A MITEL
PRODUCT
GUIDE

Mitel OpenScape Solution Set V11

Virtual Deployment Guide

Service Documentation
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Mitel

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1 Change log

Issue	Date	Description	Task
1	03/2025	Initial version	DOCLOC-9213
2	05/2025	Add note regarding OpenScape UC V11 in the Hypervisor / Product Support Matrix	UCBE-37851
3	05/2025	Updates in chapter Supported Application, the table VM lifecycle support was updated with VMware ESXi V7 version.	UCBE-37817
4	06/2025	Updates in the following chapters: • Add new bullet regarding import to Hyper-V Preparing the Hyper-V infrastructure on page 19 • Updated OSVoice version in Hypervisor / Product Support Matrix on page 12	• DOCLOC-9644 • DOCLOC-9649
5	07/2025	Updates in the following chapters: • Add new table for OSV V11 OpenScape Voice on page 31 • Added OSV V11 in table for ESXi V7 and V8 in Supported Appliances on page 13	DOCLOC-9684

2 Objective and Scope

The Objective of this document is to provide a consolidated approach to resource and configure virtual machines that will host Mitel applications.

The Scope is reflected by the following product list that supports virtualization in Solution Set:

Product	Version
OpenScape Voice	V10, V11
OpenScape Session Border Controller (SBC)	V10, V11
OpenScape Branch	V10, V11
OpenScape Common Management Portal (CMP)	V10
OpenScape Composer	V2
OpenScape 4000	V10, V11
OpenScape 4000 Manager	V10, V11
OpenScape Accounting	V4
OpenScape Concierge	V5 Rx
OpenScape Contact Center	V12
OpenScape Contact Media Service	V12
OpenScape Deployment Server (DLS)	V10
OpenScape Endpoint Management	V1
OpenScape Enterprise Express (OSEE)	V9, V10
OpenScape Fault Management	V9, V10, V11
OpenScape UC Application	V10, V11
OpenScape Media Server	V10
OpenScape Voice Survival Authority (SA)	V10
OpenScape Xpert	V8 R0
OpenScape Xpressions	V7
OpenScape Trace Manager	V8
SESAP SW Suite	V2
HiPath CAP Management	V3.0 SMR16

2.1 Acronyms

In this document the following acronyms are used:

Acronym	Meaning
ALI	Advanced Locking ID
API	Application Programming Interface
BHCA	Busy Hour Call Attempts
BoM	Bill of Materials
CAC	Carrier Access Code
CMP	Common Management Platform
CMS	Contact Media Server
CPU	Central Processing Unit
CSL	Customer Solution Lab
CSTA	Computer Supported Telecommunications Applications
DLS	OpenScape Deployment Server
OSEM	OpenScape Endpoint Management
DNS	Domain Name System
DPM	Distributed Power Management
DRS	Distributed Resource Scheduler
EVC	Enhanced vMotion Compatibility Mode
FT	Fault Tolerance
HA	High Availability
HD	Hard Disk
HT	Hyper-Threading
HW	Hardware
IOPS	Input/output operations per second
IP	Internet Protocol
KB	Knowledge Base
KVM	Kernel Virtualization Module
LAN	Local Area Network
MAC	Media Access Control
Master TT	Master Trading Turret
MLC	Multi Line Controller
NAT	Network Address Translation
NIC	Network Interface Card

Acronym	Meaning
NW	Network
OS	Operating System
OS4K	OpenScape 4000
OSB	OpenScape Branch
OSCAR	OpenScape Alarm Response
OSCC	OpenScape Contact Center
OSEE	OpenScape Enterprise Express
OSV	OpenScape Voice
pCPU	Physical CPU
PSR	Product Specific Request
PTS	Partner Technical Support
QoS	Quality of Service
RAM	Random Access Memory
RTP	Real-Time Transport Protocol
SA	Survivable Authority
SAN	Storage Area Network
SBC	OpenScape Session Border Controller
SCSI	Small Computer System Interface
SESAP	Secured Enterprise Service and Administration Platform
SIP	Session Initiation Protocol
SM	System Manager
SRM	Site Recovery Manager
SSO	Smart Switch Over
SSP	SIP Service Provider
SW	Software
TLS	Transport Layer Security
UC	OpenScape Unified Commumications
vApp	Virtual Appliance
vCPUs	virtual CPUs
VDP	VMware Data Protection

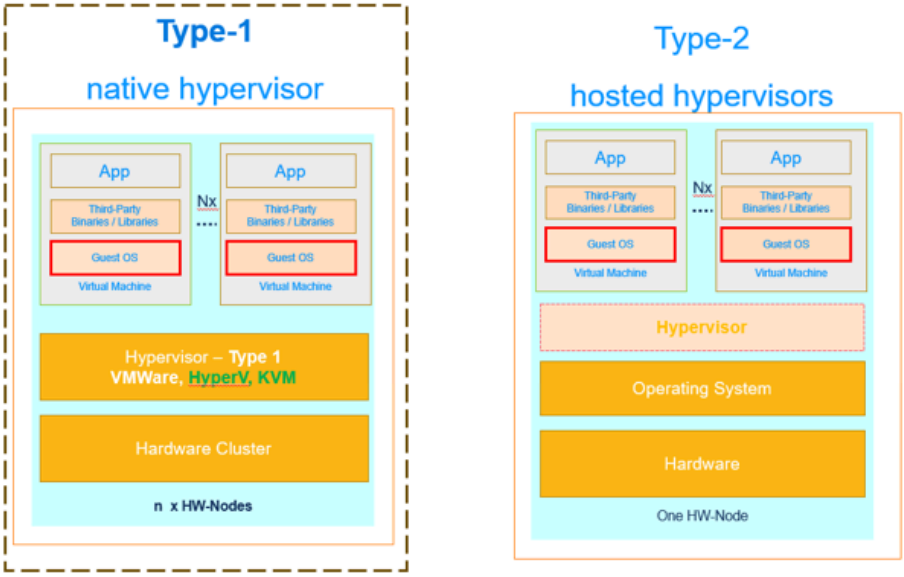
Acronym	Meaning
VDR	VMware Data Recovery
vHD	Virtual Hard Disk
VM	Virtual Machine
vNIC	Virtual Network Interface
vRAM	Virtual Memory
WAN	Wide Area Network
XPR	OpenScape Xpressions

3 Virtualized OpenScape Solution

3.1 Virtualization - Hypervisor

Virtualization of HW/SW machines require a hypervisor SW to operate on the physical machines.

This OpenScape Solution Set is supported to operate on hypervisors of Type1 and thus means this document is concerned exclusively with Type1 bare metal hypervisors.



NOTICE: Hosted hypervisors like e.g. Oracle's Virtual box or VMware Workstation may allow or make it possible to operate OpenScape applications, however it is not a supported operating mode.

In this document, the Type1-Hypervisor for hosting OpenScape Solution Set workloads are:

- VMware ESXi with vSphere as Cluster Management,
- Hyper-V as part of Windows Server 2022 and higher,
- KVM - A virtualization solution on Linux kernel, which is utilized by Cluster Management frameworks like Proxmox, Nutanix or others.

3.2 Advantages of Virtualization

The most important features provided by virtualization are the reduced number of physical servers and the capability of our solution to be hardware agnostic.

Therefore, OpenScape Solution Set operation in a virtual environment enables the following capabilities:

- Server Consolidation

  The applications and virtual machines deployed onto a Hypervisor host can use different guest operating systems, i.e. OpenScape Voice (Linux) and OpenScape Concierge (Windows) can both be deployed onto the same Hypervisor host and share its physical resources.
- Hardware Independence

  Having many hardware server vendors and models in a Data Center environment adds complexity and cost to the operation, therefore Mitel's customers often look to standardize their IT hardware infra-structure.Virtualization allows customers to deploy Mitel applications onto any hardware platform, assuming it has been certified by Hypervisor provider and it meets the resource requirements of the application, as described in this document.

Virtualization further enables OpenScape Solution Set to:

- Improve our staging concept.
- Enable the "pay as you grow" concept for hardware investment.
- Implement high-availability for all solution components.
- Decrease installation costs.

3.3 VM Cluster

IMPORTANT: This guide provides information about VMware and Hyper-V applications and requirements that were valid for the releases referred to in this guide.

Overview of the setup process:

- **Setting up the VM Cluster**
  - Refer to the respective virtualization environment documentation (outside the scope of this document).
- Operating System Requirements
  - **Application vs. Appliance Considerations**
  - Factors to consider for OS selection and configuration
  - Refer to respective OS documentation (outside the scope of this document).
- Ensuring Compliance with OpenScape Solution Set specific Product Requirements

4 Hypervisor / Product Support Matrix

The following table shows the supported Hypervisors by Mitel OpenScape Products:

Product - Appliance	VMware [1]	Hyper-V [2]	KVM [3]	
			Proxmox VE	Nutanix
OpenScape Voice	YES	V11 R0	V10 R3	PSR
OpenScape Session Border Controller	YES	V11 R2.1	V11 R2.1	PSR
OpenScape Branch	YES	V11 R2.1	V11 R2.1	PSR
OpenScape 4000	YES	PSR	V11 R0.22 + PLT HF3	PSR
OpenScape 4000 Manager	YES	PSR	V11 R0.22 + PLT HF3	PSR
OpenScape Contact Media Service	YES	PSR	Under QA	Under QA

Product - Application	VMware [1]	Hyper-V [2]	KVM [3]	
			Proxmox VE	Nutanix
OpenScape CMP	YES	V10 R6	V10 R6	PSR
OpenScape Composer	YES	V2 R3	V2 R3	PSR
OpenScape Contact Center	YES	PSR	NO	NO
OpenScape Media Server	YES	V10 R6.0.0	V10 R6.0.0	PSR
OpenScape DLS	YES	V10 R3.8	V10 R3.8	PSR
OpenScape UC Application [4]	YES	V10 R6.0.0	V10 R6.0.0	PSR
OpenScape UC Application – Openfire Server	YES	V10 R6.0.0	V10 R6.0.0	PSR
HiPath CAP Management	YES	NO	NO	NO
OpenScape Concierge	YES	V5 R0	V5 R0	PSR
OpenScape Xpert	YES	V8 R0.20.0	V8 R0.20.0	PSR
OpenScape Accounting	YES	V5 R1	V5 R1	PSR
OpenScape Fault Management	YES	V13 R0.0.11	V13 R0.0.11	PSR
OpenScape Xpressions	YES	V7 R1.5.0	V7 R1.5.0	PSR
OpenScape Trace Manager	YES	V8 R0	V8 R0	PSR

IMPORTANT: The mentioned version strings are the minimum required software versions.

NOTICE:

[1] Supported for both legacy and current versions.

[2] Minimum supported version is Windows Server 2022

[3] KVM Hypervisors are supported, however extensive tests were done using Proxmox VE 8.2 and Nutanix 6.5 AOS.

[4] OpenScape UC V11R0 supports only VMware.

4.1 Requirements and Product Classification

The following subchapters provide Hypervisor-specific requirements and details related to appliances and applications:

Appliances:

These are the products of OpenScape Portfolio that are delivered along with the operating system, like OSV, OS4K, SBC, OSB and CMS.

Applications:

The rest of the OpenScape Portfolio products, are referred to as applications. Application products like UC, DLS or OpenScape Contact Center have no dependency on the ESXi versions or VM HW versions.

4.1.1 VMware vSphere

As a general rule there is no dependency on the ESXi version or HW version for all products that are applications (not appliances).

4.1.1.1 Supported Appliances

The following information relate to appliances:

Hardware version Compatibility:

Any VM HW version can be used, based on your ESXi version.

For a list of the supported and compatible virtual machine hardware versions in VMware vSphere refer to: ESXi hosts and compatible virtual machine hardware versions list .

	Product Version	ESXi V7.0	ESXi V8.0
OpenScape Voice	V9	YES	YES
	V10	YES	YES
	V11	YES	YES
	Supported HW Version(s)	10,11,13,19[1]	10,11,13,19, 20
OpenScape SBC	V10 R3	YES	YES
	Supported HW Version(s)	10,11,13,14, 15, 17,18,19	10,11,13,14, 15,17,18,19,20

1 HW Versions 14-18 are allowed, however please note that support for VMware related issues is provided for highest verified HW version (https://kb.vmware.com/s/ article/2007240) although no issues are known for versions 14-18.

	Product Version	ESXi V7.0	ESXi V8.0
	V11 R1	YES	YES
	Supported HW Version(s)	10,11,13,14, 15, 17,18,19	10,11,13,14, 15,17,18,19,20
	V11 R2	YES	YES
	Supported HW Version(s)	10,11,13,14, 15, 17,18,19	10,11,13,14, 15,17,18,19,20
OpenScape Branch	V10 R3	YES	YES
	Supported HW Version(s)	10,11,13,14, 15, 17,18,19	10,11,13,14, 15,17,18,19,20
	V11 R1	YES	YES
	Supported HW Version(s)	10,11,13,14, 15, 17,18,19	10,11,13,14, 15,17,18,19,20
	V11R2	YES	YES
	Supported HW Version(s)	10,11,13,14, 15, 17,18,19	10,11,13,14, 15,17,18,19,20
OpenScape 4000	V10 R1	YES	YES
	Supported HW Version(s)	13	13
	V11 R0	YES	YES
	Supported HW Version(s)	17	17
OpenScape 4000 Manager	V11 R0	YES	YES
	Supported HW Version(s)	17	17
OpenScape Contact Media Service	V10	YES	YES
	V11	YES	YES
	Supported HW Version(s)	10,11,13,14, 15,17,18,19	

4.1.1.2 Supported Applications

VM Compatibility:

To ensure compatibility between the operating system and the ESXi version, please check the details of the VMware software compatibility at the following link:

https://compatibilityguide.broadcom.com

VM Lifecycle Support:

The supported VMware vSphere versions for applications are bound to the VMware software lifecycle.

Product - Application	VMware ESXi / HW Versions
OpenScape CMP	VMware ESXi V7
OpenScape Composer	
OpenScape Contact Center	
OpenScape DLS	
OpenScape UC Application	
OpenScape Media Server	
OpenScape UC Application – Openfire Server	
HiPath CAP Management	
OpenScape Concierge	
OpenScape Xpert	
OpenScape Accounting	
OpenScape Fault Management	
OpenScape Xpressions	

4.1.1.3 Supported VMware vSphere Features

OpenScape Solution Set V11	vMotion	HA	FT	SRM	vStorage-APIs for Data Protection	VMware Tools	EVC	vCloud Director
OpenScape Voice	Y	Y	N	N	Y	Y	Y	PSR
OpenScape SBC	Y	Y	N	N	N	Y	Y	N
OpenScape Branch	Y	Y	N	N	N	Y	Y	N
OpenScape CMP	Y	Y	N	PSR	N	Y	Y	N
OpenScape Composer	Y	Y	N	PSR	N	Y	Y	N
OpenScape 4000	Y	Y	N	N	Y	Y	Y*	N
OpenScape 4000 Manager	Y	Y	N	Y	Y	Y	Y	N

OpenScape Solution Set V11	vMotion	HA	FT	SRM	vStorage-APIs for Data Protection	VMware Tools	EVC	vCloud Director
OpenScape 4000 SoftGate	Y	Y	N	Y	Y	Y	Y	N
OpenScape Accounting	Y	Y	N	Y	Y	Y	Y	N
OpenScape Contact Center	Y	Y	N	Y	N	Y	Y	N
OpenScape Contact Media Service	Y	Y	N	Y	N	N	Y	N
OpenScape Concierge	Y	Y	N	Y	Y	Y	Y	N
OpenScape DLS	Y	Y	N	PSR	N	Y	Y	N
OpenScape Fault Management	Y	Y	N	Y	Y	Y	Y	N
OpenScape UC Application	Y	Y	N	N	Y	Y	Y	N
OpenScape Media Server	Y	Y	N	Y	Y	Y	Y	N
OpenScape Voice SA	Y	Y	Y	Y	Y	Y	Y	N
OpenScape Xpert (MLC)	Y	Y	Y (1vCPU)	N	N	Y	Y	N
OpenScape Xpert (SM)	Y	Y	N	N	N	Y	Y	N
OpenScape Xpert (Master TT)	Y	Y	N	N	N	Y	Y	N
OpenScape Xpressions	Y	Y	N	Y	Y	Y	Y	N
SESAP SW-Suite	Y	Y	N	N	Y	Y	Y	N
HiPath CAP Management	Y	Y	N	Y	Y	Y	Y	N

vMotion: vMotion is supported only during non-business hours or times of minimum system load. Application problems and issues during a vMotion process are not addressable towards the Mitel applications. There are known issues when executing the vMotion process under load:

- OSV might not route incoming/outgoing calls for a short time (seconds)

- Media Server and Xpressions might create crackling noises, a fax might have black lines or might be terminated during transmission
- In general UTP packet loss might occur for a limited time

High Availability (HA): HA tries to automatically restart a VM easing the recovery of a host failure. Due to the unpredictable nature of host failures, data inconsistencies (extremely seldom) might be possible and the VM might inhibit an instant restart.

Site Recovery Manager (SRM): SRM is supported in Layer 2 networks only. The failover site need to allow the failed over VMs to operate with identical IP settings (IP-address, DNS, Gateways, etc). The network environment is expected to deal with site outages and execute a proper IP routing to the failover site. Upfront Professional Service involvement is highly recommended for SRM based solutions.

Distributed Resource Scheduler (DRS): DRS uses VMware vMotion to migrate VMs from one ESX server to another one, while the VM provides it's service to the end user. As VMware vMotion is supporting only during off hours, because of known "issues" the DRS feature is supported only with limitations:

- "DRS in fully automated mode" might cause unpredictable vMotion activities and therefore is not supported by Mitel. If customers activate this mode, a conservative setting is recommended. Issues resulting from vMotion operations are not addressable towards Mitel).
- "DRS in partially automated mode" only deals with initial VM placement and does not cause a dynamic system behavior later on. Applying reasonable DRS rules in order to have a reasonable VM placement is recommended and is supported by Mitel.
- "DRS in manual mode" does neither automate initial placement nor does it cause dynamics throughout operations and is supported by Mitel.

Enhanced vMotion Compatibility Mode (EVC): Mitel defines a reference CPU within the Bill of Materials (BoM) for each product version released. As long as the choice of the EVC mode does not contradict this, EVC can be successfully used for Mitel products that support vMotion.

* VMware EVC Mode must be set to a suitable level that supports VHV e.g. "Intel® "Nehalem" Generation" for OS4K Host deployments.

4.1.1.4 Specific Virtualization Dimensioning Details

This section provides VMware-specific information from the Virtualization Dimensioning Details, outlining the applicable dimensioning criteria for VMware:

- **vCPU Shares**: Normal, Standard or High.

  The following table shows the default vCPU share values configured for a virtual machine:

  NOTICE:

  The value configured is per virtual CPU.

Settings	vCPU Share Value
Custom	Configurable number of shares per virtual CPU (up to 1,000,000)
High	2000 shares per virtual CPU
Normal	1000 shares per virtual CPU
Low	500 shares per virtual CPU

  IMPORTANT:

  Configure vCPU Share setting to Custom with the value of 1,000,000 for critical Mitel VMs.

- **vCPU Reserv**:
  - Must be calculated: **# vCPU × physical CPU Freq***
- **vCPU Limit**: is set to Unlimited
- **vRAM**: It is important that the hypervisor has sufficient RAM resources on top of the RAM configuration to be potentially used by guest virtual machines. For more details see VMware Knowledge Base.
- **vRAM Shares**: Low, Normal or High.
- **vNIC Type**: VMXNET3.
- **vNIC Manual MAC:YES** for **HiPath CAP Management, Accounting, Branch, CMP V10 & Assistants V10, Composer, DLS, Enterprise Express, Fault Management, SBC, UC Application, Xpressions, SESAP SW-Suite.**

  If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.
- **Network Bandwidth (estimated requirement)**: For details, refer to the specific OpenScape Service Documentation.
- **vDisk Mode**: Keep Defaults (which allows Snapshots).
- **vDisk Format**: Thick Lazy-Zeroed or Thin Provisioned.
- **Additional Storage**: No or Yes.

NOTICE: For specific OpenScape Solution paramenters, see chapter Virtualization Dimensioning Overview.

4.1.2 Microsoft Hyper-V

The following Hyper-V software product versions are required for use in a Mitel virtualized data center.

SOFTWARE	VERSIONS SUPPORTED	ADDITIONAL INFO AND REQUIREMENTS
Windows Server with Hyper-V role	2022	https://learn.microsoft.com/en-us/windows-server/virtualization/hyper-v/hyper-v-overview?pivots=windows

4.1.2.1 Preparing the Hyper-V infrastructure

- Regardless of the deployment environment, it is important that the overall Hyper-V infrastructure is correctly configured to guarantee the highest level of availability and performance.
- For best practices for physical servers hosting Hyper-V roles, refer to the Microsoft documentation, and the following recommendations:
- Ensure that all hosts that will be used to support real-time sensitive applications, such as OpenScape 4000, OpenScape Voice, and so on, are configured for maximum performance. This includes processor and BIOS settings requirements.
- Supply plenty of bandwidth: 1 GB across each of at least four physical ports on each host server is considered the minimum for most deployments.
- Separate the Virtual Local Area Network (VLAN) and IP interfaces for storage traffic (assuming Storage Area Network (SAN), Network File System (NFS), or similar IP storage is used). This provides adequate throughput for storage operations, while isolating traffic from other flows.
- Preferably, support storage networking on two or more physical ports on the host servers, directed at different network switches to provide resiliency. You should also consider configuring these ports for NIC bonding (using Link Aggregation Control Protocol (LACP) or similar) to improve overall throughput.
- Voice traffic to and from the Mitel applications should be separate from data traffic. Implement a dedicated voice VLAN, and support it through multiple physical ports. The same recommendation applies for physical implementations.
- In case a Virtual Machine is imported from VMWare, check with the specific product documentation if the machine requires a Static MAC address. If so, after import go to VM Settings - Network Adaptor Advanced Features and check the “Static MAC address” box.

4.1.2.1.1 Storage

In planning connections to, and stability of, the network storage, consider the following guidelines:

- Ensure adequate throughput to support the intended applications. Refer to the product-specific documentation for detailed requirements.

- Support storage using multi-path networking,with a minimum of two physical ports on each host server and on each of the storage units, directed at different network switches. This provides resiliency.
- RAID protection of all storage is strongly recommended.

Mitel virtual applications support for various storage architectures matches that of Hyper-V , unless specifically stated otherwise. This include iSCSI, NFS, Fibre Channel, and host-local storage. For details, refer to the Mitel documentation for each virtual application, available at Mitel Document Center.

NOTICE:

Regardless of the storage technology used, ensure that the storage used by Mitel applications meets or exceeds the specific requirements of the applications involved, in terms of IOPS and latency. See Hyper-V resource requirements, and application-specific Engineering Guidelines.

4.1.2.1.1.1 Resource Dimensioning

You must have a minimum of 2 GB of memory allocated for the Hyper-V Hypervisor. Refer to the Hyper-V documentation on the Microsoft website.

CAUTION: You must maintain CPU Headroom of 30% over the peak load to guarantee service level agreement (SLA) performance.

4.1.2.1.1.2 Resource Sharing Guidelines

One of the major advantages of virtualization is that you can co-locate multiple VMs on one host server.

Because most of Mitel's virtual applications provide real-time voice, the customer will experience voice quality issues if insufficient CPU resources are allocated. Hyper-V uses priorities to guarantee that the specified amount of the resource (CPU cycles and memory) is always available to the VM, regardless of the needs of other VMs sharing the resource.

Set the CPU priority to High for the voice-sensitive Mitel applications. Lower settings can be used for the other applications.

4.1.2.1.1.3 Keep Host NIC Driver up-to- date

The host NIC driver should be up-to-date.

NIC Teaming should be used and Virtual Machine Queue (VMQ) should be enabled.

4.1.2.1.1.4 Product-specific Guidelines

For additional product-specific restrictions and requirements, see the Mitel Engineering Guidelines for each product. These guides are listed in chapter Virtualization Dimensioning Details:

The Engineering Guidelines also list limits, requirements, and recommendations related to:

- I/O considerations, including effects on performance

- Power conservation
- Security

4.1.2.2 Installing and upgrading on Hyper-V

Deploying Hyper-V involves creating a Virtual Machine (VM) with the correct resource allocation to support the installation of the particular Mitel virtual application. This section provides instructions for creating the Hyper-V virtual machine on which you can install the Mitel virtual applications.

For detailed installation instructions, refer to the product documentation.

The custom features to configure during the VM creation are:

- Name the Hyper-V virtual machine (VM).
- Set **Virtual Machine Type** to **Generation 1**.
- Assign a Memory allocation to match the Mitel Appliances/Applications requirements. See Virtualization Dimensioning Details,
- Configure additional NICs allocation to match Mitel Appliances/Applications requirements. See Virtualization Dimensioning Details,
- Configure appropriate networking.
- Connect Virtual Hard Disk (fixed and correct size).

After creating the Hyper-V VM, follow the physical installation procedures for the particular Mitel application. Refer to the documentation for the Mitel product you are installing for detailed instructions.

4.1.2.2.1 Installing Mitel virtual applications on Hyper-V virtual machines

Installing Mitel Appliances in the Hyper-V environment is similar to installing on physical server, with the additional preliminary step of creating a suitable virtual machine for the application. You must add the appropriate virtual devices and set the correct resource dimensioning. See Virtualization Dimensioning Details.

Table 1: Installation parameters for Hyper-V

SETTINGS	POSSIBLE CHOICES	SUPPORTED VALUES
Hyper-V version		Microsoft Windows Server 2022
Hyper-V hardware version	Generation 1 Generation 2	Generation 1 Generation 2
Storage controller type	IDE SCSI	IDE SCSI
Virtual hard disk format	VHD VHDX	VHDX
Virtual hard disk type	Dynamically Expanding Fixed Size Differencing	Dynamically Expanding Fixed Size Differencing

SETTINGS	POSSIBLE CHOICES	SUPPORTED VALUES
Network driver	Network Adapter Network Adapter (Legacy)	Network Adapter

The CPU priority choices are **High**, **Medium**, **Low,** and **Custom**.

Set the CPU priority to **High** for the voice-sensitive Mitel applications. Lower settings can be used for the other applications.

NOTICE: Supported parameters can vary depending on each OpenScape product. Please check specific product installation guide for exact paramenters

4.1.3 KVM

KVM stands for **K**ernel **V**irtual **M**achine and is a virtualization solution on Linux kernel.

Comparable to the ESXi bare metal Hypervisor of the VMware/vSphere framework.

Characteristics:

- KVM allows you to run multiple virtual machines on a single physical host.
- Provides isolation of virtual machines with high performance.
- Can run multiple VMs running unmodified Linux or Windows images
- Typically, CLI based tools to create, configures virtual machines.

For more details, please see the following links:

https://linux-kvm.org/page/Main_Page or

https://en.wikipedia.org/wiki/Kernel-based_Virtual_Machine

KVM technology is typically, but not exclusively, used by an Enterprise-Grade Virtual Machine Management or Cluster Management Framework for Hypervisor as mentioned in this guide, such as:

- Proxmox VE
- Nutanix AHV

also, by HyperScalers, often known as cloud offerings like:

- OpenStack, as a cloud computing infrastructure
- OCI native Compute
- Google Cloud Platform
- Others

This guide does not provide a detailed description of hyperscaler-based deployments. However, the basic virtual resources demand, and minimum SW Versions for OpenScape Solution Set intended to deployed in such environments can be derived from the KVM information in this guide.

Deploying KVM involves creating a Virtual Machine (VM) with the correct resource allocation to support the installation of the particular Mitel virtual application.

After creating the KVM VM, follow the physical installation procedures for the particular Mitel application.

Refer to the documentation for the Mitel product you are installing for detailed instructions.

4.1.3.1 Proxmox VE

The Proxmox **V**irtual **E**nvironment product is a powerful open-source server virtualization platform to manage KVM virtualization technologies with a single web-based interface. It offers tools for configuring high availability between servers, software-defined storage, networking, and disaster recovery.

Further details on the design, setup and maintenance of a Proxmox-based cluster, refer to the Promox product documentation.

As input for dimensioning such a cluster and the required virtual resources for the OpenScape Solution Set Virtual machines, please see the details in chapter Virtualization Dimensioning Details.

The CPU weight is described as CPU units and cand be adjusted manually from values between 1 - 10.000 depending on the use case.

The default value is set to 100.

Set the CPU priority to a higher value for the voice-sensitive Mitel applications. Lower settings can be used for the other applications.

CPU Units	Priority	Use Case
100 - 500	Very Low	Background or test VMs
500 - 1,024	Normal	General-purpose VMs (default)
2,048 - 5,000	High	Performance-sensitive VMs
5,000 - 10,000	Very High	Critical VMs (DBs, Web Servers)

- CPU type must be set to “host”.
- No memory Ballooning (uncheck Ballooning Device checkbox)
- To ensure no network interferences, the Firewall checkbox should be unchecked

4.1.3.1.1 Installing Software Appliances and Applications

Installing Mitel Appliances and Applications in the Proxmox VE environment is similar to installing on physical server, with the additional preliminary step of creating a suitable virtual machine for the appliances or applications.

Add the appropriate virtual devices and set the correct resource dimensioning and follow the installation steps described in the related product documentation.

4.1.3.2 Nutanix AHV

Nutanix AHV is another powerful, modern virtualization platform product that powers VMs for applications workloads on-premises.

It offers advanced virtualization features include VM live migration, dynamic scheduling and VM HA.

All further details on the design, setup and maintenance of a Nutanix-based cluster can be found in the Nutanix product documentation.

Nutanix CE (Community Edition) using the Phoenix ISO, includes:

- **AOS (Acropolis Operating System)** - The main Nutanix software.
- **AHV** (**Acropolis Hypervisor)** - The Nutanix Hypervisor (installed by default).
- **Prism (Web UI for Management)** - The interface used to manage the cluster, VMs, and storage.

5 General Statements and Best Practice Recommendations for Virtualization at Mitel

NOTICE: Some URLs referenced in this documentation require valid credentials for access. Ensure you have the necessary login information before attempting to access these resources.

General Support Statement for virtualized Mitel OpenScape products

In a virtualized environment configuration, care must be taken that the customer has two support contracts: one with Mitel and one with the Hypervisor provider.

If the customer opens a ticket with the Mitel Service Desk, the ticket will be accepted and evaluated to determine the root cause (whether the problem is with a Mitel product or with the Hypervisor). This can require the involvement of several levels in the Mitel support organization.

If the root cause analysis has determined that the problem is not on an Hypervisor level, Mitel support will investigate further. If it is suspected to be a Hypervisor software issue, the ticket will be routed back to the customer who will then be asked to open a ticket with Hypervisor.

It is recommended to follow the Best Practice Recommendations: e.g.

VMware - https://knowledge.broadcom.com/

Proxmox VE - https://pve.proxmox.com/pve-docs/

Nutanix - https://portal.nutanix.com/page/documents/list/?type=software

Hyper-V - https://learn.microsoft.com/en-us/iis/web-hosting/installing-infrastructure-components/hyper-v-guides

Usage of Virtual Machine Snapshots:

NOTICE:

Snapshots are used as part of official Mitel Service procedures. However, the following restrictions must be observed.

1) Snapshots are NOT to be taken on production systems during normal operation.
2) Snapshots taken previously must NOT remain active on a production system during normal operation.
3) Snapshots can be taken, if needed, only during maintenance windows, or during the installation procedure.

   Snapshots can be a valuable mechanism during maintenance operations. For example, they allow a quick rollback to a well- defined state of the VM if a mass provisioning script fails.
4) Note that Snapshots are used internally by backup tools such as VDP or VDR. It must be ensured that (a) these backup operations are scheduled off business hours, and (b) that any Snapshots generated by these tools are deleted at the conclusion of the backup operation.

5) **Recommended Disk Mode:**

   a) For disk mode the default settings should be kept, since this allows for the creation and use of snapshots.

   b) The disk mode must not be set to "independent", since this would prevent snapshots from being taken.

For further information regarding Snapshots please consult the Hypervisor Knowledge Base (KB).

Usage of Advanced Locking ID (ALI):
The use of Advanced Locking ID is recommended whenever the Mitel product supports ALI.

5.1 Key Support Considerations

Customers must adhere to the following in order to enable Mitel PTS to effectively provide support when running virtualized Mitel mission critical and real time applications such as OSV, UC app, and Media Server co-resident with Mitel non real time/3rd-party app VMs:

Customers requesting to operate the Hypervisor Cluster with reduced vCPU reservations should be aware of the following:

- Issues resulting from resource contention cannot be addressed towards Mitel. If Mitel investigates any issues shown to be related to lacking resources, or the datacenter is unable to provide to Mitel the VM diagnostic data required to investigate the issue, the organization receiving the support agrees to reimburse Mitel for the investigation time spent.
- Mitel support can require to switch back to default settings in case of issues (or when investigating issues).
- Mitel must be granted access to Hypervisor logs and performance metrics.
- Software: Mitel PTS may require changes to the software workload to troubleshoot or resolve application performance problems. Examples include:
  - temporary power-down of non-critical VMs to facilitate perfor- mance troubleshooting.
  - moving critical VMs and/or non-critical VMs to alternate virtual- ization host/physical server as a temporary or permanent solution.
- To protect against the broad variations from the proliferation of many different flavors of KVM’s, worst case Mitel Support would ask the partner/ customer to spin up a Proxmox/KVM to recreate the issue.
- Hardware: Mitel PTS may require changes to the physical hardware, to troubleshoot or resolve application performance problems. Examples include:
  - Mitel PTS may require additions/upgrades to "fix" an overloaded host as an alternative to powering-down VMs or moving VMs.
  - adding more physical disks to increase storage capacity and/or provide IOPS.
  - decreasing storage latency.
  - adding more physical memory or more physical CPU cores.
  - adding physical NIC interfaces to address LAN congestion.

6 Virtualization Dimensioning Overview

6.1 VM Co-Residency and Quality of Service policy

This VM Co-Residency and Quality of Service Policy provides the rules for the parties responsible for deploying the Mitel VMs and managing the virtual environment when deploying Mitel VMs on consolidated network and hardware resources:

- It is up to the parties responsible for deploying the Mitel VMs and managing the virtual environment to ensure the performance criteria is met. Uncertainty can be reduced by pre-deployment testing, baselining, and following the rules of Mitel VM Configuration and Resource Guide (VM R&C) including this policy.
- VMs with Mitel real time and mission critical applications shall be protected from other applications in the routing and switching network to ensure voice/video network traffic get the needed bandwidth and protection from delay and jitter.
- VMs with Mitel real time and mission critical applications shall be protected from other applications when the virtualization host shares compute, storage, and network hardware among multiple application virtual machines (e.g. you cannot schedule Mitel real time applications to run on a host with insufficient resources for the VM).
- All components in the virtual environment shall be on Hypervisor's Compatibility Guide.
- All components in the virtual environment shall be designed to fulfill Hypervisor provider best practice guidelines.
- Adherence to Mitel Virtualization and Resource configuration rules (e.g. physical/virtual hardware sizing, co-residency policy, etc.) is required in order to ensure Mitel VMs get the needed CPU, memory, storage capacity and storage/network performance.
- Mitel VMs shall not be hosted on the same HW with third-party VMs that have incomplete resource requirements defined.
- Host hardware shall be continuously monitored and operated below 70% CPU usage with a %RDY value of 5% max.
- The total amount of RAM, Storage, and NW (including Storage Network) throughput shall not exceed the capacity of the Host hardware (no over subscription).
- Even if the host processor is hyper-threading-capable and HT is enabled, a physical core shall only be counted once.
- In case customer wishes to optimize VM resources (vCPU reservation) to a minimum, then a continuous and close monitoring of the system is absolutely required. As a starting point, a vCPU Reservation of 50% of the Mitel recommended value can be configured but that percentage will need to be adjusted by observing the peak CPU consumption required during normal business operation/hours.

  IMPORTANT NOTES:

  – CPU Overprovisioning is possible. It has to be based on the physical cores (pCPU) of the physical hosting machines, however it is not recommended to extend the pCPU/vCPU ratio **bigger than 1:2 for Realtime load**. If higher ratio (e.g. 1:3 or 1:4) is intended it could be considered on the non-VoIP Media/Signalling VMs, e.g. Management

tools, combined by close monitoring the cluster overall performance. This statement is valid independent which Hypervisor (Type1) is in use.
  - In case of CPU Overprovisioning (contention), proper CPU prioritization must be configured for each VM. This prioritization is configurable differently depending on the used Hypervisor (e.g. CPU weight/CPU share/CPU priority/CPU units ...).
  - Please note that the responsibility for such customized configurations lies to the parties that deploy and manage the Mitel VMs and the virtual environment.
  - In case of any performance issues (e.g. system/component overloads, outage etc.) the recommended values per VM system as described in this document must be applied.
  - In cluster setups with overprovisioned VM resources (CPU/RAM) I/O and CPU load intensive mainteance activities has to executed with caution e.g. only VM by VM.
- Disaster Recovery plans need to take into account the additional resources required in case a fail over occurs (datacenter 2).

6.2 Physical Resource Dimensioning

The following resources must be properly dimensioned and configured in order for any application to operate properly in a Hypervisor clustered environment:

- Virtual Cores (vCPU) – Both, the number of virtual cores consumed by the application(s), and the vCPU power in GHz consumed by the applications.
- Virtual Memory (vRAM) – Amount of memory in GB consumed by the applications.
- Virtual Hard Disks (vHD) – The amount of storage in GB consumed by the application(s), and the throughput required.
- Virtual Network Interfaces (vNIC) – The number of virtual network adaptors, and the bandwidth required.

NOTICE: Virtual core is synonymous to virtual CPU.

6.2.1 Dimensioning the Required Physical CPUs for a Deployment

Two inputs from the product virtualization dimensioning tables are relevant to dimension the resource CPU:

- Number of virtual cores (vCPU) required by this product
- Minimum percentage of the totally allocated CPU resources required for normal operation by this product. This is the percentage that is used for vCPU reservations.

The number of physical CPU cores required by the Hypervisor host when multiple Mitel applications are co-resident on that Hypervisor host is determined using the following equation:
# of Physical Cores > Total Reservation by all applications / Physical CPU Frequency

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NOTICE:

If a Mitel application does not perform CPU reservation at all then use 50% as a minimum for that product (*).

Example: We have 4 Mitel applications in the same Hypervisor host, which has a CPU clocked at 2.0 GHz. The following table lists the requirements of the aforementioned applications:

Application	# of vCPU	Reservation percentage	Reservation
A	4	75%	6,000 MHz
B	1	100%	2,000 MHz
C	2	0% (*50%)	2,000 MHz
D	2	100%	4,000 MHz
Total	-	-	14,000 MHz

Using the formula provided above (14,000 / 2,000 = 7) we see that the total number of physical CPU cores must be greater than 7.

This method can also be used to estimate the aggregate number of physical cores for an entire solution composed of numerous Mitel virtual products over multiple vSphere hosts.

Remarks:

- All VM resourcing information that is provided by development for each product already includes peak load requirements, and
- The hypervisor will reserve some (~10%) of the resources provided by one physical CPU core of a Cluster's host. In order to avoid having the hypervisor overhead being multiplied, no hypervisor overhead is considered here when estimating the physical resources required for Mitel products/ applications. Hypervisor overhead is to be accounted by the vSphere system planners/designers/administrators. This fact needs to be clearly understood by or communicated to those implementing deployments.

6.2.2 Dimensioning the Required Physical RAM for a Deployment

Sum up the virtual memory (vRAM) requirements of each of the Mitel virtual products to be deployed and ensure that:

- Amount of physical memory ≥ Sum of vRAM required by selected products

Remarks:

Be aware that extra memory is needed by the Hypervisor host for its own code and data structures, beyond the memory allocated to each virtual machine. Overhead memory depends on the number of virtual CPUs and the configured memory for the guest operating system.

6.2.3 Dimensioning the Required Physical Storage for a Deployment

Sum up the virtual storage space (vHD) requirements of each of the Mitel virtual products to be deployed and ensure that:

- Amount of physical storage space ≥ Sum of vHD required by selected products.
- A storage space overhead of 25% is accounted.

Remarks:

- Storage latency is expected not to exceed 10ms.
- The number of IOPS is an important factor that needs to be considered.

  For specific OpenScape Solution paramenters, see chapter Virtualization Dimensioning Details.

7 Virtualization Dimensioning Details

NOTICE: Always refer to each product's release notes for any possible impacts to the dimensioning details contained in this section of the document.

IMPORTANT: Applications are delivered without the operating system. As a consequence, all required RAM and diskspace values for the applications documented, do not include the required RAM and diskspace of the underlying operating system (i.e. need to be assigned on top).

Please verify with Operating System Documentations.

Typically these OS demands are between 512 MB and 1 GB RAM, and has to be added especially for SW installations running under edge/peak loads.If not added, a close Operating system level metric (RAM, CPU, I/O) monitoring is strongly recommended.

7.1 OpenScape Voice

Virtualization Environment Setup:

- Both nodes of a cluster (duplex OSV system) must be installed as virtual machines. A cluster configuration where one node is deployed as native hardware and the other as a virtual machine is not supported.
- A detailed guideline for installing an OpenScape Voice (OSV) image onto a VMware ESXi virtualized platform is found in the *OpenScape Voice Service Manual: Installation and Upgrades*.
- The virtualization dimensioning specifications listed in this section (e.g. number of vCPUs, vCPU reservation, etc.) are tested and recommended by Unify. Configurations using different specifications which are not tested, may result in an unstable system and are not recommended. (e.g. since a vCPU is a process for the VM host, using more vCPUs than the recommended, adds overhead to the ESXi (VMkernel) in order to keep up with the increased number of processes). Please address those cases with a PSR.

NOTICE:

The virtual SCSI controller must be adapted BEFORE saving the VM. Please refer to the *Virtual Machine Disk Requirements* section of *OpenScape Voice, Service Manual: Installation and Upgrades*.

Migrations:

Detailed information for Migrations to OpenScape Voice is found in the *OpenScape Voice V11 Service Manual: Installation and Upgrades* under section *Migrations to OpenScape Voice*.

For information regarding the hardware platforms that support upgrades and migrations to, please refer to section *Overview of Upgrades and Migrations to OpenScape Voice V11*.

Knowledge of the VMware environment is a prerequisite for this migration. If the hardware of the source release is reused for this migration scenario, before the OSV Image can be installed the ESXi must be installed and the virtual environment configuration built. This will extend the system down time.

Service considerations:

In a virtualized environment configuration, care must be taken that the customer has two support contracts: one with Unify and one with VMware.

If the customer opens a ticket with the Unify Service Desk, the ticket will be accepted and evaluated to determine the root cause (whether the problem is with a Unify product or with VMware). This can require the involvement of several levels in the Unify support organization including GO and GPS.

If the root cause analysis has determined that the error is on the Unify side, GPS will provide a bug fix. If it is in VMware software, the ticket will be routed back to the customer who will then be asked to open a ticket with VMware.

OpenScape Voice Deployment:

Virtualization is supported for Integrated Simplex simplex and standard duplex (collocated and geographically separated) configurations. Supports 2 node clustering in co-location and network geographical separation. The co-located OSV can be deployed on 1 (both nodes on same physical host) or 2 hosts. A geo-separated OSV should be deployed on 2 hosts.

OpenScape Voice (2 nodes):

The hardware requirement presented in the table is for two OpenScape Voice nodes. In virtual environments you can install them on the same host/ server, but for obvious reasons it is recommended to install it on separate servers.

The simplex / entry option is not available for virtual environment.

The following additional notes have to be taken into account for this product:

- OSV figures in the table indicate requirements for each node
- OSV figures in the table are based on a typical Enterprise Feature set and call load.
- OSV figures in the table are based on default RTT trace settings (24-7 extern)/distributed registration/Nodes on Separate servers/Active-Standby mode
- OSV nodes are recommended to reside on separate physical servers for HW redundancy.
- OSV uses additional disk space (on the server/SAN) to hold things like images, patch sets, mass provisioning files, restore CD, vApp, CDC ISO, etc)
- The VMware manual MAC is no longer used to lock OSV license files for Virtual deployments. Use the CLS to calculate the Advanced Locking ID for OSV license files.
- OSV Backup and Restore procedures are recommended to be used versus snapshots
- OSV NW and Disk usage may vary based on call usage and Feature mix
- OSV cps (Calls per Second) formula = # of users×(5/3600×5) (5 calls per user per hour with a loading factor of 5 for features). Ex.: 1000 users = 6.94 cps.
- OSV NW Total Bandwidth KB/s Requirement formula = cps×26.
- OSV X-channel Bandwidth KB/s Requirement formula = cps×13 (Note: starting in V6 cross channel compression is turned on by default)

- OSV HD KB/s formula = cps×3.33
- In case the OSV nodes are hosted on different servers, each one should get its own CPU reservation value calculated using the formula
- # vCPU × physical CPU Freq, even if the physical CPUs are different.

OpenScape Voice V11			OpenScape Integrated Simplex V11
General Product Info	Operating System	Please see the Release Note	Please see the Release Note
	Native Redundancy Support	Yes	No
	Redundancy Strategy	Active/ Active or Active/ Standby	VMWare
	Voice/Video Media Terminating	No	Yes
	Voice/Video Signalling Traffic	Yes	Yes
	Other real-time critical requirements	No	No
VMware Feature Compatibility	vMotion Support	Yes	Yes
		Restrictions / Limitations: (vMotion during normal operation would cause some call loss (.5 to 1s second). vMotion impact during SW update/upgrade, node reboot, registration flood is tbd.)	
	High Availability (HA) Support	Yes	Yes
	Fault Tolerance (FT) Support	No	No
	Site Recovery Manager (SRM) Support	No. - SRM is supported indirectly by deploying one OSV node at the Protected site and the other OSV node at the Recovery Site	No
	Backup with vStorage-APIs for Data Protection	VMware VDR is supported Note: OSV Backup and Restore procedures are recommended to be used as a first line of defense against data loss.	VMware VDR is supported
	VMware Tools Support	Yes	Yes
	Virtual Appliance (vApp) Support	Yes	No

OpenScape Voice V10			OpenScape Integrated Simplex V10
General Product Info	Operating System	Please see the Release Note	Please see the Release Note
	Native Redundancy Support	Yes	No
	Redundancy Strategy	Active/ Active or Active/ Standby	VMWare
	Voice/Video Media Terminating	No	Yes
	Voice/Video Signalling Traffic	Yes	Yes
	Other real-time critical requirements	No	No
VMware Feature Compatibility	vMotion Support	Yes	Yes
		Restrictions / Limitations: (vMotion during normal operation would cause some call loss (.5 to 1s second). vMotion impact during SW update/upgrade, node reboot, registration flood is tbd.)	
	High Availability (HA) Support	Yes	Yes
	Fault Tolerance (FT) Support	No	No
	Site Recovery Manager (SRM) Support	No. - SRM is supported indirectly by deploying one OSV node at the Protected site and the other OSV node at the Recovery Site	No
	Backup with vStorage-APIs for Data Protection	VMware VDR is supported Note: OSV Backup and Restore procedures are recommended to be used as a first line of defense against data loss.	VMware VDR is supported
	VMware Tools Support	Yes	Yes
	Virtual Appliance (vApp) Support	Yes	No

OpenScape Voice					OpenScape Integrated Simplex	OpenScape Virtual Standard Duplex Large
		Depl. 1	Depl. 2	Largest		
Depl. Scenarios	Depl. Scenario	OSV Duplex	OSV Duplex	OSV Duplex	Virtualized Integrated Simplex	Virtualized Standard Duplex Large
	Number of Nodes	2	2	2	1	2
	Max Users	≤ 5,000*	≤ 10,000*	Max Users	5,000 Voice users, of which no more than 1250 may also be UC users	200,000 Voice users, of which 100.000 can be registered at any time
		*This number may be lower under high load, heavy feature usage or high level of tracing.				
vCPU	vCPU	4	4	8	8	8
	vCPU Reservations[3]	Must calculate # vCPU × physical CPU Freq				
vRAM	vRAM	9 GB	9 GB	9 GB	10 GB	12 GB
	vRAM Reserv.[4]	9 GB	9 GB	9 GB	10 GB	12 GB
vNIC	vNIC (No. Req'd)	4	4	4	4	4
	vNIC Manual MAC[1]	No	No	No	No	No
	Network Bandwidth (estimated reqm't)	887 KBps Includes 468 for x-channel	1774 KBps includes 936 for x-channel	8873 KBps includes 4680 for x-channel	3000 KBps	3000 KBps
Storage (vDisk)	vDisk (No. Req'd)	1 per node	1 per node	1 per node	1	1 per node
	vDisk Size	140 GB	140 GB	140 GB	140 GB	140 GB
	vDisk Mode[2]	Keep Defaults				
	vDisk Format	Thick Lazy-Zeroed				
	Addt'l Storage	10 GB	10 GB	10 GB	10 GB	10 GB
	Storage Throughput (estimated reqm't)	116 KBps	231 KBps	1157 KBps	250 KBps	250 KBps

OpenScape Voice					OpenScape Integrated Simplex	OpenScape Virtual Standard Duplex Large
		Depl. 1	Depl. 2	Largest		
	Storage IOPS (estimated reqm't)	TBD	TBD	TBD	75 IOPS	75 IOPS

NOTICE:

[1] If parameter is set to Y, please refer to "OpenScape Solution Set V11, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku. No, if remote CLA is used.

[2] Note: The Virtual disk mode setting "Independent" disallows the creation of Snapshots of a virtual machine. For a customer environment, it is recommended the Mode settings are NOT selected. This is the default configuration. Note: Snapshots are not to be used in a production environment except during initial installation process (e.g., as a backup in case there is a problem with a mass provisioning script). All snapshots are to be removed once the OSV VM is placed into production.

Additional information: Mode Independent persistent will leave changes permanently written to disk. Mode Independent Non-persistent writes data to disk but the data will be eliminated on restart (good for a training, lab, or demo environment).
[3] If Hypervisors supports this functionality.

7.2 OpenScape Session Border Controller (SBC)

7.2.1 OpenScape Session Border Controller (SBC) V10

VMware Metrics

The following table and notes show the metrics for support of up to 32,000 OpenScape SBC SIP registered users.

Deployment Scenario	Smallest	Config 1	Config 2	Largest
Metric	250 (Note 1)	6,000 (Note 1)	20,000 (Note 1)	32,000 (Note 1)
Max. registered hosted remote OpenScape Branch users (Note 2) (without Digest Authentication or TLS; Throttling does not apply) (Note 14)	250 (Note 3)	6,000 (Note 3)	20,000 (Note 3)	32,000 (Note 3)
Max. registered SIP Remote Users (Note 2), eg, home workers (without Digest Authentication, Throttling, or TLS)	250 (Note 3)	6,000 (Note 3)	20,000 (Note 3)	32,000 (Note 3)

Deployment Scenario	Smallest	Config 1	Config 2	Largest
Metric	250 (Note 1)	6,000 (Note 1)	20,000 (Note 1)	32,000 (Note 1)
Max. simultaneous SIP signaling calls / SBC sessions (Note 4)	250	1,400	2,500	32,000 (Note 13)
Max. simultaneous RTP media streams (full-calls) anchored through OpenScape SBC (without Media Transcoding) (Notes 5, 6, 7,8)	250	1,400	2,500	3,500
Max. simultaneous SRTP secure media streams (either MIKEY0 or SDES) terminated/mediated by SBC (without Media Transcoding)	200	1,120	2,000	2,800
Number of simultaneous SIP Service Providers (SSP)	10 (Note 9)	10 (Note 9)	10 (Note 9)	10 (Note 9)
Busy Hour Call Attempts (full calls) (Note 10 and Note 11)	1,800	23,400	39,600	39,600
Max. peak half-calls (Note 10 and Note 11) per second (without Digest Authentication, Throttling, or TLS)	1	13	22	22
Registration refresh requests per second (randomized registration steady state condition)	1	4	12	15
Steady state call completion rate	99.99%	99.99%	99.99%	99.99%
Time to recover to steady state operation (99.99% call completion) following simultaneous restart of all endpoint devices (Note 12)	<15 min.	<15 min.	<15 min.	<15 min.

The following notes provide details for the VMware Metrics:

1) Network interface switch speed is set to 1 Gigabit Ethernet.

2) For keysets, each keyset line appearance is counted as one registered user.

3) Subscriber registration interval 3600 seconds. Lower intervals could cause flood of registration and impact SBC and its limits.

4) Add the following penalty (or penalties*) to get the actual registered SIP users limit. To get new numbers, apply penalty1 and on the new numbers apply penalty2.

- Digest Authentication penalty: 25%
- Throttling Penalty (600 seconds - reducing this value introduces more penalty): 60%

  * To determine cumulative penalties apply penalty1 and on the new number apply penalty2.

  ** Throttling penalties are not applicable to hosted remote Branch users.

5) An SBC Session is defined as a SIP signaled call with an access-side signaling leg and a core-side signaling leg. A typical voice call between a local OpenScape Voice user and a Remote User registered via the SBC, or to a SIP Trunk connected via the SBC requires one SBC session. A typical video call requires two SBC sessions; one for the video connection and another for the audio connection. An additional 20% penalty on OpenScape SBC capacity should be added for a video connection versus an audio connection due to the extra SIP INFO messages that are exchanged during a video call.

6) Each RTP stream (full-call) anchored through the central OpenScape SBC consists of two half-calls travelling in opposite direction. For example, two half-calls are used when a remote user registered via the SBC is connected to another remote user registered via the SBC, or to a SIP Trunk connected via the SBC. A single half-call is used when a local subscriber registered directly with the OpenScape Voice server is connected to a remote user registered via the SBC, or to a SIP Trunk connected via the SBC.

7) The RTP packet performance (e.g., packet loss) is influenced by several factors:

- Hardware BIOS settings relating to performance & power saving,
- Hardware BIOS hyper-threading,
- VM guest settings hyper-threaded core sharing,
- VM guest memory (RAM),
- VM guest OS NIC rx ring buffer size

8) RTP packetization time/size. For better performance, choose BIOS performance over power-saving. Multiple, active VM's and smaller vRAM allocations may decrease RTP packet loss

9) Up to 10 SSP simultaneous SIP trunk interfaces are supported. These interfaces can connect to the same or different SSPs assuming the IP addresses on the SSP side are different. The SSP connection can point to the same or different IP addresses on the OpenScape SBC.

10) A "half call" is a call from either Access side (WAN) to core-side (LAN) or from core-side (LAN) to access-side (WAN). A "full call" consists of two half call legs. i.e. a call being initiated by the Access side (WAN) going to core-side (LAN) and then coming back to the Access side (WAN).

11) Apply the following penalty (or penalties*) to determine the actual OpenScape SBC maximum calls per second limit when the following functions are enabled:

- Digest Authentication penalty: 30%
- Throttling penalty** (600 seconds throttling interval): 40%
- TLS penalty** (600 seconds keep alive interval; no throttling): 50%

* To determine cumulative penalties apply penalty1 and on the new number apply penalty2

**Throttling and TLS penalties are not applicable to hosted remote Branch users.

12) When restarting, SIP endpoint devices are required to comply with procedures specified in RFC3261 and OSCAR Chapter 11: Best Practices. With a simultaneous restart of all endpoint devices, when a user becomes successfully registered, that user shall immediately be able to originate and receive calls with a call completion rate of at least 99.99%.

13) The maximum number of simultaneous SBC sessions in the high-capacity model is for signaling-only sessions. If media anchoring, trans-coding,

trans-rating or any other feature is in use that requires the media to flow through the SBC, then the maximum number of simultaneous SIP sessions reverts to its old value of 3,500.

14) Throttling is a mechanism used to keep a NAT/firewall pinhole open for the subscriber's SIP signaling connection for a subscriber that is behind a far-end NAT/firewall. In order to do this, REGISTER messages coming from these subscribers responded back with a small expiry interval (configurable, default 60 seconds) to force the subscribers to re-register causing the pinhole in the NAT device to remain open.

VMware Resources

OpenScape SBC V10		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	Yes
	Redundancy Strategy	Active/ Standby
	Voice/Video Media Terminating	Yes
	Voice/Video Signalling Traffic	Yes
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes Restrictions / Limitations: It is recommended to perform a Live Migration only in periods of low traffic, otherwise noticeable service interruption might occur.
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	No
	Backup with vStorage-APIs for Data Protection	No
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	Yes

OpenScape SBC V10					
		Smallest	Config. 1	Config. 2	Largest
Depl. Scenarios	Depl. Scenario	Single or redundant node			
	Number of Nodes	1-2	1-2	1-2	1-2
	Max Users	250	6,000	20,000	32,000
vCPU	vCPU	2	4	6	8

OpenScape SBC V10					
		Smallest	Config. 1	Config. 2	Largest
	vCPU Reserv.[1] [2]	Must calculate # vCPU × physical CPU Freq			
	vCPU Limit	Unlimited			
vRAM	vRAM	4 GB	4 GB	6 GB	6 GB
	vRAM Reserv.[1]	4 GB	4 GB	6 GB	6 GB
vNIC	vNIC (No. Req'd)[2]	2	2	2	2
	vNIC Manual MAC[3]	Yes, only for local license file			
	Network Bandwidth Capacity (estimated requirement)	Core side (eth0) 100 KB/sec Access side (eth1) 16000 KB/sec	Core side (eth0) 500 KB/sec Access side (eth1) 60,000 KB/sec	Core side (eth0) 1,000 KB/sec Access side (eth1) 120,000 KB/sec	Core side (eth0) 1,000 KB/sec Access side (eth1) 120,000 KB/sec
Storage (vDisk)	vDisk (No. Req'd)	1	1	1	1
	vDisk Size	40 GB	40 GB	60 GB	60 GB
	vDisk Format[1]	Thick Lazy-Zeroed			
	Addt'l Storage	5 GB	5 GB	5 GB	5 GB
	Storage Throughput (estimated reqm't)	30 KBps	400 KBps	600 KBps	600 KBps
	Storage IOPS (estimated reqm't)	5	20	30	30

NOTICE:

For the OpenScape Session Border Controller (SBC) until V10R0 the vRAM of the VMware virtual machine is specified according to the following table:

		Smallest	Config. 1	Config. 2	Largest
vRAM	vRAM	2 GB	2 GB	4 GB	4 GB

[2] OpenScape Branch and OpenScape SBC are considered critical real time applications. Therefore, the CPU reservation settings should be adjusted to allow as much CPU speed as possible. The performance tests executed on V10 used a SR250 server with four cores running at 3.5 GHz, with a SPECint_base2017 value of 9.77. This is the recommended value for achieving the specified performance figures. If the selected host processor has a SPECint_base2017 value lower than the recommended one or the reservation settings cannot allocate the host CPU frequency for all required cores, then the reservation values can be lowered. In this case, the customer/service shall monitor closely the OpenScape Branch/SBC CPU usage to avoid performance bottlenecks. Alarms should be set for conditions and the recommended solution is to increase the host CPU capacities or reduce the resources for other non-critical applications running on same host.

		Smallest	Config. 1	Config. 2	Largest
	vRAM Reserv.	2 GB	2 GB	4 GB	4 GB

NOTICE:

[1] If Hypervisors supports this functionality.

[2] Note: The default value is 2, but it is possible to configure up to 6 vNICs.

[3] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku. No, if remote CLA is used.

7.2.2 OpenScape Session Border Controller (SBC) V11

VMware Metrics

The following table and notes show the metrics for support of up to 32,000 OpenScape SBC SIP registered users.

Deployment Scenario	Smallest	Config 1	Config 2	Largest
Metric	250 (Note 1)	6,000 (Note 1)	20,000 (Note 1)	32,000 (Note 1)
Max. registered hosted remote OpenScape Branch users (Note 2) (without Digest Authentication or TLS; Throttling does not apply) (Note 14)	250 (Note 3)	6,000 (Note 3)	20,000 (Note 3)	32,000 (Note 3)
Max. registered SIP Remote Users (Note 2), eg, home workers (without Digest Authentication, Throttling, or TLS)	250 (Note 3)	6,000 (Note 3)	20,000 (Note 3)	32,000 (Note 3)
Max. simultaneous SIP signaling calls / SBC sessions (Note 4)	250	1,400	2,500	32,000 (Note 13)
Max. simultaneous RTP media streams (full-calls) anchored through OpenScape SBC (without Media Transcoding) (Notes 5, 6, 7,8)	250	1,400	2,500	3,500
Max. simultaneous SRTP secure media streams (either MIKEY0 or SDES) terminated/mediated by SBC (without Media Transcoding)	200	1,120	2,000	2,800
Number of simultaneous SIP Service Providers (SSP)	10 (Note 9)	10 (Note 9)	10 (Note 9)	10 (Note 9)
Busy Hour Call Attempts (full calls) (Note 10 and Note 11)	1,800	23,400	39,600	39,600
Max. peak half-calls (Note 10 and Note 11) per second (without Digest Authentication, Throttling, or TLS)	1	13	22	22

Deployment Scenario	Smallest	Config 1	Config 2	Largest
Metric	250 (Note 1)	6,000 (Note 1)	20,000 (Note 1)	32,000 (Note 1)
Registration refresh requests per second (randomized registration steady state condition)	1	4	12	15
Steady state call completion rate	99.99%	99.99%	99.99%	99.99%
Time to recover to steady state operation (99.99% call completion) following simultaneous restart of all endpoint devices (Note 12)	<15 min.	<15 min.	<15 min.	<15 min.

The following notes provide details for the VMware Metrics:

1) Network interface switch speed is set to 1 Gigabit Ethernet.

2) For keysets, each keyset line appearance is counted as one registered user.

3) Subscriber registration interval 3600 seconds. Lower intervals could cause flood of registration and impact SBC and its limits.

4) Add the following penalty (or penalties*) to get the actual registered SIP users limit. To get new numbers, apply penalty1 and on the new numbers apply penalty2.

- Digest Authentication penalty: 25%
- Throttling Penalty (600 seconds - reducing this value introduces more penalty): 60%

* To determine cumulative penalties apply penalty1 and on the new number apply penalty2.

** Throttling penalties are not applicable to hosted remote Branch users.

5) An SBC Session is defined as a SIP signaled call with an access-side signaling leg and a core-side signaling leg. A typical voice call between a local OpenScape Voice user and a Remote User registered via the SBC, or to a SIP Trunk connected via the SBC requires one SBC session. A typical video call requires two SBC sessions; one for the video connection and another for the audio connection. An additional 20% penalty on OpenScape SBC capacity should be added for a video connection versus an audio connection due to the extra SIP INFO messages that are exchanged during a video call.

6) Each RTP stream (full-call) anchored through the central OpenScape SBC consists of two half-calls travelling in opposite direction. For example, two half-calls are used when a remote user registered via the SBC is connected to another remote user registered via the SBC, or to a SIP Trunk connected via the SBC. A single half-call is used when a local subscriber registered directly with the OpenScape Voice server is connected to a remote user registered via the SBC, or to a SIP Trunk connected via the SBC.

7) The RTP packet performance (e.g., packet loss) is influenced by several factors:

- Hardware BIOS settings relating to performance & power saving,
- Hardware BIOS hyper-threading,
- VM guest settings hyper-threaded core sharing,
- VM guest memory (RAM),
- VM guest OS NIC rx ring buffer size

8) RTP packetization time/size. For better performance, choose BIOS performance over power-saving. Multiple, active VM's and smaller vRAM allocations may decrease RTP packet loss

9) Up to 10 SSP simultaneous SIP trunk interfaces are supported. These interfaces can connect to the same or different SSPs assuming the IP addresses on the SSP side are different. The SSP connection can point to the same or different IP addresses on the OpenScape SBC.

10) A "half call" is a call from either Access side (WAN) to core-side (LAN) or from core-side (LAN) to access-side (WAN). A "full call" consists of two half call legs. i.e. a call being initiated by the Access side (WAN) going to core-side (LAN) and then coming back to the Access side (WAN).

11) Apply the following penalty (or penalties*) to determine the actual OpenScape SBC maximum calls per second limit when the following functions are enabled:

- Digest Authentication penalty: 30%
- Throttling penalty** (600 seconds throttling interval): 40%
- TLS penalty** (600 seconds keep alive interval; no throttling): 50%

  * To determine cumulative penalties apply penalty1 and on the new number apply penalty2

  **Throttling and TLS penalties are not applicable to hosted remote Branch users.

12) When restarting, SIP endpoint devices are required to comply with procedures specified in RFC3261 and OSCAR Chapter 11: Best Practices. With a simultaneous restart of all endpoint devices, when a user becomes successfully registered, that user shall immediately be able to originate and receive calls with a call completion rate of at least 99.99%.

13) The maximum number of simultaneous SBC sessions in the high-capacity model is for signaling-only sessions. If media anchoring, trans-coding, trans-rating or any other feature is in use that requires the media to flow through the SBC, then the maximum number of simultaneous SIP sessions reverts to its old value of 3,500.

14) Throttling is a mechanism used to keep a NAT/firewall pinhole open for the subscriber's SIP signaling connection for a subscriber that is behind a far-end NAT/firewall. In order to do this, REGISTER messages coming from these subscribers responded back with a small expiry interval (configurable, default 60 seconds) to force the subscribers to re-register causing the pinhole in the NAT device to remain open.

VMware Resources

OpenScape SBC V11		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	Yes

OpenScape SBC V11		
	Redundancy Strategy	Active/ Standby
	Voice/Video Media Terminating	Yes
	Voice/Video Signalling Traffic	Yes
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes Restrictions / Limitations: It is recommended to perform a Live Migration only in periods of low traffic, otherwise noticeable service interruption might occur.
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	No
	Backup with vStorage-APIs for Data Protection	No
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	Yes

OpenScape SBC V11					
		Smallest	Config. 1	Config. 2	Largest
Depl. Scenarios	Depl. Scenario	Single or redundant node			
	Number of Nodes	1-2	1-2	1-2	1-2
	Max Users	250	6,000	20,000	32,000
vCPU	vCPU	2	4	6	8
	vCPU Reserv.[1] [3]	Must calculate # vCPU × physical CPU Freq			
vRAM	vRAM	4 GB	4 GB	6 GB	6 GB

[3] OpenScape Branch and OpenScape SBC are considered critical real time applications. Therefore, the CPU reservation settings should be adjusted to allow as much CPU speed as possible. The performance tests executed on V10 used a SR250 server with four cores running at 3.5 GHz, with a SPECint_base2017 value of 9.77. This is the recommended value for achieving the specified performance figures. If the selected host processor has a SPECint_base2017 value lower than the recommended one or the reservation settings cannot allocate the host CPU frequency for all required cores, then the reservation values can be lowered. In this case, the customer/service shall monitor closely the OpenScape Branch/SBC CPU usage to avoid performance bottlenecks. Alarms should be set for conditions and the recommended solution is to increase the host CPU capacities or reduce the resources for other non-critical applications running on same host.

OpenScape SBC V11					
		Smallest	Config. 1	Config. 2	Largest
	vRAM Reserv.[1]	4 GB	4 GB	6 GB	6 GB
vNIC	vNIC (No. Req'd)[2]	2	2	2	2
	vNIC Manual MAC[3]	Yes, only for local license file			
	Network Bandwidth Capacity (estimated requirement)	Core side (eth0) 100 KB/sec Access side (eth1) 16000 KB/sec	Core side (eth0) 500 KB/sec Access side (eth1) 60,000 KB/sec	Core side (eth0) 1,000 KB/sec Access side (eth1) 120,000 KB/sec	Core side (eth0) 1,000 KB/sec Access side (eth1) 120,000 KB/sec
Storage (vDisk)	vDisk (No. Req'd)	1	1	1	1
	vDisk Size	40 GB	40 GB	60 GB	60 GB
	vDisk Format[1]	Thick Lazy-Zeroed			
	Addt'l Storage	5 GB	5 GB	5 GB	5 GB
	Storage Throughput (estimated reqm't)	30 KBps	400 KBps	600 KBps	600 KBps
	Storage IOPS (estimated reqm't)	5	20	30	30

NOTICE:

For the OpenScape Session Border Controller (SBC) until V11 the vRAM of the VMware virtual machine is specified according to the following table:

		Smallest	Config. 1	Config. 2	Largest
vRAM	vRAM	2 GB	2 GB	4 GB	4 GB
	vRAM Reserv.	2 GB	2 GB	4 GB	4 GB

NOTICE:

[1] If Hypervisors supports this functionality.

[2] Note: The default value is 2, but it is possible to configure up to 6 vNICs.

[3] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku. No, if remote CLA is used.

7.3 OpenScape Branch

7.3.1 OpenScape Branch V10

OpenScape Branch V10		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	Yes
	Redundancy Strategy	Active / Standby
	Voice/Video Media Terminating	Yes
	Voice/Video Signalling Traffic	Yes
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	No
	Backup with vStorage-APIs for Data Protection	No
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	Yes

OpenScape Branch V10						
		Smallest	Depl. 1	Depl. 2	Depl. 3	Largest
Depl. Scenarios	Depl. Scenario		OSB 250	OSB 1000	OSB 6000	
	Number of Nodes		1	1	1	
	Max Users		250	1,000	6,000	
vCPU	vCPU		2	4	8	
	vCPU Reserv.[1]		Must calculate # vCPU × physical CPU Freq			
vRAM	vRAM		4 GB	4 GB	6 GB	
	vRAM Reserv.[2]		4 GB	4 GB	6 GB	
vNIC	vNIC (No. Req'd) [3]		1 (proxy mode) or 2 (SBC mode)			
	vNIC Manual MAC[4]		Yes, only for local license file			

OpenScape Branch V10						
		Smallest	Depl. 1	Depl. 2	Depl. 3	Largest
	Network Bandwidth (estimated reqm't)		1 MB/s (for proxy mode) or 10MB/s (for SBC mode)	2 MB/s (for proxy mode) or 20MB/s (for SBC mode)	6 MB/s (for proxy mode) or 60MB/s (for SBC mode)	
Storage (vDisk)	vDisk (No. Req'd)		1	1	1	
	vDisk Size		40 GB	40 GB	60 GB	
	vDisk Format[2]		Thick Provision Lazy Zeroed			
	Storage Through-put (estimated reqm't)		400 KB/s	600 KB/s	600 KB/s	
	Storage IOPS(estimated reqm't)		Shares = N + unlimited IOPS (defaults) 20	Shares = N + unlimited IOPS (defaults) 20	Shares = N + unlimited IOPS (defaults) 30	

NOTICE:

For the OpenScape Branch until V10R0, the vRAM of the virtual machine is specified according to the following table:

		Smallest	Depl. 1	Depl. 2	Depl. 3	Largest
vRAM	vRAM		2 GB	2 GB	4 GB	
	vRAM Shares		Normal	Normal	Normal	
	vRAM Reserv. [2]		2 GB	2 GB	4 GB	

NOTICE:

[1] If Hypervisors supports this functionality. OpenScape Branch and OpenScape SBC are considered critical real time applications. Therefore, the CPU reservation settings should be adjusted to allow as much CPU speed as possible.

[2] If Hypervisors supports this functionality.

[3] This is the default value, but it is possible to configure up to 4 vNICs.

[4] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

7.3.2 OpenScape Branch V11

OpenScape Branch V11		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	Yes
	Redundancy Strategy	Active / Standby
	Voice/Video Media Terminating	Yes
	Voice/Video Signalling Traffic	Yes
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	No
	Backup with vStorage-APIs for Data Protection	No
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	Yes

OpenScape Branch V11						
		Smallest	Depl. 1	Depl. 2	Depl. 3	Largest
Depl. Scenarios	Depl. Scenario		OSB 250	OSB 1000	OSB 6000	
	Number of Nodes		1	1	1	
	Max Users		250	1,000	6,000	
vCPU	vCPU		2	4	8	
	vCPU Reserv.[1]		Must calculate # vCPU × physical CPU Freq			
	vCPU Limit		Unlimited			
vRAM	vRAM		4 GB	4 GB	6 GB	
	vRAM Reserv.[2]		4 GB	4 GB	6 GB	
vNIC	vNIC (No. Req'd) [3]		1 (proxy mode) or 2 (SBC mode)			
	vNIC Manual MAC[4]		Yes, only for local license file			

OpenScape Branch V11						
		Smallest	Depl. 1	Depl. 2	Depl. 3	Largest
	Network Bandwidth (estimated reqm't)		1 MB/s (for proxy mode) or 10MB/s (for SBC mode)	2 MB/s (for proxy mode) or 20MB/s (for SBC mode)	6 MB/s (for proxy mode) or 60MB/s (for SBC mode)	
Storage (vDisk)	vDisk (No. Req'd)		1	1	1	
	vDisk Size		40 GB	40 GB	60 GB	
	vDisk Format[2]		Thick Provision Lazy Zeroed			
	Storage Through-put (estimated reqm't)		400 KB/s	600 KB/s	600 KB/s	
	Storage IOPS(estimated reqm't)		Shares = N + unlimited IOPS (defaults) 20	Shares = N + unlimited IOPS (defaults) 20	Shares = N + unlimited IOPS (defaults) 30	

		Smallest	Depl. 1	Depl. 2	Depl. 3	Largest
vRAM	vRAM		2 GB	2 GB	4 GB	
	vRAM Reserv. [2]		2 GB	2 GB	4 GB	

NOTICE:

[1] OpenScape Branch and OpenScape SBC are considered critical real time applications. Therefore, the CPU reservation settings should be adjusted to allow as much CPU speed as possible. In this case, the customer/service shall monitor closely the OpenScape Branch/SBC CPU usage to avoid performance bottlenecks. Alarms should be set for conditions and the recommended solution is to increase the host CPU capacities or reduce the resources for other non-critical applications running on same host.

[2] If Hypervisors supports this functionality.

[3] This is the default value, but it is possible to configure up to 4 vNICs.

[4] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

7.4 OpenScape CMP

CMP Standalone: Whenever you do not have OpenScape UC packages (e.g. OpenScapeUC_MultipleCommunicationServerAdmin deployment), you do have to include the CMP to manage OpenScape Voice, OpenScape Branch, OpenScape Media Server, etc.

OpenScape CMP V10		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	No
	Redundancy Strategy	-
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	No
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	SRM is offered as a PSR
	Backup with vStorage-APIs for Data Protection	No
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	Yes

OpenScape CMP V10								
		Smallest	Depl. 1	Depl. 2	Depl. 3	Depl 4	Depl. 5	Largest
Depl. Scenarios	Depl. Scenario		Single-node					Single-node
	Number of Nodes		1					1
	Max Users		5,000					50,000
vCPU	vCPU		4					4
vRAM	vRAM		6 GB					8 GB
	vRAM Reserv.[1]		2 GB					2 GB
vNIC	vNIC (No. Req'd)		1					1
	vNIC Manual MAC[2]		Yes					Yes
Storage (vDisk)	vDisk (No. Req'd)		1					1
	vDisk Size		30 GB					30 GB

OpenScape CMP V10								
		Smallest	Depl. 1	Depl. 2	Depl. 3	Depl 4	Depl. 5	Largest
	vDisk Format[1]		any thick					any thick

NOTICE:

[1] If Hypervisors supports this functionality.

[2] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

[3] If the installation medium needs to be stored on the server, increase the vDisk size accordingly.

7.5 OpenScape Composer

Composer Standalone: Composer is usually installed on the same server as OpenScape CMP, but it is also possible to install it as a standalone application.

OpenScape Composer V2		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	No
	Redundancy Strategy	-
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	No
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	SRM is offered as a PSR
	Backup with vStorage-APIs for Data Protection	No
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	Yes

OpenScape Composer V2								
		Smallest	Depl. 1	Depl. 2	Depl. 3	Depl 4	Depl. 5	Largest
Depl. Scenarios	Depl. Scenario		Single-node					
	Number of Nodes		1					
	Max Users		no dependency Composer resources are not dependent to the users in the solution					
vCPU	vCPU		2					
vRAM	vRAM		6 GB					
	vRAM Reserv.[1]		2 GB					
vNIC	vNIC (No. Req'd)		1					
	vNIC Manual MAC[2]		Yes					
Storage (vDisk)	vDisk (No. Req'd) [3]		1					1
	vDisk Size		80 GB					80 GB
	vDisk Mode		See note.					See note.
	vDisk Format[1]		any thick					any thick

NOTICE:

[1] If Hypervisors supports this functionality.

[2] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

[3] Independent persistent is recommended - Snapshots allowed if observing guidelines documented in Section 3.5 General Statements and Best Practice Recommendations for Virtualization at Unify.

7.6 OpenScape 4000

OpenScape 4000 V11 Core Simplex/Duplex and SoftGate		
General Product Info	Operating System	Please see the Release Note

OpenScape 4000 V11 Core Simplex/Duplex and SoftGate		
	Native Redundancy Support	Yes
	Redundancy Strategy	Hot Standby (in Duplex mode)
	Voice/Video Media Terminating	Yes (In case Simplex with softGate)
	Voice/Video Signalling Traffic	Yes
	Other real-time critical requirements	Yes
VMware Feature Compatibility	vMotion Support	Restrictions / Limitations: This VMware feature should NOT be performed on production systems during normal operation. Using this feature may lead to soft or hard restarts of the system, however the system will return to its normal operating state automatically after the restart. It can be performed, if needed, during maintenance windows. NOTE: OS4K nodes should not be part of DRS life migration as it uses vMotion.
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	SRM can be used for SoftGate Standlone cases. SRM is supported indirectly by deploying one OS4K node at the Protected site and the other OS4K node at the Recovery site.
	Backup with vStorage-APIs for Data Protection	Snapshots allowed if observing guidelines documented in Section 3.5 General Statements and Best Practice Recommendations for Virtualization at Unify.
	VMware Tools Support	Yes, no manual installation allowed; approved updates will be delivered with OS4K Software.
	Virtual Appliance (vApp) Support	Yes, the usage of the OS4K OVF templates is mandatory for the configuration of virtual machines.

OpenScape 4000 V11								
		Core System				Survivable		SoftGate only
		Simplex/ Separated Duplex	Quorum		Simplex + SoftGate	Survivable Unit	Survivable SG Standard	SG Standard
			Quorum [2]	Quorum with SG Std.				
Depl. Scenarios	Depl. Scenario	OpenScape 4000	Quorum	Quorum with SoftGate [5]	Simplex with SoftGate	Survivable Unit	Survivable SoftGate	Standalone SoftGate

OpenScape 4000 V11								
		Core System				Survivable		SoftGate only
		Simplex/ Separated Duplex	Quorum		Simplex + SoftGate	Survivable Unit	Survivable SG Standard	SG Standard
			Quorum [2]	Quorum with SG Std.				
	Number of Nodes	1/2	1	1	1	1	1	1
	SG Max parallel channels			250	250			
vCPU	vCPU [1]	4	2	4	4	4	4	4
vRAM	vRAM [3]	6 GB	2 GB	4 GB	8 GB	4 GB	8 GB	4 GB
	vRAM Reserv.[2]	4 GB	1 GB	4 GB	8 GB	4 GB	8 GB	4 GB
vNIC	vNIC (No. Req'd)	3/4	2	3	3	3	3	1
	vNIC Manual MAC [4]	No	No	No	No	No	No	No
Storage (vDisk)	vDisk (No. Req'd)	1	1	1	1	1	1	1
	vDisk Size	250 GB	30 GB	75 GB	250 GB	250 GB	250 GB	75 GB
	vDisk Format [2]	Thick Lazy-Zeroed						
	Storage Through-put (estimated reqm't)	1250 KBps	1250 KBps	1250 KBps	1250 KBps	1250 KBps	1250 KBps	1250 KBps
	Storage IOPS (estimated reqm't)	250 tps	250 tps	250 tps	250 tps	250 tps	250 tps	250 tps

NOTICE:

[1] The CPU reservations must be calculated as: # vCPU × physical CPU Freq.

[2] If Hypervisors supports this functionality.

[3] It is important that the hypervisor has sufficient RAM resources on top of the RAM configuration to be potentially used by guest virtual machines.

[4] vNIC Manual MAC: If remote CLA is used do not use manual MAC. If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

[5] Adding a Standard SoftGate on this deployment is optional.

7.7 OpenScape 4000 Manager

7.7.1 OpenScape 4000 Manager V10R1

OpenScape 4000 Manager V10R1		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	Yes
	Redundancy Strategy	Legacy SSO (Smart Switch Over) functionality is now achieved through: - OpenScape EcoServer RAID1, ethernet bonding and Backup & Restore methodologies e.g. Recovery HD, Appliance Management etc. - VMware availability features
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	No
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	No
	Backup with vStorage-APIs for Data Protection	Yes
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	No

OpenScape 4000 Manager V10R1		
		Standard
vCPU	vCPU	4*
	vCPU Shares	Standard
	vCPU Reserv.	0
vRAM	vRAM	8 GB*
	vRAM Shares	Normal
	vRAM Limit	Unlimited
vNIC	vNIC (No. Req'd)	1

OpenScape 4000 Manager V10R1		
		Standard
	vNIC Manual MAC [1]	No
	Network Bandwidth (estimated reqm't)	No
		Number of OS4K systems dependent
Storage (vDisk)	vDisk (No. Req'd)	1
	vDisk Size	1000 GB
	vDisk Format	Thin Provisioned
	Storage Throughput (estimated reqm't)	1250 KBps
	Storage IOPS(estimated reqm't)	250 tps

* For OpenScape 4000 Managers requiring higher demands (either from specific application usage or larger networks), the CPU and Memory resources can be scaled upwards with additional CPU or Memory via VMware resource administration. Potential resource bottlenecks can be identified via normal VMware resource monitoring. Dedicated resource reservations are not necessary.

NOTICE:

[1] If parameter is set to Y, please refer to "OpenScape Solution Set, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

7.7.2 OpenScape 4000 Manager V11R0

OpenScape 4000 Manager V11R0		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	Yes
	Redundancy Strategy	Legacy SSO (Smart Switch Over) functionality is now achieved through: - OpenScape EcoServer RAID1, ethernet bonding and Backup & Restore methodologies e.g. Recovery HD, Appliance Management etc. - VMware availability features
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	No

OpenScape 4000 Manager V11R0		
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	No
	Backup with vStorage-APIs for Data Protection	Yes
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	No

OpenScape 4000 Manager V11R0		
		Standard
vCPU	vCPU	4*
	vCPU Shares	Standard
	vCPU Reserv.	0
vRAM	vRAM	8 GB*
	vRAM Shares	Normal
	vRAM Limit	Unlimited
vNIC	vNIC (No. Req'd)	1
	vNIC Manual MAC [1]	No
	Network Bandwidth (estimated reqm't)	No
		Number of OS4K systems dependent
Storage (vDisk)	vDisk (No. Req'd)	1
	vDisk Size	1000 GB
	vDisk Format	Thin Provisioned
	Storage Throughput (estimated reqm't)	1250 KBps
	Storage IOPS(estimated reqm't)	250 tps

* For OpenScape 4000 Managers requiring higher demands (either from specific application usage or larger networks), the CPU and Memory resources can be scaled upwards with additional CPU or Memory via Hypervisor resource

administration. Potential resource bottlenecks can be identified via normal Hypervisor resource monitoring. Dedicated resource reservations are not necessary.

NOTICE:

[1] If parameter is set to Y, please refer to "OpenScape Solution Set, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

7.8 OpenScape Accounting

OpenScape Accounting V5		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	No
	Redundancy Strategy	-
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	No
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes Restrictions / Limitations: vMotion should not be used during business hours on high system load
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	Yes Note: All VMware requirements (incl. Hardware) and best practices have to be fulfilled. The network between the data center sites has to be a transparent layer 2 network which provides identical environments in both locations.
	Backup with vStorage-APIs for Data Protection	Yes Note: vStorage APIs can be used as an additional backup layer for image level backups that allow to restore virtual disk contents after a disk failure fast. The standard backup mechanisms normally used in physical deployments have to be applied in addition

OpenScape Accounting V5		
	VMware Tools Support	Yes Note: Installation of VMware Tools is recommended.
	Virtual Appliance (vApp) Support	No

OpenScape Accounting								
		Smallest	Depl. 1	Depl. 2	Depl. 3	Depl. 4	Depl. 5	Largest
Depl. Scenarios	Depl. Scenario	Single Node	Single Node	Single Node	Single Node			Multi Node
	Number of Nodes	1	1	1	1			
	Max Users	300	3,000	5,000	10,000			unlimited
								PSR required!
	vCPU	2	2	2	4			
vRAM	vRAM	4 GB	8 GB	16 GB	32 GB			
	vRAM Reserv. [1]	4 GB	4 GB	4 GB	16 GB			
vNIC	vNIC (No. Req'd)	1	1	1	1			
	vNIC Manual MAC [2]	Yes	Yes	Yes	Yes			
		No, if remote CLA is used	No, if remote CLA is used	No, if remote CLA is used	No, if remote CLA is used			
Storage (vDisk)	vDisk (No. Req'd)	1	1	1	1			
	vDisk Size	60 GB	60 GB	120 GB	120 GB			
	vDisk Format [1]	thick lazy-zeroed	thick lazy-zeroed	thick lazy-zeroed	thick lazy-zeroed			

NOTICE:

[1] If Hypervisors supports this functionality.

[2] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

7.9 OpenScape Concierge

This table shows the hardware requirements for:

- small deployments (Smallest & Depl. 1) with up to 10 Attendants working in an environment with up to 30,000 subscribers in the telephone book database and a maximum of 1,200 BHCA (Busy Hour Call Attempts) as well as for
- medium deployments (Depl. 2) with up to 30 Attendants working in an environment with up to 40,000 subscribers in the telephone book database and a maximum of 2,400 BHCA.
- large deployments (Largest) with up to 100 Attendants working in an environment with up to 100,000 subscribers in the telephone book database and a maximum of 6,000 BHCA.

OpenScape Concierge V5 Rx		
General Product Info	Operating System	Please see the Release Note
	Database Server(s)	Microsoft SQL Server 2019
	E-mail Server(s)	Microsoft Exchange Server 2019
	Native Redundancy Support	Yes
	Redundancy Strategy	Active
	Voice/Video Media Terminating	
	Voice/Video Signalling Traffic	
	Other real-time critical requirements	
VMware Feature Compatibility	vMotion Support	Yes Restrictions / Limitations: It is recommended to perform a Live Migration only in periods of low traffic. vMotion during normal operation could cause noticeable service interruption and audio/voice quality degradation.
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Distributed Resource Scheduler (DRS) Support	Yes
	Site Recovery Manager (SRM) Support	Yes
	Backup with vStorage-APIs for Data Protection (Data Recovery Support)	Yes
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	No

OpenScape Concierge V5 Rx						
		Smallest	Depl. 1	Depl. 2	Largest	External SQL Server Std./ Enterprise
Depl. Scenarios	Depl. Scenario	Concierge Plus (with internal SQL Server Express)	Small Concierge Professional (with internal SQL Server Express)	Medium Concierge Professional (with internal SQL Server Std./ Enterprise)	Large Concierge Professional (with external SQL Server Std./ Enterprise)	For Deployments Largest
	Max Users	4	10	30	100	--
vCPU	vCPU	2	2	4	4	4
	vCPU Frequency (min)	2.662 GHz	2.662 GHz	2.662 GHz	2.662 GHz	TBA depending on performance tests
	vCPU Reservation.[1]	750 MHz	1.0 GHz	2.5 GHz	2.662 GHz	TBA depending on performance tests
	vCPU Limit	Unlimited				
vRAM	vRAM	4 GB	4 GB	4 GB	4 GB	TBA depending on performance tests
	vRAM Reserv.[1]	2 GB	2 GB	2 GB	2 GB	TBA depending on performance tests
vNIC	vNIC (No. Req'd)	1	1	1	1	1
	vNIC Manual MAC	No	No	No	No	No
	Network Band-width (estimated reqm't)	20 Kbps	25 Kbps	40 Kbps	200 Kbps	5 Kbps per Concierge client
Storage (vDisk)	vDisk (No. Req'd)	1 per node	1 per node	1 per node	1 per node	1 per node
	vDisk Size[2]	80 GB	80 GB	80 GB	80 GB	80 GB
	vDisk Format[1]	Thin Provisioned	Thin Provisioned	Thin Provisioned	Thin Provisioned	Thin Provisioned
	Addt'l Storage	10 GB	10 GB	10 GB	10 GB	10 GB
	Storage Throughput (estimated reqm't)	15 KBps	25 KBps	40 KBps	80 KBps	TBA depending on performance test
	Storage IOPS(estimated reqm't)	20 IOPS	22 IOPS	30 IOPS	40 IOPS	TBA depending on performance test

NOTICE:

[1] If Hypervisors supports this functionality.

[2] Only a minimum level of logging is assumed for normal operation. If additional logging functionality is to be employed then the storage requirements should be increased accordingly.

[3] Note: The values can increase depending on log level, if logging is activated.

7.10 OpenScape Contact Center

OpenScape Contact Center: There is no difference between HW requirements for virtual and non-virtual environment for the OpenScape Contact Center Application. For further information please contact Unify Service.

NOTICE:

For more information about each released version, please refer to the product's Release Notes.

OpenScape Contact Center V12		
General Product Info	Operating System for OSCC V12	For V12, the supported versions are: Windows Server 2019 Standard or Datacenter Windows Server 2022 Standard or Datacenter NOTE: Windows Server 2019 and 2016 have .NET 4.x installed by default. Since, OSCC System Monitor requires .NET 3.5, for Windows 2019 and 2016, the .NET 3.5 must be installed on the server machine before installing OSCC. NOTE: Ensure that the latest Windows updates are installed.
	Native Redundancy Support	Yes
	Redundancy Strategy	Active/ standby with Microsoft clustering
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	CSTA
	Other real-time critical requirements	Yes, real-time contact center contact processing

OpenScape Contact Center V12		
VMware Feature Compatibility	vMotion Support	Yes Restrictions / Limitations: While a virtual machine transfer between two physical machines is being performed using VMotion, we recommend that the OpenScape Contact Center system be under a maximum load of no more than 50 active users. In this condition, no system load issue should occur during OpenScape Contact Center system migration.
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	Yes, covered under VMware policy
	Backup with vStorage-APIs for Data Protection	No
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	No

OpenScape Contact Center V12 - Main Server

OpenScape Contact Center V12 - Main Server			
		Small and Medium deployments	Large deployments
Depl. Scenarios	Depl. Scenario	Depl. 1	Depl. 2
	Number of Nodes	1	1
	Max Users	Up to 750 active users. If Agent Portal Web is used, please refer to Application Server deployment on table below. (See Note 4)	More than 750 and up to 1,500 active users If Agent Portal Web is used, please refer to Application Server deployment on table below. (See Note 4)
vCPU	vCPU	4	8
	vCPU Reserv.[1]	Must calculate # vCPU × physical CPU Freq	
vRAM	vRAM (if Application Server is not installed on Main Server machine)	8 GB GB (See Note 3)	8 GB GB (See Note 3)

OpenScape Contact Center V12 - Main Server			
		Small and Medium deployments	Large deployments
	vRAM (if Application Server is installed on Main Server machine, memory must be reserved for Application Server)	8 GB + Application Server used memory (see Application Server deployment on table below) (See Note 3)	8 GB + Application Server used memory (see Application Server deployment on table below) (See Note 3)
	vRAM Reserv.[1] (if Application Server is not installed on Main Server machine)	8 GB	8 GB
	vRAM Reserv.[1] (if Application Server is installed on Main Server machine)	8 GB + Application Server used memory (see Application Server deployment on table below)	8 GB + Application Server used memory (see Application Server deployment on table below)
vNIC	vNIC (No. Req'd)	1	1
	vNIC Manual MAC[2]	NO	
	Network Bandwidth (estimated reqm't, if Application Server is not installed on Main Server Machine)	18 Mbps	24 Mbps
	Network Bandwidth (estimated reqm't, if Application Server is installed on Main Server Machine)	36 Mbps	74 Mbps
Storage (vDisk)	vDisk (No. Req'd)	1	1
	vDisk Size[3]	120 GB - 1 TB (See Note 2)	120 GB - 1 TB (See Note 2)
	vDisk Format[1]	Thick Provision Eager Zeroed	
	Storage Throughput (estimated reqm't)	57 Mbps	57 Mbps
	Storage IOPS (estimated reqm't)	200	200

OpenScape Contact Center V12 - Application Server

OpenScape Contact Center V12 - Application Server			
		Small and Medium deployments	Large deployments
Depl. Scenarios	Depl. Scenario	Depl. 1	Depl. 2
	Number of Nodes	1	1

OpenScape Contact Center V12 - Application Server			
		Small and Medium deployments	Large deployments
	Max Users	300 with high combination of features 750 with low combination of features (See Note 1)	600 with high combination of features 1500 with low combination of features (See Note 1)
vCPU	vCPU Number	2	4
	vCPU Reserv.[1]	Must calculate # vCPU × physical CPU Freq	
vRAM	vRAM	8 GB (See Note 3)	16 GB (See Note 3)
	vRAM Reserv.	8 GB	16 GB
vNIC	vNIC (No. Req'd)	1	1
	vNIC Manual MAC[2]	NO	
	Network Bandwidth (estimated reqm't)	36 Mbps	74 Mbps
Storage (vDisk)	vDisk (No. Req'd)	1	1
	vDisk Size	100 GB - 1 TB (See Note 2)	100 GB - 1 TB (See Note 2)
Storage (vDisk)	vDisk Format[1]	Thick Provision Eager Zeroed	
	Storage Throughput (estimated reqm't)	57 Mbps	57 Mbps
	Storage IOPS (estimated reqm't)	200	200

NOTICE: 1

For configuration of Deployments of the tables above, consider the limits for the features below:

Feature	Low	High
Team List	Up to 20 entries (300 agents with 20 entries each)	Up to 75 agents with 150 entries and 375 agents with 20 entries
Agent having Avatar	Up to 300 agents	Up to 450 agents
OpenMedia Connectors	Up to 10	Up to 99

In addition:

- If "chat between agents" feature is not used, please disable it from all agents' user permissions.

- For more than 300 active users, its recommended to increase maxThreads from default 150 to 650.

In this case, do the following:

- Stop Application Server service or tomcat.
- Navigate to "<Application Server installation folder>\ApacheWebServer\conf" and open server.xml.
- Search and edit MaxThread like below:

  " <Connector port="443" protocol="org.apache.coyote.http11.Http11NioProtocol" sslImplementationName="org.apache.tomcat.util.net.jsse.JSSEImplementation" **maxThreads="650"** SSLEnabled="true" scheme="https" secure="true" clientAuth="false" sslProtocol="TLS" keystoreFile="${catalina.base}\conf\keystore" keystorePass="changeme" />
- Save the file and start Application Server.

NOTICE: 2

When running OpenScape Contact Center or OpenScape Contact Center Application Server in a virtualized environment, a minimum of 100 GB is required for the operating system, OpenScape Contact Center software, Application Server software and initial Informix database files. If you require additional storage for any other purpose, you must add correspondingly sufficient disk space.

NOTICE: 3

When vRAM is reserved for the application purposes mentioned above, also consider 2 GB memory that shall be additionally reserved for the Operating System use.

NOTICE:

Nomenclature “small, medium and large deployment” is related to Application Server only. For example, we can have an environment with more 600 hundred users, using one Machine with OSCC + App Server, and other machines with additional App Servers.

NOTICE:

[1] If Hypervisors supports this functionality.

[2] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

7.11 OpenScape Contact Media Service

OpenScape Contact Media Service V12		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	Yes
	Redundancy Strategy	Active/ active or Active/ standby
	Voice/Video Media Terminating	Yes
	Voice/Video Signalling Traffic	Yes
	Other real-time critical requirements	Yes
VMware Feature Compatibility	vMotion Support	Yes, covered under VMware policy
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	Yes, covered under VMware policy
	Backup with vStorage-APIs for Data Protection	No
	VMware Tools Support	No
	Virtual Appliance (vApp) Support	No

OpenScape Contact Media Service V12						
		IVR / Announcements		WebRTC Agent Portal Web	Recorder	Dialer
Depl. Scenarios	Depl. Scenario	Single deployment	Single deployment	Single deployment	Single deployment	Single deployment
	Number of Nodes	1	1	1	1	1
	Max Users	Up to 200 IVR ports	Up to 300 IVR ports (Note 1)	300 ports (Note 1)	300 ports (Note 1)	300 ports (Note 1)
vCPU	vCPU	2	4	4	4	4
	vCPU Reserv.[1]	Must calculate # vCPU × physical CPU Freq				
vRAM	vRAM	4 GB	8 GB	8 GB	8 GB	8 GB
	vRAM Reserv.[1]	4 GB	8 GB	8 GB	8 GB	8 GB
vNIC	vNIC (No. Req'd)	1	1	1	1	1

OpenScape Contact Media Service V12						
	vNIC Manual MAC[2]	NO	NO	NO	NO	NO
	Network Bandwidth (estimated reqm't)	80 kbps per port in each direction for G.711 48 kbps per port in each direction for G.729	80 kbps per port in each direction for G.711 48 kbps per port in each direction for G.729	80 kbps per port in each direction for G.711 48 kbps per port in each direction for G.729	80 kbps per port in each direction for G.711 48 kbps per port in each direction for G.729	80 kbps per port in each direction for G.711 48 kbps per port in each direction for G.729
Storage (vDisk)	vDisk (No. Req'd)	1	1	1	1	1
	vDisk Size	160 GB	160 GB	160 GB	160 GB	160 GB
		Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	vDisk Format	Thick Provision Eager Zeroed				
	Storage Throughput (estimated reqm't)	Close to 0 unless logging is enabled	Close to 0 unless logging is enabled	Close to 0 unless logging is enabled	Close to 0 unless logging is enabled	Close to 0 unless logging is enabled
	Storage IOPS(estimated reqm't)	200	200	200	200	200

NOTICE:

A combination of features is possible if the total number of ports is not higher than the Max Users. For example, it is possible to have a combination of 100 IVR, 100 WebRTC and 100 Recorder ports.

NOTICE:

[1] If Hypervisors supports this functionality.

[2] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

7.12 OpenScape DLS

OpenScape DLS V10		
General Product Info	Operating System	Please see the Release Note

OpenScape DLS V10		
	Native Redundancy Support	No
	Redundancy Strategy	-
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	No
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	SRM is offered as a PSR
	Backup with vStorage-APIs for Data Protection	No
	vSphere Replication	No
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	No

NOTICE:

The DLS performance is measured on the basis of the number of user logons /hour (20K) rather than the number of users.

OpenScape DLS V10								
		Smallest	Depl. 1	Depl. 2	Depl. 3	Depl. 4	Depl. 5	Largest
Depl. Scenarios	Depl. Scenario							
	Number of Nodes							
	Max Users	Min # of users	5,000	10,000	20,000	50,000	up to 100,000 5 logons/sec-ond	Max # of users
							PSS only	
vCPU	vCPU	2	2	2	3	4	4	
vRAM	vRAM	4 GB	6 GB	6 GB	6 GB	8 GB	8 GB	
	vRAM Reserv.[1]	4 GB	6 GB	6 GB	6 GB	8 GB	8 GB	
vNIC	vNIC (No. Req'd) [2]	2	2	2	2	2	2	

OpenScape DLS V10								
		Smallest	Depl. 1	Depl. 2	Depl. 3	Depl. 4	Depl. 5	Largest
	vNIC Manual MAC[3]	Yes	Yes	Yes	Yes	Yes	Yes	
Storage (vDisk)	vDisk (No. Req'd)	1	1	1	1	1	1	
	vDisk Size	80 GB	80 GB	80 GB	80 GB	80 GB	80 GB	

NOTICE:

[1] If Hypervisors supports this functionality.

[2] 1 vNIC is sufficient for single-node DLS deployments.

[3] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

7.13 OpenScape Endpoint Management

Please check the OpenScape Endpoint Management (OSEM) release note.

7.14 OpenScape Enterprise Express

7.14.1 OpenScape Enterprise Express V10

Virtual Machine HW version is provisioned according to ESXi version.

NOTICE:

Please consult individual application documentation for the newer VM HW Versions.

Figures below are based on a typical Enterprise Feature set: CPU, NW, and Disk usage may vary based on call load and Feature mix.

VMs created (independently of the deployment method) must be manually configured for 100% CPU and RAM reservations using the vSphere client.

NOTICE:

Current capacity is up 250 active users, with ability to off-board to standalone OpenScape Contact Center. If you need to expand the number of users, please refer to OpenScape Contact Center V10R4 and follow the available information.

OpenScape Enterprise Express V10 Solution based on OpenScape Voice Standard Duplex							
Virtual Machine		OSV Duplex Node 1	OSV Duplex Node 2	UC	Windows Apps Server 1	Windows Apps Server 2	
Deployment Scenario			OSV Duplex	OSV Duplex	UC Openfire Composer	OSCC (Depl. 1) XPR (Depl. 4) Concierge (Plus) Max Users for OSCC: up to 250 active users	XPR (Depl. 4) Concierge (Plus)	DLS (Depl. 1/2) OSTM (Low-End)
vCPU	vCPU		Please check OpenScape Voice (Depl.2)	Please check OpenScape Voice (Depl.2)	Please check OpenScape UC Application (Small Deployment)	8	5	4
	vCPU Shares					High		
	vCPU Reserv.					must calculate # vCPU x physical CPU Freq.		
	vCPU Limit					Unlimited		
vRAM	vRAM					16	7	10
	vRAM Reserv.[1]					16	7	10
vNIC	vNIC (No. Req'd)					2		
	vNIC Manual MAC[2]					Yes		
	Network Bandwidth (estimated reqm't)					49 Mbps	13 Mbps	1 Gbps
Storage (vDisk)	vDisk (No. Req'd)					1		
	vDisk Size					500 GB	400 GB	100 GB
	vDisk Format[1]					Thick Provision Eager Zeroed		
	Additional Storage					N/A		200 GB
	Storage Throughput (estimated reqm't)					60 Mbps	2215 Kbps	N/A

OpenScape Enterprise Express V10 Solution based on OpenScape Integrated Simplex						
Virtual Machine		OpenScape Integrated Simplex	Composer	Windows Apps Server 1		Windows Apps Server 2
Deployment Scenario		Virtualized Integrated Simplex	Composer (Depl. 1)	OSCC (Depl. 1) XPR (Depl. 4) Concierge (Plus)	XPR (Depl. 4) Concierge (Plus)	OSTM (Low-End)
vCPU	vCPU	Please check OpenScape Voice (Depl. Virtualized Integrated Simple)	Please check OpenScape Composer (Depl. 1)	8	5	2
	vCPU Reserv.[1]			must calculate # vCPU x physical CPU Freq.		
vRAM	vRAM			16	7	4
	vRAM Reserv.			16	7	4
vNIC	vNIC (No. Req'd)			2		
	vNIC Manual MAC[2]			Yes		
	Network Bandwidth (estimated reqm't)			49 Mbps	13 Mbps	1 Gbps
Storage (vDisk)	vDisk (No. Req'd)			1		
	vDisk Size			500 GB	400 GB	100 GB
	vDisk Format[1]			Thick Provision Eager Zeroed		
	Additional Storage			N/A		200 GB
	Storage Throughput (estimated reqm't)			60 Mbps	2215 Kbps	N/A

NOTICE:

[1] If Hypervisors supports this functionality.

[2] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

7.15 OpenScape Fault Management

OpenScape Fault Management V12/V13		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	No

OpenScape Fault Management V12/V13		
	Redundancy Strategy	-
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	No
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes Restrictions / Limitations: vMotion should not be used during business hours on high system load
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	Yes Note: All VMware requirements (incl. Hardware) and best practices have to be fulfilled. The network between the data center sites has to be a transparent layer 2 network which provides identical environments in both locations.
	Backup with vStorage-APIs for Data Protection	Yes Note: vStorage APIs can be used as an additional backup layer for image level backups that allow to restore virtual disk contents after a disk failure fast. The standard backup mechanisms normally used in physical deployments have to be applied in addition
	VMware Tools Support	Yes Note: Installation of VMware Tools is recommended.
	Virtual Appliance (vApp) Support	No

OpenScape Fault Management V12/V13						
		Smallest	Depl. 1	Medium	Depl. 3-5	Largest
Depl. Sce-narios	Depl. Scenario	Single Node		Single Node		Single Node
	Number of Nodes	1		1		1

OpenScape Fault Management V12/V13						
		Smallest	Depl. 1	Medium	Depl. 3-5	Largest
	Max Users	unlimited Users unlimited FM Ports up to 2.500 Network IP-Nodes up to 100 SM IP-Nodes (requires 2 separate system management agents) including up to 5,000 Performance Management end points, handled by internal or external PM agent		unlimited Users unlimited FM Ports up to 5.000 Network IP-Nodes up to 200 SM IP-Nodes (requires 4 separate system management agents) including up to 10,000 Performance Management end points, handled by internal or external PM agent		unlimited Users unlimited FM Ports up to 25.000 Network IP-Nodes up to 2.000 SM IP-Nodes (requires 40 separate system management agents) including up to 50,000 Performance Management end points, handled by 5 external PM agents (1 per 10,000 end points)
vCPU	vCPU	1		2		4
vRAM	vRAM	6 GB		8 GB		16 GB
	vRAM Reserv. [1]	6 GB		8 GB		16 GB
vNIC	vNIC (No. Req'd)	1		1		1
	vNIC Manual MAC[2]	Yes		Yes		Yes
	Network Bandwidth (estimated reqm't)	480 Kbps		480 Kbps		480 Kbps
Storage (vDisk)	vDisk (No. Req'd)	1		1		1
	vDisk Size[3]	100 GB		200 GB		500 GB
	vDisk Format[1]	thick lazy-zeroed		thick lazy-zeroed		thick lazy-zeroed
	Storage Throughput (estimated reqm't)	2000 Kbps		3600 Kbps		3600 Kbps
	Storage IOPS(estimated reqm't)	32 IOPS		57 IOPS		57 IOPS

NOTICE:

[1] If Hypervisors supports this functionality.

[2] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku. No, if remote CLA is used.

7.16 OpenScape UC Application

OpenScape UC + CMP + MS: This is a package that includes OpenScape UC Application, CMP and Media Server for the UC users and features.

Although the Media Server used for OpenScape UC Application can be the same Media Server for OpenScape Voice, the hardware requirements for the voice users must be separately entered into the table.

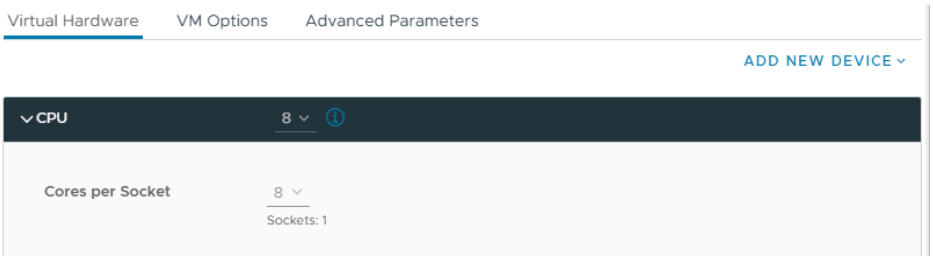
E/A Cockpit: Each E/A Cockpit user requires about 5 times more resources than a standard OpenScape UC user. Therefore you have to use the following equation to find the new number of UC users and then look-up back into the right table column:

Number of UC users (including E/A cockpit) ≥ UC users + E/A cockpit users * 5.

NOTICE: The core(s) / socket(s) ratio should always be set to all cores / one socket (e.g. 8 cores / 1 socket).

VMware sets by default the Cores per Socket value to 1, which means the CPU will have 1 core/multiple sockets.

It is recommended to change this setting from VM Settings > Expand CPU settings and configure: Cores per socket parameter to be equal with the CPU number resulting in all cores/one socket.



OpenScape UC Application V10		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	Yes
	Redundancy Strategy	vSphere HA
	Voice/Video Media Terminating	Yes
	Voice/Video Signalling Traffic	Yes
	Other real-time critical requirements	No

OpenScape UC Application V10		
VMware Feature Compatibility	vMotion Support	Yes Restrictions / Limitations: not recommended during "busy hours"
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	No. - SRM is offered as a PSR w/ PSS involvement only
	Backup with vStorage-APIs for Data Protection	Yes
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	Yes

OpenScape UC Application V9		
	Integrated Deployment	
Depl. scenario	Num. of Computers	1
	Max Users	1,250
For details see column "OpenScape Integrated Simplex" in Section 5.20 "OpenScape Voice".		

OpenScape UC Application V10 Small Deployment		
Depl. scenario	Num. of Computers	1
	Max Users	2,500
vCPU	vCPU	8
	vCPU Reserv.[1]	Must calculate # vCPU × physical CPU Freq
vRAM	vRAM	24 GB
	vRAM Reserv.	8 GB
vNIC	vNIC (No. Req'd)	1
	vNIC Manual MAC[1][2]	Yes
Storage (vDisk)	vDisk (No. Req'd)	1
	vDisk Size	300 GB
	vDisk Format[1]	Thick Lazy-zeroed
	Storage IOPS (estimated reqm't)	Total IOPS ≈ 0.02 IOPS × <number of UC Application users> This approximation only applies if you use the default logging settings.

OpenScape UC Application V10 Large Deployment				
		Application Computer	Front-end Computer	Media Server Computer
Depl. scenario	Num. of Computers	1	1 to 4 (2)	1 to 4 (2)
	Max Users	15,000 (1)	5,000 per computer	5,000 per computer(3) 2,500 per computer(4)
		(1) In case of an external Unified Messaging solution.		
		(2) In full configuration a computer system as redundancy.		
		(3) If the voice and conference portal are used in parallel without Media Sever operation for OpenScape Voice OR if no video conferences are used.		
		(4) If video conferences are used also.		
vCPU	vCPU	8 per computer		
	vCPU Reserv. [1]	Must calculate # vCPU × physical CPU Freq		
vRAM	vRAM	24 GB	12 GB per computer	
	vRAM Reserv. [1]	24 GB	12 GB	
	vRAM Limit	Unlimited		
vNIC	vNIC (No. Req'd)	1 per computer		
	vNIC Type	VMXNET3		
	vNIC Manual MAC[2]	Yes		
Storage (vDisk)	vDisk (No. Req'd)	1	1 per computer	
	vDisk Size	300 GB		
	vDisk Format	Thick Lazy-zeroed		
	Storage Throughput (estimated reqm't)	TBD		
	Storage IOPS (estimated reqm't)	Total IOPS ≈ 0.02 IOPS × <number of UC Application users> This approximation only applies if you use the default logging settings.		

OpenScape UC Application V10 Very Large Deployment					
		Application Computer (per cluster)	Front-end Computer (per cluster)	Media Server Computer (per cluster)	Openfire Server
Depl. scenario	Num. of Computers	1	1 to 4 (1)	1 to 5 (2)	min. 1
	Max Users	40,000	15,000 per computer	10,000 per computer	≈ 100,000
		(1) In full configuration a computer system as redundancy.			
		(2) In full configuration a computer system for increased video performance and a computer system as redundancy.			
vCPU	vCPU	8		12	4
	vCPU Reserv. [1]	Must calculate # vCPU × physical CPU Freq			
vRAM	vRAM	24 GB	12 GB		8 GB
	vRAM Reserv.	24 GB	12 GB		8 GB[4]
vNIC	vNIC (No. Req'd)	1 per node			
	vNIC Manual MAC[2]	Yes			
Storage (vDisk)	vDisk (No. Req'd)	1	1 per computer		1
	vDisk Size[3]	300 GB			min. 100 GB
	Storage IOPS (estimated reqm't)	Total IOPS ≈ 0.02 IOPS × <number of UC Application users> This approximation only applies if you use the default logging settings.			TBD

The table below outlines the resources needed to operate OpenScape UC, highlighting the required number of VMs, CPUs, memory, and storage specifications for single-node clusters.

OpenScape UC Application V11		
Kubernetes (K8s) Deployment		**VMs**
Single Node (Basic)		**1**
Number of Pods per Server		**1 Back-end, 1 Front-end, 1 Media Server**
Resources per VM		
vCPU	vCPU	12
	vCPU Shares	High

OpenScape UC Application V11		
Kubernetes (K8s) Deployment		**VMs**
Single Node (Basic)		**1**
Number of Pods per Server		**1 Back-end, 1 Front-end, 1 Media Server**
Resources per VM		
	vCPU Reserv.	Must calculate # vCPU × physical CPU Freq
	vCPU Limit	Unlimited
vRAM	vRAM	32 GB
	vRAM Shares	High
	vRAM Reserv.	32 GB
	vRAM Limit	Unlimited
Storage (vDisk)	vDisk (No. Req'd)	1
	vDisk Size	400 GB
	vDisk Mode	Independent persistent is recommended - Snapshots allowed
	vDisk Format	Any tick
	Addt'l Storage	No

The table below outlines the resources needed to operate OpenScape UC, highlighting the required number of VMs, CPUs, memory, and storage specifications for triple-node clusters.

OpenScape UC Application V11		
Kubernetes (K8s) Deployment		**VMs**
Triple Node (Basic)		**3**
Number of Pods per Server		**1 Back-end, 1 Front-end, 1 Media Server**
Resources per VM		
vCPU	vCPU	8
	vCPU Shares	High
	vCPU Reserv.	Must calculate # vCPU × physical CPU Freq
	vCPU Limit	Unlimited
vRAM	vRAM	24 GB
	vRAM Shares	High
	vRAM Reserv.	24 GB
	vRAM Limit	Unlimited
Storage (vDisk)	vDisk (No. Req'd)	1

OpenScape UC Application V11		
Kubernetes (K8s) Deployment		**VMs**
Triple Node (Basic)		**3**
Number of Pods per Server		**1 Back-end, 1 Front-end, 1 Media Server**
Resources per VM		
	vDisk Size	300 GB
	vDisk Mode	Independent persistent is recommended - Snapshots allowed
	vDisk Format	Any tick
	Addt'l Storage	No

The table below outlines the resources requirements for HAProxy, UC Pushy and Graph Connector, highlighting the required number of VMs, CPUs, memory, and storage specifications for single-node clusters.

HAProxy, UC Pushy & Graph Connector		VM
		1
Resources per VM		
vCPU	vCPU	8
	vCPU Shares	High
	vCPU Reserv.	0 GHz
	vCPU Limit	Unlimited
vRAM	vRAM	8 GB
	vRAM Shares	High
	vRAM Reserv.	8 GB
	vRAM Limit	Unlimited
Storage (vDisk)	vDisk (No. Req'd)	1
	vDisk Size	150 GB
	vDisk Mode	Keep Defaults (which allows Snapshots)
	vDisk Format	Any
	Addt'l Storage	No

The table below outlines the resources requirements for the External License Server, highlighting the required number of VMs, CPUs, memory, and storage specifications for single-node clusters.

External License Server		VM
		1
Resources per VM		
vCPU	vCPU	4

External License Server		VM
		1
Resources per VM		
	vCPU Shares	High
	vCPU Reserv.	0 GHz
	vCPU Limit	Unlimited
vRAM	vRAM	16 GB
	vRAM Shares	High
	vRAM Reserv.	16 GB
	vRAM Limit	Unlimited
Storage (vDisk)	vDisk (No. Req'd)	1
	vDisk Size	100 GB
	vDisk Mode	Keep Defaults (which allows Snapshots)
	vDisk Format	Any
	Addt'l Storage	No

NOTICE:

[1] If Hypervisors supports this functionality.

[2] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku. No, if remote CLA is used.

[3] In case syncUC functionality is required for the Openfire server, it is necessary to create two LVM partitions, 100 GB each.

[4] **Note:** If the Chat History feature is enabled, then the RAM must be upgraded to 16 GB.

[4] In a Kubernetes (K8s) deployment, additional Backend, Frontend and Media Server pods can be running. For each additional pod, extra resources must be added on top of the resources from the basic setup:

Additional VM resources per Pod			
Max number of Pods per K8s Deployment	2 Back-end, 4 Front-end, 4 Media Server		
	VM Resources per Pod		
Resources	Backend (per pod)	Frontend (per pod)	Media Server (per pod)
vCPU	4	4	6
vRAM	12 GB	6 GB	6 GB
Storage (vDisk)	50 GB	50 GB	100 GB

7.17 OpenScape Media Server

OpenScape Media Server V9		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	Yes
	Redundancy Strategy	N+1
	Voice/Video Media Terminating	Yes
	Voice/Video Signalling Traffic	Yes
	Other real-time critical requirements (see note)	Yes
VMware Feature Compatibility	vMotion Support	Yes Restrictions / Limitations: Only at times with low system usage since voice quality will suffer for a short time during motion
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	Yes
	Backup with vStorage-APIs for Data Protection	Yes
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	No

NOTICE:

Other real-time critical requirements: Refer to OpenScape Media Server Administrator Documentation for details.

OpenScape Media Server V9							
		Smallest	Depl. 1	Depl. 2	Depl. 3	Depl. 4	Largest
Depl. Scenarios	Depl. Scenario	OSV Simplex (all in one: UC/ MGCP etc)	OSV Duplex (Single MS image for MGCP)	OSV Duplex (2 MS images for MGCP)	Single MS image for OSC-UC (UCAS Large-Deployment)	Single-MS node for NGCP/UC	Multi-Node MS for MGCP+UC (UCAS Large-Deployment)
	Number of Nodes	1	1	2	1	1	N (up to 4)
	Max Users	Depends on used audio/codec and on used HW (there is a load -formular available					

OpenScape Media Server V9							
		Smallest	Depl. 1	Depl. 2	Depl. 3	Depl. 4	Largest
vCPU	vCPU	≥ 4 vCPU	≥ 4 vCPU	≥ 4 vCPU	≥ 4 vCPU	≥ 4 vCPU	12 vCPU
	vCPU Reserv.[1]	Must calculate #vCPU x physical CPU Freq					
vRAM	vRAM	≥ 8 GB	≥ 8 GB	≥ 8 GB	≥ 8 GB	≥ 8 GB	≥ 8 GB
	vRAM Reserv.[1]	≥ 8 GB	≥ 8 GB	≥ 8 GB	≥ 8 GB	≥ 8 GB	≥ 8 GB
vNIC	vNIC (No. Req'd)	1	1	1	1	1	1
	vNIC Manual MAC[2]	No	No	No	No	No	No
	Network Bandwidth (estimated reqm't)	Depends on load and used codec: 1 G711 ≈ 100 Kbit; 1 H264 Chn ≈ 2 Mbit/sec					
Storage (vDisk)	vDisk (No. Req'd)	1	1	1	1	1	1
	vDisk Size	≥ 80 GB	≥ 80 GB	≥ 80 GB	≥ 80 GB	≥ 80 GB	≥ 80 GB
	vDisk Format[1]	Thick Lazy-Zeroed	Thick Lazy-Zeroed	Thick Lazy-Zeroed	Thick Lazy-Zeroed	Thick Lazy-Zeroed	Thick Lazy-Zeroed
	Storage Throughput (estimated reqm't)	Depends on Media-App and Load: ~8 KB/sec per Audio Channel for VoicePortal; 0 for Conferencing					

NOTICE:

[1] If Hypervisors supports this functionality.

[2] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku. No, if remote CLA is used.

7.18 OpenScape Voice Survival Authority

Survivable Authority (SA): SA must be located at a point on the IP network where it can communicate with both OpenScape Voice nodes. SA is included in the package together with CMP; therefore it does not require extra CPU power, RAM and HD.

OpenScape Voice Survival Authority V11		
General Product Info	Operating System	Please see the Release Note

OpenScape Voice Survival Authority V11		
	Native Redundancy Support	No
	Redundancy Strategy	-
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	No
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes
	High Availability (HA) Support	Yes Restrictions / Limitations: Don't move SA to a device/location that is suspect to a failure that impacts one OSV node, but not its partner
	Fault Tolerance (FT) Support	Yes, but not needed
	Site Recovery Manager (SRM) Support	Yes Restrictions / Limitations: Only if SA and both OSV cluster nodes are in the same site and recovered together
	Backup with vStorage-APIs for Data Protection	Yes, but not needed, - SA data are static
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	No

OpenScape Voice Survival Authority V11						
		Smallest	Depl. 1	Depl. 2	Depl. 3	Largest
Depl. Scenarios	Depl. Scenario	Single Node				
	Number of Nodes	1				
	Max Users	Any # of Users				
vCPU	vCPU	1				
	vCPU Reserv.[2]	Must calculate # vCPU × physical CPU Freq				
vRAM	vRAM	0.5 GB				
	vRAM Reserv.[2]	0.5 GB				
vNIC	vNIC (No. Req'd)	1				
	vNIC Manual MAC[1]	No				
	Network Bandwidth (estimated reqm't)	5 KBps				

OpenScape Voice Survival Authority V11						
		Smallest	Depl. 1	Depl. 2	Depl. 3	Largest
Storage (vDisk)	vDisk (No. Req'd)	1				
	vDisk Size[2]	4 GB				
	vDisk Format	Thick Lazy-Zeroed				
	Storage Throughput (estimated reqm't)	2 KBps				

NOTICE:

[1] If parameter is set to Y, please refer to "OpenScape Solution Set, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku. No, if remote CLA is used.

[2] If Hypervisors supports this functionality.

7.19 OpenScape Xpert – MLC (Multi Line Controller)

OpenScape Xpert - MLC		
General Product Info	Operating System	Please see the Release Note
VMware Feature Compatibility	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	Yes (only 1 vCPU)
	VMWare Tools	Yes, recommended.
	vMotion Support	Yes, only in non-working hours & idle load. Otherwise could result in voice interruptions and/or call loss.
	DRS	Only in "Manual/Partially automated" modes. "Fully automated" is not supported
	Storage vMotion	No (could result in call loss)
	Storage DRS (sDRS)	Only in "Manual Mode" for "initial placement"
	Suspend	No
	Snapshot	With running VMs: not supported
	Storage APIs/VDP	No
	SRM	No
	App HA	No
	vSphere Replication	No

OpenScape Xpert - MLC		
	vApp	No
	VM Hardware version	Supported: 10,11,13

OpenScape Xpert - MLC				
		MLC, 1 Core	MLC, 2 Core	MLC, 4 Core
Depl. Scenario	Max connected TTs	≤ 250	≤ 250	≤ 250
	Max parallel RTP streams	≤ 250 (with FT) ≤ 300 (without FT)	≤ 500	≤ 600
vCPU	vCPU cores	1	2	4
	vCPU Reserv.[1]	2,5 GHz	5 GHz	10 GHz
vRAM	vRAM	2 GB	2 GB	2 GB
	vRAM Reserv.[1]	2 GB	2 GB	2 GB
vNIC	vNIC (No. Req'd)	1	1	1
	req Bandwidth	90 Kbps / one G.711 stream	90 Kbps / one G.711 stream	90 Kbps / one G.711 stream
Storage (vDisk)	vDisk (No. Req'd)	1	1	1
	vDisk Size	40 GB	40 GB	40 GB
	vDisk Format[1]	Thick Lazy-Zeroed	Thick Lazy-Zeroed	Thick Lazy-Zeroed
	Storage Throughput (estimated)	2000 KBps (under heavy load, for logging)	2000 KBps (under heavy load, for logging)	2000 KBps (under heavy load, for logging)

NOTICE:

[1] Must calculate # vCPU x physical CPU Freq.

7.20 OpenScape Xpert – SM (System Manager)

OpenScape Xpert - SM		
General Product Info	Operating System	Please see the Release Note
VMware Feature Compatibility	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	VMWare Tools	Yes, recommended

OpenScape Xpert - SM		
	vMotion Support	Yes, but only in non-working hours and under idle load. Otherwise could result in voice interruptions and/or call loss
	DRS	Only in “Manual/Partially automated” modes. “Fully automated” is not supported
	Storage vMotion	No (could result in call loss)
	Storage DRS (sDRS)	Only in “Manual Mode” for “initial placement”
	Suspend	No
	Snapshot	With running VMs: not supported
	Storage APIs/VDP	No
	SRM	No
	App HA	No
	vSphere Replication	No
	vApp	No
	VM Hardware version	Supported: 10,11,13

OpenScape Xpert - SM				
		SM (50 TTs)	SM (900 TTs)	SM (2000 TTs)
Depl. Scenario	Max connected TTs	50	900	2000
vCPU	vCPU cores	2	4	6
	vCPU Reserv.[1]	2.5 GHz	10 GHz	10 GHz
vRAM	vRAM	4 GB	4 GB	6GB
	vRAM Reserv.[1]	2 GB	All locked	
vNIC	vNIC (No. Req’d)	1	1	1
Storage (vDisk)	vDisk (No. Req’d)	1	1	1
	vDisk Size	60 GB	100 GB	100 GB
	vDisk Format[1]	Thick Lazy-Zeroed	Thick Lazy-Zeroed	Thick Lazy-Zeroed

NOTICE:

[1] Must calculate # vCPU x physical CPU Freq.

7.21 OpenScape Xpert – Master Trading Turret

OpenScape Xpert - Master TT		
General Product Info	Operating System	Please see the Release Note
VMware Feature Compatibility	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	VMWare Tools	Yes, recommended
	vMotion Support	Yes, but only in non-working hours and under idle load. Otherwise could result in voice interruptions and/or call loss
	DRS	Only in “Manual/Partially automated” modes. “Fully automated” is not supported
	Storage vMotion	No (could result in call loss)
	Storage DRS (sDRS)	Only in “Manual Mode” for “initial placement”
	Suspend	No
	Snapshot	With running VMs: not supported
	Storage APIs/VDP	No
	SRM	No
	App HA	No
	vSphere Replication	No
	vApp	No
	VM Hardware version	Supported: 10,11,13

OpenScape Xpert - Master TT		
vCPU	vCPU cores	2
	vCPU Reserv.[1]	2,5 GHz
vRAM	vRAM	2 GB
	vRAM Reserv.[1]	2 GB
vNIC	vNIC (No. Req’d)	1
Storage (vDisk)	vDisk (No. Req’d)	1
	vDisk Size	50 GB
	vDisk Format[1]	Thick Lazy-Zeroed

NOTICE:

[1] If Hypervisors supports this functionality.

7.22 OpenScape Xpressions

OpenScape Xpressions V7 R1 FR5		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	Yes
	Redundancy Strategy	Active/ standby using Windows Server Cluster for kernel N+1 redundancy for satellites.
	Voice/Video Media Terminating	Yes
	Voice/Video Signalling Traffic	Yes
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes Restrictions / Limitations: not recommended during "busy hours"
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	No. SRM is offered with PSS/ Customer Solution Lab (CSL) involvement only.
	Backup with vStorage-APIs for Data Protection	Yes
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	No

OpenScape Xpressions V7 R1 FR5									
		Smallest	Depl. 1	Depl. 2	Depl. 3	Depl. 4	Depl. 5	Depl. 6	Largest
Depl. Scenarios	Depl. Scenario	single-node	single-node	single-node	single-node	single-node	multi-node	multi-node	multi-node
	Number of Nodes	1	1	1	1	1	kernel +	kernel +	kernel +
							2 satellites	3 satellites	4 satellites
	Max Users	up to 100	up to 300	up to 1,000	up to 3000	up to 5000	up to 10,000	via PSR only: up to 15,000	via PSR only: up to 18,000

Virtualization Dimensioning Details

OpenScape Xpressions V7 R1 FR5									
		Smallest	Depl. 1	Depl. 2	Depl. 3	Depl. 4	Depl. 5	Depl. 6	Largest
vCPU	vCPU-kernel	1	1	1	2	3	2	3	4
	vCPU-satellites						2 × 2	3 × 2	4 × 2
	vCPU Reserv-kernel[2]	Must calculate # vCPU × physical CPU Freq							
	vCPU Reserv-satellites	-					Must calculate # vCPU × physical CPU Freq		
vRAM	vRAM	3 GB	3 GB	3 GB	3 GB	3 GB	3 GB	4 GB	6 GB
	Satellites						2 × 2 GB	3 × 2 GB	4 × 2 GB
	vRAM Reserv.[3]	3 GB	3 GB	3 GB	3 GB	3 GB	3 GB	4 GB	6 GB
	Satellites						2 × 2 GB	3 × 2 GB	4 × 2 GB
vNIC	vNIC (No. Req'd)	1	1	1	1 each	1 each	1 each	1 each	1 each
	vNIC Manual MAC[1]	Yes (due to Licensing)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Satellites						No for satellite	No for satellites	No for satellites
	Network Bandwidth (estimated reqm't)	not available	1,300 kbps	3,000 kbps	6,400 kbps	12,000 kbps	86,000 kbps	160,000 kbps	not available
Storage (vDisk)	vDisk (No. Req'd)	1	1	1	1	1	1 + 2 × 1	1 + 3 × 1	1 + 4 × 1
	vDisk Size	16 GB	40 GB	85 GB	220 GB	360 GB	690 GB	1,030 GB	1,400 GB
	Satellites						2 × 20 GB	3 × 20 GB	4 × 20 GB
	vDisk Format[2]	any thick	any thick	any thick	any thick	any thick	any thick	any thick	any thick
	Storage Throughput (estimated reqm't)	N/A	260 kBps	800 kBps	1,250 kBps	2,200 kBps	3,900 kBps	5,100 kBps.	not available

NOTICE:

[1] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku. No, if remote CLA is used.

[2] If Hypervisors supports this functionality.

7.23 OpenScape Trace Manager

OSV-TM (OpenScape Trace Manager) is a Continuous Trace tool that combines existing trace analysis tools with a database to index and locate events across trace files. It features a web-based GUI and enables 24x7 trace collection from customer systems, simplifying troubleshooting.

The tool collects **RTT traces** from:

- OpenScape Voice
- OpenScape Branch
- OpenScape SBC
- OpenScape UC

OpenScape Trace Manager V8		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	No
	Redundancy Strategy	-
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	No
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	SRM is offered as a PSR
	Backup with vStorage-APIs for Data Protection	No
	VMware Tools Support	Yes. Tools are neither delivered nor installed with the product
	Virtual Appliance (vApp) Support	No

OpenScape Trace Manager V8			
		Low-End	Recommended
Depl. Scenarios	Depl. Scenario	Can be co-hosted	Dedicated Server
	Number of Nodes	1	1

OpenScape Trace Manager V8			
		Low-End	Recommended
	Calls per Seconds loads	<= 2 CPS	<= 10 CPS
vCPU	vCPU	2	4
vRAM	vRAM	4 GB	8 GB
	vRAM Reserv.[3]	4 GB	12 GB
vNIC	vNIC (No. Req'd)[1]	1	1
	vNIC Manual MAC	No	No
	Network Bandwidth (estimated reqm't)	1 Gbps	
Storage (vDisk)	vDisk (No. Req'd)	2	2
	vDisk Size	150 GB (OS & OSTM DBs)	300 GB (OS & OSTM DBs)
	Addt'l Storage	500 GB (Trace File Storage)	>= 1 TB (Trace File Storage)

NOTICE:

Using a RAM Drive Storage for Performance Solutions requires 32 GB of RAM.

OpenScape Trace Manager V8		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	No
	Redundancy Strategy	-
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	No
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	SRM is offered as a PSR
	Backup with vStorage-APIs for Data Protection	No

OpenScape Trace Manager V8		
	VMware Tools Support	Yes. Tools are neither delivered nor installed with the product
	Virtual Appliance (vApp) Support	No

OpenScape Trace Manager V8			
		Low-End	Recommended
Depl. Scenarios	Depl. Scenario	Can be co-hosted	Dedicated Server
	Number of Nodes	1	1
	Calls per Seconds loads	<= 2 CPS	<= 10 CPS
vCPU	vCPU	2	4
vRAM	vRAM	4 GB	8 GB
	vRAM Reserv.[2]	4 GB	12 GB
vNIC	vNIC (No. Req'd)	1	1
	vNIC Manual MAC	No	No
	Network Bandwidth (estimated reqm't)	1 Gbps	
Storage (vDisk)	vDisk (No. Req'd)	2	2
	vDisk Size	150 GB (OS & OSTM DBs)	300 GB (OS & OSTM DBs)
	Addt'l Storage	500 GB (Trace File Storage)	>= 1 TB (Trace File Storage)

NOTICE:

Using a RAM Drive Storage for Performance Solutions requires 32 GB of RAM.

NOTICE:

[1] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku. No, if remote CLA is used.

[2] If Hypervisors supports this functionality.

7.24 SESAP SW-Suite

SESAP: You have to consider one per OpenScape UC Suite solution sold to a customer.

SESAP SW-Suite V2		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	No
	Redundancy Strategy	-
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	No
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	No
	Backup with vStorage-APIs for Data Protection	Yes
	VMware Tools Support	Yes
	Virtual Appliance (vApp) Support	No

SESAP SW-Suite V2								
		Smallest	Depl. 1	Depl. 2	Depl. 3	Depl. 4	Depl. 5	Largest
Depl. Scenarios	Depl. Scenario		Single node			Single node	Single node	
	Number of Nodes		1			1	1	
	Max Users		300	1,000	3,000	5,000	10,000	
vCPU	vCPU		1			1	2	
vRAM	vRAM		4 GB			6 GB	8 GB	
vNIC	vNIC (No. Req'd)		1			1	1	
	vNIC Manual MAC[1]		Yes			Yes	Yes	
Storage (vDisk)	vDisk (No. Req'd)		1			1	1	
	vDisk Size		100 GB			1500 GB	2000 GB	
	vDisk Mode		Keep Defaults (which allows Snapshots)					

SESAP SW-Suite V2								
		Smallest	Depl. 1	Depl. 2	Depl. 3	Depl. 4	Depl. 5	Largest
	vDisk Format[2]		Thin provisioned			Thin provisioned	Thin provisioned	

NOTICE:

[1] If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku. No, if remote CLA is used.

[2] If Hypervisors supports this functionality.

7.25 HiPath CAP Management

HiPath CAP Management V3.0 SMR13		
General Product Info	Operating System	Please see the Release Note
	Native Redundancy Support	No
	Redundancy Strategy	-
	Voice/Video Media Terminating	No
	Voice/Video Signalling Traffic	No
	Other real-time critical requirements	No
VMware Feature Compatibility	vMotion Support	Yes Restrictions / Limitations: vMotion should not be used during business hours on high system load.
	High Availability (HA) Support	Yes
	Fault Tolerance (FT) Support	No
	Site Recovery Manager (SRM) Support	Yes Note: All VMware requirements (incl. Hardware) and best practices have to be fulfilled. The network between the data center sites has to be a transparent layer 2 network which provides identical environments in both locations.

HiPath CAP Management V3.0 SMR13		
	Backup with vStorage-APIs for Data Protection	Yes Note: vStorage APIs can be used as an additional backup layer for image level backups that allow to restore virtual disk contents after a disk failure fast. The standard backup mechanisms normally used in physical deployments have to be applied in addition.
	VMware Tools Support	Yes Note: Installation of VMware Tools is recommended.
	Virtual Appliance (vApp) Support	No

HiPath CAP Management V3.0 SMR13									
		Smallest	Depl. 1	Depl. 2	Depl. 2	Depl. 3	Depl. 3	Depl. 4	Depl. 4
Depl. Scenarios	Depl. Scenario	Single Node	Single Node	Multi Node	Multi Node	Multi Node	Multi Node	Multi Node	Multi Node
	Number of Nodes	1	1	Frontend Server	Backend Server	Frontend Server	Backend Server	Frontend Server	Backend Server
	Max Users	500	5,000	10,000	10,000	30,000	30,000	50,000	50,000
vCPU	vCPU [1]	1	2	1	2	1	2	1	2
	vCPU Limit	Unlimited							
vRAM	vRAM	2 GB	2 GB	2 GB	2 GB	4 GB	4 GB	4 GB	4 GB
	vRAM Reserv. [2]	2 GB	2 GB	2 GB	2 GB	4 GB	4 GB	4 GB	4 GB
vNIC	vNIC (No. Req'd)	1	1	1	1	1	1	1	1
	vNIC Manual MAC [3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Network Bandwidth (estimated reqm't)	400 Kbps	400 Kbps	400 Kbps	400 Kbps	400 Kbps	400 Kbps	400 Kbps	400 Kbps
Storage (vDisk)	vDisk (No. Req'd)	1	1	1	1	1	1	1	1
	vDisk Size	60 GB	60 GB	60 GB	80 GB	135 GB	265 GB	135 GB	265 GB
	vDisk Format [4]	Thick Lazy-zeroed							

HiPath CAP Management V3.0 SMR13									
		Smallest	Depl. 1	Depl. 2	Depl. 2	Depl. 3	Depl. 3	Depl. 4	Depl. 4
	Storage Throughput (estimated reqm't)[5]	~200KB/S per SCC	~200KB/S per SCC	~200KB/S per SCC	~50KB/S per SCC	~200KB/S per SCC	~50KB/S per SCC	~200KB/S per SCC	~50KB/S per SCC
	Storage IOPS (estimated reqm't)[6]	2 per SCC	2 per SCC	2 per SCC	2 per SCC	2 per SCC	2 per SCC	2 per SCC	2 per SCC

NOTICE:

[1] Issues resulting from CPU contention cannot be addressed towards the application.

[2] If Hypervisors supports reservations.

[3] vNIC Manual MAC: If remote CLA is used do not use manual MAC. If parameter is set to Y, please refer to "OpenScape Solution Set V10, How to check MAC Addresses for Virtual Systems, Quick Reference Guide" on e-doku.

[4] If Hypervisors supports reservations.

5 Depends on log level and load

6 Maximum 10 SCCs are allowed per Frontend server