Claudio DeSanti (Cisco), Erik Smith (EMC),
Craig Carlson (QLogic), Ed McGlaughlin (QLogic)
Pat Thaler (Broadcom)

1 VA_Port Protocols

1.1 VA_Port Properties

A VA_Port is an instance of the FC-2V sublevel of Fibre Channel that connects to another VA_Port. A VA_Port is uniquely identified by an A_Port_Name Name_Identifier and is addressable by the VA_Port connected to it through the A_Port Controller address identifier (i.e., FFFFF9h). A VA_Port is identified by an address identifier different than the Fabric Controller address identifier for the reasons explained in 1.3. A VA_Port shall support Class F service and the SW_ILSs specified in 1.2.

1.2 VA_Port SW_ILSs

1.2.1 Overview

The VA_Port SW_ILSs have the same high-order byte in their command code, denoted here as XXh. Table 1 shows the VA_Port SW_ILSs command codes.

Table 1 – VA_Port SW_ILSs Command Codes

Encoded Value	Description	Abbreviation
XX00 0001h	VN_Port Reachability Notification	VNRN
XX00 0002h	VN_Port Unreachability Notification	VNUN
XX00 0003h	FDF/FCDF Reachability Notification	FDRN
XX00 0004h	FDF/FCDF Unreachability Notification	FDUN
XX00 0005h	N_Port_ID Route Distribution	NPRD
XX00 0006h	N_Port_ID and Zoning ACL Distribution	NPZD
XX00 0007h	Active Zoning ACL Distribution	AZAD
XX00 0008h	Distributed FCF/Switch Membership Distribution	DFMD

The VA_Port SW_ILSs are used to exchange information between Controlling FCF/Switches and FDFs/FCDFs (i.e., they are not used to exchange information between FDFs/FCDFs). When a Distributed FCF/Switch includes cascaded FDFs/FCDFs, the intermediate FDFs/FCDFs relay the SW_ILSs as shown in figure 1. To facilitate this, all VA_Port SW_ILSs include the originating and

destination FDF/FCDF or Controlling FCF/Switch Switch_Names in the first two fields of their payload.

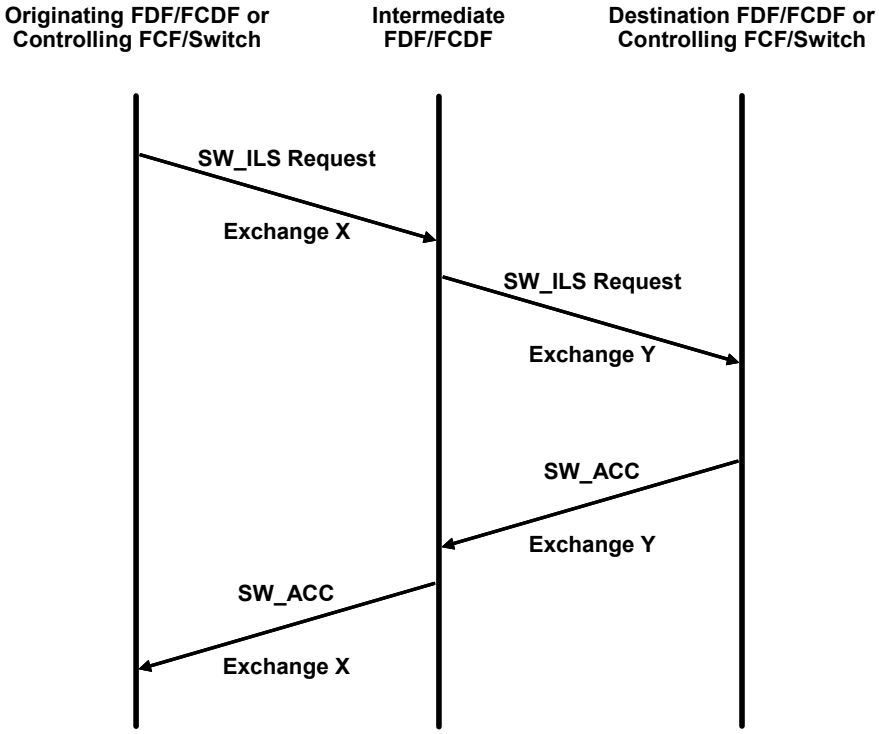

Figure 1 – VA_Port SW_ILS Relay

1.2.2 VN_Port Reachability Notification (VNRN)

The VN_Port Reachability Notification SW_ILS is used by an FDF to communicate to the Primary Controlling FCF that a ENode MAC is instantiating a VN_Port to VF_Port Virtual Link with the FDF through a FIP FLOGI Request or a FIP NPIV FDISC Request. If the FDF does not have a VA_Port to VA_Port Virtual Link with the Primary Controlling FCF, the VNRN SW_ILS is relayed to the Primary Controlling FCF by the intermediate FDFs.

The VN_Port Reachability Notification SW_ILS is used by an FCDF to communicate to the Primary Controlling Switch that a VN_Port is attempting Fabric login through an FLOGI Request or a NPIV FDISC Request. If the FCDF does not have an ASL with the Primary Controlling Switch, the VNRN SW_ILS is relayed to the Primary Controlling Switch by the intermediate FCDFs.

VNRN Request Sequence

Addressing: the S_ID field shall be set to FFFFF9h, indicating the originating VA_Port, and the D_ID field shall be set to FFFFF9h, indicating the destination VA_Port.

Payload: the format of the VNRN Request Sequence Payload is shown in table 2.

Table 2 – VNRN Request Payload

Item	Size (bytes)
SW_ILS Code = XX00 0001h	4
Originating FDF/FCDF Switch_Name	8
Destination Controlling FCF/Switch Switch_Name	8
F_Port_Name	8
FLOGI/NPIV FDISC Parameters	116

Originating FDF/FCDF Switch_Name: contains the Switch_Name of the requesting FDF/FCDF.

Destination Controlling FCF/Switch Switch_Name: contains the Switch_Name of the destination Controlling FCF/Switch.

F_Port_Name: contains the F_Port_Name of the VF_Port to which the requesting VN_Port is being associated.

FLOGI/NPIV FDISC Parameters: contains the payload of the received FLOGI or NPIV FDISC (see FC-LS-2).

VNRN Reply Sequence

SW_RJT: SW_RJT indicates the rejection of the VNRN Request Sequence. As a result, a (FIP) FLOGI LS_RJT or a (FIP) NPIV FDISC LS_RJT is sent as response to the (FIP) FLOGI Request or (FIP) NPIV FDISC Request that caused the issuance of the VNRN Request.

SW_ACC: SW_ACC indicates the acceptance of the VNRN Request Sequence for processing. The format of the VNRN SW_ACC Payload is shown in table 3.

Table 3 – VNRN SW_ACC Payload

Item	Size (bytes)
SW_ILS Code = 0200 0000h	4

1.2.3 VN_Port Unreachability Notification (VNUN)

The VN_Port Unreachability Notification SW_ILS is used by an FDF to communicate to the Primary Controlling FCF that one of its VN_Port to VF_Port Virtual Links has been deinstantiated. If the FDF does not have a VA_Port to VA_Port Virtual Link with the Primary Controlling FCF, the VNUN SW_ILS is relayed to the Primary Controlling FCF by the intermediate FDFs.

The VN_Port Unreachability Notification SW_ILS is used by an FCDF to communicate to the Primary Controlling Switch that one of its VN_Port has been logged out. If the FCDF does not have an ASL with the Primary Controlling Switch, the VNUN SW_ILS is relayed to the Primary Controlling Switch by the intermediate FCDFs.

VNUN Request Sequence

Addressing: the S_ID field shall be set to FFFFF9h, indicating the originating VA_Port, and the D_ID field shall be set to FFFFF9h, indicating the destination VA_Port.

Payload: the format of the VNUN Request Sequence Payload is shown in table 4.

Table 4 – VNUN Request Payload

Item	Size (bytes)
SW_ILS Code = XX00 0002h	4
Originating FDF/FCDF Switch_Name	8
Destination Controlling FCF/Switch Switch_Name	8
Unreachable N_Port_Name	8
Reserved	1
Unreachable N_Port_ID	3

Originating FDF/FCDF Switch_Name: contains the Switch_Name of the requesting FDF/FCDF.

Destination Controlling FCF/Switch Switch_Name: contains the Switch_Name of the destination Controlling FCF/Switch.

Unreachable N_Port_Name: contains the N_Port_Name of the unreachable VN_Port.

Unreachable N_Port_ID: contains the N_Port_ID of the unreachable VN_Port.

VNUN Reply Sequence

SW_ACC: SW_ACC indicates the acceptance of the VNUN Request Sequence for processing. The format of the VNUN SW_ACC Payload is shown in table 5.

Table 5 – VNUN SW_ACC Payload

Item	Size (bytes)
SW_ILS Code = 0200 0000h	4

1.2.4 FDF/FCDF Reachability Notification (FDRN)

The FDF/FCDF Reachability Notification SW_ILS is used by an FDF to communicate to the Primary Controlling FCF that it has instantiated a VA_Port to VA_Port Virtual Link with another FDF or with the Secondary Controlling FCF. If the FDF does not have a VA_Port to VA_Port Virtual Link with the Primary Controlling FCF, the FDRN SW_ILS is relayed to the Primary Controlling FCF by the intermediate FDFs.

The FDF/FCDF Reachability Notification SW_ILS is used by an FCDF to communicate to the Primary Controlling Switch that it has instantiated an ASL with another FCDF or with the Secondary Controlling Switch. If the FCDF does not have an ASL with the Primary Controlling Switch, the FDRN SW_ILS is relayed to the Primary Controlling Switch by the intermediate FCDFs.

The FDRN SW_ILS is also used between Primary and Secondary Controlling FCF/Switch to keep their state synchronized.

FDRN Request Sequence

Addressing: when used between a FDF/FCDF and the Primary Controlling FCF/Switch the S_ID field shall be set to FFFFF9h, indicating the originating VA_Port, and the D_ID field shall be set to FFFFF9h, indicating the destination VA_Port. When used between the two Controlling FCFs/Switches the S_ID field shall be set to FFFFFDh, indicating the originating VE_Port, and the D_ID field shall be set to FFFFFDh, indicating the destination VE_Port.

Payload: the format of the FDRN Request Sequence Payload is shown in table 6.

Table 6 – FDRN Request Payload

Item	Size (bytes)
SW_ILS Code = XX00 0003h	4
Originating FDF/FCDF Switch_Name	8
Destination Controlling FCF/Switch Switch_Name	8
Reachable FDF/FCDF or Controlling FCF/Switch Switch_Name	8
Reserved	2
(Virtual) Link Cost	2

Originating FDF/FCDF Switch_Name: contains the Switch_Name of the requesting FDF/FCDF.

Destination Controlling FCF/Switch Switch_Name: contains the Switch_Name of the destination Controlling FCF/Switch.

Reachable FDF/FCDF or Controlling FCF/Switch Switch_Name: contains the Switch_Name of the adjacent entity with which the VA_Port to VA_Port (Virtual) Link has been instantiated.

(Virtual) Link Cost: contains the cost of the instantiated VA_Port to VA_Port (Virtual) Link.

FDRN Reply Sequence

SW_ACC: SW_ACC indicates the acceptance of the FDRN Request Sequence for processing. The format of the FDRN SW_ACC Payload is shown in table 7.

Table 7 – FDRN SW_ACC Payload

Item	Size (bytes)
SW_ILS Code = 0200 0000h	4

1.2.5 FDF/FCDF Unreachability Notification (FDUN)

The FDF/FCDF Unreachability Notification SW_ILS is used by an FDF to communicate to the Primary Controlling FCF that it has deinstantiated a VA_Port to VA_Port Virtual Link with another FDF or with the Secondary Controlling FCF. If the FDF does not have a VA_Port to VA_Port Virtual Link with the Primary Controlling FCF, the FDUN SW_ILS is relayed to the Primary Controlling FCF by the intermediate FDFs.

The FDF/FCDF Unreachability Notification SW_ILS is used by an FCDF to communicate to the Primary Controlling Switch that it has deinstantiated an ASL with another FCDF or with the Secondary Controlling Switch. If the FCDF does not have an ASL with the Primary Controlling Switch, the FDUN SW_ILS is relayed to the Primary Controlling Switch by the intermediate FCDFs.

The FDUN SW_ILS is also used between Primary and Secondary Controlling FCF/Switch to keep their state synchronized.

FDUN Request Sequence

Addressing: when used between a FDF/FCDF and the Primary Controlling FCF/Switch the S_ID field shall be set to FFFFF9h, indicating the originating VA_Port, and the D_ID field shall be set to FFFFF9h, indicating the destination VA_Port. When used between the two Controlling FCFs/Switches the S_ID field shall be set to FFFFFDh, indicating the originating VE_Port, and the D_ID field shall be set to FFFFFDh, indicating the destination VE_Port.

Payload: the format of the FDUN Request Sequence Payload is shown in table 8.

Table 8 – FDUN Request Payload

Item	Size (bytes)
SW_ILS Code = XX00 0004h	4
Originating FDF/FCDF Switch_Name	8
Destination Controlling FCF/Switch Switch_Name	8
Unreachable FDF/FCDF or Controlling FCF/Switch Switch_Name	8

Originating FDF/FCDF Switch_Name: contains the Switch_Name of the requesting FDF/FCDF.

Destination Controlling FCF/Switch Switch_Name: contains the Switch_Name of the destination Controlling FCF/Switch.

Unreachable FDF/FCDF or Controlling FCF/Switch Switch_Name: contains the Switch_Name of the adjacent entity with which the VA_Port to VA_Port (Virtual) Link has been deinstantiated.

FDUN Reply Sequence

SW_ACC: SW_ACC indicates the acceptance of the FDUN Request Sequence for processing. The format of the FDUN SW_ACC Payload is shown in table 9.

Table 9 – FDUN SW_ACC Payload

Item	Size (bytes)
SW_ILS Code = 0200 0000h	4

1.2.6 N_Port_ID Route Distribution (NPRD)

The N_Port_ID Route Distribution SW_ILS is used by the Primary Controlling FCF/Switch to communicate to an FDF the N_Port_ID routing information for the Distributed FCF/Switch. If the Primary Controlling FCF/Switch does not have a VA_Port to VA_Port (Virtual) Link with the destination FDF/FCDF, the NPRD SW_ILS is relayed to the destination FDF/FCDF by the intermediate FDFs/FCDFs.

NPRD Request Sequence

Addressing: the S_ID field shall be set to FFFFF9h, indicating the originating VA_Port, and the D_ID field shall be set to FFFFF9h, indicating the destination VA_Port.

Payload: the format of the NPRD Request Sequence Payload is shown in table 10.

Table 10 – NPRD Request Payload

Item	Size (bytes)
SW_ILS Code = XX00 0005h	4
Originating Controlling FCF/Switch Switch_Name	8
Destination FDF/FCDF Switch_Name	8
Primary Controlling FCF/Switch Switch_Name	8
Number of Paths to the Primary Controlling FCF/Switch (j)	4
Next-hop Switch_Name #1	8
Path #1 cost	4
Next-hop Switch_Name #2	8
Path #2 cost	4
...	
Next-hop Switch_Name #j	8
Path #j cost	4
Secondary Controlling FCF Switch_Name	8
Number of Paths to the Secondary Controlling FCF/Switch (g)	4
Next-hop Switch_Name #1	8
Path #1 cost	4
Next-hop Switch_Name #2	8
Path #2 cost	4
...	
Next-hop Switch_Name #g	8
Path #g cost	4
Number of N_Port_ID Range Entries (p)	4
N_Port_ID Range Entry #1	see table 11
N_Port_ID Range Entry #2	see table 11
…	
N_Port_ID Range Entry #p	see table 11
Number of Reachable Domain_ID Entries (r)	4
Reachable Domain_ID Entry #1	see table 12
Reachable Domain_ID Entry #2	see table 12
…	
Reachable Domain_ID Entry #r	see table 12

Originating Controlling FCF/Switch Switch_Name: contains the Switch_Name of the requesting Controlling FCF/Switch.

Destination FDF/FCDF Switch_Name: contains the Switch_Name of the destination FDF/FCDF.

Primary Controlling FCF/Switch Switch_Name: contains the Switch_Name of the Primary Controlling FCF/Switch.

Number of Paths to the Primary Controlling FCF/Switch: contains the number of paths toward the Primary Controlling FCF/Switch. Each path that follows is expressed as the Switch_Name of the next-hop FDF/FCDF or Controlling FCF/Switch followed by its cost.

NOTE 1 – Paths toward the Primary Controlling FCF/Switch are fundamental for the operation of an FDF/FCDF. Specifying higher cost paths enables more redundancy, because if the lowest cost path toward the Primary Controlling FCF/Switch fails, a higher cost path may be used.

Secondary Controlling FCF/Switch Switch_Name: contains the Switch_Name of the Secondary Controlling FCF/Switch.

Number of Paths to the Secondary Controlling FCF/Switch: contains the number of paths toward the Secondary Controlling FCF/Switch. Each path that follows is expressed as the Switch_Name of the next-hop FDF/FCDF or Controlling FCF/Switch followed by its cost.

Number of N_Port_ID Range Entries: contains the number of N_Port_ID Range Entries that follow. The N_Port_ID Range Entry format is shown in table 11.

Table 11 – N_Port_ID Range Entry Format

Item	Size (bytes)
Destination FDF/FCDF Switch_Name	8
Number of Equal Cost Paths to the Destination FDF/FCDF (w)	4
Next-hop Switch_Name #1	8
Next-hop Switch_Name #2	8
...	
Next-hop Switch_Name #w	8
Number of N_Port_ID Ranges (q)	4
N_Port_ID Range #1	4
N_Port_ID Range #2	4
…	
N_Port_ID Range #q	4

Destination FDF Switch_Name: contains the Switch_Name of the FDF/FCDF to which the subsequent next-hops and N_Port_ID Ranges refer.

Number of Equal Cost Paths to the Destination FDF/FCDF: contains the number of equal cost paths having the lowest cost toward the destination FDF/FCDF. Each path that follows is expressed as the Switch_Name of the next-hop FDF/FCDF or Controlling FCF/Switch.

Number of N_Port_ID Ranges: contains the number of N_Port_ID Range Entries that follow. The N_Port_ID Range is defined by an N_Port_ID in the least significant three bytes, and by the number of bits defining the range in the most significant byte (e.g., the range 020200h .. 02027Fh is expressed as '7 || 020200h').

Number of Reachable Domain_ID Entries: contains the number of Reachable Domain_ID Entries that follow. The Reachable Domain_ID Entry format is shown in table 12.

Table 12 – Reachable Domain_ID Entry Format

Item	Size (bytes)
Destination Domain_ID	4
Number of Equal Cost Paths to the Destination Domain_ID (y)	4
Next-hop Switch_Name #1	8
Next-hop Switch_Name #2	8
...	
Next-hop Switch_Name #y	8

Destination Domain_ID: contains the reachable destination Domain_ID. The three most significant bytes of this field are reserved.

Number of Equal Cost Paths to the Destination Domain_ID: contains the number of equal cost paths having the lowest cost toward the destination Domain_ID. Each path that follows is expressed as the Switch_Name of the next-hop FDF/FCDF or Controlling FCF/Switch.

NPRD Reply Sequence

SW_ACC: SW_ACC indicates the acceptance of the NPRD Request Sequence for processing. The format of the NPRD SW_ACC Payload is shown in table 13.

Table 13 – NPRD SW_ACC Payload

Item	Size (bytes)
SW_ILS Code = 0200 0000h	4

1.2.7 N_Port_ID and Zoning ACL Distribution (NPZD)

The N_Port_ID and Zoning ACL Distribution SW_ILS is used by the Primary Controlling FCF/Switch to communicate to an FDF/FCDF and to the Secondary Controlling FCF/Switch the allocation or deallocation of an N_Port_ID and its associated Zoning ACL information. Upon receiving an NPZD Request, an FDF/FCDF shall update its Zoning enforcement according to the received Zoning ACLs only for the affected Peering N_Port_IDs. If the Primary Controlling FCF/Switch does not have a VA_Port to VA_Port (Virtual) Link with the destination FDF/FCDF, the NPZD SW_ILS is relayed to the destination FDF/FCDF by the intermediate FDFs/FCDFs.

NPZD Request Sequence

Addressing: when used between a FDF/FCDF and the Primary Controlling FCF/Switch the S_ID field shall be set to FFFFF9h, indicating the originating VA_Port, and the D_ID field shall be set to FFFFF9h, indicating the destination VA_Port. When used between the two Controlling FCFs/Switch-

es the S_ID field shall be set to FFFFFDh, indicating the originating VE_Port, and the D_ID field shall be set to FFFFFDh, indicating the destination VE_Port.

Payload: the format of the NPZD Request Sequence Payload is shown in table 14.

Table 14 – NPZD Request Payload

Item	Size (bytes)
SW_ILS Code = XX00 0006h	4
Originating Controlling FCF/Switch Switch_Name	8
Destination FDF/FCDF or Controlling FCF/Switch Switch_Name	8
Flags	4
Allocated / Deallocated N_Port_ID	4
N_Port_Name associated with the Allocated/Deallocated N_Port_ID	8
Switch_Name of the FDF/FCDF associated with the Allocated/Deallocated N_Port_ID	8
FLOGI / NPIV FDISC LS_ACC Parameters	116
Number of Peering Entries (h)	4
Peering Entry #1	see table 15
Peering Entry #2	see table 15
…	
Peering Entry #h	see table 15

Originating Controlling FCF/Switch Switch_Name: contains the Switch_Name of the requesting Controlling FCF/Switch.

Destination FDF/FCDF or Controlling FCF/Switch Switch_Name: contains the Switch_Name of the destination FDF/FCDF or Controlling FCF/Switch.

Flags: 32 flag bits. The following flag bits are defined:

Bit 32 .. 2: reserved.

Bit 1: indicates if the operation is an allocation or a deallocation. This flag is set to zero to indicate allocation and to one to indicate deallocation.

Bit 0: indicates if the FLOGI / NPIV FDISC LS_ACC Parameters field is present in the payload. The field is present when this flag is set to one and not present when this flag is set to zero.

Allocated / Deallocated N_Port_ID: contains the N_Port_ID that the Primary Controlling FCF allocated or deallocated in the least significant three bytes. The most significant byte is reserved.

N_Port_Name associated with the Allocated/Deallocated N_Port_ID: contains the N_Port_Name of the VN_Port for which an N_Port_ID is allocated or deallocated.

Switch_Name of the FDF/FCDF associated with the Allocated/Deallocated N_Port_ID: contains the Switch_Name of the FDF/FCDF associated with the VN_Port for which an N_Port_ID is allocated or deallocated.

FLOGI / NPIV FDISC LS_ACC Parameters: this field is present when bit zero of the flags field is set to one. It contains the payload of the LS_ACC generated by the Primary Controlling FCF in response to the FLOGI or NPIV FDISC payload provided in the VNRN Request Sequence.

Number of Peering Entries: contains the number of Peering Entries that follow. The Peering Entry format is shown in table 15.

Table 15 – Peering Entry Format

Item	Size (bytes)
Principal N_Port_ID	8
Number of Allowed Peers (k)	4
Peer N_Port_ID #1	4
Peer N_Port_ID #2	4
…	
Peer N_Port_ID #q	4

Principal N_Port_ID: contains the N_Port_ID to which the subsequent Peer N_Port_IDs refer.

Number of Allowed Peers: contains the number of N_Port_IDs to which the Principal N_Port_ID is allowed to communicate. The Peer N_Port_ID is defined by an N_Port_ID in the least significant three bytes. The most significant byte is reserved.

NPZD Reply Sequence

SW_ACC: SW_ACC indicates the acceptance of the NPZD Request Sequence for processing. The format of the NPZD SW_ACC Payload is shown in table 16.

Table 16 – NPZD SW_ACC Payload

Item	Size (bytes)
SW_ILS Code = 0200 0000h	4

1.2.8 Active Zoning ACL Distribution (AZAD)

The Active Zoning ACL Distribution SW_ILS is used by the Primary Controlling FCF/Switch to communicate to an FDF/FCDF new Zoning ACL information when a new Zone Set is activated in the fabric. Upon receiving an NPZD Request, an FDF/FCDF shall completely replace its Zoning enforcement according to the received Zoning ACLs. If the Primary Controlling FCF/Switch does not have a VA_Port to VA_Port (Virtual) Link with the destination FDF/FCDF, the AZAD SW_ILS is relayed to the destination FDF/FCDF by the intermediate FDFs/FCDFs.

AZAD Request Sequence

Addressing: the S_ID field shall be set to FFFFF9h, indicating the originating VA_Port, and the D_ID field shall be set to FFFFF9h, indicating the destination VA_Port.

Payload: the format of the AZAD Request Sequence Payload is shown in table 17.

Table 17 – AZAD Request Payload

Item	Size (bytes)
SW_ILS Code = XX00 0007h	4
Originating Controlling FCF/Switch Switch_Name	8
Destination FDF/FCDF Switch_Name	8
Number of Peering Entries (m)	4
Peering Entry #1	see table 15
Peering Entry #2	see table 15
…	
Peering Entry #m	see table 15

Originating Controlling FCF/Switch Switch_Name: contains the Switch_Name of the requesting Controlling FCF/Switch.

Destination FDF/FCDF Switch_Name: contains the Switch_Name of the destination FDF/FCDF.

Number of Peering Entries: contains the number of Peering Entries that follow. The Peering Entry format is shown in table 15.

AZAD Reply Sequence

SW_ACC: SW_ACC indicates the acceptance of the AZAD Request Sequence for processing. The format of the AZAD SW_ACC Payload is shown in table 18.

Table 18 – AZAD SW_ACC Payload

Item	Size (bytes)
SW_ILS Code = 0200 0000h	4

1.2.9 Distributed FCF/Switch Membership Distribution (DFMD)

The Distributed FCF/Switch Membership Distribution SW_ILS is used by the Primary Controlling FCF/Switch to communicate to an FDF/FCDF the identities of the Primary and Secondary Controlling FCFs/Switches and of all the FDFs/FCDFs that compose the Distributed FCF/Switch. The DFMD payload may be integrity protected by a cryptographic hash; in this case the involved entities shall be provided with a shared key. If the Primary Controlling FCF/Switch does not have a VA_Port to VA_Port (Virtual) Link with the destination FDF/FCDF, the DFMD SW_ILS is relayed to the destination FDF/FCDF by the intermediate FDFs/FCDFs.

DFMD Request Sequence

Addressing: the S_ID field shall be set to FFFFF9h, indicating the originating VA_Port, and the D_ID field shall be set to FFFFF9h, indicating the destination VA_Port.

Payload: the format of the DFMD Request Sequence Payload is shown in table 19.

Table 19 – DFMD Request Payload

Item	Size (bytes)
SW_ILS Code = XX00 0008h	4
Originating Controlling FCF/Switch Switch_Name	8
Destination FDF/FCDF Switch_Name	8
Primary Controlling FCF/Switch Switch_Name	8
Secondary Controlling FCF/Switch Switch_Name	8
Number of FDFs/FCDFs (n)	4
FDF/FCDF Switch_Name #1	8
FDF/FCDF Switch_Name #2	8
…	
FDF/FCDF Switch_Name #n	8
Integrity Type	4
Integrity Check Value Length	4
Integrity Check Value	variable

Originating Controlling FCF/Switch Switch_Name: contains the Switch_Name of the requesting Controlling FCF/Switch.

Destination FDF/FCDF Switch_Name: contains the Switch_Name of the destination FDF/FCDF.

Primary Controlling FCF/Switch Switch_Name: contains the Switch_Name of the Primary Controlling FCF/Switch.

Secondary Controlling FCF/Switch Switch_Name: contains the Switch_Name of the Secondary Controlling FCF/Switch.

Number of FDFs/FCDFs: contains the number of FDF/FCDF Switch_Names that follow. This list of FDF/FCDF Switch_Names is the FDF/FCDF Set of the Distributed FCF/Switch. If the number of FCF/FCDF Switch_Names is zero, then any FDF/FCDF is allowed in the Distributed FCF/Switch.

Integrity Type: indicates, in the least significant byte, the type of cryptographic integrity that protects the DFMD Payload. The defined values are:

00h: No integrity

01h: HMAC-SHA-256-128 integrity

02h .. FFh: Reserved

Integrity Check Value Length: contains the length expressed in bytes of the Integrity Check Value.

Integrity Check Value: contains the cryptographic hash of the DFMD payload computed using the shared key according to the specified Integrity Type.

DFMD Reply Sequence

SW_ACC: SW_ACC indicates the acceptance of the DFMD Request Sequence for processing. The format of the DFMD SW_ACC Payload is shown in table 20.

Table 20 – DFMD SW_ACC Payload

Item	Size (bytes)
SW_ILS Code = 0200 0000h	4

1.3 Handling of Well Known Addresses

ENodes and Nodes use Well Known Addresses (WKAs) and Domain Controller address identifiers to exchange information with the Fabric, either through ELSs or through the Common Transport protocol. In a Distributed FCF/Switch all this information handling is performed by the Primary Controlling FCF/Switch, therefore an FDF/FCDF shall forward all FCoE/FC frames having as D_ID the address identifiers listed in table 21 to the Primary Controlling FCF/Switch through a VA_Port. The NPRD SW_ILS provides to FDFs/FCDFs the routing information needed to reach the Primary Controlling FCF/Switch.

Table 21 – Forwarded Domain Controller and Well Known Address Identifiers

Address Value	Description
FFFC01h .. FFFCFEh	Domain Controller Address Identifiers
FFFFF4h	Event Service WKA
FFFFF6h	Clock Synchronization Service WKA
FFFFF7h	Security Key Distribution Service WKA
FFFFFAh	Management Service WKA
FFFFFBh	Time Service WKA
FFFFFCh	Directory Service WKA
FFFFFDh	Fabric Controller WKA
FFFFFEh	F_Port Controller WKA

The Fabric Controller WKA is used by some ELSs (e.g., RSCN, SCR) and to identify VE_Ports (i.e., it is used by SW_ILSs exchanged between VE_Ports). The use of a different WKA to identify VA_Ports (i.e., FFFFF9h, currently reserved) enables an unambiguous handling of the Fabric Controller WKA (i.e., FCoE and FC frames with the Fabric Controller WKA as D_ID are forwarded to the Primary Controlling FCF/Switch).

The F_Port Controller WKA is used for login and logout purposes and by other ELSs (e.g., RLS). With FCoE, Login and logout are performed through FIP and therefore handled locally by an FDF. Other ELSs using the F_Port Controller WKA are FCoE encapsulated and forwarded to the Primary Controlling FCF. With native FC, the FLOGI, NPIV FDISC and LOGO ELSs shall be locally processed by an FCDF.