The benefits of deploying IPv6 only
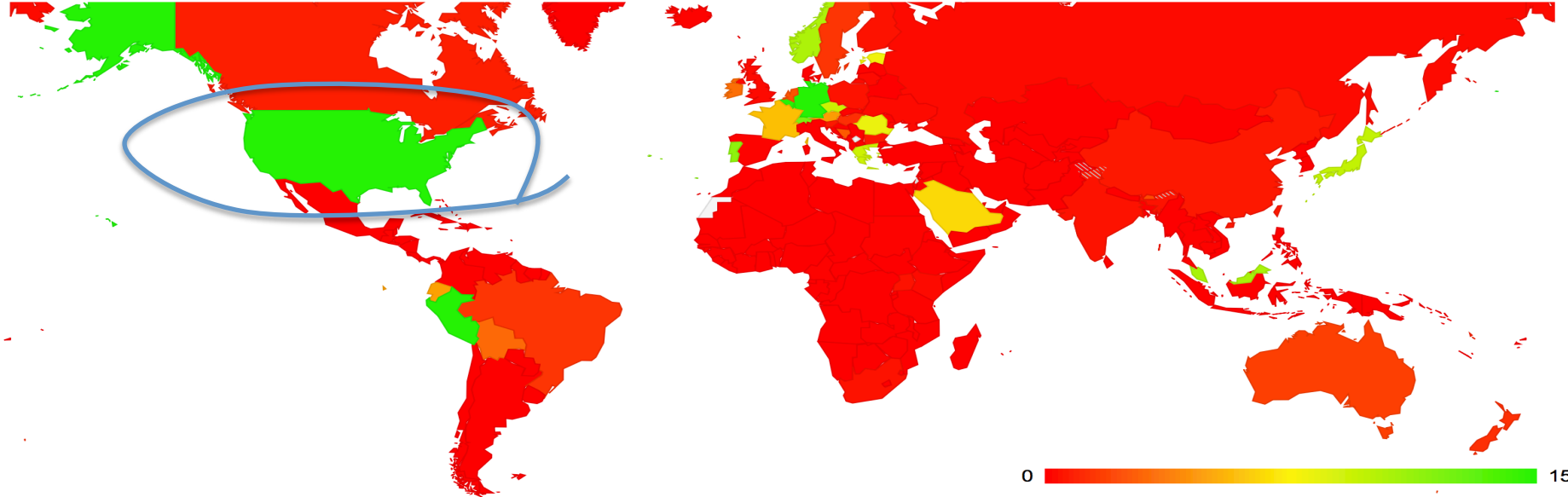
NANOG 64

June 2, 2015
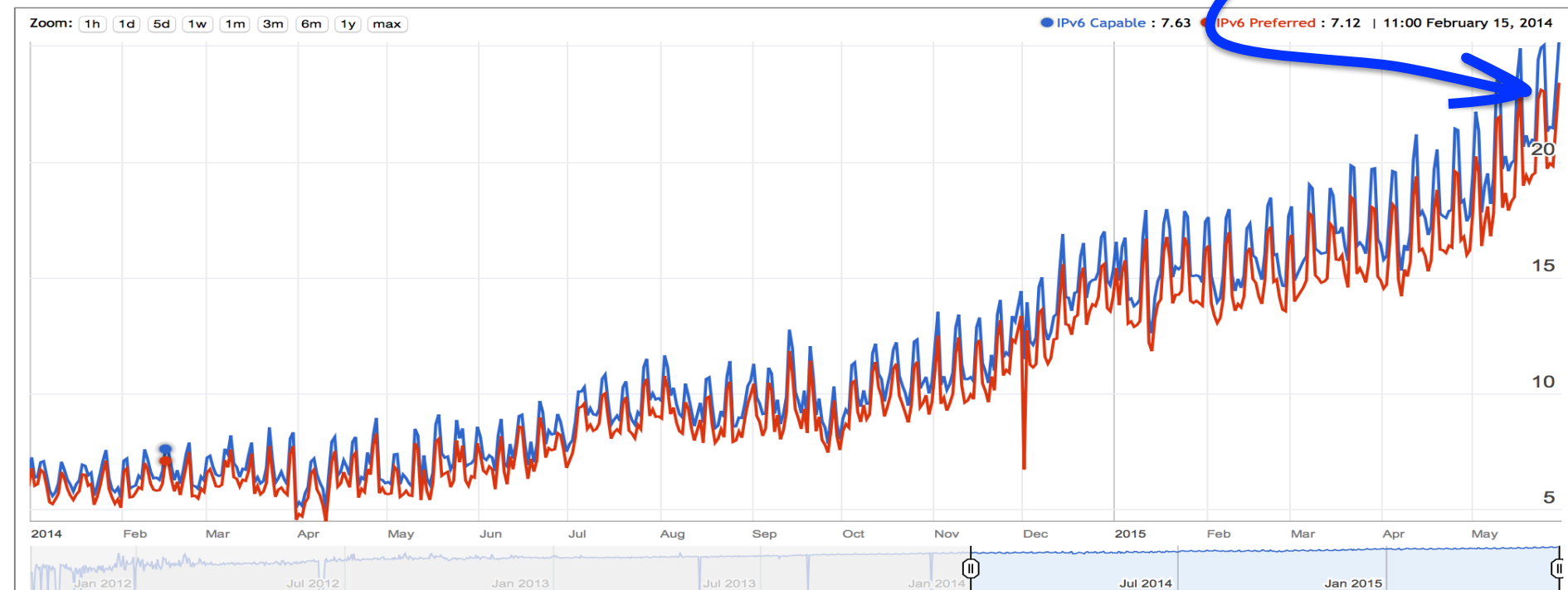
- Geoff Huston, APNIC
- John Jason Brzozowski, Comcast
- Gaurav Madan, T-Mobile
- Paul Saab, Facebook

The Internet World Colored with IPv6

IPv6 Capable Rate by country (%)

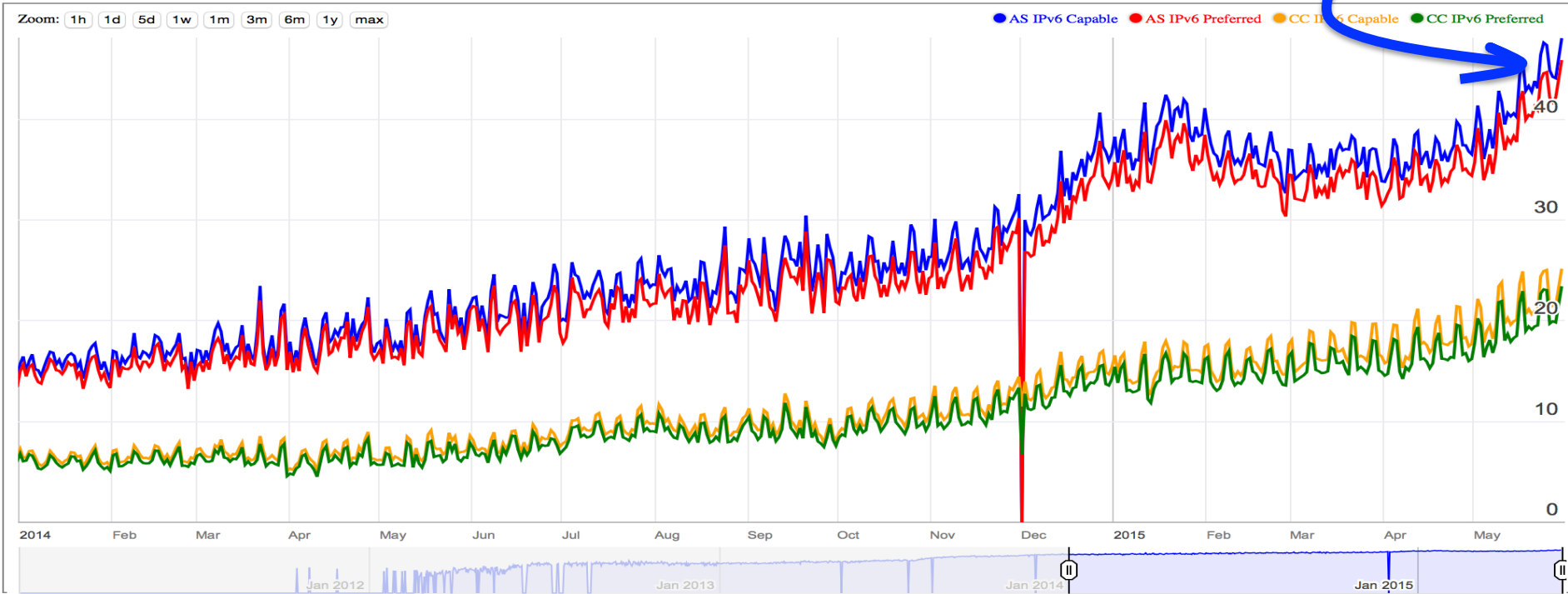# IPv6 Country Deployment for United States of America (US)

22% !

2014   2015

IPv6 Country Deployment for AS7922: COMCAST-7922 - Comcast Cable Communications, Inc., United States of America (US)

45% !

Zoom: 1h 1d 5d 1w 1m 3m 6m 1y max

● AS IPv6 Capable ● AS IPv6 Preferred ● CC IPv6 Capable ● CC IPv6 Preferred

2014   Feb   Mar   Apr   May   Jun   Jul   Aug   Sep   Oct   Nov   Dec   2015   Feb   Mar   Apr   May

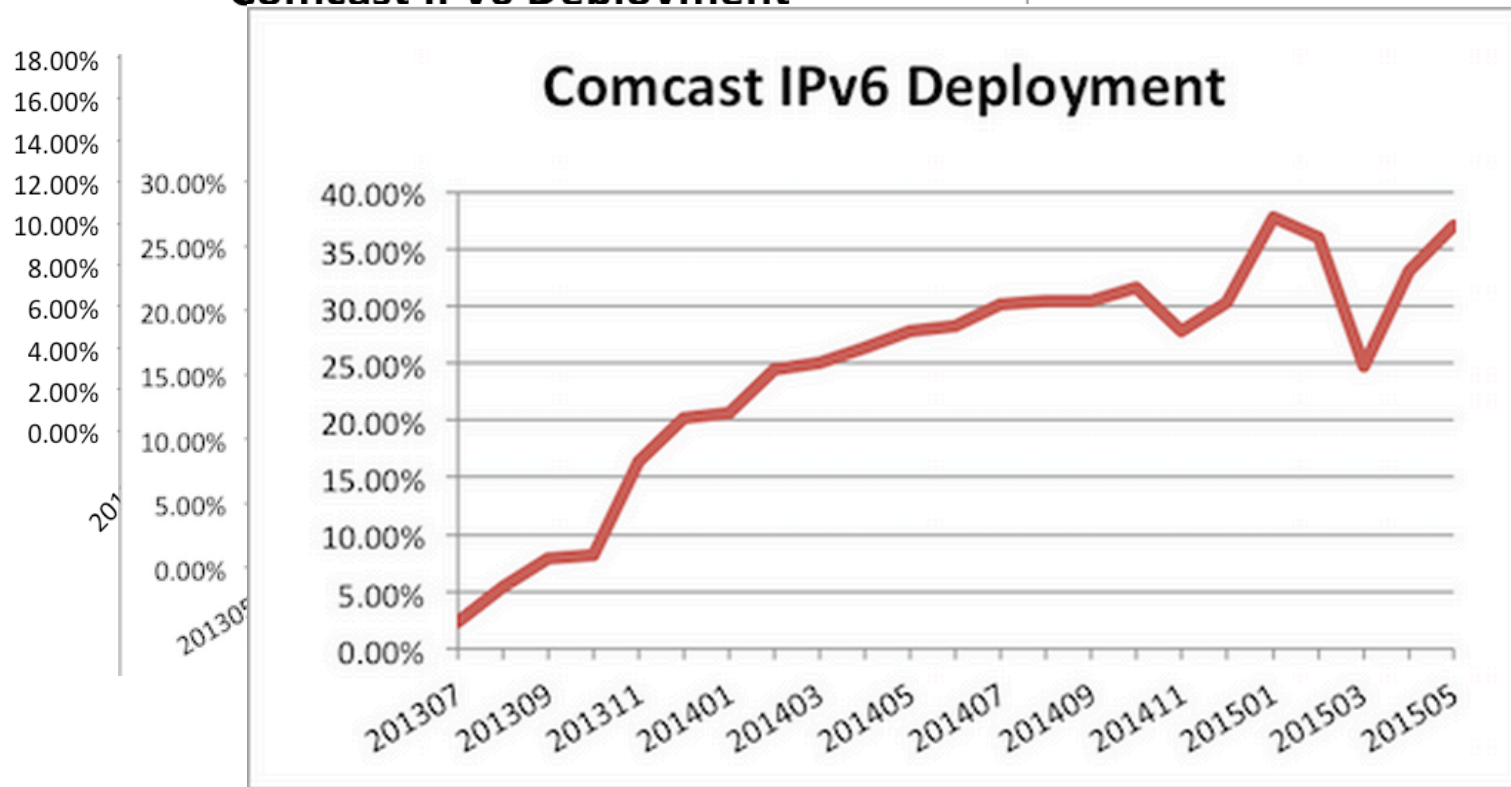Jan 2012   Jan 2013   Jan 2014   Jan 2015

2014   2015

COMCAST

Growth of IPv6 Deployment

Comcast IPv6 Deployment

What else?

- Over 60% of Comcast customers (and growing) provisioned with native IPv6 support
- Over ~10% of Internet traffic IPv6
- IPv6 support for all Comcast products and services (voice, video, and data)
  - Comcast's X1 platform is going IPv6 only
- IPv4aaS – Life after IPv4
  - Carry IPv4 over IPv6
- IPv6 foundation for innovation
  - IPv6 only lean core, IPv6 Segment Routing, IPv6 content delivery

Why IPv6?

- IPv6 is not just about more IP addresses, any longer.
- IPv6 performs better than IPv4
- IPv6 is simpler operationally and is not difficult to deploy
- IPv6 is your platform for innovation

T-MOBILE

Background

- As America's Un-carrier, T-Mobile US, Inc. (NYSE: TMUS) is redefining the way consumers and businesses buy wireless services through leading product and service innovation. The Company's advanced nationwide 4G LTE network delivers outstanding wireless experiences to approximately 56.8 million customers who are unwilling to compromise on quality and value.

- T-Mobile evaluated and deployed IPv6 only network

- NAT64/DNS64 was a good solution but some applications like WhatsApp, Spotify, Skype didn't work with IPv6 only client.

- T-Mobile, in partnership with NEC and JPIX, documented 464XLAT in the IETF as RFC6877 to overcome the limitations of NAT64 by adding a NAT46 into the client (CLAT)

- Android supports 464XLAT since October 2013, Windows Phone 8.1 and onwards supports 464XLAT since September 2014

- T-Mobile US uses default settings for all Android and Windows phone to be IPv6 only/ 464XLAT

T-Mobile US IPv6 Growth Story

- http://www.worldipv6launch.org measurements show 54% of all T-Mobile connections to in scope dual-stack sites are now IPv6

Participating Network	ASN(s)	IPv6 deployment
T-Mobile USA	21928	54.81%

T-Mobile USA IPv6 Deployment
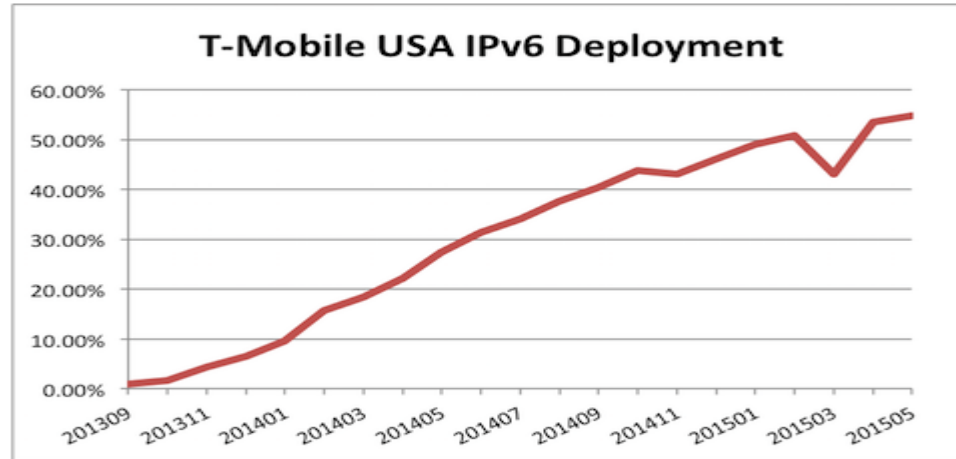
IPv6 Prospects

- TMUS now have more IPv6 users than IPv4.
- No Dual stack users.
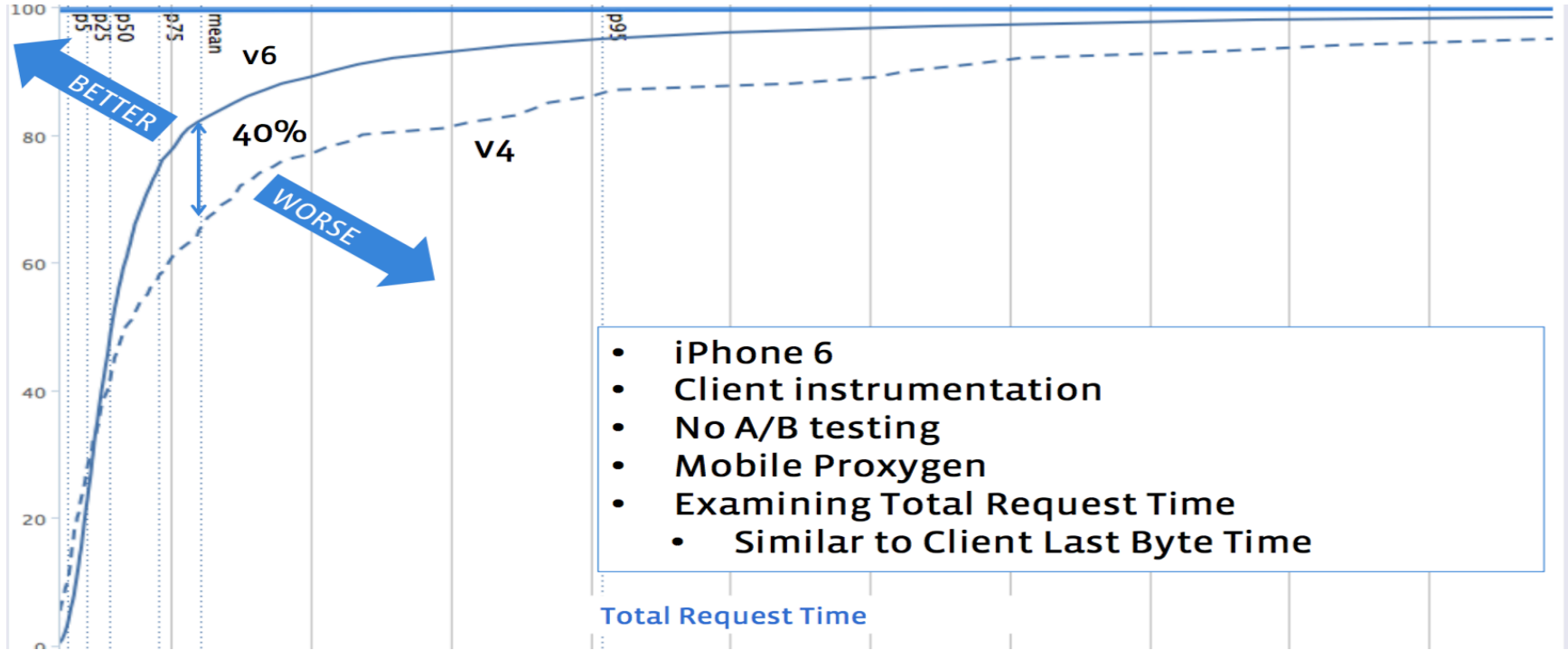- **Trends clearly shows more IPv6 users in the future.**
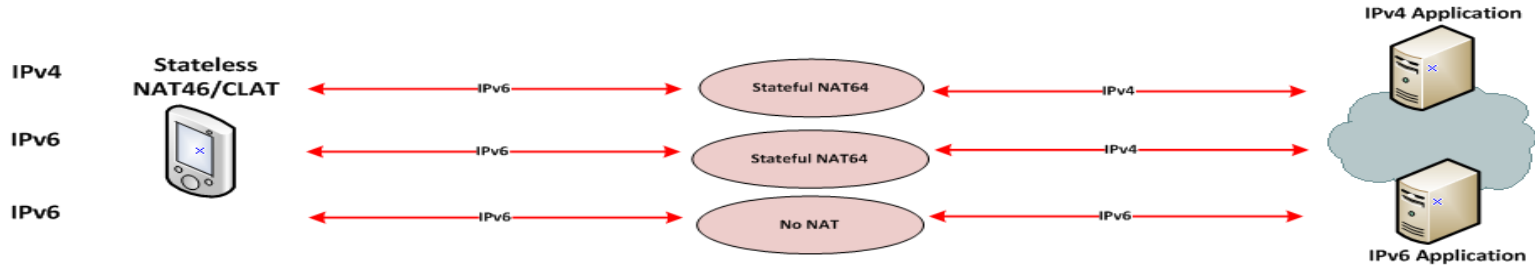
Benefits of IPv6 only deployment

- Edge network growth does not depends on IPv4 address availability.
- All client web and app traffic works, no hindrance because of IPv4 only applications. Better customer experience !
- Simplicity in ISP network.
- Saves money (Less CapEx and OpEx cost for NAT/CGN or IPv4 address procurement)
- Better visibility into network

FACEBOOK

US Mobile Performance
Dual Stack Provider iOS

- iPhone 6
- Client instrumentation
- No A/B testing
- Mobile Proxygen
- Examining Total Request Time
  - Similar to Client Last Byte Time

Total Request Time

IPv4 versus IPv6 Traffic