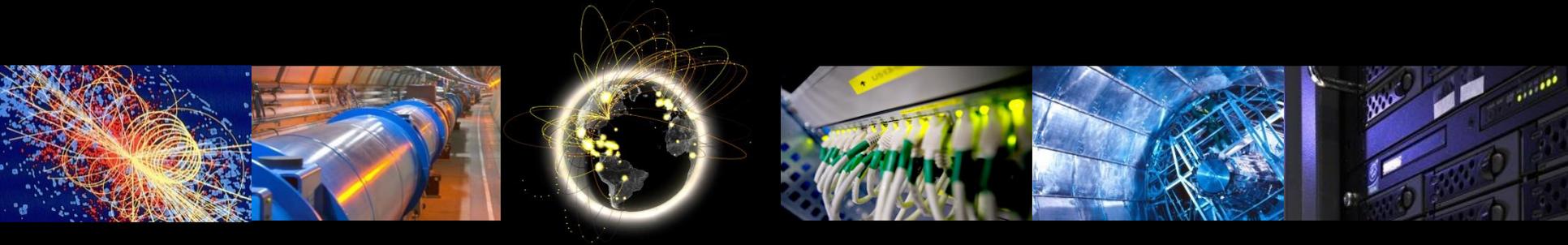


# IPv6 update

Andrea Sciabà  
on behalf of the HEPiX IPv6 WG

WLCG GDB, 12-09-2018

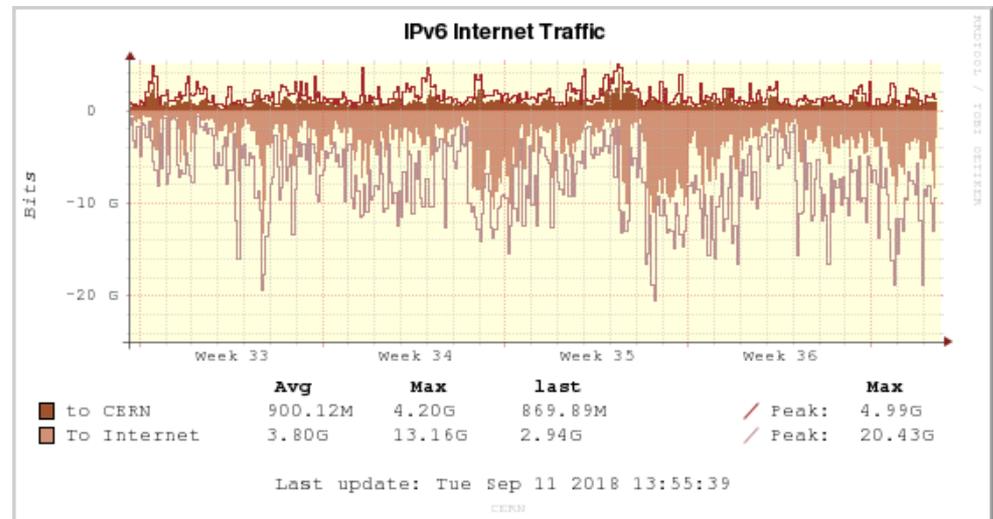
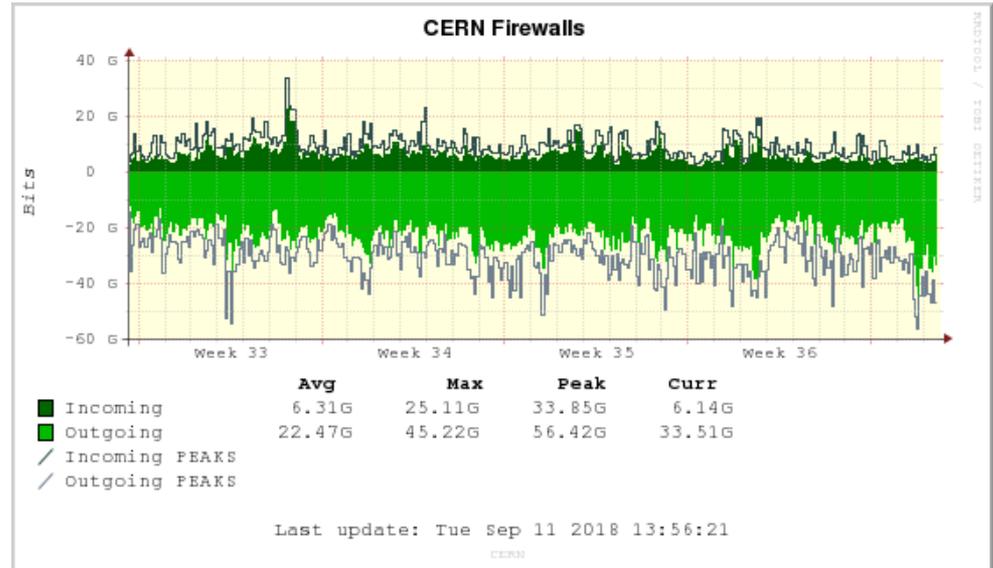


# IPv6 deployment on WLCG

- 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)

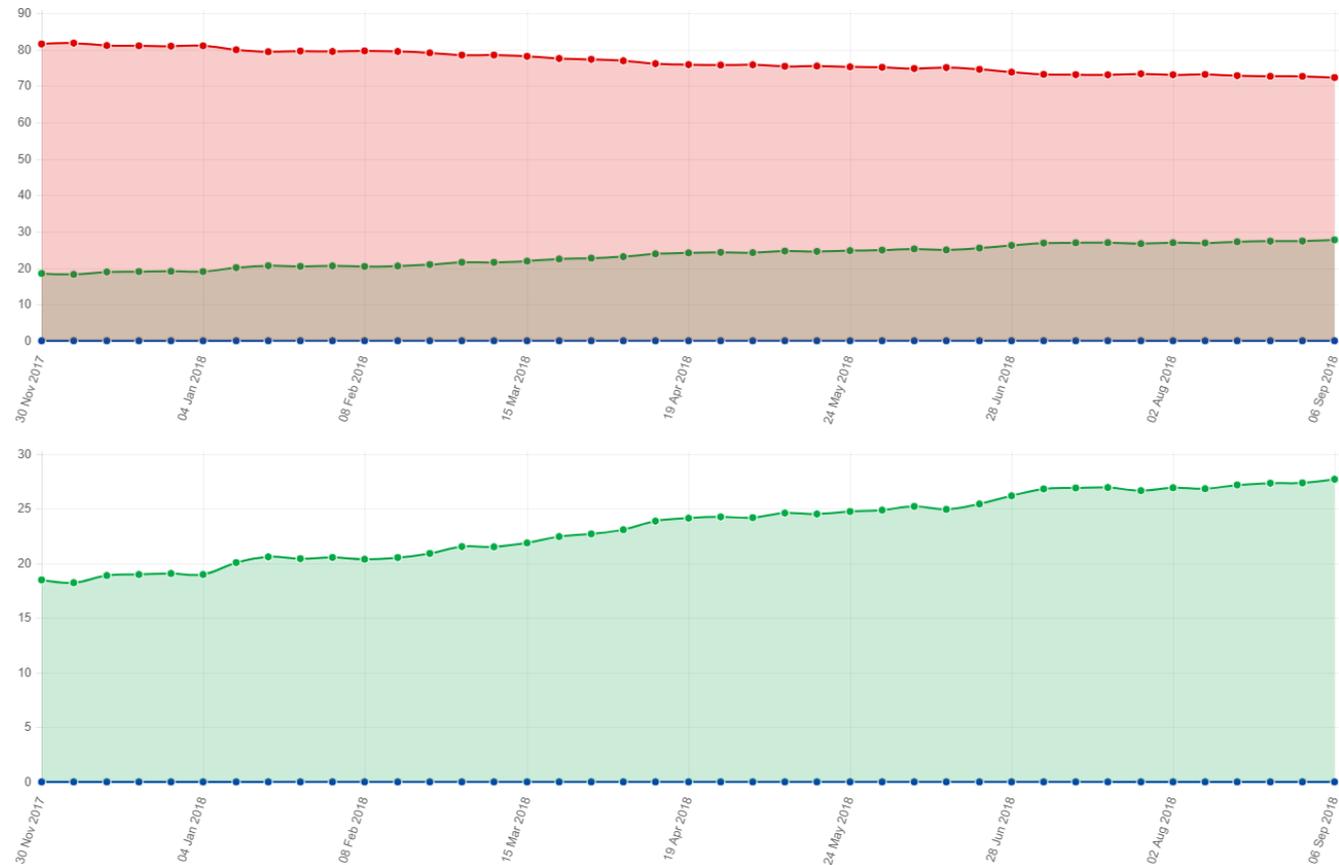
# IPv6 CERN traffic (non-LHC)

- IPv6 non-LHC traffic increased by 20% (to CERN) and by 27% (to Internet) since February
  - Information on IPv6 traffic on LHCOPN/ONE will soon be available



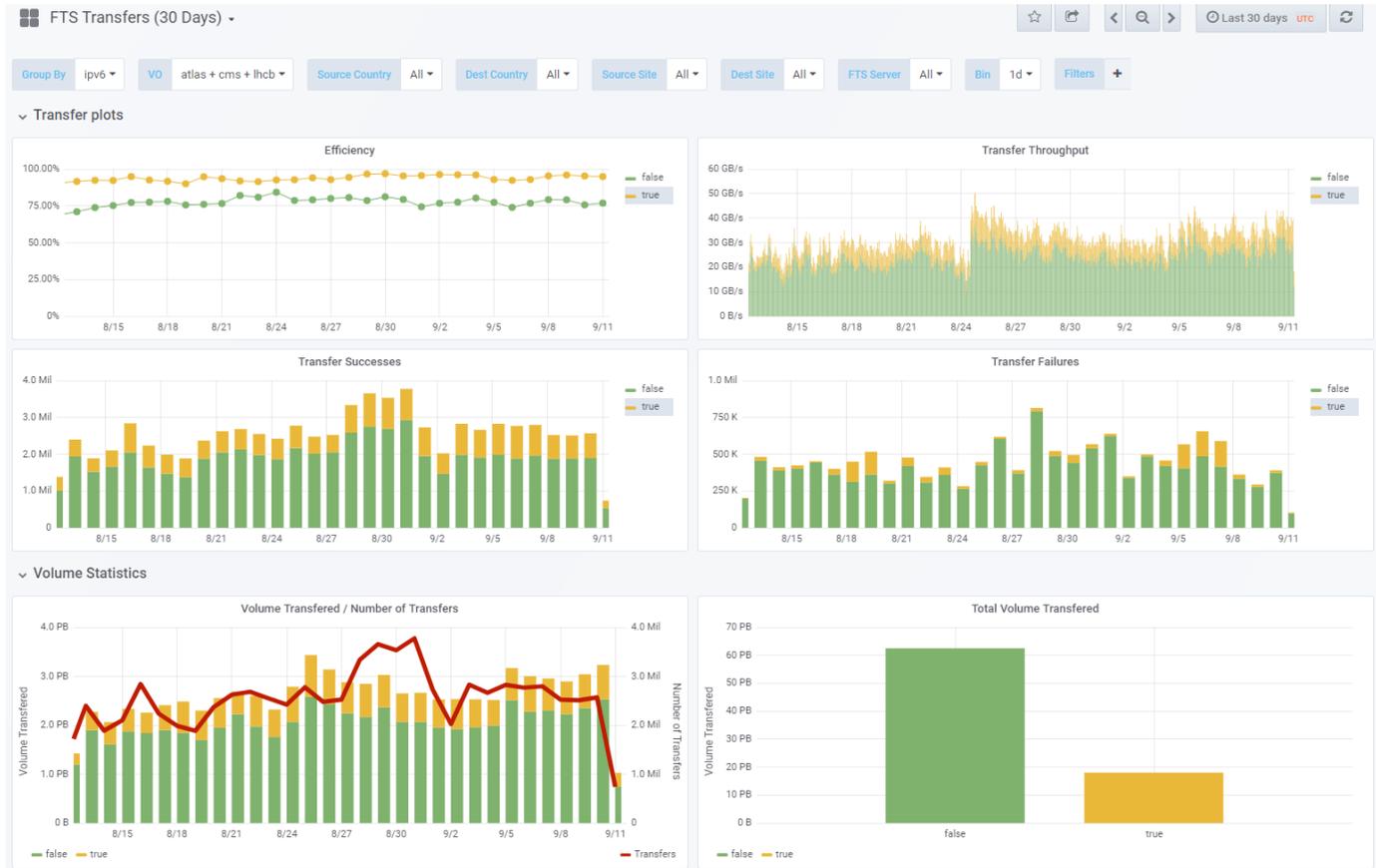
# LHC experiment endpoints on IPv6

The graphs below record, on a weekly basis (every Thursday at 06:00 CET) the fraction of service endpoints listed in the VO Feeds of the 4 major LHC experiments ([Alice](#), [Atlas](#), [CMS](#), [LHC-B](#)) where the DNS returns an IPv4-only (A) resolution (red line), a dual-stack IPv6-IPv4 (A+AAAA) resolution (green line) or an IPv6-only resolution (cyan line). The graph is meant to provide a bird's eye view of the IPv6 transition at WLCG sites. Comments and complaints → [ipv6@hepix.org](mailto:ipv6@hepix.org).



- Steady increase in IPv6 addresses (+25% since March)
  - [http://orsono.mi.infn.it/~prelz/ipv6\\_vofeed/](http://orsono.mi.infn.it/~prelz/ipv6_vofeed/)

# FTS GridFTP traffic



- IPv6 GridFTP traffic via FTS has substantially increased
  - From 11% of the total in March to 23% now
  - E.g. CERN to PIC: 90% of the total
- Xrootd IPv6 traffic not yet monitored



# Network and pS at Tier-1's

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

Tier-1	LHCOPN IPv6 Peering	LHCONE IPv6 Peering	dual stack Perfsonar
ASGC	✓	✓	LHC[OPN/ONE]
BNL	✓	✓	??
CH-CERN	✓	✓	LHC[OPN/ONE]
DE-KIT	✓	✓	LHC[OPN/ONE]
FNAL	✓	✓	??
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	✓	✓	??
Triumf	✓	✓	LHC[OPN/ONE]

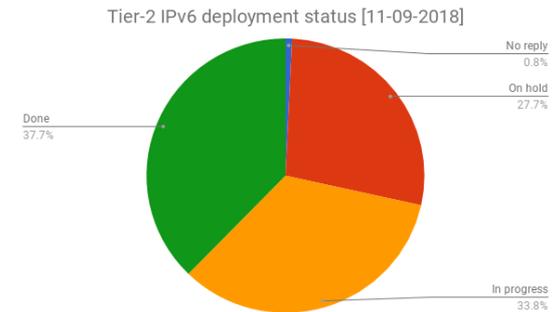
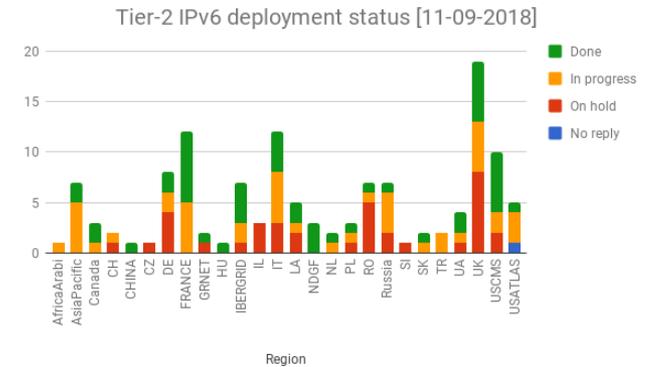


# IPv6 on FTS and at Tier-1's

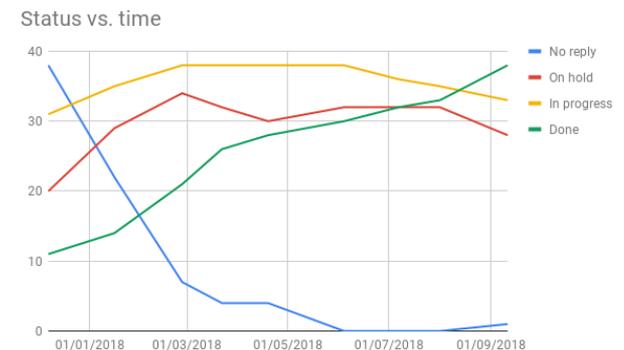
- FTS servers at CERN work in dual stack, while at BNL and FNAL they use IPv4 only
  - The IPv6 fraction of transfers could be larger than it is
- GridFTP transfers happen also via IPv6 at
  - IN2P3, JINR, NDGF, RAL, SARA-MATRIX, NIKHEF, CNAF, ASGC, PIC
- They do not at
  - BNL, FNAL, TRIUMF, KIT, RRC-KI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

# IPv6 at Tier-2 sites

- The deployment campaign was launched in November
  - 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

# Conclusions

- IPv6 is now fully supported in WLCG, middleware-wise
- It has become “merely” a deployment issue
- A few Tier-1 sites are lagging behind the deadline of last April
- Deployment Tier-2 is proceeding well enough
  - An acceleration is expected as the deadline approaches