

Computing

Jiří Chudoba

Institute of Physics, CAS

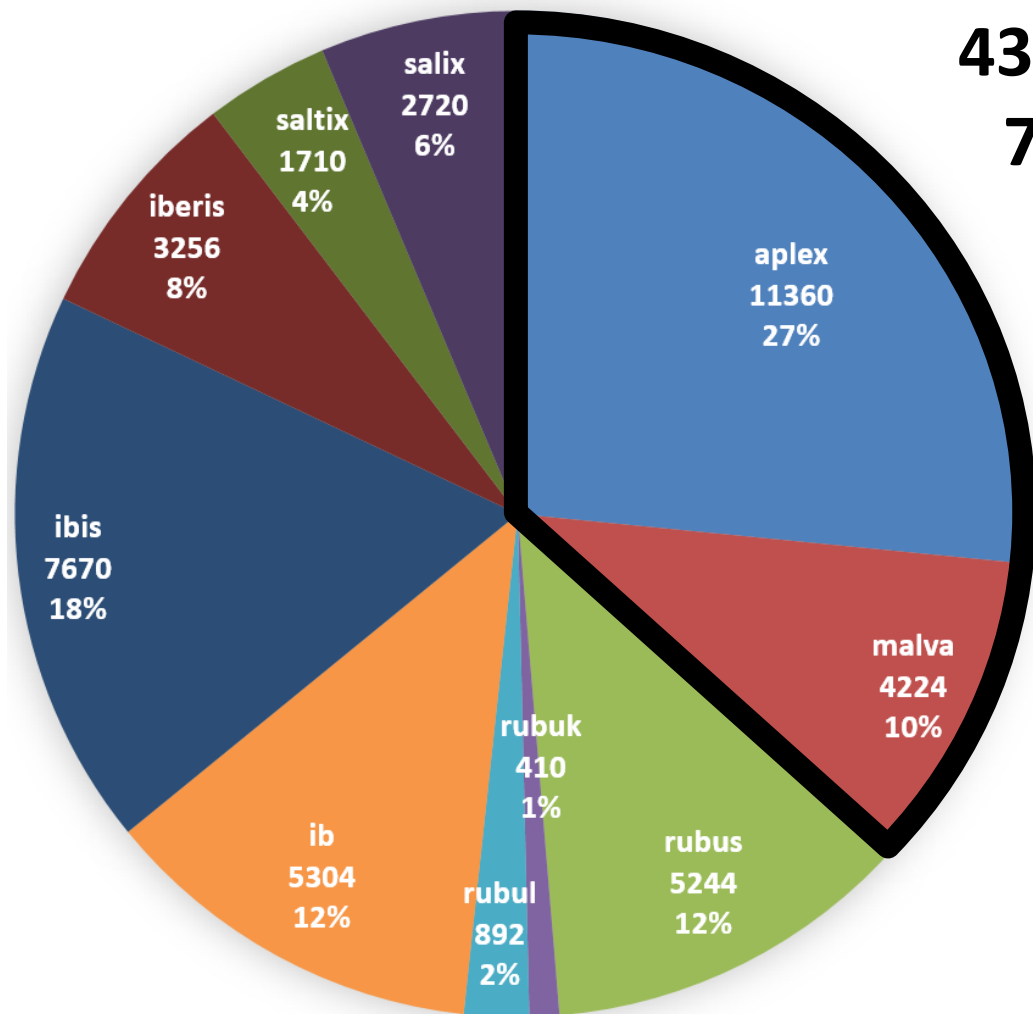
- ❑ CERN, LHC: ATLAS and ALICE
- ❑ FERMILAB: D0, NOVA
- ❑ Pierre Auger Observatory, Belle II, Cherenkov Telescope Array
- ❑ Main resources
 - INGO projects MEYS
 - Czech Academy of Sciences: Institute of Physics, Nuclear Physics Institute
 - Infrastructure, operational costs
 - CESNET (Czech NREN)
 - Networking, 1 grid site, NGI central services
 - CU and CTU
 - Tier3 clusters

- Location: IoP (Prague) and NPI (Rez)
 - NPI contributes by several disk servers dedicated to ALICE
- Server room
 - 62 m², 400 kVA UPS, 350 kVA diesel generator, 108 kW air cooling capacity, 176 kW water cooling capacity
 - upto 20 racks, 8 connected to water cooling system



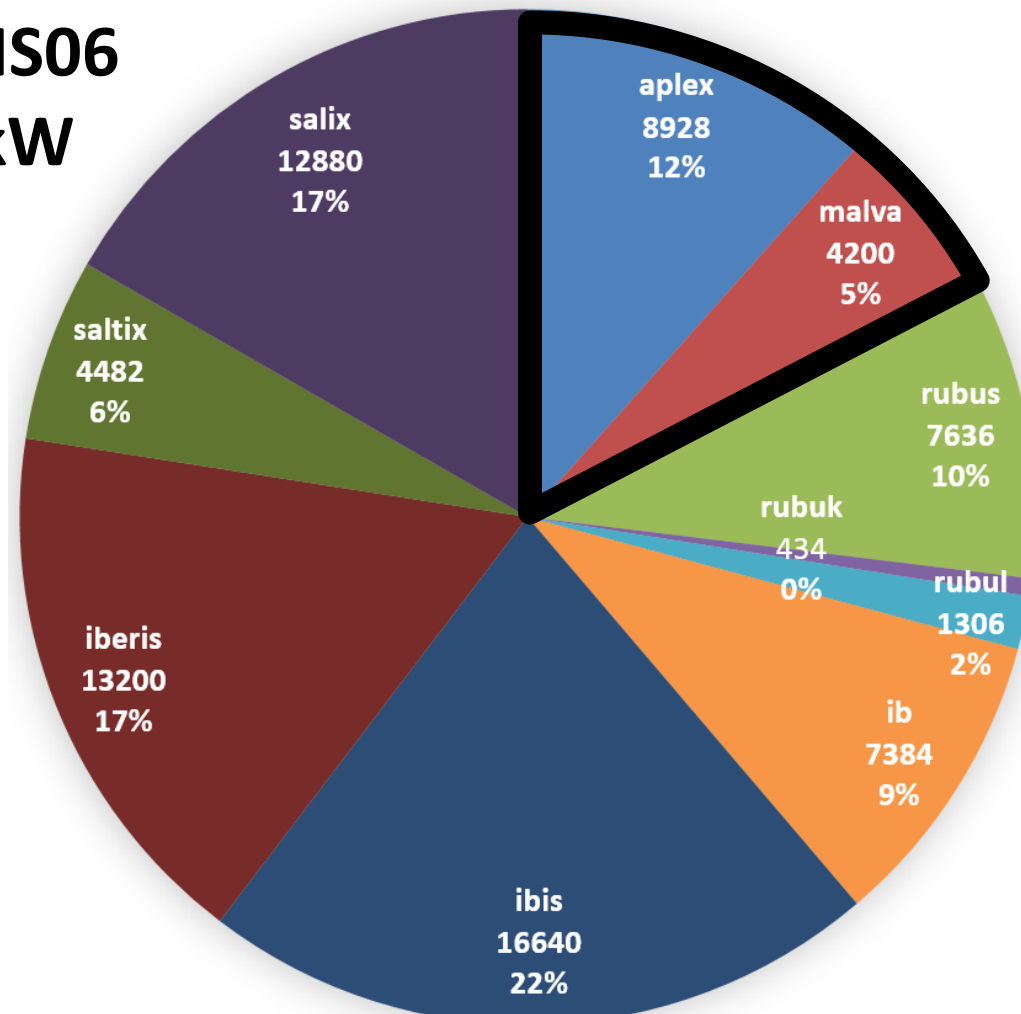
- ❑ Several subclusters, transparent for users
- ❑ 1 batch system (torque/maui)
- ❑ UI, CREAM CE, BDII, APEL, ... – virtualized infrastructure (virt01, 02, 03)
- ❑ home directories – Optima disk array (9 TB total)
- ❑ Subclusters under warranty:
 - aplex01 – aplex32
 - asus servers in iDataPlex rack, 12/2014, 11360 HS06, 1072 jobslots
 - malva01 – malva12
 - supermicro twin servers, 12/2013, 4220 HS06, 384 jobslots

Performance share [HS06, %]



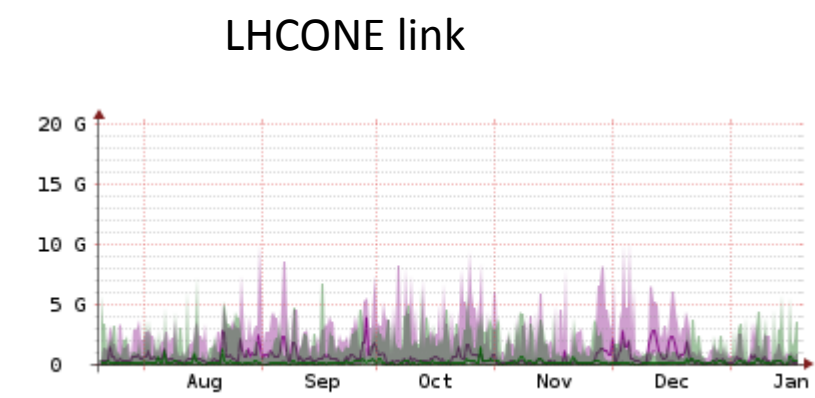
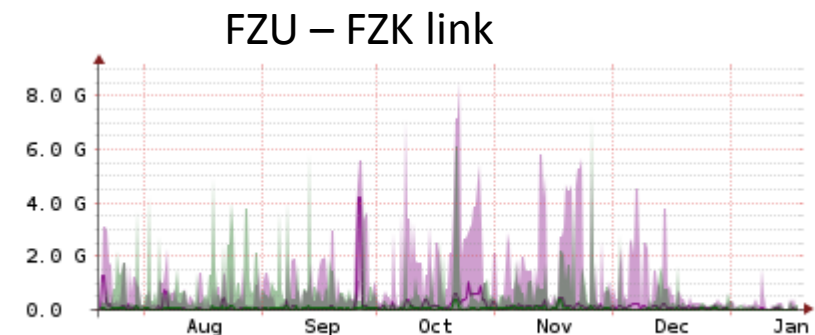
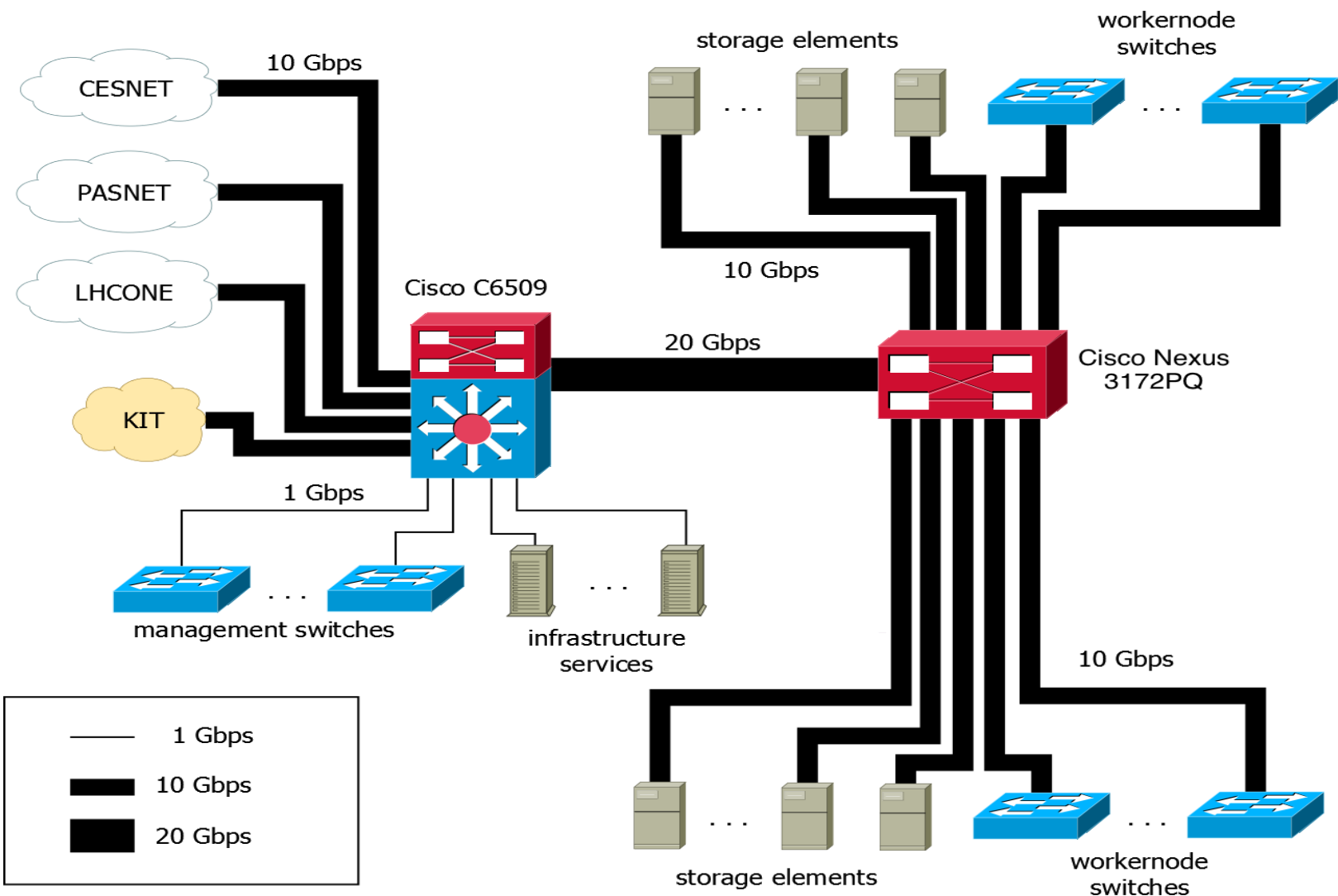
43 kHS06
77 kW

Input power share [W, %]



- ❑ DPM servers for ATLAS, PAO, CTA, BelleII
 - 12 servers plus headnode
 - 2.5 PB for ATLAS, 200 TB for PAO
- ❑ xrootd servers for ALICE
 - 4 servers at IOP plus 4 servers at NPI
 - 1 PB
 - plus 400 + 100 TB soon

Network



ATLAS + ALICE: 12000 HS06, 2500 TB

- without local jobs and LOCALGROUPDISK (ATLAS)
- fulfilled every month from 137% to 230%
 - usage of unsupported hw, minimal downtimes, lower usage by NOvA

February 2015

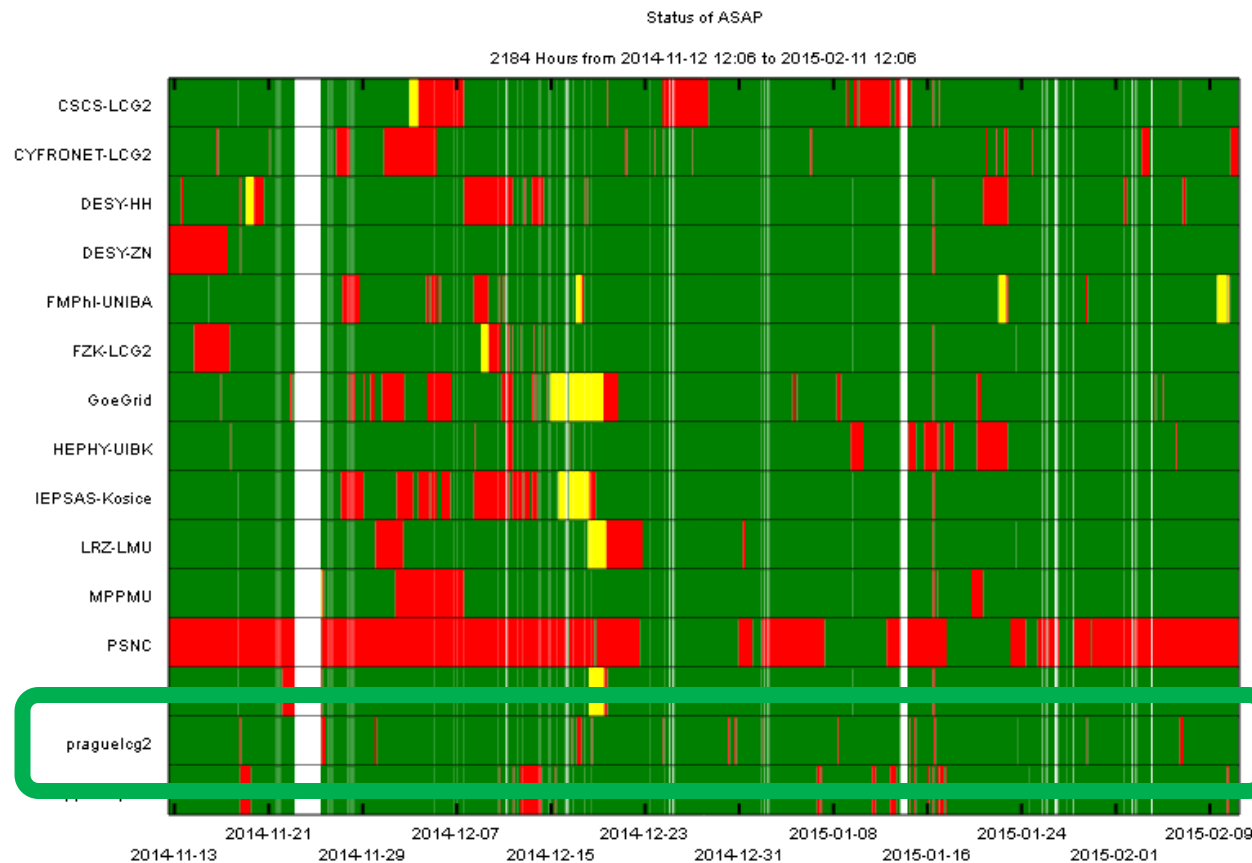
Federation - Accounting Name	April 14 - Mar 15 at 2014 CPU Pledge (HS06)	pledge inc. efficiency (HS06-Hrs)	Site(s)	ALICE	ATLAS	CMS	LHCb	Total	used as % of pledge
Czech Rep., FZU AS, Prague			prague1cg2	10 091 160	5 588 084			15 679 244	
CZ-Prague-T2	12 000	5 644 800		10 091 160	5 588 084			15 679 244	278%

Pledges for 2015:

- **ATLAS: 13000 HS06, 1600 TB**
- **ALICE: 3500 HS06, 1030 TB**

ASAP - ATLAS Site Availability Performance

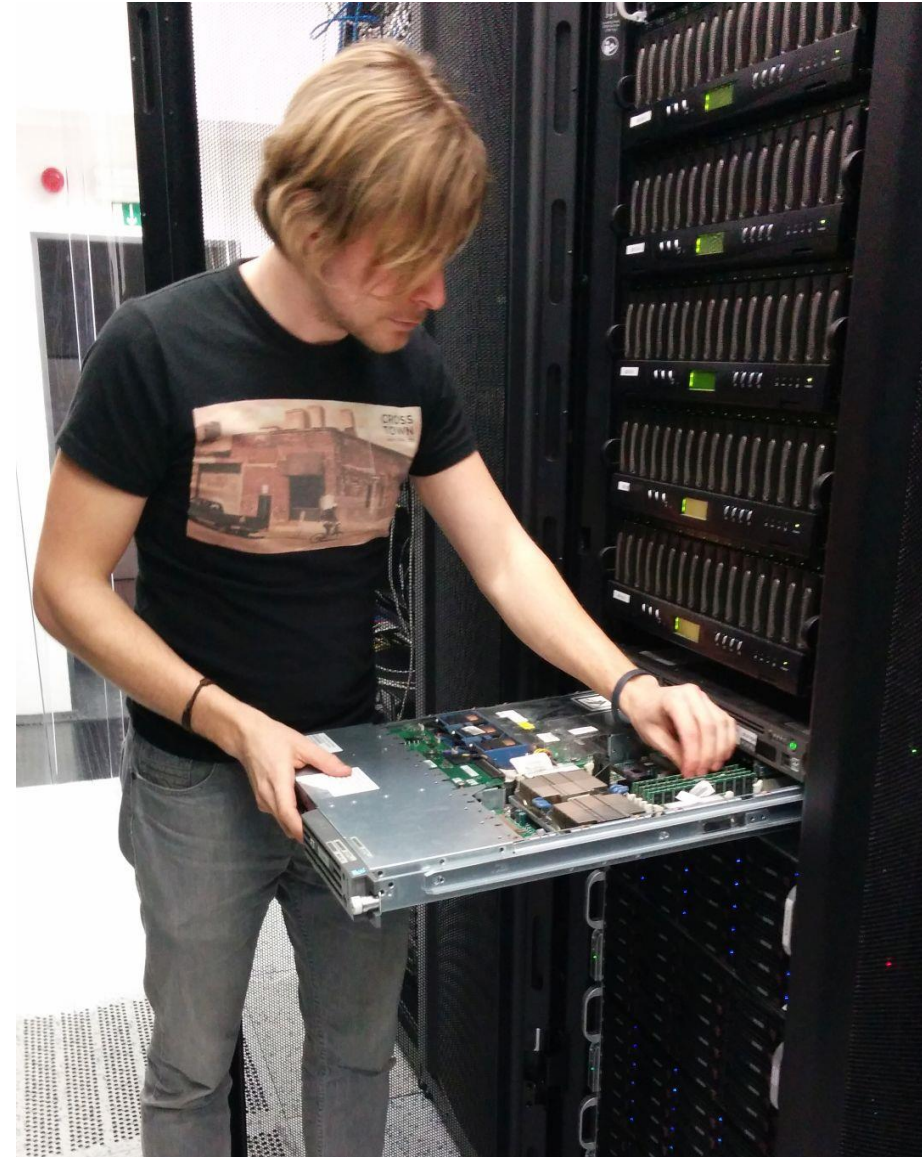
<https://twiki.cern.ch/twiki/bin/viewauth/AtlasComputing/ATLASSiteCategorization>



DE Cloud – last 3 months

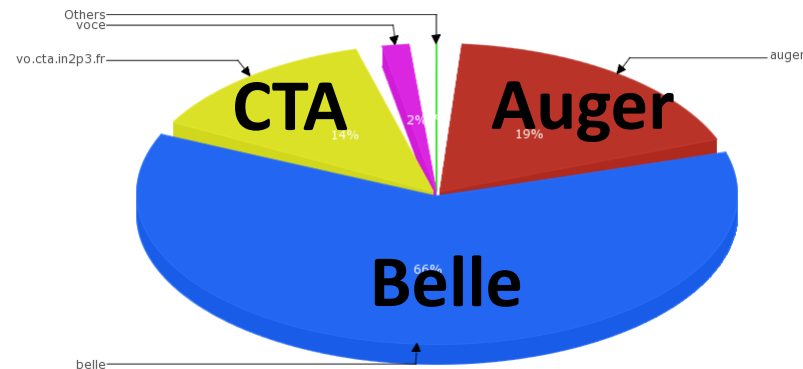
Manpower for Tier2

- ❑ 3 full time system administrators at FZU + .3 FTE from NPI for Tier2
 - 2 administrators left in 2014, they were replaced
 - big competition for IT experts in Prague
 - other administrators for non-HEP clusters
 - supported by other personnel
- ❑ 2 physicists as experiment contacts, management



□ CESNET – Czech NREN

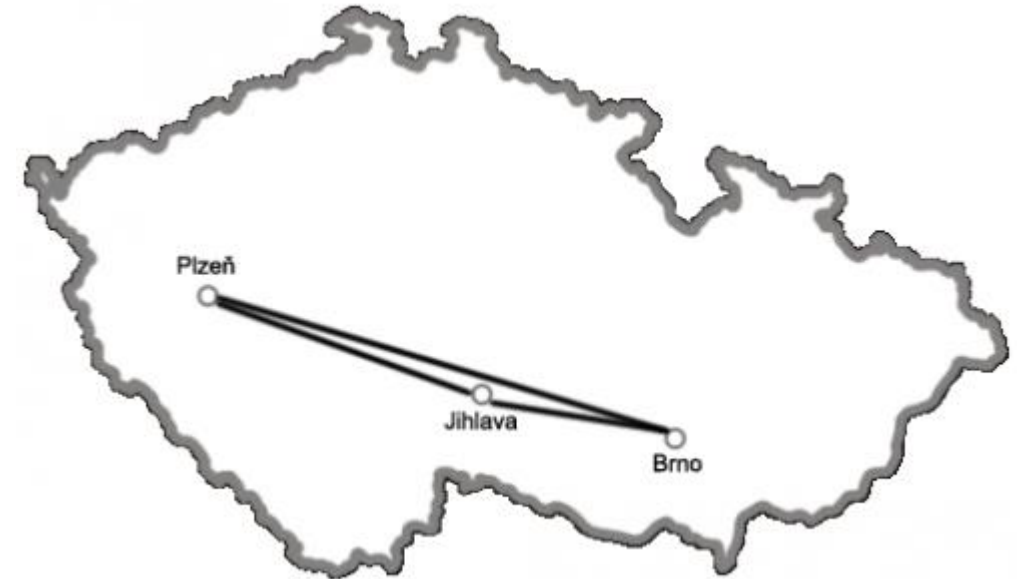
- also National Grid Initiative
- resources at several towns
- Metacentrum:
 - 10000 cores
 - 400 cores in EGI grid



CESNET EGI cluster - Statistics for 2014



- ❑ Metacentrum
 - DPM – 180 TB (Auger, Belle, CTA)
- ❑ Data Storages
 - regional development
 - 21 PB
 - dCache – 30 TB disk space, about 100 TB of tape space – ATLASLOCALGROUPTAPE
 - we can negotiate more



Pilsen: 500 TiB disks, 3.6 PiB MAID, 4.8 PiB tapes

Jihlava: 804 TiB disks, 2.5 MAID. 3.7 PiB tapes

Brno: 500 TiB disks, 2.1 MAID, 3.5 PiB tapes

MAID = massive array of idle drives

- ❑ National Supercomputing project in Ostrava
- ❑ Anselm (small cluster) – 4000 cores
- ❑ Salomon (big cluster) in May 2015 – top100
 - 24192 Intel Xeon cores
 - 52704 Intel Phi cores
 - 2 PB on disks, 3 PB on tapes
 - 10 MEuro + VAT (plus 9 MEuro for the building)
- ❑ ATLAS tested access for backfilling
 - ARC CE (European solution)
 - Panda – US solution
- ❑ Need more manpower from the ATLAS side



Image source: IT4I

- ❑ Tier2 as the main and stable resource
 - Investment money promised by MYES for 2016
- ❑ Possible bigger Tier3 capacity at UK
 - New server room built
- ❑ HPC program – IT4I
- ❑ Cloud resources (CESNET involved in EU programs)
 - Now more suitable for smaller projects