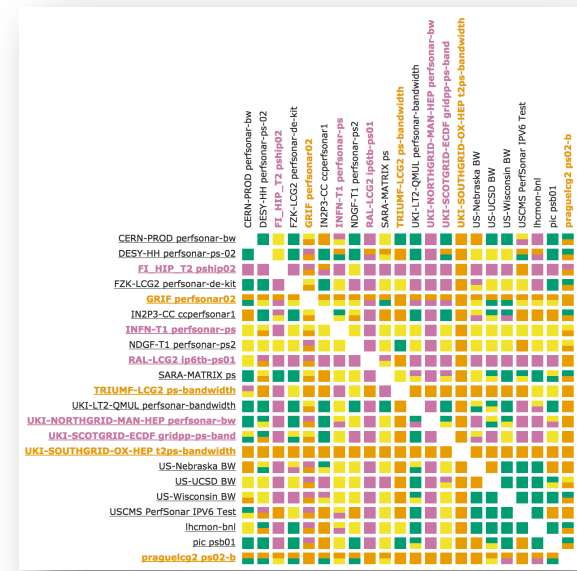
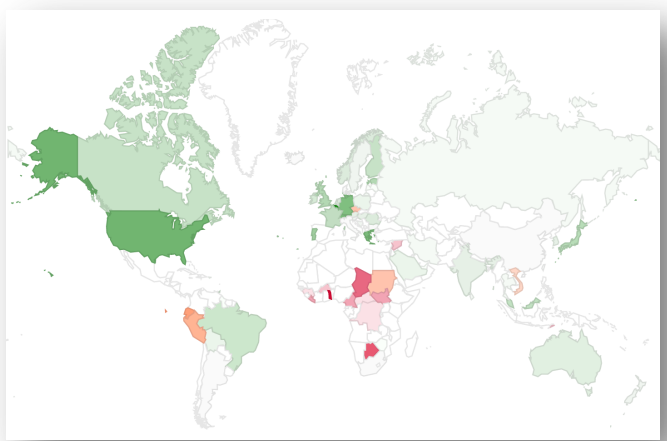


IPv6 in the WLCG

Alastair Dewhurst

IPv6 status Globally

- Over 12.5% of global internet traffic now goes via IPv6.
- 11 sites currently provide dual stack storage.
- 2 sites running IPv6 WN.
- Some commercial hosting companies offer cheaper IPv6 only services.
- Apple now mandates all Apps submitted to the App Store must support IPv6-only networking.
- Microsoft Azure is now dual stack.



IPv6 only CPU

The HEPiX IPv6 group made a proposal[1] to the WLCG Management Board which has now been accepted to allow sites to migrate their CPU resources to IPv6 only by April 2017.

- 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. FTS) 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.

[1] <https://indico.cern.ch/event/467575/contributions/1145552/attachments/1311592/1962831/WLCGIPv6Deployment.pdf>



Short term – Can we be IPv6 ready?

- Half the battle already won:
 - Everybody agrees we need to do it, and now is an appropriate time.
 - Acceptance that if a problem is uncovered with IPv6 adoption we fix it, rather than role back to IPv4 only.
- Andrea Sciaba and myself have re-activated the WLCG IPv6 deployment task force and are recruiting people to ensure Site & VO deployment is followed up.
- Some sites (10+) are already dual stack in production:
 - Validated that software tools are ready.
 - Using NAT64, can identify when VO software/machines still require IPv4 connectivity.
- Meeting on 26th October with FTS3 steering group to agree plan for making entire FTS services dual stack:
 - <https://indico.cern.ch/event/575839/>
 - Once complete transfers between dual stack sites will go over IPv6 by default!



CERN and Tier I status

- CERN: Many services already dual stack. EOS should be accessible via IPv6 by the deadline.
 - NDGF-TI: Happy with the IPv6 only CPU proposal and have already met dual stack requirements. The dCache storage and some of the computing resources are already dual stack.
 - PIC: Happy with the IPv6 only CPU proposal and have already met dual stack requirements. Their dCache storage has been dual stack since April 2016. Performance is at the same level or better than via IPv4.
 - IN2P3: In good shape to be able to provide the dual stack storage services according to the proposed time line.
-
- BNL: Planning to comply with the requested deadlines. Currently running dual stack perfSonar and test dCache instance.
 - Triumf: Deployed IPv6 in September 2016. Currently running just perfSonar dual stack box. Currently working on an IPv6 deployment timeline, so unable to comment on if they will meet deadlines.
 - FNAL: Planning to comply with the requested deadlines.



CERN and Tier 1 status (2)

- RAL: Happy with the IPv6 only CPU proposal. The IPv6 testbed should meet requirements of the April 1st 2017 deadline. RAL are working on providing production quality endpoints significantly before the April 2018 deadline.
- FZK: Should be able to meet the proposed timeline.
- INFN-T1: Underlying infrastructure is ready. Should be able to meet the proposed timeline.
- NIKHEF-ELPROD: Need to replace network backbone. This will allow full IPv6 deployment. Tentatively confirm they will meet requirements.
- SARA-MATRIX: In process of preparing for data centre move in October 2016. They will look into it after this.
- RRC-KI-T1: Have started to investigate IPv6, will try and meet deadlines.
- KISTI-GSDC: Network backbone will be IPv6 enabled at end of this year.
- Taiwan-LCG2: No official feedback. GGUS ticket is marked as in progress.



Medium Term

- In the medium term (end of Run 2) we want complete data availability.
 - This is key to allow ALICE to use IPv6 only CPU.
- Difficulty is moving all T2 sites
 - No official request yet...
 - This should be in all site plans for sometime in the next 3 years.
- Expect significant cloud usage in the medium term:
 - Require dual stack storage from start?!



Long Term

- Eventual goal is to phase out IPv4 completely.
 - IPv4 could be around for 10 – 30 more years.
- Can start moving to IPv6 only storage once all storage is dual stack.
 - Should be sometime during LS2 ...
- Review IPv6 plan in 2018 and produce updated plan to allow full migration to IPv6.



Questions?

