

News from the HEPiX IPv6 Working Group

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2015 Deployment plan - reminder

- As requested by the LHC experiments
- LHCOPN/LHCONE IPv6 routing (by August)
- perfSONAR dual-stack monitoring
 - ATLAS T1 and T2D by August
- CMS – significant production dual-stack data services
 - When LHCOPN/LHCONE peering ready
 - When testing proves functionality and performance
- Important central services to dual-stack
 - Including dual-stack SAM
- In the meantime – continue testbed with a range of storage technologies

IPv4 address exhaustion

<http://www.potaroo.net/tools/ipv4/>

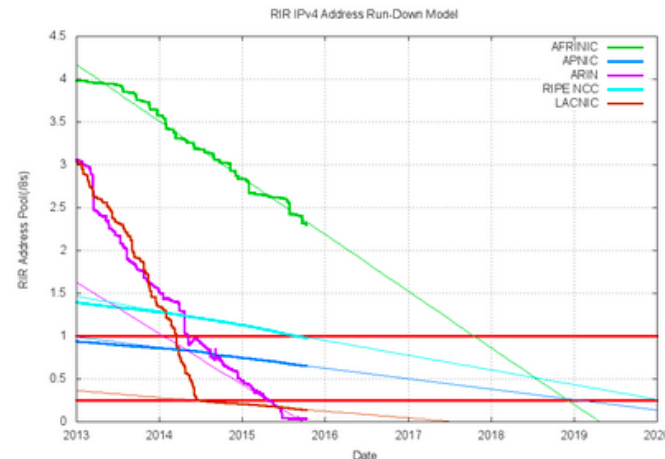
IPv4 Address Report

This report generated at 12-Oct-2015 08:24 UTC.

IANA Unallocated Address Pool Exhaustion:
03-Feb-2011

Projected RIR Address Pool Exhaustion Dates:

RIR	Projected Exhaustion Date	Remaining Addresses in RIR Pool (/8s)
APNIC:	19-Apr-2011 (actual)	0.6523
RIPE NCC:	14-Sep-2012 (actual)	0.9776
LACNIC:	10-Jun-2014 (actual)	0.1364
ARIN:	24 Sep-2015 (actual)	
AFRINIC:	21-Apr-2019	2.3033



Projection of consumption of Remaining RIR Address Pools

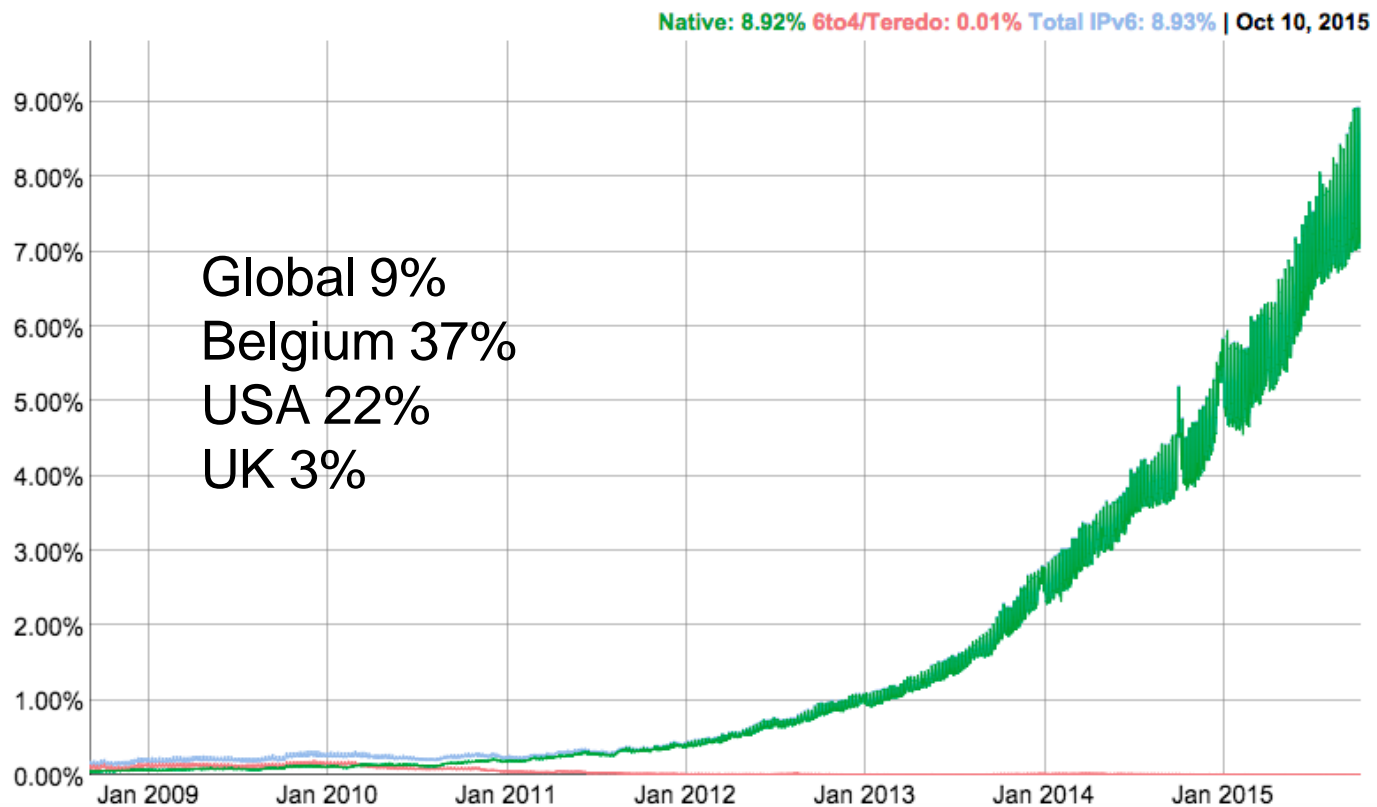
North America ran out on
24 Sep 2015

Google IPv6 stats

<https://www.google.com/intl/en/ipv6/statistics.html>

IPv6 Adoption

We are continuously measuring the availability of IPv6 connectivity among Google users. The graph shows the percentage of users that access Google over IPv6.



Testbed activities

- Still found to be useful
- dCache FTS3 testbed
 - FTS at KIT – gsiftp not working on IPv6
 - Could be related to recent update gfal2?
 - Updates were removed – still broken
 - Subsequently fixed – was a globus-ftp-client problem
- Starting on XRootD testing
- Tony Wildish leaving CMS
 - Ulf Tigerstedt will take over testbed

News from experiments

- IPv6 is not the highest priority since start of Run 2!
- LHCb IPv6 DIRAC problems (external library)
 - Was fixed
 - IPv6-capable DIRAC does not break IPv4
- ALICE updated to XRootD 4.1.x
 - Some problems with 3rd party IPv6 data transfers
- ATLAS
 - Debugging dual-stack CE problems at QMUL (see later)

Production Dual-Stack services

- As we heard in site reports
 - Several sites have (or are) deployed dual-stack
 - And peering on IPv6 via LHCOPN/LHCONE
 - And dual-stack perfSONAR
 - NDGF, PIC, others
- Very important that this does not break IPv4
- Often a dual-stack service seems to work fine
 - Until IPv6 clients come up and try to connect

Dual-stack service problems

- QMUL CREAM CE – IPv4-only
 - the CERN ATLAS pilot factories (IPv4 only) works
 - Successfully submits jobs to QMUL
- QMUL CE then moved to dual-stack
 - CERN pilot factories get a time out message – all transfers fail
 - No tcp traffic is observed from the CERN pilot factories at all
 - Seems to try IPv6 but does not fall-back to IPv4
 - Seems IPv6 stack was on but without a working DHCPv6 client
 - Had no global IPv6 address
- More recently a problem with the cvmfs stratum zero at CERN
 - DNS entry was dual-stack but no IPv6 configured
- Not good news
 - the introduction of dual-stack services should not break IPv4!

Dual-stack at CERN (2)

- Misunderstanding about the CERN network management flag “IPv6 ready”
 - IPv6 ready means – DNS AAAA record in name.cern.ch
 - Also opens firewall to allow inbound IPv6 connections
- “not ready” AAAA in name.ipv6.cern.ch
 - And outbound IPv6 connections still work
 - If the IPv6 stack is enabled
- If a system does not want to use IPv6 then turn off the IPv6 stack

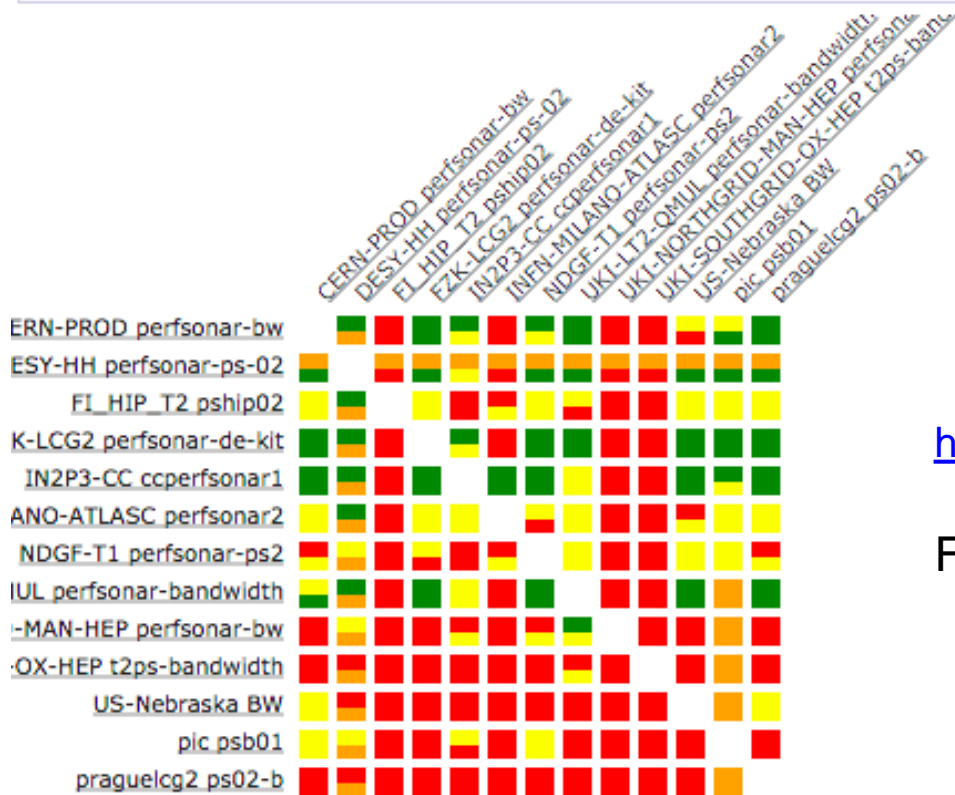
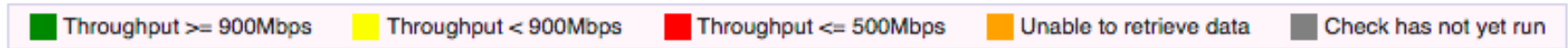
IPV6 Network Monitoring

perfSONAR monitoring

- As we turn on production dual-stack
 - We need to collect IPv6 monitoring data
- Since perfSONAR V3.4 Dual-stack is recommended
 - Add AAAA record to DNS
 - If both ends are dual-stack
 - IPv4 & IPv6 tests will both be run

perfSONAR dashboard

Dual-Stack Mesh Config - IPv6 Bandwidth Test



<http://maddash.aglt2.org/maddash-webui/>

Find Dual-Stack Mesh Dashboard

LHCOPN/LHCONE & IPv6

- To get same network performance
 - Need IPv6 data to take the same route as IPv4
- **LHCOPN** should already be peering with IPv6
- CERN and 5 Tier 1s completed
 - More to come
- **LHCONE**
 - IPv6 peering at a few places
 - Long way to go

IPv6 and Security

- 15-16 Sep 2015 F2F meeting (CERN) included
 - Work on IPv6 & operational security
 - IPv6 working group, EGI CSIRT, CERN security team
 - Aim is to provide guidance/best practice
 - To site security/networking teams
 - To sys admins
 - Important message
 - Even if you think your site is IPv4 only
 - You have many IPv6 capable systems
 - And IPv6 tunnels may be used (outside of your control)

Future plans

- Many Tier 1 sites are or will be IPv6 capable soon
- In 2016 – need to encourage more Tier 2s
 - Looking for a suitable time and place for another IPv6 workshop
 - To train, encourage/help Tier2 sites

More volunteers welcome

- Join the IPv6 working group!
- Would be very good to get wider coverage
 - Data transfer testbed
 - A good way of gaining experience
 - Testing dual-stack production services

Links

- HEPiX IPv6 web

<http://hepixonweb.cern.ch>

- HEPiX IPv6 wiki

<https://w3.hepixon.org/ipv6-bis/>

- Working group meetings

<http://indico.cern.ch/categoryDisplay.py?categId=3538>

- WLCG Operations IPv6 Task Force

<http://hepixonweb.cern.ch/content/wlcg-ipv6-task-force-0>

- Paper published in proceedings of CHEP2013
 - CHEP2015 coming soon

Questions?