Technical Brief

# Adding Zadara Storage to VMware Cloud on AWS





## Revision History

Row	Version	Date	Description
1	1.0	26 Nov 2018	Initial release
2	1.1	15 Jan 2019	Updates for VMware style guide compliance, plus trademark acknowledgements

## Introduction

#### VMware Cloud on AWS

Amazon describes VMware Cloud<sup>®</sup> on Amazon Web Services (AWS<sup>®</sup>) as an "integrated cloud offering jointly developed by AWS and VMware delivering a highly scalable, secure and innovative service that allows organizations to seamlessly migrate and extend their on-premises VMware vSphere<sup>®</sup>-based environments to the AWS Cloud running on next-generation Amazon Elastic Compute Cloud<sup>®</sup> (Amazon EC2<sup>®</sup>) bare metal infrastructure."

#### Problem

Unfortunately, the architecture of VMware Cloud on AWS (VMC-AWS) has, until now, made it impossible to present third-party storage located outside of Amazon's data centers to software-defined data center (SDDC) compute elements via AWS Direct Connect (DX). This restriction limited users' ability to present storage with full enterprise functionality to SDDCs hosted within AWS and forced users to scale storage and compute capacities in lock-step.

#### Purpose

This document describes a new method of leveraging VMware's network virtualization and security platform, VMware NSX<sup>®</sup>, to enable users to take full advantage of Zadara's data centric, location agnostic storage solution. In this example implementation, we will present Zadara iSCSI Block, SMB and NFS NAS to guest VM's running in a new SDDC within VMware Cloud for AWS.

#### Sample Use Cases

- Present the same Zadara file, block, and object storage to all compute elements, whether located on-premises, within one or more SDDCs, across multiple Virtual Private Clouds (VPCs), across multiple data centers, or across multiple cloud providers
- Scale storage capacity and compute elements independently
- Enhance availability with remote replication across regions, continents, or cloud providers
- Maximize application data security with user-managed encryption keys

- Ensure consistent high storage performance with 100% dedicated resources (i.e., no "noisy neighbors")
- Match storage performance to application requirements when one size does not fit all

#### Requirements

- SDDC v1.5 or later (NSX-T functionality enabled)
- AWS permissions to launch Cloud Formation script
- Zadara Virtual Private Storage Array (VPSA) in the same region as the SDDC in use

#### **Configuration Tested**

- VMware Cloud on AWS using NSX-T (required)
- Single Host SDDC "starter configuration"<sup>1</sup>
  - 10 TB usable SSD capacity split between VSAN datastore to support management virtual machines (VMs - vCenter, NSX, etc.) and Workload data store to host application VMs
- VMware SDDC v1.5.0.29
- NSX flags
  - o enableNsxtDeployment
  - o enableNsxtCspAuth
  - o reverseProxyUrl
  - o installNsxtCert
  - o enableNsxtTransitiveRouting
  - o dxForMgmtApplianceAndWorkload
- Zadara 1000 engine, v18.07-104 (any appropriately sized engine may be used)
- Zadara VPSA configured with (any valid VPSA configuration may be used)
  - o 8 x 10 TB SATA HDDs
  - o Extended mirrored SSD cache (480 GB)

<sup>&</sup>lt;sup>1</sup> https://cloud.vmware.com/vmc-aws/get-started

### Overview



Figure 1. Overview diagram

## Walkthrough

#### Planning Notes

- Make sure that you have Cloud Formation rights in your AWS account
- Review the latest Zadara Setup Guide (<u>http://guides.zadarastorage.com/</u>)
- By default, the SDDC will utilize a 10.0.0/20 network for management functions. Please ensure that this is not in use
- Zadara VPSAs will typically be on a 172.x.x.x network, depending upon region. However, Zadara supports custom networks and this can be set to a customer specific range if required

#### Steps

- 1. Create an organization account on AWS and VMware Cloud
- 2. CRITICAL: make sure to request that the NSX-T flags are enabled on your organization <u>before</u> proceeding
- 3. Request a new SDDC at <a href="https://cloud.vmware.com/vmc-aws">https://cloud.vmware.com/vmc-aws</a>
- 4. Step through the SDDC creation wizard
  - a. Configure basic SDDC properties.

SDDC Properties	Give your SDDC a name, choose a size, and specify the AWS region where it will be created.	e your SDDC a name, choose a size, and specify the AWS region where it will be created.						
	AWS Region     EU West (London) ~     More regions coming later       Deployment     Single Host () Multi-Host () Siretched Quster ()							
	SDDC Name Zadara NFS Poc Number of Hosts 1 () Host SDDCs expire in 30 days. LEARN MORE							
	Host Capacity     2 Sockets, 36 Cores, 312 GB RAM, 10 7 TB Storage       Total Capacity     2 Sockets, 36 Cores, 512 GB RAM, 10 7 TB Storage							
	NEXT							
Connect to AWS	Specify the AWS account that you want to connect your SDDC with							
VPC and subnet	Specify the VPC and the subnet to connect to your AWS account.							
Configure Network	Management Subnet (optional)							

b. Link AWS account (you must have cloud formation rights).



c. Identify the VPC and subnet that the SDDC will be connected to.

vm VMware Cloud on AW	/\$		۵	0	oo Zadara Storage _	~			
< Create Softwa	are-Defined Data	Center (SDDC)							
1. SDDC Properties	Zadara NFS PoC - 1 Hosts - EU W	test (London)							
2. Connect to AWS 3. VPC and subnet	Aws Account ID 98039606-713-9695-8120-2755 t0110020 Specify the VPC and the subnet to connect to your AWS account.								
	VPC     vpc-5##### (72310.0/fb) ~     C       Subnet     1723116.0/20, eu-west-2b     C       © To leverage native AWS services on your SDDCs, deploy your AWS EC2 workloads in the same availability zone to avoid cross AZ traffic charge.								
	NEXT								
4. Configure Network	Management Subnet (optional)								

d. When configuration has been completed and submitted, the provisioning progress screen is presented (the bar will move).

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Software-Defined Data Centers (SDDC)	CHART MOLE MINING CHARM.
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Software-Defined Data Centers (SDDC)	
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Software-Defined Data Centers (SDDC)	THE STATE
Zectares M/S PoC (*) Treasure a mini Demping Mill Delimited time to completion 44 Minutes	

e. When the process completes, you should see the following:

CPU     Memory     Storage       O GHz     O GiB     O TB
CPU Memory Storage O GHz O GiB O TB
CPU     Memory     Storage       O GHz     O GiB     O TB
O GHz O GiB O TB
NEW DETALS OPEN VICINIER ACTIONS -

5. After logging into VMware in AWS console you will see the following:

Zadara-NSX-T-POC  © EU (London) Ready Expires in 16 days		
CPU	Memory	Storage
83 GHz	512 GiB	10 TB
VIEW DETAILS OPEN VCENTER ACTIONS Y		

6. View Details allows you to view a summary and set the Networking firewall rules for initial setup

< BACK TO LIST Zadara-NSX-T-POC O EU (London)			ACTIONS ~ OPEN VCENTER
Summary Networking & Security Add Ons Troubleshoo	ting Settings Support		
Capacity and Usage   eu-west-2b			
Hosts	CPU	Memory	Storage
1	83 GHz	512 GiB	10 TB

7. Clicking on Networking & Security displays an overview of connections

Overview		
letwork Segments	Overview	
> VPN	SDDC	
NAT	Public IP: 35.178.218.205	
ecurity		
Distributed Eirewall		$\rightarrow$
	Management Gateway	Internet
Groups	VCenter NSX	
Services	Appliance Subnet: 10.10.12.0/22	
ools	Infrastructure Subnet: 10.10.0.0/20	
IPFIX		No IPsec VPN-Gonfigured
Port Mirroring	N Edea Simuell Dates & Course	
system	II Edge Firewall Rules, 9 Groups	On Prem     On Prem
DNS Public IPs		
Direct Connect		
Connected VPC	Compute Gateway	
	Workloads	
		Amazon
	2 Segments, 6 Edge Firewall Rules & O	VPC
	Distributed Firewall Rules, 2 Groups, 0 Public	VDC-SBICHS-

 In the Security Tab, define access rules for management and access to vCenter (by default everything is denied). Create New Objects for specific IP's to allow access and grant access to vCenter, e.g.

1	Matt_VC	Matt_VC	vCenter	ICMP (ALL ICMP), SSO (TCP 7444), HTTPS (TCP 443) show less	Allow	Disabled

9. Click on Direct Connect on the Networking & Security tab to get the AWS account ID.

S	ystem
	DNS
	Public IPs
	Direct Connect
	Connected VPC

- 10.Open a new browser window to <u>https://manage.zadarastorage.com</u> and request a new AWS VPSA (make sure it's located in the same AWS region as the just-deployed SDDC).
- 11.Send an email to Zadara support (support@zadarastorage.com) and outline the VPSA name, your account name, and the AWS account ID (from step 9, above).
- 12. When you receive confirmation that the VPSA is ready, go back to the SDDC Direct Connect pane and accept the two new virtual interfaces.

13. After a few minutes you should see something similar to this, showing the learned and advertised routes from the SDDC and the Zadara sides.

Virtual Interface Name	Virtual Interface ID	Direct Connect ID	State	BGP Status				
Zadara_AWS_SDDC	dxvif-f <sub>8</sub> 077,0	dxcon-1,221(TD)	Attached	🕒 Up	DELETE			
Zadara_AWS_SDDC	dxvif-figure, Cha	dxcon-feigithtu	Attached	O Up	DELETE			
CRETRESH								
Advertised BGP Routes								
(192 168 1.0/24) (192.168 100.0/24) (10.10 12 0/22)								
Learned BGP Routes								
172.28.224.0/22 10.51.0.0/16 10.52.0.0/10	5 10.53.0.0/16							

- 14.Ensure you have created objects for the Zadara VPSA Network and have configured firewall rules to allow traffic to flow between the Compute Network and the Zadara Network via the SDDC Management Network and Direct Connect Network
- 15. To enable VPC to VM Compute connectivity make sure that two-way network traffic can flow between EC2 instances in the VPC and the SDDC via the Elastic Network Interface (ENI). Ensure that the ACL Rules applied to the ENI Interface allow two way traffic between the two networks.
- 16.If VPC EC2 compute instances require access to the same storage types (e.g., iSCSI/Block, CIFS/SMB, Object), then additional DX Virtual Interfaces (VIFs) will need to be provisioned – speak to your Zadara Account Manager to organise this.
- 17.Log into the newly provisioned VPSA to make sure the dashboard is available.

Session View												- A 3
VPSA - ZadaraUK_Demo X	+											
← → C @ Not secure   1/2.	28.224.103										04 5	
English - Display Timezone: Etc	AUTC (+00:00)										🕹 zada	Jrauk 💽
ZadaraUK_Demo - 18.07-104	Dashboard		1									
Dashboard	VPSA Info		System Health		СРИ	100						
Resources     Resources     Resources     Resources	IO Engine: 1000 VCPUs: 5	APP Engine: 01 Memory: 18432 MB	Health Object	Inventory Attention	Courses!	80 80 70 60						
Volumes	Base Cache: 80 Management IP: 172.28.224.103	Extended Cache: 400 Public IP: None	RAID Groups     Pools     Volumes     Snapshots	11 3 13 110	13	50 - 40 - 30 - 20 -						
🜉 Servers 💜 Controllers	VPSA Name: ZadaraUK_Demo	Created: 16-03-2018 12:09	Servers     Containers	4		0	14:54	15:04	15:14	15:24	15:34	15:44
B 🔄 Remote Storage	Capacity				Performance							
🚰 Remote VPSAs 🥬 Remote Object Storage		-			1075	2 1.8 1.6 1.4						
Data Protection	Usable Capacity: 52.79 TB			Ocable Capacity: 52.79 TB (otal)	1.2 -							
Snapshot Policies	Capacity (GB)				IOPS	0.8 -						
Mirroring	00000					0.4 - 0.2 -						
Backup to Object Storage					1	0 -  14:45	14:54	15:04	15:14	15:24	15:34	15:44
Mestore from Object Storage	50000 -				1	1.1						
Container Memory Pools	40000 -				Throughput (total)	0.8						
Containers	30000 -				MB/s	0.4						
B 🗃 System					1	0	14:54	15:04	15:14	15:24	15:34	15:44
Performance	20000 -				1	1.1						
Settings	10000				Mirror Traffic (total)	0.8						
🛞 🧰 User Management					0 KB/s	0.6 - 0.4 -						
🗉 🧰 Logs	0	17 Sep 23 Se	p 29 Bep	50d 110		0.2						
i Cia Support		Usable	Capacity 📕 Used Capacity			0 14:45	14.54	15:04	15:14	15:24	15.34	15:44

18. Click on the servers tab to register new clients and setup access volumes.

© severs												
Image: Second												
Name	ISCSI / FC Connectivity	IP or CIDR Block	ISCSI IQN	IPsec ISCSI	IPsec NFS	Registered	OS					
AWS_Demo_Server	Active	172.31.31.38	ign.1991-05.com.microsoftwin-u9g	Disabled	Disabled	no	🎥 Windows					
ESX_NFS_Servers		10.10.0.0/20		Disabled	Disabled	no	ESXI					
ZADARA-WIN-DC1	Active	192.168.100.10	ign.1991-05.com.microsoft.zadara	Disabled	Disabled	yes	🎥 Microsoft Windows Server 2016					
WIN-VEEAM-01	Active	192.168.100.11	ign.1991-05.com.microsoft.win-vee	Disabled	Disabled	yes	🎥 Windows					
C C Deploying 1 - d f > C Deploying 1 - d f C												

In the above example, you can see we have defined access to the same array via iSCSI and NAS in both the VMware compute network on 192.168.100.0/24 and the AWS VPC 172.31.31.0/24.

**Note:** Servers can be registered manually or automatically via a setup script from the VPSA

19. Lastly, we can see the range of Volumes presented from the configured VPSA

Columnes											
Image: Second											
Name 🕇	Capacity	Status	Protection	Data Type	Pool	Server(s)					
AD_Block_Test	1 178	in-use		BLOCK	R10_SATA_Pool	ZADARA-WIN-DC1					
EC_Test	1 TB	In-use		BLOCK	R10_SATA_Pool	AW/S_Demo_Server					
ESX_Guest_Test	10 GB	In-use		BLOCK	R10_SATA_Pool	ZADARA-WIN-DC1					
ESX_Guest_vol2	25 GB	Available		BLOCK	R10_SATA_Pool						
iometer_test	10 GB	in-use		BLOCK	R10_SATA_Pool	AWS_Demo_Server					
NextCloud	100 GB	in-use	<u>ia</u>	File-System	R10_SATA_Pool	nextcloud_zcs					
SMBTest	10 GB	In-use	69 (j)	File-System	SSD_Pool1	Multiple(3)					
Veeam_Backups	1 TB	in-use		BLOCK	R10_SATA_Pool	WIN-VEEAM-01					
Veeam_SMB	10 TB	in-use	08	File-System	R10_SATA_Pool	WIN-VEEAM-01					
VMVVare_Templates	200 GB	In-use	12 ·	BLOCK	R10_SATA_Pool	AWS_Demo_Server					
VMwareDS1	1 TB	in-use		File-System	SSD_Pool1	Multiple(2)					
VMwareD82	10 TB	in-use		File-Bystem	88D_Pool1	Multiple(2)					
(( ( ) Page 1 of 1 ) ))   C           Displaying 1 - 12 of 12											

#### Conclusion

We have demonstrated how data residing on Zadara storage can be simultaneously presented to applications running in VMware Cloud for AWS environments, AWS EC2 instances, and on-premises servers. This data centric, location agnostic approach enables Zadara customers to enhance data availability, accelerate application performance, optimize flexibility, and capture maximum value from data.

To further explore Zadara solutions for AWS, please visit <u>https://www.zadara.com/sol\_aws.php</u> or call us at +1-949-251-0360 (US) or +1-949-284-0713 (International).

#### Transform your business with zero-risk enterprise storage.

Zadara transforms storage-related costs from a variable mix of equipment and management expenses to a predictable, on-demand, pay-per-use, elastic service that greatly simplifies planning, streamlines budgeting, and improves return on investment (ROI). Find out how zero-risk enterprise storage can help transform your business. Call or email today.

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