Putting
IPv6
to work

North American IPv6 Summit

Grand Hyatt, Denver, Colorado
September 23-25, 2014

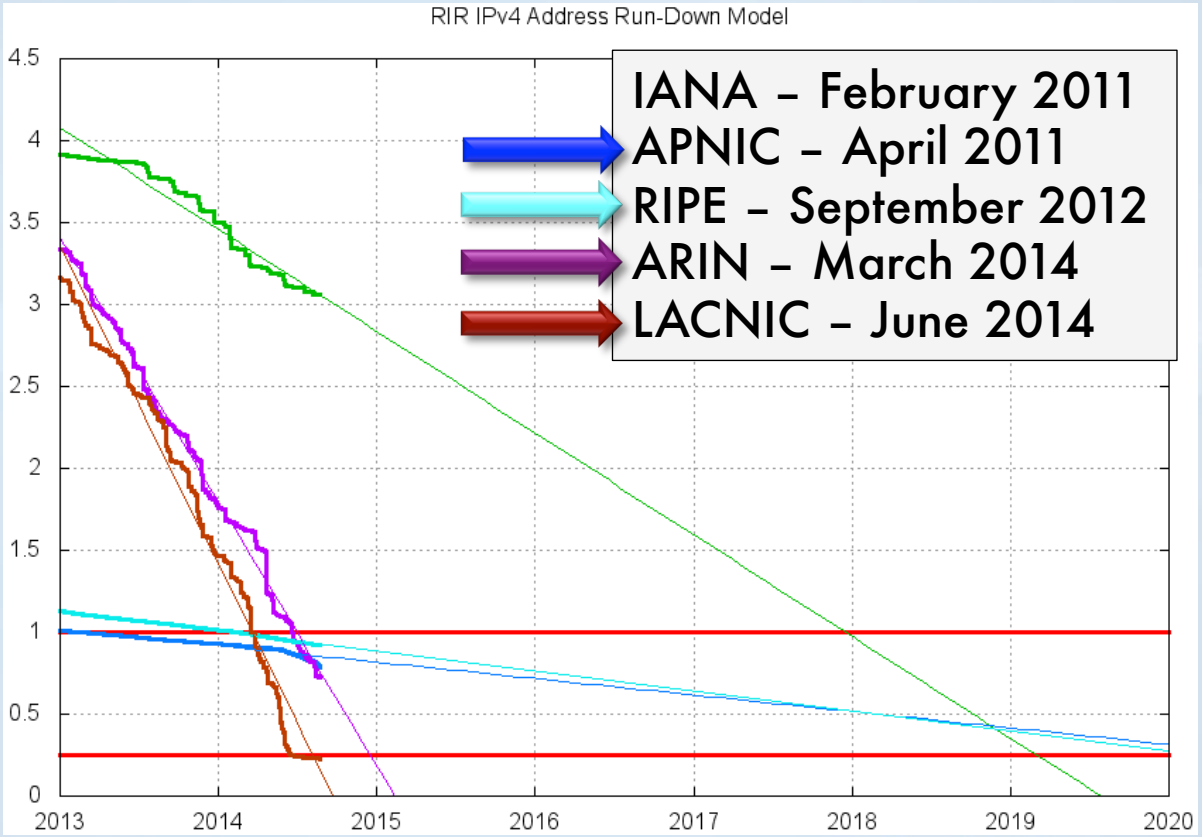
Rocky Mountain IPv6 Task Force
RMv6TF

IPv6 Has Arrived! (So Where Are We and What's Next?)

Tom Coffeen, IPv6 Evangelist

Sep. 25th, 2014

IPv4 Runout



Source: http://www.potaroo.net/tools/ipv4/index.html

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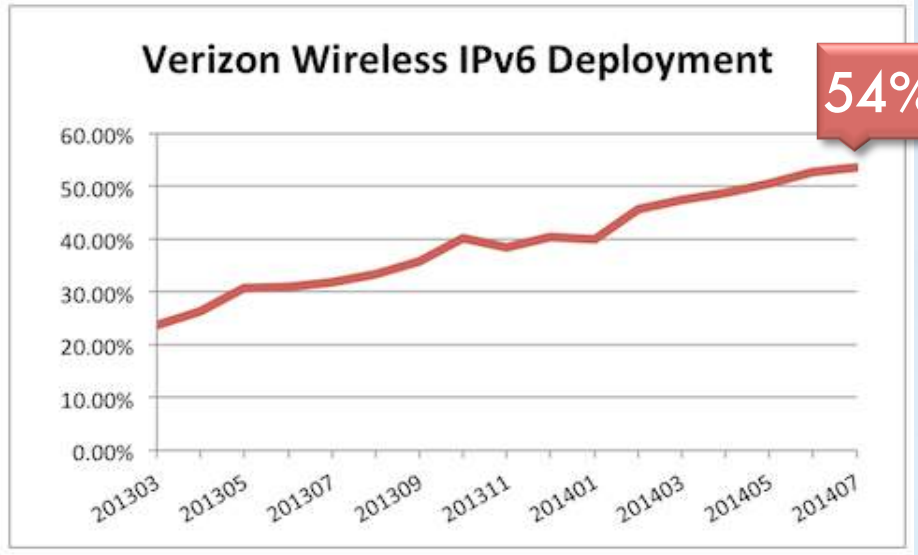
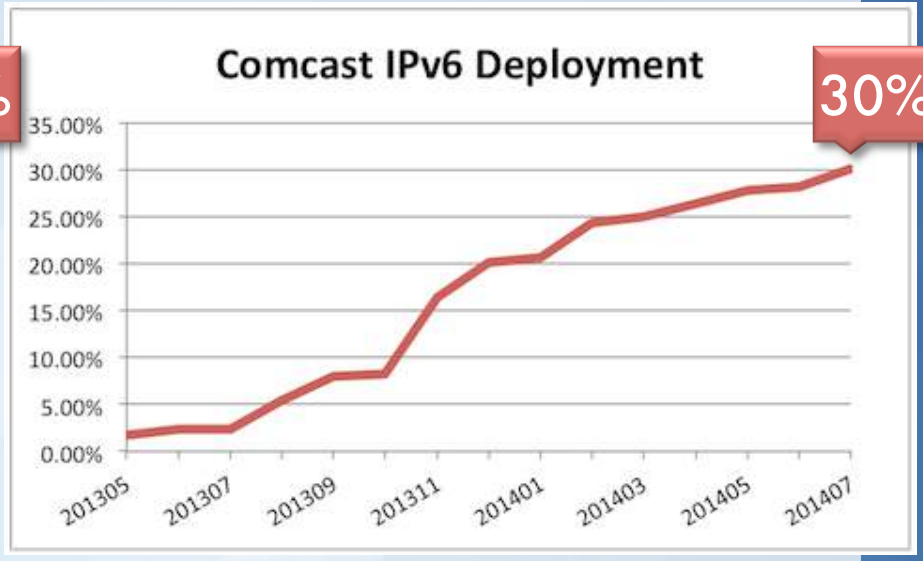
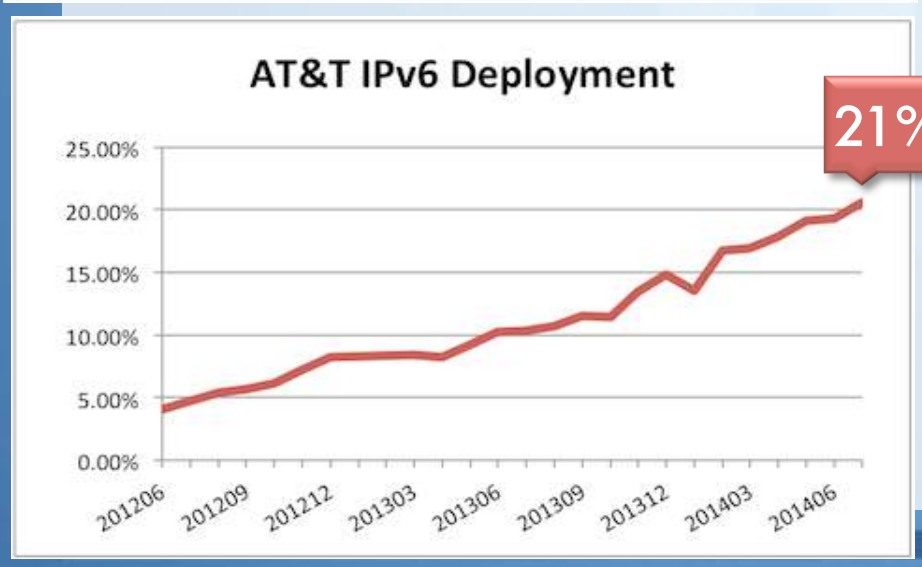
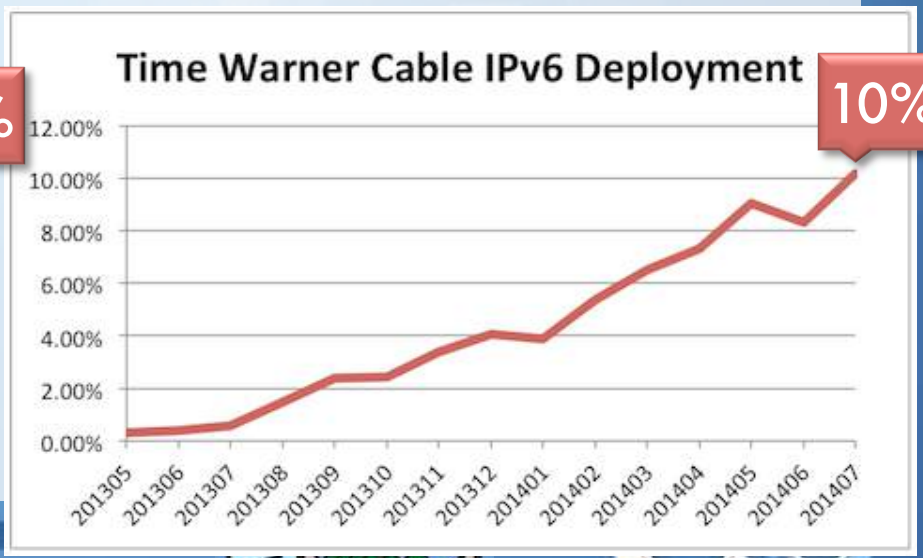
IPv6 Network Operator Measurements

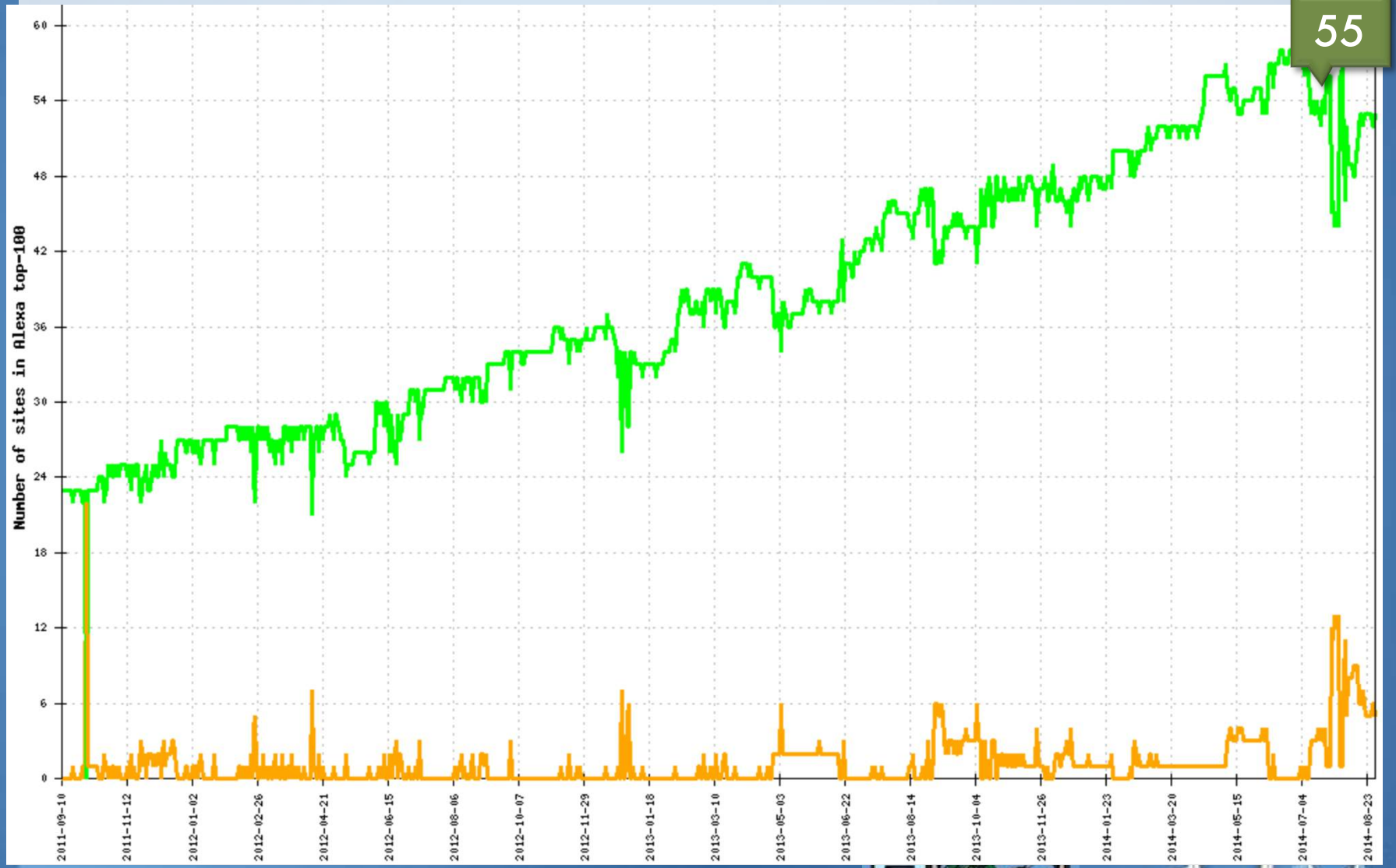




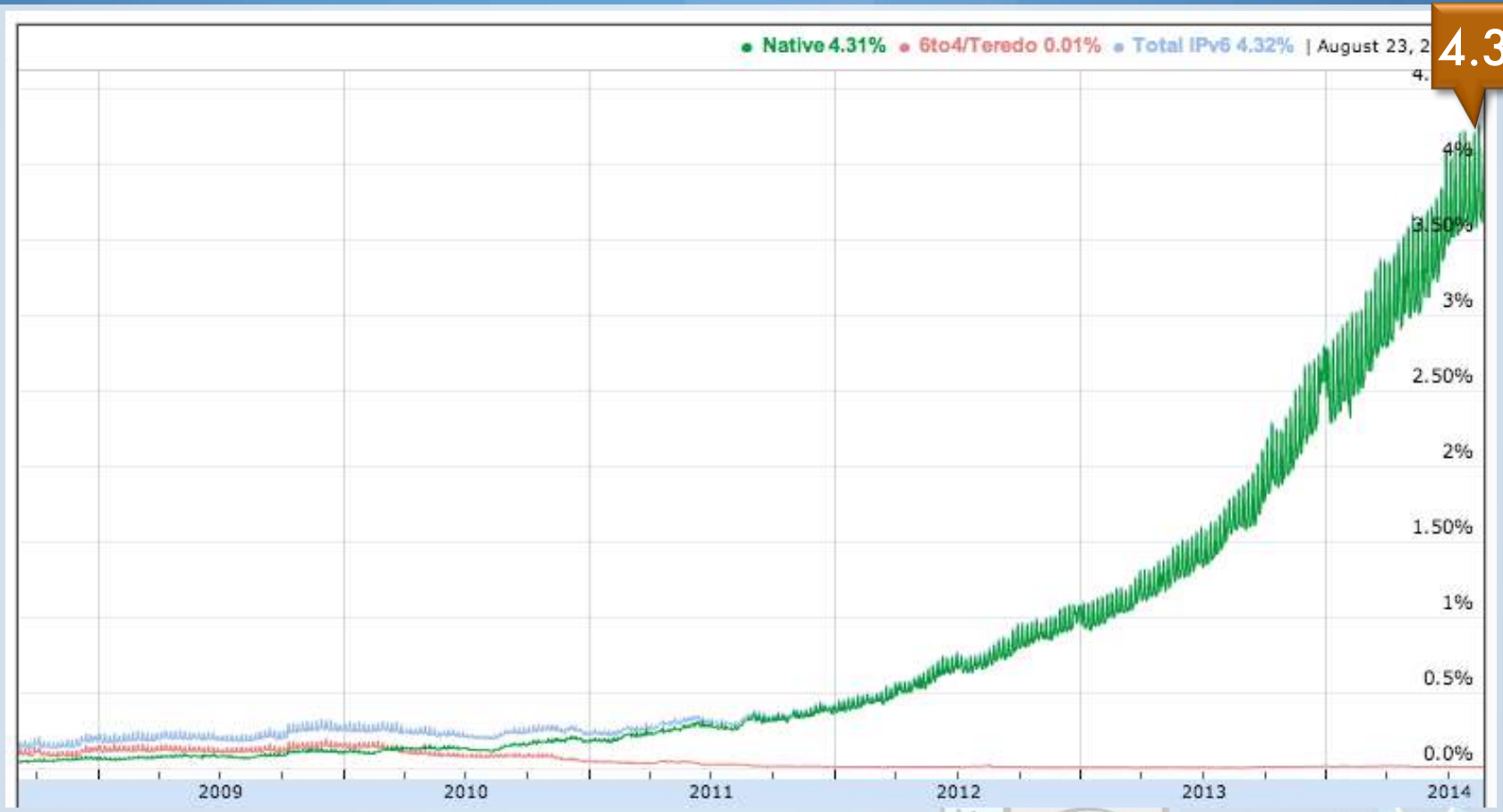




Authoritative IPv6 DNS Servers (Top 100 Alexa Sites)



Global Google Access over IPv6



US Google Access over IPv6

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Number of IPv6 Users in the US

- US Population: 323M
- US Internet penetration: 70%
- Number of Internet Users: 232M
- Percentage of IPv6 Users: 9.6%

7% of US population uses IPv6:
22.3 Million IPv6 users!

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IPv6 Has Arrived – Number of IPv6 Users in the US

22.3 Million IPv6 Users…

- More people than the seven most populous US cities combined (NY, LA, Chicago, Houston, Philadelphia, Phoenix, and San Antonio)
- 17x more people than the total number of Freemasons in the US
- 230x more people than subscribers needed to make Sarah Palin's streaming TV show profitable

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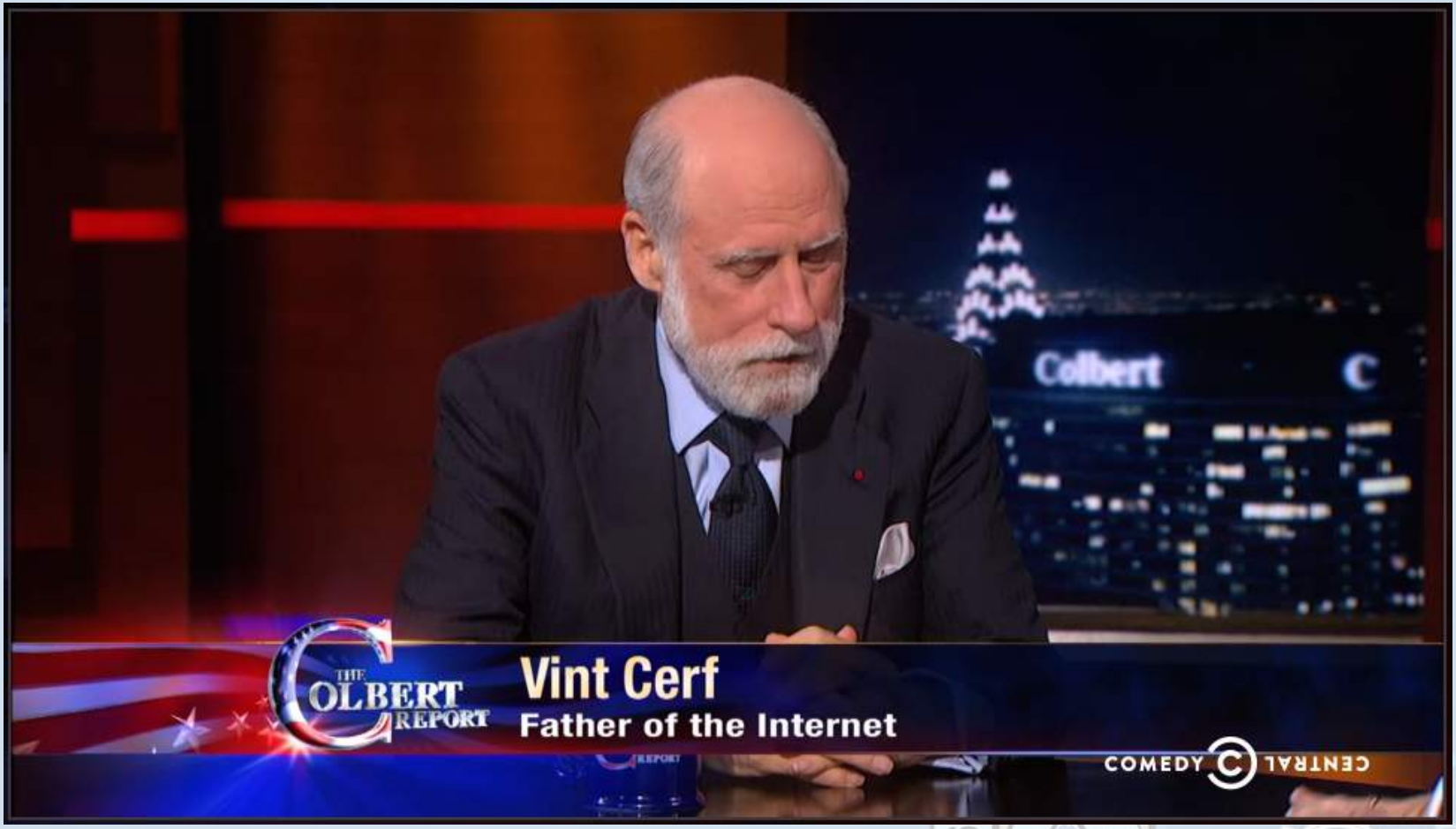
IPv6 Has Arrived



IPv6 Has Arrived

IPv6 Has Arrived

RMv6TF Keynote Greatest Hits: 2013

John Curran: IPv6 Leadership

Possible Victory Conditions:

"Leading companies (e.g. Fortune 500) using IPv6 for their internal networks and desktop office wireless devices"

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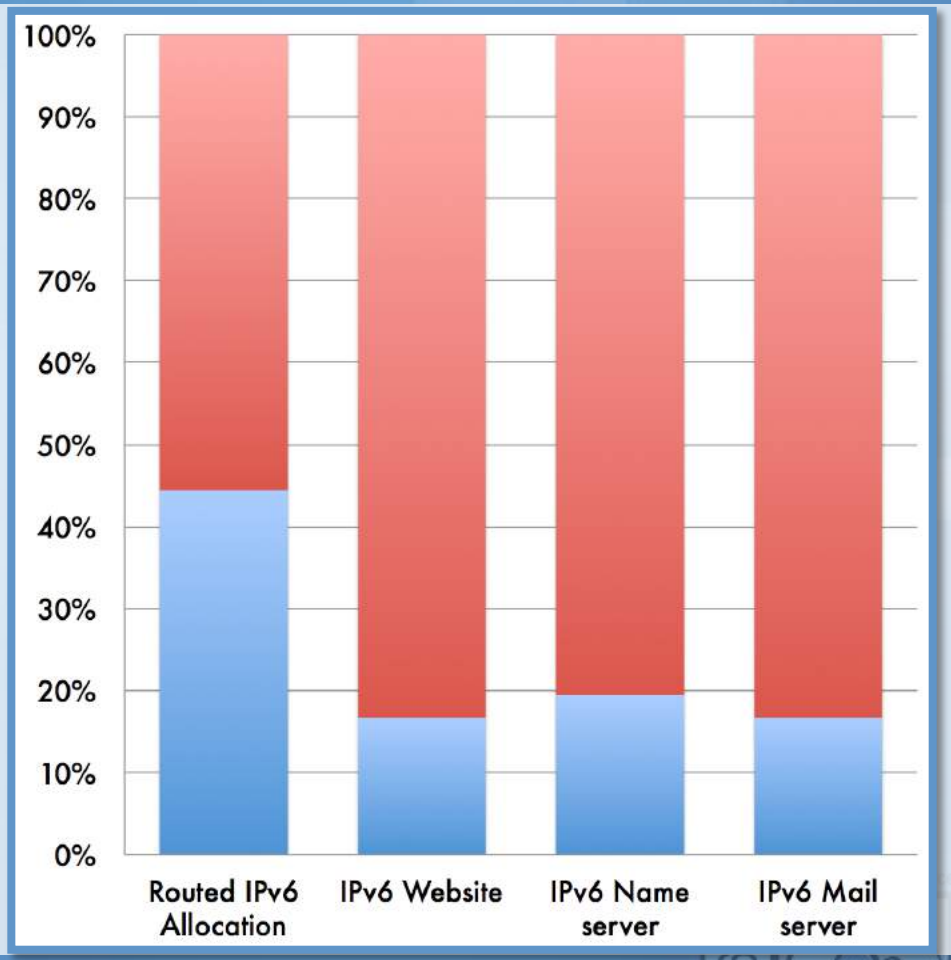
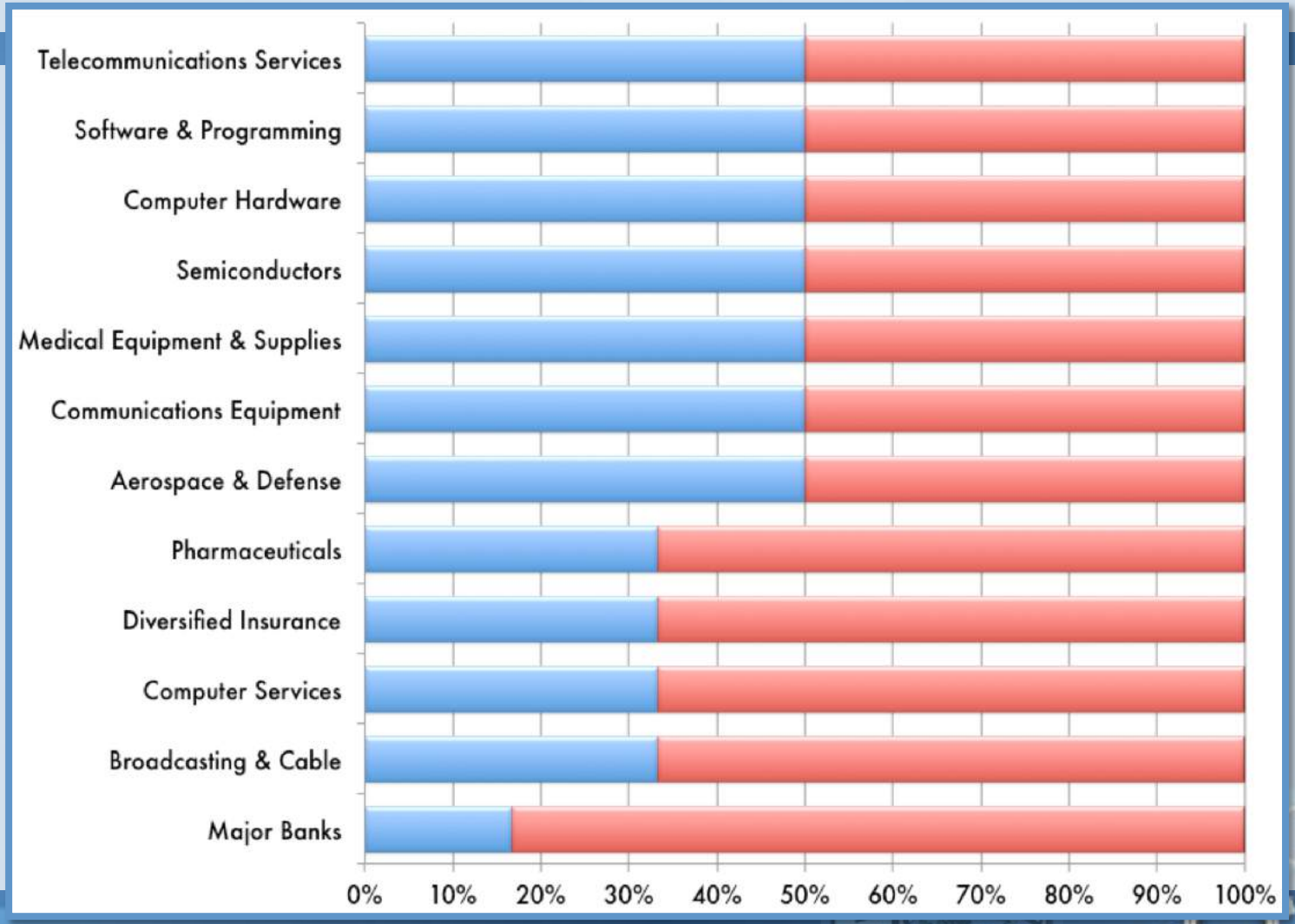
IPv6 Adoption Attributes (% by company)



IPv6 Adoption (% per Market)



IPv6 Economic Benefits - Cloud

National Institute of Standards and Technology

NIST National Institute of Standards and Technology U.S. Department of Commerce

"Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction."

- *On-demand network, configurable computing resources*
- *Rapidly provisioned and released*
- *Minimal management effort, service provider interaction*

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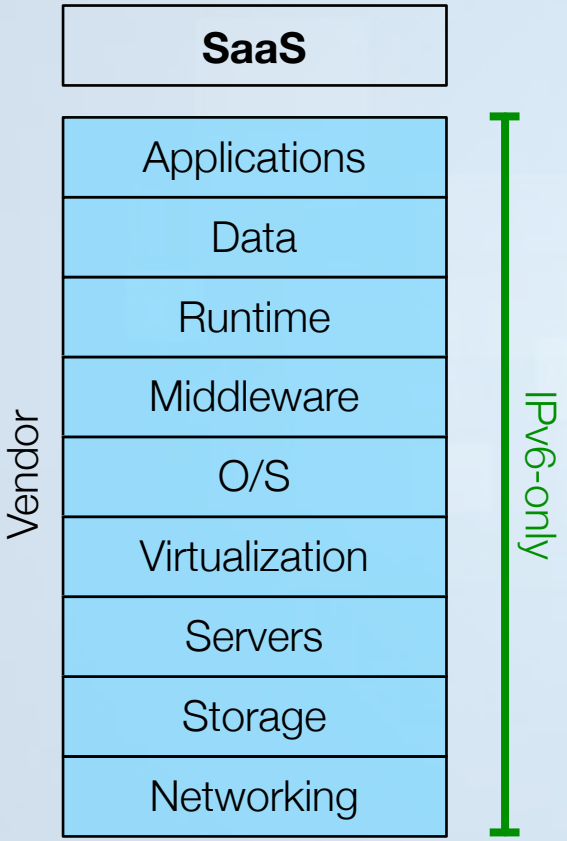
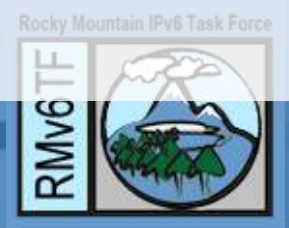
IPv6 Economic Benefits - Cloud

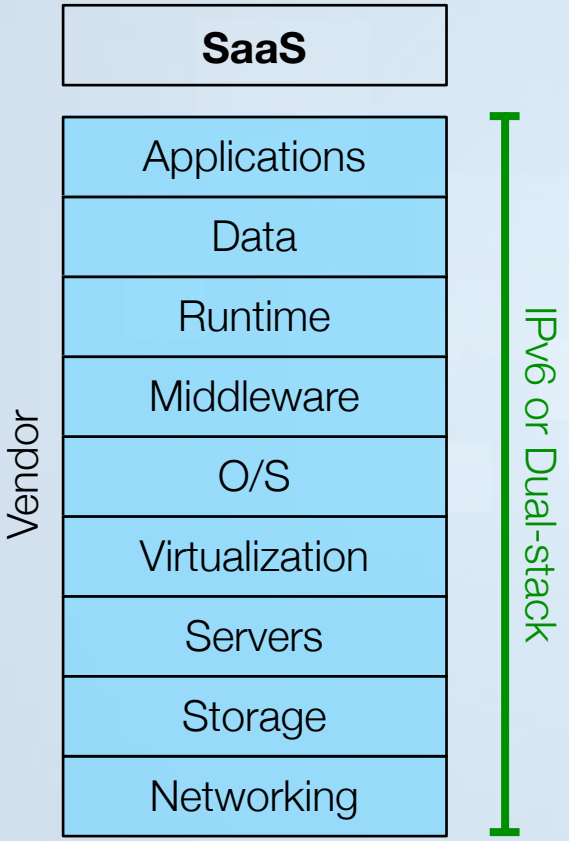


IPv6 provides:

- *Unlimited scale*
- *Operational simplicity*
- *Management efficiency*



IPv6 Economic Benefits - Cloud



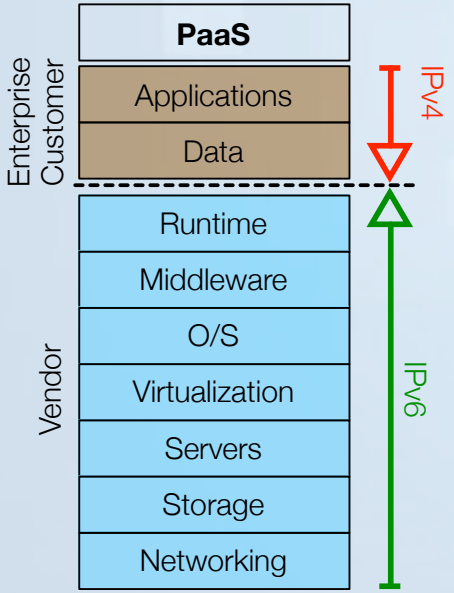
SaaS:

- Vendor-only environment
- Interface via browser, thin client, or app
- Translation/transition performance tax = externality, but…

Any dual-stack infrastructure OPEX costs potentially passed on to buyer

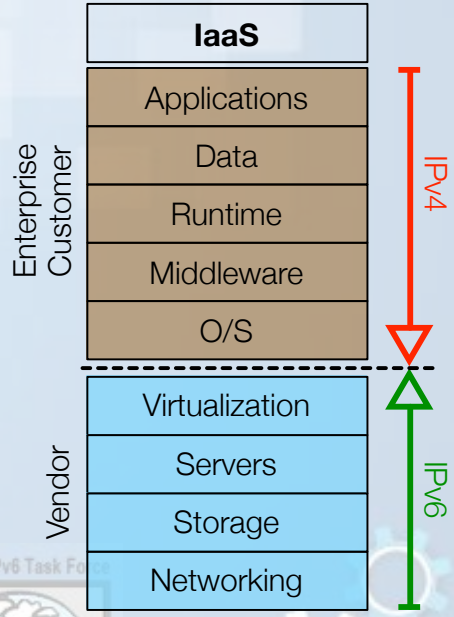
IPv6 Economic Benefits - Cloud

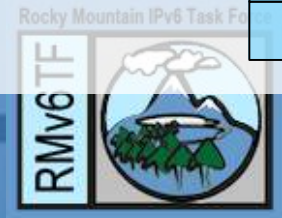
- Tools/libraries/components provided to the customer reflect the vendor environment
  - *May rely on IPv6 components*
  - *IPv4 components require additional provisioning/management practice introducing friction and cost*



PaaS/IaaS:

Anticipate premium pricing for IPv4 "legacy protocol" components...



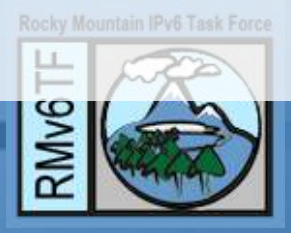


New IPv6 Economics – IoT

IoT = $$$

Deutsche Bank:

"IOT has the potential for unlocking Trillions of dollars of value – through structural improvements in operational efficiencies in every industry sector. Early stage IOT initiatives in Smart Energy, Smart Retail, Cyber Security…"

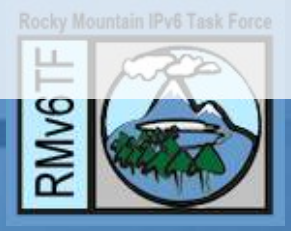


New IPv6 Economics – IoT

IoT = Billions of devices

Gartner:

"The Internet of Things, which excludes PCs, tablets and smartphones, will grow to 26 billion units installed in 2020, representing an almost 30-fold increase from 0.9 billion in 2009."



New IPv6 Economics – IoT

IoT = IPv6

IoT devices = $10n \times 10^9$

where *n* might equal 1 or 2.6 or 5…

What's Next?

<u>An exercise left to the reader:</u>

Will we have the skills, knowledge, and training to effectively manage tens of billions of IPv6 devices within the next 5 years?

What's Next?

Often, *IPv6 just works!*

At other times…

What's Next?

Remaining Challenges: Putting IPv6 to Work

- IoT IPv6 practice

  Success and Future of IPv6 from an Electrical Utility Perspective

  – Sara Bavarian, BC Hydro and Tony Mauro, Powertech Labs

Remaining Challenges: Putting IPv6 to Work

- Enterprise IPv6 practice

  Wells Fargo's IPv6 Journey

  – Wayne Smith and John Burns, Wells Fargo

Remaining Challenges: Putting IPv6 to Work

- Wireless IPv6 practice

  Municipal IPv6 Case Study: Reviewing the Results for a Government Deployment

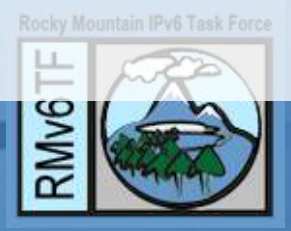
  – Brandon Ross, Network Utility Force

Remaining Challenges: Putting IPv6 to Work

- IPv6 Cloud and SDN practice

  Delivering Services From an IPv6 Only OpenStack Cloud

  - Chip Popoviciu, Nephos6

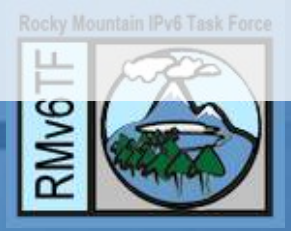


Remaining Challenges: Putting IPv6 to Work

- IPv6 Training

  IPv6 Labs-As-A-Service: The Easy Way to Hands-on Training

  - Christian Elsen, VMware



Remaining Challenges: Putting IPv6 to Work

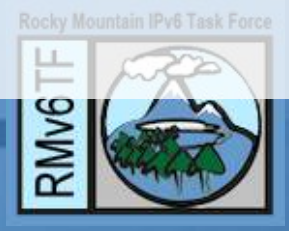
- Training, training, and more training!

  IPv6 Address Planning and Allocation Approaches

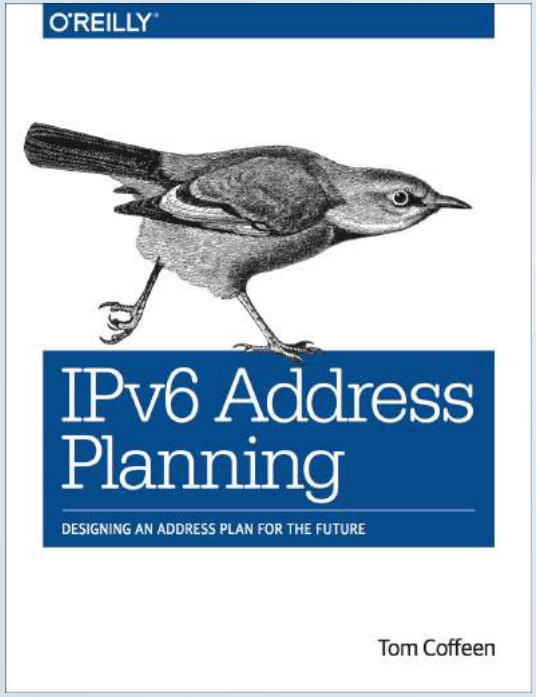
  - Tim Rooney, BT Diamond

  IPv6 address planning worksheet and tutorial

  - Tom Coffeen, Ed Horley, and Scott Hogg



Remaining Challenges: Putting IPv6 to Work



- IPv6 Address Planning, O'Reilly Media, 2014

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Thank you

Tom Coffeen
@ipv6tom