

IBM System Storage SAN Volume Controller
IBM Storwize V7000



Guidelines for the Attachment of VMware iSCSI Hosts to SAN Volume Controller and Storwize V7000 - Errata

Version 6.2.x and Higher

November 18th 2011

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Introduction

This document outlines the current guidelines and restrictions for the attachment of VMware iSCSI hosts to SVC and Storwize V7000.

Who should use this guide

This errata should be used by anyone using the IBM System Storage SAN Volume Controller Host Attachment Guide or Information Center and IBM Storwize V7000 Host Attachment Guide or Information Center who wishes to attach VMware iSCSI Hosts

Last update

This document was last updated: November 18th 2011

Change History

The following revisions have been made to this document:

Date	Sections Modified
October 18 th 2011	New Document
November 18 th 2011	Update for 6.3 (6.2.x and Higher)

System Prerequisite

The minimum supported software version for SAN Volume Controller and Storwize V7000 is version 6.2.x

Current Limitations in VMWare iSCSI Support

- **Only single session is supported between VMware ESXi Server and a SVC Node or a Storwize V7000 Node**
- **Multi Session environments are not currently supported**
- **Support is with the VMWare iSCSI Software Initiator only**
- **Each node in the SVC system or Storwize V7000 System corresponds to a single unique IQN.**
- **Each VMware host can have multiple Ethernet ports and each port can be configured with one or more IPs.**
- **Each SVC node can have multiple 1G/10G ports. We can configure one target IPv4 and one target IPv6 on each these ports**
- **VMware iSCSI initiators use Static/Dynamic Discovery method to know the target IPs configured on the Target IQN (Each SVC/Storwize V7000 Node).**
- **Initiators discover all target IPs, configured on the SVC/Storwize V7000 Node target IQN.**
- **Once target IPs are discovered VMware iSCSI initiator tries to log-in to the target IQN via all of the Target IPs discovered, if and only if IPs are accessible (ping-able).**
- **An iSCSI session is established when an iSCSI Initiator logs onto a target IP over TCP.**

VMWare iSCSI Version Support

Please visit the SAN Volume Controller or Storwize V7000 Support pages for the latest information on supported version of VMware

SAN Volume Controller

<https://www-304.ibm.com/support/docview.wss?uid=ssg1S1003797>

Storwize V7000

<https://www-304.ibm.com/support/docview.wss?uid=ssg1S1003798>

Configuration Guidelines

VMware Software Initiator Mis-configuration

Note: VMware initiators will discover all target IPs that are present on the Storwize V7000 or SAN Volume Controller system. Once target ips are discovered, by default, VMware tries to create iSCSI session on all the **accessible Targets**.

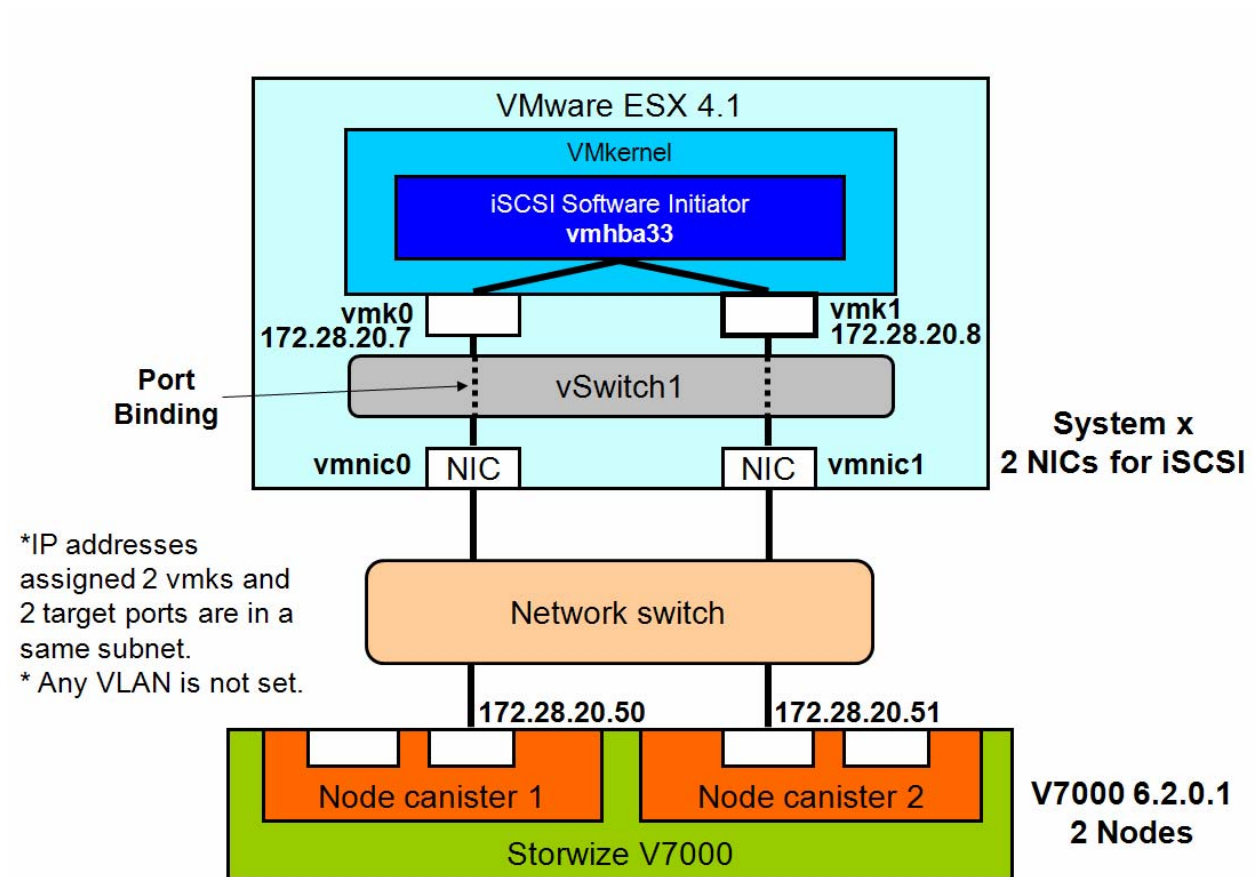


Fig 1 VMware setup with a Storwize V7000

The black lines from NIC to Network Switch in Fig 1 indicate actual physical links (Ethernet Links) between VMware server and two Storwize V7000/SVC Nodes

In the context of the Fig 1 VMware will discover 4 paths to Storwize V7000 System, automatically.

Initiators IPs	Target Ips	Paths
172.28.20.7	172.28.20.50 on IQN1	Path1
172.28.20.7	172.28.20.51 on IQN2	Path2
172.28.20.8	172.28.20.50 on IQN1	Path3
172.28.20.8	172.28.20.51 on IQN2	Path4

This means VMware ESX 4.1 will see four paths per iSCSI luns or Device. In other words, VMware host has two iSCSI sessions/paths on each SVC/Storwize V7000 Node, one from 172.28.20.7 and other from 172.28.20.8. **This is not supported and is a current limitation.** Ensure that each Node has single login session from VMware ESX 4.1.

This is outlined in steps below:

In a VMware environment, we should use 'Static Discovery' in Initiator property.

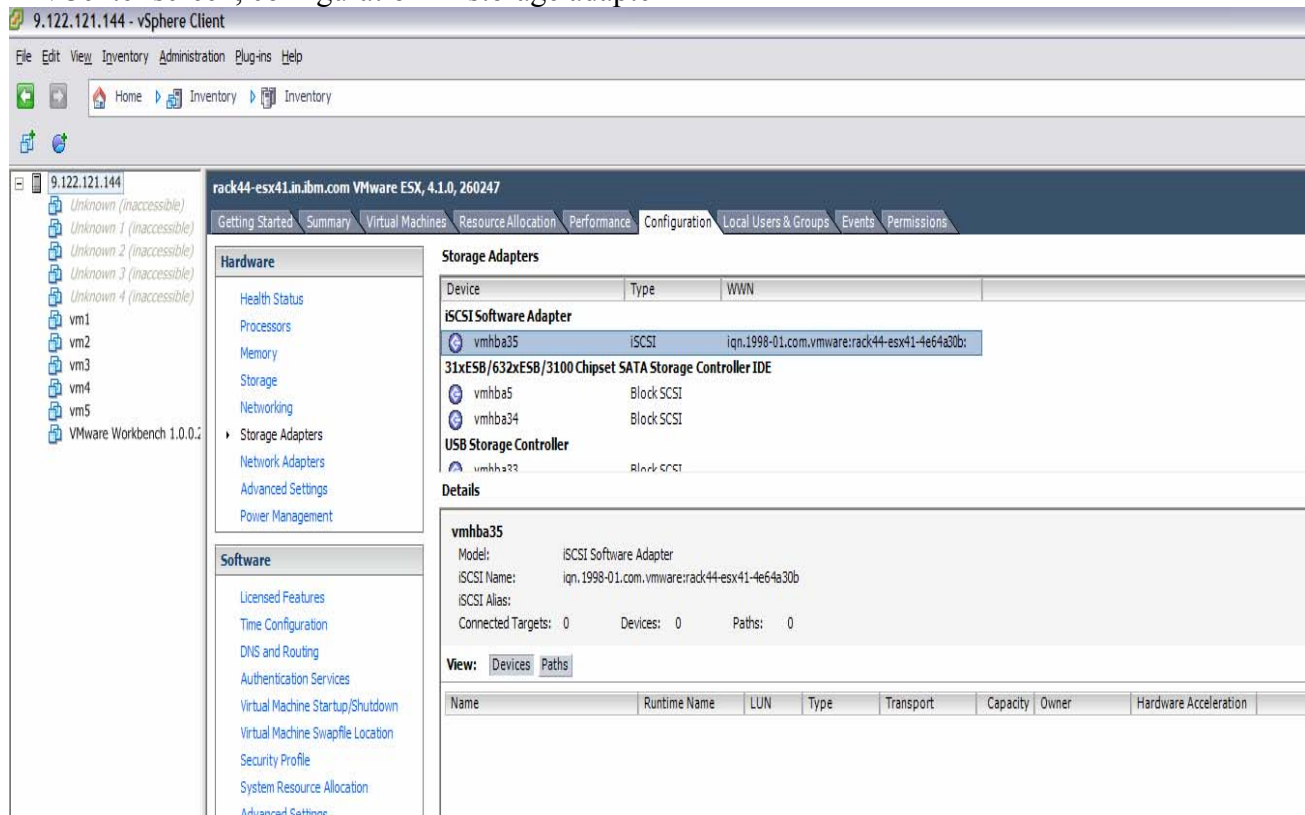
Select 'Dynamic Discovery', your ESX will see all the target IPs on the Storwize V7000/SVC. Then two IPs on the same node, total four IPs from one V7000 can be recognized from ESX. This will cause multisection to happen on ESX servers by default.

Configuring a Single Software Initiator Session

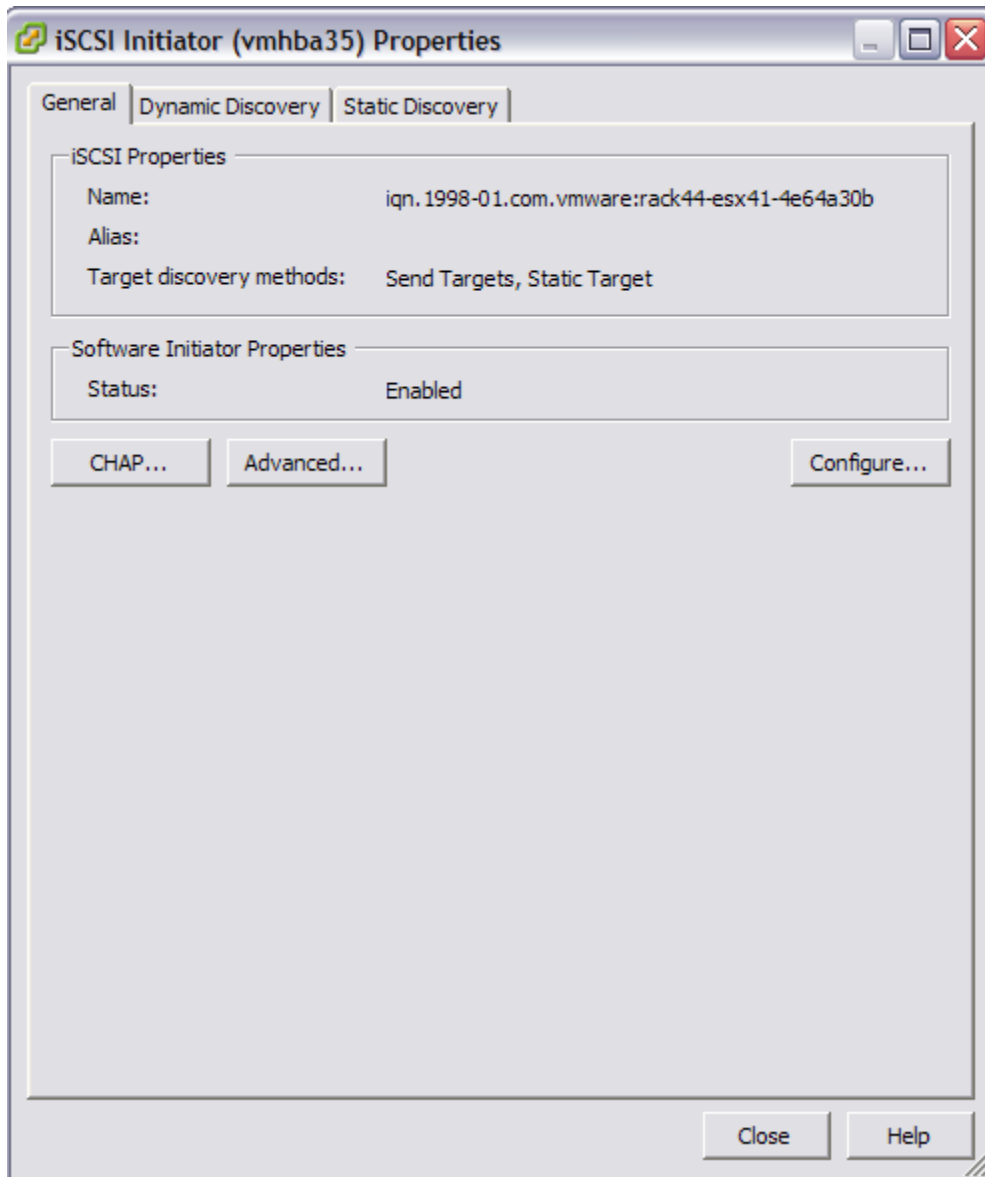
In order to configure single session, use 'Static Discovery' and set only one IP address from each SVC node / Storwize V7000 Node.

Ex:

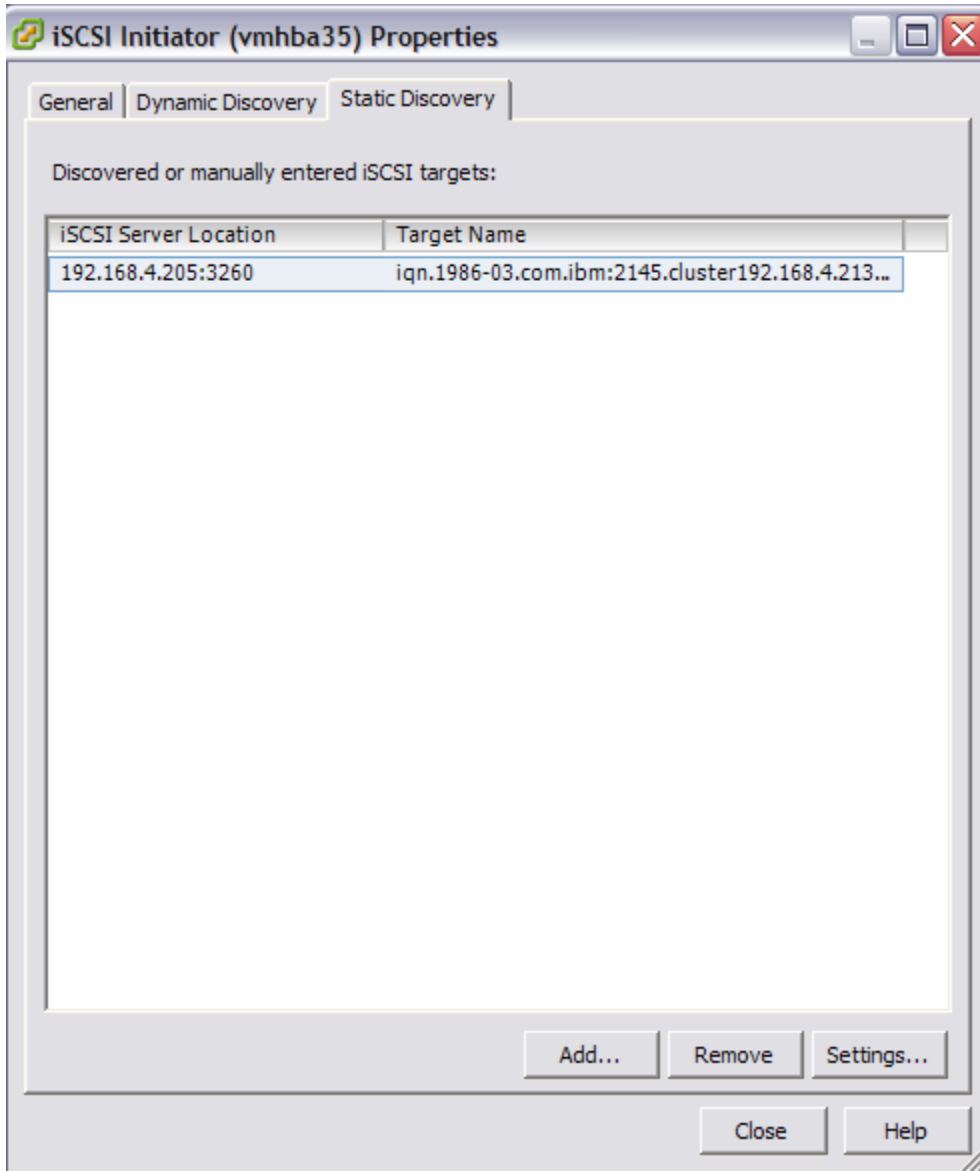
- 1) In vCenter screen, configuration -> storage adapter



- 2) Next select iSCSI Software Adapter
Right click, then select and open 'property'



In properties, select 'Static Discovery'.



Use the Add button to ensure there is only one Target IP per Target IQN.

Once Target IPs are discovered then VMware iSCSI Initiator logs onto all of them, it (VMware) will rescan for the devices, against each path. For each Storwize V7000 /SVC iSCSI device/lun exported to VMware there must be at-most two paths, one each for the Storwize V7000/SVC node.

Additional Information:

- In a Clustered setup, where multiple ESX hosts are involved, each of the ESX servers/hosts need to have an iSCSI session independently, with the restrictions described above.
- In configurations where multiple Ethernet cards are involved VMware Teaming capability can be utilized to get maximum throughput.

References:

- 1) http://www.VMware.com/pdf/vsphere4/r40/vsp_40_iscsi_san_cfg.pdf
- 2) Host-Attachment-iSCSI-Software-Initiator_v2.0.doc

Detailed Description of Supported and Non-Supported Environments

The following section gives examples of supported and non supported configurations

Illustration 1 : Supported Configuration

Consider the configuration below with the following details:

- VMware ESX 4.1 server with just one NIC Port and a single IP V4 configured on it.
- A Storwize V7000 System having a single Target IP v4 configured on an Ethernet Port.

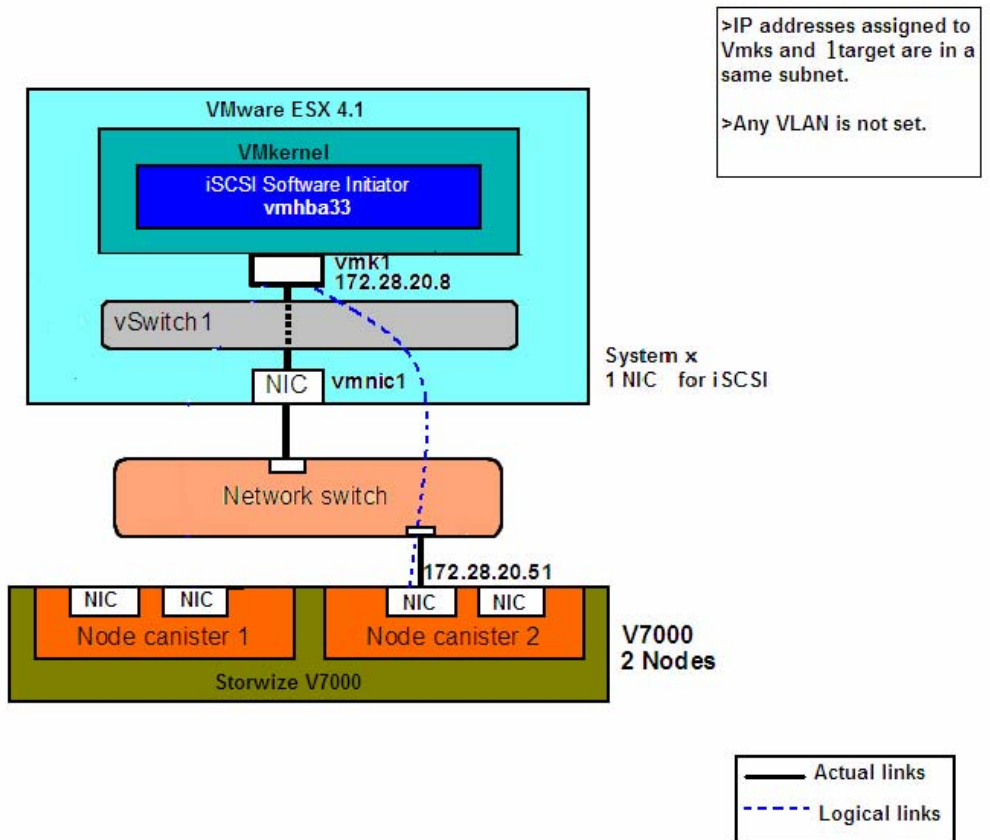


Fig 2 VMware with a single NIC Port

Fig 2 is a Supported Configuration.

VMware iSCSI initiator discovers a single target IP on the Node 2. It then tries to log-in to target IQN via the discovered IP. By the nature of configuration, only single session on the Storwize V7000/SVC Node exists. VMware just sees a single path for each of the iSCSI luns exported by the Storwize V7000/SVC, hence there is no need for NMP on VMware ESX side.

Once Node 2 goes down, the Target IP fails over to Node 1. In such a event sessions and IOs will be serviced by Node 1. Once Node 2 is back online the IP failback to Node 2, Session and IOs are then managed and serviced by Node 2.

This configuration is supported by Storwize V7000 and SAN Volume Controller

Illustration 2: Unsupported Configuration

Consider the configuration below with the following details:

- VMware ESX 4.1 server with just one NIC Port and one IP v4 and IPv6 configured on it.
- A Storwize V7000 System having one Target IP v4 and one Target IPv6 configured on an Ethernet Port.

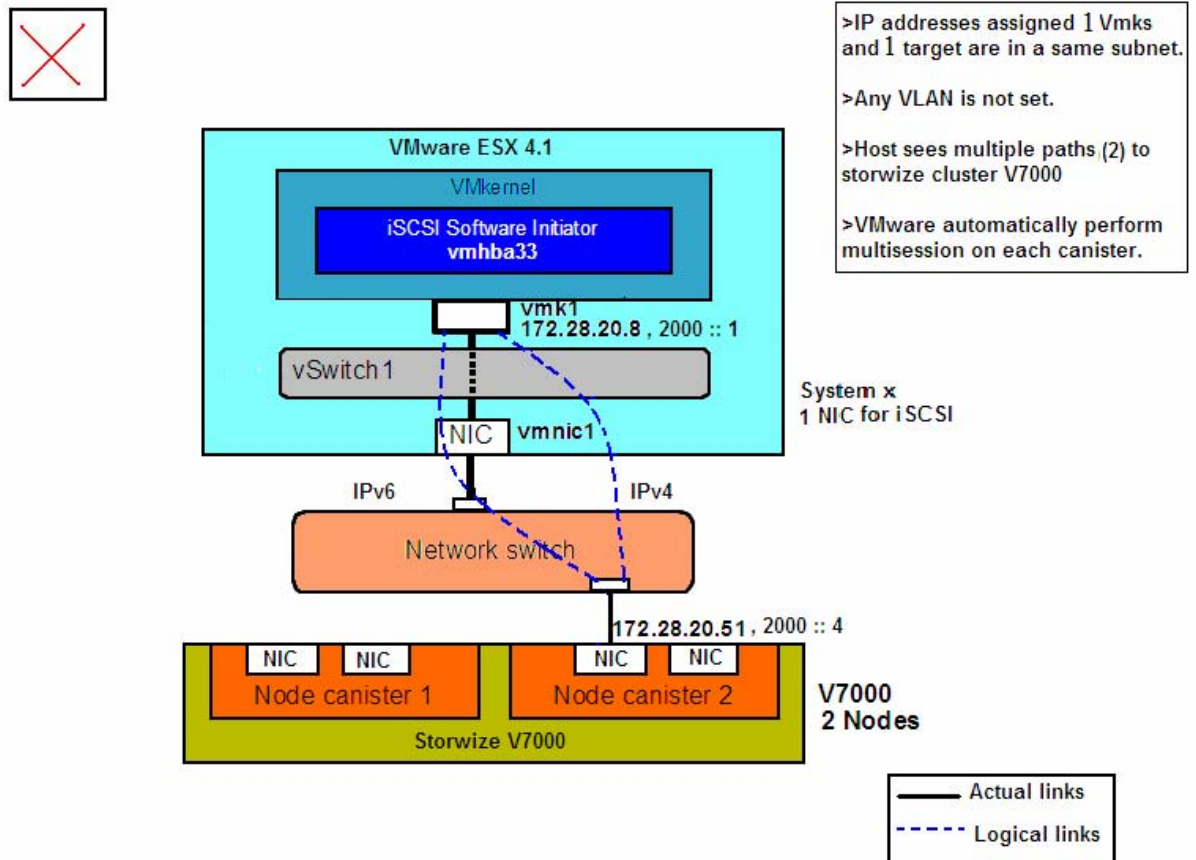


Fig 3 VMware with a single NIC Port and 2 Configured IPs

Fig 3 is an un-supported Configuration.

VMware iSCSI initiator discovers two target IPs (One IPv4 and other IPv6) on the Node 2. It then tries to log-in to target IQN via the discovered IPs. By the nature of configuration, two sessions exist on the Storwize V7000/SVC Node, one IPv4 session and other IPv6.

VMware sees two paths for each of the iSCSI luns exported by the Storwize V7000 /SVC Node. **This configuration is NOT supported by Storwize V7000 or SAN Volume Controller.**

Resolution:

Remove either of the IPs from the target Node 2 so that only one logical link is possible to ensure there is single session on Node 2

Illustration 3 : Supported Configuration

Consider the configuration below with the following details:

- VMware ESX 4.1 server with just one NIC Port and one IP v4.
- A Storwize V7000 System having two Target IP v4 configured on each Ethernet Port of Storwize V7000 Node

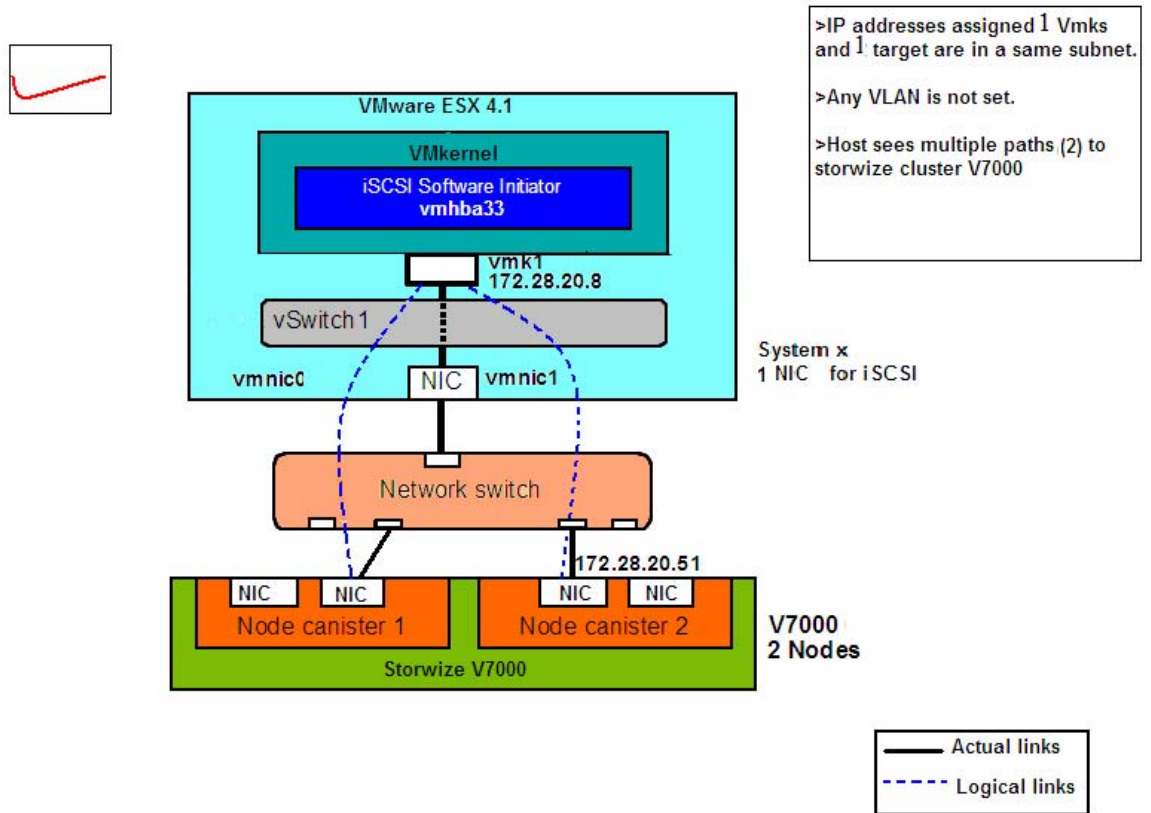


Fig 4 VMware with a single NIC Port and one Configured IPs on each Node
Fig 4 is a supported Configuration.

VMware iSCSI initiator discovers one target IPs on each of the Nodes. It then tries to log-in to target IQN via the discovered IPs. By the nature of configuration, one session exists on each of Storwize V7000 Node, one IPv4 session for Node 1 and other IPv4 session for Node 2

VMware sees two paths for each of the iSCSI luns exported by the Storwize V7000 Controller. **This configuration is supported by Storwize V7000 and SAN Volume Controller.** VMware ESX server will need NMP (Native Multi-path) for the devices

exported by the Storwize V7000 system. We support all the Multipath Policies viz Round Robin, Fixed etc.

Once either Node goes down, the Target IP fails over to the other Node. In such a event sessions and IOs will be serviced by partner Node . Once the failed Node is back online the IP failback happens from the partner Node Session and IOs are then managed and serviced by the original Node.

Illustration 4: Unsupported Configuration

Consider the configuration below with the following details:

- VMware ESX 4.1 server with just one NIC Port and one IP v4 configured on it.
- A Storwize V7000 System having two Target IP v4 configured on the Ethernet Interfaces.

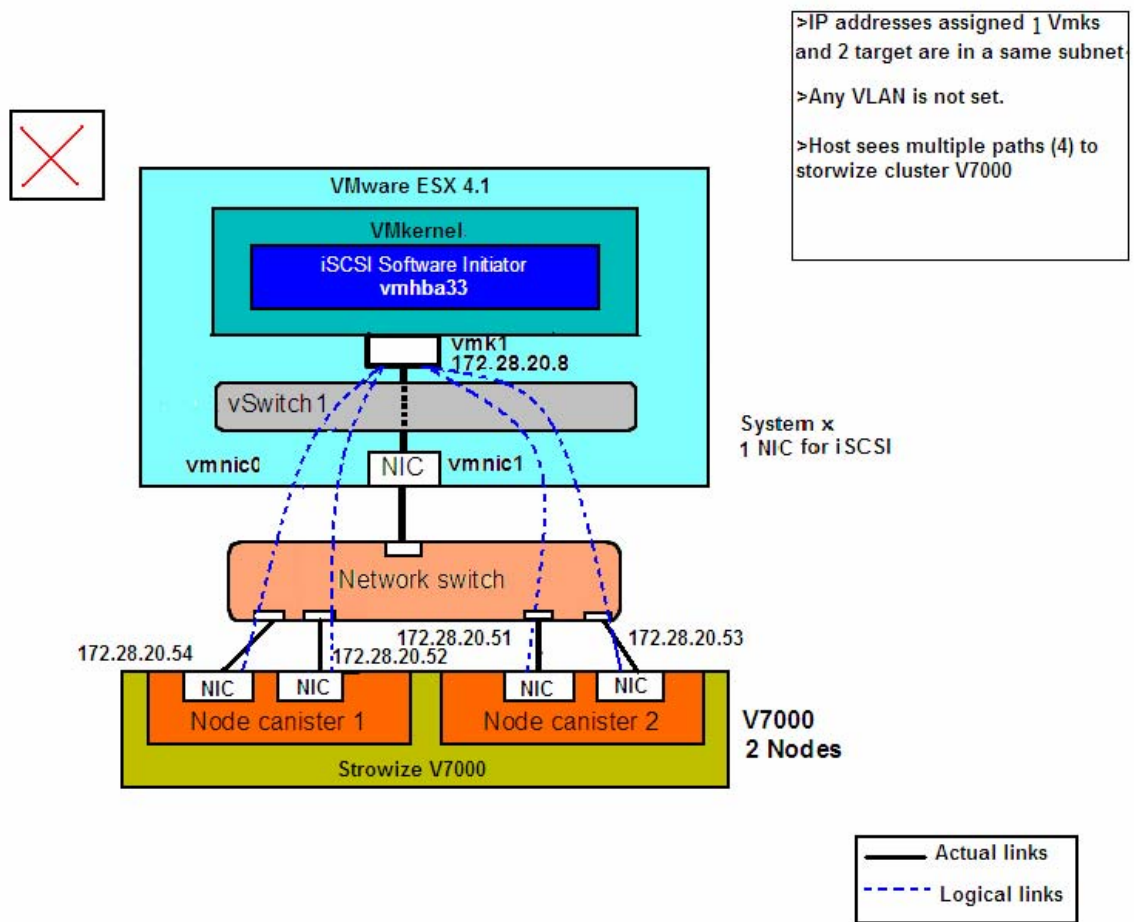


Fig 5 VMware with a single NIC Port and 2 Configured IPs on each Storwize V7000 Node

Fig 5 is an un-supported Configuration.

The VMware iSCSI initiator discovers two target IPs on each Node. It then tries to log-in to target IQN via the discovered IPs. By the nature of configuration, two sessions exist on the Storwize V7000/SVC Node.

VMware sees more than one path for each of the iSCSI luns exported by each **Storwize V7000/SVC Node. This configuration is NOT supported by Storwize V7000 or SAN Volume Controller**

Resolution:

Ensure that there is a single logical path between each target Node and VMware ESX server. This will ensure that there is single session on each of the Nodes.