Deploying Layer 3-Enabled ATM Networks with the Catalyst® 8500

Session 2804
Agenda

- L3eATM Overview
- ARM IP Switching
- ARM LANE
- L3eATM Deployment

L3eATM Overview
Analyst Quote

“ATM and TCP/IP will be the dominant backbone multiservice architectures over the next five years.”

Dataquest
September 1999

Catalyst 8500 Data Paths

L3 Module -- L3 Module

ARM

ATM Module -- ATM Module

L3 - L3
ATM - ATM
L3 - ATM

cisco.com
Software Overview

- Data forwarding path and control path are de-coupled
- FIB and CEF based forwarding
- Data forwarded directly by microcode
- Signaling handled by RP
ARM Features

- L3 IP forwarding
- L3 IPX forwarding
- L3 IP multicast forwarding
- Source/destination-based load sharing among equal-cost paths

ARM L2 Features

- Transparent bridging
- Spanning tree Protocol
- L2 learning/aging/filtering by hardware
- IRB mode
Other Features

- ICMP support
- HSRP
- Interoperates with FEC/GEC
- Interoperates with ISL/Dot1q on Ethernet interfaces

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ARM IP Switching

- Overview
- IP switching
**Ethernet to ATM Flow:**

- Ethernet-controller sees ARM as another “Ethernet-like” interface, and forwards packets to it
- ARM-controller performs a lookup on the destination IP address, encapsulates the packet with RFC-1483 encapsulation and sends to the appropriate 1483-PVC
- Switch fabric switches the cells directly between ARM and ATM
- IP Precedence bit mapped to priority within switching fabric

**ATM to Ethernet Flow:**

- ATM cells received from the ATM PVC are sent to ARM by switch fabric
- ARM-controller performs a lookup on the destination IP address, does MAC-Rewrite, updates TTL and sends the packet to destination interface using appropriate BRoute-VC
- Outgoing Ethernet-controller strips off the internal encap and sends the packet out
Overview

- Processor involved in populating routing table information
- Adjacency update is populated by ARP and by gleaning neighbors from route broadcast
- Prefix and adjacency information is populated on linecards by sending IPC messages so that RP and linecard information is always in sync

IP Switching

Routing Table:
- 10.1.0.0 is directly connected, FastEth 1/0/0
- 20.1.0.0 is directly connected, ATM3/0/0.1
- 30.1.0.0 is directly connected, ATM4/0/0.1

CEF Table:
- 10.1.0.0 attached FastEth 0/0/0
- 20.1.0.0 attached ATM 3/0/0.1
- 30.1.0.0 attached ATM 4/0/0.1

Adjacency Table:
- FastEth 1/0/0 10.1.1.2 00ab.cdef.0001 Interface No.
- ATM 3/0/0.1 20.1.1.2 00ab.cdef.0002 Data VC
- ATM 4/0/0.1 30.1.1.2 00ab.cdef.0003 Data VC
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ARM LANE

Overview

- ARM interface treated as internal ATM port
- Support LEC configuration on ARM (sub)interface (int atm x/y/z)
- No LECS/LES/BUS allowed on ARM. Allowed on CPU port (int atm 0), but NOT recommended (performance limited)
- Up to 64 LEC allowed per chassis
- Default ATM address prefix same as CPU port’s
- All LANE VC terminated on ARM interface
- ATM signaling handled by RP. ARM redirects LANE control packets to RP.
- Shut/no shut allowed on ARM interface to bring up/down ELAN traffic
- All IP/IPX/bridge configuration commands allowed on ARM interface
LANE Commands Supported

- lane client ethernet <ELAN>
- lane client-atm-address <LEC ATM Addr>
- lane config-atm-address <LECS ATM Addr>
- lane auto-config-atm-address
- lane server-atm-address <LES ATM Addr>
- lane le-arp <MAC addr> <ATM addr>

Configure LANE

ELAN1 1.1.0.0/16
Cisco 7500
LEC3
ATM
LEC4
Cisco 7500
Catalyst 8540
int a10/0/0.1 (ARM) LEC1, 1.1.1.2
int a10/0/1.1 (ARM) LEC2, 2.2.2.2
Catalyst 5500
LECS
LES
BUS
ELAN2 2.2.0.0/16
Configure LANE

Switch#config term
Switch(config)#int a10/0/0.1 multipoint
Switch(config-if)#lane config-atm-address 47.009181000000009021517801.00500F7FCC13.00
Switch(config-if)#lane client ethernet elan1
Switch(config-if)#ip address 1.1.1.2 255.255.0.0
Switch(config)#int a10/0/1.1 multipoint
Switch(config-if)#lane auto-config-address
Switch(config-if)#lane client ethernet elan2
Switch(config-if)#ip address 2.2.2.2 255.255.0.0
Switch(config-if)#end

L3eATM Overview

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- ARM LANE
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L3eATM Deployment

High-Speed Enterprise Campus

- Wiring Closet
- Data Center
- Distribution
- Core

- Catalyst 29xx
- Catalyst 4xxx
- Catalyst 5xxx
- Catalyst 8500
- Catalyst 6500
- Core

- 10/100 Mbps
- Catalyst 5xxx
- Catalyst 8500
Conclusions

- L3e™ offers excellent value proposition to both Enterprise and SP
- The L3e™ market is growing rapidly
- Help your customers take advantage of the convergence of L3 and ATM
Please Complete Your Evaluation Form

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