Integrating Arbitrated Loop Devices into a Switched Fabric Environment

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Agenda

• FC-AL and FC-SW Defined
• Why Choose to Integrate?
• How to Integrate
• Best Practices
• Q&A
Arbitrated Loop (FC-AL)

- Legacy protocol
- Point-to-Point connections
- Private Loop
- Public Loop
Point-to-Point (FC-AL)

- Used for server to storage (one to one) connections
- First generation implementation of FC
Private Loop (FC-AL)

- Up to 126 devices sharing a common loop
- Shared Bandwidth
- Devices must negotiate for transmission rights
- Devices connected using FC hubs
- No connection to a fabric
Private Loop Example Topology
Public Loop (FC-AL)

- Private Loop, but can be connected to a Fabric environment through an FL (fabric loop) port
- Not all devices can do this (Private Loop Devices)
Switched Fabric (FC-SW)

- One or more FC switches in a single network
- Up to a theoretical maximum of 16 million devices
- Dedicated concurrent bandwidth to each device
FC-SW Example Topology
Why Choose to Integrate?

• Extend the lifetime of existing assets
• Leverage investment in legacy storage devices
• Pool storage resources
• Ease of data migration to new platforms
• Improve data availability, management and reliability
Host Investment Protection

• Allow older FC-AL attached servers to access new FC-SW attached storage
• Upgrade existing servers (those that are supported) with new FC-SW HBAs
Storage Investment Protection

• Continue to use storage devices that have already been paid for
• Make new storage resources available to older FC-AL attached hosts
• Re-use older, slower storage for less critical purposes (cascading)
Storage Resource Pooling

• Ensure that the hosts that need storage are able to access it
• Easily redeploy storage resources across the organization based on changing business and IT needs
Data Migration

• Easier migration from FC-AL to FC-SW attached storage
• Old way – back up to tape, swap out storage, restore from tape
• Better way – mount both resources at the same time, copy data across server backplane
Data Availability, Management and Reliability

• Instead of redundant loops, now we can have redundant fabrics with multiple data paths
• Implement software solutions for improved performance and redundancy, such as HP’s AutoPath, Veritas Software’s DMP and/or EMC’s PowerPath
• Fabric Switches are SNMP enabled for improved management
How to Integrate FC-SW and FC-AL

• Connecting Private Loops to Fabrics
• Proprietary vendor implementations (e.g. Brocade’s QuickLoop)
• Hardware and software requirements
QuickLoop

- Software based solution to allow Private Loop Fabric Attach
- Supported on Brocade Silkworm switches
- Allows Private Loop hosts and storage to attach to a switched fabric
- Public (Fabric) hosts can easily access Private Loop attached storage devices
QuickLoop

- Individual switch ports are configured for QuickLoop – can attach any type of FC-AL device, e.g. servers storage or hubs
- All QuickLoop devices are registered automatically in the fabric
- No host reconfiguration is required on the FC-AL attached server
Fabric Assist

• Used to zone FC-SW hosts to FC-AL resources
• As all FC-AL resources are registered in the Fabric, you can use the same best practices as in FC-SW zoning
Other Requirements

• Ensure that you have a supported Fibre Channel HBA (host-bus adapter)
• Upgrade to latest revision of FC software driver
• Device addresses will change when migrating from private loop to switched fabric – be prepared, use `vgexport` and `vgimport` to migrate existing volume groups
Sample Topology
QuickLoop Fabric Attach

Private Target Device (FCAL)

Private Target Device (FCAL)

Private Target Device (FCAL)
QuickLoop Fabric Attach

- Hosts are Fabric (FC-SW) attached to F ports (public hosts)
- Storage is FC-AL attached to QuickLoop ports (private devices)
- Public hosts can access any of the private devices on QuickLoop ports, as well as any FC-SW attached storage devices on the fabric
Sample Topology
QuickLoop Private Device Attach
QuickLoop Private Device Attach

- Public host attached to F port can access all Storage Devices (public and private) on the Fabric
- Private host (FC-AL) attached to a QuickLoop port can access only storage devices on the QuickLoop
- Once the private host is migrated to FC-SW, it will be able to access all storage devices
Sample Topology
QuickLoop Public Loop Attach
QuickLoop Public Device Attach

- Private hosts on an FC-AL hub are connected to the Fabric by and FL port
- Private hosts can now access all storage on the Fabric
Best Practices

• Over plan don’t overbuild
• Always use single initiator zoning (Zone by WWN)
• When possible, remove any FC hubs from the configuration
• Multiple redundant fabrics (dual HBA’s in all servers)
• Keep “as built” and current documentation available
Future Directions

• Storage Virtualization
• iSCSI
References

- The Holy Grail of Storage Management – Jon Toigo
- Designing Storage Area Networks – Tom Clark
- HP FC Fabric Migration Guide (J2635-90014) – docs.hp.com
- Brocade – www.brocade.com
- SNIA (Storage Networking Industry Association) – www.snia.org
Discussion
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