Accelerating the Qualification of Enterprise SSDs

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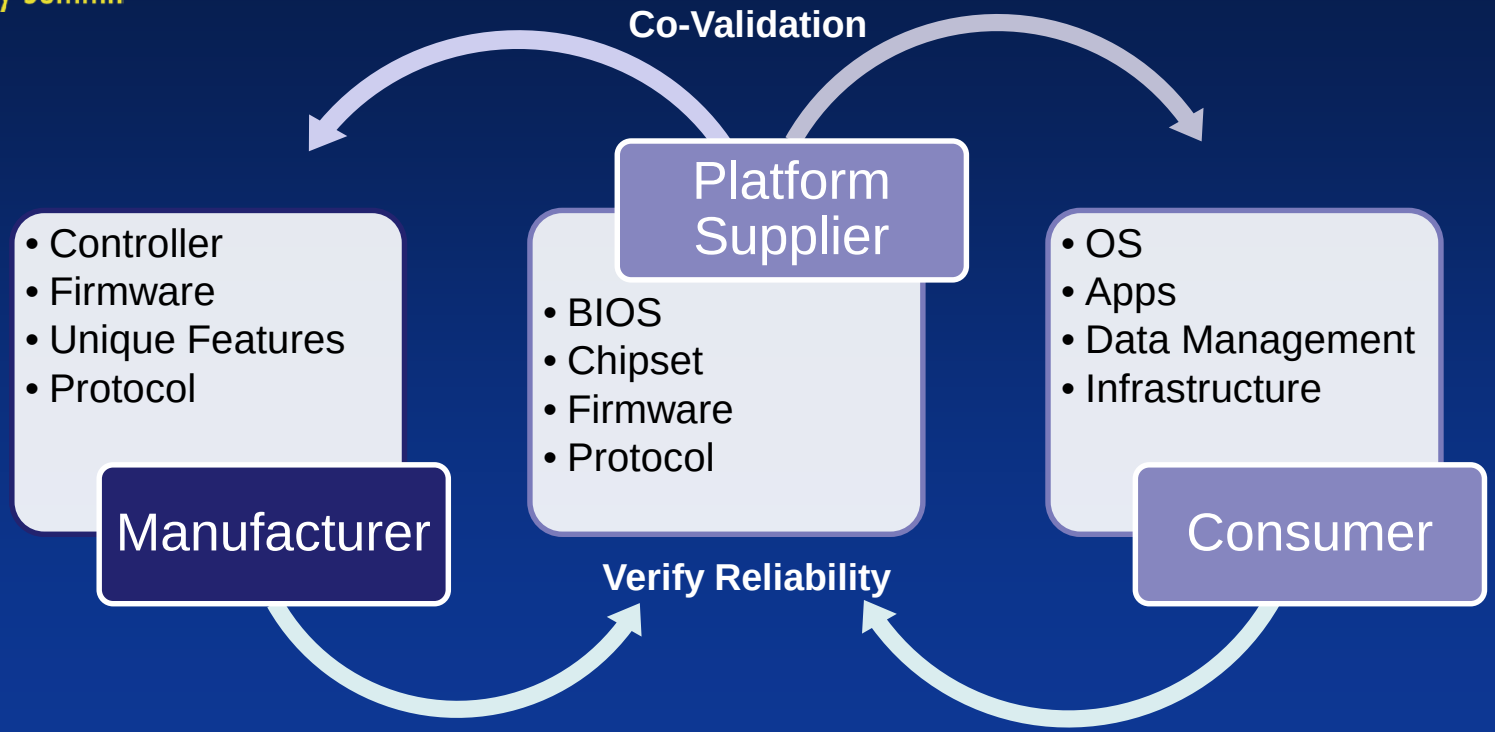
Agenda

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

Why Qualify SSDs?



Uncover unique challenges and behavioral issues

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

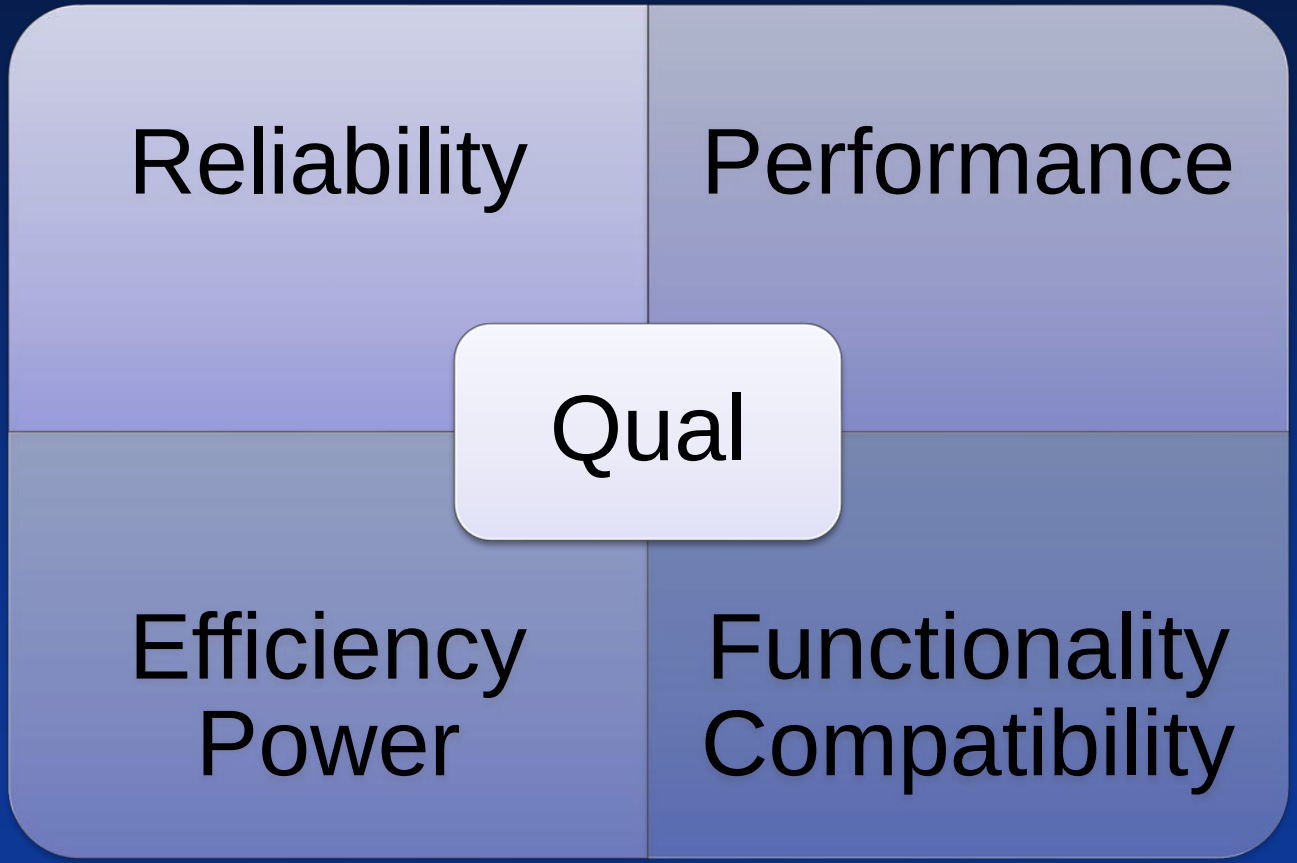
Enterprise

- 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

What to Qualify



Reliability - Boot and Exit Latencies

- Cold Boot
- Reboot
- ACPI S3
- ACPI S4
- ACPI All Support States
- Modern Standby (Windows) – Exit latency

Performance

IO Generator

- IOmeter
- VDBench

Benchmark

- Crystal Disk Mark
- IO Gen workload Profiles

Efficiency - Power Management

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

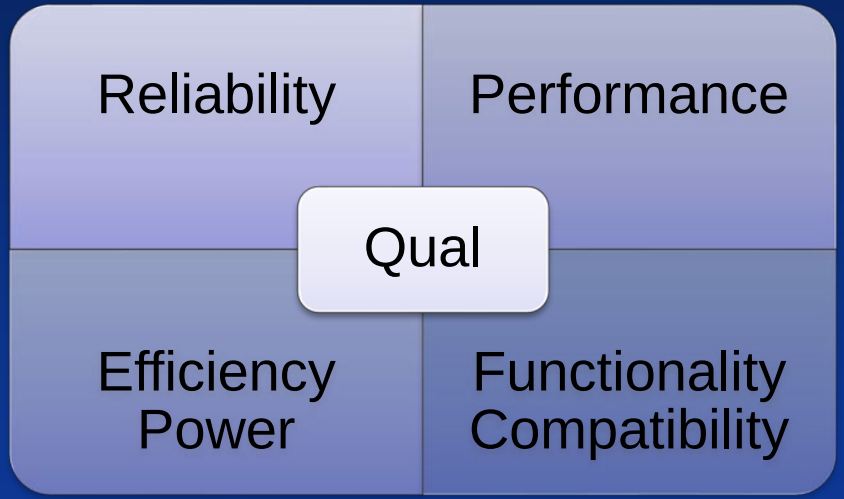
Compatibility - System Stress

- 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



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Flash Memory Summit

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