Optimizing iSCSI performance in a virtualized environment with Buffalo NAS
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   - Purpose Built Engineered Products & Solutions
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Storage & Networking Product Strength
Thank You!

We'd like to thank you for voting Buffalo #1 overall SMB External Storage Vendor in the 2017 CRN Annual Report Card! Based on your feedback Buffalo also secured top spots for Support and Partnership!
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Buffalo TeraStation 5010 series provides a scalable storage solution for virtual environments, especially with its native 10GbE port. It is able to provide either a network share or an iSCSI target for a virtual host.
iSCSI (Internet Small Computer System Interface) is a method for transferring SCSI data and commands over an IP network, typically implemented on Ethernet.
iSCSI offers the best performance value for adding storage space to a virtual host.

- Can provide large amounts of storage to a virtual host
- No need to add drives to the host itself
- Doesn’t sacrifice performance
- Can use existing networking equipment
- No need to learn fiber SAN topology configuration
iSCSI traffic should be isolated from the client network. iSCSI generates a tremendous amount of traffic and is extremely sensitive to network lag. Segregating it helps both the iSCSI network and the client network perform better.
Bonding versus MPIO

Port trunking will **NOT** increase data bandwidth on an iSCSI connection!

Using port trunking/bonding/link aggregation/NIC teaming will cause the initiator to create only one connection and limit throughput to a single link.

Using MPIO will allow multiple sessions and increase throughput.

In fact, ESXi won’t allow a kernel port using NIC teaming to bind to the iSCSI initiator!
Should you use jumbo frames for iSCSI? What is a jumbo frame? A standard ethernet frame has a payload between 42 and 1500 bytes with up to 42 bytes of overhead like routing information, tagging, etc.
Jumbo frames can reduce overhead and increase throughput on an already well functioning network.

On a network already having problems, jumbo frames can exacerbate those problems.
Will jumbo frames increase performance on my iSCSI network? The answer is... usually.

Nagle’s algorithm tells the sending system to hold a packet until it’s full unless the last packet sent has been acknowledged by the receiver.

Most Ethernet controllers are set to not acknowledge every packet right away.

If you’ve got a database that does a high number of small transactions, meaning reads and writes of less than ~2000 bytes each, jumbo frames can actually REDUCE performance!

```python
if there is new data to send
    if the window size >= MSS and available data is >= MSS
        send complete MSS segment now
    else
        if there is unconfirmed data still in the pipe
            enqueue data in the buffer until an acknowledge is received
        else
            send data immediately
    end if
else
    end if
end if
```
Imagine a delivery company sending half empty trucks all day. It would be better to wait for a full truck before you send it out.

But what if the cargo is time sensitive?

iSCSI traffic is the most time sensitive data travelling on most networks.

The best option is to make sure everything else is set up for optimum iSCSI performance, then slowly increase packet size and test the result.
How should you set up a switch used for iSCSI?

- Use a robust switch, something that’s line speed capable if using a 1GbE switch, or use 10GbE
- Turn on flow control
- Use rapid spanning tree
- Use multiple connections/switches if possible
There are two ways to use iSCSI in a virtual environment, either as storage for the virtual host or as storage for an individual virtual machine.
When it is necessary to shut down or reboot a TeraStation providing iSCSI volumes to a server ALWAYS shut down the server first and make certain the TeraStation is completely up before booting the server!

Also be sure that both the TeraStation and the host are connected to a UPS and set the timing to shut down the server first in the event of power loss.
Short demo of iSCSI connection to an ESX host and to a VM
Following these procedures should give you an iSCSI network that will provide well-performing storage for your virtual needs.
In closing

Any Questions?

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