InfoPlus

SourceBook

"How is my Communication Server configured?"

Produced For

IP Office Server Edition Demo

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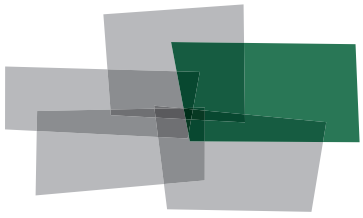

Inventory
Configuration
Performance
Security
Backup

DISCLAIMER

The information contained in this document is based upon data retrieved remotely from a Communication Server. Some of the information presented may be derived, in whole or in part, from this data. Inconsistent and/or incorrect programming of the Communication Server may cause these derivations to be inaccurate. For the sake of consistency in these reports, there may be cases in which a best-effort attempt is made to derive particular information based upon related data in the Communication Server. As the reporting facilities of the Communication Server's hardware and software improve, the enhanced data will lead to more accurate InfoPlus reports. Technical errors encountered during the remote transfer of data from the Communication Server may cause spurious results in the report. Bristol Capital, Inc. does not guarantee the accuracy of the information presented, although reasonable attempts have been and will continue to be made to ensure InfoPlus reports are as accurate as possible.

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Communications Management with InfoPlus

Regardless of the size or type of organization, there are a few basic concerns of every communications manager. InfoPlus services help address those various concerns through an integrated suite of reports and analyses.

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Configuration – This document, the InfoPlus SourceBook, details how a system's software is programmed to meet your organization's needs. The many details of system programming are laid out in understandable formats, including graphics of each set and even each button's feature or line appearance. Commonly needed but difficult to obtain information, such as call routing and Hunt Group behavior, is clearly presented in easily understood reports. The SourceBook is an excellent tool for the day-to-day management and administration of a communications system, ensuring uniformity and adherence to current design policies.

A next logical step in gaining additional control over your telecommunications resources might be an InfoPlus Site Survey. While the SourceBook details the general programming of your unified communications system, the Site Survey is a detailed accounting of each of the major hardware and software components that comprise it. Concise and detailed, the Site Survey not only provides a knowledgebase of purchased resources, it also allows for effective asset management by specifying spare as well as used and total resources available.

Other services* in the InfoPlus suite include:

Inventory – InfoPlus Site Survey
- Inventory of the major unified communications hardware and software components
- Manufacturer Support analysis pinpoints "End-of-Life" and other unsupported equipment
- Access to online database for enterprise customers

Performance – InfoPlus Traffic Study
- Consultative Report, not a "data dump"
- Supported by graphical representation of the "important" data
- Analyzes Networks, Trunks, Consoles and even Processors
- Clear recommendations for improving service

Security – InfoPlus Security Audit
- Detailed, computerized review of the system's programming
- Analyzes all telephony features with security implications
- Each analysis consists of a feature description, the security concerns and recommended changes in programming

Backup – InfoPlus Backup Service
- Off-site backup of your unified communication server's configuration
- Available at any time for restoration through the internet

Please contact your Avaya Partner for additional information about these other InfoPlus services.

* Not all InfoPlus services are available for all communications platforms. Contact your Partner for details.

Table of Contents

Conventions Used in this Document

Throughout this document, icons and stylized text are used to direct the reader's attention to areas of particular value, importance, or concern. Below is an explanation of these conventions for reference:

Introductory and explanatory text will appear in italics. Every section of this document includes introductory text to help explain the content to readers unfamiliar with this report or IP Office. This explanatory text is the same in every report, and can be skipped if the reader is already familiar with the document's general layout and contents.

Sections of the report appearing with this icon provide information that is especially valuable or difficult to analyze manually. The management interface of IP Office is designed to make changes to the configuration quickly and easily, but not necessarily to provide the high-level knowledge required to make those changes correctly. The information presented in this document goes well beyond what a technician could easily gather from the management interface, and provides far greater insight into the overall behavior of the system. Topics that deliver particularly useful information are highlighted with this icon for reference.

Cross-references to other sections of the document appear with a gray underline. When viewing this document electronically, these cross-reference links can be clicked to navigate directly to the related content.

Content displayed in red text indicates some aspect of the configuration appears to be invalid, or not functioning as intended.

Content displayed in gray text indicates some aspect of the configuration that is optional, disabled or unavailable.

Within a table, supplemental information may appear immediately below a row *in gray italics text* to distinguish it from the main content of the row.

Notes and annotations will be indicated with an asterisk* or dagger† symbol, with an explanation immediately following the annotated content.

1. Users and Groups

In an IP Office configuration, 'Users' represent the individuals who receive communication services from the system. Typically, there is a single User record configured for every employee, regardless of whether that individual has a dedicated physical station or not. In addition, special User records may be defined to support specific features within the system, such as a remote dial-up User.

The properties of each User, including which features they may use, can either be configured on a per-User basis, or be applied consistently to multiple Users via a 'User Rights' group. Application of User Rights makes managing a large collection of Users much easier, by defining a relatively small number of profiles to which the Users belong.

A group of Users can also share the responsibility of answering selected incoming calls to the organization. These 'Hunt Groups' receive a unique Extension Number, but calls to that number can be answered by any of the group members, in a highly customizable manner.

This chapter will document and explain the Users, User Rights profiles, and Hunt Groups that are configured in the IP Office system. A high-level view of the Users' access to various features is shown in the 'User Feature Matrix', which summarizes the effects of both User and applicable User Rights settings.

1.1. User Directory

Users in IP Office represent the individuals who are provided communication services by the system. The number of Users defined in the system may be different than the number of physical Extensions when using capabilities like Hot Desking, which allows multiple Users to share the same physical Extension. Most Users have a unique extension number assigned to them, and that extension number follows the User regardless of the station they are using.

In addition, a number of Users are often defined in the system for special purposes such as RAS dial-in access, WAN or Intranet Services, and applying settings to logged-out Extensions. To help differentiate the various types of User records that can appear in the system, each User was classified into one of the following categories based on the given criteria:

- *Normal User – A User that does not fall into one of the following categories, and most likely represents an actual, individual user of the system.*
- *Phantom User – A User record that is created for the sole purpose of unconditionally forwarding a unique Extension Number to another, potentially external, number. Phantom Users often do not represent actual employees, but are rather a programming convenience to define new Extension Numbers that terminate somewhere else.*
- *Special User – A User record that supports a specific function within IP Office, such as a WAN / Intranet Service, Remote Dial-Up Service, or the 'NoUser' record that specifies default settings for logged-out phones. This category includes any User without an Extension Number, any Non-licensed User, and Users associated with non-station equipment such as FAX machines and paging speakers.*
- *Disabled User – A User whose 'Account Status' has been changed to 'Disabled', likely indicating that the User is no longer active within the system.*
- *Default User – A User record that was defined automatically during system initialization for detected hardware, and which has never been fully configured with an individual's name or settings.*

The capabilities of individual Users are controlled partly by the 'User Profile' they're assigned. The 'Basic User' profile is assigned to all Users by default, and provides the essential features necessary for an employee to use IP Office. The use of more advanced features, such as Avaya Softphones and 'Communicator', remote Extensions, and text-to-speech email reading, can be enabled for a particular User by assigning them an appropriate Profile. These advanced Profiles are license-limited, and must be purchased individually for each User you wish to assign.

The table below shows all of the Users that are defined in the IP Office solution, sorted by name. Users classified as anything other than a 'Normal User' have their particular classification listed. In addition, the User's licensed feature Profile and applied User Rights are shown when applicable. If a User is configured as the primary user of any Extension (via the 'Base Extension' property), the type of their station is included. For multi-System networks, the name of the System on which the User is defined is also shown.

User Directory

Name	Extn	Classification	User Profile	User Rights	Phone Type(s)	System
Adam Miller	258		Office Worker	Sales Rights	5610SW	IPO Demo Prim
Alan Moore	253		Office Worker	Sales Rights	9611G	IPO Demo Prim
Amanda Allen-Foster	225		Power User		9504	IPO Demo Exp
Angela Black	267		Basic User	Standard Rights	9611G	IPO Demo Prim
Beatrice Phillips	214		Basic User		<none> (Digital)	IPO Demo Exp
Brad Lee	227		Power User		9504	IPO Demo Exp
Bradley Thompson	231		Office Worker		<none> (Digital)	IPO Demo Exp
Brandon Davis	260		Office Worker	Sales Rights	9611G	IPO Demo Prim
Chad Harris	232		Office Worker	Sales Rights*	9504	IPO Demo Exp
Charles Johnson	264		Office Worker	Sales Rights	<none>	IPO Demo Prim
Charlie Clark	256		Power User	Standard Rights	5610SW	IPO Demo Prim

Name	Extn	Classification	User Profile	User Rights	Phone Type(s)	System
Charlotte Nelson	208		Basic User	Standard Rights	<none> (Digital)	IPO Demo Exp
Clarence Anderson	235		Office Worker	Sales Rights*	5420D	IPO Demo Exp
Claude Walker	266		Basic User	Standard Rights	<none>	IPO Demo Prim
Dean Martinez	257		Power User	Standard Rights*	5610SW	IPO Demo Prim
Diana Hill	204		Power User		1416	IPO Demo Exp
Diane Hernandez	218		Power User		Analog	IPO Demo Exp
Duane Rodriguez	250		Power User	Admin	9611G	IPO Demo Prim
Elaine Gonzalez	254		Basic User	Standard Rights	9611G	IPO Demo Prim
Emma Markson	301		Basic User		9611G	IPO Demo Exp
Extn220	220	Default	Basic User		Analog	IPO Demo Exp
Extn221	221	Default	Basic User		Analog	IPO Demo Exp
Frances Young	219		Power User		Analog	IPO Demo Exp
Francis Martin	230		Office Worker		9504	IPO Demo Exp
Francisco Garcia	259		Power User	Standard Rights*	5610SW	IPO Demo Prim
Frank Williams	263		Office Worker		<none> (SIP)	IPO Demo Prim
Gabriel Bailey	229		Basic User		9504	IPO Demo Exp
Gladys Scott	203		Power User		1416	IPO Demo Exp
Grace Adams	201		Power User	Standard Rights	1416	IPO Demo Exp
Heather King	206		Power User		1416	IPO Demo Exp
Ida Evans	217		Basic User		Analog	IPO Demo Exp
Jean Wright	205		Power User		1416	IPO Demo Exp
Jessica Smith	277		Basic User		<none>	IPO Demo Exp
Joan Lopez	265		Basic User	Standard Rights	<none>	IPO Demo Prim
Joanne Roberts	212		Basic User		9504	IPO Demo Exp
Juan Brown	261		Office Worker	Sales Rights	B179	IPO Demo Prim
Juanita Carter	209		Basic User	Standard Rights	9504	IPO Demo Exp
Lisa Turner	213		Basic User		<none> (Digital)	IPO Demo Exp
Lucy Butler	270		Office Worker		9611G	IPO Demo Prim
Michael Gray	240	Disabled	Basic User		5420D	IPO Demo Exp
Nancy Holmes	302		Basic User		9611G	IPO Demo Exp
Nicole Perry	272		Basic User	Sales Rights	9611G	IPO Demo Prim
NoUser		Special	Basic User		<none>	IPO Demo Exp
Paging Speaker 1	216	Special	Basic User		Analog	IPO Demo Exp
Paging Speaker 2	224	Special	Basic User		Analog	IPO Demo Exp
Pearl Morris	223		Basic User		Analog	IPO Demo Exp
Rebecca Cooper	239		Power User		5420D	IPO Demo Exp
Regina Mills	304		Basic User		9611G	IPO Demo Exp
RemoteManager		Special	Basic User		<none>	IPO Demo Exp
Robert Stone	300		Basic User		9611G	IPO Demo Exp
Robin Howard	251		Basic User	Standard Rights	9611G	IPO Demo Prim
Ruby Cox	238		Basic User		5420D	IPO Demo Exp
Ryan Jones	262		Office Worker	Sales Rights	Unknown SIP	IPO Demo Prim
Sarah Walker	210		Basic User	Standard Rights	9504	IPO Demo Exp
Sean Thomas	207		Power User		1416	IPO Demo Exp

Name	Extn	Classification	User Profile	User Rights	Phone Type(s)	System
Shane Robinson	252		Power User	Admin	9611G	IPO Demo Prim
Shannon Baker	276		Basic User		<none>	IPO Demo Exp
Sharon Hall	226		Power User	Admin	9504	IPO Demo Exp
Shawn Taylor	236		Office Worker	Sales Rights / Standard Rights	5420D	IPO Demo Exp
Stacey Stewart	222		Basic User		Analog	IPO Demo Exp
Stacy Campbell	215		Basic User		Analog	IPO Demo Exp
Stanley Jackson	234		Office Worker	Sales Rights / Standard Rights	5420D	IPO Demo Exp
Steven Wallace	303		Basic User		9611G	IPO Demo Exp
Test User		Special	Basic User		<none>	IPO Demo Sec
Test User 1	275		Basic User		<none>	IPO Demo Exp
Tracy Green	202		Power User	Standard Rights	1416	IPO Demo Exp
Travis White	233		Office Worker	Sales Rights*	5420D	IPO Demo Exp
Total Users: 67						

**__NOTE:__ The User Rights displayed for this User are applied __conditionally__ based on a specific Time Profile. Refer to Section 1.2, "User Rights" to see when these User Rights are applied for each individual User.*

1.2. User Rights

The properties of each User, including which features they may use, can either be configured on a per-User basis, or be applied consistently to multiple Users via a 'User Rights' group. Application of User Rights makes managing a large collection of Users much easier, by defining a relatively small number of groups to which the Users belong.

A User Rights record defines a select subset of all possible User settings to apply. When User Rights are applied to a particular User, the effective properties of the User are a combination of the User's individual settings, and those applied by the User Rights. The User Rights settings either override or merge with the User's settings, depending on the particular feature.

User Rights can be applied to a User either unconditionally, or during a defined time period only. This allows the capabilities of a User to be different during business-hours and off-hours, for example. When using this feature, up to two different User Rights can be assigned to a User – one during a specified time period, and another outside of that time period.

The explanation of each User Rights record configured in the solution is divided into two main parts:

1. *The specific User settings that are applied as part of the User Rights*
2. *The list of Users to which the User Rights are applied (and when, if applicable)*

For multi-System networks, the name of the System on which each User Rights record is defined is also shown. When viewing this document electronically, the Time Profile names link to the profile's detailed documentation later in the report, for easy reference.

One of the more complex features that can be applied via User Rights are custom Short Codes. For a detailed explanation of Short Codes, including the special characters that can be used within their patterns and parameters, refer to Section 5.1, "Feature Short Codes".

The following User Rights are configured in this IP Office solution:

User Rights: Admin

Defined on System: Common to ALL Systems

Applied Settings

The following **User settings are applied** as part of this User Rights group:

- Users **can interrupt / listen to** other Users' calls using applicable Short Codes / button features (can intrude)
- Users' calls **cannot be interrupted or intruded upon** by others
- Users must **manually log in to their own phone** to use it (Force Login enabled)
- Users must **enter a valid Account Code** to make an external call (Force Account Code enabled)
- Users' unanswered calls are **automatically directed to voicemail** (Voicemail on)
- **Call Forwarding** features are **blocked**, including Follow Me, Call Coverage, and Hot Desking

Affected Users

These User Rights are **applied to the following Users**:

User Name	Extension	System	When are User Rights Applied
Duane Rodriguez	250	IPO Demo Prim	Always

User Name	Extension	System	When are User Rights Applied
Shane Robinson	252	IPO Demo Prim	Always
Sharon Hall	226	IPO Demo Exp	Always
Number of Users assigned these User Rights: 3			

User Rights: Phantom Users

Defined on System: IPO Demo Exp

Applied Settings

The following **User settings are applied** as part of this User Rights group:

- The following **Short Codes** are defined:

Short Code	Feature	Feature Parameter	Line Group/ ARS ID	Locale	Force Account Code	Force Authorization Code
*19	Forward Unconditional On		0			
*29	Forward Unconditional Off		0			

- Users' unanswered calls are **automatically directed to voicemail** (Voicemail on)
- **Call Forwarding** features are **blocked**, including Follow Me, Call Coverage, and Hot Desking

Affected Users

These User Rights are **applied to the following Users**:

User Name	Extension	System	When are User Rights Applied
There are no Users assigned to this User Rights group*			

**NOTE:* *If this User Rights group is no longer needed, it should be removed from the configuration to maintain a well-organized system. See the 'User Rights Clean Up' Action Item for a complete list of User Rights with similar issues.*

User Rights: Sales Rights

Defined on System: Common to ALL Systems

Applied Settings

The following **User settings are applied** as part of this User Rights group:

- **Do Not Disturb** is **enabled**

- The following **Short Codes** are defined:

Short Code	Feature	Feature Parameter	Line Group/ ARS ID	Locale	Force Account Code	Force Authorization Code
*10	Do Not Disturb On		0			
*20	Do Not Disturb Off		0			

- **Call Waiting** is **enabled** for Users on phones without appearance buttons
- **Centralized Call Logging** is **disabled**
- Users' unanswered calls are **automatically directed to voicemail** (Voicemail on)

Affected Users

These User Rights are **applied to the following Users**:

User Name	Extension	System	When are User Rights Applied
Adam Miller	258	IPO Demo Prim	Always
Alan Moore	253	IPO Demo Prim	Always
Brandon Davis	260	IPO Demo Prim	Always
Chad Harris	232	IPO Demo Exp	During Time Profile 'Day Shift'
Charles Johnson	264	IPO Demo Prim	Always
Clarence Anderson	235	IPO Demo Exp	During Time Profile 'Day Shift'
Juan Brown	261	IPO Demo Prim	Always
Nicole Perry	272	IPO Demo Prim	Always
Ryan Jones	262	IPO Demo Prim	Always
Shawn Taylor	236	IPO Demo Exp	During Time Profile 'Day Shift'
Stanley Jackson	234	IPO Demo Exp	During Time Profile 'Day Shift'
Travis White	233	IPO Demo Exp	During Time Profile 'Day Shift'
Number of Users assigned these User Rights: 12			

User Rights: Standard Rights

Defined on System: Common to ALL Systems

Applied Settings

The following **User settings are applied** as part of this User Rights group:

- The following **Short Codes** are defined:

Short Code	Feature	Feature Parameter	Line Group/ ARS ID	Locale	Force Account Code	Force Authorization Code
*15	Voicemail On		0			
*25	Voicemail Off		0			

- The following **Feature Buttons** are defined:

Button #	Label	Feature	Parameter(s)
1		Appearance	a=
2		Appearance	b=
3		Appearance	c=
5		Directory	
6		Last Number Redial	

- Users' extensions ring for **10 seconds** before notifying any **Call Coverage Users** ('Individual Coverage' time)

Affected Users

These User Rights are **applied to the following Users**:

User Name	Extension	System	When are User Rights Applied
Angela Black	267	IPO Demo Prim	Always
Charlie Clark	256	IPO Demo Prim	Always
Charlotte Nelson	208	IPO Demo Exp	Always
Claude Walker	266	IPO Demo Prim	Always
Dean Martinez	257	IPO Demo Prim	During Time Profile 'Day Shift'
Elaine Gonzalez	254	IPO Demo Prim	Always
Francisco Garcia	259	IPO Demo Prim	During Time Profile 'Day Shift'
Grace Adams	201	IPO Demo Exp	Always
Joan Lopez	265	IPO Demo Prim	Always
Juanita Carter	209	IPO Demo Exp	Always
Robin Howard	251	IPO Demo Prim	Always
Sarah Walker	210	IPO Demo Exp	Always
Shawn Taylor	236	IPO Demo Exp	**Outside** Time Profile 'Day Shift'
Stanley Jackson	234	IPO Demo Exp	**Outside** Time Profile 'Day Shift'
Tracy Green	202	IPO Demo Exp	Always
Number of Users assigned these User Rights: 15			

User Rights: Test Rights

Defined on System: IPO Demo Prim

Applied Settings

The following **User settings are applied** as part of this User Rights group:

- **Do Not Disturb** is **disabled**

- The following **Short Codes** are defined:

Short Code	Feature	Feature Parameter	Line Group/ ARS ID	Locale	Force Account Code	Force Authorization Code
There are no defined Short Codes associated with these User Rights*						

**__NOTE:__ Applying Short Codes as part of User Rights will not impact Users if there are no Short Codes specified. Either appropriate Short Codes should be added to the User Rights, or 'Not part of User Rights' should be selected on the 'Short Codes' tab. See the 'User Rights Clean Up' Action Item for a complete list of User Rights with similar issues.*

- The following **Feature Buttons** are defined:

Button #	Label	Feature	Parameter(s)
There are no defined Feature Buttons associated with these User Rights*			

**__NOTE:__ Applying Button Programming as part of User Rights will not impact Users if there are no buttons specified. Either appropriate feature buttons should be added to the User Rights, or 'Not part of User Rights' should be selected on the 'Button Programming' tab. See the 'User Rights Clean Up' Action Item for a complete list of User Rights with similar issues.*

- Users' unanswered calls are **automatically directed to voicemail** (Voicemail on)
- When new messages are available, the **voicemail server rings Users' extensions** each time they hang up the phone (Voicemail Ringback enabled)
- **Call Forwarding** features are **blocked**, including Follow Me, Call Coverage, and Hot Desking

Affected Users

These User Rights are **applied to the following Users**:

User Name	Extension	System	When are User Rights Applied
There are no Users assigned to this User Rights group*			

**__NOTE:__ If this User Rights group is no longer needed, it should be removed from the configuration to maintain a well-organized system. See the 'User Rights Clean Up' Action Item for a complete list of User Rights with similar issues.*

1.3. User Feature Matrix

Individual Users can be given access to a wide variety of system features that enhance IP Office's basic communication capabilities. This section will present a high-level view of the Users' access to the most common features, summarizing the effects of both User and applicable User Rights settings. This format allows the reader to answer the questions "Which features are available to a particular User?" and "Which Users can access a particular feature?". For a complete description of each of the features included in this summary, please refer to Avaya's IP Office documentation.

Since User Rights can be applied conditionally based upon a Time Profile, a User's access to a particular feature can change over time. See the following legend for how this is indicated in the report:

✓	the feature is enabled for the specified User
✓*	the feature is available to the User, but may not be enabled 100% of the time due to conditional application of User Rights
✓†	One-X Telecommuter is enabled for the User in addition to One-X Portal ('One-X Portal' column)
I	Internal Twinning is enabled ('Twinning Type' column)
M	Mobile Twinning is enabled ('Twinning Type' column)
-	it could not be determined whether a feature is conditionally available or not

Feature headings shown in gray *are not available on this system, often due to an older software release being used.*

Availability of Common User Features

Name	Voicemail Answers	VM Email	UMS Web Services	Gmail API	Hot Desking	Receptionist	Can Intrude	Can't Be Intruded	Sys. Phone Rights	Dial In Access	one-X Portal	Softphone	Communicator	Mobile VoIP	Remote Worker	Twinning Type	one-X Mobile	Mobile Call Ctrl	Mobile Callback	Agent	Web Self Admin	Web Collaboration
Adam Miller	✓		✓					✓			✓						✓	✓				
Alan Moore	✓							✓			✓		✓		✓		✓	✓			✓	
Amanda Allen-Foster	✓		✓		✓			✓			✓†		✓	✓	✓							
Angela Black	✓							✓														
Beatrice Phillips	✓							✓														
Brad Lee	✓		✓					✓			✓		✓		✓							
Bradley Thompson	✓		✓					✓			✓		✓									
Brandon Davis	✓		✓					✓			✓		✓		✓		✓	✓				
Chad Harris	✓*		✓					✓			✓		✓									
Charles Johnson	✓		✓		✓			✓			✓						✓	✓				
Charlie Clark	✓		✓					✓			✓		✓	✓	✓	I						
Charlotte Nelson	✓																					
Clarence Anderson	✓*		✓					✓			✓		✓									
Claude Walker	✓				✓																	
Dean Martinez	✓		✓		✓			✓			✓†		✓	✓	✓	M	✓					
Diana Hill	✓		✓					✓			✓				✓	M	✓					
Diane Hernandez	✓		✓					✓					✓		✓							

Name	Voicemail Answers	VM Email	UMS Web Services	Gmail API	Hot Desking	Receptionist	Can Intrude	Can't Be Intruded	Sys. Phone Rights	Dial In Access	one-X Portal	Softphone	Communicator	Mobile VoIP	Remote Worker	Twinning Type	one-X Mobile	Mobile Call Ctrl	Mobile Callback	Agent	Web Self Admin	Web Collaboration
Duane Rodriguez	✓		✓		✓		✓	✓			✓†		✓	✓	✓	M	✓	✓	✓			
Elaine Gonzalez	✓																					
Emma Markson	✓							✓														
Extn220	✓							✓														
Extn221	✓							✓														
Frances Young	✓		✓					✓			✓											✓
Francis Martin	✓		✓					✓			✓		✓									
Francisco Garcia	✓		✓		✓			✓			✓†		✓	✓	✓							
Frank Williams	✓		✓					✓			✓						✓	✓				
Gabriel Bailey	✓							✓														
Gladys Scott	✓		✓					✓			✓		✓	✓	✓	M	✓					
Grace Adams	✓		✓		✓	✓		✓			✓†		✓		✓							
Heather King	✓		✓					✓			✓		✓	✓								
Ida Evans	✓							✓														
Jean Wright	✓		✓					✓			✓		✓		✓							✓
Jessica Smith	✓							✓							✓							
Joan Lopez	✓				✓																	
Joanne Roberts	✓																					
Juan Brown	✓		✓					✓			✓					I						
Juanita Carter	✓																					
Lisa Turner	✓							✓														
Lucy Butler	✓		✓					✓			✓		✓		✓							
Michael Gray	✓							✓							✓							
Nancy Holmes	✓							✓														
Nicole Perry	✓							✓														
NoUser								✓														
Paging Speaker 1	✓							✓														
Paging Speaker 2	✓							✓														
Pearl Morris	✓							✓														
Rebecca Cooper	✓		✓		✓			✓			✓†				✓							
Regina Mills	✓							✓														
RemoteManager								✓		✓												
Robert Stone	✓							✓														
Robin Howard	✓					✓																
Ruby Cox	✓							✓							✓							
Ryan Jones	✓		✓					✓			✓						✓	✓				
Sarah Walker	✓																					
Sean Thomas	✓		✓		✓			✓			✓†		✓	✓	✓		✓					
Shane Robinson	✓		✓		✓		✓	✓			✓		✓	✓	✓	M						

Name	Voicemail Answers	VM Email	UMS Web Services	Gmail API	Hot Desking	Receptionist	Can Intrude	Can't Be Intruded	Sys. Phone Rights	Dial In Access	one-X Portal	Softphone	Communicator	Mobile VoIP	Remote Worker	Twinning Type	one-X Mobile	Mobile Call Ctrl	Mobile Callback	Agent	Web Self Admin	Web Collaboration
Shannon Baker	✓							✓							✓							
Sharon Hall	✓		✓		✓		✓	✓			✓†		✓	✓	✓							
Shawn Taylor	✓*		✓					✓			✓		✓									
Stacey Stewart	✓							✓														
Stacy Campbell	✓							✓														
Stanley Jackson	✓*		✓					✓			✓		✓									
Steven Wallace	✓							✓														
Test User								✓														
Test User 1	✓							✓														
Tracy Green	✓		✓		✓	✓		✓			✓†		✓	✓	✓							
Travis White	✓*		✓					✓			✓		✓									✓
Total Users: 67																						

1.4. Hunt Groups

Hunt Groups allow a defined group of Users to share the responsibility of answering selected incoming calls to the organization. Each Hunt Group receives a single Extension Number, but calls to that number can be answered by any of the group members, in a highly customizable manner.

This section will document and analyze each of the Hunt Groups configured in the IP Office solution, in order by the Hunt Group name. The explanation of each Hunt Group consists of three main aspects:

1. *The **configured behavior** of the Hunt Group is described, grouped by topic for organization. This includes a detailed explanation of the Group's ringing behavior, fallback behavior, queuing behavior, overflow behavior, etc.*
2. *The Users that are **members of the Hunt Group** are listed, along with their Hunt Group-specific properties.*
3. ***References to the Hunt Group** from other elements of the IP Office configuration are shown. This allows you to easily see which Incoming Call Routes direct calls to the Hunt Group, and which other Groups overflow to it, for example.*

Before any updates to a Hunt Group are made, this documentation should be reviewed for a complete understanding of the group's behavior. Particular attention should be paid to the configuration items that reference the Hunt Group, especially Incoming Call Routes, to avoid unintended changes. For a thorough explanation of Incoming Call Routes and their properties, refer to Section 4.1, "Incoming Call Routing".

When viewing this document electronically, both the referenced Hunt Group and Time Profile names in the content link to those elements' detailed documentation elsewhere in the report, for easy reference.

The following Hunt Groups are configured in this IP Office solution:

Hunt Group: Backup HG, Extension 610

General Properties

Hunt Group Type: Standard Hunt Group
Defined on System: IPO Demo Prim
Ring Mode: Collective - Incoming calls ring all available phones simultaneously

- This Hunt Group's Extension number is **advertised** throughout the IP Office network, and can be directly dialed from other Systems
- This Hunt Group's Extension number is **included** in the directory list displayed by applicable user applications and telephones

Service Modes (Fallback)

- The **Service Mode** of this Hunt Group is automatically changed according to the following schedule:
  The Hunt Group is automatically placed **'In Service'** on the days and hours covered by Time Profile 'Holidays'.
  The Hunt Group is automatically placed into **'Night Service'** during all other times.
- When this Hunt Group is placed in **'Night Service'** (manually or automatically), incoming calls will be **directed to voicemail**
- When this Hunt Group is manually placed **'Out of Service'**, incoming calls will be **directed to voicemail**

Queuing Behavior

- Queuing is **enabled** for this Hunt Group.

- There is **no limit** to the number of calls that can be queued (Queue Length)
- The Queue Threshold Alarm notification is **disabled** for this Hunt Group

Overflow Behavior

- There is **no Overflow treatment** configured for this Hunt Group

Voicemail Behavior

- Incoming calls to this Hunt Group will be directed to leave a voicemail message under the following scenarios:
  - After waiting to be answered for **45 seconds**, regardless of any announcements, queuing, or overflow behaviors
  - When the Hunt Group is placed in **'Night Service'** (manually or automatically)
  - When the Hunt Group is manually placed **'Out of Service'**
- There are **no Users** in the solution who **receive a message waiting indication** for the Hunt Group's voicemail mailbox

Call Recording Behavior

- Incoming calls to this Hunt Group are **not recorded** automatically

Announcements

- Announcements are **disabled** for this Hunt Group

Hunt Group Members

The following Users are members of this Hunt Group, and can answer its incoming calls.

NOTE: *Users shown in gray had their Group membership disabled at the time of data collection, and they would not be presented with incoming Group calls.*

User Name	Extension	System	Log Missed Calls	Can Change Membership
Test User 1	275	IPO Demo Exp		
Charles Johnson	264	IPO Demo Prim		
Frank Williams	263	IPO Demo Prim		
Total Hunt Group Members: 3				

Hunt Group References

The following other Hunt Groups will **overflow** to this Hunt Group when necessary:

Hunt Group Name	Extension	System
Day HG	600	IPO Demo Prim

The following Users can **perform administrative functions** on this Hunt Group using their station's menus:

User Name	Extension	System	Can Change Service State	Can Change Night Service Destination	Can Change Out of Service Destination
Charles Johnson	264	IPO Demo Prim	✓		
Duane Rodriguez	250	IPO Demo Prim	✓	✓	✓
Shane Robinson	252	IPO Demo Prim	✓	✓	✓

Hunt Group: Day HG, Extension 600

General Properties

Hunt Group Type: Standard Hunt Group
Defined on System: IPO Demo Prim
Ring Mode: Sequential - Incoming calls are presented to each available User in order, starting at the beginning of the User list each time

- Incoming calls will ring each User for **15 seconds** (the System default) before being passed to the next User as described above
- This Hunt Group's Extension number is **advertised** throughout the IP Office network, and can be directly dialed from other Systems
- This Hunt Group's Extension number is **included** in the directory list displayed by applicable user applications and telephones

Service Modes (Fallback)

- The **Service Mode** of this Hunt Group is automatically changed according to the following schedule:
  The Hunt Group is automatically placed **'In Service'** on the days and hours covered by Time Profile 'Day Shift'.
  The Hunt Group is automatically placed into **'Night Service'** during all other times.
- When this Hunt Group is placed in **'Night Service'** (manually or automatically), incoming calls will be directed to **Hunt Group 'Night HG', Ext. 601**
- When this Hunt Group is manually placed **'Out of Service'**, incoming calls will be directed to **Hunt Group 'Night HG', Ext. 601**

Queuing Behavior

- Queuing is **disabled** for this Hunt Group
- If all agents are busy, incoming calls will immediately **overflow** to the Group(s) shown below

Overflow Behavior

- If all agents are busy, incoming calls to this Hunt Group will **immediately overflow** to the other Hunt Group(s) shown below
- Calls to this Hunt Group will **overflow to the following other Hunt Groups** (in order)

    1. Backup HG, Extension 610

Voicemail Behavior

- Incoming calls to this Hunt Group will be directed to leave a voicemail message under the following scenarios:
    - After waiting to be answered for **45 seconds**, regardless of any announcements, queuing, or overflow behaviors
- There are **no Users** in the solution who **receive a message waiting indication** for the Hunt Group's voicemail mailbox

Call Recording Behavior

- **All** incoming calls to this Hunt Group are automatically **recorded**
- If recording is not possible for some reason, the call is **blocked**
- Both **external and internal** incoming calls are automatically recorded
- Automatically recorded calls will be stored in the voicemail mailbox of **Extension 610 (Backup HG)**

Announcements

- Announcements are **disabled** for this Hunt Group

Hunt Group Members

The following Users are members of this Hunt Group, and can answer its incoming calls. The order of the Users shown below is significant, given the Hunt Group's 'Ring Mode' as previously described.

NOTE: *Users shown in gray had their Group membership disabled at the time of data collection, and they would not be presented with incoming Group calls.*

User Name	Extension	System	Log Missed Calls	Can Change Membership
Grace Adams	201	IPO Demo Exp		
Heather King	206	IPO Demo Exp		
Stacy Campbell	215	IPO Demo Exp		
Sarah Walker	210	IPO Demo Exp		
Charlotte Nelson	208	IPO Demo Exp		
Paging Speaker 2	224	IPO Demo Exp		
Brad Lee	227	IPO Demo Exp		
Gabriel Bailey	229	IPO Demo Exp		
Chad Harris	232	IPO Demo Exp		
Charlie Clark	256	IPO Demo Prim		
Elaine Gonzalez	254	IPO Demo Prim		
Angela Black	267	IPO Demo Prim		
Nicole Perry	272	IPO Demo Prim		
Total Hunt Group Members: 13				

Hunt Group References

The following **Incoming Call Routes** direct calls to this Hunt Group, as either a primary or fallback destination:

System	Call Type	Line Group ID	Incoming Number	Incoming Caller ID	Time Profile	Destination Type
IPO Demo Exp	Any Voice	2	XXXX		<Default>	Fallback

The following other Hunt Groups reference this Hunt Group as their **Night Service destination**:

Hunt Group Name	Extension	System
Night HG	601	IPO Demo Prim

The following Users can **perform administrative functions** on this Hunt Group using their station's menus:

User Name	Extension	System	Can Change Service State	Can Change Night Service Destination	Can Change Out of Service Destination
Charles Johnson	264	IPO Demo Prim	✓		
Duane Rodriguez	250	IPO Demo Prim	✓	✓	✓
Shane Robinson	252	IPO Demo Prim	✓	✓	✓

Hunt Group: General MBox, Extension 603

General Properties

Hunt Group Type: Standard Hunt Group
Defined on System: IPO Demo Exp
Ring Mode: Collective - Incoming calls ring all available phones simultaneously

- This Hunt Group's Extension number is **advertised** throughout the IP Office network, and can be directly dialed from other Systems
- This Hunt Group's Extension number is **excluded** from the directory list displayed by applicable user applications and telephones

Service Modes (Fallback)

- The **Service Mode** of this Hunt Group is automatically changed according to the following schedule:
  The Hunt Group is automatically placed **'In Service'** on the days and hours covered by Time Profile 'Holidays'.
  The Hunt Group is automatically placed into **'Night Service'** during all other times.
- When this Hunt Group is placed in **'Night Service'** (manually or automatically), incoming calls will be directed to **User 'Gabriel Bailey', Ext. 229**
- When this Hunt Group is manually placed **'Out of Service'**, incoming calls will be **directed to voicemail**

Queuing Behavior

- Queuing is **enabled** for this Hunt Group.

- There is **no limit** to the number of calls that can be queued (Queue Length)
- The Queue Threshold Alarm notification is **disabled** for this Hunt Group

Overflow Behavior

- There is **no Overflow treatment** configured for this Hunt Group

Voicemail Behavior

- Incoming calls to this Hunt Group will be directed to leave a voicemail message under the following scenarios:
    - After waiting to be answered for **45 seconds**, regardless of any announcements, queuing, or overflow behaviors
    - When the Hunt Group is manually placed **'Out of Service'**
- There are **no Users** in the solution who **receive a message waiting indication** for the Hunt Group's voicemail mailbox

Call Recording Behavior

- Incoming calls to this Hunt Group are **not recorded** automatically

Announcements

- Announcements are **enabled** for this Hunt Group, and are played to callers while waiting to be answered (either queued or ringing)
- The announcements follow the sequence shown below until the call is answered:

    1. Incoming call is received
    2. Wait **5 seconds**
    3. Play the first recorded announcement
    4. Following the announcement, the caller will hear **'Music on Hold'**
    5. Wait **20 seconds**
    6. Play the second recorded announcement
    7. Wait **20 seconds**
    8. **Repeat** from step 6 (replay the second recorded announcement)

Hunt Group Members

The following Users are members of this Hunt Group, and can answer its incoming calls.

NOTE: *Users shown in gray had their Group membership disabled at the time of data collection, and they would not be presented with incoming Group calls.*

User Name	Extension	System	Log Missed Calls	Can Change Membership
Beatrice Phillips	214	IPO Demo Exp		
Sarah Walker	210	IPO Demo Exp		
Dean Martinez	257	IPO Demo Prim		
Clarence Anderson	235	IPO Demo Exp		

User Name	Extension	System	Log Missed Calls	Can Change Membership
Juanita Carter	209	IPO Demo Exp		
Shannon Baker	276	IPO Demo Exp		
Total Hunt Group Members: 6				

Hunt Group References

The following Users can **perform administrative functions** on this Hunt Group using their station's menus:

User Name	Extension	System	Can Change Service State	Can Change Night Service Destination	Can Change Out of Service Destination
Sharon Hall	226	IPO Demo Exp	✓	✓	✓

The following **Users have buttons** which reference this Hunt Group for administrative functions:

User Name	Extension	System	Button #	Feature	Label
Joanne Roberts	212	IPO Demo Exp	5	Hunt Group Enable	
			6	Hunt Group Disable	
Sarah Walker	210	IPO Demo Exp	8	Group	

Hunt Group: Night HG, Extension 601

General Properties

Hunt Group Type: Standard Hunt Group
Defined on System: IPO Demo Prim
Ring Mode: Sequential - Incoming calls are presented to each available User in order, starting at the beginning of the User list each time

- Incoming calls will ring each User for **15 seconds** (the System default) before being passed to the next User as described above
- This Hunt Group's Extension number is **advertised** throughout the IP Office network, and can be directly dialed from other Systems
- This Hunt Group's Extension number is **included** in the directory list displayed by applicable user applications and telephones

Service Modes (Fallback)

- The **Service Mode** of this Hunt Group is automatically changed according to the following schedule:
  The Hunt Group is automatically placed **'In Service'** on the days and hours covered by Time Profile 'Night Shift'.
  The Hunt Group is automatically placed into **'Night Service'** during all other times.
- When this Hunt Group is placed in **'Night Service'** (manually or automatically), incoming calls will be directed to **Hunt Group 'Day HG', Ext. 600**
- When this Hunt Group is manually placed **'Out of Service'**, incoming calls will be **directed to voicemail**

Queuing Behavior

- Queuing is **enabled** for this Hunt Group.
- There is **no limit** to the number of calls that can be queued (Queue Length)
- The Queue Threshold Alarm notification is **disabled** for this Hunt Group

Overflow Behavior

- There is **no Overflow treatment** configured for this Hunt Group

Voicemail Behavior

- Incoming calls to this Hunt Group will be directed to leave a voicemail message under the following scenarios:
  - After waiting to be answered for **45 seconds**, regardless of any announcements, queuing, or overflow behaviors
  - When the Hunt Group is manually placed **'Out of Service'**
- There are **no Users** in the solution who **receive a message waiting indication** for the Hunt Group's voicemail mailbox

Call Recording Behavior

- **All** incoming calls to this Hunt Group are automatically **recorded**
- If recording is not possible for some reason, the call is **blocked**
- Automatic call recording is only active during the days and hours covered by Time Profile 'Night Shift'
- Only **external** incoming calls are automatically recorded
- Automatically recorded calls will be stored in the voicemail mailbox of **Extension 601 (Night HG)**

Announcements

- Announcements are **disabled** for this Hunt Group

Hunt Group Members

The following Users are members of this Hunt Group, and can answer its incoming calls. The order of the Users shown below is significant, given the Hunt Group's 'Ring Mode' as previously described.

User Name	Extension	System	Log Missed Calls	Can Change Membership
Adam Miller	258	IPO Demo Prim		
Charlie Clark	256	IPO Demo Prim		
Ida Evans	217	IPO Demo Exp		
Paging Speaker 1	216	IPO Demo Exp		
Tracy Green	202	IPO Demo Exp		
Total Hunt Group Members: 5				

Hunt Group References

The following **Incoming Call Routes** direct calls to this Hunt Group, as either a primary or fallback destination:

System	Call Type	Line Group ID	Incoming Number	Incoming Caller ID	Time Profile	Destination Type
IPO Demo Exp	Any Voice	2	XXXX		Night Shift	Fallback

The following other Hunt Groups reference this Hunt Group as their **Night Service destination**:

Hunt Group Name	Extension	System
Day HG	600	IPO Demo Prim

The following other Hunt Groups reference this Hunt Group as their **Out of Service destination**:

Hunt Group Name	Extension	System
Day HG	600	IPO Demo Prim

The following Users can **perform administrative functions** on this Hunt Group using their station's menus:

User Name	Extension	System	Can Change Service State	Can Change Night Service Destination	Can Change Out of Service Destination
Charles Johnson	264	IPO Demo Prim	✓		
Duane Rodriguez	250	IPO Demo Prim	✓	✓	✓
Shane Robinson	252	IPO Demo Prim	✓	✓	✓

1.5. Instant Message and Presence Groups

The ability for Users to see each other's presence status, and to send each other instant messages through the IP Office, can be limited by placing Users in an Extensible Messaging and Presence Protocol (XMPP) Group. Only Users that are members of the same XMPP group can share presence information and instant message one another. Dividing the Users into multiple Groups creates individual realms of presence and instant message sharing.

Any User that is not placed into at least one XMPP Group is automatically added to the default System XMPP Group. Thus, if no XMPP Groups are configured, all Users are members of the System XMPP Group and can share presence information and instant messages.

Each XMPP Group configured in the solution is shown below, with the individual members of the Group listed for reference. For multi-System networks, this documentation includes the System on which each XMPP Group is defined, as well as the System on which each group member is defined.

The following Instant Message / Presence Groups (XMPP Groups) are configured in this IP Office solution:

XMPP Group: IM Group

Defined on System: IPO Demo Prim

User Name	Extension	System
Adam Miller	258	IPO Demo Prim
Alan Moore	253	IPO Demo Prim
Amanda Allen-Foster	225	IPO Demo Exp
Angela Black	267	IPO Demo Prim
Beatrice Phillips	214	IPO Demo Exp
Brad Lee	227	IPO Demo Exp
Bradley Thompson	231	IPO Demo Exp
Brandon Davis	260	IPO Demo Prim
Chad Harris	232	IPO Demo Exp
Charles Johnson	264	IPO Demo Prim
Charlie Clark	256	IPO Demo Prim
Charlotte Nelson	208	IPO Demo Exp
Clarence Anderson	235	IPO Demo Exp
Diane Hernandez	218	IPO Demo Exp
Duane Rodriguez	250	IPO Demo Prim
Elaine Gonzalez	254	IPO Demo Prim
Frank Williams	263	IPO Demo Prim
Ida Evans	217	IPO Demo Exp
Joanne Roberts	212	IPO Demo Exp
Juanita Carter	209	IPO Demo Exp
Michael Gray	240	IPO Demo Exp
Nicole Perry	272	IPO Demo Prim
Robin Howard	251	IPO Demo Prim
Ryan Jones	262	IPO Demo Prim
Sarah Walker	210	IPO Demo Exp

User Name	Extension	System
Sean Thomas	207	IPO Demo Exp
Shane Robinson	252	IPO Demo Prim
Shannon Baker	276	IPO Demo Exp
Sharon Hall	226	IPO Demo Exp
Shawn Taylor	236	IPO Demo Exp
Stacey Stewart	222	IPO Demo Exp
Stacy Campbell	215	IPO Demo Exp
Stanley Jackson	234	IPO Demo Exp
Tracy Green	202	IPO Demo Exp
Travis White	233	IPO Demo Exp
Total XMPP Group Members: 35		

2. Extensions

In an IP Office configuration, 'Extensions' represent the physical stations and software applications that Users use to handle calls. This includes legacy analog and digital telephones, mobile DECT handsets, physical IP-based (VoIP) telephones, and software-based SIP clients that run on a User's computer, laptop, tablet, or smartphone. Extension records are also used to configure certain non-telephone devices such as FAX machines, Paging speakers, and SIP adjuncts.

Despite the terminology, Extension Numbers are actually assigned to Users, ***not*** *Extensions. A User retains their Extension Number regardless of which telephone they are currently logged in to. However, each physical Extension can be associated with its primary User via the 'Base Extension' property. This defines the User that is logged in to the Extension by default, at system bootup for example. In this report, when a User's name is associated with an Extension, it is the 'Base Extension' relationship that is being shown.*

The chapter will both document and illustrate the Extensions that are configured in the IP Office system. This includes a visual representation of every physical station programmed, as well as listings of the stations grouped by their model type. The 'Extension Security' section provides an analysis of the extent to which various security features of Extensions are being applied.

NOTE: 8 additional Extensions are present in the configuration of this Solution, but are **not included** in this report because there is no physical hardware present to enable them.

2.1. Station Templates

This section presents a graphical depiction of each physical station present in the IP Office solution. The basic properties of each Extension, including station model, Extension type, Extension ID, etc., are included for identification and easy reference. Some properties, like Analog Extension Classification and IP License Reservation, will be shown conditionally based on the type of Extension.

When an Extension has a primary User associated with it via the 'Base Extension' property, that User's name, feature usage, group membership, and button programming are all displayed as well. Also shown are the User's defined Twinning/Forwarding numbers (as many as space allows). Showing the Extension and primary User's information together makes it easy to understand how the station operates under normal conditions.

The stations are presented in 'Base Extension' order, making it easy to find a particular User's telephone if you know their Extension number. To conserve space, abbreviations are used for some Extension properties and button programming features. See the lists below for their meanings.

Abbreviations Used

Bsy/NA Fwd #	The Busy / No Answer Forwarding number
Lic Resrv	License Reservation status for IP Endpoint licenses (IP stations only)
Mobility Feat.	Whether 'Mobility Features' are enabled for the primary User
UC Feat.	Whether any of the following Unified Communications features are enabled for the primary User: One-X Portal, UMS Web Services, Voicemail Email, Voicemail Email Reading, or Web Collaboration
Unc. Fwd #	The Unconditional Forwarding number

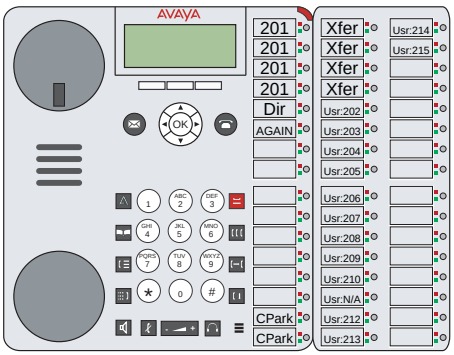
Common Button Programming Features

<Ext#> – Appearance	DNDOn – Do Not Disturb On	Logof – Extension Logout
AD – Abbreviated Dial	DpkUp – Directed Call Pickup	Page – Dial Paging
Admin – Self-Administer	FolTo – Follow Me To	Pickg – Call Pickup Group
AGAIN – Last Number Redial	FwUOn – Forward Unconditional On	Recor – Call Record
Br:<Ext#> – Bridged Appearance	Grp:<Ext#> – Group (Monitor/Answer)	SAC – Send All Calls
CFrwd – Call Forwarding All	GrpPg – Group Paging	SpdDial – Speed Dial
Conf – Conference Create	HGEna – Hunt Group Enable	Twin – Twinning
Cov:<Ext#> – Coverage Appearance	HGNS+ – Set Hunt Group Night Service	Usr:<Ext#> – User (Call/Answer)
CPark – Call Park	Ln:<Line ID> – Line Appearance	VMCol – Voicemail Collect
Dir – Directory	Login – Extension Login	Xfer – Transfer

Preparing Repair & Service Orders

This section can be a powerful tool in the verification and reporting of repair troubles, and in the placement of complete service orders. Its use will improve service and communications between you, your Users, and your service provider.

Before reporting troubles such as specific features or keys not working, this section should be consulted to determine if the feature is programmed on the reporting station, or if the correct key is being addressed. In preparing service orders, we suggest making a copy of the station to be worked on, and using that copy as both a means to communicate with your Users and your maintenance provider. Cross out those items that need to be changed and write in the changes you want to make.



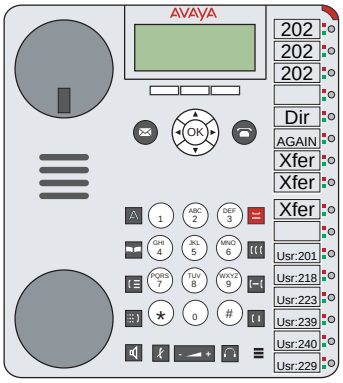
Base Ext: 201 — Grace A

Station Model: **1416**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **1**
Address: **Base Card 1 / Port 1**

User Profile: **Power User**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **600**
Monitor:
Coverage:



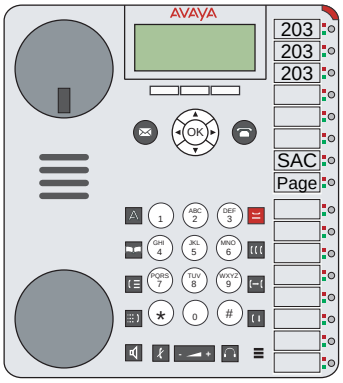
Base Ext: 202 — Tracy G

Station Model: **1416**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **2**
Address: **Base Card 1 / Port 2**

User Profile: **Power User**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **601**
Monitor:
Coverage:



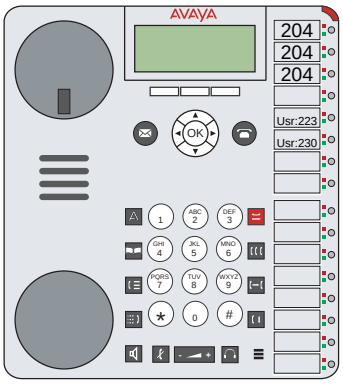
Base Ext: 203 — Gladys S

Station Model: **1416**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **3**
Address: **Base Card 1 / Port 3**

User Profile: **Power User**
Mobility Feat.: **Y** UC Feat.: **Y**
Twinning #: **1-773-555-7841**
Follow Me #:

Groups
Hunt:
Monitor:
Coverage:



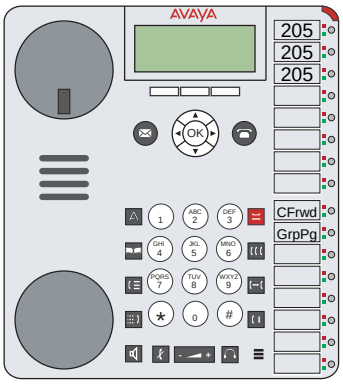
Base Ext: 204 — Diana H

Station Model: **1416**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **4**
Address: **Base Card 1 / Port 4**

User Profile: **Power User**
Mobility Feat.: **Y** UC Feat.: **Y**
Twinning #: **1-773-555-3210**
Follow Me #:

Groups
Hunt:
Monitor:
Coverage:



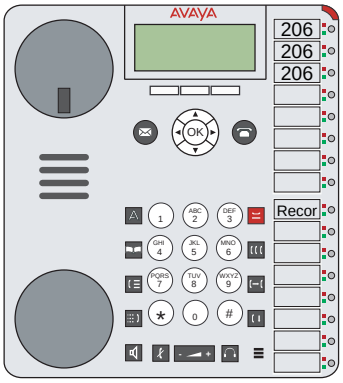
Base Ext: 205 — Jean W

Station Model: **1416**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **5**
Address: **Base Card 1 / Port 5**

User Profile: **Power User**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:



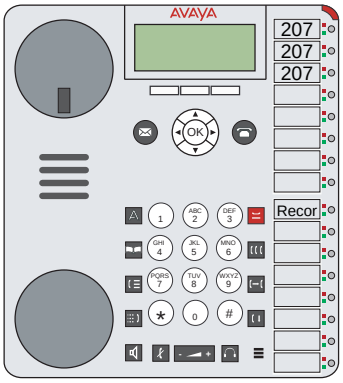
Base Ext: 206 — Heather K

Station Model: **1416**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **6**
Address: **Base Card 1 / Port 6**

User Profile: **Power User**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **600**
Monitor:
Coverage:



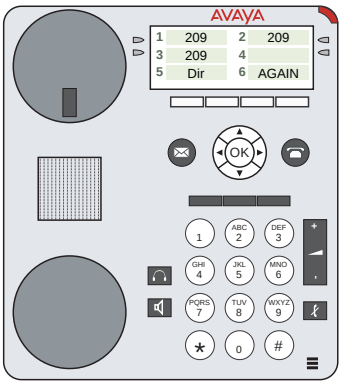
Base Ext: 207 — Sean T

Station Model: **1416**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **7**
Address: **Base Card 1 / Port 7**

User Profile: **Power User**
Mobility Feat.: **Y** UC Feat.: **Y**
Twinning #:
Follow Me #:

Groups
Hunt:
Monitor:
Coverage:



Base Ext: 209 — Juanita C

Station Model: **9504**
Station Type: **Digital (DS)**

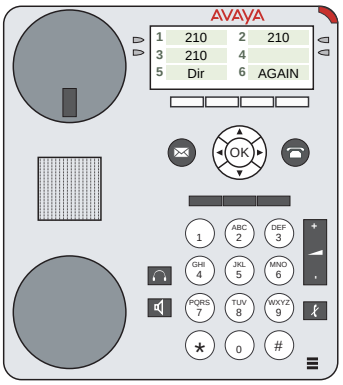
System: **IPO Demo Exp**
Ext ID: **49**
Address: **Base Card 3 / Port 1**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **603**
Monitor:
Coverage:

Additional Button Programming

7:
8: **Br:208**
9: **Ln:701**
10:
11:
12:



Base Ext: 210 — Sarah W

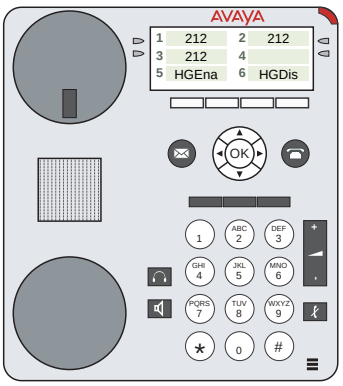
Station Model: **9504**
Station Type: **Digital (DS)**
System: **IPO Demo Exp**
Ext ID: **50**
Address: **Base Card 3 / Port 2**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **600,603**
Monitor:
Coverage:

Additional Button Programming

7:
8: **Grp:603**
9: **Usr:231**
10:
11:
12:



Base Ext: 212 — Joanne R

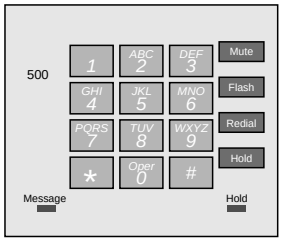
Station Model: **9504**
Station Type: **Digital (DS)**
System: **IPO Demo Exp**
Ext ID: **52**
Address: **Base Card 3 / Port 4**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

7:
8:
9:
10:
11:
12:

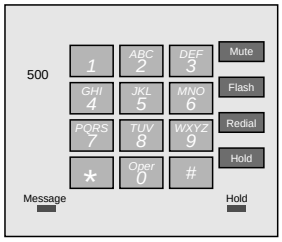


Base Ext: 215 — Stacy C

Station Model: **Analog**
Station Type: **Analog**
Classification: **Standard Telephone**
System: **IPO Demo Exp**
Ext ID: **55**
Address: **Base Card 3 / Port 7**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **600**
Monitor:
Coverage:

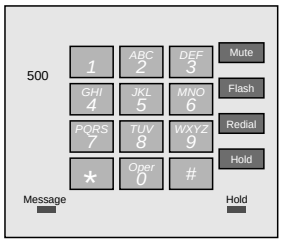


Base Ext: 216 — Paging 1

Station Model: **Analog**
Station Type: **Analog**
Classification: **Paging Speaker**
System: **IPO Demo Exp**
Ext ID: **56**
Address: **Base Card 3 / Port 8**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **601**
Monitor:
Coverage:

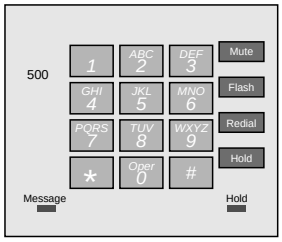


Base Ext: 217 — Ida E

Station Model: **Analog**
Station Type: **Analog**
Classification: **Standard Telephone**
System: **IPO Demo Exp**
Ext ID: **73**
Address: **Base Card 4 / Port 1**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **601**
Monitor:
Coverage:

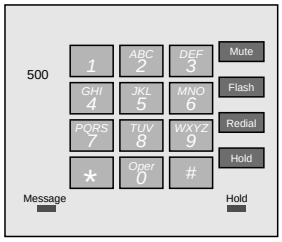


Base Ext: 218 — Diane H

Station Model: **Analog**
Station Type: **Analog**
Classification: **Standard Telephone**
System: **IPO Demo Exp**
Ext ID: **74**
Address: **Base Card 4 / Port 2**

User Profile: **Power User**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

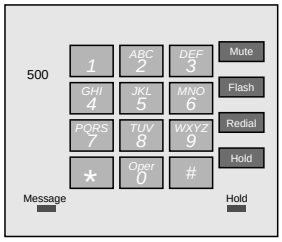


Base Ext: 219 — Frances Y

Station Model: **Analog**
Station Type: **Analog**
Classification: **Standard Telephone**
System: **IPO Demo Exp**
Ext ID: **75**
Address: **Base Card 4 / Port 3**

User Profile: **Power User**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

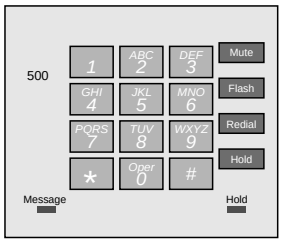


Base Ext: 220 — Extn220

Station Model: **Analog**
Station Type: **Analog**
Classification: **Quiet Headset**
System: **IPO Demo Exp**
Ext ID: **76**
Address: **Base Card 4 / Port 4**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

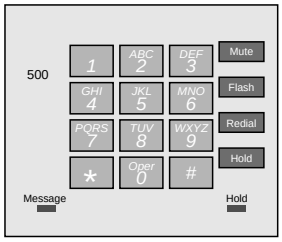


Base Ext: 221 Extn221

Station Model: **Analog**
Station Type: **Analog**
Classification: **Quiet Headset**
System: **IPO Demo Exp**
Ext ID: **77**
Address: **Base Card 4 / Port 5**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

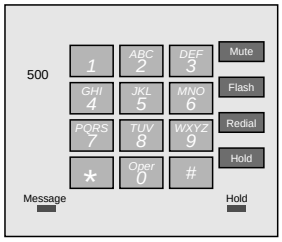


Base Ext: 222 Stacey S

Station Model: **Analog**
Station Type: **Analog**
Classification: **Standard Telephone**
System: **IPO Demo Exp**
Ext ID: **78**
Address: **Base Card 4 / Port 6**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

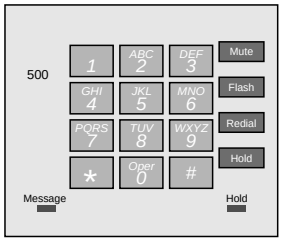


Base Ext: 223 Pearl M

Station Model: **Analog**
Station Type: **Analog**
Classification: **Standard Telephone**
System: **IPO Demo Exp**
Ext ID: **79**
Address: **Base Card 4 / Port 7**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

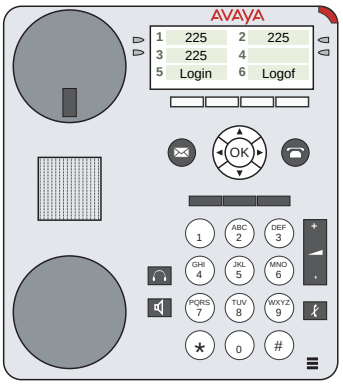


Base Ext: 224 Paging 2

Station Model: **Analog**
Station Type: **Analog**
Classification: **Paging Speaker**
System: **IPO Demo Exp**
Ext ID: **80**
Address: **Base Card 4 / Port 8**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **600**
Monitor:
Coverage:



Base Ext: 225 — Amanda A

Station Model: **9504**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **201**
Address: **Exp Mod 2 / Port 1**

User Profile: **Power User**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming
7:
8:
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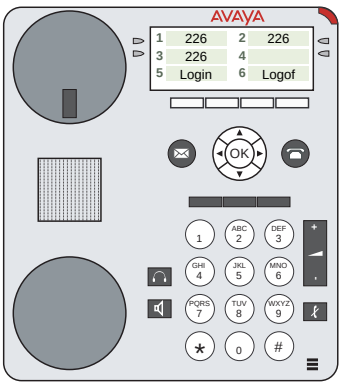
12:



Base Ext: 226 — Sharon H

Station Model: **9504**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **202**
Address: **Exp Mod 2 / Port 2**

User Profile: **Power User**
Mobility Feat.: **N** UC Feat.: **Y**

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming
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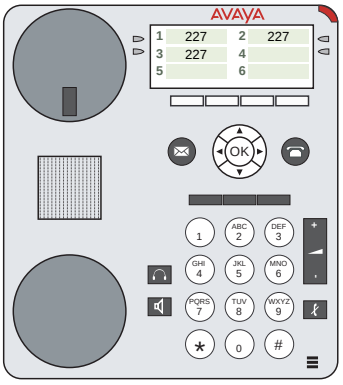
12:



Base Ext: 227 — Brad L

Station Model: **9504**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **203**
Address: **Exp Mod 2 / Port 3**

User Profile: **Power User**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **600**
Monitor:
Coverage:

Additional Button Programming
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9: **Recor**
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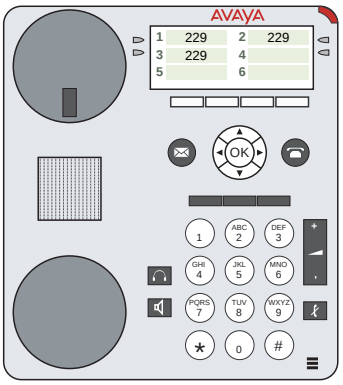

Base Ext: 229 — Gabriel B

Station Model: **9504**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **205**
Address: **Exp Mod 2 / Port 5**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **600**
Monitor:
Coverage:

Additional Button Programming
7:
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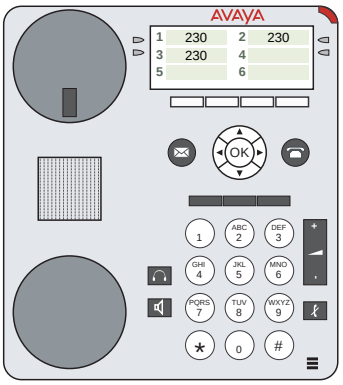
12:



Base Ext: 230 — Francis M

Station Model: **9504**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **206**
Address: **Exp Mod 2 / Port 6**

User Profile: **Office Worker**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

7:
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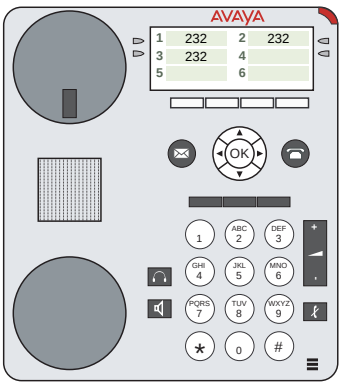
11:
12:



Base Ext: 232 — Chad H

Station Model: **9504**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **208**
Address: **Exp Mod 2 / Port 8**

User Profile: **Office Worker**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **600**
Monitor:
Coverage:

Additional Button Programming

7:
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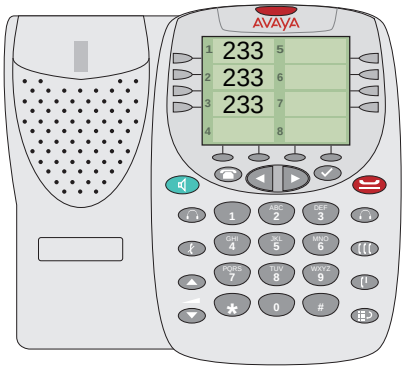
10:
11:
12:



Base Ext: 233 — Travis W

Station Model: **5420D**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **209**
Address: **Exp Mod 2 / Port 9**

User Profile: **Office Worker**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

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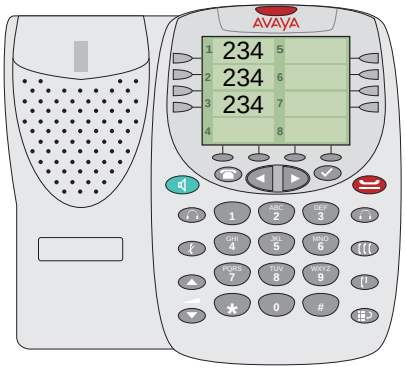
22:
23:
24:



Base Ext: 234 — Stanley J

Station Model: **5420D**
Station Type: **Digital (DS)**

System: **IPO Demo Exp**
Ext ID: **210**
Address: **Exp Mod 2 / Port 10**

User Profile: **Office Worker**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9:
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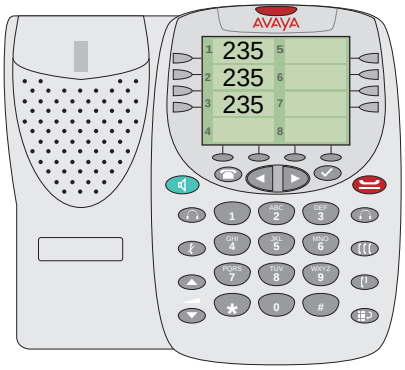
21:
22:
23:
24:



Base Ext: 235 — Clarence A

Station Model: **5420D**
Station Type: **Digital (DS)**

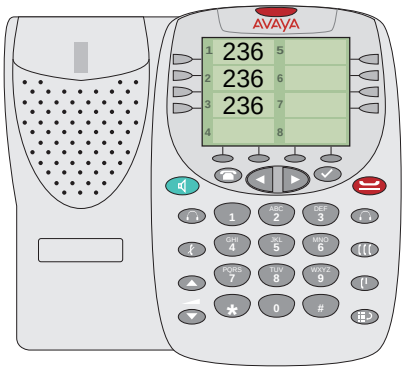
System: **IPO Demo Exp**
Ext ID: **211**
Address: **Exp Mod 2 / Port 11**

User Profile: **Office Worker**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **603**
Monitor:
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:



Base Ext: 236 — Shawn T

Station Model: **5420D**
Station Type: **Digital (DS)**

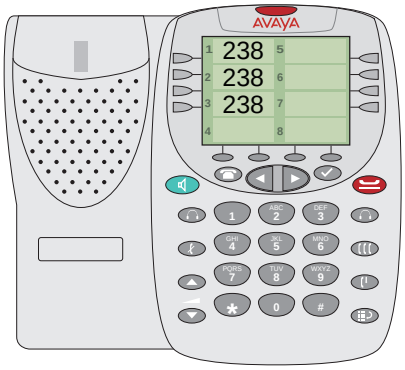
System: **IPO Demo Exp**
Ext ID: **212**
Address: **Exp Mod 2 / Port 12**

User Profile: **Office Worker**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:



Base Ext: 238 — Ruby C

Station Model: **5420D**
Station Type: **Digital (DS)**

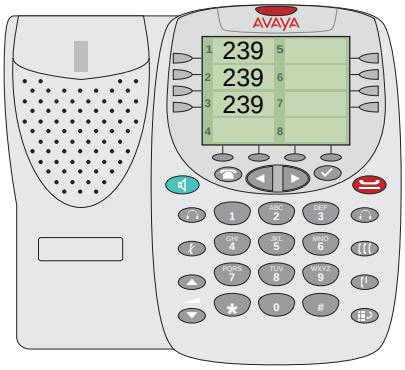
System: **IPO Demo Exp**
Ext ID: **214**
Address: **Exp Mod 2 / Port 14**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:



Base Ext: 239 — Rebecca C

Station Model: **5420D**
Station Type: **Digital (DS)**

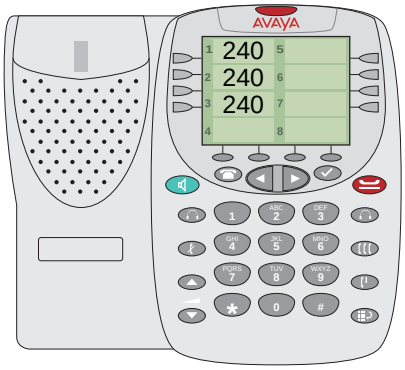
System: **IPO Demo Exp**
Ext ID: **215**
Address: **Exp Mod 2 / Port 15**

User Profile: **Power User**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:



Base Ext: 240 — Michael G

Station Model: **5420D**
Station Type: **Digital (DS)**

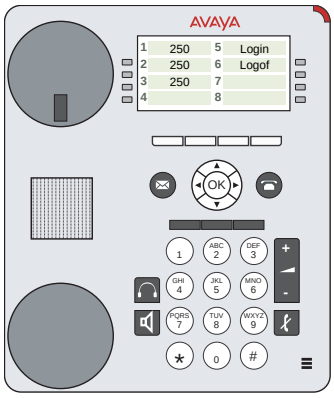
System: **IPO Demo Exp**
Ext ID: **216**
Address: **Exp Mod 2 / Port 16**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:



Base Ext: 250 — Duane R

Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **Avaya IP Endpoint**

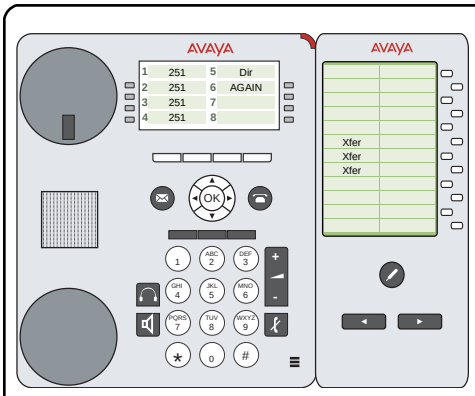
System: **IPO Demo Prim**
Ext ID: **8000**
IP Address: **0.0.0.0**

User Profile: **Power User**
Mobility Feat.: **Y** UC Feat.: **Y**
Twinning #: **1-773-555-4501**

Groups
Hunt:
Monitor: **600**
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:



Base Ext: 251 — Robin H

Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **None**

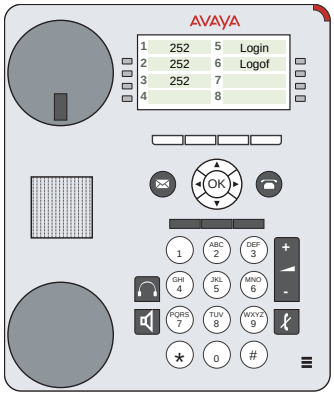
System: **IPO Demo Prim**
Ext ID: **8001**
IP Address: **0.0.0.0**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage: **600**

Additional Button Programming

9:	17: **Usr:260**
10: **Dial**	18: **VMCol**
11: **Dial**	19:
12: **Usr:N/A**	20:
13: **Usr:256**	21:
14: **Usr:257**	22:
15: **Usr:258**	23:
16: **Usr:259**	24:



Base Ext: 252 — Shane R

Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **None**

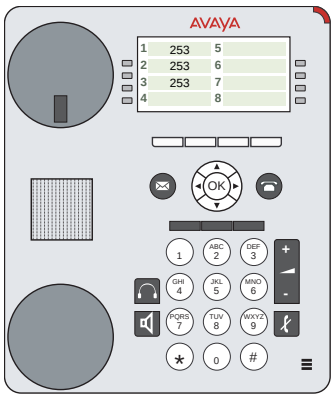
System: **IPO Demo Prim**
Ext ID: **8002**
IP Address: **0.0.0.0**

User Profile: **Power User**
Mobility Feat.: **Y** UC Feat.: **Y**
Twinning #: **1-456-555-0102**

Groups
Hunt:
Monitor: **600**
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:



Base Ext: 253 — Alan M

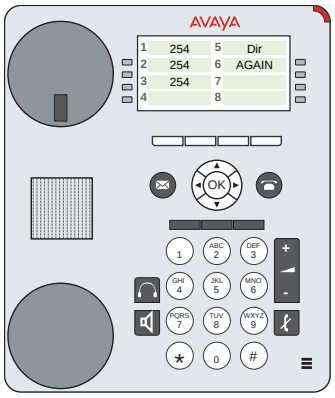
Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Prim**
Ext ID: **8003**
IP Address: **0.0.0.0**

User Profile: **Office Worker**
Mobility Feat.: **Y** UC Feat.: **Y**
Twinning #:
Follow Me #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:



Base Ext: 254 — Elaine G

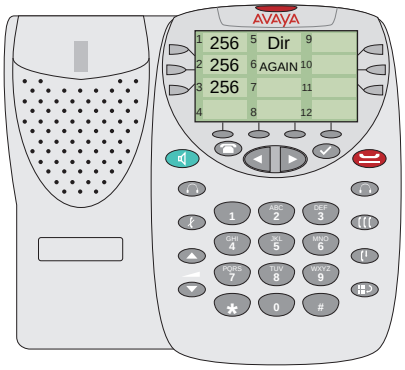
Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Prim**
Ext ID: **8004**
IP Address: **0.0.0.0**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **600**
Monitor:
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:



Base Ext: 256 — Charlie C

Station Model: **5610SW**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Prim**
Ext ID: **8006**
IP Address: **0.0.0.0**

User Profile: **Power User**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **600,601**
Monitor:
Coverage:

Additional Button Programming

13:	21:
14:	22:
15:	23:
16:	24:
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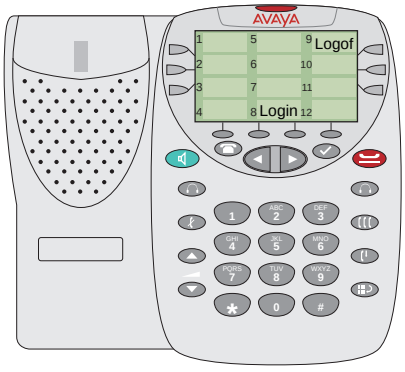
18:	
19:	
20:	



Base Ext: 257 — Dean M

Station Model: **5610SW**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Prim**
Ext ID: **8007**
IP Address: **0.0.0.0**

User Profile: **Power User**
Mobility Feat.: **Y** UC Feat.: **Y**
Twinning #: **1-773-555-6987**
Follow Me #:

Groups
Hunt: **603**
Monitor:
Coverage:

Additional Button Programming

13:	21:
14:	22:
15:	23:
16:	24:
17:	
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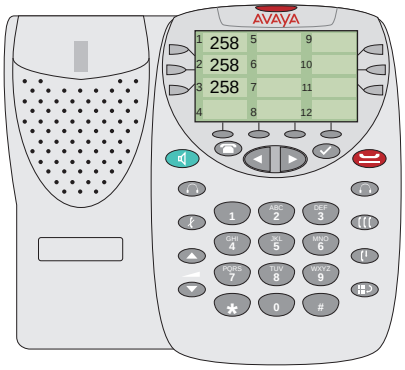
19:	
20:	



Base Ext: 258 — Adam M

Station Model: **5610SW**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Prim**
Ext ID: **8008**
IP Address: **0.0.0.0**

User Profile: **Office Worker**
Mobility Feat.: **Y** UC Feat.: **Y**
Twinning #:
Follow Me #:

Groups
Hunt: **601**
Monitor:
Coverage: **601**

Additional Button Programming

13:
14:
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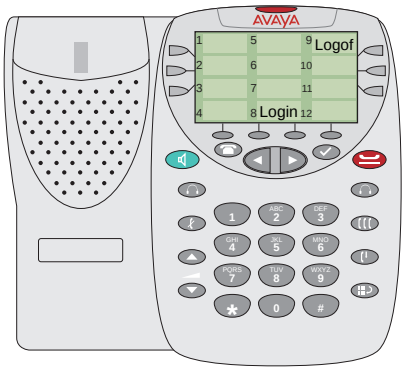
23:
24:



Base Ext: 259 — Francisco G

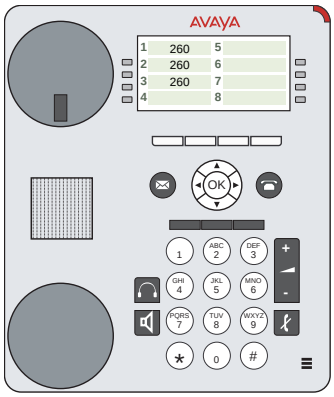
Station Model: **5610SW**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Prim**
Ext ID: **8009**
IP Address: **0.0.0.0**

User Profile: **Power User**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

13:
14:
15:
16:
17:
18:
19:
20:
21:
22:
23:
24:



Base Ext: 260 — Brandon D

Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **Avaya IP Endpoint**
System: **IPO Demo Prim**
Ext ID: **8010**
IP Address: **0.0.0.0**

User Profile: **Office Worker**
Mobility Feat.: **Y** UC Feat.: **Y**
Twinning #:
Follow Me #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9:
10:
11:
12:
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19:
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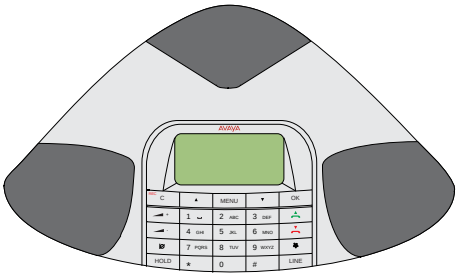
22:
23:
24:

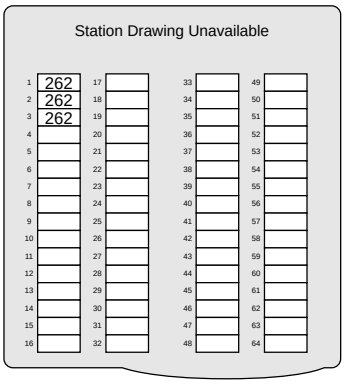


Base Ext: 261 — Juan B

Station Model: **B179**
Station Type: **IP (SIP)**
Lic Resrv: **None**
System: **IPO Demo Prim**
Ext ID: **8011**
IP Address: **0.0.0.0**

User Profile: **Office Worker**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage: **600**

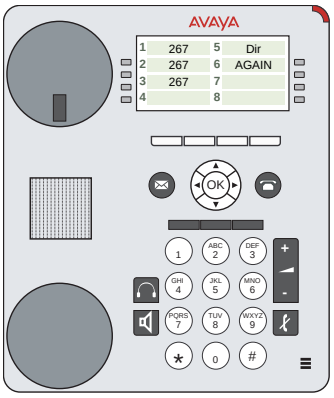


Base Ext: 262 — Ryan J

Station Model: **Unknown SIP**
Station Type: **IP (SIP)**
Lic Resrv: **None**
System: **IPO Demo Prim**
Ext ID: **8012**
IP Address: **0.0.0.0**

User Profile: **Office Worker**
Mobility Feat.: **Y** UC Feat.: **Y**
Twinning #:
Follow Me #:

Groups
Hunt:
Monitor:
Coverage:



Base Ext: 267 — Angela B

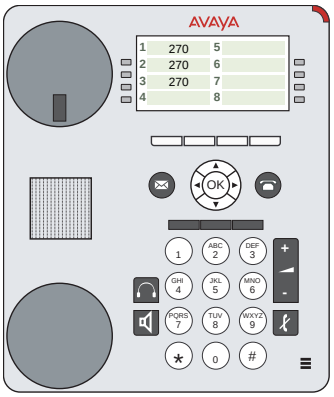
Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Prim**
Ext ID: **8015**
IP Address: **0.0.0.0**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **600**
Monitor:
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:



Base Ext: 270 — Lucy B

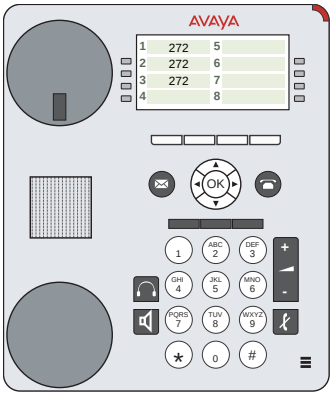
Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Prim**
Ext ID: **8005**
IP Address: **0.0.0.0**

User Profile: **Office Worker**
Mobility Feat.: **N** UC Feat.: **Y**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:



Base Ext: 272 — Nicole P

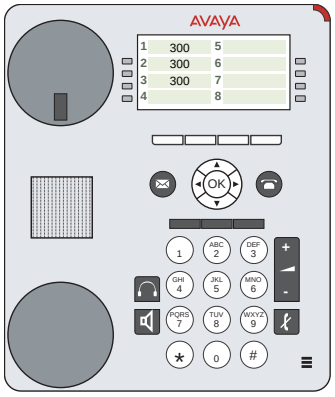
Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Prim**
Ext ID: **8014**
IP Address: **0.0.0.0**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt: **600**
Monitor:
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:



Base Ext: 300 Robert S

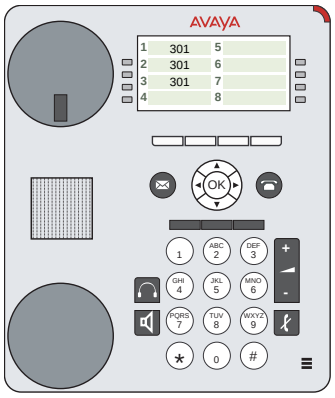
Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Exp**
Ext ID: **8000**
IP Address: **0.0.0.0**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9: 17:
10: 18:
11: 19:
12: 20:
13: 21:
14: 22:
15: 23:
16: 24:



Base Ext: 301 Emma M

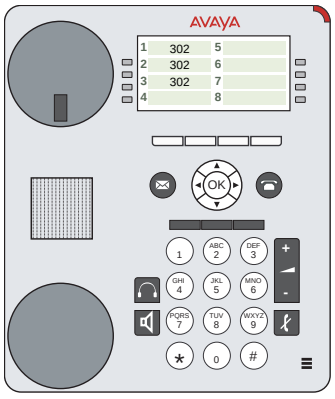
Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Exp**
Ext ID: **8004**
IP Address: **0.0.0.0**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9: 17:
10: 18:
11: 19:
12: 20:
13: 21:
14: 22:
15: 23:
16: 24:



Base Ext: 302 Nancy H

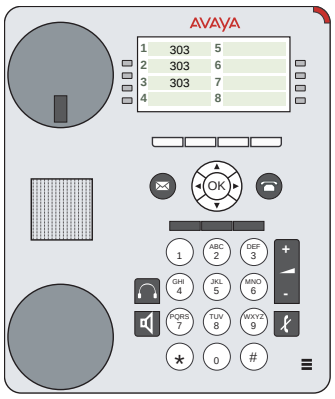
Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Exp**
Ext ID: **8001**
IP Address: **0.0.0.0**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9: 17:
10: 18:
11: 19:
12: 20:
13: 21:
14: 22:
15: 23:
16: 24:



Base Ext: 303 Steven W

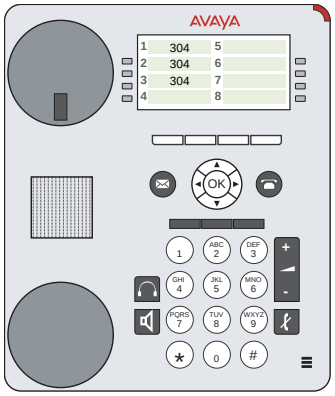
Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **None**
System: **IPO Demo Exp**
Ext ID: **8002**
IP Address: **0.0.0.0**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9: 17:
10: 18:
11: 19:
12: 20:
13: 21:
14: 22:
15: 23:
16: 24:



Base Ext: 304 Regina M

Station Model: **9611G**
Station Type: **IP (H.323)**
Lic Resrv: **None**

System: **IPO Demo Exp**
Ext ID: **8003**
IP Address: **0.0.0.0**

User Profile: **Basic User**
Mobility Feat.: **N** UC Feat.: **N**
Follow Me #:
Unc. Fwd #:

Groups
Hunt:
Monitor:
Coverage:

Additional Button Programming

9:	17:
10:	18:
11:	19:
12:	20:
13:	21:
14:	22:
15:	23:
16:	24:

2.2. Extensions by Type

This section organizes the configured Extensions by their model and type, for a high-level understanding of the stations that are used in the system. For each distinct station type in use, the model number (e.g. 9611G) and Extension type (e.g. H.323 Extension) are shown with a list of the Extensions and associated Users that are using that station model. This provides a quick view of the quantities of stations in use, and who they are assigned to.

The lists of station types are presented in model number order, with the individual Extensions within each list sorted by Extension ID. For multi-System networks, the Extensions are first grouped by System, then sorted by Extension ID.

The properties shown in the tables below are a function of the type of Extension being displayed. For example, analog and digital Extensions will include their physical Module / Port address, while IP-based Extensions will include their IP Address (if available) and license reservation state. An Extension's 'Location' is only shown when it's applicable and non-default. An empty Location column means 'Use the System's Location' for analog/digital stations, and 'Automatic' (i.e. lookup the Location by IP Address) for H.323 and SIP stations.

This section includes all non-IP Extensions that were plugged in at the time of data collection, and all IP-based Extensions that are configured in the solution (regardless of whether they're registered or not). Temporary IP Extensions that exist only while an Avaya Softphone is logged in are not included due to their transient nature.

Device Type: 1416 (Digital Extension)

System	Extension ID	Module / Port	Primary User	Location
IPO Demo Exp	1	Base Card 1 / Port 1	Grace Adams (Ext. 201)	
IPO Demo Exp	2	Base Card 1 / Port 2	Tracy Green (Ext. 202)	
IPO Demo Exp	3	Base Card 1 / Port 3	Gladys Scott (Ext. 203)	
IPO Demo Exp	4	Base Card 1 / Port 4	Diana Hill (Ext. 204)	
IPO Demo Exp	5	Base Card 1 / Port 5	Jean Wright (Ext. 205)	
IPO Demo Exp	6	Base Card 1 / Port 6	Heather King (Ext. 206)	
IPO Demo Exp	7	Base Card 1 / Port 7	Sean Thomas (Ext. 207)	
Total number of 1416 Extensions: 7				

Device Type: 5420D (Digital Extension)

System	Extension ID	Module / Port	Primary User	Location
IPO Demo Exp	209	Exp. Mod. 2 / Port 9	Travis White (Ext. 233)	New Orleans
IPO Demo Exp	210	Exp. Mod. 2 / Port 10	Stanley Jackson (Ext. 234)	New Orleans
IPO Demo Exp	211	Exp. Mod. 2 / Port 11	Clarence Anderson (Ext. 235)	New Orleans
IPO Demo Exp	212	Exp. Mod. 2 / Port 12	Shawn Taylor (Ext. 236)	New Orleans
IPO Demo Exp	214	Exp. Mod. 2 / Port 14	Ruby Cox (Ext. 238)	New Orleans
IPO Demo Exp	215	Exp. Mod. 2 / Port 15	Rebecca Cooper (Ext. 239)	New Orleans
IPO Demo Exp	216	Exp. Mod. 2 / Port 16	Michael Gray (Ext. 240)	New Orleans
Total number of 5420D Extensions: 7				

Device Type: 5610SW (H.323 Extension)

System	Extension ID	Primary User	IP Address	Location	IP Endpoint License Reserved
IPO Demo Prim	8006	Charlie Clark (Ext. 256)			
IPO Demo Prim	8007	Dean Martinez (Ext. 257)			
IPO Demo Prim	8008	Adam Miller (Ext. 258)		HQ	
IPO Demo Prim	8009	Francisco Garcia (Ext. 259)		HQ	
Total number of 5610SW Extensions: 4					

Device Type: 9504 (Digital Extension)

System	Extension ID	Module / Port	Primary User	Location
IPO Demo Exp	49	Base Card 3 / Port 1	Juanita Carter (Ext. 209)	
IPO Demo Exp	50	Base Card 3 / Port 2	Sarah Walker (Ext. 210)	
IPO Demo Exp	52	Base Card 3 / Port 4	Joanne Roberts (Ext. 212)	
IPO Demo Exp	201	Exp. Mod. 2 / Port 1	Amanda Allen-Foster (Ext. 225)	
IPO Demo Exp	202	Exp. Mod. 2 / Port 2	Sharon Hall (Ext. 226)	
IPO Demo Exp	203	Exp. Mod. 2 / Port 3	Brad Lee (Ext. 227)	
IPO Demo Exp	205	Exp. Mod. 2 / Port 5	Gabriel Bailey (Ext. 229)	
IPO Demo Exp	206	Exp. Mod. 2 / Port 6	Francis Martin (Ext. 230)	New Orleans
IPO Demo Exp	208	Exp. Mod. 2 / Port 8	Chad Harris (Ext. 232)	New Orleans
Total number of 9504 Extensions: 9				

Device Type: 9611G (H.323 Extension)

System	Extension ID	Primary User	IP Address	Location	IP Endpoint License Reserved
IPO Demo Exp	8000	Robert Stone (Ext. 300)			
IPO Demo Exp	8001	Nancy Holmes (Ext. 302)			
IPO Demo Exp	8002	Steven Wallace (Ext. 303)			
IPO Demo Exp	8003	Regina Mills (Ext. 304)			
IPO Demo Exp	8004	Emma Markson (Ext. 301)			
IPO Demo Prim	8000	Duane Rodriguez (Ext. 250)			Avaya
IPO Demo Prim	8001	Robin Howard (Ext. 251)			
IPO Demo Prim	8002	Shane Robinson (Ext. 252)			
IPO Demo Prim	8003	Alan Moore (Ext. 253)			
IPO Demo Prim	8004	Elaine Gonzalez (Ext. 254)			
IPO Demo Prim	8005	Lucy Butler (Ext. 270)			

System	Extension ID	Primary User	IP Address	Location	IP Endpoint License Reserved
IPO Demo Prim	8010	Brandon Davis (Ext. 260)		HQ	Avaya
IPO Demo Prim	8014	Nicole Perry (Ext. 272)			
IPO Demo Prim	8015	Angela Black (Ext. 267)			
Total number of 9611G Extensions: 14					

Device Type: B179 (SIP Extension)

System	Extension ID	Primary User	IP Address	Location	IP Endpoint License Reserved
IPO Demo Prim	8011	Juan Brown (Ext. 261)		Cloud	
Total number of B179 Extensions: 1					

Device Type: Not Present (SIP Extension)

System	Extension ID	Primary User	IP Address	Location	IP Endpoint License Reserved
IPO Demo Prim	8013	Frank Williams (Ext. 263)		Cloud	
Total number of SIP Extensions Not Present: 1					

Device Type: Paging Speaker (Analog Extension)

System	Extension ID	Module / Port	Primary User	Location
IPO Demo Exp	56	Base Card 3 / Port 8	Paging Speaker 1 (Ext. 216)	
IPO Demo Exp	80	Base Card 4 / Port 8	Paging Speaker 2 (Ext. 224)	
Total number of Paging Speaker Extensions: 2				

Device Type: Quiet Headset (Analog Extension)

System	Extension ID	Module / Port	Primary User	Location
IPO Demo Exp	76	Base Card 4 / Port 4	Extn220 (Ext. 220)	
IPO Demo Exp	77	Base Card 4 / Port 5	Extn221 (Ext. 221)	
Total number of Quiet Headset Extensions: 2				

Device Type: Standard Telephone (Analog Extension)

System	Extension ID	Module / Port	Primary User	Location
IPO Demo Exp	55	Base Card 3 / Port 7	Stacy Campbell (Ext. 215)	
IPO Demo Exp	73	Base Card 4 / Port 1	Ida Evans (Ext. 217)	
IPO Demo Exp	74	Base Card 4 / Port 2	Diane Hernandez (Ext. 218)	
IPO Demo Exp	75	Base Card 4 / Port 3	Frances Young (Ext. 219)	
IPO Demo Exp	78	Base Card 4 / Port 6	Stacey Stewart (Ext. 222)	
IPO Demo Exp	79	Base Card 4 / Port 7	Pearl Morris (Ext. 223)	
Total number of Standard Telephone Extensions: 6				

Device Type: Unknown SIP Station (SIP Extension)

System	Extension ID	Primary User	IP Address	Location	IP Endpoint License Reserved
IPO Demo Prim	8012	Ryan Jones (Ext. 262)		Cloud	
Total number of Unknown SIP Station Extensions: 1					

2.3. Extension Security

This section provides a unique view of the programmed Extensions in the solution to reveal the patterns of use for various security features. While the level of security required may vary from one organization to another, every institution should have an organized and consistent approach to implementing these features. This section will uncover the current security implementation design, or lack thereof, and help improve the consistent and appropriate use of security-related features available within IP Office.

*To accomplish this, all Extensions in the solution have been divided into distinct 'Extension Security Groups' based on their use of security-related features. All Extensions that share the same settings for these features have been grouped together to highlight their commonality. Note that these groups are **not** something defined within the IP Office configuration, but are rather an analysis of the Extensions' and associated Users' existing programming. For each group of Extensions with identical security-related settings, the configuration of the security features is described, followed by a list of the Extensions that share those settings.*

The following list of security-related features available to Extensions was used to define the Extension Security Groups. Not all of the features listed below are available to all types of Extensions, limiting the ability to secure analog and digital Extensions, for example. The 'Base Extension' property was used to associate Users with Extensions when necessary.

- *Phone Password*
- *Force Authorization*
- *Specific IP Address required*
- *IPEI defined (IP DECT Extensions only)*
- *Signaling Security*
- *Media Security*
- *Encrypted Protocols*
- *Authenticated Protocols*
- *SRTP Replay Window Size*
- *Crypto Suites enabled*
- *Force Login enabled on all associated Users*

In addition, each 'Extension Security Group' was assigned an 'InfoPlus Security Rating' based on its use of the features above. This rating is a general indication of how secure the Extensions in the group are, and uses the following definitions:

- High *– Media streams are required to be encrypted, and both the media and control data are authenticated. Weaker crypto suites are not in use.*
- Medium *– An attempt is made to both encrypt and authenticate the media stream, although calls may be permitted if the media cannot be secured.*
- Low *– At least one of the security-related features shown above is being used to restrict the use of the Extension, or secure some portion of its traffic.*
- None *– None of the security-related features shown above is being used to restrict the use of the Extension, or secure any portion of its traffic.*

The groups shown below are sorted by their InfoPlus Security Rating, with the most secure Extension Security Groups being shown first. Within a security group, Extensions are sorted by their Extension ID, but are grouped by System name for multi-System solutions. The Security Group numbers shown are generated purely for reference to this analysis, and do not correspond to any programming within the IP Office system itself.

When looking at the security groups that were generated, keep in mind the following: The Extensions within a group should likely have some common function or purpose. For example, all the members of a particular workgroup should probably have identical security settings. If any of the members of the workgroup are categorized into a different security group, it means their settings are inconsistent with the other members, and should likely be updated.

Consider 'merging' two or more security groups that are very similar in their programming, but not identical. Is there a reason for the discrepancy, or were the Extensions just programmed by separate individuals that didn't have a consistent approach? The existence of a large number of Extension Security Groups with few Extensions in each one could indicate a disorganized approach to Extension security – in which security decisions are being made in an arbitrary manner at the time each Extension is initially provisioned.

Extension Security Group 1

The Extensions in this group share the following security-related settings:

- SIP devices are required to **authenticate with a User Name and Password** to register with IP Office (Force Authorization enabled)
- An attempt is made to **secure the media** (voice & video) of a call, but if unsuccessful, insecure media is used instead (Best Effort Media Security)
- Media (RTP data) will be both **encrypted and authenticated**
- Control data (RTCP) will **only be authenticated** (not encrypted)
- The **Replay Protection Window Size** is 64
- **Cryptography suites** available for use:
  SRTP_AES_CM_128_SHA1_80
- **InfoPlus Security Rating:** Medium

The following **Extensions** share these security settings:

System	Extension ID	Extension Type	Device Type	Primary User
IPO Demo Prim	8011	SIP	B179	Juan Brown (Ext. 261)
IPO Demo Prim	8012	SIP	Unknown SIP Station	Ryan Jones (Ext. 262)
IPO Demo Prim	8013	SIP	Not Present	Frank Williams (Ext. 263)
Total number of Extensions in this Security Group: 3				

Extension Security Group 2

The Extensions in this group share the following security-related settings:

- The primary User is required to **manually login** to the Extension to use it (Force Login enabled for the Base Extension User)
- A **password** is required to be entered as part of H.323 phone registration (Phone Password set)
- **InfoPlus Security Rating:** Low

The following **Extensions** share these security settings:

System	Extension ID	Extension Type	Device Type	Primary User
IPO Demo Prim	8000	H.323	9611G	Duane Rodriguez (Ext. 250)
IPO Demo Prim	8002	H.323	9611G	Shane Robinson (Ext. 252)
Total number of Extensions in this Security Group: 2				

Extension Security Group 3

The Extensions in this group share the following security-related settings:

- The primary User is required to **manually login** to the Extension to use it (Force Login enabled for the Base Extension User)
- **InfoPlus Security Rating:** Low

The following **Extensions** share these security settings:

System	Extension ID	Extension Type	Device Type	Primary User
IPO Demo Exp	202	Digital	9504	Sharon Hall (Ext. 226)
IPO Demo Exp	215	Digital	5420D	Rebecca Cooper (Ext. 239)
Total number of Extensions in this Security Group: 2				

Extension Security Group 4

The Extensions in this group share the following security-related settings:

- A **password** is required to be entered as part of H.323 phone registration (Phone Password set)
- **InfoPlus Security Rating:** Low

The following **Extensions** share these security settings:

System	Extension ID	Extension Type	Device Type	Primary User
IPO Demo Prim	8001	H.323	9611G	Robin Howard (Ext. 251)
IPO Demo Prim	8003	H.323	9611G	Alan Moore (Ext. 253)
IPO Demo Prim	8004	H.323	9611G	Elaine Gonzalez (Ext. 254)
Total number of Extensions in this Security Group: 3				

Extension Security Group 5

The Extensions in this group share the following security-related settings:

- **No security provisions** are in place on these Extensions
- **InfoPlus Security Rating:** None

The following **Extensions** share these security settings:

System	Extension ID	Extension Type	Device Type	Primary User
IPO Demo Exp	1	Digital	1416	Grace Adams (Ext. 201)
IPO Demo Exp	2	Digital	1416	Tracy Green (Ext. 202)
IPO Demo Exp	3	Digital	1416	Gladys Scott (Ext. 203)
IPO Demo Exp	4	Digital	1416	Diana Hill (Ext. 204)
IPO Demo Exp	5	Digital	1416	Jean Wright (Ext. 205)
IPO Demo Exp	6	Digital	1416	Heather King (Ext. 206)
IPO Demo Exp	7	Digital	1416	Sean Thomas (Ext. 207)
IPO Demo Exp	49	Digital	9504	Juanita Carter (Ext. 209)
IPO Demo Exp	50	Digital	9504	Sarah Walker (Ext. 210)
IPO Demo Exp	52	Digital	9504	Joanne Roberts (Ext. 212)
IPO Demo Exp	55	Analog	Standard Telephone	Stacy Campbell (Ext. 215)
IPO Demo Exp	56	Analog	Paging Speaker	Paging Speaker 1 (Ext. 216)

System	Extension ID	Extension Type	Device Type	Primary User
IPO Demo Exp	73	Analog	Standard Telephone	Ida Evans (Ext. 217)
IPO Demo Exp	74	Analog	Standard Telephone	Diane Hernandez (Ext. 218)
IPO Demo Exp	75	Analog	Standard Telephone	Frances Young (Ext. 219)
IPO Demo Exp	76	Analog	Quiet Headset	Extn220 (Ext. 220)
IPO Demo Exp	77	Analog	Quiet Headset	Extn221 (Ext. 221)
IPO Demo Exp	78	Analog	Standard Telephone	Stacey Stewart (Ext. 222)
IPO Demo Exp	79	Analog	Standard Telephone	Pearl Morris (Ext. 223)
IPO Demo Exp	80	Analog	Paging Speaker	Paging Speaker 2 (Ext. 224)
IPO Demo Exp	201	Digital	9504	Amanda Allen-Foster (Ext. 225)
IPO Demo Exp	203	Digital	9504	Brad Lee (Ext. 227)
IPO Demo Exp	205	Digital	9504	Gabriel Bailey (Ext. 229)
IPO Demo Exp	206	Digital	9504	Francis Martin (Ext. 230)
IPO Demo Exp	208	Digital	9504	Chad Harris (Ext. 232)
IPO Demo Exp	209	Digital	5420D	Travis White (Ext. 233)
IPO Demo Exp	210	Digital	5420D	Stanley Jackson (Ext. 234)
IPO Demo Exp	211	Digital	5420D	Clarence Anderson (Ext. 235)
IPO Demo Exp	212	Digital	5420D	Shawn Taylor (Ext. 236)
IPO Demo Exp	214	Digital	5420D	Ruby Cox (Ext. 238)
IPO Demo Exp	216	Digital	5420D	Michael Gray (Ext. 240)
IPO Demo Exp	8000	H.323	9611G	Robert Stone (Ext. 300)
IPO Demo Exp	8001	H.323	9611G	Nancy Holmes (Ext. 302)
IPO Demo Exp	8002	H.323	9611G	Steven Wallace (Ext. 303)
IPO Demo Exp	8003	H.323	9611G	Regina Mills (Ext. 304)
IPO Demo Exp	8004	H.323	9611G	Emma Markson (Ext. 301)
IPO Demo Prim	8005	H.323	9611G	Lucy Butler (Ext. 270)
IPO Demo Prim	8006	H.323	5610SW	Charlie Clark (Ext. 256)
IPO Demo Prim	8007	H.323	5610SW	Dean Martinez (Ext. 257)
IPO Demo Prim	8008	H.323	5610SW	Adam Miller (Ext. 258)
IPO Demo Prim	8009	H.323	5610SW	Francisco Garcia (Ext. 259)
IPO Demo Prim	8010	H.323	9611G	Brandon Davis (Ext. 260)
IPO Demo Prim	8014	H.323	9611G	Nicole Perry (Ext. 272)
IPO Demo Prim	8015	H.323	9611G	Angela Black (Ext. 267)
Total number of Extensions in this Security Group: 44				

3. Lines

The Lines configured in an IP Office solution provide the communication links to other entities, whether the local 'Central Office' of the Public Switched Telephone Network, a VoIP service provider, or another IP Office in a networked environment. They enable the local IP Office Users to communicate with other individuals, often throughout the entire world.

This chapter will summarize, document, and analyze the Lines that are configured as part of this IP Office solution. It begins with a high-level summary of the various types of Lines that are provisioned – analog, digital PRI, SIP, etc. This summary provides an overview of which technologies this IP Office is using to communicate with external entities. Following the summary is a more detailed documentation of each individual Line in the system, with the most commonly needed information presented in an easy to read format.

The last section in this chapter performs an analysis of the security-related features that are available to Lines. Very similar to the analysis that was performed on Extensions in the previous chapter, this section will help reveal existing patterns of using IP Office features to secure the configured Lines.

3.1. Lines by Type

This section provides a high-level summary of the types of Lines that are being used in this IP Office solution. The technology used to carry conversations to external entities has evolved over time – from traditional analog 'POTS' Lines, to digital PRI and BRI Lines (e.g. T-1s and E-1s), to Voice over IP (VoIP) Lines using the H.323 or SIP protocols. Each of these technologies has pros and cons, and many IP Office systems use a combination of Line types for resiliency and/or legacy support.

In the tables below, all of the in-use Lines of this IP Office solution have been grouped by their Line type. This provides a simple way to identify the Line technologies currently in use, and their extent within the system. The lists below do not include any hardware-based Lines that are entirely 'Out of Service', assuming they are not physically connected.

The properties shown in the tables below are a function of the type of Line being displayed. For example, analog and digital Lines will include their physical Module / Port address, while SIP Lines will include their ITSP destination address. Note that any entries shown in the 'Telephone Number' or 'Description' columns are entered by a technician purely for reference purposes. They do not impact the system's functionality, and only reflect what the technician manually entered.

Within a table, the Lines are sorted by Line Number, but are grouped by System name for multi-System solutions. When viewing this document electronically, the Line Number column is linked to the Line's complete configuration details presented in the next section.

Analog Lines

System	Line Number	Module / Port	Line Appearance ID	Telephone Number
IPO Demo Exp	1	Base Card 1 / Port 9	701	1-201-555-7410
IPO Demo Exp	2	Base Card 1 / Port 10	702	1-201-555-9852
IPO Demo Exp	3	Base Card 1 / Port 11	703	
IPO Demo Exp	9	Base Card 3 / Port 9	729	
IPO Demo Exp	10	Base Card 3 / Port 10	730	1-201-555-5469
IPO Demo Exp	11	Base Card 3 / Port 11	731	1-201-555-0014
IPO Demo Exp	101	Exp. Mod. 1 / Port 1	733	
IPO Demo Exp	109	Exp. Mod. 1 / Port 9	741	1-201-555-1109
Total number of Analog Lines in use: 8				

PRI Lines

System	Line Number	Module / Port	Type / SubType	Usable Channels	Telephone Number
IPO Demo Exp	5	Base Card 2 / Port 9	T1 / PRI	16	1-201-555-8794
Total number of PRI Lines in use: 1					

IP Office Lines

System	Line Number	Description	# of Channels	Destination
IPO Demo Exp	17	Expansion to Primary	5	System 'IPO Demo Prim'

System	Line Number	Description	# of Channels	Destination
IPO Demo Exp	18	Expansion to Secondary	5	System 'IPO Demo Sec'
IPO Demo Prim	1	Primary to Secondary	5	System 'IPO Demo Sec'
IPO Demo Prim	2	Primary to Expansion	5	System 'IPO Demo Exp'
IPO Demo Sec	1	Secondary to Primary	5	System 'IPO Demo Prim'
IPO Demo Sec	2	Secondary to Expansion	5	System 'IPO Demo Exp'
Total number of IP Office Lines configured: 6				

SIP Lines

System	Line Number	Description	Max Calls	ITSP Domain Name	ITSP Address
IPO Demo Exp	19	Expansion SIP Line	15		192.168.78.5
IPO Demo Prim	9	Primary SIP Line	20		192.168.56.3
IPO Demo Sec	9	Backup SIP Line	10		192.168.57.3
Total number of SIP Lines configured: 3					

3.2. Line Details

This section provides a detailed description of each of the in-use Lines of this IP Office solution. The same Lines shown in the previous section are presented, but this time with a more complete explanation of each Line's unique configuration. This documentation provides an excellent reference for planning trunking changes, or validating the existing trunking configuration. The Lines are presented in Line Number order, grouped by System for a multi-System network.

The most commonly needed information is presented for each Line, specific to the type of Line being shown. For example, analog and digital Lines will include their physical Module / Port address, while SIP Lines will include their ITSP destination address, IP protocol, and a list of codecs used. For multi-channel Lines, like PRI T-1's, a table of each individual channel's properties is displayed. A similar table is shown for each of the URIs associated with a SIP Line. When viewing this document electronically, any of the Incoming or Outgoing Group IDs link to that group's documentation in Chapter 4, Call Routing, for easy reference.

The content below does not include any hardware-based Lines that are entirely 'Out of Service', assuming they are not physically connected. Note that any entries shown for the 'Telephone Number' or 'Description' values are entered by a technician purely for reference purposes. They do not impact the system's functionality, and only reflect what the technician manually entered.

The following Lines are configured in this IP Office solution:

System: IPO Demo Exp

Line: 1 Type: Analog Line

Module / Port: Base Card 1 / Port 9
Analog Trunk Type: Loop Start w/Caller ID
Direction: Bothway

Telephone Number: 1-201-555-7410
Line Appearance ID: 701
Incoming Group ID: 1
Outgoing Group ID: 10
Prefix: <none>

Line: 2 Type: Analog Line

Module / Port: Base Card 1 / Port 10
Analog Trunk Type: Loop Start w/Caller ID
Direction: Bothway

Telephone Number: 1-201-555-9852
Line Appearance ID: 702
Incoming Group ID: 1
Outgoing Group ID: 10
Prefix: <none>

Line: 3 Type: Analog Line

Module / Port: Base Card 1 / Port 11
Analog Trunk Type: Loop Start w/Caller ID
Direction: Bothway

Telephone Number: <none>
Line Appearance ID: 703
Incoming Group ID: 1
Outgoing Group ID: 10
Prefix: <none>

Line: 5 Type: PRI Line

Module / Port: Base Card 2 / Port 9

Telephone Number: 1-201-555-8794

PRI Type: T1
Line SubType: PRI
Usable Channels: 16
Incoming: 16 **Outgoing:** 13
Voice: 16 **Data:** 16

Incoming Group ID(s): 2
Outgoing Group ID(s): 5
Prefix: <none>
# of Incoming Routing Digits: 4

PRI Channels

Channel Number	Voice / Data	Direction	State	Line Appearance ID	Incoming Group ID	Outgoing Group ID
1	Voice & Data	Bothway	In Service	705	2	5
2	Voice & Data	Bothway	In Service	706	2	5
3	Voice & Data	Bothway	In Service	707	2	5
4	Voice & Data	Bothway	In Service	708	2	5
5	Voice & Data	Bothway	In Service	709	2	5
6	Voice & Data	Bothway	In Service	710	2	5
7	Voice & Data	Bothway	In Service	711	2	5
8	Voice & Data	Bothway	In Service	712	2	5
9	Voice & Data	Bothway	In Service	713	2	5
10	Voice & Data	Bothway	In Service	714	2	5
11	Voice & Data	Bothway	In Service	715	2	5
12	Voice & Data	Bothway	In Service	716	2	5
13	Voice & Data	Bothway	In Service	717	2	5
14	Voice & Data	Incoming	In Service	718	2	5
15	Voice & Data	Incoming	In Service	719	2	5
16	Voice & Data	Incoming	In Service	720	2	5
17	Voice & Data	Incoming	In Service*	721	0	0
18	Voice & Data	Outgoing	In Service*	722	0	0
19	Voice & Data	Outgoing	In Service*	723	0	0
20	Voice & Data	Outgoing	In Service*	724	0	0
21	Voice & Data	Outgoing	In Service*	725	0	0
22	Voice & Data	Outgoing	Out of Service	726	0	0
23	Voice & Data	Outgoing	Out of Service	727	0	0

NOTE:* *These Channels are configured as 'In Service', but are **not sufficiently licensed to use. Calls attempting to use these channels will fail.*

Line: 9 Type: Analog Line

Module / Port: Base Card 3 / Port 9
Analog Trunk Type: Loop Start w/Caller ID
Direction: Bothway

Telephone Number: <none>
Line Appearance ID: 729
Incoming Group ID: 1
Outgoing Group ID: 10
Prefix: <none>

Line: 10 Type: Analog Line

Module / Port: Base Card 3 / Port 10
Analog Trunk Type: Loop Start w/Caller ID

Telephone Number: 1-201-555-5469
Line Appearance ID: 730

Direction: Bothway

Incoming Group ID: 1
Outgoing Group ID: 10
Prefix: <none>

Line: 11 Type: Analog Line

Module / Port: Base Card 3 / Port 11
Analog Trunk Type: Loop Start w/Caller ID
Direction: Bothway

Telephone Number: 1-201-555-0014
Line Appearance ID: 731
Incoming Group ID: 1
Outgoing Group ID: 10
Prefix: <none>

Line: 17 Type: IP Office Line

Destination: System 'IPO Demo Prim'
Port: 443
Number of Channels: 5
Incoming: 5 **Outgoing:** 5
Network Services: Provides SCN support w/ Backup
The remote destination provides backup of:
Local IP Phones: Yes
Local Hunt Groups: Yes
Voicemail: No
IP DECT Phones: No
VoIP Codecs in use: (System default)

- G.711 A-LAW 64K
- G.711 U-LAW 64K
- G.723.1 6.3K MP-MLQ
- G.729(a) 8K CS-ACELP

Description: Expansion to Primary
Telephone Number: <none>
Location: New Orleans
Outgoing Group ID: 99999
Prefix: <none>

Line: 18 Type: IP Office Line

Destination: System 'IPO Demo Sec'
Port: 443
Number of Channels: 5
Incoming: 5 **Outgoing:** 5
Network Services: Provides SCN support
VoIP Codecs in use: (System default)

- G.711 A-LAW 64K
- G.711 U-LAW 64K
- G.723.1 6.3K MP-MLQ
- G.729(a) 8K CS-ACELP

Description: Expansion to Secondary
Telephone Number: <none>
Location: New York
Outgoing Group ID: 99998
Prefix: <none>

Line: 19 Type: SIP Line

Description: Expansion SIP Line
ITSP Domain Name: <not specified>
ITSP Address: 192.168.78.5
URI Type: SIP
IP Protocol: UDP
Send Port: 5060 **Listen Port:** 5060
VoIP Codecs in use: (System default)

Admin State: In Service
Max Calls: 15
Location: Cloud
Incoming Group ID(s): 2
Outgoing Group ID(s): 5
Prefix: <none>
National Prefix: 0

- G.711 A-LAW 64K
- G.711 U-LAW 64K
- G.723.1 6.3K MP-MLQ
- G.729(a) 8K CS-ACELP

International Prefix: 00

The following **SIP URIs** are associated with this Line, each of which acts independently as a set of trunk channels for call routing purposes:

Channel Number	SIP Name ('From' field)	Display Name	Contact	Incoming Group ID	Outgoing Group ID	Max Calls
1	Use SIP Name of the User / Group	Use SIP Display Name of the User / Group	Use SIP Contact of the User / Group	2	5	10
2	Use SIP Name of the User / Group	Use SIP Display Name of the User / Group	Use SIP Contact of the User / Group	2	5	5

Line: 101 Type: Analog Line

Module / Port: Exp. Mod. 1 / Port 1
Analog Trunk Type: Loop Start w/Caller ID
Direction: Bothway

Telephone Number: <none>
Line Appearance ID: 733
Incoming Group ID: 1
Outgoing Group ID: 10
Prefix: <none>

Line: 109 Type: Analog Line

Module / Port: Exp. Mod. 1 / Port 9
Analog Trunk Type: Loop Start w/Caller ID
Direction: Bothway

Telephone Number: 1-201-555-1109
Line Appearance ID: 741
Incoming Group ID: 1
Outgoing Group ID: 10
Prefix: <none>

System: IPO Demo Prim

Line: 1 Type: IP Office Line

Destination: System 'IPO Demo Sec'
Number of Channels: 5
Incoming: 5 **Outgoing:** 5
Network Services: Provides SCN support w/ Backup
The remote destination provides backup of:
Local IP Phones: Yes
Local Hunt Groups: Yes
Voicemail: Yes
IP DECT Phones: No
VoIP Codecs in use: (System default)

- G.711 A-LAW 64K
- G.711 U-LAW 64K

Description: Primary to Secondary
Telephone Number: <none>
Location: New York
Outgoing Group ID: 99998
Prefix: <none>

- G.723.1 6.3K MP-MLQ
- G.729(a) 8K CS-ACELP

Line: 2 Type: IP Office Line

Destination: System 'IPO Demo Exp'
Number of Channels: 5
Incoming: 5 **Outgoing:** 5
Network Services: Provides SCN support
VoIP Codecs in use: (System default)

- G.711 A-LAW 64K
- G.711 U-LAW 64K
- G.723.1 6.3K MP-MLQ
- G.729(a) 8K CS-ACELP

Description: Primary to Expansion
Telephone Number: <none>
Location: Chicago
Outgoing Group ID: 99001
Prefix: <none>

Line: 9 Type: SIP Line

Description: Primary SIP Line
ITSP Domain Name: <not specified>
ITSP Address: 192.168.56.3
URI Type: SIP
IP Protocol: TCP
Send Port: 5060 **Listen Port:** 5060
VoIP Codecs in use: (System default)

- G.711 A-LAW 64K
- G.711 U-LAW 64K
- G.723.1 6.3K MP-MLQ
- G.729(a) 8K CS-ACELP

Admin State: In Service
Max Calls: 20
Location: Cloud
Incoming Group ID(s): 5
Outgoing Group ID(s): 2
Prefix: <none>
National Prefix: 0
International Prefix: 00

The following **SIP URIs** are associated with this Line, each of which acts independently as a set of trunk channels for call routing purposes:

Channel Number	SIP Name ('From' field)	Display Name	Contact	Incoming Group ID	Outgoing Group ID	Max Calls
1	Use SIP Name of the User / Group	Use SIP Display Name of the User / Group	Use SIP Contact of the User / Group	5	2	10
2	Use SIP Name of the User / Group	Use SIP Display Name of the User / Group	Use SIP Contact of the User / Group	5	2	10

System: IPO Demo Sec

Line: 1 Type: IP Office Line

Destination: System 'IPO Demo Prim'
Port: 443
Number of Channels: 5
Incoming: 5 **Outgoing:** 5

Description: Secondary to Primary
Telephone Number: <none>
Location: New York
Outgoing Group ID: 99999

Network Services: Provides SCN support w/ Backup
The remote destination provides backup of:
Local IP Phones: Yes
Local Hunt Groups: No
Voicemail: Yes
IP DECT Phones: No
VoIP Codecs in use: (System default)

- G.711 A-LAW 64K
- G.711 U-LAW 64K
- G.723.1 6.3K MP-MLQ
- G.729(a) 8K CS-ACELP

Prefix: <none>

Line: 2 Type: IP Office Line

Destination: System 'IPO Demo Exp'
Number of Channels: 5
Incoming: 5 **Outgoing:** 5
Network Services: Provides SCN support
VoIP Codecs in use: (System default)

- G.711 A-LAW 64K
- G.711 U-LAW 64K
- G.723.1 6.3K MP-MLQ
- G.729(a) 8K CS-ACELP

Description: Secondary to Expansion
Telephone Number: <none>
Location: Chicago
Outgoing Group ID: 99002
Prefix: <none>

Line: 9 Type: SIP Line

Description: Backup SIP Line
ITSP Domain Name: <not specified>
ITSP Address: 192.168.57.3
URI Type: SIPS (Secure)
IP Protocol: TLS (Secure)
Send Port: 5061 **Listen Port:** 5061
VoIP Codecs in use: (System default)

- G.711 A-LAW 64K
- G.711 U-LAW 64K
- G.723.1 6.3K MP-MLQ
- G.729(a) 8K CS-ACELP

Admin State: In Service
Max Calls: 10
Location: Cloud
Incoming Group ID(s): 11
Outgoing Group ID(s): 11
Prefix: <none>
National Prefix: 0
International Prefix: 00

The following **SIP URIs** are associated with this Line, each of which acts independently as a set of trunk channels for call routing purposes:

Channel Number	SIP Name ('From' field)	Display Name	Contact	Incoming Group ID	Outgoing Group ID	Max Calls
1	Use SIP Name of the User / Group	Use SIP Display Name of the User / Group	Use SIP Contact of the User / Group	11	11	10

3.3. Line Security

This section provides a unique view of the programmed Lines in the solution to reveal the patterns of use for various security features. While the level of security required may vary from one organization to another, every institution should have an organized and consistent approach to implementing these features. This section will uncover the current security implementation design, or lack thereof, and help improve the consistent and appropriate use of security-related features available within IP Office.

*To accomplish this, all in-use Lines in the solution have been divided into distinct 'Line Security Groups' based on their use of security-related features. All Lines that share the same settings for these features have been grouped together to highlight their commonality. Note that these groups are **not** something defined within the IP Office configuration, but are rather an analysis of the Lines' existing programming. For each group of Lines with identical security-related settings, the configuration of the security features is described, followed by a list of the Lines that share those settings.*

The following list of security-related features available to Lines was used to define the Line Security Groups. Not all of the features listed below are available to all types of Lines, limiting the ability to secure analog and digital Lines, for example.

- *Network Type*
- *Direction*
- *URI Type*
- *IP Protocol*
- *Media Security*
- *Encrypted Protocols*
- *Authenticated Protocols*
- *SRTP Replay Window Size*
- *Crypto Suites enabled*
- *SIP Credentials*
- *WebSocket Security*
- *WebSocket Password*
- *IP DECT Auto-Create Users*
- *IP DECT Subscriptions*
- *IP DECT Authentication Code*

In addition, each 'Line Security Group' was assigned an 'InfoPlus Security Rating' based on its use of the features above. This rating is a general indication of how secure the Lines in the group are, and uses the following definitions:

- High *– Media streams are required to be encrypted, both the media and control data are authenticated, and weaker crypto suites are not in use. Transport Layer Security (TLS) is enabled for SIP or HTTP messages.*
- Medium *– An attempt is at least made to both encrypt and authenticate the media stream, or Transport Layer Security (TLS) is enabled for SIP or HTTP messages. Calls could still be permitted without secured media.*
- Low *– At least one of the security-related features shown above is being used to restrict the use of the Line, or secure some portion of its traffic.*
- None *– None of the security-related features shown above is being used to restrict the use of the Line, or secure any portion of its traffic.*

The groups shown below are sorted by their InfoPlus Security Rating, with the most secure Line Security Groups being shown first. Within a security group, Lines are sorted by their Line Number, but grouped by System name for multi-System solutions. The Security Group numbers shown are generated purely for reference to this analysis, and do not correspond to any programming within the IP Office system itself.

When looking at the security groups that were generated, keep in mind the following: The Lines within a security group should likely have some common function or purpose. For example, all the Lines that are assigned a particular Outgoing Group ID should probably have identical security settings. If any of the members of the Outgoing Group ID are categorized into a different security group, it means their settings are inconsistent with the other members, and should likely be updated.

Consider 'merging' two or more security groups that are very similar in their programming, but not identical. Is there a reason for the discrepancy, or were the Lines just programmed by separate individuals that didn't have a consistent approach? The existence of a large number of Line Security Groups with few Lines in each one could indicate a disorganized approach to Line security – in which security decisions are being made in an arbitrary manner at the time each Line is initially provisioned.

Line Security Group 1

The Lines in this group share the following security-related settings:

- A matching **password** is required from the IP Office Systems at each end of an **IP Office Line**
- The **'HTTPS' and 'TLS' protocols** will be used to provide **secure transmission** of data among IP Office Systems
- Clients' **TLS identity certificates** will be **verified** against the server's certificate store for authentication
- **Secure media** (voice & video) **is required** for all calls. Calls attempting to use insecure media will be rejected. (Media Security Enforced)
- Media (RTP data) will be both **encrypted and authenticated**
- Control data (RTCP) will **only be authenticated** (not encrypted)
- The **Replay Protection Window Size** is 64
- **Cryptography suites** available for use:
  SRTP_AES_CM_128_SHA1_80
- **InfoPlus Security Rating:** High

The following Lines share these security settings:

System	Line #	Line Type	Description	Module / Port
IPO Demo Exp	17	IP Office Line	Expansion to Primary	-
IPO Demo Exp	18	IP Office Line	Expansion to Secondary	-
IPO Demo Prim	1	IP Office Line	Primary to Secondary	-
IPO Demo Prim	2	IP Office Line	Primary to Expansion	-
IPO Demo Sec	1	IP Office Line	Secondary to Primary	-
IPO Demo Sec	2	IP Office Line	Secondary to Expansion	-
Total number of Lines in this Security Group: 6				

Line Security Group 2

The Lines in this group share the following security-related settings:

- The **'SIPS' protocol** will be used to provide **secure transmission** of SIP signaling messages using Transport Layer Security **(TLS)**
- **InfoPlus Security Rating:** Medium

The following Lines share these security settings:

System	Line #	Line Type	Description	Module / Port
IPO Demo Sec	9	SIP Line	Backup SIP Line	-
Total number of Lines in this Security Group: 1				

Line Security Group 3

The Lines in this group share the following security-related settings:

- An attempt is made to **secure the media** (voice & video) of a call, but if unsuccessful, insecure media is used instead (Best Effort Media Security)
- Media (RTP data) will be both **encrypted and authenticated**

- Control data (RTCP) will **only be authenticated** (not encrypted)
- The **Replay Protection Window Size** is 64
- **Cryptography suites** available for use:
  SRTP_AES_CM_128_SHA1_32
- **InfoPlus Security Rating:** Medium

The following Lines share these security settings:

System	Line #	Line Type	Description	Module / Port
IPO Demo Prim	9	SIP Line	Primary SIP Line	-
Total number of Lines in this Security Group: 1				

Line Security Group 4

The Lines in this group share the following security-related settings:

- **Password-based registration** to the **SIP service provider** is being used for at least some SIP URIs
- **InfoPlus Security Rating:** Low

The following Lines share these security settings:

System	Line #	Line Type	Description	Module / Port
IPO Demo Exp	19	SIP Line	Expansion SIP Line	-
Total number of Lines in this Security Group: 1				

Line Security Group 5

The Lines in this group share the following security-related settings:

- **No security provisions** are in place on these Lines
- **InfoPlus Security Rating:** None

The following Lines share these security settings:

System	Line #	Line Type	Description	Module / Port
IPO Demo Exp	1	Analog Line	1-201-555-7410	Base Card 1 / Port 9
IPO Demo Exp	2	Analog Line	1-201-555-9852	Base Card 1 / Port 10
IPO Demo Exp	3	Analog Line		Base Card 1 / Port 11
IPO Demo Exp	5	PRI Line	1-201-555-8794	Base Card 2 / Port 9
IPO Demo Exp	9	Analog Line		Base Card 3 / Port 9
IPO Demo Exp	10	Analog Line	1-201-555-5469	Base Card 3 / Port 10
IPO Demo Exp	11	Analog Line	1-201-555-0014	Base Card 3 / Port 11
IPO Demo Exp	101	Analog Line		Exp. Mod. 1 / Port 1
IPO Demo Exp	109	Analog Line	1-201-555-1109	Exp. Mod. 1 / Port 9
Total number of Lines in this Security Group: 9				

4. Call Routing

This chapter focuses on the routing of calls to and from the IP Office solution using the Lines described in the previous chapter. When Users wish to contact any individual not configured in the local IP Office System, an outgoing Line must be selected to carry the call. Similarly, when an incoming call arrives on any of the Lines, the appropriate receiver for the call must be determined. The sections of this chapter will help document and explain this call routing behavior.

Central to the configuration of call routing in IP Office are Incoming and Outgoing Line Groups. Each external Line (or channel of a multi-channel Line) is assigned to one Outgoing Line Group and one Incoming Line Group. The incoming and outgoing routing rules are then defined in terms of these Line Groups, rather than having to configure routing for each Line or channel individually. The first two sections describe the Incoming and Outgoing Line Groups defined in the solution, and explain the applicable routing behavior of each group.

The next section provides a detailed explanation of the Alternate Route Selection (ARS) configuration, which is fundamental to the outgoing routing design. This section provides details supporting the conclusions of the outgoing call routing analysis presented earlier. Finally, a section describing the dialing patterns that are explicitly barred during outgoing call routing ends this chapter.

4.1. Incoming Call Routing

The routing of incoming calls to IP Office is handled by Incoming Line Groups and Incoming Call Routes. Together, these elements select an appropriate destination (e.g. a User or Hunt Group) for calls coming in on the available Lines.

Every Line or channel that handles external, incoming calls is assigned to exactly one Incoming Line Group. Thus, each group contains one or more individual Lines or channels as its members. Incoming Call Routes, which select the appropriate recipient(s) for incoming calls, are then configured for each of the Incoming Line Groups defined. The Incoming Call Routes built for each Line Group determine how the incoming calls on the members of that group are routed. By assigning multiple Lines to the same Incoming Line Group, you can easily specify the incoming call routing behavior for all of the Lines in the group together.

This section begins with a summary of the Incoming Line Groups that are in use in the IP Office solution. For multi-System networks, the Line Groups configured in each separate System are summarized. Note that Line Groups whose members are all 'Out of Service' or are otherwise unusable are not included in the summary. Keeping the number of distinct Line Groups to a minimum may ease the administration of call routing by requiring fewer Incoming Call Routes to be built. Before creating a new Incoming Line Group, this section of the report should be referenced to determine if adding new members to an existing group would be sufficient.

After the group summary, the details of each Incoming Line Group in the solution are described. The Incoming Line Groups are presented in 'Group ID' order, organized per-System for multi-System solutions. The description of each Incoming Line Group has two major sections: a list of the group's members, and an explanation of the group's routing rules. First, the individual members of the group (the Lines and/or Line channels) are displayed in a table. Note that completely different types of Lines, and individual channels from separate digital circuits, can all be assigned to the same Incoming Line Group. If any of the members assigned to an Incoming Line Group are declared 'Out of Service', are unlicensed, or are otherwise unusable, those members will be shown in a separate table for clarity.

After the group's members are listed, the Incoming Call Routes configured for the group are shown in another table. These routing rules apply to all incoming calls received from any of the group's usable members, and explain where calls coming in on those members will be directed. Multiple routing rules can be defined to direct different types of calls to different destinations. The three main matching criteria of each rule are:

- *Call Type*
- *Incoming Number (the number that was dialed)*
- *Incoming Caller ID information (where the call is coming from)*

Incoming calls are matched against the routing rules for the Line Group, and the best match determines where the call is sent. The Incoming Number and Incoming Caller ID fields can be configured to route calls based on the number that was dialed, and/or where the call is coming from, respectively. Leaving either of these fields blank will match all incoming calls.

*The Incoming Number field normally is matched against the **ending** (rightmost) digits of the dialed number. Several special characters can be used in the Incoming Number field, and have the following meanings:*

- *A wildcard 'X' matches any single digit in the dialed number*
- *A leading '-' indicates the pattern must match the **entire** dialed number, with an exact length*
- *An 'i' sets the call type to 'National' for outgoing Caller ID matching*

Each Incoming Call Route can specify multiple destinations to use when it matches an incoming call. A different destination can be selected based on the Time Profile that is currently in effect. This allows incoming calls to be routed differently during non-business hours, for example. Furthermore, for every destination configured, an alternate 'Fallback' destination can be specified to use in the event that the primary destination cannot be reached. The tables below will include all possible destinations (primary & fallback for every configured Time Profile) for each Incoming Call Route.

Finally, an Incoming Call Route can also alter the properties of a call when it is used. For example, the Priority, Locale, and Call Tag of an incoming call can be set by the matching Call Route. This feature can be used to assign a higher priority to incoming calls to or from a particular number, for instance. A Call Route can even trigger automatic recording of the incoming

calls that match it. If an Incoming Call Route uses any of these additional features, they will be noted in gray below the matching fields.

When viewing this document electronically, both the Line numbers and Time Profile names in the tables link to those elements' detailed documentation elsewhere in the report, for easy reference. As in previous sections, any 'Description' shown for a Line is simply what a technician has manually entered, and has no functional impact on the system.

Summary of Incoming Group IDs

System	Incoming Group IDs in Use
IPO Demo Exp	1, 2
IPO Demo Prim	5
IPO Demo Sec	11

System: IPO Demo Exp

Incoming Line Group 1

The following in-use **Lines and Channels** are assigned to Incoming Group ID **1**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
1	Analog	1-201-555-7410	Base Card 1 / Port 9	-
2	Analog	1-201-555-9852	Base Card 1 / Port 10	-
3	Analog		Base Card 1 / Port 11	-
9	Analog		Base Card 3 / Port 9	-
10	Analog	1-201-555-5469	Base Card 3 / Port 10	-
11	Analog	1-201-555-0014	Base Card 3 / Port 11	-
101	Analog		Exp. Mod. 1 / Port 1	-
109	Analog	1-201-555-1109	Exp. Mod. 1 / Port 9	-

The following Lines and Channels are assigned to Incoming Group ID 1, but are **'Out of Service', unlicensed, or otherwise unusable** for incoming calls:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
4	Analog		Base Card 1 / Port 12	-
12	Analog		Base Card 3 / Port 12	-

The following **Incoming Call Routes** are configured for Incoming Group ID **1**:

Call Type	Incoming Number	Incoming Caller ID	Destination	Time Profile	Is Fallback Destination?
Any Voice	1-201-555-0014		User 'Ruby Cox', Ext. 238		
Any Voice			User 'Grace Adams', Ext. 201		
Any Data			'DialIn'		

Incoming Line Group 2

The following in-use **Lines and Channels** are assigned to Incoming Group ID **2**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
5	T1 / PRI	1-201-555-8794	Base Card 2 / Port 9	1-16
19	SIP	Expansion SIP Line	-	1 and 2

The following **Incoming Call Routes** are configured for Incoming Group ID **2**:

Call Type	Incoming Number	Incoming Caller ID	Destination	Time Profile	Is Fallback Destination?
Any Voice	1-773-555-4589		User 'Pearl Morris', Ext. 223		
*Matched calls will have their **Priority** set to **'Medium'***					
Any Voice	XXXX		Matched X's from Incoming Num.	Night Shift	
			Hunt Group 'Night HG', Ext. 601	Night Shift	✓
			Matched X's from Incoming Num.	<Default>	
			Hunt Group 'Day HG', Ext. 600	<Default>	✓
Any Voice	<Use Caller ID matching>	<Match 'Number Unavailable'>	Voicemail Pro start point 'BlockedCallerID'		
Any Data			'DialIn'		

System: IPO Demo Prim

Incoming Line Group 5

The following in-use **Lines and Channels** are assigned to Incoming Group ID **5**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
9	SIP	Primary SIP Line	-	1 and 2

The following **Incoming Call Routes** are configured for Incoming Group ID **5**:

Call Type	Incoming Number	Incoming Caller ID	Destination	Time Profile	Is Fallback Destination?
Any Voice	3561	<Match 'Number Unavailable'>	Voicemail Pro start point 'BlockedCallerID'		
Any Voice	XXXX		Matched X's from Incoming Num.		
Any Voice		1-416-555-4784	User 'Duane Rodriguez', Ext. 250		
***All** matched calls will be **recorded** if possible*					
*Call recording is **always active***					
Recorded calls are saved in the Voice Recording Library					

Call Type	Incoming Number	Incoming Caller ID	Destination	Time Profile	Is Fallback Destination?
Any Voice		1-416-555-9115	User 'Shane Robinson', Ext. 252		
			User 'Joan Lopez', Ext. 265		✓
Any Data			'DialIn'		

System: IPO Demo Sec

Incoming Line Group 11

The following in-use **Lines and Channels** are assigned to Incoming Group ID **11**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
9	SIP	Backup SIP Line	-	1

The following **Incoming Call Routes** are configured for Incoming Group ID **11**:

Call Type	Incoming Number	Incoming Caller ID	Destination	Time Profile	Is Fallback Destination?
There are no Incoming Call Routes associated with this Incoming Group ID*					

**__NOTE:__ There are in-use Lines and/or Channels assigned to this Incoming Group ID, but there are __no Incoming Call Routes__ defined for it. It is recommended to assign explicit routing rules for all Incoming Group IDs in use. See the 'Missing Incoming Call Routes' Action Item for a complete list of Incoming Line Groups with similar configuration issues.*

4.2. Outgoing Call Routing

In IP Office, the selection of a Line to place an outgoing call is controlled by the configuration of Outgoing Line Groups, Short Codes, and the Alternate Route Selection (ARS) system. These elements work together to select an appropriate Line based on the number that was dialed, who is making the call, which Lines are currently available, and even the time of day the call is being placed.

Every Line or channel that handles outgoing calls is assigned to exactly one Outgoing Line Group. Thus, each group contains one or more individual Lines or channels as its members. Short Codes and ARS tables are then configured to direct outgoing calls to a particular Outgoing Line Group, meaning that one of the group's available members should be used to carry the call. By assigning multiple Lines to the same Outgoing Line Group, many outgoing calls can be handled with very few routing rules.

This section begins with a summary of the Outgoing Line Groups that are in use in the IP Office solution. For multi-System networks, the Line Groups configured in each separate System are summarized. Note that Line Groups whose members are all 'Out of Service' or are otherwise unusable are not included in the summary. Keeping the number of distinct Line Groups to a minimum may ease the administration of call routing by requiring fewer Short Codes and ARS entries. Before creating a new Outgoing Line Group, this section of the report should be referenced to determine if adding new members to an existing group would be sufficient.

After the group summary, the details of each Outgoing Line Group in the solution are described. The Outgoing Line Groups are presented in 'Group ID' order, organized per-System for multi-System solutions. The description of each Outgoing Line Group has two major sections: a list of the group's members, and an explanation of the routing rules that direct calls to the group. First, the individual members of the group (the Lines and/or Line channels) are displayed in a table. Note that completely different types of Lines, and individual channels from separate digital circuits, can all be assigned to the same Outgoing Line Group. If any of the members assigned to an Outgoing Line Group are declared 'Out of Service', are unlicensed, or are otherwise unusable, those members will be shown in a separate table for clarity.

After the group's members are listed, the routing rules that direct outgoing calls to the group are explained. There are two basic ways that calls are routed to an Outgoing Line Group: directly by a (non-ARS) Short Code using one of the 'Dial' features, or indirectly by way of the Alternate Route Selection (ARS) tables. The 'Dial' Short Code features that can direct an external call to a Line Group include:

- *Dial*
- *Dial Emergency*
- *Dial Fax*
- *Dial Speech*
- *Dial Video*
- *Dial 3K1*
- *Dial 56K*
- *Dial 64K*
- *Dial V110*
- *Dial V120*

If there are any Short Codes that use one of the above features to route calls directly to the Outgoing Line Group, they will be shown first in a table format. Each such Short Code will be listed, indicating: the type of Short Code (System, User, User Rights, etc.), identifying information (the User's name for a User Short Code, for example), the Short Code pattern itself, the specific 'Dial' feature used, and the dialing pattern that is sent to the Outgoing Line Group when the Short Code is matched.

Next, if there are Short Codes that use any of the 'Dial' features listed above to route calls to the Outgoing Line Group by way of Alternate Route Selection (ARS), they will be shown with a slightly different table format. The originating Short Code's type, identifying information and matching pattern are listed just like they are for the direct-routing Short Codes. But for ARS-routing, each specific ARS Short Code that directs calls to the Outgoing Line Group is then identified by its ARS Form ID and ARS Short Code. If an ARS Short Code matches only a subset of the originating Short Code, the precise subset it handles is shown in gray italics underneath the originating Short Code. This identifies which specific dial patterns are sent to the Outgoing Line Group via the ARS Short Code. Both the incoming pattern that is matched by the ARS Short Code, as well as the resulting outgoing pattern that is sent to the Line Group are shown.

Thus, in the ARS routing tables, the columns before the '→' identify an initial System, User or User Rights Short Code (or subset thereof) that routes calls to the ARS system, and the columns following the '→' identify an ARS Short Code that can be reached which sends the matching dial pattern to the Outgoing Line Group. The final 'Outgoing Pattern' column identifies the specific pattern of digits that is sent to the Line Group.

When analyzing outgoing call routing via ARS, all possible routing paths through the ARS tables are examined to determine which originating Short Codes could eventually place a call using the Outgoing Line Group in question. This involves following multiple matching ARS Short Codes within a single ARS form, as well as following alternative routing options including 'Out of Service', 'Out of Hours', and 'Alternate' routing. Every path through the ARS system is investigated to determine which specific outgoing calls could terminate at the Line Group, and what the original dialed number would be transformed into during ARS processing. This analysis can result in multiple ARS routing paths being reached from a single initial Short Code, and every possibility is included in the content (indicated with multiple →'s following a single Short Code). This in-depth analysis of outgoing routing allows the reader to see which specific dialed patterns the Line Group is used for.

To help differentiate the primary outgoing routing choices from secondary or alternative choices, any of the ARS routing paths that follow an 'Out of Service', 'Out of Hours', or 'Alternate' routing option are displayed in a separate table. This allows the reader to determine whether an Outgoing Line Groups is a 'first choice' for a specific dial pattern, or whether it is only used in some form of alternate or fallback routing. For example, Outgoing Line Group 10 may be the regular choice for all Long Distance calls, but Outgoing Line Group 11 might be used as an alternate if Group 10 is unavailable ('Out of Service', busy, etc.). In this case, the pattern for Long Distance calls would appear in the standard ARS routing table for Line Group 10, but would also appear in the 'alternate or fallback ARS routing' table for Line Group 11.

In the representation of Short Codes and dialing patterns, several special characters are used with the following meanings:

- *A '?' by itself represents a default pattern that matches any possible dialing sequence*
- *An 'X' represents a single dialable digit (0-9,#,*)*
- *An 'N' represents zero or more dialable digits*
- *A ';' at the end of a Short Code indicates the system should wait for the number to be fully dialed before the Short Code is matched*

When viewing this document electronically, both the Line numbers and ARS Form IDs in the tables link to those elements' detailed documentation elsewhere in the report, for easy reference. As in previous sections, any 'Description' shown for a Line is simply what a technician has manually entered, and has no functional impact on the system.

Summary of Outgoing Group IDs

System	Outgoing Group IDs in Use
IPO Demo Exp	5, 10, 99998, 99999
IPO Demo Prim	2, 99001, 99998
IPO Demo Sec	11, 99002, 99999

System: IPO Demo Exp

Outgoing Line Group 5

The following in-use **Lines and Channels** are assigned to Outgoing Group ID **5**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
5	T1 / PRI	1-201-555-8794	Base Card 2 / Port 9	1-13
19	SIP	Expansion SIP Line	-	1 and 2

The following Lines and Channels are assigned to Outgoing Group ID 5, but are **'Out of Service', unlicensed, or otherwise unusable** for outgoing calls:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
5	T1 / PRI	1-201-555-8794	Base Card 2 / Port 9	14-16

The following **Short Codes** route calls to Outgoing Group ID 5 by way of **ARS routing**:

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Outgoing Pattern
System	?					
	91214N	→	50	?	91214N;	1214N
	91469N	→	50	?	91469N;	1469N
	91972N	→	50	?	91972N;	1972N

Outgoing Line Group 10

The following in-use **Lines and Channels** are assigned to Outgoing Group ID **10**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
1	Analog	1-201-555-7410	Base Card 1 / Port 9	-
2	Analog	1-201-555-9852	Base Card 1 / Port 10	-
3	Analog		Base Card 1 / Port 11	-
9	Analog		Base Card 3 / Port 9	-
10	Analog	1-201-555-5469	Base Card 3 / Port 10	-
11	Analog	1-201-555-0014	Base Card 3 / Port 11	-
101	Analog		Exp. Mod. 1 / Port 1	-
109	Analog	1-201-555-1109	Exp. Mod. 1 / Port 9	-

The following Lines and Channels are assigned to Outgoing Group ID 10, but are **'Out of Service', unlicensed, or otherwise unusable** for outgoing calls:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
4	Analog		Base Card 1 / Port 12	-
12	Analog		Base Card 3 / Port 12	-

The following **Short Codes** route calls to Outgoing Group ID 10 by way of **ARS routing**:

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Outgoing Pattern
System	?					
	11	→	50	?	11	911
	911	→	50	?	911	911
	91312N	→	50	?	91312N;	N
	91773N	→	50	?	91773N;	N

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Outgoing Pattern
	91872N	→	50	?	91872N;	N

Outgoing Line Group 99998

The following in-use **Lines and Channels** are assigned to Outgoing Group ID **99998**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
18	IP Office	Expansion to Secondary	-	-

The following **Short Codes** route calls to Outgoing Group ID 99998 by way of **ARS routing**:

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Outgoing Pattern
System	?	→	50	?	?	?

Outgoing Line Group 99999

The following in-use **Lines and Channels** are assigned to Outgoing Group ID **99999**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
17	IP Office	Expansion to Primary	-	-

The following **Short Codes** route calls to Outgoing Group ID 99999 by way of **ARS routing**:

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Outgoing Pattern
System	?	→	50	?	?	?

System: IPO Demo Prim

Outgoing Line Group 2

The following in-use **Lines and Channels** are assigned to Outgoing Group ID **2**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
9	SIP	Primary SIP Line	-	1 and 2

The following **Short Codes** route calls to Outgoing Group ID 2 by way of **ARS routing**:

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Outgoing Pattern
System	9N;					

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Outgoing Pattern
	911	→	50	N	11	911
	9911	→	50	N	911	911
	9N	→	50	N	?	N
User: *Alan Moore*	9011N;	→	50	011N	?	011N
User: *Joan Lopez*	901133N;	→	50	01133N	?	01133N

Outgoing Line Group 99001

The following in-use **Lines and Channels** are assigned to Outgoing Group ID **99001**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
2	IP Office	Primary to Expansion	-	-

The following **Short Codes** route calls to Outgoing Group ID 99001 by way of **ARS routing**:

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Outgoing Pattern
System	9N;					
	91312N	→	50	N	1312N;	91312N
	91773N	→	50	N	1773N;	91773N
	91872N	→	50	N	1872N;	91872N

Outgoing Line Group 99998

The following in-use **Lines and Channels** are assigned to Outgoing Group ID **99998**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
1	IP Office	Primary to Secondary	-	-

The following **Short Codes** route calls to Outgoing Group ID 99998, but only during some form of **alternate or fallback ARS routing**:

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Outgoing Pattern
System	9N;	→	51	N	N;	9N
User: *Alan Moore*	9011N;	→	51	011N	N;	9011N
User: *Joan Lopez*	901133N;	→	51	01133N	N;	901133N

System: IPO Demo Sec

Outgoing Line Group 11

The following in-use **Lines and Channels** are assigned to Outgoing Group ID **11**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
9	SIP	Backup SIP Line	-	1

The following **Short Codes** route calls to Outgoing Group ID 11 by way of **ARS routing**:

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Outgoing Pattern
System	?					
	11	→	50	?	11	911
	911	→	50	?	911	911

In addition, the following **Short Codes** can also route calls to Outgoing Group ID 11 during some form of **alternate or fallback ARS routing**:

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Outgoing Pattern
System	?					
	9N	→	51	?	9N;	N

Outgoing Line Group 99002

The following in-use **Lines and Channels** are assigned to Outgoing Group ID **99002**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
2	IP Office	Secondary to Expansion	-	-

The following **Short Codes** route calls to Outgoing Group ID 99002:

Short Code Identifier	Short Code	Feature	Outgoing Pattern
No dialable Short Codes route outgoing calls to this Group ID			

Outgoing Line Group 99999

The following in-use **Lines and Channels** are assigned to Outgoing Group ID **99999**:

Line #	Line Type	Description	Module / Port	Channels / SIP URIs
1	IP Office	Secondary to Primary	-	-

The following **Short Codes** route calls to Outgoing Group ID 99999 by way of **ARS routing**:

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Outgoing Pattern
System	?	→	50	?	?	?

4.3. Alternate Route Selection (ARS)

This section provides a detailed description of the Alternate Route Selection (ARS) configuration. ARS is used during outgoing call routing to determine which Outgoing Line Group is used to place a call. To make this decision, the ARS system can take into account the number that is dialed, the time of day the call is placed, and the current availability of Lines and channels.

ARS processing of an outgoing call can be quite complex – one ARS table can alter the dialed number of a call, direct it to another ARS table, which can itself alter the number again and send it to yet another ARS table. An in-depth analysis of how calls are routed through the ARS system and terminate at an Outgoing Line Group is performed in Section 4.2, "Outgoing Call Routing". This section will focus on the specific configuration and behavior of the individual ARS forms.

Each of the ARS forms configured in the solution will be presented in order of their ARS ID, organized per-System for multi-System networks. The description of each ARS form will consist of four main topics: general properties, alternative routing behavior, routing entries, and references to the form. The first topic will describe the basic configuration attributes of the ARS form, including the dial delay time and use of secondary dial tone. Next, the alternative routing properties of the ARS form are described. This topic will cover what happens when the ARS form is placed 'Out of Service', any 'time of day' based routing decisions, and fallback routing behavior if the ARS form's chosen route is unavailable.

A table of the ARS form's individual Short Codes is then presented. These are the patterns against which the outgoing dialed numbers are compared to determine the 'next hop' in the routing of the call. When the ARS form is used, the Short Code that most closely matches the dialed number is selected, and the call is routed to that entry's destination. The destination will either be an Outgoing Line Group to place the call, or another ARS form to continue routing the call. Note that the actual dialing pattern that is sent to the destination may be different from the incoming pattern. This feature provides a great deal of flexibility during ARS routing – the dialed number can be altered while the call is being routed, and the digits that are sent to the terminating Outgoing Line Group need not be the same as what the User originally dialed.

In the representation of ARS Short Codes, several special characters are used with the following meanings:

- *A '?' by itself represents a default pattern that matches any possible dialing sequence*
- *An 'X' represents a single dialable digit (0-9,#,*)*
- *An 'N' represents zero or more dialable digits*
- *A ';' at the end of a Short Code indicates the system should wait for the number to be fully dialed before the Short Code is matched*

In the representation of a Short Code's resulting number to be dialed, several special characters are also used with the following meanings:

- *A '.' is replaced by the complete incoming pattern that matched the Short Code. If used by itself as the number to dial, the incoming pattern is not altered by the Short Code.*
- *An 'N' is replaced with all of the digits that were matched by the wildcard characters 'X' or 'N' in the Short Code pattern*
- *A ',' introduces a one second pause in the dialing of the outgoing number*
- *Any characters enclosed in double-quotes ("…") are not interpreted as having special meaning, and are output without modification*

There are numerous other characters that have special meaning in the resulting 'number dialed' field. Please refer to Avaya's IP Office documentation for a complete list.

A matching ARS Short Code can also alter other properties of an outgoing call when it is selected. For example, it can change the 'Locale' of the call, or require the User enter a valid Account Code or Authorization Code to place the call. If any of the ARS form's Short Codes use this functionality, it will be described directly beneath the applicable code in the table.

The final topic in each ARS form's documentation is a description of the references to this ARS form by other elements of the configuration. As described earlier, Short Codes with any of the 'Dial' features can reference an ARS form to route an outgoing call (see Section 4.2, "Outgoing Call Routing" for a list of the 'Dial' features). In addition, ARS forms can reference other ARS forms for alternative 'Out of Service', 'Out of Hours', or 'Alternate' routing choices. A list of all references to the ARS form is presented as the final part of the form's documentation. This allows the reader to easily

see how the ARS form is being used within the overall IP Office configuration, which is especially important to consider before any changes are made to the form. For example, before an ARS form is modified, one must consider whether it is currently being used as an 'Alternate Route' for another ARS form. The proposed changes may or may not be appropriate when the form is being used in such an overflow or fallback scenario.

When viewing this document electronically, references to Outgoing Line Groups, other ARS forms, and Time Profiles link to those elements' detailed documentation elsewhere in the report, for easy reference. Any 'Description' shown for an ARS form is simply what a technician has manually entered, and has no functional impact on the system.

System: IPO Demo Exp

ARS 50 - Main

Description: Main ARS for the expansion

General Properties

- The ARS form will wait for **4 seconds** (the System default) **after the last dialed digit** before deciding dialing is complete
  (An exact Short Code match or the User dialing '#' will cause immediate processing of the dialed digits)
- Standard **Dial Tone will be returned to the User** until digits have been received to begin Short Code matching
- The dialing User's 'Outgoing Call Bar' setting and Short Codes are **checked** to determine whether the call should be barred

Alternate Routing

- **No alternative routes are configured** to handle calls presented to this ARS form when it is placed 'Out of Service', when none of its routes are available ('Alternate Route'), or based on the time of day ('Out of Hours' route)

Routing Entries

The following Short Codes are configured in this ARS form for outgoing call routing. The received digits will be matched against these codes, and the call will be routed to the destination of the most specific match.

Short Code	Feature	Number Dialed	Destination
911	Dial Emergency	911	Outgoing Line Group 10
91972N;	Dial	1972N	Outgoing Line Group 5
91469N;	Dial	1469N	Outgoing Line Group 5
91214N;	Dial	1214N	Outgoing Line Group 5
91872N;	Dial	N	Outgoing Line Group 10
91773N;	Dial	N	Outgoing Line Group 10
91312N;	Dial	N	Outgoing Line Group 10
11	Dial Emergency	911	Outgoing Line Group 10
?	Dial	.	Outgoing Line Group 99998
?	Dial	.	Outgoing Line Group 99999

ARS Form References

- The following Short Codes **direct calls to this ARS form** for outgoing call routing:

Short Code Type	Identifier	Short Code	Feature	Number Dialed
System		?	Dial	.

- **No other ARS forms reference this form** for any type of alternative routing ('Out of Service', 'Out of Hours', or 'Alternate Route')

ARS 51 - Test ARS

General Properties

- The ARS form will wait for **4 seconds** (the System default) **after the last dialed digit** before deciding dialing is complete
  (An exact Short Code match or the User dialing '#' will cause immediate processing of the dialed digits)
- The dialing User's 'Outgoing Call Bar' setting and Short Codes are **not checked** to determine whether the call should be barred

Alternate Routing

- **No alternative routes are configured** to handle calls presented to this ARS form when it is placed 'Out of Service', when none of its routes are available ('Alternate Route'), or based on the time of day ('Out of Hours' route)

Routing Entries

The following Short Codes are configured in this ARS form for outgoing call routing. The received digits will be matched against these codes, and the call will be routed to the destination of the most specific match.

Short Code	Feature	Number Dialed	Destination
11	Dial Emergency	911	Outgoing Line Group 5
911	Dial Emergency	911	Outgoing Line Group 5

ARS Form References

- The following Short Codes **direct calls to this ARS form** for outgoing call routing:

Short Code Type	Identifier	Short Code	Feature	Number Dialed
There are no Short Codes that directly reference this ARS form for outgoing calls				

- **No other ARS forms reference this form** for any type of alternative routing ('Out of Service', 'Out of Hours', or 'Alternate Route')

NOTE: *This ARS form **is not referenced** by any other ARS form or Short Code in the System, and therefore cannot be reached for placing outgoing calls. See the 'Alternate Route Selection Clean Up' Action Item for a complete list of ARS forms with similar issues.*

System: IPO Demo Prim

ARS 50 - Main

Description: Main ARS for the primary

General Properties

- The ARS form will wait for **4 seconds** (the System default) **after the last dialed digit** before deciding dialing is complete
  (An exact Short Code match or the User dialing '#' will cause immediate processing of the dialed digits)
- Standard **Dial Tone will be returned to the User** until digits have been received to begin Short Code matching
- The dialing User's 'Outgoing Call Bar' setting and Short Codes are **checked** to determine whether the call should be barred

Alternate Routing

- **No 'Out of Service' route is configured** to handle calls presented to this ARS form when it is not in service
- **No 'Out of Hours' route is configured** to provide alternate routing depending on the time of day
- If **none of the routes configured on this ARS form are available**, calls presented to it will also try to use the routes configured in ARS 51 - Fallback to Secondary (the 'Alternate' route)

Routing Entries

The following Short Codes are configured in this ARS form for outgoing call routing. The received digits will be matched against these codes, and the call will be routed to the destination of the most specific match.

Short Code	Feature	Number Dialed	Destination
?	Dial	.	Outgoing Line Group 2
1312N;	Dial	91312N	Outgoing Line Group 99001
1773N;	Dial	91773N	Outgoing Line Group 99001
1872N;	Dial	91872N	Outgoing Line Group 99001
1500N;	Barred		
1700N;	Barred		
1900N;	Barred		
1268N;	Barred		
1XXX976N;	Barred		
11	Dial Emergency	911	Outgoing Line Group 2
911	Dial Emergency	911	Outgoing Line Group 2

ARS Form References

- The following Short Codes **direct calls to this ARS form** for outgoing call routing:

Short Code Type	Identifier	Short Code	Feature	Number Dialed
System		9N;	Dial	N
User	Alan Moore	9011N;	Dial	011N
User	Joan Lopez	901133N;	Dial	01133N

- **No other ARS forms reference this form** for any type of alternative routing ('Out of Service', 'Out of Hours', or 'Alternate Route')

ARS 51 - Fallback to Secondary

Description: Fallback ARS for primary

General Properties

- The ARS form will wait for **4 seconds** (the System default) **after the last dialed digit** before deciding dialing is complete
  (An exact Short Code match or the User dialing '#' will cause immediate processing of the dialed digits)
- The dialing User's 'Outgoing Call Bar' setting and Short Codes are **not checked** to determine whether the call should be barred

Alternate Routing

- **No alternative routes are configured** to handle calls presented to this ARS form when it is placed 'Out of Service', when none of its routes are available ('Alternate Route'), or based on the time of day ('Out of Hours' route)

Routing Entries

The following Short Codes are configured in this ARS form for outgoing call routing. The received digits will be matched against these codes, and the call will be routed to the destination of the most specific match.

Short Code	Feature	Number Dialed	Destination
N;	Dial	9N	Outgoing Line Group 99998

ARS Form References

- The following Short Codes **direct calls to this ARS form** for outgoing call routing:

Short Code Type	Identifier	Short Code	Feature	Number Dialed
There are no Short Codes that directly reference this ARS form for outgoing calls				

- **No** other ARS forms have this form defined as their **'Out of Service'** alternate route
- **No** other ARS forms have this form defined as their **'Out of Hours'** alternate route
- The following other ARS forms have this form defined as their **'Alternate Route'**: 50 - Main

System: IPO Demo Sec

ARS 50 - Main

General Properties

- The ARS form will wait for **4 seconds** (the System default) **after the last dialed digit** before deciding dialing is complete
  (An exact Short Code match or the User dialing '#' will cause immediate processing of the dialed digits)
- Standard **Dial Tone will be returned to the User** until digits have been received to begin Short Code matching

- The dialing User's 'Outgoing Call Bar' setting and Short Codes are **checked** to determine whether the call should be barred

Alternate Routing

- **No 'Out of Service' route is configured** to handle calls presented to this ARS form when it is not in service
- **No 'Out of Hours' route is configured** to provide alternate routing depending on the time of day
- If **none of the routes configured on this ARS form are available**, calls presented to it will also try to use the routes configured in ARS 51 - Fallback (the 'Alternate' route)

Routing Entries

The following Short Codes are configured in this ARS form for outgoing call routing. The received digits will be matched against these codes, and the call will be routed to the destination of the most specific match.

Short Code	Feature	Number Dialed	Destination
911	Dial Emergency	911	Outgoing Line Group 11
11	Dial Emergency	911	Outgoing Line Group 11
?	Dial	.	Outgoing Line Group 99999

ARS Form References

- The following Short Codes **direct calls to this ARS form** for outgoing call routing:

Short Code Type	Identifier	Short Code	Feature	Number Dialed
System		?	Dial	.

- **No other ARS forms reference this form** for any type of alternative routing ('Out of Service', 'Out of Hours', or 'Alternate Route')

ARS 51 - Fallback

General Properties

- The ARS form will wait for **4 seconds** (the System default) **after the last dialed digit** before deciding dialing is complete
  (An exact Short Code match or the User dialing '#' will cause immediate processing of the dialed digits)
- The dialing User's 'Outgoing Call Bar' setting and Short Codes are **not checked** to determine whether the call should be barred

Alternate Routing

- **No alternative routes are configured** to handle calls presented to this ARS form when it is placed 'Out of Service', when none of its routes are available ('Alternate Route'), or based on the time of day ('Out of Hours' route)

Routing Entries

The following Short Codes are configured in this ARS form for outgoing call routing. The received digits will be matched against these codes, and the call will be routed to the destination of the most specific match.

Short Code	Feature	Number Dialed	Destination
9N;	Dial	N	Outgoing Line Group 11

ARS Form References

- The following Short Codes **direct calls to this ARS form** for outgoing call routing:

Short Code Type	Identifier	Short Code	Feature	Number Dialed
There are no Short Codes that directly reference this ARS form for outgoing calls				

- **No** other ARS forms have this form defined as their **'Out of Service'** alternate route
- **No** other ARS forms have this form defined as their **'Out of Hours'** alternate route
- The following other ARS forms have this form defined as their **'Alternate Route'**: 50 - Main

4.4. Barred Calls

As part of an overall call routing configuration, specific dial patterns can be explicitly barred by using a special Short Code feature. Whereas the 'Dial' features direct an outgoing call to ARS or an Outgoing Line Group, the 'Barred' Short Code feature blocks a matching call from being dialed. For example, an administrator may wish to prevent the dialing of 'premium-rate' telephone numbers, such 1-900 services. Depending on what type of Short Code the 'Barred' feature is used with (System Short Code, User Short Code, etc.), a particular dialing pattern can be blocked for a single User, a defined User Rights group, or the entire organization.

This section presents an analysis of the dialing patterns that are explicitly blocked by the use of Short Codes using the 'Barred' feature. The routing analysis it performs is very similar in concept to that used in Section 4.2, "Outgoing Call Routing", except the destination being searched for is the 'Barred' Short Code feature rather than a specific Outgoing Line Group. For a multi-System network, the barred call analysis is performed separately on each System. The results allow the reader to understand exactly what dialed numbers are being explicitly barred, and for whom.

There are two basic ways that calls can be barred via the outgoing routing configuration: directly by a (non-ARS) Short Code using the 'Barred' feature, or indirectly by way of the Alternate Route Selection (ARS) tables. If there are any Short Codes that use the 'Barred' feature to directly block an outgoing call, they will be shown first in a table format. Each Short Code that bars calls directly will be listed, indicating: the type of Short Code (System, User, User Rights, etc.), identifying information (the User's name for a User Short Code, for example), and the Short Code pattern for matching dialed numbers that should be barred.

Next, if there are any 'Dial' Short Codes whose calls are being barred by Alternate Route Selection (ARS) rules, they will be shown with a slightly different table format. The originating Short Code's type, identifying information and matching pattern are listed just like they are for the direct-barring Short Codes. But for barring via ARS, each specific ARS Short Code that eventually bars the call is then identified by its ARS Form ID and ARS Short Code. If a barring ARS Short Code matches only a subset of the originating Short Code, the precise subset it bars is shown in gray italics underneath the originating Short Code. This identifies which specific dial patterns are banned via the ARS Short Code. Both the incoming pattern that is matched by the ARS Short Code, as well as the resulting pattern that is barred from reaching an outgoing Line are shown.

Thus, in the ARS barring tables, the columns before the '→' identify an initial System, User or User Rights Short Code (or subset thereof) that directs calls to the ARS system, and the columns following the '→' identify an ARS Short Code that can be reached which bars the matching dial pattern. The final 'Barred Pattern' column identifies the specific pattern of digits that is prevented from reaching an outgoing Line.

*Note that Short Codes using the 'Barred' feature normally match dialing patterns as a **prefix**, even if there is not a trailing wildcard character in the Short Code pattern. For example, the barring Short Code '1900' will bar any call **beginning with** '1900'. This is different from the behavior experienced if the same Short Code used the 'Dial' feature, in which only the **exact** dial sequence '1900' would match. To help clarify this special behavior of 'Barred' Short Codes, the 'Barred Pattern' column will include a trailing wildcard character 'N' when appropriate (see below for details).*

When analyzing outgoing call routing via ARS, all possible routing paths through the ARS tables are examined to determine which originating Short Codes could eventually end up being barred. This involves following multiple matching ARS Short Codes within a single ARS form, as well as following alternative routing options including 'Out of Service' and 'Out of Hours' routing. Every path through the ARS system is investigated to determine which specific outgoing calls could ultimately get barred. This analysis can result in multiple ARS routing paths being reached from a single initial Short Code, and every possibility is included in the content (indicated with multiple →'s following a single Short Code). This in-depth analysis of outgoing routing allows the reader to see which specific dialed patterns are being barred, and which Users are affected (based on the type of the originating Short Code).

To help differentiate the standard barring behavior from conditional behavior, any of the ARS routing paths that follow an 'Out of Service' or 'Out of Hours' routing option are displayed in a separate table. This allows the reader to determine whether a particular dial pattern is barred under regular operating conditions, or only during some form of alternate routing. For example, additional dialing patterns might be barred only during non-business hours through the use of a different 'Out of Hours' route. In this case, the conditionally barred patterns would appear in the 'alternate or fallback ARS routing' table.

In the representation of Short Codes and dialing patterns, several special characters are used with the following meanings:

- *A '?' by itself represents a default pattern that matches any possible dialing sequence*
- *An 'X' represents a single dialable digit (0-9,#,*)*
- *An 'N' represents zero or more dialable digits*
- *A ';' at the end of a Short Code indicates the system should wait for the number to be fully dialed before the Short Code is matched*

When viewing this document electronically, the ARS Form IDs in the tables link to the forms' detailed documentation elsewhere in the report, for easy reference.

System: IPO Demo Exp

The following **Short Codes** bar any matched dialing patterns:

Short Code Identifier	Short Code
No routing Short Codes explicitly bar dialing patterns	

System: IPO Demo Prim

The following **Short Codes** bar the identified dialing patterns by way of **ARS routing** :

Short Code Identifier	Short Code	→	ARS Form	Incoming Pattern	Matching Short Code	Barred Pattern
System	9N;					
	91268N	→	50	N	1268N;	1268N
	91500N	→	50	N	1500N;	1500N
	91700N	→	50	N	1700N;	1700N
	91900N	→	50	N	1900N;	1900N
	91XXX976N	→	50	N	1XXX976N;	1XXX976N

System: IPO Demo Sec

The following **Short Codes** bar any matched dialing patterns:

Short Code Identifier	Short Code
No routing Short Codes explicitly bar dialing patterns	

5. Other Telephony Configuration

This chapter addresses several other elements in IP Office's telephony configuration that aren't directly related to the topics previously covered. This includes feature Short Codes, Time Profiles, Account & Authorization codes, and System directories. Each of these aspects of the IP Office configuration are documented and analyzed in the following sections.

5.1. Feature Short Codes

In an IP Office configuration, Short Codes are used for a wide variety of purposes. In the most general sense, a Short Code is a pattern that is compared to dialing sequences the system is processing. When a dialing sequence matches the pattern of a specific Short Code, that Short Code's action is performed. The action might enable or disable a specific telephony feature such as 'Forward On Busy', route the dialed number to an available Line to place an external call, or explicitly disallow the dialing sequence. In Chapter 4, Call Routing, the Short Codes that perform external call routing and call barring were analyzed. In this section, all of the remaining Short Codes not associated with call routing will be addressed.

The configuration of Short Codes is a common way for administrators to limit Users' access to specific IP Office features. To provide this selective feature access, Short Codes can be defined at several 'levels' within the configuration of a System:

- *A 'User Short Code' is defined for one specific User, and is only applied to dialing sequences initiated by that User*
- *A 'User Rights Short Code' is defined for a specific User Rights group, and is applied to dialing sequences initiated by any User the Rights group is currently applied to*
- *A 'System Short Code' is defined at the System level, and is applied to dialing sequences initiated by all Users of that System*

This section summarizes all of the feature Short Codes that are configured in the IP Office solution. It documents the telephony features that are available via Short Codes, identifies the specific Short Code patterns that are used to activate those features, and indicates at which level the Short Codes are configured.

The table below shows each distinct feature with at least one Short Code defined for it. The feature names are highlighted in bold, and are presented in alphabetical order. Refer to Avaya's IP Office documentation for a description of the various features. Beneath each feature name is a list of the Short Code patterns that are defined for that feature. There may be multiple Short Code patterns configured for a single feature, and they will be listed individually below the feature's name.

In the representation of Short Code patterns, several special characters are used with the following meanings:

- *An 'X' represents a single dialable digit (0-9,#,*)*
- *An 'N' represents zero or more dialable digits*
- *A ';' at the end of a Short Code indicates the system should wait for the number to be fully dialed before the Short Code is matched*

Some of the features available via Short Codes use a parameter to customize their behavior. For example, the 'Forward Busy Number' feature takes as its parameter the telephone number to which calls should be forwarded when the User is busy. When applicable, the parameter passed to the Short Code's feature is shown in the 'Feature Parameter' column. In the representation of a feature's parameter, several special characters are used with the following meanings:

- *An 'N' is replaced with all of the digits that were matched by the wildcard characters 'X' or 'N' in the Short Code pattern*
- *An 'E' is replaced with the Extension Number of the dialing User*
- *A 'U' is replaced with the Name of the dialing User*
- *Any characters enclosed in double-quotes ("...") are not interpreted as having special meaning, and are output without modification*

There are numerous other characters that have special meaning in the feature parameter field. Please refer to Avaya's IP Office documentation for a complete list.

The type of each defined Short Code (User, User Rights, or System) is shown under the 'Type' column, indicating the level at which access to the Short Code is available. If the same Short Code pattern is defined multiple times at the same level, an applicable count will appear in parentheses after the type. For example, if the same User Short Code is defined for 5 different Users, the 'Type' column will indicate: User (5). In a multi-System IP Office network, if the same Short Code is defined in every System, a ✓ will appear in the column 'Common to ALL Systems'.

The following **feature Short Codes** are configured in this IP Office solution:

Short Code	Feature Parameter	Type	Common to ALL Systems
Call Listen			
*76*N#	N	User (2)	N/A
Call Pickup Any			
*30		System	✓
Call Pickup Group			
*31		System	✓
Call Pickup Members			
*53*N#	N	System	✓
Call Queue			
*33*N#	N	System	✓
Call Steal			
*45*N#	N	System	✓
*46		System	✓
Call Waiting Off			
*16		System	✓
Call Waiting On			
*15		System	✓
Cancel All Forwarding			
*00		System	✓
Clear Call			
*52		System	✓
Clear Hunt Group Night Service			
*21*N#	N	System	✓
Conference Add			
*47		System	✓
Conference Meet Me			
*66*N#	N	System	✓
Dial Physical Extension By Number			
*70*N#	N	System	✓
Dial Physical Extn By ID			
*71*N#	N	System	✓
Do Not Disturb Exception Add			
*10*N#	N	System	✓
Do Not Disturb Exception Delete			
*11*N#	N	System	✓
Do Not Disturb Off			
*09		System	✓
*20		User Right 'Sales Rights'	✓
Do Not Disturb On			
*08		System	✓
*10		User Right 'Sales Rights'	✓
Extn Login			

Short Code	Feature Parameter	Type	Common to ALL Systems
*35*N#	N	System	✓
Extn Logout			
*36		System	✓
Follow Me Here			
*12*N#	N	System	✓
Follow Me Here Cancel			
*13*N#	N	System	✓
Follow Me To			
*14*N#	N	System	✓
Forward Busy Number			
*57*N#	N	System	✓
Forward Hunt Group Calls Off			
*51		System	✓
Forward Hunt Group Calls On			
*50		System	✓
Forward Number			
*07*N#	N	System	✓
Forward On Busy Off			
*04		System	✓
Forward On Busy On			
*03		System	✓
Forward On No Answer Off			
*06		System	✓
Forward On No Answer On			
*05		System	✓
Forward Unconditional Off			
*02		System	✓
*29		User Right 'Phantom Users'	
Forward Unconditional On			
*01		System	✓
*19		User Right 'Phantom Users'	
Group			
*32*N#	N	System	✓
Hold Music			
*34N;	N	System	✓
Park Call			
*37*N#	N	System	✓
Private Call			
*99	1-773-555-4215	User 'Duane Rodriguez'	N/A
Set Hunt Group Night Service			
*20*N#	N	System	✓
Set Mobile Twinning Off			
75		User 'Gladys Scott'	N/A

Short Code	Feature Parameter	Type	Common to ALL Systems
Set Mobile Twinning On			
65		User 'Gladys Scott'	N/A
Stamp Log			
*55		System	✓
Unpark Call			
*38*N#	N	System	✓
Voicemail Collect			
*17	"?"U	System	✓
Voicemail Off			
*19		System	✓
*25		User Right 'Standard Rights'	✓
Voicemail On			
*18		System	✓
*15		User Right 'Standard Rights'	✓
Voicemail Ringback Off			
*49		System	✓
Voicemail Ringback On			
*48		System	✓

5.2. Locations

Locations are configured in IP Office to specify the physical locale of various elements within the solution, like Extensions, Lines and Control Units. When the solution's hardware is distributed among multiple areas, Locations can be used to document and organize its physical presence. The 'size' of a Location is purely a function of the level of control and organization required. For some installations, each Location may correspond to a separate floor of a multi-story building. For others, a Location may refer to the city a branch office is located in. This flexibility allows each organization to define as many Locations as necessary to achieve their required structure.

Beyond purely organizational purposes, Locations can also be used to affect the behavior of IP Office. One common use is to assign specific Call Admission Control (CAC) parameters to a Location. Call Admission Control allows an administrator to impose limits on the number of calls that a Location can handle simultaneously. This is especially important when using IP-based Extensions and Lines, as each additional call requires additional network bandwidth.

The elements of an IP Office solution can either be manually assigned to a specific Location, or can derive their Location automatically for IP-based devices. Part of defining a Location includes specifying a range of IP addresses that constitute the Location's IP address space. By default, IP-based devices that acquire an IP address within the range of a particular Location are assumed to be 'in' that Location. This greatly eases the administration of Locations for IP-based Extensions (such as softphones) which can change physical locale far easier than traditional (non-IP) telephones.

This section documents the Locations that are defined as part of the IP Office solution. Each Location is presented in order of the Location's name, and includes the most important properties of its configuration. This includes the Location's IP address space, Call Admission Control parameters, and for multi-System networks, the System(s) on which the Location is configured. The 'Emergency ARS' property defines which Alternate Route Selection form is used to route emergency calls that originate from the Location.

The last portion of each Location's documentation is a summary of the Systems, Extensions and Lines explicitly assigned to the Location. This provides a high-level view of the amount of hardware physically present in the Location. Non-IP Extensions must be manually assigned a Location, and by default inherit the Location of the System to which they are connected. IP-based Extensions can either be manually assigned a Location, or can derive the appropriate Location from their IP address. If a phone's IP address is assigned via DHCP, the address is not included in the IP Office configuration, and thus the Location of the Extension is not available for reporting. Only IP Extensions with manually assigned Locations or IP addresses will be counted within a Location.

In addition to the defined Locations of a solution, elements may also be assigned to the 'Cloud' Location. The 'Cloud' represents the external IP address space outside the IP Office network, and does not have any of the configuration parameters that regular Locations have. As such, only the Location Reference Summary section will be shown for the 'Cloud' Location, if it is being used.

Location: Chicago

Location ID: 3
Defined on System: Common to ALL Systems

Subnet Address: 192.168.79.10
Subnet Mask: 255.255.255.0
Subnet Range: 192.168.79.0 - 192.168.79.255

Emergency ARS: <none>
Time Zone: (GMT-06:00) Central Time (US & Canada)

Call Admission Control (CAC)

Total Maximum Calls: 99
External Maximum Calls: 95

Internal Maximum Calls: 95

Location Reference Summary

Systems assigned to this Location: IPO Demo Exp

The following Extensions and Lines are explicitly assigned to this Location:

Extension Type	Count
Analog	10
Digital	14

Line Type	Count
IP Office Line	2

Location: HQ

Location ID: 4
Defined on System: IPO Demo Prim

Subnet Address: 192.168.25.10
Subnet Mask: 255.255.255.0
Subnet Range: 192.168.25.0 - 192.168.25.255

Emergency ARS: Main
Time Zone: (GMT-05:00) Eastern Time (US & Canada)

Call Admission Control (CAC)

Total Maximum Calls: 95
External Maximum Calls: 85
Internal Maximum Calls: 85

Location Reference Summary

Systems assigned to this Location: IPO Demo Prim

The following Extensions and Lines are explicitly assigned to this Location:

Extension Type	Count
H.323	3

Line Type	Count
No Lines are explicitly assigned to this Location	

Location: HQ Backup

Location ID: 4
Defined on System: IPO Demo Sec

Subnet Address: 192.168.26.15
Subnet Mask: 255.255.255.0
Subnet Range: 192.168.26.0 - 192.168.26.255

Emergency ARS: Main
Time Zone: (System Default)

Call Admission Control (CAC)

Total Maximum Calls: Unlimited
External Maximum Calls: Unlimited
Internal Maximum Calls: Unlimited

Location Reference Summary

Systems assigned to this Location: <none>

The following Extensions and Lines are explicitly assigned to this Location:

Extension Type	Count
No Extensions are explicitly assigned to this Location	

Line Type	Count
No Lines are explicitly assigned to this Location	

Location: New Orleans

Location ID: 4
Defined on System: IPO Demo Exp

Subnet Address: 192.168.48.2
Subnet Mask: 255.255.255.240
Subnet Range: 192.168.48.0 - 192.168.48.15

Emergency ARS: Main
Time Zone: (GMT-06:00) Central Time (US & Canada) (System Default)

Call Admission Control (CAC)

Treated as part of Parent Location: Chicago

Location Reference Summary

Systems assigned to this Location: <none>

The following Extensions and Lines are explicitly assigned to this Location:

Extension Type	Count
Digital	9

Line Type	Count
IP Office Line	1

Location: New York

Location ID: 2
Defined on System: Common to ALL Systems

Subnet Address: <not specified>
Subnet Mask: <not specified>

Emergency ARS: <none>
Time Zone: (GMT-05:00) Eastern Time (US & Canada)

Call Admission Control (CAC)

Total Maximum Calls: 90
External Maximum Calls: 90
Internal Maximum Calls: 75

Location Reference Summary

Systems assigned to this Location: IPO Demo Sec

The following Extensions and Lines are explicitly assigned to this Location:

Extension Type	Count
No Extensions are explicitly assigned to this Location	

Line Type	Count
IP Office Line	3

Location: Cloud

Location Reference Summary

The following Extensions and Lines are explicitly assigned to this Location:

Extension Type	Count
SIP	3

Line Type	Count
SIP Line	3

5.3. Time Profiles

In IP Office, Time Profiles provide a way to define a specific period of time, and then use that definition to conditionally alter the behavior of the system. For example, during business-hours an organization may want incoming calls to be presented to a specific Hunt Group for answering. However, after-hours it may want those same incoming calls to be answered by an automated attendant. By defining a Time Profile that determines what 'business-hours' are, and referencing that Time Profile in the appropriate Incoming Call Route, the destination of the incoming calls can be altered based upon the time of day.

*As described above, there are two steps necessary to establish time-based behaviors in IP Office: a Time Profile must be created to define **when** the behavior should change, and that Time Profile must be referenced by the appropriate feature to conditionally alter its behavior. There are many aspects of an IP Office configuration that can reference Time Profiles in this way, including User Rights application, automatic call recording, Hunt Group Day/Night Service, incoming and outgoing call routing, and mobile twinning. The same configured Time Profile can be referenced by any number of different features, eliminating the need to define duplicate Time Profiles for different features.*

There are two ways a period of time can be specified for a Time Profile:

- *A weekly recurring schedule (e.g. every Monday, Wednesday, and Friday, from 8:30 AM to 2:00 PM)*
- *Specific dates and hours (e.g. July 5-10, 2017 from 9:00 AM to 5:00 PM)*

Any number of these two forms, in any combination, can be included to define a Time Profile.

This section will document the Time Profiles that have been defined in the solution, and identify how each one is being referenced by the configuration. Each Time Profile will be presented in order of the profile's name, and for multi-System networks will indicate on which System it is defined. The period of time covered by each Time Profile will be explained as appropriate. This may consist of a weekly recurring schedule and/or specific dates and hours. The weekly schedule (if applicable) will be described as both a list of the days and times, as well as a graphical chart depicting the week for easy reference. If the definition of the Time Profile includes specific dates and hours, they will be listed after the weekly schedule.

Next, all of the references to the Time Profile throughout the entire IP Office configuration are listed. Identifying the existing references to a Time Profile is incredibly valuable when considering changing or deleting the profile. Since the same Time Profile can be referenced by any number of different features, it's important to consider all of the ways the profile is being used before making updates to avoid unintended changes in behavior. Similarly, it's important to ensure there are no outstanding references to a Time Profile before it is deleted.

If there are any issues discovered with the configuration of a Time Profile or its use, they will be identified and explained as part of the profile's documentation.

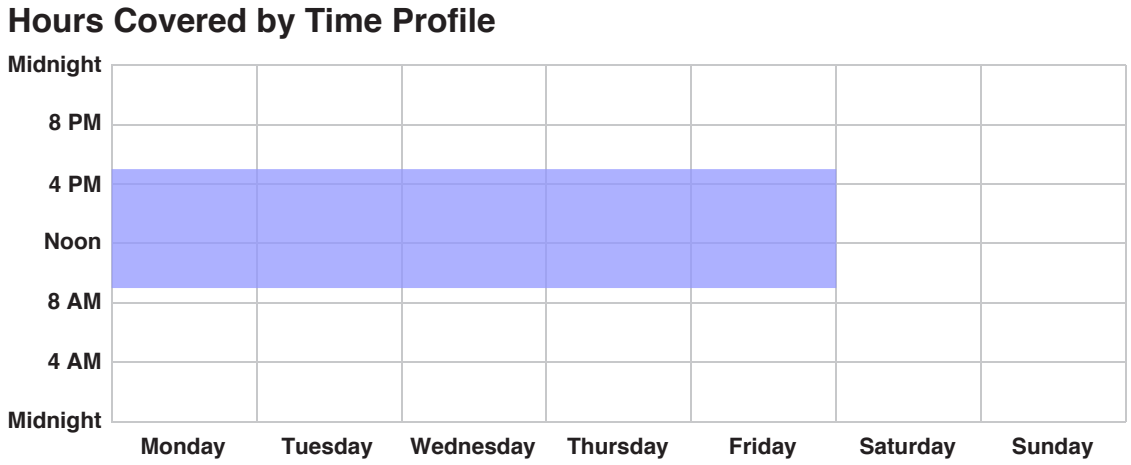
The following Time Profiles are configured in this IP Office solution:

Time Profile: Day Shift

Defined on System: Common to ALL Systems

This Time Profile covers the following time periods:

- Every Weekday (M-F), from 9:00 AM to 12:30 PM
- Every Weekday (M-F), from 12:30 PM to 1:30 PM
- Every Weekday (M-F), from 1:30 PM to 5:00 PM



This Time Profile is **referenced** by the following other objects in the solution's configuration:

Object Type	Identifier	System	Use of Time Profile
User	Chad Harris	IPO Demo Exp	Working Hours / Out of Hours User Rights
User	Clarence Anderson	IPO Demo Exp	Working Hours / Out of Hours User Rights
User	Dean Martinez	IPO Demo Prim	Working Hours / Out of Hours User Rights
User	Francisco Garcia	IPO Demo Prim	Working Hours / Out of Hours User Rights
User	Shane Robinson	IPO Demo Prim	Mobile Twinning enabled
User	Shawn Taylor	IPO Demo Exp	Working Hours / Out of Hours User Rights
User	Stanley Jackson	IPO Demo Exp	Working Hours / Out of Hours User Rights
User	Travis White	IPO Demo Exp	Working Hours / Out of Hours User Rights
Hunt Group	Day HG	IPO Demo Prim	Automatic Day Service / Night Service

Time Profile: Holidays

Defined on System: Common to ALL Systems

This Time Profile covers the following time periods:

Year	Dates	Hours
2016†	May 30, Jul 04, Sep 05, Nov 24-Nov 25	All day long
2017	Jan 01	All day long

†***NOTE:*** *Date ranges defined for* ***previous years*** *can be removed from the Time Profile to simplify its configuration. See the 'Time Profiles Clean Up' Action Item for a complete list of Time Profiles with similar issues.*

This Time Profile is **referenced** by the following other objects in the solution's configuration:

Object Type	Identifier	System	Use of Time Profile
Hunt Group	Backup HG	IPO Demo Prim	Automatic Day Service / Night Service
Hunt Group	General MBox	IPO Demo Exp	Automatic Day Service / Night Service
Account Code	13536	<All Systems>	Automatic Outbound Call Recording enabled*
Account Code	95614	<All Systems>	Automatic Outbound Call Recording enabled

Object Type	Identifier	System	Use of Time Profile
ARS	Main	IPO Demo Prim	Out of Hours routing*

NOTE:* *Some references to this Time Profile* ***may not be effective* *due to related features not being defined or enabled. If these references to the Time Profile are no longer needed, they can be removed to maintain a well-organized system. See the 'Time Profiles Clean Up' Action Item for a complete list of Time Profiles with similar issues.*

Time Profile: Night Shift

Defined on System: Common to ALL Systems

This Time Profile covers the following time periods:

- Every Weekday (M-F), from 8:00 PM to 4:00 AM*

NOTE:* *The following* ***configuration errors* *were detected in this Time Profile:*

- *One or more time periods has a Start Time* ***greater than or equal to*** *its End Time*

Such configuration errors likely mean this Time Profile is not operating the way it was intended. See the 'Misconfigured Time Profiles' Action Item for a complete list of Time Profiles with similar configuration issues.

This Time Profile is **referenced** by the following other objects in the solution's configuration:

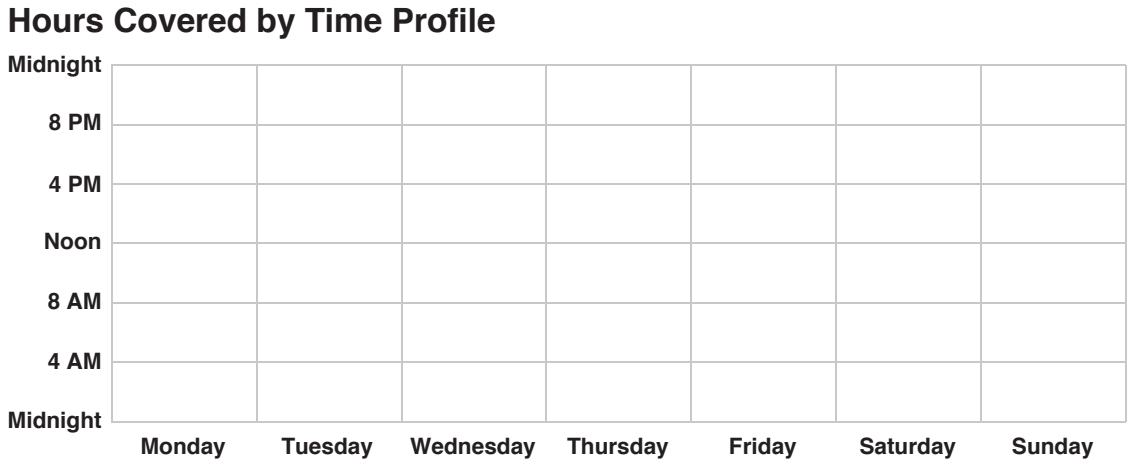
Object Type	Identifier	System	Use of Time Profile
Hunt Group	Night HG	IPO Demo Prim	Automatic Day Service / Night Service
Hunt Group	Night HG	IPO Demo Prim	Automatic Inbound Call Recording enabled
Account Code	00115	IPO Demo Exp	Automatic Outbound Call Recording enabled
Incoming Call Route	Any Voice / 2 / XXXX	IPO Demo Exp	Destination selection

Time Profile: Test Profile

Defined on System: IPO Demo Prim

This Time Profile covers the following time periods:

- No days of the week*, from midnight to 8:30 PM



*__NOTE:__ *The following __configuration errors__ were detected in this Time Profile:*

- *One or more time periods has __no__ days of the week enabled*

Such configuration errors likely mean this Time Profile is not operating the way it was intended. See the 'Misconfigured Time Profiles' Action Item for a complete list of Time Profiles with similar configuration issues.

This Time Profile is **referenced** by the following other objects in the solution's configuration:

Object Type	Identifier	System	Use of Time Profile
There were no references to this Time Profile detected in the solution*			

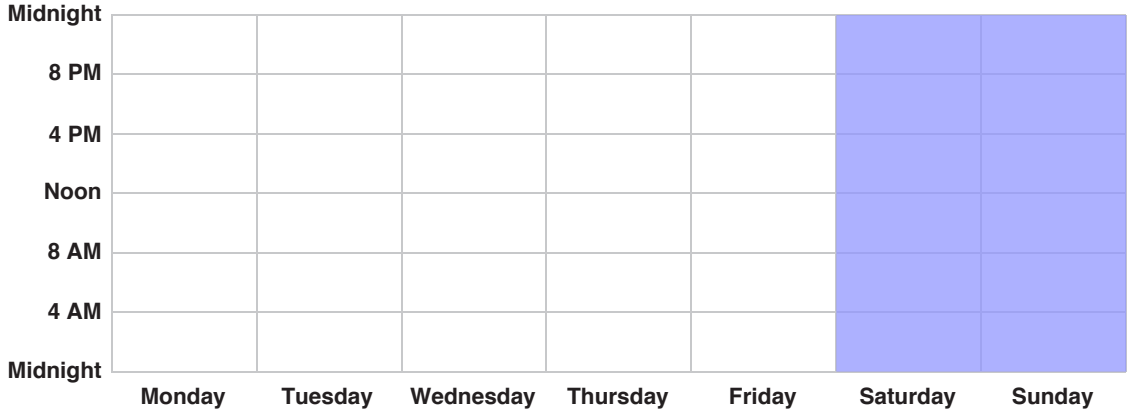
*__NOTE:__ *If this Time Profile is no longer needed, it should be __removed from the configuration__ to maintain a well-organized system. See the 'Time Profiles Clean Up' Action Item for a complete list of Time Profiles with similar issues.*

Time Profile: Weekend

Defined on System: Common to ALL Systems

This Time Profile covers the following time periods:

- Every Saturday and Sunday, All day long



This Time Profile is **referenced** by the following other objects in the solution's configuration:

Object Type	Identifier	System	Use of Time Profile
Account Code	01008	<All Systems>	Automatic Outbound Call Recording enabled

5.4. Authorization Codes

The Authorization Code feature provides an additional way to control Users' access to external calling. Short Codes that result in an external number being dialed (see Section 4.2, "Outgoing Call Routing") can be configured to require an Authorization Code is entered before the call is allowed to complete. For even greater control, specific Users can be configured such that a valid Authorization Code must be entered before any external call is allowed. By defining unique Authorization Codes for selected Users, and requiring their use when necessary, an administrator can restrict access to the outcalling capabilities of IP Office.

This section will describe the Users that are assigned Authorization Codes, as well as the dialing Short Codes that require their use. In earlier releases of IP Office, Authorization Codes could be defined for User Rights groups in addition to individual Users. In this case, the Authorization Codes are considered valid for any of the Users currently associated with the User Rights group. User Rights with assigned Authorization Codes will be covered as well when applicable.

The first table lists all of the Users that either have an Authorization Code assigned to them, and/or require an Authorization Code to make an external call. Each User's name, extension number, and specific Authorization Code(s) are displayed. For multi-System networks, the name of the System on which the User is defined is also included. If any Authorization Codes are defined for Users that no longer exist in the configuration, the Users' names will be grayed-out. Users that are required to enter an Authorization Code but have no codes assigned are highlighted for review, as they cannot place any external calls.

For applicable IP Office solutions, a similar table of User Rights groups with associated Authorization Codes will be included after the Users table.

The final table identifies all Short Codes that require the use of an Authorization Code. The full details of each Short Code are included for reference, including its type (User, User Rights, System, etc.), identifying information (User name, etc.), matching pattern, and feature. For an explanation of the special characters that can be used within Short Code patterns and parameters, refer to Section 5.1, "Feature Short Codes". The use of these Short Codes will be restricted to the Users and User Rights with defined Authorization Codes (shown previously).

The following **Users** have individual Authorization Codes defined, or are **required to enter an Authorization Code** before placing an external call:

User Name	Extension	System	Authorization Code(s)	Required for External Calling
Adam Miller	258	IPO Demo Prim	112397	✓
Amanda Allen-Foster	225	IPO Demo Exp	00021	✓
Brad Lee	227	IPO Demo Exp	00168	
Clarence Anderson	235	IPO Demo Exp	00025	
Elaine Gonzalez	254	IPO Demo Prim	658742	✓
Jean Wright	205	IPO Demo Exp	<none>	✓
John S			118753	
Michael Gray	240	IPO Demo Exp	00127	
Robin Howard	251	IPO Demo Prim	468753	✓
Ryan Jones	262	IPO Demo Prim	<none>	✓
Sharon Hall	226	IPO Demo Exp	00134	✓
Shawn Taylor	236	IPO Demo Exp	00169	
Number of User Authorization Codes defined: 10				

NOTE: *Some Authorization Codes reference Users which are no longer defined in the System. These Users' names are shown in gray in the table above. See the 'Authorization Codes Clean Up' Action Item for a complete list of Authorization Codes with similar issues.*

NOTE: *Some Users have no Authorization Codes assigned, yet are required to enter an Authorization Code to make external calls. These Users have '<none>' displayed in the Authorization Code(s) column above. See the 'Missing Authorization Codes' Action Item for a complete list of Users with similar issues.*

The following Short Codes **require an Authorization Code** to use:

Short Code Type	Identifier	System	Short Code	Feature	Feature Parameter	Line Group ID
User	Alan Moore	IPO Demo Prim	9011N;	Dial	011N	50
User	Joan Lopez	IPO Demo Prim	901133N;	Dial	01133N	50

5.5. Account Codes

Account Codes are most commonly used in IP Office for call logging and cost allocation of both incoming and outgoing calls. They can be used to track call activity per User, department, project, client, etc. For example, a law firm may need to track how much time is spent on the telephone with each of their clients for billing purposes. When an Account Code is associated with a phone call, the code is included with the rest of the call's details in the system's call log. On a periodic basis, the call log can then be used to aggregate the number of calls and the amount of time spent per individual Account Code.

An Account Code can be associated with a particular call in one of two ways. A User can manually enter the code before or during the call (using a station menu or feature button), or the system can automatically apply the code by matching the incoming Caller ID or outgoing destination of the call. Similar to Authorization Codes, Account Codes can be required to make an external call for specific Users, User Rights or Short Codes. Unlike Authorization Codes, the Account Codes themselves are not associated with any particular User in the configuration, and are not necessarily secretive. Users are expected to apply an appropriate Account Code to a call for accurate tracking (if it's not applied automatically).

In addition to call tracking and cost allocation, Account Codes can also be used to trigger automatic recording of outbound calls. Each Account Code can be configured with specific rules for call recording, and those rules are applied whenever the Account Code is associated with an outgoing call. The rules determine when call recording is in effect, what percentage of calls get recorded, and whether a call should be denied if it cannot be recorded for some reason.

This section will document the use of Account Codes in the IP Office configuration. It begins with a table displaying all of the Account Codes that are defined in the solution. Each entry includes the Account Code, the Caller ID number to match for automatic application of the code, and its call recording parameters. In a multi-System network, the name of the System on which the Account Code is configured will also be shown.

The defined Account Codes can contain special wildcard characters with the following meanings:

- *A '?' matches a single digit*
- *A '*' matches any number of digits*

Next, the Users that require an Account Code to make an external call will be listed. This requirement can either be configured per User, or per User Rights group (affecting all members of the group). Regardless of where the requirement is applied, all Users that are forced to enter an Account Code to make external calls will appear in the Users table. Users that inherit this requirement from their User Rights group will have a ✓ in the 'Managed by User Rights' column. A separate table listing the User Rights requiring an Account Code will follow the Users table.

The final table identifies all Short Codes that require the use of an Account Code. The full details of each Short Code are included for reference, including its type (User, User Rights, System, etc.), identifying information (User name, etc.), matching pattern, and feature. For an explanation of the special characters that can be used within Short Code patterns and parameters, refer to Section 5.1, "Feature Short Codes". The use of these Short Codes will require the application of one of the valid Account Codes listed in the first table.

If there are any issues discovered with the configuration of Account Codes or their use, they will be identified and explained as part of this section. When viewing this document electronically, both the Time Profiles and User Rights in the tables link to those elements' detailed documentation elsewhere in the report, for easy reference.

The following **Account Codes** are defined in the solution:

Account Code	System	Caller ID	Outbound Call Recording		
			Status	Record When?	Destination
00115	IPO Demo Exp	773-555-7124	Record 25% of calls	Night Shift	Mailbox of User 'Charlotte Nelson', Ext. 208
01008	<All Systems>	894-555-0058	Record 50% of calls	Weekend	Voice Recording Library

Account Code	System	Caller ID	Outbound Call Recording		
			Status	Record When?	Destination
13536	<All Systems>	789-555-1212	No call recording		
352	IPO Demo Prim		Record 1% of calls	Always	Voice Recording Library (authenticated)
95614	<All Systems>	1-917-555-1400	Record all calls (mandatory)	Holidays	Voice Recording Library (authenticated)
Number of Account Codes defined: 5					

The following Users are **required to enter an Account Code** to make an external call:

User Name	Extension	System	Managed by User Rights
Duane Rodriguez	250	IPO Demo Prim	✓
Jean Wright	205	IPO Demo Exp	
Ryan Jones	262	IPO Demo Prim	
Shane Robinson	252	IPO Demo Prim	✓
Sharon Hall	226	IPO Demo Exp	✓

The following User Rights **require an Account Code be entered** to make an external call:

User Rights	System
Admin	<All Systems>

The following Short Codes **require an Account Code** to use:

Short Code Type	Identifier	System	Short Code	Feature	Feature Parameter	Line Group ID
User	Alan Moore	IPO Demo Prim	9011N;	Dial	011N	50
User	Joan Lopez	IPO Demo Prim	901133N;	Dial	01133N	50

5.6. System Directory

In IP Office, the System Directory is simply a mapping of names and numbers. It serves two main functions: allowing Users to dial external numbers by name, and automatically associating names with the dialed number of outgoing calls or the Caller ID received with incoming calls. This functionality relieves Users from having to remember telephone numbers, and provides a centralized, consistent list of names that benefit all users of the IP Office solution.

On most Avaya phones and applications that support a 'Contacts' or 'Directory' function, the entries in the System Directory will be available for Users to dial by name. This is in addition to any personal directory created for the User, or stored locally in a station or application. Directory entries may also be associated with a Speed Dial Index, used for dialing a specific entry via the Speed Dial feature. In addition, dialed numbers and received Caller ID numbers are matched against the System Directory to provide names in the phone's display and call history logs.

This section will document the System Directory entries that are configured on the IP Office solution. The directory entries are sorted by name, and show the associated number and optional Speed Dial index. In multi-System networks, the name of the System on which the directory entry is configured is included as well. Note that Server Edition solutions only support a single network-wide System Directory that is shared among the entire solution.

The telephone number of a System Directory entry can include a few special characters with the following meanings:

- *A wildcard '?' matches any single digit for number-to-name matching. Entries containing a '?' are **not** available for dialing by name or Speed Dial index.*
- *Digits within parentheses '(…)' are optional, and number-to-name matching will be attempted both with and without the optional digits. Optional digits are shown in gray in the entries below.*

Any System Directory entries that do not appear to be properly formatted will be highlighted in red to indicate they may not be functioning as intended.

***NOTE:** The Directory content shown below does **not** include entries that are imported via LDAP or HTTP. Any entries imported from a remote directory service are merged with the locally configured entries described here. The importing behavior of the System Directory is described in the 'Directory Services Configuration Details' section for reference.*

The following Directory entries are defined in this IP Office solution:

Name	Number	Speed Dial Index
Anthony Stark	9 1-212-555-1931	
Clark Kent	1-787-555-2604	008
David Barton	9 1-240-555-9782	
Joy Nash	23-235342?	001
Laura Huff	915-555-4929	006
Roy Underwood	9 1-901-555-3461	002
Supplies	1-800-555-6521	004
Suzzane Atkins	9 1-607-555-7135	
Tech Help	1-800-555-3458	003
Vivian Boone	9 1-630-555-1763	005
Number of Directory entries: 10		

5.7. System Speed Dial Directory

The Speed Dial feature allows Users to easily dial a telephone number stored in the System Directory by its three-digit index. Short Codes with the Speed Dial feature may allow Users to enter any valid Speed Dial Index, or may be configured to use a pre-programmed index.

This section presents a directory for the System Speed Dial feature. These are the entries from Section 5.6, "System Directory" with a Speed Dial Index assigned to them. The directory is presented in Speed Dial Index order, and includes both the name and number associated with each entry.

In multi-System networks (except for Server Edition), a separate System Speed Dial Directory is presented for each System in the network. Server Edition solutions only support a single network-wide System Directory that is shared among the entire solution.

*Any System Directory entries containing a '?' wildcard character are **not** available for dialing by name or Speed Dial index. If any such entry is included in the System Speed Dial directory, it will be highlighted in red to indicate it cannot function as programmed.*

***NOTE:** The Directory content shown below does **not** include entries that are imported via LDAP or HTTP. Any entries imported from a remote directory service are merged with the locally configured entries described here. The importing behavior of the System Directory is described in the 'Directory Services Configuration Details' section for reference.*

The following System Speed Dial entries are configured in this IP Office solution:

Speed Dial Index	Name	Number
001	Joy Nash	23-235342?*
002	Roy Underwood	9 1-901-555-3461
003	Tech Help	1-800-555-3458
004	Supplies	1-800-555-6521
005	Vivian Boone	9 1-630-555-1763
006	Laura Huff	915-555-4929
008	Clark Kent	1-787-555-2604
Number of Speed Dial Directory entries: 7		

NOTE: *These entries **contain a wildcard character** (?), and thus are not usable for placing calls via Speed Dial.*

6. Equipment Layout

This chapter provides a graphical depiction of the core hardware that comprises this IP Office solution. Because IP Office is highly scalable, one deployment could consist of a single Control Unit, or multiple servers, Control Units, and Expansion Modules geographically distributed across the county. Regardless of the solution's size, having accurate documentation of the equipment layout and the status of physical resources is a vital component of good communications management.

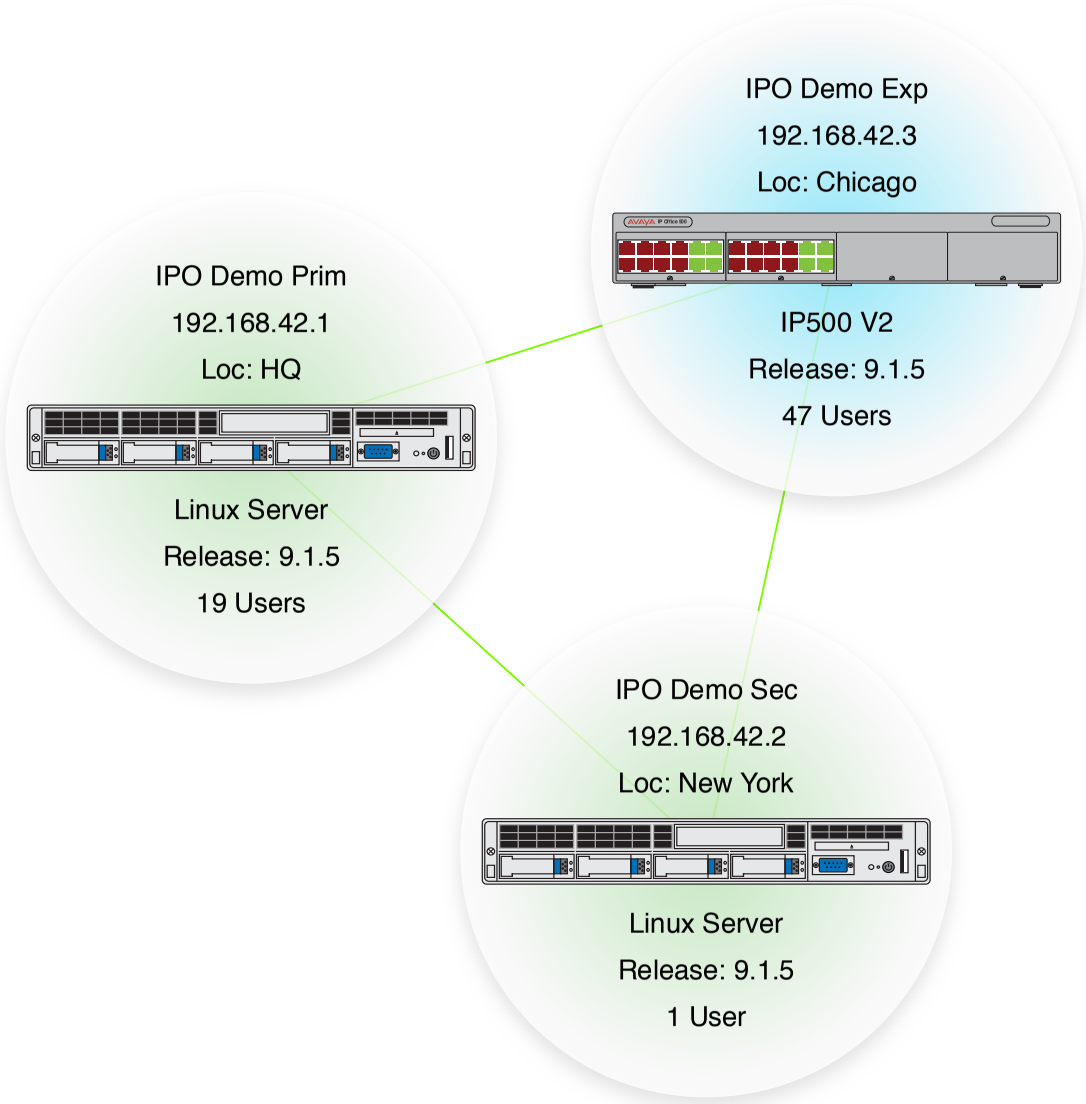
For IP Office solutions that consist of multiple, networked Systems (Small Community Network and Server Edition deployments), this chapter begins with a diagram of the overall IP Office network. Each System is represented as a node in the network graph, showing the System's name, hardware type, software release, and other high-level information. The 'IP Office' or H.323 Lines that form the network are shown connecting the Systems together. Refer to the graph's legend to understand what the style and color indicate about these inter-System Lines.

The Equipment Maps section presents a graphical illustration of the system's hardware – depicting servers, Control Units, Base Cards, and Expansion Modules. Each piece of hardware is shown with its model name and part number when available, laid out as it appears in the system. Even the used/spare status of every port and channel is indicated, for simple inventory management.

IP Office Network Graph

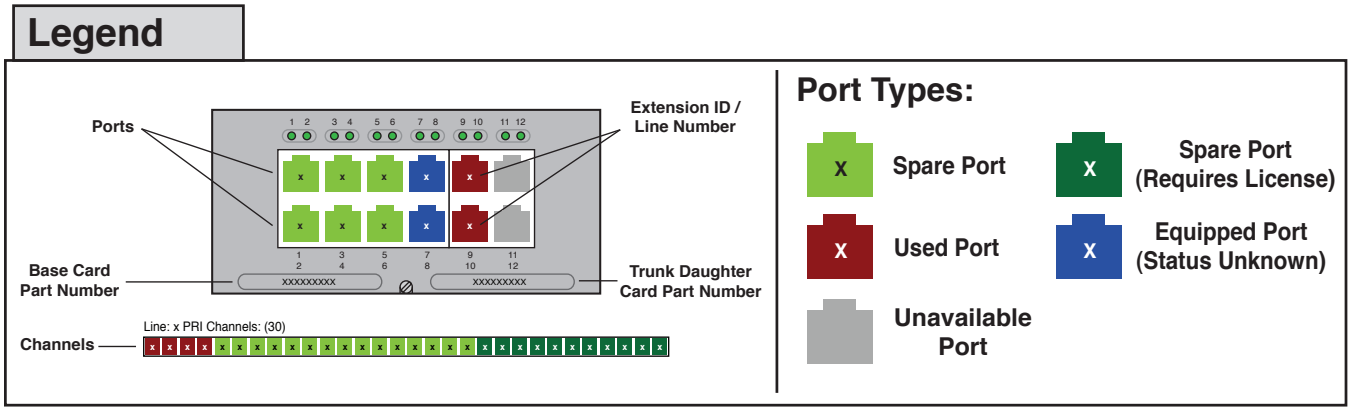
IP Office Server Edition Demo
Customer Number: 1234321
Date of Information: 3/1/2017

	Enforced Security	Best Effort Security	Disabled/ Unavailable Security
Bidirectional Lines			
Unidirectional Lines			



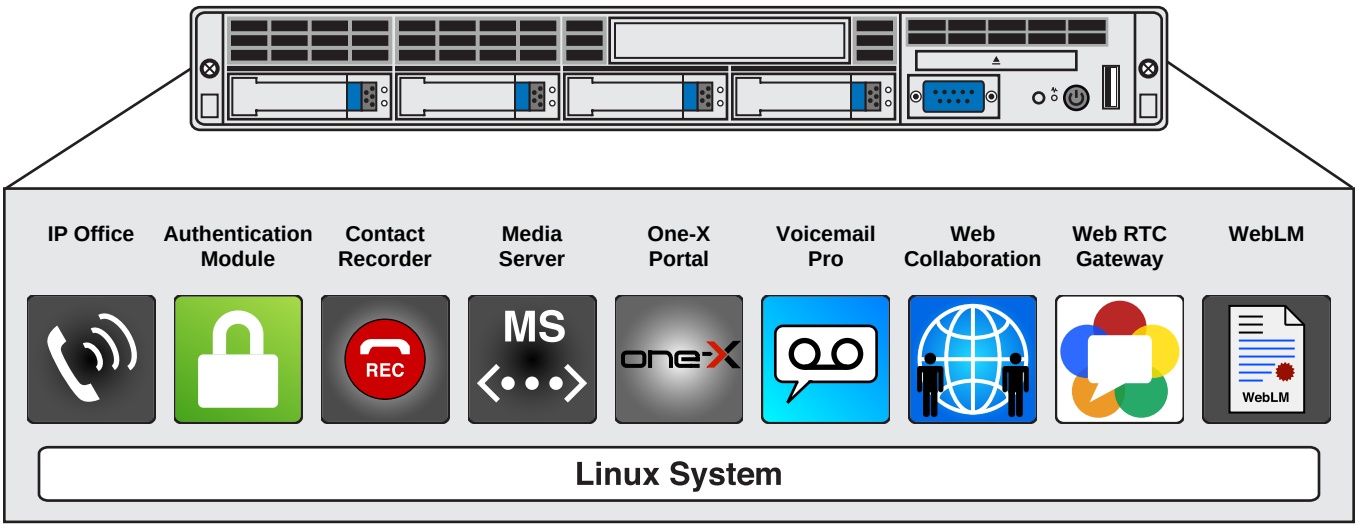
6.2. Equipment Maps

The following diagrams depict the various hardware elements that make up this IP Office solution, showing the status of individual ports and channels. The hardware is organized into Servers, Control Units, Base Cards, and Expansion Modules. The Equipment Maps are commonly used for hardware and software upgrades, business expansions, multi-site inventory control, and basic troubleshooting.



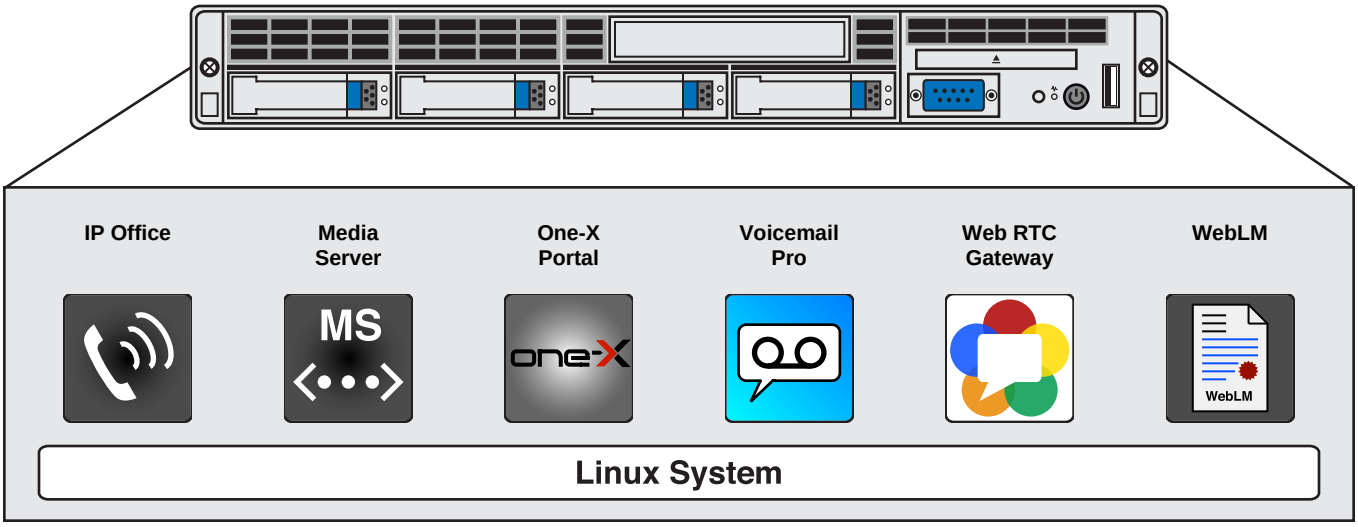
System: IPO Demo Prim

Linux Server Control Unit (Primary Server)



System: IPO Demo Sec

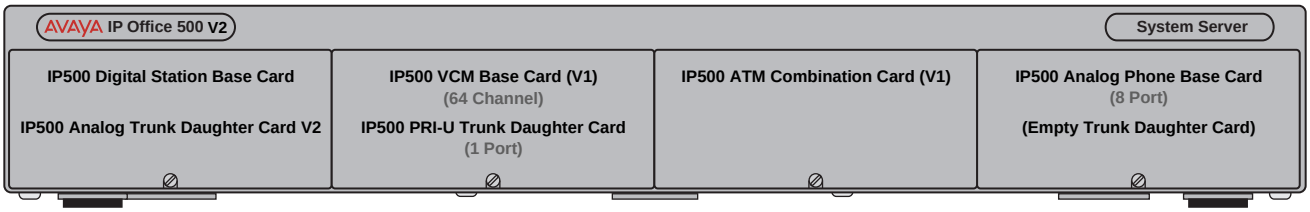
Linux Server Control Unit (Secondary Server)



System: IPO Demo Exp

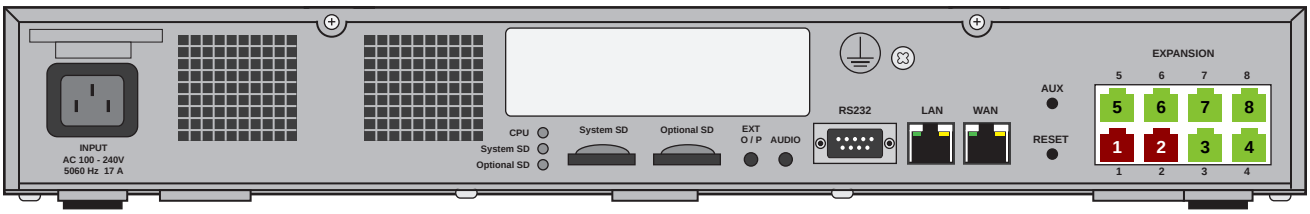
IP500 V2 Control Unit

Front

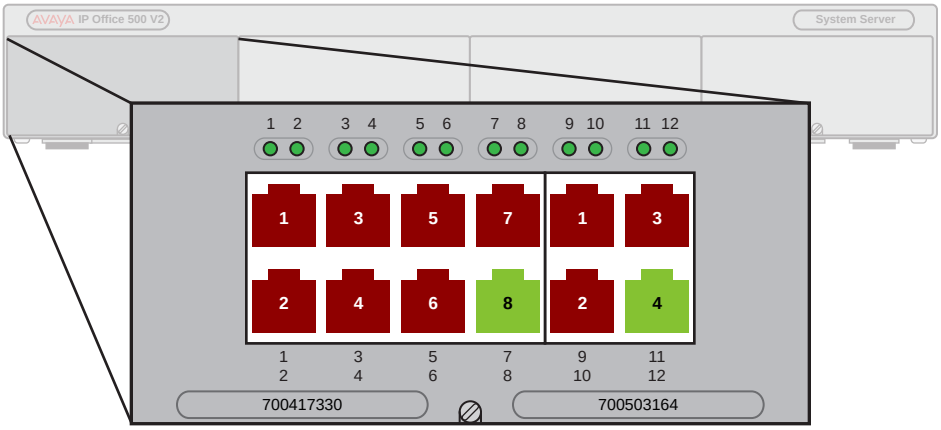


Part Number: 700476005

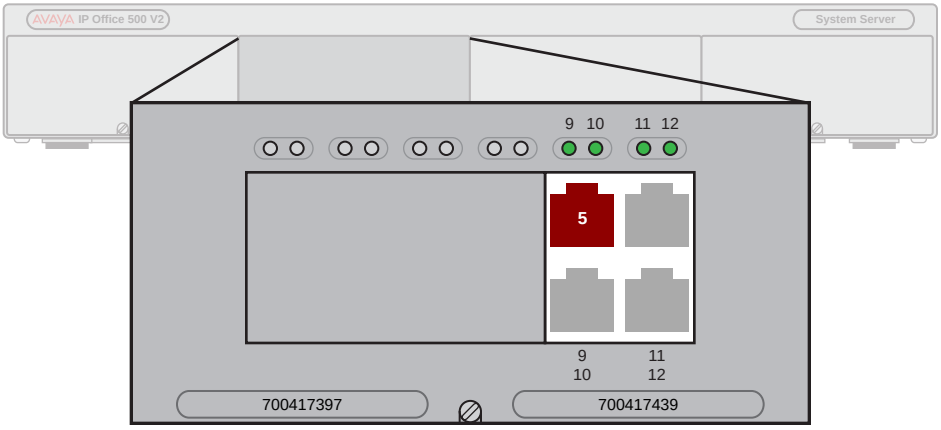
Back



Base Card 1: IP500 Digital Station Base Card / Analog Trunk Daughter Card V2



Base Card 2: IP500 VCM Base Card (V1) - 64 Channel / PRI-U Trunk Daughter Card



Channels on this component:

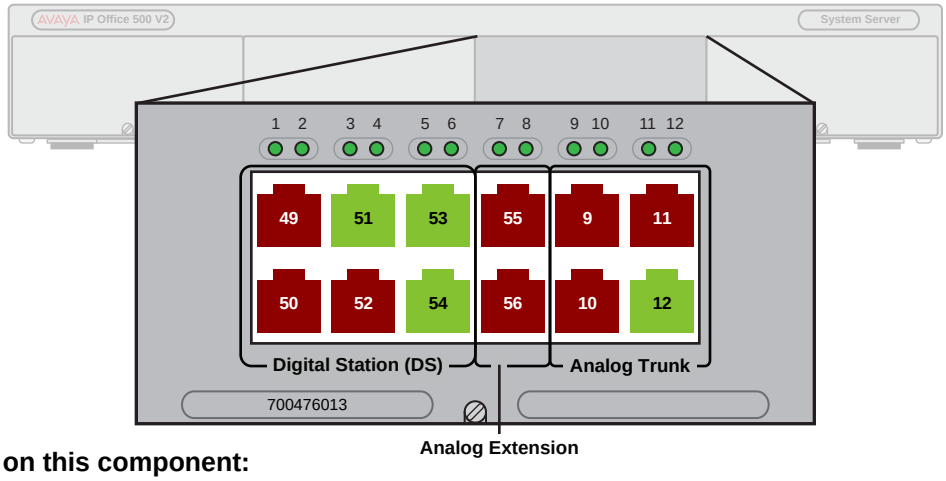
IP500 VCM Base Card (V1), VCM Channels: (64)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

Line:5 PRI Channels: (23)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

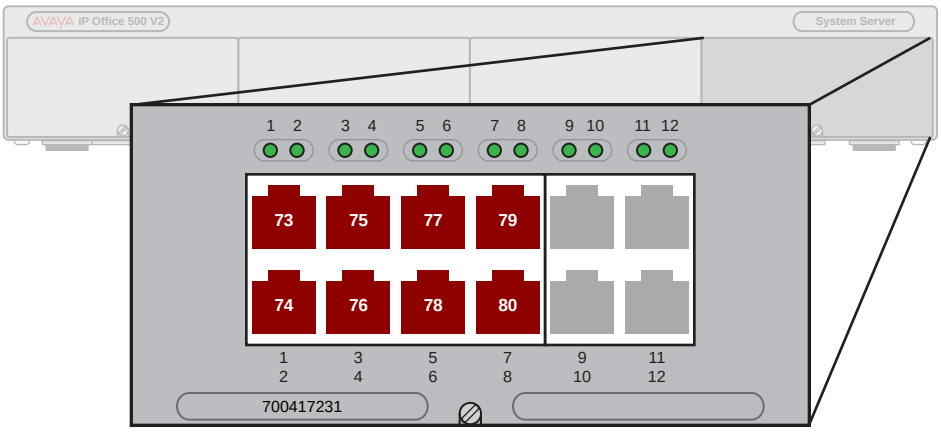
Base Card 3: IP500 ATM Combination Card (V1)



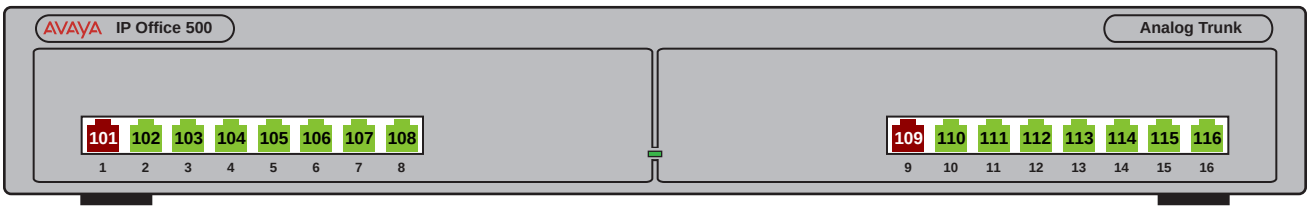
Channels on this component:

IP500 ATM Combination Card (V1), VCM Channels: (10)

Base Card 4: IP500 Analog Phone Base Card - 8 Port

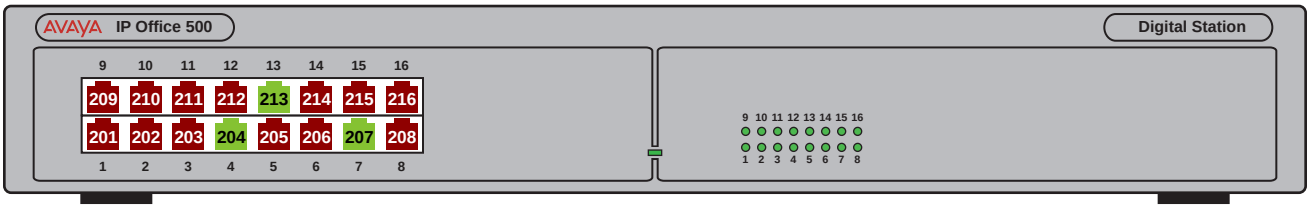


IP500 V2, Expansion Module 1: IP500 Analog Trunk Module



Part Number: 700449473

IP500 V2, Expansion Module 2: IP500 Digital Station B Module - 16 Port



Part Number: 700501585

7. Resiliency

Resilience is the ability of a system to continue to function, perhaps with a decreased level of service, despite the failure of one or more components or resources. This chapter focuses on the resilience features IP Office can use to continue providing service to its users during a network outage, hardware failure, or other disturbance. It covers the most important resilience features, and details how they are configured in the system.

Individual sections within the chapter will explain and analyze each of the features that can be used to improve the resiliency of the IP Office solution. These topics include: the use of 'fallback' SCN Lines in a multi-System network, redundancy and diversity of outgoing Lines and Line Groups, using the capabilities of the Alternate Route Selection (ARS) feature to choose an available Line, Media Call Preservation for IP phones, and Voicemail Pro resiliency. Some forms of resilience, such as fault-tolerant selection of an outbound Line, can be achieved in multiple ways using these features. The resilience features discussed can generally be used independently of one another, and selectively implemented to achieve the organization's goals.

This chapter should help the reader understand the extent to which the various resiliency features offered by IP Office are being utilized, and determine whether the features available are configured to provide the expected level of business continuity.

7.1. SCN Networking Resiliency

IP Office uses SCN Lines (of type 'IP Office' or 'H.323') to link Systems together in Small Community Networks or IP Office Server Edition networks. These SCN Lines are used to route calls between Systems, and share other information such as User lists and dialplans. These Lines can also be configured as 'SCN Resilience Lines', which designate another IP Office System in the network to act as a 'fallback' destination for the services IP Office offers. Services that can fallback over the SCN Resilience Lines include: IP Phone support, Advertised Hunt Groups, Voicemail, and IP DECT R4 support. The services provided by each individual IP Office System in a network can fallback to one other System. However, a single IP Office System can provide fallback resilience for up to 7 other Systems in the network. Server Edition Select networks have an additional Location-based fallback feature for IP Phones. This allows an administrator to designate a specific System in the network (other than the standard fallback System) to handle the fallback for IP Phones assigned to a particular Location.

This section begins with an IP Office Resilience Graph, which illustrates the SCN Resilience Lines used for fallback between the Systems in the network. Each System in the graph is labeled with identifying information (System Name, IP Address, System Type, etc.), and a list of which of its services are resilient. The list of resilient services is noted with the following letters:

- *I – IP Phone resilience*
- *H – Hunt Group resilience*
- *V – Voicemail Resilience*
- *D – IP DECT Resilience*
- *L – Location-based IP Phone Resilience*

The SCN Resilience Lines are represented in the graph by arrows which point to the System that provides fallback services for a given node. The main resilience Line for a System is represented by a blue arrow, while any Location-based resilience for IP Phones (Server Edition Select networks only) will be shown as a green arrow. The configured Line number is displayed next to each arrow for reference.

The earliest release of IP Office software in a network determines which resilience features will work throughout the network. This graph can be used to verify that all IP Office Systems in the network have a consistent software release, to ensure proper resilience functionality. You can also use the graph to verify that all IP Office Systems in the network are configured for resiliency. Systems which neither use nor provide SCN resiliency will still appear in the graph, but will not have any lines linking them to the other Systems in the network.

Following the network graph, the same SCN Resilience details are displayed in a tabular format for easy reference. For each System in the network, the SCN resilience information is shown in two tables:

*The first table, **Systems Providing Resilience**, lists each SCN Line with any resiliency features enabled, the destination System it falls back to, and which resiliency services are enabled. In the case of a Server Select network, this table will also include any Location-based resilience details as well.*

*The second table, **Systems Resilience is Provided For**, lists which other Systems in the network are using this IP Office as a resiliency fallback. This table will also display how many units of each resilient service will potentially fallback from the other Systems.*

*If a particular System is providing resiliency for other nodes in the network, the section will also include a 'worst case scenario' analysis. In this analysis we describe how many Extensions, Hunt Groups and Hunt Group members the System may be asked to handle if **all** the other Systems it provides resiliency for fail simultaneously. This analysis will note the percentage increase in elements supported during the worst-case fallback vs. a non-fallback scenario.*

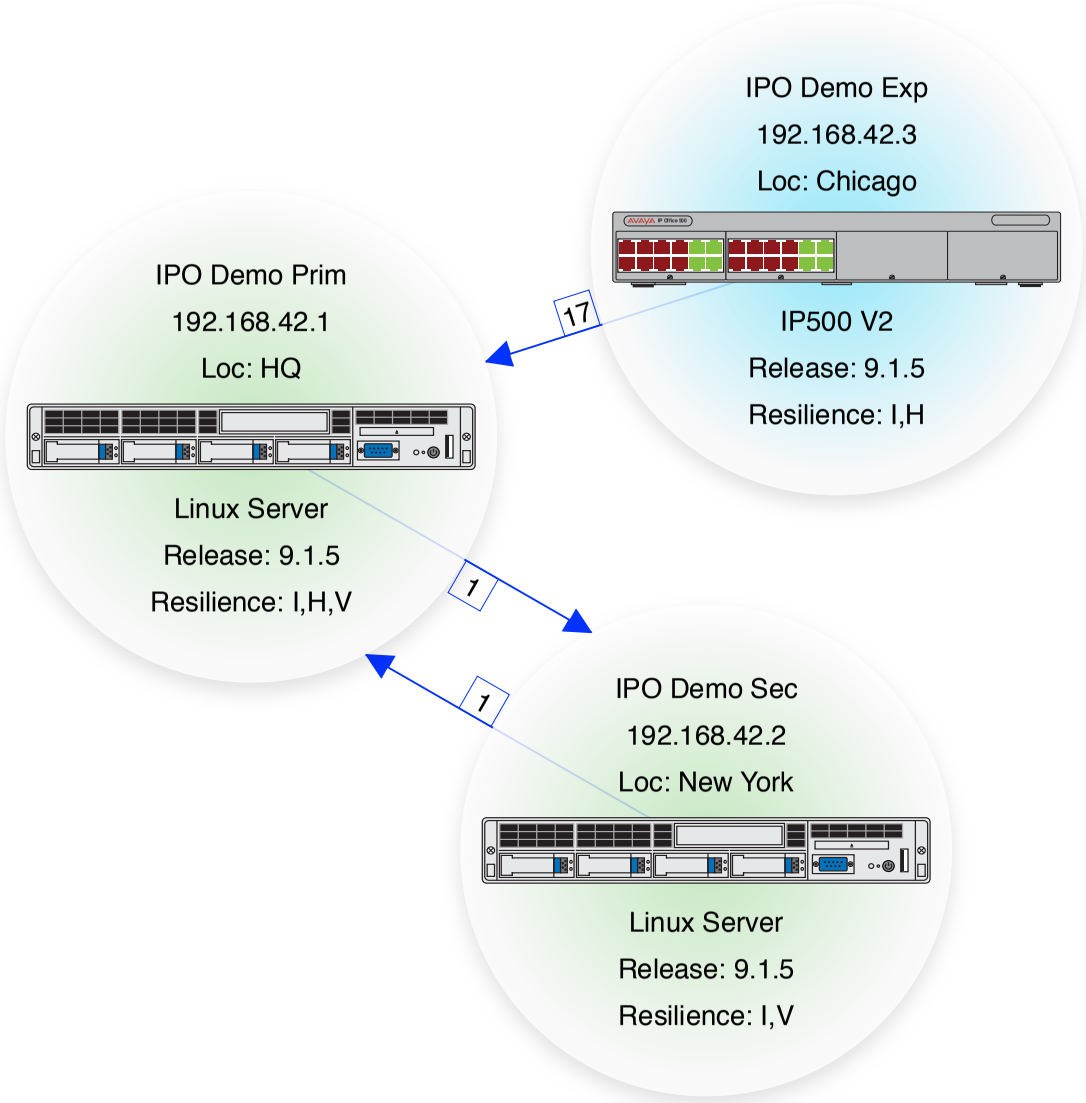
IP Office Resilience Graph

IP Office Server Edition Demo
Customer Number: 1234321
Date of Information: 3/1/2017

Main Resilience Line — N
Location Based Resilience Line — N
N = Line Number

Resilient Backup Services

IP Phones (I)
Hunt Groups (H)
Voicemail (V)
IP DECT (D)
Location (L)



System: IPO Demo Exp

Systems Providing Resilience for 'IPO Demo Exp'

Line #	Line Type	Destination System	Resilient Services
17	IP Office Line	IPO Demo Prim (192.168.42.1)	IP Phones Hunt Groups

Systems that 'IPO Demo Exp' Provides Resilience For

System	Line #	IP Phones	Hunt Groups	Hunt Groups Members
This System does not provide fallback services for any other Systems				

System: IPO Demo Prim

Systems Providing Resilience for 'IPO Demo Prim'

Line #	Line Type	Destination System	Resilient Services
1	IP Office Line	IPO Demo Sec (192.168.42.2)	IP Phones Hunt Groups Voicemail

Systems that 'IPO Demo Prim' Provides Resilience For

System	Line #	IP Phones	Hunt Groups	Hunt Groups Members
IPO Demo Exp (192.168.42.3)	17	5	1	6
IPO Demo Sec (192.168.42.2)	1	0	-	-
Totals		**5**	**1**	**6**

- This System backs up the voicemail of System 'IPO Demo Sec'

Worst Case Scenarios When Providing Resilience

The following calculations show the maximum number of IP Office resources (Extensions, Hunt Groups, etc.) that this System may need to support when providing resiliency for other Systems in the network.

Extensions

	16	Local Extensions
+	**5**	Fallback IP Phones
=	**21**	Worst Case Extension fallback (31% increase)

Hunt Groups

	4	Local Hunt Groups
+	**1**	Fallback Hunt Groups
=	**5**	Worst Case Hunt Group fallback (25% increase)

Hunt Group Members

	56	Local Hunt Group Members
+	**6**	Fallback Hunt Group Members
=	**62**	Worst Case Hunt Group Member fallback (11% increase)

System: IPO Demo Sec

Systems Providing Resilience for 'IPO Demo Sec'

Line #	Line Type	Destination System	Resilient Services
1	IP Office Line	IPO Demo Prim (192.168.42.1)	IP Phones Voicemail

Systems that 'IPO Demo Sec' Provides Resilience For

System	Line #	IP Phones	Hunt Groups	Hunt Groups Members
IPO Demo Prim (192.168.42.1)	1	8	4	56
Totals		**8**	**4**	**56**

- This System backs up the voicemail of System 'IPO Demo Prim'

Worst Case Scenarios When Providing Resilience

The following calculations show the maximum number of IP Office resources (Extensions, Hunt Groups, etc.) that this System may need to support when providing resiliency for other Systems in the network.

Extensions

	0	Local Extensions
+	**8**	Fallback IP Phones
=	**8**	Worst Case Extension fallback

Hunt Groups

	0	Local Hunt Groups
+	**4**	Fallback Hunt Groups
=	**4**	Worst Case Hunt Group fallback

Hunt Group Members

	0	Local Hunt Group Members
+	**56**	Fallback Hunt Group Members
=	**56**	Worst Case Hunt Group Member fallback

7.2. Outbound Line Diversity

IP Office can utilize multiple underlying technologies for its Lines. Analog, Digital, and IP-based (SIP/H.323) Lines can all be used to place calls. Using a variety of these technologies can help improve the resiliency of the system. For example, if a location's Internet access is temporarily unavailable, SIP-based Lines will be unusable. Having additional Digital or Analog Lines configured in the System can provide backup in such a scenario, ensuring that outbound calls can still be placed.

In addition, having multiple outbound Lines configured, even if they all use the same underlying technology, helps improve the resiliency of the system. If an individual Line is not functioning, having additional Lines available for outbound calling will help insulate Users from the outage.

This section analyzes which technologies are being used for the working (in-service) outbound Lines. For each System, it summarizes the extent to which diverse types of media and multiple available Lines are being used to improve outbound calling resiliency.

System: IPO Demo Exp

- This System has **12** Lines using **Analog, Digital AND IP media**. This provides diverse resiliency in a situation where one type of media is out of service.

System: IPO Demo Prim

- IP Office Systems using Linux servers can only utilize **IP media** for outgoing calls. This server has **3** outgoing IP Lines, which provides resilience in the case of an outage with a particular Line.

System: IPO Demo Sec

- IP Office Systems using Linux servers can only utilize **IP media** for outgoing calls. This server has **3** outgoing IP Lines, which provides resilience in the case of an outage with a particular Line.

7.3. Resilient Outgoing Line Groups

IP Office uses Outgoing Line Groups to route calls off the system. When an Outgoing Line Group is selected to place a call, the first Line in the group that is both functional and idle will be used. You can build resilience into an Outgoing Line Group by simply including multiple Lines in the group. The Lines in a group can be of the same or different media types.

This section analyzes the Outgoing Line Groups in each System, and determines which of the groups contain multiple Lines to provide resiliency. The Line Groups are then displayed in one of two tables indicating whether they are resilient (i.e. contain multiple in-service Lines) or not. The types of Lines present in each group are also displayed for reference.

Using this section will help you determine which Outgoing Line Groups may need additional resources added to provide better resilience for outgoing calls.

System: IPO Demo Exp

Resilient Outgoing Line Groups

Group ID	# of Lines	Line Type(s)
5	2	PRI, SIP
10	8	Analog

Non-Resilient Outgoing Line Groups

Group ID	Line Type
99998	IP Office
99999	IP Office

System: IPO Demo Prim

Resilient Outgoing Line Groups

Group ID	# of Lines	Line Type(s)
There are no Resilient Outgoing Line Groups		

Non-Resilient Outgoing Line Groups

Group ID	Line Type
2	SIP
99001	IP Office
99998	IP Office

System: IPO Demo Sec

Resilient Outgoing Line Groups

Group ID	# of Lines	Line Type(s)
There are no Resilient Outgoing Line Groups		

Non-Resilient Outgoing Line Groups

Group ID	Line Type
11	SIP
99002	IP Office
99999	IP Office

7.4. Resilient ARS Short Code Entries

In IP Office, ARS Forms utilize Short Codes with a 'Dial' feature to route calls to an Outgoing Line Group. As a means of resilience, an administrator can include duplicate Short Code entries in a single ARS Form, and have each entry point to a different Outgoing Line Group. IP Office will attempt to route outgoing calls that match the Short Code to each of the Outgoing Line Groups (in the order they are listed) until it finds one with an available Line. This is one way to configure the 'failover' of one Outgoing Line Group to another.

In this section, the ARS Forms in the system are analyzed to detect duplicate dialable Short Code entries. In addition, the duplicated entry's Outgoing Line Groups are also analyzed to ensure they actually contain different Lines. (Different Outgoing Line Groups that share the same Lines do not provide significant resiliency.)

Each of the duplicated ARS Short Codes in the solution is shown below, along with the Outgoing Line Groups and associated Line numbers the entries route to. When the Outgoing Line Groups contain a diverse set of Lines, a ✓ is displayed in the 'Is Resilient' column.

For more information about IP Office's ARS system and Short Codes, refer to Section 4.3, "Alternate Route Selection (ARS)" and Section 4.2, "Outgoing Call Routing".

System: IPO Demo Exp

ARS Form	Duplicate Short Code	Outgoing Line Groups	Outgoing Lines #s	Is Resilient
50 - Main	?	99998, 99999	17, 18	✓

System: IPO Demo Prim

ARS Form	Duplicate Short Code	Outgoing Line Groups	Outgoing Lines #s	Is Resilient
No duplicate Short Codes within an ARS Form were found in this System				

System: IPO Demo Sec

ARS Form	Duplicate Short Code	Outgoing Line Groups	Outgoing Lines #s	Is Resilient
No duplicate Short Codes within an ARS Form were found in this System				

7.5. Alternate ARS Routing Resiliency

One of the features of the Alternate Route Selection (ARS) system in IP Office is to provide resiliency for outbound calling. Normally, an ARS Form selects an Outgoing Line Group based on the number being dialed, and an available Line from that group is chosen to place the call. However, if none of the Lines in the selected group are available, either because they are currently in use or are out of service, the ARS Form can specify alternative routing for the call via the 'Alternate Route' feature. This feature allows an administrator to designate another ARS Form to handle calls in the case of an outage or lack of available Lines. The Alternate Route should direct calls to Outgoing Line Groups that contain different Lines than the originating ARS Form, providing both overflow and resilience.

This section provides a detailed analysis of how the 'Alternate Route' feature of the ARS system is being used to provide resilient outbound calling. The primary goal of this analysis is to explain which Outgoing Line Group(s) can be selected by the ARS system for various calls, and in which order they will be chosen. For more information about how the ARS system in IP Office functions, refer to Section 4.3, "Alternate Route Selection (ARS)" and Section 4.2, "Outgoing Call Routing".

Below, we analyze every System, User and User Rights Short Code that applies one of the 'Dial' features to place a call via the ARS system. The originating Short Code's type, identifying information and matching pattern are listed just like they are elsewhere in the report.

*The **bolded lines** in the tables show the first-choice routing options selected by the ARS system (i.e. not following any 'Alternate Routes'). On each bold row following the '→' are the ARS Form and Outgoing Line Group that will first attempt to handle the call. If specific dialed patterns matching the originating Short Code receive different routing treatments, each subset with unique routing will be shown separately.*

Underneath each bolded row will be zero or more rows beginning with '↳'. These rows show the alternate routing options selected by the ARS system when the first-choice Outgoing Line Group is unavailable. Note that an Alternate Route does not necessarily cover every call that the first-choice route handled. The precise subset of the first-choice routing rule that receives alternate treatment is shown in gray italics following the '↳'. Like the first-choice rows, the ARS Form and Outgoing Line Group that will alternatively be used to place the call are shown. Alternates of alternates are similarly displayed (when applicable) as increasingly-indented rows beginning with '↳'.

For an 'Alternate Route' to provide overflow and resilience, the Outgoing Line Group it selects must include Lines different from those in the first-choice Line Group. Any alternate Line Group that does not contain additional Lines to use will be shown in red.

To help summarize the resilience provided by the 'Alternate Route' feature, each initial routing rule is noted with one of the following statements in the 'Resiliency' column:

- ***Full** – all calls can reach at least one alternate Line Group which is resilient (contains different Lines than the first-choice Line Group)*
- ***Partial** – only a subset of the calls handled by the first-choice routing rule can reach a resilient Line Group*
- ***None** – no alternate Line Groups can be reached, or the alternate Line Groups are not considered resilient*

This resiliency summary can be used to quickly verify whether calls that are expected to use resilient Alternate Routing are properly configured to do so.

System: IPO Demo Exp

This System does not use the 'Alternate ARS Routing' feature to provide trunking resiliency for outgoing calls

System: IPO Demo Prim

Short Code Identifier	Short Code	→	ARS Form	Line Group	Resiliency
System	9N;				
	91312N	→	**50**	**99001**	**Full**
	↳*91312N*	→	51	↳99998	
	91773N	→	**50**	**99001**	**Full**
	↳*91773N*	→	51	↳99998	
	91872N	→	**50**	**99001**	**Full**
	↳*91872N*	→	51	↳99998	
	9N	→	**50**	**2**	**Full**
	↳*9N*	→	51	↳99998	
User:	**9011N;**	→	**50**	**2**	**Full**
Alan Moore	↳*9011N*	→	51	↳99998	
User:	**901133N;**	→	**50**	**2**	**Full**
Joan Lopez	↳*901133N*	→	51	↳99998	

System: IPO Demo Sec

Short Code Identifier	Short Code	→	ARS Form	Line Group	Resiliency
System	?				
	11	→	**50**	**11**	**None**
	911	→	**50**	**11**	**None**
	↳*911*	→	51	↳11*	
	?	→	**50**	**99999**	**Partial**
	↳*9N*	→	51	↳11	

NOTE: *This Line Group is not considered resilient because it already appears previously in the series of Line Groups that will be attempted.*

7.6. Media Connection Preservation

IP Office Server Edition solutions running software release 9.0 and later can utilize the Media Connection Preservation (MCP) feature to improve the resiliency of IP-based calls. This feature allows currently established calls to keep their media stream connected for up to 2 hours in the event the signaling path to the IP Office is lost. This provides callers an opportunity to complete their calls without interruption, even though the signaling path is unavailable.

Media Connection Preservation is only available on IP-based calls, and only if both endpoints of the call (Extensions and/or Lines) support the feature. MCP is only supported on 9608, 9611, 9621, and 9641 model phones running H.323 firmware. Lines types that support MCP include IP Office (SCN), SIP, and Session Manager. In addition, this capability requires both the 'Media Connection Preservation' and 'Direct Media' features be enabled on the two endpoints.

This section will analyze the use of the Media Connection Preservation feature to support call resiliency. Each System in the Server Edition network can have MCP configured differently, and thus each will be analyzed individually. However, Media Connection Preservation will only be available throughout the entire network when it is properly enabled on every System, Line, and Extension.

MCP is enabled overall at the System level, but this setting can be overridden for individual Lines as necessary. Every MCP-capable Line within each System will be listed, along with its type, destination, and whether the Line is fully configured to support MCP. Lines indicating 'No' in the 'MCP Ready?' column have one or both of the MCP and/or Direct Media features disabled at the Line or System level.

Following the Lines table will be an analysis of the Extensions in each System. This analysis shows how many total Extensions are on the System, how many of those Extensions are MCP-capable (due to the model of phone), and how many of the MCP-capable Extensions are properly configured to use MCP. This gives the reader an understanding of the extent to which MCP can actually be used to provide call resiliency for the System's Users.

Overall, this section should be used to ensure the MCP feature is enabled whenever appropriate, and to validate the consistency of the feature's usage throughout the Server Edition network.

System: IPO Demo Exp

MCP Enabled: Yes

MCP Capable Lines

Line #	Line Type	Destination	MCP Ready?
17	IP Office Line	System 'IPO Demo Prim'	Yes
18	IP Office Line	System 'IPO Demo Sec'	Yes
19	SIP Line	192.168.78.5	No

Total Number of Extensions: 38
MCP Capable Extensions: 5 (13%)
Capable Extensions configured to use MCP: 5 (13%)

System: IPO Demo Prim

MCP Enabled: Yes

MCP Capable Lines

Line #	Line Type	Destination	MCP Ready?
1	IP Office Line	System 'IPO Demo Sec'	Yes

Line #	Line Type	Destination	MCP Ready?
2	IP Office Line	System 'IPO Demo Exp'	Yes
9	SIP Line	192.168.56.3	No

Total Number of Extensions: 16
MCP Capable Extensions: 9 (56%)
Capable Extensions configured to use MCP: 9 (56%)

System: IPO Demo Sec

MCP Enabled: Yes

MCP Capable Lines

Line #	Line Type	Destination	MCP Ready?
1	IP Office Line	System 'IPO Demo Prim'	Yes
2	IP Office Line	System 'IPO Demo Exp'	Yes
9	SIP Line	192.168.57.3	No

Total Number of Extensions: 0
MCP Capable Extensions: 0
Capable Extensions configured to use MCP: 0

7.7. Voicemail Resiliency

IP Office can use Voicemail Pro or a variety of other voicemail products for its messaging services. However, only Voicemail Pro offers resilience features officially supported by Avaya. There are three aspects of a Voicemail Pro configuration related to resilience, and you can use any combination of these three options to improve the resilience of messaging:

- ***Backup** – Voicemail Pro configurations can include a Backup Voicemail Pro server to provide resilience for voicemail access and storage. If the main Voicemail Pro server becomes unavailable, the backup will automatically take over all voicemail services.*
- ***Fallback** – Voicemail Pro installed in a multi-node network can utilize a 'Fallback' System to provide a resilient path to the Voicemail Pro server if the System normally hosting voicemail becomes unavailable. The fallback IP Office System is designated via an SCN Resilience Line.*
- ***Distributed** – Voicemail Pro servers can also be set up in a Distributed configuration. This consists of a 'Central' Voicemail Pro server, and one or more additional 'Distributed' Voicemail Pro servers in the network. The Central Voicemail Pro server is used for message storage, but the Distributed server(s) handle most of the other services. If a Distributed server becomes unavailable, calls will redirect to the Central Voicemail Pro server until the Distributed server is back online. Similarly, if the Central Voicemail Pro server becomes unavailable, a Distributed server can retain messages for playback until the Central Server becomes available again.*

This section will analyze the resiliency of the voicemail configuration, and summarize the results for each System in a table. Each System's voicemail type will be listed, along with any applicable configuration details for reference. For example, a System that hosts a Voicemail Pro server will identify the server's IP address, the backup server's IP address (if specified), and the Fallback System (if part of a multi-node network). Any Voicemail Pro resilience features being used (listed and explained above) will be shown in the final column of the table.

Voicemail Resiliency Summary

System	Voicemail Type	Resiliency Type(s)
IPO Demo Exp	Centralized *Central System: IPO Demo Prim*	N/A*
IPO Demo Prim	Voicemail Lite/Pro *Voicemail IP Address: 192.168.42.1* *Backup IP Address: 192.168.42.2* *Fallback System: IPO Demo Sec*	Backup Fallback
IPO Demo Sec	Centralized *Central System: IPO Demo Prim*	N/A*

**__NOTE:__ These Systems will inherit the resiliency capabilities of the central System.*

8. Data Networking

Avaya's IP Office platform is well equipped to operate in a 'converged' environment, where both traditional voice communications and other data travel over the same network. In fact, an IP Office Control Unit can provide much of the basic data networking functionality typically provided by dedicated hardware such as servers, routers and firewalls. The system can be deployed in a prominent role in the local network, operating as a 'gateway' to a corporate WAN, the Internet, or other external network. IP Office is also a full-fledged network client, able to integrate with other available services to reduce administration and monitoring efforts.

This section provides an overview of the data networking capabilities of the IP Office solution, and how they're currently being used in your configuration. It covers:

- *Both local and external networks that each IP Office System is aware of*
- *The routing, translation, and filtering of data that IP Office performs*
- *The network services and applications that IP Office provides and/or integrates with*

8.1. Defined Interfaces

Each distinct network that an IP Office System is a member of must be defined within the configuration. Typically, this includes a Local Area Network of nearby devices, and perhaps a larger network such as a corporate WAN or the Internet if using IP Office's routing capabilities. This topic details both the physical and logical interfaces each IP Office System has to various networks, and its unique address within them.

The following table displays the primary attributes of the LAN interfaces present on each of the Systems in the solution:

System Name	Interface	IP Address	Subnet Mask	Public IP Address	Primary Translation Address	External NAT / Firewall Type
IPO Demo Prim	LAN1	192.168.42.1	255.255.255.0	192.168.42.55		Full Cone NAT
	Assigned Via DHCP		*Subnet: 192.168.42.0 - 192.168.42.255*			
IPO Demo Prim	*LAN2**	192.168.43.1	255.255.255.0			
	Assigned Manually		*Subnet: 192.168.43.0 - 192.168.43.255*			
IPO Demo Sec	LAN1	192.168.42.2	255.255.255.0			
	Assigned Via DHCP		*Subnet: 192.168.42.0 - 192.168.42.255*			
IPO Demo Sec	*LAN2**	192.168.43.1	255.255.255.0			
	Assigned Manually		*Subnet: 192.168.43.0 - 192.168.43.255*			
IPO Demo Exp	LAN1	192.168.42.3	255.255.255.0	192.168.42.75	198.168.42.100	Blocking Firewall
	Assigned Via DHCP		*Subnet: 192.168.42.0 - 192.168.42.255*			
IPO Demo Exp	*LAN2**	192.168.43.1	255.255.255.0			
	Assigned Manually		*Subnet: 192.168.43.0 - 192.168.43.255*			

NOTE:* *These LAN interfaces appear to be using **default values for their IP Address and other settings. They may not be actively in use, but will still appear in the IP Office configuration.*

The traffic from one or more LAN interfaces appears to be passing through a 3rd party, external NAT and/or Firewall device on its way to another network. Often this can cause problems for certain types of VoIP traffic, although IP Office will use the information below to help navigate these network barriers. Below is an explanation of each type of External NAT / Firewall scenario detected:

External NAT or Firewall Type: Blocking Firewall
An external firewall is blocking the ports necessary for VoIP calls to succeed.

External NAT or Firewall Type: Full Cone NAT
All requests from the same internal IP address and port are mapped to the same external IP address and port. Incoming requests can be sent to an internal host by sending data to the mapped external address.

8.2. External Network Services

When a transient connection from an IP Office System to an external network needs to be established, perhaps involving authentication to connect, a 'Service' is defined in the configuration. For example, a temporary connection to an Internet Service Provider (ISP) may be created on-demand to provide access to the Internet when necessary. Similarly, connecting to the corporate WAN may require proper authentication of one or both sides. This topic describes the various 'Services' defined in the IP Office solution, and the parameters used to establish and authenticate each connection.

Network Service: 'VPNService' on System 'IPO Demo Exp'

This Network Service provides secure, incoming access to the IP Office network for administration, management, and monitoring functions. It is configured to connect to an Avaya VPN Gateway hosted by your service provider, allowing remote access to the IP Office System.

Service Type: SSL VPN
Account Name: RemoteManager
Avaya VPN Gateway Address: 192.168.42.25

8.3. IP Routing

An IP Office Control Unit can perform sophisticated routing functions for data packets on your network, possibly eliminating the need for a separate data router. Through the application of specific routing rules, firewall profiles, and tunneling protocols, IP Office can protect the local network while providing both inbound and outbound access to public facilities like the Internet. This section describes the various functionality available within the IP Office solution for controlling your IP data network.

Static Routing Rules

An IP Office Control Unit can act as a 'gateway' for devices with an IP address in the same subnet. If an IP device on the LAN needs to access a host on another subnet, a route must be defined to specify the path the traffic should take to reach the host. These routing rules can be determined dynamically via a protocol like RIP, or can be manually defined for more static environments. The information below details the static IP routing rules that have been defined in the IP Office solution for directing data packets.

IP Office enables you to define routing rules that direct matching traffic to any IP LAN Interface, Network Service, L2TP Tunnel, or Dial-In User. A rule is triggered when the destination IP address of a packet is within the range of addresses specified by the rule. In addition, you may specify a 'Default Route' for each System that handles any packets that are not matched by a more specific rule. Once a routing rule is selected, the traffic is sent to the destination specified (LAN Interface, Network Service, L2TP Tunnel, or Dial-In User) for further routing. To forward packets to another router present on the local LAN, a specific Gateway address can also be defined.

IP Office also provides some advanced routing configurations. You can define a 'distance' metric to indicate that one route is preferable to another (routes with lower metrics are preferred). Additionally, you can allow IP Office to respond to Address Resolution Protocol (ARP) requests for the specified IP addresses, allowing others to discover the IP Office routing rules.

Below are the static IP routing rules defined for each System:

System: IPO Demo Prim

IP Address	IP Mask	Address Range	Gateway Address	Destination	Metric	Respond to ARP?
0.0.0.0	0.0.0.0	Default Route	192.168.42.1	Interface: LAN1	1	No
192.168.42.35	255.255.255.0	192.168.42.0 - 192.168.42.255	10.10.2.3	Interface: LAN1	0	No
Total Static IP Routes: 2						

System: IPO Demo Sec

IP Address	IP Mask	Address Range	Gateway Address	Destination	Metric	Respond to ARP?
0.0.0.0	0.0.0.0	Default Route	192.168.42.2	Interface: LAN1	5	No
Total Static IP Routes: 1						

System: IPO Demo Exp

IP Address	IP Mask	Address Range	Gateway Address	Destination	Metric	Respond to ARP?
0.0.0.0	0.0.0.0	Default Route	192.168.42.3	Interface: LAN1	0	No
192.168.42.25	255.255.255.0	192.168.42.0 - 192.168.42.255	10.10.2.2	Service: VPNSer-vice	0	No
Total Static IP Routes: 2						

Dynamic Routing (RIP)

In addition to the static routing rules defined above, the LAN Interfaces of certain IP Office Control Units can be configured to dynamically learn about the available routes on the network via the Routing Information Protocol (RIP). Routing rules learned from other routers through RIP are known as 'dynamic routes', and are updated as the network changes. Each local interface can be configured to listen to RIP routing rules that are broadcast from other routers, send RIP responses to inquiries from other routers, or both.

The behavior of each local interface on which RIP is available is described below:

System: IPO Demo Exp

- Local Interface **LAN 1** does not share routing information via RIP.
  This interface neither sends nor listens to dynamic routing information via RIP.

Network Address Translation (NAT)

Network Address Translation (NAT) is a process by which IP addresses from one network can be dynamically mapped to those in another network during data transmission. The most common use of NAT is to allow the various hosts on a Local Area Network (LAN) to use 'private' IP addresses internally, but share one or more 'public' IP addresses when communicating with other hosts on the Internet. In this scenario, the dynamic mapping of internal addresses to external addresses is remembered by the router doing the translation (e.g. the IP Office Control Unit), so that returning traffic can be properly directed to the internal host which initiated the request. The 'Static NAT' feature can also be used to statically map unique, 'public' IP addresses to specific internal hosts for direct incoming access.

The use of NAT is not applicable to any System in this IP Office solution

Firewall Profiles

On most Control Units, IP Office allows you to define specific rules to regulate the data traveling in to and out of the System. These rules are collected into a 'Firewall Profile', and can be applied in the configuration wherever data is being routed between two different networks. Each Firewall Profile allows you to specify exactly which types of traffic should be permitted, and in which direction (incoming to IP Office, outgoing from IP Office, or both). In this section we lay out the specific services and ports managed by each defined Firewall Profile, and describe how that profile is being applied within the configuration of the IP Office System.

Each entry in a Firewall Profile specifies the action to take for a certain type of traffic passing 'through' the firewall (i.e. from one network to another). There are four actions that can be taken for each type of traffic:

- *'Drop' – Traffic is not permitted to pass, regardless of its direction (entering or leaving the IP Office network).*
- *'In' – Incoming traffic (to the IP Office network) is allowed to pass and start a new session, but outgoing traffic is blocked unless it is a response within an existing session.*
- *'Out' – Outgoing traffic (leaving the IP Office network) is allowed to pass and start a new session, but incoming traffic is blocked unless it is a response within an existing session.*
- *'Bothway' – Both incoming traffic (to the IP Office network) and outgoing traffic (leaving the IP Office network) are allowed to pass.*

Care must be taken with the 'In' or 'Bothway' actions, as these allow devices outside of the IP Office network, and potentially untrusted, to initiate sessions without restriction.

Firewall Profiles allow these actions to be easily applied to the most common types of network traffic, and also provide a sophisticated means of specifying the action for any other traffic you need to control as well.

Below, the configuration of each defined Firewall Profile is documented, and the interfaces where it is applied are shown.

Firewall Profile: 'Main Firewall' on System 'IPO Demo Exp'

Firewall rules:

Actions for common networking protocols:

Protocol	Port(s)	Action	Description
DNS	53	Out	Domain Name System (IP address lookup)
FINGER	79	Drop	Remote User Information Protocol
FTP	20, 21	Out	File Transfer Protocol
GOPHER	70	Drop	Internet Menu System
HTTP(S)	80, 443	Bothway	Hypertext Transfer Protocol
IGMP		Drop	Internet Group Management
IRC	194	Out	Internet Relay Chat
NNTP	119	Out	Network News Transfer Protocol
POP3	110	Out	Post Office Protocol (email retrieval)
PPTP	1723	Drop	Point-to-Point Tunneling Protocol
RSVP		Drop	Reservation Protocol
SMTP	25	Out	Simple Mail Transfer Protocol
SNMP	161, 162	Drop	Simple Network Management Protocol
Telnet	23	Out	Remote Terminal Login
TIME	37	Out	TIME Protocol (clock synchronization)

Actions for Avaya administration protocols:

Protocol	Port(s)	Action	Description
CFG	50802, 50804, 50805	Drop	System configuration settings access
SEC	50812, 50813	Drop	System security settings access
SSI	50808	In	System Status Application access
TSPI	50814	In	System Enhanced TSPI access

Actions for custom traffic:

Notes	Remote Address Range	Local Address Range	Protocol	Matching	Action
NetBIOS/DNS	All	All	TCP (6)	Source Port = 137 and Dest Port = 53	Drop

Application of Firewall Profile 'Main Firewall' on System 'IPO Demo Exp'

This Firewall Profile does not appear to be used in the IP Office configuration

VPN Tunneling

IP Office provides features for securing the traffic traveling between the local network and public facilities like the Internet. This capability allows remote users, such as those in a branch office or working from home, to access the resources of the local IP Office network in a secure manner without the need to purchase private 'leased line' facilities. This is accomplished by establishing a Virtual Private Network (VPN) between the IP Office Control Unit and the remote location using the IPSec and/or L2TP tunneling protocols.

- *IPSec (Internet Protocol Security) is a protocol used to encrypt and authenticate data so that it may be sent over unprotected, public facilities without the data being intercepted or modified by third parties.*
- *L2TP (Layer 2 Tunneling Protocol) is a protocol used to establish an authenticated 'tunnel' through which any data can be encapsulated and transmitted. By itself, L2TP does not provide any encryption or confidentiality. Because of this, L2TP is often used in conjunction with IPSec to transmit encrypted, encapsulated data – the requirements of a Virtual Private Network.*

IP Office allows both of these protocols to be used by themselves, or together to obtain the combined advantages of each. This section documents and explains each of the VPN tunnels that have been defined in the solution.

Tunnel: 'Remote Data' on System 'IPO Demo Exp'

Tunnel Type: IPsec
IPsec Protocol: ESP (Encapsulating Security Payload)
Description: This tunnel provides encrypted, authenticated transmission of packets whose addresses match the local and remote address ranges specified below.

All traffic whose source and destination addresses match the ranges below will be transmitted within this IPsec tunnel, triggering its establishment if necessary:

Local Network Address: 192.168.42.20	**Remote Network Address:** 10.10.2.3
Local Network Mask: 255.255.255.0	**Remote Network Mask:** 255.255.255.0
Local IP Address Range: 192.168.42.0 - 192.168.42.255	**Remote IP Address Range:** 10.10.2.0 - 10.10.2.255

The IPsec tunnel will be established with the following IP addresses as its 'endpoints':

Local Endpoint IP Address: N/A	**Remote Endpoint IP Address:** 10.10.2.5

8.4. IP Network Services & Applications

IP Office is a full-featured 'unified communications' platform which relies heavily on network-based services to provide integration with other platforms. In this role, IP Office acts as both a provider of services on the network, as well as a consumer of services supplied by other devices. This section will briefly summarize the various IP network services and protocols the system uses to communicate with other components.

Network Services Provided by IP Office

An IP Office System can act as a 'Server' for the following protocols – accepting incoming requests from other network devices on its local interface(s). For each service shown, the interface(s) and port numbers that the system is 'listening' for requests on will be indicated.

System: IPO Demo Prim

Service / Protocol	Listening Port(s)	Listening Interface(s)	Description
DHCP Server		Not Enabled	Dynamic Host Configuration Protocol (Used to automatically configure hosts on the network)
H.323 Gatekeeper	1718, 1719	LAN 1	Provides address translation, bandwidth management, and access control for H.323 devices
HTTP	80, 443	LAN 1	Hypertext Transfer Protocol (Used for file retrieval and web management)
RTCP Monitor	5005	LAN 1	Receives RTP Control Protocol messages for monitoring of VoIP quality on the network
SIP Registrar	5060	LAN 1	Receives SIP Registration requests from elements on the network to provide SIP URI resolution
SNMP	161	LAN 1	SNMP agent for responding to Simple Network Management Protocol queries
TFTP	69	LAN 1	Trivial File Transfer Protocol (used for file retrieval by network devices)

System: IPO Demo Sec

Service / Protocol	Listening Port(s)	Listening Interface(s)	Description
DHCP Server		Not Enabled	Dynamic Host Configuration Protocol (Used to automatically configure hosts on the network)
H.323 Gatekeeper	1718, 1719	LAN 1	Provides address translation, bandwidth management, and access control for H.323 devices
HTTP	80, 443	LAN 1	Hypertext Transfer Protocol (Used for file retrieval and web management)
RTCP Monitor	5005	LAN 1	Receives RTP Control Protocol messages for monitoring of VoIP quality on the network
SIP Registrar	5060	LAN 1	Receives SIP Registration requests from elements on the network to provide SIP URI resolution
SNMP	161	LAN 1	SNMP agent for responding to Simple Network Management Protocol queries
TFTP	69	LAN 1	Trivial File Transfer Protocol (used for file retrieval by network devices)

System: IPO Demo Exp

Service / Protocol	Listening Port(s)	Listening Interface(s)	Description
DHCP Server		Not Enabled	Dynamic Host Configuration Protocol (Used to automatically configure hosts on the network)
H.323 Gatekeeper	1718, 1719	LAN 1	Provides address translation, bandwidth management, and access control for H.323 devices
HTTP	80, 443	LAN 1	Hypertext Transfer Protocol (Used for file retrieval and web management)
IKE	500	LAN 1	Key exchange for the IPsec protocol
L2TP	1701	Not Enabled	Layer 2 Tunneling Protocol for VPN tunnels
RIP	520	Not Enabled	Routing Information Protocol for automatic discovery of local routing rules
RTCP Monitor	5005	LAN 1	Receives RTP Control Protocol messages for monitoring of VoIP quality on the network
SIP Registrar	5060	LAN 1	Receives SIP Registration requests from elements on the network to provide SIP URI resolution
SNMP	161	LAN 1	SNMP agent for responding to Simple Network Management Protocol queries
TFTP	69	LAN 1	Trivial File Transfer Protocol (used for file retrieval by network devices)

Network Services Used by IP Office

IP Office system components can act as 'Clients' for the following protocols and services – initiating connections to other network devices via their local IP interface(s). For each such service, the table below will show the address of the host(s) the IP Office components will attempt to contact for the specified service, and the destination port number(s) the component will use to initiate a connection.

System: IPO Demo Prim

Service / Protocol	Host(s) to Contact	Destination Port(s)	Description
AVPP	Not Configured		Avaya Voice Priority Processor (used to implement QoS policies with Avaya IP wireless handsets)
DHCP	Broadcast via LAN 1	67	Dynamic Host Configuration Protocol (used to automatically configure the IP Office local interfaces)
DNS	192.168.92.52, 192.168.12.52	53	Domain Name System (used to convert host names to IP addresses)
HTTP	IP Office Local Interface	80	Hypertext Transfer Protocol (used by phones for software and settings files)
HTTP Directory	Not Configured	443	Hypertext Transfer Protocol (used to import user directory records)
LDAP	Not Configured	389	Lightweight Directory Access Protocol (used to import user directory records)
SMDR	192.168.32.0		Station Message Detail Recording (used to send call records to a collection server)
SMTP	192.168.145.23	25	Simple Mail Transfer Protocol

Service / Protocol	Host(s) to Contact	Destination Port(s)	Description
SNMP Traps	Not Configured	162	Simple Network Management Protocol (used to send alarms to an SNMP server)
STUN	Not Configured	3478	Simple Traversal of UDP through NAT (used to detect the effects of external NAT devices)
TFTP	IP Office Local Interface	69	Trivial File Transfer Protocol (used by phones for software and settings files)
TIME/SNTP	TIME Broadcast	37	Simple Network Time Protocol (used for system clock synchronization)
Voicemail	192.168.42.1, 192.168.42.2	50791	External server providing Voicemail services for IP Office

System: IPO Demo Sec

Service / Protocol	Host(s) to Contact	Destination Port(s)	Description
AVPP	Not Configured		Avaya Voice Priority Processor (used to implement QoS policies with Avaya IP wireless handsets)
DHCP	Broadcast via LAN 1	67	Dynamic Host Configuration Protocol (used to automatically configure the IP Office local interfaces)
DNS	192.168.92.52, 192.168.12.52	53	Domain Name System (used to convert host names to IP addresses)
HTTP	IP Office Local Interface	80	Hypertext Transfer Protocol (used by phones for software and settings files)
HTTP Directory	192.168.42.1	443	Hypertext Transfer Protocol (used to import user directory records)
LDAP	Not Configured	389	Lightweight Directory Access Protocol (used to import user directory records)
SMDR	Not Configured		Station Message Detail Recording (used to send call records to a collection server)
SMTP	192.168.145.23	25	Simple Mail Transfer Protocol
SNMP Traps	Not Configured	162	Simple Network Management Protocol (used to send alarms to an SNMP server)
STUN	Not Configured	3478	Simple Traversal of UDP through NAT (used to detect the effects of external NAT devices)
TFTP	IP Office Local Interface	69	Trivial File Transfer Protocol (used by phones for software and settings files)
TIME/SNTP	192.168.42.1	37	Simple Network Time Protocol (used for system clock synchronization)
Voicemail	Primary Server	50791	External server providing Voicemail services for IP Office

System: IPO Demo Exp

Service / Protocol	Host(s) to Contact	Destination Port(s)	Description
AVPP	Not Configured		Avaya Voice Priority Processor (used to implement QoS policies with Avaya IP wireless handsets)

Service / Protocol	Host(s) to Contact	Destination Port(s)	Description
DHCP	Broadcast via LAN 1	67	Dynamic Host Configuration Protocol (used to automatically configure the IP Office local interfaces)
DNS	192.168.92.52, 192.168.12.52	53	Domain Name System (used to convert host names to IP addresses)
HTTP	IP Office Local Interface	80	Hypertext Transfer Protocol (used by phones for software and settings files)
HTTP Directory	192.168.42.1	443	Hypertext Transfer Protocol (used to import user directory records)
LDAP	Not Configured	389	Lightweight Directory Access Protocol (used to import user directory records)
RIP	Not Configured	520	Routing Information Protocol (used to broadcast routing information)
SMDR	Not Configured		Station Message Detail Recording (used to send call records to a collection server)
SMTP	192.168.145.23	25	Simple Mail Transfer Protocol
SNMP Traps	Not Configured	162	Simple Network Management Protocol (used to send alarms to an SNMP server)
STUN	Not Configured	3478	Simple Traversal of UDP through NAT (used to detect the effects of external NAT devices)
TFTP	IP Office Local Interface	69	Trivial File Transfer Protocol (used by phones for software and settings files)
TIME/SNTP	192.168.42.1	123	Simple Network Time Protocol (used for system clock synchronization)
Voicemail	Primary Server	50791	External server providing Voicemail services for IP Office
WINS	Not Configured	137	Windows Internet Name Service (used to convert host names to IP addresses)

Remote Access Server (RAS) Configuration Details

In addition to the traditional services that IP Office can host on the Local Area Network, the system also has the ability to provide 'dial up networking' to remote users. An IP Office System can be configured as a Remote Access Server (RAS), allowing specified Users to connect to the network using a traditional modem, an ISDN modem, or a Wide Area Network (WAN) link. Once connected, the remote users can be given access to the same network services and resources as local users. One of the more common uses of the RAS service is to provide remote access to the IP Office System for maintenance activity performed by your Service Provider.

Each RAS service configured in the IP Office solution will be listed below, along with the Incoming Call Routing rules that direct calls to the specified service:

System: IPO Demo Exp

RAS Service: DialIn

The following Incoming Call Routes direct calls to this RAS Service. Incoming calls matching all of the specified parameters may be answered by the Remote Access Service:

Call Type	Incoming Line Group ID	Incoming Number	Incoming Sub Address	Incoming CLI
Any Data	1			
Any Data	2			

RAS Users

The following Users have the 'Dial In' feature enabled, providing them access to the RAS services listed above:

Name	Extension	Account Status
RemoteManager		Enabled
Local Users with 'Dial In' Access Enabled: 1		

Directory Services Configuration Details

An IP Office System can automatically import entries into the System Directory from a corporate LDAP Server, the directory of another IP Office System (via HTTP), or both. This allows an organization to maintain a single corporate directory and configure IP Office to reference that directory as necessary, rather than duplicate and maintain the information in multiple places. Any directory entries imported from an LDAP Server or another IP Office System are merged with the static System Directory entries that are configured locally. The merged entries are automatically updated at specified intervals, keeping the directory of IP Office in sync with the remote server.

HTTP Directory Import

This IP Office solution is configured to import System Directory entries from an IP Office System via the HTTP protocol. The imported entries will be merged with the rest of the directory contents, and will be updated on a regular basis.

The configuration of the HTTP import feature is summarized below:

System: IPO Demo Sec

Outgoing Group ID of the Line to import from: 99999
Other IP Office System to import from: IPO Demo Prim
HTTP Server Port: 443
Entries to Import: The entire Directory of the remote System
Re-import every: 60 minutes

System: IPO Demo Exp

Outgoing Group ID of the Line to import from: 99999
Other IP Office System to import from: IPO Demo Prim
HTTP Server Port: 443
Entries to Import: The entire Directory of the remote System
Re-import every: 60 minutes

9. Change Management

While the majority of this report is focused on documenting and analyzing the existing configuration of this IP Office solution, this chapter will display the changes that have occurred to the system since the previous iteration of the report. Having regularly updated documentation of the changes that have been made to the system's configuration can assist in troubleshooting problems that result from recent updates. In addition, this chapter can be used to verify and validate that requested changes have been made correctly and completely. This is especially important when updates to the configuration are being performed by a third-party, such as a hosted service provider.

This chapter will display the configuration changes that have been made since the last time the report was generated, regardless of how long ago that was. Receiving more frequent updates to the report will provide a finer-grained documentation of the changes that are occurring to the system.

The current analysis will reflect the changes that have been made to this system's configuration between **Thursday, December 1, 2016 @ 12:00 PM** and **Wednesday, March 1, 2017 @ 1:00 PM**.

9.1. Core Telephony Changes

This section will present the changes that have been made to four primary objects in an IP Office configuration: Users, Groups, Extensions, and Lines. For each of these elements, a detailed list will be presented showing the specific objects which have been added, deleted, and modified since the previous iteration of the report. In the list of modified objects, the specific properties which have changed are displayed individually, along with their new and old values.

When deciding which objects to display as being 'modified', frequently changing and/or less important properties are not considered. For example, a change to the 'Call Forwarding' state of a User alone will not cause the User to be listed as 'modified', since this property is likely to change often and is not significant to the high-level management of the system. This filtering will allow managers to focus on only those changes that are significant to the operation and cost of the IP Office solution.

Users

Added Users

System	Name	Extn	Classification	User Profile	User Rights	Phone Type(s)
IPO Demo Prim	Angela Black	267		Basic User	Standard Rights	9611G
IPO Demo Prim	Lucy Butler	270		Office Worker		9611G
IPO Demo Prim	Nicole Perry	272		Basic User	Sales Rights	9611G
Number of Users Added: 3						

Deleted Users

System	Name	Extn	Classification	User Profile	User Rights	Phone Type(s)
IPO Demo Exp	Eva Mitchell	211		Basic User		9504
IPO Demo Exp	Franklin Lewis	228		Power User		9504
IPO Demo Exp	Ruben Murphy	237		Basic User		5420D
IPO Demo Prim	Craig Wilson	255		Office Worker	Sales Rights	9611G
Number of Users Deleted: 4						

Modified Users

System	Name	Extn	Property	New Value	Old Value
IPO Demo Exp	Amanda Allen-Foster	225	Full Name	Amanda Allen-Foster	Amanda Allen
IPO Demo Exp	Rebecca Cooper	239	Force Login	✓	-
			Hot-Desking	✓	-
			User Profile	Power User	Basic User
IPO Demo Exp	Sarah Walker	210	Full Name	Sarah Walker	Clara Perez
			Name	Sarah W	Clara P
IPO Demo Exp	Sean Thomas	207	Hot-Desking	✓	-
			Mobility Features	✓	-
			Remote Worker	✓	-
			User Profile	Power User	Office Worker
IPO Demo Prim	Brandon Davis	260	Phone Type(s)	9611G	5610SW
			Remote Worker	✓	-
Number of Users Modified: 5					

Hunt Groups

Added Hunt Groups

System	Name	Extn	Type	Ring Mode
No Hunt Groups were Added				

Deleted Hunt Groups

System	Name	Extn	Type	Ring Mode
No Hunt Groups were Deleted				

Modified Hunt Groups

System	Name	Extn	Property	New Value	Old Value
IPO Demo Exp	General MBox	603	Members Deleted	-	User 'Craig Wilson', Ext. 255
			Night Service Destination	User 'Gabriel Bailey', Ext. 229	-
IPO Demo Prim	Day HG	600	Members Added	User 'Angela Black', Ext. 267	-
				User 'Nicole Perry', Ext. 272	-
			Members Deleted	-	User 'Eva Mitchell', Ext. 211
			Out of Service Destination	Hunt Group 'Night HG', Ext. 601	-
			Queuing Enabled	-	✓
IPO Demo Prim	IM Group		Members Added	User 'Angela Black', Ext. 267	-
				User 'Nicole Perry', Ext. 272	-
			Members Deleted	-	User 'Craig Wilson', Ext. 255
				-	User 'Eva Mitchell', Ext. 211
				-	User 'Jessica Smith', Ext. 277
				-	User 'Ruben Murphy', Ext. 237
Number of Hunt Groups Modified: 3					

Extensions

Added Extensions

System	Extension ID	Extension Type	Device Type	Primary User	Address
IPO Demo Prim	8005	H.323	9611G	Lucy Butler (Ext. 270)	
IPO Demo Prim	8014	H.323	9611G	Nicole Perry (Ext. 272)	
IPO Demo Prim	8015	H.323	9611G	Angela Black (Ext. 267)	

System	Extension ID	Extension Type	Device Type	Primary User	Address
Number of Extensions Added: 3					

Deleted Extensions

System	Extension ID	Extension Type	Device Type	Primary User	Address
IPO Demo Exp	51	Digital	9504	Eva Mitchell (Ext. 211)	Base Card 3 / Port 3
IPO Demo Exp	204	Digital	9504	Franklin Lewis (Ext. 228)	Exp. Mod. 2 / Port 4
IPO Demo Exp	213	Digital	5420D	Ruben Murphy (Ext. 237)	Exp. Mod. 2 / Port 13
IPO Demo Prim	8005	H.323	9611G	Craig Wilson (Ext. 255)	
Number of Extensions Deleted: 4					

Modified Extensions

System	Extension ID	Extension Type	Property	New Value	Old Value
IPO Demo Exp	8001	H.323	Extension ID	8001	8002
IPO Demo Exp	8002	H.323	Extension ID	8002	8003
IPO Demo Exp	8003	H.323	Extension ID	8003	8004
IPO Demo Exp	8004	H.323	Extension ID	8004	8001
IPO Demo Prim	8010	H.323	Device Type / Classification	9611G	5610SW
Number of Extensions Modified: 5					

Lines

There were no changes to Lines from the previous SourceBook

10. Action Items

As part of the documentation and analysis of the IP Office configuration, programming issues may have been uncovered that require further attention. These 'Action Items' highlight conditions that likely result in incorrect or unintended behavior, and provide opportunities to improve the accuracy and organization of the configuration. This chapter will present each of the Action Items generated during the analyses performed as part of this report. They will be divided into two broad categories: configuration errors and clean up issues.

Configuration error Action Items result from system programming that does not adhere to Avaya's documentation or recommendations, or is inconsistent with reasonable expectations. They likely have some service-affecting impact on the functioning of the system. For example, an Incoming Call Route is expected to have a destination defined for each Time Profile that is added to it. If a Time Profile was added to an Incoming Call Route, but no destination is specified for that Time Profile, it will be considered a configuration error and reported in this section.

Clean up Action Items reveal system programming that appears to have no defined purpose within the configuration, and can possibly be removed. Often this is a result of changes being made to the system without realizing that associated data is no longer used. For example, if an Authorization Code was defined for a User, and that User has since been deleted from the configuration, their Authorization Code should be removed as well.

Often it is not obvious from the IP Office management interface that an element of the configuration is no longer being used. Because of that, unnecessary or obsolete programming tends to linger in the system long after it should have been removed, potentially causing confusion and wasting technicians' time. The reference analyses performed throughout this report take the guesswork out of identifying this obsolete programming. Updating or removing unused programming helps maintain a well-organized system for faster and easier administration.

10.1. Configuration Error Action Items

The following errors in the configuration of the IP Office solution may be service-affecting:

Missing Incoming Call Routes

The following Incoming Line Groups have in-use Lines and/or Channels, but have **no associated Incoming Call Routes** defined:

System	Line Group ID
IPO Demo Sec	11

This situation may cause incoming calls on these Group IDs to trigger System Short Codes, receive a busy signal, or be dropped. It is recommended to assign explicit routing rules for all Incoming Group IDs in use.

Refer to the 'Incoming Call Routing' section for a detailed explanation of all issues detected in the configuration of Incoming Line Groups and Call Routes.

Misconfigured Dial Short Codes

The following external dialing Short Codes reference a destination that is **neither** a valid Outgoing Line Group ID nor ARS Form ID on the System containing the Short Code. Use of these Short Codes will result in a failed outgoing call.

System	Short Code Type	Identifier	Short Code	Feature	Number Dialed	Outgoing Line Group / ARS Form ID
IPO Demo Prim	System		65N;	Dial		111

These Short Codes should either be deleted, or updated with a valid Outgoing Line Group ID or ARS Form ID as their destination. Refer to the 'Outgoing Call Routing' and 'Alternate Route Selection (ARS)' sections to identify the valid destination IDs that are defined on each System.

The following external dialing Short Codes have an **empty 'Telephone Number' field**, resulting in no number being dialed. Use of these Short Codes will likely result in either a failed call, or with the caller receiving trunk-based dial tone (allowing any number to be dialed).

System	Short Code Type	Identifier	Short Code	Feature	Outgoing Line Group / ARS Form ID
IPO Demo Prim	System		65N;	Dial	111

These Short Codes should either be deleted, or updated with a valid destination number to prevent unintended behavior. The 'Barred' Short Code feature should be used to explicitly deny a specific dialing sequence if that is the desired result.

Misconfigured Time Profiles

The following Time Profiles have configuration issues, and are likely not operating as they were intended:

Night Shift, Test Profile

Refer to the 'Time Profiles' section for a detailed explanation of all issues detected in the configuration of Time Profiles.

Missing Authorization Codes

The following Users require an Authorization Code for external calls, but do not have one assigned:

User Name	Extension	System
Jean Wright	205	IPO Demo Exp
Ryan Jones	262	IPO Demo Prim

Refer to the 'Authorization Codes' section for a detailed explanation of all issues detected in the configuration.

Misconfigured Directory Entries

There are Directory entries that are **assigned a Speed Dial index, but whose 'Number' field contains a wildcard character** (?). Since the wildcard character represents an unknown digit, these entries cannot be used to place calls via Speed Dial.

Refer to the 'Speed Dial Directory' section to identify the misconfigured Directory entries.

10.2. Clean Up Action Items

The following are clean up issues that should be addressed to maintain an organized IP Office solution.
Updating or removing stale programming helps maintain a well-organized system for faster and easier administration.

User Rights Clean Up

The following User Rights can be cleaned up, or possibly removed if they are no longer needed:

Phantom Users, Test Rights

Refer to the 'User Rights' section for a detailed explanation of all clean up issues detected in the configuration of User Rights.

Incoming Call Routes Clean Up

The following Incoming Call Routes have **no** Lines or Channels associated with their 'Line Group ID', and can be removed if they are no longer needed:

System	Call Type	Line Group ID	Incoming Number	Incoming Sub Address	Incoming Caller ID
IPO Demo Prim	Any Data	25			

Alternate Route Selection Clean Up

The following ARS forms are **not referenced** by any other ARS form or Short Code in the configuration, and therefore will never be used to route outgoing calls. If they are no longer needed, they should be removed from the system's programming.

51 - Test ARS

Refer to the 'Alternate Route Selection (ARS)' section for a detailed explanation of all issues detected in the configuration of ARS forms.

Time Profiles Clean Up

The following Time Profiles can be cleaned up, or possibly removed if they are no longer needed:

Holidays, Test Profile

Refer to the 'Time Profiles' section for a detailed explanation of all issues detected in the configuration of Time Profiles.

Authorization Codes Clean Up

The following Authorization Codes can be cleaned up, or possibly removed if they are no longer needed:

User Name	Authorization Code(s)
John S	118753

Refer to the 'Authorization Codes' section for a detailed explanation of all issues detected in the configuration of Authorization Codes.

Glossary

Account Code

An Account Codes is a pre-defined number (or string) that can be associated with a call to track call activity per User, department, project, client, etc. When an Account Code is associated with a phone call, the code is included with the rest of the call's details in the system's call log. The call log can then be used to aggregate the number of calls and the amount of time spent per individual Account Code.

ARS (Alternate Route Selection)

ARS is the feature used during outgoing call routing to determine which Outgoing Line Group to use to place a call. To make this decision, the ARS system can take into account the number that is dialed, the time of day the call is placed, and the current availability of Lines and channels.

Authorization Code

An Authorization Code is a 'secret' number that is defined for a User, allowing them access to otherwise restricted capabilities. For example, specific outgoing call privileges can be configured to require the User enter a valid Authorization Code before being allowed.

BRI (Basic Rate Interface)

A digital trunking protocol which provides two 'bearer' channels for carrying voice and/or data, along with a 'data' channel for signaling. BRI service is a popular choice for providing residential and/or small business connectivity in some countries.

CAC (Call Admission Control)

Call Admission Control (CAC) is a feature that allows an administrator to impose limits on the number of calls a Location can handle simultaneously. This is especially important when using IP-based Extensions and Lines, as each additional call requires additional network bandwidth, which is a limited resource.

Centralized Call Logging

This feature stores a User's call history on the IP Office System, making it available to the User regardless of which station or application they're logged in to. Users access their centralized call log via a phone's 'Call Log' or 'History' buttons.

Coverage Group

If a Coverage Group is configured for a User, external calls presented to the User that are not answered will be presented to members of the specified Hunt Group rather than going to voicemail. All members of the group ring simultaneously, regardless of the Hunt Group's normal behavior.

DECT (Digital Enhanced Cordless Telecommunications)

DECT is a standard for implementing wireless telephony devices, such as the cordless phones used in residential and business applications.

DHCP (Dynamic Host Configuration Protocol)

The DHCP protocol allows a device to automatically retrieve IP configuration parameters from an authoritative source on the network, eliminating the need for manual configuration of every device.

DNS (Domain Name System)

The Domain Name System (DNS) is a hierarchical, distributed naming system used to organize and interconnect computers within an IP network. Each Domain name can be mapped to an IP address that identifies a specific 'device' by querying a Domain Name Service.

ETSI

Also known as 'Euro-ISDN', ETSI refers to a European variant of the ISDN protocol developed by the European Telecommunications Standards Institute (ETSI).

Extension ID

A unique identification number the IP Office uses to refer to a particular Extension. For non-IP Extensions, the ID is assigned by the system and corresponds to the physical hardware port of the Extension. For IP-based Extensions, an administrator may change the system-selected ID, but all Extension IDs within a System must be distinct.

File Writer

This address is the IP address of the PC that is allowed to push files to the SD or Memory Card for IP500/4xx systems. For Server Based systems the IP address will be allowed to push files to the /opt/ipoffice directory. The IP Address of 255.255.255.255 allows all IP addresses to push files.

Flare (Communicator)

Flare Communicator (a.k.a. Avaya Communicator) is an advanced communications client which can be used on a variety of devices running Windows, Android, or iOS. It provides audio, video, and messaging capabilities with a modern user interface.

H.323

H.323 is a specification that defines a set of protocols to provide audio and visual communication sessions on a packet switched network (e.g. a local IP network).

Hot Desking

Hot Desking is a feature by which Users defined in the IP Office system can make use of any available physical Extension, allowing them to change their location as necessary. When a Hot Desking User logs into an available station, that station acquires all of the User's settings and button programming.

HTTP(S) (HyperText Transfer Protocol)

HTTP is the protocol used for exchanging much of the content on the World Wide Web. IP Office uses the HTTP protocol to transfer files and settings to devices which cannot use the TFTP protocol. For example, the 1100, 1200, 1600, and 9600 series IP phones use the HTTP protocol to receive their configuration. HTTPS is the secure (encrypted) version of HTTP.

Hunt Group

A group of Extensions to which a call can be directed for answering. In a typical scenario, all member Extensions of a Hunt Group may ring simultaneously, or sequentially until a call is answered.

Incoming CLI (Calling Line Identification)

The identifying number and/or name from which an incoming call originates. Also known as 'Caller ID'.

Incoming Line Group

A specific grouping of Lines and channels (of multi-channel Lines) for handling incoming calls. Incoming call routing is configured per Incoming Line Group, allowing an administrator to route incoming calls from multiple Lines with a single set of rules.

IP Lines

Any Line configured in the IP Office whose traffic is carried over a packet-switched IP network, as opposed to traditional Analog and Digital Lines. H.323, SIP, and SM (Session Manager) are all types of IP Lines which can be configured in IP Office.

IP Stations

Any station (Extension) configured in the IP Office whose traffic is carried over a packet-switched IP network, as opposed to traditional Analog and Digital stations. Any Extension using the H.323 or SIP protocols is an IP Station.

ISDN (Integrated Services for Digital Network)

ISDN is a set of communication standards for digital transmission of voice, video, and data over the traditional circuits of the public switched telephone network (PSTN).

ITSP (Internet Telephony Service Provider)

An Internet Telephony Service Provider offers IP-based trunking facilities to an organization, most commonly in the form of SIP trunks. This may require the ITSP to route calls to and from non-VoIP destinations, including anyone on the traditional Public Switched Telephone Network.

L2TP (Layer 2 Tunneling Protocol)

L2TP is a protocol used to establish an authenticated 'tunnel' through which any data can be encapsulated and transmitted. By itself, L2TP does not provide any encryption or confidentiality. Because of this, L2TP is often used in conjunction with IPSec to transmit encrypted, encapsulated data – the requirements of a Virtual Private Network.

LAN (Local Area Network)

A LAN is a data network that connects multiple devices within a limited physical area such as an office or home. This is in contrast to a Wide Area Network (WAN), which covers a larger geographic area and may include resources leased from a network service provider.

LDAP (Lightweight Directory Access Protocol)

LDAP is a protocol for maintaining and transmitting directory information over an IP network. For example, an organization might maintain an LDAP database of employees' names, email addresses, and extension numbers. IP Office can import User directory records from an LDAP source.

Line Group ID

A Line Group ID is a unique number identifying either an Incoming Line Group or an Outgoing Line Group, depending on the context. Incoming Line Group IDs and Outgoing Line Group IDs may overlap, but the two sets have no impact on one another. The Line Group IDs are defined by an administrator.

NAT (Network Address Translation)

Network Address Translation (NAT) is a process by which IP addresses from one network can be dynamically mapped to those in another network during data transmission. The most common use of NAT is to allow the various hosts on a Local Area Network (LAN) to use 'private' IP addresses internally, but share one or more 'public' IP addresses when communicating with other hosts on the Internet.

Outgoing Line Group

A specific grouping of Lines and channels (of multi-channel Lines) for handling outgoing calls. Outgoing call routing is configured in terms of Outgoing Line Groups, allowing an administrator to easily route outgoing calls to the first available Line in a specified group.

Overflow Group

In a Hunt Group's configuration, an Overflow Group is an alternate Hunt Group specified to handle incoming calls not answered by members of the original Hunt Group. Multiple Overflow Groups can be defined for a single Hunt Group, and they are used in the order specified.

PRI (Primary Rate Interface)

A digital trunking protocol which provides multiple 'bearer' channels for carrying voice and/or data, along with one or more 'data' channels for signaling. PRI service is most often supplied by either a T1 circuit (23 bearer channels) or an E1 circuit (30 bearer channels), depending on the locale. PRI service is a popular choice for providing network connectivity for businesses in many countries.

PSTN (Public Switched Telephone Network)

The Public Switched Telephone Network refers to the global network of circuit-switched facilities that carries traditional telephony services based on analog and digital technologies. Before the Internet, the PSTN was the primary network that allowed any two individuals throughout the world to communicate with one another.

RAS (Remote Access Service / Server)

Remote Access Service refers to the hardware and software that provides remote users access to the various services on a network. Traditionally, this access was provided via a dial-up modem connection between a remote client and a Remote Access Server residing on the network.

RIP (Routing Information Protocol)

RIP is a protocol by which multiple routing devices can exchange their knowledge of local network topologies, thus distributing the combined routing rules throughout a network.

SCN (Small Community Network)

For deployments with a large number of Users or Extensions, multiple IP Office Systems can be connected via H.323 trunks to form a Small Community Network. This feature allows the entire network to be managed as a single entity, and common configuration data is automatically shared among the individual Systems.

SES (SIP Enablement Services)

An Avaya application which provides organizations a migration path to SIP-based communications including SIP trunking, SIP stations, Presence, and SIP-based messaging systems. The functionality of SES has been migrated to Session Manager (SM) for most cases.

Session Manager (SM)

Session Manager is a SIP-based software session management and routing application. It provides a centralized point to define enterprise-wide routing. This enables converged communications, and improvements in scalability and redundancy.

Short Code

A Short Code is a pattern that is compared to dialing sequences the IP Office is processing. When a dialing sequence matches the pattern of a specific Short Code, that Short Code's action is performed. The action might enable or disable a specific telephony feature such as 'Forward On Busy', route the dialed number to an available Line to place an external call, or explicitly disallow the dialing sequence. Different types of Short Codes (System, User, User Rights, ARS, etc.) are matched against the dialing sequence depending on the context.

SIP(S) (Session Initiation Protocol)

SIP defines a set of protocols to provide call setup, tear down, and modification for multimedia communication sessions on an IP network. SIPS is the secure (encrypted) version of SIP.

SIP URI

A SIP URI is the address used to contact a user via the SIP protocol, similar to a phone number or email address. For example, sip:john.smith@somecompany.com

SMDR (Station Message Detail Recording)

A facility for capturing and recording detailed information about the calls handled by a communications system, for billing and accounting purposes for example.

SMTP (Simple Mail Transfer Protocol)

The SMTP protocol is a widely-supported Internet standard for the transmission and exchange of electronic mail (e-mail).

SNMP (Simple Network Management Protocol)

SNMP is a widely-supported standard protocol for managing devices on an IP network, such as routers, switches, computers, printers, etc. Properties and configuration information of supported devices can be queried and possibly set via an SNMP management application.

SNTP (Simple Network Time Protocol)

A simple version of the Network Time Protocol, which allows devices to accurately set and synchronize their clocks over an IP network.

Solution

The term 'solution' refers to the entire installation of IP Office equipment and software providing communication services for an organization. This may consist of a single System for small deployments, or a network of multiple Systems acting as a distributed resource in the case of an IP Office Small Community Network or Server Edition deployment.

STUN (Simple Traversal of UDP through NATs / Session Traversal Utilities for NAT)

STUN is a protocol which allows devices to detect and possibly correct for the effects of data passing through a router using Network Address Translation (NAT). For example, STUN may be used by a device to determine its public IP address and/or the type of NAT its data passes through.

System

When written with a capital 'S', the term 'System' refers to the collection of hardware, software, and configuration data associated with a single Control Unit or server (as shown in IP Office Manager, for example). Thus, a Small Community Network or Server Edition solution consists of multiple IP Office Systems networked together to provide a distributed communications platform.

TFTP (Trivial File Transfer Protocol)

TFTP is a network protocol which enables the transmission of files between a 'server' and a 'client'. IP Office uses the TFTP protocol to provide access to an SD / memory card, and for sending configuration files to IP stations.

TLS (Transport Layer Security)

TLS is a network protocol for authenticating and securing communications between clients, ensuring the data is not intercepted or altered while being transmitted. TLS is the successor to the Secure Sockets Layer (SSL) protocol, and provides similar benefits.

VoIP (Voice over IP)

The transmission of voice communications over IP networks. Speech is encoded into IP packets using a codec, and transmitted over an IP network instead of a conventional, dedicated telecommunications network. The IP network may simultaneously be carrying non-voice data as well, resulting in a Converged Network.

VPN (Virtual Private Network)

The use of encryption and/or tunneling protocols to extend a private network across public facilities, including the Internet. VPNs allow remote users to access a private, local network as if they were directly connected to the network. IP Office supports the use of IPSec and L2TP protocols to establish virtual private networks.

WAN (Wide Area Network)

A WAN is a data network that covers a large geographic area, often using resources leased from a network service provider. This is in contrast to a Local Area Network (LAN), which covers a limited area and uses privately owned facilities.

WINS (Windows Internet Name Service)

WINS is a Microsoft implementation of a service for mapping computer host names to network addresses, much like DNS does for domain names.