Recommended Multi-Path Settings for Hitachi Storage

Question

What are the recommended multi-path configurations for Hitachi Vantara storage? Which multi-path configurations should I avoid?

Environment

- Hitachi Vantara storage
- Linux
- Microsoft® Windows®
- Solaris
- IBM® AIX®
- VMware

Answer

Hitachi Vantara basic "best practice" recommendations for multi-path configurations are:

number of paths <= number of HBAs

The configuration below optimizes performance, reliability, and recovery):

1. Each host bus adapter physical port (HBA) should only "see" one instance of each logical unit number (LUN).
   - This means if you have two single physical port HBAs (or one dual ported HBA), then you should only have two paths to each LUN.
   - If you have four single physical ported HBA's (or two dual ported HBA's), then you can provide four paths to each LUN.
   - Allowing an HBA to see more than one instance of any LUN can elongate path recovery, cause performance issues, and cause delayed error recovery and even host outages.
   - **Hitachi does not recommend having an HBA (-port) see more than one instance of a LUN.**
2. Two to four paths to each LUN provides optimal performance for most workloads.
   - While there is no limitation to the number of paths one can configure to each LUN, two to four has been

demonstrated to provide the best performance.

- Performance-wise, configuring more than four paths to each LUN will result in significantly diminishing returns.

3. Peer zoning (in Brocade environments) or Smart-zoning (in Cisco environments) who in effect provide a Single Target to Single Initiator path is the recommended zoning methodology. The principal member in a Brocade peer-zone should be the target port. In a Cisco smart-zone only one target should be configured and host HBA firmware and drivers should be configured to not advertise any target capabilities (in case the HBA provides that functionality). Refer to the documentation of your Operating System and HBA vendor.
4. Ensure that no two paths use the same physical link in any section of the fabric from initiator to target. This will ensure that a path failover in MPIO will not use the same physical link in any section of the fabric and therefore incur the same erroneous behavior.
5. In large scale environment try to distribute the provisioning of LUNs over as many host and target ports as possible whilst still taking into account the two or four maximum path distribution per HBA to LUN. This ensures that chances of FC buffer credit starvation is minimized as much as possible therefore increasing the overall performance characteristics of the entire storage solution. Any sort of bottleneck or slow-drain device therefore decreases the chance of propagating onto other parts of the storage solution however it cannot be totally ruled out. It is up the the storage administrator to implement a monitoring solution with appropriate measures to act quickly on these sorts of occurrences.

Additional Notes

This applies to all Storage arrays. 3/2018
A dual ported HBA is 2 HBA's in the same slot.

For GAD the Recommended Minimum HBA ports is four, and eight is Best Practice. Fewer than four HBA host ports will constitute a very performance limited configuration at best.

See Also: https://knowledge.hitachivantara.com/Knowledge/Storage/How_to_Configure_SAN_Solution_and_Avoid_the_Risk_of_Congestion

Internal Notes

Reference: GSS Host Configuration Guide rev 1.24

MK-90RD7037 Open-Systems Host Attachment Guide Chapter 2 NOTE