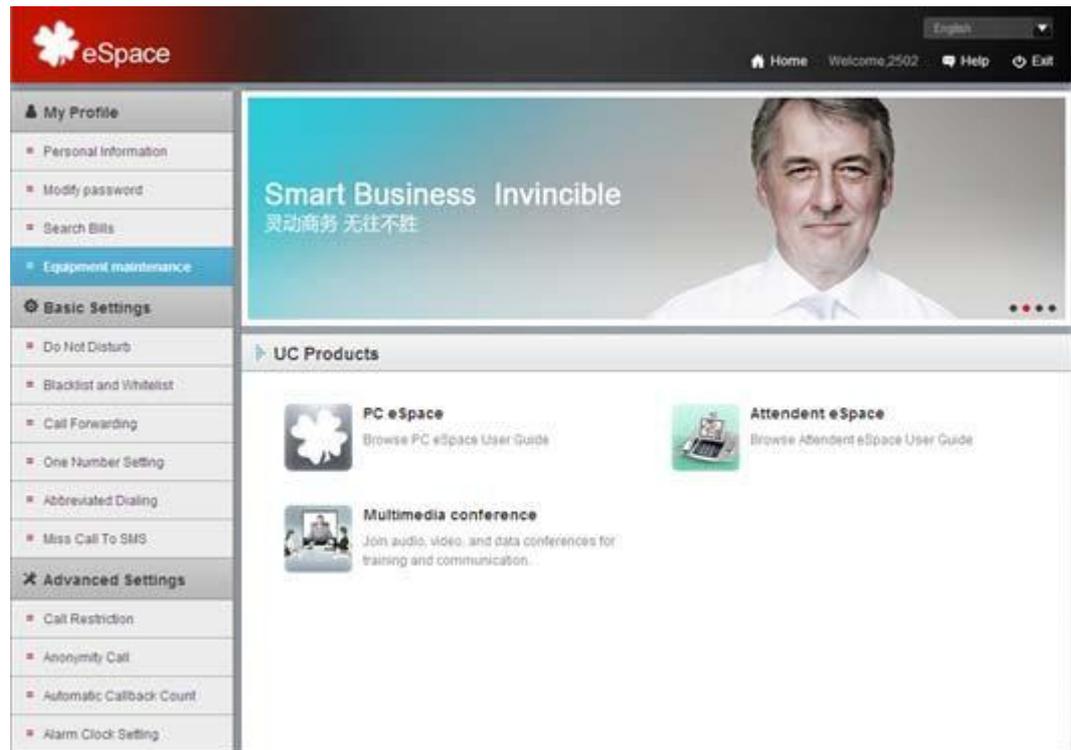
eSpace Meeting Portal

The eSpace Meeting Portal allows enterprise users to create instant conferences and scheduled conferences, and manage those conferences. When creating a conference, users can set conference information including the topic, duration, and participants.

Two types of conferences are supported: voice conference and multimedia conference.

Figure 2-5 shows the main eSpace Meeting Portal page.

Figure 2-5 eSpace Meeting Portal
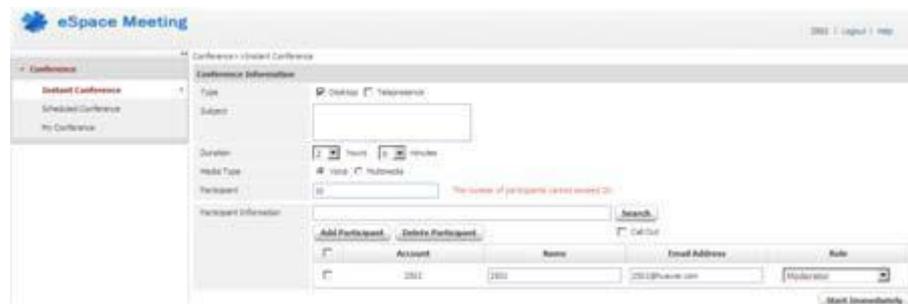
3 **Typical Networks**

About This Chapter

This topic describes all typical eSpace UC networks.

3.1 Two-Center Network

This topic describes an eSpace UC two-center network.

Network Description

eSpace UC supports remote disaster recovery. Two centers are deployed for remote disaster recovery: a production center and a disaster recovery center. Figure 3-1 shows the two-center network.

Figure 3-1 Two-center network
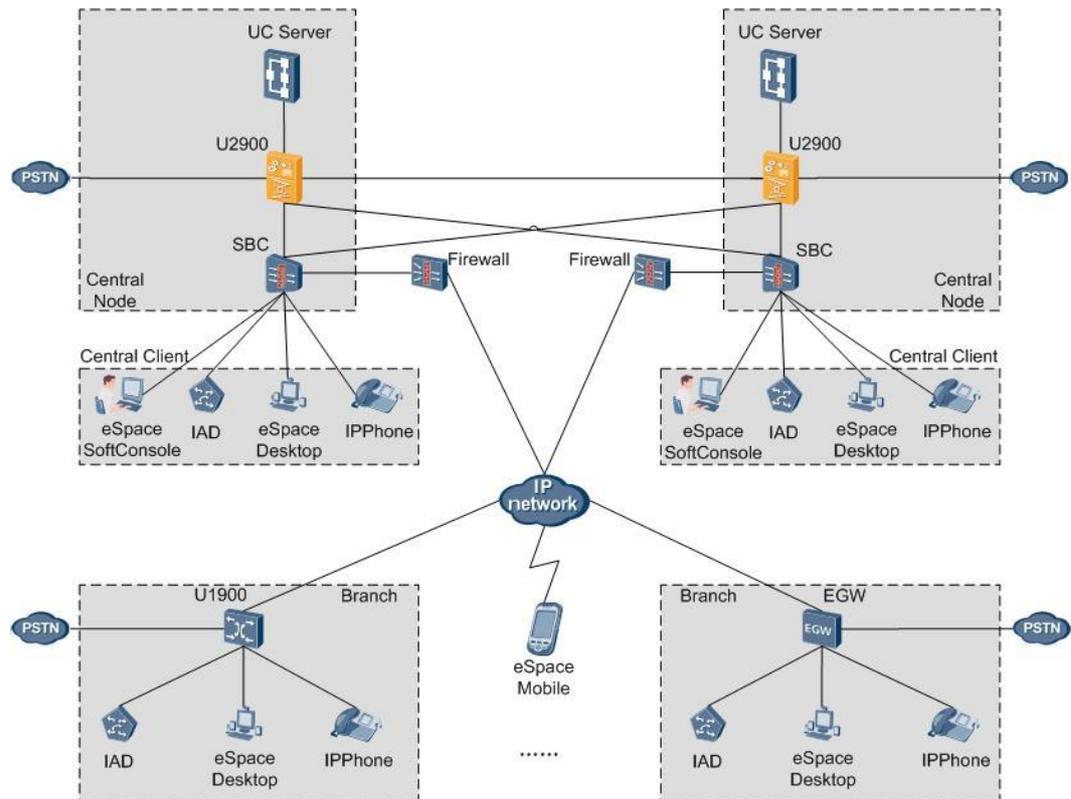
Network application:

- There is a production center and a disaster recovery center. Under normal conditions, the production center is responsible for service operation. When any fault occurs in the production center due to factors such as natural disasters, the system switches services to the disaster recovery center which takes over operations and management, preventing service interruption and improving system reliability.

- eSpace U1900 series and EGW1500E are deployed in branches as local gateways, routing calls to the PSTN and supporting local outgoing calls and local regeneration.

- Some types of servers (for example, the eSpace Meeting) can be deployed in branches, where local clients can connect to them (instead of to the enterprise headquarters' servers) to use multimedia conference resources. This reduces signaling and media roundabouts and decreases traffic load on the headquarters network.

Technical Requirements

Different gateways support different numbers of users, as described in Table 3-1.

Table 3-1 Number of users supported by different gateways

Node		Gateway	User Capacity	
Central Node		eSpace U2990	Supports a maximum of 300,000 users.	
		eSpace U2980	Supports a maximum of 50,000 users.	

Node	Gateway	User Capacity
Branch Node	eSpace SoftCo9500	Supports a maximum of 10,000 users.
	eSpace U1930	Supports a maximum of 300 users.
	eSpace U1910	Supports a maximum of 100 users.
	EGW1500E	Supports a maximum of 20 SIP users and 4 analog phone users.

□ NOTE

In normal situations, the two centers both work. However, when disaster recovery switching is triggered by a node failure, the functional node will take over all users, causing high bandwidth usage. Therefore, you are advised to use a high-bandwidth network for two-center network deployment.

3.2 Single-Center Network

This topic describes an eSpace UC single-center network.

Network Description

Figure 3-2 shows the single-center network.

Figure 3-2 Single-center network
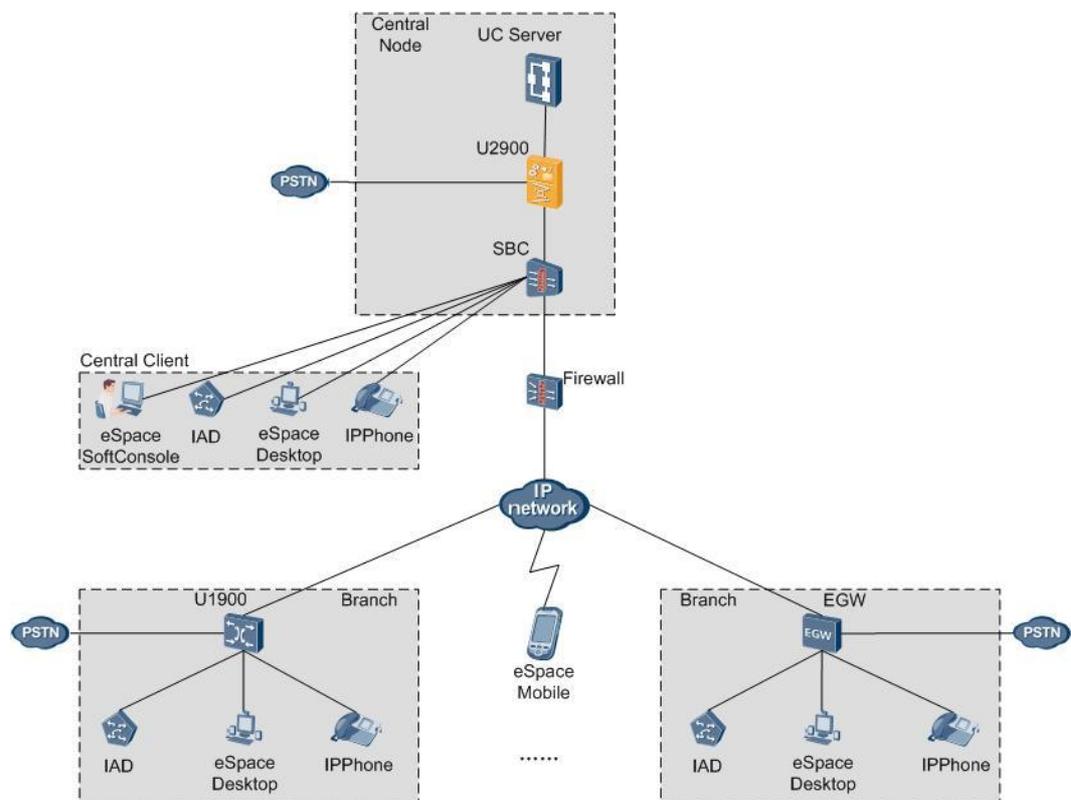
Technical Requirements

Table 3-1 describes the number of users supported by each gateway in a single-center network.

3.3 All-in-One Network

This topic describes an eSpace UC all-in-one network.

Network Description

An all-in-one network applies to the scenarios in which a maximum of 3000 users are served. In an all-in -one network, all services are deployed on only one eSpace U2980, saving equipment room space.

The all-in- one network has the same topology as the single-center network. Figure 3-3 shows an eSpace U2980 all-in-one network.

Figure 3-3 All-in-one network

Service servers (including Call AS, eSpace Meeting, PGM and AA) and management servers (including BMP and eSpace EMS) are deployed on the General Server Unit (GSU) boards of the eSpace U2980. The service servers provide unified communications services such as the voice, conference, message, and address book services. The management servers manage the system and users, and query alarm and statistical information.

Technical Requirements

An all -in-one network supports a maximum of 3000 users. The number of boards required varies with the user capacity. Table 3-2 provides the mapping between the number of boards and the number of users supported.

Table 3-2 Mapping between the number of boards and the number of users

Board	< 500 Users	500-1000 Users	1000-3000 Users
OMU	1	1	1
SGU	1	1	2
MSU	1	1	2
GSU	3	3	3
CIU	1	1	1
SMU	1	2	2

3.4 IMS Network

This topic describes an eSpace UC IP Multimedia Subsystem (IMS) network.

Network Description

IMS is a standardized NGN architecture for network convergence. Specially designed for carrier networks and carrier services, the IMS can meet high-level capacity and scalability requirements.

In eSpace UC, the IMS and eSpace U2900 series gateway (eSpace U2990 and eSpace U2980) are deployed in a unified manner, as shown in Figure 3-4.

Figure 3-4 IMS network
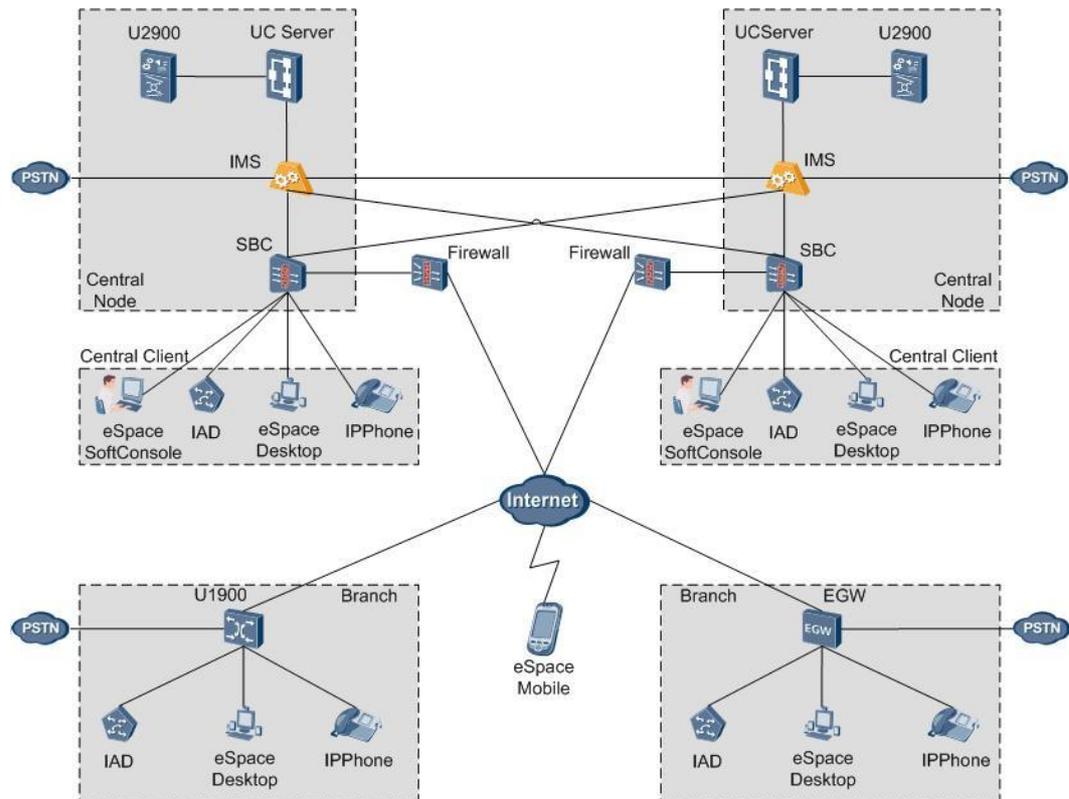
Network application:

● The eSpace U2900 series function as the voice gateways and process voice services.

● The IMS works as the service gateway and handles service processes. It provides functions such as registration, authentication, session path control, service triggering, topology hiding, resource control, and interoperation.

● In branch nodes, the eSpace U1900 series, EGW1500E, and eSpace IAD interoperate with the IMS using SIP.

Technical Requirements

The number of users supported in the IMS network is the same as that supported by the eSpace U2900 series in the dual-center network, as listed in Table 3-1.

4 Features

About This Chapter

This topic describes the eSpace UC features.

4.1 Overview

 eSpace UC provides diverse services and functions, including IP Technology (IPT), UC, unified messaging and terminal services.

4.2   IPT Services

 This topic describes the available IPT services and their features.

4.3   UC Service

 This topic describes the functions and application scenarios of the UC service.

4.4   Unified Messaging

 This topic describes the functions and typical scenario of the unified messaging service.

 4.5 Terminal

 This topic describes the eSpace terminals supported in eSpace UC, including eSpace Desktop, eSpace Mobile, eSpace Mobile HD, and IP phone.

4.1 Overview

eSpace UC provides diverse services and functions, including IP Technology (IPT), UC, unified messaging and terminal services.

Table 4-1 describes the services provided by eSpace UC.

Table 4-1 Service overview

Service	Description	
IPT	Includes basic voice services, supplementary services, SoftConsole, and CDR.	
UC	Includes multimedia conference, one number link you	

Service	Description
	(ONLY), status display, and IM.
Unified messaging	Includes voice mailbox, fax mailbox, and message leaving.
Terminal	Includes eSpace Desktop, eSpace Mobile, eSpace Mobile HD, and IP phone.

4.2 IPT Services

This topic describes the available IPT services and their features.

4.2.1 Basic Voice Services

With basic voice services, users may make basic voice calls to each other.

Table 4-2 describes the basic voice services.

Table 4-2 Basic voice services

Service		Description
Voice call	Intra-office call	Intra-office users can use various eSpace UC-supported terminals to make calls to each other.
	Inter-office call with a PSTN	eSpace UC uses the Primary Rate Interface (PRI), and SS7 digital trunks to connect to the PSTN. Intra-office users can make calls according to their call rights (for example, local calls and national toll calls).
	IP inter-office call	eSpace UC connects to the IP PBX or softswitch through a SIP trunk or SIP registration. Voice calls can be made between intra-office users and users of other devices.
Point-to-point (P2P) video communication		eSpace UC supports the following P2P video communication features: • SIP-based P2P multimedia communication • Inter-office P2P video calls through the SIP trunk and intra-office P2P video calls
Call rights control		eSpace UC specifies four different call rights: intra-office calls, local calls, national toll calls, and international toll calls.
Voice playback		eSpace UC plays different announcements, including basic connection tones and supplementary service tones, to instruct users on how to use services.
Number analysis and processing		eSpace UC provides the following features for number analysis and processing: • Analyzes and processes regular numbers containing

Service	Description
	- a maximum of 32 digits and an intra-office short numbers containing a maximum of 20 digits. - Analyzes call types according the number information of calling or called parties, such as the country code and area code. - Modifies phone numbers for outgoing calls. The number length after modification cannot exceed the maximum number of digits.
Long and short number	Internal numbers in an enterprise are short numbers, and public network numbers are long numbers. Users inside an enterprise can make calls to each other using short numbers. A short number ranges from 4 to 20 digits and is unique within the enterprise.
Group short number	eSpace UC supports creation of virtual groups. Users in different enterprises can join a virtual group. Users in the group are assigned group short numbers and can make calls to each other using these short numbers.
Fax	eSpace UC uses UMS for electronic faxing.

4.2.2 Supplementary Voice Services

Supplementary voice services expand users' voice service experience through the addition of a variety of additional services and features.

eSpace UC provides multiple supplementary voice services, as described in Table 4-3.

Table 4-3 Supplementary voice services

Service		Description
Local number query		Users can dial a specified prefix to query the local number.
Calling line identification (CLI) services	Calling line identification presentation (CLIP)	CLIP allows a calling party to specify how to display the calling number on specified terminals, such as whether to display the short number, long number, or name. Users can flexibly set the calling number display mode based on enterprise requirements.
	Caller ID feature	The caller ID feature allows a called party to specify whether to display the calling number on the terminal. If this service is not activated, **Unknown** is displayed on the terminal. If this service is activated, the calling number is displayed.
Calling line identification restriction (CLIR)		If a calling party activates this service, the calling number will not be displayed on the called party's phone.
Calling line identification restriction override		If a called party activates this service, the calling number will be displayed on the called party's phone regardless of whether

Service		Description
(CLIRO)		the calling party has activated the CLIR service. This service is available only when the caller ID feature is already enabled for the called party.
CLIR rejection		If a called party activates this service, the called party's phone automatically rejects any call where the calling party has activated the CLIR service.
Call forwarding services	Call forwarding unconditional (CFU)	If a user activates this service, all incoming calls are forwarded to a specified number regardless of user status.
	Call forwarding busy (CFB)	If a user activates this service, all incoming calls are forwarded to a specified number when the user is busy.
	Call forwarding on no reply (CFNR)	If a user activates this service, all incoming calls are forwarded to a specified number when the user does not answer the call within the no-reply duration.
	Call forwarding offline (CFO)	If a user activates this service, all incoming calls are forwarded to a specified number when the user is offline.
	Call forwarding conditional (CFC)	If a user activates this service, all incoming calls are forwarded to a specified number according to the following preset forwarding conditions: ● Calling number ● Time of day ● User type (intra-office or outer-office) ● User status, such as busy, no reply, offline, and DND
Call forwarding denial		This service allows a user to reject a forwarded call and play an announcement for the calling party. Only forwarded calls are rejected.
Call transfer		This service allows a user to transfer an ongoing call to a third party. Calls can be transferred in the following modes: blind transfer, transfer upon inquiry, and call deflection. Both the calling and called parties can transfer calls.
Call hold	Hold a single call	This service allows a user to put an ongoing call on hold and take it off hold.
	Hold multiple calls	This service is available for intelligent SIP terminals that support the multi-call function and allows a user to put multiple calls on hold simultaneously.
Call park		This service allows a user to put a call on hold on one IP phone and take the call off hold on another intra-office IP phone. If the user does not resume the call within the specified

Service		Description
		period, the call is released and the party on hold hears a busy tone.
Call waiting		This service allows a user already on a call to hear a call waiting tone when a third party calls the user. The user can choose to accept, reject, or ignore the new call.
Three-party conversation		This service allows a calling or called party to initiate a call to a third party without ending the current conversation. The party who initiates the call can then start a three-party conversation or talk to the other two parties separately.
Password change		This service allows a user to change the password following the dialing rule *service prefix*old password*new password*confirm password*. The confirm password must be the same as the new password.
Password-based call restriction		After a user sets a password for a phone, the phone can be used only when the correct password is entered. This password is also used to adjust call rights, change passwords, and activate services remotely.
ONLY		This service enables multiple terminals belonging to a single user to display the same primary number to the calling or called party and to share supplementary services.
Abbreviated dialing		This service allows a user to dial a one-, two-, or three-digit abbreviated code instead of a complete called number to connect to the called party.
Pickup	Co-group pickup	This service allows a user in a pickup group to dial a pickup access code and answer calls for any members of the group.
	Designated pickup	This service allows a user to dial a pickup access code and the phone number of a ringing terminal to answer the call.
Automatic callback (ACB)		If user A, for whom the ACB service has been enabled, calls intra-office user B, but user B is busy or does not answer the call, user A can activate the ACB service and hang up the phone. The system can automatically initiate a call to user A when detecting that user B is available.
Advanced Secretary		The advanced secretary service allows the manager and the secretary to share a line. The secretary answers incoming calls on behalf of the manager and if the manager agrees to answer, forwards them to the manager. The manager can see information about all incoming calls and directly answer important calls without the transfer of the secretary.
DND		If a user activates the DND service, a DND announcement will be heard when someone calls. Outgoing calls made by the user are unaffected.
Automatic switchboard		This service allows an enterprise to set a number as an automatic switchboard and forward all incoming calls to that number. The switchboard provides the following functions:

Service	Description
	• Plays the enterprise introduction announcement.
	• Plays the menus.
	• Forwards calls to an extension number.
	• Forwards calls to the destination number.
	• Forwards calls to an attendant.
	• Activates or deactivates a service.
	Enterprise greetings can vary according to time of day.
	When a called party hangs up the phone on an extension, the switchboard replays the voice menu for the calling party.
Call right	An enterprise can assign call rights (such as the right to make national and international toll calls) to users, and those users can only make calls permitted by the enterprise.
Call restriction on an incoming trunk	A trunk tandem call is an incoming call forwarded outside the office through a trunk.
	Call restriction on an incoming trunk restricts trunk tandem calls.
	This function prevents outer-office users from calling the enterprise switchboard and using the switchboard's extension function to forward the call to an outer-office number.
Distinctive ring tone	This service allows the ring tone to vary according to calling party type.
	• Different ring tones can be set for outer-office and intra-office calling parties.
	• A special ring tone can be set for the ACB service.
	• Different ring tones can be set for numbers and groups in the local address book.
Remote service activation	A user can dial the access code for remote service activation and activate or deactivate services as prompted.
Deactivation of all services	This service allows a user to deactivate all active supplementary services on the phone. Basic service rights are unaffected.
Hunt group	Colleagues or individuals in the same field can be added to a hunt group. When a user dials the access code of the group, the terminals of the group members ring simultaneously or sequentially.
Missed-call notification by SMS messages	With this service, information about a user's missed calls is sent to a preset mobile number as an SMS message.
Blacklist and whitelist	This service allows a user to set a blacklist and a whitelist for incoming calls.
CDR	This service generates CDRs for calls made between users in an enterprise.
	Enterprises can use CDRs to view enterprise user call

Service		Description
		information and to check call fees with carriers.
Private list		This service allows a user in DND state to answer calls from important users in the private list.
One-key switch		This service allows a user to switch an ongoing call from one terminal to another by clicking the corresponding icon and entering the number of the target terminal. One-key switch is available for call switching between eSpace Desktop, IP phone, and eSpace Mobile.
Special service numbers		Three types of special service numbers are available: ● Emergency number An enterprise can set emergency numbers such as 911 as special numbers. Intra-office users need to add an outgoing prefix to call these special numbers. ● System blacklist An enterprise can add numbers to the blacklist. When intra-office users dial blacklisted numbers, the system automatically releases the calls. ● Conference access code Users need to enter the conference access code to participate in a conference.
Concurrency control		An enterprise administrator can specify the maximum number of concurrent calls, audio conferences, and video conferences in an enterprise based on the site requirements.
SoftConsole		The service allows attendants to perform related functions on the SoftConsole after a login. These functions include login, logout, call transfer.
Night service		This service forwards all calls received in a specified time segment at night to a preset night service number or night service group.
Hotline	Instant hotline	This service automatically connects a terminal or analog phone to a preset phone number (hotline number) when the user does not dial any number after a pickup.
	Delayed hotline	This service automatically connects a terminal to a preset phone number (hotline number) when the user does not press any key within the preset delay time or directly presses the pound key (#) after pickup.
Alarm clock		A terminal with the alarm clock service activated can ring automatically at a preset time.
Follow me		A user activating this service can set several forwarded-to numbers. When the user's main number is busy or does not respond, the call will be forwarded to the preset forwarded-to numbers one by one until the call is answered.
VoIP availability		The system plays a call restriction announcement for calls

Service	Description
notification	Attempting to connect to VoIP call-prohibited areas.
Collect Call Service	When a user dials a collect call service access code to call another user, the called user pays for the call after receiving the call. The IP PBX blocks the call to avoid paying.
Extension mobility	This service allows a user login the system by extension number and password in any place through any IP extension. In this way, user can use the personal service binding to the extension number.

4.2.3 Voice Conference

This topic describes the functions and typical scenario of the voice conference service.

Function

The voice conference service allows three or more users to make a conversation.
Voice conferences can be classified into scheduled conference and instant conference.

● Scheduled conference

A user can reserve a voice conference and configure conference information such as the number of participants, start time and end time, and conference topic. Participants join the conference when the conference time arrives. After the conference is reserved, the user can notify participants of the conference by emails or SMS messages.

● Instant conference

A user can hold an instant conference using the eSpace soft terminal or reserve and hold an instant conference on the eSpace Meeting Portal.

Table 4-4 describes the classification and functions of the voice conference service.

Table 4-4 Voice conference functions

Service		Description	
Scheduled conference	Conference through individuals dialing-in	Participants dial a preset conference access code and enter the conference ID and password as prompted to join a conference.	
	Conference through moderator convening	After dialing the conference access code and joining the conference, the moderator dials participants' phone numbers on the terminal to invite participants to join the conference.	
	Conference through system convening	The user who reserves the conference configures a participant list before the conference is held. When the conference time arrives, the system automatically dials all participants in the participant list. The participants join the conference after answering the call.	
Instant conference		An instant conference can be initiated in either of the following two ways:	

Service	Description
	- On the eSpace soft terminal On the **Conferences to Join** page, click **Instant Conference**, and select participants to form a temporary group. On the **Temporary Group** page, click **Call** to start an instant conference. - On eSpace Meeting Portal On the eSpace Meeting Portal, set conference information including the topic, duration, and participants. and click **Start Immediately** to start an instant conference.

Typical Scenario

User A wants to hold a routine project conference with user B and user C. User A then creates an instant voice conference on the eSpace Desktop following the steps below:

1. User A creates a temporary group.

   User A enters the number of user B on the eSpace Desktop and sends an IM to user B. User A then adds user C in the IM window. The temporary group is created.

2. User A initiates the call in the temporary group

   window. User B and user C answer the call.

3. User A, user B, and user C discuss their project affairs.

   During the conference, user A can add participants, delete participants, and perform other conference control operations (for example, removing a participant from the conference, inviting a participant to the conference, and allowing or forbidding a participant to speak by a right-click on the participant).

4. After the conference is finished, user A clicks **Hang Up**.

4.2.4 Automatic Switchboard

This topic describes the functions and typical scenario of the automatic switchboard service.

Function

The automatic switchboard service allows an enterprise to set an automatic switchboard number and forward all incoming calls to the number. The switchboard can play the enterprise introduction announcement and menus, forward calls to a destination number, an extension number, or an attendant, and activate or deactivate services.

An enterprise administrator can customize the enterprise switchboard number and enterprise greeting.

Typical Scenario

The switchboard number of an enterprise is 400111 and the voice menus are defined as follows:

- Press **1** to learn about the enterprise introduction.

- Press **2** to dial an extension number.

- Press **3** to forward the call to the destination number.

- Press **4** to activate or deactivate a service.

- Press **5** to forward the call to an attendant.

User A outside an enterprise wants to contact user B inside an enterprise due to some emergencies, and user A knows the extension number of user B. The call process is as follows:

1. User A dials the enterprise switchboard number.

   User A hears enterprise greetings and then the switchboard menus.

2. According to the announcements, user A dials **2#**.

   The system prompts user A to dial an extension number.

3. User A dials the extension number of user B.

   User A is successfully put through to user B. The enterprise switchboard process is complete.

4.2.5 Advanced Secretary

This topic describes the functions and typical scenario of the advanced secretary service.

Function

The advanced secretary service allows the manager and the secretary to share a line. The secretary answers incoming calls on behalf of the manager and if the manager agrees to answer, forwards them to the manager. The manager can see information about all incoming calls and directly answer important calls without the transfer of the secretary. The manager role and secretary role are defined as follows:

- The manager is an employee in an enterprise and is enabled with **Secretary service** functions.
- The secretary is an employee in an enterprise and is enabled with the **Secretary station** function.

The secretary needs to set the phone type and phone line number, and associates them with the manager's phone type and phone line number on the personal Portal.

Typical Scenario

Enterprise user A wants to contact user B (manager of the product department) who has a secretary (user C). The call process is as follows:

1. User A dials the number of user B.

   Both user B and user C receive the call of user A.

2. User C answers the call when user B is absent.

   Then user C starts talking with user A.

4.2.6 Blacklist and Whitelist

This topic describes the functions and typical scenario of the blacklist and whitelist service.

Function

The blacklist and whitelist service allows users to set a blacklist or whitelist for incoming calls. Table 4-5 describes the classification and functions of the blacklist and whitelist service.

Table 4-5 Blacklist and whitelist service functions

Service	Description
Blacklist for incoming calls	Calls from numbers in the blacklist will be automatically rejected. Users can answer calls from non-blacklisted numbers.
Whitelist for incoming calls	Only calls from numbers in the whitelist can be received. Calls from non-whitelisted numbers are released.

Typical Scenario

Enterprise user A enables the blacklist and whitelist service but only uses the blacklist for incoming calls. User A blacklists the numbers of user B and user C. The call process is as follows:

1. User B calls user A.

    The system plays the call restriction announcement to user B and releases the call.

2. User D whose number is not blacklisted calls user A.

    User A answers the phone and talks with user D.

Enterprise user A enables the blacklist and whitelist service but only uses the whitelist for incoming calls. User A whitelists the numbers of user B and user C. The call process is as follows:

1. User B calls user A.

    User A answers the phone and talks with user B.

2. User D whose number is not whitelisted calls user A.

    The system plays the call restriction announcement to user D and releases the call.

4.2.7 Follow me

This topic describes the functions and typical scenario of the follow me service.

Function

The follow me service allows a user to set several forward-to numbers. When the main number of this user is busy or does not respond, the call will be forwarded to the preset forward-to numbers one by one until the call is answered. The follow me service supports only sequential ringing. A user can set the ringing priorities for the forward-to numbers.

Typical Scenario

Enterprise user A activates the call forwarding service and follow me service. User A sets the office phone as the main terminal, and sets the lab phone number and mobile phone number as the forward-to numbers (the lab phone number has a higher priority than the mobile phone number). The call process is as follows:

1. User B dials user the main number of user

    A. The office phone of user A rings.

2. When the office phone is not answered, the lab phone of user A rings.

3. When the lab phone is not answered, the mobile phone of user A rings.

4. User A answers the phone and talks with user B.

4.2.8 eSpace SoftConsole

This topic describes the functions and typical scenario of the eSpace SoftConsole service.

Function

eSpace SoftConsole is an IP-based Computer & Telephony Integration (CTI) softphone platform for use on PCs. Figure 4-1 shows the main page of the eSpace SoftConsole.

Figure 4-1 eSpace SoftConsole
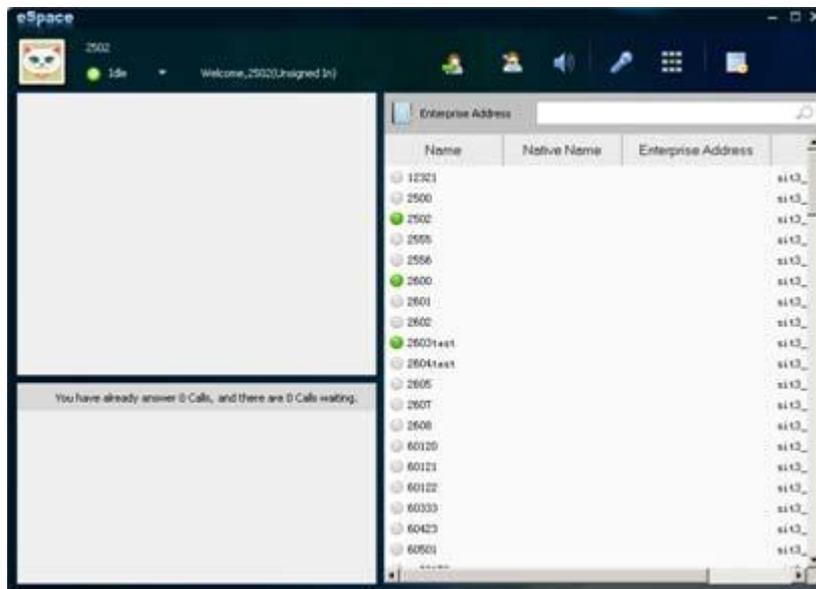
The eSpace SoftConsole forwards a call from the switchboard to an attendant. The eSpace SoftConsole has all functions of an ordinary phone and the agent functions. eSpace SoftConsole supports integrate PC client with IP Phone for communication. The attendant can use IP Phone to make and answer the call. PC client control the call, phonebook management, and at least 4 connections waiting with caller number can be displayed.

Table 4-6 describes the eSpace SoftConsole functions.

Table 4-6 eSpace SoftConsole functions

Service		Description
Basic call		eSpace UC regards an eSpace SoftConsole as a SIP user. The eSpace SoftConsole has the following basic call functions as a common SIP user: • Answers and rejects incoming calls. • Initiates and ends calls.
Agent functions	Adding attendants to or deleting attendants from attendant groups	Attendants can use the eSpace SoftConsoles on their agents only when they have been added to the attendant group configured for the eSpace SoftConsole. When deleted from the attendant group, attendants become

Service		Description
		common SIP users.
	Showing busy or idle	After an attendant is added to an attendant group, the attendant using the eSpace SoftConsole can show busy to prevent incoming calls from entering the eSpace SoftConsole and show idle to resume the agent functions.
	Queuing incoming calls	If all attendants in an attendant group are busy, the response to all calls destined for the attendant group is a call waiting tone. The calls are queued in the order in which they were received. When an attendant becomes idle, the incoming call that has been waiting the longest is first connected to the attendant.
	Transferring calls	The eSpace SoftConsole supports the following functions: - Transfers calls. - Holds multiple calls. - Displays the queue of held calls. - Selects a held call to answer, end, or transfer.
	Providing the night service	This service allows all calls in a specified time segment at night to be forwarded to a preset night service number or night service group.
	Displaying agent status	The eSpace SoftConsole obtains the status of attendants and users in real time and displays the status on the eSpace SoftConsole. Administrators can view the status of all attendants, and attendants can view the status of only attendants in the same attendant group.
	Querying user status	Attendants can query user status by: - Clicking the status icon - Clicking a number in the address book.
Corporate directory		In the corporate directory on the eSpace SoftConsole, an attendant can perform a fuzzy query on records, view record details, and initiate calls to the numbers in records. In addition, the eSpace SoftConsole can automatically search the directory for the calling number of an incoming call. If the corresponding record is found, the contact name in the record is displayed instead of the number.
Call record		On the eSpace SoftConsole, call records are displayed by categories in real time on the home page. These categories include outgoing, received, and missed calls. Users can manage call records, such as deleting one or all call records. Each call record contains information such as the peer number, start time, and call duration. Attendants can click

Service		Description
		a record to initiate a call.
Incoming call notification		The eSpace SoftConsole supports the following incoming call notifications: ● Ring ● Automatic display of an incoming call dialog box when the eSpace SoftConsole is minimized ● CLIP ● Announcement playback from the PC loudspeaker
Other functions	Login authentication	The eSpace SoftConsole authenticates attendants to log in by accounts and passwords.
	Multiple languages	The eSpace SoftConsole can be displayed in Chinese or English; however, it cannot switch between Chinese and English when in use. Users can click **Settings** and select the desired language on the login page.
	Audio control	● Microphone volume adjustment ● Speaker volume adjustment ● Echo cancellation ● Noise control ● Audio device selection

Typical Scenario

● Scenario 1

Enterprise user A wants to learn about the enterprise service information. The call of user A will be forwarded to an attendant following the steps below:

1. User A dials the enterprise switchboard number.

   User A hears enterprise greetings and then the switchboard menus.

2. According to the announcements, user A presses **5#**, and the call is forwarded to the attendant group.

3. User A enters the waiting queue and hears the waiting announcement if all attendants in the eSpace SoftConsole are busy.

4. When an attendant is idle, user A is put through to the attendant.

● Scenario 2

An enterprise sets a night service number for the time period of 20:00 to 23:00. User A dials the enterprise switchboard number at 21:00, wanting to learn about the enterprise service information. The call process is as follows:

1. User A dials the enterprise switchboard number.

   User A hears enterprise greetings and then the switchboard menus.

2. According to the announcements, user A presses **5#**, and the call is forwarded to the attendant group.

3. The system forwards the call to the night service number according to the preset night service.

4. The phone of the night service attendant rings. The attendant answers the phone and talks with the user A.

4.2.9 Hunting Group

This topic describes the functions and typical scenario of the hunting group service.

Function

Colleagues or individuals in the same field can be added to a hunting group. When a user dials the access code of the hunting group, the terminals of the group members ring simultaneously or sequentially.

Typical Scenario

The enterprise administrator adds colleagues A, B, and C in the marketing department to a hunting group, and sets simultaneous ringing for their phones. Colleague D wants to consult the marketing department about some issues. The call of colleague D will be forwarded to the hunting group of the marketing department as follows:

1. Colleague D dials the enterprise switchboard number.

   Colleague D hears enterprise greetings and then the switchboard menus.

2. According to the announcements, colleague D presses **3#** and hears the sub-menus.

3. According to the announcements, colleague D presses **2#**, and the call is forwarded to the hunting group of the marketing department.

4. The phones of colleagues A, B, and C ring simultaneously.

5. Colleague A picks up the phone and talks with colleague D.

4.2.10 CDR

This topic describes the functions and typical scenario of the CDR service.

Function

The CDR service allows users to query and export CDRs, and share CDRs with the third-party billing system.

● Enterprise users can query their own CDRs on the personal Portal page.

● Enterprise administrators can query CDRs on the BMP.

Typical Scenario

Enterprise user A wants to query the records of all national toll calls he/she has made. User A performs the following operations after logging in to his/her personal Portal:

1. Clicks **Search Bills** on the personal Portal page.

2. Sets **Call Type** to **National toll** and **Search for** to **Outgoing** on the **Search Bills** page.

3. Clicks **Search**. The related call records are displayed.

4.3 UC Service

This topic describes the functions and application scenarios of the UC service.

4.3.1 Multimedia Conference

This topic describes the functions and typical scenario of the multimedia conference service.

Function

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

Multimedia conferences are classified into the following types:

- Scheduled multimedia conference: A user can create a scheduled conference on the web conference management page and the eSpace self-service management page. After the conference is reserved, the user can notify participants of the conference by emails or SMS messages.
- Instant multimedia conference: A user can hold an instant multimedia conference on the eSpace client.

Figure 4-2 shows the main page of the multimedia conference.
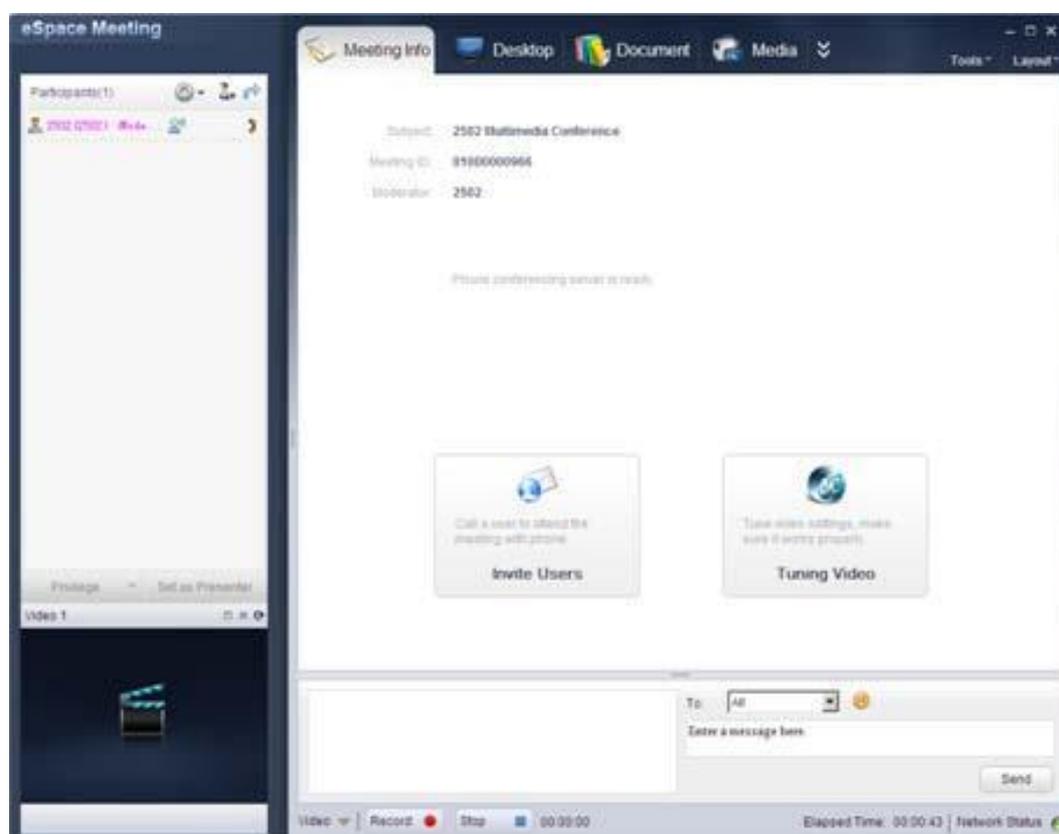
Figure 4-2 Multimedia conference

Table 4-7 describes the multimedia conference functions.

Table 4-7 Multimedia conference functions

Function	Description	
Document sharing	Enables participants to view shared documents in real time, improving communication efficiency. Diversified comment functions such as page control, text entering, and figure insertion are provided.	
Desktop sharing	- During a conference, the presenter can share the screen or an application with other participants. - The presenter can also request a participant to share the screen or an application with other participants. - An authorized participant can remotely comment a shared screen or application. This function cannot be performed in remote control mode.	
Media sharing	Enables the moderator to share local audio and video files with other participants. Common audio and video formats are supported.	
e-whiteboard	Enables participants to discuss the conference topic using a whiteboard. The moderator or presenter can save or delete a shared whiteboard that is opened, turn pages, or zoom in or zoom out on the whiteboard (scope: 25%-800%).	
Questionnaire	Enables the presenter to create a questionnaire to collect feedback from participants.	
File transfer	Enables the moderator to transfer local files to other participants. After being authorized by the moderator, other participants can also transfer files. Except the moderator, other participants can only save but not delete files.	
Text communication	Enables participants to chat by text in the group or individual chat window.	
Video conferencing	- Supports the following video windows: - Standard video window - Alternating display video window - Camera-controllable video window - Provides the following functions in a video window: - Displays the camera control panel. - Allows an authorized participant to control another participant's camera. - Modifies video settings. - Changes the video display layout. - Captures screen shots. - Processes videos. - Provides the video alternating display function, which enables the system to automatically and cyclically display all available video windows.	

Function	Description
Recording	Enables authorized participants to record a conference.

Typical Scenario

User A (manager of the product department) holds an instant multimedia conference and invites users B, C, and D (employees of the product department) to participate in the conference. User A uses eSpace Desktop to hold the conference and the process is as follows:

1. User A creates an instant conference on the eSpace Meeting Portal.

    The conference type is set to desktop conference, media type is set to multimedia, and users B, C, and D are added as participants.

2. User A selects to start the conference immediately. The instant media conference is successfully started.

3. Users B, C, and D join the conference. User A then becomes the moderator.

4. User A can control the conference.

4.3.2 ONLY

This topic describes the functions and typical scenario of the ONLY service.

Function

A user with multiple numbers can set one of the numbers as the primary number for the ONLY service, and this primary number is bound to the other numbers. When the user initiates a call using any of the numbers, the primary number is displayed on the phone of the called party. Also, to call this user, the calling party can directly dial the primary number. As such, the ONLY service ensures a higher success rate for calls.

The ONLY service can be classified into calling ONLY and called ONLY, as described in Table 4-8.

Table 4-8 ONLY service functions

Service		Description
ONLY	Calling ONLY	When a user activating the ONLY service initiates a call using any of the numbers, the primary number is displayed on the phone of the called party. **NOTE** In the ONLY service, the primary number must be intra-office number of the user.
	Called ONLY	A user activating the ONLY service can set the ringing mode for the terminals by priority. When the user is called, the user's terminals ring (simultaneous ringing or sequential ringing mode) according to the preset ringing mode. The user can answer the call from any of these terminals.

Typical Scenario

After activating the ONLY service, user A sets the office phone number as the primary number, binds the lab phone number and mobile phone number to the primary number (the lab phone number has a higher priority than the mobile phone number). User A also sets the ringing mode of the terminals to sequential ringing. When user B dials the primary number of user A, the calling process is as follows:

1. User B dials the primary number of user A.

    The office phone of user A rings first, and user B hears a ringback tone.

2. When no one answers the office phone within a specified time, the lab phone rings.

    The office phone stops ringing when the lab phone rings.

3. User A is in the lab and answers the phone. Then, user A talks with user B.

4. User C dials the primary number of user A when user A is talking with user B.

    The idle terminals ring according to the preset ringing mode.

5. After the call between user A and user B ends and the mobile phone rings, user A answers the phone and starts talking with user C.

4.3.3 Status Display

eSpace UC supports user status display. Users can query the status of a contact in real time and select an appropriate communication mode according to the contact status.
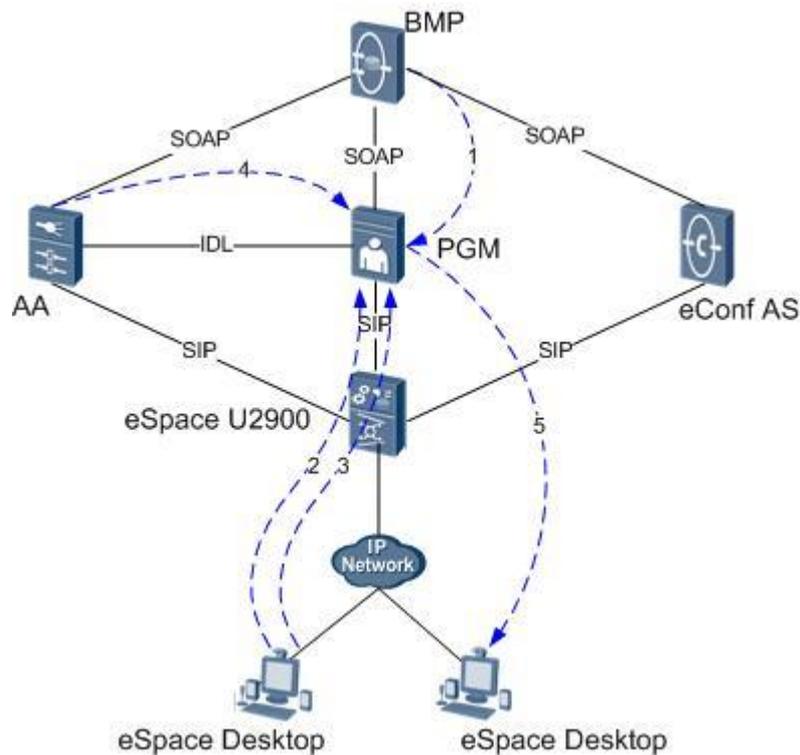
Function

eSpace UC supports display of enterprise user status on terminals such as eSpace Desktop, eSpace Mobile, and eSpace Mobile HD. There are five user states: Online, Away, Busy, Offline, and Nodisturb, as listed in Table 4-9.

Table 4-9 User status

Icon	Status
🟢	Online
🟡	Away
🟠	Busy
⚪	Offline
⛔	Nodisturb

eSpace UC, using PGM as the core component of user status management, supports real-time user status display and unified user status management. Figure 4-3 shows the process of user status management.

Figure 4-3 Status management process

The following uses eSpace U2990 as an example to describe the process of user status management.

1. The BMP sends enterprise user data to the PGM through the SOAP interface.
2. An enterprise user registers with eSpace U2990. eSpace U2990 functions as an agent of the user and registers with the PGM.
3. The enterprise user subscribes to status display from the PGM.When the user status changes, the eSpace Desktop releases the user status, which is sent to the PGM through eSpace U2990.
4. The AA provides an interface for the eSpace Desktop to set DND. When DND is set for a user, the AA invokes the PGM interface to release the user's **Nodisturb** state.
5. The PGM updates the user status and sends the information to all contacts subscribing to the status of this user.
6. When a user is in a conference, the eSpace Desktop releases the user status as **In Meeting**.

Typical Scenario

User A adds user B as a friend, and user A can view the real-time status of user B on the eSpace Desktop.

1. When user B is offline, user B's status is displayed as **Offline** on user A's eSpace Desktop.
2. When user B is online and involved in a call, user B's status is displayed as **Busy** on user A's eSpace Desktop.

3. When user B sets his/her status to **Nodisturb**, user A hears an announcement indicating a call connection failure if user A calls user B.

4.3.4 IM

eSpace UC supports point-to-point (P2P) IM, temporary group IM, and contact group IM for enterprise users.

P2P IM

P2P IM allows two users to send IMs, transfer files, and send SMS messages with each other. Table 4-10 describes the functions of P2P IM.

Table 4-10 P2P IM service functions

Function	Description
IM	An IM can be a text, picture, or table. eSpace UC limits the size of to-be-transmitted texts and pictures. System administrators can configure the upper limit of the size for texts and pictures on the BMP.
File transfer	Files can be transferred between eSpace Desktops. A user can drag a file to the IM window of the eSpace Desktop for file transfer. System administrators can configure the type and upper limit of the size for to-be-transferred files, and the maximum number of files to be transferred concurrently on the BMP.
Offline message	Offline messages can be sent between eSpace soft terminals. When the recipient of a message is offline, the server buffers the message. The buffered message is sent to the user once the user is online. **NOTE** Offline messages can be saved in the server only for a certain period of time. When the time (48 hours by default) elapses, the system automatically deletes the buffered offline message.
SMS message	Users can send SMS messages to mobile phones through the eSpace Desktop. An enterprise user can send information in format of an SMS message to the mobile phone of a contact. If the contact responds to the SMS message, the contact's response will be displayed in the IM window of the enterprise user.

Temporary Group IM

An enterprise user can select multiple contacts to create a temporary group on the eSpace Desktop. Contacts in the temporary group can send IMs in the group's IM window. The temporary group is dismissed when the user creating the group closes the group window. Figure 4-4 shows the temporary group window.

**Figure 4-4** Temporary group window
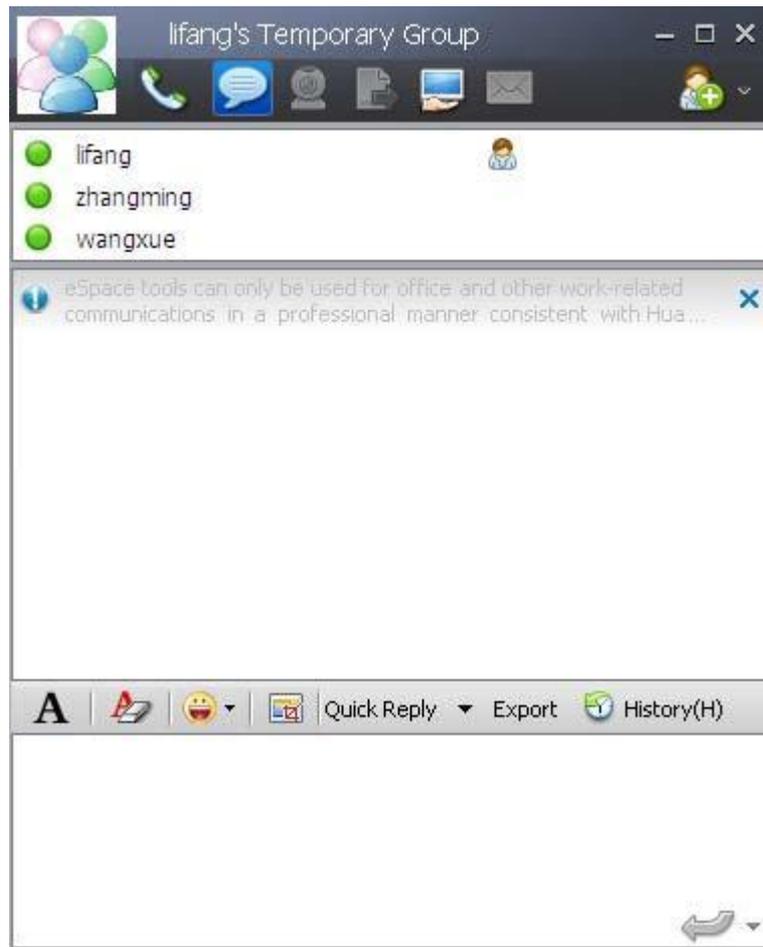
Contact Group IM

eSpace Desktop and eSpace Mobile HD support contact group IMs.

An enterprise user can right-click a group in the **Groups** list and choose **Instant Messaging**, or directly double-click a group to display the group IM window. Contacts in the group can send IMs in the group's IM window. Figure 4-5 shows the contact group window.

Figure 4-5 Contact group window
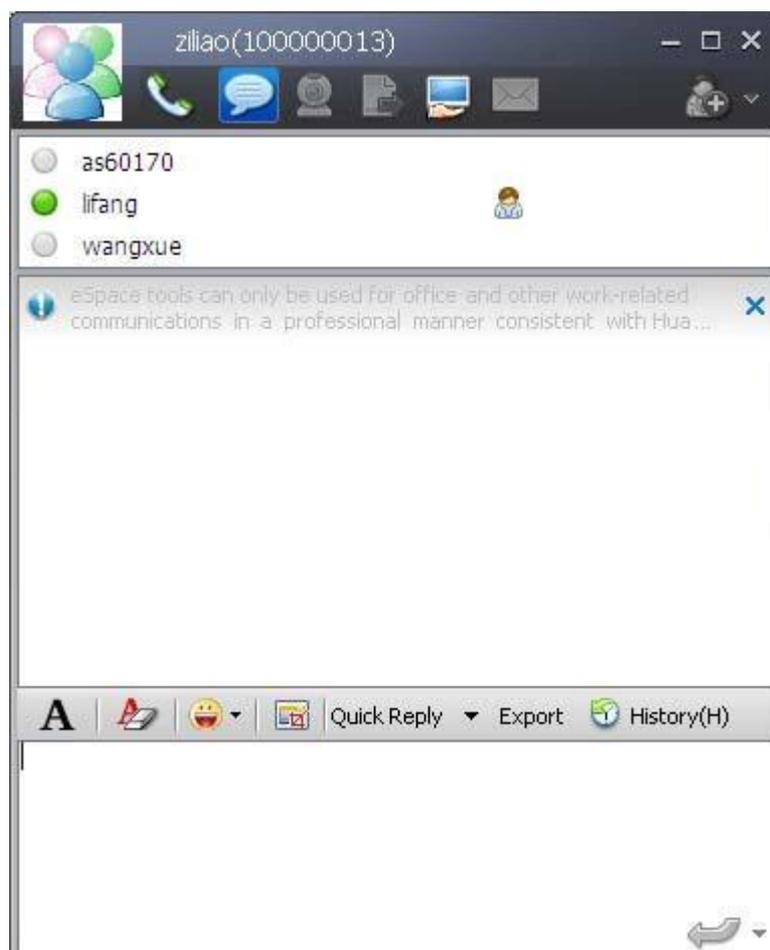
4.4 Unified Messaging

This topic describes the functions and typical scenario of the unified messaging service.

Function

eSpace UC uses the UMS (UMS for short) to achieve the unified messaging service after calls to users in specific states (for example, offline or busy) in the system are routed to the UMS. Figure 4-6 shows the interconnection between UMS and other devices in eSpace UC.

Figure 4-6 Interconnection between UMS and other devices in eSpace UC
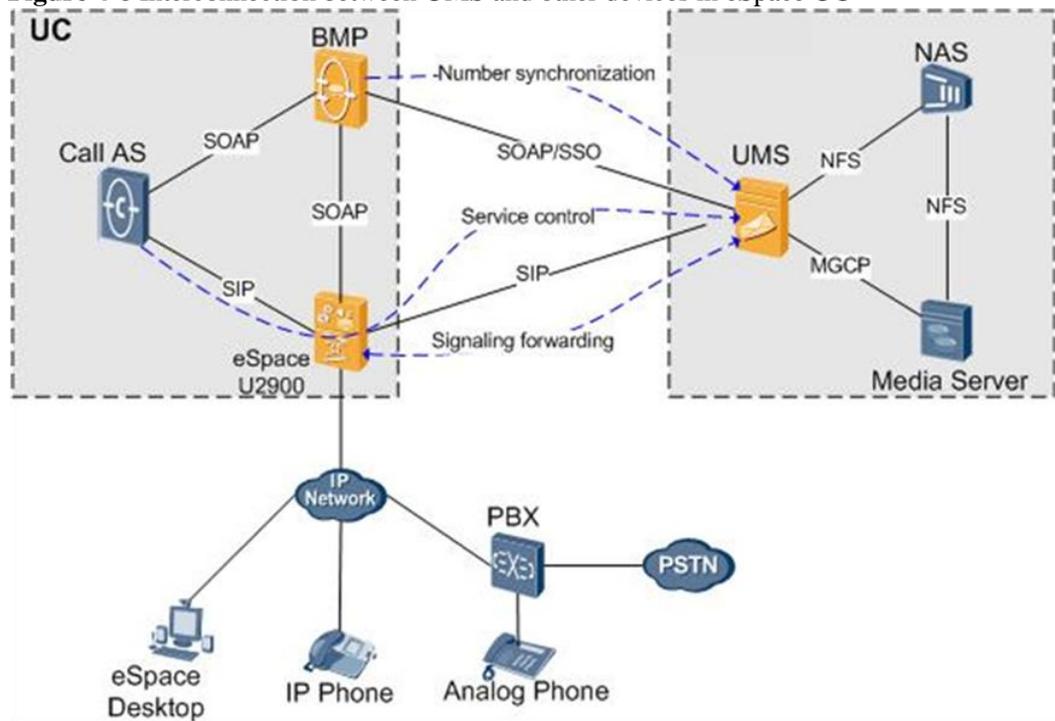
The following uses eSpace U2990 as an example to describe the service flow of unified messaging:

1. The enterprise administrator registers user A and user B on the BMP, and the registration information is synchronized to the UMS.
2. User A calls user B. The call request of user A is sent through eSpace U2990 to the Call AS for processing.
3. The Call AS determines that user B is offline and sends the call request to the UMS for processing.
4. The UMS plays the IVR announcement, prompting user A to leave a message.

The unified messaging service covers voice mailbox service and fax mailbox service. With the unified messaging service, a user can access the system to retrieve voice messages or fax messages by using a fixed phone, fax machine, mobile phone, or PC anywhere and anytime. Table 4-11 describes the classification and functions of the unified messaging service.

Table 4-11 Unified messaging service functions

Service		Description
Call transfer to voice mailbox (CTVM)	Call transfer to voice mailbox immediately (CTVMI)	When the phone of a user rings or when the user answers or holds an incoming call, the call is forwarded to the user's voice mailbox once the user presses the CTVM button.
	Call transfer to voice mailbox offline	If a user activates the CTVMO service, all incoming calls are forwarded to the user's voice mailbox when the user is offline.

Service		Description
	(CTVMO)	
	Call transfer to voice mailbox unconditional (CTVMU)	If a user activates the CTVMU service, all incoming calls are forwarded to the user's voice mailbox regardless of the user status.
	Call transfer to voice message on busy (CTVMB)	If a user activates the CTVMB service, all incoming calls are forwarded to the user's voice mailbox when the user is busy.
	Call transfer to voice mailbox on no reply (CTVMNR)	If a user activates the CTVMNR service, all incoming calls are forwarded to the user's voice mailbox when the user does not answer the calls within a specified duration.
Call transfer to fax mailbox unconditional (CTFMU)		If a user activates the CTFMU service, all incoming calls are forwarded to the user's fax mailbox regardless of the user status.
Message	Message waiting indicator (MWI)	If a user activates a CTVM service, the MWI is automatically on when there is a new voicemail message.
	Message retrieval	If a user activates a CTVM service, the user can access the voicemail system by pressing the corresponding button or soft key on the terminal to listen to messages when there is any.

Typical Scenario

User A activates the CTVMO service. User B calls user A but user A is offline. The call process is as follows:

1.   User B dials the number of user A.

       The system determines that user A is offline and forwards user B's call to user A's voicemail.
2.   User B hears a voice prompt asking user B to leave a voice message.
3.   When user A is online and finds that the MWI is on, user A retrieves the message.

4.5 Terminal

This topic describes the eSpace terminals supported in eSpace UC, including eSpace Desktop, eSpace Mobile, eSpace Mobile HD, and IP phone.
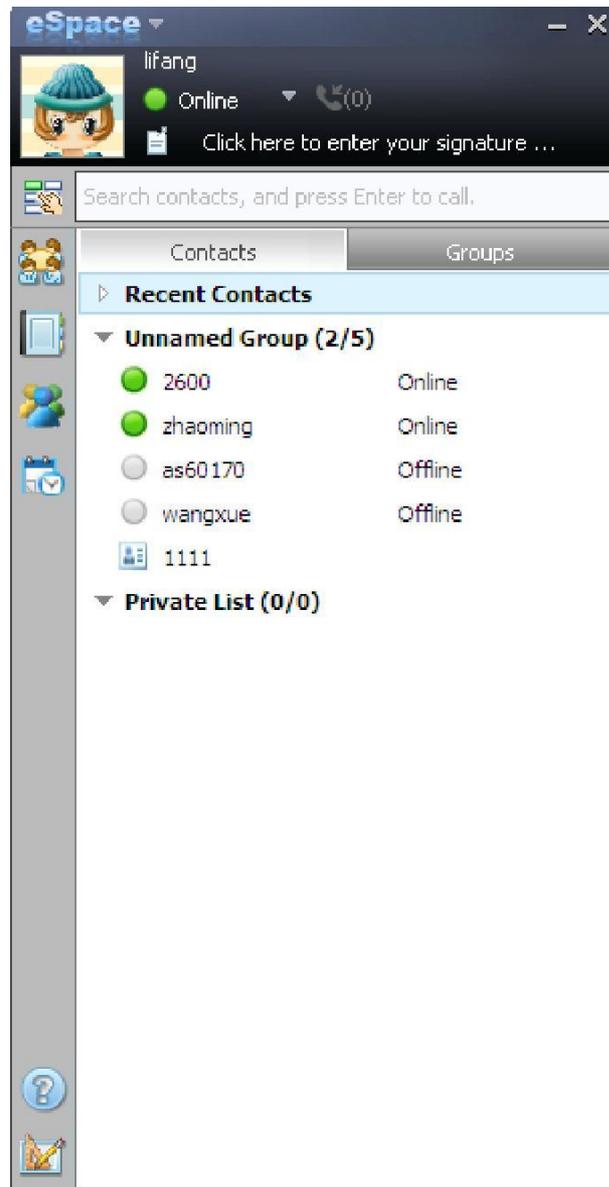
4.5.1 eSpace Desktop

eSpace Desktop, office communication software developed by Huawei, provides functions such as online status, IM, and voice call for users to work in a convenient and efficient manner.

eSpace Desktop supports various functions to achieve IT and communication technology (CT) convergence (that is, ICT) and improve the work efficiency and employee satisfaction. These functions include the IPT of eSpace UC, IM, personal address books and corporate directories, enterprise bulletin, SMS, email, and personal service management.

Figure 4-7 shows the main page of eSpace Desktop.

Figure 4-7 eSpace Desktop

 NOTE
- eSpace Desktop supports Windows XP and Windows 7 operating systems.
- eSpace Desktop supports Chinese and English languages.

Table 4-12 describes the unique UC service functions provided by eSpace Desktop.

Table 4-12 eSpace Desktop functions

Function		Description
Status display		eSpace Desktop displays real-time contact status, offering users various modes of communicating with their contacts. The default contact states are online, busy, away, offline and Nodisturb. Users can customize states.
IM	Two-party conversation	eSpace Desktop supports P2P IM sending and receiving. ● A user can initiate an IM from the corporate directory or personal address book. ● A user can initiate an IM on the IM page.
	Group chat	Users can create groups or join other groups after being approved. Users can also create temporary groups on eSpace Desktop. Such groups will be deleted after the group chat windows are closed.
	File transfer	eSpace Desktop supports P2P file transfer.
	Emoticon or image sending and receiving	Users can send and receive emoticons or images on eSpace Desktop.
	Historical IM records	eSpace Desktop saves IM records as historical records. A historical record contains the friend name, IM sending or receiving time, and IM content.
SMS messages or emails		eSpace Desktop provides the following functions: ● Receives SMS messages. ● Sends SMS messages to a single recipient or a group of recipients. ● Sends missed-call notifications by SMS messages. ● Sends conference notifications by SMS messages. ● Queries historical records. ● Selects a contact who has an email address from the personal address book and sends an email to the contact. eSpace Desktop automatically invokes the default email client of the operating system.
Mobility		A user's personal and contact information, such as the specific contacts, groups, signature, and avatar, is available on eSpace Desktop wherever the user logs in to eSpace Desktop. eSpace Desktop can work with peripheral devices such as headsets and Bluetooth devices, and can connect to the public network with the support of Secure Virtual Network (SVN) devices.
Corporate directory		The corporate directory is deployed on the Group server and managed by enterprise administrators. Enterprise administrators can enable or disable the corporate directory function. Users can search for contacts by name (full name or initials),

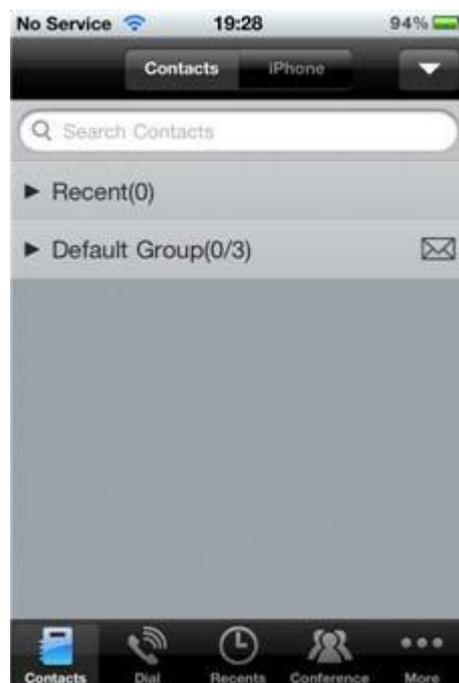| Function		Description
		phone number, or work ID.
Personal address book		The personal address book stores a user's contact information, including the name, fixed-line number, department, and mobile number.
		Users can maintain personal address books on eSpace Desktop, including querying, adding, modifying, and deleting contacts.
		Contacts in a personal address book can be sorted by status (online, busy, away, and offline) or by group, and further sorted by status or name after being sorted by group.
		Users can import Excel or CSV contact files to the personal address book.
Enterprise bulletin		eSpace Desktop supports bulletin management, bulletin pushing, online bulletins, offline bulletins, and historical bulletin records. The server pushes bulletins to eSpace Desktop and displays them in pop-up windows. If a user is offline, the server changes a bulletin to an offline bulletin and pushes it to eSpace Desktop again when the user logs in to eSpace Desktop.
Self-service	eSpace Meeting Portal	Users can create and manage scheduled conferences, and view information about the scheduled conferences that they have created or will participate in.
	Service activation	Users can view their activated services and activate other services that have been enabled but have not been activated, such as the call waiting and DND services.
	Personal account maintenance	Users can release, update, and maintain their personal information on the corporate directory server.
My workspace		Users can add frequently-viewed URLs to **My workspace** and click these URLs to visit the corresponding pages.
Others	Login	- eSpace Desktop supports automatic login. If the automatic login function is enabled, eSpace Desktop records user passwords. - Users can log in to eSpace Desktop with their unique UC accounts. A user cannot log in to eSpace Desktop on multiple PCs at the same time. If a user logs in to eSpace Desktop on PC B with an account that has been used to log in to eSpace Desktop on PC A, login to eSpace Desktop on PC B is successful, but eSpace Desktop on PC A will be logged out and a prompt message is displayed. - Users can log in to eSpace Desktop offline and view historical records.
	System setting	Users can configure system information on eSpace Desktop, such as modifying personal information, changing status, and setting automatic login.
	Software upgrade	eSpace Desktop can be automatically upgraded.

4.5.2 eSpace Mobile Client

eSpace UC provides mobile client access to implement mobile office services.

eSpace Mobile and eSpace Mobile HD, as an integral port of eSpace UC, provide functions such as corporate directory query, IM, VoIP, and mobile conferencing. Either eSpace Mobile or eSpace Mobile HD can communicate with eSpace Desktop, allowing users with eSpace Mobile or eSpace Mobile HD to communicate with others anytime anywhere. eSpace Mobile and eSpace Mobile HD can be installed on the following types of mobile terminals:

● eSpace Mobile: mobile phones running the operating system of Android 2.1 or a later version, and iPhones running the operating system of iOS 4.0 or a later version

● eSpace Mobile HD: iOS-based iPad

 Figure 4-8, Figure 4- 9, and Figure 4-10 respectively show the main pages of eSpace Mobile (for iPhone), eSpace Mobile (for Android), and eSpace Mobile HD (for iPad).

Figure 4-8 eSpace Mobile (for iPhone)

Figure 4-9 eSpace Mobile (for Android)
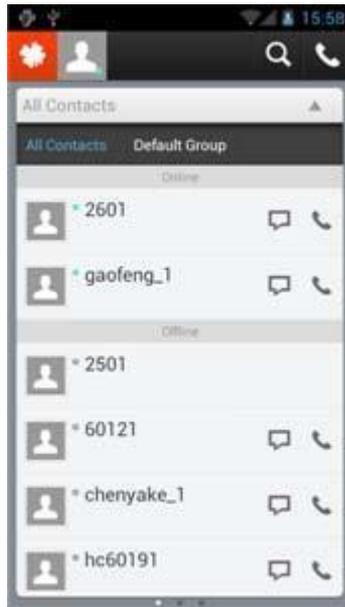
Figure 4-10 eSpace Mobile HD (for iPad)

eSpace Mobile and eSpace Mobile HD support the same service functions described in Table 4-13.

Table 4-13 eSpace Mobile and eSpace Mobile HD service functions

Service		Description
IM		A user can click a contact in the contact list or click a contact details window to send IMs. A user can view the received IMs in the window of the contact who sends the IMs.
Personal address book	Managing contacts	A user can search for contacts in the personal address book.
	Grouping friends	A users can group contacts and friends in the personal address book, but the user cannot create groups.
	Synchronizing the personal address book incrementally	The updated friend information is synchronized in the personal address book.
Corporate directory		A user can search for contacts in the corporate directory when such contacts cannot be found in the personal address book.
VoIP		In the area where Wi-Fi is available, a user can make a call to a VoIP phone number. The call is free of charge.
Conference call switch		When a user joins a conference call through Wi-Fi and VoIP, the user can seamlessly switch the call to a specified phone to continue with the conference. This process will not be sensed by the calling party.
History record query		A user can query historical IM, call, and conference information.
Conference		A user can initiate an instant conference, schedule a conference beforehand, and manage conferences. eSpace Mobile and eSpace Mobile HD supports voice, multimedia, and Telepresence conferences.

⚠ **CAUTION**

Apart from the same functions, eSpace Mobile and eSpace Mobile HD have their own unique functions.

● Click to Dial (CTD) service by eSpace Mobile

After a user enables CTD and makes a call, the carrier calls the number of the called party and the user's preset callback number, connecting the user to the called party. If the carriers of the callback number and called number do not provide the free-to-answer service, the calling party and called party in the CTD call must pay call fees.

- Group service by eSpace Mobile HD

Users can perform group-related operations on the eSpace Mobile HD, including querying group information (such as the group name and bulletin), querying group member information (account, name, and status), and sending group messages.

4.5.3 IP Phone

This topic describes the functions and typical scenario of the IP phone service.

Function

eSpace UC supports IP phones of eSpace 7800 series. eSpace 7800 series cover eSpace 7810, eSpace 7830, eSpace 7850, and eSpace 7870. Figure 4-11 shows the appearance of eSpace 7870.

Figure 4-11 Appearance of eSpace 7870

📖 **NOTE**

eSpace 7800 series are function-rich and easy-to-use IP phones. For details about their features, see the related IP phone documentation.

Typical Scenario

The number of enterprise user A is bound to an IP phone but user A has not logged in to the eSpace client. When enterprise user B dials the number of user A, the call process is as follows:

1. After user B dials the number of user A, the IP phone rings.
2. User A answers the phone and starts talking with user B.

5 Reliability

About This Chapter

eSpace UC provides various approaches to ensure system reliability, including remote disaster recovery, two-node cluster backup, local survival, and power-off survival.

5.1 Two-node Cluster Backup for Servers

eSpace UC provides servers working in two-node cluster mode to achieve quick active/standby switching of the servers.

eSpace UC provides 1+1 cold backup. In this mode, both servers with the same functions are powered on, one working in active state and the other standby state. The software programs and static data are automatically synchronized between them. When the active server is faulty, the standby server takes over services by manual intervention or automatic system switching. During the active/standby switching, services are interrupted.

Call AS, BMP, Portal, PGM, MAA, eSpace Meeting, and OBG servers use two-node cluster backup, but eSpace EMS does not.

The following uses the Call AS as an example to describe the two-node cluster backup. Figure 5-1 shows this scenario.

Figure 5-1 Two-node cluster backup for the Call AS
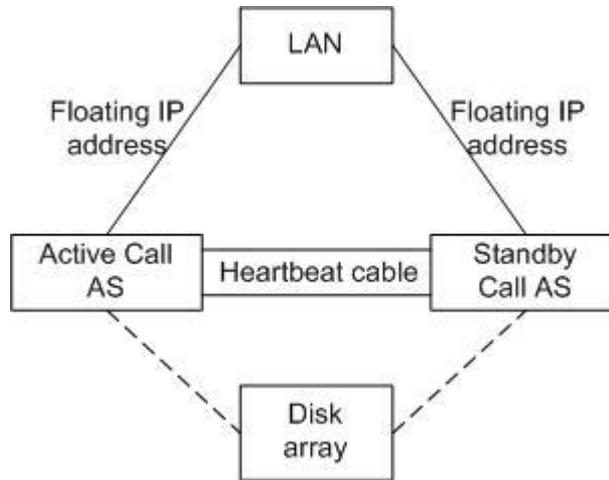
The ACS cluster management software is installed on both the active and standby Call AS servers. When the active Call AS server is faulty, the switching process is as follows:

1. The VCS on the active Call AS stops applications, uninstalls the raw devices in the disk array, and releases the floating IP address.
2. The VCS on the standby Call AS monitors the status of the active Call AS using heartbeat messages. After detecting the failure of the active Call AS, the VCS on the standby Call AS binds the floating IP address, installs the raw devices in the disk array, and starts applications.
3. During the active/standby switching, services (for example, voice call, call forwarding, and ONLY services) related to the Call AS are interrupted.
4. After the active/standby switching is complete, the original standby Call AS becomes active and processes services.

5.2 Remote Disaster Recovery

This topic describes the remote disaster recovery for servers and gateways in eSpace UC.

5.2.1 Remote Disaster Recovery for Servers

eSpace UC provides dual-center disaster recovery for servers in active-active mode.

In active-active mode, two sites are both production centers and are responsible for the work at their own sites. When the server at one site malfunctions, the system switches all services at this site to the other site. This functional site then becomes a disaster recovery site and provides services for all users.

Call AS, PGM, and eSpace Meeting servers all work in active-active mode in dual-center disaster recovery.

The following uses the Call AS as an example to describe the dual-center disaster recovery in active-active mode. Figure 5-2 shows this scenario.

Figure 5-2 Remote disaster recovery for the Call AS
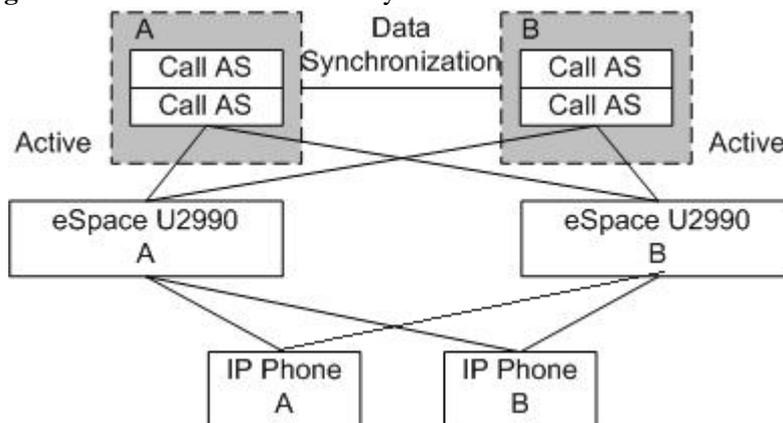
When the active and standby Call ASs at site A are faulty, the service process is as follows if IP phone A calls IP phone B:

1. eSpace U2990 A is disconnected from the Call AS at site A, and is then connected to the active Call AS at site B.
2. The calling request of IP phone A is sent to eSpace U2990 A, through which the calling request reaches the Call AS at site B for processing. The processed calling request is then returned to eSpace U2990 A.
3. eSpace U2990 A sends the called party information to the Call AS at site B for processing. The processed information is then returned to eSpace U2990 A.
4. eSpace U2990 A identifies that the called party is IP phone B. The call between IP phone A and IP phone B is connected.

5.2.2 Remote Disaster Recovery for eSpace U2900

Two sites in active state can be configured in an enterprise's data center for eSpace U2900 series.

eSpace U2900 series support remote disaster recovery in active -active mode. Two sites are both production centers, and services from the two sites can be registered at either site. When the server at one site malfunctions, the system switches all services at this site to the other site. This functional site then becomes a disaster recovery site and provides services for all users.

The following uses eSpace U2990 as an example to describe the remote disaster recovery. Figure 5-3 shows this scenario.

Figure 5-3 Remote disaster recovery for eSpace U2990
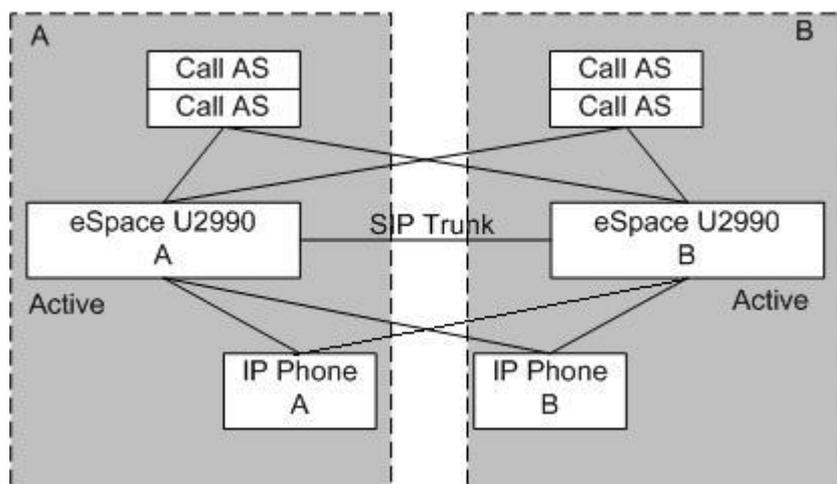
When eSpace U2990 at site B is faulty, the service process is as follows if IP phone A calls IP phone B:

1. The calling service of IP phone A is sent to the Call AS server at site B.
2. The Call AS processes the calling party service and returns it to eSpace U2990 A.
3. Services from eSpace U2990 A are originally routed to eSpace U2990 B. However, because eSpace U2990 B is faulty, eSpace U2990 A detects a disconnected from eSpace U2990 B by heartbeat messages, and services from eSpace U2990 A will be routed back to eSpace U2990 A.
4. eSpace U2990 A routes the call to the Call AS server at site B. After processing the call information, the Call AS returns the information to eSpace U2990 A.
5. eSpace U2990 A identifies that the called party is IP phone B. The call between IP phone A and IP phone B is connected.

# 5.3 Terminal Registration with Multiple Gateways

eSpace UC allows a terminal to register with multiple central gateways at the same time.

A terminal can register with the gateways at two central sites for remote disaster recovery of the gateway.

eSpace Desktop support registration with multiple gateways at the same time.

The following uses the eSpace Desktop as an example to describe terminal registration with multiple gateways. Figure 5-4 shows this scenario.

Figure 5-4 IP phone registration with multiple gateways
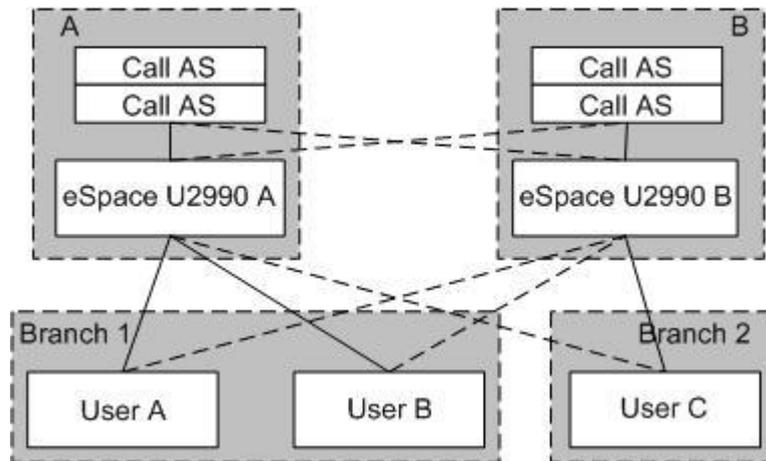
Gateways are deployed at central sites A and B, and eSpace UC users A, B, and C belong to two branches. Table 5-1 lists the active and standby gateways with which the users are registered.

Table 5-1 Active and standby gateways for user registration

User	Active Gateway	Standby Gateway
User A	eSpace U2990 A	eSpace U2990 B
User B	eSpace U2990 A	eSpace U2990 B
User C	eSpace U2990 B	eSpace U2990 A

User A registers with eSpace U2990 A and eSpace U2990 B at the same time after a login. When user A has a call, the process is as follows:

1. The call of user A is routed to eSpace U2990 A.
2. When eSpace U2990 A is unavailable, the call is routed to eSpace U2990 B.
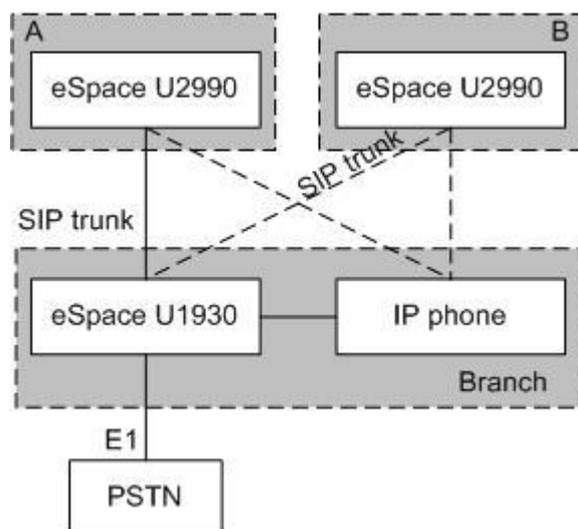3. eSpace U2990 B processes the call.

5.4 Local Regeneration

eSpace UC provides local regeneration for eSpace U1900 series and EGW1500E.

eSpace U1900 series and EGW1500E at branch sites support local regeneration. When the branch site is disconnected from the central site, eSpace soft terminals fail to register with the gateways at the central site. In this case, the local branch site enables local regeneration for IP phones registration. The gateways at the branch site then process basic call services for local intra-office users and local PSTN call services.

The following uses eSpace U1930 as an example to describe local regeneration. Figure 5-5 shows this scenario.

Figure 5-5 eSpace U1930 local regeneration

eSpace U2990 is deployed at both central sites A and B. When the branch is disconnected from the two central sites, eSpace U1930 in the branch switches to local regeneration mode.

The call process of the IP phone is as follows:

1. The IP phone has a voice call and registers with the local gateway.
2. The IP phone initiates a call to eSpace U1930.
3. eSpace U1930 processes the voice call of the IP phone.

The PSTN call process is as follows:

1. The PSTN has a voice call, and the call is routed from eSpace U1930.
2. When disconnected from eSpace U2990, eSpace U1930 itself processes the call services.
3. eSpace U1930 processes the PSTN call.

5.5 eSpace IAD Network Interruption Survival and Power-off Survival

This topic describes the functions and typical scenarios of network interruption survival and power-off survival provided by eSpace IAD.
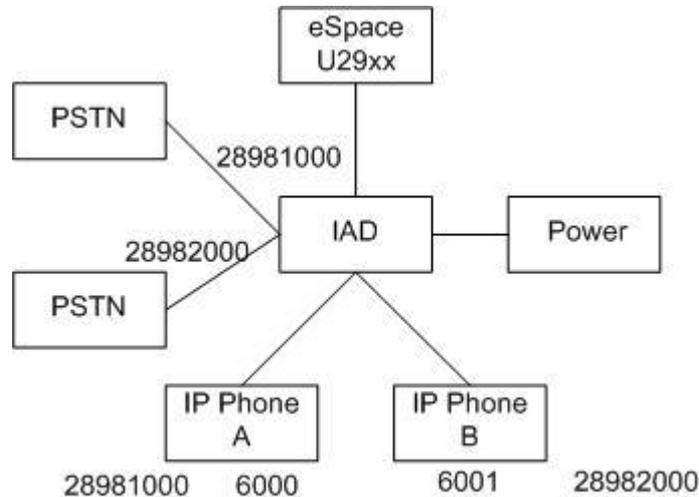
Function

● Network interruption survival

When disconnected from eSpace U2900, eSpace IAD enables emergency standalone switching and local survival to allow users in eSpace IAD to call each other by dialing short numbers. Two outgoing calls are also available in this scenario.

● Power-off survival

When eSpace IAD is powered off, users in eSpace IAD cannot call each other but they can continue to make outgoing calls through the survival port.

Typical Scenario

Figure 5- 6 shows the scenario of network interruption survival and power-off survival provided by eSpace IAD.

Figure 5-6 eSpace IAD network interruption survival and power-off survival

- Network interruption survival

  When disconnected from eSpace U2990, eSpace IAD enables emergency standalone switching and local survival. eSpace IAD engages in the following process for network interruption survival:

1. The phone (phone number: 6000) of user A and the phone (phone number: 6001) of user B are connected to the same eSpace IAD. User A dials 6001, and user B hears the ringing and answers the call.

2. User A dials 0 (outgoing prefix) and 28983000 (local phone number). This call is routed to the called party through the trunk (phone number: 28981000), and 28981000 is displayed on the phone of the called party.

3. A local user (phone number: 28983000) calls user A through the trunk. The phone of user A rings, and user A can answer the call.

- Power-off survival

  When the IAD's mains supply is cut, eSpace IAD enables local survival. eSpace IAD engages in the following process for power-off survival:

1. User A dials 0 (outgoing prefix) and 28983000 (local phone number). This call is routed to the called party through the trunk (phone number: 28981000), and 28981000 is displayed on the phone of the called party.

2. A local user (phone number: 28983000) calls user A through the trunk. The phone of user A rings, and user A can answer the call.

6 Security

About This Chapter

This topic describes the security measures for the application layer, system layer, network layer, and management layer in eSpace UC.

6.1 Application-layer Security

The BMP, eSpace Meeting Portal, PGM, and temporary group servers at the application layer provide external services.

Signaling and Media Encryption

Traditionally, signaling is transmitted based on SIP or User Datagram Protocol (UDP), and communication media is transmitted based on RTP or UDP, which faces the following security risks:

● All media data is transmitted in plain text on the IP network. Hackers can easily listen in on calls.

- All signaling data is transmitted in plain text on the IP network. Hackers can easily obtain sensitive information such as a user name and password.

To prevent such security risks, SIP Transport Layer Security (TLS) and Secure Real-Time Transport Protocol (SRTP) protocols are introduced in RFC:

- SIP TLS is a TLS-based SIP protocol, which implements confidentiality, data integrity, and non-repudiation for UC signaling interaction.
- SRTP ensures RTP sessions' security.

In eSpace UC, all signaling interaction between components must use SIP TLS instead of SIP, and all media interaction between components must use SRTP instead of RTP.

Identity Authentication

eSpace UC provides accounts and passwords for SOAP authentication during service interactions between components, and also accounts and passwords for management and maintenance of components. This helps ensure functional services and also proper running of eSpace UC application programs.

Rights Control

eSpace UC provides different user rights. Different user roles have different control rights for service interaction and component management. For example, the BMP provides different system administrator, enterprise administrator, and department administrator roles.

Secure Management Protocol

eSpace UC supports different secure management protocols such as SSH, HTTPS, and SNMPv3.

Security Mechanism for Processing Sensitive Data

Sensitive data in eSpace UC includes accounts, passwords, and private information. The security mechanism for such sensitive data is as follows:

- Sensitive data is encrypted during storage, display, and transfer in eSpace UC components.
- Passwords in plain text exchanged between eSpace UC components are not recorded in logs or alarms or during message tracing.

Security Log Audit

eSpace UC provides logs for security events, that is, security logs. Table 6-1 describes the security log levels.

Table 6-1 Security log levels

Level	Meaning
error	Logs at this level record information about login, logout, and authentication failure, and fault information and possible causes when the path or service logic is incorrect.

Level	Meaning
information	Logs at this level record information about login, logout, and authentication success.
debug	Logs at this level record system debugging information, which helps development personnel to locate faults. Logs at this level also record code information, such as the name of the function and parameter that are invoked currently, internal variable value, and return value of the function invocation.

6.2 System-layer Security

Security maintenance at the system layer is to ensure the proper running of operating systems and databases, which in turn supports the running of application software at the application layer.

eSpace UC provides security hardening policies for all general-purpose operating system, databases, and web containers, including

- SuSE Linux 11 SP1
- SQL Server 2008
- Oracle 11g R1
- Tomcat container

6.3 Network-layer Security

Security maintenance at the network layer is to ensure the proper running of switches, routers, firewalls, and VPN gateway, allowing for the implementation of security policies at this layer.

eSpace UC Network for Security

Figure 6-1 shows the eSpace UC network for the sake of system security.

Figure 6-1 eSpace UC network for security
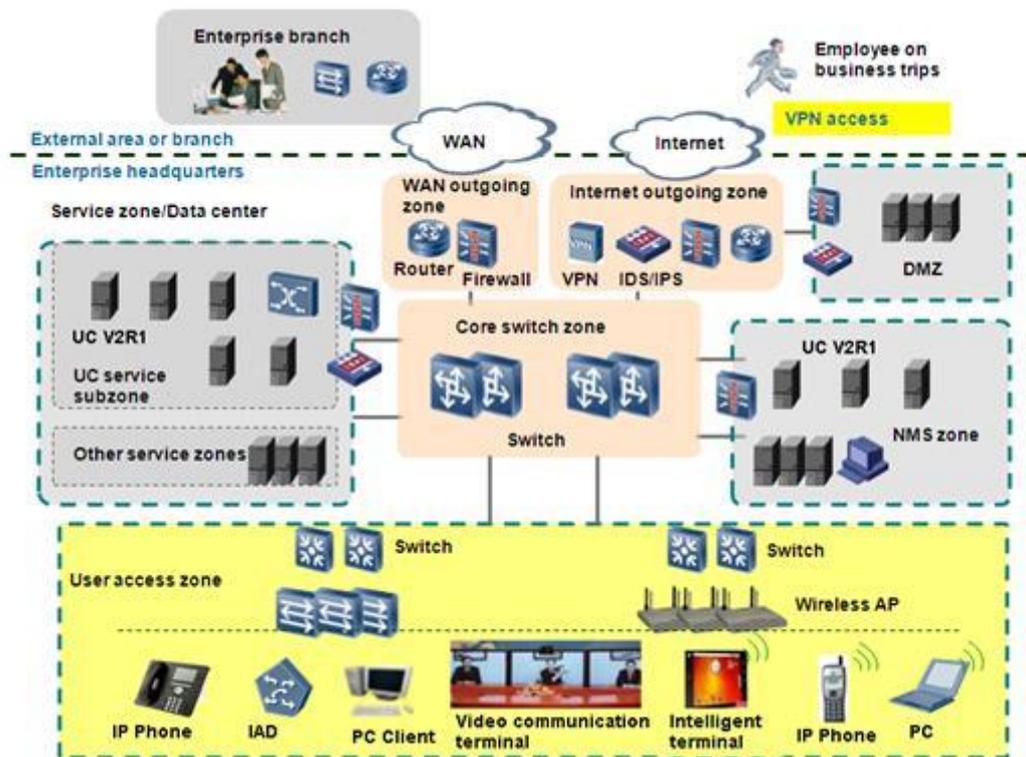
Zone Security

The eSpace UC network is divided into seven zones for different security measures.

- Terminal access zone
  - A subzone in the terminal access zone has its own IP address segment. Two subzones are separated by a virtual local area network (VLAN).
  - Terminals are authenticated before they are connected to the network. When failing to be authenticated, a terminal will be isolated in a specific isolation zone.
  - A mechanism for preventing Address Resolution Protocol (ARP) spoofing is provided. For example, an IP address and a media access control (MAC) address are bound to an access switch, or the gateway MAC address is bound to a terminal.
  - Authentication and encryption based on wireless standards are implemented for wireless terminals.
- Core switching zone
  - Dynamic routing protocols in use are secure routing protocols, unlike the insecure ones such Routing Information Protocol (RIP).
  - Core switches are deployed in redundancy mode.
- Server zone
  - Firewalls are deployed. Access control lists (ACLs) are configured for firewalls according to the *Communication Matrix* of eSpace UC services.
  - The intrusion defense/detection function is enabled.
  - Management traffic and service traffic are separated for all devices.

- Network management zone
    - Secure network management protocols are used. The secure network management protocols include Simple Network Management Protocol (SNMP) V2C or a later version, Secure Shell (SSH), and HTTPS.
    - Firewalls are deployed. ACLs are configured for firewalls according to the *Communication Matrix* of eSpace UC services.
- DMZ
    - Firewalls are deployed.
    - The intrusion defense/detection function is enabled.
    - NAT is enabled for server IP addresses.
- Internet egress zone
    - Firewalls are deployed.
    - The intrusion defense/detection function is enabled.
    - VPN gateways are deployed so that employees on business trips can securely access the enterprise intranet.
- Wide area network (WAN) egress zone
    - Firewalls are deployed.
    - Encryption devices are deployed for services that require special security, for example, the government affair intranet.

6.4 Management-layer Security

Security maintenance at the management layer is to enhance manual management and log/patch management to prevent potential risks.

eSpace UC offers the following measures to ensure the security at the management layer.

- Account maintenance

    You (system administrator) are advised to periodically check the accounts for operating system, database, and NE management and maintenance.
- Password maintenance

    You (a dedicated person) are advised to protect passwords, encrypt passwords during transmission and storage, and periodically change passwords.
- Data backup

    You are advised to back up data before and after security hardening, during routine security configuration and maintenance, and before and after troubleshooting.
- Log maintenance

    You are advised to periodically check and back up logs.

7 Openness

About This Chapter

This topic describes the openness performance of eSpace UC.

7.1 Capability Openness

This topic describes open service capabilities provided by eSpace UC.

eSpace UC provides external interfaces for third-party applications to obtain data (such as corporate directories and staff status) and use functions (such as IM and call). These external interfaces comply with standard protocols, easing integration with third-party applications. Table 7-1 describes the open service capabilities of eSpace UC.

Table 7-1 Open services

Service	Description
Third-party application management	eSpace UC manages and configures basic information, capabilities, and access parameters of third-party applications. Enterprise administrators can configure major information about third-party applications on the BMP.
Third-party application interface adaptation	eSpace UC performs access authentication of third-party applications and provides interfaces such as SOAP interfaces for third-party applications.
UC capability openness and adaptation	eSpace UC provides standard protocol interfaces that allow third-party applications to invoke the call, PGM, and conference services.
Message exchange with third-party applications	Third-party applications can send IMs to eSpace UC users through open interfaces, and eSpace UC users can directly respond to these IMs. This achieves instant communication between third-party applications and eSpace UC users.

7.2 Microsoft Lync Integration

This topic describes the integration of eSpace UC and Microsoft Lync.

Function

Microsoft Lync is an enterprise- ready unified communications platform launched by Microsoft. It provides functions such as voice, IM, video, audio, and web conference over the Internet.

eSpace UC can be integrated with the Microsoft Lync to implement voice communication between eSpace terminals and Lync clients, and simultaneous ringing of eSpace Desktops and Lync clients. Figure 7-1 shows the networking.

Figure 7-1 Interconnection between Lync and other devices in eSpace UC

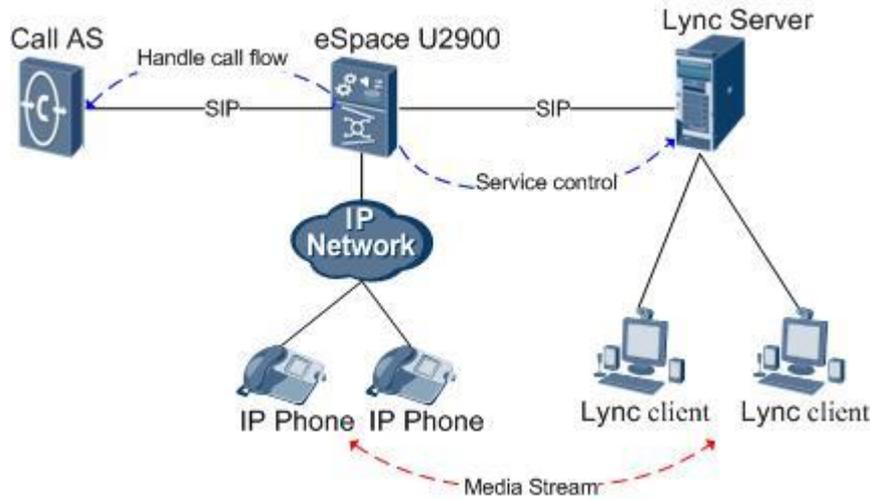Table 7-2 describes the services provided after eSpace UC is integrated with Microsoft Lync.

Table 7-2 Lync integration services

Service	Description
Voice communication between eSpace terminals and Lync clients	An enterprise administrator adds a Lync user number on the BMP, and the account of Lync user A is bound to this number. After that, user A can make calls with any eSpace terminal after logging in to the Lync client.
Simultaneous ringing of eSpace Desktops and Lync clients	An enterprise administrator adds 10000 (a common user number of an enterprise) on the BMP, and the account of enterprise user A is bound to the number 10000 and has the **Bind OCS client** function enabled. The account of Lync user B is also bound to the number 10000. When enterprise user C dials 10000 using an IP phone, the eSpace Desktop of user A and the Lync client of user B ring simultaneously.

⚠ CAUTION

Automatic recording must be disabled for the number added on the BMP; otherwise, the Lync client will fail to answer the call from this number.

Typical Scenario

The following describes a typical scenario of simultaneous ringing for the Lync client and eSpace Desktop:

1. An enterprise administrator creates a common user number 10111 on the BMP, and binds UC account A to 10111.

2. The enterprise administrator enables the **Bind OCS client** function for UC account A.

3. Lync account B is created on the Lync management platform and is bound to the number 10111.

4. A user with UC account A logs in to the eSpace Desktop, and a user with Lync account B logs in to the Lync client.

5. Enterprise user C dials 10111, and the eSpace Desktop of UC account A and the Lync client of Lync account B ring simultaneously.

6. Either the user with UC account A or the user with Lync account B can answer the call.

7.3 Outlook Integration

This topic describes the integration of eSpace UC and Microsoft Office Outlook 2007 (Outlook for short).

Function

eSpace UC can be integrated with Outlook. When logging in to the eSpace Desktop from an Outlook-available PC, an enterprise user can also log in to the Outlook client using the email address on this PC. The enterprise user can perform related operations such as viewing the contact status, initiating calls, sending IMs, and initiating instant conferences in the mail address bar on the Outlook client page, as shown in Figure 7-2.
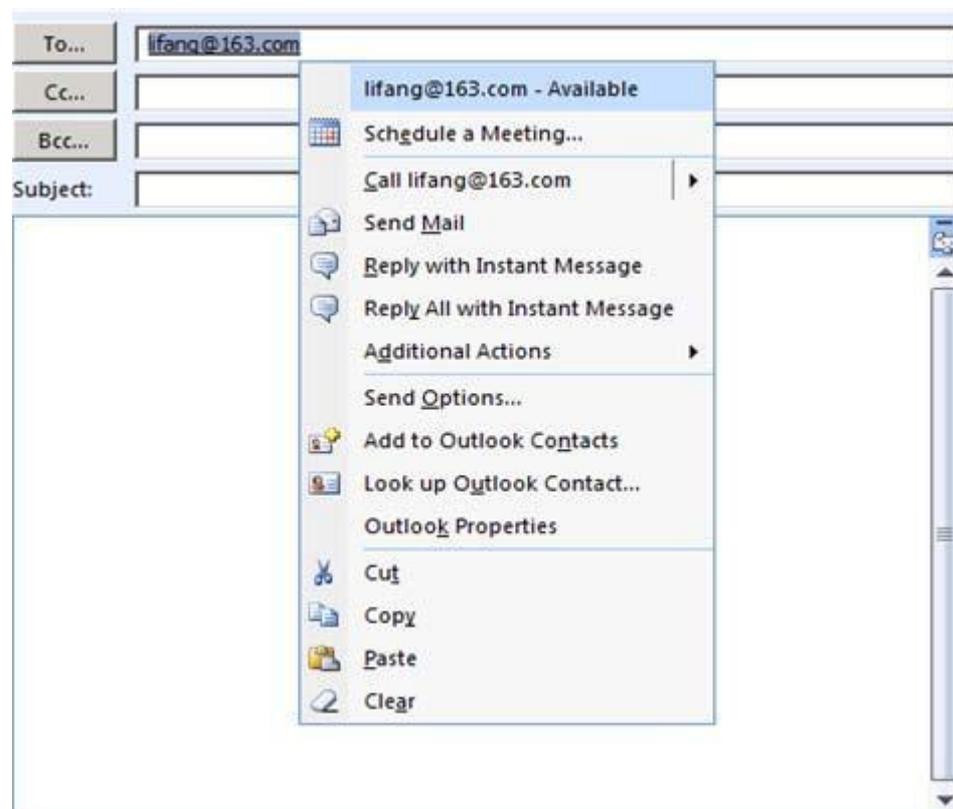
Figure 7-2 Outlook client

Table 7-3 describes the functions provided after eSpace UC is integrated with Outlook.

Table 7-3 Outlook integration services

Service	Description
Viewing user status in the mail address bar	An enterprise user can view the sender and recipient (including carbon copy recipients) status in the mail address bar. After a right-click on the recipient's email address in the mail address bar, users can view the current status of the recipient. The description of a user state obtained in Outlook is provided by Outlook and may be different from that provided by eSpace. For details about the status comparison, see Table 7-4.
Initiating a call to a single user in the mail address bar	To initiate a call to a single user, an enterprise user needs to enter the user's email address in the mail address bar, right-click the email address, and choose **Call xxxx** > **Call xxxx** from the shortcut menu ("xxxx" is the entered email address).
Initiating a voice conference in the mail address bar	To start a voice conference with multiple users, an enterprise user needs to enter the email addresses of relevant users in the mail address bar, right-click an email address, and choose **Call xxxx** > **Call all** from the shortcut menu ("xxxx" is the right-clicked email address).
Sending IMs to a single user in the mail address bar	To send IMs to a single user, an enterprise user needs to enter the user's email address in the mail address bar, right-click the email address, and choose **Reply with Instant Message** from the shortcut menu.
Sending IMs to multiple users in the mail address bar	To send IMs to multiple users, an enterprise user needs to enter the email addresses of relevant users in the mail address bar, right-click an email address, and choose **Reply All with Instant Message** from the shortcut menu.

Table 7-4 User status comparison between eSpace and Outlook

User Status in eSpace	User status in Outlook
Online	Available
Away	Away
Busy	Busy
Offline	Offline
Nodisturb	Do Not Disturb

Typical Scenario

An enterprise administrator creates enterprise users A, B, and C, and assigns email addresses a@huawei.com, b@huawei.com, and c@huawei.com for them on the BMP. After logging in

to the eSpace Desktop, users A, B, and C can perform related operations such as viewing the contact status, initiating calls, and sending IMs on the Outlook client page. The following describes how enterprise user A calls enterprise user B on the Outlook client page:

1. Enterprise user A enters user B's email address (b@huawei.com) in the Outlook mail address bar.
2. User A right-clicks b@huawei.com and chooses **Call b@huawei.com** > **Call b@huawei.com** to call user B.
3. User B's eSpace Desktop rings.
4. User B answers the call. Then, user A can talk with user B.

7.4 Telepresence Integration

This topic describes the integration of eSpace UC and the Telepresence system.

Function

The Telepresence system is integrated with eSpace UC to support high-definition (HD) conferences, providing users with 720P true-to-life dimensions and face-to-face communication experience.

Figure 7-3 shows the network of eSpace UC and the Telepresence system.

Figure 7-3 Interconnection between Telepresence and other devices in eSpace UC
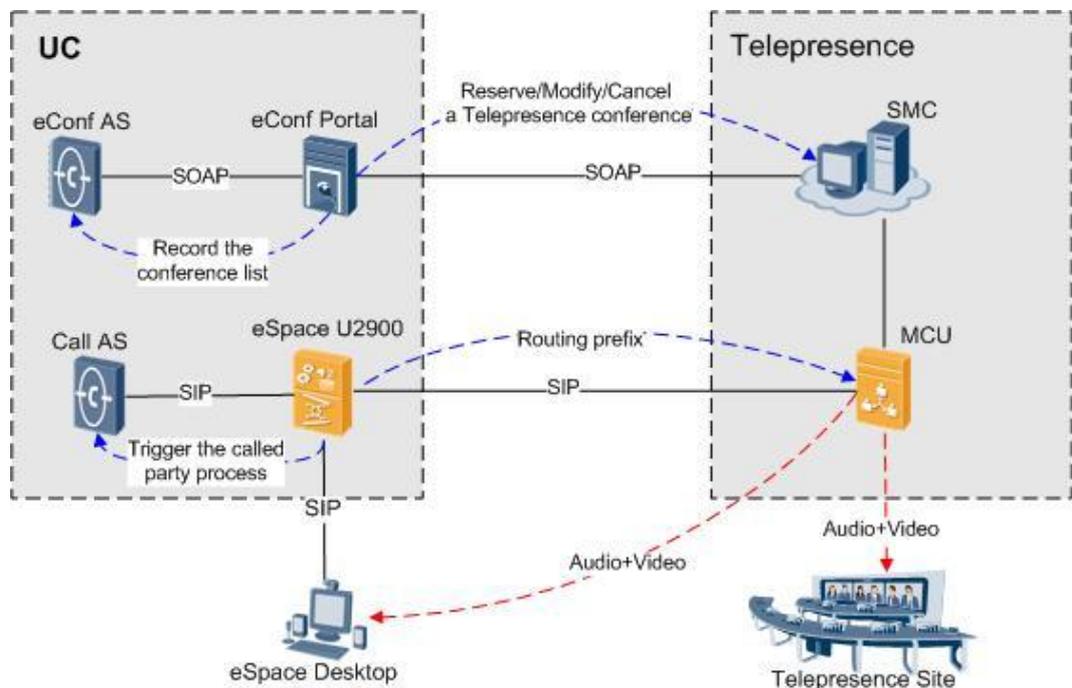
To reserve a Telepresence conference on eSpace Meeting Portal, an eSpace UC user needs to choose **Telepresence** and the corresponding Telepresence room, and enter the basic conference information.

Users can join a Telepresence conference in any of the following ways:

- Dialing the conference access code on the eSpace terminal
- Accepting an invitation from the moderator
- Answering a conference-join call from the Telepresence system

Figure 7-4 shows a Telepresence conference.

Figure 7-4 Telepresence conference

Typical Scenario

User A (manager of the marketing department) holds a Telepresence conference and invites users B and C (employees of the marketing department) to participate in the conference. User A uses eSpace Meeting Portal to create an instant Telepresence conference and the process is as follows:

1. User A logs in to eSpace Meeting Portal and creates a Telepresence conference. The conference type is set to Telepresence conference, the Telepresence conference room is selected, and users B and C are added as participants. The system sends a conference notification to all participants.
2. User A clicks **Start Immediately**. A Telepresence conference is successfully created.
3. User A dials the conference access code on the eSpace Desktop.
4. The system calls users B and C to join the conference.
5. Users A, B, and C start the conference.

7.5 Polycom Integration

eSpace UC can be integrated with the Polycom video conference system, including Polycom hard terminals and Polycom Multipoint Control Units (MCUs).

Network Description

eSpace UC can be integrated with the Polycom voice conference system, an end-to- end voice conference system launched by Polycom. Table 7-5 describes the services achieved after their integration. Figure 7-5 and Figure 7-6 show the networking.

Table 7-5 Network mode

Network Mode	Connection Mode	Scenario	Remarks
eSpace UC connected to Polycom hard terminals	Connection by SIP registration	• An eSpace UC soft terminal makes a voice call to a Polycom hard terminal.	-
eSpace UC connected to Polycom MCUs	• Connection by SIP trunks • Connection by SIP registration	• An eSpace UC soft terminal makes a video call to a Polycom hard terminal. • A Polycom hard terminal makes a video call to an eSpace UC soft terminal. • An eSpace UC soft terminal holds a voice conference and invites a Polycom hard terminal to join the conference. • An eSpace UC soft terminal holds a multimedia conference and invites a Polycom hard terminal to join the conference.	**NOTE** When eSpace UC is connected to a Polycom MCU, users can use the Polycom MCU to hold a video conference and invite UC clients to join the conference.

Figure 7-5 Interconnection between Polycom and other devices in eSpace UC

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Copyright © Huawei Technologies Co., Ltd.
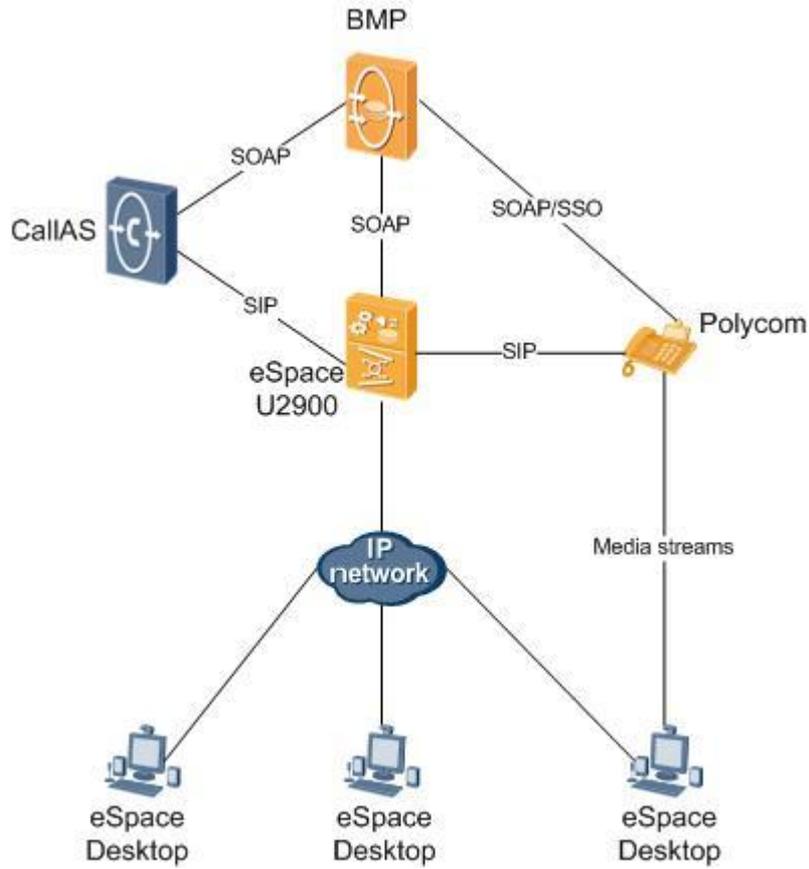
Figure 7-6 Interconnection between Polycom MCU and other devices in eSpace UC
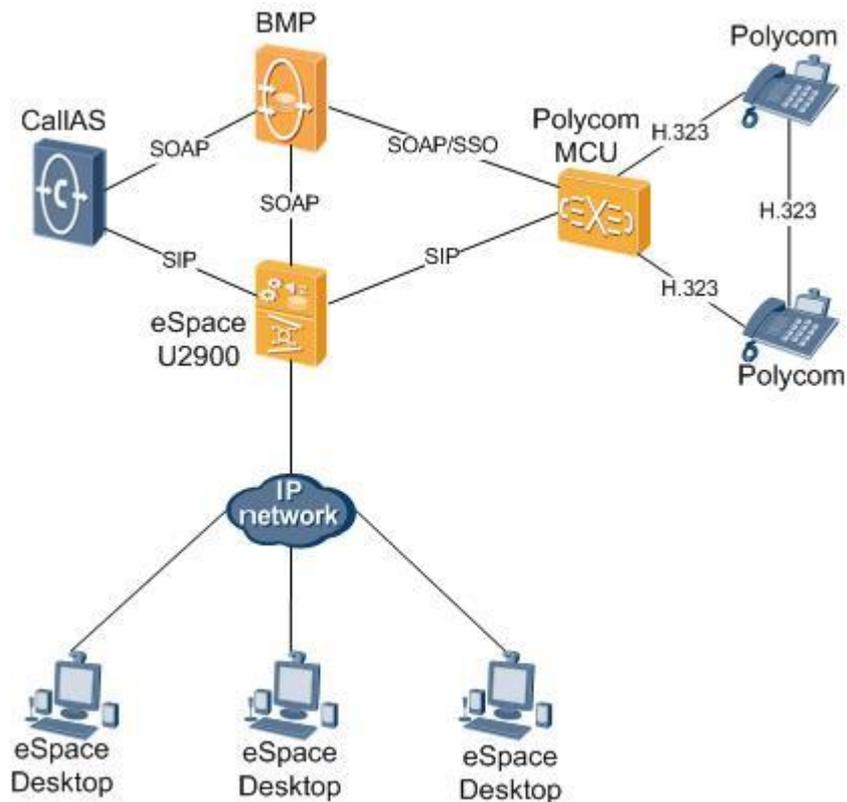
Typical Scenario

A marketing manager reserves a conference and obtains the conference access code on eSpace Meeting Portal. The manager wants to invite employee A (in the local office) and employee B (on a business trip) to the conference. The process is as follows:

1. The manager and employee A dial the access code on the Polycom hard terminal to join the conference in the conference room.
2. Employee B dials the access code using the eSpace Desktop to join the conference.
3. After they all join the conference, the manager and employee A talk with user B through the Polycom hard terminal.
4. The manager can also share the desktop with employees A and B.

7.6 LDAP Integration

eSpace UC supports integration with the corporate directory software that runs Light Directory Access Protocol (LDAP).

eSpace UC supports LDAP and can be integrated with LDAP-based corporate directory software to store the enterprise contact information, thereby achieving centralized management of enterprise contacts. Users can search corporate directories for the desired contact information by specifying search criteria on different terminals.

8 Operation and Maintenance

About This Chapter

This topic describes the operation and maintenance system of eSpace UC.

8.1   Service Management System

This topic describes the service management systems used by different roles during operation and maintenance.

8.2   Network Management System

eSpace EMS monitors and manages NE performance in a unified manner.

8.3   One-Stop Automatic Installation

eSpace UC provides iWeaver for one-stop automatic installation.

8.4   Upgrade

This topic describes the upgrade scheme for eSpace UC deployed in a large enterprise (large-enterprise deployment).

8.5 Maintenance Tool

In eSpace UC, eSpace EMS is used to monitor NEs and manage alarms, and MainAst is used for preventive maintenance of all NEs.

8.1 Service Management System

This topic describes the service management systems used by different roles during operation and maintenance.

eSpace UC provides enterprise administrator, system administrator, and enterprise member roles. Table 8-1 describes the service management systems for these roles.

Table 8-1 Service management systems

User Role	Service Management System	Description
Enterprise administrator	BMP	BMP provides enterprise administrators with a unified service management platform. Enterprise administrators can perform various management operations on the BMP, such as managing users and enabling services. The BMP also supports service plug-ins, which can be deployed flexibly based on an enterprise's requirements. Pages and interfaces displayed on the BMP GUI can be flexibly customized.
System administrator	eSpace EMS	eSpace EMS is a lightweight and large-capacity network management system for enterprises. It manages all eSpace UC components, including service configuration and upgrade management.
	eSpace Meeting Portal	eSpace Meeting Portal allows enterprise administrators to configure the eSpace Meeting, email server, and interconnection between the eSpace Meeting and the Telepresence server/U1900 so that the eSpace Meeting services can be available.
Enterprise member	eSpace Portal	eSpace Portal is provided for registered users in an enterprise. When logging in to the eSpace Portal, enterprise members can maintain their personal information and configure services.
	eSpace Meeting Portal	eSpace Meeting Portal allows enterprise members to create instant conferences and scheduled conferences, and manage the created conferences.

8.2 Network Management System

eSpace EMS monitors and manages NE performance in a unified manner.

NE monitoring involves the following operations:

- Monitoring template management

  Allows users to add, modify, customize, and delete performance monitoring templates.

- Monitoring counter management

  Allows users to add, modify, query, and delete the monitoring counters of managed objects.

- Performance alarm threshold management

  Allows users to set alarm thresholds for NE performance counters so that eSpace EMS can automatically generate and clear alarms when monitoring NE instances.

By monitoring performance data, maintenance personnel can understand in real time the current performance trend of each NE, which provides a basis for network optimization and maintenance.

Maintenance personnel can set performance counters and statistics collection durations. Based on the settings, eSpace EMS collects statistics on performance data. The statistics are displayed in real time in the performance monitoring window.

Maintenance personnel can monitor performance counters of the managed NEs in real time and detect exceptions.

eSpace EMS displays the monitoring results in bar charts or line charts to clearly show the performance trend. Maintenance personnel can avoid potential risks by taking active measures before a performance counter reaches its threshold.

Maintenance personnel can monitor the following NEs using eSpace EMS:

- eSpace U2900 series

  CPU usage, memory usage, disk usage, data in the board's memory, system module status, and port traffic
- eSpace U1900 series

  E1 resource usage, Digital Signal Processing (DSP) resource usage, Board's CPU usage and memory usage, Tx bandwidth, and Rx bandwidth
- Database

  Oracle database performance: global performance, tablespace performance, and LIB CACHE performance
- Linux operating system

  CPU usage (in the performance monitoring view)
- Call AS/PGM/eSpace Meeting/AA/MAA

  System resources and service usage
- eSpace IAD and IP phone

  eSpace IAD and IP phone versions. If the actual versions are earlier than those in eSpace EMS, eSpace EMS automatically upgrades and configures eSpace IADs and IP phones in batches.

8.3 One-Stop Automatic Installation

eSpace UC provides iWeaver for one-stop automatic installation.

iWeaver applies to service installation at a single site. Users can install eSpace UC services on the **iWeaver** page (as shown in Figure 8-1) following the installation wizard.

Figure 8-1 iWeaver main page

iWeaver has the following advantages compared with other installation modes:

- Reducing the installation complexity and time.
- Providing software pre-installation service. Basic and service software can be pre-installed on devices during the device production process.
- Achieving quick delivery. Devices can have their functions commissioned and services verified upon powered on.

8.4 Upgrade

This topic describes the upgrade scheme for eSpace UC deployed in a large enterprise (large-enterprise deployment).

In large-enterprise deployment mode, an AS is independently deployed on a server, eSpace U2900s are used as gateways, IP phones are registered with different eSpace U2900s, and eSpace U1900 and EGW1500E function as trunk gateways in branches.

Table 8-2 lists the upgrade schemes

Table 8-2 Upgrade schemes for large enterprises

NE Type	NE	Upgrade Scheme	
AS	Call AS, PGM, and eSpace Meeting	These servers support smooth upgrade. When some of the servers are upgraded, they are still compatible with the servers that are not upgraded.	

NE Type	NE	Upgrade Scheme
IP terminal	IP phone and eSpace IAD	eSpace EMS can be used to upgrade IP phones and eSpace IADs. eSpace EMS obtains the upgrade server information using DHCP, and compares the actual IP phone version with the version on the upgrade server. If the actual version is earlier than that on the upgrade server, eSpace EMS automatically downloads the latest version from the file server and performs the upgrade. eSpace IAD periodically detects the upgrade file on the FTP server. When detecting a new upgrade file, eSpace IAD automatically upgrades its software.
eSpace U1900	eSpace U1910, eSpace U1930, eSpace U1960, and eSpace SoftCo9500	eSpace EMS can be used to upgrade the main programs of eSpace U1900 series in batches. eSpace EMS supports retry and rollback if an upgrade fails.
eSpace Desktop	eSpace Desktop	Soft terminals can be upgraded in batches based on the area and user attributes. When the upgrade is complete, the soft terminals are restarted.
Mobile terminal	eSpace Mobile and eSpace Mobile HD	The system administrator configures the mobile terminal upgrade policy on the BMP, reminding mobile terminal users of online upgrade.

8.5 Maintenance Tool

In eSpace UC, eSpace EMS is used to monitor NEs and manage alarms, and MainAst is used for preventive maintenance of all NEs.

Table 8-3 describes eSpace EMS and MainAst.

Table 8-3 Maintenance tools

Maintenance Tool	Description
eSpace EMS	Allows users to monitor and manage alarms and performance counters of each NE.
MainAst	Allows users to import preventive maintenance packages and add devices for automatic preventive maintenance of devices.

9 Interface

About This Chapter

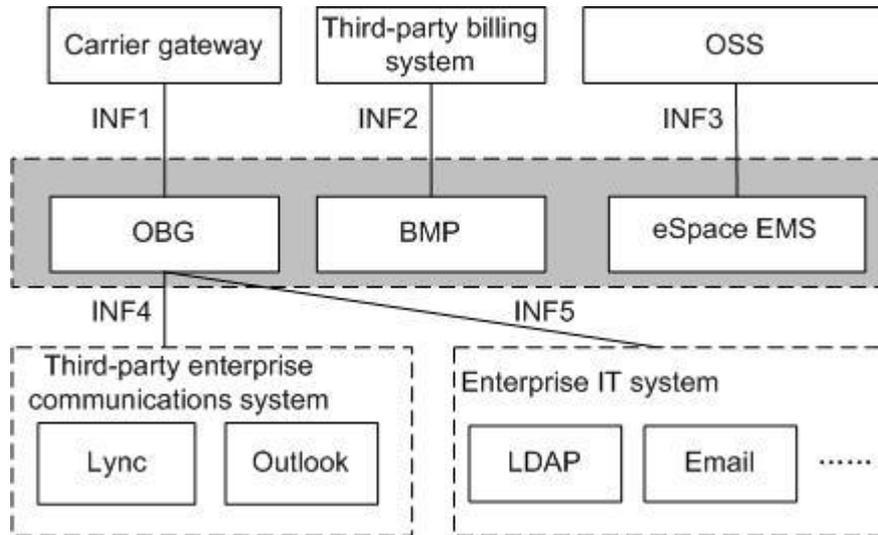This topic describes internal and external interfaces of eSpace UC.

9.1 External Interface

This topic describes the external interfaces of eSpace UC.

Schematic Diagram

Figure 9-1 shows the schematic diagram of the external interfaces.

Figure 9-1 Schematic diagram of external interfaces

Description

Table 9-1 describes the external interfaces.

Table 9-1 Description of external interfaces

Interface	Protocol	Description
INF1	• CMPP • SMPP • WAP • MM7	INF1 is a third-party interface provided by the OBG for carriers.
INF2	SOAP	INF2 allows a third-party system to obtain CDRs from the BMP server.
INF3	SNMP	INF3 is a management interface used between the eSpace EMS and the operations support system (OSS).
INF4	• SOAP • SIP	INF4 allows the communication and integration between eSpace UC and other third-party communications systems in the enterprise through the OBG.
INF5	SOAP	INF5 is an interface for integration between eSpace UC and the enterprise IT system. The message interface, CTC/CTD interface, and user status interface are included.

9.2 Internal Interface

This topic describes the internal interfaces of eSpace UC.

Schematic Diagram

Figure 9-2, Figure 9-3, and Figure 9-4 show the schematic diagrams of the internal interfaces for eSpace U2900 series.

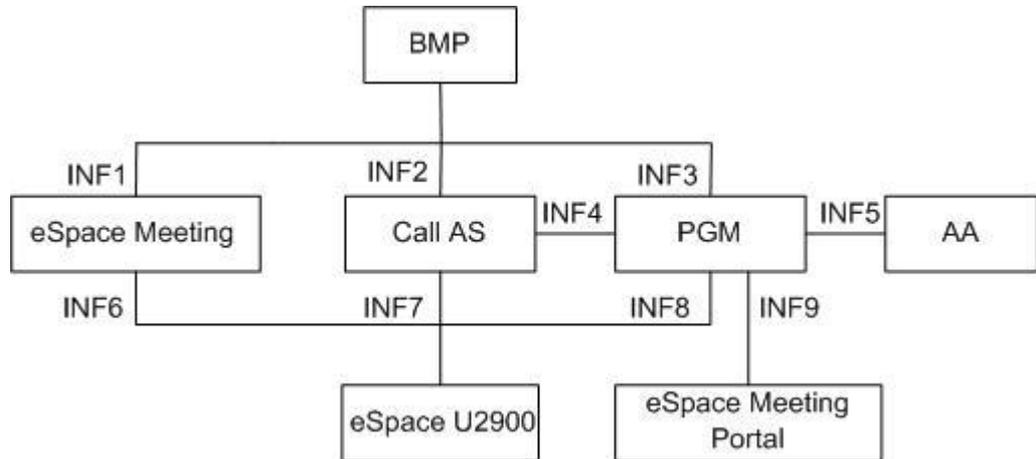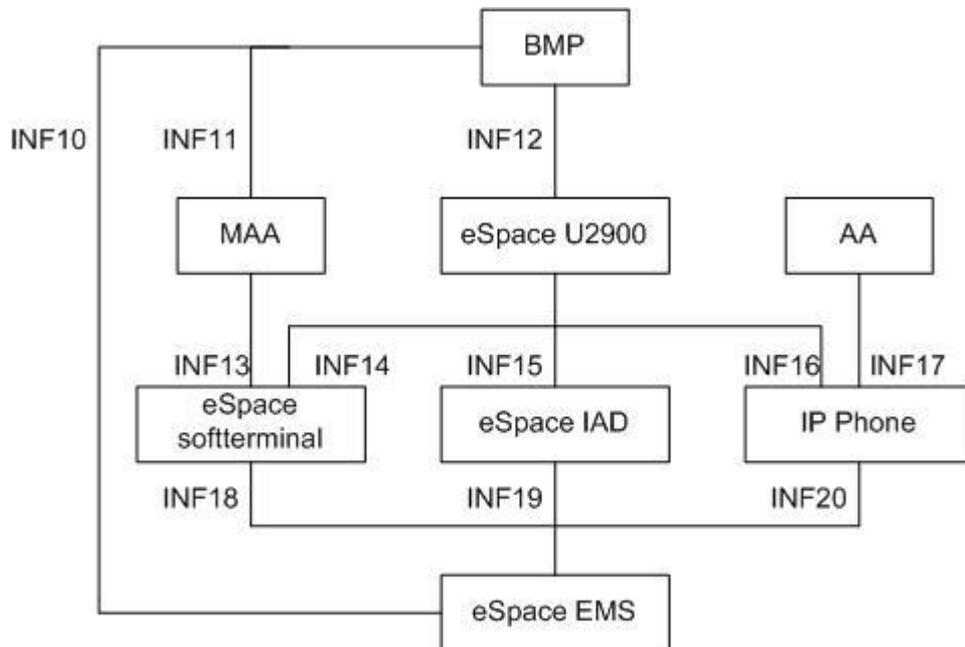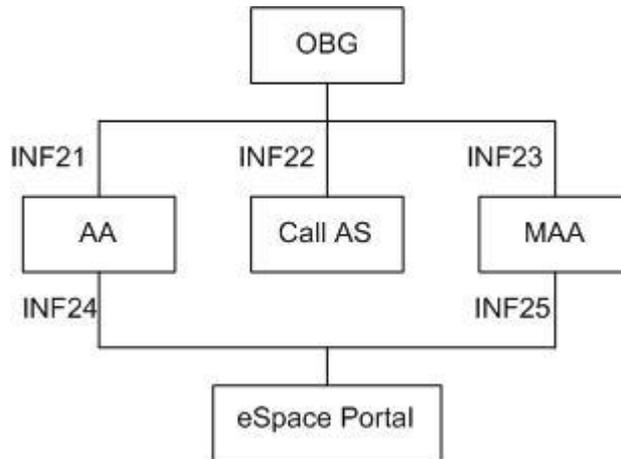**Figure 9-2** Schematic diagram of internal interfaces (1)

Figure 9-3 Schematic diagram of internal interfaces (2)

Figure 9-4 Schematic diagram of internal interfaces (3)

Description

Table 9-2 describes the internal interfaces.

Table 9-2 Description of internal interfaces

Interface	Protocol	Description
INF1	SOAP	INF1 is a SOAP interface between the BMP and eSpace Meeting to synchronize UC accounts.
INF2	• SOAP • DAS API	• The Call AS invokes the SOAP interface of the BMP to activate or deactivate services. • The BMP invokes the DAS API interface of the Call AS to synchronize service data.
INF3	SOAP	INF3 is a SOAP interface between the BMP and PGM to synchronize user data.
INF4	IDL	The Call AS invokes the IDL interface of the Presence to obtain user status data and invokes the IDL interface of the PGM to update or query user status.
INF5	IDL	The AA interacts with the PGM to authenticate SOAP messages and query user status.
INF6	SIP	INF6 is a SIP interface between eSpace Meeting and eSpace U2900 to trigger services and invoke resources.
INF7	SIP	INF7 is a SIP interface between the Call AS and eSpace U2900 to process call signaling.
INF8	SIP	INF8 is a SIP interface between the PGM and eSpace U2900 to trigger services and process status notifications.

Interface	Protocol	Description
INF9	SOAP	eSpace Meeting Portal invokes the SOAP interface of the PGM to query corporate directories and IMs.
INF10	SNMP	INF10 is an interface between the service component and the eSpace EMS to process alarms.
INF11	SOAP	The MAA uses the SOAP interface to invoke the BMP, achieving the bulletin service of the BMP.
INF12	SOAP	INF12 is a SOAP interface between the BMP and eSpace U2990 to synchronize their data.
INF13	HTTP	eSpace Mobile sends HTTP requests to the MAA through the HTTP interface, allowing eSpace Mobile to access the MAA.
INF14	SIP	INF14 is a SIP interface between the soft terminal and eSpace U2900 to support voice and data services.
INF15	SIP	INF15 is a SIP interface between IAD and eSpace U2900 to register users and process calls.
INF16	SIP	INF16 is a SIP interface between the IP phone and eSpace U2900 to support voice and data services.
INF17	HTTP	IP phones invoke INF17 to obtain related configurations from AA.
INF18	HTTP	INF18 is an upgrade interface between the soft terminal and eSpace EMS. Through this interface, the version information and URL of the upgrade package can be obtained.
INF19	• HTTP • TR069 • SNMP	• Users obtain upgrade and configuration information through the HTTP interface. The IAD supports HTTP-based upgrade and therefore provides HTTP interface upgrade and configuration management. • eSpace EMS configures, manages, and upgrades IADs in TR069 mode. • The IAD reports alarms to eSpace EMS using SNMP messages.
INF20	• HTTP • TR069 • SNMP	• Users obtain upgrade and configuration information through the HTTP interface. The IP phone supports HTTP-based upgrade and therefore provides HTTP interface upgrade and configuration management. • eSpace EMS configures, manages, and upgrades IP phones in TR069 mode. • The IP phone reports alarms to eSpace EMS using SNMP messages.
INF21	HTTP	INF21 is an HTTP interface for user login and information obtainment.

Interface	Protocol	Description
INF22	IDL	INF22 is an IDL interface used by the Call AS to provide open service capabilities for the OBG.
INF23	HTTP	The MAA provides functions such as address books, calls, friends, and messages for eSpace Mobile through the HTTP interface.
INF24	SOAP	INF24 is a SOAP interface between eSpace Portal and AA. eSpace Portal invokes this interface to authenticate users and obtain user configurations.
INF25	SOAP	INF25 is a SOAP interface between eSpace Portal and MAA to authenticate users and obtain user configurations.

10 Technical Specifications

About This Chapter

This topic describes the capacity counters, performance counters, and protocol compliance of eSpace UC.

10.1　Capacity and Performance Counters

This topic describes the capacity and performance counters of eSpace UC.

10.2　Protocol Compliance

This topic provides the protocols that eSpace UC complies with.

10.1 Capacity and Performance Counters

This topic describes the capacity and performance counters of eSpace UC.

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

Table 10-1, Table 10-2 , and Table 10-3 describe eSpace UC and eSpace U2990 capacity and performance counters, and eSpace U1900 capacity counters.

Table 10-1 eSpace UC capacity and performance counters

Capacity and Performance Counter		Value
Capacity	Maximum number of registered users	300000
	Maximum number of records in a directory	300,000
Performance	Maximum number of concurrent logins per second	58
	Maximum number of concurrent conference reservations per second	12
	Maximum number of concurrent CDR queries	50 users/5s

Table 10-2 eSpace U2990 and eSpace U2980 capacity and performance counters

Capacity and Performance Counter		eSpace U2990	eSpace U2980
Capacity	Maximum number of access trunks	100,000 (centralized deployment) 800,000 (distributed deployment)	100,000 (centralized deployment) 800,000 (distributed deployment)
	Maximum number of audio resources	50,000 (centralized deployment) 400,000 (distributed deployment)	50,000 (centralized deployment) 400,000 (distributed deployment)
	Maximum number of 2 Mbit/s or 64 kbit/s signaling links	2 Mbit/s signaling links: 80 64 kbit/s signaling links: 1,280	2 Mbit/s signaling links: 80 64 kbit/s signaling links: 1,280
Performance	Processing capability	12,000,000 Busy Hour Call Attempts (BHCAs)	12,000,000 BHCAs

Table 10-3 eSpace 1900 capacity counters

Capacity Counter	eSpace U1910	eSpace U1930	eSpace SoftCo9500
Maximum number of users	100	300	10000
Maximum number of concurrent intra-office calls	30	60	2000
Maximum capacity of digital trunks	30	60	900
Maximum capacity of SIP trunks	30	60	2000
Busy Hour Completed Calls (BHCCs)	14,400	28,800	180,000

10.2 Protocol Compliance

This topic provides the protocols that eSpace UC complies with.

Table 10-4 lists protocols used in eSpace UC.

Table 10-4 Protocols used in eSpace UC

Protocol Type	Protocol Name	
Hypertext Transfer Protocol (HTTP)	RFC 2068	
Routing Table Protocol (RTP)	RFC 1889	
	RFC 1890	
	RFC 2833	
Session Description Protocol (SDP)	RFC 2327	
Session Initiation Protocol (SIP)	RFC 3261	
	RFC 3262	
	RFC 3264	
	RFC 3311	
	RFC 3903	
Simple Network Management Protocol (SNMP)	RFC 1157	
Simple Object Access Protocol (SOAP)	SOAP Version1.2 Part 1 Messaging Framework-chs	
Transmission Control Protocol/Internet Protocol (TCP/IP)	RFC 0768	
	RFC 0791	
	RFC 0793	
XML Configuration Access Protocol (XCAP)	RFC4825	
Message Session Relay Protocol (MSRP)	RFC4975	
Secure Real-Time Transport Protocol (SRTP)	RFC3711	
	RFC4568	
Transport Layer Security (TLS) Protocol	RFC2246	
	RFC4346	
	RFC3329	
User Datagram Protocol (UDP)	RFC768	
Session Description Protocol (SDP)	RFC2327	

Protocol Type	Protocol Name
Short Message Peer to Peer (SMPPv3.3/SMPPv3.4)	3GPP-TS-TR-1-23039
China Mobile Peer to Peer	CMPP2.1
Short Message Gateway Interface Protocol	SGIP1.2
IP	IPv4 and IPv6 can be support by full solution elements