

IPv6 in CableLabs DOCSIS 3.0

IETF INT area meeting
IETF#65

Ralph Droms (rdroms@cisco.com)
Alain Durand (alain_durand@cable.comcast.com)
Deepak Kharbanda (d.kharbanda@cablelabs.com)
Jean-François Mulé (jfm@cablelabs.com)

Agenda

- Motivation: Why IPv6 in cable networks?
- DOCSIS 3.0 modems and IPv6
- Deployment scenarios; how IPv6 is used
- Conclusion

Details in:

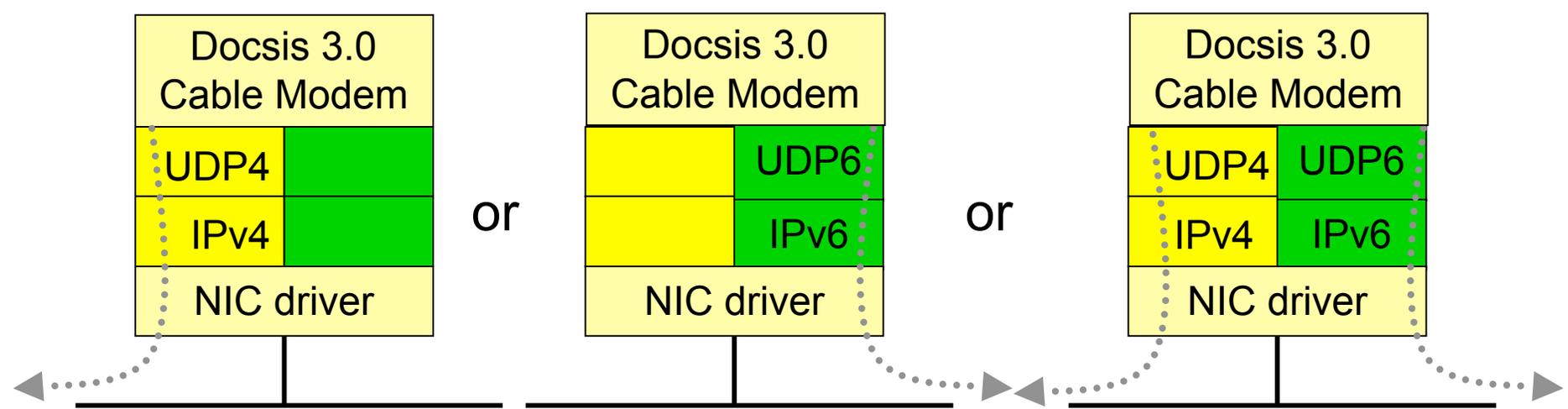
`http://www.cablelabs.com/downloads/ietf/
draft-mule-cablelabs-docsis3-ipv6-00.txt`

Motivation: Why IPv6 in cable networks?

- IPv6 for the provisioning/management of end devices (CM, MTA, STB)
 - Some MSOs have already encountered the limits of RFC1918 addressing
 - Video set top boxes becoming DOCSIS provisioned create a surge in IP address demand.
- Provide IPv6 connectivity within the home.

Docsis 3.0 Modems and Mode of Operation

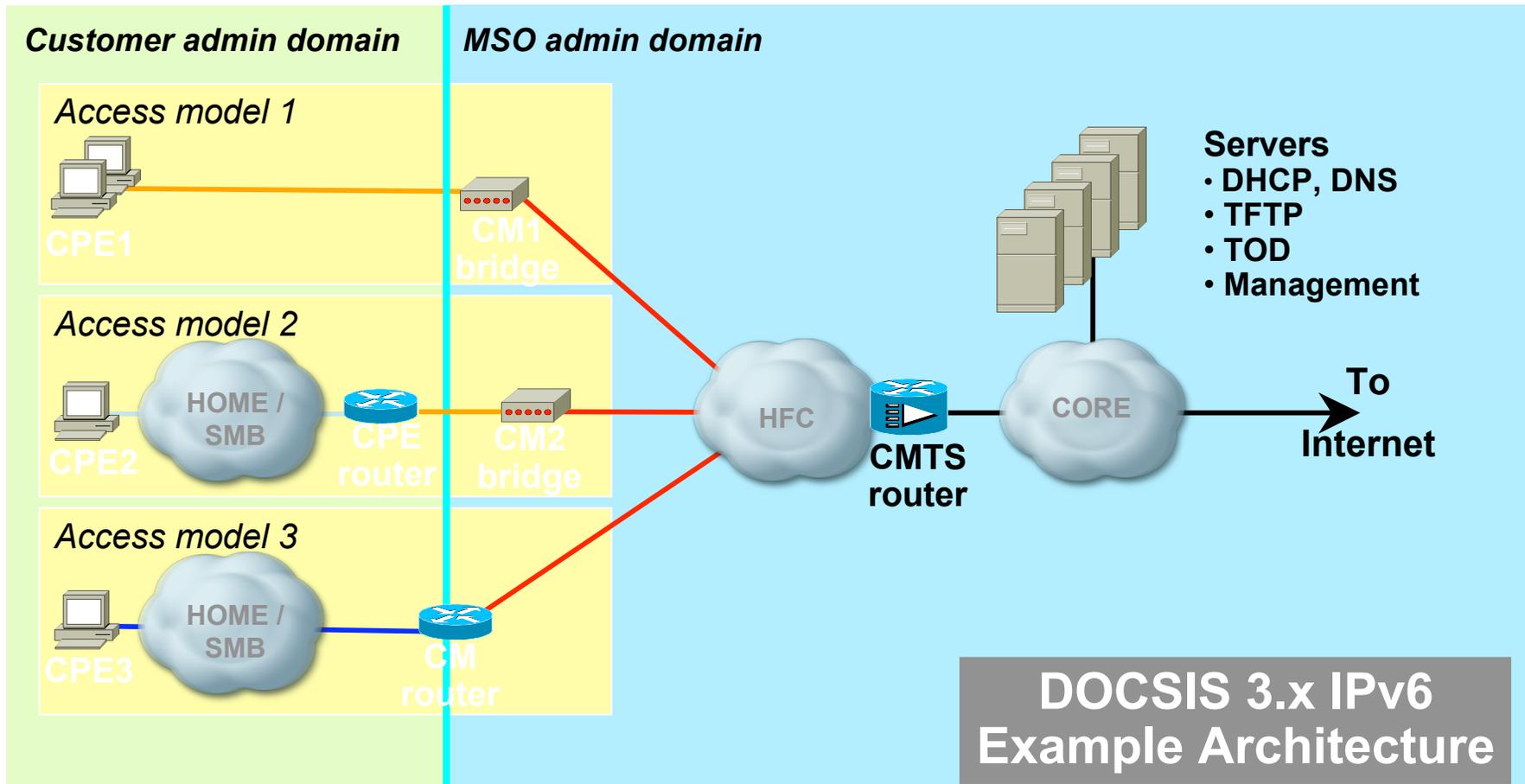
- Docsis 3.0 modems will be IPv6 ready (dual stack v4 & v6)
- When configured on IPv4-only CMTS, Docsis 3.0 modems will be provisioned using IPv4
- when configured on IPv6-enable CMTS, Docsis 3.0 modems will be provisioned either using IPv4 or using IPv6. A mode is defined where both IPv4 & IPv6 addresses are available
- In some deployment where IPv4 address space is an issue, Docsis 3.0 modems will not have both IPv4 & IPv6 addresses at the same time



depending on an L2 config message

CM features

- CM can pass IPv4 or IPv6 traffic regardless of the IP version it is provisioned with
- CM is provisioned with DHCP and/or DHCPv6
 - No stateless autoconf
- Some CM will operate as a L2 bridges, some as L3 routers
 - Get IPv6 prefix with DHCPv6-PD
 - Act as local DHCP/DHCPv6 server
 - Enable stateless autoconf of end devices
 - No routing protocol (default route only)
 - Enable NAT for IPv4
 - Implement MIBs
 - MLDv2 proxy



Management prefix: 2001:DB8:FFFF:0::/64
 Service prefix: 2001:DB8:FFFE:0::/64
 Customer 2 prefix: 2001:DB8:2::/48
 Customer 3 prefix: 2001:DB8:3::/48

- MSO management; assigned 2001:DB8:FFFF:0::/64
- MSO service 2001:DB8:FFFE:0::/64
- Customer 2 premises link; assigned 2001:DB8:2:0::/64
- Customer 3 premises link; assigned 2001:DB8:3:0::/64

Address Configuration Choices

- Why DHCPv6 for CM address allocation?
 - Follow the same provisioning model as in IPv4
 - Enable tight control of addresses in use
 - DHCPv6 act as access control mechanism as in IPv4
 - Enable simple Dynamic DNS update from the DHCPv6 server
- How can a CMTS force DHCPv6 (and prevent stateless autoconf)?
 - Send RA with prefix list empty
 - Set M&O bit to 1
- The rest is plain vanilla IPv6

Conclusion

- MSOs will deploy large number of dual-stack capable devices with only one stack enabled, equivalent to IPv6 only devices
 - CM, STB only need to communicate with servers internal to MSO that can be dual-stack
 - Some MSOs may deploy IPv6-only MTA. Those will have to communicate with IPv4-only MTA... Need a solution there!
- DOCSIS 3.0 depends on IETF specification of DHCPv6 options.