Imperial College London

GridPP
UK Computing for Particle Physics

IPv6 status

Duncan Rand

Slide from GridPP40 (2018)

Why IPv6?

- The main motivation is to make the data at the site accessible by clients running on IPv6-only machines
- WLCG might get an offer of opportunistic CPU resources which are IPv6-only
- Also for pledged resources, sites running out of IPv4 addresses and to avoid use of NAT

Slide from GridPP40 (2018)

Tickets submitted at end 2017

Tier-2s: GGUS tickets submitted to all Tier-2 sites

- Request to deploy dual-stack perfSONAR and storage by end of Run 2 (end of 2018)
- Engaging with sites - requesting timescale for deployment of IPv6 and details of steps
- Following up with assistance, checking deployment etc
- GGUS ticket details: https://tinyurl.com/y9tfd5oo

Description: IPv6 deployment at WLCG Tier-2 sites

Detailed Description:

Dear site support,

The WLCG management and the LHC experiments approved a deployment plan for IPv6 that requires that Tier-2 sites deploy dual-stack connectivity (IPv4+IPv6) at least on their perfSONAR and storage systems by the end of Run2 (end of 2018).
The main motivation is to make the data at the site accessible by clients running on IPv6-only machines, which might well soon be the case soon for opportunistic (and not only) resources.
All experiments therefore require that the vast majority of sites (if not all) offer IPv6 connectivity to their storage.

The purpose of this ticket is to track the status of the IPv6 deployment process at your site and will be closed only when your storage has been successfully tested to work via GridFTP, xrootd and WebDAV (depending on the VOs supported) from an IPv6-only client, ensuring that the transfer performance is as good as via IPv4, as monitored by perfSONAR.

Before that, we would ask you to answer with this information:

- your estimate of the timescale for the deployment;
- a few details about the required steps;

and to add comments to this ticket whenever progress has been made.
In the unfortunate case it becomes evident that the deadline cannot be met, we would appreciate if you could explain what are the obstacles and still give an estimate for the time of completion.

The final step of the deployment will be a test conducted by somebody in the LHC VO(s) supported by your sites. The relevant contact people will be monitoring the ticket and will make sure that the tests are performed.

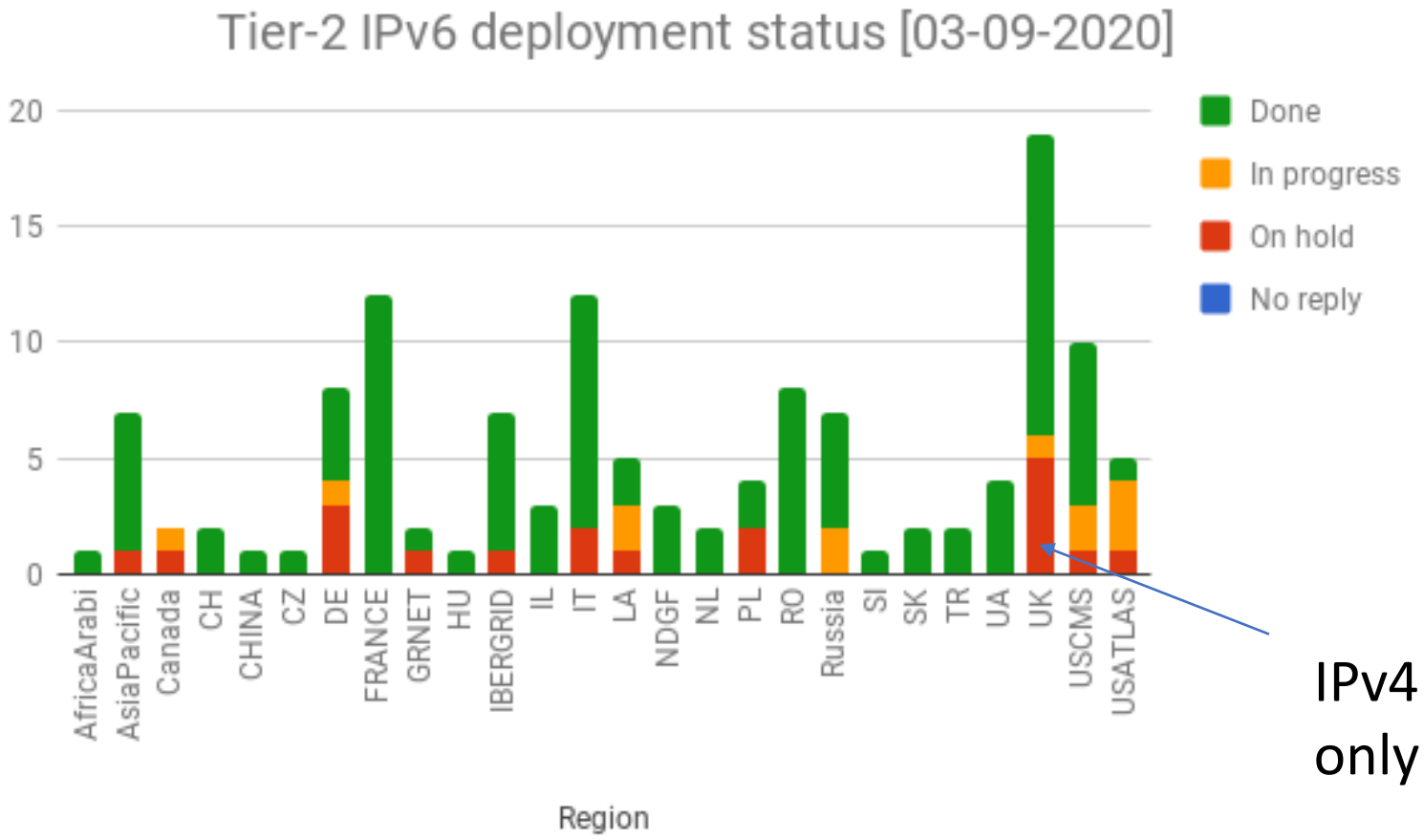
For questions and request for help, you can contact the 'WLCG IPv6' support unit in GGUS.

The WLCG IPv6 deployment task force

Slide from GridPP45 (2020)

IPv6

- IPv6 roll out seems to have stalled at RHUL, Liverpool, Sheffield, Glasgow, Bham, Oxford
- Need to try to unblock issues at sites
- Jisc is happy to advise on v6 deployment
- IPv6 playing increasing role in WLCG - to be used for packet marking to identify traffic by application and experiment



IPv4 only

Current status

- Four sites incomplete in WLCG GGUS tickets, either
  - lacking IPv6-enabled storage
  - no IPv6-enabled perfSONAR

- Glasgow, RHUL, Birmingham, Liverpool

Glasgow

- In progress: “Deployment is waiting for a campus-wide network upgrade, needed to ensure QoS”
- https://ggus.eu/ws/ticket_info.php?ticket=131611

- **IPv6 status:**
  - Enabled on perfSONAR
  - Campus IPv6 performance is poor due to constraints of existing infrastructure
    - It works, but please don’t use it
  - Hopefully, this situation will improve as part of network renewal programme (see above)

RHUL

- On hold: “Work on hold indefinitely due to difficulties related to COVID-19 and home working”
- https://ggus.eu/ws/ticket_info.php?ticket=131603

- IPv6 status
  - No plans to use on campus except for us, site DNS does not support
  - Stuck (for years) waiting for IT Service to activate IPV6 DNS hosted by JISC
  - Seems likely we will decommission storage before this happens, making it moot?

Birmingham

- On hold: “Still impossible to provide DNS support for IPv6, no ETA”
- https://ggus.eu/ws/ticket_info.php?ticket=131612

- IPv6 status
  Stalled. The gateway can route packets but after sometime trying to get DNS entries out of the university, I got told they aren’t using it yet and don’t have plans to in the near future (!). I will try to resurrect this in the coming months

Liverpool

- On hold: “Some upstream switches not yet capable of production IPv6 throughput and other issues, expected to be replaced next year”
- https://ggus.eu/ws/ticket_info.php?ticket=131606

- IPV6 status
  - Subnet allocated for years pending on the upstream upgrades to allow production use
  - Tested on Perfsonar

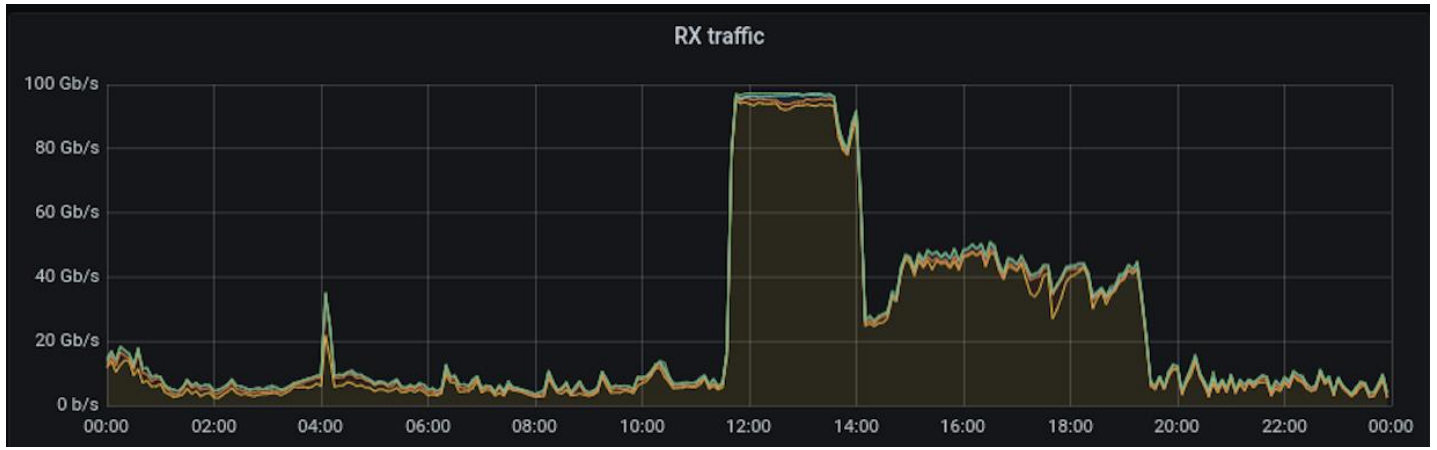
Fully IPv6 enabled sites

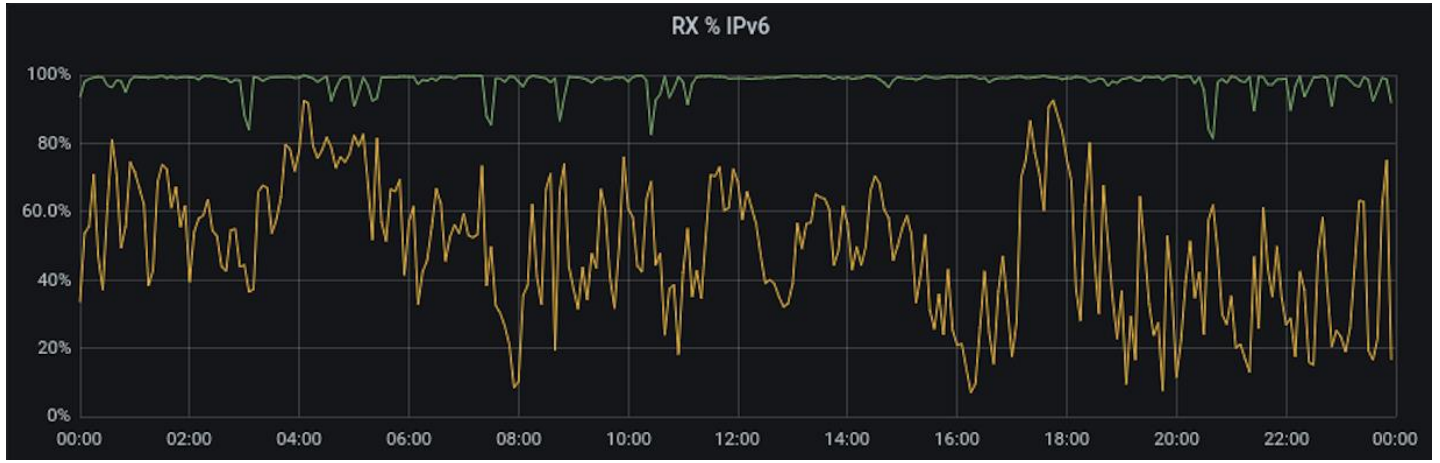
- Brunel, Imperial, QMUL and RALPPD have enabled IPv6 on their storage, perfSONAR and worker nodes

- But there has been a recent issue for dCache sites (Imperial and RALPPD)

Imperial

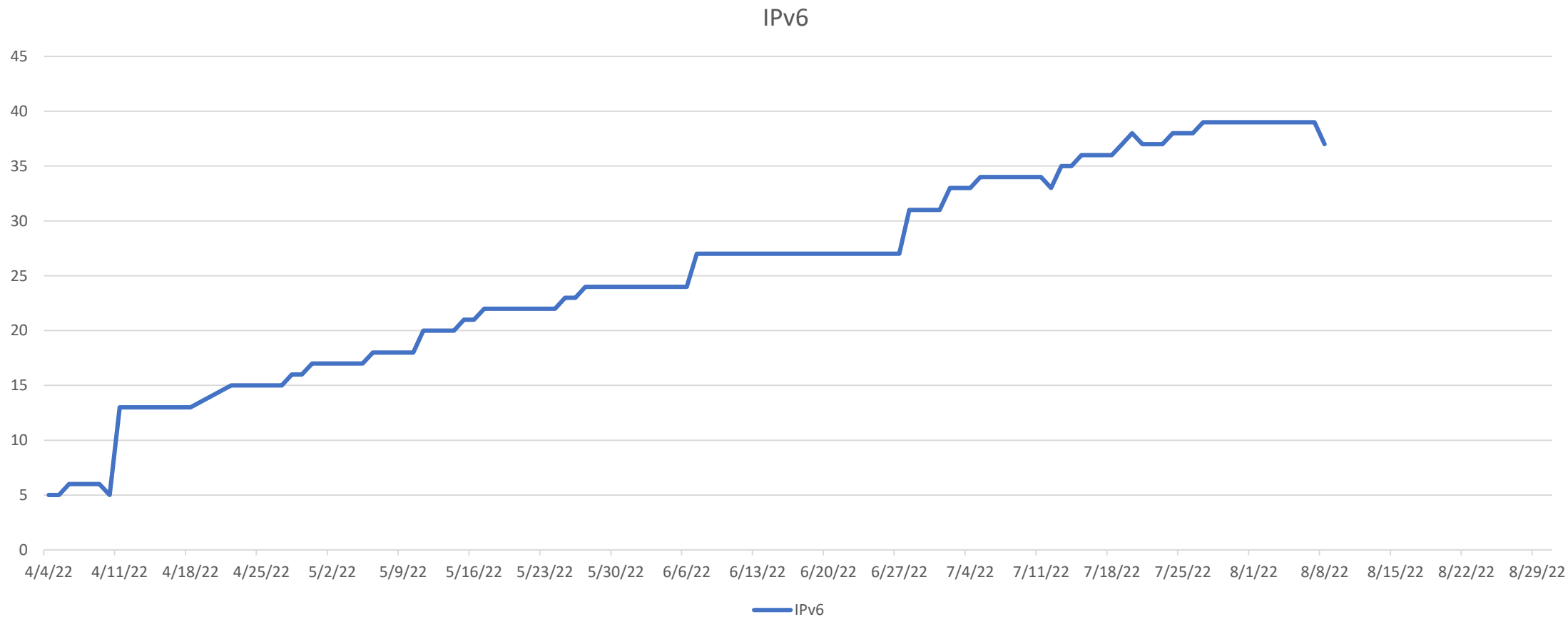
- Until recently dCache Java configuration preferred IPv4 for inbound davs transfers
- On 9th March 2022 Imperial upgraded their dCache instance to a version which favours IPv6
- Since then about 95% of data into the site over LHCONE goes over IPv6 (green line)



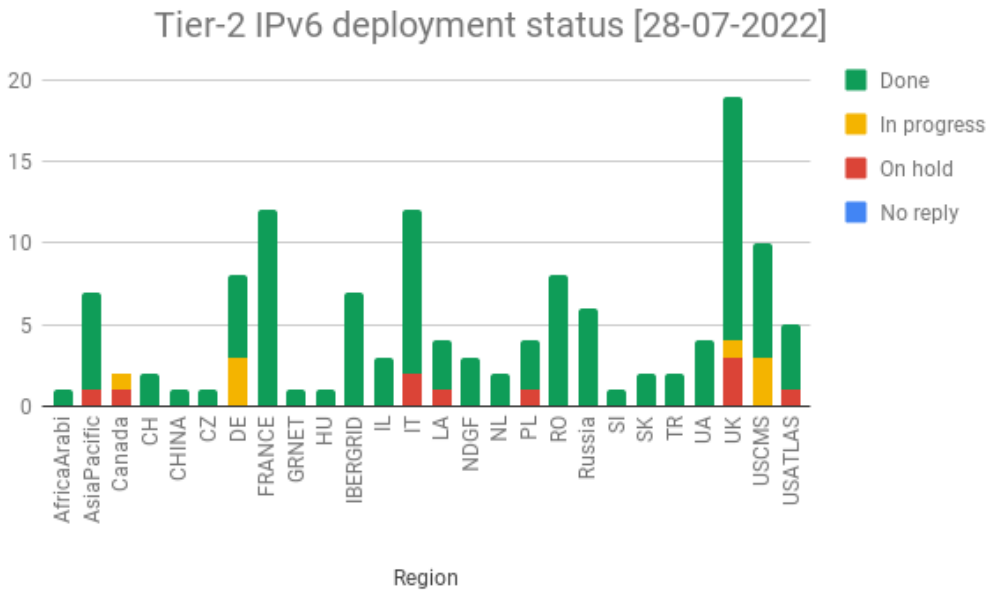


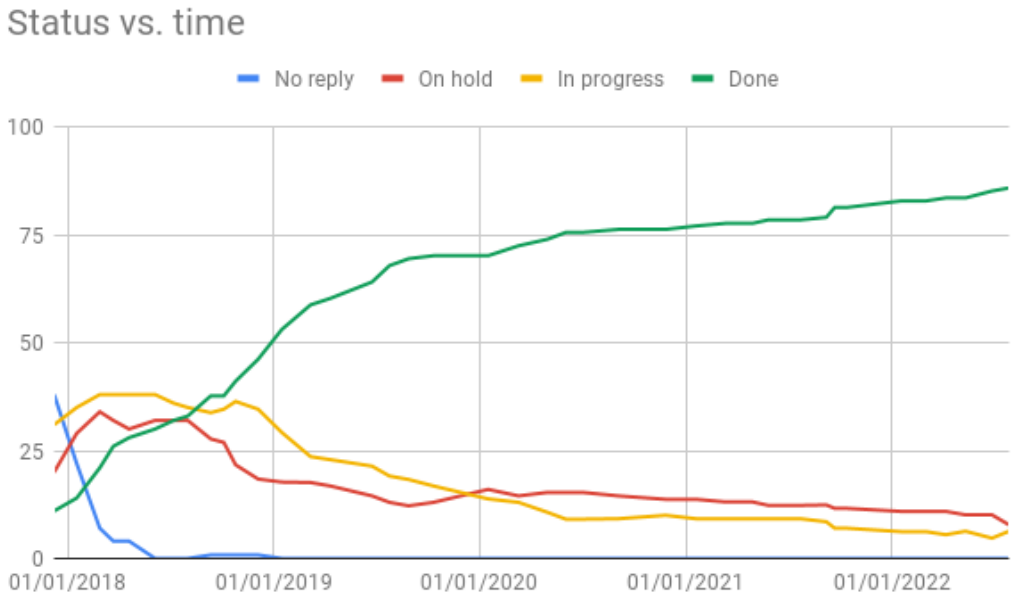
dCache upgrades to versions preferring IPv6

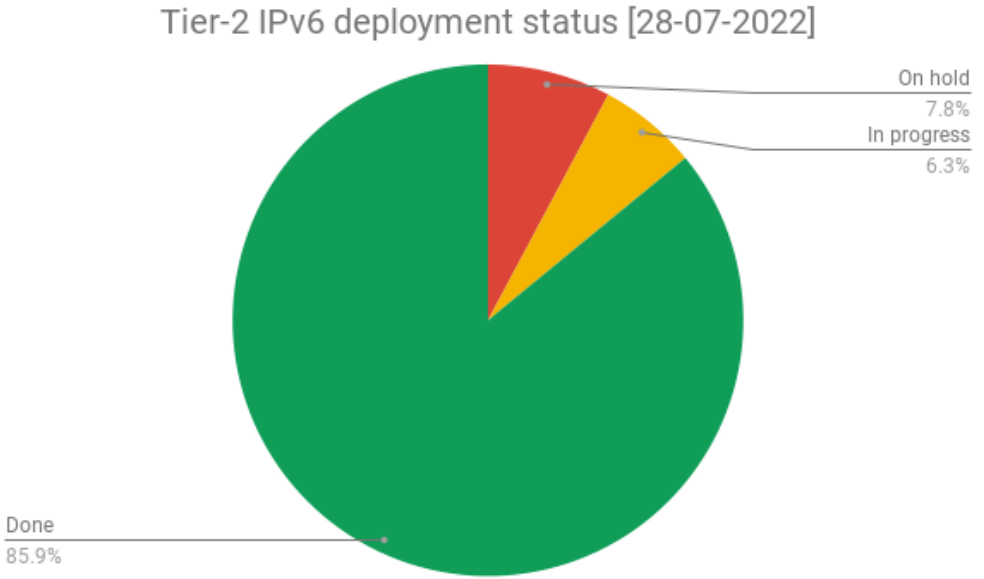
Out of ~56



- 88% of WLCG Tier-2s have enabled IPv6 on their external facing storage



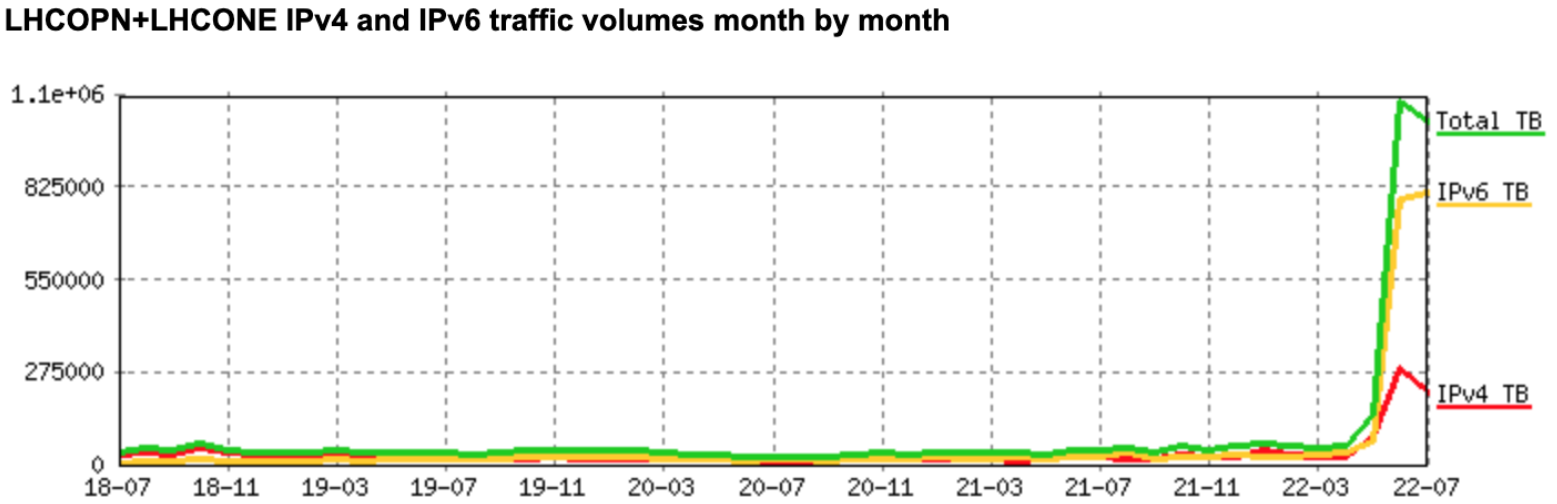




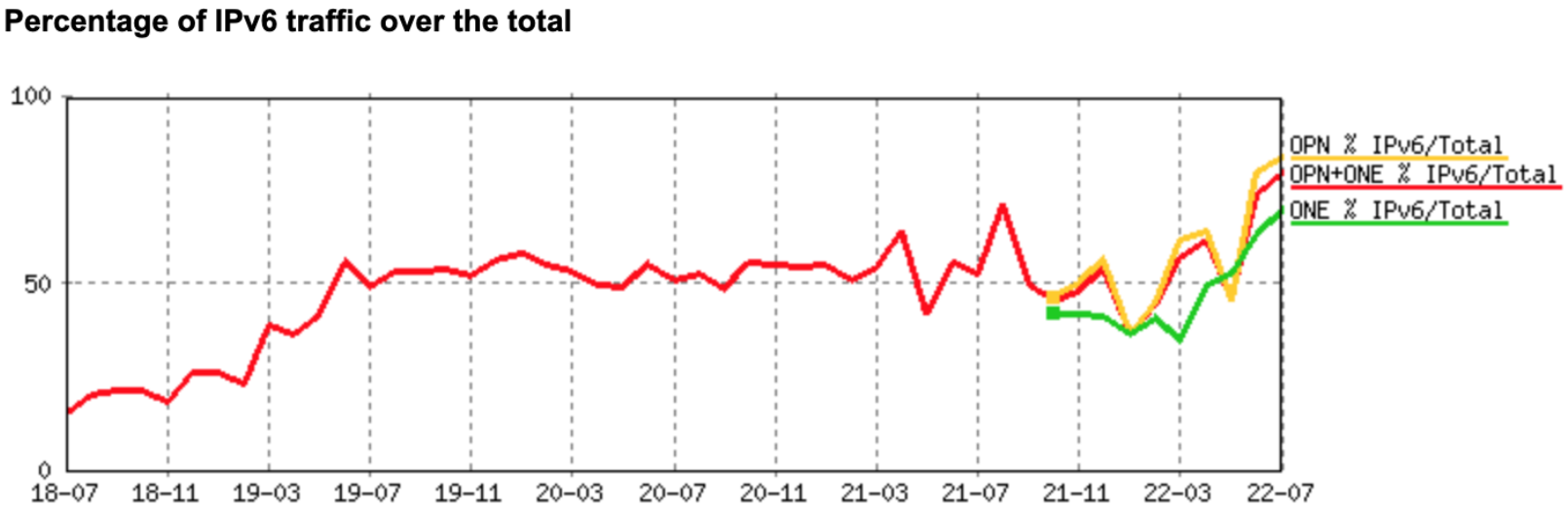
https://twiki.cern.ch/twiki/bin/view/LCG/WlcgIpv6

LHCOPN+LHCONE traffic levels

Large increase in traffic volume over the last few months not yet well understood



Do see an increase in proportion of transfers over IPv6



https://twiki.cern.ch/twiki/bin/view/LHCOPN/LHCOPNEv4v6Traffic

Summary

- Four sites still to add IPv6 to storage and perfSONAR
- Four sites with IPv6 on worker nodes (and other services)
- It would be good for more GridPP sites to enable IPv6 other services, especially on worker nodes
- Over to Dan…