



# New developments on the WLCG site at IFIN-HH

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- DIRECTIONS IN GRID, HIGH-PERFORMANCE, AND CLOUD COMPUTING
- GRID INFRASTRUCTURE AND USER COMMUNITIES
- RO-LCG FEDERATION
- HIGH-PERFORMANCE SCIENTIFIC COMPUTING
- HPC ACTIVITIES @ IFIN-HH
- CLOUD COMPUTING FOR RESEARCH AND EDUCATION
- PROSPECTS

The IT group from the Department of Computational Physics and Information Technology (DFCTI) of IFIN-HH started its grid activities in 2004, contributing to the computational support of the ATLAS experiment and for some South-East European virtual organizations.

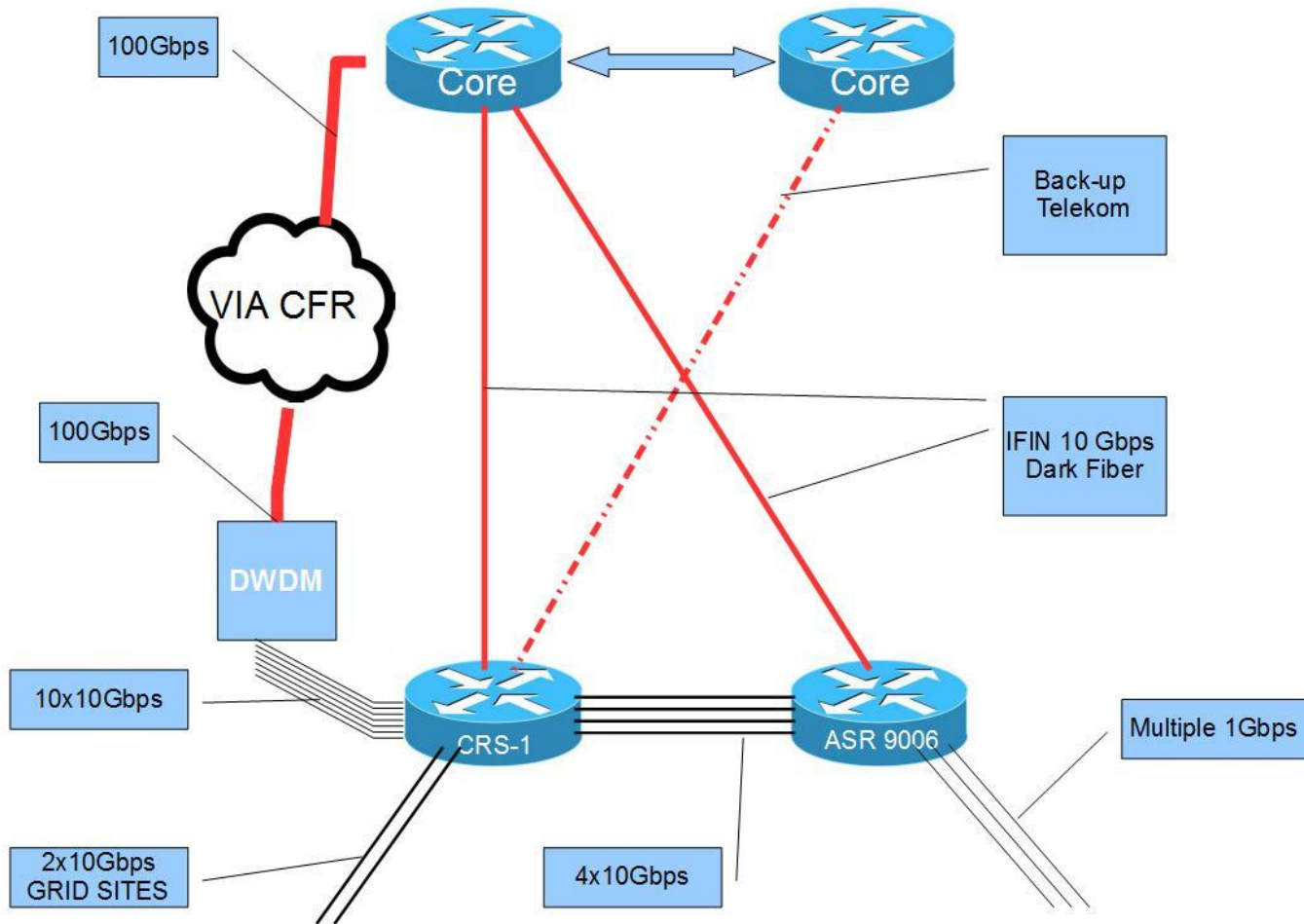
Currently, DFCTI provides:

- Coordination of RO-LCG - Romanian Tier-2 Federation (since 2006)
- Hosting and management for the RO-07-NIPNE, RO-11-NIPNE, and IFIN GRID sites
- Support for ALICE production, ATLAS, LHCb, and for eli-np.eu, gridifin, ifops Vos
- Hosting NGI-RO –monitor and support the other Romanian grid sites
- Hosting of RoEduNet's POP Magurele
- Administration of the communication node of Magurele Campus (for 6 grid sites)

Grid clusters are hosted in two data centers, currently connected through 4x10 Gbps links

IFIN-HH CORE

Another 10 Gbps Link for grid is going to be installed to ASR  
 Migration of the sites on CRS/ASR directly needs further reconfiguration



## RO-07-NIPNE: HARDWARE



### ❑ Support infrastructure

Processing: APC – 160KVA, water cooling

Storage: 4x80kVA UPU, (3+1)

### ❑ Processing capacity:

>2000 cores / ~250 nodes

8, 16, 20,32 cores / server

### ❑ Storage capacity:

1.4PBytes

13 servers

### ❑ Network infrastructure:

40 Gbps FO connections between DCs

DC1->



DC2->



### Software configuration:

- Scientific Linux 6
- EMI 3 middleware
- 3 CEs with CREAM job management service – 11 queues
- PBS/TORQUE distributed resource manager - 2 xTorque-2.5.7-9  
- 1xTorque-4.2.10-5
- Maui job scheduler;
- 1 ARC-CE – 3 queues **-the first deployed in Romania**
- SLURM job manager and scheduler
- Disk Pool Manager (DPM) for disk storage – 14 DPM disks
- Top BDII
- VOMS (for local VOs)
- VOBOX(Alice)
- Argus server
- 6 VOs – Alice, Atlas, LHCb, Ops, eli-np.eu, lfops, (local monitoring)
- CVMFS support for all WLCG VOs





## Member of LHCONE network



The screenshot shows a web browser window with the address bar containing the URL <https://twiki.cern.ch/twiki/bin/view/LHCONE/LhcOneVRF>. Below the browser window, a table lists network members. The table has 10 columns. The first column contains the member name, the second column contains the number of members, the third column contains the IP address, the fourth column contains a hyphen, the fifth column contains an email address, the sixth column contains the network name, the seventh column contains the location, the eighth column contains the bandwidth, and the ninth and tenth columns contain 'Y'.

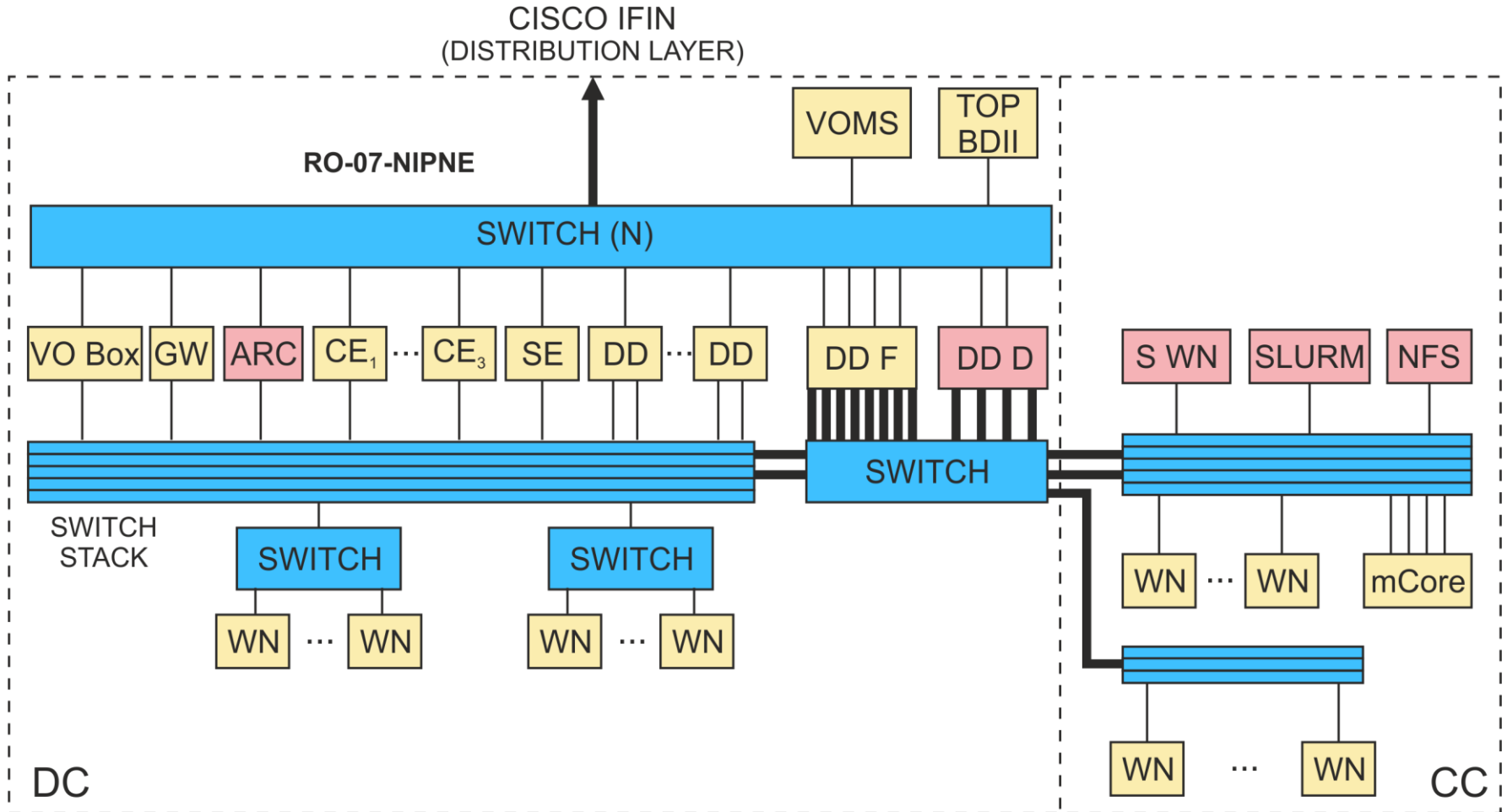
RO-07-NIPNE, RO-11-NIPNE, RO-02-NIPNE, NIHAM	2614	81.180.86.0/24	-	<a href="mailto:noc@roeduSPAMNOT.net">noc@roeduSPAMNOT.net</a>	RoEduNet	Magurele, IFIN-HH	10G	Y	Y
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# TOPOLOGY

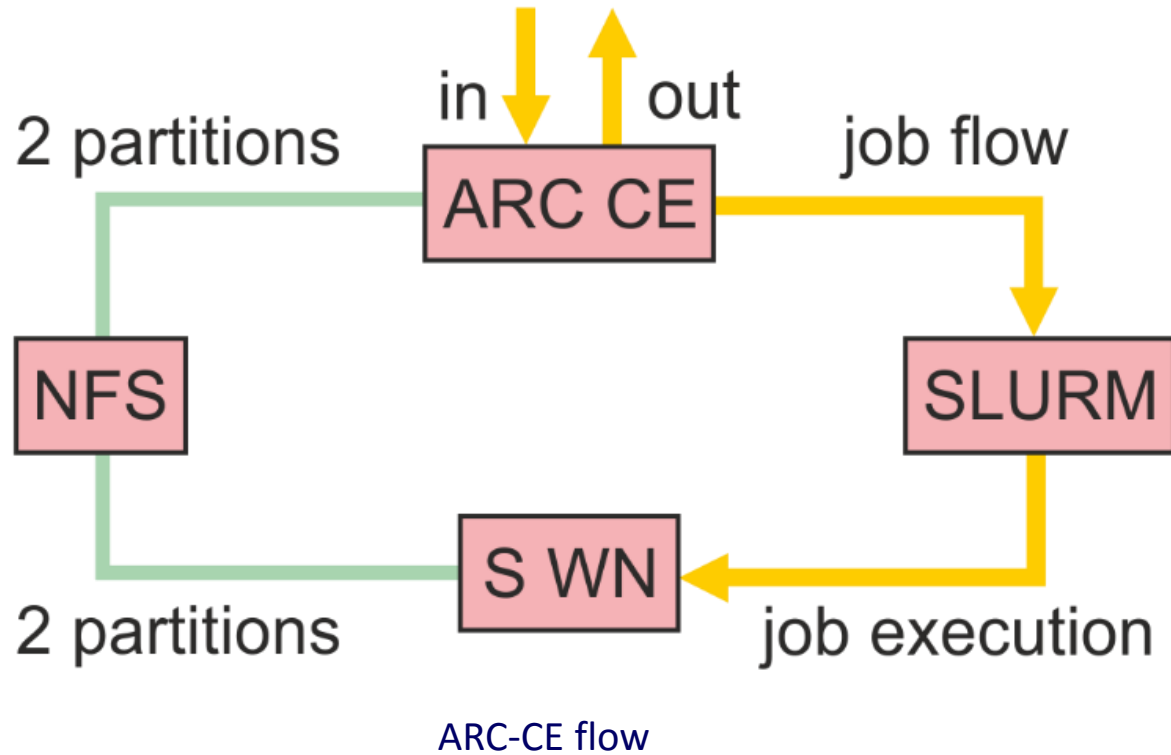


RO-07-NIPNE, RO-11-NIPNE, IFIN GRID  
DD = DPM disk server; mCore = multicore cluster  
Thick lines: 10 Gbps; thin lines 1 Gbps

Encircled in red: the last 12 months' upgrades

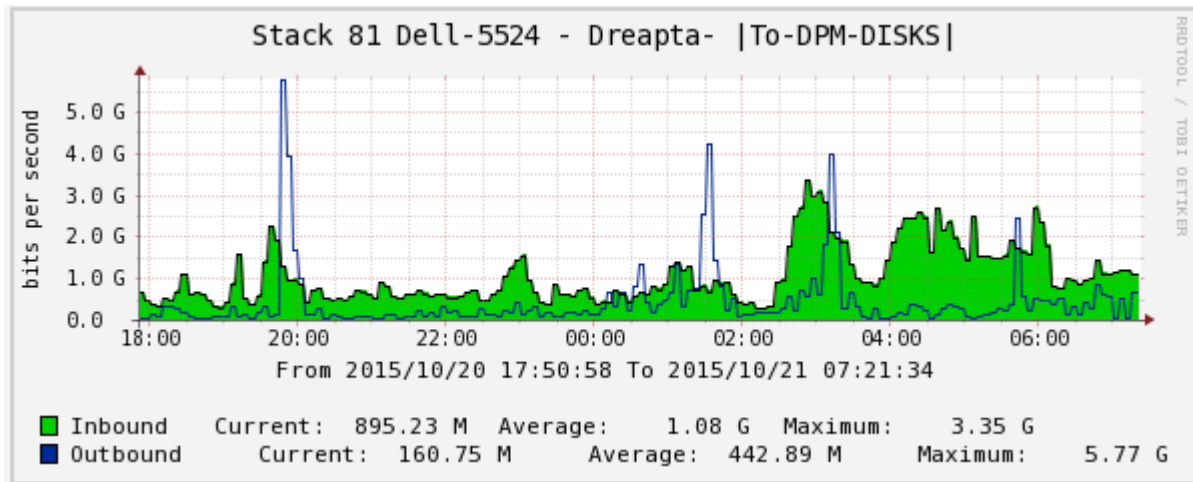
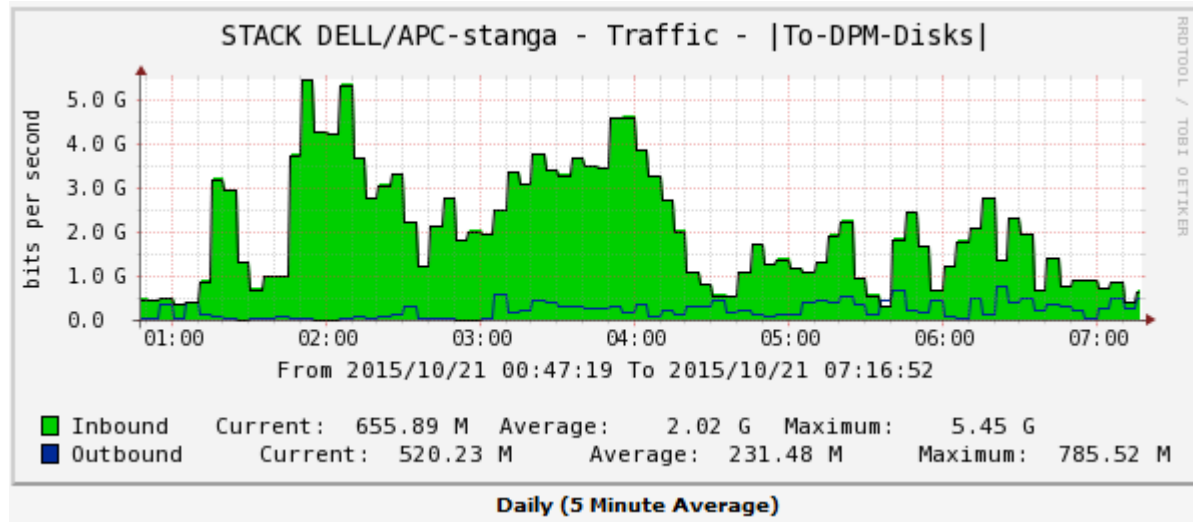






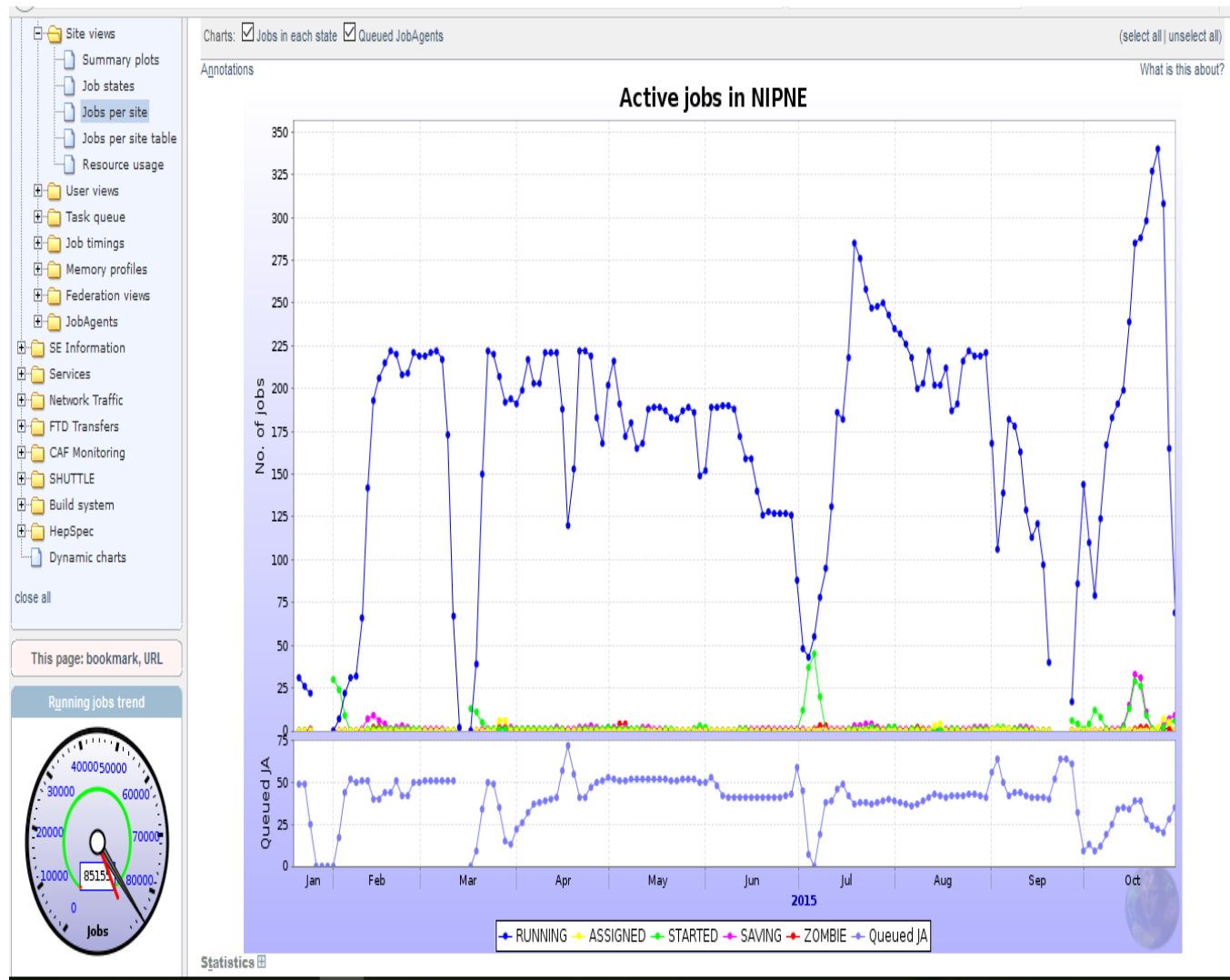
## Network output

In/Out peaks >5Gbps



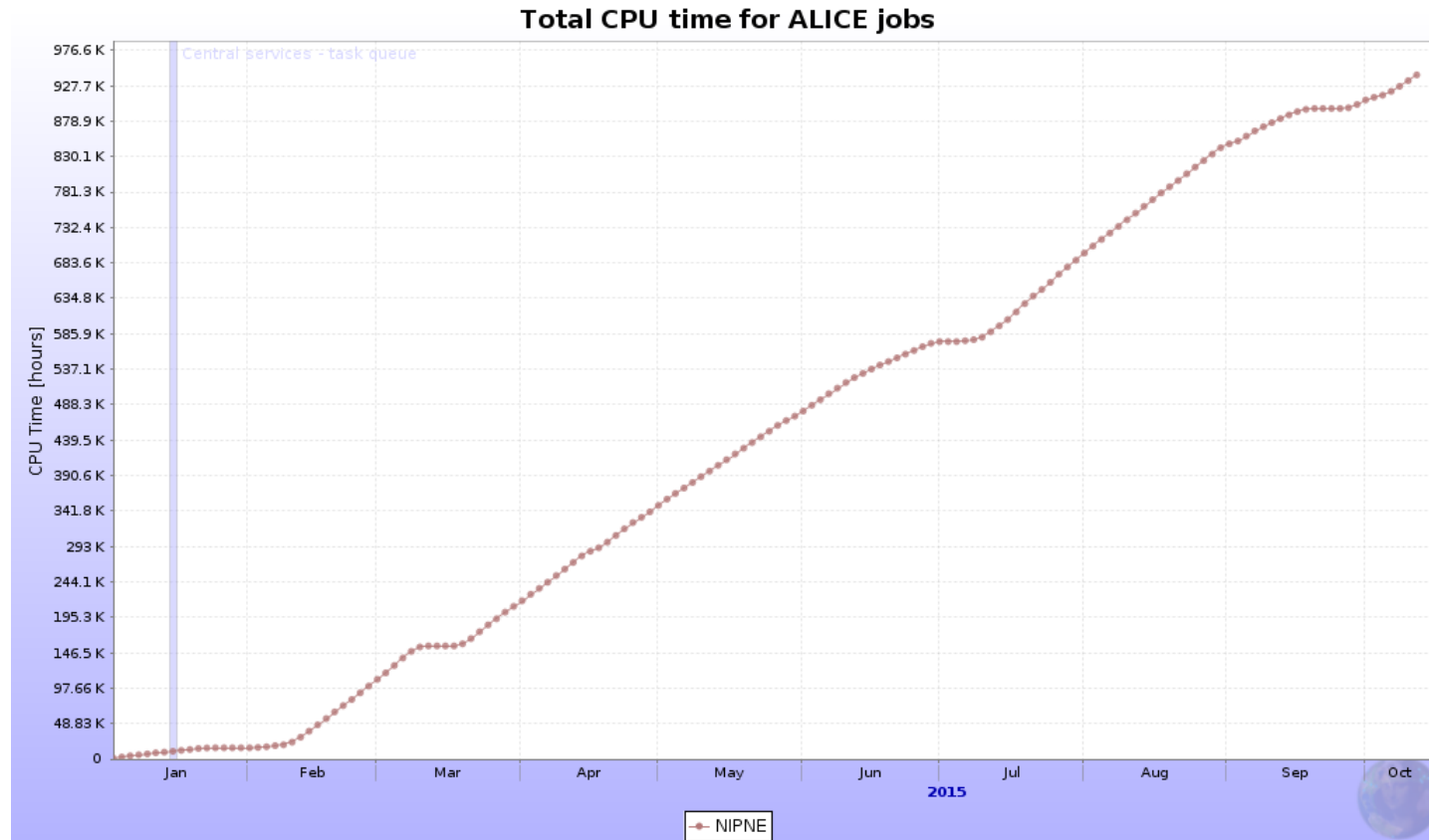
## Alice VO

- VOBOX
- dedicated CREAM
- 696 cores, 28 nodes
- 32 cores, 20 cores



## Alice VO

- Production jobs
- CPU time in 2015





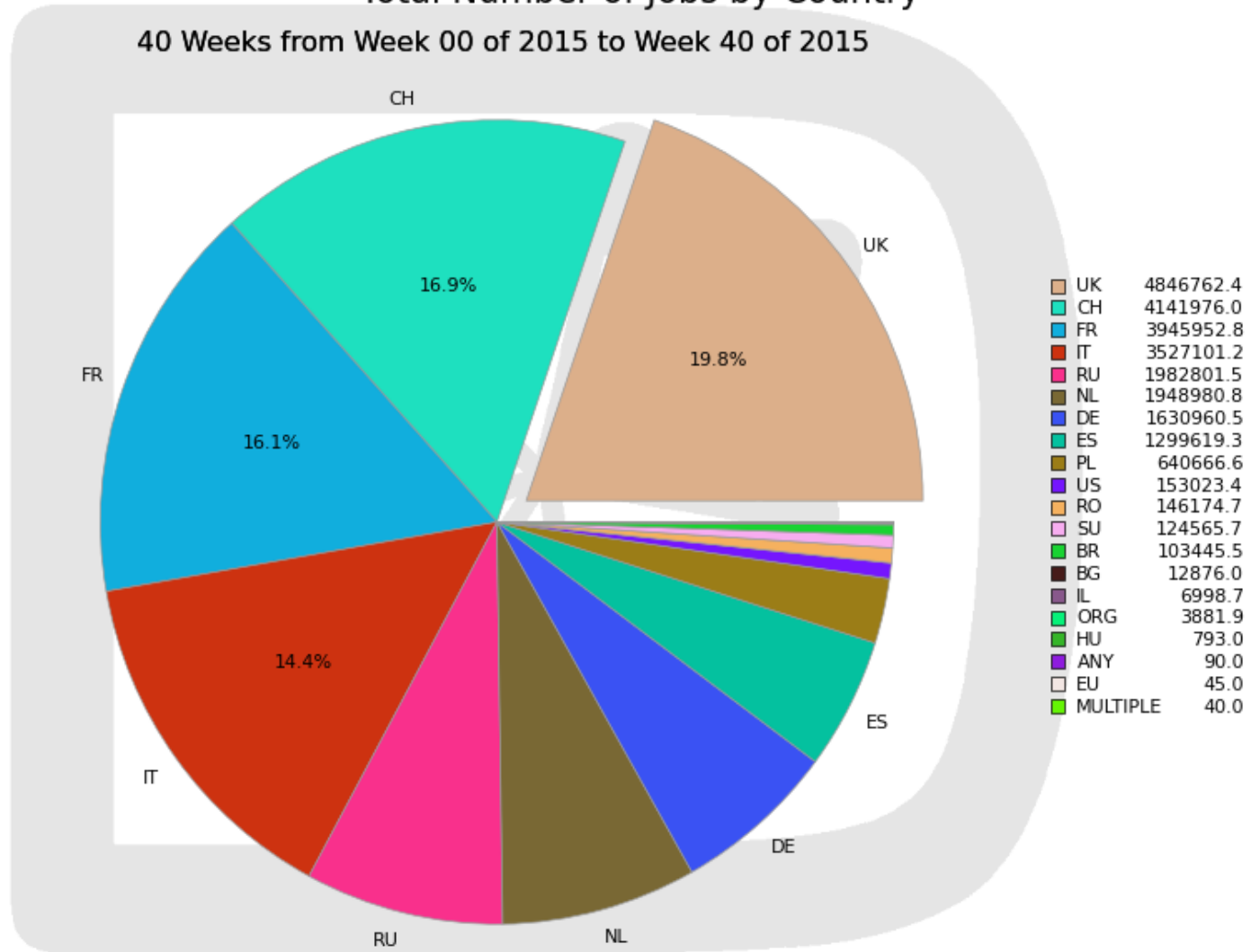
**LHCb VO**

•CREAM shared with ATLAS MC

•640 cores

•MC + Analysis

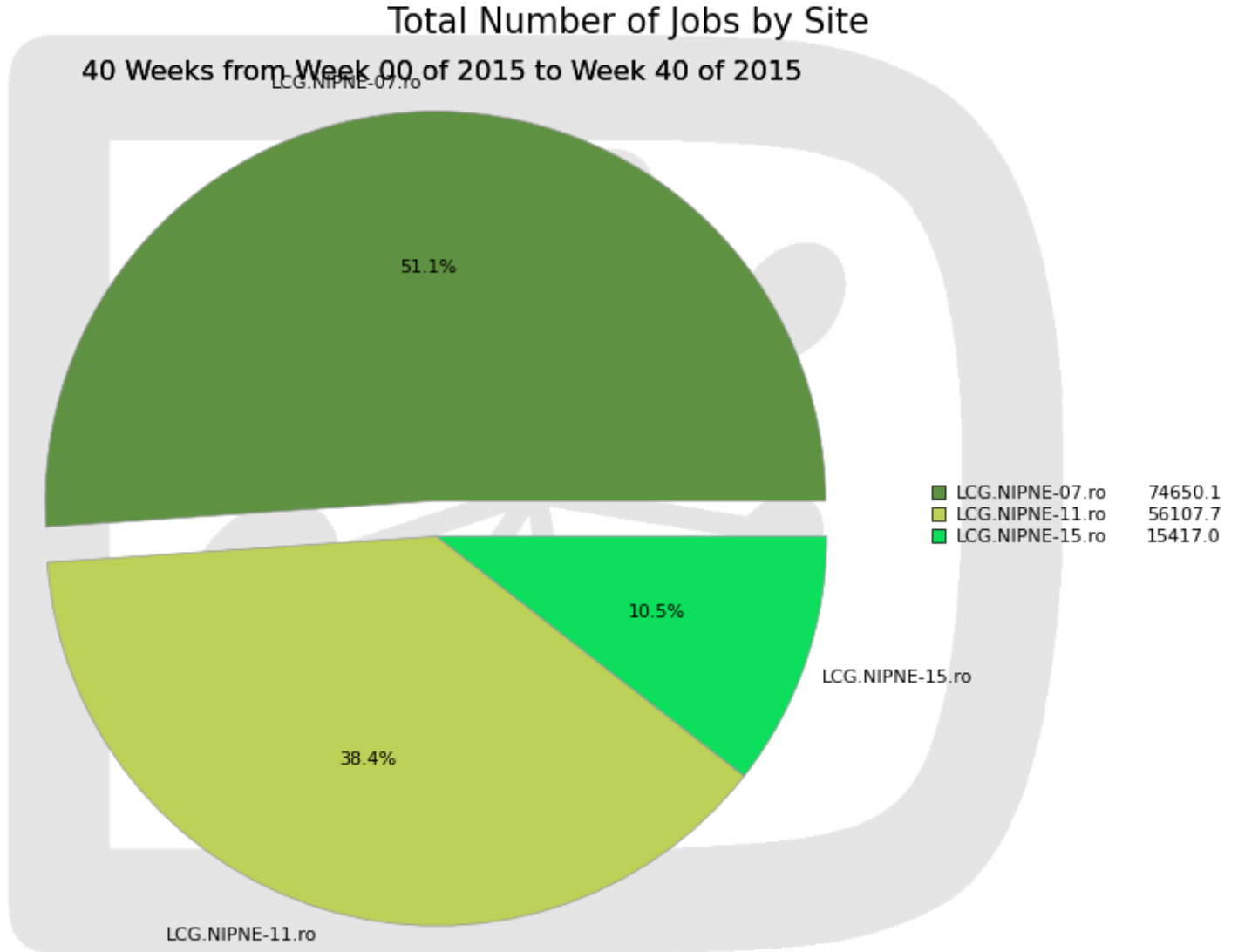
Total Number of Jobs by Country  
40 Weeks from Week 00 of 2015 to Week 40 of 2015





**LHCb VO**

- CREAM shared with ATLAS MC
- 640 cores
- MC + Analysis



**LHCb VO**

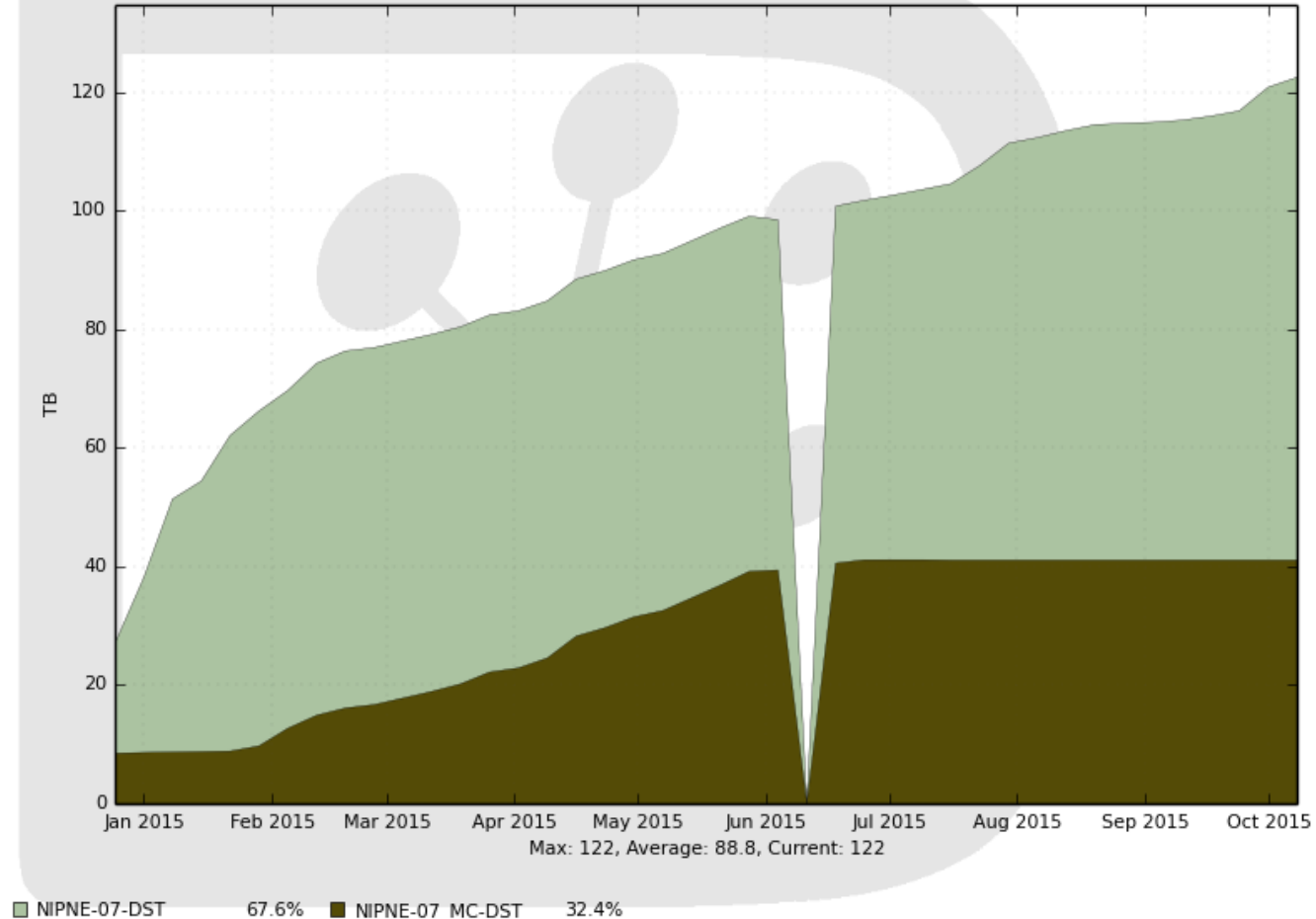
T2D(Tier2 with Data)  
In September 2014

335TB storage  
LHCb-Disk token  
Used >120TB

Data accessed via  
xrood and WebDav

PFN space usage by StorageElement

41 Weeks from Week 51 of 2014 to Week 40 of 2015



Generated on 2015-10-09 10:06:35 UTC

## **Atlas VO**

2 CREAMs +ARC-CE ,4 queue: analysis, production,  
Mcore, HPC

Mcore and analysis share >700 cores

Mcore limited to 50 jobs(nodes)

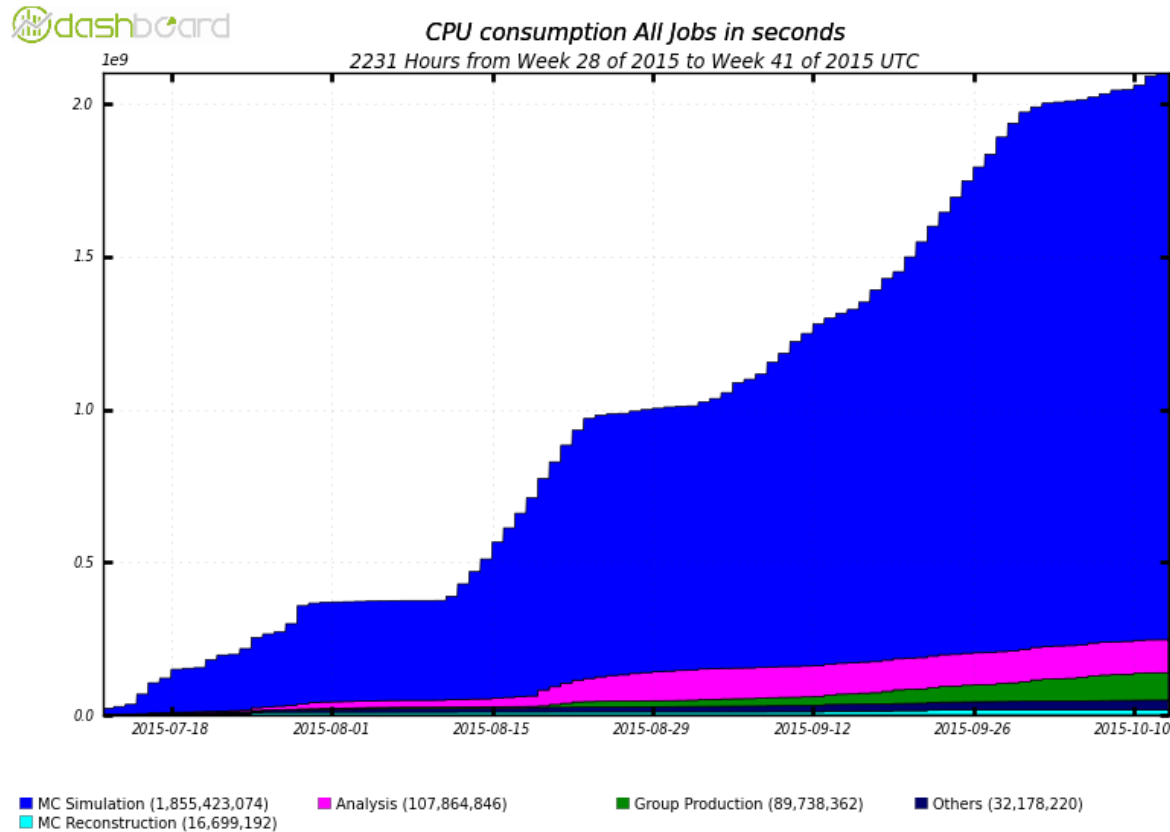
~500TB storage

824 core(dedicated) + 640 core(shared with LHCb)



# Atlas VO

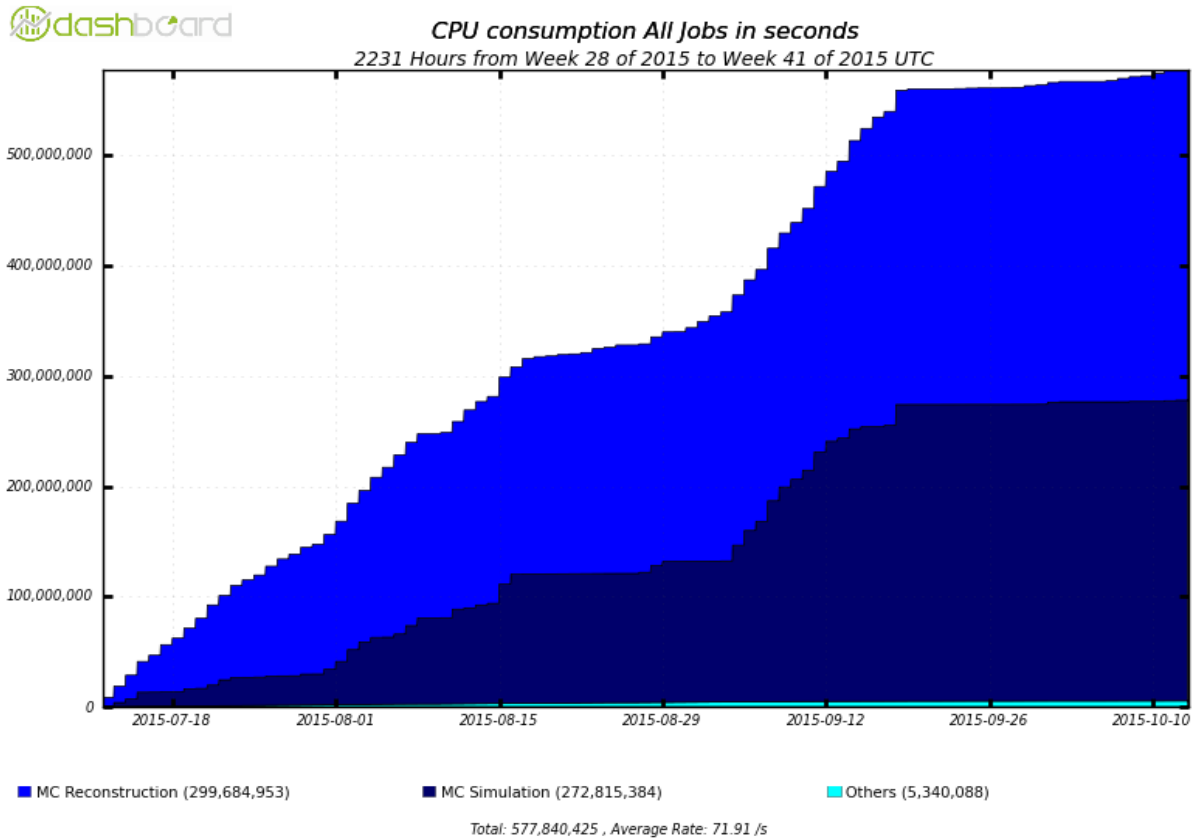
## Single core jobs



Total: 2,101,903,694 , Average Rate: 261.59 /s

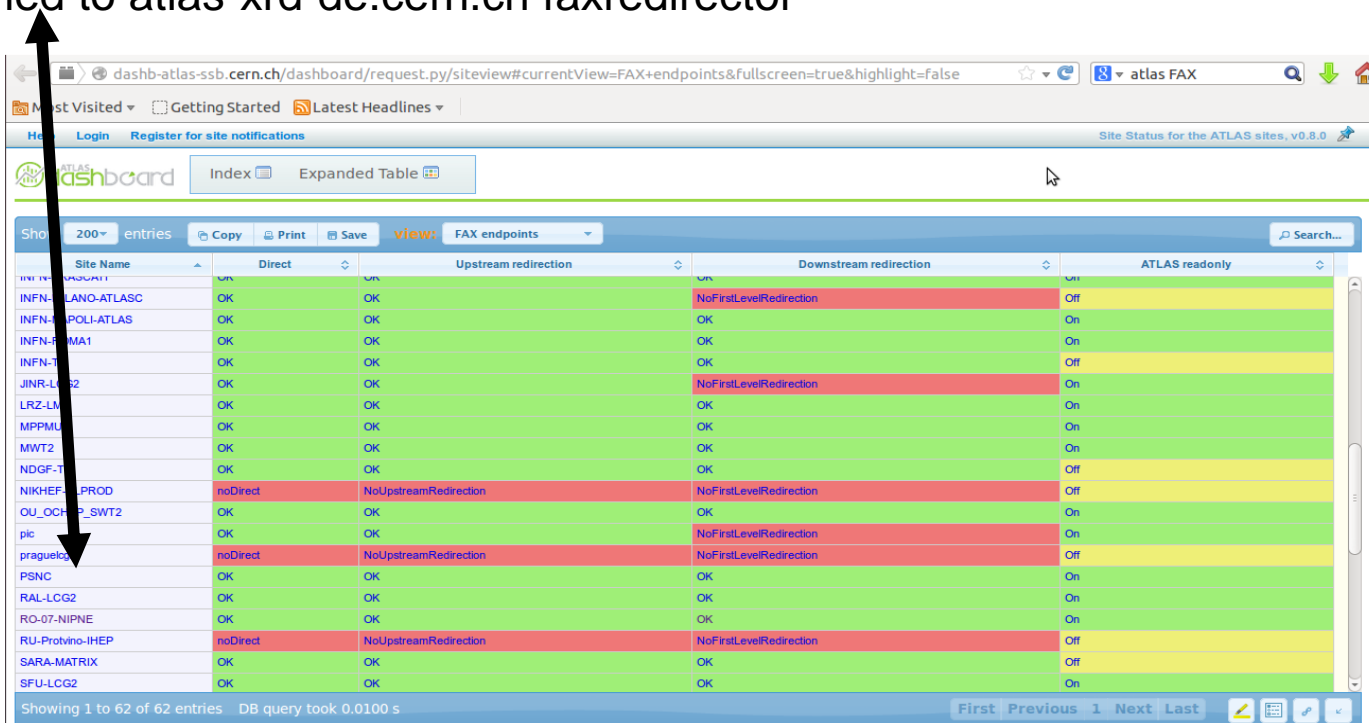
## Atlas VO

### Multi core jobs



## Atlas VO

Only RO-07-NIPNE from Romania is part of FAX(Federated ATLAS Xrootd)  
-attached to atlas-xrd-de.cern.ch faxredirector

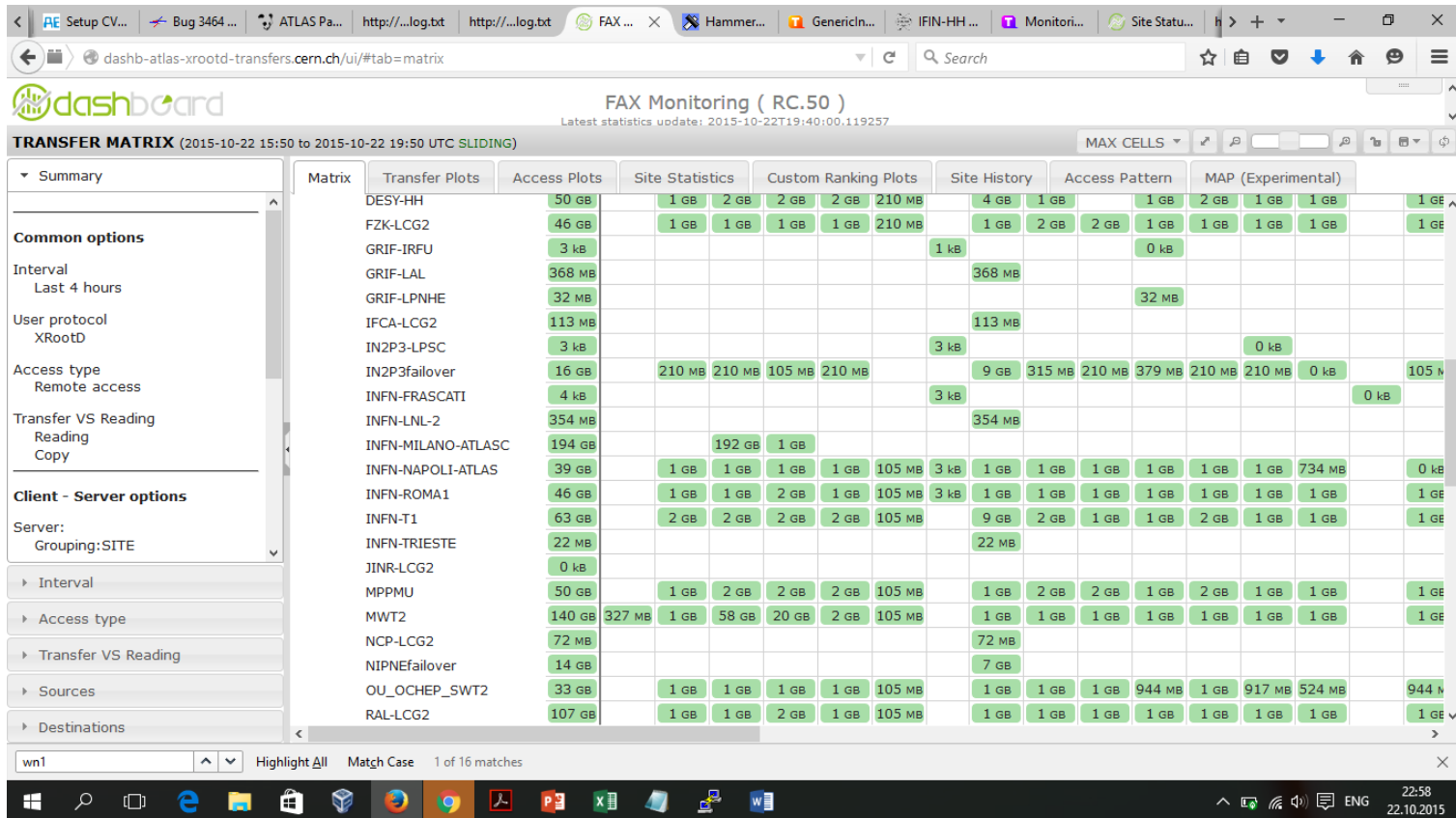


The screenshot shows the ATLAS dashboard with a table of site configurations. The table has columns for Site Name, Direct, Upstream redirection, Downstream redirection, and ATLAS readonly. The 'RO-07-NIPNE' row is highlighted in green, indicating it is part of the FAX endpoints.

Site Name	Direct	Upstream redirection	Downstream redirection	ATLAS readonly
INFN-FASANT	OK	OK	OK	Off
INFN-LANO-ATLASC	OK	OK	NoFirstLevelRedirection	Off
INFN-POLI-ATLAS	OK	OK	OK	On
INFN-PRIMA1	OK	OK	OK	On
INFN-T3	OK	OK	OK	Off
JINR-LCG2	OK	OK	NoFirstLevelRedirection	On
LRZ-LM	OK	OK	OK	On
MPPMU	OK	OK	OK	On
MWT2	OK	OK	OK	On
NDGF-T3	OK	OK	OK	Off
NIKHEF-PROD	noDirect	NoUpstreamRedirection	NoFirstLevelRedirection	Off
OU_OCHS_P_SWT2	OK	OK	OK	On
plc	OK	OK	NoFirstLevelRedirection	On
prague1	noDirect	NoUpstreamRedirection	NoFirstLevelRedirection	Off
PSNC	OK	OK	OK	On
RAL-LCG2	OK	OK	OK	On
RO-07-NIPNE	OK	OK	OK	On
RU-Protvino-IHEP	noDirect	NoUpstreamRedirection	NoFirstLevelRedirection	Off
SARA-MATRIX	OK	OK	OK	Off
SFU-LCG2	OK	OK	OK	On



# Atlas VO FAX transfers



## Conclusions

- IPv6 testing/implementation
- Installing and configuring new monitoring tool: check\_mk
- **Atlas** – becoming a T2D
- Moving from CREAM to HTCondor



**THANK YOU  
FOR YOUR ATTENTION!**

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