
IPv6 @ Comcast

Managing 100+ Million IP Addresses

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The Comcast logo is located in the bottom right corner of the slide. It features a red arc above a black shape that contains the word "comcast" in white lowercase letters, with a red dot above the 'c'.

When Net 10 is Too Small....

- Unlike DSL modems, Cable Modems are managed and consume an IP address.
- Until recently, Comcast was using Net 10 (RFC1918) for managing the cable modems:
 - That space was exhausted in 2005.
 - Since then, Comcast was allocated a very large bloc of public IPv4 address space for device management
- In the control plane, all devices need to be remotely managed, so NAT isn't going to help us, nor is federated Net 10 islands...
IPv6 is the clear solution for us.



Simple View of the Scope of Comcast IP problem

Set-Top boxes moving from proprietary management to Docsis-based IP management (provisioning, EPG,...)

- 20 Million video customers
- 2.5 set-top box per customer
- 2 IP addresses per set-top box
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- Total: 100 Million IP addresses

Note:
*This is not
IP-TV*

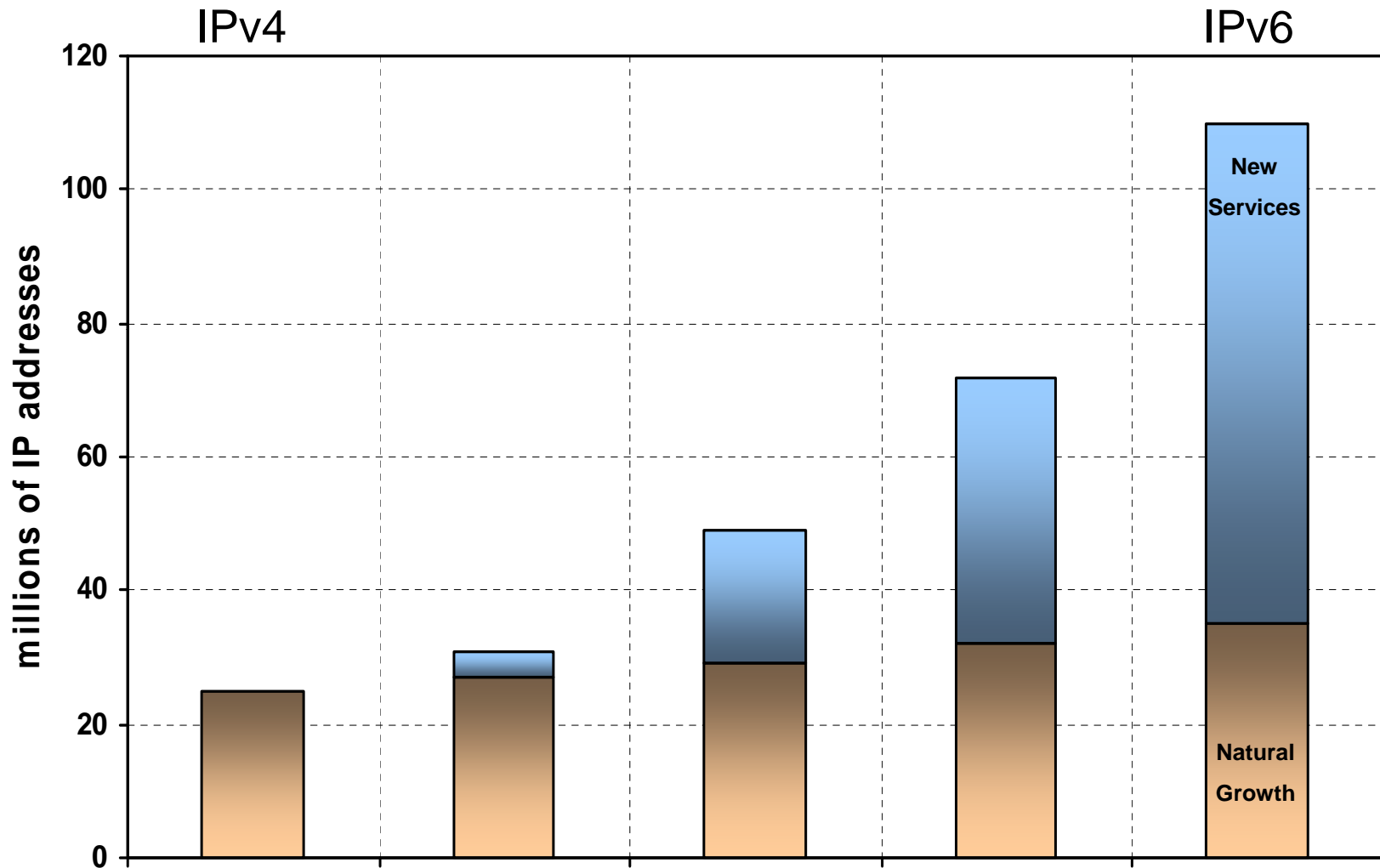
And we have not yet talked about High Speed Data...
nor Comcast Digital Voice...
nor merger/acquisition...

Triple Play Effect on the Use of IP Addresses

	2005 HSD only	2006+ Triple Play
Cable Modem (CM)	1 (private only)	1
Home Computer / Router	1	1
eMTA (Voice adaptor)	0	1 – 2
Set Top Box (STB)	0	2
Total number of IP addresses (assume 2.5 STB per household)	1 – 2	8 – 9

IP Addresses: Natural Growth vs New Services

(in the coming years)



Note: this graph shows trends, not actual data



Comcast Approach

Comcast IPv6 Strategy

- ***Start early***
 - Deployment plans have started back in 2005
- Deploy IPv6 ***initially*** on the ***Control Plane*** for the ***Management*** and ***Operation*** of the ***Edge Devices*** we manage
 - Docsis CM, Set Top boxes, PacketCable eMTA (Voice),...
- Be ready to offer our customers new services that take advantage of IPv6



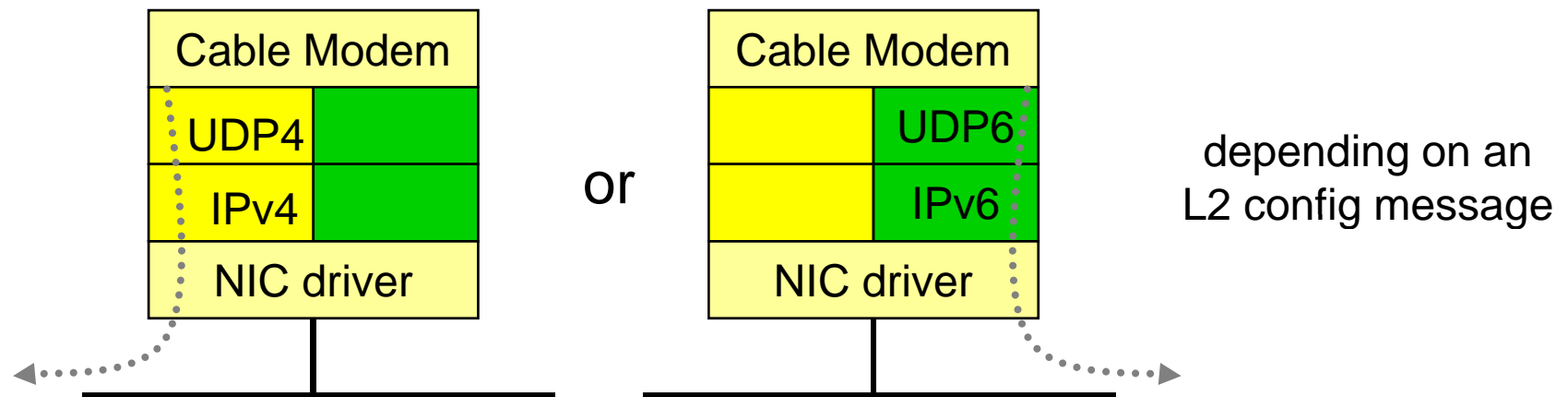
IPv6 Deployment: Principles and Approach

- Deploy IPv6 ***only where it is absolutely necessary***
 - *and nowhere else!*
- Architecture: ***dual-stack at the core, v6-only at the edges***
- Deployment approach: ***from the core to the edges***
 - Backbone -> Regional Networks -> CMTS -> Devices
 - This is an incremental deployment; existing deployments will be unaffected in the beginning.
- Follow same operational model as with IPv4
 - DHCP-based provisioning and access control



Modems and “Single IP Version” Mode of Operation

- New CM will be IPv6 ready (dual-stack capable)
- On an IPv4-only CMTS, CM will be provisioned with IPv4
- On IPv6-enable CMTS, CM will be provisioned with IPv6
 - **CM will never have both IPv4 & IPv6 addresses at the same time**
(If we could give both an IPv4 and an IPv6 address at the same time, we will not need IPv6 in the first place!)



Note: the modem is a bridge, it will forward IPv4 packets even if it is configured in an IPv6-only mode

IPv6 Architecture for Applications: Provisioning, Monitoring, Back-Office

- Mostly a software upgrade problem
 - Similar to the Y2K problem,
Fields need to be bigger in database & web scripts
- Should “application X” be upgraded for IPv6?
 - Transport questions: Does “application X” communicate with devices that are potentially IPv6-only (e.g. CM)?
 - Payload questions: Does “application X” manipulate IP data (store, input or display) that could be IPv6?
- Comcast inventory analysis: about 100 “applications”
 - 10 need major updates for transport
 - 30 need minor updates for display/storage



IPv6 Architecture for Back Office

- Back-office systems that do communicate directly with the CM or STB migrate to dual stack
- The other back-office systems keep using IPv4
- However back office systems may need to be modified to display/input/store IPv6 related data (CM IPv6 addresses)

