IP Office™ Platform 10.0

Deploying Avaya IP Office™ Platform Servers as Virtual Machines

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Chapter 1.
Server Edition Virtualization

1. Server Edition Virtualization

For IP Office Release 10.0, Avaya supports deployment of Server Edition servers as virtual machines on VMware 5.x.

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.

Avaya supports the deployment of Server Edition servers as virtual machines. This uses an Avaya supplied file that is deployed using standard virtual machine methods. Avaya does not provide or support the virtual server software and hardware chosen by the customer.

- You must use this document in conjunction with the documentation for IP Office Server Edition, see Related Documentation 20. 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.
- For details of virtual machine deployment best practices refer to the VMware documentation.
- 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.

Install and Maintainer Requirements

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

Details of available VMware training can be obtained from http://mylearn.vmware.com. Details of IP Office training can be obtained from http://www.avaya-learning.com.

1.1 Supported Server Types

After deployment of the virtual image, the server software goes through an ignition process that includes selecting the server type. That selection determines the individual IP Office applications automatically enabled on the virtual machine as shown in the table below.

Server Role	Server Edition Primary Server	Server Edition Secondary Server	Server Edition Expansion System (L)	IP Office Application Server
IP Office	Yes	Yes	Yes	–
Voicemail Pro	Yes	Yes	–	Optional
one-X Portal	Yes	Yes	–	Optional
Contact Recorder for IP Office	Yes	–	–	Optional
Web Collaboration	Yes	–	–	Optional

Within this document, the term "Server Edition one-X Portal Server" refers to an IP Office Application Server being used to provide just one-X Portal support to a Server Edition network.

Application Descriptions

- **IP Office**
  For a server ignited in one of the Server Edition roles, this application performs call management and control. It allows the server to support IP connections for trunks and end user devices. It also supports and manages data services. On an IP Office Application Server server it allows configuration of options such as VPN tunnels and SNMP but does not support any telephony functions.
- **Voicemail Pro**
  A Server Edition network supports this application on Server Edition Primary Server and Server Edition Secondary Server. You can install this application on a server ignited as an Application Server.
- **one-X Portal for IP Office**
  In an Server Edition network, this application is installed on the Server Edition Primary Server. However, in order to increase the supported user capacity, you can disable one-X Portal on the server and run it on a separate IP Office Application server instead. For Release 10, this application is also installed on the Server Edition Secondary Server to support portal resilience. Note however that if portal resiliency is not configured, the portal service on the Server Edition Secondary Server is automatically stopped and cannot be manually restarted.
  - **Web Collaboration**
    This service is supported in conjunction with one-X Portal. It provides users with web collaboration services that can be used in parallel with audio conference hosted by the telephone system. In the parallel web collaboration session users can share views of their desktop, documents, etc.
- **Contact Recorder for IP Office**
  Contact Recorder for IP Office is used in conjunction with Voicemail Pro. It provides long-term storage and retrieval of call recordings made by Voicemail Pro. However, it is only supported on the same server as Voicemail Pro when it uses a separate hard disk or disk partition. This manual includes details for adding an additional virtual hard disk for Contact Recorder for IP Office use. This option is supported with IP Office Release 9.0.2 and higher.

1.2 Virtual Server Support

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 10.0 supports VMware vSphere ESXi 5.x and 6.0.
  - Support includes the Standard, Enterprise and Enterprise Plus variants.

Supported 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 12.
- **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** 21
  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** 17
  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, VMWare have 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.

1.3 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 11. 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 11. .
- 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 13 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 12.
6. Assess the compatibility of potential server platforms using the VMware site link above.

1.3.1 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.

1.4 Profiling

The IP Office OVA installs a default virtual machine that matches the profiling values for a typical 200 user Server Edition 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 can optimize the resources allocated to meet the actual requirements of the virtual machine. For example, if the virtual machine will only support 50 users, you can reduce the allocated processor 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. If using vMotion, additional network port requirement apply. See vMotion Considerations 12.
- **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 38.
- **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.

Profile Settings

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

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

1. Web Collaboration only supported on Server Edition Primary Server.
2. Contact Recorder for IP Office not enabled. Add 250MB to RAM values if enabled.
3. Typical IOPS are the average HDD I/O transactions per second during normal operation. If IP Office backup or extensive logging is active, more IOPS will be required; 40-200 IOPS depending upon backup data size/logging rate.

Server Type		Server Edition 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	Typical	5	5	6	7	9	11

Server Type		Server Edition one-X Portal Server						
one-X Portal Users		50	100	200	500	1000	2000	3000
Web Collaboration Users		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	Typical	10	10	11	16	18	20	21

Server Type		IP Office Application Server			
one-X Portal Users		50	100	250	750
Voicemail Channels		20	50	100	150
Web Collaboration Users		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	Typical	34	49	162	318

1.5 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.

Profile Settings

Server Type		Server Edition Primary Server/Server Edition Secondary Server								
Users		20-100	20	50	100	200	500	1000	2000	3000
one-X Portal Users		–	5	16	20	40	88	175	351	703
Voicemail Channels		12	3	7	12	24	49	98	196	248
Web Collaboration Users [1]		–	2	3	5	10	21	42	84	216
IOPS	Typical	31	17	18	26	41	71	129	248	338

1. Web Collaboration only supported on Server Edition Primary Server.

Server Type		IP Office Application Server			
one-X Portal Users		50	100	250	750
Voicemail Channels		20	50	100	150
Web Collaboration Users		20	50	100	300
IOPS	Typical	34	49	162	318

Server Type		Server Edition Expansion System (L)					
Users		10	50	100	200	500	750
IOPS	Typical	5	5	6	7	9	11

Server Type		Server Edition one-X Portal Server						
one-X Portal Users		50	100	200	500	1000	2000	3000
Web Collaboration Users		9	18	35	86	171	342	512
IOPS	Typical	10	10	11	16	18	20	21

1.6 Licensing and PLDS Host ID

Licenses entered into the IP Office application configuration enable various IP Office applications and features. The IP Office applications running on an IP Office virtual machine require the same licenses as on a non-virtual Server Edition deployment.

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**
    - **DHCP Mode**

License Grace Period

If the virtual machine already contains 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.

1.7 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 42.

1.8 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.

- PLDS Host ID 16
- The Original RPM Files for Avaya applications are not installed 17
- No USB support 17
- No Blu-Ray/DVD archiving for Contact Recorder for IP Office 18
- The VNC menu 18
- Primary cannot upgrade other servers 18

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

- Do not upgrade the VMware Tools 17

1.8.1 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 Server Edition Primary Server, it cannot be used to upgrade any Server Edition Secondary Server or Server Edition Expansion System (L) servers to match its software level. However, it can be used to upgrade Server Edition Expansion System (V2) servers.

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 unpacks a full set of the RPM files.
- For an individual component, the Software Repositories section of the server's Settings | General menu can be used to upload individual RPM files or zipped sets of RPM files.

1.8.2 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.

1.8.3 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.

1.8.4 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.

1.8.5 Primary Cannot Upgrade Other Servers

In a Server Edition network, the Server Edition Primary Server can upgrade its connected Server Edition Secondary Server and Server Edition Expansion System (L) servers to the same software level as itself. However, this does not work if the Server Edition 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 17.

The solution is to upload an ISO image of the software release to the Server Edition Primary Server using any of the documented methods 58.

1.8.6 VNC Menu Operation

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.

1.9 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.

1.10 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.

1.11 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**.

1.12 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 Server Edition Primary Server, no primary resources (phones, hunt groups, voicemail server) can be supported using IP Office resilience fallback to a Server Edition Secondary Server.

1.13 Security

The normal security requirements and options are covered in the documentation of the separate IP Office products. This section only details any addition requirements specifically caused by the product being hosted on VMware.

POODLE SSL3 Vulnerability

The POODLE (Padding Oracle On Downgraded Legacy Encryption) vulnerability currently potentially affects browser based access to VMware products. Note this is a VMware issue and not an IP Office product issue. For further details refer to http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2092133.

Resolution

To mitigate the issue, disable SSL v3 in your browser. Please review or contact the browser vendor for documentation on how to disable SSL v3.

- Current VMware products support TLS and therefore continue to function when SSL v3 is disabled in the browser.
- VMware is planning to phase out the support of SSL v3 in its products during the next available maintenance releases.

Chapter 2.
Virtual Machine Deployment

2. Virtual Machine Deployment

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

Install and Maintainer Requirements

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

Details of available VMware training can be obtained from http://mylearn.vmware.com. Details of IP Office training can be obtained from http://www.avaya-learning.com.

- **! 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 16.

Process Summary

1. **Confirm the system settings** 25
2. **Download the software** 25
   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** 26
   Deploy the OVA file onto the virtual server platform, creating a new virtual machine.
   a. **Adding an Additional Hard Disk for Contact Recorder for IP Office** 31
      This optional step is required if both Voicemail Pro and Contact Recorder for IP Office are required on the same virtual machine.
4. **Virtual machine profiling** 32
   Adjust the default allocated resources of the virtual machine to match the requirements of the virtual machine's usage.
   a. **Adjusting the RAM Memory** 33
      Set the amount of RAM reserved for and useable by the virtual machine.
   b. **Adjusting the CPU Cores** 35
      Set the number of CPU cores emulated by the virtual machine.
   c. **Adjusting the CPU Cycles** 36
      Set the number of CPU cycles reserved for and useable by the virtual machine.
   d. **Disabling a Network Interface** 42
      Optionally remove the virtual machines second LAN interface.
5. **Power on the virtual machine** 43
   Start the virtual machine.
6. **Connecting to the virtual machine** 43
   Connect a browser to the virtual machine using the default IP address settings.
7. **Performing server ignition** 46
   Select the role for the virtual machine and set basic settings.
8. **IP Office initial configuration** 51
   Use IP Office Manager to perform initial configuration of the IP Office application.
9. **Adding Non-English TTS prompts** 52
   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 20.

2.1 Confirm the System Settings

The virtual machine bases its **PLDS Host ID** used for local licensing [16] on several configuration settings. Changing those values after obtaining any licenses invalidates those licenses.

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.

Therefore, before deploying the virtual machine and obtaining any licenses, you must confirm with the customer the final values for the following:

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

2.2 Downloading 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 virtual machine.
- **ISO File**
  You can use this type of file to upgrade a previously deployed virtual machine. 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 software are open source. To comply with the license conditions of that software, Avaya are required to make the source software available. However, this file is not required for installation.
- **TTS DVD ISO Files**
  The server OVA and ISO files 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. You can use these to upgrade individual components on the 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.

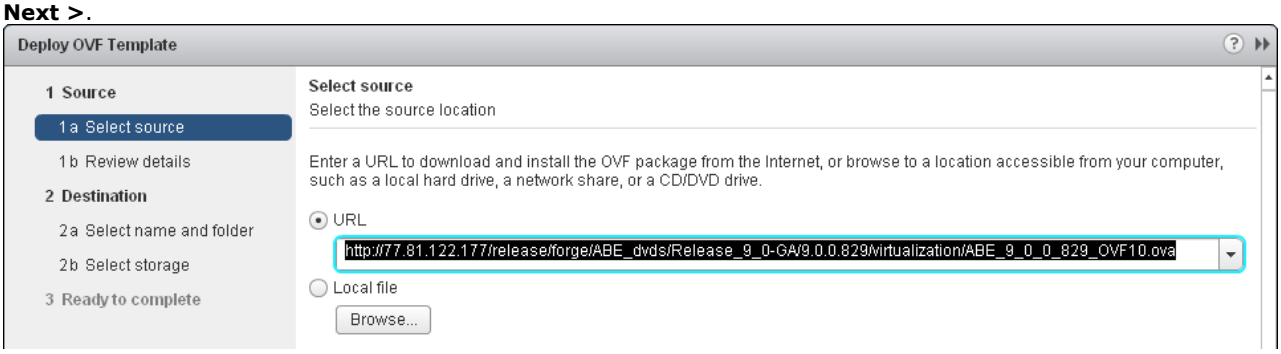
2.3 Deploying the OVA File

2.3.1 Deploying Using vSphere web client

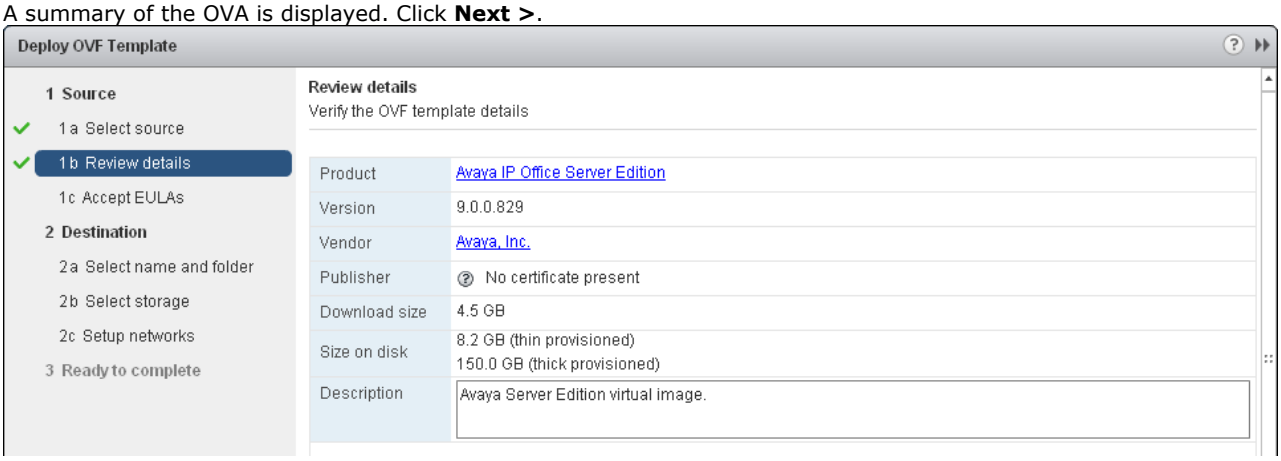
This process deploys the OVA file to the virtual server platform, creating a new virtual machine. Note that, depending on the speed of the link between the client PC and the virtual server host, this process can take several hours.

To deploy the OVA file: vSphere web client

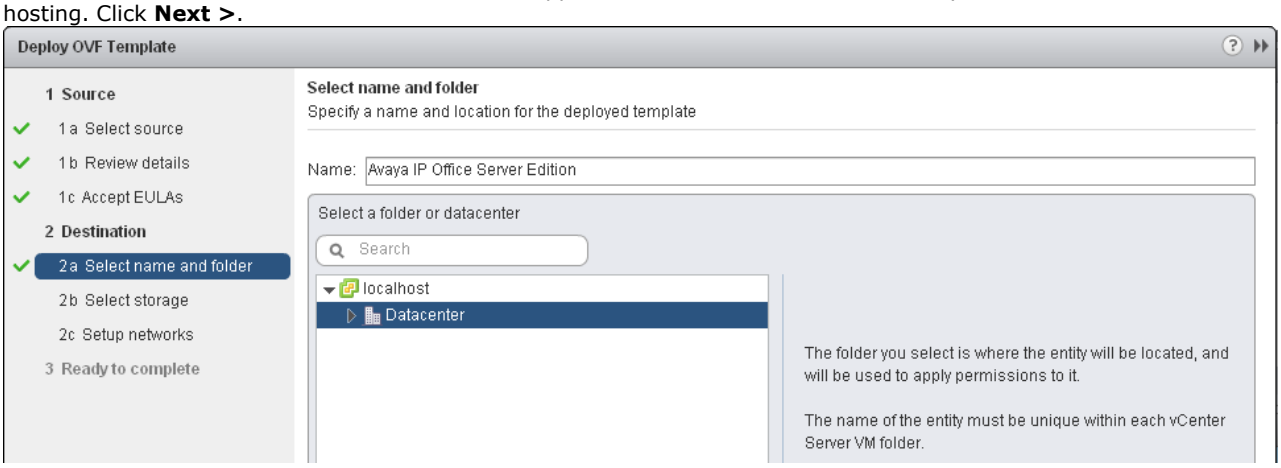
1. Using the vSphere Web Client, connect to the host server onto which you want to deploy the OVA.
2. Select **Action | All vCenter Actions | Deploy OVF Template**.
3. Enter the location of the OVA file. If on your PC, click **Browse...**, select the OVA image file and click **Open**. Click **Next >**.



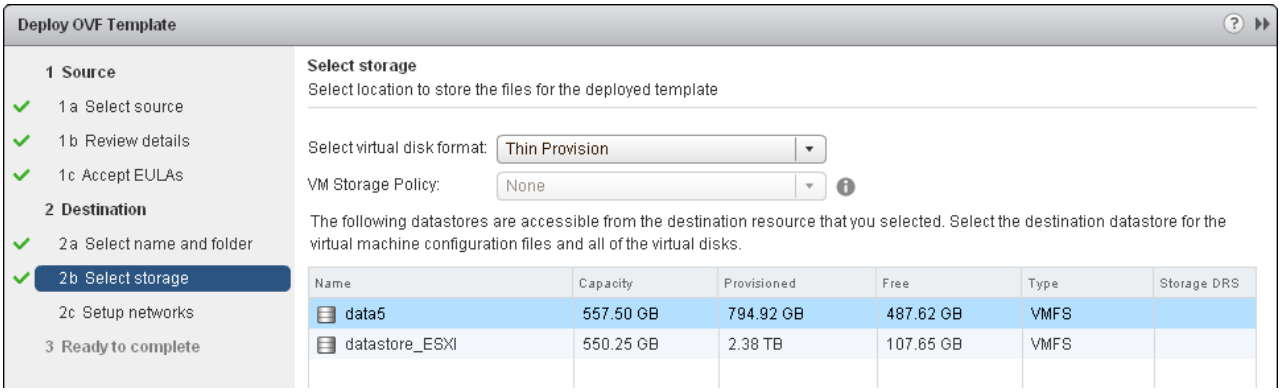
4. A summary of the OVA is displayed. Click **Next >**.



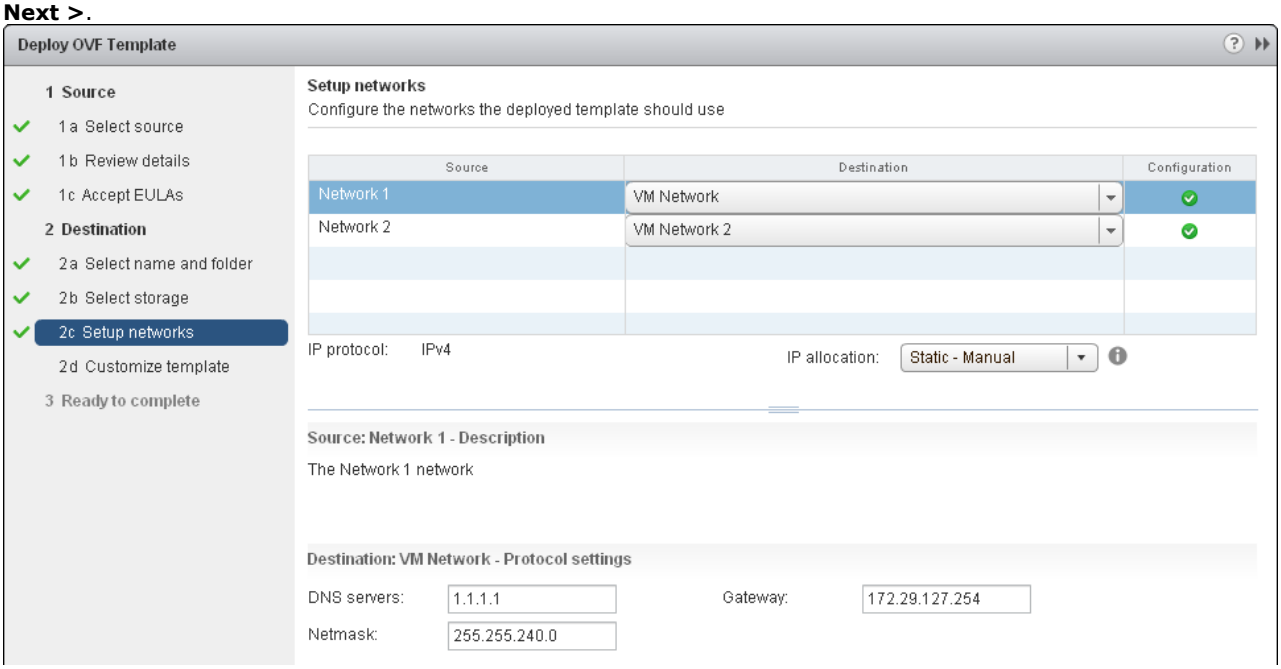
5. The installer displays the license agreement. Click **Accept** and then click **Next >**.
6. Enter a name for the virtual machine. This name appears in the VMware server inventory of virtual machines it is hosting. Click **Next >**.



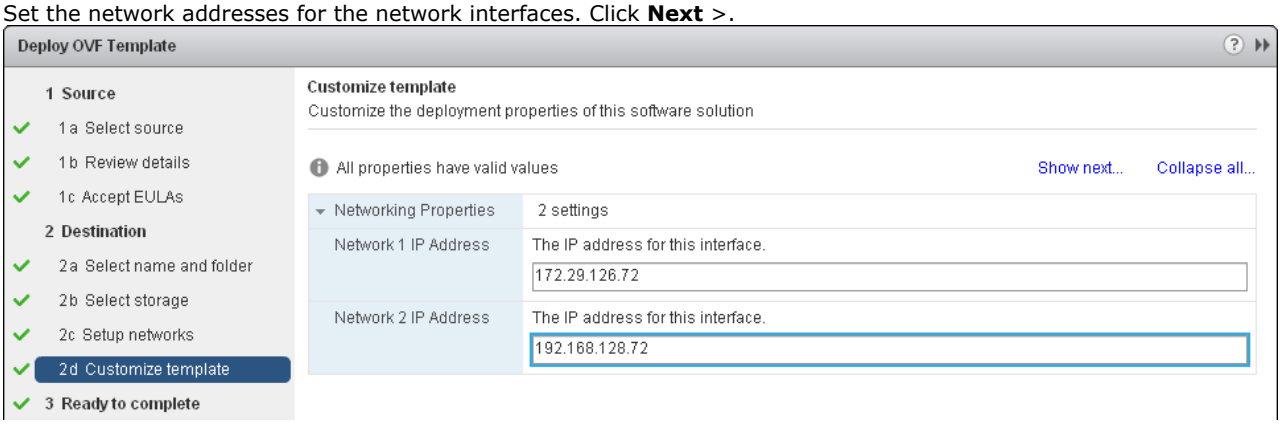
7. Select the type of disk space usage the virtual machine should use. See Disk Format Selection 19. Also select the datastore that the virtual machine should use. Click **Next >**.



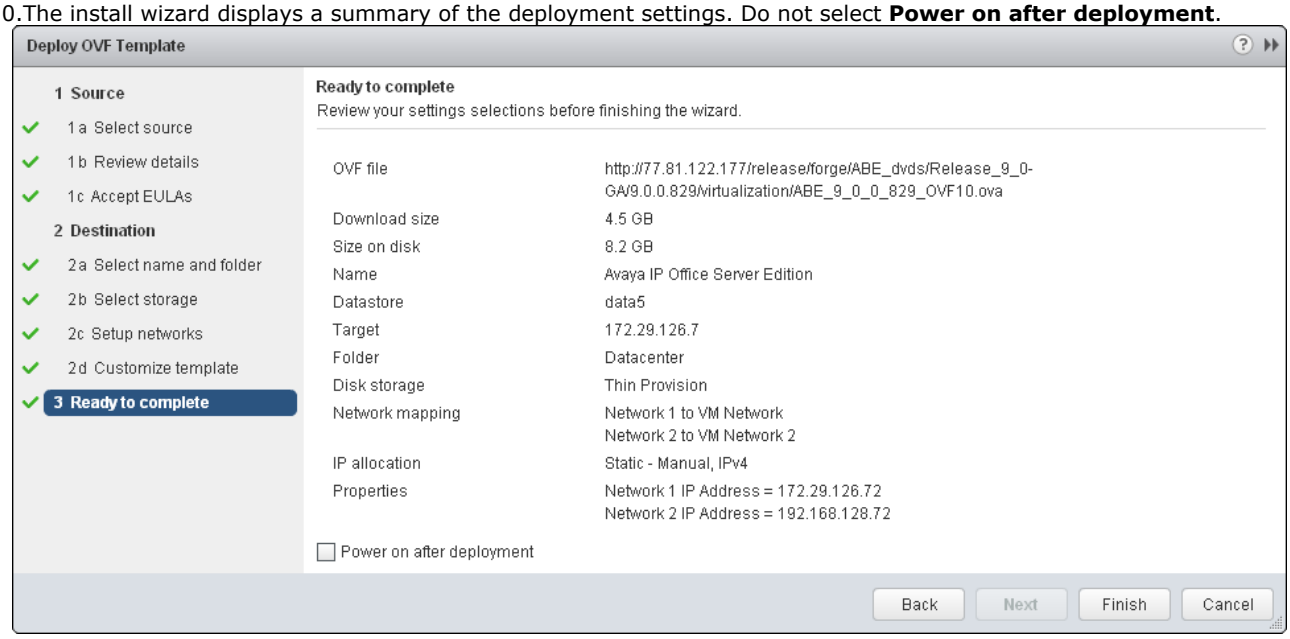
8. Select the network connections for the virtual machine. The virtual interfaces should not be on the same LAN. Click **Next >**.



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.

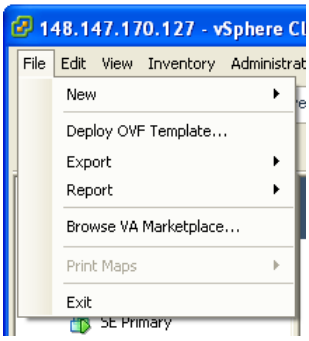
- If deploying a virtual machine to run both Voicemail Pro and Contact Recorder for IP Office, you now need to add an additional hard disk. See Adding an Additional Hard Disk for Contact Recorder for IP Office 31.
- If otherwise, you can now adjust the resource allocation of the virtual machine. See Virtual Machine Profiling 32.

2.3.2 Deploying Using vSphere desktop client

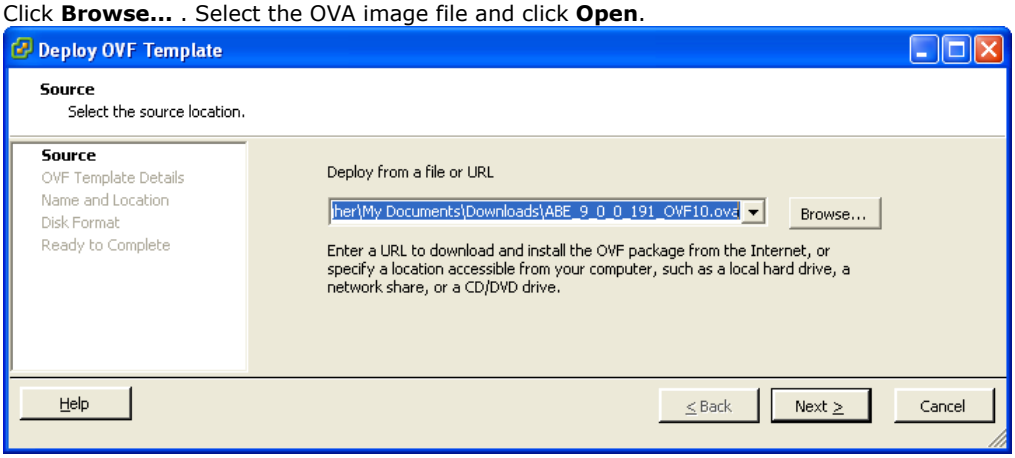
This process deploys the OVA file to the virtual server platform, creating a new virtual machine. Note that, depending on the speed of the link between the client PC and the virtual server host, this process can take several hours.

To deploy the OVA file using vSphere desktop client:

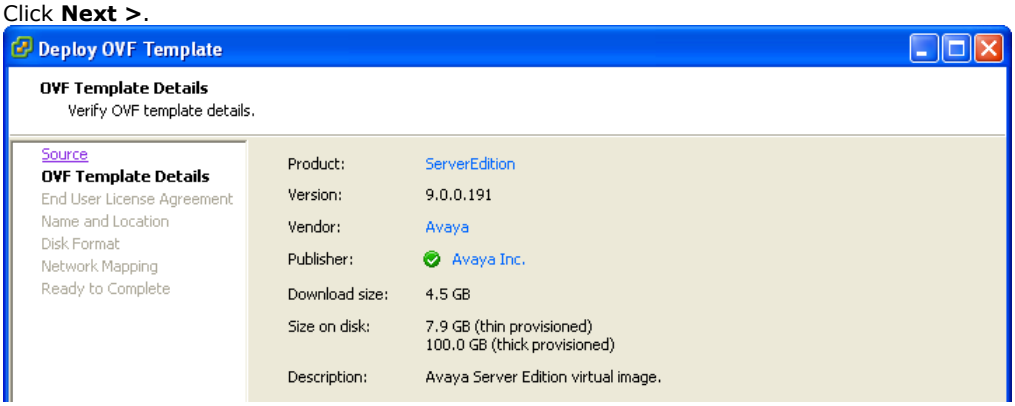
1. Using the VMware vSphere Client, connection go virtual server.
2. Select **File** and then select **Deploy OVF Template...**.



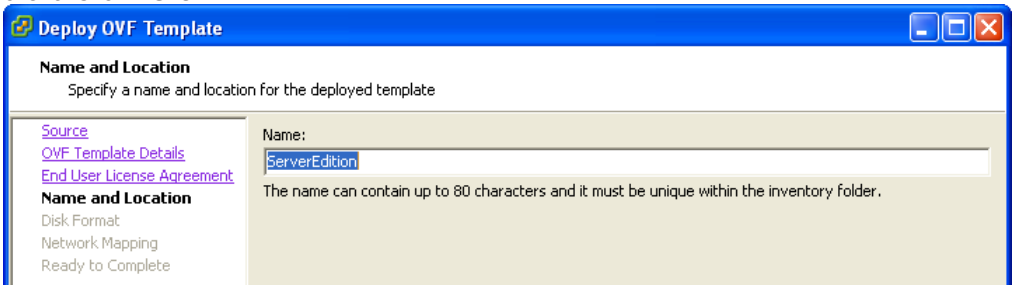
3. Click **Browse...** . Select the OVA image file and click **Open**.



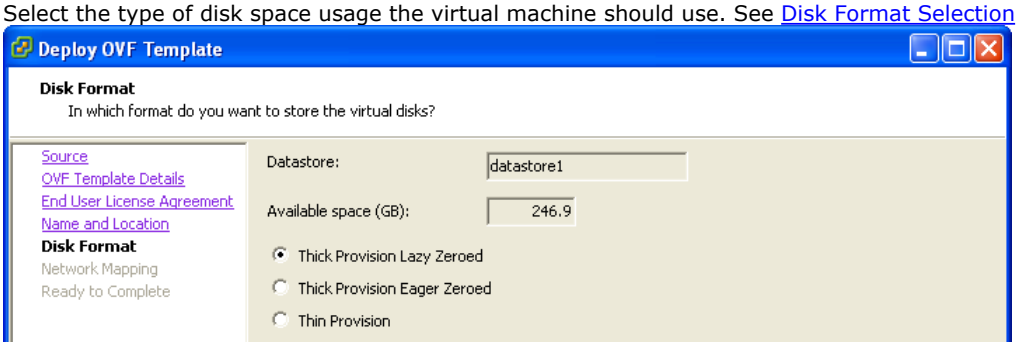
4. Click **Next >**.



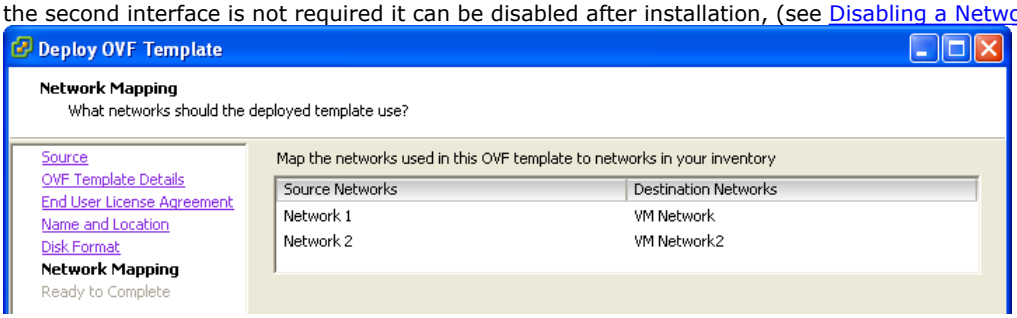
5. Click **Next >**. The installer displays the license agreement. Click **Accept** and then click **Next >**.
6. Enter a name for the virtual machine. This name appears in the inventory of virtual machines shown by the VMware client. Click **Next >**.



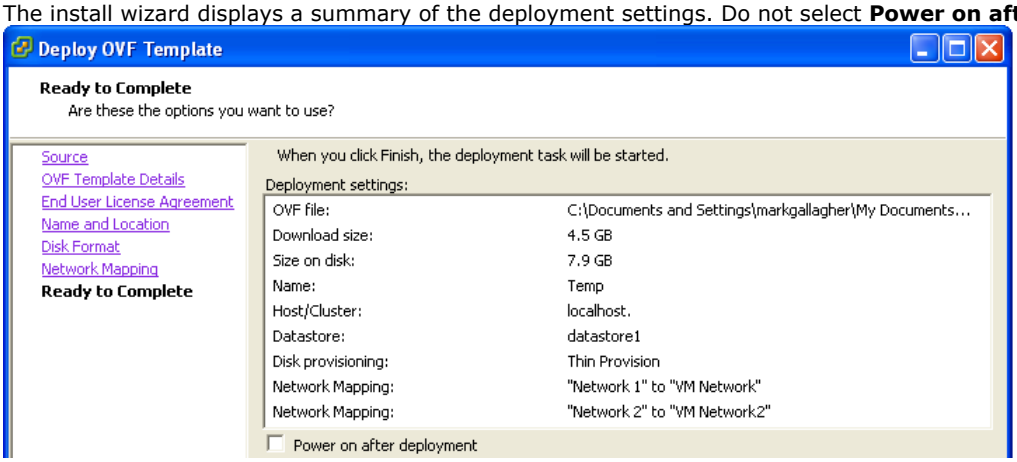
7. Select the type of disk space usage the virtual machine should use. See Disk Format Selection 19. Click **Next >**.



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 42).



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 31.
- If otherwise, you can now adjust the resource allocation of the virtual machine. See Virtual Machine Profiling 32.

2.3.3 Adding an Additional Hard Disk for Contact Recorder for IP Office

For the IP Office Release 9.0 and higher, the Contact Recorder for IP Office application is supported on the same Linux server as Voicemail Pro if provided with and configured to use an additional hard disk. This allows the support of Contact Recorder for IP Office on a Server Edition primary server included virtual machine installations.

The process below details how to add an additional hard disk to the IP Office virtual machine. This process must 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, archiving to Blu-Ray/DVD disk is not supported 18.

- 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 Virtual Machine Profiling 32.

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 Virtual Machine Profiling 32.

2.4 Virtual Machine Profiling

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

Attribute	Description
Memory 33	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 35	You can configure more than one virtual processor (vCPU) 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 36	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 38	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 42	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 16).

Following profiling, you can power on the virtual machine 43.

- **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.

2.4.1 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.

Profile Settings

Server Type		Server Edition Primary Server/Server Edition Secondary Server								
Users		20-100	20	50	100	200	500	1000	2000	3000
one-X Portal Users		–	5	16	20	40	88	175	351	703
Voicemail Channels		12	3	7	12	24	49	98	196	248
Web Collaboration Users [1]		–	2	3	5	10	21	42	84	216
RAM (MB)	Allocated	2048	2684[2]	2684[2]	3072	3072	4096	5120	6144	10240
	Reserved	1551	2416[2]	2416[2]	2624	2765	3358	4198	5376	8192

1. Web Collaboration only supported on Server Edition Primary Server.
2. Contact Recorder for IP Office not enabled. Add 250MB to RAM values if enabled.

Server Type		IP Office Application Server			
one-X Portal Users		50	100	250	750
Voicemail Channels		20	50	100	150
Web Collaboration Users		20	50	100	300
RAM	Allocated	3072	3072	4096	7168
	Reserved	2739	2739	3420	6144

Server Type		Server Edition 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

Server Type		Server Edition one-X Portal Server						
one-X Portal Users		50	100	200	500	1000	2000	3000
Web Collaboration Users		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

- **! WARNING**
  Use the processes below for the deployment of a new virtual machine that has not been powered on.
  - To perform the same actions on an existing virtual machine, that virtual machine must first be powered off before making the adjusting and then powered on 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.
7. Click the **Resources** tab and select **Memory**. Allocate the RAM for the virtual machine.
   - **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. 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**.

2.4.2 Adjusting the CPU Cores

You can configure more than one virtual processor (vCPU) 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 36 of the virtual machine.

Server Type	Server Edition Primary Server/Server Edition Secondary Server								
Users	20-100	20	50	100	200	500	1000	2000	3000
one-X Portal Users	–	5	16	20	40	88	175	351	703
Voicemail Channels	12	3	7	12	24	49	98	196	248
Web Collaboration Users [1]	–	2	3	5	10	21	42	84	216
CPUs	2-3	2-3	2-3	2-4	3-5	3-5	4-7	5-8	7-10

1. Web Collaboration only supported on Server Edition Primary Server.

Server Type	IP Office Application Server			
one-X Portal Users	50	100	250	750
Voicemail Channels	20	50	100	150
Web Collaboration Users	20	50	100	300
CPUs	2-3	2-3	3-5	4-7

Server Type	Server Edition Expansion System (L)					
Users	10	50	100	200	500	750
CPUs	2-3	2-3	2-3	2-3	2-3	2-3

Server Type	Server Edition one-X Portal Server						
one-X Portal Users	50	100	200	500	1000	2000	3000
Web Collaboration Users	9	18	35	86	171	342	512
CPUs	2-3	2-3	2-4	3-5	4-6	4-6	4-6

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.
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.
4. Click **OK**.

2.4.3 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.

Profile Settings

Server Type		Server Edition Primary Server/Server Edition Secondary Server								
Users		20-100	20	50	100	200	500	1000	2000	3000
one-X Portal Users		–	5	16	20	40	88	175	351	703
Voicemail Channels		12	3	7	12	24	49	98	196	248
Web Collaboration Users [1]		–	2	3	5	10	21	42	84	216
CPU Cycles (GHz)	Limit	5	4	5	7	10	10	14	18	20
	Reserved	4	3	4	6	8	8	12	15	17

1. Web Collaboration only supported on Server Edition Primary Server.

Server Type		IP Office Application Server			
one-X Portal Users		50	100	250	750
Voicemail Channels		20	50	100	150
Web Collaboration Users		20	50	100	300
CPU Cycles (GHz)	Limit	5	5	9	13
	Reserved	4	4	7	11

Server Type		Server Edition Expansion System (L)					
Users		10	50	100	200	500	750
CPU Cycles (GHz)	Limit	3	3	5	5	5	6
	Reserved	2	2	4	4	4	5

Server Type		Server Edition one-X Portal Server						
one-X Portal Users		50	100	200	500	1000	2000	3000
Web Collaboration Users		9	18	35	86	171	342	512
CPU Cycles (GHz)	Limit	6	6	7	10	11	11	11
	Reserved	5	5	6	8	9	9	9

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.
   - **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.
   - **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**.

2.4.4 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.

Profile Settings

Server Type	Server Edition Primary Server/Server Edition Secondary Server								
Users	20-100	20	50	100	200	500	1000	2000	3000
one-X Portal Users	–	5	16	20	40	88	175	351	703
Voicemail Channels	12	3	7	12	24	49	98	196	248
Web Collaboration Users [1]	–	2	3	5	10	21	42	84	216
Hard Disk (GB)	100	100	100	100	100	130	140	150	160

1. Web Collaboration only supported on Server Edition Primary Server.

Server Type	IP Office Application Server			
one-X Portal Users	50	100	250	750
Voicemail Channels	20	50	100	150
Web Collaboration Users	20	50	100	300
Hard Disk (GB)	100	100	100	100

Server Type	Server Edition Expansion System (L)					
Users	10	50	100	200	500	750
Hard Disk (GB)	100	100	100	100	100	100

Server Type	Server Edition one-X Portal Server						
one-X Portal Users	50	100	200	500	1000	2000	3000
Web Collaboration Users	9	18	35	86	171	342	512
Hard Disk (GB)	100	100	100	100	100	100	100

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

To match the change in web management:

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.

2.4.5 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.

Profile Settings

Server Type		Server Edition Primary Server/Server Edition Secondary Server								
Users		20-100	20	50	100	200	500	1000	2000	3000
one-X Portal Users		–	5	16	20	40	88	175	351	703
Voicemail Channels		12	3	7	12	24	49	98	196	248
Web Collaboration Users [1]		–	2	3	5	10	21	42	84	216
IOPS	Typical	31	17	18	26	41	71	129	248	338

1. Web Collaboration only supported on Server Edition Primary Server.

Server Type		IP Office Application Server			
one-X Portal Users		50	100	250	750
Voicemail Channels		20	50	100	150
Web Collaboration Users		20	50	100	300
IOPS	Typical	34	49	162	318

Server Type		Server Edition Expansion System (L)					
Users		10	50	100	200	500	750
IOPS	Typical	5	5	6	7	9	11

Server Type		Server Edition one-X Portal Server						
one-X Portal Users		50	100	200	500	1000	2000	3000
Web Collaboration Users		9	18	35	86	171	342	512
IOPS	Typical	10	10	11	16	18	20	21

- **! WARNING**
  Use the processes below for the deployment of a new virtual machine that has not been powered on.
  - To perform the same actions on an existing virtual machine, that virtual machine must first be powered off before making the adjusting and then powered on 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. 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**.

2.4.6 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 16).

- **! WARNING**
  Use the processes below for the deployment of a new virtual machine that has not been powered on.
  - To perform the same actions on an existing virtual machine, that virtual machine must first be powered off before making the adjusting and then powered on 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 43.

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 43.

2.5 Power On the Virtual Machine

Following profiling of the virtual machine [32], 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 [43].

2.6 Connecting to the Virtual Machine

IP Office virtual machine comes with default IP settings (192.168.42.1/255.255.255.0). If the virtual machine can be accessed with a browser using the process below, login and proceed to Performing Server Ignition [46].

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

- **Microsoft Internet Explorer 10** and **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***.
2. The login page appears.



3. Enter the default user name (***root***) and password (**Administrator**).
4. Click **Login**.
   - 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 [44].

2.6.1 Setting the IP Address using the Console

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.

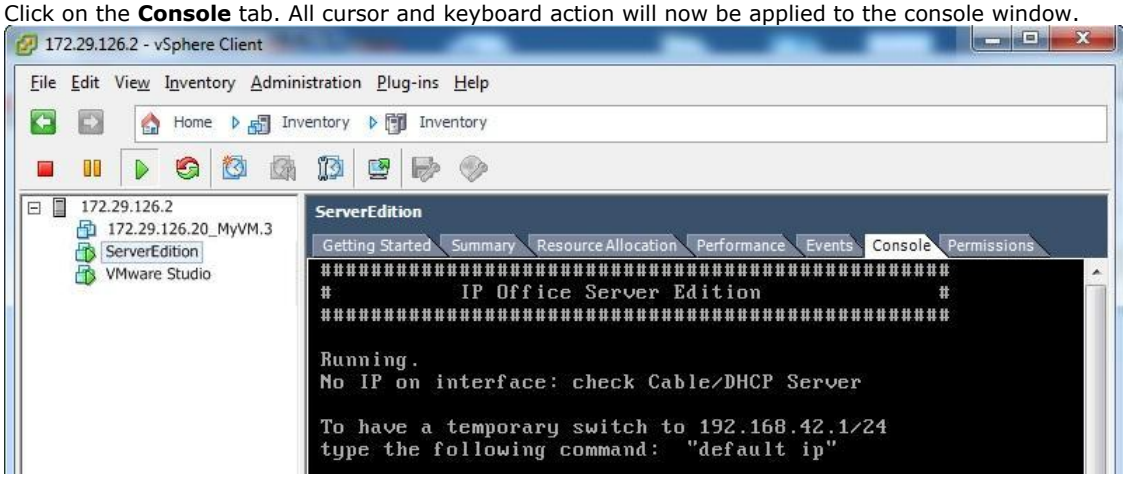
If the default IP settings are incompatible with the existing network where the virtual machine is being deployed - follow the steps described in this section to change them. Once the settings are correct and the virtual machine can be accessed with a browser, proceed to the next section - Performing Server Ignition 46.

- **! 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**
  The virtual machines uses its IP address settings to generate its unique **PLDS Host ID** used for licensing. Subsequent changes to the IP address settings can change the host ID, invalidating any existing licenses. See IP Office Licensing 16. 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.

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.

To set the virtual machine's IP address:

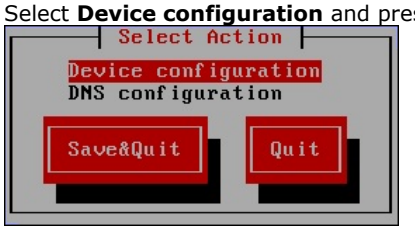
1. Either:
   - **Using the vSphere desktop client:**
     a. Using the vSphere desktop client, select the **Inventory** view.
     b. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View | Show VMs in Inventory**.
     c. Click on the virtual 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.
2. 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**.
3. In the console display, enter the command **login**.
   a. At the **login:** prompt enter ***root***.
   b. At the **Password:** prompt enter ***Administrator***.

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

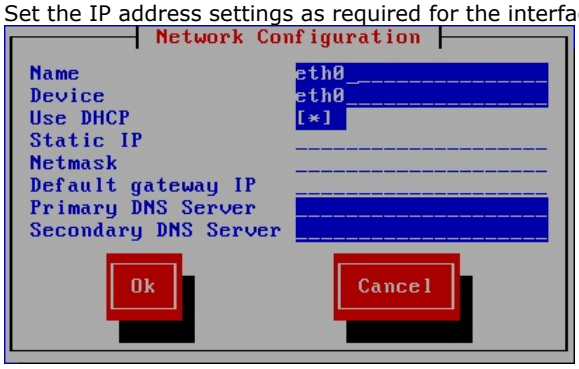
   a. Select **Device configuration** and press **Enter**.



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



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



   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**.

5. To logout, enter **exit**.

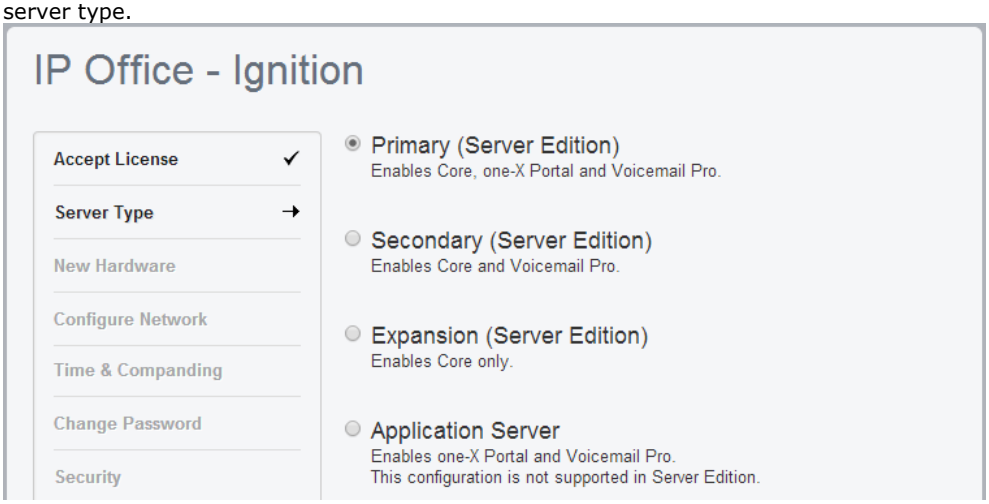
6. Power off and then power on the virtual machine again. See Power On the Virtual Machine 43.

2.7 Performing Server Ignition

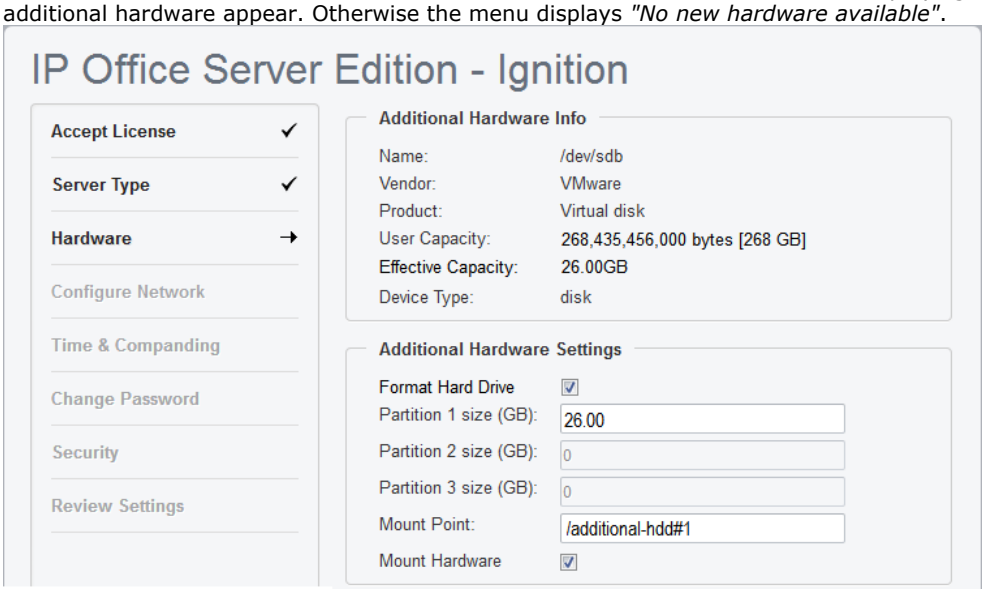
The virtual machine can perform one of several server roles in the Server Edition network. The server role and various other settings are set during the initial browser access to the virtual machine.

To start server ignition:

1. Using a browser, connect to the virtual machine 43.
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 following menus vary depending on the chosen server type.



4. If an additional hard disk for Contact Recorder for IP Office was added 31 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:

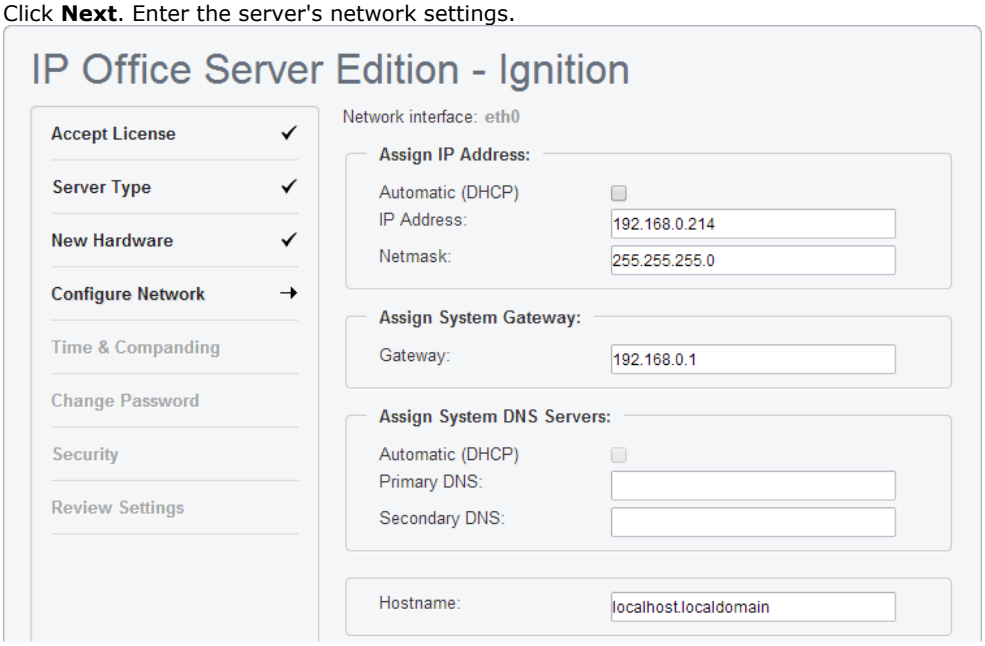
a. Leave **Format Hard Drive** checked.

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.

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

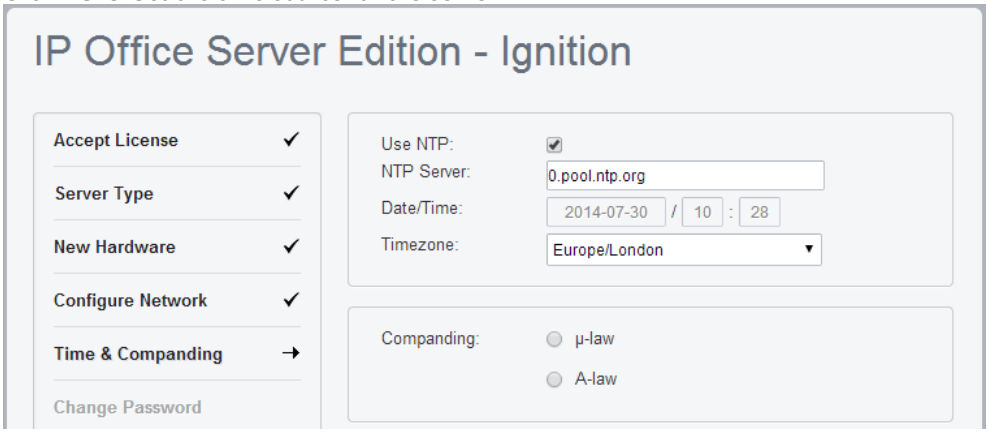


- Remember that the LAN1 and LAN2 IP addresses and DHCP mode selections affect the virtual machine's **PLDS Host ID** used for licensing. Therefore, we strongly recommended that before obtaining any licenses, you ensure that these are set to their final values.
- The ignition process allows you to set 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 you should set the LAN2 address after ignition. This can be done using IP Office Manager or IP Office Web Manager.

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

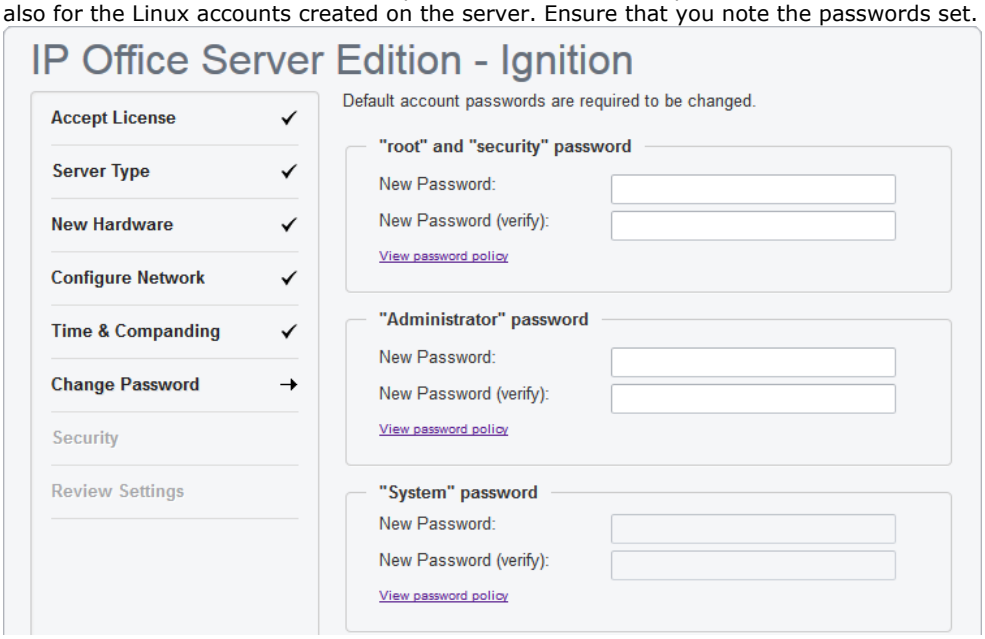
  - **! IMPORTANT: DNS Routing**
    For internal applications, this value must be reachable by DNS within the customer network. If the server will also be supporting external applications, the host name also needs to be reachable by external DNS. Consult with the customers IT support to ensure that the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

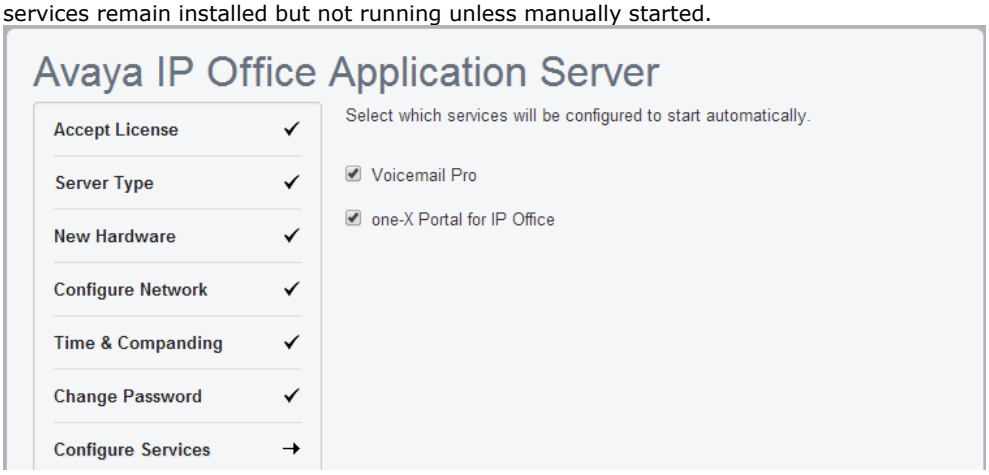


- Remember that the virtual machine uses the **Timezone** for licensing. Therefore, we strongly recommended that this is set to its final value before obtaining any licenses.
- Select to use the time provided by an NTP server.
  - For a virtual server, if not using NTP, the server takes its time from the virtual server's host platform rather than allow manual configuration through the server menus.
  - By default, Server Edition Secondary Server and Server Edition Expansion System (L) servers automatically get their time from the Server Edition 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***.

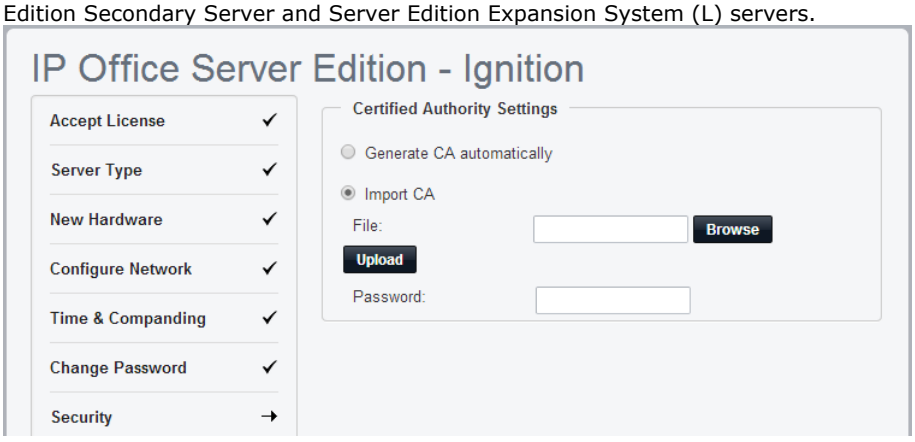
7. Click **Next**. Enter and confirm a new password. These are the passwords for various IP Office service accounts and also for the Linux accounts created on the server. Ensure that you note the passwords set. Click **Next**.



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 Server Edition Secondary Server and Server Edition 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**. Click **OK** when displayed to access the server's IP Office Web Manager menus.

2.8 Adding a Certificate to the Browser

For secure access to the server menus, the browser used requires the server certificate.

If using a certificate uploaded to the server, obtain a copy of the same certificate from the original source.

If using the server's own generated certificate, you can downloaded from the ignition menu, or after ignition, from the **Certificates** section of the **Settings | General** menu. The server provides it certificate as a PEM or CRT file.

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.

To add a server security certificate to Internet Explorer:

1. Click **Tools** 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**.

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**.
8. Click **Import**.
9. Click **Next** and **Browse** to the location of the downloaded certificate. Select it and click **Open**.
10. 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**.
11. Click **Next** and then **Finish**.
12. Click **OK**, **Close**.

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**.
5. Click **Browse**.
6. Select the **Trusted Root Certification Authorities** option.
7. Click **OK**.
8. Click **Next**.
9. Click **Finish**. If another security warning dialog displays, click **Yes**.

2.9 IP Office Initial Configuration

The IP Office service which runs on the server requires some initial configuration. This is performed the first time you login into it using either IP Office Web Manager or IP Office Manager. This is especially important for servers centrally managed using Avaya System Manager.

The following method does the initial configuration as part of the first login to IP Office Web Manager.

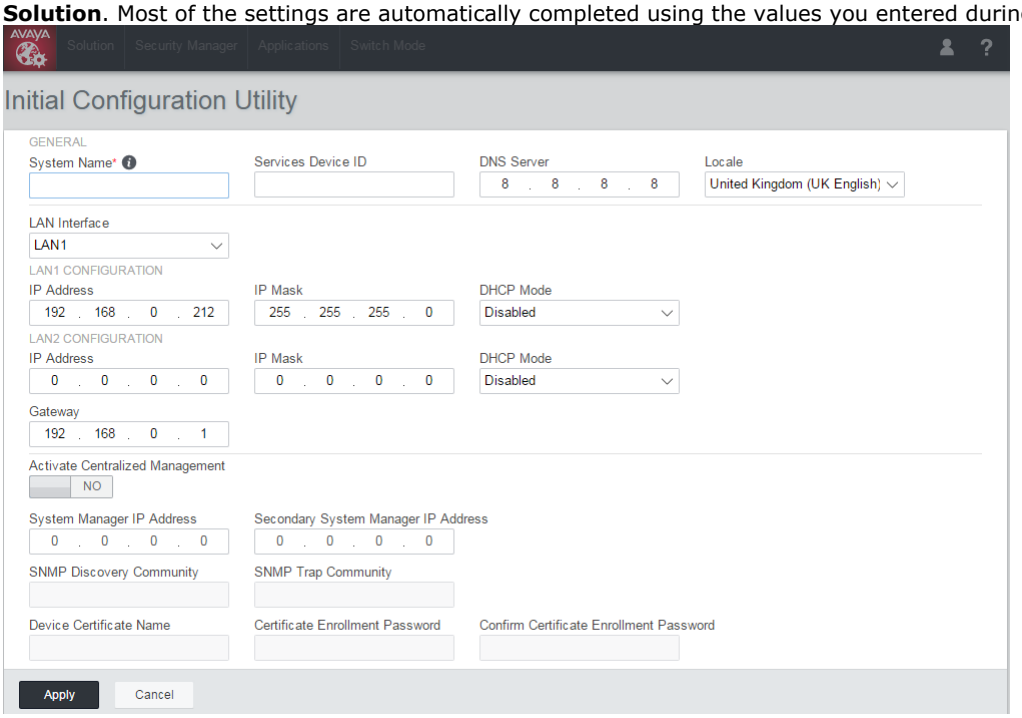
To perform initial configuration through IP Office Web Manager:

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.

2.10 Adding Non-English TTS Prompts

The Voicemail Pro application can optionally use Text-to-speech (TTS). The IP Office OVA file only includes English language text-to-speech (TTS) prompts. The TTS prompts for other languages are downloadable 25 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 Server Edition Primary Server and Server Edition 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 57.
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 53.
   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.

2.11 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 Related Documentation 20.

2.12 Logging in to IP Office Web Manager

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

- **Microsoft Internet Explorer 10** and **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.



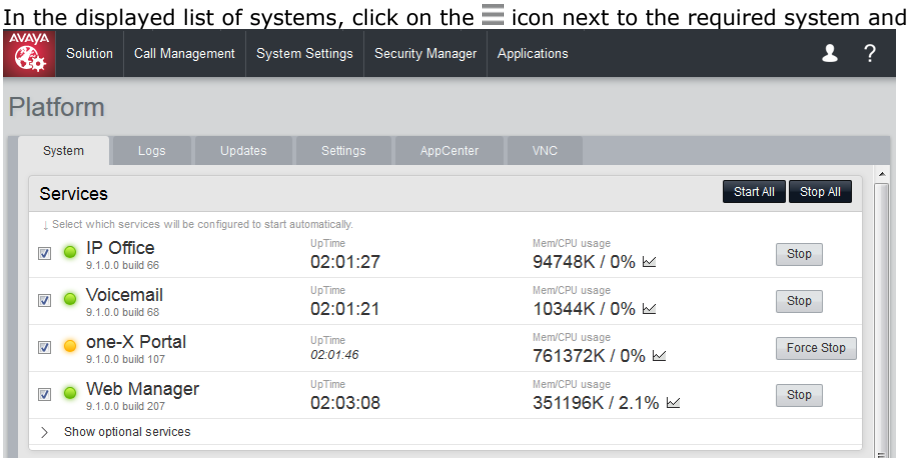
   b. Enter the user name and password.
   c. If any of the IP Office passwords are default, the server requests you to change those passwords. For a new server, the passwords are set during ignition. Note that this does not change the Linux ***root*** and ***Administrator*** account passwords.



   - ***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 for Voicemail Pro, one-X Portal and WEBMANAGER administrator access.
   - ***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**.



Chapter 3.
Upgrading a Virtual Machine

3. 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** 57
   Avaya makes the ISO files for an upgrade available from http://support.avaya.com.
4. **Backup the Applications** 57
   As a precaution, backup the applications running on the virtual machine.
5. **Transferring the ISO file** 58
   Transfer the ISO file to the Server Edition Primary Server.
6. **Upgrade using the transferred ISO file** 67
   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** 68
   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 11.

3.1 Downloading 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 virtual machine.
- **ISO File**
  You can use this type of file to upgrade a previously deployed virtual machine. 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 software are open source. To comply with the license conditions of that software, Avaya are required to make the source software available. However, this file is not required for installation.
- **TTS DVD ISO Files**
  The server OVA and ISO files 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. You can use these to upgrade individual components on the 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.

3.2 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.

3.3 Transferring the ISO File

Having backed up the applications 57, the next stage is to transfer the ISO file to the Server Edition Primary Server. As previously stated, there are number of different methods supported for a virtual machine.

- **Transfer from the virtual machine DVD** 58
  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** 64
  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** 65
  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** 66
  You can transfer an ISO file during a connected IP Office Web Manager session.

3.3.1 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** 59
   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** 60
   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** 61
   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** 63
   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.

3.3.1.1 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 53 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 67.

3.3.1.2 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.

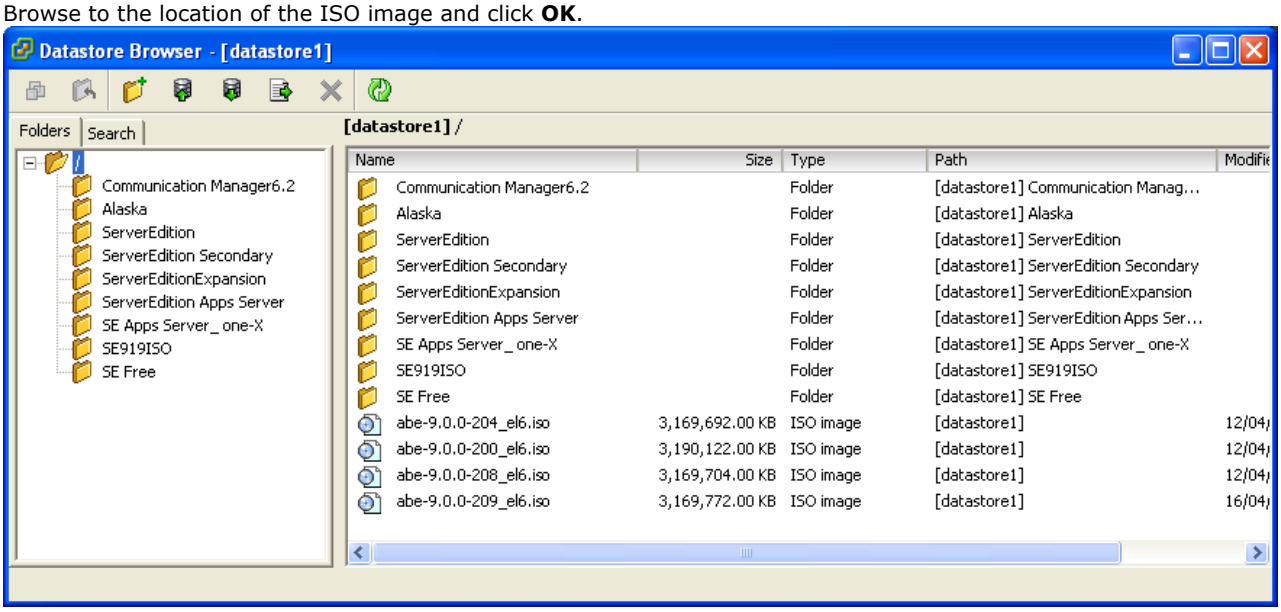
1. Login to IP Office Web Manager 53 on the virtual machine.
2. Click **Solutions**.
3. Click on the **Actions** drop-down and select **Transfer ISO**.
4. Click **Transfer from** and select ***DVD Primary Server***.
   a. Click **OK**. The menu shows the download progress.
5. When the download has finished, 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 67.

3.3.1.3 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 53 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 67.

3.3.1.4 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 53 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 67.

3.3.2 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 53 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 53 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 67.

3.3.3 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 53 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 67.

3.3.4 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 53 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 67.

3.4 Upgrading using the Transferred ISO File

Having downloaded an ISO file to the server 58, 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.

3.5 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 57.
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 53.
   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 4.
Document History

4. Document History

Date	Issue	Changes
24th May 2016	**04a**	• Update for IP Office Release 10.0.
9th June 2016	**04b**	• Addition of profiling values and IOPS description.
6th July 2016	**04c**	• Profiling values updated based on R10_0-OVAResourceProfiles_0_4 spreadsheet. • Default settings aligned with 200 user primary. [110584]
7th July 2016	**04d**	• Profiling values updated based on R10_0-OVAResourceProfiles_1_0 spreadsheet.
15th December 2016	**04e**	• Correction of VSphere screenshots to separate use of network 1 and 2 plus text warnings not to cross the beams. [115626]
9th January 2017	**04f**	• Correction of Reserved RAM 13 value from 1151MB to 1551MB for 10-200 user server.
31st January 2017	**04g**	• Note that ID used for license validation is now also conditional on the DHCP mode 16 of server.

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