The Internet – Evolution and Opportunity

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W3C Technical Plenary week, Developers Meeting
November 5, 2009.

Internet Society
InternetSociety.org

The Internet Society

- Founded in 1992
- A global community with
  - 100 organization members
  - over 90 chapters around the world
  - tens of thousands individual members
- Focused on promoting and sustaining the Internet as a platform for innovation and economic development
- One area of focus is promoting the continued health of the Internet's technical architecture
- The Internet Society is part of the overall “Internet Ecosystem” of organizations building standards, managing resources, collaborating.

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Internet Evolution

- Incremental changes in the face of external pressures
  - solve the problems you have
- Responsive
  - no master plan
- Layered architecture
  - Independent building blocks that can be assembled to produce the desired effect
- As a result –
  - Flexible and responsive
  - Impossible to nail up a global deployment plan for massive change

An external pressure… IP Addresses

- Running out of IPv4 addresses
  - last allocation from Internet Assigned Number Authority (IANA) – predicted for October 2011
  - last allocation to ISP (anywhere in the world) predicted for February 2013
- Lots of IPv6 addresses
  - It's not going to be an IPv6 Internet before the last IPv4 address is handed out
- Making do with the IPv4 addresses we have
  - More Network Address Translators (NATs)
  - NATs in the network (not at the edges)

Implications above the IP Addressing Layer

- IPAffinity breaks!
  - A recent roundtable of industry leaders we held included representatives from Google, Yahoo, Akamai, Netflix, and Comcast
  - Discussed impending impact on
    - geolocation, geoproximity
    - management of distribution of copyrighted materials
  - See: http://www.isoc.org/educpillar/resources/docs/ipv6_200905.pdf
- Multiple open streams breaks!
  - Sharing addresses => fewer ports => AJAX apps have troubles
  - Poor performance of web pages, eg Google maps

Responses to the IP Addressing situation

- Major ISPs and content providers are including IPv6 in their current deployment plans
- Wireless broadband (LTE) has IPv6 “baked in”
- Large countries, new economies are embracing IPv6 (India, China)
- IPv6 is the way forward, but we’re in for a bumpy transition

- http://isoc.org/ipv6

Opportunities in the IP Addressing Situation

- Be Prepared
  - Make sure your web servers are IPv6 capable and connected
- Don't write IP version-specific apps
  - Which is obvious, except… it happens!
- With IPv6, you can imagine a world where everything is uniquely addressable
  - What do you want to do with that?

Another external pressure – Unwanted Traffic

- A plague on the Internet!
  - Spam
  - Malware
  - BotNets (driving the above)
  - Phishing

Responses to Unwanted Traffic

- In 2006, the Internet Architecture Board (IAB) held a workshop, with operators, to explore the issues in "Unwanted Traffic"
  - http://www.ietf.org/rfc/rfc4948.txt
- Many of the conclusions described mitigating activities
  - best practices for network operations
  - best practices for infrastructure server operations

Alternatives?

- Top-down imposition of a single definition of "security" doesn't fit the Internet
  - the Internet is a "network of networks" – its heterogeneity is its strength

- Some illustrations…

Security Tools Must Address Total Threat Model

http://crankandpedal.files.wordpress.com/2007/09/buenos-candados.jpg

Different Security Mechanisms Are Needed for Different Threats

http://incredimazing.com/static/media/2008/06/21/1557e0037819d17/501791705db4c19d58db.jpg

Too Much Security Technology Impedes Usage, without Reducing Bad Behaviour

http://www.joe-ks.com/archives_may2004/NewfieLock.jpg

One building block: DNSSEC

- DNS Security – DNSSEC
- Cryptographic signing of DNS responses (resource records)
  - You can verify whether the data you get is the data the sender intended, e.g., for hostname to IP address mapping
- What this is
  - Tamper-proof packaging of DNS responses
- What this does not do
  - Prevent phishing, confusability
  - Encrypt the data in the response

DNSSEC opportunities

- The plan is that, with DNSSEC in place, you have a better platform for confidence in the responses you get from this global infrastructure
  - what would you like to do with that?

Opportunities, summary for discussion

- With IPv6, you can imagine a world where everything is uniquely addressable
  - What do you want to do with that?
- The plan is that, with DNSSEC in place, you have a better platform for confidence in the responses you get from this global infrastructure
  - What would you like to do with that?