

AfriNIC-13 Johannesburg

The road to IPv6 only networks

Graham Beneke

Nov 2010

Agenda

- IPv6 and Tunnels
- IPv6 deployments
- NAT64 & DNS64
- The IPv6 only network

IPv6 & tunnels

IPv4

- GRE
- L2TP
- PPTP
- PPPoE
- PPP

IPv6

- 6to4
- 6in4
- Teredo
- L2TP

IPv6 & Tunnels that break

Link State

- BGP
- OSPF
- Short tunnels

MTU

- Calculate optimal
- Test

Tunnels are important for IPv6 deployment. Don't ignore them.

IPv6 roll-out

- Apply for IPv6 addresses from AfriNIC
 - Add IPv6 addresses to routers
 - Get IPv6 transit
 - ping `ipv6.google.com`
-
- **Now what...????**

IPv6 Access

- Lab
- NOC
- Technical Staff Homes
- Office LAN
- Corporate Customers
- Home Users

IPv6 Services

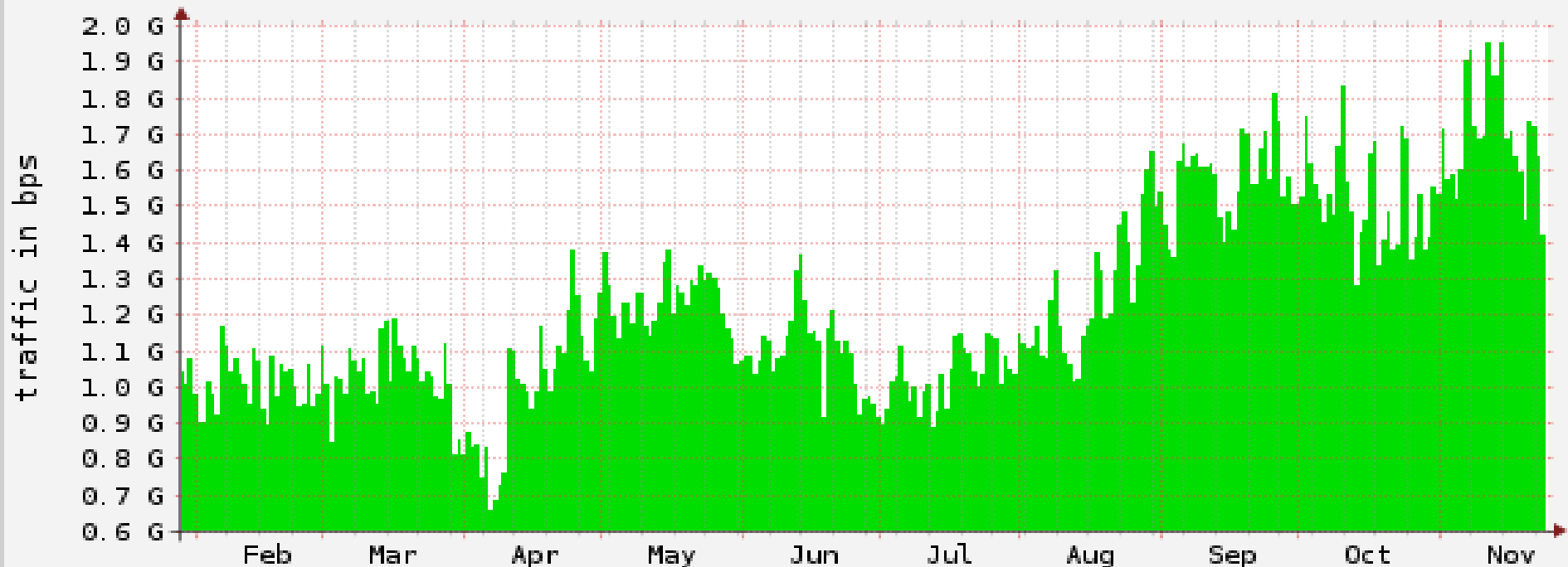
- Authoritative DNS
- MX's
- Web Sites
 - Joomla, Wordpress, etc
- Web Services
 - CRM, ERP, webmail, issue tracking, etc
- Mail Services

recap

~99 days

Some Stats

Total IPv6 Traffic - yearly



■ in

Cur = 1.4 Gbps
Avg = 1.2 Gbps
Max = 2.0 Gbps
Min = 656.5 Mbps

Copyright (c) 2010 AMS-IX B.V.

Updated: Wed Nov 24 08:50:01 2010 CET

Alexa.com Top 5

Google

2a00:1450:8007::67

facebook

2620:0:1cfe:face:b00c::3

You Tube

2a00:1450:8007::be

YAHOO!

67.195.160.76


Windows Live™

65.54.165.169

DNS64 & NAT64

- Simulate AAAA for non-IPv6 websites
- Client open connection to IPv6 endpoint
- NAT64 prefix is routed to NAT box
- Outbound IPv4 connection to destination

Alexa.com Top 5 - revisited

Google

2a00:1450:8007::67

facebook

2620:0:1cfe:face:b00c::3

You Tube

2a00:1450:8007::be

YAHOO!

64:ff9b::6289:9538


Windows Live™

64:ff9b::4137:ce9a

NAT64 works with:

- HTTP, HTTPS
- SMTP, POP3, IMAP
- Jabber (gTalk), IRC
- FTP
- SSH, Telnet
- Almost anything that works on NAT44

NAT64 doesn't work with:

- Skype
- IPv4 literals

Dual-Stack

- Core Data Network
- Public Facing Systems
- Hosting Environment
- Corporate Customers
- Devices accepting inbound connections

Dual-stack access network

- May require two connections per user:
 - PDP Context (3G)
 - PPP / PPPoE
- 2 x BRAS or NAS or GGSN/SGSN
- 2 x simultaneous user sessions
- 2 x session licenses

- Lots of additional complexity

NAT is inevitable

- Access networks become RFC1918
 - Routable IPs withdrawn into core
- Reachability to IPv4 is not going away

NAT64 Provides

- Public IPs to all users
- Access to legacy IPv4 networks

Turn it on its head

- IPv4 only network
 - Tunnel IPv6 traffic

- IPv6 only network
 - Tunnel IPv4 traffic

The Future

- IPv4 is going to be around for a long time
 - Treat it as legacy
- IPv6 is the future
 - Focus on making good IPv6 networks

Questions ??

Graham Beneke

<http://blog.ping6.co.za/>

graham@neology.co.za