Vocera Platform Telephony Guide

Version 6.3.0

Notice

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Contents

Getting Started

This section provides an overview of the Vocera SIP Telephony Gateway.

About Vocera SIP Telephony Gateway

The Vocera SIP Telephony Gateway (VSTG) service is a software telephony solution that provides a Session Initiation Protocol (SIP) telephony gateway between the Vocera Platform and an IP PBX or a Voice over Internet Protocol (VoIP) gateway.

The Vocera SIP Telephony Gateway supports non-SIP enabled PBXs via Sangoma Media Gateway or other SIP/TDM gateway products.

The Vocera SIP Telephony Gateway service provides the following key features:

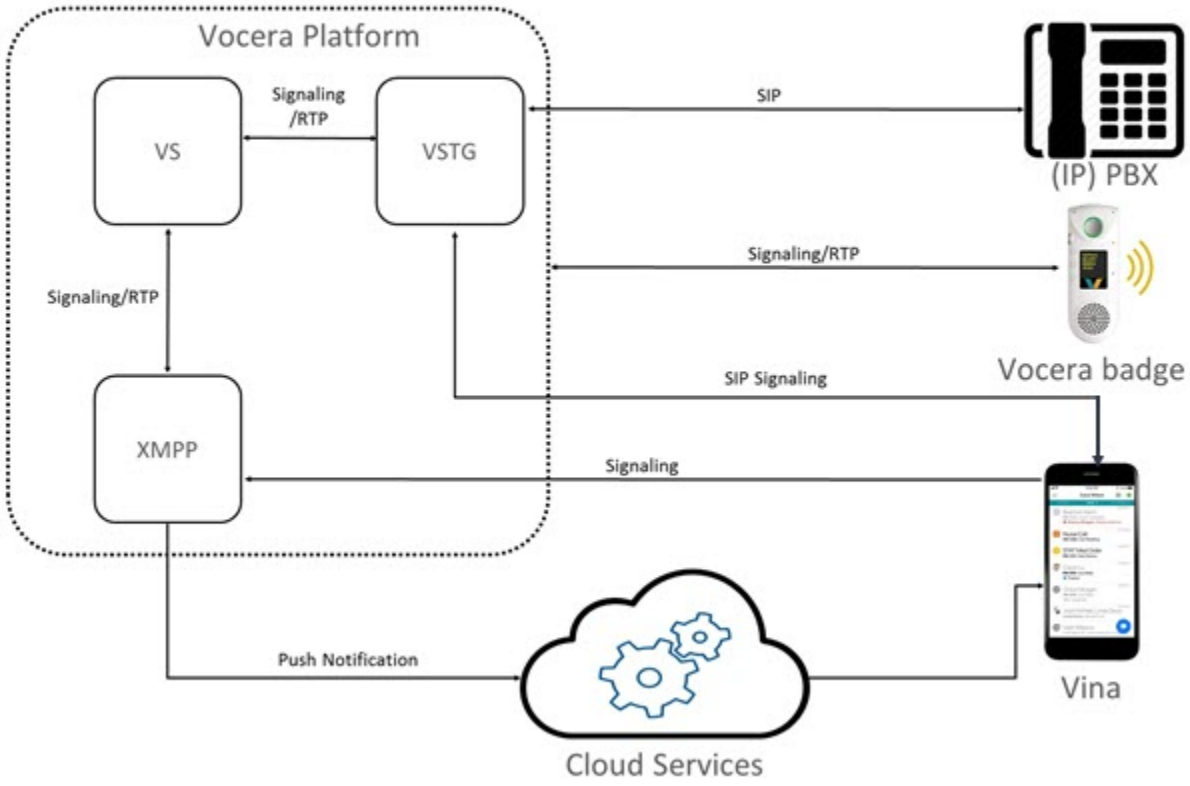
- Call to and from PBX extensions, voicemail, and the public telephone network
- Outgoing digital paging with the direct callback to the Vocera device
- Direct inward dialing (DID)
- Speech-to-touch-tone dialing
- Supports installation of multiple telephony service for N + 1 redundancy, scalability, and load balancing
- Support for deployment in a VMware virtualized environment
- Vocera Access Anywhere (phone access to the Vocera Genie) for all users

Vocera SIP Telephony Gateway Architecture

The Vocera SIP Telephony Gateway architecture explains how the VSTG is connected to Vocera mobile clients, and devices.

Vocera SIP Telephony Gateway is a Session Initiation Protocol (SIP) telephony gateway component within the Vocera Platform. It acts as a SIP gateway between the Voice Service and an IP PBX or a VoIP gateway.

The following diagram illustrates the Vocera SIP Telephony Gateway architecture.



For more information on Vocera Platform, refer to the Vocera Platform Administration Guide.

Session Initiation Protocol (SIP) Support

Vocera SIP Telephony Gateway (VSTG) is based on Internet Engineering Task Force (IETF) standards for SIP 2.0 and Real-Time Transport Protocol (RTP).

Vocera SIP Telephony Gateway communicates via a SIP trunk with a SIP-enabled PBX or a SIP Gateway and provides basic SIP telephony functionality, including placing and receiving calls, OPTIONS keep-alive messages, and obtaining Automatic Number Identification (ANI) and Dialed Number Identification Service (DNIS) information. The VSTG is interoperable with SIP-enabled PBXs and SIP Gateways as long as they follow SIP 2.0 and RTP standards.

VSTG uses RTP for audio transport, an Internet protocol standard for delivering multimedia data over unicast or multicast network services. For additional information on RTP, refer to RFC 3550 at http://tools.ietf.org/html/rfc3550 and RFC 35515 at http://tools.ietf.org/html/rfc3551.

The Vocera SIP Telephony Gateway uses Vocera proprietary signaling and transport protocols for all communication between the server and Vocera badges. Consequently, Vocera SIP Telephony Gateway converts from SIP and RTP protocols to Vocera protocols, and vice versa, to enable communication between the Vocera SIP Telephony Gateway and the IP PBX.

VSTG SIP Trunk Specifications

Understand requirements for using a hosted or cloud-based telephony system with the Voice Service in the Vocera Platform .

Connecting VSTG to a Cloud-based Telephony System

VSTG can connect to a SIP trunk on a hosted or cloud-based PBX either directly or through a SIP gateway configured at the network edge. To successfully connect and interoperate the SIP trunk used by the VSTG, your telephone system must support the following requirements:

- SIP version 2.0 as specified in RFC 3261.
- RFC 2833 standard Dual Tone Multi Frequency (DTMF) in order to support features such as paging and dialing Vocera extensions through the guest access number.
- Real Time Protocol (RTP) audio to the VSTG must use the G.711 μ-Law or A-Law codec. The packet spacing must be 20 milliseconds.

Note: If you experience interoperability challenges with a SIP trunk supporting these standards, contact Vocera Technical Support for further assistance.

Features Not Supported

The VSTG does not support the following features:

- SIP Trunk Authentication
- SIP Trunk Registration
- NAT Traversal

About Users and Telephone Numbers

If your facility has the telephony integration option enabled, entering telephone numbers for users provides a wide range of connectivity between Vocera devices (badges and smartphones), on- and off-facility telephones, and pagers.

You can provide any of the following telephone numbers when you add users to the Vocera system:

Telephone Number	Description
Desk phone or extension	Allows a user to forward or transfer calls from a Vocera device to a desk phone. If the Vocera Extension field is filled in, the Desk Phone Or Extension field is used only for forwarding. Otherwise, this number is also used for the following purposes: • Direct dialing from smartphone keypads • Paging callbacks • Vocera hunt number access You can also use the Dynamic Extension feature to assign extensions to users. For more informaiton, see Dynamic Extensions on page 40 .
Cell phone	Allows a user to forward calls from a Vocera device to a mobile phone.
Home phone	Allows a user to forward calls from a Vocera device to a home phone. It also allows a user to take advantage of the “Call My House” contact, see Special Dialing Macros on page 69 for more information.
Pager	Allows a user to receive calls on a pager from other Vocera users who issue the “Page” voice command.
Vocera Extension	Allows a user to route calls made to a virtual extension to their Vocera device instead. This field is useful for users who do not have actual desk extensions, or users who have both a Vocera smartphone and a desk phone. The Vocera Extension field takes precedence over the Desk Phone or Extension field for the following purposes: • Direct dialing from smartphone keypads • Paging callbacks • Vocera hunt number access You can also use the Dynamic Extension feature to assign extensions to users. See the Vocera Telephony Configuration Guide for more information.

If you do not enter values for these numbers, the Genie informs users who try to access these features that the number is not available.

You must set permissions to allow users to forward calls to telephones and to allow users to have toll or toll-free pager numbers.

Working with Phone Numbers

Learn how the Voice Service works with Telephony service to facilitate phone calls between a Vocera device and an outside line or a voicemail.

When a user issues a voice command to dial a telephone number, or when Vocera forwards a Vocera device call to a telephone or to voicemail, the Voice Service sends a sequence of digits to the Telephony service. In addition to the phone number itself, the sequence can contain access codes needed to obtain an outside line, to authorize a long distance call, or to access company voicemail.

You can enter phone numbers, extensions, and access codes in various configuration fields in the Vocera Platform Web Console. For example, when you add a user to the Vocera system, you can specify the user's desk extension, cell phone number, pager number, and home phone number. Users can also enter or update this information in theVocera Platform My Profile. For more information, refer to Vocera Platform My Profile Guide available on the Vocera Documentation Portal.

A field that requires a phone number, an extension, or an access code may contain any of the following characters:

- Digits — Numeric value 1234567890
- Special dialing characters — A special dialing character is a non-numeric character that you can enter in Web Console field that requires an access code, phone number, or extension. For example, you can use an asterisk (*) to simulate pressing the star key on a touch-tone phone, or enter an X at the beginning of a number to tell Vocera to treat that number as an extension.
- Special dialing macros. — A dialing macro represents a dialing sequence. In data entry fields where you cannot enter a specific number—because the number varies with the user who accesses the feature—you can enter a dialing macro. Vocera replaces that dialing macro with the actual number on demand. Dialing macros are especially useful when editing Company Voicemail Access Codes and Contacts entries. For example, the **Company Voicemail Access Code** field specifies the dialing sequence that Vocera uses to forward an incoming call to company voicemail. As part of the dialing sequence, you typically need to specify a desk phone extension to identify the voicemail box you want to access. You cannot enter a specific desk extension in this field, because the number varies depending on which user is forwarding calls. Instead, you use the **%D** macro as part of the dialing sequence. Vocera replaces that macro with the actual desk extension of the user who is forwarding calls. See Special Dialing Macros on page 69 for a complete list of dialing macros.
- PIN template macros — Each PBX has different rules for adding a PIN to a dialing sequence. Some require the phone number followed by the PIN. Some require the PIN before the phone number. Some require an access code for an outside line, or a feature code to indicate that a number is a PIN. Some require a separator character between the PIN and the number. A telephony PIN template can use macros to specify and format the information in a PIN. See PIN Template Macros on page 39 for a complete list of PIN macros.

Note: Vocera ignores any other character that you enter in these fields. For example, you can enter `(408) 790-4100`, to make a number more readable, instead of `4087904100`. Vocera ignores the extra spaces, dashes, and parentheses when the number is actually dialed.

Telephony Email Alerts

Configure your system to send email alerts to notify you when there are problems with the Voice Service and the telephony service.

The Voice Service sends a telephony email alert when one of the following events occurs on the telephony service:

- The Voice Service is unable to connect to a Vocera SIP Telephony Gateway, whether it is a single server or a member of an array.
- The Voice Service reconnected to a Vocera SIP Telephony Gateway.

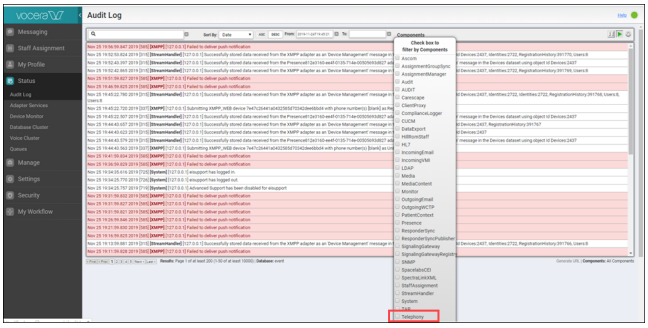
For more information on setting email alerts, refer to “Working with Destinations Settings” section in the Vocera Platform Administration Guide on the Vocera Documentation Portal.

Telephony Logs

Navigate to **Audit Log** in **Status** section of theVocera Platform Web Console to view telephony logs.

You can click on **Components** in the **Audit Log** page to display a dropdown list of adapter services configured for your enviroment. To view Telephony service logs, select the Telephony checkbox from this list.

The following screenshot displays the adapter services checkbox that you can select to filter the logs specific to Telephony service:



When you select the Telephony checkbox, the system filters the Telephony logs and displays logs specific to Telephony service.

For more information on using the **Audit Log** features, refer to the “Audit Log” section in the Vocera Platform Administration Guide available on the Vocera Documentation Portal.

Note: If you need a collection of Telephony logs, contact Vocera Technical Support.

For information on configuring Vocera SIP Telephony Gateway logs, see Configuring VSTG Logging on page 54

Using the Vocera Platform Web Console

This section describes how to get started using the Vocera Platform Web Console.

The Vocera Platform Web Console is a browser-based application that allows you to configure the Vocera SIP Telephony Gateway.

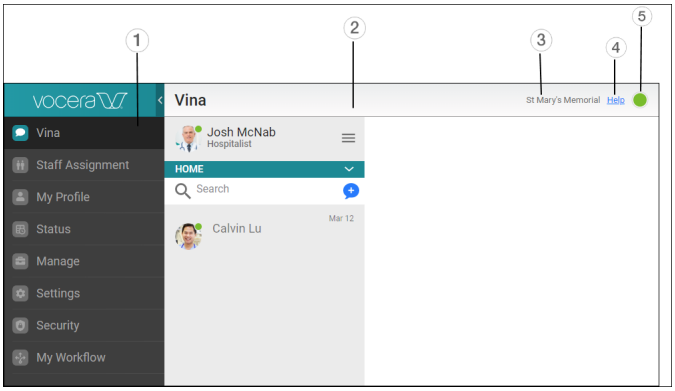
About Vocera Platform Web Console

The Vocera Platform Web Console is a browser-based application that provides a graphical user interface for users to establish default behavior, define system entities such as users and groups, specify workflows, and configure other custom settings for the Vocera Platform.

The Vocera Platform Web Console is an integrated web based application that unifies the capabilities of Vocera Platform Voice Service along with the Vina Web, and Vocera Platform Staff Assignment applications.

Depending on the role associated with your account, you can access and use the Vina Web, Vocera Platform Staff Assignment, or Vocera Platform My Profile applications from the Web Console

After you login to the Web Console you can click through the user interface to performs various tasks.

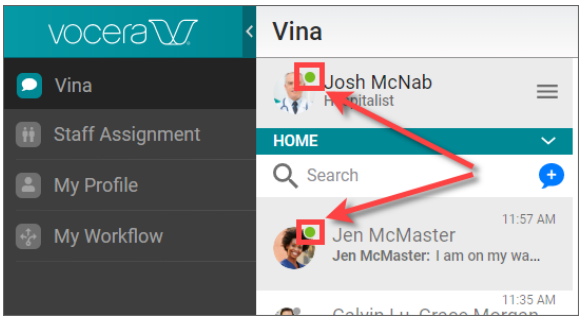


The following table describes the Web User Interface (Web UI) elements in the Vocera Platform Web Console

Web UI Components	Descriptions
1	The navigation bar with various sections supported in the Web Console.
2	The name of your company or facility as saved in the System Configuration section, see General Configuration on page 16 for more information.
3	The Vina Web home page. To learn more about Vina Web, see the Vocera Platform Messaging Guide.
4	The weblink to the Web Console context-sensitive help.
5	The Presence icon that indicates a user's availability status. To learn more about Presence status, see The Presence Indicator on page 11.

The Presence Indicator

The presence indicator dynamically updates and changes colors to indicate your availability status and that of other people who are logged in.



The following presence indicator colors are displayed:

- Green — indicates an Available status
- Red — indicates an Unavailable or DND status
- Gray — indicates Disconnected status

Vocera users registered for more than one client can set their presence on any supported client, and the same presence status is updated everywhere.

For example, if a registered Vocera Vina user sets an availability for the Web Console, then the Vocera Vina application also displays the same presence status.

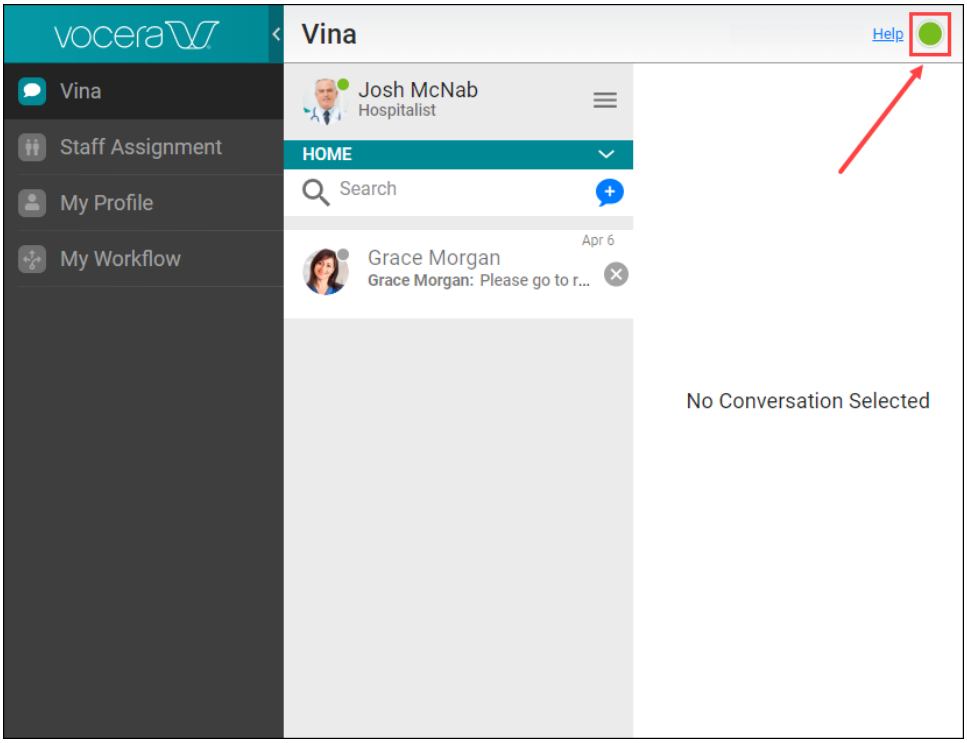
To learn more about setting presence and availability, see Setting Presence and Availability on page 12. In addition to setting an availability status, you can add a custom availability message in the Presence window to let others know of your availability status. See Adding a Custom Availability Message on page 14 for information.

Setting Presence and Availability

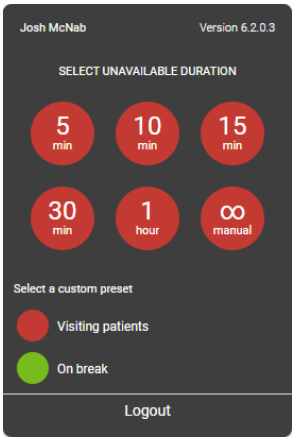
You can specify that you are unavailable, either for a specified period of time or until you make yourself available again.

To specify a period of time in which you are unavailable

1. Click the presence icon at the top right corner of the Home screen, as shown in the following screenshot.



A popup menu appears, displaying a list of options to select.



2. Select one of the following:
   - Cick one of the options in the **Select unavailable duration** section to specify that you are unavailable for a predefined period of time. After this time has elapsed, you are listed as available.
   - Click **Manual** to specify a custom unavailability interval. You remain unavailable until you make yourself available again.
   - Click on one of the options in the **Select a custom preset** section. The custom preset feature is available only if this feature is enabled by your system administrators.

When you have specified an unavailability interval, the presence icon turns red indicating a DND or unavailable status.

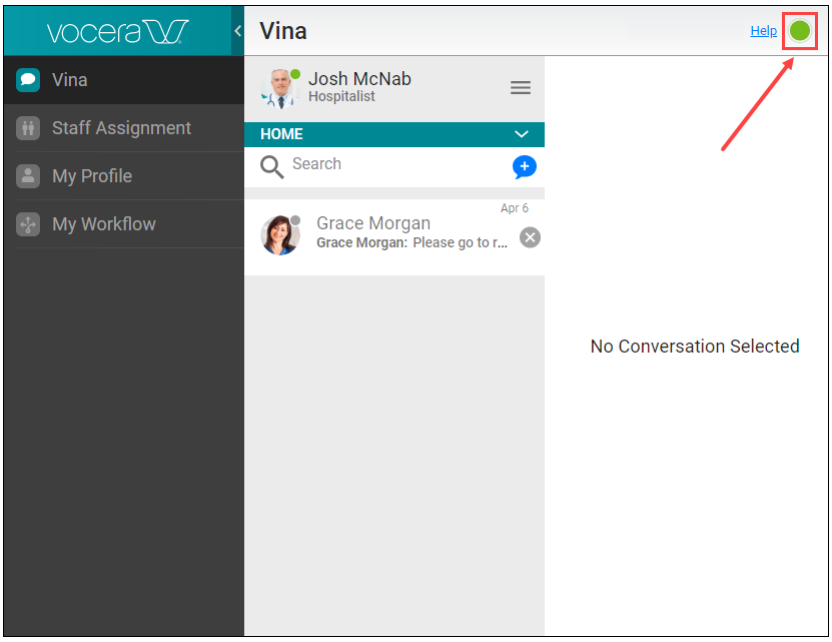
You can click the red presence icon again to revert back to an avaialble status indicated by a green color.

Removing a Custom Availability Message

You can remove your custom availability message or replace it with a new message in the Presence window.

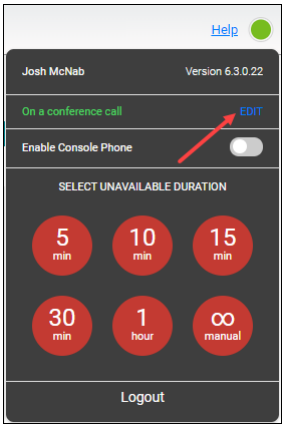
To remove a custom message, follow these steps

1. Click the green presence icon at the top right corner of the Home screen.

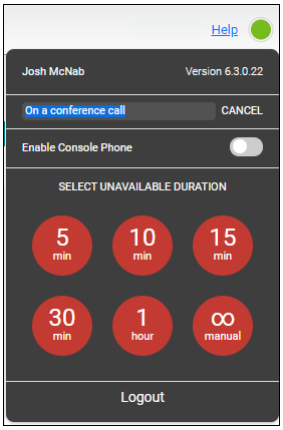


   The Presence window displays with a options to select.
2. Click the **Edit** link next to the availability status to edit the Status Message field.

For example, the following screenshot displays “On a conference call” as the custom presence message. You can click Edit to select this text in the Status Message field.



3. Select the text in the Status Message field and click the Delete key on your keyboard to remove the custom message.



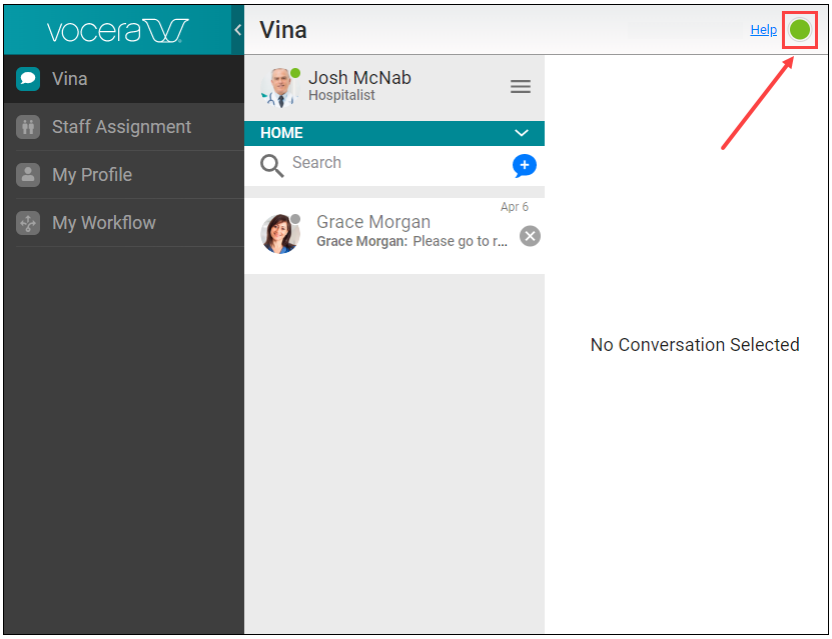
4. (Optional) If you wish to enter a new custom message, delete the text and enter a new text in the Status Message field.
5. Click the **Enter** or click away from the Status Message field to save your changes.

Adding a Custom Availability Message

You can add a custom message to describe your availability in the presence indicator.

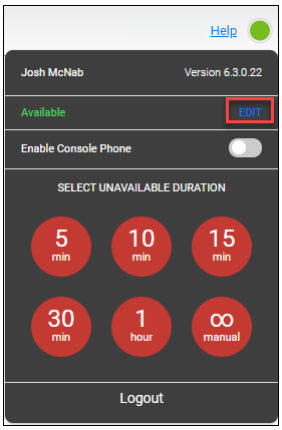
To add a custom availability message, follow these steps:

1. Click the green presence icon on the top right corner of the Home screen.

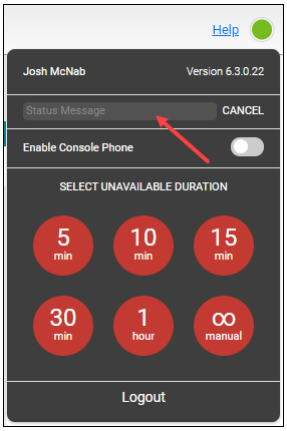


The Presence window displays with a options to select.

2. Click the **Edit** link next to the availability status to display the status message field.



3. In the Status Message field, enter a text to describe your customized availability message. Your custom message should be limited to 30 characters. For example, you an enter a text like, “Lunch Break” or “In Physicans' Conf Room” to let others know of your status.



4. Click the **Enter** or click away from the Status Message field to save your custom message.

What to do next:

If you wish to clear your custom message or replace it with a new one, see Removing a Custom Availability Message on page 13.

General Configuration

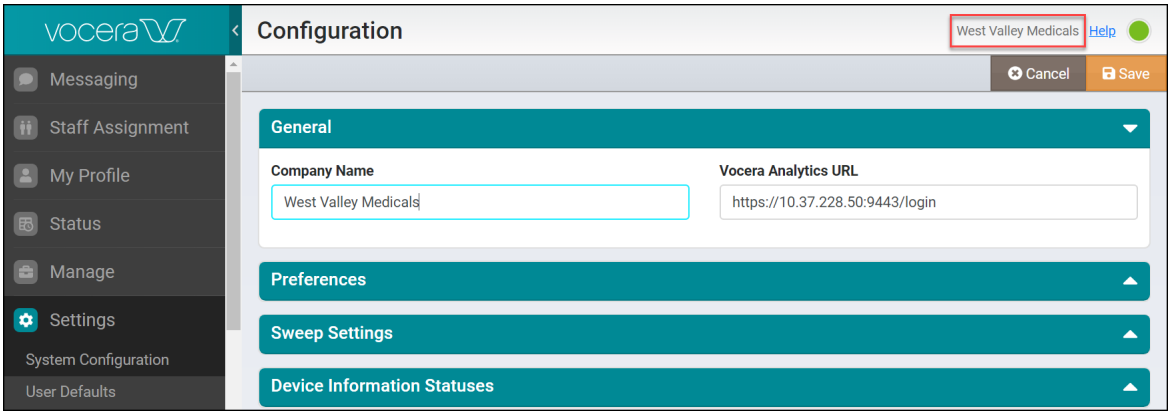
Specify your company's name and Vocera Analytics URL.

Add general information related to your company name and Vocera Analytics URL (if applicable).

1. Navigate to **System Configuration** in the **Settings** section.
   The Configuration page displays.
2. In the Generation section, complete the fields listed in the following table:

Field	Maximum Length	Description
Company Name	100	Specify the name of your company or organization. The value you enter in this field appears in reports and logs.
Vocera Analytics URL	n/a	If you are using Vocera Analytics, specify the IP address. For security reasons, you must register the address of Vocera Analytics with the Vocera Platform in this manner, or the Vocera Platform prevents Vocera Analytics from downloading data. You must also enter the IP address of the Vocera Platform in the Vocera Analytics console. **Note:** The "http://" or "https://" prefix is a required for an IP address.

3. Click **Save** to save your changes and refresh your browser to view your changes.
   You will notice that the name you entered in the **Company Name** field appears near the Help link in the Web Console.
   For example, the following screenshot shows the name "West Valley Medicals" entered in the **Company Name** and the same name appearing on top of the Web Console



You can also see the **Analytics** section in the Web Console navigation bar. You can click on **Analytics** in the navigation bar to launch the Vocera Analytics login page.

What to do next:

You can enter your credentials to login to the Vocera Analytics visualization server. The visualization server provides real-time data analysis, trends, dashboards, and reports along with the capability to customize reports.

To learn more about Vocera Analytics, refer to the supported Vocera Analytics Administration Guide and other related documents available on the Vocera Documentation Portal.

Browser Requirements

The Vocera Platform Web Console supports most popular web browsers. This section lists the specific browsers and versions that have been tested.

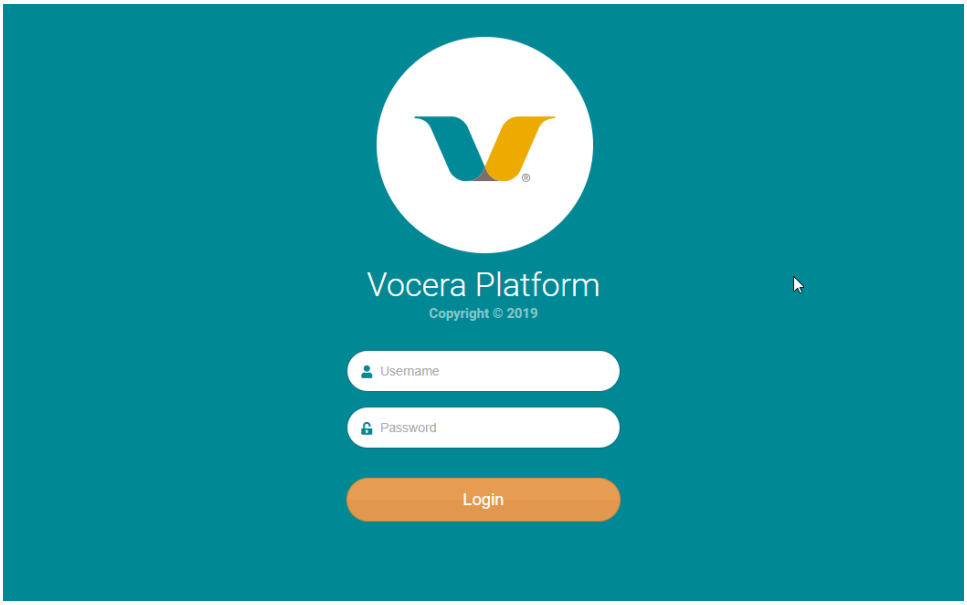
Browser	Version
Apple Safari	Version 10.10 or later
Google Chrome	Version 65 or later
Microsoft Edge for Windows 10	Version 17 or later
Mozilla Firefox	Version 58 or later

Logging Into the Vocera Platform Web Console

You can typically log into the Vocera Platform Web Console using the credentials you provide for other applications in your organization (your Active Directory credentials).

Use the following steps to log into the Vocera Platform Web Console using Active Directory authentication:

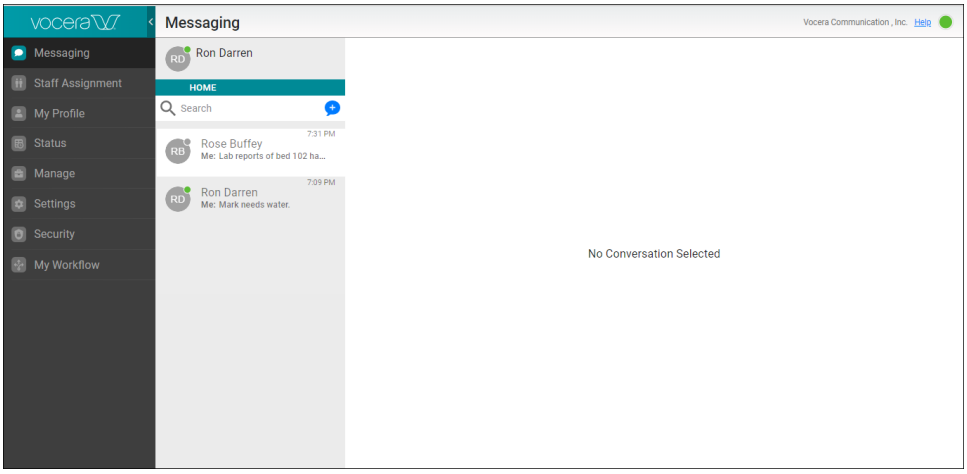
1. In your browser, type the URL of the Vocera Platform Web Console that your administrator has provided for you.
   The Vocera Platform login screen appears.



2. Specify the following values:

Field	Description
Username	Enter your username (up to 250 characters).
Password	Enter your password (up to 127 characters).

3. Click **Log In**.
   The Vocera Platform Web Console screen appears.

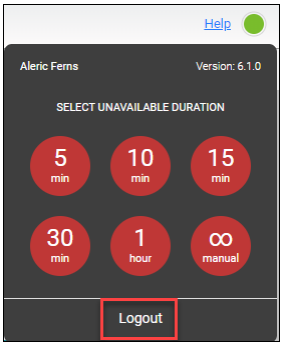


Logging Out

When you are finished using the Vocera Platform Web Console, log out.

To log out from the Vocera Platform Web Console:

1. Click the presence icon in the top right corner of the Vocera Platform Web Console.
   The presence dialog box appears.



2. Click **Logout** at the bottom of this dialog box. The system logs you out.

Telephony High Availability

High availability provides load balancing, scalability, and redundancy features to ensure uninterrupted service.

You can install two Vocera Platform nodes at a single facility, one as a master node and the other as the standby node To enable telephony high availability, you can configure each node to run an instance of the telephony gateway. If additional telephony gateways are needed for increased capacity or to manage traffic at remote facilities, additional telephony gateway virtual machines can be provisioned.

Telephony high availability supports the following features:

- **Redundancy** — If one of the telephony gateway nodes stop responding, the Voice Service automatically redirects outbound calls to another available telephony gateway node for uninterrupted service.
- **Scalability** — You can purchase and install as many telephony gateway services as you need to increase telephony capacity.
- **Load balancing** — For outbound calls, the Voice Service automatically allocates calls to the least busy telephony gateway. The PBX equipment handles inbound load balancing.

Important: The Web Console allows you to specify only one telephony configuration per facility. If you deploy multiple telephony gateway services at one facility, all of them must use the same configuration. Each telephony gateway service installed at a facility must use the same signaling protocol and have the same capacity.

Generally, all telephony gateway services at a facility use the same PBX. However, they could use different PBXs as long as all PBXs have the same configuration for the trunks to the telephony gateway services and the same capabilities for off-PBX dialing (for example, tie lines).

Telephony in a Multi-Facility Environment

Telephony is supported in multiple facility environment.

A single Vocera SIP Telephony Gateway (VSTG) can service multiple facilities.

The VSTG uses a SIP trunk to communicate with a PBX. You must install and configure a VSTG for each PBX that Vocera will use. When your Vocera deployment supports multiple facilities, you can accommodate any of the following configurations:

- An environment where each facility has its own PBX.
  Enable and configure a VSTG for each facility.
- An environment where facilities that do not have their own PBX share with facilities that do have a PBX (the principal facilities). \
  Enable and configure a VSTG for the principal facilities only.
- A mixed environment where some facilities (the principal facilities) have their own PBX, and other facilities share a PBX with a principal facility.

Enable and configure a VSTG for each principal facility.

If any facility—including the Global facility—does not have telephony enabled or does not share a PBX with a principal facility, the facility will not have telephony access.

You can configure VSTGs in a cluster configuration for a different facility, other than Global, provided both VSTGs are in the same facility.

Note: Vocera recommends that you discuss configuring an associated facility (if not Global) with a Vocera Technical Support team member.

About Shared Telephony

Vocera allows facilities to share a PBX with its associated VSTG.

Each physical location that is large enough to have its own PBX should also typically have its own VSTG unless one of the following situations is true:

- The total number of Vocera devices in use at that location is very low.
- The total number of device-to-telephone and telephone-to-device calls at that location is very low.

In general, the potential problems that can occur when facilities share a VSTG are similar to the types of problems that occur when locations share a PBX. For example, if the number of calls exceeds the number of available lines, incoming callers will receive a busy signal, and outgoing callers will hear a message telling them to try again later. Carefully consider your call volume if you plan to share a VSTG.

The use of facilities partitions the recognition space and improves speech recognition for large deployments. When multiple facilities share a PBX, you must configure separate hunt numbers to realize those speech recognition benefits for incoming callers.

Because separate hunt numbers require coordination with the PBX administrator and possible user re-training, these speech recognition enhancements for incoming callers come with a certain price. There are no firm rules for determining whether the overhead incurred by multiple hunt numbers outweighs the speech recognition benefits they provide; however, following are some guidelines to consider:

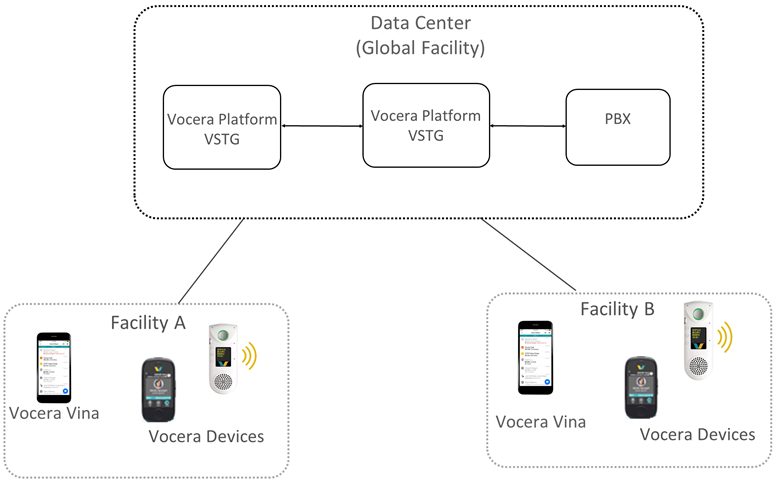
- If you are upgrading an existing deployment and the facilities sharing the PBX are relatively small, setting up independent hunt numbers provides relatively minor speech recognition benefits compared to the user retraining that would be necessary.
- If you are setting up a new deployment, the user training and PBX administrator coordination required by multiple hunt numbers is essentially the same as that required by a single hunt number, making it relatively easy to take advantage of their speech recognition benefits.

Shared Telephony

Vocera Platform supports sharing telephony configuration between two facilities.

In Vocera Platform sharing telephony is supported between two facilities. The Global facility must have at least two VSTG installed so that other facilities can take advantage of high availability features.

In the following example, a Global facility with two telephony gateways is sharing telephony service with Facility A and Facility B.



Shared Telephony and Incoming Calls

Vocera determines the required set of grammars in combined databases (Global and any other associated facility) to respond when telephony service is shared.

When an incoming telephone call arrives at the hunt group Genie, the caller can respond to the Genie by saying a name or by using the keypad to enter an extension (DTMF tones). When the telephony service is not shared, Vocera searches the combined grammars of the called facility and the Global facility to match caller responses.

When the telephony service is shared, Vocera determines the set of grammars to search in either of the following ways:

- If the caller entered DTMF tones, Vocera searches the combined databases of the Global facility and every facility that shares the telephony service.
- If the caller provided a spoken response, Vocera searches the combined grammars of the Global facility and every facility that shares the telephony service.

Shared Telephony and Outgoing Calls

Vocera does not reserve any lines for outgoing calls.

Outgoing calls from any facility sharing telephony will use the next available line.

Shared Telephony and Desk Extensions

Vocera searches combined databases (Global and any associated facility) to find the appropriate user or group for the requested desk extension.

When a user responds to the hunt group Genie by entering the keypresses for a desk extension, Vocera searches the database of each facility that shares a telephony service and also the Global facility to find the appropriate user or group for the extension.

Consequently, when you share a telephony service, desk extensions must be unique across all the shared facilities and also the Global facility, regardless of whether the hunt numbers and range of lines used by those facilities are unique.

Connecting to a Facility to Use Its Telephony Service

The telephony service facilitates connectivity to another facility.

When you use the “Connect to <facility name>” voice command to connect to another Vocera facility, the telephony service and PBX that are used (when you make telephone calls) depends on whether you are dialing an extension or an outside number. If you are:

- **Dialing an extension** — the telephony service and PBX of the facility to which you are connected are used.
- **Dialing an outside number** — the telephony service and PBX of your home facility are used. Your long distance permissions and PIN information apply to your home facility.

For example, if your company has facilities in Los Angeles and New York and your home facility is Los Angeles, you can say the command "Connect to New York" to connect to that facility. Once you are connected, you can then say “Dial extension 3145”. The Voice Service uses the telephony service for that facility to dial the local extension.

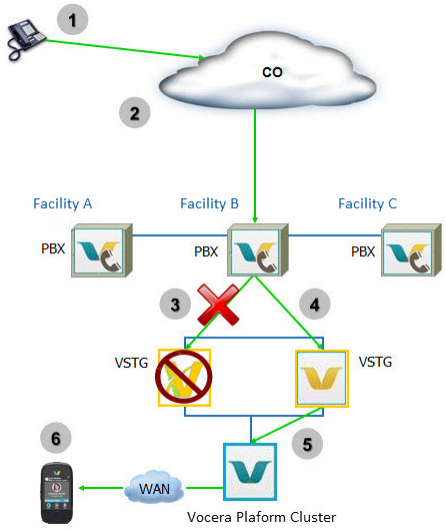
If the facility that you connect to does not have its own Vocera SIP Telephony Gateway and instead shares the telephony service at another facility, then calls are made through the shared telephony service. When you set up shared telephony for a facility, you can specify the prefix of the dial string used to place calls through a tie line to the facility. This tie line prefix allows you to dial extensions at the remote facility even though the facility does not have its own Vocera SIP Telephony Gateway Server. For more information, see Shared Telephony Configuration on page 43.

Multi-Facility Inbound Redundancy Using DNIS

In a multiple facility environment, the Vocera Platform Voice Service uses the Dialed Number Identification Service (DNIS) to determine which facility's hunt group number was called and thus which facility's grammars to use for the call.

With additional PBX configuration or utilizing the advanced routing features possibly offered by your central office, your inbound calls are routed automatically to the PBX at a different facility when one of your telephony service set ups go down.

The following figure illustrates multi-facility inbound redundancy using DNIS:



The following describes the call flow scenario illustrated in the figure:

1. Someone places a call to a Vocera device user at Facility A.
2. The Central Office routes the call to Facility A based on the called number.
3. The VSTG at Facility A is down, so the call is routed back to the Central Office.
4. The Central Office routes the call to another PBX at a different facility using an alternate routing plan.

5. The call is received by the Voice Service, which knows which facility's grammars to use based on the dialed number.
6. The badge user at Facility A receives the call.

If a call made to a facility is rejected by the initial PBX for any reason (for example, the VSTG may not be responding), the call can be routed by the Central Office to another PBX at a different facility using an alternate routing plan. When the call arrives at the telephony service at the other facility, it sends the call to the Voice Service. The Voice Service knows which facility's grammars to use based on the dialed number.

Multi-Facility Inbound Redundancy and Shared Telephony

Configure your PBX properly to ensure support for multi-facility inbound redundancy.

When multiple facilities share a PBX, you must specify separate Guest and Direct Access numbers for each facility to realize speech recognition benefits for incoming callers.

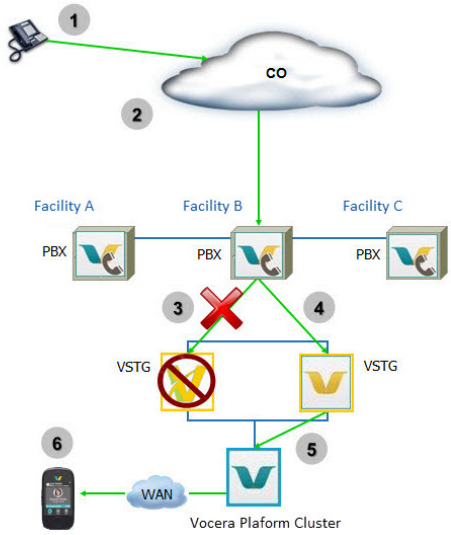
Important: To take advantage of multiple facility inbound redundancy features using shared telephony, your PBX must be configured properly and you must have a uniform dialing plan for the facilities.

For example, let's consider this scenario when a deployment has three facilities: West Philadelphia, South Philadelphia, and Center City (the principal facility). The following table shows the grammars searched for speech recognition at the hunt group prompt when each facility has a separate hunt number and all facilities share a pool of lines for incoming calls. The system relies on the DNIS to determine which facility's grammars to use for the incoming call.

The following table shows information on shared telephony with one shared pool of lines for all facilities.

Facility	Guest and Direct Access Numbers	Grammars Searched
West Philadelphia	215-549-1300 215-549-1301	• West Philadelphia • Global
South Philadelphia	215-549-2300 215-549-2301	• South Philadelphia • Global
Center City	215-549-3300 215-549-3301	• Center City • Global

The following figure illustrates inbound redundancy is achieved using shared telephony between multiple facilities.



1. Someone places a call to a Vocera device user.
2. The Central Office routes the call.
3. The PBX skips the VSTG that is down (even though it is in the routing table).
4. The call is routed to the VSTG that is online.
5. The call is received by the Voice Service, which knows which facility's grammars to use based on the dialed number.
6. The Vocera device user receives the call.

Vocera SIP Telephony Gateway and PBX Failover Support

Configure the Vocera SIP Telephony Gateway to use multiple call signaling addresses to support PBX failover.

In the Web Console, navigate to **Facilities** in **Manage** section of the navigation bar. Locate your facility and scroll down to the **Telephony- Basic Information** configuration section in the Edit Facility page. You can select the **Call Signaling Address** field and enter a comma-separated list of call signaling addresses for two or more IP PBXs or VoIP gateways. At startup, Vocera SIP Telephony Gateway tries each PBX or gateway in the order specified and uses the first one that responds. If that PBX or gateway goes down, Vocera SIP Telephony Gateway switches to another one.

The VSTG uses the response to a SIP OPTIONS message to determine if the PBX or gateway is currently available. See Detecting the Connection to the IP PBX on page 64.

In some situations, using TCP as the signaling transport protocol reduces the length of time required for the VSTG to recognize that the current PBX is down and move to the next PBX in the list. see Using UDP or TCP Transport to the IP PBX on page 65.

Configuring Telephony

Configure Vocera SIP Telephony Gateway settings for your facility from the Vocera Platform Web Console.

You can locate your facility or create a new facility in **Facilities** in the **Manage** section of the Web Console.

Important: Select the **Enable Telephony Integration** checkbox in the Telephony section to allow Vocera and your phone system to communicate with each other. Checking this field also enables several other telephony related configuration sections including the Basic Information, Access Code Exceptions, Toll Exceptions, DID Information, PINs, Dynamic Extensions, and Sharing.

When **Enable Telephony Integration** is unchecked, these additional configuration fields are disabled. You can disable the telephony integration by unchecking this option and clicking the **Save** button. When you uncheck, the system displays a messages Vocera saves your telephony settings, but disables communication to the PBX.

Enabling Telephony

Enable telephony for a specific facility from the Vocera Platform Web Console .

Telephony features are disabled by default. Enabling telephony features allows you to configure information required for your phone system to communicate with Vocera.

1. Navigate to **Facilities** in the **Manage** section of the navigation bar.
2. Select an existing facility or create a new facility to enable telephony configuration.
3. If you enabling telephony for an existing facility, click Edit Facility
   The Edit Facility page displays
4. Click the Telephony configuration section and click the drop down arrow at the right hand side to expand this section.
   The **Enable Telephony Integration** checkbox displays.
5. Select the **Enable Telephony Integration** checkbox
   The following telephony configuration sections display:
   - Telephony - Basic Information
   - Telephony - Access Code Exceptions
   - Telephony - Toll Exceptions
   - Telephony - DID Information
   - Telephony - PINs
   - Telephony - Dynamic Extensions
   - Telephony - Sharing
6. Click **Save** in the Edit Facility page to update the facility information in the system.

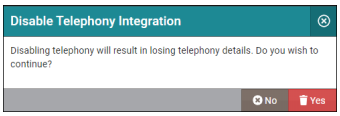
Disabling Telephony

Disable telephony integration for a specific facility.

The telephony feature is disabled by default. If you have a facility with telephony feature enabled and you wish to disable telephony features for this facility, you can do it from the Web Console.

When you disable telephony integration, Vocera saves your telephony settings but disables communication to the PBX.

1. Navigate to **Facilities** in the **Manage** section of the navigation bar
2. Locate the facility for which you want to disable the telephony features.
3. Click the **Options** button in the far right of this facility.
   The Edit Facility page displays with configuration fields and data related to these configuration fields.
4. Scroll down to **Telephony-Basic Information** section and uncheck **Enable Telephony Integration**.
   The system displays a confirmation message to confirm if you want to disable telephony integration for the selected facility.



5. Choose one of the following to close the dialog:
   - **Yes** — to confirm the disable action.
   - (optional) **No** — to cancel the disable action and return to the Edit Facility page.
6. Click **Save** to update the facility for the configuration changes.

Configuring Basic Telephony Information

You can add a new facility or edit an existing facility in the Vocera Platform Web Console and configure basic telephony information for that facility.

To configure basic telephony information, follow these steps:

1. Navigate to **Facilities** in **Manage** section of the navigation bar to locate your facility where you want to enable Telephony integration
   If you don't have a facility set up, follow the instructions described in the, “Adding a Facility” section in the Vocera Platform Administration Guide to create a new facility.

   Tip: You can also use the **Help** link provided in the **Facilities** page of the Vocera Platform Web Console and follow the instruction to create a new facility.

2. Ensure that telephony is enabled. For information on enabling telephony, see Enabling Telephony on page 26 .
3. Enter the **Telephony - Basic Information** for the following fields:

Name	Maximum Length	Description
Number of Lines	3 digits	Specify the number of lines you want to provision for each telephony service in the **Number of Lines** field. Enter either of the following values, whichever is smaller: • The number of lines supported by your license. • The number of lines provisioned by the PBX for a single telephony service. If you are configuring a high availability array, enter the number of lines available to a single telephony service, not the total number of lines available to all telephony services. For example, if you have 2 Vocera SIP Telephony Gateway services and your license contains 48 lines, specify 24 in this field to give each service 24 lines for a total of 48. The number of lines that you provision for each telephony service is decremented from the number of lines in your license.
Local Area Code	3 digits	Enter the area code of the region in which the Voice Service is installed in the Local Area Code field.
Omit Area Code when Dialing Locally	n/a	Check the Omit Area Code field when dialing locally. If your PBX requires you to dial local calls without using the area code you can enable this option. By default, Vocera includes the area code in the dialing string, even when dialing a local number. Check this field if your PBX or locale requires you to omit the area code when dialing local calls.
Voice Hunt Group	n/a	Specify the area code and phone numbers of the direct inward dialing (DID) lines or hunt group you set up for the Vocera system in the **Vocera Hunt Group Numbers** fields. There are two hunt group number fields: • **Guest Access** — This number is for guest access to the Vocera system. When callers dial the Guest Access number, they are allowed to place a call but are not identified to the called person. Because guest users are not authenticated, they can call other users, but they cannot issue voice commands. To use the **Guest Access** number with numeric pagers, enter an asterisk after the last digit of the phone number. When a user sends a numeric page, Vocera passes the value that you enter in this field to the pager and then passes the user's desk extension to the pager. Some pagers display the asterisk as a hyphen, separating the desk extension from the Vocera number. • **Direct Access** — This number is for specially licensed user access to the Vocera system. This field is used only if Calling and Called Party Information is enabled on the PBX. Vocera uses the Caller ID feature to automatically authenticate users when they call the **Direct Access** phone number from their desk phone or cell phone.
Default Local Access Code	n/a	Specify the sequence of numbers you use to get an outside line. For example, a PBX might require you to dial a 0 or a 9 or an 8 to get an outside line. By default, Vocera prepends this access code to any number within the local area code.

Name	Maximum Length	Description
Default Long-Distance Access Code	n/a	Specify the sequence of numbers you enter before placing a long distance call. For example, a PBX system might require you to dial a 9 to get an outside line and then dial a 1 before a long-distance telephone number. In this situation, the Default Long-Distance Access Code is 91. By default, Vocera prepends this access code to any number that includes an area code that is not the local area code.
Company Voicemail Access Code	n/a	Use the Company Voicemail Access Code field to specify the sequence of numbers you use to access the company's voice mail system. A typical entry includes X, then the sequence of digits that you dial to get into the voicemail system from an internal phone, and possibly special dialing characters such as the * or # to indicate the end of the sequence.
SIP Settings	n/a	Specify the SIP settings: • **Call Signaling Address** — Enter the call signaling address for your IP PBX or VoIP gateway. For PBX failover support, enter a comma-separated list (up to 256 characters) of call signaling addresses for two or more PBXs or gateways in order of preference. Enter each call signaling address in this format: `IP_Address:Port` The `Port` is optional. If you do not specify a port, port 5060 (the default) is used. Vocera SIP Telephony Gateway uses only one PBX or gateway at a time. If you specify multiple call signaling addresses, Vocera SIP Telephony Gateway tries each PBX or gateway in the order specified and uses the first one that responds. If that PBX or gateway goes down, Vocera SIP Telephony Gateway switches to another one. The preference order of call signaling addresses is important. If the Vocera SIP Telephony Gateway is currently using the PBX for the second call signaling address, and then the PBX for the first call signaling address becomes active, Vocera SIP Telephony Gateway automatically switches to the first PBX. **Note:** The Vocera SIP Telephony Gateway uses the response to a SIP OPTIONS message to determine if the PBX or gateway is currently available. The OPTIONS message is sent every 30 seconds by default. For more information on configuring VSTG to use an OPTIONS message for keep-alive, see Detecting the Connection to the IP PBX. If the PBX or gateway is not configured to support SIP OPTIONS, then entering a second call signaling address has no effect. In some situations, using TCP as the signaling transport protocol reduces the length of time required for the VSTG to recognize that the current PBX is down and move to the next PBX on the list. • **Call Party Number** — Enter the DID number, including the area code, of the Vocera trunk (the number of digits depends on the locale). Outgoing calls use this value as the caller ID. However, you can configure Vocera SIP Telephony Gateway to use caller information contained in the dial signal from the Voice Service as the caller ID.

4. Select one of the following to close the Add/Edit Facilities page:
   - **Save** — to save the telephony- basic information to the system.

- **Cancel** — to cancel the changes and return back to Add/Edit Facilities page.

Access Codes

An access code is a sequence of digits that the system must prepend to a telephone number in order to dial it.

For example, many PBX systems require you to dial a 9 to get an outside line for a local call. In this situation, 9 is the local access code—it is the number that you prepend to a telephone number.

The access codes in use at your facility are determined by they way your PBX is set up. When you configure Vocera, you need to identify these access codes so the telephony server can communicate properly with the PBX.

Your PBX may use many different access codes. For example, it may require different access codes to get an outside line for local calls, to get an outside line for toll calls, and to access your company's voicemail system.

Voicemail Access Code

Specify the sequence of characters you use to access the company's voice mail system.

Vocera passes this sequence of characters to the PBX when users forward Vocera device calls to their voice mailboxes. You can specify a value in the **Company Voicemail Access Code** field in the Telephony-Basic Information section. For more information on this field, see the Configuring Basic Telephony Information on page 27 .

The specific values you need to enter in the **Company Voicemail Access Code** field depend upon both your PBX and the way in which it is set up. You always need to enter the actual access code required by your PBX; however, you may also need to enter the `%D` macro to pass a user's desk extension to the PBX, and possibly special dialing characters such as the * or # to indicate the end of the sequence.

Vocera interprets the data you enter in the **Company Voicemail Access Code** field in either of the following ways:

- If you do not explicitly enter the `%D` macro, Vocera automatically appends the user's desk extension to the end of the sequence you specify before passing it to the PBX.
- If you explicitly enter the `%D` macro, Vocera does not append anything to the sequence before passing it to the PBX.

Hunt Group Numbers

Configure a set of telephone numbers that callers can dial to access the Vocera system.

You can configure a set of telephone numbers that callers can call to access the Vocera system. These telephone numbers are called the **Vocera Hunt Group Numbers**.

You can configure telephone numbers to the following two hunt group number fields:

- **Guest Access** – Allows to configure a number for guest access to the Vocera system.
- **Direct Access** – Allows to configure a number for specially licensed user access to the Vocera system. This field is used only if Calling and Called Party Information is enabled on the PBX.

If you are integrating Vocera with an IP PBX, you specify Direct Inward Dialing (DID) numbers for the **Guest Access** and **Direct Access** numbers.

Note: Vocera provides additional options for configuring hunt groups in a deployment that implements multiple sites. See About Shared Telephony on page 21 for more information.

Calling the Guest Access Number

Connecting to a Vocera device using the guest access number.

When a caller dials the **Guest Access** number, the Genie says, “Good morning. Say the full name of the person or group you want to reach or enter an extension.” Callers can then connect to a Vocera device in any of the following ways:

- Speak the name of a person to connect to that user's Vocera device.
- Enter a desk extension to connect to that user's Vocera device.
- Speak the name of a group to connect to the Vocera device of the first available group member.
- Speak the name of a Vocera contact entry.
- Enter the group's telephone extension to connect to the Vocera device of the first available group member.
- Enter the number **555** to receive an additional Genie prompt that allows them to send a voice message to a Vocera device.
- Enter the number **0** (for Operator) to connect to the Vocera device of the first available member of the Operator group, if one exists.
- To switch to user access mode, press the star (*) key. The Genie may prompt for your first and last name, and then it may prompt for your phone access password.

Calling the Direct Access Number

If your Vocera system includes licenses that allow users to access the Genie from a phone, the Vocera System Administrator can enable that feature for certain users and grant the appropriate permission to access the Genie from a phone.

For information about enabling user access to the Genie from a phone, see the Vocera Platform Administration Guide

When a caller dials the **Direct Access** number, the caller is automatically authenticated based on Caller ID, and the Genie says, “Good morning, [FirstName]. [Chime] Vocera." The caller can then say any of the supported commands.

Access Code Exceptions

By default, Vocera uses the rules shown here to determine what access code to use with a telephone number.

- Any number within your local area code requires the Default Local Access Code.
- Any number that begins with a **Q**, begins with an **X**, or has fewer than seven digits does not require an access code. Vocera treats numbers with fewer than seven digits as extensions.
- Any other number requires the Default Long-Distance Access Code.

If your organization uses any phone numbers that violate these rules, you must add entries that provide the access codes they require in the exception list. For example, you need to create an exception if an area code in addition to your local area code requires the Default Local Access Code instead of the Default Long-Distance Access Code.

Adding Access Code Exceptions

Use the **Telephony-Access Code Exceptions** section to add an entry to the list of Access Codes exception.

You can add exceptions to the entire area code, for a specific prefix, and a range of numbers in an area code from the Vocera Platform Web Console.

Adding

Creating an Exception for a specific Area Code

To create an exception for the entire area code, follow these steps:

1. Navigate to the **Telephony-Access Code Exceptions** section in the Add/Edit Facility page.
2. Click **Add Exceptions** button to display the Add Access Code Exception dialog box.
3. Enter an area code number in the **Area Code** field.
   For example, enter 650 as the area code number.
4. Select **All numbers in area code** checkbox.
5. Enter an access code number in the **Access Code** field.
   For example, enter 9 as the access code number.
6. Click **Done** to save your entry and close the dialog box.
   The 650 area code appears as an exception on the Access Codes page.

Creating an Exception for a Specific Prefix

To create an exception for a specific prefix, follow these steps:

1. Navigate to the **Telephony-Access Code Exceptions** section in the Add/Edit Facility page.
2. Click **Add Exceptions** button to display the Add Access Code Exception dialog box.
3. Enter the area code the exception applies to in the **Area Code** field.
4. Check **Numbers starting with** and enter the prefix in the associated field.
5. Specify the access code in the **Access Code** field.
6. Click **Done** to save your entry and close the dialog box.

Creating an Exception for a Specific Range

To create an exception for a specific range, follow these steps:

1. Navigate to the **Telephony-Access Code Exceptions** section in the Add/Edit Facility page.
2. Click **Add Exceptions** button to display the Add Access Code Exception dialog box.
3. Enter the area code the exception applies to in the **Area Code** field.
4. Check **Numbers in range** and enter the beginning and ending numbers in the associated fields.
5. Use a seven-digit range in each field. To create an exception for a single number, enter the same number in both fields.
6. Specify the access code in the **Access Code** field.
7. Click **Done** to save your entry and close the dialog box.

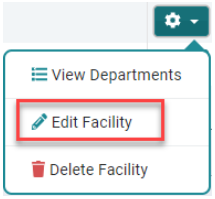
Editing Access Code Exception

Change or modify the access code entries for a specific facility from the Vocera Platform Web Console.

To modify the access code exceptions, follow these steps:

1. Navigate to **Facilities** in the **Manage** section of the navigation bar.
   The Hospital Locations page displays. The All Facilities section displays the facility name, number of departments in a facility, and a description of each facility.
2. Locate the facility for which you want to edit the access code exceptions
3. Click the **Options** button in the far right of this facility.

4. Select **Edit Facility** from the dropdown menu.



   The Edit Facility page appears with configuration fields and data related to the configuration fields.
5. Scroll down to **Telephony-Access Code Exceptions** section in the Edit Facility page.
6. Click the **Options** button in the far right of this access code entry and select **Edit** from the dropdown menu.
   The Edit Access Code Exception dialog box display with fields and values that you want to edit.
7. Change or modify the access code information and click one of the following:
   - **Done** — to update the access code changes in the system.
   - **Cancel** — to return to the Edit Facility page.
8. Click **Save** in the Edit Facility page to update the facility information in the system.

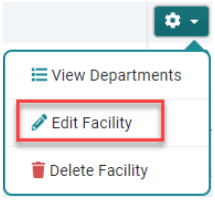
Deleting Access Code Exceptions

Remove the access code entries for a specific facility from the Vocera Platform Web Console.

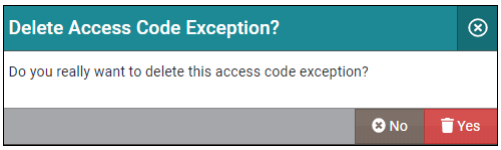
If you facility has more than one access code entries, you may need to perform this task for each entry. To delete the access code exceptions, follow these steps:

1. Navigate to the facility for which you want to delete the access code entries.
2. Click the **Options** button in the far right of this facility.

3. Select **Edit Facility** from the dropdown menu.



   The Edit Facility page appears with configuration fields and data related to the configuration fields.
4. Scroll down to **Telephony-Access Code Exceptions** section in the Edit Facility page.
5. Click the **Options** button in the far right of this access code entry and select **Delete** from the dropdown menu.
   The system displays a confirmation message to confirm if you really want to delete the selected access code exception.



6. Choose one of the following to close the dialog.
   - **No** — to cancel the delete action and return to the Edit Facility page.
   - **Yes**— to confirm the delete action.
7. Click **Save** in the Edit Facility page to update the facility information in the system.

Toll Exceptions

By default, Vocera assumes that any number within your local area code is a toll-free number, and any number outside your local area code is a toll number.

You can use the **Telephony-Toll Exceptions** section to specify exceptions to this rule. For example, many locations have an additional area code that is a toll-free calling area, or an exchange within the local area code that is a toll area. For example, in Australia, the area code 04 is reserved for mobile phone numbers, and calls to mobile phones are toll-free.

The distinction between toll-free and toll numbers is important, because Vocera requires separate permissions for making toll calls, forwarding calls to toll numbers, making toll-free calls, and forwarding calls to toll-free numbers.

For example, many locations have an additional area code that is a toll-free calling area, or an exchange within the local area code that is a toll area. You can specify exceptions such as this, or any other exception using **Telephony-Toll Exceptions** configuration section.

You must remember to add an exception in either of the following situations:

- When a number or range of numbers in your local area code is a toll call.
- When a number or range of numbers outside your area code is a toll-free call.

Adding Toll Exceptions

Use the **Telephony-Toll Exceptions** section to add an entry to the list of exceptions.You can create toll exceptions for an entire area code, for a specific exchange, and for a range of numbers in an area code.

To create an exception for an entire area code, follow these steps:

1. Navigate to the **Telephony-Toll Exceptions** section in the Add/Edit Facility page.
2. Click **Add Exception** button to display the Add Toll Exception dialog box.
3. Enter the area code the exception applies to in the **Area Code** field.

   Enter toll-free prefixes such as 800 and 888, as well as any area codes (such as 04 in Australia) that are toll-free in your dialing area.
4. In the **Match** section, choose one of the following options to define the range of DID numbers:
   - Choose **All Numbers in Area Code** to use the entire range of numbers represented by the value in the **Area Code** field.

     For example, If you add an 800 number in the **Area Code** field, an 800 prefix appears as a toll-free prefix in the list on the Toll Info page.
   - Choose **Numbers Starting With** and enter the exchange in the associated field.

     For example, if you want to specify that calls to the 427 exchange in your local 408 area code are toll calls, you can enter 408 in the **Area Code** field, select.**Numbers starting with** field and enter 427 in the associated field. Uncheck the **Toll-Free** field and click **Done**. The 427 exchange will appear as a toll exchange in the list on the Toll Info page.
   - Choose **Numbers in Range**
5. Select the **Toll-Free** field to specify a toll-free area code.

   Clear the **Toll-Free** field if you want the area code with toll.
6. Click one of the one of the following to close the Access Code Exception dialog box:
   - **Done** — to add your entry to the access code exceptions list and close the dialog box.
   - **Cancel** — to return to the Edit Facility page.
7. Click **Save** in the Edit Facility page to update the facility information in the system.

Editing Toll Exceptions

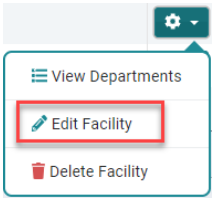
Change or modify an entry in the toll exceptions list for a specific facility.

You can use the Web Console to edit the entries in the toll exceptions list for a facility.

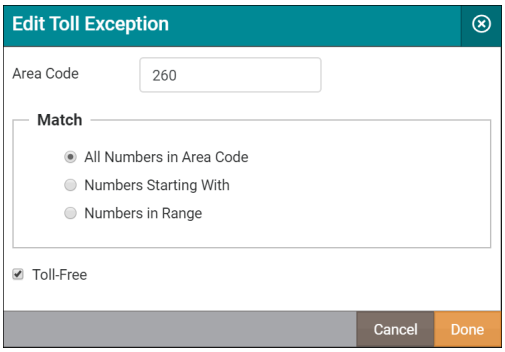
To edit toll exceptions settings, follow these steps:

1. Navigate to **Facilities** in the **Manage** section of the navigation bar.
   The Hospital Locations page displays. The All Facilities section displays the facility name, number of departments in a facility, and a description of each facility.
2. Locate the facility for which you want to edit the toll exceptions information.
3. Click the **Options** button in the far right of this facility.

4. Select **Edit Facility** from the dropdown menu.



   The Edit Facility page appears with configuration fields and data related to the configuration fields.
5. Scroll down to the **Telephony-Toll Exceptions** section in the Edit Facility page.
6. Click the **Options** button in the far right of the toll exception entry that you want to edit. and select **Edit** from the dropdown menu.
   The Edit Toll Exception dialog box displays with fields and values that you want to edit.



7. Click one of the one of the following to close the Delete Access Code Exception dialog box:
   - **Done** — to update the access code changes in the system.
   - **Cancel** — to return to the Edit Facility page.
8. Click **Save** in the Edit Facility page to update the facility information in the system.

Deleting Toll Exceptions

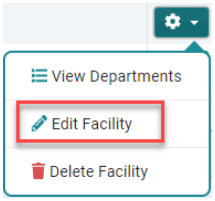
Delete the toll exception entries for a specific facility from the Vocera Platform Web Console.

To delete toll exceptions, follow these steps:

1. Navigate to **Facilities** in the **Manage** section of the navigation bar.
   The Hospital Locations page displays. The All Facilities section displays the facility name, number of departments in a facility, and a description of each facility.
2. Locate the facility for which you want to edit the toll exception entries.

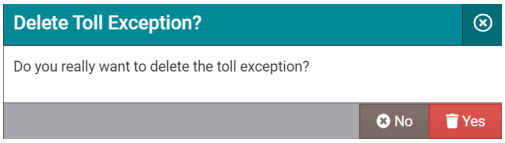
3. Click the **Options** button in the far right of this facility.

4. Select **Edit Facility** from the dropdown menu.



The Edit Facility page appears with configuration fields and data related to the configuration fields.

5. Scroll down to **Telephony-Toll Exceptions** section in the Edit Facility page.
6. Click the **Options** button in the far right of the Toll Exception entry and select **Delete** from the dropdown menu.
   The Delete Toll Exception dialog box displays with fields and values that you want to edit.



7. Click one of the one of the following to close the Delete Toll Exception dialog box:
   - **Done** — to update the access code changes in the system.
   - **Cancel** — to return to the Edit Facility page.
8. Click **Save** in the Edit Facility page to update the facility information in the system.

Direct Inward Dialing

In traditional telecommunications, Direct Inward Dialing (DID, or DDI in Europe) is the ability of a person outside an organization to call an internal PBX extension without going through an operator or intermediate interface of any kind.

When an outside caller dials a number within a specified DID range, the call goes directly to the associated user. Otherwise, the Genie prompts the caller to say the full name of the person or group, or enter an extension.

The DID feature allows callers who are not aware of Vocera or its features to contact users directly on their Vocera devices. DID extends the benefits of Vocera to telephone callers who do not necessarily even belong to the organization that is deploying Vocera.

Your PBX administrator may reserve one or more groups of DID (Direct Inward Dialing) extensions for Vocera users to use. When an outside caller dials a number within a specified DID range, the call goes directly to the device of the associated user. Otherwise, the Genie prompts the caller to say the full name of the person or group, or enter an extension.

To enable DID, your PBX administrator must reserve a range of DID numbers for Vocera to use, and you must identify that range to Vocera. Use the **Telephony-DID Information** section in the Add/Edit Facility page of the Web Console to specify the range of DID numbers reserved for Vocera.

Tip: The DID numbers that you specify must be 10-digit telephone numbers with area code in the US locale (or full numbers with city and region codes, in other locales).

If your PBX administrator provides the guest or direct access number as part of the DID range, enter it as the guest or direct access number in Vocera, but do not include it in the range of DID numbers that you configure on the DID information page. User and group profiles may be assigned the DID numbers that you specify in the Web Console, and you do not want a user or group to have the same extension as the guest or direct access number.

If an incoming call arrives on a number that is within the specified DID range, but the number is not assigned, Vocera automatically directs the call to the guest access Genie.

When multiple facilities are sharing a PBX, they also share the single pool of DID numbers that are enabled in the primary facility. You cannot distribute different ranges of DID numbers to individual facilities that share a PBX.

When multiple facilities are using different PBXs, each PBX may provide a different range of DID numbers or even none at all. The way each PBX is configured determines whether its associated facilities have access to DID.

Note: DID numbers may be more expensive and more difficult to obtain than other PBX extensions. You do not need to have a dedicated DID number for every user to receive some of their benefits.

Adding or Editing DID Information

When you add or edit DID information, you specify a prefix and the range of phone numbers to use for direct inward dialing.

Your PBX administrator may provide you with discontinuous ranges of DID extensions or even groups of DID extensions with different prefixes. Enter each range separately until they all appear in the list on the DID Info page of the Telephony screen.

For example, your PBX administrator may supply 100 DID extensions with the following ranges:

- (215) 995-4150 through (215) 995-4199
- (215) 885-6880 through (215) 885-6899
- (215) 885-6920 through (215) 885-6949

You can enter each range separately in the Add DID Range Entry dialog box to make them all available to Vocera.

To add or edit DID information in the Add DID Range dialog box, follow these steps:

1. Navigate to the **Telephony-DID Information** section in the Add/Edit Facility page.
2. Click **Add DID** to display the Add DID Range dialog box.
3. Enter the area code and prefix assigned to the range in the **Prefix** field.
   For example, if the local area code of the PBX is 408, and the corporate prefix for all extensions is 790, you typically enter `(408)-790`. In some situations, your PBX administrator may assign a different prefix for you to use.
   To provide maximum flexibility, Vocera does not check the value you enter in this field. If necessary, you may enter country and city codes, as well as extensions whose length is shorter or longer than four digits. For example, if your deployment has five-digit extensions, you may want to enter a prefix such as `(408)-79`.

   Important: Enter the area code and full prefix that make a complete dialing string when combined with a value in the range of extensions. Vocera combines the extension and the value in the **Prefix** field to create a call-back number for paging.
4. In the **Match** section, choose one of the following options to define the range of DID numbers:
   - Choose **All Desk Extensions with Prefix** to use the entire range of numbers represented by the value in the **Prefix** field.

For example:

- If the value in the **Prefix** field is `(408)-790`, you are assigning the range `(408)-790-0000` through `(408)-790-9999` as DID extensions. The extensions available for assignment to Vocera users and groups are 000 through 999, 0000 through 9999, or 00000 through 99999.
- If the value in the **Prefix** field is `5`, you are assigning any number that starts with a "5". The extensions available for assignment to Vocera users and groups are 500 through 599, 5000 through 5999, or 50000 through 59999.

- Choose **Desk Extensions Starting With** and specify a starting value to use a subset of the range of numbers represented by the value in the **Prefix** field.

  For example:

  - If the value in the **Prefix** field is `(408)-790`, and you enter `8` in the **Desk Extensions Starting With** field, you are assigning the range `(408)-790-8000` through `(408)-790-8999` as DID extensions. The extensions available for assignment to Vocera users and groups are 8000 through 8999.
  - If the value in the **Prefix** field is `(408)-790`, and you enter **94** in the **Desk Extensions Starting With** field, you are assigning the range `(408)-790-9400` through `(408)-790-9499` as DID extensions. The extensions available for assignment to Vocera users and groups are 9400 through 9499.
  - If your PBX passes 59xx to Vocera, enter `5` in the **Prefix** field and `9` in the **Desk Extensions Starting With** field. This means you are assigning the range `5900` through `5999` as DID extensions. The extensions available for assignment to Vocera users and groups are 900 through 999.

- Choose **Desk Extensions in Range** and enter beginning and ending values value to specify a range of phone numbers within the set represented by the value in the **Prefix** field. This is the most typical situation.

  For example:

  - If the value in the **Prefix** field is `(408)-790`, and you enter `8000 To 8999` in the **Desk Extensions In Range** field, you are assigning the range `(408)-790-8000` through `(408)-790-8999` as DID extensions. The extensions available for assignment to Vocera users and groups are 8000 through 8999.
  - If the value in the **Prefix** field is `5`, and you enter `501 To 549` in the **Desk Extensions In Range** field, you are assigning the range `5501` through `5549` as DID extensions. The extensions available for assignment to Vocera users and groups are 501 through 549.

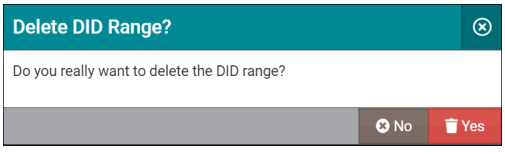
5. Click **Done** to add your entry to the list and close the dialog box.

Deleting DID Information

Delete an entry from the list of direct inward dialing (DID, also called DDI in Europe) records.

To delete a DID entry, follow these steps:

1. Navigate to the **Telephony-DID Information** section in the Add/Edit Facility page.
2. Click the **Options** button in the far right of this DID entry and select **Delete** from the dropdown menu. The system displays a confirmation message to confirm if you really want to delete the selected DID entry.



3. Click the **Options** button in the far right of the Toll Exception entry and select **Delete** from the dropdown menu.
4. Choose one of the following to close the dialog.

- **No** — to cancel the delete action and return to the Edit Facility page.
- **Yes**— to confirm the delete action.

5. Click **Save** in the Edit Facility page to update the facility information in the system.

Telephony PINs

Telephony Personal Identification Numbers (PINs) allow your organization to authorize telephone usage, and to distribute telephone costs among different users, departments, or facilities.

Telephony PINs are also referred as Forced Authorization Codes (FAC) or Forced Access Codes in some organizations.

For example, a company might require employees to enter a PIN along with a phone number to make a long distance or toll call. Vocera's telephony PIN feature automatically adds a PIN to the dialing sequence when a user places a call that requires this PIN. In addition to long distance and toll calls, a PIN is also used for long distance forwarding, transferring, and paging.

Note: A user cannot make toll calls—and telephony PINs have no effect if the user is not a member of a group that allows toll calls.

Specifying Telephony PIN Information

Specify Telephony PIN information if your facility requires authorization codes when placing a long distance calls.

To specify Telephony PIN information, follow these steps:

1. Navigate to the **Telephony-PINs** section in the Add/Edit Facility page.
2. Enter a number in the **PIN for Long Distance Calls** field to define a PIN for a facility.
3. Enter numbers, formatting characters (for example, dashes or parentheses) special dialing characters (for example, commas or ampersands), and PIN macros in the **PIN Template** field. This template defines the format of all PINs, whether they are defined at the user profile, department group, or facility level.

   If no PIN template is specified, the Vocera system applies one of the following default templates, depending on the type of PBX:

PBX type	Default template	Description
IP	%N %P	Access code, phone number, and PIN.

4. Click **Save** in the Edit Facility page to update the facility information in the system.

PIN Template Macros

Each PBX has different rules for adding a PIN to a dialing sequence.

Some require the phone number followed by the PIN. Some require the PIN before the phone number. Some require an access code for an outside line, or a feature code to indicate that a number is a PIN. Some require a separator character between the PIN and the number. A telephony PIN template can use macros to specify and format the information in a PIN.

Vocera provides the following macros for specifying a PIN template:

Macro	Effect
%A	Expands to the value of the access code for the phone number being dialed.
%M	Expands to the value of the phone number being dialed.

Macro	Effect
%N	Expands to the value of the access code for the phone number being dialed, followed by the phone number. The %N macro is the equivalent of the %A macro followed by the %M macro.
%P	Expands to the value in one of the following fields, listed in descending order of precedence: • The **PIN for Long Distance Calls** field in the Phone page of the Add/Edit User dialog box. • The **PIN for Long Distance Calls** field in the Department page of the Add/Edit Group dialog box. • The **PIN for Long Distance Calls** field in the PIN page of the Telephony section.

The %A and %M macros are useful for inserting a PIN into the dialing sequence (for example, between the access code and the number) instead of appending it.

Example PIN Templates

The following table lists some example PIN templates, along with descriptions and the values sent by the Vocera system to the PBX.

The results are based on the following assumptions:

- The user belongs to a group that allows toll calls.
- The user's PIN is **1234**.
- The phone number **(213) 555-0945** is a long distance call.
- The long distance access code (if required) is **91**.
- The feature code for a PIN (if required) is ***88**.

Table 1: PIN template examples

PIN template	Result	Description
%N %P	912135550945 1234	Access code, phone number, PIN.
%M %P	2135550945 1234	Phone number, PIN.
%A, %M %P	91, 2135550945,1234	Access code, pause, phone number, PIN.
%P, %A %M	1234, 91 2135550945	PIN, pause, access code, phone number.
%A *88 %P %M	91 *88 1234 2135550945	Access code, feature code, PIN, phone number

Dynamic Extensions

To allow Vocera users to receive paging call-backs on their Vocera device, each user must have a unique extension entered in their Vocera profile.

You must enter a value in either the **Vocera Extension** field or the **Desk Phone or Extension** field for each user. You can assign these values manually, or you can let Vocera assign them as dynamic extensions.

About Dynamic Extensions

Dynamic Extensions are artificial telephone numbers that Vocera associates with users automatically, on an as-needed basis, if they need a number to enable a paging call-back on the badge.

You can use dynamic extensions in either of the following situations:

- If Vocera users do not have actual desk extensions and you want Vocera to assign an extension to users automatically rather than use the **Vocera Extension** field.
- If you are using DID, but you don't have enough DID numbers to dedicate one to each Vocera user.
  If you can use dynamic extensions to share a small amount of DID numbers among a greater number of Vocera users, enabling recipients of a numeric page to place a return call directly to a user's device, without going through the hunt group Genie.

Use the **Telephony - Dynamic Extensions** configuration section on the Add/Edit Facilities page in the **Manage** section of Vocera Platform Web Console to enable and configure dynamic extensions. Vocera determines which of the following two situations apply based on the **Extension Range** you enter:

- If the range of numbers you enter for dynamic extensions is equal to or a subset of the range you entered for DID, Vocera assumes you are distributing DID numbers among your Vocera users.
- If the range of numbers you enter for dynamic extensions is outside the range of numbers you entered for DID, Vocera assumes that you want to assign desk extensions to users independently of DID.

Tip:
If you are using DID, set the dynamic extension range to be the same as the DID range. If the dynamic extension range is a subset of the DID range, some DIDs will not be used.

If you enter a range of numbers that include both DID numbers and non-DID numbers, Vocera still distributes all of them on an as-needed basis, starting from the beginning of the range. However, users may unpredictably have DID numbers some times and non-DID numbers other times. Vocera recommends that you avoid this configuration unless you need to use it to solve a specific communication problem.

You do not need to keep track of which users have which dynamic extensions; Vocera automatically tracks and allocates all numbers in the dynamic range. For example, if a user is deleted from the system, Vocera automatically returns that dynamic extension to the pool of available extensions.

If a user already has a desk extension or a Vocera extension, Vocera will never assign him or her a dynamic extension. Instead, Vocera will use the Vocera extension or the desk extension for paging or DID. In a mixed environment where some users have desk extensions and others don't, Vocera assigns dynamic extensions on demand to anyone who does not have either a desk extension or a Vocera extension.

Configuring Dynamic Extension for a Facility

Configure Vocera system to supply telephone extensions on demand to users who need them.

Dynamic extensions affect only users whose profile does not include a Vocera extension or a desk extension.

Vocera assigns dynamic extensions to users in a manner analogous to a DHCP server assigning IP addresses to client computers.

To configure Dynamic extension for a facility, follow these steps:

1. Navigate to **Facilities** in the **Manage** section of the navigation bar and locate your facility.
   If you don't have a facility set up, follow the instructions described in the, “Adding a Facility” section of the Vocera Platform Administration Guide to create a new facility.

   Tip: You can also use the **Help** link provided in the **Facilities** page of the Vocera Platform Web Console and follow the instruction to create a new facility.
2. Scroll down to the **Telephony - Dynamic Extensions** section and expand this section to view the **Enable Dynamic Extensions** checkbox.
3. Select the **Enable Dynamic Extensions** checkbox to assign dynamic extensions on demand to users who need them.
   The **Extension Range** and **Assignment Type** configuration fields are displayed.

4. Enter a value for the following fields:
   - **Extension Range** — Specify a range of phone numbers to use as dynamic extensions. Enter a value for the **First Extension** and **Last Extension**.

     You can only enter digits and the maximum number of digits that you can enter is limited to 7 digits. The **First Extension** and **Last Extension** fields must have the same number of digits.

     Note: If the range is equal to or a subset of the range you entered for DID, Vocera assumes you are distributing DID extensions among your Vocera users. If you are using DID, set the dynamic extension range to be the same as the DID range. If the dynamic extension range is a subset of the DID range, some DIDs will not be used. If the range is not a subset of the range you entered for DID, Vocera assumes that you want to assign desk extensions to users independently of DID.
   - **Assignment Type** — Select one of the following two assignment types:
     - Choose **Permanent** to assign users extension that does not expire.

       Permanent is useful when Vocera users do not have actual desk extensions, but you want them to have a unique identifier that allows recipients of a numeric page to place a return call to the Vocera device.
     - Choose **Temporary** to assign a lease duration value and specify the minimum amount of time that an extension is assigned to a user.

       Temporary is useful when you want to share a small number of DID extensions among a larger number of Vocera users. By default, the lease is set to seven days to allow safe paging callbacks several days later. If you don't have enough DID numbers for all Vocera users, you can set the lease duration to hours instead of days so that numbers can be reallocated as needed.
5. Select one of the following to close the Add/Edit Facilities page:
   - **Save** — to save the telephony dynamic extensions information to the system.
   - **Cancel** — to cancel the changes and return back to Add/Edit Facilities page.

Duration of Dynamic Extensions

You can determine whether users will lease dynamic extension for a specified duration or keep the dynamic extensions permanently.

When an assigned extension reaches the end of its lease period, it expires and you can reassign this extension to another user.

However, Vocera avoids reassigning a dynamic extension as long as possible, even after it expires, in a manner analogous to a DHCP server assigning IP addresses:

- You specify a range of extensions to populate the pool of available values.
- When extensions are leased, the duration specifies the minimum amount of time that an extension will be assigned to a user. By default, the lease is set to seven days to allow safe paging callbacks several days later.
- If a user has a lease that has not expired and needs an extension again (for example, when sending another page), Vocera automatically renews the lease on the same extension for a new default duration.
- If a user has a lease that has expired, Vocera will not assign that extension to another user until all other available extensions have been exhausted.
- If a user with an expired lease requests an extension again, Vocera will assign the same lease, if it is still available.

As Vocera assigns dynamic extensions, they appear in the **Dynamic Extension** field on the Phone page of the Add/Edit User dialog box. The **Dynamic Extension** field is read-only and is displayed for informational purposes only. As extensions are renewed and expire, Vocera automatically updates this field.

Because extensions are assigned on-demand, the **Dynamic Extension** field may be empty even after you enable the dynamic extensions feature. Similarly, the **Dynamic Extension** field will continue to display an expired number that has not been reassigned, indicating that the user will keep the number as long as it is available.

Facilities and Dynamic Extensions

Multiple facilities sharing a telephony service share the single pool of dynamic extension enabled in the primary facility.

You cannot distribute different ranges of dynamic extensions to individual facilities.

If multiple facilities are using different telephony servers, you may assign each facility a different range of dynamic extensions, or even none at all.

Shared Telephony Configuration

When you configure two or more facilities to share a telephony service, enable telephony for one facility only. The facility for which telephony is enabled is considered the principal facility. Facilities that use the shared telephony service of a principal facility are called secondary facilities.

Do not enable telephony for secondary facilities that use the telephony service of a principal facility. Instead, use the **Telephony- Sharing** section to configure the principal facility to share the telephony service with the other facilities.

On the principal facility's **Telephony-Sharing** section, click **Add** to display the Add Shared Telephony Info dialog box. Specify the name of the facility that is sharing the principal's telephony service, then do one of the following:

- **If the facilities have the same access numbers:**
  Leave the **Guest Access Number**, **Direct Access Number**, and **Tie Line Prefix** fields blank.
  This configuration specifies that Vocera will search the combined grammars of the principal and sharing facility when incoming callers respond to the Genie.
- **If the facilities have different access numbers:**
  If using Vocera SIP Telephony Gateway for telephony integration, enter values in the **Guest Access Number** and **Direct Access Number** fields. Leave the **Tie Line Prefix** fields blank.
  This configuration specifies that Vocera searches only the grammars for a facility as specified by the access numbers or line numbers when incoming callers respond to the Genie.

Adding and Editing Telephony Sharing Information

When you add or edit telephony sharing information, you specify the names of the secondary facilities that are using the principal facility's shared telephony service. You also optionally specify the access numbers used by the secondary facilities.

Note: You must enable telephony for the principal facility before you share it. Use the Telephony - Basic Information of the Add New Facility screen to enable the telephony integration, as described in Adding a Facility.

To add or edit telephony sharing information from the Add Shared Telephony Info dialog box, follow these steps:

1. Navigate to the **Telephony-Sharing** section in the Add/Edit Facility page.
2. Click the **Add** button to display the Add Shared Telephony Info dialog box.
3. Enter or edit the following information:

Field	Description
Facility	Specify a secondary facility that will use the shared telephony service of the principal facility. **Important:** You should not select a principal facility with telephony enabled. If you select a principal facility with telephony enabled, the system automatically disables telephony for that facility.
Guest Access Number	(Optional) Specify the area code and phone number of a DID line or guess access for this facility. This number is for guest access to the Vocera system. When callers dial the **Guest Access Number**, they are allowed to place a call but are not identified to the called person. Because guest users are not authenticated, they can call other users but they cannot issue voice commands. • If you want the secondary facility to have the same Guest Access number as the primary facility, leave this field blank or enter the primary facility's Guest Access number. • If you want the secondary facility to have a different Guest Access number, coordinate with your PBX administrator, then enter the number.
Direct Access Number	Optionally specify the area code and phone number of a DID line for this facility. This number is for specially licensed user access to the Vocera system. This field is used only if your Vocera system has a digital or IP connection to the PBX, you have selected ISDN or SIP signaling protocol, and Calling and Called Party Information is enabled on the PBX. Vocera uses the Caller ID feature to automatically authenticate users when they call the Direct Access number from their desk phone or cell phone.
Tie Line Prefix	Specify the prefix of the dial string used to place calls through the tie line to the selected facility that is sharing the principal's telephony service. Alternatively, this field could also be used to specify a prefix for Direct Inward Dialing (DID) numbers at the selected facility. For tie lines, enter the tie prefix plus the tie line. For example, if the tie prefix is 8 and the tie line is 257, enter `8-257`. For DID numbers, identify the DID prefix by determining the constant digits that become the prefix to an extension to produce a full DID number. For example, if the format of your DID numbers is 408-882-nnnn, the DID prefix is `408-882`. In the US locale, the full DID number must be a 10-digit telephone number that includes the area code. In other locales, full DID numbers include city and region codes. The Vocera Platform prepends the Tie Line Prefix to the extension dialed to generate the complete dial string for the selected facility. If the selected facility does not have its own PBX and a tie line or DID numbers, leave this field blank. **Note:** The Tie Line Prefix is used for all extensions dialed for the selected facility. Only one Tie Line Prefix can be used per shared facility.
Calling Party Number	Enter the Direct Inward Dialing (DID) number, including the area code of the Vocera trunk (the number of digits depends on the locale). Outgoing calls use this value as the caller ID. However, you can configure Vocera SIP Telephony Gateway to use caller information contained in the dial signal from the Vocera Voice Server as the caller ID. When this field is filled in, the Vocera site telephony caller ID appears on the client device of the target (called user) making it easier for them to return the call.

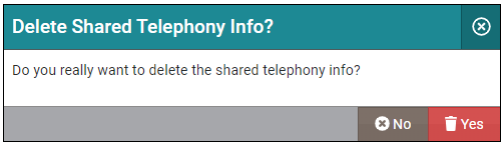
4. Click **Done** to add this facility to the list and close the dialog box.

Deleting Shared Telephony

Delete an entry from the list of Telephony-Sharing records for a specific facility.

To delete an entry from shared telephony records:

1. Navigate to the **Telelphony-Sharing** section in the Add/Edit Facility page.
2. Click the **Options** button in the far right of the Shared Telephony record that you want to delete and select **Delete** from the dropdown menu.
   The system displays a confirmation message to confirm if you really want to delete the selected record.



3. Choose one of the following to close the dialog.
   - **No** — to cancel the delete action and return to the Edit Facility page.
   - **Yes**— to confirm the delete action.
4. Click **Save** in the Edit Facility page to update the facility information in the system.

Working with Pagers

Vocera users can issue voice commands to send numeric pages to anyone with a pager when the telephony integration option is enabled for a facility.

For example, a Vocera user can speak the command "Page Dr. Shostak" to send a numeric page to someone who is either another user or an entry from your Contacts. Similarly, the "Dial a Pager Number" command allows users to send a numeric page to any arbitrary number.

Vocera supports both inside and outside pagers:

- An inside pager is used with a service that allows employees to send each other numeric pages internally. These pages typically go through the company's PBX, preventing outside users from sending pages. The numbers employees use to send an inside page are often fewer than seven digits.
- An outside pager is used with a service that allows employees to send numeric pages to full-length phone numbers.

Templates are available to define the dialing patterns Vocera uses to call inside and outside pager numbers. These templates also determine the way any callback information is formatted on the pager's display.

Contact Vocera Technical Support for assistance in configuring custom page templates.

About Vocera Paging

To allow Vocera users to receive paging call-backs on their Vocera device, each user must have a unique extension entered in their Vocera profile.

You must enter a value in either the **Vocera Extension** field or the **Desk Phone or Extension** field for each user.

If users do not have actual desk extensions and you want Vocera to assign an extension to users automatically rather than use the **Vocera Extension** field, you can use the Dynamic Extension feature to assign extensions to users, see Dynamic Extensions on page 40. When a Vocera user issues one of the "Page" commands, Vocera dials the pager number, pauses briefly, and then passes the pager a formatted string to display. The information the recipient sees depends on the type of integration. The following table describes the type of user and information on what a page recipient can see:

Type of User	What the Page Recipient Sees	What Page Recipient Does
User has DID number	DID number of the Vocera user	• Dials the DID number of the Vocera user. Call is connected directly to the user's Vocera device without any Genie prompts.
User does not have DID number	DID number of the Vocera system, followed by the user's extension	1. Dials the DID number of the Vocera system. 2. At the telephony Genie prompt, enters the user's extension. Call is connected to the user's Vocera device.

Regardless of the user configuration, Vocera always routes the return call to the user's Vocera device, not the user's extension, because the callback went through the telephony service. Vocera uses the user's extension only to identify the user and route the call appropriately.

Pagers and DID Numbers

Assign DID numbers to users who frequently send pages so that page recipients can return calls directly to the Vocera device.

When users have DID numbers, recipients of pages can return calls directly to the Vocera device without going through the guest access number.

DID numbers provide more convenient paging callbacks for recipients. In addition, some pagers cannot properly format a message containing a phone number with more than 10 digits, so DID numbers may be less confusing to the recipient of the page.

Paging Progress Indicator

When sending a page, Vocera users don't hear the DTMF tones.

Because of the nature of the SIP protocol ,Vocera users will not hear DTMF tones when sending a page

Configuring Paging

Configure paging related information in the Vocera Platform Web Console.

To allow paging interactions to take place, you must provide some configuration information in the Web Console.

Sending Pages

To enable users to send pages, follows these steps:

1. Specify a Vocera extension or a desk phone number in each user's profile. Use either an actual desk phone number, a unique number that you enter manually, or an artificial number that Vocera provides through dynamic extensions.

   The Vocera extension, desk phone, or dynamic extension allows the user to receive a callback on a Vocera device from the recipient of the page.
2. Users do not require explicit permission to send pages to other users. Any user can send a page to any other user who has a pager number defined.

Receiving Pages

To enable users to receive pages, follow these steps:

1. Specify a pager number in the profile of each user who has a pager.
2. Assign users who have pagers either the **Have Toll-Free Pager Number** or the **Have Toll Pager Number** permission.

   Users who have permission to receive numeric pages can use the following voice commands to specify whether they want to receive pages:
   - Enable pages
   - Disable pages

   Note: System administrators can enable or disable paging options from the Web Console, and users can use the Notifications & Miscellaneous Settings configuration section in My Profile to specify a pager number.
3. Specify a pager number for Contacts who have pagers.

No permissions are required for initiating a page to a Contact.

Pagers and Subscriber IDs

Specify the phone number of the paging service and the subscriber ID in the **pager** field in the user or contacts section in the Vocera Platform Web Console

Some paging services provide subscriber IDs to distinguish among different individuals. In this situation, subscribers typically share a single phone number issued by the paging service, and their unique subscriber IDs identify individual users.

For example, to send a numeric page to a person who uses this system, you could call a phone number such as 1-800-555-1111, listen to a message prompting you to provide a subscriber ID, and then enter an ID such as 4545. Some services also require you to enter a special character such as the pound symbol (#, also called a hash symbol) to indicate the end of the ID.

When you specify the pager phone number for users or contact entries that have such a paging service, you must enter both the phone number of the paging service and the subscriber ID in the **Pager** field in the Web Console. For more information on fields in Contacts, see the "Contacts" sections in the Vocera Platform Administration Guide. Use a semicolon to separate the toll-free number from the subscriber ID, and provide a special character to terminate the subscriber ID, if required. (The semicolon causes Vocera to pause until the pager is ready to receive the numbers to display.)

For example, if the number of the paging service is **(800) 555-1111,** the subscriber ID of the recipient is **4545**, and the paging service requires a pound (hash) symbol to terminate the subscriber ID, enter the following value in the **Pager** field:

(800) 555-1111 ; 4545 #

When a Vocera user issues the "Page" command, Vocera dials the pager number, waits until the connection is established, and then passes the service the subscriber ID of the person being paged followed by the pound (hash) symbol to indicate the end of the PIN. At the end of this sequence, Vocera automatically passes the pager the hunt group/DID number of the Vocera system, followed by the desk extension of the user who called, or simply the user's DID number, if he or she has one. The pager displays everything following the pound symbol.

The pager's owner returns the call by doing any of the following:

- Dialing the Guest Access number and then entering the Vocera user's extension at the telephony Genie prompt.
- Dialing the user's DID number.

In all cases, Vocera then connects the return call to the user's Vocera device—not to the desk phone.

Customizing Pager Strings in the Properties File

Customize pager strings in properties file to enable Vocera to support the paging requirements of your environment.

Important: Vocera recommends that you contact Vocera Technical Support to implement any customization to the `properties.txt` file.

Properties in `opt\vocera\server\properties.txt` allow administrators to configure the strings that the Voice Service uses to dial pagers and the strings that the pagers display. For example, some environments require trunk access codes to enable a call to an inside pager; other environments may want the pager to display only the extension of the Vocera hunt group or DID number, not the full dialing string. You edit these templates to allow Vocera to support the paging requirements of your environment. In a multiple facility installation, these properties apply to all facilities.

Note: If you modify the **properties.txt** file, you must stop and start the Voice Service to load the properties into memory. For more information on stopping and starting adapter service, refer to the "Starting and Stopping Adapter Services" section in the Vocera Platform Administration Guide

The following properties format the values passed to pagers.

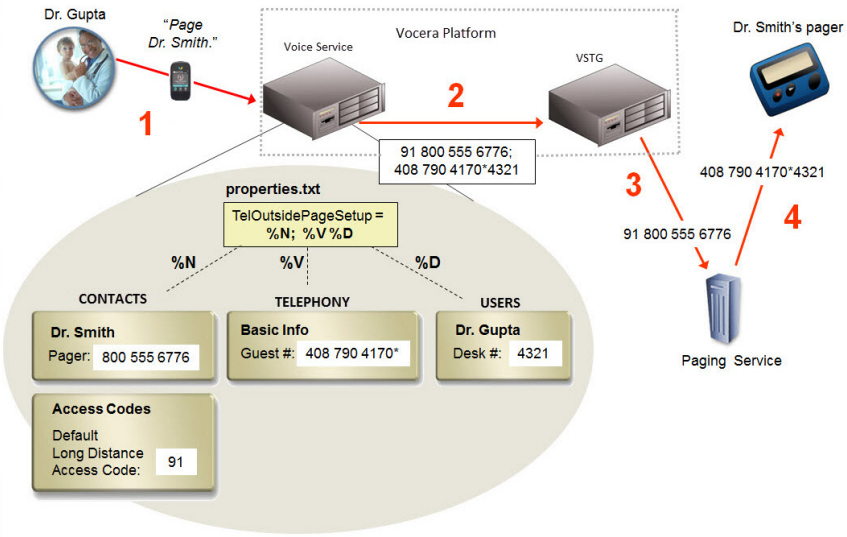
Property	Description
TelOutsidePageSetUp	Formats the string passed to a pager outside the Vocera system. The default value of this property is %N;%V%D. %N refers to the pager number Vocera will call, based on one of the following values: • An outside number specified in the voice command, "Dial a pager number." • The value entered in the **Pager**field of an Contacts entry • The value specified in **Pager** field of a user profile, if the number is not preceded by an X. %V refers to the Vocera hunt group number (analog integration) or DID number (digital integration). %D refers to the user's extension (either the **Desk Phone or Extension**, **Vocera Extension**, or dynamic extension, whichever applies). Administrators will not typically need to modify this default value.
TelInsidePageSetUp	Formats the string passed to a pager inside the Vocera system. The default value of this property is %N;%V%D. %N refers to the pager number Vocera will call, based on one of the following values: • A number specified in a voice command such as, "Page number 4321." • The value entered in the Pager Number field of Contacts entry • The value specified in Pager Number field of a the user profile, if the number is 1 to 6 digits long, or 7 digits long and preceded by an X. %V refers to the Vocera hunt group or DID number. %D refers to the user's extension (either the **Desk Phone or Extension**, **Vocera Extension**, or dynamic extension, whichever applies). Administrators may want to modify the default value. Imagine the following scenario: • An organization's telephony system requires a user to dial 64 to get to the trunk. • Users want pagers to display only the 4-digit extension of the Vocera hunt number, not the full ten-digit number. For example, if the Vocera hunt number is 408-790-4170, the pager should display 4170. • The paging system uses an asterisk to indicate a call-back number. In this situation, an administrator would provide the following value for this property: 64%N;4170*%D
TelOutsidePageSetUpForDialIn	Formats the string passed to an outside pager by a person calling into the Vocera hunt group. The default value is %N;%X. %N refers to the pager number Vocera will call (the value entered in the Pager Number field of the user profile or Contacts entry). %X refers to the call-back number the user enters when prompted by the Genie. Administrators will not typically need to modify this default.
TelInsidePageSetUpForDialIn	Formats the string passed to an inside pager when a person calls into the Vocera hunt group. The default value is %N;%X. %N refers to the pager number Vocera will call (the value entered in the Pager Number field of the user profile or Contacts entry). %X refers to the call-back number the user enters when prompted by the Genie. Administrators will not typically need to modify this default value.

Property	Description
TelOutsidePageSetUpForDID	Formats the string passed to an outside pager by a Vocera user placing the page who is assigned a DID in the Vocera system. The default value is %N;%I. %N refers to the pager number Vocera will call (the value entered in the Pager Number field of the user profile or Contacts entry). %I represents the full DID number that is used as the call-back number. Administrators will not typically need to modify this default.
TelInsidePageSetUpForDID	Formats the string passed to an inside pager by a Vocera user placing the page who is assigned a DID in the Vocera system. The default value is %N;%I. %N refers to the pager number Vocera will call (the value entered in the **Pager** field of the user profile or Contacts entry). %I represents the full DID number that is used as the call-back number. Administrators will not typically need to modify this default.

The following examples show how you can use the paging properties:

Example 1 - Paging Someone Outside Vocera System

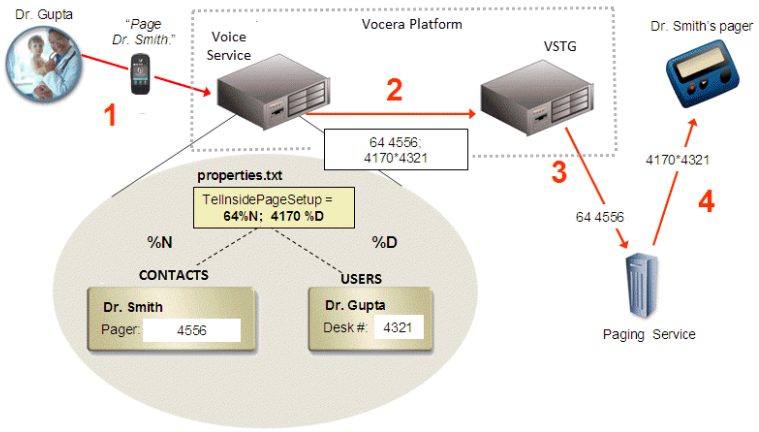
The following figure shows the flow of events that occur when a Vocera user pages someone whose pager number is outside the Vocera system. This example uses the default value of the **TelOutsidePageSetUp** property.



Example 2 - Paging Someone Inside Vocera System

The following figure shows the flow of events that occur when a Vocera user pages someone whose pager number is inside the Vocera system. In this example, the value of **TelInsidePageSetUp** is changed to meet the following criteria:

- The organization's telephony system requires a user to dial 64 to get to the trunk.
- Users want pagers to display only the 4-digit extension of the Vocera access number, not the full ten-digit number. For example, if the Vocera access number is 408-790-4170, the pager should display 4170.
- The paging system uses an asterisk to indicate a call-back number.



Specifying Fixed-Length Numbers

Use fixed-length properties to specify the fixed-length numbers in phone extensions and pager numbers to improve speech recognition.

Important: Vocera recommends that you contact Vocera Technical Support to implement any customization to the `properties.txt` file.

As a best practice, you should constrain telephone extensions and pager numbers to a fixed length. Fixed-length numbers can improve speech recognition, because they eliminate from the grammar all possibilities that are not of the specified length. The following properties in `/opt/vocera/server/properties.txt` specify the number of digits in fixed-length phone extensions and pager numbers.

Property	Description
TelExtensionLength	Specifies the number of digits in an extension. The default value is 0, which means that a variable length is accepted. A value of 0 through 7 specifies an extension of the given length.
TelPagerNumberLength	Specifies the number of digits in an internal pager system number. The default value is 0, which means that a variable length is accepted. A value of 0 through 7 specifies a pager number of the given length. It can be used in conjunction with the Page Number voice command (for example, "Page number 1234").

Note: If you modify the `properties.txt` file, you must stop and start the Voice Service to load the properties into memory.

Additional Setup

You can take full advantage of the telephony integration by performing some additional setup tasks.

Additional Telephony Configuration Tasks

You can use the Vocera Platform Web Console to set up permissions and phone numbers.

Here are some ways to manage phone numbers:

- Specify which groups have calling and forwarding permissions.

- Specify the desk phone extension, Vocera extension, home phone number, and cell phone number of Vocera users.
- Specify which users are enabled to access the Genie from a phone, and specify the default phone password for those users.
- Specify a range of phone numbers to use for dynamic extensions. This feature is useful when Vocera users do not have physical desk phones but still need to supply a call-back number when paging someone. See Dynamic Extensions on page 40 for more information.
- See Working with Pagers on page 45 for details about configuring Vocera to work with pagers.
- Specify the telephone extension and forwarding information for groups.
- Create Contacts that all users can share.

For detailed information on these tasks, refer to Vocera Platform Administration Guide.

Additional Telephony Configuration by Users

Users can add or modify phone number information in the configurable fields available in the Vocera Platform My Profile

Users can create or modify the following phone number information:

- Specify their desk phone extension, home phone number, cell phone number, and pager number.
- Specify a telephone number for forwarding Vocera device calls.
- Specify the telephone extension and forwarding information for groups that they manage.
- Specify the phone password used to authenticate users when they access the Genie from a phone.

For detailed information on modifying phone number information through My Profile, see theVocera Platform My Profile Guide.

Customizing the Prefix Used for Urgent Broadcasts

You can add a property to modify the prefix used for urgent broadcasts.

By default, Vocera uses the prefix `666` for urgent broadcasts. A user can enter the sequence `666` followed by a group's telephone extension to make an urgent broadcast to the Vocera devices of all members of the group.

To change the prefix for urgent broadcasts, add the following property to the `properties.text` file:

Property	Description
TelBroadcast	Prefix used for urgent broadcasts to the desk extension for a group. The default value is 666.

Note: If you modify the `properties.txt` file, you must stop and start the Voice Service to load the properties into memory.

For example, the following entry in **\vocera\server\properties.txt** sets the prefix for urgent broadcasts to `557`:

```
# Prefix for urgent broadcasts
TelBroadcast = 557
```

Configuring VSTG Properties

VSTG advance configuration requires editing a properties file, named `vstgproperties.txt`.

Important: We recommend that you contact Vocera Technical Support to make any modifications to the `vstgproperties.txt` file.

You can configure telephony settings for the Voice Service and Vocera SIP Telephony Gateway in the Vocera Platform Web Console For detailed information on general telephony configuration fields, see Configuring Telephony on page 26.

About VSTG Properties

You can set properties for Vocera SIP Telephony Gateway and control the VSTG behavior for your facility.

The `vstgproperties.txt` file sets properties that control the behavior of the Vocera SIP Telephony Gateway. The file is located in the `/opt/vocera/bin/vstgproperties.txt` folder.

Generally (although there are exceptions), property names have the following the “VTG” or “VGW ” prefixes that help you identify whether a property applies to Vocera SIP Telephony Gateway:.

Important: We recommend using the default settings for Vocera SIP Telephony Gateway. Contact the Vocera Technical Support to implement any customizations to the `vstgproperties.txt` file.

Modifying Properties

You can make changes to the `vstgproperties.txt` file and modify Vocera SIP Telephony Gateway properties.

Important: We recommend that you contact Vocera Technical Support for implementing any modifications to the `vstgproperties.txt` file.

To modify the VSTG properties, follow these steps:

1. Connect to your Vocera Platform server via SSH, and navigate to `/opt/vocera/bin/vstgproperties.txt`
2. Use the `cat` command to open and view the `vstgproperties.txt` file.
3. Make changes to properties in the text file using the `vi` command.
   You can use the `i` command to insert or the `u` command to update the information in the text file.
   You can use the **Esc** key from your keyboard to exit the edit mode.
4. Save the file and quit the editor using the `:wq` command.
5. Restart the Telephony service from the Web Console to load the revised settings.

For information on restarting the telephony service, see Restarting Telephony Adapter Services on page 53.

Restarting Telephony Adapter Services

Stop and start adapter services from the Vocera Platform Web Console.

1. Navigate to **Adapter Services** in the **Status** section of the navigation bar.
   The Adapter Services page displays with a list of adapter services configured in your system. It also displays the version number, status, and actions (start and stop) for each adapter service.
2. Locate the Telephony adapter service.
3. Select **Stop** in the **Actions** column.
   The status column displays STOPPING followed by NOT_ACTIVE.
4. Click**Start** in the **Actions**column.
   The status column displays STARTING followed by ACTIVE.

Configuring Ports

This section describes how to configure Vocera SIP Telephony Gateway ports.

Vocera SIP Telephony Gateway Ports

Modify port information to set new values for Vocera SIP Telephony Gateway port properties.

Important: We recommend that you contact Vocera Technical Support to make any modifications to the `vstgproperties.txt` file.

For information on VSTG properties and location of the `vstgproperties.txt` file, see About VSTG Properties on page 52

You can set the following properties to configureVocera SIP Telephony Gateway ports:

Property	Description
VTGCallSignalingPort	Specifies the port to which Vocera SIP Telephony Gateway listens on for SIP signaling. The default port number is 5060.
VTGBaseAudioPortNo	Sets the base UDP port for receiving audio packets from Vocera badges and smartphones. The default port number is 5300. By default, Vocera SIP Telephony Gateway opens up to 100 UDP ports to receive audio from Vocera badges and smartphones. **Important:** If you change this property to something other than 5300, you must also add the following property to the `opt/vocera/bin/server/vstgproperties.txt` file on the Voice Service, and then stop and start the server to load the property: `IPBasePhonePortNo = PortNumber` where PortNumber is equal to the port specified for `VTGBaseAudioPortNo`.
VTGRTPBasePort	Sets the base UDP port for receiving audio packets from the IP PBX or VoIP gateway. The default port number is 9200. Each client session uses an RTP and an RTCP port. Therefore, the total number of UDP ports for Voice Service to Vocera SIP Telephony Gateway audio is two times the number of **VTGMaxChannelsSupported**, which is set to 100 by default, resulting in 512 ports allocated by default.

Configuring VSTG Logging

Modify VSTG logging properties to control logging information.

You can make changes to the properties available in `vstgproperties.txt` file to control the logging information for desired results. For information on locating and accessing the `vstgproperties.txt`, see About VSTG Properties on page 52.

The VSTG log file names begin with the **vtg** prefixes, respectively. The names of debug-level logs, which have more detail than the console logs, begin with the **vtg-dlog** prefix.

Each Vocera SIP Telephony Gateway log statement has a preamble consisting of four sections:

- The date the event happened.
- The time the event happened.
- The ID of the thread generating the log statement and the level of the log statement (for example, INFO or DEBUG).
- The device ID (MAC address) in brackets.

Note: If a device is not associated with a log statement, 12 dashes appear in the brackets.

The following table describes the VSTG logging properties that you can modify:

Property	Description
PJSIPLogLevel	Controls the level of logging from the PJSIP stack. Specify a value from 1 (least amount of logging) to 10 (greatest amount of logging). Generally, you should set this to 5 or lower unless you are experiencing problems. The default is 4.
VGWConsoleLoggingLevel	Sets the logging level for the console. Specify 0 to 8, 0 being the least amount of logging and 8 being the most. The default is 4. 0 = FATAL 1 = ERROR 2 = WARNING 3 = INFO 4 = DEBUG 5 = PJSIP 6 = SIP_MSGS 7 = DEBUG_VERBOSE 8 = RTP_INFO If you specify 5 (PJSIP), the amount of PJSIP logging depends on the **PJSIPLogLevel** property.
VGWFileLoggingLevel	Sets the logging level for the log file. Specify 0 to 8, 0 being the least amount of logging and 8 being the most. See **VGWConsoleLoggingLevel** for the list of logging levels. The default is 4.
VGWMaxLinesPerLogfile	Sets the maximum size of each log file. The default is 70,000 lines.
VGWNumLogFilesToKeep	Sets the maximum number of log files to keep for the current gateway process. If you have plenty of disk space available and you do not want to delete older log files, you can set this property to 0. The default is 50. **Note:** Each time the gateway service is stopped and started, it will create up to **VGWNumLogFilesToKeep** new log files.
VGWMaxDaysToKeepLogfiles	Sets the maximum number of days to keep log files for the current gateway process. The default is 21 days. When the Vocera SIP Telephony Gateway is started, it finds log files that have not been modified within the **VGWMaxDaysToKeepLogfiles** period, and it deletes those files. This keeps the logs directory from growing too large. To preserve all log files and not automatically delete them, set **VGWMaxDaysToKeepLogfiles** to 0.
VTGLogMaxLines	Sets the maximum size of each VSTG console log file. This property does not affect the size of debug log files. The default is 100,000 lines.
VTGLogMaxFiles	Sets the maximum number of VSTG console log files. The default is 100 files.

Configuring Jitter Buffer Settings

This section describes how to configure Vocera SIP Telephony Gateway to handle jitter for RTP packets on the inbound or outbound Vocera side.

Jitter Buffer

Configure jitter buffer properties for Vocera SIP Telephony Gateway to prevent packet loss.

You can choose to employ a jitter buffer for the Vocera SIP Telephony Gateway to prevent lost packets. However, a jitter buffer may increase the audio latency for calls.

When you open the `vstgproperties.txt` file, you can set the following jitter buffer properties:

Property	Description
VGWUseRTPJitterBuffer	Enables a jitter buffer for RTP packets. By default, this is set to TRUE, meaning the jitter buffer is enabled.
RTPJitterMaxSize	Sets the maximum number of packets in the RTP jitter buffer. The default is .
RTPJitterPrefetch	The number of packets to pre-buffer. The default is 3.
VRTPJitterMaxSize	Sets the maximum number of packets in the RTP jitter buffer on voice side. The default is -1.
VRTPJitterPrefix	The number of packets to pre-buffer on voice side. The default is 3.

Note: The **VRTPJitterMaxSize** and the **VRTPJitterPrefix**values are applicable only if the **VGWUseVRTPJitterBuffer** is set to "true". Since the `pjsip` media framework is used, certain values are considered not valid and the application adjusts the values and logs when the value is adjusted.

PJSIP Jitter Buffer

The default PJSIP jitter buffer is an adaptive jitter buffer.

When **VGWUserRTPJitterBuffer** and **VGWUseVRTPJitterBuffer** values are set to false (or not set), the following PJSIP default values are used:

Property	Description
Jitter Buffer Max	Sets the maximum number of packets in the RTP jitter buffer. The default value is 25.
Jitter Buffer Init	Enables a jitter buffer for RTP packets. The default is 0 .
Jitter Buffer Prefetch Max	Sets the maximum prefetch value for jitter buffer. The default is 20.
Jitter Buffer Prefetch Min	Sets the minimum prefetch value for jitter buffer. The default is 1.

Specifying the Companding Algorithm (mu-law or a-law)

You can specify `VTGUseALaw` property for European locales to switch to the standard G711 a-law companding algorithm.

By default, the Vocera SIP Telephony Gateway uses the G.711 mu-law companding algorithm.

The G.711 mu-law companding algorithm is a standard for converting analog data into digital form using pulse code modulation in North America and Japan. For European locales, you can switch to the G.711 a-law companding algorithm by specifying the following property:

```
VTGUseALaw = true
```

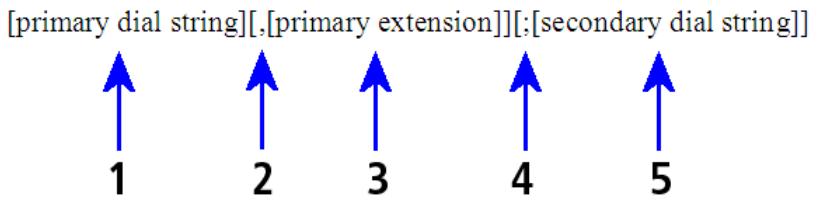
For outbound traffic, Vocera SIP Telephony Gateway uses the audio codec specified by the `VTGUseALaw` property for negotiation with the IP PBX, and then it adjusts to the codec that the IP PBX offers. If `VTGUseALaw` is set to `FALSE` (the default), G.711 mu-law is used. Otherwise, G.711 a-law is used.

For inbound traffic, Vocera SIP Telephony Gateway converts the audio to G.711 mu-law codec before sending it to the Voice Service.

Handling Page Dial Strings

The Vocera SIP Telephony Gateway explicitly sets timers for dial strings to handle paging. VSTG also uses pause characters to control when dual tone multi-frequency (DTMF) is sent to the PBX.

The following figure shows the format of a valid paging dial string for the Vocera SIP Telephony Gateway:



1. **Primary Dial String** – a dialable phone number.
2. **Comma** – separates the primary dial string from the primary extension. This separating comma along with any commas in the primary extension will be added to the DTMF queue as pauses. The comma also distinguishes the primary dial string from the primary extension. The duration of a comma pause is configurable for each trunk access code; see Configuring Trunk Access Codes (TACs) on page 59.
3. **Primary Extension** – a string of DTMF digits to be sent to the PBX. It must start with at least one comma, and it cannot contain a semicolon.
4. **Semicolon** – a single semicolon for the Connect Pause. The semicolon introduces the delay before sending the secondary dial string. It also distinguishes between the primary dial string/extension and the secondary dial string. The duration of a semicolon pause is configurable for each trunk access code; see Configuring Trunk Access Codes (TACs) on page 59.
5. **Secondary Dial String** – a string of DTMF digits to be sent to the PBX. It must start with a semicolon. After that, any valid DTMF character or pause character (comma or semicolon) is valid.

Vocera SIP Telephony Gateway can accept a dial string of the form:

```
4085551234,,9898,,##;5559999,,,3232,,,5,,7,,555667777;;##*
```

Vocera SIP Telephony Gateway interprets this dial string as follows:

- Primary Dial String = `4085551234`
- Primary Extension = `9898,,##`
- Secondary Dial String = `5559999,,,3232,,,5,,7,,555667777;;##*`

The comma and semicolon serve two distinct functions in the dial string. They introduce pauses in sending DTMF, and they affect the state behavior of the call by demarking the primary dialed number, the primary extension, and the secondary dial string.

Configuring DTMF

You can use the dual-tone multi-frequency (DTMF) properties to configure DTMF event handling.

Vocera SIP Telephony Gatewaysupports dual-tone multi-frequency (DTMF) signaling. You can press keys on your phone to send DTMF tones to the PBX. The DTMF signaling is transmitted in the RTP stream, but it is not encoded as part of the audio; it is included as a separate payload type. The volume, duration, and inter-digit duration of DTMF signals are all configurable. You can also configure Vocera SIP Telephony Gateway to not hang up the call until all the DTMF digits are sent.

The DTMF digits supported are 0 through 9, #, or *. For arbitrary pauses in a secondary dial string, you can add comma and semicolon to the DTMF queue. When the RTP sending thread pulls a comma or semicolon off the DTMF queue, it will stop sending DTMF for as long as the character represents. The duration of comma and semicolon pauses is configurable for each trunk access code; see Configuring Trunk Access Codes (TACs) on page 59.

The following properties let you configure handling of DTMF events:

Table 2: DTMF properties

Property	Description
VGWDTMFInterDigitInterval	Specifies the interval between DTMF digits in milliseconds. The default is 250.
VGWDTMFDuration	Specifies the duration of each DTMF digit in samples. For G.711, the sampling rate is 8000 samples/second, which means each sample is 1/8000 second (0.125 milliseconds). The default value for VGWDTMFDuration is 900 samples (112.5 milliseconds).
VGWDTMFVolume	Specifies the volume of DTMF signals in absolute dBm0 (the sign is removed). Enter a value between 36 and 0. The default is 16. If you enter a value outside the valid range, 16 is used.
VGWDTMFWaitToHangup	Whether to not disconnect the call until all DTMF digits in the queue have been sent. The default is FALSE, that is, the call is hung up without waiting for DTMF digits in the queue.

Handling DTMF in the RTP Payload

The Vocera SIP Telephony Gateway supports DTMF events as RTP payload as specified in the RFC 2833.

For more information on the RFC, refer to RFC 2833.

If your IP PBX does not handle DTMF events as RTP payload and you do not use a media termination point (MTP) to convert out-of-band SIP Notify DTMF messages into RFC 2833 in-band (RTP), Vocera recommends that you connect to the PBX via a T1 ISDN-PRI circuit. This would connect to a media gateway (such as a Sangoma Media Gateway), and then to the Vocera SIP Telephony Gateway, as shown in the following figure.

Configuring SIP Provisional Message Reliability

Configure SIP provisional message reliability to support interoperability with the public switched telephone network (PSTN).

To support interoperability with the PSTN such as hearing a ring back tone when you dial a number, the Vocera SIP Telephony Gateway needs to support SIP early media. This requires using the option tag “100rel”, which enables reliable provisional responses. The Vocera SIP Telephony Gateway defaults to initially trying "100rel" from the following property:

```
VTGTry100Rel = true
```

If the SIP message returns a “420 Bad Extension” response, VSTG tries to call again without requiring the “100rel”option tag.

To force calls to have early media (and a ring back tone) or otherwise fail, set the `VTGRequire100Rel` property to `TRUE`. If the SIP message returns a "420 Bad Extension" response, the call will fail. The following table describes the “100rel” properties:

Property	Description
VTGTry100Rel	Whether to support SIP early media by trying the“100rel” option tag with the SIP message. The default is TRUE, which means Vocera SIP Telephony Gateway initially tries “100rel”. If the provisional response is not acknowledged, Vocera SIP Telephony Gateway tries the call again without requiring the “100rel” option tag.
VTGRequire100Rel	Whether to always require the “100rel”option tag to enable reliable provisional responses. The default is FALSE. When this property is set to TRUE and a provisional response is not acknowledged, the call fails.

Configuring Ring Back Options

Configure VSTG to use it's own ring back tone if your IP PBX does not support SIP early media or does not provide a ring back.

The following table describes the properties and values that you can set to configure the ring back option:

Property	Description
VTGProvideRingBack	Specifies whether to provide a ring back tone from the VSTG rather than relying on the IP PBX to provide the ring back tone. The default is TRUE.
VTGRINGBACK_FREQ1	Specifies the first frequency tone of the dual tone. The default values for: • US is 440 • UK is 400
VTGRINGBACK_FREQ2	Specifies the optional second frequency tone of the dual tone. The default values for: • US is 480 • UK is 450
VTGRINGBACK_ON	Specifies the Playback ON duration, in milliseconds. The default values for: • US is 2000 • UK is 400
VTGRINGBACK_OFF	Specifies the Playback OFF duration, in milliseconds. The default values for: • US is 4000 • UK is 200
VTGRINGBACK_CNT	Specifies the count of the number of frequencies to use. The default values for: • US is 1 • UK is 2
VTGRINGBACK_INTERVAL	Specifies the Playback OFF duration, in milliseconds for the last tone descriptor. The default values for: • US is 4000 • UK is 2000

Configuring Trunk Access Codes (TACs)

Configure trunk access codes (TACs) properties to specify how specific dial strings are processed.

To provide flexibility of paging support, you can specify global defaults that affect how Vocera SIP Telephony Gateway handles paging, or you can configure trunk access codes (or TACs) to specify how specific dial strings are processed. Each TAC is compared as a prefix to a dialed number, so you can use it to override entire classes of dialed numbers.

The TAC property values are entered into a matrix, with each value delimited by a forward slash (/) as a separator character. The first column contains the default value for each property. After the default value in each row, you can specify up to 64 TAC values, each delimited with a slash. White space characters (such as space or tab) are ignored.

When you specify more than one value for any of these properties, the order is important. If two or more TACs begin with the same sequence of characters, list them in descending order of length when you specify values for the `VTGTrunkAccessCode` property.

Vocera's parser processes a dial string from left to right, and when it finds a sequence of digits that matches a value specified for `VTGTrunkAccessCode`, it interprets that sequence as the TAC portion of the dial string. Therefore, given a dial string of `1234914087904100` and two `VTGTrunkAccessCode` property values listed in the order `12/1234`, the parser interprets the first match, `12`, as the TAC. However, when the same property values are listed in the order `1234/12`, the first match is `1234`.

The following table describes the TAC properties:

Property	Description
VTGTrunkAccessCode	Specifies a trunk access code (TAC) to identify a number dialed that passes through the Vocera SIP Telephony Gateway to the IP PBX to communicate with a Vocera device. The first value is "DEFAULTS", which cannot be changed. It is used to identify the first column in the matrix as default values. To add a TAC, type a forward slash ("/") followed by the access code. You can add up to 64 TACs.
VTGHangupMacro	Specifies a sequence to dial when a Vocera device ends a call initiated using the callback option in response to a VMI message or a page. The required sequence varies depending on the device. For example, nurse call systems and paging systems from different vendors require different hang-up sequences. Consult the device documentation for details. By default, this property value is not defined.
VTGPagingCommaDuration	Specifies the pause duration (in milliseconds) of each comma in the paging dial string. The default is 2000 ms, or 2 seconds.
VTGPagingSemicolonDuration	Specifies the pause duration (in milliseconds) of each semicolon in the paging dial string. The default is 3000 ms, or 3 seconds.
VTGPagingAddPrimaryExtOnSDPNegComplete	Whether to add the Primary Extension to the DTMF queue when SIP SDP offer/answer negotiation is complete. The default is TRUE.

Property	Description
VTGPagingAddPrimaryExtOnCONFIRMED	Whether to add the Primary Extension to the DTMF queue after the call is connected and the ACK is confirmed. The default is FALSE. The Primary Extension will be added to the DTMF queue at the first event that causes it to be added based on Vocera SIP Telephony Gateway properties. Consequently, if VTGPagingAddPrimaryExtOnSDPNegComplete is set to TRUE for a particular TAC, it takes precedence over the VTGPagingAddPrimaryExtOnCONFIRMED property if it is also set to TRUE.
VTGPagingAddSecondaryOnCONFIRMED	Whether to add the Secondary Dial String to the DTMF queue after the call is connected and the ACK is confirmed. The default is TRUE. The Primary Extension will be added to the DTMF queue at the first event that causes it to be added based on Vocera SIP Telephony Gateway properties. Consequently, if VTGPagingAddPrimaryExtOnSDPNegComplete is set to TRUE for a particular TAC, it takes precedence over the VTGPagingAddPrimaryExtOnCONFIRMED property if it is also set to TRUE.
VTGPagingAddSecondaryAfterPrimaryExt	Whether to add the Secondary Dial String to the DTMF queue immediately after the Primary Extension. The default is FALSE. In some cases, a call may not be explicitly answered (that is, it does not transition to CONNECTING and then CONFIRMED) until more digits are sent. If so, set the value of this property to TRUE.
VTGPagingAppendPoundToPageString	Whether to append a pound key (#) pound key to the end of the page dial string. The default is TRUE.
VTGGainVoceraToSIP	Adjusts the volume of audio sent from a Vocera device to a telephone. By increasing or decreasing this value, you increase or decrease the volume of the call in 3 dB increments. For example, a value of 3 increases the volume by 9 dB (3 * 3 = 9). Valid values range from -6 to 6, inclusive. The default is 0. The gain is removed when the call ends.
VTGGainSIPToVocera	Adjusts the volume of audio sent from a telephone to a Vocera device. By increasing or decreasing this value, you increase or decrease the volume of the call in 3 dB increments. For example, a value of 3 increases the volume by 9 dB (3 * 3 = 9). Valid values range from -6 to 6, inclusive. The default is 0. The gain is removed when the call ends.

Sample Vocera SIP Telephony Gateway Trunk Access Code Properties

Suppose Vocera devices interact with a paging system made by company PS, a blood pressure monitoring system made by company BP, and a nurse call system made by company NC. The following entries in `vgwproperties.txt` define the TACs for these systems:

```
#                                                PS      BP     NC
#-----------------------------------------------------------------------
VTGTrunkAccessCode                    = DEFAULTS / 835   / 7812 / 781
VTGHangupMacro                        =          / ##    /      / *9*
VTGPagingCommaDuration                = 2000     /       / 1000 / 1000
VTGPagingSemicolonDuration            = 3000     /       / 2000 / 2000
VTGPagingAddPrimaryExtOnSDPNegComplete = true    / false /      /
VTGPagingAddPrimaryExtOnCONFIRMED     = false    / true  /      /
```

```
VTGPagingAddSecondaryOnCONFIRMED       = true     / false /      /
VTGPagingAddSecondaryAfterPrimaryExt   = false    / true  /      /
VTGPagingAppendPoundToPageString       = true     / false /      /
VTGGainVoceraToSIP                     = 0        / 2     / 1    / 1
VTGGainSIPToVocera                     = 0        / 1     / 2    / 2
```

In this example, the hang-up macro ## is defined for PS, which has the TAC 835. Similarly, the hang-up macro *9* is defined for NC, which has the TAC 781. However, BP, which has the TAC 7812, does not define a hang-up macro (the value is filled with spaces). Also, the TAC for BP is listed before the TAC for NC because both TACs begin with the sequence 781 and the TAC for BP is longer than the TAC for NC. Listing the TACs in this order ensures that the Vocera parser will extract them correctly from a dial string. Different comma and semicolon duration and paging properties are specified for PS, whereas the other TACs use the default values for those properties.

Configuring Caller Information

You can configure CallerInfo properties to include caller information.

When calling out through Vocera SIP Telephony Gateway , caller information can be included in the From header of the INVITE message. For example, a From header might look something like:

> From: Doctor Jankis <sip:4085559898@enterprise.com>;
> tag=023874593485734

In this example, the display name is Doctor Jankis and the user part of the From URI (the calling party number) is 4085559898.

In the Vocera SIP Telephony Gateway, the display name and the calling party number values can be set in different ways depending on the Vocera configuration.

Property	Description
VTGUseDialCallerInfoInINVITE	Whether to use the caller information contained in the Dial signal from the Voice Service. The default is FALSE.
VTGFromURIUserPartInINVITE	The user part of the From URI to include in the INVITE message. If there is no Calling Party Number specified in the **Telephony-Basic Information >SIP Settings > Calling Party Number** field in the Web Console, you can specify an alternative calling party number here. The default is 8005551212.
VTGFromHeaderDisplayNameInINVITE	The display name part of the From URI to include in the INVITE message. If the display name of the caller cannot be identified from the caller ID, this display name will be used instead. The default is “Vocera.”

Caller Information in the Dial Signal from Voice Service

Caller information is included in the Dial signal from the Voice Service in some call scenarios.

The Dial signal from the Voice Service can contain caller information that includes the display name and the number. If caller information is present in the Dial signal, it can be used in the INVITE message.

Caller information is included in the Dial signal from the Voice Service in the following two scenarios:

- The caller's Vocera extension (either the Desk Phone or Extension, Vocera Extension, or dynamic extension, whichever applies) is a Vocera DID number.

- The caller called into Vocera from a phone, and the system has the incoming caller ID information. In this case, the Voice Service passes through the caller ID.

Caller information includes the display name of the caller unless the display name cannot be identified from the caller ID.

Call Scenarios Involving Caller Information

Assess the call frequency of certain Vocera call scenarios before enabling dial signal caller information.

In certain Vocera call scenarios, caller information might be confusing or cause unintended results. Consequently, you should weigh the frequency of these scenarios before you decide to enable dial signal caller information in the Vocera SIP Telephony Gateway.

- **Scenario 1:** Using a SIP-enabled desk phone with the extension 5818, Doctor Jankis calls the Vocera Direct Access hunt group number, and then uses the Genie to call a Vocera user. When the user answers the call on a badge, the badge displays 5818 on screen, as intended.
- **Scenario 2:** Using a SIP-enabled desk phone with the extension 5818, Doctor Jankis calls the Vocera Direct Access hunt group number, and then uses the Genie to call a Vocera user. Since the user is not logged in, the call is forwarded to the user's home phone. However, the home phone is set to not accept calls from phones whose caller ID is blocked or does not conform to standard U.S. 10-digit phone numbers. In this case, the call may not go through.
- **Scenario 3:** Using his cell phone, which blocks caller ID, Doctor Jankis calls the Vocera Direct Access hunt group number, and then uses the Genie to call a Vocera user. Since the user is not logged in, the call is forwarded to the user's home phone. However, the home phone is set to not accept calls from phones that block caller ID. In this case, the call may not go through.
- **Scenario 4:** Using his cell phone, Doctor Jankis calls the Vocera Direct Access hunt group number, and then uses the Genie to call a Vocera user. Since the user is not logged in, the call is forwarded to the user's cell phone. **Doctor Jankis' caller ID (his cell phone number) is displayed on the user's cell phone. This may not be what Doctor Jankis intended.**

If the results of any of these call scenarios are unintended and you would rather display the DID number of the Vocera trunk as the caller ID for all calls, then set the **VTGUseDialCallerInfoInINVITE** property to FALSE (the default setting).

Suppressing Dial Signal Caller Information

Set the `VTGUseDialCallerInfoInINVITE` property value to “False” to hide call information from the Voice Service Dial signal.

In some cases, you may want to NOT use caller information from the Voice Service Dial signal. To do so, set the following property:

```
VTGUseDialCallerInfoInINVITE = false
```

This property affects all calls.

If the Dial signal contains no caller information or the `VTGUseDialCallerInfoInINVITE` property is set to `false`, the Calling Party Number specified in the **Telephony-Basic Information >SIP Settings > Calling Party Number** field in the Web Console entities is used as the user part of the From URI.

Configuring Calling Party Number Prefixes for Incoming Calls

Use the PrefixCallerID properties to add a prefix to the calling party number for incoming calls.

The `vstgproperties.txt` file supports the following properties that you can use to add a prefix to the calling party number for incoming calls. These properties may be needed for PBXs that use E.164 numbering plans. The new prefixed number is the calling party number that the Vocera system uses to match for caller ID purposes for Vocera Access Anywhere.

These properties are commented out by default, but you can uncomment them and modify them. Enter the same number of values for each property. As with trunk access codes (TACs), use a forward slash (/) as a separator character. Both properties are limited to 256 characters.

The following table describes the supported PrefixCallerID properties:

Property	Description
VTGPrefixCallerIDIncomingINVITEMatch	Specify dialplan entries to match against a calling party number. Numbers match at the beginning of each specified dialplan entry, with each subsequent "x" character standing for an actual digit. You may enter dashes (which are ignored) for readability, but not parentheses. Vocera matches an incoming number with the first appropriate dialplan entry going from left to right.
VTGPrefixCallerIDIncomingINVITE	Specify the prefix for the corresponding dialplan entry.

```
VTGPrefixCallerIDIncomingINVITEMatch =  2xx-xxxx / 33x-xxxx / 408-xxx-xxxx /
                                        xxx-xxx-xxxx
VTGPrefixCallerIDIncomingINVITE      =  0 / 00 / 001 / 76
```

In the above example, the dialplan entries for the `VTGPrefixCallerIDIncomingINVITEMatch` property are shown on two lines to fit on this page, but they should appear on one line in the `vstgproperties.txt` file. In the example, the following prefixes are used:

- For 7-digit calling party numbers starting with "2", the prefix "0" is added.
- For 7-digit calling party numbers starting with "33", the prefix "00" is added.
- For 10-digit calling party numbers starting with "408", the prefix "001" is added.
- For all other 10-digit calling party numbers, the prefix "76" is added.

Detecting the Connection to the IP PBX

Configure required parameters to send an OPTIONS message to the IP PBX to determine if the SIP trunk is still alive or not.

The Vocera SIP Telephony Gateway does not have a direct physical connection to the IP PBX (or VoIP gateway). However, some IP PBXs support using the OPTIONS message to ping the PBX to determine if the SIP trunk is up. The following parameters are for sending an OPTIONS message to the IP PBX to determine if the SIP trunk is still alive or not. If the connection goes down (perhaps due to a network problem), an email notification is sent to the Vocera administrator.

Note: If you have set up a VSTG service array and one of the services stops responding, the Voice Service automatically redirects outbound calls to another available VSTG service for uninterrupted service. If the connection goes down (perhaps due to a network problem), an email notification is sent to the Vocera administrator.

The following table describes the connection status properties and the default values:

Property	Description
VTGUseOPTIONSForKeepAlive	Whether to use the OPTIONS message to ping the IP PBX to determine if the SIP trunk is up. The default is TRUE. **Note:** You should only set this property to TRUE if your PBX supports using an OPTIONS message as a keep-alive mechanism.
VTGOPTIONSKeepAliveInterval	Specifies the time interval between pings of the IP PBX in seconds. The default is 30, but you can set it as low as 5.
VTGOPTIONSKeepAliveToUser	Specifies the number for the user part of the To header and for the Request URI. The default is "trunk_status". In most cases, you should not change this value. You can specify a null string (""). Do NOT change the default value to a real user number.
VTGUseOPTIONSKeepAliveText	Whether to include the text "keepalive" in the OPTIONS message payload. The default is TRUE, which is appropriate for most IP PBXs.

Using UDP or TCP Transport to the IP PBX

By default, VSTG uses UDP to send SIP packets to the IP PBX. You can configure Vocera SIP Telephony Gateway to use TCP transport instead.

The following table describes the SIP transport property details:

Property	Description
VTGSipTransport	Specifies the transport protocol used to send SIP packets to the IP PBX. Specify `udp` (the default) or `tcp`. You can enter a comma-delimited list of values to support multiple transport types. The first value in the list denotes the transport protocol for outgoing calls. All values in the list denote supported protocols for incoming calls. Also, the calls can originate from different PBX trunks. If you specify TCP or UDP, both TCP and UDP are supported. Here's an example: `VTGSipTransport = tcp` This means that all outgoing calls use TCP transport, but incoming calls can use TCP or UDP transport.

Entering Phone Numbers

Vocera allows you to enter various types of phone numbers.

For example, when you add a user to the Vocera system, you can specify the user's desk extension, cell phone number, pager number, and home phone number. Similarly, groups and contacts entries also have phone numbers associated with them.

In Vocera, the value of a phone number can contain any of the following characters:

- Digits. Any of the following characters: 0123456789.
- Special dialing characters.
- Special dialing macros.
- PIN template macros.

Vocera ignores any other character that you enter in phone number fields. For example, you can enter **(408) 790-4100**, to make a number more readable, instead of **4087904100**. Vocera ignores the extra spaces, dashes, and parentheses when the number is actually dialed. However, Vocera may add access codes or area codes to numbers before dialing.

Note: Entering a number in a console field does not guarantee that a user will be able to call that number.

About Call Types

You can manage group permissions to allow or restrict group members from making various types of calls from the Vocera Platform Web Console **Group** voice permissions.

To grant or revoke permissions for specific call types in the , navigate to **Groups** in **Manage** section of the navigation bar in Web Console. You can select and existing group or add a new group and find the Voice Permissions configuration section in the Add/Edit Group page. For more information on Group Voice permissions, refer to the "Voice Permissions Reference "section in the Vocera Platform Administration Guide .

Vocera recognizes the following call types:

Table 3: Call types

Call Type	Description
Internal	A number on your side of the PBX. For example, a call to a desk extension or internal pager is an internal call. Vocera dials these numbers without adding any other codes. The Call Internal Numbers permission controls a group's ability to make internal calls.

Call Type	Description
Outside	A number on the other side of the PBX. For example, a call to a business or residence or service or outside pager is an outside call. There are two types of outside call, toll-free and toll: • By default, a call within the specified local area code is **toll-free**. Therefore, you must grant a group Call Toll-Free Numbers permission to enable members of that group to make local calls. Vocera omits or includes the area code when making a local call, depending on the value of the **Omit Area Code when Dialing Locally** field. Vocera also adds any access codes you need to get an outside line, such as a **9**. • By default, any other call is considered a **toll call**. For example, domestic or international long distance calls are toll calls. The Call Toll Numbers permission controls a group's ability to make toll calls. For domestic long distance calls, Vocera adds any access codes you need to get an outside line, such as a **9**, and any numbers you need to specify a long distance call, such as a **1** or a **0**. The format for an international long distance number depends on the locale of the Vocera Platform Voice Service. Typically, you specify the complete dialing sequence, including access codes and country codes, as appropriate, and Vocera dials the string as-is.

Phone Number Rules

The following rules define how Vocera interprets a value in a phone number, pager number, or extension field in the Vocera Platform Web Console or Vocera Platform My Profile .

These requirements include:

- A value that starts with the letter X (for example, X1234) represents an **internal number** (for example, a desk extension or an inside pager number).
- A value that starts with the letter Q (for example, Q901114087904100) represents a number to be interpreted **literally**. Vocera dials such numbers as-is, without adding any access codes or area codes.
- Vocera also interprets a value with 6 or fewer digits as an **internal number**. However, for clarity, it's best to type the letter X before such values to make the meaning explicit. On a Vocera system configured for the UK locale, you must type the letter Q before an outside number of 6 or fewer digits (for example, Q9100 specifies an access code and a short code service number) to make Vocera dial the number as-is.
- A value longer than the maximum length for the locale is also interpreted **literally**. The following table lists the maximum phone number length, including area code, for each supported locale.

Locales	Maximum Length
AU	10 digits
CA	10 digits
GB	11 digits
NZ	11 digits
US	10 digits
IE	10 digits
AE	10 digits
QA	8 digits
SA	11 digits
OM	11 digits
KW	8 digits

- Some locales define a fixed length for telephone numbers. When a phone number field value is of this length, it represents a **local outside number**. For example, a Vocera system configured for the US locale interprets a 7-digit value as an outside number within the local area code. The following table lists the fixed length of local numbers, not including area code, defined for each supported locale.

Locales	Fixed Length
AU	Not defined
CA	7 digits
GB	Not defined
NZ	7 digits
US	7 digits
IE	7 digits
AE	7 digits
QA	8 digits
SA	7 digits
OM	7 digits
KW	7 digits

- In any other case, the value represents an outside number. Vocera adds access codes and applies **long distance** and **toll call** rules as appropriate. For clarity, it's best to include the area code with any outside number, local as well as long distance.

Vocera uses the same rules to interpret phone numbers spoken through voice commands, with the following additional limitations:

- You cannot use special dialing characters in a voice command.
- You cannot specify an extension of seven or more digits in a voice command.
- You must include the area code when speaking an outside number.

Special Dialing Characters

A special dialing character is a non-numeric character that you can enter in a field in the Vocera Platform Web Console or the Vocera Platform My Profile that requires an access code, phone number, or extension.

For example, you can use an asterisk (`*`) to simulate pressing the star key on a touch-tone phone, or enter an `X` at the beginning of a number to tell Vocera to treat that number as an extension.

The following table shows a list of special dialing characters that Vocera supports:

Character	Effect
,	When connecting to an analog PBX, pauses for two seconds before dialing the next digit. Use a comma to force Vocera to pause briefly during a dialing sequence. Use multiple commas if you need to pause for more than two seconds. For example, suppose your system requires you to dial `9` as the local access code, but it is slow to establish an outside line. If you enter `9,` in the Default Local Access Code field, Vocera dials a 9 and then pauses to let the system establish the outside line before continuing with anything following in the dialing sequence. Do not use a comma when you are connecting to a digital PBX. The comma character is not recognized by a digital PBX, and it may prevent a connection. However, you can use commas in sequences issued after a connection is made. For example, you can use commas to the right of a semicolon.

Character	Effect
;	Separates the data Vocera uses to connect a call from any data Vocera passes through after the call is established. Characters to the left of the semicolon are used to establish the connection, and characters to the right of the semicolon are passed through after the connection is made. For example, you may need to use a sequence of characters such as the following to forward calls to a pager: `Q 9, 1 (408) 555-1313 ; %V %D #` In this sequence, `Q 9, 1 (408) 555-1313` establishes the connection; the Q tells Vocera not to prepend an access code or area code, the 9 gets an outside line, and the remaining characters indicate the phone number to call. The %V %D # characters are pass-through values (the %V and %D are dialing macros, and the # is required by the pager to end the sequence). **Important:** For any dialing string that includes a semicolon (;), the Vocera Telephony Gateway server automatically appends a # to end the sequence.
&	Simulates pressing the flash key on a touch-tone telephone.
#	Simulates pressing the pound key (also called the hash key) on a touch-tone telephone.
*	Simulates pressing the star key on a touch-tone telephone.
X	Vocera treats the sequence of digits following this special dialing character as an extension, without prepending either an access code or an area code to them. Vocera ignores this character unless it is the first character of the number. This special dialing character is not case-sensitive.
Q	Vocera dials the sequence of digits following this special dialing character as a literal value, without prepending either an access code or an area code to them. Vocera ignores this character unless it is the first character of the number. This special dialing character is not case-sensitive.

Special Dialing Macros

A dialing macro represents a dialing sequence. Dialing macros are especially useful when editing Company Voicemail Access Codes and Contacts entries.

In some data entry fields where you cannot enter a specific number—because the number varies with the user who accesses the feature—you can enter a dialing macro. Vocera replaces the macro with the actual number on demand.

For example, the Company Voicemail Access Code field specifies the dialing sequence that Vocera uses to forward an incoming call to company voicemail. As part of the dialing sequence, you typically need to specify a desk phone extension to identify the voice mailbox you want to access. You cannot enter a specific desk extension in this field, because the number will vary depending on which user is forwarding calls. Instead, you use the **%D** macro as part of the dialing sequence. Vocera replaces that macro with the actual desk extension of the user who is forwarding calls.

Vocera supports the following dialing macros, listed in alphabetical order:

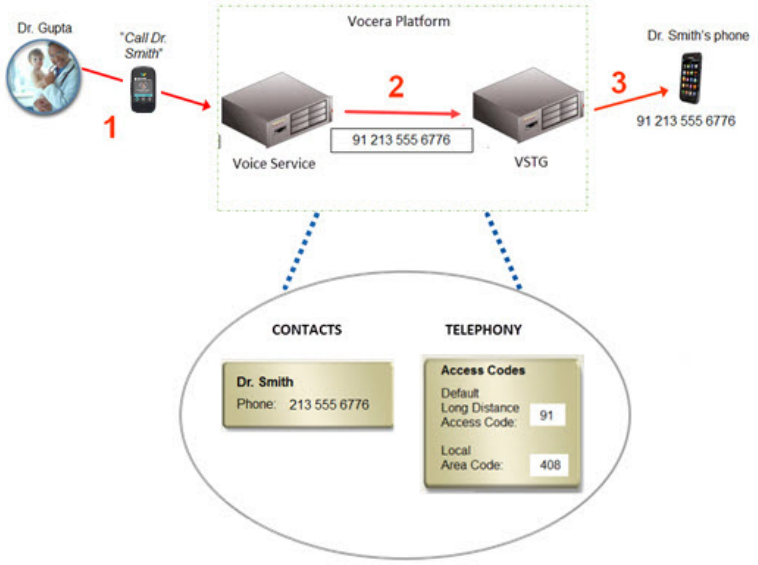
Macro	Effect
%C	Inserts the user's cell phone number into a data entry field. This macro expands to the value of the **Cell Phone** field in the Contact Information configuration section on the Add/Edit User page in the Web Console . A user can also enter or change this value in the Vocera Platform My Profile.
%D	Inserts the user's extension (either the **Desk Phone or Extension**, **Vocera Extension**, or dynamic extension, whichever applies) into a data entry field. You can enter or change the value of the **Desk Phone or Extension** field or the **Vocera Extension** field in the Contact Information configuration section on the Add/Edit User page. A user can also enter or change these values in the Vocera Platform My Profile.
%H	Inserts the user's home phone number into a data entry field. This macro expands to the value of the **Home Phone** field in the Contact Information configuration section on the Add/Edit User page. For more information, refer to "Using Macros in Contacts" section in the Vocera Platform Administration Guide . Users can also enter or change this value in the Vocera Platform My Profile.
%V	Inserts the Vocera hunt group or DID number into a data entry field. This macro expands to the value in the **Vocera Hunt Group Number** field on the **Facilities** > **Telephony- Basic Information** configuraiton section in the Web Console

About Vocera Dialing Sequence

Vocera sends a sequence of digits to the phone system to dial a number when a user issues a voice command to dial a phone number or forward a badge call to a telephone or to voice mail.

In addition to the phone number itself, the sequence may contain the access codes needed to obtain an outside line (such as a **9**), to dial long distance (such as a **9** followed by a **1**), or to access company voice mail.

You do not enter these access codes as part of a phone number. You set up these access codes for your entire organization, and Vocera adds them to phone numbers as necessary before dialing. For example, the following figure shows the flow of events that occur when a badge user places a long distance call to a person who is listed in a contact entry.



In this situation, the following events occur:

1. Dr. Gupta tells the Genie to call Dr. Smith.
   The Voice Service finds Dr. Smith's telephone number in the Contacts, then adds long distance access codes to the dial string because Dr. Smith's area code is different from the local area code.
2. The Voice Service tells the Telephony service to dial the number.
3. The Telephony service dials the number.