

ENSIM UNIFY



Ensim Unify BroadWorks 3.2.0 Installation Guide



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Document revision history

There have been no changes to this document since its initial publication. For information about new features in this release, see the What's New document on the Ensim support site, <http://support.ensim.com>.

About this guide

Introduction

This guide provides instructions for installing Ensim® Unify BroadWorks® 3.2.0. This release is compatible with the Ensim Unify platform version 3.2.0.

Note: This guide is updated as new information becomes available. Before you begin, be sure to check the documentation section of the Ensim Support Site, <http://www.ensim.com/support>, to make sure you have the latest version of the guide. The date on the title page indicates the version; changes, if any, are recorded in the document revision history (page 5).

Intended audience and required skills

This guide is intended for those who need to install and use Ensim Unify BroadWorks service. For definitions of the terms used in the system, see the glossary at the back of this guide.

To install and configure the BroadWorks service, you need to be familiar with Microsoft® Windows Server™ 2003, the BroadWorks system, and the .NET™ platform including the Microsoft Provisioning System (MPS).

Skills needed: To configure the BroadWorks service, you need basic system administration and IP networking skills.

External documentation

The following documents provide information related to planning and installing the BroadWorks system.

- *BroadWorks Recommended Hardware Guide (article 166921)*
- *BroadWorks Customer Site Survey (article 174330)*
- *BroadWorks System Capacity Planner (article 163028)*
- *BroadWorks Software Management Guide (article 161569)*
- *BroadWorks Installation Checklist (article 166004)*
- *BroadWorks Redundancy Guide (article 164848)*

- *BroadWorks Library Overview (article 160111)*

These documents can be accessed online at:

http://www.broadsoft.com/KnowledgeBase/KB_Landing.htm.

Related documentation

For a list of related documentation, see the BroadWorks release notes. Documentation is also available in the BroadWorks section of the Ensim Support site, <http://support.ensim.com>. All customers receive passwords that allow access to this site. If you do not have a password, contact your organization's liaison to Ensim.

Online Help

The Ensim Unify control panels provide comprehensive online Help designed to answer questions and help you find the information you need, when you need it. The Help system is modular; it provides general Help for platform and system-related topics, as well as separate Help systems for each installed service, such as BroadWorks.

To get help for a specific page, click  on the upper right side of forms.

Document conventions

Throughout this guide, specific fonts are used to identify user input, computer code, and user interface elements. The following table lists conventions used in this guide.

Table 1. Document conventions

Convention	How it is used
Bold text, serif font	Used for information you type as well as for file names, path names, and CD names. <i>Example:</i> On the command line, type continue .
<i>Italic text</i>	Used for column names, field names, window names, and book titles. <i>Example:</i> The <i>Select Installation Folder</i> window is displayed.
<i>Bold, italic text enclosed in angle brackets</i>	Used for variables you replace with the appropriate information. <i>Example:</i> Type <server_name> where <server_name> is the IP address or host name of your server.
Bold text, sans serif font	Used for items you click or press, such as buttons, menus, and command keys. <i>Example:</i> Click Start > Settings > Control Panel.

Table 1. Document conventions

Convention	How it is used
Non-proportional font	Used for system messages, screen text, and code examples. <i>Example:</i> The following message is displayed: The server has been added.

Note: In addition, key information is sometimes displayed using special headings and formats, such as this one, to make it stand out from regular text.

Support and feedback

For Ensim online support or feedback, use the following links:

- <http://support.ensim.com> to access product downloads and documentation
- <https://onlinesupport.ensim.com> to file a support ticket or request online support
- http://onlinesupport.ensim.com/kb_search_unify.asp to search the knowledge base
- <http://www.ensim.com/about/feedback.asp> to provide feedback to Ensim

Note: All customers receive passwords that allow access to the Ensim Support site. If you do not have a password, contact your organization's liaison to Ensim.

Overview of the BroadWorks service and Ensim Unify

Introduction

This section provides an overview of the BroadWorks service and the Ensim Unify platform.

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Overview of the BroadWorks service

The Ensim Unify BroadWorks service enables service providers to host the BroadWorks software and offer BroadSoft® business VoIP (Voice over Internet Protocol) support to their users.

The BroadWorks service delivers a wide set of basic and enhanced communication features based on VoIP.

BroadWorks service features include:

- Basic telephony service over IP
- Basic “PBX” (Private Branch Exchange) features
- Value-added group features including voice mail, conferencing, and auto attendant
- Personal user calling features such as selective call forwarding, simultaneous ring, and dial-by-name

Overview of Ensim Unify

The Ensim® Unify platform is the leading carrier-grade multi-service hosting solution. It is a flexible hosting automation infrastructure through which hosting service providers can manage multiple Windows® services, such as Microsoft® Hosted Exchange 2003, Windows SharePoint, and Windows Web Hosting, Linux services such as Linux Web Hosting and MySQL for Linux, and VoIP services such as BroadWorks. It addresses critical operational challenges for provisioning, monitoring, metering, self-management, authentication, and integration, and it is the first hosting platform to offer "out of the box" support for ASP.NET Web site hosting. The following figure illustrates Ensim Unify components.

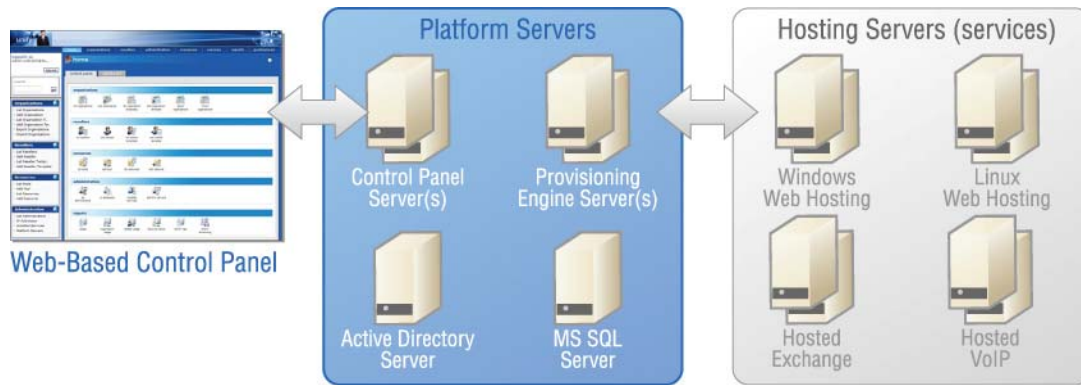


Figure 1. Ensim Unify components

Preparing for the BroadWorks service installation

Introduction

This section explains how to prepare for the Ensim Unify BroadWorks service installation.

Note: This guide is updated as new information becomes available. Before you begin, be sure to check the documentation section of the Ensim Support Site, <http://www.ensim.com/support>, to make sure you have the latest version of the guide. The date on the title page indicates the version; changes, if any, are recorded in the document revision history (page 5).

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Pre-installation requirements

Before you begin, you need to have Ensim Unify platform **3.2.0** installed, and you need to have remote access to the provisioning engine (PE) and control panel (CP) servers. For instructions on installing or upgrading to platform 3.2.0, see the *Ensim Unify Platform Installation Guide* or the *Ensim Unify Platform Upgrade Guide*.

Platform server requirements

Before you install the BroadWorks service, you need to obtain the following platform servers:

- Active Directory server
- MS SQL server
- PE servers
- CP servers

Note: Platform servers must meet the requirements shown in the following table.

Table 2. General server requirements

Hardware	Networking	Software
<p>Each server must have the following hardware:</p> <ul style="list-style-type: none"> • Pentium III 733 megahertz (MHz) or faster processor • At least 512 MB of RAM • At least 40 GB of hard disk space (unless otherwise specified) 	<p>Each server must meet the following networking requirements:</p> <ul style="list-style-type: none"> • The server must have its own static IP address. Do not use DHCP (Dynamic Host Configuration Protocol) IP addresses for any server used with Ensim Unify. • The server must be joined to the domain. Instructions are provided in the installation instructions. 	<p>Each server must meet these general software requirements:</p> <ul style="list-style-type: none"> • Prior to installation, you need to install the Microsoft Windows Server 2003 operating system (Standard or Enterprise edition). • The operating systems must be freshly installed using default settings. • You must also install the Microsoft Windows Server 2003 Service Pack1 (SP1) with default settings. • Additional software might be required during installation. See the software requirements for details.

BroadWorks system requirements

Your BroadWorks system, at a minimum, must be made up of the Application Server and Network Server components. If you want to enable voice mail support, then your BroadWorks system must also include the BroadWorks Media Server component. The other components required in the BroadWorks system depend on the features you want to offer your customers.

The BroadWorks system is made up of the following components:

- **Application Server.** Required server. The Application Server is responsible for hosting, managing, administering, provisioning, and configuring the BroadWorks group and user features. Application Servers are typically deployed in redundant pairs (primary and secondary) for high availability and they can be geographically distributed.
- **Network Server.** Required server. The Network Server enables service providers to centrally manage network-related applications within their network and is primarily responsible for routing of calls. It supports least cost routing and voice VPNs (Virtual Private Networks). Network Servers are deployed in clusters of up to seven servers; each cluster can support five application servers. Network Servers can be geographically distributed.
- **Media Server.** Optional server. The BroadWorks Media Server is responsible for the audio and video resources needed to support auto-attendant and voice messaging features. The Application Server requests resources from Media Servers and controls the behavior of those resources. Media servers are deployed in pools of $\langle N+1 \rangle$ servers, where N refers to the number of Media Servers needed for planned capacity. Media Servers can be geographically distributed.
- **External Web Server.** Optional server. Service providers can host the BroadWorks Web applications on the External Web Server rather than on the Application Server. This server supports two separate interfaces: the BroadWorks CommPilot Interface and the BroadWorks Open Client Interface. External Web Servers are deployed in a load balanced configuration.

- **Element Management System Server.** Optional server. The BroadWorks Element Management System provides a single point of entry into the BroadWorks system. It provides auto discovery and consolidation of reports. These servers are deployed in a load balanced configuration.
- **Conferencing Server.** Optional server. The BroadWorks Conferencing Server is a specialized media resource that supports enhanced business conferencing features, including web-based presentation and collaboration. A single pool of conference servers can support multiple Application Servers in a BroadWorks system. Conferencing Servers are deployed in a load balanced configuration.
- **Call Detail Server.** Optional server. The BroadWorks Call Detail Server separates the management of call logs from the Application Server. With the Call Detail Server, service providers can collect a broader range of call data and distribute those records to other systems in real-time. Call detail servers are deployed in a load balanced configuration.

Important: BroadWorks servers must meet the requirements described in the *BroadWorks Recommended Hardware Guide (article 166921)*.

Additional information about capacity planning is provided in the *BroadWorks Customer Site Survey (article 174330)* and the *BroadWorks System Capacity Planner (article 163028)*.

These documents explain how you can ensure that your BroadWorks system has adequate resources to provision the Ensim Unify BroadWorks service.

Software requirements

To install the BroadWorks service, your servers must meet the software requirements shown in the following table. Some of this software needs to be pre-installed; in other cases, you need to obtain the software and have it available during installation.

Table 3. Software requirements for platform and BroadWorks servers

Server type	Installed Software Must be installed prior to the BroadWorks service installation	Available Software Must be available during the BroadWorks service installation
Active Directory (AD) server	<ul style="list-style-type: none"> • Installed as described in the <i>Ensim Unify Platform Installation Guide</i>. 	
MS SQL server (platform)	<ul style="list-style-type: none"> • Installed as described in the <i>Ensim Unify Platform 3.2.0 Installation Guide</i> 	
PE servers	<ul style="list-style-type: none"> • Installed as described in the <i>Ensim Unify Platform 3.2.0 Installation Guide</i> 	<ul style="list-style-type: none"> • Ensim Unify BroadWorks service plugins
CP servers	<ul style="list-style-type: none"> • Installed as described in the <i>Ensim Unify Platform 3.2.0 Installation Guide</i> 	<ul style="list-style-type: none"> • Ensim Unify BroadWorks service plugins • Ensim Unify BroadWorks online Help

Table 3. Software requirements for platform and BroadWorks servers

Server type	Installed Software Must be installed prior to the BroadWorks service installation	Available Software Must be available during the BroadWorks service installation
BroadWorks servers <ul style="list-style-type: none"> • BroadWorks Application Servers (AS) • BroadWorks Network Server • BroadWorks Media Server • Other BroadWorks servers 	<ul style="list-style-type: none"> • Installed as described in the <i>BroadWorks Software Management Guide</i> (article 161569) and the <i>BroadWorks Installation Checklist</i> (article 166004). • Production deployments as described in the <i>BroadWorks Redundancy Guide</i> (article 164848). 	

Installing the BroadWorks service

Introduction

This section explains how to install the Ensim Unify BroadWorks service.

Note: This guide is updated as new information becomes available. Before you begin, be sure to check the documentation section of the Ensim Support Site, <http://www.ensim.com/support>, to make sure you have the latest version of the guide. The date on the title page indicates the version; changes, if any, are recorded in the document revision history (page 5).

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Installation instructions

To install the BroadWorks service, complete the tasks described in this section.

Time required for installation: Approximately 30 minutes depending on system configuration.

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Stopping the CronJob service on PE servers

Before you install the BroadWorks service plugin on the PE server, you must stop the CronJob service by performing the following steps on the PE servers, where this service is enabled.

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
--------	--------	--------	--------	--------	--------

Time required: Minimum 5 minutes for each PE server, depending on system configuration.

▼ To stop the CronJob service on the PE servers:

- 1 Log in to the PE server running the CronJob service and do the following:
 - a Click Start > Run, type **services.msc**, then click OK. The *Services* window is displayed.
 - b In the *Services* window, locate *Ensim CronJob Service*.
 - c If the status of Ensim CronJob Service is **Started**, right-click Ensim CronJob Service, then click Stop.
- 2 If you have more than one PE server for running the CronJob service, repeat the previous steps on each PE server.

The CronJob service is stopped on the PE servers.

Installing the BroadWorks service plugin on PE servers

This section explains how to install the BroadWorks service plugin on PE servers. If you are using multiple PE servers, make sure you install the service plugin on each server.

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
--------	--------	--------	--------	--------	--------

Time required: Approximately 5 minutes depending on system configuration.

▼ To install the BroadWorks service plugin on PE servers:

- 1 Log in to the PE server as the domain administrator.
- 2 Install the BroadWorks service on the PE server.
 - a Insert the **Ensim Unify BroadWorks 3.2.0 Service CD** into the server's CD-ROM drive.
 - b Browse to the *Setup* folder on the CD-ROM and double-click **PEInstaller.msi** to start the PE installer. The *Welcome* window opens.
 - c Click Next.
 - d In the *Select Installation Folder* window, retain the default installation folder settings or browse to select a different installation folder.
 - e Select the Everyone option. Click Next.
 - f In the *Confirm Installation* window, click Next to start the installation process.
 - g In the *Installation Complete* window, click Close.
- 3 If you have more than one PE server, repeat the previous steps for each PE server.
The PE plugin installation is complete.

Installing the BroadWorks service plugin on CP servers

This section explains how to install the BroadWorks service plugin on CP servers. If you are using multiple CP servers, make sure you install the service plugin on each server.

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
--------	--------	--------	--------	--------	--------

Time required: Approximately 10 minutes depending on system configuration.

▼ To install the BroadWorks service plugin on CP servers:

- 1 Log in to the CP server as the domain administrator.
- 2 Install the BroadWorks service on the CP server:
 - a Insert the **Ensim Unify BroadWorks 3.2.0 Service** CD into the server's CD-ROM drive.
 - b Browse to the *Setup* folder on the CD-ROM and double-click **CPInstaller.msi** to start the CP installer. The *Welcome* window opens.
 - c Click **Next**.
 - d In the *Select Installation Address* window, retain the default *Virtual directory* settings and default *Site* settings. Make sure that the *Site* text box has the value as **Default Web Site**. Click **Next**.
 - e In the *Confirm Installation* window, click **Next** to start the installation process.
 - f In the *Installation Complete* window, click **Close**.
- 3 If you have more than one CP server, repeat the previous steps for each CP server.
The CP plugin installation is complete.

Installing the Ensim Unify BroadWorks service online Help on CP servers

The BroadWorks service online Help system provides context-sensitive help for tasks related to the service. The Help system must be installed on all the CP servers in the Ensim Unify system. It is accessible through the service provider, reseller, organization, and user control panels.

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
--------	--------	--------	--------	--------	--------

Time required: Approximately 5 minutes depending on system configuration.

▼ To install the BroadWorks service online Help on CP servers:

- 1 Log in to the CP server as the domain administrator.
- 2 Install the BroadWorks service online Help:
 - a Insert the **Ensim Unify BroadWorks 3.2.0 Service** CD into the server's CD-ROM drive.
 - b Browse to the *Help* folder on the CD-ROM and double-click **BroadWorksHelp.msi** to start the Help installer. The *Welcome* window opens.
 - c Click **Next**.
 - d In the *Select Installation Address* window, retain the default *Virtual directory* settings and default *Port* settings. Click **Next**.
 - e In the *Confirm Installation* window, click **Next** to start the installation process.
 - f In the *Installation Complete* window, click **Close**.

- 3 If you have more than one CP server, repeat the previous steps for each CP server.
The BroadWorks service online Help installation is complete.

Starting the CronJob service on PE servers

After the installation is complete, you must start the CronJob service on those PE servers on which you stopped this service before starting the installation.

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
--------	--------	--------	--------	--------	--------

Time required: Approximately 10 minutes for each PE server, depending on system configuration.

▼ To start the CronJob service on the PE servers:

- 1 Log in to the PE server running the CronJob service and do the following:
 - a Click Start > Run, type **services.msc**, then click OK. The *Services* window is displayed.
 - b In the *Services* window, locate *Ensim CronJob Service*.
 - c Right-click *Ensim CronJob Service*, then click Start.
- 2 If you have more than one PE server for running the CronJob service, repeat the previous steps on each PE server.

The CronJob service is started on the PE servers.

Verifying the success of the installation

Verify that the installation succeeded using the following procedure.

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
--------	--------	--------	--------	--------	--------

▼ To verify that the installation succeeded:

- 1 Log in to the service provider control panel:

Note: For best results, use Microsoft Internet Explorer (IE) 6.0 (or later) to access the service provider and reseller control panels and Microsoft Internet Explorer (IE) 6.0 (or later) or Mozilla Firefox 1.0 (or later) to access the organization and user control panels. Using earlier versions of IE or other browser programs is not recommended.

- a Start Internet Explorer (IE) version 6.0 or later. Using earlier versions of IE or other browsers to access the service provider control panel is not recommended.
 - b Go to **http://<cp_server_ip_address>/cp** where **<cp_server_ip_address>** is the IP address of your system's CP server. The Ensim Unify login page is displayed.
 - c On the login page, type your username and password. The username is **admin@<your-domain-name>** where **<your-domain-name>** is the domain name of your Ensim Unify system. The password is the password you chose during PE server installation.
 - d Click Log In.
- 2 On the left navigation bar, expand the *Help* panel, then click **About**.
 - 3 Check the version displayed for BroadWorks. It should be displayed as 3.2.0 **<Build_no>**.
 - 4 Verify that the PE and CP servers are enabled:

- a On the top navigation bar, click **Administration**.
 - b Click the **Platform Servers** tab. The status of PE and CP servers is displayed.
 - c If the disabled icon ↓ appears in the **Status** column of any server, select the server by clicking the option button to the left of the **Status** column and click **Enable** on the action bar above the list, then click **OK**. The server's status now displays ↑.
- 5 Verify that the BroadWorks service is enabled:
- a On the top navigation bar, click **Services**.
 - b If the BroadWorks service is not enabled, select the service by clicking the option button to the left of the service name.
On the action bar above the list, click **Enable**, then click **OK**. The service is enabled and the enabled icon is displayed ↑.
- 6 Confirm the proper configuration of outbound email for billing reports:
- a On the left navigation bar, expand the **Reports** panel, then click **Ensim Accounting**. The *Ensim Accounting* page is displayed.
 - b The **send report now to** text box displays the default email address **unifyusage@ensim.com**. Replace the default address with an external email address where you can receive the billing report, then click **send**. The external email address should be an email address outside the Ensim Unify system.
 - c Go to your external email account and verify receipt of the report. If you do not receive the report, your system's outbound email configuration might be incorrect, or a firewall might be blocking external email messages. Diagnose and fix the issue before proceeding to the next step.
- 7 Send a billing report to Ensim:
On the *Ensim Accounting* page, verify that the *send report now to* address displays the default email address *unifyusage@ensim.com*, then click **send**. The system retrieves billing data and sends it to Ensim.

Note: Ensure that the SMTP service is running on the provisioning engine (PE) server as email messages are sent from this server. The billing report generation may take several minutes as billing data is retrieved. To check the status of the action, click **Action Log** on the *Reports* navigation panel.

Installation complete

This completes the installation instructions.

Post-installation tasks

After you install the BroadWorks service, you need to perform the post installation tasks described in this section.

Post-installation tasks include:

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Verifying the DNS server infrastructure

PE servers and the BroadWorks Application Servers must use the same DNS servers and infrastructure. Using the same DNS servers and infrastructure ensures that every component on the system resolves DNS names to IP addresses consistently within the system.

▼ To verify that the PE server and the BroadWorks Application Server use the same DNS server infrastructure:

- 1 Verify the DNS servers used by the PE server:
 - a Log in to the PE server as the domain administrator.
 - b Open a command window. Type the following command and then press **Enter**:

ipconfig /all

The DNS servers information is displayed in the following format:

```
Ethernet adapter Local Area Connection:
Connection-specific DNS Suffix . : ms.ensim.com
Description . . . . . : Intel(R) PRO/100 VE Network Connection
Physical Address. . . . . : 08-00-46-77-D2-31
Dhcp Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : No
IP Address. . . . . : 10.0.0.101
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 10.0.0.1
DNS Servers . . . . . : 10.60.0.6
10.60.0.5
```

The *DNS Servers* attribute lists the IP address of the primary and secondary DNS servers.

- 2 Verify the DNS servers used by the BroadWorks Application Servers:
 - a Start a session with the BroadWorks Application Server using a remote access tool such as Telnet or SSH (Secure Shell).
 - b Type **bwadmin** in the fields that require you to enter the user login information and the user password.

The UNIX command prompt appears which indicates that you are connected to the BroadWorks Application Server.

- c Verify the contents of the **/etc/nsswitch.conf** file by typing the following command:

cat /etc/nsswitch.conf

If the DNS servers are installed as illustrated in the *BroadWorks Redundancy Guide* (article 164848), then the file contains the following line: `hosts: files dns`. This indicates that the name resolver library on the BroadWorks Application Server uses the hosts file first and then uses the DNS system.

- d Verify the IP addresses of the DNS servers used by the BroadWorks Application Servers in the following file: **/etc/resolv.conf**. Type the following command then press **Enter**:

cat /etc/resolv.conf

The IP addresses of the DNS servers are listed as under:

```
nameserver <IP_of_primary_DNS_server>
nameserver <IP_of_secondary_DNS_server>
```

- 3 Verify that the IP address of the DNS servers used by the PE server matches the IP address of the DNS servers used by the BroadWorks Application Servers.
- 4 If you have more than one PE server, repeat the previous steps for each PE server.
The PE servers and the BroadWorks Application Servers are now configured to use the same DNS infrastructure.

Configuring the network time server infrastructure

Customers billing is based on the start and end time of calls, and this information is contained in log files on the PE server and the BroadWorks Application Server. To ensure that the log files are synchronized, the PE servers and the BroadWorks Application Servers must share a common network time server infrastructure.

▼ To configure a common network time server infrastructure:

- 1 Designate the primary BroadWorks Application Server as an NTP (Network Time Protocol) server. This ensures that all other BroadWorks servers are clients of this primary BroadWorks server. For instructions, see the *BroadWorks Software Management Guide (article 161569)*.

Note: Ensium recommends that the PE servers be configured as NTP clients of the primary BroadWorks Application Server.

- 2 Configure the PE server to use the BroadWorks NTP server:
 - a Obtain the IP address of the primary BroadWorks Application Server. The IP address of the Application Server is located in the *Customer Site Survey spreadsheet* in the *Network Configuration* folder of the BroadWorks Application Server. For more information, see *BroadWorks Customer Site Survey (article 174330)*.
 - b Log in to the PE server as the domain administrator.
 - c Open the registry editor and add the IP address of the primary BroadWorks Application Server in the *Value data* field under the registry key:

```
HKEY_LOCAL_MACHINE>SYSTEM>CurrentControlSet>Services>W32Time>
Parameters>NtpServer
```

Caution: Incorrectly editing the registry can cause serious problems that cannot be resolved and might require you to reinstall your operating system. Before editing the registry, back up the registry and any valuable data.

- 3 If you have more than one PE server, repeat the previous steps for each PE server.
The PE servers and the BroadWorks Application Servers are now configured to use the same network time server infrastructure.

Configuring the BroadWorks Application Server

This section describes the tasks to configure the BroadWorks Application Server.

Configuration tasks include:

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Adding system administrator credentials to the BroadWorks Application Server

System administrator credentials must be added to the BroadWorks Application Server. Unify uses these credentials to connect to the BroadWorks Web interface.

▼ To add system administrator credentials to the BroadWorks Application Server:

- 1 Log in to the PE server as the domain administrator.
- 2 Connect to the BroadWorks CLI:
 - a Start a session with the BroadWorks Application Server using a remote access tool such as Telnet or SSH (Secure Shell).
 - b Type **bwadmin** in the fields that require you to enter the user login information and the user password.

The UNIX command prompt appears which indicates that you are connected to the BroadWorks Application Server.

- c Type the following commands:

bwcli

The BroadWorks CLI opens.

login <admin>

where *<admin>* is the system administrator login name.

<password>

where *<password>* is the system administrator password.

The **AS_CLI** command prompt appears which indicates that you are connected to the BroadWorks CLI.

- 3 Add the BroadWorks system administrator credentials:

- a Type the following commands:

cd SubscriberMgmt/Administrator

You are connected to the Administrative Management layer of the BroadWorks Application Server.

add <unify_BroadWorks_administrator > system false

where:

<unify_BroadWorks_administrator> is the *system administrator* name on the BroadWorks Application Server

system indicates that the administrator has system privileges

false indicates that the administrator has read-write access

- b** Enter and then confirm the administrator password.
- 4** Verify that the system administrator is successfully created on the BroadWorks Application Server by typing the following command:

SubscriberMgmt/Administrator> get

The list of system administrators added on the BroadWorks Application Server is displayed. Verify that the administrator you added is on the list.

- 5** Log out of the BroadWorks CLI.

Important: You must enter the configured credentials in the *User name* and *Password* fields when you add a BroadWorks resource in the service provider control panel. Unify will use these credentials to connect to the BroadWorks Application Server.

Verifying the BCCT port

PE servers communicate with the BroadWorks Application Server using the BroadWorks Common Communication Transport (BCCT), a TCP-based protocol. By default, the BCCT is configured to run on port 2220 on the BroadWorks Application Server.

▼ To verify the BCCT port on the BroadWorks Application Server:

- 1** Log in to the PE server as the domain administrator.
- 2** Connect to the BroadWorks CLI:
 - a** Start a session with the BroadWorks Application Server using a remote access tool such as Telnet or SSH (Secure Shell).
 - b** Type **bwadmin** in the fields that require you to enter the user login information and the user password.

The UNIX command prompt appears which indicates that you are connected to the BroadWorks Application Server.

- c** Type the following commands.:

bwcli

The BroadWorks CLI opens.

login <admin>

where **<admin>** is the system administrator login name.

<password>

where **<password>** is the system administrator password.

The **AS_CLI** command prompt appears which indicates that you are connected to the BroadWorks CLI.

- 3** In the BroadWorks CLI, type the following command and press **Enter**:

cd /Interface/CommonCommunicationTransport

AS_CLI/Interface/CommonCommunicationTransport> get

The BCCT port information is displayed in the following format:

```
AS_CLI> login admin
Password:
```

```
Administrator,Default logging in... AS_CLI> cd
/Interface/CommonCommunicationTransport
AS_CLI/Interface/CommonCommunicationTransport> get
XSUnlimitedConnections = true
PSUnlimitedConnections = true
XSListeningPort = 2221
PSListeningPort = 2220
XSSecureListeningPort = 2321
PSSecureListeningPort = 2320 AS_CLI/Interface/CommonCommunicationTransport>
```

The **PSListeningPort** attribute lists the BCCT port. Use this port number to establish network connections between the PE server and the BroadWorks Application Server.

Important: You must enter this BCCT port number in the *Port* field when you add a BroadWorks resource using the service provider control panel.

- 4 Close the BroadWorks CLI connection by typing the following commands:
 - exit**
 - The BroadWorks CLI stops.
 - yes**
 - The BroadWorks CLI connection closes.
- 5 Log out of the remote access tool.

Establishing network connections with the BroadWorks Application Server

Network connections must be established between the PE servers and the configured BCCT port on the BroadWorks Application Server. Connection to the BCCT port is granted only to network elements listed at the OCI (Open Client Interface) level of the BroadWorks Application Server. The IP address of the PE server must be added to the BroadWorks Application Server for communication to occur between the two servers.

▼ To establish network connections with the BroadWorks Application Server:

- 1 Log in to the PE server as domain administrator.
- 2 Connect to the BroadWorks CLI:
 - a Start a session with the BroadWorks Application Server using a remote access tool such as Telnet or SSH (Secure Shell).
 - The UNIX command prompt appears which indicates that you are connected to the BroadWorks Application Server.
 - b Type **bwadmin** in the fields that require you to enter the user login information and the user password.
 - The UNIX command prompt appears which indicates that you are connected to the BroadWorks Application Server.
 - c Type the following commands:
 - bwcli**
 - The BroadWorks CLI opens.
 - login <admin>**
 - where *<admin>* is the system administrator login name.
 - <password>**

where *<password>* is the system administrator password.

The `AS_CLI` command prompt appears which indicates that you are connected to the BroadWorks CLI.

- 3 Verify that your PE server is listed on the BroadWorks Application Server. At the `AS_CLI` command prompt, type the following commands:

```
cd System/NetworkAccessLists/OCI
```

You are connected to the OCI layer of the BroadWorks Application Server.

```
get
```

You are presented with the IP addresses of the OCI clients listed with the BroadWorks Application Server. If the IP address of your PE server is listed, this procedure is complete. Otherwise, proceed to step 4.

- 4 Add the IP address of the PE server to the BroadWorks OCI list.

- a Type the following command:

```
add <IP_of_PE_server>
```

where *<IP_of_PE_server>* refers to the IP address of the PE server.

Example: If the IP address of the PE server is 10.0.0.101, then type the following command to add the PE server to the BroadWorks OCI client list:

```
add 10.0.0.101
```

- b Repeat the previous step to make sure the BroadWorks hosting server is added to the OCI client list.

- 5 Close the BroadWorks CLI connection by typing the following commands:

```
exit
```

The BroadWorks CLI stops.

```
yes
```

The BroadWorks CLI closes.

- 6 Log out of the remote access tool.

- 7 Verify that network connections between the PE server and the BroadWorks Application Server is established:

- a Open the command window of your PE server.

- b At the command line, type the following command and press Enter.

```
telnet <ip_address_of_your_BroadWorks_AS> <port_number_of_BCCT_service>
```

where:

<ip_address_of_your_BroadWorks_AS> is the IP address of the BroadWorks Application Server

<port_number_of_BCCT_service> is the port that runs the BCCT. To verify the BCCT port, see Verifying the BCCT port (on page 23).

Example: If the IP address of the BroadWorks Application Server is 10.0.0.101 and the BCCT port is 2220, then type the following command:

```
telnet 10.0.0.100 2220
```

If a network connection is established, a black screen is displayed. If a network connection is not established, see Troubleshooting (on page 30).

- c Press the Ctrl (Control) key and type -l.
 - d Close the command window.
- 8 If you have more than one PE server, repeat the previous steps for each PE server.

Determining the domain name used to connect the PE server to the BroadWorks Application Server

PE servers connect to the BroadWorks Application Server using the common DNS infrastructure between the servers. You need to determine the fully qualified domain name needed to connect the PE server to the BroadWorks Application Server.

▼ To determine the domain name:

- 1 Verify that the PE server and the BroadWorks Application Server use a common DNS servers infrastructure. For instructions, see Verifying the DNS server infrastructure (on page 20).
- 2 Determine the domain name used to connect the PE server to the BroadWorks Application Server:
 - a Log in to the PE server as domain administrator.
 - b Open a command window. Type the following command:

Nslookup

The domain information is displayed in the following format:

```
Default Server:<domain_name_of_PE_server>
Addresses:<primary_IP_address>, <secondary_IP_address>
```

where:

<domain_name_of_PE_server> is the FQDN (fully qualified domain name) of the PE server

<primary_IP_address> is the IP address of the primary DNS server, and

<secondary_IP_address> is the IP address of the secondary DNS server.

Example

Default Server: as.broadsoft.ensim.com

Addresses: 172.16.30.95, 172.16.30.195

The FDQN listed against the **Default Server** attribute must be used to connect the PE server to the BroadWorks Application Server.

Important: You must enter the domain name that you verified in the *Fully qualified domain name or IP address* field when you add a BroadWorks resource in the service provider control panel.

Ensim recommends that you use the fully qualified domain name to connect to the BroadWorks Application Server. Using the IP address may break the redundant deployment of the DNS infrastructure.

Enabling the External Authentication feature

Ensim Unify provides users with single sign-on capability. This feature allows your organization administrators and users to click a single link in the Unify control panel to access the BroadWorks interface.

To enable the single sign-on feature, you must first enable the External Authentication feature.

▼ To enable the External Authentication feature:

- 1 Set the BroadWorks External Authentication feature to ON:
 - a Connect to the BroadWorks Application Server Enterprise Web interface as a system administrator.

Note: You can log in using the system administrator credentials that you added to the BroadWorks Application Server. See “Adding system administrator credentials to the BroadWorks Application Server” on page 3-9 for details.

 - b Click the Utilities link on the left navigation bar.
 - c Click the Password Rules link.
 - d In the *Rules apply to* section, select the *System and Provisioning Administrators; all other Administrators and Users use external authentication* option.
 - e Log out of the BroadWorks Application Server Enterprise Web interface.
- 2 Add your PE server to the External Authentication list on the BroadWorks Application Server:
 - a Log in to the PE server as the domain administrator.
 - b Start a session with the BroadWorks Application Server using a remote access tool such as Telnet or SSH (Secure shell).
 - c Type **bwadmin** in the fields that require you to enter the user login information and the user password.
The UNIX command prompt appears which indicates that you are connected to the BroadWorks Application Server.
 - d Type the following commands:


```
bwcli
```

The BroadWorks CLI opens.

```
login <admin>
```

where **<admin>** is the system administrator login name.

```
<password>
```

where **<password>** is the system administrator password.

The **AS_CLI** command prompt appears which indicates that you are connected to the BroadWorks CLI.
 - e Add your PE server to the External Authentication list. At the **AS_CLI** command prompt, type the following commands and press Enter after each command:


```
cd System/NetworkAccessLists/ExtAuth
```

You are connected to the External Authentication layer of the BroadWorks Application Server.

add *<IP_of_PEserver>* *<description>*

where:

<IP_of_PEserver> *<description>* is the IP address of the PE server where the BroadWorks service is installed, and

<description> is an optional description

get

The list of IP addresses that have enabled the External Authentication feature is displayed. The IP address of your PE server must be listed.

- 3 If you have more than one PE server, repeat the previous steps for each PE server.

Note: You must enable *single sign-on* in the *Add BroadWorks Resource* page of the service provider control panel if you turn the External Authentication feature to ON. Your organization administrators and users will be able to connect to the BroadWorks interface using a link in their Unify control panel.

The External Authentication feature settings and the single sign-on settings must always be in sync. If the External Authentication feature is turned ON, single sign-on must be enabled. If the External Authentication feature is turned OFF, single sign-on must be disabled.

- 4 Close the BroadWorks CLI connection by typing the following commands:

exit

The BroadWorks CLI stops.

yes

The BroadWorks CLI closes.

- 5 Log out of the remote access tool.

Note: If you turn the External Authentication feature to OFF, you must make sure that:

- The Active Directory password policies and the BroadWorks password policies match as closely as possible
- The BroadWorks minimum length password policy is set to 3 characters
- BroadWorks service users have a password length of at least 3 characters
- BroadWorks service users have passwords that do not exceed 60 characters.

Establishing connections with the Media Server

To use the Media Server, you must first establish connections between the Media Server and the BroadWorks Application Server.

Note: This is an optional procedure. Media Server connections are required only if you want to provision auto-attendant and voice messaging features.

▼ To establish connections between the Media Server and the BroadWorks Application Server:

- 1 Log in to the PE server as the domain administrator.

2 Connect to the BroadWorks CLI:

- a** Start a session with the BroadWorks Application Server using a remote access tool such as Telnet or SSH (Secure Shell).
- b** Type the login name: **bwadmin**. Press **Enter**.
- c** Type the password: **bwadmin**. Press **Enter**.

The UNIX command prompt appears which indicates that you are connected to the BroadWorks Application Server.

- d** Type the following commands:

bwcli

The BroadWorks CLI opens.

login <admin>

where **<admin>** is the system administrator login name.

<password>

where **<password>** is the system administrator password.

The **AS_CLI** command prompt appears which indicates that you are connected to the BroadWorks CLI.

3 Associate a static entry for the Media Server on the BroadWorks Application Server. At the **AS_CLI** command prompt, type the following commands:

cd System/CallP/Routing/MediaServerSelection

You are connected to the *Media Server Selection* level of the BroadWorks Application Server.

set useStaticMediaServerDevice true

Indicates that the BroadWorks Application Server must use a static entry for the Media Server.

4 Verify that the BroadWorks Application Server has a static entry for the Media Server. Type the following command and press **Enter**:

get

The **useStaticMediaServerDevice = true** entry in your command window verifies the usage of a static entry for the Media Server.

5 Add the IP address of the Media Server to the BroadWorks Application Server. Type the following commands. Press **Enter** after each command:

MediaServerDevice

You are connected to the *Media Server Device* level of the BroadWorks Application Server.

add <IP_of_Media_Server>

where **<IP_of_Media_Server>** refers to the IP address of the Media Server you want to add.

Example: If the IP address of the Media Server is 10.0.0.110, then type the following command to add the Media Server to the BroadWorks Application Server:

add 10.0.0.110

6 Verify that the Media Server is added to the BroadWorks Application Server. Type the following command and press **Enter**:

get

The list of IP addresses for all the Media Servers that are added to the BroadWorks Application Server is displayed. The IP address of the Media Server you added must be listed.

- 7 If you have more than one Media Server, repeat step 5 to step 6 for each Media Server.

Note: The Media Server can also be added to the BroadWorks Network Server. See the *BroadWorks Network Server Web Interface Administration Guide (article 160000)* and the *BroadWorks Network Server Command Line Interface Administration Guide (article 175222)* for details.

- 8 Close the BroadWorks CLI connection. At the command prompt, type the following commands and press **Enter** after each command:

exit

The BroadWorks CLI stops.

yes

You exit the BroadWorks CLI.

- 9 Log out of the remote access tool.

Troubleshooting

This section provides information that helps you troubleshoot issues with configuring the BroadWorks Application Server.

Permitting connections to the BCCT port

The PE server connects to the BroadWorks Application Server through the BCCT port. You must ensure that any network elements such as firewalls, routers, switches, or port filters placed between the PE servers and the BroadWorks Application Server permits outbound connections from the PE server to the BroadWorks Application Server on the BCCT port.

The following command is an example of the CISCO access-list command. You can use other access-list commands to permit connections to the BCCT port.

▼ To permit connections to the BCCT port:

- Type the following CISCO command into any network element that may obstruct outbound connections from the PE server to the BCCT port:

```
access-list 121 permit tcp host <IP_of_PEserver> host <IP_of_BWserver> eq <BCCT_port>
```

where:

<IP_of_PEserver> is the IP address of the PE server

<IP_of_BWserver> is the IP address of the BroadWorks Application Server, and

<BCCT_port> is the BCCT port

Example: If the IP address of the PE server is 10.0.0.101, the IP address of the BroadWorks Application Server is 10.0.0.100, and the BCCT port is 2220, then type the following command:

```
access-list 121 permit tcp host 10.0.0.101 host 10.0.0.100 eq 2220
```

The access-list command permits the PE server to establish BCCT connections with the BroadWorks Application Server.

Verifying that the BroadWorks Application Server is listening on the BCCT port

The BroadWorks Application Server must be listening on the BCCT port. This ensures that the PE server can connect to the Application Server on the BCCT port.

▼ To verify that the BroadWorks Application Server is listening on the BCCT port:

- 1 Log in to the PE server as the domain administrator.
- 2 Connect to the BroadWorks CLI:
 - a Start a session with the BroadWorks Application Server using a remote access tool such as Telnet or SSH (Secure shell).
 - b Type **bwadmin** in the fields that require you to enter the user login information and the user password.

The UNIX command prompt appears which indicates that you are connected to the BroadWorks Application Server.

- c Type the following commands:

bwcli

The BroadWorks CLI opens.

login <admin>

where **<admin>** is the system administrator login name.

<password>

where **<password>** is the system administrator password.

The **AS_CLI** command prompt appears which indicates that you are connected to the BroadWorks CLI.

- 3 Type the following command and press Enter.

netstat -an | grep <port>

where **<port>** is the BCCT port. For more information, see Verifying the BCCT port (on page 23).

If the BroadWorks Application Server is listening on the BCCT port, the word **LISTEN** appears in the command window. If the BroadWorks Application Server is not listening, only the command prompt is displayed. You may then want to verify that the BroadWorks Application Server is running. For details, see Verifying that the BroadWorks Application Server is running (on page 31).

Verifying that the BroadWorks Application Server is running

The BroadWorks Application Server must be running to enable provisioning.

▼ To verify that the BroadWorks Application Server is running:

- 1 Log in to the PE server as the domain administrator.

- 2 Connect to the BroadWorks Application Server:
 - a Start a session with the BroadWorks Application Server using a remote access tool such as Telnet or SSH (Secure Shell).
 - b Type **bwadmin** in the fields that require you to enter the user login information and the user password.

The UNIX command prompt appears which indicates that you are connected to the BroadWorks Application Server.

- 3 Type the following command and press Enter:

```
/usr/local/broadworks/bw_base/bin/healthmon -l
```

The following commands may be displayed:


```
System Health Report Page
BroadWorks Server Name: bwas2
Date and time           : Tue Apr 25 10:38:03 EDT 2006
Report severity         : NOTIFICATION
Server type             : AppServer
Server state            : Unlock
-----
No abnormal condition detected
-----
```

If the Server State is *Unlock*, the BroadWorks Application Server is running and ready for provisioning.

Next steps

Before you can provision the BroadWorks service to resellers and organizations, you need to complete certain tasks. Each task is described in this section.

Completing setup tasks using the service provider control panel

After you configure the BroadWorks Application Server, you need to perform certain tasks, such as registering the BroadWorks resources, in the service provider control panel. Detailed instructions for these tasks are provided in the online Help setup topic, which is the first topic in the Ensim Unify BroadWorks Help. To access the online Help, log in to a control panel, then click the Help link on the lower left navigation panel. To get help for a specific page, click  on the upper right side of forms.

Installing the Web Services online Help (optional)

The Web Services application for BroadWorks is automatically installed on CP servers during the installation process. You can access the BroadWorks Web Services from any Internet-connected computer using the following URL:

```
http://<MyCPServer.com>/UnifyWS/BroadWorksWS/BroadWorksManager.asmx
```

where **<MyCPServer.com>** is the host name or IP address of your CP server.

However, the corresponding Help system, which provides an operations reference with sample SOAP requests, must be installed manually. Download the Help system, which is provided as a zip archive on the Ensim Unify support site, and install it on your local computer for reference when writing your client classes and proxies.

Troubleshooting reference guide

Use the following information to diagnose issues with BroadWorks service configuration.

Table 4. Symptoms, possible causes, and solutions for system problems

Symptom	Possible cause	Solution
Configuration related		
When the service provider or reseller add an organization, organization creation fails and the following error is displayed: <code>Ensim.BroadWorks.BroadWorksAPI.Schema.ServiceProviderAdminAddRequest.Softswitch returned following error: [Error 4960] Missing password</code>	The External Authentication feature settings and single sign-on feature settings may not be in sync.	<ol style="list-style-type: none"> 1 Ensure that you enable single sign-on (when you add the BroadWorks resource using the service provider control panel) if you turn the External Authentication feature to <i>ON</i>. 2 Ensure that the single sign-on feature is disabled if you have not enabled the External Authentication feature.

Glossary

A

action log

A record of the actions performed on the system by administrators. To access the action log, log in to the control panel, then click **reports** on the top navigation bar.

Active Directory server

The server on which Active Directory software is installed; the domain controller for the system. To improve performance and reliability, service providers can have more than one Active Directory server.

application programming interface

An XML-based or Web services based application programming interface (API). Service providers and resellers use the API to streamline common tasks and to integrate third-party systems.

auto login

Automatic login. A feature that enables you to log in automatically to a customer or user control panel without having to enter a username or password. This is useful when you want to check or configure a user's settings. When you log in automatically to the user control panel, certain features, such as change password, and some service options are not available. To access these features, you need log in to the user control panel with the user's account.

C

clustering

Clustering means taking two or more computers and making them look like one logical entity on a network. In an active/passive cluster, one or more nodes are active while other nodes are passive. If an active node fails, a passive node automatically becomes active and takes over the processing load, making it possible for a service to survive failures without any ill effect.

control panel servers

Servers that host the Web-based control panels. Service providers can have multiple CP servers to balance loads and control panel requests.

control panels

Graphical user interfaces to Ensim Unify. These control panels enable service providers, resellers, organization administrators, and users to manage their accounts, resources, and other system settings.

D

database server

A server, or server cluster, that manages the database functions of the system. All configuration information for the Ensim Unify platform is stored in an MS SQL database on this server, or server cluster.

dedicated server or dedicated resource

A hosting server or resource, such as a mailbox store, that has been or can only be sold to a single organization. Some resources, such as mailbox stores, are identified as dedicated resources when they are registered with the system. These resources can only be sold to a single organization. By contrast, resources that are registered as shared resources can be sold to one or more organizations.

Note that the term dedicated resource differs from the status of a resource, which can be Shared, Dedicated, or Free. For example, a shared mailbox store could have the status Dedicated if it has been sold to a single organization. A dedicated mailbox store, however, could only be listed as Free, if it was not in use, or Dedicated if it had been sold. A dedicated mailbox store could never have the status Shared.

H

host name

The fully qualified host name used to identify the server. For example:

server1.bigtimehosting.com.

hosting server

Servers on which services, such as Hosted Exchange and Windows Web Hosting, are installed. Hosting servers are also known as "resources." When a service is sold to an organization, the server space and other resources required to provide the service are allocated from a hosting server. Service providers have one or more hosting servers for each service, and each service is installed on a separate server. Hosting servers cannot have more than one service installed on them. Resellers who purchase hosting servers can manage these servers through the reseller control panel.

I

Integration Framework

Application programming interfaces (APIs) that enable service providers to integrate Ensim Unify with existing operations-support systems and business-support systems (BSS), and to streamline common tasks.

IP-based domain

A domain with a unique IP address. Compare to name-based domain (page 35).

M

MPF

Microsoft Provisioning Framework. A program used to set up the Microsoft Provisioning System.

MPS

Microsoft Provisioning System. MPF is a comprehensive provisioning framework developed by Microsoft. This framework:

- Automates many otherwise manual, multistep provisioning processes while performing comprehensive logging.
- Provides a structure for solutions that support the delegated administration of basic provisioning tasks to customers.
- Translates high-level business logic into specific provisioning tasks.
- Insulates business logic from underlying platform changes.
- Comes with a sample user interface (UI), Named Procedures, and Providers that accelerate the development of customized solutions for the high-volume Web and application hosting market.
- Includes a comprehensive set of documentation and developer tools that enable customization in data center environments and empower service providers to easily develop and deploy powerful .NET solutions.

N

name-based domain

A domain with a unique host name that shares an IP address with another server. Compare to IP-based domain (page 35).

netmask

A bit-mask that identifies the network number and host number components of an IP address.

O

organization

A group of individuals, usually collected into a company or business unit, that contracts with a service provider for its services.

Organization Administrator

Administrators who belong to organizations and use the organization administrator control panel to manage organization services, resources, and users. Organization users can be given Organization Administrator privileges.

organization user

Users who belong to an organization and use the user administrator control panel to manage their own accounts and services.

P

platform servers

Servers used by service providers to manage databases, control panels, services, and other system functions. Resellers do not manage platform servers. These include Active Directory (AD) servers, provisioning engine (PE) servers, control panel (CP servers), and SQL servers.

plugin

A modular software program that can be plugged in to a system to expand functionality. Ensim Unify services have plugins that are installed on provisioning engine and CP servers to enable service providers to sell services to customers.

pools

Groups you can use to manage hosting servers as a unit.

primary name server

The main Domain Name System (DNS) server that translates alphabetic domain names into numeric IP addresses.

provisioning

Selling a service to an organization.

provisioning engine servers

Servers that manage the provisioning of services to customers. Service providers can have multiple PE servers to balance loads and provisioning requests.

R

reseller

The individuals or companies who purchase resources and services from service providers or resellers and offer those resources or services for sale to others.

resource

A term used to describe a server's disk space or processing capacity which are used by services.

resource type

The type of service or a service component that requires resources. Resource types include bandwidth, number of mailboxes, and disk space.

S

scope

Logical groupings of IP addresses associated with a specific subnet mask.

secondary name server

The backup Domain Name System (DNS) server that translates alphabetic domain names into numeric IP addresses.

service

The services you sell to resellers and organizations. Each service is installed on a service-specific hosting server.

service component

The software elements that compose a service.

service provider

An entity that sells services, such as Internet access or Windows Web Hosting, to resellers, organizations, and individuals.

shared server or shared resource

A hosting server or resource, such as a mailbox store, that has been or can only be sold to multiple organizations. Some resources, such as mailbox stores, are identified as shared resources when they are registered with the system. These resources can be sold to multiple organizations. By contrast, resources that are registered as dedicated resources can be sold to only one organization.

Note that the term shared resource differs from the status of a resource, which can be Shared, Dedicated, or Free. For example, a shared mailbox store could have the status Dedicated if it has been sold to a single organization. A dedicated mailbox store, however, could only be listed as Free, if it was not in use, or Dedicated if it had been sold. A dedicated mailbox store could never have the status Shared.

SMTP

Simple Mail Transfer Protocol. The most widely used email protocol on the Internet.

SNMP

Simple Network Management Protocol. A network management protocol used for configuring and monitoring devices on IP networks.

subnet

A portion of a network that shares a common address component. On TCP/IP networks, subnets are defined as all devices whose IP addresses have the same prefix. For example, all devices with IP addresses that start with 100.100.100. would be part of the same subnet. Dividing a network into subnets is useful for both security and performance reasons. IP networks are divided using a subnet mask.

subnet mask

A mask, or filter, used to determine to what subnet an IP address belongs. An IP address has two components, the network address and the host address. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets. For example, consider the IP address 150.215.017.009. Assuming this is part of a Class B network, the first two numbers (150.215) represent the Class B network address, and the second two numbers (017.009) identify a particular host on this network. Subnetting enables the network administrator to further divide the host part of the address into two or more subnets. In this case, a part of the host address is reserved to identify the particular subnet.

T

threshold

The percentage of the resource that, when assigned, triggers an alert. When the resource allocation reaches the threshold, email is sent to the specified address stating that resources are low. This allows an administrator to take action before resources are exhausted.

U

usage monitoring

Reports that enable service providers and resellers to view (and eventually bill for) application usage by resellers and organizations.

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