Setup iSCSI on Windows Server 2012, 2012 R2 and 2016

Overview

The Pure Storage FlashArray supports the Internet Small Computer Systems Interface (iSCSI) an Internet Protocol (IP) based storage networking standard for linking data storage facilities. Using iSCSI provides access to the Pure Storage FlashArray by issuing SCSI commands over the TCP/IP network.

The screenshot below illustrates four connected Ethernet Ports (CT0.ETH6/ETH7 and CT1.ETH6/ETH7) in a Pure Storage FlashArray//M20. These ports will be configured on the FlashArray and Windows Server for connectivity in Step 05.1 – Setup iSCSI Connectivity.

The following steps will configure the MSiSCSI Initiator Service to connect to the Pure Storage FlashArray iSCSI ports using the Windows Server management tools.

Setup Using Windows Server and FlashArray Management Tools

This section walks through the steps for configuring MSiSCSI using the Graphical User Interface (GUI) tools provided by Windows Server and Pure Storage FlashArray management interface.

Configure MSiSCSI (Part 1 of 2)

1. Open up Server Manager. By default Server Manager starts when logging into Windows Server.
2. Click Tools and select iSCSI Initiator to start the MSiSCSI Initiator Service.
3. The Microsoft iSCSI dialog will open indicating that the service is not running. Click Yes to start the service and also set it to startup automatically when the server reboots.
4. After the MSiSCSI Initiator Service has started the Properties dialog will be opened. Click the **Configuration** tab to retrieve the iSCSI Qualified Name (IQN).

Write down or cut-and-paste the Initiator Name value.

This step has started the Microsoft iSCSI Service so the Initiator Name could be retrieved which is required for the next section.
Configure FlashArray Host and Volume

- Connecting a volume to a configured iSCSI host on the Pure Storage FlashArray is required before configuring MSiSCSI.

1. Open the Pure Storage FlashArray Management interface and log into the FlashArray.
2. Click on the Storage tab.
3. Click on the + in the Hosts section and select Create Host.

4. Select the newly created host, Server01, then click the Host Ports tab. Click the 'hamburger menu' to the right, then click Configure iSCSI IQNs.

5. The Configure iSCSI IQNs dialog box will open. Enter the IQN from the previous section then click Add.
6. Click on the + in the Volumes section to create a volume. For this example the name iSCSI-TestVolume with a size of 500 G is being used. A different name and size can be used.

7. After creating the new volume click the Connected Volume (0) tab then the 'hamburger menu' to the right and select Connect Volumes menu item.

8. The Connect Volumes to Host dialog will open. Click on the iSCSI-TestVolume (or whatever volume name was created) then click Confirm.

9. Now the new host, Server01, is connected to the new volume, iSCSI-TestVolume, with the host port IQN set to iqn.1991-05.com.microsoft:server01.
Configure MSiSCSI (Part 2 of 2)

In this section the configuration of MSiSCSI will be continued using the iSCSI Initiator tool.

1. Open up Server Manager. By default Server Manager starts when logging into Windows Server.
2. Click Tools and select iSCSI Initiator to open the iSCSI Initiator Properties dialog.
3. Click on Discover Portal... button which will display the Discover Target Portals dialog.

These are the iSCSI Services which were configured in the Setup iSCSI on the FlashArray topic. These need to be in place before proceeding.

4. Enter the IP Address or DNS name for the target ports on the Pure Storage FlashArray. Leave the Port default set to 3260.

Repeat Step 4 for each iSCSI service you have configured on the FlashArray. In this example there are four iSCSI services setup on the FlashArray.
5. Once all of the Target Ports have been configured the **Discovery** tab Target portals list should look the below example. This could differ based on the number of iSCSI initiators that are in the FlashArray.

![Diagram of ISCSI Initiator Properties](image)

6. Click on the **Targets** tab select the newly **Discovered target** and click the **Connect** button. This will establish a connection to the Pure Storage FlashArray iSCSI services.

   Before connecting the **Status** will show as **Inactive**.
After connecting the **Status** will show as **Connected**.
If a FlashArray volume has not been connected to the host where the iSCSI Initiator Service is being setup you will see the error, **Authorization Failure**.

This is the same FlashArray iSCSI Qualified Name (IQN) that can be seen from the FlashArray management interface.

7. Select the newly connected **Discovered target** and click the **Properties**... button to add sessions to the connection.
8. The **Properties** dialog will open. Click **Add session**, this will open up the **Connect to Target** dialog.

**Best Practice:** For best performance out of a single host, eight (8) iSCSI sessions are recommended. A session is normally created for every target port where a host is connected. If the host is connected to less than eight (8) paths additional sessions can be configured going to the same target ports.
9. Click **Enable multi-path** then click **Advanced...** button.

10. In the Advanced Settings dialog select the **Microsoft iSCSI Initiator** from the **Local adapter** dropdown. Select the appropriate IP Address from the **Initiator IP** dropdown. Select the **Target portal IP** from the dropdown that will map to the Initiator IP.
Repeat Step 9 for all of the Initiator IPs and map to their appropriate Target portal IP.

11. After completing the setup of the Initiator IPs and Target Portal IPs click the **Favorite Targets** tab and all of the configured paths will be visible.
12. Open up the FlashArray Management interface, click System tab, click Connections, click Host Connections and select host that was just configured. The Host Port Connectivity should show Redundant connections.

If the deployed switches in the fabric support changing the Maximum Transmission Unit (MTU) from 1500 to 9000 (Jumbo Frames) this can be accomplished using the FlashArray Management GUI. Or by running the Windows PowerShell cmdlets from the Pure Storage PowerShell SDK.

Using the FlashArray Management GUI
Using the PowerShell SDK

```powershell
PS > $FlashArray = New-PfaArray -EndPoint 10.21.201.57 -Credentials (Get-Credential) - IgnoreCertificateError
PS > Get-PfaNetworkInterfaces -Array $FlashArray | Format-Table -AutoSize
PS > Get-PfaNetworkInterfaces -Array $FlashArray | Format-Table -AutoSize

<table>
<thead>
<tr>
<th>subnet name</th>
<th>enabled</th>
<th>mtu</th>
<th>services</th>
<th>netmask</th>
<th>slaves</th>
<th>address</th>
<th>hwaddr</th>
<th>speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>ct0.eth0</td>
<td>True</td>
<td>1500</td>
<td>{management}</td>
<td>255.255.255.0</td>
<td>{}</td>
<td>10.21.201.55</td>
<td>24:a9:37:00:38:8f</td>
<td>10000000000</td>
</tr>
<tr>
<td>ct0.eth1</td>
<td>False</td>
<td>1500</td>
<td>{management}</td>
<td>64</td>
<td>{}</td>
<td>2620:125:9004:2021::200</td>
<td>24:a9:37:00:38:8e</td>
<td>10000000000</td>
</tr>
<tr>
<td>ct0.eth3</td>
<td>False</td>
<td>1500</td>
<td>{management}</td>
<td>64</td>
<td>{}</td>
<td></td>
<td>24:a9:37:00:38:91</td>
<td></td>
</tr>
<tr>
<td>ct0.eth6</td>
<td>True</td>
<td>9000</td>
<td>{iscsi}</td>
<td>255.255.255.0</td>
<td>{}</td>
<td>10.21.201.59</td>
<td>90:e2:ba:4d:75:51</td>
<td>10000000000</td>
</tr>
<tr>
<td>ct0.eth7</td>
<td>True</td>
<td>9000</td>
<td>{iscsi}</td>
<td>255.255.255.0</td>
<td>{}</td>
<td>10.21.201.61</td>
<td>90:e2:ba:4d:75:50</td>
<td>10000000000</td>
</tr>
<tr>
<td>ct1.eth0</td>
<td>True</td>
<td>1500</td>
<td>{management}</td>
<td>255.255.255.0</td>
<td>{}</td>
<td>10.21.201.60</td>
<td>24:a9:37:00:38:8f</td>
<td>10000000000</td>
</tr>
<tr>
<td>ct1.eth1</td>
<td>False</td>
<td>1500</td>
<td>{management}</td>
<td>64</td>
<td>{}</td>
<td>2620:125:9004:2021::201</td>
<td>24:a9:37:00:38:8f</td>
<td>10000000000</td>
</tr>
<tr>
<td>ct1.eth3</td>
<td>False</td>
<td>1500</td>
<td>{management}</td>
<td>64</td>
<td>{}</td>
<td></td>
<td>24:a9:37:00:38:91</td>
<td></td>
</tr>
<tr>
<td>replbond</td>
<td>True</td>
<td>1500</td>
<td>{replication}</td>
<td>255.255.255.0</td>
<td>{ct1.eth2, ct0.eth2}</td>
<td>10.21.201.58</td>
<td>92:76:9c:80:b9:77</td>
<td>0</td>
</tr>
<tr>
<td>vir0</td>
<td>True</td>
<td>1500</td>
<td>{management}</td>
<td>255.255.255.0</td>
<td>{}</td>
<td>10.21.201.57</td>
<td>8e:85:63:ff:fd:dd</td>
<td>10000000000</td>
</tr>
</tbody>
</table>

PS > Set-PfaInterfaceMtu -Array $FlashArray -Name 'ct0.eth6' -Mtu 9000
PS > Set-PfaInterfaceMtu -Array $FlashArray -Name 'ct0.eth7' -Mtu 9000
```
Configuring Volumes with Windows Server

Refer to the below article for configuring volumes with Windows Server.

- Working with Volumes on a Windows Server 2012, 2012 R2 or 2016 Host

Test Connectivity

To test the connectivity from the host to the FlashArray you can use DISKSPD for a basic plumbing test. DISKSPD is a storage load generator / performance test tool from the Microsoft Windows, Windows Server and Cloud Server Infrastructure Engineering teams.

DISKSPD is not recommended for performance testing. The use case mentioned here is to simply test the connectivity to the FlashArray.

Running diskspd with the below example command line will generate I/O to evaluate connectivity. The <DRIVE_LETTER> in the command line should be the drive letter of the newly connected volume. To learn how to setup a drive letter for a newly connected volume see Working with Volumes on a Windows Server 2012, 2012 R2 or 2016 Host.

```bash
> Diskspd.exe -b8K -d3600 -h -L -o16 -t16 -r -w30 -c400M <DRIVE_LETTER>\io.dat
```

The results of the plumbing test should generate similar output as below.

![Plumbing test output](image)

The host can also be monitored using the Purity CLI with the pureuser account with the below command.

```bash
PS > Set-PfaInterfaceMtu -Array $FlashArray -Name 'ct1.eth6' -Mtu 9000
PS > Set-PfaInterfaceMtu -Array $FlashArray -Name 'ct1.eth6' -Mtu 9000
```
<table>
<thead>
<tr>
<th>Name</th>
<th>Time</th>
<th>Initiator WWN</th>
<th>Initiator IQN</th>
<th>Target</th>
<th>Target WWN</th>
<th>Failover</th>
<th>I/O Relative to Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server01</td>
<td>2017-06-07 09:30:06 PDT</td>
<td>-</td>
<td>iqn.1991-05.com.microsoft:server01 (primary)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td>500187</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>iqn.1991-05.com.microsoft:server01 (secondary)</td>
<td></td>
<td>506741</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>