Update on status of IPv6 in GridPP

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- Firstly, many thanks to sites for updating their IPv6 status on the table:

  https://www.gridpp.ac.uk/wiki/IPv6_site_status

- Would like to make this a relatively interactive session to try to understand what the main issues are

- Sites are encouraged to expand on brief notes they have entered into the status table

Institute status

8th August 2014 (GridPP33)

Domain	Organization	DNS	Mail	Web
uk.ac.stfc.	RAL	[4] 1/1/1 [M]	[4] 0/0/0 [O]	[1] 0/0/0 [I]
uk.ac.brunel.	Brunel University	[5] 2/1/2 [M]	[4] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.imperial.	Imperial College London	[4] 3/3/3 [P]	[4] 4/4/0 [P]	[1] 1/1/1 [I]
uk.ac.qmul.	Queen Mary University of London	[4] 0/0/0 [P]	[2] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.rhul.	Royal Holloway University of London	[2] 0/0/0 [I]	[3] 0/0/0 [O]	[1] 0/0/0 [I]
uk.ac.ucl.	University College London	[4] 1/1/1 [M]	[6] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.lancs.	University of Lancaster	[3] 0/0/0 [I]	[5] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.liv.	University of Liverpool	[4] 0/0/0 [M]	[2] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.manchester.	University of Manchester	[4] 1/1/1 [M]	[2] 0/0/0 [I]	[1] 0/0/0 [P]
uk.ac.shef.	University of Sheffield	[3] 2/1/1 [M]	[5] 5/5/0 [O]	[1] 0/0/0 [I]
uk.ac.dur.	University of Durham	[4] 1/1/1 [M]	[4] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.ed.	University of Edinburgh	[6] 0/0/0 [I]	[3] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.gla.	University of Glasgow	[3] 0/0/0 [I]	[2] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.bham.	University of Birmingham	[2] 0/0/0 [I]	[6] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.bris.	University of Bristol	[3] 1/1/1 [M]	[4] 0/0/0 [O]	[1] 0/0/0 [I]
uk.ac.cam.	University of Cambridge	[6] 4/4/4 [M]	[1] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.ed.	University of Edinburgh	[6] 0/0/0 [I]	[3] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.ox.	University of Oxford	[4] 1/1/1 [M]	[1] 0/0/0 [I]	[2] 0/0/0 [I]
uk.ac.stfc.	RAL PPD	[4] 1/1/1 [M]	[4] 0/0/0 [O]	[1] 0/0/0 [I]
uk.ac.susx.	University of Sussex	[4] 0/0/0 [M]	[5] 0/0/0 [I]	[1] 0/0/0 [I]

http://fedv6-deployment.antd.nist.gov/

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22nd April 2015 (GridPP34)

Domain	Organization	DNS	Mail	Web
uk.ac.stfc.	RAL	[4] 1/1/1 [M]	[4] 0/0/0 [O]	[1] 0/0/0 [I]
uk.ac.brunel.	Brunel University	[5] 2/2/2 [M]	[4] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.imperial.	Imperial College London	[4] 4/4/4 [P]	[4] 4/4/0 [P]	[1] 1/1/1 [I]
uk.ac.qmul.	Queen Mary University of London	[4] 0/0/0 [P]	[2] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.rhul.	Royal Holloway University of London	[2] 0/0/0 [I]	[3] 0/0/0 [O]	[1] 0/0/0 [I]
uk.ac.ucl.	University College London	[4] 1/1/1 [M]	[6] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.lancs.	University of Lancaster	[4] 2/2/2 [M]	[5] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.liv.	University of Liverpool	[4] 0/0/0 [M]	[2] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.manchester.	University of Manchester	[4] 1/1/1 [M]	[2] 0/0/0 [I]	[1] 0/0/0 [P]
uk.ac.shef.	University of Sheffield	[3] 1/1/1 [M]	[5] 4/4/0 [O]	[1] 0/0/0 [I]
uk.ac.dur.	University of Durham	[4] 1/1/1 [M]	[4] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.ed.	University of Edinburgh	[6] 0/0/0 [I]	[3] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.gla.	University of Glasgow	[3] 0/0/0 [I]	[2] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.bham.	University of Birmingham	[2] 0/0/0 [I]	[6] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.bris.	University of Bristol	[3] 1/1/1 [M]	[5] 4/4/0 [O]	[1] 0/0/0 [I]
uk.ac.cam.	University of Cambridge	[6] 5/5/5 [M]	[1] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.ed.	University of Edinburgh	[6] 0/0/0 [I]	[3] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.ox.	University of Oxford	[4] 1/1/1 [M]	[1] 0/0/0 [I]	[2] 0/0/0 [I]
uk.ac.stfc.	RAL PPD	[4] 1/1/1 [M]	[4] 0/0/0 [O]	[1] 0/0/0 [I]
uk.ac.susx.	University of Sussex	[4] 0/0/0 [M]	[5] 0/0/0 [I]	[1] 0/0/0 [I]

- Mostly small changes in number of DNS servers
- Lancaster: DNS
- Bristol: Mail

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2nd Sept 2015 (GridPP35)

Domain	Organization	DNS	Mail	Web
uk.ac.stfc.	RAL	[4] 1/1/1 [M]	[4] 0/0/0 [O]	[1] 0/0/0 [I]
uk.ac.brunel.	Brunel University	[6] 2/2/2 [M]	[4] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.imperial.	Imperial College London	[4] 4/4/4 [P]	[4] 4/4/0 [P]	[1] 1/1/1 [I]
uk.ac.qmul.	Queen Mary University of London	[4] 0/0/0 [P]	[2] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.rhul.	Royal Holloway University of London	[2] 0/0/0 [I]	[3] 0/0/0 [O]	[1] 0/0/0 [I]
uk.ac.ucl.	University College London	[4] 1/1/1 [M]	[6] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.lancs.	University of Lancaster	[4] 2/2/2 [M]	[4] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.liv.	University of Liverpool	[4] 0/0/0 [M]	[2] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.manchester.	University of Manchester	[4] 1/1/1 [M]	[2] 0/0/0 [I]	[1] 0/0/0 [P]
uk.ac.shef.	University of Sheffield	[3] 0/0/0 [M]	[5] 4/4/0 [O]	[1] 0/0/0 [I]
uk.ac.dur.	University of Durham	[4] 1/1/1 [M]	[4] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.ed.	University of Edinburgh	[6] 0/0/0 [I]	[3] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.gla.	University of Glasgow	[3] 0/0/0 [I]	[2] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.bham.	University of Birmingham	[2] 0/0/0 [I]	[6] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.bris.	University of Bristol	[3] 3/3/3 [M]	[5] 4/4/0 [O]	[1] 0/0/0 [I]
uk.ac.cam.	University of Cambridge	[6] 5/5/4 [M]	[1] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.ed.	University of Edinburgh	[6] 0/0/0 [I]	[3] 0/0/0 [I]	[1] 0/0/0 [I]
uk.ac.ox.	University of Oxford	[4] 1/1/1 [M]	[1] 0/0/0 [I]	[2] 0/0/0 [I]
uk.ac.stfc.	RAL PPD	[4] 1/1/1 [M]	[4] 0/0/0 [O]	[1] 0/0/0 [I]
uk.ac.susx.	University of Sussex	[4] 0/0/0 [M]	[5] 0/0/0 [I]	[1] 0/0/0 [I]

- Sheffield drops DNS support

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- 19 sites in the table
  - value in brackets at end indicates change since GridPP34
- 18/19 have discussed IPv6 with local networking team (0)
- 15/19 have asked for some IPv6 addresses (0)
- 11/19 have IPv6 addresses (+1, ECDF)
- 9/19 have set up an IPv6 enabled host (+1, Mancs, ECDF testing)
- 6/19 have an IPv6 enabled DNS (+2, Mancs & Durham [both without reverse lookup], ECDF testing)

- 7/19 have a dual-stack perfSonar host (+1, Mancs, ECDF testing)
- 3/19 have some dual-stack worker nodes (0)
- 4/19 have some dual-stack grid services (e.g. SRM, xrootd) (+1, Mancs)

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- Site network team preparing final version of STFC IPv6 addressing plan for approval from STFC Network Technical committee.
  - Tier1 will be allocated 3 x /60 blocks for OPN routes, non-OPN routes and Facilities
- The LHCOPN links to CERN will be migrated to the Tier1 routers shortly
  - Current router is not IPv6 capable
  - After this migration, IPv6 will be enabled on the perfSonar nodes
- ip6tables firewall will be enabled on all Tier1 nodes before IPv6 is enabled on the network
  - Defaults to 'DROP' on all traffic
  - Currently preparing a testing plan before submitting change management request
- In the process of validating internal tools for provisioning, IP address management, monitoring, etc

- 3 in use, total 8 physical nodes
- /64 address block for the testbed
- IPv6 switch connects directly into the site border router, i.e. completely isolated from production IPv4 network.
  - First NIC on each machine in the testbed is connected to a Tier1 IPv4 switch.
  - Second NIC is connected to the IPv6 switch.
- Dual stacked UI box installed and working, with no off-site access.
- Dual stacked Ceph S3 gateway installed and working, with off-site connectivity via IPv6 only. This is connected to our development Ceph cluster.
  - Currently investigating FTS3 support for S3 endpoints.
  - Interested in trying the Ceph GridFTP plugin.
- Working on setting up a perfSonar node

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- ## Manchester
  - "The IPv6 subnet may or may not change in the future. Services on IPv6: testbed CREAM CE, IPv6 only GridPP VOMS daemon (voms6.gridpp.ac.uk)"
  - perfSonar also dual-stack

- ## Sheffield

- ## Liverpool
  - "Central Services have a new core network with IPv6 addresses. An old piece of kit needs bypassing to give us access to the new core. Once connected we should be able to start testing dual-stack on perfsonar. Target Autumn/Winter 2015."

- ## Lancaster
  - "Some work progressing on this within the central services team (setting up IPv6 services, dns etc), need to re-engage with them"

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- # Birmingham
  - "Have requested IPv6 addresses from University central IT. Waiting to hear back."

- # Cambridge
  - "University ready and willing - limited manpower at site"

- # Oxford
  - "The IPv6 service from the University runs on somewhat bandwidth limited and non-redundant kit, so we're only deploying test systems, no production work is being run over IPv6. We hope to change that rapidly once the University network upgrade completes."

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- # Bristol
  - "University ready and willing - limited manpower at site"

- # Sussex
  - "New central University core routers installed in early summer 2015, which will enable IPv6 work to progress now. I need to chase them again as this was previously the hold up."

- # RALPP
  - "IPv6 now enabled on Campus routers - Waiting for Central testing to finish before they make address spaces available to departments"

- ## Glasgow
  - No change?

- ## Durham
  - "Waiting for delegation of IPv6 reverse DNS before we can enable services"

- ## ECDF
  - "Met with university network services in August [2015] to discuss plans and address allocation and testing strategy. Got the go ahead from ECDF to test IPv6 on our service VLAN (which is insulated from their cluster). Have allocated IPv6 addresses to our two perfSonar hosts to check bi-direction resolvability before moving onto other middleware services"

- perfSonar moved to dual stack first (2013?)
- January 2014: worker nodes and DPM testbed
- August 2014: all Arc CEs
- November 2014: all storage
- Brunel peformed staged roll-out of DPM xroot4 with IPv6 support (bugs documented in both RT and GGUS tickets)
- Cream CEs are dual stack, but do not have AAAA records. They run 5% of jobs. To be retired soon.

- Present state
  - Routers and switches: CISCO equipment (all IPv6 compatible)
  - IPv4 still going through an old Janet router
  - IPv6 traffic already on Janet6 backbone
  - 10 Gbps (peaking at 9Gbps on WLCG transfers)
- September 2015
  - Installation of new CISCO firewall with advertised 40 Gbps capability. Expandable to 120 Gbps.
  - Merge of all IPv6 and IPv4 traffic trough Janet6 equipment.
  - 20 Gbps rates expected.
  - University willing to assign immediately a 40 Gbps link exclusively to the HEP grid, if we prove that we can use 20 Gbps.
  - Also, an expansion to 80 Gbps is already budgeted, including firewall expansion.

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- ## Imperial College
  - "Most services dual-stack including dCache"
  - Dual links to Janet not balanced over IPv6, will need ECMP

- ## QMUL
  - See previous talk

- ## RHUL
  - "IT will look into 10GB link commissioning in Sept14"

- ## UCL
  - "Central IT IPv6 project still in early stages"

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Conclusion

- We are making steady progress with rolling out IPv6 across GridPP sites

- We have heard from QMUL about their progress

- RAL Tier-1 are progressing with their IPv6 roll out and gaining experience with their IPv6 testbed

- Manchester's perfSONAR hosts are now dual-stack and they also have a test CREAM CE and IPv6-only GridPP VOMS

- Edinburgh have made good progress and are now actively testing

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