Emerald Physical SAN Configuration
Rules of Thumb

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SNIA Emerald™ Training
SNIA Emerald Power Efficiency Measurement Specification, for use in EPA ENERGY STAR®
July 14-17, 2014
Emerald Physical SAN Configuration

- The guiding principle that defines the configuration of the SAN (and the rest of the test harness) is to ensure that the storage device is the IO bottleneck.

- First off, this requires cardinal performance knowledge of the SUT... In particular,
  - The maximum random small block transfer IO rate (reads and writes)
  - The maximum sequential large block transfer workload throughput (MB/s for both reads and writes)

- Next we work our way up the IO stack to ensure that all subsequent components are at least this robust.
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- The aggregate throughput of the paths must support the maximum throughput of the SUT (4 Gb, 8Gb, 16 Gb FC)

- The aggregate IO rate limit of the HBAs must be >= the IO rate of the SUT (70,000 IOPS per FC port both SUT and server)

- The CPU and backplane (PCIe) on the server must have sufficient “throttle” to overdrive the SUT
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- A reliable and straightforward method for determining SAN component speed is through “fan in” and “fan out” tests.
- By installing a multi-port SAN switch between the server and the SUT, one can fan out a single HBA port on the server to many ports on the SUT.
- Measuring the IO rate and throughput, indicates the performance potential of the HBA port and the SAN path.
Another method for determining SUT port robustness is through “fan in” tests. By installing a multi-port SAN switch between the server and the SUT, one can fan in multiple paths from the SAN to a single port on the SUT. Measuring the IO rate and throughput indicates the performance potential of SAN port of the SUT.
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Example:

- SUT capable of 420,000 IOPS and 4 GB/sec
- Server CPU capable of 450,000 IOPS and 12 GB/sec
- Server HBA port capable of 70,000 IOPS 800 MB/s

How many SAN paths are needed?

- To support 420,000 IOPS, 6 HBA ports are needed
- To support 4 GB/sec, \( \frac{4000}{800} = 5 \) ports needed

This SAN will require 6 paths/HBA ports