FCoE Designs and Best Practices
End Users Tell their Story

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SNIA Ethernet Storage Forum
Today’s Presenters

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Agenda

- FCoE Design Review #1 - Single Hop FCoE Design
- FCoE Design Review #2 - Multi-Hop FCoE Design
- FCoE Design Review #3 - Inter-Switch Links (ISLs) with FCoE
- Customer case studies on FCoE
  - Michael Reed – Gannett Co.
  - Andrew Yanosick - Thermo Fisher Scientific
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Standards for I/O Consolidation

www.T11.org

Fibre Channel on network media

FC-BB-5

Completed June 2009
Published by ANSI in May 2010

FCoE

IEEE 802.1

DCB

PFC

IEEE 802.1Qaz
Priority Grouping
Configuration
Completed March 2011
Forwarded to RevCom for publication

ETS

IEEE 802.1Qaz
Enhanced Transmission Selection
Completed June 2009
Published by ANSI in May 2010

DCBx

IEEE 802.1Qbb
Priority-based Flow Control
FCoE Behind the Scenes

❖ Data Center Bridging eXchange (DCBX):
  * DCBX, is a protocol that extends the Link Layer Discovery Protocol (LLDP) defined in IEEE802.1Qaz. DCBX allows the FCF to provide Link Layer configuration information to the CNA and allows both the CNA and FCF to exchange status.

❖ FCoE Protocols:
  * FCoE Data plane protocol.
    FCoE data protocol requires lossless Ethernet and is typically implemented in hardware, and is used to carry the FC frames with SCSI.
  * "FIP" (FCoE Initialization Protocol)
    Used to discover FCoE capable devices connected to an Ethernet network and to negotiate capabilities.
Single Hop FCoE Design

- Single Hop (Directly Connected) FCoE from the CNA to FCF, then broken out to Native FC
- A VLAN can be dedicated for every Virtual Fabric in the SAN
- "FIP" discovers the FCoE VLAN and signals it to the hosts
- Trunking is not required on the host driver – all FCoE frames are tagged by the CNA
- FCoE VLANs can be pruned from Ethernet links that are not designate for FCoE
- Maintains isolated edge switches for SAN ‘A’ and ‘B’ and separate LAN switches for NIC 1 and NIC 2 (standard NIC teaming or Link Aggregation)
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Virtual E-Ports (VE) are fully part of the FC-BB-5 standard
Extending fabrics beyond the first “hop” with FCoE
Multi-Hop with VE Ports Considerations

- Designed the Same way as Core-Edge FC with E ports
  - Usual traffic is North South from Initiator to Target
- Still want to use FCoE dedicated uplinks to meet or allocate enough bandwidth for oversubscription rates
- Domain ID sprawl is still a consideration
- FSPF Domain is larger and all FC/FCoE switches participate

Over Subscription Must be met at each “hop”. At 10G best to use links dedicated to FCOE traffic on VE
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- Using North bound ISLs from first hop FCoE or FC to Core
- Extending fabrics beyond the first “hop” with FCoE
- Can be used with FC or FCoE to host (initiator) or Storage (target)
- Provides throughput benefits on ISL in comparison to 2,4,8gbps FC for ISLs.
Where are you in your consideration/deployment of FCoE?

1) Still learning/No immediate plans
2) Near plan (0-12 mos.)
3) Long term plan (12 or more mos.)
4) Deployed single-hop
5) Deployed multi-hop
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Who Am I

Mike Reed

Lead Analyst – Enterprise Network Practice – Gannett Co.
Gannett-Single Hop FCoE Design

LAN Fabric

SAN Fabric A

SAN Fabric B

VLAN 10,11,12

VSAN 20

VSAN 30

FCF-A

FCF-B

VLAN 10,11,12, 20

VLAN 10,11,12, 30

Blade Chassis
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Who Am I

Andy Yanosick
Manager, Information Technology
Global Hosting Services
Thermo Fisher Scientific

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Use and progression of FCOE

- **FCOE in Use since 2011**
  - Original design was for a single hop
  - 4 each 4 GB FC connections back to the San Directors

- **FCOE–2013**
  - Multi – Hop
  - Second implementation added a North Bound segment
  - Final segment is two 32 GB FC port channel to the San Directors
  - ESXi Hosts configured for Round Robin - leverages both 32 GB port channels

- **FCOE-2014**
  - Individual Servers with a CNA (Consolidated Network Adapter)
  - Attached to a FEX device – Physically a hop, logically Not.

- **FCOE Future** – Purchased Core San Directors with FCOE capabilities
Advantages and Disadvantages

**Advantages:**
- Simple Concept & Design, Reliable
- Twinax allows for great cable management, simple.
- Simplifies Chassis management
- CNA allows for four 4 virtual FC connections at line rate

**Disadvantages**
- Buy In – Role Based Access Control / Defender of the Turf
- Twinax maximum lengths (Middle of Row)
After This Webcast

- This webcast will be posted to the SNIA Ethernet Storage Forum (ESF) website and available on-demand
  - [http://www.snia.org/forums/esf/knowledge/webcasts](http://www.snia.org/forums/esf/knowledge/webcasts)
- A full Q&A from this webcast, including answers to questions we couldn't get to today, will be posted to the SNIA-ESF blog
  - [http://sniaesfblog.org/](http://sniaesfblog.org/)
- Help us plan 2015. Take our quick poll at [http://sniaesfblog.org](http://sniaesfblog.org) to let us know the Ethernet Storage topics you’d like to see us cover next year.
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