

AVAYA MESSAGING™

Technical Operating Guidelines

Release11.0 SP4
Issue162
October 2026

© 2019-2026, Avaya LLC
All Rights Reserved.

Notice

While reasonable efforts have been made to ensure that the information in this document is complete and accurate at the time of printing, Avaya assumes no liability for any errors. Avaya reserves the right to make changes and corrections to the information in this document without the obligation to notify any person or organization of such changes.

Documentation disclaimer

"Documentation" means information published in varying media which may include product information, subscription or service descriptions, operating instructions and performance specifications that are generally made available to users of products. Documentation does not include marketing materials. Avaya shall not be responsible for any modifications, additions, or deletions to the original published version of Documentation unless such modifications, additions, or deletions were performed by or on the express behalf of Avaya. End user agrees to indemnify and hold harmless Avaya, Avaya's agents, servants and employees against all claims, lawsuits, demands and judgments arising out of, or in connection with, subsequent modifications, additions or deletions to this documentation, to the extent made by End user.

Link disclaimer

Avaya is not responsible for the contents or reliability of any linked websites referenced within this site or Documentation provided by Avaya. Avaya is not responsible for the accuracy of any information, statement or content provided on these sites and does not necessarily endorse the products, services, or information described or offered within them. Avaya does not guarantee that these links will work all the time and has no control over the availability of the linked pages.

Warranty

Avaya provides a limited warranty on Avaya hardware and software. Please refer to your agreement with Avaya to establish the terms of the limited warranty. In addition, Avaya's standard warranty language as well as information regarding support for this product while under warranty is available to Avaya customers and other parties through the Avaya Support website: https://support.avaya.com/helpcenter/getGenericDetails?detailId=C20091120112456651010 under the link "Warranty & Product Lifecycle" or such successor site as designated by Avaya. Please note that if the product(s) was purchased from an authorized Avaya channel partner outside of the United States and Canada, the warranty is provided by said Avaya Channel Partner and not by Avaya.

"**Hosted Service**" means an Avaya hosted service subscription that You acquire from either Avaya or an authorized Avaya Channel Partner (as applicable) and which is described further in Hosted SAS or other service description documentation regarding the applicable hosted service. If You purchase a Hosted Service subscription, the foregoing limited warranty may not apply but You may be entitled to support services in connection with the Hosted Service as described further in your service description documents for the applicable Hosted Service. Contact Avaya or Avaya Channel Partner (as applicable) for more information.

Hosted Service

THE FOLLOWING APPLIES ONLY IF YOU PURCHASE AN AVAYA HOSTED SERVICE SUBSCRIPTION FROM AVAYA OR AN AVAYA CHANNEL PARTNER (AS APPLICABLE), THE TERMS OF USE FOR HOSTED SERVICES ARE AVAILABLE ON THE AVAYA WEBSITE, HTTPS://SUPPORT.AVAYA.COM/LICENSEINFO UNDER THE LINK "Avaya Terms of Use for Hosted Services" OR SUCH SUCCESSOR SITE AS DESIGNATED BY AVAYA, AND ARE APPLICABLE TO ANYONE WHO ACCESSES OR USES THE HOSTED SERVICE. BY ACCESSING OR USING THE HOSTED SERVICE, OR AUTHORIZING OTHERS TO DO SO, YOU, ON BEHALF OF YOURSELF AND THE ENTITY FOR WHOM YOU ARE DOING SO (HEREINAFTER REFERRED TO INTERCHANGEABLY AS "YOU" AND "END USER"), AGREE TO THE TERMS OF USE. IF YOU ARE ACCEPTING THE TERMS OF USE ON BEHALF A COMPANY OR OTHER LEGAL ENTITY, YOU REPRESENT THAT YOU HAVE THE AUTHORITY TO BIND SUCH ENTITY TO THESE TERMS OF USE. IF YOU DO NOT HAVE SUCH AUTHORITY, OR IF YOU DO NOT WISH TO ACCEPT THESE TERMS OF USE, YOU MUST NOT ACCESS OR USE THE HOSTED SERVICE OR AUTHORIZE ANYONE TO ACCESS OR USE THE HOSTED SERVICE.

Licenses

The Global Software License Terms ("Software License Terms") are available on the following website https://www.avaya.com/en/legal-license-terms/ or any successor site as designated by Avaya. These Software License Terms are applicable to anyone who installs, downloads, and/or uses Software and/or Documentation. By installing, downloading or using the Software, or authorizing others to do so, the end user agrees that the Software License Terms create a binding contract between them and Avaya. In case the end user is accepting these Software License Terms on behalf of a company or other legal entity, the end user represents that it has the authority to bind such entity to these Software License Terms.

Copyright

Except where expressly stated otherwise, no use should be made of materials on this site, the Documentation, Software, Hosted Service, or hardware provided by Avaya. All content on this site, the documentation, Hosted Service, and the product provided by Avaya including the selection, arrangement and design of the content is owned either by Avaya or its licensors and is protected by copyright and other intellectual property laws including the sui generis rights relating to the protection of databases. You may not modify, copy, reproduce, republish, upload, post, transmit or distribute in any way any content, in whole or in part, including any code and software unless expressly authorized by Avaya. Unauthorized reproduction, transmission, dissemination, storage, or use without the express written consent of Avaya can be a criminal, as well as a civil offense under the applicable law.

Virtualization

The following applies if the product is deployed on a virtual machine. Each product has its own ordering code and license types. Unless otherwise stated, each Instance of a product must be separately licensed and ordered. For example, if the end user customer or Avaya Channel Partner would like to install two Instances of the same type of products, then two products of that type must be ordered.

Third Party Components

The following applies only if the H.264 (AVC) codec is distributed with the product. THIS PRODUCT IS LICENSED UNDER THE AVC PATENT PORTFOLIO LICENSE FOR THE PERSONAL USE OF A CONSUMER OR OTHER USES IN WHICH IT DOES NOT RECEIVE REMUNERATION TO (i) ENCODE VIDEO IN COMPLIANCE WITH THE AVC STANDARD ("AVC VIDEO") AND/OR (ii) DECODE AVC VIDEO THAT WAS ENCODED BY A CONSUMER ENGAGED IN A PERSONAL ACTIVITY AND/OR WAS OBTAINED FROM A VIDEO PROVIDER LICENSED TO PROVIDE AVC VIDEO. NO LICENSE IS GRANTED OR SHALL BE IMPLIED FOR ANY OTHER USE. ADDITIONAL INFORMATION MAY BE OBTAINED FROM MPEG LA, L.L.C. SEE HTTP://WWW.MPEGLA.COM.

Service Provider

WITH RESPECT TO CODECS, IF THE AVAYA CHANNEL PARTNER IS HOSTING ANY PRODUCTS THAT USE OR EMBED THE H.264 CODEC OR H.265 CODEC, THE AVAYA CHANNEL PARTNER ACKNOWLEDGES AND AGREES THE AVAYA CHANNEL PARTNER IS RESPONSIBLE FOR ANY AND ALL RELATED FEES AND/OR ROYALTIES. THE H.264 (AVC) CODEC IS LICENSED UNDER THE AVC PATENT PORTFOLIO LICENSE FOR THE PERSONAL USE OF A CONSUMER OR OTHER USES IN WHICH IT DOES NOT RECEIVE REMUNERATION TO: (i) ENCODE VIDEO IN COMPLIANCE WITH THE AVC STANDARD ("AVC VIDEO") AND/OR (ii) DECODE AVC VIDEO THAT WAS ENCODED BY A CONSUMER ENGAGED IN A PERSONAL ACTIVITY AND/OR WAS OBTAINED FROM A VIDEO PROVIDER LICENSED TO PROVIDE AVC VIDEO. NO LICENSE IS GRANTED OR SHALL BE IMPLIED FOR ANY OTHER USE. ADDITIONAL INFORMATION FOR H.264 (AVC) AND H.265 (HEVC) CODECS MAY BE OBTAINED FROM MPEG LA, L.L.C. SEE HTTP://WWW.MPEGLA.COM.

Compliance with Laws

You acknowledge and agree that it is Your responsibility to comply with any applicable laws and regulations, including, but not limited to laws and regulations related to call recording, data privacy, intellectual property, trade secret, fraud, and music performance rights, in the country or territory where the Avaya product is used.

Preventing Toll Fraud

"Toll Fraud" is the unauthorized use of your telecommunications system by an unauthorized party (for example, a person who is not a corporate employee, agent, subcontractor, or is not working on your company's behalf). Be aware that there can be a risk of Toll Fraud associated with your system and that, if Toll Fraud occurs, it can result in substantial additional charges for your telecommunications services.

Avaya Toll Fraud intervention

If You suspect that You are being victimized by Toll Fraud and You need technical assistance or support, please contact your Avaya Sales Representative.

Security Vulnerabilities

Information about Avaya's security support policies can be found in the Security Policies and Support section of https:// support.avaya.com/security.

Suspected Avaya product security vulnerabilities are handled per the Avaya Product Security Support Flow (https:// support.avaya.com/css/P8/documents/100161515).

Trademarks

The trademarks, logos and service marks ("Marks") displayed in this site, the Documentation, Hosted Service(s), and product(s) provided by Avaya are the registered or unregistered Marks of Avaya, its affiliates, its licensors, its suppliers, or other third parties. Users
are not permitted to use such Marks without prior written consent from Avaya or such third party which may own the Mark. Nothing contained in this site, the Documentation, Hosted Service(s) and product(s) should be construed as granting, by implication, estoppel, or otherwise, any license or right in and to the Marks without the express written permission of Avaya or the applicable third party.

Avaya is a registered trademark of Avaya LLC.

All non-Avaya trademarks are the property of their respective owners.

Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.

Downloading Documentation

For the most current versions of Documentation, see the Avaya Support website: https://support.avaya.com, or such successor site as designated by Avaya.

Contact Avaya Support

See the Avaya Support website: https://support.avaya.com for Product or Cloud Service notices and articles, or to report a problem with your Avaya Product or Cloud Service. For a list of support telephone numbers and contact addresses, go to the Avaya Support website: https://support.avaya.com (or such successor site as designated by Avaya), scroll to the bottom of the page, and select Contact Avaya Support.

Contents

AVAYA MESSAGING TECHNICAL OPERATING GUIDELINES 5
Change history 6
Chapter 1: WHAT'S NEW 7
New Features 7
Chapter 2: EXISTING & UPGRADED FEATURES 8
Miscellaneous Changes 8
Chapter 3: CLIENT TYPE CHARACTERISTICS AND DEPLOYMENT SCENARIOS 9
Desktop Capabilities – Types 9
Avaya Messaging Versions 9
Avaya Messaging Advanced 9
Avaya Messaging Basic 9
Program Options 9
Feature Comparison 10
Product Support Requirements 12
Minimum Client Hardware Specifications 12
Chapter 4: SYSTEM REQUIREMENTS AND CAPACITY 13
General Requirements 13
Maximum System Capacity 13
Bandwidth Requirements 13
Maximum Processing Capacity 13
Storage Capacity 13
Requirements for High Availability Installations 14
Language Support 14
Pre-Installation Considerations 14
Before installing Avaya Messaging, you must have: 14
Some additional items to consider before installing the voice server: 14
Estimating the Maximum Numbers of Users (Voice Users) 15
Legacy Licensing 15
High Availability Licensing 16
Demo Mode 16
WebLM Licensing (Avaya) 16
Soft License 16
Host ID and License File 17
Normal Operation 17
License Upgrades 17
License Expiration 18
High Availability Licensing 18
Demo Mode 18

License Expiration Milestones 18
Network Requirements and Specifications 18
TCP/IP ports used by the application 20
Software Requirements 21
ANTIVIRUS Software Installation 21
CSE Gateway Requirements 24
Basic – Messaging 25
Advanced (Messaging and collaboration) 25
Chapter 5: PBX SPECIFICATIONS 27
Introduction 27
Multiple PBX/Node Support 27
SIP 27
Tested and Verified PBX 27
SIP Direct 27
SIP Gateway 27
CTI 28
Tested & Verified PBX 28
Inband 28
T1 28
Dialogic Media Gateway 29
Chapter 6: HIGH AVAILABILITY ENVIRONMENT 32
High Availability Description 32
Vulnerability of the Single Server System 32
Reliability of the Multi-Server System 32
Multiple Server Multiple PBX System 33
Database Management 33
Failure Scenario 34
Recovery Scenario 35
License Management 35
License Management During Primary Server Down Time 36
High Availability Redundancy & Scalability 36
Server Specification 36
High Availability Configuration Flow 37
Logs and Reports 39
Geo Redundancy 40
Chapter 7: VMWARE SUPPORT 41
Introduction 41
Prerequisites 41
Virtual Environment Limitations 41

Virtual Machine Environment Hardware Requirements 42
VMware Technology Guidelines 42
VM Environment Feature Comparison Chart 43
VMware: HA for the Consolidated Server 43
VMware: HA for the Primary Voice Server 45
Additional Considerations for AACCUsers 47
Conclusion 49
Chapter 8: SERVER MESSAGING TYPE CHARACTERISTICS AND DEPLOYMENT SCENARIOS 50
E-mail Server Synchronization (CSE) 50
Unified Messaging Deployment Email Requirements 50
Unified Messaging Capacity 51
MS Exchange Performance Considerations 51
Deployment: Basic Unified Messaging 52
Deployment 1 - Basic UM via SMTP Forwarding 52
SMTP forwarding may be deployed in the following email environments: 52
Chapter 9: FREQUENTLY ASKED QUESTIONS 55
Top Viewed Solutions 55
Best practices for installing Windows Updates 55
Transfer not working on SIP systems. 55
SMTP Forwarding not working. 55
How to setup up remote admin. 55
Call voicemail and the system asks for MBX number not password. 55
Top Rated Solutions 56

AVAYA MESSAGING TECHNICAL OPERATING GUIDELINES

This document covers the guidelines to be followed when deploying Avaya Messaging. Since deployment environments and technology related to Avaya Messaging are always changing, this document will also be updated periodically to reflect the latest trends and guidelines set for the industry. Please ensure that you have the latest version of Technical Operating Guidelines before proceeding with your research and deployment.

Change history

The following table outlines the key changes in this document for Release 11.x.

Date	Summary of Change
1 April 2021	Initial document release.
6 July, 2021	New installation specifications requiring a RAID 10 hard drive array.
16 July, 2021	Updated the Message Compression and Storage speed details.
28 July, 2021	Removed support for vMotion. Added VMware features supported table.
30 July,2021	Emphasized restrictions on migrating to a virtual machine and moving from a VM environment.
24 September, 2021	Added Nuance Watcher Daemon to the TCP/IP port usage table.
01 October,2021	Removed leftover references to Windows Server 2012.
18 October,2021	Removed table of virtual hardware requirements that applied only to Avaya Aura Messaging.
20 October, 2021	Removed references to IMAP and POP3 as these are no longer supported.
23 December, 2021	Removed TCP/IP port requirement for SMTP VPIM.
3 February, 2022	Removed non-Avaya brands from list of supported platforms.
8 February,2022	Added note regarding the use of RAID 6 only with ASP 130 servers.
21 March,2022	Modified Product Support Requirements page regarding AV utilities.
9 June, 2022	Added port 3389 to the port matrix: SAL Gateway Remote Access.
12 August,2022	New General Requirement to limit number of OU users to 1000 when using WebAdmin.
10 October, 2025	Updated the guide by removing the iLink Pro Desktop and updated the VMware versions.
30 October, 2026	Updated the guide for Release 11.0 SP4.

Chapter 1: WHAT'S NEW

New Features

Several new features are added to Avaya Messaging in 11.0.

- Rebranded to Avaya Messaging.
- Microsoft Azure integration is now supported.
- Avaya Messaging is now using Nuance Recognizer 10 as the ASR Engine.
- Native support for a Secondary Consolidated Server as a replacement for Carbonite Availability third party software. Failover and Failback protection is now provided within Avaya Messaging directly.

Chapter 2: EXISTING & UPGRADED FEATURES

Miscellaneous Changes

- An Advanced License is no longer required for Notification, Transcription, Mailboxes in Voice Menus and Web Messaging features.
- **Alternate ID by department**: If this feature is enabled, under Company > Advanced, one user can have the same Alternate ID in multiple Organizational Units.
- When an incoming caller searches for the Alternate ID number, they will be prompted to select which version of the contact they want to be connected to.

  For example: John Smith has a mailbox in 2 OU's: Toronto and London.
- Each has its own extension, but shares the same Alternate ID. A caller who searches for the Alternate ID will be prompted whether they want John Smith from Toronto or London.
- Accessibility Improvements were made for Web Access.
- The maximum number of UM users has increased from 20 000 to 40 000.
- A new option has been added to the Web Reports for Recorded Greetings.
- Users can set an expiration date and time for Extended Absence Greetings via the TUI.

Chapter 3: CLIENT TYPE CHARACTERISTICS AND DEPLOYMENT SCENARIOS

Desktop Capabilities – Types

Avaya Messaging can be purchased in several varieties. Options and Add-Ons can be included to extend its capabilities.

Licensing Levels

- Basic
- Advanced

Avaya Messaging Versions

All Avaya Messaging versions (Advanced and Basic) are available per user on an annual subscription or a perpetual basis. Annual subscription licensing includes software assurance for the duration of the license. Per user perpetual licensing includes 1 year of software assurance.

Annual software assurance renewal is required for license updates and support entitlement.

Note: A minimum of 50 users, in any combination, must be purchased with the initial license.

Caution: One site cannot combine both an Avaya Messaging Subscription license and an Avaya Messaging Perpetual license.

Avaya Messaging Advanced

Avaya Messaging Advanced is a comprehensive unified communications and collaboration platform. Avaya Messaging offers next generation cloud-enabled communication features that improve collaboration and boost productivity, including Unified Messaging with voicemail, Real-time communication applications like voice and instant messaging and voice conferencing.

Avaya Messaging Basic

Advanced Basic provides Voicemail integration.

Program Options

Options can be applied to any version of Avaya Messaging and must be purchased annually for each user.
Transcription

Voicemail is transcribed into text and delivered to the client's email inbox.

ASR (Automatic Speech Recognition) & Text-to-Speech

Provides voice access and navigation of email, contacts and the calendar. Initiate calls, hear and respond to email and send messages using voice commands instead of the keyboard. Call in and have the system read your emails to you.

Fax Option

eFax services require UM or Collaboration for Google Apps licenses (included with Collaboration Pro).

Add-Ons

Add-Ons are onetime costs and are not subject to annual subscription fees or renewal costs.

- Per Port License for G.729 (quantity must be equal to voice ports and SIP must be enabled).
- CSR140 Fax board support.
- JITC (Joint Interoperability Test Command) compliance for high security environments.
- Integration with Avaya Symposium.

Feature Comparison

The following table demonstrates the different types of licenses and the features available to each:

Feature and User Type	ADVANCED	BASIC
Web config. Access (Mailbox Administration)	Yes	Yes
Mobility	Yes	
All clients -Phone Email, PC mobile and Web		
Access to Contacts	Yes	
Web Client specific		
Access to Availability Filters	Yes	
Access to Find Me	Yes	
Access to Assign Calls	Yes	
Access to Locations Calendars	Yes	Yes
Phone Specific		
Enhanced call control	Yes	
Find Me (Sequential)	Yes	
Find Me (Broadcast)	Yes	
Follow Me (one number per location)	Yes	Yes
Speech commands	Optional	
Speech Access to public contacts	Optional	Optional
Speech Access to private contacts	Optional	Optional
SMS	Yes	
Remote Notification	Yes	
Message Forwarding	Yes	Yes
Distribution Lists	Yes	Yes
Screen POPS	Yes	
PIM integration	Yes	
Instant messaging	Yes	
Presence management	Yes	
Access to visual directory and buddy list	Yes	
Desktop Dialing with IP dialer	Yes	
Call Log Window	Yes	
Desktop SMS (ability to send to SMS)	Yes	
Synchronized Contacts	Yes	
Synchronized Calendar	Yes	
Inbox Access		
Web client		
Administration	Yes	Yes
Access to Inbox	Yes	Yes
Access to internal Messages	Yes	Yes
Access to email messages	Yes	Yes
Access to voice and Fax messages	Yes	Yes
Phone Access		
Access to VM from Phone	Yes	Yes
Access to fax messages from phone	Yes	Yes
Access to email messages from phone	Yes	

Feature and User Type	ADVANCED	BASIC
Synchronization mode		
Groupware Forms	Yes	
Sync voice messages to users' email inbox	Yes	
Contacts	Yes	
Outbound Desktop Faxing Capabilities (ODFC)	Yes	
Use eMail to send Fax	Yes	
Other Features		
Transcription[1]	Yes	Yes
Send URL (WebLink)	Yes	
Collaboration		
Presence	Yes	
Instant messaging	Yes	
Click-to-call	Yes	
Voice communication	Yes	
Geo-location sharing	Yes	
Screen pops and call logging	Yes	
Call control	Yes	
Unified Messaging with Voicemail		
Voicemail	Yes	
Auto-attendant	Yes	Yes
IVR Trees	Yes	
Unified Messaging	Yes	
Message Synchronization (MWI)	Yes	
Call History	Yes	
Voicemail to contact resolution	Yes	
Integration with contacts for dialing and replies	Yes	
Fax		
Fax message access from the inbox	Yes	Yes
Fax messaging (Inbound)	Yes	Yes
Fax on demand	Yes	
Application Integration		
Google Apps	Yes	
Salesforce CRM	Yes	
Salesforce CRM	Yes	
Office 365	Yes	
Avaya Aura Contact Center integration (Meridian IVR and ACCESS caller applications) with M1/CS1000	Yes	
Clients		
Desktop UM client for Outlook, Groupwise	Outlook only	
Web Access - message, manage greetings, user settings	Yes	
Add-on Applications		
eFax	Optional	
IVR connector	Optional	

Feature and User Type	ADVANCED	BASIC
Speech-to-text transcription	Optional	
Text-to-speech	Optional	
Automatic speech recognition	Optional	

[1] Transcription requires separate licenses be activated, which is distinct from the user type requirements.

Product Support Requirements

Product Support recommends the following to ensure successful and responsive assistance with regard to any field issues.

All systems must be configured for Remotely Accessed support. The Avaya Messaging Server is accessible via an Internet connection.

This will enable Avaya's Product Support team to initiate a WebEx session with the administrator of the Avaya Messaging Voice Server. This is a low-impact and very powerful tool for remote troubleshooting. Prior to loading third-party applications on the system, open an Service Request on the Avaya support page with the appropriate sold to account number. A member of the GSS team will reach out to help identify any potential conflicts.

Examples of third- party applications include antivirus and backup software applications.

Note: To avoid unnecessary technical support charges, refer first to the product documentation. The Avaya Messaging documentation suite can be found through the documentation website at https://support.avaya.com/support/en/public.

Note: To access technical support, you must be a certified technician with a valid PIN number, and the site must have an active warranty maintenance contract.

Note: It is not possible to validate every Anti-virus program. If the proper exclusions are granted for the appropriate user, then there usually are no issues. However, every site is unique, and we cannot guarantee untested AV utilities will not affect Avaya Messaging.

Minimum Client Hardware Specifications

A client workstation should at least meet the following minimum hardware specifications:

- Multimedia PC (sound card + speakers for multimedia playback)

Note: These specifications should be adjusted accordingly depending on other applications that may be running alongside end user Avaya Messaging applications.

Note: For all Windows 2016, 2019 and 2022 installations, disable the User Access Control (UAC) feature of Windows to ensure proper operation of the software. Refer to the *Server Installation Guide* for more details.

Chapter 4: SYSTEM REQUIREMENTS AND CAPACITY

General Requirements

Maximum System Capacity

Feature	Capacity
Company Directory	80,000 entries [1] [3]
Voice Mailboxes	80,000 High Availability Server [1] [2] [3] 4,800 Single server
Messaging Users	40,000 High Availability [2] 1,000 single servers
Voice channels	120 ports -SIP integration, per voice server 2400 ports - High Availability Environment
Text to speech ports	64 ports per server
Automatic Speech Recognition	64 ports per server
Extension Dialing	Unlimited
Number of Tenants	999

1 See the table below for details on calculating this value.
2 The distributed server model moves IMAP CSE functions to a separate server from the primary voice server.
3 This is 8000 users in total, with upto 40,000 of those being Advanced users.

Note: Additional licensing may be required to access all program features.
Note: Avaya Messaging is a dedicated application which should only be installed as a primary application on any server. Sharing system resources with other applications may reduce performance**.**

Hint: For optimal UC Mobile performance, it is recommended that the maximum number of users within a single Organizational Unit (OU) be kept below 500.

Hint: For optimal WebAdmin performance, it is recommended that the maximum number of users within a single Organizational Unit (OU) be kept below 1000.

Bandwidth Requirements

The network bandwidth required to properly support Avaya Messaging is dependent upon the number of channels installed onto the system. As a guide, every channel needs 15 kbps bandwidth for inbound, and another 15 kbps for outbound traffic.

#channels	Recommended Total Bandwidth
10	300 kbps
20	600 kbps
50	1,500 kbps
100	3 Mbps
2,000	60 Mbps

Maximum Processing Capacity

Avaya Messaging can successfully process up to 4000 messages per minute (combined email and voice) without loss of data, regardless of the number of users. This includes messages left on and retrieved from the system. Traffic loads in excess of this value may result in some loss of information or a decrease in performance.

Storage Capacity

The maximum storage capacity for the system is not a function of the software, but a limitation on the hard drive space available. Be sure to allot sufficient space to handle the expected voice and email traffic for all users, as well as the

average time each message is kept on the system before being deleted.

Hard Drives

Avaya Messaging must be installed onto servers with a system with a RAID 10 array. Database performance is tied to hard disk performance. RAID 10 provides the same or faster read/write speeds when compared to a single hard disk. RAID 6 is supported only when using an ASP 130 system (see the Avaya Solutions Platform documentation for complete details).

Requirements for High Availability Installations

In addition to all the normal specifications, High Availability installations have several other requirements that must be met:

- All servers must be in the same local area network.
- All servers must have a minimum 1 GB/s connection to the network.
- The maximum round-trip latency between the servers must be no more than 10 ms.
- The maximum round-trip latency between the voice servers and the PBX must not exceed 200 ms. Optimal round-trip latency is less than 150 ms.
- The path of connectivity must have 20 MB/s guaranteed bandwidth with no steady-state congestion.

Language Support

The languages supported by Avaya Messaging in Release 11.0 are:

Arabic	French	Portuguese	English	TTY- English
Chinese (CN, Mandarin)	French (EU)	Russian	English UK	TTY- French
Chinese (HK, Cantonese)	German	Spanish	English AUS	
Chinese (TW, Traditional Dutch)	Italian	Spanish EU	English	
	Japanese	Thai		
	Korean			

One language is included with the program, with the files for standard English included with the download. Other languages (see the table above) are available for download from Avaya. All documentation is available in English only.

Pre-Installation Considerations

Avaya Messaging uses a dedicated server to enable high performance operation of the program. Other applications running on the same server as Avaya Messaging can severely reduce the capacity of the voice server. Processing voice, messaging, presence and telephony data requires a dedicated system if it is to operate quickly and efficiently.

Before installing Avaya Messaging, you must have:

- The corporate telephone system and PBX are installed and functioning properly.
- The voice server computer operating system was installed and fully patched.
- A connection between the voice server to the corporate network and to the Internet.
- All email client's set up and operate according to specifications.
- Created all accounts on any cloud-based applications where necessary (i.e., Google Apps).

Caution: Avaya Messaging has only been validated on Windows in English and in French. Other varieties of Windows may not work as intended.

Some additional items to consider before installing the voice server:

- How many users will there be in each category - voice / email / fax?
- The expected number of messages of each type per day.

- The number of corporate sites / office locations that are being serviced.
- On-premises versus off-site / mobile traffic.
- Integration with email clients and cloud applications.
- Disaster recovery and redundancy planning.
- The impact of the voice server on network traffic loads and Internet traffic.
- How will Avaya Messaging affect any integrated 3rd party and cloud-based applications? Email servers?
- What additional software drivers will be required? (i.e., MS Word)

Estimating the Maximum Numbers of Users (Voice Users)

Based upon testing by Avaya, Avaya Messaging supports up to 80,0001 users (see the table below for test criteria). Adding users above this value could impact performance and may lead to loss of data.

CALCULATING AVAYA MESSAGING LIMITATIONS FOR VOICE TRAFFIC

Total number of mailboxes supported based upon performance testing = 80,000 [1]

Assumptions	
% Heavy users	5%
% Medium users	30%
% Light Users	65%
# Daily voice Messages For Heavy users	15%
# Daily voice Messages For Medium users	5%
# Daily voice Messages For Light users	1%
Average Message Length (sec)	40%
Average Call Length (sec)	60%
Number of Channels	2400%
Operating Hours per day	13%

Test Results	
Total Voice Messages per day	232,000
Total Call Per Day [2]	464,000
Total Call minutes per day	464,000

1 This is 80,000 users in total, with up to 40,000 of those being Advanced users.
2 Each message is left on the system by the caller, then retrieved by the callee, requiring 2 calls to complete the messaging process.

Legacy Licensing

This section applies to customers with existing old licenses.

Soft License

Avaya Messaging program authorization is managed through a “soft” license. Activation of the program (UC, UM, eFax, etc.), capacity (ports and mailboxes) and features (ASR, TTS) requires an Internet connection. Avaya Messaging uses this connection to periodically contact the Avaya license server to enable continued use of the program at the appropriate service level. If the connection to the Internet is lost for a long enough period, then the software will fall into Demo Mode until the connection is re- established. Renewing a license, upgrading or adding new features can be completed with a telephone call to customer service and a refreshing of the license.

Initial Installation

During the initial installation, the administrator will enter the Serial Number and Site ID information included with the installation package. These numbers are unique for each site. The program will also generate a hardware profile of the server computer which becomes a part of the license. After the initial installation, if the server hardware changes (i.e., the program has been moved to a new server), Avaya Messaging will again require an on-line activation with the Site ID and Serial Number to rebuild the license file. This is only permitted once by the software, and subsequent hardware changes will cause the program to immediately revert to Demo Mode. Contact customer service to reactivate the license in this case.

Normal Operation

Once Avaya Messaging has been installed and is operating, the program will contact the Avaya license server each minute through the Internet for authentication. In the case of a connection failure or other errors that prevent authorization, the program will go on demo mode. If the program detects that the license details are different between

the Avaya Messaging and license servers, and no updates have been included, the system will immediately revert to Demo Mode until the issue can be resolved. In the case where 2 computers are associated with the same license, only the first machine to be authenticated will receive the license. The second machine must wait up to 24 hours for authorization, and only if the first machine has relinquished the license.

License Upgrades

To upgrade the Avaya Messaging license, such as adding new features or adding more ports or mailboxes, contact your customer service representative. The new details are added to the license server and an email is sent to the administrator with a reminder to refresh the license. The next time that the program contacts the license server for authentication, it will see that the licenses do not match due to the upgrade, and it will prompt the administrator to refresh the license. To activate the upgrades, run the license activation wizard (UCLicenseUpgrade.exe), verify the updated terms for the license, and click the “Set as Active License” button. Until the license has been updated, Avaya Messaging will continue to operate at its previous levels for another 28 days, then it will revert to Demo Mode if it has still not been refreshed.

License Expiration

Term based licenses last for a specific length of time. As the program nears its termination date, it will begin sending the administrator email reminders that the license is due to expire soon. These messages are sent at 60 days and 30 days prior to expiration.

For the last 15 days, notifications will be sent out daily. If the license has not been renewed by the expiration date, the program will continue to operate, but at only 25% of its former capacity. For example, if there were 100 ports and 100 mailboxes licensed, there will now only be 25 ports and 25 mailboxes available on the system. This reduction lasts for 60 days, with reminders sent to the administrator each day, and then Avaya Messaging will fall into Demo Mode until a new license is purchased. The program can be reactivated at any time once a new term has been purchased and the license is refreshed**.** Please make the necessary arrangements in plenty of time to avoid any disruptions in service.

Offline Verification

For sites that do not permit access to the Internet for security reasons, customers can request an installation that uses Offline License Verification. The licensing information resides upon the voice server computer and does not need to be refreshed each day.

This installation comes with a hardware USB dongle/key, and a license file that is copied to the hard drive of the voice server. This file contains the hardware profile and licensed feature information that normally resides on the Avaya license server. Both are required for the program to be authorized. Any hardware changes or program upgrades require a new license file. These are generated by the customer service department and are sent to the customer. Run the license activation routine again to enable updates.

High Availability Licensing

In a High Availability (HA) installation, only the Primary connects to the license server. The Consolidated Server, and all Secondary Servers, get their licensing information from the Primary. Therefore, it is imperative that the Primary Server is the first one installed and operating because the other servers will install only the features appropriate to the license data they receive from the Primary.

Demo Mode

The program can be put into Demo Mode for many reasons, such as the license expiring, or an extended loss of connection to Avaya’s license server. Demo Mode maintains all of the previously licensed features, but operational capacity is reduce to a single port with 10 mailboxes.

No data or settings are lost from the mailboxes, but there will be problems with access. Avaya Messaging will continue to run in Demo Mode until the cause for the service reduction has been addressed (i.e., a new license is purchased, and fixing connection problems).

WebLM Licensing (Avaya)

This section applies to current customers that purchased the product through Avaya.

Soft License

Avaya Messaging program authorization is managed through a “soft” license. Activation of the program (UC, UM, eFax, etc.), capacity (ports and mailboxes) and features (ASR, TTS) is controlled by the license which resides on a server on your corporate network. Avaya Messaging uses the corporate network to regularly contact the Avaya WebLM

license server to enable continued use of the program at the appropriate service level. If the connection to the license server is lost for a long enough period, then the software will fall into Demo Mode until the connection is re-established. Renewing a license, upgrading or adding new features can be completed with a telephone call to customer service and a refreshing of the license.

Host ID and License File

During the initial installation, the administrator must create a Host ID from the WebLM License Server. This number is then sent to Avaya so that a license file can be generated and sent back to the customer. It is this license file that Officelinx / Avaya Messaging read to unlock the program features. Afterwards, if the server hardware changes (i.e., the program has been moved to a new server), the license file must be replaced. Generate a new Host ID from the WebLM server and send that to Avaya Customer Service to receive an updated file.

Normal Operation

Once Avaya Messaging has been installed and is operating, the program is in constant contact with the WebLM license server for authentication. In the case of a connection failure or other errors that prevent authorization, the program will continue to operate properly for 28 days. If the problems are not corrected and the connection re- established before then, the program will revert to Demo Mode. When errors with authentication do occur, the administrator will receive notifications from Avaya Messaging with details of the problem.

License Upgrades

To upgrade the Avaya Messaging license, such as adding new features or adding more ports or mailboxes, contact your customer service representative. The new details will be added to the license file and an email is sent to the administrator for them to refresh the license. You may be required to generate a new Host ID number from the

WebLM server.

License Expiration

Term based licenses last for a specific length of time. As the program nears its termination date, it will begin sending the administrator email reminders that the license is due to expire soon. These messages are sent at 60 days and 30 days prior to expiration. For the last 15 days, notifications will be sent daily. If the license has not been renewed by the expiration date, the program will continue to operate, but at only 25% of its former capacity. For example, if there were 100 mailboxes licensed, there will now only 25 mailboxes available on the system. This reduction lasts for 60 days, with reminders sent to the administrator each day, and then Avaya Messaging will fall into Demo Mode until a new license is purchased. The program can be reactivated at any time once a new term has been purchased and the license file is refreshed. Please make the necessary arrangements in plenty of time to avoid any disruptions in service**.**

High Availability Licensing

In a High Availability (HA) installation, only the Primary voice server connects to the WebLM license server. The Consolidated Server, and all Secondary Servers, get their licensing information from the Primary. Therefore, it is imperative that the Primary Server is the first one installed and operating because the other servers will install only the features appropriate to the license data they receive from the Primary.

Demo Mode

The program can be put into Demo Mode for many reasons, such as the license expiring, or an extended loss of connection to the license server. Demo Mode maintains all the previously licensed features, but operational capacity is reduce to 10 mailboxes. No data or settings are lost from the mailboxes, but there will be problems with access. Avaya Messaging will continue to run in Demo Mode until the cause for the service reduction has been addressed (i.e., a new license is purchased, and fixing connection problems).

License Expiration Milestones

These benchmarks apply to all licenses (legacy and WebLM).

Time Before Expiration	Action Taken
60+ days	eMail Administrator
30 + days	eMail Administrator
15 to 0 days	daily eMails to the Admin
License Expires	
Demo Mode	

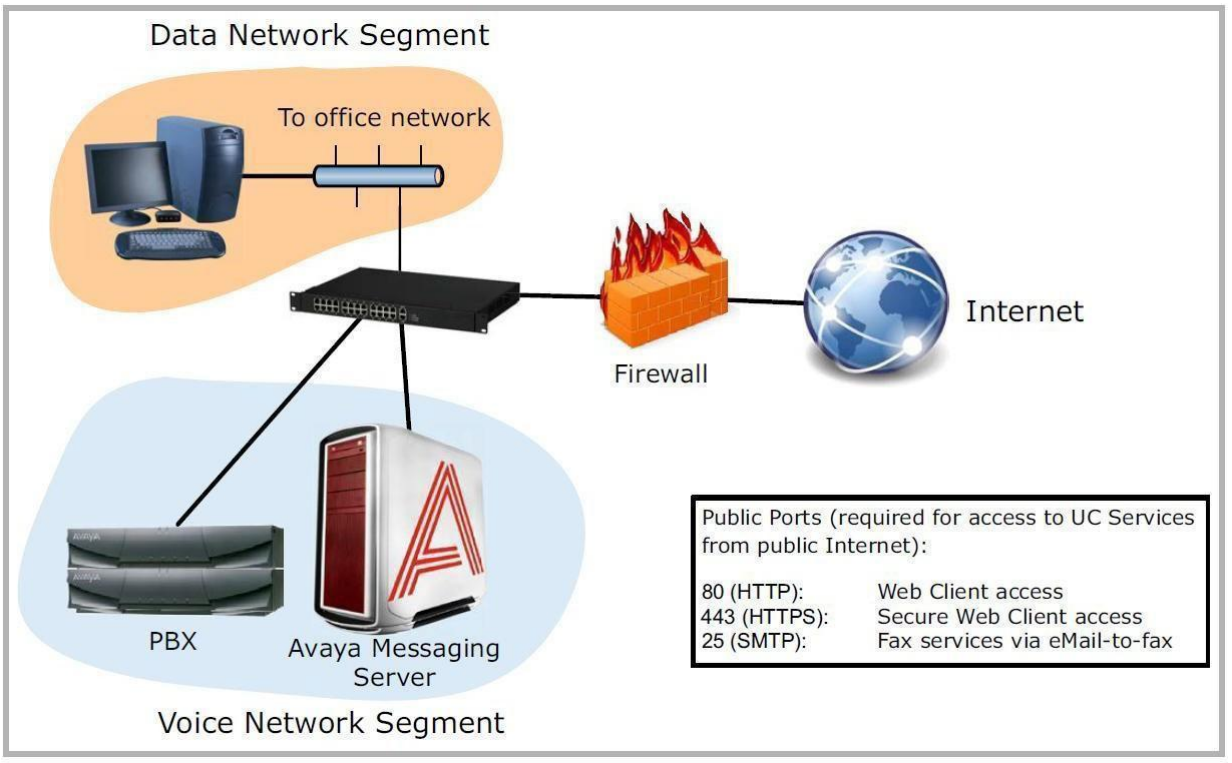
Network Requirements and Specifications

Avaya Messaging can exist as a standalone server on a local area network which allows for network-based user and system administration. For proper deployment, connect the Avaya Messaging server through the NIC interface and then boot up the server. A 1GB/s or better connection is recommended, but 100 kbps is acceptable.

Warning: There can be a maximum of 2 network cards installed in a single server computer.

Note: The Avaya Messaging server must be provided with sufficient administrative rights to the network so it can co-exist as another workstation on your local area network. For more information contact your LAN Administrator.

The following is an example of how Avaya Messaging can be configured within an organization’s network. By having a network infrastructure as shown here, you can ensure the functionality of the Avaya Messaging server within the organization while protecting all assets through the necessary security measures (e.g., firewall) from Internet or other external connections.



Before adding Avaya Messaging, you must have one of the following operating systems installed and fully patched:

- Windows Server 2012 R2 - Standard Edition
- Windows Server 2016
- Windows Server 2019
- Windows Server 2022

Caution: The MAC operating systems is NOT supported for the voice server.

Note: It is recommended that the operating system be installed on a partition with at least 100 GB of space. This is in addition to any space requirements set aside for Avaya Messaging.
Note: Disable the User Access Control (UAC) feature of Windows to ensure proper operation of the software. Refer to the *Server Installation Guide* for more details.

TCP/IP ports used by the application

Port #	Server/Client Application	Service	Direction	TCP/IP	UDP	Single Server	Primary Server	Secondary Server (s)	Consolidated Server	CSE Server	Required
21	Integrated Fax	Local net file transfer	In	FTP		●			●		1
25	VPIM-Smart Host Supported	Used for VM Networking	Out	SMTP		●	●	●	●		2
80	Web Access		In	HTTP		●	●	●	●		●
135*	MAPI/RPC	Contact and Calendar Synchronization	Both	MAPI/RPC		●					
389	LDAP Connector	AD Synch	Both	LDAP		●			●		3
443	Web Access	IIS Secure Services	In			●			●		●
443	Access to OEM Avaya	License Service	In	HTTPS		●	●				●
445	Microsoft File Sharing	File Sharing	Both	TCP			●	●	●	●	●
2439	Sybase Mobilink	Database Connection	Both	TCP			●	●	●		●
2638	AM Admin Sybase	MMC Service	Both	TCP		●			●	●	●
3389	SAL Gateway Remote Access	Remote Desktop Service	Both	TCP		●	●	●	●	●	
5060	SIP Channels	Voice Application	Both	SIP	UDP[4]	●	●	●			●
5061	SIP Channels	Voice Application	Both	TCP	TLS						
8201	UC Nuance Loader-Speech	Server/Client ASR	Both	TCP	UDP	●	●	●			●
10008[5]	AACC	Call Center Integration	Both	TCP		●	●				
11000	UM Monitor	Local App Services	Both	TCP	UDP	●	●	●			●
12000	WebLM	License Service	Both	TCP		●	●				
13780	ASR Distributed	Speech Service	Both	TCP	UDP	●	●	●			●
13888	CTIClient Manager	UC CTI Manager	Both	TCP	UDP	●	●	●	●		●
20002-x	RTP Media	Voice Application	Both		UDP	●	●	●			●
52233	WebLM	License Service	Both	TCP		●	●				

Port #	Server/Client Application	Service	Direction	TCP/IP	UDP	Single Server	Primary Server	Secondary Server (s)	Consolidated Server	CSE Server	Required
†	Nuance Speech Suite	Nuance Watcher Daemon	Both	TCP	UDP	●	●	●			

1 - Only required for outbound faxing. 2 - Only required for sending messages via SMTP. 3 - Only required for LDAP synchronization. 4 - Only required for SIP with a Dialogic Media Gateway. 5 - Only required for Call Center integration with AACC environments. * - Calendar and Contact Synchronization use MAPI, which uses RPC (Remote Procedure Call). RPC port assignment is handled dynamically, with port 135 used to locate the correct port. Both 135 and the MAPI / RPC ports must be open. † - These port numbers are automatically assigned by the operating system. All associated traffic is local and no firewall adjustments are required. For more information, click here: http://technet.microsoft.com/en-us/library/cc875824.aspx

Software Requirements

Minimum software requirements to run the Avaya Messaging server:

Software	Version
OS	Microsoft Windows Server 2012 or 2012 R2 - Standard Edition, 2016, 2019 and 2022
ASR	Nuance 10
TTS	RealSpeak 4.0 or 4.5

Media Support Requirements

If you wish to utilize additional media support within the voice server (e.g., DOC or DOCX support for fax), you must install the necessary components on the server so that the file formats can be recognized. Please refer to the chart below for requirement examples.

File format	Application Required	Comments
DOC, DOCX	Microsoft Office	Needed for additional file format Support

Note: The Remote Printer feature of Avaya Messaging can be used to redirect printer/fax traffic to another computer that already has the necessary licenses installed.

Note: Avaya Messaging versions prior to 8.2 require a separate application, such as Windows Media Player, to access MP3 files. Starting with version 8.2, Avaya Messaging supports MP3 files natively, with no additional software required.

ANTIVIRUS Software Installation

Avaya Messaging has only been validated with Norton Anti-virus Corporate Edition. Other anti-virus software applications that have been installed with Avaya Messaging are:

- McAfee VirusScan
- BitDefender
- Windows Defender

Important: After installing the antivirus program, the UC folder and all of its subfolders must be excluded from the scan. AV scanning of the UC folder will significantly decrease performance.

Fax Support

Avaya Messaging supports the Group 3 (G3) fax protocol, which conforms to the ITU-T specifications for T.30, T.4 and T.6.

Hardware Requirements

This table displays the recommended hardware values for different numbers of users, and the different types (single server, HA) of Avaya Messaging installation. Use these values to guide design and scope considerations for a new site.

For all sites:

- All processors are to be 2.0 GHz or better.
- All hard drives must be high performance, server grade drives.
- Configure the CPU for Performance mode in each server's BIOS settings.
- Virtual CPU's (vCPU) are shown as hyperthreaded and can be cut in half to equal physical cores. The same configurations can be used for both physical and virtual servers.
- Avaya Messaging must be installed onto servers with a RAID 10 array. RAID 6 is supported only on ASP 130 systems.
- Fragmentation management software, such as Diskeeper, should be installed on each server to prevent any drop in performance. This can be scheduled to run primarily during off hours.

SAN Usage

Storage Area Network (SAN) devices can be used with Avaya Messaging if they meet the necessary specifications.

- The device must provide a sustained throughput capacity of 250 requests per second, with peak traffic of up to 500 requests per second.
- This traffic is split 20% / 80% for read / write operations, respectively.

Table Key

Profile: Use this tag to identify to your vendor which system configuration meets your needs.

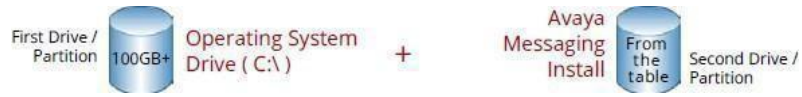
 # CPU: The number of cores the server requires to quickly process data. All should be Intel® 2.0 GHz or better. The number of cores can be reached either through physical CPU cores, or by using Hyper-Threading Technology if available.

RAM: The amount of memory that each server must have.

Storage: This is the amount of storage space required for the hard drive where Avaya Messaging is installed.

Content Synchronization Engine (CSE): This is the server that will perform the sync with Gmail, Office 365, and MS Exchange.

Important: The operating system for each server computer must be on a different partition, or on another hard drive, than Avaya Messaging. The drive for the operating system must be 100 GB or greater.



Recommended Configurations

The listed specifications are for each instance of the application. For example, in an HA environment, a minimum of 3 servers are required (Primary, Consolidated, and 1+ Secondaries). Each server must be appropriately configured. Avaya Messaging must be installed onto servers with a RAID 10 array. RAID 6 is supported only on ASP 130 servers**.**

For Standalone Deployment (SA)

SEAT LICENSE	PROFILE	STAND ALONE SOLUTION		
		#CPU	RAM (GB)`	Storage (GB)
1 - 1000	SA1	4	8	400
1001 - 4800	SA2	8	16	400

For High Availability Deployments (HA)

SEAT LICENSE	PROFILE	PRIMARY/SECONDARY SERVER			CONSOLIDATED SERVER		
		#CPU	RAM (GB)`	Storage (GB)	#CPU	RAM (GB)`	Storage (GB)
1 TO 4000	HA1	8	16	400	8	16	400
4000 TO 10,000	HA2	8	16	600	8	16	600
10001 TO 15000	HA3	8	16	700	8	16	700
15001 TO 20000	HA4	8	16	900	8	16	900
200001 TO 40000	HA5	8	32	1100	8	16	1100
400001 TO 60000	HA6	8	32	1800	8	16	1800
600001 TO 80000[1]	HA7	8	32	2600	8	16	2600

1 This is 80,000 users in total, with up to 40,000 of those being Advanced users performing UM sync.

For Unified Messaging Sync Users (UM)

UM USERS	PROFILE	EACH CONTENT SYNC ENGINE [2] [3]		
1 TO 3000	N/A	#CPU	RAM (GB)`	Storage (GB) [4]
1 TO 4000	N/A	CSE RUNNING ON VOICE SERVER		
4001 TO 10000 (HA)	UM 1	CSE RUNNING ON CS [5]		
10001 TO 15000 (HA)	UM 2	8	8	600
150001 TO 20000 (HA)	UM 3	8	8	700
20001 TO 25000 (HA)	UM 4	8	8	900
25001 TO 30000 (HA)	UM 5	8	8	900
30001 TO 35000 (HA)	UM 6	8	8	900
35001 TO 40000 (HA)	UM 7	8	8	900

2 - The number of CSE Servers required depends upon the number of Advanced users that will be working on the system. One server is required for every 4,000 Advanced users.

3 - Each Remote CSE Server supports a single email type (e.g., Exchange, Office 365, Gmail, etc.). If more than one email type is required, the Consolidated Server cannot be used for synchronization.

4 - Additional hard drive space may be required if full logging is enabled.

5 - For optional Remote CSE Server, use Profile UM1.

Note: Expanding your operation and moving from one profile to a larger one may also require changes to the system hardware (# CPU, RAM, Storage, etc.) needed to support it.

CSE Gateway Requirements

- To use CSE, the IMAP mail server must support the following standards:
- Messaging integrates with Microsoft Exchange 2010/2013, Gmail (Google Apps) and MS Office 365.
- IMAP services enabled on the email server.
- IMAP services must be installed and fully operational prior to deploying Avaya Messaging with the IMAPGateway.
- Microsoft Exchange 2010/2013 should be operational ahead of time id messaging is desired.
- Username and password (with permission) so UC can access user mailboxes on existing mail server.
- Free IMAP TCP/IP port available between the Avaya Messaging and email server.

Server Network Requirements

Networking requirements depend on what configuration and traffic load the system will bear. In most cases 100 Mbps (minimum 100BaseT) will suffice between the Avaya Messaging, IMAP CSE and the Email servers.

In larger (500+ UC user) configurations a 1 GB/s network connection between the Avaya Messaging and Email servers is required. In such cases a 1GB/s layer 2-switch between all servers is also required. The voice server can exist as a network- connected server on a LAN allowing for network-based user and system administration.

Server Email Integration Requirements

The Server can be a voicemail-only system although most deployments will involve some degree of email functionality.

Message Compression and Storage

Depending on which deployment scenario you select, messages may be stored on the Avaya Messaging Server, on the Email Server or both. It is very important that you know the message storage requirements of your environment. The following factors will affect this calculation:

- days to keep reading messages
- days to keep unread messages
- message format used
- maximum message length
- maximum number of messages allotted per user (inbox only)
- number of Messaging users (must account for email on the Avaya Messaging Server)

The message format is the factor used to calculate storage capacity as the format determines the size of the actual messages.

File Format	Kbytes/Sec	Kbytes/Min	Kbytes/hour	MB/hour	GB/Hour
Wave A- Law 8 kHz (G711)	8	480	2800	28.125	0.027
Wave u -Law 8 kHz (G711)	8	480	2800	28.125	0.027

In certain deployments where copies of voicemail messages are stored on the Email Server, storage capacities per email mailbox remain the same.

System Configuration Options

Avaya Messaging can be configured to support many user environments:

Basic – Messaging

- Basic + ASR / TTS
- Basic + Transcription
- Basic + ASR/TTS+ Transcription

Advanced (Messaging and collaboration)

- Advanced + **ASR / TTS**
- Advanced + Transcription
- Advanced + ASR/TTS+ Transcription

The following options which can be added to a license:

- SR140 Fax Ports
- ASR / TTS by user
- Transcription by user
- Upgrade the User type to Access Increased Functionality
- G.729 Support

Server Requirement Q & A

Refer to the below Q&A article for a general understanding of the hardware requirement of the Avaya Messaging system.

What is a RAID 10 system?

RAID 10, also known as RAID 1+0 or RAID 0+1, is a RAID system where 2 drives are mirrored and then spanned with 2 other mirrored drives. This gives you the ability to lose 1 of each in the set in each mirror (1/2 of the drives) and still work at full speed. RAID 10 is required for the Messaging system.

How about RAID 6 or RAID 5?

RAID 5 and 6 would be an optimal choice if the Avaya Messaging system were to be a read only system. Unfortunately, the act of writing burdens the RAID system since every log entry requires the entire span to be updated (parity needs to be updated with every change). If a RAID 5 or RAID 6 becomes fragmented there is a problem since small pieces of info will still take the entire stripe, and parity needs to be calculated for every change once again**.**

RAID 6 has been tested and is supported only when using an Avaya Solutions Platform (ASP) server system. Refer to the ASP documentation for complete details.

What speed Hard Drives should we use?

Most typical server Hard Drives will be either 10,000 RPM or 15,000 RPM. Either one will suffice for the Avaya Messaging system. The 15,000 RPM drives are much hotter but are also 50% faster. The tradeoff is the electric consumption over performance. If it is a huge installation base that has lots of UM with IP voice ports, we suggest the

15,000 RPM but this is not a requirement.

What can I do to increase the effectiveness of the RAID system?

An extra drive (one or more) may be configured as a hot swap spare. This is generally a good practice since it will automatically start rebuilding the RAID if one of the drives fail, removing the need for human interaction.

What is the total storage of a RAID system?

Total storage would be ½ of the combined storage of all the drives.

Is there a numerical restriction on the RAID system?

The number of drives that can be used in the RAID system must be even, with 4 being the minimum (4, 6, 8 etc.).

Can I install Avaya Messaging on a server that is already in use?

Avaya Messaging is a dedicated application which should only be installed as a primary application on any server. Sharing system resources with other applications may prevent Avaya Messaging from working correctly.

Chapter 5: PBX SPECIFICATIONS

Introduction

Avaya Messaging is a vendor neutral application which can integrate with many telephone systems. Use the information in this section as a general guideline to the kinds of integrations Avaya Messaging can support, as well as what is required from the phone system in order for specific features to work. While Avaya Messaging requires SIP for integration, media gateways provide compatibility for PBXs that use different protocols.

Multiple PBX/Node Support

Avaya Messaging is able to integrate with multiple PBXs or nodes at once, allowing you take advantage of all the capacity a site may have. This will also be a great option for legacy sites which are implementing additional PBX for higher capacity. A site can add new PBX to their legacy system and use them as one through Avaya Messaging without having worry about compatibility. The only requirement for multi-PBX / multi-node support is that the PBX in question is compatible with Avaya Messaging. It is recommended that all PBXs/nodes utilize SIP trunks.

SIP

SIP (Session Initiation Protocol) is a set of rules that provide the basic signals used to initiate, manage, and terminate communications sessions. SIP is an open standard which allows carrier voice equipment to interoperate seamlessly with customer premise equipment. The logical voice channel established between them is a SIP Trunk. A SIP Trunk is a virtual phone line that utilizes the customer's Internet connection for access.

Trunks come with unlimited local inbound minutes and long distance usage based at rates far below traditional phone service. SIP Trunking is a business-class telecommunications solution that delivers local, toll-free, domestic and international long distance service. SIP integration is highly recommended due to reduced costs and universal compatibility. Even most legacy hardware will be able to utilize SIP through a compatible media gateway.

Tested and Verified PBX

SIP Direct

Following PBXs are integrated directly into the voice server through SIP.

Brand	Model
Avaya	Ip office Aura Session Manager SIP Enablement Services (SES)

Other brands have not been tested and their functionality cannot be guaranteed.

SIP Gateway

Following PBXs are integrated through a media gateway to the Avaya Messaging server.

Brand	Model
Avaya	IP Office

For specific part numbers of SIP Gateways, please refer to the Dialogic Media Gateway portions of the following sections:

E1

CTI

CTI stands for Computer Telephone Integration. CTI combines data with voice systems in order to enhance telephone services.

For example, automatic number identification (ANI) allows a caller's records to be retrieved from the database while the call is forwarded to the appropriate party. An outbound example would be automatic telephone dialing from an address list.

Tested & Verified PBX

CTI Integration: Rich Presence and Call Control

Following PBXs are integrated directly into the voice server through CTI.

Brand	Model
Avaya	ACE 6.2 CM 5.2, 6.1 (AES TSAPI) IP Office 500, 6.1, 7.0 ,8.0 (TAPI) IP Office

Other brands have not been tested, and their functionality cannot be guaranteed.

Inband

Inband integration is possible on supported switches through the use of Dual Tone Multiple Frequency (DTMF) signaling. Strings of DTMF tones are transmitted on the analog voice channel after the channel connects to answer the call but before the voice is cut through.

Typically, the string contains the Calling Line Identification, the Called Party Identification, reason for the call (re- direction or direct call), and will allow the following functionality among others:

- Direct Log-In in which Avaya Messaging recognizes a direct station call, identifies the internal caller's extension number and prompts the caller to enter the security code of the subscriber mailbox associated with that number.
- Call Forwarding to a personal greeting if an extension is Busy, not answered, Do Not Disturb or Forward All. Both internal and external callers can be forwarded to the subscriber's personal greeting. Depending on how the subscriber's mailbox is configured and what information is provided by the telephone system an appropriate greeting can be played for both a Busy and a Ring No Answer condition. Callers can then leave messages in the subscriber's mailbox or be presented with another list of options through voice menus.
- Call Routing based on the trunk number, DNIS number or forwarded PBX extension number. These types of calls can be routed to a specific mailboxes, ACD agent or call center. The time frame (when the voicemail is waiting for signaling) is configurable so that it can be adjusted regardless of the PBX.

T1

SUPPORTED PROTOCOLS

Robbed Bit Signaling

Channel Associated Signaling (CAS), also referred to as Robbed Bit Signaling, is a method of signaling each traffic channel rather than having a dedicated signaling channel (like ISDN). In other words, the signaling for a particular traffic circuit is permanently associated with that circuit. The most common forms of CAS signaling are loopstart, groundstart, Equal Access North American (EANA) and E&M. The biggest disadvantage of CAS signaling is its use of user bandwidth to perform signaling functions.

In addition to receiving and placing calls, CAS signaling also processes the receipt of Dialed Number Identification Service (DNIS) and automatic number identification (ANI) information which is used to support authentication and other functions. Each T1 channel carries a sequence of frames. These frames consist of

192 bits and an additional bit designated as the framing bit, for a total of 193 bits per frame. Super Frame (SF) groups 12 of these 193 bit frames together and designates the framing bits of the even numbered frames as signaling bits.
CAS looks specifically at every sixth frame for the timeslot's or channel's associated signaling information. These bits are commonly referred to as A- and B-bits. Extended super frame (ESF), due to grouping the frames in sets of twenty-four, has four signaling bits per channel or timeslot. These occur in frames 6, 12, 18, and 24 and are called the A-, B-, C-, and D-bits respectively.

ISDN Signaling Concepts

The Integrated Services Digital Network (ISDN) is a digital communications network capable of carrying all forms (voice, computer and facsimile) of digitized data between switched end points. This network is a digital-switched system that makes a connection only when requested. Control over switched connections is provided by a protocol of messages that pass between the two ends of the digital link.

Any type of equipment can be connected to an ISDN provided the equipment is capable of generating a digital bit stream that conforms to ISDN standards. ISDN technology offers the benefits inherent in digital connectivity such as fast connection (setup and tear down), fast Direct Dialing In service (DDI) and fast Automatic Number Identification (ANI) acquisition.

ISDN protocols use an out-of-band signaling method carrying signaling data on a channel or channels separate from user data channels. This means that one signaling channel (D channel) carries signaling data for more than one bearer channel (B channel). This signaling technique is referred to as common channel signaling (CCS). Signaling data carries information such as the current state of the channel (for example, whether the telephone is on-hook or off-hook). Common channel signaling allows the transmission of additional information, such as ANI and DNIS digits, over the signaling channel.

An ISDN Primary Rate Interface (PRI) trunk provides a digital link that carries some number of TDM (Time Division Multiplexed) channels:

- a T-1 trunk carries 24 64 Kbit channels, 23 voice/data channels (B channels) and one signaling channel (D channel) on a single 1.544 MHz digital link.
- an E-1 trunk carries 32 64 Kbit channels, 30 voice/data channels and two additional channels: one signaling channel (D channel) and one framing channel to handle synchronization on a single 2.048 MHz digital link.

The ISDN digital data stream contains two kinds of information: user data and signaling data used to control the communication process.

For example, in telephony applications user data is digitally encoded voice data. Voice data from each time slot is routed to a separate B channel. Signaling data carries information such as the current state of the channel (for example, whether the telephone is on-hook or off-hook). The signaling information for all B channel information is routed to the D channel of the device.

Dialogic Media Gateway

SIP

The Dialogic® 2000 Media Gateway Series is a turnkey appliance that seamlessly merges traditional PSTN technology with IP networks. This economical gateway helps consolidate typically separate voice and data networks and provides new and differentiated communications services.

Without making radical, disruptive, and expensive upgrades to existing PBX equipment, service providers and enterprises can realize the benefits of a converged voice and data network.

Dialogic Media Gateway Part numbers for E1	
DMG2030DTIQ	Single E1 Integration Gateway
DMG2060DTIQ	Dual E1 Integration Gateway
DMG2120DTIQ	Quad E1 Integration Gateway

Note: For detailed information regarding Dialogic Media Gateway, please refer to:

http://www.dialogic.com/products/gateways/DMG2000.htm
For integration notes regarding Dialogic Media Gateway, or to check your current hardware for compatibility, please refer to: http://www.dialogic.com/support/helpweb/mg/iw1904.aspx

E1

QSIG is the European association for Standardizing Information And Communication Systems. QSIG has a long history of producing standards related to the interworking of communications equipment within Private Integrated Services Networks (PISNs).

PISN standardization is undertaken by the various task groups of its technical committee: TC32. Much of their effort is put towards the definition of the intraPISN signaling system commonly referred to as "QSIG". QSIG is an ISDN based protocol for signaling between nodes of a Private Integrated Services Network (PISN).

Dialogic Media Gateway

SIP

The Dialogic® 2000 Media Gateway Series is a turnkey appliance that seamlessly merges traditional PSTN technology with IP networks. This economical gateway helps consolidate typically separate voice and data networks and provides new and differentiated communications services.

Without making radical, disruptive, and expensive upgrades to existing PBX equipment, service providers and enterprises can realize the benefits of a converged voice and data network.

Dialogic Media Gateway Part numbers for E1	
DMG2030DTIQ	Single E1 Integration Gateway
DMG2060DTIQ	Dual E1 Integration Gateway
DMG2120DTIQ	Quad E1 Integration Gateway

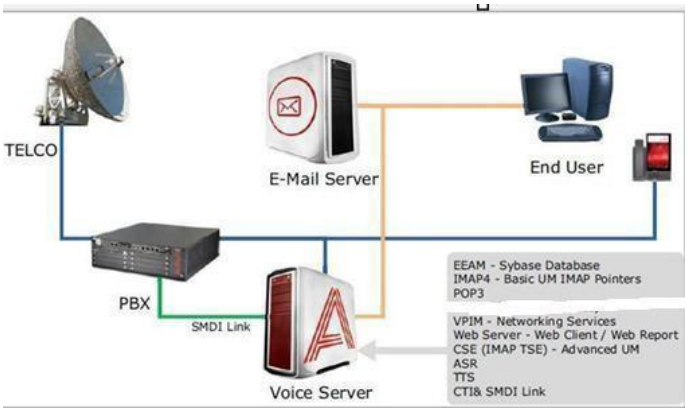
Note: For detailed information regarding Dialogic Media Gateway, please refer to: http://www.dialogic.com/products/gateways/DMG2000.htm
For integration notes regarding Dialogic Media Gateway, or to check your current hardware for compatibility, please refer to: http://www.dialogic.com/support/helpweb/mg/iw1904.aspx

Chapter 6: HIGH AVAILABILITY ENVIRONMENT

High Availability Description

Vulnerability of the Single Server System

The High Availability system is designed to deliver a redundancy solution to environments where uptime is critical. The HA system achieves redundancy through Secondary servers that are constantly online along with the Primary server. In a traditional single server environment as shown below, the system is vulnerable to downtime which can be caused by the malfunction of the single Voice Server computer.

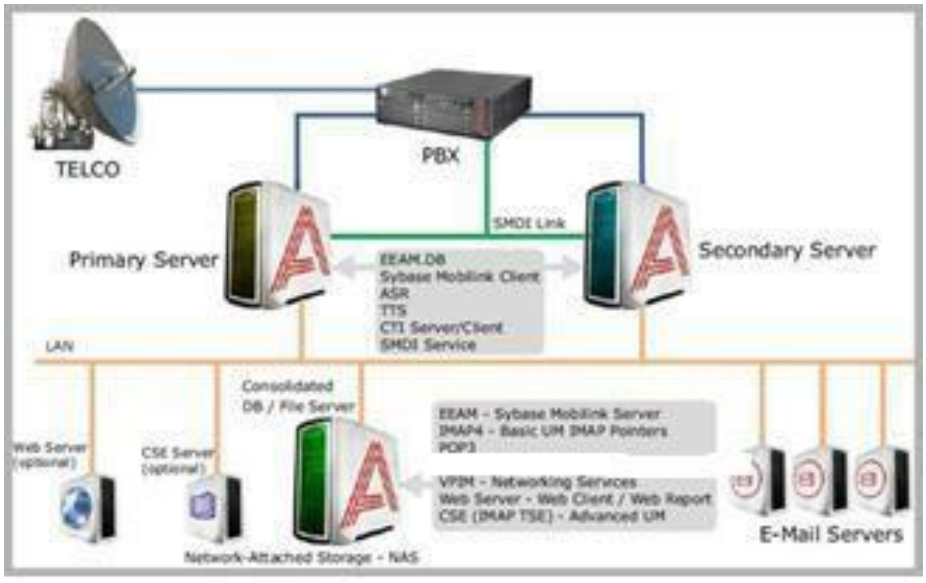


Since only one Voice Server is operating, any failure of the voice server equates to downtime. Even regular tasks such as regular maintenance, or a simple reboot will cause the system to be offline in single server configurations.

Reliability of the Multi-Server System

In the multiple server environment illustrated below, the Primary server is always supported by the Secondary server(s). This means that a site can remain functional even if one of the voice servers fail. When the Primary server stops working, a Secondary server will take over until the Primary is back online.

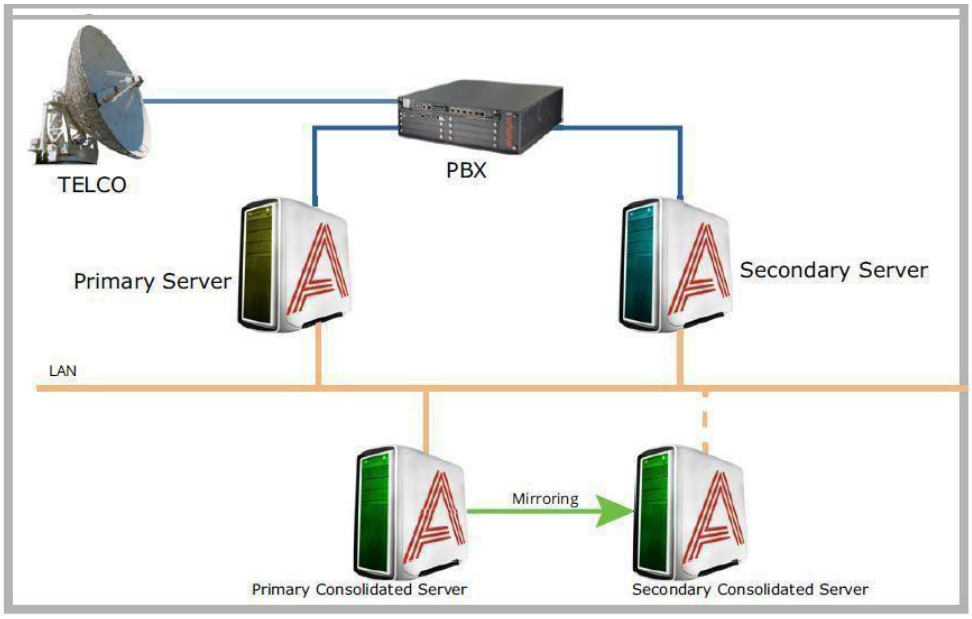
The Primary and Secondary servers can work in unison with the help of the Consolidated (DB/File) server, also referred to as the Database server. The Consolidated server manages the flow of data between all servers and ensures proper synchronization of files.



While the Multi-Server installation guarantees uptime for the voice servers, there may be scenarios in which the PBX itself is out of service.

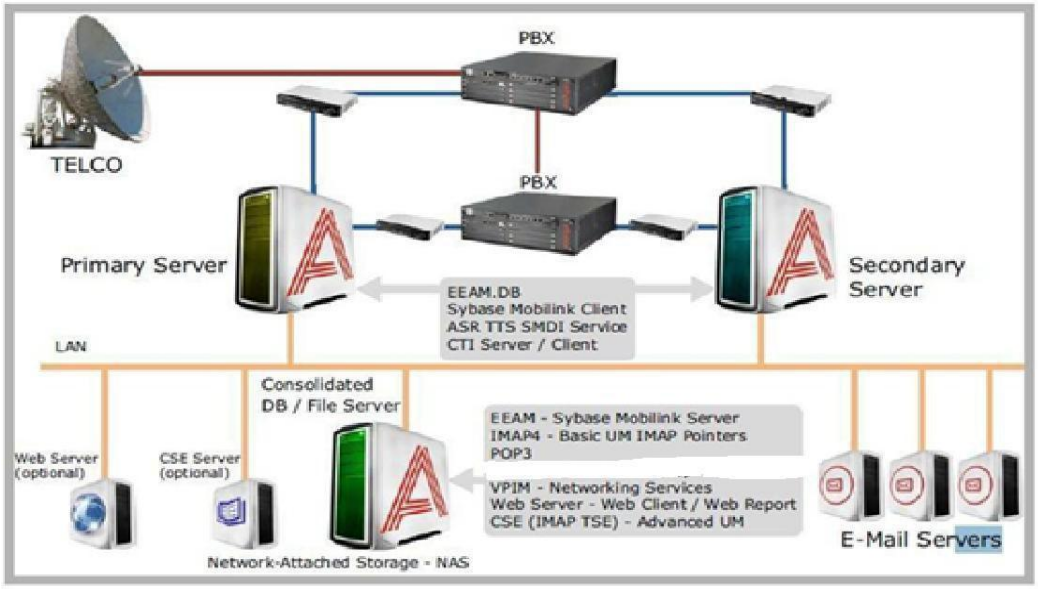
Multi-Consolidated Server System

In a standard High Availability configuration, the Primary server is supported by the Secondary server(s) at all times, but the Consolidated server has no such backup. If the Consolidated server fails then the system will go offline. A Secondary Consolidated server can be added to an HA system to provide redundancy for the Primary Consolidated server. The Secondary Consolidated server mirrors the state and the data found on the Primary Consolidated server. If the Primary Consolidated server stops responding, the Secondary Consolidated takes over to keep the system running.



Multiple Server Multiple PBX System

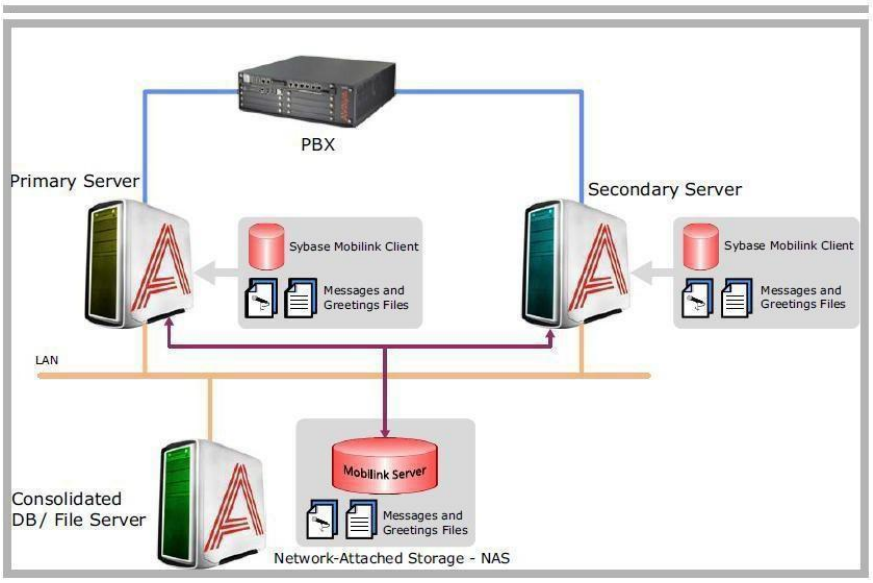
The multiple server system combined with multiple PBXs provides the most reliable configuration. In this scenario, maximum uptime is guaranteed even if the PBX fails along with the Primary server. The secondary PBX and the Secondary server will continue to accept calls while the Primary voice server and the primary PBX are offline.



Database Management

In a High Availability environment, the databases in all the servers are synchronized through the Sybase Mobilink system. The Consolidated (Common) server acts as the Mobilink Server and manages the database for all the Primaries and Secondaries.

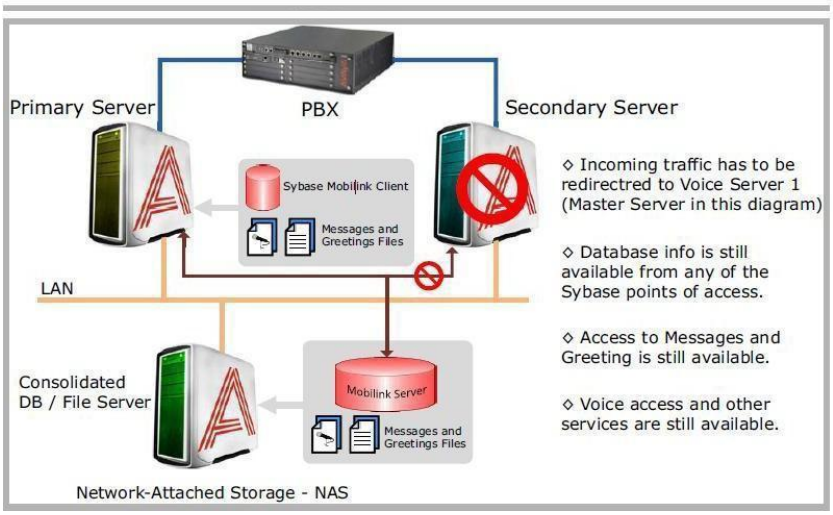
This architecture always gives sites full message access, not just full uptime for all Voice server functions. Whenever a change (new message, deleted message, etc.) is made in either the Primary or Secondary servers, the Consolidated server copies this change to all databases in the system, allowing end users to maintain their messages and greetings even when one of the servers becomes unavailable.



Failure Scenario

In this scenario, the Secondary server is unavailable due to a malfunction, severing the tie between the databases. The new messages received in the Primary server will continuously be synchronized with the Consolidated server but the Secondary server will be left behind during the down time.

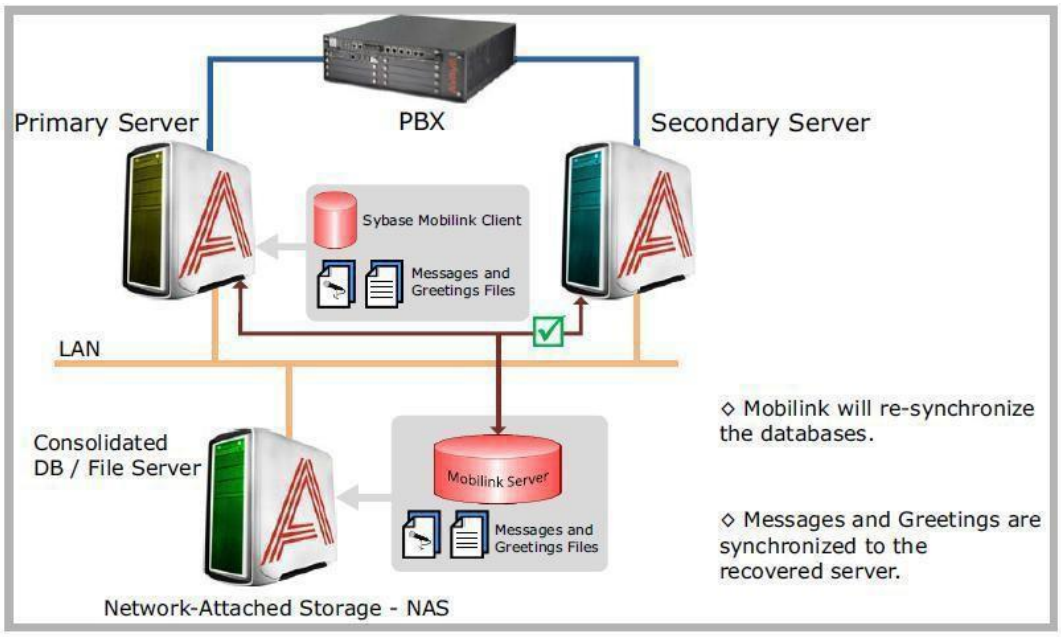
Any messages received by the Secondary server are still accessible by the users since the database has already been synchronized before the Secondary server crash. There is also no disruption in regular service since the Primary server is still fully functional. All traffic is handled by the Primary server in the meantime.



Recovery Scenario

In this scenario, the Secondary server that was down in the previous example has recovered. Soon after the Secondary server comes back online, the Consolidated server will start to synchronize the data between all the servers again, allowing the Secondary server to catch-up to the current database.

All messages and greetings will become automatically up to date on the secondary system soon after it comes online, which means that recovery will be a virtually invisible process that takes place in the background during regular operation.

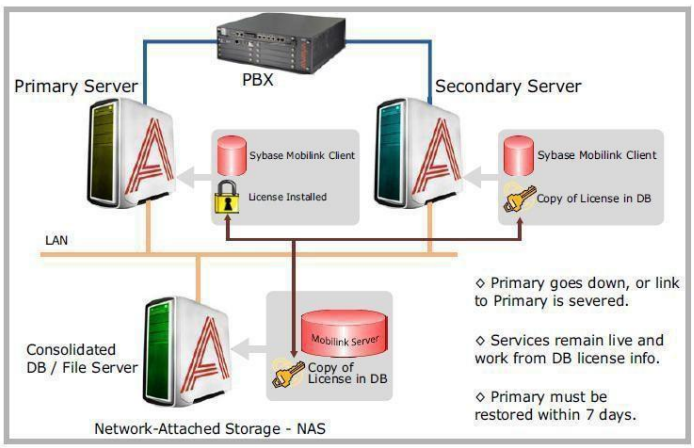


License Management

The High Availability system utilizes a unique licensing feature that allows full functionality of service while only one server holds the license. In all cases, the Primary server houses the license. However, the license file will be copied to all servers in the system through the database synchronization performed by Sybase Mobilink.

The copied license files will allow other servers (other than the Primary) to maintain full functionality even when they don't have individual license available to them. This system also allows for easier license management since only the Primary server must be updated, should there be any type of addition or modification to the license.

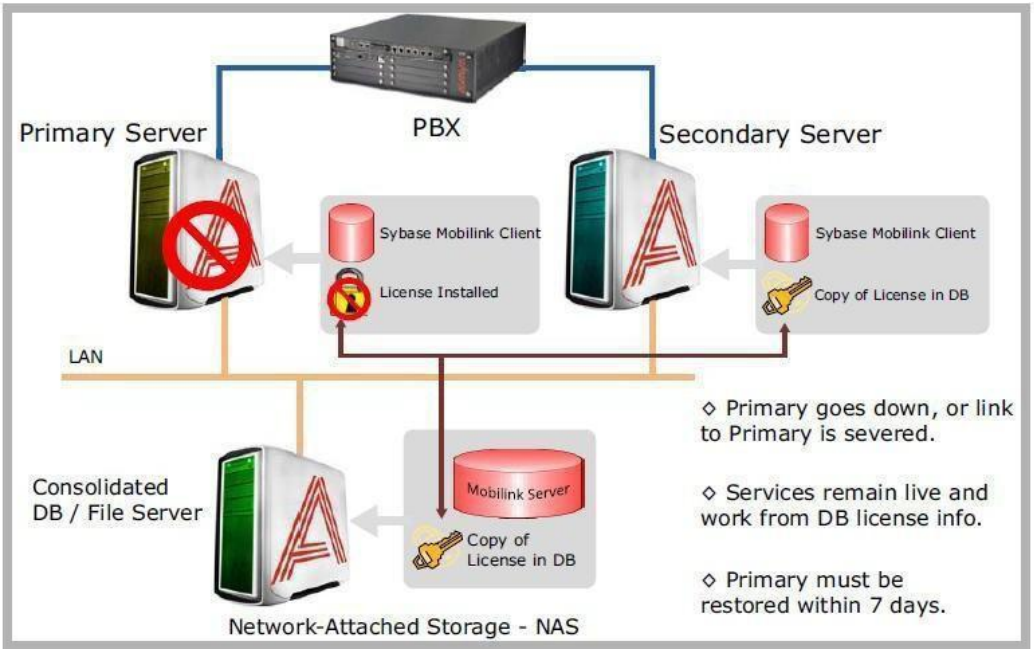
However, the copied license files are time stamped to expire after a certain period. The time stamps are constantly updated by the Primary server, so it will not have any effect during regular operation.



License Management During Primary Server Down Time

When the Primary server becomes unavailable, it will also stop updating the time stamps on the copied license files that exist on the Secondary server and the Consolidated server.

When this happens, the Primary server must be recovered within 7 days. If the Primary server isn't brought back online within 7 days, the copied license files will expire, and the system will cease to function due to invalid license status. For 7 days is a generous time for recovery, most sites will not even notice such architecture in licensing. They will experience no problems if the Primary server is recovered in a timely manner.



High Availability Redundancy & Scalability

Server Specification

The minimum configuration for a High Availability system is three servers, Primary, Secondary and Consolidated. As of now, the High Availability system is able to support up to 20 voice servers maximum. This means that a site can maintain 1 Primary server and 19 Secondary servers in a single High Availability environment.

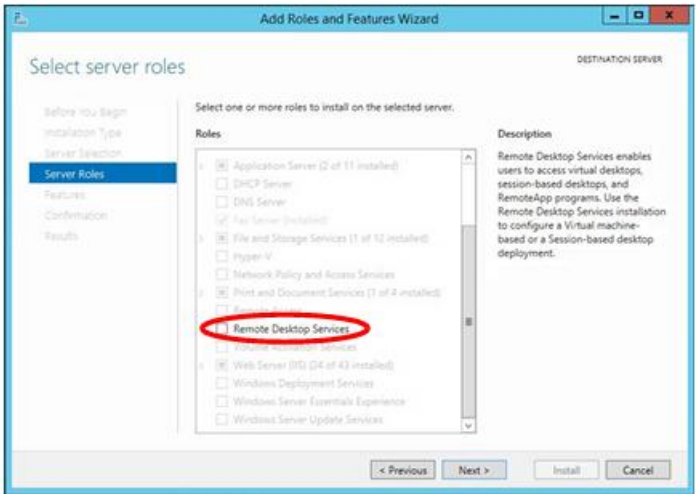
Configuration Limitation

Each voice server is designed to support up to 120 ports (SIP). A single High Availability environment can support up to 20,000 user accounts (business rules apply). Single Web server can support up to 10,000 users. Single CSE server can support up to 5,000 users.

Other Rules and Limitations

The system is high availability rather than fully redundant. The MWI function is only available for Voice and Fax messages.

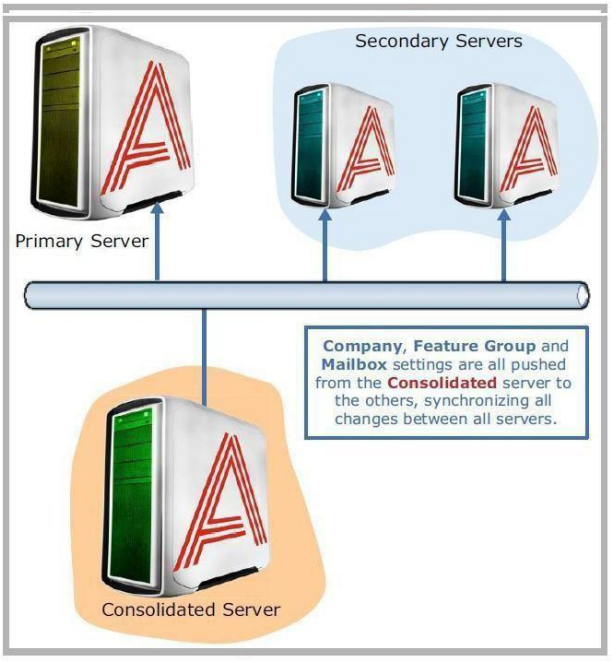
Warning: Avaya Messaging is not compatible with Windows Remote Desktop Services (Server Manager > Server Roles). If Remote Desktop Services exists on the server, it must be removed or Avaya Messaging will not work or install properly.



High Availability Configuration Flow

General Configuration Logic

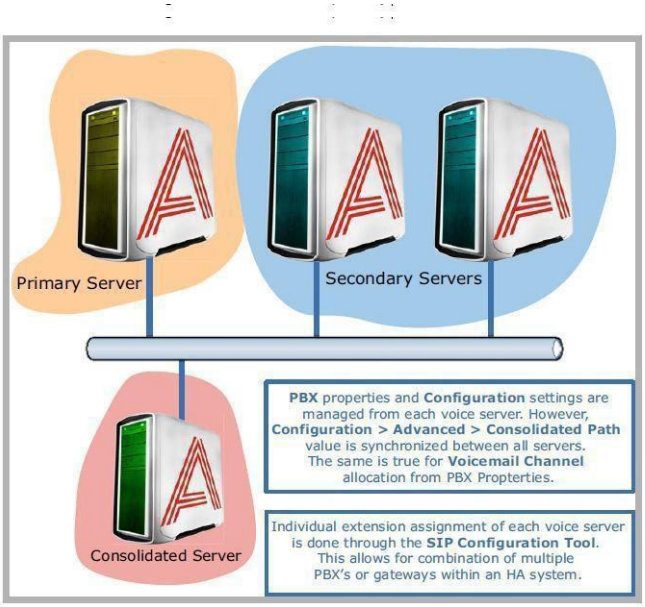
Most configurations within an HA system will take place on the Consolidated server. While all servers have access to Avaya Messaging admin console, only the Consolidated server can change the fields for Company, Feature Group and Mailbox settings. Any changes made on these fields from the consolidated server will be pushed to all voice servers, which synchronizes configuration settings on all servers.



Server Specific Configuration

PBX properties and Configuration section within Avaya Messaging admin console is managed individually. Since each voice server may integrate into a different PBX, it is necessary for voice servers to be in control of their PBX related settings. However, Configuration > Advanced > Consolidated Path will be synchronized between all servers. This is the path which defines the location of the Consolidated server, so all servers must have an identical entry to correctly synchronize. The same goes for the Voicemail Channel list within the PBX.

This list will be a compilation of all channels allocated on all voice servers. Defining individual extensions or



channels within a voice server are done through the SIP Configuration Tool, which manages each voice server separately.

Requirements for High Availability Installations

In addition to all the normal specifications, High Availability installations have several other requirements that must be met:

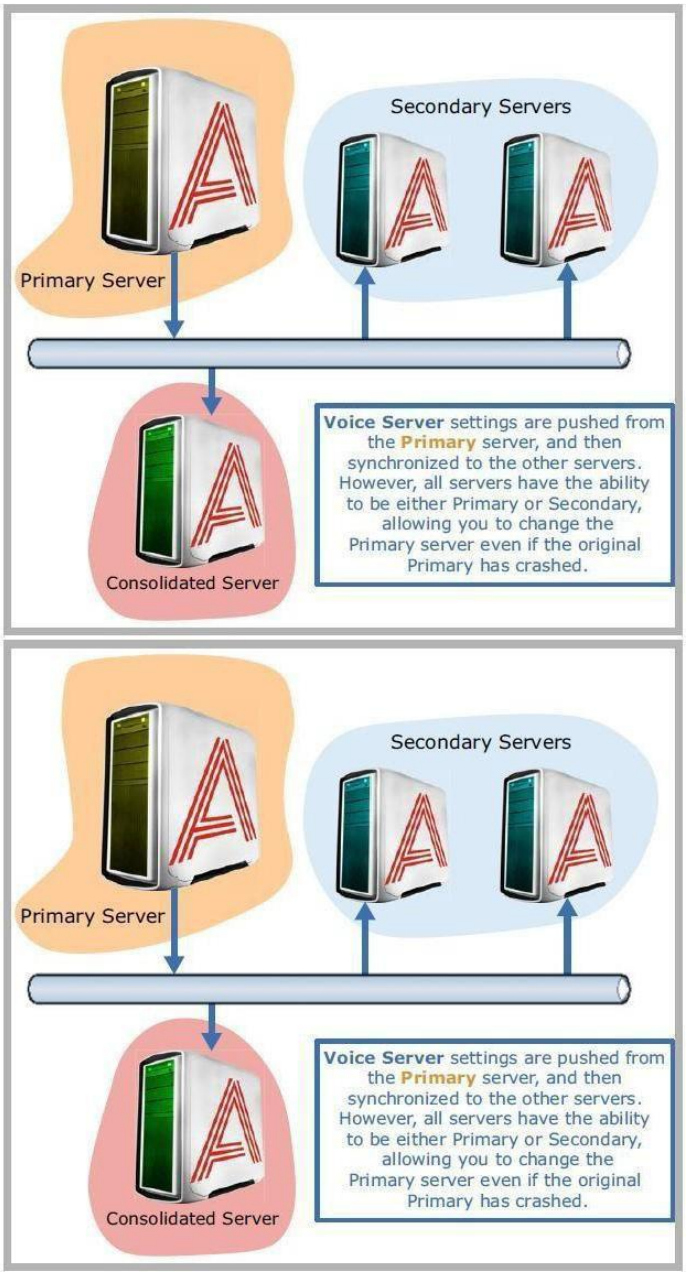
- All servers must be part of the same domain.
- All servers must have a minimum 1 GB/s connection to the network.
- The maximum round-trip latency between the servers must be no more than 10 ms.
- The maximum round-trip latency between the voice servers and the PBX must not exceed 200 ms. Optimal round-trip latency is less than 150 ms.
- The path of connectivity must have 1.5 MB/s guaranteed bandwidth with no steady-state congestion.

Voice Server Settings and Primary Server Selection

While many of the settings are controlled by Consolidated server, Voice Server settings within Avaya Messaging admin console is managed by the Primary Server.

Each Voice Server, including the Primary and all Secondary Servers, will have its own entry within the Voice Server settings section. Only the Primary Server will be able to modify the fields within Voice Server settings, which is then pushed and synchronized to all other servers. However, all servers are able to change a single field labeled Primary within the Voice Server settings.

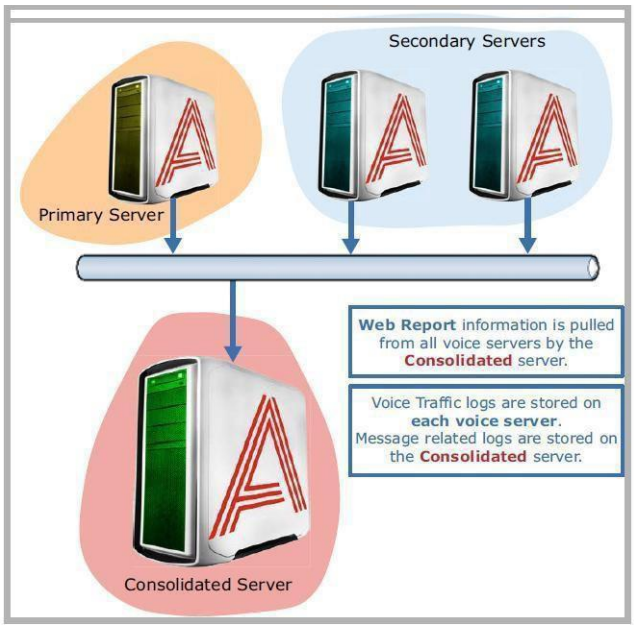
This field can be used to designate any Voice Server as the Primary Server. If your Primary Server is unavailable for any reason (e.g., taken offline for maintenance), you will be able to assign another Voice Server as a Primary should the need arise.



Logs and Reports

When it comes to voice traffic, each Voice Server will store activities which have occurred on that server, which means that logs related to a call will only be available on the specific server that the call took place (both incoming and outgoing). All message related logs (including voice messages) will be stored on the Consolidated server since it is the Consolidated server's task to maintain synchronization of messages.

If you wish to create a Web Report of server activities, the necessary information will be pulled by the Consolidated server from the Voice servers. For most purposes, all you have to do is connect to Web Report services within the Consolidated server to obtain comprehensive information regarding the usage and status of your server. Individual log files are mostly used for troubleshooting purposes, so you will not have to track them from each servers separately.



Geo Redundancy

An Avaya Messaging HA installation can be spread across a geographically distributed network. Geo Redundancy allows a section of the network in one part of the world to go offline without affecting the remaining elements. Installing Avaya Messaging with Geo Redundancy proceeds the same way as it does with any other HA install, but with some of the servers existing in other locations.

Geo Redundancy has the following network connection requirements to operate properly.

- All Avaya Messaging servers must be on the same network as the PBX.
- All servers must have a minimum 1Gbps connection to the network.
- The maximum round-trip latency for optimum performance is 10ms between servers, with an acceptable tolerance up to 60ms.
- The maximum round-trip latency between the voice servers and the PBX must be no more than 200 ms.
- Optimal round-trip latency is a maximum of 150 ms.
- The path of connectivity must have 20Mbps guaranteed bandwidth with no steady-state congestion.
- At all times, the LAN network connection must provide a min guaranteed 20Mbps upload / download speed.

Contact your dealer if you have any further questions,

Chapter 7: VMWARE SUPPORT

Introduction

Many organizations are turning to virtual environments for their server needs due to their cost and efficiency. Instead of a room full of servers, virtual servers on hosted or in-house environments can perform the functions of multiple computers.

Avaya Messaging can be installed in a virtual environment enabling you to reuse the equipment you already have. Instead of buying a new computer to host the voice server, upgrades to existing hardware may be sufficient through virtualization.

Prerequisites

Software	Version
VM Software	VMware ESXi 4.x, 5.0, 6.0, 6.5, 6.7, 7.0, 7.5 and 8.0. Hyper- V server 2012 /2016.
OS for Avaya Messaging	Microsoft Windows Server 2012, 2016, 2019 and 2022.

Note: ESXi has been tested on versions 4.x / 5.0 / 5.1 / 5.5 / 6.0 / 6.7 / 7.0/7.5 and 8.0. Hyper-V Server 2012 and Hyper- V Server 2016 have also been tested.

Hardware	
CPU	Requires Intel CPU which meets or exceeds the requirements for ESXi 4+

Virtual Environment Limitations

Migrating data from a virtual machine environment is not supported.

Migrating data to a virtual machine from an existing physical environment is supported, but only if AM is installed first.

Move an existing server onto a virtual machine by migrating the database using the utilities provided on the Messaging installation package. You can transfer both 7.x and 8.x systems to an 10.8 virtual environment. Messaging must be installed on a new virtual machine with a clean operating system.

Warning: Importing an existing Avaya Messaging environment to a virtual image is not supported.

Avaya Messaging installed don a VM requires the same hardware resources as a non VM machine environments.

Note: The fax capability of Avaya Messaging within a virtual environment is limited to 24 ports.

Warning: Do Not take snapshots while the servers are in operation as this can lead to serious corruption in the database. System performance may also be heavily compromised. To take a snapshot, shutdown the server first, then take the snapshot while the system is down.

This table shows the list of VMWare features supported:

Feature	Avaya messaging 10.8	Avaya Messaging 11.0
Support for ESXi 6.0	Yes	No
Support for ESXi 6.5	Yes	Yes
Support for ESXi 6.7	Yes	Yes
Support for ESXi 7.0	No	Yes
Support for ESXi 7.5 and 8.0	No	Yes
VMware vMotion	No	No
VMware Snapshot	No	No (Only temporary snapshots prior to upgrade can be created and should be removed after upgrade)
VMware HA	Yes	Yes
VMware DRS	No	No
VMware FT	No	No
VMware Standard Switch	Yes	Yes
VMware Distributed Switch	Yes	Yes
Reservation Required	No	No
VSAN Support	Yes	Yes
Thin Provisioning	No	No

Virtual Machine Environment Hardware Requirements

The hardware requirements for setting up Avaya Messaging within a virtual environment are the same as for a physical machine. See the System Requirements and Capacity chapter of this guide for more information.

The configuration of the virtual environment does create other considerations for server installation.

VMware Technology Guidelines

VMware offers a wide range of technologies which may be implemented on a virtual machine for greater redundancy and ease of maintenance. This section explains which features are compatible with the Avaya Messaging server application and how to utilize VMware solutions with Avaya Messaging in mind.

- High Availability: VMware also offers its own High Availability solution, which should not be confused with Avaya Messaging HA. VMware's HA model is initiated in 2 ways: one is hardware (machine) failure and the other is software (Operating System) failure. When the ESXi hardware fails on a system monitored by HA, VMware will automatically restart the Virtual Machine image on another ESXi host. If the OS becomes unresponsive, VMware Will start the virtual machine on another ESXi host and bring the server back online. This will lead to down time while VMware moves operations onto another host. Avaya Messaging will be down during the recovery period and will not be able to answer calls until the secondary virtual image is fully up and running. The recovery occurs automatically but it must be 'hard coded' to a specific recovery ESXi server. If there are no available resources on the recovery server, Avaya Messaging may fail to restart.
- Distributed Resource Scheduler: Distributed Resource Scheduler is intended for sites with multiple physical ESXi servers available. DRS keeps track of hardware resources and is able to see the current availability of CPUs, RAM, etc. on all servers. When the main server crashes, DRS will automatically allocate the necessary resources and restart the virtual machine in a suitable environment. This means that Avaya Messaging will be guaranteed a minimum level of resources upon recovery to ensure there is no reduction in service. This is an advantage offered by DRS when compared to HA alone since HA does not consider hardware requirements when allocating space for a new virtual machine to replace the crashed server.

- Fault Tolerance: Fault Tolerance offers a higher level of protection than HA by eliminating downtime. A virtual machine being monitored by an FT system will have a shadow image created that is identical to the monitored virtual machine. When the main server becomes unavailable for any reason, the shadow image which has been reproducing all activity on the main server will become active, instantly replacing the crashed server. This reduces the chance of interruption or data loss in most active environments. However, due to the extensive nature of FT's monitoring, FT can only support virtual machines with a single core CPU. This does not
  meet Avaya Messaging Voice Server's minimum hardware requirements, so Avaya Messaging will remain incompatible with FT until the algorithm is changed to support the resources required.

VM Environment Feature Comparison Chart

	HA	DRS	FT
Active Migration	N	n	N
Recovery from Hardware Crash	Y	y	y
Recovery from Software Crash	Y	Y	Y
0 Downtime during crash	N	N	Y
Smart Allocation of Hardware Resources	N	Y	N
Avaya Messaging support	Y	Y	N
Known Behaviors			
Voice Traffic	Interrupted until HA recovers	Interrupted until HA recovers	N/A
Messaging	Interrupted until HA recovers	Interrupted until HA recovers	N/A
CTI	Interrupted until HA recovers	Interrupted until HA recovers	N/A

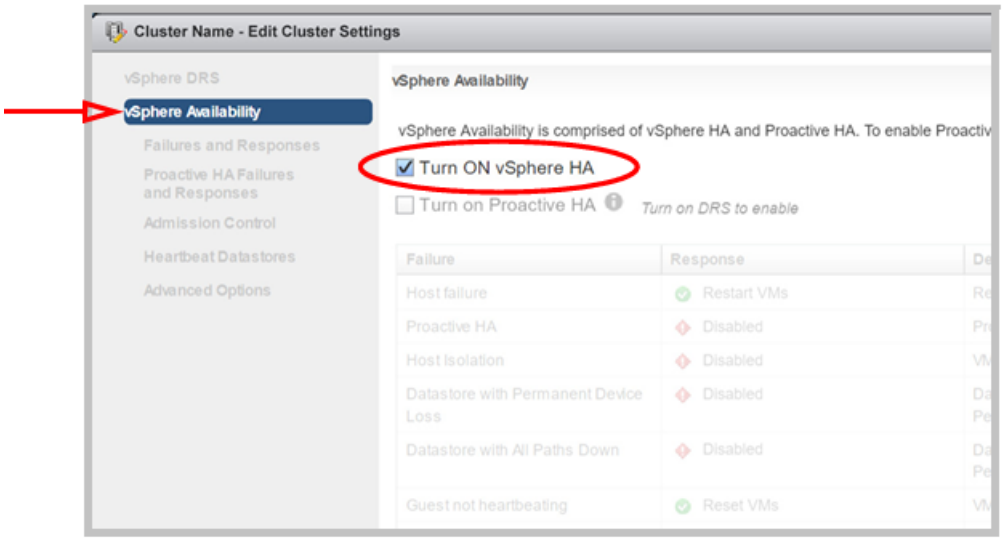
Due to the way in which Fault Tolerance is designed, Avaya Messaging cannot function within the FT model. FT is limited about computer resources (e.g., single core processor) while Avaya Messaging has specific minimum resource requirements to function properly. Until VMware upgrades the FT system to support higher amounts of resources, Avaya Messaging cannot be deployed under the FT model.

VMware: HA for the Consolidated Server

In a High Availability environment, the Primary and all Secondaries act as backups for each other. If one server fails, the Consolidated server redirects traffic through the remaining operational units preventing any service interruptions.

However, the Consolidated server has no such protection. If the Consolidated server fails, the entire system will fail. VMware includes an HA option for its Hosts, providing failover support for the Consolidated server. Both the Consolidated and Primary voice servers can back up this way. The Secondary voice servers cannot.

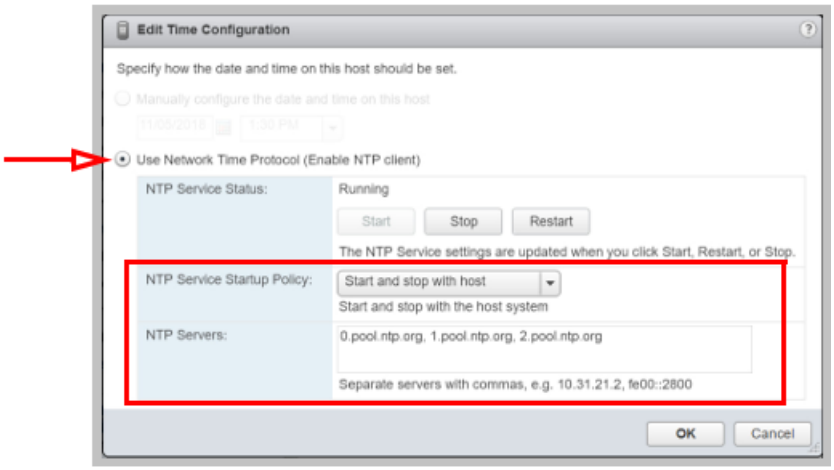
1. The site admin must install and configure VMware vSphere on the network. There should also be an external SAN for data storage.
2. Create a Cluster within vSphere.
   - When configuring the Cluster, under vSphere Availability, ensure that Turn ON vSphere HA is enabled.



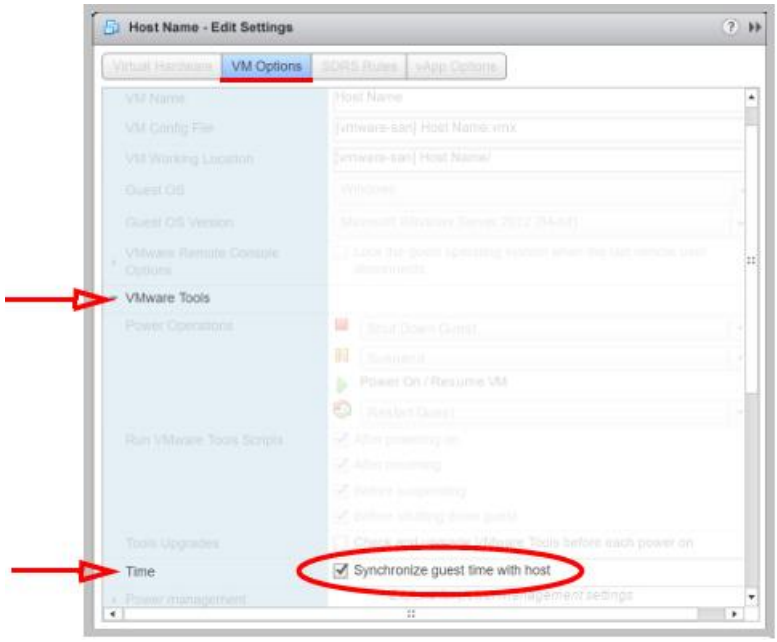
3. Add 2 or more Hosts within the Cluster. One Host contains the virtual machine that houses the Consolidated server, while the others are available should the active Host fail.

   Important: It is essential that all of the Host servers (Consolidated, Primary, and backups) have their clocks synchronized. Certain critical functions within Avaya Messaging are time sensitive and will fail if the Hosts are not coordinated.

4. For each Host, open the Configuration tab and go to System >Time Configuration.
   - Enable Use Network Time Protocol (Enable NTP client).
   - Set the NTP Service Startup Policy to Start and stop with host.
   - Enter one or more NTP servers in the space provided. The time signals will be synchronized with these sites.
   - Start / Restart the NTP Service to activate the changes.



5. Create virtual machines and choose the SAN as the data storage location.
6. Edit the settings for each virtual machine. Under VM Options > VMware Tools > Time, enable Synchronize guest time with host.



7. Install the Avaya Messaging Consolidated server onto one of the virtual machines. If the Host with the virtual machine running the Consolidated server fails, VMware will automatically move the server to another Host within the Cluster and restart the virtual machine.

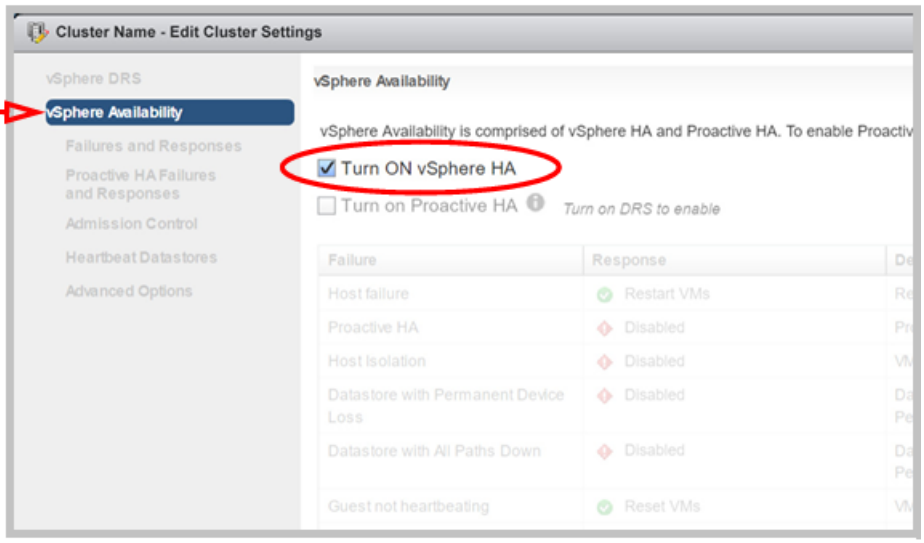
Important: The Avaya Messaging system will be unavailable during the changeover and reboot process.

VMware: HA for the Primary Voice Server

In a High Availability environment, the Primary and all Secondaries act as backups for each other. If one server fails, the Consolidated server redirects traffic through the remaining operational units preventing any service interruptions.

VMware includes an HA option for its Hosts, providing failover support for the Primary voice server. Both the Consolidated and Primary voice servers can back up this way. The Secondary voice servers cannot.

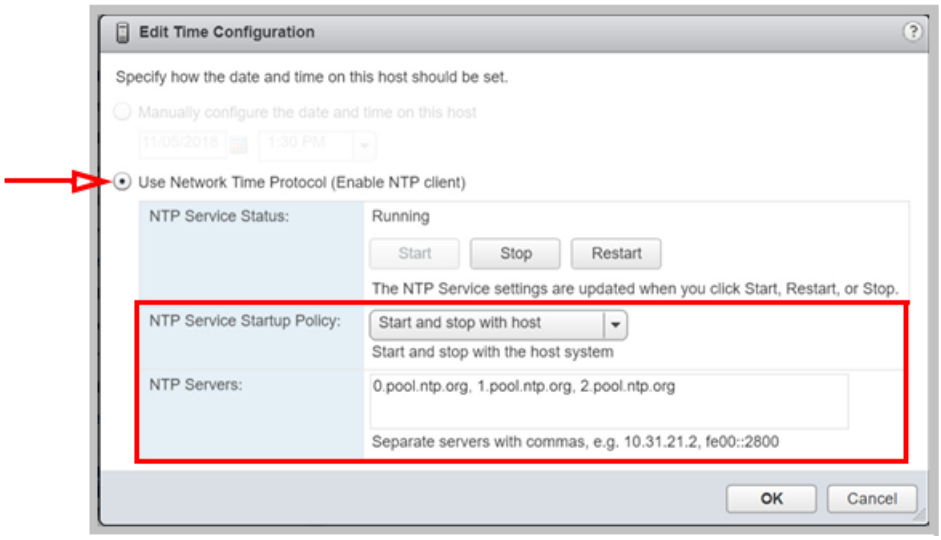
1. The site admin must install and configure VMware vSphere on the network. There should also be an external SAN for data storage.
2. Create a Cluster within vSphere.
   - When configuring the Cluster, under vSphere Availability, ensure that Turn ON vSphere HA is enabled.



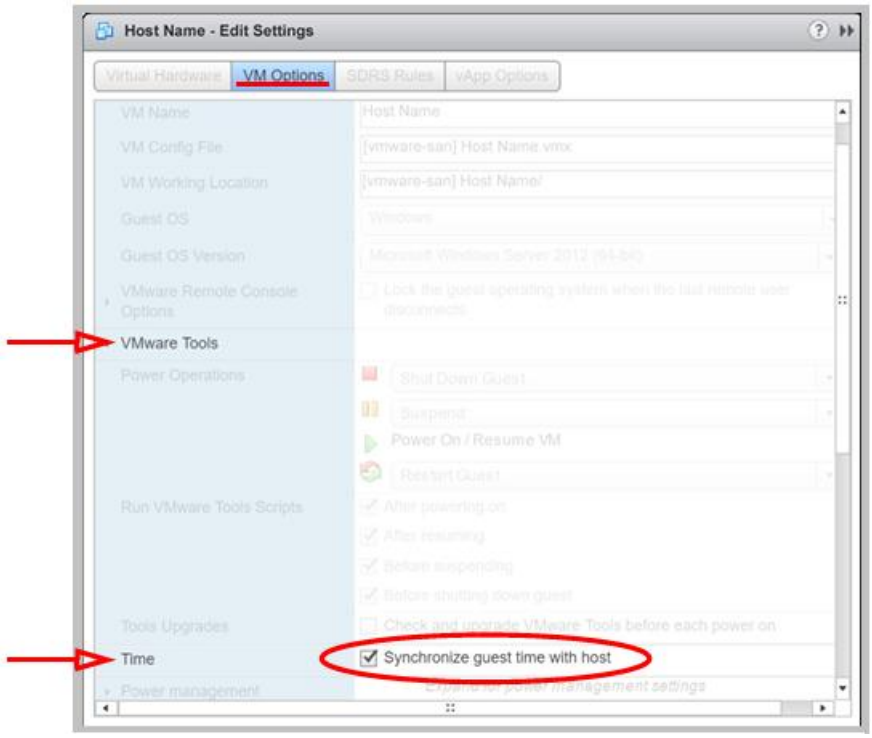
3. Add 2 or more Hosts within the Cluster. One Host contains the virtual machine that houses the Primary voice server, while the others are available should the active Host fail.

   Important: It is essential that all of the Host servers (Consolidated, Primary, and backups) have their clocks synchronized. Certain critical functions within Avaya Messaging are time sensitive and will fail if the Hosts are not coordinated.

4. For each Host, open the Configuration tab and go to System >Time Configuration.
   - Enable Use Network Time Protocol (Enable NTP client).
   - Set the NTP Service Startup Policy to Start and stop with host.
   - Enter one or more NTP servers in the space provided. The time signals will be synchronized with these sites.
   - Start / Restart the NTP Service to activate the changes.



5. Create virtual machines and choose the SAN as the data storage location.
6. Edit the settings for each virtual machine. Under VM Options > VMware Tools > Time, enable Synchronize guest time with host.



7. Install the Avaya Messaging Primary voice server onto one of the virtual machines. If the Host with the virtual machine running the Primary voice server fails, VMware will automatically move the server to another Host within the Cluster and restart the virtual machine.

   Important: The Avaya Messaging system will be unavailable during the changeover and reboot process.

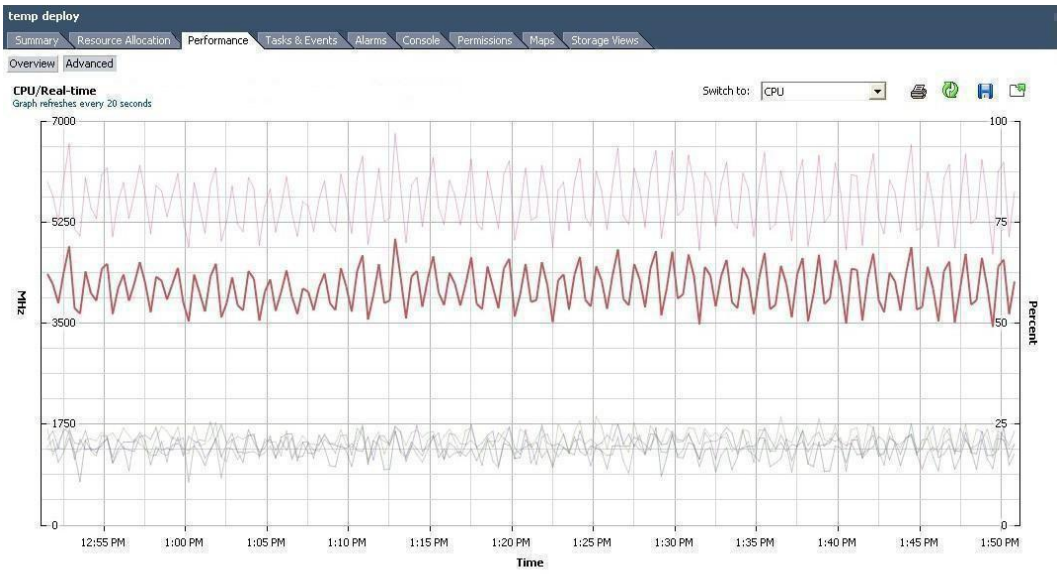
Additional Considerations for AACCUsers

There are additional conditions for sites that are integrating with Avaya Aura Contact Center. • The Avaya Messaging virtual machine must use the same network interface card (NIC) for both ELAN and CLAN

- On the CS1000, configure the parameter Set Type = 2008 for the DMG ports.
- Configure the following 2 services for Automatic (Delayed Start):
- UC Voice Server
- UC Service Recovery Manager (found on the Consolidated Server)

Virtual Environment Deployment Example

The following are performance results from a virtualized Avaya Messaging system running 100 active voice ports with 1,000 users registered under the system. Please keep in mind that this is a limited test run to showcase how a typical operation may perform under a virtual environment. This example does not guarantee an identical level of performance on every virtual environment, but rather serves as a guideline with regards to Avaya Messaging's behavior under virtual environments.



Key	Object	Measurement	Rollup	Units	Latest	Maximum	Minimum	Average
	2	Usage in MHz	Average	MHz	1408	1753	749	1307.307
	temp deploy	Usage	Average	Percent	60.35	70.95	49.09	58.945
	temp deploy	Usage in MHz	Average	MHz	5779	6793	4700	5643.95
	1	Usage in MHz	Average	MHz	1631	1790	742	1359.134
	0	Usage in MHz	Average	MHz	1237	1748	967	1397.089
	3	Usage in MHz	Average	MHz	1383	1883	1041	1484.603

CPU Usage

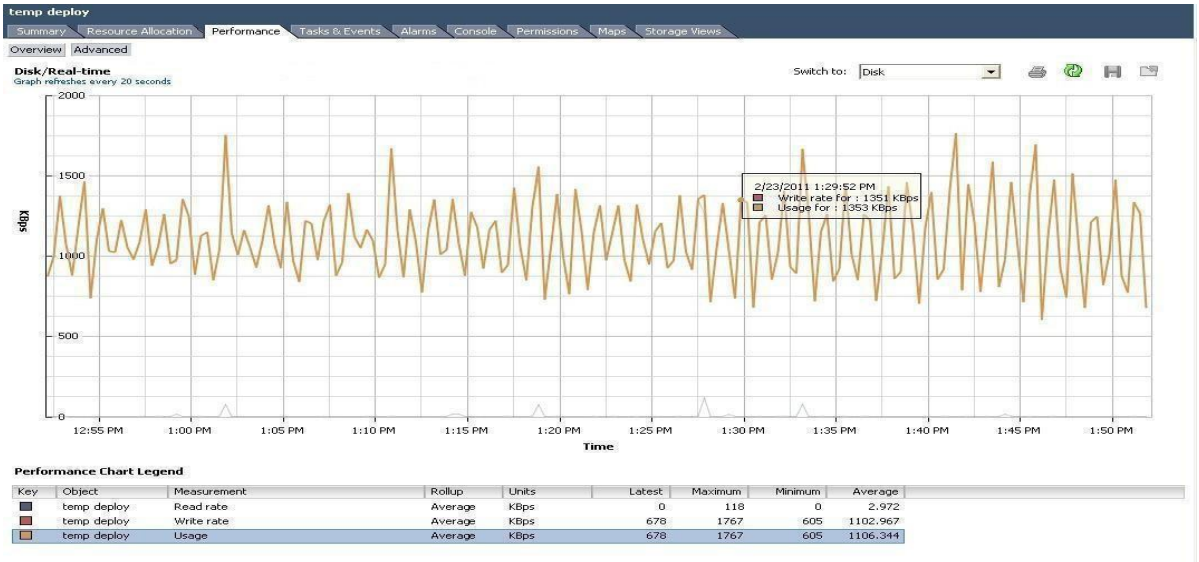
Avaya Messaging used an average of 58.945% of the CPU capacity, which equates to 5,643.95 MHz. When considering the Maximum requirement, providing at least 6.8 GHz of CPU resources to Avaya Messaging will guarantee a consistent level of performance.

Datastore Latency



Key	Object	Measurement	Rollup	Units	Latest	Maximum	Minimum	Average
	openfilersan2	Read rate	Average	KBps	0	118	0	2.972
	openfilersan2	Write rate	Average	KBps	1266	1767	604	1105.6
	openfilersan2	Read latency	Average	Millisecond	12	72	0	5.356
	openfilersan2	Write latency	Average	Millisecond	2	6	1	2.378

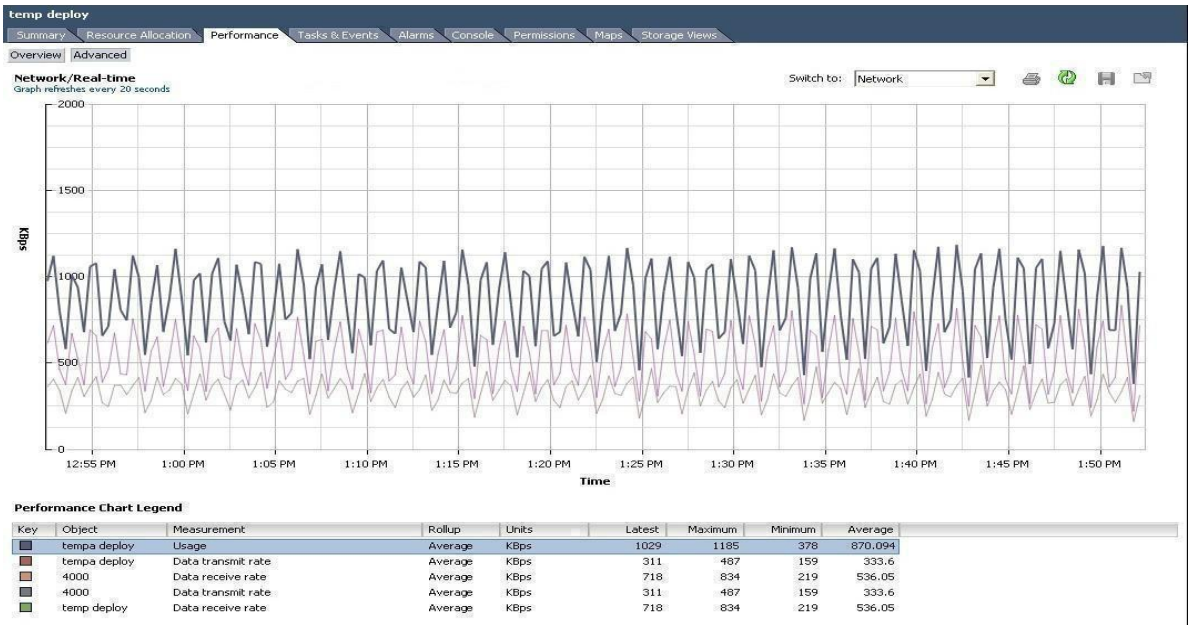
Avaya Messaging achieved a low average latency of 5.356ms for reading and 2.378ms for writing.



Disk Usage Rate

Avaya Messaging had an average disk usage rate of 1,106.344 KBps with a peak of 1,767 KBps. Ensuring a data transfer.

Network Usage Rate



Avaya Messaging had an average network usage rate of 870.094 KB/s with a peak of 1,185 KB/s. Providing 1,500 KB/s of network bandwidth to Avaya Messaging will guarantee a consistent level of performance.

Conclusion

Since Avaya Messaging is designed to be the sole application running on a given Virtual Machine, it is easy to assign the necessary resources for Avaya Messaging. By ensuring that Avaya Messaging always has access to the required resources, you will be able to guarantee the level of performance required by your site.

Chapter 8: SERVER MESSAGING TYPE CHARACTERISTICS AND DEPLOYMENT SCENARIOS

E-mail Server Synchronization (CSE)

Unified Messaging Deployment Email Requirements

Deployment of Unified Messaging into an email system is limited to tested and verified email server environments. Please refer to the chart below to determine if a site is compatible for UM deployment.

Email Server	Requirements	Contact Sync	Calendar Sync	Comments
Exchange 2010/2013	Configure to be compatible With Avaya Messaging. Enables IMAP4	Y	Y	
Google Apps Gmail	Configure to be compatible With Avaya Messaging. Enables IMAP4	Y	Y	Oauth performs Super User function

Note: CSE is based on IMAP4 standards. Other email servers with this same capability may function correctly but take note that they have not been validated by Avaya.

Avaya Messaging's CSE gateway can now utilize high performance pace (HPP) mode when connecting to an Exchange server. The HPP mode uses an event-driven model to communicate information changes between the Avaya Messaging Server and the Exchange server. This contrasts with the polling model used in previous releases which continues to be used in the current release with non- Exchange servers. The default setting for HPP mode is "enabled".

To turn it off it is necessary to go to the IMAP Tester utility. The benefit of using HPP mode is a significant reduction in CPU usage on the voice Server. When a voicemail message is received by the Avaya Messaging Server the MWI on the user's telephone is extinguished. When the message from the phone or Web Client is read the MWI is no longer lit. Unified users with access to all their phone and email messages may notice a slight delay before their MWI is extinguished when accessing their messages via their email client (Outlook, etc).

This delay is very short and can be modified based on individual user priorities and on how many users are in the feature group. The following tables indicate MWI behavior in a controlled environment. The following data reflects traffic with inbox-only synchronization with a maximum message count of 250 messages in the inbox. Keep in mind that using HPP mode ignores the priority assigned to mailboxes, which means that the following information does not apply to HPP systems.

Unified Messaging Capacity

The following chart illustrates the capacity of CSE server on a UM environment.

Capacity	
Maximum number of total users on system	20,000
Maximum number of M+C users on system	10,000
Maximum number of users for 1 CSE Server	5,000
Maximum number of users for 2 CSE Server	10,000
Maximum number of users for 3 CSE Server	15,000
Maximum number of users for 4 CSE Server	20,000

MS Exchange Performance Considerations

Microsoft advises that a large numbers of items in folders can decrease the speed of operations in Exchange. For details on MS Exchange 2010, refer to the following link: https://learn.microsoft.com/en-us/previous-versions/office/exchange-server-2010/ee832791(v=exchg.141)?redirectedfrom=MSDN

Deployment: Basic Unified Messaging

Integrated Messaging is a unified view of all messages in a user's email client. There are two methods of deploying Basic Unified Messaging (UM):

Deployment 1 - Basic UM via SMTP Forwarding

In this deployment Avaya Messaging forwards received voice and fax messages to an SMTP* compliant email server. All message types are stored on the email server and the user is given a single view in their email client.

Note: Simple Mail Transfer Protocol (SMTP) is a TCP/IP protocol used to send and receive email.

You can record voice mail responses from your PC desktop and either have these responses sent via email or forwarded to others. You also have the option of responding to a voice mail with a simple email.

Note: As the reply destination would be the user's mailbox and not that of the original sender the 'Reply' feature is not available.

You respond to a voice message from Outlook via the 'Forward' feature, by keying in your response and selecting a recipient from the Global Address List. By this method both the original voice message and the email response is sent back to the original sender.

Note: The Avaya Messaging toolbar plug-in (Outlook only) is required to enable the recording of voice replies to voice messages from email.

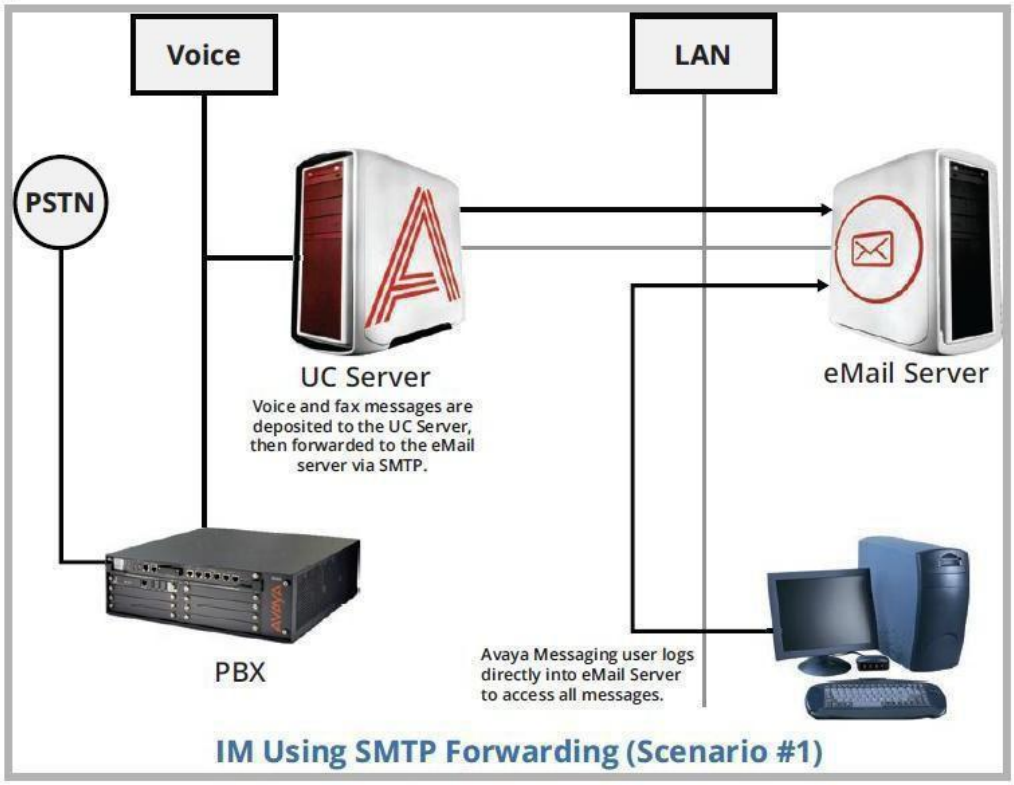
Deployment 1 is ideal for PC-centric desktop users who want to retrieve their messages via their email client. Such users do not typically need to check their voice messages by telephone. They may access this option if the voice messages are copied and sent to the email server rather than deleted from the voice Server.

SMTP forwarding may be deployed in the following email environments:

- Exchange 2010/2013
- Gmail (Google Apps)
- Office 365

The email server must be configured to accept attachments (WAV attachments specifically) and the client PC must have a media player installed that can play GSM compressed WAV files (i.e., Windows Media Player).

Warning: Users of SMTP forwarding should make careful use of the Delete after Forward option. If this option is selected messages are permanently deleted immediately after being forwarded to the designated email address. In the event of a failure to deliver the message (receiving server is down, mailbox is full, invalid address, etc.), an “undeliverable mail” message will be received in the inbox on the Avaya Messaging Server. Although the forwarded message will still be accessible from the Sent folder the Web Client application must be used to access this folder (by the user or the System Administrator) and retrieve the message.

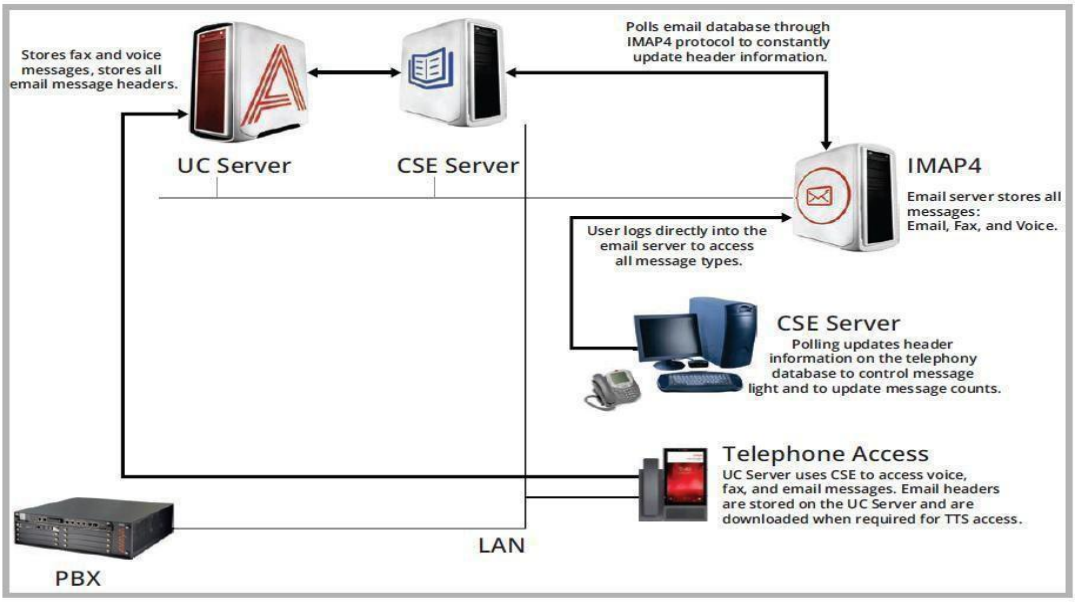


Deployment: Advanced Unified Messaging

Unified Messaging is a unified view and single point of management for phone, web, and email messages.

CSE (Content Synchronization Engine) / CSE Gateway

The CSE gateway connects directly to the current email server for synchronized message access. Email servers currently supported include Exchange 2010 / 2013, and Gmail (Google Apps). CSE polls the messaging servers on a schedule determined by the System Administrator. At the time of the poll, actions and changes are synchronized. Although polling activity on the Avaya Messaging Server does use a lot of CPU resources the service is low priority and uses CPU resources only as they become available. Any time another service or process requires CPU resources the polling service releases the needed resources. This applies to Gmail.



CSE Deployment

Microsoft Exchange Configurations

- Although Exchange can be in Mixed mode, an additional CSE Gateway must be purchased for each separate Exchange Server (i.e., non-clustered).
- Active Directory in Mixed mode is supported.
- The CSE Gateway does not work directly with the Exchange store, but uses standard IMAP4 protocol to access mailboxes, folders and messages contained within the message store.
- UC deployments cause a considerable increase in transaction log activity on the Exchange Server. Make sure you have enough available hard disk storage space for additional logging. The general rule (how much space required for logging after UC implementation) is twice your current logging storage requirements.
- In order to perform synchronization with the mail store the CSE Gateway will connect to the Exchange server which will increase overall system traffic. This in turn can cause an increase in the amount of transaction logs generated by Exchange. In addition, the CSE Gateway will increase the size of the message store within Exchange. This, in combination of with the above, results in a higher growth rate of transaction logs. These increases are discussed at the following online links: https://learn.microsoft.com/en-us/exchange/?redirectedfrom=MSDN#TheStmFilehttp://forums.msexchange.org/m_1800422 107/mpage_1/tm.htm#1800422251
- The structure of the .STM and set of operations recorded into the transaction logs while working with the .STM might be different from operations with the .EDB (standard part of the message store).

Make sure your Exchange Server meets Microsoft's recommended minimum specifications prior to deploying UC.

Chapter 9: FREQUENTLY ASKED QUESTIONS

Included are the 10 most viewed solutions, and the 10 with the highest customer ratings.

Top Viewed Solutions

Best practices for installing Windows Updates.

To prevent unexpected down time, Avaya recommends that Windows Updates be set to Download updates but let me choose whether to install them. With this setting the user can schedule an appropriate time to install the upgrades with a minimum of disruption since a system reboot is usually required.
Avaya tests all windows updates as they are released and if any cause conflicts with our software, a technical bulletin will be released, and a knowledge base article is created. Contact Avaya Customer Support for further information.

Transfer not working on SIP systems.

Transfers to any number are not working on SIP systems when you call into the auto attendant and transfer to an internal or external number. The voicemail seems to perform the transfer but then the call is dropped. For a call to be transferred, the system must put the call on hold. If the call gives Anonymous@anonymous.invalid as contact info, then the system cannot put this call on hold since there is no specific call information to pass to the PBX. This can be seen by running a Wireshark trace and using a SIP filter.

SMTP Forwarding not working.

SMTP Forwarding is not working. When checking the VPIM log, voicemail does connect to the email server but the message is rejected. The log shows Client Not Authenticated because the email server is looking for SMTP authentication which is not supported. STMP Authentication must be disabled on the email server.

How to setup up remote admin.

Remote Admin allows system administrators and support personnel to remotely access Avaya Messaging Admin from a workstation. However, using Remote Admin means that more than one person can be modifying the database at one time. If two or more people make changes to the same entry, some changes may be overwritten without notification. The maximum number of people that can connect through Remote Admin is 5. AM Admin must be installed on each workstation where Remote Admin is to be used.

1. Insert the Avaya Messaging installation DVD. Browse to the root folder and double-click TOLEE_Admin.exe.
2. Click Next to continue with the installation.
3. Select the drive where Remote Admin will be installed. Click Next.
4. Confirm the selection, and then click Next to begin copying the files.
5. Click Finish when completed.

Remote Admin is now ready to be used. A shortcut has been placed on the Windows desktop for convenience.

Call voicemail and the system asks for MBX number not password.

When calling into the voicemail server to retrieve messages, the system should prompt for the mailbox password, but it is asking for the mailbox number instead. This occurs when more than one mailbox has the same extension. In AM Admin, go to the Mailbox Structure > Addresses tab. Review all listed addresses to find one with the same extension. Remove the extension from the other mailbox.

Say date and time or caller ID.

Starting with Avaya Messaging 8.x, caller ID and message delivery information are not heard. Users do not hear the date, time or caller ID of a message even when pressing the key for Envelope Information in the TUI. In 8.X, Caller ID, date, time and delivery flags (i.e., urgent, important, etc.) for a message are part of the Message Envelope. To activate the function, open the TUI associated with the mailbox and in sub menu 2, open Envelope Information and enable the options you want to include in the playback.

Top Rated Solutions

Notification to cell.

Set up a mailbox to outcall to a cellphone for notifications. After leaving a message, the cell does not ring, and the ports are not making an outcall. Make sure that Notification has a schedule setup, and the schedule has a Default Address. If the notification is to a single cellphone, do not enable Cascade Notification on the Options tab.

Setting a custom TUI to play message count.

Calling into a mailbox does not play the new message count. To play, it must be enabled on the Custom TUI. On the Custom TUI, click on Announcements, enable Play message count and select Read and Unread. Save the TUI.

Faxing out of Avaya Messaging and back to the same system fails.

Faxing a doc to another employee on the same voicemail system does not work. The fax is sent out on one port and comes in on another, taking 2 ports of the voicemail fax setup. However, faxing to another address on the same voicemail system is not supported. Internal users can only send a fax to a fax machine internally. Faxing to external numbers is not affected.

The UC License is not available on the voicemail server.

When going to Start > Programs > Office-LinX > UCLicenseUpgrade, the system displays Error 70. Cannot read license. This will occur when connecting to the voice server using Remote Desktop. Sign in on the server machine itself or access it remotely through another remote client application, such as Logmein or VNC.

Web Access cannot be displayed.

When attempting to launch Web Access through a browser, the screen does not load and there is an error message saying The page cannot be displayed or Not authorized to view the page. On the voice server (Windows Server O/S): Go to Administrative Tools > Computer Management > Local Users and Groups, select UCIISUser and click Reset Password. Then go to Computer Management > Services and Applications > Internet Information Services (IIS) > Web Sites > Default Web Site > UC. Right-click Properties and select Directory Security. Choose Edit under Authentication and Access Control. Make sure the user UCIISUser has the necessary rights and click Reset Password. Restart the World Wide Web Service.

Say date and time or caller ID.

Starting with Avaya Messaging 8.x, caller ID and message delivery information are not heard. Users do not hear the date, time or caller ID of a message even when pressing the key for Envelope Information in the TUI. In 8.X, Caller ID, date, time and delivery flags (i.e., urgent, important, etc.) for a message are part of the Message Envelope. To activate the function, open the TUI associated with the mailbox and in sub menu 2, open Envelope Information and enable the options you want to include in the playback.

After adding a PDF license, incoming faxes are still TIFF files.

After applying the PDF license and rebooting, incoming faxes are still TIFF files even though the VPIM is set to PDF. This is a voicemail issue where the VPIM server version and PDF library are not installed. Please call support for assistance with replacing the VPIM server and adding the PDF library.