Fabric Extension (FEX)

Terminology

N2K Fabric Extender (FEX) Managed as line carf of parent switch (9K/7K/6K/5K), no local switching, traffic between local port flow “north” via uplink to parent and then “south” back down. No console port or software, NX-OS automatically downloaded from parent switch.Uses Cisco VN-TAG or pre-standard IEEE 802.1BR

Host Interface (HIF) Physical user/host interfaces on the FEX that receive normal ethernet traffic before it is encapsulated with tag

Network Interface (NIF) Physical uplink interface on the FEX that connect back to the parent switch and carries only tagged traffic

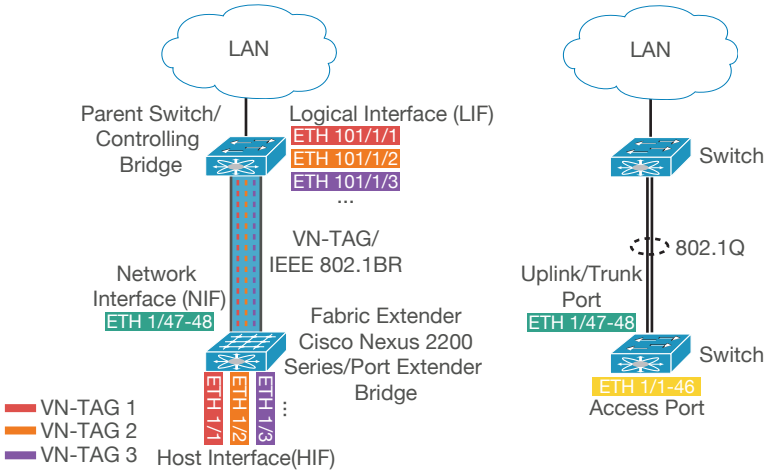
Logical Interface (LIF) Logical representation of the HIF on the parent switch (LIF Notation : Eth(fex/mod/port), I.e. (eth 101/1/1))

Virtual Interface (VIF) Logical interface on the FEX, parent switch assigns/pushes the config of a LIF to the VIF of an associated FEX which is mapped to a physical HIF.

FEX and STP Layer 2 FEX ports are STP “edge” ports and are not subject to STP listening & learning delay. They run as BPDU Gaurd and BPDU are not sent out of edge ports. Edge port will be error disabled state when a BPDU is recived

Connection Model Fex support traffic distribution base on static pinning and etherchannel. By pinning the host interface (HIF) to use individual Network Interface (NIF) or base on port channel LACP load balancing faeture

Legacy Vs. FEX Switch Port Architecture



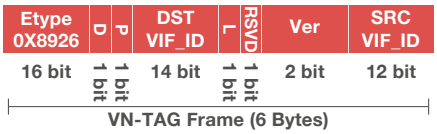
FEX Configuration

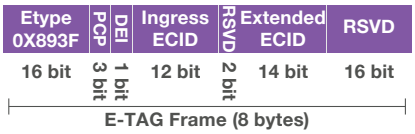
```
# Initialize FEX feature set
feature fex (5K/6K)
install feature-set fex & feature-set fex (7K)

# Configure downlinks to FEX
interface port-channel 1
 switchport mode fex-fabric
 fex associate 101

show interface [fex-fabric | po 1 fex-intf]
show fex 101 detail
show module fex
show diag result fex 101
show environment fex 101
show sprom fex 101 all
```

VN-TAG & E-TAG Encapsulation



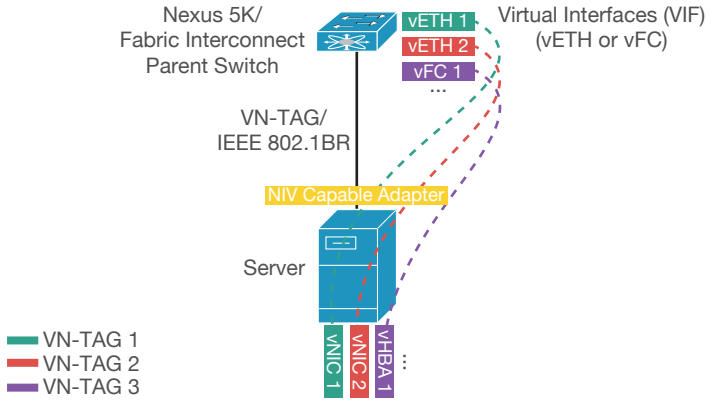


* D: Direction, P: Unicast/Multicast, P=1 (Multicast), L:Loop, RSVD: Reserved

VN-TAG Cisco standard which provides a mechanism for physical downstream ports to be controlled by a logical port on the parent switch. Add additional header to the Ethernet frame which allows individual identification for virtual interfaces (VIF) or identifier carrying source/destination interface ID

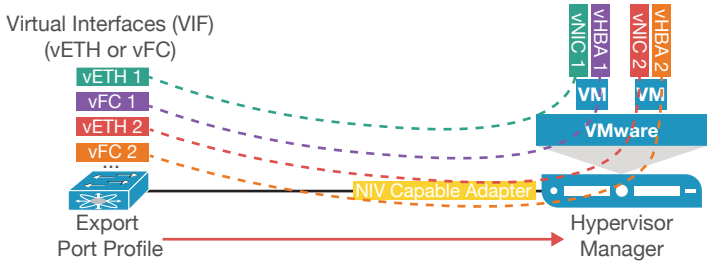
802.1BR (Bridge Port Extension) Standardized equivalent of Cisco VNTag, identified by ECID tag (E-TAG) and support cascading Port Extenders. Consist of Controlling Bridge + Port Extender Bridge

Adapter FEX



Adapter FEX Extension of 802.1BR to Server Adapter or Consolidates multiple virtual interface into single physical interface and extend the network into the server by controlling the virtual interfaces from the switch

VM-FEX



VM-FEX Extension of 802.1BR and adapter FEX to the hypervisor. Each VM is given its own virtual NIC on the Virtual Interface Card (VIC) where frames received from the VM are marked on the uplink port with a VN-Tag and sent to the upstream

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References: https://cloudpacket.net/bookmarks/

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