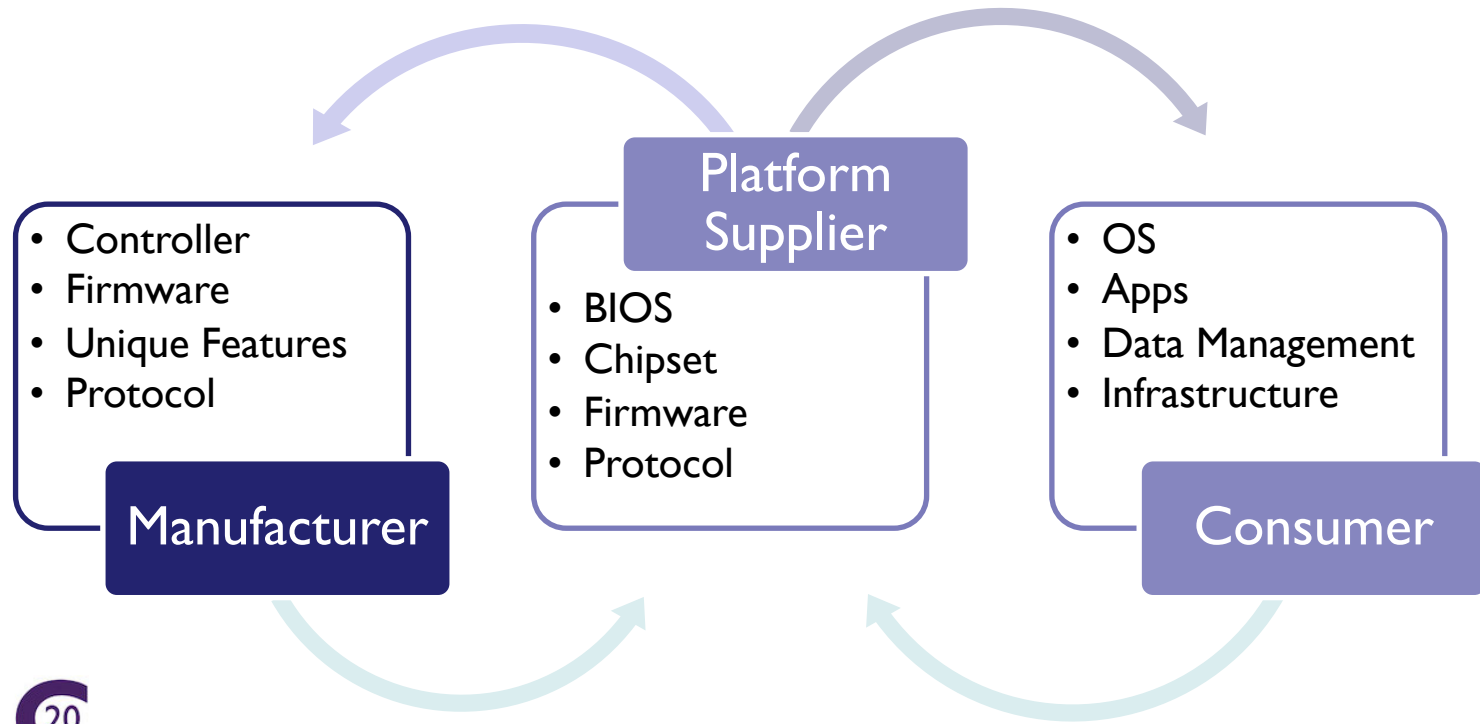# Accelerating the Qualification of Enterprise SSDs

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Agenda

- ☐ Why Qualify?
- ☐ Types of Drives
- ☐ What to Qualify
- ☐ Summary

Why Qualify SSDs?

Manufacturer
- Controller
- Firmware
- Unique Features
- Protocol

Platform Supplier
- BIOS
- Chipset
- Firmware
- Protocol

Consumer
- OS
- Apps
- Data Management
- Infrastructure

Qual is Unique to Drive Type

Datacenter

- Garbage collection
- Flash Translation
- ZNS Support
- T10 DIF DIX
- Power Loss Protection (PLC)
- Generally Lower Power than Enterprise
- U.2 or M.2 interfaces

Enterprise

- Garbage Collection
- Flash Translation
- T10 DIF/DIX
- Power Loss Protection
- Generally Dual Ported
- NVMeOF support
- Higher Endurance
- Higher Power Consumption
- Controller/Host Memory Buffer
- Virtualization Support

Client

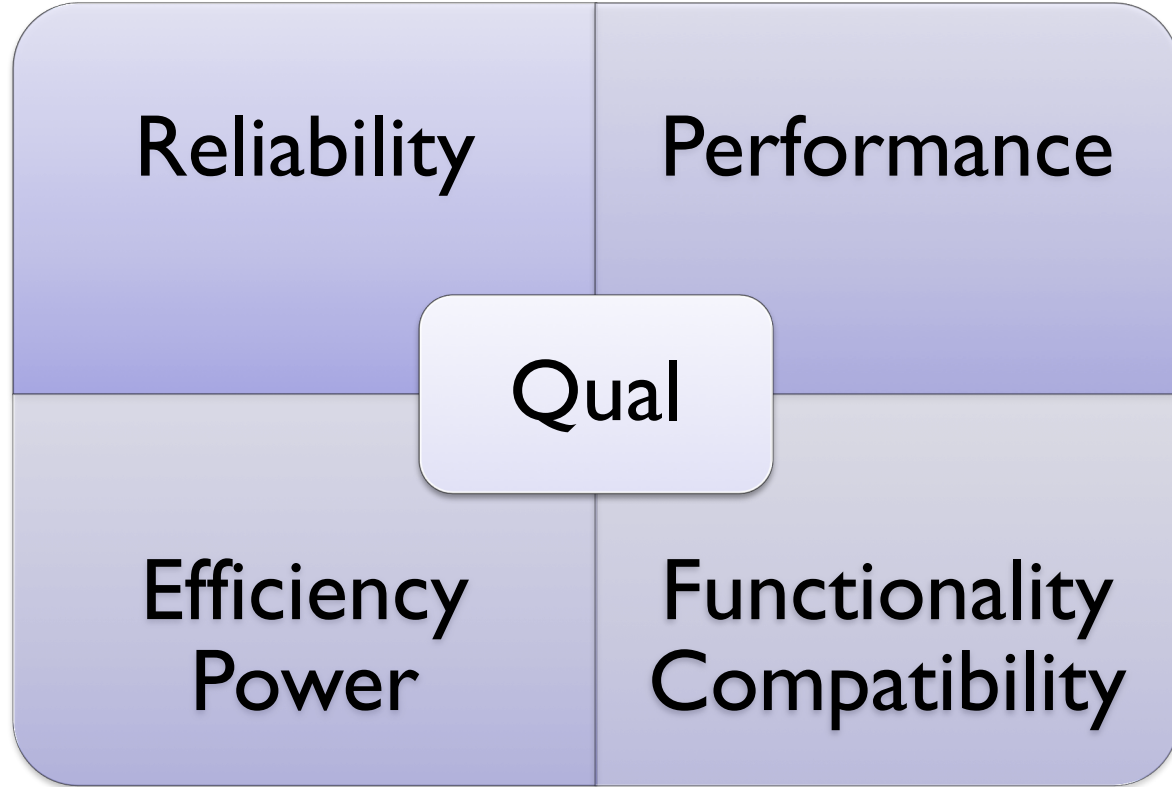- Garbage Collection
- Flash Translation Layer
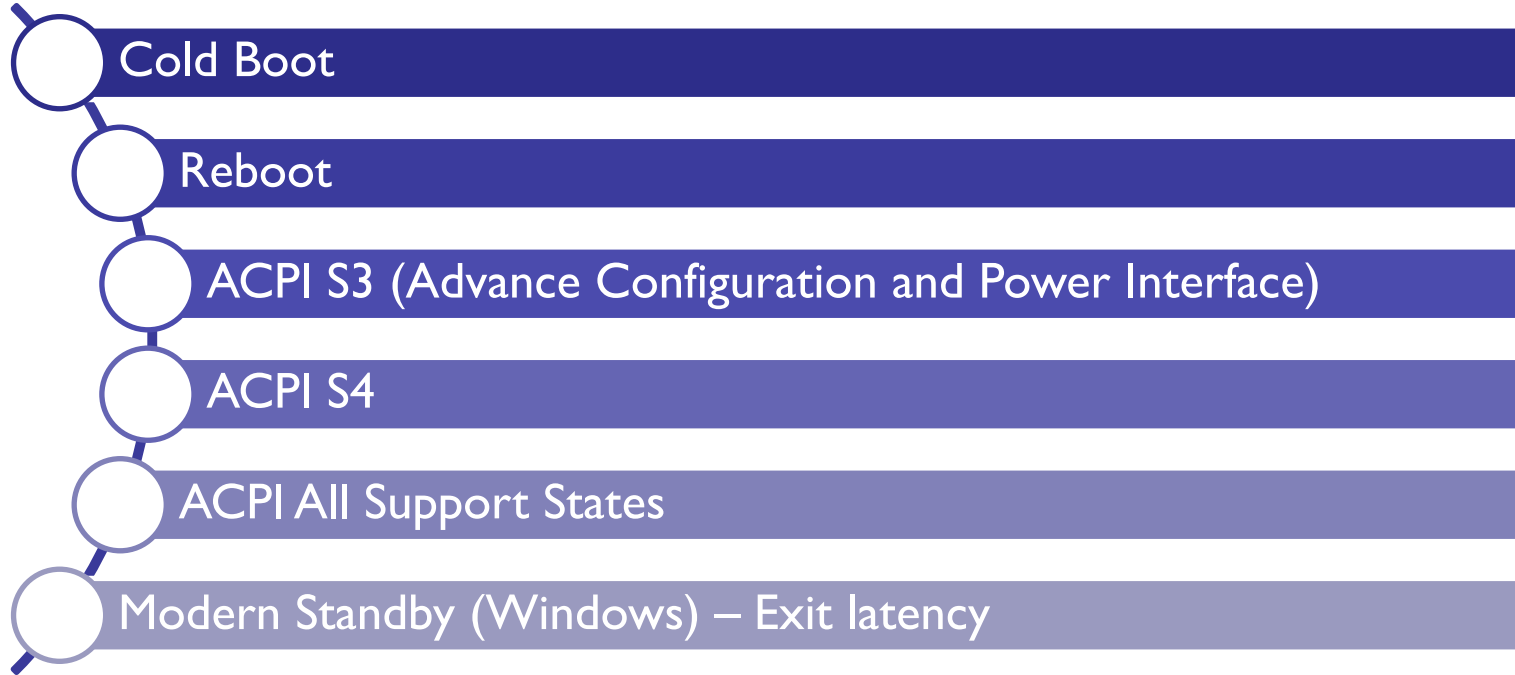- Multi-Level power management

Consumer

- Garbage Collection
- Flash Translation Layer
- Multi-Level power management

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What to Qualify

Reliability

Performance

Qual

Efficiency
Power

Functionality
Compatibility

Reliability - Boot and Exit Latencies

Cold Boot

Reboot

ACPI S3 (Advance Configuration and Power Interface)

ACPI S4

ACPI All Support States

Modern Standby (Windows) – Exit latency

Performance

IO Generator	Benchmark
IOmeter	**Crystal Disk Mark**
VDBench	**IO Gen workload Profiles**

SD C 20
SNIA EMEA

Efficiency - Power Management

Client & Consumer

Idle States	• L0, L1, L1.2, L3
Sleep States	• G1/S3-4, D3
ASPM	• G0/S0/D0
Disk Util	• Performance vs utilization

Functionality & Compatibility

BIOS	• Installation • Feature & functionality • Discovery
Partitioning	• Extend • Format • Shrink
Dynamic	• Simple • Spanned • Mirror • stripe
PCIe	• PSPP • Backwards compatibility (Gen1, Gen2, Gen3,…) • Compliance to specifications from Standards

Compatibility - System Stress

Workload Behavior

Filesystem

NCQ – Linux Queuing
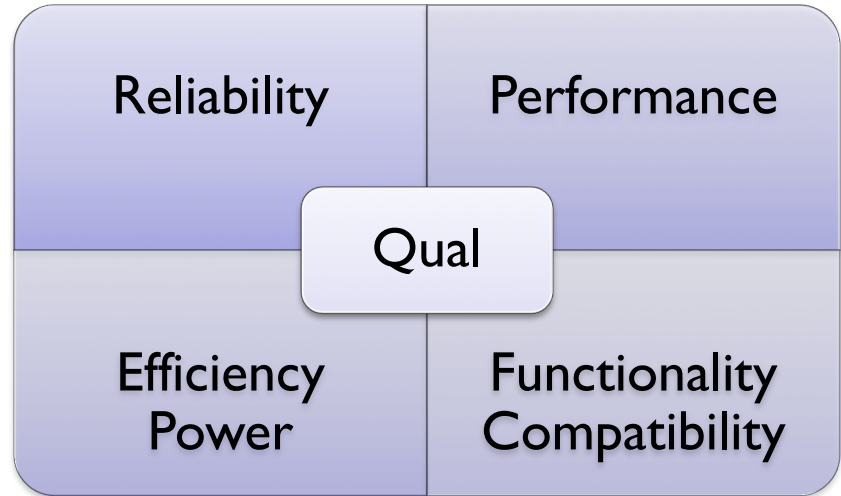
RAID

Filesystem

Summary

- Co-Validation
- Depends on Drive Type
- Comparing Drives
  - Consistent configuration
  - Same methodology
  - What do you value?

4 Main areas of Qualification

Reliability	Performance
Efficiency Power	Functionality Compatibility

Qual

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