

VMware

vCloud Air Testing Process for the VMware Ready Program

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Preface

This document outlines the steps required to test a specific application, as a step towards achieving VMware Ready status for that product. Its assumed that a VMware partner will be leading this testing, and that they are already a member of TAP, the Technical Alliance Program at VMware. General program guidelines for TAP and VMware are largely on-line, and outside of the scope of this document.

VMware Ready status helps identify products that have been specifically tested for use on VMware platforms, and as such provide added confidence to customers who are considering adopting those applications. However, the scope of such testing is limited by practical considerations, and the logo is no guarantee of functionality or performance, and it is recommended that vendors of VMware Ready applications perform rigorous performance and QA testing on VMware platforms, as they would before releasing their product on other platforms.

Summary

The following testing process focuses on how to get an application into a vCloud Air environment, how to make it externally accessible in that vCloud Air environment, and how to do load testing against the application in that environment. As such, it is assumed that the vendor performing is using a product that is generally available today, supported on vSphere deployments. It is also assumed that the vendor has basic hands-on skills with both vSphere and the vCloud Suite. Having engineers that are certified on these products is recommended.

This testing will include a simple load testing step, to ensure that the sizing and configuration of the application is reasonable for use in a vCloud Air configuration. We therefore assume the tester will have access to a load driver that drives load that is similar to what a real user might do with the product. In some cases this load driver could be a simple script or command line that initiates a batch operation, but more likely it will be based on a tool that allows simulation of on-line users, such as HP LoadRunner or the open source tool JMeter. Construction of new load tests is a labor intensive effort, and is outside of the scope of this testing, but it is assumed that vendors would already have a load driver to ensure they understand the performance of their products before they release them.

A vCloud Air environment will be provided to the tester for a short period (known as the on-line testing phase), during which the testing outlined below will be completed. Getting access to a vCloud Air environment for a longer period may be useful for a vendor interested in this program, but that is outside of the scope of this testing process – the below testing will take place within a 2 or 3 hour period on a loaner vCloud Air configuration that will be provided. At the completion of this testing cycle, it will be determined if the testing was a success or not, and if not, specific recommendations will be made to the partner on what to improve before the next testing attempt. After 3 such testing cycles, if the product is still not passing the tests, then testing will be assumed complete and the application will not have achieved the VMware Ready logo.

The general process of certification is a follows:



- 1. Partner creates appropriate vApp of the application to be tested, and provides it to the certification team (existing vApps may also be used)
- 2. Certification team and partner meet on via on-line collaboration tools (e.g. webex) to perform on-line testing phase.
- 3. Certification team and partner collaborate to deploy and license application from the vCloud Air service catalog, and then make it externally accessible by setting up appropriate networking and firewall configuration.
- 4. Partner drives load against deployed application and certification team gathers metrics to understand the capacity and performance of the vApp.
- 5. Certification team determines if the certification was successful and notifies partner.

Prerequisites

The minimum prerequisites for this testing are as follows: 1) a stable product that is in general availability and that is current supported to be run on vSphere, 2) a load driver or batch load that can drive the product to a reasonable CPU utilization, and that simulates a typical use of the product in production use, 3) TAP membership for the partner submitting the application for VMware Ready status for the application. It is also highly recommended that the vendor of the application have staff that has appropriate VMware certifications, such as VMware Certified Professional status. The tester will need to create a vApp or Virtual Appliance for the application under test (note: we use the terms vApp and Virtual Appliance interchangeably in this document, but generally a Virtual Appliance is one VM, which a vApp contains multiple VMs). Once the certification team has access to this virtual appliance, the online portion of the certification testing can take place.

vApp Creation, Upload and Deployment

The following sections provide guidance on how to create your vApp, how to upload it into a vCloud Air environment, and how to deploy it and configure it in that environment. It is the testers' responsibility to build such a vApp before the on-line certification process begins, as per the directions below. If the tester already has such a vApp, they may simply provide that for the on-line testing, but they should ensure that the below checklist is adhered to for that vApp. A vApp template uploaded to vCloud Air's service catalog is a definition of the applications virtual machine requirements, a snapshot of the default vanilla state of the application upon deployment and additional installers or configuration files to help the application run post deployment procedures in cloud.

vCloud Air uses OVF/OVA as its primary standard for upload of vApp templates in the service catalog. Below are some of the key points/checklist to remember while building a vApp/Virtual machine



template. There are multiple ways to create a vApp template, however creating templates using vCenter server is suggested.

Checklist for building virtual machine templates:

- 1. The template must be in OVF/OVA format and should not have any residue IP/MAC addresses or static configuration attached to it. Using 'convert to template' feature in vCenter server ensures the static configuration content is overwritten
- 2. Create a virtual machine with default reservation, shares and limits
- 3. Use hardware version 7, 8 or 9 while building the virtual machine template. If using vCenter server 5.x and above the virtual machine template is automatically set to the highest hardware version available
- 4. Install latest VMware tools
- 5. Check if the Virtual Appliance's operating System is listed in the supported OS list, the current list is here, http://pubs.vmware.com/guestnotes/

Creating Virtual machine template using vCenter server

Using vCenter server to creation your vApp or Virtual machine is the recommended approach, as it doesn't require larger install steps such as vCloud Director. However, existing vApps created through other mechanisms (e.g. VMware Studio or vCloud Director) may also be acceptable, if they fit the specified criteria.

1. Log in to vCenter Server, version 5.x, select a cluster/datacenter, Click File->New->vApp



2. Give it a recognizable name, this will be the name that will be used in vCloud Air service catalog, please name it appropriately.

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3. On the resource Allocation tab, leave the resources to Normal shares with no reservation or Limits applied. These sections are overwritten during vApp upload on vCloud Air

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4. Confirm selections and Click Finish

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5. Right click the newly created vApp from the inventory list, click add a virtual machine validation-dhcp22b - vSphere Client

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6. Create new Virtual Machine window pops up, select, 'Typical' radio button for configuration

Create New Virtual Machine	
Configuration Select the configuration fo	Virtual Machine Version: 8 or the virtual machine
Configuration Name and Location Storage Guest Operating System Network	Configuration
Create a Disk Ready to Complete	 Custom Create a virtual machine with additional devices or specific configuration options.
Help	< Back Next > Cancel

7. Give the Virtual machine Name, the name of the virtual machine should be meaning full, since the virtual machines created using this template will also follow the naming convention mentioned here. Add Storage information, The OS, Network and click complete, if ready. While selecting Network, Please use 'VMXNET3'. Add disk information according to your vApp requirements.

Create New Virtual Machin	
Name and Location Specify a name and loca	tion for this virtual machine Virtual Machine Version: 8
Configuration Name and Location Storage Guest Operating System Network Create a Disk Ready to Complete	Name: Web_Server Virtual machine (VM) names may contain up to 80 characters and they must be unique within each vCenter Server VM folder.
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Network Which network connection	s will be used by the virtual machine?	Virtual Machine Version: 8
Configuration Name and Location Storage Guest Operating System Network Create a Disk Ready to Complete	Create Network Connections How many NICs do you want to connect? Network IC 1: VM Network If supported by this virtual machine version, more than 4 N virtual machine is created, via its Edit Settings dialog. Adapter choice can affect both networking performance and m the VMware KnowledgeBase for more information on choosin supported for various guest operating systems and hosts.	Connect at Adapter Power On VMXNET 3 ICs can be added after the nigration compatibility. Consult Ig among the network adapters
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Create a Disk

Specify the virtual disk size and provisioning policy

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Virtual Machine Version: 8

Ready to Complete Click Finish to start a task	k that will create the new virtual mad	Virtual Machine Versio
Configuration Name and Location Storage Guest Operating System Network Create a Disk Ready to Complete	Settings for the new virtual mac Name: Host/Cluster: Resource Pool: Datastore: Guest OS: NICs: NIC 1 Network: NIC 1 Type: Disk provisioning: Virtual Disk Size:	hine: Web_Server cmf-cluster vchs_app_template Debian GNU/Linux 6 (64-bit) 1 VM Network VMXNET 3 Thin Provision 16 GB
	Edit the virtual machine sett Creation of the virtual mac system. Install a guest OS	ings before completion hine (VM) does not include automatic installation of the guest operating on the VM after creating the VM.

9. At this point, the first virtual machine for the Virtual applinace has been defined, if your application needs more virtual machined to be added please repeat the procedure to add a new virtual machine to the vApp. Else power ON the vApp, connect the Operating System ISO via USB/host ISO and proceed to install the OS and application



10. After the OS and application had been installed, go ahead and install VMware Tools , hot to install VMware tools:

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https://www.vmware.com/support/ws55/doc/ws_newguest_tools_linux.html#wp1127214



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	312 v 	/chs_ar	p_templat Server	e					VMware Tools: IP Addresses	Running (Current)

- 11. Configure Custom OVF properties:
 - a. In case you would like to identify an custom OVF properties, add it after powering off the vApp, start orders etc.

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12. Export the vApp Template, Select the vApp, File -> Export , click OVA as the format

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Directory:				
Format:	Single file (OVA)			
Description:	Single file (OVA)			
Help	1		OK	Cancel
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Close thi	s dialog when completed	el		

Uploading vApp template in vCloud Air service catalog

The Partner will upload the vApp based on the upload instructions provided by the certification team, the certification team will upload the vApp template into the service catalog using the below steps.



Login to your vCloud Air Public cloud instance with the user credential provided to you, https://vCloud Air.vcloud .com, upon landing on the dash board, select US-Nevada as your Cloud region from the drop down list on the top of the page

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	0	20-162 Service ID: 20-162 Type: Shared Cloud	1 VDCs	CPU Purchased: 10000 MHz, Allocated: 10000 MHz E Purchased: 20 GB, Allocated: 20 GB Purchased: 2.0 TB, Allocated: 2.0 TB
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13. Once on the Dashboard for the US-Nevada region, select the virtual data given

https://vchs.vmware.com/?page=dashboard				٩	☆自
	Service US - Nevada			Boskey Salva •	Help •
🕑 Dashboard 🗮 Virtual Machines 🔮 Gateways	Data Protection				Users
RESOURCE SNAPSHOT	83 GHz /	ALLOCATED TO VDCs / 2.0 GHz UNALLOCATED	1116 VIRTUAL MACHINES 116 active, 61 powered on (DR VMs excluded from count)	MY DEDICATED CLOUDS a 85.719 Service ID: 85 RELATED LINKS Purchase More Resources	
MEMORY 300 GB PURCHASED	290 GE	ALLOCATED TO VDCs / 10 GB UNALLOCATED		Memory, Storage or CPU in MyVMware.com	
STORAGE 17 TB PURCHASED	17 18	ALLOCATED TO VDCs / 500 GB UNALLOCATED	31 PUBLIC IPS ALLOCATED 5 more available	H Activity Log	E
VIRTUAL DATA CENTERS (21)			Add a Virtual Data Center		
20-162 a On: Multi-Tenant Cloud CPU 10 GHz ALLOCATED 6.0 GHz USED / 4.0 GHz FREE	666660012-121 A On: Multi-Tenant Cloud CPU 5.0 GHz ALLOCATED 0 MHz USED / 5.0 GHz FREE	APPSERVICES On: 85-719 CPU 2.0 GHz ALLOCATED 0 MHz USEI	20 / 2.0 GHz FREE		
MEMORY 20 GB ALLOCATED 12 GB USED / 8.5 GB FREE	MEMORY 20 GB ALLOCATED 0 MB USED / 20 GB FREE	MEMORY 20 GB ALLOCATED 420 MB US	ED / 20 GB FREE		
STORAGE 2.0 TB ALLOCATED 1.0 TB USED / 1.0 TB FREE	STORAGE 2.0 TB ALLOCATED 18 GB USED / 2.0 TB FREE	STORAGE 1.0 TB ALLOCATED 266.5 GB USED	/ 733.5 GB FREE		
BOFA-VCHS-LASVEGAS On: 85-719	BRADY On: 85-719	CANTON On: 85-719	a		
CPU 5.0 GHz ALLOCATED 0 MHz USED / 5.0 GHz FREE	CPU 4.0 GHz ALLOCATED 0 MHz USED / 4.0 GHz FREE	CPU 3.0 GHz ALLOCATED 0 MHz USED	D / 3.0 GHz FREE		
MEMORY 16 GB ALLOCATED 0 MB USED / 16 GB FREE	MEMORY 20 GB ALLOCATED 0 MB USED / 20 GB FREE	MEMORY 10 GB ALLOCATED 315 MB USE	ED / 9.7 GB FREE		
5 FURHUE 352 GB ALLOCATED 0 MB USED / 352 GB FREE	407.3 GB USED / 342.7 GB FREE	831.1 GB USED	/ 704.9 GB FREE		
CAPTAIN_ANDY a	COWAN On: 85-719	DENNY On: 85-719	a		
CPU 8.0 GHz ALLOCATED 0 MHz USED / 8.0 GHz FREE	CPU 6.0 GHz ALLOCATED 0 MHz USED / 6.0 GHz FREE	CPU 2.0 GHz ALLOCATED 0 MHz USED	0 / 2.0 GHz FREE		Ŧ

14. The Virtual Datacenter Dashboard is displayed, we want to add the vAPP catalog here, click on 'Manage Catalogs in vCloud Director'

https://vchs.vmware.com/?page=dashboard&view=vdcDetail&recordId=bc0286ae-1961-4179-b297-23c2b8cf2844	⊽ C ^e S × vcd rest ca	ls ク 合 自
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Usage & Alocation Virtual Machines Gateways Networks Users		'urchase More Resources femory, Storage or CPU Service (D: 20)
CPU 10 GHz ALLOCATED	6.0 GHz USED / 4.0 GHz FREE	rCloud Director API URL
	() ()	Aanage Catalogs in vCloud Director
MEMORY 20 GB ALLOCATED	12 GB USED / 8.5 GB FREE	
STORAGE 2.0 TB ALLOCATED	1.0 TB USED / 1.0 TB FREE	
SSD-Accelerated 2.0 TB ALLOCATED	1.0 TB USED / 1.0 TB FREE	

15. A new window/tab displaying vCloud Director's user interface with Organization Catalogs is displayed, select the catalog by name 'VMR'

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20-162						bsa	wla@vmware.com (VP	C Administrator) Preferen	ces Help +	Logout
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Catalogs	My Organization's	s Catalogs								
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	Name 1	Version	Status	Shared	External	Owner	Created On	vApp Templates	Media & Other	
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16. Once inside the VMR catalog in vCloud Director, click the upload button to locate the vApp OVA on your local system and upload it, if this is the first time uploading a vApp to vCloud director's interface, you will be prompted to downlaod and install the 'Client Integration Plugin'.

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	C								

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✓ I My Organization's Catalogs	vApp Templates	Media & Oth	ier									
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17. The upload begins, the upload time may vary based on the size of the vApp

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Adding Virtual machines from service catalog

Below section showcases in general steps to deploy a Virtual Machine/ vApp from a service catalog into active Cloud and also how to edit/change Firewall and Routing properties to enable traffic from external sites to reach your application in the Cloud. These steps will be executed by the tester and the certification team during the on-line testing phase, so the following is for information only.

The sample virtual machine template used in the steps below is CentOS that was created using the above methods and has light-http service running on it (web server). The goal is to deploy the centos template from the service catalog and have it configured to have the web server accessible from any external network.

Deploying Virtual machines

1. Login to vCloud Air portal and click on the vDC where a new centos virtual machine with webserver needs to be deployed.



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2. Click on the Virtual Machines tab and click 'Add One'. The virtual machine view gives you a list of virtual machines that are currently added to the cloud.

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3. A popup screen with a list of Catalogs appears, the catalog has two tabs, VMware Catalog and 'My Catalog'. The VMware Catalog has images that are publicly available to all service



subscribers of vCloud Air. These are vanilla OS templates. The 'My Catalog' is where vApp templates uploaded by a user will be listed. Click on this tab to select a virtual machine template, select the template by clicking the Radio Button against it and click Continue.

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4. Next up, questions on the name to be given to this machine in the Cloud, networking and resource allocation will be asked. Give the virtual machine a name, click the radio button "Select network manually'. We can choose to add more disk space to the virtual machine that the one listed. However, the additional disk space will only be visible after the disk has been

appropriately mounted on Power on.

New Virtual Machine on 20-162

Name	
Name	
VMR test-vapp1	
Guest OS Name	
CentOS	
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Select network manually (Advanced)	
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5. The next screen takes us over selecting the appropriate network to place the vApp into. By default a vDC will have two types of networks, an Isolated network, which is not accessible from any external interfaces, and a Routed network, which can be configured (with appropriate firewall policies and NAT rules) to be accessible from external networks. If the virtual machine you are deploying needs to be visible to external world, always place it in a Routed Network. In the example to follow, we want the webserver on the CentOS template to be visible, hence placing it in a Routed Org Network. Select the network, and click 'Deploy This virtual machine'.



New Virtual Machine on 20-162

Select Networks

IP addresses will be assigned from the network IP pool.



6. The virtual machine gets deployed . Click on 'Power On' to start the machine. At this point the virtual machine has been deployed in cloud and is ready



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Licensing Appliance

The virtual appliances that will be eventually uploaded to the service catalog will be listed in VMware marketplace (VSX). Since the appliance resides in a public domain and if the appliance needs a license, there has to be processes/mechanisms defined to deliver the License pre/post deployment.

There are multiple ways to deliver a license to 'activate' the application. The appliance can have Evaluation license already wired into the vApp template and a valid license can be delivered/applied post deployment upon purchase, Or, if the license isn't already wired and the vApp needs it upon deployment, an evaluation license can be published along with the user guide for the appliance.

Configuring deployed VM for external access.

The Routed Org networks in vCloud Air are virtual private networks that by default do not allow any packets of data through and from the network to any outside or other private networks in the vDC, they



are protected by a Firewall. These networks can be customized such that only application level traffic can be exposed to external networks. Since we placed our virtual machines in this network and we want only the application specific traffic (web traffic in this case) to flow through the networks, we can append/customize Firewall/NAT rules to enable this. Below steps show how the IP address of the virtual machine which is a private non routable address on the internet is mapped to a Public Routable address to achieve traffic flow.

In order to map the private IP address to Public IP's, there needs to be Public IP address available in the vDC. A single Public IP can be mapped to multiple private IP's on a port basis, however if the mappings are done on all inbound TCP/UDP ports than Public IP 's needed will be equal to the private IP's mapped.

 To begin configuring Firewall rules, first we need to identify the Private IP address of the virtual machine deployed, you can get this information by logging into your vDC and clicking on 'Manage VM in vCloud Director'. This opens up the native vCloud Director interface.

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STATUS:	Powered On	GUEST OS CUSTOMIZATION: Enabled GUEST OS PASSWORD: VKI2#382						
OWNER:	bsavla@vmware.com	Edit VM Name & Description						
CPU:	1 vCPUs	Manage VM in vCloud Director Launch Console						
MEMORY:	512 MB							
DISKS:	6144 MB SSD-Accelerated Primary Disk							
VMware TOOLS:	Installed	2						

 Once in the vCloud Director interface, Click on Virtual machines tab and note the IP address of the virtual machine. For this example, the virtual machine, VMR-test-vapp has a IP of 192.168.109.5

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A https://p1v17-vcd.vchs.	xmware.com/cloud/org/20-162/#/AppDiagram?vapp=c20b1017-9b1e-4ee5-8410-02cebe11ee2 🗸 C 🔂 - Google 🖉 🛧 🏚 🖡	•
20-162	bsads@umware.com (VPC.ddministrator) Preferences Help +	Logout
付 Home 🛆 My Cloud 🗐 Ca	atalogs 🚯 Administration	
My Cloud	PR VMR.testvapp1-VApp Running	
← 聞 vApps	VADP []_yaram Virtual lachines Networking	
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►/►/	www.ecom.comp.org/u-rate/vrm.tetrappe.com/u+rate/4eo-54U-4/centerliez/	
20-162	bsada@vmware.com (VPCAdministrator) Preferences Help •	Logou
🕼 Home 🛆 My Cloud 🗎 Ca	staloga 🚯 Administration	
My Cloud	CVMR.test.vapp1-VApp Running	
✓ ₩ vApps Recent Ferra	vApp Diagram Virtual Machines Networking	
WMR-test-vapp1-VApp	◆ ▷ III ■ © ⊚ ∅+	C 0
🗗 VMs	Console Name 1.6 Status OS Networks IP-Address Eckenal IP Storage Policy	
≚ Expired Items ∭ Logs	D VMR-test-vapp1 Powered On Cent/OS 4/5/6 (32- NIC 0*: 20-162-default-route 192.168.109.5 - E⊉ SSD-Accelerated	

3. Looking at the console , there is a web server active on port 5480 of the virtual machine, Pointing the browser window to the <u>https://192.168.109.5:5480</u> will not lead us to any site , since it's a non-routable address.



 To change the network configuration, to allow inbound traffic on port 5480 to the virtual machine, we need to to append the Firewall and NAT(network address Translation) settings. Login to the vDC, click on the gateways tab. Double click the gateway listed to reach to the configuration page.

Construction	nttps://vchs. vmware.com /?page=dashboard&view=vdcDetail&recordId=bc0286ae-1961-4179-b297-23c2b8cf2844	⊽ C' 8.	Google		+	A
DASHBOARD > VIRTUAL DATA CENTER DETAILS DASHBOARD > VIRTUAL DATA CENTER DETAILS Desge & Alocation Virtual Machines Geneways Vetworks Users Virtual Machines Geneways Vetworks Users CATEWAYS Showing 1 of 1 VCHS SPECIALISTS ON 20-162 GATEWAY P: 192.240.153.41 ConfigURATION: Vompact HIGH AUALENTY: Enabled HIGH AUALENTY: HIGH AUALENTY: Enabled HIGH AUALENTY: HIGH AUALENTY: HI	Deshboard 💬 Virtual Machines 👰 Gateways 🌉 Data Protection		Boskey :	Salva • Help •		
GATEWAYS Manage in vCloud Director Showing 1 of 1	DASHBOARD > VIRTUAL DATA CENTER DETAILS 20-162 ON MULTI-TENANT CLOUD Usage & Allocation Vitual Machines Gateways Network Users		VM QUOTA: Unlimited RELATED LINKS Durchase More Resources			
VCHS SPECIALISTS ON 20-162 GATEWAY IP: 192.240.153.41 CONFIGURATION: ✓ compact HIGH AVXIABLITY: ● Enabled NETWORKS: 1 Public IP: 2 2 USED / 0 FREE	GATEWAYS Showing 1 of 1	Manage in vCloud Director	(Service ID: 20) vCloud Director API URL Manage Catalogs in vCloud Director			
NETWORKS: 1 Public Pre: 2 2 USED / 0 FREE	VCHS SPECIALISTS ON 20-162 GATEWAY IP: 192.240.153.41 CONFIGURATION: ▶4 compact HIGH AVAILABILITY: IP Enabled					
	NETWORKS: 1 Public MP: 2 2 USED / 0 FREE					

5. On the NAT tab, there will be two rules defined; one is a SNAT rule that will allow traffic that is out bound from the virtual machine to the outside/external networks and a DNAT rule that will allow incoming traffic from the outside world to this particular virtual machine via the Public IP address "192.240.153.42".

Click on 'Add one', add a SNAT and a DNAT rules to allow all inbound and outbound ports from private IP '192.168.109.5' to public IP '192.204.153.42'

WAYS > GATEWAY DETAILS	ON 20-162						GATEWAY IP: 192.240.153.41 CONFIGURATION: ▶€ compact HIGH AVALUABILITY: © Enabled STATUS
Rules Firewall Rules Network Address Translation (NAT) modifies the source/de	stination IP	Addresses or packets ar	riving to and	d leaving from this Edge G	iateway.	Edit Name & Description
owing 4 of 4 Add One •						ඟ Disable 🕥 Enable 🛞 Delete	IN VCLOUD DIRECTOR
Туре	Origina	al	Translat	ed	Protocol	Applied On	Manage Advanced Gateway Settings
DNAT	192.240.153.41	Any	192.168.109.2	Any	Any	d0p1-ext	
SNAT	192.168.109.2	Any	192.240.153.41	Any	Any	d0p1-ext	
SNAT	192.168.109.5	Any	192.240.153.42	Any	Any	d0p1-ext	
DNAT	192.240.153.42	Any	192.168.109.5	Any	Any	d0p1-ext	

6. The NAT rules helps us map the IP's together, however Firewall still needs to enable to allow specific traffic between these two networks. On the same page in the vDC, click on the Firewall tab. We will allow any inbound packet from external network on port 5480 to the private network. Also for the reverse traffic allow any outbound packet from internal network on port 5480 to outside/external networks on TCP and UDP.

Dashboard Virtual Machines Gateways Gateways > GATEWAY DETAILS											
/(CI	HS SPECIALISTS (ON 20-162								
6	NAT	Rules Fixewall Rules Netwo	rks Public IPs								
	By	y default, the edge gateway is cor	figured to deny all incoming tra	ffic. Set Firewall "Allow" Exception	ons to allow specific incoming traffi	с.					
	Sł	nowing 7 of 7 Add One				🜑 Disable 🕥 Enable 🛞 Delete					
		Name	Source	Destination	Protocol	Log					
	a	RDP inbound	external:Any	internal:3389	TCP	Disabled					
	a	DNS outbound	internal:Any	external:53	TCP & UDP	Disabled					
		DNS inbound	external:53	internal:Any	TCP & UDP	Disabled					
	a			external:80	TCP	Disabled					
	a	HTTP outbound	internal:Any								
		HTTP outbound HTTP inbound	internal:Any external:80	internal:Any	TCP	Disabled					
		 HTTP outbound HTTP inbound 5480inbound 	internal:Any external:80 external:Any	internal:Any internal:5480	TCP TCP & UDP	Disabled Disabled					

7. This completes the IP mappings and firewall changes, now if you point the browser to the external IP address @ port 5480 you will reach the virtual machines web page, see below.

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https://192.240.153.42:5480	V C Scogle	P ☆ 自 ♣ ★ 🖸 ☰

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♠ https://192.240.153.42:5480/#core.Login			🔻 🥙 🗧 Google	▶ ◇ 自 ♣	↑ 🖸 =
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Driving Load against the deployed vApp:

The next step for the certification process involves testing the application connectivity and performance by driving load across the WAN using the public IP address configured for the vApp. It is recommended to use the same tools being used for existing Physical / Virtual testing, and that the load driver will drive load from an on-premise configuration, across the WAN to the vCloud Air setup where your application is running.

Once the vApp has been successfully deployed and configured for external access, configure your load generator (LoadRunner, JMeter or in-house tools, etc.) to drive application load through the public IP address. Collect the in-guest resource utilization numbers during the test runs using vCloud Air portals's VM console. Use the Load generator results and correlate with VM resource utilization for the vApp.

As an example, the steps for Load testing using JMeter have been listed below.

Load Testing using JMeter 2.11

JMeter is a Java based application designed to load test and measure performance of various application resources (like Files, Web dynamic languages - PHP, Java, ASP.NET, etc.). Below mentioned steps highlight how JMeter can be used to simulate heavy Web traffic load on a lighthttpd server deployed on vCloud Air Cloud.

Prerequisites:

- a. Confirm the Web Server is accessible externally using an IP address/hostname.
- b. Latest versions of JMeter and Java are installed on the desktop being used for testing.
- c. List information regarding 3-4 Webpages that can be used to serve the http/https requests generated by JMeter. The Webpages can be different links within the Website.

Steps to generate load using JMeter:

1. Create a Test Plan with 2 -3 Thread Groups and HTTP requests as shown below. For all the Thread groups, select the number of threads, ramp up time and loop count.

📏 test.jmx	(C:\Users\mrawat\Deskt	op\test.jmx) -	Apache JMe	eter (2.11	. r1554548)									
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	HTTPS Request			Com	iments: tion to be taken after a Sam	ler error								
- 💽	View Results in Table													
	Aggregate Graph							• C	ontinue	Start N	ext Thread Lo	op 🔘 Stop Thread	 Stop Test 	Stop Test Nov
• Ir	Thread 3				ad Properties									
	Add	•	Logic Con	troller	er of Threads (users): 50									
Wor	Cut	Ctrl-X	Config Ele	ment !	IIn Deriod (in seconds):	10								
	Сору	Ctrl-C	Timer		poprenou (in seconds).	10								
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	Reset Gui		Accortion		AJP/1.5 Sampler									
	Remove	Delete	Listonor	5 /	Deditoriell Sampler									
	Open		Listener	I	Debug Sampler									
	Merge				FTP Request									
	Save Selection As				HTTP Request									
	Save Node As Image	Ctrl-G			Java Request									
	Save Screen As Image	e Ctrl+Shift-G			JDBC Request									
	Enable				JMS Point-to-Point									
	Disable				JMS Publisher									
	Toggle	Ctrl-T			JMS Subscriber									
	Help				JSR223 Sampler									
			-		JUnit Request									
					LDAP Extended Request									
					LDAP Request									
					Mail Reader Sampler									
					MongoDB Script									
					OS Process Sampler									
					SMTP Sampler									
					SOAP/XML-RPC Request									
					TCP Sampler									
					Test Action									

2. Enter the Web server IP, port number and path of the website. Change the protocol to https, if required.



- 3. Add the "View Results in Table" and "Graph Result" tabs (Test Plan -> Add -> Listner)
- 4. Once the configuration is finished, Press Start button to start the test:

📏 test.jmx (C:\Users\mr	awat\Desktop\test.jmx) - A	Apache JMeter (2.11 r1554548)							
<u>F</u> ile <u>E</u> dit Search <u>R</u> v	un <u>O</u> ptions <u>H</u> elp		_						
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A Test Diag			13				<u> </u>		_
Threads	View Results in T	lable	Start						
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🕈 🌓 Thread 2	Comments:								1
T / HTTPS	Write results to file //	Posd from file							
View Resu	Filonomo	read from the			Browno	Log/Dieplay Only		Configuro	1
Aggregate	Filename				Browse	Log/Display Only.	Errors Successes	Configure	
🕶 🌇 Thread 3	(
🔄 🔄 Graph Resi	Sample #	Start Time Thread Nam	/e Label	Sample Tim	Status	Bytes	Latency		1, 1
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	× 2	16:36:40.499 Inreads 1-1	HTTPS Request 2	23		1888		23	1
	4	16:36:40 526 Threads 1-1	HTTPS Request 2	23		1888		4090	il-
	5	16:36:40.536 Thread 2 2-1	HTTPS Request	23		1888		2?	1
	6	16:36:40.554 Threads 1-1	HTTPS Request 2	25		1888		25	1
l /	7	16:36:35.852 Thread 3 3-1	HTTPS Request 3	4748	<u>_</u> /	1888		4748	4
	8	16:36:40.571 Thread 2 2-1	HTTPS Request	35		1888		35	4
	9	16:36:40.604 Thread 3 3-1	HTTPS Request 3	36		1888		36'	4
l	10	16:36:40.622 Ihreads 1-1	HTTPS Request 2	22	<u> </u>	1888		22	4
	12	16:36:35:984 Inreads 1-2 46:26:40.643 Thread 2.2-1	HTTPS Request	4082		1888		2/	1
	13	16:36:40.665 Thread 3 3-1	HTTPS Request 3	22		1888		27	از
1	14	16:36:36.023 Thread 2 2-2	> HTTPS Request	4688		1888		4688	il.
A 117	15	16:36:40.707 Threads 1-2	HTTPS Request 2	23		1888		23	4
A 17	16	16:36:40.709 Thread 2 2-1	HTTPS Request	24		1888		24	4
4 17	17	16:36:40.721 Thread 3 3-1	HTTPS Request 3	24		1888		24	4
A 17	18	16:36:36.067 Thread 3 3-2	HTTPS Request 3	4685		1888		4685	4
A 11	19	16:36:40.743 Thread 2 2-2	HTTPS Request	48		1888		48	4
1	20	16:36:40.762 Threads 1-2	HTTPS Request 2	44	<u> </u>	1888		44	4
A]+	21	16:36:40.780 I fileau 3 3-1 49:39:40 790 Thread 3 3-2	HTTPS Requests	25		1888		20	
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l]*	24	16:36:36.176 Threads 1-3	HTTPS Request 2	4678		1888		4678	i
A 117	25	16:36:40.838 Threads 1-2	HTTPS Request 2	25		1888		25	1
4 👔	26	16:36:40.841 Thread 3 3-2	HTTPS Request 3	22		1888		22	
l	27	16:36:40.854 Thread 2 2-2	2 HTTPS Request	36		1888		36	1
A 11	28	16:36:40.875 Threads 1-3	HTTPS Request 2	24		1888		24	4
4 17	29	16:36:40.889 Threads 1-2	HTTPS Request 2	23	<u></u>	1888		23	4
1 1	30	16:36:40.892 Thread 3 3-2	HTTPS Request 3	21		1888		21	4
1 👔	31	16:36:36.219 Inread 2 2-3	HTTPS Request	4/02		1888		4/02	:
1	32	16:36:40.922 mileau z z-z	HTTPS Request 2	24		1888		24	al)
A 17	34	16:36:36:274 Thread 3:3-3	HITPS Request 2	4688		1888		4688	1
l]*	35	16:36:40.938 Thread 3 3-2	HTTPS Request 3	24		1888		24	d
A 17	36	16:36:40.945 Thread 2 2-3	4 HTTPS Request	23		1888		23	3
4 17	37	16:36:40.971 Threads 1-3	HTTPS Request 2	23		1888		23	3
A 17	38	16:36:40.991 Thread 2 2-3	HTTPS Request	27		1888		27	4
A 👔	39	16:36:40.987 Thread 3 3-3	HTTPS Request 3	37		1888		37	
4 17	40	16:36:41.022 Threads 1-3	HTTPS Request 2	26		1888		26	4
	41	16:36:41.034 Thread 2 2-3	HTTPS Request	25	<u></u>	1888		25	4
	421	16:36:41 045iThread 3 3-3	HTTPS Request 3	361	<u> </u>	1888		36	4
	Scroll automatically?	Child samples?	No of Samples 750	La	test Sample 24	Average 95	9 Deviation 1866		

Graph:



 Open vCloud Air.vmware.com, go to the VM (Webserver) detail page and click monitoring. Check the resource Utilization numbers for the VM. There should be a increase in the CPU utilization during the JMeter test execution. Ideally the amount of CPU utilization from the load test is typical of real production use, so between 10% CPU and 60% CPU.



6. Open the VM console by clicking the "Launch Console" button through the vCloud Air portal.

7. Use the top command to observe the increase in CPU utilization during the tests.

https://vchs.vmware.com	/assets/resource	es/vmrc/console.ht	tml?vmName=VM	/R-test-vapp1&	vmIP=p1v17-vcdcp.v	chs.vmware.com				
https://vchs.vmware.com/assets/resources/vmrc/console.html?vmName=VMR-test-vapp1&vmIP=p1v1										
		V	MR-test-	app1						
-		100					20.—200 			
ton - 00:32:36	un 2 dai	18. 6:48.	1 user	. load a	verage: 0.0	A. A.AA. A.AA				
Tasks: 69 tot	al, 1	cunning,	68 sleep	ing, 0	stopped, 1	0 zombie				
Cpu(s): 10.4%u	s, 0.0%	sy, 0.0%n	i, 88.8%	id, 0.0%	wa, 0.4%hi	, 0.4%si, 0.1	3a It			
Fiem: 514500 Suppl: 120512	k total,	166656k	used,	348252k	free, 64	612k buffers				
əwap. 120312	.κ ιυται,	OK.	usea,	1702178	11.66, 01.	TOCK CACHEA				
PID USER	PR NI	VIRT RE	S SHR S	ZCPU ZME	M TIME+	COMMAND				
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4 root	10 -5	0	0 0 S	0.0 0.	0 0:00.05	events/0				
5 root	14 -5	0	0 0 S	0.0 0.	0 0:00.00	khelper				
6 root	20 -5	0	0 0 S	0.0 0.	0 0:00.00	kthread				
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462 root	11 -5	ы	0 02	и.и и.	0 0:00.00	kpsmoused				
•										

8. Use the "netstat –atc" command to observe the network traffic and queuing during the tests.