Monitoring the vCloud Director

eG Enterprise v6

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Chapter 1

Monitoring the vCloud Director Cell

VMware vCloud Director enables customers to build secure, multitenant hybrid clouds by pooling infrastructure resources into virtual datacenters. and enabling those resources to be consumed by users on-demand. vCloud Director pools datacenter resources, including compute, storage and network, along with their relevant policies into virtual data centers. Fully encapsulated multitier virtual machine services are delivered as vApps, using the Open Virtualization Format (OVF). End users and their associated policies are captured in organizations. With programmatic and policy-based pooling of infrastructure, users and services, VMware vCloud Director enforces policy intelligently and creates unprecedented flexibility and portability.

vCD (vCloud Director) is a layer on top of vCenter and abstracts all the resources vCenter manages. All these resources are combined into large pools for your customers - i.e., tenants - to consume. VMware vCloud Director not only abstracts and pools resources it also adds a self service portal. As stated before, it is more or less bolted on top of vCenter/ESX(i). The diagram below provides a simplistic, high-level overview of this architecture:

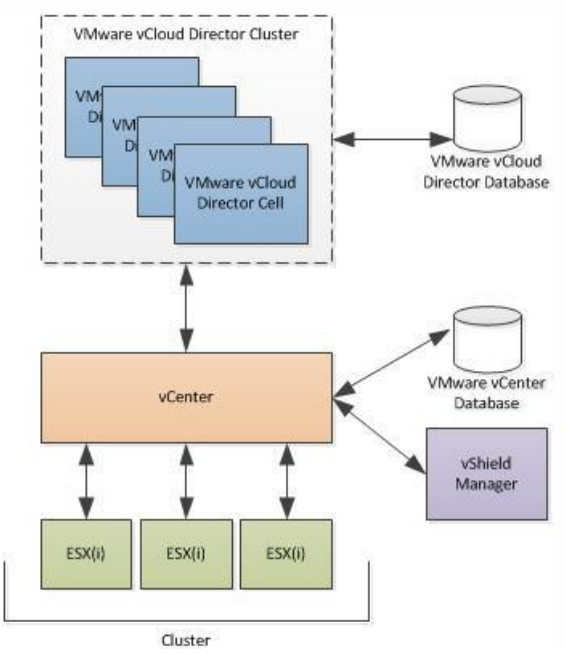

Figure 1.1: Architecture of the vCloud Director

The VMware vCloud Director Cluster is a cluster formed by multiple vCD servers or "cells" as they are commonly referred to. The cells are responsible for the abstraction of the resources and the portal.

There are currently three types of resources that can be used by a tenant. They are as follows:

- Compute
  - refers to clusters and resource pools managed by vCenter
- Network
  - refers to dvSwitches and/or portgroups
- Storage
  - refers to VMFS datastores and NFS shares

These resources will be offered through a self-service portal which is part of vCD. As a vCD Administrator you can use the vCD portal to carve up these resources as required and assign these to a customer or department, often referred to in vCD as an "Organization".

In order to carve up these resources a container will need to be created and this is what we call a Virtual Datacenter. There are two different types of Virtual Datacenters:

- Provider Virtual Datacenter (Provider vDC)
- Organization Virtual Datacenter (Org vDC)

A Provider Virtual Datacenter is the foundation for your Compute Resources. When creating a Provider Virtual Datacenter you will need to select a resource pool; however, this can also be the root resource pool aka your vSphere cluster. At the same time, you will need to associate a set of datastores with the Provider vDC; generally speaking, this will be all LUNs masked to your cluster.

After you have created a Provider vDC you can create an Org vDC and tie that Org vDC to a vCD Organization. An Organization can have multiple Org vDCs associated to it. The Org vDCs so configured can then be consumed by creating vApps. A vApp is just a logical container for 1 or more

virtual machines. This vApp could for instance contain a three tiered app which has an internal network and a firewalled outbound connection for a single VM.

If users to applications launched on a cloud complaint of slowdowns, then cloud administrators need to determine whether the vCloud Director Cell is able to pool and provision sufficient resources for the users to consume. If not, you need to be able to determine why the problem is happening – is it because the vCloud Director Cell is unavailable? is it because the vCloud Director Cell is unable to connect to the vCenter server for resource abstraction and pooling? is it because no pVDCs and org vDCs are currently enabled for use with the Cell? or is it due to one/more resource-hungry VMs/vApps in an org vDC? The action you take depends on what you diagnose as being the root-cause of the problem.

To deliver performance management for the vCloud Director Cell, the eG Enterprise offers the *vCloud Director Cell* model. This monitoring model provides you with proactive updates on the overall health and status of a vCloud Director Cell and its core components such as pVDCs, org vDCs, organizations, VMs, vApps, etc., and proactively alerts you to bottlenecks to cloud performance.

Note:

The vCloud Director Cell can be monitored in an *agent-based* or in an *agentless* manner. While a Linux agent is required for performing *agent-based* monitoring, for *agentless* monitoring, you need to deploy the eG agent on any remote Windows host in the environment. Moreover, this eG remote agent should be configured to run using **domain administrator** privileges.

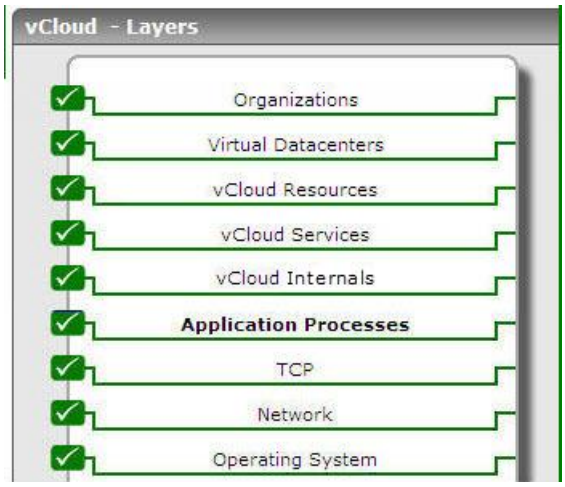

Figure 1.2: Layer model of the vCloud Director Cell

1.1.1 How does eG Enterprise Monitor the vCloud Director?

eG Enterprise can monitor a vCloud Director Cell in an agent-based or an agentless manner. To monitor the Cell in an agentless manner, you need to deploy an eG agent on a remote Windows host in the environment and configure that remote agent to run using *domain administrator* privileges.

Regardless of the monitoring approach used (agent-based or agentless), the eG agent uses the **vCloud API** to run the tests mapped to the top-4 layers of Figure 1.2 and report a variety of metrics - these include availability metrics, status indicators, measures exploring the resource allocation to and resource usage of pvDCs and org vDCs, and more. To ensure access to the **vCloud API**, the tests mapped to the top 4 layers need to be configured with the credentials of a user who has **Administrator** access to the vCloud Director cell to be monitored.

On the other hand, the fifth layer of Figure 1.2- i.e., the **vCloud Internals** layer - uses JMX to pull out metrics of interest from the vCloud Director cell. To make sure that the tests mapped to the **vCloud Internals** layer work, you need to **enable JMX for the vCloud Director cell to be monitored**. By default, JMX requires **no authentication or security (SSL)**. In this case therefore, to use JMX for pulling out metrics from vCloud Director, the following will have to be done:

1. Login to the system hosting the vCloud Director.
2. Edit the **vmware-vcd-cell** script file in the **/opt/vmware/vcloud-director/bin** directory.
3. Look for an entry that begins with the string, **JAVA_OPTS=** in the file.
4. Insert the following lines to the **JAVA_OPTS** entry as depicted by Figure 1.3 below:

```
-Dcom.sun.management.jmxremote.port=<PortNo> -
Dcom.sun.management.jmxremote.authenticate=false -
Dcom.sun.management.jmxremote.ssl=false
```

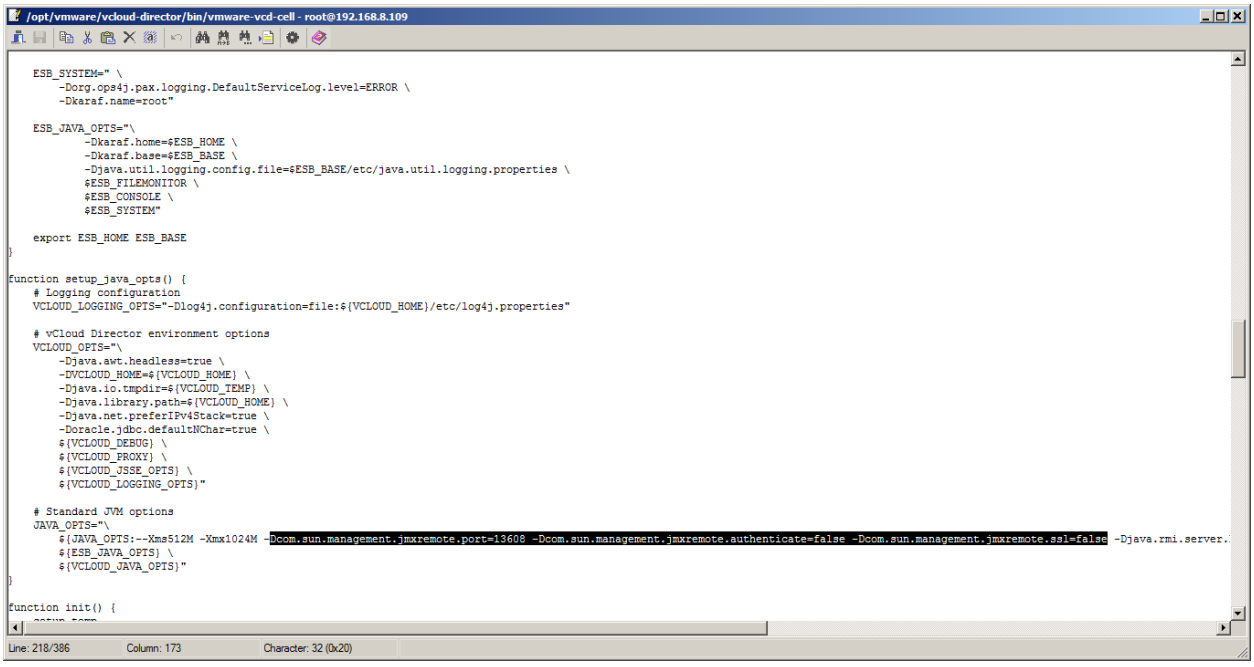

Figure 1.3: Enabling JMX (without authentication or security) for a vCloud Director cell

For instance, if the JMX listens on port 13608, then the first line of the above specification would be:

```
-Dcom.sun.management.jmxremote.port=13608
```

5. Finally, save the file.
6. Next, during test configuration, do the following:

- Set the port that you defined in step 4 above (in the **vmware-vcd-cell** file) as the **JMX REMOTE PORT**;
- Set the **USER** and **PASSWORD** parameters to *none*.
- Update the test configuration.

On the other hand, if JMX requires **only authentication** (and no security), then the following steps will apply:

1. Login to the vCloud Director host.
2. Copy the **jmxremote.password.template** file from the **<JAVA_HOME>/jre/lib/management** folder used by the vCloud Director to any other location on the same host.
3. Rename the **jmxremote.password.template** file as **jmxremote.password** and then copy it back to the **<JAVA_HOME>/jre/lib/management** folder.
4. Next, edit the **jmxremote.password** file and the **jmxremote.access** file to create a user with *read-write* access to the JMX. To achieve this, follow the steps below:
   - Open the **jmxremote.password** file and scroll down to the end of the file. By default, you will find the commented entries indicated by Figure 1.4 below:

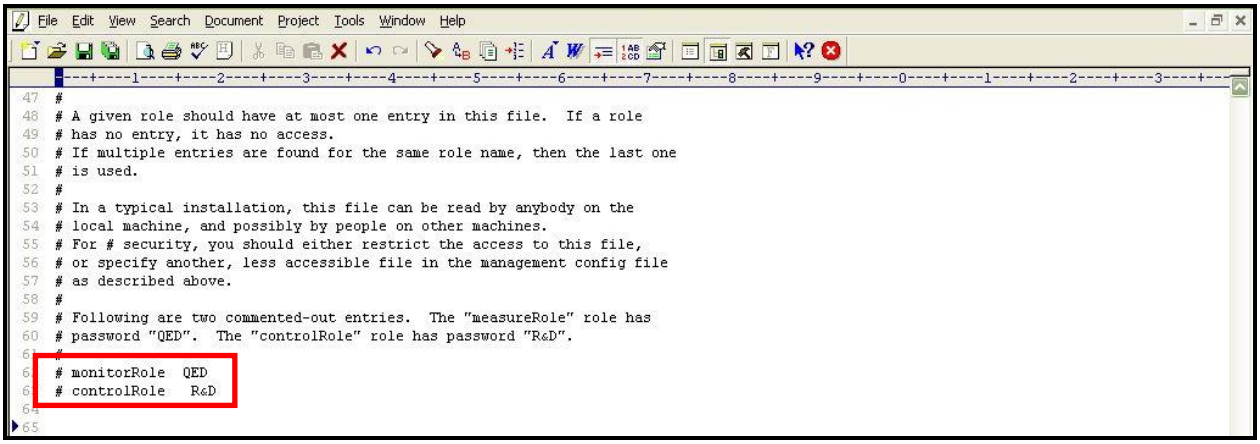

Figure 1.4: Scrolling down the jmxremote.password file to view 2 commented entries

- The two entries indicated by Figure 1.4 are sample *username password* pairs with access to JMX. For instance, in the first sample entry Figure 1.4, *monitorRole* is the *username* and *QED* is the *password* corresponding to *monitorRole*. Likewise, in the second line, the *controlRole* user takes the password *R&D*.
- If you want to use one of these pre-defined *username password* pairs during test configuration, then simply uncomment the corresponding entry by removing the # symbol preceding that entry. However, prior to that, you need to determine what privileges have been granted to both these users. For that, open the **jmxremote.access** file in the editor.

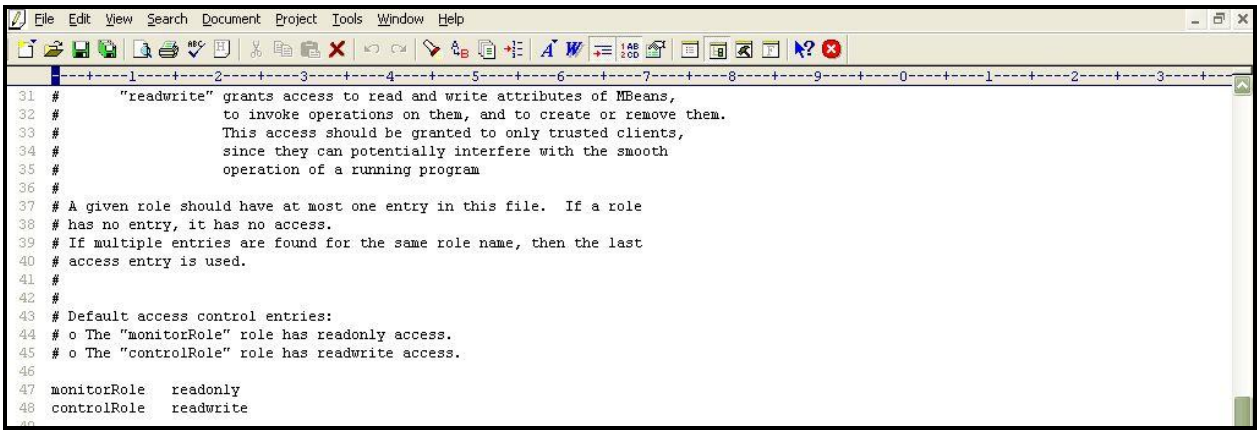

Figure 1.5: The jmxremote.access file

- Scrolling down the file (as indicated by Figure 1.5) will reveal 2 lines, each corresponding to the sample *username* available in the **jmxremote.password** file. Each line denotes the access rights of the corresponding user. As is evident from Figure 1.5, the user *monitorRole* has only *readonly* rights, while user *controlRole* has *readwrite* rights. Since the eG agent requires *readwrite* rights to be able to pull out metrics using JMX, we will have to configure the test with the credentials of the user *controlRole*.
- For that, first, edit the **jmxremote.password** file and uncomment the *controlRole <password>* line as depicted by Figure 1.9.

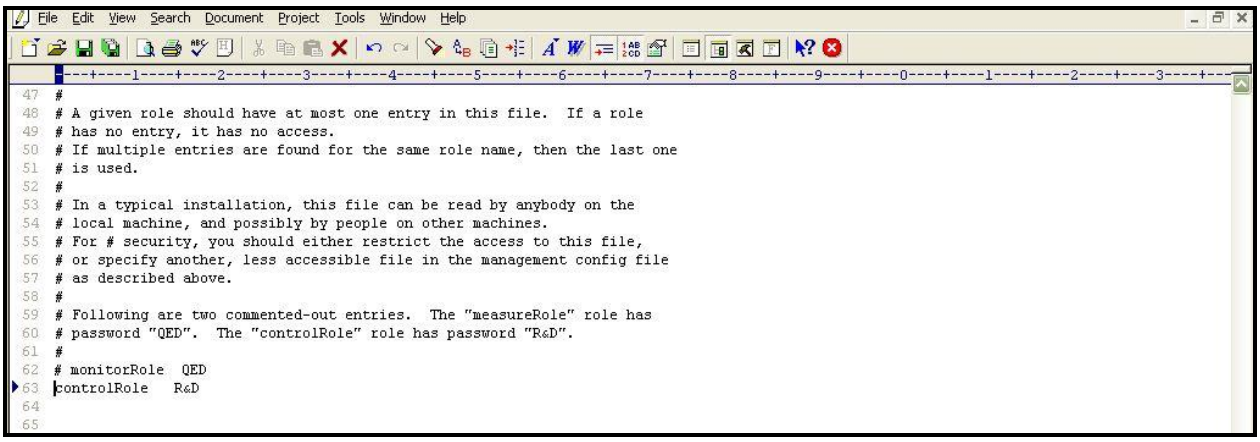

Figure 1.6: Uncommending the 'controlRole' line

- Then, save the file. You can now proceed to configure the tests with the **USER** name *controlRole* and **PASSWORD** *R&D*.
- Alternatively, instead of going with these default credentials, you can create a new *username password* pair in the **jmxremote.password** file, assign *readwrite* rights to this user in the *jmxremote.access* file, and then configure the eG tests with the credentials of this new user. For instance, let us create a user *john* with password *john* and assign *readwrite* rights to *john*.
- For this purpose, first, edit the **jmxremote.password** file, and append the following line (see Figure 1.7) to it:

  john john

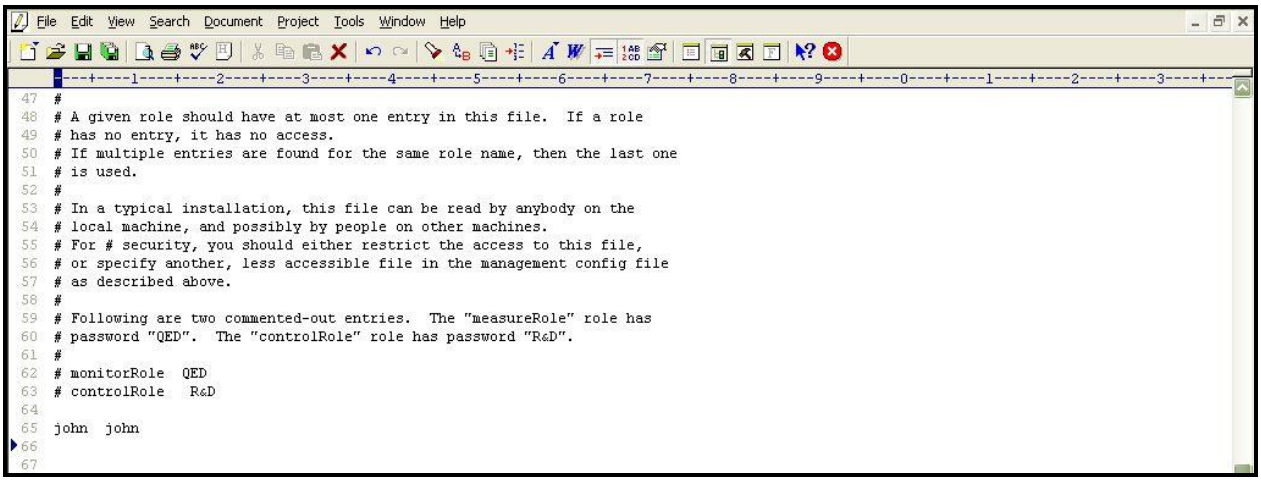

Figure 1.7: Appending a new username password pair

- Save the **jmxremote.password** file.
- Then, edit the **jmxremote.access** file, and append the following line (see Figure 1.8) to it:

  john readwrite

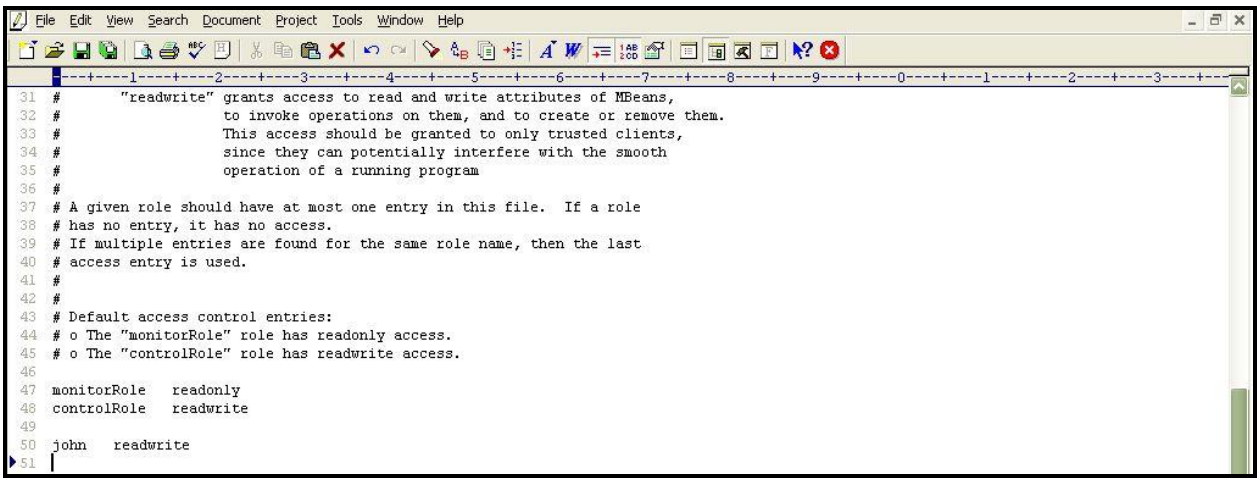

Figure 1.8: Assigning rights to the new user in the jmxremote.access file

- Then, save the **jmxremote.access** file.
- Finally, proceed to configure the tests with the **USER** name and **PASSWORD**, *john* and *john*, respectively.

7. Then, proceed to make the **jmxremote.password** file secure by granting a single user "full access" to that file. To do so, follow the steps below:

   - Login to the vCloud Director host as the user who is to be granted full control of the **jmxremote.password** file.
   - Issue the following command:

     chmod 600 jmxremote.password

   - This will automatically grant the login user full access to the **jmxremote.password** file.

8. Next, edit the the **vmware-vcd-cell** script file in the **/opt/vmware/vcloud-director/bin** directory.
9. Look for an entry that begins with the string, **JAVA_OPTS=** in the file.
10. Insert the following lines to the **JAVA_OPTS** entry as depicted by Figure 1.3 below:

```
-Dcom.sun.management.jmxremote.port=<PortNo> -
Dcom.sun.management.jmxremote.authenticate=true -
Dcom.sun.management.jmxremote.ssl=false -
Dcom.sun.management.jmxremote.access.file=<Path of jmxremote.access> -
Dcom.sun.management.jmxremote.password.file=<Path of jmxremote.password>
```

For instance, assume that the JMX remote port is 9005, and the **jmxremote.access** and **jmxremote.password** files exist in the **/usr/jdk1.5.0_05/jre/lib/management** folder of the host. The specification above will then read as follows:

```
com.sun.management.jmxremote.port=9005
com.sun.management.jmxremote.access.file=/usr/jdk1.5.0_05/jre/lib/management/jmxrem
ote.access
com.sun.management.jmxremote.password.file=/usr/jdk1.5.0_05/jre/lib/management/jmxr
emote.password
```

11. Finally, save the file.

With the help of the metrics collected using the **vCloud API** and **JMX**, cloud administrators can determine the following:

- Is the vCloud Director Cell available? If so, how quickly is it responding to requests?
- Is the vCloud Director service currently running?
- How many connections has the vCloud Director Cell currently established with the vCenter server, vShield Manager, and the vSphere hosts?
- Have any unique hosts established connections with the vCloud Director Cell?
- Is the vCloud Director Cell able to connect to the vCenter server attached to it?
- Which vSphere hosts are currently available on the vCenter server?
- Is host spanning enabled on any vSphere host?
- Which vSphere host is not ready currently?
- Are all vSphere hosts using the CPU and memory resources available to the optimally? Is any host abusing these resources?
- Which datastores are currently used by the vCloud Director Cell?
- Is any datastore disabled currently?
- Is any datastore running out of storage space? If so, which one?
- Is any org vDC in an abnormal state currently?
- Which org vDCs are not enabled for use with the vCloud Director Cell?
- Is any org vDC consuming the storage, CPU, and memory resources allocated to it excessively? If so, which org vDCs are these?
- Is any provider vDC in an abnormal state currently?
- Which provider vDC is elastic?

- Are all provider vDCs enabled for use with the vCloud Director Cell? If any pvDC not enabled yet?
- Is any pvDC consuming the storage, CPU, and memory resources allocated to it excessively? If so, which pvDC is this?
- Which organization is disabed currently?
- Can't catalogs be published on any organization? If so, which one is it?
- Are any VMs in an organization consuming too much CPU, memory, and storage? If so, which ones are these, and what is their powered on state currently?
- Which organization tasks have failed?
- Are too many organization tasks outstanding? Which ones are these?
- Is the message bus in good health?
- Are any vCloud Director cells unreachable?
- Are there too many open transactions and/or sessions to the vCloud Director database?
- Are transactions to the database taking too long to complete?
- Is the database object access very slow?
- Are queries built and executed using the query service failing often? If so, which type of queries are failing the most?
- Are too many login attempts to the vCloud Director failing?
- Are any vCenter server instances disconnected from the vCloud Director? If so, which instances are they?
- Is the VIM inventory manager unable to process object updates?
- Which long-running tasks on the vCloud Director failed frequently?
- Have any vCenter tasks failed recently?

The sections that follow will discuss the top 4 layers of Figure 1.2, as the remaining layers have already been dealt with in the *Monitoring Unix and Windows Servers* document.

1.2 The vCloud Internals Layer

This layer reports the internal health of the vCloud Director cell being monitored.

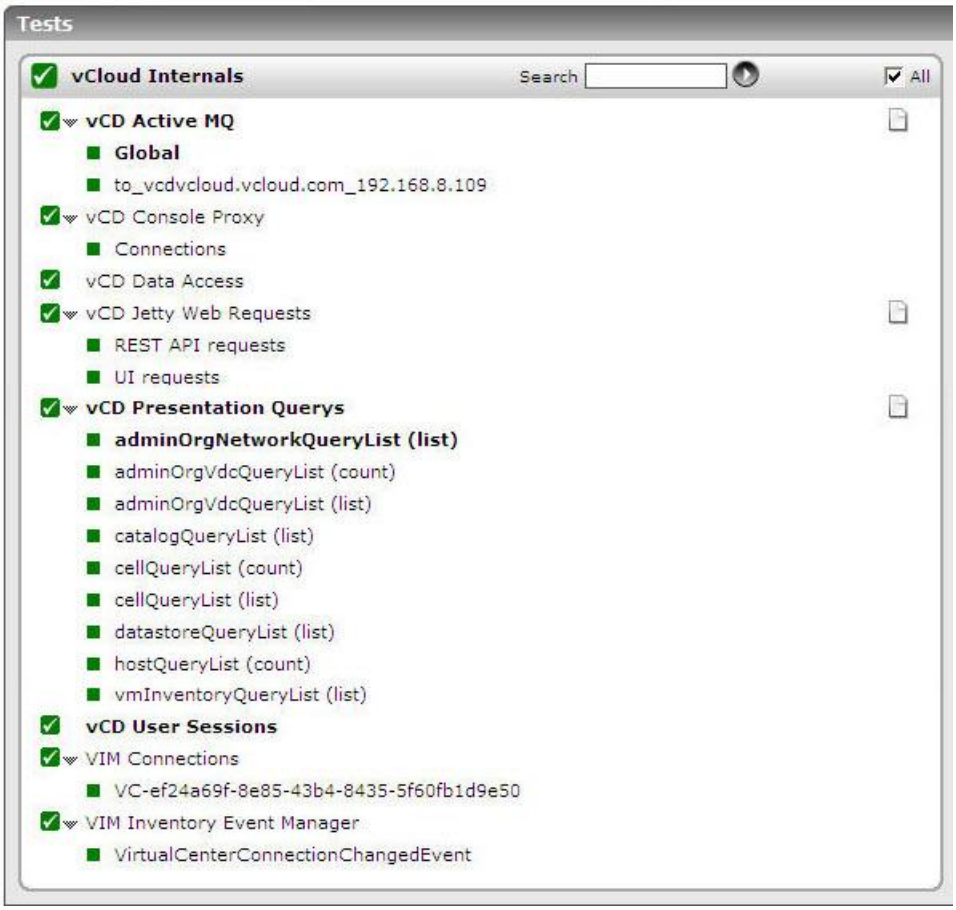

Figure 1.9: The tests mapped to the vCloud Internals layer

1.2.1 vCD Active MQ Test

The message bus in the vCloud Director cell is used for inter-cell communication, based on ActiveMQ (the message broker) and JMS (which defines the message format).

This test reports the health of the message bus connection and helps the administrator to figure out the number of vCloud Director cells that are currently reachable and not reachable in a vCloud Director infrastructure.

Purpose	Reports the health of the message bus connection and helps the administrator to figure out the number of vCloud Director cells that are currently reachable and not reachable in a vCloud Director infrastructure
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent

<table>
<tr><td>Configurable parameters for the test</td><td colspan="3">1. TEST PERIOD - How often should the test be executed
2. HOST – The host for which the test is being configured
3. PORT - Specify the port at which the specified HOST listens in the PORT text box. By default, this is NULL.
4. JMX REMOTE PORT - Here, specify the port at which the JMX listens for requests from remote hosts. Ensure that you specify the same port that you configured in the vmware-vcd-cell file in the /opt/vmware/vcloud-director/bin folder of the vCloud Director.
5. JNDINAME - The JNDINAME is a lookup name for connecting to the JMX connector. By default, this is jmxrmi. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same.
6. USER, PASSWORD, and CONFIRM PASSWORD – By default, JMX requires no authentication or security (SSL). This is why, by default, the USER and PASSWORD parameters are set to none. If JMX requires authentication only (but no security), then ensure that the USER and PASSWORD parameters are configured with the credentials of a user with read-write access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the CONFIRM PASSWORD text box.</td></tr>
<tr><td>Outputs of the test</td><td colspan="3">One set of results for the vCloud Director Cell being monitored</td></tr>
<tr><td>Measurements made by the test</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
<tr><td></td><td>Is active MQ healthy?:
Indicates whether/not the message bus connection to peer cell from this vCloud Director cell is healthy.
In the case of the global descriptor, the overall health of the message bus connection to the vCloud Director cell is taken into consideration.</td><td></td><td>This measure reports the value Yes if the message bus connection is healthy and the value No if otherwise.
The numeric values that correspond to the above-mentioned measure values are as follows:
<table><tr><th>Measure Value</th><th>Numeric Value</th></tr><tr><td>Yes</td><td>1</td></tr><tr><td>No</td><td>0</td></tr></table>Note:
By default, this measure reports the above-mentioned Measure Values while indicating the health of the message bus connection. However, the graph of this measure will be represented using the corresponding numeric equivalents only.</td></tr>
</table>

	Reachable cells: Indicates the number of vCloud Director cells that are currently reachable in the vCloud Director infrastructure.	Number	This measure is applicable only for the *global* descriptor.
	Unreachable cells: Indicates the number of vCloud Director cells that are currently not reachable in the vCloud Director infrastructure.	Number	This measure is applicable only for the *global* descriptor.

1.2.2 vCD Console Proxy Test

The Console Proxy along with the VMRC i.e., the VMware Remote Console client in the vCloud Director cell enables a user to view the screen of a specified vApp (VM).

The Console Proxy performs three distinct functions:

- **Provides a single entry point**: A VMware vCloud Director installation works with a large number of vCenter servers and ESX/ESXi servers and therefore the Virtual Machines (VM) can be located on many different hosts. The vCD clients are not aware of that however – they communicate only with the Console Proxy in order to open Remote Consoles. It is the only visible entry point for Remote Console communication from the viewpoint of the vCD clients. The Console Proxy is responsible for redirecting the requests to the correct vCenter server and ESX/ESXi servers.
- **HTTPS communication**: The VMware vCloud Director clients communicate with the Console Proxy only via HTTPS on port 443. This communication can be channelled through a client's HTTPS proxy as well if needed. The Console Proxy converts the incoming HTTPS communication to the protocols specific to the vCenter server and ESX/ESXi servers.
- **Security**: The Console Proxy provides an additional layer of VMware vCloud Director specific security on top of the standard vCenter server security. The Console Proxy assists with the protection of customer Virtual Machines (VMs) in a multi-tenant environment. In this case it ensures that a client in one organization does not get access to the Virtual Machines (VMs) of another organization. The Console Proxy also protects the vCenter and vSphere servers from denial of service attacks. This works through the Console Proxy communicating with the vCenter and ESX/ESXi servers, but only if the connection is made by clients who have already authenticated to the VMware vCloud Director server. Other clients are denied access, and as a result the vSphere servers cannot be subjected with connections from anonymous users.

The Remote Console Proxy runs as a process on the VMware vCloud Director Cell and communicates to the vCenter server on port 443 and to the ESX/ESXi host on ports 902 and 903. The VMware Remote Console Plugin, which runs on the client browser, communicates with the Remote Console Proxy only on port 443. The VMware Remote Console Plugin then tunnels the MKS traffic (902/903 raffic) over HTTPS to the Console Proxy. It is the Console Proxy's responsibility to direct the

connection to the correct vCenter server or ESX/ESXi server and to convert the HTTPS connections to MKS connections on ports 902/903 if needed.

By tracking the connections to the Remote Console Proxy, you can gauge the number of remote console requests coming into the vCloud Director Cell, and thus assess the workload on the vCloud Director Cell. To keep tabs on Console Proxy connections, use this test.

This test reports the total number of Console Proxy connections and the number of connections that are currently active, and thus holds a mirror to the current workload of the vCloud Director Cell.

Purpose	Reports the total number of Console Proxy connections and the number of connections that are currently active, and thus holds a mirror to the current workload of the vCloud Director Cell		
Target of the test	A vCloud Director Cell		
Agent deploying the test	An internal/remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **JMX REMOTE PORT** - Here, specify the port at which the **JMX** listens for requests from remote hosts. Ensure that you specify the same port that you configured in the **vmware-vcd-cell** file in the **/opt/vmware/vcloud-director/bin** folder of the vCloud Director. 5. **JNDINAME** - The **JNDINAME** is a lookup name for connecting to the JMX connector. By default, this is *jmxrmi*. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same. 6. **USER**, **PASSWORD**, and **CONFIRM PASSWORD** – By default, JMX requires **no authentication or security (SSL)**. This is why, by default, the **USER** and **PASSWORD** parameters are set to *none*. If JMX requires **authentication only** (but no security), then ensure that the **USER** and **PASSWORD** parameters are configured with the credentials of a user with *read-write* access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the **CONFIRM PASSWORD** text box.		
Outputs of the test	One set of results for the vCloud Director Cell being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Total connections: Indicates the total number of connections to the Remote Console Proxy.	Number	A high value is a clear indicator of heavy load on the vCloud Director cell.

	Active connections: Indicates the number of Console Proxy connections that are currently active.	Number	A value of zero indicates that there are no users accessing the vApps at present.

1.2.3 vCD Database Test

vCloud Director cells use a database to store shared information. This database must exist before you can complete installation and configuration of vCloud Director software. Long running transactions to the database can keep resources locked unnecessarily and can cause unprecedented delays in processing subsequent transactions. Using this test, you can be proactively alerted to transactions and sessions that have been active for a long time, so that you can quickly deep dive into your database server to know which sessions and transactions have been running for a long time and why.

Purpose	Proactively alerts administrators to transactions and sessions that have been active for a long time, so that you can quickly deep dive into your database server to know which sessions and transactions have been running for a long time and why
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **JMX REMOTE PORT** - Here, specify the port at which the **JMX** listens for requests from remote hosts. Ensure that you specify the same port that you configured in the **vmware-vcd-cell** file in the **/opt/vmware/vcloud-director/bin** folder of the vCloud Director. 5. **JNDINAME** - The **JNDINAME** is a lookup name for connecting to the JMX connector. By default, this is *jmxrmi*. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same. 6. **USER**, **PASSWORD**, and **CONFIRM PASSWORD** – By default, JMX requires **no authentication or security (SSL)**. This is why, by default, the **USER** and **PASSWORD** parameters are set to *none*. If JMX requires **authentication only** (but no security), then ensure that the **USER** and **PASSWORD** parameters are configured with the credentials of a user with *read-write* access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the **CONFIRM PASSWORD** text box.
Outputs of the test	One set of results for the vCloud Director Cell being monitored

Measurements made by the test	Measurement	Measurement Unit	Interpretation
	Open transactions: Indicates the number of transactions that are currently open in the database.	Number	A consistent rise in the value of this measure could indicate that transactions are running for a long a time; this could imply that one/more transactions are slow and or are not getting completed. This is a cause for concern and warrants an investigation.
	Open sessions: Indicates the number of sessions that are currently open in the database.	Number	A consistent rise in the value of this measure could indicate that sessions are not getting closed properly. This is a cause for concern and warrants an investigation.
	Transactions: Indicates the time taken for transaction completion.	Secs	A high value indicates that transactions are taking too long to complete. This calls for an investigation into the reason for the slowness.

1.2.4 vCD Data Access Test

This test monitors accesses to database objects and reports whether the last database object access was slow or not. In the process, the test points you to road-blocks (if any) to database access.

Purpose	Monitors accesses to database objects and reports whether the last database object access was slow or not
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **JMX REMOTE PORT** - Here, specify the port at which the **JMX** listens for requests from remote hosts. Ensure that you specify the same port that you configured in the **vmware-vcd-cell** file in the **/opt/vmware/vcloud-director/bin** folder of the vCloud Director. 5. **JNDINAME** - The **JNDINAME** is a lookup name for connecting to the JMX connector. By default, this is *jmxrmi*. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same. 6. **USER**, **PASSWORD**, and **CONFIRM PASSWORD** – By default, JMX requires **no authentication or security (SSL)**. This is why, by default, the **USER** and **PASSWORD** parameters are set to *none*. If JMX requires **authentication only** (but no security), then ensure that the **USER** and **PASSWORD** parameters are configured with the credentials of a user with *read-write* access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the **CONFIRM PASSWORD** text box.
Outputs of the test	One set of results for the vCloud Director Cell being monitored

Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Last access time: Indicates the time taken by the last database object access.	Secs	A low value is desired for this measure. If the value of this measure is the same as that of the *Worst access time*, it is a clear indicator that the last database access was the slowest.
	Worst access time: Indicates the time duration that was the slowest for a database object access.	Secs	

1.2.5 vCD Jetty Web Requests Test

This test monitors the web requests to the vCloud Director UI and the REST API, and reports the number of active requests, so that the workload on the vCloud Director can be measured. In the event of an overload, you can use this test to know which type of requests is high - UI requests? or REST API requests?

Purpose	Monitors the web requests to the vCloud Director UI and the REST API, and reports the number of active requests, so that the workload on the vCloud Director can be

<table>
<tr><td></td><td colspan="3">measured</td></tr>
<tr><td>Target of the test</td><td colspan="3">A vCloud Director Cell</td></tr>
<tr><td>Agent deploying the test</td><td colspan="3">An internal/remote agent</td></tr>
<tr><td>Configurable parameters for the test</td><td colspan="3">1. TEST PERIOD - How often should the test be executed
2. HOST – The host for which the test is being configured
3. PORT - Specify the port at which the specified HOST listens in the PORT text box. By default, this is NULL.
4. JMX REMOTE PORT - Here, specify the port at which the JMX listens for requests from remote hosts. Ensure that you specify the same port that you configured in the vmware-vcd-cell file in the /opt/vmware/vcloud-director/bin folder of the vCloud Director.
5. JNDINAME - The JNDINAME is a lookup name for connecting to the JMX connector. By default, this is jmxrmi. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same.
6. USER, PASSWORD, and CONFIRM PASSWORD – By default, JMX requires no authentication or security (SSL). This is why, by default, the USER and PASSWORD parameters are set to none. If JMX requires authentication only (but no security), then ensure that the USER and PASSWORD parameters are configured with the credentials of a user with read-write access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the CONFIRM PASSWORD text box.</td></tr>
<tr><td>Outputs of the test</td><td colspan="3">One set of results for REST API requests and UI requests to the vCloud Director Cell being monitored</td></tr>
<tr><td rowspan="2">Measurements made by the test</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
<tr><td>Active requests:
Indicates the number of web requests (HTTP/HTTPS) of this type that are currently handled by this vCloud Director cell.</td><td>Number</td><td>In the event of an overload, you can compare the value of this measure across descriptors to know what type of requests are contributing to the overload - REST API requests? Or UI requests?</td></tr>
</table>

1.2.6 vCD Presentation Querys Test

Using the vCloud API query service, administrators can build typed and packaged queries that can be executed on the vCloud Director database for retrieving information about objects in the cloud. The **vCD Presentation Querys** test enables administrators to track the status of every query built and executed via the query service, so that query failures can be instantly detected.

Purpose	Enables administrators to track the status of every query built and executed via the query service, so that query failures can be instantly detected		
Target of the test	A vCloud Director Cell		
Agent deploying the test	An internal/remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **JMX REMOTE PORT** - Here, specify the port at which the **JMX** listens for requests from remote hosts. Ensure that you specify the same port that you configured in the **vmware-vcd-cell** file in the **/opt/vmware/vcloud-director/bin** folder of the vCloud Director. 5. **JNDINAME** - The **JNDINAME** is a lookup name for connecting to the JMX connector. By default, this is *jmxrmi*. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same. 6. **USER**, **PASSWORD**, and **CONFIRM PASSWORD** – By default, JMX requires **no authentication or security (SSL)**. This is why, by default, the **USER** and **PASSWORD** parameters are set to *none*. If JMX requires **authentication only** (but no security), then ensure that the **USER** and **PASSWORD** parameters are configured with the credentials of a user with *read-write* access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the **CONFIRM PASSWORD** text box.		
Outputs of the test	One set of results for each query executed by the query service of the vCloud Director Cell being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Current invocations: Indicates the number of invocations that are currently active for this query.	Number	

	Failed executions: Indicates the number of executions that failed for this query.	Number	Ideally, the value of this measure should be 0.
	Total invocations: Indicates the total number of invocations for this query.	Number	

1.2.7 vCD User Sessions Test

User sessions serve as good indicators of the workload of a vCloud Director cell. Using the **vCD User Sessions** test, you can not only understand the session load on the vCloud Director cell, but can also rapidly determine if any login attempt to the vCloud Director cell failed.

Purpose	Using the **vCD User Sessions** test, you can not only understand the session load on the vCloud Director cell, but can also rapidly determine if any login attempt to the vCloud Director cell failed
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **JMX REMOTE PORT** - Here, specify the port at which the **JMX** listens for requests from remote hosts. Ensure that you specify the same port that you configured in the **vmware-vcd-cell** file in the **/opt/vmware/vcloud-director/bin** folder of the vCloud Director. 5. **JNDINAME** - The **JNDINAME** is a lookup name for connecting to the JMX connector. By default, this is *jmxrmi*. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same. 6. **USER**, **PASSWORD**, and **CONFIRM PASSWORD** – By default, JMX requires **no authentication or security (SSL)**. This is why, by default, the **USER** and **PASSWORD** parameters are set to *none*. If JMX requires **authentication only** (but no security), then ensure that the **USER** and **PASSWORD** parameters are configured with the credentials of a user with *read-write* access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the **CONFIRM PASSWORD** text box.

Outputs of the test	One set of results for the vCloud Director Cell being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Total sessions: Indicates the total number of sessions to the vCloud Director cell.	Number	This is a good indicator of how busy the vCloud Director cell is.
	Successful logins: Indicates the number of login attempts to the vCloud Director cell that were successful.	Number	
	Failed logins: Indicates the number of login attempts that failed.	Number	Ideally, the value of this measure should be 0.

1.2.8 VIM Connections Test

vCloud Director works transparently with VMware vCenter Server to provision and deploy virtual machines on hosts. Each vCloud Director cell can connect to one or more vCenter Server instances to access resources for running workloads. Each attached vCenter Server instance provides resources, such as CPU and memory, which can be leveraged by vCloud Director. If a vCloud Director cell disconnects from vCenter, the cell will no longer be able to access critical resources and will be unable to provision/deploy VMs on-demand to end-users. This is why, administrators demand that they be immediately notified of such disconnects, so that they can initiate investigation, follow-it up with instant remedial action, and thus ensure the uninterrupted delivery of the cloud-hosted services. The **VIM Connections** test helps administrators achieve this. The test monitors cell user connections to each vCenter server instance, and promptly brings disconnected instances to light. In addition, the test also reports reconnects and the number of times the VC listener had to be started owing to the disconnects.

Purpose	Helps administrators achieve this. The test monitors cell user connections to each vCenter server instance, and promptly brings disconnected instances to light. In addition, the test also reports reconnects and the number of times the VC listener had to be started owing to the disconnects
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent

<table>
<tr><td>Configurable parameters for the test</td><td colspan="3">1. TEST PERIOD - How often should the test be executed
2. HOST – The host for which the test is being configured
3. PORT - Specify the port at which the specified HOST listens in the PORT text box. By default, this is NULL.
4. JMX REMOTE PORT - Here, specify the port at which the JMX listens for requests from remote hosts. Ensure that you specify the same port that you configured in the vmware-vcd-cell file in the /opt/vmware/vcloud-director/bin folder of the vCloud Director.
5. JNDINAME - The JNDINAME is a lookup name for connecting to the JMX connector. By default, this is jmxrmi. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same.
6. USER, PASSWORD, and CONFIRM PASSWORD – By default, JMX requires no authentication or security (SSL). This is why, by default, the USER and PASSWORD parameters are set to none. If JMX requires authentication only (but no security), then ensure that the USER and PASSWORD parameters are configured with the credentials of a user with read-write access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the CONFIRM PASSWORD text box.</td></tr>
<tr><td>Outputs of the test</td><td colspan="3">One set of results for the vCloud Director Cell being monitored</td></tr>
<tr><td rowspan="3">Measurements made by the test</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
<tr><td>Successful connections:
Indicates the number of user connections to this vCenter instance that were successful.</td><td>Number</td><td></td></tr>
<tr><td>Total disconnections:
Indicates the number of user connections that were disconnected from this vCenter instance.</td><td>Number</td><td>Ideally, the value of this measure should be 0.</td></tr>
</table>

	VC listeners started: Indicates the number of times the VC listener service was started in this vCenter instance.	Number	vCloud Director has a service called VC Listener (inventory service) through which it monitors and aggregates changes of vCenter Server entities. Each VC Listener service is capable of listening for changes from one or more vCenter Server instances. However there is only one VC Listener Service that is listening to a given vCenter Server. Whenever the connection is broken between the vCenter and the vCloud Director cell, you would need to restart the VC Listener service. A high value of this measure may therefore indicate how often the vCenter instance was disconnected.
	VIM reconnects through the UI: Indicates the number of times this vCenter was reconnected through the UI to the vCloud Director cell.	Number	Ideally, the value of this measure should be low. Frequently reconnecting the Virtual Center results in the disconnection of the vApp sessions from the vCloud Director cell thus leading to a poor Cloud computing experience for the users.

1.2.9 VIM Inventory Event Manager Test

For every type of inventory events that were handled by the VCD cell, this test reports the number of inventory events that were dispatched. This enables administrators to identify the type of inventory events that occurred the maximum on the VCD cell.

Purpose	Reports the number of inventory events of each type that were dispatched
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **JMX REMOTE PORT** - Here, specify the port at which the **JMX** listens for requests from remote hosts. Ensure that you specify the same port that you configured in the **vmware-vcd-cell** file in the **/opt/vmware/vcloud-director/bin** folder of the vCloud Director. 5. **JNDINAME** - The **JNDINAME** is a lookup name for connecting to the JMX connector. By default, this is *jmxrmi*. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same. 6. **USER**, **PASSWORD**, and **CONFIRM PASSWORD** – By default, JMX requires **no authentication or security (SSL)**. This is why, by default, the **USER** and **PASSWORD** parameters are set to *none*. If JMX requires **authentication only** (but no security), then ensure that the **USER** and **PASSWORD** parameters are configured with the credentials of a user with *read-write* access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the **CONFIRM PASSWORD** text box.
Outputs of the test	One set of results for every type of inventory event that occurred on the vCloud Director Cell being monitored

Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Total invocations: Indicates the total number of VIM inventory events of this type that were dispatched during the last measurement period.	Number	Compare the value of this measure across event types to know which type of events occurred frequently on the VCD cell.

1.2.10 VIM Property Collector Test

This test measures the processing ability of the VIM Inventory Event Manager by indicating the number of object updates that could not be processed by the event manager. In addition, the test monitors the PropertyCollector and reports how frequently objects were updated and were ready for processing by the collector.

Purpose	Measures the processing ability of the VIM Inventory Event Manager by indicating the number of object updates that could not be processed by the event manager. In addition, the test monitors the PropertyCollector and reports how frequently objects were updated and were ready for processing by the collector
Target of the test	A vCloud Director Cell

Agent deploying the test	An internal/remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **JMX REMOTE PORT** - Here, specify the port at which the **JMX** listens for requests from remote hosts. Ensure that you specify the same port that you configured in the **vmware-vcd-cell** file in the **/opt/vmware/vcloud-director/bin** folder of the vCloud Director. 5. **JNDINAME** - The **JNDINAME** is a lookup name for connecting to the JMX connector. By default, this is *jmxrmi*. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same. 6. **USER**, **PASSWORD**, and **CONFIRM PASSWORD** – By default, JMX requires **no authentication or security (SSL)**. This is why, by default, the **USER** and **PASSWORD** parameters are set to *none*. If JMX requires **authentication only** (but no security), then ensure that the **USER** and **PASSWORD** parameters are configured with the credentials of a user with *read-write* access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the **CONFIRM PASSWORD** text box.		
Outputs of the test	One set of results for the vCloud Director Cell being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Total invocations: Indicates the total number of object updates that were received for processing by the VIM Inventory Event Manager during the last measurement period.	Number	
	Failed object updates: Indicates the total number of object updates that failed to be processed in the VIM Inventory Event Manager during the last measurement period.	Number	A consistent increase in the value of this measure is a cause for concern. You may consider fine-tuning the Inventory Event Manager to handle future load.

	Total check for updates calls: Indicates the total number of times the PropertyCollector invoked the *CheckForUpdates* method during the last measurement period.	Number	PropertyCollector is the managed object type that clients use to retrieve a set of properties from one or more managed objects. Clients can also use the PropertyCollector to determine when any of the properties have changed. The change detection mechanism supports both polling and notification to detect property changes. • Polling is supported with the *CheckForUpdates* method. • Notification is supported with the *WaitForUpdates* method. The *CheckForUpdates* method checks whether updates are awaiting processing. A high value for the *Total check for updates calls* measure indicates that this method was called very frequently. The *WaitForUpdates* method waits until updates are available before it completes. A very low value for the *Total wait for updates calls* measure could indicate that each invocation of the *WaitForUpdates* method took too long to complete owing to very few object updates.
	Total wait for updates calls: Indicates the total number of times the PropertyCollector invoked the *WaitForUpdates* method during the last measurement period.	Number	

1.2.11 VCD Task Execution Jobs Test

vCloud Director tasks represent long-running operations on a vCloud Director cell. Such tasks should be monitored continuously and their status tracked, so that administrators are promptly informed of task failures and are enabled to investigate and fix the reasons for the same. The **VCD Task Execution Jobs** test helps administrators in this exercise. This test periodically checks the vcloud Director cell for long running tasks, and for each task it auto-discovers, it promptly reports the count of failed instances of that task. This way, the test helps administrators identify tasks that fail frequently. In addition, the test also reveals the total time for which task has been running, thereby pinpointing the tasks that have been running for the longest time.

Purpose	Periodically checks the vcloud Director cell for long running tasks, and for each task it auto-discovers, it promptly reports the count of failed instances of that task. This way, the test helps administrators identify tasks that fail frequently. In addition, the test also reveals the total time for which task has been running, thereby pinpointing the tasks that have been running for the longest time.
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent

<table>
<tr><td>Configurable parameters for the test</td><td colspan="3">1. TEST PERIOD - How often should the test be executed
2. HOST – The host for which the test is being configured
3. PORT - Specify the port at which the specified HOST listens in the PORT text box. By default, this is NULL.
4. JMX REMOTE PORT - Here, specify the port at which the JMX listens for requests from remote hosts. Ensure that you specify the same port that you configured in the vmware-vcd-cell file in the /opt/vmware/vcloud-director/bin folder of the vCloud Director.
5. JNDINAME - The JNDINAME is a lookup name for connecting to the JMX connector. By default, this is jmxrmi. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same.
6. USER, PASSWORD, and CONFIRM PASSWORD – By default, JMX requires no authentication or security (SSL). This is why, by default, the USER and PASSWORD parameters are set to none. If JMX requires authentication only (but no security), then ensure that the USER and PASSWORD parameters are configured with the credentials of a user with read-write access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the CONFIRM PASSWORD text box.</td></tr>
<tr><td>Outputs of the test</td><td colspan="3">One set of results for each long-running task on the vCloud Director Cell being monitored</td></tr>
<tr><td rowspan="4">Measurements made by the test</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
<tr><td>Total invocations:
Indicates the total number of times this task was invoked.</td><td>Number</td><td>Compare the value of this measure to identify the tasks that are run frequently.</td></tr>
<tr><td>Current invocations:
Indicates the number of instances of this task that are currently active.</td><td>Number</td><td></td></tr>
<tr><td>Failed executions:
Indicates the number of times this task failed.</td><td>Number</td><td>A low value is desired for this measure.</td></tr>
<tr><td></td><td>Execution time:
Indicates the total time for which this task executed.</td><td>Number</td><td>Compare the value of this measure across tasks to know which task has been executing for the longest time. A long-running task could also indicate that the task is experiencing some bottlenecks in execution, causing it to operate for long time periods. A high value for this measure for any task would warrant an investigation.</td></tr>
</table>

1.2.12 VCD Global User Sessions Test

An Organization is the fundamental vCloud Director grouping that contains users, the vApps that they create, and the resources the vApps use. It is a top-level container in a cloud that contains one or more Organization Virtual Data Centers (Org vDCs) and Catalog entities. It owns all the virtual resources for a cloud instance and can have many Org vDCs.

This test reports the number of user sessions that are currently active on each organization configured on the vCloud Director cell.

Purpose	Reports the number of user sessions that are currently active on each organization configured on the vCloud Director cell		
Target of the test	A vCloud Director Cell		
Agent deploying the test	An internal/remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **JMX REMOTE PORT** - Here, specify the port at which the **JMX** listens for requests from remote hosts. Ensure that you specify the same port that you configured in the **vmware-vcd-cell** file in the **/opt/vmware/vcloud-director/bin** folder of the vCloud Director. 5. **JNDINAME** - The **JNDINAME** is a lookup name for connecting to the JMX connector. By default, this is *jmxrmi*. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same. 6. **USER**, **PASSWORD**, and **CONFIRM PASSWORD** – By default, JMX requires **no authentication or security (SSL)**. This is why, by default, the **USER** and **PASSWORD** parameters are set to *none*. If JMX requires **authentication only** (but no security), then ensure that the **USER** and **PASSWORD** parameters are configured with the credentials of a user with *read-write* access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the **CONFIRM PASSWORD** text box.		
Outputs of the test	One set of results for each organization configured on the vCloud Director Cell being monitored		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

test	**Active sessions:** Indicates the total number of sessions that are currently active on this organization.	Number	A high value of this measure indicates that too many users are currently active on the organization. A rapid increase in the value of this measure is a cause of concern. If this value increases, the availability of the resources to the user sessions would gradually decrease and the time taken for accessing the resources would increase manifold leading to the performance slowdown of the cloud.

1.2.13 vCenter Object Validations Test

For every validator configured on the vCloud Director cell, this test reports the total number of vCenter (VC) object executions that are available for validation, and thus indicates the load per validator. Also, by reporting the length of the validation queue and the count of objects requeued, the test brings probable processing bottlenecks in the validator to the attention of administrators.

Purpose	For every validator configured on the vCloud Director cell, this test reports the total number of vCenter (VC) object executions that are available for validation, and thus indicates the load per validator
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **JMX REMOTE PORT** - Here, specify the port at which the **JMX** listens for requests from remote hosts. Ensure that you specify the same port that you configured in the **vmware-vcd-cell** file in the **/opt/vmware/vcloud-director/bin** folder of the vCloud Director. 5. **JNDINAME** - The **JNDINAME** is a lookup name for connecting to the JMX connector. By default, this is *jmxrmi*. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same. 6. **USER**, **PASSWORD**, and **CONFIRM PASSWORD** – By default, JMX requires **no authentication or security (SSL)**. This is why, by default, the **USER** and **PASSWORD** parameters are set to *none*. If JMX requires **authentication only** (but no security), then ensure that the **USER** and **PASSWORD** parameters are configured with the credentials of a user with *read-write* access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the **CONFIRM PASSWORD** text box.
Outputs of the test	One set of results for each validator configured on the vCloud Director Cell being monitored

Measurements made by the test	Measurement	Measurement Unit	Interpretation
	Total invocations: Indicates the total number of VC object executions that are available for validation on this validator.	Number	A high value is indicative of a heavy load on a validator. Compare the value of this measure across validators to know which validator is handling the maximum load. For the *global* descriptor, this measure reports the total number of VC object executions that are available for validation across all validators.
	Objects in queue: Indicates the total number of items (VC objects) that were currently queued for validation.	Number	This measure is not applicable for the *global* descriptor.
	Object busy requeue count: Indicates the number of VC objects that were requeued for validation.	Number	The objects are requeued only when the objects were busy during validation.
	Duplicate discarded: Indicates the total number of duplicate VC objects that were discarded during validation.	Number	

1.2.14 VCD vCenter Tasks Test

This test reports the Virtual Center Task Manager statistics. Using this test, you can easily figure out the following:

- The number of VC tasks that were successful and that failed during the last measurement period
- The number of times the *wait for task* inventory event was invoked
- The number of task completions that were received
- The number of task completion messages that were received and were published on the message bus and
- The time duration that elapsed for a task to be completed successfully and for a task that failed

Purpose	Reports the Virtual Center Task Manager statistics		
Target of the test	A vCloud Director Cell		
Agent deploying the test	An internal/remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **JMX REMOTE PORT** - Here, specify the port at which the **JMX** listens for requests from remote hosts. Ensure that you specify the same port that you configured in the **vmware-vcd-cell** file in the **/opt/vmware/vcloud-director/bin** folder of the vCloud Director. 5. **JNDINAME** - The **JNDINAME** is a lookup name for connecting to the JMX connector. By default, this is *jmxrmi*. If you have registered the JMX connector in the RMI registry using a different lookup name, then you can change this default value to reflect the same. 6. **USER**, **PASSWORD**, and **CONFIRM PASSWORD** – By default, JMX requires **no authentication or security (SSL)**. This is why, by default, the **USER** and **PASSWORD** parameters are set to *none*. If JMX requires **authentication only** (but no security), then ensure that the **USER** and **PASSWORD** parameters are configured with the credentials of a user with *read-write* access to JMX. To know how to create this user, refer to Page 5 of this document. Confirm the password by retyping it in the **CONFIRM PASSWORD** text box.		
Outputs of the test	One set of results for the vCloud Director Cell being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Successful tasks: Indicates the total number of VC tasks that were successful during the last measurement period.	Number	A high value is desired for this measure.
	Failed tasks: Indicates the total number of VC tasks that failed during the last measurement period.	Number	Ideally, the value of this measure should be zero.

	Wait for task invocation: Indicates the number of times the *wait for task* VIM Inventory event was invoked during the last measurement period.	Number	A Wait for Task event is triggered when a task is configured to wait for another long-running process/task to complete before it starts. For instance, a task can be configured to wait on a vCO/vCenter workflow to complete and then to resume, abort gracefully or fail the task before it has a chance to start.
	Completed task waits: Indicates the total number of *wait for task* VIM Inventory events that were completed during the last measurement period.	Number	
	Historical tasks updates received: Indicates the total historical task updates received during the last measurement period.	Number	
	Tasks completion received: Indicates the number of task completions that were received during the last measurement period.	Number	
	Task completion msg published on msg bus: Indicates the number of task completion messages that were published on the message bus during the last measurement period.	Number	

	Task completion msg received on msg bus: Indicates the number of task completion messages that were received on the message bus during the last measurement period.	Number	
	Time elapsed for successful tasks: Indicates the time duration that elapsed for the tasks to be completed successfully during the last measurement period.	Secs	
	Time elapsed for failed tasks: Indicates the time duration that elapsed for the tasks that failed during the last measurement period.	Secs	

1.3 The vCloud Services Layer

You can quickly detect issues with the availability and responsiveness of the vCloud Director Cell using the tests mapped to this layer.

Figure 1.10: The tests mapped to the vCloud Services layer

1.3.1 vCloud Cell Connectivity

This test performs periodic availability checks on the target vCloud Director cell, and reports the status of that vCloud Director cell. In addition, the test also indicates the time taken for connecting to the vCloud Director cell so that, connectivity issues can be isolated.

Purpose	Performs periodic availability checks on the target vCloud Director cell, and reports the status of that vCloud Director cell. In addition, the test also indicates the time taken for connecting to the vCloud Director cell so that, connectivity issues can be isolated		
Target of the test	A vCloud Director Cell		
Agent deploying the test	An internal/remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **VCLOUD DIRECTOR USER** - Specify the name of the user with **Administrator** access to the target vCloud Director Cell. 5. **VCLOUD DIRECTOR PASS** - Enter the password of the specified **VCLOUD DIRECTOR USER**. 6. **CONFIRM PASSWORD** - Confirm the password by retyping it here. 7. **SSL** - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the **SSL** flag is set to **Yes** by default.		
Outputs of the test	One set of results for the vCloud Director Cell being monitored		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

test	**Availability:** Indicates whether/not the vCloud Director is currently available.	Number	A value *0* indicates that the vCloud Director is *Not Available* and the value *100* indicates that the vCloud Director is *Available*.
	Response time: Indicates the time taken by the vCloud Director to respond to requests.	Secs	A low value is typically desired for this measure. A high value or a consistent increase in this value could be indicative of connection bottlenecks.

1.3.2 vCloud Cell Service Status

Whenever users complaint that they are unable to access their critical applications hosted on the vCloud, you may want to know whether it is owing to a bad network connection between the user terminal and the vCloud Director or because of the sudden failure of the vCloud Director cell. Using this test, you can track the status of the vCloud Director Cell and be promptly alerted when it stops running.

Purpose	Performs periodic availability checks on the target vCloud Director cell, and reports the status of that vCloud Director cell. In addition, the test also indicates the time taken for connecting to the vCloud Director cell so that, connectivity issues can be isolated		
Target of the test	A vCloud Director Cell		
Agent deploying the test	An internal/remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **VCLOUD DIRECTOR USER** - Specify the name of the user with **Administrator** access to the target vCloud Director Cell. 5. **VCLOUD DIRECTOR PASS** - Enter the password of the specified **VCLOUD DIRECTOR USER**. 6. **CONFIRM PASSWORD** - Confirm the password by retyping it here. 7. **SSL** - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the **SSL** flag is set to **Yes** by default.		
Outputs of the test	One set of results for the vCloud Director Cell being monitored		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

test	**Availability:** Indicates whether/not the vCloud Director service is currently running.	Percent	A value *0* indicates that the vCloud Director service is *Not Available* and the value *100* indicates that the vCloud Director service is *Available*.

1.3.3 vCloud Director Web Access

This test emulates a user accessing the vCloud Director Cell via HTTP(S), and reports whether the vCloud Director Cell is accessible or not. In the process, the test indicates the availability of the vCloud Director Cell over the web, and the time it took for the agent to access it. This way, issues in web-based access to the Cell come to light.

Purpose	Emulates a user accessing the vCloud Director Cell via HTTP(S), and reports whether the vCloud Director Cell is accessible or not. In the process, the test indicates the availability of the vCloud Director Cell over the web, and the time it took for the agent to access it. This way, issues in web-based access to the Cell come to light
Target	A vCloud Director Cell
Agent deploying this test	An internal/remote agent
Configurable parameters for this test	1. **TEST PERIOD** – How often should the test be executed 2. **HOST** - The host for which the test is to be configured. 3. **URL** – The web page being accessed. While multiple URLs (separated by commas) can be provided, each URL should be of the format **URL name:URL value**. **URL name** is a unique name assigned to the URL, and the **URL value** is the value of the URL. By default, the **URL** parameter is set to *HomePage:https://<IP_address_of_managed_vCloudDirectorCell:443/*, where *HomePage* is the **URL name**, and *https://<IP_address_of_managed_vCloudDirectorCell:443/* is the **URL** value. 4. **COOKIEFILE** – Whether any cookies being returned by the web server need to be saved locally and returned with subsequent requests 5. **PROXYHOST** – The host on which a web proxy server is running (in case a proxy server is to be used) 6. **PROXYPORT** – The port number on which the web proxy server is listening 7. **PROXYUSERNAME** – The user name of the proxy server 8. **PROXYPASSWORD** – The password of the proxy server 9. **CONFIRM PASSWORD** – Confirm the password by retyping it here. 10. **CONTENT –** Is a set of instruction:value pairs that are used to validate the content being returned by the test. If the **CONTENT** value is *none:none*, no validation is performed. The number of pairs specified in this text box, must be equal to the number of URLs being monitored. The instruction should be one of *Inc* or *Exc*. *Inc* tells the test that for the content returned by the test to be valid, the content must include the specified value (a simple string search is done in this case). An instruction of *Exc* instructs the test that the test's output is valid if

<table>
<tr><td></td><td colspan="3">it does not contain the specified value. In both cases, the content specification can include wild card patterns. For example, an Inc instruction can be Inc:*Home page*. An Inc and an Exc instruction can be provided in quick succession in the following format: Inc:*Home Page*,Exc:*home.
11. CREDENTIALS – The HttpTest supports HTTP authentication. The CREDENTIALS parameter is to be set if a specific user name / password has to be specified to login to a page. Against this parameter, the URLname of every configured URL will be displayed; corresponding to each listed URLname, a Username text box and a Password text box will be made available. These parameters will take either of the following values:
o a valid Username and Password for every configured URLname
o none in both the Username and Password text boxes of all configured URLnames (the default setting), if no user authorization is required
Where NTLM (Integrated Windows) authentication is supported, valid CREDENTIALS are mandatory. In other words, a none specification will not be supported in such cases. Therefore, in this case, against each configured URLname, you will have to provide a valid Username in the format: domainname\username, followed by a valid Password.
Please be sure to check if your web site requires HTTP authentication while configuring this parameter. HTTP authentication typically involves a separate pop-up window when you try to access the page. Many sites use HTTP POST for obtaining the user name and password and validating the user login. In such cases, the username and password have to be provided as part of the POST information and NOT as part of the CREDENTIALS specification for the this test.
12. TIMEOUT - Here, specify the maximum duration (in seconds) for which the test will wait for a response from the server. The default TIMEOUT period is 30 seconds.</td></tr>
<tr><td>Outputs of the test</td><td colspan="3">One set of results for every URL being monitored</td></tr>
<tr><td rowspan="2">Measurements of the test</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
<tr><td>Availability:
This measurement indicates whether the test was able to access the configured URL or not.</td><td>Percent</td><td>Availability failures could be caused by several factors such as the web server process(es) (hosting the configured web page) being down, the web server being misconfigured, a network failure, etc. Temporary unavailability may also occur if the web server is overloaded. Availability is determined based on the response code returned by the test. A response code between 200 to 300 indicates that the configured web page is available.</td></tr>
</table>

	Total response time: This measurement indicates the time taken by the test to access this URL.	Secs	Response time being high denotes a problem. Poor response times may be due to an overload. If the URL accessed involves the generation of dynamic content, backend problems (e.g., an overload at the application server or a database failure) can also result in an increase in response time.
	Tcp connection availability: This measure indicates whether the test managed to establish a TCP connection to this URL.	Percent	Failure to establish a TCP connection may imply that either the web server process hosting the web page is not up, or that the process is not operating correctly. In some cases of extreme overload, the failure to establish a TCP connection may be a transient condition. As the load subsides, the web page may start functioning properly again.
	Tcp connect time: This measure quantifies the time for establishing a TCP connection to the configured URL.	Secs	Typically, the TCP connection establishment must be very small (of the order of a few milliseconds).
	Server response time: This measure indicates the time period between when the connection was established and when the test sent back a HTTP response header to the client.	Secs	While the total response time may depend on several factors, the server response time is typically, a very good indicator of a server bottleneck (e.g., because all the available server threads or processes are in use).
	Response code: The response code returned by the test for the simulated request	Number	A value between 200 and 300 indicates a good response. A 4xx value indicates a problem with the requested content (eg., page not found). A 5xx value indicates a server error.
	Content length: The size of the content returned by the test	Kbytes	Typically the content length returned by the test for a specific URL should be the same across time. Any change in this metric may indicate the need for further investigation.

	Content validity: This measure validates whether the test was successful in executing the request made to it.	Percent	A value of 100% indicates that the content returned by the test is valid. A value of 0% indicates that the content may not be valid. This capability for content validation is especially important for multi-tier web applications. For example, a user may not be able to login to the web site but the server may reply back with a valid HTML page where in the error message, say, "Invalid Login" is reported. In this case, the availability will be 100 % (since we got a valid HTML response). If the test is configured such that the content parameter should exclude the string "Invalid Login," in the above scenario content validity would have a value 0.

1.3.4 vCloud Container Debug Log

The **vcloud-container-debug.log** file, which will be present in the **/opt/vmware/cloud-director/logs** directory (on the vCloud Director host) by default, captures the debug-level log messages from the cell. This test scans this debug log file for specific patterns of messages and quickly reports the count and details of messages that match the configured patterns.

This test is disabled by default. To enable the test, follow the *Agents -> Tests -> Enable/Disable* menu sequence. Select *vCloud Director Cell* as the **Component type**, select *Performance* as the **Test type**, pick this test from the **DISABLED TESTS** list, and click the **<<** button to enable it.

Note:

- This test can be executed only in an agent-based manner.
- The eG agent executing this test should run with **root** user privileges.

Purpose	Scans the debug log file for specific patterns of messages and quickly reports the count and details of messages that match the configured patterns
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** - The host for which the test is to be configured. 3. **PORT** – The port at which the server listens 4. **ALERTFILE** - Specify the path to the debug log file to be monitored. For eg.,. */opt/vmware/cloud-director/logs/vcloud-container-debug.log*. Also, instead of a specific log file path, the path to the directory containing log files can be provided - eg., */opt/vmware/cloud-director/logs*. This ensures that eG Enterprise monitors the most recent log files in the specified directory. Specific log file name patterns can also be specified. For example, to monitor the latest log files with names containing the string 'container-debug', the parameter specification can be, */opt/vmware/cloud-director/logs/*container-debug**. Here, '*' indicates leading/trailing characters (as the case may be). In this case, the eG agent first enumerates all the log files in the specified path that match the given pattern, and then picks only the latest log file from the result set for monitoring. Your **ALERTFILE** specification can also be of the following format: *Name@logfilepath_or_pattern*. Here, *Name* represents the display name of the path being configured. Accordingly, the parameter specification for the 'container-debug' example discussed above can be: *debuglog@/opt/vmware/cloud-director/logs/*container-debug**. In this case, the display name 'debuglog' will alone be displayed as descriptors of this test. Every time this test is executed, the eG agent verifies the following: ➢ Whether any changes have occurred in the size and/or timestamp of the log files that were monitored during the last measurement period; ➢ Whether any new log files (that match the **ALERTFILE** specification) have been newly added since the last measurement period; If a few lines have been added to a log file that was monitored previously, then the eG agent monitors the additions to that log file, and then proceeds to monitor newer log files (if any). If an older log file has been overwritten, then, the eG agent monitors this log file completely, and then proceeds to monitor the newer log files (if any). 5. **SEARCHPATTERN** - Enter the specific patterns of alerts to be monitored. The pattern should be in the following format: *<PatternName>:<Pattern>*, where *<PatternName>* is the pattern name that will be displayed in the monitor interface and *<Pattern>* is an expression of the form - *expr* or expr or *expr or expr*, etc. A leading '*' signifies any number of leading characters, while a trailing '*' signifies any number of trailing characters. For example, say you specify ORA:ORA-* in the SEARCHPATTERN text box. This indicates that "ORA" is the pattern name to be displayed in the monitor interface. "ORA-*" indicates that the test will monitor only those lines in the alert log which start with the term "ORA-". Similarly, if your pattern specification reads: offline:*offline, then it means that the pattern name is offline and that the test will monitor those lines in the alert log which end with the term offline.

A single pattern may also be of the form e1+e2, where + signifies an OR condition. That is, the <*PatternName*> is matched if either e1 is true or e2 is true.

Multiple search patterns can be specified as a comma-separated list. For example: ORA:ORA-*,offline:*offline*,online:*online

If the **ALERTFILE** specification is of the format *Name@logfilepath*, then the descriptor for this test in the eG monitor interface will be of the format: *Name:PatternName*. On the other hand, if the **ALERTFILE** specification consists only of the log file path, then the descriptors will be of the format: *LogFilePath:PatternName*.

If you want all the messages in a log file to be monitored, then your specification would be: *<PatternName>:**.

6. **LINES** - Specify two numbers in the format x:y. This means that when a line in the alert file matches a particular pattern, then x lines before the matched line and y lines after the matched line will be reported in the detail diagnosis output (in addition to the matched line). The default value here is 0:0. Multiple entries can be provided as a comma-separated list.

   If you give 1:1 as the value for **LINES**, then this value will be applied to all the patterns specified in the **SEARCHPATTERN** field. If you give 0:0,1:1,2:1 as the value for **LINES** and if the corresponding value in the **SEARCHPATTERN** filed is like ORA:ORA-*,offline:*offline*,online:*online then:

   0:0 will be applied to ORA:ORA-* pattern

   1:1 will be applied to offline:*offline* pattern

   2:1 will be applied to online:*online pattern

7. **EXCLUDEPATTERN** - Provide a comma-separated list of patterns to be excluded from monitoring in the **EXCLUDEPATTERN** text box. For example **critical*, *exception**. By default, this parameter is set to 'none'.

8. **UNIQUEMATCH** - By default, the **UNIQUEMATCH** parameter is set to **FALSE**, indicating that, by default, the test checks every line in the log file for the existence of each of the configured **SEARCHPATTERNS**. By setting this parameter to **TRUE**, you can instruct the test to ignore a line and move to the next as soon as a match for one of the configured patterns is found in that line. For example, assume that *Pattern1:*fatal*,Pattern2:*error** is the **SEARCHPATTERN** that has been configured. If **UNIQUEMATCH** is set to **FALSE**, then the test will read every line in the log file completely to check for the existence of messages embedding the strings 'fatal' and 'error'. If both the patterns are detected in the same line, then the number of matches will be incremented by 2. On the other hand, if **UNIQUEMATCH** is set to **TRUE**, then the test will read a line only until a match for one of the configured patterns is found and not both. This means that even if the strings 'fatal' and 'error' follow one another in the same line, the test will consider only the first match and not the next. The match count in this case will therefore be incremented by only 1.

9. **ROTATINGFILE** - This flag governs the display of descriptors for this test in the eG monitoring console.

   If this flag is set to **true** and the **ALERTFILE** text box contains the full path to a specific (log/text) file, then, the descriptors of this test will be displayed in the following format: *Directory_containing_monitored_file:<SearchPattern>*. For instance, if the **ALERTFILE** parameter is set to */opt/vmware/cloud-director/logs/vcloud-container-debug.log*, and **ROTATINGFILE** is set to **true**, then, your descriptor will be of the following format: */opt/vmware/cloud-director/logs/vcloud-container-debug.log:<SearchPattern>*. On the other hand, if the **ROTATINGFILE** flag had been set to **false**, then the descriptors will be of the following format: *<FileName>:<SearchPattern>* - i.e., *vcloud-container-debug.log:<SearchPattern>* in the case of the example above.

   If this flag is set to **true** and the **ALERTFILE** parameter is set to the directory containing log files, then, the descriptors of this test will be displayed in the format: *Configured_directory_path:<SearchPattern>.* For instance, if the **ALERTFILE** parameter is set to */opt/vmware/cloud-director/logs*, and **ROTATINGFILE** is set to **true**, then, your descriptor will be: */opt/vmware/cloud-director/logs:<SearchPattern>*. On the other hand, if the **ROTATINGFILE** parameter had been set to **false**, then the descriptors will be of the following format: *Configured_directory:<SearchPattern>* - i.e., *logs:<SearchPattern>* in the case of the example above.

   If this flag is set to true and the **ALERTFILE** parameter is set to a specific file pattern, then, the descriptors of this test will be of the following format: *<FilePattern>:<SearchPattern>*. For instance, if the **ALERTFILE** parameter is set to */opt/vmware/cloud-director/logs/*container-debug**, and **ROTATINGFILE** is set to **true**, then, your descriptor will be: */*container-debug*:<SearchPattern>*. In this case, the descriptor format will not change even if the **ROTATINGFILE** flag status is changed.

10. **OVERWRITTENFILE** - By default, this flag is set to **false**. Set this flag to **true** if you want the test to support the 'roll over' capability of the specified **ALERTFILE**. A roll over typically occurs when the timestamp of a file changes or when the log file size crosses a pre-determined threshold. When a log file rolls over, the errors/warnings that pre-exist in that file will be automatically copied to a new file, and all errors/warnings that are captured subsequently will be logged in the original/old file. For instance, say, errors and warnings were originally logged to a file named *messages*. When a roll over occurs, the content of the file *messages* will be copied to a file named *messages.1*, and all new errors/warnings will be logged in *messages*. In such a scenario, since the **OVERWRITTENFILE** flag is set to **false** by default, the test by default scans only *messages.1* for new log entries and ignores *messages*. On the other hand, if the flag is set to **true**, then the test will scan both *messages* and *messages.1* for new entries.

    If you want this test to support the 'roll over' capability described above, the following conditions need to be fulfilled:

    - The **ALERTFILE** parameter has to be configured only with the name and/or path of one/more alert files. File patterns or directory specifications should not be specified in the **ALERTFILE** text box.
    - The roll over file name should be of the format: "<**ALERTFILE**>.1", and this file must be in the same directory as the **ALERTFILE**.

11. **CASESENSITIVE** - This flag is set to **No** by default. This indicates that the test functions in a 'case-insensitive' manner by default. This implies that, by default, the test ignores the case of your **ALERTFILE** and **SEARCHPATTERN** specifications. If this flag is set to **Yes** on the other hand, then the test will function in a 'case-sensitive' manner. In this case therefore, for the test to work, even the case of your **ALERTFILE** and **SEARCHPATTERN** specifications should match with the actuals.
12. **DD FREQUENCY** - Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is *1:1*. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying *none* against **DD FREQUENCY**.
13. **DETAILED DIAGNOSIS** - To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option. To disable the capability, click on the **Off** option.

    The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled:

    - The eG manager license should allow the detailed diagnosis capability
    - Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.

Outputs of the test	One set of results for every **ALERTFILE** and **SEARCHPATTERN** combination		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Recent errors: Indicates the number of errors that were added to the log file when the test was last executed.	Number	The value of this measure is a clear indicator of the number of "new" alerts that have come into the log file. The detailed diagnosis of this measure, if enabled, provides the detailed descriptions of the errors of the configured patterns.

1.3.5 vCloud Container Info Log

The **vcloud-container-info.log** file, which will be present in the **/opt/vmware/cloud-director/logs** directory (on the vCloud Director host) by default, captures informational log messages from the cell. This log also shows warnings or errors encountered by the cell. This test scans this log file for specific patterns of messages and quickly reports the count and details of messages that match the configured patterns.

This test is disabled by default. To enable the test, follow the *Agents -> Tests -> Enable/Disable* menu sequence. Select *vCloud Director Cell* as the **Component type**, select *Performance* as the **Test type**, pick this test from the **DISABLED TESTS** list, and click the **<<** button to enable it.

Note:

- This test can be executed only in an agent-based manner.
- The eG agent executing this test should run with **root** user privileges.

Purpose	Scans the informational log file for specific patterns of messages and quickly reports the count and details of messages that match the configured patterns
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** - The host for which the test is to be configured. 3. **PORT** – The port at which the server listens 4. **ALERTFILE** - Specify the path to the debug log file to be monitored. For eg.,. */opt/vmware/cloud-director/logs/vcloud-container-info.log*. Also, instead of a specific log file path, the path to the directory containing log files can be provided - eg., */opt/vmware/cloud-director/logs*. This ensures that eG Enterprise monitors the most recent log files in the specified directory. Specific log file name patterns can also be specified. For example, to monitor the latest log files with names containing the string 'container-info', the parameter specification can be, */opt/vmware/cloud-director/logs/*container-info**. Here, '*' indicates leading/trailing characters (as the case may be). In this case, the eG agent first enumerates all the log files in the specified path that match the given pattern, and then picks only the latest log file from the result set for monitoring. Your **ALERTFILE** specification can also be of the following format: *Name@logfilepath_or_pattern*. Here, *Name* represents the display name of the path being configured. Accordingly, the parameter specification for the 'container-info' example discussed above can be: *debuglog@/opt/vmware/cloud-director/logs/*container-info**. In this case, the display name 'debuglog' will alone be displayed as descriptors of this test. Every time this test is executed, the eG agent verifies the following: ➢ Whether any changes have occurred in the size and/or timestamp of the log files that were monitored during the last measurement period; ➢ Whether any new log files (that match the **ALERTFILE** specification) have been newly added since the last measurement period; If a few lines have been added to a log file that was monitored previously, then the eG agent monitors the additions to that log file, and then proceeds to monitor newer log files (if any). If an older log file has been overwritten, then, the eG agent monitors this log file completely, and then proceeds to monitor the newer log files (if any). 5. **SEARCHPATTERN** - Enter the specific patterns of alerts to be monitored. The pattern should be in the following format: *<PatternName>:<Pattern>*, where *<PatternName>* is the pattern name that will be displayed in the monitor interface and *<Pattern>* is an expression of the form - *expr* or expr or *expr or expr*, etc. A leading '*' signifies any number of leading characters, while a trailing '*' signifies any number of trailing characters. For example, say you specify ORA:ORA-* in the SEARCHPATTERN text box. This indicates that "ORA" is the pattern name to be displayed in the monitor interface. "ORA-*" indicates that the test will monitor only those lines in the alert log which start with the term "ORA-". Similarly, if your pattern specification reads: offline:*offline, then it means that the pattern name is offline and that the test will monitor those lines in the alert log which end with the term offline.

A single pattern may also be of the form e1+e2, where + signifies an OR condition. That is, the <*PatternName*> is matched if either e1 is true or e2 is true.

Multiple search patterns can be specified as a comma-separated list. For example: ORA:ORA-*,offline:*offline*,online:*online

If the **ALERTFILE** specification is of the format *Name@logfilepath*, then the descriptor for this test in the eG monitor interface will be of the format: *Name:PatternName*. On the other hand, if the **ALERTFILE** specification consists only of the log file path, then the descriptors will be of the format: *LogFilePath:PatternName*.

If you want all the messages in a log file to be monitored, then your specification would be: *<PatternName>:**.

6. **LINES** - Specify two numbers in the format x:y. This means that when a line in the alert file matches a particular pattern, then x lines before the matched line and y lines after the matched line will be reported in the detail diagnosis output (in addition to the matched line). The default value here is 0:0. Multiple entries can be provided as a comma-separated list.

   If you give 1:1 as the value for **LINES**, then this value will be applied to all the patterns specified in the **SEARCHPATTERN** field. If you give 0:0,1:1,2:1 as the value for **LINES** and if the corresponding value in the **SEARCHPATTERN** filed is like ORA:ORA-*,offline:*offline*,online:*online then:

   0:0 will be applied to ORA:ORA-* pattern

   1:1 will be applied to offline:*offline* pattern

   2:1 will be applied to online:*online pattern

7. **EXCLUDEPATTERN** - Provide a comma-separated list of patterns to be excluded from monitoring in the **EXCLUDEPATTERN** text box. For example **critical*, *exception**. By default, this parameter is set to 'none'.

8. **UNIQUEMATCH** - By default, the **UNIQUEMATCH** parameter is set to **FALSE**, indicating that, by default, the test checks every line in the log file for the existence of each of the configured **SEARCHPATTERNS**. By setting this parameter to **TRUE**, you can instruct the test to ignore a line and move to the next as soon as a match for one of the configured patterns is found in that line. For example, assume that *Pattern1:*fatal*,Pattern2:*error** is the **SEARCHPATTERN** that has been configured. If **UNIQUEMATCH** is set to **FALSE**, then the test will read every line in the log file completely to check for the existence of messages embedding the strings 'fatal' and 'error'. If both the patterns are detected in the same line, then the number of matches will be incremented by 2. On the other hand, if **UNIQUEMATCH** is set to **TRUE**, then the test will read a line only until a match for one of the configured patterns is found and not both. This means that even if the strings 'fatal' and 'error' follow one another in the same line, the test will consider only the first match and not the next. The match count in this case will therefore be incremented by only 1.

9. **ROTATINGFILE** - This flag governs the display of descriptors for this test in the eG monitoring console.

   If this flag is set to **true** and the **ALERTFILE** text box contains the full path to a specific (log/text) file, then, the descriptors of this test will be displayed in the following format: *Directory_containing_monitored_file:<SearchPattern>*. For instance, if the **ALERTFILE** parameter is set to */opt/vmware/cloud-director/logs/vcloud-container-info.log*, and **ROTATINGFILE** is set to **true**, then, your descriptor will be of the following format: */opt/vmware/cloud-director/logs/vcloud-container-info.log:<SearchPattern>*. On the other hand, if the **ROTATINGFILE** flag had been set to **false**, then the descriptors will be of the following format: *<FileName>:<SearchPattern>* - i.e., *vcloud-container-info.log:<SearchPattern>* in the case of the example above.

   If this flag is set to **true** and the **ALERTFILE** parameter is set to the directory containing log files, then, the descriptors of this test will be displayed in the format: *Configured_directory_path:<SearchPattern>.* For instance, if the **ALERTFILE** parameter is set to */opt/vmware/cloud-director/logs*, and **ROTATINGFILE** is set to **true**, then, your descriptor will be: */opt/vmware/cloud-director/logs:<SearchPattern>*. On the other hand, if the **ROTATINGFILE** parameter had been set to **false**, then the descriptors will be of the following format: *Configured_directory:<SearchPattern>* - i.e., *logs:<SearchPattern>* in the case of the example above.

   If this flag is set to true and the **ALERTFILE** parameter is set to a specific file pattern, then, the descriptors of this test will be of the following format: *<FilePattern>:<SearchPattern>*. For instance, if the **ALERTFILE** parameter is set to */opt/vmware/cloud-director/logs/*container-info**, and **ROTATINGFILE** is set to **true**, then, your descriptor will be: */*container-info*:<SearchPattern>*. In this case, the descriptor format will not change even if the **ROTATINGFILE** flag status is changed.

10. **OVERWRITTENFILE** - By default, this flag is set to **false**. Set this flag to **true** if you want the test to support the 'roll over' capability of the specified **ALERTFILE**. A roll over typically occurs when the timestamp of a file changes or when the log file size crosses a pre-determined threshold. When a log file rolls over, the errors/warnings that pre-exist in that file will be automatically copied to a new file, and all errors/warnings that are captured subsequently will be logged in the original/old file. For instance, say, errors and warnings were originally logged to a file named *messages*. When a roll over occurs, the content of the file *messages* will be copied to a file named *messages.1*, and all new errors/warnings will be logged in *messages*. In such a scenario, since the **OVERWRITTENFILE** flag is set to **false** by default, the test by default scans only *messages.1* for new log entries and ignores *messages*. On the other hand, if the flag is set to **true**, then the test will scan both *messages* and *messages.1* for new entries.

    If you want this test to support the 'roll over' capability described above, the following conditions need to be fulfilled:

    - The **ALERTFILE** parameter has to be configured only with the name and/or path of one/more alert files. File patterns or directory specifications should not be specified in the **ALERTFILE** text box.
    - The roll over file name should be of the format: "<**ALERTFILE**>.1", and this file must be in the same directory as the **ALERTFILE**.

11. **CASESENSITIVE** - This flag is set to **No** by default. This indicates that the test functions in a 'case-insensitive' manner by default. This implies that, by default, the test ignores the case of your **ALERTFILE** and **SEARCHPATTERN** specifications. If this flag is set to **Yes** on the other hand, then the test will function in a 'case-sensitive' manner. In this case therefore, for the test to work, even the case of your **ALERTFILE** and **SEARCHPATTERN** specifications should match with the actuals.
12. **DD FREQUENCY** - Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is *1:1*. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying *none* against **DD FREQUENCY**.
13. **DETAILED DIAGNOSIS** - To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option. To disable the capability, click on the **Off** option.

    The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled:

    - The eG manager license should allow the detailed diagnosis capability
    - Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.

Outputs of the test: One set of results for every **ALERTFILE** and **SEARCHPATTERN** combination

Measurements made by the test

Measurement	Measurement Unit	Interpretation
Exceptions: Indicates the number of errors that were added to the log file when the test was last executed.	Number	The value of this measure is a clear indicator of the number of "new" alerts that have come into the log file. The detailed diagnosis of this measure, if enabled, provides the detailed descriptions of the exceptions of the configured patterns.

1.3.6 vCloud Container Info Log

The **vcloud-container-info.log** file, which will be present in the **/opt/vmware/cloud-director/logs** directory (on the vCloud Director host) by default, captures the debug-level log messages from the cell. This test scans this debug log file for specific patterns of messages and quickly reports the count and details of messages that match the configured patterns.

This test is disabled by default. To enable the test, follow the *Agents -> Tests -> Enable/Disable* menu sequence. Select *vCloud Director Cell* as the **Component type**, select *Performance* as the **Test type**, pick this test from the **DISABLED TESTS** list, and click the **<<** button to enable it.

Note:

- This test can be executed only in an agent-based manner.
- The eG agent executing this test should run with **root** user privileges.

Purpose	Scans the debug log file for specific patterns of messages and quickly reports the count and details of messages that match the configured patterns
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** - The host for which the test is to be configured. 3. **PORT** – The port at which the server listens 4. **ALERTFILE** - Specify the path to the debug log file to be monitored. For eg.,. */opt/vmware/cloud-director/logs/vcloud-container-info.log*. Also, instead of a specific log file path, the path to the directory containing log files can be provided - eg., */opt/vmware/cloud-director/logs*. This ensures that eG Enterprise monitors the most recent log files in the specified directory. Specific log file name patterns can also be specified. For example, to monitor the latest log files with names containing the string 'container-info', the parameter specification can be, */opt/vmware/cloud-director/logs/*container-info**. Here, '*' indicates leading/trailing characters (as the case may be). In this case, the eG agent first enumerates all the log files in the specified path that match the given pattern, and then picks only the latest log file from the result set for monitoring. Your **ALERTFILE** specification can also be of the following format: *Name@logfilepath_or_pattern*. Here, *Name* represents the display name of the path being configured. Accordingly, the parameter specification for the 'container-info' example discussed above can be: *debuglog@/opt/vmware/cloud-director/logs/*container-info**. In this case, the display name 'debuglog' will alone be displayed as descriptors of this test. Every time this test is executed, the eG agent verifies the following: ➢ Whether any changes have occurred in the size and/or timestamp of the log files that were monitored during the last measurement period; ➢ Whether any new log files (that match the **ALERTFILE** specification) have been newly added since the last measurement period; If a few lines have been added to a log file that was monitored previously, then the eG agent monitors the additions to that log file, and then proceeds to monitor newer log files (if any). If an older log file has been overwritten, then, the eG agent monitors this log file completely, and then proceeds to monitor the newer log files (if any). 5. **SEARCHPATTERN** - Enter the specific patterns of alerts to be monitored. The pattern should be in the following format: *<PatternName>:<Pattern>*, where *<PatternName>* is the pattern name that will be displayed in the monitor interface and *<Pattern>* is an expression of the form - *expr* or expr or *expr or expr*, etc. A leading '*' signifies any number of leading characters, while a trailing '*' signifies any number of trailing characters. For example, say you specify ORA:ORA-* in the SEARCHPATTERN text box. This indicates that "ORA" is the pattern name to be displayed in the monitor interface. "ORA-*" indicates that the test will monitor only those lines in the alert log which start with the term "ORA-". Similarly, if your pattern specification reads: offline:*offline, then it means that the pattern name is offline and that the test will monitor those lines in the alert log which end with the term offline.

A single pattern may also be of the form e1+e2, where + signifies an OR condition. That is, the <*PatternName*> is matched if either e1 is true or e2 is true.

Multiple search patterns can be specified as a comma-separated list. For example: ORA:ORA-*,offline:*offline*,online:*online

If the **ALERTFILE** specification is of the format *Name@logfilepath*, then the descriptor for this test in the eG monitor interface will be of the format: *Name:PatternName*. On the other hand, if the **ALERTFILE** specification consists only of the log file path, then the descriptors will be of the format: *LogFilePath:PatternName*.

If you want all the messages in a log file to be monitored, then your specification would be: *<PatternName>:**.

6. **LINES** - Specify two numbers in the format x:y. This means that when a line in the alert file matches a particular pattern, then x lines before the matched line and y lines after the matched line will be reported in the detail diagnosis output (in addition to the matched line). The default value here is 0:0. Multiple entries can be provided as a comma-separated list.

   If you give 1:1 as the value for **LINES**, then this value will be applied to all the patterns specified in the **SEARCHPATTERN** field. If you give 0:0,1:1,2:1 as the value for **LINES** and if the corresponding value in the **SEARCHPATTERN** filed is like ORA:ORA-*,offline:*offline*,online:*online then:

   0:0 will be applied to ORA:ORA-* pattern

   1:1 will be applied to offline:*offline* pattern

   2:1 will be applied to online:*online pattern

7. **EXCLUDEPATTERN** - Provide a comma-separated list of patterns to be excluded from monitoring in the **EXCLUDEPATTERN** text box. For example **critical*, *exception**. By default, this parameter is set to 'none'.

8. **UNIQUEMATCH** - By default, the **UNIQUEMATCH** parameter is set to **FALSE**, indicating that, by default, the test checks every line in the log file for the existence of each of the configured **SEARCHPATTERNS**. By setting this parameter to **TRUE**, you can instruct the test to ignore a line and move to the next as soon as a match for one of the configured patterns is found in that line. For example, assume that *Pattern1:*fatal*,Pattern2:*error** is the **SEARCHPATTERN** that has been configured. If **UNIQUEMATCH** is set to **FALSE**, then the test will read every line in the log file completely to check for the existence of messages embedding the strings 'fatal' and 'error'. If both the patterns are detected in the same line, then the number of matches will be incremented by 2. On the other hand, if **UNIQUEMATCH** is set to **TRUE**, then the test will read a line only until a match for one of the configured patterns is found and not both. This means that even if the strings 'fatal' and 'error' follow one another in the same line, the test will consider only the first match and not the next. The match count in this case will therefore be incremented by only 1.

9. **ROTATINGFILE** - This flag governs the display of descriptors for this test in the eG monitoring console.

   If this flag is set to **true** and the **ALERTFILE** text box contains the full path to a specific (log/text) file, then, the descriptors of this test will be displayed in the following format: *Directory_containing_monitored_file:<SearchPattern>*. For instance, if the **ALERTFILE** parameter is set to */opt/vmware/cloud-director/logs/vcloud-container-info.log*, and **ROTATINGFILE** is set to **true**, then, your descriptor will be of the following format: */opt/vmware/cloud-director/logs/vcloud-container-info.log:<SearchPattern>*. On the other hand, if the **ROTATINGFILE** flag had been set to **false**, then the descriptors will be of the following format: *<FileName>:<SearchPattern>* - i.e., *vcloud-container-info.log:<SearchPattern>* in the case of the example above.

   If this flag is set to **true** and the **ALERTFILE** parameter is set to the directory containing log files, then, the descriptors of this test will be displayed in the format: *Configured_directory_path:<SearchPattern>.* For instance, if the **ALERTFILE** parameter is set to */opt/vmware/cloud-director/logs*, and **ROTATINGFILE** is set to **true**, then, your descriptor will be: */opt/vmware/cloud-director/logs:<SearchPattern>*. On the other hand, if the **ROTATINGFILE** parameter had been set to **false**, then the descriptors will be of the following format: *Configured_directory:<SearchPattern>* - i.e., *logs:<SearchPattern>* in the case of the example above.

   If this flag is set to true and the **ALERTFILE** parameter is set to a specific file pattern, then, the descriptors of this test will be of the following format: *<FilePattern>:<SearchPattern>*. For instance, if the **ALERTFILE** parameter is set to */opt/vmware/cloud-director/logs/*container-info**, and **ROTATINGFILE** is set to **true**, then, your descriptor will be: */*container-info*:<SearchPattern>*. In this case, the descriptor format will not change even if the **ROTATINGFILE** flag status is changed.

10. **OVERWRITTENFILE** - By default, this flag is set to **false**. Set this flag to **true** if you want the test to support the 'roll over' capability of the specified **ALERTFILE**. A roll over typically occurs when the timestamp of a file changes or when the log file size crosses a pre-determined threshold. When a log file rolls over, the errors/warnings that pre-exist in that file will be automatically copied to a new file, and all errors/warnings that are captured subsequently will be logged in the original/old file. For instance, say, errors and warnings were originally logged to a file named *messages*. When a roll over occurs, the content of the file *messages* will be copied to a file named *messages.1*, and all new errors/warnings will be logged in *messages*. In such a scenario, since the **OVERWRITTENFILE** flag is set to **false** by default, the test by default scans only *messages.1* for new log entries and ignores *messages*. On the other hand, if the flag is set to **true**, then the test will scan both *messages* and *messages.1* for new entries.

    If you want this test to support the 'roll over' capability described above, the following conditions need to be fulfilled:

    - The **ALERTFILE** parameter has to be configured only with the name and/or path of one/more alert files. File patterns or directory specifications should not be specified in the **ALERTFILE** text box.
    - The roll over file name should be of the format: "<**ALERTFILE**>.1", and this file must be in the same directory as the **ALERTFILE**.

<table>
<tr><td></td><td colspan="3">
11. CASESENSITIVE - This flag is set to No by default. This indicates that the test functions in a 'case-insensitive' manner by default. This implies that, by default, the test ignores the case of your ALERTFILE and SEARCHPATTERN specifications. If this flag is set to Yes on the other hand, then the test will function in a 'case-sensitive' manner. In this case therefore, for the test to work, even the case of your ALERTFILE and SEARCHPATTERN specifications should match with the actuals.
12. DD FREQUENCY - Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is 1:1. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying none against DD FREQUENCY.
13. DETAILED DIAGNOSIS - To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the On option. To disable the capability, click on the Off option.
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➢ Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.
</td></tr>
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<tr><td rowspan="2">Measurements made by the test</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
<tr><td>Exceptions:
Indicates the number of errors that were added to the log file when the test was last executed.</td><td>Number</td><td>The value of this measure is a clear indicator of the number of “new” alerts that have come into the log file. The detailed diagnosis of this measure, if enabled, provides the detailed descriptions of the errors of the configured patterns.</td></tr>
</table>

1.4 The vCloud Resources Layer

With the help of the tests mapped to this layer, the following can be determined:

- The number of current connections between the vCloud Director Cell and the vCenter server / vShield Manager / vSphere hosts;
- The number of connections to the vCloud Director Cell;

- The current status of the vCenter server attached to the vCloud Director Cell,and the vSphere hosts managed by that vCenter;
- The status and space usage of the datastores managed by the vCenter server attached to the vCloud Director Cell.

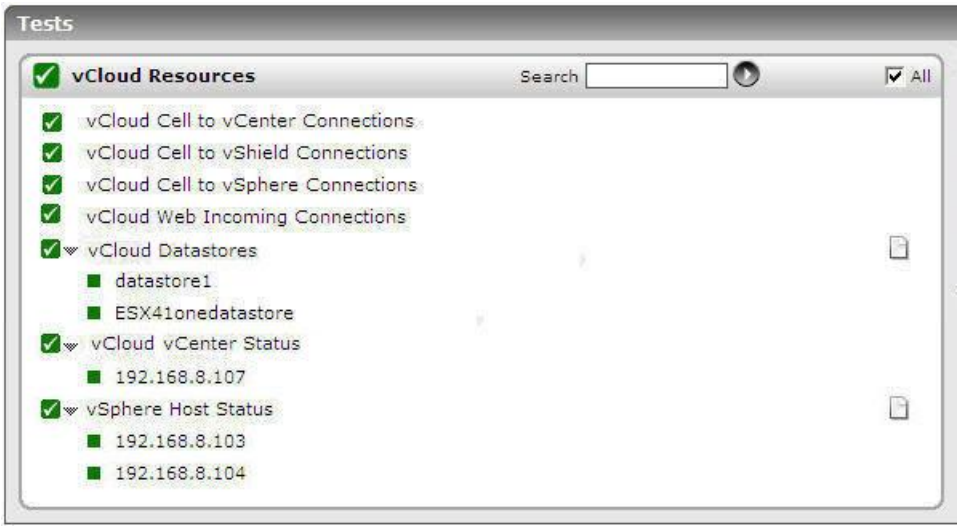

Figure 1.11: The tests mapped to the vCloud Resources layer

1.4.1 vCloud Cell to vCenter Connections

The vCloud Director Cell abstracts and pools resources made available for use by the vCenter server that is attached to it. This test reports the number of connections that are currently established between the vCloud Director and the vCenter server.

Purpose	Reports the number of connections that are currently established between the vCloud Director and the vCenter server
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **VCLOUD DIRECTOR USER** - Specify the name of the user with **Administrator** access to the target vCloud Director Cell. 5. **VCLOUD DIRECTOR PASS** - Enter the password of the specified **VCLOUD DIRECTOR USER**. 6. **CONFIRM PASSWORD** - Confirm the password by retyping it here. 7. **SSL** - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the **SSL** flag is set to **Yes** by default.		
Outputs of the test	One set of results for the vCloud Director Cell being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Current connections: Indicates the number of connections that the vCloud Director Cell has currently established with the vCenter server.	Number	

1.4.2 vCloud Cell to vShield Connections

The vCloud Director requires vShield Manager to provide network services. Each vCenter Server you attach to Cloud Director requires its own vShield Manager. This test reports the number of connections that are currently established between the target vCloud Director cell and the vShield Manager it uses.

Purpose	Reports the number of connections that are currently established between the target vCloud Director cell and the vShield Manager it uses
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **VCLOUD DIRECTOR USER** - Specify the name of the user with **Administrator** access to the target vCloud Director Cell. 5. **VCLOUD DIRECTOR PASS** - Enter the password of the specified **VCLOUD DIRECTOR USER**. 6. **CONFIRM PASSWORD** - Confirm the password by retyping it here. 7. **SSL** - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the **SSL** flag is set to **Yes** by default.		
Outputs of the test	One set of results for the vCloud Director Cell being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Current connections: Indicates the number of connections that the vCloud Director Cell has currently established with the vShield Manager.	Number	

1.4.3 vCloud Cell to vSphere Connections

This test reports the number of connections that the vCloud Director Cell being monitored has established currently with the vSphere servers managed by the vCenter server that has been attached to it.

Purpose	Reports the number of connections that the vCloud Director Cell being monitored has established currently with the vSphere servers managed by the vCenter server that has been attached to it
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **VCLOUD DIRECTOR USER** - Specify the name of the user with **Administrator** access to the target vCloud Director Cell. 5. **VCLOUD DIRECTOR PASS** - Enter the password of the specified **VCLOUD DIRECTOR USER**. 6. **CONFIRM PASSWORD** - Confirm the password by retyping it here. 7. **SSL** - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the **SSL** flag is set to **Yes** by default.		
Outputs of the test	One set of results for the vCloud Director Cell being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Current connections: Indicates the number of connections that the vCloud Director Cell has currently established with the vSphere servers.	Number	

1.4.4 vCloud Cell to LDAP Connections Test

Cloud Director supports LDAP integration for user authorization. You can use an LDAP service to provide a directory of users and groups to import into an organization. When an imported LDAP user logs in to vCloud Director, vCloud Director checks the credentials of the user against the LDAP directory. If the credentials are accepted, vCloud Director creates a user account and logs the user in to the system.

This test reports the number of connections that are currently established between the vCloud Director and the LDAP server.

Purpose	Reports the number of connections that the vCloud Director Cell being monitored has established currently with the vSphere servers managed by the vCenter server that has been attached to it
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **VCLOUD DIRECTOR USER** - Specify the name of the user with **Administrator** access to the target vCloud Director Cell. 5. **VCLOUD DIRECTOR PASS** - Enter the password of the specified **VCLOUD DIRECTOR USER**. 6. **CONFIRM PASSWORD** - Confirm the password by retyping it here. 7. **SSL** - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the **SSL** flag is set to **Yes** by default.		
Outputs of the test	One set of results for the vCloud Director Cell being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Current connections: Indicates the number of connections that the vCloud Director Cell has currently established with the LDAP server.	Number	

1.4.5 vCloud Web Incoming Connections

This test reports the number of currently established connections with the vCloud Director and the number of unique hosts that have established connections with the vCloud Director. This way, you can accurately judge the connection load on the vCloud Director Cell at any given point in time.

Purpose	Reports the number of currently established connections with the vCloud Director and the number of unique hosts that have established connections with the vCloud Director. This way, you can accurately judge the connection load on the vCloud Director Cell at any given point in time
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **VCLOUD DIRECTOR USER** - Specify the name of the user with **Administrator** access to the target vCloud Director Cell. 5. **VCLOUD DIRECTOR PASS** - Enter the password of the specified **VCLOUD DIRECTOR USER**. 6. **CONFIRM PASSWORD** - Confirm the password by retyping it here. 7. **SSL** - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the **SSL** flag is set to **Yes** by default.		
Outputs of the test	One set of results for the vCloud Director Cell being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Current connections: Indicates the total number of connections that are currently established with the vCloud Director.	Number	This is a good indicator of the connection load on the vCloud Director.
	Unique connections: Indicates the number of connections that are currently established by unique hosts accessing the vCloud Director.	Number	

1.4.6 vCloud Datastores Test

The vCloud Director relies heavily on vSphere datastores to provide provide storage for virtual machine files and other files necessary for virtual machine operations. Unavailability of a datastore or the lack of storage space in a datastore can severely hamper virtual machine operations and can consequently delay or suspend resource delivery by the vCloud Director. By keeping constant tabs on the availability and space usage by each datastore managed by the target vCloud Director Cell, this test proactively alerts you to potential space contentions on a datastore.

Purpose	Keeps constant tabs on the availability and space usage by each datastore managed by the target vCloud Director Cell and proactively alerts you to potential space

	contentions on a datastore		
Target of the test	A vCloud Director Cell		
Agent deploying the test	An internal/remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **VCLOUD DIRECTOR USER** - Specify the name of the user with **Administrator** access to the target vCloud Director Cell. 5. **VCLOUD DIRECTOR PASS** - Enter the password of the specified **VCLOUD DIRECTOR USER**. 6. **CONFIRM PASSWORD** - Confirm the password by retyping it here. 7. **SSL** - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the **SSL** flag is set to **Yes** by default.		
Outputs of the test	One set of results for each datastore managed by the vCloud Director Cell being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Physical disk capacity: Indicates the total capacity of this datastore.	GB	
	Used space: Indicates the amount of space that is currently used in this datastore.	GB	Ideally, the value of this measure should be low. Compare the value of this measure across datastores to know which datastore is utilizing the maximum storage space.
	Free space: Indicates the amount of space that is currently available for use in this datastore.	GB	A high value is desired for this measure. Compare the value of this measure across datastores to identify the datastore with the least free space.
	Physical disk space usage: Indicates the percentage of disk space in this datastore that is in use currently.	Percent	A consistent increase in the value of this measure count point to a space contention on a datastore.

	Allocated space: Indicates the amount of physical space provisioned by an administrator for this datastore i.e., the storage size upto which the files can be stacked in this datastore.	GB	
	Physical disk allocated space usage: Indicates the percentage of physical disk space that is provisioned for this datastore.	GB	If a datastore shows signs of a space drain, then, you may want to check the value of this measure for that datastore to know whether it is owing to improper space allocation to that datastore.
	Request space: Indicates the amount of space requested for the functioning of the vCloud Director VMs on this datastore.	GB	
	Requested space usage: Indicates the percentage of space requested for the functioning of the vCloud Director VMs on this datastore.	Percent	

	Is enabled? Indicates whether/not this datastore is enabled.		This measure reports a value **Yes** if the datastore is enabled with the vCloud Diirector, and a value **No** if the datastore is not enabled. The numeric values for the above mentioned states are represented in the table below: **State** / **Numeric Value**: Yes / 1; No / 0 **Note:** By default, this measure reports the above-mentioned **State**s while indicating whether this datastore is enabled with the vCloud Director or not. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.
	Is busy? Indicates whether/not this datastore is busy.		This measure reports a value **Yes** if the datastore is busy, and a value **No** if the datastore is not busy. The numeric values for the above mentioned states are represented in the table below: **State** / **Numeric Value**: Yes / 1; No / 0 **Note:** By default, this measure reports the above-mentioned **State**s while indicating whether this datastore is busy or not. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.

1.4.7 vCloud vCenter Status Test

The vCloud Director interacts with the vCenter server attached to it to abstract and pool the resources it manages. If the vCloud Director Cell is unable to connect to a vCenter server, or if the vCenter server is not enabled for use with the Cell, then, the Cell will not have access to any network, compute, or storage resources that can be pooled and provided for on-demand consumption to users. Using this test, you can be promptly alerted to connectivity issues between the vCloud Director Cell and vCenter and can also determine whether/not the vCenter server is enabled for use with the Cell.

Purpose	Promptly alerts you to connectivity issues between the vCloud Director Cell and vCenter and helps determine whether/not the vCenter server is enabled for use with the Cell		
Target of the test	A vCloud Director Cell		
Agent deploying the test	An internal/remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **VCLOUD DIRECTOR USER** - Specify the name of the user with **Administrator** access to the target vCloud Director Cell. 5. **VCLOUD DIRECTOR PASS** - Enter the password of the specified **VCLOUD DIRECTOR USER**. 6. **CONFIRM PASSWORD** - Confirm the password by retyping it here. 7. **SSL** - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the **SSL** flag is set to **Yes** by default.		
Outputs of the test	One set of results for each vCenter attached to the vCloud Director Cell being monitored		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

<table>
<tr>
<td>test</td>
<td>Is connected?:
Indicates whether/not the vCloud Director is currently connected to this vCenter server.</td>
<td></td>
<td>This measure reports the value Yes if the vCloud Director is connected to the vCenter server and the value No if the vCloud Director is not connected to vCenter.

The numeric values for the above mentioned states are represented in the table below:
<table><tr><th>State</th><th>Numeric Value</th></tr><tr><td>Yes</td><td>1</td></tr><tr><td>No</td><td>0</td></tr></table>
Note:
By default, this measure reports the above-mentioned States while indicating whether/not the vCloud Director is connected to the vCenter server. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.</td>
</tr>
<tr>
<td></td>
<td>Enabled:
Indicates whether/not this vCenter server is currently enabled for use with the vCloud Director Cell being monitored .</td>
<td></td>
<td>This measure reports the value Yes if the vCenter server is enabled, and the value No if the vCenter server is not enabled.
The numeric values for the above mentioned states are represented in the table below:
<table><tr><th>State</th><th>Numeric Value</th></tr><tr><td>Yes</td><td>1</td></tr><tr><td>No</td><td>0</td></tr></table>
Note:
By default, this measure reports the above-mentioned States while indicating whether/not the vCenter server is enabled. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.</td>
</tr>
<tr>
<td></td>
<td>Datastores in VC:
Indicates the number of datastores currently managed by this vCenter server.</td>
<td>Number</td>
<td></td>
</tr>
</table>

1.4.8 vSphere Host Status

For each vSphere host that is managed by the vCenter server attached to the vCloud Director Cell being monitored, this test reports the following:

- Whether/not the host is available;
- Whether the host is disabled/enabled;
- Whether the host is ready or not;
- Whether 'Host Spanning' is enabled on the host or not;

In addition, the test also indicates the CPU/memory capacity and usage of each host, so that you can make a fair assessment of the amount of resources that is available to the vCloud Director Cell for pooling.

Purpose	Reports the current status, resource capacity, and resource usage of each vSphere host that is managed by the vCenter server attached to the vCloud Director Cell being monitored		
Target of the test	A vCloud Director Cell		
Agent deploying the test	An internal/remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **VCLOUD DIRECTOR USER** - Specify the name of the user with **Administrator** access to the target vCloud Director Cell. 5. **VCLOUD DIRECTOR PASS** - Enter the password of the specified **VCLOUD DIRECTOR USER**. 6. **CONFIRM PASSWORD** - Confirm the password by retyping it here. 7. **SSL** - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the **SSL** flag is set to **Yes** by default.		
Outputs of the test	One set of results for each vSphere host that is managed by the vCenter server attached to the vCloud Director Cell being monitored		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

<table>
<tr>
<td>test</td>
<td>Is available?:
Indicates whether/not this vSphere host is currently available on the vCenter server.</td>
<td></td>
<td>This measure reports the value Yes if the vSphere host is available and the value No if it is unavailable.
The numeric values for the above mentioned states are represented in the table below:
<table><tr><th>State</th><th>Numeric Value</th></tr><tr><td>Yes</td><td>1</td></tr><tr><td>No</td><td>0</td></tr></table>
Note:
By default, this measure reports the above-mentioned States while indicating whether/not the vSphere host is available. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.</td>
</tr>
<tr>
<td></td>
<td>Is busy?:
Indicates whether/not this vSphere host is currently busy.</td>
<td></td>
<td>This measure reports the value Yes if the vSphere host is busy currently, and the value No if the vSphere host is free.
The numeric values for the above mentioned states are represented in the table below:
<table><tr><th>State</th><th>Numeric Value</th></tr><tr><td>Yes</td><td>1</td></tr><tr><td>No</td><td>0</td></tr></table>
Note:
By default, this measure reports the above-mentioned States while indicating whether/not the vSphere host is busy. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.</td>
</tr>
</table>

<table>
<tr>
<td></td>
<td>Enabled?:
Indicates whether/not this vSphere host is enabled.</td>
<td></td>
<td>You can disable a host to prevent vApps from starting up on the host. Virtual machines that are already running on the host are not affected.

This measure reports the value Yes if the vSphere host is currently enabled, and the value No if the vSphere host is disabled.

The numeric values for the above mentioned states are represented in the table below:

<table>
<tr><th>State</th><th>Numeric Value</th></tr>
<tr><td>Yes</td><td>1</td></tr>
<tr><td>No</td><td>0</td></tr>
</table>

Note:

By default, this measure reports the above-mentioned States while indicating whether/not the vSphere host is enabled. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.</td>
</tr>
</table>

<table>
<tr>
<td></td>
<td>Host Spanning Enabled?
Indicates whether/not host spanning is currently enabled on this host.</td>
<td></td>
<td>Host Spanning is a feature that enables the virtual machines in a configuration that uses fencing or virtual networks to be deployed on different ESX/ESXi hosts. When you deploy a configuration that uses Host Spanning, some of the virtual machines can get deployed to one ESX/ESXi host and some of the virtual machines can get deployed to a different host.

This measure reports the value Yes if host spanning is current enabled on the vSphere host, and the value No if it is not.

The numeric values for the above mentioned states are represented in the table below:

<table>
<tr><th>State</th><th>Numeric Value</th></tr>
<tr><td>Yes</td><td>1</td></tr>
<tr><td>No</td><td>0</td></tr>
</table>

Note:

By default, this measure reports the above-mentioned States while indicating whether/not the host spanning is enabled/disabled. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.</td>
</tr>
<tr>
<td></td>
<td>Is Ready?
Indicates whether/not this vSphere host is currently ready.</td>
<td></td>
<td>This measure reports the value Yes if the vSphere host is currently ready, and the value No if it is not.

The numeric values for the above mentioned states are represented in the table below:

<table>
<tr><th>State</th><th>Numeric Value</th></tr>
<tr><td>Yes</td><td>1</td></tr>
<tr><td>No</td><td>0</td></tr>
</table>

Note:

By default, this measure reports the above-mentioned States while indicating whether/not the vSphere host is ready. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.</td>
</tr>
</table>

	Total CPU: Indicates the total CPU capacity of this host.	Mhz	
	CPU cycles: Indicates the number of CPU cycles consumed by all processes that were executing on this host during the last measurement period.	Number	A high value is indicative of excessive CPU usage.
	CPU packages: Indicates the of CPU packages present in this vSphere host.	Number	
	Total Memory: Indicates the total memory capacity of this host.	MB	
	Used Memory: Indicates the amount of memory that is currently utilized by this host.	MB	A sudden or steady increase in the value of this measure is indicative of excessive memory usage by the host.

1.5 The Virtual Datacenters Layer

To determine the overall health, resource allocations, and resource usage of the Provider and Organization vDCs of a vCloud Director Cell, use the tests mapped to this layer.

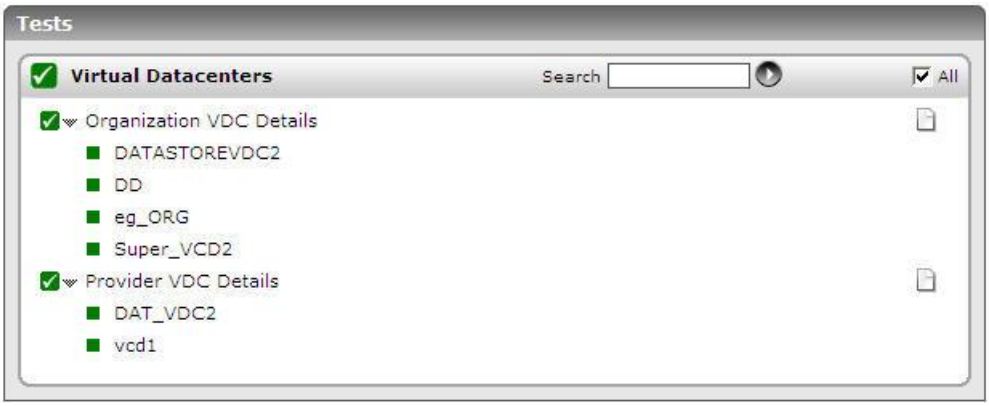

Figure 1.12: The tests mapped to the Virtual Datacenters layer

1.5.1 Organization VDC Details Test

An Organization vDC (Org vDC) is a subset or an allocation from the Provider vDC (PvDC). The resources that are provided by the PvDC are consumed by the Org vDC. Organization vDCs inherit the resource types - i.e., CPU, Memory and Storage types - from the Provider vDC. Whenever an Org vDC is created within vCloud Director, a Resource Pool is then subsequently created within vSphere under the PvDC Resource Pool (if mapped correctly should be created under the cluster or root resource pool).

This test reports the current status of each Org vDC on the vCloud Director, reveals the enabled and disabled ones, and indicates the resource allocation and resource usage of every Org vDC. This way, you can quickly identify those vDCs that contain resource-intensive VMs or vApps.

Purpose	Reports the current status of each Org vDC on the vCloud Director, reveals the enabled and disabled ones, and indicates the resource allocation and resource usage of every Org vDC. This way, you can quickly identify those vDCs that contain resource-intensive VMs or vApps		
Target of the test	A vCloud Director Cell		
Agent deploying the test	An internal/remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **VCLOUD DIRECTOR USER** - Specify the name of the user with **Administrator** access to the target vCloud Director Cell. 5. **VCLOUD DIRECTOR PASS** - Enter the password of the specified **VCLOUD DIRECTOR USER**. 6. **CONFIRM PASSWORD** - Confirm the password by retyping it here. 7. **SSL** - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the **SSL** flag is set to **Yes** by default.		
Outputs of the test	One set of results for each Org vDC		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

<table>
<tr>
<td>test</td>
<td>Status:
Indicates the current status of this organization vDC.</td>
<td></td>
<td>The values this measure can report and their numeric equivalents have been listed in the table below:
<table><tr><th>Measure Value</th><th>Numeric Value</th></tr><tr><td>Creation Failed</td><td>-1</td></tr><tr><td>Not ready</td><td>0</td></tr><tr><td>Ready</td><td>1</td></tr><tr><td>Unknown</td><td>2</td></tr><tr><td>Unrecognized status</td><td>3</td></tr></table>
Note:
By default, this measure reports the above-mentioned Measure Values while indicating the current status of an Org vDC. However, in the graph of this measure, the status will be represented using the corresponding numeric equivalents only.</td>
</tr>
<tr>
<td></td>
<td>Is Enabled?:
Indicates whether/not this Org vDC is currently enabled.</td>
<td></td>
<td>This measure reports the value Yes if the Org vDC is currently enabled, and the value No if it is disabled.
The numeric values for the above mentioned states are represented in the table below:
<table><tr><th>State</th><th>Numeric Value</th></tr><tr><td>Yes</td><td>1</td></tr><tr><td>No</td><td>0</td></tr></table>
Note:
By default, this measure reports the above-mentioned States while indicating whether/not the Org vDC is enabled. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.</td>
</tr>
<tr>
<td></td>
<td>Vms in vDC:
Indicates the number of VMs that are currently using this Org vDC.</td>
<td>Number</td>
<td></td>
</tr>
</table>

	vApps in vDC Indicates the number of vApps that are currently using this Org vDC.	Number	
	CPU used: Indicates the amount of CPU that is currently in use in this organization vDC.	Mhz	A very high value for these measures indicates the excessive usage of an Org vDC by VMs and vApps. Compare the value of this measure to isolate the CPU-hungry Org vDCs.
	CPU Used Percentage: Indicates the percentage of CPU resources in this org VDC that is currently in use.	Percent	
	CPU Limit: Indicates the maximum CPU resource that is allocated for this organization vDC.	Mhz	
	CPU Allocated: Indicates the amount of CPU of this organization vDC that is allocated to the VMS.	Mhz	
	CPU Overhead: Indicates the CPU units that are allocated to the vShield Manager for connecting to the VMs that are running within this Org vDC.	Mhz	
	Memory Used: Indicates the amount of memory that currently in use in this Org vDC.	MB	A very high value for this measure indicates the excessive usage of the memory resources in an Org vDC by VMs and vApps. Compare the value of this measure to isolate the memory-hungry Org vDCs.

	Memory Limit: Indicates the maximum memory resource that is allocated for this organization vDC.	MB	
	Memory Used Percentage: Indicates the percentage of memory that is currently used in this organization vDC.	Percent	A very high value for this measure indicates the excessive usage of the memory resources in an Org vDC by VMs and vApps. Compare the value of this measure to isolate the memory-hungry Org vDCs.
	Memory Allocated: Indicates the amount of memory that is allocated to the VMs from this organization vDC.	MB	
	Memory Overhead: Indicates the amount of memory that is allocated to the vShield Manager for connecting the VMs to this organization vDC.	MB	
	Storage Used: Indicates the amount of storage space that is currently in use in this org vDC.	GB	A very high value for this measure indicates the excessive usage of the storage space in an Org vDC by VMs and vApps. Compare the value of this measure to isolate the Org vDCs that could potentially require more space.
	Storage Limit: Indicates the maximum storage space that is allocated to this organization vDC.	GB	

	Storage Used Percentage: Indicates the percentage of storage that is currently used in this organization vDC.	Percent	A very high value for this measure indicates the excessive usage of the storage space in an Org vDC by VMs and vApps. Compare the value of this measure to isolate the Org vDCs that could potentially require more space.
	Storage Allocated: Indicates the amount of storage units of this organization vDC that are allocated to the VMs.	GB	
	Storage Overhead: Indicates the amount of storage that is allocated to the vShield Manager for connecting the VMs to this organization vDC.	GB	

1.5.2 Provider VDC Details Test

A Provider vDC (PvDC) is used to provide a single type of compute resources and a single type of storage resources. PvDCs are created for segmenting resources based on resource characteristics. A PvDC can be used to define availability and SLAs based around performance. These are then mapped back to a cluster or resource pool at the vSphere layer.

This test reports the compute capacity and storage capacity of the provider virtual DataCenters (provider vDCs) connecting to the vCloud Director. Also, this test throws light on the status of the provider vDC, verifies whether this provider vDC is enabled/not, and also periodically checks whether the compute capacity of the provider vDC is capable of growing/shrinking based on demand.

Purpose	Reports the compute capacity and storage capacity of the provider virtual DataCenters (provider vDCs) connecting to the vCloud Director. Also, this test throws light on the status of the provider vDC, verifies whether this provider vDC is enabled/not, and also periodically checks whether the compute capacity of the provider vDC is capable of growing/shrinking based on demand.
Target of the test	A vCloud Director Cell
Agent deploying the	An internal/remote agent

test			
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The host for which the test is being configured 3. **PORT** - Specify the port at which the specified **HOST** listens in the **PORT** text box. By default, this is *NULL*. 4. **VCLOUD DIRECTOR USER** - Specify the name of the user with **Administrator** access to the target vCloud Director Cell. 5. **VCLOUD DIRECTOR PASS** - Enter the password of the specified **VCLOUD DIRECTOR USER**. 6. **CONFIRM PASSWORD** - Confirm the password by retyping it here. 7. **SSL** - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the **SSL** flag is set to **Yes** by default. 8. **DETAILED DIAGNOSIS** - To make diagnosis more efficient and accurate, the eG system embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option against **DETAILED DIAGNOSIS**. To disable the capability, click on the **Off** option. The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled: ➢ The eG manager license should allow the detailed diagnosis capability. ➢ Both the bad and normal frequencies configured for the detailed diagnosis measures should not be 0.		
Outputs of the test	One set of results for each Provider vDC		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

<table>
<tr>
<td>test</td>
<td>Status:
Indicates the current status of this provider vDC.</td>
<td></td>
<td>The values this measure can report and their numeric equivalents have been listed in the table below:
<table><tr><th>Measure Value</th><th>Numeric Value</th></tr><tr><td>Creation Failed</td><td>-1</td></tr><tr><td>Not ready</td><td>0</td></tr><tr><td>Ready</td><td>1</td></tr><tr><td>Unknown</td><td>2</td></tr><tr><td>Unrecognized status</td><td>3</td></tr></table>
Note:
By default, this measure reports the above-mentioned Measure Values while indicating the current status of a provider vDC. However, in the graph of this measure, the status will be represented using the corresponding numeric equivalents only.</td>
</tr>
</table>

	Is Elastic? Indicates whether/not this provider vDC is elastic.		An Elastic vDC allows you to add more resources to a Provider vDC when they become consumed/constrained. This only works with the *Pay-as-you-go Allocation model*. When you opt for this model, it implies that you have little knowledge as a provider on how many VMs will be deployed. Potentially, there is the possibility that all your resources will be consumed, and your consumers will not be able to deploy any more workloads. This is where Elastic vDCs come in, as it allows you to add more resources to a PvDC on the fly. This measure reports the value **Yes** if the provider vDC is elastic, and the value **No** if it is not. The numeric values for the above mentioned states are represented in the table below: **State** / **Numeric Value** Yes / 1 No / 0 **Note:** By default, this measure reports the above-mentioned **State**s while indicating whether/not the provider vDC is elastic or not. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.

<table>
<tr>
<td></td>
<td>Is HA?:
Indicates whether/not the vSphere cluster from which this provider vDC derives its resources is an HA-enabled cluster.</td>
<td></td>
<td>This measure reports the value Yes if the vSphere cluster mapped to the Provider vDC is HA-enabled, and the value No if it is not.
The numeric values for the above mentioned states are represented in the table below:
<table><tr><th>State</th><th>Numeric Value</th></tr><tr><td>Yes</td><td>1</td></tr><tr><td>No</td><td>0</td></tr></table>
Note:
By default, this measure reports the above-mentioned States while indicating whether/not the vSphere cluster mapped to a provider vDC is HA-enabled. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.</td>
</tr>
<tr>
<td></td>
<td>Is Enabled?:
Indicates whether/not this provider vDC is currently enabled with the vCloud Director.</td>
<td></td>
<td>This measure reports the value Yes if the provider vDC is currently enabled, and the value No if it is disabled.
The numeric values for the above mentioned states are represented in the table below:
<table><tr><th>State</th><th>Numeric Value</th></tr><tr><td>Yes</td><td>1</td></tr><tr><td>No</td><td>0</td></tr></table>
Note:
By default, this measure reports the above-mentioned States while indicating whether/not the provider vDC is enabled. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.</td>
</tr>
<tr>
<td></td>
<td>Datastores in PvDC:
Indicates the number of datastores in this pVDC.</td>
<td>Number</td>
<td>Use the detailed diagnosis of this measure to know which datastores are mapped to this pVDC.</td>
</tr>
</table>

	Organization vDC: Indicates the number of organization vDCs provisioned from this pVDC.	Number	The detailed diagnosis of this measure lists out the names of the organization vDCs that are provisioned from this provider vDC.
	Total CPU: Indicates the CPU units that are allocated for consumption in this provider vDC.	Mhz	
	CPU used: Indicates the CPU that is currently in use in this provider vDC.	Mhz	A very high value for these measures indicates the excessive usage of a pVDC by the org vDCs that are mapped to it. Compare the value of this measure to isolate the CPU-hungry pvDCs.
	CPU Used Percentage: Indicates the percentage of CPU resources in this pVDC that is currently in use.	Percent	
	CPU Allocation: Indicates the CPU units that are currently allocated to the Org vDCs mapped to this pVDC.	Mhz	The detailed diagnosis of this measure lists out the Organization, Organization vDC and the CPU allocated to each of the Organization vDC.
	CPU Allocation Percentage: Indicates the percentage of CPU resources of this pVDC that is allocated to the Org vDCs mapped to it.	Percentage	
	CPU Overhead: Indicates the CPU units that are allocated to the vShield Manager for connecting to the VMs that are provisioned from this provider vDC.	Mhz	

	Total Memory: Indicates the maximum amount of memory that is allocated for consumption in this provider vDC.	MB	
	Memory Used: Indicates the amount of memory that currently in use in this pvDC.	MB	A very high value for these measures indicates the excessive usage of the memory resources in a pvDC by the Org vDCs mapped to it. Compare the value of each of these measures across pvDCs to isolate the memory-hungry pvDCs.
	Memory Used Percentage: Indicates the percentage of memory that is currently used in this pvDC.	Percent	
	Memory Allocated: Indicates the amount of memory that is currently allocated to the Org vDCs mapped to this pVDC.	MB	The detailed diagnosis of the this measure lists the org vDCs mapped to a provider vDC, the organization to which each org vDC belongs, and the amount of memory allocated to every org vDC.
	Memory Allocation Percentage: Indicates the percentage of memory in this pVDC that is currently allocated to the Org vDCs mapped to it.		
	Memory Overhead: Indicates the percentage of memory that is allocated to the vShield Manager for connecting to the VMs that are provisioned from this provider vDC.	Percent	

	Total Storage: Indicates the maximum number of storage units that are allocated for consumption in this provider vDC.	GB	
	Storage Used: Indicates the amount of storage space that is currently in use in this pvDC.	GB	A very high value for this measure indicates the excessive usage of the storage space in an pVDC by the Org vDCs mapped to it. Compare the value of this measure to isolate the pvDCs that could potentially require more space.
	Storage Used Percentage: Indicates the percentage of storage that is currently used in this pvDC.	Percent	
	Storage Allocated: Indicates the amount of storage units currently allocated to the Org vDCs mapped to this pvDC.	GB	The detailed diagnosis of the *Storage Allocated* measure lists the org vDCs mapped to a provider vDC, the organization to which each org vDC belongs, and the amount of storage space allocated to every org vDC.
	Storage Allocation Percentage: Indicates the percentage of storage that is currently allocated to the org vDCs mapped to this pvDC.	Percent	
	Storage Overhead: Indicates the amount of memory that is allocated to the vShield Manager for connecting to the VMs that are provisioned from this provider vDC.	GB	

The detailed diagnosis of the *Datastores in pVDC* measure displays the names of datastores that are mapped to a particular pvDC.

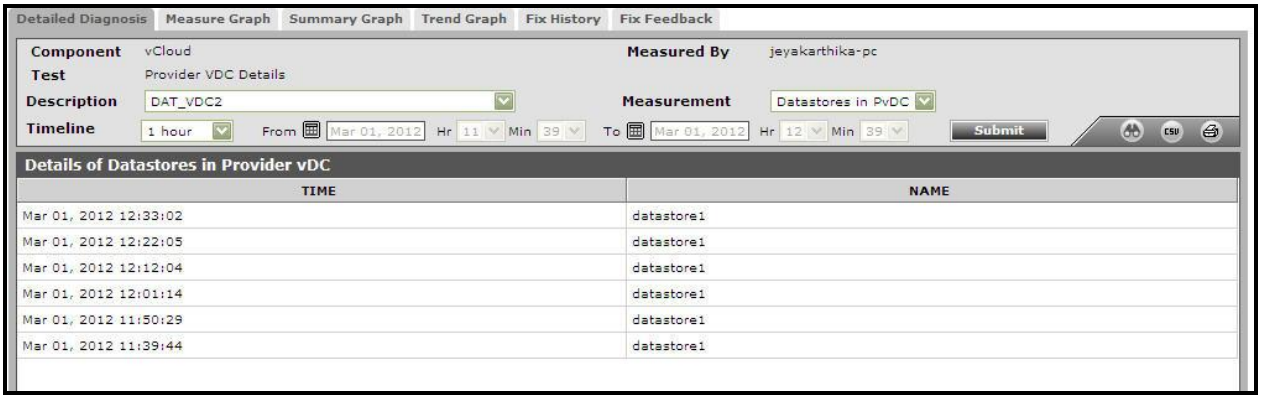

Figure 1.13: The detailed diagnosis of the Datastores in pVDC measure

The detailed diagnosis of the *Organization vDC* measure reports the names of organization vDCs that are mapped to a particular vDC.

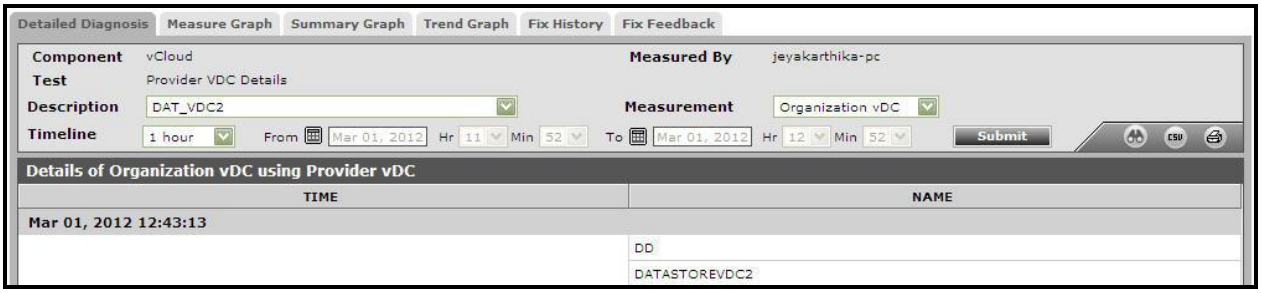

Figure 1.14: The detailed diagnosis of the Organization vDC measure

The detailed diagnosis of the *CPU Allocation* measure lists the org vDCs mapped to a provider vDC, the organization to which each org vDC belongs, and the CPU allocated (in MHz) to every org vDC.

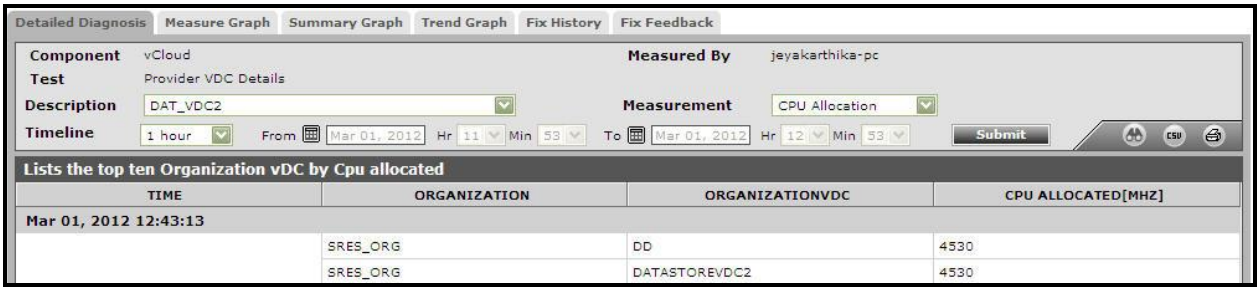

Figure 1.15: The detailed diagnosis of the CPU Allocation measure

The detailed diagnosis of the *Memory Allocated* measure lists the org vDCs mapped to a provider vDC, the organization to which each org vDC belongs, and the amount of memory allocated to every org vDC.

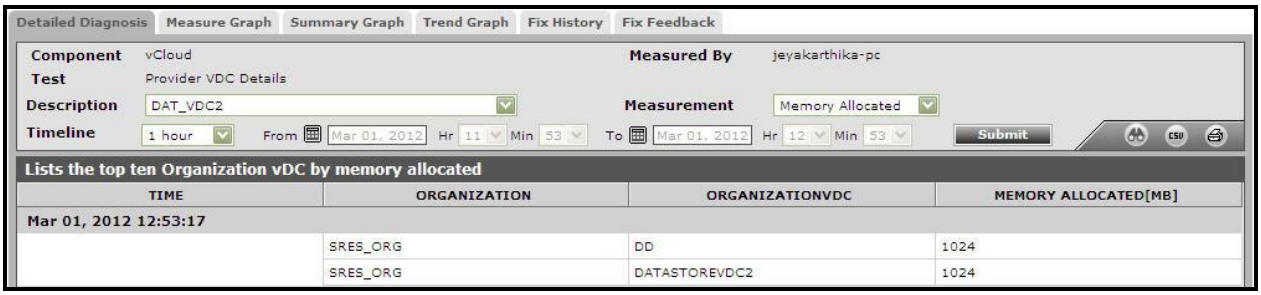

Figure 1.16: The detailed diagnosis of the Memory Allocated measure

The detailed diagnosis of the *Storage Allocated* measure lists the org vDCs mapped to a provider vDC, the organization to which each org vDC belongs, and the amount of storage space allocated to every org vDC.

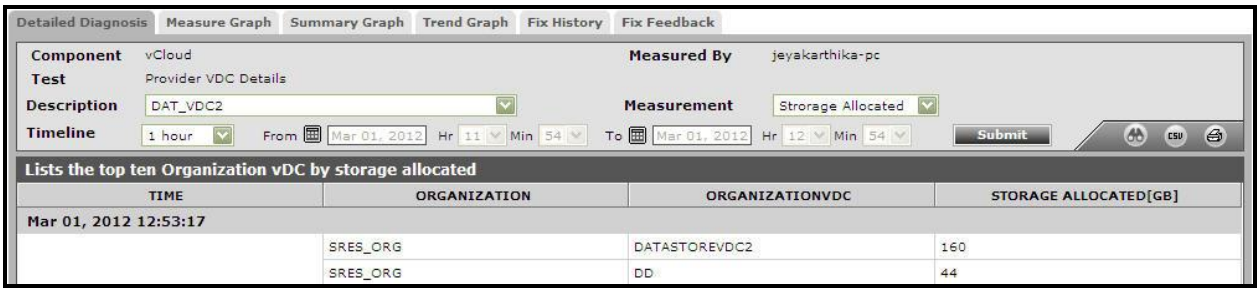

Figure 1.17: The detailed diagnosis of the Storage Allocated measure

1.6 The Organizations Layer

The tests mapped to this layer reveal the following:

- The current status, composition, resource allocations, and resource usage of the organizations configured on the vCloud Director Cell;
- The current status of tasks executing on each organization.

Figure 1.18: The tests mapped to the Organizations layer

1.6.1 Organization Details

An Organization is the fundamental vCloud Director grouping that contains users, the vApps that they create, and the resources the vApps use. It is a top-level container in a cloud that contains one or more Organization Virtual Data Centers (Org vDCs) and Catalog entities. It owns all the virtual resources for a cloud instance and can have many Org vDCs.

This test reports the status of each organization configured on a vCloud Director Cell, the composition of every organization, the total resource capacity of the individual organizations, and the powered-on status of the VMs in the organizations.

Purpose	Reports the status of each organization configured on a vCloud Director Cell, the composition of every organization, the total resource capacity of the individual organizations, and the powered-on status of the VMs in the organizations
Target of the test	A vCloud Director Cell
Agent deploying the test	An internal/remote agent

<table>
<tr><td>Configurable parameters for the test</td><td colspan="3">1. TEST PERIOD - How often should the test be executed
2. HOST – The host for which the test is being configured
3. PORT - Specify the port at which the specified HOST listens in the PORT text box. By default, this is NULL.
4. VCLOUD DIRECTOR USER - Specify the name of the user with Administrator access to the target vCloud Director Cell.
5. VCLOUD DIRECTOR PASS - Enter the password of the specified VCLOUD DIRECTOR USER.
6. CONFIRM PASSWORD - Confirm the password by retyping it here.
7. SSL - By default, the vCloud Director Cell is SSL-enabled. Accordingly, the SSL flag is set to Yes by default.
8. DETAILED DIAGNOSIS - To make diagnosis more efficient and accurate, the eG system embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the On option against DETAILED DIAGNOSIS. To disable the capability, click on the Off option.
The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled:
➢ The eG manager license should allow the detailed diagnosis capability.
➢ Both the bad and normal frequencies configured for the detailed diagnosis measures should not be 0.</td></tr>
<tr><td>Outputs of the test</td><td colspan="3">One set of results for each organization</td></tr>
<tr><td rowspan="2">Measurements made by the test</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
<tr><td>Is Enabled?:
Indicates whether/not this organization is enabled to communicate with the vCloud Director.</td><td></td><td>This measure reports the value Yes if the organization is currently enabled, and the value No if it is disabled.
The numeric values for the above mentioned states are represented in the table below:
<table><tr><th>State</th><th>Numeric Value</th></tr><tr><td>Yes</td><td>1</td></tr><tr><td>No</td><td>0</td></tr></table>
Note:
By default, this measure reports the above-mentioned States while indicating whether/not the organization is enabled. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.</td></tr>
</table>

<table>
<tr>
<td></td>
<td>Can publish catalogs?
Indicates whether/not this organization is allowed to publish catalogs in the vCloud Director.</td>
<td></td>
<td>Organizations use catalogs to store vApp templates and media files. The members of an organization that have access to a catalog can use the catalog's vApp templates and media files to create their own vApps. A system administrator can allow an organization to publish a catalog to make it available to other organizations. Organizations administrators can then choose which catalog items to provide to their users.

This measure reports the value Yes if the organization is allowed to publish catalogs, and the value No if it is not.

The numeric values for the above mentioned states are represented in the table below:

<table>
<tr><th>State</th><th>Numeric Value</th></tr>
<tr><td>Yes</td><td>1</td></tr>
<tr><td>No</td><td>0</td></tr>
</table>

Note:

By default, this measure reports the above-mentioned States while indicating whether/not the an organization is authorized to publish catalogs. However, in the graph of this measure, states will be represented using their corresponding numeric equivalents only.</td>
</tr>
<tr>
<td></td>
<td>Deployed Vm Quota:
Indicates the maximum number of VMs that can be deployed simultaneously by a user of this organization.</td>
<td>Number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stored Vm Quota:
Indicates the maximum number of vApps or vApp templates that can be stored by a user of this organization in an undeployed state.</td>
<td>Number</td>
<td></td>
</tr>
</table>

	Provider vDC: Indicates the number of provider vDCs currently present in this organization.	Number	The detailed diagnosis of this measure lists out the names of the provider vDCs present connected to this organization.
	Organization vDC: Indicates the number of organization vDCs currently present in this organization.	Number	The detailed diagnosis of this measure lists out the names of the organization vDCs that are present in this organization.
	Catalogs: Indicates the number of catalogs present in this organization.	Number	Organizations use catalogs to store vApp templates and media files. The members of an organization that have access to a catalog can use the catalog's vApp templates and media files to create their own vApps. A system administrator can allow an organization to publish a catalog to make it available to other organizations. Organizations administrators can then choose which catalog items to provide to their users.
	vApps: Indicates the number of vApps currently present in this organization.	Number	A vApp is a virtual system that contains one or more individual virtual machines, along with parameters that define operational details.
	Registered Users: Indicates the number of users registered with this organization.	Number	
	VMs in Organization: Indicates the number of VMs that are functioning using this organization.	Number	
	VMs powered on: Indicates the number of VMs that are currently powered on in this organization.	Number	

	VMs powered off: Indicates the number of VMs that are currently powered off in this organization.	Number	
	VMs suspended: Indicates the number of VMs that are currently suspended in this organization.	Number	
	Total number of CPUs used by VMs: Indicates the total number of CPU units that are used by the VMs of this organization.	Number	
	Number of CPUs used by powered on VMs: Indicates the number of CPU units used by the powered on VMs in this organization.	Number	By comparing the value of this measure with the value of the *Total number of CPUs used by VMs* measure for an organization, you can figure out which VMs are utilizing the CPU resources available to that organization excessively - the powered on VMs? or the powered off VMs?
	Total memory allocated to VMs: Indicates the total amount of memory allocated to the VMs of this organization.	MB	
	Memory allocated to powered on VMs: Indicates the amount of memory allocated to the powered on VMs in this organization.	MB	By comparing the value of this measure with the value of the *Total memory allocated to VMs* measure for an organization, you can figure out which VMs are hogging the memory resources available to the organization - the powered on VMs? or the powered off VMs?

	Total storage space used by VMs: Indicates the total storage space used by the VMs in this organization.	GB	

The detailed diagnosis of the *Organization vDC* measure lists the names of the Org vDCs that a particular organization contains.

Figure 1.19: : The detailed diagnosis of the Organization vDC measure

The detailed diagnosis of the *Registered users* measure lists the names of the users who are registered with a particular organization.

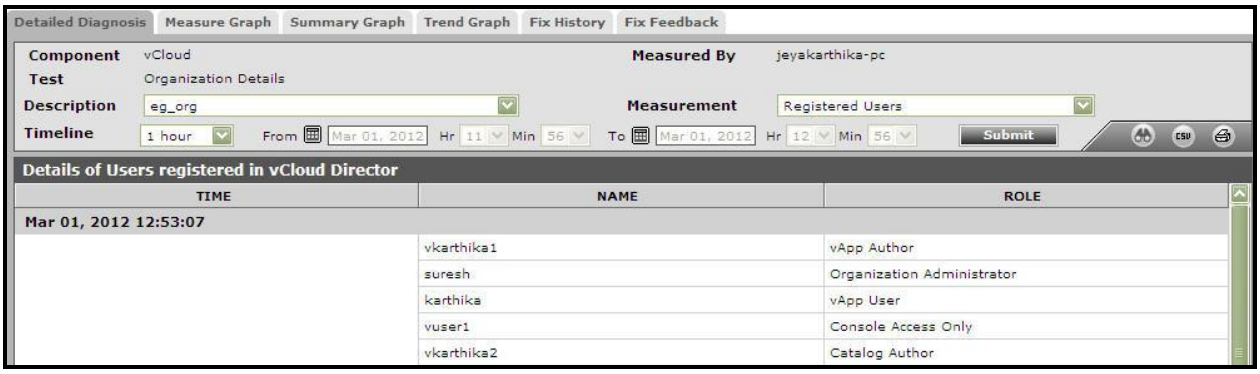

Figure 1.20: The detailed diagnosis of the Registered Users measure

The detailed diagnosis of the *vApps* measure lists the names of the vApps that a particular organization contains.

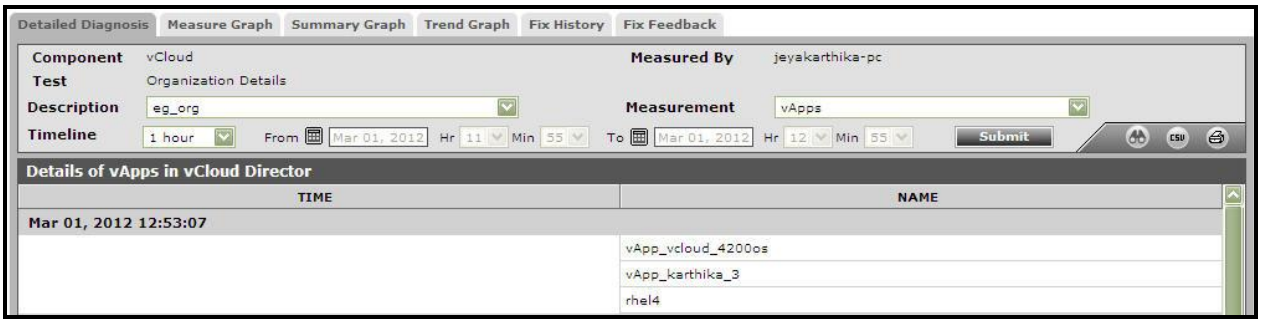

Figure 1.21: The detailed diagnosis of the vApps measure

The detailed diagnosis of the *VMs powered off* measure lists the name, IP address, operating system, CPU, memory, and disk capacity of each powered off VM in an organization.

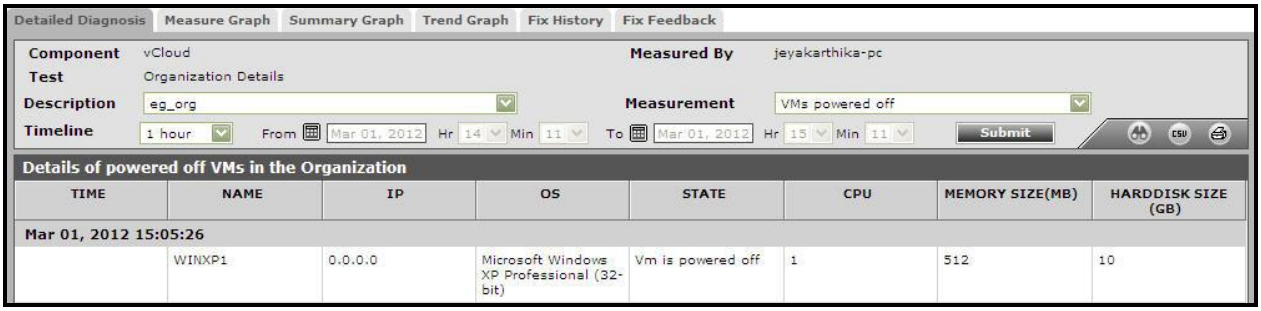

Figure 1.22: The detailed diagnosis of the VMs powered off measure

The detailed diagnosis of the *VMs suspended* measure lists the name, IP address, operating system, CPU, memory, and disk capacity of each suspended VM in an organization.

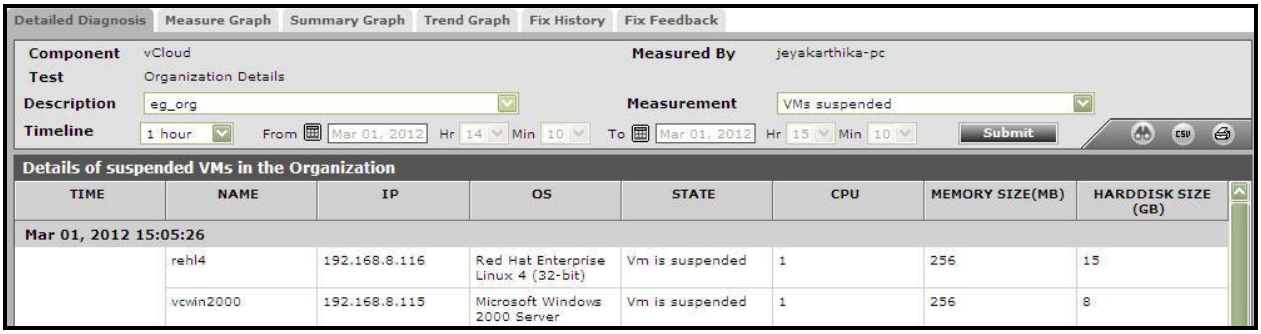

Figure 1.23: The detailed diagnosis of the VMs suspended measure

1.6.2 vCloud Organization Tasks

For each vCloud organization, this test reports the number and names of tasks that completed successfully and failed, reveals the tasks that are taking too long to complete, and turns the spotlight on the outstanding tasks.

<table>
<tr><td>Purpose</td><td colspan="3">Reports the number and names of tasks that completed successfully and failed, reveals the tasks that are taking too long to complete, and turns the spotlight on the outstanding tasks</td></tr>
<tr><td>Target of the test</td><td colspan="3">A vCloud Director Cell</td></tr>
<tr><td>Agent deploying the test</td><td colspan="3">An internal/remote agent</td></tr>
<tr><td>Configurable parameters for the test</td><td colspan="3">1. TEST PERIOD - How often should the test be executed
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<tr><td>Outputs of the test</td><td colspan="3">One set of results for each organization</td></tr>
<tr><td rowspan="2">Measurements made by the test</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
<tr><td>Started tasks:
Indicates the number of tasks started during the last measurement period.</td><td>Number</td><td></td></tr>
</table>

	Completed tasks: Indicates the number of tasks that were completed during the last measurement period.	Number	
	Canceled tasks: Indicates the number of tasks that were cancelled during the last measurement period.	Number	
	Successful tasks: Indicates the number of tasks that were successfully completed during the last measurement period.	Number	Use the detailed diagnosis of this measure to view the tasks that were successfully completed.
	Failed tasks: Indicates the number of tasks that failed during the last measurement period.	Number	Use the detailed diagnosis of this measure to view the tasks that failed.
	Percent of failures: Indicates the poercentage of tasks that failed to execute.	Percent	Ideally, this value should be low. A high value would require an investigation.
	Avg. completion time: Indicates the average time taken by the tasks to complete the execution in this organization.	Secs	Ideally, this value should be low.

	Max completion time: Indicates the maximum time taken by the tasks in this organization to complete execution.	Secs	
	Outstanding tasks: Indicates the number of outstanding tasks in this organization during this measurement period.	Number	A large number of outstanding tasks could indicate a bottleneck. Use the detailed diagnosis of this measure to know which are the outstanding tasks.

Chapter 2

Conclusion

This document has clearly explained how eG Enterprise monitors the vCloud Director Cell. For more information on eG Enterprise, please visit our web site at www.eginnovations.com or write to us at sales@eginnovations.com.