

IPv6 @ LHCOPN + LHCONE

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STEINBUCH CENTRE FOR COMPUTING - SCC



IPv6 deployment on WLCG

- The main activity of the HEPiX IPv6 working group and the WLCG ops coordination IPv6 task force in the last year is the coordination and support for the deployment of IPv6 at WLCG sites
- The stated goal is to allow data on federated storage to be accessible by jobs on IPv6-only connected CPUs
- Short summary of the timeline
 - Tier-1: deployment of dual-stack on production storage, CVMFS and FTS by April 2018
 - Tier-2: deployment of dual-stack on production storage (and perfSonar if installed) by end of Run2 (i.e. end of 2018)

Network and pS @ Tier-1's

- All sites connected do LHCOPN/ONE except RAL
- perfSonar servers on IPv6 at most sites
- RRC-KI-T1 and JINR don't have IPv6 on pS

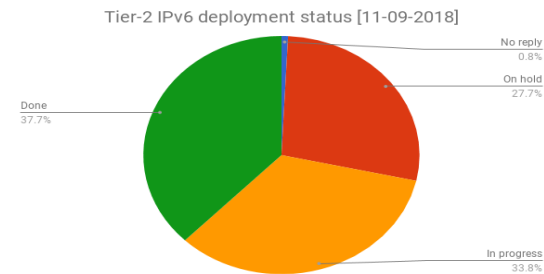
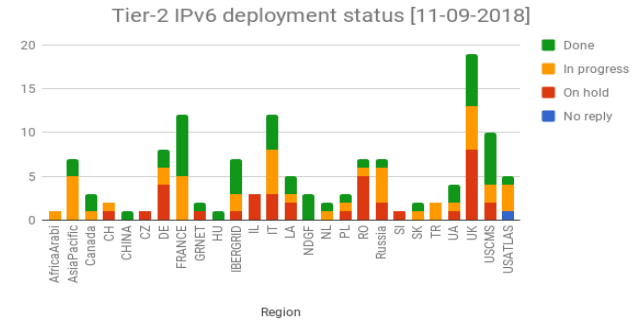
Tier-1	LHCOPN IPv6 Peering	LHCONE IPv6 Peering	dual stack Perfsonar
ASGC	✓	✓	LHC[OPN/ONE]
BNL	✓	✓	LHC[OPN/ONE]
CH-CERN	✓	✓	LHC[OPN/ONE]
DE-KIT	✓	✓	LHC[OPN/ONE]
FNAL	✓	✓	test LHC[OPN/ONE]
FR-CCIN2P3	✓	✓	LHC[OPN/ONE]
IT-INFN-CNAF	✓	✓	LHC[OPN/ONE]
NGDF	✓	✓	LHC[OPN/ONE]
ES-PIC	✓	✓	LHC[OPN/ONE]
KISTI	✓	✓	LHC[OPN/ONE]
NL-T1	✓	✓	LHC[OPN/ONE]
RAL	✓		LHC[OPN]
RRC-KI-T1	✓	✓	??
JINR	✓	✓	??
Triumpf	✓	✓	LHC[OPN/ONE]

IPv6 and FTS @ Tier-1's

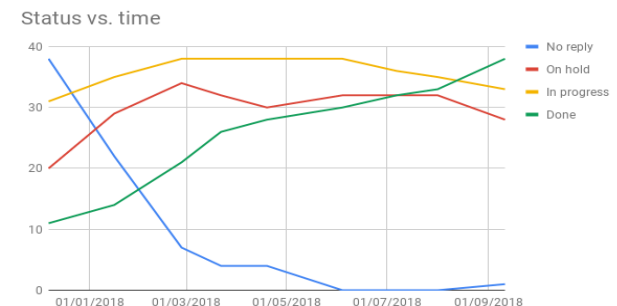
- FTS servers at CERN work in dual stack, while at BNL and FNAL they use IPv4 only
 - The IPv6 fraction of transfers could be larger than it is
- GridFTP transfers happen also via IPv6 at
 - IN2P3, JINR, NDGF, RAL, SARA-MATRIX, NIKHEF, CNAF, ASGC, PIC (, Triumpf)
- They do not at
 - BNL, FNAL, (TRIUMF,) KIT, RRC-KI
 - KIT needs to redeploy the network for the storage to move from a dual-homed setup (which does not work well at dCache with GridFTP) to a dual-stack setup
 - TRIUMF just finished migration of all dCache nodes to dual-stack servers

IPv6 Tier-2 sites

- The deployment campaign was launched in November 2017
 - GGUS tickets sent to all non-US sites
 - Sites made aware of the WLCG plans and asked to report plans and give updates
- **Steady progress (status)**
 - About 40% of T2 sites have storage on dual stack



Experiment	Fraction of T2 storage accessible via IPv6
ALICE	37%
ATLAS	33%
CMS	55%
LHCb	38%
Overall	42%



T2 deployment observations

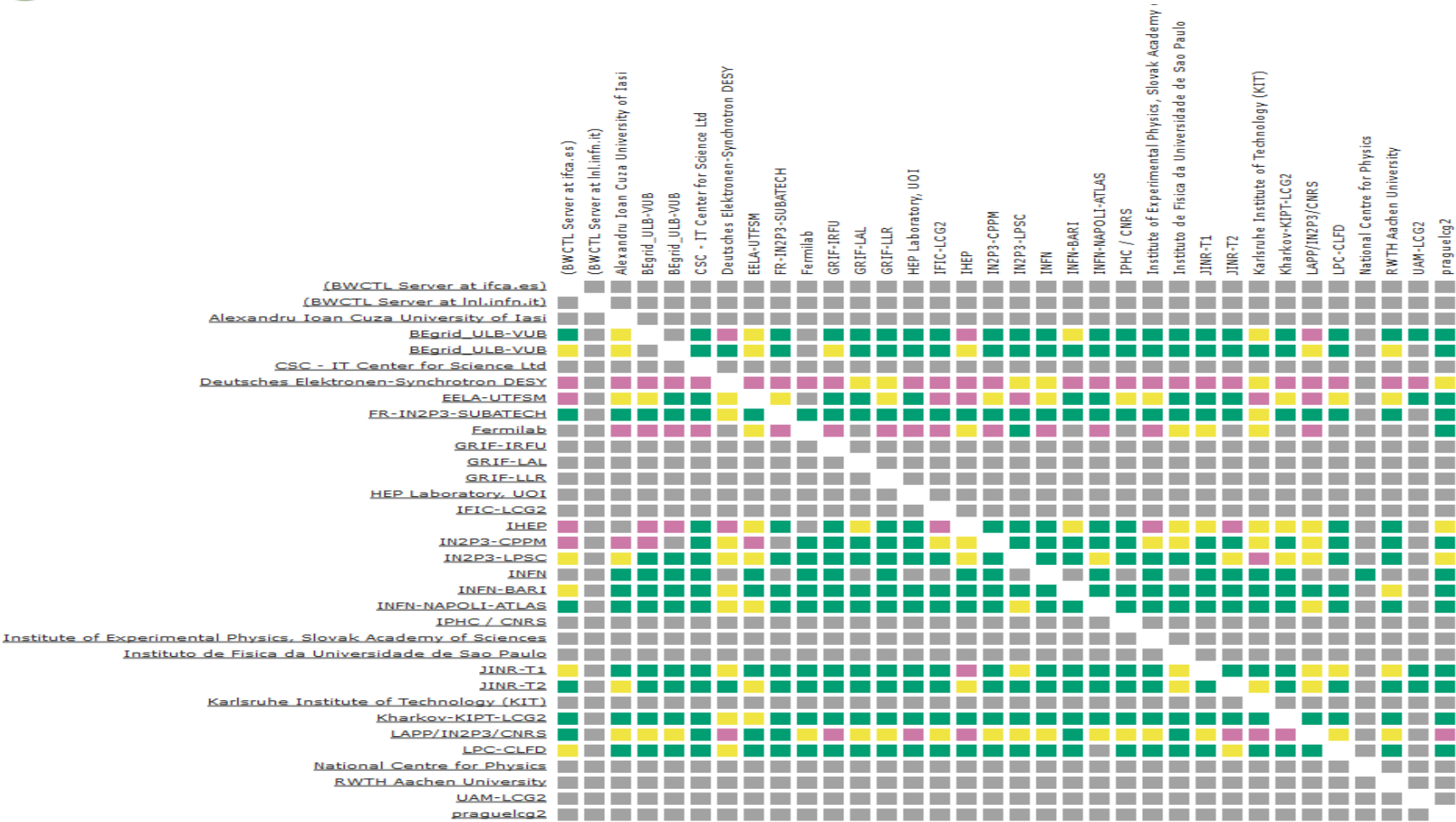
- USATLAS and USCMS sites are now also tracked
 - Not via GGUS but via the experiments
- Regions differ greatly with respect to their status
 - NDGF, IBERGRID, France, USCMS lead the pack
- Very few sites (<5) say they won't meet the deadline
- Most sites are responsive and provide detailed information
 - For some however regular pinging is a must...
- Several sites must wait for their campus infrastructure to become IPv6-ready
- It is evident that IPv6 is being deployed or will soon be deployed at the vast majority of the remaining sites and that the WLCG deadline is taken seriously

dual-stack PerfSONAR status

Dual-Stack Mesh Config - IPv6 Traceroute Tests

■ Number of Paths is <= 1
 ■ Number of Paths is >= 1
 ■ Number of Paths is >= 2
 ■ Unable to retrieve data
 ■ Check has not yet run

✔ No problems found in grid

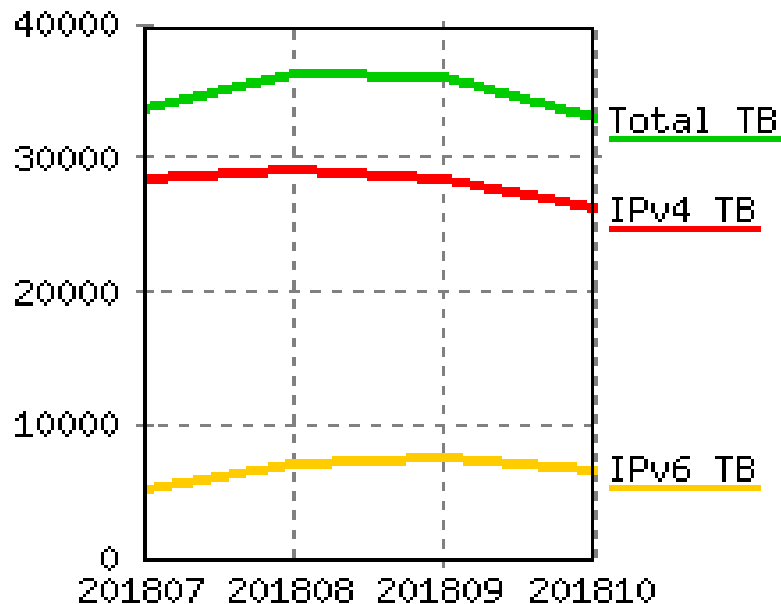


LHCOPN and LHCONE

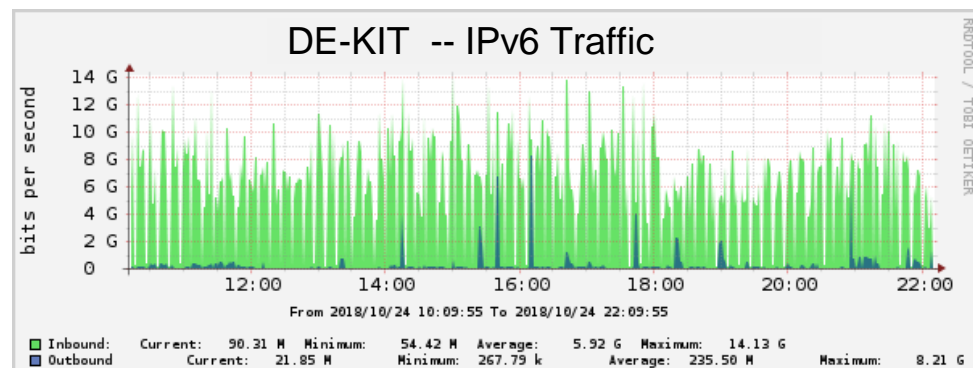
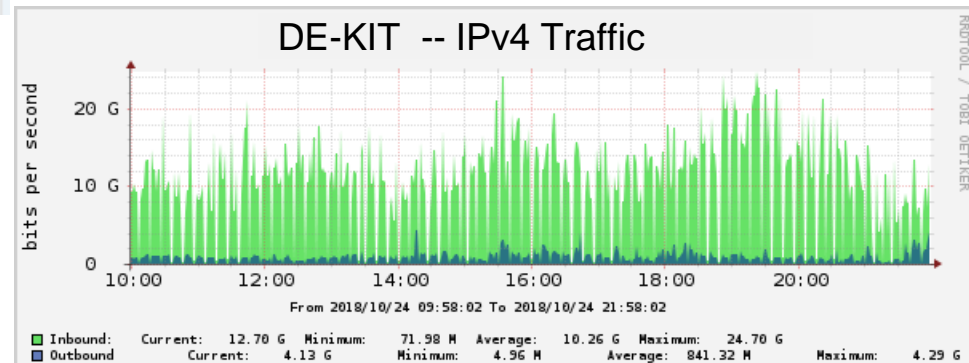
IPv4 and IPv6 traffic volumes seen at CERN Tier0

Period	IPv4 TB	IPv6 TB	Total TB	% IPv6/Total
201807	28464	5202	33666	15.45
201808	29039	7172	36211	19.81
201809	28361	7590	35951	21.11
201810	26215	6697	32912	20.35

at the 24th/10, one week missing



@DE-KIT – after CMS and Belle-2 dual-stack enabling



Conclusion

- IPv6 peering of Tier-1 sites in place
- last Tier-1 sites are getting IPv6 „production“ ready (Q1 2019)
- Several Tier-2 site on a good track – prommissing of keeping the timeline (end of 2018)

- IPv6 Minitoring
 - url of NRENs → collect them at the HEPiX-WG page

- PerfSONAR
 - Greate tool – enables network insides for end sites
 - PerfSONAR dev. team has good job
 - List of issues at installed instances → incl. recomondations
 - 4.1.2 is a matchure and stable version, several issues of previus versions are dealt with
 - → a „outreach / deployment / maintanance“ team (one in Europe + one in US)
 - Deploying PerfSONAR at additional sites
 - Maintaning the installed basis
 - Training of site administrator (even if it requires on site training)

Several slids are of Andrea Sciabà presentation at GDB / CERN Sept. 12th 2018

https://indico.cern.ch/event/651357/contributions/3128685/attachments/1714023/2765091/IPv6_deployment_update.pdf

Questions Suggestions Discussion