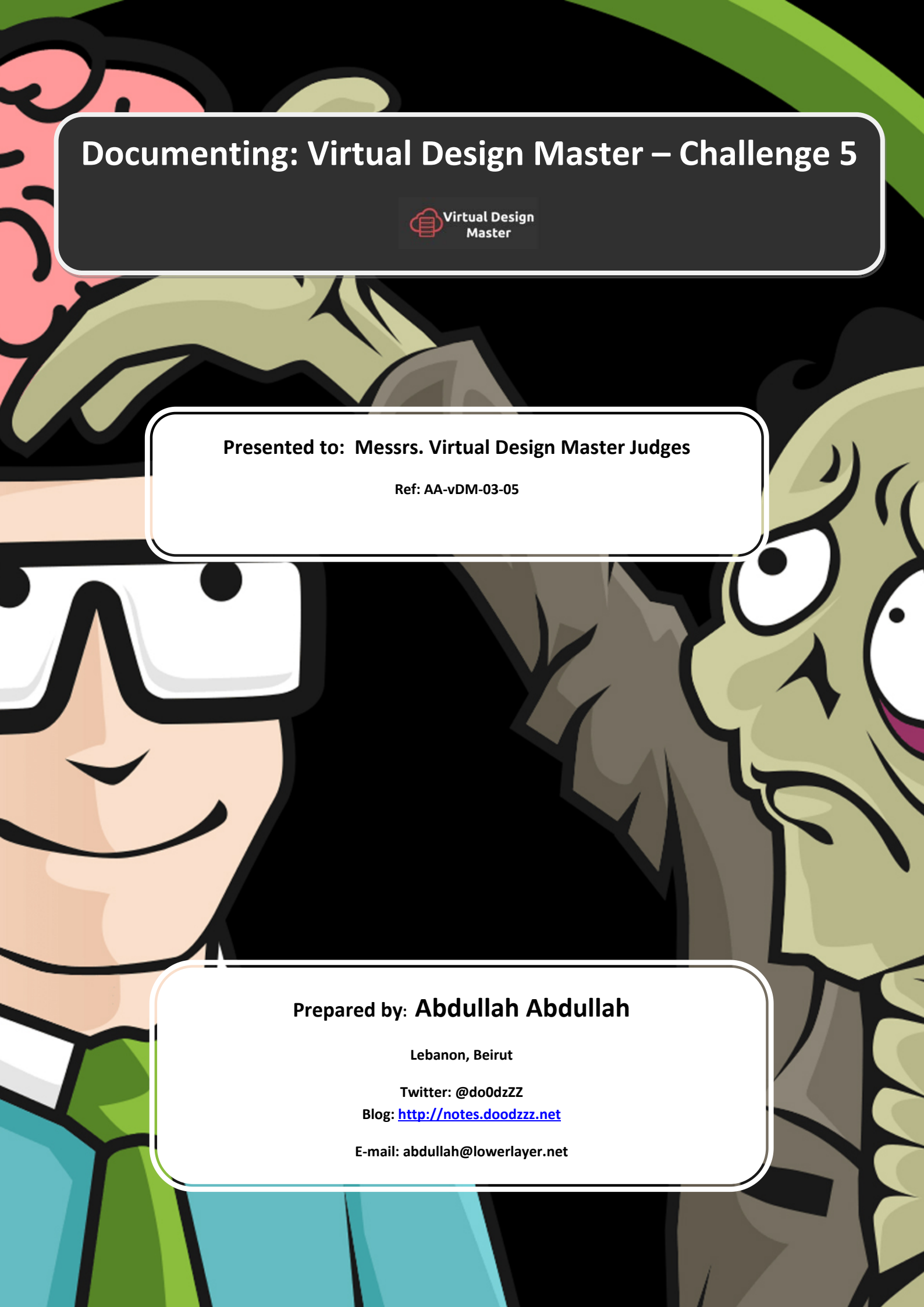
# Documenting: Virtual Design Master – Challenge 5



**Presented to: Messrs. Virtual Design Master Judges**

**Ref: AA-vDM-03-05**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Learning is definitely not mere imitation or the ability to accumulate and conform to fixed knowledge. Learning is a constant process of discovery and never a concluding one. (**Bruce Lee**)

# [Synopsis]

Our scientists on Mars have attempted to engineer an anti--- zombie virus, to eradicate the zombies left on Earth. Since we now have several areas on Earth secured, we are ready to attempt to deliver the anti---zombie virus. The whole system, which we call the Zombie Assassin System is very complex. After vials of anti--- zombie virus are sent to earth, robots will pack the virus into aerosol canisters which explode on impact and will be delivered by drones. The drones will then monitor the effects of the anti--- zombie virus, and the virus will be modified by scientists on Mars as needed. This is the first step in winning the Earth back from the zombies.

Two sites will be selected to begin testing in Africa, and we will need to deploy new infrastructures to run the system. If successful, the Zombie Assassin System will later be expanded across the globe, and we will be able to start taking our planet back. You will be provided with two physical servers on Bare Metal Cloud, which you should think of as two different physical sites.

To allow the Zombie Assassin System to get off the ground, we will need you to do the following:

- Build a multi---tenant private cloud platform, with your platform of choice.
- Illustrate deploying at least two virtual workloads of your choice with your orchestration tool of choice.
- Describe updating and patching for both your cloud platform and virtual workloads
- Build an overlay network across the two physical servers.

Be sure to keep resiliency in mind as you build your environment.

# Table of Contents

# 1. Executive Summary

## 1.1. Project Overview

Revenge is a plate better served remotely ;-), this project is all about payback and giving the Zombies a taste of how conquering feels likes.

Moving down back to Earth requires a lot of precaution and mainly requires super-agility and resiliency and a keen eye on high availability.

## 1.2. Intended audience

This document is intended for any Earthling (even flees and crickets can take part if needed) participating in getting our planet back.

## 1.3. Project Insights

We will be building a cloud of clouds, yes we will precious! The revenge in the making will hit Africa first and we were lucky to have two sites available for us.

### 1.3.1. Project Requirement

- R001: Build a multi-tenant private cloud platform.
- R002: Create an operational document for two orchestrated workloads.
- R003: Create an operational document on patching/updating the cloud platform and workloads.
- R004: Build an overlay network across the two physical servers.

### 1.3.2. Project Constrains

- C001: No shared storage -> No Storage resiliency.
- C002: Single physical host -> no site based high availability.
- C003: Each host compute/network/storage resources are very low.

### 1.3.3. Project Assumptions

- A001: The two sites are connected directly via undersea fiber optics.
- A002: Site one exists in South Africa.
- A003: Site two exists in Morocco.
- A004: An overlay network is not required at the workload cluster level.

### 1.3.4. Project Risks

- A001: Physical host failure, as a single host exists in each site.
- A002: Performance might be degraded due to lack of resources.

# 2. Design Summary

For the purpose of building our multi-tenant private cloud we will be utilizing VMware various technologies, our main focus will be on vCloud Director to deliver multi-tenancy, we will be using vCloud Suite 5.5 update 2 for all of our components.

The main reason behind this decision is that our team members are not skillful at maintaining an Oracle database environment and are skillful with MSSQL, after looking the compatibility matrix we have chosen vCD 5.5.2 because it is the latest with support for MSSQL server 2012.

## 2.1. Physical Design

### 2.1.1. Datacenters

Because this mission is taking place on Earth we've managed to regain control over two datacenters that we intend to use as our sites in Africa:

**1-** Site01 will be in South Africa.
**2-** Site02 will be in Morocco.

Both countries are very much near the sea, this will give us an edge when getting supplies via the spaceships because Zombies are terrified of water and usually do not rally near sea areas.

Luckily these datacenters run on an old solar power grid that is still functioning and it will serve us well for the purpose of providing the physical equipment with power and provide sufficient power for system.

### 2.1.2. Servers

1- Site01 (South Africa Datacenter):
   - **a.** Dell M610
   - **b.** 1 x 1x2.13 GHz Harpertown E5506
   - **c.** 16GB DDR3-1066
   - **d.** 1 x 250.0GB 2.5" SATA 7200RPM
   - **e.** 1 x 10Gbps NIC (1 real IP address reachable from the internet).

2- Site02 (Morocco Datacenter):
   - **a.** Dell M610
   - **b.** 1 x 1x2.26GHz Quad Core L5520
   - **c.** 12GB DDR3-1333
   - **d.** 1 x 250.0GB 2.5" SATA 7200RPM
   - **e.** 1 x 10Gbps NIC (1 real IP address reachable from the internet).

### 2.1.3. Storage

On each server exists a 250GB SATA HDD with no RAID projection whatsoever, this will serve as our local datastore for each ESXi host.

### 2.1.4. Networking

LAN: each server has been equipped with 10Gbps network interface.

WAN: Now this is a different story, we have chosen our locations wisely, again as we are near the sea in both countries, we will be leveraging the underwater fiber optics cabling to insure network connectivity between the two sites, also it is good to mention that the fiber channel connection is direct, since we needed to build this quickly we didn't want to waste time to track routers and providers thus we chose redundant FC paths and connected our sites directly.

### 2.1.5. Security

We're regaining Earth and we're not cutting back on security, since we're dealing with Zombies our concern is physical security, for that purpose we have:

**1-** Setup a false projection of human beings around 5KMs from the surrounding of the datacenter to keep the zombies from rallying to the datacenters area.

**2-** Remove all sort of on-foot access to the perimeter and access is limited to a helipad that is suitable to fit our spaceship pods.

## 2.2. Logical Design

Once we're done here, you'll be able to tell that the physical design is merely simple in comparison with the logical design.

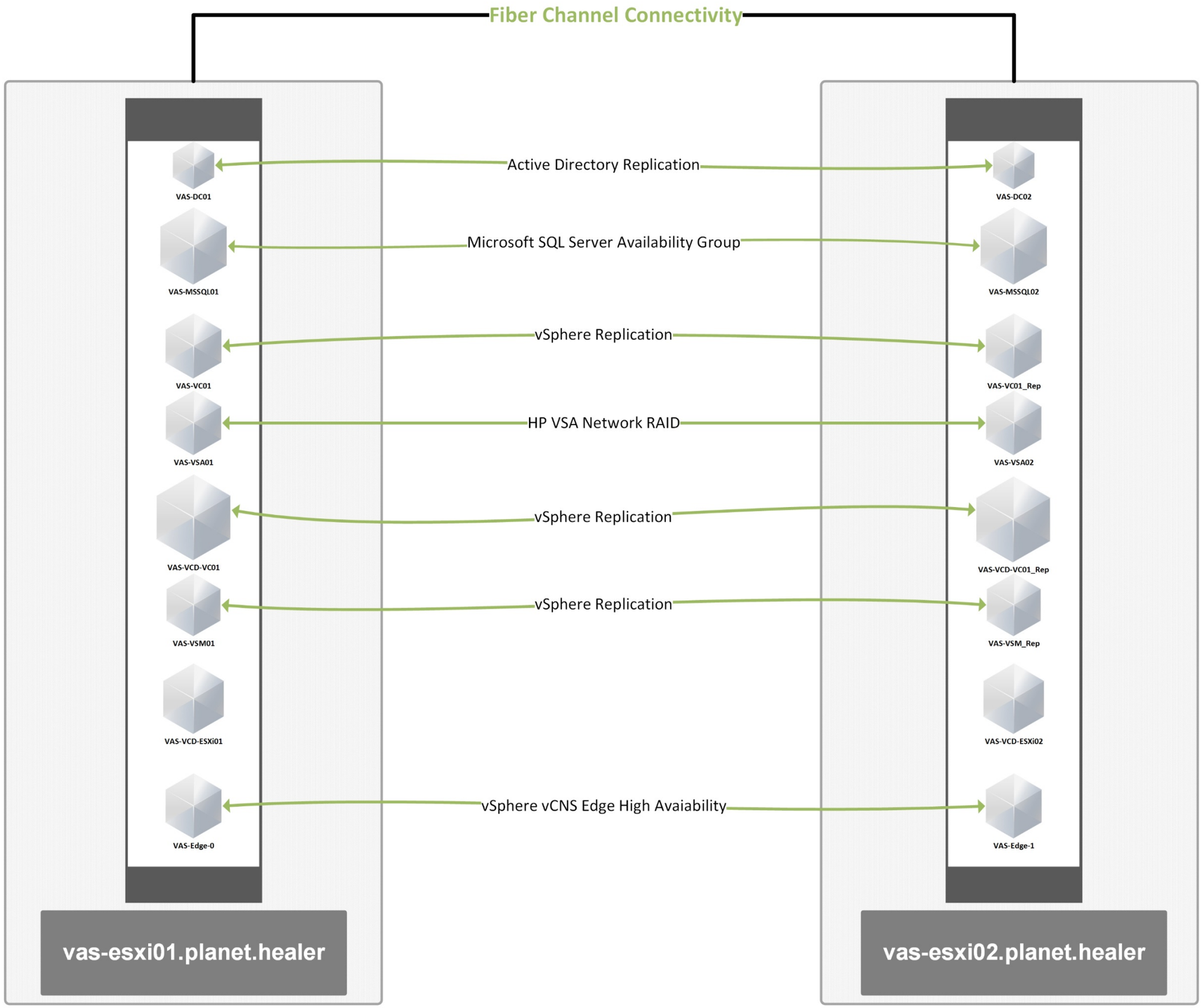
Since we have a single server in each site, we had to think of a way of bring our multi-tenant private cloud platform taking into consideration:

1- Operability.
2- Availability.
3- Resiliency.

Since we're doing a VMware vCloud design, we will be having:

**1-** A management cluster (Physical ESXi hosts).
**2-** A resource cluster (Nested ESXi hosts).

In the next page you'll find a diagram that reflects the high level design and the building blocks of our multi-tenant cloud infrastructure.




**Site01 – South Africa – Management Cluster**

**Site02 – Morocco – Management Cluster**

**VAS Virtual Infrasctructure**

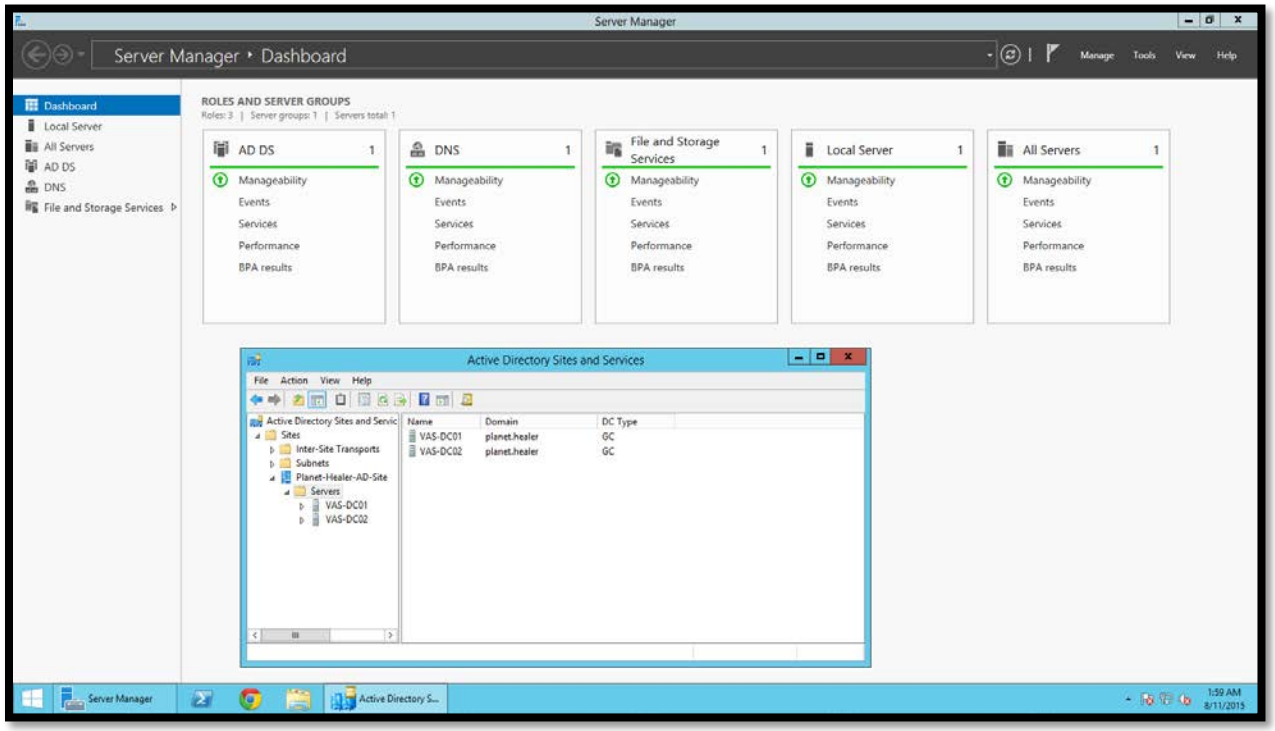
## 2.2.1. Management Cluster

### 2.2.1.1. Active Directory Services

Since this is a new setup we need directory services to be able to centralize authentication and management of users/clusters and computers.

<u>High availability/Resiliency:</u>

Because we have single hosts and not HA at all we will be having a primary domain controller in Site01 (South Africa) and a secondary domain controller in Site02 (Morocco) thus leveraging active directory replication services to preserve our Active Directory and DNS services.




### 2.2.1.2. Database Services

We will be leveraging MSSQL Server 2012 to serve our database needs, as we have mentioned our staff excel with MSSQL and they prefer using it for component that requires databases.

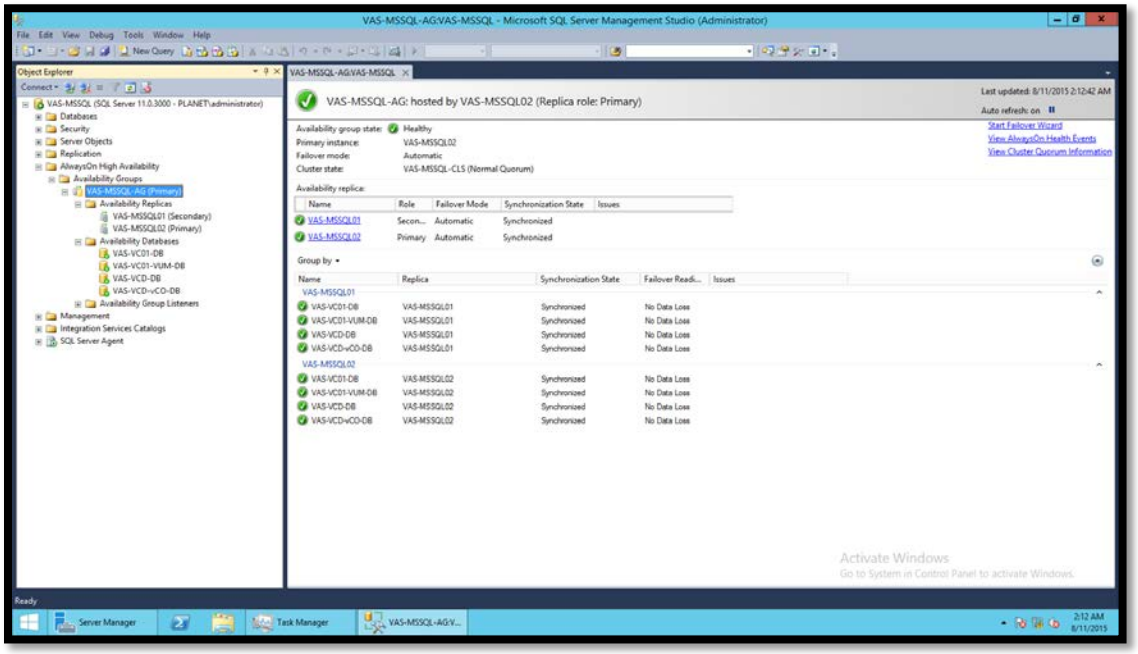
We will be providing databases for:

1- vCenter Server.
2- vCenter Server Orchestrator.
3- vCenter Server Update Manager.
4- vCloud Director.
5- vCenter Orchestrator.

High availability/Resiliency:

Because we have single hosts and not HA at all we will be leveraging MSSQL Server 2012 AlwaysON availability groups to maintain database availability at the application level.

We will be having an MSSQL server in Site01 and another MSSQL server in Site02 with continuous synchronous replication.

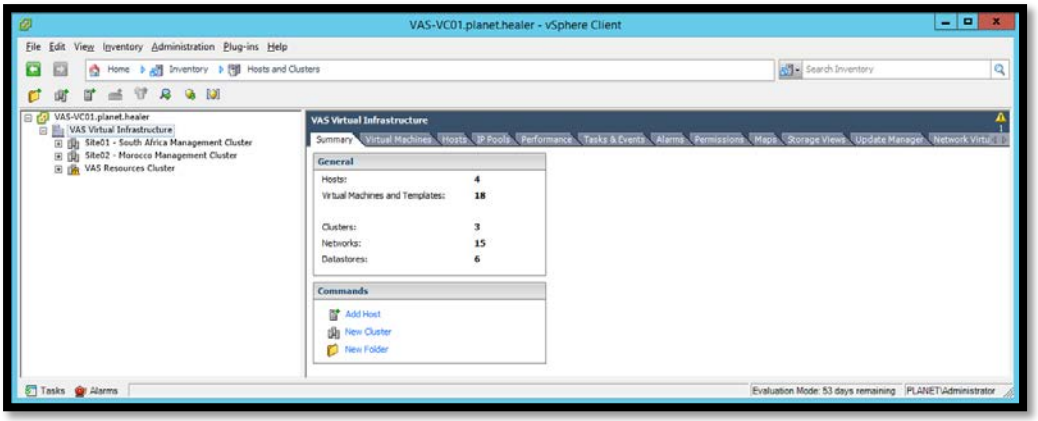



## 2.2.1.3. Virtual Datacenter

Although we have two separate physical sites, we will be including them both in a single Virtual Datacenter, the main reason for taking this decision is because we need to have both hosts to use the same distributed switch for the requirement of having an overlay network between the physical hosts.

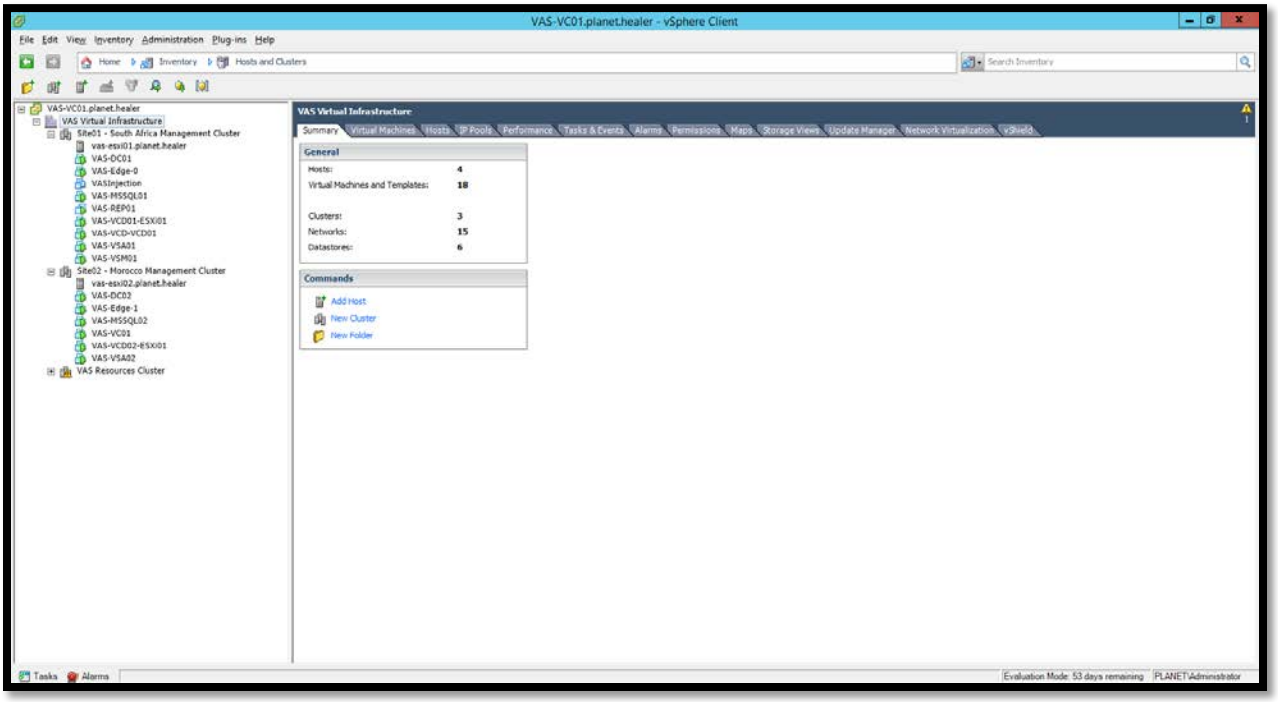
High availability/Resiliency:

No datacenter/site level high availability is possible as we have single ESXi host in each datacenter.



### 2.2.1.4. vSphere Cluster

This cluster will be dedicate to run the management components, each ESXi will be included in a single node cluster with no HA of what so ever, all hosts will run vSphere 5.5 update 2.

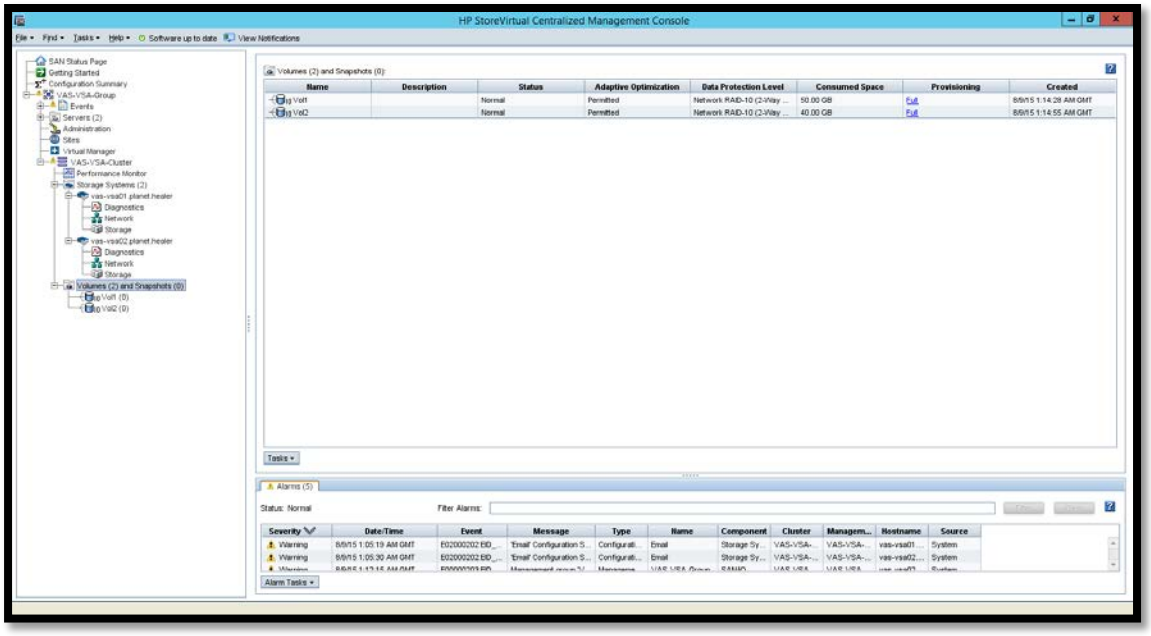



### 2.2.1.5. HP StoreVirtual VSA

To provide resiliency and high availability to our resource ESXi hosts and since we do not have any shared storage what-so-ever coming from our physical infrastructure, to complete what we're doing we have decided to go with 2 HP StoreVirtual appliances that will be providing our resource ESXi hosts with the shared storage.

The reason behind our decision is network RAID, we will be deploying two appliances in a single management group and we will be having a network RAID across the virtual appliances across the two sites.

While some would say network RAID over WAN is a something to be not so lightly taken into consideration, I would see that in this scenario specifically we're not looking at best practices and we're rather looking for the best resilient way to get our multi-tenancy into action with whatever resources we have available.



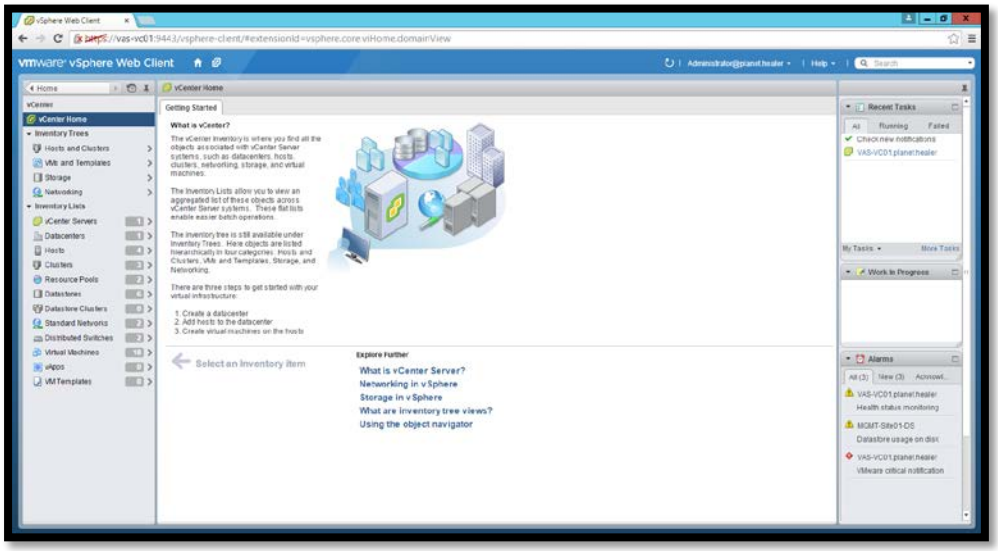

## 2.2.1.6. vCenter Server Design

This is a one of the mail pillars in forming our multi-tenant cloud platform, in an ideal situation where we have lots of resources would have had a vCenter server for the management cluster and another vCenter server for the resources cluster.

In this scenario we will only be having a single vCenter server that will be managing everything inside-out.

<u>High availability/Resiliency:</u>

We will be utilizing vSphere replication to protect the vCenter Server with an RPO of 12 hours.

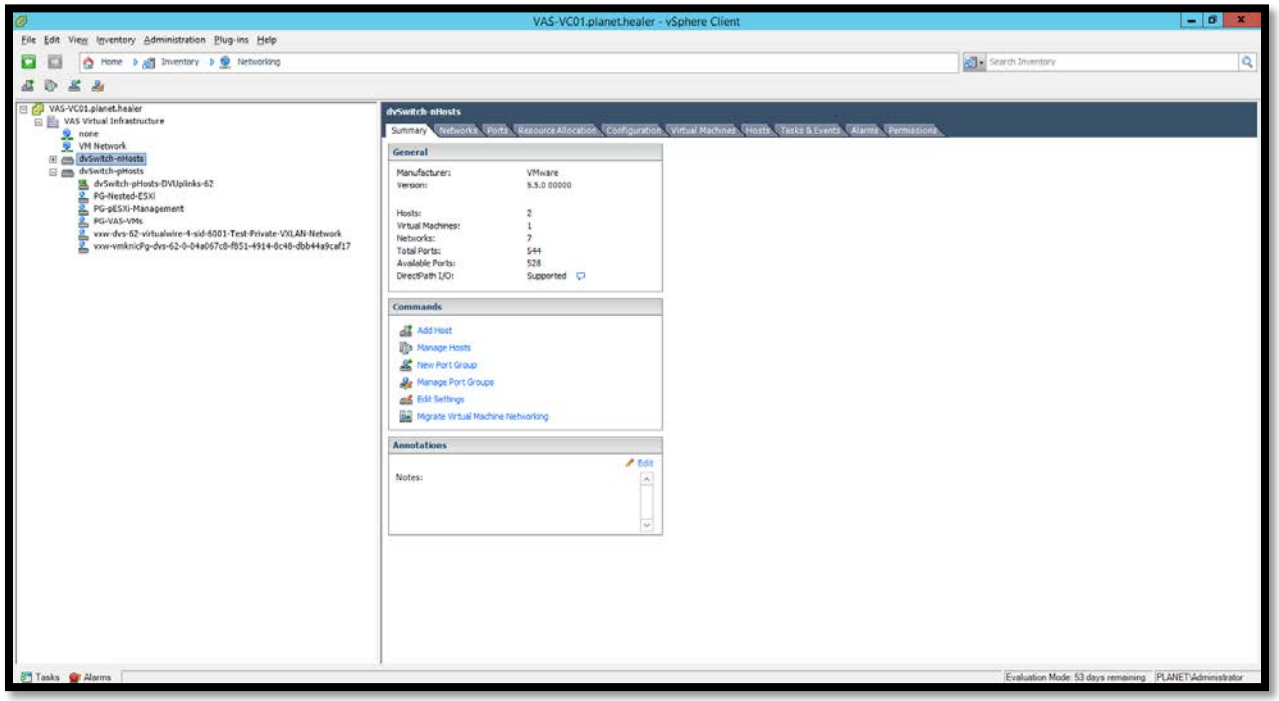


### 2.2.1.7. Distributed Virtual Switches

Our requirement states that we should have an overlay network between the physical hosts, which requires having the hosts to be added to a distributed switch as a prerequisite.

| dVSwitch | Uplinks |
|---|---|
| dvSwitch-pHosts | 1 (dvSwitch-pHosts-DVUplinks-62) 1 pNIC from each pHost. |

| dVSwitch Port Groups | Function |
|---|---|
| PG-pESXi-Management | Used for the physical ESXi management |
| PG-Nested-ESXi | Used for the resource cluster nested ESXi hosts (Promiscuous Mode (Accept) and Forged Transmit (Accept)) |
| PG-VAS-VMs | Used for management VMs. |

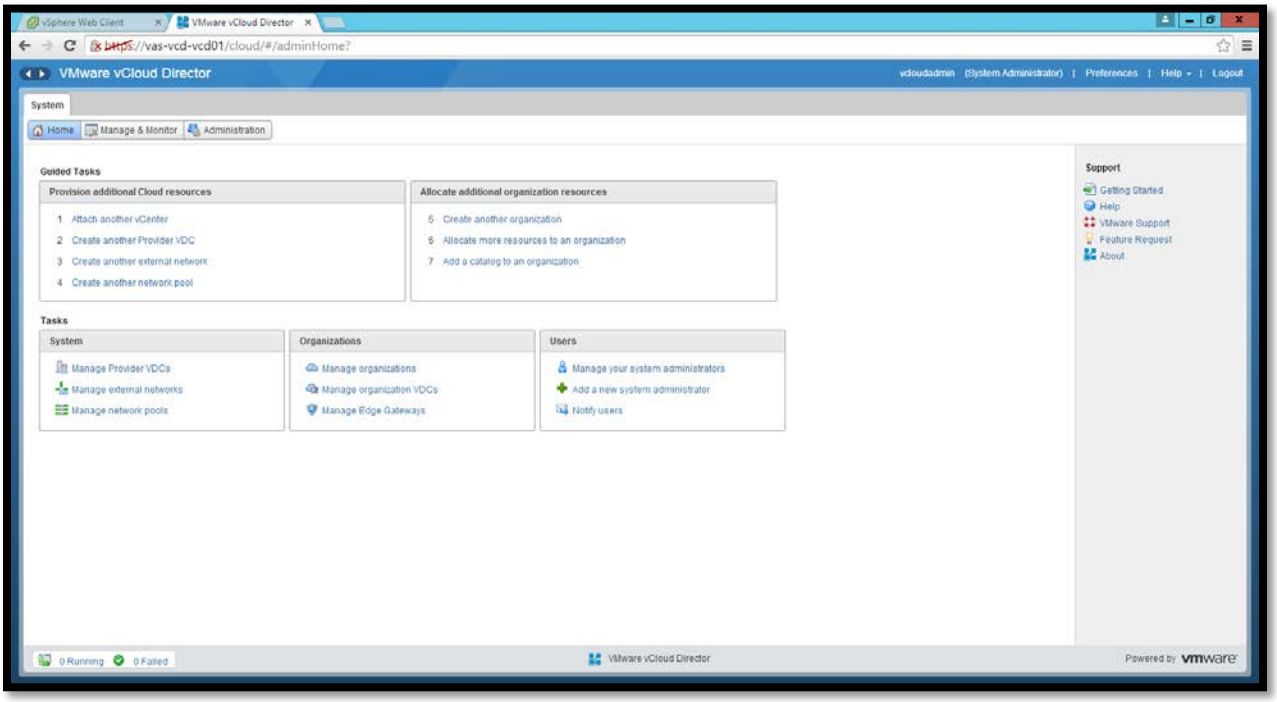



### 2.2.1.8. vCloud Director

We will have a single vCloud Director cell in Site01 which will be providing us with the require multi-tenancy.

High availability/Resiliency:

We will be utilizing vSphere replication to protect the vCloud Director Server with an RPO of 12 hours, in an optimal situation to have a more resilient infrastructure we would have two vCloud Director cells that are topped with a load-balancer but the constraint here is compute resources and the shared storage as we require an external NFS resource to complete such a setup and placing the NFS store on one site won't satisfy the HA needs.




## 2.2.1.9. vShield Manager

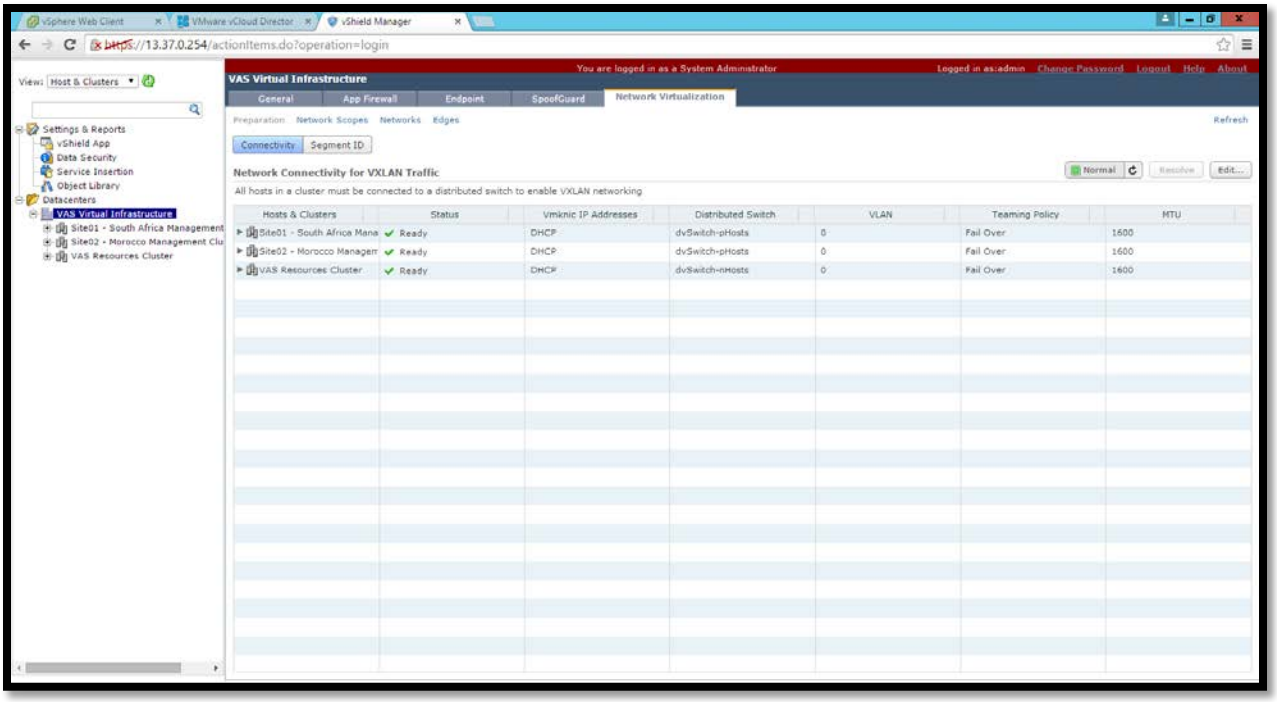
We will be having one vShield Manager Appliance, the vShield Manager is a pre-installed virtual appliance and is deployed as an OVF, we will be reconfiguring the default vShield Manager resources as we don't have much to spare.

1- For the management clusters we will need a vShield Manager in order to fulfill the requirement of having an overlay network, namely we will be utilizing the VXLAN feature. Knowing that both sites are using the name network VXLAN sounds useless in this scenario but since we're testing all possible scenarios we might be creating further networks and we will be utilizing this feature and it's better to configure it ahead of time.

2- For the Resources cluster we will need a vCNS to complete the vCloud Director configuration, in addition because the resource cluster will be running on a tight resource we will be deploying to edge appliances in the management cluster that will serve the resource cluster.

High availability/Resiliency:

We will be utilizing vSphere replication to protect the vCNS appliance with an RPO of 12 hours.




## 2.2.2. Resources Cluster

Our resources cluster is all nested without the management cluster, where we will be utilizing:

1- The same virtual datacenter.
2- The same vCenter Server.
3- The same vCNS appliance.

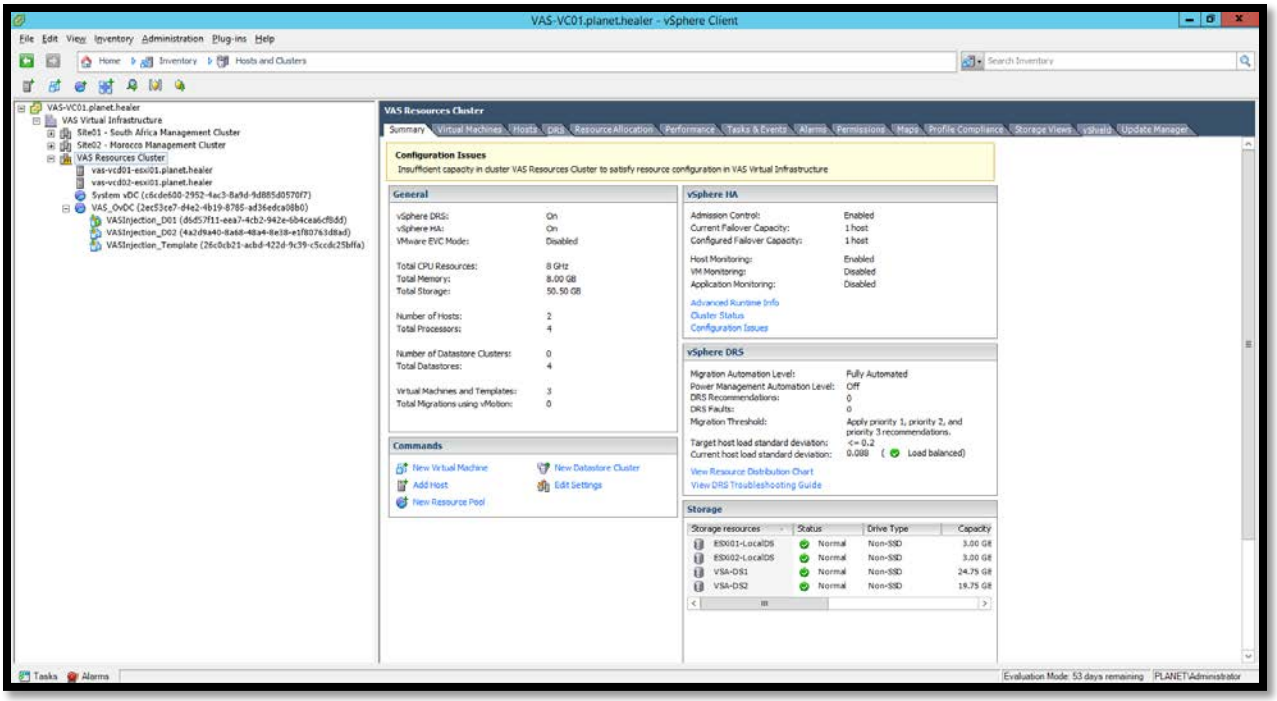
### 2.2.2.1. vSphere Cluster

On the management cluster we have 2 Nested ESXi hosts running vSphere 5.5 update 2 we will have HA and DRS enabled for this cluster.

### 2.2.2.2. vSphere Cluster Storage

Our vSphere hosts will be configured for software iSCSI and from the HP virtual storage appliances we will be able to have two datastores:

1- Volume 1 (25GB) – Protected by network RAID against appliance failure.
2- Volume 2 (20GB) – Protected by network RAID against appliance failure.

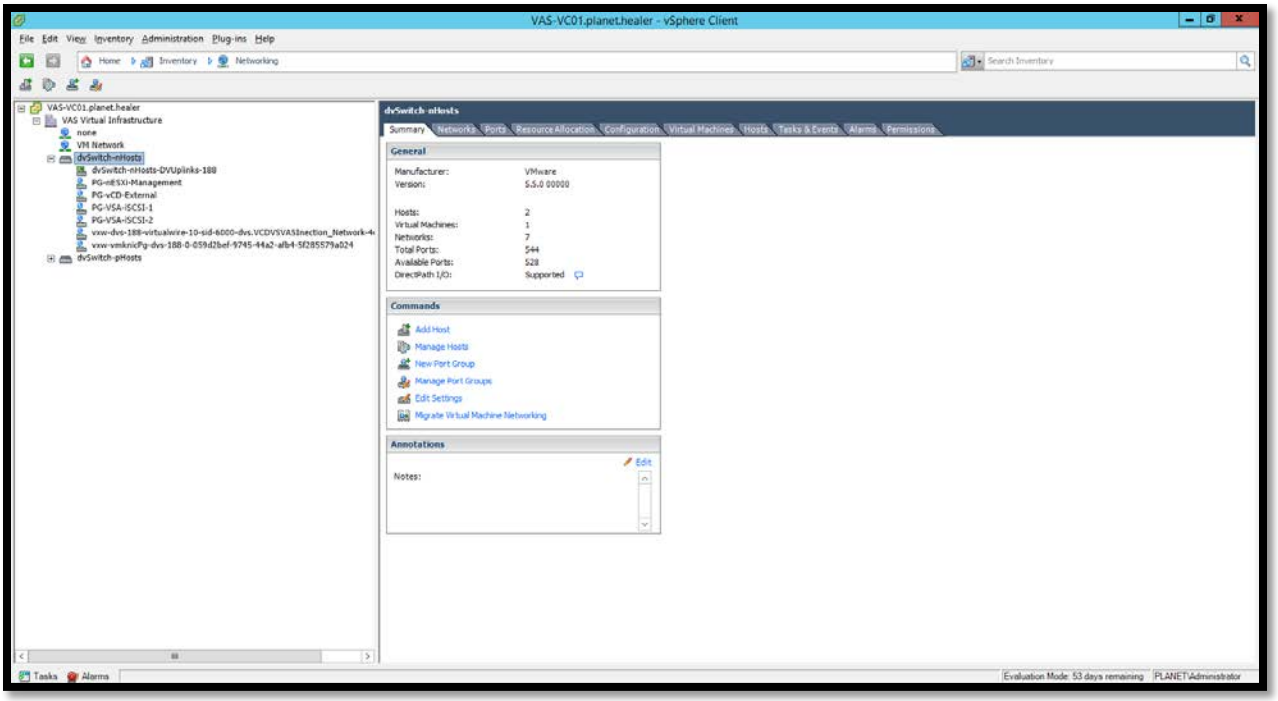



## 2.2.2.3. Distributed Virtual Switches

So that to keep the configuration in align with what we have at the management cluster, and since we are serving multi-tenancy configuring the hosts for VXLAN becomes a requirement so that to provide our users with the network separation they desire.

| dVSwitch | Uplinks |
|---|---|
| dvSwitch-nHosts | 1 (dvSwitch-nHosts-DVUplinks-188) 4 vNIC from each nHost. |

| dVSwitch Port Groups | Function |
|---|---|
| PG-nESXi-Management | Used for the nested ESXi management |
| PG-VSA-iSCSI-1 | Used for IP Storage |
| PG-VSA-iSCS-2 | Users for IP Storage |
| PG-vCD-External | Used to provide the tenants with access to the management network. |




## 2.2.3. Multi-Tenancy

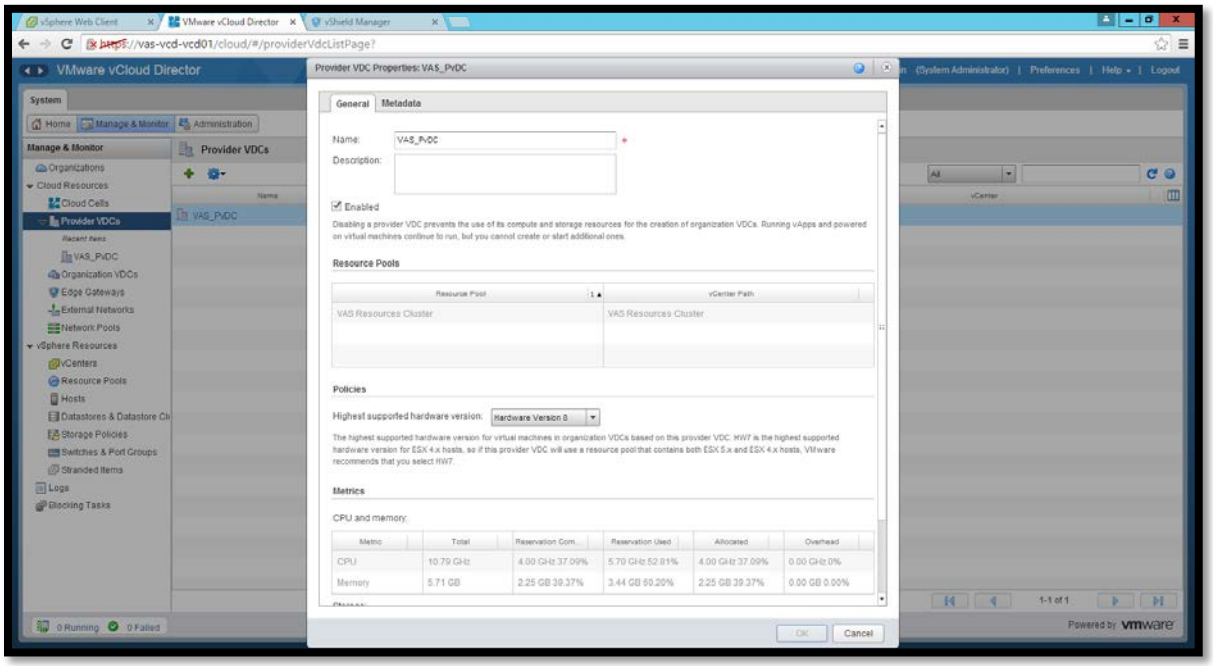
Since our multi-tenancy comes via vCloud Director it is good to mention that VCD provides a number of constructs that map to vSphere resources.

| vCloud Director Construct | Description |
|---|---|
| Provider virtual datacenter | Logical grouping of vSphere compute resources (attached vSphere cluster and one or more datastores) to provide cloud resources to consumers. |
| Organization | A unit of administration that represents a logical collection of users, groups, and computing resources. It also serves as a security boundary from which only users of a particular organization can deploy workloads and have visibility into such workloads in the cloud. In the simplest term, an organization is an association of related end consumers. |
| Organization virtual datacenter | Subset allocation of a provider virtual datacenter's resources assigned to an organization, backed by a vCenter resource pool automatically created by vCloud Director. An organization virtual datacenter allocates resources using one of three models:<br>• Pay-As-You-Go<br>• Reservation<br>• Allocation |

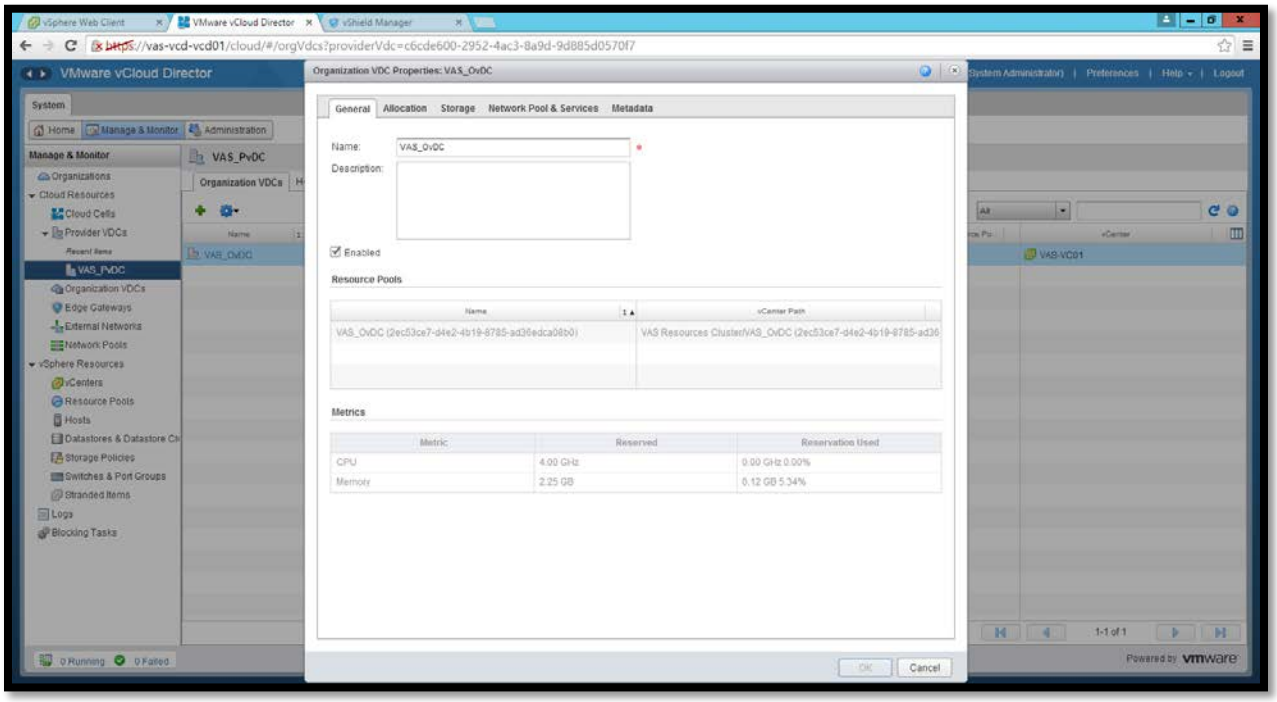
| | |
|---|---|
| External network | A network that connects to the outside using an existing vSphere network port group. |
| Organization network | A network visible within an organization—an external organization network with connectivity to an external network using a direct or routed connection, or an internal network visible only to vApps within the organization. |
| Network pool | A set of pre-allocated networks that vCloud Director can draw upon as needed to create private networks and NAT-routed networks. |
| vApp | A preconfigured container or one or more virtual machines and vApp networks. |
| vApp network | A network visible within a vApp—connected to other vApp networks within an organization using a direct or routed connection, or an internal network visible only to virtual machines within the vApp. |
| vApp templates and media catalogs | A collection of available services for consumption. Catalogs contain vApp templates (preconfigured containers of one or more virtual machines) and/or media (ISO images of operating systems). |

Due to the resources constraints and for the purpose of testing the Antivirus system we will be having:

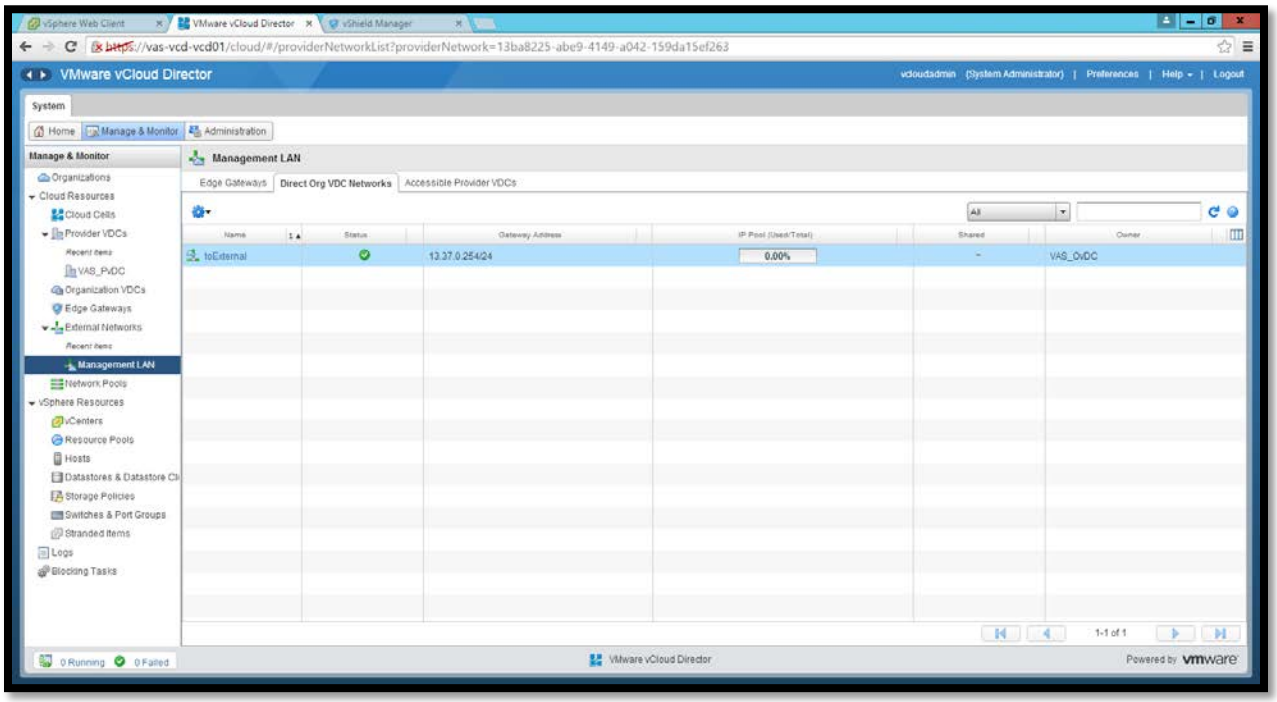
1- One Provider Virtual Datacenter.



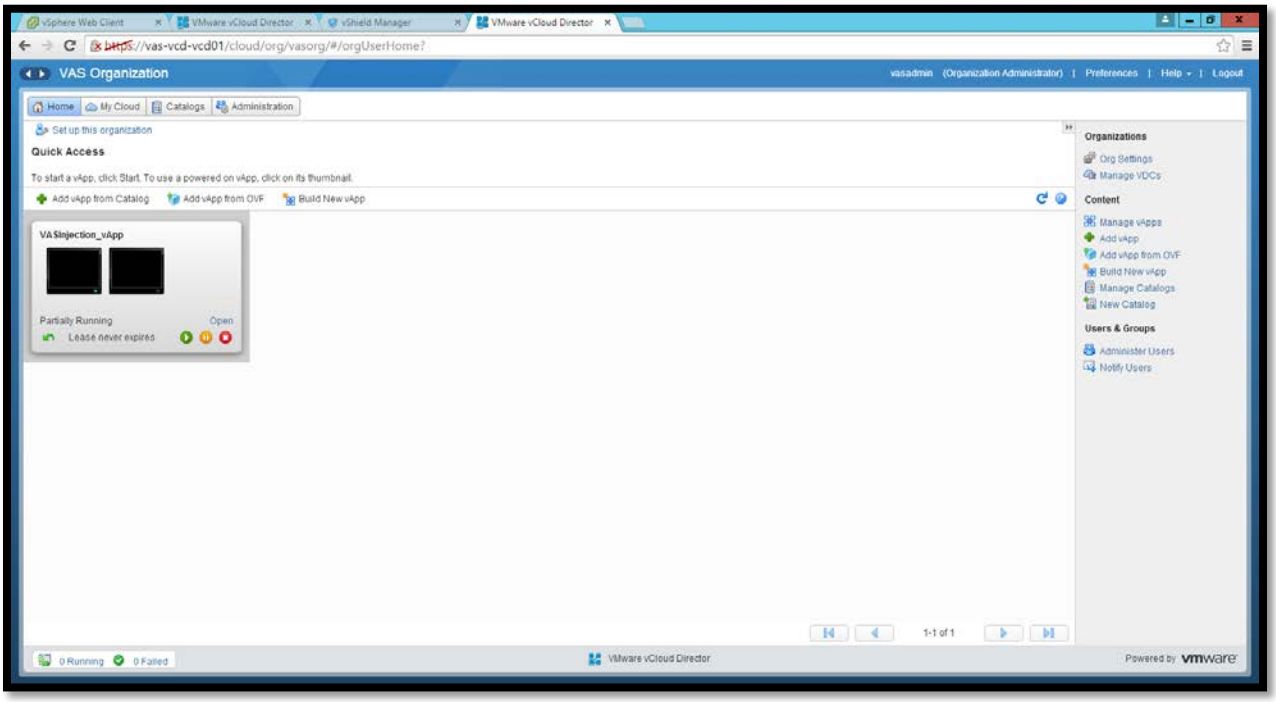
2- One Organization Virtual Datacenter.



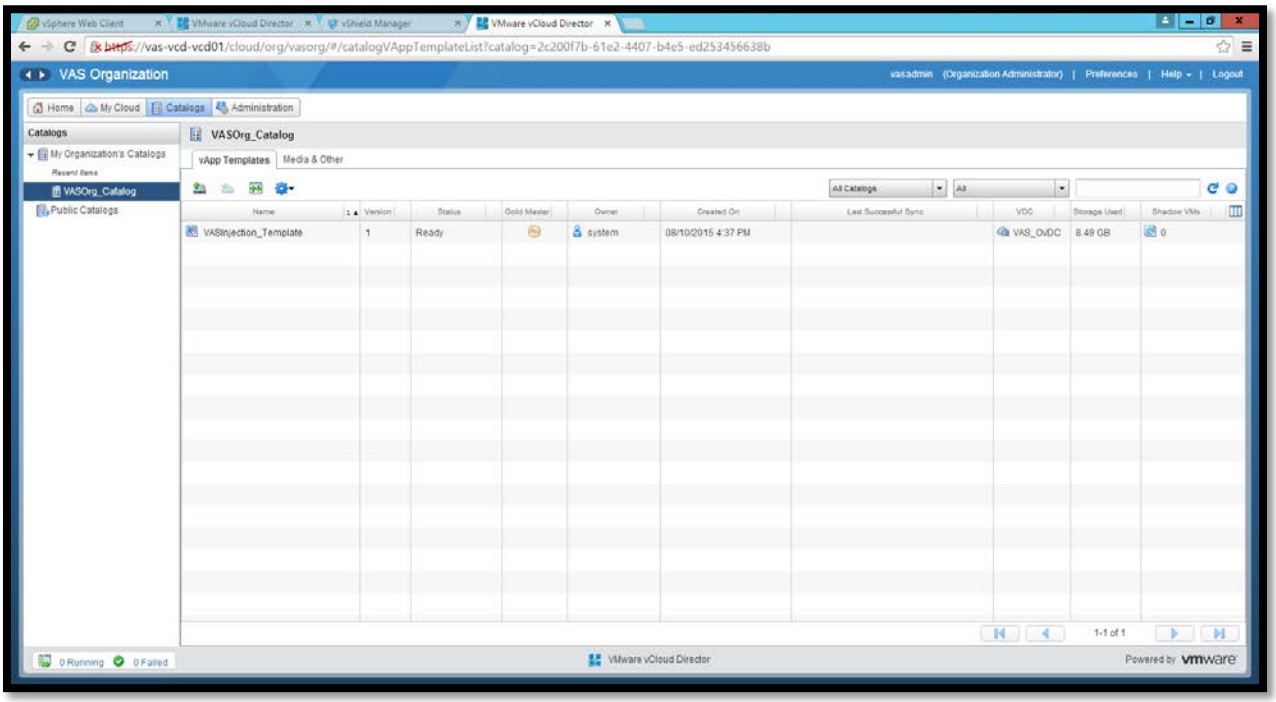

3- One External Network.



4- One vApp.

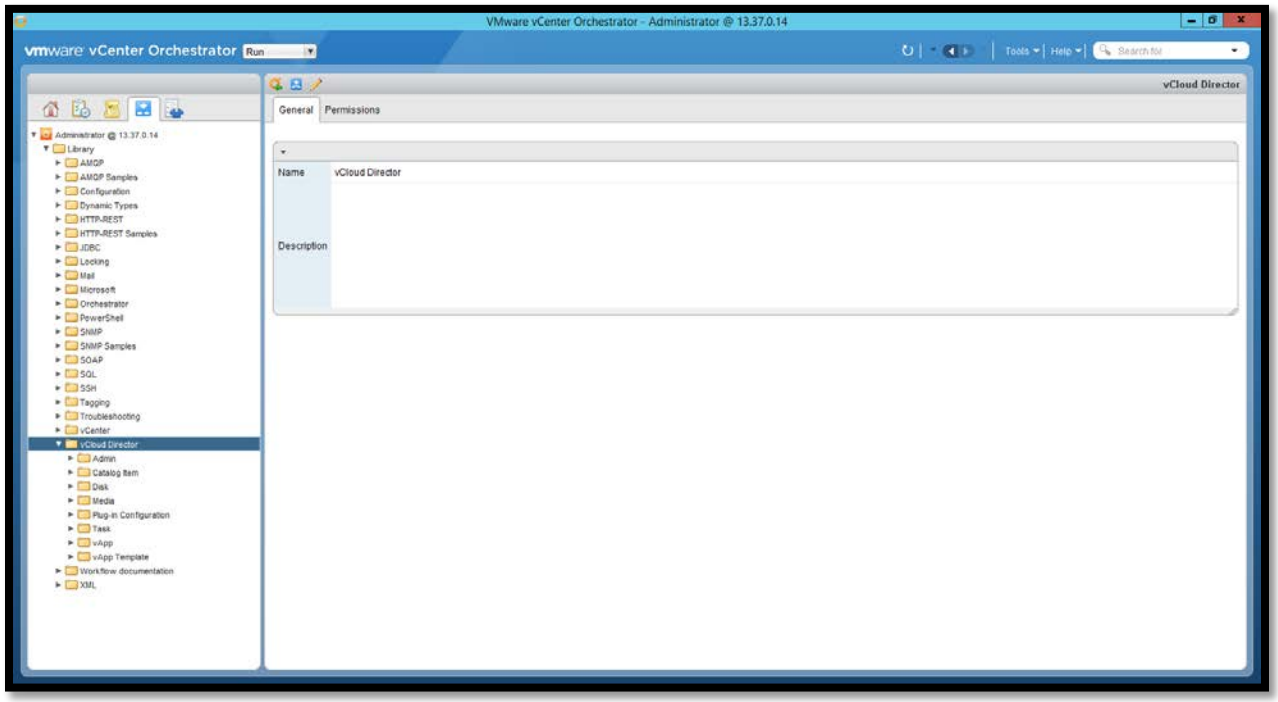



5- One vApp Template (placed in to the organization catalogue).



## 2.2.4. Orchestration

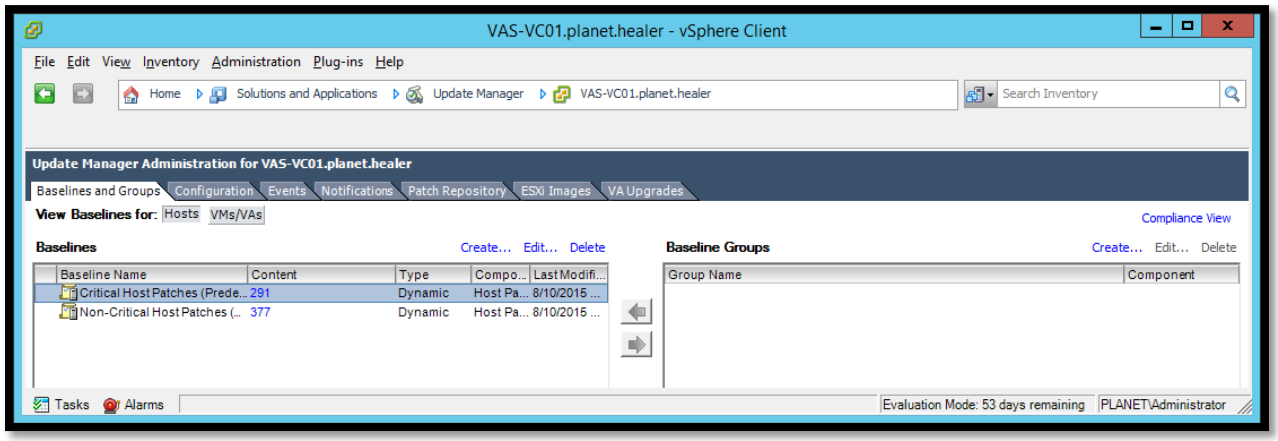
We will be utilizing VMware vCenter Orchestrator with vCloud Director Plug-in which will enable us orchestrate deployments to our organization virtual datacenter via various workflows. Orchestrator has been configured on the vCenter Server (VAS-VC01).




## 2.2.5. Patches and Updates

Virtual Infrastructure:

This will be updated and patched via update manager which has been installed and configured on the vCenter Server (VAS-VC01).



Virtual Workloads:

Since our virtual workloads are vApps, patching and updating them is a matter of:

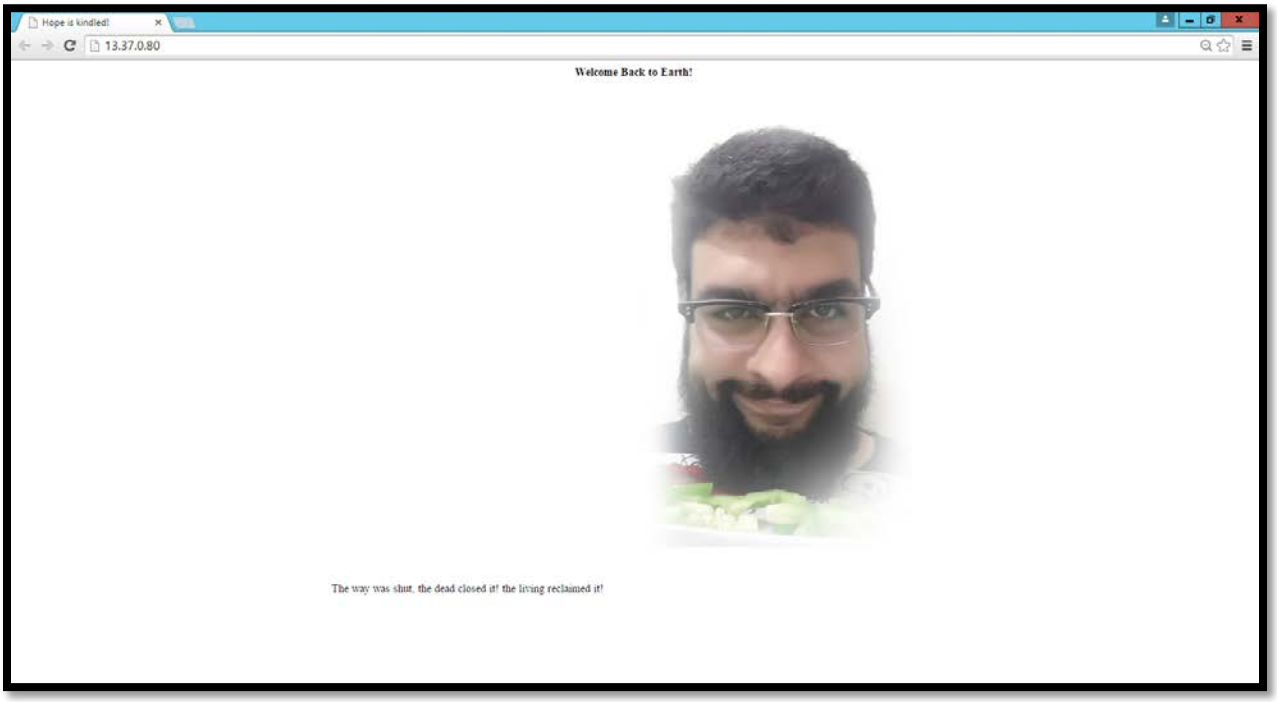
1- Deploying the vApp (from the original template).
2- Perform whatever necessary patches needed.
3- Copy the vApp back to the catalog as the new version and the delete the old one.

## 3. The Zombie Assassination Workload

Well we're preparing this whole infrastructure just to deploy this, our scientists call it the Zombie Assassination System but it is more of a virus assassination system because they actually found a way to kill the zombie virus and cure the human race and restore all beings to their original zombie-free mode.

Since our scientists are placing the vaccination in specific areas we need to flock the zombies towards it, the best way to do so is use bait and the basic testing for our virtual workload includes running a webserver so display an image of a human being which will attract the zombies once projected.

The vApp will consist of several docker images running instances of Ubuntu with Apache.




Although zombies are not attracted to vegetables but we had to place this guy's head on a plate because he didn't feel like being a bait just standing out ;-).

## 4. Workload Deployment Via Orchestrator

Orchestrator has been configured with:

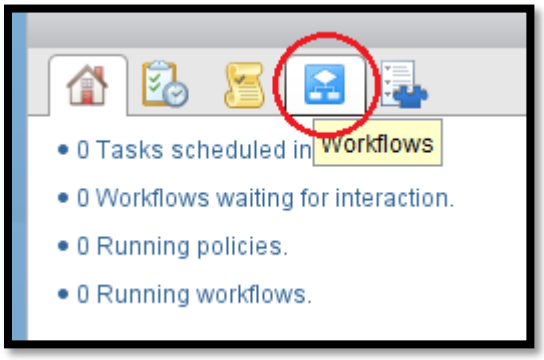
1- vCloud Director Plug-in.

2- Authentication via Active Directory LDAP.

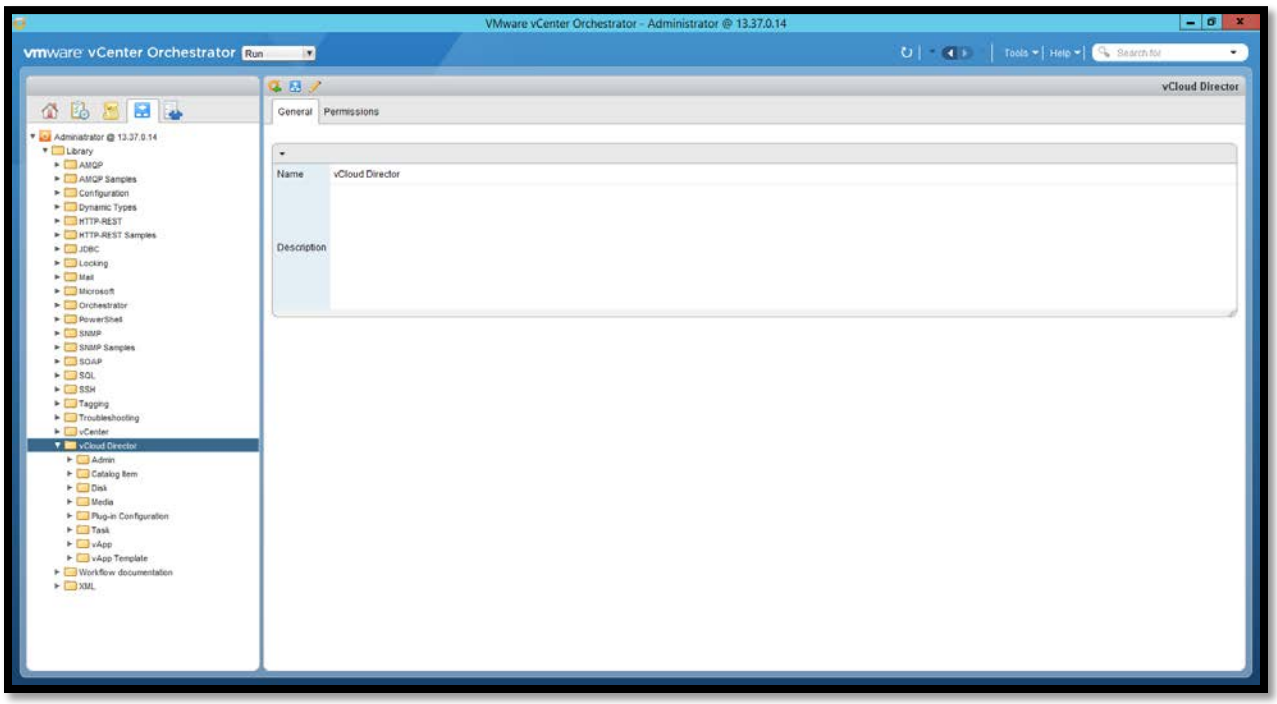
To deploy a vApp or a VM from a template please follow the hereunder:

1- Launch the vCenter Orchestrator Client (found on VAS-DC01 or VAS-VC01).

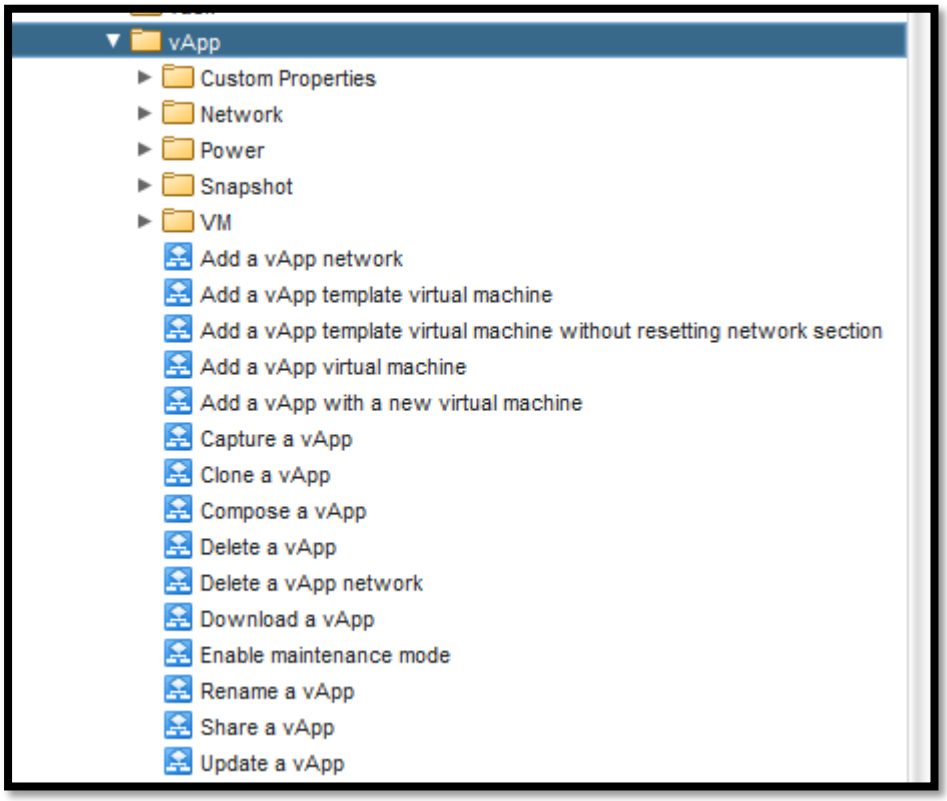
2- Go to workflows



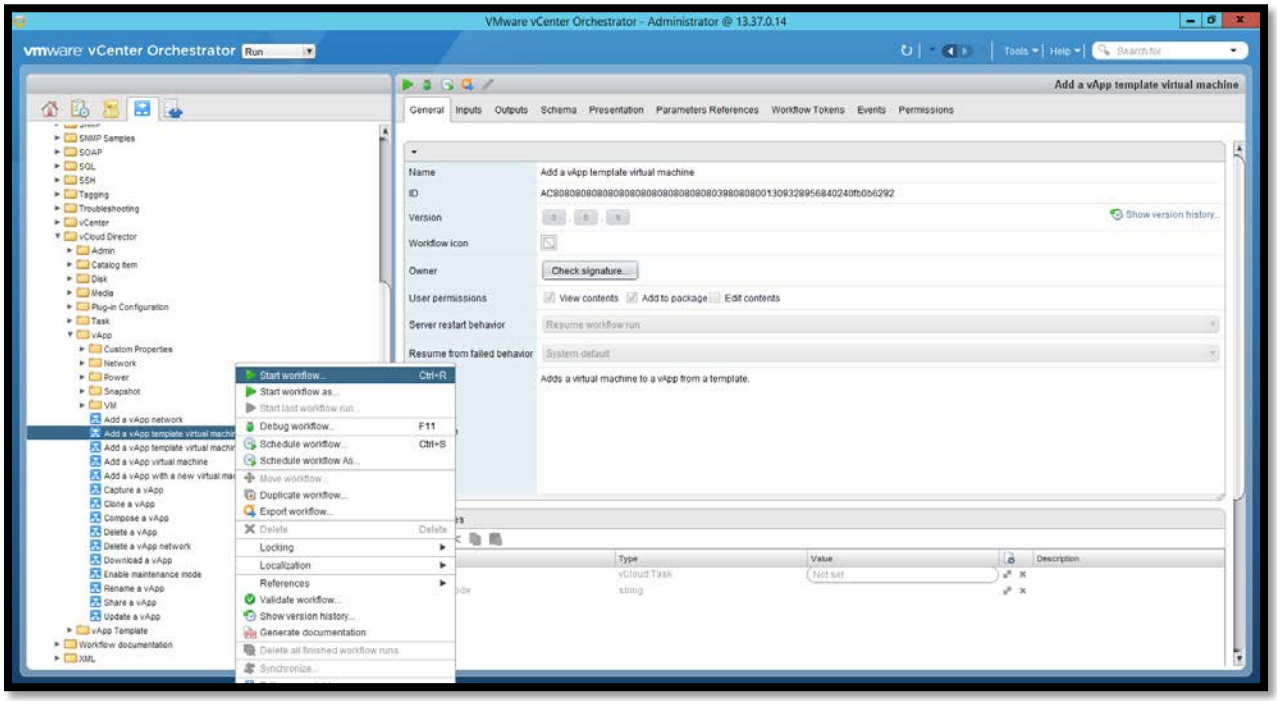

3- Expand the library and locate vCloud Director library



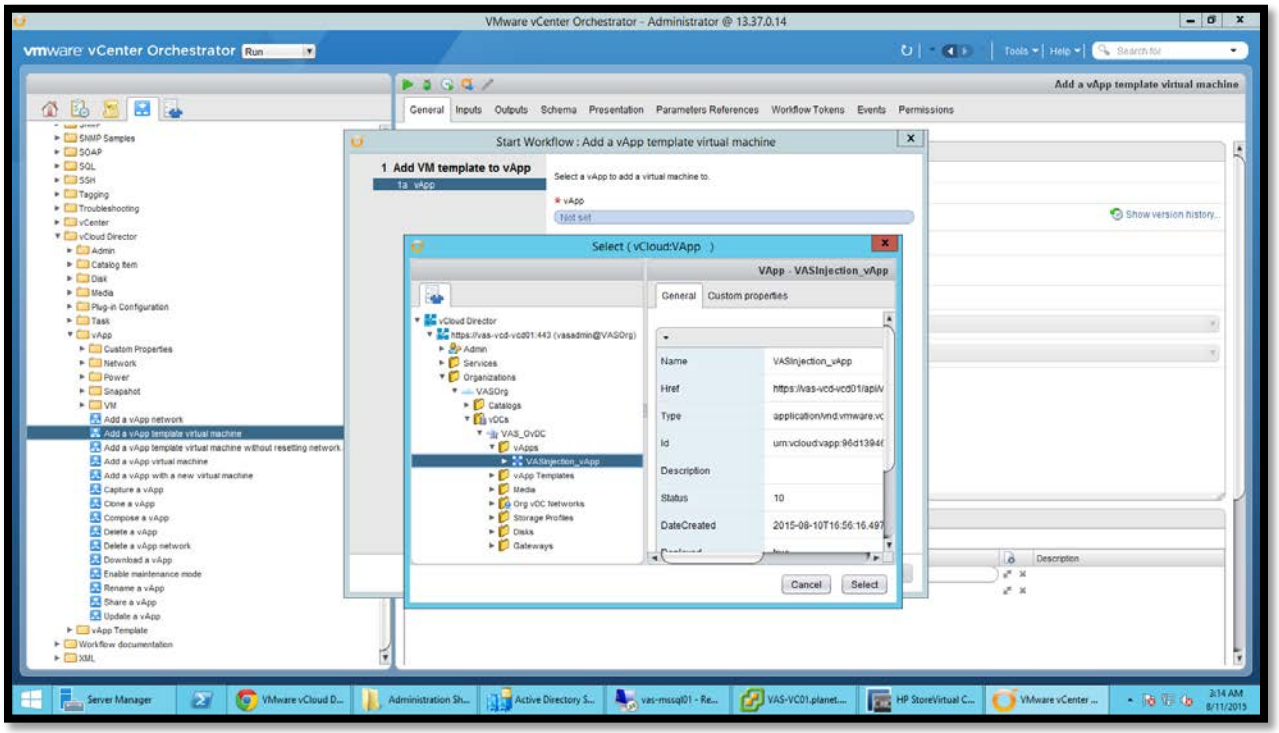
4- Expand vApp



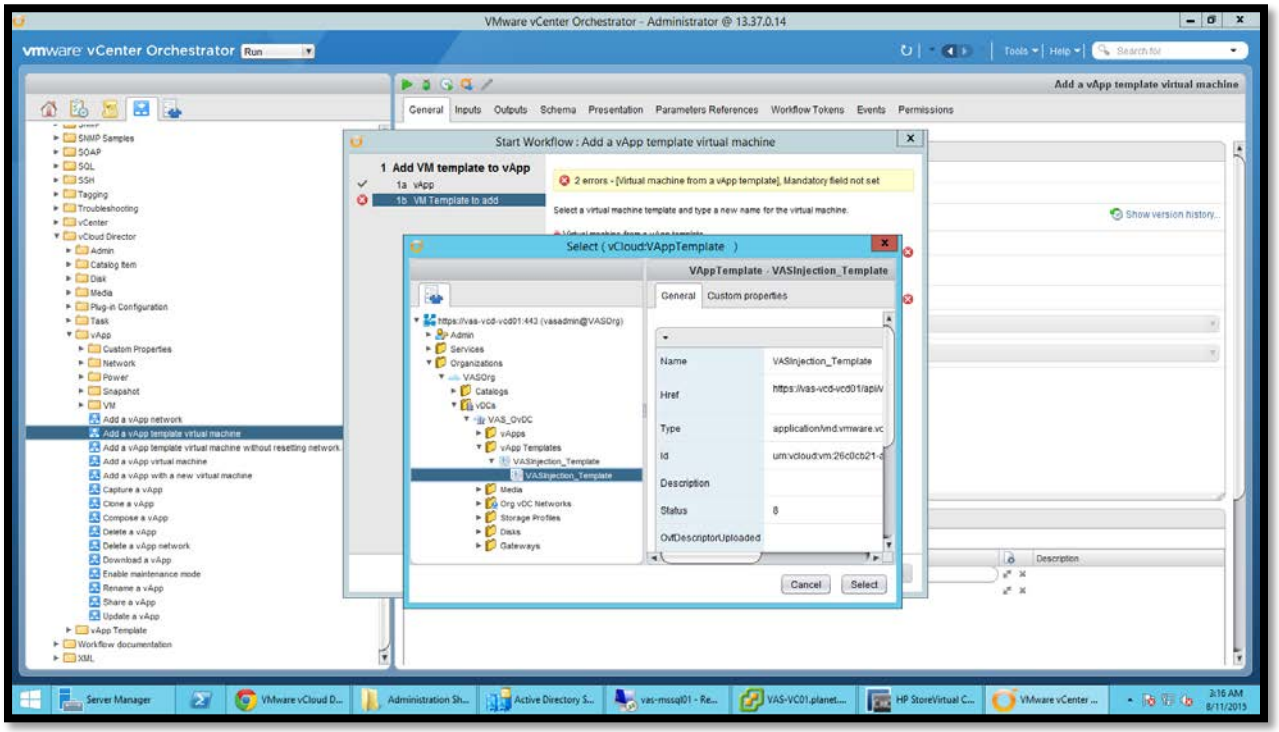

5- Locate for example the **'Add a vApp template virtual machine'** right click and start workflow



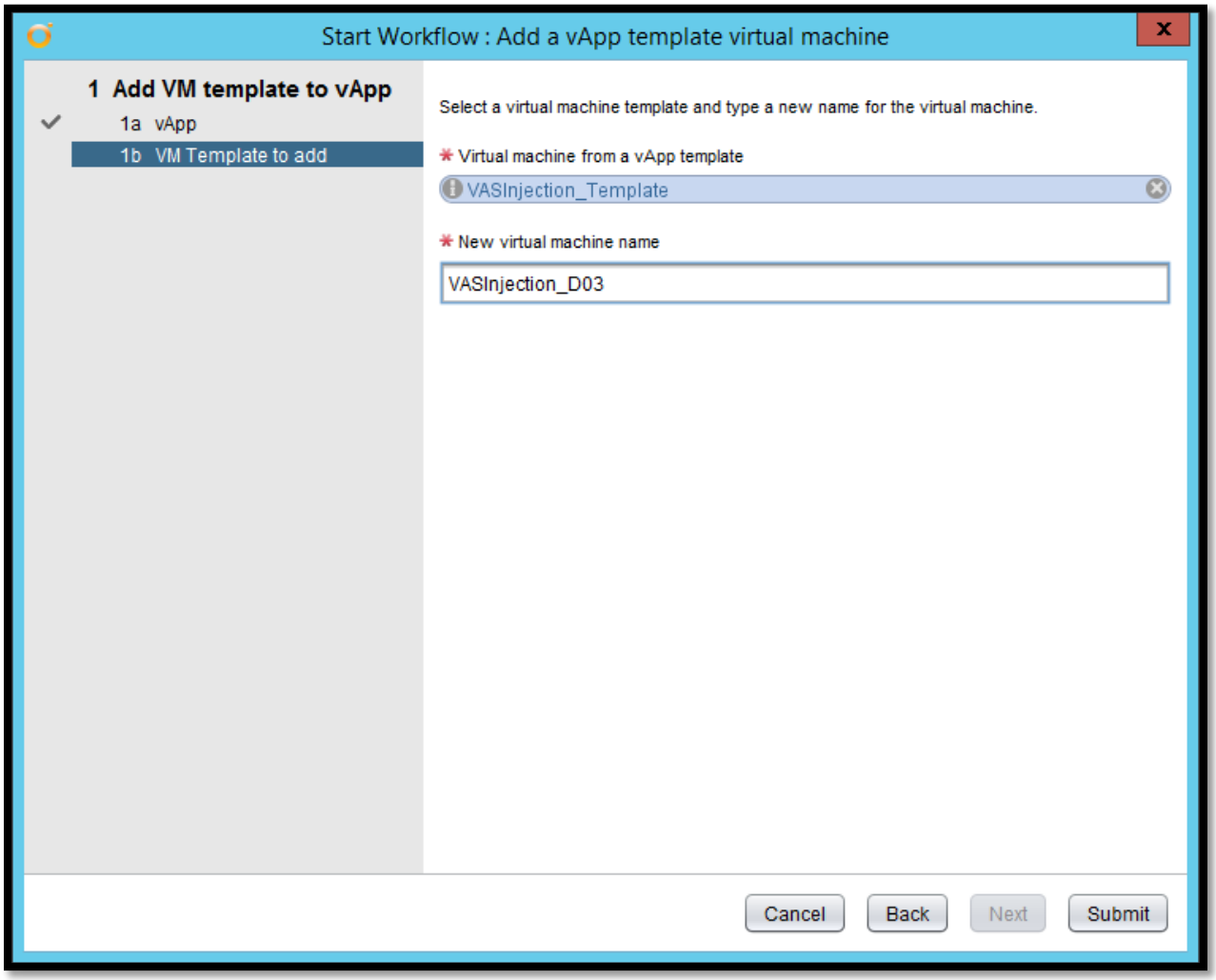
6- Select the vApp




7- Select vApp Template VM



8- Set the name of the new virtual machine




9- Click submit and you're done, now go to your organization and see the new VM being created in your vApp.

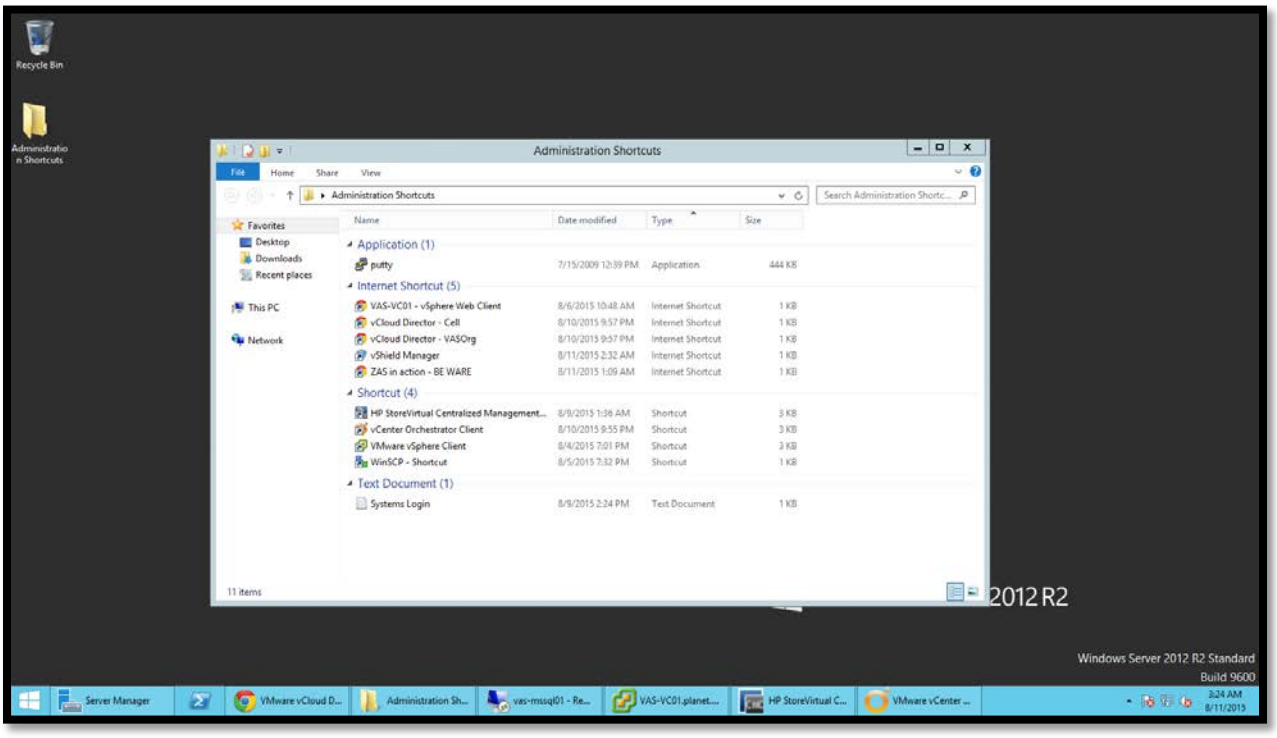
The same almost applies to all workflows that comes by default with the vCloud Director plug-in.

## 5. Access to environment

We've been given two internet accessible IP addresses that were placed initially on the physical ESXi hosts, now after we've setup our infrastructure it didn't seem right to access a single ESXi host and then hop into several virtual machines, it caused us a lot of pain initially, afterwards we have removed those IPs from the ESXi hosts and gave them to two virtual machines running without our infrastructure

1- VAS-DC01 (set for automatic start with ESXi Site01) < 199.16.204.105
2- VAS-VC01 (set for automatic start with ESXi Site02) < 199.16.204.107

Both virtual machines have RDP enabled on them, our preference is to use VAS-DC01, there is a directory called '**Administration Shortcuts**' that can be found on the desktop.




IP Addresses, and credentials can be found in Appendix B and C respectively (although you might not need as we have setup everything to ease your access).

## 6. Final Words

This task has not been easy knowing that we were given minimal resources to provide so much of a complex environment, we are happy with the results and we do look forward to eating popcorn while the zombies fall on the near with the memory of that ugly face haunting their recovery dreams.

# 7. Appendices

## 7.1. Appendix A – Virtual Machines Configuration

| Virtual Machine | Role | Operating System / Version | VM Model | vCPU | vRAM (MB) | vNIC | vDisk (GB) | Additiona information | Site |
|---|---|---|---|---|---|---|---|---|---|
| VAS-DC01 | Active Directory Services | Win2k12 R2 | 8 | 1 | 2048 | 2 | C: (40) thin | Second NIC for external access and VM added to ESXi auto startup | Site01 |
| VAS-DC02 | Active Directory Services | Win2k12 R2 | 8 | 1 | 512 | 1 | C: (40) thin | | Site02 |
| VAS-MSSQL01 | Microsoft SQL Server | Win2k12 R2 / 2012 SP1 | 8 | 1 | 1024 | 1 | C: (40) thin | | Site01 |
| VAS-MSSQL02 | Microsoft SQL Server | Win2k12 R2 / 2012 SP1 | 8 | 1 | 1024 | 1 | C: (40) thin | | Site02 |
| VAS-VC01 | VMware vCenter Server | Win2k12 R2 / 5.5 update 2 | 8 | 2 | 4096 | 2 | C: (40) thin | Second NIC for external access and VM added to ESXi auto startup | Site02 |
| VAS-VCD-VCD01 | VMware vCloud Director | CentOS 6.6 / 5.5.2 | 8 | 1 | 2560 | 1 | / (30) thin | | Site01 |
| VAS-VSM01 | VMware vCNS | Ready to deploy appliance / 5.5 update 2 | 8 | 2 | 1024 | 1 | / (60) thin | | Site01 |
| VAS-VSA01 | HP StoreVirtual | Ready to deploy appliance / 12 | 7 | 2 | 4096 | 2 | 32 thin \| 50 thin | | Site01 |
| VAS-VSA02 | HP StoreVirtual | Ready to deploy appliance / 12 | 7 | 2 | 4096 | 2 | 32 thin \| 50 thin | | Site02 |
| VAS-VCD-ESXi01 | Nested ESXi | vSphere 5.5 update 2 | 8 | 2 | 4096 | 4 | / 3 thin | Connected to HP VSA via iSCSI | Site01 |
| VAS-VCD-ESXi01 | Nested ESXi | vSphere 5.5 update 2 | 8 | 2 | 4096 | 4 | / 3 thin | Connected to HP VSA via iSCSI | Site02 |
| VAS-REP01 | vSphere Replication | Ready to deploy appliance / 5.5 update 2 | 7 | 2 | 2048 | 1 | / 10 thin \| /2 thin | vSphere Replication appliance | Site01 |

## 7.2. Appendix B – Virtual Infrastructure IP Address Allocation

- Physical Host Site01: 13.37.0.3/24
- Physical Host Site02: 13.37.0.4/24

| Hostname | IP Address | Subnetmask | DNS | Gateway | Description |
|---|---|---|---|---|---|
| VAS-DC01 | 13.37.0.1 | 255.255.255.0 | 13.37.0.1 \| 13.37.0.2 | 13.37.0.254 | Domain Controller |
| VAS-DC02 | 13.37.0.2 | 255.255.255.0 | 13.37.0.2 \| 13.37.0.1 | 13.37.0.254 | Domain Controller |
| VAS-MSSQL01 | 13.37.0.10 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | MSSQL Server |
| VAS-MSSQL02 | 13.37.0.11 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | MSSQL Server |
| VAS-MSSQL-CLS | 13.37.0.12 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | MSSQL Server Cluster |
| VAS-MSSQL | 13.37.0.13 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | MSSQL Listener (1443) |
| VAS-VC01 | 13.37.0.14 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | vCenter Server |
| VAS-VCD-VCD01 | 13.37.0.20 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | vCloud Director Server |
| VAS-VSM01 | 13.37.0.254 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | vCNS Appliance |

| | | | | | |
|---|---|---|---|---|---|
| VAS-Edge-(0 \| 1) | 13.37.0.252 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | vCNS Edge (provides DHCP) |
| VAS-VSA01 | 13.37.0.190 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | HP VSA Appliance 1 |
| VAS-VSA02 | 13.37.0.191 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | HP VSA Appliance 2 |
| VAS-VSA-VIP | 13.37.0.192 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | Virtual IP used to access the VSA Cluster |
| VAS-VCD-ESXi01 | 13.37.0.15 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | Nested ESXi Management |
| VAS-VCD-ESXi02 | 13.37.0.16 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | Nested ESXi Management |
| VAS-VCD-ESXi01-VXLAN | 13.37.0.115 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | Nested ESXi Management – VXLAN backed |
| VAS-VCD-ESXi02-VXLAN | 13.37.0.116 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | Nested ESXi Management – VXLAN backed |
| VAS-VCD-ESXi01-iSCSI | 13.37.0.200 \| 201 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | Nested ESXi IP Storage |
| VAS-VCD-ESXi02-iSCSI | 13.37.0.202 \| 203 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | Nested ESXi IP Storage |
| DHCP Scope | 13.37.0.80 - 90 | 255.255.255.0 | 13.37.01 \| 13.37.0.2 | 13.37.0.254 | vAPP DHCP Scope |

## 7.3. Appendix C – Virtual Infrastructure User Access and Credentials

| Service | Username | Password | Access method |
|---|---|---|---|
| Physical ESXi Host 01 | root | B87zy6TEWgPT | vSphere Client |
| Physical ESXi Host 02 | root | 23dGa8R7Txdj | vSphere Client |
| Active Directory Domain Services (planet.healer) | Administrator | G0tr00t123 | Usable Domain Wide |
| vCenter SSO | administrator@vsphere.local | P@ssw0rd | vSphere web-client https://vas-vc01:9443/vsphere-client |
| vCenter Server | administrator@planet.healer | G0tr00t123 | vSphere Client and vSphere web-client https://vas-vc01:9443/vsphere-client |
| Nest ESXi Host 01 | root | G0tr00t123 | vSphere Client |
| Nest ESXi Host 02 | root | G0tr00t123 | vSphere Client |
| vShield Administration | Admin | G0tr00t123 | https://13.37.0.254 |
| vCloud Cell Administration | vcloudadmin | G0tr00t123 | https://vas-vcd-vcd01 |
| vCloud VASOrg Administration | vasadmin | G0tr00t123 | https://vas-vcd-vcd01/cloud/org/VASOrg/ |
| vCenter Orchestrator (AD LDAP Integrated_ | Administrator | G0tr00t123 | vCenter Orchestrator Client |
| HP VSA | Vsaadmin | G0tr00t123 | Centralized Management Console |

## 7.4. Appendix D – Reference URLs

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