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Scope

This document; briefly describes Data Center technology and provides a straight forward simple configuration to 2 N5k connected and running layer 2 protocols. This Design assumes 2 Nexus 5020 units, with 12 FEX 2000 single homed to each of the Nexus 5000.

Technology Overview

Data Center Switching:

The Cisco Nexus family of switches is a primary part of the unified fabric pillar of the Cisco Data Center Business Advantage architectural framework. These switches are designed to meet the stringent requirements of the next-generation data center. Not simply bigger or faster, these switches offer the following advantages:

```
* Infrastructure that can be scaled cost-effectively and that helps you increase energy, budget
* Transport 10 Gigabit Ethernet and unified fabric and can handle virtualization, Web 2.0 appli
* Operational continuity where system availability is assumed and maintenance windows are rare
```

The Cisco Nexus 5000 Series Switches help you transform the data center with innovative, standards-based, multilayer, multiprotocol, and multipurpose Ethernet-based fabric. Now you can help enable any transport over Ethernet, including Layer 2 and Layer 3 traffic, and storage traffic, all on one common data center-class platform.

Best Practice Design Objectives

The Goal of this document is to connect 2 Nexus 5020 devices and have them configured to do Layer 2 switching while layer 3 is handled on the core level. Layer 3 configs are out of the scope of this document.

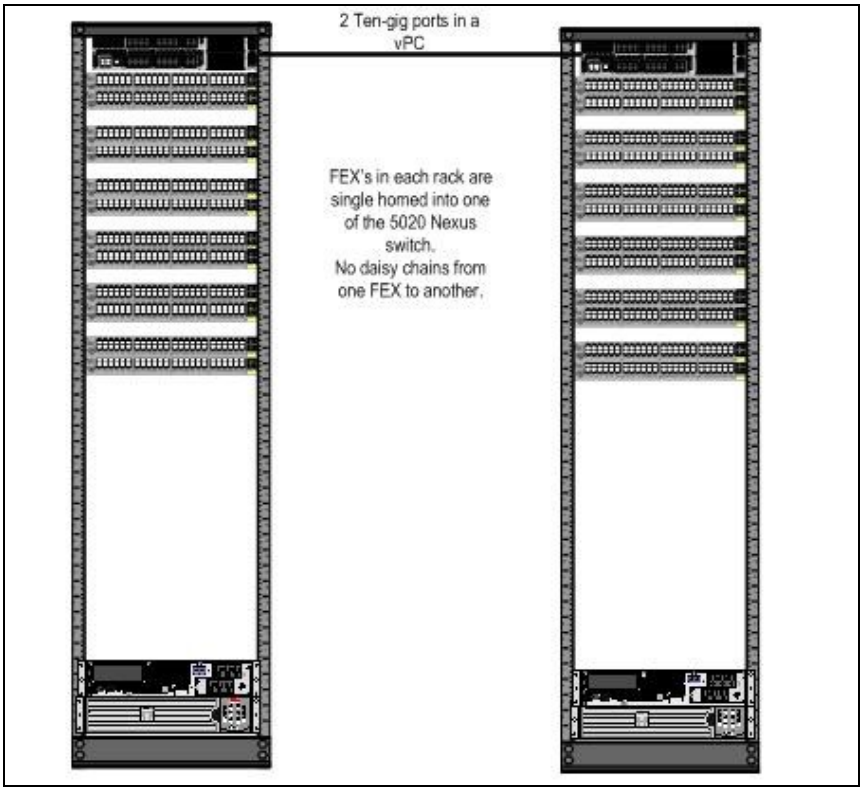
Best Practice Design Technology Considerations

This design uses 2 Nexus 5020 with 24 Fabric extender 2248G attached single homed (12 FEX attached on to each of the 5020). Layer 3 routing is done on a core switch Cisco 6513 (not covered in this document)

The following steps needs to be taken:

upgrade the switch NX-OS enable features connect and configure the fabric extenders; which includes creatig port channel interfaces, and associating ethernet interfaces with a FEX ID and PO number. configure vPC between N5K General and layer 2 configurations TACACS+ configs

Reference Design Example



Configuration Example(s)

Upgrading the Nexus parent Switch:

Upgrading Cisco Nexus switch:

```
?Select and download the kickstart and system software files to a server.
?Ensure that the required space is available in the bootflash: directory for the image file(s) to
?Copy the kickstart and system images to the supervisor module bootflash using a transfer protocol
   copy tftp bootflash:kick start n5000-uk9-kickstart.5.0.2.N1.1.bin
   copy tftp bootflash:system files n5000-uk9.5.0.2.N1.1.bin
```

I used ftp as the files were too large for tftp.

```
?Install the new images, specifying the new image names that you downloaded
  install all kickstart bootflash:n5000-uk9-kickstart.4.0.0.N1.2.bin system bootflash:n5000-uk9.4.
?After the switch completes the installation, log in and verify that the switch is running the req
?Make sure; you set the boot variables for kcikstart and system image to point to the proper BIN f
```

Enabling features:

Nexus needs to have its features enabled to do a lot of the configurations. Available features are listed below:

```
 fcoe            Enable/Disable FCoE/FC feature
 fex             Enable/Disable FEX
 http-server     Enable/Disable http-server
```

```
 interface-vlan  Enable/Disable interface vlan
 lacp            Enable/Disable LACP
 private-vlan    Enable/Disable private-vlan
 privilege       Enable/Disable IOS type privilege level support
 ssh             Enable/Disable ssh
 tacacs+         Enable/Disable tacacs+
 telnet          Enable/Disable telnet
 udld            Enable/Disable UDLD
 vpc             Enable/Disable VPC (Virtual Port Channel)
 vtp             Enable/Disable Vlan Trunking Protocol (VTP)
```

Connecting the Fabric extenders:

Note: lacp feature and FEX feature needs to be enabled *Note*: all configurations are done on the parent switch (Nexus 5020). When connecting a fabric extender to its parent switch (5020), it will not come up online; unless it has a chassis ID configured and the chassis ID is associated with the interface where the fabric extender is plugged into. Configure the Fabric extender (FEX):

```
fex 101
 pinning max-links 1
 description "FEX0101"
fex 102
 pinning max-links 1
 description "FEX0102"
fex 103
 pinning max-links 1
 description "FEX0103"
fex 104
 pinning max-links 1
 description "FEX0104"
fex 105
 pinning max-links 1
 description "FEX0105"
fex 106
 pinning max-links 1
 description "FEX0106"
fex 107
 pinning max-links 1
 description "FEX0107"
fex 108
 pinning max-links 1
 description "FEX0108"
fex 109
 pinning max-links 1
 description "FEX0109"
fex 110
 pinning max-links 1
 description "FEX0110"
fex 111
 pinning max-links 1
 description "FEX0111"
fex 112
 pinning max-links 1
 description "FEX0112"
```

Configure the Port Channels:

```
interface port-channel101
 switchport mode fex-fabric
 fex associate 101
```

```
interface port-channel102
 switchport mode fex-fabric
 fex associate 102

interface port-channel103
 switchport mode fex-fabric
 fex associate 103

interface port-channel104
 switchport mode fex-fabric
 fex associate 104

interface port-channel105
 switchport mode fex-fabric
 fex associate 105

interface port-channel106
 switchport mode fex-fabric
 fex associate 106

interface port-channel107
 switchport mode fex-fabric
 fex associate 107

interface port-channel108
 switchport mode fex-fabric
 fex associate 108

interface port-channel109
 switchport mode fex-fabric
 fex associate 109

interface port-channel110
 switchport mode fex-fabric
 fex associate 110

interface port-channel111
 switchport mode fex-fabric
 fex associate 111

interface port-channel112
 switchport mode fex-fabric
 fex associate 112
```

Configure the Ethernet port interfaces and associate them with the FEX chassis and port-channel:

```
interface Ethernet1/1
 fex associate 101
 switchport mode fex-fabric
 channel-group 101

interface Ethernet1/2
 fex associate 101
 switchport mode fex-fabric
 channel-group 101

interface Ethernet1/3
 fex associate 102
 switchport mode fex-fabric
 channel-group 102
```

```
interface Ethernet1/4
 fex associate 102
 switchport mode fex-fabric
 channel-group 102

interface Ethernet1/5
 fex associate 103
 switchport mode fex-fabric
 channel-group 103

interface Ethernet1/6
 fex associate 103
 switchport mode fex-fabric
 channel-group 103

interface Ethernet1/7
 fex associate 104
 switchport mode fex-fabric
 channel-group 104

interface Ethernet1/8
 fex associate 104
 switchport mode fex-fabric
 channel-group 104

interface Ethernet1/9
 fex associate 105
 switchport mode fex-fabric
 channel-group 105

interface Ethernet1/10
 fex associate 105
 switchport mode fex-fabric
 channel-group 105

interface Ethernet1/11
 fex associate 106
 switchport mode fex-fabric
 channel-group 106

interface Ethernet1/12
 fex associate 106
 switchport mode fex-fabric
 channel-group 106

interface Ethernet1/13
 fex associate 107
 switchport mode fex-fabric
 channel-group 107

interface Ethernet1/14
 fex associate 107
 switchport mode fex-fabric
 channel-group 107

interface Ethernet1/15
 fex associate 108
 switchport mode fex-fabric
 channel-group 108

interface Ethernet1/16
```

```
 fex associate 108
 switchport mode fex-fabric
 channel-group 108

interface Ethernet1/17
 fex associate 109
 switchport mode fex-fabric
 channel-group 109

interface Ethernet1/18
 fex associate 109
 switchport mode fex-fabric
 channel-group 109

interface Ethernet1/19
 fex associate 110
 switchport mode fex-fabric
 channel-group 110

interface Ethernet1/20
 fex associate 110
 switchport mode fex-fabric
 channel-group 110

interface Ethernet1/21
 fex associate 111
 switchport mode fex-fabric
 channel-group 111

interface Ethernet1/22
 fex associate 111
 switchport mode fex-fabric
 channel-group 111

interface Ethernet1/23
 fex associate 112
 switchport mode fex-fabric
 channel-group 112

interface Ethernet1/24
 fex associate 112
 switchport mode fex-fabric
 channel-group 112
```

Configuring a vPC between the 2 N5K chassis:

Need to configure the port channel and make sure the switchport mode of the channel matches that of the Ethernet interface that will associate with the channel:

```
interface port-channel100
 switchport mode trunk
 vpc peer-link
 spanning-tree port type network
```

Make sure vPC feature is enabled:

```
Feature vpc
```

Create the vpc domain and specify the peer keep alive destination:

```
 vpc domain "domain ID #"
   peer-keepalive destination ?mgmt0 address?
```

Configure the Ethernet ports in trunk mode and add them to the channel group of the peer link port channel interface (port channel mode must match ethernet port mode):

```
interface Ethernet1/35
 switchport mode trunk
 channel-group 100 mode active
!
interface Ethernet1/36
 switchport mode trunk
 channel-group 100 mode active
```

General configs

```
ip domain-lookup
ip domain-name mydomain.ca
hostname NX1
username myuser password 5 xyz.  role priv-15
username myotheruser password 5 abc.  role priv-15
```

Configs to get Layer 2 connectivity with CTD Core:

```
vlan 75
 name mgmt
!
interface Vlan75
 no shutdown
 description MGMT
 ip address 10.16.75.X/24
!
interface Ethernet1/39
 switchport mode trunk
 switchport trunk allowed vlan 75
!
vrf context management
 ip route 0.0.0.0/0 10.60.75.Y  (10.160.175.Y is the address of the vlan interface on the Layer 3
```

TACACS+ configurations:

```
ip tacacs source-interface Vlan75
tacacs-server timeout 10
tacacs-server host X.X.X.X key 7 "layer2keys"
tacacs-server host Y.Y.Y.Y key 7 "layer2keys"
aaa group server tacacs+ tac-servers
   server X.X.X.X
   server Y.Y.Y.Y
   use-vrf management
   source-interface Vlan75
aaa authentication login default group tac-servers local
aaa authentication login console group tac-servers local
aaa accounting default group tac-servers
aaa authentication login error-enable
tacacs-server directed-request
```

References

Technical Support & Documentation - Cisco Systems

http://www.cisco.com/en/US/prod/collateral/switches/ps9441/ps9402/white_paper_c11-516396.html

http://www.cisco.com/en/US/products/ps9670/index.html

http://www.cisco.com/en/US/prod/collateral/switches/ps9441/ps9670/configuration_guide_c07-543563.html

http://www.cisco.com/en/US/products/ps10110/index.html

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