

Adam Sandberg

ITAS 267 – Assignment 1

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Assignment 1 (15%) - DR Strategies with VMware SRM (Site Recovery Manager)

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YouTube Link: <https://youtu.be/j1DCZg0in5o>

Introduction

In this lab, we will use VMware's Replication & Site Recovery Manager (two separate products) to write and configure a Disaster Recovery (DR) strategy with a 5-minute Recovery Time Objective (RTO) and test and execute the plan using the VMware Site Recovery Manager software. We will deploy and configure a "Protected Site" named PHOENIX (Our student ESXi tower) and a "Recovery Site" named LIVERPOOL (A Virtual ESXi VM on our tower) and document and demonstrate all aspects of the project. The lab will test our understanding of highly available systems design and disaster recovery scenarios and requires the use of best practices learned in class and found online. Our goal is to show the ability to recover critical systems in a given time in case of a disaster.

Part 1 - Install VM Replication and SRM Appliance

Installing a VM replication appliance is a straightforward process that can be completed in a few steps. This appliance allows you to replicate virtual machines to a remote site, ensuring continuity and disaster recovery. Before beginning the installation, make sure you have all the necessary hardware components and have prepared the target environment. Here are the basic steps to follow to install your VM replication appliance:

1. Using the vCenter web appliance, right click on the Datacenter and press "Deploy OVF template."
2. Select these 3 files shown in the figure below and press next.

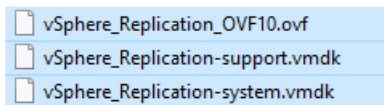


Figure 1 ovf Files

3. Choose the location and the name then press next.
4. Choose your ESXi host as the compute source and press next.
5. Review details and press next. Accept agreement and press next.
6. In configuration choose 2 or 4 vCPUs. Press next.
7. Choose your datastore, choose thin provision and press next.
8. Select your network and press next.

9. In the customize template page, enter a password for root and admin accounts. Then enter the ip address if using static and choose the domain name. Click next.

Ready to complete

Click Finish to start creation.

Provisioning type	Deploy from template
Name	VM Rep App
Template name	vSphere_Replication_OVF10
Download size	779.3 MB
Size on disk	1.7 GB
Folder	Datacenter
Resource	as-liverpool.as
Storage mapping	1
All disks	Datastore: datastore1; Format: Thin provision
Network mapping	1
Network 1	VM Network
IP allocation settings	
IP protocol	IPV4
IP allocation	Static - Manual

Figure 2 Ready to Complete

10. Review the details and press finish.
11. Repeat steps 1 – 10 for the VMware SRM install. The process is the exact same just use the different ISO and a different IP and FQDN.

Note: vCenter servers will need this software so part 4 will be completed for both sites.

Part 2 – Configuring VMware SRM and vRep

Now that the appliances are setup, we need to configure them to work with our sites. To begin part 5 these steps will be used for both sites. But keep in mind proper domain names and IP addresses during the process.

1. Log into the SRM management page. Click summary then click “Configure Appliance”
2. It will ask for your “PSC” enter your appropriate vCenter server domain name.

Enter the Platform Services Controller details for the vCenter Server for which you want to configure Site Recovery Manager.


PSC host name	<input type="text" value="vCenter.AS-Phoenix.as"/>
PSC port	<input type="text" value="443"/>
User name	<input type="text" value="administrator@asp.local"/>
Password	<input type="password" value="....."/> 

Figure 3 PSC Setup

Note: If prompted, you must accept the certificate for the configuration to proceed.

Enter the password, press next and accept the certificate.

3. Select the vCenter server you want to configure, press next.
4. Enter your site name, either Phoenix or Liverpool. Then enter and Admin email. Press Next.

Enter name and extension for Site Recovery Manager

Site name	AS-Phoenix	Figure 4 Enter Name for Site
	A unique display name for this Site Recovery Manager site.	
Administrator email	adam.sandberg@itas.ca	
	An email address to use for system notifications.	
Local host	srm.as-phoenix.as	
	The address on the local host to be used by Site Recovery Manager.	
Extension ID	<input checked="" type="radio"/> Default extension ID (com.vmware.vcDr) <input type="radio"/> Custom extension ID	

5. Look over the ready to complete page and press finish. The appliance will take a few minutes to configure.

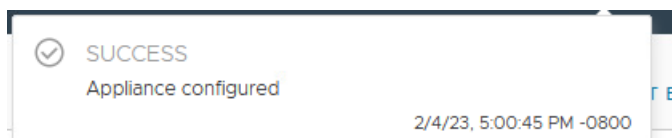


Figure 5 SRM Configured

6. Now that the SRM applications have been registered to there respective vCenter servers. Its time to configure the VRMS appliance. Navigate to the management site and press “Configure Appliance”

7. Same as before, enter the FQDN of your vCenter server and enter the administrator credentials.

Enter the Platform Services Controller details for the vCenter Server for which Replication.

PSC host name	vcenter.as-phoenix.as	Figure 6 Choose PSC
PSC port	443	
User name	administrator@asp.local	
Password	

Note: If prompted, you must accept the certificate for the configuration to proceed.

Press next and accept the cert.

8. Click next on the vCenter server screen.

9. Choose a site name and enter your admin email. Press next.

Name and extension

All fields are required unless marked (optional)

Enter name and extension for vSphere Replication

Site name	AS-Phoenix
	A unique display name for this vSphere Replication site.
Administrator email	adam.sandberg@itas.ca
	An email address to use for system notifications.
Local host	vrep.AS-Phoenix.as
	The address on the local host to be used by vSphere Replication.
Extension ID	com.vmware.vchms
Storage Traffic IP (Optional)	
	Must match one of the Appliance NIC IP addresses. If empty, an appliance IP will be used.

Figure 7 Site Name

10. On the ready to complete page look over the details and press finish.
11. Now that the 4 sites have been registered to our vCenter servers. Its time to make the Protection rules and zones.

Part 3 - Set up a Protection group and Recovery plan

A Protection Group and Recovery Plan will be set up using VMware SRM and VRMs, allowing for the replication and recovery of virtual machines in the event of a disaster.

1. To begin, open the vCenter web page for the Phoenix site. Navigate to the menu then select "Site Recovery".
2. Click "Open Site Recovery" here we will add our protected VM's.

Site Recovery

Figure 8 Site Recovery.

Local vCenter Server instances with installed vSphere Replication or Site Recovery Manager are listed below. Click the Open button. The Site Recovery application opens in a new browser tab.

vCenter.AS-Phoenix.as		
> vSphere Replication	✓ OK	CONFIGURE
> Site Recovery Manager	✓ OK	CONFIGURE
OPEN Site Recovery		


3. Click new site pair then enter the FQDN and credentials of the Liverpool site. Click next.

Peer vCenter Server

Figure 9 Peer vCenter Server.

All fields are required unless marked (optional)

Enter the Platform Services Controller details for the peer vCenter Server.

PSC host name	<input type="text" value="vcenter.as-liverpool.as"/>
PSC port	<input type="text" value="443"/>
User name	<input type="text" value="administrator@asl.local"/>
Password	<input type="password" value="....."/> 

FIND VCENTER SERVER INSTANCES

4. Choose both available services and press next.

New Pair

1 Pair type

2 Peer vCenter Server

3 Services

Services

The following services were identified on the selected vCenter Server instances. Select the ones you want to pair.

☒ Service

☒ Site Recovery Manager (com.vmware.vcd)

☒ vSphere Replication

NEW SITE PAIR

vCenter.AS-Phoenix.as ↔ vcenter.AS-Liverpool.as

Site Recovery Manager

Protection Groups 0 Recovery Plans 0

vSphere Replication

Outgoing 0 Incoming 0

VIEW DETAILS

ACTIONS ▾

Figure 10 New Pair Services

5. Look over the details and press finish. You should now see your completed tasks and the new site listed.
6. Now that are sites are paired, some resource mapping needs to be done. In the site pair tab. Click Network Mappings and press “New”.
7. Choose the default setting on the first page and press next.

Recent Tasks					Alarms
Task Name		Target		Status	Initiator
Select placeholder datast...		vCenter.AS-Phoenix...		✓ Completed	ASP.LOCAL
Add Remote Site		vCenter.AS-Phoenix...		✓ Completed	ASP.LOCAL
Connect vSphere Replicat...		vCenter.AS-Phoenix...		✓ Completed	{Name: Adm

Figure 11 New Site Pair

- On the recovery networks page. Choose the VM Network from each site and then press “Add Mappings”. Click next.

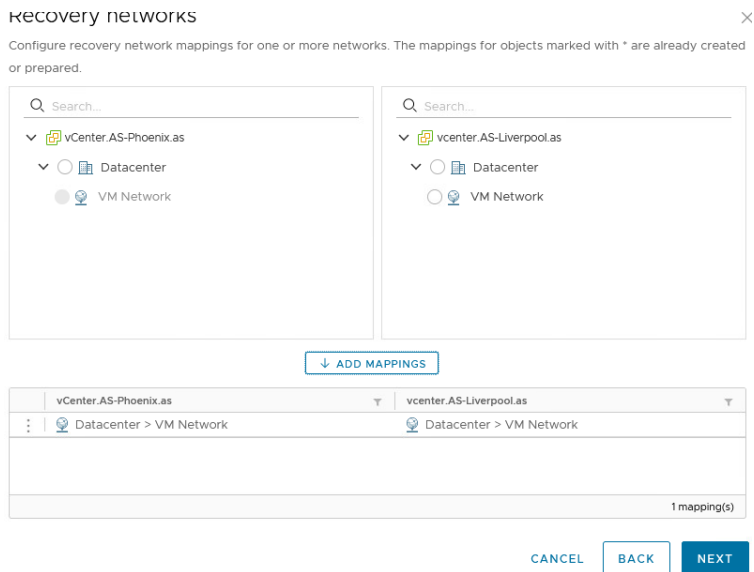


Figure 12 Add Mappings (Network)

- In the reverse mapping page choose your newly created mapping and press next.

- On the test network screen press next. Then press Finish.

- Now click folder mapping – New. This is similar to the network mapping.

- Choose “Prepare mappings manually” then press next.

- Select the created mappings in the reverse page and press next, then finish.

- Now press the “Resource Mapping” icon and press new.

15. In recovery resources choose both ESXi Servers. Press “Add Mappings” then click next.

Recovery resources

Configure recovery resource mappings for one or more resources. The mappings for objects marked with * are already created or prepared.

Figure 13 Recovery Resources

16. Choose the mapping in the reverse section and press next, then finish.

Configure VM replication

- Now that the resources have been mapped. Navigate to the “Replications” tab and press “New”. Note that it is either outgoing or incoming before pressing new. This is the Phoenix to Liverpool replication so my DC/DNS and two file servers will be included in this replication plan.
- In the target site leave it as default and press next.
- On the Virtual Machine page, select your VM,s that will be replicated. In this case since its Phoenix to Liverpool, my file servers and DC will be chosen. Press next.

All Selected (3)

				SELECT ALL	CLEAR SELECTION
<input type="checkbox"/>	Name	VM Folder	Compute Resource		
<input checked="" type="checkbox"/>	ASP-DC	Datacenter	esxi.as-phoenix.as		
<input checked="" type="checkbox"/>	FS1	Datacenter	esxi.as-phoenix.as		
<input checked="" type="checkbox"/>	FS2	Datacenter	esxi.as-phoenix.as		

Figure 14 Select VM's

- In the Datastore page, accept the defaults and ensure your main Datastore is selected. Press next.

- On the Replication Settings page, click to enable point in time instances. Change it to 2 instances per day for the last 3 days. Click to enable quiescing and network compression for VR data. Click next.

Replication settings

Configure the replication settings for the virtual machines.

Recovery point objective (RPO) ⓘ



Figure 15 Replication Settings

☒ Enable point in time instances ⓘ

Instances per day

Days

Keep 2 instances per day for the last 3 days.

If the RPO period is longer than 12 hours, you might want to decrease the RPO value to allow vSphere Replication to create the number of instances that you want to keep.

☒ Enable guest OS quiescing ⓘ

⚠ 1 of the selected VMs does not support quiescing. Quiescing is enabled only for the VMs that support it. [Details](#)

☒ Enable network compression for VR data ⓘ

☐ Enable encryption for VR data ⓘ

- On the protection group choose to not add it one now and press next.
- Review and click finish.
- You can click on the replications tab to see the new replications present.

vCenter.AS-Phoenix.as → vcenter.AS

NEW

<input type="checkbox"/>	Virtual Machine	Status
<input type="checkbox"/>	ASP-DC	Initial Sync
<input type="checkbox"/>	FS1	Initial Sync
<input type="checkbox"/>	FS2	Initial Sync

Figure 16 Current Replications

Steps 1 – 8 will need to be done again except it will be for the singular DC from Liverpool to Phoenix.

Protection Group & Recovery Plan

Now that the replication rules have been made, we need to make a Protection Group and a recovery plan.

- Click the protection group tab. Then select “New”

- Enter the name and direction of the group. There will be two groups, 1 for each direction. Below is my single DC from the Liverpool site that will go to the Phoenix site. Click next.

Name: 68 characters remaining

Description:
(Optional) 4096 characters remaining

Direction:

☐ AS-Phoenix.srm → AS-Liverpool

☒ AS-Liverpool → AS-Phoenix.srm

Figure 17 Protection Group Settings

- On the “Type” page, choose “Individual VMs” and select the required VMs depending on the direction you chose. Click next.
- On the “Recovery Plan” page choose to create new plan. Name it accordingly and press next.
- You will complete steps 1-4 for both sites and will have two protection groups, and two recovery plans. See below.

Protection Groups			
NEW			
	Name	Protection Status	Recovery Status
<input type="radio"/>	Liverpool-DC	✓ OK	Ready
<input type="radio"/>	Phoenix VMs	✓ OK	Ready

Recovery Plans		
NEW		
	Name	Status
<input type="radio"/>	ASL-DC -> Phoenix	→ Ready
<input type="radio"/>	Phoenix VMs -> Liverpool	→ Ready

Figure 18 Protection Groups and Recovery Plans

Now we need to configure the Recovery Plan steps.

- Go to the Recovery Plans tab and choose the Phoenix to Liverpool plan. Since this plan has 3 VMs. Let's set the Domain Controller to have the highest priority and start up first.
- Go to virtual machine tab, click on the dc and press the priority dropdown menu. Choose 1 (Highest).

Phoenix VMs -> Liverpool									
Summary Recovery Steps Issues History Permissions Protection Groups Virtual Machines									
	Virtual Machine	Recovery Status	Status Modified By	Protection Group	Priority				
<input type="checkbox"/>	ASP-DC	Ready for recove...		Phoenix VMs	1 (Highest)				

Figure 19 VM Priority.

That concludes the Recovery Plans. Now your recovery environment is complete.

Testing Recovery

In the Recovery Plans tab, you can choose any plan you have and press “Test” this is highly recommended to do before any large-scale implementation.

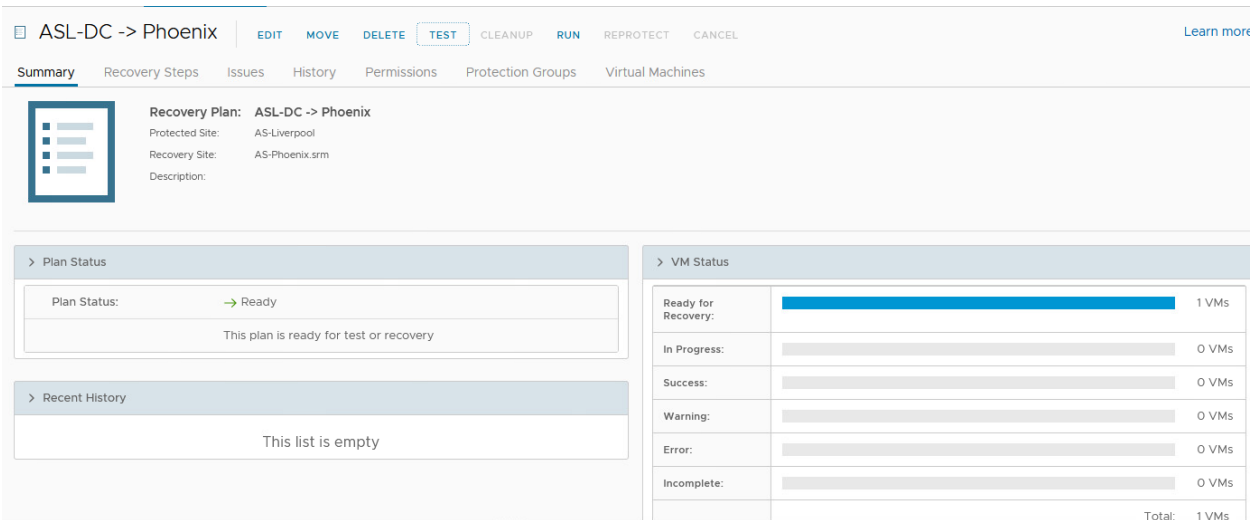


Figure 21 Test Recovery Plan.

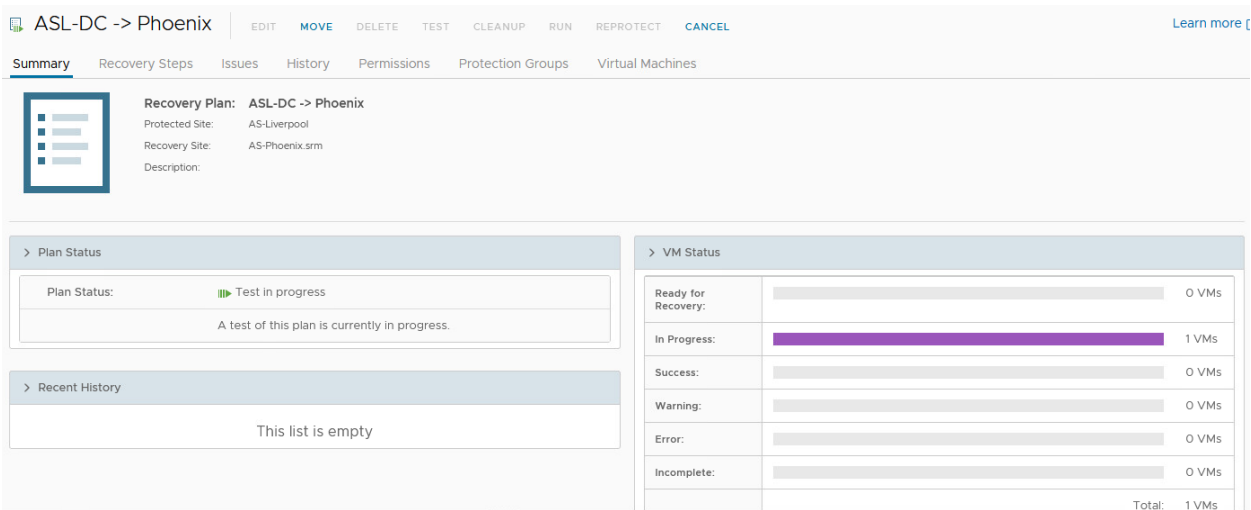


Figure 20 Test in Progress

You can follow along and see if the test is successful.

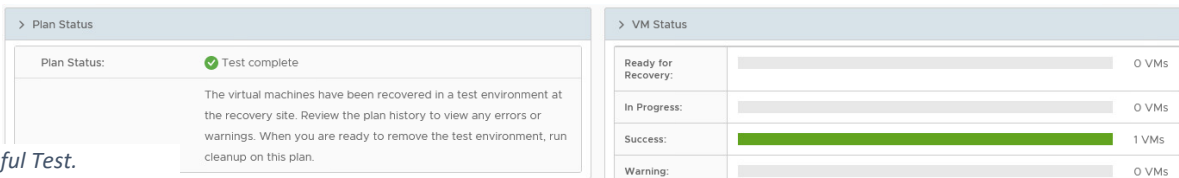


Figure 22 Successful Test.

After the test has been completed, run the cleanup. The cleanup will remove the VM and reset the plan to a ready state.

Conclusion

In conclusion, this lab provided a comprehensive hands-on experience in installing, configuring, and testing disaster recovery solutions using VMware technologies like vCenter Server, vSphere Replication, Site Recovery Manager, and Windows Failover Clustering. It emphasized the importance of backup and recovery strategies in ensuring the availability and accessibility of critical data and services in the event of an unexpected disaster. The lab also demonstrated the power of these technologies in enabling seamless migrations and failovers with minimal disruption to the end-users. The detailed network topology diagrams and IP tables, along with the video demonstration, serve as a clear record of the steps taken and the recoveries in action, emphasizing the need for thorough documentation in any enterprise-level deployment. Finally, this lab highlights the significance of proper planning, resource allocation, and testing in the implementation of successful disaster recovery solutions.

IP Tables

AS-Phoenix Site:

Server Name (FQDN)	IP Address
ESXi.AS-Phoenix.as	192.168.58.10
vCenter.AS-Phoenix.as	192.168.58.11
ASP-DC.AS-Phoenix.as	192.168.58.19, 10.58.0.19
FS1-AS-Phoenix.as	192.168.58.41, 10.58.0.41
FS2-AS-Phoenix.as	192.168.58.42, 10.58.0.42
SRM.AS-Phoenix.as	192.168.58.12
vREP.AS-Phoenix.as	192.168.58.13

AS-Liverpool Site:

Server Name (FQDN)	IP Address
ESXi.AS-Liverpool.as	192.168.58.20
vCenter.AS-Liverpool.as	192.168.58.21
SRM.AS-Liverpool.as	192.168.58.22
vREP.AS-Liverpool.as	192.168.58.23
ASL-DC.AS-Liverpool.as	192.168.58.29, 10.58.0.29

Network Diagram

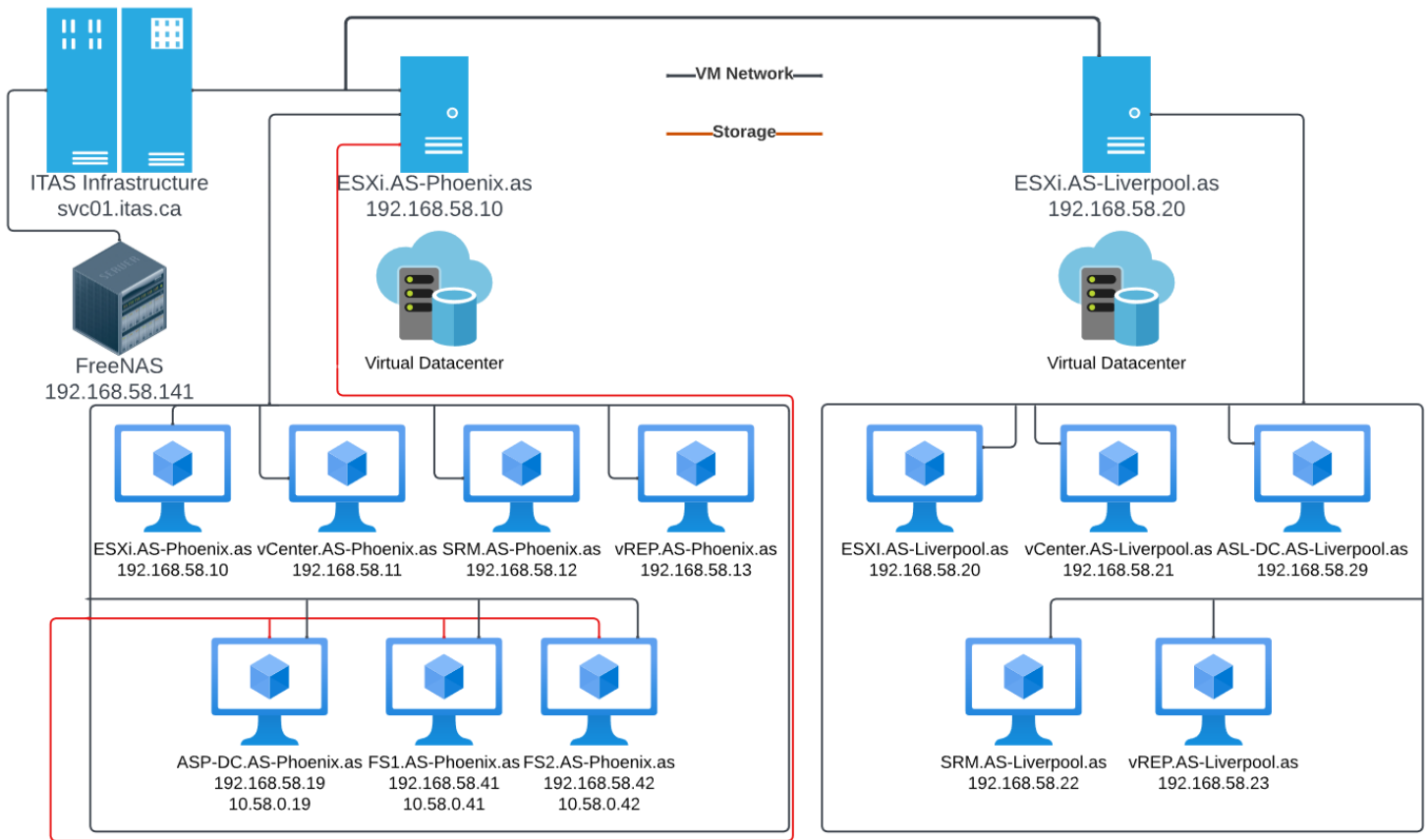


Figure 23 Network Diagram.

References

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