Service Guide

Release 14.0

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BroadWorks® Guide

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Abstract

This document provides a summary of user and group services offered by BroadWorks as of Release 14.0. For each service, the document provides an overview of the following:

- Features and functionality
- Usage and activation (as applicable)
- Parameters and configuration options (as applicable)

This document is intended for BroadSoft customers and partners and it is a complement to other product information published by BroadSoft.

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1 Introduction

This document provides a description of the services offered by BroadWorks. The following services are covered:

- **User services** – These services are assigned to specific users on the system and are used, managed, and configured by the user.
- **Group services** – These services apply to groups of users, which can be further categorized as:
  - **Virtual services** – These services are assigned to a group and make use of a virtual user that performs some action upon receiving a call (for example, an Auto Attendant).
  - **Multi-user services** – These services are assigned to a group and enable functionality that involves selected users in the group (for example, the Call Pickup service).
  - **Group services** – These services provide functionality that applies to all users in a group (for example, an Outgoing Calling Plan).
- **Messaging services** – These services provide users with the ability to send, receive, and manage services.
- **Service provider and enterprise services** – These services provide capabilities specific to the service provider administrator and the enterprise administrator.

This document describes the basic functionality of each service and provides an explanation of how the service is used and configured by a user, as well as an administrator.

BroadWorks configuration and provisioning tasks are hierarchical and, although not explicitly mentioned for each occurrence, any configuration or provisioning action available to an administrative level is also available to higher-level administrators.

2 User Services

This section describes the services offered to BroadWorks users.

2.1 Alternate Numbers (Multiple Numbers Per User)

This service allows a user to have up to ten alternate phone numbers in addition to the user's main phone number. The user can assign one of four distinctive ring patterns for each alternate number and in addition each distinctive ring pattern has a distinctive call waiting tone.

2.1.1 Description

The Alternate Numbers service allows a user to have up to ten alternate phone numbers or extensions assigned in addition to the user's main phone number. A user can be reached through any of the phone numbers. The first number is the main or primary phone number, while the additional ten numbers are the user's alternate or secondary phone numbers. Each alternate phone number can be a direct inward dialing number (DID) or an extension.

For each alternate number, the user can associate one of the four ring patterns. All calls to the main number result in the normal ring pattern. Calls to the alternate numbers result in a distinctive ring pattern that corresponds to the number that was used.

If a user is busy (and Call Waiting is enabled) an incoming call to the main number results in the usual call waiting tone, while an incoming call to any of the alternate numbers results in a distinctive call waiting tone.

When calls are placed to one of the alternate numbers using the CommPilot Call Manager, the alternate phone number in addition to the caller's main number appear.

The administrator (system, provisioning, service provider, enterprise, and group) can configure up to ten alternate phone numbers for a user. The first number is the main or primary number, while the additional ten numbers are the user's alternate or secondary numbers. The alternate numbers are read-only to the user.

All ten alternate numbers can be regular group-assigned phone numbers (DID) or extensions (phantom numbers). Users can be provisioned with alternate numbers without the main number being provisioned.

The user can select whether or not a distinctive ring should be provided when a call arrives on an alternate number, or whether the normal ring (pattern 1) should always be used. The user can assign one of four ring patterns to an alternate number. (However, the support for a distinctive ring pattern depends on the capability of a user's device. If the device does not support a distinctive ring pattern then the normal ring pattern is applied.)

Normal Ring Pattern

Calls to the main number alert the user with the normal ring pattern (pattern 1) as shown in the following table.

Pattern 1	Cadence	Minimum Duration (ms)	Nominal Duration (ms)	Maximum Duration (ms)
Ringing	2 seconds on	1800	2000	2200
Silent	4 seconds off	3600	4000	4400

Calls to an alternate number can alert the user with the normal ring pattern (1) or if selected, one of the distinctive ring patterns as shown in the following tables.

Distinctive Pattern 2 (Long-Long)

Selecting pattern 2 results in the following distinctive ring pattern:

Pattern 2	Cadence	Minimum Duration (ms)	Nominal Duration (ms)	Maximum Duration (ms)
Ringing	Long	630	800	1025
Silent		315	400	525
Ringing	Long	630	800	1025
Silent		3475	4000	4400

Distinctive Pattern 3 (Short-Short-Long)

Selecting pattern 3 results in the following distinctive ring pattern:

Pattern 3	Cadence	Minimum Duration (ms)	Nominal Duration (ms)	Maximum Duration (ms)
Ringing	Short	315	400	525
Silent		145	200	525
Ringing	Short	315	400	525
Silent		145	200	525
Ringing	Long	630	800	1025
Silent		2975	4000	4400

Distinctive Pattern 4 (Short-Long-Short)

Selecting pattern 4 results in the following distinctive ring pattern:

Pattern 4	Cadence	Minimum Duration (ms)	Nominal Duration (ms)	Maximum Duration (ms)
Ringing	Short	200	300	525
Silent		145	200	525
Ringing	Long	800	1000	1100
Silent		145	200	525
Ringing	Short	200	300	525
Silent		2975	4000	4400

Distinctive Call Waiting Tones

When the user is busy or on a line, an incoming call results in a call waiting tone (if enabled). The call waiting tone is also distinct based on the number called. The following tables show the distinctive call waiting tone for each ring pattern.

This call waiting tone pattern for ring pattern 1 is as follows:

Pattern 1	Cadence	Minimum Duration (ms)	Nominal Duration (ms)	Maximum Duration (ms)
Tone On	One Tone	270	300	330

This call waiting tone pattern for ring pattern 2 is as follows:

Pattern 2	Cadence	Minimum Duration (ms)	Nominal Duration (ms)	Maximum Duration (ms)
Tone On	Short	90	100	110
Tone Off		90	100	110
Tone On	Short	90	100	110

This call waiting tone pattern for ring pattern 3 is as follows:

Pattern 3	Cadence	Minimum Duration (ms)	Nominal Duration (ms)	Maximum Duration (ms)
Tone On	Short	90	100	110
Tone Off		90	100	110
Tone On	Short	90	100	110
Tone Off		90	100	110
Tone On	Short	90	100	110

This call waiting tone pattern for ring pattern 4 is as follows:

Pattern 4	Cadence	Minimum Duration (ms)	Nominal Duration (ms)	Maximum Duration (ms)
Tone On	Short	90	100	110
Tone Off		90	100	110
Tone On	Long	270	300	330
Tone Off		90	100	110
Tone On	Short	90	100	110

2.2 Anonymous Call Rejection

This service enables a user to reject calls from anonymous parties who have explicitly restricted their identities. By activating the service, callers who have restricted their identities are informed that the user is not accepting calls from restricted callers. The user's phone does not ring and the user does not see or hear any indication of the attempted call. This service does not apply to calls from within a group.

2.2.1 Description

Anonymous Call Rejection enables users to instruct BroadWorks to reject incoming call attempts from callers not within the same group, who have blocked their identity (phone number and name) to the user, with a calling identity delivery blocking service.

When this service is active, the user receives no alerting indication for external calls from callers with their identities blocked. Instead, the caller is connected to an announcement stating that the user does not accept calls with the caller's identity blocked.

Another common name for this service is Anonymous Caller Rejection but the Anonymous Call Rejection naming convention is used throughout the documentation and system for consistency.

2.2.2 Configuration

The user configures this service through the CommPilot Personal web portal. The service can be activated (block anonymous calls) and deactivated (allow anonymous calls).

This service enables a user to reject calls from anonymous parties who have explicitly restricted their identities. By activating the service, callers who have restricted their identities are informed that the user is not accepting calls from restricted callers. The user's phone does not ring and the user does not see or hear any indication of the attempted call. This service does not apply to calls from within a group.

The default state for Anonymous Rejection is "Off".

2.3 Authentication

This service provides authentication of sessions for SIP-based customer premises equipment. It ensures that a user is authorized for service on the BroadWorks system. Authentication is performed on registrations (SIP Registers) as well as incoming calls (SIP INVITEs). Standard MD5 digest authentication is used. The authentication information for a user is configured both on the phone and for BroadWorks via the CommPilot Group web portal.

2.3.1 SIP Register Authentication Description

If authentication is enabled, each SIP REGISTER method received by BroadWorks is challenged. Generally, the flow is that a SIP device sends a REGISTER method to BroadWorks. The server replies with an authentication challenge. This takes the form of a 401 Unauthorized response with a *WWW-Authenticate* header. The device uses the information in the *WWW-Authenticate* header together with its user ID and password, and generates an authentication response. It then sends a second REGISTER method with a WWW-Authorization header containing the authentication response to BroadWorks. BroadWorks uses this information and its own copy of the user's password to authenticate the request. If authentication succeeds, the registration is accepted. If authentication fails, another authentication challenge is issued.

2.3.2 SIP INVITE Authentication Description

If SIP INVITE authentication is enabled, the SIP INVITE messages received from users are challenged as described above.

2.3.3 Configuration

The CommPilot Group web portal allows a group administrator to enter a user ID and password for each user that requires authentication. Each group has an option of enabling or disabling authentication.

The system administrator can configure the system to challenge only 1 in n INVITE messages received by the system.

2.4 Automatic Callback

The Automatic Callback (ACB) service allows users to monitor a busy party and automatically establish a call when the busy party becomes idle.

Upon reaching a valid ACB busy condition, the users hear an announcement asking if they would like to monitor the line and be called back when it is idle. To activate ACB, the subscriber enters the digit prompted for and then goes on-hook. As soon as the called party becomes idle again, ACB attempts to re-establish the call between the subscriber and the previous busy party.

The ACB service can only be activated against a destination within the same group.

ACB is authorized and provisioned as a subscriber service, and can be enabled and disabled by the subscriber.

2.4.1 Description

Automatic Callback is an outgoing call feature that allows a subscriber to place a call to another subscriber in the same group. If the called subscriber is busy, the call originator can activate Automatic Callback to be notified when the called subscriber is idle. When notified, a new call setup attempt to the idle subscriber is initiated automatically and the originating subscriber is not required to redial the phone number. The new call attempt is treated as an originating call attempt; it could receive busy treatment or be redirected. For the new call setup to be attempted, both parties must be available.

Terminating subscribers are considered busy, or unavailable if they cannot receive a call at their primary locations. This means that if a terminating feature redirects the call and the new location is busy, ACB is not activated. ACB is also disabled if the call is handled by any of the following terminating services, that is, Selective Call Rejection and Selective Call Acceptance, but is not limited to these service interactions.

When a subscriber originates a call to another subscriber in the group, if the called party is unable to receive the call because of a valid ACB busy condition, a prompt is played giving the originator the opportunity to activate ACB (for example, “The line you are calling is busy. Press 1 if you would like to be notified when the line is available”).

After activating ACB, the subscriber goes on hook and is notified with special ringing when both parties are idle. If the user answers special ringing, call setup is automatically initiated towards the other party.

A subscriber that has activated ACB can also deactivate all outstanding ACB requests. Entering the ACB deactivation feature access code cancels all outstanding requests by that subscriber.

ACB has several operating parameters that are configured at the system:

- **Monitor Minutes:** The amount of time to camp-out on the busy line, waiting for it to become idle. (Default 30 minutes – Range 5 -120)
- **Retry Originator Minutes:** The amount of time to wait before re-trying a busy Automatic Callback originator (the owner of the ACB session). (Default 5 minutes – Range 1 - 15)
- **Max Sessions:** The total number of outstanding ACB sessions for one subscriber. (Default 5 – Range 1 - 30)
- **Max Retry Rings:** The maximum number of rings when alerting the originator that the terminator is available. (Default 6 – Range 3 - 8)

- **Max Time To Retry:** Total amount of time to alert an originator that has been busy (unavailable). How long ACB tries to alert a busy originator. (Default 180 – Range 180 - 360)

2.4.2 Configuration

At the system provider level, the administrator can modify the default feature access code used to deactivate outstanding Automatic Callback sessions. This allows the service providers to set the deactivation code to match their legacy system. There is no requirement to change the feature access code; the current default is #8.

The default state for Automatic Callback is "Off".

Automatic Callback is a user assignable feature; once it is assigned, users have the option to enable or disable the feature. Automatic Callback is an outgoing feature with its default set to off. From the users *Options web* page, select *Outgoing Calls*, and then select *Automatic Callback* to provision the feature.

The following are system-wide parameters for all users that are assigned Automatic Callback. The system administrator configures these parameters using the command line interface.

- **monitorLineMinutes** – How long the busy line is monitored, in minutes. (Default 30, Range 5 – 120)
- **retryCallOriginatorMinutes** – If the originator that activated ACB is busy, how long to wait before trying again, in minutes. (Default 5, Range 1 – 15)
- **maxSessions** – Total number of active ACB sessions for one user. (Default 5, Range 1 – 30)
- **maxTimeToRetry** – Total time to alert a busy ACB originator. (Default 180, Range 180 – 360)
- **maxRetryRings** – The maximum of number of rings when alerting an ACB originator. (Default 6, Range 3 – 8)

2.5 Automatic Hold/Retrieve

The Automatic Hold/Retrieve (AHR) service provides an alternate method to hold and retrieve calls for BroadWorks users. This service is assigned to users so that their incoming calls are automatically held and retrieved without having to use feature access codes.

This service is useful for attendants who handle many incoming calls, by allowing them to hold calls simply by transferring them to dedicated parking stations. This service also allows the holding of calls without having to use a flash key, which many SIP CPEs do not provide.

2.5.1 Description

The AHR service is commonly used by receptionists operating attendant consoles. When a call terminates on the attendant console, the receptionist answers the call, gathers information from the caller, and then transfers the call to a subscriber with the AHR service. The caller is held and listens to Music On Hold while waiting. The receptionist then communicates with the person who should handle the call, and provides him/her with the extension against which the call is held. That person calls the extension and retrieves the call that is on hold.

Only one call can be held for a subscriber with the AHR feature active.

2.5.2 Configuration

This service is authorized at the service provider and group levels and is assigned at the user level. It introduces two new attributes for a user:

- **Active** – The AHR service is enabled when this attribute is set to “true” and disabled when this attribute is set to “false”.
- **Recall Timer** – The AHR recall functionality is activated after a call has been held for the value specified for this attribute.

These attributes can be set by end users, group administrators, and administrators using the web portal, or through the OSS interface.

Usually a subscriber with the Automatic Hold/Retrieve service should not have any device associated with it due to limitations with what that subscriber can do. For example, it would be impossible for that subscriber to receive calls, or invoke services that put calls on hold. For cases where a subscriber has a device and the Automatic Hold/Retrieve service is active, the Application Server blocks call origination from that subscriber and applies a treatment. The Application Server does not allow emergency and maintenance calls to go through.

Feature access codes (for example Music On Hold activation/deactivation, Call Pickup, Call Retrieve) are also blocked.

While a subscriber, with the AHR feature active, is making an emergency or maintenance call, calls terminating to that subscriber get a busy signal.

The default state for Automatic Hold/Retrieve is “Off”.

2.6 Blind Call Transfer

This service enables a user to transfer a call before or after the call is answered, without consulting with the transferred to party. Users can only execute blind call transfer from the CommPilot Call Manager.

2.6.1 Description

Blind Call Transfer allows a user to transfer an active call to a specific destination without consulting with the destination party. This capability is provided exclusively through the CommPilot Call Manager.

- To blind transfer an incoming call (unanswered), the user selects the incoming call in the active call window, enters a destination in the dial window, and clicks the **Transfer** button. The call is automatically redirected to the specified destination.
- To blind transfer a talking or held call, the user selects the call in the active call window, enters a destination in the dial window, and clicks the **Transfer** button. The call is automatically redirected to the specified destination. When there is only one call in the active call window, this call is selected by default and does not need to be selected explicitly.

2.6.2 Configuration

There are no configuration parameters. The Blind Call Transfer service is provided as part of the CommPilot Call Manager.

2.7 Busy Lamp Field

The Busy Lamp Field (BLF) service enhances BroadWorks to support a SIP phone-based attendant console. It allows monitoring the hook status and remote party information of users via the busy lamp fields and appears on an attendant console phone.

It enables SIP attendant console phones to subscribe to a list of resources (users) to monitor, and receive notifications of the state of the monitored resources.

2.7.1 Description

The BLF service is a user service that supports the provisioning of an ordered list of monitored users, and a SIP URI on this list.

The list SIP URI addressing must be on a domain available to the user, and be unique amongst other list URIs within the system. For example, if the list SIP URI is sip:mon-users@broadworks.net for a monitored user list, then another monitored user list within BroadWorks cannot use this URI.

The order of monitored users corresponds to the line appearance order of the monitored user on the SIP attendant console phone. The initial NOTIFY for the subscription contains the full state of all the resources in the order specified in the BLF service configuration. If the monitored user list is modified (by adding, removing, or moving members) after there is an active subscription to the list, the subscription is terminated and BroadWorks sends a termination NOTIFY to the Attendant console phone. The phone should re-subscribe if needed.

2.7.2 Configuration

The list of available users to be monitored is determined by the users within the enterprise or group of the user who is assigned the BLF service. If the user is not a member of an enterprise, then the available user list is taken from the group. The maximum number of monitored users that can be provisioned is fifty.

NOTE: There is no limit to the number of lists a user can be a part of.

2.8 Call Forwarding Always

This service enables a user to automatically redirect all incoming calls to another destination.

2.8.1 Description

Call Forwarding Always (CFA) provides the capability to redirect incoming calls, intended for a user, to another destination. When active, all incoming calls are redirected unconditionally (that is, busy, idle, alerting, and so on).

When the service is active, a reminder indicator is set on the user's CommPilot Call Manager. Furthermore, a ring splash (500 ms ring burst) is applied to the user's device each time a call is forwarded[1].

BroadWorks supports multi-path forwarding for all flavors of call forwarding. Thus, there are no restrictions on the number of simultaneous forwarded calls.

The Outgoing Calling Plan service allows a group administrator to impose restrictions that are specific to calls forwarded from a user, thereby eliminating a fraud exposure that may result from uncontrolled forwarding of calls.

It is possible for the CFA service to create a loop. For example, consider the case that arises when Subscriber A has the CFA service activated and configured to forward all calls to Subscriber B, and Subscriber B calls Subscriber A. In this case, if the two subscribers are in the same group, the system detects the loop and overrides the CFA service, resulting in Subscriber B establishing a normal call connection to Subscriber A. If the two subscribers are not in the same group, the system redirects the call to Subscriber A, terminating with a re-order tone (or being accepted by Subscriber A's voice mail).

2.8.2 Configuration

This service can be controlled via the CommPilot Personal web portal, via feature access codes dialed from the user's device, and from the CommPilot voice portal. Following are descriptions of the first two. The configuration through the CommPilot voice portal is described in section *2.14 Call Forwarding Remote Access*.

When the user enters the forwarding phone number, the system validates the phone number against the user's calling plans (Outgoing Calling Plan, Outgoing Digit Plan, and Acct/Auth Codes). If the number is not allowed, the user is presented with an audio treatment or an error message.

The default state of the Call Forwarding Always service is "Off".

2.8.2.1 Web Portal Activation

The Call Forwarding Always service can be activated and deactivated through the user's CommPilot Personal web portal. When activated, a valid forwarding phone number or URL must be entered. Users can also select whether a ring splash should be played upon forwarding a call.

The *Call Forwarding Always configuration* page can also be accessed directly by clicking on the **CFA** button on the CommPilot Call Manager.

[1] The ring burst capability is optional and can be turned on or off by the user.

2.8.2.2 Feature Access Codes

The Call Forwarding Always service can be activated and deactivated through feature access codes dialed from the user's device.

- To activate, the user dials *72 (default), optionally followed by a valid forwarding phone number. If no phone number is entered, the calls are forwarded to the phone number that was previously configured by default. The system then plays a confirmation announcement and the user hangs up.
- To deactivate, the user dials *73 (default). The system then plays a confirmation announcement and the user hangs up.

Feature access codes can also be used from the CommPilot Call Manager. For example, the user can enter *72XXXXXXXXXX to activate call forwarding, with XXXXXXXXXX being the forwarding number. The system then rings the user's device and plays a confirmation announcement, indicating that call forwarding has been activated.

In addition, the user can just enter *72 through the CommPilot Call Manager. Then the user's device rings, and when answered, the system prompts for the forwarding number (as described earlier).

The user can also set the call forwarding destination to the voice portal FAC, which is *62 (default value) instead of the voice portal number or extension. The caller rolls to the called party's voice mail box in the BroadWorks voice mail system.

2.9 Call Forwarding Always to Voice Mail

This feature is used to enable or disable the immediate handling of all incoming calls (by voice mail) regardless of whether the user is busy or not. It can be enabled or disabled via the user's web portal by checking or un-checking the *Send **All** Calls to Voice Mail* box on the *Voice Management* web page or via the user's phone by dialing the FAC *21# (default value), and disabled by dialing the FAC #21# (default value).

After the FAC is dialed, the system plays a confirmation announcement "Your Voice Mail service is now set to [not] answer calls immediately. Thank you". It then releases the call.

- When enabled, all incoming calls to a user are sent immediately to voice mail.
- When disabled, the Voice Mail service does not activate immediately for an incoming call, and other applicable services execute as usual.

Note that this activity does not change the service priorities, and Call Forwarding Always continues to have higher precedence than Call Forwarding Always to Voice Mail.

These FAC codes allow setting the "all" option for both BroadWorks Voice Messaging and Third-Party Voice Mail Support. In general, a user has only one of the two services assigned, and that service flag is updated with these FACs. Should a user have both voice mail services assigned, both flags are updated on each use of one of these two FACs.

Along with other FACs, the FAC for the Call Forwarding Always to Voice Mail can also be configured, for more information, see section *5.3 Configurable Default Feature Access Codes*.

2.10 Call Forwarding Busy

This service enables a user to redirect incoming calls to another destination when the user is busy.

2.10.1 Description

Call Forwarding Busy forwards calls to a specified destination when the user is busy. A user is considered busy when there are too many active calls or a service makes the user appear busy to the caller (for example, services such as Do Not Disturb or Selective Call Rejection).

2.10.2 Configuration

The service can be controlled via the CommPilot Personal web portal or via feature access codes dialed from the user's device.

When the user enters the forwarding phone number, the system validates the phone number against the user's calling plans (Outgoing Calling Plan, Outgoing Digit Plan, and Acct/Auth Codes). If the number is not allowed, the user is presented with an audio treatment or an error message.

The default state for Call Forwarding Busy is "Off".

2.10.2.1 Web Portal Activation

The service can be activated and deactivated through the CommPilot Personal web portal. When activated, a valid forwarding phone number or URL must be entered.

2.10.2.2 Feature Access Codes Activation

The service can be activated and deactivated through feature access codes dialed from the user's device.

- To activate, the user dials *90 (default), optionally followed by a valid forwarding phone number. The system then plays a confirmation announcement and the user hangs up.
- To deactivate, the user dials *91 (default). The system then plays a confirmation announcement and the user hangs up.

Feature access codes can also be used from the CommPilot Call Manager. For example, the user can enter *90XXXXXXXXX to activate call forwarding with XXXXXXXXX being the forwarding number. The system then rings the user's device and plays a confirmation announcement indicating that call forwarding has been activated. In addition, the user can just enter *90 through the CommPilot Call Manager. Then the user's device rings, and when answered, the system prompts for the forwarding number (as described above).

The user can also set the call forwarding destination to the voice portal FAC, which is *62 (default value) instead of the voice portal number or extension. The caller rolls to the called party's voice mail box in the BroadWorks Voice Mail system.

2.11 Call Forwarding Busy to Voice Mail

This feature is used to enable or disable the handling of incoming calls (by voice mail) when the called user is busy. It can be enabled or disabled via the user's web portal by checking or un-checking the *Send Busy Calls to Voice Mail* box on the *Voice Management* web page or via the user's phone by dialing the FAC *40# (default value), and disabled by dialing the FAC #40# (default value).

After the FAC is dialed, the system plays a confirmation announcement "Your Voice Mail service is now set to [not] answer calls when you are busy. Thank you." It then releases the call.

- When enabled, an incoming call to a busy user is sent to voice mail immediately.
- When disabled, the Voice Mail service does not activate for an incoming call to a busy user, and the applicable handling for a busy condition occurs.

Note that this activity does not change the service priorities, and Call Forwarding Busy continues to have higher precedence than Call Forwarding Busy to Voice Mail.

These FAC codes allow setting the "busy" option for both BroadWorks Voice Messaging and Third-Party Voice Mail Support. In general, a user has only one of the two services assigned, and that service flag is updated with these FACs. Should a user have both voice mail services assigned, both flags are updated on each use of one of these two FACs.

Along with other FACs, the FAC for the Call Forwarding Busy to Voice Mail can also be configured, for more information, see section see section *5.3 Configurable Default Feature Access Codes.*

2.12 Call Forwarding No-Answer

This service enables a user to redirect incoming calls to another destination when the user does not answer within a specified number of rings.

2.12.1 Description

Call Forwarding No-Answer forwards calls to a specified forwarding phone number when a user does not answer an incoming call for a user-specified number of rings.

2.12.2 Configuration

The service can be controlled via the CommPilot Personal web portal or via feature access codes dialed from the user's device.

When the user enters the forwarding phone number, the system validates the phone number against the user's calling plans (Outgoing Calling Plan, Outgoing Digit Plan, and Acct/Auth Codes). If the number is not allowed, the user is presented with an audio treatment or an error message.

The default state for Call Forwarding No-Answer is "Off".

2.12.2.1 Web Activation

The service can be activated and deactivated through the user's CommPilot Personal web portal. When activated, a valid forwarding phone number or URL must be entered. Users can also configure the number of rings before the call is forwarded.

2.12.2.2 Feature Access Codes Activation

The service can be activated and deactivated through feature access codes dialed from the user's device.

- To activate, the user dials *92 (default), optionally followed by a valid forwarding phone number. The system then plays a confirmation announcement and the user hangs up.
- To deactivate, the user dials *93 (default). The system then plays a confirmation announcement and the user hangs up.

The user can also set the number of rings before the call is forwarded by dialing a configurable feature access code. The default feature access code is *610. Note however, that this setting applies to all services with no-answer handling, that is, the Voice Mail, Third-Party Voice Mail Support, and Sequential Ringing services.

Feature access codes can also be used from the CommPilot Call Manager. For example, the user can enter *92XXXXXXXXX to activate call forwarding, with XXXXXXXXX being the forwarding number. The system then rings the user's device and plays a confirmation announcement indicating that Call Forwarding has been activated. In addition, the user can just enter *92 through the CommPilot Call Manager. Then, the user's device rings, and when answered, the system prompts for the forwarding number (as described earlier).

The user can also set the call forwarding destination to the voice portal FAC, which is *62 (default value), instead of the voice portal number or extension. The caller rolls to the called party's voice mail box in the BroadWorks Voice Mail system.

2.13 Call Forwarding No-Answer to Voice Mail

This feature is used to enable or disable the handling of incoming calls (by voice mail) when the called user does not answer their phone. It can be enabled or disabled via the user's web portal by checking or un-checking the *Send Unanswered Calls to Voice Mail* box on the *Voice Management* web page or via the user's phone by dialing the FAC *41# (default value), and disabled by dialing the FAC #41# (default value).

After the FAC is dialed, the system plays a confirmation announcement "Your Voice Mail service is now set to [not] answer calls when you do not answer. Thank you." It then releases the call.

- When enabled, an incoming call to a user is sent to voice mail if the call is not answered.
- When disabled, the Voice Mail service does not activate for an unanswered incoming call to a user, and the applicable handling for a no-answer condition occurs.

Note that this activity does not change the service priorities, and Call Forwarding No Answer continues to have higher precedence than Call Forwarding No Answer to Voice Mail.

These FAC codes allow setting the "no-answer" option for both BroadWorks Voice Messaging and Third-Party Voice Mail Support. In general, a user has only one of the two services assigned, and that service flag is updated with these FACs. Should a user have both voice mail services assigned, both flags are updated on each use of one of these two FACs.

Along with other FACs, the FAC for the Call Forwarding No-Answer to Voice Mail can also be configured, for more information, see section see section *5.3 Configurable Default Feature Access Codes*

2.14 Call Forwarding Remote Access

This service allows a user to activate, deactivate, and program the Call Forwarding Always service through an interactive voice response interface from any phone.

2.14.1 Description

This service allows users to configure their Call Forwarding Always service from any phone.

Users access this service by calling their group CommPilot voice portal from any phone. After authenticating themselves with a user ID and a passcode, they are presented with a menu of options that includes the ability to query, activate, deactivate, and program their Call Forward Always service. After configuring this service, users may hang up, or continue to navigate through other options of the CommPilot voice portal.

2.14.2 Configuration

The ability to configure Call Forward Always through the voice portal is automatically available to all users who are subscribed to the Call Forwarding Always service. The service does not require any specific provisioning and configuration.

2.15 Call Forwarding Selective

This service enables a user to define criteria that causes certain incoming calls to be redirected to user-specified destinations.

2.15.1 Description

Call Forwarding Selective provides the capability to forward calls intended for a user to another destination, when the incoming call matches pre-specified criteria. If the incoming call does not match any of the criteria, normal call handling applies.

The possible criteria include:

- Selected time schedule, for example, “Every Day All Day”
- Whether the calling line ID is PRIVATE or UNAVAILABLE
- A list of up to 12 phone numbers or digit patterns (for example, 514*). Phone numbers are matched against the sending number received in the INVITE. This may be the *P-Asserted-Id* header, the *Remote-Party-Id* header, or the *From* header, depending on context. This service may therefore require the user to provide complete 10-digit numbers to match those included in the INVITE.

The criteria can be combined within predicates (for example, incoming call from this number and within business hours and during work week). Multiple predicates can be defined and the call is forwarded when at least one of the predicates is met.

The user can associate a different destination with each predicate, or use the same destination for all predicates.

2.15.2 Configuration

The service is configured through the CommPilot Personal web portal. The user defines criteria based on the incoming caller identity, ranges of digits, or time schedule.

Ranges of digits can include digits from 0-9, and the following wildcard characters:

- * *(star)* – This wildcard can only be used as the last character of a digit string and matches any number of trailing digits.
- ? *(question mark)* – This wildcard can be used anywhere in the string and matches any single digit.

Multiple criteria can be combined to build predicates, and multiple predicates can be defined simultaneously. Each predicate can be active or inactive. Each predicate can be associated with its own destination number or URL.

When the user enters the forwarding phone number, the system validates the phone number against the user’s calling plans (Outgoing Calling Plan, Outgoing Digit Plan, and Acct/Auth Codes). If the number is not allowed, the user is presented with an error message.

The default state for Call Forwarding Selective is “Off”.

2.16 Call Notify

This service enables a user to define criteria that cause certain incoming calls to trigger an e-mail notification to a user-specified address.

2.16.1 Description

When an incoming call matches pre-defined criteria, this service sends an e-mail with information about the caller to a user-configurable address. The criteria include:

- Selected time schedule, for example, “Every Day All Day”
- Whether the calling line ID is PRIVATE or UNAVAILABLE
- A list of up to 12 phone numbers or digit patterns (for example, 514*)

The criteria can be combined within predicates (for example, incoming call from this number AND within business hours AND during work week). Multiple predicates can be defined and a notification is sent when at least one of the predicates is met.

2.16.2 Configuration

This service is configured through the CommPilot Personal web portal. The user defines criteria based on the incoming caller identity, ranges of digits, the time of day, and the day of the week.

The default state of Call Notify is “Off”.

Ranges of digits can include digits from 0-9, and the following wildcard characters:

- * *(star)* – This wildcard can only be used as the last character of the digits string and matches any number of trailing digits.
- ? *(question mark)* – This wildcard can be used anywhere in the string and matches any single digit.

Multiple criteria can be combined to build predicates, and multiple predicates can be defined simultaneously. Each predicate can be active or inactive. The user defines an e-mail address for notification, which is used to send the notification if any of the active predicates is met.

2.17 Call Return

This service enables a user to call the last party that called, whether or not the call was answered. To call back the last party that called, the user dials a recall feature access code. The system stores the number of the last party that called and attempts to connect the user to that party.

2.17.1 Description

Call Return allows the user to call the last party that called by dialing *69 (default) on the user's device or through the CommPilot Call Manager. Call Return can be used for calling back answered and unanswered calls, as long as the calling number is available to BroadWorks. If the calling number is available, the last calling party is called as if the user dialed this number directly. If the calling number is not available, the user is played an error announcement. A call originated with Call Return is subject to all user services and restrictions.

Note however, that when a user tries to use Call Return on a call with the caller ID blocked, the user is played an error announcement.

The Call Return service can be used through the CommPilot Call Manager. To do so, the user simply enters the Call Return feature access code in the CommPilot Call Manager dial window and clicks the **Dial** button. This results in holding the current call and originating a call to the last calling number if the user was already active on a call or it rings back the user's phone and originates the call to the last calling number when the user picks up the phone.

2.17.2 Configuration

There are no configuration parameters.

2.18 Call Trace (Customer Originated Trace)

This service enables the recipient of an obscene, harassing, or threatening call to request that it be automatically traced by dialing a feature access code after the call.

2.18.1 Description

Users are able to trace an incoming call by dialing *57 (default) after the call is received. The call that is being traced is defined as the call that was last received by the user. It could either be an answered or a missed call. If neither the name nor the number of the caller is available to BroadWorks, a trace cannot be sent.

After dialing a feature access code, the user hears an announcement followed by dial tone. If neither the caller's name nor number is available to BroadWorks, the user receives an error announcement and the trace is not sent. Otherwise, the user receives a confirmation announcement and the requested trace is sent in the form of an alarm to the system provider.

The alarm contains the following information:

- The phone number of the user who initiated the trace. When the user does not have a phone number, the group phone number, and the extension of the user is provided instead. For intra-group calls, only the caller's extension is used.
- The date and time the call was received.
- The identity (name and number) of the caller, if available.

2.18.2 Configuration

There are no configuration parameters.

2.19 Call Transfer with Three-Way Consultation

This service enables a user to make a three-way call with the original caller and an add-on party before transferring the caller to the add-on party.

2.19.1 Description

To initiate call transfer with three-way consultation, the user presses the flash hook, receives a dial tone, and then dials the add-on party. When the call is answered, the user presses the **flash hook** and forms a three-way call with the add-on party and the original caller. To transfer, the user hangs up, which then transfers the original caller to the add-on party.

Users can also execute call transfer with three-way consultation via the CommPilot Call Manager. To do so, they enter the number of the dial party in the dial window of the CommPilot Call Manager and click the **Dial** button. Once the call to the add-on party is established, users can click the **Conference** button to join the three parties together and have a three-way consultation before hanging up or using the **Transfer** button to connect the two other parties together.

The user can elect to abort the transfer during the three-way consultation by flashing the switch hook, which releases the add-on party. The same can be achieved by releasing the party on the CommPilot Call Manager.

The flash method and the **CommPilot Call Manager** buttons can be used interchangeably during the session.

2.19.2 Configuration

The Flash_3WC and Flash_Transfer options must be assigned to analog phones users to allow them to initiate three-way conferences by flashing the switch hook, and to establish a transfer by hanging up during three-way consultation.

Users who are assigned a CommPilot Call Manager can also use it to initiate call transfer with three-way consultations.

2.20 Call Transfer with Third-Party Consultation

This service enables a user to consult with an add-on party before transferring the caller to the add-on party.

2.20.1 Description

To initiate call transfer with consultation, the user presses the flash hook, receives a dial tone, and then dials the add-on party. When the call is answered, the user can consult with the add-on party. To transfer, the user hangs up, which transfers the original caller to the add-on party.

Users can also execute call transfer with consultation via the CommPilot Call Manager. To do so, they enter the number of the dial party in the dial window of the CommPilot Call Manager, and click the **Dial** button. Once the call to the add-on party is established, users can talk privately with the add-on party before hanging up or using the **Transfer** button to connect the two other parties together.

The user can elect to abort the transfer during the consultation by flashing the switch hook twice, which releases the add-on party. The same can be achieved by releasing the party on the CommPilot Call Manager.

The flash method and the **CommPilot Call Manager** buttons can be used interchangeably during the session.

2.20.2 Configuration

The Flash_Transfer option must be assigned to analog phone users to allow them to create the consultation call leg after flashing and to transfer by hanging up during consultation.

Users who are assigned the CommPilot Call Manager can also use it to transfer calls.

2.21 Call Waiting

This service enables a user to answer a call while already engaged in another call.

2.21.1 Description

When an incoming call is received while a user is already engaged in a call, the user is informed of the new call via a call waiting tone. To answer the waiting call, the user presses the flash hook, which connects the user with the waiting party and holds the original party. Subsequent use of the flash hook allows the user to toggle between the two parties.

If the user hangs up while another party in the session is held or waiting, the user is re-rung. Upon answer, the user is reconnected to the held party.

The service ends when any party hangs up.

Users can also execute call waiting via the CommPilot Call Manager. When a second call is presented to the user in the CommPilot Call Manager window, the user can click the **Talk** button while the new party is highlighted, to hold the other party and establish a connection with the incoming call. This procedure can be repeated as many times as necessary to toggle between the two parties.

The flash method and the CommPilot Call Manager can be used interchangeably during the same session.

The Call Waiting service may optionally be configured to provide callers with a distinctive ringback tone when the called party is already busy on a call.

2.21.2 Configuration

The default state for the Call Waiting service is “On”.

This service can be enabled or disabled either through the web portal or by dialing a configurable Feature Access Code.

The use of a distinctive ringback tone informing users when a called party is already busy on a call may be configured by the system administrator through the web portal or the CLI.

2.21.3 Cancel Call Waiting Persistent

This feature allows users to disable call waiting persistently.

2.21.3.1 Description

This feature allows users to disable call waiting. When Cancel Call Waiting Persistent is active, any incoming call received while the user is already busy on a call receives busy processing. It is however possible for the user to have more than one call active if the user has originated them.

2.21.3.2 Configuration

Persistent Cancel Call Waiting can be activated or deactivated through the CommPilot Personal web portal.

2.21.4 Cancel Call Waiting Per Call

This feature allows the users to disable Call Waiting for the next or current call.

2.21.4.1 Description

To cancel Call Waiting Per Call, the user dials *70 (default). The system plays a confirmation announcement and then applies a dial tone. The user then dials the destination number. For the duration of the call, the user is not presented with any waiting calls. Call Waiting is automatically re-activated when the call ends.

The user can also cancel Call Waiting for calls in progress. The user can flash the switch hook while a call is in progress, and then dial *70 (default) after the dial tone is applied. The system then responds with a confirmation announcement, followed by a dial tone. The user can then flash back to the other call, and no other waiting calls are presented for the duration of the current call.

Feature access codes can also be used from the CommPilot Call Manager. For example, the user can enter *70XXXXXXXXXX to cancel call waiting, with XXXXXXXXXX being the destination number. The system does not play a confirmation announcement. In addition, the user can just enter *70 through the CommPilot Call Manager. Then, the user's device rings, and when answered, the system prompts for the destination number (as described above).

2.21.4.2 Configuration

Cancel Call Waiting Per Call has no configuration parameters and is available to all users with Call Waiting capabilities.

2.22 Calling Line ID Blocking Persistent

This service enables a user to persistently block delivery of his or her identity to the called party.

2.22.1 Description

Calling Line ID Blocking is used to block or allow the delivery of a user's identity (both name and number) to a called party.

When active, calls made by the user to parties outside of the enterprise have the presentation of their identity (name and number) blocked. The blocking is achieved by setting the presentation indicator associated with the calling party number to "private", which prevents the user's identity from being presented to the called party's device.

2.22.2 Configuration

The user configures the service activation and deactivation via the CommPilot Personal web portal, or by dialing a configurable feature access code from their phone, which is enabled by dialing the FAC *43# (default value) and disabled by dialing the FAC #43# (default value).

2.23 Calling Line ID Blocking Per Call

This service overrides the persistent blocking of the calling line ID (CLID) so users can block the delivery of their identities for the next call. At the end of the call, the presentation of the user's identity is restored to its persistent status.

2.23.1 Description

The users block the delivery of their identities for the next call by dialing *67 (default), from their devices, before making the call. This results in a confirmation tone followed by a dial tone. The users can then make the call as usual and their identities are blocked.

Per-call Calling Line ID Blocking is deactivated automatically when the user hangs up.

Feature access codes can also be used from the CommPilot Call Manager. For example, the user can enter *67XXXXXXXXX to activate Per-call Calling Line ID Blocking with XXXXXXXXXX being the destination number. The system then rings the user's device and upon answer, starts alerting the called party destination. In addition, the user can just enter *67 through the CommPilot Call Manager. Then, the user's device rings, and when answered, the system prompts for the destination number (as described earlier).

If the user's identity is persistently blocked, the service is used the same way but has no impact.

2.23.2 Configuration

This service has no configuration parameters.

2.24 Calling Line ID Delivery

This service is a terminating service that delivers the identity of the calling party to the user via the CommPilot Call Manager and device (if capable).

2.24.1 Description

Calling Line ID Delivery relays a caller's identity to the user's CommPilot Call Manager and device, if the device is capable of displaying such information.

The caller identity is delivered for every call that terminates to the user. If an incoming call is redirected or blocked before it can terminate, or if the user is busy, the identity is not delivered. The identity includes the calling party's number and name, if available.

The Calling Line ID Delivery service is divided into two features: External Calling Line ID Delivery and Internal Calling Line ID Delivery features.

Feature	Description
External Calling Line ID Delivery Feature	This feature allows BroadWorks subscribers to be able to view the caller ID information of another user in a different group. This feature also applies to Intra-group calls that use the Network Server.
Internal Calling Line Delivery Feature	This feature allows BroadWorks subscribers to be able to view the caller ID information of another user within the same group.

2.24.2 Configuration

Users can enable and disable the external and internal calling line ID delivery services via their web portal.

The default state for Calling Line ID Delivery is "On".

2.25 Calling Line ID Delivery Per Call

This service overrides the persistent presentation of the calling line ID (CLID) so users can allow the delivery of their identity for the next call. At the end of the call, the presentation of the user's identity is restored to its persistent status.

2.25.1 Description

This service is the exact opposite of Calling Line ID Blocking Per Call (see section *2.23 Calling Line ID Blocking Per Call*) and shares the same characteristics of the user interface and service interactions.

The users allow the delivery of their identities for the next call by dialing *65 (default), from their devices, before making the call. This results in a confirmation tone followed by dial tone. (This is the same type of announcement/tone as Calling Line ID Blocking Per Call.) The user can then make the call as usual and their identity is delivered to the far end.

When the user hangs up, the blocking of the calling line ID is restored to its persistent status.

Feature access codes can also be used from the CommPilot Call Manager. For example, the user can enter *65XXXXXXXXX to activate Calling Line ID Delivery Per Call (the XXXXXXXXX represents the destination number). The system then rings the user's device and upon answer, starts alerting the called party destination. In addition, the user can simply enter *65 through the CommPilot Call Manager. In this case, the user's device rings, and when answered, the system prompts for the destination number (as described above).

Calling Line ID Delivery Per Call behaves the same if the CLID is not persistently blocked for the user, but it has no impact.

2.25.2 Configuration

This service has no configuration parameters.

2.26 Calling Line ID Restriction Override

Calling Line ID Blocking Override (CLIO) allows users to override calling line identity presentation restrictions and always receive the calling line identity at their CPE, if available.

In other words, the user who activates this option always receives the calling line identity if available, regardless of whether or not the calling line identity is blocked. The user never receives a calling line identity indicating "private". This service is configured via the CommPilot web portal.

2.26.1 Description

Calling Line ID Blocking Override is offered as an override to Calling Line ID Delivery Blocking. When activated by the user, this service ignores the presentation indicator and delivers the calling line ID to the user if it is available (both name and number).

The user activates and deactivates the service persistently through the CommPilot Personal web interface.

It should be noted that the caller information provided to the CLIO user is bound to what BroadWorks receives from the calling party and from other peripheral systems. For instance, if the caller's name is blocked in the CNAM database and cannot be obtained by BroadWorks, the CLIO user only gets the calling number. Similarly, if the Caller ID Enhancement service is activated and the incoming call is overseas from a payphone or from an operator, the CLIO user only gets the corresponding indication instead of the caller ID.

When this service is active, all Caller ID-based services behave as if the Caller ID was present, regardless of the presentation indicator (unless the call is ANONYMOUS):

- Anonymous Caller Rejection lets private calls through.
- Screening services apply regardless of the presentation indicator.
- The call manager incoming call log shows all incoming Caller IDs.

This service is only overridden by the CLID Delivery (both external and internal) service. If the Caller ID Delivery service is not active for a user, then CLIO has no impact.

2.26.2 Configuration

The service is activated and deactivated via the user's web portal.

The default state for the Calling Line ID Blocking Override service is "Off".

2.27 Calling Name Delivery

This service allows BroadWorks to provide calling name delivery to its users by retrieving the calling name from a PSTN-hosted database through an SS7-enabled network element like a softswitch.

2.27.1 Description

This service provides a user subscription-based method of retrieving calling name information from an external database on a per-call basis; this function is analogous to the GR-1188 TCAP terminating query.

If the name information is already present in the incoming call setup message, then the external database is not accessed.

BroadWorks uses the SIP event notification framework to communicate with the external database. A *SIP Subscribe message* is sent by BroadWorks to query the caller's name information, and the external database uses a *SIP Notify* message to respond to the BroadWorks request.

The query contains the caller's number, which allows the external database to query the caller's name information. When BroadWorks receives a response from the external database, the caller's name information is extracted from the message and is relayed to the called end point.

2.27.2 Configuration

This service has no configuration parameters.

2.28 Charge Number

This service allows administrators to associate an additional directory number with a user account for charging.

2.28.1 Description

The Charge Number may be selected from any number available to the user's group, including numbers already assigned to other user accounts.

The selected number will be recorded in all Call Detail Records (CDRs) generated for the user's outgoing calls. Records for calls that get redirected to the network will contain only the charge number of the last redirecting party, if one exists; they will not contain the charge number of the redirected party.

2.28.2 Configuration

The Charge Number can be configured by a group-level administrator or higher using the web portal. A new *Call Control* page, accessible from the user-level *Call Control* menu page, provides a list of all available directory numbers.

Users may view any charge numbers associated with their accounts, but may not modify the settings configured by their administrator.

2.29 CommPilot Call Manager

The CommPilot Call Manager enables a user to use a web-based tool for service invocation and call control.

2.29.1 Description

The CommPilot Call Manager provides an alternative to pressing the flash hook and using star codes. It provides the user with a visual, graphical user interface to initiate, manipulate, and release calls. The CommPilot Call Manager provides the following functions:

- **Navigation, support, help** – Useful links help the user with the CommPilot Call Manager including support (to send an e-mail to the applicable support service), help (to display a *context-sensitive help web* page), and configure (to jump to the CommPilot Personal web portal).
- **User information** – Presents the name, phone number, and extension of the user of the CommPilot Call Manager.
- **Service link area** – Provides status and configuration for commonly used services.
- **Call control** – Provides the user with call dispositions to make, control, and release calls by clicking them with the mouse.
- **Dial** – Allows the user to initiate an outgoing call.
- **Call display** – Presents the user with information on active calls and allows the user to select calls with the mouse.
- **Directories** – Provides access to the user directories.
- **Preferences** – Allows the user to configure the CommPilot Call Manager.
- **Outlook integration** – User has access to Outlook contacts, journaling, and vCards.
- **Web pop-up** – User can configure a web server to be queried with the CLID of the caller to return a *web* page with related information.

The CommPilot Call Manager can be used in conjunction with any BroadWorks controlled device while maintaining a consistent behavior regardless of device type.

2.29.1.1 Call Control

The following functions are provided for call control:

- **Click-to-dial** – Enables a user to dial an entered number, dial from a phone list or Outlook, or redial the last called number.
- **Answer** – Enables a user to answer a waiting call while already engaged in a call or to retrieve a held call.
- **Hold/Retrieve** – Enables a user to place an existing call on hold and then retrieve the call to resume conversation.
- **Release** – Enables a user to disconnect a call that has been answered.
- **Transfer** – Enables a user to redirect a ringing, active, or held call to another destination or directly to voice mail.

- **Conference** – Enables a user to connect two existing calls into a three-way conference.
- **Forced off-hook support** – Enables a user to Dial and Answer with a single click on the Call Manager by connecting to the phone in hands-free mode[2].

2.29.1.2 Directories

The CommPilot Call Manager provides the user with directories that can be used to make outgoing calls and obtain information on parties. These directories include:

- **Group** – The user can browse a list of other members of the group and call them directly from the list. Furthermore, the user can print the group directory in summary or detailed format directly from the CommPilot Call Manager.
- **Personal** – The user can create and maintain a list of personal contacts and call them directly from the list.
- **Call logs** – The user has access to a log of the last calls dialed and received and missed and can call them directly from the list.
- **Outlook contacts** – The users have access to their Microsoft Outlook contacts and can call them directly from the list. Furthermore, the users can configure the CommPilot Call Manager to have a matching vCard be presented automatically upon receiving a call.
- **LDAP** – The users have access to an external LDAP contact database and can originate calls directly from the LDAP directory listings.

2.29.1.3 Service Status and Hyperlinks

The CommPilot Call Manager provides the user with direct access to the status of some commonly used services and presents their activation status on the CommPilot Call Manager. These services include:

- **Call Forwarding Always** – The user can see the current status and have direct access to the *configuration* page.
- **Do Not Disturb** – The user can see the current status and have direct access to the *configuration* page.
- **Remote Office** – The user can see the current status and have direct access to the *configuration* page.
- **CommPilot Express** – The user can see the current status and configure the state directly from the CommPilot Call Manager.

2.29.1.4 Outlook Integration

The CommPilot Call Manager makes use of Microsoft Outlook to provide the user with:

- **Contacts** – Access to the user's contact database for directories and dialing.
- **Journaling** – The users can have incoming and/or outgoing calls logged into the Outlook journal with their start time, answer time, and stop time.
- **vCard** – The users can bring up the vCard of other parties involved in calls (when available) and create new vCards for parties who do not have one already.

[2] This capability is available to users with CPE that supports the *Answer-After* and *Talk* SIP event package.

The integration with Outlook is done automatically and is transparent to the user. It does not require any configuration changes to Outlook.

The default state for Outlook Integration is “On”.

The Outlook Integration service is supported for Outlook 2000 and later versions.

2.29.1.5 Web Pop-Up

The user can configure the CommPilot Call Manager to issue HTTP queries to an external server for active calls.

By clicking on an icon, the user triggers an HTTP query to a specified URL. The URL is created from a string previously configured by the user. The URL string may contain static and dynamic fields. The dynamic fields are instantiated from the characteristics of the user and the call (for example, name, number, group, and so on).

2.29.2 Configuration

The user can configure the CommPilot Call Manager as follows:

- Allow or disallow one-click dialing from the directories.
- Configure a web-pop upon incoming calls.
- Open an Outlook journal entry for both incoming calls and/or outgoing calls.
- Select the Outlook Contact folder to use.

2.30 CommPilot Express

CommPilot Express enables a user to pre-configure multiple profiles for managing incoming calls differently, based on a preset status as follows:

- Available – In the office
- Available – Out of the office
- Busy
- Unavailable

2.30.1 Description

CommPilot Express is a meta-service that consolidates BroadWorks call termination services into four profile-based call management templates. Each profile includes preferences for managing the relevant incoming call functions (for example, Call Forwarding [busy, no-answer, always, selective], Voice Messaging, Simultaneous Ringing, Call Notify), which can be configured through a single easy-to-use *web* page.

The following profiles are defined:

- **Available - In the office** – This profile is meant for users working from their desks where their BroadWorks devices are located. In this context, users need calls to be delivered to their regular devices and optionally to another number or URL in case they are temporarily away from their desks (for example, mobile phone). Furthermore, users also need their incoming calls to be redirected to voice mail when they are busy, or unable to answer the call. Alternatively, users can choose to have their calls redirected to a selected phone number or URL (for example, to an Auto Attendant or an administrative assistant).
- **Available - Out of office** – This profile is meant for users working away from their desks for an extended period of time. In this case, users are interested in getting all of their calls sent to their temporary locations. Optionally, these users may want to keep track of all incoming calls so they know if they missed some calls or simply want to keep a log of these calls to follow up on them when back in the office. For that purpose, this profile allows users to optionally specify an e-mail address where a notification of all calls should be sent.
- **Busy** – This profile is meant for users who are temporarily unavailable to take calls, for instance when they are in a meeting. In this context, users are interested in screening their calls so only the most important ones come through. Hence, the busy profile allows the users to select up to three parties for which calls are allowed to come through. Other calls are sent directly to their voice mail. Furthermore, users may be interested in being notified of messages being left in their mailbox. So the "Busy" profile allows users to optionally specify an e-mail address where e-mail notifications should be sent.
- **Unavailable** – This profile is meant to be used outside of business hours, or while users are on vacation or holidays. In this case, users are interested in sending all of their calls directly to voice mail or to a specified phone number or URL (auto-attendant or administrative assistant), and provide callers with a distinctive greeting, informing them of their unavailability, or regular business hours. Also, these users may be interested in having some critical calls come through anyway. Hence, the Unavailable profile allows users to send all calls directly to voice mail, and optionally allows them to specify a distinctive greeting and a list of up to three parties who should be allowed to alert the users at a specified phone number or URL.

2.30.2 Configuration

See above for a description of the attributes associated with each CommPilot Express profile.

The following table describes the options available to the user to select an active CommPilot profile:

Item	Description
CommPilot Personal Web Portal	The CommPilot Express templates are configured through the CommPilot Personal web portal. Users can also use the portal to select their active profiles.
CommPilot Call Manager	Users can select their active CommPilot Express profiles through a pull-down menu on the CommPilot Call Manager.
CommPilot Voice Portal	Users on the road or without web access can call into their voice portal to select their active CommPilot Express profiles.

When the user enters the forwarding phone number, the system validates the phone number against the user's calling plans (Outgoing Calling Plan, Outgoing Digit Plan, and Acct/Auth Codes). If the number is not allowed, the user is presented with an audio treatment or an error message.

The default state for CommPilot Express is "Off".

2.31 CommPilot Personal Web Portal

This service allows users to configure and customize services.

2.31.1 Description

The CommPilot Personal web portal provides users with a web interface that allows them to view, configure, activate, and deactivate their services.

The CommPilot Personal web portal also provides the users with:

- List of user services they are subscribed to.
- List of group services they are subscribed to.
- Context-sensitive help for every service.
- Feature access codes that are associated with subscribed-to services.

The CommPilot Personal web portal is authenticated for each user with a user ID and a password, and provides a secure connection to BroadWorks.

2.31.1.1 Login Wizard

When a new user or administrator attempts to log in for the first time, BroadWorks detects the initial login attempt and redirects the user to a *web* page where the user can change his or her password.

When a user attempts to log in with an expired password, BroadWorks also redirects the user to the same page to change the password. Previously, users with expired passwords were completely blocked from proceeding.

In both cases, BroadWorks detects a valid user name and password. The user's identity is authenticated so BroadWorks can provide the proper visual branding for the *Password Change* web page. However, the user is not authorized to do anything except change his or her password. The user is unable to navigate to any other pages within the web portal. Attempting to navigate to other pages by typing URLs directly into the browser address bar will fail. In addition, the Call Manager and Attendant Console windows do not automatically pop up until after the password has been changed.

The *Password Change* web page contains a form where the user enters his or her old password and new password. Submitting the form does two things:

1) It changes the user's password.
2) It redirects the user to whatever page would normally be displayed after a successful login.

2.31.2 Configuration

The user can access the CommPilot Personal web portal from any standard web browser, to perform service configuration.

2.32 Consultation Hold

This service enables a user to put a caller on hold and then make a consultation call to another party.

2.32.1 Description

To initiate consultation hold, a user presses the flash hook and then dials the add-on party. When the call is answered, the user can consult with the add-on party. To drop the add-on party and reconnect to the original party, the user presses the flash hook twice.

Users can also execute Consultation Hold from the CommPilot Call Manager.

2.32.2 Configuration

There are no configuration parameters.

2.33 Custom Ringback User

2.33.1 Description

Two new user services (one for audio and one for video) and two new group services (one for audio and one for video) are introduced for Custom Ringback. They allow a user to specify custom media files to be used for ringback, when incoming calls are received. When the user is called, the system allocates a media resource and plays a custom ringback file to the caller instead of the standard ringback tone.

The user services allow a user to specify multiple profiles. Each profile is associated with a set of criteria (phone numbers, time of day, and so on) and a custom media file. When a call is received, it is compared with the profiles associated with the user. If a match is found, then the associated custom media file is used; otherwise the group service is checked. If active, then the group's custom media file is used; otherwise system ringback is provided.

2.33.2 Configuration

A new Custom Ringback User service is added, which allows a user to configure selective profiles, with each profile having its own defined audio Custom Ringback. Custom Ringback selective profiles conform to the BroadWorks model for selective services.

A new Custom Ringback User - Video service is also added. When this service is assigned, it enhances the Custom Ringback service. It allows a video ringback to be configured in addition to an audio ringback in each Custom Ringback selective profile.

NOTE: For each Custom Ringback selective profile, at least one Custom Ringback file (audio or video) is defined.

Custom Ringback audio and video files loaded via the web interface are subject to a length and format validation. The duration of a ringback file must be between 1 and 120 seconds. This applies to media files, loaded as files, either from the web interface or from the OCI/OSS interfaces. Although this validation is not done for ringback files specified as URLs, it is recommended to use ringback media files that are between 1 and 120 seconds.

The default state for Custom Ringback User is "Off".

2.34 Directed Call Pickup

Directed Call Pickup allows a user to dial a feature access code followed by an extension, to pick up (answer) a call directed to a user with that extension (in the same customer group).

2.34.1 Description

To pick up a call using the Directed Call Pickup service, users dial the Directed Call Pickup feature access code, followed by the extension of the ringing party.

If the ringing party has already answered the call, or if it has no alerting call, or if the dialed extension is invalid, the user receives a reorder treatment.

The main feature interactions introduced by this service are described in the following table.

Feature	Interaction Description
Call Waiting	It is not possible to pick up a waiting call. A call must alert the user with ringing to be picked up.
Call Forwarding No-Answer	It is possible to pick up a ringing call before the call is forwarded by Call Forward No-Answer (CFNA). Picked up calls are not forwarded by the user picking up the call.
Call Hold and Retrieve	It is possible to flash during a call, to place a call on hold and pick up another call. In addition, the user can use the CommPilot to hold the active call and dial the Call Pickup access code.
Call Notify	Call Pickup does not send a call notify message for picked-up calls.
Call Transfer (Blind Transfer)	It is possible to pick up a blind transferred call. It is possible to transfer a picked-up call.
Caller ID	When the identity of the calling party is anonymous, the caller's identity is not delivered to the user who picks up the call.
Do Not Disturb	It is possible to pick up calls regardless of whether the answering party is accepting calls.
Three-Way Call	It is not possible for the conference controller to pick up another call. If the controller flashes during a conference, the flash is processed in priority by the flash service. However, a participant in a three-way call can pick up another call by flashing and dialing the Call Pickup access code.

2.35 Directed Call Pickup with Barge-in

Directed Call Pickup with Barge-in (DPUBI) allows users to dial a feature access code (FAC) followed by an extension to pickup (answer) a call directed to another user in the same customer group, or barge in on the call if the call was already answered. When a barge-in occurs, a three-way call is established between the parties with the DPUBI user as the controller.

NOTE: The pick up portion of this feature is identical to the existing Directed Call Pickup (DPU) feature. DPUBI is a completely separate service from DPU, however, that adds the barge-in capability and has its own, unique FAC.

Throughout this section, the following terms apply:

- DPUBI user – The user invoking the DPUBI service
- Picked up user – The user whose extension has been selected by the DPUBI user
- Other party – The party that is connected with the picked up user before the DPUBI attempt takes place

2.35.1 Description – Provisioning

The DPUBI service is a user service. Therefore, it can be authorized to service providers and groups, and can be assigned to users.

The only configurable option for the DPUBI user service is the barge-in warning tone. This option controls whether a warning tone is given to the picked up user when a barge-in occurs.

The warning tone option is only configurable by administrators. Users can view the current warning tone setting, but cannot change it.

At the group level, administrators can configure the DPUBI FAC. It defaults to *33, but can be changed to any valid available FAC.

2.35.2 Description – Service Invocation

A user invokes the DPUBI service by dialing the DPUBI FAC. If the users do not supply extensions when dialing the DPUBI FAC, then they are given stutter dial tones so that they can enter the extensions to be picked up.

If an invalid extension is entered (for example, an extension that doesn't exist in the group, too few digits, etc.), then the DPUBI user is given reorder tone.

If a valid extension is entered, then a pickup or barge-in is attempted as described in the following sections.

NOTE: If the picked up user has no calls or more than one call, then the DPUBI user is given reorder tone. A pickup or barge-in can occur only when the picked up user has exactly one call.

2.35.3 Description – Pickup

A pickup is triggered by the DPUBI service when the picked up user is alerting for a single, terminating call. When a pickup occurs, the DPUBI user and the other party are connected to one another, and the picked up user is released.

The DPUBI service's pickup functionality is identical to the DPU service, so please refer to the *Release 10 Directed Call Pickup FS* for any additional information.

2.35.4 Description – Barge-in

A barge-in is triggered by the DPUBI service when the picked up user has a single, answered call. The barge-in occurs regardless of whether the picked up user's call was originating or terminating, and regardless of its current state (for example, active and held).

When a barge-in occurs and the user's warning tone option is enabled, the picked up user is given the barge-in warning tone (1 second of 440 Hz, followed by 50 ms of silence). The other party is put on hold while the picked up user is receiving the warning tone.

NOTE: The picked up user is not given the warning tone if he/she has put the call on hold.

Once the warning tone has finished (or immediately if the user's warning tone option is disabled), a three-way call is established with the DPUBI user as the controller. The DPUBI user now has a call with the picked up user and the other party. The picked up user and the other party now have a call with the DPUBI user instead of with each other.

If the DPUBI user has the Flash Three-Way Call service assigned and flashes while the three-way call for the barge-in is present, then the other party is dropped from the three-way call. If the DPUBI user does not have the Flash Three-Way Call service and flashes, then the flash is ignored per the existing Flash service rules.

If the DPUBI user hangs up (goes on-hook) while the three-way call for the barge-in is present, then the picked up user and the other party are transferred together if permitted according to the user's Outgoing Calling Plan configuration. If the transfer is not allowed, then the picked up user and the other party are released. (Therefore the user's Outgoing Calling Plan configuration controls the rest of the call once the DPUBI user hangs up.)

2.35.5 Description – Barge-in Exempt

When a user has the Barge-in Exempt service enabled, another user (using the DPUBI service) cannot barge in on their calls. If a user attempts to use DPUBI to barge-in, then the barge-in is rejected and the user gets reorder tone.

If the Barge-in Exempt service is disabled, then DPUBI barge-in attempts are allowed as normal.

If a user has the Barge-in Exempt service enabled but has a single incoming, alerting call, then the call can be picked up by another user using the DPUBI service. Barge-in Exempt does not block pickup attempts.

2.35.6 Configuration

The administrator can turn the warning tone on and off for each user. The users can see the status of the warning tone but cannot change it. Users can activate and deactivate their Barge-in Exempt service via their web portal. The administrator can select the Directed Call Pickup with Barge-in feature access codes that apply to the group.

The default state for Barge-in Exempt is "On".

2.36 Direct Inward/Outward Dialing

Users are assigned a public phone number that can be used to place or receive calls directly, without forcing access via a central number.

2.36.1 Description

Any BroadWorks user can be assigned a public phone number (also known as a direct inward dialing phone number, or DID) that can be used by external parties to call the user directly, without having to go through an attendant. BroadWorks provides the required translation, routing, and location policies to terminate inbound calls to the user associated with the dialed number.

Similarly, BroadWorks users can make outward calls directly without having to select an outbound access trunk or going through an attendant. BroadWorks provides the required translation, routing, and location policies to originate outbound calls to any public phone number.

2.36.2 Configuration

There are no configuration parameters.

Section *3.24 Outside Access Code* describes the use of an outside access code that is related to Direct Outward Dialing (DOD).

2.37 Distinctive Alert/Ringing

For information on Distinctive Alert/Ringing, see section *2.50 Priority Alert.*

2.38 Diversion Inhibitor

The Diversion Inhibitor service prevents calls, redirected by a user, to be redirected again by the called party. This service is especially useful to help prevent calls from being answered by another user's voice mail when using Simultaneous Ringing or Sequential Ringing.

2.38.1 Description

The Diversion Inhibitor service allows a caller to inhibit redirecting services on the terminating side of an unanswered call, which is done using a feature access code (FAC). The FAC can be activated as a dial prefix on a per-call basis or as a static prefix for the destination number for the caller's redirection services.

2.38.2 Configuration

The service is authorized at the service provider and group levels, and is assigned at the user level. The FAC is configurable via the web and OSS interfaces at the service provider and group level, and defaults to *80. There is no provisioning configuration for the service at the user level and it can only be used on a per-call basis via the FAC dial prefix.

This service is only available within a group or enterprise. For external calls outside of a group or enterprise, the prefix is ignored and the call is processed as usual (that is, redirection services are invoked).

The following services can be inhibited with the Diversion Inhibitor FAC:

- Call Forwarding No-Answer, Busy, Always
- Selective Call Forwarding
- Voice Mail (BroadWorks Voice Mail and External Voice Mail)
- Simultaneous Ringing (Personal)
- Sequential Ringing
- CommPilot Express

The following redirection services are not affected by the FAC and cannot be inhibited:

- Remote Office
- Hunt Group
- Auto Attendant
- Call Center
- Call Pickup (all variations)

2.39 Do Not Disturb

This service allows users to set their status as unavailable.

2.39.1 Description

When a user activates the Do Not Disturb (DND) service, all calls to the user are processed as if the user is busy and cannot receive calls. Other terminating services trigger on the busy condition, as if the user is really busy.

Since the usual busy processing applies to the call, the caller is unaware that the user has the service activated.

When active, the service provides a visual reminder to the user via a button on the CommPilot Call Manager. Furthermore, every time a call is blocked or deflected as a result of the service, the user is played a ring splash[3] as a reminder that the service is active.

2.39.2 Configuration

The default state of the Do Not Disturb service is “Off”.

2.39.2.1 CommPilot Personal Web Portal

The user can activate and deactivate the service through the CommPilot Personal web portal. The user can also select whether a ring splash is applied when a call is blocked or deflected by the service.

2.39.2.2 Feature Access Code

The user can activate and deactivate the Do Not Disturb (DND) service by dialing *78 (default) to activate or *77 (default) to deactivate. The system then plays a confirmation announcement and the user hangs up.

Feature access codes can also be used from the CommPilot Call Manager. For example, the user can enter *78 to activate Do Not Disturb. The system then rings the user’s device and plays a confirmation announcement indicating that Do Not Disturb has been activated.

2.39.2.3 CommPilot Call Manager

The user is provided with a shortcut to the *Do Not Disturb CommPilot Personal web portal configuration* page from the CommPilot Call Manager. In addition, a visual reminder of the status of Do Not Disturb is shown on the CommPilot Call Manager.

[3] Users can activate and deactivate the ring splash reminder through the *Do Not Disturb configuration* page.

2.40 Feature Access Code Service Chaining

2.40.1 Description

Feature Access Code Service Chaining enhances the validation performed on phone numbers entered on *configuration* pages for various BroadWorks services. It allows users to enter feature access codes (FAC) and speed codes in addition to phone numbers and extensions.

For instance, it can be used to configure an Auto Attendant to go directly to a user's voice mail by prefixing the destination number by the "Direct Voice Mail Transfer" feature access code.

2.40.2 Configuration

Feature Access Code Service Chaining is used to enter feature access codes (FACs) and speed codes for the destination address for specific BroadWorks services.

The following services have been modified to allow the use of FACs and/or speed codes:

- Blind Transfer
- Call Forwarding (Always, Busy, No-Answer, Selective)
- Auto Attendant
- Hunt Group
- Call Center
- Simultaneous Ringing
- Sequential Ringing
- CommPilot Express

2.41 Flash Call Hold

The Flash Call Hold feature allows a user to hold one call for any length of time until either party goes on-hook. Activation requires using a feature activation code that is dialed after a switch hook flash.

2.41.1 Description

When a station user is on a two-port call and wants to place the call on hold, the user flashes the switch hook, receives special dial tone, and dials the Flash Call Hold feature activation code. The station then receives a confirmation tone to indicate that the call is being held. Flash Call Hold is deactivated when any of the following occurs:

- If the holding party goes on-hook while another call is held, hold recall applies and the holding party is alerted with power ringing. When going off-hook, the connection with the held party is restored.
- The held station hangs up, terminating the connection.
- The holding station flashes the switch hook (receives the special dial tone) and dials the Flash Call Hold feature activation code again. The holding station is then reconnected to the held party.

This service has specific interactions with other BroadWorks services (described below).

2.41.1.1 Call Waiting

Although Call Waiting creates scenarios where the user must toggle between an active party and a held party, the service does not interact with the Flash Call Hold service. Users with Flash Call Hold are able to answer a waiting call by simply flashing the switch hook, as usual. Furthermore, when users who answered a call waiting want to toggle between the active and held parties, they simply flash the switch hook as usual.

If the user flashes to retrieve a call that has been released, Flash Call Hold behaves as usual and the user gets recall dial tone. This means BroadWorks knows whether a held call is the result of a call waiting session or flash call hold, so the flash can be interpreted correctly.

This also applies when the Call Manager is used to manage the parties in a call waiting session.

If users wish to conference all parties during a call waiting session, they have to use the **CommPilot Call Manager Conference** button, as usual.

The default state for Call Waiting is “On”.

2.41.1.2 CommPilot Call Manager

The Flash Call Hold service has the following impact on the Call Manager:

- Calls show up as held calls as soon as the user flashes the switch hook during a call. The use of the Flash Call Hold feature access code after the flash does not change the status of the call (held) on the Call Manager.
- If a call was held with Flash Call Hold, flashing the switch hook again leaves the call in the held state on the Call Manager as long as the call has not been explicitly retrieved, by entering the Flash Call Hold feature access code again.

- Clicking the **Talk** button can be used to reconnect to calls held by Flash Call Hold, Call Waiting Hold, or Consultation Hold. In all cases, the nature of the session is persisted so further interactions using the flash remain the same.
- Clicking the **Conference** button can be used to conference parties held by Flash Call Hold, Call Waiting Hold, or Consultation Hold.

2.41.1.3 Consultation Hold

The Flash Call Hold service changes some of the existing Consultation Hold functionality. The changes listed below only apply to the flash method. The impact related to the Call Manager Consultation Hold is described in the previous section.

Consultation Hold is invoked by flashing the switch hook during a two-party call, which results in special dial tone. At this point, users who are assigned the Flash Call Hold service can perform the following actions immediately after flashing:

- Dial the Flash Call Hold feature access code to hold the active call.
- Flash again (twice) to reconnect to the held party.

The following actions can be performed with or without dialing the Flash Call Hold feature access code. When these actions are performed immediately after flashing the switch hook (the Flash Call Hold feature access code is not dialed), all parties are bridged over a conference upon flashing again. When the Flash Call Hold feature access code is used first, flashing the switch hook again, results in special dial tone, and the parties are not bridged.

- Dial an add-on party.
- Dial the Call Return feature access code.
- Dial the Last Number Redial feature access code
- Dial the Call Park Retrieve feature access code.
- Dial most other feature access codes (for example, the Call Forwarding Always programming feature access code).

NOTE: These actions are not possible if the two calls are already active. If two calls (one held, one active) are up, the flash is interpreted as follows:

- If the second call results from a call waiting session, flashing toggles between the two parties (that is, call waiting hold).
- If the second call was originated after a Consultation Hold (that is, no Flash Call Hold feature access code), flashing conferences the three parties.
- If the second call was originated after holding the first party with Flash Call Hold, flashing should result in recall dial tone. The user can then only enter the Flash Call Hold feature access code to toggle between the two parties (that is, no other actions are possible). If another number is dialed (or if nothing is dialed), the Flash Call Hold service provides a re-order tone for approximately five seconds, and then reconnects the user with the last active call.

2.41.1.4 Flash Call Transfer

The Flash Call Hold service has priority over Flash Call Transfer. This means that if a user hangs up after bringing in a second party following the Flash Call Hold feature access code, the two remaining parties are not connected together.

If the Flash Call Hold feature access code is not dialed however, Flash Call Transfer works as usual.

2.41.1.5 Hold Recall

The Hold Recall feature applies to Consultation Hold, Call Waiting Hold, and Flash Call Hold.

2.41.1.6 SIP Phones

Flash Call Hold is not supported on SIP phones (similar to other flash services).

2.41.1.7 Three-Way Call

When Flash Call Hold holds a call, flashing the switch hook again during an add-on call does not conference the parties but rather returns a special dial tone. The only way to conference all parties in that situation is to use the **Conference** button on the Call Manager.

When Consultation Hold holds a call, a three-way call behaves as usual.

When Call Waiting Hold holds a call, flashing the switch hook toggles between the two parties and a conference, can only be established using the Call Manager.

2.41.2 Configuration

This service has no user configuration option.

The administrator configures the Flash Call Hold feature access code through the *group feature access code configuration* page.

2.42 Extension Dialing

This service enables users to dial extensions to call other members of their business group.

2.42.1 Description

Extension dialing allows a user to dial an abbreviated digit string to call another user in the user's group. By default, the extension is the last n digits of the user's phone number. However, it can be set to any other valid string of 2 to 6 digits by the group administrator.

Extensions can be associated to users and virtual users. Users without a phone number can have just an extension.

Extensions can be dialed from the phone, from the **CommPilot Call Manager Dial** button, or clicked from the CommPilot Call Manager group directory.

Callers to the group Auto Attendant can use the dial by extension option to reach any user of the group through their extension.

2.42.2 Configuration

The length of the extension is common to all users of the group and is configured by the group administrator. The group administrator can also override the default extension of the user to replace it with another unique digit string of the same length.

2.43 Hoteling

Hoteling allows BroadWorks subscribers to associate their service profiles with devices other than their own. Hoteling consists of two separate services, Hoteling Host and Hoteling Guest.

The first service, Hoteling Host, is used to designate a particular user as a host allowing other users with the Hoteling Guest service assigned, to associate their service profile with this user's device.

The second service, Hoteling Guest, is used to allow a user to associate the user's service profile with a user's device that has the Hoteling Host service assigned.

This functionality is typically used for transient employees. For example, an enterprise can establish visitor cubes with a phone. The user account associated with this phone would have the Host service assigned. Salespersons, with the guest service assigned and using the cube, can associate their service profiles with the phone in the cube while they are working in the office.

Subscribers with Hoteling Guest assigned associate themselves with Hoteling Host via the CommPilot web portal or the voice portal. From the web portal, users select an idle host and associate their service profiles with this host. From the voice portal, users dial in from the host phones they wish to associate their service profiles with. After entering their identities and passwords, they invoke the Hoteling menu and can associate their service profiles with the host phone.

2.43.1 Description

Hoteling allows users to associate their service profiles with a different device. It is typically used for transient employees, that is, an enterprise can set up a visitor cube with a phone, and a visiting employee can use the phone with the visiting employee's service profile.

Hoteling functionality is delivered via two separate services, Hoteling Host and Hoteling Guest.

- User accounts with Hoteling Host assigned allow their devices to host other Hoteling Guest users.
- Users that have Hoteling Guest assigned can be associated with a Hoteling Host user and use the Hoteling Host user's device with their service profiles.

Hoteling Guest users require mobility (these users require their service profiles to be available over different devices in different locations across an enterprise). Hoteling Host users enable this functionality by providing their devices to one guest at a time.

2.43.1.1 Hoteling Host

This service is assigned to a BroadWorks user that will operate as a host for Hoteling. Typically, such users are configured with a basic set of services and do not identify an actual person within an organization. Note that there are no service assignment restrictions on such users, however. A Hoteling Host user can have a full set of services, if desired.

The default state for Hoteling Host is "Off".

Various service settings can be configured that determine the hosting behavior of this user, via the Hoteling Host service. These settings are as follows:

On/Off

The service can be enabled or disabled, making this host user available or unavailable to host guest users. If this service is inactive, no guest user can be associated with it. If there is an existing guest user associated and this service is made inactive, that guest user is forcibly disassociated. If the guest is active on a call, then that call is allowed to complete normally.

Associated Guest Indicator

The guest indicator shows which guest (if any) is currently associated with the host. It will show the first name, last name, phone number, location code, and extension. If a guest is not associated with the host, the indicator will not show any information.

Association Time Limit

The association time limit can only be configured by group administrator level users and above. It is view-only for user level users.

The association time limit value is a policy setting on the host that restricts the maximum timeout value in hours a guest user can configure when associating with the host. It can be set to an integer value greater than 0 and less than or equal to 999 and defaults to 24. The guest timeout setting is a timer that will automatically disassociate the guest from the host after the specified period of time.

Changing the time limit while a user is actively hosted will have no impact on the current host-guest association. For example, if the initial association time limit was 24 hours, then when a guest associates with a host he/she will be allowed to configure a maximum timeout setting of 24 hours. If the association time limit is subsequently changed on the host, then this new setting will be used the next time a guest associates with the host.

Access Levels

The access level can only be configured by group administrator level users and above. It is view-only for user level users.

The service defines an access level indicator (Group, Enterprise), restricting the set of guest users that can use it for hosting.

- The Group indicator will only allow guest users within the customer group of the host user to be associated with it.
- The Enterprise indicator allows all guest users within the host user's enterprise to be associated with it. Changing the access level has no impact on any current association.

Only host-guest associations moving forward will use the changed access level.

2.43.1.2 Hoteling Guest

This service is assigned to BroadWorks users that need Hoteling functionality, that is, they need their services available from different locations. Typically, such users identify actual persons in an organization, who travel and need their service profile to execute for calls to/from different devices in different locations.

The default state for Hoteling Guest is "Off".

Various settings control how this particular guest account behaves when associated with a Hoteling Guest user account, via the Hoteling Guest service. These settings are as follows:

On/Off

This service can be active or inactive. If inactive, this user cannot be associated with a host user account. If this guest user is associated with a host account, and the service is disabled, then this user is forcibly disassociated.

Association Time

The association time can be configured by user-level users and above. This setting is used to set a timer that will automatically disassociate the guest from the host when the timer expires. The value for the timeout must be greater than 0 and less than the association time limit configured on the host.

Associated Host Indicator

This will show the host (if any) that this guest is associated with.

Host Association

This service lists all host user accounts where the user is allowed to access the host, determined via the host's access indicator (group, enterprise). A guest user uses this list to choose a host to associate with.

Search capability exists to filter available hosts to associate with. The list of available hosts can be filtered by Last Name, First Name, or Department. This allows for easy searching across large enterprises.

2.43.1.3 Association and Disassociation

Via CommPilot Web Portal

Associating a guest with a host via the *web* pages is accomplished via the Hoteling Guest service configuration portal. A guest user or administrator navigates to the *Hoteling Guest* pages and selects a host user from the list of available hosts. Available hosts are Hoteling Host user accounts that are active, not associated with other guest users, access levels for the host permit the guest to see the host, and the host has a main end point.

Disassociating a guest from a host is accomplished from the same *web* pages.

Via Voice Portal

Associating a guest with a host via the voice portal is accomplished via the guest user's voice portal. The "Access Hoteling" option is only available if all conditions are met:

- The voice portal is accessed by a user account with the Hoteling Guest service assigned.
- The voice portal is accessed from the host user's device, that is, the Hoteling Host service is assigned and enabled.
- The access level (enterprise or group) that configured the Hoteling Host service is compatible with the type of access being made.

NOTE: If the guest user is already associated with the host device, then the "Access Hoteling" option is available regardless of the configured access level. In the case where the access level becomes more restrictive while an association exists, this allows the guest user to use the voice portal to disassociate with the host device.

The guest user must log in to the voice portal using the user's credentials (user ID/password). Depending on whether the guest user is already associated with the host device or not, the guest user dials in to the voice portal and is prompted to enter a password or needs to dial the escape key to enter his or her user ID.

From the Hoteling options menu, a user can associate, disassociate, or check the host's status.

Voice Portal Main Menu (If Hoteling Guest is Assigned)

Default Key	Option
1	Access Voice Messaging
2	Change CommPilot Express Profile
3	Record Personalized Name
4	Change Call Forwarding Options
6	Make Call
7	Access Hoteling
8	Change Passcode
9	Exit Voice Portal
#	Repeat Menu

Hoteling Menu

Default Key	Option
1	Check Host Status
2	Associate With Host
3	Disassociate From Host
4	Return to Main Menu
#	Repeat Menu

Check Host Status

If the status option is chosen, the system provides an indication of whether or not the host is associated with a guest, and (if so) the identity of the guest user. The guest user is identified by the user's recorded name (if available) and a phone number or extension. If the guest user has an extension, then the extension is voiced, prefixed by a location code, if applicable. If the guest user does not have an extension, then the phone number is voiced.

Association

If the associate option is chosen and the host is not currently associated with a guest, then the user is played a message indicating the association was successful. The guest association timeout is set to the association time limit value configured on the host. If the host is already associated with another guest, then the request is denied and the user is informed that another guest is already associated with this host. If the guest user is already associated with another host device, then that association is terminated and a new association is made with the current host device. In this case, the user is simply played a message indicating that the association was successful.

Disassociation

If the disassociate option is chosen, the associated guest user's service profile is disassociated from the host user's device. If the guest user is not the current user associated with the host, then the request is denied and the user is informed that he/she is not currently associated with the host.

Association Behavior

Once an association is made, the device configured on the host user account is associated with the guest user. Calls made to and from the guest use the guest service profile and the host's device. Calls initiated via the Call Manager by the guest will use the host's device. The web, CLI, and OSS interfaces will continue to show the originally configured guest device as the guest user's primary device.

Calls made to the host user account trigger a not-reachable condition, and services configured on the host's service profile will execute. This is similar to the host having no assigned primary device.

The guest user's device will be unreachable (unable to receive calls) as well. All non-emergency calls placed from the guest user's device (the device belonging to the guest that is now actually using the host's device) will be rejected. Emergency calls made from the guest user's device will not be blocked.

All non-emergency calls made by the guest from the host's device will use the CLID of the guest. Emergency calls made by the guest from the host's device will use the CLID of the host user. This is required so that the emergency personnel will have the true location of the guest.

Once a guest is disassociated from a host, the host user is free to accept other associations. The guest user's primary device now reverts back to the user's original device, and the host user's device is re-associated with the host user account. If there are any active calls up while a disassociation occurs, those calls are allowed to complete normally.

If the primary end point is removed from a host user when there is a host-guest association, then the guest is automatically disassociated from the host.

2.43.2 Configuration

Both the Hoteling Host and Hoteling Guest are configurable at a user level. When authorized and assigned to a user, links to *configuration* pages for Hoteling Host and Hoteling Guest appear under the "Call Control" section in the left navigation panel.

All levels of users can configure the Hoteling Host and Hoteling guest features except for the hoteling host association time limit value. This is view-only to the user and can be configured by group administrator levels and above.

2.44 Intercept User

This service allows the system to intercept calls routed to a line that has been decommissioned, providing an informative announcement and alternate routing options (for example, "*This number is no longer in service. To talk to an operator, press 0*").

The Intercept User service intercepts calls directed to individual users. The related Intercept Group service intercepts all calls directed to users in a specified group.

2.44.1 Description

If the Intercept User service is assigned, then incoming calls to the specified user are intercepted and played an announcement. If configured, this announcement plays back a new destination number to the caller and offers the caller to connect to this new number.

The announcement can be in audio or video format, depending on the service configuration and the calling party's ability to support video.

NOTE: The maximum recording length for Intercept User is five minutes.

Outgoing calls are prohibited from a user with the Intercept User service assigned. Only emergency and repair calls are permitted, although the system-level administrator may choose to restrict those call types as well. All other call attempts are rejected and the calling user is played a treatment.

2.44.2 Configuration

The group administrator assigns the Intercept User service to selected users using the CommPilot Group web portal.

The Call Intercept service allows three types of incoming call interception:

- **Static** – An out-of-service announcement (audio or video) is played twice followed by a fast-busy treatment.
- **Hear new destination** – The out-of-service announcement is complemented with the playback of the user's new phone number.
- **Connect to new destination** – After hearing the new phone number, the caller can press a digit to be immediately transferred.

The desired type of interception is configured when the service is assigned.

The system administrator may choose to restrict intercepted users from making emergency and repair calls. This setting can be configured through the web interface or the CLI.

The default state of Intercept User is "Off".

2.44.3 Emergency Intercept

Emergency Intercept allows carriers to temporarily suspend service for users who are roaming outside of the carrier serving area. In this context, roaming refers to a user who registers a device outside of the geographical area served by a carrier, which may result in limited emergency services. Once it has been established that a user is outside of the area, Emergency Intercept allows the carrier to temporarily suspend the service for that user.

Emergency Intercept is implemented as an optional enhancement to the User Intercept service. The enhancement is activated for the entire Application Server via a system parameter. When activated, User Intercept blocks all calls including emergency and repair calls made by the user. Hence, to suspend a roaming user, the carrier simply assigns the User Intercept service to that user and activates it.

When a user has the Intercept User feature assigned and enabled, the user is no longer allowed to originate calls (except emergency and repair calls) or to receive calls (including calls from emergency centers). This feature enhances the Application Server such that the Intercept User feature can now also block emergency and repair calls made by intercepted users.

The feature introduces a new system parameter called *Emergency_Intercept*. When the system parameter is set to “false”, this feature is disabled and Intercept User works as it did before. When the system parameter is set to “true”, Intercept User works as it did before and all emergency and repair call attempts made by the intercepted users are blocked as with other calls.

2.45 Last Number Redial

This service enables users to redial the last number they called by clicking the **Redial** button on their CommPilot Call Manager or by dialing a feature access code (for example, *66).

2.45.1 Description

The Last Number Redial service allows the user to repeat the last call that was made by dialing *66 (default). The service substitutes the feature access code with the digits used for the last call that was made and originates the call as usual. The digits are obtained from the last entry in the call log for originated calls.

Feature access codes can be entered on the user's device or through the CommPilot Call Manager. Furthermore, the service can be used on the original or add-on call leg (that is, after a switch hook flash or through the CommPilot Call Manager with one call active).

2.45.2 Configuration

There are no configuration parameters.

2.46 Malicious Call Trace

Malicious Call Trace is a user service that allows the service provider to trace calls coming to a BroadWorks user. When a user is assigned Malicious Call Trace, any call that attempts to terminate on that user triggers the generation of a report (or trace) that is delivered to the service provider in an SNMP trap. The report contains information about the calling party (number, name), the time and date the call was received, and other relevant information (for example, redirection information).

2.46.1 Description

Malicious Call Trace (MCT) is a user service. Only a system administrator can manage (authorize, assign, and configure) this service. Note, that service providers, administrators, group administrators, or end users cannot see the Malicious Call Trace feature in the CommPilot web portal (not even read only).

The system administrator can obtain a list of all Malicious Call Trace assignments on the system using the web portal, under the Service folder at system level, using the “Malicious Call Trace” link.

At execution time, the instant at which the alarm is generated depends on the trace type, as follows:

- Answered: The alarm is generated when the call is answered by the user being traced.
- Alerting: The alarm is generated when a call attempts to terminate on the user being traced, before any terminating services of the user are allowed to proceed.
- All: The alarm is generated when a call attempts to terminate on the user being traced, or when the user being traced originates a call (for example, upon sending an outgoing invite), including originations due to a redirection (such as call forward).

The alarm contains a subset of the Call Detail Record information. It contains all the available information at the time it is generated.

2.46.2 Configuration

The default state for Malicious Call Trace is “Off”.

The system administrator specifies the following information once Malicious Call Trace is assigned to a user:

- Activation: On/Off
- Whether to trace for a time period only or not (applicable only when “On”)
- Time period: Specified with a start date, a start time, stop date, stop time
- Trace type: One of the following three options:
  - Answered (all incoming answered calls)
    An alarm is generated for any terminating call that gets answered by the user being traced.
  - Alerting (all incoming calls)
    An alarm is generated for any terminating call on the user being traced (answered or not).

- All (all incoming and outgoing calls)
  An alarm is generated for any originating or terminating call involving the user being traced.

2.47 Music On Hold User

This feature enables users to enable/disable Music On Hold on either a per-call or persistent basis by using a feature access code or the web portal.

2.47.1 Description

Music On Hold user configuration allows a user to turn on or off music for held and parked calls by the user when the group has enabled the Music On Hold for held and parked calls. This configuration is available to all users within a group who have Music On Hold assigned. This configuration is not available to virtual users and it is not applicable to users within a call center.

The user can configure this via the web portal or the OSS and also turn it off per call with a feature access code. Using the web portal, the user can configure this via a *Music On Hold configuration user* page, which is available as a link on the *User Call Control* page (or via the OSS using the modifyUserService command). If Music On Hold is turned off, then callers will hear silence for calls that are held and parked. If Music On Hold is turned on, then callers will hear for calls that are held and parked, (assuming Music On Hold is enabled for held and parked calls for the group). The user configuration is on by default when the user is created, or when the service is assigned to the group.

A new feature access code (FAC) called Music On Hold Per-Call Deactivation is added to the service provider and group. This FAC can be configured for a service provider when Music On Hold is authorized to the service provider using the existing service provider *Feature Access Code* page or the service provider modifyFacCode OSS command. This FAC can be configured for a group when Music On Hold is authorized to the group at the existing group *Feature Access Code* page or the group modifyFacCode OSS command. The default value for the FAC is *60.

A user can turn off music for all held or parked calls prior to dialing a call or when a call is in progress. It can be turned off prior to a call by dialing the FAC before dialing the outgoing telephone number. When the user dials the FAC, the user is provided with a confirmation tone followed by dial tone after which the user dials the outgoing telephone number. It can be turned off when a call is in progress by flashing the switch hook and then dialing the FAC. After the FAC is dialed, the system provides a confirmation tone followed by the dial tone. The user can now flash back to the active call. Music will be turned off for all user sessions until the user who initiated the FAC is disconnected. Once the call is disconnected the Music On Hold configuration will be returned to the persistent state.

2.47.2 Configuration

The user activates and deactivates Music On Hold via the CommPilot personal portal (persistently) or via a feature access code (per call).

The default state for Music On Hold is “On”.

2.48 N-Way Calling

This service provides users with the ability to add other users to a call in progress, similar to the Three-Way Calling service, up to a maximum number configured at the system or service provider/enterprise level.

2.48.1 Description

Users with the N-Way Calling service assigned and activated can create a conference using their phones, adding other users to a call in progress up to a maximum concurrent number configured by the system or service provider administrator.

Users allowed to transfer calls can also drop out of conferences that they have created, leaving the other participants connected.

Users must have SIP devices that support the REFER method to use this service.

For details on using the N-Way Calling service, see section *2.62 Three-Way Calling.*

2.48.2 Configuration

Users enable and disable the N-Way Calling service using the *Three-Way Calling/N-Way Calling configuration* page in the web portal.

Administrators must use the CLI or web portal to configure the maximum number of participants allowed in each N-Way Calling conference and to configure the URI of the conferences created. These settings can be configured at the system level and at the service provider/enterprise level. If configured at the service provider/enterprise level, those settings take precedence over the system-wide settings.

2.49 Physical Location

The Physical Location service controls whether originating calls are allowed from physical locations other than the one configured for the user's device. This allows proper support of emergency calling in countries and regions where the location of a user cannot be derived from a user's phone number.

2.49.1 Description

When a user with the Physical Location service assigned and activated originates a call, the system compares the physical location of the call (specified by the *P-Access-Network-Info* header) with the physical location configured for the user's assigned device.

- If the *P-Access-Network-Info* header is received and the originating device has a configured physical location, then the contents of the header must match the configured value exactly, except for white space and case. If the values do not match, then the origination is blocked and treatment is played. Note that all originating calls (including emergency and repair calls) are blocked.
- If the *P-Access-Network-Info* header is received but the originating device has no configured physical location, then the origination is allowed to proceed.
- If the *P-Access-Network-Info* header is not present and the originating device has a configured physical location, then the origination is blocked and treatment is played. Note that all originating calls (including emergency and repair calls) are blocked.
- If the *P-Access-Network-Info* header is not present but the originating device has no configured physical location, then the origination is allowed to proceed.

2.49.2 Configuration

Administrators can use the web portal to enable or disable the Physical Location service for a user. When enabled, the user's originating calls are restricted to the physical location configured for his or her device. When disabled, the user can call from physical locations different from the one configured for his or her device.

Administrators can also use the web portal to set the Physical Location for a device by modifying the device profile.

Users can view their Physical Location setting in the web portal, but may not modify the settings configured by their administrators.

The default state for Physical Location is "Off".

2.50 Priority Alert

This service enables a user to define criteria to have certain incoming calls trigger distinctive alerting.

2.50.1 Description

The Priority Alert service allows a user to have some incoming calls alert them distinctively when meeting pre-specified criteria. The service applies to power ringing and alerting tones. In both cases, incoming calls meeting the criteria result in a distinct ringing cadence and alerting tone pattern, respectively. The distinctive alerting pattern is the same for ringing and tones. Apart from the distinctive alerting pattern, this service does not change the way incoming calls are processed.

This list of criteria includes:

- Selected time schedule, for example, “Every Day All Day”
- Whether the calling line ID is PRIVATE or UNAVAILABLE
- A list of up to 12 phone numbers or digit patterns (for example, 514*)

The criteria can be combined within predicates (for example, incoming call from this number and within business hours and during work week). Multiple predicates can be defined and distinctive alerting is provided when at least one of the predicates is met.

The service can also be assigned to hunt groups and call centers. In this case, the analysis of the incoming call against the set of criteria is done at the Hunt Group or call center level, and then affects the power-ringing pattern of all agents in the group. The Priority Alert feature does not need to be assigned to the agents themselves.

2.50.2 Configuration

This service is configured through the CommPilot Personal web portal. A user can define criteria based on the incoming caller identity, ranges of digits, the time of day, and the day of the week.

Ranges of digits can include digits 0 through 9, and the following wildcard characters:

- * *(star)* – This wildcard can only be used as the last character of the digit string and matches any number of trailing digits.
- ? *(question mark)* – This wildcard can be used anywhere in the string and matches any single digit.

Multiple criteria can be combined to build predicates, and multiple predicates can be defined simultaneously. Each predicate can be active or inactive. This service applies if at least one of the active predicates is met.

The default state for Priority Alert is “Off”.

2.51 Privacy

The Privacy service allows a user to exclude himself or herself from the Group and Enterprise Directory lists visible in the Call Manager and web portal.

2.51.1 Description

This service, when assigned and activated for a user, prevents the CommPilot Call Manager and the web portal from including that user's name in any group or enterprise directory lists.

2.51.2 Configuration

Users can activate or deactivate the Privacy service for their own accounts using the web portal. On the *Profile menu* page, a link in the *Advanced* column appears for users with this service assigned. This link takes the user to the *service configuration* page, where the service can be enabled or disabled.

2.52 Push To Talk

The Push To Talk (PTT) service allows a user to call another station, where the system requests that the destination station automatically answer. This provides for intercom-like functionality. A user or administrator can specify an accept list and a reject list. These are used to screen incoming Push-To-Talk sessions.

- The accept list indicates which users are allowed to call a station.
- The reject list indicates which users are not allowed to call a station.

In both lists, a wildcard can be used, which indicates all stations.

2.52.1 Description

2.52.1.1 Push-To-Talk Origination

A user originates a PTT call by dialing the PTT FAC. If the users do not supply a destination address when dialing the PTT FAC, then they are given stutter dial tone so that they can enter the destination address for the PTT call.

- If no destination address is entered (that is, digit collection times out), then the call is sent to reorder treatment.
- If a destination address is provided, then a PTT call is originated to the destination address.

NOTE: The PTT origination is processed by the user's origination services such as the Outgoing Calling Plan.

When the originator of a PTT call receives an indication that the call has been answered, a PTT confirmation tone is played to both the originator and terminator. Once the confirmation tone has finished playing, the media path between the originator and terminator is established according to the Outgoing Connection Type.

If the user has the Outgoing Connection Type option set to One-Way, then no media can be transmitted from the terminator to the originator, after the call is answered. Only the originator is allowed to transmit media. If the terminator answers the call to play treatment, the originator will not hear the treatment since the call has been answered and the connection is now one-way.

NOTE: Before answer, the connection is always two-way so that remote media (such as remote ringback and early treatment) can be heard prior to answer.

If the Outgoing Connection Type option is set to Two-Way, then the originator and terminator can talk to each other as usual.

2.52.1.2 Push-To-Talk Termination

When users receive a PTT call, it is screened using their Access List according to the Access List type setting.

If the Access List type option is set to “Allow calls from only the users selected below” (that is, an Accept List), then the PTT call is rejected with the PTT Rejected announcement, if the originator is not in the Access List.

If the Access List type option is set to “Allow calls from everyone except the users selected below” (that is, a Reject List), then the PTT call is rejected with the PTT Rejected announcement, if the originator is in the Access List.

Note that the Access List in this release can only contain other users in the group and/or enterprise. If the terminator has the Access List set to be an Accept List, then all PTT calls from outside the group and enterprise are rejected since the originator cannot be in the list. Similarly, if the terminator has the Access List set to be a Reject List, then all PTT calls from outside the group and enterprise are accepted since the originator cannot be in the list.

If the user’s Access List allows the PTT call, then it is allowed to continue. If the Auto-Answer option setting is set to “On”, then a header like the following is added to the INVITE(s) sent to the user’s SIP device:

```
Call-Info:<sip:as.broadsoft.com>;answer-after=0
```

This header is defined in the BroadWorks Advanced Call Control Specification and indicates that the device should immediately answer the call. If the device supports the header, then the PTT call is automatically answered. If the device doesn’t support the header, then the PTT call must be manually answered.

Note that if the terminating user does not have the PTT service assigned, then an incoming PTT call is treated as a normal call termination instead of a PTT termination (for example, no Auto-Answer, no Access List screening), but continues to be considered a PTT call for service interactions.

2.52.2 Configuration

The PTT service is a user service. Therefore, it can be authorized to service providers/enterprises and groups, and can be assigned to users.

There are several configurable options for the PTT service. All are configurable by both administrators and users.

The Outgoing Connection Type option can be set to One-Way or Two-Way. When set to One-Way, only the originator of a PTT call can talk. When set to Two-Way, both the originator and terminator of a PTT can talk. Its default setting is Two-Way.

The Auto-Answer option can be set to “On” or “Off”. When users receive a PTT call with Auto-Answer set to “On”, their device is signaled to automatically answer the call. Its default setting is “On”.

The Access List type option can be set to “Allow calls from only the users selected below” (that is, an Accept List) or “Allow calls from everyone except the users selected below” (that is, a Reject List). Its default setting is “Allow calls from only the users selected below”.

The Access List itself is a list of users within the PTT user’s Group and/or Enterprise (if the user is a member of an Enterprise). Users can be searched for, added to, and removed from the Access List. The Access List is used as defined by the Access List type option.

At the group and service provider/enterprise levels, the PTT FAC can be configured by administrators. It defaults to *50, but can be changed to any valid, available FAC.

2.53 Remote Office

This service enables users to access and use their BroadWorks profile and services from any device, on-net, or off-net (for example, home office or mobile phone).

2.53.1 Description

Remote Office is especially useful for telecommuters and mobile workers, as it enables them to use all of their features while working remotely (for example, extension dialing, transfers, conference calls, Outlook Integration, directories, and so on). In addition, since calls are still originated from BroadWorks, the service provides an easy mechanism for separating personal and business phone expenses, as well as keeping alternate phone numbers private.

To use the service, users simply enter the phone number of their current location and activate the service. From that point on, their usual BroadWorks location is temporarily overridden by the newly configured location.

When the service is active, all incoming calls to users are redirected to their Remote Office location and are subjected to the user's terminating services.

Similarly, users can originate calls from their Remote Office location through the CommPilot Call Manager click to dial capability. This ensures that calls are processed by BroadWorks as normal originating calls, and are subjected to the users' originating services.

This service allows users to manage active calls as usual through the CommPilot Call Manager, thus providing the users with their BroadWorks profile and services from any addressable phone on the network or the PSTN.
When the service is active, a reminder is provided on the user's CommPilot Call Manager, indicating that incoming calls are redirected to an alternate destination.

2.53.2 Configuration

The following table describes the configuration items for Remote Office.

Item	Description
CommPilot Personal	A user can configure his or her temporary location and activate the service through the CommPilot Personal web portal. The location is entered as a phone number.
CommPilot Call Manager	The user can click the Remote Office status indicator on the CommPilot Call Manager to link directly to the *CommPilot Personal* web portal *Remote Office* configuration page.

When the user enters a phone number, the system validates the phone number against the user's calling plans (Outgoing Calling Plan, Outgoing Digit Plan, and Acct/Auth Codes). If the number is not allowed, the user is presented with or an error message.

The default state for Remote Office is "Off".

2.54 Selective Call Acceptance

This service enables a user to define criteria that allows incoming calls. All calls that do not meet the specified criteria are rejected and provided a treatment.

2.54.1 Description

Selective Call Acceptance allows a user to only accept calls that meet user-configurable criteria. The possible criteria include:

- Selected time schedule, for example, "Every Day All Day"
- Whether the calling line ID is PRIVATE or UNAVAILABLE
- A list of up to 12 phone numbers or digit patterns (for example, 5?4*). Phone numbers are matched against the sending number received in the INVITE. This may be the P-Asserted-Id header, the *Remote-Party-Id* header, or the *From* header, depending on context. This service may therefore require the user to provide complete 10-digit numbers to match those included in the INVITE.

The criteria can be combined within predicates (for example, incoming call from this number and within business hours and during work week). Multiple predicates can be defined and any call meeting any predicate is allowed to terminate to the user. For calls that do not meet any criteria, a system announcement is played to the caller.

2.54.2 Configuration

The service is configured through the CommPilot Personal web portal. A user can define criteria based on the incoming caller identity, ranges of digits, and a time schedule.

Ranges of digits can include digits 0 through 9, and the following wildcard characters:

- * *(star)* – This wildcard can only be used as the last character of the digit string and matches any number of trailing digits.
- ? *(question mark)* – This wildcard can be used anywhere in the string and matches any single digit.

Multiple criteria can be combined to build predicates, and multiple predicates can be defined simultaneously. Each predicate can be active or inactive. Incoming calls are accepted if at least one of the active predicates is met.

The default state for Selective Call Acceptance is "Off".

2.55 Selective Call Rejection

This service enables a user to define criteria that causes certain incoming calls to be rejected and provided a treatment. All other calls terminate as usual.

2.55.1 Description

Selective Call Rejection allows a user to block calls that meet user-configurable criteria. The blocked calls are provided a treatment whereas all calls not meeting the user-specified criteria are allowed to terminate as usual.

The possible criteria include:

- Selected time schedule, for example, “Every Day All Day”
- Whether the calling line ID is PRIVATE or UNAVAILABLE
- A list of up to 12 phone numbers or digit patterns (for example, 514*). Phone numbers are matched against the sending number received in the INVITE. This may be the *P-Asserted-Id* header, the *Remote-Party-Id* header, or the *From* header, depending on context. This service may therefore require the user to provide complete 10-digit numbers to match those included in the INVITE.

The criteria can be combined within predicates (for example, incoming call from this number and within business hours and during work week). Multiple predicates can be defined and Selective Call Rejection is provided if at least one of the predicates is met. All other calls terminate as usual.

2.55.2 Configuration

The service is configured through the CommPilot Personal web portal. Through the portal, the user can define criteria based on the incoming caller identity, ranges of digits, and a time schedule.

Ranges of digits can include digits from 0 through 9, and the following wildcard characters:

- * *(star)* – This wildcard can only be used as the last character of the digit string and matches any number of trailing digits.
- ? *(question mark)* – This wildcard can be used anywhere in the string and matches any single digit.

Multiple criteria can be combined to build predicates, and multiple predicates can be defined simultaneously. Each predicate can be active or inactive. Incoming calls are rejected if at least one of the active predicates is met.

The default state for Selective Rejection is “Off”.

2.56 Sequential Ringing

This service allows users to define a “find-me” list of phone numbers or URLs, which are alerted sequentially upon receiving an incoming call that matches a set of criteria. While the service searches for the user, the calling party is provided with a greeting followed by periodic comfort announcements. The caller can also interrupt the search at any point to leave a message by pressing a DTMF key.

2.56.1 Description

When the Sequential Ringing service is active on an incoming call, it takes control of the call and provides the calling party with an announcement stating the system will attempt to locate the user. This announcement is provided on a one-way voice path to the called party with a provisional response (183). No answer supervision is sent back to the caller (unless the incoming call was through an INVITE without SDP, in which case the Application Server has no choice but to answer the call to get an SDP from the caller).

The service then attempts to call the user by calling the phone numbers or URLs in the Sequential Ringing list (starting with the user’s base location, if enabled) one after the other until the call is answered, or the last number remains unanswered. At this point, the caller is provided with no-answer processing (CFNA, voice mail).

For each phone number in the Sequential Ringing list, the following occurs:

- A call is originated to the phone number or URL and a timer is started. The timer is configured separately (in number of rings) for each location. The user can set the number of rings for the base location by dialing a configurable feature access code. The default feature access code is *610. Note however, that this setting applies to all services with no-answer handling, that is, the Voice Mail, Third-Party Voice Mail Support, and Call Forwarding No-Answer services.
- If the called number is busy or results in a local announcement, the call is released and the service moves on to the next number. The base location can be configured so that Sequential Ringing will not attempt any further location if the base location is busy. If this happens, busy processing will occur immediately. If all locations are busy, busy processing occurs as well.
- If the called party answers, the calling party is connected to the called party and the service ends.
- If the timer expires before the call is answered, the call is released and the service moves on to the next number.
- If this is option is enabled and the caller presses the # key, the search process is interrupted and the caller is presented with no-answer processing immediately.

Note that nothing prevents a destination from being configured (and thus alerted) twice, or the user from entering his or her own number should the user want his or her base location to be alerted last, for example.

The Sequential Ringing user defines a set of criteria that determine if the Sequential Ringing service should be activated for the incoming call.

The set of criteria is analogous to the Selective Call Forwarding set of criteria and allows for defining a time schedule (time-of-day, day-of-week) and calling number(s) for which the service should be activated. If the criteria are met, the service is activated as described above. Otherwise, the call is processed as usual.

For Sequential Ringing to always be enabled, for example, one criterion set to “Every Day All Day” and “Any phone number” must be defined and activated.

While the service goes through the list of locations, the caller is provided with the initial greeting followed by local ringback. Since the time necessary to find the user can be considerable (up to six times six rings, or more than three minutes), a comfort announcement is played after every 20 seconds of ringback.

Once a call is successfully connected, or when the last location in the list remains unanswered, the ringback or announcement is interrupted and the caller is connected to the user, or provided with no-answer processing, as applicable.

The feature is assigned like any ordinary user feature. It can be configured via the OSS interface by the system administrator or via the web interface by the user (or any administrator).

2.56.2 Configuration

The following elements can be configured for Sequential Ringing:

- Whether to use the base location or not
- The number of rings for the base location (shared with other services such as CFNA) can be configured through the web portal or by dialing a configurable feature access code
- Whether to continue searching if the base location is busy
- Whether the caller can press # to interrupt the search process or not
- The list of up to five locations and their timers (number of rings), which can be set using the web portal or a configurable feature access code
- A list of criteria (similar to the other “selective” services) and whether each one is active or not

When the user enters a phone number, the system validates the phone number against the user’s calling plans (Outgoing Calling Plan, Outgoing Digit Plan, and Acct/Auth Codes). If the number is not allowed, the user is presented with an error message.

The default state for Sequential Ringing is “Off”.

2.57 Service Scripts User

The Service Scripts User service provides users with the ability to set a call processing language (CPL) script for use with their accounts.

2.57.1 Description

Users with the Service Scripts User service assigned and activated may specify a CPL script for the system to use when processing calls for their account. Users can upload scripts from local files or from URLs.

Scripts specified with the Service Scripts User service take precedence over any specified for the group using the related Service Scripts Group service.

2.57.2 Configuration

Users can configure the script to be used for their account using the web portal. Users with the service assigned and activated will see a Service Scripts choice in the Options list. This link brings the user to the *Service Scripts menu* page, offering access to the service scripts *Configuration* page, *Load* page, and *Logs* page.

The service scripts *Configuration* page allows users to view the source of the script to be used, and to enable or disable the service.

The *Load* page allows users to upload a script from a local file or a URL.

The *Logs* page allows users to view any log messages generated by the active service script.

2.58 Shared Call Appearance (Multiple Appearance Directory Numbers)

This service allows an incoming call to appear at multiple locations simultaneously. All devices where call appearance is shared can be used to answer an incoming call or originate a call on behalf of the main location, such as in an administrative assistant/executive scenario for instance.

The SCA also has private hold capability. When a location puts a call on private hold, only the location that held the call can retrieve it. Retrieve attempts from all other locations are rejected.

2.58.1 Basic Functionality Description

The Shared Call Appearances service gives an administrator the ability to provision up to 35 locations (devices) for a user. These locations are known to share the same line appearance, so they all behave as extensions of a single line or user.

One of these provisioned locations is the user's primary location while the other locations are called alternate locations. Users can be assigned any type of device for their primary and alternate locations.

When a user with this service is idle, an incoming call alerts all the assigned locations. The first location to answer is considered the active location and the others are released and locked for further use by that user.

If the user is already busy on a call on one of the locations associated with the line, the incoming call is presented to the active location only.

A Shared Call Appearance user can originate a call from any location, which locks out the other locations for the duration of the call. Any further incoming calls to that user are presented to the busy location, similar to a terminating scenario.

Calls are transferred between locations by hanging up on a held call. This causes all locations to be rung again, and any location can then answer the call, thus transferring the call between the two locations.

2.58.2 Configuration

The group administrator configures the Shared Call Appearance service using the CommPilot Group web portal. The user can view limited configuration information through the CommPilot Personal web portal.

There are eight different Shared Call Appearance (SCA) features that can be assigned to a user: SCA, SCA 5, SCA 10, SCA 15, SCA 20, SCA 25, SCA 30, and SCA 35. The feature is chosen based on the maximum number of locations required for a given user. For example, if a user is assigned SCA 10, up to ten individual alternate locations can be defined for that user.

The configuration of SIP end points allows different line appearances on the phone to be assigned to different users. This allows SCA applications such as an assistant/executive scenario and key system emulation.

2.58.3 Hold/Retrieve Support Description

This capability allows for calls being put on hold on one station to be retrieved from any other station sharing that call appearance.

After a call is put on hold on a station, all stations show that call as being held by flashing the corresponding lamp slowly. At this point, any of the stations can be used to retrieve the held call. After the call is retrieved by a station, all lamps go on (solid) showing the call as Active, and the station becomes the active station.

2.58.4 CommPilot Call Manager Description

Only one instance of the CommPilot Call Manager can be running for each user. The Shared Call Appearance user can log in to the Call Manager from anywhere, and it displays the active calls regardless of which location is used by the calls.

When an idle user initiates a call from the CommPilot Call Manager, the initiated call alerts the primary location only. When a call is already active and a second call is initiated from the CommPilot Call Manager, the second call uses the same location as the first call.

2.58.5 Multiple Call Arrangement Description

SCA with the Multiple Call Arrangement (MCA) feature provides the ability for multiple calls to be handled concurrently on different SCA locations for a user. No single SCA location is considered the active location, so all locations are allowed to originate calls and receive new incoming calls when they have an available call appearance, regardless of the activity at the other locations.

2.58.5.1 Configuration of MCA with SCA

The MCA service is a user service and can be authorized to service providers/enterprises and groups, and can be assigned to users.

The MCA service has a single on/off configuration option, and it is configurable by both administrators and users. It is configured via the SCA service profile and defaults to “On”. If the user has the MCA service but does not have the SCA service, then the MCA option is not configurable.

The SCA service allows a user's primary locations and SCA location to be a mix of any type of devices. However, MCA is only supported with intelligent devices. Intelligent devices are devices that can provide their own call control capability including call transfer, three-way calling, and so on. Intelligent devices include SIP phones, most analog telephone adapters, and some SIP gateways. Non-intelligent devices include all MGCP IADs and SIP gateways which do not provide their own call control. If a user is provisioned with a non-intelligent device for any of their locations (primary or SCA), then MCA is disabled for that user. In addition, if any device assigned to a user is controlled by BroadWorks, such as Windows Messenger, the system overrides the MCA service and treats all incoming and outgoing calls as if the MCA service were not assigned.

2.58.6 SCA Bridging Description

The Shared Call Appearance service provides an attribute that is used to allow or disallow bridging between the SCA locations. This allows for bridging calls between shared call appearance locations to facilitate manager/administrative assistant interactions.

Retrieve or Barge-in

A user can retrieve a held call appearance by selecting the call appearance and pressing a feature key (for example, Retrieve) on a SIP phone. If the user presses the Retrieve feature key, then the SIP phone sends an INVITE request with a *Call-Info* header that refers to the held call appearance index. The Application Server interprets the INVITE request as a request to retrieve the held call appearance, and proceeds as such.

The SCA Bridging feature allows the user to barge in to an active call appearance. The user can barge in to an active call appearance by selecting the call appearance and pressing a feature key (for example, Barge-In). If the user presses the Barge-In feature key, then the SIP phone sends an INVITE request with a *Call-Info* header that refers to the active call appearance index. The Application Server interprets the INVITE request as a request to barge in to the active call appearance, and proceeds as such.

Warning Tone

Another attribute is also added to the Shared Call Appearance service to determine whether a warning tone should be provided when a location bridges on an existing call. This warning tone is useful for privacy to notify the executive that another party is now listening on the call.

If the warning tone is enabled for a user, a warning tone is provided to all parties connected to the bridge when a location barges in. While the SCA-Bridge is active, the warning tone is optionally repeated periodically every 30 seconds.

2.59 Simultaneous Ringing Personal

This service enables a user to have multiple destinations ring simultaneously when any calls are received on their phone number. The first destination to be answered is connected.

2.59.1 Description

The Simultaneous Ringing Personal service is a user "find-me" service that alerts multiple terminating locations simultaneously. A user can provision up to ten secondary terminating locations (for example, cell phone, home phone, and MSN Messenger Call Client).

When a party calls a BroadWorks user, service issues simultaneous termination requests to the locations specified. The first location to answer the call is connected to the originating party; all other terminations are released.

All calls to secondary locations are subject to the services that apply to these locations. For instance, a call to a busy cell phone may be forwarded to voice mail, thus resulting in the other legs being released.

If all call legs are busy, the caller gets busy processing.

To avoid overwhelming users when they are using their main location, the service can be configured to not alert the secondary locations when the primary location is active on a call.

The secondary location can be any valid phone number or URL that is allowed by the Outgoing Calling Plan of the user.

2.59.2 Configuration

The service is configured through the CommPilot Personal web portal. The user can:

- Activate or deactivate the service.
- Enter up to ten secondary phone numbers.
- Select whether secondary phone numbers or URL should be alerted while the primary location is active on a call.

When the user enters a phone number, the system validates the phone number against the user's calling plans (Outgoing Calling Plan, Outgoing Digit Plan, and Acct/Auth Codes). If the number is not allowed, the user is presented with an error message.

The default state for Simultaneous Ringing Personal is "Off".

2.60 Speed Dial 8

This service allows users to associate single-digit codes to frequently dialed or hard-to-remember long strings of digits. Users can then use these codes instead of the full numbers to place calls.

2.60.1 Description

A user can associate a single-digit code with a string of digits. This single-digit code is referred to as a speed code. The user can associate two to 30 numeric digits, including x11 emergency and repair call numbers or a URL. The user can also associate a string of digits that includes the * character. This allows a user to program a speed code that maps to a feature access code, or multiple, chained feature access codes.

At the time of programming, the system does not validate the digits. It is the user's responsibility to ensure that the address associated with a speed code is valid. When the associated address is invalid, the user is provided with the applicable treatment.

Once a speed code is defined, the user can dial that single digit and wait (for an inter-digit timer to expire), or terminate the code with a #. This can be done through the user's device, or from the CommPilot Call Manager. Once the speed code is collected, it is replaced by its associated digit string and the call is originated as usual with these digits.

2.60.2 Configuration

There are two methods by which a user can program speed codes, through the CommPilot Personal web portal or by dialing a feature access code.

2.60.2.1 CommPilot Personal Web Portal

A table of eight rows contains the speed code definitions. A user can enter the digits or URL and a name or description for the speed code.

2.60.2.2 Feature Access Code

The user can program speed codes by dialing *74 (default) from their device. The user is played recall dial tone (three quick beeps and then regular dial tone). The user then dials the single-digit speed code, followed by the associated phone number and a terminating digit (#). The system plays a confirmation announcement and the user hangs up.

Feature access codes can also be used from the CommPilot Call Manager. For example, the user can enter *74YXXXXXXXXXX to define a speed code, where Y is the speed code and XXXXXXXXXX is the associated phone number. The system then rings the user's device and plays a confirmation announcement indicating that the speed code has been defined. In addition, the user can just enter *74 through the CommPilot Call Manager. Then the user's device rings, and when answered, the system prompts for the speed code and associated phone number (as described above).

2.61 Speed Dial 100

2.61.1 Description

The Speed Dial 100 service allows users to place calls using a directory of up to 100 frequently called numbers. The user dials the associated two-digit speed code, which is preceded by a configurable prefix. This is a user-assignable service that involves two activities, programming and dialing.

2.61.2 Programming

A user can associate a Speed Dial 100 prefix and two-digit code with a string of digits or a URL. The Speed Dial 100 prefix can be configured from the *Feature Access Code* page and the code can be one or two digits selected from the following: [0-9, A-D, *, #]. (The default value for Speed Dial 100 prefix is the # character.)

The user can associate 2 to 30 numeric digits; including x11 emergency and repair call numbers, or a URL. The user can also associate a string of digits that includes the * character. This allows a user to program a speed code that maps to a feature access code, or multiple chained feature access codes.

Apart from the criteria listed above, the Speed Dial 100 service performs minimal validation on the digit string associated with a speed code. It is the responsibility of the user to ensure that the digit string associated with a speed code is valid. If the associated digit sting is invalid, the user is provided with the applicable treatment.

There are two methods by which a user can program speed codes, through the CommPilot web portal or through a phone using feature access codes.

2.61.2.1 CommPilot Web Portal

When the user selects the Speed Call 100 option from the Outgoing Calls menu, a list appears that displays the personal speed codes that are currently configured.

To configure a new Speed Dial 100 speed code, a user clicks the **Add** button on the *Speed Dial 100 configuration* page. For each speed code, the user enters the code and the associated digit string or URL, as well as an optional short description of the code (for example, Company's Auto Attendant).

To modify an existing speed code, a user clicks the **Edit** link on the *Speed Call 100* page, which redirects the user to the *Speed Call 100 Modify* page. This page is similar to the *Speed Call 100 Add* page.

2.61.2.2 Feature Access Code

The user can program Speed Dial 100 speed codes through a phone using a feature access code. The phone can be an analog phone, an IP phone, or even the CommPilot Call Manager (with any type of phone).

To program through the phone, the user dials the Speed Dial 100 feature access code, (default is *75). The user then hears the "recall dial tone" (three quick beeps and then a dial-tone). The user then dials the two-digit speed code to be created or modified, followed by the digits to be associated with it. The user then ends the programming with # or waits for the inter-digit timer to expire. The service then announces the success or failure of the programming.

For example, if a user wants to program the speed code 23 with the following digits 0112511792402, the user enters:

*75 [recall dial tone] 23 0112511792402# [success or failure announcement]

Any change to a user's Speed Dial 100 speed codes using a phone are reflected on the user's *Speed Dial 100 configuration* page.

2.61.3 Dialing

Once a speed code is defined, the user can dial that speed code and end dialing with the # or wait (for an inter-digit timer to expire). This can be done through the user's phone or the CommPilot Call Manager. However, there are several interactions that can interfere with Speed Dial 100 dialing:

- Collision between a feature access code and Speed Dial 100
- Collision with an emergency number or repair number
- Collision with an extension number

2.61.3.1 Collision Between a Feature Access Code and Speed Dial 100

This scenario occurs when a speed code uses the same prefix and digits as an existing feature access code. For example, if the user creates a*70 speed code for #70, this may collide with the default *70 because the Cancel Call Waiting feature access code is also set to #70. In this case, the feature access code takes precedence and the speed code cannot be dialed over the speed code. Note that the default speed code prefix of the # character causes conflicts with the default feature access codes provided by other BroadWorks services. These services include:

- Automatic Callback Deactivation (#80), which overrides speed dial numbers #80 to #89 inclusive
- Call Forwarding Always To Voice Mail Deactivation (#21)
- Call Forwarding Busy To Voice Mail Deactivation (#40)
- Call Forwarding No Answer To Voice Mail Deactivation (#41)
- Calling Line ID Delivery Blocking Persistent Deactivation (#31)
- Call Waiting Persistent Deactivation (#43)

To eliminate such conflicts, consider changing the prefix for the Speed Dial 100 service to another character, or to ##.

2.61.3.2 Collision with an Emergency Number or Repair Number

This scenario occurs when a speed code plus its prefix is the same as an emergency or repair number. For example, if the Speed Dial 100 prefix is set to 9 and a speed code 11 is associated with 2403645239, this may collide with 911, when it is defined as an emergency or repair number. A user who intends to call 2403645239 using a Speed Dial 100 speed code would dial 9 (Speed Dial 100 prefix) and then 11 (the associated speed code) would end up calling the emergency number 911 instead of 2403645239. Dialing 911 causes the emergency number 911 to be dialed instead of the number associated

with the speed code. In this case, an emergency number take precedence over Speed Dial 100.

2.61.3.3 Collision with an Extension Number

This scenario occurs when a Speed Dial 100 prefix and speed code are the same as an extension number. For example, suppose a group has its extension dialing set to four digits and a user in that group uses the default feature access code for Speed Dial 100 (*75) and programs 0112511792402 as follows: *75 52 29 0112511792402. In this scenario 52 is the prefix for Speed Dial 100 and 29 is the two-digit speed code to call 0112511792402. If another user in that group has its extension number set to 5229, in this situation dialing 5229 by the first user would cause the extension number and not the speed code to be dialed. In this case, an extension number take precedence over Speed Dial 100.

2.61.4 CommPilot Interaction

The user can also use feature access codes through the CommPilot Call Manager. In addition to the interactive sequence described above, the user for example can enter *75 ## XX 0112511792402# to program XX as the speed code for 0112511792402, where ## is the Speed Dial 100 prefix. The user's phone then rings, the user answers, and then hears an announcement indicating the programming has succeeded or failed.

2.61.5 Configuration

For a description of the user configuration of Speed Dial 100 codes, see section *2.61.2 Programming*.

2.61.5.1 Speed Dial 100 Feature Access Code Assignment Provisioning

A group administrator and/or a higher-level administrator can provision the feature access code that is used to program Speed Dial 100 for a given group. The system default is *75, but a group administrator and/or a higher-level administrator can set the feature access code to an arbitrary value through the web interface. The feature access code can be provisioned once Speed Dial 100 is authorized for a group. At the time Speed Dial 100 is authorized, if another feature already is using *75 feature access code; the Speed Dial 100 is set to "blank". The feature access code for Speed Dial 100 cannot be used until a new code is selected.

2.62 Three-Way Calling

This service enables a user to make a three-way call with two other parties, whereby all parties can communicate with each other.

2.62.1 Analog Phone Description

To initiate a three-way call while engaged in a regular two party call, the user presses the flash hook and dials the third party (also known as an add-on party). Before or after the add-on party answers, the user presses the flash hook and forms a three-way call with the two parties. To drop the add-on party, the user presses the flash hook and is reconnected with the original party in a regular two party call. If the user hangs up, all parties are released (unless the user is allowed to transfer, in which case the call remains active between the two other parties).

The user can have a private conversation with the add-on party before conferencing all three parties. This phase is known as consultation. If the user hangs up during consultation, the add-on party is released and the user is recalled by the original party on hold (that is, the user's device is rung again).

2.62.2 CommPilot Call Manager Description

Users also have the ability to execute three-way calls using the CommPilot Call Manager. To initiate a conference, the user simply clicks the **Conference** button on the CommPilot Call Manager while two calls are active. From this point, all three parties are connected on a three-way call.

The CommPilot Call Manager also provides the user with capabilities above and beyond what can be done on an analog phone, as follows:

- **Conference hold** – A user can select the conference and hold it, which results in muting the user from the conference.
- **Conference release** – A user can select the conference and release it, which results in dropping all parties, independently of the call transfer capability.
- **Call waiting/join** – A user involved in a call waiting session has no way to join all parties in a conference using an analog phone. The flash is always interpreted as a toggle between the two active parties. The CommPilot Call Manager allows users to join parties involved in a call waiting session with the **Conference** button.
- **Selective hold** – A user can hold either active party at any time, as many times as desired, with the **Hold** and **Talk** (retrieve) buttons.
- **Selective release** – A user can selectively release any party, not just the add-on parties.

2.62.3 IP Phone Description

IP phones have access to the same capabilities as analog phones through the CommPilot Call Manager, and often provide embedded conferencing capabilities on the phone itself. An IP phone with embedded conferencing capabilities and corresponding procedures are specific to each phone and vendor.

2.62.4 Configuration

This service is provided by default to users assigned the CommPilot Call Manager web control client. IP phone users can also establish three-way conferences through the phone's feature keys.

The Flash_3WC option must be assigned to users to allow them to initiate three-way conferences by flashing the switch hook on analog phones.

2.63 Two-Stage Dialing

This service optionally prompts a user with a stutter dial tone or an announcement, and collects dual-tone multi-frequency (DTMF) digits. The collected digits replace the dialed digits, and are used in subsequent processing for service execution, translations, and routing functions. In addition, an indication that the service was executed is captured in a call detail record.

NOTE: While the Media Server is collecting digits for the Two-Stage Dialing (TSD) number, the user cannot enter an E.164 number as the Media Server does not support the "+" sign for digit collection. The TSD number should not be an E.164 number.

2.63.1 Description

The service is triggered when a user originates a call, and the dialed digits match the user's phone number, alternate phone number, extension, alternate extensions, or SIP aliases. The dialed digits are contained in the *Request-URI* header of the SIP INVITE.

Once the service is triggered, the user is optionally prompted based on the configuration and localization of the Two-Stage Dialing announcement. Next, DTMF digits are collected based on the public dialing plan and digit map corresponding to the group for the user with this service. The collected digits replace the dialed digits. The collected digits are then used in all subsequent call processing and service execution.

An indication that the service was triggered is captured in a call detail record.

A user is able to enable or disable the service. If the service is disabled, then the system executes in the normal manner, translating and routing on the dialed digits and not the collected digits, no matter what the user dials to originate the call.

Note that this service applies to all locations associated with the user applicable with Shared Call Appearance and Multiple Call Arrangement.

2.63.2 Configuration

The system administrator, service provider administrator, and group administrator can assign this service to a user. The user can turn the service on or off.

This service can be used in conjunction with the Mobile Assistant or Shared Call Appearance services. When it is used with the Mobile Assistant (residing on a user's mobile phone) it allows access to BroadWorks originating services from the mobile phone.

The following configuration is required on BroadWorks:

- A system-wide device is created corresponding to the media gateway controller connected to the PSTN.
- The system-wide device is assigned as the user's primary device. The line/port or identity of the primary device is set to the user's mobile phone number.

  OR

  The Shared Call Appearance (SCA) service is assigned to the user and the system-wide device is assigned as a secondary appearance. The line/port or identity of the secondary device is set to the user's mobile phone number.
- The Two-Stage Dialing service is assigned to the user and enabled.

When the Mobile Assistant is invoked and a call is made, the following actions are taken:

- The Mobile Assistant dials the user's phone number (either their main BroadWorks number or one of the alternate phone numbers, if assigned). The Mobile Assistant can obtain the number to dial from its own configuration or via the OCI, accessing the user's profile.
- The Mobile Assistant waits for the call to be answered.
- Since the Two-Stage Dialing service is assigned and enabled and the dialed digits correspond to the user's phone number or alternate numbers, the system optionally prompts the user with a dial tone.
- The Mobile Assistant pauses and then dials the DTMF digits corresponding to the destination.
- The system collects the DTMF digits, and the Two-Stage Dialing service replaces the original dialed digits (the user's phone number) with the collected digits.

The system executes the user's originating services, translates the dialed digits, and routes the call in the usual manner based on the newly collected dialed digits.

This behavior allows users with the Mobile Assistant to originate calls via BroadWorks from their cell phone as if they were dialing from the primary device (which for example, is typically, a desk phone).

For a PSTN landline origination, the user's home phone is configured as a Shared Call Appearance on a system device that corresponds to the media gateway controller connected to the PSTN.

The user originates a call from the home location and dials his or her BroadWorks number. BroadWorks answers the call and provides a special dial tone to the user. The user enters the destination digits and the call is routed accordingly.

2.63.3 TrtTwoStageDialingPrompt.wav

By default, the *TrtTwoStageDialingPrompt.wav* file simply consists of silence. This feature was also designed for interworking with the Assistant–Mobile. In this case, the silent mode is preferable from a user experience perspective and the silent mode is selected as the default.

With the Two-Stage Dialing feature, the prompt can be localized so the behavior can be changed on a system-wide basis. In Release 14.sp4, the BroadWorks Anywhere feature introduces a portal that serves a similar purpose as Two-Stage Dialing. With BroadWorks Anywhere, the silent mode is configurable on a per-portal basis through an explicit attribute (hence, not through localization).

The file can be localized and upon upgrade, the customer must carry over that file manually.

2.64 User Category Service

The Calling Party Category service allows a category to be associated with a subscriber, which is included in the signaling for all outgoing calls. It is used by a softswitch or switching system for call routing, and is also used by the operator services system to determine the allowed policies for a subscriber.

2.64.1 Description

This service allows a category to be associated with a subscriber, which is then included in the signaling for all outgoing calls. It is used by a softswitch or switching system for call routing, and is also used by operator services system to determine the allowed policies for a subscriber. Depending on the trunking device BroadWorks is interacting with for a given call, BroadWorks automatically populates the user category in the appropriate format so it can be passed to that trunking device (either the calling party category or ISUP-OLI).

The following Calling Party Category formats are supported by BroadWorks:

Category	Description
Ordinary	The user has no special characteristics.
Payphone	The user represents a smart payphone.
Prison	The user is from a prison.
Hotel	The user is from a hotel or motel.
Hospital	The user is from a hospital.
Special	The user should always be routed to an operator service system.

During a call forward or call transfer to another subscriber by the terminating party in a different group, and in case when the terminating party is assigned a category, the category of the terminating party is substituted in the SIP INVITE to the terminating party.

2.64.2 Configuration

The system administrator, service provider administrator, and group administrator can assign this feature to users and configure the category of the users. The users can only view current configurations of the feature.

2.65 Video Add-On

This service allows a user to specify a device and policies to be used for multimedia calls. The policies define the actions taken when calls are received from multimedia destinations as well as the actions taken when calls are made to multimedia destinations.

2.65.1 Description

This feature defines devices and policies for video media, used in conjunction with regular audio media in BroadWorks. This feature allows for an additional video-capable device to be configured on a subscriber if the subscriber's primary device does not support video.

The Video Add-On service is especially useful when the subscriber's primary device does not have multimedia capability; in such a case, the service is used to configure a video-capable device where BroadWorks will deliver the video portions of a call. In this scenario, BroadWorks "splits" the multimedia call, directing the audio portions to the primary device and the video portions to the video add-on device. All other services continue to operate without change on the audio portions of the call.

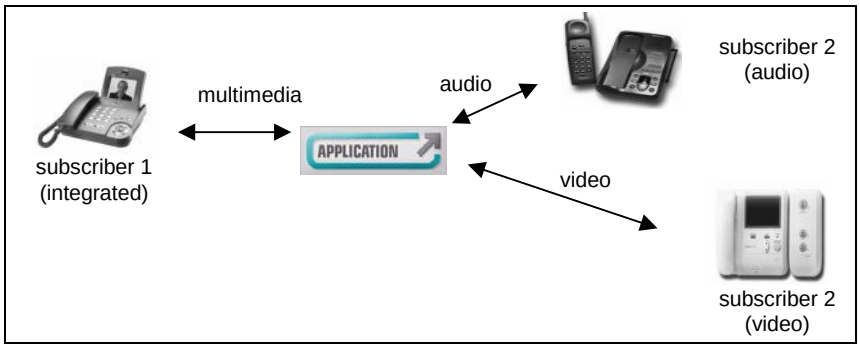

Figure 1 Video Add-On

The feature allows one device to be configured as the user's add-on video device. In addition, the service can be enabled or disabled by the user. If a user's primary device supports video, but the Video Add-On service is assigned and enabled, video will be sent to the video add-on client, and not the user's primary device. Also, if the user's video device is not reachable (it is not registered and neither is it configured to be reached via an IP address/host name) but the service is enabled, then the call will proceed as an audio call only regardless of whether the primary device supports video or not.

NOTE: Throughout this document, a user's video device is to be considered active if the Video Add-On service is assigned and enabled.

2.65.1.1 Incoming Invitation

When a user receives an incoming multimedia call invitation and the user's video device is not active, the system sends an invitation to the user's primary device. This invitation contains a session descriptor that describes both the audio and video portions of the call.

If the user's video device is active, then the invitation contains a session descriptor that describes only the audio portion of the call. In these cases, the system also sends an invitation to the user's video device. This invitation contains hold media descriptor(s)

similar to the video portion of the incoming call instead of the actual video media descriptor(s) in the incoming call. This invitation also contains a parameter requesting the device to auto answer. Note, the device may or may not support this parameter. A timer is started upon dispatch of the invitation to the user's video device.

If the user receives an incoming video-only call, the system rejects this invitation. Video-only calls are not supported by BroadWorks at this time. When a user receives an incoming audio-only call, the system operates as usual. The Video Add-On service has no impact in this scenario.

2.65.1.2 Alerting Response/Early Media

If an alerting response is received from the user's primary device before an alerting response is received from the user's video device, the system propagates that response to the caller. If an alerting response is received from the user's video device, the system will not propagate that alerting response to the caller.

The session descriptor (if present) in alerting responses is RFC 3264 compliant. This means that the audio and video media streams represented in the offer are present in this answer in the form of the actual media descriptor(s) received or hold media descriptor(s).

Early media provided by a Video Add-On client is not supported at this time. If the user's video device provides a session descriptor in an alerting response, that session descriptor will not be propagated on to the caller. Hold media descriptor(s) will be provided instead. Note that early media from the user's audio device will continue to be supported as is; there is no change or loss of functionality.

2.65.1.3 Answer Response

If an answer is received from the user's primary device before an answer is received from the user's video device, then the system propagates an answer back to the originator. The session descriptor in this answer indication is RFC 3264 compliant. This means that video media streams present in the offer will be represented in the answer in the form of a hold media descriptor. When an answer indication is received from the user's video device, then the system sends a re-invitation containing no session descriptor to both the user's primary device and video device, followed by a re-invitation containing a session descriptor that corresponds to the audio and video portions of the call back to the caller.

If an answer is received from the user's video device before an answer is received from the user's primary device, then the system acknowledges the answer but does not propagate it. When an answer is received from the user's primary device, then the system sends an answer containing audio actual media descriptor(s) and video hold media descriptor(s) back to the caller. The system then subsequently re-invites the user's primary and video devices, without any session descriptors, followed by re-inviting the caller with audio and video session descriptors obtained from the callee devices.

2.65.1.4 Ring Timeout

A ring timer is started when an invitation is sent to any device. This timer applies to invitations sent to primary devices, alternate devices, and now video devices as well.

On an invitation sent by BroadWorks to a Video Add-On device, this ring timeout will apply. If the associated timer pops before the user's video device answers, then the video session is canceled. If an answer is received after the timer pops, then the answer indication is ignored. This video timer will not affect the audio portion of the call.

2.65.1.5 Outgoing Invitation

When a user places an outgoing call, an invitation from the user's primary device is received by BroadWorks. If the user's video device is active, then the system sends an invitation to the user's video device. This invitation contains no session descriptor, but does contain a parameter requesting the device to auto answer. Note, the device may or may not support this parameter. A timer is started upon dispatch of the invitation to the user's video device.

In some scenarios, an outgoing call attempt may be rejected (invalid destination, outgoing calling plan restrictions). There are also outgoing scenarios when a user is dialing a feature access code. In cases such as this, the user experience is improved if the Video Add-On client is not part of the call. BroadWorks will thus delay inviting a Video Add-On client until it has been determined that the call will actually be placed to the destination. In scenarios such as described above, BroadWorks will not involve a Video Add-On client. Note that emergency calls will not involve the Video Add-On client.

If the user's video device sends an invitation, the system rejects that invitation.

Once the user's video device answers, an invitation is sent to the destination. This invitation contains a session descriptor corresponding to the audio and video portions of the call. To the destination, the call looks like it was received from a multimedia device. The user's video device is immediately acknowledged with an RFC 3264 compliant session descriptor. This means that media streams present in the offer are represented in the answer, in the form of a hold media descriptor.

2.65.1.6 Video Origination Timeout

The video invitation timer indicates the amount of time that the call can be delayed waiting for the video device to answer. This timer is configurable on a per-user basis. Users can access the *Video Add-On service* page to modify the timer value. The default value for this timer is two seconds and is tuned for video devices that support the auto-answer mechanism described above.

If the timer pops before the user's video device answers, then the video session is canceled and the call completes as an audio-only call. If an answer is received after the timer pops, then it is ignored.

The value of this timer affects call setup. The setup of any call originated by the user may be delayed by at most the value of this timer.

2.65.1.7 Alerting Response/Early Media

If an alerting indication is received from the destination, that alerting indication is propagated to both the user's primary device and the user's video client. BroadWorks ensures that the session descriptor received in this alerting response is RFC 3264 compliant. That is, if there is session descriptor information in this response, all media streams sent in the offer will be represented in the answer. If all media streams sent in the offer are not present in the answer, BroadWorks takes appropriate action to make the incoming session descriptor RFC 3264 compliant.

If the destination releases the session before it answers, then both the user's audio and video sessions are released. If the user's primary device releases the session, then the destination's session and the user's video session are released. If the user's video device releases the session before the destination answers, then the system acknowledges the release with no other action.

2.65.1.8 Answer Response

Upon answer, the answer indication is propagated to the user's primary device and the user's video device. The session descriptor sent to the user's primary device contains audio information and the session descriptor sent to the user's video device contains video information. BroadWorks ensures that the session descriptor received in this alerting response is RFC 3264 compliant.

If the video information is in the form of a rejected media descriptor, then the video session is released.

2.65.1.9 Active Call Release

If the far-end releases the session, then both the user's audio and video sessions are released.

If the user's primary device releases the session, then the far-end's session and the user's video session are released.

If the user's video device releases the session, then the user's primary device is re-invited. There is no session descriptor in this re-invite. The answer indication from the user's primary device, which is propagated across to the destination, contains the new offer session descriptor with audio information only.

If the far end sends a re-invitation containing audio only session descriptors, then the user's video session is released and a re-invitation is sent to the user's primary device. If the far end subsequently sends a re-invitation with an audio and video session descriptor, then a re-invitation is sent to the user's primary device and a new invitation is sent to the user's video device. Once the user's video device answers, then the re-invitation from the destination is accepted. If the far end sends a re-invitation containing a video-only session descriptor, then the re-invitation is rejected.

2.65.1.10 Active Call Hold/Retrieve

If the far-end sends a re-invitation indicating a hold condition, then a re-invitation indicating a hold condition is sent to the user's primary device and the user's video device.

If the user's primary device sends a re-invitation indicating a hold condition, then a re-invitation indicating a hold condition is sent to the user's video device, and the audio hold indication is propagated to the far-end.

If the user's video device sends a re-invitation containing a hold session descriptor, then it is rejected.

2.65.1.11 Click-To-Dial Originations

If the user dials another number using the CommPilot Call Manager, the system sends an invitation to the user's primary device and the user's video device. These invitations have no session descriptor. An invitation to the user's video device will not be sent until the user has picked up the handset on the audio device.

Similar to a regular outgoing call setup, the invitation sent to the user's video device also contains a parameter requesting the device to auto answer. Note, the device may or may not support this parameter. The video invitation timer is started upon dispatch of the invitation to the user's video device to ensure that the audio call setup can proceed, if the user's video device fails to respond in a timely manner.

Once the user's primary and video device have answered, an invitation is sent to the destination. This invitation contains a session descriptor corresponding to the audio and

video portions of the call. To the destination, the call looks like it was received from a multimedia device. The user's primary and video devices are immediately acknowledged with an RFC 3264 compliant session descriptor. This means that media streams present in the offer are represented in the answer, in the form of a hold media descriptor.

2.65.2 Configuration

This feature is configurable at a user level. A link to its *configuration* pages can be found under the "Call Control" section in the left navigation pane, when assigned to a user. This feature can be enabled or disabled. It also allows one device to be added for the user; this device would be the video add-on client device. Only video-capable device types are allowed to be configured under this portal. Once a device is added, it can be modified and/or deleted as well.

Once the service is assigned and activated, it automatically applies to calls involving the user. When the user makes or receives a call, the video client is automatically alerted. The video client then has a configurable amount of time to answer the call.

The default state for Video Add-On is "Off".

2.66 Web Portal Call Logs

The Web Call Logs service allows for storing several days of logs for each user, or a much larger number of logs than the 20 per-call type of Basic Call Logs. The maximum number of logs per user can be set independently for each enterprise or service provider.

2.66.1 Description

When the Web Call Logs feature is assigned, logs are to an external call detail server, using the Radius protocol. They are retrieved using the SOAP over HTTP protocol.

A new *web* page showing the users' call logs is added. This *web* page fetches all the call log information from the call detail server and displays it under three tabs, one for each call type (placed, received, missed). The number of call logs displayed depends on the enterprise/service provider's configuration.

2.66.2 Configuration

For each enterprise/service provider, a maximum number of call logs per user (per-call type), along with an expiry period in days, are configured via the web portal.

The system administrator is responsible for configuring the enterprise/service provider values (the service provider admin only sees a read-only page).

2.67 Yahoo! Messenger Online Status

This feature allows a user's Yahoo! Messenger online status to be shown on the *Group Directory* page.

2.67.1 Description

This feature allows users to enter their Yahoo! Messenger user ID on their *profile* page. It also allows a group administrator or above and a user to be able to view the online status of users within that group on the *Group Directory* page, provided that each user has configured his or her Yahoo ID.

2.67.2 Configuration

A new optional field is added to the user profile that allows users to configure their Yahoo! Messenger user ID. When the user ID is configured, other users of the group and the group administrator can see the online status of the user (online/offline) on their *Group Directory* page.

3 Group Services

This section describes the services offered to BroadWorks groups.

3.1 Account Codes

The Account Code service allows the users to assign certain calls to specified accounts, for tracking purposes.

Two account code dialing methods are offered, which can be assigned concurrently to different users of a group.

3.1.1 Mandatory Account Codes Description

Users assigned the mandatory Account Codes service are prompted to enter an account code every time they make a call outside of the group. When prompted to enter a code, the user dials the applicable digit string, after which the call resumes normally. The code is captured in the associated accounting information generated for that call.

The group administrator can elect to have account codes apply only to long distance calls. In this case, users are not prompted for an account code when making a local or toll-free call.

Account codes are a fixed length, as configured by the group administrator. When prompted for an account code, the user is informed of the number of digits to enter. Hence, when a user makes a call for which an account code is required, the dialing sequence is as follows:

[User dials phone number] [account code prompt] [user enters account code] call proceeds.

Emergency and repair calls are never prompted for an account code.

3.1.2 Feature Access Code-Based Account Codes Description

When assigned the Feature Access Code-Based Account Code service, the user can:

- Make a call as usual, without entering an account code.
- Dial a feature access code (for example, *XX) before making a call. In this case, the user is prompted for an account code, dials the code, receives confirmation, and then proceeds with the call as usual. The sequence is as follows:

  [Off-hook] [FAC] [prompt] [code] [confirmation] [dial tone] [call]
- Flash the switch hook during the call and enter a feature access code (for example, *XX). In this case, the user is prompted for an account code, dials the account code, and then is reconnected to the call. The sequence is as follows:

  [Call] [flash] [FAC] [prompt] [code] [confirmation] [call]

NOTE: The last two methods can be used concurrently, in which case the last account code to be entered is the one that is captured in the associated accounting information, generated for that call.

3.1.3 Configuration

The group administrator configures the Account Code service through the CommPilot Group web portal.

When configuring the service, the group administrator:

- Activates or deactivates the service.
- Selects the length of the account code.
- Selects whether the service should apply only to long distance calls.
- Selects which users of the group are assigned the service.
- Selects the activation method to be used for each user.

Users can view the *Account Code* page but cannot modify it.

3.2 Attendant Console

This web-based service enables a user (for example, a receptionist) to monitor a configurable set of users in the user's business group. This service provides critical call detail and group member status for effective attendant call routing. Entirely web based, this service surpasses legacy PBX consoles, and seamlessly combines with BroadSoft applications such as Auto Attendant, for enhanced attendant solutions.

3.2.1 Components and Functionality

Functionality is distributed across three components to optimize attendant performance. The components and associated functionality are as follows:

The Attendant Console is used to:

- View members' information: status, name, number, extension, department, e-mail, mobile, pager, and title. The attendant can select which column to display and in which order.
- View call details (remote name, number, and duration)
- Click-to-dial/Transfer
- Multi-character jump in list and filtering capabilities
- An IP phone is used to Answer, Transfer, Hold/Retrieve, and Release. (Some IP phones support multiple call appearances: Cisco 7960 supports six appearances and Mitel 5055 supports four call appearances.)

The CommPilot Call Manager (optional) is used to:

- Answer, Transfer, Hold/Retrieve, and Release.
- Provide directory assistance, and web pop-ups.
- Integrate with Outlook contacts, and send calls to voice mail.

Combining these components, allows attendants to view call details and initiate transfers in a several ways to accommodate a variety of user preferences.

3.2.2 Web Interface

The Attendant Console service is entirely web based for flexible deployment and configuration. Moreover, an intuitive layout of station functionality minimizes attendant training and support. Web-based configuration allows quick addition and/or deletion of group members.

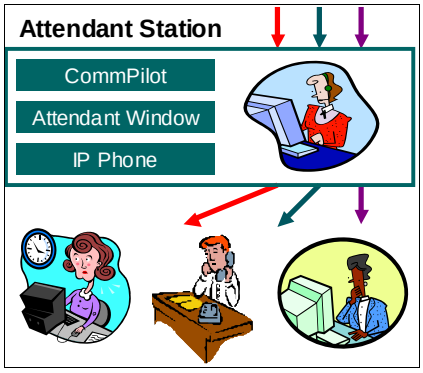

Figure 2 Attendant Console

Attendant Console supports flexible staffing arrangements and can be rapidly assigned to specific users at their desks with limited disruption. With instant messaging, attendants can quickly confirm user status to ensure correct call routing and relate critical instructions.

3.2.3 Enhanced Attendant Solutions

The modularity and flexibility of BroadSoft applications allow the creation of enhanced attendant solutions. Solutions are available as part of a BroadWorks service offering as follows:

- Multiple attendants (primary/alternate, multi-shift attendants):
  - Attendants log in and log out as needed.
  - Since the application is web-based, there is no need to change desks.
  - Functions behind a call center front end.
- Night service:
  - Apply Selective Call Forwarding, whereby after-hours calls are forwarded to specified contacts.
- Company voice mail:
  - Transfer calls to the company voice mail or a call center.
- Integration with Auto Attendant:
  - Overflow/busy/after hour calls go to an Auto Attendant.
- Combination with Instant Messaging:
  - Attendant sends instant messages to group members for call routing instructions.
- Configurable web pop-up:
  - Pop-up screen with customer relationship management (CRM) system information, in-house database records, or other important caller details.

Several enhanced Attendant Console solutions are unique to BroadWorks, which can be deployed for improved productivity and customer service performance.

3.2.4 Configuration

The group administrator assigns the Attendant Console service to selected users and also determines which users are monitored by a given Attendant Console.

The attendant can select the user information (columns) appearing in the main Attendant Console window.

3.3 Authorization Codes

The Authorization Codes service allows the group administrator to select specific users who must enter a valid authorization code, when making a call to a party outside of the group.

3.3.1 Description

Users assigned the Authorization Code service are prompted to enter a valid authorization code when making a call outside of the group. Unlike account codes, authorization codes entered by a user must match one of the valid codes previously configured by the group administrator.

When a user dials a number for which an authorization code is required, BroadWorks prompts the user for a valid code. The user then dials the authorization code followed by the (#), or waits for the inter-digit timeout. If the code entered does not match any of the valid authorization codes configured for the group, the user is provided with another attempt at entering a valid code. If the second attempt is also unsuccessful, the user is sent to an error treatment. If a valid code is entered, the call is allowed to proceed as usual and the authorization code entered by the user is captured in the accounting information generated for that call.

The group administrator can elect to have account codes apply only to long distance calls. In this case, users are not prompted for an account code when making a local or a toll-free call.

Emergency and repair calls are never prompted for an authorization code.

3.3.2 Configuration

The group administrator configures the Authorization Code service through the CommPilot Group web portal.

Through the *configuration* page, the group administrator can:

- Activate or deactivate the service.
- Select the length of the authorization codes (2 to 14).
- Select whether non-toll calls are subject to an authorization code.
- Configure valid authorization codes (and optional descriptions).
- Select which users in the group are required to use the authorization code service.

NOTE: The Authorization Code service applies to all applicable calls made from a device assigned to a user who is subject to the service.

3.4 Auto Attendant

The BroadWorks Auto Attendant provides enterprises with a powerful and flexible tool to field inbound calls and deliver them to the intended destination through interactions with the caller. The BroadWorks Auto Attendant is an integral part of the BroadWorks product offering and does not require an external third-party system.

3.4.1 Description

The BroadWorks Auto Attendant is reached by dialing an associated phone number or an extension. Once connected to the Auto Attendant, the caller is played a greeting that provides a menu of options to complete call routing.

NOTE: The maximum recording length for Auto Attendant is five minutes.

The menu, which is configured by a group administrator, can provide up to nine options to the caller, including:

- **One-Key Dialing** – The caller presses a pre-defined DTMF key to reach a particular phone number or extension within the group. This option is also used to build multi-level IVR menus as shown in the following example.

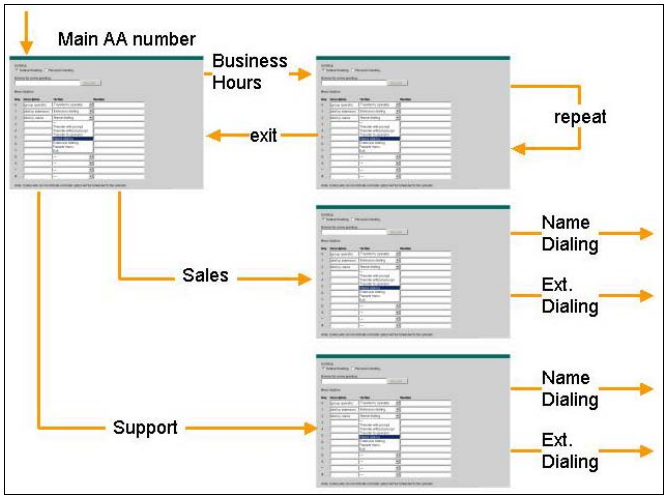

Figure 3 Multi-Level IVR Menu

- **Operator Dialing** – The caller presses a pre-defined DTMF key to reach an operator.
- **Name Dialing** – The caller spells the name of the intended party, using the numerical DTMF keypad. Upon identifying a unique match, the caller is played the name of the called party and is then transferred.
- **Extension Dialing** – The caller enters the extension of the intended party through the numerical DTMF keypad. Upon collecting the full extension, the caller is played the name of the called party, and is then transferred.
- **Immediate Extension Dialing** – The group administrator may elect to allow callers to dial an extension from the first-level menu. The First-Level Extension Dialing option allows the administrator to enable or disable immediate extension dialing for a given

Auto Attendant. When the feature is enabled, the caller, to the Auto Attendant, can dial the desired extension right away on the first level of the Auto Attendant, without having to first navigate to the second-level of the AA menu.

- **Dial by First Name** – The group administrator may elect to allow name dialing from a combined FirstName-LastName in addition to the current LastName-FirstName list.
- **Holiday Schedule** – A group administrator may define a holiday schedule that can be associated with an Auto Attendant. More than one holiday schedule maybe created. Each holiday schedule may be a maximum of 20 dates or date ranges.
- **Enhanced Business Hour Support** – Group administrators can define time schedules for their group. Multiple time schedules can be created. Time schedules consist of 20 date/time ranges for a week. Time schedules can be business hours, call center hours, after business hours, and so on. Time schedules created by the group are visible to groups and users.

3.4.1.1 Auto Provisioning Users in a Group

The moves, additions, and changes for users in a group are automatically available for the Auto Attendant name dialing and extension dialing functions. Access to users currently in the group is always available.

3.4.1.2 Multi-Site Support

The Auto Attendant uses the multi-location enterprise capabilities of the BroadWorks platform to transparently support geographically distributed groups.

3.4.1.3 Support for Users without DID

The Auto Attendant supports users with a direct inward dialing (DID) number as well as users without an external public directory number. These users originate calls as usual and the Auto Attendant allows them to receive external calls. Calls made to the Auto Attendant use the routing capabilities described above to terminate calls to the appropriate user.

This support provides greater flexibility for a group administrator to create and delete users and in many cases reduces the costs associated with obtaining DID numbers.

3.4.1.4 Video Support

The Auto Attendant can provide the caller with an audio or video menu, based on the Auto Attendant profile and the capabilities of the calling party's end point.

3.4.2 Configuration

The group administrator configures the Auto Attendant through the CommPilot Group web portal.

The following options are provided on the Attendant configuration screen:

- Greeting – The group administrator can select the default Auto Attendant greeting or upload a customized greeting that matches the available options.
- Default menu options – The group administrator can assign keys to the default menu options of the Auto Attendant (operator, name, and extension dialing).

The administrator can configure the Auto Attendant to allow:

- Extension dialing on the first level of menu.
- Name dialing with first name entered before last name.

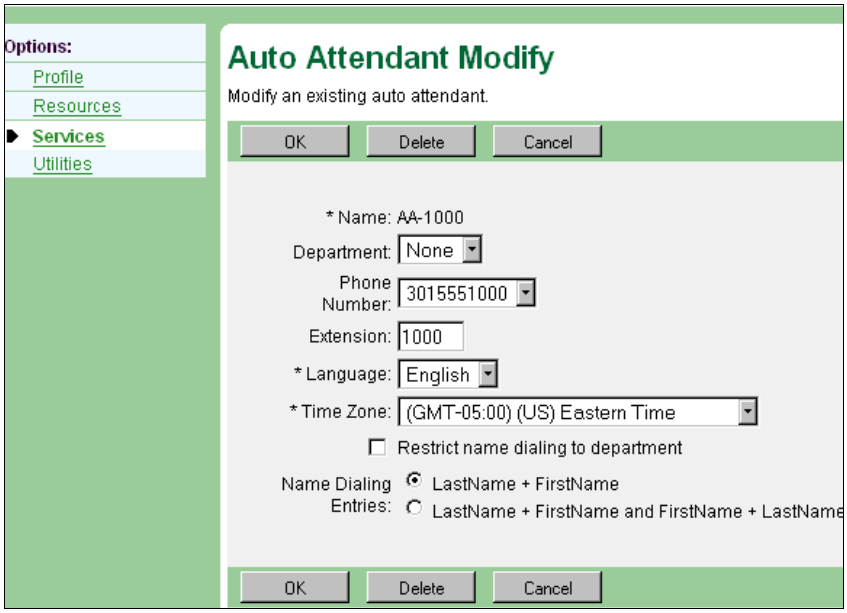

Figure 4 Auto Attendant Modify Page

- **Customized menu options** – The group administrator can create customized menu options by associating keys to specific phone numbers.
- **Customized actions** – The group administrator can assign specific actions to the keys entered by the user. The available actions are shown in the following table:

Action	Number	Transfer prompt	Runtime
Transfer to operator	Text box, in which any number can be entered.	"Please wait while your call is transferred to the operator."	The call is transferred if the number is valid. Otherwise, the call ends with the message, "Your call cannot be transferred; please try again later, thank you".
Transfer with prompt	Text box, in which any number can be entered.	"Please wait while your call is transferred."	The call is transferred if the number is valid. Otherwise, the call ends with the message, "Your call cannot be transferred; please try again later, thank you".
Transfer without prompt	Text box, in which any number can be entered.	None	The call is transferred if the number is valid. Otherwise, the call ends with the message, "Your call cannot be transferred; please try again later, thank you".
Name dialing	Disabled	None	Name dialing.
Extension dialing	Disabled	None	Extension dialing.
End call	Disabled	"Thank you for calling."	Call is released.
Repeat menu	Disabled	None	Menu greeting is replayed.

Action	Number	Transfer prompt	Runtime
--- (Not set)	Disabled	Not applicable	Menu greeting is replayed.

- **Business Hours** – The administrator can define the business hours for the Auto Attendant and select the business hour pattern that applies to the attendant via the web portal.

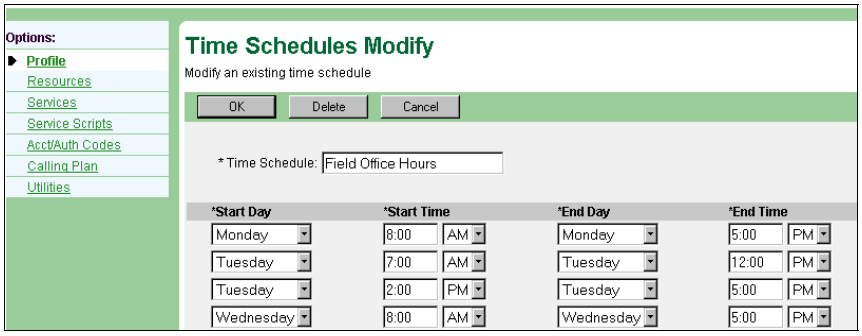

Figure 5 Time Schedules Modify Page

Once a business time schedule is created, it can be assigned to specific Auto Attendant, as depicted in the following figure:

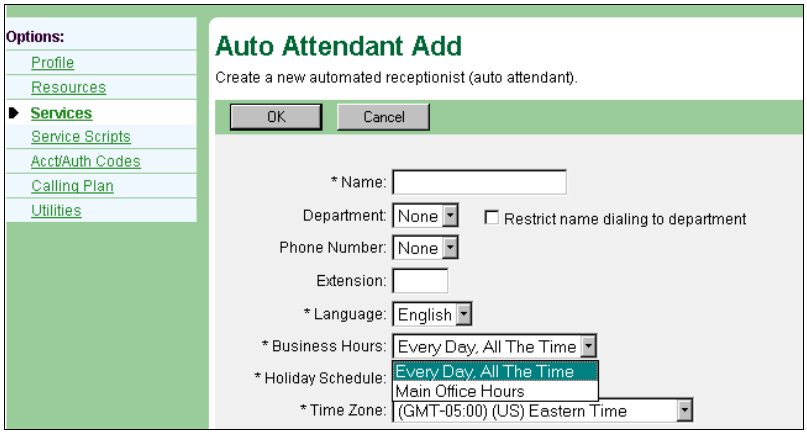

Figure 6 Auto Attendant Add Page

- **Holiday schedule** – The administrator can define holiday schedules via the web portal.

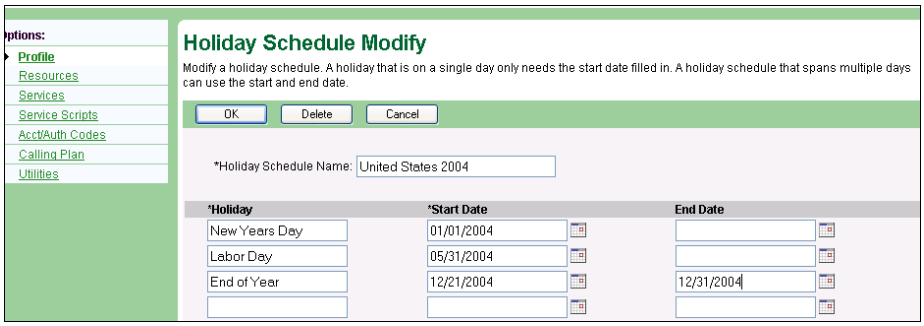

Figure 7 Holiday Schedule Modify Page

Once holiday schedules are defined, they can be assigned to selected Auto Attendants.

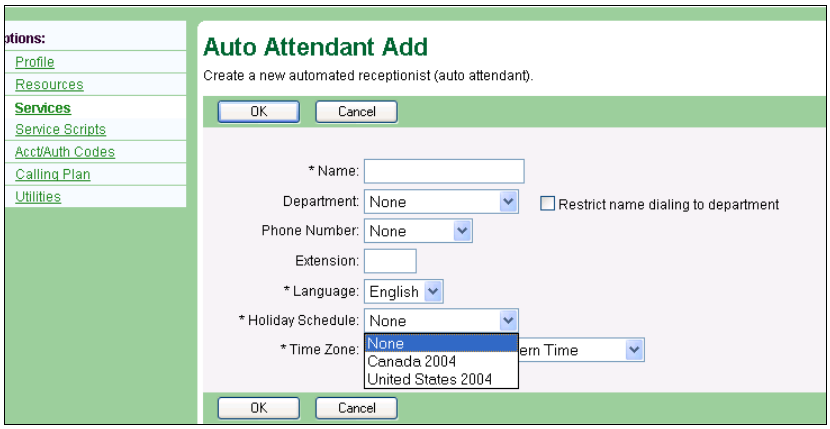

Figure 8 Auto Attendant Add Page

- **BroadWorks voice portal greeting change** – The group administrator can record new greeting menus through the voice portal phone interface. This automatically provisions the newly recorded greeting as the active greeting for the Auto Attendant.

3.5 Call Centers

BroadWorks provides support for basic call centers, allowing business agents to receive incoming calls from a central phone number. Using this service, a business can establish technical assistance lines, customer support numbers, or order-taking centers. Multiple call centers can be supported per business. Incoming calls to a call center are presented to the next available agent.

3.5.1 Description

The Call Center service builds on the basic Hunt Group service to provide a complete, business-ready application. Hence, call centers inherit all of the characteristics of the Hunt Group service and are also provided with sophisticated call-handling features like queuing, Music On Hold, and so on. For a complete description of Hunt Group service features and characteristics, refer to section *3.19 Hunt Groups.*

Provisioning interfaces are available to support third-party call center supervisor and agent clients. The Call Center Reporting service is used to assign or unassign the supervisors who supervise agents and the server to which call center activity data is to be sent. A supervisor can be a member of the group or enterprise and can be assigned to more than one Call Center. A supervisor then selects agents to be supervised. For more information, see section *3.5.3 Call Center Reporting and Support for Agent and Supervisor Clients.*

The Directory Number Hunting service can also be assigned to a call center, which allows a caller to reach a call center by calling the number of one of the call center agents. For more information about this service, see section *3.19.3 Directory Number Hunting.*

The following sub-sections describe the additional features provided by the Call Center service.

3.5.1.1 Geographical Distribution

BroadWorks expands the capabilities of legacy call centers by allowing call center agents to be geographically distributed. Therefore agents can attend calls from home, a satellite office, or any other location served by BroadWorks in a transparent fashion.

3.5.1.2 Features

BroadWorks Call Center service functionality can be combined with other BroadWorks Call Completion services to ensure that all incoming calls are serviced expeditiously under any network condition and at anytime.

- **Voice mail** – If there are no agents to handle an incoming call or the call goes unanswered for a specified amount of time, the call can be forwarded to a call center voice mailbox.
- **Night service** – Calls received after-hours or on non-business days receive a service menu of options allowing a caller to leave a voice message or transfer to an emergency number.
- **Multiple call distribution policies** – Incoming calls are handled according to the selected policy, which include uniform call distribution, linear hunt group, circular hunt group, simultaneous ringing, weighted, and no-answer. For more information on distribution policies, refer to section *3.19 Hunt Groups*.

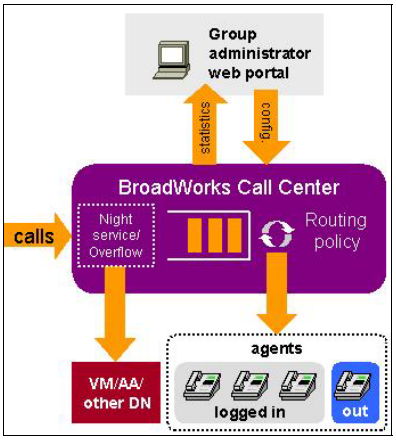

Figure 9 Multiple Call Distribution Policies

- **Call queuing** – When all call center agents are busy, incoming calls can be queued until they can be presented to an available agent.
- **Queue escape** – Callers who are queued can press a key to be sent directly to the call center voice mailbox instead of waiting for an available agent.
- **Overflow** – When a call center cannot accept any more calls, incoming calls can be forwarded to an overflow phone number.
- **Statistics** – Statistics are generated for each call center and each agent in the call centers, and can be viewed by the group administrator via the web portal and/or periodically dispatched to a configurable destination.
- **Service integration** – Any BroadWorks personal service can be assigned to a call center phone number to customize the call center group. This includes services such as Call Forwarding, Call Notification, Call Screening, and Voice Messaging.
- **Queue flushing** – When all agents in the call center group log out, queued calls are automatically sent to the call center group voice mailbox.
- **Outlook contact integration** – vCards from the agent's Outlook or Exchange contact database pop up for incoming calls.
- **Agent log in/log off** – Agents can log in and out from the group so that calls are only presented to agents who are on duty.
- **Screen pop-ups** – Incoming calls pop up on a web screen showing information associated with the incoming call. A group-specific URL is accessed for each call.
- **Configurable Music On Hold** – The queued callers are provided with an initial greeting, followed by music or advertisements and periodic comfort announcements. All announcements can be played in audio or video format, based on the call center profile and the capabilities of the caller's end point. The maximum recording length for Music On Hold for Call Center is 10 minutes.
- **Third-Party Call Center Clients** – This feature enables the development of third-party call center clients that use the Call Center functionality on the BroadWorks platform. The third-party call center clients use the BroadWorks Open Client Interface (OCI) to communicate with BroadWorks.
- **Call Center Support for Agent and Supervisor Clients** – This feature provides support for agent and supervisor PC clients.

- **Call Center Reporting** – This feature is used to assign or unassign the supervisors who supervise agents as well as identify the server to which call center activity data is to be sent.
- **Call Center OSS** – This feature allows call center agents to log in and log out of a call center via the OSS. For agents to be able to log in and log out of a call center, they must be an assigned agent of the call center they belong to, and the call center must be configured to allow an agent to log in and log out.

3.5.2 Configuration

The group administrator configures call centers through the CommPilot group web portal.

NOTE: The Call Center maximum recording length is five minutes. The Call Center Music On Hold maximum recording length is also limited to five minutes.

Through the *configuration* pages, the administrator can set users who should be part of the call center and configure the following (in order).

- Phone number of the call center
- Queue length
- Hunting policy (circular, regular, simultaneous, uniform)
- No-answer policy (applied in overlay of the other policy)
- Statistics dispatch, sampling period, and destination
- Phone number and extension
- Queue greeting, comfort tone, and Music On Hold
- Delay between comfort tones
- Agent's ability to log in and out of the call center

The administrator can also consult the call center daily statistics that provide the following information:

- Current number of calls in queue
- Number of incoming calls to the group
- Number of calls queued for today
- Number of busy overflows for today
- Number of calls answered for today
- Average time spent with an agent
- Average time a call spent in the queue
- Number of calls processed by each agent

These statistics are provided for the current day and previous day.

3.5.3 Call Center Reporting and Support for Agent and Supervisor Clients

This feature provides provisioning interfaces necessary to support third-party call center supervisor and agent clients. The Provisioning Server (PS) supports call center supervisor and call center agent clients as well as the Call Center Reporting service.

3.5.3.1 Call Center Reporting

The Call Center Reporting service is assigned to a call center. This service allows any member of a group or enterprise to be designated as a supervisor for a call center in that group. The number of supervisors a call center can be associated with is not restricted. This service allows for the provisioning of a uniform resource locator (URL), which points to the reporting server for a call center.

The service also enables queueUpdate messages to report updates to a call center queue. A call client who logs into Client Application Protocol (CAP) interface as a call center user with the service assigned receives CAP queueUpdate messages.

3.5.3.2 BroadWorks Supervisor

The BroadWorks Supervisor service can be assigned to any user to enable that user to supervise agents for one or more call centers. A user can be a supervisor for multiple call centers. The BroadWorks Supervisor service is a superset of the BroadWorks Agent service. A BroadWorks Supervisor is also considered to have BroadWorks Agent capabilities. Therefore a user having BroadWorks Supervisor assigned does not need the BroadWorks Agent service also assigned to them to be an agent.

Once assigned this service allows the user to select which members of a call center the user supervisors. The supervisor can choose any member of a call center to supervise including an agent also serving as a supervisor.

A CAP application ID is created for the BroadWorks Supervisor. Clients using BroadWorks Supervisor as the application ID can log in only with the BroadWorks Supervisor service assigned. These clients have complete ability to use CAP call control messages.

3.5.3.3 BroadWorks Agent

The assignment of this service allows the user to view who the assigned supervisors are in each call center in which the user is a member. The BroadWorks Agent can be assigned to any user.

A CAP application ID is created for the BroadWorks Agent. Clients using the BroadWorks Agent as the application ID can log in only with the BroadWorks Agent service assigned. These clients have complete ability to use CAP call control messages.

3.6 Call Park

The Call Park service allows a user to suspend a call for an extended period of time. During this time, the user can freely make and receive other calls and invoke other features without limitation. When ready, the user can retrieve the parked call from any extension.

NOTE: There must be only one other active call when the call park is attempted. If there are multiple calls in progress, the software would not be able to determine which call to park.

3.6.1 Description

The Call Park service allows users to park a call so that any member of the group can retrieve it with the Call Park Retrieve function.

A call can be parked against any user of the group, including the user who parks the call. However, a user can only have one call parked at a time.

To park a call, the user presses the flash hook during an established call and then dials the Call Park feature access code, after which the user is prompted to enter a number[4] and then the call is parked. If no number is entered and the user hangs up immediately after dialing the feature access code, the call is parked against the user's line.

Once a call is parked, it no longer appears on the user's Call Manager and the user can hang up or perform other telephone tasks.

While parked, the parked parties hear the audio on hold configured for that group[5].

To retrieve a parked call, users dial the Call Park Retrieve feature access code, which results in prompting the users to enter a number[6] where the call to be retrieved is parked. Upon entering the number, users are reconnected to the parked party. If no number is dialed after the feature access code, the user is reconnected to the call parked against the user's line[7].

A 45-second timer is started when a user parks a call. If the timer expires before the parked call is retrieved, BroadWorks determines if the parking party is idle. If so, the parking party is alerted and the call appears on the parking party's CommPilot Call Manager as a held call and the user's phone is rung (if on-hook). The behavior is similar to hold recall.

If the parking party is not idle, the timer is restarted for 10 seconds and the call remains parked. This procedure is repeated until the parking party can be alerted or the parked call is retrieved or released.

3.6.2 Call Manager

Calls can be parked and retrieved through the CommPilot Call Manager. To park an active call, the user enters the Call Park feature access code in the Dial window of the Call

[4] Although entering a full DN is supported, the party against which the call is parked must be in the same group as the party parking the call.
[5] If no audio on hold is configured for the group of the user parking the call, the parked party hears silence.
[6] Although entering a full DN is supported, the party against which a call is parked must be in the same group as the party parking the call.
[7] To retrieve calls parked against them, users enter the Call Park Retrieve feature access code followed by the #, an inter-digit timeout, or their own extension.

Manager and then clicks the **Dial** button. This results in connecting the user to the Call Park number prompt. The user can then resume the Call Park interactions on the phone itself.

Similarly, a user retrieves calls by entering the Call Park Retrieve feature access code in the Call Manager Dial window and clicks **Dial** while idle, or while involved in another call. This results in connecting the user to the Call Park Retrieve prompt. The user can then resume the interactions on the phone itself.

3.6.3 Configuration

The group administrator assigns the Call Park service to the entire group at once through the CommPilot Group web portal. Once assigned, all users in the group can park and retrieve calls.

The group administrator can also configure a default audio on hold for the group, which is played to all parked calls.

The group administrator also configures the Call Park service and Call Park retrieve feature access codes through the CommPilot Group web portal.

3.7 Call Pickup

Call Pickup allows users to answer any ringing line within their call-pickup group. A call-pickup group is defined by the administrator and is a subset of the users in the group that can pick up each other's calls.

3.7.1 Description

To pick up a ringing call coming to another user of the group, users go off-hook and dial the Call Pickup feature access code, which connects them to the ringing party.

If more than one line in the call pickup group is ringing, the call that has been ringing the longest is picked up.

Users already engaged in a two-way call can flash the switch hook to put the other party on hold and dial the Call Pickup feature access code to answer an incoming call to the call pickup group. Users then flash the switch hook to toggle between the two parties, or use the CommPilot Call Manager to control the two calls.

3.7.2 Call Manager

Users can pick up a call through the CommPilot Call Manager, either when idle or busy on one other call. They simply enter the Call Pickup feature access code in the Call Manager Dial window and then click the **Dial** button. This results in ringing the phone or placing the other party on hold, and connecting to the ringing party.

3.7.3 Configuration

The group administrator defines Call Pickup groups through the CommPilot Group web portal. A single group can have multiple Call Pickup groups defined simultaneously, but a given user can only belong to a single Call Pickup group.

The group administrator also defines the Call Pickup feature access code through the CommPilot Group web portal.

3.8 Calling Group ID Delivery

This service allows the group administrator to assign a Calling Line Identity (name and number) to an entire group.

3.8.1 Description

This service allows the group administrator to define a default group Calling Line ID (CLID). The default group CLID is made up of:

- **Name** – The name of the group (truncated to 15 characters).
- **Number** – A valid phone number authorized to the group, also known as direct-inward dialing (DID).

The default group number applies to all external[8] calls made by non-DID users (also known as extension-only users).

The group default DID also provides a default billing number for non-DID users, thus allowing them to make external calls.

For users with their own DID, the administrator can select whether the default group name and/or number should override the users' own name and number.

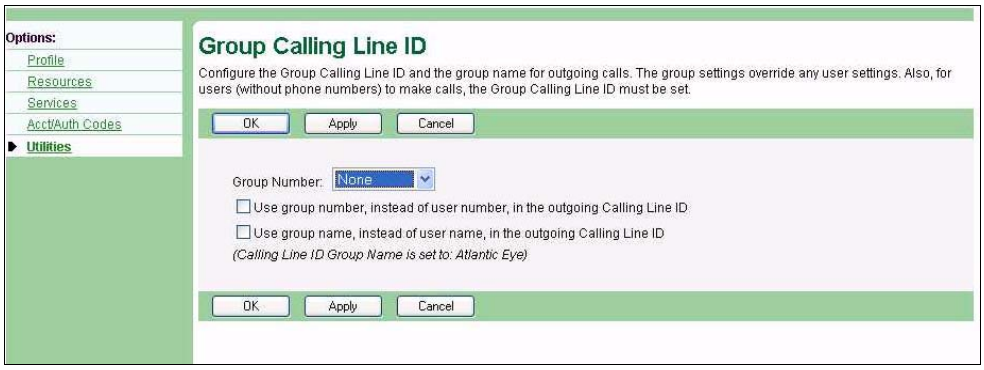

Figure 10 Use Default Group Name or Number

In all cases, if the user making a call, blocked the delivery of the CLID, the presentation indicator sent to the far-end party is set accordingly and the presentation of the group CLID is blocked.

The DID used as a default group CLID can still be assigned to a user in the group. For instance, it can be assigned to a group Auto Attendant to allow external parties to use it to reach non-DID users (phantom users).

3.8.2 Configuration

The following options are offered to the administrator to configure the Calling Group ID Delivery service:

- **Group number** – The administrator can select the group DID among the ones authorized for the group.

[8] The default group calling line ID (CLID) is never used for intra-group calls.

NOTE: The selected DID is still available to be assigned to a real or virtual user of the group.

- **Use group name** – The administrator can select whether the group name should override the user name when making an external outbound call.
- **User group number** – The administrator can select whether the group DID should override the user number when making an external outbound call.

3.9 Calling Plan

The Calling Plan service allows the administrator to restrict the type of calls users can make and receive.

3.9.1 Description

The Calling Plan service allows the administrator to control the type of calls made, received, transferred, and forwarded by users in a group. The restrictions are applied by means of sets of call screening templates assigned to groups, departments, or single users. The templates specify various screening methods that should be applied to calls according to the call type or the digits dialed.

The administrator can define different screening templates for outgoing, incoming, and redirected calls. The following sub-sections describe these capabilities in more detail.

3.9.1.1 Call Topology

The administrator can define different screening templates for the following:

- **Outgoing calls** – The outgoing call screening template allows the administrator to define how calls originated by users should be restricted.
- **Forwarding/transferring calls** – The forwarding/transferring call screening template allows the administrator to define how calls that are redirected by the user services should be restricted.
- **Being forwarded/transferred** – This call screening template allows for preventing users from being forwarded or transferred to external parties so to offer Originating Fully Restricted functionality. When an outgoing call is denied based on this call screening template, the user receives the applicable OCP treatment.
- **Incoming calls** – The incoming call screening template allows the administrator to define how calls received by users should be restricted.

The call screening templates apply independently to different legs of the call. For instance, when a call is transferred by the user, both the incoming and transferred call screening templates are applied to the call sequentially.

3.9.1.2 Call Types

The Incoming Call Screening template can screen the following call types:

- **Calls from within the group** – When this option is checked, users are allowed to receive calls from other members of the group.
- **Collect calls** – When this option is checked, users are allowed to receive collect calls. When an incoming collect call is blocked, the caller is played an announcement stating the called party is not authorized to receive collect calls[9].

[9] BroadWorks relies on the *Calling Party Category (CPC)* parameter of the *Generic Transparency Descriptor (GTD)* parameter received in the incoming SIP INVITE message to identify collect calls. When the CPC value is not related to an operator call or when the *GTD* parameter is not present, it is assumed that the call is not a collect call.

- **Calls from outside the group** – The "calls from outside group" screening criterion of the ICP service provides a distinction between:
  - Allow calls from outside of the group.
  - Partial – Allow calls from outside of the group only if transferred by a group user.
  - Block calls from outside of the group.

For a user, setting the "call from outside group" option to N disallows incoming calls from callers outside of the group, independently of how the call got to the user.

When an incoming call is denied by this new attribute, the caller receives the standard ICP denial announcement.

NOTE: In enterprise scenarios, the "Calls from within the group" and "Calls from outside the group" screening criteria refer only to calls from outside the enterprise. Calls from outside the group but within the same enterprise do not trigger the "Calls from within the group" and "Calls from outside the group" screening criteria.

The outgoing call screening template can screen the following call types:

- **Group** – Calls from within the user's business group
- **Local** – Calls within the same geographic region
- **Toll free** – Free calls to numbers beginning with 1, usually followed by 800, 877, or 888
- **Toll** – Chargeable calls within the same geographic region
- **International** – Chargeable calls to other countries
- **Operator assisted** – Calls made with the chargeable assistance of an operator
- **Chargeable directory assistance** – Chargeable calls made to Directory Assistance such as 411 or 555-1212
- **Special services I** – Calls to 700 numbers. These calls may or may not be chargeable
- **Special services II** – (Reserved for system administrator's discretion)
- **Premium services I** – Chargeable calls to 900 numbers
- **Premium services II** – Chargeable calls to 976 numbers
- **Casual** – 1010XXX chargeable calls, such as 1010321
- **URL** – Chargeable calls made to an e-mail address instead of a phone number
- **Unknown** – Calls to unknown call types

The same call types can be screened by the forward/transfer and the call screening templates being forwarded/transferred.

The system administrator defines a digit map for the system that defines digit strings that should be mapped to each call type. For instance, this digit map would assign 911 to emergency calls in North America.

In addition to fixed call types, the Calling Plan service allows the administrator to screen calls against configurable digit strings. The digit strings are entered as fixed digit strings (for example, 2022517151) or digit patterns (for example, 202251*).

The administrator can define as many digit strings as required, and selectively assign them to the group, to selected departments or selected users. The digit strings can be used to complement the outgoing and forward/transfer call screening templates.

3.9.1.3 Basic and Enhanced Screening Options

The Calling Plan service offers basic and enhanced screening options. The enhanced screening options apply only to the outgoing call screening templates. The incoming and transfer/forward call screening templates remain the same with either option.

With the basic screening option, any outgoing call that is intercepted by the Calling Plan service is sent to an announcement, informing the caller that the call is not allowed. Otherwise, the call is allowed to go through as usual.

With the enhanced screening options, the administrator can select how to process the calls that are intercepted by the service. The following interception options are offered for each call type or digit string:

- **Allow** – The call is allowed to proceed as usual (same as basic).
- **Block** – The call is routed to an announcement (same as basic).
- **Authorization code** – The caller is prompted for an authorization code. If a valid code is entered (through DTMF digits), the call is allowed to go through[10]; otherwise the call is blocked as described above.
- **Transfer 1/2/3** – The caller is transferred to a configurable destination for further processing (for example, an attendant position). Three possible transfer destinations can be defined.

The enhanced screening options are only available when the Enhanced Outgoing Calling Plan (OCP) service is authorized and assigned to the group.

3.9.1.4 Sustained Authorization Codes

The Sustained Authorization Codes (SAC) feature allows users to unlock their calls by having their Calling Plan service use a sustained authorization code instead of prompting for the code on a per-call basis. Users can also disable the sustained authorization codes feature, which restores the collection of authorization codes for each call.

Once a user has unlocked his or her calls, any call originated by a phone belonging to that user and for which the Calling Plan service would usually require the user to enter an authorization code, is allowed to complete directly, without prompting the user for an authorization code. Instead, the code entered as part of the unlocking procedure is used implicitly, and captured in the call detail record (CDR) associated with that call.

3.9.2 Interaction between ODP and OCP

The Outgoing Digit Plan (ODP):

- Denies origination to digitString.
- Denies Call Forward/Transfer to digitString.

For example:

- When A calls B, the ODP service of user A applies.

[10] The authorization code entered by the user is also captured in the accounting call detail record generated by BroadWorks.

- When A calls B and is call forwarded to C, the ODP service of user B applies.

The Outgoing Call Plan (OCP):

- Denies origination to callType.
- Denies Call Forward/Transfer to callType.
- Denies being forwarded/transferred to callType.

For example:

- When A calls B, the OCP service of user A applies.
- When A calls B and is call forwarded to C, the OCP service of user B applies (Call Forward/Transfer). Also, the OCP service of user A applies (being forwarded/transferred).

The Outgoing Calling Plan (OCP) Originating Transfer

If B is talking to A and C and B presses Transfer, then the OCP Originating Transfer screens the B to A leg and the B to C leg. It is the opposite of *Direct Transfer Screening,* which only screens the B to C leg.

3.9.3 Configuration

The group administrator configures the Calling Plan service in a hierarchical fashion.

- The administrator first defines default calling plans for the entire group. This plan applies to any department or user who does not have its own plan defined.
- The group administrator can define specific calling plans for selected departments in the group. The department calling plans have precedence over the group default calling plans for all users belonging to that department.
- The group administrator can define a specific calling plan for selected users. In this case, the users' calling plans have precedence over the department and group calling plans.

The Calling Plan service is configured through the CommPilot Group web portal. The configuration data is the same at each of the group, department, and user levels.

The following information items must be configured at each level when using the basic screening option:

- Define digit strings that should be screened if required. Digit strings can include digits from 0 through 9, and the following wildcard characters:
  - * *(star)* – This wild card can only be used as the last character of the digit strings and matches any number of trailing digits.
  - ? *(question mark)* – This wild card can be used anywhere in the string and matches any single digit.
- Allow/block for each system call type.
- Allow/block for each digit string.

This configuration must be done for outgoing calls and for forward/transfer calls. The incoming plan can also be configured to block or allow external calls. This process should be repeated for each department and user needing a specific calling plan.

When using the enhanced screening option, the configuration is similar, but the following information must also be configured as part of the outgoing calling plan to support the enhanced interception options:

- Allow/block/authorization code/transfer1-3 for each system call type
- Allow/block/authorization code/transfer1-3 for each digit string
- Provision the valid authorization code for the group, department, or user (each group, department, and user profile uses its own list of valid authorization codes)
- Provision the required transfer destinations (each group, department, and user profile uses its own list of redirection destinations)

NOTE: When creating a new department or user calling plan template, the default values for all configurable items are inherited from the layer above, which can be refined as required.

3.10 Configurable Calling Line ID

This capability allows a group administrator to assign to users an alternate Calling Line ID name and number, which is delivered to the called party.

3.10.1 Description

This capability provides the group administrator with the following fields on the *user profile* page:

- **Caller ID first name** – The user's first name as it should be delivered as part of the caller ID.
- **Caller ID last name** – The user's last name as it should be delivered as part of the caller ID.
- **Caller ID number** – The user's number as it should be delivered as part of the caller ID.

These attributes are optional. When they are left blank, the user's actual name and numbers are used by default.

Users themselves cannot modify these attributes, but can see them in their profile.

3.10.2 Configuration

Group administrators configure the users' caller ID attributes through the CommPilot Group portal. All caller ID attributes are optional.

The usage of the Configurable Calling Line ID is determined by a system parameter. This system parameter can be configured to:

- Enable the use of configurable CLID for all calls.
- Enable the use of configurable CLID for all calls except emergency calls.
- Enable the use of configurable CLID for emergency calls only.
- Disable the use of configurable CLID for all calls.

3.11 CommPilot Group Web Portal

The CommPilot Group web portal allows group administrators to provision and configure resources for a group.

3.11.1 Description

The CommPilot Group web portal provides the group administrator with a web interface that allows for viewing, provisioning, and configuring the resources of a group.

The following configuration and provisioning areas are available through the CommPilot Group web portal:

- **Group** – Allows for viewing and configuring the existing group resources like the group profile, departments, voice portal, and so on. It also allows for tunneling down into the user profiles and services.
- **Resources** – Allows for creating and deleting group resources like conference ports, users, phone numbers, devices, user services, group services, and so on.
- **Group services** – Allows for configuring the group services like the hunt groups, call centers, Auto Attendants, feature access codes, messaging, and so on.
- **Account/authorization codes** – Allows for configuring the Authorization Codes and Account Codes services, provisioning the valid codes, and so on.
- **Service scripts** – Allows for creating and loading call processing language (CPL) service scripts that apply to the entire group.
- **Calling plans** – Allows for defining calling plans for the group, department, and users.

The CommPilot Group web portal also allows for creating other group administrators, managing passwords, and configuring miscellaneous items related to the group.

The CommPilot Group web portal is authenticated for each administrator with a user ID and a password, and provides a secure connection to BroadWorks.

3.11.2 Configuration

The group administrator can access the CommPilot Group web portal from any standard web browser to perform the configuration and provisioning tasks listed above.

3.12 Configurable Extension Dialing

This service provides the ability to map directory numbers to unique extensions to allow abbreviated dialing between users of a group.

3.12.1 Description

The configurable extension dialing service allows the users of a group to call one another using abbreviated dialing.

The abbreviated digit string ranges from two to six digits in length, and is set to the last *n*[11] digits of the user's phone number by default. The group administrator can change the default extension to any other value that is not already in use by another member of the group.

Once assigned, users' extensions can be used for dialing and for more intra-group routing application that requires a phone number (for example, call forwarding, simultaneous ringing, speed dial, and so on).

Extensions can also be assigned to routable group services like Hunt Groups, Call Centers, and Auto Attendants.

3.12.2 Configuration

The group administrator configures the Configurable Extension Dialing service through the CommPilot Group web portal.

- The length of the extension is the same for all users in the group and is selected through the *Extension Dialing configuration* page.
- Each user and virtual user's extension is populated by default with the last *n* digits of the user's phone number. For users without phone numbers and for other cases where the default extension is not appropriate, the group administrator can change the default extension through each user and virtual user's *configuration* page.

The *CommPilot Call Manager Group* tab and the group Auto Attendant are automatically provisioned with the extensions of the users within their scope.

[11] The length *n* of the extension is configurable by the group administrator but should at least allow for accommodating the number of users in the group.

3.13 Configurable Feature Codes

BroadWorks allows group administrators to select the feature access codes (FAC) used to activate, deactivate, and program various BroadWorks services.

3.13.1 Description

This capability allows administrators to configure the feature access codes used by members of the group to activate, deactivate, program, and configure various BroadWorks services.

A feature access code is defined as a string of two to five digits and special characters that is associated with a BroadWorks service or function, which is dialed by the members of the group to interact with this service or function.

Feature access codes are configurable by the group administrator and are subject to the following rules:

- A feature access code can be two to five digits in length.
- Special prefix characters (A, B, C, D, *, #) can only be used for the first two digits.
- The last digit must be number from 0 to 9.

Feature access codes must be unique within a group. It is possible to configure an alternate feature access code for each feature access code-based service. When an alternate feature access code is defined for a service or function, it can be used instead of the primary feature access code, to interact with the associated function or service.

When no feature access code is associated with a service or function, users of the group cannot interact with this service or function through their phone.

BroadWorks validates all the feature access codes to ensure that:

- There are no collisions between feature access codes.
- There are no collisions between feature access codes and extensions.

A second test is also applied when adding or modifying a user's extension. If a collision occurs when either a feature access code or an extension is modified, an error message appears. Also, when the length of extensions is increased, a warning appears stating that feature access codes and extensions may collide.

When there is a collision between a feature access code and an extension or a Speed Dial Code, the feature access code has precedence.

3.13.2 Configuration

The group administrator configures feature access codes using the CommPilot Group portal. For a list of the system default feature access codes, see section *5.3 Configurable Default Feature Access Codes.*

3.14 Conferencing

This service allows administrators and users to create, configure, and manage multi-party conferences hosted on the BroadWorks Conference Server.

3.14.1 Description

The Conferencing service allows group administrators and users to create multi-port conference bridges that can be used by members of the group and external parties to hold scheduled, recurring, reservationless, and ad-hoc conferences.

Groups who subscribe to the Conferencing service are allocated a maximum number of conference ports that may be used simultaneously.

Group administrators can assign bridges to users (as many bridges as desired). Each bridge can accept as many participants as there are ports available for that group.

NOTE: The enterprise level (not displayed in *Figure 11 Conferencing Tasks*) is at the same level as the service provider.

Figure 11 Conferencing Tasks

For instance, if a group is allocated 10 ports, the group administrator could use them to create a seven-port bridge and a smaller three-port bridge.

Bridge moderators (BroadWorks users) have access to a bridge management portal that is integrated into the BroadWorks CommPilot Personal portal. The portal allows for creating and managing bridges before the conference as well as moderating a live conference by adding, removing, muting, holding, and retrieving participants.

The conferencing application is integrated with the user's personal information manager (PIM) so invitations to participants can be e-mailed to the moderator's contacts. Participants can dial into the conference or click a link in the invitation.

The moderator has access to enhanced functions during the conference:

- Selective muting and hand raising (participants may request to be temporarily un-muted)
- Roll call (service can record and announce participants' names as they join)
- Recording
- Playback

The Conferencing service also allows for document sharing (Excel, Word, and PowerPoint documents).

3.14.1.1 Accounting Integration

This feature integrates accounting information from the Conferencing Server into the BroadWorks CDRs. As a primary benefit of this feature, BroadWorks service providers should find it easier to bill their customers for use of the Conference Server.

This feature affects two Application Server interfaces: the Application Server/Conference Server SIP interface, and BroadWorks CDRs.

The Application Server/Conference Server SIP interface changes to add support for SIP NOTIFY messages from the Conference Server to the Application Server. These NOTIFY messages convey relevant accounting information from the Conference Server to the Application Server.

The BroadWorks CDRs change to add new information necessary to allow more accurate billing for usage of the Conference Server.

3.14.2 Configuration

The group administrator creates and manages conference bridges through the CommPilot Group web portal.

When creating a bridge, the group administrator assigns it a name, a phone number, a maximum number of ports, and one or more moderators. Each moderator has access to the *Bridge* page to start new conferences.

After being allocated a certain number of ports for the group, the administrator can create as many conference bridges as required with these ports, as long as the total number of ports allocated to these bridges does not exceed the maximum number of ports allocated to the group.

During the conference, the moderator can manage the conference and its participants through the *Bridge Configuration* page.

3.15 Custom Ringback Group

Two new user services (one for audio and one for video) and two new group services (one for audio and one for video) are introduced for Custom Ringback. They allow a user to specify custom media files to be used for ringback, when incoming calls are received. When the user is called, the system allocates a media resource and plays a custom ringback file to the caller instead of the standard ringback tone.

The user services allow a user to specify multiple profiles. Each profile is associated with a set of criteria (phone numbers, time of day, and so on) and a custom media file. When a call is received, it is compared with the profiles associated with the user. If a match is found, then the associated custom media file is used; otherwise the group service is checked. If active, then the group's custom media file is used, otherwise system ringback is provided.

3.15.1 Description

A new Custom Ringback Group service is added, which allows an audio ringback at the group level to be defined. A new Custom Ringback Group - Video service is also added. When this service is assigned, it enhances the Custom Ringback Group service. It allows a video ringback to be configured in addition to an audio ringback at the group level.

NOTE: The Custom Ringback Group service can be turned on only when at least one custom ringback file (audio or video) is defined.

Custom Ringback audio and video files loaded via the web interface are subject to a length and format validation. The duration of a ringback file must be between 1 and 120 seconds. This applies to media files, loaded as files, either from the web interface or from the OCI/OSS interfaces. Although this validation is not done for ringback files specified as URLs, it is recommended to use ringback media files that are between 1 and 120 seconds.

3.16 Department Administrative Layer

This feature creates a new department administrative layer to improve the management of large or geographically distributed groups.

3.16.1 Department Administrators

Like groups, departments can be assigned an administrator who shares most of the group administrator's privileges for the users and services assigned to the group. Hence, the group administrator can delegate most of the day-to-day service management of the department to a department administrator.

Specifically, department administrators have the following management capabilities:

- Add, modify, and delete users in their department.
- Modify Auto Attendants, call centers, hunt groups, and instant conference bridges belonging to the department.
- View group directory and modify group common phone list.

The group administrator defines the administrative scope of the department administrators by assigning users and services to specific departments. The department administrators can manage users and services belonging to their department the same way the group administrator can.

Furthermore, the department administrator can create new users in the department and assign them services the same way the group administrator can. The department administrator can also delete users in the department.

3.16.2 Department Provisioning

The following services can be assigned to a department:

- **Auto Attendant** – When an Auto Attendant is assigned to a department, the department administrator can configure it. Also, assigning Auto Attendant to a department allows the option to restrict the scope of name dialing to the users in the department. This is especially useful with large groups to limit the number of collisions between user names.
- **Call Centers** – When a call center is assigned to a department, the department administrator can configure it and populate the list of agents with any user from the group.
- **Hunt Groups** – When a hunt group is assigned to a department, the department administrator can configure it and populate the list of agents with any user from the group.
- **Instant Conference** – When an instant conference bridge is assigned to a department, the department administrator can configure it.

Furthermore, the BroadWorks CommPilot web portal is enhanced to allow the administrator to bulk-provision services with entire departments. Hence, when populating the agents in a call center, the administrator can select a whole department at once instead of selecting the users one by one. The following services are enhanced with department bulk provisioning:

- Call Center
- Hunt Group

- Account and Authorization Codes
- Series Completion
- Call Capacity Management
- Call Pickup
- Attendant Console

Finally, this service allows the group administrator to assign phone numbers (DID) to departments. Any phone number assigned to a department shows up as such in the list of phone numbers when assigning new phone numbers to users or group services.

3.16.3 Configuration

Group administrators create departments and only a group administrator can assign or modify users or services for a department.

Once users and services are assigned to specific departments, they can be configured and managed by the department administrators. Any user created by the department administrator is automatically assigned to the same department.

NOTE: The use of departments is optional. Department selection for users and services may be omitted (left as "None"), which leaves provisioning at the group level.

3.17 Device Inventory

The Device Inventory service provides the group administrator with an inventory of all integrated access devices (IAD), gateways, and IP phones for a group. In addition, this service provides the capability to assign users directly to a device and/or a port on a device.

3.17.1 Description

This service allows the group administrator to keep track of the devices (IADs, gateways, IP phones) used by the group

This service also hides the technical details specific to each device and vendor so the group administrator can easily assign users to devices without an in-depth understanding of how the device works.

For instance, to activate user A, the group administrator plugs user A's phone into port N of device X, and then assigns user A to port N or device X through BroadWorks device inventory, without having to know the specific port numbering scheme used for that device and vendor[12].

The Device Inventory service also allows the group administrator to drill down into a device by clicking on it in the inventory list to view detailed information about the device and see all users assigned to this device. Clicking on a user in the assigned list drills down to the user's *User – Profile web* page where the device information can be modified.

3.17.2 Configuration

On the CommPilot Group web portal, the Devices link directs the administrator to a list of all the devices assigned to the group. The group administrator can add, delete, and modify the devices in the list.

When the administrators add new devices to their group, they are required to pick the device type from the list of available devices known to BroadWorks, which is created from the inventory file. The new device then becomes a new instance of a known device type, and BroadWorks can present a standardized *configuration* page to the administrator that abstracts all the device specific details.

[12] A device inventory file contains details for all BroadWorks devices. This file is loaded onto the Application Server at start up or when requested by the command line interface (CLI). The device inventory file is maintained by BroadSoft and includes the required information for BroadWorks certified devices.

3.18 Emergency Zones

The Emergency Zones feature allows a service provider to configure (on a group basis) whether emergency calls are allowed for a user, when roaming outside of the group's home zone or location.

3.18.1 Description

The Emergency Zone feature allows a service provider to configure a home zone or location for a group, and deny SIP registrations, call originations, or emergency call originations based on the home zone.

The service provider can also optionally configure an e-mail address where detailed call information for emergency calls made from a user in the group is sent.

This e-mail is sent whether the emergency call is permitted or denied, as long as an address is configured and the "Send e-mail" option is enabled.

This feature can be enabled or disabled by a service provider. If the feature is disabled, then the behavior for SIP registrations and all call originations is not modified.

3.18.1.1 Configure a Home Zone

The zone is a list that contains IP addresses or IP address ranges.

The * and ? wildcards are supported for IP addresses. The * wildcard can only be used as the fourth octet of an IP address, and represents the 0 – 255 range. The ? wildcard matches any single digit in the IP address, and can only be used in the fourth octet of the IP address.

Examples of values in a group's home zone that can be configured are:

- 66.54.30.*
- 66.54.34.21 – 29
- 66.54.34.19?

3.18.1.2 Reject SIP Registrations and Outgoing Calls Outside Home Zone

The feature can be configured to deny SIP registrations and call originations from outside of the home zone, thus giving the service provider greater control over SIP mobility.

For example, if this configuration was set for a group, and a user in the group tries to use his or her SIP phone or device from outside of the home zone, the device would not be able to register or originate calls.

On a registration attempt by the SIP phone or device, the system responds with a 403 Forbidden, and triggers a system alarm.

On a call origination attempt, the user receives a treatment. This is a new treatment configurable at the system level.

3.18.1.3 Permit or Deny SIP Emergency Calls from Outside Home Zone

A more granular control is also provided by this feature. It is used to deny emergency calls from outside the home zone. Hence, this configuration allows SIP users to make calls from outside of the home zone, but it denies emergency calls, thus preventing invalid locations being provided to emergency response teams based on the user's calling line ID.

If an emergency call is denied, then the user receives a treatment. This is a new treatment configurable at the system level.

3.18.1.4 Configure Emergency E-mail Setting

An optional e-mail address can be configured for this feature. If the "send emergency e-mail" option is enabled, then an e-mail is sent (at the start of the call) with detailed information of the emergency call to this e-mail address.

The e-mail includes:

- Date and start time of call
- Dialed digits
- User ID, user name, user extension (if assigned), and user phone number (if assigned)
- Group ID, group name, group address (if entered on group profile), CLID number for the call (either user DN or group CLID number), CLID name (either user name or group CLID name)
- IP address of the calling device
- Whether the call is in-zone or out-of-zone
- Whether the call was permitted or denied

3.18.1.5 Determine In-Zone or Out-of-Zone Requests

The *via* header(s) in the SIP request messages for registrations and invites is used to build a list of IP addresses. If any of these IP addresses are contained in the home zone list, then the request is considered to be from within the home zone.

3.18.2 Configuration

The group administrator configures emergency zones using the CommPilot Group portal.

For more information about emergency zones configuration, refer to section *3.18.1.1 Configure a Home Zone*.

3.19 Hunt Groups

The Hunt Group service allows incoming calls to a central phone number to be distributed among the members of that group according to a hunting policy.

3.19.1 Description

The Hunt Group service allows processing of a high volume of calls to a single phone number by distributing the incoming calls to multiple users according to a hunting policy. Based on the chosen policy, an incoming call hunts for an idle user in the group to terminate the call to that user.

3.19.1.1 Hunting Policies

When a hunt group is created, the users are provisioned in an ordered list. The hunting process essentially determines how to process that list to find an idle user where the call can be terminated.

BroadWorks supports the following hunting policies:

- **Regular (linear)** – The incoming calls to the group start hunting on the first user in the list and hunt all the provisioned users sequentially, until an idle user is found or the end of the list is reached.
- **Circular** – The incoming calls to the group start hunting with the user following the last user to receive a call. When the end of the list is reached, the hunting circles back to the first user in the list. The hunting ends when an idle user is found or all the users have been visited.
- **Uniform** – The incoming calls to the group are presented with the user that has been idle for the longest time.
- **Simultaneous** – The incoming calls alert all idle users in the group. The call is connected to the first user to answer the call.
- **Weighted** – The incoming calls alert agents in a pseudo-random fashion according to their relative weight. Agents with a higher weight are assigned more incoming calls than agents with lower weights.

In all cases, if all users in the hunt group are busy, the incoming call is provided with the busy processing that applies to the hunt group.

3.19.1.2 Hunt Group Services

BroadWorks hunt groups are assigned a phone number like regular users, and can also be assigned services like regular users. The following services can be assigned to hunt groups:

- **Anonymous Call Rejection** – This service allows blocking of anonymous calls to the hunt group.
- **Call Forward Always** – This service redirects calls to the hunt group to the selected destination.
- **Call Forward Busy** – This service redirects calls to the selected destination if all the users in the group are busy.
- **Call Forward No Answer** – This service redirects calls to the selected destination if the user does not answer before the expiration of the timeout.

- **Directory Number Hunting** – This service allows a caller to reach a hunt group by calling the number of one of the hunt group users. For more information, see section *3.19.31 Directory Number Hunting*.
- **Do Not Disturb** – This service makes the hunt group appear as busy.
- **Incoming Call Notification** – This service reports all incoming calls to the hunt group to the selected e-mail account.
- **Incoming Calling Plan** – This service allows selective blocking of external calls to the hunt group.
- **Selective Call Forwarding** – This service redirects calls to the hunt group based on the time-of-day, day-of-week, or the CLID of the caller.
- **Selective Call Acceptance/Rejection** – This service blocks calls to the hunt group based on the time-of-day, day-of-week, or the CLID of the caller.
- **Voice Mail** – This service redirects calls to the group voice mail if all agents are busy or if the call remains unanswered for too long.

3.19.1.3 User Services

Users who are members of a hunt group can have their own phone number where they receive calls, and have their own service independently of the Hunt Group services.

To maintain consistency of the hunting policy when traversing the list of users, the calls presented to the users by the hunt group are subject to the following service interactions:

- **Call Forwarding (all types)** – Incoming calls to the hunt group are never forwarded by any call forwarding service assigned to a member of the hunt group.
- **Voice Mail** – Incoming calls to the hunt group DN are never forwarded by the voice mail service assigned to a member of the hunt group.
- **Call Transfer** – A member of a hunt group can transfer/blind transfer the call via the phone or the CommPilot Call Manager application, if assigned.

3.19.2 Configuration

An administrator configures the Hunt Group service using the CommPilot group web portal. There is no limit to the number of hunt groups that can be created in a group, and a given user can be part of more than one hunt group.

The following attributes can be configured when creating a hunt group:

- **Group name** – Allows for selecting the name of the hunt group. This name is prefixed to the caller ID delivered to the user when a call terminated through a hunt group. Hence, if a call from Bob Smith is presented to a user through the “Support” hunt group, the CLID appears as Support – Bob Smith on the user’s phone and Call Manager.
- **Group number** – Allows for selecting the number used to call the hunt group. This number must have been previously authorized for the group, and be available.
- **Extension** – Allows for selecting the extension that can be used by other members of the group to call the hunt group. By default, it is set to the last N digits of the group number, and can be modified by the administrator.
- **Group policy** – Allows for selecting the hunting policy used for that group, as defined in the previous section.

- **Members** – Allows for selecting the members of the hunt group among users of the group. The members are provisioned in an ordered list.

As described in the previous section, the administrator can also assign services to the hunt group through the CommPilot group web portal.

3.19.3 Directory Number Hunting

Directory Number Hunting is a service extension that allows a caller to reach a hunt group (or call center) by calling the number of one of the hunt group users. When Directory Number Hunting is enabled and a caller calls a user's number, the Hunt Group service directs the call to the called user first. If that user is unavailable, the Hunt Group service then applies the distribution policy that has been configured. For example, for the Regular (sequential) hunting policy, the called user is skipped and for the Simultaneous hunting policy, the hunt group alerts all users simultaneously (as if the caller had called the pilot number).

This feature makes a hunt group pilot number optional. If an administrator provisions a pilot number for the hunt group, the service continues to function as in past BroadWorks releases.

3.19.3.1 Configuration

To provision Directory Number Hunting, an administrator uses the CommPilot group web portal to assign the Directory Number Hunting user service to a hunt group. The administrator then selects users for Directory Number Hunting from the full list of the hunt group's users. The selected users form a Directory Number Hunting group, and BroadWorks directs calls to these users to the hunt group. A BroadWorks user can be a member of only one Directory Number Hunting group.

After a system upgrade or patch installation, by default Directory Number Hunting is "off".

3.19.3.2 Call Waiting

This feature also adds the capability to enable Call Waiting for hunt group users. Using the CommPilot group web portal, an administrator can enable or disable this functionality from the *Hunt Group Profile* page or the *Hunt Group Add* page.

After a system upgrade or patch installation, by default Call Waiting for users is "off".

3.20 Instant Group Call

The Instant Group Call (IGC) service allows a user to call a group of members, whereby the system alerts all members in the group. As the members answer, they are joined into a multi-way conference.

The Instant Group Call service allows an administrator to define a group composed of a list of member users. These members can be part of the same group or enterprise (specified by user name, extension or location code + extension) or can be external users (specified by a phone number or SIP URI).

3.20.1 Description

The IGC service is a group service assigned to a group by a system or service provider administrator. Once the service is assigned to the group, then a system, service provider, or group administrator creates an instance of the service and sets its attributes.

3.20.2 Configuration

Each service instance (also referred to as virtual user) is configured with the following:

- **ID** – The ID uniquely identifies the virtual user, for example, group1@domain.net.
- **Name** – The name allows an administrator to provide a descriptive name that identifies the purpose of the virtual user, for example, “sales”.
- **Phone number/extension** – An administrator can assign a phone number and/or an extension to the virtual user.
- **Calling line ID names** – The calling line ID name is used when the virtual user alerts group members.
- **Hiragana names** – For special markets only, which is used to sort names.
- **Department** – The administrator may assign a department to the virtual user.
- **Language** – The language associated with the virtual user.
- **Time zone** – The time zone in which in the virtual user is defined.
- **Aliases –** The virtual user can be assigned up to three SIP-URI aliases.
- **Enable answer timeout** – A flag indicates if there is a maximum call time for unanswered calls.
- **Maximum call time** – The maximum call time for unanswered calls.
- **List of members** – This is the list of members that are alerted when the virtual user phone number or extension is dialed. Up to 20 members can be defined for a virtual user. A member consists of an address that is used to reach the member. The address can be a SIP-URI, a phone number, location code and extension, extension or E.164 number. With the exception of SIP-URI, the address can be prefixed with a FAC, providing that the corresponding service is assigned to the virtual user.

An IGC virtual user can be assigned user services and may be subject to group service behavior when it applies to users. The following services typically apply for virtual users (for example, Hunt Group, Instant Conferencing, Call Center) and also apply for an IGC virtual user:

- Incoming Call Notification
- Selective Call Acceptance
- Selective Call Rejection
- Anonymous Call Rejection
- Call Forwarding Selective
- Call Forwarding Always
- Call Forwarding Busy
- Do Not Disturb
- Voice Messaging User
- Third Party Voice Mail
- Alternate Numbers
- Priority Alert
- Calling Line ID Blocking
- Diversion Inhibitor
- Custom Ringback
- Incoming Calling Plan

3.21 Intercept Group

This service allows the system to intercept calls routed to a line that has been decommissioned, providing an informative announcement and alternate routing options (for example, "*This number is no longer in service. To talk to an operator, press 1*").

The Intercept Group service intercepts calls directed to users within the specified group. The related Intercept User service intercepts calls directed to individual users.

3.21.1 Description

If the Intercept Group service is assigned, then incoming calls to any user within the group are intercepted and played an announcement. If configured, this announcement plays back a new destination number to the caller and offers the caller to connect to this new number.

The announcement can be in audio or video format, depending on the service configuration and the calling party's ability to support video.

NOTE: The maximum recording length for Intercept Group is five minutes.

Outgoing calls are prohibited from user in a group that has the Intercept Group service assigned. Only emergency and repair calls are permitted. All other call attempts are rejected and the calling user is played a treatment.

3.21.2 Configuration

The service provider uses the CommPilot Service Provider web portal to authorize and assign the Intercept Group service to a group.

The Intercept Group service allows three types of incoming call interception:

- **Static** – An out-of-service announcement (audio or video) is played twice followed by a fast-busy treatment.
- **Hear new destination** – The out-of-service announcement is complemented with the playback of a specified phone number.
- **Connect to new destination** – After hearing the new phone number, the caller can press a digit to be immediately transferred.

The desired type of interception is configured when the service is assigned to a group.

3.22 Loudspeaker Paging

This service allows users to access an intercom paging system by dialing an extension within the group.

3.22.1 Description

The Loudspeaker Paging service allows users in a group to call a number or extension to voice a message over a loudspeaker system.

To voice a message, users simply dial the number or extension associated with the loudspeaker system, and they are presented with a tone indicating that they are “on the air”. The connection to the loudspeaker paging system remains until the calling party releases it.

The loudspeaker paging system is provided by a third party.

3.22.2 Configuration

The loudspeaker paging system is configured like a regular BroadWorks user; however, the following services are suggested:

- By assigning only an extension to the loudspeaker paging system, external parties are prevented from accessing it.
- The Incoming Calling Plan service can also be used to prevent the loudspeaker paging system from receiving external calls.
- The Selective Call Acceptance service can also be assigned to the loudspeaker paging system to prevent the system from being used outside of normal business hours.

3.23 Music On Hold

This service allows an administrator to set up and maintain an audio or video source that can be broadcasted to held parties in various scenarios (Call Park, Call Hold, and Call Centers).

3.23.1 Description

Music On Hold is a group service that allows the group administrator to set up a media source (audio or video) that can be broadcasted to held parties in various scenarios.

The Music On Hold service is made up of two components:

- **Media source component** – The media source is provided by the group administrator by uploading media files on the system. These media files are played back to held parties of applicable services. The media file that gets played back is selected based on the available formats and the capabilities of the party's end point, that is, if a video file is available and the party supports video, the video file is played back. Otherwise, the audio file is played back.
- **Broadcast component** – The broadcast component allows the group administrator to enable selected services to use Music On Hold so that parties held through these services are played back the configured media source.

The following services can be enabled to use the Music On Hold service:

- **Call Hold** – This includes calls held by activation of a flash service or via the Call Manager.
- **Call Park**
- **Call Waiting** – This includes calls held by activation of a flash service or via the Call Manager.
- **Consultation Hold** – This includes Call Transfer and Three-Way Calls.

When no Music On Hold media file is specified or if Music On Hold is turned off for one of these services, the held or parked party hears silence.

3.23.1.1 External Source for Music On Hold

The group administrator can configure the Music On Hold service to make use of an external audio source.

The audio source is controlled by the enterprise and is typically located on the enterprise's premises. When configured, BroadWorks connects held parties to the audio source using SIP. The external music source then automatically answers the SIP call and plays music. It is assumed that the external music source accepts multiple simultaneous connections.

NOTE: This method, to provide music on hold, only supports audio media.

3.23.1.2 Call Hold and Call Park

The Call Hold and Call Park services use the audio source specified through the group *Music On Hold service* page on the CommPilot Group web portal. The page also allows for selectively activating and deactivating Music On Hold for each service.

The music source can be a system-provided audio file, or a custom audio file selected by the group administrator and uploaded to the system.

The music files uploaded by the administrator must be μ-law .wav files that are a maximum of ten minutes in length. The maximum size of this file is 4.6875 MB.

Alternately, the group administrator can also select an external source for the Music On Hold service. In this case, the administrator can select the device providing the audio among the list of authorized devices for the group.

Users can activate and deactivate the music on hold for themselves via the CommPilot portal and via a feature access code. For more information, see section *3.23 Music On Hold*.

3.23.1.3 Call Center

Each call center can define and use its own music source. As for Call Hold and Call Park, the music source for each call center can be the default system, or a custom music source uploaded by the administrator.

The same format requirements apply for the call center Music On Hold; however, the length of the audio file is limited to 5 minutes and its maximum size is 2.4 MB.

3.23.1.4 Department Music On Hold

This functionality allows for separate music on hold audio sources to be configured on a per-department basis.

The per-department audio source is optional, and departments without their own audio source make use of the group-defined audio source by default, as usual.

Once the group administrator allows a department to use its own audio source, this audio source can be configured by the department administrator.

3.24 Outside Access Code

BroadWorks provides the ability to support PBX-dialing transparency or private dialing plans. Using an access code (for example, 9+), BroadWorks can support both a private and public dialing plan simultaneously.

3.24.1 Description

When a user is configured to use an access code (at the system-wide or group level), BroadWorks creates an implicit digit map, which contains a digit map for the extensions in the group, feature access codes, and the outside access code.

BroadWorks sends this implicit map to the user devices and Media Servers to collect digits, as appropriate.

If the outside access code is reported to the Application Server, BroadWorks sends an additional digit map containing the public dialing plan map. This new digit map is used to collect a public number.

3.24.2 Configuration

The access code is configurable on a system-wide and per-group basis. The following attributes are configurable:

- System-wide configurable digit map
- Per-group configurable digit map
- System-wide access code
- Per-group access code

Due to the intrinsic nature of protocols, only MGCP device digit maps can be dynamically updated to use outside access codes. SIP access devices support outside access codes but their digit map is configured as part of a separate process.

3.25 Resource Inventory Reporting

This service allows a group administrator to generate a report on the resources used in the group and in each department.

3.25.1 Description

This capability allows a group administrator to generate reports on the resources used in the group and in each department, and can select the information to be reported. The report is generated dynamically when an administrator submits a request. The report is sent by e-mail to the account provided on the *Inventory Report* page as an ASCII attachment file and is displayed in separate window in ASCII comma-separated value (CSV) format. The resources reported include:

- Phone numbers
- Devices
- Users and departments
- Services

Reports are displayed on a *web* page in CSV format, which can be exported easily to a spreadsheet for sorting and archiving.

3.25.2 Configuration

To configure inventory reports, the group administrator provides the e-mail address where the report is to be sent, and checks or selects the options for report generation to be included in the report. The following options are offered:

- Users
- Services
- Devices
- Phone numbers
- Department

The group administrator submits the form by clicking the **View** button. The report is generated dynamically and is sent in ASCII CSV format to the specified e-mail address. Also, a window pops up and displays the Resource Inventory Report in ASCII CSV format.

3.26 Series Completion

The Series Completion service is used to create an ordered list of users, and when a call attempts to terminate on one of these users and finds a busy condition, the call overflows to the next user on the list, until a free user is found or the end of the list is reached.

3.26.1 Description

The Series Completion service provides a special hunting capability that is well suited to support a key telephone system (KTS).

Unlike hunt groups that use separate phone numbers, all calls trigger the hunting capability. Series Completion is initiated for any call terminating on a member of the series completion group. Hence, a Series Completion group can be viewed as a call forward busy chain, among selected members of a group.

In a scenario where a customer uses a key telephone system as customer premises equipment, the key telephone system lines can be placed in a Series Completion arrangement to allow incoming calls to any line (or key) to hunt for the next idle line.

3.26.2 Configuration

The administrator configures the Series Completion service through the CommPilot Group web portal. The *configuration* page allows the administrator to enter the ordered list of users, making up the series completion group.

The following figure shows a typical BroadWorks configuration supporting a three-line key telephone system.

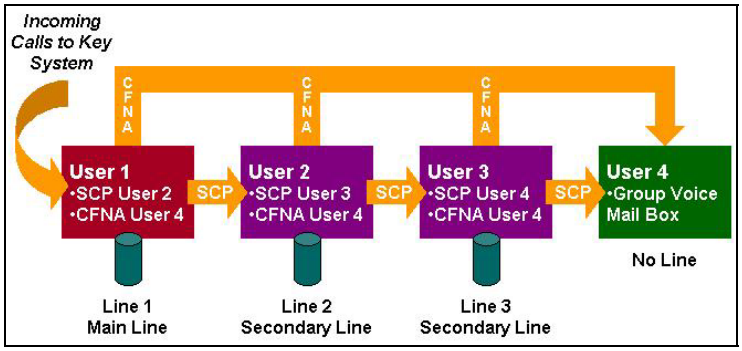

Figure 12 BroadWorks Configuration for a Three-Line KTS

When using Series Completion to support a key telephone system, other complementary services can also be assigned to users in the Series Completion list, since Series Completion uses user services, unlike Hunt Groups.

3.27 Service Scripts Group

The Service Scripts Group service provides group administrators with the ability to set a Call Processing Language (CPL) script for use with all user accounts in the group.

3.27.1 Description

Groups with the Service Scripts Group service assigned and activated may have a CPL script specified for the system to use when processing calls for user accounts in the group. Group administrators can upload scripts from local files or from URLs.

Scripts specified for individual users with the related Service Scripts User service take precedence over any specified for the group using the Service Scripts Group service.

3.27.2 Configuration

Group administrators can configure the script to be applied to all user accounts in the group using the web portal. Administrators of groups with the service assigned and activated will see a Service Scripts choice in the Options list. This link brings the administrator to the *Service Scripts menu* page, offering access to the service scripts *Configuration* page, *Load* page, and *Logs* page.

- The service scripts *Configuration* page allows administrators to view the source of the script to be used, and to enable or disable the service.
- The *Load* page allows administrators to upload a script from a local file or a URL.
- The *Logs* page allows administrators to view any log messages generated by the active service script.

4 Messaging

4.1 Fax Messaging

The Fax Messaging service is an add-on to the Voice Messaging service that allows users to retrieve and manage fax messages from their voice mailboxes and/or e-mail accounts.

4.1.1 Description

Fax messages in the voice mailbox are treated similarly to voice and video messages; users can listen to the headers or envelope of a message (the calling number, the date and time it was recorded, and the number of pages), delete the message, or forward the message to another mailbox. The user may also print the fax message by forwarding to a phone number terminating at a fax device.

Fax messages sent by e-mail are converted to the TIFF image format and attached to the e-mail, similar to voice and video messages.

Notifications of new fax messages, like new audio and video messages, are sent to the Message Waiting Indicator of the user's phone if the phone supports MWI, and to the user's e-mail account if the user has enabled e-mail notification.

4.1.2 Configuration

Users can enable or disable the Fax Messaging service through the web portal. In addition, the settings defined on the *Voice Management* page for configuring the behavior of the Voice Messaging service – for example, e-mail notification and forwarding settings – will also govern fax messaging.

Administrators use the web portal to set a fax number for each user with the Fax Messaging service enabled. This number is taken from the pool of directory numbers available to the user's group. Once configured as a fax number, this number is unavailable for assignment to any other service or profile. Users may not modify this setting, but may view it using the web portal.

The default state for Fax Messaging is "Off".

4.2 Send to VM Feature Access Code

The Send to Voice Mail (VM) feature access code functionality allows a user to transfer the user's remote party (or parties) to the voice mailbox of any user in the user's group, at anytime during a call, and without using the CommPilot Call Manager. The target mailbox may be the user's own mailbox. The transfer is done by entering a configurable feature access code (FAC) while the remote party is on hold.

4.2.1 Description

This capability can be used when a party is on hold (that is, consultation hold). Then, from a new consultative call, the user dials the Direct Voice Mail Transfer FAC to initiate the transfer. A first-time user is guided by announcements that explain how to transfer the held party to the user's mailbox, or to anyone else's mailbox. Power users have the possibility of dialing through, and to perform the transfer without waiting for the prompts.

With the Direct Voice Mail Transfer functionality, a user can essentially achieve the same transfers to a voice mailbox as possible with the CommPilot Call Manager. The only exception to this is that the user can only do post-answer transfers to voice mail.

4.3 SMDI Message Desk

The SMDI Message Desk service is a user service that is assigned to hunt groups on BroadWorks to support a legacy voice mail system (VMS) over an analog interface. The analog interface consists of a legacy voice mail system phone number and an SMDI interface. For calls terminating on the hunt group, the SMDI Message Desk service sends the following redirecting information about the call to the voice mail system over an analog interface:

- Calling number
- Called number
- Redirection info

This information can be used by the voice mail system to redirect the calling party to the user's mailbox and provide the correct greeting.

4.3.1 Description

This service allows BroadWorks to interface to an external VMS, which is accessed over an analog interface. The analog lines of the legacy VMS are connected to an access gateway hosted by an Application Server. Each analog line is mapped to a user/phone number in BroadWorks and the voice mail server is the number of a hunt group in BroadWorks. An SMDI Message Desk function provides the voice mail server with redirection information for the incoming call.

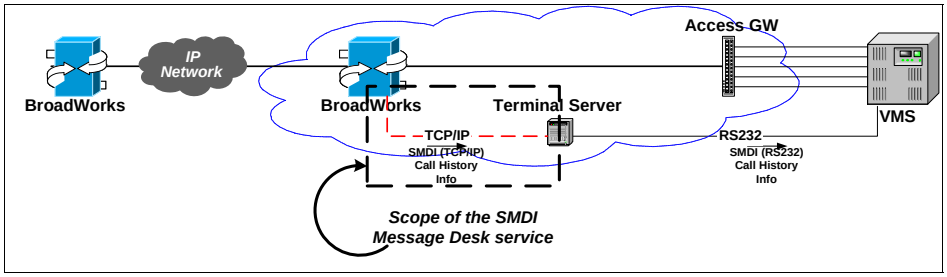

Figure 13 SMDI Message Desk Service

To complete this configuration, BroadWorks hunt groups are enhanced to deliver the SMDI Call History Information that ultimately tells the VMS which analog line has been identified as available by the hunt group and selected to deliver the call to the VMS. The SMDI information is delivered over TCP/IP to a terminal server, that in turn delivers it to the legacy VMS over an RS-232 link.

When the SMDI Message Desk service is enabled, the hunt group behaves as before. In addition, an SMDI message is sent to a terminal server when any call (from the hunt group to a user/device) is alerted.

4.3.1.1 SMDI Message

An SMDI message is composed of fields described in following table:

Field	Description
CR/LF	Carriage return/line feed
MD	Message desk
Message Line Identifier (Seven digits)	A unique message desk number configured for the hunt group. If the extension is longer than four digits, only the last four digits are used. If the extension is less than four digits, it is left-padded with zeros.
Type of Call Indicator (One character)	The reason the call reached the hunt group, whereby: A: Call Forwarded (to the hunt group) Always B: Call Forwarded (to the hunt group) on Busy Condition D: Direct Call was made to the hunt group N: Call Forwarded (to the hunt group) on No-Answer U: Call Forwarded, reason not available. This includes calls forwarded by Selective Call Forwarding
Forwarding DN (10 digits)	The last redirecting number. This field is skipped whenever the Type of Call Indicator is “D”. This field has 10 digits.
Space	An ASCII space character.
Calling DN (10 digits)	The original calling number. This field has 10 digits. The calling number is included regardless of the presentation indicator.
Space	An ASCII space character.
Presentation Indicator (One character)	The presentation indicator, whereby A is for “allowed” and P is for “private or restricted”.
Space	An ASCII space character.
Calling Name (Zero to 15 characters)	This is the calling name when calling name presentation is allowed. This is “Private” when calling name presentation is restricted. This field is omitted whenever the calling name is not available.
CR/LF	Carriage return/line feed.
CTRL+Y	

4.3.2 Fields with Phone Numbers

For those fields that contain phone numbers, the calling number (or forwarding number) is converted to a 10-digit number as follows:

- When it is a SIP URI (user@host):
  - If the user part contains only digits, those digits are taken, and left-padded (with zeros) or left-stripped (with the right-most part retained) to 10 digits.
  - Otherwise, the number is replaced by a 10-digit sequence of zeros.
- If it is a number, or an extension that is less than 10 digits, it is left-padded to 10 digits with zeros.

- If it is a number, or an extension that is more than 10 digits, it is left-stripped to 10 digits.

4.3.3 Selection of Terminal Server

For a given SMDI Message Desk service, all terminal servers have an equal static priority. Each time an SMDI message is sent out, the list of terminal servers is ordered randomly, and this sequence of terminal servers is used. If the TCP/IP link to the first terminal server is down, the next terminal server on the list is tried, until the SMDI message is successfully sent, or until the list is exhausted. This ensures load balancing between terminal servers, as well as redundancy of the SMDI path between the Application Server and the VMS.

4.3.4 Configuration

The following configuration steps are performed by a group administrator:

- Configures an access gateway for the group.
- Defines a user for each line of the VMS. Each of these users is assigned a line on the access gateway.
- Defines and configures a hunt group. To achieve this, the users, configured to represent each line of the VMS, are added to the list of hunt group members. The phone number given to the hunt group is the voice mail server address as used for the Third-Party Voice Mail Support service. Although this application typically uses the "Regular" hunting policy, all hunting policies, except for "Simultaneous", are supported.
- Assigns the (new) SMDI Message Desk service to the hunt group.
- Configures the service using the *SMDI Message Desk web* page. (This can also be done through the OSS.) Configuration steps are as follows:
  - Enables the service.
  - Assigns a three-digit message desk number. This number is included as a field in the SMDI Call History Messages, and is used by the VMS to uniquely identify the hunt group (within the scope of the service provider). If this mandatory configuration value is not provided, the SMDI Message Desk service cannot be turned on. Providing a message desk number that is less than or more than three digits (specifying a longer one is prevented by the web interface but possible through the OSS) is rejected by the system, with an appropriate error message. There is no validation for uniqueness of the message desk number.
  - Completes a list of terminal servers to which SMDI messages are sent. A terminal server is defined by a name, IP address, and port, and each of these fields is mandatory. If the list of terminal servers is empty, an alarm is generated during call processing. This alarm is different from those generated when all terminal servers are unreachable or fail to receive a given SMDI message.
- Configures Third-Party Voice Mail Support service to use the phone number of the newly created hunt group as the voice mail server address. Additional configuration of Third-Party Voice Mail Support service may be required.

4.4 Third-Party Voice Mail Support

The Third-Party Voice Mail Support service facilitates the support and integration of an external voice mail platform. This capability is required to deploy BroadWorks with a third-party voice mail platform, while retaining the integration of voice mail with other BroadWorks services.

4.4.1 Description

This feature allows forwarding of busy and/or unanswered calls to an external voice messaging platform.

- The destination can be a phone number or a URL.
- The destination is configured at the group level.
- It allows configuration, at the user level, of the user-part of the Diversion Header.
- It has the least level of precedence, which means that Call Forwarding services and Voice Messaging services have precedence.

4.4.1.1 Message Deposit

Incoming calls that reach a busy or no-answer condition are redirected to the third-party messaging server configured for the group.

Users can also redirect an incoming call to a third-party messaging system through the **Send to VM** button of the CommPilot Call Manager.

The address of the mailbox where the caller is redirected is determined by the *Custom Mailbox ID* configured for the user.

Once the call is answered by the third-party messaging system, the call control is handed off to the messaging system for further processing.

4.4.1.2 Message Retrieval

Users of the Third-Party Voice Mail Support service who are configured to use the external voice mail platform are able to retrieve their voice messages by:

- Pressing the **Messaging** button on their phone (if available),

OR

- Calling their own number from their phone.

In addition, users of the Third-Party Voice Mail Support service are always able to retrieve their voice messages by:

- Calling the external voice mail platform voice portal number,

OR

- Calling the external voice mail platform voice portal SIP-URL.

In cases 1 and 2, BroadWorks redirects the call to the external voice mail platform, which allows the users to retrieve their messages through the applicable procedure.

4.4.1.3 Interaction with BroadWorks CommPilot Call Manager

For any member of a group who is using this service, the **Send To VM** button of the CommPilot Call Manager is always visible and enabled, and can be used to redirect an active call to the messaging system.

Clicking the **Send To VM** button handles the call as follows:

Content of "Enter Phone Number" input box on CommPilot Call Manager	Outcome
Empty	The call is redirected to the user's mailbox.
Filled	The call is sent to the third-party voice mail platform, if configured for the target user.

4.4.1.4 Interactions with CommPilot Express

CommPilot Express is available to Third-Party Voice Mail subscribers. The *CommPilot Express configuration* page is customized to reflect the dispositions available from an external voice mail system.

4.4.1.5 Incoming Message Waiting Indicator

Incoming message waiting indicators (MWIs) with the customMailboxId of a user are handled by the Third-Party Voice Mail service. In addition, the BroadWorks Application Server is enhanced to process incoming MWIs sent with aliases.

4.4.2 Configuration

Third-Party Voice Mail Support is composed of two levels of configuration:

- At the group level:
  - Set whether or not the service is enabled (active).
  - Set the phone number or URL of the external voice mail platform. This parameter is not visible to a user or group administrator. It is visible and can be modified only by service provider and system administrators.
- At the user level:
  - Set whether or not the service is enabled (active). By default, the service is inactive for assigned users, regardless of the group-level setting.
  - Set whether or not all calls are redirected to the external voice mail platform. The default is "false". This can be set through the web portal or through a configurable feature access code.
  - Set whether or not busy calls are redirected to the external voice mail platform. The default is "true". This can be set through the web portal or through a configurable feature access code.
  - Set whether or not unanswered calls are redirected to the external voice mail platform. The default is "true". This can be set through the web portal or through a configurable feature access code.
  - Set the number of rings before considering a call as being unanswered. This can be set through the web portal or through a configurable feature access code. The default feature access code is *610. Note however, that this setting applies to all services with no-answer handling, that is, the Voice Mail, Call Forwarding No-Answer, and Sequential Ringing services.

- Set the custom mailbox ID to use (as diversion header) when redirecting calls to the external platform. This parameter is not visible to a user or group administrator. It is visible and can only be modified by service provider and system administrators. The customMailboxId can be a phone number, SIP URL, or "empty" (then the value used to fill the diversion header is the E164 phone number of this user, or the E164 number of the group).

4.5 Voice Messaging – Personal

This service enables users to record messages from callers for calls that are not answered within a specified number of rings, or for calls that receive a busy condition.

4.5.1 Description

BroadWorks messaging provides all of the features of a traditional voice messaging solution, plus:

- Message delivery to any specified e-mail account
- Message waiting notification delivered to the phone and to any specified mail or short message service (SMS) account (for example, cell phone)
- Integration of the messaging capabilities with BroadWorks services (Call Back, Transfer, CommPilot Express, escape to extension, voice portal, and so on)
- Integration of hybrid messaging systems within an enterprise
- Administrator and user self-management through a web interface

Further sub-sections provide more details on the capabilities of BroadWorks voice messaging, specifically:

- Message depositing
- Message storage
- Message retrieval
- Message waiting notification

4.5.1.1 Deposit

Incoming calls to the user are sent to voice mail upon reaching a busy or no-answer condition. The caller is then played a greeting. There can be different greetings for busy and no-answer conditions and all greetings can be partially or fully customized by the user:

- Default busy greeting
- Default busy greeting with name
- Custom busy greeting
- Default no-answer greeting
- Default no-answer greeting with name
- Custom no-answer greeting

The caller can then leave a message or press 0 to transfer to an attendant. The attendant is configurable by the user and can be any valid phone number. If the caller leaves a message, he/she has access to the following functions:

- Long message warning tone
- Set the message status to urgent and/or confidential
- Review the message and erase, record it again or deposit it

Users can also configure their voice mail service to serve other phones, such as a cell phone. With this capability, users can forward any phone to the CommPilot voice portal

phone number and have calls sent directly to their mailbox greeting. This functionality is referred to as Voice Messaging Aliasing.

The maximum length for a single voice message is 10 minutes. The maximum number of distribution lists is 15.

The maximum length for a user's personalized name is 10 seconds.

4.5.1.2 Video Support

BroadWorks messaging allows for providing a video greeting to video-enabled callers, and also allows callers to leave video messages for the user.

If users are authorized, they can upload video greetings in addition to audio greetings. Depending on the network condition (busy/no-answer) and the codecs supported by the calling party, the appropriate greeting is selected and played back.

The caller can then leave a message as usual, in audio or video format. Video messages are stored as .mov attachments to e-mails (instead of .wav). Users are notified that a specific message is in video format. In this case, messages can be retrieved via e-mail through the voice portal, but in this case, only the audio portion is played back.

4.5.1.3 Storage

Voice messages are stored on standard e-mail servers (POP3, IMAP4, or Microsoft Exchange Server) as .wav audio files attached to e-mails. The voice messages can be stored on a default mail server (provided by the service provider or corporate server), or the user may elect to have voice messages sent to a private account.

The maximum amount allowed for a mailbox is 900 minutes, which is defined by the Full Mailbox Limit that can be set at the system, group, and user levels.

4.5.1.4 Retrieval

Users can retrieve their e-mails from their location, from a third-party location, or from any standard e-mail client.

When retrieving e-mails from their location, users simply dial the CommPilot voice portal phone number (or extension). The system prompts the users for their passcode. After entering the passcode, the user is informed of the mailbox status (how many urgent, new, expired, and saved messages) and can review the messages through a menu. While reviewing the messages, users can play the envelope, jump to next or previous message, skip ahead, skip back, pause, repeat, erase, save, reply, call back, forward, compose and send to a user or a distribution list.

When retrieving e-mails from an e-mail client, the user simply configures the client to collect e-mail from the e-mail server where the messages are stored. Messages are retrieved as .wav attachments to e-mails and can be listened to with standard audio software. Messages received can be manipulated like any other e-mail (stored, forwarded, replied to, and so on).

4.5.1.5 Message Waiting Notification

When the user receives new messages, they can be notified by standard message waiting indication mechanism (stutter dial tone and message waiting lamp). Users can also request a notification to be e-mailed to a specific location, such as a cell phone, when a voice message is received.

4.5.1.6 Immediate Voice Mail

This service adds the possibility to select 0 (or "None") rings, meaning to immediately apply No-Answer processing.

When the number of rings before No-Answer processing applies is set to 0, and the called party is busy, the busy processing is applied. The only exception to this is for users using a SIP device, and when the phone is off-hook but the user is not yet involved in a call. In such a case, although the phone is off-hook, the No-Answer processing applies, because the Application Server is not aware that the called party is off-hook.

When a user with the Sequential Ringing service enabled receives a call and the number of rings before No-Answer processing applies is set to 0, the base location is not rung, and the service proceeds to the next location.

4.5.2 Configuration

A broad range of configuration options is available to the user. Through the CommPilot voice portal, the user can record new greetings and record a personalized name that is played as part of the default system greeting.

Through the CommPilot Personal web portal, the user configures:

- Whether to forward all calls directly to Voice Messaging (this may also be set using a configurable feature access code)
- Whether to forward calls to Voice Messaging when the user is busy (this may also be set using a configurable feature access code)
- Whether to forward unanswered calls directly to Voice Messaging (this may also be set using a configurable feature access code)
- Greetings to be played
- Server where messages are stored (personal or default mail server)
- Mode of retrieval of voice mails
- Number of rings defining the no-answer condition, which can also be set using a configurable feature access code. The default feature access code is *610. Note however, that this setting applies to all services with no-answer handling, that is, the Third-Party Voice Mail Support, Call Forwarding No-Answer, and Sequential Ringing services
- Alias to allow other phones to use the messaging service
- Pass code to retrieve messages through the CommPilot voice portal
- Activation and deactivation of message waiting indication on the phone
- Activation and configuration of message waiting indication to an e-mail address
- Distribution lists

The CommPilot Personal web portal also allows users to upload wav files from their computer, to be used as greetings or a personalized name.

4.6 Voice Messaging – Group

The Voice Messaging Group service allows the administrator to configure group-wide attributes for the voice mail service.

4.6.1 Description

The Voice Messaging Group service allows the administrator of the group to select attributes of the Voice Messaging service that apply to the whole group:

- **Message aging** – Allows the group administrator to set a maximum duration for the storage of saved messages.
- **Mail servers** – Allows the group administrator to specify a default POP3 mail server for the group.
- **Mailbox sizes** – Allows the group administrator to set a maximum mailbox size for the group.
- **User mailbox settings** – This feature is used by a group administrator to allow or prevent users from configuring their own POP3/IMAP server. While the administrator can always perform configuration changes on behalf of users, the users may or may not be able to do so.

NOTE: These attributes apply only to the users of the group using the default group mail server.

4.6.2 Configuration

The voice messaging group attributes are configured through the CommPilot Group web portal.

4.7 Voice Messaging – Service Provider

The Voice Messaging Service Provider service allows the administrator to configure service provider-wide attributes for the voice mail service.

For customers providing wholesale service, they need to be able to support multiple service providers. The "From" field used when sending an e-mail for message deposit and message notification needs to be set based on the service provider. This feature allows the "From" field to be configurable on a service provider basis instead of a system basis.

4.7.1 Description

This service allows the "From" field to be defined at the service provider/enterprise level. The provisioning at the service provider/enterprise level is similar to the current provisioning supported at the system level.

Voice Messaging uses the "From" field defined at the service provider/enterprise level if one exists. Otherwise, it reverts to the one defined at system level.

4.8 Voice Portal

The voice portal provides an interactive voice response (IVR) application that can be called by members of the group from any phone, to manage their services and voice mailbox, or to change their passcode.

The group administrator can also use the voice portal to record new greetings for a group's Auto Attendants.

As of Release 13, the voice portal has been enhanced to allow users to automatically log in to the voice portal if calling from their own phone or device. This feature adds a new user option *Auto-login to voice portal if calling from own phone*. When set to "yes", then when users call in to the voice portal from their own phone, they are not prompted for a passcode, and instead, immediately access the voice portal menu. When set to "no", then the existing functionality is used and users are prompted for their passcode.

4.8.1 Description

The voice portal provides a convenient way for users to manage their services from any phone. The voice portal allows the users to:

- Log in by dialing the voice portal number or extension, or by dialing a configurable feature access code (default is *62)
- Manage their voice mail box (see section *4.5 Voice Messaging – Personal*):
  - Retrieve messages
  - Compose, forward, or reply to messages
  - Change greetings
- Activate, deactivate, and program their Call Forwarding Always service (see section *2.7.2 Configuration*)
- Select a CommPilot Express profile (see section *2.30 CommPilot Express*)
- Record a personalized name for an Auto Attendant and standard voice mail greetings
- Modify passcode
- Record Auto Attendant greetings (group administrator only)
- Make an external call

To access the voice portal menu, users must dial either the number of their group voice portal or a configurable feature access code.

Each user can enable or disable auto-login to the voice portal. When the voice portal auto-login option is disabled, the login behavior remains unchanged. When enabled, all scenarios where the system recognizes the calling user (and would usually prompt immediately for a password rather than for an ID), result in an automatic authentication, and the password collection phase is skipped. Examples of automatically logging in to the voice portal are as follows:

- BroadWorks users call the system voice portal number from their own phone
- BroadWorks users call their group voice portal number from their own phone
- BroadWorks users call themselves from their own phone (the entry point is the VMR main menu).

Upon connecting to the voice portal, users are optionally played a branding announcement, followed by a prompt for their number and passcode[13]. Upon successfully authentication, users are presented with the main menu that offers the options described earlier[14].

Users can then select the desired option from the main menu and navigate through the menus by pressing the corresponding DTMF keys on their phone.

All options offered by the voice portal service allow users to revert back to the main menu, so multiple options can be selected during the same session.

4.8.1.1 Voice Portal Wizard

The voice portal wizard is optionally assigned to groups, and assists users the first time they log into the voice portal.

Upon logging in, users are guided through the following steps:

- Change passcode from the default one (or after an administrator has reset it)
- Record personalized name

When the voice portal wizard is active for a group, all users must go through the wizard before they can use the voice portal for the first time.

4.8.1.2 Passcode Rules

This feature enhances voice portal security by providing a set of rules to minimize voice portal access by unauthorized parties.

A system level default voice portal passcode rule is defined. When the service provider/enterprise has Voice Messaging Group service authorized, the default passcode rule is applied. Only the system administrator can change the system default passcode rule.

Each service provider however, can override the system default passcode rules. This modified set of rules is then used as the default rules for the groups within the service provider/enterprise. The group has the rule applied when the Voice Messaging Group service is authorized.

The voice portal passcode rules can also be overridden for each group, and ultimately define the rules that apply to all users of the group.

The passcode rules are described below and apply each time users change their passcode.

Passcode Aging

When enabled, this rule starts a timer when the user changes his or her passcode. The change can be performed via the CommPilot web portal or the voice portal.

When the timer expires, users are requested to select a new passcode before they are granted access to their voice portal (via a wizard-like IVR). The user hears “Your passcode is expired; Please enter a new one now to get access to the voice portal. Please enter the new passcode, followed by # sign.” announcement.

The new passcode can be selected via the CommPilot web portal or the voice portal.

[13] When users call their voice portal from their own phone or from a phone for which they define a Voice Messaging alias, they are only prompted to enter their passcode if they have activated the auto-login option.
[14] The voice portal presents only the options corresponding to the services assigned to the user. If a user is not subscribed to a service offered by the voice portal, the option is not offered as part of the menu.

The administrator can configure the duration of the timer.

Passcode Rules

Users have to select a passcode that follows the rules defined by the administrator; otherwise their new passcode is rejected, and they have to choose a new one.

The following rules are defined. Each rule can be enabled and disabled independently:

- **Passcode length** – By default, the length of the passcode must be between 4 and 8 digits. When enabled, this rule allows for setting these boundaries to other values.
- **Trivial passcode** – When enabled, this rule rejects passcodes that are considered trivial:
  - Repeated digits (for example, 11111, or 22222)
  - The user's own extension or phone number
  - The user's own extension or phone number reversed
- **Repeated passcode** – When enabled, this rule rejects the passcode that is the same as the previous passcode or a reversal of the previous passcode. This only applies when the user logs in. It does not take effect when the administrator modifies the user's passcode.

Passcode Lockout

This feature locks out a user voice portal access after N unsuccessful log in attempts in a row. Upon locking out a user account, an e-mail is sent to the group administrator with the user ID, the time of the unsuccessful attempt, and the Caller ID of the party for the last unsuccessful attempt.

When locked out, a user voice portal account must be reset by the group administrator via the user's *Passcode Reset* page before it can be used again. If the user tries to log in when the account is locked out, he/she hears the message "Your voice portal access is locked out. Please contact your group administrator to reset the passcode. This operation can not be completed at this time. Please hang up and try again later." announcement.

The group administrator can configure the value of *N*.

4.8.1.3 Enterprise Voice Portal

As of BroadWorks Release 11, the system administrator could set the scope of the voice portal for the whole system, between:

- **Group level** – In this mode, any voice portal in the system serves only users of the group it belongs to.
- **System level** – In this mode, any voice portal in the system has the capability of redirecting any caller to the voice portal of their own group. In other words, under this mode of operation, all voice portals in the system work in a cooperative mode.

In Release 12, the voice portal is enhanced to add more flexibility, by adding a new mode:

- **Service provider/enterprise level** – In this mode, voice portals defined in groups of a same enterprise act cooperatively, by redirecting users of the same service provider/enterprise to the voice portal of their own group, but they do not cooperate with voice portals defined outside the scope of the service provider/enterprise.

Another enhancement that is part of the same activity consists in enhancing the voice portal messaging capabilities, such that where users used to be identified by their

extension, now they will also be identifiable by (location code + extension). This affects log in to the voice portal, compose/forward/reply, and also extends to distribution lists. Note that for users who are not part of an enterprise, the voice portal only supports phone numbers as a user identifier.

Finally, the "Send to whole group" is optional. For the voice portal scope, for a system or service provider/enterprise, this option is unavailable and hidden at configuration, whereas when voice portal scope is group, the option is available (can be turned on/off) and is configurable at the group level.

Scope of Voice Portal

The scope of any voice portal depends on the following configuration values:

Voice Portal Scope at System Level	Voice Portal Scope at Enterprise or Service Provider Level	Behavior
System	Not configurable	Voice portal cooperates with any other voice portal in the system. Equivalent to (Scope of Voice Portal = System) of Release 11.
Configurable at enterprise or service provider level	Enterprise or service provider	Voice portal cooperates with any other voice portal that is defined in a group that belongs to the same enterprise.
	Group	Voice portal does not cooperate with any other voice portal in the system. Equivalent to (Scope of Voice Portal = Group) of Release 11.

When the voice portal scope is set to "system" at the system level, the configuration value for voice portal scope at the enterprise level remains unchanged; it is only shadowed (made invisible and inapplicable) by the fact that the system administrator has set it to "system".

Log in with Location Code + Extension

The login to the voice portal now supports (location code + extension) for users who are part of an enterprise. This does not affect the ability for a given user to login through a given voice portal; it only provides a new way of login. This ability to login using location code + extension applies only when done in the context of a same enterprise.

Location code + Extension to Identify Destinations of Message Compose and Forward, and Distribution Lists

When sending a composed message, or forwarding a received message, destinations used to be identified by either an extension or a national number. The option to identify them using (location code + extension) is added. This also applies to pre-configured destinations stored in distribution lists.

In either case, the destinations are to be reached (receive the composed or forwarded message) only if they belong to the applicable scope of voice portal (system, enterprise, or group). Again, this ability to log in using location code + extension, applies only when done in the context of a same enterprise.

Option to "Send to Entire Group" for Message Compose and Forward

The "Send to Entire Group" option of Message Compose and Forward is to remain disabled (and not configurable) where the voice portal scope is larger than the group.

Otherwise it would become configurable. It is to be configured directly in the *configuration* page of the voice portal.

Availability of the "Send to Entire Group" option of Message Compose and Forward:

Release	Voice Portal Scope		
	System	**Enterprise or Service Provider**	**Group**
Release 11	Not available	---	Available
Release 12	Not available	Not available	Optional, configurable

When disabled, the option is simply not voiced to a user of the voice portal, and pressing the matching key (typically 4, although now configurable at the system level) results in an error message ("this key is not valid"), followed by a replay of the options, similar to pressing any other invalid key.

Redirection Mechanism between Voice Portals and Management of Direct Inward Numbers that can be Dialed

For the only configuration where the voice portal scope is enterprise, the redirection mechanism is to refer to voice portals by (location code + extension), instead of by an direct inward number that can be dialed, when no direct inward number that can be dialed is assigned to a voice portal. This is possible within the scope of an enterprise, as in this context it can be assumed that there is a dial plan, configured at the Network Server, which allows reachability between locations by dialing (location code + extension).

Redirection mechanism between voice portals:

Release	Voice Portal Scope		
	System	**Enterprise or Service Provider**	**Group**
Release 11	Redirection implies usage of a DID number. Each voice portal must have a DID number.	---	Not applicable. Voice portal can have a DID number and/or an extension.
Release 12		Enterprise: Redirection is done using 1) DID, if present, 2) (location code + extension). Any voice portal can have a DID number, or only an extension. Service Provider: Redirection implies usage of a DID number. Each voice portal needs to have a DID number.	

4.8.1.4 Voice Portal Calling

This feature allows an authenticated user to originate calls from the voice portal. This feature is particularly useful for traveling users that already access the voice portal to retrieve voice messages and configure services. Traveling users typically access the voice portal using a toll-free number and this feature allows them to originate calls that eventually get charged against their account. For similar reasons, this feature can be useful for the employee working at home who needs to make long-distance or international calls on behalf of the company. Dialing in to the voice portal first allows the subsequent long distance call to be charged to the company instead of the user's home line.

The default state for Voice Portal Calling is “On”.

Once the voice portal authenticates the user, the user makes calls as if they were originated from their normal location. This means that services such as OCP, account/auth code, and voice VPN will apply on the outgoing calls made from the voice portal. This also means that accounting records will be generated against the user’s account.

The user can make as many calls as desired. The user can either wait for the remote party to hang up, or hit an escape sequence to originate a new call from the voice portal.

4.8.1.5 Voice Portal Customization

This feature allows the system administrator to customize the prompts and the keys that can be used to navigate through the menus.

For each menu and submenu of the voice portal, the association of keys to actions (choices of each menu) is to be made configurable. The following are excluded:

- Voice Mail Deposit Menu and submenus
- Voice Portal Admin Menu and submenus
- Voice Portal Wizard Menu and submenus

Only the system provider administrator is allowed to change the system-wide configuration of keys for all the voice portals in the system.

When choosing a key for a menu option, the system provides the list of valid free keys from which a key can be selected. Some key values may not be listed if the Application Server has these keys reserved for non-configurable purposes. For instance, in the “send to distribution list” menu, keys 0 to 9 are reserved as identifiers for distribution lists. Therefore, to avoid any clash, these values for keys cannot be selected for actions in this menu. For example, “Repeat menu” cannot be assigned key 3; it can only be assigned * or #).

The key is either one digit (0-9), *, or # (or “none” when choosing to disable an optional menu option), except for the prompt to initiate a new call when using VP calling (currently set to “##”), in which case the selection is made of a sequence of two to three keys, where the inter-digit timeout cannot be configured (set to one second).

The concept of “any key”, “remaining keys”, or “choice between x keys” is not supported for a menu option. For example, a menu action cannot be configured as being triggered by any keypad key (0-9, *, #), any key not used in a menu (1, 4, 9, and #, assuming these are not yet assigned to any other option in the menu), or a set of keys (“Repeat menu” is * or #).

Prompts

The system introduces new announcements, with one announcement per menu option, and one announcement per key value. So for most languages, prompts are automatically constructed to list the options and their matching keys. For languages that do not follow the “For this menu action, …” + “… press 5” way of building sentences, a change in the customization of the VP keys also requires a re-recording of these new announcements. This means that the Application Server builds a menu option prompt by playing the new announcement introduced by this feature and by automatically appending the appropriate announcement that voices the key number (by appropriate, we mean here the key that maps to the menu option as configured on the new *web* page).

This feature does not modify the order in which menu options are voiced, regardless of the key configuration chosen, although optional menu options not selected, are skipped. So

menu options continue to be voiced in the order in which they are currently voiced for Release 11.

Extended Availability of Options

With this feature, some sub-menu options are now offered from more than one menu. For example, the option "reply to a voice message" is now offered from the "Play Messages" menu and from the "Message Handling Options" menu. This way, it is possible to customize the menus such that it is possible to reach the "reply" option directly from the "Play Messages" menu only, from the "Message Handling Options" menu only, from both menus, or from none.

Not all options are available from any menu; only the relevant options are presented in each menu. Without allowing complete re-organization and dynamic definitions of new menus, this allows for some flexibility on how menus are structured.

4.8.2 Configuration

The group administrator configures the voice portal through the CommPilot Group web portal. The following parameters can be configured:

- Activate/deactivate the voice portal
- Assign a phone number to the voice portal
- Assign an extension to the voice portal
- Assign an administrator passcode to the voice portal
- Activate/deactivate the voice portal wizard
- Activate/deactivate voice portal log in using phone numbers or Voice Messaging Aliases (in addition to an extension)

The voice portal is service-aware, and only offers menu options that are available via the user services.

Furthermore, the following configuration applies to voice portal customization:

```
For each menu, the mapping between the available options and their assigned keys:
option  ← →  key

option: Any option available under a given menu(for example, change a greeting,
enter a submenu, return to previous menu, and so on).

key: 1, 2, … ,9, 0, *, #
```

In a given menu, each option is defined as being either mandatory or optional. A mandatory option has to be assigned a key. An optional option can be assigned a key, but it can also have no key associated to it.

4.8.3 Residential Voice Portal

This feature is used to create a voice portal that spans all groups in a service provider without requiring a public phone number for each group voice portal. In addition, a user can be configured to use the service provider voice portal or the group voice portal. If a carrier is using the service provider voice portal, a user is assigned a service provider voice mailbox, which is unique for that service provider.

4.8.3.1 Description

Residential deployments are frequently implemented using one group per household and one user per occupant. All these groups are usually under a single service provider. BroadWorks already supports a voice portal with a "service provider" scope. Each group has one voice portal, but when its scope is set to "service provider", a user can dial any of the group voice portals to log in. The user is then silently redirected to the user's actual group voice portal.

So far, this redirection required a full national number (DN), thus consuming one additional DN per group (that is, per household in residential deployments). This enhancement removes this requirement. The redirection is done by using the BroadWorks user ID of the voice portal.

4.8.3.2 Configuration

No configuration is required because the user ID is automatically created when assigning the Voice Messaging Group feature to a group.

5 Administrator Provisioning and Configuration Tools

The following capabilities provide administrators with provisioning and configuration tools.

5.1 Business Trunking

Business Trunking is a service that provides a new framework and introduces the concept of a “Trunk Group” used to serve PBX-type customer premises equipment. This framework provides better support for intelligent customer premises equipment (CPE) such as PBXs, while still allowing BroadWorks services to be offered to CPE users. The trunk group allows for licensing a maximum number of simultaneous calls that can be handled by a selected group of users, referred to as trunk users.

5.1.1 Description

This framework enhances the BroadWorks data model to introduce the concept of a “Trunk Group” used to serve PBX-type customer premises equipment that share the following characteristics:

- The number of users on the CPE may be greater than the number of users on BroadWorks. Hence, the number of users on BroadWorks does not provide a reliable indication of the system resources consumed by the CPE. (For example, a single BroadWorks user may be mapped to an Auto Attendant on the CPE that covers an unlimited number of CPE users).
- The CPE can pull some services from BroadWorks, such as:
  - Account/Authorization Codes
  - Calling Plans
  - Auto Attendant
  - Hunt Groups
  - Call Centers
  - Series Completion
  - Conferencing
  - Messaging
  - Find-me/Follow-me
- The CPE can pull network services from BroadWorks, such as:
  - Abbreviated dialing
  - Voice VPN
  - Far-End Hop-Off

Hence, to serve these CPE, the BroadWorks data model has been enhanced to provide a licensing model that considers call bandwidth independently of the number of users. It retains its user model to allow for assigning BroadWorks services to CPE users as required.

Deployment Model

In a typical deployment, a group/site hosts zero or more trunk groups serving a large CPE, and zero or more regular users. In this model, user resources are authorized as usual to the group. In addition, one or more trunk group(s) is assigned to the group with the following attributes:

- **Trunk group name** – This is name for the trunk group, which is unique within the group.
- **Call capacity** – This is the maximum number of concurrent calls that can be processed by trunk users in a trunk group. Call capacity can also be configured for incoming and outgoing calls. When the maximum number of calls is reached for a trunk group, or for incoming and outgoing capacities, the call is released with a BUSY release cause for a blocked termination and a FORBIDDEN release for a blocked origination.
- **List of trunk users** – These users are mapped to the CPE, using the trunk as an access method. All calls processed for these users are accounted for by the trunk group call capacity.
- **Trunking device** – This device is the access device that represents the CPE (and which holds the IP address and port information). There can only be one trunking device per trunk group, so all trunk users make use of that trunking device. Any group device can be used for the trunk. Shared devices for a service provider/enterprise can also be used.

5.1.2 Configuration

Call Capacity Allocation

The system provider allocates trunking calls to a service provider and the service provider then distributes those calls to their groups. The service provider and groups have a read-only view of the calls allocated to them.

No license checking is performed during these allocations which is why unlimited is an option.

Trunk Group

The trunk group is added as a virtual user in the system and the web is similar to other virtual users (Auto Attendant, Call Center, and so on). Items specific to the trunk group are the device associated with it, the call capacity for the trunk group and the authentication password.

When modifying the trunk group, the same attributes are shown in addition to a list of group users using the trunk group. If any users are currently using the trunk group, the device selected may not be changed.

User Profile

The trunk group is associated to the user as if it were a device in the *profile* page of the user. The group administrator selects the trunk group and fills in the line port that is displayed based on the rules of the device associated with the trunk group.

5.2 Call Processing Policies

This feature provides explicit control of certain BroadWorks call processing behavior. The policies are configurable in a hierarchal manner. The user policies have the highest precedence and can defer to the associated group policy. The group policies have the next highest precedence and can defer to the associated Service Provider/Enterprise policy. The Service Provider/Enterprise policies have the lowest precedence and are defaulted to the system-wide defaults set on the Application Server.

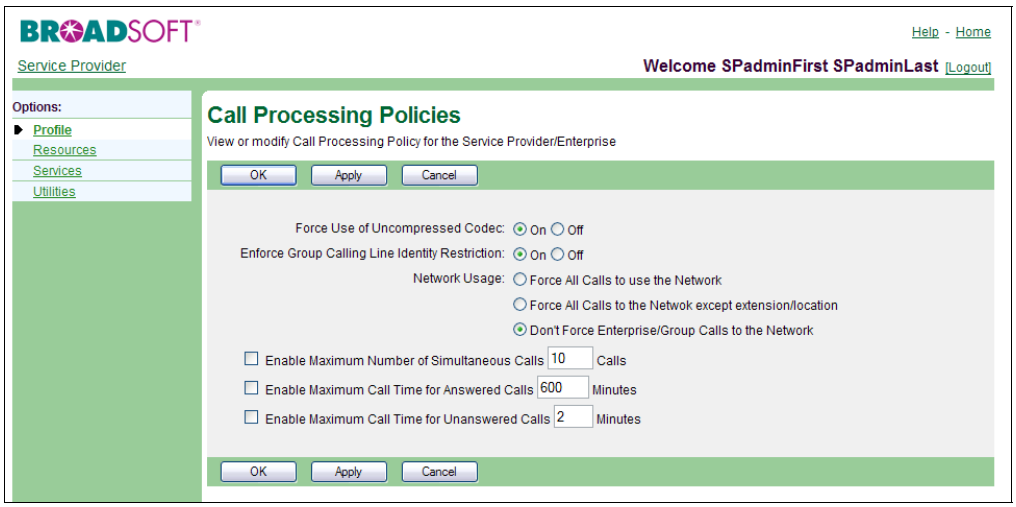

Figure 14 Service Provider – Call Processing Policies

5.2.1 Forced Use of Uncompressed Codec

Fax machines and modems require the use of a clear channel and an uncompressed Codec. This feature allows an administrator to force a user's device to use an uncompressed Codec on a service provider/enterprise, group, and/or user basis.

On a per call basis, the system selects the policy based on the level at which it is configured. The user-level policies have the highest precedence, followed by the group level, the service provider and enterprise levels, and finally the system level.

Therefore, the user policy is used if it is configured and enabled. If it is not, then the group policy is used (if it is configured and enabled). And if the group policy is not used, the service provider/enterprise policy is used (again, if it is configured and enabled).

If none of these policies are enabled, the policies are defaulted to the system-wide defaults sent on the Application Server, the SDP is not manipulated, and the user is able to use any codec supported by the user's device.

5.2.2 Calling Line Identity Restrictions

This feature allows an administrator to specify if calling line identity restrictions are enabled or disabled for a group on a service provider/enterprise or group basis. When incoming calls are received, this feature is checked to determine if calling line identity restrictions are enforced or not for the group.

This feature also allows an administrator to specify if calling line identity restrictions are enabled or disabled for an enterprise on a service provider/enterprise basis. When

incoming calls are received, this feature is checked to determine if calling line identity restrictions are enforced or not for the enterprise.

The group level policy for the group capability is used if it is configured and enabled. If it is not, the service provider/enterprise level policy for the group capability is used (if it is configured and enabled). If neither one of these policies is enabled, the calling line identity restrictions for the group are not enforced for group calls for the user.

5.2.3 Network Usage

This policy allows an administrator to force all calls to route via the network interface on a service provider/enterprise or group basis. With this policy enabled, all calls from a group or enterprise, and optionally even extension dialed and location code + extension dialed are directed to the network interface. A Network Server with Private Dial Plan is required for extension dialed and location code/extension dialed calls to work properly when forced to the network.

This policy has three settings: disabled, force all non-extension or non-location/extension calls to the network, and force all calls to the network.

The group level policy for this capability is used if it is configured and enabled. If it is not, the service provider/enterprise level policy for this capability is used (if it is configured and enabled). If neither one of these policies is enabled, the call is routed internally for group and enterprise calls.

5.2.4 Maximum Number of Simultaneous Calls

This feature allows an administrator to specify the maximum number of simultaneous calls supported on a service provider/enterprise, group, and/or user basis. If a user exceeds the maximum number of simultaneous calls allowed on terminations, the calling party is provided Busy treatment. Busy treatment may include Voice Messaging, Call Forwarding Busy, and any other active service assigned to the subscriber which is invoked on Busy. If the terminating subscriber has no active services assigned which trigger on Busy, Busy tone is provided to the calling party. Note that this feature only counts originating and terminating calls for a subscriber. Redirected calls are not counted as part of this policy.

The user level policy for this capability is used if it is configured and enabled. If it is not, then the group level policy for this capability is used (if it is configured and enabled). And if the group policy is not used, the service provider/enterprise level policy for this capability is used (again, if it is configured and enabled). If none of these policies are enabled, the number of calls for the user is not limited.

5.2.5 Maximum Call Time for Answered Calls

This feature allows an administrator to specify the maximum call time, in minutes, for answered calls on a service provider/enterprise, group, and/or user basis. If a user exceeds the maximum time on a given call, the call is torn down and an abnormal release is indicated within the Call Detail Record.

The user level policy for this capability is used if it is configured and enabled. If it is not, then the group level policy for this capability is used (if it is configured and enabled). And if the group policy is not used, the service provider/enterprise level policy is used (again, if it is configured and enabled). If none of these policies are enabled, the answered call time for a user is not limited.

5.2.6 Maximum Call Time for Unanswered Calls

This feature allows an administrator to specify the maximum call time in minutes for unanswered calls on a service provider/enterprise, group, and/or user basis. If a user exceeds the maximum time on a given call, the call is torn down and the calling party is given reorder tone.

The user level policy for this capability is used if it is configured and enabled. If it is not, the group level policy for this capability is used (if it is configured and enabled). And if the group policy is not used, the service provider/enterprise level policy is used (again, if it is configured and enabled. If none of these policies are enabled, the unanswered call time for a user is not limited.

5.3 Configurable Default Feature Access Codes

This feature adds a service provider level default feature access code (FAC) set. When new groups are created under that service provider, their FAC table is initialized based on the service provider's defaults.

5.3.1 Description

Currently the Application Server supports a default system-wide feature access code setting. Any group that is created within the system has the same default FAC setting.

This feature removes the restriction for a default FAC prefix that applies to each group created in the system. Instead the configurable default feature access code setting allows service providers to be able to set the default FAC services. Service providers assign the default FAC prefix. And any group that is created under that service provider is assigned the default FAC that was created by the service provider. This feature does not change how FAC works. The group administrator still has the privilege to change the assigned default FAC to any other allowed value.

The service provider administrator (or an administrator above), determines both the main and alternate default FAC for any group that is created within their scope.

When configuring the default FAC, the following rules apply:

- An FAC must be 2-5 digits in length.
- Special prefix characters [A, B, C, D, *, #] can only be in the first two digits.
- The last digit must be numeric [0-9].

When services are authorized to a group, a check is made to validate that:

- There are no collisions between FACs and extension numbers within the group.
- There are no collisions between FACs.

In case of collisions, the newly authorized FAC (to the group) is left blank and a warning message is generated in the Application Server log file.

5.3.2 Configuration

The service provider can create default FAC values for various services. These FACs are assigned to groups as default FACs for authorized services.

The group *FAC Configuration* page provides a reset link used to reset the group FAC values back to the default value.

System Default Feature Access Codes

The following table shows the system default feature access codes:

Code	Feature
#8	Automatic Callback Deactivation
*72	Call Forwarding Always Activation
*73	Call Forwarding Always Deactivation
*21	Call Forwarding Always To Voice Mail Activation
#21	Call Forwarding Always To Voice Mail Deactivation

Code	Feature
*90	Call Forwarding Busy Activation
*91	Call Forwarding Busy Deactivation
*40	Call Forwarding Busy To Voice Mail Activation
#40	Call Forwarding Busy To Voice Mail Deactivation
*92	Call Forwarding No Answer Activation
*93	Call Forwarding No Answer Deactivation
*41	Call Forwarding No Answer To Voice Mail Activation
#41	Call Forwarding No Answer To Voice Mail Deactivation
*31	Calling Line ID Delivery Blocking Activation
#31	Calling Line ID Delivery Blocking Deactivation
*67	Calling Line ID Delivery Blocking per Call
*65	Calling Line ID Delivery per Call
*68	Call Park
*88	Call Park Retrieve
*98	Call Pickup
*69	Call Return
*43	Call Waiting Persistent Activation
#43	Call Waiting Persistent Deactivation
*70	Cancel Call Waiting
*99	Clear Voice Message Waiting Indicator
*57	Customer Originated Trace
*97	Directed Call Pickup
*33	Directed Call Pickup with Barge-in
*55	Direct Voice Mail Transfer
*80	Diversion Inhibitor
*78	Do Not Disturb Activation
*79	Do Not Disturb Deactivation
*22	Flash Call Hold
*66	Last Number Redial
*60	Music On Hold Per-Call Deactivation
*610	No Answer Timer
*71	Per-Call Account Code
*50	Push to Talk
*75	Speed Dial 100
*74	Speed Dial 8

Code	Feature
*47	Sustained Authorization Code Activation (calls unlocking)
*37	Sustained Authorization Code Deactivation (calls locking)
*62	Voice Portal Access

5.4 Large Enterprise Support

This activity introduces an Enterprise layer in the BroadWorks provisioning model. This layer allows BroadSoft customer to better model, administer, and manage large multi-site enterprises.

This layer resides in parallel with service providers. Thus, a system administrator can create service providers and/or enterprises. Each is administered separately.

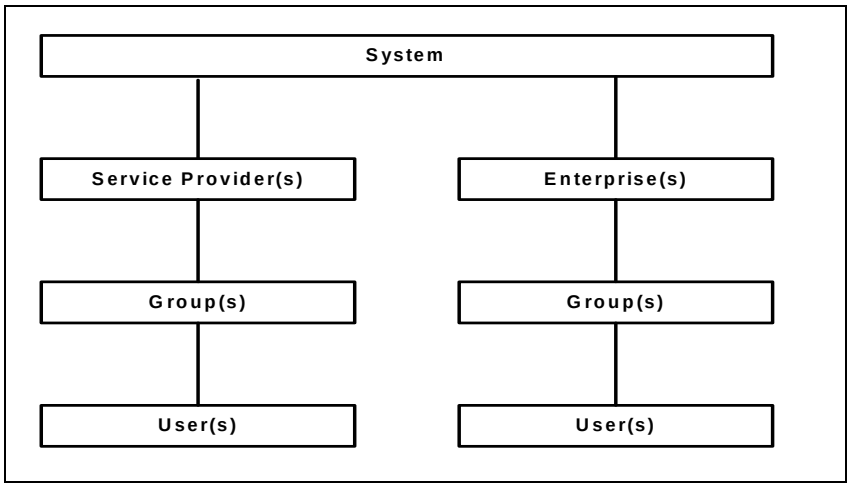

Figure 15 Service Provider and Enterprise Layers

5.4.1 Enterprise

The concept of Enterprises is added to the Application Server. An enterprise should be used when a company has multiple sites or heavily geographically distributed users.

The Application Server models an Enterprise as a specific type of service provider. All the capabilities of the service providers are available to the Enterprise. A system provider now sees a list of service providers and a list of enterprises.

The existing service provider layer remains unchanged.

The web interface is enhanced to exhibit the enterprise at the enterprise, sites, and user levels.

5.4.2 Enterprise Creation Wizard

A new wizard is provided to assist the administrator in creating a new enterprise on the Application Server.

The first step is the creation of the enterprise itself along with the basic enterprise profile:

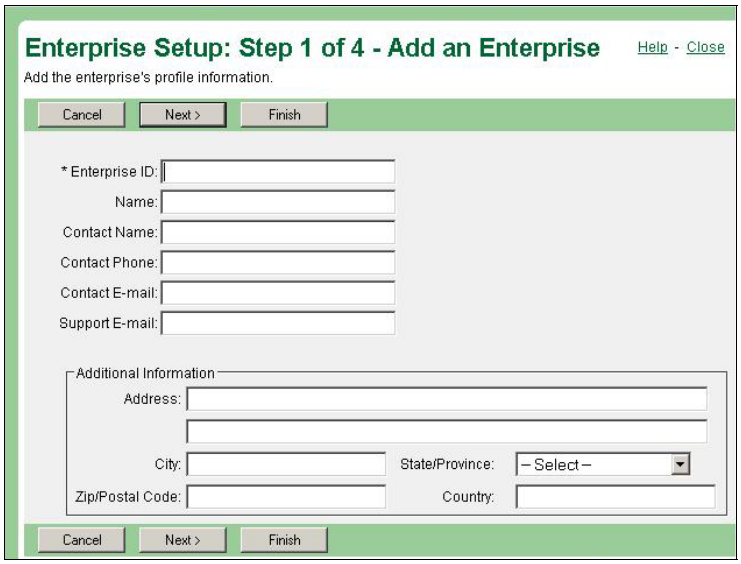

Figure 16 Add Enterprise Wizard – Step 1

The second step is to add administrator(s) to the enterprise. These administrators carry out the daily management tasks related to the enterprise.

One or more administrators can be created in this step.

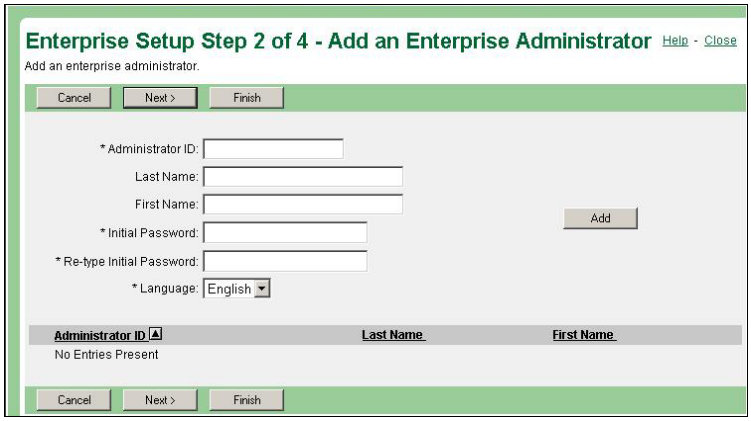

Figure 17 Add Enterprise Wizard – Step 2

The next step is to authorize the services that can be further assigned to the sites making up the enterprise.

Figure 18 Add Enterprise Wizard – Step 3

The last step is to authorize phone numbers and blocks of phone numbers to the enterprise. These phone numbers can be further assigned to the sites and then to the users.

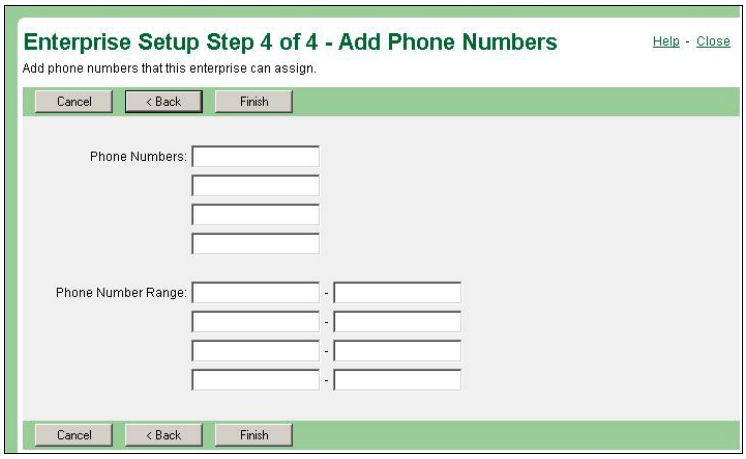

Figure 19 Add Enterprise Wizard – Step 4

5.4.3 Enterprise Private Dialing

This capability allows for creating a private dialing plan shared between the multiple sites making up an enterprise on the Application Server. The enterprise dialing plan allows users of the enterprise to call one another using location codes and extensions instead of full phone numbers.

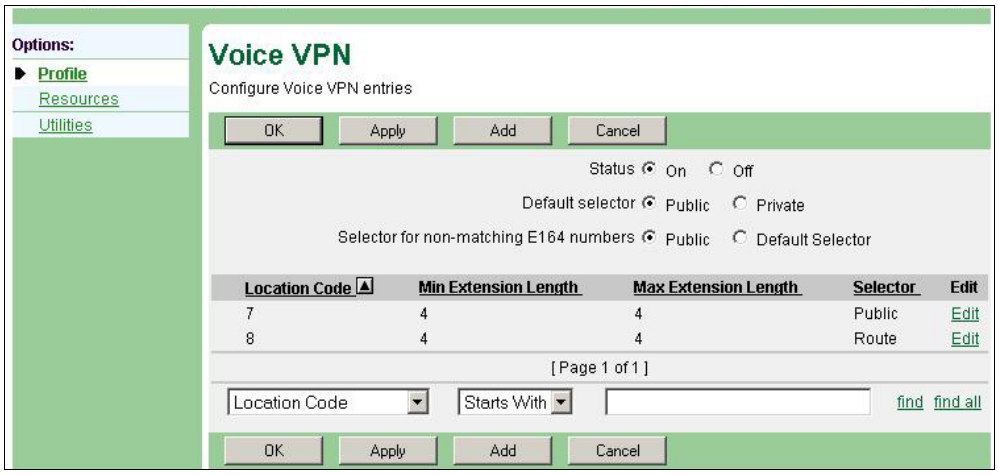

Figure 20 View Voice VPN for Enterprise Page

From the main *Enterprise Voice VPN* page, the administrator can create new voice VPN entries (policies) that will apply to the enterprise.

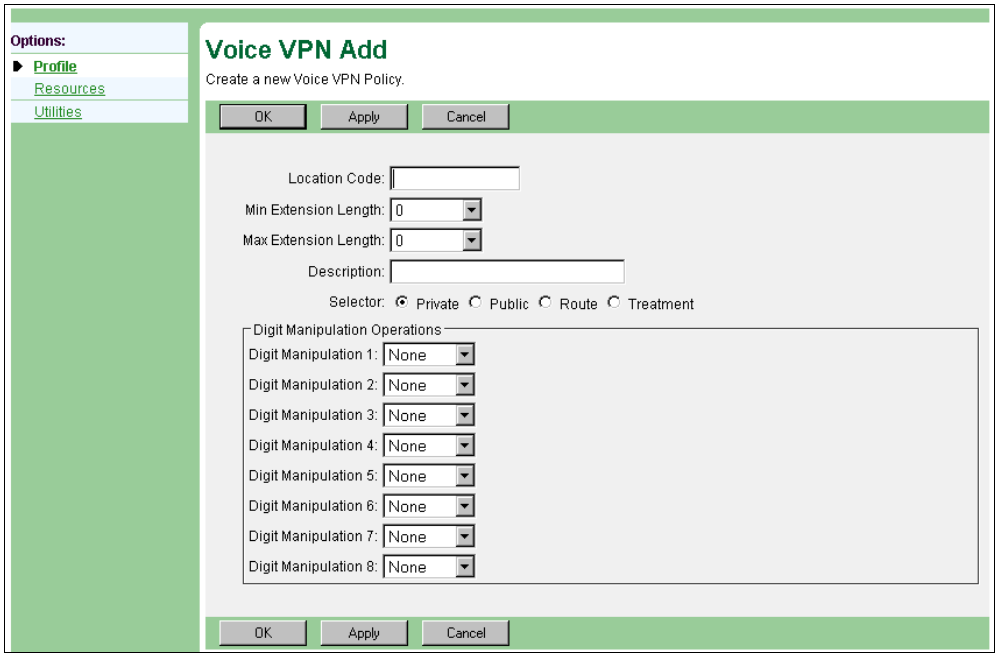

Figure 21 Add Enterprise Voice VPN Policy

When creating the sites (group), the administrator can assign location codes to each group that will be used by enterprise users to make calls between sites, using a private dialing plan and the previously configured VPN policies.

All the enterprise private dialing changes and policies carried out by the administrator on the Application Server are automatically synchronized on the Network Server without requiring the administrator intervention.

It should be noted however, that the Network Server can be accessed directly by the enterprise administrator to provision the enterprise routing policies or to configure

advanced routing policies that are not exposed via the enterprise administrator portal on the Application Server.

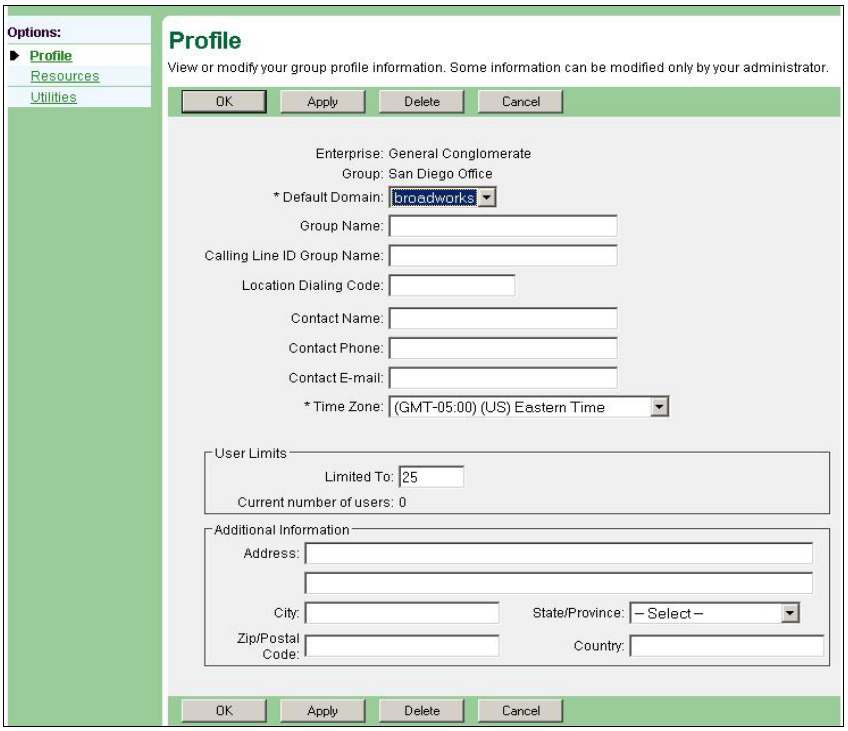

Figure 22 Enterprise Profile Page

5.4.4 Policies for Service Provider and Enterprise Administrators

Policies are added to the service provider (enterprise) administrators in a similar way to how they exist for group administrators today. The following policies are allowed:

Enterprise Profile Access

- Full access to modify an enterprise's profile. This is the default, which is the same as it is today.
- Read-only access to an enterprise's profile. The *Enterprise: Profile - Profile* page is read-only.
- No access to enterprise's profile. The *Enterprise: Profile - Profile* is not shown on the Profile menu.

Group Access

- Full access to groups. This is the default, which is the same as it is today.
- Restricted from adding or removing groups:
  - The **Add** and **Add Enterprise Wizard** buttons on the *Enterprise: Profile - Groups* page are not shown.
  - The **Delete** button on the *Group: Profile - Profile i*s not shown.
- No access to groups. The *Enterprise: Profile - Groups* is not shown on the Profile menu.

Administrator Access

- Full access to add, modify, and delete enterprise administrators. This is the default, which is the same as it is today.
- Read-only access to enterprise administrators. The *Enterprise: Profile - Administrators* is a read-only list.
- No access to enterprise administrators. The *Enterprise: Profile - Administrators* is not shown on the Profile menu.

Device Access

- Full access to devices. This is the default, which is the same as it is today.
- Read-only access to devices:
  - The *Enterprise: Resources - Devices* page is a read-only list.
  - The *Group: Resources - Devices* page is a read-only list.
  - All device assignments are read-only (user profile, shared call appearance, music on hold, and so on)

Domains

- Assignable only – Domains can be assigned to groups and users, but new domains cannot be added and existing ones cannot be deleted.
- Read and write (default) – Domains can be viewed, added, deleted, and modified.

Phone Number Access

- Full access to phone numbers. This is the default, which is the same as it is today.
- Read-only access to phone numbers:
  - *Group: Resources - Assign Numbers* is not shown on the resources menu.
  - All number assignments are read-only. The administrator cannot assign a number to a user or group service.

Service Access

- Full access to assigning resources to the group or users. This is the default, which is the same as it is today.
- Read-only access to service assignments:
  - *Group: Resources - Services* is read-only, which is the same as the group administrator's view.
  - *Group assignment* pages are not shown (*Assign Group Services, New User Services Template, Existing User Services*)
  - *User assignment* pages are not shown (*Assign User Services*)

Service Pack Definition Access

- Full access to add, modify, and delete service packs. This is the default, which is the same as it is today.
- No access to service pack definitions:
  - *Enterprise: Resources - Service Pack* page is hidden.
  - *Enterprise: Utilities - Service Pack Migration* page is hidden.

Web Branding Access

- Full access to web branding. This is the default, which is the same as it is today.
- No access to web branding. The *Enterprise: Utilities - Web Branding* page is hidden.

5.4.5 Priority Alert

The *BroadWorks Priority Alerting* page currently has (within the "Calls From" section), a button that allows the selection of "Any external phone number".

If this option is selected, then all calls received from outside the group, use distinctive ringing – even if the caller is in the same enterprise. This behavior is modified by this enhancement.

If "Any external phone number" is selected, then the user should not receive distinctive ringing for any call originated within its enterprise (even if it is in a different group).

5.4.6 Enterprise-Wide Departments

Managing the users in very large enterprises is enhanced by placing the users into departments.

Departments may be created either at the enterprise level or within a particular group. Departments belong to either the enterprise or the group in which they were created. A hierarchy of departments is supported in such a way that a parent department can have multiple sub-departments. A department created within a group can extend an enterprise department or another department within the same group. A department created within an enterprise cannot extend departments created at the group level.

All the departments that belong to a group must have a unique name within that group. Likewise, all the departments created at the enterprise level must have a unique name within the enterprise. However, it is possible to have duplicate department names in different groups or a department at the enterprise level with the same name as a department at the group level.

Users created within a group may be assigned to any department created at the enterprise level or departments created within the same group. In this way, departments can span across multiple geographic locations.

There are *web* pages to create and modify departments at the enterprise level. The existing *web* pages for managing group departments are changed to allow parent departments. All the *web* pages that display departments are changed to display the full path name of the departments including the parent department(s). In the full path name of the department, each sub-department is delimited from its parent department with a "\" symbol. If a group level department does not extend another group level department, the system automatically suffixes the department name with the group name in parenthesis, for example, Sales\Pre-Sales (Atlanta).

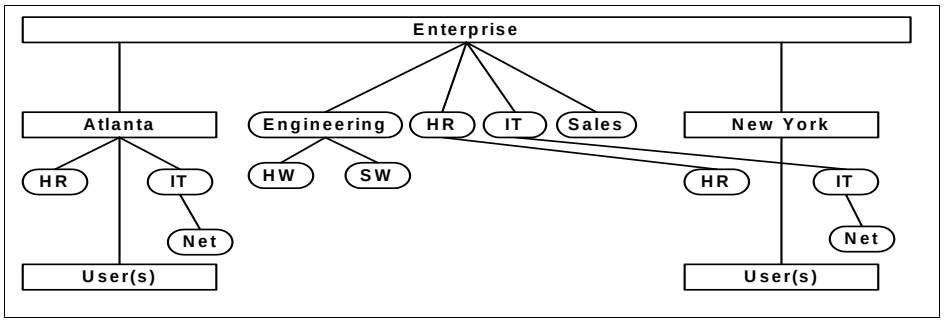

Figure 23 Departments

Departments can be created at the enterprise level or at the group level. A group administrator can extend the enterprise department hierarchy, but cannot create departments at the top-most enterprise level. Users can belong to any department within the enterprise hierarchy unless the department belongs exclusively to another group. In the figure above, we have the following departments:

Department	Description
Engineering	May contain any user
Engineering\HW	May contain any user
Engineering\SW	May contain any user
HR	May contain any user
HR(Atlanta)	May contain Atlanta users only
HR\HR(New York)	May contain New York users only
IT	May contain any user
IT(Atlanta)	May contain Atlanta users only
IT(Atlanta)\Net	May contain Atlanta users only
IT\IT(New York)	May contain New York users only
IT\IT(New York)\Net	May contain New York users only
Sales	May contain any user

Groups within service providers can also have a hierarchy of departments. In this case, all the departments belong to the group, because there is no enterprise, and the system does not insert the group name into the full path name of the departments.

The CLI and OSS are enhanced so that any command that takes a department as a parameter now allows specifying a department defined within the enterprise or a group. In addition, the CLI and OSS responses that include department names now specify the full path name of the departments.

It is not possible to create department administrators for departments defined at the enterprise level.

5.4.7 Enterprise-Wide Group Services

The BroadWorks Large Enterprise framework allows group services, group rules, and dialing rules to be shared across the groups within the enterprise. These services and rules can be broken down into the following categories:

Terminating Services - These services require the ability to route calls to users across the enterprise. They include:

- Call Centers
- Hunt Groups

These services can be configured with agents belonging to different groups in the enterprise.

Rules – These capabilities can be defined by an enterprise, and inherited by all groups, or they can be defined on a group basis. They include:

- Digit Collection rules
- Extension Dialing rules
- Feature access codes
- LDAP configuration
- Password rules
- Voice portal branding

Dialing – These functions allow a user to access other users by dialing their extension (when in the same site) or their location code plus extension (when not in the same site). They include:

- Auto Attendant
- Hoteling
- Push to Talk
- Voice Messaging
- Voice Portal

These enhancements allow these services to be used between users belonging to different groups in the enterprise.

Enterprise Voice Portal and Messaging – For more information, see section *4.8.1.3 Enterprise Voice Portal*.

5.4.8 Enterprise Directories and Usability

5.4.8.1 Enterprise Directories

The enterprise directory is a list of all the assigned phone numbers in the enterprise. It includes users, Auto Attendants, hunt groups, call centers, instant conferences, and voice portal numbers. Each entry in the directory contains the name of the entity with their DN, extension, group, and department. There are new *web* pages at the enterprise, group, and user levels to view and search the enterprise directory.

There are also new web screens to allow the enterprise administrator to define a list of common phone numbers for the enterprise, similar to the existing group common phone list. The enterprise directory also shows the common phone numbers.

Users with the CommPilot Call Manager (CPCM) feature can view the enterprise directory from the CPCM. The CPCM company directory will continue to show the group directory for users within a service provider. The directory will show the enterprise directory for users within an enterprise.

5.4.8.2 Usability Enhancements

Many of the existing *web* pages are redesigned to improve performance or ease of use when managing very large numbers of users, DNs, or devices. The changes are at all levels, that is, system, service provider, group, and user, not necessarily enterprise-related.

The most common change involves presenting a search form prior to displaying a list of search results.

Figure 24 Search Form

The search form allows you to search by multiple search criteria. Clicking the **plus** button adds a new search line. Clicking the **minus** button removes the last search line. The search can be as detailed as required. Clicking the **search** button finds the items matching all the specified search criteria.

5.5 Restricted Administrative Access

This feature adds granularity to the authorization of each administrative level of the CommPilot web portal. Currently, BroadWorks supports a multi-tier authorization scheme including: system administrator, provisioning administrator, service provider, group administrator, department administrator, and user. With this new feature, when a new administrator or user is provisioned, it is possible to set their specific level of control. For example, a group administrator can be created without the ability to add or remove users.

The administrative and user privileges on BroadWorks are currently fixed to allow and disallow certain actions. With this feature, when new users or administrators are created, "access rights" dictate which privileges they have on their *web portal* pages. Access rights can be qualified as "read-only" or "read and write". Read-only access control makes the function available for viewing, but not for modification. Read and write access control makes the function available for both viewing and modification.

5.5.1 System Level Policies – Password Rules

System-level password rules include an option called "System and provisioning administrators; all other administrators and users use external authentication". This option assumes that administrators and users are maintained outside of the system and the following web pages are hidden or modified:

- *Add Administrator (service provider)* – Hidden
- *Modify Administrator (service provider)* – Change password is removed
- *Add Administrator (group)* – Hidden
- *Modify Administrator (group)* – Change password is removed
- *Password Rules (service provider)* – Hidden
- *Password Rules (group)* – Hidden
- *Change Password (department)* – Hidden
- *Add User* – Hidden (button is not shown)
- *Passwords (user)* – Web access is removed

System and provisioning administrators are not affected.

When the option, "System and provisioning administrators; all other administrators and users use external authentication" is chosen, the step to add an administrator is skipped for the *Add Service Provider* and *Add Group* wizards. The step numbers for subsequent pages are updated accordingly.

5.5.2 Provisioning Administration Level Policies

5.5.2.1 Read-Only System or Provisioning Administrators

Read-only administrators at the system level view all the *web* pages as they do today, but are supplied with a modified read-only form that contains a **Cancel** button only.

5.5.2.2 Group Level Policies

Group policies are set by a service provider and determine what and how a group can administer itself. All administrators and users belonging to the group are restricted by these policies.

- **Extension Dialing**

  A group policy setting allows hiding the *extension dialing* page, making the *extension dialing* page read-only, or allowing full access as today. The *extension* page is always full access for service provider administrators.

- **LDAP Integration**

  A group policy setting allows the *Light Weight Directory Access Protocol (LDAP) Directory web* page to be hidden, making the *LDAP directory* page read-only or allowing full access as today. The *LDAP Directory* page is always full access for service provider administrators.

- **Department Administrator User Policy**

  A group policy setting controls department administrator access to users. The choices are:

  - Full access to users in that department.
  - Restricted from adding or removing users; read-only user profile. This means the user profile is read-only and also that the administrator has the user view of the *Alternate Numbers* and *Shared Call Appearance* pages.
  - Restricted from adding or removing users; no access to user profile. This means the user profile is hidden and also that the administrator has the user view of the *Alternate Numbers* and *Shared Call Appearance* pages.
  - No access to users.

- **User Authentication Policy**

The user has a policy that determines if the *Authentication* page is available to them as it is today, is read-only, or it is hidden completely. This applies only to a user and not to an administrator.

- **User Profile Policy**

The group profile setting determines if the *User Profile* page is available to them as it is today, is read only, or it is hidden completely. This applies only to users in the group and not to administrators.

5.5.2.3 Group Administrator Level Policies

Group administrator policies can be modified on the *Administrator Modify* page. When a group administrator is created, the default group administrator policy is applied. It controls access to users, departments, numbers, devices, services, administrators, and the group profile.

- **Group Profile Policy**

  The group administrator has a policy that determines if the *Group Profile* page is available to them as it is today, is read-only, or to hide it completely.

- **User Policy**

  The group administrator has a policy that is used to restrict access to users. There are four choices:

- Full access to users.
- Restricted from adding or removing users; read-only user profile. This means the user profile is read only.
- Restricted from adding or removing users; no access to user profile. This means the user profile is hidden.
- No access to users.

- **Department Policy (Full Access, Restricted, Not Available)**

  The group administrator has a policy that is used to hide the department *web* pages: *List, Add,* and *Modify*, to show only the department list, or operate with full access as is today. In addition, the assignment of departments to numbers is disabled unless the administrator has full access.

- **Numbers Policy (Full Access, Restricted)**

  The group administrator has a policy that is used to restrict them from performing number assignment. "Restricted" has the following changes:

  - The phone number for group services (Auto Attendant, Hunt Group, Call Center, Instant Conferencing, and Voice Messaging Group) is read-only for the administrator. The administrator is able to add these services, but not able to configure a number.
  - The phone number in the add user and *user profile* page is read-only.
  - The phone number in the *alternate numbers* page is read-only.

- **Device Policy (Full Access, Restricted)**

  The group administrator has a policy that is used to restrict them from performing device-related changes. "Restricted" has the following changes:

  - Resources – Devices is a read-only list (cannot add or modify).
  - Call Control – Shared Call Appearance is a read-only list (cannot add or modify).
  - Add User or User Profile has a read-only device section.

- **Service Access Policy (Full Access, Restricted, Not Available)**

  The group administrator has a policy that is used to hide, make read-only, or allow full access to the service configuration of the group and/or users. The following occurs on the different access levels:

  - *Full Access* is the same as is today.
  - *For Read-only*:
    - *Services* page is currently read-only; no changes have been made.
    - Assign Group Services are hidden.
    - Assign Existing Services are hidden.
    - Assign New User Services are hidden.
    - Assign User Services at the user level are hidden.

- **Administrator Policy (Full Access, Read Only, Not Available)**

  The group administrator has a policy that is used to restrict them from seeing the administrator list, allowing them to view only the administrator list, but not add, modify, or delete the list, or having full access as is today.

5.5.3 Policy Defaults

When creating groups or group administrators, a system default policy, which can be pre-configured, is applied. The exception to the default policies is made when other group administrators create group administrators.

5.5.4 Policy Dependencies

Policies have dependencies such that an administrator with limited access cannot create a user or administrator that has more access than they have today. The following dependencies are therefore implemented:

- **Group Administrator Creating Group Administrator**

  When a group administrator creates another group administrator, the policy of the new group administrator is set to the policy of the creating group administrator. The buttons that give access to privileges greater than the creating administrator are disabled.

- **Group Administrator Modifying Group Administrator**

  When a group administrator modifies another group administrator, the following buttons are disabled:

  – All buttons for a policy that the group administrator being edited has greater privileges than the administrator performing the editing.

  – All buttons, for a policy, which are greater than the group administrator performing the editing.

5.5.5 Configuration

See above.

5.6 Service Packs

This activity introduces the concept of packages of user services that can be authorized and assigned as a package of services rather than individual services.

5.6.1 Description

The Service Packs feature allows service providers to group services together as atomic units that can be authorized and assigned according to their marketing strategy. Service packs are managed by service providers and do not impact how system providers authorize services to service providers.

Service packs consist of a name, a description that is visible to group administrators, one-to-many user services, and a quantity of packs. The quantity is the maximum number of a particular service pack that can be deployed to groups. Service packs consume the quantities of individual services given by the system administrator as soon as they are created.

5.6.2 Configuration

Service packs are designed to support different variations of how a service provider packages services. The following service packs configurations are supported:

1) **Exclusive packs** – For this configuration, a service provider creates multiple packs with exclusive services. No two packs include the same services. A low-end user would have a single package of limited services and a high-end user would have multiple packages with each package adding additional services.

2) **Comprehensive packs** – For this configuration, a service provider creates multiple packs with duplicate services. In this strategy a user would always have a single pack. A low-end user would have a low-end pack and a high-end user would have a high-end pack.

3) **Combination packs** – For this configuration, a service provider creates multiple Exclusive User Packs and Comprehensive User Packs. Services in Exclusive User Packs would not exist in any Comprehensive User Packs. This strategy is provided to extend Comprehensive User Packs for "special" services.

4) **Unrestricted packs** – This package combination is supported for upgrading users from an "old" marketing strategy to a "new" marketing strategy. However, it is NOT recommended as a general marketing strategy because it is difficult to maintain.

   This strategy consists of packages that contain the same services that can be assigned to the same user. For example, package A contains service 1, 2, and 3 and package B contains services 2, 3, and 4. When a user is assigned these two packages, they receive the superset of the services, in this case services 1, 2, 3, and 4. The reason to do something like this is to migrate from package A to package B without users losing their configuration data. In this case a user begins with package A. The service provider then adds the new package - package B. The service provider can then remove package A. The user ends up with services 2, 3, and 4 with services 2 and 3 remaining in their original configuration. If package A was removed and then package B was added, the user would have services 2, 3, and 4 with all the services in the default configuration.

Once a service pack is created, services cannot be added or removed. The name, description, and quantities can be modified. All service packs can also be made active or inactive which allows or prevents these packs from being sold to groups that do not yet

have these packs authorized. This allows a service provider to deprecate old marketing schemes.

Service providers authorize and unauthorize a desired quantity of service packs to the group. A service provider can assign as many user packs as desired to a group, including 'unlimited'. They can remove service packs unless service packs are assigned to a user.

Group administrators can assign and un-assign user packs to and from users. The users' available services are the superset of all the services in the packs assigned. When a pack is un-assigned, that service is no longer available to the user and the user loses any configuration data associated with it if the service is not assigned individually or in another pack.

Group administrators are not able to individually distribute services in a service pack. The service pack is treated as a unit and cannot be broken or redistributed.

Individual services can be authorized and assigned as they were before, without using service packs, as well as in addition to using service packs.

5.6.2.1 Service Pack Migration Tools

The Service Pack Migration feature is a powerful tool for service providers to assign and un-assign services and service packs to groups of users.

Before Release 10, BroadWorks did not support service packs, so users were provisioned with individual services. Since service packs are an improved provisioning approach, existing customers will likely want to migrate their users to service packs as soon as possible. While the conversion could be done manually, the Service Pack Migration feature greatly simplifies the process.

The Service Pack Migration feature can bulk-convert large groups of users matching a specified configuration to any new desired configuration. It is possible to assign or remove any combination of services and service packs. Since the process can be time consuming and processor-intensive, the migration tasks should be scheduled for execution during the night when system load is lightest. All of this is possible through an intuitive web-based interface.

Customers who are already using service packs can benefit from the Service Pack Migration feature as well. If a service provider decides to repackage the services into different service packs, the Service Pack Migration feature can be used to migrate users from the old packs to the new packs.

5.7 Shared Devices

This activity allows for assigning devices to service providers. These devices can then be shared between the groups within the scope of the service provider.

5.7.1 Description

This activity allows for sharing access devices across groups, which is especially useful when supporting large access devices. It can also be used to support configurations where BroadWorks is used to provide voice mail for another host system (in which case the "host" system is configured as a shared access device for the purpose of delivering the message waiting indicator notifications).

5.7.2 Configuration

The shared devices are assigned to service providers making them available to all users and groups within the scope of this service provider.

New *configuration* pages are created at the service provider level to configure the shared devices.

Shared devices are accessible by any administrator when assigning a device to a user. The *user* page has a button for shared devices. The shared devices on the *user* page have a drop-down list of all devices available at the service provider level.

5.8 Trunk Bulk Number Provisioning

Trunk Bulk Number Provisioning allows for bulk provisioning ranges of numbers (trunk users) against a trunk group. This feature provides an automated process to add users/lines to existing trunk groups. These lines can be created by using a selected list of phone numbers or ranges of extensions. In addition, the services or service packs to be assigned to these lines can be selected.

Trunk Bulk Number Provisioning consists of two main parts: a web-based interface used to specify the details of the task for creating the users and a user creation task that creates the users as the tasks themselves are created. When the task is complete, a detailed report of the task is available.

The ability to add user creation tasks is available to administrators who have permission to add users, associate users to devices, assign phone numbers/extensions to users, and assign services to users. Viewing/deleting a user creation task is available to all administrators.

5.8.1 Web Interface Task Description

Users can be created based on either directory numbers (DNs) or extensions. If DNs are used, the user ID format, line/port format, and contact format can be specified as either the extension, the national DN (no country code), or the E.164 version of the DN. The domain for the user ID and line/port can be selected from any that are assigned to the group. In this case, the extension can optionally be populated based on the DN and the extension length setting for the group. The contact can optionally be set if the trunk group is on a device that supports static registrations.

If extensions are used, the user ID, line/port, and contact may only be based on the extension. The contact can optionally be set if the trunk group is on a device that supports static registrations. The domain for the user ID and line/port can be selected from any that are assigned to the group.

The department, time zone, and language of the trunk group are used for the users created. The DN or extension is used for the Hiragana first name/last name, if Hiragana support is enabled. The password is either the DN or the extension and the password rules do not prevent the user from being added.

The users created are assigned the services and service packs selected on the page. The list of services and service packs available are determined from those that are authorized to the group. The users created do not receive the services and service packs that are part of the new user template that is set for the group.

Once the user creation task has been created, the task is viewable, but not modifiable until it has completed. After completion, the log file is available and the task can then be deleted.

5.8.2 User Creation Task Description

User creation tasks are run one at a time. There is never more than one task running on a given Application Server. The tasks are only run on the primary Application Server. The tasks run on a first-come first-serve basis. The status of a task is Pending, Executing, or Completed. As the task is running, each user is created along with the assignment of the desired services and service packs, and then there is a small delay of no more than half of a second.

Each user and his or her service assignment is part of a single logical transaction. If for any reason there is an error during the adding of a single user (for example, due to duplicate user ID, DN already in use, or duplicate line/port) or assigning any of the services or service packs to a single user, that user fails. The user creation task continues to attempt to create each user until all of the DNs or extensions allocated have been exhausted.

Each task has two log files that provide details of each user created and the services/service packs assigned. One log file logs the successes and the other logs the failures. The log files are stored in the same base folder as the service pack migration logs. All of the log files are stored in the same directory and are named using the trunk group ID and the task name followed by "success" or "error", thereby providing uniqueness of the file names. These log files are deleted upon deletion of the task. The file is stored in */var/broadworks/userfiles/AuditLogs/_TGUCTaskLogs_/*. The format of the file name is as *trunkgroupuserid_taskname_success.log and trunkgroupuserid_taskname_errors.log*. Trunk group IDs are unique in the system and the task names are unique for a trunk group, thereby ensuring unique file names.

The format of the success log file is as follows:

```
Trunk Group User Creation Success Log File
Service Provider: sp1
Group: gp1
Trunk Group Id: TrunkGroup1
Task Name: TrunkGroup1 Users
Total number of users to create = 6
User ID                 Status
3015551000@broadworks   success
3015551001@broadworks   success
3015551002@broadworks   success
3015551004@broadworks   success
Number of users created = 4
```

The format of the error log file is as follows:

```
Trunk Group User Creation Error Log File
Service Provider: sp1
Group: gp1
Trunk Group Id: TrunkGroup1
Task Name: TrunkGroup1 Users
Total number of users to create = 6
User ID                 Status
3015551003@broadworks   failed, duplicate user id
3015551005@broadworks   failed, DN already in use
Number of users not created = 2
```

If the server is shut down, or stops suddenly, the user creation task is stopped and picks up where it left off when the server restarts.

5.8.3 User Search Criteria

New search criteria have been added to search for users in the system, as to whether or not the users are in a trunk group. This functionality is added at the system, service provider/enterprise, and group level. A new column is added to the results of the search that shows whether or not a user is in a trunk group. If the trunk group search criteria are omitted from the search, then both users that are in a trunk group and not in a trunk group are returned in the response.

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