Accelerating the Qualification of Enterprise SSDs

Leah Schoeb
Sr. Developer Relations Manager
AMD
Agenda

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

- Controller
- Firmware
- Unique Features
- Protocol

- BIOS
- Chipset
- Firmware
- Protocol

- OS
- Apps
- Data Management
- Infrastructure

Manufacturer → Platform Supplier → Consumer

Co-Validation

Uncover unique challenges and behavioral issues
Verify Reliability
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
- NVMeOF support
- Higher Endurance
- Higher Power Consumption
- Multi-Level power management

**Consumer**
- Garbage Collection
- Flash Translation Layer
- NVMeOF support
- Multi-Level power management

---

2020 Storage Developer Conference EMEA. © All Rights Reserved.
What to Qualify

Reliability  Performance

Efficiency  Functionality
Power  Compatibility

Qual
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
- IOmeter
- VDBench

Benchmark
- Crystal Disk Mark
- IO Gen workload Profiles
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
Leah Schoeb

Leah.Schoeb@amd.com

Twitter: @vLeahSchoeb
References

- ACPI
  - http://www.acpi.info/ PCI,

- PCI Express, PCI Power Management
  - http://www.pcisig.com/home

- Network Device Class Specification

- EPA Enterprise Server and Data Center Energy Efficiency Initiatives