CLOUD INFRASTRUCTURE
VIRTUAL SERVER (DEDICATED)
USER GUIDE
WELCOME TO THE VIRTUAL SERVER (DEDICATED) USER GUIDE

AUSTRALIAN ACCOUNT HOLDERS
For sales, account set-up enquiries and technical support, contact your Telstra representative or visit the Cloud Services website (www.cloud.telstra.com), where you’ll find all our contact details plus a glossary, FAQs and Our Customer Terms.

TELSTRA GLOBAL ACCOUNT HOLDERS
For sales, account set-up enquiries and technical support, contact your Telstra Global representative or visit the Telstra Global website (www.telstraglobal.com/cloud) for the customer service team in your region.

Note: we don’t provide assistance with issues specific to a customer’s local network, servers, operating systems and software (post-installation). Specialist technical support may be charged as an additional service.

CONVENTIONS USED IN THIS GUIDE
The following typographical conventions are used in this guide for simplicity and readability:

Web addresses, email addresses and hyperlinks are shown in bold italics; for example www.cloud.telstra.com.

Button names and titles/features on your computer screen are shown in italics.

User input is shown in typewriter font.

Virtual Server on Dedicated Compute User Guide, Version 10.0

© Telstra Corporation Limited (ABN 33 051 775 556) 2017. All rights reserved.

This work is copyright. Apart from any use as permitted under the Copyright Act 1968, information contained within this manual cannot be used for any other purpose other than the purpose for which it was released. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the written permission of Telstra Corporation Limited.

Words mentioned in this book that are known to be trademarks, whether registered or unregistered, have been capitalised or use initial capitals. Terms identified as trademarks include Microsoft®, Microsoft Windows®, VMware®, Sybase®, Oracle®, Red Hat® and Ubuntu®.
## WHAT’S INSIDE

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OVERVIEW</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>HOW IT WORKS</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>DEDICATED RESOURCES – BLADES AND STORAGE</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>MANAGING YOUR VIRTUAL SERVERS</td>
<td>19</td>
</tr>
<tr>
<td>5</td>
<td>IP MANAGEMENT</td>
<td>29</td>
</tr>
<tr>
<td>6</td>
<td>VIEW SERVERS</td>
<td>31</td>
</tr>
<tr>
<td>7</td>
<td>GROUP VIRTUAL SERVERS</td>
<td>33</td>
</tr>
<tr>
<td>8</td>
<td>SNAPSHOTS</td>
<td>36</td>
</tr>
<tr>
<td>9</td>
<td>BACKUPS</td>
<td>37</td>
</tr>
<tr>
<td>10</td>
<td>YOUR PRIVILEGES</td>
<td>44</td>
</tr>
<tr>
<td>11</td>
<td>REPORTS</td>
<td>47</td>
</tr>
<tr>
<td>12</td>
<td>SOFTWARE</td>
<td>48</td>
</tr>
<tr>
<td>13</td>
<td>APPENDIX A: VSPHERE CLIENT FEATURES</td>
<td>49</td>
</tr>
<tr>
<td>14</td>
<td>APPENDIX B: VIRTUALISATION RESPONSIBILITIES</td>
<td>70</td>
</tr>
<tr>
<td>15</td>
<td>APPENDIX C: INSTALL OPERATING SYSTEM CLIENT SOFTWARE, CONSOLE SOFTWARE AND DATABASE BACKUP SOFTWARE</td>
<td>74</td>
</tr>
<tr>
<td>16</td>
<td>APPENDIX D: FIND A BACKUP SERVER NAME</td>
<td>112</td>
</tr>
<tr>
<td>17</td>
<td>APPENDIX E: RESTORE BACKUP FILE TO ALTERNATE SERVER</td>
<td>114</td>
</tr>
</tbody>
</table>
CHAPTER 18  APPENDIX F: BACKUP AND RESTORE PROCEDURES FOR DATABASE SOFTWARE  120

CHAPTER 19  APPENDIX G: LINUX BACKUP AND RESTORE COMMAND LINES  149

CHAPTER 20  APPENDIX H: IP ADDRESSES TO CONFIGURE ROUTES TO BACKUP  150

CHAPTER 21  APPENDIX I: BACKUP AND RESTORE TROUBLESHOOTING  155
CHAPTER 1
OVERVIEW

There are three virtual server services available on Telstra’s cloud infrastructure. Each one offers different ways to create and manage your cloud resources.

This guide refers specifically to our virtual server (dedicated) service and outlines your resources plus how to create and manage your virtual servers.

Our cloud services allow you to use different server types in any combination. You can learn about the other types of virtual servers in the:

- **Virtual Server (Shared) User Guide**
- **Managed Virtual Server (Dedicated) User Guide** — this service is available at data centres in Sydney, Melbourne and Perth.

These user guides do not include detailed information about account management, networks and security, infrastructure design and pricing. This along with other information features in the following guides, which can be used in conjunction with this one:

- **Account Management Guide**
- **Network and Security User Guide**
- **Infrastructure Design Guide**
- **Pricing Guides**
- **Responsibilities Guide**
Australian customers can also view the terms and conditions associated with their cloud services in Our Customer Terms. For terms and conditions for customers outside Australia, contact your account representative.
CHAPTER 2
HOW IT WORKS

When you purchase this service, you complete an order form detailing the resources you need for us to set up your service. You also receive separate welcome emails, which include:

- Your vCenter Server IP address, which you need to complete the vSphere Client installation
- The VMware ESXi host name – ESXi is installed on the blades that your virtual server(s) run on
- The IP address for your connection
- On separate emails, the username and password you need to complete the installation

PHYSICAL ENVIRONMENT

On our virtual server (dedicated) service, dedicated physical blades are allocated entirely to your environment.

Your service includes a minimum of two blade (physical) servers that are physically separate from those of other data centre tenants. The processing capacity of each blade is also dedicated to you. Blades can be added or removed on request. We manage the physical server environment according to defined service level agreements.

Our data centres house the physical resources used to provide your virtual servers and feature high availability and 24/7 security. For more details on our data centres, see the Network and Security User Guide.

VCenter Server

All your servers on this service are created using vSphere Client on the VMware® vCenter Server platform.

vSphere Client is the Windows program you use to create, modify or delete virtual servers. Resources including CPU, RAM and storage are also virtualised in vCenter Server, and can be scaled up or down to meet your needs.

INFRASTRUCTURE PATCH MANAGEMENT

We actively monitor your compute environment and liaise with our vendors.

Our vendors provide VCenter patches – updates for reasons including, but not limited to, issues with stability and performance, vulnerabilities, supportability and weaknesses. Most patches are assumed to have been rigorously tested by the respective vendor under strict conditions; however the vendor cannot realistically test for all interoperability scenarios. This is why we test all selected patches that can potentially impact the platform.

We conduct two levels of testing and validation to ensure patch integrity and to mitigate virus damage from accidental execution of the file. The patch is then analysed through technical evaluation, a business impact assessment, security evaluation and a risk evaluation report providing a severity rating for how essential the patch is and how quickly it should be applied.

<table>
<thead>
<tr>
<th>SEVERITY</th>
<th>RISK</th>
<th>ACTION REQUIRED</th>
<th>RECOMMENDED TIMEFRAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical</td>
<td>Unacceptable</td>
<td>ASAP</td>
<td>Deploy within maximum of 24 hours</td>
</tr>
<tr>
<td>Important or moderate</td>
<td>Marginally accepted</td>
<td>Consider action soon</td>
<td>Deploy within maximum of four months</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------</td>
<td>----------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Low</td>
<td>Acceptable</td>
<td>No immediate action</td>
<td>Deploy within maximum of 12 months</td>
</tr>
</tbody>
</table>

We always minimise the risk of disruption in applying the patch to your service. Part of the assessment is to determine whether an outage is necessary and, if required, when the best time is to restart your system. Applying patches in the cloud infrastructure environment is subject to the following normal change management procedures:

1. Review each patch and approve it for the environment.
2. Send you a detailed report of patches/updates required for each of your servers with notification of the patching plan.
3. Schedule with you an agreed date to apply patches.
4. Perform pre-implementation checks (e.g. previous day backup completed, key Telstra services are up).
5. Perform the patches, confirm installation and perform post-implementation checks.
6. Notification sent to you advising you to test the application.
7. Notification sent to our support desk advising completion and alarming to be actioned.

THE CLOUD SERVICES MANAGEMENT CONSOLE

You can manage, configure and view elements of this service using our secure online Cloud Services management console at www.cloud.telstra.com/manage or, for customers outside Australia, via the C3 portal.

These include:
- View and submit requests to modify your dedicated resources (*blades, clusters* and active/performance *storage*)
- Create clusters
- Find the IP address of your vCenter Server
- Request public IP address and management IP addresses
- View the public port group (for public network) and management port group (for the management connection)
- Request a backup of your virtual server data
- Configure, manage or remove your backup set-up
- Submit and manage various network requests (see the *Network and Security User Guide*)
- View your activity log

Instructions on how to use the Cloud Services management console are included in this guide. For details about how to access the Cloud Services management console, see our *Account Management Guide*.

VIRTUAL SERVER (DEDICATED) SERVICE

Each virtual server (dedicated) service allows you to create virtual servers within a virtual data centre and add and configure individual virtual server resources.

Virtual servers (dedicated) can be deployed alongside our other types of virtual servers – virtual servers (shared) and managed virtual servers (dedicated).
While there’s no limit to the number of virtual servers you create in either your public or private network, the number of virtual servers you run in your cluster can affect your virtualisation high availability. Also, bear in mind that clusters have a limitation.

A private network connection is required to access virtual servers in your private network.

Our services come in a range of sizes, including varying amounts of cloud resources. Contact us to find out more about our different plans.

**NETWORK RESOURCES**

Network and security resources for your virtual servers (dedicated) can be created and managed in the Cloud Services management console, but are not detailed in this guide.

Your use of network resources is calculated under your virtual data centre subscription.

Refer to the *Network and Security Guide* for information about:

- Virtual data centres
- Networks and network connections
- Firewalls
- Load balancers
- IPsec VPN
- SSL VPN
- VLAN Extension
- SMTP mail relay (optional service)
- Security (including denial of service and web content security)
- Security add-ons
CHAPTER 3
DEDICATED RESOURCES – BLADES AND STORAGE

VIEW DEDICATED RESOURCES

View your dedicated resources at any time via our secure online Cloud Services management console at www.cloud.telstra.com/manage or, for Telstra customers outside Australia, via the C3 portal.

The Dedicated Resources screen highlights the details of your blades, cluster(s) and active/performance storage.

Any changes you make to your dedicated resources appear on this screen. You can also filter your view by blade type, cluster and virtual data centre location.

If you’re viewing this console screen for the first time after purchasing virtual server (dedicated), you’ll see the cluster you created, including a minimum two blades plus their CPU, RAM, storage type and capacity.

You can also check on the status of a blade – it may be awaiting activation or removal. You can add blades and storage from this page.

Select a specific blade to reveal a summary of its details, including: the blade ID; the data centre it’s associated with; CPU; RAM; and the term of your service.

Select a storage type to reveal which datastore and virtual server(s) it’s allocated to, the amount of storage allocated plus storage removal options.
WHAT IS A CLUSTER?

A cluster is a grouping of the blades and storage you need to run your virtual servers. Virtual servers are then associated with a cluster.

Clusters provide a way to manage groups of blades and storage. Networks can connect between clusters. You might want to use resource pools to manage your CPU and Ram resources to separate testing/development/production virtual servers. You can have different datastores in a cluster for e.g. test/development/production virtual servers.

Each cluster:

- Contains at least two blades plus associated storage (each blade in your subscription can only be associated with one cluster)
- Is visible to public and private network containers
- Can only be associated with one virtual data centre (i.e. a single network)
- Has its own physical RAM and CPU load, independent of other clusters (while you can mix blade configurations in a cluster, for high availability resilience we recommend you keep blades with the same physical CPU and RAM in the same cluster)
- Exists on a separate VLAN (you can have multiple VLANs on a blade)

Limitations

You can't have a mix of virtual server types in the same cluster (e.g. self-managed virtual servers with managed virtual servers).

There is a limit to the number of virtual servers that can be deployed to a cluster. This is based on capacity limits in our infrastructure, including total amounts of CPU, RAM and storage.

You need to manage your cluster so that if the blade with the highest specifications is taken out (in the case of fault or assurance/operation activities) that the remaining blades in the cluster can manage your virtual servers. See below.

Ensuring high availability in a cluster

Your service levels are dependent on enough high-availability capacity being maintained for each virtual server in a cluster. You must ensure enough RAM and CPU capacity is available to failover any virtual server within the cluster.

When configuring a cluster for your policy, choose a percentage for CPU and RAM that reflects the number of blade failures you wish to support. For example, if you want to set aside capacity for two blade failures and there are 10 blades of equal capacity in the cluster, then specify 20 percent (2/10). For more information on capacity requirements, see VMware vSphere’s high availability deployment best practices.
Cluster scenario

The following is an example of a customer with three types of clusters: the first two in this configuration have virtual servers (dedicated) and a third cluster contains managed virtual servers (dedicated).

1. Clusters 1 and 2 belong to this service: virtual server (dedicated)
2. Cluster 3 is part of the virtual server (dedicated) service (separate service)

BLADES (PHYSICAL SERVERS)

Your service includes a minimum of two blade (physical) servers that are physically separate from those of other data centre tenants. The processing capacity of each blade is also dedicated to your use. Blades can be added or removed on request. We manage the physical server environment according to defined service level agreements.

A blade chassis may be shared by multiple customers, but you will have your own dedicated blade server (i.e. the blades are unique) on the chassis.

Blades are available in the following configurations:

<table>
<thead>
<tr>
<th></th>
<th>CPU</th>
<th>RAM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>128</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>256</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>512</td>
</tr>
</tbody>
</table>

OPERATING SYSTEMS AND APPLICATIONS

You need to provide and license the operating system and application(s) required for this service.

OPERATING SYSTEM COMPATIBILITY

Check [www.vmware.com](http://www.vmware.com) to ensure your operating system is compatible and [http://kb.vmware.com](http://kb.vmware.com) if any workarounds need to be implemented for use on the platform.

Some of our customers have seen a bug CRITICAL_STRUCTURE_CORRUPTION with VMware’s ESXi 5.0 Update 2 and Windows Server 2012 R2. If you see this or any other issue visit [http://kb.vmware.com](http://kb.vmware.com) for guidance.

ADD A BLADE(S)

From Dedicated Resources, choose Add Blade/Storage and select Blade from the dropdown.
You’ll be taken to the Request Blade Server form. Complete the requirements on the form in order to submit a request to us to add a blade(s) to your service.

**CONFIGURE BLADES**

You’ll need to know:

- Which virtual server configuration to add the blade to (if you have more than one)
- The number of blades you’d like to add, up to a maximum of 10
- The amount of CPU per blade (2 or 4). If you order multiple blades of differing CPU, you’ll need to complete the Request Blade Server form twice.
- The amount of RAM per blade (128GB, 256GB or 512GB)
- The length of time you want the blade(s) for (1/12/24/36 months)

Note: each blade is allocated 1,000GB (1TB) of active storage by default, though the entire 1TB is not available after formatting.
CHAPTER 3  DEDICATED RESOURCES – BLADES AND STORAGE

14

CONFIGURE CLUSTERS

Each blade you request to add must be allocated to a new or existing cluster. A new cluster must have a minimum of two blades allocated to it.

REVIEW AND PURCHASE

Review your blades and cluster configuration, the estimated fee and make changes to your request before submitting it to us.

REMOVE A BLADE

Removing a blade is upon request. You must contact us to remove a blade(s), ensuring any virtual servers using resources on the blade won’t be affected by its removal.

STORAGE

VIEW STORAGE

The Dedicated Resources page summarises the amount of Active storage and/or Performance storage allocated to your selected cluster.

Active storage is suitable for standard intense file, print and mixed workloads, offering up to 1,000 IOPS (input/output operations per second).

Performance storage is our premium offering, designed to meet demanding workloads of up to 20,000 IOPS, such as databases and business analytics. It comes at a higher fee. You can request an upgrade to performance storage at any time.

You can have as much of each type of storage as required in a cluster.
If you’ve submitted a request to us to add or remove storage, these actions are displayed as *In progress.*
MODIFY STORAGE

You can submit a request to add storage (datastore) or to downsize a datastore. A datastore is a unit of storage assigned to a *cluster* – when a datastore is created it is added to all VMware ESXi hosts in a cluster.

You can track your request in the *activity log* on the Cloud Services management console.

**Add storage**

Adding storage increases the capacity of your infrastructure.

1. From *Dedicated Resources*, choose *Add Blade/Storage* and select *Storage* from the dropdown. This takes you to the *Request storage* page.

   ![Request storage page](image1)

   Or you can access the *Request storage* page from the *Active storage* details page. Select *Add storage*.

   ![Add storage](image2)

2. Complete the details on the *Request storage* page, including:

   The cluster you’re adding storage to
The datastore you’d like the storage in (new or existing)

The type of storage (active or performance)

The new storage quantity

If 8TB is exceeded in the request, a new datastore is created for the remaining storage.

The datastore name (if you’ve selected an existing datastore)
Downsize storage (datastore)

On the storage details page for each cluster, a *Downsize* option appears alongside your datastore(s).

Before you submit a downsize request, make sure any virtual servers using the resources on that datastore won’t be affected.

When you request to downsize a datastore, we move the data from the old datastore to one with the storage amount you have requested.
CHAPTER 4
MANAGING YOUR VIRTUAL SERVERS

You’ve chosen a service that allows you to manage your own virtual server environment. Before you begin, there are some things you need to know about who is responsible for what within the environment. Where possible, we’ve provided you with all the access and privileges you need. Bear in mind that we’re responsible for some parts of the infrastructure, so some access and privileges are restricted.

YOUR ACCESS ROLES

VM LEVEL AND VCENTER LEVEL ACCESS

Using VMware® vCenter Server, two roles are provided for your virtual servers with similar privileges granted; however there are a few additional privileges in the VM level role:

1. Customer Access Role with vCenter level privileges in vSphere, and
2. Customer Access Role VM level privileges in vSphere.

Both roles are granted permissions to your user account at different points in the vCenter Server object hierarchy. The vCenter level role has root level access to the vCenter object and the VM level role has access to your Customer virtual machines folder. It’s recommended that you place all your virtual servers in this folder for the right permission levels to manage the servers.

If you need separate folders at the same level as this folder, they can be created by you but will not have the necessary permissions to manage your virtual servers. To have the permissions apply, contact us.

Note: there is a management folder, containing management machines such as any firewall devices which are hidden from view.

These configurations ensure we can avert uncontrolled change to objects that may prevent us from being able to support your service.

RESTRICTED ACCESS

To ensure compliance with our security best practice, access is not given to infrastructure that is managed by us to support your service.

A Resource Pool will contain any optional firewall devices you choose to deploy. This will assure the required processing resources are adequately allocated.

A VM folder, port groups and datastores are used to isolate infrastructure under our management and operation.

As these parts of the infrastructure have restricted access you will not see them in your vSphere Client; however you will see the resource capacity that has been allocated to them.

For a breakdown of vSphere Client features under the virtual server (dedicated) model, see Appendix A.
VSPHERE CLIENT ACCESS

The following ports to the vCenter Server and ESXi hosts are opened so your vSphere Client can connect to the vCenter Server from any of your specified local source subnets or SSL VPN private subnet. This allows you to manage your virtual servers and the application interfaces that run your service.

<table>
<thead>
<tr>
<th>NAME</th>
<th>PROTOCOL</th>
<th>PORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWW</td>
<td>TCP</td>
<td>80</td>
</tr>
<tr>
<td>Internet Locator Service</td>
<td>TCP</td>
<td>389</td>
</tr>
<tr>
<td>HTTPS</td>
<td>TCP</td>
<td>443</td>
</tr>
<tr>
<td>TCP_636</td>
<td>TCP</td>
<td>636</td>
</tr>
<tr>
<td>UDP_902</td>
<td>UDP</td>
<td>902</td>
</tr>
<tr>
<td>TCP_902-903</td>
<td>TCP</td>
<td>902-903</td>
</tr>
<tr>
<td>TCP_5989</td>
<td>TCP</td>
<td>5989</td>
</tr>
<tr>
<td>TCP_8080</td>
<td>TCP</td>
<td>8080</td>
</tr>
<tr>
<td>TCP_8443</td>
<td>TCP</td>
<td>8443</td>
</tr>
<tr>
<td>TCP_60099</td>
<td>TCP</td>
<td>60099</td>
</tr>
</tbody>
</table>

ACCESS THE vSPHERE CLIENT VIA SSL VPN

If you selected SSL VPN as your connection method, we have created an SSL VPN jump box for you. Depending on your solution configuration, the jump box may be a temporary solution to facilitate access until permanent VPN or Telstra Next IP® network access is operational.

For the pre-conditions required for connecting to these services (network, firewalls etc.), see the Network and Security User Guide.

To access the vSphere Client, go to the SSL VPN login page address using your internet browser. This address was included in the SSL VPN details email you should have already received.

Log in with the SSL VPN username provided in the same email to you. Your password was provided in a separate email.

Your SSL VPN agent will automatically install when using SSL VPN for the first time.

Next, open a remote desktop session to the SSL VPN jump box IP address that was provided in the SSL VPN jump box details email you would have received from us.

Log in with SSL VPN jump box username which was also included in the SSL VPN jump box details email. Your password was provided in a separate email.

Open the vSphere Client by selecting the shortcut icon on the jump box desktop. Log in to the vSphere Client with your vCenter Server IP address, username and password.
You can now create virtual server(s) using the VMware vCenter.

**ACCESS THE vSPHERE CLIENT VIA A TELSTRA NEXT IP® NETWORK**

You can download the vSphere Client to your computer using the browser of your choice.

You'll need to reboot your computer as part of this installation. Ensure you log off any additional users and close all running programs before proceeding.

You also need to set up hostname lookup for the ESXi hosts locally, so the client machine you’re using can perform virtualisation functions with this service. You will need the blade information we provided you previously by email.

Have your vCenter Server IP address and username handy – you’ll need this to complete the installation. The IP address and username can be found in the vCenter Server details email you would have received from us. Your password was provided in a separate email.

1. **Download vSphere Client**

For Telstra customers in Australia, to access your vCenter Server ensure you’re connected via your Telstra Next IP® network. You would have chosen the Telstra Next IP® network connection option in the application form for this service.

For Telstra customers outside Australia, connect via Global Internet Direct or Global IP VPN.

For the pre-conditions required for connecting to these services (network, firewalls etc.), see the Network and Security User Guide.

Open your internet browser and in the address field at the top of the screen type https:// followed by the IP address of your vCenter Server.

A security warning message may appear. To proceed, click OK.

A security alert will appear on your screen, warning you about trusting the SSL certificate. To proceed, select *Continue to this website.*
Once you’ve agreed to continue past the security alerts the VMware vSphere Welcome page will appear. Select Download vSphere Client link to begin.

Save the download to a local file of your choice. Locate the files you saved and run the vSphere Client Installer. A User Account Control dialogue box will appear. Click Yes to continue.
Figure 5: User Account Control Dialogue Box
2. Install vSphere Client

Review VMware documentation for compatible operating systems for the vSphere Client (it’s only compatible with Windows). To begin, double-click the file you download and the Install Wizard will open. To install the vSphere Client step through the instructions in the Installation Wizard.

It may take a few minutes to progress through the installation. Once the Installation Completed dialog box appears click Finish.

3. Reboot your computer

If a dialog box appears asking you to reboot your computer, click Yes, providing there’s no impact to other users or programs on your computer.

CREATE A VIRTUAL SERVER USING THE VMWARE vCENTER

Ensure you’re connecting from a location where your firewall rules permit a connection to your vCenter Server. Refer to the Network and Security User Guide for general instructions on how to configure firewall rules.

1. Prepare to run vSphere Client

You can log in to the Network section of the Cloud Services management console to find the IP address of your vCenter Server. The username and password you need to complete this installation can be found in the welcome email we sent for your service.

2. Open and log in to your vSphere Client

Locate the vSphere Client icon on your desktop and double-click to launch. Alternatively you can locate and run it from your program menu.

Enter your vCenter IP address, username and password in the login dialog box. Click Login.

![Figure 9: VMware vSphere Client login dialog box](image-url)
3. Create a virtual server

In your vSphere Client, select the cluster in the left-hand menu in which you wish to create your virtual server. If you can’t see the cluster you need, expand or shrink the objects in the menu by clicking on the plus or minus sign next to the object. To get started click **Create new virtual machine** from the main screen.

![vSphere Client](image)

**Figure 10: vSphere Client**

1. **Getting Started** tab, where you can access this screen
2. Shows the clusters where you can add a virtual machine
3. Click on **Create new virtual machine**

From the **Create New Virtual Machine** dialog box select **Typical** or **Custom**. Follow the instructions then click **Next**.
Figure 11: Create New Virtual Machine dialog box
Create a name and select a folder location for your virtual server, ensuring you locate it within the *Customer virtual machines* folder.

**Note:** if you need increased privileges, make sure you create your virtual servers within the *Customer virtual machines* folder. Permissions are inherited down the structure if you create subfolders in your virtual machines folder.

Select the cluster where you want to locate the virtual server; click *Next*.

Select the tier of storage you require from your chosen datastore and click *Next*. Information on your storage can be found by logging into the *Cloud Services management console*.

Select your preferred operating system and version and click *Next*.

Configure the network connections for your virtual server as desired. Once complete, click *Next*.  

CHAPTER 4  MANAGING YOUR VIRTUAL SERVERS 27
CREATE A DISK FOR YOUR VIRTUAL SERVER AND CONFIGURE IT, THEN CLICK NEXT.

You’re now ready to complete the creation of a new virtual server. Check your configuration and click Finish. If you want to change the virtual server settings go Back. A task pane will appear at the bottom of the screen to show the progress of the virtual server being created. Once complete your virtual server will be ready. You’ll need to mount an ISO file on it to install your operating system. Your vSphere Client will now look like this:

![Figure 20: vSphere Client with a newly created virtual server](image)

1. Run VM
2. Install OS
3. New VM
4. Task pane

ACCESS

NETWORK CONFIGURATION

Virtual servers on dedicated compute are available in all our data centres globally on cloud infrastructure. The service uses a distributed switch.

The following vSwitch settings are restricted as they are not supported by us or present a risk to our shared Cloud Services network:

- Promiscuous mode
- MAC address and IP changes on public and management networks
- Port mirroring
CHAPTER 5
IP MANAGEMENT

To acquire either a public IP address or management IP address, you need to submit a request to us via the Cloud Services management console.

You need a public IP address to connect to the public network and communicate with the internet.

You need an IP management address for the following services on your virtual servers:

- Backup
- SMTP*
- SSL VPN*

All private IP addresses on this service are managed by you.

*See the Network and Security User Guide for more details.

REQUEST AN IP ADDRESS

Log in to the Cloud Services management console.

Go to the Servers page, select Request an IP address.
CONNECTING TO YOUR VIRTUAL SERVERS

CONNECT TO A VIRTUAL SERVER IN YOUR PUBLIC NETWORK
1. In vCenter Server, create a virtual server and attach it to the correct port group. You’ll find the public port group (specified by us) on the Request IP address page in the Cloud Services management console.

2. Log in to the Cloud Services management console and request a public IP address. We’ll process your request as soon as we can and let you know when it’s ready.

3. From your virtual server, configure the vNIC with the IP address specified in the Cloud Services management console.

MANAGEMENT CONNECTION TO A VIRTUAL SERVER
1. In vCenter Server, create a virtual server and attach it to the correct port group. You’ll find the management port group (specified by us) on the Request IP address page in the Cloud Services management console.

2. Log in to the Cloud Services management console and request a management IP address. We’ll process your request as soon as we can and let you know when it’s ready.

3. From your virtual server, configure the vNIC with the IP address specified in the Cloud Services management console.

CONNECT TO A VIRTUAL SERVER IN YOUR PRIVATE NETWORK
1. Make sure you’ve set up a private network as you’ll need to provide an IP subnet (see the Network and Security User Guide).

2. In vCenter Server, create the virtual server and assign it to the private network.

3. Give the virtual server an IP address from the IP subnet range of your private network.
CHAPTER 6
VIEW SERVERS

VCENTER SERVER
This is the primary platform to view the details of all the virtual servers you’ve created with this service.

CLOUD SERVICES MANAGEMENT CONSOLE
While the Servers page (below) on the Cloud Services management console summarises the virtual servers on any of the cloud infrastructure products you’re subscribed to (shared and dedicated compute), it will only display the virtual servers (dedicated) with a management and public IP address (requested via the console). The remainder of your virtual servers are viewable in vCenter Server (see above).

The console Servers page also features details of servers in any of your data centre locations (Australia and globally).

This page does not display the dedicated resources of your service. See the Blades and Storage chapter for details on viewing and managing blade and storage assets.
In the Cloud Services management console, each of your virtual servers (dedicated) with a management IP address displays with this icon:

![Virtual server (dedicated)](image)

Plus:

- The virtual server name
- The port group and management IP address attached to vNIC1. You’ll also see the server’s IP address when you click on the server.

**CPU, RAM AND DISK SPACE**

To modify CPU, RAM and virtual server data storage (disk space) on your virtual servers for this service, you need to log in to vCenter Server.
CHAPTER 7
GROUP VIRTUAL SERVERS

VIEW AND MANAGE GROUPS

Here, ‘groups’ and ‘grouping’ relate solely to the activities and view in the Cloud Services management console. They do not relate to grouping in vCenter Server, networking groups or group operations.

Creating groups in the Cloud Services management console allows you to organise your servers by function such as development, test or production.

You can create and manage your own groups from the Servers section. A group can include servers on any of the cloud infrastructure services you’re subscribed to, though of the virtual servers (dedicated) you’ve created in vCenter Server, you’ll only see here the ones with a management IP address. Any other virtual servers (compute) you’ve created using vCenter Server can only be viewed in vCenter Server.

1. Create a group icon at top right
2. Server group names (e.g. Production servers, Test servers), defined by you

Find out how to:

- Create a group
- Move servers to groups
- Rename a group
- Delete a group

CREATE A GROUP

Initially, all of your virtual servers are in Ungrouped.

From the Servers page, select the Create group icon to create a new group. Make sure you enter a unique name (i.e. not the same as an existing group).
A new empty group is created – ready for you to move your servers into it.

**MOVE SERVERS TO A GROUP**

Move individual or multiple servers to an existing group.

**Individual servers**

Select a server icon in any group, then hover over the arrow next to the name. Select *Move to...* from the menu to display the next *Move server to group* window (the *Move* link only displays if you've created more than one group).

**Multiple servers**

You can select multiple servers in list and grid view.

In *grid view*, select *Move servers* (the link displays if you’ve created more than one group).

A tick box displays next to the server names. Select one for each server you want to move.

Select a group from the *Move selected servers to* menu, then click *Move servers*.

In list view, select the tick box next to each server you want to move.

Select the *Move servers* link.
RENAMING A GROUP

Select Rename. Enter a new name for the group, then select Rename group.

DELETE A GROUP

Select Delete link. A message displays asking you to confirm that you want to delete the group. Servers in a deleted group are moved back to Ungrouped (the ungrouped section can't be deleted or renamed).

POWER STATES

Log in to vCenter to power on, suspend or power off your server(s). The change takes place immediately.
SNAPSHOTS

A snapshot is a full system image copy of a virtual server, made at any time by you through vCenter Server. Refer to the VMware Knowledge Base for best practices for virtual server snapshots in the VMware environment.

To confirm the snapshot compatibility of your servers, check your operating system's specifications directly with the vendor of your operating system and from the vendor(s) of any software running on your virtual system.
CHAPTER 9
BACKUPS

Operating and file system backups are not set up automatically for your virtual server. You will need to install software, configure host files and routes (see these headings below).

There are two types of backups: Telstra-scheduled or customer ad hoc. You can enable nightly file system backups of some or all of your virtual server data.

You first need to request a Telstra-scheduled backup configuration of your virtual server data (including database applications), log in to the Cloud Services management console. You need to ensure the server you want to back up has an IP management address. Once we’ve configured your Telstra-scheduled backup, you can perform ad hoc backups and/or restores from backups directly from your virtual server using the installed backup system. Alternatively, you can submit a request to us to set up an ad hoc backup or restore for you (this service attracts a fee).

To configure, manage or remove your set-up, select Backup under the Infrastructure menu in the Cloud Services management console or by selecting the server (via the Servers page) and the Backup dropdown menu.

From the Cloud Services management console, you can also request modification of your scheduled backups and/or request a restore from a backup (for a fee).

BACKUP RETENTION

<table>
<thead>
<tr>
<th>RETENTION PERIOD</th>
<th>TOTAL NUMBER OF DAILY BACKUPS</th>
<th>TOTAL NUMBER OF MONTHLY BACKUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 week</td>
<td>7 x daily backups</td>
<td></td>
</tr>
<tr>
<td>1 month</td>
<td>31 x daily backups</td>
<td></td>
</tr>
<tr>
<td>1 quarter</td>
<td>93 x daily backups</td>
<td></td>
</tr>
<tr>
<td>1 year</td>
<td>93 x daily backups 12 x monthly backups</td>
<td></td>
</tr>
<tr>
<td>7 years</td>
<td>93 x daily backups 84 monthly backups</td>
<td></td>
</tr>
</tbody>
</table>

BACKUP MANAGEMENT TOOLS

There are two recommended tools available to help you manage your backups:

Client software
Administrator software
### Configure Backup in Host Files

You’ll need to configure backup details in the host file for each of your virtual servers (dedicated). These must correspond to the virtual data centre locations of each of your virtual servers. Once these are configured, do not delete any backup host file entries. See the list of *host files* in Appendix I.

### Configure Routes to Backup

You also need to configure network routes to the backup management network (see examples below). In Appendix H, you’ll find the list of IP addresses for the customer management subnet, backup subnet and the gateway for each site.

For customers with virtual data centres in Hong Kong, London, Singapore and New Jersey, your gateway is your public or private PVLAN gateway:

Once you’ve configured routes and hosts on your server you can test the following for your location.

**Windows**

- **Sydney**
  ```
  C:\route add -p 58.162.72.0 MASK 255.255.248.0 gateway
  Test: C:\ping stlava03un01
  ```

- **Melbourne**
  ```
  C:\route add -p 58.162.72.0 MASK 255.255.248.0 gateway
  Test: C:\ping claava01un01
  ```

- **Perth**
  ```
  C:\route add -p 58.162.106.0 MASK 255.255.255.0 gateway
  ```

---

**Table:**

<table>
<thead>
<tr>
<th>CLIENT SOFTWARE</th>
<th>ADMINISTRATOR SOFTWARE*</th>
</tr>
</thead>
<tbody>
<tr>
<td>You will need to install file system backup client software for your operating system (see Appendix C for instructions). Before installing operating system client software, make sure you’ve configured your host files and routes. Additional client software is required for database applications.</td>
<td>You will need to install administrator software on at least one Windows server per data centre location. See Appendix C for instructions.</td>
</tr>
<tr>
<td>To load the software in Windows, log in to your virtual server and click on the Avamar icon in the taskbar.</td>
<td>To load the software, log in to your virtual server and click on the Avamar administrator icon from your desktop.</td>
</tr>
<tr>
<td>From here, selecting Restore or Backup will take you to the Avamar web interface.</td>
<td>From here you can: Restore from a backup Create a non-scheduled backup View the backup activity log Produce backup reports</td>
</tr>
</tbody>
</table>

*If you only have Linux servers, you won’t have access to Avamar administrator. You’ll need to use command lines to list all backups on a server and to initiate non-scheduled backups and restores. See Appendix G.*
Test: C:\ping welava01un01

**Hong Kong**
C:\route add -p 101.167.188.0 MASK 255.255.255.0 gateway
Test: C:\ping honava01un01

**London**
C:\route add -p 101.167.212.0 MASK 255.255.255.0 gateway
Test: C:\ping lonava01un01

**Singapore**
C:\route add -p 101.167.200.0 MASK 255.255.255.0 gateway
Test: C:\ping sinava01un01

**New Jersey**
c:\route add -p 144.130.128.0 MASK 255.255.255.0 gateway
Test: C:\ping njnava01un01

**LINUX, SUSE, DEBIAN, UBUNTU**

Using the IP address range and gateway for your location, follow the examples below (see Windows test examples above to test your network):

**Sydney**
# route add -net 58.162.72.0 gw x.x.x.x netmask 255.255.248.0
Test:
# ping tsbava07un01
# netstat -rnv

**Melbourne**
# route add -net 58.162.72.0 gw x.x.x.x netmask 255.255.248.0
Test:
# ping claava01un01
# netstat -rnv

**Hong Kong**
# route add -net 101.167.188.0 gw x.x.x.x netmask 255.255.255.0
Test:
# ping honava01un01
# netstat -rnv

**London**
# route add -net 101.167.212.0 gw x.x.x.x netmask 255.255.255.0
Test:
# ping lonava01un01
# netstat -rnv

**Singapore**
# route add -net 101.167.200.0 gw x.x.x.x netmask 255.255.255.0
Test:
# ping sinava01un01
# netstat -rnv

**New Jersey**
# route add -net 144.130.128.0 gw x.x.x.x netmask 255.255.255.0
Add this line to any configuration files e.g.
/etc/sysconfig/static-routes:
any net 58.162.72.0 netmask 255.255.248.0 gw x.x.x.x

FIREWALL PORTS
If you’ve previously installed any client-side firewalls, the following TCP ports need to be open:

- 27000 to backup network
- 28000 to backup network
- 28002 from backup network
- 29000 to backup network
- 7778 to backup network
- 7779 to backup network
- 7780 to backup network
- 7781 to backup network
- 443
- 111 to backup network
- 2049 to backup network
- 2052 to backup network
- 3008 to backup network

TEST CONNECTIVITY
Ensure communications are working correctly. The following must succeed for:

- Sydney – telnet stlava02un01 28001
- Melbourne – telnet clava02un01 28001
- Perth – telnet welava01un01 28001
- Hong Kong – telnet honava01un01 28001
- Singapore – telnet sinava01un01 28001
- London – telnet lonava01un01 28001
- New Jersey - telnet njnava01un01 28001

BACKUP ADMINISTRATOR LOGIN DETAILS
We sent your backup administrator login details to you after we set up your first scheduled backup. Passwords can be reset for a fee via the Cloud Services management console (we do not keep passwords).

You’re provided with one backup administrator username and password per location, with backup/restore rights. You cannot change the password, which is sent to you via encrypted email. We do not keep a record of passwords so please store yours safely.

To access the administrator, enter your user name, password, the virtual server’s domain name and administrator server.
Note: these login details are not the same as your Cloud Services management console login details.

**MANAGE YOUR BACKUPS**

<table>
<thead>
<tr>
<th>RESTORING FROM A BACKUP</th>
<th>CREATE AN AD HOC BACKUP</th>
<th>CHANGE SCHEDULED BACKUP DIRECTORIES AND FOLDERS</th>
<th>CHANGE BACKUP RETENTION PERIODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>To restore from a long-term backup, <strong>contact us</strong>.</td>
<td>Using the administrator, select <strong>Backup and Restore</strong> and follow the prompts.</td>
<td>To change the directories and folders for a scheduled backup, <strong>contact us</strong>.</td>
<td>Log in to the Cloud Services management console and go to <strong>Infrastructure &gt; Backups</strong>.</td>
</tr>
<tr>
<td>For short-term backups, select the <strong>Backup and Restore</strong> tab using the administrator and follow the prompts.</td>
<td>Or, select <strong>Backup</strong> in the client.</td>
<td>Or, select <strong>Restore</strong> in the client.</td>
<td></td>
</tr>
<tr>
<td>Or, select <strong>Restore</strong> in the client.</td>
<td>To limit disruption to the backup servers, we recommend you don't create frequent non-scheduled backups.</td>
<td>Check your backup reports to see if the restoration was successful.</td>
<td>See below for more details.</td>
</tr>
</tbody>
</table>

**AD HOC BACKUPS**

A limited number of ad hoc backups can occur during the backup infrastructure maintenance window between 12PM and 6PM daily, when capacity is limited.
If your ad hoc backup cannot be performed at the time it’s requested, it will be performed in the next available window.

Ad hoc backups can be initiated at any time except during the backup infrastructure blackout window: between 6AM and 12PM daily.

**COMPATIBLE OPERATING SYSTEMS**
You can back up any of your virtual servers running operating systems we currently support. For a complete list of operating system compatibility with backup, refer to backup vendor documentation (support pages require registration). For database compatibility, check individual vendor documentation.

**APPLICATION BACKUPS**
While configuring a backup, you can also back up the following applications:

- **Microsoft SQL Server** – you’ll need to identify the database location (e.g.: C:\Program Files) and backup type.
- **Microsoft SharePoint Server** – provide the location of temporary files and your database
- **Microsoft Exchange** – provide database location and cluster virtual server (hostnames and IP addresses of relevant cluster(s)),
- **Oracle** – database name, location and backup type (full or transactional)
- **Sybase** – provide the instance name and Sybase OCS directory
- **SAP on Oracle** – provide the database location.

**Application backup types**

- **Full backup** – always records the entire database (including all objects, system tables and data)
- **Transactional backup** – only records transaction logs, the serial records of all database modifications
- **Differential database backup** – records only the data that’s changed since the last full database back up

**EMAIL REPORTS**
You are emailed a daily, weekly and monthly backup report.

**NOTE THE FOLLOWING WITH YOUR BACKUP PLATFORM INSTALLATION**

- Do not activate your host using the backup software. We will do this.
- Enhanced backups and restores of database applications (Microsoft SQL Server, Exchange etc.) require your database administrator to set up access for backup. Refer to the relevant section below. Note: file system backups do not back up databases.
- Once your configuration is activated and a backup has been made, make sure you perform a test restore.
- We do not receive alerts for failed backups.
- It’s your responsibility to solve backup and restore issues on your hosts.
- For restorations which require data in excess of three months old contact us.
- The backup service is designed for file, directory restore and correctly setup restore of databases using scripts and enhanced plug-ins. Disaster recovery (loss of the operating system or complete server) requires more than this backup platform to rebuild your server. You need to test your own disaster recovery procedure. Contact us for help with developing a disaster recovery plan.

**MORE DETAILS**
Select an appendix link in the table heading for instructions on the following:
<table>
<thead>
<tr>
<th>APPENDIX C</th>
<th>APPENDICES D &amp; E</th>
<th>APPENDIX F</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Install client software for operating systems (you must configure host files and routes first):</td>
<td>Appendix D: <em>Find a backup server name</em></td>
<td>Backup and restore procedures for:</td>
</tr>
<tr>
<td>              - <em>Microsoft Windows Server</em></td>
<td>Appendix E: <em>Restore to an alternate server</em></td>
<td><em>Microsoft SQL Server</em></td>
</tr>
<tr>
<td>              - <em>Linux: CentOS, Debian, Red Hat, SUSE, Ubuntu</em></td>
<td></td>
<td><em>Microsoft SharePoint</em></td>
</tr>
<tr>
<td>• Install console for Microsoft Windows</td>
<td></td>
<td><em>Microsoft Exchange</em></td>
</tr>
<tr>
<td>• Install plug-ins for the following database backup software:</td>
<td></td>
<td><em>Linux</em></td>
</tr>
<tr>
<td>              - <em>Microsoft SQL Server</em></td>
<td></td>
<td><em>Oracle</em></td>
</tr>
<tr>
<td>              - <em>Microsoft SharePoint Server</em></td>
<td></td>
<td><em>Sybase</em> – for Windows and Red Hat</td>
</tr>
<tr>
<td>              - <em>Microsoft SharePoint Server 2013</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This is an overview of privileges granted for your customer access roles. You’ll find a detailed breakdown of privileges by role in Appendix A.

### PRIVILEGES AVAILABLE

<table>
<thead>
<tr>
<th>Privilege</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALARMS</td>
<td>Alarm privileges control your ability to set and respond to alarms on the inventory objects. With your VM level customer access role you can create, modify and respond to alarms for all your inventory objects. Alarms are managed through your vCenter Server.</td>
</tr>
<tr>
<td>DATASTORE</td>
<td>Datastore privileges control the ability to browse, manage and allocate space on datastores. Both your customer access roles are granted many of the datastore privileges to the vCenter Server and host clusters. Where datastore privileges are not granted, contact us to raise a service request.</td>
</tr>
<tr>
<td>FOLDER</td>
<td>Folder permissions control the ability for you to create and manage folders and mainly apply to virtual machines in the VMs and Templates view of vCenter Server. Both your customer access roles are granted these permissions.</td>
</tr>
<tr>
<td>GLOBAL</td>
<td>Global privileges enable you to control global tasks, scripts and extensions. Both your customer access roles are granted limited Global privileges to the vCenter and/or host clusters. Where Global privileges are not granted you can raise a service inquiry with our customer service team to determine if the modification can be made.</td>
</tr>
<tr>
<td>NETWORK</td>
<td>Network privileges enable you to control tasks related to the management of your network. Both your customer access roles have privileges to assign a network to a virtual server, however for other modifications, you can make a service inquiry with our customer service team to see if they are possible.</td>
</tr>
<tr>
<td>RESOURCE</td>
<td>Resource privileges enable you to control the creation and management of your resource pools and the migration of your virtual servers. Both of your customer access roles are granted full resource privileges.</td>
</tr>
<tr>
<td>SCHEDULED TASK</td>
<td>Scheduled task privileges enable you to control creation, editing and removal of scheduled tasks through vCenter Server. Full privileges are granted to both your customer access roles.</td>
</tr>
<tr>
<td>STORAGE VIEWS</td>
<td>Storage views privileges provide the ability for you to configure and use the storage views on your vCenter Server. You can access the user interface views; contact our team if you have questions about modifications.</td>
</tr>
<tr>
<td>TASKS</td>
<td>Task privileges enable you to control the ability of extensions to create and update tasks on your vCenter Server. Privileges for tasks are provided to both of your customer access roles.</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>VAPP</strong></td>
<td>vApp privileges enable you to control operations related to deploying and configuring a vApp. These privileges are granted to both of your customer access roles. vApps that require root access to the ESXi host are not supported.</td>
</tr>
<tr>
<td><strong>VIRTUAL MACHINE CONFIGURATION</strong></td>
<td>Virtual Machine Configuration privileges enable you to configure your virtual server options and devices. Most of these privileges are granted to both customer access roles.</td>
</tr>
<tr>
<td><strong>VIRTUAL MACHINE GUEST OPERATIONS</strong></td>
<td>Virtual Machine Guest Operations privileges allow you to interact with files and programs inside a virtual server’s guest operating system. Both your customer access roles have been granted these privileges; access this functionality through the VMware vSphere API. For information on this API visit <a href="http://www.vmware.com">www.vmware.com</a>.</td>
</tr>
<tr>
<td><strong>VIRTUAL MACHINE INTERACTION</strong></td>
<td>With Virtual Machine Interaction privileges you can interact with a virtual server console, configure media, perform power operations and install VMware tools. Many of these access privileges are granted for both your customer access roles. For a full breakdown of the privileges refer to <a href="#">Appendix A</a>.</td>
</tr>
<tr>
<td><strong>VIRTUAL MACHINE INVENTORY</strong></td>
<td>Your customer access roles are granted full Virtual Machine Inventory privileges so you can control the adding, moving and removing of your virtual servers.</td>
</tr>
<tr>
<td><strong>VIRTUAL MACHINE PROVISIONING</strong></td>
<td>Virtual Machine Provisioning privileges enable you to control activities related to deploying and customising your virtual servers. These privileges are granted to both your customer access roles.</td>
</tr>
<tr>
<td><strong>VIRTUAL MACHINE STATE</strong></td>
<td>We provide both your access roles with Virtual Machine State privileges that enable you to take a snapshot of your virtual server’s current state. This privilege provides you with the ability to take, delete, rename and restore your snapshots.</td>
</tr>
</tbody>
</table>

Note: you’re granted a greater level of access to VM level privileges so you can manage your virtual servers.
RESTRICTED PRIVILEGES

A number of privileges are not granted for either of your customer access roles. This is to ensure compliance to our security best practice and so we can provide assurance for the infrastructure that supports your virtual servers.

The following privileges are restricted, however you can contact us to find out if they can be carried out. In some cases an assessment may be needed to determine the viability and risk associated with your requested modification:

- Host Configuration
- Host Inventory and Cluster
- Host Inventory
- Performance
- Sessions

The following privileges are restricted for your service and modifications cannot be made:

- Datacenter
- Datastore Cluster
- Distributed Virtual Port Group
- ESX Agent Manager
- Extension
- Host CIM
- Host Local Operations
- Host vSphere Replication
- Host Profile
- Permissions
- Profile-Driven Storage
- Virtual Machine vSphere Replication
- vServices
- vSphere Distribution Switch
- Virtual Rights Management Policy
CHAPTER 11
REPORTS

VIRTUAL SERVERS

To view performance statistics of the virtual servers running on your clusters, log in to vCenter Server.

OTHER SERVICE USAGE

Log in to the Reports section of the Cloud Services management console to view usage for other services you might have activated, including:

- Backups
- Network and security (public IP addresses, firewalls, IPsec VPN tunnels)
- Internet (including SMTP email relay)

Refer to the Reports section of the Account Management Guide for more details, including instructions on viewing the Cloud Services management console Activity log.
We only provide software licences to cover the operation of vCenter Server and vSphere/ESXi hosts. To use other software products in this environment, you must install them and acquire the licences yourself.

To find out what software is compatible with your service, contact your Telstra representative.
The following table provides a detailed breakdown of privileges by Customer Access Role.

## ALARMS

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarms.Acknowledge alarm</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Alarms.Create alarm</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Alarms.Disable alarm action</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Alarms.Modify alarm</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Alarms.Remove alarm</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Alarms.Set alarm status</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>NAME</td>
<td>VCENTER ACCESS ROLE</td>
<td>VM ACCESS ROLE</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>---------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Datacenter.Create datacenter</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Datacenter.IP pool configuration</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Datacenter.Move datacenter</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Datacenter.Remove datacenter</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Datacenter.Rename datacenter</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>
### DATASTORE

<table>
<thead>
<tr>
<th>NAME*</th>
<th>VCENTER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datastore.Allocate space</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Datastore.Browse datastore</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Datastore.Configure datastore*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Datastore.Low level file operations</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Datastore.Move datastore*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Datastore.Remove datastore*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Datastore.Remove file</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Datastore.Rename datastore*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Datastore.Update virtual machine files</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

To determine if this request can be performed, **contact us.**

### DATASTORE CLUSTER

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datastore.cluster.Configure a datastore cluster</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>
## DISTRIBUTED VIRTUAL PORT GROUP

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>dvPort group.Create</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>dvPort group.Delete</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>dvPort group.Modify</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>dvPort group.Policy operation</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>dvPort group.Scope operation</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

## ESX AGENT MANAGER

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESX Agent Manager.Config</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>ESX Agent Manager.Modify</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>ESX Agent View.View</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

## EXTENSION

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension.Register extension</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Extension.Unregister extension</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Extension.Update extension</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>
### FOLDER

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folder.Create folder</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Folder.Delete folder</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Folder.Move folder</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Folder.Rename folder</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

### GLOBAL

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global.Act as vCenter Server</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Global.Cancel task</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Global.Capacity planning*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Global.Diagnostics*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Global.Disable methods</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Global.Enable methods</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Global.Global tag</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Global.Health</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Global.Licenses</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>NAME</td>
<td>VCENTER SERVER ACCESS ROLE</td>
<td>VM ACCESS ROLE</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>----------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Global.Log event</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Global.Manage custom attributes*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Global.Proxy</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Global.Script action</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Global.Service managers</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Global.Set custom attribute</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Global.Settings</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Global.System tag</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

*Contact us to find out if this request can be performed with your service.*
### HOST CIM

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host.CIM.CIM Interaction</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

### HOST CONFIGURATION

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host.Configuration.Advanced Settings*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Authentication Store</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Change date and time settings</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Change PciPassthru settings*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Change settings</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Change SNMP settings</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Connection</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Firmware</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Hyperthreading</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>NAME</td>
<td>VCENTER SERVER ACCESS ROLE</td>
<td>VM ACCESS ROLE</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>----------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Host.Configuration.Maintenance</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Memory configuration</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Network configuration</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Power</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Query patch</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Security profile and firewall</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Storage partition configuration*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.System Management</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.System resources</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Host.Configuration.Virtual machine autostart configuration*</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

*Contact us* to find out if this request can be performed with your service.

**HOST INVENTORY**

The following do not have a vCenter Server or VM access role. To determine if any of the following can be performed, *contact us.*

- Host.Inventory.Add host to cluster
- Host.Inventory.Add standalone host
- Host.Inventory.Create cluster
- Host.Inventory.Modify cluster
- Host.Inventory.Move cluster or standalone host
- Host.Inventory.Move host
- Host.Inventory.Remove cluster
- Host.Inventory.Remove host
Host.Inventory.Rename cluster

**HOST LOCAL OPERATIONS**
The following do not have a vCenter Server or VM access role. To determine if any of the following can be performed, *contact us.*

Host.Local operations.Add host to vCenter
Host.Local operations.Create virtual machine
Host.Local operations.Delete virtual machine
Host.Local operations.Manage user groups
Host.Local operations.Reconfigure virtual machine
Host.Local operations.Relayout snapshots

**HOST VSPHERE REPLICATION**
*Host.vSphere Replication.Manage vSphere Replication* – this does not have a vCenter Server or VM access role. To determine if any of the following can be performed, *contact us.*

**HOST PROFILE**
The following do not have a vCenter Server or VM access role. To determine if any of the following can be performed, *contact us.*

Host profile.Clear
Host profile.Create
Host profile.Delete
Host profile.Edit
Host profile.Export
Host profile.View

**NETWORK**
*To determine if those listed as *No* below can be performed, *contact us.*

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network.Assign network</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Network.Configure*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Network.Move network*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Network.Remove</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>
### PERFORMANCE

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance.Modify intervals*</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

*To determine if this request can be performed, contact us.

### PERMISSIONS

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permissions.Modify permission</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Permissions.Modify role</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Permissions.Reassign role permissions</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

### PROFILE DRIVEN STORAGE

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile-driven storage.Profile-driven storage update</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Profile-driven storage.Profile-driven storage view</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

### RESOURCE

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource.Apply recommendation</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Resource.Assign vApp to resource pool</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Resource.Assign virtual machine to resource pool</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Resource.Create resource pool</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Resource.Migrate</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Resource.Modify resource pool</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Resource.Move resource pool</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Resource.Query vMotion</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Resource.Relocate</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Resource.Remove resource pool</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Resource.Rename resource pool</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

### SCHEDULED TASK

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduled task.Create tasks</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Scheduled task.Modify task</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Scheduled task.Remove task</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Scheduled task.Run task</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

### SESSIONS

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sessions.Impersonate user</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Sessions.Message*</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>
Sessions.Validate session | NO | NO
Sessions.View and stop sessions* | NO | NO

*To determine if this request can be performed, contact us.

### STORAGE VIEWS

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage views.Configure service*</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Storage views.View</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

*To determine if this request can be performed, contact us.

### TASKS

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tasks.Create task</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Tasks.Update task</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

### VAPP

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>vApp.Add virtual machine</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.Assign resource pool</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.Assign vApp</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.Clone</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.Create</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>NAME</td>
<td>VCENTER SERVER ACCESS ROLE</td>
<td>VM ACCESS ROLE</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>---------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>vApp.Delete</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.Export</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.Import</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.Move</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.Power Off</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.Power On</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.Rename</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.Suspend</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.Unregister</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.vApp application configuration</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.vApp instance configuration</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.vApp managedBy configuration</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.vApp resource configuration</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>vApp.View OVF Environment</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>
## VIRTUAL MACHINE CONFIGURATION

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual machine.Configuration.Add existing disk</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Add new disk</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Add or remove device</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Advanced</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Change CPU count</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Change resource</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Configure managedBy</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Disk change tracking</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Disk lease</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Display connection settings</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Extend virtual disk</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Host USB device</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Memory</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Modify device settings</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Query Fault Tolerance compatibility</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>NAME</td>
<td>VCENTER SERVER ACCESS ROLE</td>
<td>VM ACCESS ROLE</td>
</tr>
<tr>
<td>------</td>
<td>---------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Query unowned files</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Raw device</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Reload from path</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Remove disk</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Rename</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Reset guest information</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Set annotation</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Settings</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Swapfile placement</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Unlock</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Configuration.Upgrade virtual hardware</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

**VIRTUAL MACHINE GUEST OPERATIONS**

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual machine.Guest Operations.Guest Operation Modifications</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Guest Operations.Guest Operation Program Execution</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Guest Operations.Guest Operation</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>
## VIRTUAL MACHINE INTERACTIONS

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual machine.Interaction.Acquire guest control ticket</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Answer question</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Backup operation on virtual</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>machine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual machine.Interaction.Configure CD media</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Configure floppy media</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Console interaction</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Create screenshot</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Defragment all disks</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Device connection</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Disable Fault Tolerance</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Enable Fault Tolerance</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Power Off</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Power On</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Record session on Virtual</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>NAME</td>
<td>VCENTER SERVER ACCESS ROLE</td>
<td>VM ACCESS ROLE</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>----------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Machine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual machine.Interaction.Replay session on Virtual Machine</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Reset</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Suspend</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Test failover</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Test restart Secondary VM</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Turn Off Fault Tolerance</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Virtual machine.Interaction.Turn On Fault Tolerance</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Virtual machine.Interaction.VMware Tools install</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

**VIRTUAL MACHINE INVENTORY**

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual machine.Inventory.Create from existing</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Inventory.Create new</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Inventory.Move</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Inventory.Register</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Inventory.Remove</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>
### VIRTUAL MACHINE PROVISIONING

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual machine.Inventory.Unregister</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td><strong>VIRTUAL MACHINE PROVISIONING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Allow disk access</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Allow read-only disk access</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Allow virtual machine download</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Allow virtual machine files upload</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Clone template</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Clone virtual machine</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Create template from virtual machine</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Customize</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Deploy template</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Mark as template</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Mark as virtual machine</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Modify customization specification</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>NAME</td>
<td>VCENTER SERVER ACCESS ROLE</td>
<td>VM ACCESS ROLE</td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
<td>----------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Promote disks</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.Provisioning.Read customization specification</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

**VIRTUAL MACHINE STATE**

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual machine.State.Create snapshot</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.State.Remove snapshot</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.State.Rename snapshot</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Virtual machine.State.Revert to snapshot</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

**VIRTUAL MACHINE VSPHERE REPLICATION**

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual machine.vSphere Replication.Configure vSphere Replication</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Virtual machine.vSphere Replication.Manage vSphere Replication</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Virtual machine.vSphere Replication.Monitor vSphere Replication</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>
## VSERVICES

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>vService.Create dependency</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>vService.Destroy dependency</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>vService.Reconfigure dependency configuration</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>vService.Update dependency</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

## vSPHERE DISTRIBUTION SWITCH

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>vSphere Distributed Switch.Create</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>vSphere Distributed Switch.Delete</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>vSphere Distributed Switch.Host operation</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>vSphere Distributed Switch.Modify</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>vSphere Distributed Switch.Move</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>vSphere Distributed Switch.Network I/O control operation</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>vSphere Distributed Switch.Policy operation</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>vSphere Distributed Switch.Port configuration operation</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>vSphere Distributed Switch.Port setting operation</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>
### vSphere Distributed Switch. VSPAN operation

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>vSphere Distributed Switch. VSPAN operation</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

### Virtual Rights Management Policy

<table>
<thead>
<tr>
<th>NAME</th>
<th>VCENTER SERVER ACCESS ROLE</th>
<th>VM ACCESS ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRMPolicy.Query VRMPolicy</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>VRMPolicy.Update VRMPolicy</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>
not supported

| Microsoft Cluster Server (MCS)       |
| Root access to ESXi                  |
| Windows load balancing               |
| VMware Data Recovery (VDR)           |
| vSphere Replication (VR)             |
| Virtual Rights Management (VRM) policy |
| vService                             |
| Host USB devices                     |
| ESX agent manager                    |
| Extensions                            |
| Direct ESXi host access              |
| Direct ESXi host access              |
| Root access to ESXi                  |
| Profile driven storage               |
| Microsoft clustering                 |
| Microsoft network load balancing     |

telstra’s responsibility
Management resource pool, vCenter and SQL Server VM

Permissions and privileges

vCenter server settings

Datacenter configuration

Cluster configuration

Host configuration

Network configuration

Storage configuration

Manage host, network, storage and management virtual server alarming

Modify VM auto-restart

HA configuration

DRS configuration

Rename datastores and folders in datastores

VMware vSphere update manager

vCenter sessions

Configure storage views service
### Log collection and bundling

### Notes for infrastructure

### Custom attribute annotations on hosts and management virtual servers

### Common Information Model (CIM) interaction

### vCenter collected performance statistics for infrastructure components

### Modify vCenter statistics interval levels

### Put host into maintenance mode

### CUSTOMER’S RESPONSIBILITY

#### Virtual server configuration

#### Attach virtual server to network/portgroup

#### Use provided storage for virtual servers, storage vMotion, browse datastore

#### vMotion and cold migration of virtual servers

#### Manage Customer VM Alarming within VM Folders
   (contingent on VMs being placed in the *Customer virtual machines* folder)

#### View only access to vCenter, host, network, storage and management virtual server alarming

#### Guest customisation manager
<table>
<thead>
<tr>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place virtual servers in cluster</td>
</tr>
<tr>
<td>Create object folders</td>
</tr>
<tr>
<td>Create and manage resource pools</td>
</tr>
<tr>
<td>Create and manage vApps</td>
</tr>
<tr>
<td>Create scheduled tasks (task limited by permissions)</td>
</tr>
<tr>
<td>Manage VMDK snapshots</td>
</tr>
<tr>
<td>View storage views</td>
</tr>
<tr>
<td>View historical events and tasks</td>
</tr>
<tr>
<td>View virtual server, host and datastore maps</td>
</tr>
<tr>
<td>Annotation notes for customer virtual servers</td>
</tr>
<tr>
<td>vCenter collected performance statistics</td>
</tr>
<tr>
<td>Read access, of the virtualisation infrastructure configuration</td>
</tr>
<tr>
<td>View hardware status</td>
</tr>
</tbody>
</table>
This appendix provides instructions on how to install the following:

1. **CLIENT OPERATING SYSTEM SOFTWARE**

   Before installing operating system client software, make sure you’ve configured your host files and routes.

   *Microsoft Windows Server*
   *Linux – CentOS, Debian, Red Hat, SUSE, Ubuntu*

2. **BACKUP ADMINISTRATOR SOFTWARE**

   *Install console for Microsoft Windows*

3. **PLUG-INS**

   Follow instructions to install the plug-in for your service by selecting the relevant database software:

   *Microsoft SQL Server*
   *Microsoft SharePoint Server*
   *Microsoft SharePoint Server 2013*
   *Microsoft Exchange Server*
   *Microsoft Exchange Server 2010 VSS*
   *Sybase Windows and Red Hat*
   *Oracle on Enterprise Linux, Red Hat and Windows*
INSTALL OPERATING SYSTEM CLIENT SOFTWARE

Before installing operating system client software, make sure you’ve configured your host files and routes.

MICROSOFT WINDOWS SERVER

1. Log in to the computer onto which you want to install this software. Note: you must log in as Administrator if installing the Avamar Windows Client on a Windows Vista or higher platform.

2. Point your web browser at the appropriate backup server above by typing the relevant URL e.g: https://stlava02un01 (for Sydney). You will be automatically redirected to the secure backup web server. The backup server you use is the one your hosts are being activated on. The server may vary.

3. Depending on your browser security settings, a security alert dialog box may appear.

4. If a security alert dialog box appears, click Yes or OK to allow redirection to the backup secure web server.

5. Page down until the Documents and Downloads hyperlink is visible.

6. Click Documents and Downloads.

7. Click the correct operating system hyperlink for your client computer.
8. A directory listing appears in your browser. Double-click the *AvamarClient-windows-x86-VERSION.msi* install package. Your browser will prompt you to either open the file “in-place” (on the server) or save it to your local computer. Either method will work. However, if you save the file to your local computer, you must open (double-click) that installation file to continue with this procedure.

9. Open the installation in place (on the server). The installation wizard appears. Follow the on-screen instructions.

10. Immediately after accepting the End User Licensing Agreement, the *Backup for Windows Setup* screen appears. Do one of the following:
   - Click **Next** – the *Ready to install Backup for Windows* screen appears.
   - Click **Install** to begin the installation procedure.

11. When prompted, click **Finish** to complete the installation procedure. The installation wizard closes.

12. Check the Windows services, make sure the *Backup Agent* is started and running.
DOT NET SOFTWARE

The installation may prompt you to install Microsoft .NET. If this occurs the following screen will appear:

You will be directed to the download site as displayed:

Select Download and install the software.
Before installing operating system client software, make sure you’ve configured your host files and routes.

DOWNLOAD CLIENT INSTALL FILES

A directory listing appears in your browser.

If your operating system is...

<table>
<thead>
<tr>
<th>CentOS</th>
<th>Linux for x86 (32 bit)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CentOS 4 and 5</td>
</tr>
<tr>
<td></td>
<td>CentOS 6</td>
</tr>
<tr>
<td>Debian</td>
<td>Debian Linux 4, 5, and 6</td>
</tr>
<tr>
<td></td>
<td>Oracle Linux 5</td>
</tr>
<tr>
<td></td>
<td>Oracle Linux 6</td>
</tr>
<tr>
<td>Red Hat</td>
<td>Red Hat Enterprise Linux 4</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 5</td>
</tr>
<tr>
<td></td>
<td>Red Hat Enterprise Linux 6</td>
</tr>
<tr>
<td>SUSE</td>
<td>SUSE Linux Enterprise Server 10</td>
</tr>
<tr>
<td></td>
<td>SUSE Linux Enterprise Server 11 SP1</td>
</tr>
<tr>
<td></td>
<td>SUSE Linux Enterprise Server 9</td>
</tr>
<tr>
<td>Ubuntu</td>
<td>Ubuntu Linux 10 x and 11 x</td>
</tr>
<tr>
<td></td>
<td>VMWare ESX 3.0.x, 3.5</td>
</tr>
</tbody>
</table>

Download the Avamar Linux Client install package to any convenient temporary install directory on your system, for example:

Download for Red Hat Enterprise Linux 5

<table>
<thead>
<tr>
<th>Name</th>
<th>Last Modified</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>rhpam.linuxclient.4.x.x.x.x.x.x.x.x.x</td>
<td>11 Nov 2013</td>
<td>36.3M</td>
</tr>
<tr>
<td>rhpam.linuxclient.5.x.x.x.x.x.x.x.x.x</td>
<td>11 Nov 2013</td>
<td>1.0M</td>
</tr>
</tbody>
</table>

NOTES:

- /tmp is used as an example temporary install directory in the remainder of this appendix. Your actual temporary install directory may be different.
The actual filename of the Avamar Linux Client install package.
AVAMARLINUX.rpm is an example file name. Your actual file name will be different.

**CENTOS/DEBIAN/RED HAT/SUSE/UBUNTU**

1. Open a command shell and log in as root.
2. Change directory to your temporary install directory. For example: cd /tmp
3. Based on the operating system enter the appropriate commands:

<table>
<thead>
<tr>
<th>IF YOUR OPERATING SYSTEM IS...</th>
<th>TYPE...</th>
</tr>
</thead>
<tbody>
<tr>
<td>CentOS</td>
<td>Download 32-bit compatibility libraries from <a href="http://www.centos.org/">http://www.centos.org/</a>&lt;br&gt;rpm -ivh compat-libstdc++-33-3.2.3-61.i386.rpm&lt;br&gt;rpm -ih AvamarClient-linux-sles11-x86-6.1.100-402.rpm</td>
</tr>
<tr>
<td>Debian</td>
<td>dpkg -i AvamarClient-debian4.0-x86_64-6.0.101-66.deb</td>
</tr>
<tr>
<td>Red Hat</td>
<td>rpm -ih AVAMARLINUX.rpm</td>
</tr>
<tr>
<td>SUSE</td>
<td>rpm -ih AvamarClient-linux-sles11-x86_64-6.0.101-66.rpm</td>
</tr>
<tr>
<td>Ubuntu</td>
<td>dpkg -i AvamarClient-debian4.0-x86_64-6.0.101-66.deb</td>
</tr>
</tbody>
</table>

4. Check the result is as follows:

<table>
<thead>
<tr>
<th>IF YOUR OPERATING SYSTEM IS...</th>
<th>THEN OUTPUT SHOULD BE...</th>
</tr>
</thead>
<tbody>
<tr>
<td>CentOS</td>
<td>[root@localhost tmp]$ rpm -ivh AvamarClient-linux-sles11-x86_64-6.1.100-402.rpm&lt;br&gt;Preparing...&lt;br&gt;.................................................... [100%]&lt;br&gt;1:AvamarClient&lt;br&gt;.................................................... [100%]</td>
</tr>
</tbody>
</table>
Install step linking /var/avamar to //usr/local/avamar/var

Installation complete

You may run /usr/local/avamar/bin/avregister to register and activate this client with the Administrator server.

To ensure all functionality is enabled and avoid common issues, please verify that any existing firewalls do not restrict EMC Avamar network communication.

avagent Info <5008>: Logging to /usr/local/avamar/var/avagent.log

avagent Info <5417>: daemonized as process id 3501

avagent.d Info: Client Agent started.

Red Hat

################################################
################################################ [100%]
################################################ [100%]

Installation complete

You may run /usr/local/avamar/bin/avregister to register and activate this client with the Administrator server.

avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log

avagent Info <5417>: daemonized as process id 2066

avagent.d Info: Client Agent started.

SUSE

################################################ [100%]
################################################ [100%]

Install step linking /var/avamar to //usr/local/avamar/var

Installation complete

You may run /usr/local/avamar/bin/avregister to register and activate this client with the Administrator server.

insserv: warning: script 'K01vmware-tools-upgrade' missing LSB tags and overrides

insserv: warning: script 'vmware-tools-upgrade' missing LSB tags and overrides

avagent 0:off 1:off 2:off 3:on 4:off
5:on   6:off

avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log

avagent Info <5417>: daemonized as process id 18338

avagent.d Info: Client Agent started.

lxincbat0004:/home/admin #

UBUNTU/DEBIAN

Unpacking avamarclient-debian (from AvamarClient-debian4.0-x86_64-6.0.101-66.deb) ...

Setting up avamarclient-debian (6.0.101-66) ...

Installation complete

You may run /usr/local/avamar/bin/avregister to register and activate this client with the Administrator server.

update-rc.d: warning: avagent start runlevel arguments (2 3 4 5) do not match LSB Default-Start values (3 5)

update-rc.d: warning: avagent stop runlevel arguments (0 1 6) do not match LSB Default-Stop values (none)

Adding system startup for /etc/init.d/avagent ...

/etc/rc0.d/K20avagent -> ../init.d/avagent

   Etc...

avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log

avagent Info <5417>: daemonized as process id 6205

avagent.d Info: Client Agent started.

root@ubuntu:/home/tdev#
INSTALL BACKUP ADMINISTRATOR SOFTWARE

MICROSOFT WINDOWS CONSOLE

1. Log in to the computer onto which you want to install this software. You must log in as Administrator if installing the Avamar Windows Client on Windows Vista platforms.

2. Point your web browser at your backup server by typing the following URL, for example:
   https://stlava02un01 (for Sydney)
   https://claava02un01 (for Melbourne)
   You will be automatically redirected to the backup secure web server.

3. The Avamar server to use is the one your hosts are being activated on. Depending on your browser security settings, a security alert dialog box might appear.

4. If a security alert dialog box appears, click Yes or OK to allow redirection to the backup secure web server.

5. Page down until the Documents and Downloads hyperlink is visible as per below (note: you do not need to enter your log on information)

6. Click Documents and Downloads.

7. If the Java Runtime Environment 6.0 Update 12 is not installed on the system, click Microsoft Windows XP, 2003, Vista, 2008 hyperlink under Windows for x86(32 bit).
8. Click the jre-6u12-windows-i586-p install package. Your browser will prompt you to either open the file “in-place” (on the server) or save it to your local computer. Either method will work. However, if
you save the file to your local computer, you must open (double-click) that installation file to continue with this procedure.

9. Open the installation in place (on the server). If a security warning appears, click Run. The installation wizard appears.

10. Click Accept for the licence agreement. The installation destination window appears.

11. Click Install to complete the installation procedure.
12. Click the `AvamarConsoleMultiple` install package. Your browser will prompt you to either open the file “in-place” (on the server) or save it to your local computer. Either method will work. However, if you save the file to your local computer, you must open (double-click) that installation file to continue with this procedure. Follow the on-screen instructions to complete the installation.
CHAPTER 15
Appendix C: Install Operating System Client Software, Console Software and Database Backup Software

INSTALL PLUG-INS

MICROSOFT SQL SERVER

PRELIMINARY STEPS

<table>
<thead>
<tr>
<th>REQUIREMENT</th>
<th>MINIMUM/RECOMMENDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM</td>
<td>512 MB (2GB recommended).</td>
</tr>
<tr>
<td>Hard Drive Space</td>
<td>2GB permanent hard drive space for software installation.</td>
</tr>
<tr>
<td></td>
<td>The Avamar SQL Server Client software also requires an</td>
</tr>
<tr>
<td></td>
<td>additional 12 MB of permanent hard drive space for each</td>
</tr>
<tr>
<td></td>
<td>64 MB of physical RAM.</td>
</tr>
<tr>
<td></td>
<td>This space is used for local cache files.</td>
</tr>
<tr>
<td>Network Interface</td>
<td>10baseT minimum; 100baseT or higher recommended,</td>
</tr>
<tr>
<td></td>
<td>configured with latest drivers for your platform.</td>
</tr>
</tbody>
</table>

SET UP SQL

1. In Computer Management, create new user with the name svc_tbr and a password.

Note: this account may already exist for NetBackup SQL, which can be used with Avamar as well. If so, skip to Step 6.

2. Once the account has been created, double-click on the account to open properties and select the Members Of tab. Type Administrators in the blank space and click OK.
3. Open and log in to Microsoft SQL Server Management Studio, expand Security and right click Logins. Select New Login.

4. Click Search.
5. Type `svc_tbr` in the blank space and click **OK**.

6. Select **Server Roles** (left pane), and tick the **sysadmin** check box.
7. Select Status (left pane), check that login has been enabled, then click OK.
8. Open Computer Management, then Services. Look for Backup Agent (Avamar) or NetBackup Client Service (Netbackup). Double-click to access its properties then select the Log On tab.

9. Select This Account and Browse, type svc_tbr then click OK. Type in the password you set up in Step 1 and click OK.

---

**INSTALL AVAMAR WINDOWS PLUG-IN**

Perform a test on file system backup to see if it works.

**INSTALL THE SQL SERVER BACKUP PLUG-IN**

1. Log in to the computer hosting the SQL Server.

2. Point your web browser at your backup server by typing the relevant backup platform URL e.g. https://<avamar server name>. You will be automatically redirected to the backup platform’s secure web server. Depending on your browser security settings, a security alert dialog box might appear.

   Your allocated backup server details would have been provided to you after you submitted a request to us to activate backups. See Appendix D for how to determine the backup server name on your server.
1. If a security alert dialog box appears, click Yes or OK to allow redirection to the backup secure web server.

2. Page down until the Documents and Downloads hyperlink is visible.

3. Click Documents and Downloads.

4. Click the appropriate operating system hyperlink for your client computer or workstation.

5. Double-click the corresponding install package `AvamarSQL-windowsx86-VERSION.msi` (32-bit) or `AvamarSQL-windows-x86_64-VERSION.msi` (64-bit).

Your browser will prompt you to either open the file in-place (on the server) or save it to your local computer or workstation. Either method will work. However, if you save the file to your local computer or workstation, you must open (double-click) that installation file to continue with this procedure.

6. Open the installation in place (on the server).

7. Follow the on-screen instructions.

8. Click Finish to complete the installation procedure.

**MICROSOFT SHAREPOINT SERVER**

The following are required to install and configure the backup plug-in for SharePoint:

- The standard backup plug-in has been installed and tested
- Microsoft SharePoint has been installed
- A folder has been created on the local disk of the SharePoint server for temporary backup files.
- The host with the installed backup plug-in must have a directory that is shared with enough space to accommodate the entire capacity of the MOSS Farm as a full backup.
- If the plan is to leverage both full and differential backups for restore, then adequate disk space on this host is required to recover both the full and differential export sets. Differential implies data changed since the last full backup.
- This host must also have credentials accessible by both the SQL Server service account and the MOSS Web server service account. The share permissions required for each account are:

<table>
<thead>
<tr>
<th>Domain Account</th>
<th>Grant Rights on Sharing Tab</th>
<th>Grant Rights on Security Tab</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Server Database Service Account</td>
<td>Change, Read</td>
<td>Read, Write</td>
</tr>
<tr>
<td>Central Administrator Pool Account</td>
<td>Change, Read</td>
<td>All Except Full Control</td>
</tr>
<tr>
<td>Timer Service Account</td>
<td>Change, Read</td>
<td>All Except Full Control</td>
</tr>
</tbody>
</table>
SET UP USER

If this account is set to the SharePoint administrator, click OK.

If the Local System account is selected, select This account and type the SharePoint administrator account and password in the text boxes.

INSTALL PLUG-IN

For SharePoint 2013, note the special instructions below.

1. Log in to the computer hosting SharePoint.

2. Point your web browser at your backup server by typing the relevant backup platform URL e.g. https://<avamar server name>. You will be automatically redirected to the backup platform’s secure web server. Depending on your browser security settings, a security alert dialog box might appear.

   Your allocated backup server details would have been provided to you after you submitted a request to us to activate backups. See Appendix D for how to determine a backup server name on your server.

3. If a security alert dialog box appears, click Yes or OK to allow redirection to the secure backup web server.
4. Page down until the *Documents and Downloads* hyperlink is visible.

5. Click *Documents and Downloads*.

6. Click the appropriate operating system hyperlink for your client computer or workstation.

7. Double-click the corresponding *AvamarMoss* install package displayed below:

Install the plug-in by taking all the defaults during the installation e.g.
On your SharePoint 2013 host, perform the following tasks:

Open your Services window.

Set the SharePoint VSS Writer Service with the following attributes:

Startup Type = Automatic
Logon User = set this to your SharePoint 2013 Windows account

Start the service by right-clicking it and selecting Start. E.g.
Install the Avamar for SharePoint agent.

Download and install the Avamar Agent for SharePoint as described above.

When prompted for the type of installation, select the type of SharePoint installation you have i.e. either web/stand-alone or application/database server.

The screen above will result.

Select OK and complete your installation.

Open a DOS prompt and navigate to the folder below:

C:\Program Files\Common Files\Microsoft Shared\Web Server Extensions\15\BIN>

Enter the following two commands:

```
stsadm -o unregisterwsswriter
stsadm -o registerwsswriter
```
Re-start the Avamar service.

Open your Services window.

Select the Backup Agent service. Right click and select Re-start.

**MICROSOFT EXCHANGE SERVER**

Note: recovery of mailboxes requires an initial restore of the Microsoft Exchange database to a Recovery Storage Group. The mailbox can then be connected to the running database.

1. Log into the computer hosting the Microsoft Exchange server.

2. Point your web browser at your backup server by typing the relevant backup platform URL e.g. https://<avamar server name>. You will be automatically redirected to the secure backup web server. Depending on your browser security settings, a security alert dialog box might appear.

Your allocated backup server details would have been provided to you after you submitted a request to us to activate backups. See Appendix D for how to determine an backup server name on your server. For Exchange 2010, use Avamar Version 6.x or above.

3. If a security alert dialog box appears, click Yes or OK to allow redirection to the secure backup web server.

4. Page down until the Documents and Downloads hyperlink is visible.

5. Click Documents and Downloads.

6. Click the appropriate operating system hyperlink for your client computer or workstation.

7. Double-click the corresponding install package displayed below:

   ![Downloads Table]

   Your browser will prompt you to either open the file in-place (on the server) or save it to your local computer or workstation. Either method will work. However, if you save the file to your local computer or workstation, you must open (double-click) that installation file to continue with this procedure.

8. Open the installation in place (on the server). The Install Shield Wizard appears.

9. Follow the on-screen instructions.

10. Click Finish to complete the installation procedure.
Note: this is required for Exchange 2010 DAG configurations.

Download the Avamar Exchange VSS installation file. Install the plug-in as follows:

For granular/message level backups, select to install Exchange GLR and select a write cache folder:
SYBASE WINDOWS AND RED HAT

Ensure that the standard Avamar plug-in has been installed and tested successfully.

Download installation package

1. Log in to the computer onto which you want to install this software. Before downloading, ensure communications are working correctly by telnetting on port 28001 to your allocated backup server or one of the following that correspond to your server's location:

   **Sydney:** $ telnet stlava02un01 28001
   **Melbourne:** $ telnet claava02un01 28001
   **Perth:**  $ telnet welava01un01 28001
2. The servers above are one of many backup servers that exist in each location. For each of your servers, it is important to download your software from your allocated backup server.

Your allocated backup server details would have been provided to you after you submitted a request to us to activate backups. See Appendix D for how to determine a backup server name on your server.

3. Point your web browser at your backup server by typing the relevant backup platform URL e.g. https://<avamar server name>. You will be automatically redirected to the secure backup web server. Depending on your browser security settings, a security alert dialog box might appear.

4. If a security alert dialog box appears, click Yes or OK to allow redirection to the secure backup web server. The Secure Log On page appears.

5. Page down until the Documents and Downloads hyperlink is visible.

6. Click Documents and Downloads. The Documents and Downloads page appears.

7. Click the correct operating system hyperlink for your client computer.

**WINDOWS**

<table>
<thead>
<tr>
<th>Web Access - Documents and Downloads</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>enavmar <a href="http://enavmar/cgi-bin/enterprise/download.cgi?dir=/SPLInstalls/download">http://enavmar/cgi-bin/enterprise/download.cgi?dir=/SPLInstalls/download</a></td>
<td></td>
</tr>
<tr>
<td>Most Visited</td>
<td></td>
</tr>
<tr>
<td>AvamarHost-VSS_windows_x86_64-5.1.101-87.msi</td>
<td>11-Dec-2012 14:57</td>
</tr>
<tr>
<td>AvamarRMAN-windows-x86_64-5.1.101-87.msi</td>
<td>11-Dec-2012 14:56</td>
</tr>
<tr>
<td>AvamarSAP-windows-x86_64-5.1.101-87.msi</td>
<td>11-Dec-2012 14:57</td>
</tr>
<tr>
<td>AvamarSQL-windows-x86_64-5.1.101-87.msi</td>
<td>11-Dec-2012 14:56</td>
</tr>
<tr>
<td>AvamarSybase-windows-x86_64-5.1.101-87.msi</td>
<td>11-Dec-2012 14:57</td>
</tr>
<tr>
<td>AvamarSybase-windows-x86_64-5.1.101-87.msi</td>
<td>11-Dec-2012 14:57</td>
</tr>
<tr>
<td>Avamar_ConfigChecker_win_x64.zip</td>
<td>07-Jan-2012 08:06</td>
</tr>
<tr>
<td>tc-6441-windows-x64.exe</td>
<td>21-Mar-2013 03:48</td>
</tr>
</tbody>
</table>

Ensure the bitness of your Sybase installation matches the download selected. Download the file.
Select the install file and press Next.

Select Install when the set-up screen appears.
Complete the installation by copying file `<Avamar Install Path>/avs/bin/libsybase_avamar.dll` to your `<Sybase Install location>`/ASE-15_0/lib

**LINUX**

<table>
<thead>
<tr>
<th>Name</th>
<th>Last Modified</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>AvamarClient-linux-rhel4-x86_64-5.1.101-87.rpm</td>
<td>11-Dec-2012 14:55</td>
<td>51.9M</td>
</tr>
<tr>
<td>AvamarDB2-linux-rhel4-x86_64-5.1.101-87.rpm</td>
<td>11-Dec-2012 14:55</td>
<td>1.9M</td>
</tr>
<tr>
<td>AvamarRMANlinux-rhel4-x86_64-5.1.101-87.rpm</td>
<td>11-Dec-2012 14:55</td>
<td>1.8M</td>
</tr>
<tr>
<td>AvamarSAP-linux-rhel4-x86_64-5.1.101-87.rpm</td>
<td>11-Dec-2012 14:55</td>
<td>3.5M</td>
</tr>
<tr>
<td>AvamarSybase-UX-Linux-15_0-x86_64-5.1.101-87.rpm</td>
<td>11-Dec-2012 14:55</td>
<td>1.8M</td>
</tr>
<tr>
<td>AvamarSybase-UX-Linux-15_0-x86_64-5.1.101-87.rpm</td>
<td>11-Dec-2012 14:55</td>
<td>1.9M</td>
</tr>
</tbody>
</table>

Ensure the bitness of your Sybase installation matches the download selected.

In the examples below, Sybase has been installed in the directory named `/var/sybase`

You’ll need to know the architecture of the Sybase application you’re running in order to download the correct plug-in file from the backup platform. If you’re unsure, you can confirm the architecture using the following command:

```
# file /var/sybase/ASE-15_0/lib/libsyb_tsm.so
```

The following sample text should be returned:
/var/sybase/ASE-15_0/lib/libsyb_tsm.so: ELF 64-bit LSB shared object, x86-64, version 1 (SYSV),

Select and download the installation file for Sybase. Select the file name `AvamarSybase-linux-type-x86-version.rpm`

```
rpm -hi AvamarSybase-linux-type-x86-version.rpm
```

or

```
rpm -hi AvamarSybase-linux-type-x86_64-version.rpm
```

```
######################################################################## [100%]
######################################################################## [100%]

avagent Info: Stopping Avamar client Agent (avagent)...

avagent Info: Client Agent stopped.

avagent Info <0000>: Logging to /usr/local/avamar/var/avagent.log

avagent Info <5417>: daemonized as process id 17001

avagent Info: Client Agent started.

Installation complete
```

Create a symbolic link named `libsybase_avamar.so` in the Sybase ASE library directory

```
$SYBASE/$SYBASE_ASE/lib.
```

This points to the backup plug-in for Sybase library file (`libsybase_avamar.so`) in the

Avamar_installation_dir/lib directory.

For example:

```
# ln -s /usr/local/avamar/lib/libsybase_avamar.so /var/sybase/ASE-15_0/lib/libsybase_avamar.so
```

Confirm with:

```
# ls -l /var/sybase/ASE-15_0/lib/libsybase_avamar.so
```

Will return:

```
1rwxrwxrwx 1 root root 41 Dec 6 23:25 /var/sybase/ASE-15_0/lib/libsybase_avamar.so -> /usr/local/avamar/lib/libsybase_avamar.so
```

Copy and edit the `avsybase` script file, and add the Sybase OCS library path to the LD_LIBRARY_PATH path in the script. This resides in `/usr/loca/avamar/bin` e.g.

```
LD_LIBRARY_PATH="${BASEDIR}/lib:/var/sybase/OC5-15_0/lib:${LD_LIBRARY_PATH}"
```

Enter the following command to activate the Sybase plug-in:

```
/usr/local/avamar/bin/avregister
```

Enter the backup server name and domain name we provided to you when we activated your service.
Client Registration and Activation

This script will register and activate the client with the Administrator server.

Enter the Administrator server address (DNS text name or numeric IP address, DNS name preferred): $AvamarServerName$

Enter the Avamar server domain [clients]: $AvamarDomainName$

avagent.d Info: Stopping Avamar client Agent (avagent)...

avagent.d Info: Client Agent stopped.

avagent Info <0000>: Logging to /usr/local/avamar/var/avagent.log

avagent.d Info: Client activated successfully.

avagent Info <0000>: Logging to /usr/local/avamar/var/avagent.log

avagent Info <5417>: daemonized as process id 18347

avagent.d Info: Client Agent started.

Registration Complete.

Verify the configuration by entering the following command to check that the Sybase plug-in installation is complete:

```
# ./avsybase --version
```

The command should respond with:

version: 6.1.100-402

build date: Jun 13 2012 21:32:30

msg format: 13-10

SSL: TLSv1 OpenSSL 0.9.8r-fips 8 Feb 2011

Zlib: 1.2.3

LZO: 1.08 Jul 12 2002

platform: Linux

OS version: SLES-64

Processor: x86_64

ORACLE ON ENTERPRISE LINUX, RED HAT AND WINDOWS

INSTALL PLUG-IN

The standard backup plug-in first needs to be installed for the required platform.

Next, download the Avamar Oracle installation file for the platform required from an Avamar server.
INSTALL ORACLE PLUG-IN

RED HAT
For example:

```
root@lxdcbres01:/home/tdev# ls -l
total 1452
-rw-r--r-- 1 tdev tadmin 1477020 Dec 14 15:48 AvamarRMAN-linux-rhel3-x86-6.1.101-87.rpm
root@lxdcbres01:/home/tdev# rpm -ih AvamarRMAN-linux-rhel3-x86-6.1.101-87.rpm

avagent Info: Stopping Avamar client Agent (avagent)...  
avagent Info: Client Agent stopped.
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log
avagent Info <5417>: daemonized as process id 9807
avagent Info: Client Agent started.
Installation complete

Verify:
root@lxdcbres01:/home/tdev# rpm -qa | grep RMAN
AvamarRMAN-6.1.101-87
```

WINDOWS
Select the install file as in the sample below.

```
AvamarClient-windows-x86-6.1.101-87.msi
AvamarConsoleMultiple-windows-x86-6.1.101-87.exe
AvamarDB2-windows-x86-6.1.101-87.msi
AvamarDownloaderService-windows-x86-6.1.101-87.exe
AvamarLotus-windows-x86-6.1.101-87.msi
AvamarRMAN-windows-x86-6.1.101-87.msi
AvamarSAP-windows-x86-6.1.101-87.msi
AvamarSQL-windows-x86-6.1.101-87.msi
AvamarSybase-windows-x86-6.1.101-87.msi
Avamar_ConfigChecker_win_x86.zip
jre-6u41-windows-i586.exe
```
SET UP USER
This set-up must be completed by an Oracle database administrator (DBA). If an Oracle user account with SYSDBA privileges does not already exist, you must create one. This Oracle account (backupuser) is used to perform database backups and restores.

CONFIGURE HOT BACKUPS
To be completed by an Oracle database administrator. For example:

```
Prepare database for Hot Database Backups:
sqlplus "/ as sysdba"
```
SET-UP FOR RECOVERY

The following instructions are required to set up Avamar and RMAN for selective restores i.e. tablespace and file level recovery.

1. Set up avtar file
2. Create an Avamar folder to contain scripts i.e. /home/oracle/avamar/avtar-flags.txt

RED HAT LINUX

Create the following file:

```bash
--pidname=Oracle
--server=stlava02un01.tsb.avamar.com.au
--expires=30

Linux:
--pidnum=1002

Red Hat:
--logfile=/usr/local/avamar/var/rmanavtarbkup.log
--vardir=/usr/local/avamar/var/
--id=backup20/Cus
--ap=xxxxxxxx
--path=/Cus/cuspitsap001/cuspitzc02ssz02.hosting.telstra.com
--retention-type=daily,weekly
```

WINDOWS

Create a folder e.g. d:\oraexe\avamar

```bash
--pidname=Oracle
```
server is the backup platform server (or administrator server) e.g. stlava03un01.tsb.avamar.com.au

expires is the backup retention in days i.e. 30 or 90 days

id is userid@domain of the client, e.g. backup2@Cus

ap is the password for the backup user name provided to you at activation

SET PERMISSIONS

RED HAT LINUX

- $ chmod 766 /usr/bin/avtar
- $ chmod 766 /home/oracle/avamar/avtar-flags.txt

RED HAT

- $ chmod 766 /usr/local/avamar
- $ chmod 766 /usr/bin/avtar
- $ chmod 777 /usr/local/avamar/bin/avtar
- $ chmod 766 /home/oracle/avamar/avtar-flags.txt

CONFIGURE HOT BACKUPS

To be completed by an Oracle database administrator.

For example:

Prepare database for hot database backups:

```
sqlplus "/ as sysdba"
```

SQL*Plus: Release 10.1.0.2.0 - Production on Wed Apr 6 14:19:12 2005
Copyright (c) 1982, 2004, Oracle. All rights reserved.
Connected to:
Oracle Database 10g Enterprise Edition Release 10.1.0.2.0 - Production With the
Partitioning, OLAP and Data Mining options

```
SQL> shutdown immediate;
```

Database closed.
Database dismounted.
ORACLE instance shut down.

```
SQL> startup mount;
```

ORACLE instance started.
Total System Global Area 171966464 bytes
Fixed Size 787988 bytes
Variable Size 144964076 bytes
Database Buffers 25165824 bytes
Redo Buffers 1048576
Database mounted

```
SQL> alter database archivelog;
Database altered.
SQL> alter database open;
Database altered.
SQL> exit
Disconnected from Oracle Database 10g Enterprise Edition Release 10.1.0.2.0
```

**IF REQUIRED, CONFIGURE LOCK CHANGE TRACKING**

To be completed by an Oracle database administrator. To perform incremental backups of an Oracle database, you must enable the Block Change Tracking feature. To determine whether or not Block Change Tracking is enabled, type the following from an SQL prompt:

```
select status from v$block_change_tracking;
```

The **STATUS** column shows whether or not Block Change Tracking is enabled. The **FILENAME** column contains the filename of the change tracking file.

Refer to your Oracle documentation for additional information about `v$block_change_tracking`.

To enable Block Change Tracking, perform the following:

1. Open a command shell.
2. Log into Oracle RMAN by using your Oracle user ID and password. The command prompt changes to:
   ```
   RMAN>
   ```
3. Connect to the Oracle database.
4. Type the following:

```
alter database enable block change tracking using file
'/app/oracle/change_file.fil';
```

Oracle uses the `change_file.fil` file to track changes to datafiles.

**TEST RMAN**

To be completed by an Oracle database administrator. Create the following RMAN script:

**Linux**

```
run {
allocate channel c1 type sbt
PARMS="SBT_LIBRARY=/usr/local/avamar/lib/libobk_avamar.so" format '%d_%U';
send ""--flagfile=/home/oracle/avamar/avtar-flags.txt" "--bindir=/usr/local/avamar/bin";
release channel c1;
}
```

**Windows**

```
run {
configure controlfile autobackup on;
ALLOCATE CHANNEL ch1 TYPE sbt
PARMS="SBT_LIBRARY=C:\Program Files\avamar\Libobk_avamar.dll ENV=(path=C:\Program files\avamar\bin)";
send ""--flagfile=D:\oraexe\avamar\avtar-flags.txt" "--bindir=C:\Program Files\avamar\bin\Libobk_avamar.dll ENV=(path=C:\Program files\avamar\bin)";
}```
files\avs\bin";
RELEASE CHANNEL ch1;

Will return:

using target database controlfile instead of recovery catalog allocated channel: c1
channel c1: sid=12 devtype=SBT_TAPE
channel c1: EMC|Avamar (avtar backup)
sent command to channel: c1
released channel: c1
Recovery Manager complete.

SAP WITH ORACLE ON RED HAT

Note that the Avamar SAP Agent is used. Ensure the same Filesystem and SAP plugin are used. The minimum version is 6.1 SP1.

1. Point your web browser at the Telstra Backup Platform by typing the URL provided upon activation. Depending on your browser security settings, a security alert dialog box might appear e.g. http://<server name>
2. The Secure Log On page appears. Note: you don’t have to log in at this stage.

Scroll down until the Documents and Downloads hyperlink is visible and then follow the link. e.g. 'AvamarSAP-linux-rhel4_x86_64-6.1.100-402.rpm'.

3. Install using the downloaded 'rpm' file as displayed below:

root@rhel664test tdev]# rpm -ih AvamarSAP-linux-rhel4-x86_64-6.1.100-402.rpm
# ................................................................................ [100%]
# ................................................................................ [100%]
Installation complete
You may run /usr/local/avamar/bin/avregister to register and activate this client with the Administrator server.
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log
avagent Info <5417>: daemonized as process id 2066
avagent.d Info: Client Agent started.
CONFIGURE AVAMAR

In Red Hat, the path /var/avamar requires WRITE access by the ORAsid user account.

1. Copy the backint program from the SAP plug-in installation directory to the directory that contains the SAP BR*Tools to /usr/local/avamar/bin
2. Create Avamar Flag File: Log in to your SAP host as the SAP user. Create a directory with the name $home/avamar
3. Add the contents similar to the text below;

```
--bindir=/usr/local/avamar/bin
--sysdir=/usr/local/avamar/etc
--vardir=/usr/local/avamar/var
--id=AAAadmin@/AvamarDomainName
--password=BBBBBB
--account=/AvamarDomainName/AvamarSubDomainName/myhostname
--server=AvamarServerName
```

usr/local/avamar is the location of the Avamar install.

We supply the following details to you:

- Avamar userid (e.g. AAAadmin)
- Avamar password (e.g. BBBBBB)
- AvamarDomainName (e.g. CompanyX)
- AvamarSubDomainName (e.g. comstlsap001, comclasap001)
- AvamarServerName (e.g. stlava01un01, claava01un01)

4. Edit your initDBSID.sap file and add the entries below;

```
util_path = /usr/local/avamar/bin
This path was used to install Avamar and should exist.

util_par_file = /home/oraie0/avamar/avamar.txt
This is the full path of the Flag File created above.
```

Note: for restore operations, perform the steps below:

- Comment out util_par_file
- Perform the restore(s)
- Comment in util_par_file

CONFIGURE ORACLE

Check the status of the log mode by using the following procedure:

```
> sqlplus /Nolog;
SQL*Plus: Release 11.2.0.2.0 Production on Mon Mar 4 14:23:46 2013
Copyright (c) 1982, 2010, Oracle. All rights reserved.
SQL> connect / as sysdba;
Connected.
SQL> select NAME,LOG_MODE from v$database;
NAME     LOG_MODE
--------- ------------
IU4     ARCHIVELOG
If Archivelog is not set as the log_mode), then;
SQL> shutdown immediate;
Database closed.
Database dismounted.
```
ORACLE instance shut down.
SQL> startup mount
ORACLE instance started.
Database mounted.
SQL> alter database archivelog;
Database altered.
SQL> alter database open;
Database altered.

Set "sysdba" privileges to the database user being used for backup and restore. For example, if the user is "sapuser":

SQL> grant sysdba to sapuser;
SQL> select * from v$pwfile_users;

<table>
<thead>
<tr>
<th>USERNAME</th>
<th>SYSDB</th>
<th>SYSOP</th>
<th>SYSAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYS</td>
<td>TRUE</td>
<td>TRUE</td>
<td>FALSE</td>
</tr>
<tr>
<td>SAPUSER</td>
<td>TRUE</td>
<td>FALSE</td>
<td>FALSE</td>
</tr>
<tr>
<td>SYSTEM</td>
<td>TRUE</td>
<td>FALSE</td>
<td>FALSE</td>
</tr>
</tbody>
</table>
There are a few ways to retrieve a backup server name.

Firstly, check your records – the server name should have been provided to you after you submitted a request to us to activate backups.

If backups are already running on your server, you can check your daily report for backup server details.

Otherwise, enter the following details for the relevant service, which also shows what backups are working on your server.

**LINUX SERVER**

```
#service avagent status
```

**WINDOWS SERVER**

1. Click the Avamar icon in the task tray.

2. Select *Additional Info*...
3. An About Avamar Client box appears – view the Avamar Server details.
Your restore target does not have to be the same virtual server the backup was originally created from.

You can restore a stored backup file to any type of Telstra virtual server that shares the same virtual data centre location as the virtual server the backup originated from.

You can restore to an alternate virtual server from either:

A long-term backup
A short-term backup

The target virtual server you are restoring to may need to be redirected to the backup platform containing the data to be restored. A virtual server can only be connected to one backup platform at a time.

Note: performing a single-directory restore to an alternate virtual server will only restore the contents of the directory. The original parent directory is not restored as part of this operation. However, if you restore two or more directories to an alternate virtual server, then the original parent directories will be restored along with the contents of those directories.

RESTORE A LONG-TERM BACKUP TO AN ALTERNATE VIRTUAL SERVER

To restore from a long-term backup, you’ll need to contact us to specify details including:

- The virtual server the backup was created from
- The backup files/folders you want to restore
- The alternate backup target virtual server
- The directory location you’d like the files restored to

We perform all restores from long-term backups. We’ll identify and advise you if a redirected restore is required when you make your backup request. A redirected restore could cause a temporary backup service interruption.

PREPARE TO RESTORE A SHORT-TERM BACKUP TO AN ALTERNATE VIRTUAL SERVER

You can check the backup platform that a virtual server is connected to at any time by following the initial instructions to change your backup platform connection.

To allow us to perform a restore to an alternate target, your target virtual server may need to be temporarily redirected to the backup platform where your chosen backup file(s) are stored.

If so, and you’re restoring to a managed virtual server (dedicated) then we’ll take care of the platform redirection for you.

We’ll advise you by email if you need to perform a redirection for a virtual server (dedicated) or virtual server (shared) restore target. In this case, you’ll need to change your backup platform connection.
POSSIBLE BACKUP SERVICE INTERRUPTION

If you have scheduled backups configured on your restore target virtual server, your backup service could be interrupted.

A virtual server can only be connected to one backup platform at a time. Daily scheduled backups will not perform successfully from your target virtual server while it’s temporarily redirected to a different backup platform.

If your redirected target is a managed virtual server (dedicated), we’ll email you to let you know when the redirected restore is complete, and your scheduled backups will resume on your target virtual server.

If your redirected target is a virtual server (shared) or virtual server (dedicated), we’ll advise you when the restore is complete. The scheduled backup service on your target virtual server will only resume when you change your backup platform connection to its original address.

CHANGE A BACKUP PLATFORM CONNECTION

These actions are not required if your alternative restore target is a managed virtual server (dedicated) – we’ll do this for you.

If your alternative restore target is a virtual server (shared) or virtual server (dedicated), use this process to either:

Temporarily redirect a restore target virtual server to a different backup platform
Switch a restore target virtual server back to its original backup platform

If you’re required to perform the redirect for the restore, we’ll send you an email with the new platform address you need to temporarily connect to.

Do not switch your target virtual server back to its original platform, until we advise you by email the restore has been completed.

The method for connecting a virtual server to a backup platform varies according to your virtual server’s operating system.

CHANGE A BACKUP PLATFORM CONNECTION FOR A VIRTUAL SERVER RUNNING WINDOWS

Right click the Avamar icon in your task tray.

Select Manage, then select Activate Client.
The *Activate Client Setup* window will appear.

The *Administrator Server Address* field will be pre-populated with the address of your virtual server’s current backup platform. This example shows a connection to *stlava03un01.tsb.avamar.com.au*.

If you just want to check the backup platform your virtual server is connected to, you can select *Close* at this stage to leave the settings unchanged.

If you are changing the backup platform, take note of the existing platform address before you redirect. The name of a virtual server’s current backup platform (Administrator server) appears in your most recent daily backup report.

Highlight the *Administrator Server Address* field, and replace the entry with the address of either:

- The backup platform where your backup file(s) is stored (before starting the redirected restore)
- The original backup platform of your target virtual server (once we advise you the restore is complete)

The pre-populated *Client Domain* will be replaced with ‘/’.
If you’re restoring from a *short-term backup*, then you’ll need to enter your details in the *Client Domain* field. Refer to your most recent daily backup report for this information.

If you are restoring from a *long-term backup*, leave the *Client Domain* field as ‘/’.

Select *Activate*.

The following message will be displayed only if your target virtual server has previously been configured for scheduled backups.

Select *Yes*.

A message should appear to confirm connection to a different backup platform was successful.

Select *OK* to complete the process.

**CHANGE A BACKUP PLATFORM CONNECTION FOR A VIRTUAL SERVER RUNNING LINUX**

Find which backup platform your restore target virtual server is connected to by entering the following command:

```
root@lxtsbres01:~# service avagent status
```

In this example, the following response shows that the virtual server is currently connected to the backup platform address: *tsbava12un01.tsb.avamar.com.au*
If you are changing the backup platform, take note of the existing platform address before you redirect. The name of a virtual server’s current backup platform (Administrator server) appears in your most recent daily backup report.

To connect to a different backup platform, enter the command:

```
root@lxtsbres01:~# /usr/local/avamar/bin/avregister
```

This script will register and activate the client with the Administrator server.

Then enter either:
The backup platform where your backup file(s) is stored (before starting the redirected restore)
The original backup platform of your target virtual server (once we advise you the restore is complete)
Enter the address of the new backup platform in the format: (DNS text name or numeric IP address, DNS name preferred).

Enter the Client Domain field.

If you’re restoring from a short-term backup, then you’ll need to enter your details in the Client Domain field. Refer to your most recent daily backup report in the Domain Name column.

If you’re restoring from a long-term backup, leave the Client Domain field blank and press the enter key.

Enter the Avamar server domain [clients]:

In the following example, the new backup platform being connected to is `tsbava11un01`.

```
root@lxtsbres01:~# /usr/local/avamar/bin/avregister
```

This script will register and activate the client with the Administrator server.

Enter the Administrator server address (DNS text name or numeric IP address, DNS name preferred): `tsbavallun01`

Enter the Avamar server domain [clients]:

```
avagent.d Info: Stopping Avamar client Agent (avagent)...  
avagent.d Info: Client Agent stopped.  
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log  
avagent.d Info: Client activated successfully.  
avagent Info <5241>: Logging to /usr/local/avamar/var/avagent.log  
avagent Info <5241>: daemonized as process id 22187
```
avagent.d Info: Client Agent started.
Registration Complete.

The command is only successful if Registration Complete displays.
CHAPTER 18
APPENDIX F: BACKUP AND RESTORE PROCEDURES FOR DATABASE SOFTWARE

This appendix outlines backup and restore procedures for:

- **Microsoft SQL Server**
- **Microsoft SharePoint Server**
- **Microsoft Exchange Server**
- **Linux** (including Oracle, Red Hat, SUSE, Ubuntu and CentOS)
- **Sybase** – for Windows and Red Hat

**MICROSOFT SQL SERVER**

**BACKUPS**

Click the *Backup and Restore* tab, the *Backup and Restore* window appears.

Click the *Select for Backup* tab.

Select a client in the clients tree. A list of the client’s files, folders and directories is displayed to the right of the client’s tree. Placing a check mark next to a directory or file selects it for backup.

Select one or more directories and files.

If you want to change your backup retention setting, select the *Retention period*, if you want this backup to be deleted from the backup server after a specific number of days, weeks, months or years, type the number of days, weeks, months or years. Set the retention period either 30 days or 3 months.

Select *None* for the encryption method.

Select *More Options*. If there is an entry for a hostname in the field *Store backup on Data Domain system* select it as shown in the sample below. Select *OK*.

![Check box for Store backup on Data Domain system]

Click *OK* again. The On Demand Backup Options dialog box closes and the *Backup initiated* status message appears.

Click *OK* and monitor it from activity monitor.
Note: to perform a tail-log backup, the database must be online and using either the full or bulk-logged recovery model. To perform a point-in-time restore, the database must be using the full recovery model. As a result, you cannot perform either a tail-log backup or a point-in-time restore of system databases such as the master, msdb, and model databases because those databases use the simple recovery model.

To restore to a specific point in time, you must provide the transaction date and time or named mark to recover to from the SQL Server transaction log. The SQL Server documentation on the Microsoft website provides details on how to access transaction log information.

The point in time that you are restoring to must be after the finish time for the most recent full backup. In addition, if the point in time is before the start time of the most recent transaction log (incremental) backup, then a tail-log backup is not required. However, a tail-log backup is required if the point in time is after the most recent transaction log backup.

When you specify the point in time for restore, do not specify the start time of the selected transaction log backup if it is not the last backup in the backup sequence. Otherwise, the restore fails and a tail-log backup does not occur even if the Log Tail Backup option is selected.

Log in to the Avamar administrator console.

1. Select a client in the clients tree, click Select for Restore tab.
2. Click the By Date tab. Clicking the By Date tab displays a browsable calendar for locating backups in the Avamar server. Dates highlighted in yellow indicate that a backup was performed on that date. Selecting a valid backup date on the calendar populates the backups list immediately to the right of the calendar. Selecting a backup populates the contents list directly below the Backup History pane.

9. In the Backup History pane, browse to a valid backup date in the Calendar (highlighted in yellow).
10. Select the backup from which you want to restore directories, folders or files.
Select Actions > Restore Now, the Restore Options dialog box appears. Review your restore settings, select None for Encryption method.

Full backups are f-0 files, differential backups are d-n files, and transaction log (incremental) backups are i-m files.

If you are restoring from a transaction log or differential backup, select the database backup file that corresponds to the date and time to which you want to recover.

During the restore process, the backup service automatically restores any necessary data from the full backup, then restores and applies the intervening backup files as necessary. In other words, you do not need to select the full backup in addition to the transaction log or differential backup.

Select the most recent backup file if you plan to perform a tail-log backup and recover to a point in time since that last backup. A tail-log backup only includes transactions that have not yet been included in a backup.

Select the Restore Destination. See Appendix D for how to restore to an alternate server.
Select More Options

Select Show Advanced Options
Specify either the point in time or the named mark to recover to.

To recover to a specific point in time, specify the date and time in yyyy-mm-ddThh:mm:ss format in the Point-in-Time text box. For example, 2011-02-25T14:15:45 is February 25, 2011 at 2:15:45 p.m.

To recover to a named mark, specify the mark in the Mark name text box.

Note: specify either a point in time or a named mark, but not both. If you specify both, then the restore fails to complete and an error message is written to the log file.

If you specified a mark and named marks are not unique in the transaction log, then use the After date/time text box to locate the mark to recover to. The recovery process stops at the first mark with the specified name, exactly at or after the specified date and time. Specify the date and time in yyyy-mm-ddThh:mm:ss format.

Click OK. The Restore Options dialog box closes and the Restore initiated status message appears.

Monitor it from the activity monitor.
## Appendix F: Backup and Restore Procedures for Database Software

### Table of Schedules

<table>
<thead>
<tr>
<th>Status</th>
<th>Error Code</th>
<th>Start Time (EST)</th>
<th>Elapsed</th>
<th>End Time (EST)</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed</td>
<td></td>
<td>2010-04-19 15:00</td>
<td>00:02:03</td>
<td>2010-04-19 15:32</td>
<td>Resto</td>
</tr>
<tr>
<td>Completed</td>
<td></td>
<td>2010-04-19 15:30</td>
<td>00:02:03</td>
<td>2010-04-19 15:32</td>
<td>Resto</td>
</tr>
</tbody>
</table>
MICROSOFT SHAREPOINT SERVER

BACKUP

In the Backup and Restore tab, select Backup.

Select the SharePoint components to backup:

Right click and select Backup Now.

RESTORE

In the Backup and Restore tab, choose the Select for Restore tab. For example:

Select the Sharepoint option you wish to restore.
Right click and select Restore Now.
Select the *Restore type*, either *Overwrite* or *New*. 
MICROSOFT EXCHANGE SERVER

BACKUPS

Navigate to the backup pane
Select the host and Exchange component required for the backup
Select Actions > Backup Now.

For example:
Monitor activity using the Activity Monitor. For example:

RESTORE
Before performing a database restore, carefully review all restore options. If you do not want to overwrite the database, restore the database to a Recovery Storage Group (RSG) instead by selecting the Restore into Recovery Storage Group option from the Restore Options dialog box in the administrator.

Note: at the time of backup, the restore target Exchange server must have the same version and service pack level as the source Exchange server.

EXCHANGE SERVER 2007 DATABASE MOUNTING AFTER RESTORE
Before starting a restore, Avamar must dismount all databases within a storage group, whether they are all part of the restore or not. When the restore is completed, Avamar will attempt to mount all existing databases in the storage group whether they were previously mounted or not. Avamar will not attempt to mount databases that do not exist on disk, even if they exist within the Active Directory.

Selective restore of databases may fail if done from an older backup.

The restore of selected databases may fail if done from an older backup after a restore of that database has been done with a newer backup. If this occurs, you can delete the restore.env file created in the log folder path along with all the log files in that path, and rerun the restore.

ADDITIONAL NOTES ABOUT RESTORING TO AN EXCHANGE RDB OR RSG
In Exchange Server 2010 and Exchange Server 2007, you can recover a database to a separate storage group or database without disrupting your active production databases and servers. Once you have recovered the database, you can explore and select individual mailboxes to recover to your production server while it is online. In Exchange Server 2010, this capability is provided by the RDB feature. In Exchange Server 2007, this capability is provided by the RSG feature. The Avamar Exchange VSS Client provides the Windows Exchange VSS plug-in for recovering to an Exchange Server 2010 RDB or Exchange Server 2007 RSG.

When you use the restore to a RDB or RSG feature, always delete the existing RDB or RSG and then create a new clean RDB or RSG. If you are performing a directed recovery, delete the existing RDB or RSG on the original server as well as the RDB or RSG on the target server.

The restore process should be managed by the Exchange Administrator. The procedure involves:

In the Backup and Restore tab, select Restore.
Highlight the date of the backup.

Select Plug-In *Windows Exchange Database*.

Select the Exchange component to restore. The example above has: *19 Dec 2010, Second Storage Group*

Select Actions >> Restore Now

The *Restore Options* panel will display:
Select the *Host* to direct the restore operation.

Select *More Options*:

Select the options required to perform the recovery as in the example above

Select *OK* and the recovery will commence

*Use the Activity Monitor to view the process of the operation*
Specify a setting that will allow this database or all databases to be overwritten by the restore, using one of the two following methods:

To specify to allow overwrite of just the database you actually want to restore, in the Restore Command Line Options dialog box, leave the Allow database overwrite checkbox cleared, and then in Exchange Management Console, select the This database can be overwritten by a restore option in the recovery options for the database you want to restore. This allows you to set Allow database overwrite for the databases that were selected for restore.

OR

To specify to allow overwrite of all databases when you perform a restore, in the Restore Command Line Options dialog box, select the Allow database overwrite option.

Note: If you select the Allow database overwrite option and accidently select a database to be restored, it will be overwritten. By default, when you first open the Restore Command Line Options dialog box, this setting is not selected.

Select or type other options as needed, and then click OK when done.

**LINUX**

This section includes the procedure for the platforms listed below. The administration console can be used to manage these platforms:
MANAGE YOUR SYSTEM FROM THE COMMAND LINE

The avtar program is a command-line backup and restore program used to:

- Back up files and directories
- Delete an existing backup
- Extract and restore files or directories from a previous backup
- List the labels and dates of backups, or list the names of files and directories in a backup
- Validate a backup to ensure that data can be extracted

AVTAR SYNOPSIS

```
avtar {{--create | -c} | --delete} {--extract | --get | --x}
| {--list | -t} | --backups | --validate}
```

Only one of the following commands must be supplied on each command line:

- **--create** or **-c** creates a new backup. Typically, you should include a list of files, directories or a path you want to back up. If you do not specify which files, directories or a path to backup, your entire local filesystem is backed up.

- **--delete** deletes an existing backup.

Backups can only be deleted one at a time.

- **--extract** or **--x** restores (extracts) files or directories from a previous backup.

- **--list** or **-t** lists the contents of a backup. When used with the **--verbose** option, it returns file and directory permissions, size, creation date and time, as well as the file or directory name.

- **--backups** lists all backup names and when they were created by a specific user account.

- **--id** specify the full path for the user id, this will be provided by Telstra operation team with the password.

You need the login name, password and domain Avamar host name to log in using SSH. These details are provided by us.

AVTAR EXAMPLES

Show backups for user id user1@/here:

```
user1 is the user name provided by Telstra
z-test is the primary domain name
linux is the sub-domain name
lxtsbres01 is the host name
```
**password** is your Avamar domain password

```
root@lxtsbres01:~# /usr/local/avamar/bin/avtar --backups --id=user1@/z-test/linux/lxtsbres01

avtar Info <5551>: Command Line: /usr/local/avamar/bin/avtar.bin --vardir=/usr/local/avamar/var --bindir=/usr/local/avamar/bin --sysdir=/usr/local/avamar/etc --backups --id=user1@/z-test/linux/lxtsbres01

Password:

avtar Info <5552>: Connecting to Server (tsbava01un01.tsb.avamar.com.au)

avtar Info <5583>: Login User: "user1", Domain: "default", Account: "/z-test/linux/lxtsbres01"

avtar Info <6509>: Successfully logged into Server

avtar Info <7338>: Backups for /z-test/linux/lxtsbres01 as of 2010-04-22 13:01:13 EST

Date       Time   Seq       Label           Size     Plug-in   Working directory Targets
----------  ------  ---- ------- --------------- -------- ------- ----------------- ---------- -------
2010-04-09 13:48:25 1 linuxfs-1270784006846  38490839K Unix /var/avamar

avtar Info <5314>: Command completed (exit code 0: Success)"
```

**Restore /var/log to target /restore1/avamar:**

```
usr/local/avamar/bin/avtar -xv --target="/restore1/avamar" /var/log --id=user@/z-test --acnt=/ztest/linux/lxtsbres01

avtar Info <5551>: Command Line: /usr/local/avamar/bin/avtar.bin --vardir=/usr/local/avamar/var --bindir=/usr/local/avamar/bin --sysdir=/usr/local/avamar/etc -x -v --target="/restore1/avamar" /var/log --id=user1@/z-test/linux/lxtsbres01

Password:

avtar Info <5552>: Connecting to Server (tsbava01un01.tsb.avamar.com.au)

avtar Info Enter password:password

avtar Info <5583>: Login User: "user1", Domain: "default", Account: "/z-test/linux/lxtsbres01"

avtar Info <6509>: Successfully logged into Server

avtar Info <5295>: Starting restore at 2010-04-22 13:06:47 EST as "root" on "lxtsbres01" (2 CPUs) [5.0.101-32]`
```
avtar Info <5949>: Backup file system character encoding is UTF-8.

avtar Info <8695>: Backup from Linux host "/z-test/linux/lxtsbres01" (lxtsbres01) with plug-in 1001 - Linux Filesystem

avtar Info <5530>: Backup #1 label "linuxfs-1270784006846" timestamp 2010-04-09 13:48:25 EST, 44,171 files, 36.71 GB

avtar Info <5291>: Estimated size for "/var/log" is 15.56 MB

avtar Info <5260>: Restoring files from "/var/log" to directory "/restore1/avamar".

/restore1/avamar/Xorg.0.log
/restore1/avamar/Xorg.0.log.old
/restore1/avamar/acpid
/restore1/avamar/anaconda.log
/restore1/avamar/anaconda.syslog
Etc......
Etc...

avtar Info <5267>: Restore of "/var/log" completed

avtar Info <7875>: Restored 15.56 MB from selection(s) with 15.56 MB in 71 files, 6 directories

avtar Info <6090>: Restored 15.56 MB in 0.06 minutes: 14.28 GB/hour (66,734 files/hour)

avtar Info <7833>: Finished at 2010-04-22 13:06:47 EST, Elapsed time: 0000h:00m:03s

avtar Info <6608>: Not sending wrapup anywhere.

avtar Info <5314>: Command completed (exit code 0: Success)

Backup /var/log:

```
root@lxtsbres01:~# /usr/local/avamar/bin/avtar --cv /var/log --id=user1@/z-test/linux/lxtsbres01

avtar Info <5551>: Command Line: /usr/local/avamar/bin/avtar.bin --vardir=/usr/local/avamar/var --bindir=/usr/local/avamar/bin --sysdir=/usr/local/avamar/etc -c -v /var/log --id=user1@/z-test/linux/lxtsbres01

Password:

avtar Info <5946>: File system character encoding is UTF-8.

avtar Info <7508>: Starting back up at 2010-04-22 13:09:40 EST as "root" on
```
"lxtsbres01" (2 CPUs) [5.0.101-32]

avtar Info <5730>: Entering include/exclude rules.

avtar Info <5552>: Connecting to Server (tsbava01un01.tsb.avamar.com.au)

avtar Info <5583>: Login User: "user1", Domain: "default", Account: "/z-test/linux/lxtsbres01"

avtar Info <5550>: Successfully logged into Server (Compression enabled)

avtar Info <7513>: Back up of "/var/log" on server "tsbava01un01.tsb.avamar.com.au" for /z-test/linux/lxtsbres01

avtar Info <5586>: Loading cache files from /usr/local/avamar/var

avtar Info <6426>: Done loading cache files

/var/log/boot.log
/var/log/boot.log.1
/var/log/boot.log.3
/var/log/boot.log.2
/var/log/boot.log.4
/var/log/cron
/var/log/cron.3
/var/log/cron.1

Etc.....

avtar Info <5163>: Backup complete, wrapping-up session with Server

avtar Info <5156>: Backup #2 timestamp 2010-04-22 13:09:41, 72 files, 9 directories, 15.80 MB (61 files, 1.532 MB, 9.70% new)

avtar Info <7539>: No label, no scheduled expiration

avtar Info <6083>: Backed-up 15.80 MB in 0.08 minutes: 12 GB/hour (55,807 files/hour)

avtar Info <5587>: Updating cache files in /usr/local/avamar/var

avtar Info <7833>: Finished at 2010-04-22 13:09:41 EST, Elapsed time: 0000h:00m:04s

avtar Info <6608>: Not sending wrapup anywhere.

avtar Info <5314>: Command completed (exit code 0: Success)

avtar Info <5314>: Command completed (exit code 0: Success)

#
CHAPTER 18  APPENDIX F: BACKUP AND RESTORE PROCEDURES FOR DATABASE SOFTWARE

ORACLE
ON DEMAND AND GROUP BACKUP

RESTORE PROCEDURE
Oracle database operator to prepare database, depending on the type of restore operation being performed.

RESTORE FROM LATEST BACKUP
The following is an example in /home/oracle/avamar/restore.rcv

run {
    allocate channel c1 type sbt
    PARMS="SBT_LIBRARY=/opt/AVMRclnt/lib/libbk_avamar.so";
    send '"--flagfile=/home/oracle/avamar/avtar-flags.txt" --'
bindir=/opt/AVMRclnt/bin';
restore datafile "/u02/oradata/PDCBRC01/tools01.dbf";
recover datafile "/u02/oradata/PDCBRC01/tools01.dbf";
release channel c1;
}

Start the restore, for example:

$ rman target / @/home/oracle/avamar/restore.rcv

RESTORE FROM PREVIOUS BACKUP

The example below will restore a datafile from a backup taken 21 Dec 2010.

List backups in RMAN and obtain TAG.

oracle@tsblabvcs:~/avamar/PDCBRC01> rman target /
Recovery Manager: Release 9.2.0.5.0 - Production
Copyright (c) 1995, 2002, Oracle Corporation. All rights reserved.
connected to target database: PDCBRC01 (DBID=3652467607)
RMAN> list backup;

<table>
<thead>
<tr>
<th>BS Key</th>
<th>Type</th>
<th>LV Size</th>
<th>Device Type</th>
<th>Elapsed Time</th>
<th>Completion Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>6638</td>
<td>Full</td>
<td>211M</td>
<td>SBT_TAPE</td>
<td>00:00:33</td>
<td>21-DEC-10</td>
</tr>
</tbody>
</table>

BP Key: 6638   Status: AVAILABLE   Tag: TAG20101221T114943

Piece Name: PDCBRC01_gkm041un_1_1

List of Datafiles in backup set 6638

<table>
<thead>
<tr>
<th>File</th>
<th>Type</th>
<th>Ckp SCN</th>
<th>Ckp Time</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Full</td>
<td>182224026</td>
<td>21-DEC-10</td>
<td>/u02/oradata/PDCBRC01/system01.dbf</td>
</tr>
<tr>
<td>2</td>
<td>Full</td>
<td>182224026</td>
<td>21-DEC-10</td>
<td>/u02/oradata/PDCBRC01/undo01.dbf</td>
</tr>
<tr>
<td>3</td>
<td>Full</td>
<td>181739199</td>
<td>13-DEC-10</td>
<td>/u02/oradata/PDCBRC01/tools01.dbf</td>
</tr>
<tr>
<td>4</td>
<td>Full</td>
<td>181732645</td>
<td>13-DEC-10</td>
<td>/u02/oradata/PDCBRC01/users01.dbf</td>
</tr>
<tr>
<td>5</td>
<td>Full</td>
<td>182224026</td>
<td>21-DEC-10</td>
<td>/u02/oradata/PDCBRC01/rman_rep01.dbf</td>
</tr>
</tbody>
</table>
Create RMAN script as in the example below, adding the TAG:

```sql
run {
    allocate channel c1 type sbt
    PARMS="SBT_LIBRARY=/opt/AVMRclnt/lib/libobk_avamar.so";
    send '"
    --flagfile=/home/oracle/avamar/avtar-flags.txt"
    --bindir=/opt/AVMRclnt/bin"';
    restore datafile "/u02/oradata/PDCBRC01/tools01.dbf" from tag='TAG20101221T114943';
    recover datafile "/u02/oradata/PDCBRC01/tools01.dbf";
    release channel c1;
}
```

Start the restore, for example:

```
$ rman target / @/home/oracle/avamar/restore.rcv
```

**SYBASE FOR WINDOWS AND RED HAT**

The administrator console is the recommended tool for restoring Sybase structured application data to a Linux server.

Log in to the administrator console.

Select the *Backup & Restore* tab.
Select the host to backup.

In the Browse for Files, Folders, and Directories pane, select Sybase ASE.
Enter the information as per the sample above.

For the OCS library directory:

For Windows, enter the \OCS library path\dll

For Red Hat, enter /ocs_library_path/lib
The database will be displayed.

Select the database to backup. Select Actions > Backup Now.

Select the Activity Monitor tab to view the display of the backup operation.

You can double-click the job to obtain a detailed status of the log.

Select a retention period that you are set up to use i.e. 30 or 90 days.

For Encryption Method, select None.
Select More Options. If there is an entry for a hostname in the field Store backup on Data Domain system select it as shown in the sample below. Click OK.

Select OK again and the backup will commence.

**RESTORE**

Select the Backup & Restore tab.

Select Select to Restore.

Highlight the server in the list down the left column on the window.

Using the calendar, select the date you wish to restore from.

Select the database to restore.

Select Actions > Restore.

Select More Options.

Enter the details for the fields labelled:

Sybase installation directory (e.g. /sybase)

OCS library directory (e.g. /sybase/OCS-15_0/lib)

Sybase username (e.g. sa)
Sybase user password
Select OK to start the restore.
CHAPTER 19
APPENDIX G: LINUX BACKUP AND RESTORE COMMAND LINES

If you only have Linux servers, you won’t have the backup administrator, which means you’ll need to use command lines to list all backups on a server and to initiate non-scheduled backups and restores.

In these examples:

- `cllxprmgtlog01.ncs.corp.telstra.com` is the server
- `maradmin` is the backup user name
- `PSL_Infrastructure` is the top level domain name

LIST ALL BACKUPS ON A SERVER
```
avtar --backups --id=maradmin@/PSL_Infrastructure --account=/PSL_Infrastructure/pslclastd003/cllxprmgtlog01.ncs.corp.telstra.com
```

RESTORE TO A BACKUP
In this example, the file `/etc/hosts` is restored to a target of `testrestore` on the server:
```
cllxprmgtlog01.ncs.corp.telstra.com
avtar -xv --target="/testrestore/" /etc/hosts --id=maradmin@/PSL_Infrastructure --account=/PSL_Infrastructure/pslclastd003/cllxprmgtlog01.ncs.corp.telstra.com
```

BACKUP
To back up a file called `/etc/hosts` on the server, for this example enter:
```
cllxprmgtlog01.ncs.corp.telstra.com
avtar -cv /etc/hosts --id=maradmin@/PSL_Infrastructure --account=/PSL_Infrastructure/pslclastd003/cllxprmgtlog01.ncs.corp.telstra.com
```
You’ll need the following IP addresses to help you configure network routes to the backup management. Detailed here are the customer management subnets and backup subnets for each site. Refer to the Routes section of this guide for more details.

For customers with virtual data centres in Hong Kong, London, Singapore and New Jersey, your gateway is your public or private PVLAN gateway:

### SITES OUTSIDE AUSTRALIA

<table>
<thead>
<tr>
<th>SITE</th>
<th>PRIVATE PVLAN</th>
<th>PUBLIC PVLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>HONG KONG</td>
<td>101.167.188.0 255.255.255.0 10.178.224.1</td>
<td>101.167.188.0 255.255.255.0 101.167.191.1</td>
</tr>
<tr>
<td>LONDON</td>
<td>101.167.212.0 255.255.255.0 10.179.160.1</td>
<td>101.167.212.0 255.255.255.0 101.167.215.1</td>
</tr>
<tr>
<td>SINGAPORE</td>
<td>101.167.200.0 255.255.255.0 10.179.64.1</td>
<td>101.167.200.0 255.255.255.0 101.167.203.1</td>
</tr>
<tr>
<td>NEW JERSEY</td>
<td>144.130.128.0 255.255.255.0 10.255.192.1</td>
<td>144.130.128.0 255.255.255.0 144.130.131.1</td>
</tr>
</tbody>
</table>

### SITES WITHIN AUSTRALIA

<table>
<thead>
<tr>
<th>Site</th>
<th>Private Pvlan Subnet (/23)</th>
<th>Private Pvlan Gateway</th>
<th>Public Pvlan Subnet (/24)</th>
<th>Public Pvlan Gateway</th>
<th>Avamar Subnet (/24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MELBOURNE</td>
<td>10.84.64.0</td>
<td>10.84.64.1</td>
<td>58.162.83.0</td>
<td>58.162.83.1</td>
<td>58.162.74.0</td>
</tr>
<tr>
<td></td>
<td>10.84.65.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.66.0</td>
<td>10.84.66.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.67.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.68.0</td>
<td>10.84.68.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.69.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.70.0</td>
<td>10.84.70.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.71.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.72.0</td>
<td>10.84.72.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.73.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.74.0</td>
<td>10.84.74.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.75.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.76.0</td>
<td>10.84.76.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.77.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.78.0</td>
<td>10.84.78.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.79.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.80.0</td>
<td>10.84.80.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.81.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.82.0</td>
<td>10.84.82.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.83.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.84.0</td>
<td>10.84.84.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.85.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.86.0</td>
<td>10.84.86.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.87.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SYDNEY</strong></td>
<td>10.84.32.0</td>
<td>10.84.32.1</td>
<td>58.162.82.0</td>
<td>58.162.82.1</td>
<td>58.162.72.0</td>
</tr>
<tr>
<td>10.84.33.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.34.0</td>
<td>10.84.34.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP Address</td>
<td>Subnet Mask</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.35.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.36.0</td>
<td>10.84.36.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.37.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.38.0</td>
<td>10.84.38.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.39.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.40.0</td>
<td>10.84.40.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.41.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.42.0</td>
<td>10.84.42.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.43.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.44.0</td>
<td>10.84.44.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.45.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.46.0</td>
<td>10.84.46.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.47.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.49.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.50.0</td>
<td>10.84.50.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.51.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.52.0</td>
<td>10.84.52.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.53.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.54.0</td>
<td>10.84.54.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.55.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERTH</td>
<td>10.84.128.0</td>
<td>10.84.128.1</td>
<td>58.162.108.0</td>
<td>58.162.108.1</td>
<td>58.162.106.0</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>-------------</td>
<td>----------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td>10.84.129.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.130.0</td>
<td>10.84.130.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.131.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.132.0</td>
<td>10.84.132.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.133.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.134.0</td>
<td>10.84.134.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.135.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.136.0</td>
<td>10.84.136.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.137.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.138.0</td>
<td>10.84.138.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.139.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.140.0</td>
<td>10.84.140.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.141.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.142.0</td>
<td>10.84.142.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.143.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.144.0</td>
<td>10.84.112.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.145.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.146.0</td>
<td>10.84.146.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.147.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.84.148.0</td>
<td>10.84.148.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP Address</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>----------</td>
<td>----------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.149.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.150.0</td>
<td>10.84.150.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.84.151.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 21
APPENDIX I: BACKUP AND RESTORE TROUBLESHOOTING

If you can’t get a database backup working or you’re having trouble downloading the backup software, try the following:

CHECK IF THE AGENT IS RUNNING

- On a Windows operating system, open `services.msc` and check that the backup agent is running
- On a Linux operating system enter `#avagent service status`
  
  ```
  e.g. root@testserver ~]# service avagent status
  avagent Info: Client Agent is running.
  ```

CHECK COMMUNICATIONS RESTRICTIONS

Make sure there are no restrictions on communications by any firewall on your server. The following firewall TCP ports must be open in both directions to enable backups: 27000, 28000, 28002, 29000, 7778, 7779, 7780, 7781

ENSURE THE AVAMAR FQDN CAN BE RESOLVED TO AN IP ADDRESS

To do this, perform the following:

- Ping Avamar server FQDN (e.g. `ping honava01un01.tsb.avamar.com.au`)
- Telnet Avamar server FQDN on port 28001 (e.g. `telnet honava01un01.tsb.avamar.com.au 28001`)

Windows

ping [Avamar FQDN] e.g. `ping honava01un01.tsb.avamar.com.au`
nslookup [Avamar FQDN]

Linux

ping [Avamar FQDN] e.g. `ping honava01un01.tsb.avamar.com.au`
nslookup [Avamar FQDN]

If your virtual server is not using DNS, your `host file` should be in the format:

(IP address) (your allocated backup platform) (short name and fully qualified domain name)

For your configuration, [your IP address, short name and FQDN of backup platform]

HOST FILE FORMAT

If your virtual server is not using DNS, your host file should be in the format:

(IP address of your allocated administrator server) (fully qualified domain name (FQDN)) and (short name)

You’ll need to have pre-configured the host file for each of your virtual servers (dedicated). If your original host file details have been deleted, you’ll need to re-enter the host file entries corresponding to your virtual server and virtual data centre locations:
- Sydney
- Melbourne
- Perth
- Hong Kong
- London
- Singapore
- New Jersey

**SYDNEY BACKUP ADMINISTRATOR SERVERS**

<table>
<thead>
<tr>
<th>IP ADDRESS</th>
<th>FQDN</th>
<th>SHORT NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>58.162.73.4</td>
<td>tsbava09un01.tsb.avamar.com.au</td>
<td>tsbava09un01</td>
</tr>
<tr>
<td>58.162.73.5</td>
<td>tsbava10un01.tsb.avamar.com.au</td>
<td>tsbava10un01</td>
</tr>
<tr>
<td>58.162.73.6</td>
<td>tsbava11un01.tsb.avamar.com.au</td>
<td>tsbava11un01</td>
</tr>
<tr>
<td>58.162.73.7</td>
<td>tsbava12un01.tsb.avamar.com.au</td>
<td>tsbava12un01</td>
</tr>
<tr>
<td>58.162.73.8</td>
<td>tsbava13un01.tsb.avamar.com.au</td>
<td>tsbava13un01</td>
</tr>
<tr>
<td>58.162.73.9</td>
<td>tsbava14un01.tsb.avamar.com.au</td>
<td>tsbava14un01</td>
</tr>
<tr>
<td>58.162.73.10</td>
<td>tsbava15un01.tsb.avamar.com.au</td>
<td>tsbava15un01</td>
</tr>
<tr>
<td>58.162.73.11</td>
<td>tsbava16un01.tsb.avamar.com.au</td>
<td>tsbava16un01</td>
</tr>
<tr>
<td>58.162.73.12</td>
<td>tsbava17un01.tsb.avamar.com.au</td>
<td>tsbava17un01</td>
</tr>
<tr>
<td>58.162.73.13</td>
<td>tsbava18un01.tsb.avamar.com.au</td>
<td>tsbava18un01</td>
</tr>
<tr>
<td>58.162.73.14</td>
<td>tsbava19un01.tsb.avamar.com.au</td>
<td>tsbava19un01</td>
</tr>
<tr>
<td>58.162.73.15</td>
<td>tsbava20un01.tsb.avamar.com.au</td>
<td>tsbava20un01</td>
</tr>
<tr>
<td>58.162.73.16</td>
<td>tsbava21un01.tsb.avamar.com.au</td>
<td>tsbava21un01</td>
</tr>
<tr>
<td>58.162.72.4</td>
<td>stlava01un01.tsb.avamar.com.au</td>
<td>stlava01un01</td>
</tr>
<tr>
<td>58.162.72.21</td>
<td>stlava02un01.tsb.avamar.com.au</td>
<td>stlava02un01</td>
</tr>
<tr>
<td>58.162.72.38</td>
<td>stlava03un01.tsb.avamar.com.au</td>
<td>stlava03un01</td>
</tr>
<tr>
<td>58.162.72.39</td>
<td>stlava04un01.tsb.avamar.com.au</td>
<td>stlava04un01</td>
</tr>
</tbody>
</table>
### Melbourne Backup Administrator Servers

<table>
<thead>
<tr>
<th>IP Address</th>
<th>FQDN</th>
<th>Short Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>58.162.72.40</td>
<td>stlava05un01.tsb.avamar.com.au</td>
<td>stlava05un01</td>
</tr>
<tr>
<td>58.162.72.41</td>
<td>stlava06un01.tsb.avamar.com.au</td>
<td>stlava06un01</td>
</tr>
<tr>
<td>58.162.72.42</td>
<td>stlava07un01.tsb.avamar.com.au</td>
<td>stlava07un01</td>
</tr>
<tr>
<td>58.162.72.43</td>
<td>stlava08un01.tsb.avamar.com.au</td>
<td>stlava08un01</td>
</tr>
<tr>
<td>58.162.72.44</td>
<td>stlava09un01.tsb.avamar.com.au</td>
<td>stlava09un01</td>
</tr>
<tr>
<td>58.162.72.45</td>
<td>stlava10un01.tsb.avamar.com.au</td>
<td>stlava10un01</td>
</tr>
<tr>
<td>58.162.72.46</td>
<td>stlava11un01.tsb.avamar.com.au</td>
<td>stlava11un01</td>
</tr>
<tr>
<td>58.162.72.47</td>
<td>stlava12un01.tsb.avamar.com.au</td>
<td>stlava12un01</td>
</tr>
<tr>
<td>58.162.72.48</td>
<td>stlava13un01.tsb.avamar.com.au</td>
<td>stlava13un01</td>
</tr>
<tr>
<td>58.162.72.49</td>
<td>stlava14un01.tsb.avamar.com.au</td>
<td>stlava14un01</td>
</tr>
<tr>
<td>58.162.75.4</td>
<td>dcbava06un01.dcb.avamar.com.au</td>
<td>dcbava06un01</td>
</tr>
<tr>
<td>58.162.75.5</td>
<td>dcbava07un01.dcb.avamar.com.au</td>
<td>dcbava07un01</td>
</tr>
<tr>
<td>58.162.75.6</td>
<td>dcbava08un01.dcb.avamar.com.au</td>
<td>dcbava08un01</td>
</tr>
<tr>
<td>58.162.75.7</td>
<td>dcbava09un01.dcb.avamar.com.au</td>
<td>dcbava09un01</td>
</tr>
<tr>
<td>58.162.75.8</td>
<td>dcbava10un01.dcb.avamar.com.au</td>
<td>dcbava10un01</td>
</tr>
<tr>
<td>58.162.75.9</td>
<td>dcbava11un01.dcb.avamar.com.au</td>
<td>dcbava11un01</td>
</tr>
<tr>
<td>58.162.75.10</td>
<td>dcbava12un01.dcb.avamar.com.au</td>
<td>dcbava12un01</td>
</tr>
<tr>
<td>58.162.75.11</td>
<td>dcbava13un01.dcb.avamar.com.au</td>
<td>dcbava13un01</td>
</tr>
<tr>
<td>58.162.75.12</td>
<td>dcbava14un01.dcb.avamar.com.au</td>
<td>dcbava14un01</td>
</tr>
<tr>
<td>58.162.75.13</td>
<td>dcbava15un01.dcb.avamar.com.au</td>
<td>dcbava15un01</td>
</tr>
<tr>
<td>58.162.75.14</td>
<td>dcbava16un01.dcb.avamar.com.au</td>
<td>dcbava16un01</td>
</tr>
</tbody>
</table>
### Perth Backup Administrator Servers

<table>
<thead>
<tr>
<th>IP Address</th>
<th>FQDN</th>
<th>Short Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>58.162.106.4</td>
<td>welava01un01.tsb.avamar.com.au</td>
<td>welava01un01</td>
</tr>
<tr>
<td>58.162.106.5</td>
<td>welava02un01.tsb.avamar.com.au</td>
<td>welava02un01</td>
</tr>
<tr>
<td>58.162.106.6</td>
<td>welava03un01.tsb.avamar.com.au</td>
<td>welava03un01</td>
</tr>
<tr>
<td>IP ADDRESS</td>
<td>FQDN</td>
<td>SHORT NAME</td>
</tr>
<tr>
<td>------------</td>
<td>------</td>
<td>------------</td>
</tr>
<tr>
<td>58.162.106.7</td>
<td>welava04un01.tsb.avamar.com.au</td>
<td>welava04un01</td>
</tr>
<tr>
<td>58.162.106.8</td>
<td>welava05un01.tsb.avamar.com.au</td>
<td>welava05un01</td>
</tr>
<tr>
<td>58.162.106.9</td>
<td>welava06un01.tsb.avamar.com.au</td>
<td>welava06un01</td>
</tr>
<tr>
<td>58.162.106.10</td>
<td>welava07un01.tsb.avamar.com.au</td>
<td>welava07un01</td>
</tr>
<tr>
<td>58.162.106.11</td>
<td>welava08un01.tsb.avamar.com.au</td>
<td>welava08un01</td>
</tr>
<tr>
<td>58.162.106.12</td>
<td>welava09un01.tsb.avamar.com.au</td>
<td>welava09un01</td>
</tr>
<tr>
<td>58.162.106.13</td>
<td>welava10un01.tsb.avamar.com.au</td>
<td>welava10un01</td>
</tr>
<tr>
<td>58.162.106.14</td>
<td>welava11un01.tsb.avamar.com.au</td>
<td>welava11un01</td>
</tr>
<tr>
<td>58.162.106.15</td>
<td>welava12un01.tsb.avamar.com.au</td>
<td>welava12un01</td>
</tr>
<tr>
<td>58.162.106.16</td>
<td>welava13un01.tsb.avamar.com.au</td>
<td>welava13un01</td>
</tr>
</tbody>
</table>

**HONG KONG BACKUP ADMINISTRATOR SERVERS**

<table>
<thead>
<tr>
<th>IP ADDRESS</th>
<th>FQDN</th>
<th>SHORT NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>101.167.188.4</td>
<td>honava01un01.tsb.avamar.com.au</td>
<td>honava01un01</td>
</tr>
<tr>
<td>101.167.188.5</td>
<td>honava02un01.tsb.avamar.com.au</td>
<td>honava02un01</td>
</tr>
</tbody>
</table>

**LONDON BACKUP ADMINISTRATOR SERVERS**

<table>
<thead>
<tr>
<th>IP ADDRESS</th>
<th>FQDN</th>
<th>SHORT NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>101.167.212.4</td>
<td>lonava01un01.tsb.avamar.com.au</td>
<td>lonava01un01</td>
</tr>
<tr>
<td>101.167.212.5</td>
<td>lonava02un01.tsb.avamar.com.au</td>
<td>lonava02un01</td>
</tr>
</tbody>
</table>

**SINGAPORE BACKUP ADMINISTRATOR SERVERS**

<table>
<thead>
<tr>
<th>IP ADDRESS</th>
<th>FQDN</th>
<th>SHORT NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>101.167.200.4</td>
<td>sinava01un01.tsb.avamar.com.au</td>
<td>sinava01un01</td>
</tr>
<tr>
<td>101.167.200.5</td>
<td>sinava02un01.tsb.avamar.com.au</td>
<td>sinava02un01</td>
</tr>
</tbody>
</table>
NEW JERSEY BACKUP ADMINISTRATOR SERVERS

<table>
<thead>
<tr>
<th>IP ADDRESS</th>
<th>FQDN</th>
<th>SHORT NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>144.130.128.4</td>
<td>njnava01un01.tsb.avamar.com.au</td>
<td>njnava01un01</td>
</tr>
</tbody>
</table>

CHECK VIRTUAL SERVER’S NETWORK PORT AND REQUIRED ROUTE ARE CONFIGURED

Windows
ipconfig /all
route print

Linux / Unix
ifconfig -a
netstat -rnv

ENSURE COMMUNICATIONS ARE WORKING CORRECTLY

To test this, enter the following command:

telnet [Avamar FQDN] 28001

Examples of a successful result for:

Linux
root@gnlxprmgtzcl01 ~]# telnet welava01un01.tsb.avamar.com.au 28001Trying 58.162.106.4... Connected to welava01un01.tsb.avamar.com.au (58.162.106.4). Escape character is '^]'.

Windows
telnet welava01un01.tsb.avamar.com.au
The result is a blank screen.

CHECK LOG FILES

Log files are available in the avs installation directory.

- Avagent.log
- Backup logs
  - Windows logs are located at C:\program files\avs\var
  - Linux logs are located at /usr/local/avamar/var

STILL HAVING PROBLEMS?

Contact your account representative or contact us.