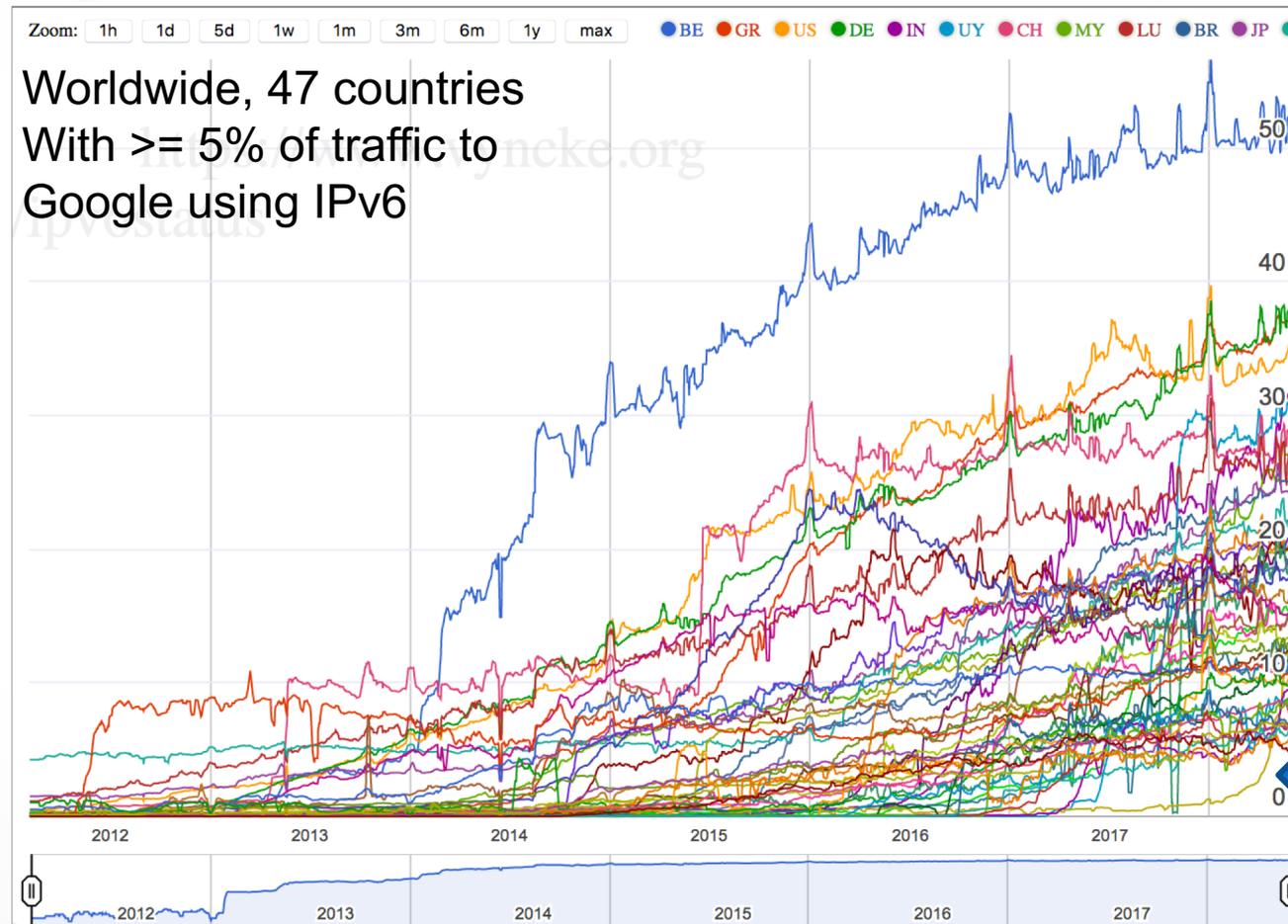


Next steps - IPv6 deployment and growth

Fred Baker

Co-chair, IPv6 Operations Working Group

Global growth in IPv6 deployment

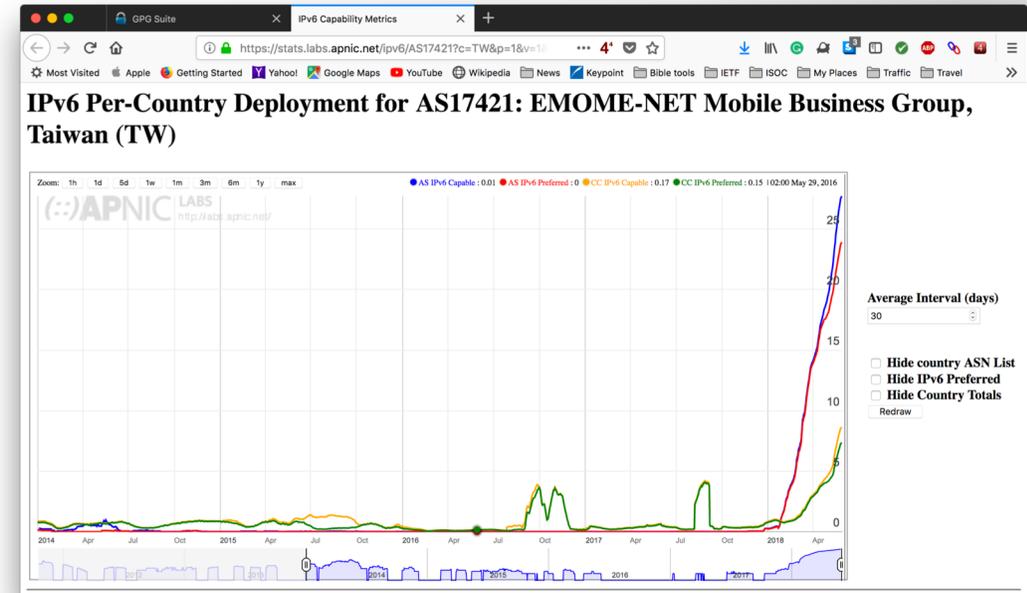


Taiwan a recent start

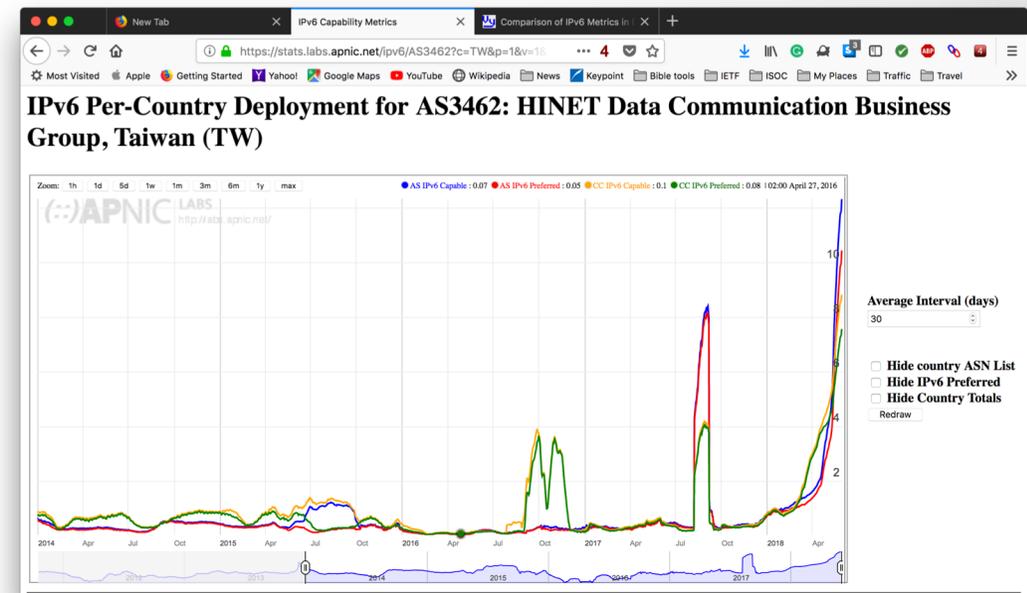
<https://www.vyncke.org/ipv6status/compare.php?metric=p&countries=be,gr,us,de,in,uy,ch,my,lu,br,jp,fr,fi,ee,gb,ec,tt,ax,ca,pt,ie,th,pe,nz,no,au,pr,nl,tw,vn,hu,cz,ro,sa,si,mx,lk,pl,gt,mo,zw,at,ar,se,fo,bo,kr>

Taiwan

- As of 2018, Chunghwa Telecom (Taiwan's former national carrier) has two dual stack services:
 - HiNet, wireline carrier
 - Emome, a wireless carrier
- There are also several city and academic networks deploying, notably TANET

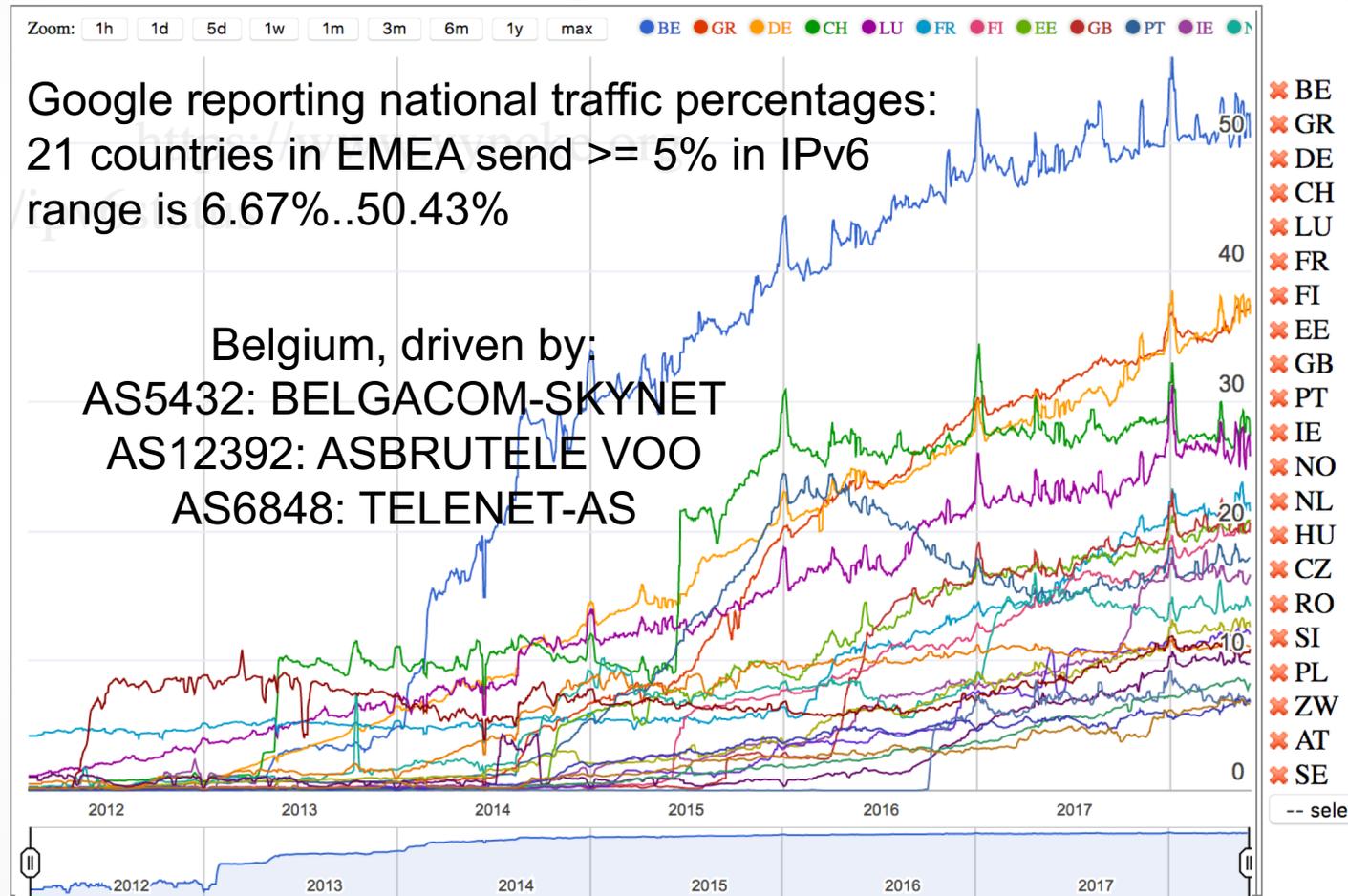


<https://stats.labs.apnic.net/ipv6/AS17421?c=TW&p=1&v=1&w=30&x=1>



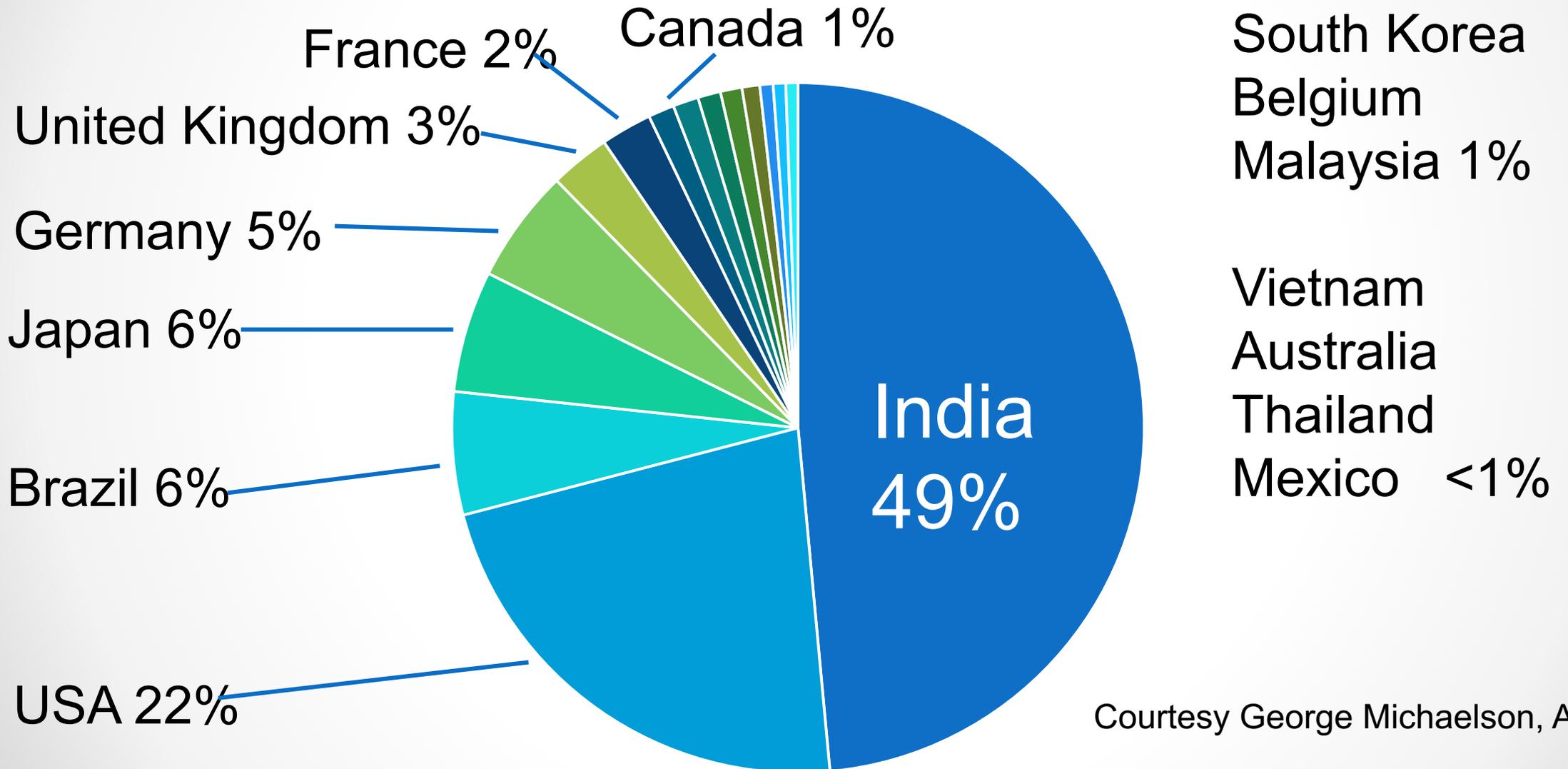
<https://stats.labs.apnic.net/ipv6/AS3462?c=TW&p=1&v=1&w=30&x=1>

Recent history in RIPE Region



<https://www.vyncke.org/ipv6status/compare.php?metric=p&countries=be,gr,de,ch,lu,fr,fi,ee,gb,pt,ie,no,nl,hu,cz,ro,si,pl,zw,at,se>

Top 15 economies in IPv6 Traffic



Courtesy George Michaelson, APNIC

Observations: what's doing well

- A number of networks are reporting high IPv6 use, notably mobile networks
 - Reliance JIO and Verizon Wireless similarly report that about 90% of its traffic uses **IPv6**. **T-Mobile** is among the providers in the process of turning IPv4 off. Other major **cellular IPv6** providers include AT&T **Wireless**, Sprint, Telus, Tele2, EE, KDDI, Softbank, OTE, Rogers and many others.
 - *That was a year ago* – ISOC's 2017 IPv6 report
- Residential Broadband, especially with managed routers
 - My kids tease me about IPv6. But each one uses it more than they know...
- Data Centers and Content
 - Some data center and content operations report high IPv6 availability/use
 - Cloudflare, Mythic Beasts
 - Google, Facebook, etc

The elephant in the room: Enterprise

- When a dual stack device tries to access an IPv6-capable device, it may use IPv6
 - Visible in Google/APNIC/Akamai statistics: turn on IPv6, and suddenly see traffic
- *When a dual stack device tries to access an IPv4-only device, it uses IPv4*
 - Very common with enterprise web presence, email, etc
 - *Enterprise in general hides behind IPv4/NAPT*
- Some companies moving toward IPv6-only to have one network to manage
 - Microsoft and Facebook being reasonably public about it
 - IPv6/IPv4 translation at the edge in some form
- IPv6 Operations (v6ops) investigating this by charter and in invited talks at IETF meetings
 - Also EDCO

Question for the house

- **How do we encourage Enterprise deployment?**
- I like Mythic Beasts' approach to web application hosting
 - IPv4 addresses cost actual money; pass cost along to customer
 - IPv6 addresses don't cost much, and from them are free
- **Fair to expect IPv6 traffic levels to rise as a result, as seen by Google/APNIC/Akamai statistics**