

T11.3 BB-5 Technical Commentary

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Presentation Goals

- Agree on important functional components needed in the final specification and priorities
- Identify immediate work items, owners & confirm priorities
- Scope each work item and raise initial issues
- Discuss and ensure each of the following functional items are addressed adequately in the FCoE standard

T11.3 BB-5 Technical Commentary

	Function Work Item	<u>Owner</u> BB-5 or IEEE	Man. Vs Opt.	Description / Notes
A1	FCoE ports (N_Port to F_Port association)	BB-5	Mandatory	<ol style="list-style-type: none"> 1. Architecture supports both end ports connected to FCoE switches and N_Port connected to Ethernet switches 2. FLOGI /FLOGI Accept + Failover mechanism, if needed, for login server 3. Should define mechanisms to get access to FC WKAs 4. Avoid N_Port associating to wrong F_Port
A2	MAC Addressing Architecture	BB-5	Mandatory	<ol style="list-style-type: none"> 1. MAC's to be used, VF port to VN port assignment, VF port failover across FCoE switches and within an FCoE switch 2. VN_Port MAC – construction – How? And Who? 3. Deal with possibility of duplicate MAC addresses, e.g. possible data integrity issues 4. Include FCID –MAC translation 5. Prefer single MAC addressing approach

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	Function Work Item	<u>Owner</u> BB-5 or IEEE	Man. Vs Opt.	Description / Notes
A3	Addressing High Availability	BB-5	Mandatory	<ol style="list-style-type: none"> 1. FC multipathing of end-to-end flows 2. F_Port high availability 3. Single FCoE switch F_Port failover, i.e. F_Port to F_Port 4. Switch failover and hence path fail-over within the Ethernet cloud 5. Avoid F_Port to F_Port frame forwarding (infinite loop)
A4	Fabric Interoperability	BB-5	Mandatory	<ol style="list-style-type: none"> 1. High Priority: FCoE N_Port to FCoE switch Interop; i.e. any FCoE N_Port will work with any FCoE switch 2. FC-BB-5 must not require any change to the existing FC-SW-* standards 3. Possible duplicate address issues, when merging fabrics with different MAC address mapping methods

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	Function / Description	<u>Owner</u> BB-5 or IEEE	Man. Vs Opt.	Notes / Recommendation
A5	FCoE N_Port to FCoE N_Port data path	BB-5	Mandatory	<ol style="list-style-type: none"> 1. FCoE initiator to FCoE target without FCoE switch in the data path 2. FCoE N_Port to FCoE N_Port, may impact current N_Port to F_Port discovery models 3. FCoE N_Port to FCoE N_Port requires FCoE switch permission
A6	Logical Link management requirements	BB-5	Mandatory	<ol style="list-style-type: none"> 1. FC fabric state must match FCoE link connectivity 2. Loss of FCoE connectivity must cause logical FC links to reflect the failure and to post management notifications 3. Ethernet transmission errors also seen as FC transmission errors, etc.

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	Function / Description	<u>Owner</u> BB-5 or IEEE	Man. Vs Opt.	Notes / Recommendation
A7	FCoE E_Port – discovery & initialization	BB-5	Mandatory	<ol style="list-style-type: none"> 1. ISL establishment (logical or physical) 2. All FCoE aware switches and mixed fabric with Ethernet only and FCoE aware switches
A8	FCoE use of Ethernet ACLs (Configuration/Automation/Zoning)	BB-5	Optional	<ol style="list-style-type: none"> 1. Configuration/protocol needs to be standardized so we don't end up with different proprietary approaches. 2. May depend on addressing format – might be mandatory for L2 switches + FCID-mapped or dynamic addresses 3. Ethernet ACL automation: How establishment of FC connectivity (e.g., FLOGI) causes what ACL entries to be put in place 4. Ethernet ACLs and FC zoning to co-exist, if ACLs are defined

Is it time to start writing the following?

	Function / Description	<u>Owner</u> BB-5 or IEEE	Man. Vs Opt.	Notes / Recommendation
A9	FCoE Frame Format and Semantics	BB-5	Mandatory	1. As adopted by plenary
A10	FCoE Zoning / Access Control	BB-5	Mandatory	1. Ensure that standard FC WWN zoning is enforced by FCoE.
A11	VLAN Tagging	BB-5	Mandatory	1. Spec VLAN usage with FCoE, e.g., fabric separation, not zoning.

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	Function / Description	Owner BB-5 or IEEE	Man. Vs Opt.	Notes / Recommendation
B1	Per priority flow control	IEEE	Recommended	1. Ethernet flow control (e.g., Pause) to handle link flow issues and hence not use BB Credits,
B2	Per priority packet scheduling	IEEE	Recommended	1. Priority processing and scheduling 2. Has not become publicly visible
B3	Discovery and Capability Exchange protocol	IEEE	Mandatory	1. Has not become publicly visible

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	Function / Description	<u>Owner</u> BB-5 or IEEE	Man. Vs Opt.	Notes / Recommendation
B4	STP / Link Aggregation	IEEE	STP – Mandatory Link Aggr - Optional	1. Informative annex on Ethernet usage desirable
B5	Jumbo (at least baby jumbo) frames	IEEE	Mandatory	1. May have to live with current de facto standardization status of this
B7	TRILL	IEEE	Optional	
B8	802.1au BECN	IEEE	Optional	

FCoE BB-5 Working Group Proposal

Attendees agree this presentation has identified most of the important functional components needed in the final specification and priorities for next few meetings

→ Assign action items for initial high priority tasks

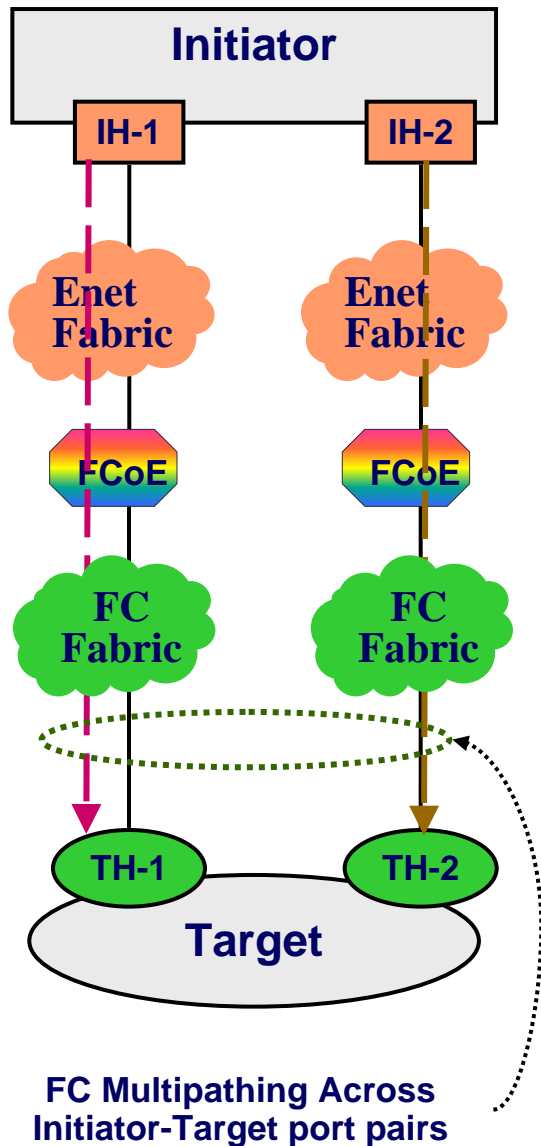
Proposed high priority task list

- A1: FCoE ports (N_Port to F_Port association)
- A2: MAC Addressing Architecture
- A3: Addressing High Availability
- A4: Fabric Interoperability
- A5: FCoE N_Port to FCoE N_Port data path
- A6: Logical Link management requirements
- A7: FCoE E_Port – discovery & initialization
- A8: FCoE use of Ethernet ACLs

Backup slides on Extended Feature & Function Topology Views

Multipathing Examples

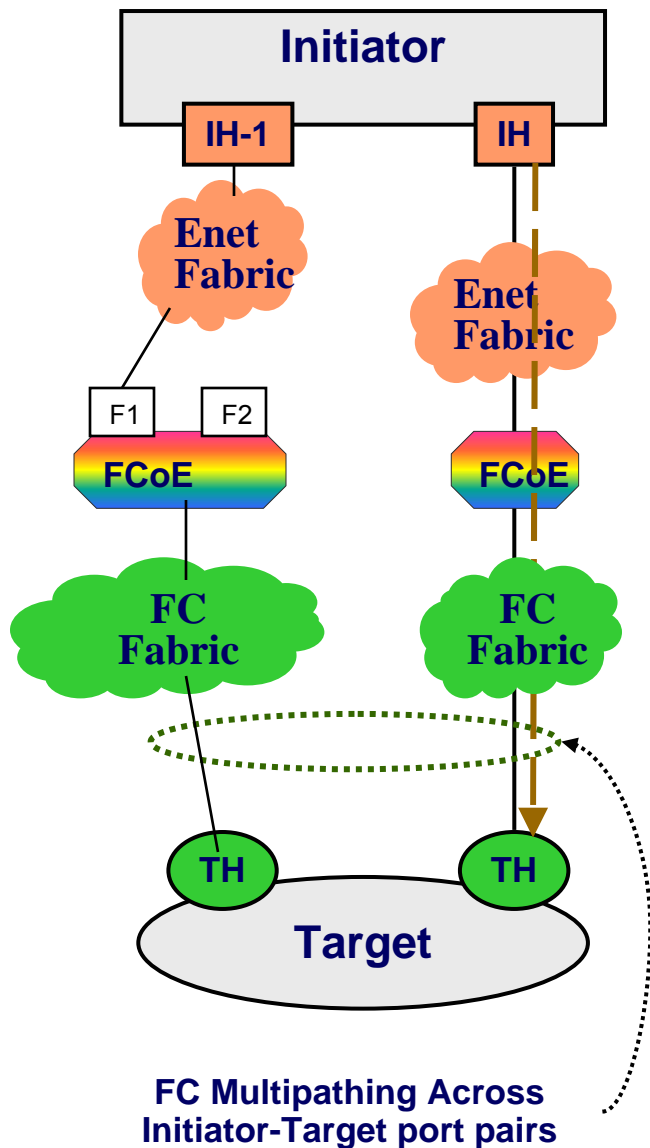
Example 1



- High availability of the logical path between IH-1 and TH-1 is provided by IH-2 and TH-2
- xx

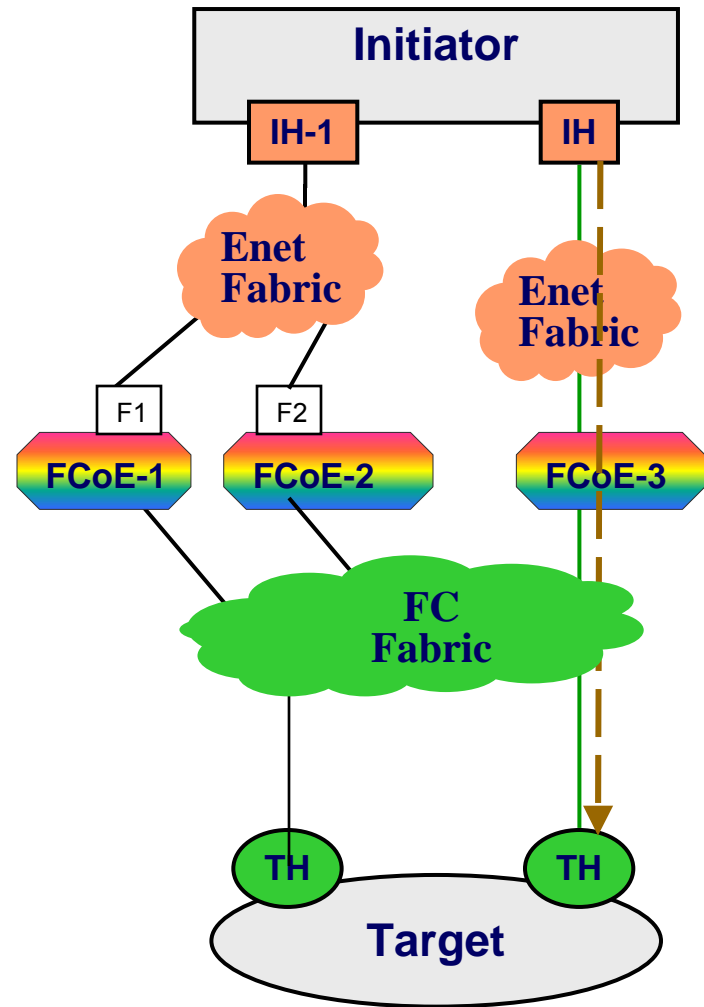
Multipathing Examples

Example 2



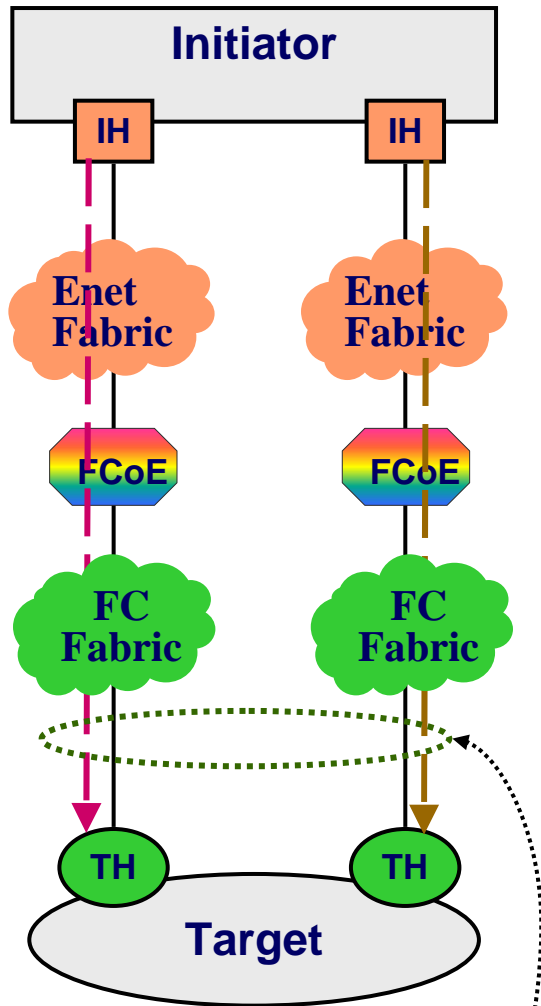
- HA mechanism to recover from a failure of F1 by connecting F2 to IH-1
- Are exchanges started via F1 allowed to complete via F2 or must all in-flight exchanges be aborted?
- Are there any expectations on the FCoE switches handling of the in-flight exchanges?
- Will the FCID of IH-1 change as a result of this F port movement?
- If so does this create a zoning problem.

- HA mechanism to recover from a failure of FCoE-1 by connecting F2 of FCoE-2 to IH-1
- Are exchanges started via F1 allowed to complete via F2 or must all in-flight exchanges be aborted?
- Are there any expectations on the FCoE switches handling of the inflight exchanges?
- Will the FCID of IH-1 change as a result of this F port movement?
- Impact on zoning?

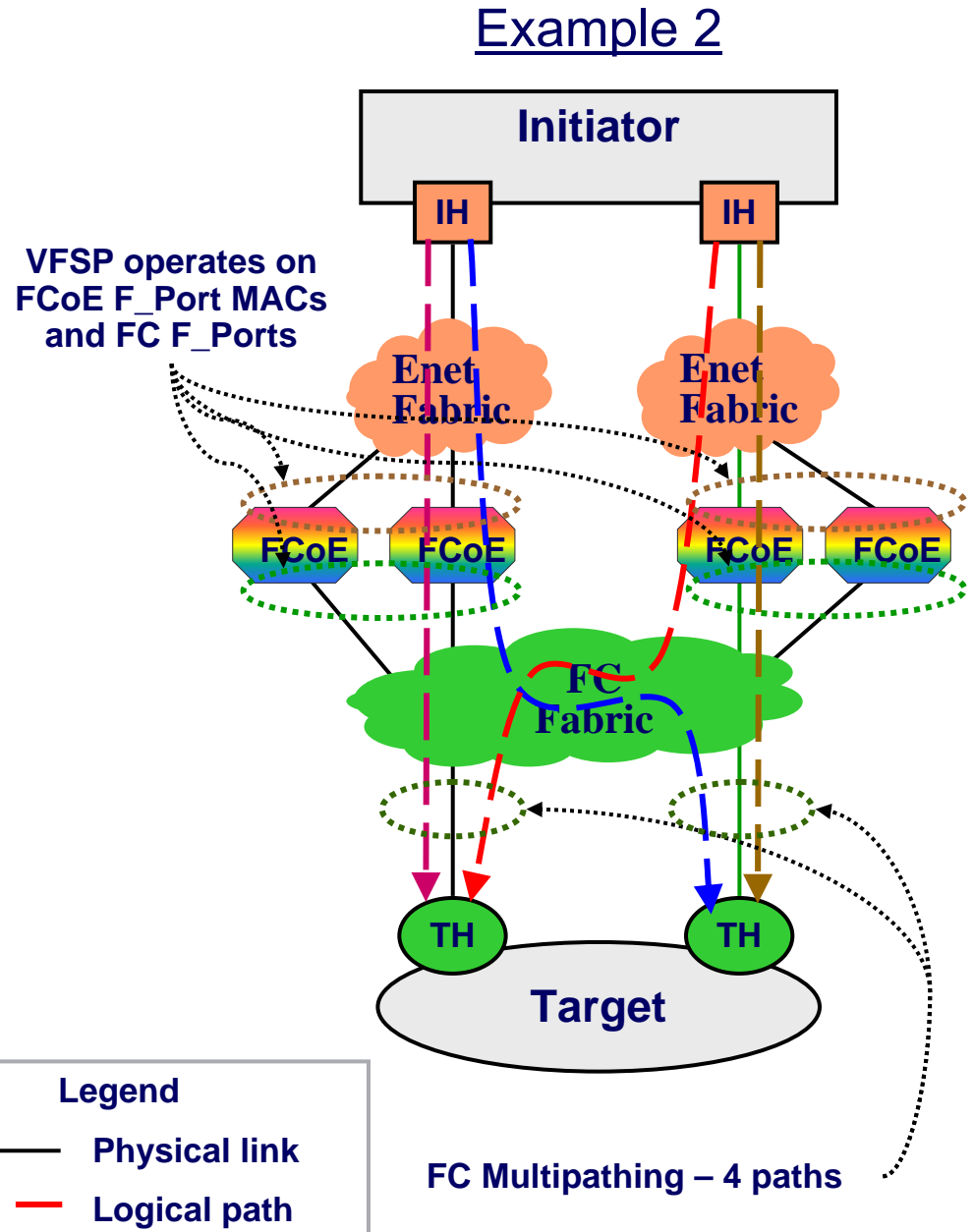


Multipathing Examples

Example 1



FC Multipathing Across Initiator-Target port pairs



FC Multipathing - 4 paths

Legend

- Physical link
- - - Logical path

Switch to Switch Communication

Case 1:

Enhanced Ethernet (EE) Switch to FCoE switch

- Must leverage heavily existing Ethernet Ecosystem
- STP/ Link Aggregation 802.3ad
- Transparent to FSPF
- In-order delivery
- Load balancing
- In Fig:3, does FSPF see the two FCoE switches?
 - If yes, how is the virtual ISL established?
 - What is the MAC address mapping mechanism to FC WKAs?
 - Is Multi/broad-casting ELPs a solution?
- Recommendation: Standard must address and define a mechanism to establish the virtual ISL between these two FCoE switches or better
there should be generic VE_Port to VE_Port initialization that should take care of this case

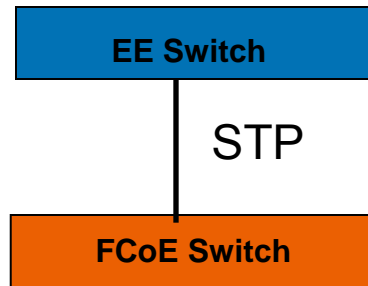


Fig:1

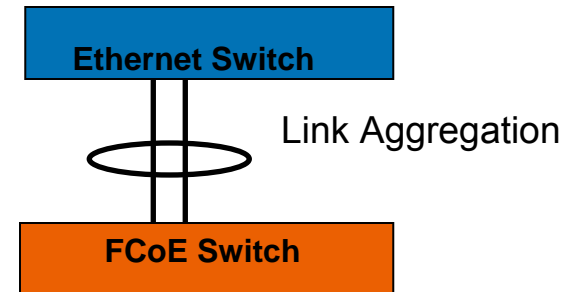


Fig:2

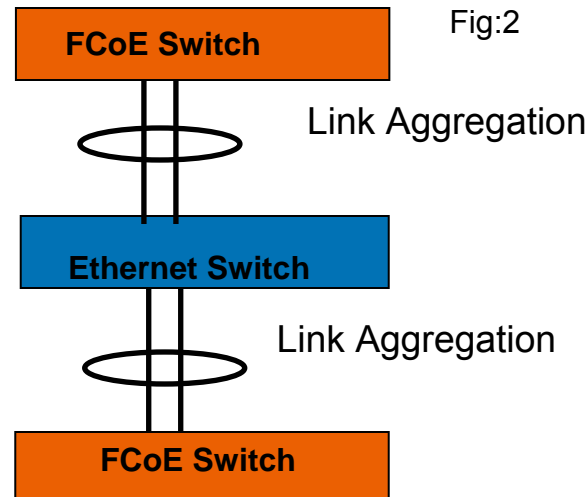


Fig:3

Switch to Switch Communication (contd..)

Case 2:

FCoE to FCoE

- STP/ Link Aggregation 802.3ad
- VE_Port to VE_Port initialization
 - Virtual ISL
 - Exchange FC SW_ILSs (ELP/ESC/EFP etc.,)
- FSPF routing on top
- Routing metrics /load balancing
- In-order delivery
- Single FCoE fabric
- Distributed FC Fabric services
- A single link failure in a multi-link (Link Ag) group should not cause any issue other than losing the transit frames on that link (should be very similar to what we have in FC fabrics today)

