IP Office Platform Guidelines Capacity

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Chapter 1: Purpose

The following document covers various aspects of IP Office 11.1 capacity and performance that may have an influence on the design of a specific customer's solution. This document also includes the relevant aspects of the IP Office Selectand IP Office Subscription product offers and when it should be considered.

Related links

Intended Audience on page 7
Disclaimer on page 7
Information classifications and NDA requirements on page 8
Applicability on page 8

Intended Audience

This document is intended for pre-sales, solution design, installation, administration and support personnel who required knowledge of IP Office systems capacity and performance.

Related links

Purpose on page 7

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Related links

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As this document is generally available, the information herein is considered *Public*. This document contains references to additional information sources which may disclose both confidential and proprietary information and require a non-disclosure agreement (NDA) with Avaya.

Related links

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Applicability

The following information is applicable for IP Office Release 12.1.

Related links

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Chapter 2: Overview

Before proceeding with any capacity analysis or planning, the following resources should be consulted:

- The "Avaya IP Office Solution Description" gives a high level view on deployment components.
- IP Office Technical Bulletins: Bulletins announce the general availability of new releases and their content. They can be found at: https://ipofficekb.avaya.com/bulletins
- Virtualized Deployments: Linux-based server components are supported in a virtualized environment using VMware technologies; the performance and capacity is directly governed by static and dynamic resource assignments which are not covered here. For more information, see "Deploying IP Office Servers as Virtual Machines".
- Avaya Contact Center Applications: IP Office Server Edition supports differing capacity and performance levels when Avaya Contact Center Select (ACCS) is attached. See Avaya Contact Center Applications on page 12
- Other attached Avaya DevConnect applications: Please refer to the relevant application documentation.

The "Avaya IP Office Solution Description" provides information about solution components, their capabilities and capacities sufficient to allow a high level design. This capacity planning document should subsequently be used to qualify and refine that design.

The most complex single component to consider is generally the IP500 V2 when acting as a expansion system in a Linux-based primary server network, due to its combination of VoIP, digital and analog phones/trunks.

The Linux-based server components (primary, secondary Server and Linux-based expansion) are VoIP only and single construct, save for the decision whether to move the one-X Portal server from the Primary to a separate platform (an IP Office Application Server) for capacity.

Releases prior to IP Office R11.1 have differing capacities and performance limits; the corresponding release documentation should be used.

Related links

Definitions on page 10
Virtualized Deployments on page 10
IP Office Select/IP Office Subscription on page 10
Subscription on page 11
Avaya Contact Center Applications on page 12

Definitions

The following terms are used within this document:

Term	Definition
Linux-Based Network	This refers to a network of servers centered around a Linux-based IP Office primary server. • The network can then included a Linux-based secondary server and a number of expansion servers (Linux and/or IP500 V2 based). • The network can run in IP Office Server Edition, IP Office Select and IP Office Subscription mode.

Related links

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Virtualized Deployments

Linux-based IP Office servers can be deployed on a number of virtualized platforms. Within this document, the capacities for virtual servers are maximum. However, the actual capacities are depending on profiling requirements as stated in :see "Deploying IP Office Servers as Virtual Machines".

- The necessary host and Virtual Machine (VM) resources have been assigned. Hyper-V and Azure require additional resources over VMware.
- To achieve the stated capacity and performance virtual disk provisioning must be Thick Provision Eager Zeroed or equivalent – that is, all virtual hard disks must be pre-provisioned and initialized during VM deployment.
- The supported maximum capacities and performance of an IP Office expansion differs from those of a primary or secondary regardless of being virtualized.

Related links

Overview on page 9

IP Office Select/IP Office Subscription

Avaya IP Office Select is a premium IP Office Server Edition offer providing extended capacity, performance and features over basic IP Office Server Edition. The following also apply to IP Office Subscription when running on the Linux-based server platforms.

Additional Capacity

In summary, IP Office Select offers the following increased capacities. Note that the capacities are also be subject to meeting server platform requirements, refer to the individual sections on each feature.

Feature	Capacity Change
User/Extensions per server:	1500 > 3000
Users/Extensions whole solution:	2000 > 3000
Expansion systems:	30 > 148
Power User/UC clients:	2000 > 3000
Voicemail/Attendant/Recording channels:	250 > 500
Conference channels:	256 > 512
SIP trunk calls:	512 > 1024
Inter IP Office line channels:	250 > 500
Solution SoftConsole instances:	32 > 75
Button module buttons per Linux server:	4096 > 8192
Peak call Rate:	18,000 > 20,000

Additional Features

IP Office Select also offers the following additional features:

- Expansion to Expansion Inter IP Office lines
- Location based phone resilience
- Expansion to Expansion phone and hunt group resilience
- VMware High Availability (HA) - Note: Not compatible with resilience features. Either VMware HA or resilience can be used but not both.
- Resilient Avaya one-X® Portal server on a second Avaya one-X® Portal server or Secondary Server

The decision to deploy IP Office Server Edition or IP Office Select should be made at the outset. However it is possible to convert a IP Office Server Edition to an IP Office Select solution at a later date without loss of configuration or data. Moving from IP Office Select to IP Office Server Edition requires complete reconfiguration.

Related links

Overview on page 9

Subscription

On Linux-based IP Office servers, Avaya IP Office Subscription is an OPEX licensed offer which supports the same capacity and performance as IP Office Select mode. See IP Office Select/IP Office Subscription on page 10.

IP500 V2 control units, Avaya IP Office Subscription has the same capacity as IP Office Preferred Edition. See IP500 V2 Servers on page 34.

Related links

Overview on page 9

Avaya Contact Center Applications

IP Office supports Avaya Contact Center Select (ACCS). When ACCS is connected, certain aspects of IP Office Server Edition capacity and performance are determined by that application. These include:

- Maximum agents
- Supported call rate
- Maximum Recording channels
- Available capacity and performance for non-agent users
- Maximum Conference channels for recording calls

These are irrespective of the mode (IP Office Select, IP Office Server Edition or IP Office Subscription being used as the IP Office system.

Maximum conference and recording channels are covered in Audio Conferencing on page 14 and Call Recording on page 19; please refer to the relevant application documentation for all other aspects:

Related links

Overview on page 9

Chapter 3: Capacity Planning

When designing a solution using a Linux-based IP Office primary server, many aspects need to be considered for capacity. These include:

- IP Office Subscription, IP Office Select or IP Office Server Edition deployment
- Maximum extension, and user capacity required; both per server and solution
- Maximum anticipated site/node capacity
- Maximum trunk capacity
- Hunt group quantity, size and location
- The total concurrent VoIP call capacity
- Call media destination location and type; both intermediate and final
- Direct/indirect/secure VoIP media
- Conference, and recording capacity
- Multi-site Network link capacities
- Call Destination
- IP Infrastructure & VoIP QoS
- Trunk utilization and call traffic profile
- Resilience and Failover requirements
- Available licenses

All should be assessed as one factor may limit another.

- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.

Chapter 4: Primary and Secondary Server Capacity

The following sections cover capacity considerations specific to Linux-based primary and secondary servers

Related links

Audio Conferencing on page 14
Call Capacity on page 16
Call Destination Server on page 18
Call Media Path (Linux) on page 19
Call Recording on page 19
Call Traffic Profile on page 21
Extension/User/Site Capacity on page 23
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Trunk Capacity on page 29
Voicemail or Auto-Attendant or IVR on page 31

Audio Conferencing

Primary/Secondary Server

Each Primary and Secondary supports a local audio conference capability with the following capacities:

Mode	Primary/Secondary server	Total Conference Channels	Maximum conference size	Total Conference Channels with ACCS
IP Office Server Edition	**Dell R240**	128	128	414
	HP DL360	256	256	825
	Dell R640	256	256	1650

Table continues…

Mode	Primary/Secondary server	Total Conference Channels	Maximum conference size	Total Conference Channels with ACCS
	Virtual	256	256	1650
IP Office Select	**Dell R640**	512	256	1650
IP Office Subscription (Linux)	**Virtual**	512	256	1650

IP500 V2 and Linux Expansion System

Each IP500 V2 and Linux Expansion System supports a local audio conference capability with the following capacities:

Expansion	Total Conference Channels	Maximum conference size	Total Conference Channels with ACCS
Linux/Virtual	128	128	128
IP500 V2	128	64	128

System Conferences

System conferences use the same conference capacity as above but are subject to the following additional limits:

- **IP Office Essential Edition/IP Office Preferred Edition:** 30.
- **IP Office Server Edition/IP Office Select/IP Office Subscription (Linux):** 120. System conferences are hosted by the primary server (secondary server during resilience).

Notes

- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
- **Virtual:** Maximum figures. Actually capacity depends on profiling as detailed in "Deploying IP Office Servers as Virtual Machines".
- The figures cover both ad-hoc and meet-me conference types.
- With one-X Portal users active, a solution-wide limit of 750 conference channel participants applies, but this does not include conferences used for call recording.
- IP Office Server Edition supports differing capacity and performance levels when Avaya Contact Center Select (ACCS) is attached. See Avaya Contact Center Applications on page 12.
- The increased capacities for ACCS are only supported when the applications are actively connected to the host IP Office and should only be used for call recording purposes.
- No dynamic solution-wide conference allocation is supported, only static via call flows or Conference Meet Me short code Line Group ID.
- V2 Expansion conferences exist in the digital domain; hence all VoIP parties (trunk or extension) will require a VCM channel for the duration. See VCM Channel Capacity on page 53.

- Further information on conferences can be found at: http://marketingtools.avaya.com/knowledgebase/businesspartner/ipoffice/mergedProjects/manager/_frame2.html?Conferencing.Overview.html

Which Servers Conference Resources are Used?

The location of the conference resource used when a conference is started are determined by a number of factors:

- A user performing an ad-hoc conference uses the conference resources of the server on which they are logged in.
- A meet-me conference using a user's personal meet-me bridge uses the conference resources of the server on which they are logged in.
- A meet-me conference created by Voicemail Pro call flow, or the Conference meet-me short code feature use the system on which the feature was invoked.
- To invoke a meet-me Conference using the resources of a remote system, use the Line Group ID field of the Conference Meet Me short code feature. By default this is set to 0, for local system.
- For the case where a conference is scheduled by Avaya one-X® Portal and at the scheduled time the conference dials the delegates: The conference location is the server to which the active Avaya one-X® Portal is attached.

Recording a conference requires an additional conference channel, as well as an IP Office Line (SCN trunk) channel to the recording destination (Primary or Secondary Server, alternate during fail over operation). Neither IP Office nor Voicemail Pro can automatically link or move conference locations, but existing conferences can be connected together.

When conference resources run out, attempts to record calls, join or create conferences are rejected.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Call Capacity

Each server type is rated to support every single extension engaged in a call providing it is direct media and regardless of security settings. If the media stream passes through the server, the capacity is reduced.

Mode	Primary/Secondary server	Concurrent Calls		
		Direct Media	Indirect Media	Secure Indirect Media
IP Office Server Edition	**Dell R240**	750	128	64
	HP DL360	1500	256	128
	Dell R640	2000	1024	512
	Virtual[1]	2000	1024	512
IP Office Select	**Dell R640**	3000	1024	512
IP Office Subscription (Linux)	**Virtual**[1]	3000	1024	512

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
- One VoIP call is one pair of RTP or SRTP streams between IP Office and a VoIP endpoint – for example VoIP phone, VoIP trunk, IP Office line, Voicemail Pro. Note that an indirect media call via IP Office from one VoIP endpoint to another counts as two calls; one between IP Office and endpoint A and one between IP Office and endpoint B.
- Direct media is RTP/SRTP data directly between VoIP endpoints, not via IP Office. There are some IP Office networking constraints to achieve direct media. See Call Media Path (IP500 V2) on page 41.
- Transcoding between any codec does not reduce the server indirect media concurrent call capacity.
- Direct media with SRTP does not reduce the direct media capacity.
- One SRTP indirect media call reduces the available RTP call capacity by 2 (and vice versa).
- If SRTP transcoding is present (for example where the security parameters are mismatched between two phones), the capacity is reduced by a further 50%.
- If the server is running Voicemail Pro, one call to voicemail, attendant, recording or IVR consumes one indirect media call.
- If the server is the location for an audio conference, each member consumes one indirect media call.

Administration

Concurrent call maximum capacity can be administered via IP Office Server Edition Manager in a number ways to ensure limits are not exceeded:

- Number of Channels and Outgoing Channels setting in the **Line** > **VoIP tab of IP Office lines**.

- Max Calls per Channel setting in the **Line** > **SIP URI tab of SIP trunks**.
- Call Admission Control area of the Location settings.
- VoIP Security area of the System settings.
- Media Security area in the **Line** > **VoIP Settings** tab.
- Media Security area in the **Extension** > **VoIP** tab.

The following occurs if the maximum numbers are exceeded:

- Unless administered, IP Office does not limit the number of concurrent calls and makes a best effort to service all.
- VoIP voice quality degrades as load increases; high overload conditions cause the Server to perform poorly in general.

Related links

Primary and Secondary Server Capacity on page 14

Call Destination Server

When considering Expansion or Server planning from a media perspective it is important to note that communication with any other IP Office Server Edition component will use VoIP and hence is limited by the media, IP Office Line (SCN trunk) and VCM capacities. This includes:

- Calls to/from Primary/Secondary and other Expansions
- Call recording - one VoIP channel per recorded call. Destination is the location of the active Voicemail Pro.
- Auto Attendants/IVR - one VoIP channel per call when connected to the Auto Attendant/IVR. Destination is the location of the active Voicemail Pro.
- Conferencing when the conference focus is not the local system - one VoIP channel per local member
- Local conferences involving remote users - one VoIP channel per remote member when connected to the conference
- Voicemail leave and collect - one VoIP channel per VM caller when. Destination is the location of the active Voicemail Pro.
- Announcements - one VoIP channel per call when generating announcements. Destination is the location of the active Voicemail Pro.
- Centralized Music on Hold – one VoIP channel per central MOH source when playing to held calls. Destination is the location of the Music on Hold source.

For all VoIP connections between systems, the codec used will be according to the IP Office Line settings of those two nodes.

Consideration should also be given to intermediate destinations to ensure adequate capacity is present. For example a consultation call will open a secondary channel for the consultation whilst keeping the initial call connected.

Lastly, any call on the IP Office Line will take into consideration administered channel limits and Call Admission Control (CAC) if active. Please refer to the CAC section of the IP Office administration documentation for behaviors when CAC limits are exceeded.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Call Media Path (Linux)

Where calls go between VoIP endpoints (e.g. SIP trunk to H.323 extension) there are two options: Direct and indirect media. Direct media does not use the server's routing engine and hence the base capacity concurrent calls will apply.

Direct media is a configurable parameter for VoIP trunks and extensions with a default of active.

Indirect media will occur either where configured, or if direct media is not possible (even if configured). Some causes would be:

- VoIP traffic routed between the LAN1 and LAN2 interface
- Unsuccessful codec negotiation (including silence suppression, DTMF transport as well as basic codec support)
- A VoIP endpoint that does not support direct media
- Mismatch of RTP and SRTP
- Mismatched SRTP or SRTCP security settings such as no common cipher suite. These should be avoided if at all possible due to the limited indirect media SRTP capacity.
- Network Address Translation (NAT) traversal usually associated with Remote Worker phone deployments.

The above should be avoided if at all possible due to the limited indirect media capacity.

Related links

Primary and Secondary Server Capacity on page 14

Call Recording

Each Primary and Secondary supports a voice call recording capability with the following capacities:

Mode	Platform	Recording Channels		
		Server[1]	Solution	Solution with ACCS
IP Office Server Edition	**Dell R240**	75	75	175
	HP DL360	150	150	350
	Dell R640	150	150	500
	Virtual[1]	150	150	500
IP Office Select	**Dell R640**	250	500	500
IP Office Subscription (Linux)	**Virtual**[1]	250	500	500
IP Office Preferred Edition		40	40	40

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
- **Virtual:** Maximum figures. Actually capacity depends on profiling as detailed in "Deploying IP Office Servers as Virtual Machines".
- Call recording uses a 3-party conference per recorded call. Note that without ACCS connected, the primary server does not have sufficient conference channels for the whole solution - other server's conference resources must be used.
- Conference recording adds a further conference channel to an existing conference.
- Each recording requires one licensed (and available) voicemail channel, a VCM (for the IP500 V2 Expansion) and IP Office Line (SCN trunk) channel as the recording destination is on the Primary or Secondary Server. See VCM Channel Capacity on page 53.
- The system supports differing capacity and performance levels when Avaya Contact Center Select (ACCS) is attached. See Avaya Contact Center Applications on page 12.
- The increased capacities for ACCS are only supported for call recording, and are active when the application is connected to the host IP Office.
- The solution internal call recording capacity is fixed at 333 hours total (555 hours for IP Office Select). This is separate from the voicemail mailbox recording capacity, see Voicemail or Auto-Attendant or IVR on page 31. It is also separate from Media Manager storage capacity, see Media Manager Recording Capacity on page 66.
- The Media Manager application supports recordings management at the maximum channel and call rate appropriate to the server platform.
- If the dual Voicemail Pro feature is active IP Office Select and IP Office Subscription only) the maximum solution capacity is doubled to maximum of 500 channels, the per-server capacity remains unchanged.

- One active recording channel consumes one voicemail/AA channel. If the call is being recorded in two places – for example at the user and the incoming trunk – two licensed and available voicemail channels are required.
- Maximum recording call rate is 7200/9000/10000 BHCC for a primary/secondary Linux-based server, 3,600 BHCC for an Expansion. See Call Traffic Profile on page 21.

  Recording call rate is further reduced for ACCS. See Avaya Contact Center Applications on page 12.

Which Servers Conference Resources are Used?

The location of conference resource used is determined by the point of recording:

- Incoming Call Route (ICR) recording is done at trunk's location
- User recording is done at user's location.
- Hunt group recording is done at the group's location.
- System recording is done at the system's location.
- Conference recording at conference location: Ad-hoc conference recording is done at the initial user's location. Meet-me conference recording can specify the location.
- Account code recording is done at the user's location.

Administration

To ensure Voicemail Pro channel capacity is available for recordings, the IP Office Server Edition Manager settings **Voicemail Channel Reservation** on the Primary and Secondary Server's **System** > **Voicemail** tab can be configured to reserve channels exclusively for specific uses.

- If recording channel resources run out:
  - If the recording is mandatory, busy is returned.
  - If the recording is not mandatory, further attempts to record calls or conferences are not successful, but there may still be visual recording indications.

If exceeded:

If recording storage resources run out, further attempts to record calls or conferences will not be successful and receive announcements to that effect.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Call Traffic Profile

General traffic engineering is outside the scope of this document, however you must consider the following factors:

Mode	Platform	Maximum Call Rate (BHCC)	
		Server	Solution
IP Office Server Edition	**Dell R240**	7200	7200
	HP DL360	18000/9000[3]	18000/9000[3]
	Dell R640	18000/9000[3]	18000/9000[3]
	Virtual[1]	18000/9000[3]	18000/9000[3]
IP Office Select **IP Office Subscription (Linux)**	**Dell R640**[2]	20000/10000[3]	20000/10000[3]
	Virtual[1, 2]	20000/10000[3]	20000/10000[3]
All	**Linux**	7200	-
	IP500 V2	3600	-

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".
2. These platforms (**Dell R640** or **Virtual**) only. Other servers only support the lower 18000/9000 call rate.
3. Lower call rate when any Avaya one-X® Portal user active.

- The quoted Busy Hour Call Completion (BHCC) rates assumes a normal call distribution.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
- Total solution BHCC must not exceed 9000/10000 BHCC when Avaya one-X® Portal users are active
- Continuously running at the maximum supported solution call rate when Avaya one-X® Portal users are active should not exceed 24 hours.
- Avaya one-X® Portal users include: Web Client, Call Assistant, Outlook Integration, Lync Integration, one-X preferred Mobile Clients
- The maximum rate for call recording and Voicemail leave combined is 7200/9000/10000 BHCC.
- The Maximum Solution Call Rate can be further reduced by the presence of Call recording, CTI or Contact Center application such as ACCS. See Avaya Contact Center Applications on page 12.
- **IP Office Subscription (Linux):** Supports the same capacity as **IP Office Select** (see IP Office Select/IP Office Subscription on page 10).
- **IP500 V2:** Unless stated otherwise, IP500 V2 and IP500 V2A control units are equivalent.

The following occurs if these figures are exceeded:

If the call rate is exceeded, there may be disruption to call voice quality, recordings, or a general slowdown in other operation such as UC or management clients.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Extension/User/Site Capacity

The server platform type should be selected to support the maximum potential users/extensions/sites according to the following table.

- The extension limits shown are for 1600/9600/J100 extensions not using TLS. Each VoIP extension using TLS for signaling or configuration reduces the extension capacity of the server and solution by 2.

This table is for systems in a Linux-based IP Office network.

Mode	Primary, Secondary server	Maximum Users, Extensions		Maximum Expansion Systems
		Server	Solution	
IP Office Server Edition	**Dell R240**	750	1500	30
	HP DL360	1500	2000	30
	Dell R640	2000	2000	30
	Virtual[1]	2000	2000	30
IP Office Select	**Dell R640**	3000	3000	148
IP Office Subscription (Linux)	**Virtual**[1]	3000	3000	148

- Expansion systems are limited to 750 users/extensions (Linux-based expansion) or 384 users/extensions (IP500 V2).

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".
2. The secondary server and primary server platforms must match in terms of capacity and performance.
3. **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
4. **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
5. A mix of physical and virtualized servers is supported, providing the resources assigned to the virtual server match those of the physical server.

6. Maximum users and extensions are configuration limits as well as a currently active/registered limit.
7. Extension and user limits include potential resilience failover extensions/users and simultaneous VoIP extensions. Again these are configuration limits as well as currently active/registered limits.
8. Extension capacity support includes the system acting as DHCP and file server for the phones. File server performance of Linux-based servers is limited as follows. If higher performance is required, an external HTTP/S server can be used.
   - **Dell R240:** 100 phones per 50 minutes.
   - **HP DL360:** 200 phones per 50 minutes.
   - **Dell R640:** 300 phones per 50 minutes.
   - **Virtual:** Up to 300 phones per 50 minutes.
9. The special user 'NoUser' is not counted.
10. Simultaneous user extensions are counted in the total.
11. An Avaya Workplace Client counts as one SIP extension and one CTI load. It does not use Avaya one-X® Portal capacity.
12. Each VoIP extension that uses TLS for signaling or configuration reduces the extension capacity by 2.
13. Maximum per server capacity of other extension types can be lower; for example DECT R4 (750 per system), 1100/1200 Series phones (1000, 500 with TLS).
14. DECT R4 and 1100/1200 Series phones have directory capacity limitations. See Directory on page 70.
15. Remote worker 9600 H323 extensions are supported at a lower capacity for the HP DL360G7 (maximum 256 remote workers) and R220 servers (maximum 128 remote workers). Other server and endpoint types have no such restrictions.
16. **Virtual:** Maximum figures. Actually capacity depends on profiling as detailed in "Deploying IP Office Servers as Virtual Machines".
17. On non-IP Office Select or IP Office Subscription systems, if the above figures are exceeded:
    - IP Office Manager will not permit more than 2000 extensions/users per server and whole solution.
    - IP Office Manager will not permit more than 30 Expansions. It always reserve one system for a Secondary Server.
    - The Primary/Secondary Server will not accept phone registrations from more than the above per-server quantity of extensions; any more are rejected. This is important when considering fallback scenarios.

Related links

Primary and Secondary Server Capacity on page 14

Hunt and Presence Groups

Hunt Groups are sets of telephone users targeted by calls. Presence groups are sets of XMPP users for IM purposes. Both are viewed together for group capacity, of which there are both per-solution and per system limits:

Mode	Platform	Maximum Server Group size	Maximum Groups		Total Hunt Solution Group Members
			Server	Solution	
IP Office Essential Edition **IP Office Preferred Edition**	**IP500 V2**	384	200	300	3000
IP Office Server Edition	**Linux/Virtual**	750	300	300	3000
	IP500 V2	384	200	300	3000
IP Office Select	**Linux/Virtual**	1250	600	600	6000
IP Office Subscription (Linux)	**IP500 V2**	384	200	600	6000

- Maximum Solution Groups is the total number of hunt and presence groups over the whole solution.
- Maximum Server Group size is the maximum number of members in a single hunt/presence group.
- Total Solution Group Members is the total members over all hunt/presence groups.

The following occurs if these figures are exceeded:

- IP Office Manager does not permit the administration of more than 300 solution groups if the solution is not IP Office Select or IP Office Subscription.
- IP Office Manager does not permit the administration of more than 750 per group members if the solution is not IP Office Select or IP Office Subscription.
- If the number of groups or individual size is exceeded (particularly if the **Ring Mode** is **Collective** or **Collective Call Waiting**), there may be inaccurate hunt group call presentation, or a general slowdown in other operation such as UC or management clients.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

IP Infrastructure, Bandwidth and VoIP QoS

It is not within the scope of this document to cover detailed aspects of Ethernet and IP infrastructure.

- IP500 V2 supports two 10/100 Mbit/s, Full/Half duplex 802.3 Ethernet interfaces with DSCP/ToS support.
- Avaya IP Office Linux servers supports two 10/100/1000 Mbit/s, Full/Half duplex 802.3 Ethernet interfaces with DSCP/ToS and static 802.1Q VLAN support.
- Subject to IP infrastructure: All supported IP Office traffic can be routed via a single LAN interface: All supported IP Office traffic can be routed between the LAN interfaces, however this may lead to inefficiencies and limit performance for the IP500 V2 platform.

For more information on LAN interface support, see the IP Office Server Edition LAN Support chapter of "Deploying IP Office Server Edition".

Note that secure VoIP (SRTP) can increase the required bandwidth by up to 8%, see the 'VoIP Security' chapter of Avaya IP Office™ Platform Security Guidelines.

In addition to the network requirements for VoIP calls, additional bandwidth should be reserved for the corresponding inter-node signaling and management paths. This should include any access via SSLVPN (IPOSS) or Remote Support Service (RSS). The following suggested minimum bandwidths should be made available for these additional paths:

Traffic	Suggested Minimum Bandwidth	Comments
Inter-node Signaling/ Status	256 kbit/s	Between Primary and each Expansion Between Primary and Secondary Between Secondary and each Expansion. Limited signaling/status directly between Expansions Bursty traffic, peaking after start-up or restoration of node to node connectivity.
one-X Portal CTI	96 kbit per call (or 192 kbit/s @ 7,200 BHCC)	Between one-X Portal server location and Expansion when one-X Portal server active.
Web Management	512 kbit/s	Between Web Manager PC and Primary (or Secondary under failover conditions) when a Web Management session is active
IP Office Server Edition Manager	512 kbit/s	Between SE Manager PC and each node when a IP Office Server EditionManager session is active
Upgrade	512 kbit/s	Between Primary and each node when upgrade is being performed

Table continues…

Traffic	Suggested Minimum Bandwidth	Comments
Backup/Restore	256 – 2048 kbit/s	Between Backup Server and each Expansion Between Backup Server and Primary Between Backup Server and Secondary An IP Office Linux platform can be designated as the backup server. Bandwidth is only required when a backup or restore operation is active, and only between participating nodes. The bandwidth required depends on the backup/ restore content.
Voicemail Pro client	512 kbit/s	Between Voicemail Pro PC and Primary (or Secondary under failover conditions) when a Voicemail Pro server management session is active
Voicemail Pro Server <> Voicemail Pro Server	1024 kbit/s	Bursty traffic, peaking after start-up or restoration of Server to Server connectivity
	32 kbit/s per active channel	Extra traffic between Secondary and Primary when Dual Voicemail Pro active
Voicemail Pro Server <> IP Office Media Manager	32 kbit/s per active channel	Bursty SFTP traffic, between Primary and external server running IP OfficeMedia Manager. Typically IP Office Media Manager runs coresident with Voicemail Pro. For dual active Voicemail Pro, the Secondary Voicemail Pro will send all recordings to the server running IP Office Media Manager.
WebRTC Client	6 – 256 kbit/s	Between each active Avaya Communicator for Web client and the WebRTC Gateway
one-X Server <> one-X Server	1–500 users: 512 kbit/s 500–1500 users: 1024 kbit/s 1500–3000 users: 2048 kbit/s	Bursty traffic, peaking after start-up or restoration of Server to Server connectivity
SoftConsole	64–1024 kbit/s	Bursty traffic, peaking after start-up. Higher figure for maximum 3000 user deployment. Between each SoftConsole application and the IP Office server.
SMDR	1 kbit per call report (or 7.2 kbit/s @ 7,200 BHCC)	Average SMDR message size for typical call pattern
RSS to co-located server	64 –1024 kbit/s per TCP Tunnel	Between remote client and col-located server when a remote management session is active

- These figures are for general guidance only as they do not reflect the specific requirements for a given installation. For example management operations are typically session based;

backup/restore content and frequency are administerable; many are bursty in nature and may or may not coincide with others.

- Only the major signaling and management paths are included here, further network bandwidth may be required for SSA, SysMonitor, syslog, SNMP, etc.
- An IP Office port matrix document that covers all possible IP communications should also be consulted. It is available via the Avaya Support site (https://support.avaya.com).
- Server internal communications do not require bandwidth assessment

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Multi-Site Network Link Capacities

A multi-site network link is the IP Office Line connection between each server (node). The links are arranged in a star topology with the Primary Server at the center, or double star when a Secondary is present.

Regardless of direct/indirect media, VCM or codec used, a further capacity consideration is the multi-site network links between all nodes. Each IP500 V2 or Linux link has a maximum capacity of 250 channels/calls (500 for IP Office Select Linux servers). The maximum total and outgoing channels are independently configurable in Manager via the **IP Office Line** > **VoIP Line** tab, and have a default of 128 for both.

This is per link, not a per system limit; for example a Primary or Secondary may have up to 250/500 concurrent calls to each Expansion system. Due to the star topology of IP Office Server Edition, calls between Expansion systems typically go via the Primary or Secondary and therefore these calls must also be taken into account when considering Multi-site network link capacity.

For IP Office Select/IP Office Subscription, it is possible to add IP Office lines between expansion Systems. There is a limit of one link between each pair of expansions. This link can be used to increase capacity or resilience. Calls between Expansions will go direct rather than via the Primary/Secondary.

It is not possible to add additional multi-site network links between the Primary/Secondary and Expansions – if the capacity is exhausted an additional Secondary or Expansion system should be considered.

The following occurs if the maximum numbers are exceeded:

- If the configured values are exceeded, additional outgoing calls can be routed via ARS configuration providing an alternative route exists; additional incoming calls are automatically routed, again providing an alternative route exists.
- Alternative routes only exist when a Secondary Server is present.

- If no alternative route, incoming calls remain ringing until a channel is free, outgoing calls indicate busy.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Resilience and Failover

Resilience is supported in Linux-based networks. However, the use of resilience requires consideration of various capacity issues:

- The total extensions/users on any single Primary, Secondary or Expansion must not be configured to exceed their supported limits under any circumstances.
- Primary failure when Secondary present will route all non-local Expansion calls, Voicemail leave and collect, IVR and Auto Attendants to the Secondary
- Primary failure when Secondary present will move Hunt group processing and management access to the Secondary. This will increase the management bandwidth from the Secondary to the Expansion systems.
- Users whose extension or application fails over retain their existing user profiles rights without needing or consuming an licenses on the fallback server.
- Any voicemail channel entitlements associated with the Primary, move to the Secondary on failover; no separate license provision on the fallback server is required – unless the dual active Voicemail Pro feature is enabled.

For further information, refer to the IP Office Resilience Overview manual.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Trunk Capacity

The Primary/Secondary Server supports SIP, H323 and IP Office lines.

Mode	Primary/ Secondary server	Maximum Registered SIP Trunks	Total SIP Trunk Calls (direct/ indirect media)	Maximum IP Office Trunks	Maximum IP Office Trunk Calls
IP Office Server Edition	**Dell R240**	125	256/128	32	250
	HP DL360	250	512/256	32	250
	Dell R640	250	512/256	32	250
	Virtual[1]	250	512/256	32	250
IP Office Select	**Dell R640**	250	1024/512	150	500
IP Office Subscription (Linux)	**Virtual**[1]	250	1024/512	150	500

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
- The **Total SIP Trunk Calls** figure is the maximum number of concurrent SIP trunk calls/ sessions for one system. They can be distributed over one or more trunks on the same system.
- SIP trunk concurrent call capacity is also limited by available licenses and the **SIP Line** > **SIP URI** > **Max Calls per Channel** setting and the maximum server call capacity. See Call Capacity on page 16.
- The number of SIP trunk session licenses requested by each system is defined by the **Maximum SIP Sessions** setting on the **License** > **Remote Server** > **Reserved Licenses** tab of IP Office Server Edition Manager. One available SIP Trunk session license enables one concurrent SIP session or call.
- The maximum number of configured URIs per SIP trunk is 150. This is not correlated with maximum SIP trunks or concurrent calls or sessions.
- The **Maximum Calls/Sessions per SCN Trunk** figure is the maximum number of concurrent sessions supported on a single inter-node link whether **WebSocket** or **Proprietary** type. The number of concurrent sessions is controlled by the **Line** > **IP Office Line** > **Number of Channels** setting and is also limited by the maximum server call capacity
- H323 trunks are distinct from SCN (IP Office Line), but are taken from the same capacity pool.
- The above figures are a theoretical maximum; other factors can reduce what can be utilized on a concurrent basis:
  - Available licenses
  - Trunk configuration
  - Maximum server call capacity

- IP infrastructure

The following occurs if the maximum numbers are exceeded:

Unless administered, IP Office does not limit the number of concurrent trunk calls and makes a best effort to service all. VoIP voice quality will degrade as load increases; high overload conditions will cause the server to perform poorly in general.

Related links

Primary and Secondary Server Capacity on page 14

Voicemail or Auto-Attendant or IVR

Leaving a voicemail for a user or hunt group uses one licensed voicemail channel and consumes one from the indirect media call capacity of the Voicemail Pro server.

- If the endpoint is remote, an IP Office Line (SCN trunk) channel is used.
- If the source of the call is digital/analog, a VCM channel is also required.

A voicemail collect operation uses the same resources as voicemail leave. Invoking an Auto Attendant, Announcement or IVR script uses the same resources as voicemail, and is taken from the same pool of licenses and voicemail channel capacity; one active Auto Attendants/IVR/Announcement takes one channel and license.

The total solution voicemail channel capacity is determined by a number of factors:

- The number of per-server supported voicemail channels:

Server	Maximum Voicemail Channels
Dell R640/Virtual	250
HP DL360	150
Dell R240	75
IP500 V2	40

- If dual Voicemail Pro feature is active (IP Office Select and IP Office Subscription only) – this doubles the maximum capacity to 500 channels.
- The number of licensed voicemail channels: Each active master Voicemail Pro must have its own licenses. It inherits the other set when active as a backup.
- Call recording also uses licensed voicemail channels. One active recording channel consumes one voicemail/AA channel.

Dual Voicemail Server Operation

When the dual Voicemail Pro feature is active (IP Office Select and IP Office Subscription only) and not under failover conditions, users are provided voicemail services (voicemail,

announcements, call recording, auto attendant, IVR, etc) services from one of the Voicemail Pro servers:

- All Primary users' voicemail invocations are directed to the Primary Voicemail Pro instance.
- All Secondary users' voicemail invocations are directed to the Secondary Voicemail Pro instance.
- All Expansion users' voicemail invocations are directed to the Voicemail Pro instance defined by the **System** > **Voicemail** > **Voicemail Destination** setting. This is initially selected by the Initial Configuration Utility (ICU).

Administration

To ensure Voicemail Pro channel capacity is available for voicemail, call flow and announcement operations, the IP Office Server Edition Manager settings Voicemail Channel Reservation on the Primary and **Secondary Server's System** > **Voicemail** tab can be configured to reserve channels exclusively for specific uses.

Mailbox capacity

The Voicemail Pro automatically creates a mailbox for each user and hunt group in the IP Office configuration. The individual capacity is fixed at 60 minutes per user or group mailbox.

If voicemail channel resources run out:

- Unanswered calls continue to alert rather than going to voicemail.
- Voicemail collect fails to connect to the voicemail.
- Calls to attendants and call-flows will continue to alert. However, text-to-speech (TTS) will not be output during call flows.
- Announcements are not played.
- Note that the TTS channel capacity is 250.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.

What happens if mailbox storage resources run out?

- Voicemail leave operations will receive an announcement that the user/group's mailbox is full.
- Voicemail collect will continue to function.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Chapter 5: one-X Portal Server

The following Avaya one-X® Portal client capacity is supported with three main options:

- The Avaya one-X® Portal server running on the Primary
- Standalone server IP Office Application Server to allow increased Avaya one-X® Portal user capacity.
- Second portal server to provide geo-resilience (running on Secondary server or secondary with second standalone IP Office Application Server)

Mode	Platform	Maximum one-X Portal Clients		Maximum Solution Call Rate (BHCC)
		Primary	Stand Alone	
IP Office Server Edition	**Dell R240**	375	750	7200
	HP DL360	750	750	9000
	Dell R640	750	750	9000
	Virtual[1]	750	750	9000
IP Office Select	**Dell R640**	1500	3000	10000
IP Office Subscription (Linux)	**Virtual**[1]	1500	3000	10000
IP500 V2	**UCM V2**	-	50	3600

- Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".
- The quoted Busy Hour Call Completion (BHCC) rates assumes a normal call distribution.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
- If Avaya one-X® Portal server geo-resilience is required, it must be a Secondary if Primary one-X server used, or another standalone one-X server if standalone one-X server used.
- The maximum supported total solution call rate is 7200/9000/10000 BHCC when Avaya one-X® Portal users are active.
- The Avaya one-X® Portal client types can be of any mix, including plugins. HTTP or HTTPS.
- Each connected Avaya one-X® Portal client counts as one load.

Chapter 6: IP500 V2 Servers

This section provides capacity notes for IP500 V2 systems. That includes all modes except IP Office Basic Edition.

- **IP500 V2:** Unless stated otherwise, IP500 V2 and IP500 V2A control units are equivalent.

Related links

IP500 V2 Overall Capacity on page 34
IP500 V2 Hardware Summary on page 36
Audio Conferencing on page 14
Call Capacity (IP500 V2) on page 39
Call Destination Server on page 18
Call Media Path (IP500 V2) on page 41
Call Recording on page 19
Call Traffic Profile on page 21
Extension/User Capacity on page 45
Hunt and Presence Groups on page 25
IP Infrastructure, Bandwidth and VoIP QoS on page 26
Multi-Site Network Link Capacities on page 28
Resilience and Failover on page 29
Small Community Network Capacity on page 51
Maximum Trunk Capacity on page 51
VCM Channel Capacity on page 53
Voicemail or Auto-Attendant or IVR on page 31

IP500 V2 Overall Capacity

The following table is a summary only. Support for particular types of extension, trunk and user ports also depends on other factors such as local support variations. For example, BRI trunks are not supported in North American locales.

For more detailed capacity notes, refer to the "IP Office Platform Guidelines: Capacity" document.

		IP Office Partner Mode	IP Office Norstar Mode	IP Office Basic Edition	IP Office Essential Edition IP Office Preferred Edition IP Office Subscription
Extensions	**Maximum Extensions**	100[1]	100[1]	100[1]	384
Trunks	**Maximum Trunks**	64	64	64	–[5]
	- Analog Trunks	32	32	32	204
	- BRI Channels[3]	–	12	12	32
	- PRI Channels[4]	24	30	30	240
	- SIP Channels[2]	20	20	20	–[5]
	- H323 IP Channels	–	–	–	–[5]

1. 100 Extensions in 3-digit extension numbering mode. 48 extensions in 2-digit extension numbering mode.
   - For IP Office Basic Edition modes, the system assumes that the base control unit is always fully populated with up to 32 extensions, either real or phantom or a mix, to which it assigns extension numbers in sequence.
     - It does this before assigning extension numbers to any real extensions on attached external expansion modules up to the system extension limit. If the system extension limit has not been exceeded, any remaining extension numbers are assigned to additional phantom extensions.
2. In all modes, voice compression hardware resources are also required for SIP support.
3. IP Office Basic Edition mode systems do not support BRI and PRI trunks in the same system. They are also restricted to 12 BRI channels regardless of the BRI hardware installed.
4. IP Office Basic Edition mode systems are limited to 1 x single-port PRI card.
5. Capacity is dependent on licenses, voice compression resources and available bandwidth.

Related links

IP500 V2 Servers on page 34

IP500 V2 Hardware Summary

Note that even where indicated as supported, the availability and support of equipment may still be subject to local restrictions. For supported phones, see IP Office Phones.

	IP Office Basic Edition IP Office Norstar Mode IP Office Partner Mode	IP Office Essential Edition IP Office Preferred Edition	IP Office Subscription
IP500 Base Cards			
IP500 DS8 Digital Station[5]	✓ 3	✓ 3	✓ 3
IP500 DS8A Digital Station	✓ 4	✓ 4	✓ 4
IP500 Analog Phone 2/8	✓ 4	✓ 4	✓ 4
IP500 VCM 32/64	–	✓ 2	✓ 2
IP500 4-Port Expansion	–	✓ 1	✓ 1
IP500 BRI Combo[3]	✓ 2	✓ 2	✓ 2
IP500 ATM Combo	✓ 2	✓ 2	✓ 2
IP500 ETR6[1]	✓ 3	–	–
Trunk Daughter Cards			
Analog Trunk Cards	✓ 4	✓ 4	✓ 4
BRI Trunk Cards[3]	✓ 3	✓ 3	✓ 4
PRI Trunk Cards[3][4]	✓ 1	✓ 4	✓ 4
External Expansion Modules			
Number of Modules[2]	8	12	12
Digital Station	✓	✓	✓
Phone	✓	✓	✓
Analog Trunk	✓	✓	✓
Telephone Types			
ETR Phones *(ETR ports)*	✓	–	–
DS Phones *(DS ports)*	✓	✓	✓
H323 IP Phones *(LAN)*	–	✓	✓
SIP IP Phones *(LAN)*	–	✓	✓
DECT R4 *(LAN)*	–	✓	✓
Voicemail Types			
Embedded Voicemail	✓	✓	✓

Table continues…

	IP Office Basic Edition IP Office Norstar Mode IP Office Partner Mode	IP Office Essential Edition IP Office Preferred Edition	IP Office Subscription
Voicemail Pro	–	✓	✓

1. ETR6 is only supported in IP Office Basic Edition - PARTNER Mode and IP Office Basic Edition U-Law modes.
2. External expansion modules can be added up to the overall limit for extensions and trunks. More than 8 modules requires a 4-Port Expansion base card. IP Office Basic Edition systems support one Analog Trunk 16 module only.
3. IP Office Basic Edition mode systems do not support a mix of BRI and PRI trunks and only supports a maximum of 12 BRI channels.
4. IP Office Basic Edition mode systems only support 1 single-port PRI card.
5. DS8 is not supported in IP500 V2A and later systems. Use DS8A instead.

Related links

IP500 V2 Servers on page 34

Audio Conferencing

Primary/Secondary Server

Each Primary and Secondary supports a local audio conference capability with the following capacities:

Mode	Primary/Secondary server	Total Conference Channels	Maximum conference size	Total Conference Channels with ACCS
IP Office Server Edition	**Dell R240**	128	128	414
	HP DL360	256	256	825
	Dell R640	256	256	1650
	Virtual	256	256	1650
IP Office Select **IP Office Subscription (Linux)**	**Dell R640**	512	256	1650
	Virtual	512	256	1650

IP500 V2 and Linux Expansion System

Each IP500 V2 and Linux Expansion System supports a local audio conference capability with the following capacities:

Expansion	Total Conference Channels	Maximum conference size	Total Conference Channels with ACCS
Linux/Virtual	128	128	128
IP500 V2	128	64	128

System Conferences

System conferences use the same conference capacity as above but are subject to the following additional limits:

- **IP Office Essential Edition/IP Office Preferred Edition:** 30.
- **IP Office Server Edition/IP Office Select/IP Office Subscription (Linux):** 120. System conferences are hosted by the primary server (secondary server during resilience).

Notes

- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
- **Virtual:** Maximum figures. Actually capacity depends on profiling as detailed in "Deploying IP Office Servers as Virtual Machines".
- The figures cover both ad-hoc and meet-me conference types.
- With one-X Portal users active, a solution-wide limit of 750 conference channel participants applies, but this does not include conferences used for call recording.
- IP Office Server Edition supports differing capacity and performance levels when Avaya Contact Center Select (ACCS) is attached. See Avaya Contact Center Applications on page 12.
- The increased capacities for ACCS are only supported when the applications are actively connected to the host IP Office and should only be used for call recording purposes.
- No dynamic solution-wide conference allocation is supported, only static via call flows or Conference Meet Me short code Line Group ID.
- V2 Expansion conferences exist in the digital domain; hence all VoIP parties (trunk or extension) will require a VCM channel for the duration. See VCM Channel Capacity on page 53.
- Further information on conferences can be found at: http://marketingtools.avaya.com/knowledgebase/businesspartner/ipoffice/mergedProjects/manager/_frame2.html?Conferencing.Overview.html

Which Servers Conference Resources are Used?

The location of the conference resource used when a conference is started are determined by a number of factors:

- A user performing an ad-hoc conference uses the conference resources of the server on which they are logged in.
- A meet-me conference using a user's personal meet-me bridge uses the conference resources of the server on which they are logged in.

- A meet-me conference created by Voicemail Pro call flow, or the Conference meet-me short code feature use the system on which the feature was invoked.
- To invoke a meet-me Conference using the resources of a remote system, use the Line Group ID field of the Conference Meet Me short code feature. By default this is set to 0, for local system.
- For the case where a conference is scheduled by Avaya one-X® Portal and at the scheduled time the conference dials the delegates: The conference location is the server to which the active Avaya one-X® Portal is attached.

Recording a conference requires an additional conference channel, as well as an IP Office Line (SCN trunk) channel to the recording destination (Primary or Secondary Server, alternate during fail over operation). Neither IP Office nor Voicemail Pro can automatically link or move conference locations, but existing conferences can be connected together.

When conference resources run out, attempts to record calls, join or create conferences are rejected.

Related links

[Primary and Secondary Server Capacity](#) on page 14
[IP500 V2 Servers](#) on page 34
[General Capacity Considerations](#) on page 58

Call Capacity (IP500 V2)

The concurrent call capacity between digital/analog extensions and/or digital/analog trunks is non-blocking. That is, all extensions and trunks can be involved in calls simultaneously. VoIP calls do not affect this capacity.

Parameters		Concurrent VoIP calls	Comment
Unsecure or Secure	**Direct media**	384	Calls with direct media between VoIP endpoints/trunks.
Unsecure	**Indirect media, IP500 V2 VCM**	120	Calls between the VoIP and digital/analog domain. Also limited by the available VCM channel capacity (see below).
Unsecure or secure	**Indirect media, IP500 V2 RTP relay**	120	Calls between VoIP endpoints/trunks that cannot go direct media, but do not require a VCM. Note that a VCM channel is always required during call setup. The value is per call leg. For example 60 H.323 extensions calling 60 H.323 extensions constitutes 120 total calls.

Table continues…

Parameters		Concurrent VoIP calls	Comment
Secure	**Indirect media, IP500 V2**	40	The value is per call leg. This means 40 VCM calls or 20 indirect media calls if some SRTP settings demand decoding, then re-encoding. If a mixed RTP/SRTP call environment, each SRTP leg removes three from the RTP call capacity.

These are not cumulative VoIP capacity figures – for example, a mixture of two call types changes the capacity to a value between the two limits. Calls that remain in the digital/analog domain do not affect this VoIP call capacity.

Administration

Concurrent call maximum capacity can be administered via IP Office Server Edition Manager in a number ways to ensure limits are not exceeded:

- **Number of Channels** and **Outgoing Channels** setting in the **Line** > **VoIP** tab of IP Office lines
- **Max Calls per Channel** setting in the **Line** > **SIP URI** tab of SIP trunks
- **Call Admission Control** area of the **Location** settings.
- **VoIP Security** area of the **System** settings.
- **Media Security** area in the **Line** > **VoIP Settings** tab.
- **Media Security** area in the **Extension** > **VoIP** tab.

The following occurs if the maximum numbers are exceeded:

Unless administered, the IP500 V2 Expansion does not limit the number of concurrent calls and makes a best effort to service all. VoIP voice quality will degrade as load increases; high overload conditions will cause the IP500 V2 Expansion to perform poorly in general.

Related links

IP500 V2 Servers on page 34

Call Destination Server

When considering Expansion or Server planning from a media perspective it is important to note that communication with any other IP Office Server Edition component will use VoIP and hence is limited by the media, IP Office Line (SCN trunk) and VCM capacities. This includes:

- Calls to/from Primary/Secondary and other Expansions
- Call recording - one VoIP channel per recorded call. Destination is the location of the active Voicemail Pro.
- Auto Attendants/IVR - one VoIP channel per call when connected to the Auto Attendant/IVR. Destination is the location of the active Voicemail Pro.

- Conferencing when the conference focus is not the local system - one VoIP channel per local member
- Local conferences involving remote users - one VoIP channel per remote member when connected to the conference
- Voicemail leave and collect - one VoIP channel per VM caller when. Destination is the location of the active Voicemail Pro.
- Announcements - one VoIP channel per call when generating announcements. Destination is the location of the active Voicemail Pro.
- Centralized Music on Hold – one VoIP channel per central MOH source when playing to held calls. Destination is the location of the Music on Hold source.

For all VoIP connections between systems, the codec used will be according to the IP Office Line settings of those two nodes.

Consideration should also be given to intermediate destinations to ensure adequate capacity is present. For example a consultation call will open a secondary channel for the consultation whilst keeping the initial call connected.

Lastly, any call on the IP Office Line will take into consideration administered channel limits and Call Admission Control (CAC) if active. Please refer to the CAC section of the IP Office administration documentation for behaviors when CAC limits are exceeded.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Call Media Path (IP500 V2)

Where calls start and remain in the digital and/or analog domain, the IP500 V2 Expansion's VCM and VoIP capacities have no effect. The base non-blocking capacity of the IP500 V2 Expansion will apply.

Where calls go between VoIP and digital/analog domains within the IP500 V2 Expansion, the indirect media limit of 120 concurrent calls and VCM availability will always apply.

Where calls go between VoIP domains (for example SIP trunk to H.323) there are two options: Direct and indirect media. Direct media does not use the IP500 V2 Expansion's routing engine and hence the base capacity of 384 concurrent calls will apply.

Direct media is a configurable parameter for VoIP trunks and extensions with a default of active.

Indirect media will occur either where configured, or if direct media is not possible (even if configured). Some of the reasons are:

- VoIP traffic routed between the LAN1 and LAN2 interface

- Unsuccessful codec negotiation (including silence suppression, DTMF transport as well as basic codec support)
- A VoIP endpoint that does not support direct media
- Mismatch of RTP and SRTP
- Mismatched SRTP or SRTCP security settings such as no common cipher suite. These should be avoided if at all possible due to the limited indirect media SRTP capacity.
- Network Address Translation (NAT) traversal usually associated with Remote Worker phone deployments.

Related links

IP500 V2 Servers on page 34

Call Recording

Each Primary and Secondary supports a voice call recording capability with the following capacities:

Mode	Platform	Recording Channels		
		Server[1]	Solution	Solution with ACCS
IP Office Server Edition	**Dell R240**	75	75	175
	HP DL360	150	150	350
	Dell R640	150	150	500
	Virtual[1]	150	150	500
IP Office Select **IP Office Subscription (Linux)**	**Dell R640**	250	500	500
	Virtual[1]	250	500	500
IP Office Preferred Edition		40	40	40

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
- **Virtual:** Maximum figures. Actually capacity depends on profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

- Call recording uses a 3-party conference per recorded call. Note that without ACCS connected, the primary server does not have sufficient conference channels for the whole solution - other server's conference resources must be used.
- Conference recording adds a further conference channel to an existing conference.
- Each recording requires one licensed (and available) voicemail channel, a VCM (for the IP500 V2 Expansion) and IP Office Line (SCN trunk) channel as the recording destination is on the Primary or Secondary Server. See VCM Channel Capacity on page 53.
- The system supports differing capacity and performance levels when Avaya Contact Center Select (ACCS) is attached. See Avaya Contact Center Applications on page 12.
- The increased capacities for ACCS are only supported for call recording, and are active when the application is connected to the host IP Office.
- The solution internal call recording capacity is fixed at 333 hours total (555 hours for IP Office Select). This is separate from the voicemail mailbox recording capacity, see Voicemail or Auto-Attendant or IVR on page 31. It is also separate from Media Manager storage capacity, see Media Manager Recording Capacity on page 66.
- The Media Manager application supports recordings management at the maximum channel and call rate appropriate to the server platform.
- If the dual Voicemail Pro feature is active IP Office Select and IP Office Subscription only) the maximum solution capacity is doubled to maximum of 500 channels, the per-server capacity remains unchanged.
- One active recording channel consumes one voicemail/AA channel. If the call is being recorded in two places – for example at the user and the incoming trunk – two licensed and available voicemail channels are required.
- Maximum recording call rate is 7200/9000/10000 BHCC for a primary/secondary Linux-based server, 3,600 BHCC for an Expansion. See Call Traffic Profile on page 21.

  Recording call rate is further reduced for ACCS. See Avaya Contact Center Applications on page 12.

Which Servers Conference Resources are Used?

The location of conference resource used is determined by the point of recording:

- Incoming Call Route (ICR) recording is done at trunk’s location
- User recording is done at user’s location.
- Hunt group recording is done at the group's location.
- System recording is done at the system’s location.
- Conference recording at conference location: Ad-hoc conference recording is done at the initial user's location. Meet-me conference recording can specify the location.
- Account code recording is done at the user's location.

Administration

To ensure Voicemail Pro channel capacity is available for recordings, the IP Office Server Edition Manager settings **Voicemail Channel Reservation** on the Primary and Secondary Server's **System** > **Voicemail** tab can be configured to reserve channels exclusively for specific uses.

- If recording channel resources run out:
  - If the recording is mandatory, busy is returned.
  - If the recording is not mandatory, further attempts to record calls or conferences are not successful, but there may still be visual recording indications.

If exceeded:

If recording storage resources run out, further attempts to record calls or conferences will not be successful and receive announcements to that effect.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Call Traffic Profile

General traffic engineering is outside the scope of this document, however you must consider the following factors:

Mode	Platform	Maximum Call Rate (BHCC)	
		Server	Solution
IP Office Server Edition	**Dell R240**	7200	7200
	HP DL360	18000/9000[3]	18000/9000[3]
	Dell R640	18000/9000[3]	18000/9000[3]
	Virtual[1]	18000/9000[3]	18000/9000[3]
IP Office Select **IP Office Subscription (Linux)**	**Dell R640**[2]	20000/10000[3]	20000/10000[3]
	Virtual[1, 2]	20000/10000[3]	20000/10000[3]
All	**Linux**	7200	-
	IP500 V2	3600	-

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".
2. These platforms (**Dell R640** or **Virtual**) only. Other servers only support the lower 18000/9000 call rate.

3. Lower call rate when any Avaya one-X® Portal user active.

- The quoted Busy Hour Call Completion (BHCC) rates assumes a normal call distribution.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
- Total solution BHCC must not exceed 9000/10000 BHCC when Avaya one-X® Portal users are active
- Continuously running at the maximum supported solution call rate when Avaya one-X® Portal users are active should not exceed 24 hours.
- Avaya one-X® Portal users include: Web Client, Call Assistant, Outlook Integration, Lync Integration, one-X preferred Mobile Clients
- The maximum rate for call recording and Voicemail leave combined is 7200/9000/10000 BHCC.
- The Maximum Solution Call Rate can be further reduced by the presence of Call recording, CTI or Contact Center application such as ACCS. See Avaya Contact Center Applications on page 12.
- **IP Office Subscription (Linux):** Supports the same capacity as **IP Office Select** (see IP Office Select/IP Office Subscription on page 10).
- **IP500 V2:** Unless stated otherwise, IP500 V2 and IP500 V2A control units are equivalent.

The following occurs if these figures are exceeded:

If the call rate is exceeded, there may be disruption to call voice quality, recordings, or a general slowdown in other operation such as UC or management clients.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Extension/User Capacity

An IP500 V2 control unit can support 384 users and up to 384 extensions (analog, digital, H.323, SIP, or DECT R4). Analog and digital extension capacity is dependent upon the hardware fitted to the system.

- Maximum users and extensions are configuration limits as well as a currently active/registered limit.
- Extension and user limits include any resilience fail-over extensions/users; again these are configuration limits as well as a currently active/registered limit.

- Extension capacity support includes IP Office acting as a server for any DHCP, upgrade and other operational files. 1600/9600/J100 phone upgrade performance is limited to 50 within 50 minutes for the same phone type.
- Upgrading more than 50 phones at a time from an IP500 V2 is not recommended. If upgrade performance above these figures are required, an external HTTP/S server can be used.
- For non-subscription systems, H323, DECT R4 and SIP extension capacity is also limited by available licenses.
- 9600 H323 Remote worker extensions are supported at a lower capacity; maximum 120.
- 9600 H323 extensions with TLS are supported at a lower capacity; maximum 128. That is, each VoIP extension that uses TLS reduces the extension capacity by 3.

Related links

IP500 V2 Servers on page 34

Hunt and Presence Groups

Hunt Groups are sets of telephone users targeted by calls. Presence groups are sets of XMPP users for IM purposes. Both are viewed together for group capacity, of which there are both per-solution and per system limits:

Mode	Platform	Maximum Server Group size	Maximum Groups		Total Hunt Solution Group Members
			Server	Solution	
IP Office Essential Edition **IP Office Preferred Edition**	**IP500 V2**	384	200	300	3000
IP Office Server Edition	**Linux/Virtual**	750	300	300	3000
	IP500 V2	384	200	300	3000
IP Office Select	**Linux/Virtual**	1250	600	600	6000
IP Office Subscription (Linux)	**IP500 V2**	384	200	600	6000

- Maximum Solution Groups is the total number of hunt and presence groups over the whole solution.
- Maximum Server Group size is the maximum number of members in a single hunt/presence group.

- Total Solution Group Members is the total members over all hunt/presence groups.

The following occurs if these figures are exceeded:

- IP Office Manager does not permit the administration of more than 300 solution groups if the solution is not IP Office Select or IP Office Subscription.
- IP Office Manager does not permit the administration of more than 750 per group members if the solution is not IP Office Select or IP Office Subscription.
- If the number of groups or individual size is exceeded (particularly if the **Ring Mode** is **Collective** or **Collective Call Waiting**), there may be inaccurate hunt group call presentation, or a general slowdown in other operation such as UC or management clients.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

IP Infrastructure, Bandwidth and VoIP QoS

It is not within the scope of this document to cover detailed aspects of Ethernet and IP infrastructure.

- IP500 V2 supports two 10/100 Mbit/s, Full/Half duplex 802.3 Ethernet interfaces with DSCP/ToS support.
- Avaya IP Office Linux servers supports two 10/100/1000 Mbit/s, Full/Half duplex 802.3 Ethernet interfaces with DSCP/ToS and static 802.1Q VLAN support.
- Subject to IP infrastructure: All supported IP Office traffic can be routed via a single LAN interface: All supported IP Office traffic can be routed between the LAN interfaces, however this may lead to inefficiencies and limit performance for the IP500 V2 platform.

For more information on LAN interface support, see the IP Office Server Edition LAN Support chapter of "Deploying IP Office Server Edition".

Note that secure VoIP (SRTP) can increase the required bandwidth by up to 8%, see the 'VoIP Security' chapter of Avaya IP Office™ Platform Security Guidelines.

In addition to the network requirements for VoIP calls, additional bandwidth should be reserved for the corresponding inter-node signaling and management paths. This should include any access via SSLVPN (IPOSS) or Remote Support Service (RSS). The following suggested minimum bandwidths should be made available for these additional paths:

Traffic	Suggested Minimum Bandwidth	Comments
Inter-node Signaling/ Status	256 kbit/s	Between Primary and each Expansion Between Primary and Secondary Between Secondary and each Expansion. Limited signaling/status directly between Expansions Bursty traffic, peaking after start-up or restoration of node to node connectivity.
one-X Portal CTI	96 kbit per call (or 192 kbit/s @ 7,200 BHCC)	Between one-X Portal server location and Expansion when one-X Portal server active.
Web Management	512 kbit/s	Between Web Manager PC and Primary (or Secondary under failover conditions) when a Web Management session is active
IP Office Server Edition Manager	512 kbit/s	Between SE Manager PC and each node when a IP Office Server EditionManager session is active
Upgrade	512 kbit/s	Between Primary and each node when upgrade is being performed
Backup/Restore	256 – 2048 kbit/s	Between Backup Server and each Expansion Between Backup Server and Primary Between Backup Server and Secondary An IP Office Linux platform can be designated as the backup server. Bandwidth is only required when a backup or restore operation is active, and only between participating nodes. The bandwidth required depends on the backup/ restore content.
Voicemail Pro client	512 kbit/s	Between Voicemail Pro PC and Primary (or Secondary under failover conditions) when a Voicemail Pro server management session is active
Voicemail Pro Server <> Voicemail Pro Server	1024 kbit/s	Bursty traffic, peaking after start-up or restoration of Server to Server connectivity
	32 kbit/s per active channel	Extra traffic between Secondary and Primary when Dual Voicemail Pro active
Voicemail Pro Server <> IP Office Media Manager	32 kbit/s per active channel	Bursty SFTP traffic, between Primary and external server running IP OfficeMedia Manager. Typically IP Office Media Manager runs coresident with Voicemail Pro. For dual active Voicemail Pro, the Secondary Voicemail Pro will send all recordings to the server running IP Office Media Manager.

Table continues…

Traffic	Suggested Minimum Bandwidth	Comments
WebRTC Client	6 – 256 kbit/s	Between each active Avaya Communicator for Web client and the WebRTC Gateway
one-X Server <> one-X Server	1–500 users: 512 kbit/s 500–1500 users: 1024 kbit/s 1500–3000 users: 2048 kbit/s	Bursty traffic, peaking after start-up or restoration of Server to Server connectivity
SoftConsole	64–1024 kbit/s	Bursty traffic, peaking after start-up. Higher figure for maximum 3000 user deployment. Between each SoftConsole application and the IP Office server.
SMDR	1 kbit per call report (or 7.2 kbit/s @ 7,200 BHCC)	Average SMDR message size for typical call pattern
RSS to co-located server	64 –1024 kbit/s per TCP Tunnel	Between remote client and col-located server when a remote management session is active

- These figures are for general guidance only as they do not reflect the specific requirements for a given installation. For example management operations are typically session based; backup/restore content and frequency are administerable; many are bursty in nature and may or may not coincide with others.
- Only the major signaling and management paths are included here, further network bandwidth may be required for SSA, SysMonitor, syslog, SNMP, etc.
- An IP Office port matrix document that covers all possible IP communications should also be consulted. It is available via the Avaya Support site (https://support.avaya.com).
- Server internal communications do not require bandwidth assessment

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
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Multi-Site Network Link Capacities

A multi-site network link is the IP Office Line connection between each server (node). The links are arranged in a star topology with the Primary Server at the center, or double star when a Secondary is present.

Regardless of direct/indirect media, VCM or codec used, a further capacity consideration is the multi-site network links between all nodes. Each IP500 V2 or Linux link has a maximum capacity of 250 channels/calls (500 for IP Office Select Linux servers). The maximum total and outgoing

channels are independently configurable in Manager via the **IP Office Line** > **VoIP Line** tab, and have a default of 128 for both.

This is per link, not a per system limit; for example a Primary or Secondary may have up to 250/500 concurrent calls to each Expansion system. Due to the star topology of IP Office Server Edition, calls between Expansion systems typically go via the Primary or Secondary and therefore these calls must also be taken into account when considering Multi-site network link capacity.

For IP Office Select/IP Office Subscription, it is possible to add IP Office lines between expansion Systems. There is a limit of one link between each pair of expansions. This link can be used to increase capacity or resilience. Calls between Expansions will go direct rather than via the Primary/Secondary.

It is not possible to add additional multi-site network links between the Primary/Secondary and Expansions – if the capacity is exhausted an additional Secondary or Expansion system should be considered.

The following occurs if the maximum numbers are exceeded:

- If the configured values are exceeded, additional outgoing calls can be routed via ARS configuration providing an alternative route exists; additional incoming calls are automatically routed, again providing an alternative route exists.
- Alternative routes only exist when a Secondary Server is present.
- If no alternative route, incoming calls remain ringing until a channel is free, outgoing calls indicate busy.

Related links

[Primary and Secondary Server Capacity](#) on page 14
[IP500 V2 Servers](#) on page 34
[General Capacity Considerations](#) on page 58

Resilience and Failover

Resilience is supported in Linux-based networks. However, the use of resilience requires consideration of various capacity issues:

- The total extensions/users on any single Primary, Secondary or Expansion must not be configured to exceed their supported limits under any circumstances.
- Primary failure when Secondary present will route all non-local Expansion calls, Voicemail leave and collect, IVR and Auto Attendants to the Secondary
- Primary failure when Secondary present will move Hunt group processing and management access to the Secondary. This will increase the management bandwidth from the Secondary to the Expansion systems.
- Users whose extension or application fails over retain their existing user profiles rights without needing or consuming an licenses on the fallback server.

- Any voicemail channel entitlements associated with the Primary, move to the Secondary on failover; no separate license provision on the fallback server is required – unless the dual active Voicemail Pro feature is enabled.

For further information, refer to the IP Office Resilience Overview manual.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Small Community Network Capacity

IP500 V2 servers can be used in a network of IP Office servers. The details here cover IP500 V2 servers connected in a Small Community Network (SCN). For use as expansion servers in Server Edition/Select networks, see Extension/User/Site Capacity on page 23.

Small Community Network Capacity

- Maximum: 32 nodes with a total of 1000 users.
- If using a Unified Communications Module:
  - If using the Unified Communications Module to provide voicemail, the network is limited to 6 nodes.
  - If using the Unified Communications Module to also support Avaya one-X Portal, the network is limited to 200 users and 50 portal sessions at any time.

Related links

IP500 V2 Servers on page 34

Maximum Trunk Capacity

A single IP500 V2 control unit can support up to:

- 204 Analog trunks total
- 8 E1/PRI digital trunks with 240 channels total
- 8 T1/PRI digital trunks with 192 channels total
- 16 BRI digital trunks with 32 channels total
- 125 SIP trunks with 128 concurrent calls total
- 32 H323/SCN trunks with 250 concurrent calls per trunk

This is a theoretical maximum possible trunk channels that can be supported, but other factors will reduce what can be utilised on a concurrent basis:

- Available licenses
- Trunk configuration
- VCM channels
- Maximum server call capacity

Analog and digital trunk capacity is dependent upon the hardware fitted to the system unit. The following table shows the various constructs and the resulting maximum (note that many variants are not shown):

Trunk Card #1	Trunk Card #2	Trunk Card #3	Trunk Card #4	Exp. Module #1-8	Exp. Module #9-12	Max BRI	Max PRI E1/T1	Max Analog
Dual PRI	Dual PRI	Dual PRI	Dual PRI	ATM 16	-	0	240/192	128
ATM 4	ATM 4	ATM 4	4 Port Exp.	ATM 16	ATM 16	0	0	204
BRI 8	BRI 8	BRI 8	BRI 8	ATM 16	-	32	0	128
-	-	-	-	-	-	0	0	0

Server Type	Maximum Registered SIP Trunks	Total SIP Trunk Calls (direct/ indirect media)	Maximum IP Office (SCN) Trunks	Maximum Calls per SCN Trunk
IP500 V2	125	128/120	32	250

- The **Total SIP Trunk Calls** figure is effectively the maximum number of concurrent SIP trunk calls/sessions. They can be distributed over one or more trunks on the same system.
- SIP trunk concurrent call capacity is also limited by available licenses and the **SIP Line** > **SIP URI** > **Max Calls per Channel setting**.
- The number of SIP Trunk session licenses requested by each system is defined by the **Maximum SIP Sessions** setting on the **License** > **Remote Server** > **Reserved Licenses** tab of IP Office Server Edition Manager. One available SIP Trunk session license enables one concurrent SIP session/call.
- The maximum number of configured URIs per SIP trunk is 150. This is not correlated with maximum SIP trunks or concurrent calls.
- The Maximum Calls per SCN Trunk figure is the maximum number of concurrent sessions supported on a single inter-node link whether WebSocket or Proprietary type. Note that the number of SCN channels is controlled by the **Number of Channels** setting on the **IP Office Line** > **Line** tab of IP Office Server Edition Manager.
- H323 trunks are distinct from SCN, but are taken from the same capacity pool.
- The PRI trunk capacity is also limited by available licenses. One available PRI Trunk Channel license enables one concurrent PRI call.

Related links

IP500 V2 Servers on page 34

VCM Channel Capacity

Voice Compression Module (VCM) channels allow an IP500 V2 to convert media (for example speech) between analog/digital and IP. These are essential when routing analog/digital trunk calls to or from VoIP endpoints.

- It is important to note that in a Linux-based server network, media communication with any other server components requires the use of VoIP, including Primary, Secondary, other expansions, call recording, attendants, IVR, conferencing and voicemail.
- Local IP500 V2 conferences and music-on-hold use the digital domain; hence all VoIP parties (trunk or extension) require a VCM channel.
- VCM channels are also used to perform VoIP transcoding. Transcoding is used where the VoIP codec differs between two legs of a call; for example a VoIP endpoint supporting only G.729 calling a SIP trunk with only G.711. This case uses 2 VCM channels and should be avoided wherever possible.

The following table summarizes VCM channel usage.

Endpoint A	Endpoint B	Channels used [1]	Notes
Analog/Digital trunk or extension	Analog/Digital trunk or extension	None	DECT R4 endpoints are classified as VoIP
	Local Conference	None	Conference hosted on the IP500 V2
	Local Music on Hold	None	
	Embedded Voicemail	None	Includes voicemail, attendants, announcements.
Analog/Digital trunk or extension	VoIP trunk or extension	1	
	Central Voicemail	1	Includes voicemail, IVR attendants, announcements
	Remote Conference	1	
	Remote Music on Hold	1	Maximum of 3 MOH sources streamed from Primary Server using a maximum of 3 VCM channels
	Call recording	1	Using Voicemail Pro or ACCS.
VoIP trunk or extension	VoIP trunk or extension	None[2]	VoIP endpoints includes IP Office Line (SCN trunk), SM and H323 lines, DECT endpoints

Table continues…

Endpoint A	Endpoint B	Channels used [1]	Notes
	Central Voicemail	None[2]	Includes voicemail, IVR attendants, announcements
	Remote Conference	None[2]	
	Remote Music on Hold	None[2]	Streamed from Primary Server
	Call recording	None[2]	Using Voicemail Pro or ACCS.
VoIP trunk or extension	Analog/Digital trunk or extension	1	
	Local Conference	1	Conference hosted on the IP500 V2
	Local Music on Hold	1 per MOH source[2]	Maximum of 4 MOH sources. One VCM channel is used per codec type per source.
	Embedded Voicemail	1	Includes voicemail, attendants, announcements

1. Unless otherwise specified, the VCM channel is used for the duration of the call and the VCM resource is always local.
2. Assumes both endpoints' VoIP codecs match, if they do not match 2 VCM channels are used.

Three base card types provide VCM channel capacity for the IP500 V2 control units:

- VCM 32
- VCM 64
- Combination card

Each base card can carry a trunk module, however the Combo card can only support BRI and analog. Hence, if more than two dual PRI cards are required, the VCM capacity is reduced. Also note that the type of trunk module fitted to the Combo card is fixed.

The following table shows various constructs and the resulting theoretical maximum. Not all the variants are listed. Only those variants that provide the maximum capacity are listed.

Base Card #1	Base Card #2	Base Card #3	Base Card #4	Maximum G.711 calls	Maximum G.729 calls	Maximum G.723 calls	Maximum G.722 calls
VCM 64	VCM 64	-	-	128	120	88	120
VCM 64	VCM 64	Combo	-	138	130	98	130
VCM 64	VCM 64	Combo	Combo	148	140	108	140

The capacity in the above table is for a bidirectional channel between a VoIP and an analog or digital endpoint and assumes the calls are of the same codec type. Differing codec types can be supported at the same time; the lowest channel figure should be used for calculations.

If VCM channels are used to convert SRTP media, a maximum of 40 calls per system are supported regardless of codec type.

The IP500 V2 control unit manages this common resource as efficiently as possible but if there are insufficient at any one time:

- Outgoing calls will not get connected (they do not receive dial tone)
- Incoming calls will queue until a VCM channel is free
- Transfers cannot be made

Related links

IP500 V2 Servers on page 34

Voicemail or Auto-Attendant or IVR

Leaving a voicemail for a user or hunt group uses one licensed voicemail channel and consumes one from the indirect media call capacity of the Voicemail Pro server.

- If the endpoint is remote, an IP Office Line (SCN trunk) channel is used.
- If the source of the call is digital/analog, a VCM channel is also required.

A voicemail collect operation uses the same resources as voicemail leave. Invoking an Auto Attendant, Announcement or IVR script uses the same resources as voicemail, and is taken from the same pool of licenses and voicemail channel capacity; one active Auto Attendants/IVR/Announcement takes one channel and license.

The total solution voicemail channel capacity is determined by a number of factors:

- The number of per-server supported voicemail channels:

Server	Maximum Voicemail Channels
Dell R640/Virtual	250
HP DL360	150
Dell R240	75
IP500 V2	40

- If dual Voicemail Pro feature is active (IP Office Select and IP Office Subscription only) – this doubles the maximum capacity to 500 channels.
- The number of licensed voicemail channels: Each active master Voicemail Pro must have its own licenses. It inherits the other set when active as a backup.
- Call recording also uses licensed voicemail channels. One active recording channel consumes one voicemail/AA channel.

Dual Voicemail Server Operation

When the dual Voicemail Pro feature is active (IP Office Select and IP Office Subscription only) and not under failover conditions, users are provided voicemail services (voicemail,

announcements, call recording, auto attendant, IVR, etc) services from one of the Voicemail Pro servers:

- All Primary users' voicemail invocations are directed to the Primary Voicemail Pro instance.
- All Secondary users' voicemail invocations are directed to the Secondary Voicemail Pro instance.
- All Expansion users' voicemail invocations are directed to the Voicemail Pro instance defined by the **System** > **Voicemail** > **Voicemail Destination** setting. This is initially selected by the Initial Configuration Utility (ICU).

Administration

To ensure Voicemail Pro channel capacity is available for voicemail, call flow and announcement operations, the IP Office Server Edition Manager settings Voicemail Channel Reservation on the Primary and **Secondary Server's System** > **Voicemail** tab can be configured to reserve channels exclusively for specific uses.

Mailbox capacity

The Voicemail Pro automatically creates a mailbox for each user and hunt group in the IP Office configuration. The individual capacity is fixed at 60 minutes per user or group mailbox.

If voicemail channel resources run out:

- Unanswered calls continue to alert rather than going to voicemail.
- Voicemail collect fails to connect to the voicemail.
- Calls to attendants and call-flows will continue to alert. However, text-to-speech (TTS) will not be output during call flows.
- Announcements are not played.
- Note that the TTS channel capacity is 250.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.

What happens if mailbox storage resources run out?

- Voicemail leave operations will receive an announcement that the user/group's mailbox is full.
- Voicemail collect will continue to function.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Chapter 7: Linux Expansion Server

When designing a IP Office Server Edition solution that includes a Linux-based Expansion System, the same aspects that are covered for the IP500 V2 Servers on page 34 need to be assessed, with the following differences:

- Maximum extension capacity for each Linux Expansion:
  - No digital or analog extensions
  - Maximum users/extensions 750 (including DECT R4).
  - 128 maximum remote worker 9600 Series H323 extensions.
- Maximum trunk capacity for each Linux Expansion:
  - No digital or analog trunks.
  - Maximum SIP sessions/calls 256 total.
- The concurrent call capacity of the Linux Expansion:
  - No analog/digital calls
  - Indirect media capacity 128 (64 when SRTP used)
  - Direct media capacity 750
- The VCM channel capacity for each Linux Expansion:
  - Only transcoding is relevant; 128 channels
  - There is no capacity difference due to codec type

All of the above should be assessed as one factor may limit another.

Chapter 8: General Capacity Considerations

The following capacity topics apply to all types of server and mode of operations.

Related links

Account Codes on page 59
Audio Conferencing on page 14
Button Modules on page 61
Appearance Button Programming on page 62
Call Destination Server on page 18
Call Logs/Call History on page 63
Call Recording on page 19
Media Manager Recording Capacity on page 66
Call Traffic Profile on page 21
CTI & TAPI on page 68
DECT R4 on page 70
Directory on page 70
Hunt and Presence Groups on page 25
Incoming Call Routes on page 72
IP Infrastructure, Bandwidth and VoIP QoS on page 26
IP Office SoftConsole on page 74
Multi-Site Network Link Capacities on page 28
Paging on page 76
Remote Support Services on page 77
Resilience and Failover on page 29
Unified Messaging Capacity on page 78
Voicemail or Auto-Attendant or IVR on page 31
WebRTC Gateway on page 81
WebLM Server on page 82

Account Codes

A maximum of 1500 account codes are supported on any IP Office server. For servers in a network using consolidated obejcts, that also sets the maximum for the whole network.

The maximum is for account codes entered into the system configuration. Using wildcards in the account code entries, a larger number of dialed account codes can match configured codes.

Related links

General Capacity Considerations on page 58

Audio Conferencing

Primary/Secondary Server

Each Primary and Secondary supports a local audio conference capability with the following capacities:

Mode	Primary/Secondary server	Total Conference Channels	Maximum conference size	Total Conference Channels with ACCS
IP Office Server Edition	**Dell R240**	128	128	414
	HP DL360	256	256	825
	Dell R640	256	256	1650
	Virtual	256	256	1650
IP Office Select	**Dell R640**	512	256	1650
IP Office Subscription (Linux)	**Virtual**	512	256	1650

IP500 V2 and Linux Expansion System

Each IP500 V2 and Linux Expansion System supports a local audio conference capability with the following capacities:

Expansion	Total Conference Channels	Maximum conference size	Total Conference Channels with ACCS
Linux/Virtual	128	128	128
IP500 V2	128	64	128

System Conferences

System conferences use the same conference capacity as above but are subject to the following additional limits:

- **IP Office Essential Edition/IP Office Preferred Edition:** 30.

- **IP Office Server Edition/IP Office Select/IP Office Subscription (Linux):** 120. System conferences are hosted by the primary server (secondary server during resilience).

Notes

- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
- **Virtual:** Maximum figures. Actually capacity depends on profiling as detailed in "Deploying IP Office Servers as Virtual Machines".
- The figures cover both ad-hoc and meet-me conference types.
- With one-X Portal users active, a solution-wide limit of 750 conference channel participants applies, but this does not include conferences used for call recording.
- IP Office Server Edition supports differing capacity and performance levels when Avaya Contact Center Select (ACCS) is attached. See Avaya Contact Center Applications on page 12.
- The increased capacities for ACCS are only supported when the applications are actively connected to the host IP Office and should only be used for call recording purposes.
- No dynamic solution-wide conference allocation is supported, only static via call flows or Conference Meet Me short code Line Group ID.
- V2 Expansion conferences exist in the digital domain; hence all VoIP parties (trunk or extension) will require a VCM channel for the duration. See VCM Channel Capacity on page 53.
- Further information on conferences can be found at: http://marketingtools.avaya.com/knowledgebase/businesspartner/ipoffice/mergedProjects/manager/_frame2.html?Conferencing.Overview.html

Which Servers Conference Resources are Used?

The location of the conference resource used when a conference is started are determined by a number of factors:

- A user performing an ad-hoc conference uses the conference resources of the server on which they are logged in.
- A meet-me conference using a user's personal meet-me bridge uses the conference resources of the server on which they are logged in.
- A meet-me conference created by Voicemail Pro call flow, or the Conference meet-me short code feature use the system on which the feature was invoked.
- To invoke a meet-me Conference using the resources of a remote system, use the Line Group ID field of the Conference Meet Me short code feature. By default this is set to 0, for local system.
- For the case where a conference is scheduled by Avaya one-X® Portal and at the scheduled time the conference dials the delegates: The conference location is the server to which the active Avaya one-X® Portal is attached.

Recording a conference requires an additional conference channel, as well as an IP Office Line (SCN trunk) channel to the recording destination (Primary or Secondary Server, alternate during

fail over operation). Neither IP Office nor Voicemail Pro can automatically link or move conference locations, but existing conferences can be connected together.

When conference resources run out, attempts to record calls, join or create conferences are rejected.

Related links

[Primary and Secondary Server Capacity](#) on page 14
[IP500 V2 Servers](#) on page 34
[General Capacity Considerations](#) on page 58

Button Modules

Button module capacity is defined in terms of the total number of additional buttons per system, whether used or not.

Mode	Platform	Total Buttons	Maximum			
			BM32	DBM32	BM12 SBM24 JBM24 JEM24[2]	Appearances [1]
IP Office Server Edition	**All**	4096	128	-	170	20
IP Office Select **IP Office Subscription (Linux)**	**All**	8192	256	-	340	40
All	**IP500 V2**	1024	32	32	42	10

1. Maximum Appearances is the supported limit for the total solution-wide buttons that can be programmed to the same call appearance, line appearance or covered user.
2. With J179/J169 phones, JEM24 button module capacity depends on whether a single or multiple modules are attached to phones:
   - A single JEM24 module on a phone provides 72 buttons in 3 pages of 24. In this mode, single modules are equivalent to 3 modules for overall capacity.
   - Multiple JEM24 modules on a phone only provide 24 buttons each.

- Capacities are regardless of whether the buttons are configured for use or not, and whether physical or logical (as in the case of BM12 or JEM24).
  - BM12: 24 buttons each in 2 pages of 12. 9608, 9611 and 9641 IP telephones.
  - BM32: 32 buttons each. 1616 IP telephones.

  - DBM32: 32 buttons each. 1416 digital telephones.
  - JBM24: 24 buttons each. J169 and J179 IP telephones.
  - JEM24: J169/J179 - 24 or 72 buttons each, see note 2 above. J189 - 24 buttons each.
  - SBM24: 24 buttons each. 9608, 9611 and 9641 IP telephones.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.

Related links

General Capacity Considerations on page 58

Appearance Button Programming

The following limits apply to appearance buttons:

- Supported maximum number of bridged appearances to the same call appearance.
- Supported maximum number of line appearances to the same line.
- Supported maximum number of call coverage appearances of the same covered user.

The limits are:

- 10 for IP500 V2 systems.
- 20 for Server Edition.
- 40 for Server Edition Select and Linux-based IP Office Subscription.

MADN Buttons

You can have up to 30 MADN buttons associated with the same user.

Related links

General Capacity Considerations on page 58

Call Destination Server

When considering Expansion or Server planning from a media perspective it is important to note that communication with any other IP Office Server Edition component will use VoIP and hence is limited by the media, IP Office Line (SCN trunk) and VCM capacities. This includes:

- Calls to/from Primary/Secondary and other Expansions
- Call recording - one VoIP channel per recorded call. Destination is the location of the active Voicemail Pro.

- Auto Attendants/IVR - one VoIP channel per call when connected to the Auto Attendant/IVR. Destination is the location of the active Voicemail Pro.
- Conferencing when the conference focus is not the local system - one VoIP channel per local member
- Local conferences involving remote users - one VoIP channel per remote member when connected to the conference
- Voicemail leave and collect - one VoIP channel per VM caller when. Destination is the location of the active Voicemail Pro.
- Announcements - one VoIP channel per call when generating announcements. Destination is the location of the active Voicemail Pro.
- Centralized Music on Hold – one VoIP channel per central MOH source when playing to held calls. Destination is the location of the Music on Hold source.

For all VoIP connections between systems, the codec used will be according to the IP Office Line settings of those two nodes.

Consideration should also be given to intermediate destinations to ensure adequate capacity is present. For example a consultation call will open a secondary channel for the consultation whilst keeping the initial call connected.

Lastly, any call on the IP Office Line will take into consideration administered channel limits and Call Admission Control (CAC) if active. Please refer to the CAC section of the IP Office administration documentation for behaviors when CAC limits are exceeded.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Call Logs/Call History

The following call log capacities are supported:

Platform	Personal Call Log Per User
Linux/Virtual[1]	60
IP500 V2	30

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

- For calls from/to the same number, the system only keeps the details of the last such call status plus a count of the number of such calls.

- If a user hot desks to/from a IP500 V2 Expansion, only the last 30 retained.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.

Related links

General Capacity Considerations on page 58

Call Recording

Each Primary and Secondary supports a voice call recording capability with the following capacities:

Mode	Platform	Recording Channels		
		Server[1]	Solution	Solution with ACCS
IP Office Server Edition	**Dell R240**	75	75	175
	HP DL360	150	150	350
	Dell R640	150	150	500
	Virtual[1]	150	150	500
IP Office Select **IP Office Subscription (Linux)**	**Dell R640**	250	500	500
	Virtual[1]	250	500	500
IP Office Preferred Edition		40	40	40

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
- **Virtual:** Maximum figures. Actually capacity depends on profiling as detailed in "Deploying IP Office Servers as Virtual Machines".
- Call recording uses a 3-party conference per recorded call. Note that without ACCS connected, the primary server does not have sufficient conference channels for the whole solution - other server's conference resources must be used.
- Conference recording adds a further conference channel to an existing conference.

- Each recording requires one licensed (and available) voicemail channel, a VCM (for the IP500 V2 Expansion) and IP Office Line (SCN trunk) channel as the recording destination is on the Primary or Secondary Server. See VCM Channel Capacity on page 53.
- The system supports differing capacity and performance levels when Avaya Contact Center Select (ACCS) is attached. See Avaya Contact Center Applications on page 12.
- The increased capacities for ACCS are only supported for call recording, and are active when the application is connected to the host IP Office.
- The solution internal call recording capacity is fixed at 333 hours total (555 hours for IP Office Select). This is separate from the voicemail mailbox recording capacity, see Voicemail or Auto-Attendant or IVR on page 31. It is also separate from Media Manager storage capacity, see Media Manager Recording Capacity on page 66.
- The Media Manager application supports recordings management at the maximum channel and call rate appropriate to the server platform.
- If the dual Voicemail Pro feature is active IP Office Select and IP Office Subscription only) the maximum solution capacity is doubled to maximum of 500 channels, the per-server capacity remains unchanged.
- One active recording channel consumes one voicemail/AA channel. If the call is being recorded in two places – for example at the user and the incoming trunk – two licensed and available voicemail channels are required.
- Maximum recording call rate is 7200/9000/10000 BHCC for a primary/secondary Linux-based server, 3,600 BHCC for an Expansion. See Call Traffic Profile on page 21.

  Recording call rate is further reduced for ACCS. See Avaya Contact Center Applications on page 12.

Which Servers Conference Resources are Used?

The location of conference resource used is determined by the point of recording:

- Incoming Call Route (ICR) recording is done at trunk's location
- User recording is done at user's location.
- Hunt group recording is done at the group's location.
- System recording is done at the system's location.
- Conference recording at conference location: Ad-hoc conference recording is done at the initial user's location. Meet-me conference recording can specify the location.
- Account code recording is done at the user's location.

Administration

To ensure Voicemail Pro channel capacity is available for recordings, the IP Office Server Edition Manager settings **Voicemail Channel Reservation** on the Primary and Secondary Server's **System** > **Voicemail** tab can be configured to reserve channels exclusively for specific uses.

- If recording channel resources run out:
  - If the recording is mandatory, busy is returned.

- If the recording is not mandatory, further attempts to record calls or conferences are not successful, but there may still be visual recording indications.

If exceeded:

If recording storage resources run out, further attempts to record calls or conferences will not be successful and receive announcements to that effect.

Related links

[Primary and Secondary Server Capacity](#) on page 14
[IP500 V2 Servers](#) on page 34
[General Capacity Considerations](#) on page 58

Media Manager Recording Capacity

Media Manager requires an additional drive which it use as the location of its primary call storage folder. Media Manager uses this location to store recordings after transferring them from the temporary storage folder used by Voicemail Pro.

Important:

- Avaya does not support Media Manager using the same drive that is hosting the Voicemail Pro service. Doing so will cause space conflicts with other IP Office applications and risks losing recordings during other IP Office maintenance activities.

You must either:

- Add an additional drive to the server hosting the Voicemail Pro service. Avaya recommends you add a pair of drives configured for RAID.
- Configure a cloud-based service as the primary call storage. Media Manager supports the following:
  - Google Bucket
  - Azure Blob
  - Amazon S3 Bucket
- **Warning:**
  - When using storage other than an additional hard-disk in the IP Office system, you must check the file aging policies of that other storage, as they may differ from the file aging policy applied by the Media Manager settings.

In operation, you can optimize the use of the primary call storage by having Media Manager also copy recordings to separate archive storage, which can be a DVD, NAS or cloud-based storage. After a time, the primary call storage will contain just the newest recordings whilst the archive contains old recordings.

Estimating the storage capacity required

The required capacity for the storage you use for Media Manager depends on factors that will vary between different customers. You need to estimate the typical number and length of calls recordings that the customer's business will generate.

You also need to include how long the customer wants to retain recordings, and how the customer wants to use recordings in the primary call storage and those in a separate archive (if installed).

For both types of storage, you can use the following figures:

- Media Manager recordings require 60KB a minute for non-authenticated files, 120KB a minute for authenticated files.
- For the primary call storage, the minimum size Avaya support is 30GB. However, Avaya recommends 300GB or larger.

Related links

General Capacity Considerations on page 58

Call Traffic Profile

General traffic engineering is outside the scope of this document, however you must consider the following factors:

Mode	Platform	Maximum Call Rate (BHCC)	
		Server	Solution
IP Office Server Edition	**Dell R240**	7200	7200
	HP DL360	18000/9000[3]	18000/9000[3]
	Dell R640	18000/9000[3]	18000/9000[3]
	Virtual[1]	18000/9000[3]	18000/9000[3]
IP Office Select **IP Office Subscription (Linux)**	**Dell R640**[2]	20000/10000[3]	20000/10000[3]
	Virtual[1, 2]	20000/10000[3]	20000/10000[3]
All	**Linux**	7200	-
	IP500 V2	3600	-

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".
2. These platforms (**Dell R640** or **Virtual**) only. Other servers only support the lower 18000/9000 call rate.
3. Lower call rate when any Avaya one-X® Portal user active.

- The quoted Busy Hour Call Completion (BHCC) rates assumes a normal call distribution.

- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.
- Total solution BHCC must not exceed 9000/10000 BHCC when Avaya one-X® Portal users are active
- Continuously running at the maximum supported solution call rate when Avaya one-X® Portal users are active should not exceed 24 hours.
- Avaya one-X® Portal users include: Web Client, Call Assistant, Outlook Integration, Lync Integration, one-X preferred Mobile Clients
- The maximum rate for call recording and Voicemail leave combined is 7200/9000/10000 BHCC.
- The Maximum Solution Call Rate can be further reduced by the presence of Call recording, CTI or Contact Center application such as ACCS. See Avaya Contact Center Applications on page 12.
- **IP Office Subscription (Linux):** Supports the same capacity as **IP Office Select** (see IP Office Select/IP Office Subscription on page 10).
- **IP500 V2:** Unless stated otherwise, IP500 V2 and IP500 V2A control units are equivalent.

The following occurs if these figures are exceeded:

If the call rate is exceeded, there may be disruption to call voice quality, recordings, or a general slowdown in other operation such as UC or management clients.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

CTI & TAPI

Each CTI or TAPI connection contributes to the overall loading of a system, whether directly or indirectly connected. Capacity is specified in three ways per system:

- Total number of CTI links (sessions)
- Number of CTI controlled users per session
- Total number of CTI controlled users

Mode	Platform	Maximum CTI sessions	Maximum CTI users per session	Total CTI controlled users	Maximum BHCC
IP Office Server Edition	**Dell R240**	5	750	3750	9000
	HP DL360	5	1500	7500	9000
	Dell R640	5	2000	10000	9000
	Virtual[1]	5	2000	15000	10000
IP Office Select	**Dell R640**	5	3000	15000	10000
IP Office Subscription (Linux)	**Virtual**[1]	5	3000	15000	10000
All	**IP500 V2**	3	384	1152	7200

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

- The quoted Busy Hour Call Completion (BHCC) rates assumes a normal call distribution.
- An active Avaya one-X® Portal or ACCS server counts as one CTI session for each and every server in the solution.
- An active Avaya one-X® Portal is one that has at least one portal client of any type or an open API session.
- An active 3rd Party TAPI session counts as one CTI session for that IP Office.
- All 1st party TAPI sessions together count as one CTI session for that IP Office.
- An active one-X Portal makes every user a CTI controlled user for each and every system.
- An active ACCS makes every Agent a CTI controlled user for that IP Office.
- An active portal open API session counts as one CTI session for each and every system.
- A single portal open API session supports the BHCC and CTI users per session quoted above.
- An Avaya Workplace Client counts as one SIP extension and one CTI load. It does not use Avaya one-X® Portal capacity.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.

Related links

General Capacity Considerations on page 58

DECT R4

The IP Office system can support DECT handsets through the attachment of a DECT R4 system. The following capacity considerations apply:

- The DECT handset capacity must be within the overall extension capacity of the IP Office system solution.
- Each DECT R4 system supports:
  - A maximum of 750 DECT extensions (384 on IP500 systems).
  - A maximum of 256 DECT base stations. 128 of those can be digital base stations connected through IP DECT Digital Gateways.
  - For digital base stations, up to 8 IP DECT Digital Gateways, each supporting up to 16 digital base stations.
  - Up to 2000 directory entries from the IP Office system.

Related links

General Capacity Considerations on page 58

Directory

The following directory capacities are supported:

Platform	System Directory			Personal Directory	
	LDAP	HTTP	Configuration	Per User	Per System
Linux/Virtual[1]	10,000	10,000	10,000	250	100,000
IP500 V2	10,000	10,000	2,500	250	10,800

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

- The system directory capacity is solution-wide and cannot exceed 10,000 entries total
- Any duplicate entries are discarded on import.
- Only the Primary can be administered with external directory entries as part of the configuration.
- The display of directory entries is limited on some phones:
  - 1100/1200 cannot support above 1000 directory entries.
  - DECT R4 cannot support above 2000 directory entries.
- If the number of supported entries is exceeded, the directory is truncated to the supported system limit.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.

Related links

General Capacity Considerations on page 58

Hunt and Presence Groups

Hunt Groups are sets of telephone users targeted by calls. Presence groups are sets of XMPP users for IM purposes. Both are viewed together for group capacity, of which there are both per-solution and per system limits:

Mode	Platform	Maximum Server Group size	Maximum Groups		Total Hunt Solution Group Members
			Server	Solution	
IP Office Essential Edition **IP Office Preferred Edition**	**IP500 V2**	384	200	300	3000
IP Office Server Edition	**Linux/Virtual**	750	300	300	3000
	IP500 V2	384	200	300	3000
IP Office Select	**Linux/Virtual**	1250	600	600	6000
IP Office Subscription (Linux)	**IP500 V2**	384	200	600	6000

- Maximum Solution Groups is the total number of hunt and presence groups over the whole solution.
- Maximum Server Group size is the maximum number of members in a single hunt/presence group.
- Total Solution Group Members is the total members over all hunt/presence groups.

The following occurs if these figures are exceeded:

- IP Office Manager does not permit the administration of more than 300 solution groups if the solution is not IP Office Select or IP Office Subscription.
- IP Office Manager does not permit the administration of more than 750 per group members if the solution is not IP Office Select or IP Office Subscription.
- If the number of groups or individual size is exceeded (particularly if the **Ring Mode** is **Collective** or **Collective Call Waiting**), there may be inaccurate hunt group call presentation, or a general slowdown in other operation such as UC or management clients.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34

General Capacity Considerations on page 58

Incoming Call Routes

The following maximums apply to the number of supported incoming call routes.

Mode	Platform	Maximum Server	Maximum Solution
IP Office Server Edition		2300	4600
IP Office Select **IP Office Subscription (Linux)**		3000	6000
Expansion	**Linux**	1000	As above
	IP500 V2	1000	-

Related links

General Capacity Considerations on page 58

IP Infrastructure, Bandwidth and VoIP QoS

It is not within the scope of this document to cover detailed aspects of Ethernet and IP infrastructure.

- IP500 V2 supports two 10/100 Mbit/s, Full/Half duplex 802.3 Ethernet interfaces with DSCP/ToS support.
- Avaya IP Office Linux servers supports two 10/100/1000 Mbit/s, Full/Half duplex 802.3 Ethernet interfaces with DSCP/ToS and static 802.1Q VLAN support.
- Subject to IP infrastructure: All supported IP Office traffic can be routed via a single LAN interface: All supported IP Office traffic can be routed between the LAN interfaces, however this may lead to inefficiencies and limit performance for the IP500 V2 platform.

For more information on LAN interface support, see the IP Office Server Edition LAN Support chapter of "Deploying IP Office Server Edition".

Note that secure VoIP (SRTP) can increase the required bandwidth by up to 8%, see the 'VoIP Security' chapter of Avaya IP Office™ Platform Security Guidelines.

In addition to the network requirements for VoIP calls, additional bandwidth should be reserved for the corresponding inter-node signaling and management paths. This should include any access via SSLVPN (IPOSS) or Remote Support Service (RSS). The following suggested minimum bandwidths should be made available for these additional paths:

Traffic	Suggested Minimum Bandwidth	Comments
Inter-node Signaling/ Status	256 kbit/s	Between Primary and each Expansion Between Primary and Secondary Between Secondary and each Expansion. Limited signaling/status directly between Expansions Bursty traffic, peaking after start-up or restoration of node to node connectivity.
one-X Portal CTI	96 kbit per call (or 192 kbit/s @ 7,200 BHCC)	Between one-X Portal server location and Expansion when one-X Portal server active.
Web Management	512 kbit/s	Between Web Manager PC and Primary (or Secondary under failover conditions) when a Web Management session is active
IP Office Server Edition Manager	512 kbit/s	Between SE Manager PC and each node when a IP Office Server EditionManager session is active
Upgrade	512 kbit/s	Between Primary and each node when upgrade is being performed
Backup/Restore	256 – 2048 kbit/s	Between Backup Server and each Expansion Between Backup Server and Primary Between Backup Server and Secondary An IP Office Linux platform can be designated as the backup server. Bandwidth is only required when a backup or restore operation is active, and only between participating nodes. The bandwidth required depends on the backup/ restore content.
Voicemail Pro client	512 kbit/s	Between Voicemail Pro PC and Primary (or Secondary under failover conditions) when a Voicemail Pro server management session is active
Voicemail Pro Server <> Voicemail Pro Server	1024 kbit/s	Bursty traffic, peaking after start-up or restoration of Server to Server connectivity
	32 kbit/s per active channel	Extra traffic between Secondary and Primary when Dual Voicemail Pro active
Voicemail Pro Server <> IP Office Media Manager	32 kbit/s per active channel	Bursty SFTP traffic, between Primary and external server running IP OfficeMedia Manager. Typically IP Office Media Manager runs coresident with Voicemail Pro. For dual active Voicemail Pro, the Secondary Voicemail Pro will send all recordings to the server running IP Office Media Manager.

Table continues…

Traffic	Suggested Minimum Bandwidth	Comments
WebRTC Client	6 – 256 kbit/s	Between each active Avaya Communicator for Web client and the WebRTC Gateway
one-X Server <> one-X Server	1–500 users: 512 kbit/s 500–1500 users: 1024 kbit/s 1500–3000 users: 2048 kbit/s	Bursty traffic, peaking after start-up or restoration of Server to Server connectivity
SoftConsole	64–1024 kbit/s	Bursty traffic, peaking after start-up. Higher figure for maximum 3000 user deployment. Between each SoftConsole application and the IP Office server.
SMDR	1 kbit per call report (or 7.2 kbit/s @ 7,200 BHCC)	Average SMDR message size for typical call pattern
RSS to co-located server	64 –1024 kbit/s per TCP Tunnel	Between remote client and col-located server when a remote management session is active

- These figures are for general guidance only as they do not reflect the specific requirements for a given installation. For example management operations are typically session based; backup/restore content and frequency are administerable; many are bursty in nature and may or may not coincide with others.
- Only the major signaling and management paths are included here, further network bandwidth may be required for SSA, SysMonitor, syslog, SNMP, etc.
- An IP Office port matrix document that covers all possible IP communications should also be consulted. It is available via the Avaya Support site (https://support.avaya.com).
- Server internal communications do not require bandwidth assessment

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

IP Office SoftConsole

IP Office SoftConsole is an operator/receptionist application that can be assigned to particular extension users.

Mode	Platform	Maximum SoftConsole Users		Monitor Max. Hunt Groups / Users
		Server	Solution	
IP Office Server Edition	**Linux/Virtual**[1]	10	32	20
	IP500 V2	4	32	10
IP Office Select	**Linux/Virtual**[1]	10	75	40
IP Office Subscription (Linux)	**IP500 V2**	4	75	10

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

- The number of supported IP Office SoftConsole users depends on licensing/subscriptions:
  - For IP Office Subscription mode systems, the maximums and the number of subscriptions control the number of users who can be configured as IP Office SoftConsole users.
  - For other modes, the maximums and the number of licenses control the number of simultaneous active IP Office SoftConsole users
- Monitor Max. Hunt Groups /Users - The maximum active IP Office SoftConsole applications that can be used to monitor the same hunt group or user.
- IP Office Manager does not permit more than 32 IP Office SoftConsole users if the solution is not IP Office Select or IP Office Subscription.

Related links

General Capacity Considerations on page 58

Multi-Site Network Link Capacities

A multi-site network link is the IP Office Line connection between each server (node). The links are arranged in a star topology with the Primary Server at the center, or double star when a Secondary is present.

Regardless of direct/indirect media, VCM or codec used, a further capacity consideration is the multi-site network links between all nodes. Each IP500 V2 or Linux link has a maximum capacity of 250 channels/calls (500 for IP Office Select Linux servers). The maximum total and outgoing channels are independently configurable in Manager via the **IP Office Line** > **VoIP Line** tab, and have a default of 128 for both.

This is per link, not a per system limit; for example a Primary or Secondary may have up to 250/500 concurrent calls to each Expansion system. Due to the star topology of IP Office Server Edition, calls between Expansion systems typically go via the Primary or Secondary and therefore these calls must also be taken into account when considering Multi-site network link capacity.

For IP Office Select/IP Office Subscription, it is possible to add IP Office lines between expansion Systems. There is a limit of one link between each pair of expansions. This link can be used

to increase capacity or resilience. Calls between Expansions will go direct rather than via the Primary/Secondary.

It is not possible to add additional multi-site network links between the Primary/Secondary and Expansions – if the capacity is exhausted an additional Secondary or Expansion system should be considered.

The following occurs if the maximum numbers are exceeded:

- If the configured values are exceeded, additional outgoing calls can be routed via ARS configuration providing an alternative route exists; additional incoming calls are automatically routed, again providing an alternative route exists.
- Alternative routes only exist when a Secondary Server is present.
- If no alternative route, incoming calls remain ringing until a channel is free, outgoing calls indicate busy.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Paging

The paging function is limited by the number of extensions present in the paging group, and the platform type.

Mode	Platform	Maximum Paging Group Size
IP Office Server Edition	**Dell R240**	128
	HP DL360	128
	Dell R640	512
	Virtual[1]	512
IP Office Select	**Dell R640**	512
IP Office Subscription (Linux)	**Virtual**[1]	512
All	**IP500 V2**	64

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

- Paging groups that include any user on a IP500 V2 control unit are limited to 64.
- Paging groups with SRTP endpoints reduces the maximum size pro-rata up to 50%.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.

Related links

General Capacity Considerations on page 58

Remote Support Services

Remote Support Services (RSS) is a TCP tunneling mechanism supported by IP Office Subscription, used for both internal IP Office and co-located server management interfaces.

The following RSS capacities are supported:

Platform	Total RSS bandwidth Mbit/s	Maximum TCP Tunnels	Notes
Dell R240	10	64	-
HP DL360	10	64	-
Dell R640	20	64	Assumes sufficient VM resources assigned.
Virtual[1]	20	64	-
IP500 V2	1	64	-

Notes

- No bandwidth limits are enforced
- RSS traffic flows between the Primary and Secondary or Expansion using the IP Office line
- The RSS bandwidth of the Primary also determines the total Server Edition deployment bandwidth

The following occurs if these figures are exceeded:

- If total bandwidth is exceeded, general IP Office processing capacity and performance will reduce. High overload conditions will cause the IP Office to perform poorly in general.

Related links

General Capacity Considerations on page 58

Resilience and Failover

Resilience is supported in Linux-based networks. However, the use of resilience requires consideration of various capacity issues:

- The total extensions/users on any single Primary, Secondary or Expansion must not be configured to exceed their supported limits under any circumstances.
- Primary failure when Secondary present will route all non-local Expansion calls, Voicemail leave and collect, IVR and Auto Attendants to the Secondary

- Primary failure when Secondary present will move Hunt group processing and management access to the Secondary. This will increase the management bandwidth from the Secondary to the Expansion systems.
- Users whose extension or application fails over retain their existing user profiles rights without needing or consuming an licenses on the fallback server.
- Any voicemail channel entitlements associated with the Primary, move to the Secondary on failover; no separate license provision on the fallback server is required – unless the dual active Voicemail Pro feature is enabled.

For further information, refer to the IP Office Resilience Overview manual.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

Unified Messaging Capacity

Voicemail Pro provides a number of integration options for Unified Messaging (UMS):

Mode	Platform	Native/ IMAP/ SMTP	Exchange Integration		Gmail Integration	
			EWS	MAPI	Copy/ Alert	Forward
IP Office Server Edition	**Dell R240**	750	750	490	750	250
	HP DL360	1500	1500	490	1500	250
	Dell R640	2000	2000	490	2000	250
	Virtual[1]	2000	2000	490	2000	250
IP Office Select **IP Office Subscription (Linux)**	**Dell R640**	3000	3000	490	3000	250
	Virtual[1]	3000	3000	490	3000	250
IP500 V2	**UCM V2**	384 (200)[2]	384 (200)[2]	384 (200)[2]	384 (200)[2]	384 (200)[2]

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".
2. Capacity when one-X Portal is running on the module.
3. **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.

4. **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.

- Use of these options requires the user or hunt group to be licensed, either using an appropriate IP Office user profile license or the legacy UMS Web Services license.
- Each voicemail server in a dual active Voicemail Pro deployment supports independent UMS integration capacity.
- When resilience active, UMS integrations are supported at the same per-server capacity.
- The MAPI exchange integration supports 245 users per MAPI proxy service running on the Exchange Server.
- A maximum of two MAPI proxy services can be running, giving a total of 490 mailboxes.
- Hunt Groups cannot support Gmail integration.
- The Gmail maximum message length is 14 minutes.

Related links

General Capacity Considerations on page 58

Voicemail or Auto-Attendant or IVR

Leaving a voicemail for a user or hunt group uses one licensed voicemail channel and consumes one from the indirect media call capacity of the Voicemail Pro server.

- If the endpoint is remote, an IP Office Line (SCN trunk) channel is used.
- If the source of the call is digital/analog, a VCM channel is also required.

A voicemail collect operation uses the same resources as voicemail leave. Invoking an Auto Attendant, Announcement or IVR script uses the same resources as voicemail, and is taken from the same pool of licenses and voicemail channel capacity; one active Auto Attendants/IVR/Announcement takes one channel and license.

The total solution voicemail channel capacity is determined by a number of factors:

- The number of per-server supported voicemail channels:

Server	Maximum Voicemail Channels
Dell R640/Virtual	250
HP DL360	150
Dell R240	75
IP500 V2	40

- If dual Voicemail Pro feature is active (IP Office Select and IP Office Subscription only) – this doubles the maximum capacity to 500 channels.
- The number of licensed voicemail channels: Each active master Voicemail Pro must have its own licenses. It inherits the other set when active as a backup.

- Call recording also uses licensed voicemail channels. One active recording channel consumes one voicemail/AA channel.

Dual Voicemail Server Operation

When the dual Voicemail Pro feature is active (IP Office Select and IP Office Subscription only) and not under failover conditions, users are provided voicemail services (voicemail, announcements, call recording, auto attendant, IVR, etc) services from one of the Voicemail Pro servers:

- All Primary users' voicemail invocations are directed to the Primary Voicemail Pro instance.
- All Secondary users' voicemail invocations are directed to the Secondary Voicemail Pro instance.
- All Expansion users' voicemail invocations are directed to the Voicemail Pro instance defined by the **System** > **Voicemail** > **Voicemail Destination** setting. This is initially selected by the Initial Configuration Utility (ICU).

Administration

To ensure Voicemail Pro channel capacity is available for voicemail, call flow and announcement operations, the IP Office Server Edition Manager settings Voicemail Channel Reservation on the Primary and **Secondary Server's System** > **Voicemail** tab can be configured to reserve channels exclusively for specific uses.

Mailbox capacity

The Voicemail Pro automatically creates a mailbox for each user and hunt group in the IP Office configuration. The individual capacity is fixed at 60 minutes per user or group mailbox.

If voicemail channel resources run out:

- Unanswered calls continue to alert rather than going to voicemail.
- Voicemail collect fails to connect to the voicemail.
- Calls to attendants and call-flows will continue to alert. However, text-to-speech (TTS) will not be output during call flows.
- Announcements are not played.
- Note that the TTS channel capacity is 250.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.

What happens if mailbox storage resources run out?

- Voicemail leave operations will receive an announcement that the user/group's mailbox is full.
- Voicemail collect will continue to function.

Related links

Primary and Secondary Server Capacity on page 14
IP500 V2 Servers on page 34
General Capacity Considerations on page 58

WebRTC Gateway

The following WebRTC client capacity is supported with two main options aligned to the Avaya one-X® Portal Server:

- WebRTC Gateway running on the Primary Server
- Standalone server with increased capacity (IP Office Application Server with just Avaya one-X® Portal)

Mode	Platform	Max. Sessions		Max. Clients		Max. Call Rate (BHCC)
		Primary	Stand Alone	Primary	Stand Alone	
IP Office Server Edition	**Dell R240**	64	128	375	7200	7200
	HP DL360	128	256	750	9000	9000
	Dell R640	512	1024	1024	9000	9000
	Virtual[1]	512	1024	1024	10000	10000
IP Office Select **IP Office Subscription (Linux)**	**Dell R640**	512	1024	1024	10000	10000
	Virtual[1]	512	1024	1024	10000	10000

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

- The quoted Busy Hour Call Completion (BHCC) rates assumes a normal call distribution.
- The WebRTC server application must run co-resident with the Avaya one-X® Portal server.
- The maximum WebRTC sessions figures are the maximum number of WebRTC Gateway client sessions.
- If video used, capacity is reduced by 2 for each session.
- Each WebRTC session results in a SIP session with indirect media between the WebRTC Gateway and the user's IP Office.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.

Related links

General Capacity Considerations on page 58

WebLM Server

The WebLM server application that is co-resident on the Primary and Application Server is primarily intended for use by IP Office components, but can be used for other Avaya license clients such as ACCS providing the following capacities are not exceeded:

Platform	Maximum License files	Maximum WebLM clients	Maximum client requests
Dell R240	150	300	6000
HP DL360	300	600	12500
Dell R640	300	600	12500
Virtual[1]	300	600	12500

1. Assumes virtual machine profiling as detailed in "Deploying IP Office Servers as Virtual Machines".

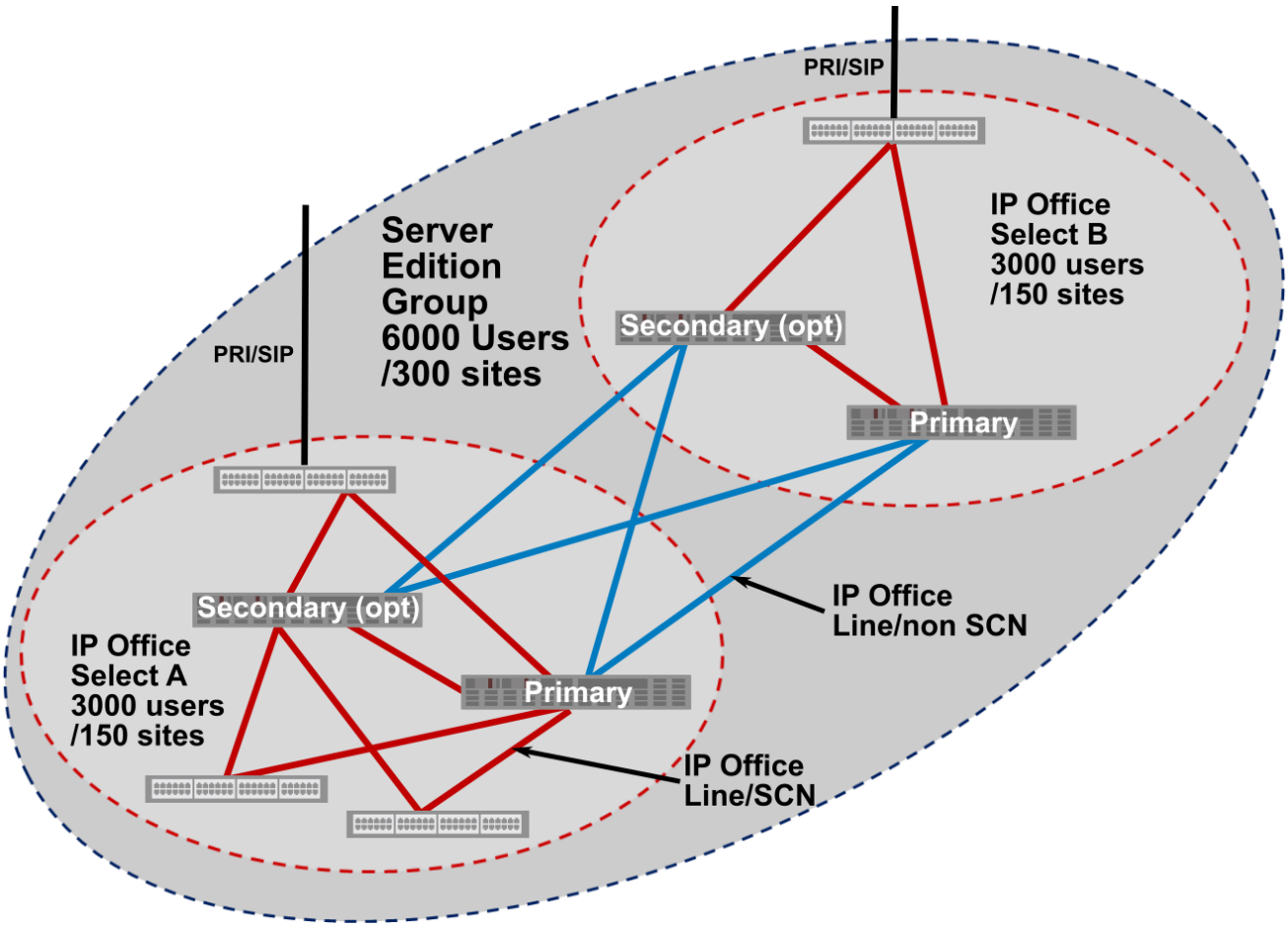
- One license type from one client constitutes one client request. For example: an expansion system requesting 6 different license types (for example SIP trunk channels, IP Endpoints, SoftConsole, and Power User) results in 4 client requests.
- **Dell R240:** Unless stated otherwise, Avaya-supplied Dell R230/R240 servers are equivalent.
- **Dell R640:** Unless stated otherwise, Avaya-supplied Dell R620/R630/R640 servers are equivalent.

Related links

General Capacity Considerations on page 58

Chapter 9: Capacity Planning Beyond 3000 Users

To provide a cost effective solution of more than 3000 users or 150 sites to larger customers, two IP Office Select systems may be linked together to support a total of 6000 users/extensions:



This construct may also be used when other per-solution capacities are exceeded, for example Avaya one-X® Portal users, hunt groups or Voicemail/recording channels.

You can create a group by linking two separate IP Office Select systems via IP Office lines to provide a single system view to users.

Each IP Office Server Edition system has its own Primary and Applications, and optional Secondary Server and Expansion Systems; each IP Office Server Edition system needs to be managed separately. The systems are set up through configuration to share a common dial plan and directory.

Feature	IP Office Select	Grouped SE	Comment
Maximum Users/ Extensions	3000	6000	3000 per system
Directory	Single Directory	Common directory with manual synchronization between the two systems	Can use auto synchronization for system directory
Directory Size	10000	10000	–
Dial Plan	Single dial plan	Single dial plan	For example, 21xxxx is on A and 22xxxx is on B
Trunk Sharing across nodes	Yes	Yes	Requires additional ARS and ICR setup
Dial by name	Yes	Yes	Requires common directory
Hold/Transfer	Yes	Yes	–
Internal dialing and calling user name	Yes	Yes	–
Direct Media	Yes	Yes	–
Busy and Presence Indicators	System Wide	Limited to local SE	–
Hot Desking	System Wide	Limited to local SE	Partial resolution with multiple accounts
Hunt Groups	Fully Networked	Partially Networked	Hunt groups are limited to one SE system but can be linked between systems
Music On Hold	4 per node, either local or from Primary	4 per node, either local or from local Primary	Cannot stream MOH from other Primary
SMDR	Single stream per node	Single stream per node	–
Voicemail	Single/Dual	Single/Dual VM per SE	–
Avaya one-X® Portal	Single	Single one-X server per SE	–
SCN telephony features	System Wide	Limited to local SE	–

Related links

Inter Server Edition Link on page 85
Directory on page 85
Dial plan on page 86
Outgoing Call routing on page 86
Hunt Groups on page 86
Administration on page 87

Versions or Upgrades on page 87

Inter Server Edition Link

The links between the two IP Office Server Edition systems are achieved using IP Office Lines with the following settings:

- Transport Type: WebSocket Client/Server
- Security: Medium or High
- Networking Level: None
- Allow Direct Media Path: Active
- Out Of Band DTMF: Active

One trunk should be added between each Primary and each Secondary. This allows calls from one system to appear as though internally dialled on the other. The WebSocket Server end for all lines should be the same IP Office Select system.

Related links

Capacity Planning Beyond 3000 Users on page 83

Directory

To enable users of one system to be visible in the directory of the other, each Primary's directory configuration requires a copy of the other's:

- Export each node's users as CSV using IP Office Server Edition Manager.
- Extract Full Name and Extension fields from each file into a single CSV directory file. See 'Importing and Exporting Settings' in the "*Deploying Avaya IP Office Platform IP500 V2*" manual for more information on the file formats.
- Hunt groups or common system directory entries can also be added to the directory file at this time if required.
- Import the resultant CSV directory file into the other Primary (only) using IP Office Server Edition Manager.
- Ensure the total central directory on each SE does not exceed 10,000 entries. See Directory on page 70.

The centralised system directory mechanism will distribute to all other nodes.

If an external LDAP directory is also used, one Primary can be configured with the LDAP source, and the other using the first as the HTTP source.

For more information on directory options and capacities see 'Directory & Call Log' and 'Centralized System Directory' in "*Administering Avaya IP Office Platform with Manager*".

Related links

Capacity Planning Beyond 3000 Users on page 83

Dial plan

Each user and hunt group of the cluster must have a unique name and number.

Branch prefix should not be used as this will conflict with the internal routing.

Related links

Capacity Planning Beyond 3000 Users on page 83

Outgoing Call routing

The default outgoing call routing provides a fall-back ARS on every Expansion to Primary then Secondary. When creating a cluster it is recommended that a further fall-back ARS is added between each Primary and each Secondary.

PSTN/SIP trunks on one system can be accessed from the other using ARS and/or dial short codes, along with additional Incoming Call Routes.

Related links

Capacity Planning Beyond 3000 Users on page 83

Hunt Groups

Each IP Office Server Edition System has separate hunt groups. It is not possible to configure hunt groups with members of both systems. It is possible to support limited overflow between systems by the use of an overflow group with local users that have hunt group call forwarding enabled to a remote user. This is only supported on rotary and sequential ring types and must not be used to link hunt groups.

Related links

Capacity Planning Beyond 3000 Users on page 83

Administration

Each IP Office Server Edition System is managed as a separate entity although both solutions can be managed from the same workstation if required.

Related links

Capacity Planning Beyond 3000 Users on page 83

Versions or Upgrades

Both IP Office Select systems should be the same software version. Each should be upgraded separately from their respective Primary Server.

Related links

Capacity Planning Beyond 3000 Users on page 83

Chapter 10: Additional Help and Documentation

The following pages provide sources for additional help.

Related links

Additional Manuals and User Guides on page 88
Getting Help on page 88
Finding an Avaya Business Partner on page 89
Additional IP Office resources on page 89
Training on page 90

Additional Manuals and User Guides

The Avaya Documentation Center website contains user guides and manuals for Avaya products including IP Office.

- For a listing of the current IP Office manuals and user guides, look at the Avaya IP Office™ Platform Manuals and User Guides document.
- The Avaya IP Office Knowledgebase and Avaya Support websites also provide access to the IP Office technical manuals and users guides.
  - Note that where possible these sites redirect users to the version of the document hosted by the Avaya Documentation Center.

For other types of documents and other resources, visit the various Avaya websites (see Additional IP Office resources on page 89).

Related links

Additional Help and Documentation on page 88

Getting Help

Avaya sells IP Office through accredited business partners. Those business partners provide direct support to their customers and can escalate issues to Avaya when necessary.

If your IP Office system currently does not have an Avaya business partner providing support and maintenance for it, you can use the Avaya Partner Locator tool to find a business partner. See Finding an Avaya Business Partner on page 89.

Related links

Additional Help and Documentation on page 88

Finding an Avaya Business Partner

If your IP Office system currently does not have an Avaya business partner providing support and maintenance for it, you can use the Avaya Partner Locator tool to find a business partner.

Procedure

1. Using a browser, go to the Avaya Website at https://www.avaya.com
2. Select **Partners** and then **Find a Partner**.
3. Enter your location information.
4. For IP Office business partners, using the **Filter**, select **Small/Medium Business**.

Related links

Additional Help and Documentation on page 88

Additional IP Office resources

In addition to the documentation website (see Additional Manuals and User Guides on page 88), there are a range of website that provide information about Avaya products and services including IP Office.

- Avaya Website (https://www.avaya.com)

  This is the official Avaya website. The front page also provides access to individual Avaya websites for different regions and countries.
- **Avaya Sales & Partner Portal** *(*https://sales.avaya.com*)*

  This is the official website for all Avaya business partners. The site requires registration for a username and password. Once accessed, you can customize the portal to show specific products and information type that you want to see.
- **Avaya Support** *(*https://support.avaya.com*)*

  This site provide access to Avaya product software, documentation and other services for Avaya product installers and maintainers.

  - **Avaya Support Forums** *(*https://support.avaya.com/forums/index.php*)*

    This site provides forums for discussing product issues.

- **International Avaya User Group** *(*https://www.iuag.org*)*

  This is the organization for Avaya customers. It provides discussion groups and forums.

- **Avaya Learning** *(*https://www.avaya-learning.com/*)*

  This site provides access to training courses and accreditation programs for Avaya products.

Related links

Additional Help and Documentation on page 88

Training

Avaya training and credentials ensure our Business Partners have the capabilities and skills to successfully sell, implement, and support Avaya solutions and exceed customer expectations. The following credentials are available:

- Avaya Certified Sales Specialist (APSS)
- Avaya Implementation Professional Specialist (AIPS)
- Avaya Certified Support Specialist (ACSS)

Credential maps are available on the Avaya Learning website.

Related links

Additional Help and Documentation on page 88

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