



Virtual Domain

T11/10-345v2



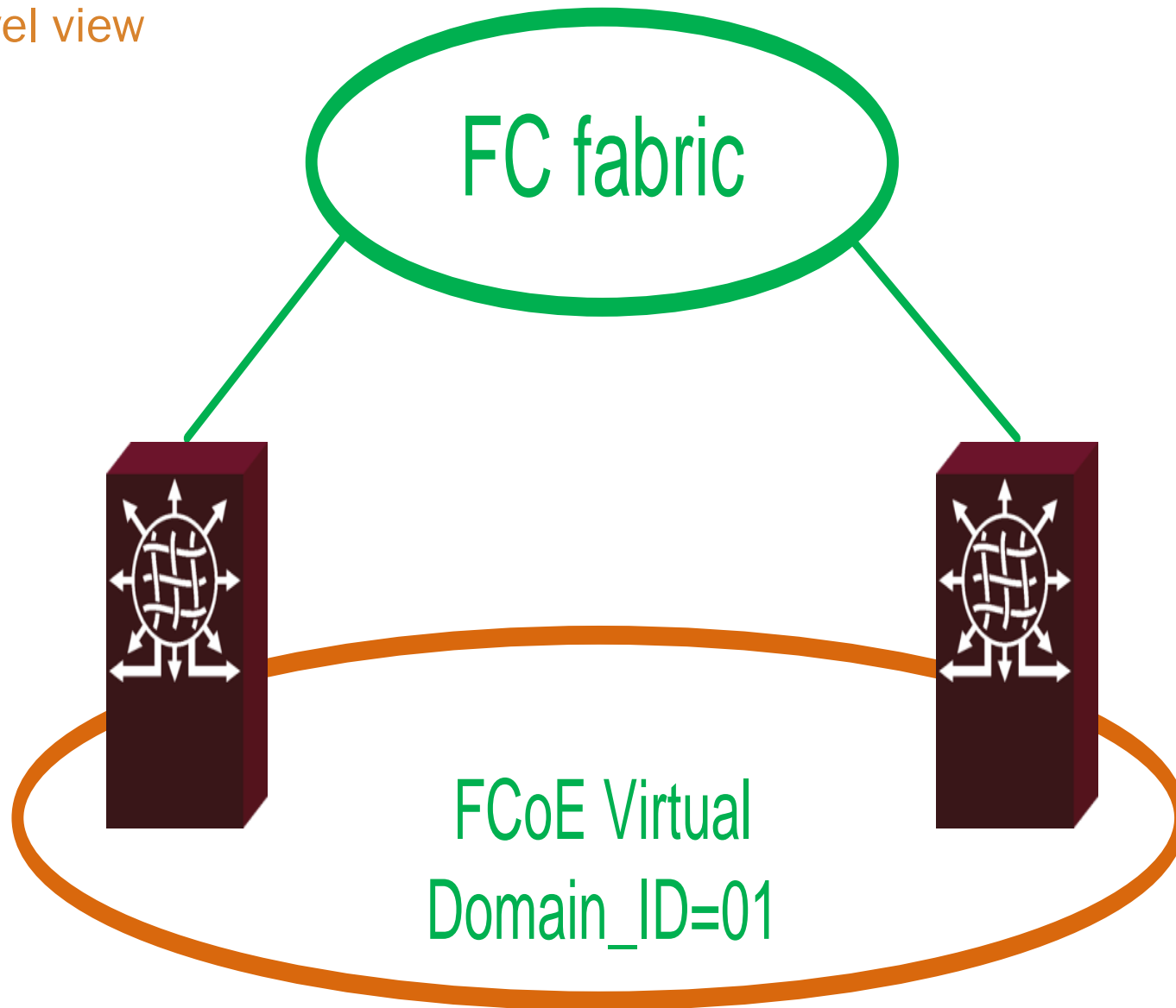
Virtual Domain

Introduction

- Supports Point-to-Point (P2P) and Point-to-Multipoint (P2MP)
 - P2P is very straight forward, and is this presentations focus
 - P2MP is supported by port configuration to allow/disallow Virtual Link instantiation between Controlling FCFs and FDFs

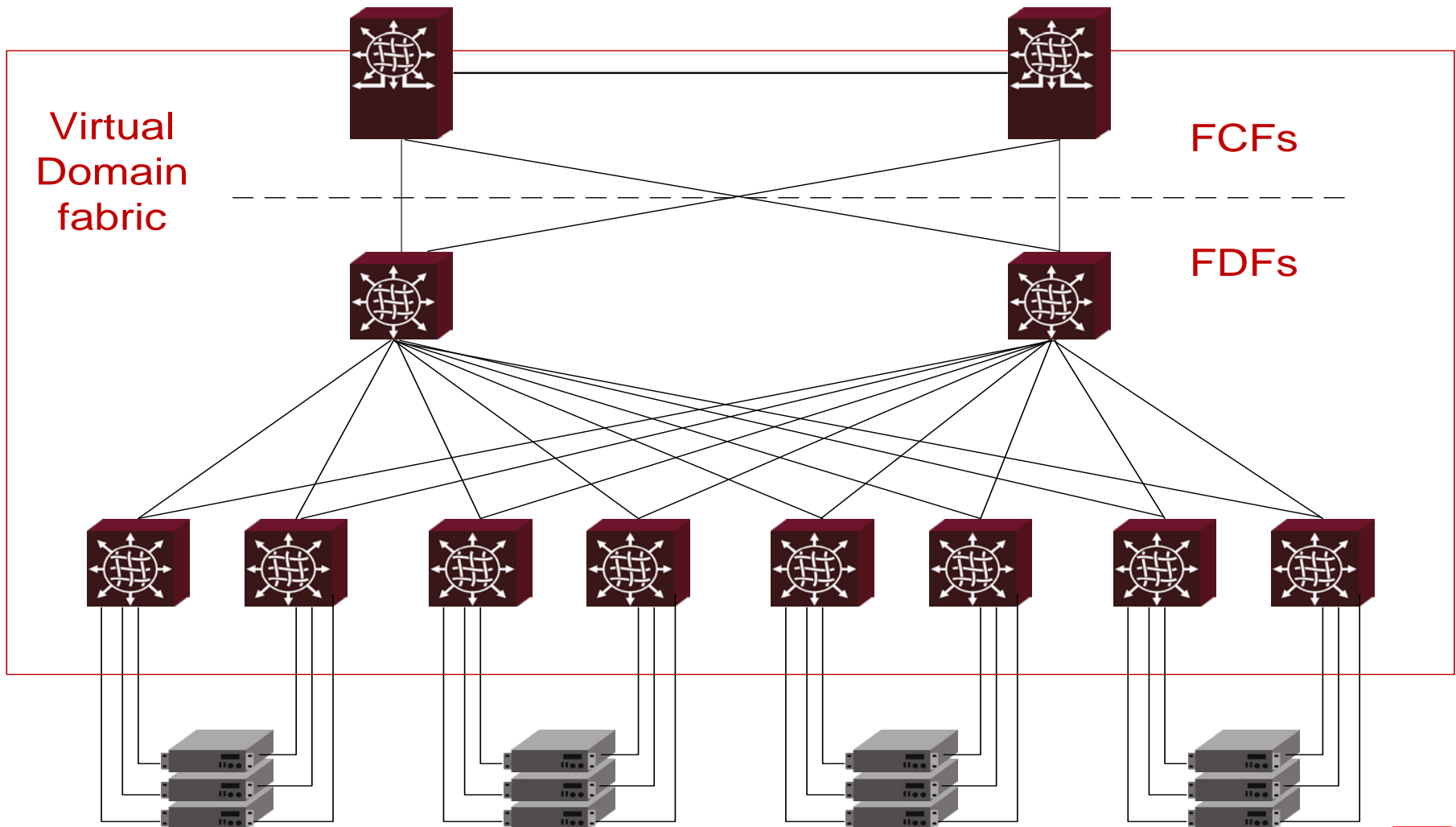
Virtual Domain

High level view



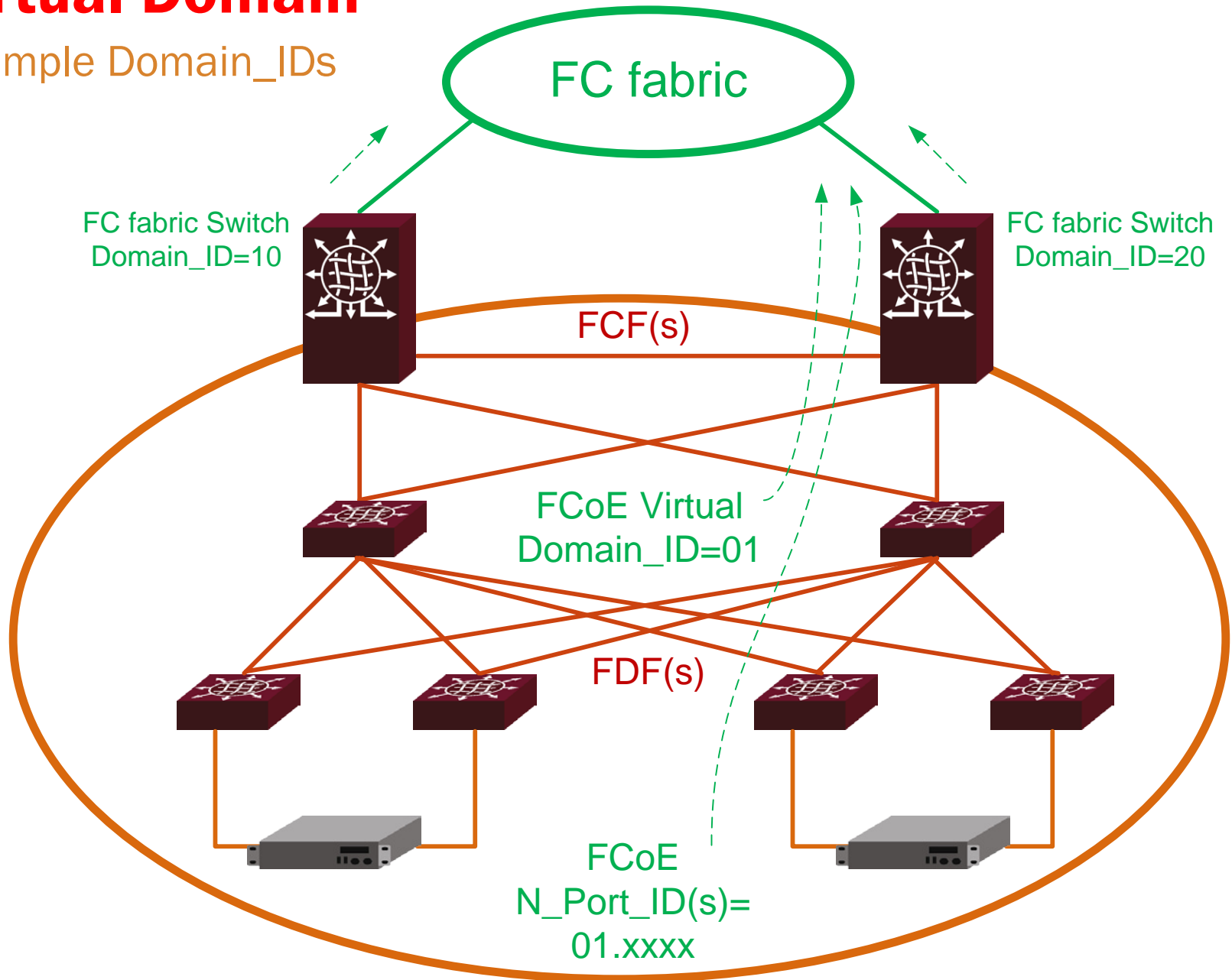
Virtual Domain

P2P multi-hop configuration example



Virtual Domain

Example Domain_IDs



Virtual Domain

Overview

- Controlling FCFs and FDFs
- FDFs do not connect to FC fabric
- All end devices in the Virtual Domain are presented to the Fabric via a single Domain 😊
- Each FCF and FDF is assigned a Virtual Domain unique subDomain_ID (SDID)



Virtual Domain

Addressing & Routing

- Usable address range is 16 bits (i.e., 01.xx.xx)
- CIDR-based addressing may be used to indicate the SDID in the N_Port_ID
 - 8-bit SDID network address mask for the (entire) Virtual Domain is configured (i.e., all FDFs in the Virtual Domain use the same prefix)
- FSPF is used to keep the FCFs and FDFs informed of the path costs to the SDIDs



Virtual Domain

CIDR-based addressing

- SDID value of 00h is Reserved per FC-SW-5

Network Address bit(s)		Host Address bits	
Binary	Num	Binary	Num
1b	1	1111111111111111b	32768
11b	3	1111111111111111b	16384
111b	7	1111111111111111b	8192
1111b	15	111111111111111b	4096
11111b	31	11111111111111b	2048
111111b	63	1111111111111b	1024
1111111b	127	111111111111b	512
11111111b	255	1111111111b	256



Controlling FCF(s)

Functionality (1)

- Operate as pairs (Master and Slave)
- Perform normal FC-SW-5 Fabric Configuration with native FC fabric (if present)
- Creates Virtual Link with Controlling FCF peer
 - Master FCF is higher Switch_Name
- Assign and confirm Virtual Domain_ID
 - Configured value to use independent of FC fabric



Controlling FCF(s)

Functionality (2)

- If FC fabric is present, send RDI requesting the Virtual Domain_ID
 - If Virtual Domain_ID is not granted, segment
 - Virtual Domain is still functional, but user intervention required
 - If Virtual Domain_ID is granted, send LSU for the Virtual Domain to FC fabric



Controlling FCF

Functionality (3)

- Send Virtual Domain_ID information to the Slave FCF
 - Master FCF Switch_Name
 - Slave FCF Switch_Name
 - Virtual Domain Switch_Name
 - Virtual Domain_ID
- Send SDID to each FDF
- Create Virtual Link(s) with Controlling FCF(s) and each other FDF in the Virtual Domain
- Receive FIP FLOGI and forward the FIP FLOGI to the Master FCF
- Runs standard SW-5 FSPF protocol



VE_Port Virtual Link(s)

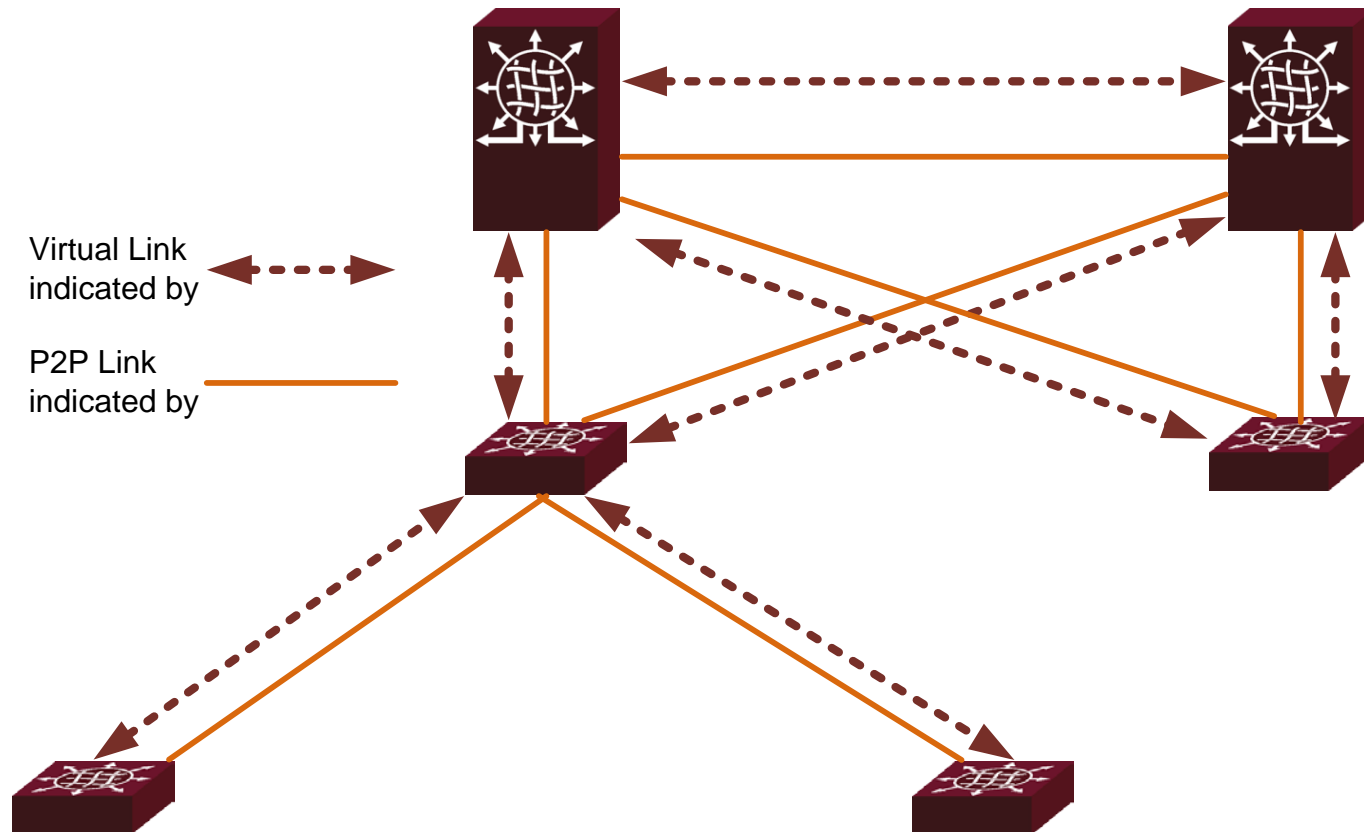
Used for both FCF(s) and FDF(s)

- Lightweight VE_Port implementation
 - FIP discovery for Controlling FCF(s) and FDF(s)
 - Controlling FCF
 - Assigns and confirms Virtual Domain_ID
 - transmits LSR to the native FC fabric if present
 - Allocates SDIDs for each FDF
 - No (SW-5) Principal Switch selection process
 - Master FCF is the “Principal Switch”
 - SW-5 Address assignment process
 - Zone Merge – TBD
 - Path Selection using FSPF



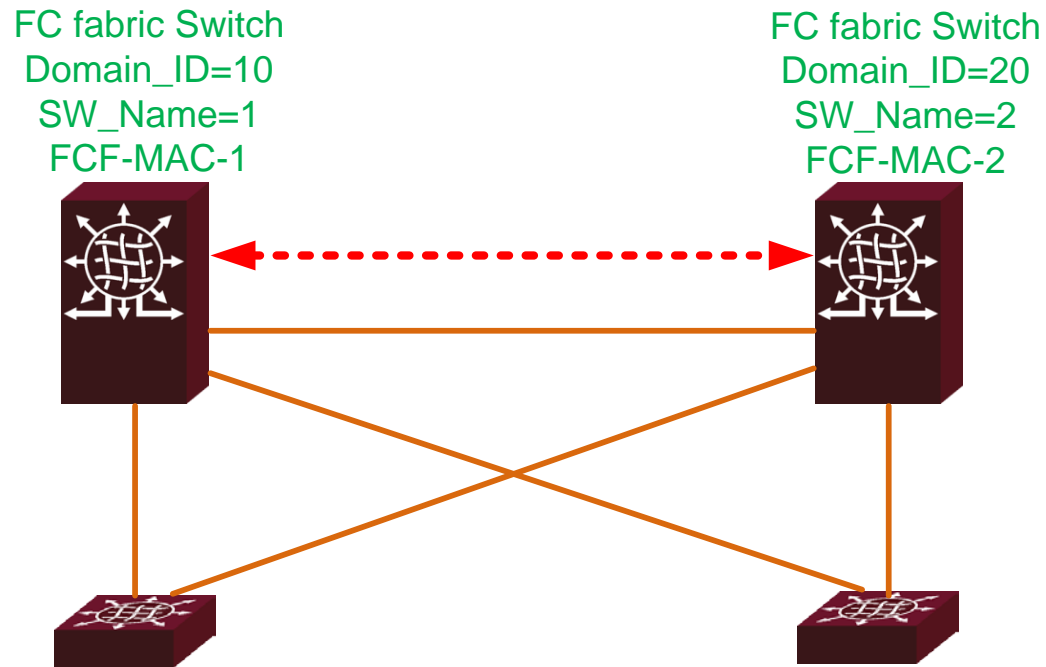
Virtual Domain

Virtual Links (slice)



Virtual Domain

Virtual Links (top slice, Controlling FCF to Controlling FCF)

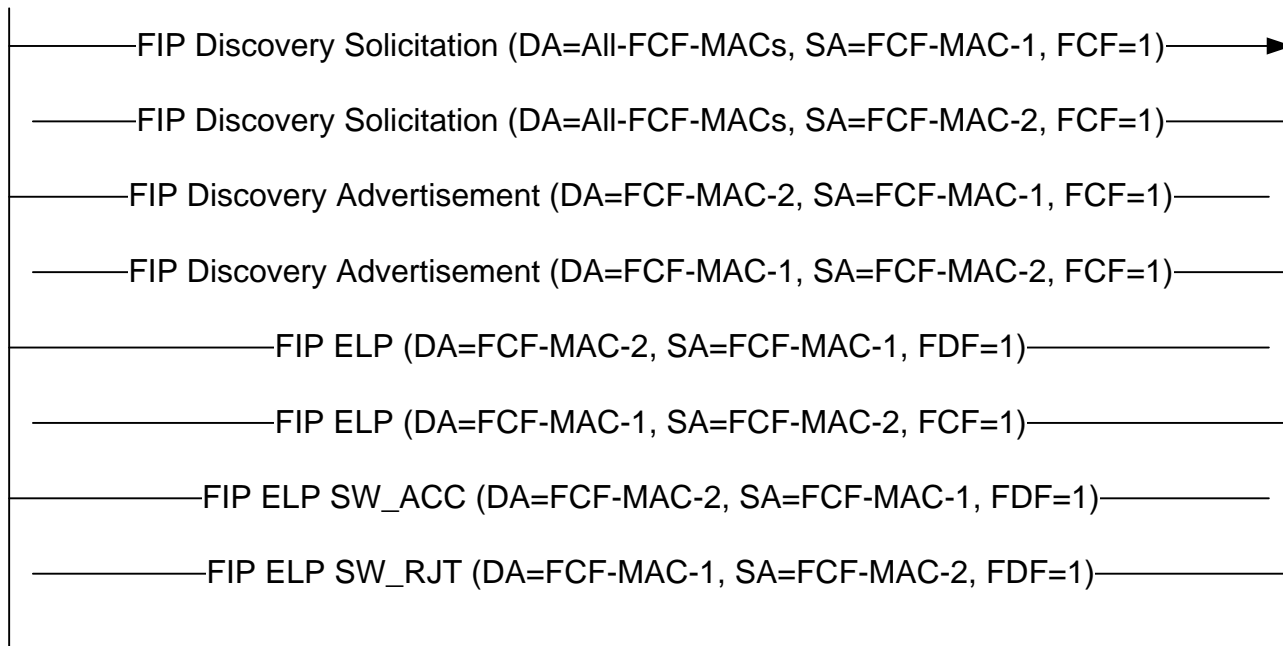


FCF to FCF Virtual Link instantiation

Controlling FCF(s) set FCF bit=1 (word 1 bit 14) in FIP DS, FIP DA, and FIP ELP, Master FCF selected by higher Switch_Name

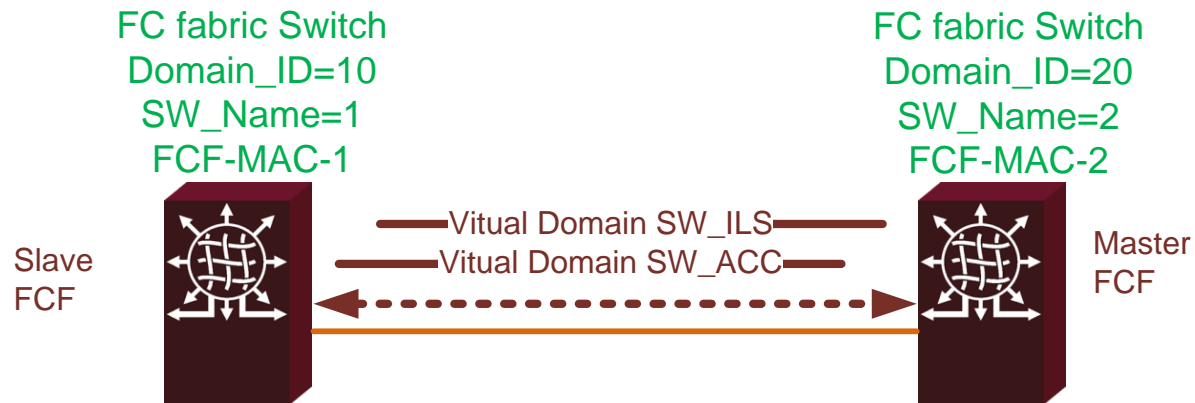
FCF (FCF-MAC-1, SW_Name=1)

FCF (FCF-MAC-2, SW_Name=2)



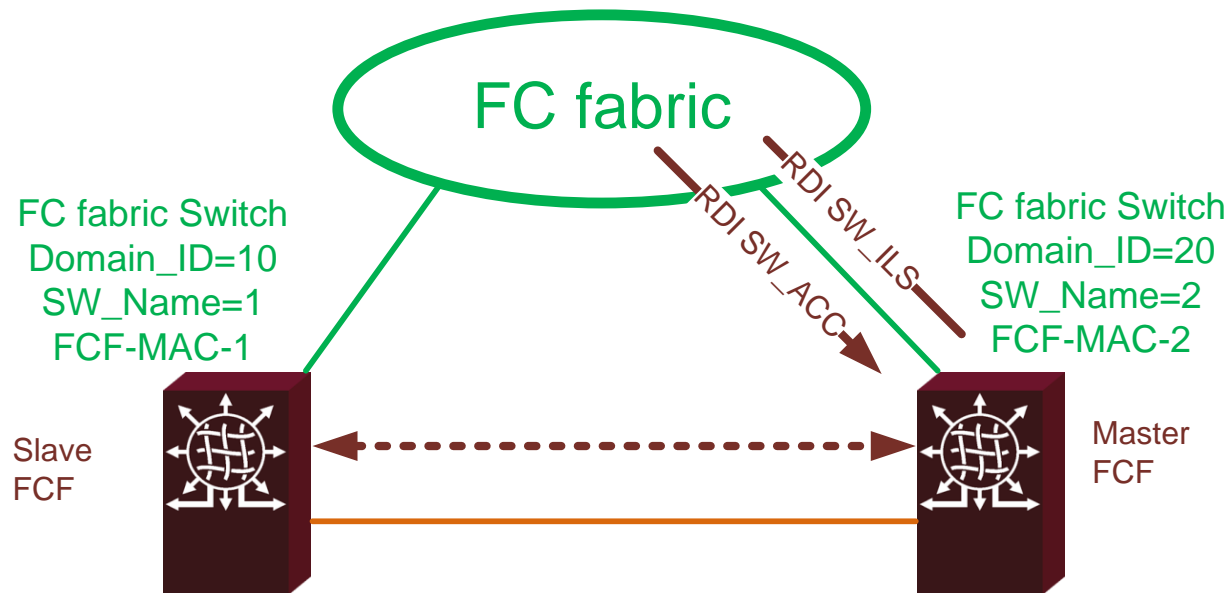
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Virtual Links (top slice, Master FCF assigns Virtual Domain_ID and sends Virtual Domain information to Slave FCF via new SW_ILS)



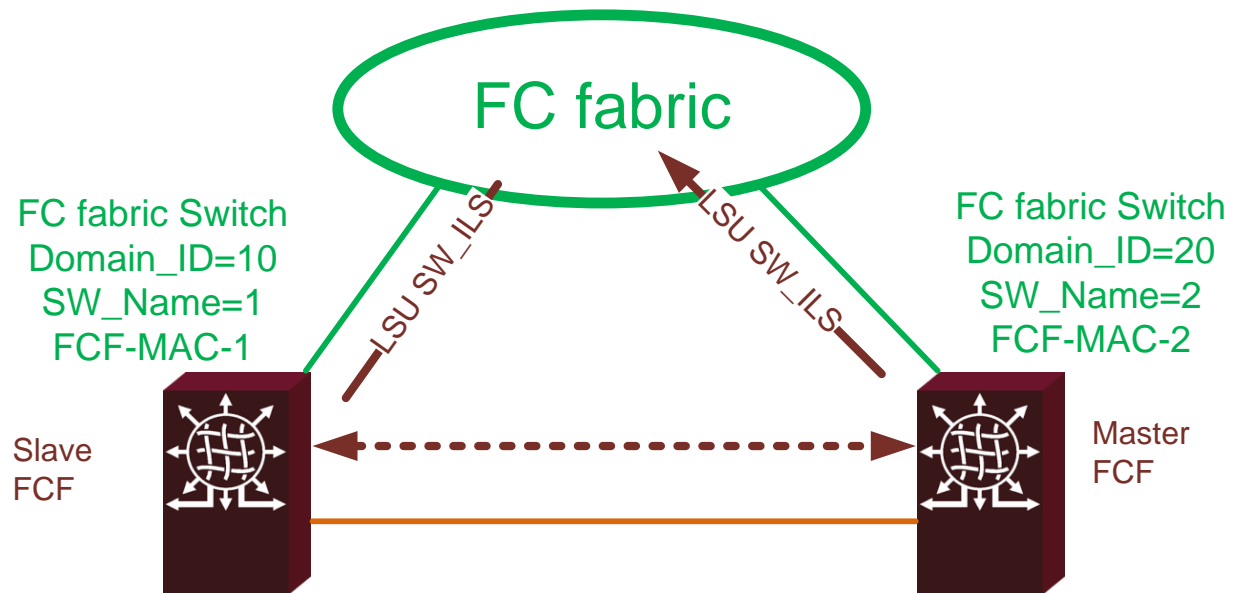
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Virtual Links (top slice, Master FCF sends RDI with Virtual Domain_ID to FC fabric to confirm Virtual Domain_ID)



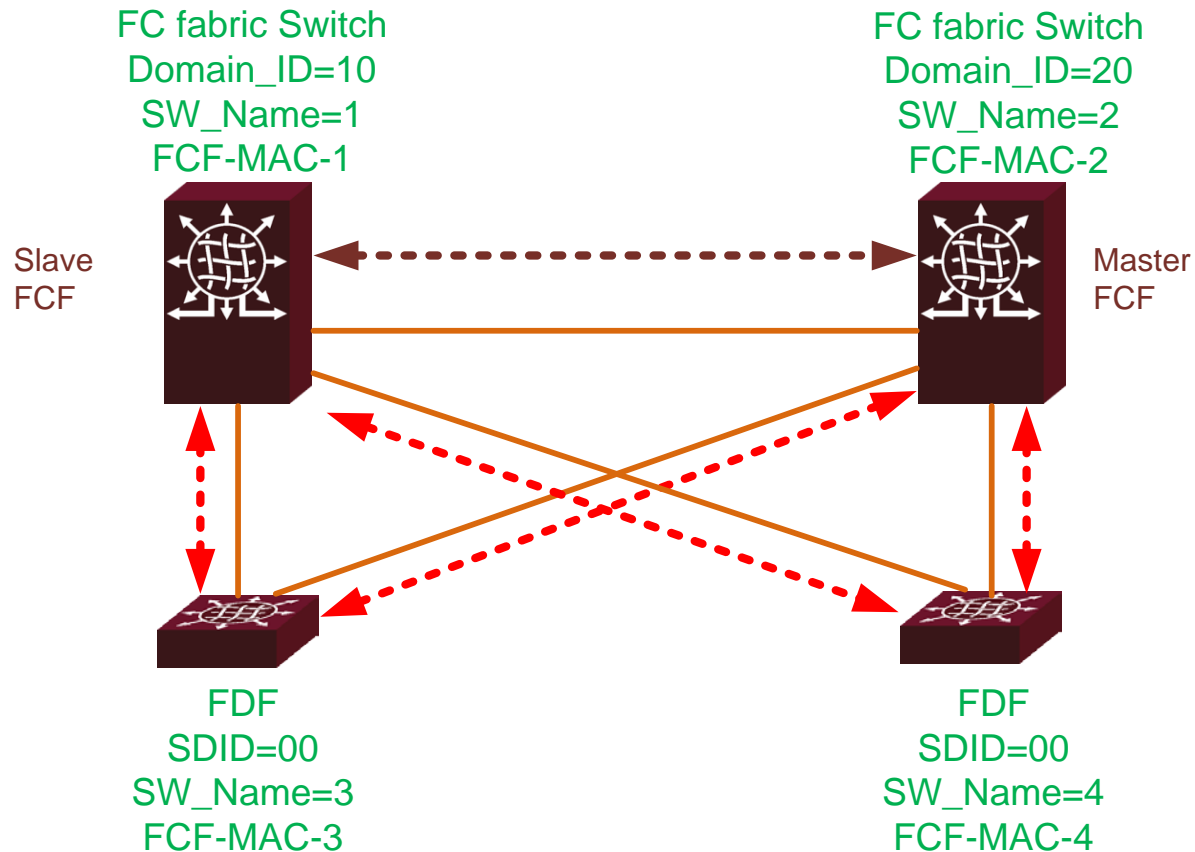
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Virtual Links (top slice, Master FCF sends LSU to FC fabric for Virtual Domain_ID)



Virtual Domain

Virtual Links (top slice, Controlling FCFs to FDFs)



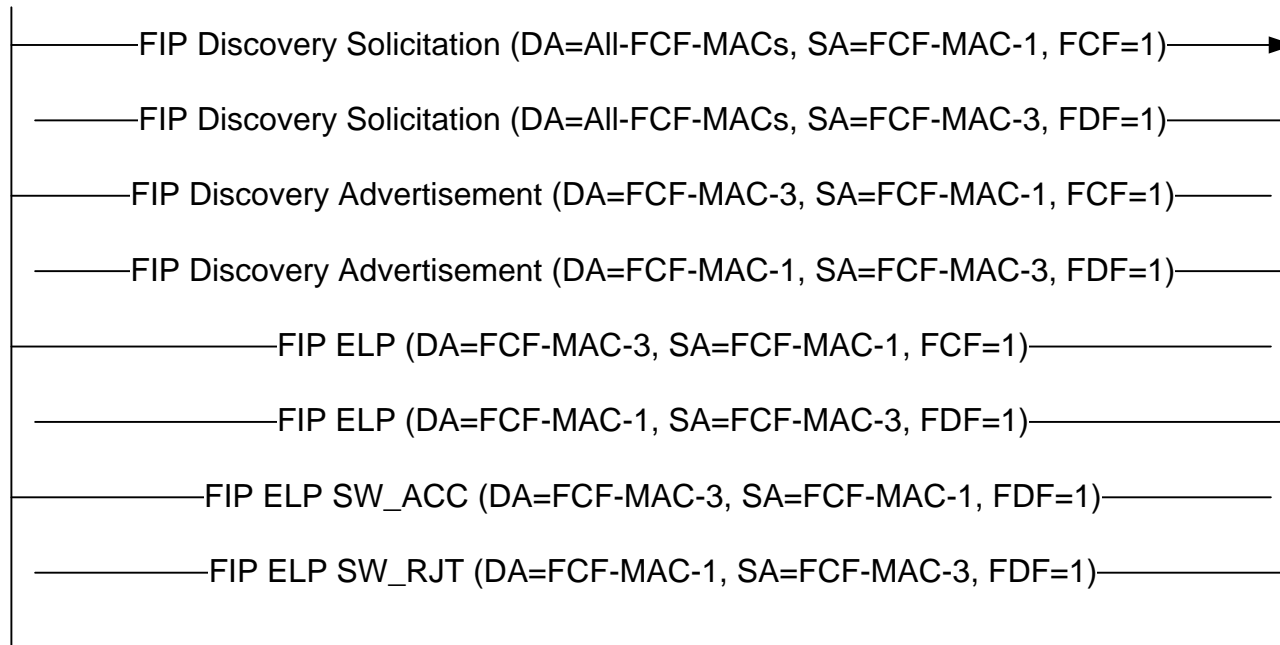
FCF to FDF Virtual Link instantiation

Controlling FCF(s) set FCF bit=1 in FIP DS, FIP DA, and FIP ELP

FDF(s) set FDF bit=1 (word 1 bit 15) in FIP DS, FIP DA, and FIP ELP

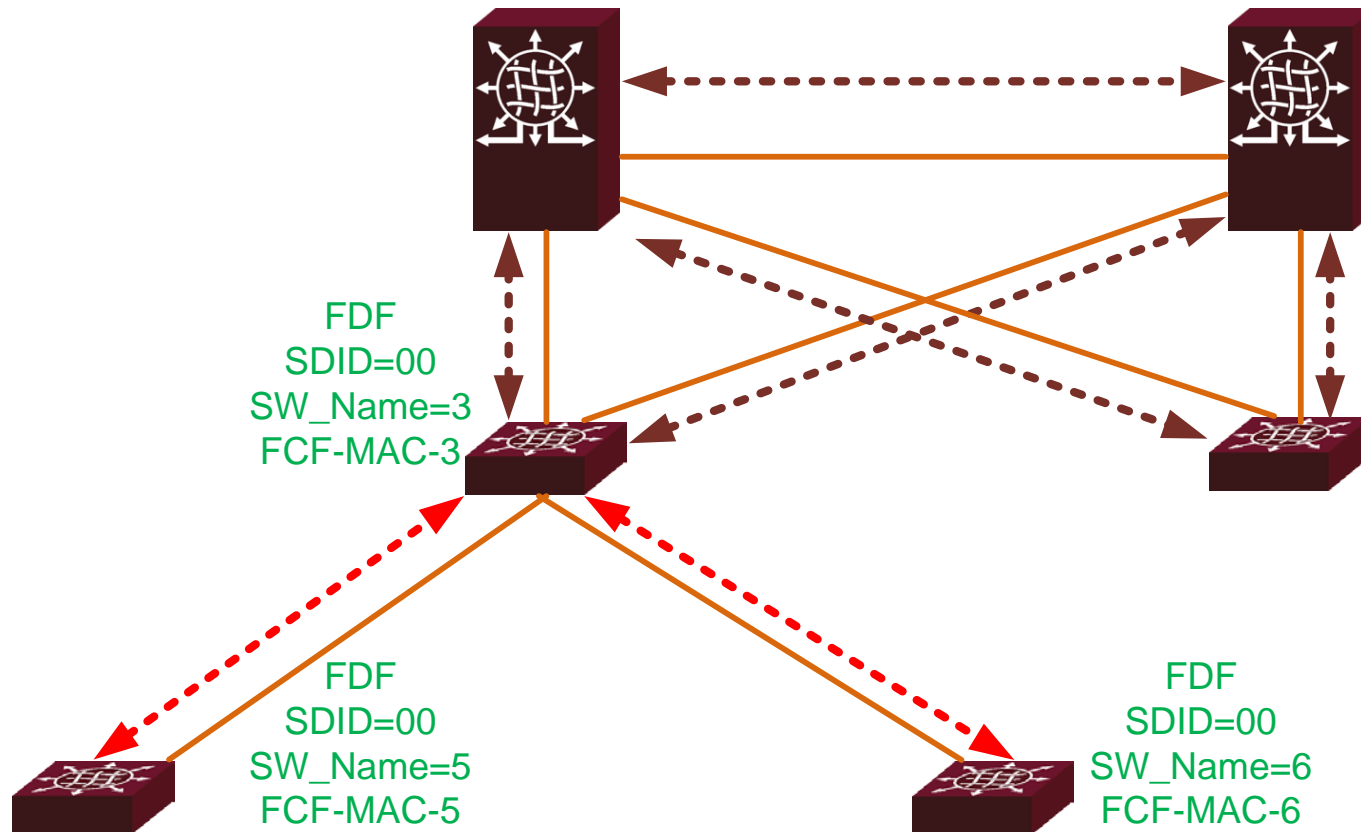
FCF (FCF-MAC-1, SW_Name=1)

FDF (FCF-MAC-3, SW_Name=3)



Virtual Domain

Virtual Links (bottom slice, FDF to FDF)

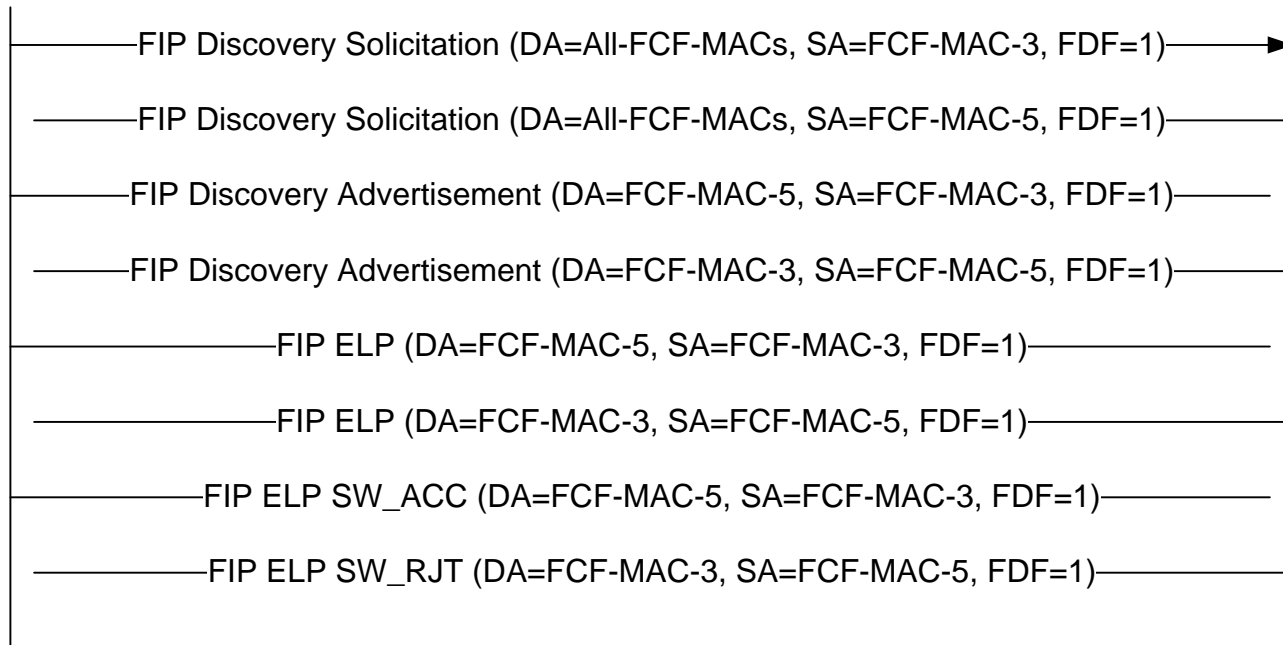


FDF to FDF Virtual Link instantiation

FDF(s) set FDF bit=1 in FIP DS, FIP DA, and FIP ELP

FDF (FCF-MAC-3, SW_Name=3)

FDF (FCF-MAC-5, SW_Name=5)

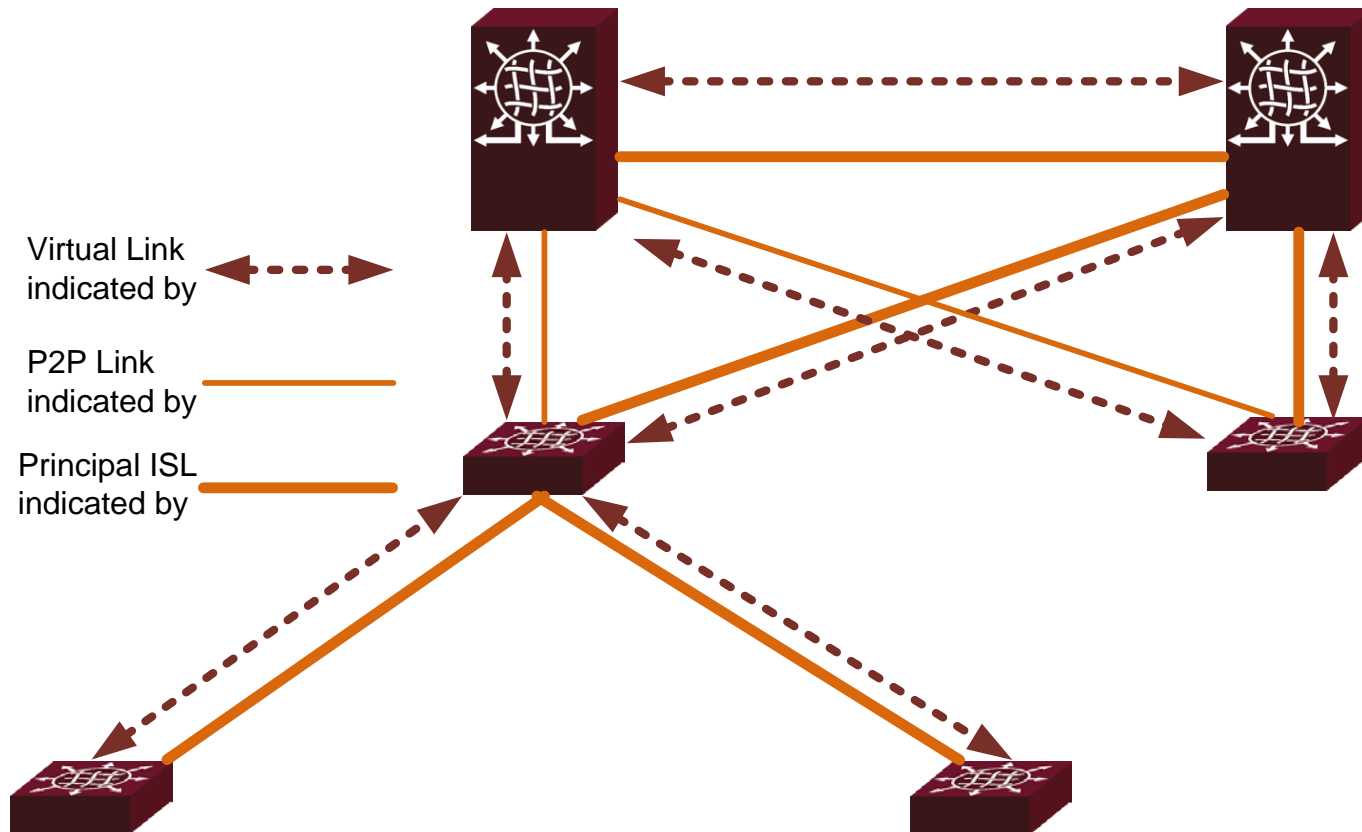


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subDomain_ID address assignment

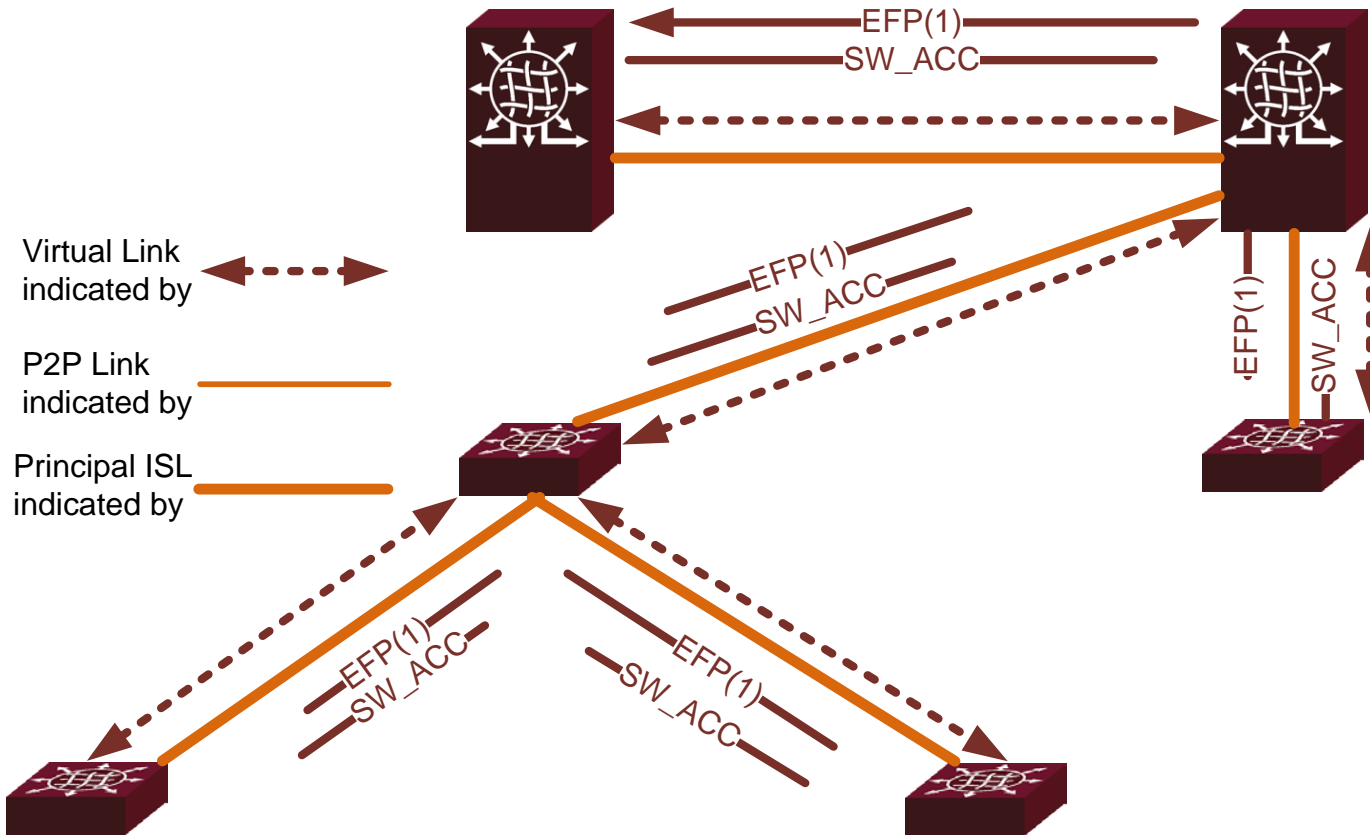
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subDomain_ID address assignment via SW-5 address assignment



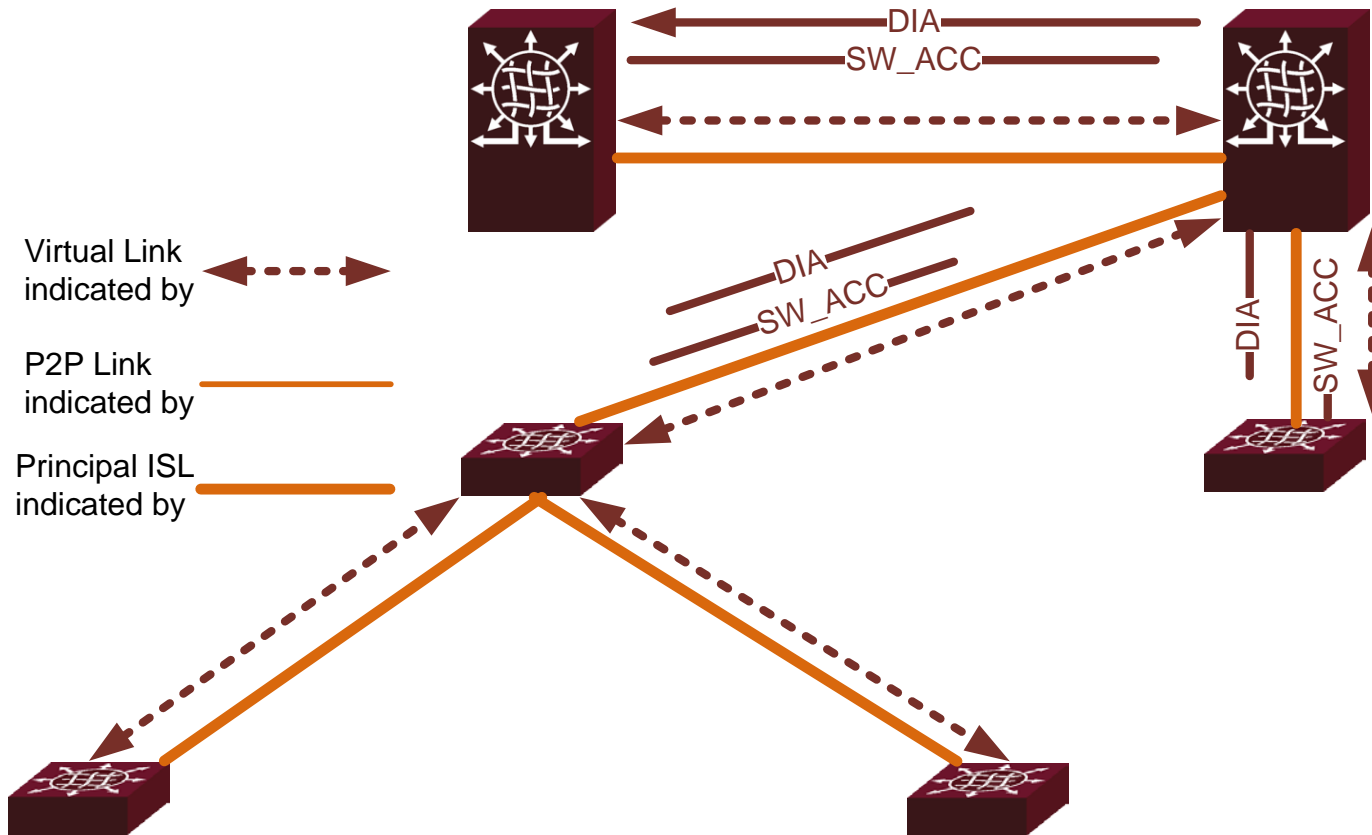
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Master FCF assigns itself SubDomain_ID=1 and sends EFP



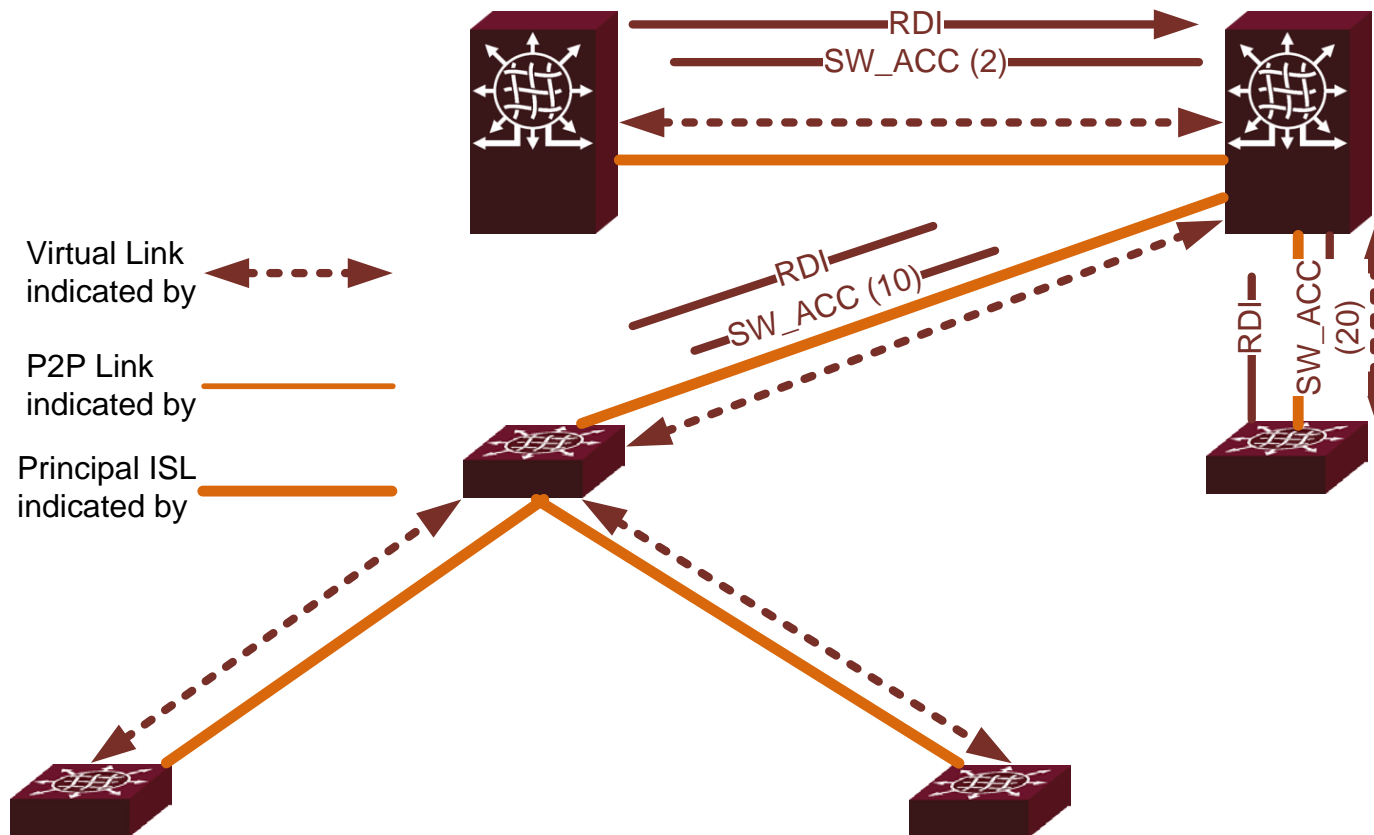
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Master FCF sends DIA



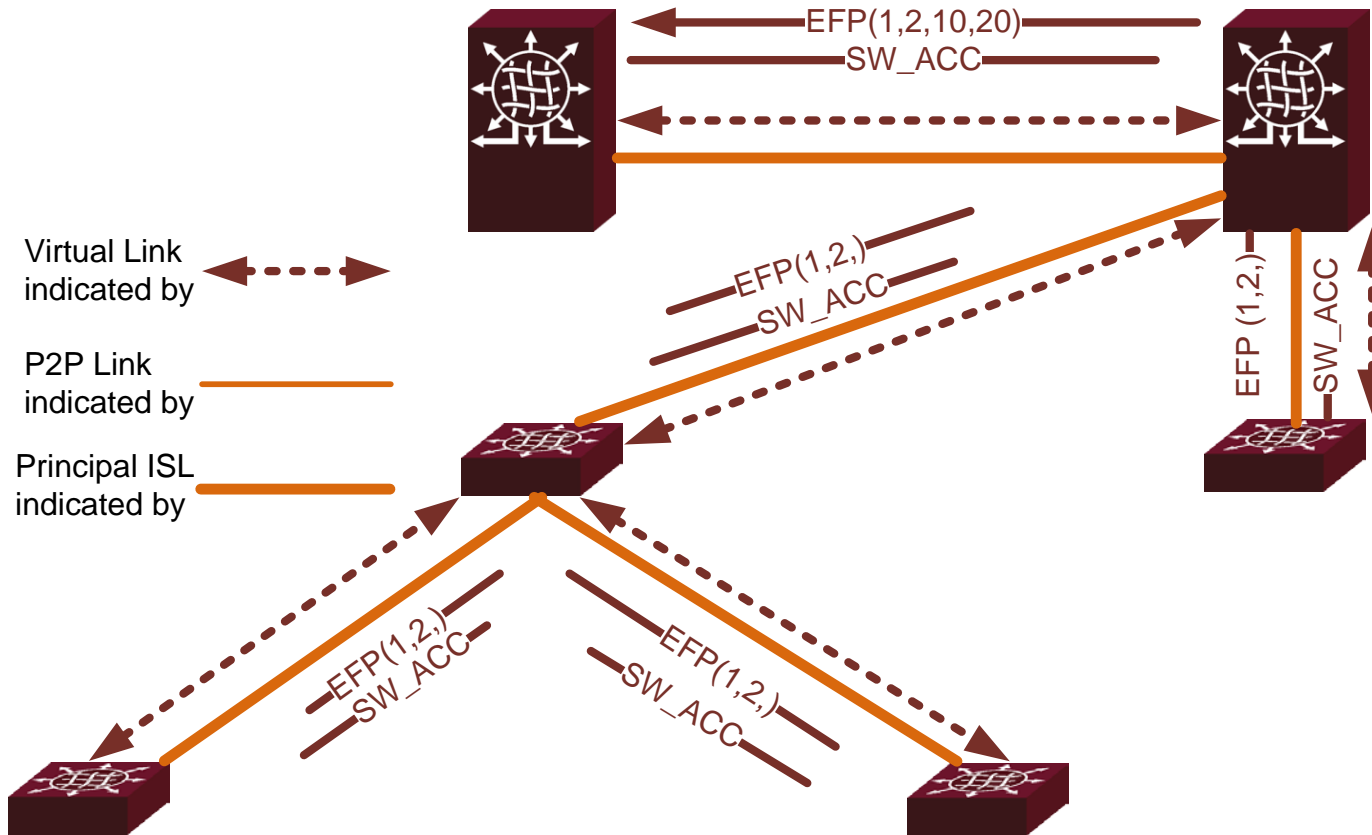
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Slave FCF and FDFs send RDI to the Master FCF and the SW_ACC contains the subDomain_ID



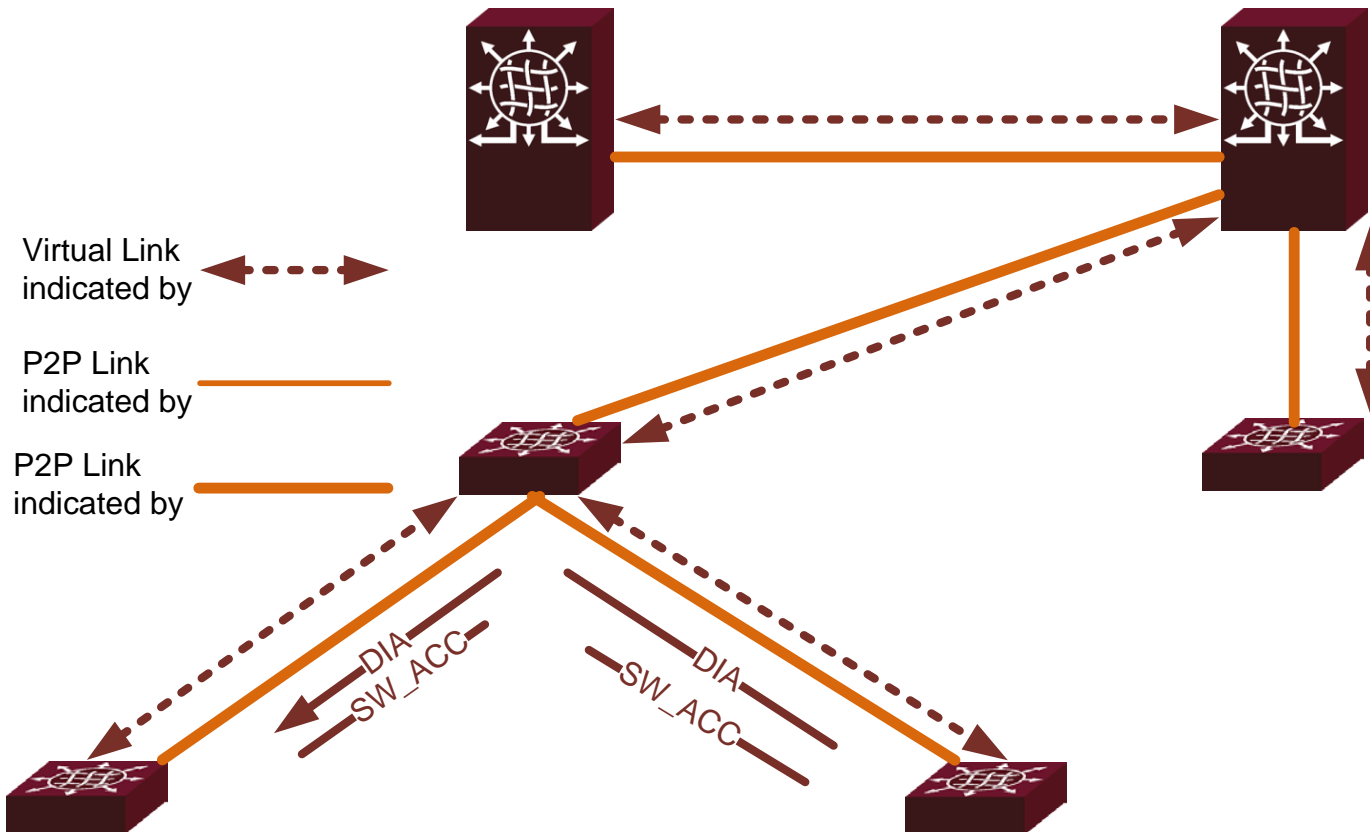
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Master FCF sends EFP update



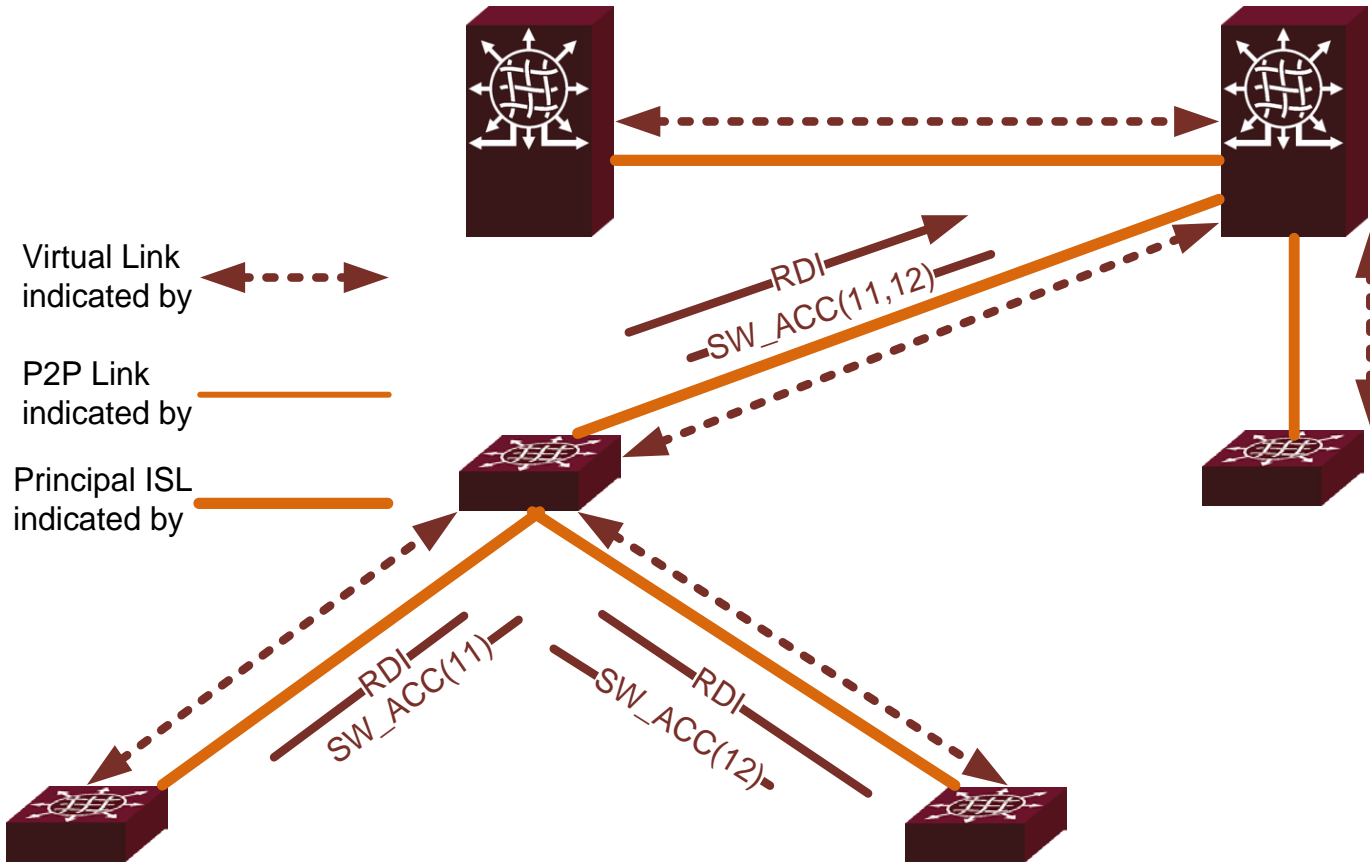
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Following receipt of RDI SW_ACC middle FDF sends DIA via downstream Principal ISL



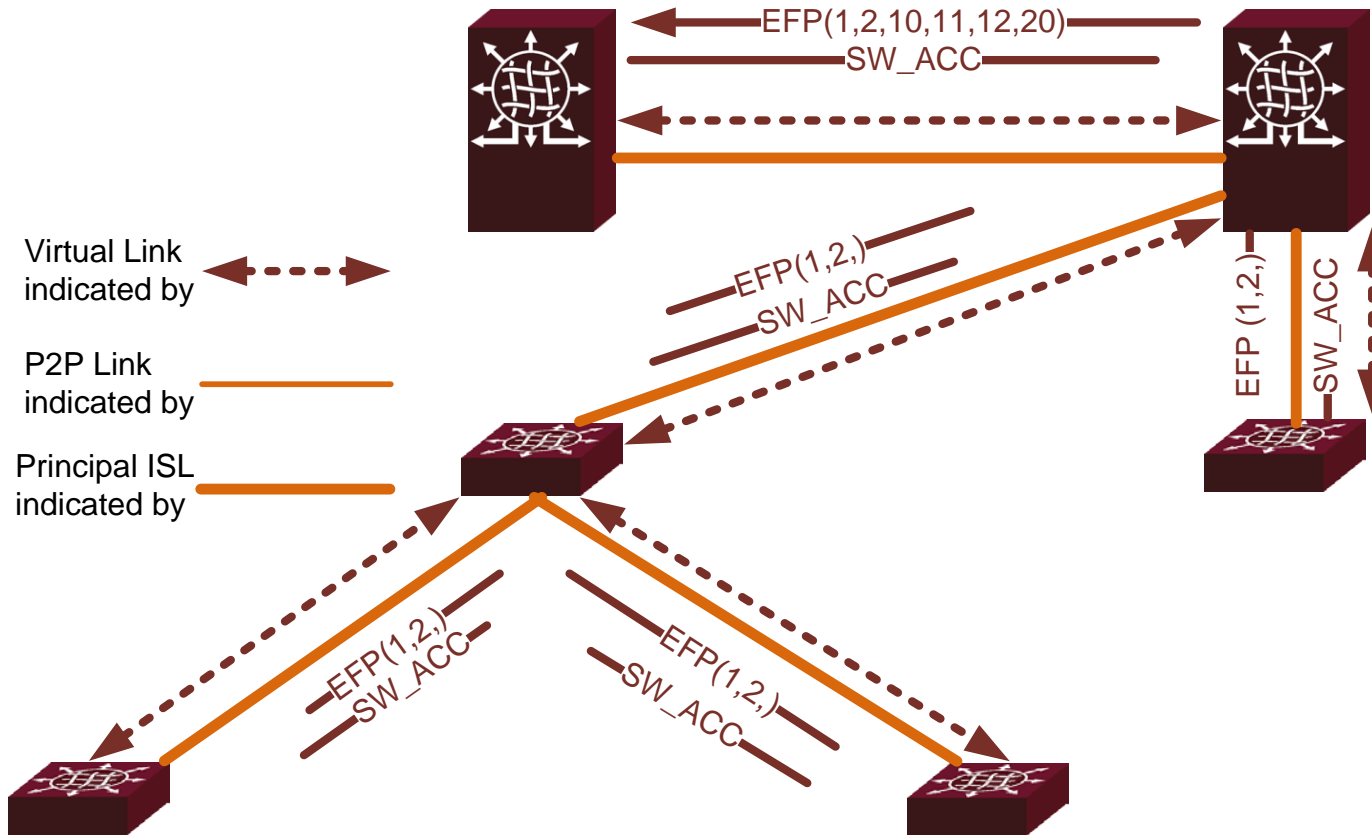
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Bottom FDFs send RDI to middle FDF which sends RDI(s) to Master FCF



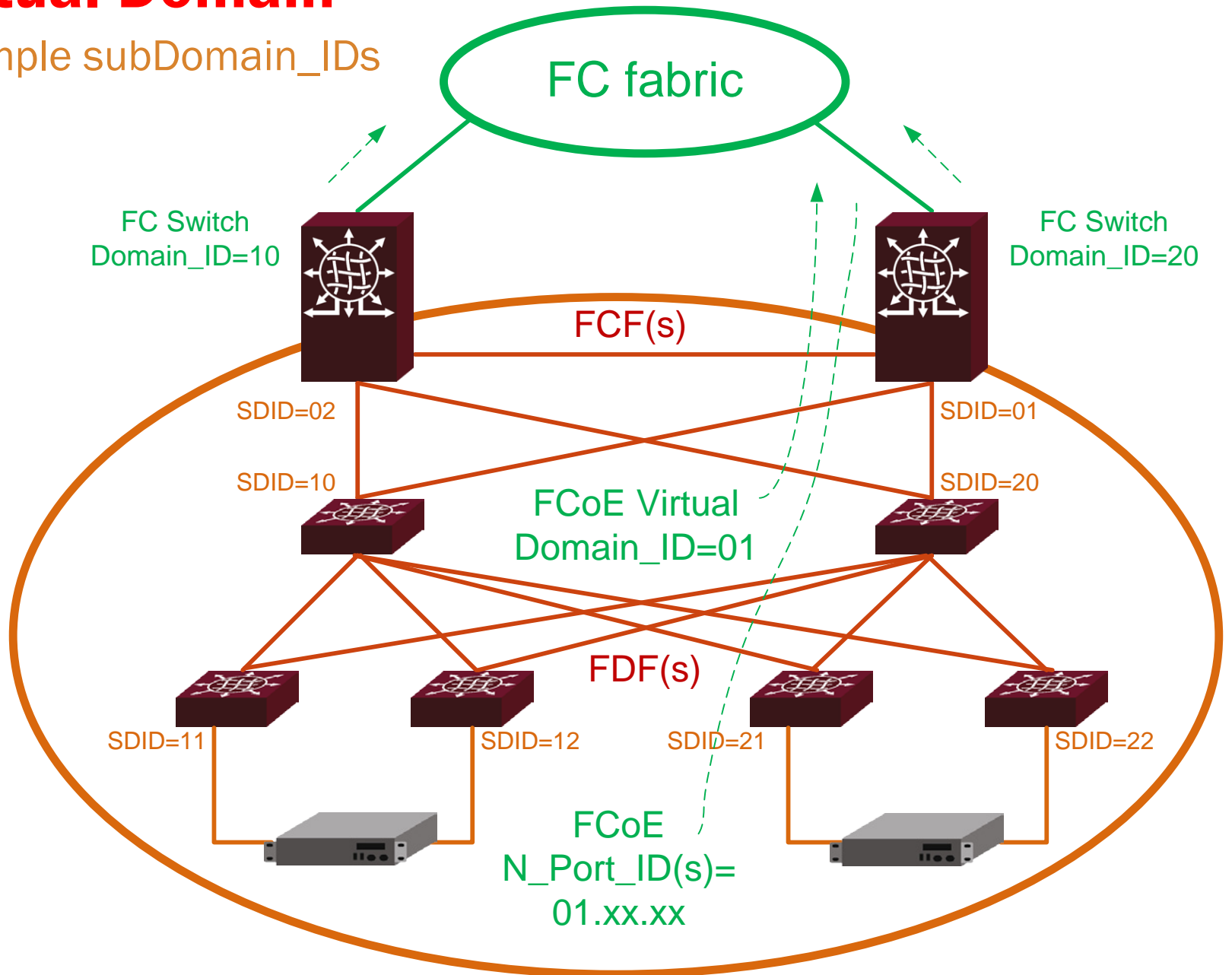
Virtual Domain

Master FCF sends EFP update



Virtual Domain

Example subDomain_IDs



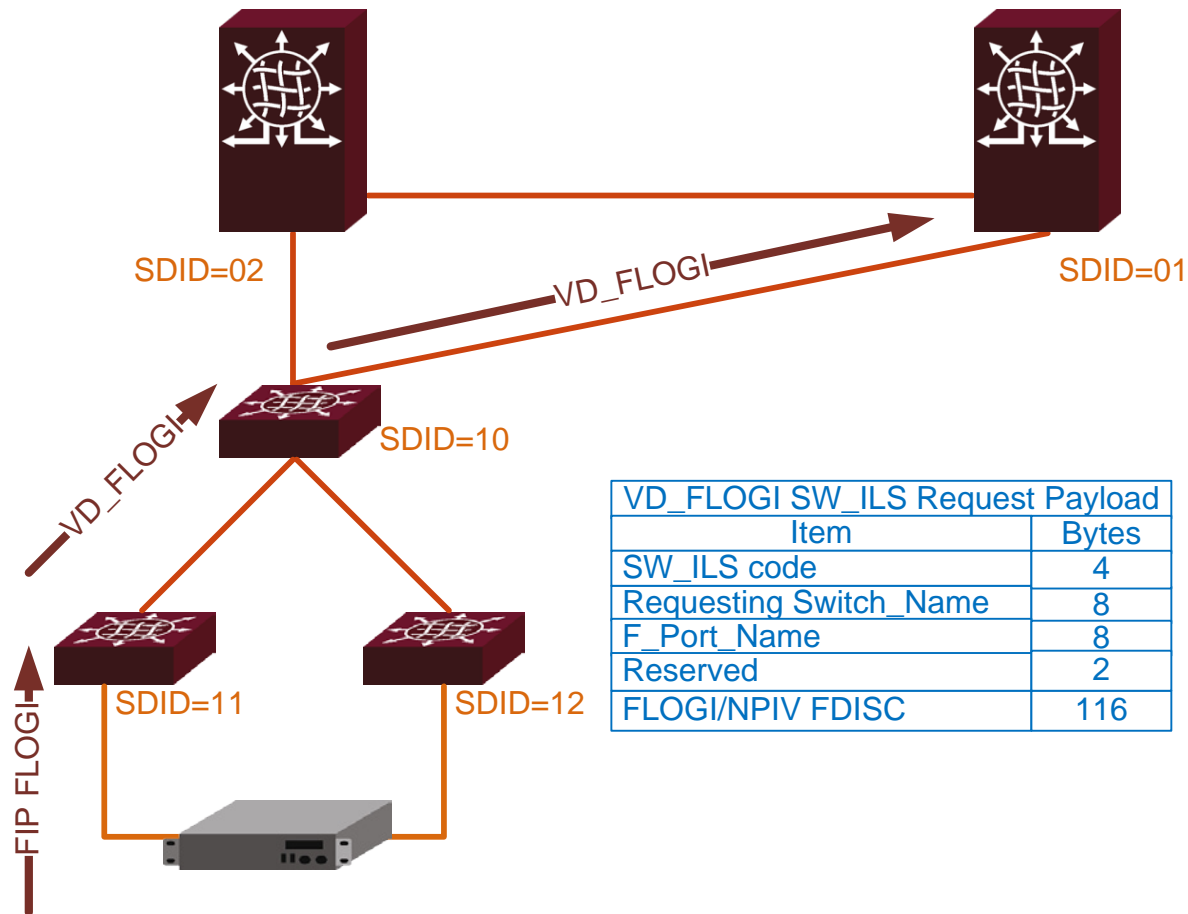
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FIP FLOGI processing



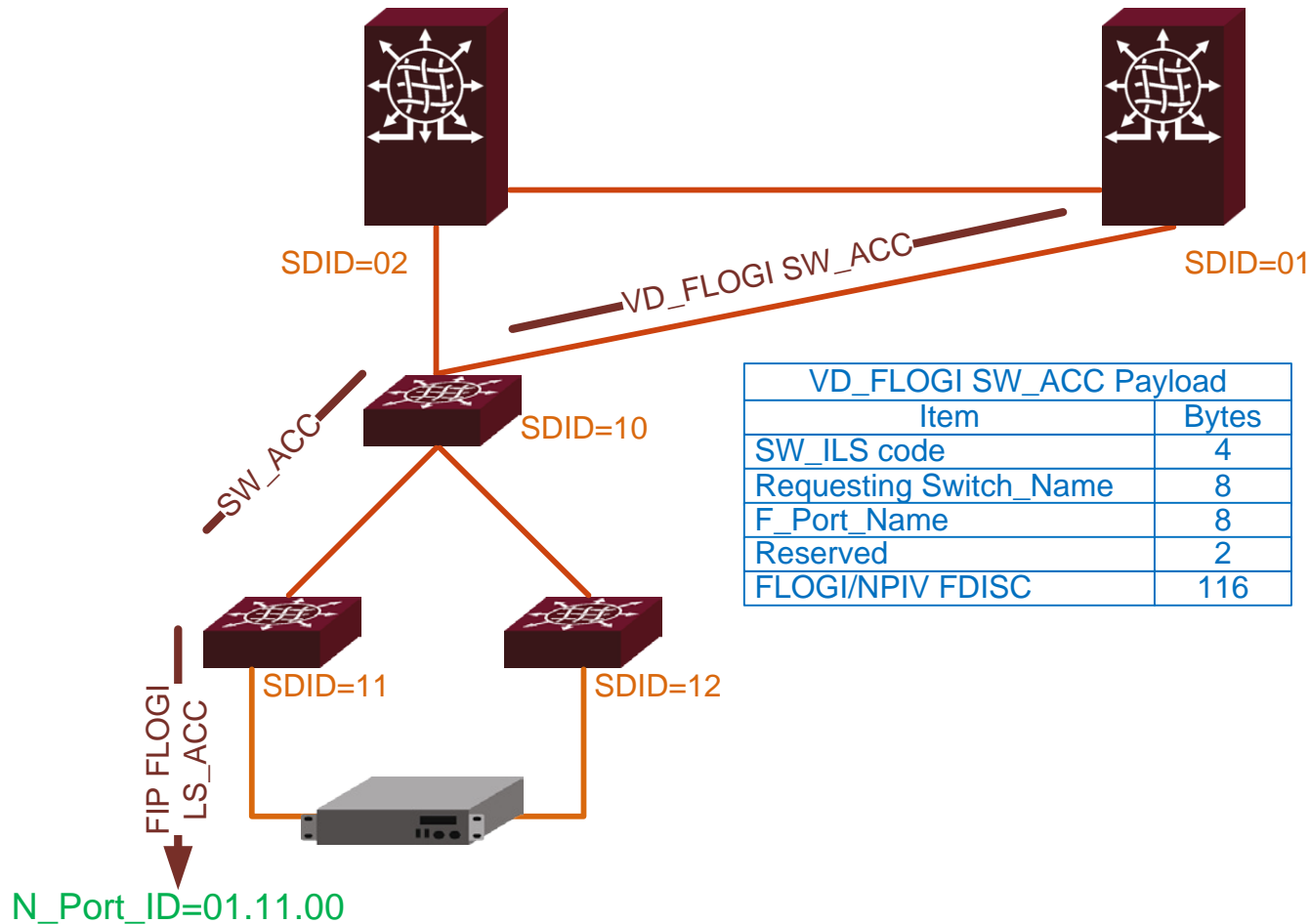
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ENode sends FIP FLOGI to FDF and FDF sends Virtual Domain Login (VD_FLOGI) SW_ILS to the Master FCF



Virtual Domain

Master FCF sends VD_FLOGI SW_ACC to FDF and FDF sends FIP FLOGI LS_ACC



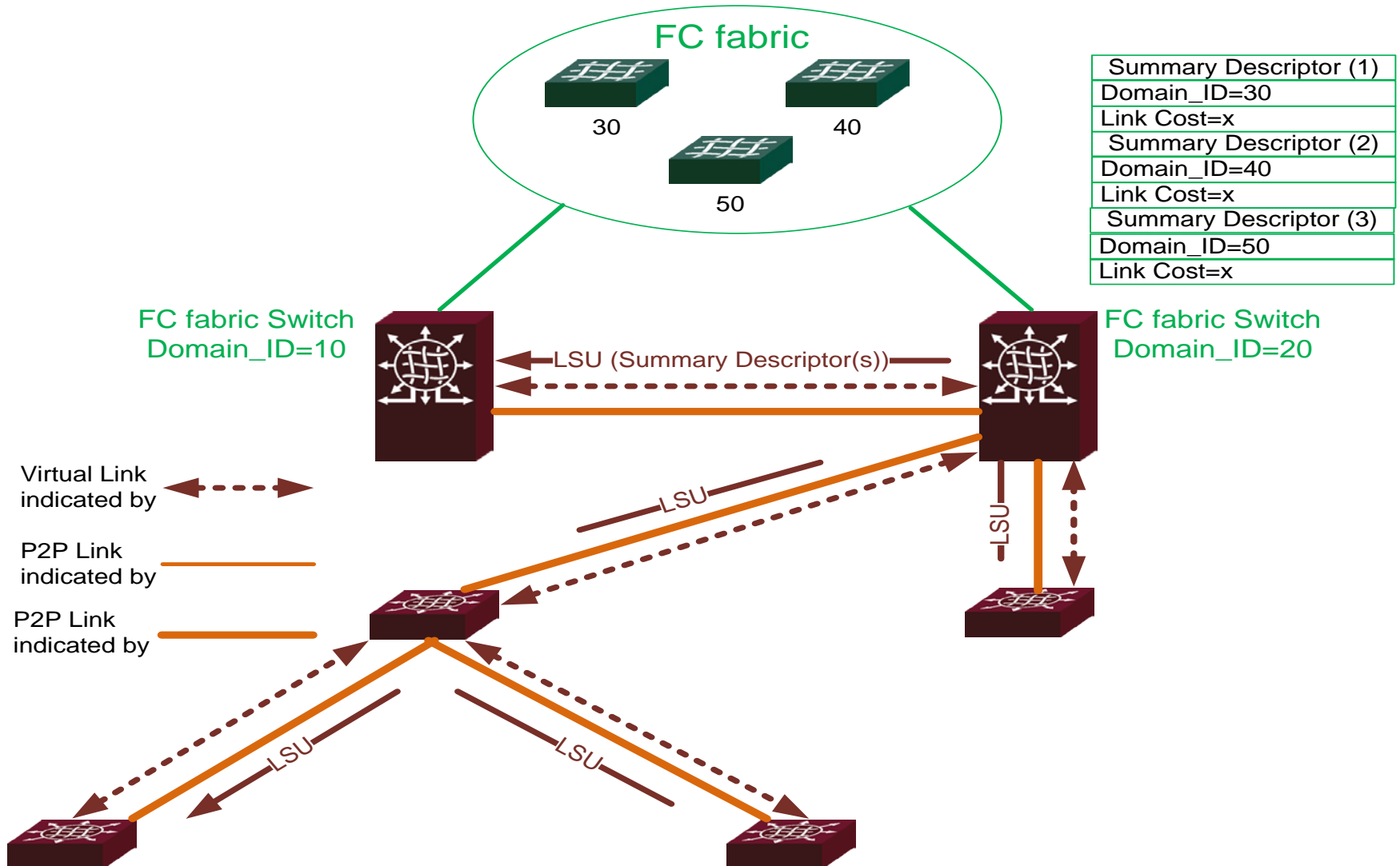
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FSPF



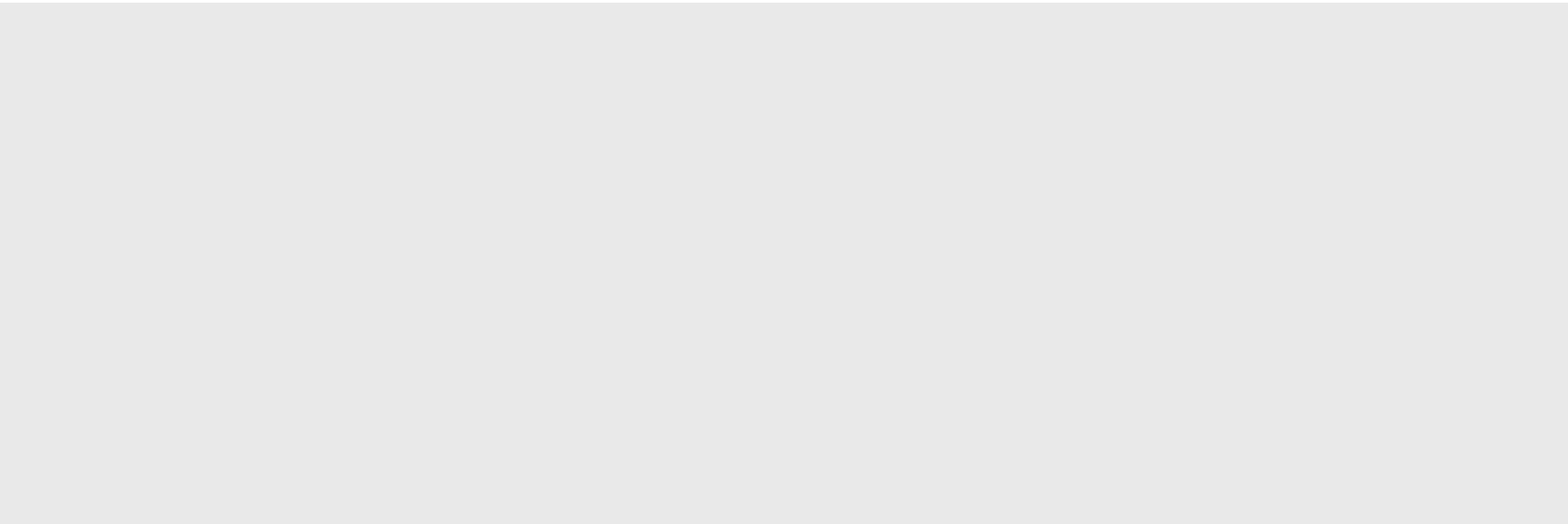
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Master FCF sends LSU with Summary Descriptor(s) to Slave FCF and FDFs



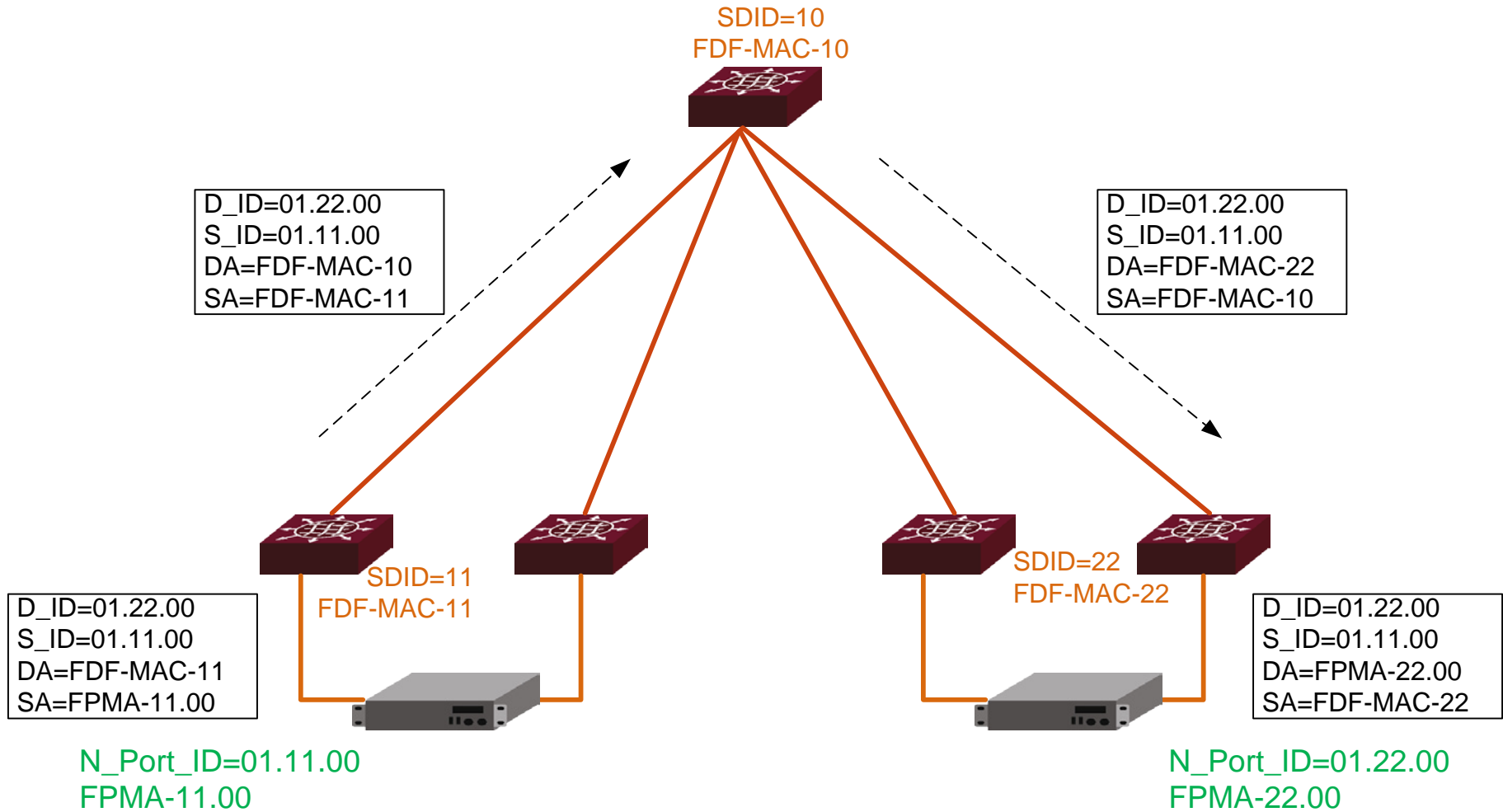
Virtual Domain

Example data path flow



Virtual Domain

Example data path frame flow





Thank You !