
GridPP Network Forward Look

Status presented at GridPP meeting
Lancaster, 15 Sept 2017

P.Clarke, D.Rand, D.Colling, R.Jones, A.McNab, A.Sansum



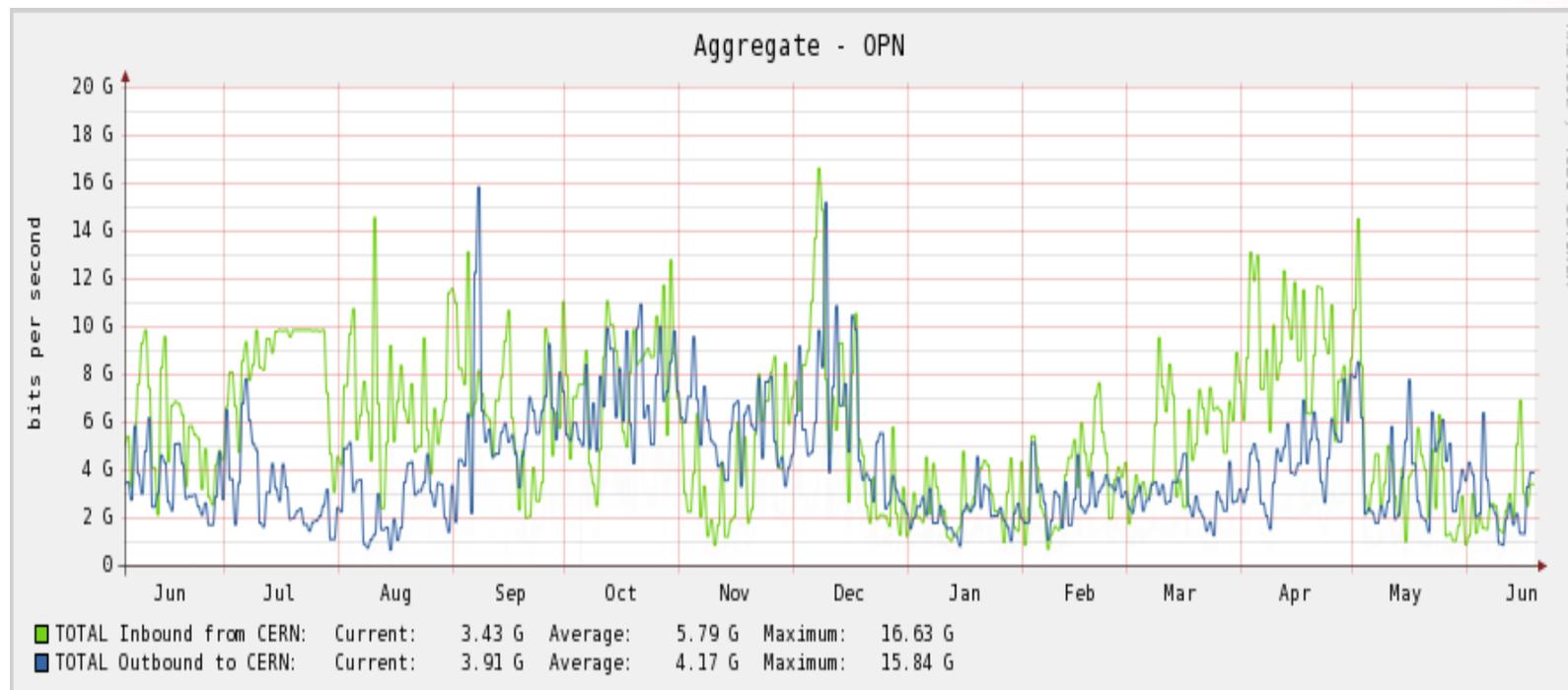
GridPP
UK Computing for Particle Physics

GridPP Project Management Board

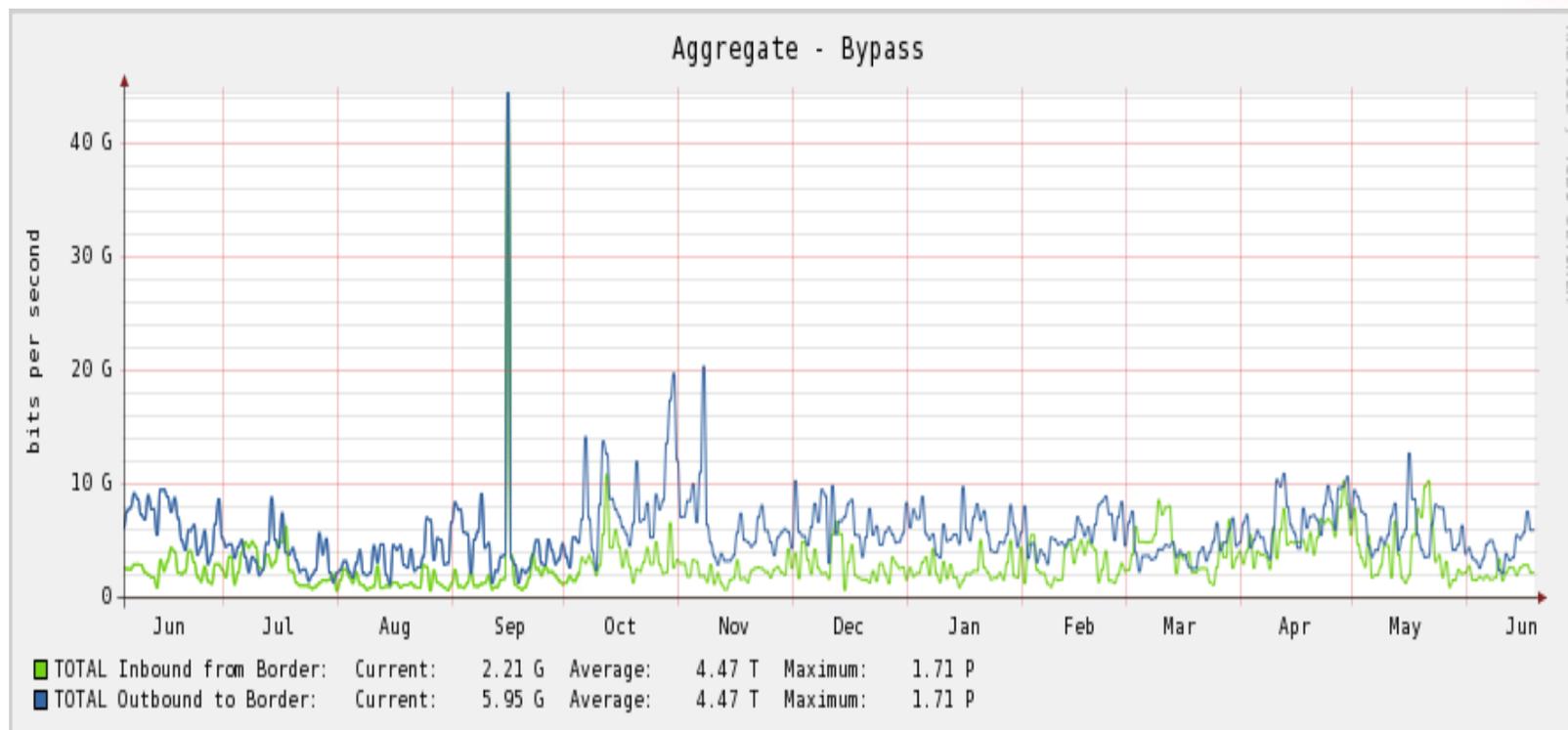
LHC Network Forward Look 2017

Document identifier:	GridPP-PMB-xxx-NetworkFL-2017
Date:	September/2017
Version:	
Document status:	Draft
Author	P.Clarke, D.Rand, D.Colling, R.Jones, A.McNab, & Sansum

- ❑ LHC will continue to use OPN for Tier-0 ⇔ Tier-1 for foreseeable future
- ❑ 10 -> 20 -> 30 Gbit/s on 28th June
- ❑ May need 40 Gbit/s within 2 years



- ❑ Currently 2 x 40 Gbit/s resilient connection to Janet
- ❑ Investigating 60 and 100 Gbit/s as “normal business planning” for the site.
- ❑ I know its a stock phrase but: “Science at RAL (LHC, other PPAN, Diamond, ISIS.... JASMIN....) is becoming ever more data-intensive”



Tier-2 - General expectations of ATLAS

- ❑ ATLAS is in the process of constructing a more detailed network model. However, the large-scale features are already clear: Over the next 2(4) years ATLAS expect a growth of processing and analysis capacity of a factor 1.5(2) (roughly 20% per year).
- ❑ Model changing : increased concentration of storage at fewer sites -> more network access
- ❑ So expect large Tier-2s need 20 Gbit/s or even 40 Gbit/s in next 2 years for LHC traffic alone
- ❑ Most Tier-2s actually have
 - 2 x 10 Gbit/s Janet connection
 - About 50% of this (1 x 10 Gbit/s) for Tier-2 traffic

Tier-2 - General expectations of CMS

- ❑ CMS has been successfully making use of remote data access using AAA ('Any data Anytime Anywhere') for 3-4 years and it now forms a significant part of the computing model.
- ❑ CMS will require similar capacity to ATLAS at its main sites (ICSTM, Brunel, RAL), i.e. at least 20 Gb/s for most of the UK Tier-2 traffic alone in the next 2 years. The exception to this is the large Tier-2 site at ICSTM which already uses up to 30 Gb/s of a 40 Gb/s
- ❑ The large USA Tier-2s are already at 100GB/s and there are plans in Germany and Italy to similarly upgrade.
 - The UK needs to monitor this situation.
- ❑ CMS large Tier-2s
 - ICSTM : Use up to 30 of 40 Gbit/s
 - Brunel 2 x 10
 - RAL : see Tier1

We tried to collect a summary of IPv6 readiness

Not sure how useful it is

See more detail at

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

IPv6 readiness

The IPv6 status of each Tier-2 is shown in the table below.

	IPv6 Ready	Description/Comments
UKI-LT2-Brunel	Yes	Brunel has been on dual stack for nearly 4 years.
UKI-LT2-IC-HEP		
UKI-LT2-QMUL	Yes	IPv6 connectivity to all outward facing GRID services (SE, GRIDFTP, Webdav, xrootd, CEs, SQUIDS...) . Plan to extend to worker nodes in the future
UKI-LT2-RHUL	No	
UKI-LT2-UCL		
UKI-NORTHGRID-LANCS-HEP		
UKI-NORTHGRID-LIV-HEP	Ongoing	Capability established, tranche of addresses provided, technically tested. However, link very slow. Cluster room refurb is our priority until Sept; after that, we'll look for bandwidth improvements, and a gradual migration to IPv6.
UKI-NORTHGRID-MAN-HEP		
UKI-NORTHGRID-SHEF-HEP	No	The University of Sheffield does not currently run IPv6 on its Internet links due to hardware/software limitations on current border routers, which are unlikely to be replaced in 2018. If IPv6 is requirement for GridPP, then a separate, IPv6-only link could possibly be sourced from Janet (at additional cost), but this would also need separate firewalling hardware, (again, at extra cost). If IPv6 is requirement, but high-bandwidth isn't, the University could ask Janet to provide IPv6 link over a single 1Gbps link as was done previously. Firewalling this 1Gbps link would still need consideration.
UKI-SCOTGRID-DURHAM	Partial	IPv6 is available and usable, waiting for IPv6 reverse DNS support from the University for full implementation.
UKI-SCOTGRID-ECDF	No	
UKI-SCOTGRID-GLASGOW	Has an IPv6 allocation	Site has an IPv6 allocation, at present does not route IPv6 to production cluster. Rollout of IPv6 is slated to take place with move to Data Centre in 2018
UKI-SOUTHGRID-BHAM-HEP	No	
UKI-SOUTHGRID-BRIS-HEP	We believe campus is IPv6 enabled.	UKI-SOUTHGRID-BRISTOL-HEP lcgce01, & lcgse01 & its I/O server are in IPv6 production as far as we think / know. We're quite sure about the Storage. We *think* the CE is enabled & configured correctly for IPv6.
UKI-SOUTHGRID-CAM-HEP	Yes	Campus has been ready for several years. We have a /64 allocated. Grid site shares the local network with group resources (ie. Linux, Windows and MAC) and so there is some concern about what will happen when IPv6 is turned on.
EFDA-JET		
UKI-SOUTHGRID-OX-HEP	No	Some test systems with limited bandwidth. Awaiting University upgrade.
UKI-SOUTHGRID-RALPP	No	IPv6 has now reached the routers above the Tier 2 router. We have requested an IPv6 allocation and developed an addressing plan. We will meet with networking soon to develop a plan to roll it out on the Tier 2.
UKI-SOUTHGRID-SUSSEX		

Table 2 : IPv6 status of each Tier-2 site.

- ❑ The LHC is now just over half way through its Run-2, which started in 2015 and will finish mid 2018. To date, the LHC has been very successful, leading to larger data rates/volumes than expected. In addition, several experiments are moving further towards “move data to compute” models, or accessing data over the network. Therefore, we expect the network requirement to increase.
- ❑ We expect that the Tier-0 ↔ RAL Tier-1 network requirement will rise to approximately 40 Gb/s within the next 2 years, with at least 20 Gb/s fall back redundancy. Tier-0 ↔ Tier-1 data will continue to be transferred via the LHCOPN for the foreseeable future.
- ❑ The Tier-1 connection to Janet should be served by the on-going upgrade plans for the RAL campus, which targets 60 Gb/s and even 100 Gb/s later. This is within the planning scope of STFC-RAL and its connection onto Janet.

- In the next 2 years, the larger Tier-2 sites (Glasgow, Manchester, Lancaster, QMUL, Imperial, RAL) are likely to need at least ~ 20 Gb/s connections for Tier-2 traffic alone and some may even require 40 Gb/s (ICSTM already has 30 Gb/s).
- We expect the medium and smaller GridPP sites to require 5-10 Gb/s for Tier-2 traffic, though there are some “medium” sites that currently have a high network I/O rate and a connection bandwidth similar to the larger sites.
- We note that ATLAS and CMS plans envisage major Tier-2 sites connected at 40-100 Gb/s in the next few years. This is already being implemented in the US and there are plans in Germany and Italy. GridPP will keep this under review and advise Janet appropriately. This would be limited to the large sites listed above.
- The UK still sees no imperative to use LHCONE at present, but continues to work to join in order to understand any associated issues.