Vocera Products Server Sizing Guide

Notice

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SSG-Production-Docs build 328

Contents

Introduction

The section summarizes the information covered in this guide and the related documentation that you can refer to.

About This Guide

This guide provides the sizing and scalability guidelines for implementing Vocera server infrastructure.

A list of hardware and software requirements is provided in the Server Sizing guide and it is available for the following Vocera products:

- Vocera Engage
- Vocera Messaging Platform
- Vocera Platform
- Vocera Voice Server

Related Information

Here is a list of recommended Vocera products and reference documentation that support the information in this guide.

Vocera Product Documentation

- Vocera Messaging Platform documentation
- Vocera Platform documentation
- Vocera Voice Server documentation

Server Sizing Guides for Vocera Products

- Engage Server Sizing Guide
- Vocera Messaging Platform Server Sizing Guide
- Vocera Platform Server Sizing Guide
- Vocera Voice Server Sizing Guide

Cisco and VMware Documents

- vSphere Resource Management Guide
- Performance Best Practices for VMware vSphere® 5.5
- Unified Communications Virtualization Sizing Guidelines

Note: Cisco server sizing guidelines formed the basis for Vocera's recommendations for the Vocera Voice Server.

Vocera Analytics Server Sizing Matrix

This section describes the server requirements and the performance expectations for Vocera Analytics.

Vocera Analytics Hardware Requirements

The size of your Vocera Analytics server depends on the number of users and the number of beds at your site. The requirements vary for small, medium, and large servers.

Hardware Requirements for Small, Medium, and Large Deployments

The following table contains the hardware requirement for small, medium and large servers. For information on the size of deployment, refer to Customer Deployment Sizing for Vocera Platform 5.x on page 9.

Requirement	Small	Medium	Large
Memory	32 GB	64 GB	128 GB
CPU	Octa Core (with CPU speed 2.5gHZ or above)	Octa Core (with CPU speed 2.5gHZ or above)	12 Core (with CPU speed 2.5gHZ or above)
Disk Space	500 GB HDD (per year) with SSD Cache	1 TB HDD (per year) with SSD Cache	2 TB HDD (per year) with SSD Cache
Operating System	• Windows Server 2022 • Windows Server 2019 **Note:** Supported from VA 1.2.4 Release onwards. • Windows Server 2016 • Windows Server 2012	• Windows Server 2022 • Windows Server 2019 **Note:** Supported from VA 1.2.4 Release onwards. • Windows Server 2016 • Windows Server 2012	• Windows Server 2022 • Windows Server 2019 **Note:** Supported from VA 1.2.4 Release onwards. • Windows Server 2016 • Windows Server 2012
Browser Support	Microsoft Edge 108.0.1462.54, Firefox 91.9.0 or later, Safari 11.1.2 or later, Google Chrome version 100.0.4896.127 or later (JavaScript must be enabled)		
Database Provided	MariaDB (MySQL)	MariaDB (MySQL)	MariaDB (MySQL)

Hardware Requirements for Extra Small Server Deployments

The following table lists the hardware requirements for extra small server deployments:

Requirement	Extra Small (Voice only)	Extra Small (Voice + VMP)	Extra Small (Voice + VMP + Engage)
Memory	12 GB	16 GB	24 GB
CPU	Xeon (4 Core with CPU speed 2.5gHZ or above)	Xeon (4 Core with CPU speed 2.5gHZ or above)	Xeon (4 Core with CPU speed 2.5gHZ or above)
Disk Space	300 GB HDD (per year) with SSD Cache	300 GB HDD (per year) with SSD Cache	300 GB HDD (per year) with SSD Cache

Requirement	Extra Small (Voice only)	Extra Small (Voice + VMP)	Extra Small (Voice + VMP + Engage)
Operating System	• Windows Server 2022 • Windows Server 2019 **Note:** Supported from VA 1.2.4 Release onwards. • Windows Server 2016 • Windows Server 2012	• Windows Server 2022 • Windows Server 2019 **Note:** Supported from VA 1.2.4 Release onwards. • Windows Server 2016 • Windows Server 2012	• Windows Server 2022 • Windows Server 2019 **Note:** Supported from VA 1.2.4 Release onwards. • Windows Server 2016 • Windows Server 2012
Browser Support	Microsoft Edge 108.0.1462.54, Firefox 91.9.0 or later, Safari 11.1.2 or later, Google Chrome version 100.0.4896.127 or later (JavaScript must be enabled)		
Database Provided	MariaDB (MySQL)	MariaDB (MySQL)	MariaDB (MySQL)

Hardware Requirements for Microsoft Azure Platform

The following table lists the hardware requirements for Vocera Analytics Server on Microsoft Azure Platform:

Requirement	Large Deployments
Memory	224 GB
CPU	16 Core (with CPU speed 2.5gHZ or above)
Disk Space	2 TB HDD (per year) with SSD Cache
Operating System	• Windows Server 2019 • Windows Server 2016 • Windows Server 2012
Browser Support	Internet Explorer 11, Firefox 45.0.1.0 or later, Safari 11.1.2 or later, Google Chrome version 70 or later (JavaScript must be enabled)
Database Provided	MariaDB (MySQL)
VM Size	Standard H16m_Promo
Virtual Memory (Pagefile.sys)	256 GB
IOPS	> 20000 (not less than 20000)

RAM Requirements for Vocera Analytics Components

The following table lists the RAM requirements for Vocera Analytics Database, Spark and Visualization:

Component	Percentage	12 GB System	16 GB System	24 GB System	32 GB System	64 GB System	128 GB System
Database	40%	4.8 GB	6.4 GB	9.6 GB	12.8 GB	25.6 GB	51.2 GB
Spark	25%	3 GB	4 GB	6 GB	8 GB	16 GB	32 GB
Visualization	15%	1.8 GB	2.4 GB	3.6 GB	4.8 GB	9.6 GB	19.2 GB

RAM Requirements for Vocera Voice Server

The following table lists the Vocera Voice Server hardware (RAM) requirements for small, medium, and large Vocera Analytics servers.

Requirement	Extra Small	Small	Medium	Large
RAM Additions for Voice Server	1 GB	2 GB	2 GB	4 GB

Note: For Voice Servers in cluster mode, ensure additional RAMs are added on all nodes.

Note: Vocera Analytics does not support memory oversubscription.

Note: Each Vocera Analytics server configuration supports 1 Active Directory at a time.

Note: Each Vocera Analytics server configuration supports 1 Vocera Voice Server.

Note: To run properly, the Vocera Analytics Agent running on a Vocera Voice Server (VS) will require 2 GB of RAM when interacting with a small or medium Vocera Analytics Server database and 4 GB of RAM when interacting with a large Vocera Analytics Server database. If the VS does not have sufficient memory to meet the mandated minimum memory for the VS plus the needs of the Vocera Analytics Agent, memory will need to be added to the VS. For example, a VS running version 5.2.3 requires a minimum of 8 GB of RAM. If the Vocera Analytics Agent will be interacting with a large Vocera Analytics Server database requiring 4 GB of RAM, the server running the VS and the Vocera Analytics Agent must have a minimum of 8 + 4 or 12 GB of RAM installed. If it does not, sufficient RAM to meet or exceed the 12 GB requirement should be added. If the VS is running in a virtual environment, Memory Over Subscription is not supported and the Host Server should have sufficient physical RAM to support the memory allocated to the Guest Servers plus the Hypervisor.

Disk Space Requirements for Vocera Voice Server

As Vocera Analytics recommends you to retain Voice Server log files for 7 days, ensure that you increase the disk space accordingly. For example, within a day, if 5 GB Voice Server logs are generated, then you must have at least an additional 35 GB disk space.

Note: Ensure that you add the additional disk space on all nodes of the Voice Server.

For more information on log retention policy for Voice Server, refer to Log Retention Policy for Voice Server on page 11.

Vocera Analytics Hardware Requirements for Vocera Platform 6.x

The size of your Vocera Analytics server depends on the number of users and the number of beds at your site. The requirements vary for small, medium, and large servers.

Hardware Requirements for Small, Medium, and Large Deployments

The following table contains the hardware requirement for small, medium and large servers. For information on the size of deployment, refer to Customer Deployment Sizing for Vocera Platform 6.x on page 10.

Requirement	Small	Medium	Large
Memory	32 GB	64 GB	128 GB
CPU	Octa Core (with CPU speed 2.5gHZ or above)	Octa Core (with CPU speed 2.5gHZ or above)	12 Core (with CPU speed 2.5gHZ or above)
Disk Space	500 GB HDD (per year) with SSD Cache	1 TB HDD (per year) with SSD Cache	2 TB HDD (per year) with SSD Cache

Requirement	Small	Medium	Large
Operating System	• Windows Server 2022 • Windows Server 2019 **Note:** Supported from VA 1.2.4 Release onwards. • Windows Server 2016 • Windows Server 2012	• Windows Server 2022 • Windows Server 2019 **Note:** Supported from VA 1.2.4 Release onwards. • Windows Server 2016 • Windows Server 2012	• Windows Server 2022 • Windows Server 2019 **Note:** Supported from VA 1.2.4 Release onwards. • Windows Server 2016 • Windows Server 2012
Browser Support	Microsoft Edge 108.0.1462.54, Firefox 91.9.0 or later, Safari 11.1.2 or later, Google Chrome version 100.0.4896.127 or later (JavaScript must be enabled)		
Database Provided	MariaDB (MySQL)	MariaDB (MySQL)	MariaDB (MySQL)

Hardware Requirements for Extra Small Server Deployments

The following table lists the hardware requirements for extra small server deployments:

Requirement	Extra Small (Voice + Engage)
Memory	24 GB
CPU	Xeon (4 Core with CPU speed 2.5gHZ or above)
Disk Space	300 GB HDD (per year) with SSD Cache
Operating System	• Windows Server 2022 • Windows Server 2019 **Note:** Supported from VA 1.2.4 Release onwards. • Windows Server 2016 • Windows Server 2012
Browser Support	Microsoft Edge 108.0.1462.54, Firefox 91.9.0 or later, Safari 11.1.2 or later, Google Chrome version 100.0.4896.127 or later (JavaScript must be enabled)
Database Provided	MariaDB (MySQL)

RAM Requirements for Vocera Analytics Components

The following table lists the RAM requirements for Vocera Analytics Database, Spark and Visualization:

Component	Percentage	12 GB System	16 GB System	24 GB System	32 GB System	64 GB System	128 GB System
Database	40%	4.8 GB	6.4 GB	9.6 GB	12.8 GB	25.6 GB	51.2 GB
Spark	25%	3 GB	4 GB	6 GB	8 GB	16 GB	32 GB
Visualization	15%	1.8 GB	2.4 GB	3.6 GB	4.8 GB	9.6 GB	19.2 GB

RAM Requirements for Vocera Voice Server

The following table lists the Vocera Voice Server hardware (RAM) requirements for small, medium, and large Vocera Analytics servers.

Requirement	Extra Small	Small	Medium	Large
RAM Additions for Voice Server	1 GB	2 GB	2 GB	4 GB

Note: For Voice Servers in cluster mode, ensure additional RAMs are added on all nodes.

Note: Vocera Analytics does not support memory oversubscription.

Note: Each Vocera Analytics server configuration supports 1 Active Directory at a time.

Note: Each Vocera Analytics server configuration supports 1 Vocera Voice Server.

Note: To run properly, the Vocera Analytics Agent running on a Vocera Voice Server (VS) will require 2 GB of RAM when interacting with a small or medium Vocera Analytics Server database and 4 GB of RAM when interacting with a large Vocera Analytics Server database. If the VS does not have sufficient memory to meet the mandated minimum memory for the VS plus the needs of the Vocera Analytics Agent, memory will need to be added to the VS. For example, a VS running version 5.2.3 requires a minimum of 8 GB of RAM. If the Vocera Analytics Agent will be interacting with a large Vocera Analytics Server database requiring 4 GB of RAM, the server running the VS and the Vocera Analytics Agent must have a minimum of 8 + 4 or 12 GB of RAM installed. If it does not, sufficient RAM to meet or exceed the 12 GB requirement should be added. If the VS is running in a virtual environment, Memory Over Subscription is not supported and the Host Server should have sufficient physical RAM to support the memory allocated to the Guest Servers plus the Hypervisor.

Disk Space Requirements for Vocera Voice Server

As Vocera Analytics recommends you to retain Voice Server log files for 7 days, ensure that you increase the disk space accordingly. For example, within a day, if 5 GB Voice Server logs are generated, then you must have at least an additional 35 GB disk space.

Note: Ensure that you add the additional disk space on all nodes of the Voice Server.

For more information on log retention policy for Voice Server, refer to Log Retention Policy for Voice Server on page 11.

Customer Deployment Sizing for Vocera Platform 5.x

Customer deployment sizing determines the recommended deployment size and uses the data parameters to categorize deployments as small, medium, or large.

The following table displays the data parameters and the recommended deployment sizing:

Note:

- One month of data is displayed in 10-15 seconds for Reports and Dashboards.
- Data can be exported in 30-45 seconds.

Data Parameters	Extra Small	Small	Medium	Large
Vocera Voice Server Users	150	450	2000	5000-20000
VMP Users	150	200	3000	10000
Beds	150	300	500	1000
Vocera Platform Users	150 per shift	450 (225 per shift)	1000 (500 per shift)	2000 (1000 per shift)
Clinical Alarms	1100/day	2200/day	5000/day	9500/day
Nurse Call Alerts	1600/day	3200/day	11000/day	22000/day

Data Parameters	Extra Small	Small	Medium	Large
Orders	200/day	400/day	1200/day	2400/day
Lab Alerts	10/day	24/day	75/day	150/day
VMI Messages	1000 messages/day	2000 messages/day	10000 messages/day	60000 messages/day
Calls Per Day	1500 calls/day	2000 calls/day	10000 calls/day	60000 calls/day
VCS Messages	2000 messages/day	9000 messages/day	40000 messages/day	400,000 messages/day

The following table lists the data parameters for Extra Small deployments that include Voice, Voice+VMP, and Voice+VMP+Engage combinations.

Data Parameters	Extra Small (Voice Only)	Extra Small (Voice + VMP)	Extra Small (Voice + VMP + Engage)
Vocera Voice Server Users	150	150	150
VMP Users	-	150	150
Beds	-	-	150
Engage Users	-	-	150 per shift
Clinical Alarms	-	-	1100/day
Nurse Call Alerts	-	-	1600/day
Orders	-	-	200/day
Lab Alerts	-	-	10/day
VMI Messages	1000 messages/day	1000 messages/day	1000 messages/day
Calls Per Day	1500 calls/day	1500 calls/day	1500 calls/day
VCS Messages	-	2000 messages/day	2000 messages/day

Customer Deployment Sizing for Vocera Platform 6.x

Customer deployment sizing determines the recommended deployment size and uses the data parameters to categorize deployments as small, medium, or large.

The following table displays the data parameters and the recommended deployment sizing:

Note:

- One month of data is displayed in 10-15 seconds for Reports and Dashboards.
- Data can be exported in 30-45 seconds.

Data Parameters	Extra Small	Small	Medium	Large
Vocera Voice Server Users	150	450	2000	5000-20000
Beds	150	300	500	1000
Vocera Platform Users	150 per shift	450 (225 per shift)	1000 (500 per shift)	2000 (1000 per shift)
Clinical Alarms	1100/day	2200/day	5000/day	9500/day
Nurse Call Alerts	1600/day	3200/day	11000/day	22000/day
Orders	200/day	400/day	1200/day	2400/day
Lab Alerts	10/day	24/day	75/day	150/day
VMI Messages	1000 messages/day	2000 messages/day	10000 messages/day	60000 messages/day

Data Parameters	Extra Small	Small	Medium	Large
Calls Per Day	1500 calls/day	2000 calls/day	10000 calls/day	60000 calls/day
Vina Messages	2000 messages/day	9000 messages/day	40000 messages/day	400,000 messages/day

Log Retention Policy for Voice Server

Log files contain relevant information that are used to troubleshoot specific issues or errors. Log files should be retained for a particular period of time before it can be deleted.

By default, the Vocera Voice Server retains up to 100 log files. However, Vocera Analytics recommends that you retain log files for a minimum of 7 days.

To increase the log files size, perform the following steps:

Vocera Voice Server Releases 5.3.3 and Later

1. Logon to all Voice Servers.
2. Navigate to <Vocera_Drive>`\Vocera\Server\Conf\`
3. Open `logback.xml`.
4. Modify line 27 (<maxFiles>${file.maxFiles:-100}</maxFiles>) to 490 from 100.
5. Save the file.
6. Restart Voice Server services

   Restart the standby server first and then the failover.

Vocera Voice Server Releases 5.3.2 and Earlier

1. Modify the **LogMaxFiles** property in the `\vocera\server\Properties.txt` file on the Vocera Voice Server:

   For example, consider 70 VS log files (Log filename begins with **log-***), are generated in a day, then you must set the LogMaxFiles value to 490, which is (70x7=490).

   ```
   LogMaxFiles     =     490
   ```

2. Stop and start the Vocera Voice Server to load the properties into memory.

Note: Perform these steps on the passive Voice Server. Consequently, do a failover of the active Voice Server so that it becomes passive. Now, perform the steps on the Voice Server that just turned passive.

Vocera Engage 5.x Server Sizing Matrix

The Vocera Engage Server Sizing Guide provides the sizing and scalability guidelines for implementing Engage server infrastructure.

Appliance Environment Requirements

This table lists the Appliance Environment Requirements for the Vocera Communications Engage Medical Device Alarm Notification (EMDAN) product.

Component	Specification
EMDAN	• A server rack capable of housing a 1U rack mountable enterprise appliance, 1.68"(w) x 14"(d) x 1.75" (h) and 25 lbs • 120VAC Switching, 4A max, 260 Watts • 10 to 35 C (50 to 95 F) operating temperature • 90% non-condensing operating relative humidity • 887 BTU output, 12,000 hours, RFTB • EMI Safeguards

Engage 5.x Server VMware Requirements

Vocera provides the FTP site and login credentials to access the appliance. The virtual machine (VM) is provided as an `.ovf` file containing the entire VM and application.

Browser Requirements

- Microsoft Internet Explorer version 10 or later
- Firefox version 47 or later
- Apple Safari version 10.10 or later
- Chrome version 53 or later

Network Requirements

All network segments from the monitor to the fixed or mobile communication device should have a network latency for an 8000 byte packet of no more than 70 milliseconds, or an end-to-end latency of no more than 500 milliseconds.

VM Requirements

Component	Specification
Network Addresses	1 – Static IP address with network connectivity to required data sources
Remote Connectivity	Remote connectivity through VPN client from Vocera Engage
Operating System	Support for Linux 64-bit operating system

Firewall Requirements

The following firewall requirements should be configured to successfully install, update, and support the Vocera Engage application and the operating system.

Port	Destination	Purpose
22	svc.ext-inc.com(199.180.201.227)	Remote Support (SSH)
443	(199.180.201.227)	Initial Server Provisioning Port must be left open for Remote Support
443	yum.ext-inc.com (38.99.68.43)	Upgrade repository for OS and Application

Vocera Engage 7.x Server Sizing Matrix

The Vocera Engage Server Sizing Guide provides the sizing and scalability guidelines for implementing Vocera Engage server infrastructure.

Physical Appliance Information

This section provides a list of the specifications for the physical appliance for the Vocera Engage 7.x product.

Important: This appliance supports a maximum of 500 concurrent users.

Component	Specification
Vocera Engage Appliance Specifications	• A server rack capable of housing a 1U rack mountable enterprise appliance, 1.68"(w) x 14"(d) x 1.75" (h) and 25 lbs. • 120VAC Switching, 4A max, 260 Watts • 10 to 35 C (50 to 95 F) operating temperature • 90% non-condensing operating relative humidity • 887 BTU output, 12,000 hours, RFTB • EMI Safeguards

Important:
The Vocera Engage 1U physical appliance is a server available for purchase directly from Vocera to meet the needs of customers who may not be able to deploy Virtual Machines. Vocera does not support installing directly on customer-supplied hardware.

The following table lists the specifications of the Vocera Engage 1U appliance physical hardware:

Component	Specification
Vocera 1U Appliance Specifications	• Intel Xeon E3-1275 v5 CPU • 16GB RAM • 800GB Intel S3610 Series SSD hard drive • 1U Rackmount Chassis

Important: For hardware redundancy, Vocera recommends a separate physical host for each Vocera Engage cluster node.

Vocera Engage VMware Requirements

Determine the resource allocation requirements for your implementation. The resource allocation requirements include the Virtual Machine (VM) set up with network and VM components.

Access the VM through the FTP site and login credentials that Vocera provides to get to the appliance. The virtual machine is provided as an `.ovf` file containing the entire VM and application.

VM Requirements

Vocera Engage 7.x VM requires the following resources:

Component	Specification
Network Addresses	1 – Static IP address with network connectivity to required data sources
Remote Connectivity	• Through SSH (TCP 22) • Through the VPN Client as a fallback from the Vocera Engage
Operating System	Support for Linux 64-bit operating system

VMware Feature Recommendations

Vocera recommends that you **do not** use VMware vMotion, DRS, Storage vMotion, or Storage DRS features on Vocera Engage.

These features have the potential to disrupt real-time communication. VM Override rules or Affinity/Anti-Affinity rules should be used if possible, or selectively disabling some of these features, to prevent these actions.

Performing vMotion on a running Vocera Engage server is likely to cause cluster failover.

Required Minimum Resource Allocation

This section provides information on the minimum required resource allocation for the Vocera Engage 7.x node virtual machine (VM) for planning a Vocera deployment.

This guidance represents the resources required to provide adequate performance for simulated customer environments of various sizes. These specifications should be considered a starting point. Additional factors such as the number and type of system integrations can impact overall system sizing, and we recommend that you discuss this with your Vocera account team.

The following table lists minimum required resources to be allocated to each Vocera Engage VM node supporting the specified number of concurrent Vocera users.

An example of basic integrations includes the following: LDAP, NurseCalls, Patient Monitoring (Clinical Alarms), an EHR, Staff Assignment, and one or two types of output devices (smartphone, badges, pagers, email).

An example of complex integrations includes the following: multiple sources of Patient Monitoring (Clinical Alarms), Staff Assignment via HL7 (such as Epic TT), other/multiple Staff Assignment sources, multiple output devices (such as smart phones, badges, pagers, email), NurseCalls, and enterprise alerting.

Important: Vocera Engage does not include an XMPP integration. The sizing specifications listed in this topic are for Vocera Engage 7.x deployments with no XMPP integration. For deployments using XMPP, see the Vocera Platform Server Sizing Guide .

Resource Type			
Deployment	2500 with complex integrations / 5000 beds with basic integrations	Up to 7500 beds with complex integrations	Vocera recommends splitting larger sized sites into multiple deployments
Processor Type	Intel Xeon	Intel Xeon	
CPU Single Thread Rating	2000	2000	
Logical CPUs assigned to VM	8	12	
Memory (GB)	16	20	
Hard Disk (GB)	300	800	
Storage IOPS	16000	18000	
Sustained Disk Write Throughput	500 MB/s	750 MB/s	
Sustained Disk Read Throughput	500 MB/s	750 MB/s	

Note: The CPU Single Thread Rating reflects the benchmark reported for various processor models by PassMark Software published on https://www.cpubenchmark.net/. Vocera's test methodology includes various reference hardware configurations deployed with Intel Xeon class CPU s meeting the listed Single Thread Rating.

Oversubscription

The Vocera Engage features many latency sensitive use-cases, such as the clinical system notification delivery, real-time communication, and speech recognition. Oversubscription of the host resources needs to be avoided to ensure adequate performance is maintained for these mission critical use-cases.

Oversubscription Type	Description
Disk	No disk oversubscription is allowed on the host.
CPU	• No CPU oversubscription is allowed on the host. • The amount of provisioned logical CPU's for all VM's on the host should be no more than the amount of physical processor cores installed on the host. • CPU affinity is not required or recommended. • Hyper-threading should be enabled but additional logical CPU's made available via the hyper-threading feature do not count toward the provisioning totals.
Memory	No memory oversubscription is allowed on the host.

Vocera Messaging Platform Server Sizing Matrix

The Vocera Messaging Platform Server Sizing Guide provides the sizing and scalability guidelines for implementing Vocera Messaging Platform server infrastructure.

Operating System Requirements

This table lists the VMP Server operating system and software framework requirements.

Table 1: Operating system requirements

Item	Requirement
Operating System	• Windows Server 2012 R2 Update (KB2919355) Standard • Windows Server 2016 • Windows Server 2019 • Windows Server 2022 **Note:** If you are implementing VMP as a high availability solution, Vocera recommends that you use the same operating system on all servers.
Software Framework	Microsoft .NET Framework 4.7.1

Tip: The VMP Server can run on a 32-bit system, but a 64-bit system is recommended for enterprise deployments.

VMP MS SQL Server Requirements

This table lists the VMP MS SQL Server requirements.

Table 2: SQL server requirements

Item	Requirement
MS SQL Server	• MS SQL Server 2014 • MS SQL Server 2016 • MS SQL Server 2017 • MS SQL Server 2019 If you have upgraded your SQL server from an older version, you must ensure that the compatibility level for your server is set to 100 (MS SQL Server 2008) or higher.

Item	Requirement
Database Connectivity	The SQL Server must be configured to enable: • Remote Connections • TCP/IP • Named Pipes • SQL Authentication
SQL Instance Name	The SQL Server should be configured with a unique instance to house the VMP SQL database.
Default Language	English
Collation (sort order)	SQL_Latin1_General_CP1_CI_AS

The **SQL_Latin1_General_CP1_CI_AS** collation supports the following capabilities that are required by the Vocera Messaging Platform:

Collation Capability	Description
Latin1	Specifies the Latin 1 character set (ASCII)
CP1	Specifies code page 1 (ANSI code page 1252)
CI	Specifies case-insensitive sorting, so "ABC" is treated the same as "abc"
AS	Specifies accent-sensitive sorting, so "ü" is not treated the same as "u"

Important: In addition to the supported platform requirements, SQL Server System Administrator (SA) credentials are required. The credentials are requested during the installation to connect with the SQL Server during the initial configuration. These credentials are also required for future upgrades.

VMP CPU and Memory Recommendations

This lists computer performance and storage requirements for VMP.

Active Users	Active Directory synchronized entities	CPU Class	Min. Total Cores	Min. Memory
1 - 200	1 - 500	Xeon	2	6 GB
200 - 3,000	500 - 10,000	Xeon	4	12 GB
3,000 - 10,000	10,000 - 30,000	Xeon	8	16 GB
10,000 +	30,000 +	Xeon	8	24 GB

Hard Drive Storage Recommendations

This lists the disk space requirements.

Note: Vocera applications must be installed on a dedicated hard drive separate from the server operating system.

Active Users	Minimum Storage
1 - 200	100 GB
200 - 3,000	250 GB
3,000 - 10,000	500 GB
10,000 +	750 GB

SQL Server VMP Instance Database Growth and Storage Recommendations

This describes the database and storage requirements as the number of database instances increases.

Active Users	CPU Class	Min. CPU Cores assigned to VMP database instance	Min. Memory assigned to VMP database instance
1 - 200	Xeon	2	8 GB
200 - 3,000	Xeon	4	16 GB
3,000 - 10,000	Xeon	8	32 GB
10,000 +	Xeon	10	64 GB

Active Users	Database Size / 2 Years	Log File Size / 2 Years
1 - 200	10 GB	100 GB
200 - 3,000	20 GB	200 GB
3,000 - 10,000	60 GB	250 GB
10,000 +	120 GB	1 TB

Virtual Environment Support

VMP can be deployed on a virtual machine (VM).

The following VMware platforms are supported:

- VMware vSphere 5 with ESXi 5.0 and later
- VMware vSphere VMware virtualization platform must include VMware vCenter Server (formerly VMware Virtual Center) with a Standard license or better.
- Virtual Server requirements are identical to the equivalent physical server requirements.
- To maintain real-time performance, the virtual environment must be designed to avoid oversubscription or resource contention on the VM host. Failure to provide sufficient resources can result in poor server and client performance.

Table 3: VMP Server VM requirements

Active Users	CPU Class	Minimum Memory
1 - 200	Xeon	4 GB
200 - 3,000	Xeon	8 GB
3,000 - 10,000	Xeon	16 GB
10,000 +	Xeon	24 GB

Table 4: SQL Server VMP instance requirements

Active Users	CPU Class	Minimum Memory
1 - 200	Xeon	8 GB (if the total of Distribution Lists, contacts, and users in the VMP Server does not exceed 5,000)
200 - 3,000	Xeon	16 GB
3,000 - 10,000	Xeon	32 GB
10,000 +	Xeon	64 GB

Vocera Platform Server Sizing Matrix

The Vocera Platform Server Sizing Guide provides the sizing and scalability guidelines for implementing Vocera Platform server infrastructure.

Physical Appliance Information

This section provides a list of the specifications for the physical appliance for the Vocera Platform product.

Important: This appliance supports a maximum of 500 concurrent users.

Component	Specification
Vocera Platform Appliance Specifications	• A server rack capable of housing a 1U rack mountable enterprise appliance, 1.68"(w) x 14"(d) x 1.75" (h) and 25 lbs. • 120VAC Switching, 4A max, 260 Watts • 10 to 35 C (50 to 95 F) operating temperature • 90% non-condensing operating relative humidity • 887 BTU output, 12,000 hours, RFTB • EMI Safeguards

Important:
The Vocera Platform 1U physical appliance is a server available for purchase directly from Vocera to meet the needs of customers who may not be able to deploy Virtual Machines. Vocera does not support installing directly on customer-supplied hardware.

The following table lists the specifications of the Vocera Platform 1U appliance physical hardware:

Component	Specification
Vocera 1U Appliance Specifications	• Intel Xeon E3-1275 v5 CPU • 16GB RAM • 800GB Intel S3610 Series SSD hard drive • 1U Rackmount Chassis

Important: For hardware redundancy, Vocera recommends a separate physical host for each Vocera Platform cluster node.

Vocera Platform VMware Requirements

Determine the resource allocation requirements for your implementation. The resource allocation requirements include the Virtual Machine (VM) set up with network and VM components.

Access the VM through the FTP site and login credentials that Vocera provides to get to the appliance. The virtual machine is provided as an `.ovf` file containing the entire VM and application.

VM Requirements

The Vocera Platform VM requires the following resources:

Component	Specification
Network Addresses	1 – Static IP address with network connectivity to required data sources
Remote Connectivity	• Through SSH (TCP 22) • Through the VPN Client as a fallback from the Vocera Platform
Operating System	Support for Linux 64-bit operating system

VMware Feature Recommendations

Vocera recommends that you **do not** use VMware vMotion, DRS, Storage vMotion, or Storage DRS features on the Vocera Platform.

These features have the potential to disrupt real-time communication. VM Override rules or Affinity/Anti-Affinity rules should be used if possible, or selectively disabling some of these features, to prevent these actions.

Performing vMotion on a running the Vocera Platform server is likely to cause some or all of the following:

- Cluster failover (all active calls will be dropped)
- Badges displaying the **Searching For Server** error and not able to make calls
- Interruption in communication (badge-to-server communication, such as speech recognition and call setup)

Required Minimum Resource Allocation

This section provides information on the minimum required resource allocation for the Vocera Platform Node virtual machine (VM) for planning a Vocera deployment.

This guidance represents the resources required to provide adequate performance for simulated customer environments of various sizes. These specifications should be considered a starting point. Additional factors such as the number and type of system integrations can impact overall system sizing, and we recommend that you discuss this with your Vocera account team.

The following table lists minimum required resources to be allocated to the Vocera Platform Node virtual machine (VM) supporting the specified number of concurrent Vocera users.

Resource Type			
Concurrent Users	500 or less	500 - 2000	2000 - 4000
Processor Type	Intel Xeon	Intel Xeon	Intel Xeon
CPU Single Thread Rating	2000	2000	2000
Logical CPUs assigned to VM	8	12	20
Memory (GB)	16	24	32
Hard Disk (GB)	300	800	800
Storage IOPS	20000	20000	20000

Note: The CPU Single Thread Rating reflects the benchmark reported for various processor models by PassMark Software published on https://www.cpubenchmark.net/. Vocera's test methodology includes various reference hardware configurations deployed with Intel Xeon class CPU s meeting the listed Single Thread Rating.

Oversubscription

The Vocera Platform features many latency sensitive use-cases, such as the clinical system notification delivery, real-time communication, and speech recognition. Oversubscription of the host resources needs to be avoided to ensure adequate performance is maintained for these mission critical use-cases.

Oversubscription Type	Description
Disk	No disk oversubscription is allowed on the host.
CPU	No CPU oversubscription is allowed on the host. The amount of provisioned logical CPU's for all VM's on the host should be no more than the amount of physical processor cores installed on the host. CPU affinity is not required or recommended. Hyper-threading should be enabled but additional logical CPU's made available via the hyper-threading feature do not count toward the provisioning totals.
Memory	No memory oversubscription is allowed on the host.

Mass Notifications in Vocera Platform

Mass notifications are alarms that are sent globally or to a specific group. Mass notifications can be user-generated via the Vina devices or triggered by 3rd party systems.

Generally, system administrators are the initiators for Template-based mass notifications. Additional administrators can be added to the mass notification via clients or in the XMPP rule form, which includes non-template based notifications.

The mass notifications delivery time depends on the size of the group to which it is being delivered. Vocera recommends that you review the group size limits and delivery times outlined in the Mass Notification Delivery Time on page 22 section.

Mass Notification Delivery Time

The mass notification delivery times vary depending upon the group size.

The following table lists the group sizes (total number of users in a group) and the corresponding expected delivery times for Mass Notification in Vocera Platform 6.3.4 and later versions.

Group Size	Delivery Times
0-200	Delivered in 5 seconds or less.
200-400	Delivered in 15 seconds or less.
400-600	Delivered in 20 seconds or less
600-1200	Delivered in 45 seconds or less
1200 and above	Not supported until Vocera Platform 6.6.1 and above

Important: Beginning in Vocera Platform 6.6.1 mass notifications are split into batches of up to 1200 messages, with a 90 second delay in between delivery initiation.

Attention:

- The delivery times mentioned in the table assume a properly resourced system based on Vocera guidelines.
- Sending subsequent mass notifications within the delivery time of the first notification will extend the overall delivery times.

Vocera Voice Server Server Sizing Matrix

The Vocera Voice Server Sizing Guide provides the sizing and scalability guidelines for implementing Vocera Voice Server infrastructure.

Vocera System Requirements

This section provides the system, configuration, and hardware requirements for Voice Server and other Vocera software components.

Site Size

Determine the site size for your implementation of Vocera Server before setting up and planning your environment with the correct configuration and server size.

Note: Contact Vocera Technical Support for information about appropriate server sizing if you plan to support more than 5000 simultaneous users.

Entity	Small Installations	Large Installations
Maximum Simultaneous Users	450	5,000
Entities (Spoken Name Count)	0-6,000	6,000 or greater

The Spoken Name Count includes user names, group names, alternate spoken names, locations, address book entries, and department names.

Server Requirements

The hardware requirements for the Voice Server are listed in the following table.

Resource Type	<450 Concurrent Users	450-5000 Concurrent Users
Processor Type	Intel Xeon CPU	Intel Xeon CPU
Cores/vCPU's	2	4
Minimum Memory	8GB	8GB
Recommended Memory	16GB	16GB
Note: Systems configured with additional system features such as Analytics, Enhanced Voice Configuration, or multiple recognition servers should meet the recommended memory guidelines.		
Storage	80GB	120GB
Operating System	64-bit Windows Server 2022, 2019, 2016, or 2012 R2	

The hardware requirements for other Vocera software components are listed in the following table.

Resource Type	SIP Telephony Gateway	Rauland Integration SIP Gateway	Report Server	Vocera Client Gateway	Vocera Voice Staging Server	Badge Configuration Utility
Processor Type	Intel Xeon CPU	Intel Xeon CPU	Intel Xeon CPU	Intel Xeon CPU	N/A	N/A
Cores/vCPU's	2	2	2	2	N/A	N/A
Minimum Memory	4GB	4GB	4GB	4GB	8GB	N/A
Storage	40GB HD	40GB HD	100GB HD	40GB HD	40GB HD	40GB HD
Operating System	64-bit Windows Server 2022, 2019, 2016, or 2012 R2					Windows 7 or later

VMware Requirements

This section describes supported VMware products and feature recommendations.

Vocera supports the following products running in a VMware virtualized environment.

Server	VMware Platform
Vocera Server	VMware vSphere 5 with ESXi 5.0 and later
Vocera SIP Telephony Gateway	VMware vSphere 5 with ESXi 5.0 and later
Vocera Rauland Integration SIP Gateway	VMware vSphere 5 with ESXi 5.0 and later
Vocera Client Gateway	VMware vSphere 5 with ESXi 5.0 and later
Vocera Report Server	VMware vSphere 5 with ESXi 5.0 and later

The ESXi hosts in this environment must be managed by a VMware vCenter Server, using a minimum of Standard licensing for both ESXi and vCenter.

Important: Vocera does not support other virtualization platforms, including VMware Workstation, Citrix XenServer, Red Hat KVM and Microsoft Hyper-V.

VMware Feature Recommendations

Vocera recommends that you **do not** use VMware vMotion, DRS, Storage vMotion, or Storage DRS features on certain Vocera Servers (VS, VCG, VSTG, or RSIP).

These feature have the potential to disrupt real-time communication. VM Override rules or Affinity/Anti-Affinity rules should be used if possible, or selectively disabling some of these features, to prevent these actions.

Performing vMotion on a running Vocera server is likely to cause some or all of the following:

- Cluster failover (all active badge calls will be dropped)
- Badges displaying the **Searching For Server** error and not able to make calls
- Gateway disconnects (all active gateway calls will be dropped)
- Interruption in communication (badge-to-server communication such as speech recognition and call setup)

VMware Requirements for Voice Server

This section describes Vocera Voice Server and the VMware requirements.

Component	Requirements
Vocera Server Version	Version 5.x with latest service pack

Component	Requirements
Virtual CPU's (vCPU's) per VM	4
Minimum Memory Size or Configuration	8 GB RAM **Note:** For licenses including Enhanced Voice Configuration, 12 GB RAM is required.
Network Interface	VMXNET 3
Minimum Disk Space	120 GB (thick provisioned)
Guest Operating System	Windows Server 2022, Windows Server 2019, Windows Server 2016, Windows Server 2012 R2 Update (KB2919355) Standard

Important: Vocera has validated that the Vocera Server works with the above requirements. However, we understand that every virtual infrastructure has unique characteristics. Consequently, you may need to deviate from the required configuration. If you encounter performance issues with virtualized Vocera Servers, Vocera Technical Support will work with your VMware administrator to help identify the cause of the problem and make recommendations to help fix or mitigate the problem. The recommendation could be to move the Vocera Server to a host with more available resources or higher performing disk capabilities. In some cases, Vocera Technical Support may recommend migrating to physical hardware if the virtual environment is not able to maintain the level of performance required by the Vocera solution.

Applications on the Same Host

The following applications are supported running on the same host as a virtualized Vocera Server:

- VS (staging)
- VSTG
- VCG
- VRS
- VMP
- VCTS
- VAM
- RSIP

Important: For hardware redundancy, Vocera recommends a separate physical host for each Vocera Server cluster node.

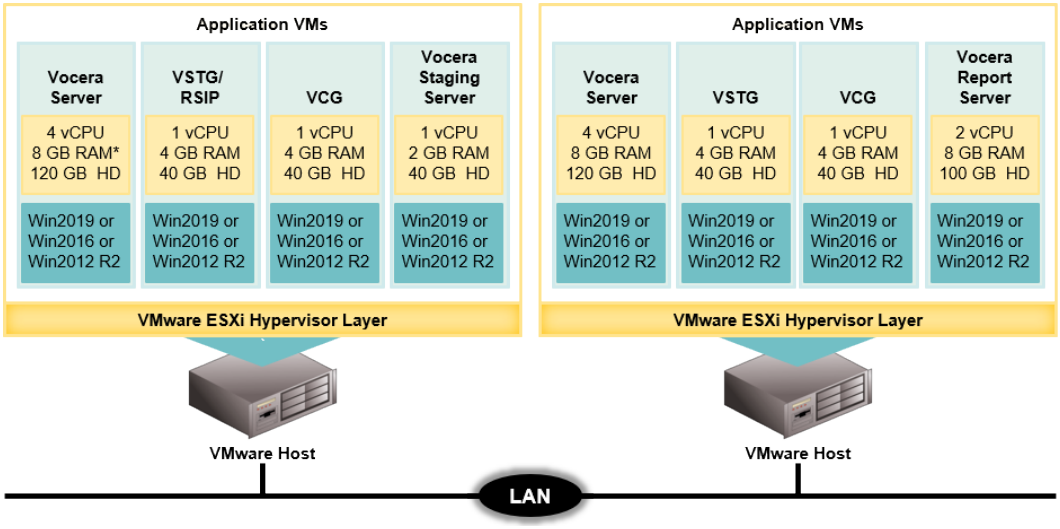
VMware Requirements for Optional Vocera Software Components

This section describes optional Vocera software components and the VMware requirements.

Vocera VMware Architecture

Two VMware ESXi hosts for a Vocera Server cluster that include VMs for VSTG, RSIP, VCG, VRS and a Vocera Server staging server need the following hardware and Operating System to meet the minimum requirements.

Based on server load, you can add more VCG, VSTG, and RSIP VMs.



Attention: *The Vocera Voice Server requires 12 GB RAM for licenses including Enhanced Voice Configuration.

	Requirements		
Component	VSTG/RSIP	VCG	VRS
Virtual Processors (vCPU's) per VM	1	1	2
Minimum RAM	4 GB	4 GB	8 GB
Minimum Disk Space	40 GB	40 GB	100 GB

Component	Requirements for VSTG, RSIP, VCG, and VRS
Resource Reservation	CPU: 500 MHz RAM: 512 MB
Network Interface	VMXNET 3
Guest Operating System	Windows Server 2022Windows Server 2019 Windows Server 2016 Windows Server 2012 R2 Update (KB2919355) Standard

HA Recommendations

You can install multiple VSTG, RSIP and VCG servers, also known as an array, to take advantage of high availability features. Vocera recommends the following best practices for high availability:

- Set up 2 separate VMware ESXi servers for redundancy
- Install VSTG on each VMware ESXi server
- For VSTG only: Allocate the total number of SIP lines evenly between the VSTG servers

Important: (For VSTG only) When you configure the **Number of Lines** field on the **Telephony > Basic Info** page of the Vocera Administration Console, enter the number of lines available to a single VSTG server, not the total number of lines available to all servers. For example, if you purchased a license with 6 lines and you have 2 VSTG servers, assign 3 lines to each VSTG server.

Limitations

Number of lines supported by a single VSTG	128

Number of SIP calls supported by a single RSIP	2500
Number of simultaeneous audio sessions supported by a single RSIP	256
Number of clients supported by a single VCG	2500
Number of simultaneous audio sessions supported by a single VCG	256

CPU and Memory Resource Reservations

When setting up VMs for Vocera servers, ensure that the CPU and memory resource reservations are specified.

A reservation specifies the guaranteed minimum allocation for a VM. CPU and memory resource reservations ensure that the VM will have enough CPU and memory resources provided by the host or cluster. If you do not specify CPU and memory resource reservations, the VM environment could become stressed, causing the clock on the VM to slow down or speed up, which could cause a Vocera SIP Telephony Gateway or Vocera Client Gateway to disconnect from its Vocera Server.

Recommendations for VM Resource Allocation

The allocation of resources for the Vocera Voice Server (i.e., processor, memory, etc.) for optimal performance depends on factors such as the volume of inbound data, processing overhead of the data type, and the complexity of the solution implemented.

Oversubscription

Oversubscription Type	Description
Disc	• No disk oversubscription is allowed on the host • All virtual disks should use a “thick” provisioning method • Only direct-attached storage is recommended  **Note:** If you are using NAS or SAN the maximum disk latency should be in line with the best practices for a real-time Voice application. See VMware vSphere® 5.5 Documentation Center.
CPU	• No CPU oversubscription is allowed on the host • The amount of provisioned vCPU's should be one less than the amount of physical processor cores available in the hypervisor (ESXi host) • CPU affinity is not required or recommended • Hyper-threading can be enabled but additional logical processors made available via the hyper-threading feature do not count toward the provisioning totals Example: Host machine contains 2 quad-core processors with hyper-threading enabled. • Physical CPUs = 8 • Logical processors = 16 • Maximum vCPU’s allowed = 7 (8 – 1 available for hypervisor use)

Oversubscription Type	Description
Memory	• No memory oversubscription is allowed on the host • Provisioned memory of all virtual machines combined should equal 1GB less than the amount of memory installed in the hypervisor Example: • Host machine contains 24 GB of RAM • 24 – 1 = 23 GB of RAM available for guest VMs memory allocation