Emerald Physical SAN Configuration Rules of Thumb

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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 deterermining 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

Emerald Physical SAN Configuration

- 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

Emerald Physical SAN Configuration

- 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 neede
  - To support 4 GB/sec, 4000/800 = 5 ports needed
- This SAN will require 6 paths/HBA ports