



IPv4 Waiting List & IPv6 Deployment Update

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IPv4 Waiting List

- Requesters have the waiting list option
 - Initial /21 (ISP) or /24 (EU) with no justification
 - Larger blocks based on 24 month need
 - Requester may specify a smaller acceptable size
 - One request per org on the list at a time
- Oldest requests filled first
- Requests met by transfer are removed

IPv4 Waiting List – Block Sources

- IANA Redistribution (2x a year)
 - Down from /11 May 2014 to /19 Mar 2017
- Returned IPv4 Blocks
- Revoked IPv4 Blocks
 - Generally for nonpayment
- Lengthy review process before reissue

Reissue Review Process

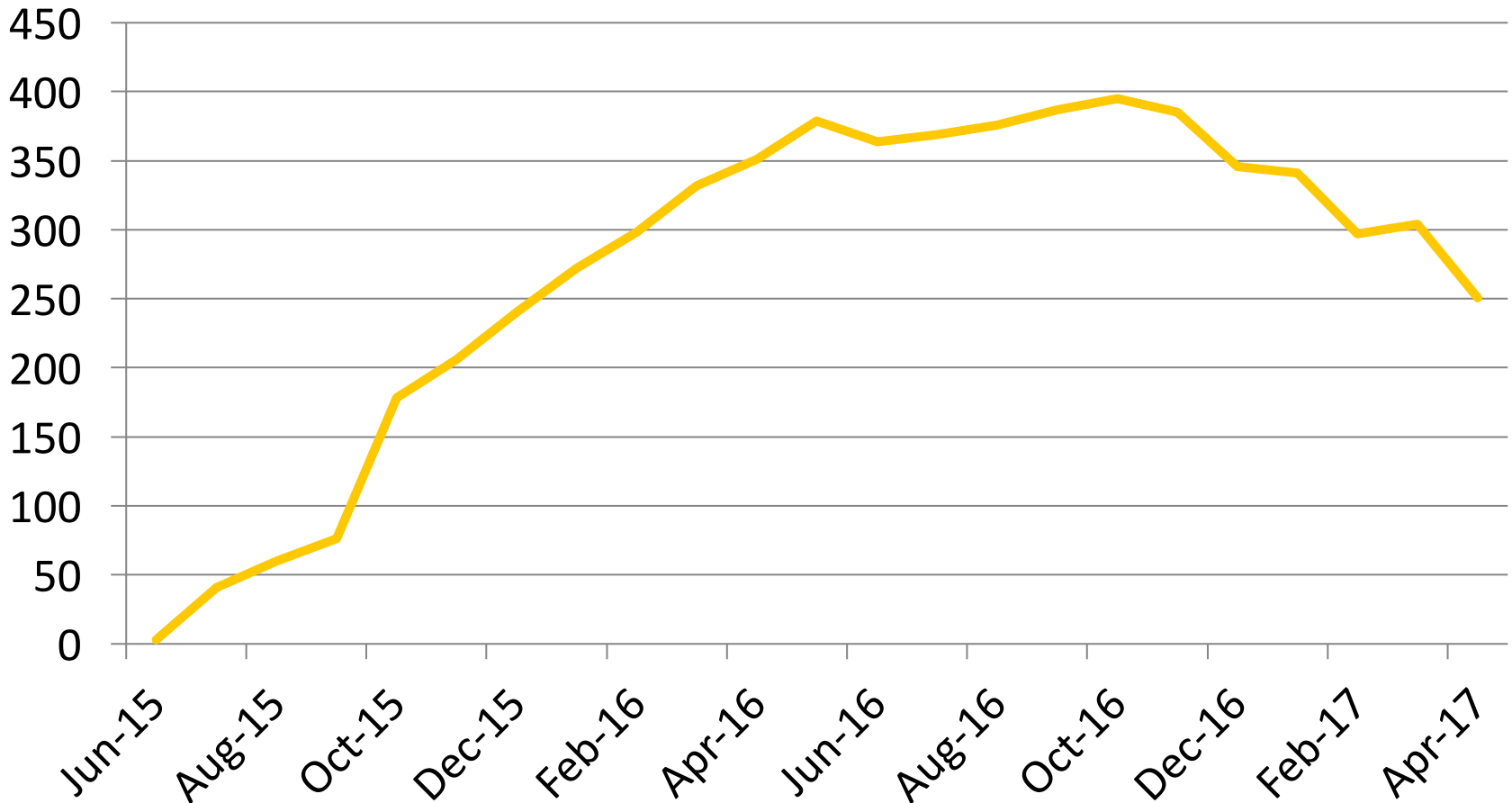
- **RSD analyzes returned/revoked blocks**
 - Unrouted blocks get priority over routed blocks
 - Need verification the return/revoke was done properly
- **FSD confirms fees unpaid & notices sent**
- **Meeting held to confirm reissue**
 - Legal review
 - 4 management team signatures required
 - 20-40 blocks reviewed in each meeting
- **328 blocks currently in the review process**

IPv4 Waiting List Statistics

Of the 663 requests added:

- **256 (39%) have been filled**
 - Last request filled waited ~13 months
- **156 (24%) dropped off**
 - Most got IPv4 via the transfer market
- **251 (38%) still waiting**
 - Oldest added 31 Jul 2015 (/16)

IPv4 Waiting List Size

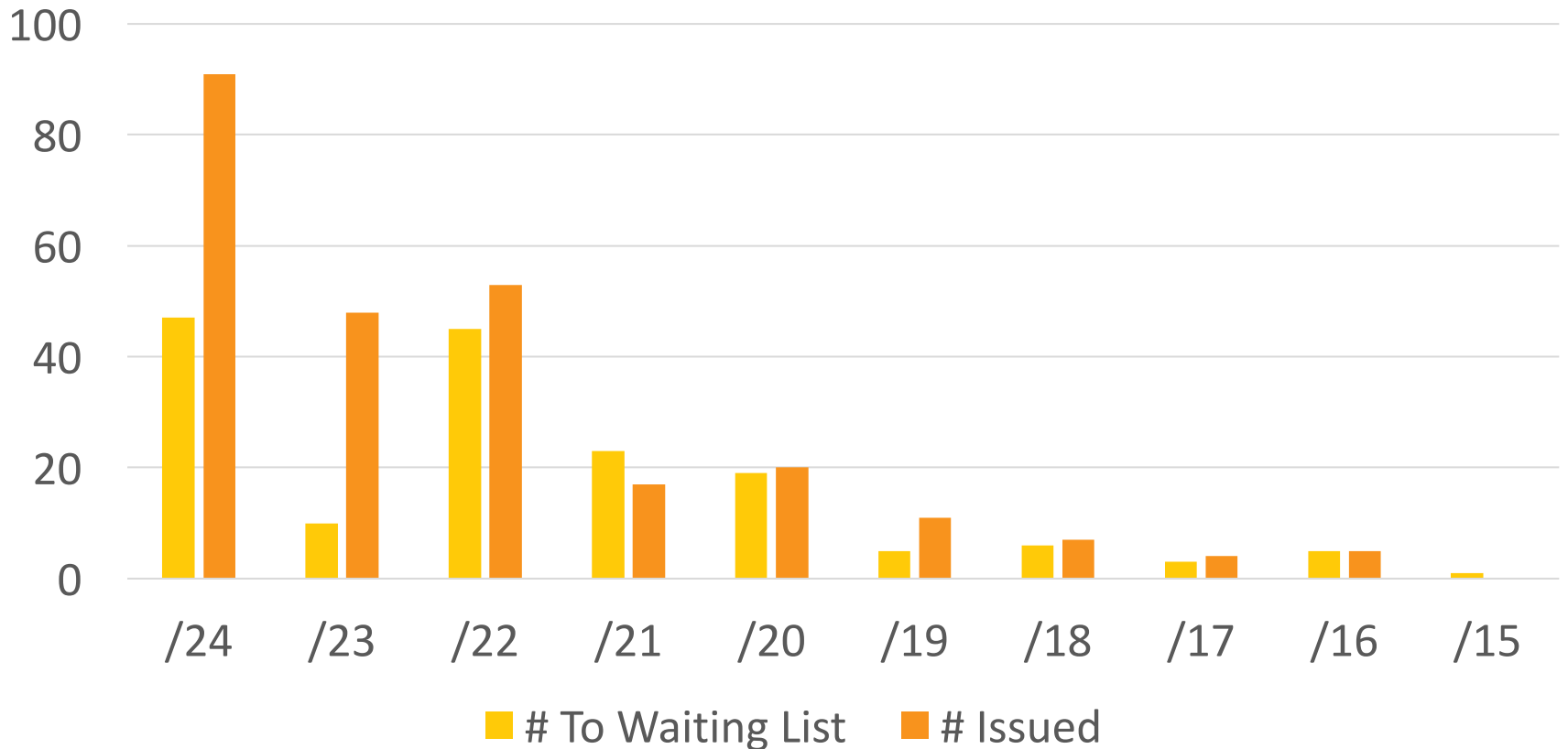


Waiting Time

- Of the 256 completed requests:
 - Average 15 months wait
 - Longest wait: 24 months
- Of the 156 closed requests:
 - Average 7 months before close
 - Longest wait: 21 months (filled via transfer)

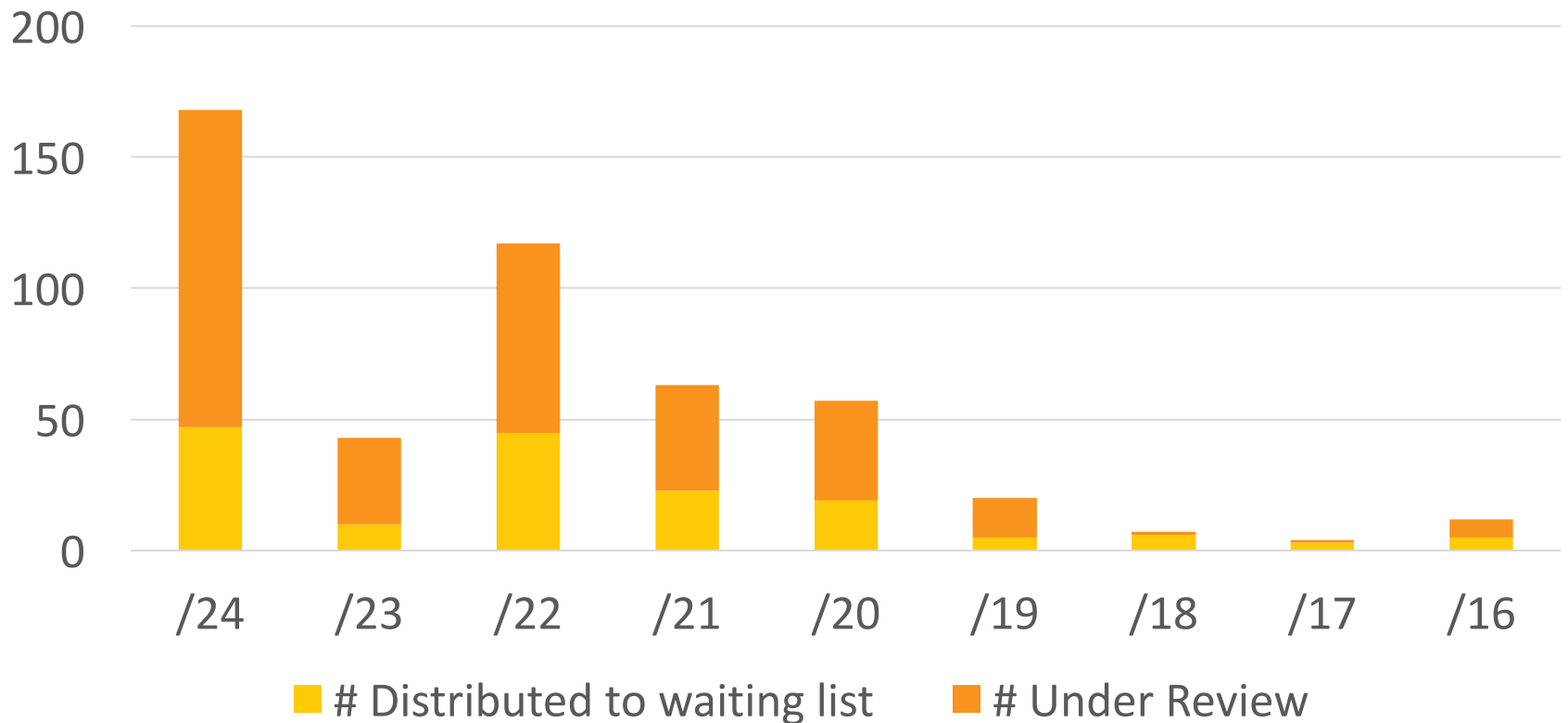
Waiting List Deaggregation

164 prefixes available - 256 prefixes issued

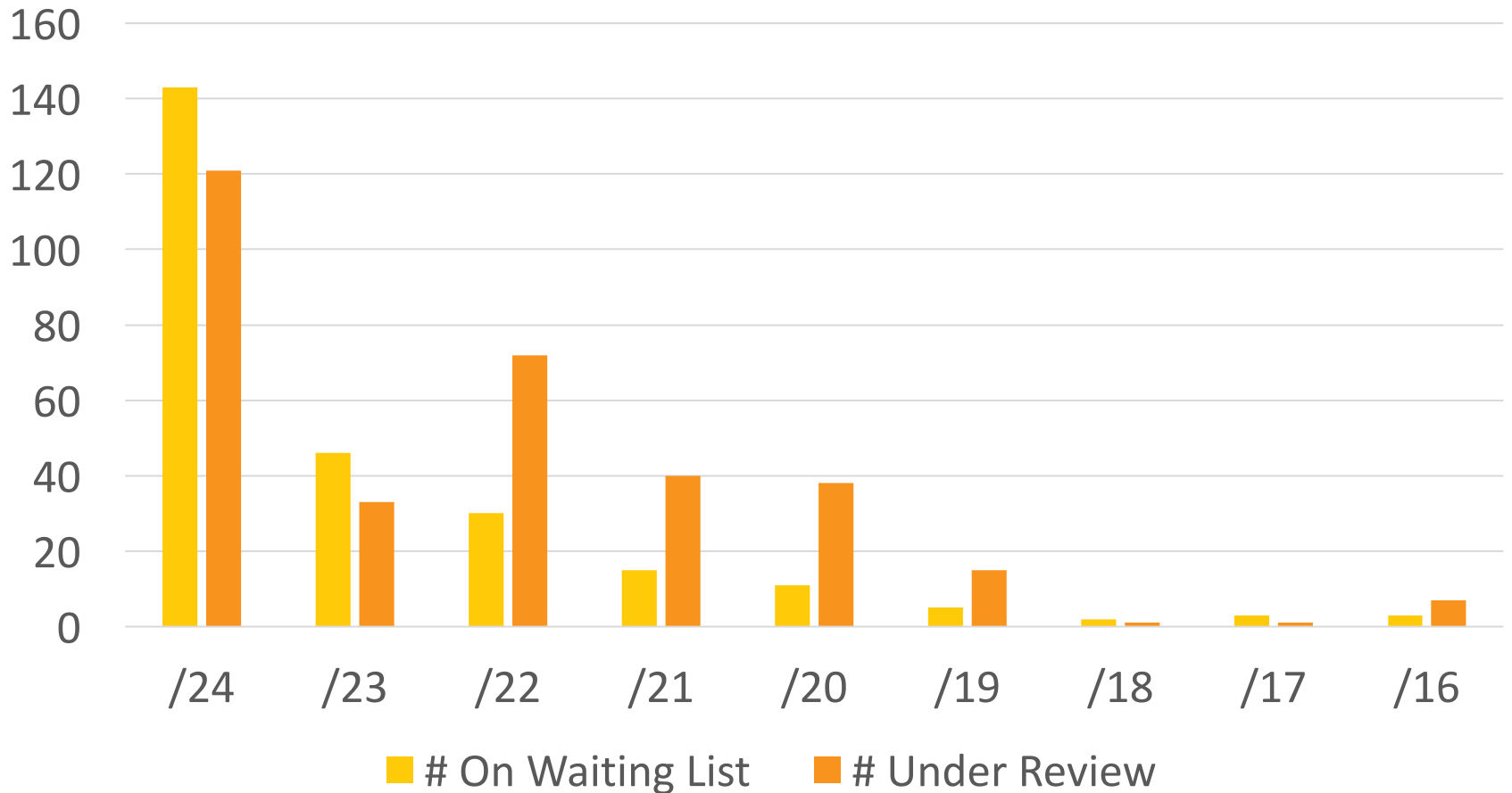


Blocks Under Review

163 blocks distributed, 328 under review



Waiting List/Inventory Comparison



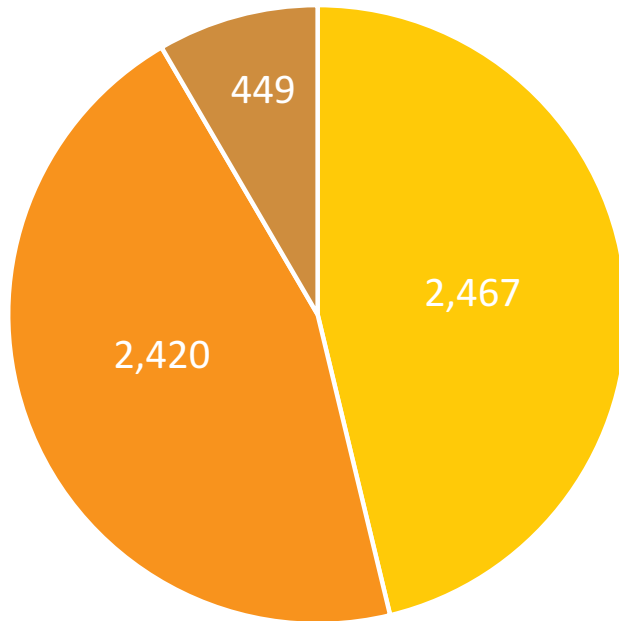
How Far Are We In IPv6 Adoption?

Depends where you look...

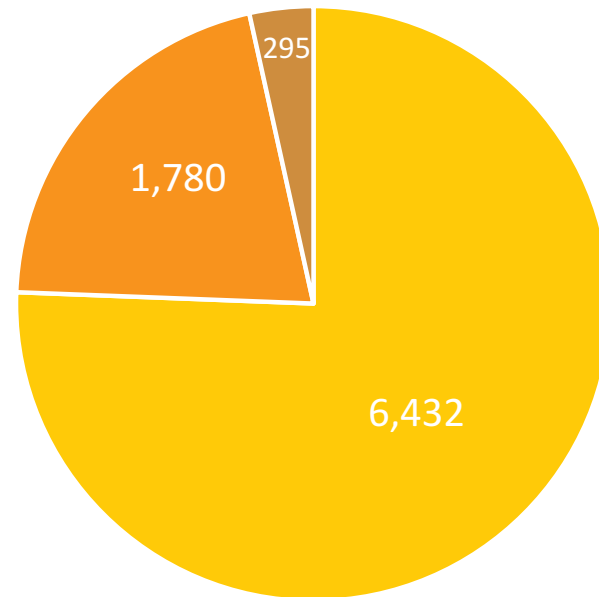
- How many networks have an IPv6 block?
- How many networks are routing IPv6?
- How much traffic is using IPv6?

ARIN RSP/EU Orgs IPv4/IPv6 Holdings

RSP

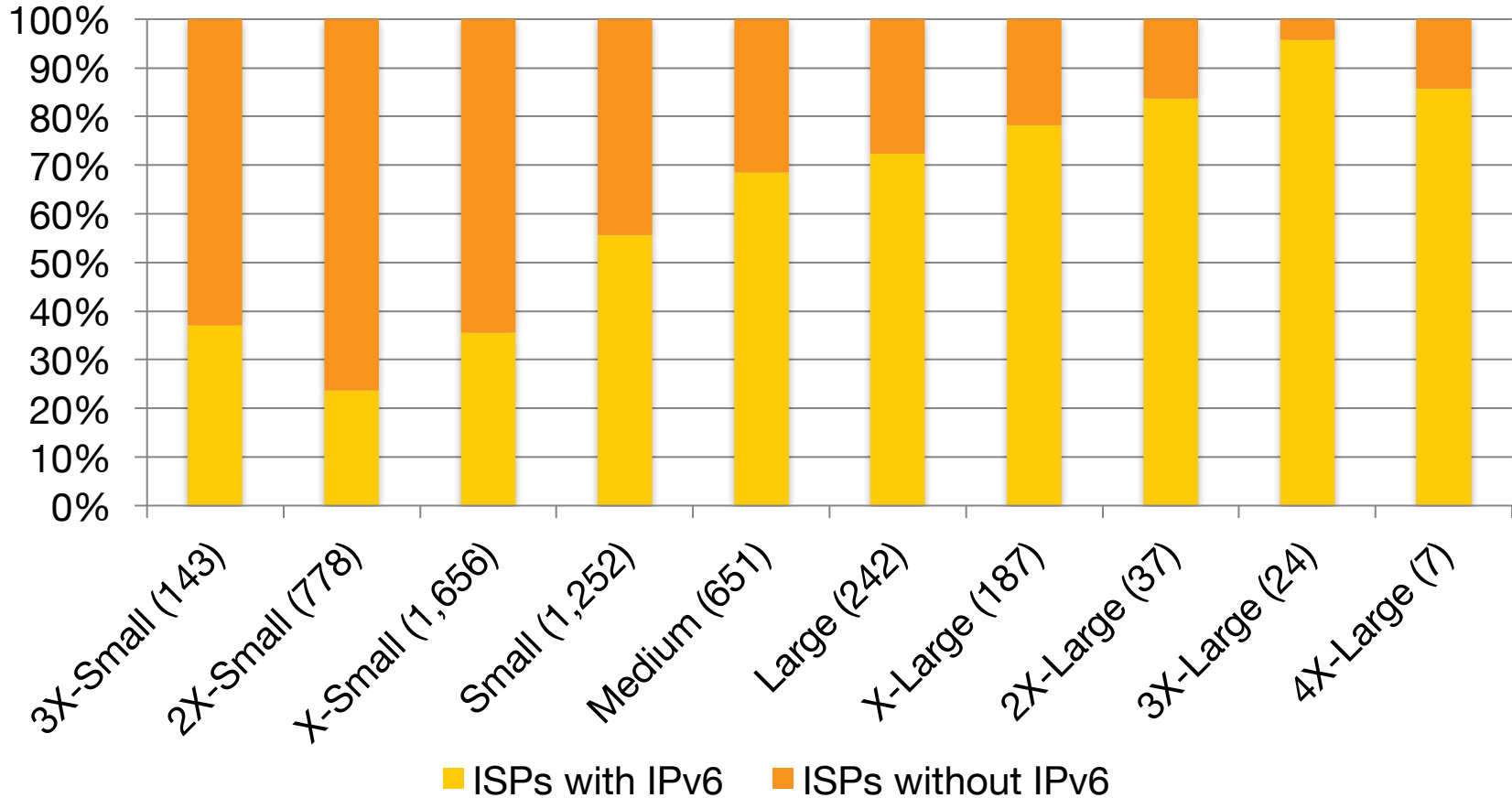


End Users

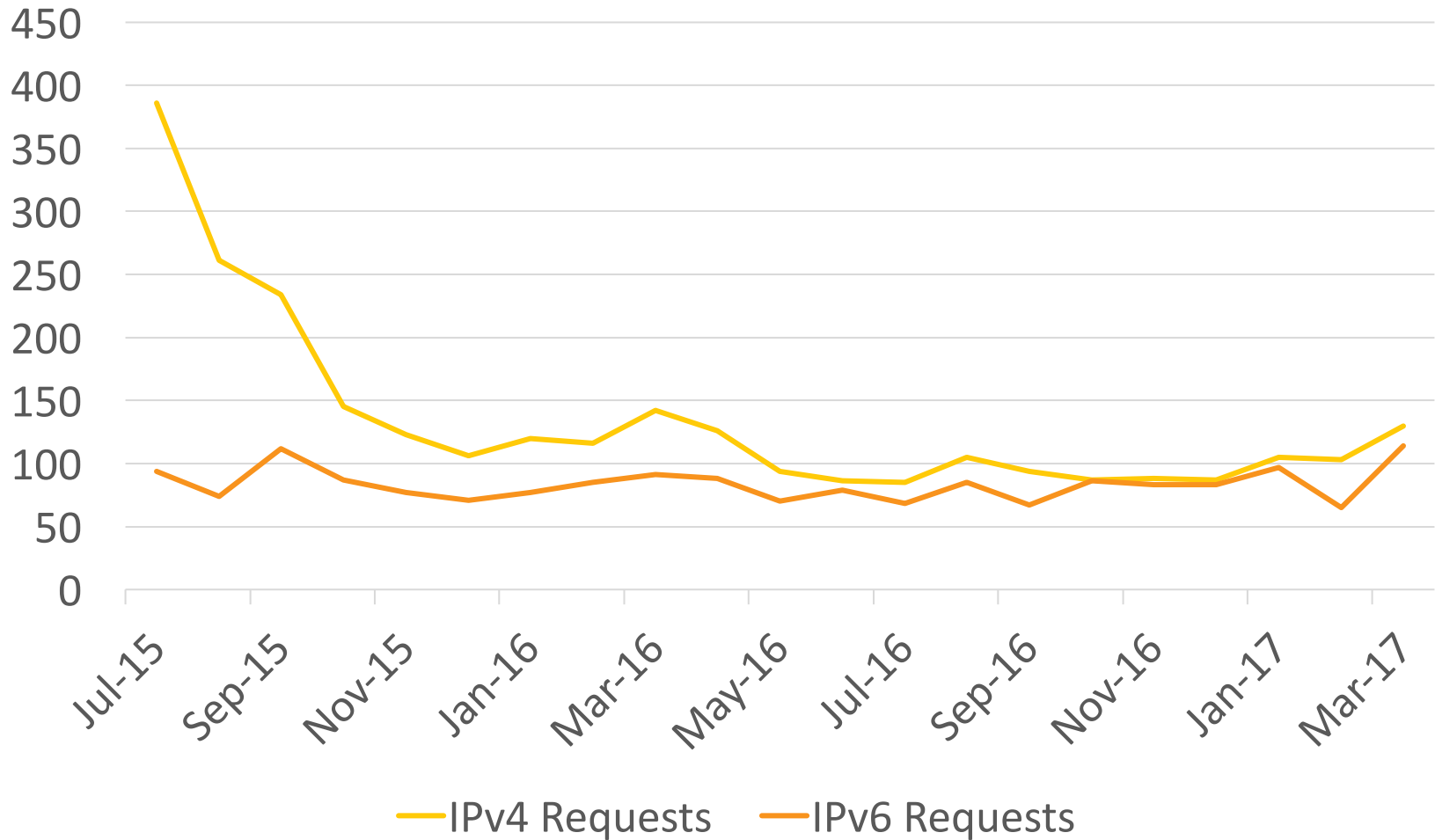


■ IPv4 Only ■ IPv4 & IPv6 ■ IPv6 Only

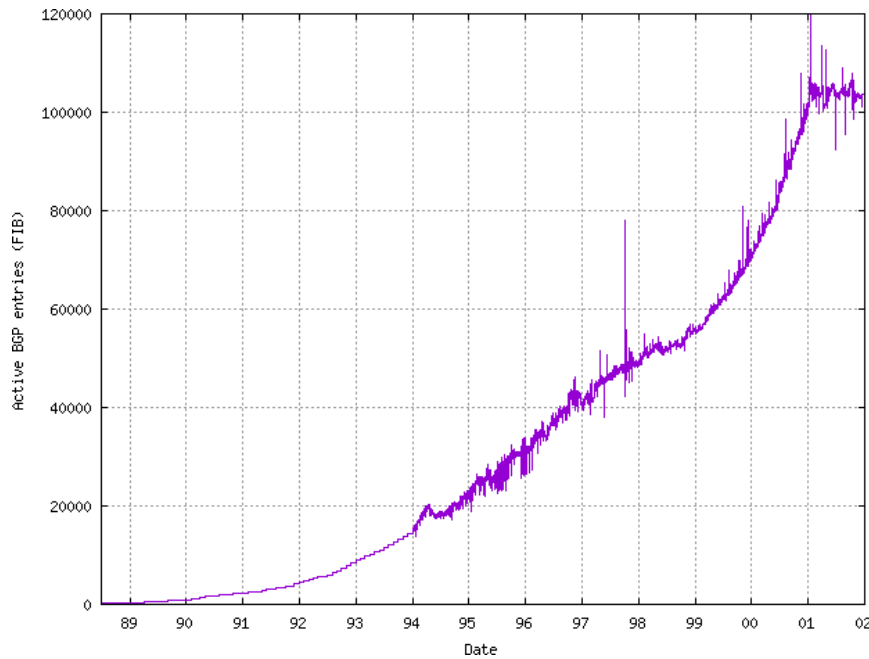
IPv6 Adoption by ISP Size



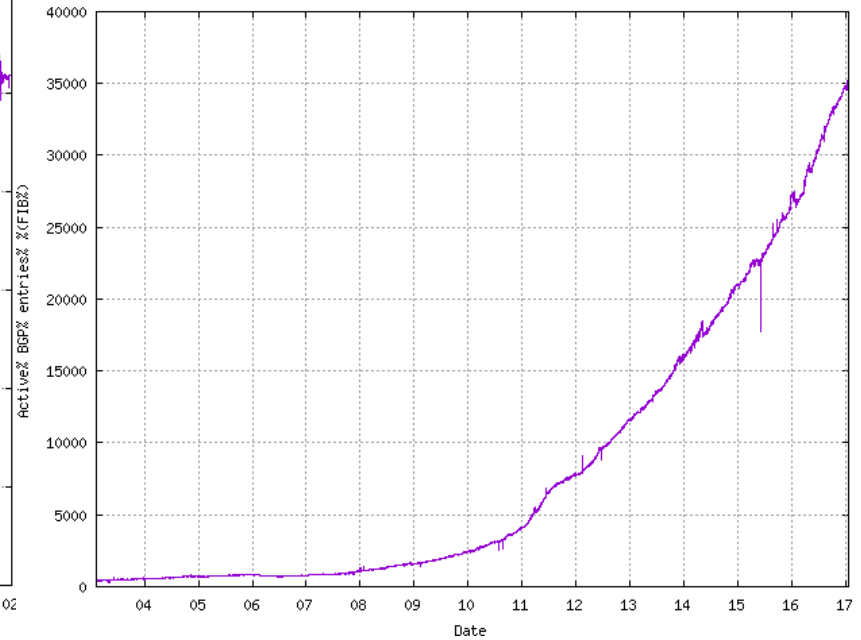
IPv4 & IPv6 Requests Since Depletion



Routing Table Growth

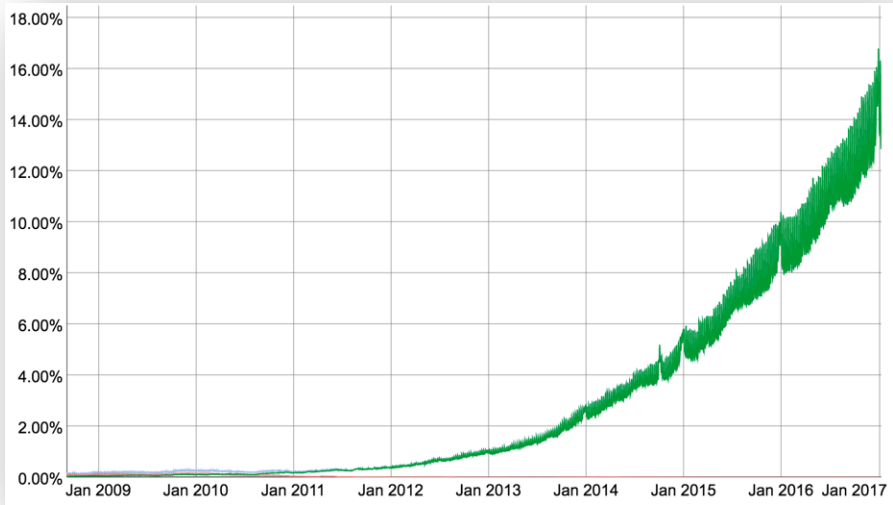
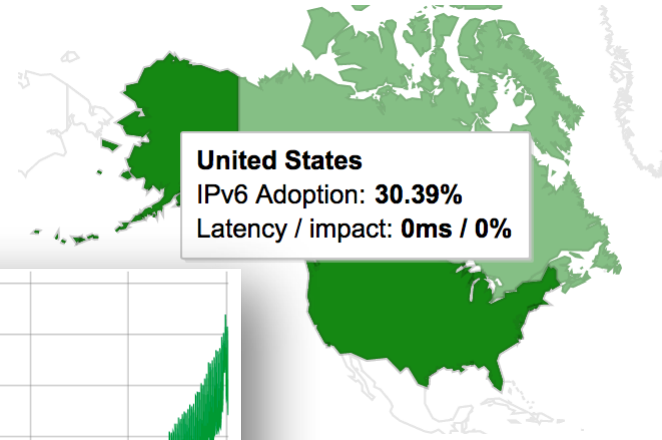


IPv4 – First 14 Years



IPv6 – First 14 Years

Google's IPv6 Traffic Growing



Facebook & Akamai



Paul Saab

August 17 at 2:08am

Today marks the first day that more people used IPv6 to access Facebook than IPv4 from the 4 major USA mobile networks. This is a huge milestone in just 4 short years since World IPv6 Launch in 2012.

[Erik Nygren](#) | [August 12, 2016 9:23 PM](#) | [Reply](#)

As an update as of August 10th, there has been significant growth over the past three months and deployment has crossed a major milestone: over half of requests to dual-stacked sites on Akamai from the top-4 US mobile networks now use IPv6! IPv6 is used around 70% of the time for Android and over 30% of the time for iPhones, up 10% each from May. We have also seen T-Mobile start to deploy IPv6 to iOS devices as well in a dual-stacked configuration.

How Can ARIN Help?

- Educate customers on IPv6 benefits
 - Cost of being IPv4-only (transfer market, latency, CGN boxes, NAT)
 - Generally no additional cost for ISPs & fees recently lowered for end users
 - IPv6 gives you access to a reserved IPv4 block
- Clarify minimal qualification requirements
- Provide subnetting guidance
- Provide deployment information

Reserved IPv4 for IPv6 Deployment

- /10 reserved under policy in April 2009
 - 60 /24s issued to date (99.6% remains available)
- Must be used to facilitate IPv6 deployment
 - Dual stacking key servers, NAT-PT/NAT464, etc.
- Must have an IPv6 block
- One per organization every six months
 - /24 maximum size

Minimal Requirements

Have an v4 block from ARIN

OR

Intend to IPv6 multi-home

OR

ISP

End User

- Make 50 assignments within 5 years

- 2000 IPv6 addresses used
- 200 IPv6 subnets used
- 13 sites within a year
- PA IPv6 unsuitable

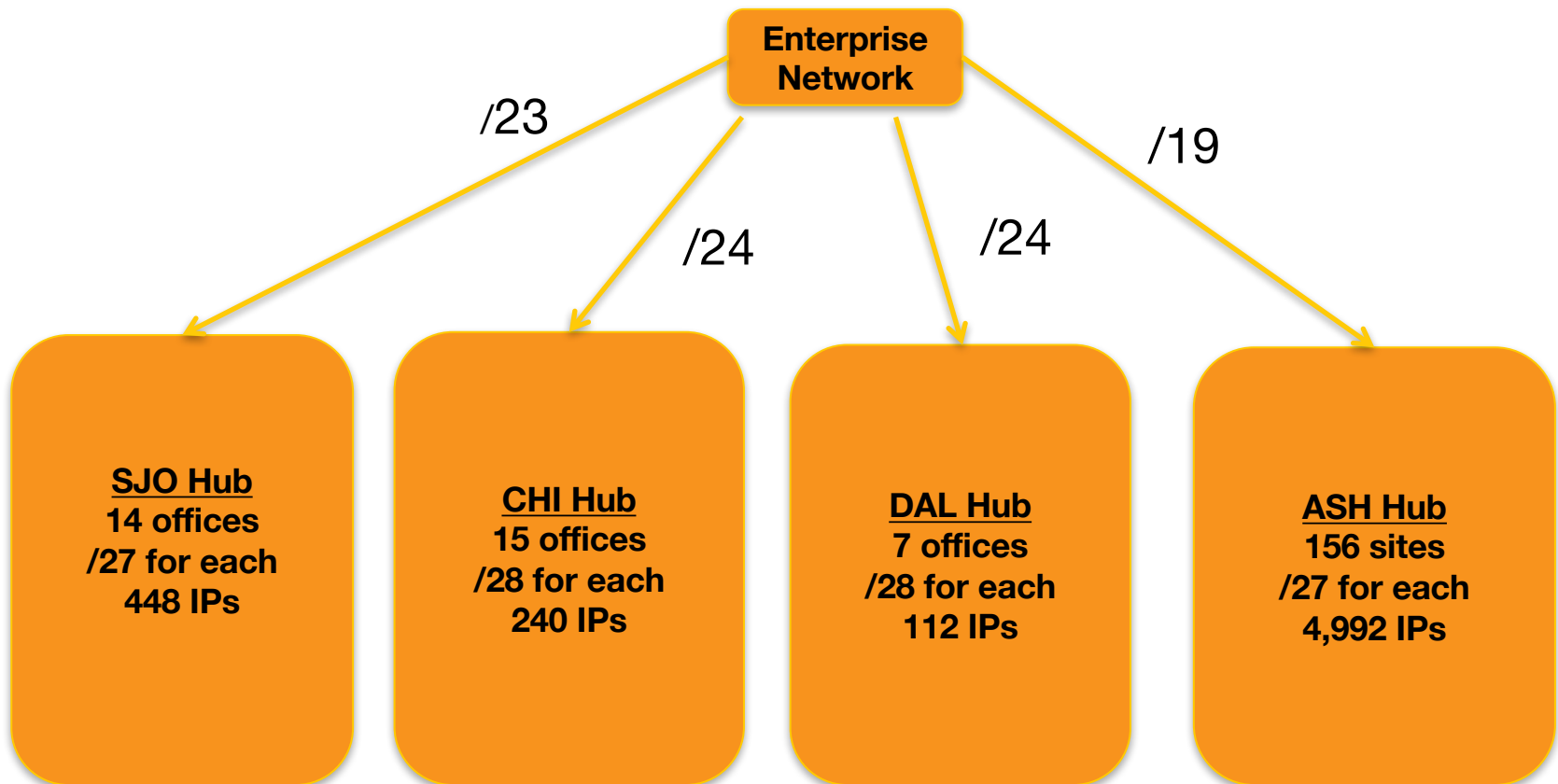
Subnetting: IPv4 vs IPv6

- The IPv4 mindset: think in terms of IP addresses
 - “If a site has 50 devices, I give it a /26”
- The IPv4 mindset does not work for IPv6
 - Last 64 bits used for device autoconfiguration
 - ... and we have a ton of IPv6 addresses.
- The correct IPv6 mindset: think in terms of subnets, not addresses

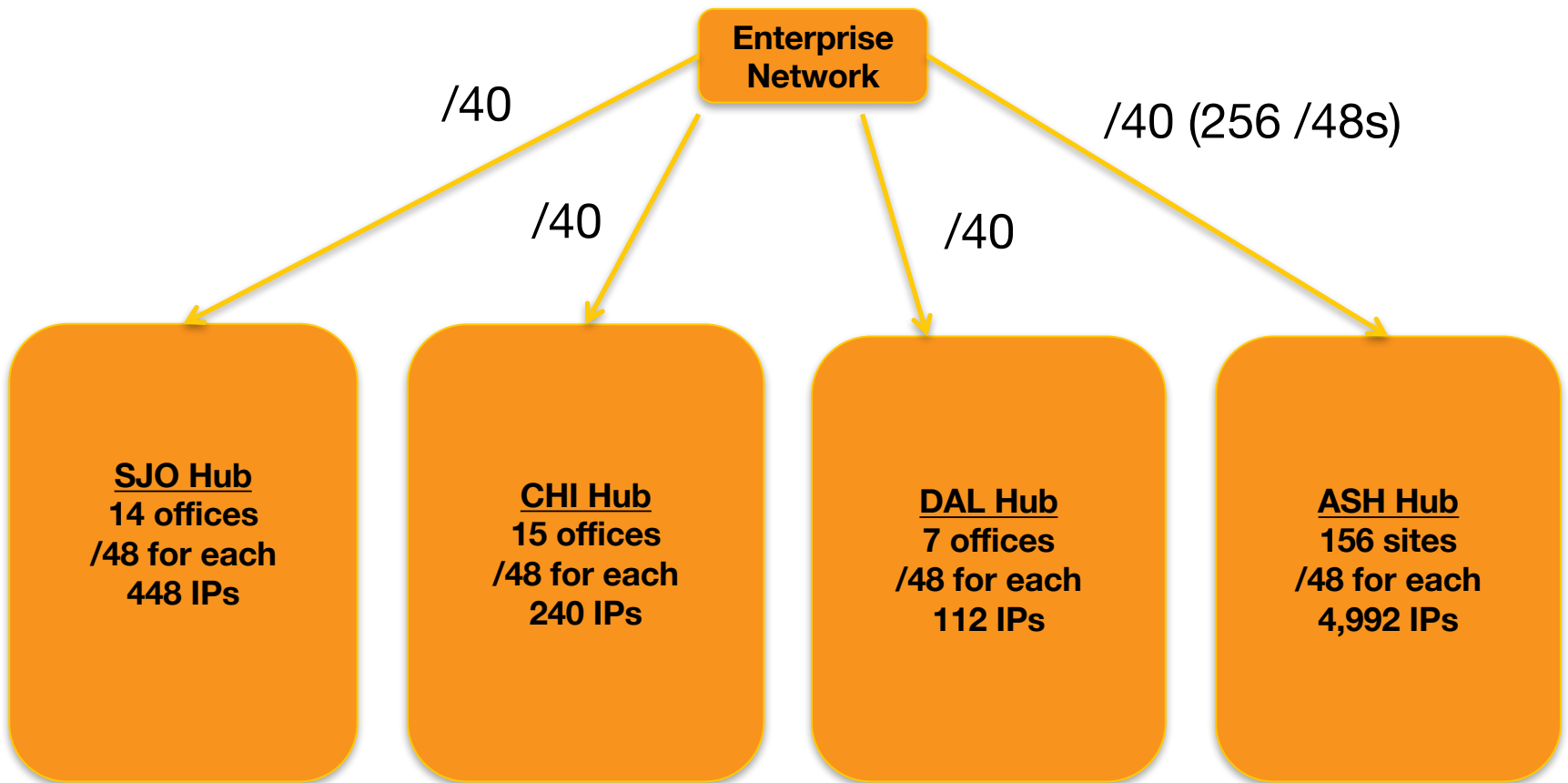
IPv6 Subnetting – NANOG BCOP

- Each individual network segment gets a /64
 - A /64 can hold a near-infinite number of devices
- Subnet on nibble boundaries for DNS
 - /48, /44, /40, etc
- Addressing plans should be hierarchical, with each level using subnets of the same size
 - Each site gets a /48
 - Customers generally get a /48
 - PoPs/aggregation points sized based on largest

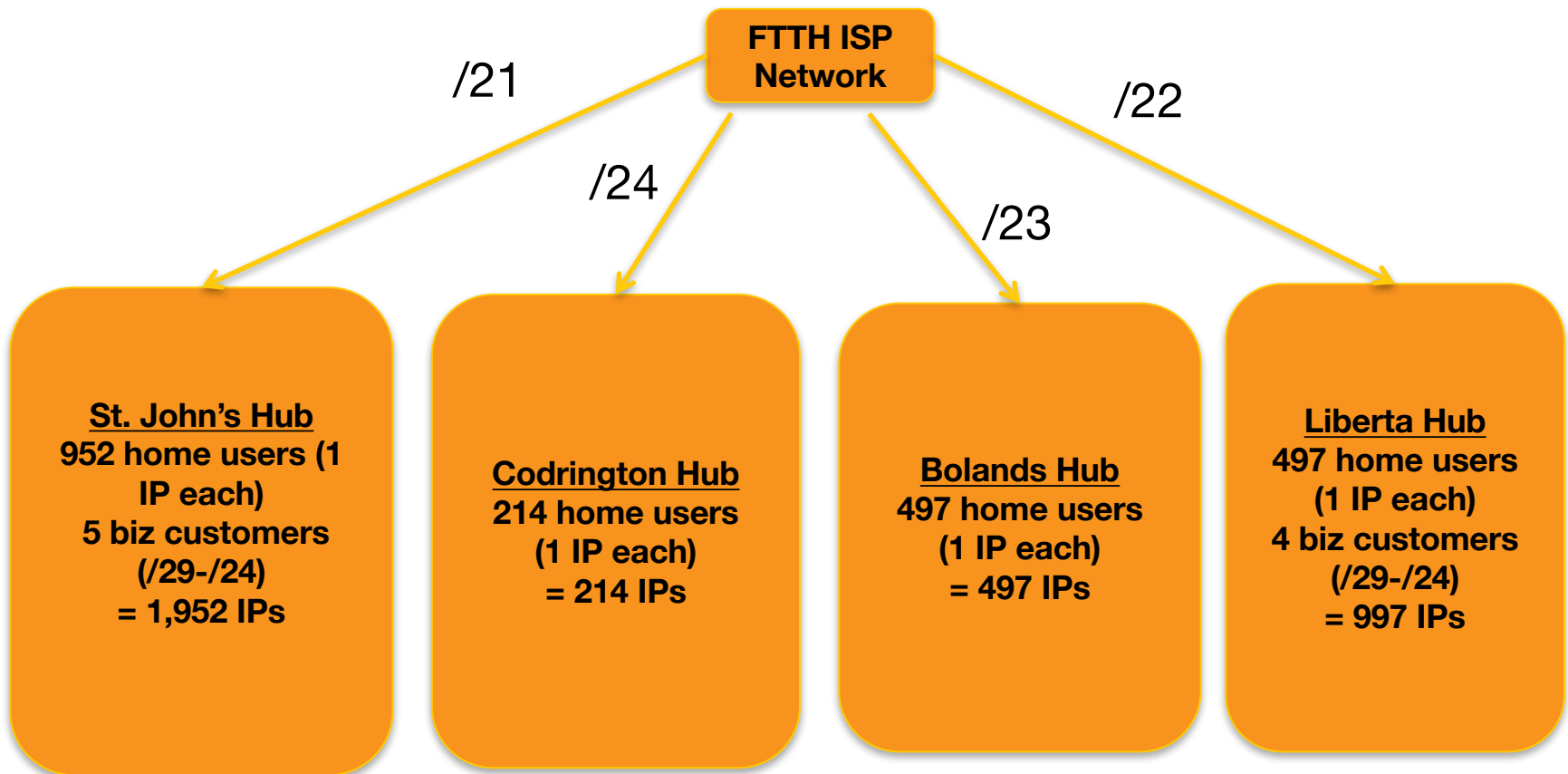
IPv4 Address Plan: End User



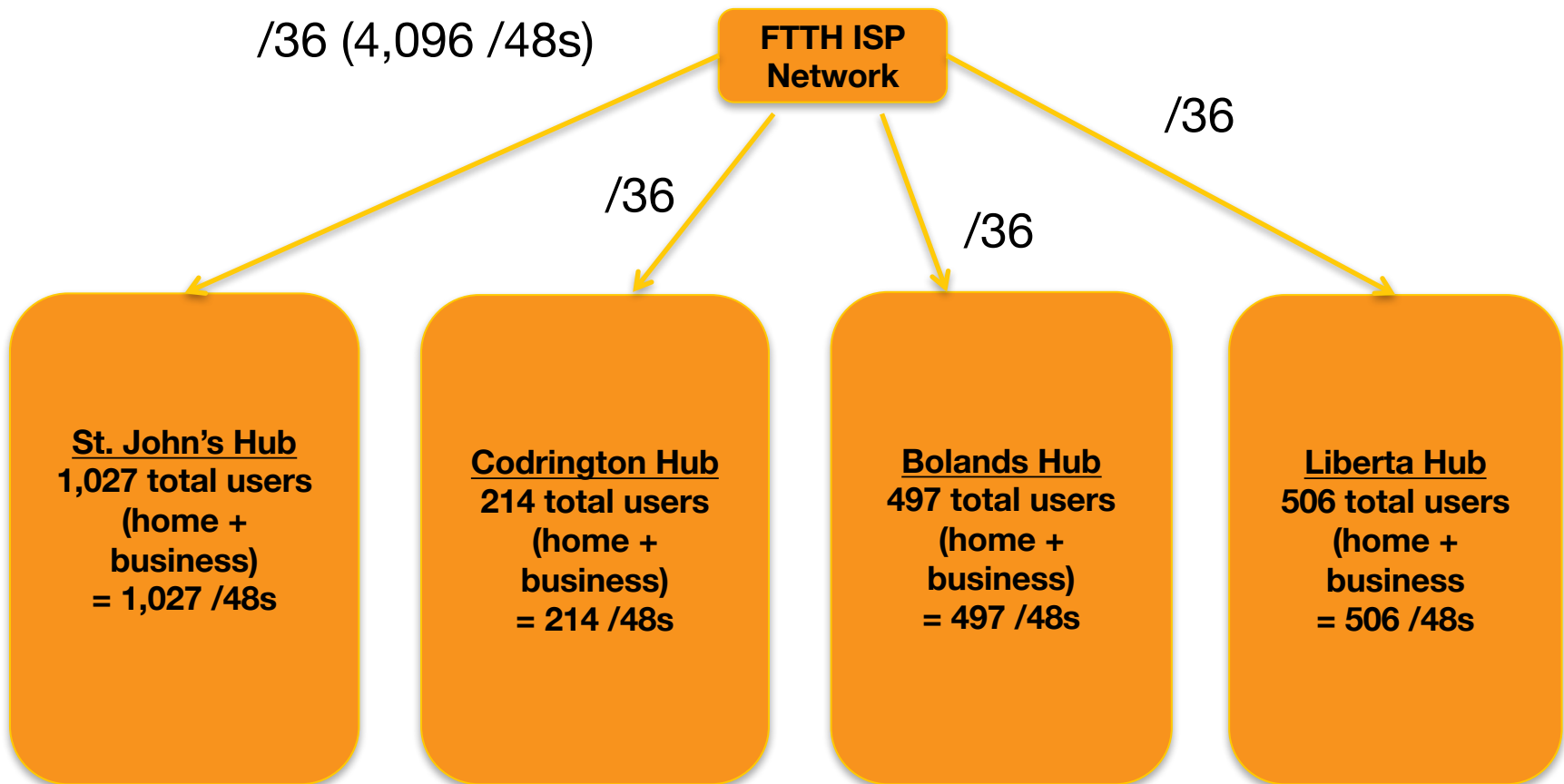
IPv6 Address Plan: End User



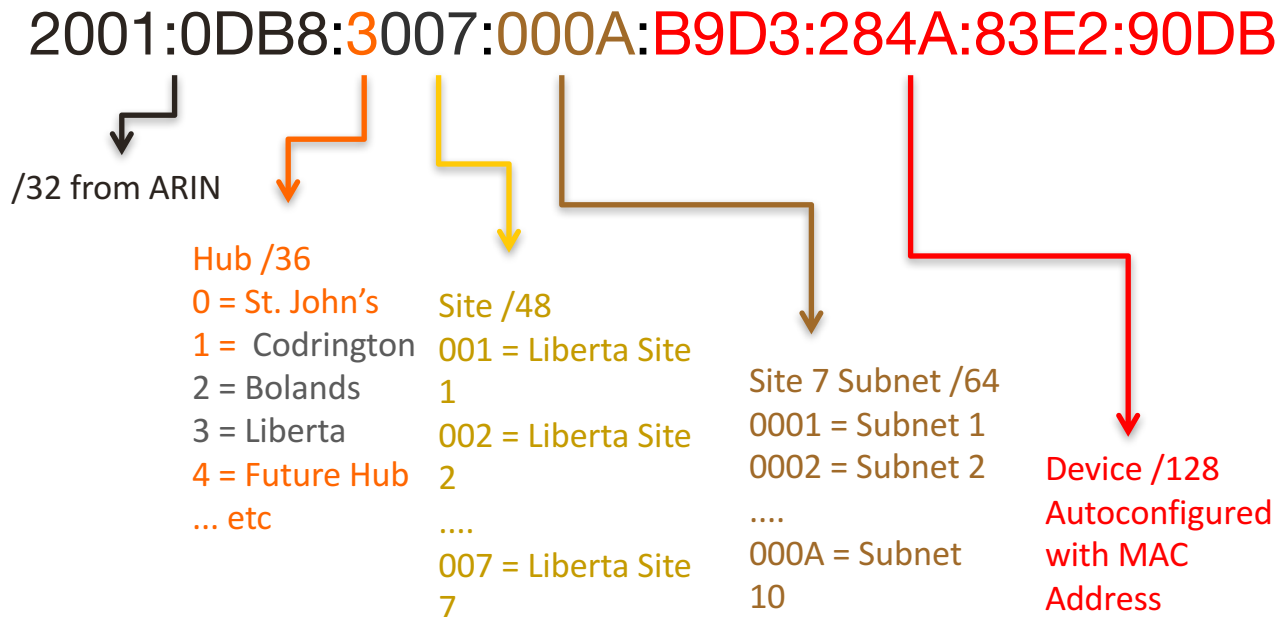
IPv4 Address Plan: ISP



IPv6 Address Plan: ISP



Anatomy Of An IPv6 Address



IPv6 Deployment Information

- ISOC's Deploy360 program has 16 detailed case studies covering:
 - ISPs
 - Hosting providers
 - Enterprise businesses
 - Universities
 - Governments
- **ARIN's IPv6 Wiki**
 - DNS, tools, translation services, etc



IPv6 Info Center

www.arin.net/knowledge/ipv6_info_center.html



www.GetIPv6.info



www.TeamARIN.net

Q&A

