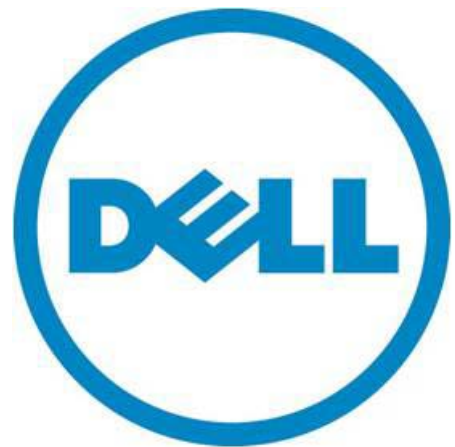


MD3600i Series Array Best Tuning Practices

A Dell Technical White Paper

Dell PowerVault™ Series



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Introduction

This paper outlines recommended best tuning practices for Windows Microsoft iSCSI Initiator configurations connecting to the MD36xxi array. This paper focuses only on implementations that use the Microsoft virtual miniport implementation. Hardware initiators that provide their own hardware Storport miniport implementation are beyond the scope of this paper and will not be covered. Therefore, the information that follows is based on typical customer Windows configurations that run on NDIS drivers only, or NDIS driver implementations that also provide iSCSI offload capabilities. The network cards used to generate this information are the 10GBase-T Intel Server AT adapter, and the Dell Broadcom 57710 10GBase-T adapter.

Configuration

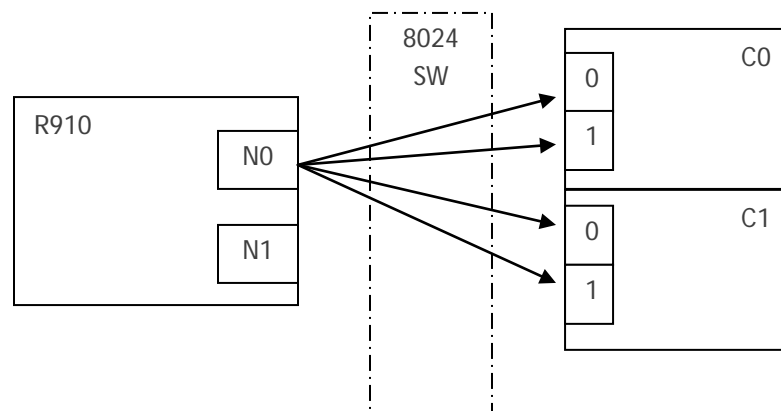
The host configuration used in this report is an R910 with 32GB of memory installed; two 10GBase-T PCIe GEN2 x8 adapters installed in PCIe GEN2 x8 electrical slots; and Windows 2008 Standard SP2 installed. Host and MD36xxi connect to a Dell Power Connect 8024 10GBase-T switch with jumbo frames enabled. Default settings are used on Microsoft iSCSI Software Initiator.

Recommendations

The following recommendations are based on a single host connectivity solution that has one or two 10GBase-T single port network adapters installed, and a duplex MD36xxi configuration. The host is a Windows 2008 Standard server with SP2 and MD36xxi multi-path host software installed.

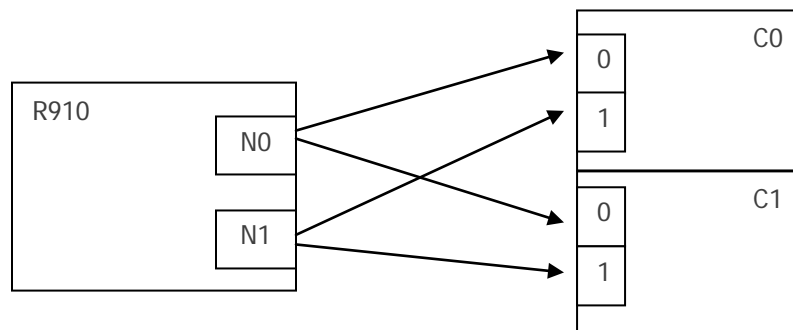
NDIS Only Single Adapter Port

For a single network adapter, four iSCSI connections are recommended between host and array—one connection per array host port, two connections per array controller. The recommend MTU size is the standard Ethernet frame size of 1518 bytes; jumbo frames are not recommended. If you are using Intel and your system supports input/output acceleration technology (IOAT), we recommend that this feature and the IOAT drivers be installed. We also recommend that you enable RSS in the operating system, configure the number of RSS queues on the adapter to be equivalent to the number of CPU cores on the system, and set the receive and transmit buffer size to maximum values. Use the default value for all other settings. For Broadcom, we recommend that Chimney and RSS support be enabled and default adapter settings be used. For a single 10GBase-T port implementation, four iSCSI connections are recommended between host and target.



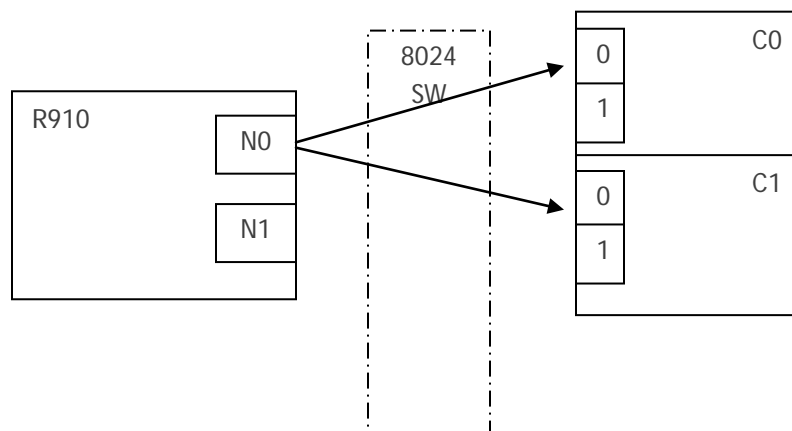
NDIS Only Two Adapter Ports

For a two network adapter configuration, four iSCSI connections are recommended between host and array—one connection per array host port, two connections per array controller. The recommend MTU size is the standard Ethernet frame size of 1518 bytes; jumbo frames are not recommended. If you are using Intel and your system supports IOAT, we recommend that this feature and the IOAT drivers be installed. We also recommend that you enable RSS in the operating system, configure the number of RSS queues on the adapter to be equivalent to the number of CPU cores on the system, and set the receive and transmit buffer size to maximum values. Use the default value for all other settings. For Broadcom, we recommend that Chimney and RSS support be enabled and default adapter settings be used. For a two 10GBase-T port implementation, four iSCSI connections are recommended between host and target.

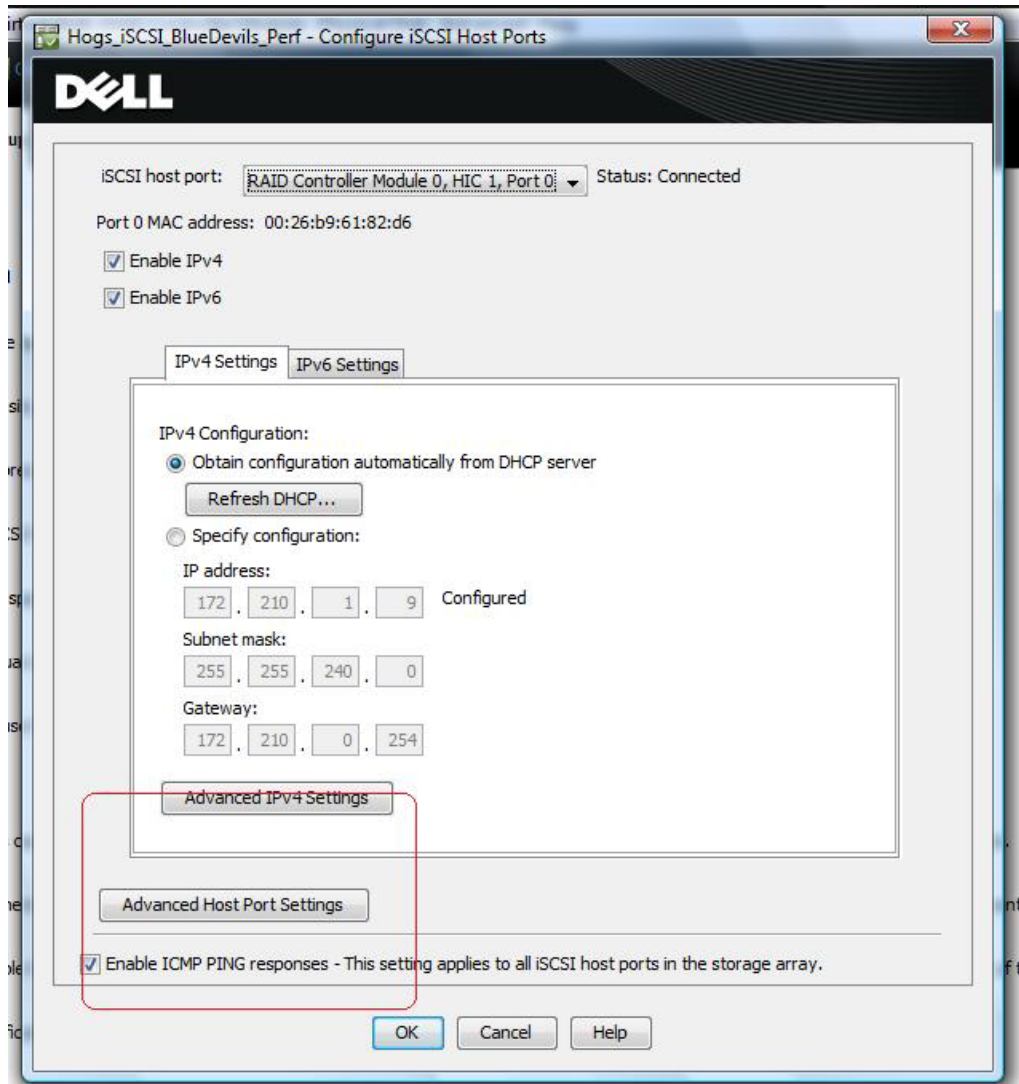


Hardware Initiator Single Port

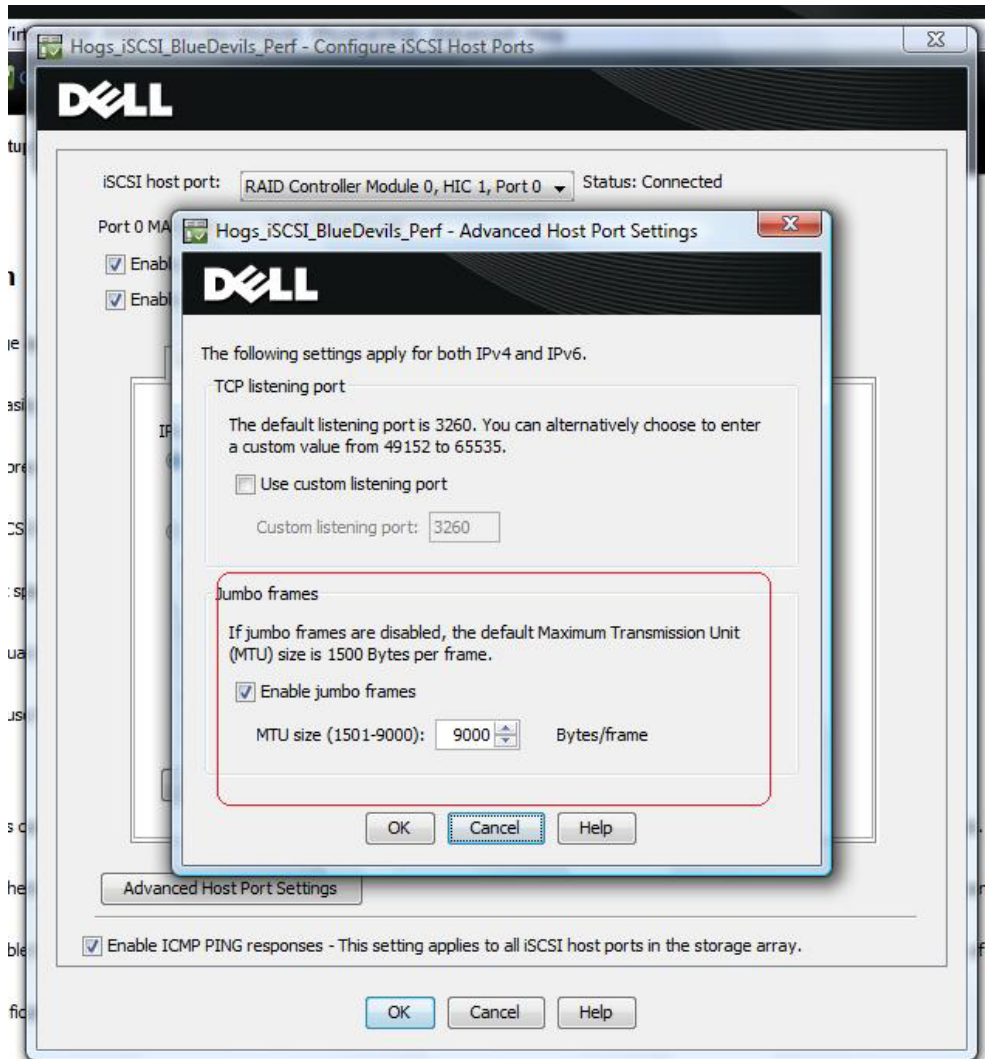
For a single network adapter, two iSCSI connections are recommended between host and array—one connection per array host port and one connection per array controller. Enable jumbo frames on the host, switch, and array. Set the host adapter MTU to 4500 bytes, and set switch and MD36xxi MTU size to a value greater than 4500 byte (a 9000 byte MTU size is recommended for both switch and array). The Dell Modular Disk Storage Manager can be used to configure jumbo frames on the MD36xxi.



To configure jumbo frames on the array, open a management connection with the array, select the **Setup** tab on the main screen, and then click **Configure iSCSI Host Ports**. The following management screen displays:



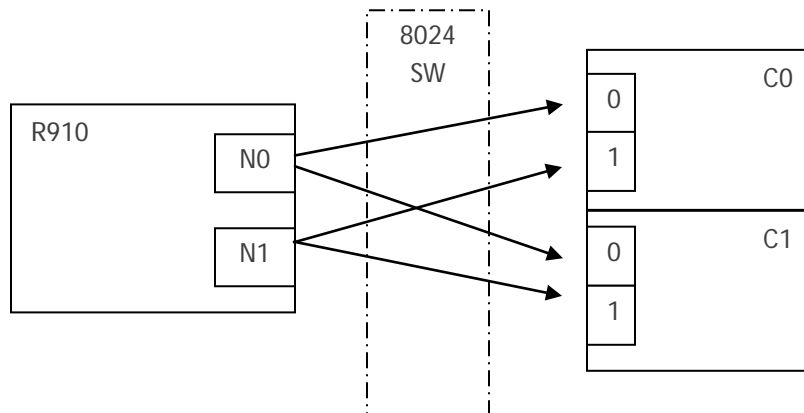
Click the **Advanced Host Port Settings** button in the lower left of the window to display the following configuration window:



In the **Jumbo Frames** section, check the **Enable jumbo frames** box and set the MTU size to 9000 bytes/frame. Click the **OK** button. Perform this operation on each MD36xxi iSCSI host port.

Hardware Initiator Dual Port

For a two network adapter configuration, four iSCSI connections are recommended between host and array—one connection per array host port, two connections per array controller. Enable jumbo frames on the host, switch, and array. Set the host adapter MTU to 4500 bytes, and set switch and MD36xxi MTU size to a value greater than 4500 byte (a 9000 byte MTU size is recommended for both switch and array). The Dell Modular Disk Storage Manager can be used to configure jumbo frames on the MD36xxi.



Conclusion

In general, when configuring MS iSCSI Initiator on a system running NDIS drivers on a 10GBase-T adapter, we recommend no more than four iSCSI sessions between host and array. This will provide adequate streaming capability between host and array without overwhelming the host adapter port. For iSCSI hardware initiators, the number of iSCSI connections between host and array can be fewer for the single adapter port case. These guidelines are meant to provide a general configuration topology based on a typical 10GBase-T host connection profile, but every situation is unique and may require a different set of guidelines. If this is the case, contact Dell Technical Support for further assistance.