

How to ensure Advanced Host Controller Interface (AHCI) conformance

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Levels of Conformance

- Device Bring Up
- Protocol Conformance
- Performance

Device Bring Up

- PCIe Information
- AHCI Register Access
- Directed Tests
 - Ensure bios and driver can initialize device
 - Register validation

Protocol Conformance

- Directed Tests
 - AHCI
 - SATA
- Error Injection
 - Protocol level errors
 - Low level errors
- Traffic
- Data Validation

Protocol Conformance - Directed Tests

- AHCI and SATA

IO Exerciser

IO Exerciser | Conformance | Target Config Editor

Enabled	Index	Type	Revision	Test Name	Excl. Lun Acc...	Sub-Tests	Passed Cases	Failed Cases	Status	% Co...
<input type="checkbox"/>	0	generic_ahci_sam...	0.1	Initial PCI Header Register Values	×	1	0	0	Idle	0
<input type="checkbox"/>	1	generic_ahci_sam...	0.1	Initial Generic Host Control Register Va...	×	1	0	0	Idle	0
<input type="checkbox"/>	2	generic_ahci_sam...	0.1	Initial Port Register Values	×	32	0	0	Idle	0
<input type="checkbox"/>	3	generic_ahci_sam...	0.1	Number of Command Slots Supported	×	1	0	0	Idle	0
<input type="checkbox"/>	4	generic_ahci_sam...	0.1	Ports Implemented	×	32	0	0	Idle	0
<input checked="" type="checkbox"/>	5	generic_ahci_sam...	0.1	Exchanged Bit Test	×	32	25	7	Comple...	100
<input type="checkbox"/>	6	generic_ahci_sam...	0.1	Unknown FIS Bit	×	1	0	0	Idle	0
<input type="checkbox"/>	7	generic_ahci_sam...	0.1	PhyRdy Changed Bit	×	32	0	0	Idle	0
<input checked="" type="checkbox"/>	8	generic_ahci_sam...	0.1	Device Detection	×	32	24	8	Comple...	100
<input type="checkbox"/>	9	generic_ahci_sam...	0.1	Interface Speed Support	×	32	0	0	Idle	0
<input checked="" type="checkbox"/>	10	generic_ahci_sam...	0.1	PRD Underflow	×	1	1	0	Comple...	100
<input type="checkbox"/>	11	generic_ahci_sam...	0.1	Valid Command List Base Address	×	32	0	0	Idle	0
<input type="checkbox"/>	12	generic_ahci_sam...	0.1	Illegal Command List Base	×	32	0	0	Idle	0

Selected Lun(s):

Current Lun: Halt On Error Loop On Selected

DT List Mgmt:

Index	Lun Path	Sel	Type	Ini	Tgt #	Tgt ID	IO State	DT State	IO Details
0	LunBasicinitAHCI 0100	<input checked="" type="checkbox"/> Yes	SATA	Sys 1.182 - AHCI 0100	0		Stopped	Stopped	

Protocol Conformance - Error Injection

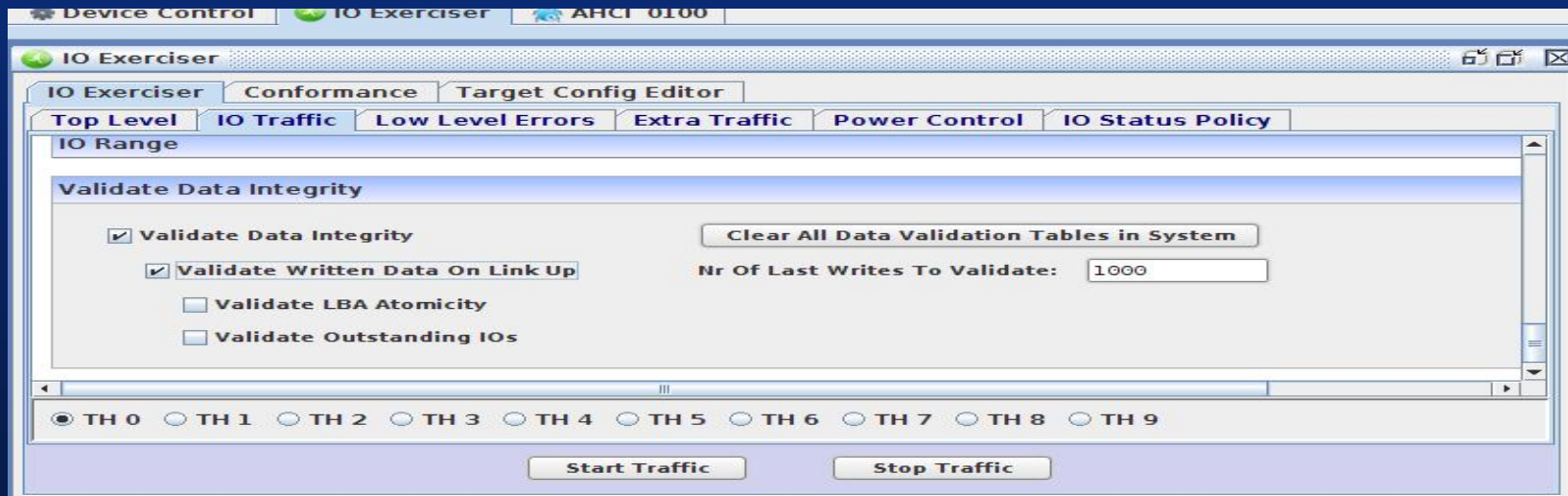
- Protocol level errors
 - Malformed Commands
 - Protocol Resets
- Low level errors
 - Power Loss/Recovery
 - PCIe Resets

Protocol Conformance - Traffic

- Everything at once
 - Maximum queue depth
 - Simultaneous mixed commands
 - Mixed mode (FPDMA and non-FPDMA)
 - Error Injection
 - Power Loss/Recovery

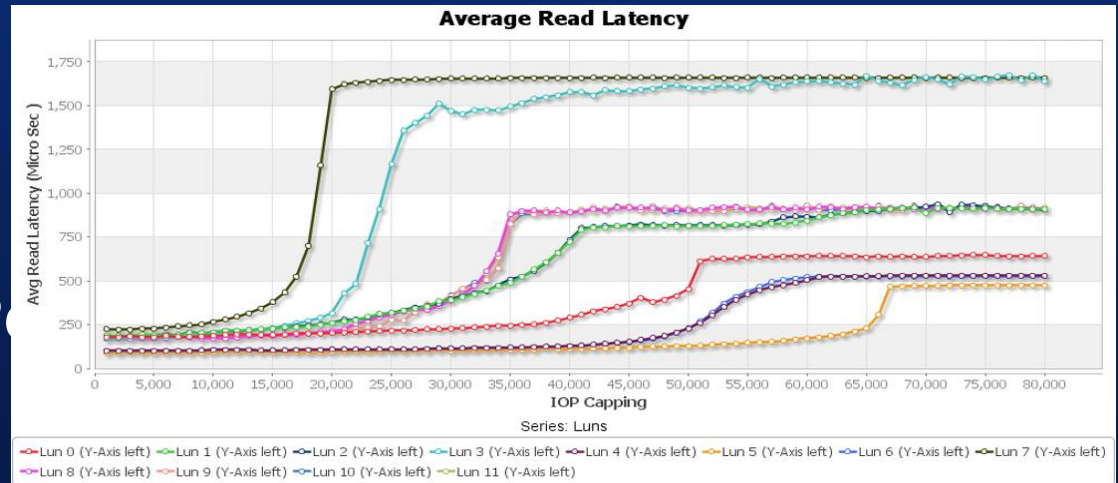
Protocol Conformance - Data Validation

- Verification of existing data after resets and power fails
- Verification of writes leading up to resets/power fails

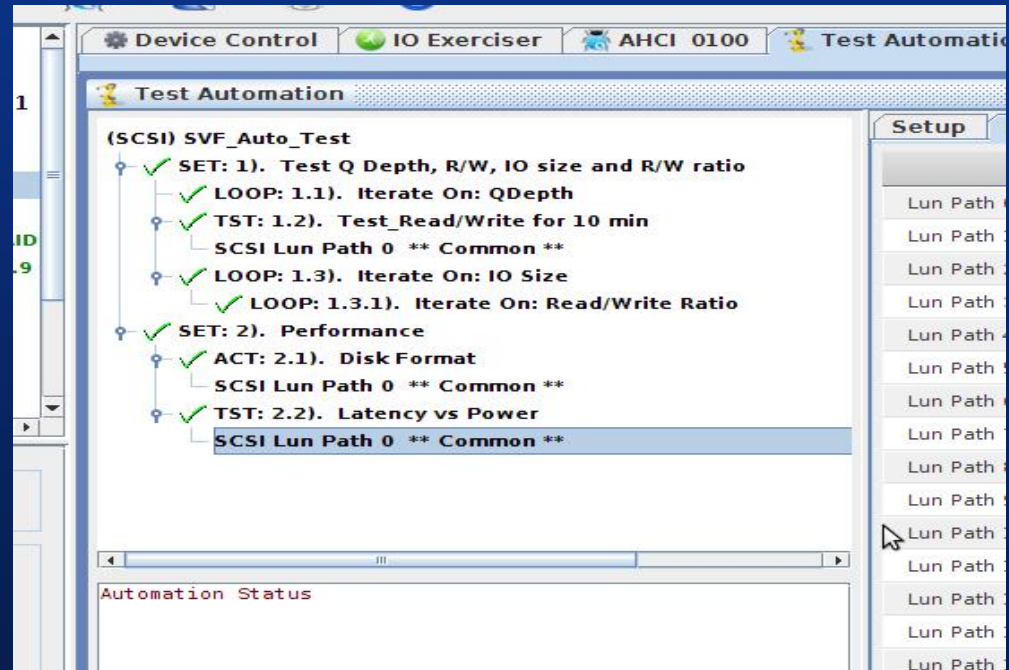


Performance

- Custom drivers allow truly consistent and repeatable performance measurements
- Industry Leading Performance
 - Achieved greater than 1.3 million IOPS per core
- Deep Analytics
- Power
 - Power versus P



- Provides a Test Suite for consistent repeatable testing mechanism
 - Initial conditions
 - Vary test parameters
 - Graphing
 - Report Generation
 - HTML
 - CSV



Summary

- Advanced toolset to verify conformance through all phases of development
- OakGate AHCI Conformance Suite, developed in partnership with customers, can serve as a useful vehicle to ensure compliance with the AHCI standard