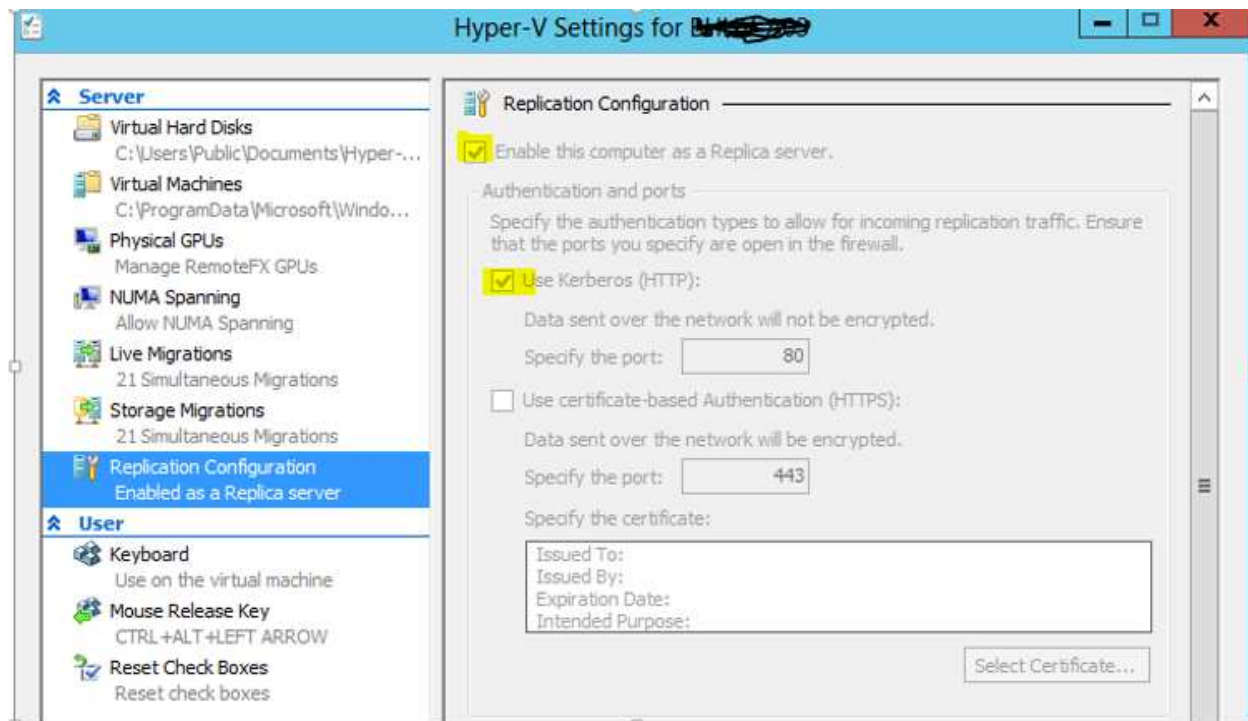# Hyper-V Replication – Enabling VM Replica
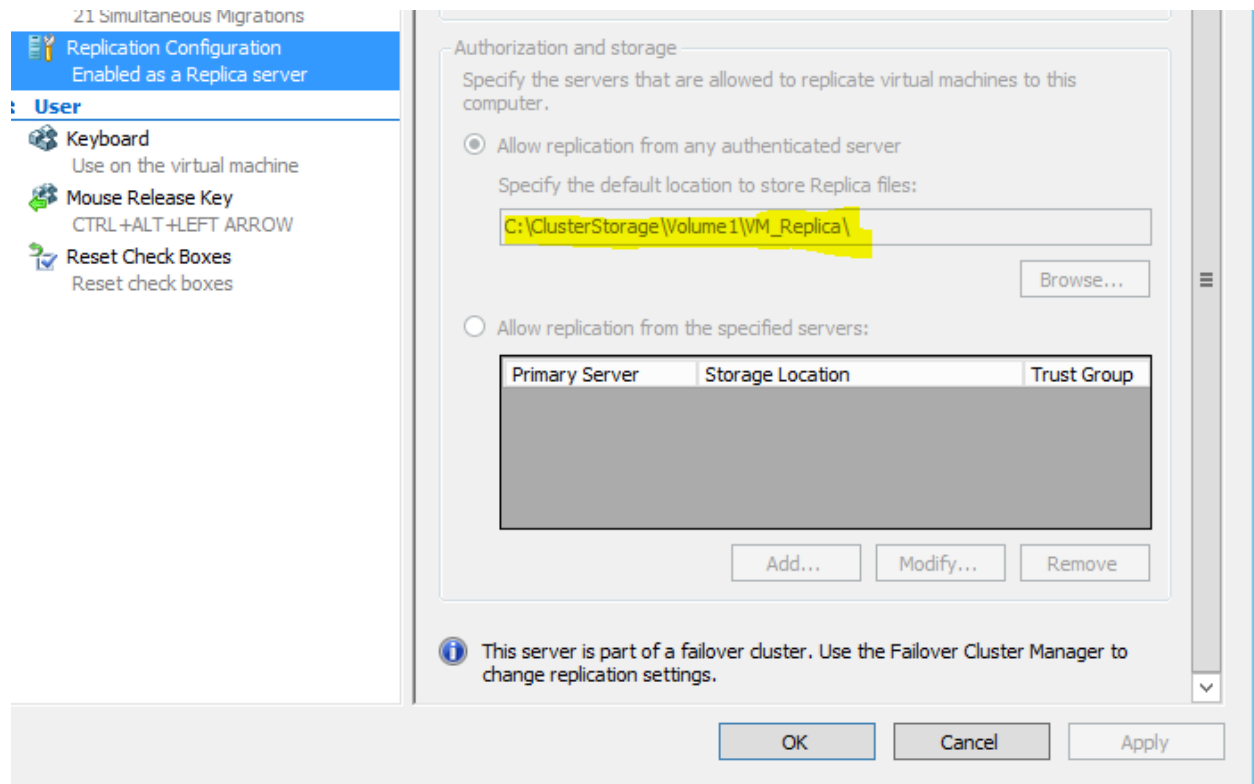
Below document prepared by taking the example "MOB-TEST" VM

Prerequisites:

- Make sure sufficient disk free space available at Primary site & Replica site servers
  - At primary site, approx. disk space observed during initial replication requires double the size of VHD because snapshots & HRL files will be created in same VHD folder at the time of initial replication.
- Make Sure Replica Broker Service (Role) is online in cluster roles.
- For successful replication, VM backup need to stop till replication completion
- In this SOP, Initial replica export will be taken to external HDD due to less bandwidth –Make sure it is connected to Hyper-v server wherever VM's hosted.
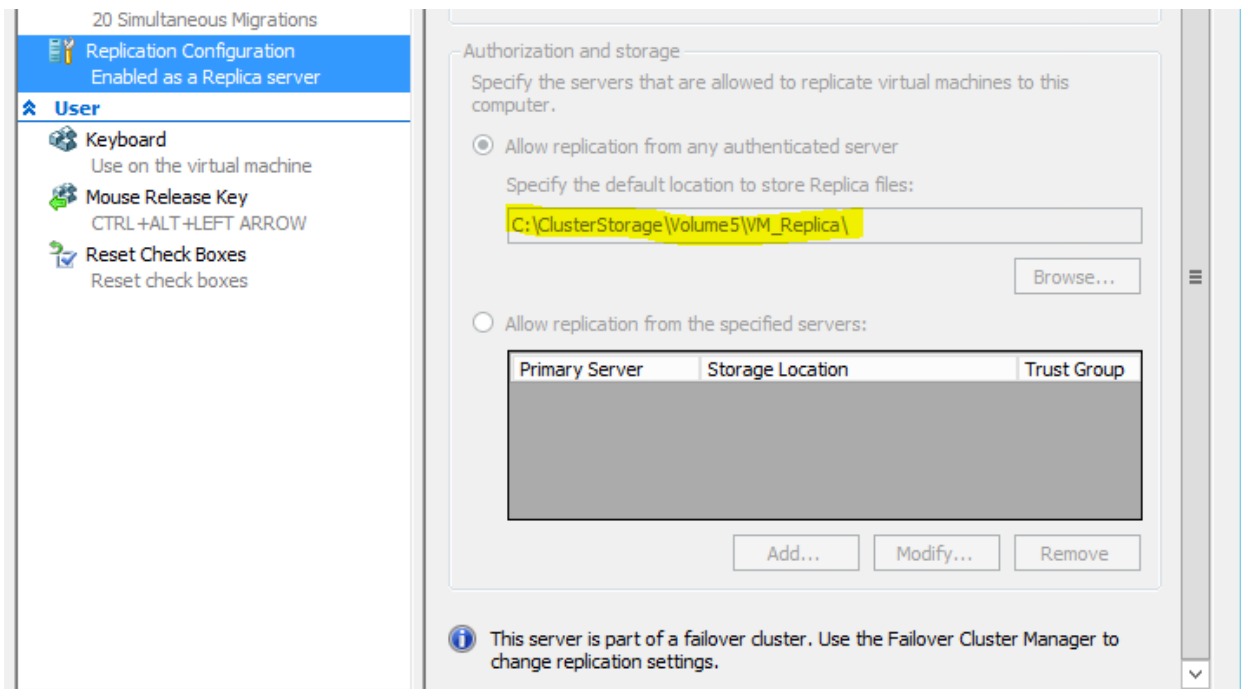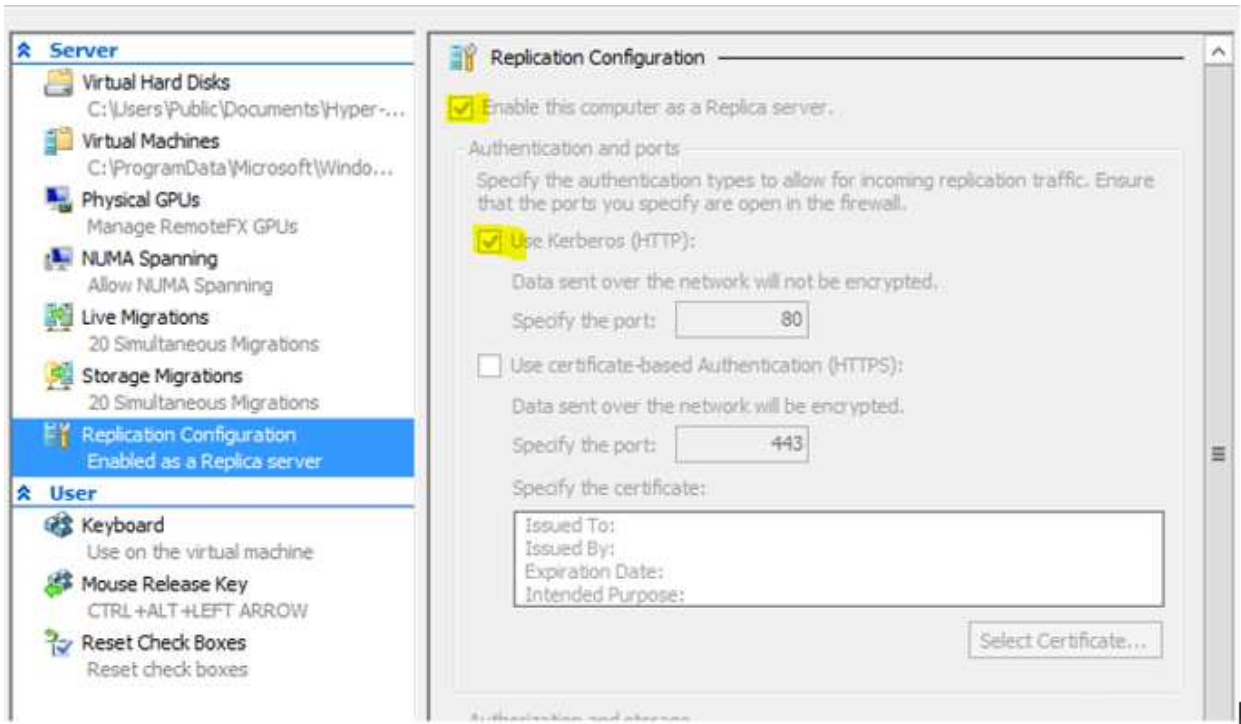
At Primary Site

21 Simultaneous Migrations

Replication Configuration
Enabled as a Replica server

User

Keyboard
Use on the virtual machine

Mouse Release Key
CTRL+ALT+LEFT ARROW

Reset Check Boxes
Reset check boxes

Authorization and storage

Specify the servers that are allowed to replicate virtual machines to this computer.

◉ Allow replication from any authenticated server

Specify the default location to store Replica files:

C:\ClusterStorage\Volume1\VM_Replica\

Browse...

◯ Allow replication from the specified servers:

Primary Server	Storage Location	Trust Group

Add...   Modify...   Remove

ℹ This server is part of a failover cluster. Use the Failover Cluster Manager to change replication settings.

OK   Cancel   Apply

Replica Broker at Primary

Name	Status	Type	Owner Node	Priority	Information
-REPLBKR	● Running	Hyper-V Replica Broker		Medium	

At Replica Site

Server

Virtual Hard Disks
C:\Users\Public\Documents\Hyper-...

Virtual Machines
C:\ProgramData\Microsoft\Windo...

Physical GPUs
Manage RemoteFX GPUs

NUMA Spanning
Allow NUMA Spanning

Live Migrations
20 Simultaneous Migrations

Storage Migrations
20 Simultaneous Migrations

Replication Configuration
Enabled as a Replica server

User

Keyboard
Use on the virtual machine

Mouse Release Key
CTRL+ALT+LEFT ARROW

Reset Check Boxes
Reset check boxes

Replication Configuration

☑ Enable this computer as a Replica server.

Authentication and ports

Specify the authentication types to allow for incoming replication traffic. Ensure that the ports you specify are open in the firewall.

☑ Use Kerberos (HTTP):

Data sent over the network will not be encrypted.

Specify the port: `80`

☐ Use certificate-based Authentication (HTTPS):

Data sent over the network will be encrypted.

Specify the port: `443`

Specify the certificate:

Issued To:
Issued By:
Expiration Date:
Intended Purpose:

Select Certificate...

---

20 Simultaneous Migrations

Replication Configuration
Enabled as a Replica server

User

Keyboard
Use on the virtual machine

Mouse Release Key
CTRL+ALT+LEFT ARROW

Reset Check Boxes
Reset check boxes

Authorization and storage

Specify the servers that are allowed to replicate virtual machines to this computer.

◉ Allow replication from any authenticated server

Specify the default location to store Replica files:

`C:\ClusterStorage\Volume5\VM_Replica\`

Browse...

◯ Allow replication from the specified servers:

Primary Server	Storage Location	Trust Group

Add... | Modify... | Remove

ⓘ This server is part of a failover cluster. Use the Failover Cluster Manager to change replication settings.

Replica Broker at Replica site

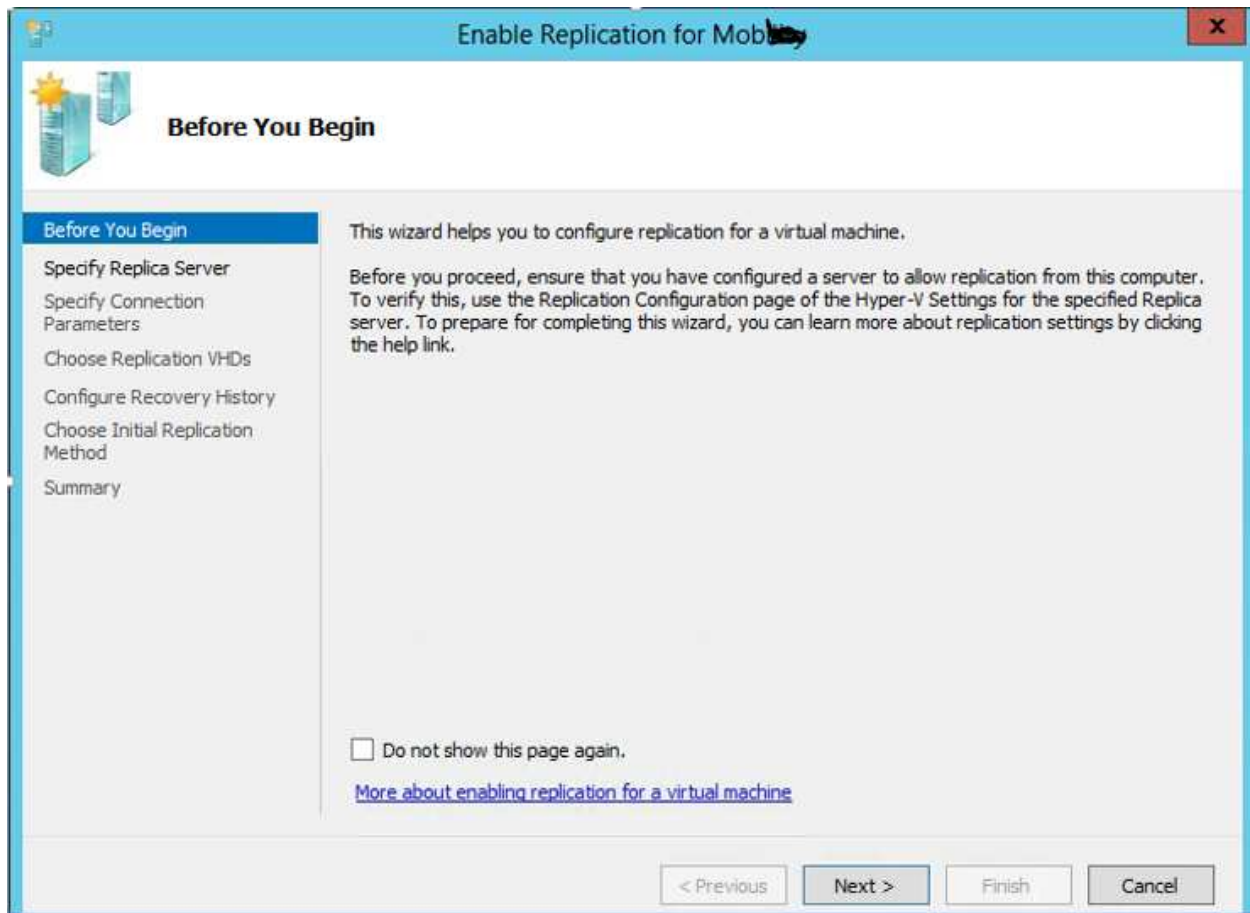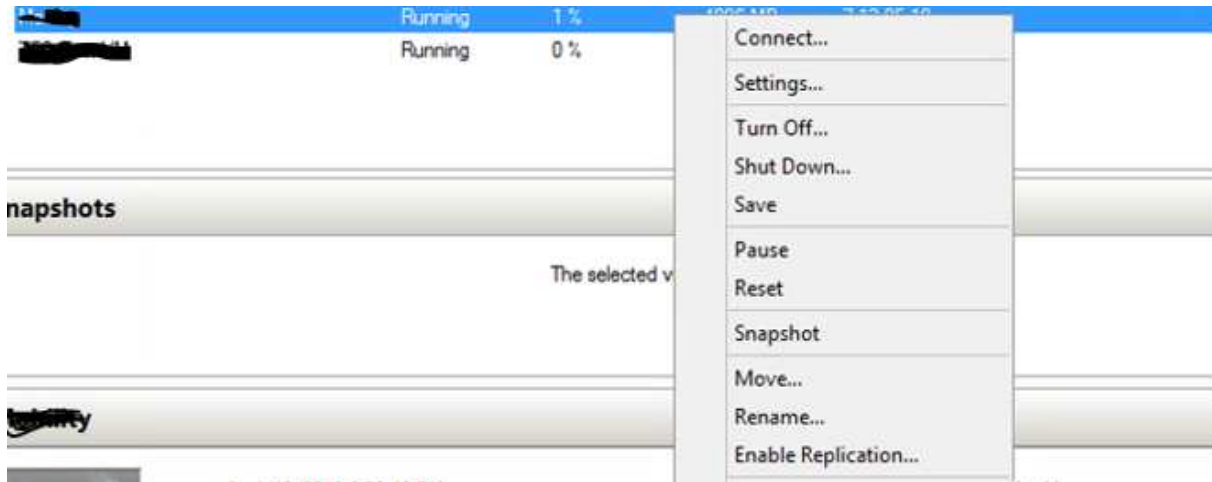| Name	Status	Type	Owner Node	Priority	Information
-REPLBKR	Running	Hyper-V Replica Broker		High	

How to Enable Replica for a VM in Cluster

Choose the VM to enable replica. Now, I take the example of MOB-TEST VM to enable replica between Primary Site and Replica Sites.

MOB-TEST VM Size is 80 GB and folder path as below –Verification step only

Settings for

Virtual Hard Disk Properties

General

Format: VHD

Type: Dynamically expanding virtual hard disk

Location:

File Name:

Current File Size: 79.9 GB

Maximum Disk Size: 80 GB

Hardware
- Add Hardware
- BIOS
  Boot from CD
- Memory
  4096 MB
- Processor
  1 Virtual processor
- IDE Controller 0
  - Hard Drive
- IDE Controller 1
  - DVD Drive
    None
- SCSI Controller
- Network Adapter

Disk 10 800.05 GB Bus 0 Lun 8 Target 0

Close

Login to Primary server, Go to Hyper-v Manager -> Select VM MOB-TEST -> Right Click to enable replication

	Running	1 %		
	Running	0 %		

Connect...

Settings...

Turn Off...

Shut Down...

Save

Pause

Reset

Snapshot

Move...

Rename...

Enable Replication...

napshots

The selected v

bility

Enable Replication for Mob

Before You Begin

Before You Begin

Specify Replica Server

Specify Connection
Parameters

Choose Replication VHDs

Configure Recovery History

Choose Initial Replication
Method

Summary

This wizard helps you to configure replication for a virtual machine.

Before you proceed, ensure that you have configured a server to allow replication from this computer. To verify this, use the Replication Configuration page of the Hyper-V Settings for the specified Replica server. To prepare for completing this wizard, you can learn more about replication settings by clicking the help link.

☐ Do not show this page again.

More about enabling replication for a virtual machine

< Previous   Next >   Finish   Cancel

Specify Replica Server

Before You Begin

Specify Replica Server

Specify Connection
Parameters

Choose Replication VHDs

Configure Recovery History

Choose Initial Replication
Method

Summary

Specify the Replica server name to use to replicate this virtual machine. If the Replica server is on a failover cluster, specify the name of the Hyper-V Replica Broker as the Replica server. Use the Failover Cluster Manager on the Replica server to find the name of the Replica Broker.

Replica server: ██████-REPLBKR

Browse...

< Previous   Next >   Finish   Cancel

Provide the Replica site Replica Broker name in the path as per above screenshot and click on Next

Specify Replica Server

Specify the Replica server name to use to replicate this virtual machine. If the Replica server is on a failover cluster, specify the name of the Hyper-V Replica Broker as the Replica server. Use the Failover Cluster Manager on the Replica server to find the name of the Replica Broker.

Replica server: ████-REPLBKR   Browse...

Verifying configuration...
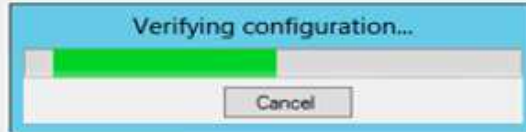
Cancel

< Previous   Next >   Finish   Cancel

Specify Connection Parameters

Replica server: ████REPLBKR.TFO.LOCAL

Replica server port: 80

Authentication Type

● Use Kerberos authentication (HTTP)

    Data will not be encrypted while being transmitted over the network.

○ Use certificate-based authentication (HTTPS)

    Data will be encrypted while being transmitted over the network.

    Issued To:
    Issued By:
    Expiration Date:
    Intended Purpose:

    Select Certificate...

☐ Compress the data that is transmitted over the network.

< Previous   Next >   Finish   Cancel

In above screenshot, I underlined the Compress the data that is transmitted over network because the customer is already had WAN optimizer. Based on customer requirement, enable the same
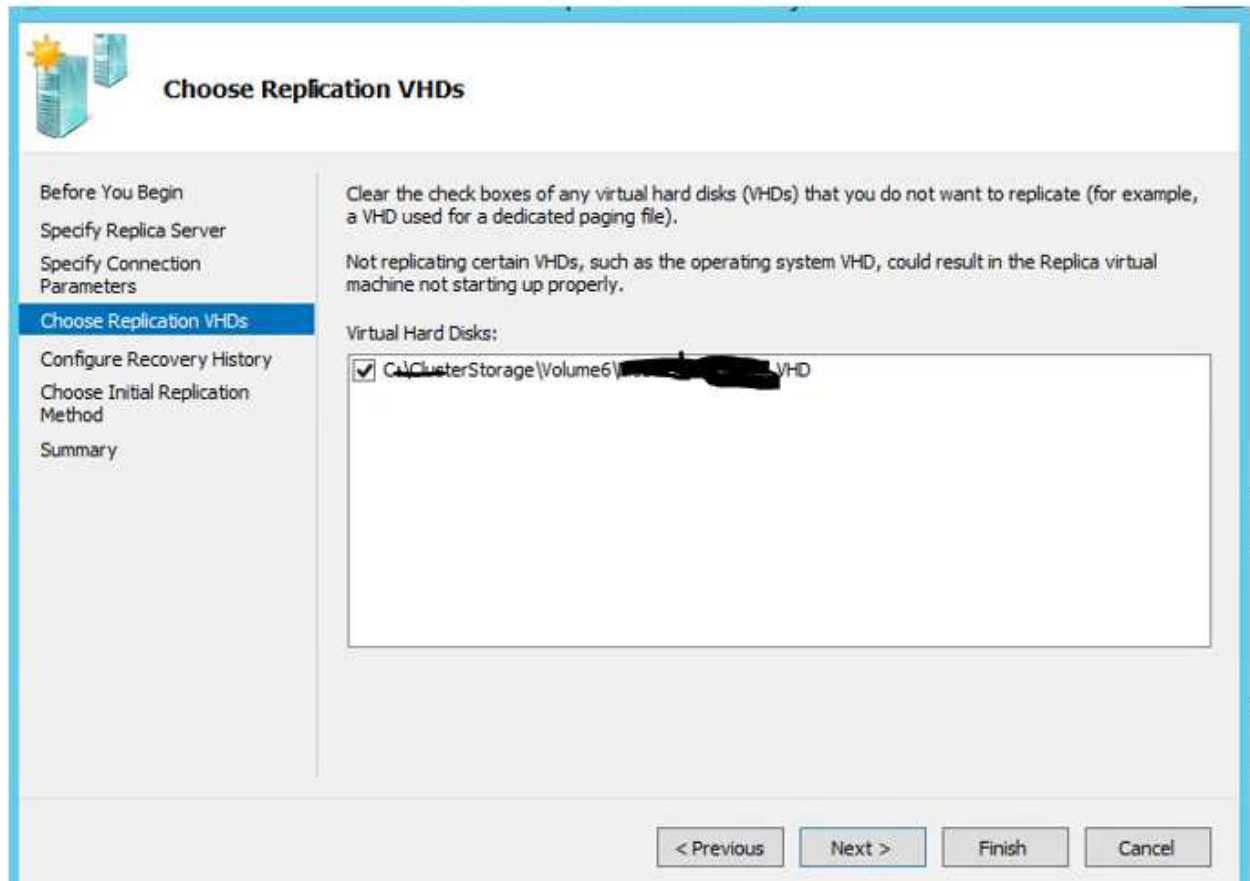
Choose the VHD's which are need to be part of replica.

Note:
 If VM 's are configured with explicit page drives on different VHD files then it is good practice to exclude the Page File's VHD from replication - In this example, it is not applicable.
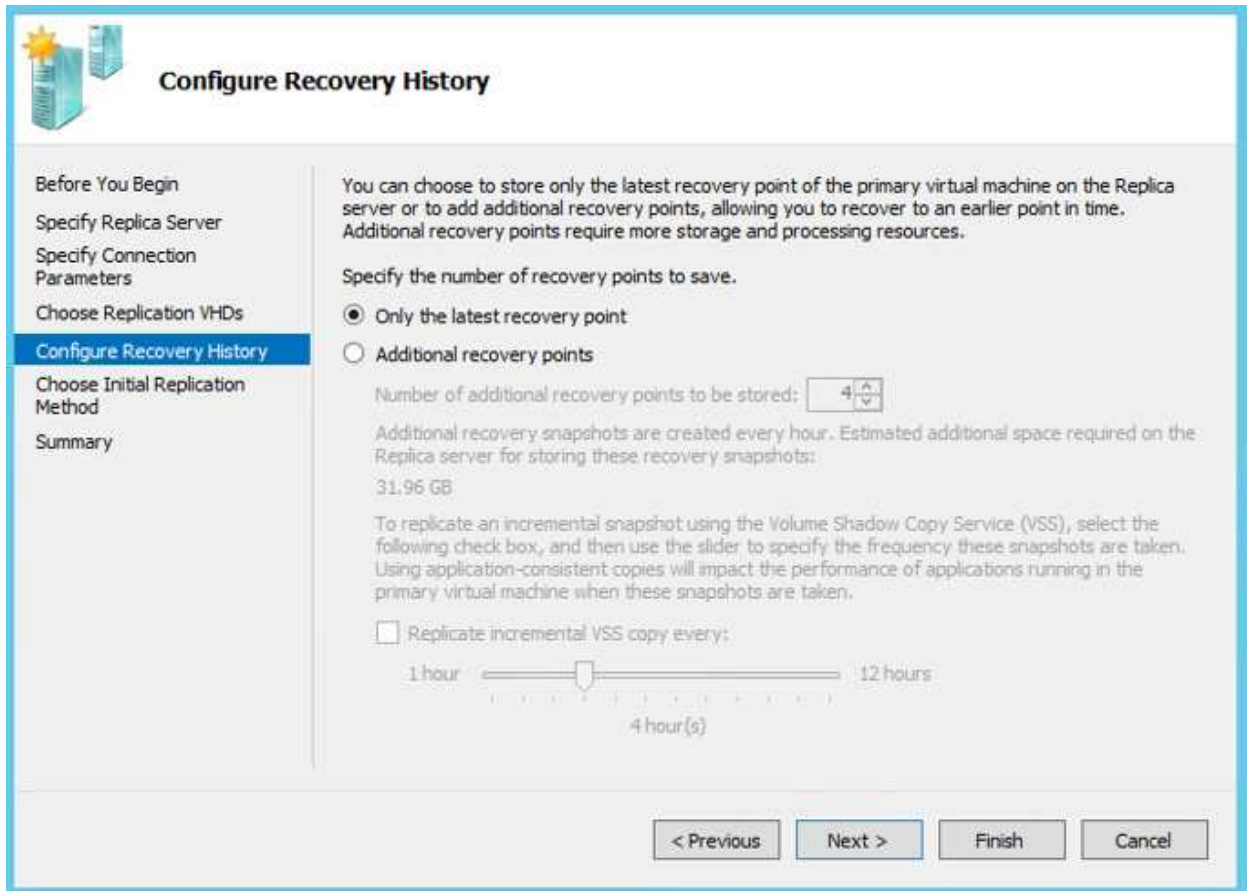
Select latest recovery point and click on Next

Reason:
This option is based on customer requirement and disk space. We are choosing only one recovery point as per customer requirement and considering disk sizes
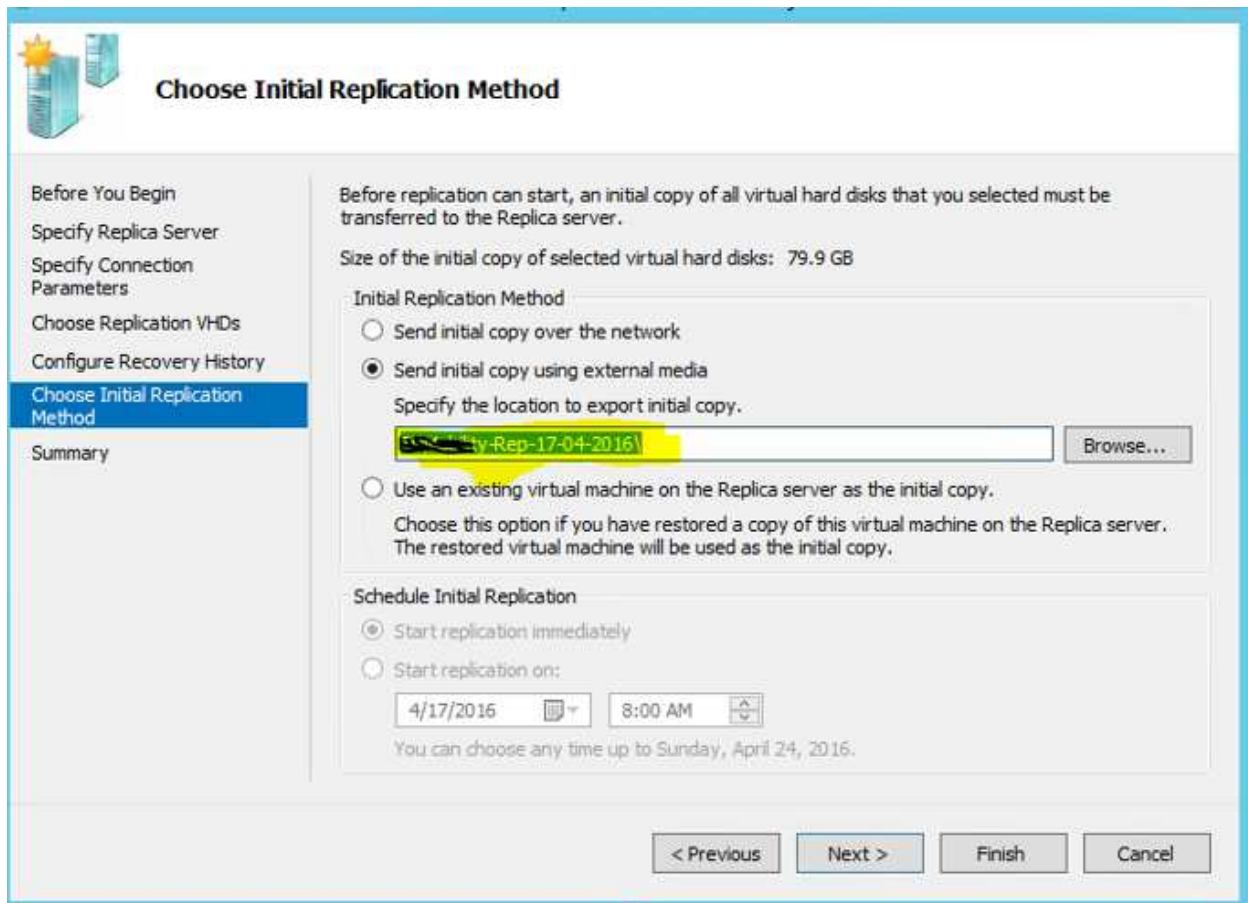
Note: Choose the external HDD path, create a folder and map the same in above screenshot

Reason:
Replication over network is not recommended as it chokes the bandwidth and to reduce the bandwidth consumption, we are initially exporting the VM to external disk and this disk will be shifted to DR site to import the VM replica at replica site , so that only difference of changes will be replicated over network.
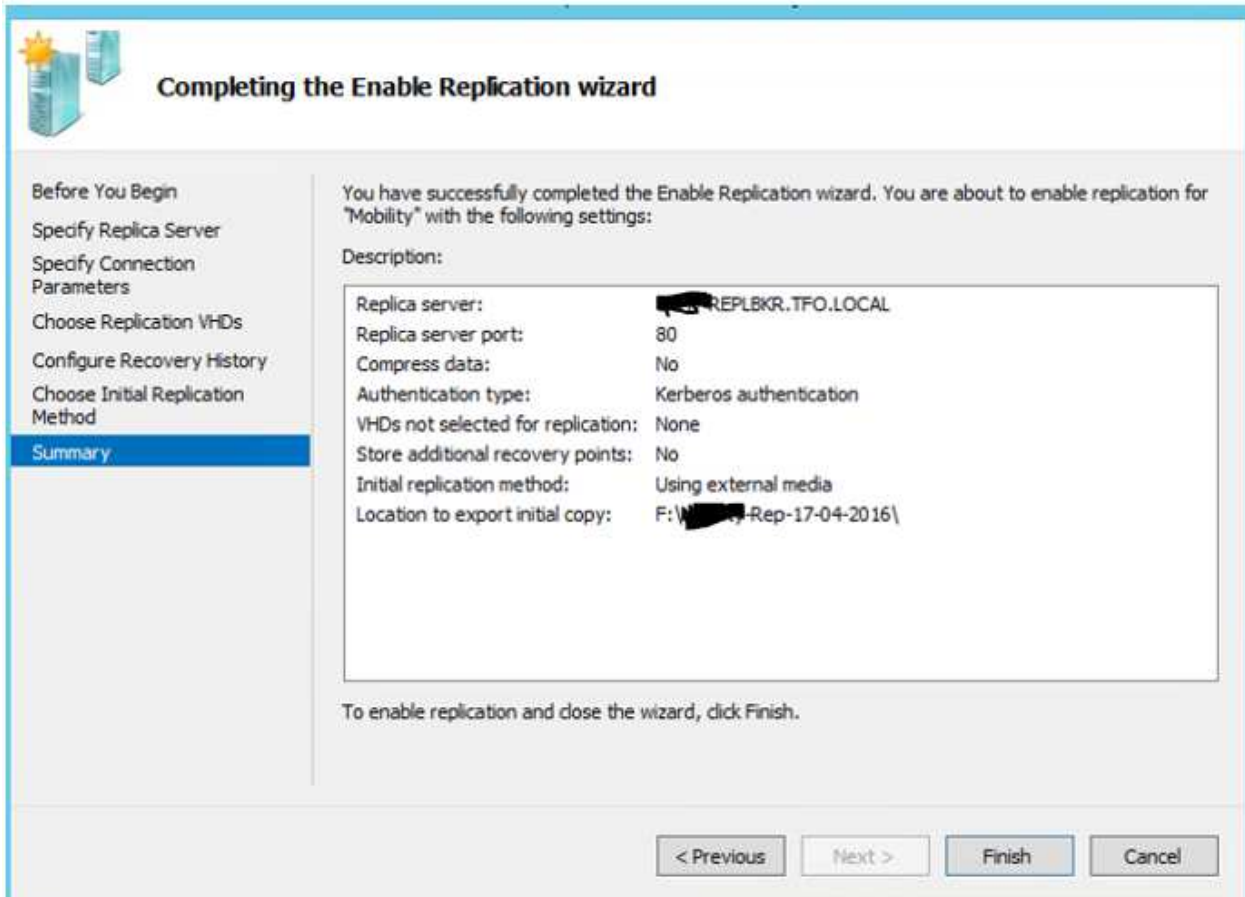
Check the configuration and click on FINISH
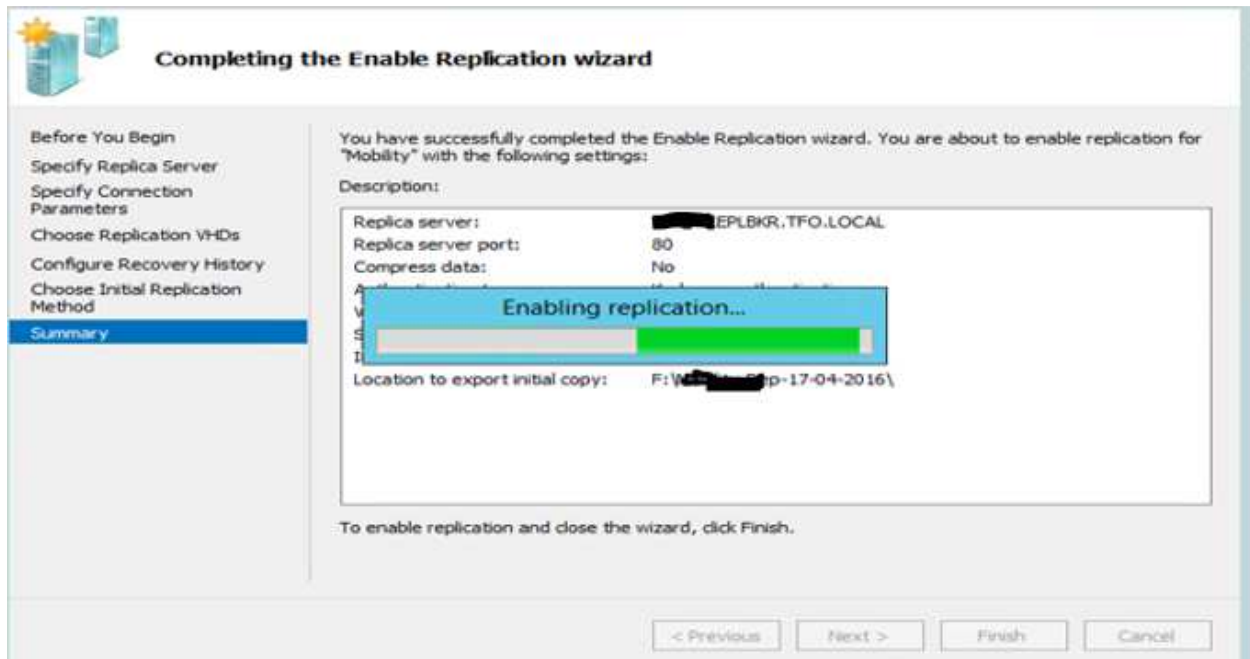
Below tasks will be done during initial replication stage –Verification step only

At Replica Site

Explanation on above screenshots:

- Initial replication started immediately at Primary Site and base VM will be created at DR site.
- Replica VM can be created on any other node in cluster, <u>Move that VM to REPILCA HOST as external disk will be connected to this server only</u>
- At primary site, snapshots will be created during initial replica and deleted after initial replication finished

After reaching 100 % of Sending Initial replica it will reach to the stage of <mark>"**Replicating changes"**</mark> (Screenshot) –<u>Verification step only</u>

,

After Replicating Change reaches to 100 %, **snapshots will be deleted automatically**.

<mark>**Note:**</mark>

If VM is accessed by 24 *7, then "**Replicating Changes**" may not go to 100 % stage so you can disconnect external drive if it taking very longer time than expected

Folder at primary Site, will be as below – <u>Verification step only</u>

Note:
- HRL size will be varies from VM to VM based disk read/writes.
- HRL Size should not grow beyond 50% of total size of VHD size as there is chance of replication failures
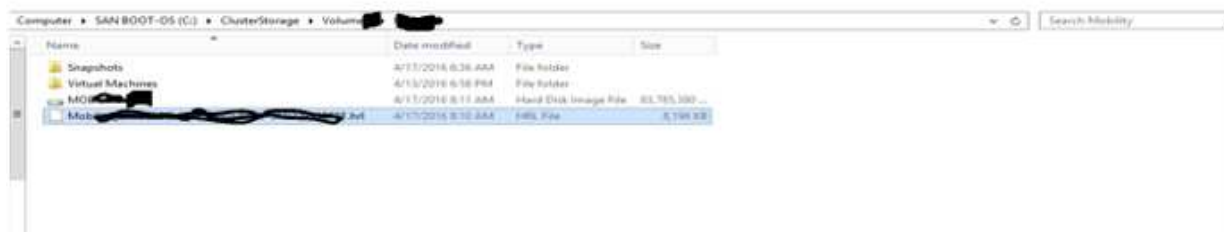
You can view replication health -> Right click VM-> Replication -> View Replication Health

Replication State: Initial replication in progress
Replication Type: Primary
Current Primary Server:
Current Replica Server:
Replication Health: ✓ Normal

Statistics for past 1 Hour 37 Minutes

From time: 4/17/2016 6:36:26 AM
To time: 4/17/2016 8:13:50 AM
Average size: 257 MB
Maximum size: 257 MB
Average latency: 0:02:21
Errors encountered: 0
Successful replication cycles: 1 out of 1 (100%)

Pending replication

Size of data yet to be replicated: 16 MB
Last synchronized at: 4/17/2016 8:09:47 AM (Less than 5 minutes ago)
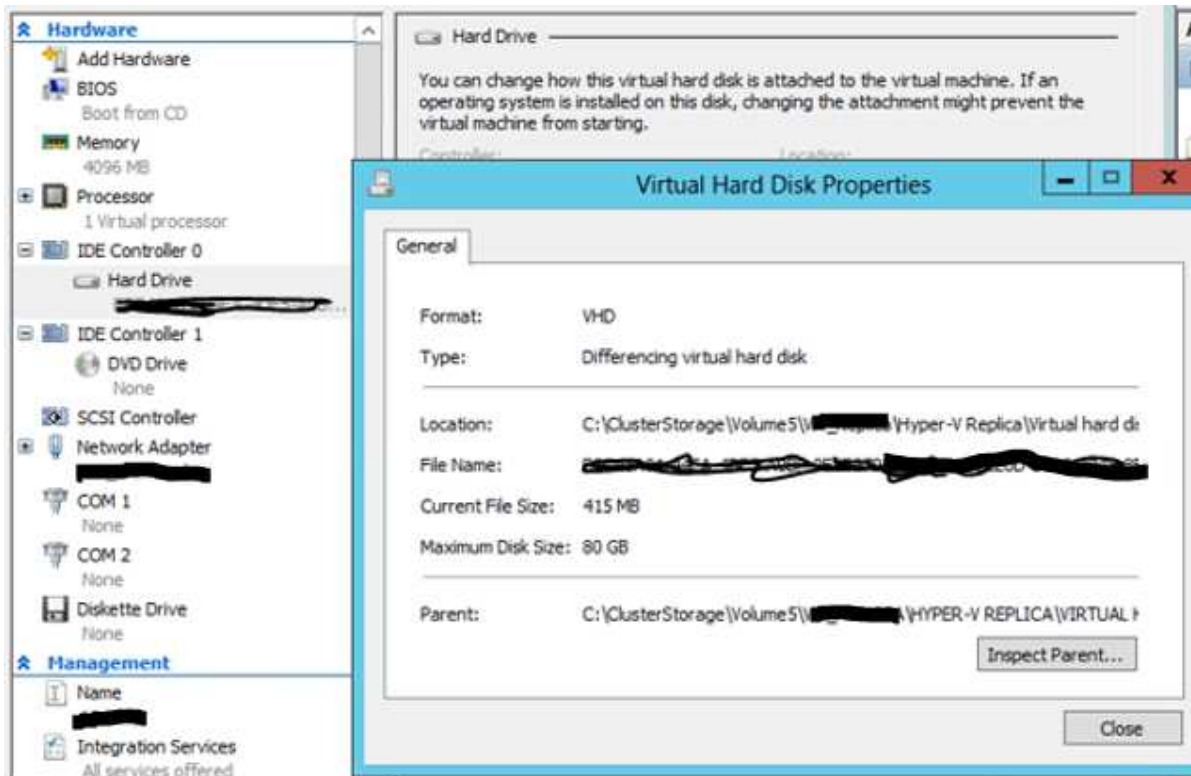
[Refresh] [Reset Statistics]   [Save As...] [Close]

At replica Site, Snapshots will be created at UK site after initial replica export completed - Verification Step only

After Disk connected to REPILCA HOST-> Start Import Initial Replica as below

Virtual Machines

Name	State	CPU Usage	Assigned Memory	Uptime*	Status
	Off				
Mob	Off				
	Off				
	Off				
	Off				
	Off				
	Off				
	Running			3 16 22:52	

Connect...
Settings...
Start
Snapshot
Revert...
Move...
Export...
Rename...
Delete...
Replication →   Import Initial Replica...
Help   Pause Replication
               View Replication Health...
               Remove Replication

Snapshots

⊟ Mob...tial Replica - (4/17/2016 - 12 15:03 PM)
  ▶ Now

Off
Off

101
102
103
104
105
KS02

Import initial replication

Provide the location where the files required for the Initial Replication are located:

F:\VM-Replica-Intial Export\........p-17042016\.......24-258!   [Browse]

[Complete Initial Replication]   [Cancel]

---

ots

....- Initial Replica - (4/17/2016 - 12:15:03 PM)
  ▶ Now

Provide the path external HDD where VM exported ->Click on Complete Initial Replication

Import initial replication

Import Replication

Provide the location where   are located:

F:\VM-Replica-Initial Expo   F24-258!   Browse

Cancel

Complete Initial Replication   Cancel

- Initial Replica - (4/17/2016 - 12:15:03 PM)
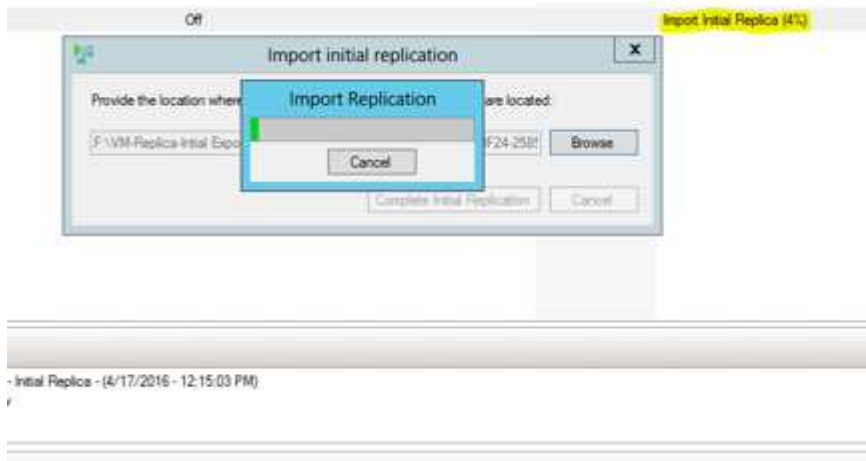
After Import replication finished, snapshots will be deleted automatically – <u>Verification Step Only</u>

Off

Mob.   Off   Merge in Progress (3%)

Off

After Import finishes -> Check at Primary Site replication Health as sometime replication will go in paused state -> in this stage, Select VM ->Replication -> Resume replication. It start replicating changes if it went to paused state.

Virtual Machines

Name	State	CPU Usage	Assigned ...	Uptime	Status	Replication Health
M2.	Running	0 %	4096 MB	10.14:05:29	Replicating changes (58%)	Normal
	Running	0 %	4096 MB	10.14:15:27		Normal

To View Replication Health at Primary and replica sites from GUI

Go to VM-> Replication ->View Replication Health

Replication State: Replication enabled
Replication Type: Primary
Current Primary Server:
Current Replica Server:
Replication Health: ✅ Normal

Statistics for past 12 Hours 10 Minutes

From time: 4/19/2016 9:00:01 PM
To time: 4/20/2016 9:10:56 AM
Average size: 22 MB
Maximum size: 871 MB
Average latency: 0:00:31
Errors encountered: 13 View events
Successful replication cycles: 137 out of 147 (93%)

Pending replication

Size of data yet to be replicated: 4 KB
Last synchronized at: 4/20/2016 9:10:23 AM (Less than 5 minutes ago)

Replication State: Replication enabled
Replication Type: Replica
Current Primary Server:
Current Replica Server:
Replication Health: ✅ Normal

Statistics for past 21 Hours 12 Minutes

From time: 4/19/2016 10:00:00 AM
To time: 4/20/2016 7:12:32 AM
Average size: 18 MB
Maximum size: 871 MB
Average latency: 0:00:20
Errors encountered: 0
Successful replication cycles: 245 out of 253 (96%)

Pending replication

Last synchronized at: 4/20/2016 7:10:23 AM (Less than 5 minutes ago)

Test Failover

Test failover status: Not Running
Last test failover initiated at: Not Applicable

To View Replication Health at Primary and replica sites from PowerShell

Event Logs - <u>Verification Step only</u>

Event ID:32074, when replication enabled at Primary site

Event id 33602, Initial Replication was successfully exported to external drive
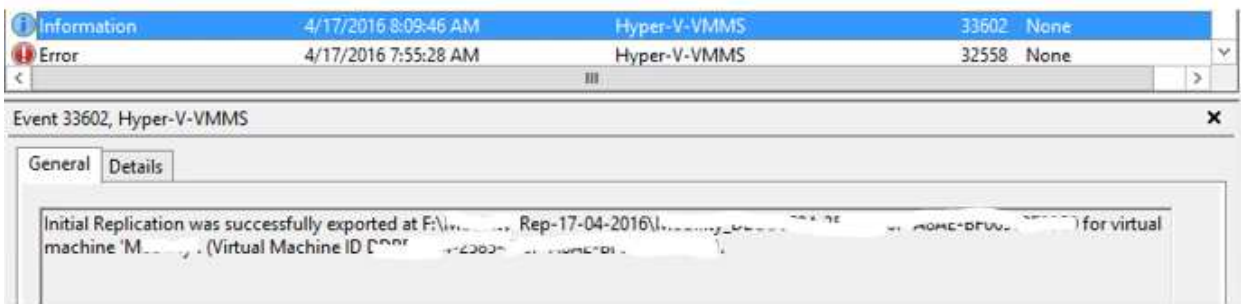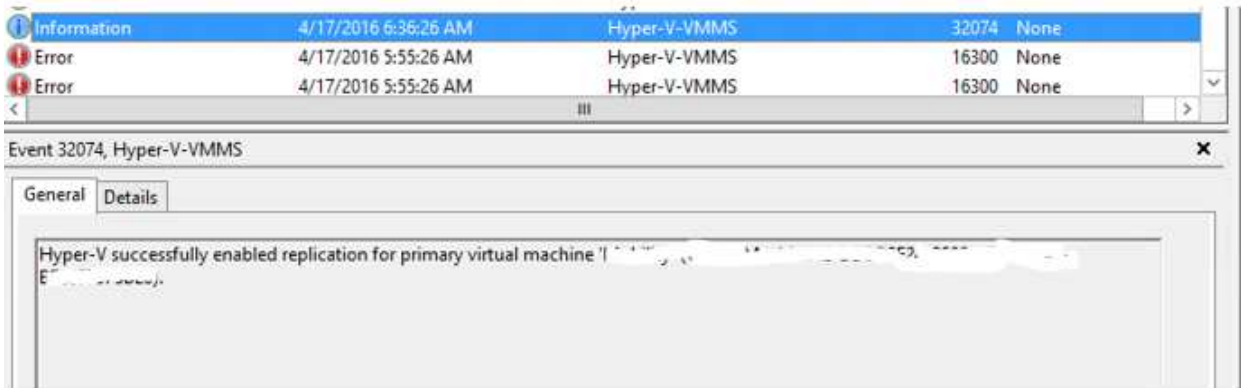
Information	4/17/2016 8:09:47 AM	Hyper-V-VMMS	19070	None
Information	4/17/2016 8:09:47 AM	Hyper-V-VMMS	19090	None
Information	4/17/2016 8:09:46 AM	Hyper-V-VMMS	19070	None
Information	4/17/2016 8:09:46 AM	Hyper-V-VMMS	33602	None
Error	4/17/2016 7:55:28 AM	Hyper-V-VMMS	32558	None

Event 19070, Hyper-V-VMMS   ✕

General | Details

background disk merge has been started. (Virtual machine ID ██████████████████50607█████)

Information	4/17/2016 8:10:15 AM	Hyper-V-VMMS	19080	None
Information	4/17/2016 8:09:47 AM	Hyper-V-VMMS	19070	None
Information	4/17/2016 8:09:47 AM	Hyper-V-VMMS	19090	None
Information	4/17/2016 8:09:46 AM	Hyper-V-VMMS	19070	None
Information	4/17/2016 8:09:46 AM	Hyper-V-VMMS	33602	None

Event 19080, Hyper-V-VMMS   ✕

General | Details

'M████ background disk merge has been finished successfully. (Virtual machine ID █████████████████████)

Event Logs after Initial Import Completion

Event id 32079 - Initial replication success event id after initial import in replica server
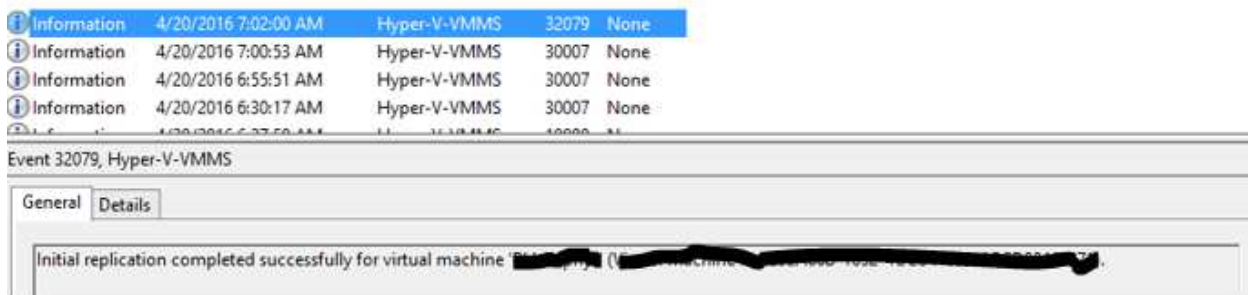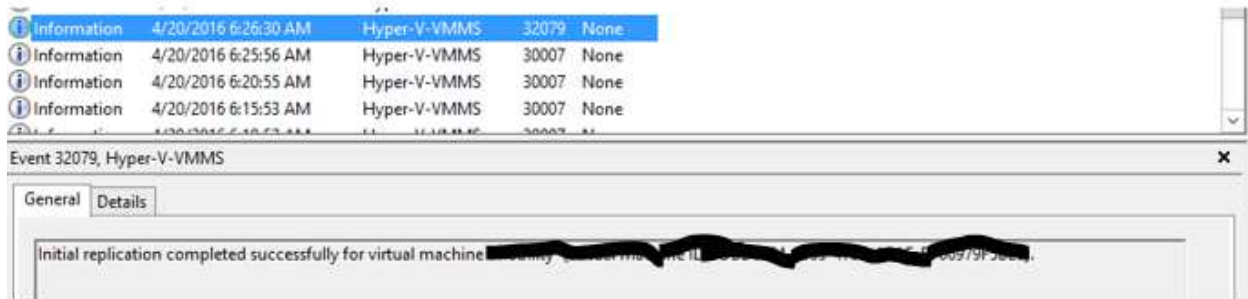
Resynch Initiate event 32325
Resynch Success event 29244,29242
Resynch Fail Event 32572,29270
Hyper-V snapshot deletion fail event 32589

How to Remove Replica for a VM in Cluster

Removing replica is simple method, Go the VM->Right Click ->Replication->Remove Replication from any server

Remove Replication in both sites and delete replica files (HRL) if any..

Note:

   Ideally, replica removing from Primary server should automatically remove other side also, in windows 2012, you may see an issue in reflecting this , so if other side replication is not removed automatically then remove replication manually on both sides.

Knowledge base References

- https://blogs.technet.microsoft.com/virtualization/2012/06/15/interpreting-replication-health-part-1/
- http://blogs.technet.com/b/virtualization/archive/2012/06/21/interpreting-replication-health-part-2.aspx
- https://blogs.technet.microsoft.com/virtualization/2013/06/28/save-network-bandwidth-by-using-out-of-band-initial-replication-method-in-hyper-v-replica/
- https://blogs.technet.microsoft.com/virtualization/2013/08/27/using-an-existing-vm-for-initial-replication-in-hyper-v-replica/
- https://blogs.technet.microsoft.com/virtualization/2014/02/02/hyper-v-replica-debugging-why-are-very-large-log-files-generated/