IPv6 Statistics on Vyncke.org

An overview

Eric Vyncke

evyncke@cisco.com

eric@vyncke.org eric.vyncke@ipv6council.be @evyncke
“It is a capital mistake to theorize before one has data.”

Sherlock Holmes, “A Study in Scarlett” (Arthur Conan Doyle)
What to Measure?
Which data sources?
Type of Data

• How many IPv6 Internet users?
  • In app measurement => requires a specific app, app bias
  • Browser measurement => no specific requirements

• How many IPv6 ISP worldwide?
  • How many prefix allocated by Regional Internet Registries
  • How many IPv6 routes in global routing table?
  • How important are those ISP? Tier one, tier two...

• How much IPv6 contents?
  • How many web servers can be reached over IPv6 access?

• How much IPv6 traffic over the Internet?
  • Internet Exchange Points?
Data Sources

- Browser data => need to have big site and make data public
  - Thank you Google, APNIC
- Allocated IPv6 prefix => easy thank you RIPE, ARIN, ...
- Global Routing Table => easy thank you routeview.org
- Content, get the list from Alexa, then query DNS and issue real HTTP requests
- Traffic: AMS-IX does not see Google, Facebook, Netflix traffic ...
  - Little information from ISP
Even for Content, not so easy

- Free Alexa top 1-million global view not per country
  - Manual process to assign the .com, .net, .org to countries
  - With too many false positives for .cd, .to, .io, ... Or even youtu.be!
  - Attempt to measure the content **SERVED** by the country

- Pay Alexa a fee to get the top-500 per country
  - Nearly no false information
  - Measuring the content **SEEN** by the country

- Possible bias because Alexa is a voluntary plugin mainly on desktop
Difference for the Netherlands
Content in country <-> Content seen

- Booking.com
- Wetransfer.com
- Usenet.nl
- Ero-advertising.com
- Dumpert.nl
- Markplaats.nl
- Tweakers.net
- Ing.nl
- Google.nl
- Youtube.com
- Google.com
- Vk.com
- Facebook.com
- Wikipedia.org
- Reddit.com
- Ok.ru
Let’s Start Showing Data
One Country Users by Google: Netherlands

https://www.vyncke.org/ipv6status
Multiple Countries Users by Google

https://www.vyncke.org/ipv6status/compare.php?metric=p&countries=nl,be,ch,us,au,de,gb,it,in
IPv6 Content Served by Netherlands (top-50)

https://www.vyncke.org/ipv6status/compare.php?metric=w&countries=nl
IPv6 Content Seen by Netherlands (top-100)

http://6lab.cisco.com/stats/cible.php?country=NL&option=content
Too Many Metrics?

- Let’s blend them!

\[
\text{Relative Mean} = \frac{1}{4 \max_{\text{world}} (\%\text{Transit AS})} + \frac{3}{4 \max_{\text{world}} \left( \sqrt{\%\text{content} \times \%\text{user}} \right)}
\]
What about tomorrow?
Can past predict the future?

https://www.vyncke.org/ipv6status/project.php?metric=p
Using Google Users Data: linear regression

https://www.vyncke.org/ipv6status
Using Google Users Data: quadratic

https://www.vyncke.org/ipv6status
3rd Order Regression is strange...
Logistic Curve ‘S-curve’ is probably the most sensible

https://www.vyncke.org/ipv6status
“Do not forget that data can be biased, manipulated, shown on a specific light, ...”