

Configuring a VEEAM off host backup proxy server for backing up a Windows Server 2012 R2 Hyper-V cluster with a DELL Compellent SAN (Fiber Channel)

Introduction

This white paper describes how to configure a VEEAM Off host backup proxy server for backing up a Windows Server 2012 R2 Hyper-V cluster that uses a DELL Compellent SAN with VEEAM Backup & Replication 7.0. The protocol used here is Fiber Channel. This has following benefits:

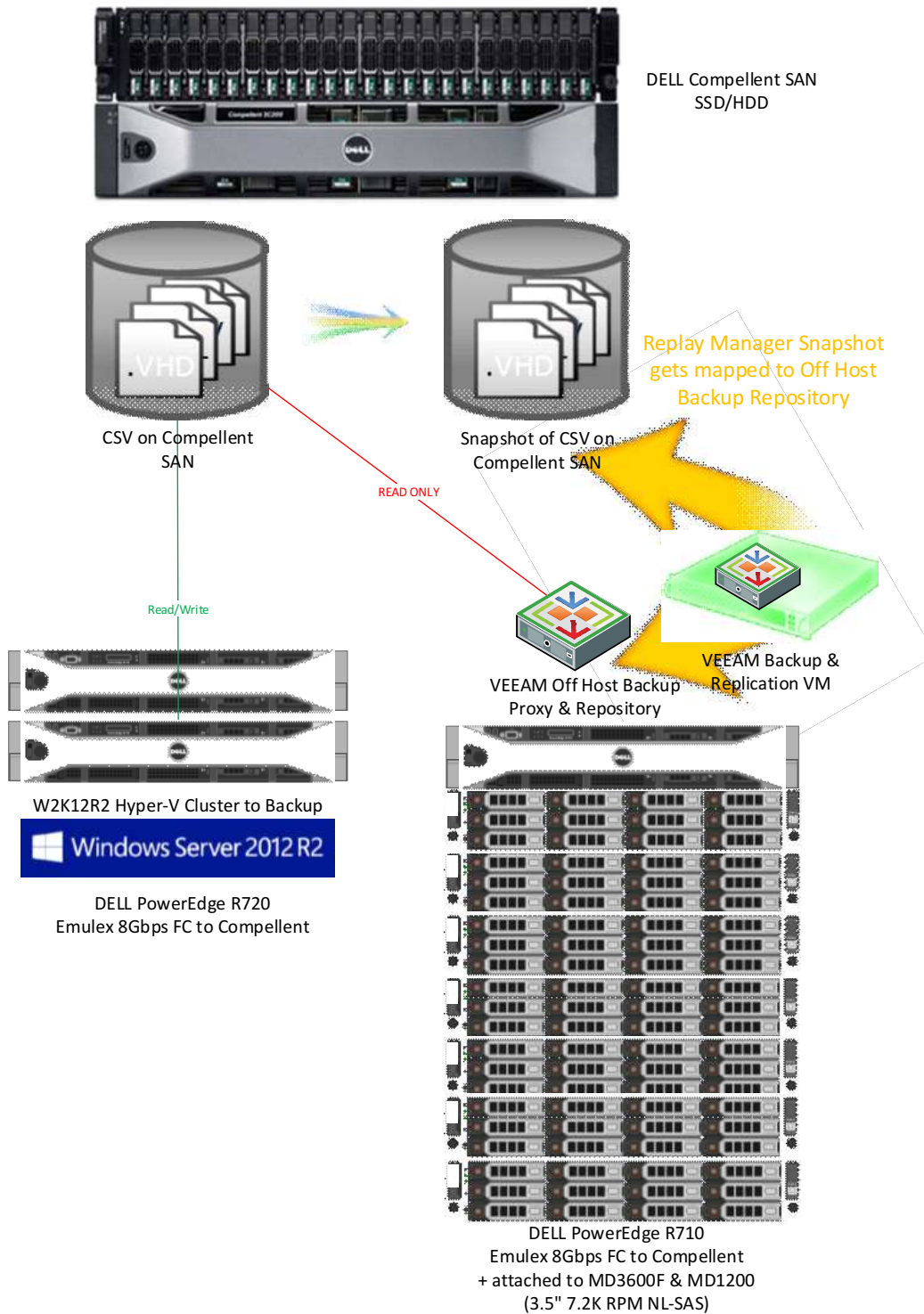
- You leverage the hardware VSS provider of the Compellent Replay Manager for snapshots. This avoids time out issues on heavy IO CSV or some of the bugs related to software snapshots of Hyper-V CSVs on Windows Failover Cluster nodes that have ODX enabled.
- You off load the backup process from the Hyper-V nodes to a separate server. This preserves CPU cycles and network bandwidth associated with the backup process for virtualization workloads.
- Depending on your particular setup you avoid copying data over the network if the backup repository storage is attached directly to the Off Host Backup Proxy.

Environment Used

In this article we use a 2 node Windows Server 2012 R2 Hyper-V cluster with Fiber Channel access to the DELL Compellent SAN. We have a Windows Server 2012 R2 server that serves as a VEEAM off host backup proxy and also has Fiber Channel access to the DELL Compellent SAN. This server also has access over fiber channel to a DELL PowerVault MD3600F with MD1200 JBOD extension bays. VEEAM Backup & Replication runs on Virtual Machine with 12GB of memory, 8 vCPU and a local SQL Server Standard 2012 SP1 database. This virtual machine is actually running on the VEEAM Off host backup proxy that must have the Hyper-V role enabled anyway. Fiber Channel access is over 8Gbps and Brocade 5100 switches. The bottle neck here are the source nodes of the Hyper-V Cluster that “only have 4Gbps” FC cards.

- DELL Compellent SC 6.3.10
- DELL R710, dual socket, 4 core , 48GB of DDR3 memory (off host backup proxy server)
- DELL R720, dual socket, 8 core, 128GB DDR3 memory (Hyper-V nodes)
- Brocade FC switches (5100 series)
- DELL MD3600F with 6 MD1200 JBODs. 2TB 3.5” NL-SAS disks 7.2K RPM

Here’s a simplified drawing of the environment



Configuration

Preliminary Configuration of the Off Host Backup Proxy

Once we have our Hyper-V clusters and VEEAM Backup environment set up we need to configure the Compellent SAN LUNs and the Replay Manager software to make sure the hardware VSS provider is used and the transportable snapshots can be presented to the Off host backup proxy server.

The following steps are extremely important and cannot be ignored without running the risk of data corruption on your Hyper-V CSVs.

For many system administrators running a Windows Failover Cluster (WFC) the idea of mapping a LUN used for a cluster to another server is disconcerting. Visions of corrupted data & pink slips fly through their heads. A very understandable concern. But the OHBP only needs to be able to see/read the LUN. For that it doesn't need to be online for Windows and it is actually very much unwanted! So to make sure that this does not happen we take two actions:

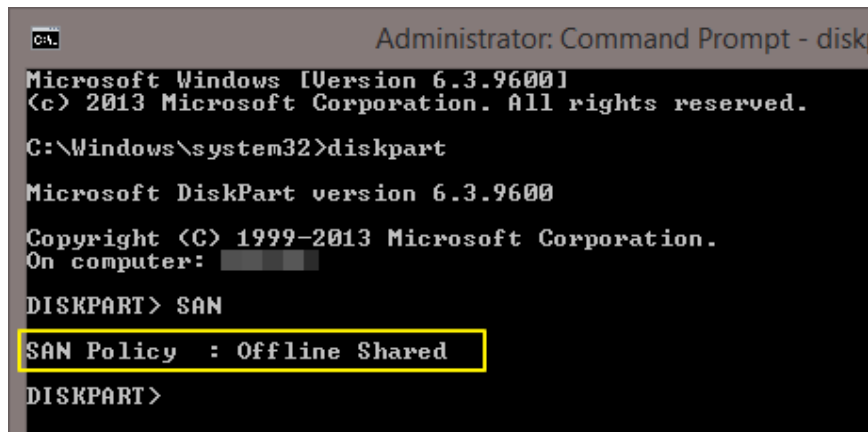
- 1) We set the SAN policy on the OHBP to offline.
- 2) We map the Hyper-V LUNs as read only to the OHBP host.

We'll discuss how to do both these actions below.

Set the SAN policy on the OHBP to offline.

Please note that installing VEEAM will set the policy to "OfflineShared" for you. But you have to make sure. I have seen this policy being reverted after a reboot. So to make sure this is correct we set it manually to and reboot the server to check it's active and stays active. See

<http://technet.microsoft.com/en-us/library/gg252636.aspx> for more information on SAN policy.



```
Administrator: Command Prompt - diskpart
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Windows\system32>diskpart

Microsoft DiskPart version 6.3.9600

Copyright (C) 1999-2013 Microsoft Corporation.
On computer: ██████████

DISKPART> SAN

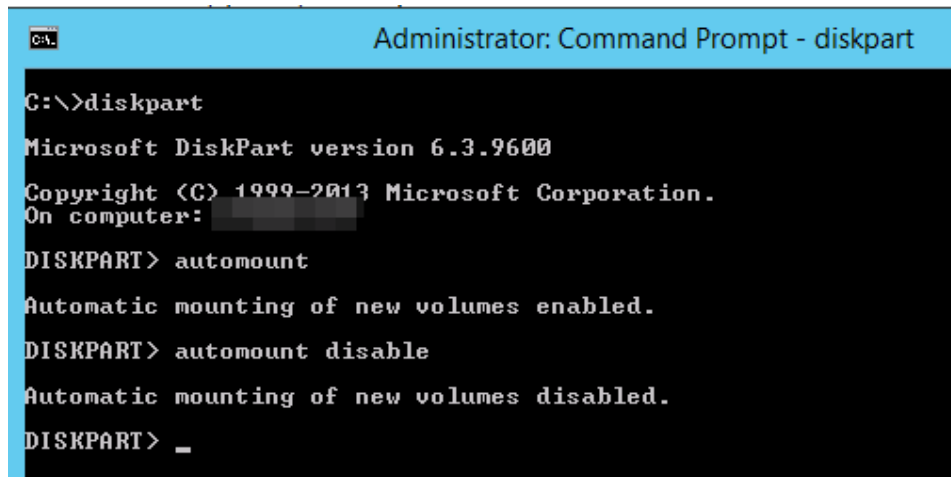
SAN Policy : Offline Shared

DISKPART>
```

I'm actually quite paranoid and I tend to set the SAN Policy to Offline All. Reboot and verify again.

```
DISKPART> san policy=OfflineAll
DiskPart successfully changed the SAN policy for the current operating system.
DISKPART> SAN
SAN Policy : Offline All
```

For yet even more added security one can disable automount.



```
C:\>diskpart

Microsoft DiskPart version 6.3.9600

Copyright (C) 1999-2013 Microsoft Corporation.
On computer: [REDACTED]

DISKPART> automount

Automatic mounting of new volumes enabled.

DISKPART> automount disable

Automatic mounting of new volumes disabled.

DISKPART> _
```

Let's do so. Yes this is the "better safe than sorry" approach and I'll take the overhead of managing any LUN presented to this host manually over data corruption!

Configuring DELL Compellent SAN Volume Mappings

Make sure you have the MPIO feature installed on the VEEAM off host backup proxy server just like you do on cluster nodes. Also, just like on your cluster nodes, don't forget to associate the Dell Compellent volumes with the DSM. You can do this via the MPCLAIM CLI. Open an elevated command prompt and type the following:

```
mpclaim.exe -r -i -d "COMPELNTCompellent Vol"
```

(-r reboots the server automatically, exclude it to have the option to restart manually). This one-time reboot sets up the associations.

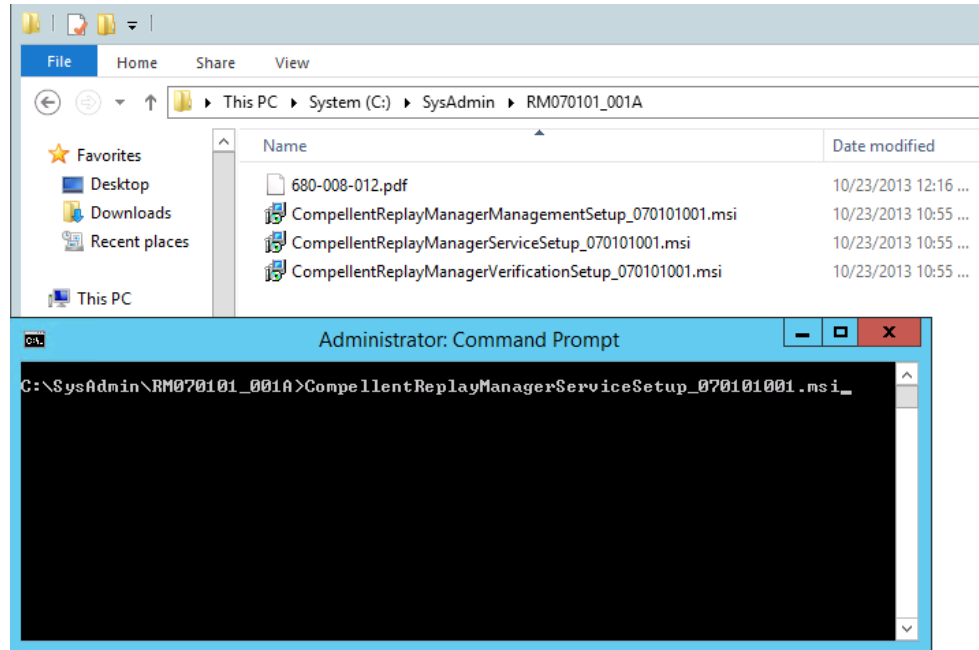
Configuring Dell Compellent Replay Manager Software

Install the Compellent Replay Manager Service

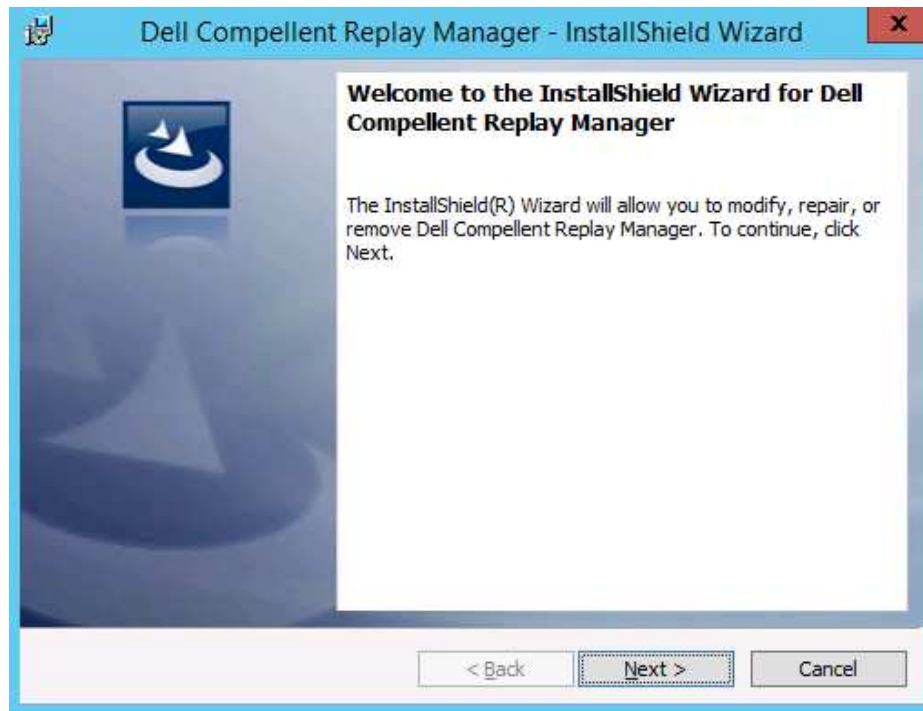
You need to install the Compellent Replay Manager Service on both the Hyper-V cluster nodes and on the VEEAM off host backup proxy server. Do note that you need a license for this software, which is needed later on when you configure this service on the hosts to interact with the Compellent SAN.

Note: before we begin this installation we have already installed the Hyper-V role on the VEEAM off host backup proxy server. This is a prerequisite to use this VEEAM capability and it makes the Compellent Replay Manager Service auto detect to install the Hyper-V Host Extension.

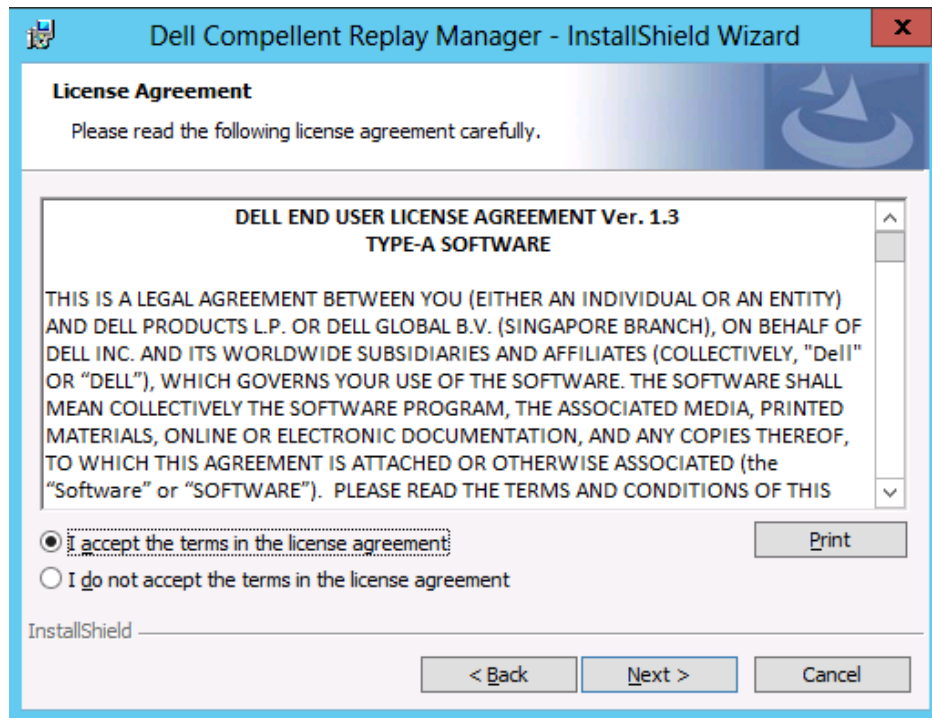
To install the hardware VSS Provider (part of Compellent Replay Manager) you need open up an elevated command prompt (run your command shell as an administrator), navigate to the folder where the software is located and launch the msi.



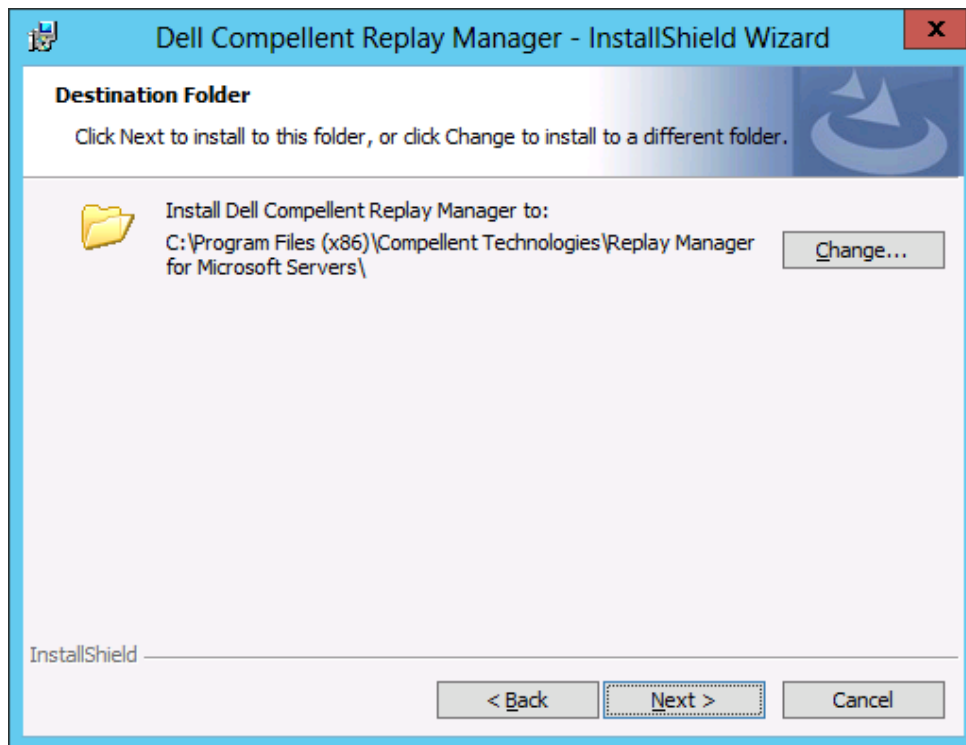
You'll see the InstallShield wizard pop up, click "Next"



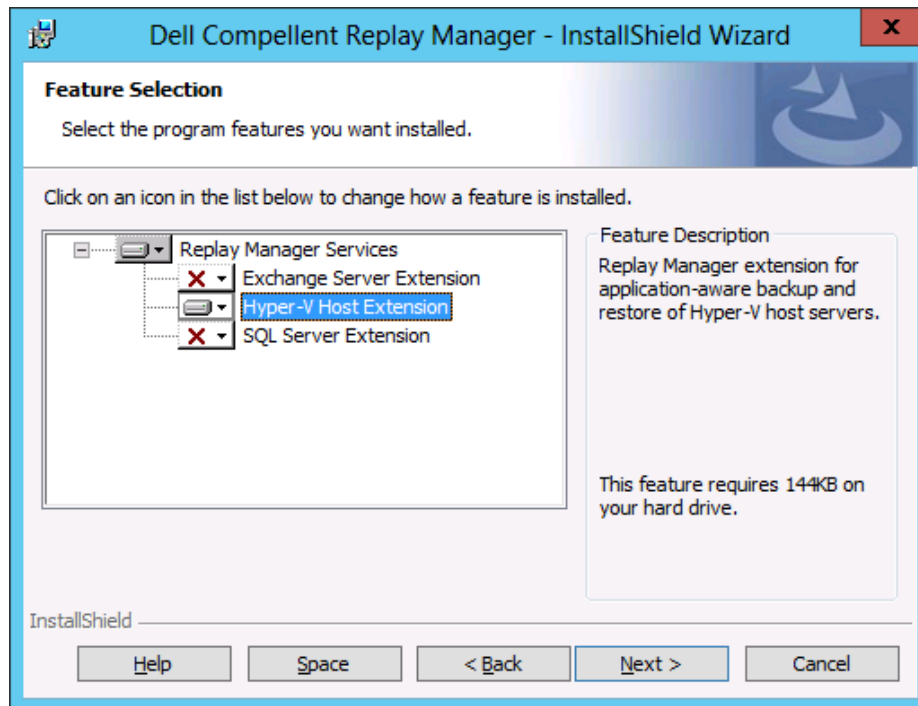
Accept the license agreement and click "Next"



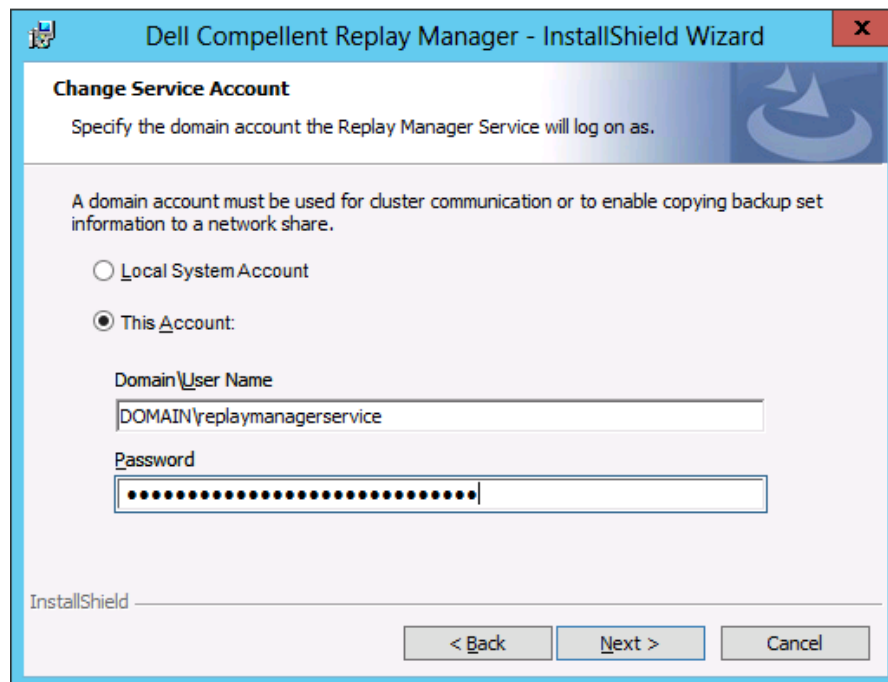
Either accept the default destination folder or change it and click "Next"



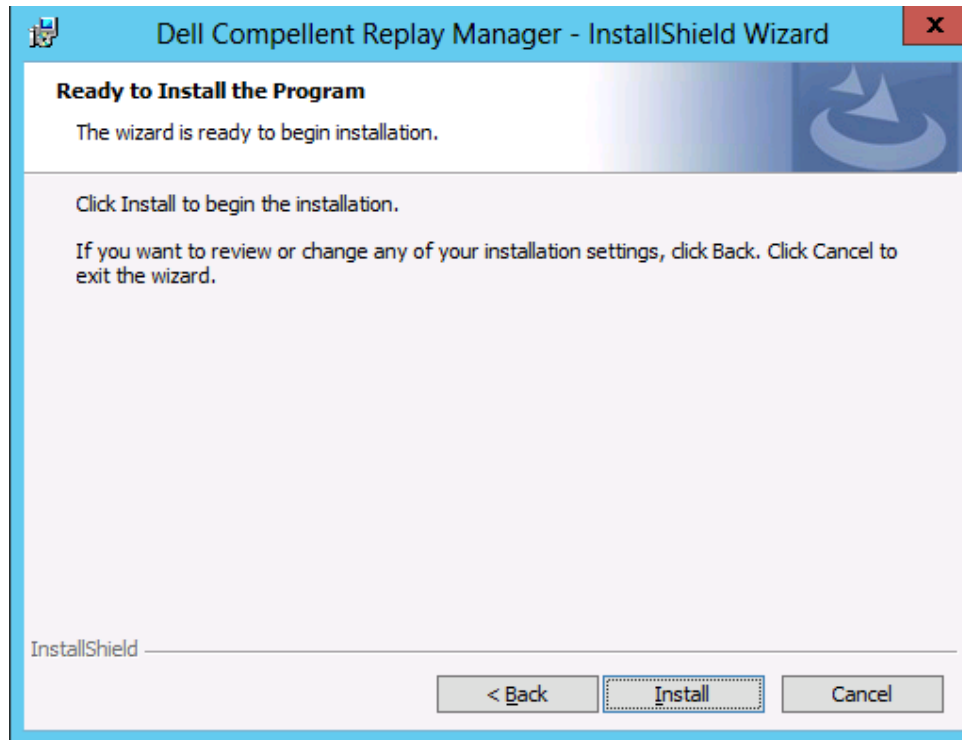
The installer auto detects that it needs to install the Hyper-V Host Extension if the Hyper-V role is installed on the server. This is exactly what we want. Click “Next”



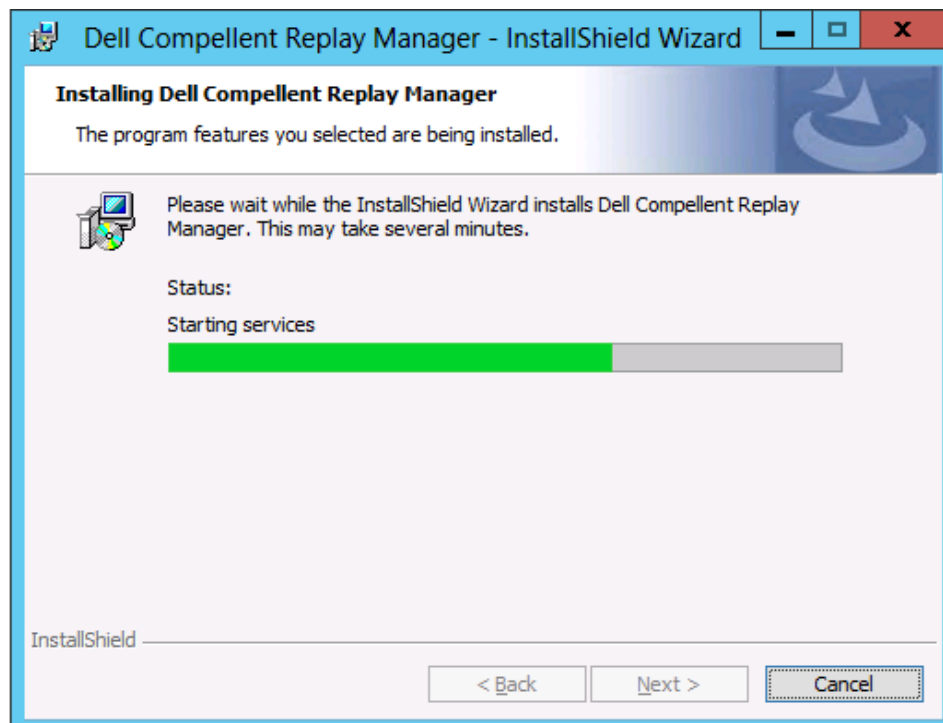
You need to use a domain account that is a member of the local administrators group on the servers involved. While not strictly necessary for snapshots made on one system it is needed for multi-server setups such as Windows Failover clusters and in our use case the combination of a WFC with a VEEAM off host backup proxy server. Fill out the account and password, click “Next”.



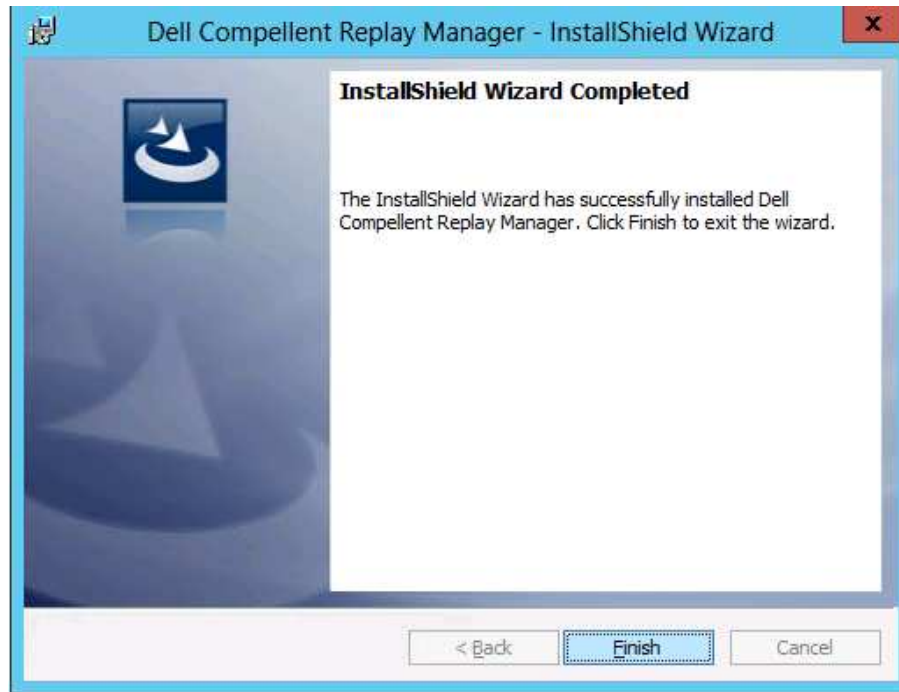
The wizard is ready to install, kick this off by clicking “Install”



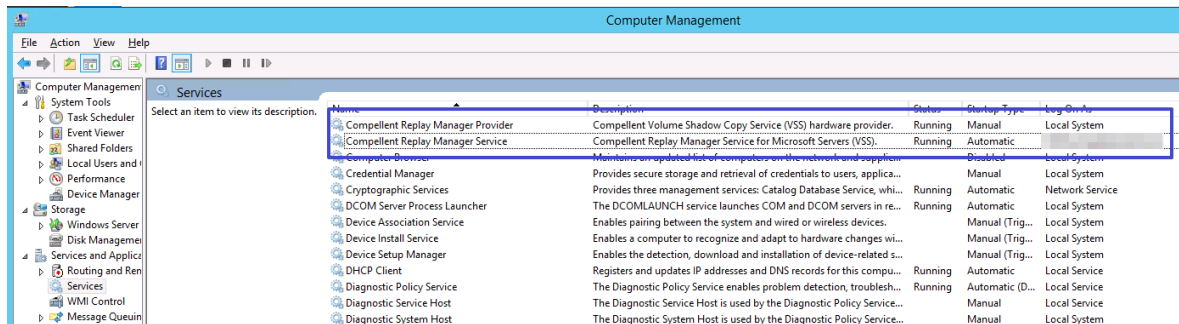
Let the wizard complete.



Click "Finish" to close the InstallShield wizard.



After a successful installation of the Replay Manager service you should see these two services running on the hosts.



Important! Verify that you have setup a Windows firewall rule to allow inbound traffic to TCP port 27444 for the Replay Manager service.

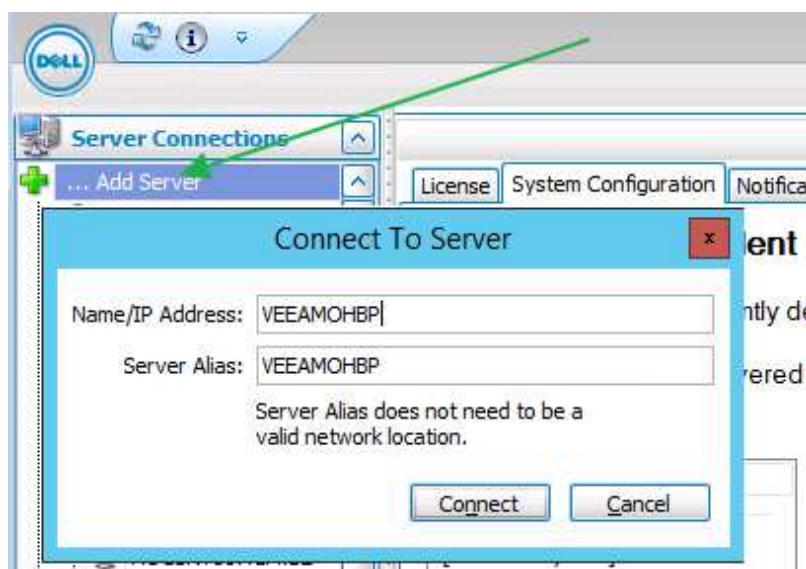
You are now ready to configure the hosts in the Dell Compellent Replay Manager Explorer. This is need to allow the Replay manager Services on the host to interact with the Dell Compellent SAN in order to create application consistent VSS based snapshot.

Configure the DELL Compellent Replay Manager Explorer

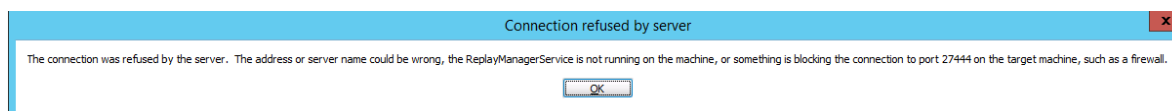
You should have a server running the DELL Compellent Replay Manager Explorer. We're using the most current Replay manager version at the time of writing which is 7.1.1.1



You need to add the VEEAM Off host backup proxyserver to the Replay manager Explorer and then configure which Compellent SAN or SANs it can access via the Virtual IP address (VIP). This also needs to be done for your Hyper-V nodes of the cluster, the process is similar. Please read the Compellent Replay Manager documentation for more information on this subject. We only walk through the process here to avoid digressing too much.

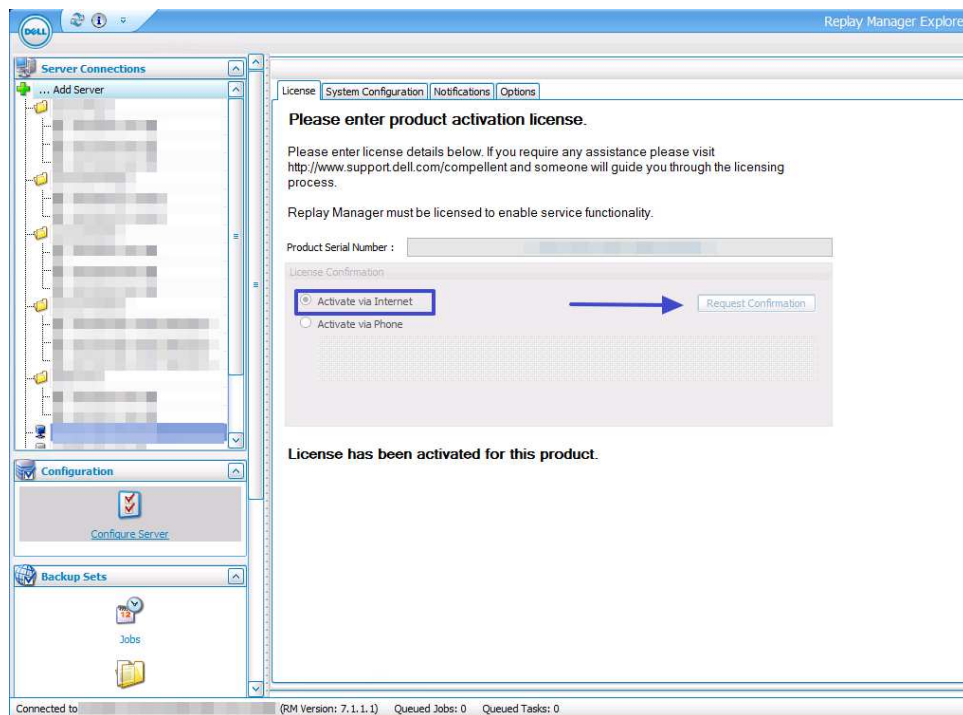


If you have not installed the Replay Manager client, or if you have but the Replay Manager port 27444 is not opened for inbound connections in the Windows firewall you'll get an error:

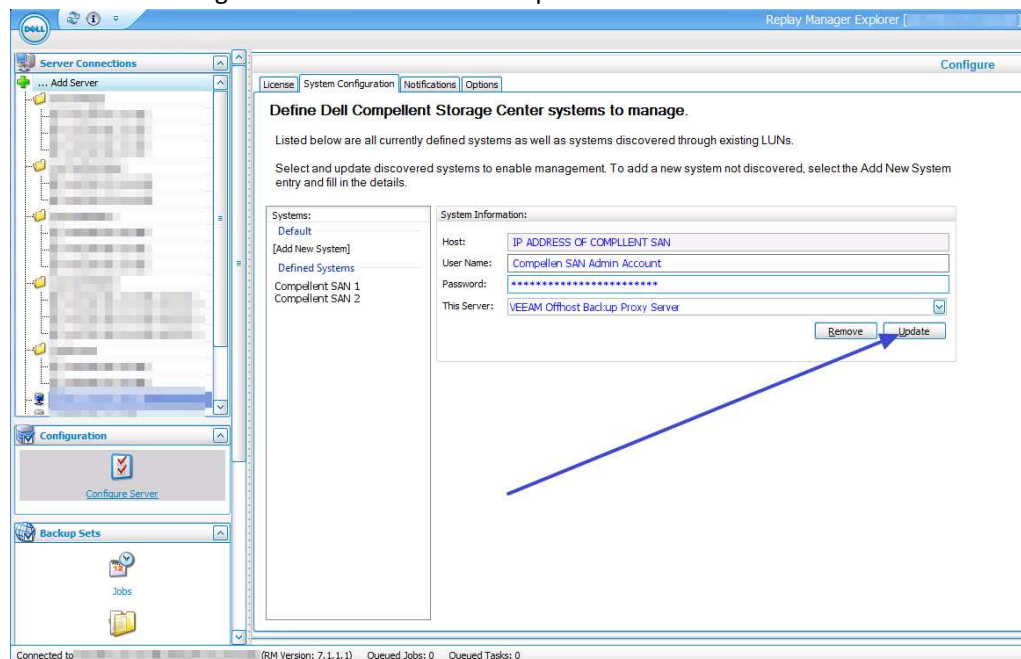


The fix is easy. Make sure the Replay Manager is indeed installed & running without issues. Then verify that the firewall is configured to allow inbound traffic to port 27444.

After you have added the server you need to activate it by entering your Replay Manager License Key in the “Product Serial Number).

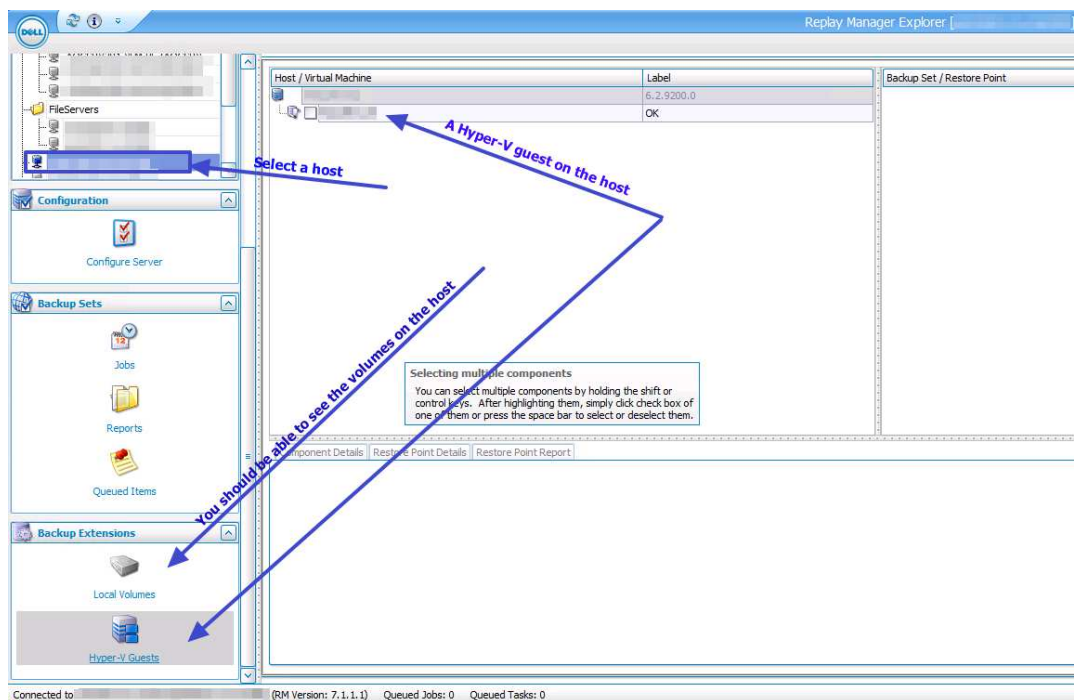


You can now configure access to the DELL Compellent SAN



Important! When you add LUNs/CSVs to your cluster and as such to your VEEAM off host backup proxy server you need to update your server configuration!

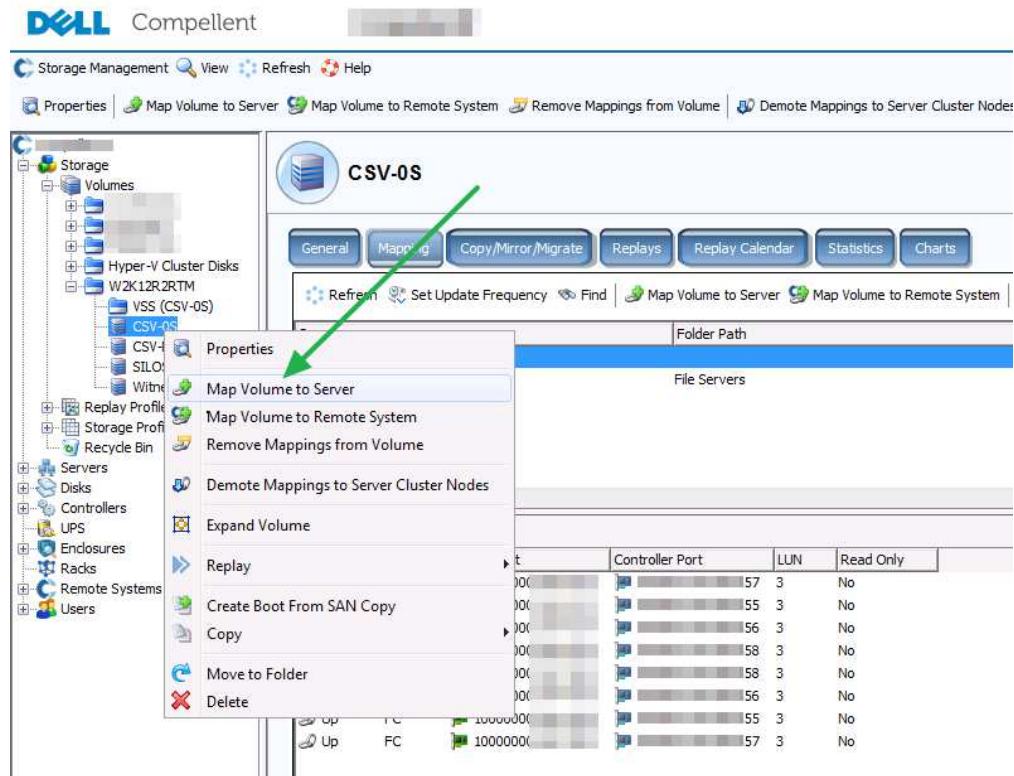
If all is well you should be able to view the volumes on the server and any Hyper-V guests on that host



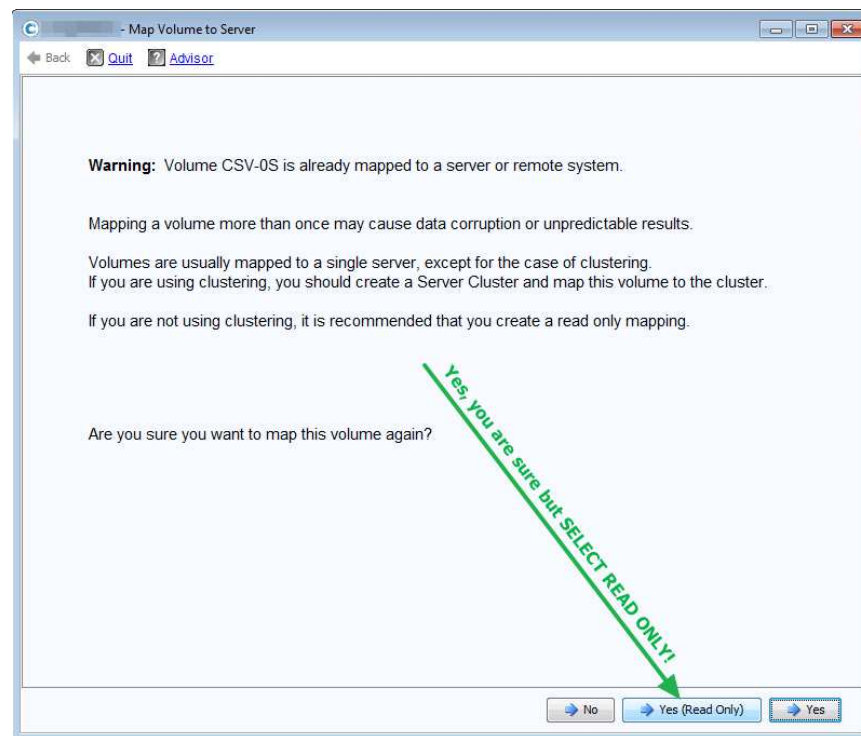
To test all is working well you can create a replay manager backup schedule and run it. Make sure to set it a "Copy" (do **not** select "Full VSS backup") so that it will not interfere with any backup software. Please see the DELL Compellent Replay Manager user guide for more information.

Map Hyper-V LUNs as read only to the OHBP host

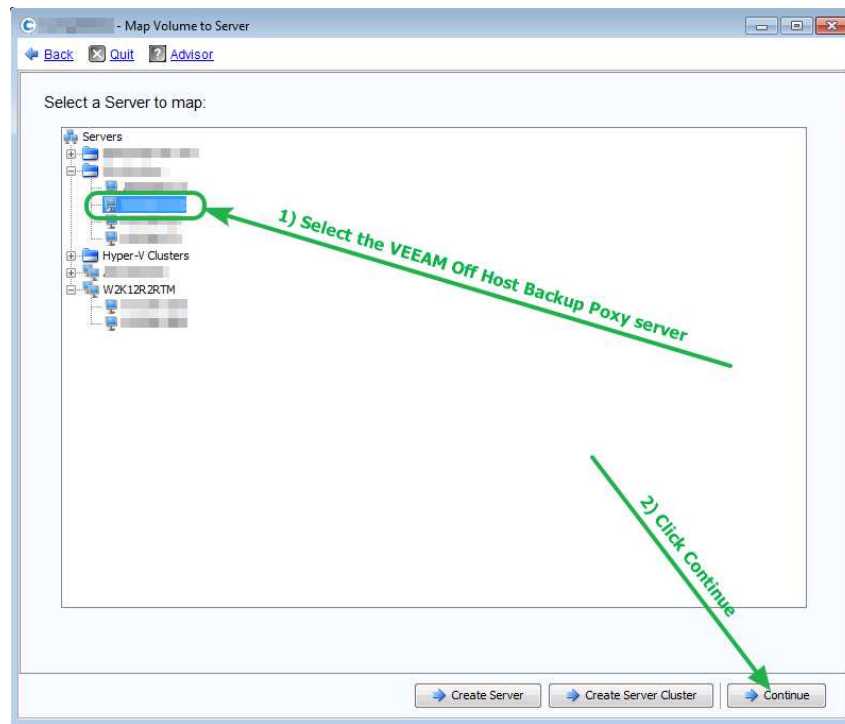
This protects us against an accident with the above mentioned DiskPart SAN policy and Automount settings. If for some reason the policy gets reset to "OnlineAll" and "automount" gets enabled, you'll see lots of file system related errors but you'll be saved by the SAN blocking any writes. The errors are due to the operating system wanting to write to the online disk but in this scenario that would cause disastrous corruption. As the host can't write to the LUN due to the fact that it's mapped as "read only" to the host in Compellent SAN this is your fail safe. And while the event log might fill with worrying event entries, you are protected.



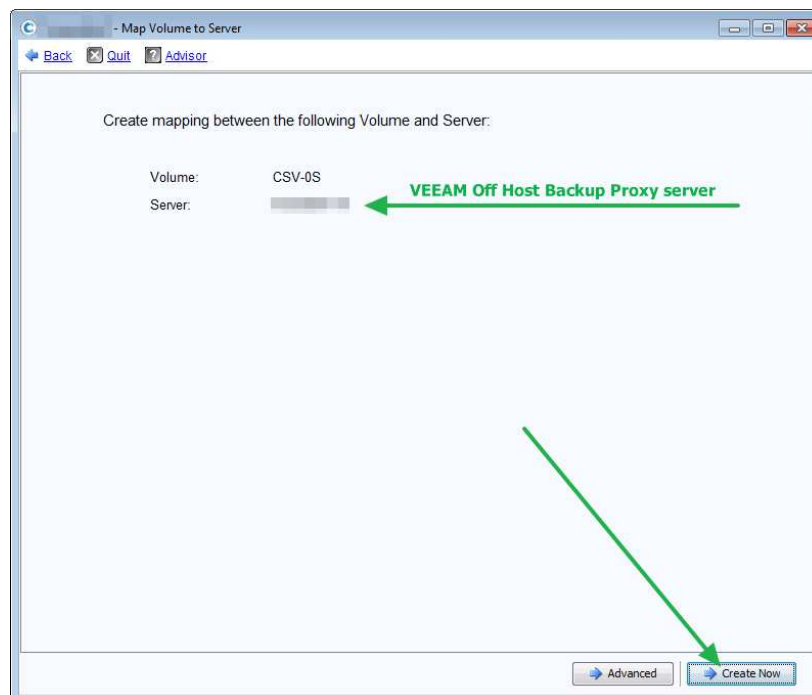
Now your Compellent SAN is a bit concerned about you're data's wellbeing and will notify you that it's already mapped to a remote server or system (a Windows Failover Cluster in our case). Select "Yes (Read Only)".



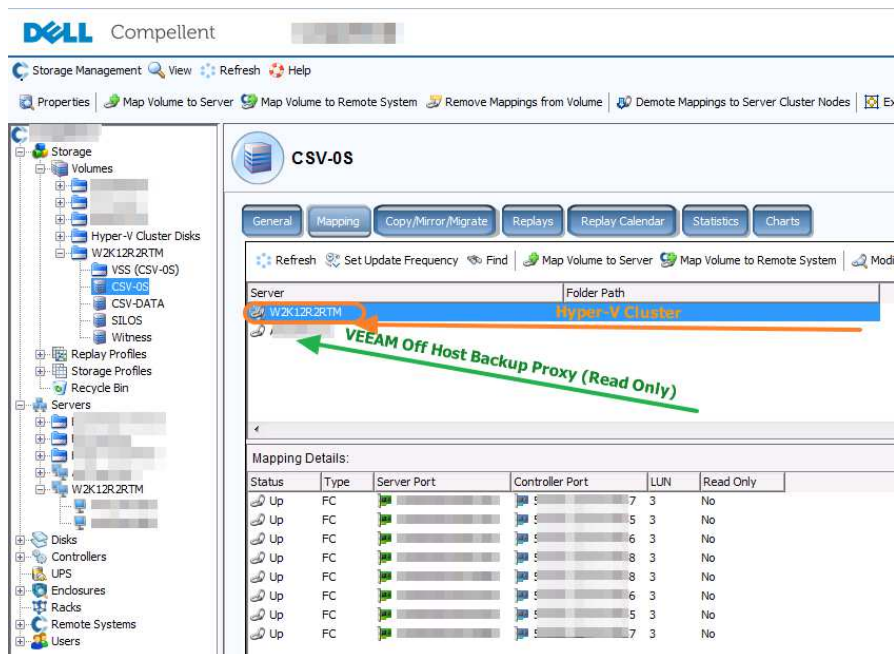
Select the VEEAM Off host backup proxyserver and click “Continue”



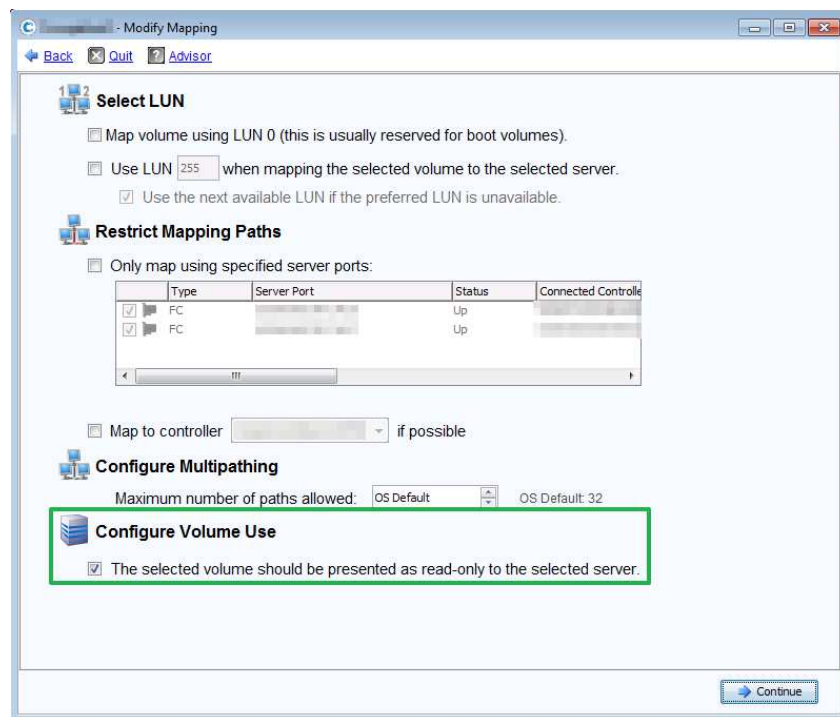
Confirm the details of the volume/LUN to be mapped to the server (your off host backup proxy) and click “Create Now”.



The CSV will be mapped to the server running the VEEAM Off host backup proxyrole.



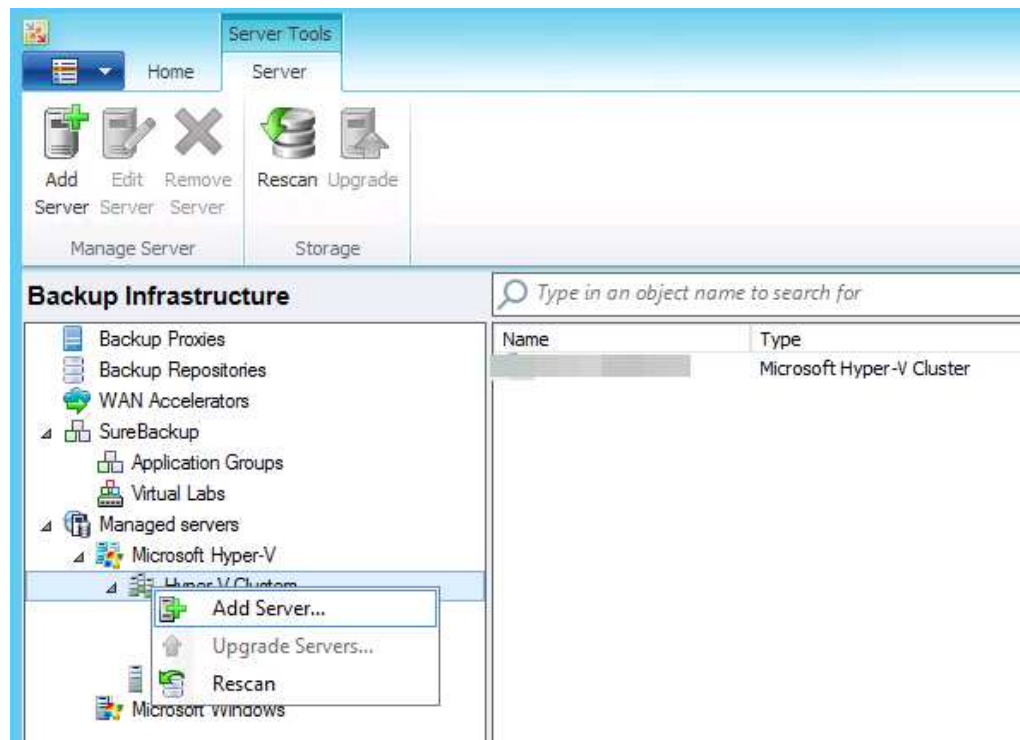
It goes without saying you need to do this for all CSV LUNs of the Hyper-V cluster you want to backup in this fashion. If you look at the properties for the mappings of that server by right clicking it and selecting "Modify Mapping" you'll notice it is indicated that the current mapping is "Read Only"



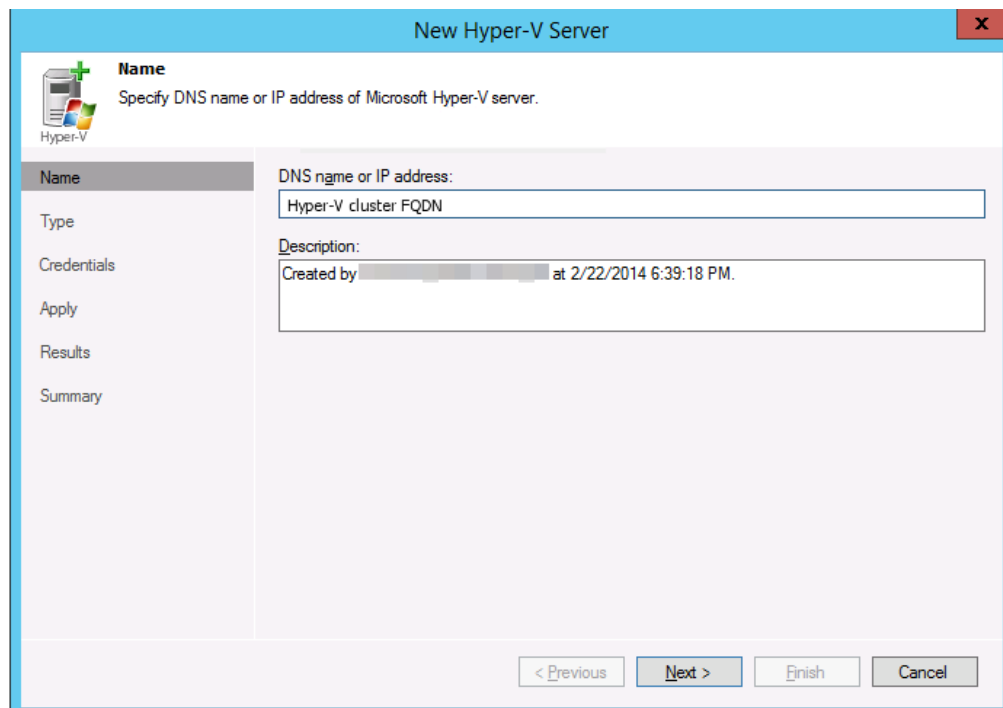
Note: When using Compellent Enterprise Manager GUI the wizard is different. You MUST go into advanced properties and select to map the volume as read only!

Configuration of the Hyper-V Cluster in VEEAM Backup & Replication

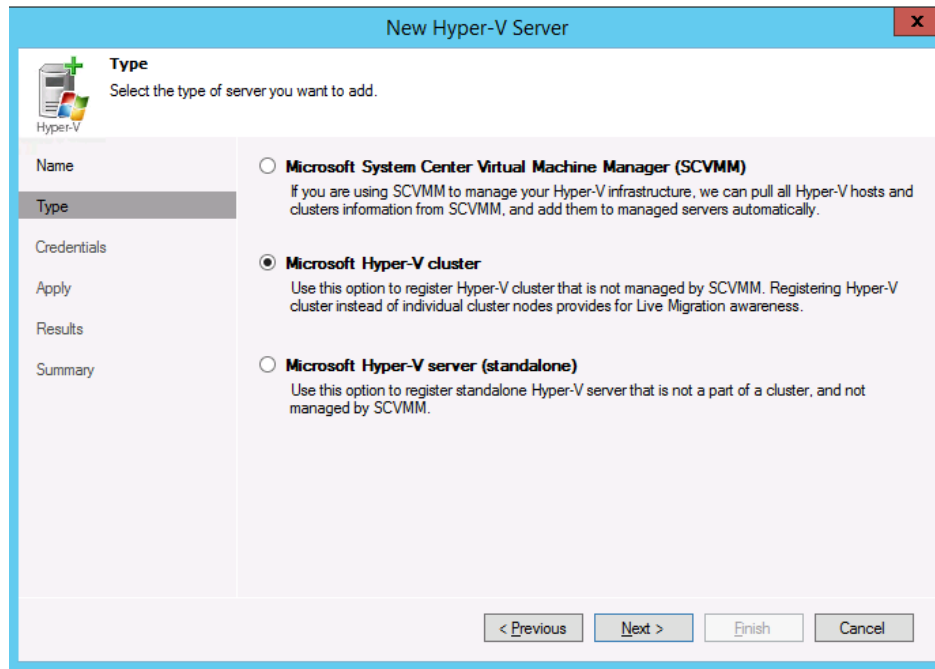
We are adding our Hyper-V cluster to the VEEAM Backup & Replication server in Managed Servers under Backup Infrastructure



Fill out the FQDN of the Hyper-V Cluster and click “Next”

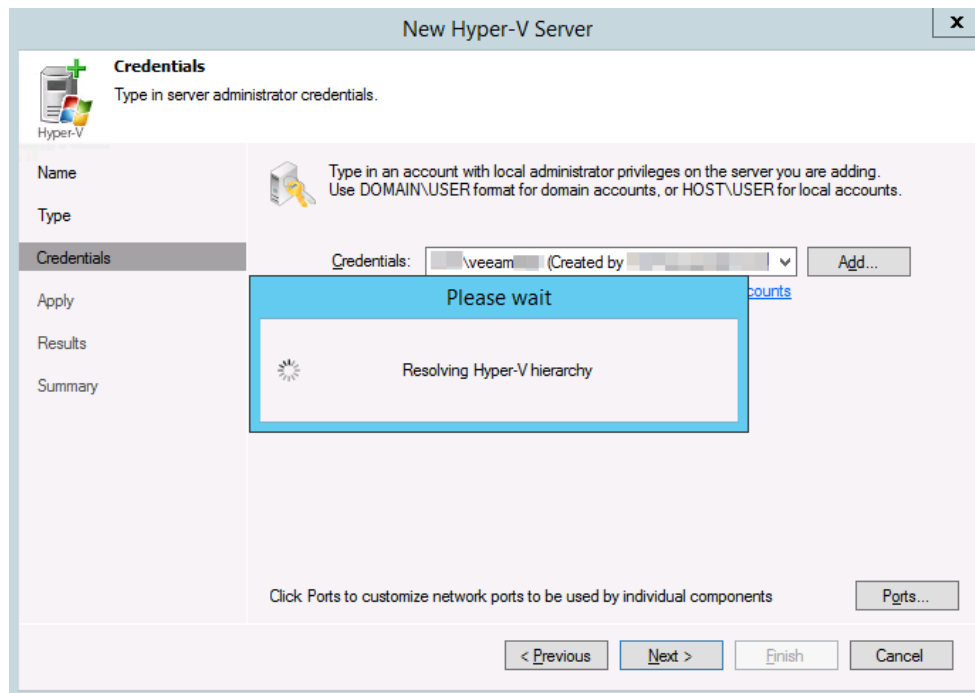


Select the correct option in this case a Microsoft Hyper-v cluster.

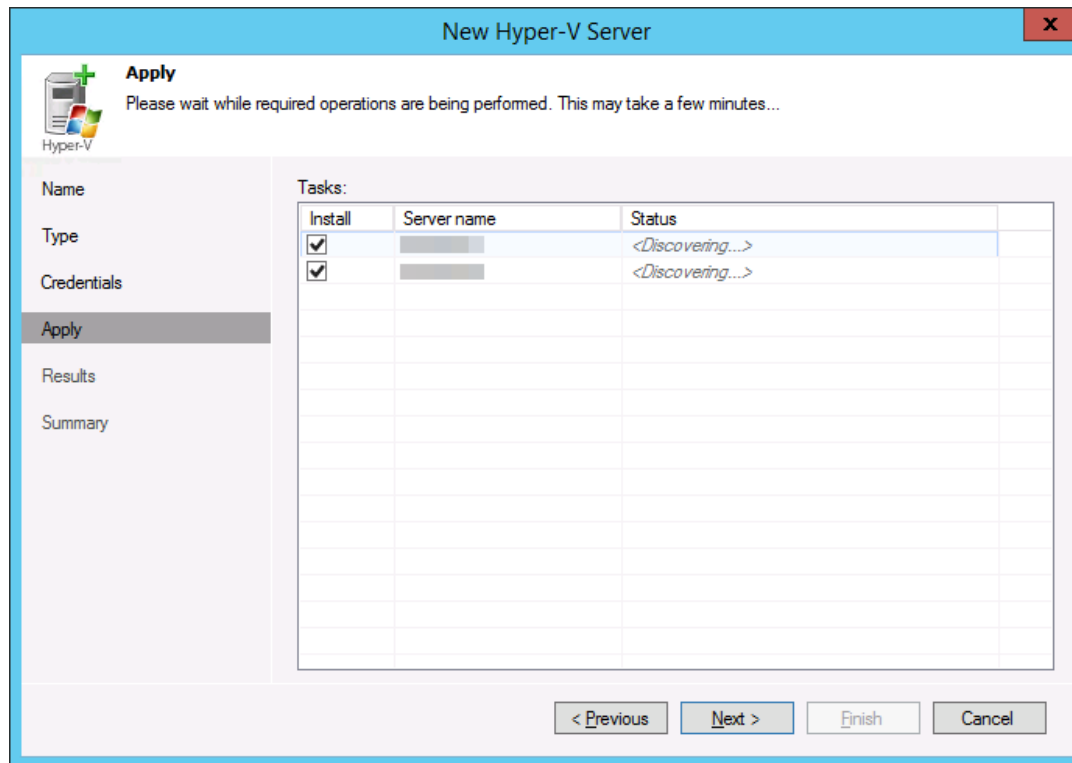


Select an account with local admin rights on the cluster nodes and click “Next”

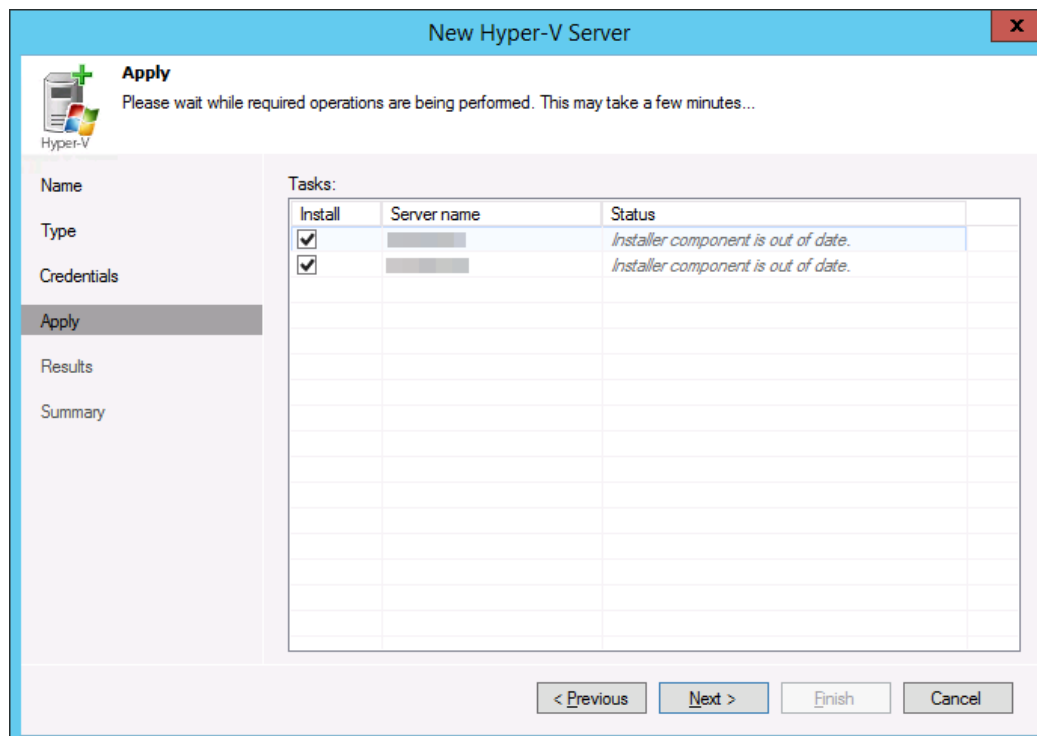
(Note the VEEAM isn't dealing well with global group nested in domain local groups. So we add our domain user VEEAM account to the local admins groups on the servers directly.)



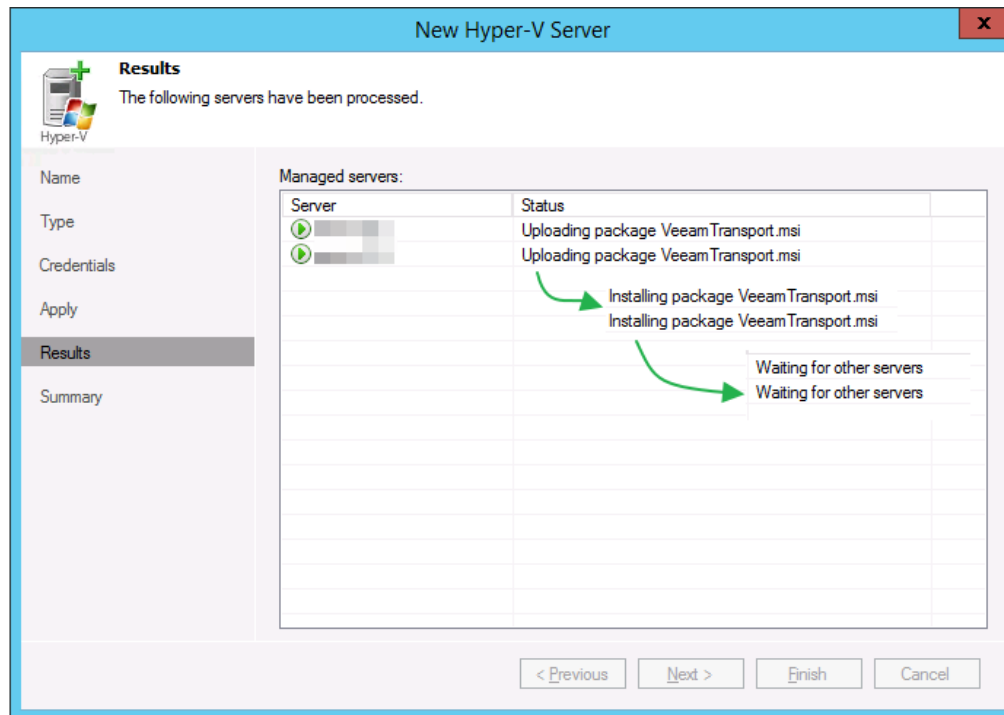
Wait until it has resolved the Hyper-V hierarchy ... and then wait for discovery to complete



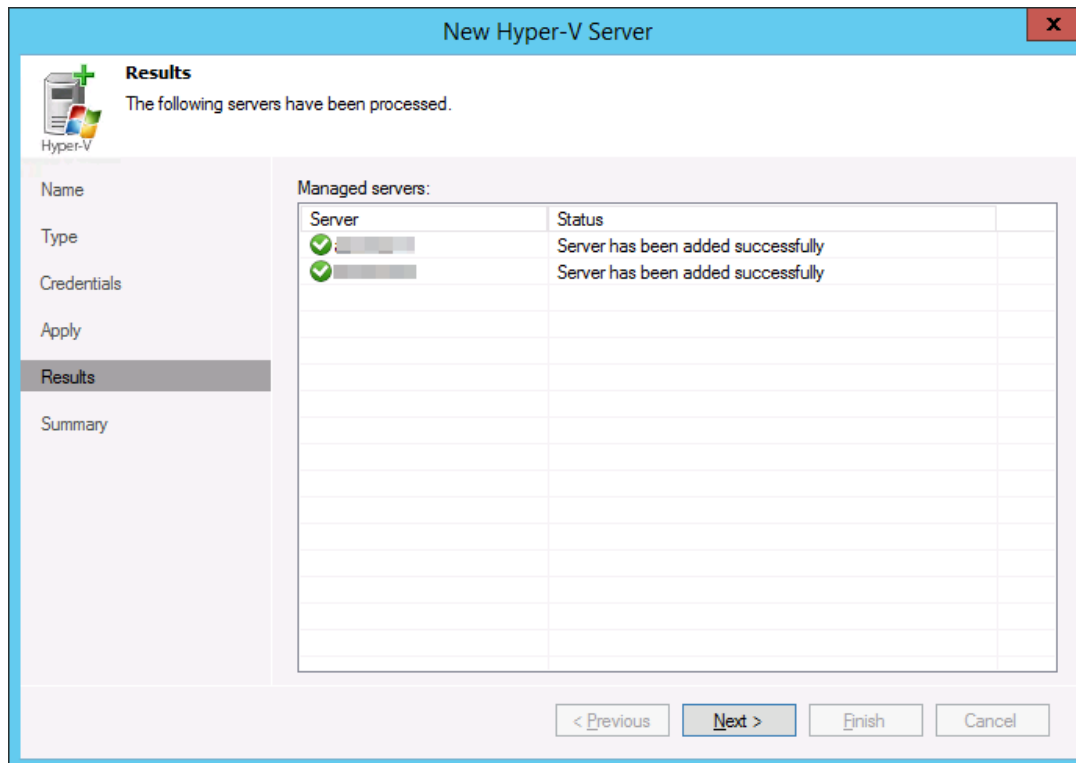
You'll see that the Installer components on both cluster nodes is out of date, which is sort of true as they are not even there yet. Click "Next".



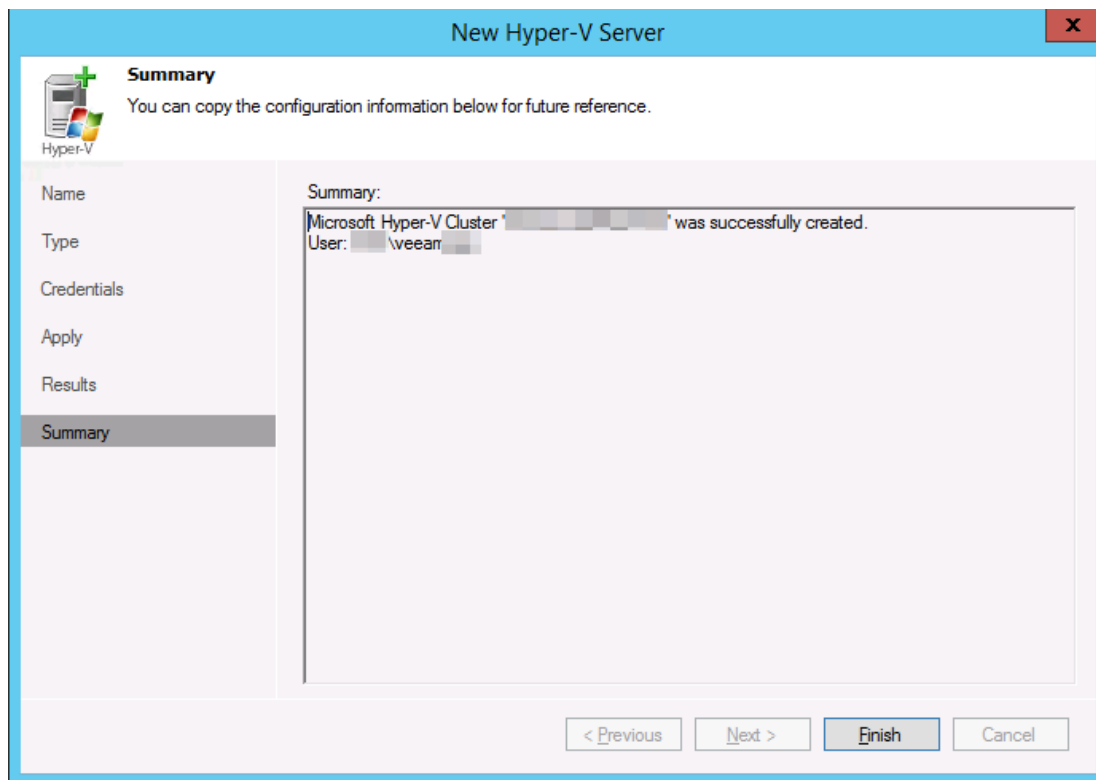
Watch the progress of the installation unfold.



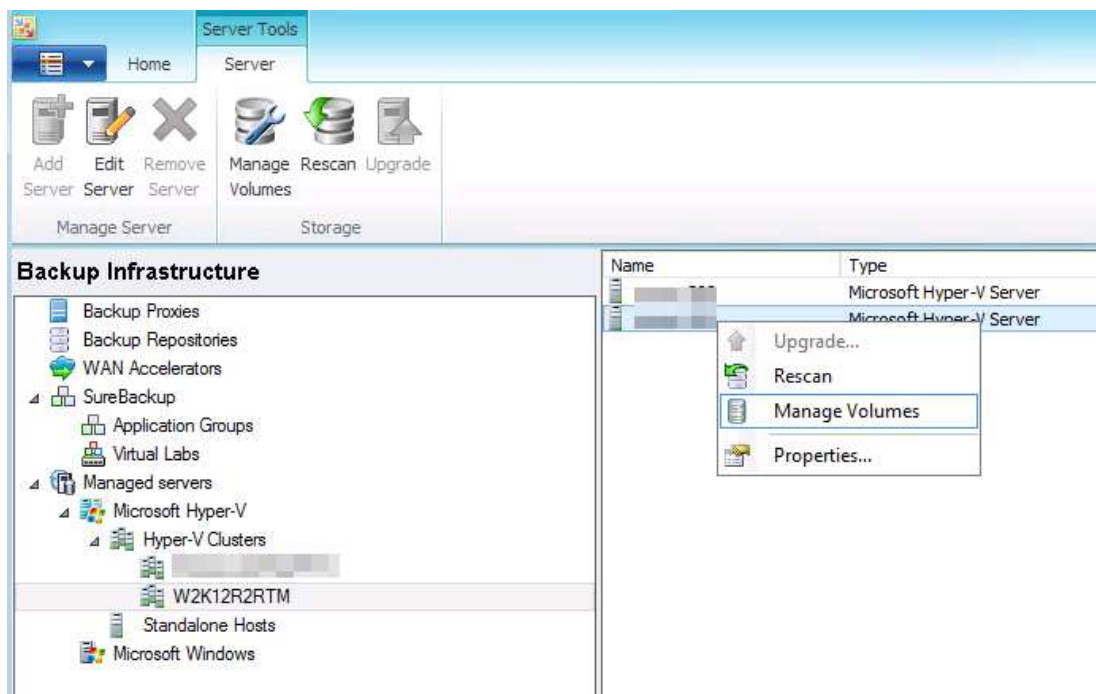
When it's done and succeeded, click "Next".



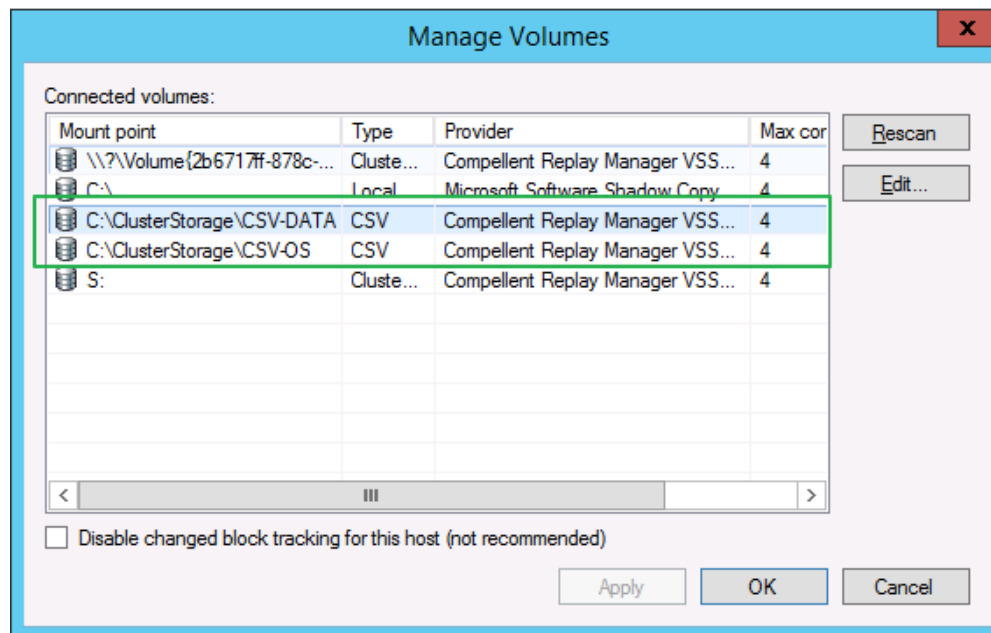
You'll get a summary and you click "Finish" to end this part.



If you go and look at the cluster nodes and select "Manage Volumes" ...



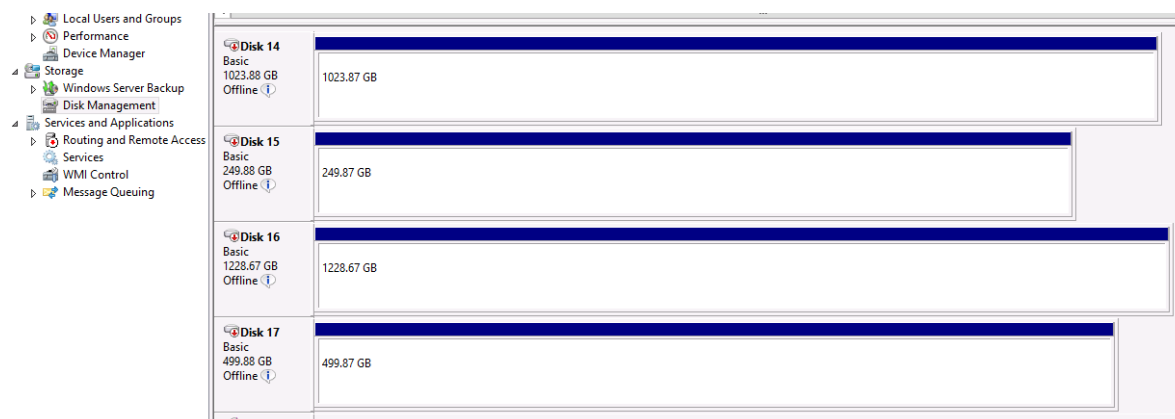
You will see the CSV volumes & local volumes of the cluster nodes. You will also see that the provider is the Compellent Replay Manager VSS provider.

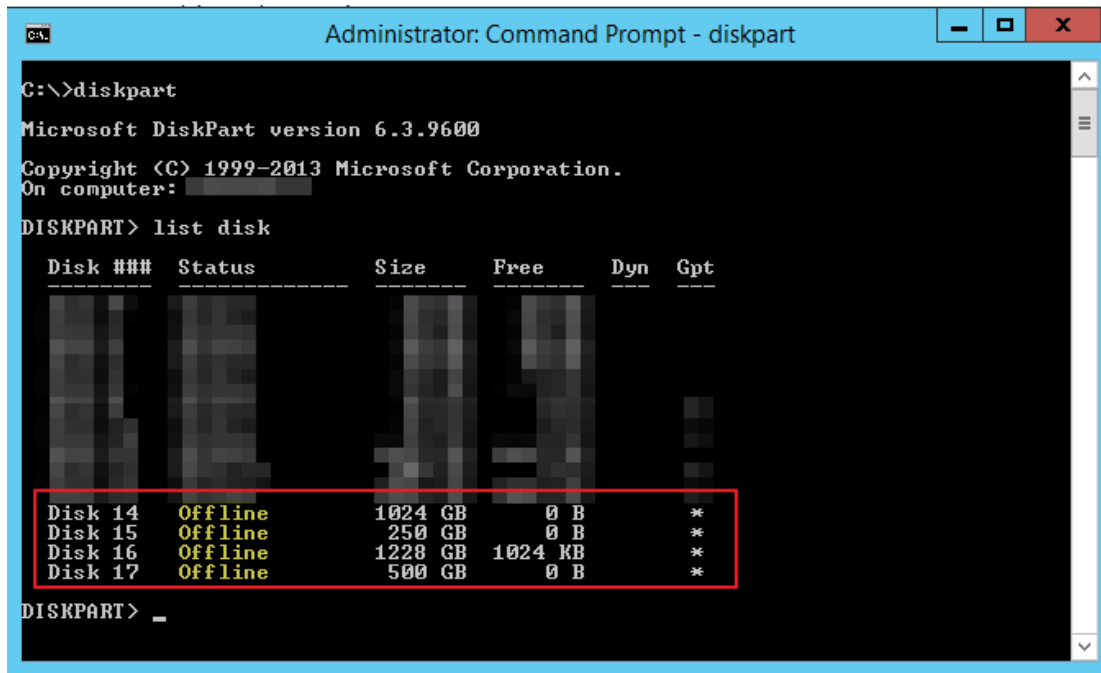


I have found that setting the Max concurrent snapshots on these CSV volumes to 1 instead of the default 4 reduces the potential for the hardware VSS provider to attempt and create snapshots of the same volume. The timing and communication between VEEAM and the hardware VSS provider can be a bit sensitive and this tweak helps with that. If you still run into issues consider using the "HyperVRestrictConcurrentSnapshotCreation" registry tweak (<http://forums.veeam.com/microsoft-hyper-v-f25/advice-on-backing-up-csv-with-hardware-vss-writer-t21016.html>) as an extra aid.

Configuration of the Off Host Backup Proxy

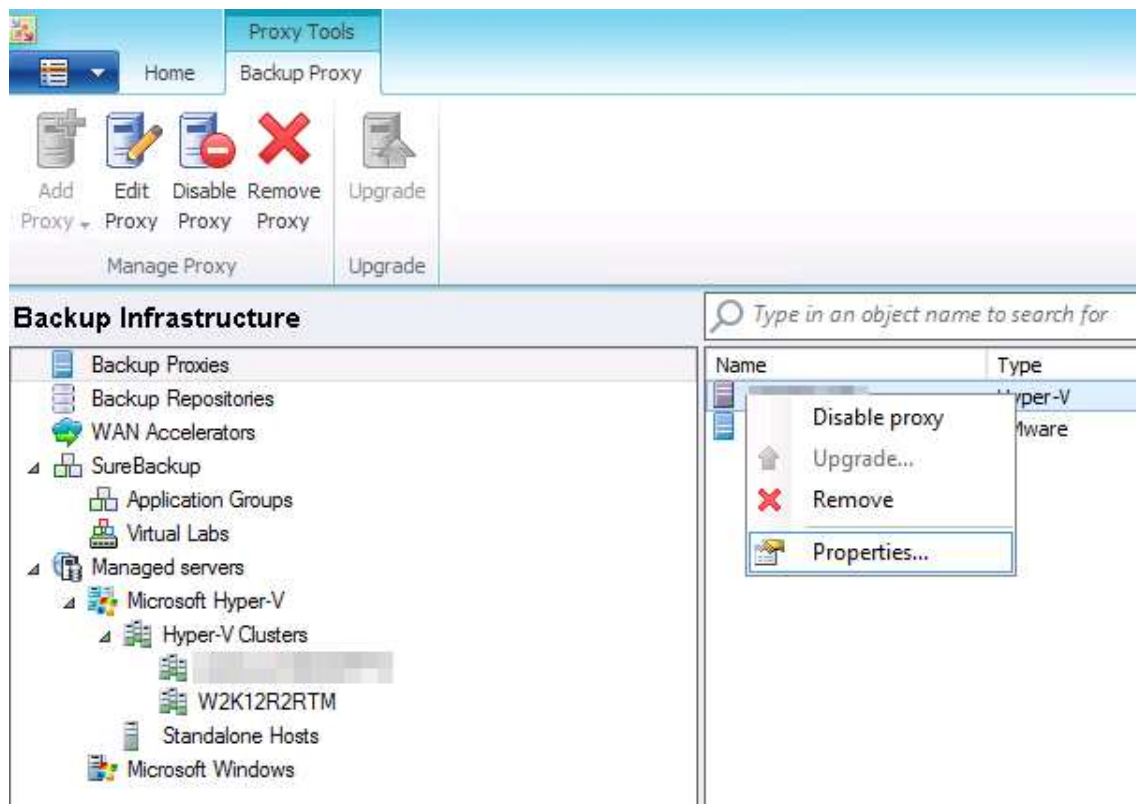
Check if you can see the CSV LUNs that are presented to this server in Disk Manager or in Diskpart





If you can't, rescan your disks. If that doesn't help check the SAN configuration & mapping. If you can you're good to continue.

Go to your backup proxy and go to Properties.



Under connected volumes you click on “Choose”.

Edit Hyper-V Offhost Proxy

Server

Traffic

Review

Apply

Summary

Choose a server for off-host Hyper-V backup proxy. You can only select between Microsoft Windows servers added to the managed servers tree in the console. The server you select must have Hyper-V server role enabled.

Choose server:

Add New...

Proxy description:

Created by at 2/21/2014 5:42:09 PM.

Connected volumes:

Manual selection

Choose...

Max concurrent tasks:

8

▲▼

✔

< Previous

Next >

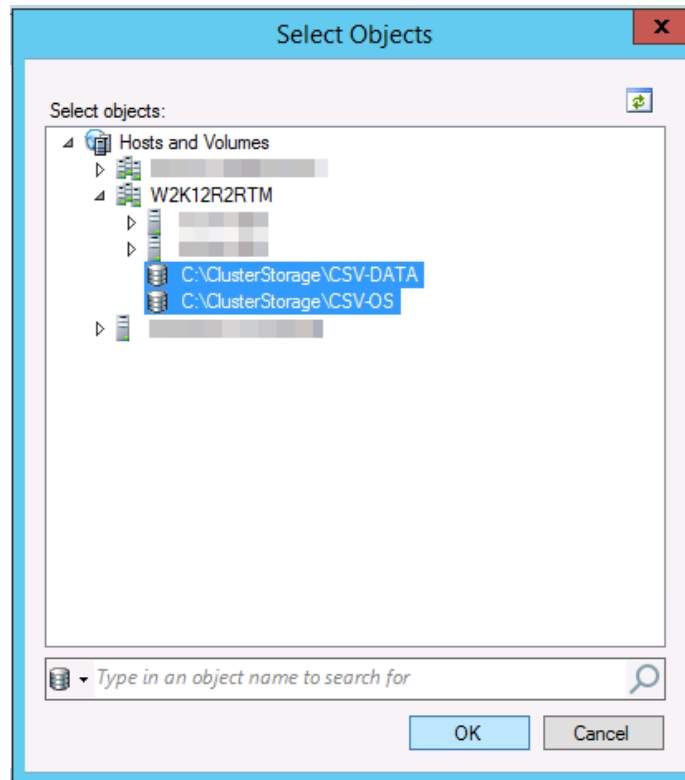
Finish

Cancel

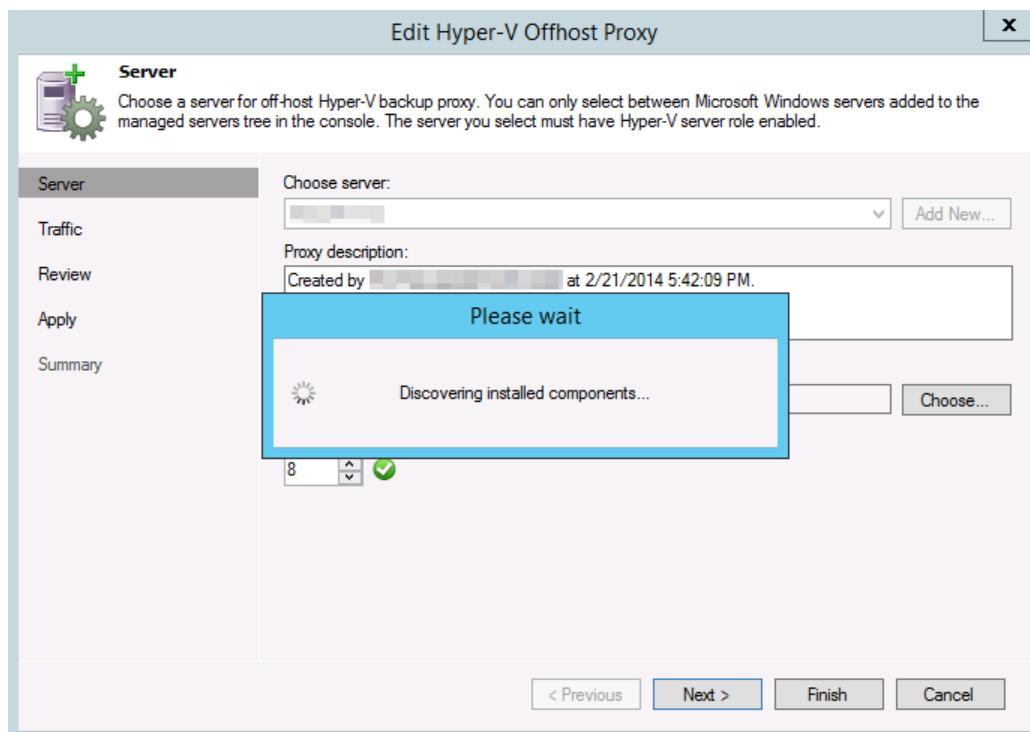
You can leave it on auto selection or do manual selection. We choose manual (Populate doesn't always seem to work 100%) and select "Add".

[illegible]

We now navigate to our new Hyper-V cluster and see the CSVs we have available on this cluster for backup. Select them and click “OK”.



Let the discovery take place.



When done skip the throttling part, we have no need as our backup target is locally attached to the server.

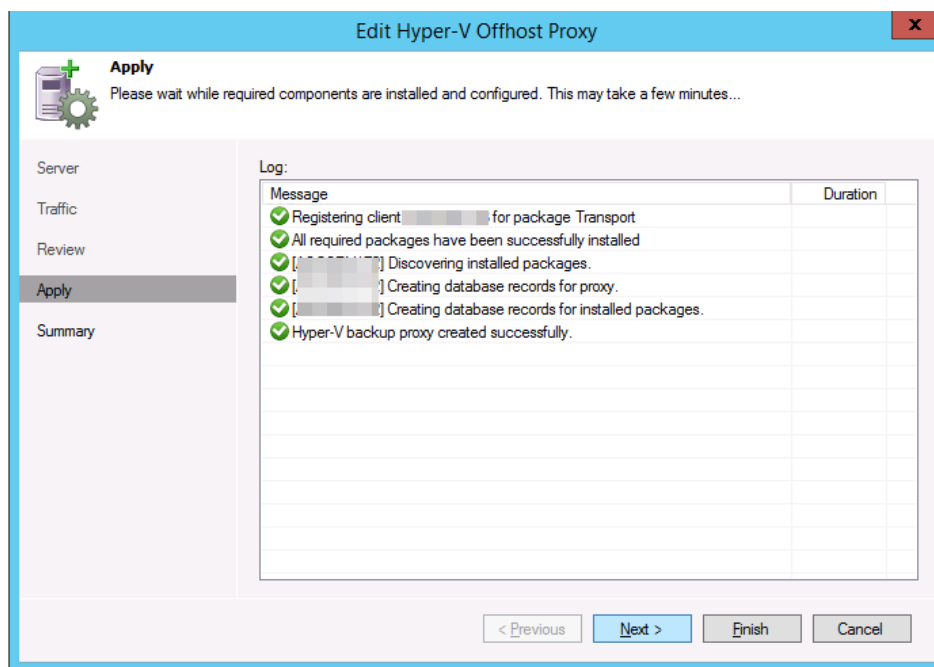
The screenshot shows the 'Edit Hyper-V Offhost Proxy' window with the 'Traffic' tab selected. The left sidebar contains links for 'Server', 'Traffic', 'Review', 'Apply', and 'Summary'. The main area is titled 'Traffic' and includes a sub-header 'Throttling' with the text: 'Choose whether you want to compress the network traffic, and use inbound and outbound traffic throttling for this backup proxy. Traffic compression setting is used for replication only.' Below this, it states: 'Limits outbound data rate when sending the data to the specified destinations. Throttling is global across backup proxies, with available bandwidth split equally. The following throttling rules apply to this proxy:' followed by a table with columns 'Target IP address range', 'Throttling', and 'Time'. The table is currently empty. A 'View' button is to the right of the table. Below the table is a link: 'Manage network traffic throttling rules'. At the bottom of the window are buttons for '< Previous', 'Next >', 'Finish', and 'Cancel'.

Target IP address range	Throttling	Time

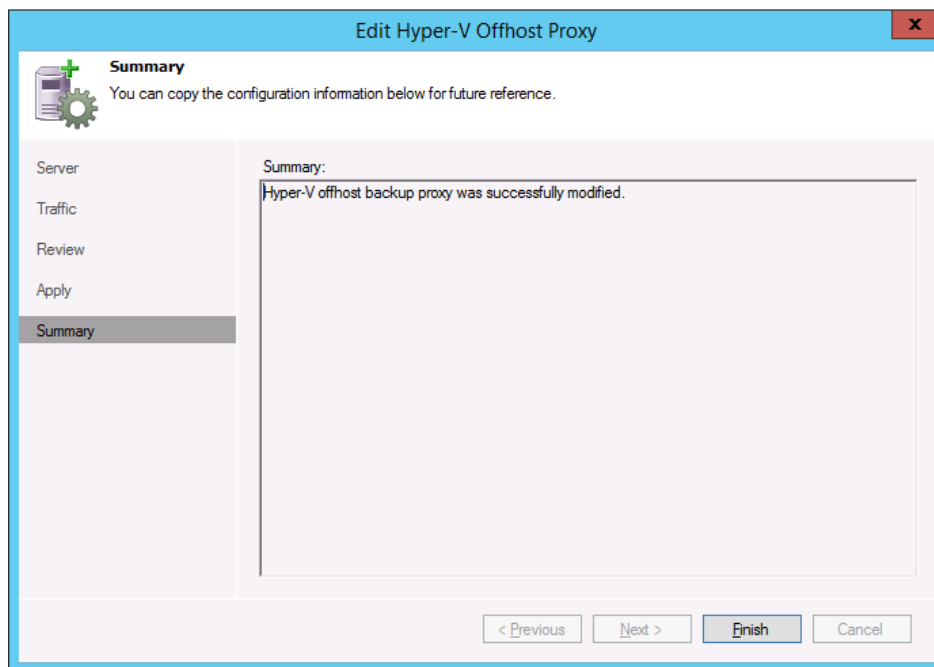
Review your settings (defaults should be fine) and click "Next"

The screenshot shows the 'Edit Hyper-V Offhost Proxy' window with the 'Review' tab selected. The left sidebar contains links for 'Server', 'Traffic', 'Review', 'Apply', and 'Summary'. The main area is titled 'Review' and includes the text: 'Please review the settings and click Next to continue.' Below this, it shows 'Backup proxy settings:' with the following values: 'Server name: [redacted]', 'Server type: **Physical**', 'Cores: **8**', and 'Max tasks: **8**'. Below this, it states: 'The following components will be processed on [redacted]:' followed by 'Transport **already exists**'. At the bottom of the window are buttons for '< Previous', 'Next >', 'Finish', and 'Cancel'.

Let the settings apply.



We're done and have successfully modified/update our Off Host backup Proxy. Click "Next" to get to the summary page.



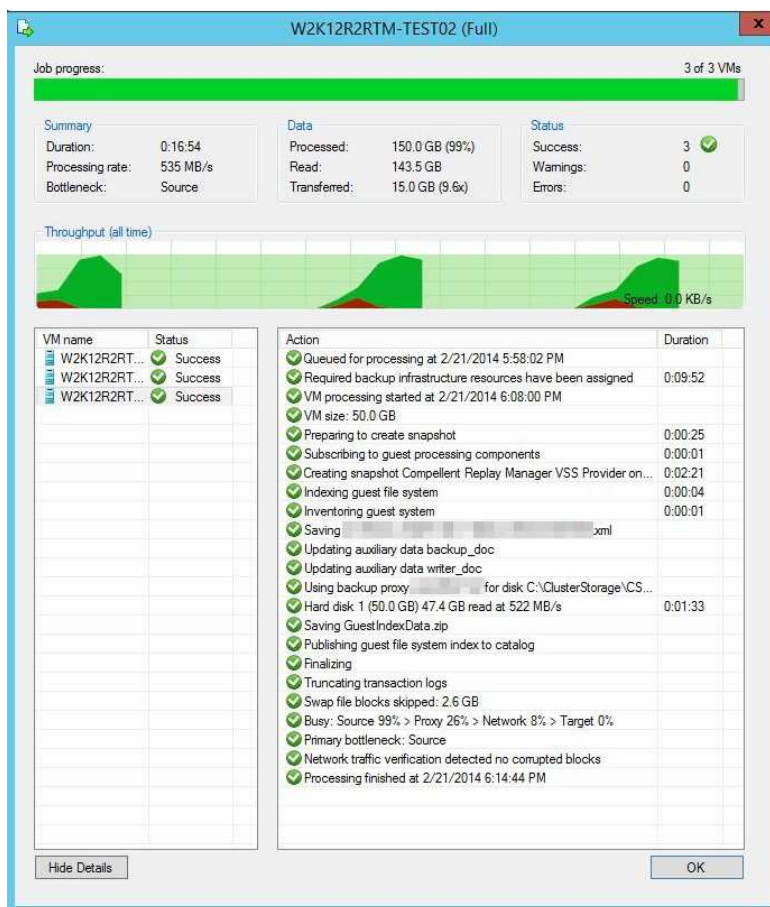
Click "Finish" to end this part of the configuration.

Note that we will have to do this anytime we add a CSV to a cluster or remove one, for proper housekeeping.

The Results

Well let's create and run a backup job that uses this off host backup proxy. I leave configuring that job as an exercise for the reader, it should be a fairly familiar exercise. Let's see what the results are.

Here's a screenshot of our results. Nice speeds right? As we have both the DELL Compellent Replay Manager transportable snapshot presented to our VEEAM off host backup proxy for reading the data for backup and have the backup repository on the same server we don't need to copy any more data over the wire.



Do note that having both the DELL PowerVault DSM and the Compellent DSM on the same host might not be supported officially. As always the results you get will vary due to a number of reasons in your environment. The challenge is keeping the pipes filled and balanced. You need to find the optimal number of jobs (against separate clusters even) to find the balance between the source, VEEAM Backup & Replication VMs and the backup target (VEEAM Off Host Proxy & repository). This means that it can compete with the best out there and at a much more attractive price point due to the easy licensing not charging you per workload (SQL Server, Exchange, AD, File Servers) and the fact they don't charge huge amounts of money for deduplication, backup capacity and so on.

About the Author



Didier Van Hoya is an IT veteran with over 17 years of expertise in Microsoft technologies, storage, virtualization & networking. He works mainly as a subject matter expert advisor and infrastructure architect in Wintel environments leveraging DELL hardware to build the best possible high performance solutions with great value for money. As Microsoft MVP in Hyper-V, a member of the Microsoft Extended Experts Team in Belgium and a DELL TechCenter Rockstar he contributes his experience and knowledge to the global community. He's a blogger, writer & public speaker on his areas of expertise.



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