

IPV6 @ COMCAST



RIPE 72

"Route 6 runs uncertainly from nowhere to nowhere, scarcely to be followed from one end to the other, except by some devoted eccentric"

George R. Stewart



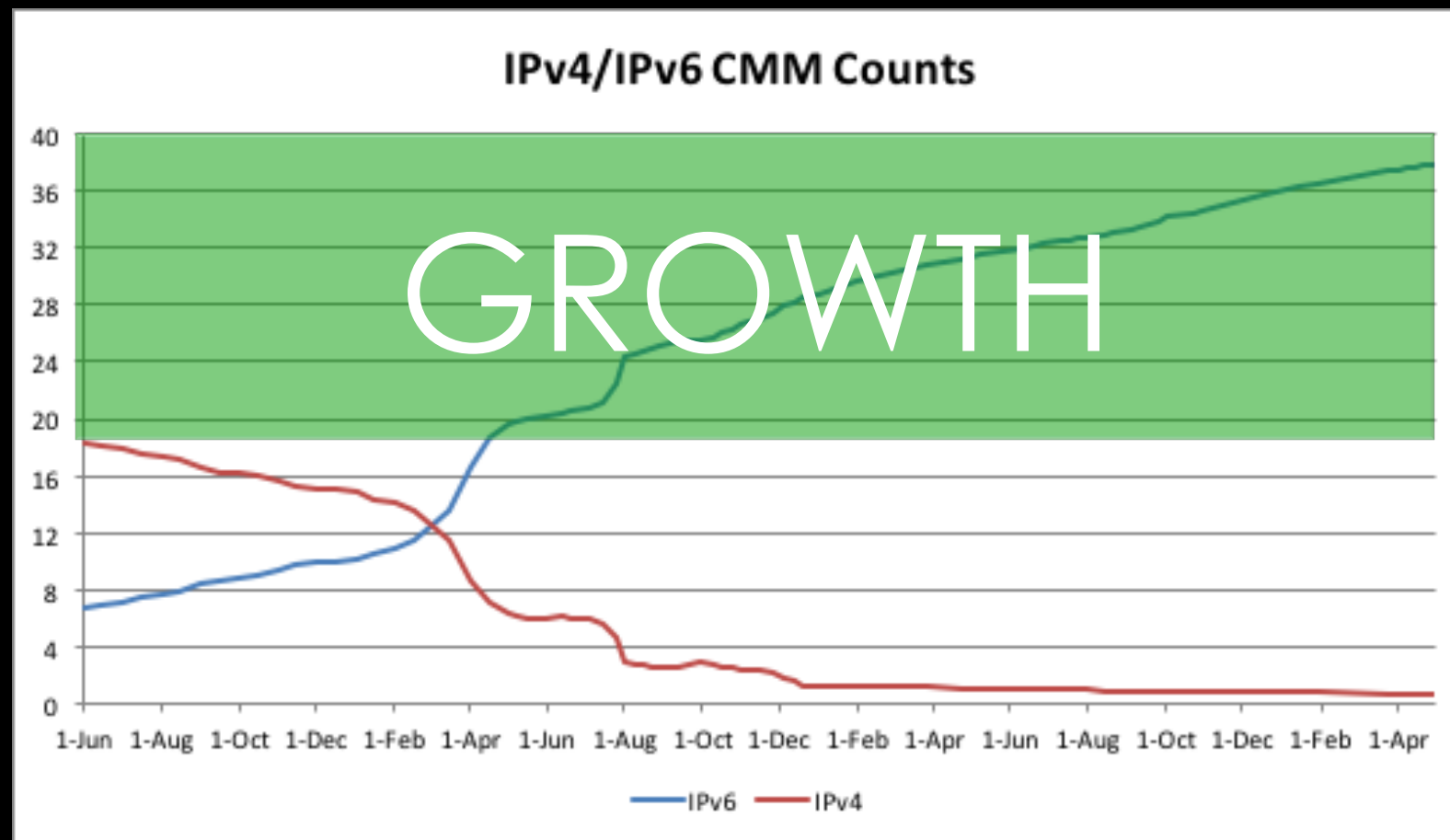
BACKGROUND

- The IPv6 program at Comcast began in 2005
- Seamlessness is a cornerstone of our program
- Motivation
 - IPv4 is not adequate, could not support near or long term growth requirements
 - IPv6 is inevitable
- Scope
 - Everything, over time!

IPv6 ONLY

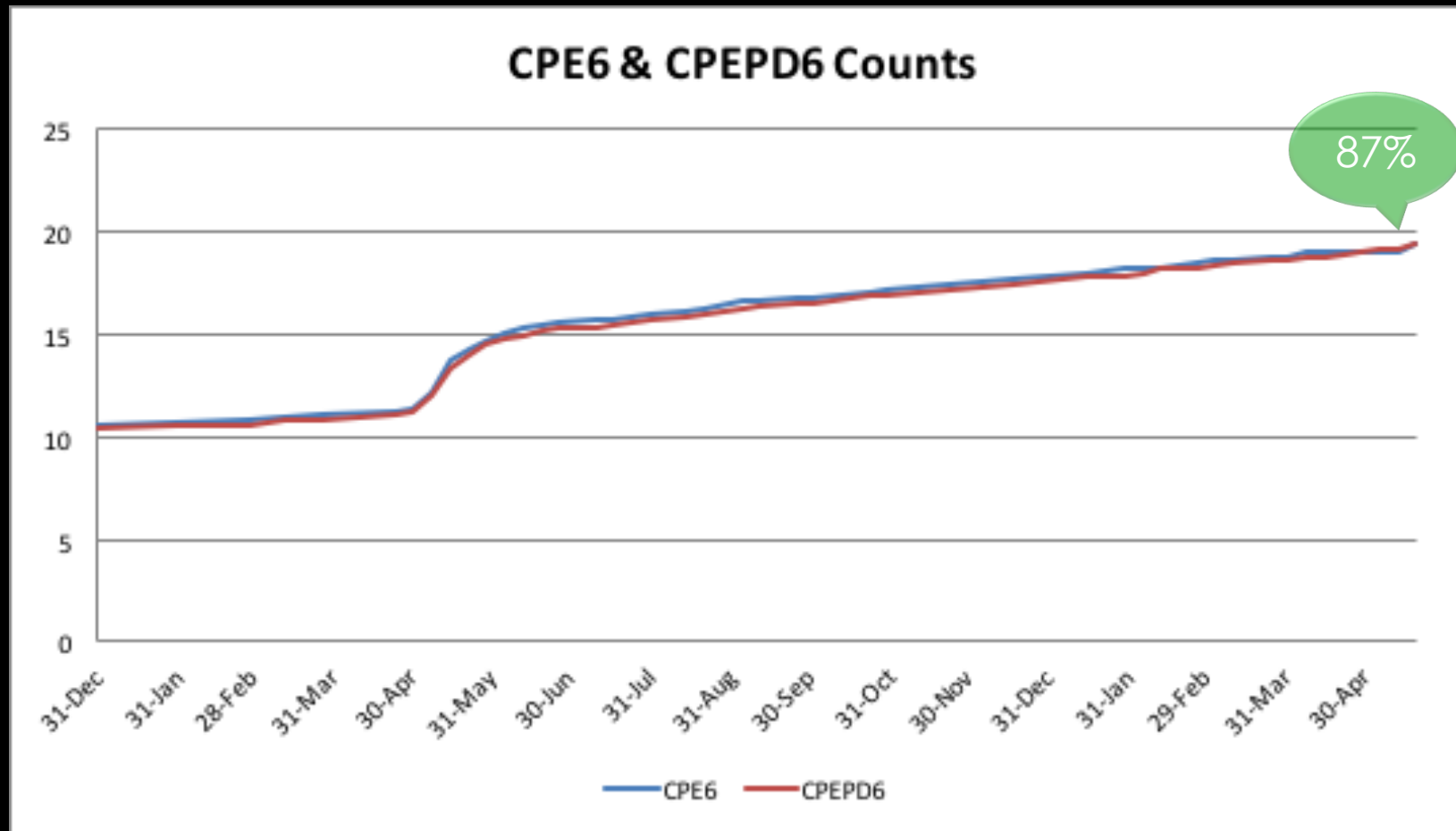
THE FIRST IPV6 ONLY SERVICE...

- 98+% of devices are managed using IPv6 only
- Management use of IPv6 (only) is one of the largest deployments of IPv6 worldwide
- Trending towards 100% of all new and existing devices managed using IPv6 only, no IPv4

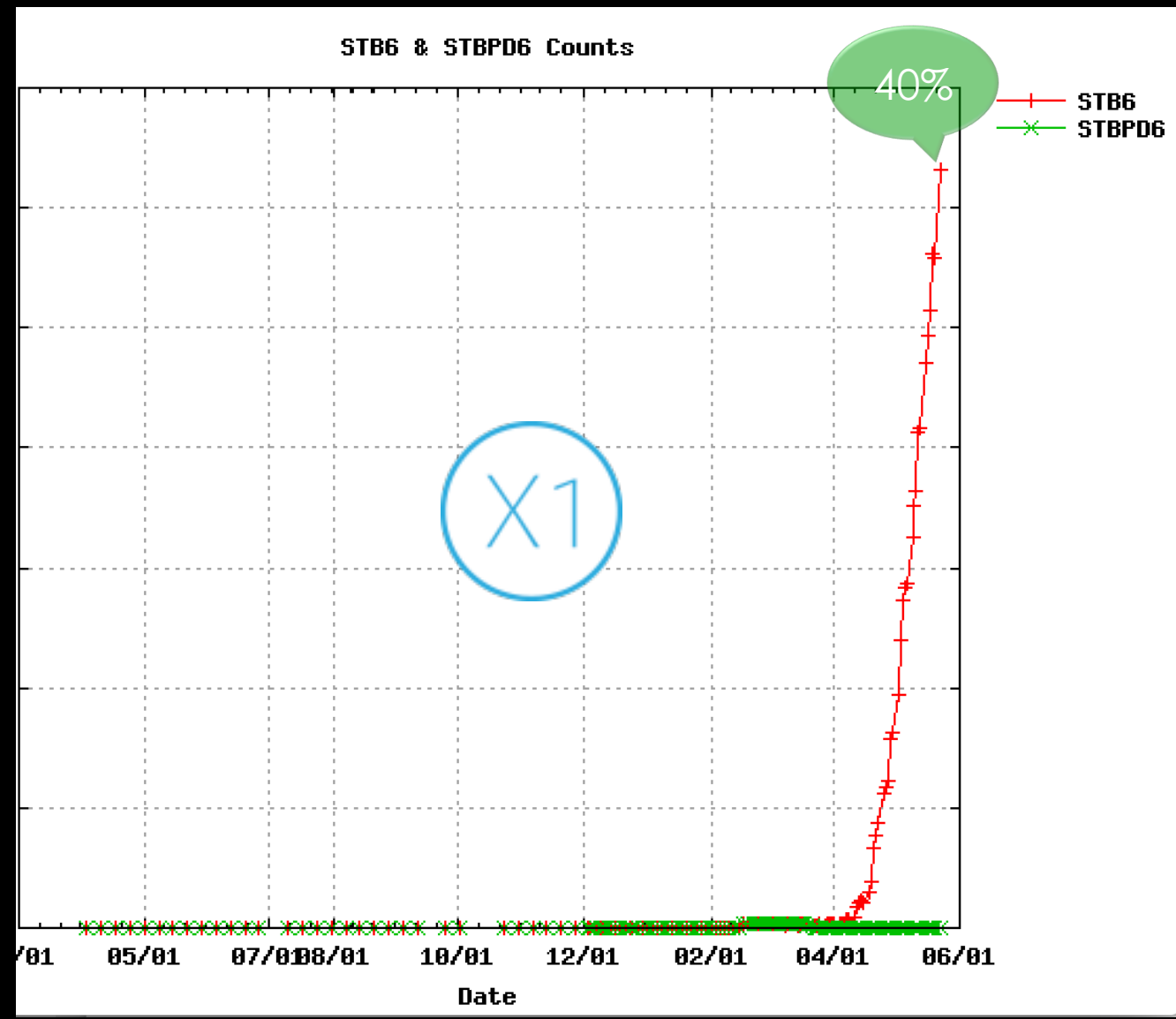


BROADBAND

Dual Stack



IPV6 ONLY

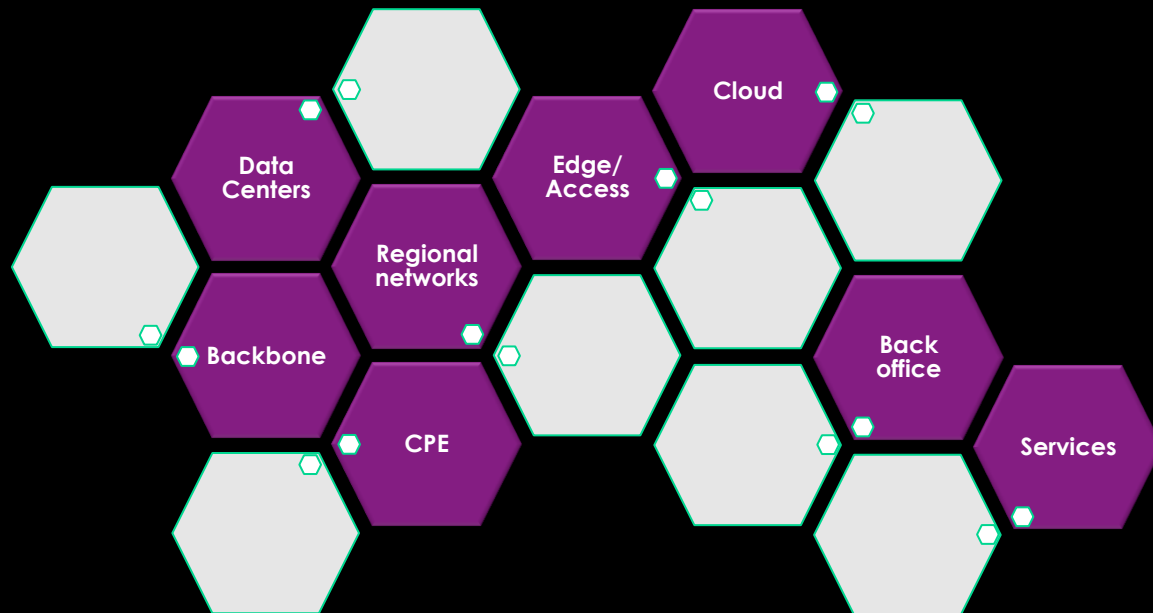


X1

OBSERVATIONS

- Technology availability and readiness
- Incrementalism
 - Word to live by...
- Have a plan
 - A, B, C, D....
- Bugs
- Everything is IPv6's fault, initially
- Oh...and IPv6 does work!

APPROACH

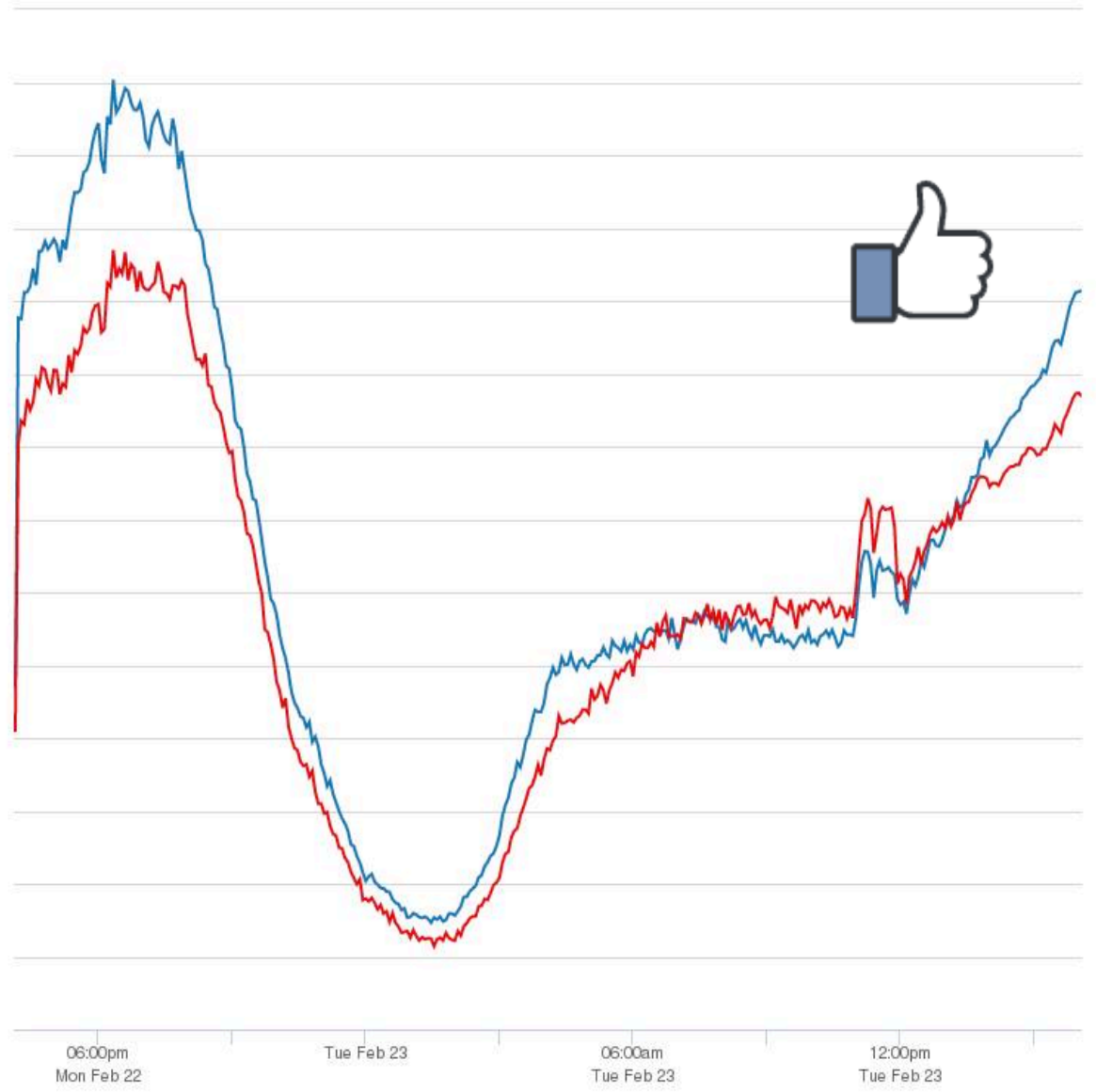


- Building blocks
- Deployed from the core of the network out
 - Backbone, regional networks, edge/access
- Leveraged back office enhancements incrementally
 - Singular provisioning system, no one offs
- Deployed IPv6 one time for each service
 - Native IPv6, no transition technologies

NEXT...

- Minimizing and reducing IPv4 dependencies
- IPv6 is used to manage the majority (and growing) of our business needs today
- IPv6 utilization continues to grow
 - Currently ~25% of our Internet facing communications is over IPv6
- Leverage IPv6 as a platform for innovation

TimeSeries (4 minutes) ordered by Bits/s



THE PATH TO ONLY IPV6

	TotalInbound v4 and V6	%ipv4	%ipv6
Ashburn	408.8	48.90%	51.10%
Atlanta	270.5	45.18%	54.82%
Chicago	616.9	45.06%	54.94%
Dallas	177.8	39.93%	60.07%
LA	115.6	72.06%	27.94%
NY	500.4	41.61%	58.39%
Nota	179.4	40.08%	59.92%
Palo Alto	237.7	49.60%	50.40%
San Jose	216	49.58%	50.42%
Seattle	262.1	44.87%	55.13%
Denver?	206.2	43.26%	56.74%

NEXT STEPS TOWARDS IPV6 ONLY

Infrastructure

- IPv6 only back plane
 - IPv6 Zero Touch Provisioning
 - Managing the network with IPv6 only
- IPv6 only network plane
 - IPv6 only interconnects
- IPv6 only cloud
 - Instigated by X1 migrating to IPv6 only

Services

- IPv4aaS
 - MAP for Broadband
 - NFV for MAP BR
 - GRE over IPv6 for Wi-Fi + Dual stack UE
 - IPv6 only access network (PON, DOCSIS 3.1)
- Voice
- Xfinity Home