IP Office™ Platform 10.1

Deploying Avaya IP Office Servers as Virtual Machines

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Downloading Documentation

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

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Chapter 1.

IP Office Linux Server Virtualization

1. IP Office Linux Server Virtualization

Companies are increasingly using virtual machines to support their business needs. The use of a virtual software platform allows the customer's IT staff flexibility to maximize the use of the platform's hardware to meet the individual needs of each virtual machines it hosts. It also provides them with access to various tools that ease maintenance and monitoring processes.

For IP Office Release 10.1, Avaya supports the deployment of its Linux-based servers for Server Edition, IP Office Select and IP500 V2 support as virtual machines on:

- VMware
- Microsoft Hyper-V
- Amazon Web Services

The virtual machines can be configured as primary, secondary, expansion or application servers in a Server Edition network; or as an application server supporting preferred edition IP500 V2 systems.

Avaya does not provide or support the virtual server software and hardware chosen by the customer.

- Use this document in conjunction with the documentation for standard IP Office Server Edition and IP Office application deployments, see Related Documentation 16 . Those documents define the supported features, capacities and requirements of the virtual machine applications as part of the customer solution. This document only provides notes for the deployment of the server software as a virtual machine.

- Avaya only supports virtual machines based on software images supplied by Avaya. Resellers and customers who create their own image files for virtual deployment are solely responsible for the support and maintenance of those products.

IP Office Anywhere

IP Office Anywhere is a special version of the Linux-based IP Office service intended for product demonstrations and evaluation. It includes a pre-built and pre-licensed IP Office configuration. Whilst IP Office Anywhere can be installed on a physical server or any of the virtual platforms listed above, it is also supported on VMware Player and Oracle VirtualBox virtual server platforms. That installation is covered separately in the *"Installing the IP Office Anywhere Demonstration Software"* manual.

Installer and Maintainer Requirements

In addition to certified IP Office training, the installer must also have certified training on the specific virtual platform type or be supported by someone who has that certification. The same requirement applies to the system maintainer.

IP Office Cloud Product Support

This document covers virtualized Linux-based servers for Server Edition, IP Office Select and IP500 V2 support used as customer-premises equipment (CPE). If does not cover cloud based virtualized servers offered as part of OnAvaya and PoweredBy IP Office solutions. Those use a different deployment methodology and licensing and are covered by separate documentation.

1.1 Profiling

The standard IP Office virtual machine assumes 4 virtual CPUs, 3072MB RAM and a 100GB hard disk. However, the resources actually allocated should be adjusted to meet the intended role of the virtual machine and to optimize the use of the virtual server platform's available resources, especially if it is supporting multiple virtual machines.

The IP Office virtual machine requirements are outlined in the following tables. Depending on the type of virtual server, the stage at which these can be adjusted may vary.

Restrictions

- **Network Ports**
  You must configure all IP Office virtual machines with two Ethernet ports. If using vMotion, additional network port requirement apply, see vMotion Considerations 19.

- **Hard Disk**
  Regardless of the IP Office virtual machine's role, it requires a minimum of 100GB of allocated hard drive space. However, if required additional hard disk space can be added. See Adjusting the Disk Space 35.

- **Disk Storage IOPS Requirements**
  To maintain acceptable performance, the number of virtual machines using the same disk storage and the total throughput of those machines must be within the capacity of that storage.

- **Multiple IP Office Servers**
  If deploying servers with the intention of using resiliency, then the hardware resources and profiling applied to each server must include allowance for the scenarios where users re-register from one server to the other, effectively increasing the server's user requirements. If there is a mix of non-virtualized and virtualized machines, then the assignment of resources to the virtual machine must match the hardware resources available in the non-virtualized machine.

The following tables show the tested and supported profile values for different IP Office virtual machine usages.

1.1.1 Primary Server/Secondary Server

Server Type		Primary Server/Secondary Server								
Users[6]		20[5]	100	20	50	100	200	500	1000	2000	3000
one-X Portal Users[6]		–	–	5	16	20	40	88	175	351	703
Voicemail Channels[6]		2	12	3	7	12	24	49	98	196	248
Web Collaboration Users [1][6]		–	–	2	3	5	10	21	42	84	216
RAM (MB)	Allocated	768	2048	2684[2]	2684[2]	3072	3072	4096	5120	6144	10240
	Reserved	625	1551	2416[2]	2416[2]	2624	2765	3358	4198	5376	8192
CPUs		1	2-3	2-3	2-3	2-4	3-5	3-5	4-7	5-8	7-10
CPU Cycles (GHz)	Limit	3	5	4	5	7	10	10	14	18	20
	Reserved	2	4	3	4	6	8	8	12	15	17
Hard Disk (GB)		100	100	100	100	100	100	130	140	150	160
IOPS[3]	Typical	15	31	17	18	26	41	71	129	248	338
AWS Machine Instance[4]		m3.med'		m4.large			m4.xlarge			m4.2xlarge	

1. Web Collaboration only supported on Primary Server.

2. Contact Recorder for IP Office/Media Manager not enabled. Add 250MB to RAM values if enabled and increase Typical IOPS if enabled.

3. Typical IOPS are average HDD I/O transactions per second during normal operation. If IP Office backup, intense logging, Contact Recorder for IP Office/Media Manager are in use, more IOPS are required; 40-200 IOPS depending on backup data size/logging rate/recording channels.

4. The quoted AWS machines instances are recommendations only. The range of machine instances and capabilities of existing instances change frequently. Therefore other instances can be used so long as their capabilities match the profiling resource requirements.

5. This profile is only supported for the Powered by IP Office Release 2.1 product offer.

6. If these is any profile misalignment between user and channel quantities, the highest profile that meets all requirements should be used.

7. The CPU values shown are applicable to all virtualization platforms. However, for Hyper-V the CPU values should be increased by 20%.

1.1.2 Expansion System (L)

Server Type		Expansion System (L)					
Users		10	50	100	200	500	750
RAM	Allocated	1024	1024	1024	1024	1024	1024
	Reserved	887	896	900	900	903	906
CPUs		2-3	2-3	2-3	2-3	2-3	2-3
CPU Cycles (GHz)	Limit	3	3	5	5	5	6
	Reserved	2	2	4	4	4	5
Hard Disk (GB)		100	100	100	100	100	100
IOPS[3]	Typical	5	5	6	7	9	11

3. Typical IOPS are average HDD I/O transactions per second during normal operation. If IP Office backup, intense logging, Contact Recorder for IP Office/Media Manager are in use, more IOPS are required; 40-200 IOPS depending on backup data size/logging rate/recording channels.

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1.1.3 one-X Portal Server

Server Type		one-X Portal Server						
one-X Portal Users[6]		50	100	200	500	1000	2000	3000
Web Collaboration Users[6]		9	18	35	86	171	342	512
RAM Memory	Allocated	3072	3072	3072	4096	6144	10240	14336
	Reserved	2703	2703	2703	3548	5386	8555	12272
CPUs		2-3	2-3	2-4	3-5	4-6	4-6	4-6
CPU Cycles (GHz)	Limit	6	6	7	10	11	11	11
	Reserved	5	5	6	8	9	9	9
Hard Disk (GB)		100	100	100	100	100	100	100
IOPS[3]	Typical	10	10	11	16	18	20	21

3. Typical IOPS are average HDD I/O transactions per second during normal operation. If IP Office backup, intense logging, Contact Recorder for IP Office/Media Manager are in use, more IOPS are required; 40-200 IOPS depending on backup data size/logging rate/recording channels.

6. If these is any profile misalignment between user and channel quantities, the highest profile that meets all requirements should be used.

1.1.4 IP Office Application Server

Server Type		IP Office Application Server			
one-X Portal Users[6]		50	100	250	750
Voicemail Channels[6]		20	50	100	150
Web Collaboration Users[6]		20	50	100	300
RAM	Allocated	3072	3072	4096	7168
	Reserved	2739	2739	3420	6144
CPUs		2-3	2-3	3-5	4-7
CPU Cycles (GHz)	Limit	5	5	9	13
	Reserved	4	4	7	11
Hard Disk (GB)		100	100	100	100
IOPS[3]	Typical	34	49	162	318

3. Typical IOPS are average HDD I/O transactions per second during normal operation. If IP Office backup, intense logging, Contact Recorder for IP Office/Media Manager are in use, more IOPS are required; 40-200 IOPS depending on backup data size/logging rate/recording channels.

6. If these is any profile misalignment between user and channel quantities, the highest profile that meets all requirements should be used.

1.2 Virtual Server Licensing

IP Office systems use licenses to enable various IP Office applications and features. They also use licenses to enable each Server Edition or IP Office Select server itself (IP Office Application Server server does not require a server license, just application/feature licenses on the IP Office system it is supporting).

For applications and feature, virtualized IP Office servers use the same licenses as used on non-virtual server deployments. However, for the server's themselves, virtualized Server Edition and IP Office Select servers consumes specific *Virtualized Server Edition* or *Virtualized Server Edition Select* licenses respectively rather than standard *Server Edition* or *Server Edition Select* licenses.

PLDS licenses can be hosted in the network in one of two ways:

- **WebLM Centralized Licensing**
  A PLDS file containing the licenses is uploaded to the WebLM service running on the network's primary server. The licenses are issued/validated against the host ID of the WebLM service. That ID is automatically generated from various initial configuration settings of the server but does not subsequently change. Through their license menus, the servers in the network, including the primary, request licenses from those available. Due to its flexibility this is the recommended method of licensing.

- **Local Nodal Licensing**
  A PLDS license containing the licenses is uploaded to the IP Office service running on the server. The licenses are issued/validated against the PLDS Host ID of the server. That ID is automatically generated from various initial configuration settings of the server. As a result of certain system configuration changes that ID may also change, see below.

Nodal PLDS Host ID Restrictions

If the server is hosting its own licenses, then Avaya validates each license against the server's unique **PLDS Host ID**. For an IP Office virtual machine, the IP Office generates the **PLDS Host ID** based on a number of factors:

- **Deployment Specific Factors**
  The **PLDS Host ID** is partial based on a number of factors relating to the particular virtual machine's deployment. Redeploying the virtual machine will change its **PLDS Host ID**. That will immediately invalidate any licenses already in the IP Office configuration. To move the virtual machine to another virtual server platform without requiring new licenses, use vMotion.

- **Configuration Specific Factors**
  The **PLDS Host ID** is also partial based on the following parameters of the virtual machine. Changing any of these parameters changes the virtual machine's **PLDS Host ID**:

  - **Host Name**, **LAN1 IP Address**, **LAN2 IP Address**, **Timezone** and **DHCP Mode**

Nodal License Grace Period

If the virtual machine already contains nodal licenses and the **PLDS Host ID** changes, the licenses remain valid for a 30-day grace period. During that 30-day period, if you make more than 5 further changes to the parameters above, the existing licenses become invalid immediately. Therefore, we strongly recommend that you finalize all these parameters before acquiring any licenses from Avaya.

1.3 Duplicate IP Address Issue

The virtual machine deploys by default with two virtual network interfaces and two IP addresses, LAN1 and LAN2. When starting, if a duplicate IP address is detected, ie. the address is already in use, the IP Office application will not start.

For example, if you deploy two IP Office virtual machines and only configure the LAN1 address on each, the matching default LAN2 addresses (192.168.43.1) on each causes the IP Office application on both virtual machines to stop.

Therefore, during deployment, you must ensure that the deployment of one IP Office virtual machine has completed, including setting the LAN1 and LAN2 IP addresses to their required values, before starting the deployment of any other IP Office virtual machine.

If the LAN2 port of an IP Office virtual machine is not required, you can disable it. This reduces the risks of conflicts. Disabling a port is detailed as an optional step in the deployment process in this manual. See Disabling a Network Interface 37.

1.4 Differences in Operation

Largely, the operations of virtual version of Server Edition match that of the non-virtual Server Edition installations. However, the following specific differences apply.

- Virtual Server Licensing [13]
- The Original RPM Files for Avaya applications are not installed [14]
- No USB support [14]
- No Blu-Ray/DVD archiving for Contact Recorder for IP Office [15]
- The VNC menu [15]
- A New Primary cannot upgrade other servers [15]

Similarly, the following VMware operation notes apply to the IP Office virtual machine:

- Do not upgrade the VMware Tools [14]

1.4.1 Original RPM Files Not Installed

The installation of a non-virtual machine includes copying the original RPM files used for each component's installation onto the server. Therefore, after uninstalling a component, using the **Updates** menu and clicking **Uninstall**, the presence of the original RPM allows reinstallation by clicking **Install**.

In order to reduce the size of the Avaya OVA file, it does not include the original RPM files. This has the following effects:

- **You cannot reinstall uninstalled components**
  You cannot reinstall a component (RPM) if you delete it from the server's **Updates** menu. Instead you need to transfer the appropriate RPMs to the server first.

- **You cannot upgrade other servers from the primary**
  If the server is a Primary Server, it cannot be used to upgrade any Secondary Server or Expansion System (L) servers to match its software level. However, it can be used to upgrade Expansion System (V2) servers.

Solution

Both issues above can be resolved as follows:

- Follow the server upgrade process to upload an ISO image to the server. This involves transferring a copy of the full ISO to the server from which it then automatically unpacks a full set of RPM files necessary to upgrade both itself and other servers.

1.4.2 No USB Support

Avaya does not support features that require access to the virtual machine's USB port. That includes using the USB port for upgrades and for external music on hold.

1.4.3 VMware Tools

VMware tools is used by the virtual machine management software such as the vSphere client and vCenter to complete requested administrative tasks.

Avaya packages a specific version of VMware Tools as part of the IP Office OVA. This version is tailored for the IP Office operating system.

You should not upgrade the IP Office virtual machine version of VMware Tools except when advised by Avaya. Doing so could destabilize operation of the virtual machine and affect its performance.

1.4.4 Contact Recorder for IP Office Archiving

The Contact Recorder for IP Office application can be configured so that during operation, when the disk partition it is using nears full capacity, older recordings are archived onto a Blu-Ray -R or DVD+RW disk. However, when being run on a virtual machine, this method of archiving is not supported. Instead Contact Recorder for IP Office delete the oldest recordings when required to create space for new recordings.

Note that archiving of old recording onto network attached storage (NAS) devices is still supported.

1.4.5 Primary Cannot Upgrade Other Servers

In a Server Edition network, the Primary Server can upgrade its connected Secondary Server and Expansion System (L) servers to the same software level as itself. However, this does not work if the Primary Server is a newly installed virtual machine.

This issue is related to the fact the the OVA deployment does not include a set of the original RPM files required for reinstallation of IP Office components. See Original RPM Files Not Installed 14.

The solution is to first upgrade the Primary Server using any of the documented methods 70. The upgrade process includes loading all the original RPM files onto the server which it can then use to upgrade other servers.

1.4.6 VNC Menu Operation

For VMware virtual servers, in some cases it has been found that the VNC menu does not work correctly. This is related to the version of VMware tools installed with the OVA.

This can be resolved by removing a particular plug-in file from the VMware tools installed with the OVA as follows:

1. Log into the virtual machine as the root user.

2. Remove (or rename) the file "*/usr/lib/vmware-tools/plugins/vmusr/libresolutionSet.so*".

For further details refer to http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2013891.

1.5 Related Documentation

This section lists the related documents for the products and solutions referenced in this document. These documents are available from the Avaya support website (http://support.avaya.com).

In addition, you should also refer to the VMware documentation. This is available from http://www.vmware.com/support.

IP Office Server Edition

	Document	Document ID
1	IP Office Server Edition Solution Overview Guide	100175142
2	IP Office Server Edition Reference Configuration	100175151
3	Deploying the IP Office Server Edition Solution	100175282
4	Using the Server Edition Web Control Menus	100174002

IP Office Application Server

	Document	Document ID
1	IP Office Application Server Installation and Maintenance Manual	100174011

IP Office

	Document	Document ID
1	IP Office Manager	100174478
2	IP Office Web Manager for Server Edition and Standard Mode	100175049

Voicemail Pro

	Document	Document ID
1	Implementing Voicemail Pro	100174760
2	Administering Voicemail Pro	100174759
3	Voicemail Pro Example Exercises	100073436

one-X Portal for IP Office

	Document	Document ID
1	Implementing one-X Portal for IP Office	100175163
2	Administering one-X Portal for IP Office	100175204
3	Using one-X Portal for IP Office	100175220

Contact Recorder for IP Office

	Document	Document ID
1	Contact Recorder for IP Office Installation	100174010
2	Administering Contact Recorder for IP Office	100174856
3	Using Contact Recorder for IP Office	100174857

To download Avaya documentation:

1. Browse to *http://support.avaya.com* and log in.

2. Select **Support by Product** and click **Documentation**.

3. Enter *IP Office* in the **Enter Product Name** box and select the matching option from the displayed list.

4. Use the **Choose Release** drop-down to select the required IP Office release.

5. Select the content type you want included in the list of documents.

6. Click **ENTER**.

Chapter 2.

VMware Virtual Machines

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2. VMware Virtual Machines

The following are the supported VMware features. It should not be assumed that any features not mentioned here are supported.

Supported Virtual Servers

Avaya supports the IP Office virtual machine on the following virtual server platforms:

- **VMware vSphere**
  The vSphere support is:
  - IP Office 10.1 supports VMware vSphere ESXi 5.x, 6.0 and 6.5.
  - Support includes the Standard, Enterprise and Enterprise Plus variants.

Supported VMware Virtual Server Features

- **vCenter**
  VMware vCenter server, is the centralized management tool for the vSphere suite. It allows the management of multiple host servers and virtual machines on different hosts through a single console application.

- **vMotion**
  vMotion allows you to move an existing virtual machine from one virtual server platform to another with minimal interruption to the operation of the virtual machine. For example, this may be necessary if the existing server platform resources become exhausted. See vMotion Requirements [19].

- **Snapshot**
  The virtual machine must be powered off before taking or deleting a snapshot. Note that running a virtual machine with snapshots degrades its performance. Similarly, deleting snapshots can take some time to complete and can impact performance.
  - The virtual machines disk size cannot be changed if any snapshot have been taken of the virtual machine. Any existing snapshots must first be deleted.

- **OVA Deployment**

- **Soft Power Off**

- **High Availability** [22]
  Enables the automatic re-establishment of the virtual machine on a new host server during a failure on or of the original host.

- **VMware Tools** [14]
  An IP Office specific version of VMware tools is included as part of the IP Office OVA.

vSphere Clients

Traditional host management used the vSphere desktop client installed on a client PC. For vSphere 5.0 onwards, VMware introduced the vSphere web client. The vSphere desktop client is still supported, however new features released with vSphere 5.1 and higher are only managed using the vSphere web client.

Also, using vSphere desktop client to connect to the ESXi 5.5 host and deploy the OVA will fail. When a version 5.x ESXi host is managed by a virtual center, the vSphere desktop client's management capabilities are restricted.

2.1 Supported Hardware and Virtual Machine Requirements

Supported Hardware

For a searchable list of hardware platforms, refer to http://www.vmware.com/resources/compatibility/search.php. The platform must support at least 2 Ethernet interfaces.

The web page :
https://pubs.vmware.com/vsphere-55/index.jsp?topic=%2Fcom.vmware.vsphere.install.doc%2FGUID-DEB8086A-306B-4239-BF76-E354679202FC.html lists the hardware requirements for VMware ESXi 5.5. The total hardware requirements are those of all the virtual machines plus the vSphere infrastructure requirements.

Supported VMware vSphere Platforms

See Virtual Server Support [18]. Please refer to VMware's website (http://www.vmware.com/files/pdf/support/Product-Lifecycle-Matrix.pdf) for current supported VMware software.

Minimum Hardware and Software Requirements

Avaya provides IP Office virtualization software in an OVA format. This framework must meet minimum resource requirements of vSphere infrastructure and OVA. The following are high-level software and hardware requirements:

- Latest VMware vSphere 5.x or higher software. See Virtual Server Support [18]. .

- VMware vSphere desktop client software. vCenter is supported but not required unless using vSphere web client.

- VMware compatible hardware platform. See the links above.

- Intel-based CPUs from the Xeon family with 2 GHz clock speed or better. 2.4 GHz recommended.

- The RAM size must satisfy the ESXi requirements (see the link above) in addition to the specific RAM requirements of the virtual machines deployed. The profiling section lists the requirements for IP Office virtual machines. 6GB and higher is recommended.

- 2 Ethernet interfaces (more recommended if using vMotion)

To determine the required virtual server platform:

1. Refer to the Profiling [20] section to assess the total requirements for the IP Office virtual machines.

2. Add in the requirements for any other virtual machines.

3. Add in the underlying requirements for the virtual server software itself. See the link above.

4. Note the minimum requirements above.

5. Note the requirements for vMotion. See vMotion Requirements [19].

6. Assess the compatibility of potential server platforms using the VMware site link above.

2.1.1 vMotion Requirements

vMotion allows you to move an existing virtual machine from one virtual server platform to another with minimal interruption to the operation of the virtual machine. For example, this may be necessary if the existing server platform resources become exhausted.

For IP Office virtual machines, using vMotion allows you to move the virtual machine without changing its **System Identification** and requiring new IP Office licenses. If the virtual machine is running one-X Portal, any existing sessions may have to log in again after the move.

To use vMotion:

- Each server platform requires 2 Gigabit Ethernet ports with one port dedicated to vMotion traffic.

- The server platform CPUs must be similar, that is, from the same manufacturer and using similar processor architectures.

- The Ethernet switch connecting the two servers must be minimum 10GbE.

- vMotion imposes specific storage requirements. Several options exist including iSCSI and local storage, among others. Please refer to VMware vMotion documentation for detailed requirements.

- To decrease chances of one-X Portal connectivity interruptions, it is recommended that vMotion operation is done at times of low IP Office use.

2.2 Profiling

The IP Office OVA installs a default virtual machine that matches the profiling values for a typical 200 user Primary Server.

Hardware Configuration	Resource Allocation	Memory	Hard Disk
• **vCPU:** 4. • **RAM:** 3072MB. • **HDD:** 1 x 100GB.	• **CPU:** 5GHz. • **Shares:** High. • **Reservation:** 8000Mhz. • **Limit:** Unlimited.	• **Shares:** High. • **Reservation:** 2765MB. • **Limit:** Unlimited.	• **Shares:** High. • **Limit:** Unlimited.

After deployment of a virtual machine, you should optimize the resources allocated to meet the actual requirements of the virtual machine. See Profiling ⌐10⌐. For example, if the virtual machine will only support 50 users, you can reduce the allocated processors and RAM memory. This allows for the best use of the overall resources provided by the virtual server platform.

Restrictions

- **Network Ports**
  You must configure all IP Office virtual machines with two Ethernet ports. For VMware, if using vMotion, additional network port requirement apply, see vMotion Considerations ⌐19⌐.

- **Hard Disk**
  Regardless of the IP Office virtual machine's role, it requires a minimum of 100GB of allocated hard drive space. However, if required additional hard disk space can be added.

- **Disk Storage IOPS Requirements**
  To maintain acceptable performance, the number of virtual machines using the same disk storage and the total throughput of those machines must be within the capacity of that storage.

- **Multiple IP Office Servers**
  If deploying servers with the intention of using resiliency, then the hardware resources and profiling applied to each server must include allowance for the scenarios where users re-register from one server to the other, effectively increasing the server's user requirements. If there is a mix of non-virtualized and virtualized machines, then the assignment of resources to the virtual machine must match the hardware resources available in the non-virtualized machine.

Profiling Other Virtual Machines

It is in customers best interest and in vSphere administrator best practices to monitor resource utilization of the virtual machines running in their infrastructure. We strongly encourage the customers to profile not only our virtual machines but others they might be running on their ESXi servers to precisely fine-tune hardware resources that are allocated to the virtual machines. This will improve performance by allocating resources where they are needed and optimize the use of their virtual infrastructure.

2.3 Disk IOPS Requirements

Input/Output Operations Per Second (IOPS) is a measurement of the traffic between a virtual machine and the disk storage it is using.

The following factors should be considered when assessing the IOPS aspect of the virtual platform:

- The number of virtual machines running on an ESXi host should not exceed the IOPS of the disk storage divided by 30. For example, a datastore with an IOPS of 150 should only support up to 5 virtual machines.

- The total maximum IOPS of all the virtual machines must be within the IOPS capacity of the datastore. To compute how many IOPS the storage supports, you need to know the hard disk type, RAID configuration, number of drives, connection method, etc. Refer to http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=1031773 for further details.

- By default no IOPS limit is set for each virtual machine disk. However, an IOPS limit can be set. If limits are set, it is important to understand how the limits are used for all virtual machines using the same datastore. The limits are aggregated to set an overall limit for the datastore as follows:

  - **Example: 4 virtual machine disks using the same datastore and each disk set to 100 IOPS**
    As each disk is limited to 100, the total IOPS for the datastore is 400. If disks 1, 2 and 3 are currently using 10 IOPS each, disk 4 could use 370 IOPS without being restricted.

  - **Example: One disk set to *Unlimited* (the default), all other disks are set to 100 IOPS**
    As one of the disks is set to unlimited, the potential IOPS for the virtual machine disks using that datastore are also unlimited.

Exceeding the IOPS capacity of the datastore will lead to unpredictable results for virtual machine applications using that storage. Whilst a maximum IOPS limit can be applied to each virtual machine disk, that approach is not recommended for IP Office virtual machines as once again it will lead to unpredictable behaviour.

2.4 Disk Format Selection

During the virtual machine deployment, you select how the VMware server should allocate space for the virtual machine's virtual hard disk. The options vary depend on the version of vSphere:

- **Thick Provision Eager Zeroed**
  This method allocates the storage space to the virtual machine during deployment. It offers best performance once the virtual machine is running. However, it means that space becomes unavailable to other virtual machines even if not being used. This is the best option if the customer intends to store numerous voicemail messages. Note that this option can significantly increase the initial deployment time.

- **Thick Provision Lazy Zero**
  This method allocates the storage space during deployment. It does not offer better performance than Thin Provision but also does not significantly increase the deployment time.

- **Thin Provision**
  This method allocates spaces for the virtual machine as and when the space is required, that is, during normal operation rather than during deployment. Until allocated, the space is available for any virtual machine. This may be the best option for customers who will only make light use of voicemail storage and where storage space is in high demand on the server.

2.5 Alarms

The vSphere clients **Performance** tab displays performance information for individual virtual machines and for the whole ESXi server. vCenter further extends the capabilities of monitoring this performance on long term basis.

In addition to the above performance monitors for any virtual machines, for IP Office virtual machines a number of specific alarms are available that can be output to other applications. The alarms are warning alarms, critical alarms and OK alarms for when usage returns to below the alarm threshold.

Alarm	Alarm Threshold	
	Warning Alarm	Critical Alarm
CPU Clock Cycles	90%	95%
RAM Memory	85%	97%
Hard Disk Input/Output	15%	25%
Network	15%	25%

Viewing Alarms
You can view and or receive the alarms in a number of ways:

- They appear in the alarms shown by the server's web control menus. Refer to the Server Edition documentation.

- Within the configuration of the IP Office application on the virtual machine, you can select to output alarms to SNMP, Syslog and or email. Refer to the IP Office Manager manual.

- System Status Application displays these alarms when connected to the virtual machine.

2.6 High Availability

VMware High Availability (HA) allows a virtual machine to be automatically re-established on another host machine if its normal host fails or detects a potential failure. For example:

- Host failures include power failure and ESXi kernel panic.

- A Linux operating system crash on the host server.

Backup is started up after a failure has been detected and takes a approximately 10 minutes to complete. During the switch any unsaved data and active calls are lost.

Use of this feature is only supported for IP Office Select systems. It requires the customer data center to include multiple host servers and for those hosts to have access to the same separate datastore.

HA cannot be combined with IP Office resiliency as the two mechanisms conflict. For example, if HA is enabled for a Primary Server, no primary resources (phones, hunt groups, voicemail server) can be supported using IP Office resilience fallback to a Secondary Server.

2.7 Virtual Machine Deployment

This section outlines the steps required to install an IP Office virtual machine. If deploying several virtual machines, for example a Primary Server and Secondary Server, the order of deployment and configuration is the same as per the Server Edition deployment documentation 16⌐.

Installer and Maintainer Requirements

In addition to certified IP Office training, the installer must also have certified training on the specific virtual platform type or be supported by someone who has that certification. The same requirement applies to the system maintainer.

- **! IMPORTANT**
  During deployment you must ensure that the deployment of one IP Office virtual machine has completed, including the server ignition process and setting the LAN1 and LAN2 IP addresses to their required operational values, before starting the deployment of any other IP Office virtual machine. This is necessary to minimize the risk of duplicate IP addresses which cause the IP Office application to stop. See Duplicate IP Address Issue 13⌐.

Process Summary

1. **Confirm the system settings**

2. **Download the software** 24⌐
   Download the OVA file for the IP Office release. Also download the IP Office Technical Bulletin for the release and, if required, the non-English TTS ISO files.

3. **Deploy the OVA file** 25⌐
   Deploy the OVA file onto the virtual server platform, creating a new virtual machine.

   - **Adding an Additional Hard Disk** 30⌐
     This optional step is required if both Voicemail Pro and Contact Recorder for IP Office are required on the same virtual machine.

4. **Profile the virtual machine** 31⌐
   Adjust the default allocated resources of the virtual machine to match the requirements of the virtual machine's usage.

   a. **Adjusting the RAM Memory** 32⌐
      Set the amount of RAM reserved for and useable by the virtual machine.

   b. **Adjusting the CPU Cores** 33⌐
      Set the number of CPU cores emulated by the virtual machine.

   c. **Adjusting the CPU Cycles** 34⌐
      Set the number of CPU cycles reserved for and useable by the virtual machine.

   d. **Disabling a Network Interface** 37⌐
      Optionally remove the virtual machines second LAN interface.

5. **Power on the virtual machine** 37⌐
   Start the virtual machine.

6. **Connecting to the virtual machine** 56⌐
   Connect a browser to the virtual machine using the default IP address settings.

7. **Performing server ignition** 59⌐
   Select the role for the virtual machine and set basic settings.

8. **IP Office initial configuration** 64⌐
   Use IP Office Web Manager to perform initial configuration of the IP Office application.

9. **Adding Non-English TTS prompts** 65⌐
   Optional. If intending to use text-to-speech (TTS) in a language other than English, add the additional language files.

Following the installation processes above, configuration of the applications provided by the virtual machine is the same as for a non-virtual machine deployment. Refer to the separate documentation. See Related Documentation 16⌐.

2.7.1 Confirm the System Settings

In addition, any duplication of IP addresses, even the temporary default IP addresses, will cause the IP Office application to not start and any existing IP Office applications to stop.

If using local nodal licensing ⌐13⌐, the virtual server bases the PLDS Host ID its uses for license validation on several server configuration settings. If this is the case, before deploying the virtual machine and obtaining any licenses, you must confirm with the customer the final values for the following settings. This does not apply if using WebLM centralized licensing.

- **Host Name**, **LAN1 IP Address**, **LAN2 IP Address**, **Timezone** and **DHCP Mode**

2.7.2 Download the Software

Avaya makes software for each IP Office release available from the Avaya support website (http://support.avaya.com) in the following formats:

- **OVA File**
  You use this type of file for the initial deployment of a VMware virtual machine. The file is an full machine image.

- **ISO File**
  You can use this type of file to upgrade a previously deployed virtual machine ⌐68⌐. Before using an ISO file, you must backup all applications data and check that you have understood any additional requirements mentioned in the IP Office Technical Bulletin for the IP Office release. IP Office Technical Bulletins are downloadable from the same website as the software.

- **Source ISO File**
  Some components of the server software are open source. To comply with the license conditions of that software, Avaya are required to make the source software available. However, you do not need to download this file for virtual machine installation.

- **TTS DVD ISO Files**
  The images used to deploy new virtual machines only include text-to-speech (TTS) prompts for English. To use other languages, you need to download and install the additional ISO files for non-English languages.

- **RPM/ZIP Files**
  Occasionally Avaya may make RPM files available, either as individual files or combined into a single ZIP file. If directed to do so by Avaya, you can use these to upgrade individual components on a virtual machine.

To download software:

1. Browse to *http://support.avaya.com* and log in.

2. Select **Downloads & Documents**.

3. In the **Enter Your Product Here** box, enter *IP Office*.

4. Use the **Choose Release** drop-down to select the required IP Office release.

5. If shown, click **View downloads >**.

6. The resulting page lists the files available for download. Select the file to download.

7. Click **View documents >**.

8. Select the **Technical Tips** checkbox.

9. In the list of documents, download the IP Office Technical Bulletin for the IP Office release.

2.7.3 Deploying the OVA File

The method of deployment depends on which VMware tool you use.

2.7.3.1 Deploying Using vSphere web client

This process deploys the OVA file to the virtual server platform, creating a new virtual machine. Note that, depending on the speed of the link between the client PC and the virtual server host, this process can take several hours.

To deploy the OVA file: vSphere web client

1. Using the vSphere Web Client, connect to the host server onto which you want to deploy the OVA.

2. Select **Action | All vCenter Actions | Deploy OVF Template**.

3. Enter the location of the OVA file. If on your PC, click **Browse...**, select the OVA image file and click **Open**. Click **Next >**.

4. A summary of the OVA is displayed. Click **Next >**.

5. The installer displays the license agreement. Click **Accept** and then click **Next >**.

6. Enter a name for the virtual machine. This name appears in the VMware server inventory of virtual machines it is hosting. Click **Next >**.

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7. Select the type of disk space usage the virtual machine should use. See Disk Format Selection . Also select the datastore that the virtual machine should use. Click **Next >**.

8. Select the network connections for the virtual machine. The virtual interfaces should not be on the same LAN. Click **Next >**.

9. Set the network addresses for the network interfaces. Click **Next >**.

10. The install wizard displays a summary of the deployment settings. Do not select **Power on after deployment**.

11. Click **Finish**. The installer displays the progress of the deployment.

12. Once deployment has complete, the new virtual machine appears in the inventory of virtual machines.

- If deploying a virtual machine to run both Voicemail Pro and Contact Recorder for IP Office, you now need to add an additional hard disk. See Adding an Additional Hard Disk for Contact Recorder for IP Office 30.

- If otherwise, you can now adjust the resource allocation of the virtual machine. See Virtual Machine Profiling 31.

2.7.3.2 Deploying Using vSphere desktop client

This process deploys the OVA file to the virtual server platform, creating a new virtual machine. Note that, depending on the speed of the link between the client PC and the virtual server host, this process can take several hours.

To deploy the OVA file using vSphere desktop client:

1. Using the VMware vSphere Client, connection go virtual server.

2. Select **File** and then select **Deploy OVF Template...**.
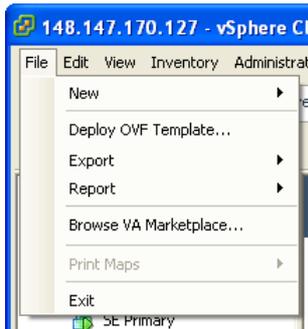
3. Click **Browse...** . Select the OVA image file and click **Open**.
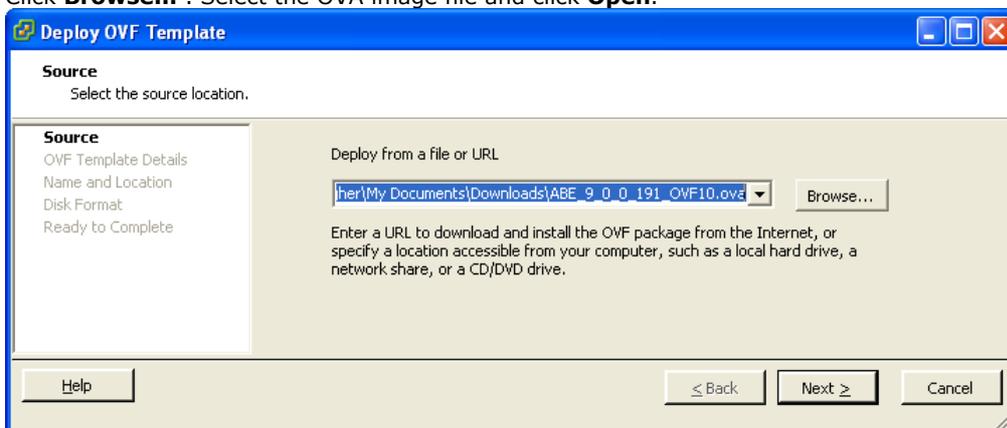
4. Click **Next >**.
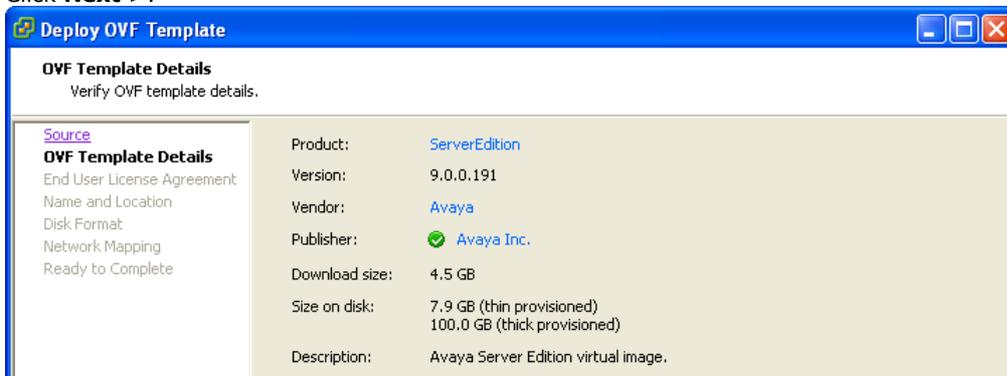
5. Click **Next >**. The installer displays the license agreement. Click **Accept** and then click **Next >**.

6. Enter a name for the virtual machine. This name appears in the inventory of virtual machines shown by the VMware client. Click **Next >**.
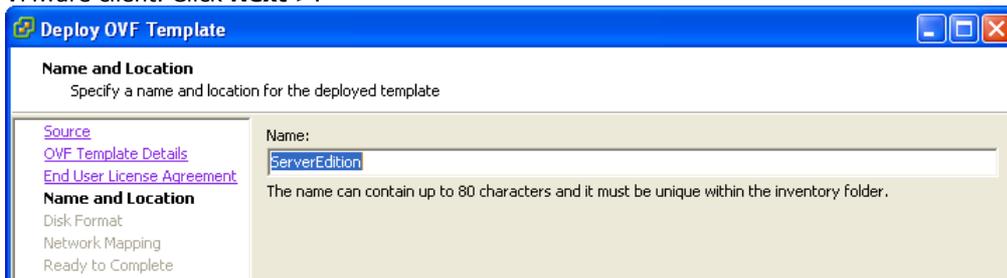
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7. Select the type of disk space usage the virtual machine should use. See Disk Format Selection 22. Click **Next >**.
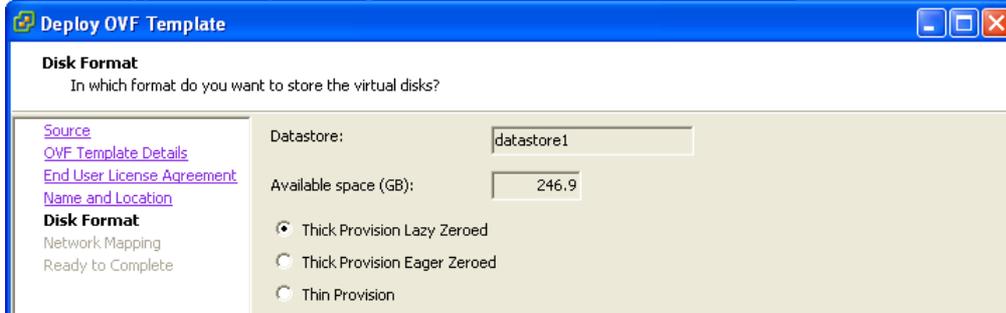
8. Click **Next >**. Set the networks each interface should used. The virtual interfaces should not be on the same LAN. If the second interface is not required it can be disabled after installation, (see Disabling a Network Interface 37).
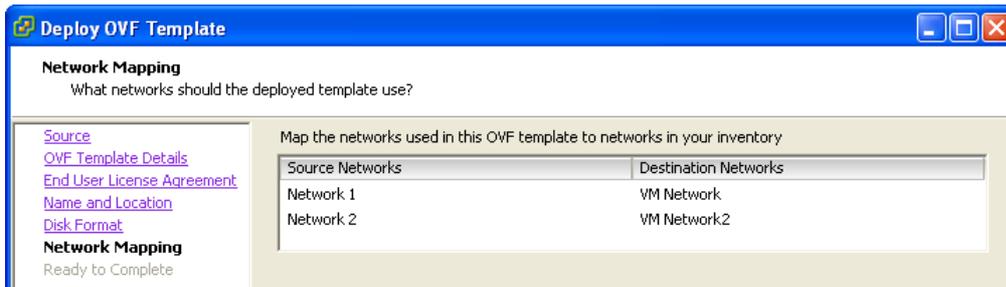
9. The install wizard displays a summary of the deployment settings. Do not select **Power on after deployment**.
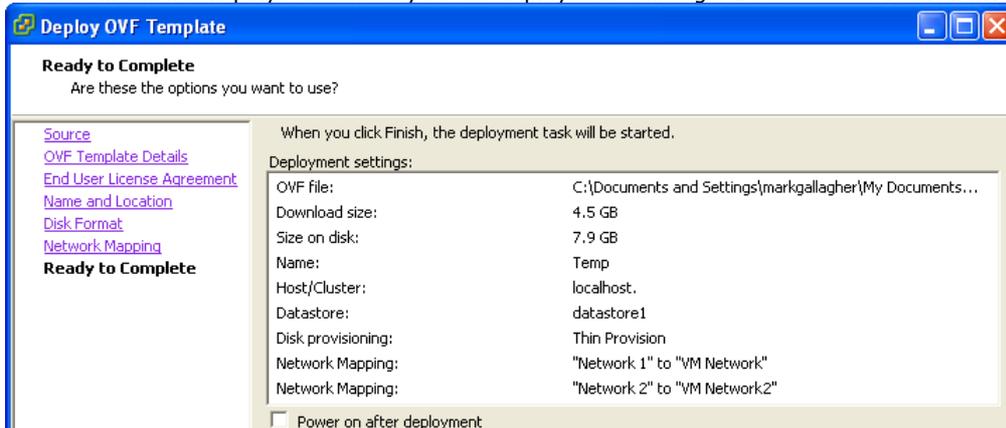
10. Click **Finish**. The installer displays the progress of the deployment.

11. Once deployment has complete, the new virtual machine appears in the inventory of virtual machines.

- If deploying a virtual machine to run both Voicemail Pro and Contact Recorder for IP Office, you now need to add an additional hard disk. See Adding an Additional Hard Disk for Contact Recorder for IP Office 30.

- If otherwise, you can now adjust the resource allocation of the virtual machine. See Virtual Machine Profiling 31.

2.7.3.3 Adding an Additional Hard Disk

To run the Contact Recorder for IP Office application on the same Linux-based IP Office server as Voicemail Pro, it must be provided with and configured to use an additional hard disk. This requirement applies even is running on a virtual machine.

The process below details how to add an additional hard disk to the virtual machine. This process <u>must</u> be performed before initial server ignition.

The minimum supported size is 30GB. However, the recommended size is 300GB or higher. Remember that for a virtual machine installation of Contact Recorder for IP Office, <u>archiving to Blu-Ray/DVD disk is not supported</u> ⌐15⌐.

- Contact Recorder for IP Office typically requires 60KB per minute for non-authenticated files and 120KB per minute for authenticated files.

- Contact Recorder for IP Office also reserves 1GB of space for the call details database and other operations.

To add an additional hard disk to the virtual machine: (vSphere desktop client)

1. Using the vSphere desktop client, select the **Inventory** view.

2. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

3. Click on the virtual machine.

4. Right-click on the virtual machine and select **Edit Settings**.

5. On the **Virtual Hardware** tab, click on **Add..** and select **Hard Disk**. Click **Next >**.

6. Select **Create a new virtual disk** and click **Next >**.

7. Set the **Disk Size**.

8. Set the **Disk Provisioning** to *Thick Provision Eager Zeroed*.

9. Select the **Datastore** to use. This can be the same datastore or a different one from that used during the OVA deployment.

10. Click **Next >**.

11. Check the settings are as required. Click **Finish**.

12. You can now adjust the resource allocation of the virtual machine. See <u>Virtual Machine Profiling</u> ⌐31⌐.

To add an additional hard disk to the virtual machine: (vSphere web client)

1. Using the vSphere web client, select the virtual machine. For example, select **vCenter Management** and in the navigation tree on the left select the virtual machine.

2. Right-click a virtual machine in the inventory and select **Edit Settings**.

3. On the **Virtual Hardware** tab, from the **New device** drop-down select **New Hard Disk** and click **Add**. The hard disk appears in the virtual hardware devices list.

4. Expand **New hard disk**.

5. Set the hard disk size and select the units (MB or GB) from the drop-down menu.

6. Select the datastore location where you want to store the virtual machine files.

7. For the format select *Thick Provision Eager Zeroed*.

8. Click Next. You can now adjust the resource allocation of the virtual machine. See <u>Virtual Machine Profiling</u> ⌐31⌐.

2.7.4 Virtual Machine Profiling

After deployment of a virtual machine, you should optimize the resources allocated to meet the actual requirements of the virtual machine. See Profiling 10 . For example, if the virtual machine will only support 50 users, you can reduce the allocated processors and RAM memory. This allows for the best use of the overall resources provided by the virtual server platform.

Attribute	Description
Memory 32	You can set the maximum amount of RAM memory that the virtual machine can use. You can also set how much of that RAM memory the platform guarantees for the virtual machine.
CPUs 33	You can configure multiple virtual processor (vCPUs) for a virtual machine. A virtual machine cannot have more vCPUs than the maximum number of logical CPUs on the host virtual server platform. The number of logical CPUs is the number of physical processor cores.
CPU Clock Cycles 34	You can set the maximum number of CPU clock cycles that the virtual machine can use. You can also set the number of CPU clock cycles guaranteed for the virtual machine. Multiply the clock cycle of the CPU with the number of allocated virtual CPU processors to determine the aggregate value and compare it with recommended profiling values.
Hard Disk 35	By default the virtual machine is allocated a 100GB virtual disk. However, this can be increased if required. Note however that the size cannot be decreased at a later stage.
IOPS	Input/Output Operations Per Second (IOPS) is a measurement of the traffic between a virtual machine and the disk storage it is using.
Network Ports 37	The IP Office virtual machine deploys with two network interfaces. By default these configure as **LAN1** (192.168.42.1/255.255.255.0) and **LAN2** (192.168.43.1/255.255.255.0) when the virtual machine starts. If the LAN2 port is not required, it can be disabled. This reduces the chances of IP address duplication which causes the IP Office application to not start (see Duplicate IP Address Issue 13).

Following profiling, you can power on the virtual machine 37 .

- **Profiling Other Virtual Machines**
  It is in customers best interest and in vSphere administrator best practices to monitor resource utilization of the virtual machines running in their infrastructure. We strongly encourage the customers to profile not only our virtual machines but others they might be running on their ESXi servers to precisely fine-tune hardware resources that are allocated to the virtual machines. This will improve performance by allocating resources where they are needed and optimize the use of their virtual infrastructure.

- **Multiple IP Office Servers**
  If deploying servers with the intention of using resiliency, then the hardware resources and profiling applied to each server must include allowance for the scenarios where users re-register from one server to the other, effectively increasing the server's user requirements. If there is a mix of non-virtualized and virtualized machines, then the assignment of resources to the virtual machine must match the hardware resources available in the non-virtualized machine.

2.7.4.1 Adjusting the RAM Memory

You can set the maximum amount of RAM memory that the virtual machine can use. You can also set how much of that RAM memory the platform guarantees for the virtual machine.

- **!** **WARNING**
  Use the processes below for the deployment of a new virtual machine that has not been powered on/started.

  - To perform the same actions on an existing virtual machine, that virtual machine must first be powered off/ stopped before making the adjusting and then powered on/started again. That will interrupt all services provided by the virtual machine.

To adjust the virtual machine's RAM memory settings: (vSphere desktop client)

1. Using the vSphere desktop client, select the **Inventory** view.

2. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

3. Click on the virtual machine.

4. Right-click on the virtual machine and select **Edit Settings**.

5. Select **Memory**.

6. On the right-hand side, adjust the maximum memory size for the virtual machine. See Profiling 10.

7. Click the **Resources** tab and select **Memory**. Allocate the RAM for the virtual machine. See Profiling 10.

   - **Reservation**
     This value sets the guaranteed minimum available RAM for the virtual machine. You cannot set the reservation higher than the maximum memory value. For IP Office virtual machines, the recommended value is 75%-80% of the maximum.

   - **Shares**
     Select the virtual machine's relative priority for sharing the server platform memory. The values are *Low*, *Normal*, *High* and *Custom*. The more shares a virtual machine has, the more often it gets a time slice of a memory when there is no memory idle time. Shares represent a relative priority for the allocation of memory capacity between virtual machines. For more information about share values, refer to the VMware Resource Management Guide.

     - Select *Normal* only if the IP Office virtual machine has exclusive use of the ESXi host. However, if other virtual machines utilizing the share mechanism present on the host, it is imperative that IP Office virtual machine is set to *High*. IP Office is a real-time telecommunication software that requires immediate access to hardware resources.

8. Click **OK**.

To adjust the virtual machine's RAM memory settings: (vSphere web client)

1. Using the vSphere web client, select the virtual machine. For example, select **vCenter Management** and in the navigation tree on the left select the virtual machine.

2. Right-click on the virtual machine and select **Edit Settings**.

3. Expand the **Memory** section.

4. In the **RAM** text box, type the amount of RAM to assign to the virtual machine. See Profiling 10. Select whether the memory is specified in MB or GB.

5. Select the required values for reservations and shares:

   - **Reservation**
     This value sets the guaranteed minimum available RAM for the virtual machine. You cannot set the reservation higher than the maximum memory value. For IP Office virtual machines, the recommended value is 75%-80% of the maximum.

   - **Shares**
     Select the virtual machine's relative priority for sharing the server platform memory. The values are *Low*, *Normal*, *High* and *Custom*. The more shares a virtual machine has, the more often it gets a time slice of a memory when there is no memory idle time. Shares represent a relative priority for the allocation of memory capacity between virtual machines. For more information about share values, refer to the VMware Resource Management Guide.

     - Select *Normal* only if the IP Office virtual machine has exclusive use of the ESXi host. However, if other virtual machines utilizing the share mechanism present on the host, it is imperative that IP Office virtual machine is set to *High*. IP Office is a real-time telecommunication software that requires immediate access to hardware resources.

6. Click **OK**.

2.7.4.2 Adjusting the CPU Cores

You can configure multiple virtual processor (vCPUs) for a virtual machine. A virtual machine cannot have more vCPUs than the maximum number of logical CPUs on the host virtual server platform. The number of logical CPUs is the number of physical processor cores.

Profile Settings

Note that the CPU core clock speed affects the range selection below. When the CPU is at the low end toward 2GHz, use the higher number of CPUs. When the CPU speed is higher, for example 3.6GHz, use the lower number of CPUs.

The CPU core clock speed multiplied by the number of cores, must meet the aggregate CPU cycle requirements ⌐34⌐ of the virtual machine.

To adjust the virtual machine's vCPU cores: (vSphere desktop client)

1. Using the vSphere desktop client, select the **Inventory** view.

2. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

3. Click on the virtual machine.

4. Right-click on the virtual machine and select **Edit Settings**.

5. Click the **Hardware** tab and select the **CPUs**.

6. Select the number of virtual processors for the virtual machine. See Profiling ⌐10⌐.

7. Click **OK**.

To adjust the virtual machine's vCPU cores: (vSphere web client)

1. Using the vSphere web client, select the virtual machine. For example, select **vCenter Management** and in the navigation tree on the left select the virtual machine.

1. Right-click on the virtual machine and select **Edit Settings**.

2. Expand the **CPU** section.

3. Select the number of virtual processors for the virtual machine. See Profiling ⌐10⌐.

4. Click **OK**.

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2.7.4.3 Adjusting the CPU Cycles

You can set the maximum number of CPU clock cycles that the virtual machine can use. You can also set the number of CPU clock cycles guaranteed for the virtual machine. Multiply the clock cycle of the CPU with the number of allocated virtual CPU processors to determine the aggregate value and compare it with recommended profiling values.

To adjust the virtual machine's CPU clock cycle settings: (vSphere desktop client)

1. Using the vSphere desktop client, select the **Inventory** view.

2. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

3. Click on the virtual machine.

4. Right-click on the virtual machine and select **Edit Settings**.

5. Click the **Resources** tab and select **CPU**.

6. Allocate the CPU cycles for the virtual machine's vCPUs. See Profiling 10 .

   - **Reservation**
     This value sets the guaranteed minimum available CPU clock cycles for the virtual machine. You cannot set the reservation higher than the maximum aggregate CPU value. For IP Office virtual machines, the recommended value is 75%-80% of the maximum.

   - **Shares**
     The more shares a virtual machine has, the more often it gets a time slice of a CPU when there is no CPU idle time. Shares represent a relative priority for the allocation of memory capacity between virtual machines. For more information about share values, refer to the VMware Resource Management Guide.

     - Select *Normal* only if the IP Office virtual machine has exclusive use of the ESXi host. However, if other virtual machines utilizing the share mechanism present on the host, it is imperative that IP Office virtual machine is set to *High*. IP Office is a real-time telecommunication software that requires immediate access to hardware resources.

7. Click **OK**.

To adjust the virtual machine's CPU clock cycle settings: (vSphere web client)

1. Using the vSphere web client, select the virtual machine. For example, select **vCenter Management** and in the navigation tree on the left select the virtual machine.

2. Right-click on the virtual machine and select **Edit Settings**.

3. On the **Virtual Hardware** tab, expand **CPU**.

4. Allocate the CPU cycles for the virtual machine's vCPUs. See Profiling 10 .

   - **Reservation**
     This value sets the guaranteed minimum available CPU clock cycles for the virtual machine. You cannot set the reservation higher than the maximum aggregate CPU value. For IP Office virtual machines, the recommended value is 75%-80% of the maximum.

   - **Shares**
     The more shares a virtual machine has, the more often it gets a time slice of a CPU when there is no CPU idle time. Shares represent a relative priority for the allocation of memory capacity between virtual machines. For more information about share values, refer to the VMware Resource Management Guide.

     - Select *Normal* only if the IP Office virtual machine has exclusive use of the ESXi host. However, if other virtual machines utilizing the share mechanism present on the host, it is imperative that IP Office virtual machine is set to *High*. IP Office is a real-time telecommunication software that requires immediate access to hardware resources.

5. Click **OK**.

2.7.4.4 Adjusting the Disk Space

By default the virtual machine is allocated a 100GB virtual disk. However, this can be increased if required. Note however that the size cannot be decreased at a later stage.

- The virtual machines disk size cannot be changed if any snapshot have been taken of the virtual machine. Any existing snapshots must first be deleted.

The process for increasing the disk size takes two parts:

- Using a vSphere client, increase the virtual machine's disk size and then restart the virtual machine.

- Using the server's IP Office web management menus, indicate to use the additional space and restart the server.

To adjust the virtual machine's disk space: (vSphere desktop client)

1. Using the vSphere desktop client, select the **Inventory** view.

2. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

3. Click on the virtual machine.

4. Right-click on the virtual machine and select **Power | Power Off**.

5. Right-click on the virtual machine and select **Edit Settings**.

6. Click the **Hardware** tab and select the hard disk to modify.

7. Select a **Virtual Device Node** type from the drop-down menu.

8. To change the size of the disk, enter a new value in the **Provisioned Size** text box. See Profiling 10.

9. Click **OK**.

10. Right-click on the virtual machine and select **Power | Power On**.

To adjust the virtual machine's disk space: (vSphere web client)

1. Using the vSphere web client, select the virtual machine. For example, select **vCenter Management** and in the navigation tree on the left select the virtual machine.

2. Right-click on the virtual machine and select **Power | Power Off**.

3. Right-click on the virtual machine and select **Edit Settings**.

4. Click the **Hardware** tab and select the hard disk to modify.

5. Select a **Virtual Device Node** type from the drop-down menu.

6. To change the size of the disk, enter a new value in the **Provisioned Size** text box. See Profiling 10.

7. Click **OK**.

8. Right-click on the virtual machine and select **Power | Power On**.

To expand the root partition to match the disk size:

This additional process is required on virtual machines that are already running. It formats the additional disk space and adjusts the disk partition settings to use the additional space.

1. Login to web manager.

2. In the displayed list of systems, click on the ☰ icon next to the required system and select **Platform View**.

3. Select the **Settings** tab and then **System**.

4. In the **Increase Root Partition** section, click on **Increase Partition Size**.

5. Click **Save**.

6. Restart the server in order for the change to take effect.

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2.7.4.5 Adjusting IOPS Limits

Input/Output Operations Per Second (IOPS) is a measurement of the traffic between a virtual machine and the disk storage it is using.

The following factors should be considered when assessing the IOPS aspect of the virtual platform:

- The number of virtual machines running on an ESXi host should not exceed the IOPS of the disk storage divided by 30. For example, a datastore with an IOPS of 150 should only support up to 5 virtual machines.

- The total maximum IOPS of all the virtual machines must be within the IOPS capacity of the datastore. To compute how many IOPS the storage supports, you need to know the hard disk type, RAID configuration, number of drives, connection method, etc. Refer to http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=1031773 for further details.

- By default no IOPS limit is set for each virtual machine disk. However, an IOPS limit can be set. If limits are set, it is important to understand how the limits are used for all virtual machines using the same datastore. The limits are aggregated to set an overall limit for the datastore as follows:

  - **Example: 4 virtual machine disks using the same datastore and each disk set to 100 IOPS**
    As each disk is limited to 100, the total IOPS for the datastore is 400. If disks 1, 2 and 3 are currently using 10 IOPS each, disk 4 could use 370 IOPS without being restricted.

  - **Example: One disk set to *Unlimited* (the default), all other disks are set to 100 IOPS**
    As one of the disks is set to unlimited, the potential IOPS for the virtual machine disks using that datastore are also unlimited.

Exceeding the IOPS capacity of the datastore will lead to unpredictable results for virtual machine applications using that storage. Whilst a maximum IOPS limit can be applied to each virtual machine disk, that approach is not recommended for IP Office virtual machines as once again it will lead to unpredictable behaviour.

- **! WARNING**
  Use the processes below for the deployment of a new virtual machine that has not been powered on/started.

  - To perform the same actions on an existing virtual machine, that virtual machine must first be powered off/stopped before making the adjusting and then powered on/started again. That will interrupt all services provided by the virtual machine.

To adjust the virtual machine's IOPS limit: (vSphere desktop client)

1. Using the vSphere desktop client, select the **Inventory** view.

2. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

3. Click on the virtual machine.

4. Click the **Resources** tab.

5. Select **Disk**.

6. In **Limit - IOPs** set the required IOPS limit for each disk the virtual machine uses. See Profiling 10. By default, the limits are set to *Unlimited*.

7. Click **OK**.

To adjust the virtual machine's IOPS limit: (vSphere web client)

1. Using the vSphere web client, select the virtual machine. For example, select **vCenter Management** and in the navigation tree on the left select the virtual machine.

2. Right-click the virtual machine and select **Edit Settings**.

3. Click the **Virtual Hardware** tab and expand **Hard disk**.

4. Select a virtual hard disk from the list.

5. Under **Shares**, click the drop-down menu and select the relative amount of shares to allocate to the virtual machine (*Low*, *Normal* or *High*). You can select *Custom* to enter a user-defined shares value. Higher shares allow a virtual machine to keep more concurrent I/O operations pending at the storage device or datastore compared to a virtual machine with lower shares.

6. Under **Limit - IOPS**, click the drop-down menu and enter the upper limit of storage resources to allocate to the virtual machine. By default, IOPS are unlimited. You select *Low* (500), *Normal* (1000), or *High* (2000), or you can select *Custom* to enter a user-defined number of shares.

7. Click **OK**.

2.7.4.6 Disabling a Network Interface

The IP Office virtual machine deploys with two network interfaces. By default these configure as **LAN1** (192.168.42.1/255.255.255.0) and **LAN2** (192.168.43.1/255.255.255.0) when the virtual machine starts. If the LAN2 port is not required, it can be disabled. This reduces the chances of IP address duplication which causes the IP Office application to not start (see Duplicate IP Address Issue 13).

- **!** WARNING
  Use the processes below for the deployment of a new virtual machine that has not been powered on/started.

  - To perform the same actions on an existing virtual machine, that virtual machine must first be powered off/ stopped before making the adjusting and then powered on/started again. That will interrupt all services provided by the virtual machine.

To disable the second network port: vSphere desktop client

1. Using the vSphere desktop client, select the **Inventory** view.

2. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

3. Click on the virtual machine.

4. Right-click on the virtual machine and select **Edit Settings**.

5. Select **NIC 2**.

6. Deselect **Connect at power on**.

7. Click **OK**. Following profiling, you can power on the virtual machine 37 .

To disable the second network port: vSphere web client

1. Using the vSphere web client, select the virtual machine. For example, select **vCenter Management** and in the navigation tree on the left select the virtual machine.

2. Right-click on the virtual machine and select **Edit Settings**.

3. On the Virtual Hardware tab, expand Network adapter.

4. Select **NIC 2**.

5. Deselect **Connect at power on**.

6. Click **OK**. Following profiling, you can power on the virtual machine 37 .

2.7.5 Power On the Virtual Machine

Following profiling of the virtual machine 31 , you can power on the virtual server.

To power on the virtual machine:

1. Right-click on the virtual machine.

2. Select **Power** and then **Power On**.

   - You can now use a web browser to access the virtual machine. See Connecting to the Virtual Machine 56 .

   - If this is being done as part of the deployment of a new virtual machine, you now need to complete the Initial Server Configuration 56 processes.

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Chapter 3.
Hyper-V Virtual Machines

3. Hyper-V Virtual Machines

For IP Office Release 10.1, IP Office server's are supported as Hyper-V virtual machines.

- Supported virtual machine platforms are Hyper-V running on Windows 2012 R2 and Windows 2016 servers and Microsoft Hyper-V Server 2012 R2 and 2016.

- The installation is performed using a Hyper-V disk image file (VHDX) downloaded from the Avaya support website.

- Virtual Server Edition/IP Office Select servers require Virtualized Server licenses. See Virtual Server Licensing ¹³.

This section outlines the steps required to install an IP Office virtual machine. If deploying several virtual machines, for example a Primary Server and Secondary Server, the order of deployment and configuration is the same as per the Server Edition deployment documentation ¹⁶.

Installer and Maintainer Requirements

In addition to certified IP Office training, the installer must also have certified training on the specific virtual platform type or be supported by someone who has that certification. The same requirement applies to the system maintainer.

- **! IMPORTANT**
  During deployment you must ensure that the deployment of one IP Office virtual machine has completed, including the server ignition process and setting the LAN1 and LAN2 IP addresses to their required operational values, before starting the deployment of any other IP Office virtual machine. This is necessary to minimize the risk of duplicate IP addresses which cause the IP Office application to stop. See Duplicate IP Address Issue ¹³.

Process Summary

1. **Confirm the system settings** ⁴¹

2. **Download the software** ⁴¹
   Download the VHDX file for the IP Office release. Also download the IP Office Technical Bulletin for the release and, if required, the non-English TTS ISO files.

3. **Copy and rename the disk image file** ⁴²
   The file used to create a new virtual machine becomes the hard disk of the virtual machine and cannot be reused to create another virtual machine.

4. **Adjust the virtual hard disk size** ⁴²
   The default hard disk size set in the downloaded file is 100GB. This may need to be expanded to depending on planned role of the virtual machine.

5. **Create a New Virtual Machine** ⁴³
   Deploy the OVA file onto the virtual server platform, creating a new virtual machine.

   - **Adding an Additional Hard Disk** ⁴⁵
     This optional step is required if both Voicemail Pro and Contact Recorder for IP Office are required on the same virtual machine.

6. **Profile the virtual machine** ⁴⁶
   Adjust the default allocated resources of the virtual machine to match the requirements of the virtual machine's usage.

   a. **Adjusting the RAM Memory** ⁴⁶
      Set the amount of RAM reserved for and useable by the virtual machine.

   b. **Adjusting the Processors** ⁴⁷
      Set the number of CPU cores emulated by the virtual machine.

7. **Start the virtual machine** ⁴⁷
   Start the virtual machine.

8. **Connecting to the virtual machine** ⁵⁶
   Connect a browser to the virtual machine using the default IP address settings.

9. **Performing server ignition** ⁵⁹
   Select the role for the virtual machine and set basic settings.

10. **IP Office initial configuration** ⁶⁴
    Use IP Office Web Manager to perform initial configuration of the IP Office application.

11. **Adding Non-English TTS prompts** ⁶⁵
    Optional. If intending to use text-to-speech (TTS) in a language other than English, add the additional language files.

3.1 Confirm the System Settings

In addition, any duplication of IP addresses, even the temporary default IP addresses, will cause the IP Office application to not start and any existing IP Office applications to stop.

If using local nodal licensing 13 , the virtual server bases the PLDS Host ID its uses for license validation on several server configuration settings. If this is the case, before deploying the virtual machine and obtaining any licenses, you must confirm with the customer the final values for the following settings. This does not apply if using WebLM centralized licensing.

- **Host Name**, **LAN1 IP Address**, **LAN2 IP Address**, **Timezone** and **DHCP Mode**

3.2 Download the Software

Avaya makes software for each IP Office release available from the Avaya support website (http://support.avaya.com) in the following formats:

- **VHDX File**
  This file is actually downloaded as a zipped file from which you can then extract the VHDX file. The file is a hard disk image. In the process of creating a new virtual machine, the file becomes the virtual machine's hard disk.

- **ISO File**
  You can use this type of file to upgrade a previously deployed virtual machine 68 . Before using an ISO file, you must backup all applications data and check that you have understood any additional requirements mentioned in the IP Office Technical Bulletin for the IP Office release. IP Office Technical Bulletins are downloadable from the same website as the software.

- **Source ISO File**
  Some components of the server software are open source. To comply with the license conditions of that software, Avaya are required to make the source software available. However, you do not need to download this file for virtual machine installation.

- **TTS DVD ISO Files**
  The images used to deploy new virtual machines only include text-to-speech (TTS) prompts for English. To use other languages, you need to download and install the additional ISO files for non-English languages.

- **RPM/ZIP Files**
  Occasionally Avaya may make RPM files available, either as individual files or combined into a single ZIP file. If directed to do so by Avaya, you can use these to upgrade individual components on a virtual machine.

To download software:

1. Browse to ***http://support.avaya.com*** and log in.

2. Select **Downloads & Documents**.

3. In the **Enter Your Product Here** box, enter *IP Office*.

4. Use the **Choose Release** drop-down to select the required IP Office release.

5. If shown, click **View downloads >**.

6. The resulting page lists the files available for download. Select the file to download.

7. Click **View documents >**.

8. Select the **Technical Tips** checkbox.

9. In the list of documents, download the IP Office Technical Bulletin for the IP Office release.

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3.3 Copy and Rename the Disk Image File

The file used when creating a new virtual machine becomes the hard disk of that virtual machine. It cannot then be used to create another new virtual machine. Therefore, it is important to use a copy of the downloaded file, especially if you are planning to create several virtual machines.

To prepare the disk image file for deployment:
1. Download the zipped file 41 for the required software release.

2. Unzip the VHDX file and copy it to a personal folder. Keep this file as your master copy for that software release.

3. Make a copy of the file and give it a name that will help identify the virtual machine which it will become part of.

4. Move the renamed copy file to the folder on the Hyper-V server used to store virtual machine disks. By default that is C:\Users\Public\Documents\Hyper-V\Virtual Hard Disks.

5. You should now adjust the hard disk size 42.

3.4 Adjust the Hard Disk Size

The default hard disk size set in the downloaded file is 100GB. This may need to be expanded depending on planned role of the virtual machine. See Profiling 10.

It is strongly recommended that the hard disk size is set as required before the disk has been added to a virtual machine and that virtual machine stared. Expanding the hard disk once the virtual machine has been started requires additional steps for the operating system to use the additional space and invalidate any existing snapshots that may have been created.

To expand the file hard disk size:
1. In Hyper-V Manager, select **Action | Edit Disk** or in the **Actions** panel select **Edit Disk**.

2. In the **Locate Disk** menu, enter the file path of the VHDX file or browse to the file. Click **Next**.

3. In the **Choose Action** menu select **Expand** and click **Next**.

4. In the **Configure Disk** menu set the new size required and click **Next**.

5. In the **Summary** menu check the settings. If okay click **Finish**.

6. You can now proceed with using the file to create a new virtual machine 43.

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3.5 Create a New Virtual Machine

After preparing a new VHDX file [42] for the virtual machine, that file can be used as part of creating a new virtual machine. The file used becomes the hard disk on the new virtual machine.

To install a new IP Office virtual machine:

1. Prepare a VHDX file for the new virtual machine [42]. Use the new file for the installation and not the original file downloaded for the Avaya support site. The file used becomes the hard disk of the new virtual machine.

2. From the Hyper-V Manager menu bar, select **Action | New | Virtual Machine**. Alternatively, from the server's **Actions** panel, select **New | Virtual Machine**.

3. If the welcome menu is shown, click **Next**.

4. Add a name to help identify the virtual machine you are creating and click **Next**.
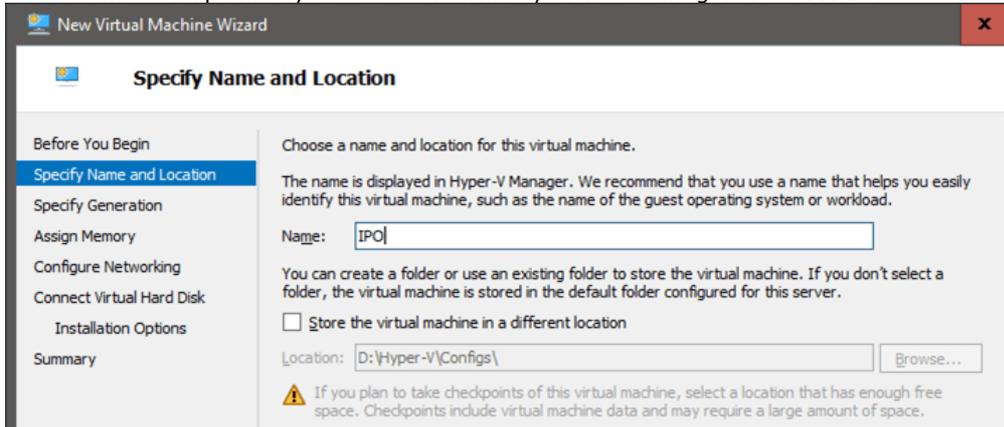
5. When asked to specify the generation select **Generation 1** and click **Next**.
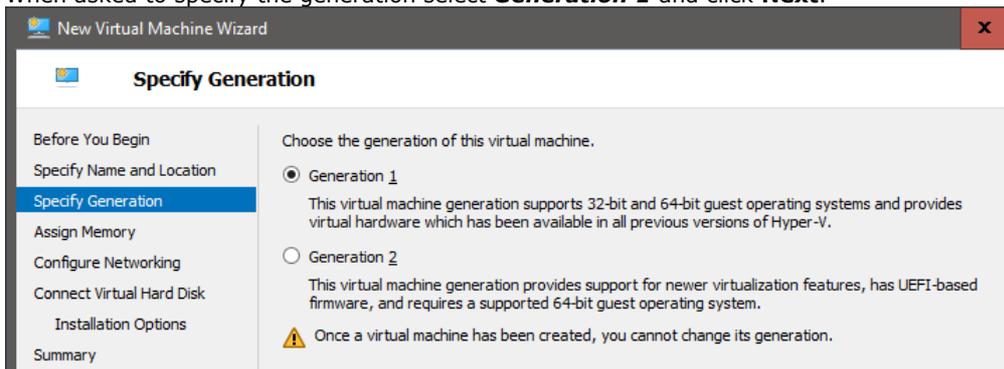
6. In the **Assign Memory** menu, you can set the memory to match the recommend settings for the server's planned role [46]. However you can accept the default and adjust the memory later during the virtual machine profiling [46] stage. Click **Next**.
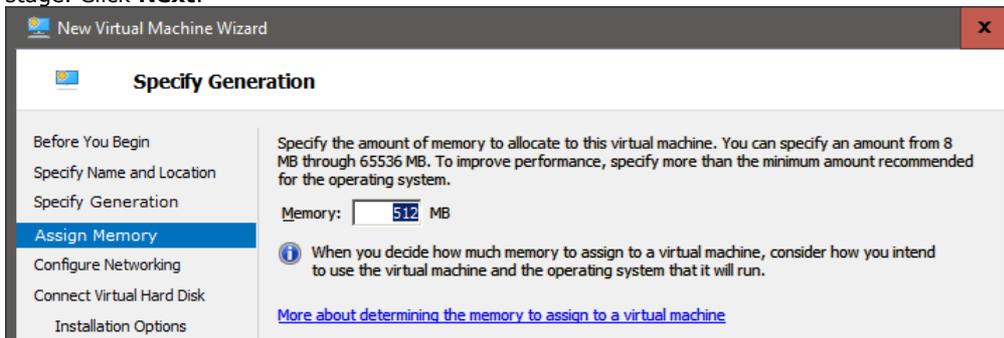
7. In the **Configure Networking** menu, select the network connection that the new virtual machine should use. Note that the IP Office image expects to obtain an initial IP address from that network using DHCP. That address can then be changed once the virtual machine has been started. Click **Next**.

8. In the **Connect Virtual Hard Disk** menu select **Use an existing virtual hard disk**.
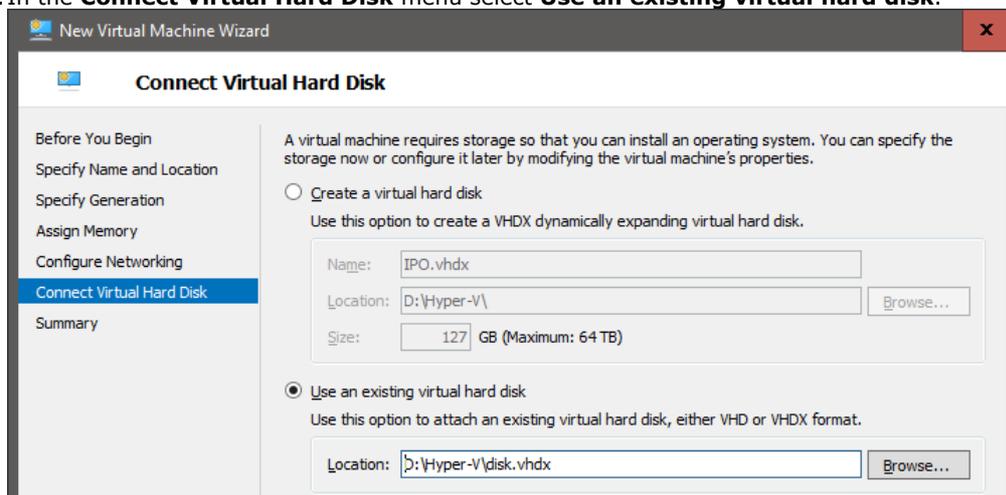
9. Browse to and select the VHDX file that you prepared for this new virtual machine. Click **Next**.

10. In the **Summary** menu click **Finish**. The new virtual machine should now appear in the list of virtual machines.

11. Do not start the virtual machine at this start, instead first perform any required <u>virtual machine profiling</u> 46. Right-click and select **Connect**. Alternatively select **Actions | Connect** from the menu or in the Actions panel select **Connect**.

3.6 Adding an Additional Hard Disk

To run the Contact Recorder for IP Office application on the same Linux-based IP Office server as Voicemail Pro, it must be provided with and configured to use an additional hard disk. This requirement applies even is running on a virtual machine.

The process below details how to add an additional hard disk to the virtual machine. This process <u>must</u> be performed before initial server ignition.

The minimum supported size is 30GB. However, the recommended size is 300GB or higher. Remember that for a virtual machine installation of Contact Recorder for IP Office, <u>archiving to Blu-Ray/DVD disk is not supported</u> 15 .

- Contact Recorder for IP Office typically requires 60KB per minute for non-authenticated files and 120KB per minute for authenticated files.

- Contact Recorder for IP Office also reserves 1GB of space for the call details database and other operations.

To add an additional hard disk to the virtual machine:

1. In the list of virtual machines:

   a. Select the virtual machine. Right-click and select **Connect**. Alternatively select **Actions | Connect** from the menu or in the **Actions** panel select **Connect**.

   b. If the virtual machine is already running, stop it by clicking the 🔴 icon. This will stop all services provided by the virtual machine.

2. In the virtual machine connection window, select **File | Settings**.

3. Select **IDE Controller 0**.

4. Select **Hard Drive** and click **Add**.

5. Select **Virtual hard disk** and click **New**.

6. See the location and name for the file that will be the additional virtual for the virtual machine.

7. In the **Locate Disk** menu, enter the name for the new virtual hard disk file. Click **Next**.

8. In the **Configure Disk** menu set the new size required and click **Next**.

9. In the **Summary** menu check the settings. If okay click **Finish**.

3.7 Virtual Machine Profiling

After deployment of a virtual machine, you should optimize the resources allocated to meet the actual requirements of the virtual machine. See Profiling 10. For example, if the virtual machine will only support 50 users, you can reduce the allocated processors and RAM memory. This allows for the best use of the overall resources provided by the virtual server platform.

Attribute	Description
Memory 46	You can set the maximum amount of RAM memory that the virtual machine can use. You can also set how much of that RAM memory the platform guarantees for the virtual machine.
Processors 47	You can configure multiple virtual processor (vCPUs) for a virtual machine. A virtual machine cannot have more vCPUs than the maximum number of logical CPUs on the host virtual server platform. The number of logical CPUs is the number of physical processor cores.

Following profiling, you can start the virtual machine 47.

- **Profiling Other Virtual Machines**
  It is in customers best interest and in vSphere administrator best practices to monitor resource utilization of the virtual machines running in their infrastructure. We strongly encourage the customers to profile not only our virtual machines but others they might be running on their ESXi servers to precisely fine-tune hardware resources that are allocated to the virtual machines. This will improve performance by allocating resources where they are needed and optimize the use of their virtual infrastructure.

- **Multiple IP Office Servers**
  If deploying servers with the intention of using resiliency, then the hardware resources and profiling applied to each server must include allowance for the scenarios where users re-register from one server to the other, effectively increasing the server's user requirements. If there is a mix of non-virtualized and virtualized machines, then the assignment of resources to the virtual machine must match the hardware resources available in the non-virtualized machine.

3.7.1 Adjusting the RAM Memory

You can set the maximum amount of RAM memory that the virtual machine can use. You can also set how much of that RAM memory the platform guarantees for the virtual machine.

To adjust the virtual machine's RAM memory settings:

1. In the list of virtual machines:

   a. Select the virtual machine. Right-click and select **Connect**. Alternatively select **Actions | Connect** from the menu or in the **Actions** panel select **Connect**.

   b. If the virtual machine is already running, stop it by clicking the 🔴 icon. This will stop all services provided by the virtual machine.

2. In the virtual machine connection window, select **File | Settings**.

3. Select **Memory**.

4. Adjust the memory settings to match the recommended settings for the server role. See Profiling 10.

5. Click **Apply**.

6. If doing as part of installing a new virtual machine, continue with any further profiling required and then start the virtual machine 47.

3.7.2 Adjusting the Processors

You can configure multiple virtual processor (vCPUs) for a virtual machine. A virtual machine cannot have more vCPUs than the maximum number of logical CPUs on the host virtual server platform. The number of logical CPUs is the number of physical processor cores.

Profile Settings

Note that the CPU core clock speed affects the range selection below. When the CPU is at the low end toward 2GHz, use the higher number of CPUs. When the CPU speed is higher, for example 3.6GHz, use the lower number of CPUs.

The CPU core clock speed multiplied by the number of cores, must meet the <u>aggregate CPU cycle requirements</u> 34 of the virtual machine.

- **! WARNING**
  Use the processes below for the deployment of a new virtual machine that has not been powered on/started.

  - To perform the same actions on an existing virtual machine, that virtual machine must first be powered off/stopped before making the adjusting and then powered on/started again. That will interrupt all services provided by the virtual machine.

To adjust the virtual machine's processors:

1. In the list of virtual machines:

   a. Select the virtual machine. Right-click and select **Connect**. Alternatively select **Actions | Connect** from the menu or in the **Actions** panel select **Connect**.

   b. If the virtual machine is already running, stop it by clicking the 🛑 icon. This will stop all services provided by the virtual machine.

2. In the virtual machine connection window, select **File | Settings**.

3. Select **Processor**.

4. Adjust the memory settings to match the recommended settings for the server role. See <u>Profiling</u> 10.

5. Click **Apply**.

6. If doing as part of installing a new virtual machine, continue with any further profiling required and then <u>start the virtual machine</u> 47.

3.8 Starting the Virtual Machine

Having installed and profiled the new virtual machine, it can be started. This will boot it from the virtual hard disk file after which the <u>initial IP Office server configuration</u> 56 can be started.

To start a virtual machine:

1. In the list of virtual machines, right-click and select **Connect**. Alternatively select **Actions | Connect** from the menu or in the Actions panel select **Connect**.

2. In the virtual machine connection window click on the start ⏻ icon or alternatively select **Action | Start** to start the virtual machine.

3. For a new virtual machine, the virtual machine now goes through the standard Linux start up process seen on physical servers. This includes partition resizing and other processes and can take approximately 15 minutes to complete.

4. Wait until the server displays the address details for further configuration of the server. When this appears, use the address to start the <u>initial server configuration process</u> 56.

Chapter 4.

Amazon Web Services Virtual Machines

4. Amazon Web Services Virtual Machines

For IP Office Release 10.1, IP Office server's are supported as Amazon Web Server (Amazon Web Services) virtual machines, referred to as 'instances'. Each AWS instance is created using a combination of parts:

- **Machine Instance**
  This defines the processor and memory and other factors of the platform on which the virtual machine is run. AWS provide a range of different machine instances (https://aws.amazon.com/ec2/instance-types). The machine instance selected should match the profiling requirements 51ᐟ of the server's intended IP Office role.

- **Disk Storage**
  Storage can be defined and associated with the virtual machine. AWS support several different types of storage, however for IP Office virtual machines it is assumed that a drive or droves using EBS (Elastic Block Storage) will be used. Again the amount of storage provided should match the profiling requirements 51ᐟ of the server's intended IP Office role.

- **Amazon Machine Image (AMI)**
  This is a file that contains the initial image for the operating system and applications that the virtual machine should load. Separate files are provided for each supported release of IP Office. However, the same image is used to create the different types of IP Office server, for example Server Edition primary, secondary or expansion or IP Office Application Server.

- **Virtual Private Cloud (VPC)**
  This is the customer's private network within an AWS cloud. It defines the private IP addresses that you can use for the instances launched in the network and provides a range of features for controlling the traffic into the network from the public between them; route tables, internet gateways, public IP addresses, etc. This documentation does not cover the configuration of the customer's VPC.

- **Security Group** 51ᐟ
  A security group controls external internet access to a particular virtual machine. Each security group consists of a set of rules defining the allow access based on protocol, port and source address. You can define multiple security groups and then select which one is currently used by a particular instance.

The process of combining the elements above to create a new virtual IP Office server is referred to as 'launching an instance'. During that process, the AWS menus request details of the components to use and the settings to be applied to those components.

This section outlines the steps required to install an IP Office virtual machine. If deploying several virtual machines, for example a Primary Server and Secondary Server, the order of deployment and configuration is the same as per the Server Edition deployment documentation 16ᐟ.

Installer and Maintainer Requirements

In addition to certified IP Office training, the installer must also have certified training on the specific virtual platform type or be supported by someone who has that certification. The same requirement applies to the system maintainer.

4.1 Profiling

The AWS machine instance (https://aws.amazon.com/ec2/instance-types) and storage specified when launching a new instance should match the requirements of the virtual server's intended role. See Profiling 10.

4.2 Creating Security Groups

Prior to launching any IP Office instances you should create several security groups. A security group consists of a set of rules for what access is allowed based on a set of selected protocols, ports and source address settings. When launching a new instance, you can select the security group that it should use.

- When launching a new instance you should use a highly restricted security group you have created that allow access from as few hosts and protocols as possible. For example, one that only allows access from your IP address and using HTTPS access to ports 7070/7071. This is necessary since the new instance boots with default passwords until initial configuration is completed.

- Once the instance is ignited and initial configuration utility completed, you can then switch the virtual machine's security group 54 to one you have created for operational systems. For example, one that allows access from customer addresses using the ports/protocols of the IP Office services that have been configured on the server.

4.3 Launching a New Instance

The following is a general example for launching a new virtual instance. The exact process may vary depending on the requirements of the customer VPC network and external site networks.

To launch a new AWS virtual machine:

1. Sign in to your AWS account. Click **Services** and select **EC2**.

2. From the top-right hand corner, select the zone, for example **US East (N. Virginia)**, in which the customer's VPC is defined and in which you want to launch the new instance.

3. Click **Launch Instance**. Select **Community AMIs** and enter **Avaya** as the search string.

4. Locate the AMI required and click **Select**. Make sure you select the correct AMI. Its name should indicate the required IP Office release and **CPE**. For example **ipo-cpe-10.1.0125** is the partner hosted AMI for IP Office Release 10.1.0 Build 125.

5. Select a machine instance that matches the profiling requirements 51 of the virtual machine's intended role.

6. Click **Next: Configure Instance Details**.

Step 3: Configure Instance Details

Network ⓘ	vpc-a8944ccd | VPC ▾	🔄 Create new VPC
Subnet ⓘ	subnet-3732cb40 | us-east-1a ▾	Create new subnet
	65531 IP Addresses available	
Auto-assign Public IP ⓘ	Enable ▾	
IAM role ⓘ	None ▾	🔄 Create new IAM role
Shutdown behavior ⓘ	Stop ▾	
Enable termination protection ⓘ	☐ Protect against accidental termination	
Monitoring ⓘ	☐ Enable CloudWatch detailed monitoring	
	Additional charges apply.	
Tenancy ⓘ	Shared - Run a shared hardware instance ▾	
	Additional charges will apply for dedicated tenancy.	

- Select the customer's VPC and the subnet in which the virtual machine should operate.

- To support eth1, under **Network interfaces** click **Add Device**. If this option is used, AWS will not automatically assign IP addresses to the ports. After launching the instance, you can obtain the eth0 interface ID and assign a Elastic IP public IP address which can then be used for ignition and initial configuration.

7. Click **Next: Add Storage**. Set the size of the disk to match the [profiling requirements][51] of the virtual machine's intended role. Note that currently adjusting the disk size following server ignition is not supported.

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. Learn more about storage options in Amazon EC2.

Volume Type ⓘ	Device ⓘ	Snapshot ⓘ	Size (GiB) ⓘ	Volume Type ⓘ	IOPS ⓘ	Throughput (MB/s) ⓘ	Delete on Termination ⓘ	Encrypted ⓘ
Root	/dev/sda1	snap-428677	100	General Purpose SSD (GP2) ▾	150 / 3000	N/A	☑	Not Encrypted

Add New Volume

- If the server will be supporting Media Manager it will require an additional separate storage volume. To add this click **Add New Volume** and specify the size required.

8. Click **Next: Add Tags**. Enter any tags that you want associated with this instance. Tags can be displayed and used in other EC2 menus to display, sort and group matching resources. . Each tag consists of name and value pairs. For example, you might find it useful to have tags that indicate the server type, the location it serves and the customer it is for, eg, server=primary, site=paris, customer=Example.com.

9. Click **Next: Configure Security Group**. Select the system installer's security group that [you previously created][51].

  - **! Important:**
    This should be a security group that restricts access to as few hosts and protocols as possible. For example, access from your address using HTTPS access to ports 7070/7071. This is necessary since the new instances boots with default passwords until its initial configuration is completed.

  - If you don't select a previously created group, the install process automatically creates a launch wizard group which only allows SSH access on port 22.

10. Click **Review and Launch**. Check that the details shown match the requirements for the server being created. If so, click **Launch**.

11. Create a new key pair or choose an existing key pair. This provides a security certificate for secure SSH access to the virtual machine.

12. If creating a new key pair, click **Download Key Pair** and ensure that you store the downloaded PEM certificate file in a safe place.

13. Click **Launch Instances**.

14. If no problems are reported, scroll down the summary form and click **View Instances**. Alternatively, select **Services | EC2** and from the navigation tree select **Instances | Instances**. The list of your instances should include the new virtual machine.

15. The machine starts by performing initial formatting and partitioning of the storage. This takes approximately 15 minutes to complete.

	Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)
☐		i-0eba3951d11b78971	t2.micro	us-east-1d	🟢 running	⧗ Initializing	None	ec2-54-210-132-144.co...

16. Proceed with the initial server configuration process [56].

4.4 Changing the Security Group

You can change the security group 51 assigned to an instance. This allows you to maintain a set of security groups for different purposes and to flexible switch which security group an instance is currently using.

To change the security group assigned to an instance:

1. Sign in to your AWS account. Click **Services** and select **EC2**.

2. In the navigation tree on the left select **Instances | Instances**.

3. Select the instance for which you want to change the security group.

4. Click **Actions** and select **Networking | Change Security Groups**.

5. Select the security group that you want the virtual machine to use and click **Assign Security Groups**.

4.5 Changing the Machine Instance

If necessary, you can change the machine instance on which the virtual machine is running.

- **!** **Important**
  This processes requires the server to be stopped and restarted and so ends any calls and operations currently in progress.

To change the machine instance used by an instance:

1. Sign in to your AWS account. Click **Services** and select **EC2**.

2. In the navigation tree on the left select **Instances | Instances**.

3. Select the instance for which you want to change the machine instance it uses.

4. Click **Actions** and select **Instance State | Stop**. When prompted, select **Yes, Stop**.

5. Wait until the **Instance State** has changed to **stopped**.

6. Click **Actions** and select **Instance Settings | Change Instance Type**.

7. Select the type of machine instance required and click **Apply**.

8. Click **Actions** and select **Instance State | Start**. Click **Yes, Start**.

Chapter 5.
Initial Server Configuration

5. Initial Server Configuration

Once a new virtual machine has been started it requires initial configuration to set the server role and complete other basic configuration settings. Once these have been complete. it should be possible to license, configure and manage the virtual machine in the same way as a normal physical IP Office server.

Process Summary

1. **Connect to the Server** 56
   Using a web browser, connect to the server on its default IP address.

2. **Perform Server Ignition** 59
   Set the server's specific IP Office server role and configure the essential settings for IP addressing, time, etc.

3. **Run IP Office Initial Configuration** 64
   Use the IP Office service's initial configuration utility (ICU) to configure the key settings of the IP Office service provided by the server.

5.1 Connecting to the Virtual Machine

Using a browser, use the process below to login and proceed to Performing Server Ignition 59.

Avaya supports the following browsers for web access to the server menus:

- **Microsoft Internet Explorer 10/11**, **Microsoft Edge**, **Mozilla Firefox**, **Google Chrome**, **Safari**.

To start server ignition:

1. From a client PC, start the browser and enter **https://** followed by the IP address of the server and **:7071**. For example **https://192.168.42.1:7071**.

   - **VMware:**
     The virtual machines eth0 IP address is shown in the console window. By default the IP address for initial configuration is **192.168.42.1/255.255.255.0**. If you cannot connect to the virtual machine using the default IP address, you need to assign the virtual machine a valid browseable address. See Setting the IP Address using the Console 57.

   - **Hyper-V:**
     The virtual machines eth0 IP address is shown in the console window. By default this type of virtual machines uses DHCP to obtain an initial IP address. If DHCP is not available, a fixed IP address should be assigned through the virtual machine settings and the virtual machine restarted.

   - **AWS:**
     For initial configuration use the public IP address assigned to the instances eth0 interface as shown in the EC2 listing of the instance's details. This can be a temporary public IP address which is removed afterwards when external access to the server's private IP addresses is added to the VPC's route tables or internet gateway. It is recommended to use an installation security group that is highly restricted to protect your instance until such time its provisioned sufficiently to be on your production network.

2. The login page appears.

3. Enter the default user name (***root***) and password (**Administrator**).

4. Click **Login**.

5.1.1 Setting the IP Address using the Console

This process is for VMware virtual machines only. A newly deployed IP Office virtual machine uses the following default IP settings: LAN1 192.168.42.1, LAN2 192.168.43.1, Mask 255.255.255.0.

If the default IP settings are incompatible with the existing network where the virtual machine is being deployed - follow the steps described in this section to change them. Once the settings are correct and the virtual machine can be accessed with a browser, proceed to the next section - Performing Server Ignition 59.

- **!** **WARNING**
  Only use this process if absolutely necessary, ie. if it is not possible to browse to the default address of the virtual machine.

- **!** **WARNING**
  If using or planning to use local nodal licensing, the virtual machines uses its IP address as part of the unique **PLDS Host ID** used for licensing. Subsequent changes to the IP address settings can change the host ID, invalidating any existing licenses. See Virtual Server Licensing 13. Therefore, you must ensure that you have confirmed the IP address settings required before setting those values. After performing this process, you can make future changes if necessary through the server's web menus.

- **!** **WARNING**
  Using the process below on an installed virtual machine will cause service disruption.

To set the virtual machine's IP address:

1. Using the vSphere desktop client, select the **Inventory** view.

2. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

3. Click on the virtual machine.

4. Either:

   - **Using the vSphere desktop client:**

     a. Using the vSphere desktop client, select the **Inventory** view.

     b. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

     c. Click on the virtual machine.

     d. Click on the **Console** tab. All cursor and keyboard action will now be applied to the console window.
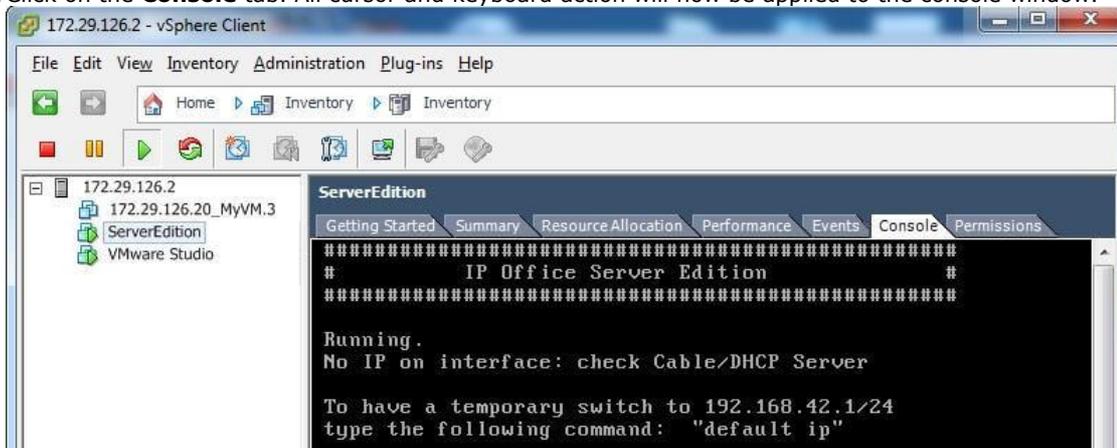
   - **Using the vSphere web client:**

     a. On the **Summary** tab, in the **Guest OS Details** pane click **Launch console**.

     b. The virtual machine console opens in a new tab of the Web browser.

     c. Click anywhere inside the console window to enable your mouse, keyboard, and other input devices to work in the console.

5. All cursor and keyboard action will now be applied to the console window. To exit this mode press **Ctrl+Alt**. If the tab is blank, press **Enter**.

6. In the console display, enter the command **login**.

   a. At the **login:** prompt enter *root*.

   b. At the **Password:** prompt enter *Administrator*.

7. Once logged in, enter the command **system-config-network**. The menus that appears is navigated using the cursor keys, tab key and **Enter** key.

a. Select **Device configuration** and press **Enter**.

```
┌──────┤ Select Action ├──────┐
│ Device configuration        │
│ DNS configuration           │
│                             │
│  ┌──────────┐  ┌──────────┐ │
│  │ Save&Quit│  │   Quit   │ │
│  └──────────┘  └──────────┘ │
└─────────────────────────────┘
```

b. Select the network interface to configure and press **Enter**.

```
┌──────────────────────┤ Select A Device ├──────────────────────┐
│ eth0 (eth0) - Intel Corporation 82545EM Gigabit Ethernet Controller (Coppe │
│ eth1 (eth1) - Intel Corporation 82545EM Gigabit Ethernet Controller (Coppe │
│ <New Device>                                                   │
│      ┌──────────┐                      ┌──────────┐            │
│      │   Save   │                      │  Cancel  │            │
│      └──────────┘                      └──────────┘            │
└───────────────────────────────────────────────────────────────┘
```

c. Set the IP address settings as required for the interface.

```
┌──────────┤ Network Configuration ├──────────┐
│ Name                 eth0_____ │
│ Device               eth0_____ │
│ Use DHCP             [*]                       │
│ Static IP            _____    │
│ Netmask              _____    │
│ Default gateway IP   _____    │
│ Primary DNS Server   _____  │
│ Secondary DNS Server _____  │
│   ┌──────────┐      ┌──────────┐               │
│   │    Ok    │      │  Cancel  │               │
│   └──────────┘      └──────────┘               │
└───────────────────────────────────────────────┘
```
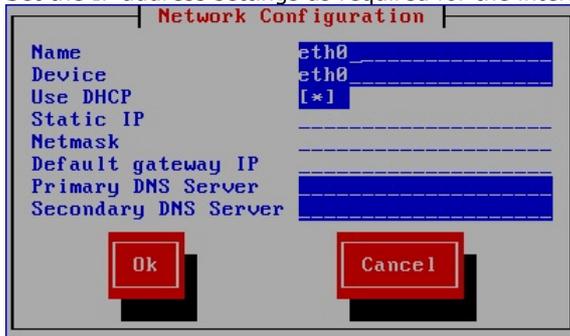
d. Select **OK** and press **Enter**.

e. Repeat the previous steps for any other network interface supported by the virtual machine.

f. Select **Save** and press **Enter**.

g. Select **Save & Quit** and press **Enter**.

h. Enter the command **service network restart**.

8. To logout, enter **exit**.

9. Power off and then power on the virtual machine again. See Power On the Virtual Machine 37 .

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5.2 Performing Server Ignition

Server ignition is used to set the server's role and other key settings.

To start server ignition:

1. Using a browser, connect to the virtual machine $\boxed{56}$.

2. If you accept the license, select **I Agree** and click **Next**.

3. Select the role that the server should perform and click **Next**. The menus vary depending on the chosen server type.

4. If an additional hard disk was added $\boxed{30}$ after deploying the OVA, details of the additional hardware appear. Otherwise the menu displays *"No new hardware available"*.

For Contact Recorder for IP Office support it is recommended to accept the defaults. These are:

a. Leave **Format Hard Drive** checked.

b. Create a single partition for the whole disk. You can create up to 3 logical partitions on the physical disk.

c. Leave the **Mount Point** name as */additional-hdd#1*. The full mount path name for each partition is automatically configured by the system adding */partition1*, */partition2*, etc. as a suffix. For example */additional-hdd#1/partition1*. Note that it is this partition name, including */partition1*, that should be used for Contact Recorder settings.

d. Select **Mount Hardware** to have the additional disk automatically mounted.

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5. Click **Next**. Enter the server's network settings.

- Remember that the LAN1 and LAN2 IP addresses and DHCP mode selections affect the virtual machine's **PLDS Host ID** used for licensing [13]. Therefore, if using or planing to use local nodal licensing, we strongly recommended that before obtaining any licenses, you ensure that these are set to their final values.

- The ignition process allows you to set the IP address for the LAN1 port only. The LAN2 port initially uses the default address 192.168.43.1. To avoid the duplicate IP address issue [13] you should set the LAN2 address after ignition. This can be done using IP Office Manager or IP Office Web Manager.

- For AWS virtual machine these settings affect the private IP address settings of the instance. They do not alter the public IP address values assigned by AWS.

- **Hostname**
  This value is used as the DNS host name of the server.

    - **! IMPORTANT: DNS Routing**
      For internal applications, this value must be reachable by DNS within the customer network. If the server will also be supporting external applications, the host name also needs to be reachable by external DNS. Consult with the customers IT support to ensure that the host name is acceptable and that routing to the host name has been configured correctly.

6. Click **Next**. Set the time source for the server.

- Remember that the virtual machine uses the **Timezone** for licensing [13]. Therefore, we strongly recommended that this is set to its final value before obtaining any licenses.

- Select to use the time provided by an NTP server.

    - For a virtual server, if not using NTP, the server takes its time from the virtual server's host platform rather than allow manual configuration through the server menus.

    - By default, Secondary Server and Expansion System (L) servers automatically get their time from the Primary Server and you can only change the **Timezone**.

- Select the companding setting to use. For telephone systems in North American locations and Japan, select **μ-Law** (also referred to as U-Law and Mu-Law). For most other locations, select **A-Law**.

7. Click **Next**. Enter and confirm a new password. These are the passwords for various IP Office service accounts and also for the Linux accounts created on the server. Ensure that you note the passwords set. Click **Next**.

8. If the selected **Server Type** was *Application Server*, select the services provided by the server. Unselected services remain installed but not running unless manually started.

9. Click **Next**. The menu prompts which security certificate the server should use. This option is not used for Secondary Server and Expansion System (L) servers.

- If you select **Generate CA automatically**, you must download the certificate from the next screen.

- If you select **Import CA**, click **Browse** and locate the security certificate file that the server should use. Click **Upload**.

10. Click **Next**. Check the displayed summary. Use the **Previous** and **Next** options to readjust settings if necessary.

11. Click **Apply**.

12. The browser menu will attempt to redirect you to the server IP address you configured during ignition. Click **OK** when displayed to access the server's IP Office Web Manager menus.

- AWS: For an AWS virtual machine the browser is redirected to the private IP address of the server. You will need to manually change the browser address back to the instance's public IP address.

5.3 Adding a Certificate to the Browser

Browser access to the server uses secure access. The browser used therefore needs to have a copy of the same CA certificate as used to sign the virtualized server's own identity certificate.

- If the server is using its own auto-generated certificate, you can downloaded the certificate from the **Certificates** section of the **Settings | General** menu. Download the *DER-encoded* certificate (a CRT file).

- If the server is using an identity certificate generated elsewhere and then uploaded to the server, obtain a copy of the CA certificate from the same source.

5.3.1 Adding a Certificate to Firefox

To add a server security certificate to Firefox:

1. Click the ☰ icon and select ⚙ **Options**. Alternatively, click on the ⚙ **Settings** icon if shown on the browser home page.

2. Click **Advanced** and select **Certificates**.

3. Click **View Certificates**.

4. Click **Authorities**.

5. Click **Import**. Browse to the location of the CRT or PEM file downloaded from the server. Select the file and click **Open**.

6. Select all the check boxes to trust the certificate.

7. Click **OK** twice.

5.3.2 Adding a Certificate to Explorer

To add a server security certificate to Internet Explorer:

1. Click **Tools** or the options ⚙ icon and select **Internet Options**.

2. Select the **Content** tab and click **Certificates**.

3. Click **Import**.

4. Click **Next** and **Browse** to the location of the downloaded certificate. Select it and click **Open**.

5. Click **Next**. Click **Place all certificates in the following store**.

   - If using the server's own generated certificate, select the **Trusted Root Certification Authorities**.

   - If using a certificate from another source, select **Intermediate Certification Authorities**.

6. Click **Next** and then **Finish**.

7. Click **OK**, **Close**.

8. Click **OK**.

5.3.3 Adding a Certificate to Chrome

To add a server security certificate to Google Chrome:

1. Click the ⋮ icon and select **Settings**.

2. Click **Show advanced settings**. Scroll to **HTTP/SSL** and click **Manage certificates**.

3. Click **Import**.

4. Click **Next** and **Browse** to the location of the downloaded certificate. Select it and click **Open**.

5. Click **Next**. Click **Place all certificates in the following store**.

   - If using the server's own generated certificate, select the **Trusted Root Certification Authorities**.

   - If using a certificate from another source, select **Intermediate Certification Authorities**.

6. Click **Next** and then **Finish**.

7. Click **OK**, **Close**.

5.3.4 Adding a Certificate to Edge

To add a server security certificate for Windows Edge:

1. From the file browser, open the directory containing the certificate file.

2. Right-click the file and select **Install Certificate**. You may be prompted for admin credentials and/or a confirmation prompt.

3. On the first wizard screen, click **Next**.

4. On the **Certificate Store** screen select **Place all certificates in the following store**.

    - If using the server's own generated certificate, select the **Trusted Root Certification Authorities**.

    - If using a certificate from another source, select **Intermediate Certification Authorities**.

5. Click **OK**.

5.3.5 Adding a Certificate to Safari

To add a server security certificate to Mac Safari:

1. From the browser, open the directory containing the certificate file.

2. Double-click the certificate.

3. You are prompted to store the certificate in the **login keychain** or the **system keychain**. To make the certificate available to all users of this system, select **system keychain**.

To add a server security certificate to Windows Safari:

1. From the browser, open the directory containing the certificate file.

2. Right-click the file and select **Install Certificate**. You may be prompted for admin credentials and/or a confirmation prompt.

3. On the first wizard screen, click **Next**.

4. On the **Certificate Store** screen select **Place all certificates in the following store**.

    - If using the server's own generated certificate, select the **Trusted Root Certification Authorities**.

    - If using a certificate from another source, select **Intermediate Certification Authorities**.

5. Click **OK**.

6. Click **Next**.

7. Click **Finish**. If another security warning dialog displays, click **Yes**.

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5.4 IP Office Initial Configuration

The IP Office service running on the server requires some initial configuration. This is done using the initial configuration utility (ICU) menu. This menu is automatically shown the first time you login using either IP Office Web Manager or IP Office Manager.

To perform initial configuration through IP Office Web Manager:

1. Log in to IP Office Web Manager.

    a. Enter **https://** followed by the server address. Click on the **IP Office Web Manager** link.

    b. Enter the user name **Administrator** and the password that was created for that user during ignition.

2. Web manager displays the initial configuration menu for the IP Office service. If this does not appear, click **Solution**. Most of the settings are automatically completed using the values you entered during module ignition.
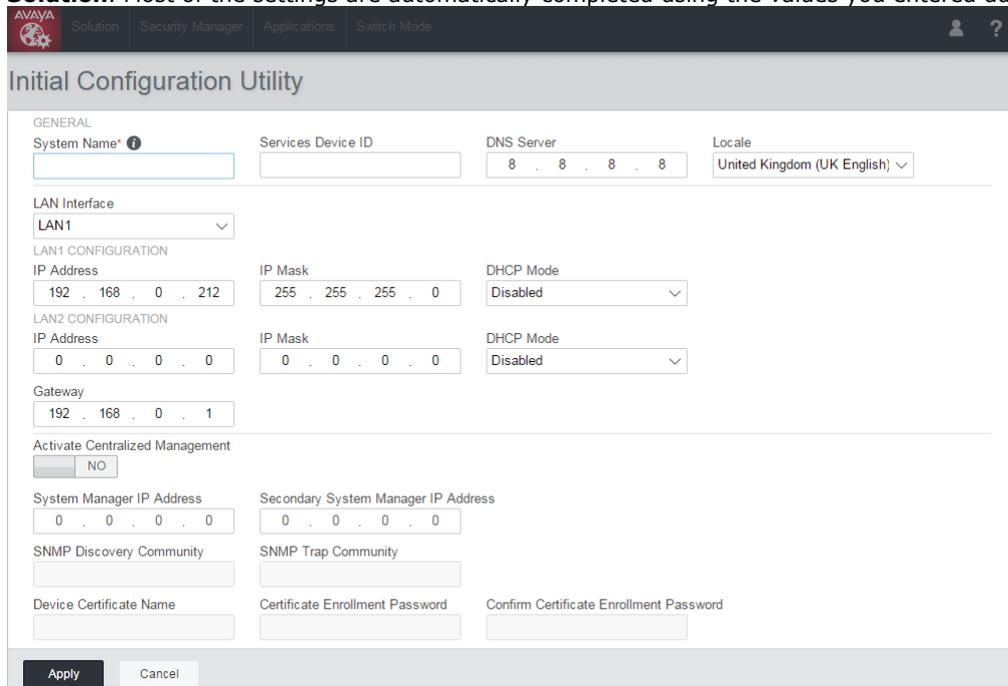
3. Check the values are as expected:

    • If the module will be under centralized management from Avaya System Manager, select the **Centralized Management** checkbox. Enter the details required for Avaya System Manager.

4. Click **Apply**. The service is restarted using the values set in the menu. After the restart the browser is redirected to the normal web management menus.

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5.5 Adding Non-English TTS Prompts

The Voicemail Pro application can optionally use Text-to-speech (TTS). The IP Office image file used to create virtual machine only includes the English language text-to-speech (TTS) prompts. The TTS prompts for other languages are downloadable 24 as 3 separate DVD ISOs.

To use non-English TTS languages, you need to upload and install the additional prompt sets to the virtual machines running the Voicemail Pro application. In a Server Edition network, that applies to the Primary Server and Secondary Server servers.

- **!** **WARNING**
  During this process, the virtual machine needs to restart the voicemail application each time it installs a new set of TTS prompts.

To add additional TTS prompt languages:

1. Download the TTS ISO files that match the IP Office release from the Avaya support web site. See Downloading the Software 69.

2. Extract the individual RPM files for each language. You can open ISO files using applications such as WinZip.

   - **Optional**
     The server can upload and unpack ZIP files. If you want to install several RPM files, create a ZIP file containing all the RPM files and upload the ZIP file.

3. Access to the server's web control menus:

   a. Login to IP Office Web Manager 66.

   b. On the **Solution** tab, click on the ☰ icon next to the server and select **Platform View**. The system's web control menus appear.

4. Upload the TTS files:

   a. Select **Settings** and then the **General** tab.

   b. In the **Software Repositories** section, on the **Applications** line, click **Browse.**

   c. Select the individual RPM file or the ZIP file containing multiple RPMs.

   d. Click **Add** and wait while server uploads the file.

   e. Repeat the steps to upload any additional files.

5. Install the new files:

   a. Select the **Updates** tab.

   b. In the **Services** section, click on the **Status** column header to sort the list using that column.

   c. Scroll the list to locate the group of services that have the status "*not installed*".

   d. For the first language, click the **Install** button.

   e. The server warns you that the installation requires the server to restart the voicemail services. Click **OK**.

   f. Repeat the installation steps for each new TTS language.

6. The new TTS languages are now useable by the voicemail service.

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5.6 Configuring the Server Applications

The services provided by the virtual machine can now be configured in the same way as for non-virtual installations. Refer to the appropriate documentation for Voicemail Pro, one-X Portal and Contact Recorder for IP Office. See .

5.7 Logging in to IP Office Web Manager

Avaya supports the following browsers for web access to the server menus:

- **Microsoft Internet Explorer 10/11**, **Microsoft Edge**, **Mozilla Firefox**, **Google Chrome**, **Safari**.

To access IP Office Web Manager:

1. Log in to IP Office Web Manager.

   a. Enter **https://** followed by the server address. Click on the **IP Office Web Manager** link.
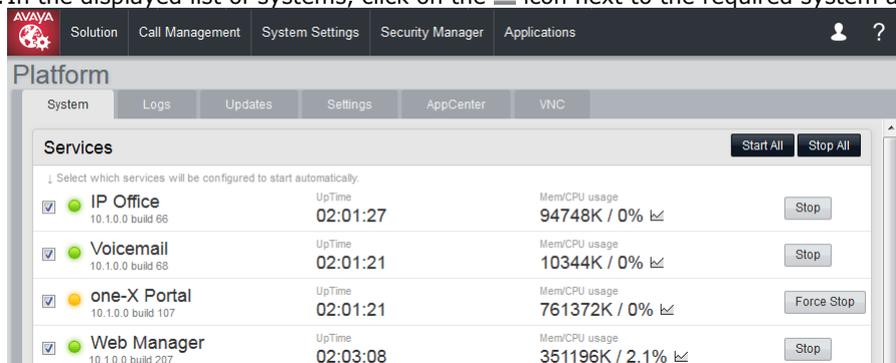

   b. Enter the user name and password.

   c. If any of the IP Office passwords are default, the server requests you to change those passwords. For a new server, the passwords are set during ignition. Note that this does not change the Linux *root* and *Administrator* account passwords.

   - *Change Password*
     This sets the password for the **Administrator** account of the IP Office service run on the IP Office Application Server. With **Referred Authentication** enabled (the default) this is also the default account used administrator access to most other IP Office applications.

   - *Change Security Administrator Password*
     This sets the password for the IP Office security administrator account.

   - *Change System Password*
     This sets the **System** password for the IP Office.

2. Click on **Solution**.

3. In the displayed list of systems, click on the ☰ icon next to the required system and select **Platform View**.

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Chapter 6.

Upgrading a Virtual Machine

6. Upgrading a Virtual Machine

Server Edition software supports several methods for upgrading. For virtual machines, the supported method is to upload the new ISO file to the virtual server using one of the methods below and then select upgrade within the IP Office Web Manager menus.

Method	Summary
Transfer from a virtual DVD	Upload the ISO file from a virtual DVD drive. You can connect an ISO file to the virtual machine's DVD drive in several ways.
Transfer from a remote file server	Upload the ISO file to the server from a file server (http, https, ftp, sftp or scp).
Transfer via SSH/SFTP to the virtual machine	Upload the ISO file directly to a folder on the server using SFTP.
Direct transfer	Upload the ISO file to the server using the IP Office Web Manager browser session.

- **! WARNING: Boot from DVD Upgrades**
  For non-virtual IP Office servers, the server can boot from a DVD copy of the ISO. The menu presented includes an option to upgrade. However, for virtual machines this method of upgrading is not supported.

Upgrading Multiple Servers

In a Server Edition network consisting of several servers, you can use IP Office Web Manager to first upgrade the primary server. The files on the primary are then used to upgrade its associated secondary, expansion and application servers.

Process Summary

1. **Check the Technical Bulletin**
   The Technical Bulletin for the IP Office release will contain details of the upgrade compatibility and any additional steps or processes required before upgrading.

2. **Obtain an Upgrade License**
   Some upgrades require the IP Office configuration to include an upgrade license. If you do not add the correct license, following the upgrade, Avaya phones display *"License not available"* and the system does not allow any calls.

3. **Download the Upgrade ISO Software** 69
   Avaya makes the ISO files for an upgrade available from http://support.avaya.com.

4. **Backup the Applications** 69
   As a precaution, backup the applications running on the virtual machine.

5. **Transferring the ISO file** 70
   Transfer the ISO file to the Primary Server.

6. **Upgrade using the transferred ISO file** 79
   Once the ISO file has transferred, you can use IP Office Web Manager to upgrade all the servers using the same ISO.

7. **Upgrade the Non-English TTS Prompts** 80
   If Voicemail Pro uses non-English TTS prompts you must upgrade those prompts.

Using Snapshots

The VMware Snapshot feature can be used to provide a more robust upgrade process by providing a fall back point to the previous instance of the virtual machine. See Snapshot 18.

6.1 Downloading the Software

- **ISO File**
  You can use this type of file to <u>upgrade a previously deployed virtual machine</u> 68. Before using an ISO file, you must backup all applications data and check that you have understood any additional requirements mentioned in the IP Office Technical Bulletin for the IP Office release. IP Office Technical Bulletins are downloadable from the same website as the software.

- **Source ISO File**
  Some components of the server software are open source. To comply with the license conditions of that software, Avaya are required to make the source software available. However, you do not need to download this file for virtual machine installation.

- **TTS DVD ISO Files**
  The images used to deploy new virtual machines only include text-to-speech (TTS) prompts for English. To use other languages, you need to download and install the additional ISO files for non-English languages.

- **RPM/ZIP Files**
  Occasionally Avaya may make RPM files available, either as individual files or combined into a single ZIP file. If directed to do so by Avaya, you can use these to upgrade individual components on a virtual machine.

To download software:

1. Browse to **_http://support.avaya.com_** and log in.

2. Select **Downloads & Documents**.

3. In the **Enter Your Product Here** box, enter **_IP Office_**.

4. Use the **Choose Release** drop-down to select the required IP Office release.

5. If shown, click **View downloads >**.

6. The resulting page lists the files available for download. Select the file to download.

7. Click **View documents >**.

8. Select the **Technical Tips** checkbox.

9. In the list of documents, download the IP Office Technical Bulletin for the IP Office release.

6.2 Backing Up Applications

You can configure IP Office Web Manager to backup the servers in a Server Edition network to a variety of remote file servers. Refer to the Server Edition Deployment Guide.

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6.3 Transferring the ISO File

Having backed up the applications 69⌐, the next stage is to transfer the ISO file to the Primary Server. As previously stated, there are number of different methods supported for a virtual machine.

- **Transfer from the virtual machine DVD** 70⌐
  For a physical server, this method uses an ISO file burnt to DVD and placed in the server's DVD drive. For a virtual machine, there are several methods to connect an ISO file to the virtual machine's DVD drive.

- **Transfer from a remote file server** 76⌐
  Thorough the IP Office Web Manager menus, you can configure the server with the details of remote file servers (http, https, ftp, sftp and/or scp) from which it can upload an ISO file.

- **Transfer from a primary server path** 77⌐
  Using SFTP, you can upload the ISO file directly to the server. Within IP Office Web Manager, you can then use the server file path to download the file.

- **Transfer from IP Office Web Manager** 78⌐
  You can transfer an ISO file during a connected IP Office Web Manager session.

6.3.1 Transfer from a Virtual Machine DVD

One of the options for downloading an ISO image used by IP Office Web Manager is to download the ISO file from the primary server's DVD drive. To use this option for a virtual machine, you must first connect the virtual machine's DVD drive to the ISO file.

The VMware client supports the following options for connecting the virtual machine's DVD drive to a source. This section lists the different methods in order of preference based on speed and reliability:

1. **Connect to an ISO file on the client PCs hard disk** 71⌐
   This method connects the virtual machine's DVD drive to an ISO file on the hard disk of the VMware client PC. The time to complete the upgrade depends on the speed between the vSphere host and the client PC.

2. **Connect to the client PCs DVD drive** 72⌐
   This method connects the virtual machine's DVD drive to the DVD drive of the PC running the VMware client PC. The time to complete the upgrade depends on the speed between the vSphere host and the client PC.

3. **Connect to an ISO file in the virtual server datastore** 73⌐
   This method connects the virtual machine's DVD drive to an ISO file previously uploaded to the virtual server datastore. For remote upgrades, this method is the most reliable. In addition, if multiple virtual machines use the same datastore, they can access the same ISO file.

4. **Connect to the VMware server's DVD drive** 75⌐
   This method connects the virtual machine's DVD drive to a DVD drive on the VMware server PC. This method requires physical access to a DVD drive on the VMware server.

6.3.1.1 Connect to an ISO File on the Client PCs Hard Disk

This method maps the DVD drive of the virtual machine to an ISO file on the PC running the VMware client.

To map the virtual machine's DVD to a local PC ISO file: (vSphere desktop client)

1. Place the ISO file in a folder on your client PC.

2. Using the vSphere client, select the **Inventory** view.

3. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

4. Click on the virtual machine.

5. Click on the **Connect/disconnect the CD/DVD device of the virtual machine** icon in the toolbar.
   - If already connected to a source, the details are shown and the option to disconnect. Select disconnect and then click the icon again.

6. From the drop-down, select **CD/DVD drive 1** and then select **Connect to ISO image on local disk...** .

7. Select the ISO file and click **Open**.

8. You can now download the ISO to the virtual server using the **Primary DVD** option in the IP Office Web Manager menus. See below.

To map the virtual machine's DVD to a local PC ISO file: (vSphere web client)

1. Place the ISO file in a folder on your client PC.

2. Using the vSphere web client, select the virtual machine. For example, select **vCenter Management** and in the navigation tree on the left select the virtual machine.

3. Click on the **CD/DVD Connections** icon in the toolbar.

6. From the **CD/DVD** drive drop-down, select **CD/DVD drive 1** and then select **Connect to ISO image on local disk...** .

7. Select the ISO file and click **Open**.

8. You can now download the ISO to the virtual server using the **Primary DVD** option in the IP Office Web Manager menus. See below.

To download the ISO from the primary DVD:

Having connected the virtual server's DVD to an ISO source as above, you can now use IP Office Web Manager to download that ISO source to the server.

1. Login to IP Office Web Manager 66 on the virtual machine.

2. Click **Solutions**.

3. Click on the **Actions** drop-down and select **Transfer ISO**.

4. Click **Transfer from** and select *DVD Primary Server*.

   a. Click **OK**. The menu shows the download progress.

5. When the download has finished, the menu displays the available version. Click **Close**.

6. The servers listed in the **Solution** overview show an icon and *Upgrade Available*. Proceed to Upgrading from a downloaded ISO 79 .

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6.3.1.2 Connect to the Client PCs DVD Drive

This method maps the DVD drive of the virtual machine to the DVD drive of the PC running the VMware client.

- On some Windows operating systems, access to the client PC DVD drive requires vSphere to run with local administrator rights. For details refer to the VMware Knowledge Base.

To map the virtual machine's DVD to the local PC drive: (vSphere desktop client)

1. Insert the DVD into the PC's DVD drive.

2. Using the vSphere client, select the **Inventory** view.

3. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

4. Click on the virtual machine.

5. Click on the 💿 **Connect/disconnect the CD/DVD device of the virtual machine** icon in the toolbar.
   - If already connected to a source, the details are shown and the option to disconnect. Select disconnect and then click the 💿 icon again.

6. From the drop-down, select **CD/DVD drive 1** and select the appropriate drive letter for the PC drive containing the DVD.

7. You can now download the ISO to the virtual server using the **Primary DVD** option in the IP Office Web Manager menus. See below.

To map the virtual machine's DVD to local PC drive: (vSphere web client)

1. Insert the DVD into the PC's DVD drive.

2. Click **Virtual Machines** and select a virtual machine from the list and click it.

3. Click the **Manage** tab, and click the **CD/DVD drive** connection icon.

4. Select an available drive to connect to, and browse for the CD/DVD media.

5. An **Access Control** dialog box opens. Click **Allow** to proceed. To change your selection, click the connection icon, select **Disconnect**, and select a different option.

6. Click **OK**.

7. You can now download the ISO to the virtual server using the **Primary DVD** option in the IP Office Web Manager menus. See below.

To download the ISO from the primary DVD:

Having connected the virtual server's DVD to an ISO source as above, you can now use IP Office Web Manager to download that ISO source to the server.

1. Login to IP Office Web Manager 66️⃣ on the virtual machine.

2. Click **Solutions**.

3. Click on the **Actions** drop-down and select **Transfer ISO**.

4. Click **Transfer from** and select *DVD Primary Server*.

   a. Click **OK**. The menu shows the download progress.

5. When the download has finished, the menu displays the available version. Click **Close**.

6. The servers listed in the **Solution** overview show an ⚠️ icon and *Upgrade Available*. Proceed to Upgrading from a downloaded ISO 79️⃣.

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6.3.1.3 Connect to an ISO File in the Virtual Server Datastore

This method uses an ISO file uploaded to the file datastore used by the virtual machine.

To upload an ISO file to the datastore: (vSphere desktop client)

1. Using the vSphere desktop client, select the **Inventory** view.

2. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

3. Click on the virtual machine.

4. Select the **Summary** tab on the right.

5. In the **Resources** section, right click on the datastore and select **Browse Datastore...** .

6. Click on the ⬆ **Upload** button and select **Upload File...**.

7. Browse to the location of the ISO image and click **OK**.
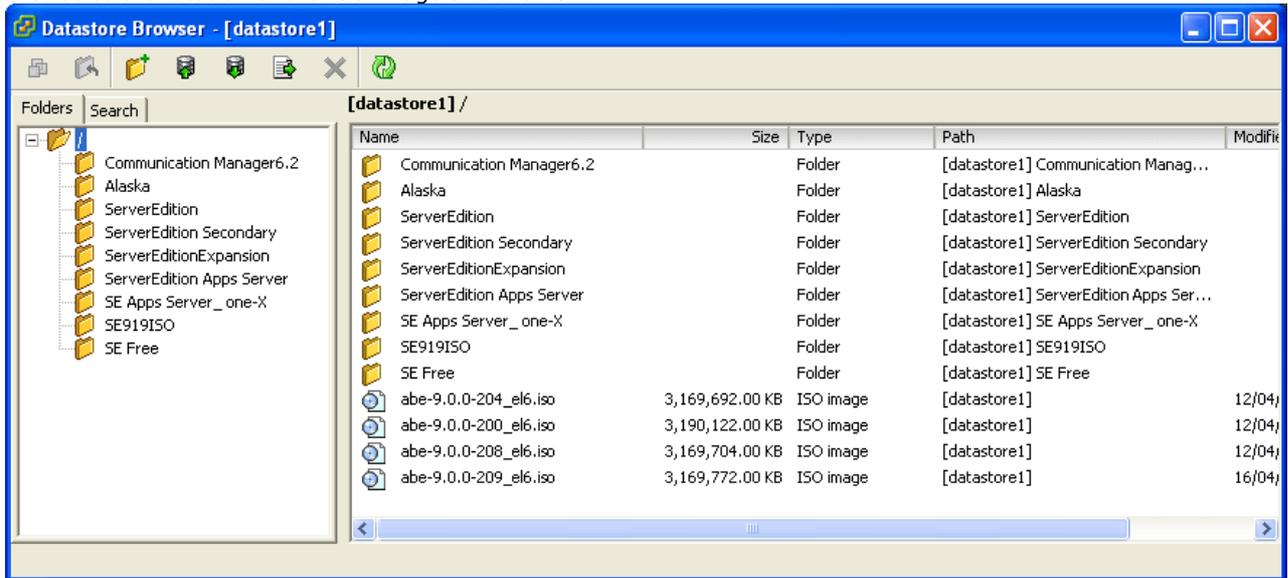
8. Once the upload has finished, close the **Datastore Browser**.

9. You can now map the virtual machine DVD drive to the ISO file. See the process below.

To upload an ISO file to the datastore: (vSphere web client)

1. Using the vSphere web client, select the virtual machine. For example, select **vCenter Management** and in the navigation tree on the left select the virtual machine.

2. In the inventory, click **Datastores** and on the **Objects** tab, select the datastore to which you will upload the file.

3. Click the 🔍 **Navigate to the datastore file browser** icon.

4. Select the folder that you created or select an existing folder, and click the ⬆ **Upload a File** icon.

5. If the **Client Integration Access Control** dialog box appears, click **Allow** to allow the plug-in to access your operating system and proceed with the file upload.

6. On the local computer, find the ISO file and upload it.

7. Once the upload has finished, refresh the datastore file browser to see the uploaded file in the list.

8. You can now map the virtual machine DVD drive to the ISO file. See the process below.

To map the virtual machine DVD to an ISO file in the datastore: (vSphere desktop client)

1. Use the process above to upload the ISO file to the datastore.

2. Using the vSphere client, select the **Inventory** view.

3. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

4. Click on the virtual machine.

5. Click on the 🪩 **Connect/disconnect the CD/DVD device of the virtual machine** icon in the toolbar.
   - If already connected to a source, the details are shown and the option to disconnect. Select disconnect and then click the 🪩 icon again.

6. From the drop-down, select **CD/DVD drive 1** and then select **Connect to ISO image on a datastore...** .

7. Select **Datastore ISO File** and click **Browse**.

8. Select the ISO file and click **OK**.

9. You can now download the ISO to the virtual server using the **Primary DVD** option in the IP Office Web Manager menus. See below.

To map the virtual machine DVD to an ISO file in the datastore: (vSphere web client)

1. Use the process above to upload the ISO file to the datastore.

2. Right-click the virtual machine and select **Edit Settings**.

   a. To locate a virtual machine, select a datacenter, folder, cluster, resource pool, host, or vApp.

   b. Click the **Related Objects** tab and click **Virtual Machines**.

2. Expand **CD/DVD drive**, and select **Datastore ISO File** from the drop-down menu.

3. Browse to select the file and click **OK**.

4. Click **Edit** and select **Connected** next to the datastore ISO file to connect the device.

5. Click **OK**.

6. You can now download the ISO to the virtual server using the **Primary DVD** option in the IP Office Web Manager menus. See below.

To download the ISO from the primary DVD:

Having connected the virtual server's DVD to an ISO source as above, you can now use IP Office Web Manager to download that ISO source to the server.

1. Login to IP Office Web Manager 66 on the virtual machine.

2. Click **Solutions**.

3. Click on the **Actions** drop-down and select **Transfer ISO**.

4. Click **Transfer from** and select *DVD Primary Server*.

   a. Click **OK**. The menu shows the download progress.

5. When the download has finished, the menu displays the available version. Click **Close**.

6. The servers listed in the **Solution** overview show an ⚠ icon and *Upgrade Available*. Proceed to Upgrading from a downloaded ISO 79 .

6.3.1.4 Connect to the Host Server's DVD Drive

This method uses an ISO file burnt to DVD and then placed into the physical DVD drive of the VMware server platform. Whilst this method is fast, it requires access to the physical virtual server platform.

To map the virtual machine DVD to the host DVD drive: (vSphere desktop client)

1. Insert the DVD into the host server's DVD drive.

2. Using the vSphere client, select the **Inventory** view.

3. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.

4. Click on the virtual machine.

5. Click on the 🖫 **Connect/disconnect the CD/DVD device of the virtual machine** icon in the toolbar.
   - If already connected to a source, the details are shown and the option to disconnect. Select disconnect and then click the 🖫 icon again.

6. From the drop-down list, select **CD/DVD drive 1** and then select **Connect to host device...** .

7. From the drop-down list, select the host device to use. For example, a typical entry for a CD/DVD drive is **/vmfs/ devices/cdrom/mpx.vmhba0:C0T0L0**. Click **OK**.

8. You can now download the ISO to the virtual server using the **Primary DVD** option in the IP Office Web Manager menus. See below.

To map the virtual machine DVD to the host DVD drive: (vSphere web client)

1. Insert the DVD into the host server's DVD drive.

2. Right-click the virtual machine and select **Edit Settings**.

   a. To locate a virtual machine, select a datacenter, folder, cluster, resource pool, host, or vApp.

   b. Click the **Related Objects** tab and click **Virtual Machines**.

2. On the **Virtual Hardware** tab, expand **CD/DVD** and from the drop-down menu select **Host Device**.

3. If more than one type of CD/DVD media is available on the host, select the media.

4. Click **OK**.

5. You can now download the ISO to the virtual server using the **Primary DVD** option in the IP Office Web Manager menus. See below.

To download the ISO from the primary DVD:

Having connected the virtual server's DVD to an ISO source as above, you can now use IP Office Web Manager to download that ISO source to the server.

1. Login to IP Office Web Manager 66 on the virtual machine.

2. Click **Solutions**.

3. Click on the **Actions** drop-down and select **Transfer ISO**.

4. Click **Transfer from** and select **DVD Primary Server**.

   a. Click **OK**. The menu shows the download progress.

5. When the download has finished, the menu displays the available version. Click **Close**.

6. The servers listed in the **Solution** overview show an ⚠ icon and **Upgrade Available**. Proceed to Upgrading from a downloaded ISO 79.

6.3.2 Transfer from a Remote File Server

You can upload an ISO file to the virtual server from a previously configured file server. The process for this is the same for virtual and non-virtual machines. Refer to the Server Edition documentation for full details.

To configure a remote file server source:

1. Login to IP Office Web Manager 66 on the virtual machine.

3. Click on the **Solution Settings** drop-down and select **Remote Server Options**.

4. IP Office Web Manager lists the currently configured remote servers.

5. Click **Add Remote Server**.

6. Enter details for the remote file server hosting the ISO file. The details required vary depending on the protocol used by the server.

7. Click **OK**.

8. The new remote server is now included in the list of remote servers. Click **Close**.

To transfer the ISO from a primary server path:

1. Login to IP Office Web Manager 66 on the virtual machine.

2. Click **Solutions**.

3. Click on the **Actions** drop-down and select **Transfer ISO**.

4. Click **Transfer from** and select *Remote Location*.

   a. Click **Select Remote Server** and select the previously configured remote file server from the list.

   b. In the **File path** field, enter the path to the ISO file on that server.

   c. Click **OK**. The menu shows the progress of the download.

5. When the download has finished, the menu displays the available version. Click **Close**.

6. The servers listed in the **Solution** overview show an ⚠ icon and *Upgrade Available*. Proceed to Upgrading from a downloaded ISO 79.

6.3.3 Transfer from a Primary Server Path

SFTP/SSH can be used to upload an ISO file directly to a folder on the virtual machine. The upload process is typically slow, several hours, but reliable.

To upload an ISO file using SSH/SFTP:

1. Start your SFTP or SSH file application and connect to the IP Office Application Server PC. The exact method depends on the application you are using.

   a. Enter the details for the IP Office Application Server:

      - The **Host Name** is the IP address of the IP Office Application Server.

      - The **User Name** is *Administrator*.

      - The **Protocol** is *SFTP/SSH*.

      - The **Port** is *22*. If this is the first time the application has connected to the server, accept the trusted key.

   b. If this is the first time the application has connected to the IP Office Application Server, accept the trusted key.

   c. When prompted, enter the user password.

2. The default folder displayed after logging in is */home/Administrator*.

3. Upload the ISO file to the server.

To transfer the ISO from a primary server path:

1. Login to IP Office Web Manager 66 on the virtual machine.

2. Click **Solutions**.

3. Click on the **Actions** drop-down and select **Transfer ISO**.

4. Click **Transfer from** and select *Primary Server Path*.

   a. In the **File path** field, enter the path to the previously uploaded ISO file. For example, */home/Administrator/Downloads/abe-9.0.0-209_el6.iso*.

   b. Click **OK**. The menu shows the progress of the download.

5. When the download has finished, the menu displays the available version. Click **Close**.

6. The servers listed in the **Solution** overview show an ⚠ icon and *Upgrade Available*. Proceed to Upgrading from a downloaded ISO 79.

6.3.4 Transfer from IP Office Web Manager

We do not recommend this method of uploading an ISO file to the server for remote maintenance of servers not located on the same local network as the PC. The file transfer is slow and does not continue or automatically resume if the IP Office Web Manager session disconnects during the transfer.

To transfer the ISO from the IP Office Web Manager client PC:

1. Login to IP Office Web Manager ⌐66⌐ on the virtual machine.

2. Click **Solutions**.

3. Click on the **Actions** drop-down and select **Transfer ISO**.

4. Click **Transfer from** and select *Client Machine*.

   a. For the **Select ISO** field, click **Browse**. Locate and select the ISO file and click **Open**.

   b. Click **OK**. The menu shows the progress of the download.

5. When the download has finished, the menu displays the available version. Click **Close**.

6. The servers listed in the **Solution** overview show an ⚠ icon and *Upgrade Available*. Proceed to Upgrading from a downloaded ISO ⌐79⌐.

6.4 Upgrading using the Transferred ISO File

Having [downloaded an ISO file to the server](#) 70, IP Office Web Manager indicates those servers it can upgrade. It does this by showing an ⚠ icon and *Upgrade Available* next to the server's details on the **Solution** menu.

- **Scheduled Upgrade**
  Through the IP Office Web Manager menus you can schedule actions such as upgrading rather than running them immediately. For details of scheduling actions, refer to the Server Edition documentation.

To start an upgrade using IP Office Web Manager:

1. Login to IP Office Web Manager on the virtual machine.

2. The **Solution** overview appears. If not, select **Solution**.

3. Select the checkbox next to each server to upgrade.

   - **Note**
     Some upgrades require the primary server upgraded before any other servers. When that is the case, repeat this process until both the primary server and any other servers are upgrade.

4. Click on the **Actions** drop down and select **Upgrade**.

5. Set the **Upgrade from** option to *Primary Server* and click **OK**.

   a. Read the license warning and if okay to upgrade, click **Yes**.

   b. Read the license agreement for the upgrade and if okay select **Accept** and click **Next**.

6. Click **Close**.

7. The menu shows the progress of the upgrade.

8. The upgrade process typically requires the IP Office Web Manager server to restart, ending the current web browser connection. If this occurs, login to IP Office Web Manager again to check on the status of the upgrade.

9. If necessary, repeat the process to upgrade all the servers.

6.5 Upgrading the Non-English TTS Prompts

Non-English Text-to-Speech (TTS) prompts are not as part of the DVD ISO file used for server upgrade. Avaya supplies the non-English TTS prompts for other languages on 3 separate DVDs.

The IP Office Technical Bulletin for a new IP Office software release indicates whether an upgrade to that release also requires the upgrade of TTS prompts.

Upgrading the non-English TTS prompt languages:

1. Download the TTS ISO files that match the IP Office release from the Avaya support web site. See Downloading the Software 69 .

2. Extract the individual RPM files for each language. You can open ISO files using applications such as WinZip.

   - **Optional**
     The server can upload and unpack ZIP files. If you want to install several RPM files, create a ZIP file containing all the RPM files and upload the ZIP file.

3. Access to the server's web control menus:

   a. Login to IP Office Web Manager 66 .

   b. On the **Solution** tab, click on the ☰ icon next to the server and select **Platform View**. The system's web control menus appear.

4. Upload the TTS files:

   a. Select **Settings** and then the **General** tab.

   b. In the **Software Repositories** section, on the **Applications** line, click **Browse.**

   c. Select the individual RPM file or the ZIP file containing multiple RPMs.

   d. Click **Add** and wait while server uploads the file.

   e. Repeat the steps to upload any additional files.

5. Install the new files:

   a. Select the **Updates** tab.

   b. In the **Services** section, click on the **Status** column header to sort the list using that column.

   c. Locate the group of "*out of date*" services.

   d. For the first language, click the **Update** button.

   e. Repeat the installation steps for each new TTS language.

6. The new TTS languages are now useable by the voicemail service.

Chapter 7.
Document History

7. Document History

Date	Issue	Changes
16th May 2017	**05c**	• Update for IP Office Release 10.1.
22nd May 2017	**05d**	• Updated R10.1 profiling values and recommended Amazon machine instances. [120799]
22nd May 2017	**05e**	• Centralization of profiling tables.
18th July 2017	**05f**	• Clarification that virtualization of Linux-based IP Office servers includes IP Office Select!
20th July 2017	**05g**	• Additional resource requirements for Contact Recorder also apply for Media Manager. • Lower capacity profile for Powered by Avaya R2.1 added. • Profiling restriction notes from VMware section copied to the general profiling section.
21st August 2017	**05h**	• Removed repeated paragraph appearance.
7th November 2017	**05i**	• Publishing short name changed.
24th November 2017	**05j**	• Correction of <%Variables%> appearing in text.
19th January 2018	**05k**	• Mention of IP Office Anywhere added.

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