

# 6 Watch: Monitoring IPv6 Deployment and Connectivity

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# The Future of IPv6

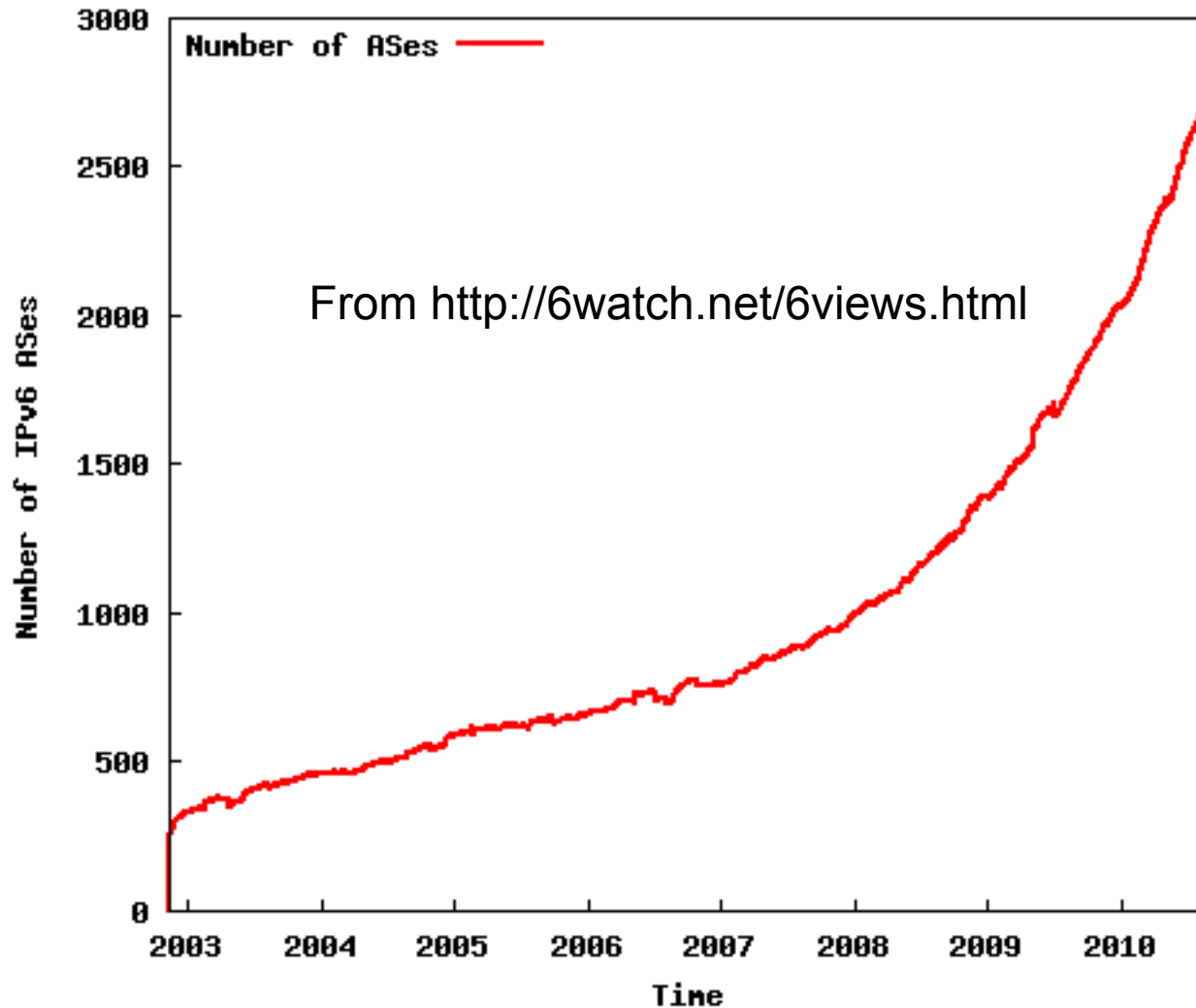
- IPv6 is Not User Driven
  - Users don't gain a benefit by deploying IPv6
  - May be unable to reach portions of IPv4 net
  - Not all apps work, *no new apps enabled*
- IPv6 Does Not Produce New ISP Revenue
  - No one will pay more for IPv6
  - At a minimum, ISPs must pay *operational cost* of adding v6 support to management.

# So Why Might IPv6 Succeed?

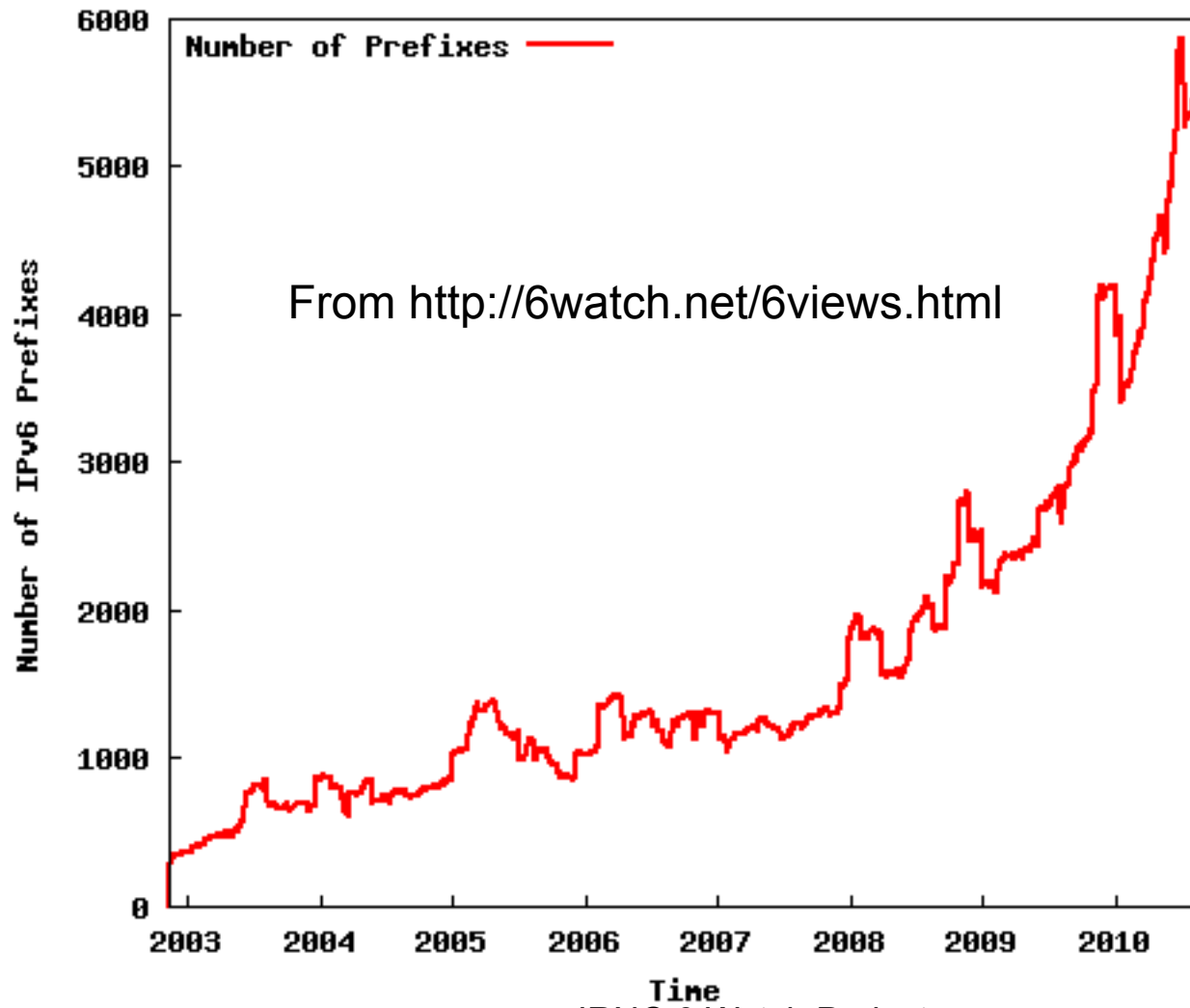
- IANA Has Run Out of Unallocated v4 Space
  - An IPv4 Address Market Emerging
    - Microsoft paid \$7.5 million for IPv4 space
    - Addrex: <http://www.addrex.net>
    - Depository: <http://www.depository.net>
    - Tradeipv4: <http://www.tradeipv4.com>
- Vast Pool of (Cheap) IPv6 Allocations
  - Ideal motivation for IPv6 deployment
  - But prefer paying millions for IPv4 over free IPv6 ??

# Many Positive Trends For IPv6

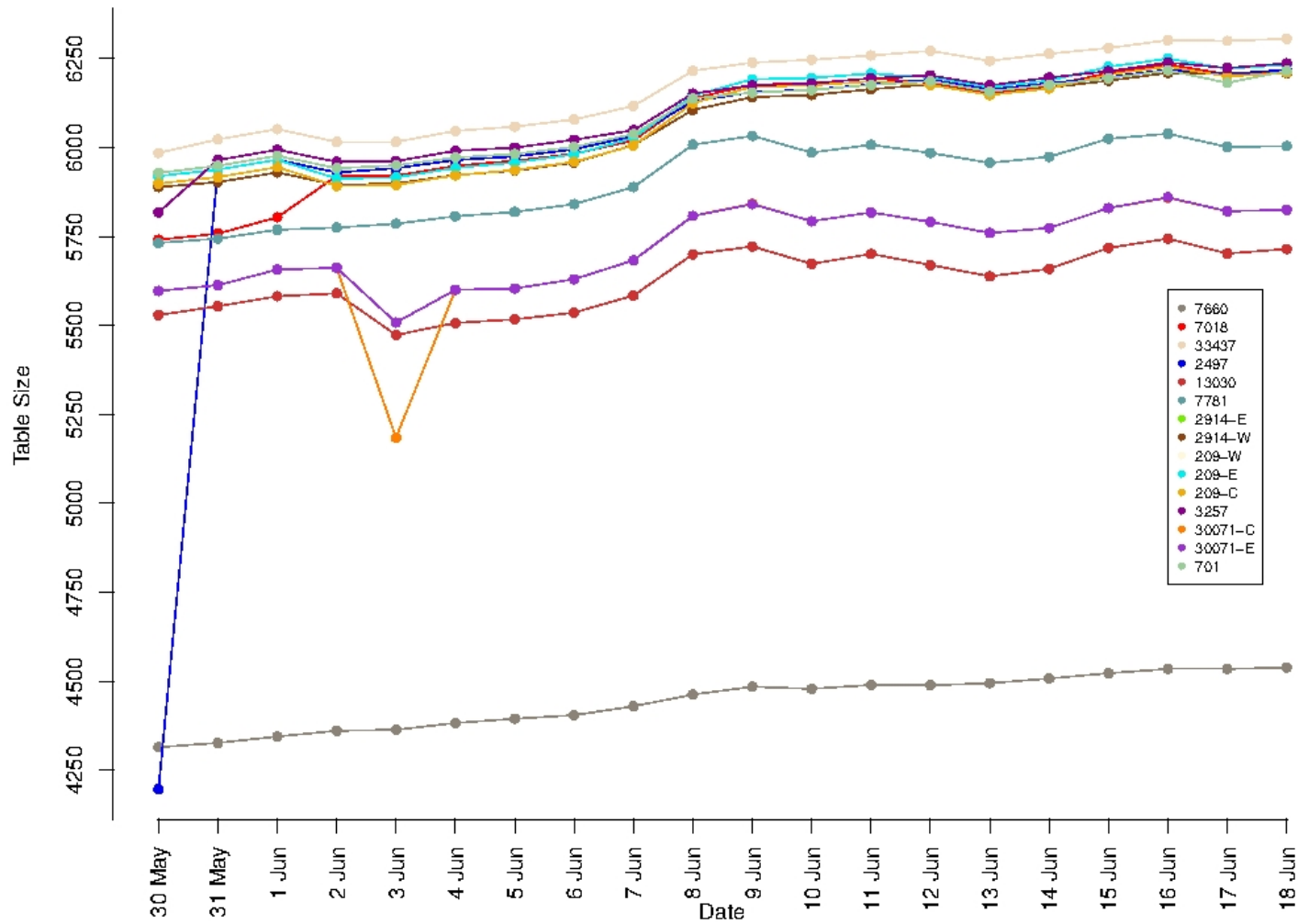
# Growth in IPv6 ASNs



# Growth in IPv6 Prefixes



# BGP Table & World v6 Day

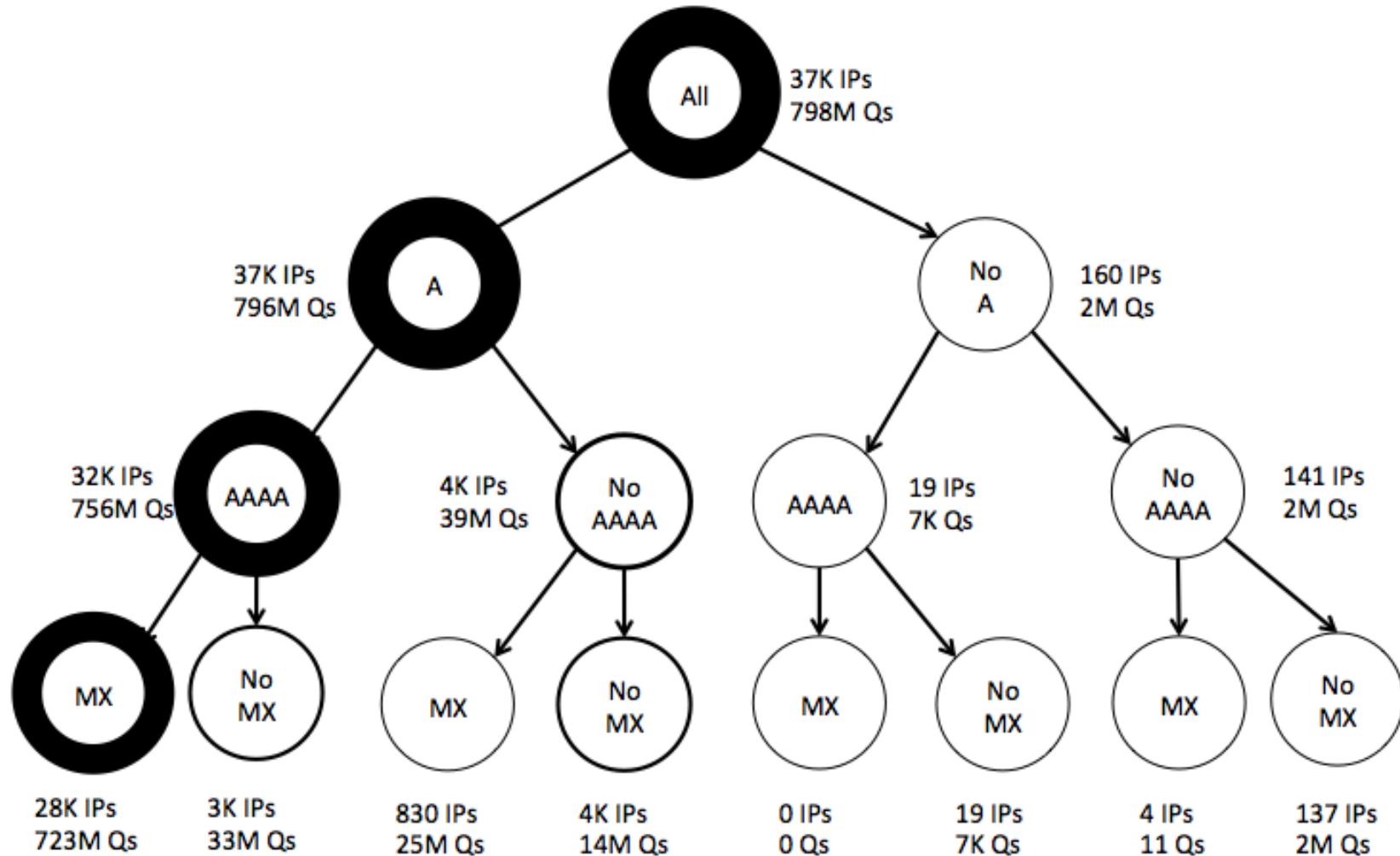


# But BGP Is Not Sufficient...

- BGP Data Only Shows Control Plane
  - Do all announced routes work?
  - Can they be reached from v4 and/or reach v4?
- 6Views Enhances BGP with Data Plane
  - But how to test? Ping? Look for websites?
  - Our solution: DNS!

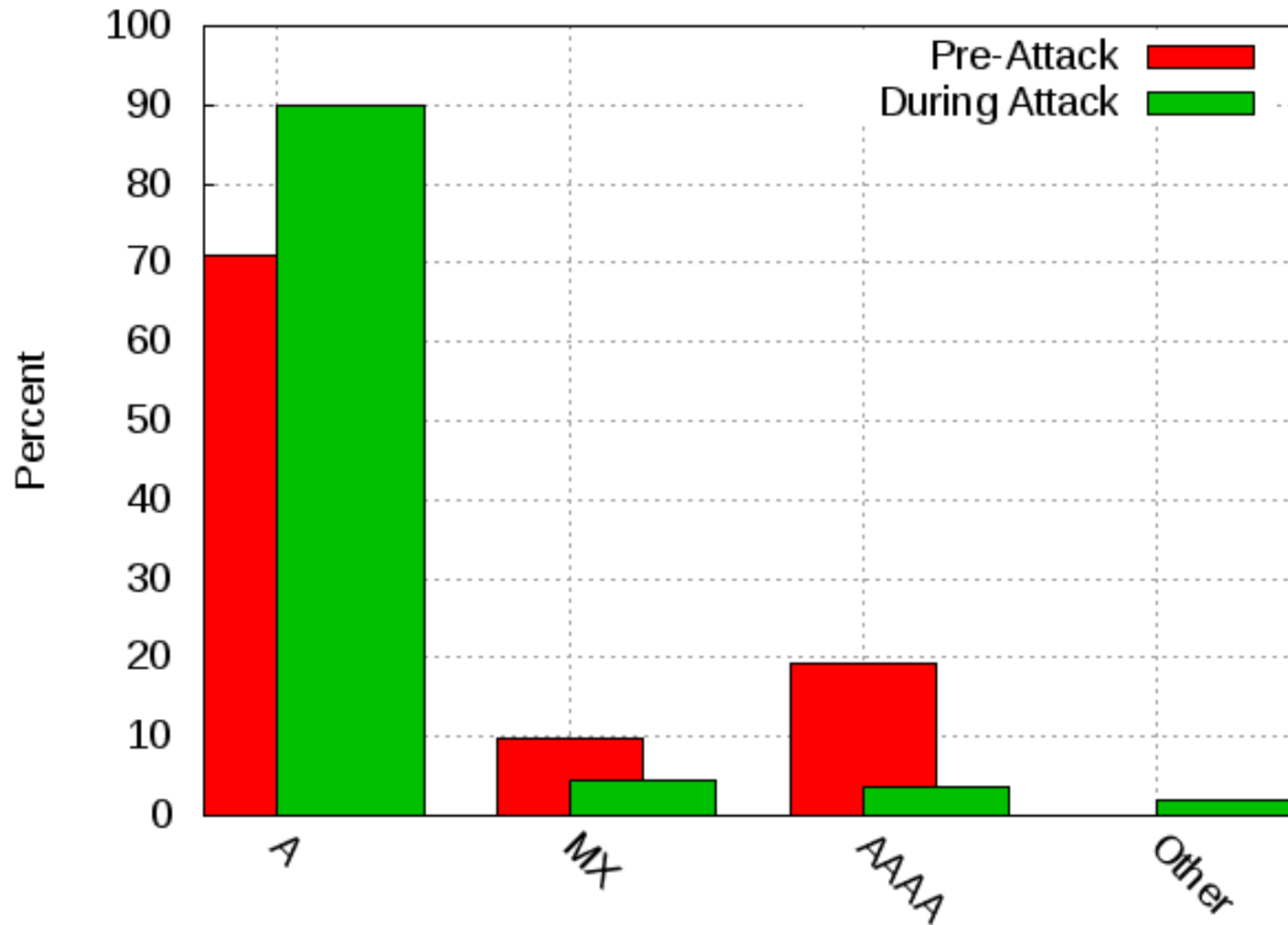


# DNS Queries to a gTLD



# Bad Guys Also Lagging on IPv6

Histogram of Qtype Distribution



# Why Might All This Matter to You?

- IPv6 Data Already Widely Used in Many Numbers You See Now
  - New IPv6 RouteViews specific data archives makes analyzing IPv6 data easier
    - (don't have to sift out lots of IPv4 cruft)
  - DNS Data will add data plane results
  - CAIDA ARK ties together data and control
- Essential for IPv6 troubleshooting
  - Note subtle differences in numbers today

# A Request For Your Help

- Help Finding Your **IPv6** DNS Servers
  - 6Spider Pollers Query IPv6 DNS Servers
  - Standard DNS query, requires nothing at the server...
- Additional Peering For IPv6 Data Collection
  - If you are already peering with RouteViews, Thank You!
  - If not, could you consider peering with RV/BGPmon?
- Couple the above with an CAIDA ARK Monitor
  - Match control plane data with data plane

# More Generous Help

- Help decide what needs to be measured
  - What metrics do want to capture for trouble shooting?
  - What metrics do want to see after the next World IPv6 Day?
  - What metrics should we recommend governments use in assessing IPv6?
- **Combination of China and America can be powerful team for advancing IPv6**
  - **Hope this is the start of more collaborative work**

# Questions?

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