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White Papers by Polycom

Deploying the Polycom Office

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Deploying the Polycom Office

Introduction: The Polycom Office

This document provides a brief introduction to the Polycom Office, and an overview of deploying it.

The Polycom Office is a blueprint that allows organizations to make decisions on deploying a collaborative conferencing network that includes voice, video and data communications. The Polycom Office enables end-to-end connectivity that is both transport- and protocol-agnostic. Whilst the true potential of the Polycom Office is realized when all the elements are deployed, any investment in any Polycom solution can be leveraged in the future as the needs of the organization grow. Furthermore, any investment already made in third-party solutions can be integrated within the Polycom Office.

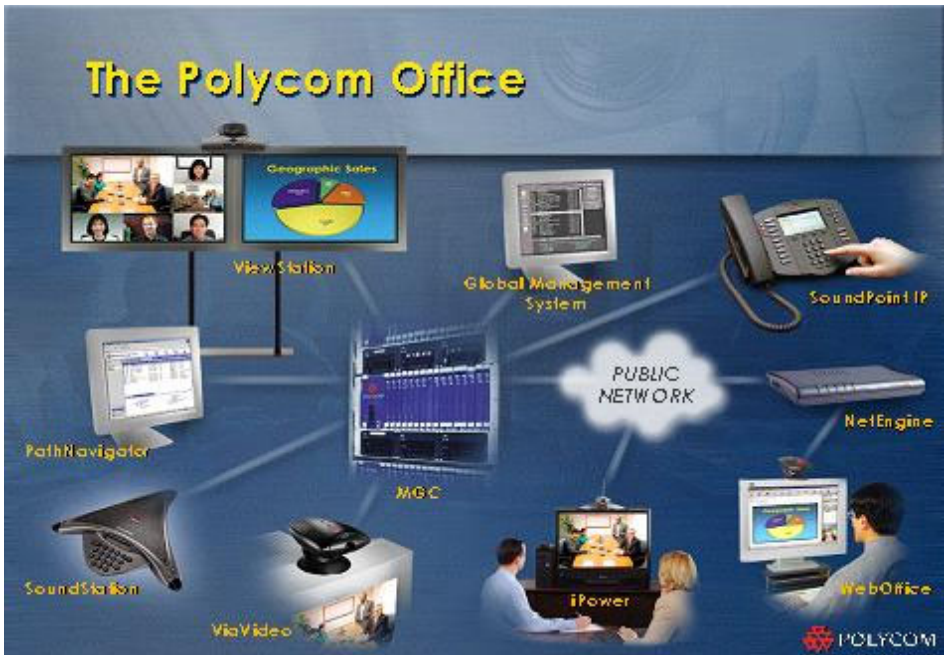

Figure 1. The Complete Polycom Office

This document discusses the deployment of a network including video endpoints, MGC and MGC Manager, Global Management System, WebCommander, and PathNavigator. These are described below.

Video Terminals

Polycom offers a complete range of video terminals including personal, group and boardroom solutions. Connectivity is not an issue as most terminals come with both IP and ISDN support. All video terminals are tightly integrated with the Polycom Global Management System and PathNavigator Call Processing Server. This integration enables facilities such as remote management and Polycom OneDial™ to be delivered to all users of the video network.

Global Management System

The Polycom Global Management System provides centralized directory services, removing the need to update the address book of each terminal individually. These directory services are also linked into PathNavigator to enable Polycom OneDial™ and ad-hoc multipoint services.

The Global Management System also automatically discovers all video devices on the network and allows you to configure any Polycom device remotely. It can automatically update terminal software, proactively monitor your network, and manage any faults that may occur during video calls. These tools combine to provide automated helpdesk services for your deployment. Global Management System also provides call detail recording and cost accounting. These powerful support facilities help ensure that the maximum service is delivered to conferencing users with the minimum of overhead.

PathNavigator

PathNavigator, a call-processing server for video communications, works with the Global Management System to deliver the unique Polycom OneDial™ facility, which enables corporate video communications to function like corporate telephone systems.

Polycom PathNavigator also provides facilities such as automatic call re-routing, least-cost routing and call forwarding. These facilities are standard in the audio world – PathNavigator provides them for video communications.

WebCommander

WebCommander provides a simple easy-to-use interface that allows a user to book a video meeting and then manage that meeting once it is in progress. Without WebCommander any conferencing solution needs to rely on centralized administration and control to book and manage video meetings.

Polycom MGC Platform

The Polycom MGC platform provides integrated support for both audio and video meetings. The MGC transcoding architecture ensures all sites receive optimum video and audio quality by automatically translating between all connections in a conference, irrespective of connection speed, network type, compression algorithms and data rates.

The Polycom MGC solution is fully integrated with PathNavigator and other network management tools, ensuring that all the facilities such as call forwarding; ad-hoc multipoint calls and Polycom OneDial™ are available across the entire video network.

Planning the Deployment

The main factors to consider in planning the deployment are:

- LAN/WAN considerations – document the LANs, subnets, and WAN links involved in the deployment.
- Capacity planning – assess the bandwidth requirements for the deployment.
- Call processing considerations – define call processing architecture and identify gatekeepers, define registration policy and call policy.
- Dial plan – define details of services, routing, policies, zones, and addressing.
- Server requirements – verify that all management software will be installed on suitable equipment.

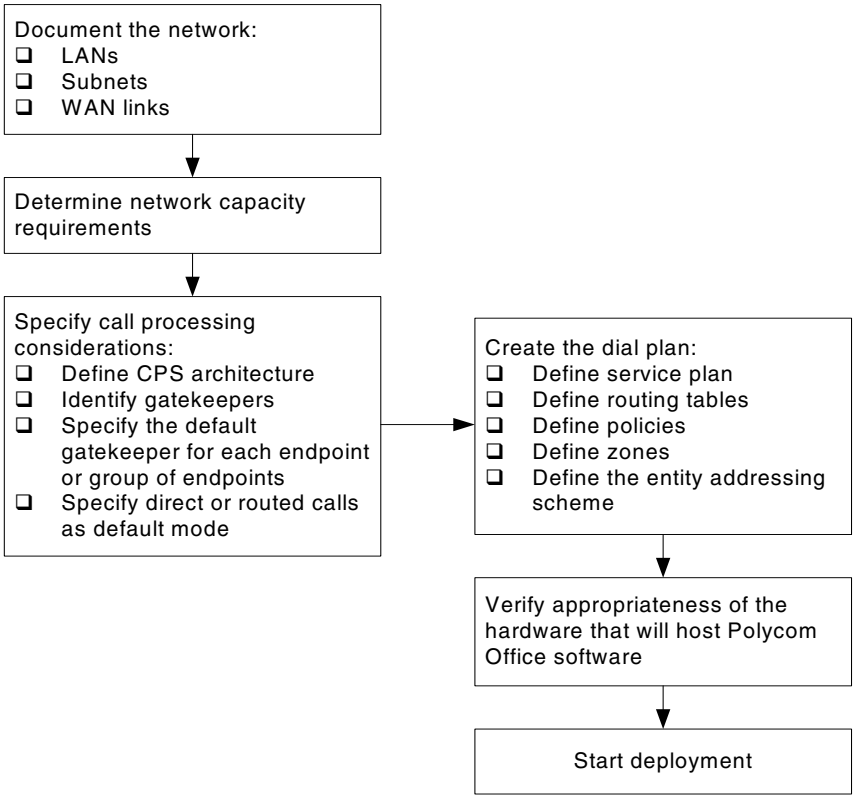

Figure 2. Steps in Preparing for Deployment

Defining a call processing architecture is outside the scope of this white paper, but is discussed in detail in the PathNavigator Deployment Guide in the Documentation section at http://www.polycom.com/.

LAN/WAN Considerations

You will need to develop a network topology checklist that includes the following information:

- **List of Networks:** To take advantage of least cost routing and alternate routing, you must define the topology of the Local area networks (LANs) that each gatekeeper serves, as well as the LANs that are logically connected to these but served by other gatekeepers. This allows the gatekeeper to determine how IP traffic is routed from one endpoint to the next. PathNavigator uses the network topology to determine when resources are unavailable so that an alternate (ISDN) path can be determined.

- **Subnets within each network and subnet IP address:** A network address is the equivalent of a subnet. You will need to define all subnet addresses within your LAN. If this information is not available to the gatekeeper, calls may be rejected because no route can be determined.
- **WAN links:** WAN links are logical connections from one LAN to another LAN within the WAN cloud, or logical connections from one network to another network outside of the enterprise. The two types of WAN links are the dedicated WAN link, which is a logical connection via a dedicated link, leased line, frame relay or though an ATM network; and the WAN link to other networks through a VPN tunnel, which connects one network to another through a secure connection over the Internet.
- **Network Diagram** describing how networks are connected and bandwidth capacity on each WAN Link.

Each gatekeeper will need information about its neighbor gatekeepers to be able to communicate with them. Neighbor gatekeepers manage other H.323 zones within an organization and allow the network's workload to be distributed across logical boundaries within the organization. This enables more efficient use of the network by limiting communication between zones (across WAN links). When a call originates with one gatekeeper's zone and that zone's gatekeeper is unable to resolve the dialed address, it will be forwarded to the neighbor gatekeepers for resolution. The port used for gatekeeper-to-gatekeeper communication is usually 1719.

Capacity Planning

H.323 traffic uses more bandwidth than the selected call quality or H.320 equivalent. Polycom recommends that you allow 20% overhead for the H.323 signaling traffic. ISDN networks do not include signaling in the payload calculations, but in TCP/IP networks all signaling must also be accounted for. For example, a 384-Kbps video call would require approximately 384 Kbps + 20% = 460 Kbps of bandwidth on a TCP/IP network. These figures assume a full-duplex network.

If H.323 traffic starts out on a half-duplex network segment, it will require twice the bandwidth indicated by the bandwidth calculations described above. It will, however, take advantage of full-duplex segments as soon as it reaches them. For full-duplex segments, the calculations above remain valid. WAN segments (T1, Frame Relay, ATM) are typically full-duplex.

The following equations will help in determining the bandwidth required for H.323 traffic across various network segments:

- Full-duplex Ethernet = (Call Speed + 20%) x 1
- Half-duplex Ethernet = (Call Speed + 20%) x 2
- Wide Area Network = (Call Speed + 20%) x 1
- ATM (Using LANE) = (Call Speed + 35%) x 1

The table below provides a comparison between H.320 and H.323 point-to-point calls.

Table 1: Bandwidth Requirements

Call Quality (Speed)	Bandwidth Required over ISDN (H.320)	Bandwidth Required over IP (H.323)
128 Kbps	1 Basic Rate ISDN (BRI) line	153 Kbps
256 Kbps	2 BRI lines	307 Kbps
384 Kbps	3 BRI lines	460 Kbps
512 Kbps	4 BRI lines	614 Kbps
768 Kbps	Fractional T1 or full Primary Rate ISDN (PRI) line	922 Kbps
1.5 Mbps	1 PRI line	1.843 Mbps
2.0 Mbps	Multiple[a] PRI lines or E1 line (Europe)	2.4 Mbps

a. Requires a third-party inverse multiplexer. Inverse multiplexers provide inverse multiplexing to transmit a single high-speed data channel over one or many T1 (PRI) or E1 links.

Keep in mind that the examples given here discuss only a single point-to-point call. Your capacity planning calculations must take into account the total number of calls that you expect the network to handle at one time, including multipoint calls. In addition, you will need to factor in the requirements for any other traffic that the network must handle.

For detailed information about capacity planning, please refer to the Polycom white paper, **IP Bandwidth Guide**, available at http://www.polycom.com/.

Call Processing Considerations

After documenting your network topology, you will need to define:

- Call processing architecture
- Gatekeeper identifier
- Default gatekeeper
- Call routing mode

Note: Polycom's PathNavigator call processing server contains a gatekeeper module. The terms "call processing server" and "gatekeeper" are used interchangeably throughout this document.

Call-Processing Architecture

As previously stated, defining the call processing architecture is outside the scope of this document. Please refer to the **PathNavigator Deployment Guide** in the Documentation section at http://www.polycom.com/ for detailed information on this topic.

Gatekeeper Identifier

You will need to specify the gatekeeper identifier for each gatekeeper being deployed. You must also define the maximum number of endpoints that may be registered to each gatekeeper and the maximum number of calls that each gatekeeper may handle at one time.

Default Gatekeeper

An endpoint may register to a gatekeeper automatically or manually. If endpoint registration is automatic, the registration policy must specify a default gatekeeper – more than one gatekeeper may exist on the network.

The registration policy defines the endpoints that may register to the gatekeeper. It may allow any endpoint to register, or it may restrict registration to specific endpoints or endpoints on specific networks.

Call Routing Mode

The default call mode may be direct or routed. In direct call mode, the gatekeeper allows endpoints to send messages directly to each other – the calls do not need to be routed through the gatekeeper. If direct call mode is used, gatekeeper functionality (such as simplified dialing, Conference on Demand, and alternate routing) is not available, because the call bypasses the gatekeeper.

In routed call mode, the gatekeeper processes the calls. This provides access to configured features such as simplified dialing, alternate routing, least cost routing and call forwarding functions. For this reason, Polycom recommends that you use routed mode as the default.

Developing the Dial Plan

The final element of the predeployment preparations is the dial plan.

The dial plan defines how you set numeric aliases and service prefixes. Numeric aliases look like telephone numbers. They allow people to dial a short string of numbers like a telephone extension or local telephone number instead of entering a full IP address. Service prefixes are short numeric strings that identify the services being requested, such as call speed and zone.

An H.323 dial plan allows you to associate a numeric alias to the network address of each H.323 entity. This is the calling plan that you develop for H.323 deployments.

In large deployments, the dial plan also helps to manage resources by segmenting user populations.

The dial plan defines the following elements of the deployment:

- Services – these include system services, gateway and MCU services.
- Routing and policies – these include the default group policy and least-cost routing tables.
- Network topology – includes private numbering plans (E.164 provisioning) or a public dialing plan (ISDN alias assignment).
- Neighbor gatekeepers – these are gatekeepers that manage other H.323 zones within an enterprise.
- Addressing – specifies the requirements for assigning zone and service prefixes and endpoint addresses.

Services

System services

System services are defined within PathNavigator. They include many of the functions that simplify the user's interaction with the Polycom Office. System services only work within a zone.

Gateway and MCU services

The dialing architecture in PathNavigator makes it simple for the user to dial out through a gateway or dial into a conference. With a standard gatekeeper, in order to use most gateways, users have to note the different prefixes that are required to use the gateway service. Some gateways even have different prefixes for calling at different call speeds. PathNavigator provides Simplified Dialing, a gateway service that reduces the complexity of making video calls. With PathNavigator, users only have to dial 9 then the number to access the gateway for call execution. All gateway services are registered with PathNavigator, which keeps track of all of the service codes instead of requiring the user to do so.

In order for Simplified Dialing to be effective, the gateway service information such as service and zone prefixes, device capabilities, and call speed must be registered with PathNavigator.

It is important to understand that gateway and MCU services are defined in both PathNavigator and the MGC platform itself. It is critical that the prefixes are exactly the same in each system.

Routing and Policies

Default Group Policy

A group policy allows you to define dialing properties, services, and bandwidth management parameters for all members of a defined group without having to configure these individually for each user.

The default group is normally all users, and the policy settings for this group are the default group policy. The administrator sets policy, services, and other settings for this and other groups.

Least-Cost Routing

Least-cost routing enables calls that originate inside the enterprise to be routed in the manner that incurs the lowest expense. In order for least-cost routing to be implemented, the network topology must be defined – the gateways on each network, WAN link capacities, and other factors.

Each gateway has an associated least-cost routing table which is created by the administrator. The table consists of dial string entries (country code, area/city code, etc.) and cost. For calls between networks, the tables are compared to identify the least-cost route for the call. Least-cost routing will not be used if the least-cost route cannot be identified, if the required resources are unavailable, or if bandwidth limitations exist on the WAN link.

The cost element of the least-cost routing table is usually a long-distance rate. For example, a call within an area code may have no associated cost. However, calls to nearby area codes may have a value of 10. Calls made to more distant area codes might have a value of 15, and international calls might have values from 20 to 30, depending on both the point of origin and the country being called. Least-cost routing compares the rates when determining possible routes for the call being made. In this example, if calling Asian countries from the western USA is less expensive than calling from Washington DC, then the least-cost routing tables would be set up to route calls from Washington DC to Asia through a gateway in the western USA.

If your enterprise has special rate plans, those should be incorporated into the least-cost routing tables.

Network Topology

You will need the network topology information described under LAN/WAN Considerations when you design your dial plan and configure PathNavigator to manage your video network.

If the network is physically changed, you will need to update PathNavigator's network information so that it can manage the video network effectively.

PathNavigator provides the means for you to assign ISDN numbers to endpoints. The way numbers are assigned depends on your network:

- **E.164 provisioning** - Choose E.164 provisioning if you are using private numbers.
- **ISDN alias assignment** - If you assign ISDN numbers to endpoints, then the ISDN ranges need to be provided to the gatekeeper. These numbers must be coordinated with your local ISDN provider as these numbers cannot be self-populated. Assigning numbers that are not in your domain will result in failed calls when users outside the enterprise try to access users within the enterprise with self-populated numbers.
- **Automatically assigned numbers –** PathNavigator can automatically assign direct inward dial (DID) numbers or gateway extensions. You cannot automatically assign both types of numbers on the same network.

Neighbor gatekeepers

Neighbor gatekeepers allow for the distribution of the workload across logical boundaries within the enterprise. This enables more efficient use of the network by limiting communication across WAN links. When a call originates in one

gatekeeper's zone and that gatekeeper is unable to resolve the dialed address, it will be forwarded to the neighbor gatekeepers for resolution.

Addressing

The addressing components of an H.323 dial plan are:

- Gatekeeper zone identifiers (or prefixes)
- Entity addressing
- Terminal aliases: These include numeric and alphabetic aliases
- System Services
- MCU service prefixes
- Gateway service prefixes

Each H.323 entity must have at least one network address (transport address). The network address uniquely identifies the H.323 entity on the network. It is typically a TCP/IP address.

If the entity is a terminal, it may also have one or more alias addresses associated with it.

Zones and Zone Prefixes

A zone is the collection of all terminals, gateways, and MCUs managed by a single gatekeeper. A zone may be independent of network topology, and may include multiple network segments which are connected by routers and other devices. Figure 3 below shows a three-zone deployment.

When using multiple zones (multiple gatekeepers), zone identifiers must be used. Zone identifiers are analogous to area codes.

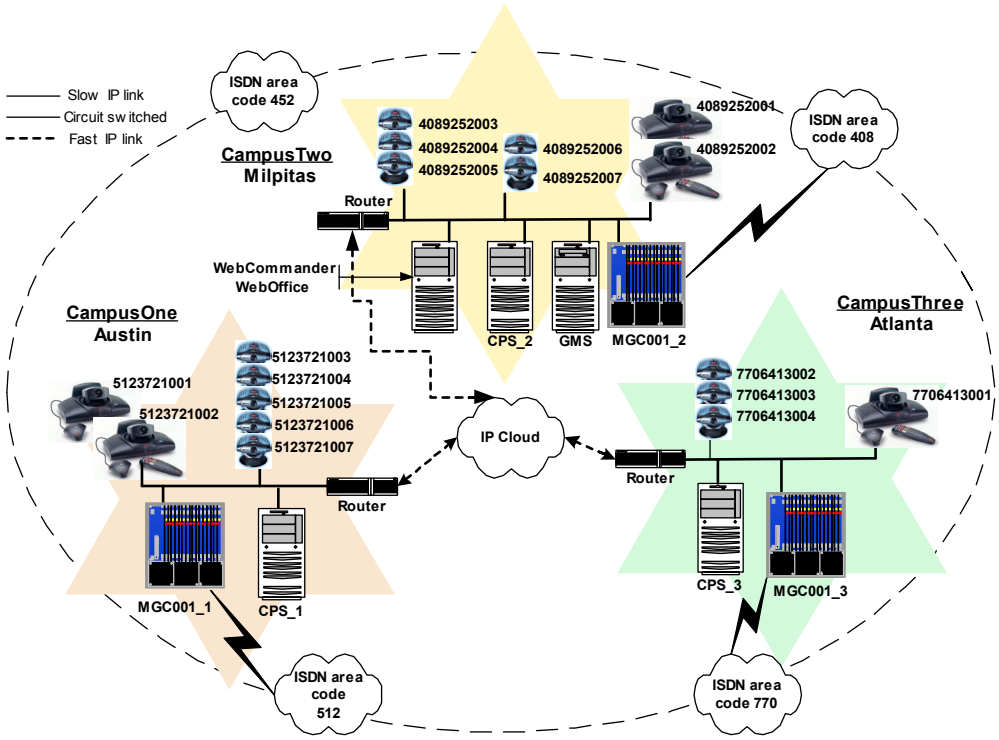

Figure 3. A Three-Zone Deployment

Specifying local zone prefixes enables the gatekeeper to resolve addresses sent by neighbor gatekeepers. The local zone prefix identifies this gatekeeper. Some gatekeepers do not strip prefixes before the address when sending out a request for address resolution. These addresses cannot be resolved without the local zone prefix. The local zone prefix needs to be removed from the dialed address in order to match the address to a registrant.

Here is an example of how local zone prefixes work.

Table 2: Local Zones and Neighbor Gatekeepers

Prefix	Milpitas gatekeeper	Austin gatekeeper	Atlanta gatekeeper
Local zone prefix	408	512	770
Neighbor gatekeeper 1 prefix	512	408	408
Neighbor gatekeeper 2 prefix	770	770	512

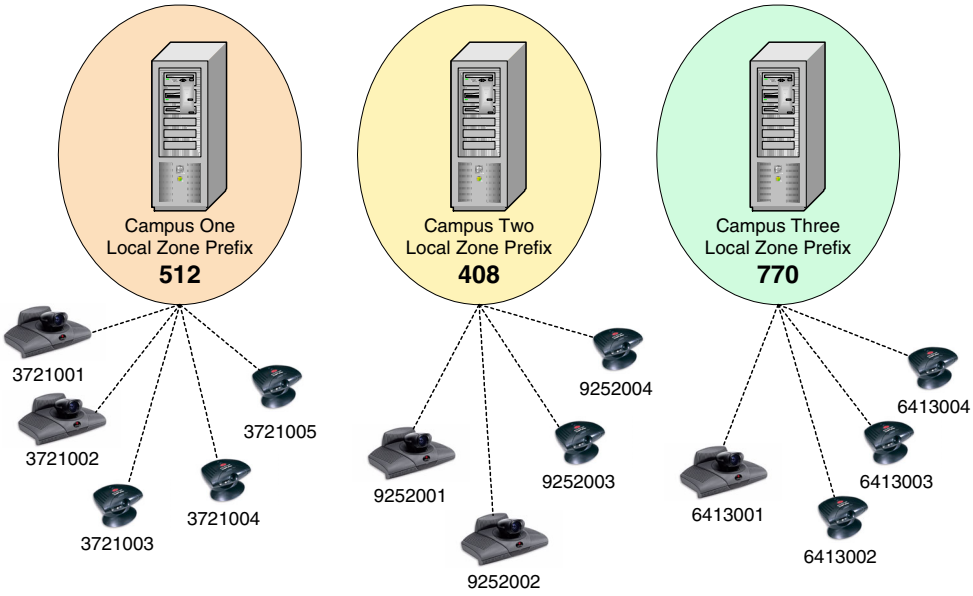

Figure 4. Local Zone Prefix Example

If Endpoint 3721005 in the Austin zone dials 4089252002, the Austin gatekeeper matches the prefix 408 to its neighbor gatekeeper prefix table. The call request is then routed to the Milpitas gatekeeper since its prefix is 408 and is a match. The full dial string 4089252002 is sent to the Milpitas gatekeeper, which maintains a list of local zone prefixes. This gatekeeper recognizes that 408 is its local zone prefix and strips it, resolving the resulting address of 9252002 to connect the endpoint at that address to endpoint 3721005 in the Austin zone.

If the local zone prefixes are configured, requests from neighbor gatekeepers with prefixes that match the local zone prefix will be resolved. All other calls will be rejected.

Entity Addressing

An entity must have a network address and may have alias addresses. These are defined as follows:

- Network address: This address relates to network transport. It is usually a TCP/IP address. This address can either be automatically issues via dynamic host configuration protocol (DHCP), or statically assigned by the administrator from a pool of available addresses.
- Alias address: This may be a telephone number (private number or public E.164 address) or an H.323 identifier, which is an alphabetic string such as a username, email-like address, or H.323 URL.
- LAN host name: Any system connected to a LAN must have a LAN host name (netBIOS name) defined. This is sometimes called the computer name.

An alias address may represent a terminal or it may represent a conference. Alias addresses must be unique within a zone. For example, within a zone there may only be one entity that uses the alias 3721005.

Rules for Assigning Prefixes and Numeric Aliases

In assigning prefixes and numeric aliases, it is critically important to observe certain rules:

- MCUs and gateways provide services, so they must have service prefixes assigned to them. Each service must have its own prefix. For example, an MCU or gateway will have a separate service prefix for each call speed that it provides. However, PathNavigator, through the use of system services, can hide the complexity of multiple prefixes from users. The CON service, for example, allows you to set up a multipoint conference by selecting addresses from a directory, without having to enter a service prefix.
- MCU and gateway services work across zones only if used in conjunction with a manually entered zone prefix. For example, if a user in zone prefix 512 wants to use the MCU service 20 in zone prefix 408, the dial string would look like 40820* followed by an alias identifier.
- If the system uses more than one gatekeeper, each gatekeeper must have a zone identifier prefix.
- The numeric aliases for terminals and conferences may begin with the same initial digit(s) as any service prefix or zone identifier prefix. This is because PathNavigator's parsing rule is that aliases are checked first and service prefixes are checked last.
- The numerals used for service prefixes may not start with an existing service prefix. Example: If 9 is selected as your access simplified dialing system

service, then you may not create MCU or gateway service prefixes that begin with 9.
- Local zone prefixes are not considered local service prefixes. Therefore, if you have a local zone prefix of 408, you may still use 40 to designate a service.

Service Plans

A service plan assigns numeric prefixes to services on the network. Gatekeepers use service prefixes to route terminal requests to the appropriate provider of services. Services on the network are processed by media processors on the network. Within H.323, media processors are MCUs, gateways, and proxies. A service prefix is analogous to the digit 9 that you must dial to request an outside line from a PBX system; the system's response of connecting you to the requested outside line would be the service in this example.

In H.323 deployments, service plans can become complex. According to the H.323 standard, MCUs and gateways may have service prefixes signaled within the dial string. For example, to enter a 384K MCU conference, a user may be required to dial a string such as (service prefix)(conference alias), which might take the form 22 5551212, where 22 is the service prefix to request a 384K call via the MCU, and 5551212 is the conference alias.

Including the necessary service prefixes in the dial string can make dialing very complex for end users. Polycom is committed to reducing this complexity by not requiring that end users understand and use service prefixes. The call processing component of Polycom Office (PathNavigator) allows an administrator to create the service plans that the infrastructure needs, without requiring the end user to be aware of them.

System Services

System services include the following:
- Conference on demand
- Call forwarding: set forward busy, set forward no answer, and set forward unconditional.
- Access simplified dialing
- Join or leave hunt group

System services only work within a zone. They do not work across zones.

It is important to understand that gateway and MCU services are defined in both PathNavigator and the MGC platform itself. It is critical that the prefixes are exactly the same in each system.

Number Translation

When dialing between enterprises or campuses, number translation (digit manipulation) may be required.

Imagine the number of potential addresses a single user may have. For instance, when called within the same building, an end user's alias may be a 4-digit number. When calling within the same area code but outside the building, the user's alias may be either a 7 or 10 digit number. When calling outside of the area code or outside of the country, it may be a 10 or 15 digit number. 15 digit numbers are the E.164 international dial plan standard.

Digit manipulation simplifies the task of dialing by determining whether the elements of the alias are the same for the caller and the called party, and assembling a dial string that consists of each element that is different between the two parties. For example, if both parties are connected to the same PBX system, only the extension is needed. If the caller and the called party are in the same country but different area codes, the outside line service code, area code, and full subscriber number are needed but the country code is not.

Digit manipulation is a service provided to the end user by the Polycom Office management systems. This greatly simplifies your dial plan for end users. Global Management System™, Global Address Book™, and PathNavigator™ provide this service to Polycom terminals.

The Polycom Office utilizes a directory service to allow users to simply select a name from the directory and click the call button. Using digit manipulation, the Polycom Office then assembles the appropriate digit string on behalf of the user. The figure below shows an example: The user **swhite** wishes to call **wcoyote**, and selects the previously created "wcoyote" entry from the Global Address Book.

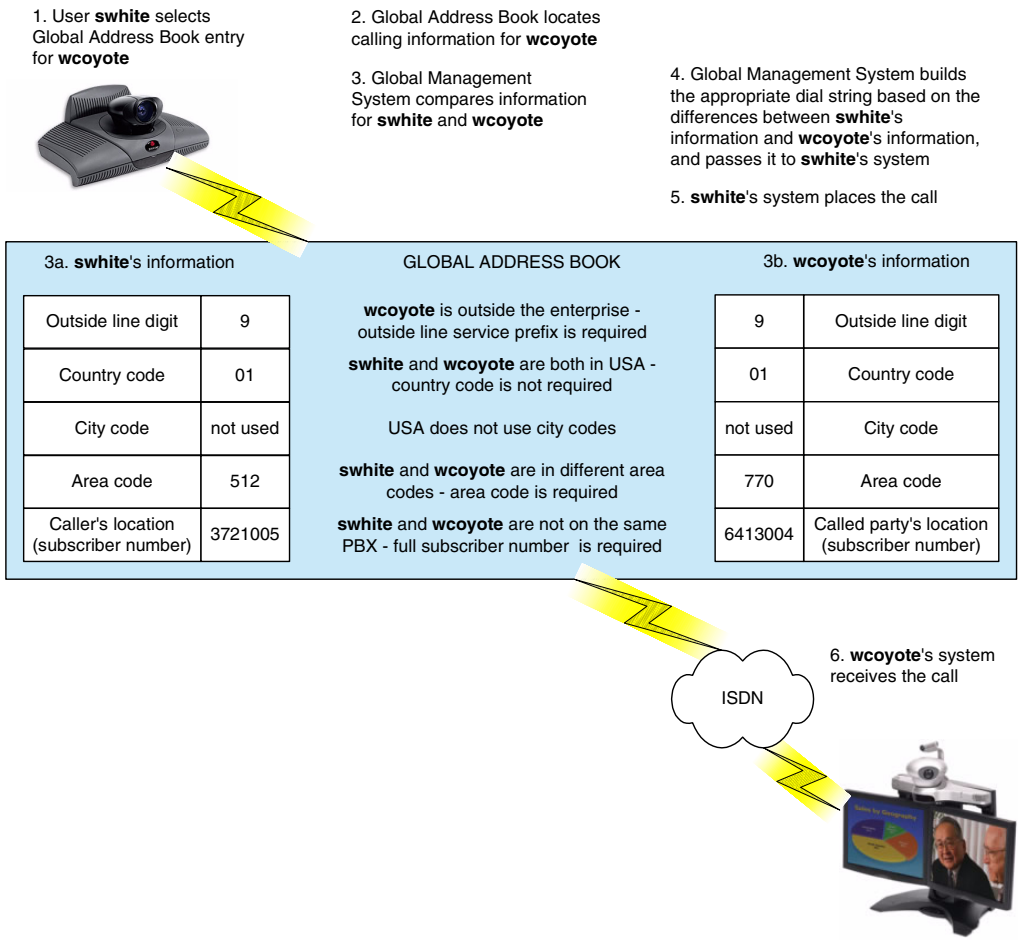

Figure 5. Number Translation

Example Dial Plan

The following tables show an example dial plan. Each table describes one of three campuses.

Table 3: Campus One: Austin

Service	Code	Direct Inward Dial	Max IP Bandwidth	IP Address	LAN host name
Zone Prefix	512				
Entity Addressing (TCP/IP)	X	X		X	X
Terminal Alias (H.323 ID)	[Extension]	[E.164]			
mmouse	1001	512-372-1001	1.5 Mbps	(10.10.1.2)	VS001_1
dduck	1002	512-372-1002	768 Kbps	(10.10.1.3)	VS002_1
wtpooh	1003	512-372-1003	384 Kbps	(10.10.1.4)	VV001_1
ppan	1004	512-372-1004	384 Kbps	(10.10.1.5)	VV002_1
swhite	1005	512-372-1005	384 Kbps	(10.10.1.6)	VV003_1
jcricket	1006	512-372-1006	384 Kbps	(10.10.1.7)	VV004_1
crobin	1007	512-372-1007	384 Kbps	(10.10.1.8)	VV005_1
System Services					
Conference on demand (COD)	con				
Call forwarding: forward on busy	*73				
Call forwarding: forward no answer	*74				
Call forwarding: forward unconditional	*75				
Access simplified dialing	9				
Join hunt group	*71				
Leave hunt group	*72				

Table 3: Campus One: Austin (Continued)

Service	Code	Direct Inward Dial	Max IP Bandwidth	IP Address	LAN host name
MCU Gateway alias					
323#1				10.10.1.1	MGC001_1
MCU Services					
All speeds Multipoint	20				
Gateway main dial-in number					
Gateway PRI Dial-in numbers		512-372- (1000-1050)			
Gateway Services					
Audio only	29		64 Kbps		
Gateway 128 Kbps	21		128 Kbps		
Gateway 384 Kbps	22		384 Kbps		
Gateway 768 Kbps	23		768 Kbps		
Gateway 1.5 Mbps	24		1.5 Mbps		

Table 4: Campus Two: Milpitas

Service	Code	Direct Inward Dial	Max IP Bandwidth	IP Address	LAN host name
Zone Prefix	408				
Entity Addressing (TCP/IP)	X	X		X	X
Terminal Alias (H.323 ID)	[Extension]	[E.164]			
gwashington	2001	408-925-2001	1.5 Mbps	(10.10.2.2)	VS001_2
alincoln	2002	408-925-2002	768 Kbps	(10.10.2.3)	VS002_2
gford	2003	408-925-2003	384 Kbps	(10.10.2.4)	VV001_2

Table 4: Campus Two: Milpitas (Continued)

Service	Code	Direct Inward Dial	Max IP Bandwidth	IP Address	LAN host name
jcarter	2004	408-925-2004	384 Kbps	(10.10.2.5)	VV002_2
jkennedy	2005	408-925-2005	384 Kbps	(10.10.2.6)	VV003_2
tjefferson	2006	408-925-2006	384 Kbps	(10.10.2.7)	VV004_2
jmadison	2007	408-925-2007	384 Kbps	(10.10.2.8)	VV005_2
System Services					
Conference on demand (COD)	con				
Call forwarding: forward on busy	*73				
Call forwarding: forward no answer	*74				
Call forwarding: forward unconditional	*75				
Access simplified dialing	9				
Join hunt group	*71				
Leave hunt group	*72				
MCU-1 (also Gateway)				(10.10.2.1)	MGC001_2
MCU-1 Alias	323#1				
MCU Service					
All speeds Multipoint	20				
Gateway PRI Dial-in numbers		408-925- (2000-2050)			
Gateway Services					
Audio only	29		64 Kbps		
Gateway 128 Kbps	21		128 Kbps		
Gateway 384 Kbps	22		384 Kbps		
Gateway 768 Kbps	23		768 Kbps		

Table 4: Campus Two: Milpitas (Continued)

Service	Code	Direct Inward Dial	Max IP Bandwidth	IP Address	LAN host name
Gateway 1.5 Mbps	24		1.5 Mbps		

Table 5: Campus Three: Atlanta

Service	Code	Direct Inward Dial	Max IP Bandwidth	IP Address	LAN host name
Zone Prefix	770				
Entity Addressing (TCP/IP)				X	
Terminal Alias (H.323 ID)	[Extension]	[E.164]			
bbunny	3001	770-641-3001	1.5 Mbps	(10.10.3.2)	VS001_3
ysam	3002	770-641-3002	768 Kbps	(10.10.3.3)	VV001_3
rrunner	3003	770-641-3003	384 Kbps	(10.10.3.4)	VV002_3
wcoyote	3004	770-641-3004	384 Kbps	(10.10.3.5)	VV003_3
System Services					
Conference on demand (COD)	con				
Call forwarding: forward on busy	*73				
Call forwarding: forward no answer	*74				
Call forwarding: forward unconditional	*75				
Access simplified dialing	9				
Join hunt group	*71				
Leave hunt group	*72				

Table 5: Campus Three: Atlanta (Continued)

Service	Code	Direct Inward Dial	Max IP Bandwidth	IP Address	LAN host name
MCU-1 (also Gateway)				10.10.3.1	MGC001_3
MCU-1 Alias	323#1				
MCU Service					
All speeds Multipoint	20				
Gateway PRI Dial in numbers		770-641- (3000-3050)			
Gateway Services					
Audio only	29				
Gateway 128 Kbps	21				
Gateway 384 Kbps	22				
Gateway 768 Kbps	23				
Gateway 1.5 Mbps	24				

Deployment

Deployment consists of installing the selected Polycom Office products and configuring them to work together. This section assumes that you have chosen to deploy one or more MGC MCUs, MGC Manager software, one or more instances of PathNavigator, Global Management System, a number of video endpoints, and WebCommander. The following diagram illustrates the deployment process.

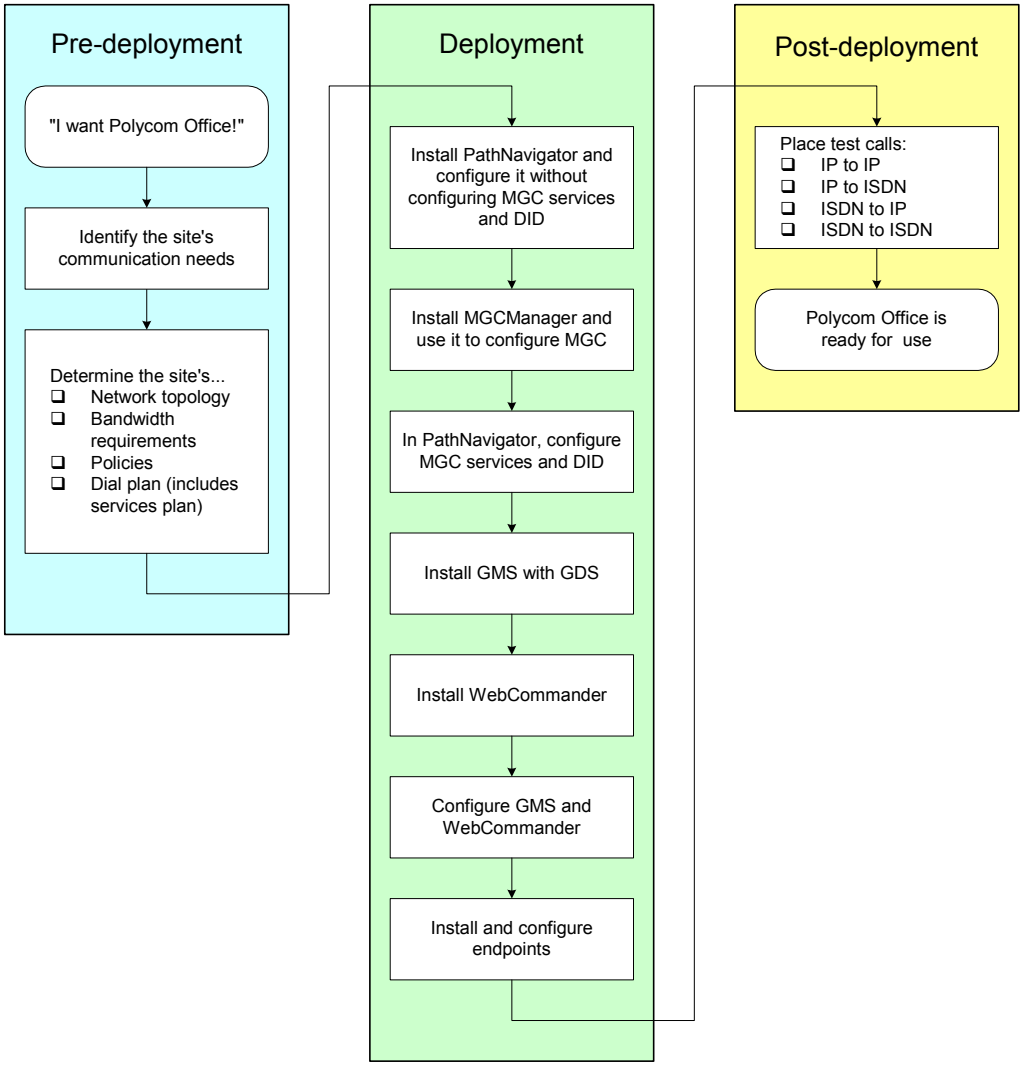

Figure 6. The Deployment Process

Deployment Sequence

The general sequence of deployment tasks is as follows:

- Install the MGC MCU(s).
- Install PathNavigator on a suitable server. Configure those aspects of PathNavigator that do not address MGC services or direct inward dialing (DID).
- Install MGC Manager on a suitable server and configure the MGC MCU(s). The MGC MCU(s) should register automatically to PathNavigator.
- Use PathNavigator to configure MGC services and DID according to your deployment plan.
- Install Global Management System on an appropriate server and set up the Global Directory System.
- Install WebCommander.
- Configure Global Management System and WebCommander. This will allow you to configure endpoints automatically, by loading predefined profile information.
- Install endpoints and load initial profile information. When you complete the installation for each endpoint, test it by placing calls to known valid addresses.

Glossary: H.323 Entities

The ITU H.323 standard defines the following types of devices:

- Endpoints: terminals, MCUs, and gateways
- Gatekeepers

The following definitions are from the International Telecommunication Union's ITU-T H.323 standard, Draft v4, dated November 2000.

Endpoint: An H.323 terminal, gateway, or MCU. An endpoint can call and be called. It generates and/or terminates information streams.

Gateway: An H.323 gateway (GW) is an endpoint on the network which provides for real-time, two-way communications between H.323 terminals on the packet based network and other ITU terminals such as H.320 (ISDN) terminals on a switched circuit network or to another H.323 gateway.

Multipoint control unit: The multipoint control unit (MCU) is an endpoint on the network which provides the capability for three or more terminals and gateways to participate in a multipoint conference. It may also connect two terminals in a point-to-point conference which may later develop into a multipoint conference. An MCU may also be brought into a conference by the gatekeeper without being explicitly called by one of the endpoints.

Gatekeeper: The gatekeeper (GK) is an H.323 entity on the network that provides address translation and controls access to the network for H.323 terminals, gateways, and MCUs. The Gatekeeper may also provide other services to the endpoints, such as bandwidth management and locating gateways.

In addition to the devices listed above, conferences are also considered H.323 entities.