

FCoE End-to-End Connection

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T11/10-132v1



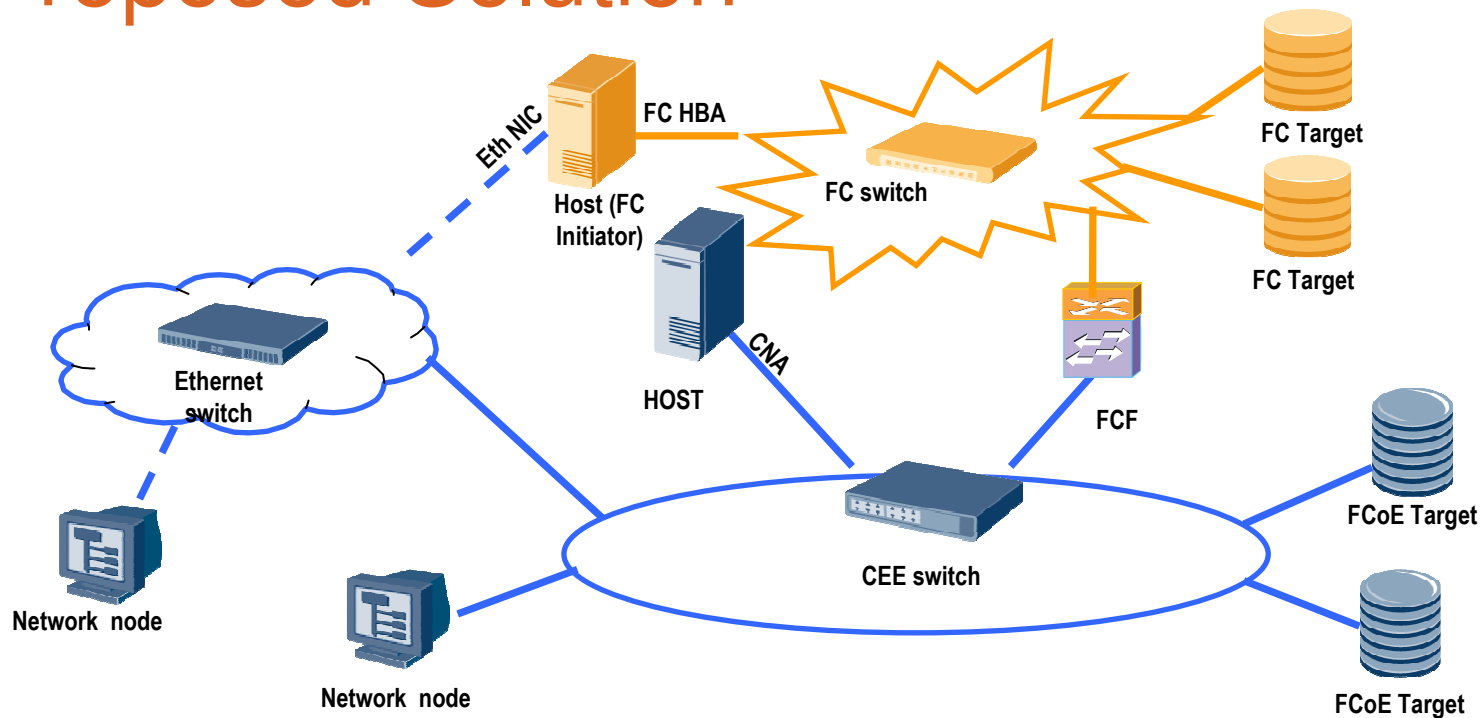
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Motivation

- Why do we need another multi-point connection scheme besides the 10-019 proposal that do not require an FCF?
 - Lengthy delay with distributed N_Port ID assignment scheme
 - Cannot support FC zoning since there is no FCF
 - Requires random number generator, additional timers and FIP messages
- We want to provide an upgrade path for customers who have adopted FCoE and have deployed FCFs in the network
- For such customers, the FCF in FC-BB-5 still remains a bottleneck
- We want to provide a multi-point connectivity solution that will relieve the FCF bottleneck and is compatible with FC-BB-5 deployment



Proposed Solution



- We want to support end-to-end connections for a network configuration using CEE switches with no FCoE functionality
- Existing FCFs will be sufficient to provide the needed functions

Proposal in a Nutshell

- An ENode issues FLOGI to the FCF in the network for N_Port ID assignment
- Each ENode capable of supporting multi-point connections then discovers other ENode with the same capability
- Each ENode then issues FLOGI to the other ENode for a direct end-to-end connection and bypasses the FCF

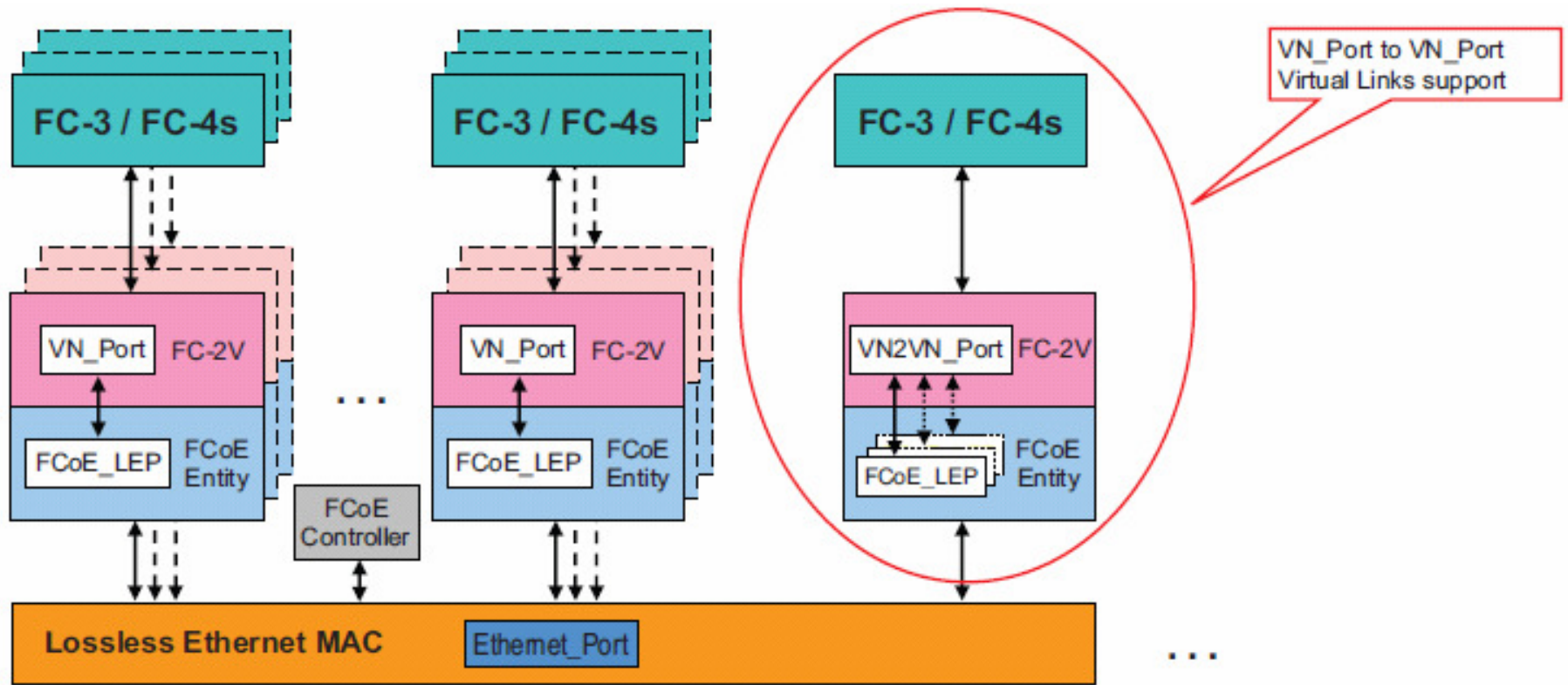


N_Port ID Assignment

- Each ENode issues FLOGI to the FCF in the fabric for N_Port ID assignment as per FC-BB-5
 - The assigned N_Port ID will be used in the multi-point connections
 - VN2VN-FC-MAP (see T11/10-019) is used in VN_Port MAC Address
- Just like T11/10-019, a VN2VN ENode MAC is used with a VN2VN_Port dedicated to the instantiation of VN_Port to VN_Port Virtual Links
 - The FCoE Controller of a VN2VN ENode MAC may perform FIP FLOGI with multiple remote VN2VN ENode MACs to instantiate multiple VN_Port to VN_Port Virtual Links
 - Results in multiple FCoE_LEPs associated with a VN2VN_Port
- An ENode uses the FCF-assigned N_Port ID to communicate with its peer directly in the point-to-point topology
 - There is no need to go through the FCF in the fabric topology
 - Sharing the N_Port ID for the fabric and the point-to-point topologies should not be a problem
 - Should this be a requirement, a separate virtual fabric (mapped to a VLAN) can be set up for the multi-point connections



ENode with VN_Port to VN_Port Support

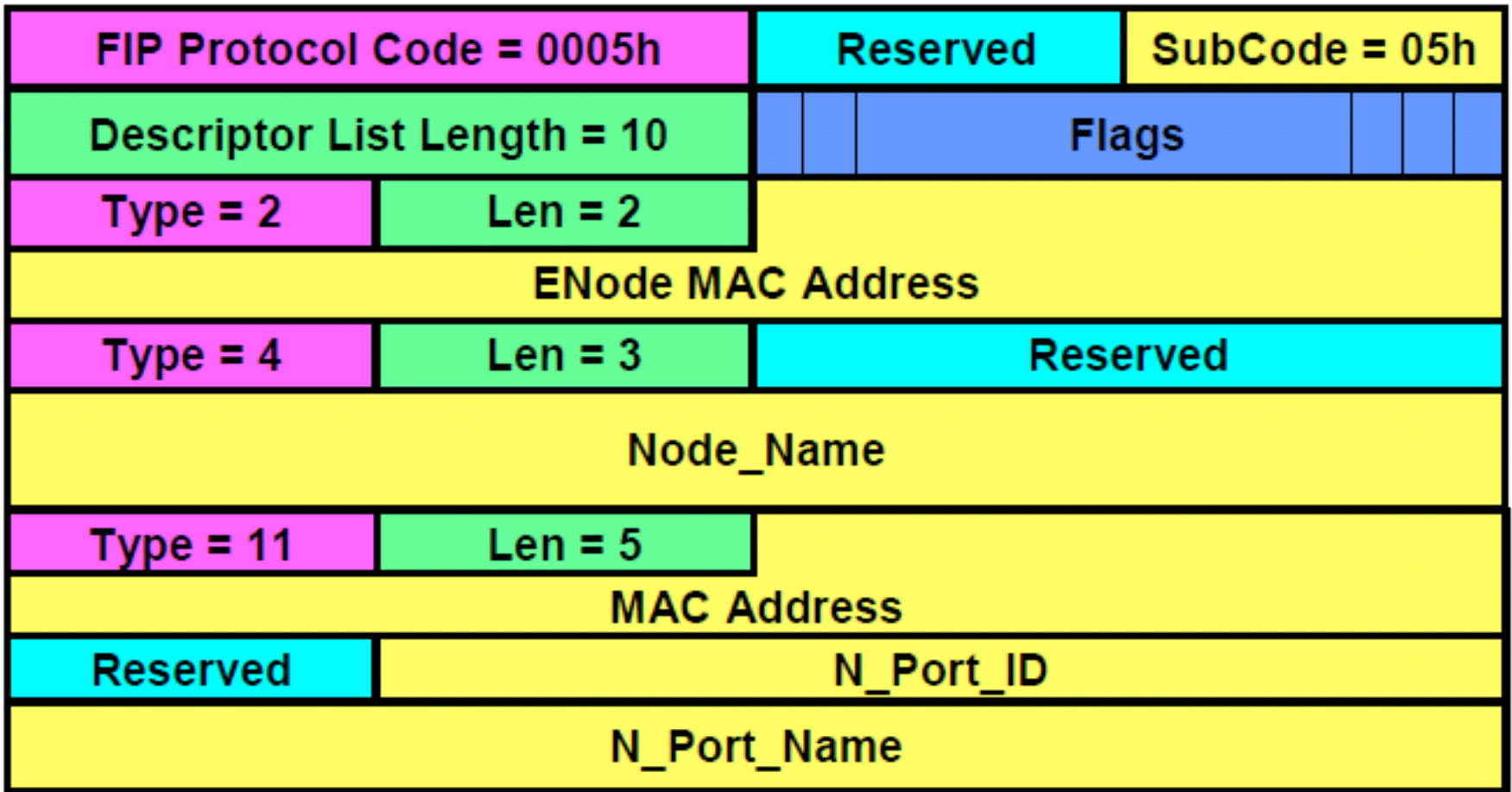


VN2VN Discovery

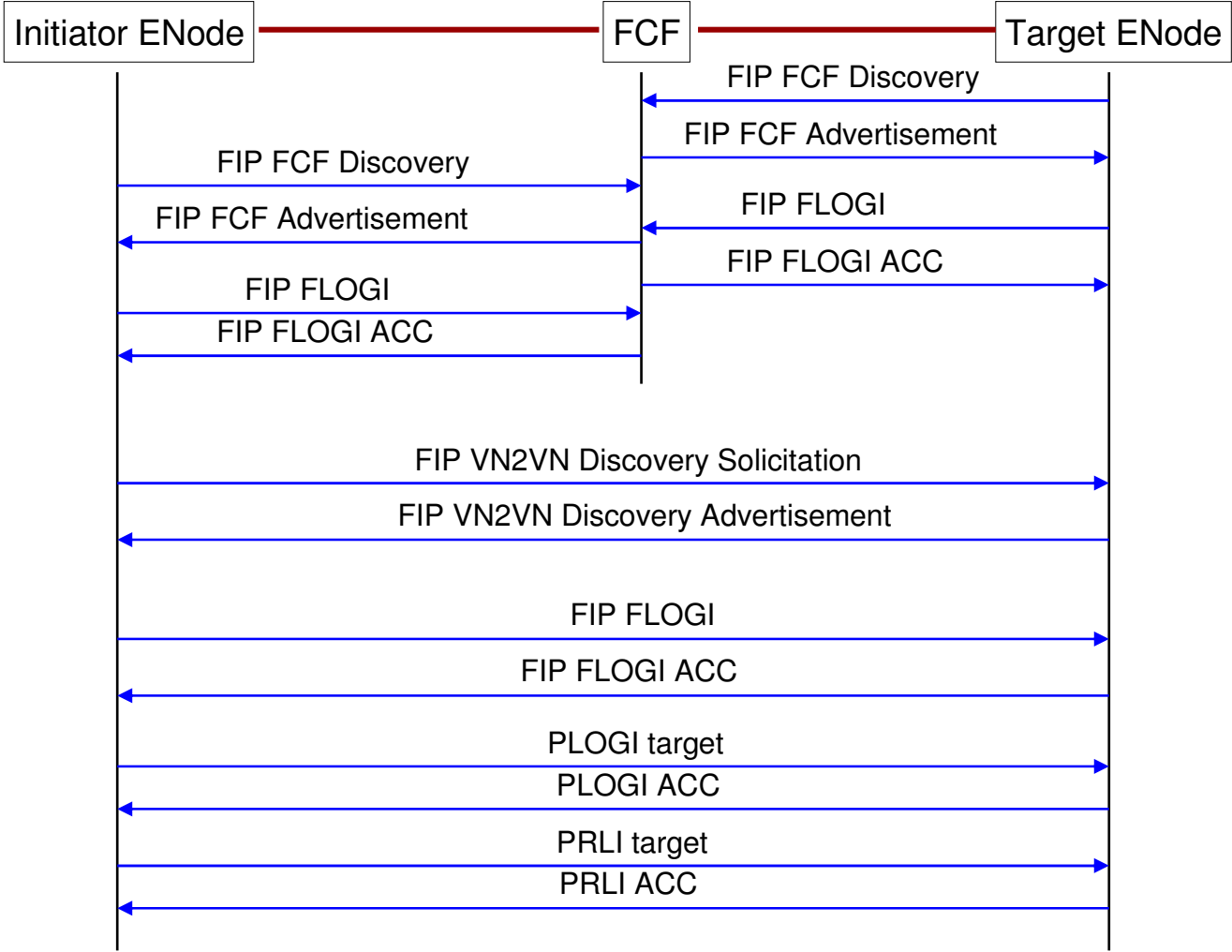
- To discover peer ENodes which support VN2VN operation, an ENode multicasts a FIP VN2VN Discovery Solicitation message to All_VN2VN_Enode_MACs
- Each VN2VN ENode responds with a unicast VN2VN Discovery Advertisement
- VN2VN Discovery Solicitation and Advertisement messages contain different FIP Protocol Code but the same descriptors
 - Type 2: MAC Address
 - Type 4: Name identifier
 - Type 11: VN_Port Identification
- An ENode may maintain the received information in a VN2VN Neighbor Set
- An ENode then issues FLOGI to the peer ENode using the FC point-to-point protocol
- Therefore, an ENode may issue VN2VN Discovery Solicitation messages as necessary upon a RSCN event



VN2VN Discovery Advertisement



VN2VN Connection Process



FCF Considerations

- For legacy customers with FC SAN, FCFs will be available in the FCoE network
- Subset of FCF functions needed
 - Handling of FCF Discovery
 - Handling of FLOGI
 - N_Port ID Assignment
 - Keep Alive Messages
 - Name Server
 - Fabric Zone Server



FC Zoning Support

- Zoning support will be done at the target
 - Eliminates the need for FCoE-aware CEE switches
- Each target obtains the list of WWPN for the different zones from the fabric zone server
- An initiator is allowed to FLOGI with a target if it belongs to an authorized zone
 - Each target then correlates the WWPN with the N_Port ID in the FLOGI from the initiator
 - N_Port ID will be used to identify future frames from the initiator
 - Optionally each target can obtain the N_Port ID from the name server
- FC-SP can be used for better security protection



Interoperability with FC-BB-5

- New FCoE initiators can access new FCoE targets directly, bypassing the FCF
- Other combinations of new/old initiators/targets can be accessed via the FCF as per FC-BB-5



Summary

- Customers with legacy FC SAN will purchase FCFs to connect FC storage with FCoE hosts
- As the data center slowly migrates from FC storage to native FCoE storage, additional FCoE storage can be connected using CEE switches
- Existing FCFs are used to access legacy FC storage and provide the N_Port ID assignment function
- Customers wanting more robust features can upgrade existing FCFs to Control FCFs and add additional FDFs



Thanks!
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