

VMware Cloud Foundation (VCF) Certification on HPE Synergy

Best practices and general build information for VCF 2.3.2 use on HPE Synergy platform

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Introduction and Executive Summary

This document is an installation guide for VMware VCF installations on the HPE Synergy hardware platform.

The intended users for this content are HPE, VMware, and their channel partners who are interested in setting up a lab or doing services implementations. This document is not intended to be a training guide for OneView, Synergy, or VCF. Prior knowledge of these applications and hardware is expected to understand the content herein.

VMware Cloud Foundation is an integrated hybrid cloud platform that delivers a complete set of software defined services for compute, storage, networking, security, and cloud management for the private and public cloud. Cloud Foundation drastically simplifies data center operations by deploying a standardized and validated architecture with built in lifecycle automation of the cloud stack. Cloud Foundation can also be flexibly consumed as-a-service in the public cloud (VMware Cloud on AWS, IBM, Rackspace, etc), enabling a true hybrid cloud that is based on a consistent infrastructure and operational model using common tools and processes.

HPE Synergy is a single infrastructure of pools of compute, storage, and fabric resources, along with a single management interface that allows IT to rapidly assemble, disassemble and re-assemble resources in any configuration. HPE Synergy architecture eliminates hardware and operational complexity so IT can deliver infrastructure to applications faster and with greater precision and flexibility. HPE OneView is your infrastructure automation engine built with software intelligence. It streamlines provisioning and lifecycle management across compute, storage and fabric resources in the Synergy System.

Physical and Logical Layout

Example with 3 Frames, Management Domain, and separate Workload Domain



This example can be scaled from one Synergy Frame to multiple Synergy Frames spread across multiple racks. **Solutions Components**

Software components: (Starting reference during publication, Refer to HCL for current list)

Software	Version
HPE OneVlew for Synergy	4.00.07.02
HPE Synergy Firmware Bundle (SPP)	2018.03.00
HPE P416mi-e Firmware	1.34
HPE P416mi-e Driver	smartpqi-1.0.1.254-10EM.650.0.0.4598673.x86_64

VMware Cloud Foundation	2.3.2
VMware ESXi Server	February 2018 HPE Custom ISO

Hardware components initial configuration:

Hardware	Detail
HPE Synergy Frame with Fabric	1-3 Frames with 2 VC SE 40Gb F8 Modules and 20 GB satellite
HPE Synergy Storage Module	D3940 (multiple depending on sizing guide)
HPE Synergy Compute Model	4x Management nodes
	3 or more Production nodes
	HPE SY480/SY660 Gen10
HPE Synergy Compute	2x CPU - Intel Xeon, 256GB Memory each min
HPE Synergy Storage	HPE Smart Array P416i-e
HPE Synergy Network Options	Synergy 3820C 10/20Gb CNA

Resources for Sizing and Use of VCF on Synergy

- Compute, memory and storage must be vSAN certified and part of the Synergy vSAN ReadyNodes. Please work with your Hewlett Packard Enterprise sales representative to build the order by following the prescribed configurations on the Ready Nodes document in the VMware hardware compatibility list. You can access the Simple Configurator at: vSANreadynode.vmware.com/RN/RN and follow the steps outlined. For OEM: choose "Hewlett Packard Enterprise," select the model, then follow "Next steps."
- See resources below:<u>HPE Best Practices Guide for vSAN on Synergy</u>
- VMware hardware compatibility list (HCL)
- <u>VMware[®] vSAN[™] Design and Sizing Guide 6.5</u>
- VM Sizing Tool from VMWare

Key Considerations and Prequisites

Please observe the following considerations to make sure a customer is within the correct parameters.

- 1. VMware vSAN HCL must be used as a reference for required driver and firmware levels
 - a. Check the driver/firmware combinations against what is currently being used in the latest Synergy SPP
 - b. If firmware required for HCL is not available in latest SPP then download driver from HPE support and upload to the Composer via method described in <u>Managing Composable Infrastructure guide</u>
- 2. Cache and Data drive sizes dictated by VM sizing done prior to purchasing (no set "only use these disks" in VCF)
- 3. Physical layout of frames and racks depending on HA and VM sizing (local to D3940) with specific drives
- 4. All nodes must have equivalent configurations of memory and vSAN sizing in the same cluster

Pre-Requisites

This section describes required configurations, and access credentials that must be known, prior to initiating the VCF build.

To facilitate the deployment of VMware Cloud Foundation software to Synergy Compute modules, a VMware Imaging Appliance (VIA) VM is required.

One or more HPE Synergy frames – populated with compute, memory, storage, and fabric per VMware certified specifications – must be installed and networked.



The Synergy Composer must be configured per Synergy specifications. In addition, the following OneView attributes should be preconfigured prior to proceeding with the VCF build configuration:

- Settings => Networking, Time and Locale, Licenses, and SNMP
- Settings => Address and Identifiers, including the management network address range
 - o Note: The management network may be identified by any name. E.g.: **iLO_Range** in the screenshot on the next page.
- Settings => Repository (with space available)
- Enclosures
- Server Hardware
- Server Hardware Types
- Drive Enclosures

Configuration of all other required OneView parameters are covered in this document.

HPE OneView Configuration through HPE Synergy Composer

Configuring Networks (VLANs)

The VLANs configured on OneView are consumed by the Server Profiles and Interconnect. Hence they must configured in a Network Set and Logical Interconnect Group. VMware VCF requires all VLANs used by VCF not have a VLAN ID lower than 24 or greater than 3299.

In addition to any VLANs that may already exist, create the following VLANs as **Tagged** under OneView => Networking => Networks. For a listing of the components included in the solution, see Table x in <u>Appendix A – Solution hardware configuration (this section is required)</u>.

At a minimum, the following VLANS are required to bring up VMWare Cloud Foundation on Synergy::

- 1. A VCF "build network" used for initial imaging and deployment
- 2. Vmotion Network
- 3. VCF-Internal Management Network
- 4. Datacenter Network (External Management and guests)
- 5. VXLAN transport VLAN
- 6. 1 vSAN Network per workload domain

Examples of the networks are shown in the following images. NOTE: These are **examples** and can vary depending on the customer installation. The names do not need to be identical, but being specific will help the customer know which networks apply to what function.

\$	OneView	V Q Sea	arch		
Y	Networks 8	All statuses 🗸 📝	All types 🗸 🛛 All resource	es 🗸 All labels 🗸	
+	Create network			⊘ Net-234 Ov	erview ~ 🗧
•	Name	▲ VLAN	Туре	General	
•	fc-san1		FC	ocherar	
•	fc-san2		FC	Туре	Ethernet
•	Net-230	300	Ethernet	VLAN	304
•	Net-231	301	Ethernet	Associated with subnet ID	none
•	Net-232	302	Ethernet	Purpose	General
•	Net-233	303	Ethernet	Preferred bandwidth	2.5 Gb/s
•	Net-234	304	Ethernet	Maximum bandwidth	20 Gb/s
•	vsan-2000	2000	Ethernet	Smart link	Yes
				Private network	No
				Uplink set	<u>UplinkSet</u>
				Used by	none
				Member of	<u>1 network set</u>
Revie	W @		v Motion Netwo	ork	VXI AN Network

Review configuration details. Please note, on	ce these details are s
~ General	
Physical Rack Name	skrack
Company Name	vmware
Company Department	isbu
Root DNS Domain	vsphere.local
VMware Cloud Foundation Sub-Domain	vrack.vsphere.local
SSO Domain	vsphere.local
 Management Network 	
VLAN ID	1108
Subnet	172.21.0.0
Subnet Mask	255 255 255 0
Gateway	172,21.0.1
Primary DNS	192.168.1.104

30
172.22.0.0
255 255 252 0
172.22.0.1
40
172.24.0.0
255 255 252 0
172.24.0.1
50
172.31.0.0
255 255 252.0

VXLAN Network	
VLAN ID	50
Subnet	172.31.0.0
Subnet Mask	255 255 252.0
Gateway	172.31.0.1
Excluded IP Address Ranges	
Data Center Network	
VLAN ID	60
Subnet	172.41.0.0
Subnet Mask	255 255 252 0
Gateway	172:41.0.1
Excluded IP Address Ranges	
V Data Center Uplink	
Uplink Type	L2
Uplink LAG	Disabled
2012/04/2019/7	

Configuring HPE OneView Network Sets (VLAN sets)

Network sets are consumed only by server profiles. Network sets allow multiple VLANs to be carried on the same physical server interface. Create a network set for use from **OneView => Networking => Network Sets** and include all networks to be used by VCF.

Note: Set whichever network will be used as the "build network" for initial imaging and deployment as Untagged.

Networks

Name	*	VLAN ID	Untagged	
DataCenter		100		×
Imaging		99		×
Management		101		×
vMotion		102		×
vSAN		103		×
VXLAN		104		×

There are no available networks to add.

Remove networks	Remove all

🛞 OneView 🗸 🗸	Q Search
Network Sets 1 All resour	rces 🗸 All labels 🗸
+ Create network set	Net230-234 Overview ∨ ≳
Name 🔺	General
Net230-234	Preferred bandwidth2.5 Gb/sMaximum bandwidth20 Gb/sUntagged networkNet-231Used by9 server profiles 2 server profile templates
	Networks
	<u>Net-230</u> 300 <u>Net-231</u> 301 <u>Net-232</u> 302 <u>Net-233</u> 303 <u>Net-234</u> 304 <u>vsan-2000</u> 2000

Configuring HPE OneView Logical Interconnect Groups

The following 2 Logical Interconnect groups must be configured from **OneView => Networking => Logical Interconnect Groups**. These will be consumed by the Logical Enclosure to configure the physical enclosures.

- 1. Logical Interconnect Group for 40G Ethernet Connectivity
- 2. Logical Interconnect Group for 12G SAS Connectivity

Adding Logical Interconnect Group for Virtual Connect SE 40Gb Ethernet Connectivity

Select [Create logical interconnect group]

- 1. Any name will suffice for the logical interconnect.
- 2. The Enclosure count is the number of Synergy Frames in the logical interconnect group (e.g.: networked through the physical Master Interconnect Module Pair).
- 3. Interconnect bay set: select **3**
 - o Interconnect bay sets are typically as follows:
 - Bay Set 1: Storage primary bays 1 & 4 and the only bays that support the SAS Connection Module
 - Bay Set 2: Storage and networking secondary bays 2 & 5
 - Bay Set 3: Networking primary bays 3 & 6
- 4. Redundancy: For a single frame, this is typically **Redundant**. For multiple frames, this is typically Highly Available.
 - o Redundancy selection options are as follows:
 - Highly Available: When the Master Interconnect Modules are on opposite sides of two enclosures.
 - Redundant: When a Master Interconnect Module pair are on opposite sides of a single enclosure (e.g.: bays 3 & 6)
 - Non-redundant (A side only): When a single Master Interconnect Module is used on A side (e.g.: bay 3)
- 5. Non-redundant (B side only): When a single Master Interconnect Module is used on B side (e.g.: bay 6)

Create Logical Intercor	nect Group General ~	?
General		
Name	ETH-LIG	
Logical Interconnect Grou	p	
Using the selectors below, describe interconnects" to see the bay and it	the logical interconnect group to be created and then click "Select nterconnect choices.	
Interconnect type	Virtual Connect SE 40Gb F8 Module for Synergy v C The interconnect type will determine configuration of interconnect choices and bay	
Enclosure count	1 v	
Interconnect bay set	3 ~	
Redundancy	Redundant ~	
Select interconnects		
Changed: Interconnect typ	e to "Virtual Connect SE 40Gb F8 Module for Sy Create Create + Cancel	

Select [Select interconnects]

Create Logical In	terconnect Group General ~	?
General		
Name	ETH-LIG	
Logical Interconne	ct Group	
Interconnect type	Virtual Connect SE 40Gb F8 Module for Synergy	
Enclosure count	1	
Interconnect bay set	3	
Redundancy	Redundant	
Scope	none	
Internal 🖉	Add uplink set	

Select [Add uplink set]

Create Uplink Set		
General		
Name	UplinkSet	
Туре	Ethernet 🗸	
Connection mode	Automatic	
LACP timer	Short (1s) v	

Select [Add networks]

Note: Do not mark any VLAN as native during Uplink Set creation unless that VLAN is indeed set as the PVID or Native VLAN on the upstream switch. .

Networks				
Name	 Туре	VLAN ID 🔺	Native	
Net-230	Ethernet	300		×
Net-231	Ethernet	301		×
Net-232	Ethernet	302		×
Net-233	Ethernet	303		×
Net-234	Ethernet	304		×
vsan-2000	Ethernet	2000		×

Select [Add uplink ports]

All the VLANs must be configured on the Logical Interconnect Uplink set as shown below. The Uplink set establishes the north-south connectivity from Synergy to the Customer Core switch.

Note: You must select the ports that correspond to your physical wiring.

Uplink Ports							
Interconnect Module	 Enclosure	Bay	Port	Capability	Speed	Auto-negotiation	
Virtual Connect SE 40Gb F8 Module for Synergy	1	3	Q5	Ethernet + FCoE	Auto 🗸	Enabled	х
Virtual Connect SE 40Gb F8 Module for Synergy	2	6	Q5	Ethernet + FCoE	Auto 🗸	Enabled	×

Notes:

1. In a 2 or more frame configuration, the second interconnect module will likely be in enclosure 2.

2. When connecting to external SANs, additional uplink sets will be required and the Logical Interconnect Map will look like:

	Redu	indancy	Highly	y available							
1	internal network	0	SA 1 ne 1 up	N-A etwork blink port	0 ×	Ur 5 n 2 u	olinkSet ietworks iplink po	∕∕ × s orts	SAN-B 1 network 1 uplink po	Ø×	Add uplink set
3	L1 L2	1 2 Q	3 4 1 E 40Gb	1 2 3 Q2 F8 Module	4	I 2 3 Q3	3 4	1 2 3 4 Q4	4		

Select [Create]

Validate the Logical Interconnect Group settings and Select [Create]

Add a Logical Interconnect Group for 12Gb SAS Connectivity

This logical interconnect group enables Server Profiles to consume storage from D3940 Storage Modules. The SAS Logical Interconnect Group applies to all enclosures in the OneView management network.

Select [Create logical interconnect group]

```
Give any name for the LIG
```

Create Logical Interconnect Group General ~								
General								
Name	SAS-LIG							
Logical Interconnect Grou	P							
Using the selectors below, describe interconnects" to see the bay and in	the logical interconnect group to be created and then click "Select nterconnect choices.							
Interconnect type	Synergy 12Gb SAS Connection Module ~ The interconnect type will determine							
Enclosure count	1							
Interconnect bay set	1							
Select interconnects								

Select [Select interconnects]

Select [Synergy 12Gb SAS Connection Module] for Bays 1 and 4

	al	~				
General						
Name SAS-LIG						
Logical Interconnect Group						
Interconnect type Synergy 12Gb SAS Connection Module						
Interconnect bay set 1						
Scope none						
1 Synergy 12Gb SAS Connection Module 1 2 3 4 5 6	7	8	9	10	11	12
4 Synergy 12Gb SAS Connection Module → 1 2 3 4 5 6	7	8	9	10	11	12

Select [Create]

NOTE: The steps used above all show best practices and examples. The names and exact uplinks for the Uplink Sets can be different in the customer environment and do not need to match these pictures identically.

Configuring HPE OneView Enclosure Group

Create an Enclosure Group from **OneView => Servers => Enclosure Groups**, similar to as shown in the screenshot, populating the interconnect bays with the LIG definitions created in the previous steps.

In this example the enclosure count is [3] because the environment is the maximum 20Gb interconnect satellite configuration. If starting with one enclosure as an installation then the count would be [1].

Depending on customer's specifications from earlier in the document the use of address pool or DHCP or managed externally will be selected.

As the build does not use the HPE Image Streamer there will not be a deployment settings or deployment network for that hardware in the build examples. If it exists in the customer environment then it would be added here.

Create Enclosure	Group General ~		?
General			
Name	Main EG		
Enclosure count	3 ~		
IPv4 management address configuration	 Use address pool Use 	DHCP 💿 Manage externally	
IPv4 address pool	Range Name 🔺 Domain	IPv4 Addresses	
	Mgmt	10.16.44.200 - 10.16.44.240	×
	Add address ranges	Remove all	
OS Deployment Se	ttings		
OS Deployment Se	inings		
Deployment network type	None ~		

Interco	onnect Bay Configurati	on
Enclosu	ure 1	
1	Interconnect	Synergy 12Gb SAS Connection Module
	Logical interconnect group	SAS-LIG × Q
2	Logical interconnect group	None × Q
3	Interconnect	Virtual Connect SE 40Gb F8 Module for Synergy
	Logical interconnect group	ETH-LIG × Q
4	Interconnect	Synergy 12Gb SAS Connection Module
	Logical interconnect group	SAS-LIG × Q
5	Logical interconnect group	None Q
6	Interconnect	Synergy 20Gb Interconnect Link Module
	Logical interconnect group	ETH-LIG × Q
Enclosu	ure 2	

Select the bay number [1] for the SAS-LIG and it will automatically populate bay number [4] as well. This must be done for every frame that has SAS connectivity to the D3940 modules inside those frames.

Select the bay number [3] for the ETH-LIG and it will automatically populate the bay number [6] as well as other [3][6] bays in different frames if more than one enclosure count selected.

Configuring HPE OneView Logical Enclosure

Create one Logical Enclosure from OneView => Servers => Logical Enclosures.

Note: The Logical Enclosure creation process will take some time since it applies the Logical Interconnect and Logical Enclosure configuration including the HPE Virtual Connect fabric and SAS Fabric. For a minimal configuration, this process could take up to 40 minutes and significantly longer with more complex configurations. Also, user interaction may be required during the creation process for firmware updates and other requirements.

Note: Depending on current SPP release it would be attached to the Logical Enclosure here in "Firmware Baseline". The upload to the Composer should be added through the OneView => General => Firmware Bundles then "+ Add Firmware Bundle" prior to this.

Note: The names below are examples. When populating the "Enclosures" check the serial numbers of the enclosures the customer needs and use the correct Enclosure Group created in the previous step.

During the Logical Enclosure creation process, you can select the button next to create => Details to display creation process activity.

Create Logical Enclosur	e	
Name	R10-LEC	
Enclosures	CN7515010L	×Q
Enclosure group	R10-EG	×Q
Firmware		
Firmware ba <i>s</i> eline	Manage manually 🗸 🗸	

Once the creation is finished, the Logical Enclosure parameters should appear similar to (NOT for every environment, just as an example):

Main LE G	eneral -> 🗧
General	
Consistency state	Consistent
Enclosure group	• <u>Main EG</u>
Enclosures	 <u>CN75150484 Middle</u> <u>CN7515048Q Bottom</u> <u>CN7515010J Top</u>
Logical Interconnects	 <u>Main LE-ETH-LIG</u> <u>Main LE-SAS-LIG-2</u> <u>Main LE-SAS-LIG-1</u>
OS Deployment Se	ettings
This logical enclosure is	not configured for OS deployments.

Interconn	ects			
Enclosure	• <u>CN75150484 Middle</u>			
Bay 🛦 🔹	Interconnect	Logical Interconnect	Installed Module	Expected Module
1 •	CN75150484 Middle, interconnect 1	Main LE-SAS-LIG-2	Synergy 12Gb SAS Connection Module	Synergy 12Gb SAS Connection Module
2	none	not set	empty	none
3 •	CN75150484 Middle, interconnect 3	Main LE-ETH-LIG	Synergy 20Gb Interconnect Link Module	Synergy 20Gb Interconnect Link Module
4 •	CN75150484 Middle, interconnect 4	Main LE-SAS-LIG-2	Synergy 12Gb SAS Connection Module	Synergy 12Gb SAS Connection Module
5	none	not set	empty	none
6 •	CN75150484 Middle, interconnect 6	Main LE-ETH-LIG	Virtual Connect SE 40Gb F8 Module for Sy	nergy Virtual Connect SE 40Gb F8 Module for Synergy
Enclosure	 <u>CN7515048Q Bottom</u> 			
Bay 🔺 🔹	Interconnect	Logical Interconnect	Installed Module	Expected Module
1	none	not set	empty	none
2	none	not set	empty	none
3 •	CN7515048Q Bottom, interconnect 3	Main LE-ETH-LIG	Synergy 20Gb Interconnect Link Module	Synergy 20Gb Interconnect Link Module
4	none	not set	empty	none
5	none	not set	empty	none
6 •	CN7515048Q Bottom, interconnect 6	Main LE-ETH-LIG	Synergy 20Gb Interconnect Link Module	Synergy 20Gb Interconnect Link Module
Enclosure	• <u>CN7515010J Top</u>			

Validating HPE OneView Logical Interconnects

Logical Interconnects will be automatically created during the Logical Enclosure creation process. Validate the Logical Interconnect configurations from **OneView => Networking => Logical Interconnects**.

Note: If there are any problems with the Logical Interconnects they will be displayed here through the menu and selecting "Activity".

Y	Logical Interconnects 3	All statuses v All types v All resources v All labels v
		⊘ Main LE-ETH-LIG Logical Interconnect ∨ >
•	Name 🔺	Expected: Synergy 2060 Interconnect Link Module
•	Main LE-ETH-LIG	
•	Main LE-SAS-LIG-1	CN75150484 Middle
•	Main LE-SAS-LIG-2	
		3 L1 L2 • <u>CN75150484 Middle, interconnect 3</u> State: Configured Expected: Synergy 20Gb Interconnect Link Module Actual: Synergy 20Gb Interconnect Link Module
		6 L1 L2 1 2 3 4 1 2 3 5 3 5 5 5
		CN7515048Q Bottom
		3 L1 L2 • <u>CN7515048Q Bottom, interconnect 3</u> State: Configured Expected: Synergy 20Gb Interconnect Link Module Actual: Synergy 20Gb Interconnect Link Module

Configuring HPE OneView Server Profile Templates

Typically for VMware VCF, all servers in a domain (management domain or workload domains) must have identical Server Profiles, although they may be sourced from different service profile templates.

Create a OneView Server Profile Template as follows from OneView => Servers => Server Profile Templates => [Create server profile template].

Select the appropriate hardware type and Enclosure Group created in previous steps.

Do not select any OS Deployment options if they are available (here one does not exist in the Logical Enclosure).

Select the appropriate firmware baseline and select "Firmware Only". Using Smart Update Tools is not currently supported with VCF.

General		
Name	VCF-Node-Gen10	
Description	VCF Node for SY480 Gen10	
Server Profile		
Server profile description		
Server hardware type	SY 480 Gen101 Change	
Enclosure group	Main EG <u>Change</u>	
Affinity	Device bay 🗸	
OS Deployment		
To define OS deployment setting	gs, select an enclosure group configured for OS deployment.	
Firmware		
Firmware baseline	HPE Synergy Custom SPP 2017 12 20 version 2017.12.20.00 🗸	
	Force installation	
Installation Method	Firmware and OS Drivers using Smart Update Tools	

Select [Add connection] to add two network connections, both configured to use the Network Set created earlier in this document. In this example, the network set is named "Net230-234".

Mark the first connection as PXE Primary and the second as PXE Secondary.

Add Connection		Add Connection	
General		General	
Name	vmnic0	Name	vmnic1
Function type	Ethernet 🗸	Function type	Ethernet 🗸
Network	Net230-234 × Q	Network	Net230-234 X Q
Port	Auto × Q	Port	Auto × Q
Link aggregation group	None × Q	Link aggregation group	None × Q
Requested bandwidth (Gb/s)	2.5	Requested bandwidth (Gb/s)	2.5
Requested virtual	None	Requested virtual	None
functions	Custom	functions	Custom
	Auto		Auto
Boot	PXE primary \lor	Boot	PXE secondary 🗸 🗸

) N	1ana	ge connectio	ons					
	ID	Name	Network		Port	Boot		
0	1	vmnic0	<u>Net230-234</u>	(network set)	Mezzanine 3:1-a	PXE primary	O	×
		Туре		Ethernet				
		MAC addres	S .	Auto				
		Requested v functions	virtual	None				
		Requested I	bandwidth	2.5 Gb/s				
		Link aggreg	ation group	None				
0	2	vmnic1	Net230-234	(network set)	Mezzanine 3:2-a	PXE secondary	O	×
		Туре		Ethernet				
		MAC addres	ss	Auto				
		Requested v functions	virtual	None				
		Requested I	bandwidth	2.5 Gb/s				
		Link aggreg	jation group	None				

NOTE: Do not assign a LAG to networks used to provision a network via PXE boot. Without OS level drivers forming the LAG at time of the PXE request, the server will not connect properly to the PXE server. As VCF uses two connections with all uplink sets included with PXE primary/secondary, there will not be LAGs used here.

NOTE: In a SY480 Gen10 server for this build the P416i-e handles both internal and external drive configurations. For this build a separate storage controller card does not exist for the two front-facing (internal) drives and therefore the boot drive must be a single SAS drive in HBA mode (**Mixed-Mode RAID/HBA is not supported on VMware on a single controller**). The customer could also use M.2 SATA or SDcard for installation media if available.

SAS Mezzanine storage controller (P416i-e): Drives in the D3940 storage module should be configured as HBA (external logical JBOD) as follows:

- 1. Select the edit icon for "SAS Mezz 1 storage controller" to create the local SAS drives
- 2. Select Mode HBA, check "Re-initialize controller on next profile application"
- 3. Select [Create logical JBOD]
- 4. Create the Cache Tier with defined number of cache drives from the VM sizing
- 5. Select [Create logical JBOD] to create the capacity tier logical drive.
- 6. Enter the name for the capacity tier, the number of drives as determined above, and select the appropriate SAS drive type.
- 7. Select [Create] and [OK].
- 8. Your logical storage configuration should look similar to this (NOTE: Boot drive in HBA mode will not appear in this list).

Create Logical JE	BOD	?
Name	Cache Tier	
Storage Location	External	
Number of physical drives	1	
Select drives by	Drive type O Size and technology	
Drive type	800 GB SAS SSD (9 available) \sim	
Changed: Drive te	chnology to "SAS SSD" Create C	ncel
·		
S Mezz 1 storage control	ller 🧷	
Managed by OneView		

Name	Туре	RAID Level	Number of Drives	Size GB	Drive Technology	Boot	Erase on Delete	
Cache Tier	External logical JBOD	n/a	1	200	SAS SSD	n/a	Yes	×
Capacity Tier	External logical	n/a	4	300	SAS HDD	n/a	Yes	×

Note: VMware VIA does not support UEFI Boot Mode. Configure the Server Profile Boot Settings as shown below:

Create Server Profile Template	Local Storage ~ ?
Local Storage drive uisk4 Extern drive	
SAN Storage	
Manage SAN Storage	
Boot Settings Manage boot mode	
Boot mode Legacy BIO:	Changing the Boot Mode can impact the ability of the server to boot the installed operating system. An operating system is installed in the same mode as the platform during the installation of the Boot Mode
* 1 CD	does not match the operating system installation, it might not boot
* 3 Hard disk	
4 PXE Drag and drop or edit rows to re-order	
BIOS Settings	
Manage BIOS	
Advanced	
Changed: Boot mode to 'Legacy BIOS'	Create + Cancel

Select [Create].

NOTE: Create additional server profile templates as needed for the different server profile definitions. This will include different:

- 1. Processor generations and versions
- 2. Mezzanine connectors
- 3. Local storage drives and allocated drives in the D3940 Storage Module

Configuring HPE OneView Server Profiles

A Server Profile will need to be added for each server used for VCF.

Create a OneView Server Profile as follows from OneView => Server Profile => [Create server profile].

Enter the General information for the specific server as follows:

Create Server Profile	General ~		?
On next assignment to serv will have their logical drives that you back up any data with this option selected. If deselect the re-initialize sto	er hardware, the local storage controllers mark ; deleted making existing data inaccessible. It is on existing logical drives on these controllers b you wish to preserve any existing logical drive rrage checkbox.	ed for re-initialization strongly suggested efore applying a profile s on these controllers,	
General			
Name	VCE-Node-1		
Description			
Server profile template	VCF-Node-Gen10		
Server hardware	unassigned	×Ç	
	Show empty bays		
Server hardware type	SY 480 Gen10 1		
Enclosure group	Main EG		
Affinity	Device bay \lor		

The default entries should be fine for all remaining fields. Select the appropriate server to be used in VCF and validate the entries and select [Create]. During the create process, select the circular button to the left of the Create task bar and select Details to see the creation details.

Repeat these steps for each server to be used by VCF. The end result should depend on how many profiles are initially created. (VCF needs 4 hosts for "management" and a minimum of 3 for a workload domain, resulting in 7 servers required at a minimum).

VMware Cloud Foundation on HPE Synergy

Cloud Foundation is an integrated hybrid cloud platform that delivers a complete set of software defined services for compute, storage, networking, security, and cloud management for the private and public cloud. Cloud Foundation drastically simplifies data center operations by deploying a standardized and validated architecture with built in lifecycle automation of the cloud stack. Cloud Foundation can also be flexibly consumed as-a-service in the public cloud (VMware Cloud on AWS, IBM, Rackspace, etc), enabling a true hybrid cloud that is based on a consistent infrastructure and operational model using common tools and processes.

Deploying the VCF Imaging Server and Jump VM on Management ESXi Server

While VCF will deploy its own internal vCenter, in order to stage all the components for install, an "imaging station" needs to be created. To image servers to be used for VMware Cloud Foundation, VMware provides the "VIA OVF" imaging appliance as well as the Cloud Foundation software bundle. There are many supported methods to image a collection of hosts, such a laptop running VMware Workstation plugged into the infrastructure.

In this example, there is a vSphere cluster residing on a set of Apollo servers plugged into the same upstream switch as the Synergy Frame. The same VLAN that will be used for imaging (and is marked as Native in the Synergy Network Set) is configured as a port group on this cluster.

Management vSphere Standard Switch Configuration



Deploying the VMware Cloud Foundation Imaging Appliance

Deploying the VMware Imaging Appliance (VIA) VM. Deploy the VMware OVF in the port group backed by the VLAN to be used for PXEbased Imaging which was configured on the HPE Synergy OneView and the network switch in the <u>Configuring VLANs on network switch</u> section. Follow the steps in the "VMware Cloud Foundation VIA User Guide", 2.3.1 version pages 34-36.

Enabling EMS Mode on the VIA Appliance

By Default, the VIA Imaging appliance is configured to deploy an entire rack worth of infrastructure, including Top-of-Rack switches. In a HPE Synergy based deployment, the Top-of-Rack-Switch deployment options are not required. VIA has a hidden option to bypass all switch configuration and use externally managed switches called "EMS Deployment." For Synergy deployments, once the Imaging Appliance VM has been deployed, it is necessary to enable the "EMS Deployment" option.

To enable the EMS Deployment Option, perform the following steps.

- 1. Open a VMware console to the VIA Imaging Appliance.
- 2. Alt-F2 to get to a CLI Prompt.
- 3. Login as root Password root123
- 4. Edit the file /opt/vmware/evorack-imaging/config/via.properties
- 5. Append via.enable.ems=true to the end of this file and save.
- 6. Stop the VIA services by issuing service via-service stop.
- 7. Wait a few moments, then restart the services by issuing service via-service start

Note: Ignore the "No Networking Detected" warnings on the VIA Imaging Host's console. This is normal.

Deploying the Windows Jump VM

Depending on which method used to deploy and stand up Cloud Foundation, it may be convenient to deploy a utility VM to assist with running the VIA Imaging Appliance and the first-time bring up wizard of VMWare Cloud Foundation. In the lab in which this guide was built, the build network (VLAN 301) also has a routed IP network associated with it (10.16.231/24). The VIA appliance, however, deploys with a pre-configured address of 192.168.100.2, and will leverage the 192.168.100.0/24 address scheme throughout the deployment process.

By going into the "Advanced TCP/IP Settings" of the Jump VM, we can set a secondary IP address in the 192.168.100.0/24 network on the same interface. A secondary IP address on the "192.168.100" network that the VCF Imaging Host uses is easily configured in the Advanced TCP/IP menu of the VM's NIC properties.

- Setungs DNS W	INS		
IP addresses			
IP address		Subnet mask	
10.16.231.2		255.255.255.0	
192.168.100.151		255.255.255.0	
[Add	Edit	Remove
Default gateways:			
Gateway		Metric	
10.16.231.1		Automatic	
	Add	Edit	Remove
Automatic metric			
Interface metric:			

Note: In order to avoid IP address conflicts during the imaging and initial bring-up phase, please use an IP address in the 192.168.100.151-199 range. Once the IP address is set, and launch a browser session and navigate to http://192.168.100.2:8080/via/

- 1. From the vCenter console, mount the VCF Bundle directly to the VIA Imaging Appliance VM.
- 2. Go back to the web session established and "refresh" under core bundle and validate that it sees the CD mount.
- 3. Browse / select the appropriate MD5SUM for the bundle.

4.

VIA		Imaging	Inventory	History	Logs	About	(0)
	Core Bundle		Modily ViBs	Modify IS	SOs		
	Upload Bundle						
	Bundle Location CD/DVD Drive	.CD mount	ed successfully			Refresh	
	Bundle Hash						
	MD6SUM File	MD	5SUM.bd			flowse	

- 5. Press "upload bundle" watch the bundle upload. It will take 15-45 minutes for it to finish.
- 6. Wait for it to finish before going to the next steps.
- 7. Once the upload finishes, click "Activate Bundle" Wait for it to show "activated"

Configuring VCF Imaging Server

Uploading the HPE Custom ISO

The steps in this section follow along with the "VMware Cloud Foundation VIA User Guide", 2.2 version pages 40-48.

- 1. Upload the latest HP custom ESXi image that is current with VMware requirements.
 - a. Obtain the compatible HPE ESxi Custom Image to be used that is supported by VCF and HPE Synergy
 - b. If a current driver exists that is required but not in current HPE ISO then upload driver to VIA after current ISO.
- 2. Switch to the "Modify ISO" tab in the VIA browser session.
- 3. Select Vendor "HP" from vendor pull down.
- 4. Browse to current HPE custom ISO.
- 5. Add in the MD5 sum.
- 6. Upload ISO.

7.

Core Bundle	Modify VIBs	Modify ISC	5		
Vendor Name :	HP			•	Add Vendor
Available ISOs :	Nan	ne	Source	Active	
	VMware-VMvisor-Installer-201	710001-6765664 x86_64 iso	Bundle	٠	
Select ISO to Add	VMware-ESXI-6.5.0-Update1-6765	664-HPE-650 U1 10 1.5 26-Oc	2017.iso		Browse
MD5 Checksum :	fc7655c3cedb2685ce3ba3a8/9608	078			
Checksum Type :	MD5 * SHA-1				

- 8. For any additional VIBs such as updated storage drivers upload them in the same menu above.
- 9. Important: Mark the new Uploaded HPE ISO as "active" in this screen, or servers will not find a NIC when they PXE boot.
 - a. Go back to main bundle and then back to "ISOs" and make sure it is still marked as ACTIVE. (Imaging App is sensitive)
- 10. After uploading the HPE media and marking it active, switch to the Imaging tab. Under the imaging tab change the imaging type to be "VMWARE CLOUD FOUNDATION EMS DEPLOYMENT"
 - a. Change the vendor to HP and click the "gear" icon to display the "Update Properties for Next Run" screen

ESXI SERVER		Number: 4
(1) Vendor: HP	▼ Model: Any ▼ IP: 192.168.100.50 MAC: Optional	
2 Vendor: HP	▼ Model: Any ▼ IP: 192.168.100.51 MAC: Optional	
(3) Vendor: HP	▼ Model: Any ▼ IP: 192.168.100.52 MAC: Optional	•

- b. If using local "boot media" you have to add or replace for the proper media driver in this screen.
 - i. NOTE: For Gen10 and the P416i, the driver is "smartpqi"
 - ii. Gen 9 compute modules using the P542 will use "nhpsa". The example below is for a Gen9.

Update prope	erties for Next Run
Server PXE Boot Mode	TFTP
Server Boot Disk	iscoVD.Hypervisor.ahci.vmw_ahci.VMware.usb. nhpsa
Vendor Name seen in ESXi	HP

c. Select how many servers that will be imaged in this run.

- d. Select "start imaging" wait about 30-40 seconds for all imaging services to start in the background
- 11. Power on ESXi servers and watch boot via ILO remote console. They should go into PXE booting. The first server to power on will be the "core" server and the customer should wait 30 seconds before powering on additional servers.
- 12. Once all servers are booting / deploying, switch back to the VIA Browser session -- the customer should see all servers in progress. For imaging detail on a specific server, click one of the boxes corresponding to the server.

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$r \rightarrow \mathbf{C}$ (0)	192.168.100.2:8080/via/imaging	g.html					†
VIA	Bundle		Inventory	History	Logs	About	(4)
1	Details	>	Imaging	Varii /		Finish	_
	Name : VCF Deploy			Desc :			
	Run ID: 2 Rack Type: PRIMARY			Rack ID : 5a68ccfb1be5	c53149cdcc85		
				Danale. Vcr-banale-2.5.0			
	PRIMARY ESXI SERVER		ESXI SERVER	ESXISERVE	R	ESXI SERVER	
	192.100.500.00	2	162.100.51	990.102.100.50	~	192.168.100.83	_ 24
			(
				stop			
						Activate Wi	ndows
						Go to Settings	to activate Windows.
	Internet Explorer						13.35.81
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13. After all servers complete the initial imaging process, the screen will automatically refresh and run through various post-imaging verification tests.

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					122271000	_
	Details	> Ima	iging >	Verify	Finish	
	Name : VCF Deploy Run ID: 2 Status: POST IMAGING P	HASE RUNNING	Desc : Rack ID : 5 Bundle in u	a68ccfb1be5c53149cdcc85 se:vcf-bundle-2.3.0-7574964		
	PRIMARY ESXI SERVER	192.168.100.50	Import All Devices Certificate	×	Renun	
	PRIMARY ESXI SERVER	192.168.100.50	Import SSH Public Ke	ys 🖌	Rerun	
	PRIMARY ESXI SERVER	192.168.100.50	Copy PRM manifest	×	Rerun	
	PRIMARY ESXI SERVER	192.168.100.50	Prepare and copy rack imaging details	× •	Rerun	
	PRIMARY ESXI SERVER	192.168.100.50	SDDC Manager Controller VM shutdov	Running		
	PRIMARY ESXI SERVER	192.168.100.50	Create SDDC Manage Controller VM snapsh	er SCHEDULED ot	Rerun	
	PRIMARY ESXI SERVER	192.168.100.50	Power on SDDC Manager Controller VI	SCHEDULED	Rerun	
			Stop		Activate Wind Go to Settings to a	fows activate Windows
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14. Once all servers are fully imaged, and all validation has been performed then check with the following screen.

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IA	Bundle		Inventory	History	Logs	About	△ ⁽³⁾
	10						
	Details	\rightarrow	Imaging	Veri	ry >	Finish	
	Name Run ID: 1 Status: POST IMAGINO PHASE CO	OMPLETED		Desc Rask ID : 5e550fe97s Bundle in use : vof-bu	194515ceduaa3a ndia-2.3.0-7663765		
	PRIMARY ESXI SERVER	192.168.100.50	Import All D	evices Certificate	*	Rerun	
	PRIMARY ESXI SERVER	192.168.100.50	Import SSH	Public Keys	~	Renan	
	PRIMARY ESXI SERVER	192.168.100.50	Copy PRM	manifest	*	Roun	
	PRIMARY ESXI SERVER	192.168.100.50	Prepare an imaging det	i copy rack ails	*	Renin	
	PRIMARY ESXI SERVER	192.168.100.50	SDDC Man VM shutdov	ager Controller	*	Rerun	
	PRIMARY ESXI SERVER	192 168 100 50	Create SDD Controller V	IC Manager M snapshot	*	Rerun	
	PRIMARY ESXI SERVER	192.168.100.50	Power on S Controller V	DDC Manager M	*	Rerun	
			Click here to visit S	DDC Manager Bringu	e.UI	Activate Win Go to Settings to	dows activate Windows.
			Back				
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15. Choose complete, or alternatively, click the link to continue to the SDDC Manager Bring Up UI.

Initializing VMware SDDC Manager

Before You Begin

- 1. VCF relies heavily on DNS and runs its own DNS server. Please have administrative access to DNS and be prepared to create a DNS Delegation to the VCF sub-domain.
- 2. For VLAN and IP Scheme used in the PoC, refer to the "Network Switch Configuration" section of this document.
- 3. Before starting VI WLD deployment the administrator will need an extra VLAN/subnet for the vSAN which needs to be configured on the vSAN networking screen during VI WLD deployment configuration. If the default vSAN VLAN is used then deployment will fail.

VCF Bring-up Steps

Logging into the SDDC Manager BringUp UI

1. 1.Login to the BringUP UI using the credentials <u>administrator@vsphere.local</u> and password of "vmware1234"



2. The BringUP UI will first discover the installed components and then prompt to move to the next steps.



- 3. Set the system date and time
- 4. Time will be synchronized across all components

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	Setting Time on Co	mponents of the SDDC			
		100%			
	Component	Status			
	SERVER (4)	⊘ Completed			
	RINO	Completed			
	RINI	⊘ Completed			
	RINZ	Completed			
	RIN3	⊘ Completed			
	SDDCMANAGER (1)	Completed			
	SDDCMANAGER	O Completed			
	SWITCH (2)	Completed			
		BACK RETRY CONTINUE			
		Activate Windows			
		Go to Settings to activat	te Windo	2WC	1
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- 5. After time synchronization, VCF SDDC Manager will validate all the servers are ready to continue with deployment.
 - a. If the "power On System Validation" hangs on ToR switch validation. Clear the alerts and retry.
- 6. Select 4 hosts to create the Management domain and choose "Continue". Ignore the warning on "different disk sizes" this error is false.

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	Host Sele	ction								
	R1NO is preselected	d for the manager	nent domain by default. Based on t	he redundancy	/ criteria, selec	t 3 more host	s for the			
	management doma	ain from the list be	NOW.							
	A Hosts with diff	erent disk sizes sel	ected. vSAN performance may be imp	acted. For more	e information re	fer to vSAN de	sign and sizir	Ig		
	documentation	n.								
	Selected hosts: R	1N0 R1N1 R1N2 R	1N3							
	Host ID 🔻	Server 🔻	Processor T	Memory T	Total ⊤ Storage	Disks 🔻	Port	Ŧ		
	RIN0	HP Synergy 480 Gen9	2 x 12 Core intel Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz	96 GB	1620 GB	1 SSD, 5 HDD	vmnic0	^		
	R1N1	HP Synergy 480 Gen9	2 x 12 Core intel Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz	96 GB	1620 GB	1 SSD, 5 HDD	vmnic0	-		
	4					То	otal Hosts Availa	ble: 4		
						BACK	CONT	NUE		
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7. Begin deployment and Agree to the EULA

Begin deployment of the SDDC



- 8. Choose to Opt-in to VMware's Customer Experience Program (CEIP).
- 9. Create a new super-user account (It can't be "administrator"). For this example, the username is "super-user".

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4. Pack Details	Specify the SDDC Mana	ger super user account.					
+ Rack Details	Liser Name	super-user					
5 Management Network				-			
6 vMotion Network	Password			-			
7 VSAN Network	Confirm Password			-			
8 VXI AN Network							
9 Data Center Network							
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10. Enter the Rack Details specific to the customer environment.

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🗅 VMware Imaging Applian 🗙 🔷 VMware Cloud Found	atic 🗙			Θ	- 0	×	
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4. Rack Details	Physical Rack Name	Synergy03					
4 Rack Details	Company Name	HPE					
5 Management Network	Company Department	DCA-LABS			- 18		
6 vMotion Network					- 15		
	Root DNS Domain	synergy.local			- 15		
7 VSAN Network	VMware Cloud Foundation Sub- Domain	vcf.synergy.local			- 15		
8 VXLAN Network	SSO Domain	vsphere.local			- 15		
	Manual Cloud Envirolation				- 15		
9 Data Center Network	VMware Cloud Foundation License Key	*****			- 15		
10 Data Center Uplink							
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11. Enter the management network VLAN and IP network information.

12.



13. Enter the information for the internal vMotion network

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🕒 VMware Imaging Applian 🗙 VMware Cloud Foun	datic 🗙			Θ –	٥	×
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3 Super User					^	
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5 Management Network	VLAN ID	304				
6 vMotion Network	Subnet	10.16.234.0				
7 VSAN Network	Subnet Mask	255.255.255.0	<u>.</u>			
8 VXLAN Network	Gateway	10.16.234.1			- 18	
9 Data Center Network	Surfacto ID Address D					
10 Data Center Uplink	Exclude IP Address Ra	inges (Optional)			-	
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14. Enter the vSAN network information

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3 Super User						
4 Rack Details	Specify the system's review the defaults a	s Virtual SAN network settings. If y and then proceed to the next step	you selected to use de).	fault settings,		
5 Management Network	VLAN ID	2000		-		
6 vMotion Network	Subnet	172.16.20.0			. 88	
7 VSAN Network	Subnet Mask	255.255.255.0	!		. 88	
8 VXLAN Network	Gateway	172.16.20.1				
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15. Enter the VXLAN transport network information

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7 VSAN Network	Subnet Mask	255.255.255.0	<u>()</u>				
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11 Review			CANCEL BACK	NEXT			
			Activate Windov Go to Settings to acti	vs vate Windows.			
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16. Enter the network information for the Datacenter Network. The Datacenter network is used for access to the Workload Domain and it needs to be routed also.

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3 Super Oser	Specify the settings to r	ise to connect the system to your corporate networ	rk. Because these
4 Rack Details	settings will not be valid	ated until later in the configuration process, please	ensure the accuracy
5 Management Network	of the values you enter	before continuing.	
	VLAN ID	300	
6 vMotion Network	Subnet	10.16.230.0	
7 VSAN Network			
8 VXLAN Network	Subnet Mask	255.255.255.0	-
	Gateway	10.16.230.1	
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17. At the Datacenter Uplink screen, select an uplink type of "L2" – and put in "uplink port" value between 43 and 46. These settings are not used in Synergy deployments, but values must be inserted to move past this screen.

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	5 Management Network	Uplink Type	L2 ×	
	6 vMotion Network	Uplink LAG	Enable Uplink LAG	
	7 VSAN Network	Uplink Ports	43	
	8 VXLAN Network	Uplink Speed	10G ~	
	9 Data Center Network			
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18. After selecting "Finish," the SDDC BringUp process will begin and will take some time to complete.

Technical white paper

19.

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	\$
administrator@vsphere.loca	al 🗇
×	
🛓 DOWNLOAD 🛛 🛱 PRINT	
Status 🗸	
Status	
) In-Progress	
⊘ Success	
) In-Progress	
Not Started	
Success -	
	e − c administrator@vsphere.lock x x x x Status Status Status Status Status In-Progress Not Started Success Not Started Success

20. The entire deployment will take roughly 2 hours.

VMRC 🕶 📕 🕶 🤀 🖽	×		9 🐚
🗅 VMware Imaging Applian X VMware Cloud Foundatic X	-	٥	×
← → C ▲ Not secure https://192.168.100.40:8008/view/bringup-pages		Å	7 :
SDDC components are being deployed and configured.			*
All SDDC deployment tasks completed successfully. You may proceed to the SDDC manager dashboard here: SDDC Manager x Dashboard			
Q Search Tasks			
Tasks			
121 tasks completed Status ~	_		
Tasks Status			
> Authorize SDDCAdmins Group			
> Backup Initial Host State 📀 Success			
✓ Backup State and Bootbank			
Backup State of Hosts 📀 Success			
RETRY SEE IP ALLOCATION			
Activate Window Go to Settings to activ	/S ate Wi	ndows. D1 PM	

21. Upon completion, check the "See IP Allocation" and record the value for the SDDC Manager VM.

	VCF-Jump - VMware Remote Console		
• III • 🖶 🖂			» 📮 💿
VMware Imaging Applian × VMware Cloud For	undatic 🗙 Privacy error 🛛 🗙 📃	θ	- 0
C A Not secure https://192.168.100.4	0:8008/view/bringup-pages/ip-allocation		☆
n Cloud Foundation ™		administrator@vsph	nere.local (?)
SDDC Compone Displays IP addresses for the VIV Insight software components.	nts IP Allocation Is deployed for SDDC Manager, vCenter Server, Platform Servi	ces Controller, NSX, and vRealize Log	
 Configure DNS delegation. Cl 	lick Help for more information.		
Components			
Component	DNS Name	IP Address	
SDDC_MANAGER	sddc-manager-controller.vcf.synergy.local	10.16.232.103	
MANAGEMENT SWITCH	r1s0	10.16.232.109	
TOR_SWITCH	r1s1	10.16.232.110	
TOR_SWITCH	rist ris2	10.16.232.110	
TOR_SWITCH TOR_SWITCH VCENTER	r1s1 r1s2 vcenter-1.vcf.synergy.local	10.16.232.110 10.16.232.111 10.16.232.112	

Configure DNS Delegation

For quick validation the DNS server of the jump vm or the laptop from where the SDDC manager will be accessed from, can be updated to point to the SDDC Manager Controller vm.

SDDC Manager uses Unbound (a DNS server software) for name resolution during the Cloud Foundation bring-up. The customer must now configure the corporate DNS server to delegate zone control for the Cloud Foundation domain to SDDC Manager.

For example, if the corporate domain is synergy.local, and the Cloud Foundation Sub Domain is subdomain.synergy.local, the corporate DNS server must be configured to delegate control of subdomain.synergy.local to SDDC Manager.

- 1. Install DNS on your server by adding a new role through Server Manager and selecting DNS.
- 2. Ensure that your jump server uses the local DNS for name resolution.
- 3. Configure the primary zone (vmware.corp) as a zone managed by Windows DNS.
- 4. Right-click the zone and select New Delegation.
- 5. Enter the name of the sub-domain (subdomain in our example).
- 6. In the Server fully qualified domain name (FQDN) field, type the IP address of SDDC Manager and click Resolve.
- 7. Click OK.
- 8. The new zone appears as a delegated zone under your primary domain.

2 DNS	Name		
✓ ☐ DC1	mades		
✓	Lookup Zones sites		
> 🛐 _msc	dcs.synergy.local tcp		
> 📑 Synn	Update Server Data File	New Delegation Wizard	×
> Trust P	Reload	Delegated Domain Name	
> 📔 Condit	New Host (A or AAAA)	Authority for the DNS domain you supply will be delegated to a different zone.	10
	New Alias (CNAME)		
	New Mail Exchanger (MX)	Specify the name of the DNS domain you want to delegate.	
	New Domain	Delegated domain:	
	New Delegation	vcf	
	Other New Records		
	DNSSEC	> Fully qualified domain name (FQDN):	
	All Tasks	vcf.synergy.local	
	View	>	
	Delete		
	Refresh		
	Export List		
	Properties		
	Help	< Back Next > Cancel	
New Name Server Re	ecord	×	
Enter the name of a D	ONS server that is authoritative for this zone.		
Server fully qualified o	domain name (FQDN):		
sddc-manager-contro	oller.vcf.synergy.local	Resolve	
IP Addresses of this N	IS record:		
IP Address	Validated	Delete	
10.16.232.103	· · · · · · · · · · · · · · · · · · ·	Up	
		Down	

ОК

Cancel



9. Test a ping to the platform services controller VM.

```
C:\>ping psc-1.vcf.synergy.local
Pinging psc-1.vcf.synergy.local [10.16.232.121] with 32 bytes of data:
Reply from 10.16.232.121: bytes=32 time<1ms TTL=63
Reply from 10.16.232.121: bytes=32 time<1ms TTL=63
Reply from 10.16.232.121: bytes=32 time<1ms TTL=63
Ping statistics for 10.16.232.121:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>_
```

10. Once DNS Delegation tasks are complete go back to the BringUP UI and clock "Proceed to Dashboard"



The VCF Management Domain is now deployed.

At this point, additional servers can be imaged, if they were not imaged previously.

NOTE: To image additional servers, go back to the "VIA", choose "individual deployment", do not select primary esxi host, and select the number of servers then continue in a similar fashion to the first servers that were imaged.

Importing additional imaged hosts to VCF's inventory

If additional hosts were imaged separately, it is important, post-imaging, to save the "manifest" and import it into VCF.

Following a successful image run of additional nodes, navigate to the "Inventory" tab in the VIA Imager.

1. Choose "Download Manifest" and save the downloaded *.tgz file.

*			VCF-Jump - VMwa	e Remote Console			_ 🗆 X
VMRC 👻 📗 🔻	· 4 13						» 🚐 💿 🚦
C VMware Imag	ging Appliar 🗙						9 – 0 ×
\leftrightarrow \Rightarrow C \odot	192.168.100.2:8080/via/via	manifest.html					२ ☆ :
VIA	Bundle	Imaging	Inventory	History	Logs	About	(3)
	Select Run ID: 2 VCF Workld	ad Domain	•	▼ Downloa	ad Manifest		
	Name - VCE Workland Domain			Doro :			
	Run ID: 2			Rack ID : 5a8db8ab7b19d518c	cedf59c9		
	Status: POST IMAGING PHASE	RUNNING		Bundle in use : vcf-bundle-2.3.	0-7663765		
	ESXI SERVER 102.168.100.55	Ø	ESXI SERVER 192. Tel: 100.56	ESXI SERVER 11/2.166.100.57	Ø	ESXI SERVER 192 Hell 190 Se	0
						Activate Win	dows
						Go to Settings to	activate Windows.
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2. In the SDDC Manager Controller UI, navigate to "Settings" and then "Add Host".

	are sddc	Manager									
♠	VDI SETTINGS	NETWORK SETTINGS	LICENSING	PASSWORD ROTATION	LOGGING A	DD RACK	ADD HOST	VREALIZE	CONFIGURATIC	ON BACKUP	
DASHBOARD				Virtual Desk	top Infras	structu	ire Setti	ngs			
STATUS O LIFECYCLE				Additional Upload only ve Invalid file may Physical Rack	Host alid manifest file a v cause complicat x Name	and ensure t	hat the file con hals of existing	tains valid det racks lect the Rac	ails of hosts being k to add Host •	added	
USERS SETTINGS				Upload Manif	est File 🍞	ADD I	HOST	CONTINUE		BROWSE	

- 3.
- 4. Choose the appropriate Physical rack, browse to the TGZ file saved in the previous step and choose "add host".
- 5. The screen will pause for a moment on "Host Discovery" and when prompted, choose "Continue".



6. The Host Bring Up will now begin and the progress can be monitored.

Host Bringup is In-Progress	EXPAND ALL
Update Physical Inventory	👩 In Progress 📏
Change Private IP on Hosts	Not Started 📏
Generate SSL Certificate on Host	Not Started 📏
Configure Host DNS and NTP	Not Started 📏
Determine the software version on the ESXi host	Not Started 📏
Configure SDDC Manager Security	Not Started
Not available	Not Started
Configure Lifecycle Management Repository	Not Started
Save Inventory	🔘 Not Started 📏
Backup State and Bootbank	Not Started >

7. Once the discovery finishes, return to the Dashboard and the additional hosts will be available.

		ADD WORKLOAD DOMAIN
1 Rack	8 Hosts 3 Switches	VIEW DETAILS >
1 Domain	0 VDI 0 VI 1 Management	VIEW DETAILS >
	1 _{Rack} 1 Domain	1 Rack 8 Hosts 3 Switches 0 VDI 0 VI Domain 1 Management

Adding a Workload Domain to VCF

- 1. Click the Add Workload Domain button.
- 2. Choose the appropriate type of Workload Domain (VDI or VI).
 - a. NOTE: In this example, it is a "Virtual Infrastructure" workload domain.

W	0	HOSTS	NETWORK	REVIEW
General Configu	Jration e Virtual Infrastructure er	wironment. When the sys	tem creates the environment	, it carves out the
ecessary capacity from	i the currently available c	apacity, as appropriate fo	r your selections.	
/irtual Infrastructur	e Name	Virtuarini	rastracture Osage Name	
Organization Name)	Organizat	tion Name(optional)	
Organization Name	ž	Organizat	tion Name(optional)	

3. Choose the Workload Configuration appropriate to your needs. Note: Do not choose "Use all Default Networks" during this wizard. Leave this button blank.

GENERAL	WORKLOAD	HOSTS	NETWORK	REVIEW
Workload Co Specify the level of whether to use system system automaticall	nfiguration availability you want the syst em-defined default network y configures the Virtual Infra	tem to apply to the Virtual Ir configurations for the vMoti structure as appropriate for	frastructure environme on, Virtual SAN, and VX your selections.	nt. Optionally select (LAN networks. The
Availability 1		NONE Ve cannot deplo have a single rac	NORMAL HI y high availability type of w k with 5 free hosts.	SH vorkload, Since we don't
BACK	CANCEL	USE ALL D	EFAULT NETWORKS	NEXT

4. Select available imaged hosts to use in this workload domain. (Minimum of 3 required)

	ost Selec	tion						
C	alculated vSAN	↓FTT=0 A h	nost failure with curren	t configurati	ion will lead to data loss. Ir	ncreasing av	ailability will solve this	i. ×
H	losts with differ efer to product	ent memory documentat	size selected HA faile ion.	over betwee	en hosts may be impacted	. For more ir	nformation on HA cons	straints ×
H	losts with differ nabling EVC m	ent CPU typ anually pleas	es selected vMotion t se refer to product doo	petween ho cumentation	sts may not work as Enhar	nced vMotio	n(EVC) is not enabled.	For X
H	losts with differ	ent disk size ation.	es selected vSAN perf	formance m	ay be impacted. For more	information	refer to vSAN design :	and X
Tota	al Selected R	esources :	Hosts - 4, Cores - 11	6 CORES,	Memory - 704 GB, Disk	< - 6.48 TB	, CPU - 274.404 GH	IZ
		selected H	lost(s)			CLEAR CUS	TOM FILTERS CLEAR	SELECTIONS
	HOST ID ESXI VERSION	PORT #	lost(s) но <mark>sts</mark>	MEMORY (GB)	PROCESSOR	CLEAR CUS TOTAL STORAGE (GB)	TOM FILTERS CLEAR	SELECTIONS STORAGE TYPE
	HOST ID ESXI VERSION Host	PORT#	HOSTS Search for hosts	MEMORY (GB)	PROCESSOR search for processor	CLEAR CUS TOTAL STORAGE (GB)	TOM FILTERS CLEAR	SELECTIONS STORAGE TYPE
S	HOST ID ESXI VERSION Host R1N5 unknown	PORT #	HOSTS Search for hosts HP Synergy 480	MEMORY (GB)	PROCESSOR search for processor intel Intel(R) Xeon(R)	CLEAR CUS TOTAL STORAGE (GB) 1620	TOM FILTERS CLEAR	STORAGE TYPE
 S 	HOST ID ESXI VERSION Host R1N5 unknown R1N6 unknown	PORT #	HOSTS Search for hosts HP Synergy 480 HP Synergy 480	MEMORY (GB) 96	PROCESSOR search for processor intel Intel(R) Xeon(R) intel Intel(R) Xeon(R)	CLEAR CUS TOTAL STORAGE (GB) 1620	TOM FILTERS CLEAR DISKS 1xHP LOGICAL V 1xHP MO0200JE	STORAGE TYPE AII THYBRID HYBRID
S S	HOST ID ESRI VERSION Host R1N5 unknown R1N6 unknown R1N7 unknown	PORT # vmnic0 vmnic0 vmnic0	HOSTS Search for hosts HP Synergy 480 HP Synergy 480 HP Synergy 480	мемоку (бв) 96 96 256	PROCESSOR search for processor intel Intel(R) Xeon(R) intel Intel(R) Xeon(R) intel Intel(R) Xeon(R)	CLEAR CUS TOTAL STORAGE (GB) 1620 1620	TOM FILTERS CLEAR	STORAGE TYPE AII THE HYBRID HYBRID

5. For the next several screens, review the Management, vMotion, vXLAN VLAN and IP address items. For all networks except for the vSAN network, an indidivual "use defaults" button can be selected. For vSAN, however, it's important to use a discrete vSAN VLAN ID

per workload domain. If this is a new VLAN ID, it will be necessary to switch to the Synergy Composer and verify that the VLAN ID is included in the Network Set on the profiles. If it is not, it can be added at this time.

e used for this Virti d Virtual Infrastruct	ual Infr	astructur	e envi	onment	The m	anadomo	-1-
	ture er	nvironmer	nt will i	use the sy	/stem's	s already-	nt
302							
10	÷	16	-	232		0	
255		255		255		0	
Subnet mas 22	k bit le	ngth is rec	ommen	ded to be	less tha	in or equal	to
10	•	16		232	÷	1	
10	ŀ	16	•	232	•	103	
XXX		xxx		xxx	•	xxx	
time.nis	st.gov	6					
START IP ADD	DRESS						
xxx		xxx		xxx	÷	xxx	
END IP ADDR	ESS						
xxx		xxx		xxx		xxx	СЫСК
	302 10 255 5ubnet mas 22 10 10 10 10 XXX time.nis START IP ADD XXX	30210255Subnet mask bit le2210101010XXXtime.nist.govSTART IP ADDRESSXXXEND IP ADDRESSXXXEND IP ADDRESSXXXXXX	302 10 • 16 255 • 255 Subnet mask bit length is received 16 10 • 16 10 • 16 10 • 16 10 • 16 10 • 16 10 • 16 10 • 16 10 • 16 10 • 16 10 • 16 10 • 16 10 • 15 10 • 16 10 • 16 10 • 16 10 • 12 10 • 12 10 • 12 10 • 12 10 • 12 10 • 12 10 • 12 10 • 12 10 • 12 10 <t< td=""><td>302 10 16 255 255 255 255 Subnet mask bit length is recommended 10 16 <</td><td>302 10 • 16 • 232 255 • 255 • 255 Subnet mask bit length is recommended to be 22 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 100 10 • 12 100 • 100 10 • 100 • 100 • 100 • 100 • 100 • 100 •<</td><td>302 10 16 232 1 255 255 255 255 1 255 255 255 255 1 255 255 255 255 1 255 255 255 255 1 255 255 255 255 1 22 10 16 232 1 10 16 232 1 1 10 16 232 1 1 10 16 232 1 1 10 16 232 1 1 10 16 232 1 1 10 16 10 10 1 1 10 16 10 1 1 1 1 10 16 10 1 1 1 1 10 10 10 1 1 1 1 10 10 1 1 1 1 1</td><td>302 10 • 16 • 232 • 0 255 • 255 • 255 • 0 255 • 255 • 255 • 0 255 • 255 • 255 • 0 255 • 255 • 255 • 0 22 • 10 • 232 • 11 10 • 16 • 232 • 103 10 • 16 • 232 • 103 10 • 16 • 232 • 103 10 • 16 • 232 • 103 10 • 16 • 232 • 103 10 • 16 • 100 • 103 100 • 16 • 100 • 103 100 • 100 • 100 • <td< td=""></td<></td></t<>	302 10 16 255 255 255 255 Subnet mask bit length is recommended 10 16 <	302 10 • 16 • 232 255 • 255 • 255 Subnet mask bit length is recommended to be 22 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 232 10 • 16 • 100 10 • 12 100 • 100 10 • 100 • 100 • 100 • 100 • 100 • 100 •<	302 10 16 232 1 255 255 255 255 1 255 255 255 255 1 255 255 255 255 1 255 255 255 255 1 255 255 255 255 1 22 10 16 232 1 10 16 232 1 1 10 16 232 1 1 10 16 232 1 1 10 16 232 1 1 10 16 232 1 1 10 16 10 10 1 1 10 16 10 1 1 1 1 10 16 10 1 1 1 1 10 10 10 1 1 1 1 10 10 1 1 1 1 1	302 10 • 16 • 232 • 0 255 • 255 • 255 • 0 255 • 255 • 255 • 0 255 • 255 • 255 • 0 255 • 255 • 255 • 0 22 • 10 • 232 • 11 10 • 16 • 232 • 103 10 • 16 • 232 • 103 10 • 16 • 232 • 103 10 • 16 • 232 • 103 10 • 16 • 232 • 103 10 • 16 • 100 • 103 100 • 16 • 100 • 103 100 • 100 • 100 • <td< td=""></td<>

GENERAL	WORKLOAD	HOSTS	NETWORK	
			emotion Virtual SAN VXLAN DA	TA CENTER
Data Center (Connections			
Data Center Connec process. Please revi	ctions won't be validated un ew them carefully.	til later in the		
Data Center Net	twork 👔	PUBLIC		Ŧ
Configuration N	ame 🕣	PUBLIC		
VLAN ID (300		
Subnet 🕧		10.16.230.0	0	
Subnet Mask 👔		255.255.2	255.0	
Gateway 🕧		10.16.230.1		
BACK	CANCEL			NEXT

- 6. Select the datacenter network "Public" from the drop-down menu. This was created during the initial bringup. If a new network is needed, first provision that on OneView before creating it on SDDC Manager.
- 7. Review the configuration and choose finish.

'l Configuration	٦			
GENERAL	WORKLOAD	HOSTS	NETWORK	REVIEW
				년 DOWNLOAD 🖶 PRINT
Configuration F	Review			
VIRTUAL INFRASTRUCTURE NAME	ORGANIZATION NAME	CPU	MEMORY	STORAGE
VCF-Testing01	254	274.4GHz	704GB	4.53TB
Workload				
AVAILABILITY				
NONE				
BACK	CANCEL			FINISH

8. VCF management and 1 workload domain is now finished and the system can now be consumed.

NOTE: Consumption of and use cases for VCF are out of scope for this paper. The intended purpose is to get the customer started on their installation and first initialization of VCF and HPE Synergy. Consult VMware services for further help with VMware Virtual Cloud Foundation.

Troubleshooting

Issue 1: UEFI Boot does not start PXE Installation

Resolution: Use Legacy Boot Mode

Use Legacy Boot Mode on OneView Service Profile. UEFI is not validated with VCF at the moment. This is described in the "Configuring HPE OneView Server Profile Templates" section of this document.

Issue 2: VRM Error: SSD in use - 4 of 6, pending 172.21.0.33, 172.21.0.33:DISK:naa.600508b1001c232022fe5c6f3af6d1a8

Resolution: Possible Sever Profile storage configuration inconsistency

← → C ▲ Not secure bttps://192.168.100.40:8443/vrm-ui/co	nfig.jsp#/task-details				☆ :
				administrator	Help 🕜 Copyright 🕤 Øvsphere.local 👻
د CONFIGURI	NG :41% COMPLETED				
SETUP				🖞 DOWNLOAD 👼 PRINT	
Search	Q		ALL 🔻	ALL 🔻	
vCenter; Wait Virtu	al SAN to Come Up Complet	FAILED		Jun 12, 2017 3:47:07 PM	
NAME:	VCENTER: WAIT VIRTUAL SAN TO COME UP COMPLETELY	STATUS:	FAILED		
DESCRIPTION	CENTER WAIT VIRTUAL SA	IN TO COME UP COM	PLETELY		
COMPONENT	SECONDBOOT				
PROGRESS MESSAGES:	PENDING OBJECTS AT 8:47 172.21.0.33:DISK:NAA.60050	PM: 172.21.0.33, 8B1001C232022FE5C	6F3AF6D1A8		
SUB TASKS:					

Ensure all Server Profile have identical Storage configuration.

Issue 3: vSAN Datastore configuration fails and vSAN Datastore capacity displayed is 0GB even though devices are present on the P416mi-e Controller.

Resolution: This issue may occur if the disks were previously used for another vSAN configuration or metadata exists such as prior RAID.

- 1. If the ESXi Server can list all the devices on the Storage Adapter for P416mi-e Controller, it is possible that the disks were used by some other vSAN installation. This requires cleanup of the disks.
- 2. To clean up the disks run login to the ESXi Server using SSH and run the following commands.

List all devices and note their device name. Note: Ensure that the local boot disk must not be wiped or ESXi installation will be lost

esxcfg-mpath -L (Sample output below)

[root@rack-1-n4	:~] esxcfq-mpa	ath -L													
vmhba0:C0:T0:L1	state:active	naa.6005	08b1001c	2a4ea24d	d090a5e3187a	vmhba0	0 () 1	NMP	active	san	sas.5	00143	80376	542fb0
vmhba1:C0:T0:L1	state:active	naa.6005	08b1001c	2eed7a69	4ed948ea8c2c	vmhba1	0 () 1	NMP	active	loca	al sas	.5001	43803	3755bac
vmhba1:C0:T0:L2	state:active	naa.6005	08b1001c	090e0eff	971e58f1f710	vmhba1	0 () 2	NMP	active	san	sas.5	00143	80375	5bac0
vmhba1:C0:T0:L3	state:active	naa.6005	08b1001c	bea60858	75a5a8770220	vmhba1	0 () 3	NMP	active	san	sas.5	00143	80375	5bac0
vmhba1:C0:T0:L4	state:active	naa.6005	08b1001c	06567b8c	c02891a9a85b	vmhba1	0 () 4	NMP	active	san	sas.5	00143	80375	5bac0
vmhba1:C0:T0:L5	state:active	naa.6005	08b1001c	760da13c	96f3f4721ca9	vmhba1	0 () 5	NMP	active	san	sas.5	00143	80375	5bac0
[root@rack-1-n4	:~]														

Delete all partition in the D3940 Disk Drive

for I in 1 2 3 4 5 6 7 8 9; do partedUtil /dev/disks/ naa.600508b1001c760da13c96f3f4721ca9 \$i; done

#Rescan all storage adapter *esxcfg-rescan –A*

Issue 4: SDDC Manager Initial Setup fails to bring up the vSAN Cluster successfully

Resolution: Occurs if one of the host is unable to claim disks and create diskgroup in automatic mode.

- 1. Perform steps in "Issue 3: vSAN Datastore configuration may fail. vSAN Datastore capacity displayed is OGB even though devices are present on the P542D Controller" to clean up the vSAN Disks.
- 2. Disable Automatic Claim on the vSAN Cluster.

VRack-Cluster - Edit Virtual SA	AN Settings ?
✓ Turn ON Virtual SAN	
Add disks to storage	Automatic All empty disks on the included hosts will be automatically claimed by Virtual SAN. Remote disks will not be claimed in Automatic mode.
Deduplication and compression	Disabled ▼ Allow Reduced Redundancy ● Changes require a rolling reformat of all disks in the VSAN cluster. Depending on the amount ▲ of data stored, this might take a long time. Enabling this feature would lead to some performance degradation.
	OK Cancel

3. Select host which does not have enough disks. Click on add disks SSD and HDD. vSAN will automatically add the disks in the appropriate Tier.

🖏 vRack-Cluster Actions 👻							=-
Getting Started Summary Mon	itor Manage Related Objects						
Settings Scheduled Tasks Alar	m Definitions Tags Permissions Add disks						
	manually				1	Disk Groups	Disks
 Services 	🤕 🔛 🛃 🛃 ' 'E C'			(Q Filter		-
vSphere DRS	Disk Group	Disks in Use	State	Virtua	al SAN H	Туре	Fault
vSphere HA	✓ 172.21.0.25	5 of 5	Connect	ed Hea	ilthy		
Virtual SAN	Disk group (0200010000600508b1001c9709d23f5617f580	a 5	Mounted	Hea	althy	Hybrid	
General		5 of 5	Connect	ed Hea	althy		
Disk Management	Disk group (0200010000600508b1001c68365b34a59a28d	a 5	Mounted	Hea	ilthy	Hybrid	
Fault Domains & Stretched		3 of 3	Not all dis	ks claimed ea	althy		
Cluster	Disk group (0200010000600508b1001c1f34ae0a7dd07311	1e 3	Wouldted	Hea	ilthy	Hybrid	
Health and Performance		5 of 5	5 Connected He				
 Configuration 	Disk group (0200050000600508b1001c87010af2216de900	:9 5	Mounted	Hea	Healthy		
General	4						Þ
Licensing	M					8 items	- 🗐
VMware EVC	470.24.0.25 Dista						
VM/Host Groups	172.21.0.25: DISKS						
VM/Host Rules	🍪 All Actions 👻			Show:	In use	(5)	•
VM Overrides	Name	Drive Type	Disk Tier	Capacity	Virtual SA	N Health Status	State
Host Options	Local HP Disk (naa.600508b1001c9709d23f5617f580aa2e)	Flash	Cache	372.58 GB	Healthy	(Moi
Profiles	Local HP Disk (naa.600508b1001c8b31d4f06b2003b81e45)	HDD	Capacity	558.88 GB	Healthy	/	Moi
	Local HP Disk (naa.600508b1001cd2e3cef5e915c04e644d)	HDD	Capacity	558.88 GB	Healthy	/	Moi
	Local HP Disk (naa.600508b1001ccd0fb3b0cbe3010f0b40)	HDD	Capacity	558.88 GB	Healthy	/	Mot
	Local HP Disk (naa.600508b1001c1fa131b02b5b3cac33fc)	HDD	Capacity	558.88 GB	Healthy	/	Moi
	4						
	M					5 items	P

4. Re-enable Automatic Mode for the vSAN cluster.

Issue 6: vCenter "Wait for vSAN" to come up completely

Resolution: This may occur if the ESXi host is unable to detect or mount the disks in a disk group.

Follow the documented steps for Issue 5: SDDC Manager Initial Setup fails to bring up vSAN Cluster successfully.

Appendix – Important Links

VMware Documentation

- 1. <u>VMware VCF Install Files</u>
- 2. VMware VCF Imaging Appliance deployment and Install Guide
- 3. VMware VCF Bring-Up Guide
- 4. VMware vSAN Disk Requirements KB 2106708

HPE Documentation

- 1. <u>HPE Synergy System (1 Frame) Setup</u>
- 2. HPE Synergy with VMware vSAN Best Practices Guide

Learn more at http://www.hpe.com/info/synergy-docs



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