Cisco Support Community Expert Series Webcast:

What's New on Catalyst 6500

Richard Michael and Somu Jayaraman
Engineer, Technical Services

March 11 '2014

Cisco Support Community – Expert Series Webcast

- Today's featured experts are Cisco Support Engineers **Richard Michael** and **Somu Jayaraman**
- Ask them questions now about "What's New on Catalyst 6500"

Richard Michael

Customer Support Engineer

Somu Jayaraman

Customer Support Engineer

What's New on Catalyst 6500

Event Date: 11 March 2014

Panel of Experts

Subbiah M A
CSE

Varun Jose
CSE

Thank You For Joining Us Today

Today's presentation will include audience polling questions

We encourage you to participate!

Thank you for joining us today

If you would like a copy of the presentation slides, click the PDF link in the chat box on the right or go to:

https://supportforums.cisco.com/document/12132661/whats-new-cisco-catalyst-6500-series

Polling Question 1

What is your level of experience on Catalyst 6500 Platform?

A. I’m have plans to implement this soon in my network
B. I have setup this in the lab and testing.
C. I’m running it in production
D. I’m an expert with 6500 series of switches.

Submit Your Questions Now!

Use the Q & A panel to submit your questions and panel of experts will respond.

Cisco Support Community – Expert Series Webcast

What's New on Catalyst 6500

Somu Jayaraman & Richard Michael

Engineer Technical Services

March 11, 2014

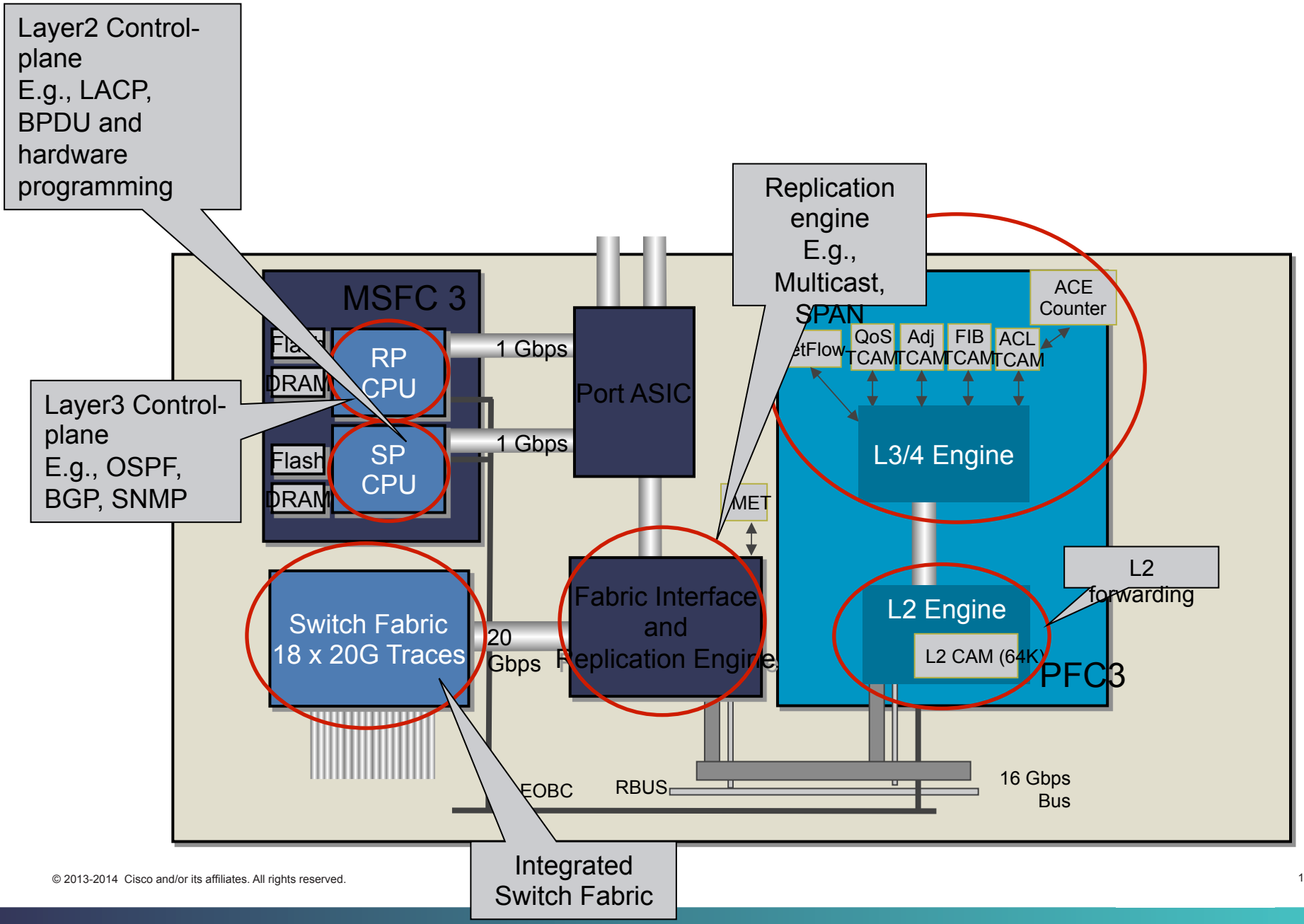
Agenda

- Introduction
- Sup720 Vs Sup2T - Comparison
- Inbuilt Troubleshooting Tools
- 6800IA – Next Gen
- Overview and Architecture
- Q & A

What is “720” in Sup720?

- 2 fabric channels per slot
- Slots 1- 8 -> Single fabric channel
- Slots 9-13 -> Dual fabric channel
- Total no. of Channels = 18
- 20 Gbps full duplex per channel (or 8 Gbps)
- 18 channels x 20 Gbps per channel x full duplex = 720 Gbps

Supervisor 720/PFC3 Architecture

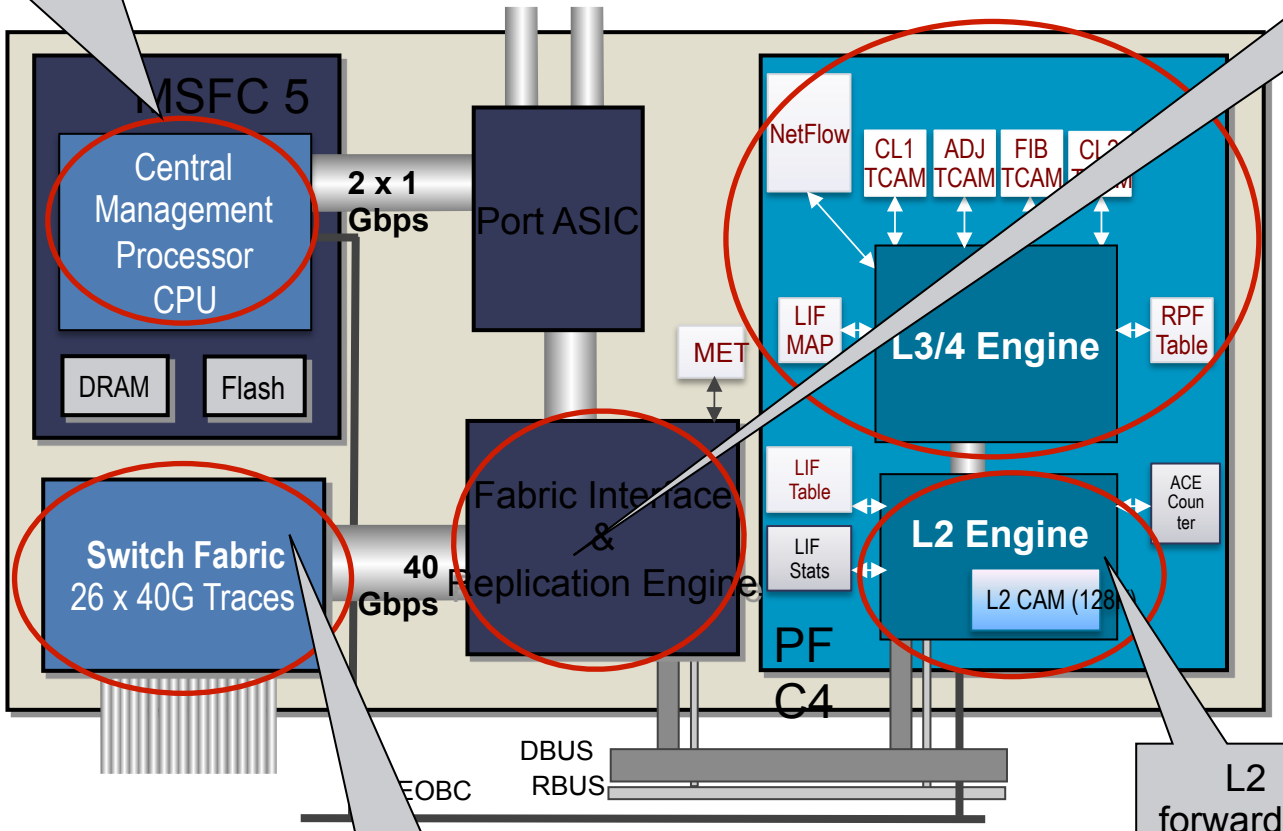


What's is "2T" in Sup2T

- 2 fabric channels per slot
- Slots 1- 13 -> Dual fabric channel
- Total no. of Channels = 26
- 40 Gbps full duplex per channel (or 20 Gbps)
- 26 channels x 40 Gbps per channel x full duplex = 2080 Gbps ~ 2Terabps
- Faster Boot-up process, Simpler Troubleshooting

Supervisor 2T/PFCA Architecture

MSFC5 Complex contains single dual-core CPU for both Layer 2 and Layer 3 control-plane protocols and hardware programming

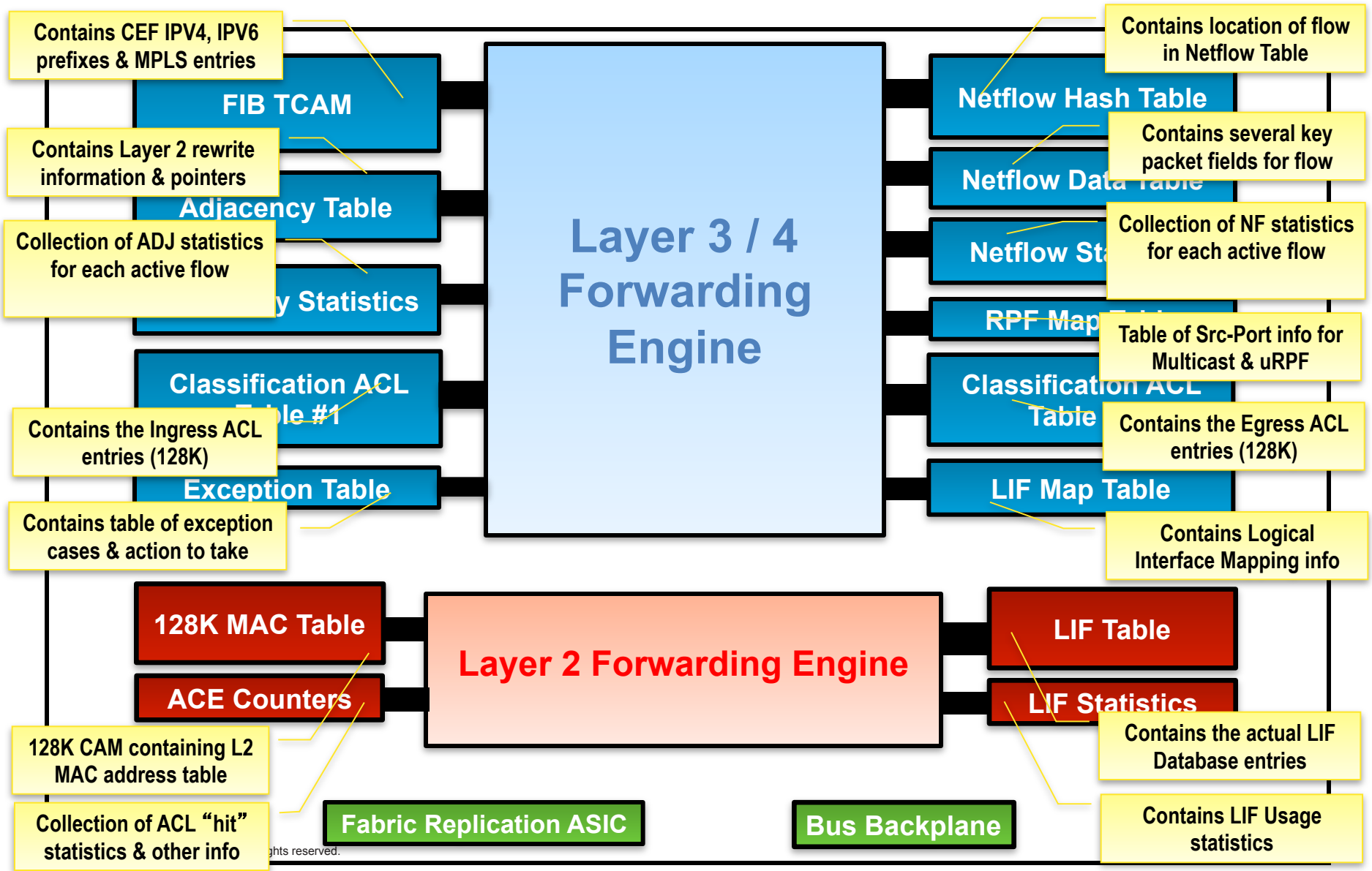


Replication engine
E.g., Multicast, SPAN

Integrated Switch Fabric

L2 forwarding

Supervisor2T – PFCA Overview



Catalyst 6500 Supervisors – Sup 720 vs Sup2T

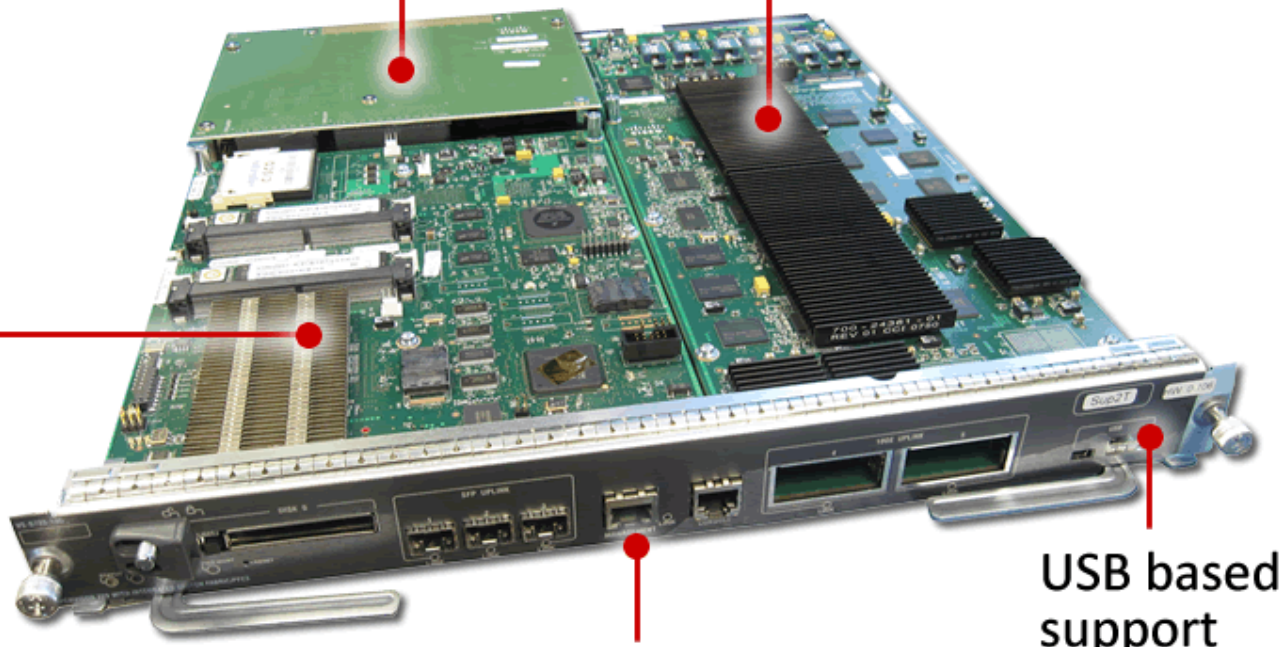
	Supported by Sup720	Supported by Sup2T
Classic BUS	Yes	No*
Switch Fabric	8Gbps, 20Gbps	20Gbps, 40Gbps
Linecard Connection	Single or Dual Channel	Single or Dual Channel
Supports Classic Linecard	Yes	No*
Supports CEF256 Linecard	Yes	No
Supports CEF720 Linecard	Yes	Yes
Supports Linecard with DFC	DFC3A/B/C	DFC4
Supports For VSS	DFC3C Only	DFC4
Supports Legacy Service Modul	Fabric Mode	Bus Mode*
Supports WS-C6513E	Single Channel from slot 1 to 8 Dual Channel from slot 9 to 13	Dual Channel from slot 1 to 13

* Sup2T supports only the legacy service-modules (with 8Gbps fabric connection) in Bus mode and WS-X6148-GE-TX with Enhanced PoE.

NEW Supervisor 2T Elements

Improved Switch Fabric providing 80G/slot

New PFC4 featuring improved levels of performance and scalability along with new enhanced hardware features



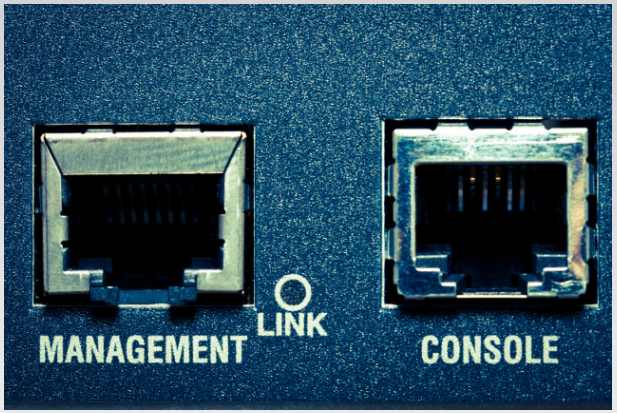
New MSFC5 supporting dual core CPU and single IOS image

Connectivity Mgmt Processor (CMP)

USB based console support

CMP

The Connectivity Management Processor (CMP) supports new capabilities that will aid Network Administrators in managing the system:



Separate Dedicated CPU Running Linux

CMP (Cont)

- No more need for a telnet server
- Remote reset of the switch (soft or hard)
- Remote Image recovery via TFTPBoot
- Boot from USB front-panel port (USB key)
- Access console thru USB port
- Remote console to Route Processor
- Message logging monitoring

GOLD HalfDome Plus – What's new?

- New Online Diagnostic Tests
  - TestPortSecurity
  - TestAclRedirect
  - TestRBAcl
  - TestInbandEdit
  - TestEarlMemOnBootup
  - TestNonDisruptiveLoopback
  - TestFabricVlanLoopback
  - TestL2CTSLoopback
  - TestL3CTSLoopback
  - TestDQUP
  - TestEarlInternalTables

- Renamed Diagnostics Tests
  - TestBpduTrap (older name TestBadBpduTrap)
  - TestFibTcam (older name TestFibTcamSSRam)

- Earl 8 specific diagnostic coverage

http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst6500/ios/15-0SY/configuration/guide/15_0_sy_swcg/diagnostic_tests.html#wp1320471

Polling Question 2

What are the common issues that you face during Migration?

A. Configuration Issues

B. Hardware Issues

C. Absolutely no problem because of good migration documents.

D. One never know what happens

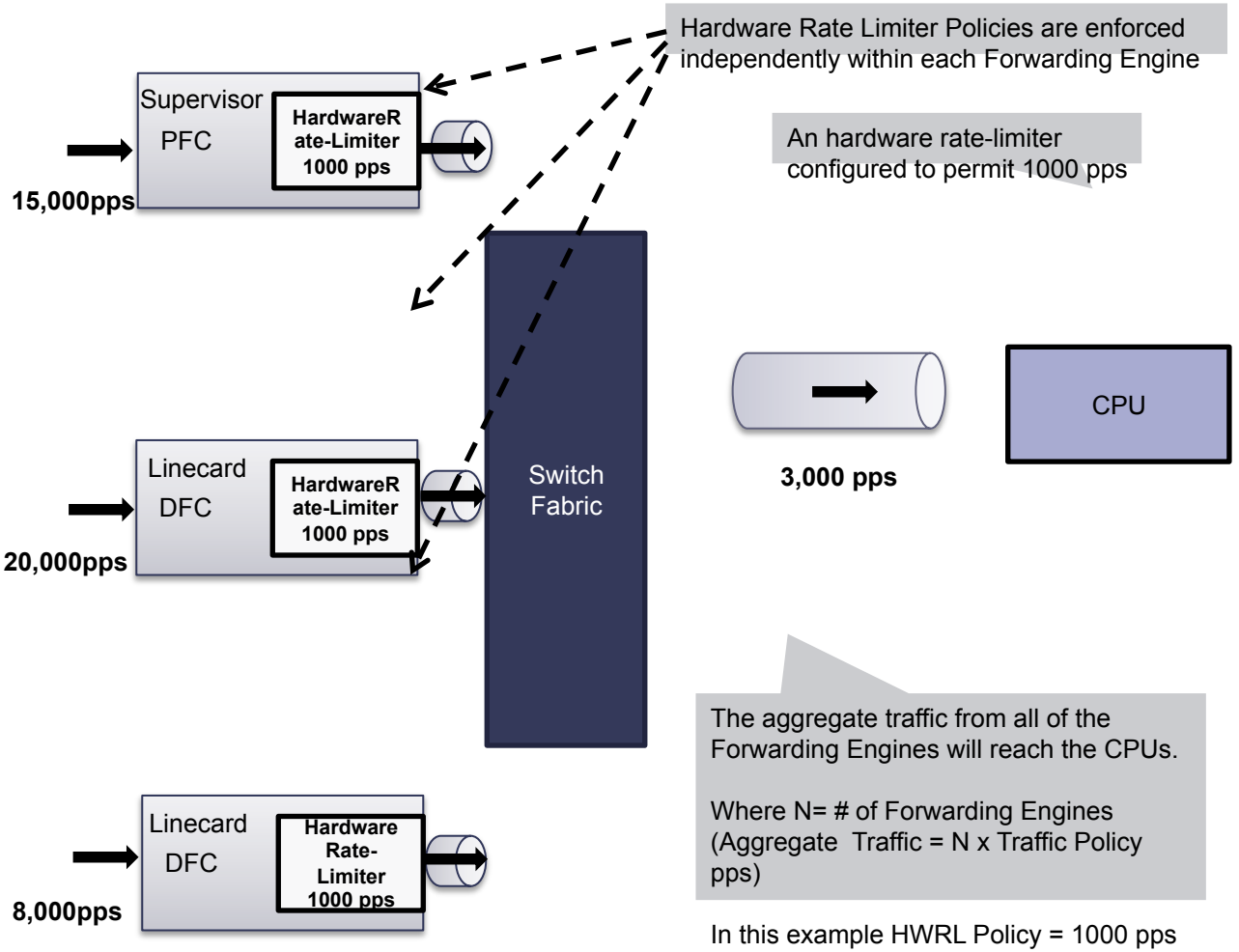
In-Built Troubleshooting Tools

Common Issues

- CoPP
- LDB Resources
- Netflow Issues
- Forwarding Issues

Control Plane Protection

Hardware Rate-Limiters



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Control Plane Protection
Hardware Rate-Limiters

Rate-miters are implemented in hardware, to reduce flow of excess traffic to CPU

```
Sup2T# show platform rate-limit
 State : ON - enabled but not sharing, ON/S - enabled and sharing
 Share : NS - not sharing, G - group, S - static sharing, D - dynamic sharing
       : P/sec - Packets/sec, B/sec - Bytes/second, BP - Burst period (microsec)
   Rate Limiter Type    State     P/sec  P/burst      B/sec    B/burst BP      Share    Leak
 -------------------- ----- -------- -------- ---------- ---------- ------- ------- ----
           CEF RECEIVE   OFF        -        -          -          -       -       -      -
             CEF GLEAN    ON     1000        -          -          - 1000000      NS    OFF
             IP ERRORS   OFF        -        -          -          -       -       -      -
       UCAST IP OPTION    ON     1000        -          -          -     100 G: 0, S     ON
         ICMP ACL-DROP    ON     1000        -          -          -     100 G: 0, S     ON
         ICMP NO-ROUTE    ON      100        -          -          - 1000000      NS    OFF
         ICMP REDIRECT   OFF        -        -          -          -       -       -      -
           TTL FAILURE   OFF        -        -          -          -       -       -      -
```

Traffic hitting ACL deny entry are rate-limited

Traffic with TTL=1 are **not** rate-limited

```
Sup2T(config)#platform rate-limit ?
  all         Rate Limiting for both Unicast and Multicast packets
  layer2      layer2 protocol cases
  multicast   Rate limiting for Multicast packets
  unicast     Rate limiting for Unicast packets
```

En/Disable and fine-tune hardware rate-limiters.

Use **"mls rate-limit"** for Sup720 engines.

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Control Plane Protection

Hardware Rate Limiters Support

Unicast Rate Limiters	
CEF Receive	Traffic Destined to the Router
CEF Glean	ARP Packets
CEF No Route	Packets with Not Route in the FIB
ICMP Redirect	Packets that Require ICMP Redirects
IP Errors	Packet with IP Checksum or Length Errors
IP Features	Security Features (Auth-Proxy,IP Sec, others)
ICMP No Route	ICMP Unreachables for Unroutable Packets
ICMP ACL Drop	ICMP Uncreachables for Admin Deny Packets
RPF Failure	Packets that Fail uRPF Check
L3 Security	CBAC, Auth-Proxy, and IPSEC Traffic
ACL Input	NAT, TCP Int, Reflexive ACLs, Log on ACLs
ACL Output	NAT, TCP Int, Reflexive ACLs, Log on ACLs
VACL Logging	CLI Notification of VACL Denied Packets
IP Options	Unicast Traffic with IP Options Set
Capture	Used with Optimized ACL Logging

General Rate Limiters	
MTU Failure	Packets Requiring Fragmentation
TTL Failure	Packets with TTL<=1

Multicast Rate Limiters	
Multicast FIB-Miss	Packets with No mroute in the FIB
Partial Shortcut	Partial Shortcut Entries
Directly Connected	Local Multicast on Connected Interface
IP Options	Multicast Traffic with IP Options Set
V6 Directly Connect	Packets with No Mroute in the FIB
V6*, G M Bridge	IGMP Packets
V6*, G Bridge	Partial Shortcut Entries
V6 S, G Bridge	Partial Shortcut Entries
V6 Route Control	Partial Shortcut Entries
V6 Default Route	Multicast Traffic with IP Options Set
V6 Second Drop	Multicast Traffic with IP Options Set

Layer 2 Rate Limiters	
L2PT	L2PT Encapsulation / Decapsulation
PDU	Layer 2 PDUs
IGMP	IGMP Packets

Troubleshoot data path failures using ELAM

```
Router#show platform capture elam asic eureka slot 5

Router#show platform capture elam trigger master eu50 dbus dbi ingress if vlan = 1006

Router#show platform capture elam status
ID#    Role  ASIC     Slot  Inst  Ver  ELAM        Status
-----  ----  -------  ----  ----  ---  ---------   ------
eu50   M     EUREKA   5     0     0.0  DBI_ING     Not Started

ID#    ELAM        Trigger
-----  ---------   ----------
eu50   DBI_ING     VLAN = 1006

Router#show platform capture elam start
cap_commands: Default ELAM RBI PB1 added to list

Router#show platform capture elam status
ID#    Role  ASIC     Slot  Inst  Ver  ELAM        Status
-----  ----  -------  ----  ----  ---  ---------   ------
eu50   M     EUREKA   5     0     0.0  DBI_ING     In Progress
eu50   s     EUREKA   5     0     0.0  RBI_PB1     In Progress

ID#    ELAM        Trigger
-----  ---------   ----------
eu50   DBI_ING     VLAN = 1006
eu50   RBI_PB1     TRIG=1
Router#
```

Sup2T CoPP Troubleshoot (Cont)

High Level view on what steps are involved

- Check configuration and software state
  - show platform rate-limit | in ON
  - show policy-map control-plane input class class-copp-xxx
- Check datapath in hardware
  - show platform datapath ingress-interface <interface>
  - show platform hardware statistics exception
  - show policy-map control-plane detail input class class-copp-xxx
  - show platform qos ip
  - show platform hardware statistics exception | sec Policing
  - show platform capture elam status
- Check if packet is going to software
  - debug netdr capture / show netdr capture
  - show int <interface> stat

Troubleshoot Step 2: IP options

```
Router# show platform datapath ingress-interface g9/1
Capturing from GigabitEthernet9/1 src_index 512[0x200]

_____________________________________________________________________
Packet    IP/L4=255[len=64]R: 9.1.0.2 -> 9.2.0.2
   |             Dscp/Tos 0/0x0 Ttl 64 Options
   |       RouterMAC 000b.fca6.b840 SMAC 0000.0901.0002
   |       Vlan 1012 CoS 0 1q 0
   V
Gi9/1[200] Ingress Lif 0x406F Vlan 1012
   |       ILM 0x406F Lif_Sel 1 Lif_Base 0x0
   |       Cpp_en
   V
Ingress    ACL: Permit (Default)
Features   QoS: Default (Tcam_Lkup_Disabled)
   V
 RIB-L3    Key: 9.2.0.2 [No VPN]
   |       TCAM[32261] Adj 0x2800A dgt 0
   V
Adjacency  [Exception: Ip_Option] Rdt ADJ[IP][0x10008]
   V
EgressLIF  0x9FC48 To_RP[380] Vlan 0 IpMtu 9234[0] Base 0x4
   |       cpp
   V
Egress     ACL: Permit (Default) Lbl_A 1
Features   QoS: Acos(Ingress)[1] AggPolice Tcam[Bank0][16378] Lbl 1
   V
Rewrite    [ADJ] RECIRC[8]:
   |       CCC 4 Pv
   |       To_RP[380]RIT[0x10008]
   |       RECIRC[ShimHdr]: Shim_Op DTI_FROM_RIT
   |       Dti_Type XCPT[4] Dti_Index 0x8
   V
```

Exception hit, exception-driven adjacency

Has to hit CPP egress lif

QoS should be enabled

For Unicast packet, shim header is added. Dti_index is “exception_cause”, indicates why a packet is punt to software

Troubleshoot Step 2a (Cont)

```
Router# show platform hardware statistics exception | sec IP op
    IP option
        IPv4        : 0 @ 0 pps
        IPv6        : 0 @ 0 pps
    IP option
        IPv4        : 0 @ 0 pps
        IPv6        : 0 @ 0 pps
    IP option
        IPv4        : 2107597 @ 2000 pps
        IPv6        : 0 @ 0 pps

Router# show platform hardware statistics exception | sec TTL
    TTL fail
        Input       : 0 @ 0 pps
        Output      : 0 @ 0 pps
    TTL fail
        Input       : 0 @ 0 pps
        Output      : 0 @ 0 pps
    TTL fail
        Input       : 0 @ 0 pps
        Output      : 278321 @ 2002 pps

Router# show platform hardware statistics module 9 | sec FIB
    FIB Switched
        IPv4 Ucast : 0
        IPv6 Ucast : 0
        EoMPLS     : 0
        MPLS       : 0
        (S , *)    : 0
        IGMP MLD   : 0
        IPv4 Mcast : 95524
```

Check whether exception is detected in hardware

Check whether exception is detected in hardware

Check whether Multicast forwarding is detected

LDB Resources

- LIF is a Logical InterFace that represents forwarding services/features for a port, or a (port, vlan) pair, or vlan
- It is associated with an L3 interface (physical, logical or virtual).
- Every BD is mapped to at least one LIF for L2 features (in Lamira)
- BD is the L2 counterpart of LIF
- Each LIF database entry contains following information
  - LIF, BD, L2 control bits, etc.

Mini Protocol Analyzer

- Built-in hardware span to the RP
- Well, not really new. Sup720 has it as well with later versions.
- Capture and monitor traffic
- Wireshark compatible tool running on the RP to analyze captured packets
- Dive deeper with full Wireshark compatibility for off the box analysis
- More details can be found at:

http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst6500/ios/15-1SY/config_guide/sup2T/15_1_sy_swcg_2T/mini_protocol_analyzer.html

Flexible Netflow

Configuration Steps

```
flow record SAMPLE-FLOW
 match ipv4 source address
 match ipv4 destination
address
 match transport source-
port
 match transport destination-port
 match flow direction
 collect counter bytes
 collect counter packets
 collect timestamp sys-
uptime first
 collect timestamp sys-
uptime last
```

KEY

NON-KEY

```
flow exporter SAMPLE-EXPORT-1
 description SAMPLE FnF v9 Exporter
 destination 11.1.1.1 vrf MGMT
 source Loopback0
 transport udp 999
```

```
flow exporter SAMPLE-EXPORT-2
 description SAMPLE FnF v9
Exporter
 destination 12.1.1.1 vrf MGMT
 transport udp 999
```

```
flow monitor SAMPLE-
MONITOR
 description SAMPLE FnF v9
Monitor
 record SAMPLE-FLOW
 exporter SAMPLE-EXPORT-1
 exporter SAMPLE-EXPORT-2
```

Interfaces support multiple monitors if their key fields do not overlap

```
interface GigabitEthernet1/1/1
 ip address 172.16.0.1 255.255.255.0
 ip flow monitor SAMPLE-MONITOR
input
 ip flow monitor SAMPLE-MONITOR
output
 logging event link-status
```

```
interface Vlan10
 ip address 172.16.1.1 255.255.0
 ip flow monitor SAMPLE-MONITOR
input
 ip flow monitor SAMPLE-MONITOR
output
 logging event link-status
```

Steps:

1. Create Flow Record
2. Create Flow Exporter
3. Associate Record and Exporter to a Flow Monitor
4. Apply to the interfaces

Flexible Netflow

```
Sup2T# show process cpu
CPU utilization for five seconds:  65%/8%; one minute:
63%; five minutes: 61%
 PID  Runtime(ms)   Invoked  uSecs     5Sec    1Min    5Min
TTY Process
 310       30544    189234     81   47.12%  45.11% 45.23%
0  IP Input
```

High CPU due to process "IP Input"

```
Sup2T(config)#flow RECORD copp-fnf-cef-receive-rec
Sup2T(config-flow-record)#match ipv4 protocol
Sup2T(config-flow-record)#match ipv4 source address
Sup2T(config-flow-record)#match ipv4 destination address
Sup2T(config-flow-record)#match transport source-port
Sup2T(config-flow-record)#match transport destination-port
Sup2T(config-flow-record)#collect interface input
Sup2T(config-flow-record)#collect counter packets
Sup2T(config-flow-record)#exit

Sup2T(config)#flow MONITOR copp-fnf-cef-receive
Sup2T(config-flow-monitor)#record copp-fnf-cef-receive-rec
Sup2T(config-flow-monitor)#exit
```

Building a FnF record, matching L3 and L4 parameters (key fields) and collecting details on Input interface and packet count (non-key fields)

```
Sup2T(config)#control-plane
Sup2T(config-cp)#ip flow monitor copp-fnf-cef-receive input
Sup2T(config-cp)#exit
```

Associating the FnF record to a monitor. Here, there is an option (not enabled here) to export the data to the collector

Applying to the control-plane interface

Flexible Netflow

Monitoring Control-Plane traffic

```
Sup2T# show flow monitor copp-fnf-cef-receive cache
  sort counter packet
Processed 5 flows
Aggregated to 5 flows
Showing the top 5 flows

IPV4 SOURCE ADDRESS:        192.168.40.5
IPV4 DESTINATION ADDRESS:   192.168.40.1
TRNS SOURCE PORT:           48827
TRNS DESTINATION PORT:      63
IP PROTOCOL:                17
interface input:            Vl40
counter packets:            460983
<snip>

After few seconds…

Sup2T# sh flow mon copp-fnf-cef-receive ca sort
  pack
<snip>
IPV4 SOURCE ADDRESS:        192.168.40.5
IPV4 DESTINATION ADDRESS:   192.168.40.1
TRNS SOURCE PORT:           48827
TRNS DESTINATION PORT:      63
IP PROTOCOL:                17
interface input:            Vl40
counter packets:            461181
<snip>
```

Results sorted according to the number of packets per flow

First flow with high number of packets hitting the CPU

Clear the statistics of the FnF using the command:

```
Sup2T# clear flow monitor ?
  copp-fnf-cef-receive  User defined
  name                  Name a specific
   Flow Monitor
  <cr>

Sup2T# clear flow monitor copp-fnf-cef-
  receive ?
  cache          Flow Monitor cache
   information
  force-export   Export the contents of
   the cache
  statistics     Flow Monitor cache
   statistics
  <cr>
```

Flexible Netflow

Mitigating Malicious Traffic

```
Sup2T(config)#ip access-list extended UDP63
Sup2T(config-ext-nacl)#permit udp host 192.168.40.5 host
  192.168.40.1 eq 63

Sup2T(config)#class-map TEST
Sup2T(config-cmap)#match access-group name UDP63

Sup2T(config)#policy-map policy-default-autocopp
Sup2T(config-pmap)#class TEST
Sup2T(config-pmap-c)#police rate 50 pps burst 10 packets
```

The default CoPP applied to the control-plane interface

```
Sup2T# show policy-map control-plane input class TEST
 Control Plane Interface
  Service-policy input: policy-default-autocopp
  Hardware Counters:
    class-map: TEST (match-all)
      <snip>
    Earl in Slot 1:  <snip>
    Earl in Slot 2:  <snip>
  Software Counters:
      <snip>
```

Hardware (per EARL, aggregate counter) and Software counters

CPU usage went down after applying the policer

```
Sup2T# show process cpu
CPU utilization for five
seconds: 10%/8%;
<snip>
```

Flexible NetFlow Usage Examples

- Top ten IP addresses that are sending the most packets

```
Sup2T# show flow monitor <monitor> cache \
        aggregate ipv4 source address \
         sort highest counter bytes top 10
```

- Top five destination addresses to which we're routing most traffic from the 10.10.10.0/24 prefix

```
Sup2T# show flow monitor <monitor> cache \
        filter ipv4 destination address 10.10.10.0/24 \
         aggregate ipv4 destination address \
          sort highest counter bytes top 5
```

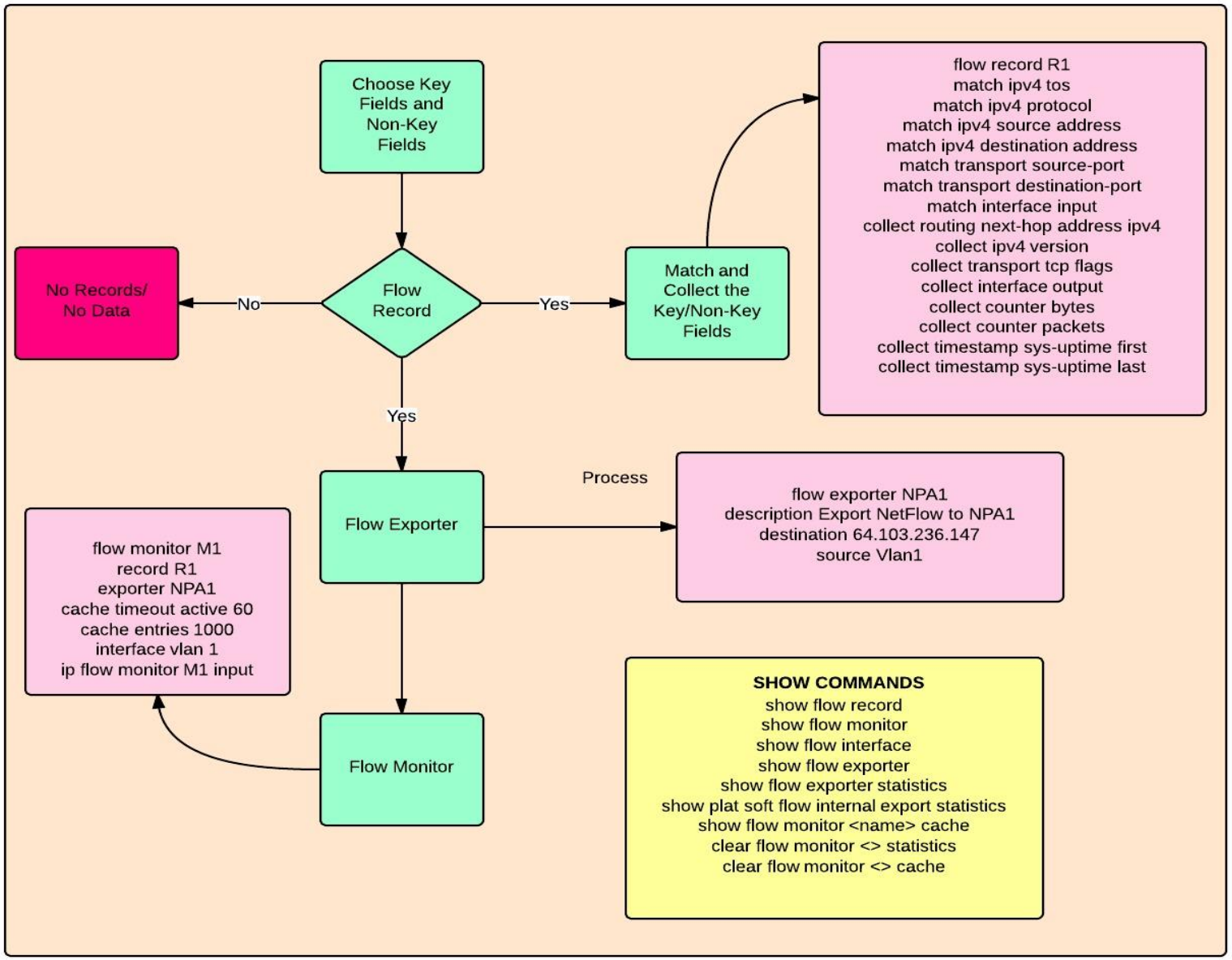
- Five VLANs that we're sending the least bytes to:

```
Sup2T# show flow monitor <monitor> cache \
       aggregate datalink dot1q vlan output \
        sort lowest counter bytes top 5
```

- Top 20 sources of one-packet flows:

```
Sup2T# show flow monitor <monitor> cache \
        filter counter packet 1 \
         aggregate ipv4 source address \
          sort highest flow packet top 20
```

Flexible Netflow - Snapshot



6800IA – Next Gen Switches Overview & Architecture

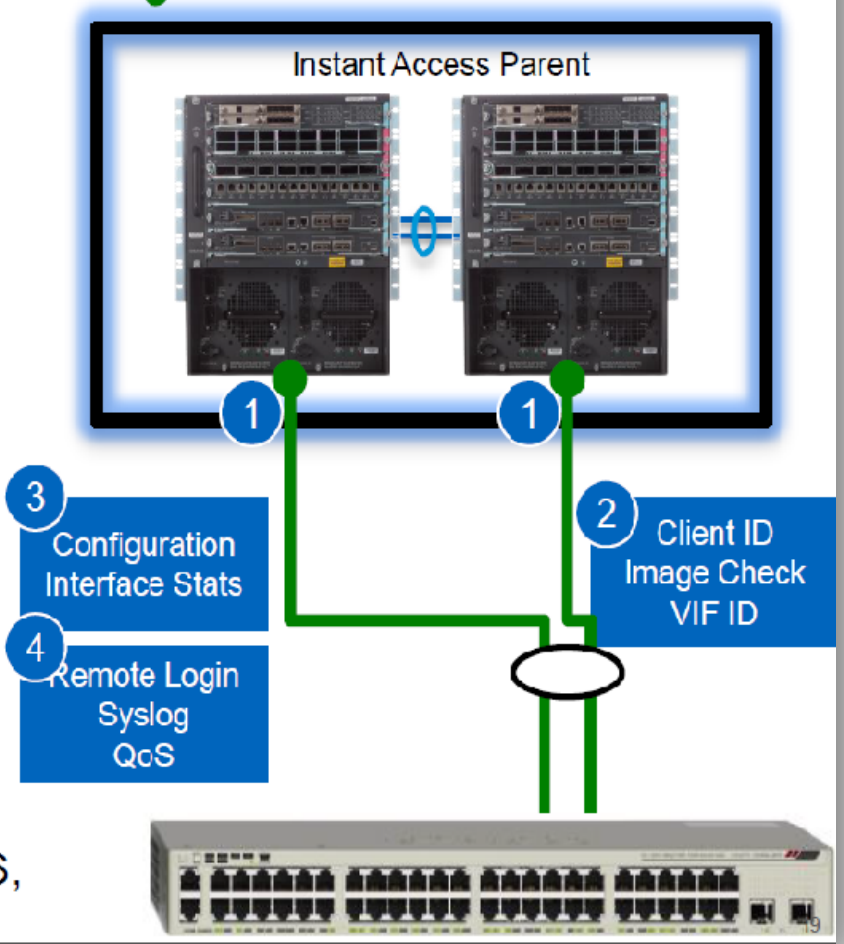
Catalyst Instant Access Client: 6848ia

- Two options: 48 Ports GigE PoE+, 48 Ports GigE
- 2 x 10G uplink SFP+ Ports
- Stackable up to 3 clients at FCS
- 80Gbps Bidirectional Stack Bandwidth
- Single Fixed Power Supply and Fixed Fans
- Operates in Client Mode ONLY
- Full PoE (15W) across 48 ports
- Full PoE+ (30W) across 24 ports
- Includes Stack Module, no licensing required

Catalyst Instant Access
Control Plane – Behind the Scene

"No User Configuration"
All Magically Happens in background
Instantly

1. Satellite Discovery Protocol (SDP)
   - Fabric Link Discovery
     - switchport mode Fex-fabric
   - Switch Discovery
     - Fex associate <Fex-ID>
   - EtherChannel Link Aggregation
2. Satellite Registration Protocol (SRP)
   - Exchange Compatibility information
   - IA Client Registration
     - IA Client image management
     - IA Client OIR
   - Stack Member Identification & mgmt
3. Satellite Configuration Protocol
   - Configuration
   - Status
   - Statistics
4. Inter Card Communication (ICC) for Syslog, QoS, Remote login.

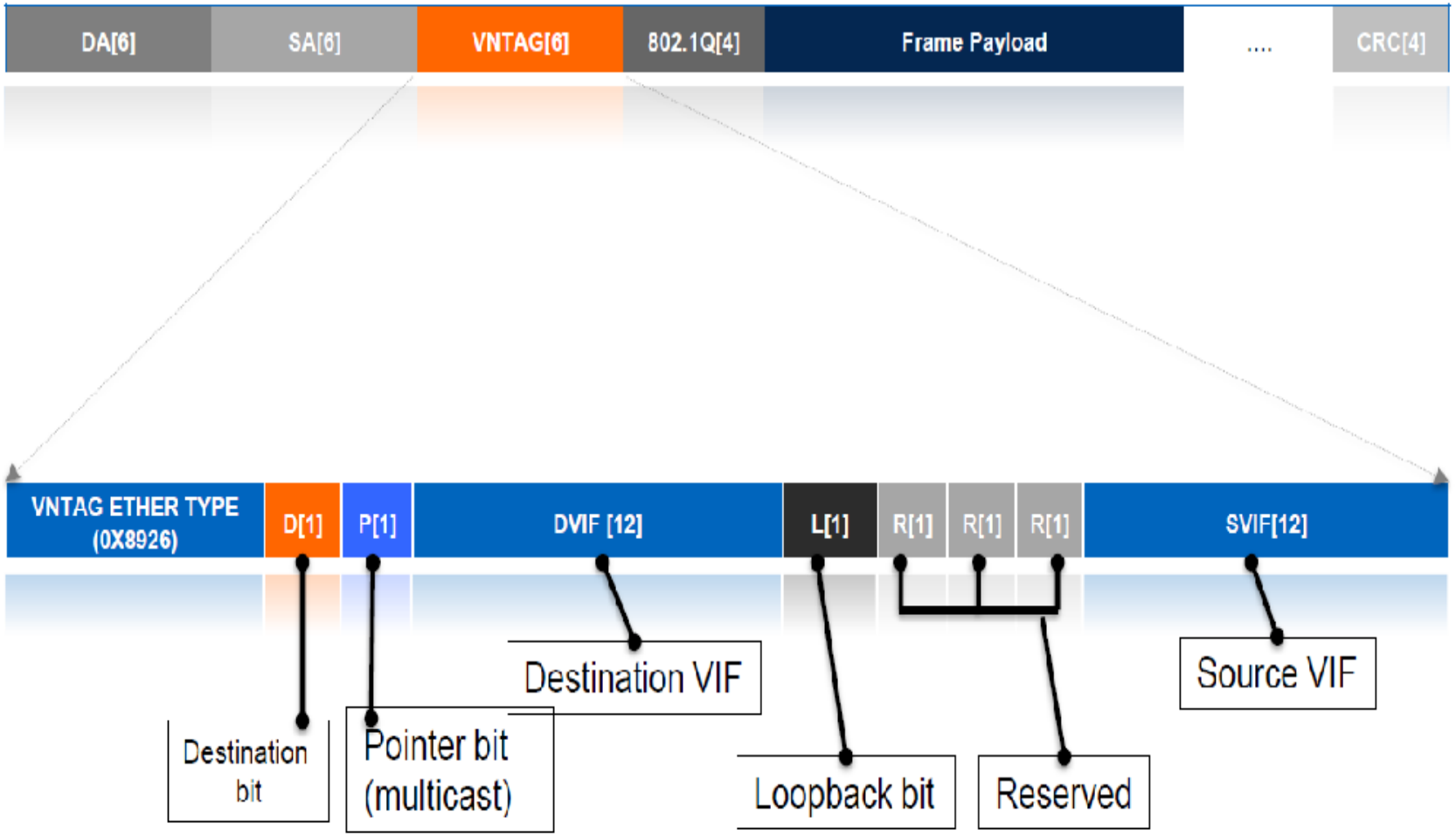


Catalyst Instant Access
Control Protocols

- **SDP** : Switch Discovery Protocol
  - ✓ The first protocol to send Hello's (keep alive) and establish communication between Parent Switch and Client Switch
  - ✓ Is a link based protocol, runs on every link between Controller and FEX.
  - ✓ Communicates all attributes to/from each IA Client (Client ID, VIFs, SKU…)
- **SRP** : Switch Registration Protocol
  - ✓ Completes the OIR and registration of IA Client on a Parent Switch.
- **SCP** : Switch Configuration Protocol
  - ✓ Configuration and management protocol established between Parent and IA Client Switch.
  - ✓ Lightweight L2 based protocol.
- **ICC** : Inter Card Communication
  - ✓ Protocol for heavyweight features running over Cisco IPC.

VNTAG
802.1Qbh

Unicast	D=1	Unicast to FEX Host Port
Multicast	P=1	Pointer to Multicast Table on FEX Client

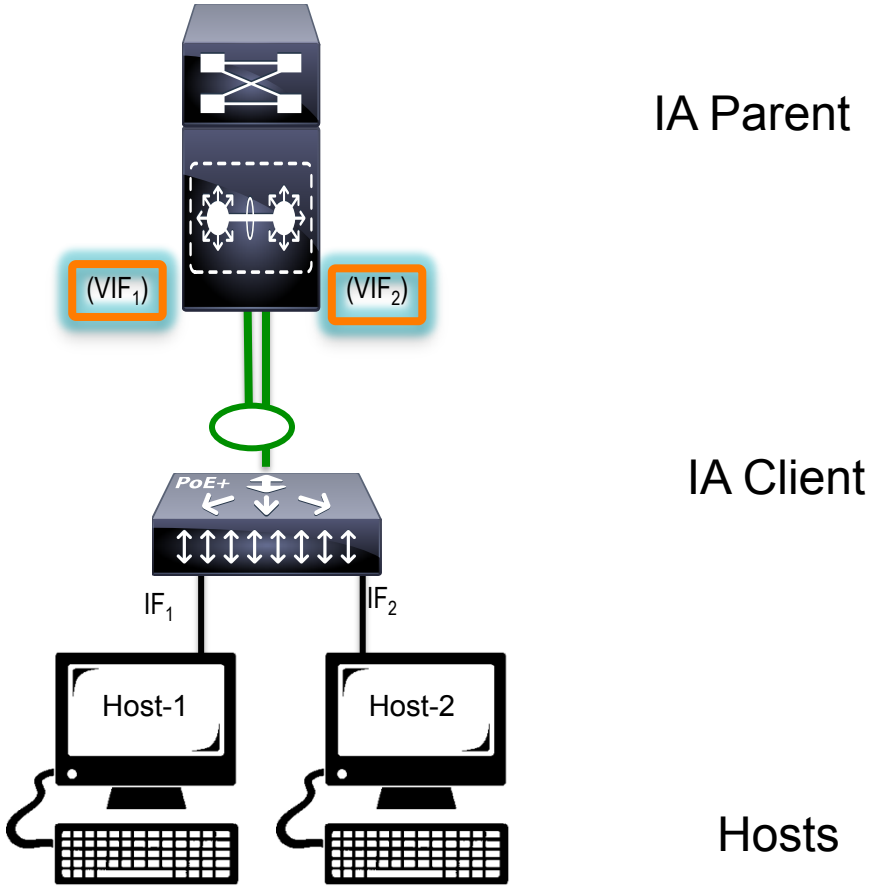


Catalyst Instant Access

Local Processing of Remote Port. How?

Ingress Mapping

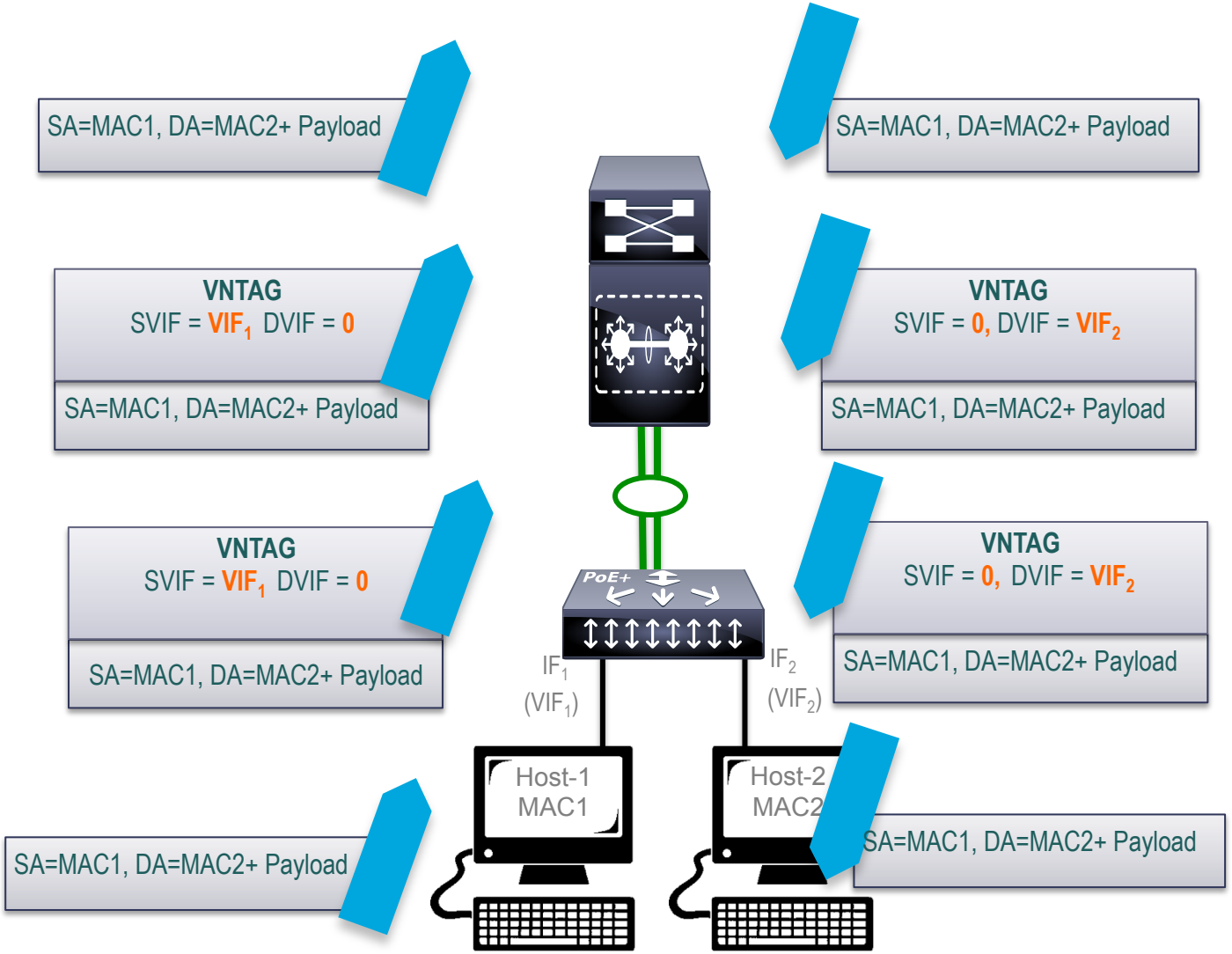
TAG	IA Client Interface
VIF_1	IF_1
VIF_2	IF_2



- Automatically assigned
- One VIF to each host port
- One VIF to each Etherchannel
- One VIF to FEX CPU for Control Channel
- IA Parent VIF = 0
- Multicast/Broadcast: Pointer to Replication Table in IA Client

TAG: Virtual NIC Tag VIF – Virtual Interface

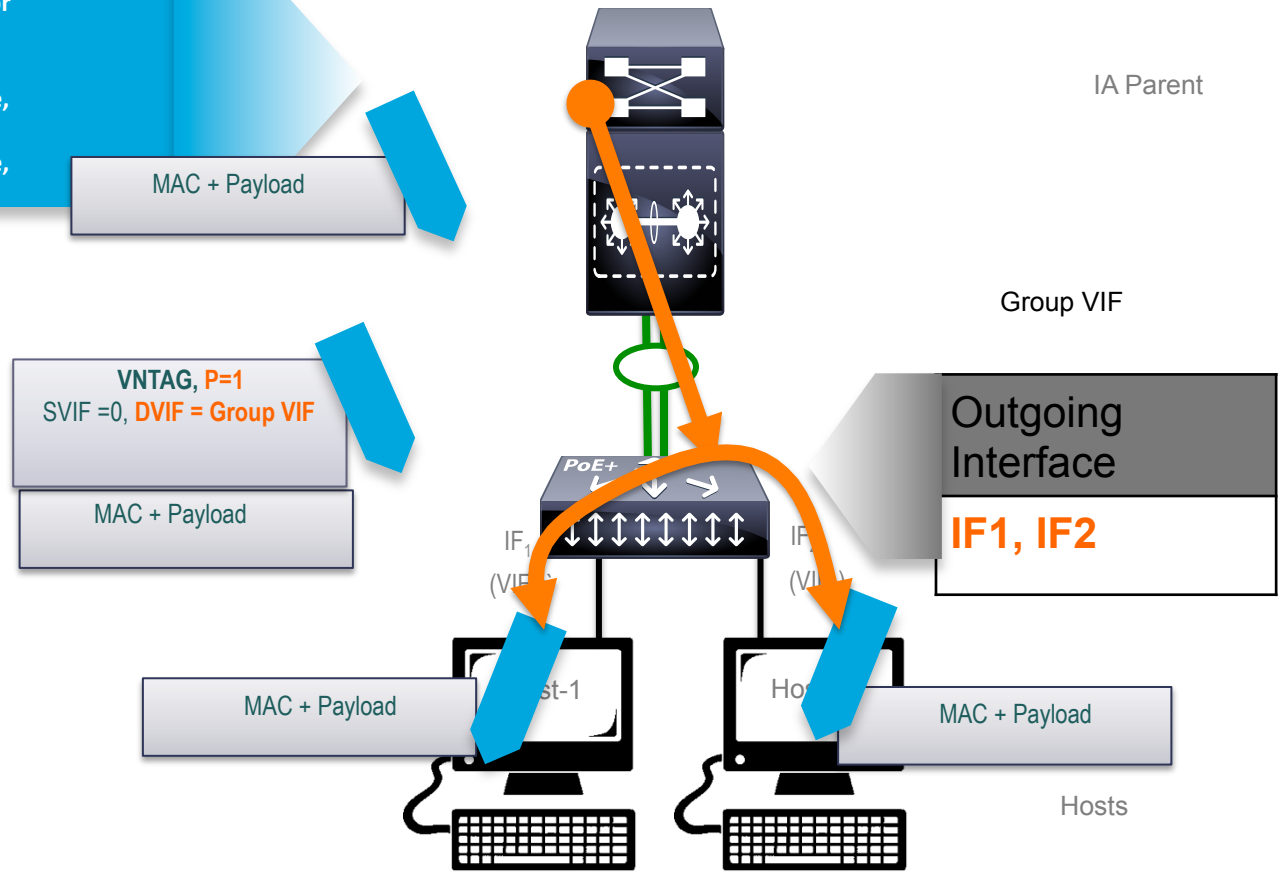
Catalyst Instant Access Packet Walk (Host 1 to Host 2)



VNTAG: Virtual NIC Tag

Catalyst Instant Access – Packet Walk – Multicast / Broadcast

192.168.1.100, 224.0.255.1
Incoming Interface: FortyGig 5/1 RPF Neighbor 210.20.37.33
Outgoing interface list:
Gigabitethernet 101/1/0/1, Forward/Dense, 0:57:31/0:02:52
Gigabitethernet 101/1/0/2, Forward/Dense, 0:56:55/0:01:28



VNTAG: Virtual NIC Tag VIF – Virtual Interface

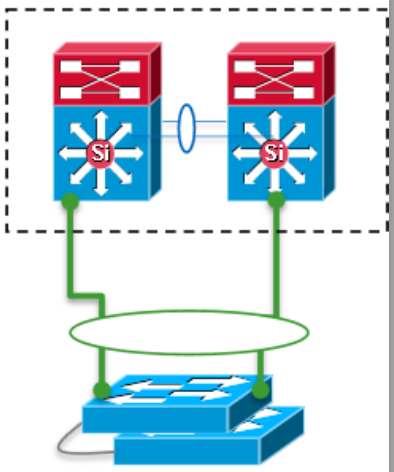
Catalyst Instant Access Provisioning

Simplicity of adding a Stack Member – Plug and Play

```
Cat6500-VSS#show mod fex 118
 Switch Number:   118   Role:                        FEX
---------------------  ----------------------------
Mod Ports Card Type                                 Model              Serial No.
--- ----- ----------------------------------------- ------------------ -----------
  1    48  C6800IA 48GFPwr 2SFP                      Fullers_48FullPwr  FHH1707P00S
```

```
Cat6500-VSS#
*Apr  3 19:37:58.026: %SATMGR-SW1-5-FEX_MODULE_ONLINE: FEX 118, module 2 online
Cat6500-VSS#
*Apr  3 19:37:58.030: %OIR-SW1-6-INSREM: Switch 118 Physical Slot 2 - Module Type
LINE_CARD  inserted
 Fex 118 Module 2: Passed Online Diagnostics
*Apr  3 19:38:12.178: %OIR-SW1-6-SP_INSCARD: Card inserted in Switch_number =
118, physical slot 2, interfaces are now online
```

```
Cat6500-VSS#show mod fex 118
 Switch Number:   118   Role:                        FEX
---------------------  ----------------------------
Mod Ports Card Type                                 Model              Serial No.
--- ----- ----------------------------------------- ------------------ -----------
  1    48  C6800IA 48GFPwr 2SFP                      Fullers_48FullPwr  FHH1707P00S
  2    48  C6800IA 48GFPwr 2SFP                      Fullers_48FullPwr  FHH1707P010
```



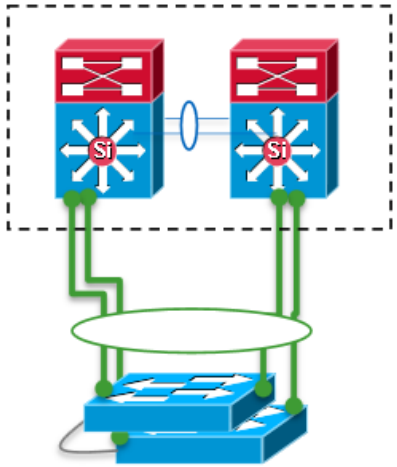
Stack Member automatically Discovered and associated to FEX like a Line Card

Catalyst Instant Access Provisioning
Simplicity of Adding Additional Uplinks

```
Cat6500-VSS#show fex 118 detail
FEX: 118        Description: FEX0118     state: online
<Snip>…
  Fabric Portchannel Ports: 2
  Fabric port for control traffic: Te1/2/5
  Fabric interface state:
    Po20        - Interface Up.
    Te1/2/5     - Interface Up.       state: bound
    Te2/2/5     - Interface Up.       state: bound
```

```
Cat6500-VSS(config)#int range TenGig1/2/13, TenGig2/2/13
Cat6500-VSS(config-if-range)#channel-group 20 mode on
```

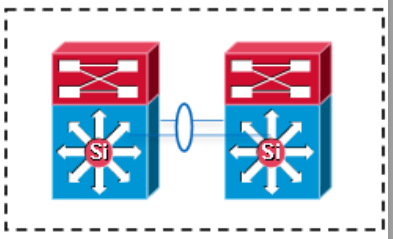
```
Cat6500-VSS#show fex 118 detail
FEX: 118        Description: FEX0118     state: online
  <Snip>…
  Fabric Portchannel Ports: 4
  Fabric port for control traffic: Te1/2/5
  Fabric interface state:
    Po20        - Interface Up.
    Te1/2/5     - Interface Up.       state: bound
    Te1/2/13    - Interface Up.       state: bound
    Te2/2/5     - Interface Up.       state: bound
    Te2/2/13    - Interface Up.       state: bound
```



Just Bundling to "fex-fabric" Port Channel on Parent, No Configuration at IA Client

Catalyst Instant Access Provisioning
Pre-Provisioning of IA Client

Pre-Provisioning Switch and host port configuration before the IA Switch is physically connected can be done very similar to a line card Pre Provisioning



Pre-Provisioning of IA Client

```
Cat6500-VSS#mod provision create fex 121 type  WS-XC6800IA-48FPD
FEX 121 slot 1 module provisioning entry added.
```

Pre-Provisioning a Stack Member to Existing FEX-ID

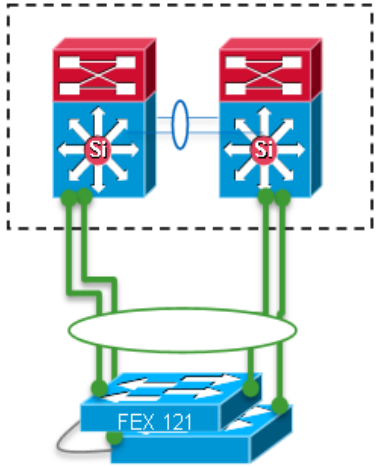
```
Cat6500-VSS#mod provision create fex 121 type WS-XC6800IA-48FPD slot 2
FEX 121 slot 2 module provisioning entry added.
```

```
Cat6500-VSS#show switch virtual slot-map
Virtual Slot to Remote Switch/Physical Slot Mapping Table:

Virtual     Remote       Physical    Module
Slot No     Switch No    Slot No     Uptime
---------+-----------+----------+----------
  68         121              1
  69         121              2
```

Catalyst Instant Access Provisioning
Pre Provisioning of Host Port Configuration

Once the FEX-ID is provisioned, the Host Port Interface can be configured like Any regular interface in Cat6500

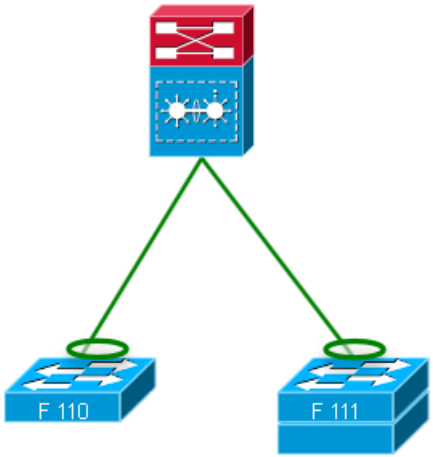
```
Cat6500-VSS#show run fex 121
Building configuration...

Current configuration : 5564 bytes
!
interface GigabitEthernet121/1/0/1
 switchport mode access
.....
```



Pre Provision any IA Client Host Port like a regular port ahead.

```
Cat6500-VSS#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Cat6500-VSS(config)#int Gig 121/1/0/24
Cat6500-VSS(config-if)#description To Printer Bldg3,4th Floor.
Cat6500-VSS(config-if)#switchport access vlan 110
```

Catalyst Instant Access L2 Deployment
Simplicity of Discovering New Instant Access Clients



Automatic-Discovery

- A Client gets automatically discovered and provisioned using IA Control Protocol when connected.
- Automatic Discovery and Stack Member by Parent via Stack Master

Pre-Provisioning

Provision IA Client and interface Configurations before even physically connecting the IA Client

```
mod provision  create fex  111 type WS-C6800ia
mod provision  create fex  111 module 2 type WS-C6800ia
```

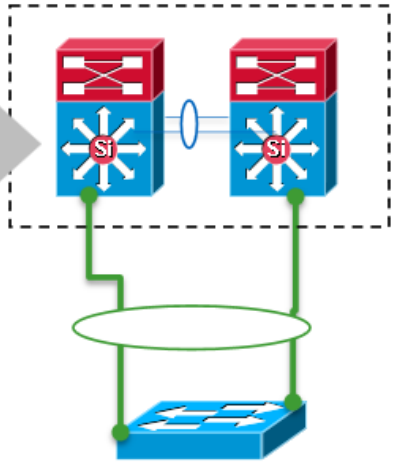
Catalyst Instant Access Provisioning
Automatic Discovery of IA Client.

Step 1

```
interface Port-channel20
 switchport
 switchport mode fex-fabric
fex associate 118
```

Step 2

```
interface  range  TenGig1/2/5, TenGig2/2/5
 switchport
 channel-group 20 mode on
```

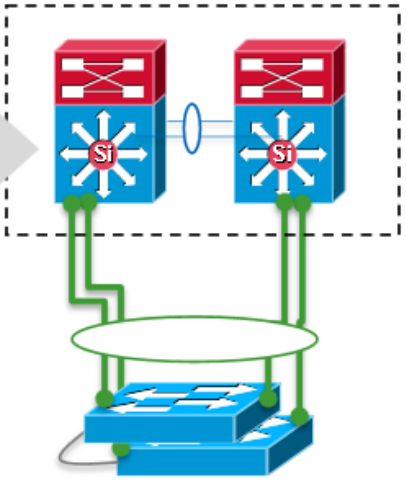


The Discovery process starts automatically once the FEX-Fabric is configured on downlinks to IA Client

No Console Access Required to Instant Access Client Provisioning

Catalyst Instant Access Provisioning
Automatic Discovery and Provisioning of IA Client

```
Cat6500-VSS#show fex 118 detail
FEX: 118         Description: FEX0118     state: online
  FEX version: 15.0(2.0.51)UCP
  Extender Model: WS-C2960X-48FPD-L, Extender Serial:
FHH1707P00S
  FCP ready: yes
  Image Version Check: overridden
  Fabric Portchannel Ports: 2
  Fabric port for control traffic: Te1/2/5
  Fabric interface state:
    Po20        - Interface Up.
    Te1/2/5     - Interface Up.       state: bound
    Te2/2/5     - Interface Up.       state: bound
```

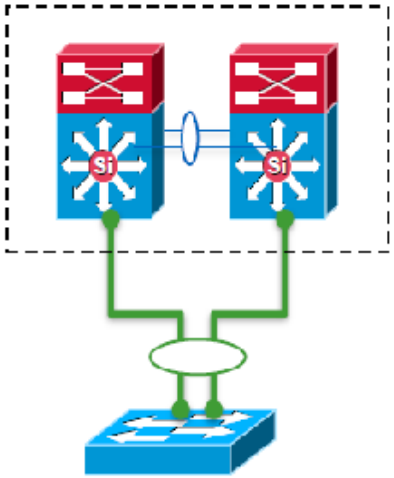



```
Cat6500-VSS#show run fex 118
Current configuration : 11123 bytes
!
interface GigabitEthernet118/1/0/1
```

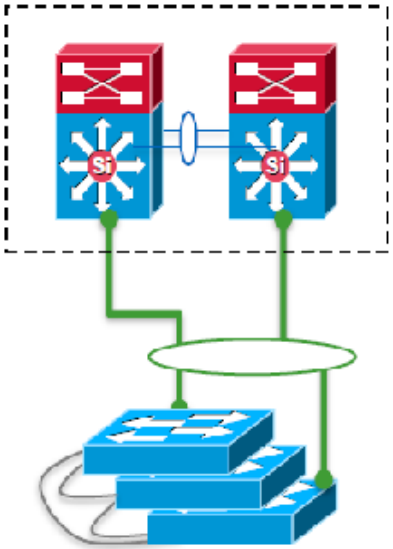
Catalyst Instant Access

Fabric Link Connectivity Scenarios – Dual Homed to VSS Pair

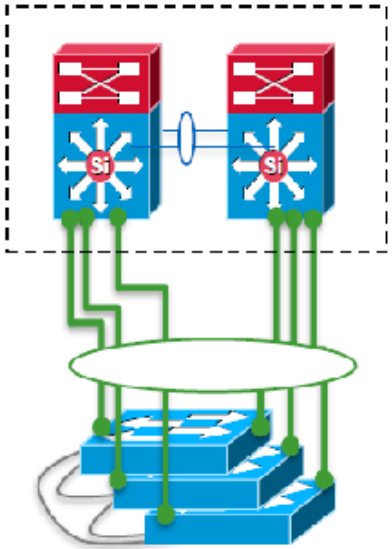
Recommended Design



Dual Homed to VSS Pair

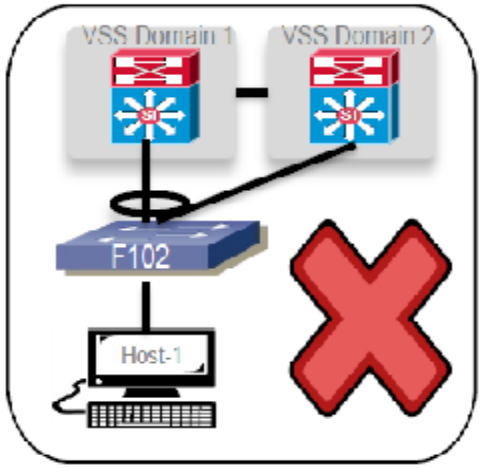


Dual Homed across Stack Members

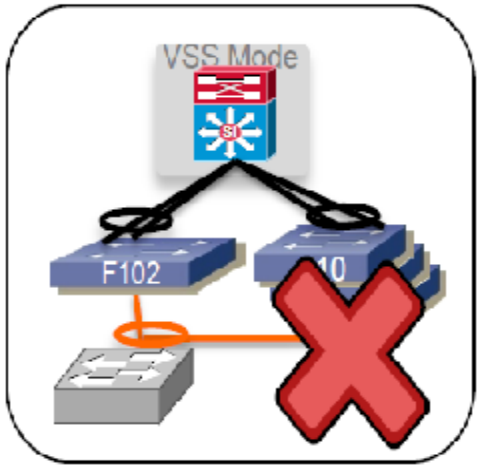


Up to 6 uplinks(60G) MEC across Client to Parent

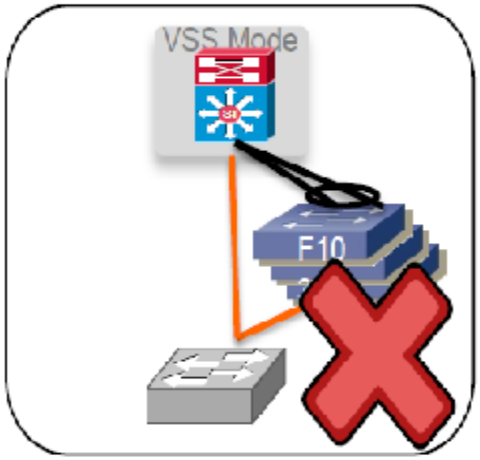
Catalyst Instant Access
Un-Supported Topologies



IA Client can not be connected to two Standalone Switches in VSS Mode



Ether channel across Multiple FEX ID's no supported.



Ether channel across IA Client and Native Cat6k ports not supported

References

- Cisco Live BRKCRS-3502
- Cisco Documents
- http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-6500-series-switches/white_paper_c11-652021.html
- Cisco Live BRKCRS-3143
- http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-6800ia-switch/qa_c67-728684.html

Polling Question 3

How useful was this presentation?

A. This was very informative presentation.
B. This presentation needed more in depth details.
C. I wanted to see some information on configuration
D. This presentation was somewhat useful

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https://supportforums.cisco.com/event/12125081/ask-expert-whats-new-cisco-catalyst-6500-series

You can catch the video or read the Q&A five business days after the event at

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Trivia Question (Select the correct answer)

What do Cisco Catalyst 6500 and vacations have in common?

A. In the year 2001, the first 10 Gigabit Ethernet (10GbE) modules for the Cisco Catalyst 6500 Series switches were developed and the travel company Orbitz was founded.

B. The Cisco Catalyst 6500 was used to revamp the Data Center for Orbitz travel

C. Both A and B

March Expert Series Webcast - Russian

Topic: Deploying and Troubleshooting Cisco Unified Contact Center Express Scripts

Tuesday, March 18

12:00 p.m. Moscow Time

9:00 a.m. Brussels Time

Join Cisco Expert:

Sergey Oliferov

During this live event, Sergey Oliferov discuss how to deploy and troubleshoot scripts for Cisco Unified Contact Center Express.

Registration for this live webcast:

http://tools.cisco.com/gems/cust/customerSite.do?METHOD=E&LANGUAGE_ID=R&SEMINAR_CODE=S19966&PRIORITY_CODE=

March Expert Series Webcast - Portuguese

Topic: Unified Communications on UCS – Virtualized Networks

Wednesday, March 19

11:00 a.m. Brasilia Time

2:00 p.m. Lisbon

7:00 a.m. San Francisco

10:00 a.m. New York

Join Cisco Expert:

Pedro Ivo Mauri

During this live event, Pedro will present the concepts and trends in UC virtualization, applications and operations of virtualized network access with a focus on UCS-B series, Nexus 1000v and VMware ESXi.

Registration for this live webcast:

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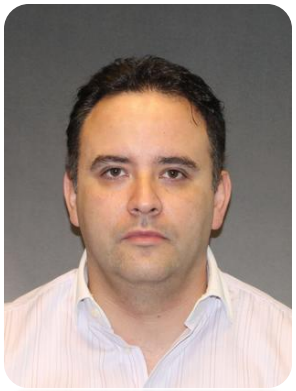
March Expert Series Webcast – Spanish

Topic: Interoperability of Cisco Collaboration Solutions



Tuesday, March 25

9:00 a.m.	**Mexico City**
10:30 a.m.	**Caracas**
12:00 p.m.	**Buenos Aires**
4:00 p.m.	**Madrid**

Join Cisco Expert:

Omar Peláez

During this live event, Omar will discuss the challenges of overlap in services collaboration with Cisco and Microsoft, including voice, video, instant messaging and presence, unified messaging and web collaboration.

Registration for this live webcast:

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April Expert Series Webcast – English

Topic: Securing Enterprise LAN

Tuesday, April 1

9:00 a.m.	**San Francisco**
12:00 p.m.	**New York**
5:00 p.m.	**London**
6:00 p.m.	**Paris**

Join Cisco Expert:

Vaibhav Katkade

During this live event, Omar will cover the various security features available on Cisco Catalyst switching platforms and how they can be used to block internal threats in enterprise networks.

Registration for this live webcast:

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Topic: FSPF Concepts and Troubleshooting in Cisco SAN Environments

Join Cisco Expert: **Upinder Sujlana**

Learn and ask questions about FSPF, VSAN interaction, load balancing, and troubleshooting

Ends March 14

Topic: Demystifying Long-Term Evolution

Join Cisco Experts: **Rahul Pal, Arpit Menaria & Krishna Kishore**

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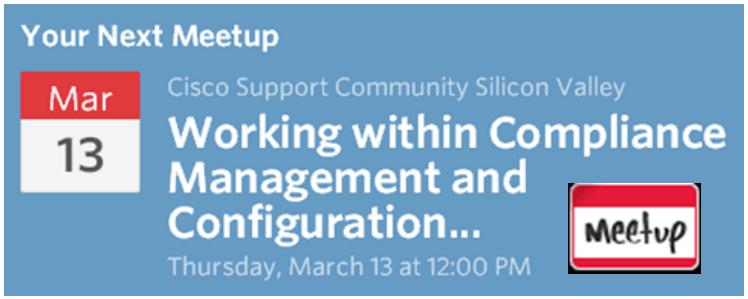
Meetup

Topic: Working with Compliance Management and Configuration Services (CMCS)



Thursday, March 13, 2014

12:00PM – 2:00PM *San Clara, CA*

Join Cisco Expert:

Mark Doering, Technical Marketing Engineer, Cisco

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Lunch will be provided.

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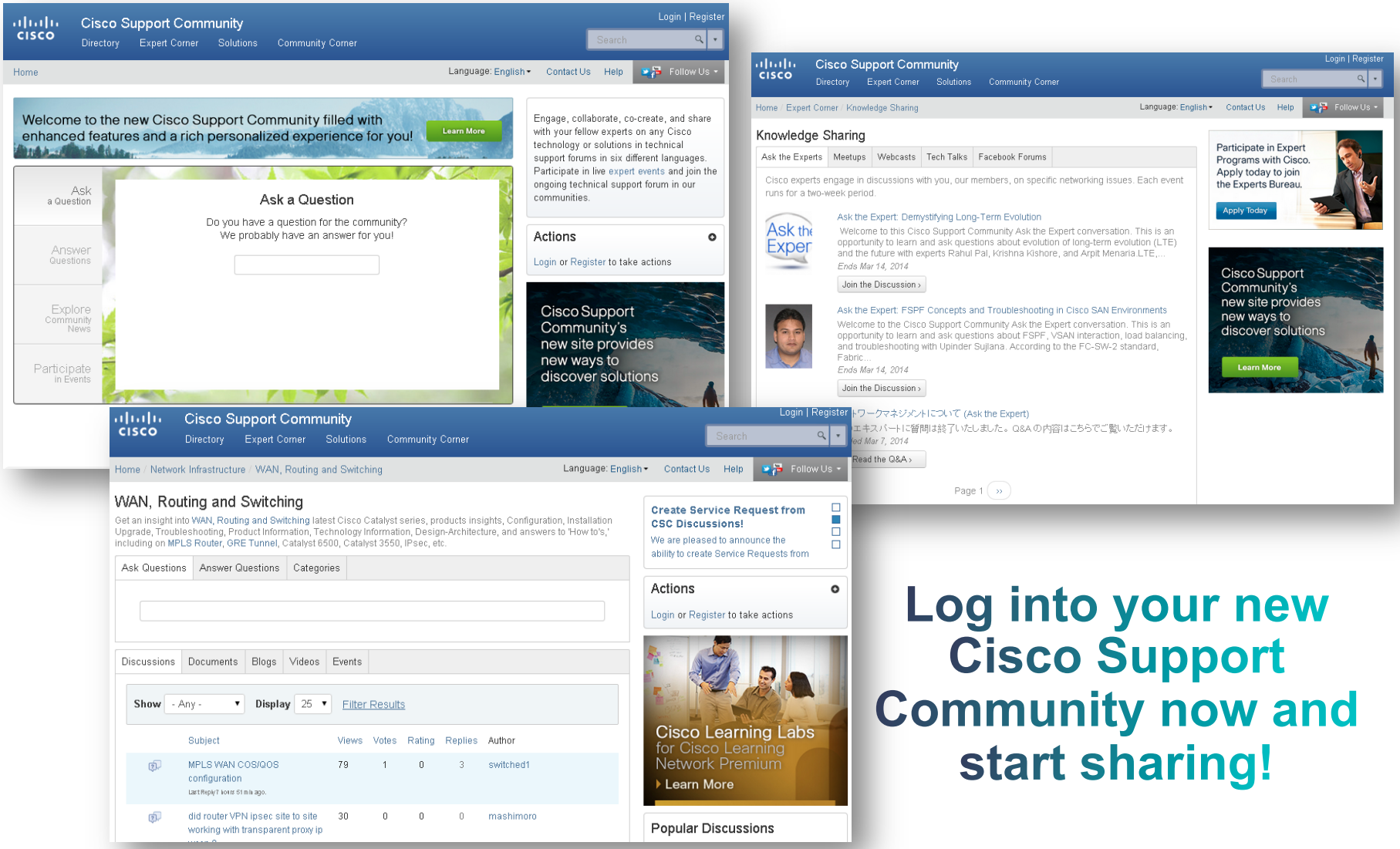

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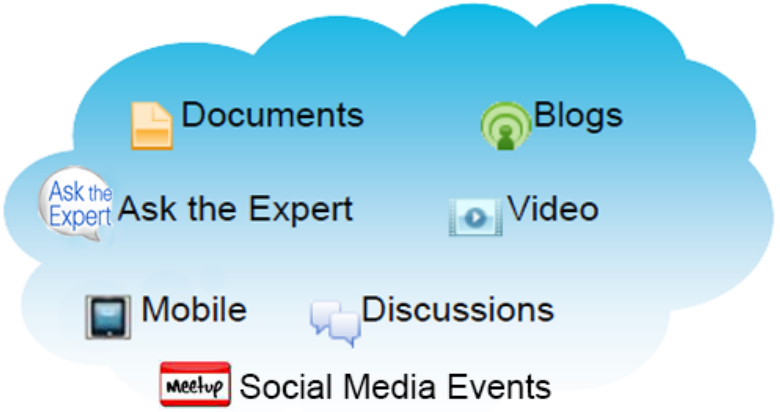

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Trivia Question (Select the correct answer)

What do Cisco Catalyst 6500 and vacations have in common?

A. In the year 2001, the first 10 Gigabit Ethernet (10GbE) modules for the Cisco Catalyst 6500 Series switches were developed and the travel company Orbitz was founded.

B. The Cisco Catalyst 6500 was used to revamp the Data Center for Orbitz travel

C. Both A and B

The answer is C. In 2001 Orbitz travel company was founded and the first 10 Gigabit Ethernet (10GbE) modules for the Cisco Catalyst 6500 Series switches were developed. The Cisco Catalyst 6500 was also part of the new infrastructure for the Orbitz Travel Data Center. Orbitz noticed more uptime and higher sales. The higher their availability, the better the online sales numbers and their bottom line.

Thank you for Your Time!

Please take a moment to complete the evaluation

Thank you!