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Deploying Polycom® Unified Communications in RealPresence® Access Director™ System Environments

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About This Guide

This guide describes the Polycom® RealPresence® Access Director™ system solution and the process of deploying the products in the solution. The solution provides firewall traversal for the connections required for the supported deployment architecture, model, and user scenarios.

Related Documentation

This guide is meant to supplement the associated product documentation, not replace it. When deploying the systems in this solution, please have the product documentation accessible, specifically.

- *Polycom RealPresence Access Director System Release Notes*
- *Polycom RealPresence Access Director System Getting Started Guide*
- *Polycom RealPresence Access Director System Administrator's Guide*

In addition, you will need the product documentation for the other infrastructure products required for this solution, including:

- *Polycom DMA System Operations Guide*
- *Polycom RealPresence Resource Manager System Operations Guide*
- *Polycom RealPresence Collaboration Server System Administrator's Guide*

Required Skills

Integrating Polycom infrastructure and endpoint systems with the RealPresence Access Director system requires planning and elementary knowledge of Polycom video conferencing and video conferencing administration.

This is not a training document. Polycom assumes those deploying this solution have a good understanding of networking, firewalls, DNS, H.323, and SIP concepts.

Contents

About This Guide iii

Related Documentation iii

Required Skills iii

1 Unified Communications with the Polycom® RealPresence® Access Director™ System Solutions 1

Overview of the Polycom RealPresence Access Director System Solution . 2

RealPresence Access Director System Solution Deployment Models 3

Call Scenarios Supported by this Architecture 6

Products Tested in this Solution 7

2 Deploying the Basic RealPresence Access Director System Solution to Support Remote and Guest Users 9

Configure the DNS Service 10

Configure Firewalls and Ports 13

Install the RealPresence Access Director System 14

Configure the RealPresence Resource Manager System 14

Configure the RealPresence Access Director System 18

Configure the Polycom DMA System 20

Supporting Guests in a SIP Environment 21

Configure Polycom Endpoint Systems 23

Configure the Polycom RealPresence Collaboration Server 24

Configure the Polycom RSS™ System 24

3 Federation Between RealPresence Access Director Systems Only 27

Federation in a SIP Environment 27

Federation in an H.323 Environment 30

4 Federation Between RealPresence Access Director and Other Systems 33

Federation in an H.323 Environment with Polycom VBP-E Systems 33
Federation in a SIP Environment with Acme Packet 37

5 Verifying Deployment 39

Verifying Access Proxy 39
Verifying SBC 39
Verifying Certificates 40

A Required Ports 41

Management Ports 41
From the WAN to the RealPresence Access Director System 41
From the LAN to the RealPresence Access Director System 42
From the RealPresence Access Director System to the WAN 42
From the RealPresence Access Director System to the LAN 43
H.323 and WAN Support 43
From the WAN to the RealPresence Access Director System 44
From the WAN to the RealPresence Access Director System: H.323 B2B Calls 44
From the RealPresence Access Director System to the WAN: H.323 B2B Calls 45
H.323 and LAN Support 46
From the RealPresence Access Director System to the LAN 46
From the LAN to the RealPresence Access Director System 47
From the RealPresence Access Director System to the LAN: H.323 B2B Calls 47
From the LAN to the RealPresence Access Director System: H.323 B2B Calls 48
SIP and WAN Support 49
From the WAN to the RealPresence Access Director System 49
From the RealPresence Access Director System to the WAN 50
SIP and LAN Support 51
From the RealPresence Access Director System to the LAN 51
From the LAN to the RealPresence Access Director System 52

B Network Interface Configurations 55

Network Interface Configuration Summary 55
Network Interface Configurations for Dynamic Routing 56
Two Firewalls—One Interface to the Outside Firewall 56

Two Firewalls—Four Interfaces to the Outside Firewall 56
Two Firewalls—One Interface to Inside Firewall 57
Two Firewalls—Four Interfaces to Inside Firewall 57
Single Firewall—One Interface 58
Single Firewall—Four Interfaces 58
Network Interface Configurations for Static Routing 59
Two Firewalls—One Interface to the DMZ 59
Two Firewalls—Four Interfaces to the DMZ 59

1

Unified Communications with the Polycom® RealPresence® Access Director™ System Solutions

In this solution, Polycom's integrated suite of video conferencing systems includes the RealPresence Access Director system, which:

- Secures the borders to the enterprise IP network, the private VPN, and the Internet.
- Enables high-quality and secure unified communications between divisions or enterprises, remote users, and guest users.
- Supports the Simple Network Management Protocol (SNMP) to enable communication between the RealPresence Access Director system SNMP agent and the SNMP management system.

The topics that follow describe the Polycom solution that includes the RealPresence Access Director system as the session border controller (SBC) for a site's IP network.

Overview of the Polycom RealPresence Access Director System Solution

The Polycom video infrastructure integrates with the RealPresence Access Director system to provide video conferencing management for remote, guest, and federated users with secure firewall traversal for all the required connections. The following table describes the network traversal feature services this solution secures.

Component	Description
HTTPS Access Proxy	Enables remote and guest users via designated video endpoints to make HTTPS connections to the RealPresence Access Director system, which are then proxied to the internal RealPresence Resource Manager system or RealPresence Content Sharing Suite (the latter supports video sharing among Lync conference participants).
XMPP Access Proxy	Enables XMPP signaling from remote users via designated video endpoints to traverse the firewall to the internal XMPP server, and enables sending of outgoing XMPP signaling to other remote endpoints.
LDAP Access Proxy	Enables remote and guest users via designated video endpoints to make LDAP connections to the RealPresence Access Director system, which are then proxied to the internal LDAP server.
SIP Signaling	Enables: • SIP signaling from remote users via designated video endpoints to traverse the firewall to the internal SIP server. • Sending of outgoing SIP signaling to remote endpoints. • Modifying SIP signaling to direct media through the media relay when required.
H.323 Signaling	Enables: • H.323 signaling from and to remote users via designated video endpoints to traverse the firewall to the internal gatekeeper. • Functionality to understand and manipulate all H.323 Annex O dialing messages. • Functionality to route all H.323 messages from guest users to and from the internal gatekeeper.
Media Relay	Enables media from remote and guest users residing in federated sites to traverse the firewall. The media relay functions as an SBC-based relay.

Component	Description
Static Routing	Enables use of static routes to route traffic to the correct network destination. One or more static routes may be defined for each network interface

In this solution, the RealPresence Access Director system uses access proxy to enable remote users to be provisioned and managed by setting up the HTTPS, LDAP, and XMPP connections with the RealPresence Resource Manager system. When access proxy receives an HTTPS, LDAP, or XMPP connection request from an external endpoint, the RealPresence Access Director system accepts the request and initializes a request to the internal HTTPS, LDAP, or XMPP server.

If your RealPresence Access Director system provides firewall traversal for a Polycom® RealPresence® Content Sharing Suite, HTTPS requests can be forwarded to the RealPresence Content Sharing Suite server.

If your system is deployed with both a RealPresence Resource Manager system and a RealPresence Content Sharing Suite server, the RealPresence Access Director system forwards requests to the correct server based on the access proxy HTTPS configuration settings. See the *Polycom® RealPresence® Access Director™ System Administrator's Guide* for configuration details.

RealPresence Access Director System Solution Deployment Models

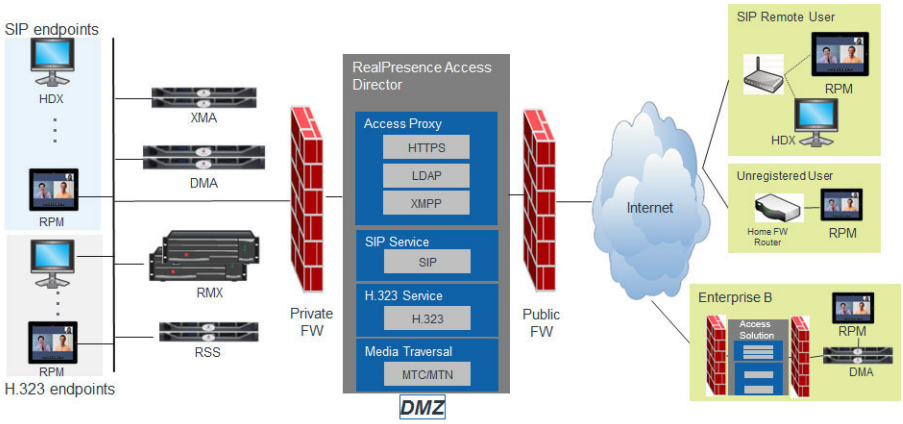
In general, Polycom recommends that the RealPresence Access Director system be deployed in a corporate back-to-back DMZ; that is, deployed between an outside (also referred to as public or external) firewall and inside (also referred to as private or internal) firewall.

In this implementation:

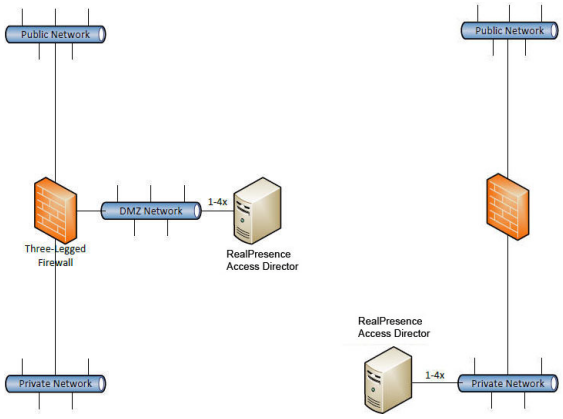
- The outside firewall, which resides between the WAN (Untrust) and the RealPresence Access Director system in the DMZ, must be in Destination NAT mode. In this mode:
  - When inbound packets from the WAN pass through the firewall, it translates the destination IP address to that of the RealPresence Access Director system.
  - When outbound packets from the enterprise network pass through the firewall, it translates the source IP address to the outside IP address of the firewall system.
  - A static and direct 1:1 NAT mapping is recommended for the outside firewall.

- The inside firewall, which resides between the RealPresence Access Director system in the DMZ and the LAN (Trust), ***must be in Route mode***. In this mode, the firewall does not change the destination or source IP address, so no translation is required or supported.

This approach takes advantage of the firewall's security functionality. However, because all media and signaling traffic flows through the firewall, performance can be affected.



The following figure illustrates two other ways in which the RealPresence Access Director system can be deployed in relationship to the outside firewall.



If you have a "three legged firewall" (one with at least three network interfaces), the same firewall can separate the RealPresence Access Director system in the DMZ from both the internal LAN and the Internet.

Note that in these configurations:

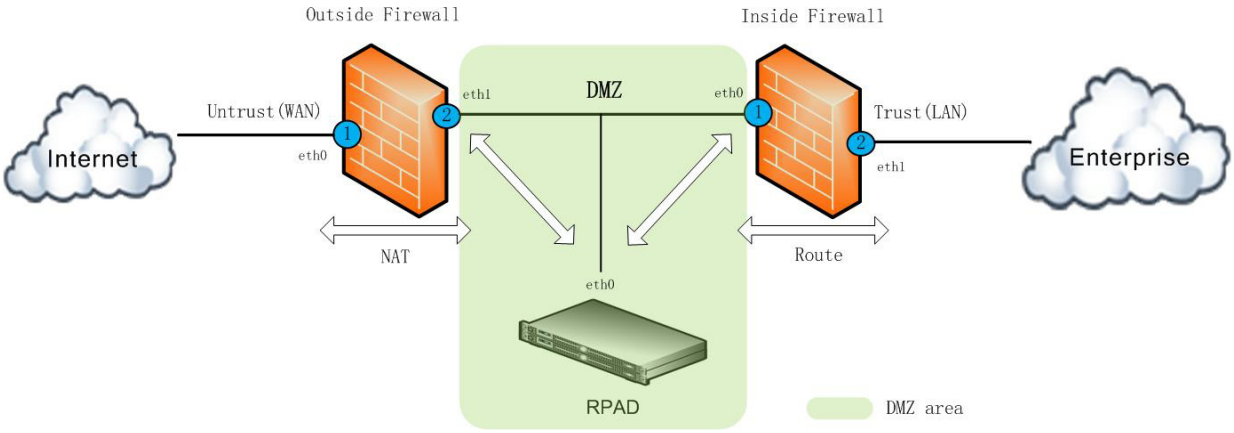
- Not all firewall traffic goes through the RealPresence Access Director system.
- All of these models can support the scenarios in this solution.

The three-legged firewall configuration requires a static and direct 1:1 NAT mapping between the WAN (Untrust) and the DMZ and Route mode between the DMZ and the LAN (Trust).

Appendix B includes diagrams of the network interface configurations supported for this solution.

Avoiding Asymmetric Routing

Asymmetric routing issues may occur if the RealPresence Access Director system is deployed in the DMZ into the network topology shown in the figure below. To prevent asymmetric routing issues, static routes can be defined for each available network interface in your system. See the *Polycom® RealPresence® Access Director™ System Administrator's Guide* for detailed information about configuring static routes.



Call Scenarios Supported by this Architecture

This Polycom solution supports the following user scenarios:

- Connecting Remote Users to the Enterprise (SIP only)
- Connecting Guest Users to the Enterprise (H.323 and SIP)
- Connecting Trusted Divisions or Enterprises (H.323 and SIP)

Connecting Remote Users to the Enterprise (SIP only)

A *remote user* is an enterprise user with a managed Polycom SIP endpoint that lies outside of the enterprise network. In this user scenario:

- Remote users can participate in video calls with other enterprise users as if they were inside the enterprise network.
- Remote users can receive calls as if they were inside the network.
- Remote users can receive management services including endpoint provisioning, user directory, and XMPP contact list and presence services, as well as SIP calling, calendaring, and scheduling services.

The standard RealPresence Access Director system deployment as described in Chapter 2, "Deploying the Basic RealPresence Access Director System Solution to Support Remote and Guest Users," supports this user scenario.

Connecting Guest Users to the Enterprise (H.323 and SIP)

A *guest user* is a user with a non-managed SIP or H.323 endpoint that lies outside of the enterprise network.

In this user scenario:

- Guest users can participate in video calls with division or enterprise users without being members of the site.
- Division or enterprise users cannot place video calls out to guest users. Until guest users initiate video calls, calls cannot be routed to them by the gatekeeper (H.323 endpoints) or SIP Proxy (SIP endpoints).
- Guest users do not have access to any management services such as endpoint provisioning, user directory, XMPP contact list and presence services, or SIP calling, calendaring, and scheduling services.

To support this user scenario, you must perform the standard RealPresence Access Director system deployment as described in Chapter 2, "Deploying the Basic RealPresence Access Director System Solution to Support Remote and Guest Users."

Connecting Trusted Divisions or Enterprises (H.323 and SIP)

Enterprise users from one division or enterprise can call enterprise users from another division or enterprise when:

- Both division or enterprise users have supported and managed SIP or H.323 endpoints.
- Both division or enterprise sites have implemented a RealPresence Access Director system or other Access Solution for federation.
- The federated sites are connected by a mutually trusted connection. For SIP systems, this trust relationship is a SIP trunk. For H.323 systems, this trust relationship is mutually neighbored gatekeepers.
- The sites have established and supported dial plans.

In this user scenario, each user has access to their site's provisioning, directory, presence, and calling services, as well as contact lists.

To support this user scenario, you must:

- Perform the standard RealPresence Access Director system deployment as described in Chapter 2, "Deploying the Basic RealPresence Access Director System Solution to Support Remote and Guest Users."
- Perform the additional deployment processes described in the appropriate section for your deployment model.
  - Chapter 3, "Federation Between RealPresence Access Director Systems Only."
  - Chapter 4, "Federation Between RealPresence Access Director and Other Systems."

Products Tested in this Solution

The following products are supported in this RealPresence Access Director system solution.

Polycom Product	Version	Function in Solution
Polycom RealPresence Access Director	2.1	Secures access to H.323 and SIP video services for small- to medium-sized federated enterprises.
Polycom Distributed Media Application™ (DMA™) 7000	5.2, 6.0	Functions as SIP proxy/registrar, H.323 gatekeeper, SIP and H.323 gateway, and bridge virtualizer.
Polycom RealPresence Resource Manager	7.1, 7.2	Provisions and manages remote endpoints, and enables directory and presence services.

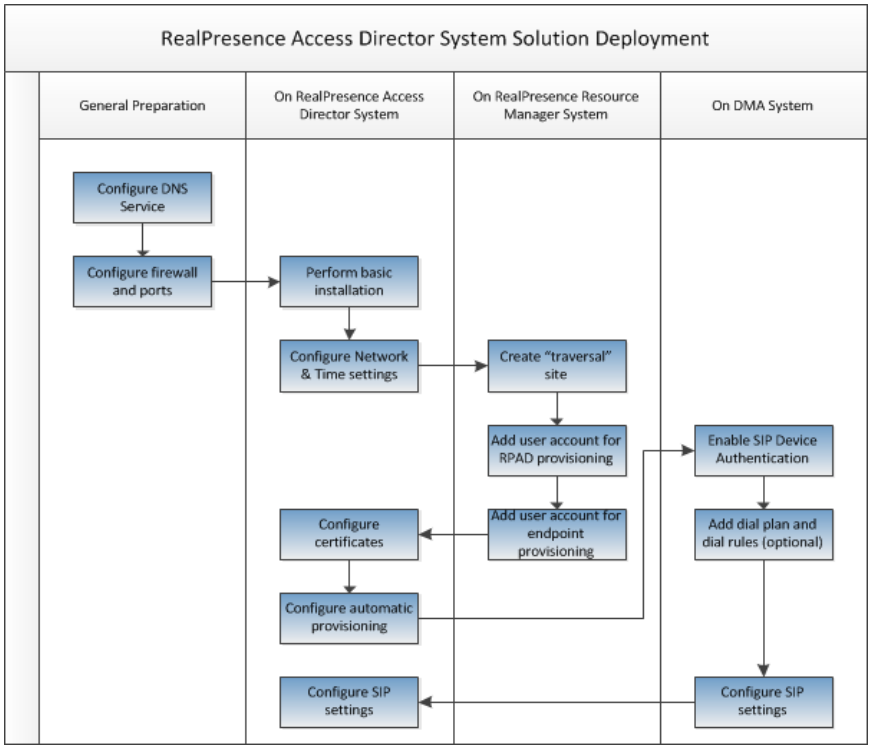
Polycom Product	Version	Function in Solution
Polycom RSS™ 4000	8.5, 8.6	Provides recording functionality for video, audio, and content.
Polycom RealPresence Collaboration Server 1500, 2000, and 4000	7.8	Provides bridge capability for SIP and H.323 conferences, including support for content over video.
Polycom RealPresence Collaboration Server 800s	8.0	Provides bridge capability for SIP and H.323 conferences, including support for content over video.
Polycom HDX Series	3.1.0	Video conferencing endpoint systems.
Polycom RealPresence Mobile	2.2, 2.3	Serves as client application for supported Apple® devices.
Acme Packet Net-Net ESD	6.3	Testing was carried out specifically with the Acme Packet Net-Net ESD-3820 platform running S-Cx6.3.MF-2 software. Other Acme Packet E-SBCs such as Net-Net ESD-4500, Net-Net ESD-SE and Net-Net ESD-VME also run the same line of C-series software. These other products can also be used in this Polycom RealPresence solution.
Polycom Video Border Proxy (VBP)	11.2.12	In some solution models, provides border control functionality for federated enterprises.
Polycom CMA system	6.2	In those solution models using a Polycom VBP-E border controller, the CMA system is behind the VBP system and provides management and H.323 gatekeeper functionality.
Polycom RealPresence Group 300 and Group 500	4.0.1, 4.0.2	Video conferencing endpoint systems.

2

Deploying the Basic RealPresence Access Director System Solution to Support Remote and Guest Users

This chapter describes the general configuration processes required for any RealPresence Access Director system deployment to support remote or guest users. The chapters that follow describe additional configuration processes required for the specific deployment models.

The following cross-functional flow chart identifies the tasks you must perform.



See these topics for detailed information about each of the tasks.

- "Configure the DNS Service" on page 10
- "Configure Firewalls and Ports" on page 13
- "Install the RealPresence Access Director System" on page 14
- "Configure the RealPresence Resource Manager System" on page 14
- "Configure the RealPresence Access Director System" on page 18
- "Configure the Polycom DMA System" on page 20
- "Supporting Guests in a SIP Environment" on page 21
- "Configure Polycom Endpoint Systems" on page 23
- "Configure the Polycom RealPresence Collaboration Server" on page 24
- "Configure the Polycom RSS™ System" on page 24

Configure the DNS Service

This section describes creating domain name system (DNS) service records to enable this solution.

If you're not familiar with DNS administration, the creation of various kinds of DNS resource records, and your enterprise's DNS implementation, please consult with someone who is.

Task 1

Create a DNS A record on the external DNS server

Create a DNS A (address) record on the external DNS server to map the FQDN of the RealPresence Access Director system to its public IP address.

So if the RealPresence Access Director system has the FQDN name *rpad.example.com,* add an A record as follows.

```
rpad.example.com IN A 192.168.11.175
```

Where:

```
FQDN = rpad.example.com
Class = IN (Internet)
A = Record type
192.168.11.175 = RealPresence Access Director system IP address
```

Task 2

Create a DNS SRV record on the external DNS server

Create an SRV record on the external DNS server to map the SRV service address for endpoint provisioning to the FQDN of the RealPresence Access Director system. The SRV record is required by the **Auto Find Provisioning Server** feature of the RealPresence Mobile system.

So if the RealPresence Access Director system has the FQDN name *rpad.example.com*, add an SRV record as follows.

_cmaconfig._tcp.example.com. IN SRV 0 100 443 rpad.example.com

Where:

Service = _cmaconfig
Protocol = _tcp
Priority = 0
Weight = 100
Port = 443
Host offering this service = rpad.example.com

Task 3 Create DNS A records on the internal DNS server

Create three DNS A records on the internal DNS server as identified in the following sections.

The RealPresence Resource Manager system and the DMA system in the internal network each need one A record to map their FQDNs to the IP address of the internal DNS server. In addition, the RealPresence Access Director system can use a specified FQDN as the provisioning server (access proxy configuration), SIP server, or gatekeeper (SBC setting). For example:

1. If the FQDN of RealPresence Resource Manager system is *rprm.example.com*, and its IP address is *10.22.202.134*, create an A record:

   rprm.example.com IN A 10.22.202.134

2. If the FQDN of the DMA system is *dma.example.com*, and its IP address is *10.22.120.126*, create an A record:

   dma.example.com IN A 10.22.120.126

3. If the FQDN of RealPresence Access Director system is *rpad.example.com*, and its IP address is *10.22.210.111*, create an A record:

   rpad.example.com IN A 10.22.210.111

Task 4 Create DNS SRV records on the internal DNS server

Create the required DNS SRV records on the internal DNS server as identified below.

The RealPresence Resource Manager system requires a DNS SRV record on the internal DNS server to map the SRV service address to the FQDN of the system. The DMA system requires several DNS SRV records on the internal DNS server to map the SRV service address for several services (SIP/UDP, SIP/TCP, SIP/TLS, H323) to the FQDN of the system.

If the FQDN of the RealPresence Resource Manager system is *rprm.example.com*, and its IP address is *10.22.202.134*, create an SRV record:

```
_rprmconfig._tcp.example.com. IN SRV 0 100 443 rprm.example.com
```

- If the FQDN of the DMA system is *dma.example.com*, and its IP address is *10.22.120.126*, create SRV records:

```
_sip._tcp.example.com. IN SRV 0 100 5060 dma.example.com
_sip._udp.example.com. IN SRV 0 100 5060 dma.example.com
_sip._tls.example.com. IN SRV 0 100 5061 dma.example.com
_sip._tcp.example.com. IN SRV 0 100 5061 dma.example.com.
```

Task 5 Validate DNS settings on the external DNS server

The following steps use the Windows *nslookup* commands as an example. The procedure is similar on Mac and Linux.

To validate the DNS settings on the external DNS server

1. From a Windows computer located on the Internet network, open a command line.
2. Type *nslookup rpad.example.com* to check the A record of the RealPresence Access Director system. The response should include the corresponding RealPresence Access Director system's public IP address.
3. Type *nslookup* -type=srv _cmaconfig._tcp.example.com to check the SRV record. The response should include the FQDN of each RealPresence Access Director system.

Task 6 Validate DNS settings on the internal DNS server

The following steps use the Windows *nslookup* commands as an example. The procedure is similar on Mac and Linux.

To validate the DNS settings on the internal DNS server

1. From a Windows computer located on the Internet network, open a command line.
2. Type *nslookup rprm.example.com* to check the A record of the RealPresence Resource Manager systems. The response should include the corresponding RealPresence Resource Manager system's IP address.
3. Type *nslookup dma.example.com* to check the A record of the DMA systems. The response should include the corresponding DMA system's IP address.

4. Type *nslookup rpad.example.com* to check the A record of the RealPresence Access Director systems. The response should include the corresponding RealPresence Access Director system's internal IP address.
5. Type *nslookup -type=srv _cmaconfig._tcp.example.com* to check the SRV record. The response should include the FQDN of RealPresence Resource Manager system.
6. Type *nslookup -type=srv _sip._tcp.example.com* and *nslookup -type=srv _h323cs._tcp.example.com* to check the SRV record. The response should include the FQDN of DMA system.

Configure Firewalls and Ports

Follow these guidelines for configuring your firewalls.

- If you're not familiar with firewall concepts and administration and your enterprise's firewall implementation, please consult with someone who is.
- For greater security, Polycom recommends that you disable SSH and Web access connectivity from the Internet, and enable SSH and Web access connectivity from the LAN.

Outside Firewall Configuration

- Implement a WAN (untrusted) and LAN (trusted) configuration
- Configure 1:1 NAT
- Set interface mode to NAT
- Disable H.323 and SIP ALG
- Disable any H.323 helper services on the firewall (for example, Cisco® H323 Fixup).

Inside Firewall Configuration

- Implement a WAN (untrusted) and LAN (trusted) configuration
- Disable H.323 and SIP ALG
- Set interface mode to Route
- Disable the port NAT.
- Disable any H.323 helper services on the firewall (for example, Cisco® H323 Fixup).

For more information on port configuration, refer to Appendix A.

Install the RealPresence Access Director System

Task 1 Perform Basic Installation

Perform the basic installation as documented in the *RealPresence Access Director System Getting Started Guide*.

Task 2 Configure Network Settings

You must edit the network settings for the RealPresence Access Director system based upon the deployment model you are implementing. For more information about the deployment models, see "RealPresence Access Director System Solution Deployment Models" on page 3. For more information about RealPresence Access Director system network settings, see the *Polycom RealPresence Access Director Administrator's Guide.*

To configure the Network Settings

1. See the *Polycom RealPresence Access Director Administrator's Guide* for detailed information about the **Configuration Wizard.** Then go to **Admin > Network Settings**.

   The **General Network Settings** that display are the settings configured during initial installation and first-time setup of the system.
2. Click **Advanced network settings > Configuration Wizard** and configure the network interface settings, binds, and static route settings for the different services (such as signaling, traffic, management).
3. Go to **Admin > Time Settings > System time zone** and select the time zone of your specific geographic location.

Configure the RealPresence Resource Manager System

The following tasks describe the configuration steps to perform on the RealPresence Resource Manager system to enable RealPresence Access Director system integration and provisioning. They include:

- Add a Site for the RealPresence Access Director System
- Add a Provisioning User Account for the RealPresence Access Director System
- Add a Provisioning User Account for Endpoints

It is assumed here that the RealPresence Resource Manager system is already installed and configured for use.

Task 1 Add a Site for the RealPresence Access Director System

The RealPresence Access Director system secures a specific network segment or subnet. To accurately characterize and represent that network segment, you must create a site on the RealPresence Resource Manager system that is specifically enabled for the RealPresence Access Director system. Your remote users will be managed through this site.

To add a site to the RealPresence Resource Manager system

1 See the *Polycom RealPresence Resource Manager System Operations Guide* for detailed information about adding a site. Then go to **Admin > Topology > Sites** and add a site.

This procedure identifies just the requirements specific to integrating the site with a RealPresence Access Director system.

2 On the **General Info** tab of the **Add Site** dialog box, select **Site with RPAD**. Complete the other fields of the tab as required.

3 On the **Subnets** tab, add a subnet. Enter the RealPresence Access Director system internal signalling **IP address** and **Mask** (255.255.255.255).

4 Complete the other tabs and fields of the **Add Site** dialog box as required and finish adding the site.

The site is added to the system, and the **Add Site Provisioning Details** dialog box appears.

5 On the **Directory Setting** tab, enter the RealPresence Access Director system's public IP address as **Directory Server**. Complete the other fields of the tab as required.

6 On the **Presence Settings** tab, enter the RealPresence Access Director system's public IP address as **Presence Server**. Complete the other fields of the tab as required.

7 On the **RPAD Settings** tab, configure the general system values for the RealPresence Access Director system deployment.

8 On the **RPAD Settings 2** tab:, enter the required values.

Field	Description
Enable IP H.323	Select this if support for H.323 signalling is required for H.323 endpoints.
Gatekeeper Address	In this solution, the DMA system is the gatekeeper, so enter the DMA system IP address here.
Enable SIP	Select this if support for SIP signalling is required for SIP endpoints.

Field	Description
Proxy Server	Enter the address of the internal SIP proxy server to which the RealPresence Access Director system forwards information when an endpoint sends SIP registration or SIP call routing. In this solution, the DMA system is the proxy server, so this is the DMA system IP address.
Registrar Server	Enter the public IP address or the DNS name of the RealPresence Access Director system. **Note** If using a custom port for remote users, enter the following text after the public IP address or DNS name: *:<custom port number>*
Transport Protocol	Enter TCP as the SIP signal transport protocol. Polycom suggests using TCP but UDP, UDP/TCP, or TLS may also be used. You must specify the same protocol as the protocol used in the RealPresence Access Director system for remote users.
Verify Certificate	(SIP Settings) Indicate whether to verify certificate between the RealPresence Access Director system and the SIP server.
Use Default Directory Server	This server or specify a directory server.
Directory Server	Enter the address of the internal LDAP server to which the RealPresence Access Director system forwards information when an endpoint tries to register to an LDAP directory.
Verify Certificate	(Directory Settings) Indicate whether to verify certificate between the RealPresence Access Director system and LDAP server.
Use Default Presence Server	This server or specify a presence server.
Presence Server	Enter the address of the internal presence server to which the RealPresence Access Director system forwards information when an endpoint tries to register to a presence server.
Verify Certificate	(Presence Settings) Indicate whether to verify certificate between the RealPresence Access Director system and presence server.

9 To enable remote users with H.323 endpoints:

   a On the **H.323 Settings** tab, select **Enable IP H.323** and in the **Gatekeeper Address** field, enter the RealPresence Access Director system's public IP signalling address.

   b Complete the other fields of the tab as required.

10 To enable remote users with SIP endpoints:

   a On the **SIP Settings** tab, select **Enable SIP** and in the **Proxy Server** and **Registrar Server** fields, enter the RealPresence Access Director system's public signaling IP address.

   b Set the **Transport Protocol** to TLS.

IMPORTANT

If Device Authentication is enabled on the DMA system, disable **Use Endpoint Provisioning Credentials** and enter the **Common SIP User Name** and **Common SIP Password**, which are in the authentication list configured on the DMA system. For more information, refer to "Enable SIP Device Authentication" on page 20.

   c Complete the other fields of the tab as required.

11 Complete the other fields of the dialog box as required.

Task 2 Add a Provisioning User Account for the RealPresence Access Director System

To provision a RealPresence Access Director system, the RealPresence Resource Manager system must have a user account dedicated for this purpose. This user account is the Login Name and Password that you enter on the RealPresence Access Director system to enable the integration and provisioning capability.

Because this user account is for system authentication only, the account:

- Should not be a real user account
- Needs only the minimum required user information

To add a provisioning user account to the RealPresence Resource Manager system for this purpose

1 See the *Polycom RealPresence Resource Manager System Operations Guide* for detailed information about adding a user account. Then go to **User > Users > Add**.

2 On the **General Info** tab of the **Add New User** dialog box, enter the minimum required information, as indicated by an asterisk and then click **OK**.

Task 3 Add a Provisioning User Account for Endpoints

To provision endpoint systems through the firewall, the RealPresence Resource Manager system must have a user account dedicated for this purpose. This user account is the username and password that you must enter on the endpoint system to enable the integration and provisioning capability.

To add a user account to the RealPresence Resource Manager system for an endpoint

1. See the *Polycom RealPresence Resource Manager System Operations Guide* for detailed information about adding a user account. Then go to **User > Users > Add**.
2. On the **General Info** tab of the **Add New User** dialog box, enter the minimum required information, as indicated by an asterisk and then click OK.
3. On the **Dial String Reservations** tab, enter the SIP URI for the endpoint and then click OK.

Configure the RealPresence Access Director System

Once the RealPresence Resource Manager system has been configured to integrate with and provision the RealPresence Access Director system, you can finish configuring the RealPresence Access Director system.

The following sections describe the tasks to be performed. They include:

- Configure System Certificates
- Configure Automatic Provisioning (Recommended)

See the *Polycom RealPresence Access Director Administrator's Guide* for detailed information about each of these tasks. The following sections provide specific information as it relates to this solution.

Task 1 Configure System Certificates

The RealPresence Access Director system is delivered with a self-signed certificate at installation. You can replace the self-signed certificated with signed certificates issued by a certificate authority.

The RealPresence Access Director system certificate must be both a `serverauth` and `clientauth` certificate.

You should configure certificates before configuring automatic provisioning of the RealPresence Access Director system and before federating your RealPresence Access Director system with another enterprise. For more information about certificate signing requests and certificates, see the *Polycom RealPresence Access Director Administrator's Guide*.

Task 2 Configure Automatic Provisioning (Recommended)

When integrated with a Polycom Management System, the RealPresence Access Director system connects to the RealPresence Resource Manager system to get some of the configuration information you entered when you configured the management system. (See "Configure the RealPresence

Resource Manager System" on page 14.)

Specifically, automatic provisioning configures:

- An NTP server for system time
- Access proxy settings
- SIP and H.323 signaling settings

After connecting and enabling provisioning mode, you cannot update the provisioned information manually in the RealPresence Access Director system until after disconnecting.

To configure automatic provisioning on the RealPresence Access Director system

1. See the *Polycom RealPresence Access Director Administrator's Guide* for detailed information about configuring automatic provisioning. Then go to **Admin > Polycom Management System**.
2. Enter the **Login Name**, **Password**, and RealPresence Resource Manager IP address as configured in "Add a Provisioning User Account for the RealPresence Access Director System" on page 17, and then click **Connect**.

   When the RealPresence Access Director system connects successfully to the RealPresence Resource Manager system, some SIP and H.323 settings are automatically provisioned.

Configure the Polycom DMA System

Enable SIP Device Authentication

Device authentication enhances security by requiring devices registering with or calling through the DMA system to provide credentials that the system can authenticate. In turn, the DMA system may need to authenticate itself to an external SIP peer or neighbored gatekeeper.

If your DMA system is peered with other SIP devices, enabling SIP device authentication may cause inbound calls to the DMA system from those SIP peers to fail. Multiple solutions exist for resolving these issues with dial plan and network design. If necessary, please contact your Polycom field representative.

All authentication configurations are supercluster-wide, but note that the default realm for SIP device authentication is the cluster's FQDN, enabling each cluster in a supercluster to have its own realm for challenges.

IMPORTANT

If **Device Authentication** is enabled on the DMA system, you must disable **Use Endpoint Provisioning Credentials** on the RealPresence Resource Manager system (see step 10 on page 17).

To enable SIP authentication for ALL internal and external endpoints:

1. See the *Polycom DMA System Operations Guide* for detailed information about enabling SIP device authentication. Then go to **Admin > Local Cluster > Signaling Settings** and in the **SIP Settings** section, select **Enable authentication**.
2. To add a device's authentication credentials to the list of device credential entries that the Call Server checks, click **Add** and enter the user **Name**, **Password**, and **Confirm Password** credentials.

   These are the credentials you set up in "Add a Provisioning User Account for Endpoints" on page 17. They provide authentication of the endpoint's provisioning request.

To disable SIP authentication for a specific endpoint:

1. Go to **Network > Endpoints**.
2. Select the endpoint for which you want to remove authentication.
3. Click **Edit**.
4. Clear **Device Authentication**.

Supporting Guests in a SIP Environment

To support SIP guest calls, additional settings must be configured on the DMA system and on the RealPresence Access Director system. Polycom recommends the configurations described in the following sections:

- "Configure SIP settings for guests on the Polycom DMA system" on page 21
- "Configure SIP settings for guests on the RealPresence Access Director system" on page 22
- "Configure SIP settings for registered users on the RealPresence Access Director system" on page 23

Task 1 Configure SIP settings for guests on the Polycom DMA system

Your DMA system must be configured with a dial rule prefix that corresponds to the prefix used for guests on the RealPresence Access Director system.

To configure the DMA system to support SIP guest calls

1. See the **Configure Signaling** section of the *Polycom DMA System Operations Guide* for detailed information about this process. Then on the DMA system, go to **Admin > Local Cluster > Signaling Settings.**
2. Add a guest dial rule prefix (**SIP Settings > Unauthorized prefixes> Add)** and enable **Strip prefix**.
3. Configure the required information so that it matches the prefix for guest calls added in the RealPresence Access Director system.
4. Go to **Admin > Call Server > Dial Rules** and add three dial rules to handle the incoming unauthorized guest calls; one for each type of call resolution:
   - Resolve to conference room ID
   - Resolve to virtual entry queue
   - Resolve to external SIP peer
5. Go to **Admin > Call Server > Domains** and add a domain to the domain list for the host specified for guest port configuration.

Task 2 Configure SIP settings for guests on the RealPresence Access Director system

To configure the RealPresence Access Director system external SIP port 5060 for guests

1. See the *Polycom RealPresence Access Director Administrator's Guide* for detailed information about configuring SIP settings. Then on the RealPresence Access Director system, go to **Configuration > SIP and H.323 Settings**.
2. **Enable SIP signaling** and then configure external port 5060 for SIP guest users (**External Port Settings > Edit**) with the required information. In this case:
   - **Port name**: Defaults to **Unencrypted port**.
   - **Transport: UDP/TCP**.
   - Enable **Dial string policy** and enter a dial string prefix (**Prefix of Userinfo**) that does not interfere with your dial plan and will be stripped by the DMA system.
   - The host is a domain name change the system can implement. For example, if a SIP guest user calls 8222@polycom.com, but the host is configured as example.com and the prefix is 77, the system will change the users dial string to 778222@example.com.
   - Enable **Forbid registration**.

To configure the RealPresence Access Director system external SIP port 5061 for guests

1. See the *Polycom RealPresence Access Director Administrator's Guide* for detailed information about configuring SIP settings. Then on the RealPresence Access Director system, go to **Configuration > SIP and H.323 Settings**.
2. **Enable SIP signaling** and then configure external port 5061 for SIP guest users (**External Port Settings > Edit**) with the required information. In this case:
   - **Port name**: Defaults to **Encrypted port**.
   - **Transport: TLS**.
   - Enable **Dial string policy** and enter a dial string prefix (**Prefix of Userinfo**) that does not interfere with your dial plan and will be stripped by the DMA system.
   - The host is a domain name change the system can implement. For example, if a SIP guest user calls 8222@polycom.com, but the host is configured as example.com and the prefix is 77, the system will change the users dial string to 778222@example.com.
   - Enable **Forbid registration**.

Task 3 Configure SIP settings for registered users on the RealPresence Access Director system

If you configure the external SIP ports 5060 and 5061 for guest users, you must also add an external SIP port for registered users.

To configure a RealPresence Access Director system non-standard external SIP port to support registered user calls

1. On the RealPresence Access Director system, go to **Configuration > SIP and H.323 Settings**.
2. **Enable SIP signaling** and then configure a port for SIP registered users (**External Port Settings > Add**) with the required information. In this case:
   - **Port number:** Any non-standard port number that is not already in use.
   - **Port name**: **RegisteredUser** (for example).
   - **Transport:** Polycom suggests using **TCP** but UDP, UDP/TCP, or TLS may also be used. The transport protocol entered here must match the transport protocol for the RealPresence Access Director system site in the RealPresence Resource Manager system. See "To add a site to the RealPresence Resource Manager system" on page 15.
   - Disable **Forbid registration**.

Configure Polycom Endpoint Systems

This solution supports the Polycom endpoint systems identified in "Products Tested in this Solution" on page 7.

Task 1 Configure Polycom HDX Series Endpoints

Polycom HDX series endpoints do not require any special set up for this solution. Polycom recommends automatic provisioning because it enables easy setup and access to advanced features.

See the Polycom HDX system documentation available at *support.polycom.com* for more information about configuring the system for automatic provisioning.

Task 2 Configure the Polycom Group Series System

See the RealPresence Group Series 300 or 500 user documentation at *support.polycom.com* for configuration information.

Task 3 Configure Polycom RealPresence Mobile or Desktop Endpoints

This section includes some specific information for configuring RealPresence Mobile software in this solution. It assumes you have already installed the software on your device.

For more detailed RealPresence Mobile product information, refer to the Help and the Release Notes for the software version you are using, available at *support.polycom.com*.

Professional Mode Sign-In Settings

Users can choose to use their RealPresence Mobile or Desktop system in Professional Mode. In this mode, the system is automatically provisioned/configured by the RealPresence Resource Manager system. Polycom recommends automatic provisioning because it enables easy setup and access to advanced features.

The product Help describes how users configure their systems for professional mode. When setting up professional mode, the user will need to enter the user name and password configured in "Add a Provisioning User Account for Endpoints" on page 17.

Configure the Polycom RealPresence Collaboration Server

To ensure that a RealPresence Mobile client can send content to a conference, on the RealPresence Collaboration Server, go to **Setup > System Configuration > System Flags** and set the value of the

NUM_OF_INITIATE_HELLO_MESSAGE_IN_CALL_ESTABLISHMENT

system flag to at least 3.

For information about adding system flags, see "Manually Adding and Deleting System Flags" in the *Polycom RMX System Administrator Guide*.

After the change, you must restart the RMX system.

Configure the Polycom RSS™ System

Ensure that the Polycom RSS 4000 system is in normal mode, not maximum security mode.

Refer to the *Polycom RSS 4000 User Guide* for more information about Polycom RSS working modes.

3

Federation Between RealPresence Access Director Systems Only

This chapter describes how to configure this solution to support calls between endpoint users in two separate but federated (trusted) divisions or enterprises. In the deployment solution described in this chapter, each division or enterprise must have a RealPresence Access Director system.

In this chapter, we assume you have already performed the standard deployment as documented in Chapter 2, "Deploying the Basic RealPresence Access Director System Solution to Support Remote and Guest Users."

Federation in a SIP Environment

To configure this solution to support calls between endpoint users in two separate but federated (trusted) divisions or enterprises in a SIP environment, each division or enterprise must have a RealPresence Access Director system that is configured:

- To trust the other's certificate
- With mutual **TLS** enabled
- With a default route to the other's Real Presence Access Director system.

In addition, the federated enterprises must:

- Have a dial plan to route traffic to and from specific ports using specified protocols
- Directed to the designated port

To support SIP calls from federated divisions or enterprises, perform the following deployment tasks:

- Create additional DNS SRV records on the external DNS server
- Configure the RealPresence Access Director systems to support federated SIP calls

- Configure the Polycom DMA systems to support federated SIP calls

Task 1 Create additional DNS SRV records on the external DNS server

"Configure the DNS Service" on page 10 describes the basic DNS setup required for this solution. Federating sites requires additional DNS configuration as described here.

- Complete this process on the DNS systems for the two sites being federated.
- If you're not familiar with DNS administration, the creation of various kinds of DNS resource records, and your enterprise's DNS implementation, please consult with someone who is.

Create an SRV record on the external DNS server (the DNS server configured on the Network Setting page of the RealPresence Access Director system) to map the SRV service address to the FQDN of the RealPresence Access Director system. The SRV record is required by the **Auto Find Provisioning Server** feature of the RealPresence Mobile system.

So if the RealPresence Access Director system has the FQDN name *rpad.example.com,* add an SRV record as follows.

```
_sips._tcp.example.com. IN SRV 0 0 5080 rpad.example.com.
```

Task 2 Configure the RealPresence Access Director systems to support federated SIP calls

To configure the federated sites' RealPresence Access Director systems to support SIP calls

1 See the *Polycom RealPresence Access Director Administrator's Guide* for detailed information about configuring SIP settings. Then go to **Configuration > SIP and H.323 Settings**.

Complete this process on the RealPresence Access Director systems for the two sites being federated.

2 **Enable SIP signaling** and add a port for SIP users (**External Port Settings > Add**) and configure the required information.

- Transport protocol must be **TLS** (mutual TLS)
- **Require certificate from remote endpoint** must be selected
- Enable **Forbid registration**

3 Go to **Configuration > Federation Settings > Add** and configure the required information for the federated sites.

   – Enter the FQDN or IP address of the federated site's RealPresence Access Director system.

4 Go to **Admin > Certificates** and verify that the federated site's certificate is in the **Trusted Store**.

Task 3 Configure the Polycom DMA systems to support federated SIP calls

To configure the federated sites' DMA systems to support federated SIP calls

1 See the *Polycom DMA System Operations Guide* for detailed information about adding an external SIP peer. Then go to **Network > External SIP Peer > Add**.

Complete this process on the RealPresence Access Director systems for the two sites being federated.

2 On the **External SIP Peer** tab, enter the internal signaling IP address of the RealPresence Access Director system as the **Next hop address.**

3 On the **Postliminary** tab, set **Request URI options** to **Use original request URI (RR)**.

4 On the **Authentication** tab, click **Add** and add the federated site's authentication information.

5 Go to **Admin > Call Server > Device Authentication** and add the federated site's authentication credentials to the list of device credential entries that your call server should check.

6 Select the **Inbound Authentication** tab, click **Add** and add the local system's authentication information for inbound messages.

7 Select the **Shared Outbound Authentication** tab, click **Add** and add the federated site's authentication information for outbound messages.

8 Go to **Admin > Local Cluster > Signaling Settings** and in the **SIP Settings** section, select **Enable SIP signaling** and **Enable authentication**.

9 Go to **Admin > Call Server > Dial Rules** and add a dial rule for federated site's RealPresence Access Director system that resolves to external SIP peer, so the DMA system can send the INVITE message out to the RealPresence Access Director system.

10 Go to **Admin > Call Server > Domains** and add the local RealPresence Access Director system to the domain list.

Federation in an H.323 Environment

To configure this solution to support calls between endpoint users in two separate but federated (trusted) divisions or enterprises in an H.323 environment, each division or enterprise must have a RealPresence Access Director system that is configured:

- With a dial plan to route E.164 aliases properly between the enterprises
- To be directed to the designated port

To support H.323 calls from federated divisions or enterprises, perform the following deployment tasks:

- Configure the RealPresence Access Director systems to support federated H.323 calls
- Configure the Polycom DMA Systems to support federated H.323 calls

Task 1 Configure the RealPresence Access Director systems to support federated H.323 calls

To configure the federated enterprises' RealPresence Access Director systems to support H.323 calls

1 See the *Polycom RealPresence Access Director Administrator's Guide* for detailed information about configuring H.323 settings. Then go to **Configuration > SIP and H.323 Settings**.

Complete this process on the RealPresence Access Director systems for both of the enterprises being federated.

2 **Enable H.323 signaling** and configure the required information.

- Gatekeeper (next hop) address is the DMA system IP address
- CIDR should only include the subnet of internal gatekeeper

3 Go to **Configuration > Federation Settings > Add** and configure the required information for the federated enterprise.

- Enter the IP address of the federated site's RealPresence Access Director system

Generally, you will not need to configure the remote RAS port and H.225 signaling ports. The port used during the call will be returned by the DNS SRV search.

Task 2 Configure the Polycom DMA Systems to support federated H.323 calls

To configure the federated enterprises' DMA systems to support H.323 calls

1 See the *Polycom DMA System Operations Guide* for detailed information about adding a neighbored gatekeeper. Then go to **Network > External Gatekeeper > Add** and add the local RealPresence Access Director system as a neighbored gatekeeper identified by its internal signaling address.

Complete this process on the RealPresence Access Director systems for both of the enterprises being federated.

2 Go to **Admin > Call Server > Dial Rules** and add a "resolve to external gatekeeper" dial rule for the local RealPresence Access Director system that has been identified as the gatekeeper.

3 Go to **Admin > Call Server > Domains** and add the local RealPresence Access Director system to the domain list.

4

Federation Between RealPresence Access Director and Other Systems

This chapter describes how to configure this solution to support calls between endpoint users in two separate but federated (trusted) divisions or enterprises.

In this deployment solution, one of the federated sites has a RealPresence Access Director. The other site has a different session border controller. Supported solutions include:

- Federation in an H.323 Environment with Polycom VBP-E Systems
- Federation in a SIP Environment with Acme Packet

In this chapter, we assume you have already performed the standard deployment for the applicable systems as documented in Chapter 2, "Deploying the Basic RealPresence Access Director System Solution to Support Remote and Guest Users."

Federation in an H.323 Environment with Polycom VBP-E Systems

In this solution deployment model, two enterprises or divisions are federated. One of the federated enterprise has a RealPresence Access Director system as its access controller along with a DMA system as gatekeeper. The other federated enterprise has a Polycom VBP 5300E as its access controller and either uses an embedded or Polycom CMA system v6.2 gatekeeper.

To support calls between these federated divisions or enterprises, perform the following deployment tasks:

- "Create an additional DNS A record on the external DNS server" on page 34
- "Create additional DNS SRV records on the external DNS server" on page 34

- "Configure the RealPresence Access Director systems to support federated H.323 calls" on page 35
- "Configure the Polycom DMA System to support federated calls" on page 35
- "Configure the CMA system to support federated H.323 calls" on page 36
- "Configure the VBP-5300E system to support federated H.323 calls" on page 36.

Task 1 Create an additional DNS A record on the external DNS server

"Configure the DNS Service" on page 10 describes the basic DNS setup required for the RealPresence Access Director system in this solution. Federation requires additional DNS configuration as described here.

If you're not familiar with DNS administration, the creation of various kinds of DNS resource records, and your enterprise's DNS implementation, please consult with someone who is.

Create a DNS A (address) record on the external DNS server to map the FQDN of the VBP 5300E system to its public (WAN side) IP address.

So if the VBP-E system has the FQDN name *vbp_b.example2.com,* add an A record as follows.

```
vbpe_b.example2.com IN A 192.168.11.100
```

Task 2 Create additional DNS SRV records on the external DNS server

Each access controller—the RealPresence Access Director system and the VBP 5300E system must have an SRV record on the external DNS server to map the SRV service address to its FQDN.

- Create an SRV record on the external DNS server to map the SRV service address to the FQDN of the RealPresence Access Director system.

  The SRV record is required by the **Auto Find Provisioning Server** feature of the RealPresence Mobile system.

  So if the RealPresence Access Director system has the FQDN name *rpad.example.com,* add SRV records as follows.

  ```
  _h323ls._udp.example.com. IN SRV 0 0 1719 rpad.example.com.
  _h323cs._tcp.example.com. IN SRV 0 0 1720 rpad.example.com.
  ```

- Create an SRV record on the external DNS server to map the SRV service address to the public IP address of the Polycom VBP-5300E system.

  So if the VBP-E system has the FQDN name *vbpe_b.example2.com,* add SRV records as follows.

  ```
  _h323ls._udp.example2.com. IN SRV 0 0 1719 vbpe_b.example2.com
  _h323cs._tcp.example2.com. IN SRV 0 0 1720 vbpe_b.example2.com
  ```

Task 3 Configure the RealPresence Access Director systems to support federated H.323 calls

To configure the federated enterprises' RealPresence Access Director systems to support federated H.323 calls

1 See the *Polycom RealPresence Access Director Administrator's Guide* for detailed information about configuring H.323 settings. Then go to **Configuration > SIP and H.323 Settings**.

2 **Enable H.323 signaling** and configure the following gatekeeper and network settings (**External Port Settings > Add**).

- Gatekeeper (next hop) address is the DMA system IP address
- CIDR should only include the subnet of the internal gatekeeper

The CIDR is used by the RealPresence Access Director system to determine the origin of a call:, the internal network or external network. The value of CIDR depends on the local DMA system mode (Routed or Direct).

- If the local DMA is configured in Routed mode, the CIDR should only include the subnet of the DMA system.
- If the local DMA system is configured in Direct mode, then the CIDR should include the subnet of the DMA system and local enterprise endpoints.

3 Go to **Configuration > Federation Settings > Add** and configure the required information for the federated enterprise.

- Enter the FQDN or IP address of the federated site's VBP-E system.
- Complete the other tabs and fields of the dialog box as required

Generally, you will not need to configure the remote RAS port and H.225 signaling ports. The port used during the call will be returned by the DNS SRV search.

Task 4 Configure the Polycom DMA System to support federated calls

To configure the federated enterprises' DMA system to support federated calls

1 See the *Polycom DMA System Operations Guide* for detailed information about adding neighbored gatekeeper. Then go to **Network > External Gatekeeper > Add** and add the local RealPresence Access Director system as a neighbored gatekeeper identified by its internal signaling address.

2 Go to **Admin > Call Server > Dial Rules** and add a "resolve to external gatekeeper" dial rule for the local RealPresence Access Director system that has been identified as the gatekeeper.

Task 5 (Conditional) Configure the CMA system to support federated H.323 calls

If a CMA system v6.2 is the gatekeeper for the federated enterprise using the VBP-E access controller, perform this task. Otherwise, skip to "Task 7 (Conditional)" on page 37.

To configure the federated enterprises' CMA system to support federated H.323 calls

1 See the *Polycom CMA System Operations Guide* for detailed information about adding neighbored gatekeeper. Then go to **Admin > Gatekeeper Settings > Neighboring Gatekeepers** and add the RealPresence Access Director system as neighboring gatekeeper.

2 Go to **Admin > Server Settings > Network** and enter the VBP-E's LAN interface address as the **IPv4 Default Gateway** address.

3 Go to **Admin > Dial Plan and Sites > Dial Rules** and add a **Prefix** dial rule. Assign it a **Routing Action** of **Route to a trusted neighbor**.

4 Go to Trusted Neighbors and select the RealPresence Access Director system as a trusted neighbor.

Task 6 (Conditional) Configure the VBP-5300E system to support federated H.323 calls

If a CMA system is the gatekeeper for the federated enterprise using the VBP-E access controller, perform this task. Otherwise, skip to "Task 7 (Conditional)" on page 37.

To configure the federated enterprises' VBP-5300E systems to support federated calls when the CMA system is the gatekeeper

1 See the *Polycom VBP System Configuration Guide* for detailed information about specifying H.323 settings. Then go to **Configuration Menu> VoIP ALG > H.323.**

2 Select **Gatekeeper mode > LAN/Subscriber-side gatekeeper mode** and enter the CMA system's IP address as the **LAN/Subscriber-side GK address**.

Task 7 (Conditional) Configure the VBP-5300E system in Embedded gatekeeper mode to support federated H.323 calls

If the VBP-E is both the access controller and gatekeeper for the federated enterprise or division, perform this task. Otherwise, skip to

To configure the federated enterprises' VBP-5300E systems to support federated calls when the CMA system is the gatekeeper

1. See the *Polycom VBP System Configuration Guide* for detailed information about specifying H.323 settings. Then go to **Configuration Menu> VoIP ALG > H.323.**
2. Select **Gatekeeper mode > LAN/Subscriber-side gatekeeper mode** and enter the CMA system's IP address as the **LAN/Subscriber-side GK address**.

Federation in a SIP Environment with Acme Packet

To support calls from federated divisions or enterprises when an Acme Packet® Net-Net Enterprise Session Director (ESD) system is in the environment, perform the following configuration.

It is assumed here that the Acme Packet Net-Net ESD system is already installed and configured for standard use.

To configure the Acme Packet Net-Net ESD for federation

1. See the Acme Packet documentation at https://support.acmepacket.com/documentation.asp. Then add two realms（***configure terminal; media-manager; realm-config***). Configure the following mandatory parameters:

```
identifier = B2B-Access
description = For External Connection(Optional)
network-interfaces = s0p0:0

identifier = B2B-Core
description = For Internal Connection(Optional)
network-interfaces = 1p0:0
```

2. Add two SIP interfaces（***configure terminal; session-router; sip-interface***). Configure the following parameters:

```
state enabled
realm-id B2B-Access
sip-port
    address 192.168.203.2 ACME Server External IP
```

```
    port 5061 ACME External Listening Port
    transport-protocol TLS ACME External Listening Transport
    tls-profile TLS-profile
    allow-anonymous all

state enabled
realm-id B2B-Core
sip-port
    address 192.168.204.2 ACME Server Internal IP
    port 5060
    transport-protocol UDP
    tls-profile
    allow-anonymous                all
```

3. Add two steering pools (***configure terminal; media-manager; steering-pool***). Configure the following parameters:

```
ip-address 192.168.203.2 ACME Server External IP
start-port 60000
end-port 61999
realm-id B2B-Access

ip-address 192.168.204.2 ACME Server Internal IP
start-port 62000
end-port 63999
realm-id B2B-Core
```

4. Add two local policies (***configure terminal; session-router; local-policy***). Configure the following parameters:

```
local-policy
from-address *
to-address *
source-realm B2B-Access
state enabled
policy-attribute
    next-hop 192.168.12.4-----DMA IP
    realm B2B-Core

local-policy
from-address *
to-address *
source-realm B2B-Core
state enabled
policy-attribute
    next-hop 10.220.211.112----Another Enterprise IP
    realm B2B-Access
```

5. Save the configuration.

5

Verifying Deployment

Verifying Access Proxy

To verify functionality and connectivity between the RealPresence Access Director system and the RealPresence Mobile system, and between the RealPresence Access Director system and the RealPresence Resource Manager system:

1. On the RealPresence Mobile device, configure a WiFi network.

   For example, if the RealPresence Access Director public IP address is 192.168.11.175, make sure that the RealPresence Mobile system can access this address.

2. On the RealPresence Mobile device, configure this sign-in setting.

   Provision Server: FQDN or public IP address of the RealPresence Access Director system.

   User Name: User account login managed by the RealPresence Resource Manager system.

   Password: Correct password associated with User Name.

3. Click **Sign in**, and verify that sign-in was successful.
4. On the RealPresence Resource Manager system, go to **ENDPOINT > Monitor view** to check the status of the user.

Verifying SBC

To verify SIP service and H.323 service:

1. Have a user sign into the DMA system and verify that the user registered to the DMA system successfully.
2. Place a call, and verify that the call was established successfully.

3 Place a long call, and verify that the call remained connected.

4 Have the user sign out, and verify that the user was unregistered from the DMA system successfully.

Verifying Certificates

To verify that the administrator installed correct certificates on the RealPresence Resource Manager, RealPresence Access Director, and RealPresence Mobile systems:

1 In the access proxy configuration, select these settings:

- **Require client certificate from the remote endpoint**
- **Verify certificate from internal server**

2 Have a user sign on to the RealPresence Mobile device, and verify that the user signed on successfully.

3 In SIP settings, select **TLS transport**, and verify that the user can register and place a call successfully.

A

Required Ports

Management Ports

The following tables describe the management ports on which the RealPresence Access Director system (RPAD) can listen.

For greater security, Polycom recommends that you disable SSH and Web access connectivity from the WAN, and enable SSH and Web access connectivity from the LAN. If you require the ability to manage the RealPresence Access Director system from the WAN, refer to the following tables for specific requirements.

From the WAN to the RealPresence Access Director System

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
IP address of the host managing the RPAD system via HTTPS	Any	TCP	* The RPAD system public management IP address	8443	HTTPS Web connectivity from the WAN client to the RPAD system
IP address of the host managing the Access Director system via SSH	Any	TCP	The RPAD system public management IP address	22	SSH connectivity from the WAN client to RPAD system
* The RPAD system public management IP address refers to the public IP address mapped in the firewall located between the WAN and the RealPresence Access Director system.					

From the LAN to the RealPresence Access Director System

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
IP address of the host managing the RPAD system via HTTPS	Any	TCP	* The RPAD system public management IP address	8443	HTTPS Web connectivity from internal client to the RPAD system
IP address of the host managing the RPAD system via SSH	Any	TCP	The RPAD system public management IP address	22	SSH connectivity from internal client to the RPAD system
IP address of the host sending and SNMP request to the RPAD system	Any	** UDP or TCP	* The RPAD system public management IP address	** **161**	SNMP connection from internal server to the RPAD system
* The RPAD system public management IP address refers to the public IP address mapped in the firewall located between the WAN and the RealPresence Access Director system. ** The protocol and DST port depend on the SNMP settings you configure in the RealPresence Access Director system user interface. See the *Polycom RealPresence Access Director System Administrator's Guide* for details.					

From the RealPresence Access Director System to the WAN

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
RPAD system management IP address	123	UDP	IP address of external NTP, if in use	123	NTP service from the RPAD system to the public NTP server
RPAD system management IP address	30001-64000	TCP	IP address of external OCSP responder, if in use	8080	TCP connectivity from the RPAD system to the public OCSP responder

From the RealPresence Access Director System to the LAN

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
RPAD system management IP address	30001-64000	UDP	IP address of external DNS, if in use	53	DNS service from the RPAD system to the internal DNS server
RPAD system management IP address	30001-64000	TCP	IP address of internal OCSP responder, if in use	8080	TCP connectivity from the RPAD system to the internal OCSP responder
RPAD system management IP address	30001-64000	* UDP or TCP	IP address of internal syslog server, if in use		Syslog service from the RPAD system to the internal syslog server
RPAD system management IP address	30001-64000	** UDP or TCP	IP address of internal SNMP server, if in use	** 162	SNMP connection from the internal server to the RPAD system

* The protocol for syslog service depends on the remote syslog settings you configure in the RealPresence Access Director system user interface. See the *Polycom RealPresence Access Director System Administrator's Guide*.

** The protocol and DST port depend on the SNMP settings you configure in the RealPresence Access Director system user interface. See the *Polycom RealPresence Access Director System Administrator's Guide* for details.

H.323 and WAN Support

The following table describes the required ports for DMZ port-filtering policies between the RealPresence Access Director system's public IP address and the WAN for H.323 support.

If your firewall has an H.323 function that enables it to intercept and alter H.323 messaging, for example, H.323 ALG, you must disable the service. if not disabled, the service may cause call failures due to re-writing of port or IP address information.

From the WAN to the RealPresence Access Director System

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
IP of external H.323 devices	>1023	TCP	* RPAD public signaling IP	* 1720	H.225 TCP connectivity from the WAN to the RPAD system
IP of external H.323 devices	>1023	TCP	RPAD public signaling IP	10001-13000	H.245 TCP connectivity from the WAN to the RPAD system
IP of external H.323 devices	>1023	UDP	* RPAD public media IP	20001-40000	Inbound RTP traffic transport from the WAN to the RPAD system
* RPAD public signaling IP refers to the mapping public signaling IP address in the firewall located between the WAN and the RealPresence Access Director system. * Port 1720 is the default H.225 TCP port in the RealPresence Access Director system. If you change the port in the RealPresence Access Director system, you must also change it accordingly on the firewall. * RPAD public media IP refers to the mapping public media IP address in the firewall located between the WAN and the RealPresence Access Director system.					

From the WAN to the RealPresence Access Director System: H.323 B2B Calls

If you use the RealPresence Access Director system for H.323 enterprise-to-enterprise calls, the ports listed in the tables below are required in addition to those listed in the preceding table.

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
Public signaling IP of RPAD or VBP-E in the other enterprise	* 1719	UDP	RPAD public signaling IP	** 1719	Inbound H.225 UDP connectivity for B2B call scenarios
Public signaling IP of RPAD or VBP-E in the other enterprise	10001-13000(RPAD-RPAD) 14085-15084(VBP-E-RPAD)	TCP	RPAD public signaling IP	** 1720	Inbound H.225 TCP connectivity for B2B call scenarios

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
Public signaling IP of RPAD or VBP-E in the other enterprise	10001-13000(RPAD-RPAD) 14085-15084(VBP-E-RPAD)	TCP	RPAD public signaling IP	10001-13000	Inbound H.245 TCP connectivity for B2B call scenarios
Public media IP of RPAD or VBP-E in the other enterprise	20001-40000(RPAD-RPAD) 16386-25386(VBP-E 5300-E-RPAD)	UDP	RPAD public media IP	20001-40000	Inbound RTP traffic transport from WAN to RPAD for B2B call scenarios
* SRC Port 1719 is the default H.225 UDP port on the RealPresence Access Director system or VBP-E of the other enterprise, so this port must be the same as the RPAD or VBP-E of the other enterprise. ** DST Ports 1719, and 1720 are the default H.225 ports on the local RealPresence Access Director system. If you change the ports on the local system, you must also changed them accordingly on the firewall.					

From the RealPresence Access Director System to the WAN: H.323 B2B Calls

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
RPAD signaling IP	* 1719	UDP	Public signaling IP of RPAD or VBP-E in the other enterprise	** 1719	Outbound H.225 UDP connectivity for B2B call scenarios
RPAD signaling IP	10001-13000	TCP	Public signaling IP of RPAD or VBP-E in the other enterprise	** 1720	Outbound H.225 TCP connectivity for B2B call scenarios
RPAD signaling IP	10001-13000	TCP	Public signaling IP of RPAD or VBP-E in the other enterprise	10001-13000(RPAD-RPAD) 14085-15084(RPAD-VBP-E)	Outbound H.245 TCP connectivity for B2B call scenarios
RPAD external media IP	20001-40000	UDP	Public media IP of RPAD or VBP-E in the other enterprise	20001-40000(RPAD-RPAD) 16386-25386(RPAD-VBP-E 5300-E)	Outbound RTP traffic transport from RPAD to WAN for B2B call scenarios

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
* SRC Port 1719 is the default H.225 UDP port on local RPAD. If you change the port in the RealPresence Access Director system, you must also change it accordingly on the firewall. ** DST Ports 1719 and 1720 are the default H.225 ports on the RealPresence Access Director system or VBP-E of the other enterprise, so these two ports must be the same as the RealPresence Access Director system or VBP-E of the other enterprise.					

H.323 and LAN Support

The following table describes the required ports for DMZ port-filtering policies between the RealPresence Access Director system's internal IP address and the LAN for H.323 support.

If your firewall has an H.323 function that enables it to intercept and alter H.323 messaging, for example, H.323 ALG, you must disable the service. If not disabled, the service may cause call failures due to re-writing of port or IP address information.

From the RealPresence Access Director System to the LAN

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
RPAD signaling IP	10001-13000	TCP	IP Address of LAN-based H.323 Gatekeeper(DMA)	* 1720	H.225 TCP connectivity from the RPAD system to the LAN-based H.323 gatekeeper (DMA system)
RPAD signaling IP	10001-13000	TCP	IP Address of LAN-based H.323 Gatekeeper(DMA)	** 36000-61000	H.245 TCP connectivity from RPAD to LAN-based H.323 gatekeeper (DMA system)
* 1720 is the default H.225 TCP port on a DMA system, so this port must be the same on the RealPresence Access Director system. ** 36000-61000 is the H.245 port range on a DMA system.					

From the LAN to the RealPresence Access Director System

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
IP address of LAN-based H.323 endpoints or MCUs	>1023	UDP	RPAD internal media IP	40001-60000	Outbound RTP traffic from the LAN H.323 clients to the RPAD system
* 1720 is the default H.225 TCP port on a DMA system, so this port must be the same on the RealPresence Access Director system. ** 36000-61000 is the H.245 port range on a DMA system.					

From the RealPresence Access Director System to the LAN: H.323 B2B Calls

If you use the RealPresence Access Director system for H.323 enterprise-to-enterprise calls, the ports listed in the tabes below are required in addition to those listed in the preceding tables.

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
RPAD signaling IP	* 1719	UDP	IP address of the LAN-based H.323 gatekeeper (DMA system)	** 1719	Inbound H.225 UDP connectivity for B2B scenarios
* SRC Port 1719 is the default H.225 UDP port on the local RealPresence Access Director system. If you change it on the local system, you must also change it accordingly on the firewall. ** DST Port 1719 is the default H.225 UDP port on a DMA system, so this port must be the same on the RealPresence Access Director system.					

From the LAN to the RealPresence Access Director System: H.323 B2B Calls

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
IP address of the LAN-based H.323 gatekeeper (DMA system)	*1719	UDP	RPAD signaling IP address	**1719	Outbound H.225 UDP connectivity for B2B scenarios
IP address of the LAN-based H.323 gatekeeper (DMA system)	36000-61000	TCP	RPAD signaling IP address	**1720	Outbound H.225 TCP connectivity for B2B scenarios
IP address of the LAN-based H.323 gatekeeper (DMA system)	36000-61000	TCP	RPAD signaling IP address	10001-13000	Outbound H.245 connectivity for B2B scenarios
* SRC Port 1719 is the default H.225 UDP port on a DMA system, so this port must be the same on the RealPresence Access Director system. ** DST Ports 1719 and 1720 are the default H.225 ports on the local RealPresence Access Director system. If you change the ports on the local system, you must also change them accordingly on the firewall.					

SIP and WAN Support

The following table describes the required ports for DMZ port-filtering policies between the RealPresence Access Director system's public IP address and the WAN for SIP support with Access Proxy.

If your firewall has a SIP function that enables it to intercept and alter SIP messaging, for example, SIP ALG, you must disable the service. If not disabled, the service may cause call failures due to re-writing of port or IP address information.

From the WAN to the RealPresence Access Director System

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
IP of external SIP clients	>1023	TCP	RPAD public signaling IP	389	LDAP connectivity from the WAN to the RPAD system
IP of external SIP clients	>1023	TCP	RPAD public signaling IP	443	HTTPS connectivity from the WAN to the RPAD system
IP of external SIP clients	>1023	TCP	RPAD public signaling IP	*5060	SIP TCP connectivity from the WAN to the RPAD system
IP of external SIP clients	>1023	UDP	RPAD public signaling IP	*5060	SIP UDP connectivity from the WAN to the RPAD system
IP of external SIP clients	>1023	TCP	RPAD public signaling IP	*5061	SIP TLS connectivity from the WAN to the RPAD system
IP of external SIP clients	>1023	TCP	RPAD public signaling IP	5222	XMPP connectivity from the WAN to the RPAD system

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
IP of external SIP clients	>1023	UDP	RPAD public media IP	20001-40000	Inbound RTP traffic transport from the WAN to the RPAD system

From the RealPresence Access Director System to the WAN

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
RPAD signaling IP	*5060	UDP	Any IP of external SIP clients	>1023	SIP UDP connectivity from the RPAD system to the WAN SIP clients
*5060 is the default SIP external listening port on RPAD. If you change these external ports or you have other SIP extenal listening ports on RPAD, these ports must be changed or added accordingly on firewall.					

SIP and LAN Support

The following table describes the required ports for DMZ port-filtering policies between RealPresence Access Director's internal IP address and the LAN for SIP support with Access Proxy.

If your firewall has an SIP function that enables it to intercept and alter SIP messaging, for example, SIP ALG, you must disable the service. Failure to disable the service may cause call failures due to re-writing of port or IP address information.

From the RealPresence Access Director System to the LAN

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
The RPAD system signaling IP address	13001-15000	TCP	IP of LAN-based SIP registrar(DMA)	*5060-5061	SIP TCP (5060) and SIP TLS (5061) connectivity from the RPAD system to the LAN-based SIP registrar (DMA system)
The RPAD system signaling IP address	**5070	UDP	IP of LAN-based SIP registrar(DMA)	*5060	SIP UDP connectivity from the RPAD system to the LAN-based SIP registrar (DMA system)
The RPAD system signaling IP address	30001-64000	TCP	IP of LAN-based provisioning server	443	HTTPS connectivity from the RPAD system to the LAN-based provisioning server

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
The RPAD system signaling IP address	30001-64000	TCP	IP of LAN-based LDAP server	389	LDAP connectivity from the RPAD system to the LAN-based LDAP server
The RPAD system signaling IP address	30001-64000	TCP	IP of LAN-based XMPP server	5222	XMPP connectivity from the RPAD system to the LAN-based XMPP server
*5060, 5061 are the default SIP listening ports on DMA, so these ports must be the same as DMA. **5070 is the default SIP internal ports on RPAD. If you change this internal port on RPAD, this port must be changed accordingly on firewall.					

From the LAN to the RealPresence Access Director System

SRC IP	SRC Port	Protocol	DST IP	DST Port	Description
IP address of the LAN-based SIP registrar (DMA system)	*5060	UDP	RPAD signaling IP	**5070	SIP UDP connectivity from the LAN-based SIP registrar (DMA system) to the RPAD system
IP address of the LAN-based SIP registrar (DMA system)	>1023	TCP	RPAD signaling IP	**5070-5071	SIP TCP connectivity from the LAN-based SIP registrar (DMA system) to the RPAD system
IP address of LAN SIP clients	>1023	UDP	RPAD internal media IP	40001-60000	Outbound RTP traffic from LAN SIP clients to the RPAD system
*5060 is the default SIP listening ports on DMA, so these ports must be the same as DMA. **5070, 5071 are the default SIP internal ports on RPAD. If you change these internal ports on RPAD, this port must be changed accordingly on firewall.					

B

Network Interface Configurations

The illustrations in this chapter show the RealPresence Access Director system network interface configurations supported in this solution.

Network Interface Configuration Summary

The table below distinguishes which network interface configurations require use of static routes.

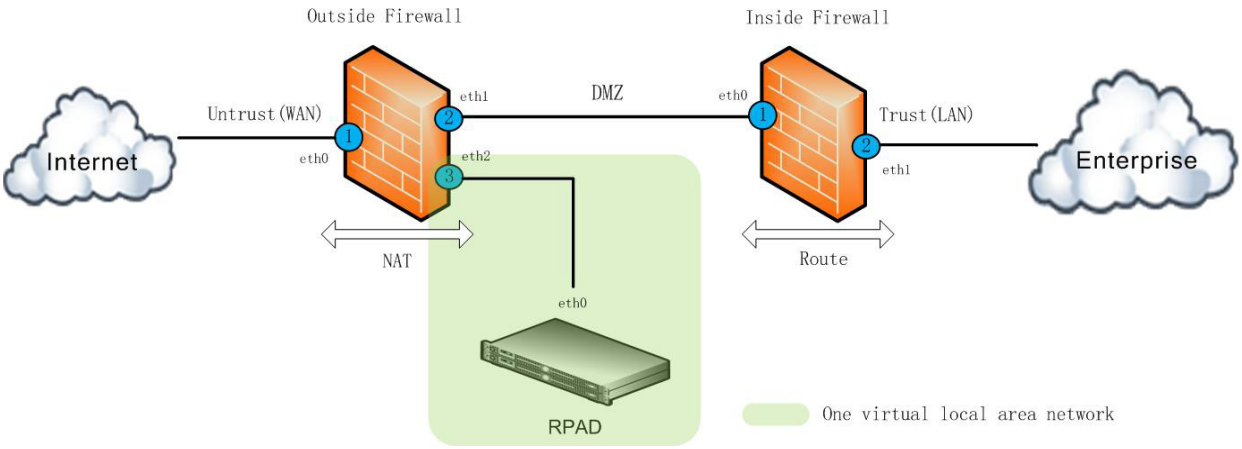
Network Interface Configuration	Static Routing Required?
Two firewalls—one interface to the outside firewall	No
Two firewalls—four interfaces to the outside firewall	No
Two firewalls—one interface to the inside firewall	No
Two firewalls—four interfaces to the inside firewall	No
Two firewalls—one interface to the DMZ	Yes
Two firewalls—four interfaces to the DMZ	Yes
Single firewall—one interface	No
Single firewall—four interfaces	No

Legend for Network Interface Configuration Diagrams

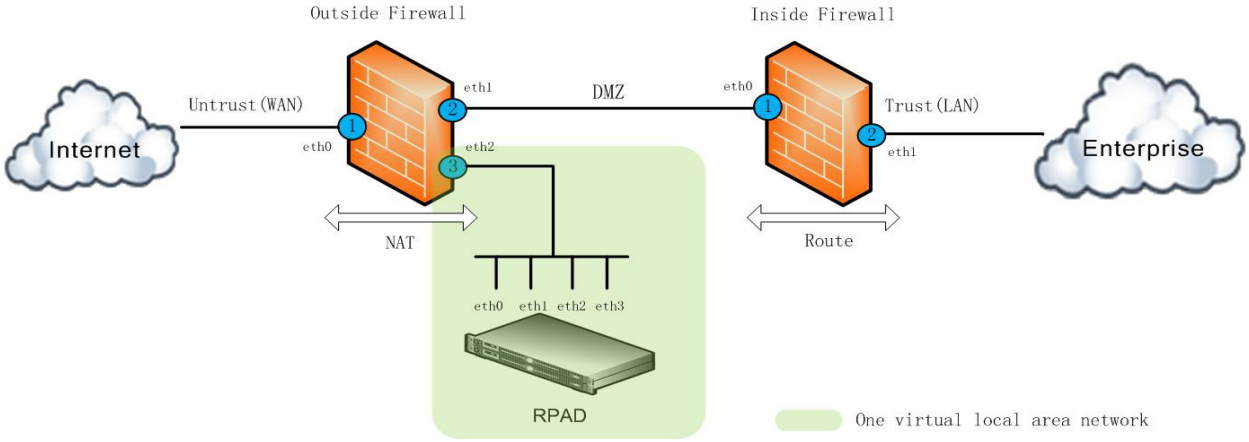
- Numbers inside blue circles specify the number of network interfaces required for the specific configuration.
- Network interface names, e.g., eth0 and eth2, indicate the interface being used and serve as examples only.

Network Interface Configurations for Dynamic Routing

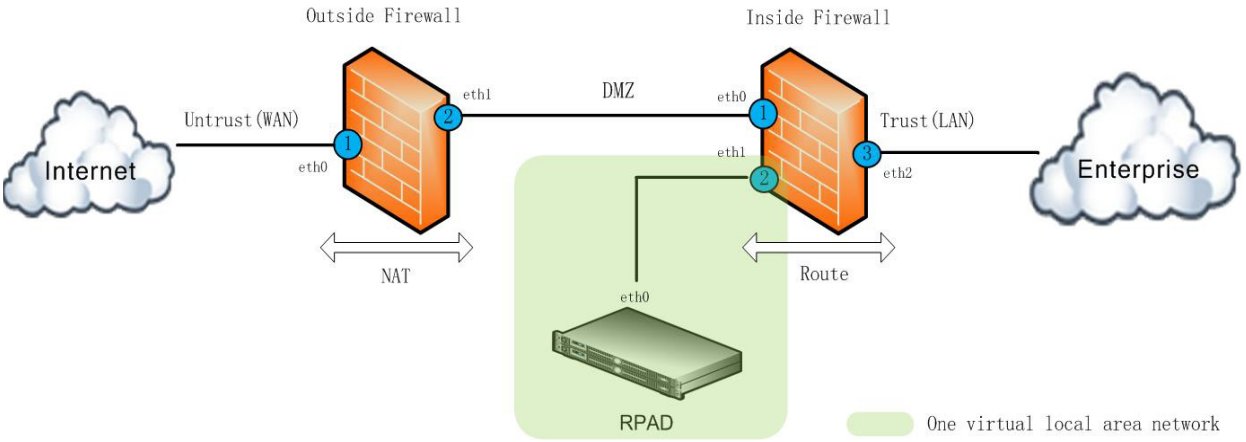
Two Firewalls—One Interface to the Outside Firewall



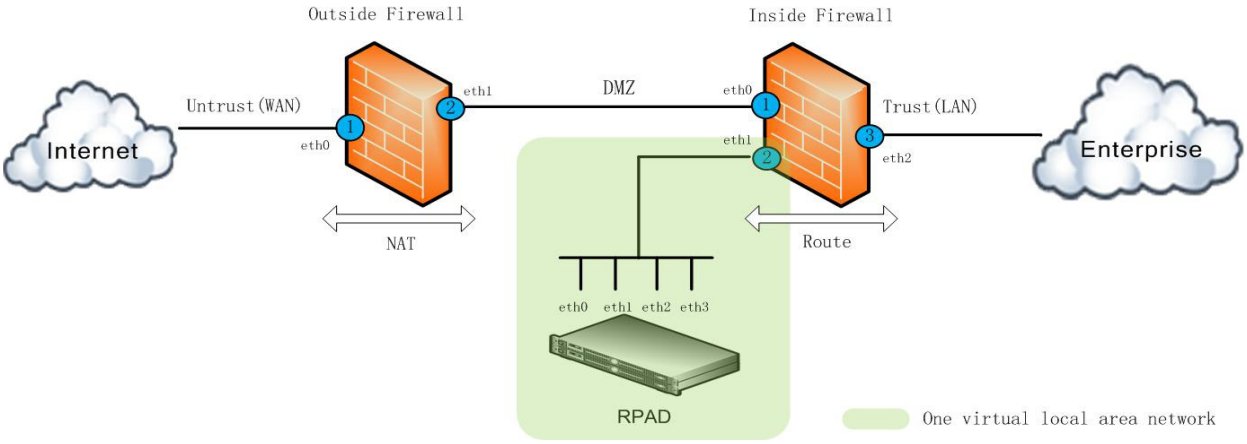
Two Firewalls—Four Interfaces to the Outside Firewall



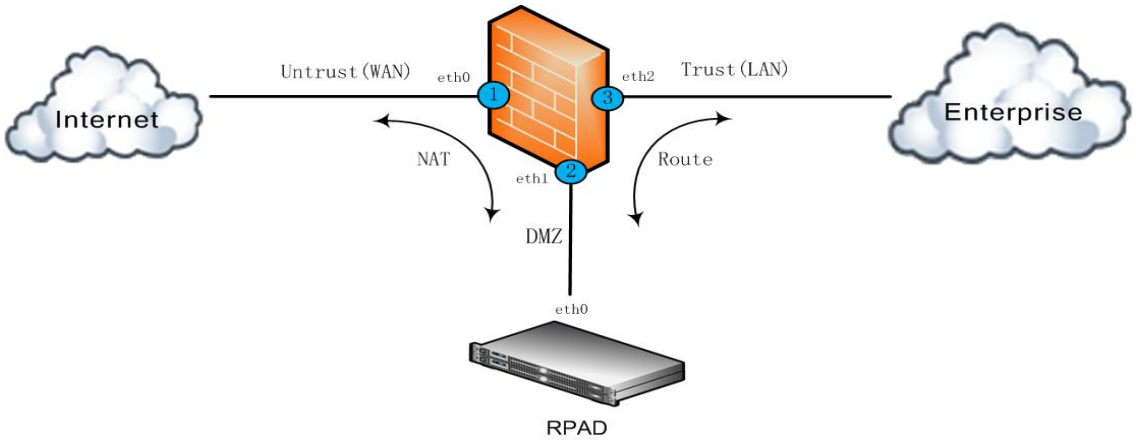
Two Firewalls—One Interface to Inside Firewall



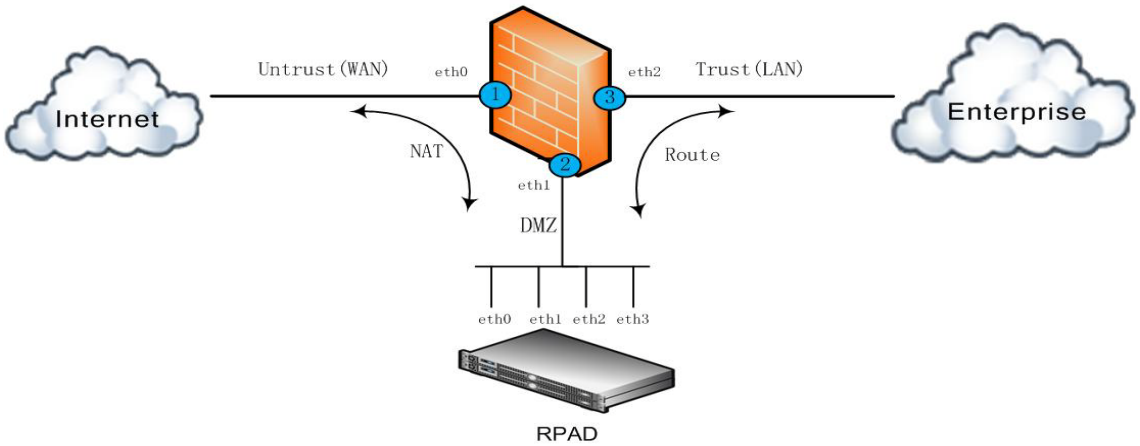
Two Firewalls—Four Interfaces to Inside Firewall



Single Firewall—One Interface

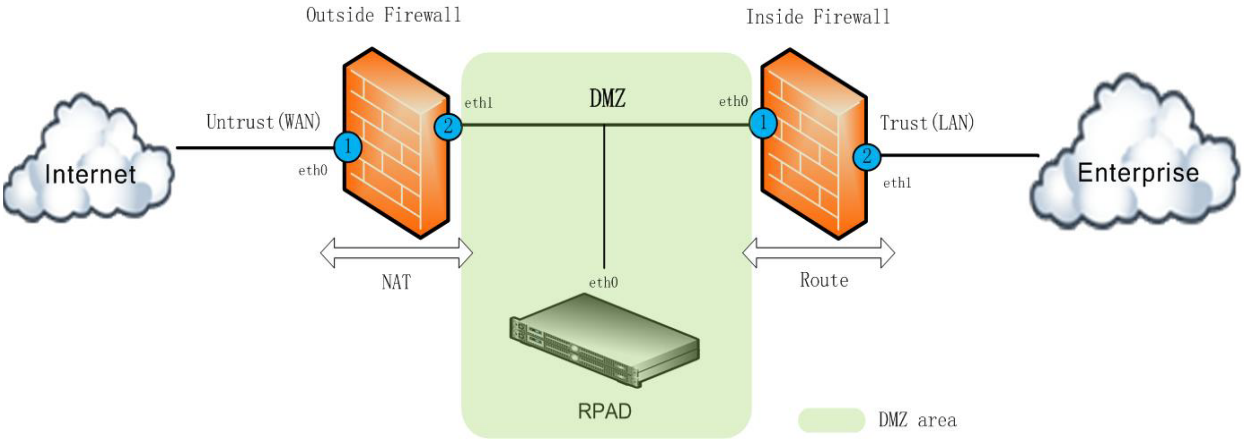


Single Firewall—Four Interfaces



Network Interface Configurations for Static Routing

Two Firewalls—One Interface to the DMZ



Two Firewalls—Four Interfaces to the DMZ