

# UK-T1-RAL Update

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**The UK Tier-1  
Centre**

LHCOPN



**GridPP**  
UK Computing for Particle Physics

# GridPP

*delivering*

The UK Grid for Particle Physics

Week 09      Week 10      Week 11  
CPUS   ■ Running Processes  
Memory last month



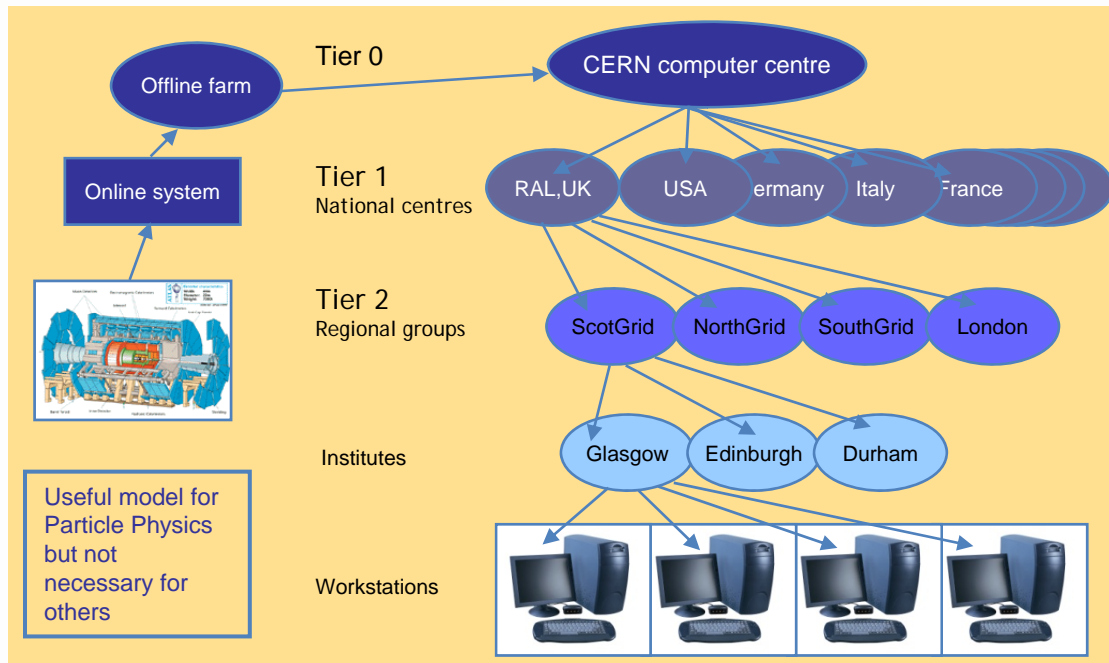


**GridPP**  
UK Computing for Particle Physics

# What is GridPP?



GridPP is an internationally recognised collaboration of particle physicists and computer scientists from 19 UK universities, STFC and CERN, who have built a Grid for particle physics.



GridPP delivers the UK part of the Worldwide LHC Computing Grid (wLCG), a global project that the UK, with funding via GridPP, played a pivotal role in creating.

The LHC will produce unprecedented amounts of data, expected to rise beyond 10PB/year.



**GridPP**  
UK Computing for Particle Physics

# *National Impact*

UK Tier-2s – Leverage University funding, Local publicity



New kit from Viglen at QMUL

UK Tier-2s – Enabled development of new University-based facilities



New machine room at Glasgow

Tier-2: 15,000 CPUs, 3PB Disk

- GridPP has successfully developed and deployed a Grid across ~19 sites in the UK with ~20,000 cores and ~11 PB of storage.
- RAL Tier-1: Oxfordshire.
- ScotGrid: Durham, Edinburgh, Glasgow.
- NorthGrid: Lancaster, Liverpool, Manchester, and Sheffield.
- SouthGrid: Birmingham, Bristol, Cambridge, Oxford, RAL PPD and Jet.
- London: Brunel, IC, QMUL, RHUL, and UCL.
- This has changed the landscape of HEP computing in the UK, placing UK physicists at the forefront of research by allowing seamless access to local, national and international resources through the Grid paradigm.



The Science and Technology Facilities Council is an independent, non-departmental public body of the Department for Business, Innovation and Skills (DBIS).

STFC was formed as a new Research Council on 1 April 2007 through a merger of the Council for the Central Laboratory of the Research Councils (CCLRC) and the Particle Physics and Astronomy Research Council (PPARC) and the transfer of responsibility for nuclear physics from the Engineering and Physical Sciences Research Council (EPSRC).

STFC is a science-driven organisation, ...ambition... to do the highest quality research tackling some of the most fundamental scientific questions.

- funding researchers in universities directly through grants
- providing in the UK access to world-class facilities,
- providing in the UK a broad range of scientific and technical expertise
- providing access to world-class facilities overseas

STFC has campuses at Harwell (RAL), Daresbury, the UKATC and in Swindon





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# RAL and the Harwell Campus

The Rutherford Appleton Laboratory (RAL) is located on the Harwell Science and Innovation Campus near Chilton in Oxfordshire.

RAL supports research in areas including materials and structures, light sources, astronomy and particle physics.

Every year about 10,000 scientists and engineers use the Laboratory's facilities to advance their research. Many are academics and post-graduate students working on projects funded by STFC.





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# Science Facilities #1



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**ISIS**

## **ISIS**

*a world-leading centre for research in the physical and life sciences at the Rutherford Appleton Laboratory. The suite of neutron and muon instruments allow the properties of materials to be understood at the scale of atoms.*



## **Central Laser Facility**

*a partnership between its staff and the large number of members of UK and European universities who use the specialised laser equipment provided to carry out a broad range of experiments in physics, chemistry and biology.*





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## Science Facilities #2



diamond

### **The Diamond Light Source**

*a third generation synchrotron light source facility based at the STFC's Harwell Science and Innovation Campus producing X-ray, infrared and ultra-violet beams*



**Research Complex  
at Harwell**

### **The Research Complex at Harwell (RC@H)**

*is a new, multidisciplinary laboratory that will provide facilities for researchers to undertake new and cutting edge scientific research in both life and physical sciences and the interface between them. It will be open, on a competitive basis, to research teams from UK universities, as well as to Diamond and STFC staff. The MRC is leading the project on behalf of RCUK, in partnership with BBSRC, EPSRC, NERC, STFC and Diamond.*



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## Science Programmes

### **Space Science and Technology Department**

*carries out an exciting range of world-class space research and technology development. With significant involvement in over 150 space missions in recent years, SSTD is at the forefront of UK Space Research.*

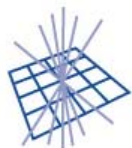
### **Earth Observation and Atmospheric Science**

*contributes to and underpins UK and international programmes in environmental science through the provision of research expertise, services, and facilities in support of the UK science community.*

### **Particle Physics**

*STFC coordinates the UK particle physics and particle astrophysics programmes and is involved in many high energy physics experiments at different research institutes around the world*

### **UK Tier 1 Centre**



**GridPP**  
UK Computing for Particle Physics

**LHCOPN**



**GridPP**  
UK Computing for Particle Physics

# *UK Tier 1 at RAL*



**Tier-1: 4,500 CPUs, 3PB Disk, 5PB Tape**





## Overview

- o T1 operated successfully during first part of LHC data taking in November and December. Transition from simulated and real data taking was almost imperceptible and no unexpected problems.*
- o Data loads generally remained low, and not all use cases yet seen*

## Priority Work

- o Resolution of stability problems associated with the new R89 Computer Building
  - Two cooling failures in August – BMS problems and now resolved*
  - Condensate leak into machine room and tape robot. Luckily there was minimal damage and the leak (inadequate drainage) has been addressed with a full water audit completed!*
  - Power supply problems – an impedance mis-match between UPS supply and load characteristics of the equipment in the UPS room. Remedial work nearly complete**
- o Resolution of problems half of last years disk procurement*

## Networking

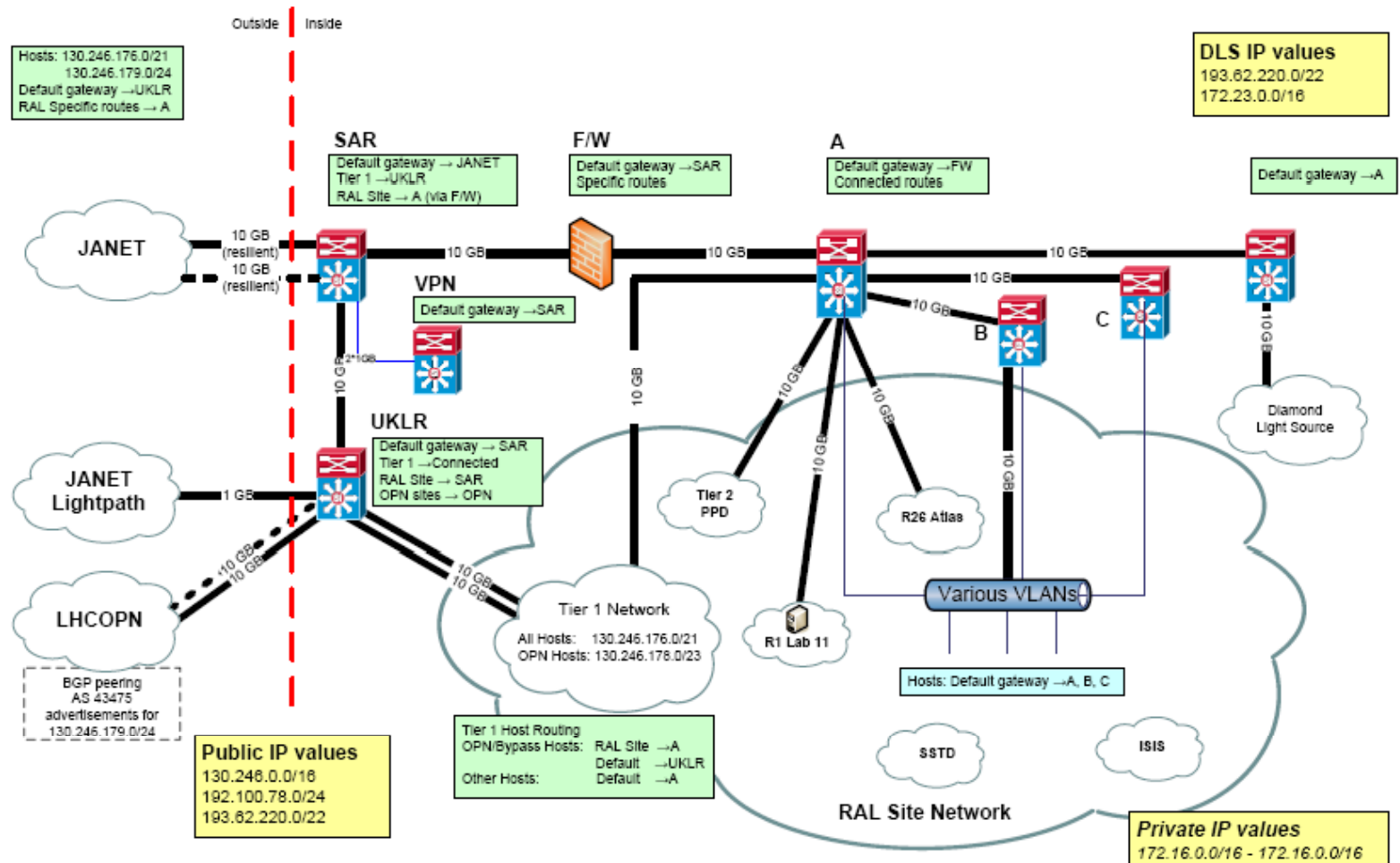
- o LHCOPN resilient link operating at 10G being installed.*
  - RAL JANET connection being upgraded to a path resilient 2 \* 10G*



# Networking at RAL

TDA-2010-02  
Published

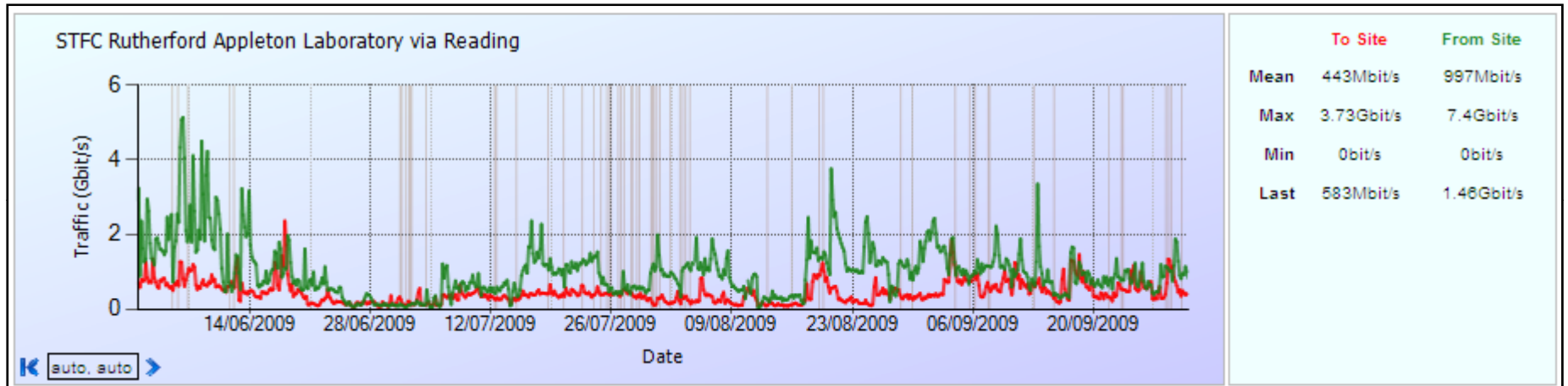
RAL Core Network (Version 1.7)



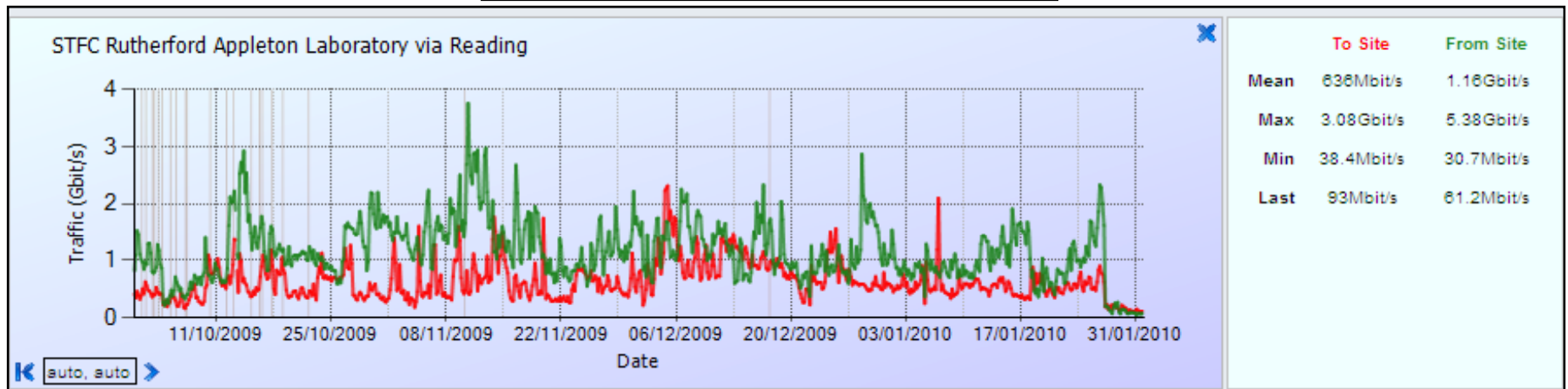


# RAL – JANET Recent Usage

June 2009 – September 2009



October 2009 – January 2010

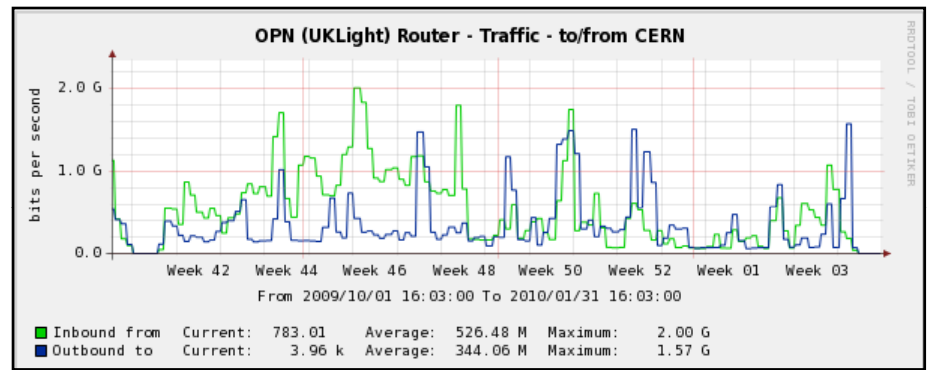
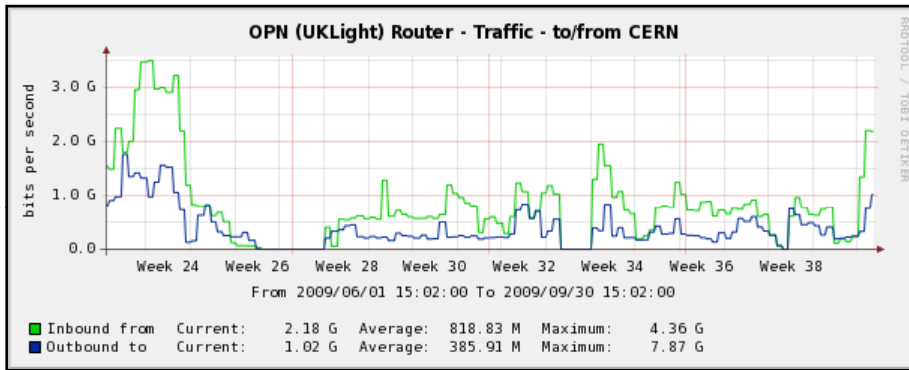




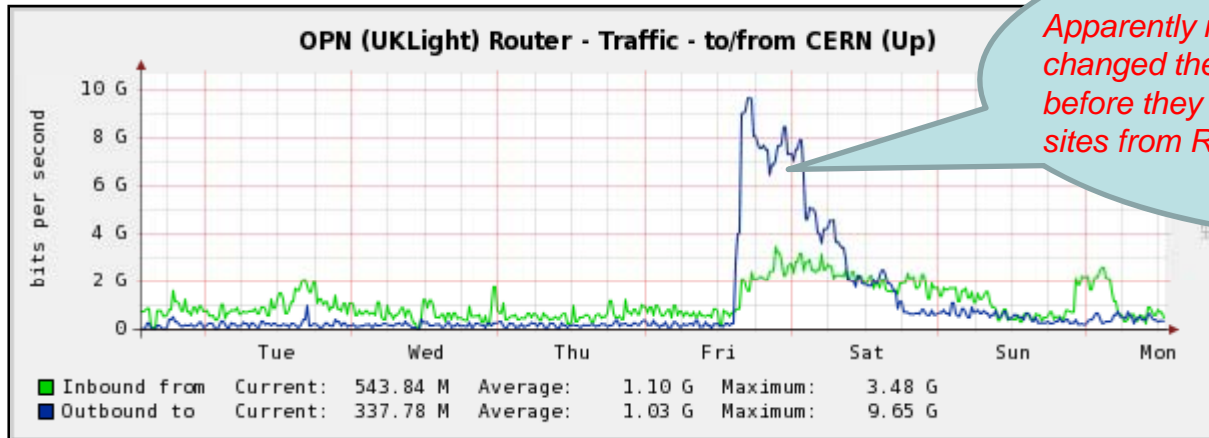


# LHCOPN Recent Usage

June 2009 – January 2010



23 February – 1 March 2010

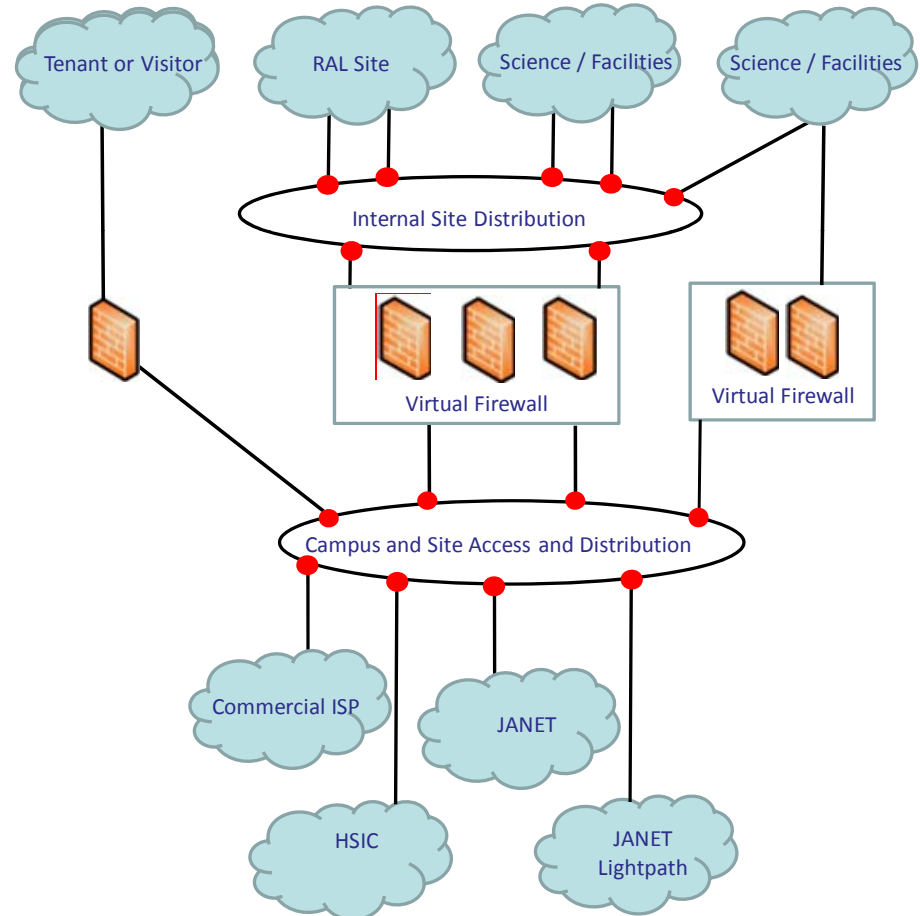
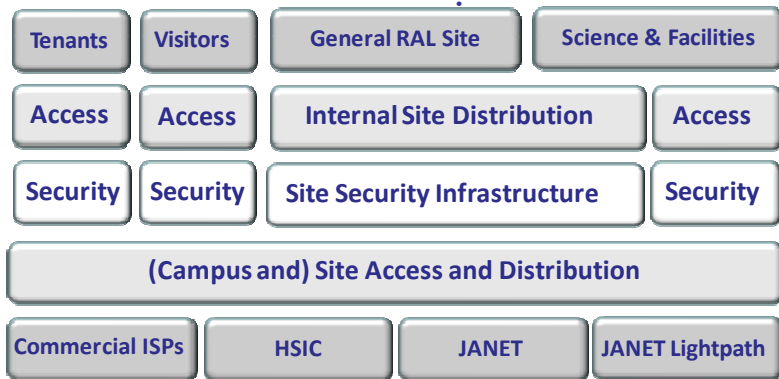


*Apparently normal operations. ATLAS seem to have changed the way they allow datasets to accumulate before they initiate a move to replicate (to other Tier-1 sites from RAL in this case).*

# RAL Tier 1 Network Load

Updated: Mar 05 2010 15:30:15









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# Questions?