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AfriNIC-11 Meeting

IPv6 Deployment on AfriNIC Infrastructure

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(remote presentation)

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Overview

Objective

Readiness Assessment

Addressing Plan

IPv6 Transit

Test bed

Security, Monitoring

Deploying on production systems

Issues

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Objective

To have AfriNIC public services available on IPv6, viz:

www, whois, mail, ftp, dns

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Readiness Assessment

An inventory of all affected hardware and application software was taken

Based on this, an IPv6 readiness matrix was drawn up

Upgrades were performed where deficiencies existed

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Addressing

2001:42d0::/32 was obtained from AfriNIC RS

/48s for each existing IPv4 subnet

/64s to hosts (servers and routers)

A separate /64 for loopback interfaces

/126 for point-to-point links

With the help of sipcalc, break out two /44 blocks and from each /44, break out four /46 blocks

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Addressing (cont'd)

sipcalc 2001:42d0::/44 --v6split=46
2001:42d0::/46 Network at colo in Johannesburg
2001:42d0:4/46 Pretoria Network
2001:42d0:8/46 Cairo Network
2001:42d0:c/46 (reserved)

Assigning from 2001:42d0::/48 (and chosing 200 as the interface ID) on the Johannesburg network:-
For every A record, setup corresponding AAAA rec. e.g.
mail.afrinic.net
196.216.2.2 ←----→ 2001:42d0::200:2:2/64
www.afrinic.net
196.216.2.1 ←----→ 2001:42d0::200:2:1/64

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IPv6 Transit

Upstream provider (AS2905) could only provide transit from the core of their network to the public net. Customers at the edge (like us) need to build a tunnel to their core.

A second tunnel via ISC (AS1280) helped us to multi-home using our AS – AS33764

in the routing registry

aut-num: AS33764

as-name: AFRINIC-ZA

descr: IPv6 Traffic to AfriNIC-ZA

mp-import: afi ipv6 from AS2905 action pref=100; accept ANY

mp-import: afi ipv6 from AS1280 action pref=120; accept ANY

mp-export: afi ipv6 to AS2905 announce AS33764

mp-export: afi ipv6 to AS1280 announce AS33764

mp-default: to AS2905 action pref=100;

mp-default: to AS1280 action pref=120;

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The test bed

A dual stack test bed network was setup consisting:-

A software based router (FreeBSD 7.0) running ipfw and quagga

A linux server

Layer 2 switch

Created a route6 object in RIPE DB

Setup and tested all services running dual stack

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Security & Monitoring

Was important to setup IPv6 ACLs together with IPv4 ACLs, as well as bogon filters for v6

As usual, service and statistics monitoring with nagios, ntop, webalizer and munin.

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Turning on IPv6 for live services

Network configuration

- Firewall and router configuration
- Interface configuration
- Test connectivity: Local & Remote

DNS:

- Configure BIND to listen on IPv6
- Setup reverse zones for 0.D.2.4.1.0.0.2.ip6.arpa
- Test local and remote connectivity
- Use sipcalc –r to setup reverse dns for IPv6 in “nibble format” e.g. for 2001:42d0::200:2:1

1.0.0.0.2.0.0.0.0.0.0.2.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.d.2.4.1.0.0.2.ip6.arpa. IN PTR

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Turning on IPv6 for live services

www: Re-configure apache to support v6 virtual hosts

Create AAAA record for www.afrinic.net with 10 minute TTL initially

Run local and remote tests

Mail:

Configure MTA to listen on IPv6

Create necessary AAAA record in the dns zone for mail.afrinic.net

Test all ancillary systems such as greylisting, spamassassin, message submission and POP/IMAP on IPv6.

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Turning on IPv6 for live services

ftp:

Run another instance of vsftpd

create AAAA record in the dns for ftp.afrinic.net

run local and remote tests

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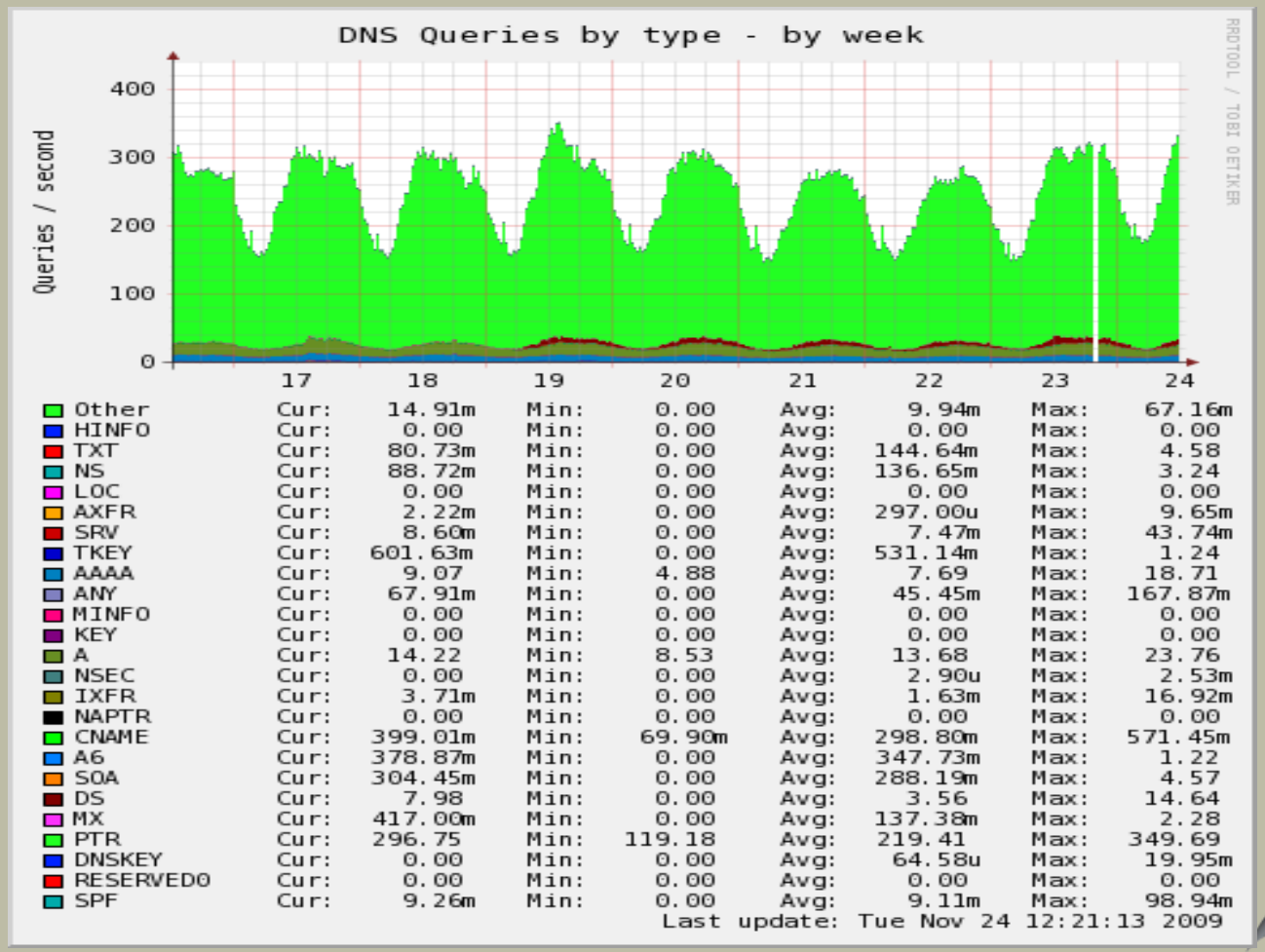
DNS stats



Other	Cur:	14.91m	Min:	0.00	Avg:	9.94m	Max:	67.16m
HINFO	Cur:	0.00	Min:	0.00	Avg:	0.00	Max:	0.00
TXT	Cur:	80.73m	Min:	0.00	Avg:	144.64m	Max:	4.58
NS	Cur:	88.72m	Min:	0.00	Avg:	136.65m	Max:	3.24
LOC	Cur:	0.00	Min:	0.00	Avg:	0.00	Max:	0.00
AXFR	Cur:	2.22m	Min:	0.00	Avg:	297.00u	Max:	9.65m
SRV	Cur:	8.60m	Min:	0.00	Avg:	7.47m	Max:	43.74m
TKEY	Cur:	601.63m	Min:	0.00	Avg:	531.14m	Max:	1.24
AAAA	Cur:	9.07	Min:	4.88	Avg:	7.69	Max:	18.71
ANY	Cur:	67.91m	Min:	0.00	Avg:	45.45m	Max:	167.87m
MINFO	Cur:	0.00	Min:	0.00	Avg:	0.00	Max:	0.00
KEY	Cur:	0.00	Min:	0.00	Avg:	0.00	Max:	0.00
A	Cur:	14.22	Min:	8.53	Avg:	13.68	Max:	23.76
NSEC	Cur:	0.00	Min:	0.00	Avg:	2.90u	Max:	2.53m
IXFR	Cur:	3.71m	Min:	0.00	Avg:	1.63m	Max:	16.92m
NAPTR	Cur:	0.00	Min:	0.00	Avg:	0.00	Max:	0.00
CNAME	Cur:	399.01m	Min:	69.90m	Avg:	298.80m	Max:	571.45m
A6	Cur:	378.87m	Min:	0.00	Avg:	347.73m	Max:	1.22
SOA	Cur:	304.45m	Min:	0.00	Avg:	288.19m	Max:	4.57
DS	Cur:	7.98	Min:	0.00	Avg:	3.56	Max:	14.64
MX	Cur:	417.00m	Min:	0.00	Avg:	137.38m	Max:	2.28
PTR	Cur:	296.75	Min:	119.18	Avg:	219.41	Max:	349.69
DNSKEY	Cur:	0.00	Min:	0.00	Avg:	64.58u	Max:	19.95m
RESERVED0	Cur:	0.00	Min:	0.00	Avg:	0.00	Max:	0.00
SPF	Cur:	9.26m	Min:	0.00	Avg:	9.11m	Max:	98.94m

Last update: Tue Nov 24 12:21:13 2009

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www stats

6% of the traffic to www.afrinic.net is IPv6 as of Nov 2009.

Issues

DNS glue: registrar for afrinic.net is yet to fully implement addition of IPv6 glue records.

The whois system cannot talk to v6-only clients; code Is being worked on.

No known IPv6 RBL for filtering spam on mail servers.

VPN cannot talk on v6 as IOS for Cisco's VPN 3000 concentrator doesn't support it.

Tunneling as opposed to having full native v6 does introduce a latency penalty compared with v4.

Upstream does not officially support IPv6 yet.

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Questions?

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