



Firmware Version 1.x

Cudatel Communication Server Administrator's Guide

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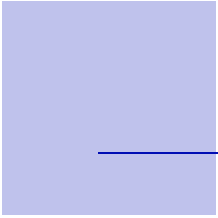
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Chapter 1

Introduction

This chapter provides an overview of the CudaTel Communication Server and includes the following topics:

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Overview

What This Guide Covers

The CudaTel Communication Server is an integrated hardware and software telephone system solution, providing a simple, feature rich system for connecting and managing voice connections established through Internet and traditional phone lines. The system can be pure VoIP (Voice over Internet Protocol) or it can blend VoIP with traditional phone service, such as analog and digital phone connections. CudaTel provides configuring and monitoring of the phone system, inbound and outbound routing of calls, and management and recording of users and phones through an easily understood administration user interface (Web Interface) over the Internet.

Depending on the model, CudaTel can support hundreds of concurrent calls. This guide provides concepts and general guidance the administrator needs to understand how to best configure the CudaTel Communication Server according to the organization's deployment needs, policies and telephony infrastructure.

Easy Administration

The powerful Web Interface of the CudaTel Communication Server allows for convenient configuration and management of your phone system from any networked computer as soon as the CudaTel Communication Server is installed on your network. All management, routing and monitoring of phone calls can be managed from one central location.

Features of the CudaTel Communication Server

All models of CudaTel Communication Server support the following:

- **Unlimited number of extensions, telephones, and users.**
- **Management of local users, and creation of user groups.**
- **LDAP synchronization** between CudaTel and back end repository of users and extensions.
- **Group calling:** Allows association of users/telephones permitting one ring/all ring functionality.
- **Follow-me:** Allows telephone number to be routed to various extensions in order to locate a user, based on date, day or time of day.
- **Networking of VoIP voice connections.**
- **SIP telephones:** Allows attachment to devices which use the SIP protocol to establish media streams for voice or video transmission.
- **Networking to analog phone lines (model 270B):** Provides connection with dial tone provided by telephone company.
- **Networking to digital phone lines (models 370B, 470B, 670B):** Provides connections with Primary Rate Interface ISDN, which can carry voice traffic for up to 30 simultaneous digital voice calls.
- **Trunk group support:** Allows establishment of logical groups of phone lines (analog and digital) to accomplish call routing with transparency to the user.
- **Inbound call queues:** Keeps track of incoming calls allowing them to be held and then retrieved in the order received. Can be configured so on hold callers hear announcements or music.
- **Multi-party conferences:** Allows multiple callers dialing into an extension to connect, and to communicate with each other. Can require users to provide secure PIN for access.
- **Automated attendant:** Provides for menu based call routing system using Interactive Voice Response (IVR) to play announcements and route calls according to caller responses. Also provides for caller to be immediately transferred to dialed extension.
- **Advanced call routing:** Routes inbound calls based on a simple list of actions to perform for each caller, including announcements or transfers to extensions, including conditional routing based on date, time of day, or day of week.
- **Call monitoring and recording:** Allows real time monitoring and recording of calls and stores call parameters including call start time, call end time, extension dialing and number dialed.
- **Call bridging:** Allows any telephone in network, whether soft (connected via Internet) or hard (connected via traditional POTS line) to establish a voice connection with any other phone in network.
- **Automatic provisioning of telephone sets:** Allows automatic provisioning of all existing hard and soft phones on the network.
- **Power over Ethernet:** CudaTel supports power over ethernet provided by telephone service providers.

Energize Updates

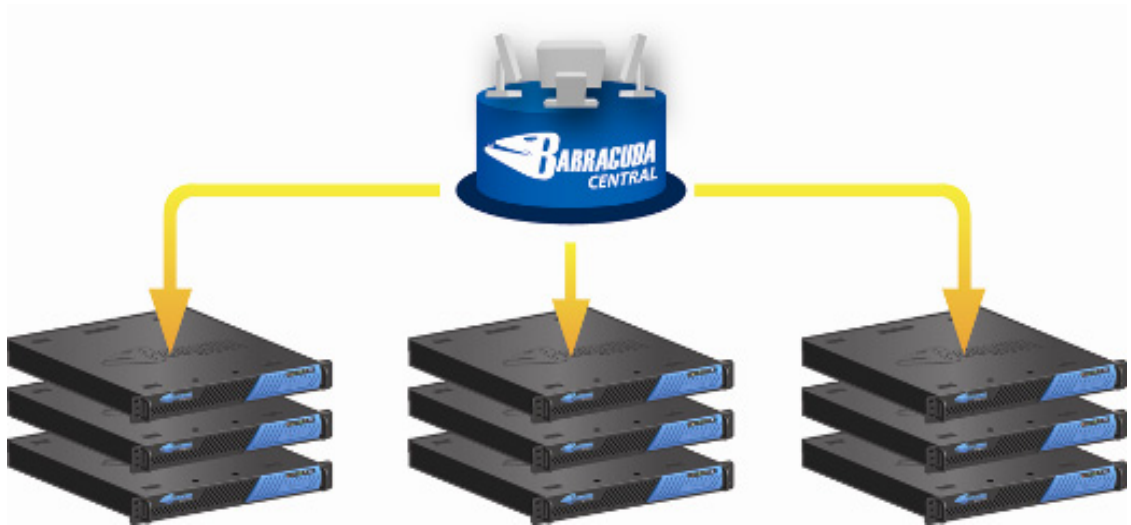
Barracuda Central

To provide you with the latest features and support for your CudaTel Communication Server, Energize Updates are available around the clock to your CudaTel Communication Server from Barracuda Central. These updates are automatically made available to your CudaTel Communication Server.

Energize Updates provide your CudaTel Communication Server with the following benefits:

- Access to round the clock free tech support
- Access to the latest firmware, including the latest features and enhancements

Figure 1.1: Energize Updates from Barracuda Central Delivers the latest CudaTel firmware.



CudaTel Communication Server Models

The CudaTel Communication Server comes in a variety of models. Refer to the following table for the concurrent call capacity and features available on each model:

Table 1.1:

Feature	Model 270	Model 370	Model 470	Model 670
Concurrent Call Support	10	50	100	2250
Conferences	2	5	15	50
User Support	Unlimited	Unlimited	Unlimited	Unlimited
Voicemail Storage	50 GB	50 GB	50 GB	50 GB
Hardware				
Rackmount Chassis	1U Mini	1U Mini	1U Mini	1U Fullsize
Dimensions (in)	16.8x1.7x14	16.8x1.7x14	16.8x1.7x14	16.8x1.7x22.6
Dimensions (cm)	42.7x4.3x35.6	42.7x4.3x35.6	42.7x4.3x35.6	42.7x4.3x57.4
Weight (lbs/kg)	12 lb/5.4 kg	12 lb/5.4 kg	12 lb/5.4 kg	26 lb/11.8 kg
Ethernet	2 x 100	2 x 100	2 x 100	2xGigabit
AC Input Current (Amps)	1A	1.2A	1.4A	1.8A
Solid State Boot Disk	YES	YES	YES	YES
Echo Cancellation	YES	YES	YES	YES
ECC Memory				YES
Redundant Disk Array (RAID)				YES
Optional Phone Line (TDM) Hardware	4 Analog	Single T1/PRI	Dual T1/PRI	Quad T1/PRI
Features				
Call Conferencing	YES	YES	YES	YES
Voicemail	YES	YES	YES	YES
Voicemail Email Integration	YES	YES	YES	YES
Automated Attendant (IVR)	YES	YES	YES	YES

Table 1.1:

Feature	Model 270	Model 370	Model 470	Model 670
SIP Voice/Video Client Support	YES	YES	YES	YES
SIP Provider Support	YES	YES	YES	YES
High-Definition Audio	YES	YES	YES	YES
Windows Active Directory Integration	YES	YES	YES	YES
LDAP Support/User Import	YES	YES	YES	YES
Call Recording	YES	YES	YES	YES
Performance Monitoring	YES	YES	YES	YES
Automated Phone Provisioning	YES	YES	YES	YES
Customizable Branding				YES

Contacting Technical Support

To contact Barracuda Networks Technical Support:

- By phone: call 1-408-342-5400 if you are in the United States, or (888) 268-4772.
- By email: use *support@cusdatel.com*
- Online: visit *http://www.cusdatel.com/support* and click on the **Support Case Creation** link.

There is also a Barracuda Networks Support Forum available where users can post and answer other users' questions. Register and log in at *http://forum.barracuda.com*.

CudaTel Communication Server Concepts

This chapter introduces the general topics that will help you understand what your CudaTel Communication Server can do and how to approach configuring the features that are important to your particular deployment and organization policies. The Getting Started chapter walks through initial setup and configuration of the system to get you up and running.

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Telephone Concepts and Technologies

The following is a list of some of the terms used to describe the CudaTel Communication Server functions and features.

Table 2.1: CudaTel Terms and Concepts

Term	Description
Telephone System	A telephone system is a server for telephones. It allows the communication connections between hard, soft and IP phones, the Internet, and traditional phone lines. Traditionally, telephone systems, also called PBXs (Private Branch Exchanges), connected phone lines provided by telephone companies through traditional lines to phones -- actual hardware used to receive and make calls. The CudaTel is a modern phone system allowing the expansion from this traditional model to include connections over the Internet. It allows for easy configuration of the system over the Internet and connection through the Internet to non-traditional phones such as soft phones and IP phones.
Phone Lines	Phone Lines are the traditional lines provided by telephone companies or telephone service providers which provide dial tone. Phone lines can be connected to the CudaTel by analog ports, standard RJ14 four conductor jacks, or digital ports, which are PRI circuits using standard eight conductor RJ45 jacks. Additional voice connections can be provided through the Internet, with service providers providing accounts to establish media streams for voice or video connections using voice over Internet protocol (VoIP).
Grouping Phone Lines	Trunk Groups are logical groupings of phone lines. Analog and/or digital lines can be associated into a trunk group to allow the routing of outbound calls through any available line in the trunk group. Users are not required to know which line the outbound call uses; as long as at least one of the trunk group lines is available, the outbound call routing is transparent to the user. By creating digital trunk groups, a very large pool of phone lines can be established for environments such as call centers, where there is heavy telephone traffic.

Table 2.1: CudaTel Terms and Concepts

Term	Description
Phones: Hard/Soft/ IP	A telephone is a device which receives and transmits the voice connection between a user and another user or a system resource, such as voice messaging. Phones can establish connections via traditional phone lines (POTS lines) or through Internet connections (LAN or WAN). Hard phones are the traditional telephone hardware that allows direct connection through POTS (“Plain Old Telephone Service”) lines to the phone network. Soft phones are implemented through software on a computer, where the computer acts as your telephone, connected through the Internet to the phone network. IP Phones are hardware devices, resembling a traditional telephone, which connect to the Internet and provide the needed subset of computing functionality (connection to the Internet, display of caller information, function “buttons”, etc.). Voice connection feels as though on a traditional phone, though the connection is actually made through the Internet.
Provisioning Phones	The process of assigning the phone to the CudaTel Communication Server from which it will get assignment of an extension number and firmware updates.
Extensions/ Extension Numbers	An extension is the final destination of a routed call. It may be a phone or a system resource such as a queue, conference, voice mailbox, or automated attendant. For the purposes of CudaTel Communication Server documentation, an extension number, the number dialed to reach an extension, and the extension itself, are interchangeable terms.
Grouping Users	Grouping users allows assigning an extension (in addition to the users assigned individual extension) to be associated to all of the grouped users. All phones of users in the group ring when that group extension number is dialed. This is a simple way to alert multiple users of incoming calls of common interest. The group association also allows the establishment of a default call recording policy for the whole group with one setting.
Policies	Policies allow setting a default configuration for a group of users. For example, policies can be established for collection of data records for a group of users. The group policy can be over-ridden by individual user settings.

Call Routing

The CudaTel Communication Server allows local management of calls both incoming from the PSTN (public switched telephone network), or Internet, and outgoing to the PSTN or Internet. The CudaTel is connected to the Internet (through its LAN/ WAN ports) and optionally to analog or digital phone lines, directing both inbound and outbound calls to the proper route.

Outbound Routes

Outbound routes, associated with a specific Telephone Service Provider, are specified as a list of potential dialed patterns. The patterns may be specific, such as '911', or more general, such as 'any 7 digits'. An outbound route provides the mechanism for a particular dialed sequence to be allowed. These routes direct calls fitting a defined pattern to be routed using PSTN lines, or Internet connection from the associated telephone service provider. By specifying outbound routes per provider, the administrator can direct calls to the best provider for that call type. For example, '411' calls can be directed to the best information resource of the telephone service providers. To enable a particular dialed pattern to connect out, that pattern must be specified for at least one provider. For example, to enable '911' dialing, the '911' dialed pattern must be set as an outbound route for at least one provider. If no outbound route exists for the sequence, it will be denied connection access. For information about the use of Regular Expressions (text patterns) to set up outbound call routes, see Appendix C.

Inbound Routing

Incoming calls to the CudaTel Communication Server can be routed with a variety of options. Queues, lists of calls kept in the order received, allow calls to be handled in order, according to the configured strategy. Calls can be processed according to interactive inputs from the caller, who chooses off of an announced menu asking him to respond by pressing a key that indicates his choice (using Automated Attendant). Alternatively, calls can be handled according to a simple list of actions for each call (List based routing), or can be routed according to time of day, date, or day of week (Rule based routing). In each case, the CudaTel processes the call according to the configured list of actions, which may include playing announcements or transferring the call. Because queues, automated attendant, and list or rule based routing are all associated with logical extensions, transferring to the associated extension provides for the call's handling using any of these configured mechanisms.

Automated Attendant

Automated Attendants use sound files to provide an announcement asking for caller input. The input (key-press of a digit) is captured to determine the proper routing of the call.

Advanced Routing

When a group of calls all require the same handling, an advanced router is a simple way to configure the required steps for each incoming call. The list may include playing messages, transferring to extensions, and may have conditional handling dependent on the time, day, or date the call is received. For example, a call may be routed to an operator during business hours, to an automated attendant after hours on business days, or by default to a general voicemail extension.

Queues

Queues allow calls to be held in the order received, and answered in that order by designated queue agents as they become available to process them. A queue is assigned a logical extension number and calls transferred to that extension join the queue. Queues work on a simple first in, first out principle, such that calls are retrieved from the queue in the order they were received. While queue agents receive calls automatically from the queue as they become available, anyone can take calls off the queue by dialing the associated agent access extension. A queue can have a timeout which transfers calls waiting beyond the timeout period to a designated extension. The queue provides for music on hold or break in announcements at regular intervals if desired.

Parking/Retrieving Calls

Dynamic routing of calls can be accomplished by configuring blocks of call parking extensions. An incoming call (which requires paging to locate the intended call receiver, for example) can be parked in the block of parking extensions by transferring the call to the first extension in the block. The call will be held at any available extension in the block. The retrieval extension is returned to the user who parked the call and can be passed on to the intended call receiver, once s/he is located. For example, the intended receiver can be paged with instructions to pick up the retrieval extension. Alternatively, the call could be directly transferred to an extension from the block of parking extensions if it is known to be available. In this case, the call can be retrieved by simply re-dialing that extension.

Phone System Network Considerations

Deployment of the CudaTel Communication Server requires connection to a network. The performance of your phone system and the ease or complexity of setup will depend, in part, on the network configuration you choose. The CudaTel Communication Server relies on the attached network to provide bandwidth, the amount of data flow available for voice connections, and to provide correct configuration information. While connecting your CudaTel Communication Server to an existing network may require less physical network configuration, it introduces some performance and complexity issues to your phone system deployment. These issues need consideration before deciding which network configuration you will implement.

Voice connections rely on adequate network bandwidth. By attaching your CudaTel Communication Server and phones to an existing network, the bandwidth available for voice connection traffic will be constrained to the existing network bandwidth available. Lack of bandwidth could negatively impact voice connection quality and reliability. Also, attaching the CudaTel Communication Server and phones to the existing network may impact other network elements vying for the same bandwidth.

Any network device with its own IP address (phones and SIP devices in your system) receives configuration information from the DHCP server when connected to the network. Because phones need configuration to point to the CudaTel Communication Server as the phone server, the network will need to be configured to allow the DHCP server to correctly distinguish which network elements are phones and SIP devices so correct configuration information can be transmitted to them. Implementing a virtual LAN (VLAN) comprised only of phone system elements is one way of ensuring that phones are identified as such, and receive correct configuration information from the DHCP server when attached to an existing network.

Considering these quality and complexity issues, the ideal network setup for the CudaTel Communication Server and the phones it serves (SIP devices, IP phones) would be a dedicated physical network. Using this configuration results in high quality voice transmission, with the fewest dropped calls. This setup enables phones to get the proper configuration information without introducing added complexity into the existing network.



The most reliable network configuration, providing maximum performance of your phone system, is to set up a dedicated physical network for your CudaTel Communication Server and phones.

Telephone Service Provider Considerations

The CudaTel Communication Server requires a connection to the outside world for receiving and routing calls. The connection may be via the Internet through accounts provided by Internet voice connection (VoIP) providers or through physical analog or digital lines from the telephone company. The CudaTel Communication Server allows connection to each of these and provides bridged connections among them. Your phone system will need to be configured to support the phone service provider you choose, whether VoIP voice connection provider or traditional telephone company.

VoIP Telephone Service Connection

VoIP providers use the Session Initiation Protocol (SIP) to implement voice connections over the Internet. The CudaTel Communication Server supports various SIP configurations. VoIP accounts are used to set up the connections. The VoIP provider establishes an account and provides parameters which the CudaTel Communication Server is then configured to use. Once configured, the CudaTel can route calls in and out through the VoIP connection.

Emergency Dialing Configuration

Because VoIP connections, unlike traditional phone lines, are not mapped to physical locations, Emergency call (911) routing can be problematic. To insure proper emergency call routing over the Internet, always check with your VoIP provider. The CudaTel Communication Service allows for the configuration of sites which are identified by:

- IP address or subnet mask,
- inbound provider or port,
- inbound authorization account.

This allows site specific emergency service to be properly identified when 911 calls are made. Internet emergency service (for example: **E911**) requires the registration of each site in order to ensure that authorities in the locale of the caller are notified in the event of an emergency.

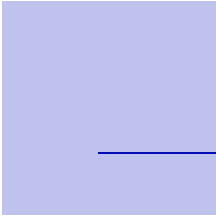
Traditional Telephone Service Connection

Analog Telephone Service Connections Setup

The CudaTel Communication Server (model 270B) allows you to connect your phone system directly to traditional phone service through analog ports. Up to four analog phone lines can be attached through two analog ports on the back of the appliance. These physical connections provide the lines through which incoming and outgoing calls can be routed. For information about maximum concurrent call count and other features, see *CudaTel Communication Server Models* on page 7.

Digital (PRI) Telephone Service Connection Setup

The CudaTel Communication Server (models 370B, 470B, 670B) provides the option to connect your phone system directly to traditional phone service through digital PRI ports. Up to four PRI connections can be made depending on your model. These physical connections can provide for a large call volume to be supported. For information about maximum concurrent call count and other features, see *CudaTel Communication Server Models* on page 7.



Chapter 3

Getting Started

This chapter will guide you in installing the CudaTel Communication Server and configuring the phone system to take advantage of its rich feature set.

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- Update the CudaTel Communication Server Firmware*..... 24
- Administrative Settings and the Web Interface*..... 26
- Basic Phone System Configuration*..... 27

Initial Setup

Checklist for Unpacking

Begin by unpacking your new CudaTel Communication Server. Consult the checklist and directions in this section for instructions on how to proceed.

Unpacking checklist:

- CudaTel Communication Server
- Power cord
- Ethernet cable
- For model 270B, also included are two telephone Y-cables

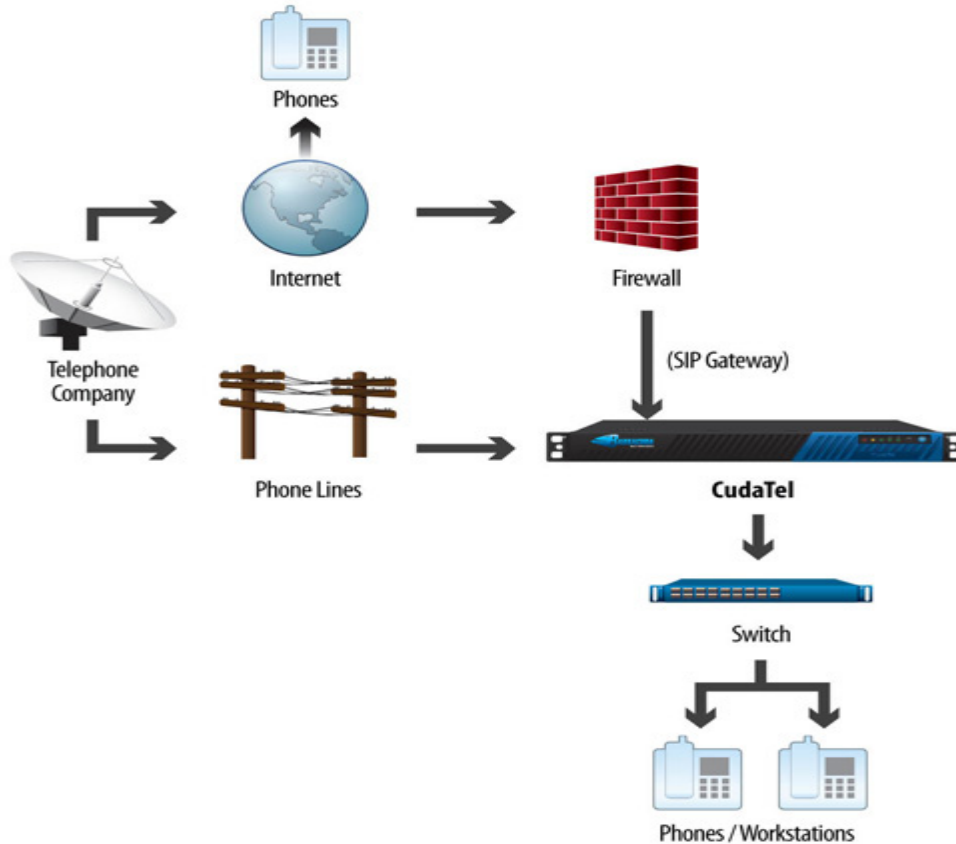
Required equipment for installation:

- VGA monitor (recommended)
- PS/2 keyboard (recommended)
- 1U space in 19" rack or other suitable location
- Climate controlled environment
- A/C power
- Uninterruptible power supply (recommended)

Deployment/Installation

The following figure shows the configuration of the CudaTel installed in the system, connecting both POTS lines (“Plain old Telephone Service”) and Internet voice connections through the firewall to IP and soft phones in the system.

Figure 3.1: The CudaTel Communication Server behind the corporate firewall



Install the CudaTel Communication Server

1. Fasten the Barracuda CudaTel Communication Server to a standard 19-inch rack or other stable location..

Warning



Do not block the cooling vents located on the front and rear of the appliance.

2. Connect a CAT5 or CAT6 patch cable from your network switch to the LAN Ethernet port on the front of the CudaTel Communication Server.
3. Connect the following to your CudaTel Communication Server:
 - Power cord
 - VGA monitor
 - PS2 keyboard
4. Press the **Power** button located on the front of the appliance

Configure IP Address and Network Settings

Wait for system to fully boot up. The login prompt for the administrative console is displayed on the monitor, and the power light on the front of the system turns on. To physically install the CudaTel Communication Server Appliance:

- At the Administrative Console prompt login enter Username: **admin** Password: **0000** (four zeroes)
- Use the TAB key to move and the ENTER key to select.
- Configure the IP address. If you do not have a keyboard and monitor and want to set the IP address, push and hold the **Reset** button on the front panel. Holding the **Reset** button for 5 seconds changes the IP address to **192.168.200.200**. Holding the **Reset** button for 8 seconds changes the IP address to **192.168.1.200**. Holding the **Reset** button for 12 seconds changes the IP address to **10.1.1.200**.
- Configure subnet mask, default gateway, and optional primary DNS and secondary DNS.
- Apply the network settings.

Configure the Corporate Firewall

Open up the following ports in your firewall:

Table 3.1:

Port	Direction	TCP	UDP	Usage
22	In/Out	Yes	Yes	Remote Support*
53	Out	Yes	Yes	DNS
80	Out	Yes	No	Firmware Updates
123	In/Out	No	Yes	NTP
5060	In/Out	Yes	Yes	Standard SIP Port
5065	In/Out	Yes	Yes	Custom SIP Port
16384-32768	In/Out	No	Yes	RTP Ports

* Access via port 22 is required only if technical support is requested

Initial Configuration of the System

After specifying the IP address of the system and opening the necessary ports on your firewall, you need to configure the CudaTel Communication Server from the Web interface. Make sure the computer from which you configure the CudaTel Communication Server is connected to the same network, and the appropriate routing is in place to allow connection to the CudaTel Communication Server's IP address from a Web browser.

To configure the CudaTel Communication Server:

1. From a Web browser, enter the IP address of the CudaTel Communication Server on the address line (Example: <http://192.168.200.200>).
2. Login to the Web interface by entering the username **admin** and password **0000** (four zeroes)

Now the Web Interface will allow you to continue with configuration of the phone system. For the purposes of this guide, the Web Interface screens will be referred to by the name of the page (in uppercase letters, followed by a right arrow (>) and the actual section name. For example, you are currently looking at the **SYSTEM DASHBOARD** page, with the upper left section **SYSTEM DASHBOARD > Updates and Support**.

Configure Nat Routing

If your CCS is behind a NAT router and you wish it to communicate via the Internet then enable NAT routing on the **SYSTEM CONFIGURATION > Network** screen of the Web Interface. Using the Auto-detect function, the External IP address may be automatically determined, or it may be set manually. Click on **Apply Network Settings** after configuring the Nat Routing information.

Configure Proxy Settings

If you are using a proxy server, then the Proxy Settings may be set on the **SYSTEM_CONFIGURATION > Network** screen of the Web Interface to reflect the proxy server IP address, port, and login information (user and password). Click on **Apply Network Settings** after configuring the Proxy Settings information.

SMTP Mail Settings

SMTP mail settings are used to send voicemail messages to users' email. This function requires the following inputs on the **SYSTEM_CONFIGURATION > Network** screen: SMTP Server Address/IP address, the "from" host, the sender address and port, as well as login information for the host (username and password). Click on **Apply SMTP Settings** after configuring the SMTP Mail Settings information.

Activate Your Subscriptions

After installation, your **Energize Updates** and other optional subscriptions must be activated for the CudaTel Communication Server to be fully enabled, and continue to receive the latest updates to your firmware from Barracuda Central. The **Energize Updates** service is responsible for downloading these updates to your CudaTel Communication Server.

- At the top of every page, you may see a warning that your subscription has not been activated.

Product Activation

- Click on the designated link to open up the **Product Activation** page in a new browser window.
- On the **Product Activation** page, fill in the required fields and click **Activate**. A confirmation page opens to display the terms of your subscription.
- Return to the CudaTel Communication Server Web interface and navigate to the **SYSTEM Dashboard > Updates and Support** page. Verify that the **Energize Updates**, **Instant Replacement Service** (if purchased) and **Premium Support** (if purchased) all indicate active status.
- There may be a slight delay of a few minutes for the display to reflect your updated subscription status. If the status is still showing as unactivated, click **Refresh** in the **Subscription Status** section.

Note



If your subscription status does not change within an hour, or if you have trouble filling out the **Product Activation** page, call your Barracuda Networks sales representative.

Update the CudaTel Communication Server Firmware

Prior to upgrading the firmware on your CudaTel Communication Server, it is always recommended that you read the release notes. Subscribers to **Energize Updates** will have automatic access to the latest firmware. The **SYSTEM DASHBOARD > Updates and Support** screen indicates when a firmware update is available for installation by displaying an **Updates Available** notification directly below the firmware version number. Selecting the notification navigates to the **SYSTEM CONFIGURATION > Updates** page where the Current Installed Version of the firmware and Latest General Release firmware versions can be compared. Release notes for all versions can be reviewed, and a download of the latest firmware can be initiated.

To upgrade the firmware on the CudaTel Communication Server:

1. Navigate to the **SYSTEM CONFIGURATION > Updates** page. The **Start Download** button is disabled if the CudaTel Communication Server is already up-to-date with the latest firmware.

Note



ALWAYS read the release notes prior to downloading a new firmware version. Release notes provide you with information on the latest features and fixes provided in the updated firmware version. You can access the release notes from the **SYSTEM CONFIGURATION > Updates** page.

2. **If the installed version does not match the Latest General Release:** read the release notes to learn about the latest features and fixes provided in the new firmware version, and click **Start Download** to begin the download. Updating the firmware may take several minutes. Do not turn off the appliance during this process.

You can view the download status by clicking the **Refresh** button next to the firmware download progress. A “Firmware downloaded” message displays once the download is complete, and the **Refresh** button will say **Apply Now**.

Note



The “apply” process takes several minutes to complete. It is important to not power-cycle the appliance during the download. Your CudaTel Communication System will be offline during this time, so it should be scheduled to minimize the business impact.

3. Installing the update will take a few minutes and will require the CudaTel Communication System to be offline during that time. The install should be scheduled to least impact your operations. When an appropriate downtime is available, click **Apply Now** to activate the newly-downloaded firmware. This process will automatically reboot your system when completed, which can cause your Web interface to disconnect momentarily. **This is normal and expected behavior**, so there is no need to perform a manual reboot. A Status page displays the progress of the reboot. Once the reboot is complete, the login page will reappear.

Administrative Settings and the Web Interface

Controlling Access to the Web Interface

The **SYSTEM CONFIGURATION > System** page allows you to change the password of the administration account.

Setting the Time Zone of the System

You can set the time zone of your CudaTel Communication Server from the **SYSTEM CONFIGURATION > System** page. The current time on the system is automatically updated via Network Time Protocol (NTP). When the CudaTel Communication Server resides behind a firewall, NTP requires port 123 to be opened for outbound UDP traffic. If you desire to use an NTP server other than the default, this can also be specified a bit further down on the **SYSTEM CONFIGURATION > System** page.

It is important that the time zone is set correctly for accurate monitoring and routing of calls.

Note: The CudaTel Communication Server automatically reboots when you change the time zone.

Note



It is important that the time zone be set correctly because this information is used throughout the system (e.g. rule based routers branch based on system time, and call data records store the system time).

Basic Phone System Configuration

Once the corporate network is properly configured (see Getting Started earlier in this manual) then phone system (PBX) configuration can begin in earnest. The basic steps are:

- Gather user information
- Identify physical telephones to setup
- Configure users and phones
- Configure routing features such as automated attendants, queues, MOH, and conferences
- Configure telephone service providers

Configuring Users/Telephones/Extensions

Gather a list of users and phones (or use the autoprovisioning feature) before continuing with your configuration.

Using Active Directory synchronization allows the CudaTel Communication Server to synchronize to your LDAP database. To best implement your telephone system using this feature, it is recommended that you create an organizational unit in your LDAP directory with only the telephone system users. Then, to use Active Directory, use the **SYSTEM CONFIGURATION > Active Directory** page to view the LDAP. Drill down to the telephone system organizational unit you created and select it. Synchronizing now configures all of the telephone users in your system at once. The user names will be configured according to your LDAP, so to delete, add, or modify a user after the synchronization requires the modification to be made in the LDAP and synchronized again to your CudaTel Communication Server. The Active Directory option is only recommended when the LDAP is kept up to date.

Note



To use Active Directory synchronization, create a telephone organizational unit with only the telephone system users you intend to configure. Then select and synchronize only to that organizational unit to configure all of your telephone system users at once.

The autoprovisioning feature allows the CudaTel Communication Server to automatically provision any SIP telephone it detects. Autoprovisioning should not be used if you have an existing VoIP system in production on your LAN because it will attempt to provision every phone detected on the network. If you are doing a "clean" install then the autoprovisioning feature will save configuration time by automatically setting up each system phone to get provisioning information from the CudaTel Communication Server. To turn autoprovisioning on, toggle the **Turn Automatic Provisioning On** button in the **SYSTEM CONFIGURATION > Phones, Automatic Provisioning** screen. If autoprovisioning is not used, then you will need to manually set each phone to look for the CudaTel Communication Server to get its provisioning information. For detailed instructions on provisioning specific manufacturer's phones, see APPENDIX C.

Note



Automatic provisioning should be used only to setup a system where no other VoIP phones are already in production on the LAN. Cudatel Communication Server autoprovisioning function streamlines setup of a clean install by provisioning all VoIP phones it detects on the LAN.

To manually set up users and phones, begin by hooking up phones, creating the users in the system, and provisioning the telephones. The basic steps are as follows:

- Connect telephone to network
- Manually configure phone to get provisioning information from CudaTel Communication Server. (APPENDIX C for manufacturer specific information on connecting phones to the network).
- Add new user.
- Assign telephone to user.

Adding Phones

Connecting phones to your CudaTel Communications Server simply requires powering up the phone and connecting it to the LAN. Provisioning it manually takes two steps: set the provisioning server in the phone's configuration to point to the CudaTel Communication Server (<http://x.x.x.x/provision> where x.x.x.x is the IP address of the CudaTel), then reboot the phone. The provisioning server is the CudaTel Communications Server, and each manufacturer requires this information to be provided in its own way. For Cisco, Polycom and Snom phones, see Appendix C for instructions.

After provisioning the phone, it is unassigned, and can be viewed in the **PEOPLE GROUPS and PHONES** page on the list of **Unassigned Phones**. The assigned temporary extension will appear in this listing.

For soft phones, the CudaTel Communication Server automatically generates an authorization **Username** and **Password** which can be copied and entered into the appropriate fields of your soft phone configuration. The phone will then appear in the **Unassigned Phones** list, and can be assigned to a user.

Adding Users and Assigning Phones to Users

To add users manually, use the **PEOPLE GROUPS and PHONES** page **Add New** option. Fill in the first name, last name, PIN, and group options as desired to set the user up initially. These values can be edited at any time by returning to the **PEOPLE GROUPS and PHONES** page and selecting the user from the list, which opens an editable window of the user's information.

To assign a phone to a user, either **select by choosing a phone** (assigns the temporary extension associated with this phone to the user), or **select an extension for the user** (directing the system to assign the first free extension, or manually entering a single extension or range of extension numbers), then click **Add**.

The **select an extension for the user** also allows an external number (direct inward dial number) to be associated with a user which will ring the assigned user extension when dialed. The external number will also be the caller ID sent out from that extension, unless overridden by the Telephone Service Provider option to always use the preset caller ID.

After each user is created and has a phone assigned, voicemail can be set up by dialing *98 and following the voice prompts.

Once the phones and users are set up, you can begin configuring queues, conferences, and automated attendants. (While these system features may be created before adding and assigning users, it is recommended to configure phones and users first to allow for verification that the configuration was set up properly.) Lastly, configure your telephone service provider connections. In some cases you may need to do this after business hours, such as when migrating from a phone system (PBX) that you are replacing.

Configuring Inbound Routing

Configuring Queues

A queue is a list of calls on hold and tracked according to the order received. A queue is associated with an extension number, where transferring a call to that extension adds the call to the queue. The order of the calls is maintained so the first call in the queue is the first one retrieved. Calls are retrieved automatically by assigned queue agents, or manually by dialing the associated agent access extension, if configured. Queue calls receive announcements or music while on hold. Calls may be transferred to a configured extension if they are held beyond the configured queue timeout period.

Queue Agents

Assign a queue agent if calls should be routed automatically to a user's extension when the extension is available. One or more queue agents can be added manually by entering the extensions associated with them.

Agent Access Extensions

Assign an agent access extension to allow users to manually retrieve the next call from the queue. Any user may help service queue calls (when the queue is backed up, for example) by calling the queue agent access extension, thereby retrieving the next call (the call which has been waiting the longest) from the queue for processing.

Music on Hold

Music on Hold determines what a caller in this queue will hear while on hold, silence or the default hold music. The **SYSTEM CONFIGURATION > Sound Prompts** page is the place to upload sound files and the **SYSTEM CONFIGURATION > Music on Hold** page allows the default hold music to be configured.

Break-in Announcements

Recorded break-in announcements, stored as sound files uploaded to the CudaTel on the **SYSTEM CONFIGURATION > Sound Prompts** page, can be played at the interval you choose while the call is on hold.

Queue Timeout

To set a queue timeout, enter the maximum time on hold and the extension to which the call should be transferred if the hold time exceeds this maximum. Calls will then automatically transfer to the configured extension if the elapsed time on hold exceeds the queue timeout setting.

Automated Attendant

Uploaded sound files are required to configure an automated attendant. The **SYSTEM CONFIGURATION > Sound Prompts** page allows creating and uploading sound files. The sound file should prompt the caller to indicate his selection by pressing the announced key associated with his reason for calling. The Automated Attendant can capture the input and route the call accordingly, or to a default extension if user input isn't detected. The announcement is made at intervals configured on the automated attendant screen.

List based Routing

List based routers, associated with an extension number, specify an ordered list of steps to take for each call coming into that extension. The list of routing actions are taken in order, and as soon as a condition is met transferring the call, the list based router is exited. If no condition in the list results in the call being transferred when the list has been exhausted, then the call is transferred to the Default Destination Extension (fall-through).

Rule based Routing

Rule based routers, associated with an extension number, specify an ordered list of steps to take for each call, where each step may include a condition such as time, day, or date of call to apply before taking that action. The list of routing actions are taken in order, and as soon as a condition is met transferring the call, the rule based router is exited. If no condition in the list results in the call being transferred when the list has been exhausted, then the call is transferred to the Default Destination Extension (fall-through).

Call Detail Reports

Call Detail reports are collected according to the **Call Recording Policy** setting on the **People, Groups, and Phones** page, associated with each user, or group. This setting allows the collection of information about each call to/from this user or group, including calling and called parties, call start time and duration of call. These records can be viewed on the **SYSTEM CONFIGURATION > Call Detail Records** page, or for further processing, the records can be downloaded from the **SYSTEM CONFIGURATION > Call Detail Records** page into a file in comma separated format (CSV) .

Multi-user Conferences

Multi-user conferences allow the connection and interaction of multiple users through a configured conference extension. Conferences can be set up on the **SYSTEM CONFIGURATION > Call Detail Records** page by supplying a single conference extension number, an optional access code (which invited users must supply to join the conference), and waiting music, played only when exactly one person has called into the conference. A block of extensions can be assigned as conference extensions, allowing for multiple individual conferences if desired. A call connected to the conference extension, once the access code is provided, if required, joins the conference.

Connection to Service Providers

The CudaTel Communication Server requires a connection to the outside world to properly receive and route calls. These connections may be through analog or digital lines from the telephone company, or through the Internet to accounts provided by Internet voice connection providers. The CudaTel Communication Server allows connection to each of these and provides bridged connections among them.

VoIP Telephone Service Connection Configuration

VoIP providers use the SIP protocol to implement voice connections over the Internet. The CudaTel supports various SIP configurations. VoIP accounts are used to set up the connections. The VoIP provider establishes an account which will be registered using the **SYSTEMCONFIGURATION >**

Telephone Service Providers screen. Setting up a new telephone service provider account requires the following inputs received from the VoIP provider: **Name of the provider**, **SIP configuration of the provider** (use generic unless otherwise indicated), **host**, **port**, login information (**username**, **password**), **Realm** (if known). Other configuration options allow outbound calls to have a set **Caller ID**, optionally overriding alternative caller IDs with the configured one (check box). VoIP connections can be unidirectional, inbound calls only or outbound calls only, or bidirectional (both inbound and outbound calls). Outbound routing can be manually set or can automatically allow routing through any outbound route. If **registration is required** for your VoIP provider (normally it is), this can be indicated for the provider, along with the **expiration date** on the registration, if specified by your provider. Once each of these fields has been updated with the provider information, your new provider connection can be installed.

Analog Telephone Service Connections Setup

The CudaTel Communication Server (model 270B) provides the option to connect your phone system directly to traditional phone service through analog ports. To use the analog ports, simply attach incoming phone lines (from the traditional RJ14 wall phone jacks) to the analog ports. Each analog port allows the connection of up to 2 lines. To attach two lines, connect the provided Y cable to the analog port on the back of the CudaTel appliance, then two separate lines may be attached to the two jacks at the other end of the Y cable. Once these lines are connected, the analog ports will appear in a list on the **TELEPHONE SERVICE PROVIDERS** page.

Selecting a port on the **TELEPHONE SERVICE PROVIDERS** page brings up the configuration screen for that port. The direction of the connection can be set to Inbound only, Outbound only, or both directions. Correspondingly, inbound and outbound voice connections can be configured on this screen. Inbound calls can be connected with any extension, including automated attendants, routers, or a user phone. Outbound routes are set at the bottom of this screen. For more information on configuring outbound routes, see appendix C.

Digital (PRI)Telephone Service Connection Setup

The CudaTel Communication Server (models 370B, 470B, 670B) can connect directly to traditional phone service through digital PRI ports. To use the digital port, simply attach the incoming PRI line (from the traditional RJ45 wall phone jacks) to a PRI Port on the back of the CudaTel appliance. One (model 370B), two (model 470B), or four (model 670B) PRI connections can be made depending on your CudaTel model. Once the connections are made, the PRI ports will appear in the provider list on the **TELEPHONE SERVICE PROVIDERS** screen.

Selecting a digital port on the **TELEPHONE SERVICE PROVIDERS** page brings up the configuration screen for that port. On digital ports, the signal type, default caller id, external numbers and outbound routes must be configured. Compatible signal types for your CudaTel Communication Server include National ISDN-2 (NI-2), Lucent 5ESS, or NorTel DMS100. When ordering new equipment, use the signalling type supported by the current phone system. If no current service exists, NI-2 is recommended. Default Caller ID setting will override all other caller ID settings for outbound calls. External numbers can be configured for the Telephone Service Provider implementing Direct Inward Dialing. Outbound routes for the digital circuit must be configured for any calls to be routed outbound. For more information on configuring outbound routes, see appendix C.

Configuring Distributed Telephone Systems

This chapter discusses configuration options for phone systems which are distributed across multiple locations.

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<i>Configuring Remote Phones</i>	35
<i>Configuring Communication to Remote CudaTels</i>	36

Emergency Service and Distributed Systems

To insure proper emergency dialing response, the CudaTel Communication Server allows sites, locations of remote elements of your phone system, to be configured and associated one of three ways with phone system elements. The specification of the remote site can be made using IP address/Subnet mask, by inbound provider/port, or by a new inbound authorization account.

Configuring a site, allows the CudaTel Communication Server to associate configured site specific information (for example, outgoing caller id) with the remote network element. You need to consult your VoIP or Internet emergency service provider for additional configuration setup required to implement emergency service dialing.

Warning To insure emergency service properly identifies a remote network element location, you must consult your VoIP provider, or register with an Internet emergency service and follow their instructions. The CudaTel Communication System does not implement emergency dialing, but rather assists your VoIP or Internet emergency service provider in implementing it.



Configuring Remote Phones

It is recommended that when configuring a phone remote to your CudaTel Communication System you contact your VoIP or Internet Emergency Service provider to discuss the implications for your emergency dialing.

Basic configuration of the phone is the same as a phone colocated with the CudaTel Communication Server. The remote phone needs to be configured to look to the CudaTel for it's setup (set the provisioning server to <http://x.x.x.x/provision> where x.x.x.x is the IP address of the CudaTel). Then reboot the phone.

To assist in correctly identifying the location of your remote phone, the CudaTel Communication Server allows you to configure and associate site specific information (for example, outgoing caller id) with your remote phone. You need to consult your VoIP provider for additional configuration setup required to implement emergency service dialing.

Warning To insure emergency service properly identifies a remote phone location, you must consult your VoIP provider and follow their instructions. The CudaTel Communication System does not implement emergency dialing, but rather assists your VoIP or Internet emergency service provider in implementing it.



Configuring Communication to Remote CudaTels

CudaTel Communication Servers use Session Initiation Protocol, making them generic SIP devices, and can be configured to communicate with each other over the Internet as such without any required telephone company or VoIP service provider.

Configuring CudaTels to connect with each other requires setting up an outbound connection and inbound connection for each CudaTel Communication Server configured. The outbound connection is configured as a telephone service provider, with an associated extension on the remote CudaTel, and must have an associated outbound route which directs the remote CudaTel extension numbers through that associated extension to the remote CudaTel Communication Server. The inbound connection is implemented through a configured person (on the People, Groups and Phones page) assigned to a generic SIP device (as its phone), which is configured with the remote CudaTel IP Address. This allows incoming voice calls from that IP address (the remote CudaTel Communication Server) to be routed inbound properly and identified as coming from a remote site, using site configuration of the remote CudaTel's IP address.

To connect two CudaTel Communication Servers together, Inbound and Outbound gateways must be set up on each CudaTel. That is, configuring must be done for inbound voice connections (through a user with a generic SIP device at the remote CCS IP address) and outbound voice connections (through the outbound route associated with a telephone service provider specific to the remote CudaTel) on each CudaTel. A total of four connections (two inbound, one for each CudaTel, and two outbound, one for each CudaTel) must be configured to achieve proper inbound and outbound routing for calls between remote CudaTels.

Once configured, the dialing between locations is achieved through the existing Internet connection with no additional costs or service providers. This allows remote offices, each with their own CudaTel Communication Server, to have direct dialing and voice connection.

Using the **SYSTEM CONFIGURATION>Site screen**, and IP address/Subnet discriminator, the sites can be distinguished according to their locations and tagged with site specific information such as a local caller id number. However, insuring proper emergency service dialing requires the user to register and verify proper emergency service access in each location with an Internet emergency service provider.

Warning



To insure emergency service properly identifies a remote extension on a remote CudaTel Communication Server, you must register with an Internet emergency service provider and follow their instructions. The CudaTel Communication System does not implement emergency dialing, but rather assists the VoIP or Internet emergency service provider in implementing it.

Securing the CudaTel Communication Server

Securing your CudaTel Communication Server requires balancing the need to restrict potentially hostile contacts from the internet while still allowing access through the internet to desired voice connections. In the pursuit of security, the best practice is to have your CudaTel Communication Server reside behind a firewall. Your phone system benefits from the protections you already have established for your other internet interfaces.

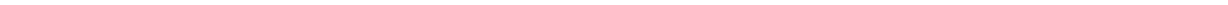


CudaTel Communication Server should reside behind a firewall maximizing security from internet threats.

CudaTel Communication Server also allows the setup of additional filtering of network inputs to prevent undesired communications from breaching your phone system. The WAN (wide area network) connection has a configurable firewall which allows filtering according to IP address and subnet mask using the SYSTEM CONFIGURATION>WAN Firewall screen. Specified IP address/Subnet masks can be allowed or denied access based on your configuration.

Encrypted Voice

WAN in DMZ Isolated from network internet facing Avoids Nat problems



Monitoring the System

The CudaTel Communication System allows for real time monitoring of the phone system performance as well as live monitoring and play back of system calls. The ability to monitor the phone system provides useful insight into system effectiveness, efficiency, and call execution.

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<i>Monitoring Calls</i>	42
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Viewing Performance Statistics

The Web Interface **SYSTEM DASHBOARD** page provides an overview of the health and performance of your CudaTel Communication Server, including:

- **Updates and Support**
 - System** - System model and serial number
 - Firmware** - System firmware revision number
 - Energize Updates** - Energize update status, expiration information
 - Instant Replacement** - Instant replacement service status, expiration information
 - Premium Support** - Premium support status, expiration information
- **Phone Status**
 - Configured phones** - Total number of telephones that have been provisioned to this system
 - Assigned to users** - Number of provisioned phones that are assigned to users
 - Unassigned phones** - Number of provisioned phones not currently assigned to a user
 - Phones on-line** - Number of telephones that are on-line and connected to the system (includes phones that are idle and in use)
 - Available Extensions** - Number of extension numbers available to be assigned to phones, users, etc. (Extension number ranges are configured in System Configuration >Extensions tab)
- **System Performance**
 - Firmware Storage** - Amount of storage space available for firmware
 - Voice Mail Storage** - Amount of storage space available for voice mail messages
 - CPU Load** - Load percentage on CPU
 - CPU Temp** - Temperature of the CPU
 - System Temp** - Temperature inside the system's case
 - CPU Fan** - Speed of CPU fan
 - System Fan** - Speed of system fan
- **Telephone Service Providers**
 - Status** - Displays "Active" or "Inactive" to reflect the status of the service provider
 - Name** - Provider's name as displayed in various UI pages
 - Direction** - Indicates whether the connection is for inbound calls, outbound calls, or both.
- **Voicemail Statistics**
 - Read** - Number of read voicemail messages and storage time in minutes and seconds
 - Saved** - Number of saved voicemail messages and storage time in minutes and seconds
 - Unread** - Number of unread voicemail messages and storage time in minutes and seconds
 - Total** - Total number of voicemail messages and storage time in hours, minutes, and seconds
- **Active Call Information**
 - Direction** - Call direction (inbound or outbound)
 - Caller Name** - Name of calling party
 - Caller Number** - Caller ID number (or extension number) of calling party
 - Destination Name** - Name of called party
 - Destination Number** - Destination phone number (i.e. dialed phone number) of the called party

- **Network and Call Statistics**

Sessions - Number of sessions, that is, number of call legs (a normal call has two call legs: the caller and the called party)

LAN Interface - LAN interface traffic (in and out)

WAN Interface - WAN interface traffic (in and out)

Monitoring Calls

Monitoring Live Calls

Using the **SYSTEM DASHBOARD > Active and Recent Calls** screen of the Web Interface allows the selection and connection to an ongoing call. The call connection makes no sound, allowing for noiseless monitoring of the call.

Reviewing Recorded Calls

Collecting call recordings for a user or group is configured when setting up or editing a user or group. Recorded calls can then be played and reviewed from the **SYSTEM DASHBOARD > Active and Recent Calls** screen.

Troubleshooting

Diagnostic Tools

Testing Network Connectivity

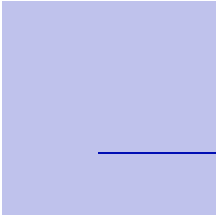
The CudaTel Communication Server connectivity can be tested from any networked computer by pointing a browser to the CudaTel (setting the browser address to the CudaTel Communication Server IP address).

Connect to Barracuda Support Servers with Network Connectivity

If network connectivity is verified, using the Web Interface **SYSTEM CONFIGURATION> Utilities** screen, a Support Tunnel to Barracuda Networks Technical Support Center can be established, allowing Technical support engineers to troubleshoot any issues you may be experiencing.

Connecting to Barracuda without Network Connectivity

If the CudaTel Communication Server is not accessible from the network, a monitor and keyboard can be attached directly to the appliance to establish a Support Tunnel to Barracuda Networks Technical Support Center. This will allow Barracuda Technical Support to troubleshoot the system and restore connectivity.



Chapter 7

Maintenance

This chapter provides instructions for general maintenance of the CudaTel Communication Server using the Web interface, and covers the following topics:

- Updating the Firmware and Definitions.....* 46
- Restarting and Shutting Down the System.....* 47
- Restarting and Shutting Down the System.....* 47
- Using the Built-in Troubleshooting Tools.....* 49
- Rebooting the System in Recovery Mode.....* 50

Updating the Firmware and Definitions

Updating the Firmware on your CudaTel Communication Server

This should be one of the steps the administrator performs in the initial installation of the CudaTel Communication Server. The **SYSTEM CONFIGURATION > Updates** page allows you to manually update the firmware version. The only time you should revert back to an old firmware version is if you recently downloaded a new version that is causing unexpected problems. In this case, call Barracuda Networks *Contacting Technical Support before* for instructions on reverting back to a previous firmware version.

If you have the latest firmware version already installed, the **Download Now** button will be disabled.

Note



Applying a new firmware version results in a temporary loss of service. For this reason, you should apply new firmware versions during non-busy hours. **Before upgrading, BE SURE TO TAKE THE CudaTel Communication Server OFFLINE (using SYSTEM CONFIGURATION > Utilities Tab).** DO NOT MANUALLY REBOOT YOUR SYSTEM at any time during an upgrade, unless otherwise instructed by Technical Support.

The current firmware version and the latest General Release version of the firmware shown below in the **Firmware Download** section. To download the latest firmware version, click the **Download Now** button. The Web interface will display download progress. When the firmware download is complete, click the **Apply Now** button. The CudaTel Communication Server will reboot and you will need to log in again to the Web interface.

Restarting and Shutting Down the System

The Shutdown and Restart section on the [Configuration > Utilities](#) page allows you to **Shut Down** or **Restart** the CudaTel Communication Server. You can also **Reboot all phones** from this page if necessary.

Shutting down the system powers off the appliance. Restarting the system reboots the appliance.

You can also perform a hard reset of the CudaTel Communication Server by pressing the **RESET** button on the front panel of the system. Caution should be used when pressing the reset button, however, since doing so while the CudaTel Communication Server is in the midst of a configuration update or other task can result in inadvertent corruption of the system.

Built-in Network Connectivity Test

You can test your CudaTel Communication Server's connection to the phone network. From a monitor attached to the CudaTel Communication Server, the **ADVANCED > PING** button allows the testing of the connection between the CudaTel Communication Server and any network address entered, for example, the IP address of the computer on which you are using the Web Interface to configure your CudaTel Communication Server. Network connectivity is indicated by a display of packets received by the appliance which scrolls as new packets are received.

Replacing a Failed System

Before you replace your CudaTel Communication Server, use the tools provided to try to resolve the problem.

Barracuda Instant Replacement Service

In the event that a CudaTel Communication Server fails and you cannot resolve the issue, customers that have purchased the Instant Replacement service can call Barracuda Networks Technical Support and arrange for a new appliance to be shipped out within 24 hours.

After receiving the new system, ship the old CudaTel Communication Server back to Barracuda Networks at the address below with an RMA number marked clearly on the package. Barracuda Networks Technical Support can provide details on the best way to return the appliance.

Barracuda Networks
3175 S. Winchester Blvd
Campbell, CA 95008

attn: RMA # <your RMA number>

Note



To set up the new CudaTel Communication Server, see the *Initial Setup page 20*.



Appendix A

About the Hardware

Hardware Compliance

This section contains compliance information for the CudaTel Communication Server hardware.



Notice for the USA

Compliance Information Statement (Declaration of Conformity Procedure) DoC FCC Part 15: This device complies with part 15 of the FCC Rules.

Operation is subject to the following conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received including interference that may cause undesired operation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:
 - Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and the receiver.
 - Plug the equipment into an outlet on a circuit different from that of the receiver.
 - Consult the dealer or an experienced radio/television technician for help.

Notice for Canada

This apparatus complies with the Class B limits for radio interference as specified in the Canadian Department of Communication Radio Interference Regulations.



Notice for Europe (CE Mark)

This product is in conformity with the Council Directive 89/336/EEC, 92/31/EEC (EMC).

Limited Warranty and License

Barracuda Networks Limited Hardware Warranty (v 2.1)

Barracuda Networks, Inc., or the Barracuda Networks, Inc. subsidiary or authorized Distributor selling the Barracuda Networks product, if sale is not directly by Barracuda Networks, Inc., ("Barracuda Networks") warrants that commencing from the date of delivery to Customer (but in case of resale by a Barracuda Networks reseller, commencing not more than sixty (60) days after original shipment by Barracuda Networks, Inc.), and continuing for a period of one (1) year: (a) its products (excluding any software) will be free from material defects in materials and workmanship under normal use; and (b) the software provided in connection with its products, including any software contained or embedded in such products will substantially conform to Barracuda Networks published specifications in effect as of the date of manufacture. Except for the foregoing, the software is provided as is. In no event does Barracuda Networks warrant that the software is error free or that Customer will be able to operate the software without problems or interruptions. In addition, due to the continual development of new techniques for intruding upon and attacking networks, Barracuda Networks does not warrant that the software or any equipment, system or network on which the software is used will be free of vulnerability to intrusion or attack. The limited warranty extends only to you the original buyer of the Barracuda Networks product and is non-transferable.

Exclusive Remedy

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Outbound Routing Regular Expressions

The CudaTel Communications Server uses Perl-compatible regular expressions for pattern matching in outbound gateways. This appendix will assist you in understanding regular expressions in this environment. NOTE: The vast majority of all patterns that need to be matched in outbound routes are only digit-based so the following information will focus on matching number patterns.

Basics

Regular expressions use a combination of standard and meta-characters to create a pattern against which to match a specific string. Characters in the regular expression can mean different things depending upon the context. For the sake of simplicity this discussion will focus on the basic operation of regular expressions.

The basic use of a regular expression is in a pattern match. The system will compare a regular expression to a string of characters and answer the basic question: does this string of characters match the pattern described by the regular expression? It's a simple yes or no. Sometimes a yes is called a "positive match" and a no is called a "negative match."

Sample Patterns

Some common characters you will see in a regular expression include the following:

Characters Meaning

1	Match only the digit "1"
5	Match only the digit "5"
411	Match digit sequence "411"
^411	Match string beginning with 411
411\$	Match string ending with 411
^411\$	Match exact string "411" (see below)
[0-9]	Match any digit between 0 and 9
[2-9]	Match any digit between 2 and 9
[456]	Match either the digit 4, 5, or 6
\d	Match any digit between 0 and 9
^	Match at beginning of string
\$	Match at end of string

+	Match one or more of the preceding character
*	Match zero or more of the preceding character
{n}	Match exactly n of the preceding character

Note that the above list is by no means comprehensive, however it is a good representation of the kinds of characters that will appear in regular expressions number routes. Let's see these characters in action to get an idea of how they might be used in matching patterns for outbound dialing. The following table describes some simple patterns, strings, and whether there is a match:

Pattern	Dialed Number	Match
411	411	Yes
411	4085550411	Yes (matches <i>any</i> number including "411")
^411\$	411	Yes
^411\$	4085550411	No (matches only the exact dialed "411")
^5[0-9][0-9][0-9]	5000	Yes (matches any four digit number beginning with "5")
^5\d\d\d\$	5000	Yes (same as previous pattern, \d matches any digit)
^5\d{3}\$	5000	Yes (same as previous pattern, \d{3} same as \d\d\d)
^71\d\d\$	7150	Yes
^71\d\d\$	7050	No (matches only dialed numbers from 7100 to 7199)
^d{7}\$	5551212	Yes
^d{10}\$	4085551212	Yes

The above examples demonstrate the syntax for specifying dialed patterns. The following is a list of syntax rules:

- To match an exact dial string, use ^ and \$ at the beginning and end of your regular expression. The caret (^) means "match at the beginning of the string" and the dollar sign (\$)
- (\$ means "match at the end of the string." Reviewing the "411" examples in the previous table:
- The pattern 411 means "match any string that contains 411"
- The pattern ^411 means "match any string that begins with 411"
- The pattern 411\$ means "match any string that ends with 411"
- The pattern ^411\$ means "match any string that matches exactly 411"
- To match a range of numbers, use a combination of literal numbers and meta-characters.

Consider these examples:

- The pattern 7\d\d\d will match 7000 through 7999
- The pattern 74\d\d will match 7400 through 7499
- The pattern 745\d will match 7450 through 7459
- 408\d{7} will match calls made to area code 408
- 212\d{7} will match calls made to area code 212

Replacing and Trimming Digits

In some cases you may wish to add or remove digits before they are sent out. The classic example of this is the dial 9 "to get an outside line" that most of us are familiar with. Here are a few examples of inserting digits.

Pattern	Dialed Digits	Digits Actually Sent Out
<code>^9(1\d{10}):::\$1</code>	918005551212	18005551212
<code>^9(\d{7}):::\$1</code>	95551212	5551212

In these cases, we match the leading digit 9, but we don't capture that digit. Instead we capture all of the digits dialed after the 9. The expression "`:::$1`" means to replace what was actually dialed with what was captured inside the (and) characters.

In some cases you may wish to let your users dial 9 (or not) and dial 1 (or not) and then have the system dial appropriately. For example, some carriers absolutely require you to send 1 + area code + phone number for all calls, even local ones. Others require all 10 digits of the phone number but do not want the leading 1. The following are some sample regular expressions you can use to deal with these situations:

Pattern Dialed	Digits Sent	Digits Application
<code>^9?1?(\d{10})\$:::\$1</code>	918005551212	8005551212
Dialing 9 or 1 optional, send only 10 digits		
<code>^9?1?(\d{10})\$:::1\$1</code>	918005551212	18005551212
Dialing 9 or 1 optional, send 1 + 10 digits of phone number		
<code>^9?(\d{7})\$:::408\$1</code>	95551212	4085551212
Dialing 9 optional, user dials 7 digits, system sends area code 408 + 7 digits		
<code>^9?(\d{7})\$:::1408\$1</code>	95551212	14085551212
Dialing 9 optional, user dials 7 digits, system sends 1 + area code + 7 digits		

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