Potential NPIV Enhancements

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Outline

- What and why
- Potential areas for NPIV enhancements (NPIV-e)
- NPIV-e Intra domain switching use cases
- Differences between NPIV-e and a distributed switch
- NPIV-e Benefits

What and Why

Simple NPIV edge devices, also referred to as gateway or NPIV switch, today allow for inter-operable connection to legacy 3rd party FC switches

Goal is to continue to:

- ***Maintain the NPIV device N_Port to FCF F_Port Standard***
- Place no new requirement on legacy adapters
- Preserve domain-ID(s) by using NPIV port expansion
- Continue to support cascaded NPIV devices

Why enhancements are needed?

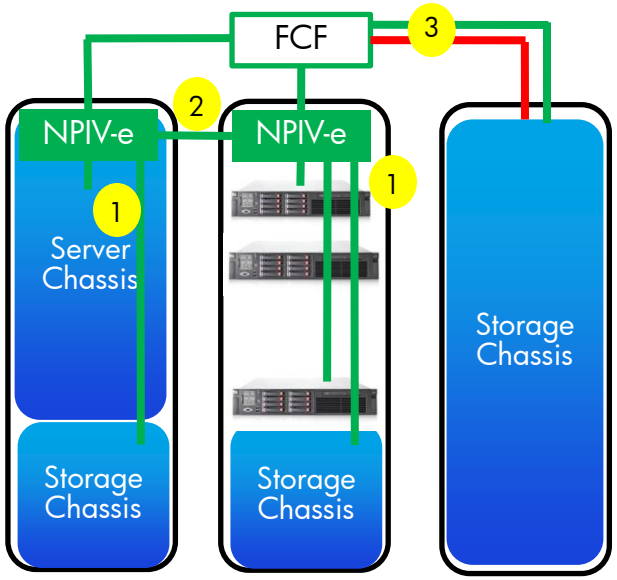
- More storage is moving to the edge
- Growing demand for scale
- Simple edge devices to grow the eco system
- New network architectures and technology allow for new ways of doing good old things

Simplicity of an adapter with functionality of a switch

Potential areas for NPIV-Enhancements

- ***Remove FCF choke point & traffic hair pin***
  - Allow for local switching for Intra-domain traffic
- Currently for each link between the FC switch and NPIV gateway that goes down; all connections that were established on that port need to be taken down
  - Link aggregation between the NPIV gateway and the FCF currently not a standard
  - Link aggregation for ISL(s) did not find traction, perhaps because E_Port inter-operability is not a popular use case; however several implementations do exist
  - However, this is an N_Port to F_Port interface and inter-operability is vital
- Optional HA, where FCF HA supports attached NPIV-e gateways
- Addresses new use cases where soft zoning is sufficient for traffic filtering
  - Allow for innovation in implementing hardware enforced zoning where needed for NPIV-e devices

NPIV-e Intra Domain Switching– Two Use Cases



More storage is moving to the edge

1. Intra NPIV-e switching between a server and local storage
2. Inter NPIV-e switching between neighboring chassis for the same domain
3. Access to legacy FCF fabrics and core attached storage, same as current NPIV

Differences between a Distributed Switch and NPIV-enhanced

- A distributed switch uses the VA_Port protocol over ASL(s) as listed below
- Here we compare functions of an FDF and an NPIV-e device

VA Port Protocol Functions and SW_ILS(s)	***NPIV-Enhanced Functions***
VN_Port Reachability Notification (VNRN)/(VNUN)	N_Port_ID Acquisition Procedures is in standard and will NOT change
Distributed Switch Membership Distribution (DFMD)	No need as there are no ASL(s)
FCDF Reachability Notification (FDRN)/(FDUN)	No need as there are no ASL(s)
N_Port_ID Route Distribution (NPRD)	No need if intra domain forwarding is at layer-2 or handled outside of the FC fabric
N_Port_ID and Zoning ACL Distribution (NPZD)/(AZAD)	- Soft zoning only use case; no need for hardware enforced zoning for local attached storage - Or hardware enforced zoning is handled outside of the FC fabric for NPIV-e local attached storage - Therefore there is no need for NPZD/AZAD

Don't use VA_Port Protocol per table above

How about HA?

- This proposal is orthogonal to the distributed switch HA protocol running between FCF(s)
- Please note that various HA proposals i.e. 12-035v3 or 12-312v2 only provide HA for the virtual domain and ***not the sessions established on the principal switch***
- So currently if an HBA or NPIV gateway is connected to a distributed FCF, it will not be covered by HA anyway
  - Connecting an NPIV gateway to an FDF is not likely to be a popular use case
- Therefore there is room, if there is interest, to extend HA to cover the NPIV devices attached
- Link aggregation also improves HA

NPIV-e Benefits

- Meets T11.3 goals for SW6 listed below:
  - ***Allow for simple edge devices*** which happen to be inter-operable with legacy 3rd party FC switches to begin with and already deployed in the field
  - ***Remove FCF choke points*** by enabling intra domain forwarding avoiding additional hops to/from the first hop FCF
  - No new requirement on adapters, Preserves domain-ID(s), Support cascading
  - Offer optional HA
- Simplify interoperability testing
  - ***NPIV N_Port to F_Port Standard MUST be preserved***
- No new demands on FCF(s); for intra domain switching capability
  - Customer investments in BB5/SW5 switch/adapter is preserved
- Addresses new use cases where soft zoning is adequate
  - Allows for innovation in implementing hardware enforced zoning where needed for NPIV-e devices
- Opportunity to add new features e.g. link aggregation to make NPIV more robust
- May simplify management

Thank You