Cluster IO Module (CLIM) Update

Porter Call
Feb. 2009
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Agenda

• Quick review
  – New IO Infrastructure
    • IP CLIM
    • Storage CLIM

• Attachability rules

• CLIM plans

• Documentation

• Manageability

• Q/A
New IO Infrastructure

• All new controllers for storage and communications

• Storage CLIM
  – New 2.5 inch disks - Serial Attached SCSI (SAS)
    • 72GB 15 RPM
    • 146GB 10K RPM
  – Supports XP Array fibre channel disks plus tape

• IP CLIM
  – Supports TCP/IP v6 and v4
  – Supports IP Security
  – Up to 5 gigabit per second links
  – Supports SCTP (Telco streaming protocol)
IP CLIM

- Two models
  - CM881R2: 5 Copper Gigabit Ethernet ports
    - One controller with four Gigabit Ethernet ports, copper
    - One built-in Gigabit Ethernet port, copper
  - CM882R2: 3 Gigabit Ethernet Ports, 2 Gigabit fiber ports
    - One controller with 2 Gigabit Ethernet ports, copper
    - One built-in Gigabit Ethernet port, copper
    - 2 controllers with one Gigabit Ethernet port each, fiber
  - IP CLIMs are normally ordered in multiples of 2 for backup
  - HP standard manageability
    - HP SIM (System Insight Manager)
    - Storage Essentials as well as OSM and SCF
IP CLIM Software

Bladesystem

Application
Socket Calls

IP CLIM SW

ServerNet

IP CLIM SW
= Value Add

TCP Stack

Ethernet Links

CLIM system
IP CLIM failover

• Intra-CLIM failover
  – Occurs when a link to the external network has failed
  – Is configured and handled completely within the CLIM by using a feature called *bonding* interfaces
  – All interface resources are switched without disruption

• Inter CLIM failover
  – Occurs when an entire CLIM fails
  – All the interfaces on that CLIM are failed over to its configured failover destination(s) on a different CLIM
  – CLIM is considered failed when NonStop processors do not receive “heartbeat timer” from CLIM
Netperf Aggregate TPS (higher is better)
Storage CLIM

- High-end storage technology made accessible and affordable
  - Leverages advancements in storage technology
- Reduces system footprint contributing to lower TCO
- Facilitates easy adoption of future technological advancements
- Improves throughput from processing subsystem to individual storage media
Storage CLIM Benefits

- Faster random and sequential reads and writes
- Double the adapter bandwidth
- Supports SAS and FC
- Lower system entry cost; lower storage product cost
- Designed for fault tolerance (e.g., dual ported disks)
- Smaller footprint, energy-efficient, cooler
- HP standard manageability:
  - HP SIM (System Insight Manager)
  - Storage Essentials as well as OSM and SCF
- Open to future storage functionality
- Storage technology leadership; *keeping current*
Storage CLIM Overview

Supports Serial Attached SCSI (SAS) and Fibre Channel devices

- High capacity enclosure (up to twenty-five 2.5” SAS disks)
- HP StorageWorks XP Enterprise Storage Array
  - 10K, 20K, 24K models
- Tape Drives and Virtual Tape

- Replace/Co-exist with the IOAME + FCSA + FCDM
Storage CLIM Supported Devices

- SAS Disk enclosure
- FC Tape: LTO3, LTO4
- Virtual Tape

- **M8380-25**: SAS Disk enclosure
- **BL8400-72**: 72GB, 15KRPM disk
- **BL8400-146**: 146GB, 10K RPM disk

XP Disk Arrays
Storage CLIM product options

**CM871R2**: 2 built-in SAS Host Bus Adapters (HBA)

- Two additional slots available
  - Choices for each slot are
    - **BL8710-02**: SAS Host Bus Adapter (HBA)
    - **BL8710-03**: Fibre Channel HBA

- Storage CLIMs are normally ordered in multiples of 2 for fault-tolerance

- NonStop BladeSystem configuration with 2 Storage CLIMs can host up to 100 physical SAS disks
Storage CLIM Option - WCE

Modes of operation

1. Write Cache Enabled
   - Improved response time and performance
   - Requires that SAS enclosures be connected to in-cabinet Uninterrupted Power Supply (UPS)

2. Pass through (aka *write through cache*)
   - Standard response time
   - No connection to UPS required
Write Cache Enable (WCE)

Pass Through

NonStop  
Storage  
CLIM  
SAS Enclosure  
Cache  
Media  
Individual SAS disk

Write Cache Enabled

NonStop  
Storage  
CLIM  
SAS Enclosure  
Cache  
Media
WCE Performance

• Our Lab Testing
  – Random writes are 30% faster
  – Sequential writes are up to 6 times faster

• Your performance
  – WCE should improve audit trail throughput
  – For data disks, applications with the following characteristics are more likely realize the benefits of WCE performance improvement
    • Non-buffered files (The default mode for TMF audited files is buffered)
    • When disk writes are intensive
Random reads (4 KB) per disk

- CLIM SAS is ~20% faster than FCSA/FCDM
- With 2 GB file on 72 GB 15K RPM CLIM SAS disk
Sequential reads (56 KB) per disk

- CLIM SAS is ~70% faster than FCSA/FCDM
CLIMs per System

- **BladeSystems**
  - Can support both IP and Storage CLIMs
  - One C7000 can support up to 24 CLIMs
  - Two C7000s can support up to 48 CLIMs

- **NS-series**
  - NS16x00 supports only IP CLIMs at present
  - NS5000CG/T will support IP, Storage, and Telco CLIMs in Feb 2009
  - NS-series can support up to 24 CLIMs

- **Default Connections**
  - IP and Telco CLIMs default to 1 connection point but can be configured with 2
  - Storage CLIM defaults to 2 connection points but can be configured with 1

- **Overall Connectivity**
  - BladeSystem without an IOAME requires 1 IP CLIM and 1 Storage CLIM
    - However, the recommended number is at least 2 of each
  - BladeSystem with an IOAME does not require any IP CLIMs or Storage CLIMs
  - Based on the system and connectivity options the number of IP and Storage CLIMs can vary from 0 to 48 on a BladeSystem
  - The number of IP CLIMs on an NS16x00 can vary from 0 to 24.
CLIM Plans

• Storage CLIM will be added to NS16x00 in August 2009
  – Storage encryption support will be added for both NS16x00 and BladeSystem (software-based)
  – Two models of CLIM will be offered
    • A standard 4-core model
    • A faster 8-core model
    • Customers can order licenses for encryption
      – For n CLIMs
      – For all CLIMs on a system

• IP CLIM will add functionality in August 2009
  – VLAN support
  – Increased security
  – Improved firmware/software updating process
  – Firewall support
  – Others

All schedules/plans are subject to change without notice.
Documentation (1)

• External posting of the following manuals are at: docs.hp.com
  – Cluster I/O Protocols Configuration and Management Manual
  – SCF Reference Manual for the Storage Subsystem

• CLIMs are also covered in the planning guides and hardware installation manuals for BladeSystem, NS16x00/NS5000, Carrier Grade BladeSystem, and Carrier Grade NonStop manuals.

Note 1: The IPv6 Ready Logo is approved for our product set. We passed two international certification tests: one for core IPv6 and one for IPSec.

Note 2: Two CLIM J06.05 manuals changed after they were put on the DVD and after they were first released on docs.hp.com. See the notes section for more info. You should go to the Web for the latest versions of these manuals.
Documentation (2)

• White papers
  – Comparison of older TCP capability and IP CLIM stack

• Check with your account rep
  – CLIM performance report
  – Disk configuration guideline
  – Disk WCE Performance
CLIM Manageability

- All NonStop management tools and applications continue to provide their functionality
- OSM continues to be the main NonStop serviceability application
  - Provides CLIM control and status
  - Taps into CLIM OS events; EMS messages
  - Dials out on CLIM problems
- NonStop I/O Essentials is available to virtualize the configuration and control of everything on the CLIM to ease migration
- Systems Insight Manager (SIM) continues to provide expanded serviceability
Manageability (2)

• Measure support
  – CPU entity has new per IPU counters for Dispatches, Busy Time, and Qtime
  – PROCESSH supports sampling from all IPUs.
  – PROCESS entity has new IPU Switches counter SERVERNET entity
    • Supports CLIMs under the new node classes, CLMI (for IP CLIM) and CLMS (for Storage CLIM)
    • Two new counters for Read and Write Control Requests.
  – DISC entity supports CLIM disk devices
  – DEVICE entity supports CLIM tape devices

• ASAP support
  – Provides full support for the CIP subsystem in release 3.1
  – Provides disk monitoring and statistics for disks connected to Storage CLIMs.
  – Provides more Blades specific information like number of IPUs/CPU,
    • CPU and IPU busy for processes, process affinity, IPUs, etc.
Questions

...and as the sun sets over the hills...