

**SCTE CABLE-TEC**  
**EXPO'13**  
OCTOBER 21-24 / ATLANTA, GA

# IPV6 DEPLOYMENT BEST PRACTICES

**Jeff Riddel**

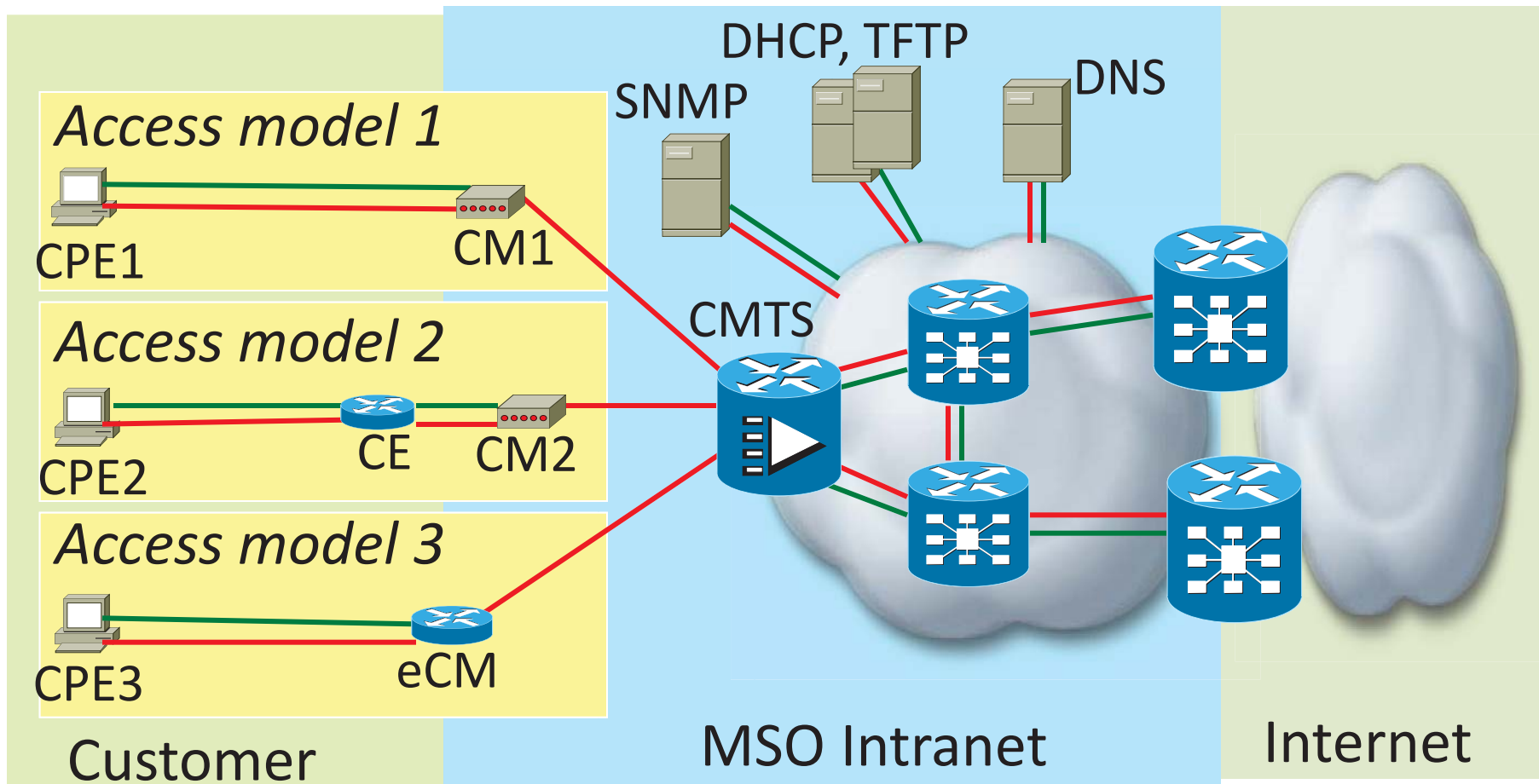
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# Moving to IPv6



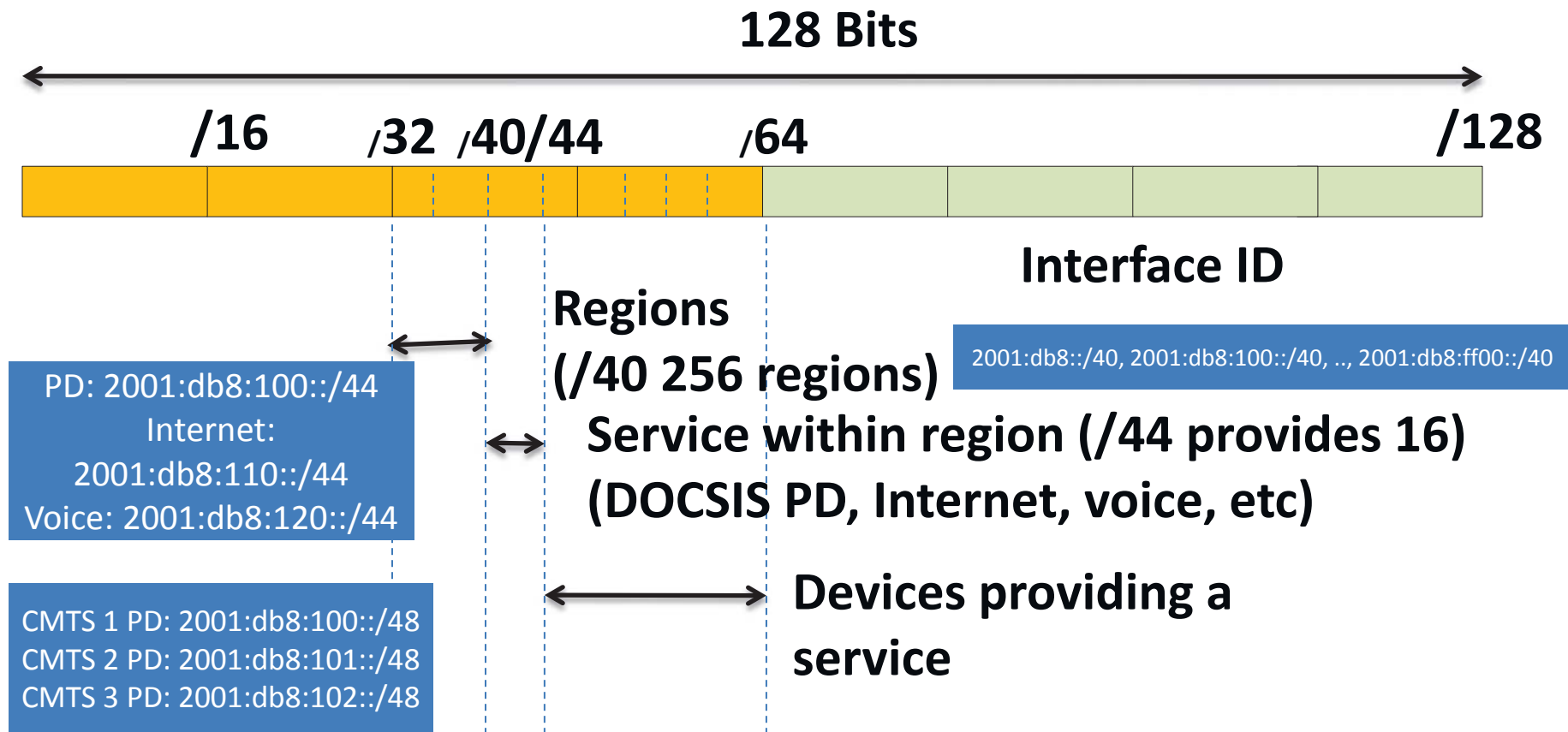
← IPv4 →

← IPv6 →

# IPv6 Addressing Strategy

## Sub-netting example

2001:db8::/32



[http://www.cisco.com/en/US/docs/solutions/SBA/February2013/Cisco\\_SBA\\_BN\\_IPv6AddressingGuide-Feb2013.pdf](http://www.cisco.com/en/US/docs/solutions/SBA/February2013/Cisco_SBA_BN_IPv6AddressingGuide-Feb2013.pdf)



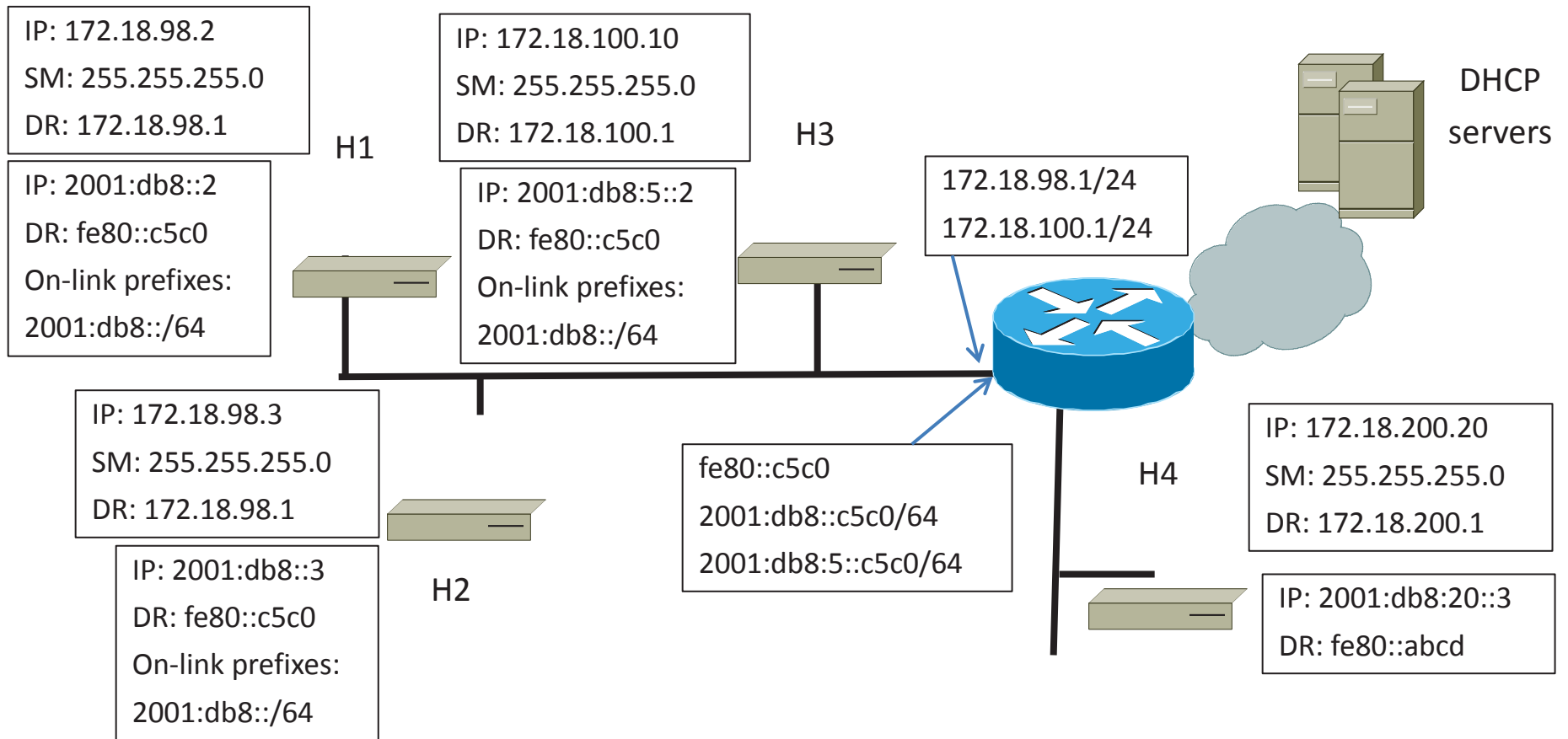
# IPv6 for the Access Network

IPv6 neighbor discovery

IPv6 address acquisition



# Next-hop Determination

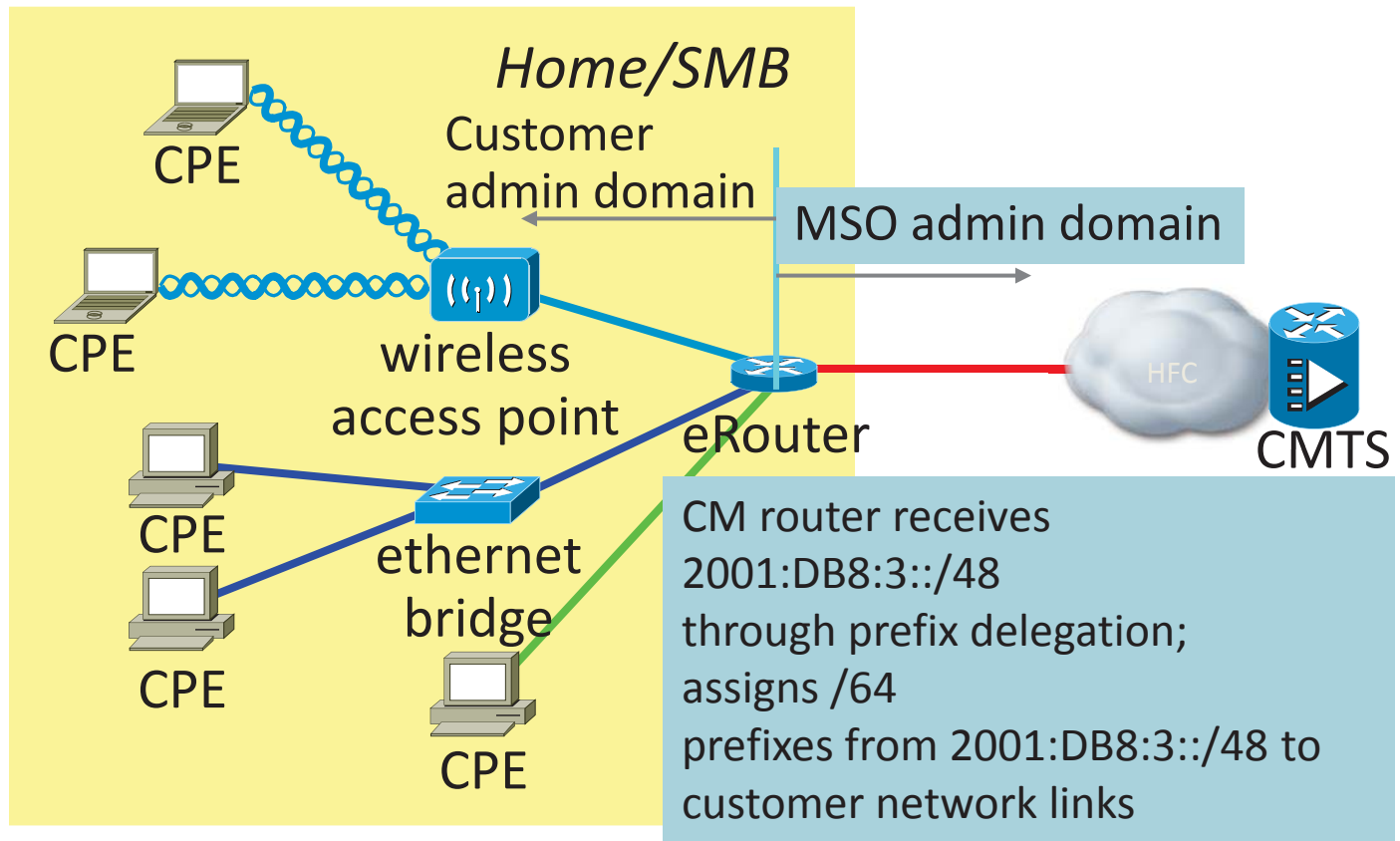


# IPv6 Router Advertisement

Type (134)	Code (0)						Checksum		
Hop Limit	M	○	H	Pr	P	RR	Router Lifetime		
Reachable Time									
Retransmit Timer									
Source LL(1)	Length (1)				Link-layer Address				
Link-layer Address (continued)									
MTU (5)	Length (1)				Reserved				
MTU									
PIO (3)	Length (4)				Prefix Len	L	A	R	Resv
Valid Lifetime									
Preferred Lifetime									
Reserved (all zeroes)									
Prefix									



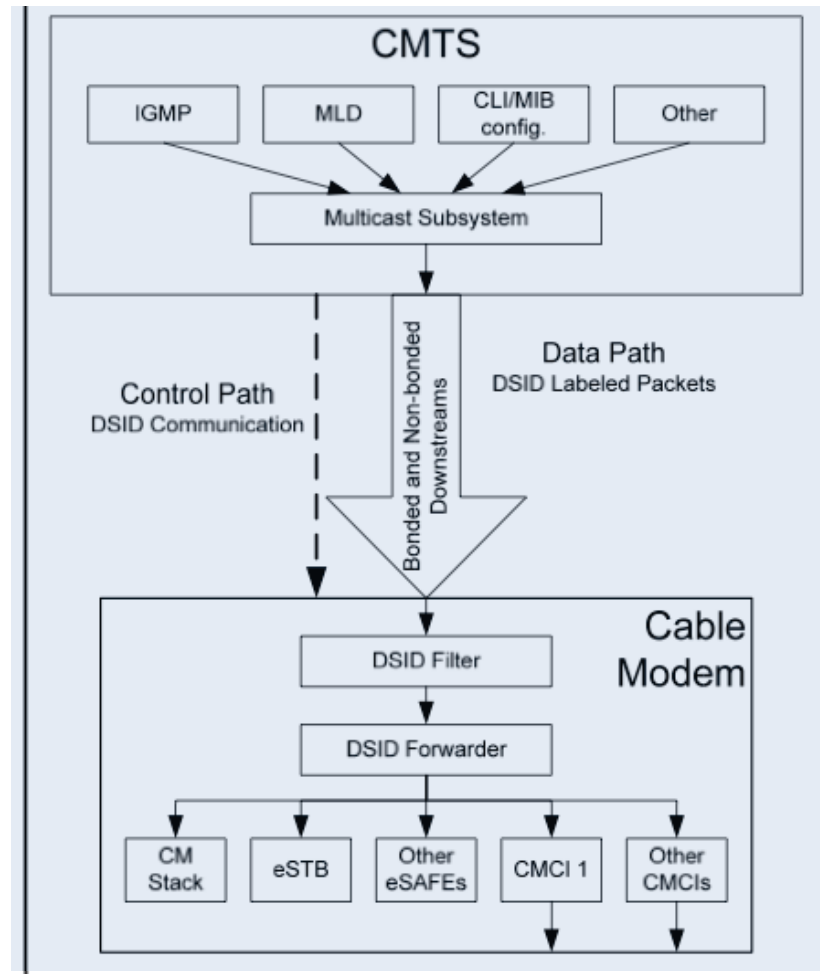
# DOCSIS 3.0 IPv6 architecture



- HFC link; assigned 2001:DB8:FFFF:0::/64 (mgmt) and 2001:DB8:FFFE:0::/64 (service)
- Customer network link 1; assigned 2001:DB8:3:0::/64
- Customer network link 2; assigned 2001:DB8:3:1::/64
- Customer network link 3; assigned 2001:DB8:3:2::/64

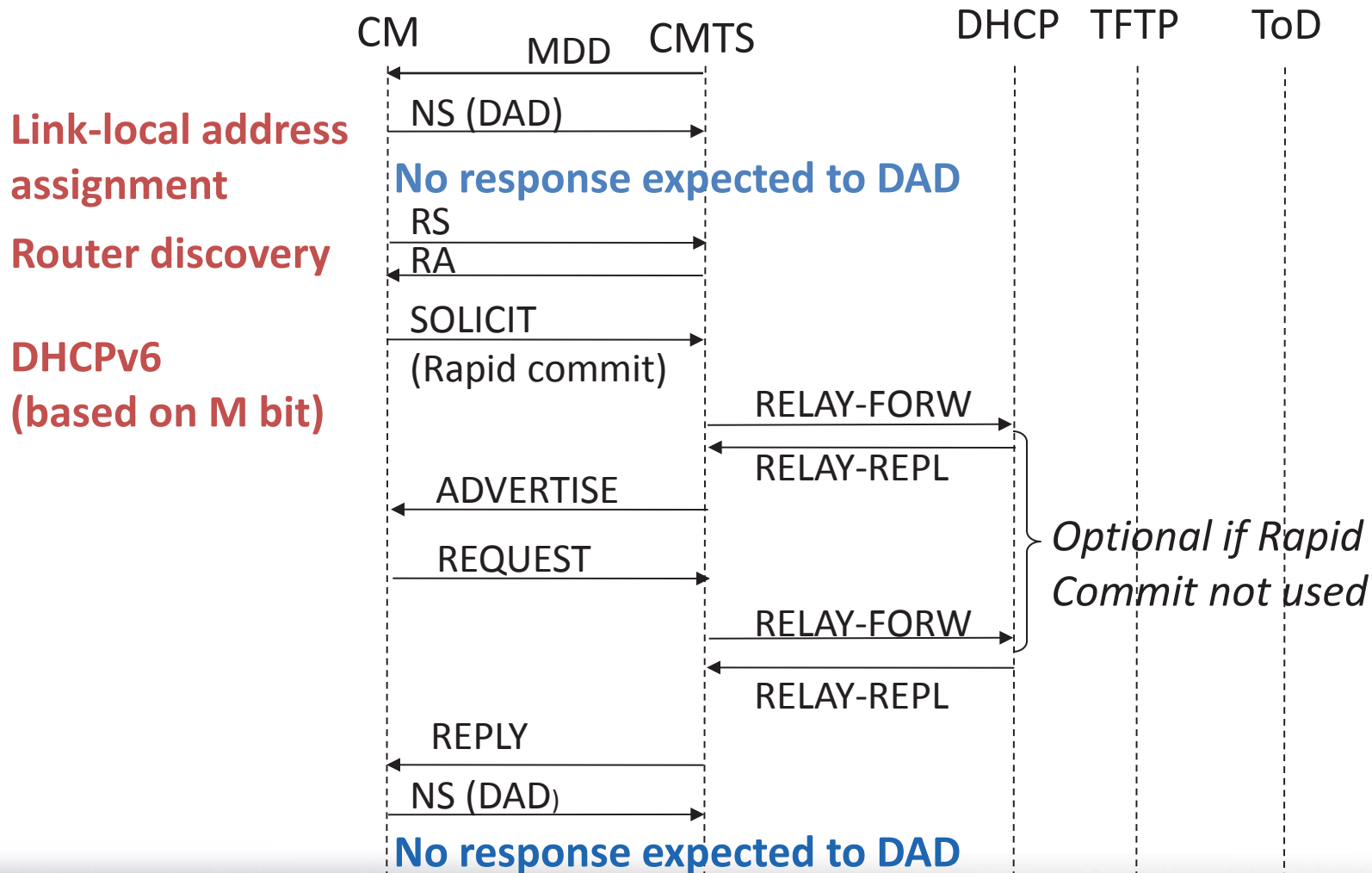
# Multicast in DOCSIS

- ▶ DOCSIS 3.0 & 2.0 +
- ▶ Multicast DSID Forwarding





# IPv6 Provisioning



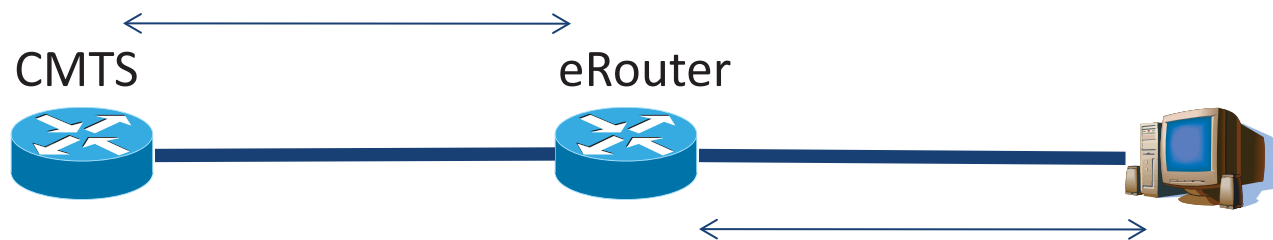
# IPv6 for a CE Router

eRouter generates RA (M=1, O=1, prefix = derived from IA\_PD with A=1, L=1)

**CPE can use SLAAC or DHCPv6 to get IP address**

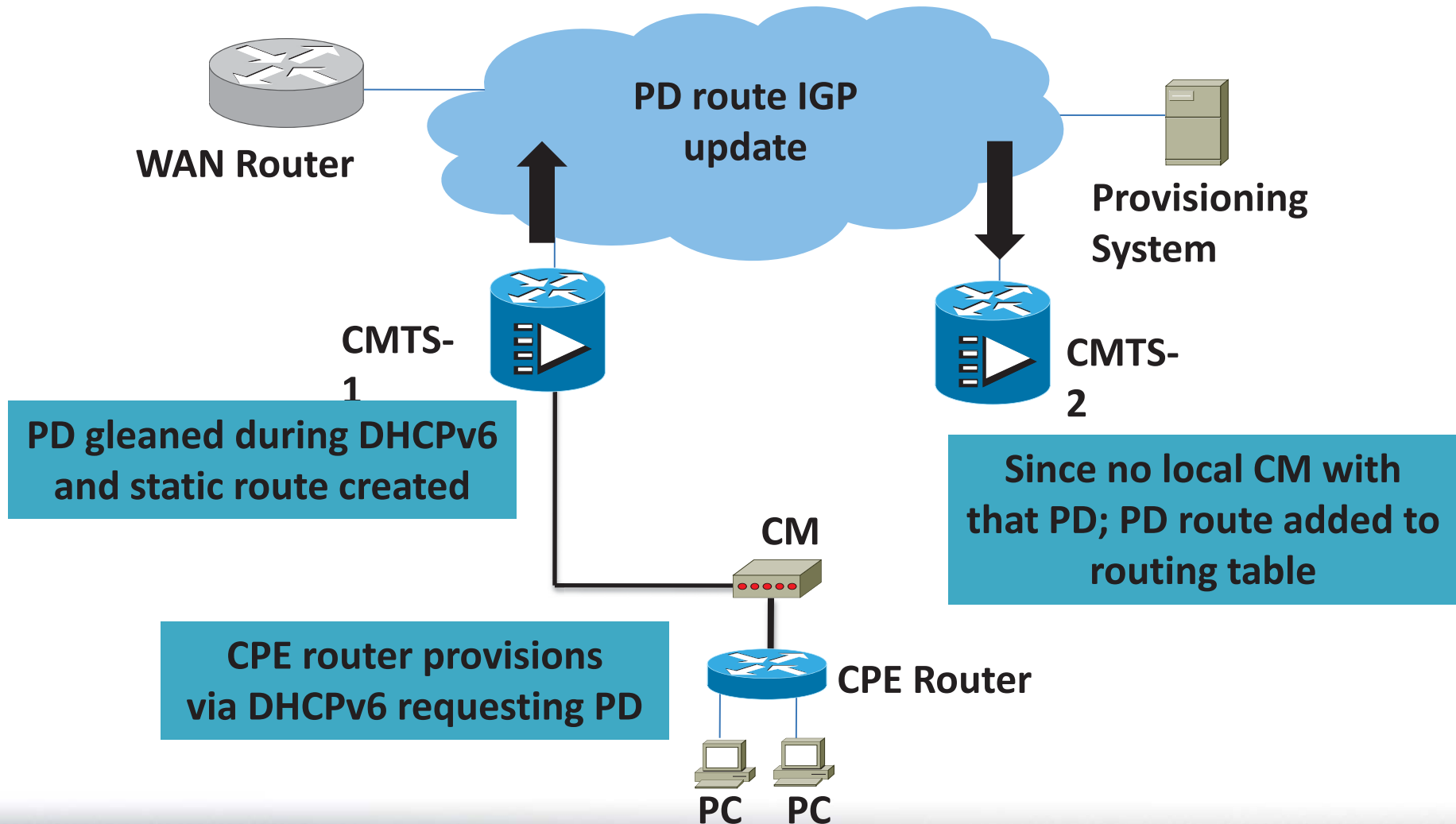
**If using DHCPv6 CPE can also request IA\_PD**

DHCPv6 for IA\_NA and IA\_PD

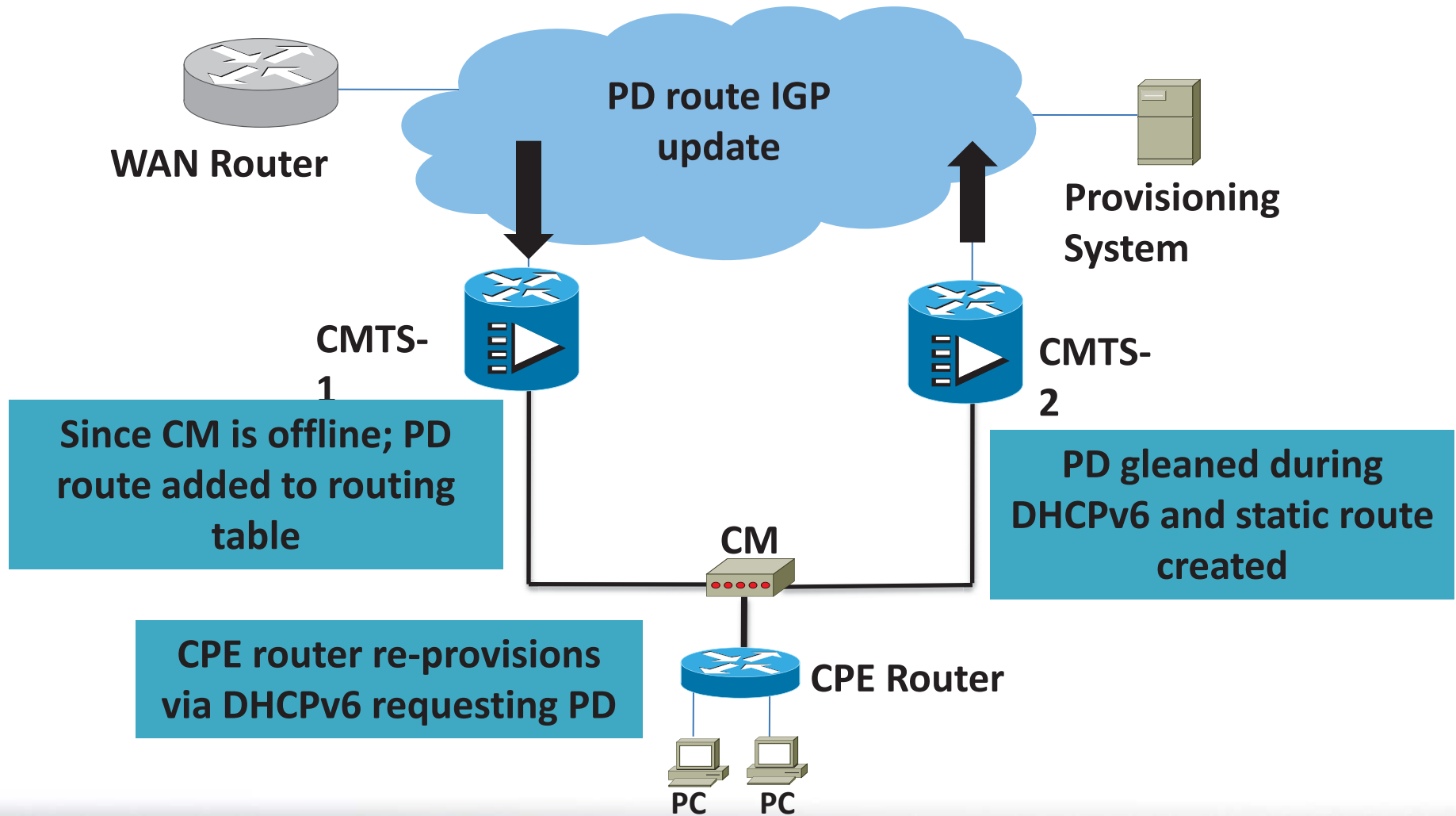


RA with prefix = derived from IA\_PD  
SLAAC for hosts

# CM online on CMTS-1



# CM move to CMTS-2

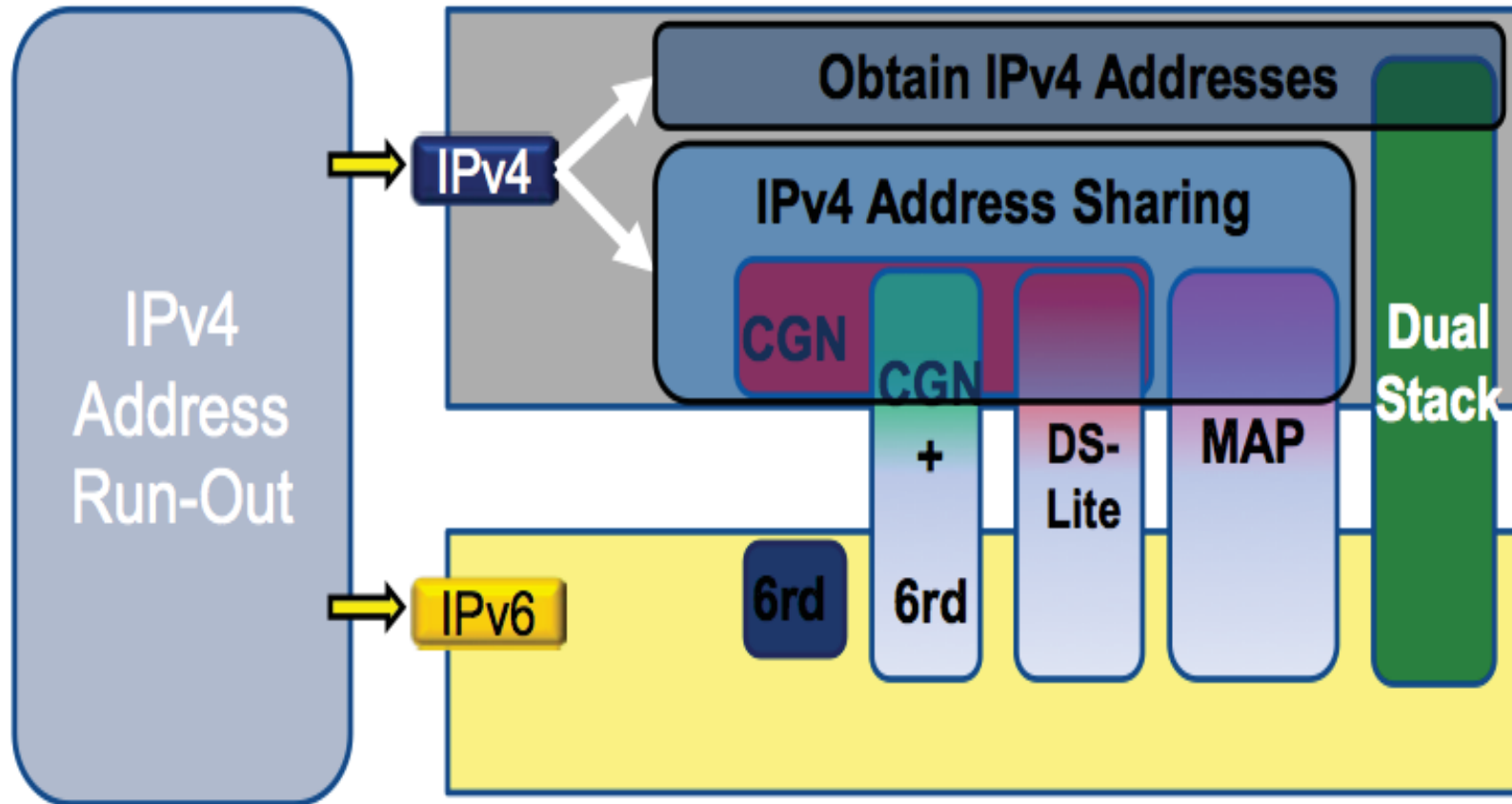


# Protecting the Network

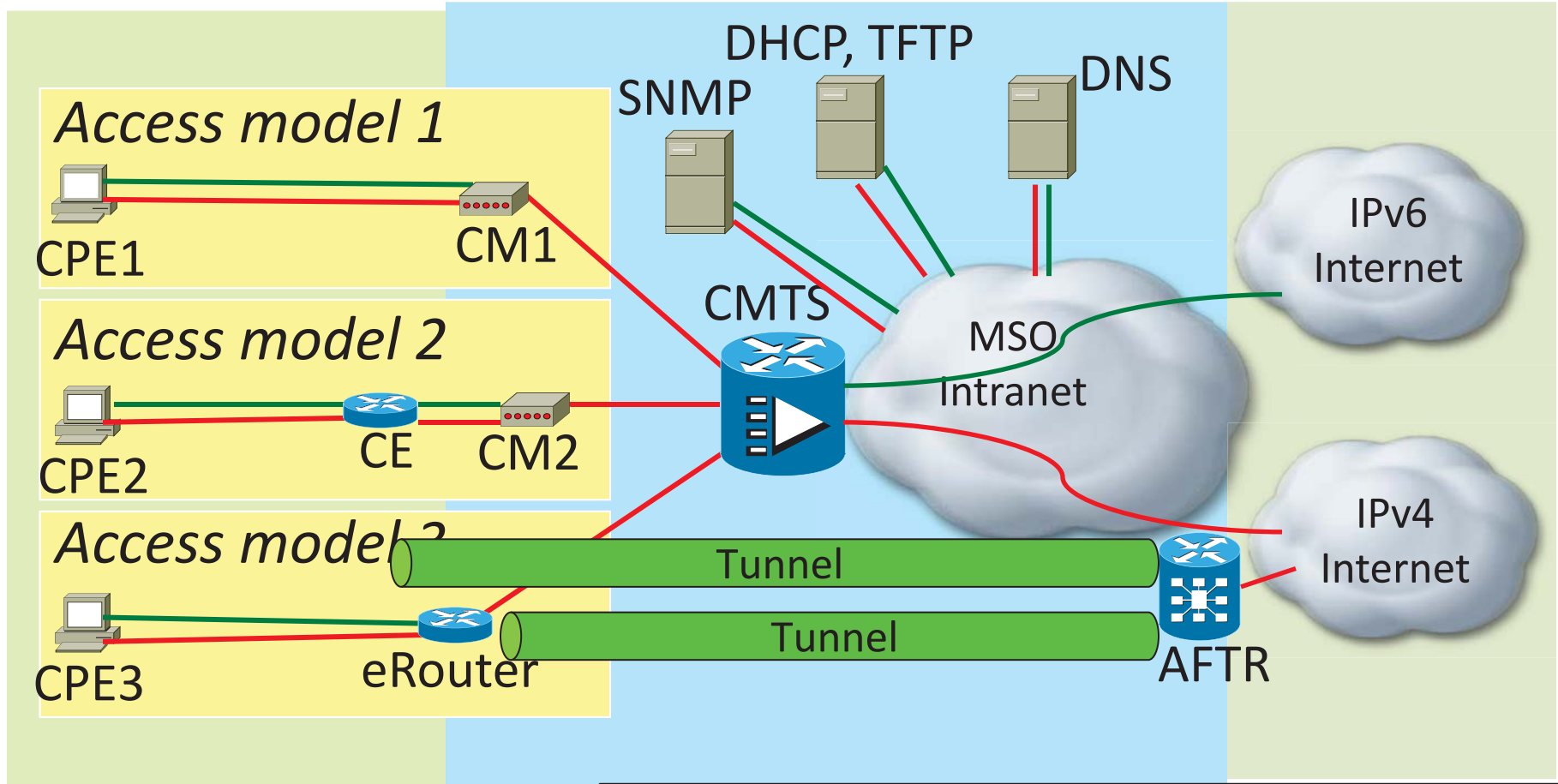
- ▶ Dual-stack considerations
- ▶ Neighbor Discovery attacks
- ▶ CPU and memory resource protection



# Transition Strategies



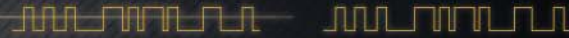
# Transition Strategy – MSO “X”



↔ IPv4

↔ IPv6

Public IPv4 space used for CMM reclaimed  
 Public IPv4 space used for CPE reclaimed



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