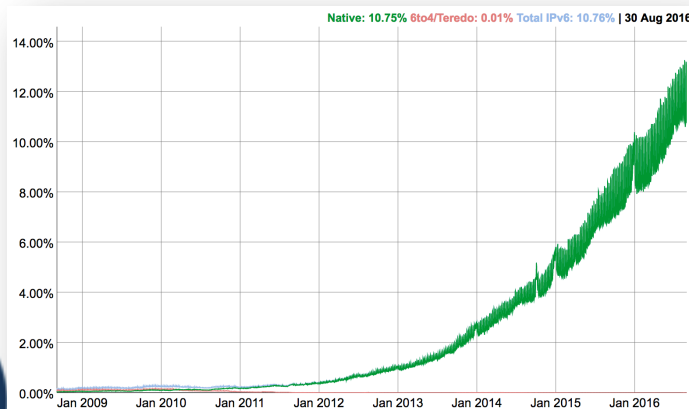# IPv6 only CPU Deployment Plan and Tier 1 update

Alastair Dewhurst

IPv6 status

> People have been claiming that IPv6 deployment is just around the corner for the years, why should we believe you this time?

- IPv6 now makes up a significant amount of global internet traffic.

- Some commercial hosting companies offer cheaper IPv6 only services[1].

- Apple now mandates that all Apps submitted to the App Store must support IPv6-only networking[2].

Native: 10.75% 6to4/Teredo: 0.01% Total IPv6: 10.76% | 30 Aug 2016

[1] https://www.mythic-beasts.com/servers/virtual
[2] https://developer.apple.com/news/?id=05042016a

**Alastair Dewhurst, 2nd September 2016**

IPv6 Goal

- The eventual goal is for IPv6 to completely replace IPv4.

- Running dual stack services is extra work over just one protocol.

  - Minimize the number of services that need to be run as dual stack

  - Provide a complete upgrade path so that sites can plan appropriately.

- Sites may use an IPv6 upgrade to re-architecture their entire network.

- CPU resources is the easiest thing to make IPv6 only

  - We will need dual stack storage and Central Services.

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Required upgrade path

We can't wait for everyone to upgrade to dual stack before allowing other to migrate to IPv6 only.

Some (smaller) sites can upgrade directly

IPv4

Dual Stack

IPv6

Tier 1s
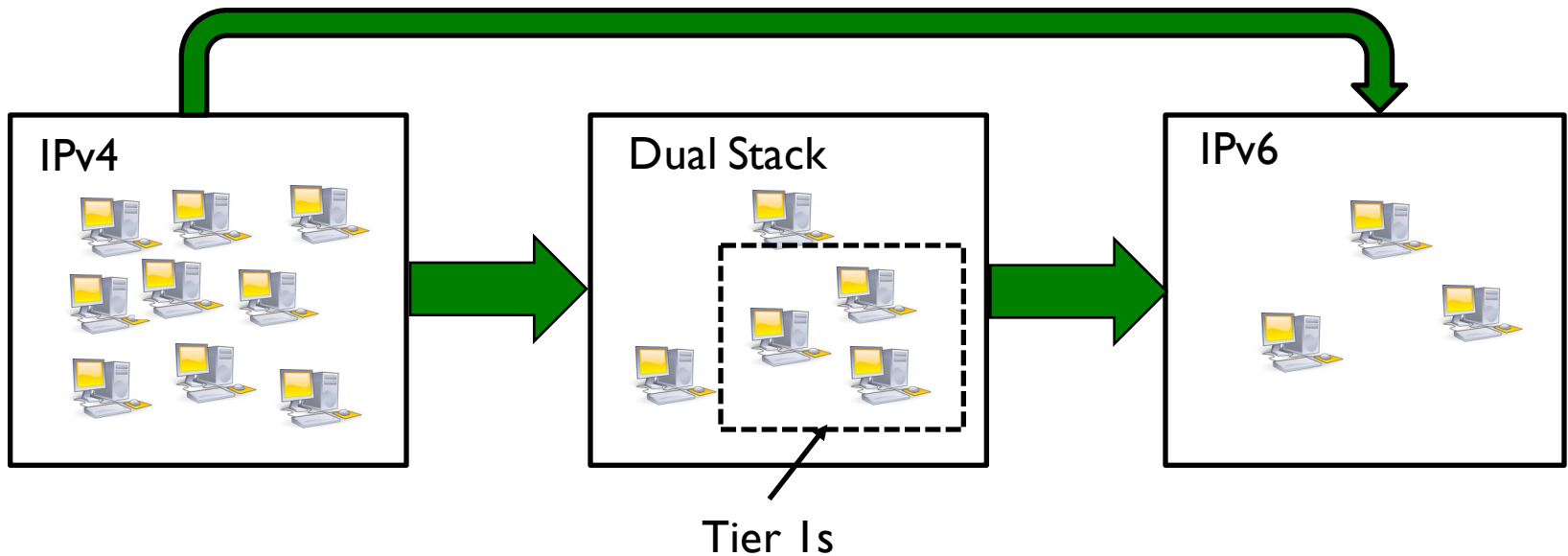
We will require leadership facilities to support dual stack services to allow other sites to upgrade.

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Software status

- The HEPiX IPv6 group has tested a large amount of software for IPv6 compliance.

- Key storage software and protocols work:

  - dCache, DPM, Lustre

  - XrootD 4, GridFTP, http

- Enough has been shown to work to allow most LHC VO workflows to run over IPv6.

- Software developers need to be making sure that their software is IPv6 ready.

  - If we haven't heard from developers by now, VO need to be dropping usage of it.

- We are not aware of any blocking issues with software.

Alastair Dewhurst, 2nd September 2016

IPv6 only CPU plan

> The HEPiX IPv6 group has been trying to come up with a formal plan to allow sites to migrate their CPU resources to IPv6 only by April 2017.

- Proposal is now being considered by WLCG MB.

- We have not managed to get full agreement on all issues from the VOs.

  - Primarily on how many sites need to be dual stack before the VO is comfortable in allowing IPv6 only.

- Many things we do agree on.

- While it is important to provide sites with the option to upgrade to IPv6, we do not expect a large initial take up.

  - If a site wished to upgrade CPU to IPv6 only by next year I believe we could come to an individual agreement.

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Agreements

- All VOs encourage sites to upgrade their storage to dual stack.

- All VOs are working towards making their central services required by Grid jobs dual stack by April 2017.

- Shared central services (e.g. CVMFS) should be accessible via IPv6 by April 2017.

- Tier 1s should provide functional dual stack access to storage (and other services they may run):

  - 1GB/s and 90% availability by April 2017.

  - 10Gb/s and 95% availability by April 2018.

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Tier 1 status

- Tier 1 has testbed comprising several old WN connected to single switch.

- Connected to CICT via 1 Gb/s link.

  - Set up by Year in Industry Student -No guarantee of availability.

- Currently setup and run by Tiju (who is leaving).

  - Handful of machines to play around with (e.g. UIs).

  - Test GOCDB instance.

  - Test Perfsonar instance.

Tier 1 network

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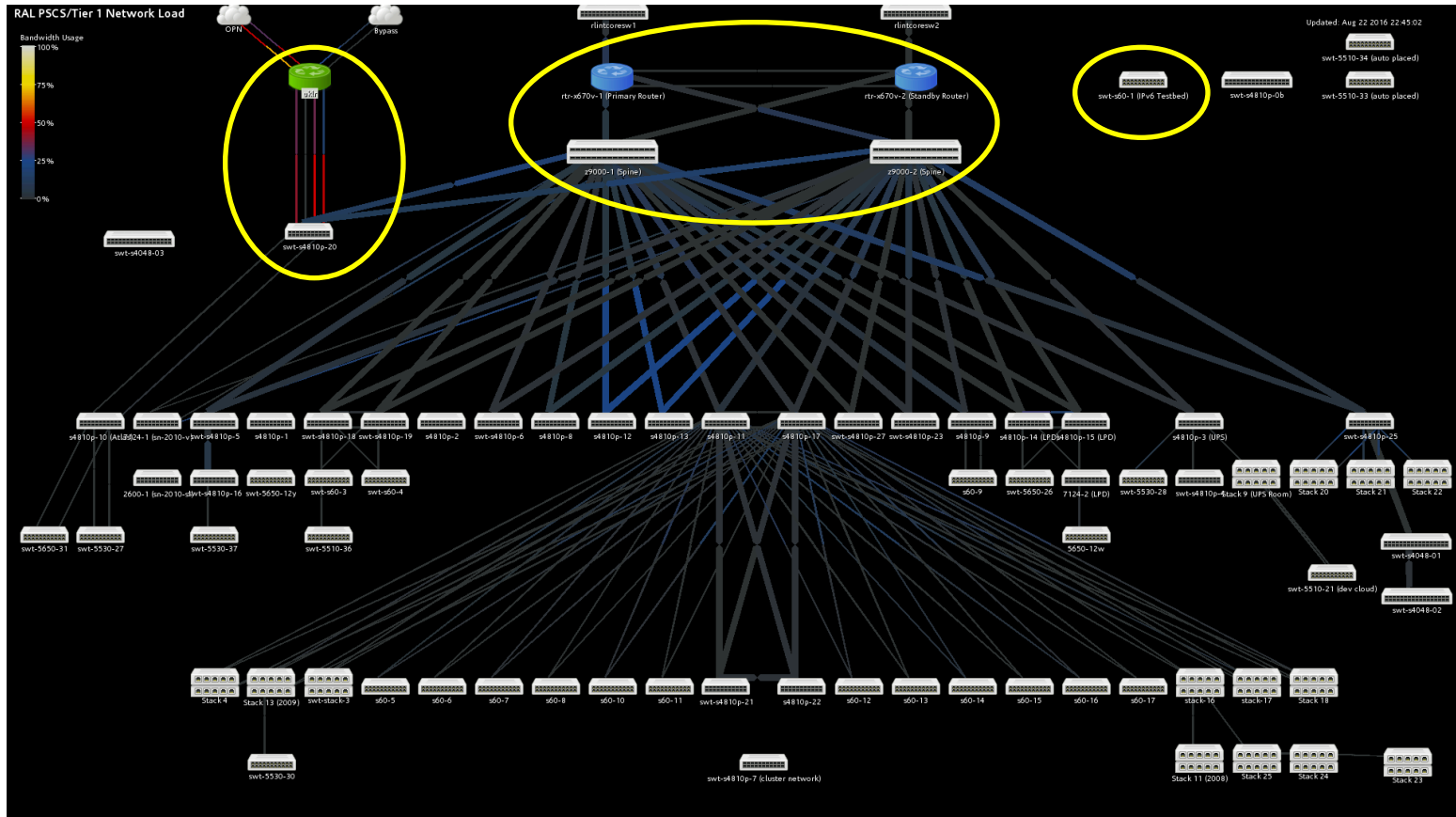
Tier 1 internet access

1. ## OPN via UKLR

   - Machines (mostly disk servers) in 'OPN subnet' to/from CERN + Tier 1s
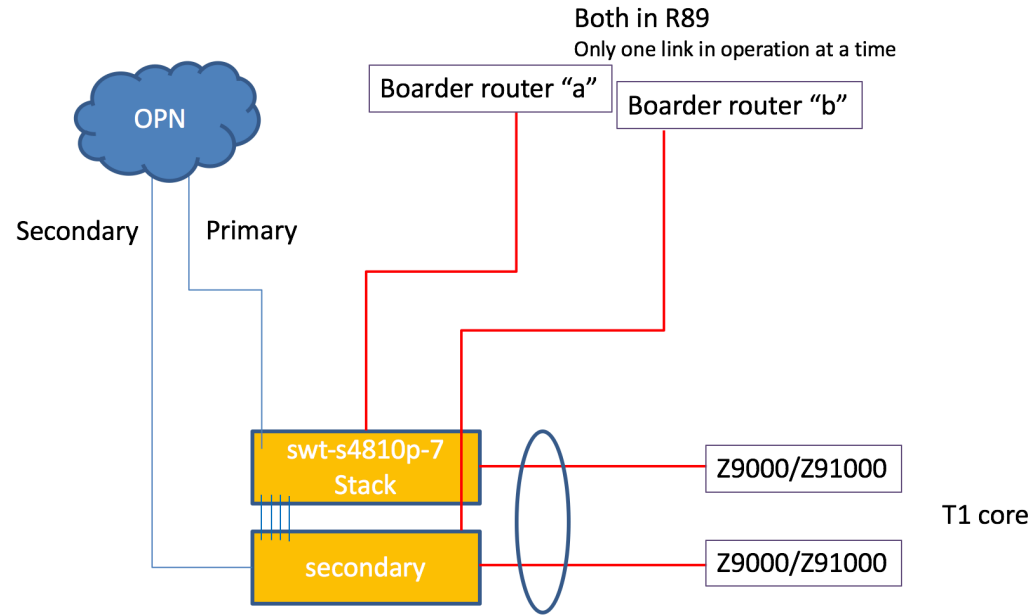
2. ## Firewall Bypass via UKLR

   - Machines in 'OPN subnet' to/from everyone else

3. ## Through firewall via Core

   - Everything else (e.g. Services)

   - Non Tier 1 services (e.g. GoCDB / APEL) are on a different network.

UKLR replacement

Both in R89
Only one link in operation at a time

OPN

Boarder router "a"

Boarder router "b"

Secondary   Primary

swt-s4810p-7
Stack

Z9000/Z91000

T1 core

secondary

Z9000/Z91000

Red lines: 40Gbit connections;   Blue lines: 10 Gbit connections.

- RFC 2460 stating basic IPv6 protocol was published in 1998. Unfortunately the UKLR is older than that!

- Once UKLR has been replaced, 4810s will need configuring to allow IPv6 traffic.

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Tier 1 to do

- Decide how we want to configure the IPv6 address space.

  - Martin Bly will be coming out to the IPv6 F2F next week.

- We need to 'IPv6 proof' the Tier 1.

  - The introduction of IPv6 networking on the Tier 1 should not affect existing services.

- The networking team need to understand what infrastructure (e.g. DNS) needs to be put in place.

- We are looking at employing consultants/contractors to help with IPv6 deployment.

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Conclusion

- IPv6 is finally becoming main stream.

- The IPv6 working group has a plan to allow IPv6 only CPU resources at sites.

  - LHC VOs have signed up.

- Dual stack storage is going to be expected by the end of Run 2.

- Tier 1 has a plan…