Deploying Avaya IP Office Servers as Virtual Machines

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Contents

Part 1: IP Office Virtual Servers 8
- **Chapter 1: IP Office Virtual Servers** 9
  - Duplicate IP address issue 10
  - IP Office Anywhere 10
  - Related Documentation 10
    - Downloading documents 11
- **Chapter 2: Virtual server licensing** 12
  - Nodal PLDS Host ID Restrictions 13
  - Nodal License Grace Period 13
- **Chapter 3: Differences in operation** 14
  - Original RPM files not installed 14
  - No USB support 15
  - VMware tools 15
  - Media Manager archiving 15
  - Primary cannot upgrade other servers 15
- **Chapter 4: IP Office Server Profiling** 17
  - Profiling considerations 17
  - Default virtual machine 18
  - Primary and secondary servers 19
  - Server Edition Expansion Server (L) 20
  - Server Edition Application Server 20
  - IP Office Application Server 21

Part 2: VMware 23
- **Chapter 5: VMware Features** 24
  - Hardware, software and virtual machine requirements 25
  - vMotion requirements 26
  - Disk IOPS requirements 26
  - Alarms 27
  - High availability 28
- **Chapter 6: VMware deployment** 29
  - Confirm the system settings 29
  - Downloading software for VMware 30
  - Adding the IP Office OVA Build Certificate 31
  - Deploying the VMware OVA file (vSphere web client) 32
  - Adding an additional VMware hard disk (vSphere web client) 33
  - Deploying the VMware OVA file (vSphere desktop client) 33
  - Adding an additional VMware hard disk (vSphere desktop client) 34
- **Chapter 7: Virtual machine profiling** 36

Adjusting the VMware RAM memory ... 37
Adjusting the VMware RAM memory (vSphere web client) ... 37
Adjusting the VMware RAM memory (vSphere desktop client) ... 38
Adjusting the VMware CPU Cores ... 39
Adjusting the VMware CPU Cores (vSphere web client) ... 39
Adjusting the VMware CPU Cores (vSphere desktop client) ... 40
Adjusting the VMware CPU Cycles ... 40
Adjusting the VMware CPU Cycles (vSphere web client) ... 41
Adjusting the VMware CPU Cycles (vSphere desktop client) ... 41
Adjusting the VMware disk space ... 42
Adjusting the VMware disk space (vSphere web client) ... 43
Adjusting the VMware disk space (vSphere desktop client) ... 43
Adjusting the VMware IOPS limits ... 44
Adjusting the VMware IOPS limits (vSphere web client) ... 45
Adjusting the VMware IOPS limits (vSphere desktop client) ... 45
Powering On a VMware virtual machine ... 46
Part 3: Microsoft Hyper-V ... 47
Chapter 8: Hyper-V deployment ... 48
Confirm the system settings ... 48
Downloading the software ... 49
Copying and renaming the disk image file ... 50
Expanding the file hard disk size ... 50
Creating a new Hyper-V virtual machine ... 51
Adding an additional hard disk ... 52
Hyper-V virtual machine profiling ... 53
Adjusting the virtual machine's RAM memory settings ... 54
Adjusting the virtual machine's processors ... 55
Starting the virtual machine ... 56
Part 4: Amazon Web Services ... 57
Chapter 9: Amazon deployment ... 58
AWS profiling ... 59
Creating security groups ... 59
Launching a new instance ... 60
Changing the security group ... 62
Changing the machine instance ... 62
Part 5: Microsoft Azure ... 64
Chapter 10: Azure virtual machine deployment ... 65
Downloading the Software ... 65
Logging in to Azure ... 66
Creating a Resource Group ... 67
Creating a virtual network ... 67
Uploading the VHD file to Azure ... 68

Creating a new Azure virtual machine ... 69
Adding an Additional Disk for Media Manager ... 70
Starting an Azure Virtual Machine ... 71
Creating a copy of an Azure VHD file ... 71
Chapter 11: Azure SSH connection ... 73
Creating a public-private key pair ... 73
Adding a public key to an IP Office virtual machine ... 74
Converting the private key using PuTTYgen ... 75
Using a private key with PuTTY ... 75
Part 6: KVM on Red Hat Linux ... 77
Chapter 12: KVM Virtual machine deployment on an Avaya ASP 130 R6 ... 78
Downloading the IP Office KVM Software ... 78
Creating an IP Office KVM virtual machine file ... 79
Adding an IP Office KVM virtual machine ... 81
Adding an Additional Disk for Media Manager ... 82
IP Office KVM virtual machine profiling ... 83
Adjusting the IP Office KVM virtual machine CPUs ... 84
Adjusting the IP Office KVM virtual machine memory ... 85
Adjusting the IP Office KVM virtual machine disk ... 86
Starting the IP Office KVM virtual machine ... 87
Part 7: Server Configuration ... 89
Chapter 13: Initial server configuration ... 90
Connecting to the uninitialized virtual machine ... 90
Setting the virtual machine's IP address ... 91
Performing server ignition ... 92
Adding a certificate to the browser ... 97
Adding a certificate to Firefox ... 97
Adding a certificate to Google Chrome ... 98
Adding a certificate to Windows Edge ... 99
Adding a certificate to Mac Safari ... 99
IP Office initial configuration ... 99
Configuring the server applications ... 100
Disabling a network port ... 100
Disabling a network port ... 101
Enabling a network port ... 101
Chapter 14: Adding TTS languages ... 103
Checking the TTS languages installed ... 103
Downloading the TTS languages ... 104
Adding a new language ... 104
Part 8: Upgrading ... 106
Chapter 15: Upgrading a virtual machine ... 107
Downloading the software ... 108

Backing up applications..... 108
Transferring the ISO File..... 109
Chapter 16: Transfer from a Remote File Server..... 110
Configuring a remote file server source..... 110
Transferring the ISO from a remote server path 110
Upgrading using the Transferred ISO file..... 111
Chapter 17: Transfer from a primary server path..... 113
Uploading an ISO file using SSH/SFTP..... 113
Transferring the ISO from a primary server path..... 114
Upgrading using the Transferred ISO file..... 114
Chapter 18: Upgrade by Transfer from Your Client PC..... 116
Transfer the ISO from the IP Office Web Manager client PC..... 116
Upgrading using the Transferred ISO file..... 117
Chapter 19: Transfer from a virtual machine DVD..... 118
Connect to an ISO File on the client PCs hard disk..... 119
Mapping the virtual machine's DVD to a local PC ISO file (vSphere desktop client)..... 119
Mapping the virtual machine's DVD to a local PC ISO file (vSphere web client)..... 119
Connect to the client PCs DVD drive..... 120
Mapping the virtual machine’s DVD to the local PC drive (vSphere desktop client)..... 120
Mapping the virtual machine's DVD to local PC drive (vSphere web client)..... 121
Connect to an ISO File in the virtual server datastore..... 121
Uploading an ISO file to the datastore (vSphere desktop client)..... 122
Uploading an ISO file to the datastore (vSphere web client)..... 122
Mapping the virtual machine DVD to an ISO file in the datastore (vSphere desktop client)..... 123
Mapping the virtual machine DVD to an ISO file in the datastore (vSphere web client).. 123
Connect to the host server's DVD drive..... 124
Mapping the virtual machine DVD to the host DVD drive (vSphere desktop client)..... 124
Mapping the virtual machine DVD to the host DVD drive (vSphere web client)..... 125
Downloading the ISO from the primary DVD..... 126
Upgrading using the Transferred ISO file..... 126
Part 9: Further Help..... 128
Chapter 20: Additional Help and Documentation..... 129
Additional Manuals and User Guides..... 129
Getting Help..... 129
Finding an Avaya Business Partner..... 130
Additional IP Office resources..... 130
Training..... 131

Part 1: IP Office Virtual Servers

Chapter 1: IP Office Virtual Servers

Avaya supports the installation of its Linux-based IP Office servers as virtualized servers. Using a virtual software platform allows the customer's IT staff flexibility to maximize the use of the platform's hardware to meet the individual needs of each virtual machines it hosts. It also provides them with access to various tools that ease maintenance and monitoring processes.

- For IP Office R12.1, IP Office is supported on the following virtual server platforms:
  - VMware
  - Microsoft Hyper-V
  - Amazon Web Services (AWS)
  - Microsoft Azure
  - KVM on Red Hat Enterprise Linux 8.10.
- For IP Office R12.1, the following changes to the IP Office platform affect the installation and support on virtual server platforms:
  - The Linux OS used is 64-bit only.
  - UEFI booting is supported where also supported by the virtual server host platform. Where used:
    - You must configure IP Office virtual machines as Generation 2.
    - You must not enable Secure Boot or equivalent features on the IP Office virtual machines.
    - The IP Office virtual machines will use SCSI virtual hard drives rather than IDE.
- Avaya does not provide or support the virtual server software and hardware chosen by the customer.
- This document outlines the steps required to deploy an IP Office server as a virtual machine. If deploying multiple virtual machines, follow the order of deployment and configuration in the Deploying IP Office Server Edition manual.
- Avaya only supports IP Office virtual machines created using the virtualized server images supplied by Avaya.
- Avaya does not support IP Office virtual machines created from an IP Office ISO file.
- In addition to certified IP Office training, the installer and system maintainer must have certified training on the specific virtual platform type or supported by someone who has the required certification.

Related links

Duplicate IP address issue on page 10
IP Office Anywhere on page 10
Related Documentation on page 10

Duplicate IP address issue

By default, each new IP Office virtual machine deploys with two virtual network interfaces and two IP addresses, LAN1 and LAN2. If a duplicate IP address is detected, the IP Office application stops.

- 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.
- During deployment, you must ensure that the deployment of each IP Office virtual machine is completed, including setting the required LAN1 and LAN2 IP addresses, before starting the deployment of another 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. See Disabling a network port on page 100

Related links

IP Office Virtual Servers on page 9

IP Office Anywhere

IP Office Anywhere is a special version of the Linux-based IP Office service intended for product demonstrations and evaluation. It includes a pre-built and pre-licensed IP Office configuration.

Anywhere can be installed on a physical server or any of the virtual platforms listed above, it is also supported on VMware Player and Oracle VirtualBox virtual server platforms. See *Installing the IP Office Anywhere Demonstration Software* manual for installation procedure.

Related links

IP Office Virtual Servers on page 9

Related Documentation

This section lists the related documents for the products and solutions referenced in this document.

In addition, you should also refer to the VMware documentation. This is available from VMware Support Offerings.

- Avaya IP Office™ Platform Solution Description
- Avaya IP Office™ Platform Server Edition Reference Configuration
- Deploying IP Office Server Edition

IP Office Administration

- Administering Avaya IP Office™ Platform with Manager
- Administering Avaya IP Office™ Platform with Web Manager

Voicemail Pro

- Administering IP Office Voicemail Pro
- Voicemail Pro Example Exercises

one-X Portal for IP Office

- *Administering Avaya one-X Portal for IP Office*

Related links

IP Office Virtual Servers on page 9
Downloading documents on page 11

Downloading documents

Procedure

1. Browse to http://support.avaya.com and log in.
2. Select **Downloads & Documents**.
3. In the **Enter Your Product Here** box, type `IP Office`.
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**.

Related links

Related Documentation on page 10

Chapter 2: Virtual server licensing

This section provides notes on licensing if using PLDS licensing. Virtual servers can also be deployed using subscriptions.

IP Office systems use licenses to enable various IP Office applications and features. IP Office also use licenses to enable each Server Edition or IP Office Select server.

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

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

Licensing Mode	Description
WebLM Centralized Licensing	A `PLDS` file containing the licenses is uploaded to the WebLM service running on the network's primary server. • The licenses are issued or validated against the host ID of the WebLM service. The host ID is automatically generated from various initial configuration settings of the server but does not subsequently change. • Through the IP Office license menus, servers in the network, including the primary, request licenses from those available. • Due to its flexibility this is the recommended method of licensing.
Local Nodal Licensing	A PLDS license containing the licenses is uploaded to the IP Office running on the server. • The licenses are issued or validated against the **PLDS Host ID** of the server. The host ID is automatically generated from various initial configuration settings of the server. If any of those settings change, the host ID also changes and new licenses are required. See Nodal PLDS Host ID Restrictions on page 13 and Nodal License Grace Period on page 13.

Related links

Nodal PLDS Host ID Restrictions on page 13
Nodal License Grace Period on page 13

Nodal PLDS Host ID Restrictions

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

- **Deployment Specific Factors:**

  The **PLDS Host ID** is partially based on several factors relating to the particular virtual machine's deployment. Redeploying the virtual machine changes its **PLDS Host ID**, thus existing licenses in IP Office configuration becomes invalid. To move 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

Related links

Virtual server licensing on page 12

Nodal License Grace Period

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

Related links

Virtual server licensing on page 12

Chapter 3: Differences in operation

The operations of the virtual IP Office servers largely matches that of the physical IP Office servers. However, this section details known differences.

Related links

Original RPM files not installed on page 14
No USB support on page 15
VMware tools on page 15
Media Manager archiving on page 15
Primary cannot upgrade other servers on page 15

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. Go to **Updates** menu and click **Uninstall** to uninstall the component before reinstalling. The presence of the copied original `RPM` files allows reinstallation on a non-virtual machine.

In order to reduce the size of the Avaya `OVA` file, by not including the original `RPM` files has the following effects:

- You cannot reinstall the uninstalled components: You cannot reinstall a component if you delete the `RPM` file it from the server's **Updates** menu. Instead you need to transfer the appropriate `RPM` files to the server first.
- You cannot upgrade other servers from the Primary: If the server is a Primary Server, it cannot be used to upgrade any Secondary Server or Expansion System (L) servers to match its software level. However, it can be used to upgrade Expansion System (V2) servers.

You can resolve the issues by: Following the server upgrade process to upload an `ISO` image to the server. This involves transferring a copy of the full ISO to the server, that automatically unpacks a full set of `RPM` files necessary to upgrade both Primary and other servers.

Related links

Differences in operation on page 14

No USB support

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

Related links

Differences in operation on page 14

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.

Related links

Differences in operation on page 14

Media Manager archiving

When the Media Manager application's disk partition reaches full capacity, its starts using older recordings archived onto a separate storage and deletes local recordings. A variety of archive destinations are supported.

For virtual server installations, the Blu-Ray-R and DVD+RW archiving options are not supported. Instead, the Network Attached Storage (NAS) or cloud based storage archive options must be used. Refer to the Administering Avaya IP Office™ Platform Media Manager.

Related links

Differences in operation on page 14

Primary cannot upgrade other servers

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

This issue is related to the fact the 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 on page 14

The solution is to first upgrade the Primary Server using any of the documented methods, see Transferring the ISO File on page 109. The upgrade process includes loading all the original `RPM` files onto the server which it can then use to upgrade other servers.

Related links

Differences in operation on page 14

Chapter 4: IP Office Server Profiling

The standard IP Office virtual machine image assumes four CPUs, 3072 MB RAM and a 100 GB hard disk (see Default virtual machine on page 18). However, you must adjust the resources allocated to meet the intended role of the virtual machine and to optimize the use of the virtual server platform's available resources, especially if it is supporting multiple virtual machines.

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

Related links

Profiling considerations on page 17
Default virtual machine on page 18
Primary and secondary servers on page 19
Server Edition Expansion Server (L) on page 20
Server Edition Application Server on page 20
IP Office Application Server on page 21

Profiling considerations

Special factors to consider for profiling are:

- **Network Ports:**
  - You must configure all IP Office virtual machines with two Ethernet ports.
  - If you are using vMotion, additional network port requirement will apply, see vMotion requirements on page 26.
- **Hard disk:**
  - Regardless of the IP Office virtual machine's role, it requires a minimum of 100 GB of allocated hard drive space. However, if required additional hard disk space can be added. See Adjusting the VMware disk space on page 42.
  - To achieve the stated capacity and performance, you must provision all IP Office virtual disks as **Thick Provision Eager Zeroed** or the equivalent for the particular hosting platform.
  - If you are planning to run Media Manager on the virtual server, the requirement for an additional hard disk for Media Manager still applies.

- **Disk Storage IOPS Requirements:**

  To maintain acceptable performance, the number of virtual machines using the same storage volume and the total throughput of those machines must be within the capacity of that storage. See Disk IOPS requirements on page 26.

- **Profiling Other Virtual Machines:**

  It is good practice to monitor the resource utilization of all the virtual machines running in their infrastructure. Profile all virtual machines running on the virtual server platform to fine-tune the hardware resources allocated and used. This will improve performance by allocating resources where needed and optimize the use of the 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.

Related links

IP Office Server Profiling on page 17

Default virtual machine

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

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

After deployment of a virtual machine, you should optimize the resources allocated to meet the actual requirements of the virtual machine. See IP Office Server Profiling on page 17. For example, if the virtual machine supports only 50 users, you can reduce the allocated processors and RAM memory. This allows for the best use of the overall resources provided by the virtual server platform.

Related links

IP Office Server Profiling on page 17

Primary and secondary servers

The following table displays the minimum supported profile values for different IP Office virtual machine roles in primary and secondary servers:

Server Type		**Primary and Secondary servers**										
Users [1]		**20**	**100**	**20**	**50**	**100**	**200**	**500**	**1000**	**2000**	**3000**	
one-X Portal Users [1]		**-**		**5**	**16**	**20**	**40**	**88**	**175**	**351**	**703**	**1500**
Voicemail Channels [1]		**2**	**12**	**3**	**7**	**12**	**24**	**49**	**98**	**196**	**248 [2]**	
RAM (MB)	Allocated	768	2048	2684 [5]	2684 [5]	3072	3072	4096	5120	6144	10240	14336
	Reserved	625	1551	2416 [5]	2416 [5]	2624	2765	3358	4198	5376	8192	11909
CPUs		1	2–3	2–3	2–3	2–4	3–5	3–5	4–7	5–8	7–10	11-14
CPU Cycles (GHz)	Limit	3	5	4	5	7	10	10	14	18	20	25
	Reserved	3	4	3	4	6	8	8	12	15	17	21
Hard Disk (GB) [7,8,10]		100	100	100	100	100	100	130	140	150	160	160
IOPS [6]		15	31	17	18	26	41	71	129	248	338	346
AWS Machine Instance [9]		m5.large		m5.xlarge			m5.2xlarge			m5.4xlarge		

1. If there is any profile misalignment between the user and channel quantities, use the highest-profile that meets all requirements.
2. More than 250 recording channels with Media Manager requires approximately 12 vCPU or 30 GHz CPU cycles in total.
3. Each one-X Portal client connection counts as one load.
4. The CPU values shown apply to all virtualization platforms. However, for Hyper-V the CPU values should be increased by 20%.
5. If Media Manager is enabled, add 250MB RAM and increase the typical IOPS values.
6. Typical IOPS is the average HDD I/O transactions per second during normal operation. When backup, intense logging or Media Manager are in use, more IOPS are required; 40 to 200 IOPS depending on backup data size, logging rate or recording channels.
7. Voicemail Pro requires 0.5 MB per minute for messages, prompts and announcements. Each user and group mailbox is limited to up to 30 MB (1 hour).
8. Media Manager requires 60 KB per minute for non-authenticated `VRL` files and 120 KB per minute for authenticated `VRLA` files. Media Manager also reserves 1 GB of space for the call details database and other operations. Note that more than 250 channels of recording requires at least 12 vCPUs and 30 GHz CPU cycles.
9. The quoted AWS machines instances are recommendations only. The range of machine instances and the capabilities of existing instances change frequently. Therefore, other instances can be used so long as their capabilities match the profiling resource requirements.

10. To achieve the stated capacity and performance, you must provision all IP Office virtual disks as **Thick Provision Eager Zeroed** or the equivalent for the particular hosting platform.

Related links

IP Office Server Profiling on page 17

Server Edition Expansion Server (L)

Server Type		Server Edition Expansion Server (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)[2]		100	100	100	100	100	100
IOPS [1]	Typical	5	5	6	7	9	11

Notes

1. Typical IOPS is the average HDD I/O transactions per second during normal operation. When backup, intense logging or Media Manager are in use, more IOPS are required; 40 to 200 IOPS depending on backup data size, logging rate or recording channels.
2. To achieve the stated capacity and performance, you must provision all IP Office virtual disks as **Thick Provision Eager Zeroed** or the equivalent for the particular hosting platform.

Related links

IP Office Server Profiling on page 17

Server Edition Application Server

These profiling values are for an IP Office Application server being used to provide one–X Portal service support to a Server Edition/Select server that has had its own portal service switched-off in order to increase its supportable user capacity.

Server Type		Server Edition Application Server						
one-X Portal Users [1]		**50**	**100**	**200**	**500**	**1000**	**2000**	**3000**
RAM (MB)	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)[3]		100	100	100	100	100	100	100
IOPS [2]		10	10	11	16	18	20	21

Notes

1. If there is any profile misalignment between the user and channel quantities, use the highest-profile that meets all requirements.
2. Typical IOPS is the average HDD I/O transactions per second during normal operation. When backup, intense logging or Media Manager are in use, more IOPS are required; 40 to 200 IOPS depending on backup data size, logging rate or recording channels.
3. To achieve the stated capacity and performance, you must provision all IP Office virtual disks as **Thick Provision Eager Zeroed** or the equivalent for the particular hosting platform.

Related links

IP Office Server Profiling on page 17

IP Office Application Server

These profiling values are for an IP Office Application Server being used provide services to an IP500 V2 running in IP Office Preferred Edition mode. This can be used to provide Voicemail Pro, Media Manager and or one-X Portal support to the IP500 V2.

Server Type		IP Office Application servers			
one-X Portal Users [1]		**50**	**100**	**200**	**750**
Voicemail Channels [1]		**20**	**50**	**100**	**150**
RAM (MB)	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) [3, 4, 6]		100	100	100	100
IOPS [5]		34	49	162	318

Notes

1. If there is any profile misalignment between the user and channel quantities, use the highest-profile that meets all requirements.
2. Each one-X Portal client connection counts as one load.
3. Voicemail Pro requires 0.5 MB per minute for messages, prompts and announcements. Each user and group mailbox is limited to up to 30 MB (1 hour).
4. Media Manager requires 60 KB per minute for non-authenticated `VRL` files and 120 KB per minute for authenticated `VRLA` files. Media Manager also reserves 1 GB of space for the call details database and other operations. Note that more than 250 channels of recording requires at least 12 vCPUs and 30 GHz CPU cycles.
5. Typical IOPS is the average HDD I/O transactions per second during normal operation. When backup, intense logging or Media Manager are in use, more IOPS are required; 40 to 200 IOPS depending on backup data size, logging rate or recording channels.
6. To achieve the stated capacity and performance, you must provision all IP Office virtual disks as **Thick Provision Eager Zeroed** or the equivalent for the particular hosting platform.

Related links

IP Office Server Profiling on page 17

Part 2: VMware

Chapter 5: VMware Features

The following VMware features are supported.

Supported Virtual Servers

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

- **VMware vSphere:** The vSphere support is:
  - Supported with VMware vSphere ESXi 7.0 and 8.0.
  - Support includes the Standard, Enterprise and Enterprise Plus variants. Also support for Essentials Kit and Essentials Plus Kit variants where available.

Supported VMware Virtual Server Features

- **vCenter:** VMware vCenter server, is the centralized management tool for the vSphere suite. It allows the management of multiple host servers and virtual machines on different hosts through a single console application.
- **vMotion:** vMotion allows you to move an existing virtual machine from one virtual server platform to another with minimal interruption to the operation of the virtual machine. For example, this may be necessary if the existing server platform resources become exhausted. see vMotion requirements on page 26.
- **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 is taken from the virtual machine. Any existing snapshots must be deleted first.
- **OVA Deployment**
- **Soft Power Off**
- **High Availability:** Enables the automatic re-establishment of the virtual machine on a new host server during a failure on or of the original host. See High availability on page 28.
- **VMware Tools:** Note however that an IP Office specific version of VMware tools is included as part of the IP Office OVA. See VMware tools on page 15.

vSphere Clients

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

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

Related links

Hardware, software and virtual machine requirements on page 25
vMotion requirements on page 26
Disk IOPS requirements on page 26
Alarms on page 27
High availability on page 28

Hardware, software and virtual machine requirements

Refer to the following:

- For a searchable list of hardware platforms, refer to VMware Compatibility Guide. The platform must support at least 2 Ethernet interfaces.
- ESXi Hardware Requirements.
- VMware Lifecycle Product Matrix for current supported VMware software.

Avaya provides IP Office virtualization software in an OVA format. The following are high-level software and hardware requirements:

- Latest VMware vSphere software. See VMware Features on page 24.
- VMware vSphere desktop client software. vCenter is supported but not required unless using vSphere web client.
- VMware compatible hardware platform.
- 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 in addition to the specific RAM requirements of the virtual machines deployed. The profiling section lists the requirements for IP Office virtual machines. 6 GB and higher is recommended.
- 2 Ethernet interfaces (more recommended if using vMotion)

To determine the required virtual server platform:

- Refer to the Default virtual machine on page 18 section to assess the total requirements for the IP Office virtual machines.
- Add in the requirements for any other virtual machines.
- Add in the underlying requirements for the virtual server software itself.
- Note the minimum requirements above.
- Note the requirements for vMotion. See vMotion requirements on page 26.

- Assess the compatibility of potential server platforms using the VMware site.

Related links

VMware Features on page 24

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 10Gbps.
- vMotion imposes specific storage requirements. Several options exist including iSCSI and local storage, among others. See 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.

Related links

VMware Features on page 24

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, and so on. See Poor performance and high disk latency with some storage configurations

- By default, no IOPS limit is set for each virtual machine disk. 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, 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 behavior.

Related links

VMware Features on page 24

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%

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. see *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. IP Office Manager manual.

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

Related links

VMware Features on page 24

High availability

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

- Host failures include power failure and ESXi kernel panic.
- A Linux operating system crash on the host server.

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

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

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

Related links

VMware Features on page 24

Chapter 6: VMware deployment

This document outlines the steps required to deploy an IP Office server as a virtual machine. If deploying multiple virtual machines, follow the order of deployment and configuration in the Deploying IP Office Server Edition manual.

- In addition to certified IP Office training, the installer and system maintainer must have certified training on the specific virtual platform type or supported by someone who has the required certification.
- During deployment, you must ensure that the deployment of each IP Office virtual machine is completed, including setting the required LAN1 and LAN2 IP addresses, before starting the deployment of another IP Office virtual machine.

Related links

Confirm the system settings on page 29
Downloading software for VMware on page 30
Adding the IP Office OVA Build Certificate on page 31
Deploying the VMware OVA file (vSphere web client) on page 32
Adding an additional VMware hard disk (vSphere web client) on page 33
Deploying the VMware OVA file (vSphere desktop client) on page 33
Adding an additional VMware hard disk (vSphere desktop client) on page 34

Confirm the system settings

Any duplication of IP addresses, even the temporary default IP addresses, causes the IP Office application to not start and any existing IP Office service to stop.

If using local nodal licensing (see Virtual server licensing on page 12), the virtual server bases the **PLDS Host ID** its uses for license validation on several server configuration settings. Hence, 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

This does not apply if using WebLM centralized licensing.

Related links

VMware deployment on page 29
Hyper-V deployment on page 48

Downloading software for VMware

About this task

Avaya make a number of different file available for each IP Office release. For a VMware deployment, select the following files:

- **Avaya IP Office OVA Certificate:**

  You must install this certificate (`AvayaIPOffice-2023-OVA-CertChain.crt`) in VMware before deploying any IP Office `.ova` file. VMware uses the certificate to verify the build certificate of the IP Office `.ova` files.

- **OVA file:**

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

- **TTS ISO:**

  The images used to deploy new virtual machines do not include text-to-speech (TTS) prompts. To add TTS languages, you need to download and install the additional ISO files for TTS languages. These are provided as 3 `.iso` files:

  - Note: TTS files from pre-12.0 releases are not compatible with R12.0 and higher.
  - **DVD 1:** English, Spanish, French, German, Italian.
  - **DVD 2:** Swedish, Norwegian, Finnish, Dutch, Danish, Portuguese, Greek.
  - **DVD 3:** Chinese, Polish, Russian.

Procedure

1. Browse to http://support.avaya.com and log in.
2. Click **Support by Product** and select **Downloads**.
3. In the **Enter Product Name** box, enter `IP Office` and select the displayed match.
4. Use the **Choose Release** drop-down to select the required release.
5. From the listed **Downloads**, select the version of release required. There are multiple versions depending on the number of service packs and feature packs available.
6. Click on the required files and follow any further instructions shown by the website and your browser.

7. Also download and read any documents shown under **Related Documents**

Next steps

- If not previously done, add the `AvayaIPOffice-2023-OVA-CertChain.crt` certificate file to VMware (see Adding the IP Office OVA Build Certificate on page 31).
- Otherwise, proceed to deploying the new virtual machine using the VMware desktop client (see Deploying the VMware OVA file (vSphere desktop client) on page 33) or web client (see Deploying the VMware OVA file (vSphere web client) on page 32).

Related links

VMware deployment on page 29

Adding the IP Office OVA Build Certificate

About this task

The latest versions of VMware ESXi 7.0/8.0 perform security checks on the build certificates of `.ova` and `.ovf` files before allowing you to use those files. See https://kb.vmware.com/s/article/84240.

- For IP Office `.ova` files, you must upload the `AvayaIPOffice-2023-OVA-CertChain.crt` file to VMware. You only need to perform this process once.

Before you begin

- Download the `AvayaIPOffice-2023-OVA-CertChain.crt` file. See Downloading software for VMware on page 30.

Procedure

1. Login to vCenter as administrator.
2. From the drop-down menu, select **Administration** > **Certificates** > **Certificate Management**.
3. Click **ADD** next to **Trusted Roots Certificates**.
4. Browse and select the `AvayaIPOffice-2023-OVA-CertChain.crt` certificate.

Next steps

- Proceed to deploying the new virtual machine:
  - Using the VMware desktop client, see Deploying the VMware OVA file (vSphere desktop client) on page 33.
  - Using the VMware web client, see Deploying the VMware OVA file (vSphere web client) on page 32.

Related links

VMware deployment on page 29

Deploying the VMware OVA file (vSphere web client)

About this task

Deploying the OVA file to the virtual server platform creates 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.

Procedure

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** and then 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. Set the type of disk space usage to **Thick Provision Eager Zeroed**. 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** check box.
11. Click **Finish**.

Next steps

After the deployment is complete, the new virtual machine appears in the inventory of virtual machines.

- If deploying a virtual machine to run Media Manager, you now need to add an additional hard disk. See Adding an additional VMware hard disk (vSphere web client) on page 33.
- Otherwise, you can now adjust the resource allocation of the virtual machine. See Virtual machine profiling on page 36.

Related links

VMware deployment on page 29

Adding an additional VMware hard disk (vSphere web client)

About this task

To run Media Manager, you must add an additional hard disk to the IP Office server running Voicemail Pro. Avaya recommend that you add the additional disk before the IP Office server initial configuration.

- The minimum supported size is 30 GB. The recommended size is 300 GB or larger.
- Media Manager requires 120 KB per minute for recordings.
- Media Manager also reserves 1 GB of space for the call details database and other operations.
- If you need to add the additional disk after initial configuration, refer to the Administering Avaya IP Office™ Platform Media Manager manual for details of initializing the new disk.

Procedure

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** and click **Next**.

Next steps

- You should now adjust the resource allocation of the virtual machine. See Virtual machine profiling on page 36.

Related links

VMware deployment on page 29

Deploying the VMware OVA file (vSphere desktop client)

About this task

Deploying the `OVA` file to the virtual server platform creates 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.

Procedure

1. Using the VMware vSphere Client, connection go virtual server.
2. Select **File** and then select **Deploy OVF TemplateDeploy OVF Template**.
3. Click **Browse** and select the `OVA` image file and click **Open** and click **Next**.
4. The installer displays the license agreement. Click **Accept** and then click **Next**.
5. Enter a name for the virtual machine. This name appears in the VMware server inventory of virtual machines it is hosting. Click **Next**.
6. Set the type of disk space usage to **Thick Provision Eager Zeroed**. Also select the datastore that the virtual machine should use. Click **Next**.
7. Select the network connections for the virtual machine. The virtual interfaces should not be on the same LAN. Click **Next**.
8. Set the network addresses for the network interfaces. Click **Next**.
9. The install wizard displays a summary of the deployment settings. Do not select **Power on after deployment** check box.
10. Click **Finish**.

Next steps

After deployment is complete, the new virtual machine appears in the inventory of virtual machines.

- If deploying a virtual machine to run Media Manager, you now need to add an additional hard disk. See Adding an additional VMware hard disk (vSphere desktop client) on page 34.
- Otherwise, you can now adjust the resource allocation of the virtual machine. See Virtual machine profiling on page 36.

Related links

VMware deployment on page 29

Adding an additional VMware hard disk (vSphere desktop client)

About this task

To run Media Manager, you must add an additional hard disk to the IP Office server running Voicemail Pro. Avaya recommend that you add the additional disk before the IP Office server initial configuration.

- The minimum supported size is 30 GB. The recommended size is 300 GB or larger.
- Media Manager requires 120 KB per minute for recordings.
- Media Manager also reserves 1 GB of space for the call details database and other operations.

- If you need to add the additional disk after initial configuration, refer to the Administering Avaya IP Office™ Platform Media Manager manual for details of initializing the new disk.

Procedure

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** and 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**.

Next steps

- You should now adjust the resource allocation of the virtual machine. See Virtual machine profiling on page 36.

Related links

VMware deployment on page 29

Chapter 7: Virtual machine profiling

You must optimize the IP Office virtual machines resources to meet the requirements of virtual machines IP Office role, see IP Office Server Profiling on page 17.

Attribute	Description
Memory	You can set the maximum amount of RAM memory that the virtual machine uses. • See Adjusting the VMware RAM memory on page 37
CPU	You can configure multiple virtual processor (vCPUs) for a virtual machine. A virtual machine cannot have more vCPUs than the maximum number of logical CPUs on the host virtual server platform. The number of logical CPUs is the number of physical processor cores. • See Adjusting the VMware CPU Cores on page 39
CPU Clock 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. • See Adjusting the VMware CPU Cycles on page 40
Hard Disk	By default the virtual machine has an 100 GB virtual disk. You can increased the disk size if required. Note that you cannot reduce the size. • See Adjusting the VMware disk space on page 42.
IOPS	Input/Output Operations Per Second (IOPS) is a measurement of the traffic between a virtual machine and the disk storage it is using. • See Disk IOPS requirements on page 26
Network Ports	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, see Disabling a network port on page 100. This reduces the chances of IP address duplication which causes the IP Office application to not start, see Duplicate IP address issue on page 10.

After profiling, you can power on the virtual machine. See Powering On a VMware virtual machine on page 46.

- **Profiling Other Virtual Machines:**

  It is good practice to monitor the resource utilization of all the virtual machines running in their infrastructure. Profile all virtual machines running on the virtual server platform to fine-tune the hardware resources allocated and used. This will improve performance by allocating resources where needed and optimize the use of the 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.

Related links

Adjusting the VMware RAM memory on page 37
Adjusting the VMware CPU Cores on page 39
Adjusting the VMware CPU Cycles on page 40
Adjusting the VMware disk space on page 42
Adjusting the VMware IOPS limits on page 44
Powering On a VMware virtual machine on page 46

Adjusting the VMware 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. Set these values to match the virtual server's profile requirements. See IP Office Server Profiling on page 17.

Warning:

- The following processes can be used on a new virtual machine that has not been powered on/started.
- To perform the same actions on an existing virtual machine, it must first be powered off/stopped before making the adjusting and then powered on/started again. That will interrupt all services provided by the virtual machine.

Related links

Virtual machine profiling on page 36
Adjusting the VMware RAM memory (vSphere web client) on page 37
Adjusting the VMware RAM memory (vSphere desktop client) on page 38

Adjusting the VMware RAM memory (vSphere web client)

Procedure

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. Expand the **Memory**.

4. In the **RAM** text box, type the amount of RAM to assign to the virtual machine. See IP Office Server Profiling on page 17. 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**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Powering On a VMware virtual machine on page 46).

Related links

Adjusting the VMware RAM memory on page 37

Adjusting the VMware RAM memory (vSphere desktop client)

Procedure

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. Adjust the maximum memory size for the virtual machine. See IP Office Server Profiling on page 17.
7. Click the **Resources** tab and select **Memory**. Allocate the RAM for the virtual machine. See IP Office Server Profiling on page 17.
   - **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**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Powering On a VMware virtual machine on page 46).

Related links

Adjusting the VMware RAM memory on page 37

Adjusting the VMware CPU Cores

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

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

The CPU core clock speed multiplied by the number of cores, must meet the aggregate CPU cycle requirements of the virtual machine. See IP Office Server Profiling on page 17.

Related links

Virtual machine profiling on page 36
Adjusting the VMware CPU Cores (vSphere web client) on page 39
Adjusting the VMware CPU Cores (vSphere desktop client) on page 40

Adjusting the VMware CPU Cores (vSphere web client)

Procedure

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. Expand the **CPU**.
4. Select the number of virtual processors for the virtual machine. See IP Office Server Profiling on page 17
5. Click **OK**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Powering On a VMware virtual machine on page 46).

Related links

Adjusting the VMware CPU Cores on page 39

Adjusting the VMware CPU Cores (vSphere desktop client)

Procedure

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 **CPU**.
6. Select the number of virtual processors for the virtual machine. See IP Office Server Profiling on page 17
7. Click **OK**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Powering On a VMware virtual machine on page 46).

Related links

Adjusting the VMware CPU Cores on page 39

Adjusting the VMware 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. See IP Office Server Profiling on page 17.

Related links

Virtual machine profiling on page 36
Adjusting the VMware CPU Cycles (vSphere web client) on page 41
Adjusting the VMware CPU Cycles (vSphere desktop client) on page 41

Adjusting the VMware CPU Cycles (vSphere web client)

Procedure

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, expand **CPU**.
4. Allocate the CPU cycles for the virtual machine's vCPUs. See IP Office Server Profiling on page 17
   - **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** – 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**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Powering On a VMware virtual machine on page 46).

Related links

Adjusting the VMware CPU Cycles on page 40

Adjusting the VMware CPU Cycles (vSphere desktop client)

Procedure

1. Using the vSphere desktop client, select the **Inventory** view.
2. Locate the required virtual machine in the inventory navigation tree on the left. If not shown, select **View** > **Show VMs in Inventory**.
3. Click on the virtual machine.

4. Right-click on the virtual machine and select **Edit Settings**.
5. Click the **Resources** tab and select **CPU**.
6. Allocate the CPU cycles for the virtual machine's vCPUs. See IP Office Server Profiling on page 17
   - **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** – 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**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Powering On a VMware virtual machine on page 46).

Related links

Adjusting the VMware CPU Cycles on page 40

Adjusting the VMware disk space

By default the virtual machine is allocated a 100 GB virtual disk. However, this can be increased to meet the virtual server’s profiling requirements. See IP Office Server Profiling on page 17.

Note however:

- The disk 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.

Related links

Virtual machine profiling on page 36
Adjusting the VMware disk space (vSphere web client) on page 43
Adjusting the VMware disk space (vSphere desktop client) on page 43

Adjusting the VMware disk space (vSphere web client)

Procedure

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. Click the **Hardware** tab and select the hard disk to modify.
4. Select a **Virtual Device Node** type from the drop-down menu.
5. To change the size of the disk, enter a new value in the **Provisioned Size** text box. See IP Office Server Profiling on page 17.
6. Click **OK**.
7. Right-click on the virtual machine and select **Power** > **Power Off**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Powering On a VMware virtual machine on page 46).

Related links

Adjusting the VMware disk space on page 42

Adjusting the VMware disk space (vSphere desktop client)

Procedure

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 hard disk to modify.
6. Select a **Virtual Device Node** type from the drop-down menu.
7. To change the size of the disk, enter a new value in the **Provisioned Size** text box. See IP Office Server Profiling on page 17.
8. Click **OK**.
9. Right-click on the virtual machine and select **Power** > **Power Off**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Powering On a VMware virtual machine on page 46).

Related links

Adjusting the VMware disk space on page 42

Adjusting the VMware 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, and so on. See VMware Knowledge Base.
- 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 behavior.

Warning:

- The following processes can be used on a new virtual machine that has not been powered on/started.

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

Related links

Virtual machine profiling on page 36
Adjusting the VMware IOPS limits (vSphere web client) on page 45
Adjusting the VMware IOPS limits (vSphere desktop client) on page 45

Adjusting the VMware IOPS limits (vSphere web client)

Procedure

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. 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 can select**Low** (500), **Normal** (1000), or **High** (2000), or you can select **Custom** to enter a user-defined number of shares.
7. Click **OK**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Powering On a VMware virtual machine on page 46).

Related links

Adjusting the VMware IOPS limits on page 44

Adjusting the VMware IOPS limits (vSphere desktop client)

Procedure

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 **Hard Disk**.
6. In **Limit — IOPS** set the required IOPS limit for each disk the virtual machine uses. See IP Office Server Profiling on page 17. By default, the limits are set to **Unlimited**.
7. Click **OK**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Powering On a VMware virtual machine on page 46).

Related links

Adjusting the VMware IOPS limits on page 44

Powering On a VMware virtual machine

About this task

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

Procedure

1. Right-click on the virtual machine.
2. Select **Power** > **Power On**.

Next steps

- You can now use a web browser to access the virtual machine. See Connecting to the uninitialized virtual machine on page 90.
- As part of the deployment of a new virtual machine, you now need to complete the initial server configuration processes.

Related links

Virtual machine profiling on page 36

Part 3: Microsoft Hyper-V

Chapter 8: Hyper-V deployment

IP Office server's are supported as Hyper-V virtual machines.

- Supported virtual machine platforms are Hyper-V running on Windows 2016, Windows 2019 and Windows 2022 servers and on Microsoft Hyper-V Server 2016, 2019 and 2022.
- The installation is performed using a Hyper-V disk image file (VHDX) downloaded from the Avaya support website.
- Virtual Server Edition/IP Office Select servers require Virtualized Server licenses. See Virtual server licensing on page 12.
- This document outlines the steps required to deploy an IP Office server as a virtual machine. If deploying multiple virtual machines, follow the order of deployment and configuration in the Deploying IP Office Server Edition manual.
- In addition to certified IP Office training, the installer and system maintainer must have certified training on the specific virtual platform type or supported by someone who has the required certification.
- During deployment, you must ensure that the deployment of each IP Office virtual machine is completed, including setting the required LAN1 and LAN2 IP addresses, before starting the deployment of another IP Office virtual machine.

Related links

Confirm the system settings on page 29
Downloading the software on page 49
Copying and renaming the disk image file on page 50
Expanding the file hard disk size on page 50
Creating a new Hyper-V virtual machine on page 51
Adding an additional hard disk on page 52
Hyper-V virtual machine profiling on page 53
Starting the virtual machine on page 56

Confirm the system settings

Any duplication of IP addresses, even the temporary default IP addresses, causes the IP Office application to not start and any existing IP Office service to stop.

If using local nodal licensing (see Virtual server licensing on page 12), the virtual server bases the **PLDS Host ID** its uses for license validation on several server configuration settings. Hence,

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

This does not apply if using WebLM centralized licensing.

Related links

VMware deployment on page 29
Hyper-V deployment on page 48

Downloading the software

About this task

Avaya make a number of different file available for each IP Office release. For a Hypervisor deployment, select the following files:

- **VHDX file: (Hypervisor)**

  The downloaded is a `.zip` file from which you can extract the `.vhdx` file. The file is a hard disk image. In the process of creating a new virtual machine, the file becomes the virtual machine's hard disk.

- **TTS ISO:**

  The images used to deploy new virtual machines do not include text-to-speech (TTS) prompts. To add TTS languages, you need to download and install the additional ISO files for TTS languages. These are provided as 3 `.iso` files:

  - Note: TTS files from pre-12.0 releases are not compatible with R12.0 and higher.
  - **DVD 1:** English, Spanish, French, German, Italian.
  - **DVD 2:** Swedish, Norwegian, Finnish, Dutch, Danish, Portuguese, Greek.
  - **DVD 3:** Chinese, Polish, Russian.

Procedure

1. Browse to http://support.avaya.com and log in.
2. Click **Support by Product** and select **Downloads**.
3. In the **Enter Product Name** box, enter `IP Office` and select the displayed match.
4. Use the **Choose Release** drop-down to select the required release.

5. From the listed **Downloads**, select the version of release required. There are multiple versions depending on the number of service packs and feature packs available.
6. Click on the required files and follow any further instructions shown by the website and your browser.
7. Also download and read any documents shown under **Related Documents**

Next steps

- Copy and rename the VHDX file. See Copying and renaming the disk image file on page 50.

Related links

Hyper-V deployment on page 48

Copying and renaming the disk image file

About this task

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

Procedure

1. Download the zipped file for the required software release. See Downloading software for VMware on page 30.
2. Unzip the `VHDX` file and copy the file to a personal folder. Keep this file as your master copy for that software release.
3. Save a copy of the file and rename it.
4. Move the renamed file to the folder on the Hyper-V server used to store virtual machine disks. By default it is `C:\Users\Public\Documents\Hyper-V\Virtual Hard Disks`.

Next steps

- Now adjust the disk size. See Expanding the file hard disk size on page 50.

Related links

Hyper-V deployment on page 48

Expanding the file hard disk size

About this task

The default hard disk size set in the downloaded file is 100 GB. This may need to be expanded depending on planned role of the virtual machine. See IP Office Server Profiling on page 17.

Procedure

1. In Hyper-V Manager, select **Action** > **Edit Disk**.
2. In the **Locate Disk** menu, enter the file path of the `VHDX` file or browse to the file and click **Next**.
3. In the **Choose Action** menu select **Expand** and click **Next**.
4. In the **Configure Disk** menu set the new size required and click **Next**.
5. In the **Summary** menu check the settings. If okay click **Finish**.

Next steps

- You can now proceed with using the file to create a new virtual machine. See Creating a new Hyper-V virtual machine on page 51.

Related links

Hyper-V deployment on page 48

Creating a new Hyper-V virtual machine

About this task

After preparing a new `VHDX` file for the virtual machine, you can use it to create a new virtual machine.

Before you begin

- Copy and rename and the download VHDX file, see Copying and renaming the disk image file on page 50. The copy becomes the hard disk of the new virtual machine. Therefore, you cannot use it for other virtual machines.

Procedure

1. From the Hyper-V Manager menu bar, select **Action** > **New** > **Virtual Machine**. Alternatively, you can go to **Actions** panel, and select **New** > **Virtual Machine**.
2. Click **Next**.
3. Rename the virtual machine you are creating and click **Next**.
4. On the **Specify Generation** page, select the appropriate generation:
   - **IP Office R12.1 and higher:** Select generation 2.
   - **IP Office R12.0 and earlier:** Select generation 1.
5. Click **Next**.
6. In **Assign Memory** menu, you can set the memory to match the recommend settings for the server's planned role, see IP Office Server Profiling on page 17. However, you can accept the default and adjust the memory later during the virtual machine profiling stage. Click **Next**.

7. In **Configure Networking** menu, select the network connection that the new virtual machine should use. Note that the IP Office image expects to obtain an initial IP address from that network using DHCP. You can change the address after starting the virtual machine. Click **Next**.
8. In the **Connect Virtual Hard Disk** menu, select **Use an existing virtual hard disk**.
9. Browse to and select the `VHDX` file that you prepared for this new virtual machine and click **Next**.

   Warning:

   - Use the copy of the `VHDX` file for the installation. Do not use the original file downloaded for the Avaya support site or any copy already used for another virtual machine. The copy you use becomes the hard disk of the new virtual machine.
10. In the **Summary** menu, click **Finish**. The new virtual machine should now appear in the list of virtual machines.
11. Do not start the virtual machine at this stage.
12. Right-click on the new virtual machine and select **Settings**.
13. Select **Security**. Check that **Enable Secure Boot** is not selected. Click **OK**.

Next steps

- Do not start the virtual machine at this stage:
  - If intending to support Media Manager, see Adding an additional hard disk on page 52.
  - Otherwise, perform virtual machine profiling, see Virtual machine profiling on page 36.

Related links

Hyper-V deployment on page 48

Adding an additional hard disk

About this task

To run Media Manager, you must add an additional hard disk to the IP Office server running Voicemail Pro. Avaya recommend that you add the additional disk before the IP Office server initial configuration.

- The minimum supported size is 30 GB. The recommended size is 300 GB or larger.
- Media Manager requires 120 KB per minute for recordings.
- Media Manager also reserves 1 GB of space for the call details database and other operations.
- If you need to add the additional disk after initial configuration, refer to the Administering Avaya IP Office™ Platform Media Manager manual for details of initializing the new disk.

Procedure

1. In the list of virtual machines, select the required virtual machine.
2. Right-click and select **Connect**.
3. If the virtual machine is already running, stop it by clicking the . This stops the services provided by the virtual machine.
4. In the virtual machine connection window, select **File** > **Settings**.
5. Select **SCSI Controller**.
6. Select **Hard Drive** and click **Add**.
7. Select **Virtual hard disk** and click **New**.
8. Click **Next**.
9. In the **Choose Disk Format** menu, select **VHDX**. Click **Next**.
10. In the **Choose Disk Type** menu, select how you want the disk file to behave. Click **Next**.
    - To achieve the stated capacity and performance, you must provision all IP Office virtual disks as **Thick Provision Eager Zeroed** or the equivalent for the particular hosting platform.
11. In the **Specify Name and Location** menu, enter the name and location for the new virtual hard disk file. Click **Next**.
12. Set the size for the new disk. Click **Next**.
13. In the **Summary** menu check the settings. If okay, click **Finish**.
14. Click **Apply** and then click **OK**.

Next steps

- Do not start the virtual machine. Instead, perform any required virtual machine profiling, see Virtual machine profiling on page 36.

Related links

Hyper-V deployment on page 48

Hyper-V virtual machine profiling

You must optimize the IP Office virtual machines resources to meet the requirements of virtual machines IP Office role, see IP Office Server Profiling on page 17.

Attribute	Description
Memory	You can set the maximum amount of RAM memory that the virtual machine uses. See Adjusting the virtual machine's RAM memory settings on page 54.
Processors	You can configure multiple virtual processor (vCPUs) for a virtual machine. A virtual machine cannot have more vCPUs than the maximum number of logical CPUs on the host virtual server platform. The number of logical CPUs is the number of physical processor cores. See Adjusting the virtual machine's processors on page 55.

After profiling, you can start the virtual machine.

- **Profiling Other Virtual Machines:**

  It is good practice to monitor the resource utilization of all the virtual machines running in their infrastructure. Profile all virtual machines running on the virtual server platform to fine-tune the hardware resources allocated and used. This will improve performance by allocating resources where needed and optimize the use of the 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.

Related links

Hyper-V deployment on page 48
Adjusting the virtual machine's RAM memory settings on page 54
Adjusting the virtual machine's processors on page 55

Adjusting the virtual machine's RAM memory settings

About this task

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. Set these values to match the virtual server’s profile requirements. See IP Office Server Profiling on page 17.

Before you begin

- The following processes can be used on a new virtual machine that has not been powered on/started.
- To perform the same actions on an existing virtual machine, it must first be powered off/ stopped before making the adjusting and then powered on/started again. That will interrupt all services provided by the virtual machine.

Procedure

1. In the list of virtual machines, select the required virtual machine.

2. Right-click and select **Connect**.
3. If the virtual machine is already running, stop it by clicking the . This stops the services provided by the virtual machine.
4. In the virtual machine connection window, select **File** > **Settings**.
5. Select **Memory**.
6. Adjust the memory settings to match the recommended settings for the server role. See IP Office Server Profiling on page 17
7. Click **Apply**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Starting the virtual machine on page 56).

Related links

Hyper-V virtual machine profiling on page 53

Adjusting the virtual machine's processors

About this task

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

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

The CPU core clock speed multiplied by the number of cores, must meet the aggregate CPU cycle requirements of the virtual machine. See IP Office Server Profiling on page 17.

Before you begin

- The following processes can be used on a new virtual machine that has not been powered on/started.
- To perform the same actions on an existing virtual machine, it must first be powered off/ stopped before making the adjusting and then powered on/started again. That will interrupt all services provided by the virtual machine.

Procedure

1. In the list of virtual machines, select the required virtual machine.
2. Right-click and select **Connect**.
3. If the virtual machine is already running, stop it by clicking the . This stops the services provided by the virtual machine.
4. In the virtual machine connection window, select **File** > **Settings**.
5. Select **Processor**.

6. Adjust the settings to match the recommended settings for the server role. See IP Office Server Profiling on page 17.
7. Click **Apply**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Starting the virtual machine on page 56).

Related links

Hyper-V virtual machine profiling on page 53

Starting the virtual machine

About this task

Having installed and profiled the new virtual machine, it can be started. This will boot it from the virtual hard disk file after which the initial IP Office server configuration can be started. See Initial server configuration on page 90.

Procedure

1. In the list of virtual machines, select the required virtual machine.
2. Right-click and select **Connect**.
3. In the virtual machine connection window click on the icon or alternatively select **Action** > **Start** to start the virtual machine.

   - For a new virtual machine, the virtual machine now goes through start up processes such as partition resizing. This can take up to 15 minutes to complete.
   - The server displays the address details for further configuration of the server.

Next steps

- Use the address shown to start the initial server configuration process. See Initial server configuration on page 90.

Related links

Hyper-V deployment on page 48

Part 4: Amazon Web Services

Chapter 9: Amazon deployment

IP Office server's are supported as AWS virtual machines, referred to as 'instances'. Each AWS instance is created using a combination of parts:

- **Machine Instance:**

  This defines the processor and memory and other factors of the platform on which the virtual machine is run. AWS provide a range of different machine instances (https://aws.amazon.com/ec2/instance-types). The machine instance selected should match the profiling requirements of the server's intended IP Office role. See AWS profiling on page 59.

- **Disk Storage:**

  Storage can be associated with the virtual machine. AWS supports several different types of storage, however for IP Office it is assumed that a drive or drives using EBS (Elastic Block Storage) are used.

- **Amazon Machine Image (AMI):**

  This file contains the initial image for an IP Office virtual machine.

  - The name of the file indicates the release of IP Office software.
  - The same image is used to create different types of IP Office server. The server type is selected during initial server configuration.

- **Virtual Private Cloud (VPC):**

  This is the customer's private network within an AWS cloud. It defines the private IP addresses you can use for the instances launched in the network and provides a range of features for controlling the traffic between the VPC and the public internet; route tables, internet gateways, public IP addresses, and so on. This documentation does not cover the configuration of the customer's VPC.

- **Security Group:**

  A security group controls external internet access to virtual machines. Each security group consists of a set of rules defining the allowed access based on protocol, port and source address. You can define multiple security groups and then select which one is used by each particular virtual machine.

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

- This document outlines the steps required to deploy an IP Office server as a virtual machine. If deploying multiple virtual machines, follow the order of deployment and configuration in the Deploying IP Office Server Edition manual.
- In addition to certified IP Office training, the installer and system maintainer must have certified training on the specific virtual platform type or supported by someone who has the required certification.
- During deployment, you must ensure that the deployment of each IP Office virtual machine is completed, including setting the required LAN1 and LAN2 IP addresses, before starting the deployment of another IP Office virtual machine.

Related links

AWS profiling on page 59
Creating security groups on page 59
Launching a new instance on page 60
Changing the security group on page 62
Changing the machine instance on page 62

AWS profiling

The AWS machine instance https://aws.amazon.com/ec2/instance-types and storage specified when launching a new instance should match the requirements of the virtual server's intended role. See IP Office Server Profiling on page 17.

Related links

Amazon deployment on page 58

Creating security groups

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

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

- Once the instance is ignited and initial configuration utility completed, you can then switch the virtual machine's security group to one you have created for operational systems. For example, one that allows access from customer addresses using the ports/protocols of the IP Office services that have been configured on the server. See Changing the security group on page 62.

Related links

Amazon deployment on page 58

Launching a new instance

About this task

The following is a general example for launching a new virtual instance. The exact process can vary depending on the customer network requirements.

Procedure

1. Sign in to your AWS account. Click **Services** and select **EC2**.
2. From the top-right corner, select the zone appropriate to the customer location.
3. Click **Launch Instance** and select **Community AMIs** and enter `Avaya` as the search string.
4. Locate the IP Office AMI and click **Select**.
   - The name of the file indicates the release of IP Office software.
   - The same image is used to create different types of IP Office server. The server type is selected during initial server configuration.
5. Select a machine instance that matches the profiling requirements of the virtual machine's intended role. See AWS profiling on page 59.
6. Click **Next**.
   a. In **Configure Instance Details** page, select the customer's VPC and the subnet in which the virtual machine should operate.
   b. To support eth1, under **Network interfaces**, click **Add Device**.
      - If you use this option, AWS will not automatically assign IP addresses to the ports. After launching the instance, you must obtain the eth0 interface ID and assign a Elastic IP public IP address.
7. Click **Next**.
8. In **Add Storage** page, set the size of the disk to match the profiling requirements of the virtual machine's intended role. See AWS profiling on page 59.
   - Note: Adjusting the disk size following server ignition is not supported.

- To achieve the stated capacity and performance, you must provision all IP Office virtual disks as **Thick Provision Eager Zeroed** or the equivalent for the particular hosting platform.
- If the server will support Media Manager, you must add an additional separate storage volume. To add this, click **Add New Volume** and specify the size required.

9. Click **Next**.
10. In **Add Tags** page, enter any tags that you want associated with this instance.
    - AWS uses tags in other EC2 menus to display, sort and group matching resources. Each tag consists of name and value pair. For example, you may find it useful to have tags that indicate the server type, the location it serves and the customer
11. Click **Next**.
12. In **Configure Security Group** page, select the system installer's security group you created. See Creating security groups on page 59.

    Important:

    - When launching a new instance, you should use a highly restricted security group that allows access from as few hosts and protocols as possible. For example, one that allows access from your IP address and using HTTPS access to ports 7070/7071 only. This is necessary since the new instance boots with default passwords until initial configuration is completed. Following server ignition, you can assign a different security group that allows the access required for normal IP Office operation.
    - If you do not select a group, the install process automatically creates a launch wizard group which allows SSH access on port 22 only.

13. Click **Review** and **Launch**. Check that the details shown match the requirements for the server being created. If so, click **Launch**.
14. Create a new key pair or choose an existing key pair. This provides a security certificate for secure SSH access to the virtual machine.
15. If creating a new key pair, click **Download Key Pair** and ensure that you store the downloaded PEM certificate file in a safe place.
16. Click **Launch Instances**.
17. If no problems are reported, scroll down the summary form and click **View Instances**. The list of your instances displays the new virtual machine.
    - Alternatively, select **Services** > **EC2** and from the navigation tree select **Instances** > **Instances**.
18. The machine starts by performing initial formatting and partitioning of the storage. This takes approximately 15 minutes to complete.

Next steps

- Proceed with the initial server configuration process. See Initial server configuration on page 90.

Related links

Amazon deployment on page 58

Changing the security group

About this task

You can change the security group assigned to an instance. This allows you to maintain a set of security groups for different purposes and to flexible switch which security group an instance is currently using. See Changing the security group on page 62.

Procedure

1. Sign in to your AWS account. Click **Services** and select **EC2**.
2. In the navigation tree on the left select **Instances** > **Instances**.
3. Select the instance for which you want to change the security group.
4. Click **Actions** and select **Networking** > **Change Security Groups**.
5. Select the security group that you want the virtual machine to use and click **Assign Security Groups**.

Related links

Amazon deployment on page 58

Changing the machine instance

About this task

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

Important:

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

Procedure

1. Sign in to your AWS account. Click **Services** and select **EC2**.
2. In the navigation tree on the left select **Instances** > **Instances**.
3. Select the instance for which you want to change the machine instance it uses.
4. Click **Actions** and select **Instance State** > **Stop**|. When prompted, select **Yes, Stop**.
5. Wait until the **Instance State** has changed to **stopped**.
6. Click **Actions** and select **Instance Settings** > **Change Instance Type**.

7. Select the type of machine instance required and click **Apply**.
8. Click **Actions** and select **Instance State** > **Start**. Click **Yes, Start**.

Related links

Amazon deployment on page 58

Part 5: Microsoft Azure

Chapter 10: Azure virtual machine deployment

IP Office server's are supported as virtual machines within Microsoft's Azure environment.

- This document outlines the steps required to deploy an IP Office server as a virtual machine. If deploying multiple virtual machines, follow the order of deployment and configuration in the Deploying IP Office Server Edition manual.
- In addition to certified IP Office training, the installer and system maintainer must have certified training on the specific virtual platform type or supported by someone who has the required certification.
- During deployment, you must ensure that the deployment of each IP Office virtual machine is completed, including setting the required LAN1 and LAN2 IP addresses, before starting the deployment of another IP Office virtual machine.

Related links

Downloading the Software on page 65
Logging in to Azure on page 66
Creating a Resource Group on page 67
Creating a virtual network on page 67
Uploading the VHD file to Azure on page 68
Creating a new Azure virtual machine on page 69
Adding an Additional Disk for Media Manager on page 70
Starting an Azure Virtual Machine on page 71
Creating a copy of an Azure VHD file on page 71

Downloading the Software

About this task

Avaya make a number of different file available for each IP Office release. For a Azure deployment, select the following files:

- **VHD file: (Azure)**

  The download is a `.zip` file from which you can extract the `.vhd` file.

- **TTS ISO:**

  The images used to deploy new virtual machines do not include text-to-speech (TTS) prompts. To add TTS languages, you need to download and install the additional ISO files for TTS languages. These are provided as 3 `.iso` files:

  - Note: TTS files from pre-12.0 releases are not compatible with R12.0 and higher.
  - **DVD 1:** English, Spanish, French, German, Italian.
  - **DVD 2:** Swedish, Norwegian, Finnish, Dutch, Danish, Portuguese, Greek.
  - **DVD 3:** Chinese, Polish, Russian.

Procedure

1. Browse to http://support.avaya.com and log in.
2. Click **Support by Product** and select **Downloads**.
3. In the **Enter Product Name** box, enter `IP Office` and select the displayed match.
4. Use the **Choose Release** drop-down to select the required release.
5. From the listed **Downloads**, select the version of release required. There are multiple versions depending on the number of service packs and feature packs available.
6. Click on the required files and follow any further instructions shown by the website and your browser.
7. Also download and read any documents shown under **Related Documents**

Next steps

- Create a resource group for the IP Office virtual machines. See Creating a Resource Group on page 67.

Related links

Azure virtual machine deployment on page 65

Logging in to Azure

About this task

For information on Microsoft Azure, see https://docs.microsoft.com/en-us/azure.

Procedure

1. In your web browser, enter https://portal.azure.com.
2. In the **Email**, **Phone** and **Skype** fields, enter your the registered email.
3. In the **Password** field, type your password.
4. Click **Sign In**. The web browser displays the Microsoft Azure portal.

Related links

Azure virtual machine deployment on page 65

Creating a Resource Group

About this task

A resource group is used to group related servers and services. In this case, that can be set of IP Office virtual servers.

Procedure

1. In the Azure portal, click the ☰ icon.
2. Select **Resource groups**.
3. Click **Create**.
4. Complete the required details.
5. Click **Review + create**.
6. Click **Create**.

Next steps

- Having created a resource group, define the virtual network used by the group. See Creating a virtual network on page 67.

Related links

Azure virtual machine deployment on page 65

Creating a virtual network

About this task

Once a resource group has been created for the virtual IP Office servers, a virtual network can also be created.

Before you begin

- Create a resource group for the IP Office virtual machines. See Creating a Resource Group on page 67.

Procedure

1. In the Azure portal, click the ☰ icon.
2. Select **Virtual networks**.
3. Click **Create**.
4. In the **Basics** settings:
   a. Select your **Subscription** and **Resource group**.
   b. Enter a **Virtual network name**.
   c. Select your **Region**.

d. Click **Next**.

5. In the **Security** settings:
   a. Select any additional security services required.
   b. Click **Next**.
6. In the **IP addresses** settings:
   a. Configure your virtual network address space with the IPv4 and IPv6 address subnets you will need.
   b. Click **Next**.
7. Click **Review + create**.
8. Click **Create**.

Next steps

- Upload the IP Office `.vhd` file. See Uploading the VHD file to Azure on page 68.

Related links

Azure virtual machine deployment on page 65

Uploading the VHD file to Azure

Before you begin

- Define the virtual network for use by servers in the resource group. See Creating a virtual network on page 67.

Procedure

1. In the Azure portal, click the ☰ icon.
2. Select **Storage accounts**.
3. Select the storage account to which you want to upload the `.vhd` file.
   - If you do not have a storage account, click **Create** to create one.
   - Note that the selected storage location dictate where subsequent image can be created and deployed.
4. Click **Data storage** and select **Containers**.
5. Select the container to which you want to upload the `.vhd` file.
   - If you do not have a storage container, click **+ Container** to create one.
6. Click **Upload**.
   a. Select the `.vhd` file to upload.
   b. Click **Advanced**.

c. Set the **Blob type** to **Page Blob**.

d. Click **Upload**.

Next steps

- You can use the uploaded file to create virtual machines. See Creating a new Azure virtual machine on page 69.

Related links

Azure virtual machine deployment on page 65

Creating a new Azure virtual machine

About this task

Follow this procedure to create a new virtual machine from the `.vhd` file.

Before you begin

- Upload the IP Office `.vhd` file. See Uploading the VHD file to Azure on page 68.

Procedure

1. In the Azure portal, click the icon.
2. Enter `managed disks` in the search box.
3. Select **Managed Disks** from the results.
   a. Select your **Subscription** and **Resource group**.
   b. Enter the disk name in **Disk name**.
   c. Select your **Region**.
   d. Set the **Source type** to **Storage blob**.
   e. Next to **Source blob**, click **Browse**.
   f. Browse to the uploaded `.vhd` file. Select the file and click **Select**.
   g. Set the **OS type** to **Linux**.
   h. Set the **Security type** to **Standard**. Do not select **Confidential** or **Trusted launch**.
   i. Set the **VM generation**.
      - **IP Office R12.1 and higher:** Select generation 2.
      - **IP Office R12.0 and earlier:** Select generation 1.
   j. Click **Change size** and select the require disk size and type.
      - To achieve the stated capacity and performance, you must provision all IP Office virtual disks as **Thick Provision Eager Zeroed** or the equivalent for the particular hosting platform.

k. Click **Review + create**.
l. Click **Create**.

4. In the Azure portal, click the ☰ icon.
5. Select **Home**.
6. Select **Disks**:
   a. Click on the disk created in the previous steps.
   b. Click **Create VM**.
   c. Select the **Resource group**.
   d. Enter a name in **Virtual machine name**.
   e. In the **Image** text box, browse and select the uploaded **iposerver** file.
   f. Select the required virtual machine size.
   g. In the **Authentication type**, select **Password**.
   h. Verify the network subnets.
   i. Click **Review + create**.
   j. Click **Create**.

Next steps

- If intending to support Media Manager, see Adding an Additional Disk for Media Manager on page 70.
- Otherwise, start the server. See Starting an Azure Virtual Machine on page 71.

Related links

Azure virtual machine deployment on page 65

Adding an Additional Disk for Media Manager

About this task

To run Media Manager, you must add an additional hard disk to the IP Office server running Voicemail Pro. Avaya recommend that you add the additional disk before the IP Office server initial configuration.

- The minimum supported size is 30 GB. The recommended size is 300 GB or larger.
- Media Manager requires 120 KB per minute for recordings.
- Media Manager also reserves 1 GB of space for the call details database and other operations.
- If you need to add the additional disk after initial configuration, refer to the Administering Avaya IP Office™ Platform Media Manager manual for details of initializing the new disk.

Procedure

1. In the Azure portal, click the icon.
2. Select **Virtual machines**.
3. Select the virtual machine from the list.
4. Select **Settings** > **Disks** .
5. Click **Create and attach a new disk**.
6. Configure the new disk as required.
   - To achieve the stated capacity and performance, you must provision all IP Office virtual disks as **Thick Provision Eager Zeroed** or the equivalent for the particular hosting platform.
7. Click **Apply**.

Next steps

- Start the server. See Starting an Azure Virtual Machine on page 71.

Related links

Azure virtual machine deployment on page 65

Starting an Azure Virtual Machine

Procedure

1. In the Azure portal, click **Virtual machines**.
2. Select the virtual machine(s) to be started.
3. Click **Start**.

Next steps

- If this is a new server, proceed to initial server configuration. See Initial server configuration on page 90.

Related links

Azure virtual machine deployment on page 65

Creating a copy of an Azure VHD file

About this task

Microsoft recommend that number of concurrent virtual machines deployed using the any particular snapshot or `.vhd` file is limited to 20.

If more than 20 virtual machines are required, an additional disk can be created for the additional virtual machines.

Procedure

1. In the Azure portal, select **All Services**.
2. In the **All Services** search box, enter **disks** and then select **Disks** to display the list of available disks.
3. Select the disk that you would like to use. The page for that disk appears.
4. From the menu at the top, select **Create snapshot**.
5. Enter a **Name** for the snapshot.
6. Choose a **Resource group** for the snapshot. You can use either an existing resource group or create a new one.
7. For **Account type**, choose **Standard (HDD)** or **Premium (SSD)** storage.
8. When done, select **Create** to create the snapshot.
9. After the snapshot has been created, select **Create a resource** in the left menu.
10. In the search box, enter **managed disk** and select **Managed Disks** from the list.
11. On the **Managed Disks** page, select **Create**.
12. Enter a **Name** for the disk.
13. Choose a **Resource group** for the disk. You can use either an existing resource group or create a new one. This selection will also be used as the resource group where you create the virtual machines from the disk.
14. For **Account type**, choose **Standard (HDD)** or **Premium (SSD)** storage.
15. In **Source type**, select **Snapshot**.
16. In the **Source snapshot** drop-down, select the snapshot created earlier.
17. Make any other adjustments as needed and then select **Create** to create the disk.

Related links

Azure virtual machine deployment on page 65

Chapter 11: Azure SSH connection

By default, Azure virtual machines use a public-private key pair for SSH connection. This is in addition to the IP Office service username and password used for the SSH connection.

- This section covers using a public-private key pair generated by Azure. If required, you can use a public-private key pair generated from another source.
- You can use the same public-private key pair with multiple virtual machines.

Related links

Creating a public-private key pair on page 73
Adding a public key to an IP Office virtual machine on page 74
Converting the private key using PuTTYgen on page 75
Using a private key with PuTTY on page 75

Creating a public-private key pair

About this task

You can use this process to have Azure create a public-private key pair. You can use the same public-private key pair with multiple virtual machines.

Procedure

1. In the Azure portal, click the ☰ icon.
2. Enter `SSH` in the search box.
3. Under **Marketplace** click **SSH Key**.
4. On the **SSH Key** page click **Create**.
   a. Select your **Subscription** and **Resource group**.
   b. Select your **Region**.
   c. Enter a **Key pair name** that identifies the key pair role.
   d. Leave the other settings as **Generate new key pair** and **RSA SSH Format**.
   e. Click **Review + create**.
   f. Click **Create**.

5. Select **Download private key and create resource**. This downloads a `.pem` file containing the private key for use with your SSH application.

   Important:

   - You must keep this file safe and secure. Whilst you can download the public key at any time, you cannot download the private key file again. If you lose the private key file, you will have to create a new private-public key pair.

6. Click **All resources**.
7. Locate and click on the name of the SSH key pair.
   - If necessary, set the filter to **Type** and change `all` to `SSH`.
8. Use the **Copy to clipboard** icon to copy the **Public key**.
9. Paste the value into a text file. You need to add the public key to your IP Office virtual machine.

Next steps

- See Adding a public key to an IP Office virtual machine on page 74.

Related links

Azure SSH connection on page 73

Adding a public key to an IP Office virtual machine

About this task

This process adds a public key to an IP Office virtual machine.

Before you begin

- Download the public key. See Creating a public-private key pair on page 73.

Procedure

1. Open the text file containing the public key. Select and copy the whole public key.
2. In Azure, select the IP Office virtual machine.
3. Click **Operations** > **Run command**.
4. Click **RunShellScript**.
5. Enter the following command, replacing `<public_key>` with the public key text:

```
sudo mkdir -p /home/Administrator/.ssh
chmod 755 /home/Administrator
echo "<public_key>" | sudo tee -a /home/Administrator/.ssh/authorized_keys
sudo chmod 700 /home/Administrator/.ssh
sudo chmod 600 /home/Administrator/.ssh/authorized_keys
sudo chown -R Administrator:Administrator /home/Administrator/.ssh
```

6. Click **Run**.

Next steps

- See Converting the private key using PuTTYgen on page 75.

Related links

Azure SSH connection on page 73

Converting the private key using PuTTYgen

About this task

PuTTY cannot use the private key `.pem` file directly. You must use PuTTYgen to convert the `.pem` file into a `.ppk` file.

Before you begin

- Add the matching public key to IP Office. See Adding a public key to an IP Office virtual machine on page 74

Procedure

1. Start PuTTYgen.
2. Locate **Load an existing private key pair** and click **Load**.
3. In the file browser change the file type to **All Files (*.*)**.
4. Select the private key file and click **Open** and **OK**.
5. Click **Save private key**.
6. When prompted to save without a passphrase, click **Yes**.
7. Enter a name for the file and click **Yes**. This creates a `.ppk` file you can use with PuTTY.
8. Close PuTTYgen.

Next steps

- See Using a private key with PuTTY on page 75.

Related links

Azure SSH connection on page 73

Using a private key with PuTTY

About this task

This process is for PuTTY. The process for using a private key with other SSH applications will differ.

Before you begin

- PuTTY requires you to convert the `.pem` private key file into a `.ppk` file. See Converting the private key using PuTTYgen on page 75.

Procedure

1. Start PuTTY.
2. Configure the SSH connection settings on the **Session** settings menu.
3. Select **Connection** > **SSH** > **Auth**.
4. In **Private key file for authentication**, click **Browse** and select the `.ppk` file created from the private key.
5. Click **Open**.
6. When prompted to login, enter `Administrator`. The server will respond `Authenticating with public key "import-openssh-key"`.
7. Enter `admin` and login using the `Administrator` or `root` username and password.
8. Enter `root` and the user password.

Related links

Azure SSH connection on page 73

Part 6: KVM on Red Hat Linux

Chapter 12: KVM Virtual machine deployment on an Avaya ASP 130 R6

For IP Office R12.1, Avaya supports the deployment of IP Office virtual machines on the Avaya Solutions Platform 130 Appliance R6 platforms (ASP 130 R6).

Avaya supplies the ASP 130 R6 with Red Hat Enterprise Linux 8.10 pre-installed and configured to support KVM based virtual machines.

- ASP 130 R6 documentation is available from the Avaya Support website (https://support.avaya.com).
- For the Red Hat Enterprise Linux documentation, see https://docs.redhat.com/en/documentation/red_hat_enterprise_linux/8/html/configuring_and_managing_virtualization/index

Related links

Downloading the IP Office KVM Software on page 78
Creating an IP Office KVM virtual machine file on page 79
Adding an IP Office KVM virtual machine on page 81
Adding an Additional Disk for Media Manager on page 82
IP Office KVM virtual machine profiling on page 83
Starting the IP Office KVM virtual machine on page 87

Downloading the IP Office KVM Software

About this task

Avaya makes files available for each IP Office release. For a KVM deployment, download the following files:

- **KVM file: (KVM on Red Hat Linux)**

  The download is a `.zip` file from which you can extract the `.qcow2` file.

- **TTS ISO:**

The images used to deploy new virtual machines do not include text-to-speech (TTS) prompts. To add TTS languages, you need to download and install the additional ISO files for TTS languages. These are provided as 3 `.iso` files:

- Note: TTS files from pre-12.0 releases are not compatible with R12.0 and higher.
- **DVD 1:** English, Spanish, French, German, Italian.
- **DVD 2:** Swedish, Norwegian, Finnish, Dutch, Danish, Portuguese, Greek.
- **DVD 3:** Chinese, Polish, Russian.

Procedure

1. Browse to http://support.avaya.com and log in.
2. Click **Support by Product** and select **Downloads**.
3. In the **Enter Product Name** box, enter `IP Office` and select the displayed match.
4. Use the **Choose Release** drop-down to select the required release.
5. From the listed **Downloads**, select the version of release required. There are multiple versions depending on the number of service packs and feature packs available.
6. Click on the required files and follow any further instructions shown by the website and your browser.
7. Also download and read any documents shown under **Related Documents**

Next steps

- Extract the `.qcow2` file from the downloaded `.zip`
- Copy the `.qcow2` file to the ASP 130 R6 server and use it to create a file for an IP Office virtual machine. See Creating an IP Office KVM virtual machine file on page 79.

Related links

KVM Virtual machine deployment on an Avaya ASP 130 R6 on page 78

Creating an IP Office KVM virtual machine file

About this task

Use this process to prepare a copy of the downloaded IP Office `.qcow2` file for use as an IP Office KVM virtual machine.

Before you begin

- Download the IP Office `.qcow2` file. See Downloading the IP Office KVM Software on page 78.

Procedure

1. Login to the KVM CLI as the *custadm* user.
2. Enter `sudo ls -ld /var/lib/libvirt/staging`.

3. If the command did not find the directory, create the directory:
   a. Enter the following commands:

      ```
      sudo mkdir /var/lib/libvirt/staging
      sudo chown custadm:wheel /var/lib/libvirt/staging
      ```

   b. Enter `sudo ls -ld /var/lib/libvirt/staging` again.
4. Check the permissions shown are `drwxr-x--- 2 custadm wheel ...`.

   These allow the *custadm* user to write into the directory using **sudo** commands. If the permissions shown are different:
   a. Enter `sudo chown custadm:wheel /var/lib/libvirt/staging`
   b. Run `sudo ls -ld /var/lib/libvirt/staging` again and check the permissions.
5. Using an SCP file transfer tool, for example WinSCP, and the *custadm* user credentials, copy the downloaded IP Office `.qcow2` file into the `/var/lib/libvirt/staging` directory.
6. Enter `cd /var/lib/libvirt/staging`.
7. Enter `sudo ls -lh` and check for the IP Office `.qcow2` file.
8. The downloaded IP Office `.qcow2` file is a thin-provisioned file. You must create a thick-provisioned copy which you can then use as an IP Office KVM virtual machine. Enter:
   - `sudo qemu-img convert -O qcow2 -o preallocation=full <thin filename> <thick filename>`

   For example:
   - `sudo qemu-img convert -O qcow2 -o preallocation=full IpolCPERHELKVM-12_1_0_80-disk.qcow2 ipo_primary.qcow2`
9. Move the thick provisioned `.qcow2` file to the virtual machine images directory. Enter:
   - `sudo mv -i <thick filename> <destination>`

   For example:
   - `sudo mv -i ipo_primary.qcow2 /var/lib/libvirt/images`
10. Enter `cd /var/lib/libvirt/images`.
11. Enter `sudo ls -ltr` and check for the thick-provisioned file.
12. Change the file owner and permission of the thick-provisioned file by entering the following commands:
    - `sudo chown qemu:qemu <filename>`
    - `sudo chmod 640 <filename>`

For example:

- `sudo chown qemu:qemu ipo_primary.qcow2`
- `sudo chmod 640 ipo_primary.qcow2`

13. If no longer required, for example to create a file for another IP Office virtual machine, delete the thin-provisioned file from the `/var/lib/libvirt/staging` folder. Enter:

    - `rm /var/lib/libvirt/staging/<thin filename>`

    For example:

    - `rm /var/lib/libvirt/staging/IpolCPERHELKVM-12_1_0_80-disk.qcow2`

Next steps

- See Adding an IP Office KVM virtual machine on page 81.

Related links

KVM Virtual machine deployment on an Avaya ASP 130 R6 on page 78

Adding an IP Office KVM virtual machine

About this task

Use this process to use the `.qcow2` file as the hard disk of a new IP Office virtual machine.

Before you begin

- Create the source file for the virtual machine. See Creating an IP Office KVM virtual machine file on page 79.
- Check you have required profile details for the IP Office servers intended role and capacity. See IP Office Server Profiling on page 17.
- Check that the required network bridge has been configured. IP Office servers support two network interfaces configured on separate sub-nets.

Procedure

1. Using a browser, login to Web Console on the host server.
2. Click **Virtual machines**.
3. Click **Import VM**.
4. Add a **Name** for the virtual machine that identifies its role.
5. Set the path to the location of the `.qcow2` file that you want used as the virtual machines hard disk.
6. Set the **Operating system** to **Rocky Linux 9 (Blue Onyx)**
7. Set the **Memory** to match the amount required by the profile for the virtual machines IP Office role. See IP Office Server Profiling on page 17.

8. Click **Import and edit**.
9. Click **Firmware**. Change the setting to **UEFI** and click **Save**.
10. For **Autostart**, select **Run when host boots**.
11. In the **Networking** section, check that the virtual machine is associated with the correct bridge.
12. Do not start the virtual machine at this stage. You should complete all the virtual machine profiling before starting the virtual machine.

Next steps

- If the IP Office server will include Media Manager, see Adding an Additional Disk for Media Manager on page 82.
- Otherwise, perform virtual machine profiling, see IP Office KVM virtual machine profiling on page 83.

Related links

KVM Virtual machine deployment on an Avaya ASP 130 R6 on page 78

Adding an Additional Disk for Media Manager

About this task

To run Media Manager, you must add an additional hard disk to the IP Office server running Voicemail Pro. Avaya recommend that you add the additional disk before the IP Office server initial configuration.

- The minimum supported size is 30 GB. The recommended size is 300 GB or larger.
- Media Manager requires 120 KB per minute for recordings.
- Media Manager also reserves 1 GB of space for the call details database and other operations.
- If you need to add the additional disk after initial configuration, refer to the Administering Avaya IP Office™ Platform Media Manager manual for details of initializing the new disk.

Procedure

1. Login to the KVM CLI as the *custadm* user.
2. Enter `cd /var/lib/libvirt/images`.
3. To create a new thick-provisioned disk, enter:

   - `sudo qemu-img create -o preallocation= full -f qcow2 <filename>.qcow2 <size>G`

   Where:

   - **`<filename>`** is a name for the new disk.

- **<size>** is the required size in GB.
  - **Medium server configuration:** 400 GB.
  - **Large server configuration:** 1000 GB.

  For example:

  - `sudo qemu-img create -o preallocation= full -f qcow2 media-manager.qcow2 400G`

4. Change the file owner and permission of the thick-provisioned file by entering the following commands:
   - `sudo chown qemu:qemu <filename>`
   - `sudo chmod 640 <filename>`

   For example:

   - `sudo chown qemu:qemu media-manager.qcow2`
   - `sudo chmod 640 media-manager.qcow2`
5. Using a browser, login to Web Console on the host server.
6. Click **Virtual machines**.
7. Click on the name of the IP Office virtual machine to displays its details.
8. In the console, login at root.
9. In the **Disks** section: click **Add disk**.
   a. Select **Use existing**.
   b. Select the new volume you created for IP Office.
   c. Set the **Persistence** to **Always attach**.
   d. Click **Add**.
10. Do not start the virtual machine at this stage. You should complete all the virtual machine profiling before starting the virtual machine.

Next steps

- Perform virtual machine profiling, see IP Office KVM virtual machine profiling on page 83.

Related links

KVM Virtual machine deployment on an Avaya ASP 130 R6 on page 78

IP Office KVM virtual machine profiling

You must optimize the IP Office virtual machines resources to meet the requirements of virtual machines IP Office role, see IP Office Server Profiling on page 17.

Attribute	Description
Memory	You can set the maximum amount of RAM memory that the virtual machine uses. See Adjusting the IP Office KVM virtual machine memory on page 85.
Processors	You can configure multiple virtual processor (vCPUs) for a virtual machine. A virtual machine cannot have more vCPUs than the maximum number of logical CPUs on the host virtual server platform. The number of logical CPUs is the number of physical processor cores. See Adjusting the IP Office KVM virtual machine CPUs on page 84.

After profiling, you can start the virtual machine.

- **Profiling Other Virtual Machines:**

  It is good practice to monitor the resource utilization of all the virtual machines running in their infrastructure. Profile all virtual machines running on the virtual server platform to fine-tune the hardware resources allocated and used. This will improve performance by allocating resources where needed and optimize the use of the 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.

Related links

KVM Virtual machine deployment on an Avaya ASP 130 R6 on page 78
Adjusting the IP Office KVM virtual machine CPUs on page 84
Adjusting the IP Office KVM virtual machine memory on page 85
Adjusting the IP Office KVM virtual machine disk on page 86

Adjusting the IP Office KVM virtual machine CPUs

About this task

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

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

The CPU core clock speed multiplied by the number of cores, must meet the aggregate CPU cycle requirements of the virtual machine. See IP Office Server Profiling on page 17.

Before you begin

- To do this on an existing virtual machine, you must first power off/stop the virtual machine before making the adjustment. That will interrupt all services provided by the virtual machine.

Procedure

1. Using a browser, login to Web Console on the host server.
2. Click **Virtual machines**.
3. Click on the name of the virtual machine to display its details.
4. Click on the **edit** option next to **CPU**.
5. Adjust the settings to match the recommended settings for the server role. See IP Office Server Profiling on page 17.
6. Click **Apply**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Starting the IP Office KVM virtual machine on page 87).

Related links

IP Office KVM virtual machine profiling on page 83

Adjusting the IP Office KVM virtual machine memory

About this task

You can set the maximum amount of RAM memory that the virtual machine can use. Set these values to match the virtual server's profile requirements. See IP Office Server Profiling on page 17.

Before you begin

- To do this on an existing virtual machine, you must first power off/stop the virtual machine before making the adjustment. That will interrupt all services provided by the virtual machine.

Procedure

1. Using a browser, login to Web Console on the host server.
2. Click **Virtual machines**.
3. Click on the name of the virtual machine to display its details.
4. Click on the **edit** option next to **Memory**.
5. Adjust the settings to match the recommended settings for the server role. See IP Office Server Profiling on page 17.
6. Click **Save**.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Starting the IP Office KVM virtual machine on page 87).

Related links

IP Office KVM virtual machine profiling on page 83

Adjusting the IP Office KVM virtual machine disk

About this task

By default, IP Office virtual machines have a 100 GB virtual disk. You must adjust this to meet the IP Office server profiling requirements. See IP Office Server Profiling on page 17.

Important:

- You cannot decrease the disk size at a later stage.
- You cannot change the disk size if there are snapshots of the virtual machine. You must delete any snapshots before increasing the disk size.

Before you begin

- You can use this processes on a new virtual machine before starting it.
- To perform this shut down the virtual machine.

Procedure

1. Use the following command to list the virtual machines the Linux server is hosting:
   - `sudo virsh list`

   The list shows the virtual machines and their status. For example:

```
$ sudo virsh list
 Id   Name        State
----------------------------
 2    ipoffice    running
```

2. Identify the name of the virtual machine you want to profile.
3. If the machine is running, shut it down using the following command:
   - `sudo virsh shutdown <name>`

     Where:

     - **<Name>** is the name shown in the list of virtual machines.

   For example:

   - `sudo virsh shutdown ipoffice`
4. Use the `sudo virsh list` command again to check that the virtual machine is no longer running.
5. Use the following command to display the virtual machine disks:
   - `sudo virsh domblklist <Name>` where **<Name>** is the name shown in the list of virtual machines.
   - For example: `sudo virsh domblklist ipoffice`

6. List the existing disk size:
   - `sudo qemu-img info <disk>`

     Where:

     - `<disk>` is the disk source path shown in the previous step.

     For example:

   - `sudo qemu-img info /var/lib/libvirt/images/ipo_primary.qcow2`
7. Use the following command to expand the existing disk size:
   - `sudo qemu-img resize <disk> +<increase>`

     For example:

   - `sudo qemu-img resize /var/lib/libvirt/images/ipo_primary.qcow2 +20G`
8. Adjust the settings to match the recommended settings for the server role. See IP Office Server Profiling on page 17.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Starting the IP Office KVM virtual machine on page 87).

Related links

IP Office KVM virtual machine profiling on page 83

Starting the IP Office KVM virtual machine

About this task

Having installed and profiled the new virtual machine, you can start it. This will boot it from the virtual hard disk (the `.qcow2` file) after which you can start the initial IP Office server configuration.

Procedure

1. Using a browser, login to Web Console on the host server.
2. Click **Virtual machines**.
3. Click on the name of the virtual machine to display its details.
4. Click on **Run**.
5. Watch the **Console** and wait for it to display IP Office Server Edition login menu.

Next steps

- Start the initial server configuration process. See Initial server configuration on page 90.

Related links

KVM Virtual machine deployment on an Avaya ASP 130 R6 on page 78

Part 7: Server Configuration

Chapter 13: Initial server configuration

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

Related links

Connecting to the uninitialized virtual machine on page 90
Setting the virtual machine's IP address on page 91
Performing server ignition on page 92
Adding a certificate to the browser on page 97
IP Office initial configuration on page 99
Configuring the server applications on page 100
Disabling a network port on page 100

Connecting to the uninitialized virtual machine

About this task

Using a browser, use the process below to login and proceed to Performing Server Ignition. See Performing server ignition on page 92.

Procedure

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`
   - The virtual machines eth0 IP address is shown in the console window. By default the IP address for initial configuration is `192.168.42.1/255.255.255.0`. If you cannot connect to the virtual machine using the default IP address, you need to assign the virtual machine a valid browseable address. See Setting the virtual machine's IP address on page 91.
2. The login page is displayed. Enter the user name as `root` and the password `Administrator`.
3. Click **Login**.

Next steps

- Once connected, the server ignition menus are displayed. See Performing server ignition on page 92.

Related links

Initial server configuration on page 90

Setting the virtual machine's IP address

A newly deployed IP Office virtual machine uses the following default IP settings:

- **LAN1 (eth0):** `192.168.42.1/24`
- **LAN2 (eth1):** `192.168.43.1/24`

If the default IP settings are incompatible with the network on which you are deploying the virtual machine, you can use the steps described to change them. When the settings are correct and you can access the virtual machine from the network using a browser, you can proceed to performing the server ignition.

- Avaya does not support setting IPv6 addresses before IP Office server ignition. For IP Office administration, you must set and use an IPv4 address. If you require an IPv6 address for the IP Office, you can set the address during or after IP Office server ignition.

Before you begin

Warning:

- If using local nodal licensing, the virtual machine uses its IP address as part of the unique **PLDS Host ID** used for licensing. Changing the IP address can change the host ID, invalidating any existing licenses. See Virtual server licensing on page 12. Therefore, you must ensure that you have confirmed the final IP address settings before setting these values.

Procedure

1. Within the virtualized platform you are using to host the virtual machine, open a console window.
2. Log in as the root user:
   a. In the console, enter `login`.
   b. Enter username `root` and password `Administrator`.
3. Use the Network Manager Tool to view and edit the address settings:
   a. Enter `nmtui`.
   b. Select **Edit a connection**.
   c. Select **eth0** or **eth1**.

d. Edit the settings to match the customer network requirements.

- Avaya does not support setting IPv6 addresses before IP Office server ignition. For IP Office administration, you must set and use an IPv4 address. If you require an IPv6 address for the IP Office, you can set the address during or after IP Office server ignition.

e. Select **OK**.

f. Select **Back** and then select **OK** again.

4. Restart the ports network connections and check the port status. In this example, port `eth0`:

   a. Enter `nmcli con down eth0 && nmcli con up eth0`.

   b. Enter `nmcli`. Check that the address details shown for the port are correct.

5. Restart the virtual machine and check that the network address changes have persisted.

Next steps

- Using a browser, connect to the server using the new address. See Connecting to the uninitialized virtual machine on page 90.

Related links

Initial server configuration on page 90

Performing server ignition

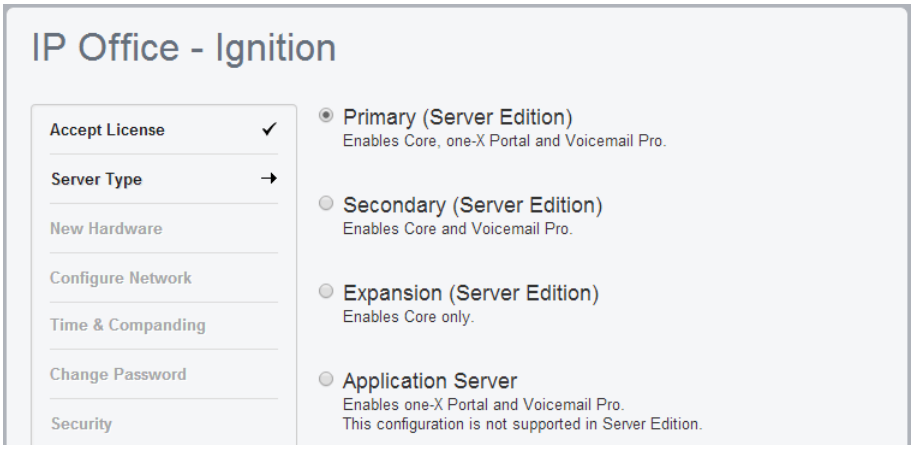
About this task

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

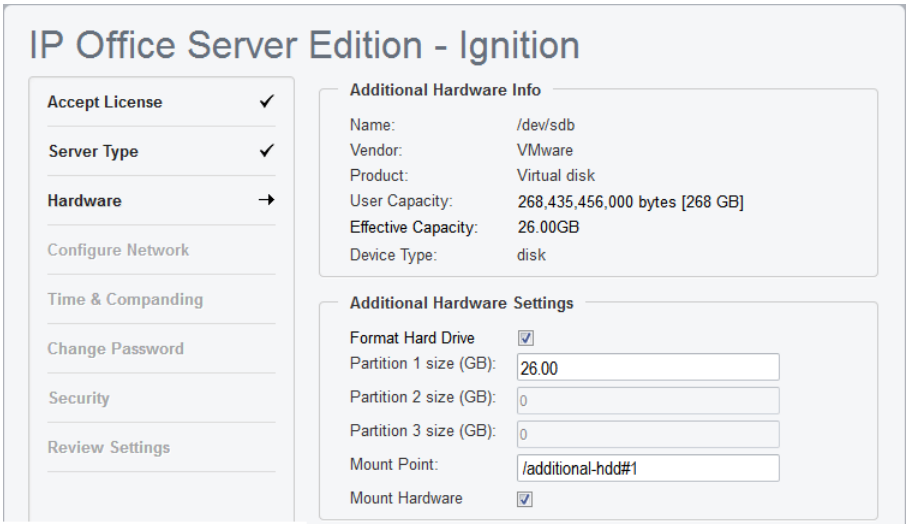
Procedure

1. Using a browser, connect to the virtual machine. See Connecting to the uninitialized virtual machine on page 90.
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 subsequent menus vary depending on the chosen server type.



4. If an additional hard disk was added during the virtual server deployment, details of the additional hardware appear. Otherwise the menu displays `No new hardware available`.



For Media Manager support, it is recommended to accept the defaults. These are:

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

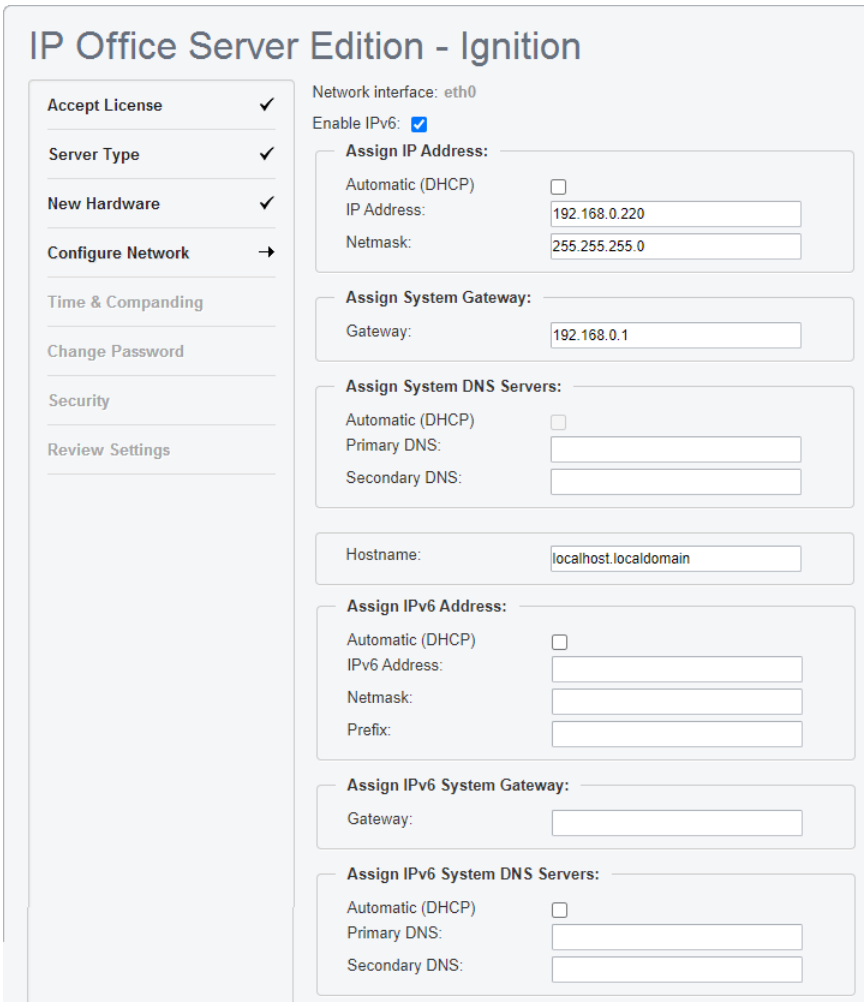
b. Create a single partition for the whole disk. You can create up to 3 logical partitions on the physical disk.

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** and so on, as a suffix.

   For example **/additional-hdd#1/partition1**. Note that it is this partition name, including **/partition1**, that should be used for Media Manager settings.

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

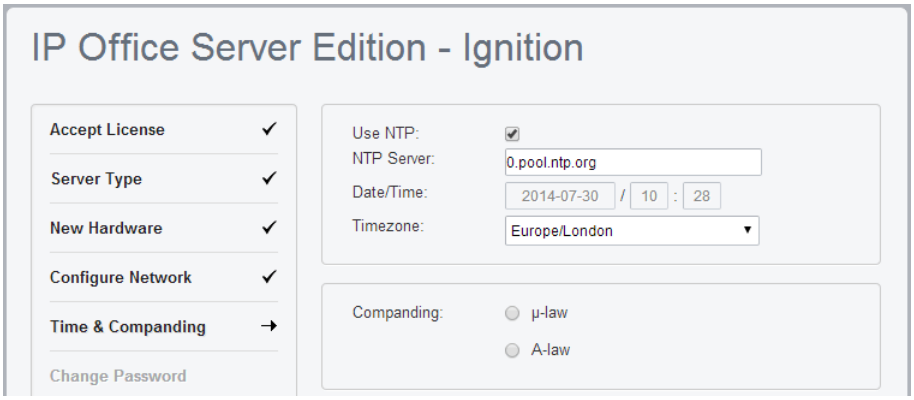
5. Click **Next**. Enter the server's network settings.



- Remember that the LAN1 and LAN2 IP addresses and DHCP mode selections affect the virtual machine's **PLDS Host ID** used for licensing . Therefore, if using or planing to use local nodal licensing, we strongly recommended that before obtaining any licenses, you ensure that these are set to their final values.
- The ignition process allows you to set the IP address for the LAN1 port only. The LAN2 port initially uses the default address 192.168.43.1. To avoid the duplicate IP address issue you should set the LAN2 address after ignition. This can be done using IP Office Manager or IP Office Web Manager.
- For AWS virtual machine these settings affect the private IP address settings of the instance. They do not alter the public IP address values assigned by AWS.
- **Hostname** is used as the DNS host name of the server.
  - For internal applications, this value must be reachable by DNS within the customer network. If the server is also 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.

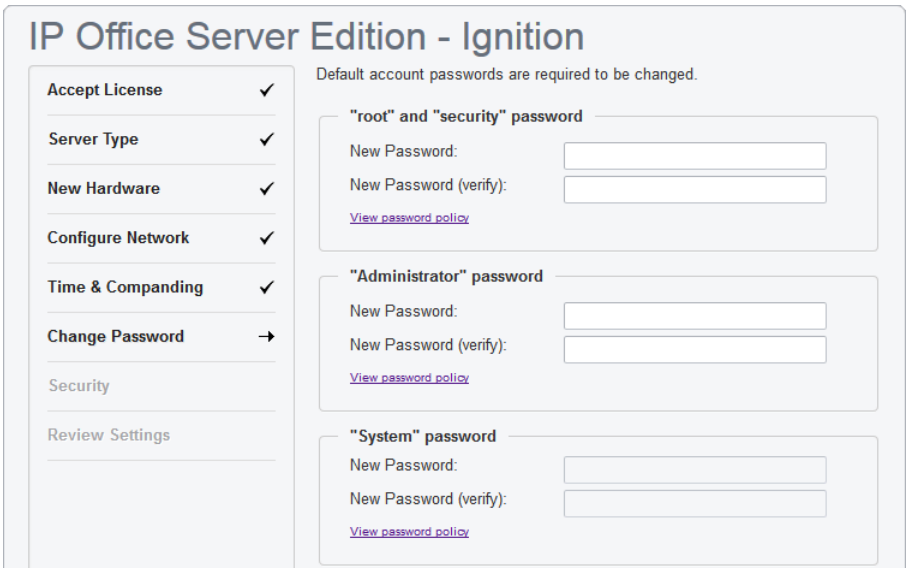
6. Click **Next**.
7. Set the time source for the server.



- 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, Secondary Server and Expansion System (L) servers automatically get their time from the Primary Server and you can only change the **Timezone**.
- Select the companding setting to use. For telephone systems in North American locations and Japan, select **µ-Law** (also referred to as U-Law or Mu-Law). For most other locations, select **A-Law**.

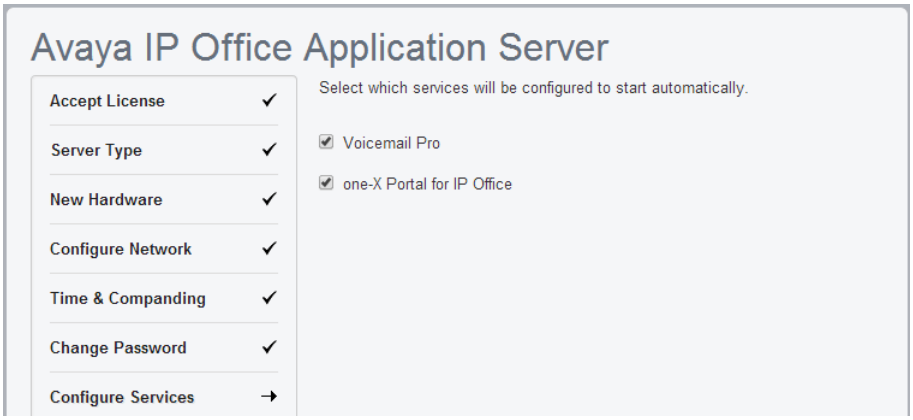
8. Click **Next**.

9. 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.

10. Click **Next**.
11. 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.

12. Click **Next**.

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

- If you select **Generate CA automatically**, you must download the certificate from the next screen.
- If you select **Import CA**, click **Browse** and locate the security certificate file that the server should use and click **Upload**.

13. Select whether you want the server to be supported by Avaya through their **EASG** service and click **Next**.
14. Check the displayed summary. Use the **Previous** and **Next** options to readjust settings if necessary.
15. Click **Apply**.
16. The browser menu will attempt to redirect you to the server IP address you configured during ignition. Click **OK** when displayed to access the server's IP Office Web Manager menus.

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

Next steps

- Add the downloaded certificate to our browser, see Adding a certificate to the browser on page 97. Then proceed to initial configuration, see IP Office initial configuration on page 99.

Related links

Initial server configuration on page 90

Adding a certificate to the browser

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

- If the server is using its own auto-generated certificate, you can downloaded the certificate from the **Certificates** section of the **Settings** > **General** menu. Download the **DER-encoded** certificate (a `CRT` file).
- If the server is using an identity certificate generated elsewhere and then uploaded to the server, obtain a copy of the CA certificate from the same source.

Related links

Initial server configuration on page 90
Adding a certificate to Firefox on page 97
Adding a certificate to Google Chrome on page 98
Adding a certificate to Windows Edge on page 99
Adding a certificate to Mac Safari on page 99

Adding a certificate to Firefox

Procedure

1. Click the ☰ icon and select ⚙. Alternatively, click on the ⚙ 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.

Next steps

- If adding the certificate from a newly initialized server, proceed to initial configuration. See IP Office initial configuration on page 99.

Related links

Adding a certificate to the browser on page 97

Adding a certificate to Google Chrome

Procedure

1. Click the ⋮ icon and select **Settings**.
2. Click **Show** advanced settings. Scroll to **HTTP/SSL** and click **Manage certificates**.
3. Click **Import**.
4. Click **Next** and browse to the location of the downloaded certificate. Select it and click **Open**.
5. Click **Next**.
6. 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**.
7. Click **Next** and then **Finish**.
8. Click **OK**, **Close**.

Next steps

- If adding the certificate from a newly initialized server, proceed to initial configuration. See IP Office initial configuration on page 99.

Related links

Adding a certificate to the browser on page 97

Adding a certificate to Windows Edge

Procedure

1. From the file browser, open the directory containing the certificate file.
2. Right-click the file and select **Install Certificate**. You may be prompted for admin credentials and/or a confirmation prompt.
3. On the first wizard screen, click **Next**.
4. On the **Certificate Store** screen select **Place all certificates in the following store**.
   - If using the server's own generated certificate, select the **Trusted Root Certification Authorities**.
   - If using a certificate from another source, select **Intermediate Certification Authorities**.
5. Click **OK**.

Next steps

- If adding the certificate from a newly initialized server, proceed to initial configuration. See IP Office initial configuration on page 99.

Related links

Adding a certificate to the browser on page 97

Adding a certificate to Mac Safari

Procedure

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**.

Next steps

- If adding the certificate from a newly initialized server, proceed to initial configuration. See IP Office initial configuration on page 99.

Related links

Adding a certificate to the browser on page 97

IP Office initial configuration

About this task

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

Procedure

1. Log in to IP Office Web Manager.
   a. Enter `https://` followed by the server address. Click on the IP Office Web Manager 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 is 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.

Related links

Initial server configuration on page 90

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 Media Manager. See Related Documentation on page 10.

Related links

Initial server configuration on page 90

Disabling a network port

The IP Office virtual machine deploys with two network interfaces. By default these configure as **`eth0`** (192.168.42.1/255.255.255.0) and **`eth1`** (192.168.43.1/255.255.255.0) when the virtual machine starts. The IP Office uses these as LAN1 and LAN2 respectively.

If **`eth1`** (LAN2) is not required, you can disable the port. Doing that reduces the chances of IP address duplication, which causes the IP Office application to not start. See Duplicate IP address issue on page 10.

Related links

Initial server configuration on page 90

Disabling a network port on page 101
Enabling a network port on page 101

Disabling a network port

About this task

You can use this process to disable a network port.

Procedure

1. Login to the server as root.
2. Enter **nmcli** to see details of the active ports.
3. Enter **nmtui**.
4. Select **Activate a connection**.
5. Highlight the connection you want to disable and select **Deactivate**.
6. Select **Back**.
7. Select **OK**.
8. Enter **nmcli** to see details of the active ports.

Related links

Disabling a network port on page 100

Enabling a network port

About this task

You can use this process to enable a network port.

Procedure

1. Login to the server as root.
2. Enter **nmcli** to see details of the active ports.
3. Enter **nmtui**.
4. Select **Activate a connection**.
5. Highlight the connection you want to disable and select **Activate**.
6. Select **Back**.
7. Select **OK**.
8. Enter **nmcli** to see details of the active ports.

Next steps

- If doing as part of installing a new virtual machine, continue with any further profiling required. When completed, start the virtual machine (see Powering On a VMware virtual machine on page 46).

Related links

Disabling a network port on page 100

Chapter 14: Adding TTS languages

The Voicemail Pro application can use Text-to-speech (TTS). However, the IP Office image file used to create virtual machines does not include the TTS languages. The TTS languages are downloadable as three separate DVD's. See Downloading software for VMware on page 30.

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

Warning:

- Note: TTS files from pre-12.0 releases are not compatible with R12.0 and higher.
- The server will restart the voicemail service each time you install a TTS language.

Related links

Checking the TTS languages installed on page 103
Downloading the TTS languages on page 104
Adding a new language on page 104

Checking the TTS languages installed

Procedure

1. Access the server's web control/platform view menus.
2. Select **Updates**.
3. In the list of **Services**, each TTS language is shown with the prefix **TTS**.

Related links

Adding TTS languages on page 103

Downloading the TTS languages

About this task

Avaya make a number of different file available for each IP Office release. For TTS, select the following files:

- **TTS ISO:**

  The images used to deploy new virtual machines do not include text-to-speech (TTS) prompts. To add TTS languages, you need to download and install the additional ISO files for TTS languages. These are provided as 3 `.iso` files:

  - Note: TTS files from pre-12.0 releases are not compatible with R12.0 and higher.
  - **DVD 1:** English, Spanish, French, German, Italian.
  - **DVD 2:** Swedish, Norwegian, Finnish, Dutch, Danish, Portuguese, Greek.
  - **DVD 3:** Chinese, Polish, Russian.

Procedure

1. Browse to http://support.avaya.com and log in.
2. Click **Support by Product** and select **Downloads**.
3. In the **Enter Product Name** box, enter `IP Office` and select the displayed match.
4. Use the **Choose Release** drop-down to select the required release.
5. From the listed **Downloads**, select the version of release required. There are multiple versions depending on the number of service packs and feature packs available.
6. Click on the required files and follow any further instructions shown by the website and your browser.
7. Also download and read any documents shown under **Related Documents**

Related links

Adding TTS languages on page 103

Adding a new language

About this task

Note that this process causes the voicemail service to restart, ending all calls currently being handled by the voicemail service.

Procedure

1. Access the server's web control/platform view menus.
2. Select **Settings** > **General**.

3. In the **Software Repositories** section, click on the **Browse** button for **Application**. Browse to and select the RPM file for the required language and click **OK**.
4. Click **Add**.
5. Select **Updates**.
6. In the **Services** section, locate the newly added TTS language and click **Install**.

Related links

Adding TTS languages on page 103

Part 8: Upgrading

Chapter 15: 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:

- **Not Supported for Upgrades from Pre-R12.0:**

  This method of upgrading is not supported for upgrading from pre-R12.0 releases. For example, from R11.1 to R12.0.You must upgrade the server using the processes in the Upgrading Linux-based IP Office Systems to R12.0 manual.

- **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.

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. Note that this is not possible from a newly installed virtual primary server.

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 VMware Features on page 24.

Related links

Downloading the software on page 108
Backing up applications on page 108
Transferring the ISO File on page 109

Downloading the software

About this task

Virtual server upgrades use the same ISO file as used for non-virtual servers.

- **ISO file:**

  You can use this type of file to upgrade an existing virtual machine, see Upgrading a virtual machine on page 107. 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.

Procedure

1. Browse to http://support.avaya.com and log in.
2. Click **Support by Product** and select **Downloads**.
3. In the **Enter Product Name** box, enter `IP Office` and select the displayed match.
4. Use the **Choose Release** drop-down to select the required release.
5. From the listed **Downloads**, select the version of release required. There are multiple versions depending on the number of service packs and feature packs available.
6. Click on the required files and follow any further instructions shown by the website and your browser.
7. Also download and read any documents shown under **Related Documents**

Next steps

- Backup the existing servers. See Backing up applications on page 108.

Related links

Upgrading a virtual machine on page 107

Backing up applications

You can configure IP Office Web Manager to backup the servers in a Server Edition network to a another servers. Refer to the *Deploying Avaya IP Office Server Edition Manual* manual.

Next steps

- Once you have backed up the servers, proceed with transferring the new ISO file to the server. See Transferring the ISO File on page 109.

Related links

Upgrading a virtual machine on page 107

Transferring the ISO File

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

- **Transfer from the virtual machine DVD:**
  - 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. See Transfer from a virtual machine DVD on page 118.
- **Transfer from a remote file server:**
  - Thorough the IP Office Web Manager menus, you can configure the server with the details of remote file servers from which it can upload an `ISO` file. See Transfer from a Remote File Server on page 110.
- **Transfer from a primary server path:**
  - 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. See Transfer from a primary server path on page 113.
- **Transfer from the Web Manage client PC:**
  - You can transfer an ISO file during a connected IP Office Web Manager session. See Transfer the ISO from the IP Office Web Manager client PC on page 116.

Related links

Upgrading a virtual machine on page 107

Chapter 16: 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. See *Server Edition documentation* for full details.

Related links

Configuring a remote file server source on page 110
Transferring the ISO from a remote server path on page 110
Upgrading using the Transferred ISO file on page 111

Configuring a remote file server source

Procedure

1. Login to IP Office Web Manager.
2. Click on the **Solution Settings** drop-down and select **Remote Server Options**.
3. IP Office Web Manager lists the currently configured remote servers.
4. Click **Add Remote Server**.
5. Enter details for the remote file server hosting the `ISO` file. The details required vary depending on the protocol used by the server.
6. Click **OK**. The new remote server is now included in the list of remote servers.
7. Click **Close**.

Related links

Transfer from a Remote File Server on page 110

Transferring the ISO from a remote server path

Procedure

1. Login to IP Office Web Manager.

2. Click **Solution**.
3. Click on the **Actions** drop-down and select **Transfer ISO**.
4. Click **Transfer from** and select **Remote Location**.
5. Click **Select Remote Server** and select the previously configured remote file server from the list.
6. In the **File Path** field, enter the path to the ISO file on that server.
7. Click **OK**. The menu shows the progress of the download.
8. The servers listed in the Solution overview show an ⚠ icon and **Upgrade Available**.

Next steps

- Proceed with upgrading from the uploaded file. See Upgrading using the Transferred ISO file on page 111.

Related links

Transfer from a Remote File Server on page 110

Upgrading using the Transferred ISO file

About this task

Having downloaded an `ISO` file to the server , 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.

⚠ Warning:

- **Not Supported for Upgrades from Pre-R12.0:**

  This method of upgrading is not supported for upgrading from pre-R12.0 releases. For example, from R11.1 to R12.0.You must upgrade the server using the processes in the Upgrading Linux-based IP Office Systems to R12.0 manual.

Procedure

1. Login to IP Office Web Manager.
2. Select **Solution**.
3. Select the checkbox next to each server to upgrade. Upgrades require the primary server upgraded before any other servers.
4. Click on the **Actions** drop down and select **Upgrade**.
5. The upgrade process typically requires the IP Office 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.

Next steps

If necessary, repeat the process to upgrade all the servers.

Related links

Transfer from a Remote File Server on page 110

Chapter 17: 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.

Related links

Uploading an ISO file using SSH/SFTP on page 113
Transferring the ISO from a primary server path on page 114
Upgrading using the Transferred ISO file on page 114

Uploading an ISO file using SSH/SFTP

Procedure

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.

Related links

Transfer from a primary server path on page 113

Transferring the ISO from a primary server path

Procedure

1. Login to IP Office Web Manager.
2. Click **Solution**.
3. Click on the **Actions** drop-down and select **Transfer ISO**.
4. Click **Transfer from** and select **Primary Server Path**.
5. In the **File Path** field, enter the path to the previously uploaded ISO file. For example, `/home/Administrator/Downloads/abe-11.1.1-209_el6.iso`.
6. Click **OK**. The menu shows the progress of the download.
7. The servers listed in the Solution overview show an ⚠ icon and **Upgrade Available**.

Next steps

- Proceed with upgrading from the uploaded file. See Upgrading using the Transferred ISO file on page 114.

Related links

Transfer from a primary server path on page 113

Upgrading using the Transferred ISO file

About this task

Having downloaded an `ISO` file to the server , 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.

⚠ Warning:

- **Not Supported for Upgrades from Pre-R12.0:**

  This method of upgrading is not supported for upgrading from pre-R12.0 releases. For example, from R11.1 to R12.0.You must upgrade the server using the processes in the Upgrading Linux-based IP Office Systems to R12.0 manual.

Procedure

1. Login to IP Office Web Manager.
2. Select **Solution**.
3. Select the checkbox next to each server to upgrade. Upgrades require the primary server upgraded before any other servers.
4. Click on the **Actions** drop down and select **Upgrade**.

5. The upgrade process typically requires the IP Office 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.

Next steps

If necessary, repeat the process to upgrade all the servers.

Related links

Transfer from a primary server path on page 113

Chapter 18: Upgrade by Transfer from Your Client PC

This method of upgrade uses an `.iso` file transferred directly from your PC through the browser.

Related links

Transfer the ISO from the IP Office Web Manager client PC on page 116
Upgrading using the Transferred ISO file on page 117

Transfer the ISO from the IP Office Web Manager client PC

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.

Procedure

1. Login to IP Office Web Manager.
2. Click **Solution**.
3. Click on the **Actions** drop-down and select **Transfer ISO**.
4. Click **Transfer from** and select **Client Machine**.
5. For the **Select ISO** field, click **Browse**. Locate and select the `ISO` file and click **Open**.
6. Click **OK**. The menu shows the progress of the download.
7. The servers listed in the Solution overview show an ⚠ icon and **Upgrade Available**.

Next steps

- Proceed to upgrading from a downloaded ISO. See Upgrading using the Transferred ISO file on page 117.

Related links

Upgrade by Transfer from Your Client PC on page 116

Upgrading using the Transferred ISO file

About this task

Having downloaded an `ISO` file to the server , 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.

⚠ Warning:

- **Not Supported for Upgrades from Pre-R12.0:**

  This method of upgrading is not supported for upgrading from pre-R12.0 releases. For example, from R11.1 to R12.0.You must upgrade the server using the processes in the Upgrading Linux-based IP Office Systems to R12.0 manual.

Procedure

1. Login to IP Office Web Manager.
2. Select **Solution**.
3. Select the checkbox next to each server to upgrade. Upgrades require the primary server upgraded before any other servers.
4. Click on the **Actions** drop down and select **Upgrade**.
5. The upgrade process typically requires the IP Office 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.

Next steps

If necessary, repeat the process to upgrade all the servers.

Related links

Upgrade by Transfer from Your Client PC on page 116

Chapter 19: 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:

- **Connect to an ISO file on the client PCs hard disk –** 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. See Connect to an ISO File on the client PCs hard disk on page 119.
- **Connect to the client PC DVD drive –** 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. See Connect to the client PCs DVD drive on page 120.
- **Connect to an ISO file in the virtual server datastore –** 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. See Connect to an ISO File in the virtual server datastore on page 121.
- **Connect to the VMware server's DVD drive –** 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. See Connect to the host server's DVD drive on page 124.

Related links

Connect to an ISO File on the client PCs hard disk on page 119
Connect to the client PCs DVD drive on page 120
Connect to an ISO File in the virtual server datastore on page 121
Connect to the host server's DVD drive on page 124
Downloading the ISO from the primary DVD on page 126
Upgrading using the Transferred ISO file on page 126

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.

Related links

[Transfer from a virtual machine DVD](#) on page 118
[Mapping the virtual machine's DVD to a local PC ISO file (vSphere desktop client)](#) on page 119
[Mapping the virtual machine's DVD to a local PC ISO file (vSphere web client)](#) on page 119

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

Procedure

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**.

Next steps

- You can now download the ISO to the virtual server using the **DVD Primary Server** option in the IP Office Web Manager menus. See Downloading the ISO from the primary DVD on page 126.

Related links

Connect to an ISO File on the client PCs hard disk on page 119

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

Procedure

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 icon in the toolbar.
4. From the **CD/DVD** drive drop-down, select **CD/DVD drive 1** and then select **Connect to ISO image on local disk**.
5. Select the ISO file and click **Open**.
6. You can now download the ISO to the virtual server using the **DVD Primary Server** option in the IP Office Web Manager menus.

Next steps

- You can now download the ISO to the virtual server using the **DVD Primary Server** option in the IP Office Web Manager menus. See Downloading the ISO from the primary DVD on page 126.

Related links

Connect to an ISO File on the client PCs hard disk on page 119

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.

Related links

Transfer from a virtual machine DVD on page 118
Mapping the virtual machine’s DVD to the local PC drive (vSphere desktop client) on page 120
Mapping the virtual machine's DVD to local PC drive (vSphere web client) on page 121

Mapping the virtual machine’s DVD to the local PC drive (vSphere desktop client)

Procedure

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** and then select the appropriate drive letter for the PC drive containing the DVD.

Next steps

- You can now download the ISO to the virtual server using the **DVD Primary Server** option in the IP Office Web Manager menus. See Downloading the ISO from the primary DVD on page 126.

Related links

Connect to the client PCs DVD drive on page 120

Mapping the virtual machine's DVD to local PC drive (vSphere web client)

Procedure

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** 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**.

Next steps

- You can now download the ISO to the virtual server using the **DVD Primary Server** option in the IP Office Web Manager menus. See Downloading the ISO from the primary DVD on page 126.

Related links

Connect to the client PCs DVD drive on page 120

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.

Related links

Transfer from a virtual machine DVD on page 118
Uploading an ISO file to the datastore (vSphere desktop client) on page 122
Uploading an ISO file to the datastore (vSphere web client) on page 122
Mapping the virtual machine DVD to an ISO file in the datastore (vSphere desktop client) on page 123
Mapping the virtual machine DVD to an ISO file in the datastore (vSphere web client) on page 123

Uploading an ISO file to the datastore (vSphere desktop client)

Procedure

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. Select the **Summary** tab on the right.
6. In the **Resources** section, right click on the datastore and select **Browse Datastore**.
7. Click on the and select **Upload File**.
8. Browse to the location of the `ISO` image and click **OK**.
9. Once the upload has finished, close the **Datastore Browser**.

Next steps

- You can now map the virtual machine DVD drive to the `ISO` file. See Mapping the virtual machine DVD to an ISO file in the datastore (vSphere desktop client) on page 123.

Related links

Connect to an ISO File in the virtual server datastore on page 121

Uploading an ISO file to the datastore (vSphere web client)

Procedure

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 **Datastore** and on the **Objects** tab, select the datastore to which you will upload the file.
3. Click the icon.
4. Select the folder that you created or select an existing folder, and click the 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.

Next steps

- You can now map the virtual machine DVD drive to the `ISO` file. See Mapping the virtual machine DVD to an ISO file in the datastore (vSphere web client) on page 123.

Related links

Connect to an ISO File in the virtual server datastore on page 121

Mapping the virtual machine DVD to an ISO file in the datastore (vSphere desktop client)

Before you begin

- Upload the ISO file. See Uploading an ISO file to the datastore (vSphere desktop client) on page 122.

Procedure

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 **Connect/disconnect the CD/DVD device of the virtual machine** 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 datastore**.
7. Select **Datastore ISO File** and click **Browse**.
8. Select the ISO file and click **OK**.

Next steps

- You can now download the ISO to the virtual server using the **DVD Primary Server** option in the IP Office Web Manager menus. See Downloading the ISO from the primary DVD on page 126.

Related links

Connect to an ISO File in the virtual server datastore on page 121

Mapping the virtual machine DVD to an ISO file in the datastore (vSphere web client)

Before you begin

- Upload the ISO file. See Uploading an ISO file to the datastore (vSphere web client) on page 122.

Procedure

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**.
3. Expand **CD/DVD**, and select **Datastore ISO File** from the drop-down menu.
4. Browse to select the file and click **OK**.
5. Click **Edit** and select **Connected** next to the datastore `ISO` file to connect the device.
6. Click **OK**.

Next steps

- You can now download the ISO to the virtual server using the **DVD Primary Server** option in the IP Office Web Manager menus. See Downloading the ISO from the primary DVD on page 126.

Related links

Connect to an ISO File in the virtual server datastore on page 121

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.

Related links

Transfer from a virtual machine DVD on page 118
Mapping the virtual machine DVD to the host DVD drive (vSphere desktop client) on page 124
Mapping the virtual machine DVD to the host DVD drive (vSphere web client) on page 125

Mapping the virtual machine DVD to the host DVD drive (vSphere desktop client)

Procedure

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, select **CD/DVD** 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`.
8. Click **OK**.

Next steps

- You can now download the ISO to the virtual server using the **DVD Primary Server** option in the IP Office Web Manager menus. See Downloading the ISO from the primary DVD on page 126.

Related links

Connect to the host server's DVD drive on page 124

Mapping the virtual machine DVD to the host DVD drive (vSphere web client)

Procedure

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**.
3. On the **Virtual Hardware** tab, expand **CD/DVD** and from the drop-down menu select **Host Device**.
4. If more than one type of CD/DVD media is available on the host, select the media.
5. Click **OK**.

Next steps

- You can now download the ISO to the virtual server using the **DVD Primary Server** option in the IP Office Web Manager menus. See Downloading the ISO from the primary DVD on page 126.

Related links

Connect to the host server's DVD drive on page 124

Downloading the ISO from the primary DVD

About this task

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.

Procedure

1. Login to IP Office Web Manager.
2. Click **Solution**.
3. Click on the **Actions** drop-down and select **Transfer ISO**.
4. Click **Transfer from** and select **DVD Primary Server**.
5. Click **OK**. The menu shows the progress of the download.
6. The servers listed in the Solution overview show an ⚠ icon and **Upgrade Available**.

Next steps

- Proceed with upgrading from the uploaded file. See Upgrading using the Transferred ISO file on page 126.

Related links

Transfer from a virtual machine DVD on page 118

Upgrading using the Transferred ISO file

About this task

Having downloaded an `ISO` file to the server , 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.

⚠ **Warning:**

- **Not Supported for Upgrades from Pre-R12.0:**

  This method of upgrading is not supported for upgrading from pre-R12.0 releases. For example, from R11.1 to R12.0.You must upgrade the server using the processes in the Upgrading Linux-based IP Office Systems to R12.0 manual.

Procedure

1. Login to IP Office Web Manager.
2. Select **Solution**.
3. Select the checkbox next to each server to upgrade. Upgrades require the primary server upgraded before any other servers.
4. Click on the **Actions** drop down and select **Upgrade**.

5. The upgrade process typically requires the IP Office 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.

Next steps

If necessary, repeat the process to upgrade all the servers.

Related links

Transfer from a virtual machine DVD on page 118

Part 9: Further Help

Chapter 20: Additional Help and Documentation

The following pages provide sources for additional help.

Related links

Additional Manuals and User Guides on page 129
Getting Help on page 129
Finding an Avaya Business Partner on page 130
Additional IP Office resources on page 130
Training on page 131

Additional Manuals and User Guides

The Avaya Documentation Center website contains user guides and manuals for Avaya products including IP Office.

- For a listing of the current IP Office manuals and user guides, look at the Avaya IP Office™ Platform Manuals and User Guides document.
- The Avaya IP Office Knowledgebase and Avaya Support websites also provide access to the IP Office technical manuals and users guides.
  - Note that where possible these sites redirect users to the version of the document hosted by the Avaya Documentation Center.

For other types of documents and other resources, visit the various Avaya websites (see Additional IP Office resources on page 130).

Related links

Additional Help and Documentation on page 129

Getting Help

Avaya sells IP Office through accredited business partners. Those business partners provide direct support to their customers and can escalate issues to Avaya when necessary.

If your IP Office system currently does not have an Avaya business partner providing support and maintenance for it, you can use the Avaya Partner Locator tool to find a business partner. See Finding an Avaya Business Partner on page 130.

Related links

Additional Help and Documentation on page 129

Finding an Avaya Business Partner

If your IP Office system currently does not have an Avaya business partner providing support and maintenance for it, you can use the Avaya Partner Locator tool to find a business partner.

Procedure

1. Using a browser, go to the Avaya Website at https://www.avaya.com
2. Select **Partners** and then **Find a Partner**.
3. Enter your location information.
4. For IP Office business partners, using the **Filter**, select **Small/Medium Business**.

Related links

Additional Help and Documentation on page 129

Additional IP Office resources

In addition to the documentation website (see Additional Manuals and User Guides on page 129), there are a range of website that provide information about Avaya products and services including IP Office.

- Avaya Website (https://www.avaya.com)

  This is the official Avaya website. The front page also provides access to individual Avaya websites for different regions and countries.
- **Avaya Sales & Partner Portal** *(*https://sales.avaya.com*)*

  This is the official website for all Avaya business partners. The site requires registration for a username and password. Once accessed, you can customize the portal to show specific products and information type that you want to see.
- **Avaya Support** *(*https://support.avaya.com*)*

  This site provide access to Avaya product software, documentation and other services for Avaya product installers and maintainers.

  - **Avaya Support Forums** *(*https://support.avaya.com/forums/index.php*)*

    This site provides forums for discussing product issues.

- **International Avaya User Group** *(https://www.iuag.org)*

  This is the organization for Avaya customers. It provides discussion groups and forums.

- **Avaya Learning** *(https://www.avaya-learning.com/)*

  This site provides access to training courses and accreditation programs for Avaya products.

Related links

Additional Help and Documentation on page 129

Training

Avaya training and credentials ensure our Business Partners have the capabilities and skills to successfully sell, implement, and support Avaya solutions and exceed customer expectations. The following credentials are available:

- Avaya Certified Sales Specialist (APSS)
- Avaya Implementation Professional Specialist (AIPS)
- Avaya Certified Support Specialist (ACSS)

Credential maps are available on the Avaya Learning website.

Related links

Additional Help and Documentation on page 129

Index

A

A-law 92
activate
  network port 101
add
  browser certificate 97
  hard disk Hyper-V 52
  hard disk VMware 33
  TTS language 104
Add
  KVM 81
Additional disk
  Azure 70
  Hyper-V 52
  KVM 82
  VMware 33
additional hard disk
  add Hyper-V 52
  add Vmware 33
  AWS 60
  mount point 92
Administrator 129
alarm 27
Amazon
  machine instance 19
  profiling 59
  security groups 59, 62
Anywhere 10
APIs 130
Application Notes 130
Application Server
  profiling 21
  select role 92
archiving
  media manager 15
ASP 130 R6 78
AWS
  machine instance 19, 62
  profiling 59
  security groups 59, 62
Azure 65
  Additional disk 70
  Container 68
  Copy VHD 71
  Download VHD 65
  Login 66
  Network 67
  public-private key 73
  Resource Group 67
  SFTP 73
  SSH 73
  Start virtual machine 71
Azure *(continued)*
  Storage Account 68
  Upload VHD 68

B

backup 108
Blob Type 68
Blu-Ray 15
browser
  certificate 97
  connect to new server 90
  connect to server 99
business partner locator 130

C

certificate
  Chrome 98
  Edge 99
  Firefox 97
  Google Chrome 98
  OVA certificate 31
  Safari 99
change
  IP address 91, 92
  machine instance 62
check
  TTS languages 103
Chrome certificate 98
companding 92
configuration 90
configure
  remote file server 110
  server 100
connect
  new server 90
  server 99
Container 68
convert
  private key 75
copy
  VHD 71
copy disk image 50
courses 130
CPU
  adjust (Hyper-V) 55
  adjust (KVM) 84
  adjust (VMware) 39
  alarm 27
  Application Server 21
  expansion server 20
  primary server 19

CPU *(continued)*
secondary server 19
Server Edition application server 20
CPU cycles
adjust (VMware) 40
create a virtual server
AWS 58
Azure 65
Hyper-V 48
VMware 29
critical alarm 27

D

date 92
deactivate
network port 101
default
user name and password 90
virtual server spec 18
Dell 640 78
deploy a new server
AWS 58
Azure 65
Hyper-V 48
VMware 29
differences 14
Media Manager archiving 15
RPM files 14
upgrading 15
USB 15
VMware tools 15
disable
port 101
disk image
copy 50
download 49
rename 50
documentation 10
download 11
download
documentation 11
ISO file 108
OVA certificate 30
OVA file 30
TTS 104
VHDX file 49
Download
Azure VHD 65
KVM 78
TTS 65, 78
duplicate IP address 10
DVD+RW archiving 15

E

Edge certificate 99
enable
port 101
Enterprise 24
Essentials 24
ESXi 24
eth1
activate 101
deactivate 101
expansion server
profiling 20
select role 92
external music 15

F

files
RPM files 14
Firefox certificate 97
format
additional hard disk 92
forums 130

G

gateway 92
Generation 51
Generation 2 69
Google Chrome certificate 98
Grace period 13

H

hard disk
add Hyper-V 52
add VMware 33
adjust (Hyper-V) 50
adjust (KVM) 86
adjust (VMware) 42
alarm 27
Application Server 21
expansion server 20
IOPS 26
mount point 92
primary server 19
secondary server 19
Server Edition application server 20
hardware requirements 25
Help 129
High Availability 28
hostname 92
Hyper-V
Additional disk 52
adjust CPU 55
adjust hard disk 50
adjust RAM 54
power on 56

Hyper-V *(continued)*
profiling 53
start 56

I

ignition 92
initialization 90
IOPS 26
adjust (VMware) 44
alarm 27
Application Server 21
expansion server 20
primary server 19
secondary server 19
Server Edition application server 20
IP address
change 92
change (console) 91
duplicate issue 10
IP Office
documentation 10
public key 74
IP Office Anywhere 10
ISO file
download 108
transfer to server 109

K

key pair 73
KVM 78
Add virtual machine 81
Additional disk 82
adjust CPU 84
adjust hard disk 86
adjust RAM 85
Copy 79
Download 78
power on 87
profiling 83
start 87

L

launch a new server
AWS 58
Azure 65
Hyper-V 48
VMware 29
license 12
Linux
KVM 78
Local nodal licensing 12
login
new server 90
login *(continued)*
server 99
Login
Azure 66

M

machine instance
application server 20, 21
change 62
expansion server 20
primary server 19
secondary server 19
Manuals 129
Media Manager
archiving 15
Azure disk 70
Hyper-V disk 52
KVM disk 82
VMware disk 33
memory
alarm 27
Application Server 21
expansion server 20
primary server 19
secondary server 19
Server Edition application server 20
music-on-hold 15

N

NAS 15
network
alarm 27
Azure 67
network port 100
disable 101
enable 101
New machine
Hyper-V 51
Nodal licensing 12
NTP 92

O

one-X Portal
documentation 10
users 19–21
Oracle VirtualBox 10
OS Type 69
OVA certificate
download 30
install 31
OVA file
deploy 32, 33
download 30

P

Page Blob 68
password 92
PLDS Host ID 12
port
  disable 101
  enable 101
power on
  Azure 71
  Hyper-V 56
  KVM 87
  VMware 46
primary server
  profiling 19
  select role 92
private key 73
  convert 75
  PuTTY 75
  PuTTYgen 75
profiling 17
  Application Server 21
  AWS 59
  CPU (Hyper-V) 55
  CPU (KVM) 84
  CPU (VMware) 39
  CPU cycles (VMware) 40
  default server profile 18
  expansion server 20
  hard disk (Hyper-V) 50
  hard disk (KVM) 86
  hard disk (VMware) 42
  Hyper-V 53
  IOPS (VMware) 44
  KVM 83
  primary server 19
  RAM (Hyper-V) 54
  RAM (KVM) 85
  RAM (VMware) 37
  secondary server 19
  Server Edition application server 20
  VMware 36
public key 73
  add to IP Office 74
PuTTY
  private key 75
  PuTTYgen 75
PuTTYgen 75

Q

Quick Reference Guides 129

R

RAM
  adjust (Hyper-V) 54
RAM *(continued)*
  adjust (KVM) 85
  adjust (VMware) 37
Red Hat Linux 78
related documentation 10
remote file server 110
rename disk image 50
requirements
  vMotion 26
Reseller 129
resilience 17
  High Availability 28
Resource Group 67
role 92
RPM files 14

S

Safari certificate 99
sales 130
SDKs 130
secondary server
  profiling 19
  select role 92
Secure Boot 51
security groups
  change 62
  create 59
Security Type 69
server
  backup 108
  configue 100
  configuration 90
  connect 99
  connect to new 90
  ignite new 92
  initialization 90
  license 12
  profiling 17
  server type 92
  transfer ISO file 109
  upgrade 107
  virtual server differences 14
setting
  IP address 91
SFTP
  Azure 73
Snapshot 24
software requirements 25
Source Blob 69
Source Type 69
SSH
  Azure 73
start
  Hyper-V virtual machine 56
  KVM 87
Start

Start *(continued)*
Azure ... 71
Storage Account ... 68
support ... 130
Media Manager archiving ... 15
RPM files ... 14
upgrading ... 15
USB ... 15
VMware ... 24
VMware tools ... 15
switch on
Azure ... 71
Hyper-V ... 56
KVM ... 87
VMware ... 46
system
settings ... 29, 48
System Administrator ... 129

T

Technical Bulletins ... 130
time ... 92
timezone ... 92
training ... 130, 131
transfer ISO
from DVD ... 118
from remote file server ... 110
using SSH/SFTP ... 113
TTS ... 103
add language ... 104
check ... 103
download ... 104

U

U-law ... 92
upgrade ... 107
from virtual server ... 15
RPM files ... 14
transfer ISO file ... 109
upload
VHD ... 68
USB ... 15
User Guides ... 129
users
Application Server ... 21
expansion server ... 20
one-X Portal ... 20
primary server ... 19
secondary server ... 19

V

vCenter ... 24
VHD
copy ... 71
Download ... 65
upload ... 68
VHDX file
deploy ... 51
download ... 49
Virtual machine
Add KVM ... 81
Start Azure ... 71
Start Hyper-V ... 56
Start KVM ... 87
VM Generation ... 69
vMotion ... 24, 26
VMware
Additional disk ... 33
adjust CPU ... 39
adjust CPU cycles ... 40
adjust hard disk ... 42
adjust RAM ... 37
High Availability ... 28
IOPS ... 44
OVA certificate ... 31
power on ... 46
profiling ... 36
requirements ... 25
Snapshot ... 24
supported features ... 24
VMware Player ... 10
VMware tools ... 15
Voicemail Pro
channels ... 19
documentation ... 10
TTS ... 103
vSphere ... 24

W

warning alarm ... 27
WebLM centralized licensing ... 12
websites ... 130