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RO-14-ITIM,
upgrade and maintenance

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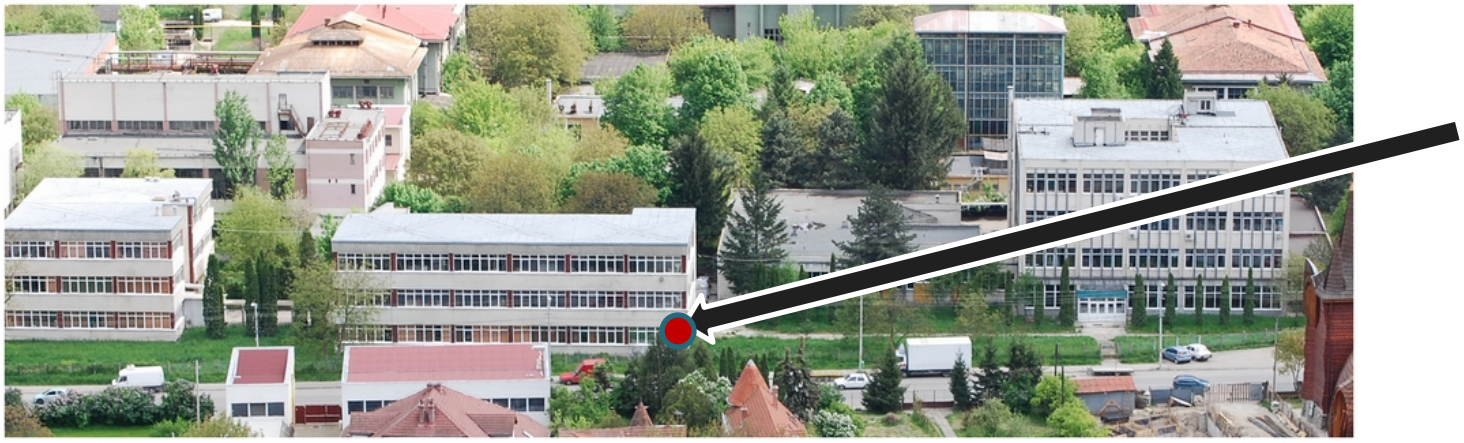
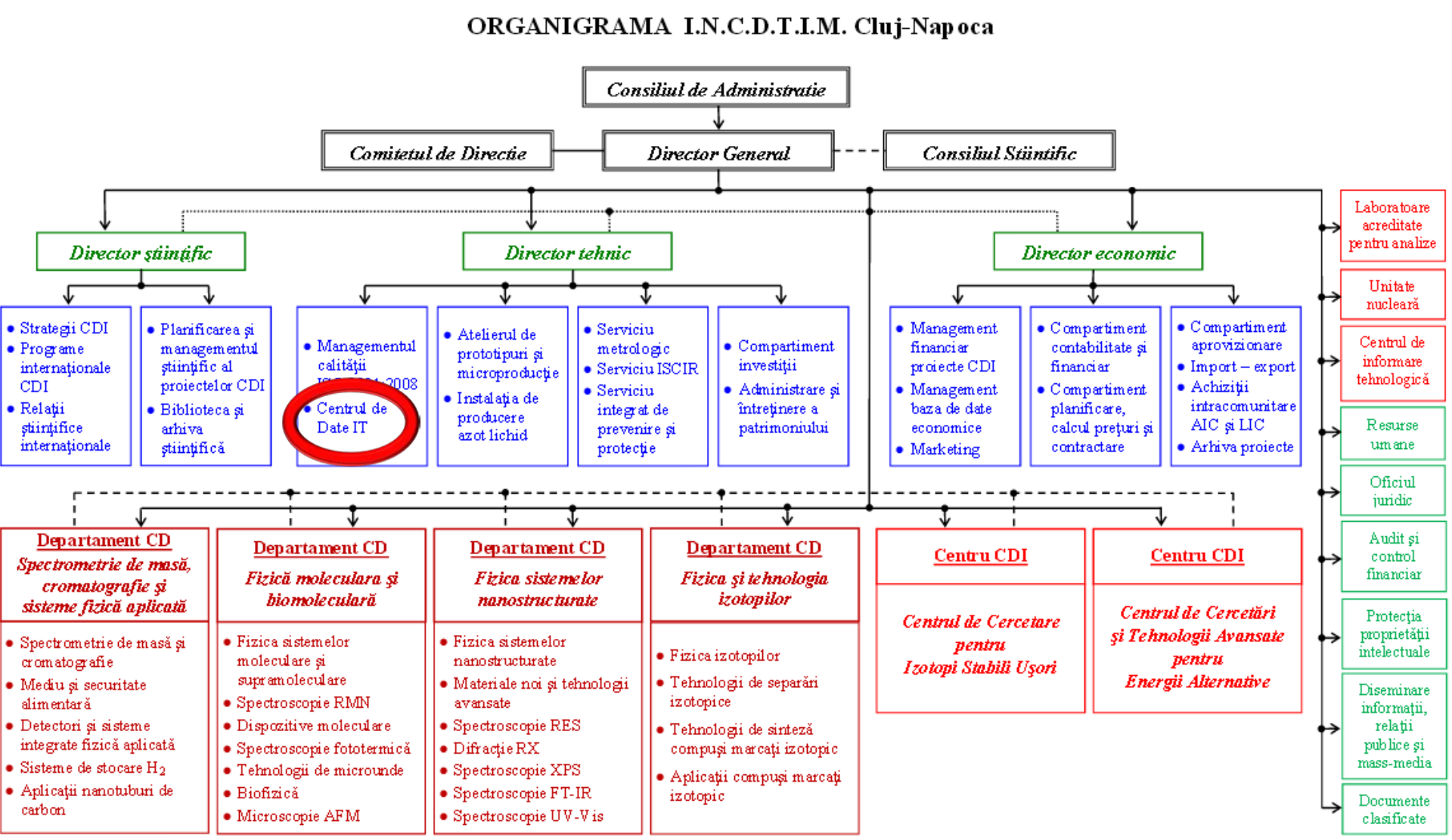


Where are we located in the Institute??



Financial Resources over the years

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1. 12 EU / 8EU – ConDeGrid / 2009 – present
2. 15 EU/ 7EU 2008 – present
3. POS-CCE 192/2719, Sectorial Operational Program, "Increase of Economic Competitiveness", **contract 42/11.05.2009** Axis 2, Operation 2.2.3~ *Improving the capacity and reliability of INCDTIM GRID center for integration in international networks (INGRID)*, Value: 2.345.800 lei ~ **500.000 Euro (2009-2011)**
4. Cooperation program "Hulubei-Meshcheryakov" together with the Laboratory of Information Technologies at JINR – Dubna
5. Capacity – Module I – Big Projects and investments, **Molecular and Biomolecular Physics Department Upgrading** – MDFMOLBIO, Project number **2 PM/I/07.10.2008,** Value, **30.034.930 lei, The value of the MPI Cluster was 1.000.000 lei**

The Datacenter and his component

Datacenter Logical Schema

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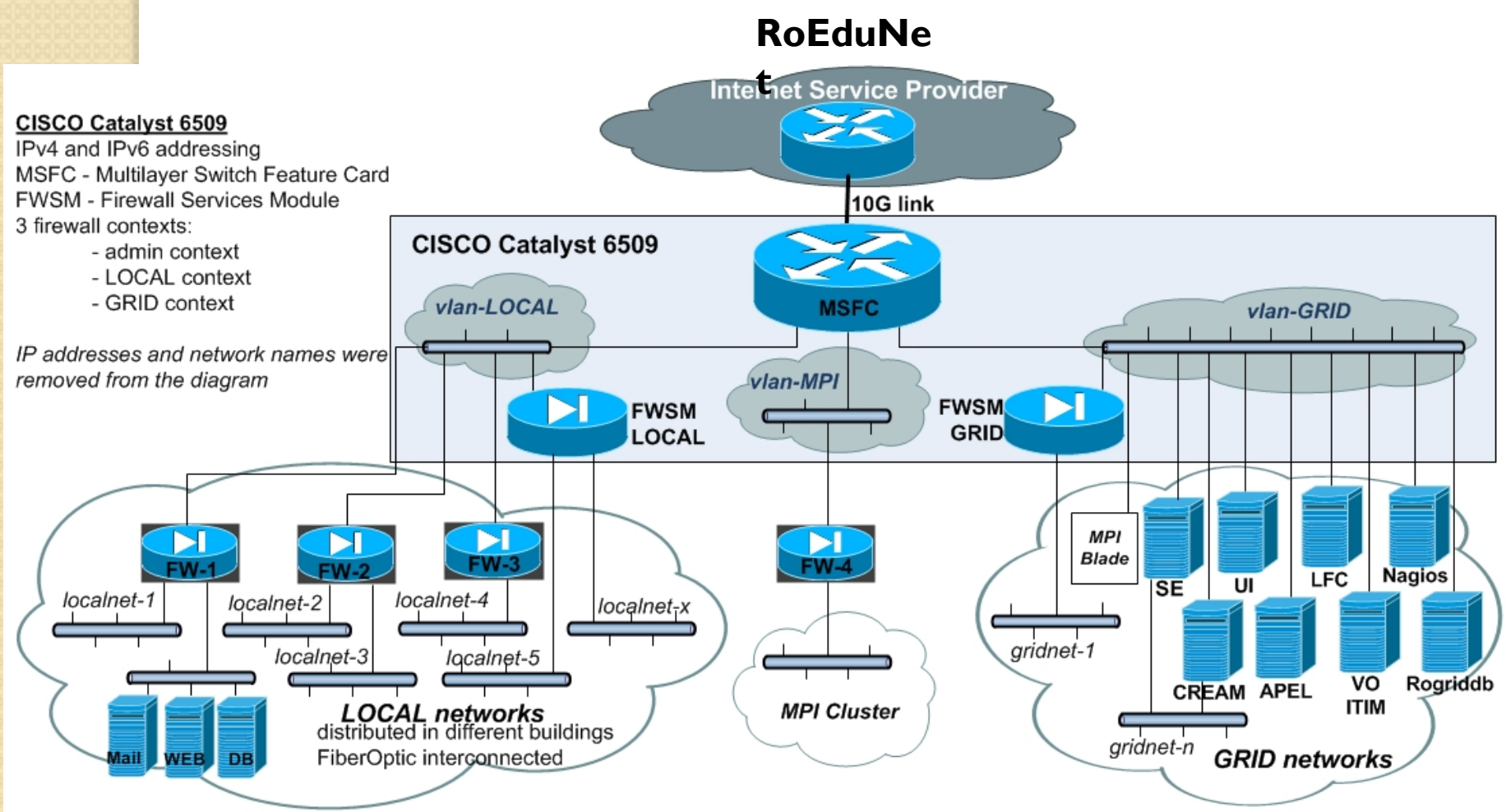

CISCO Catalyst 6509
IPv4 and IPv6 addressing
MSFC - Multilayer Switch Feature Card
FWSM - Firewall Services Module
3 firewall contexts:
- admin context
- LOCAL context
- GRID context

IP addresses and network names were removed from the diagram

What is Inside and outside of the datacenter??

inside

outside

Inside

2007

Grid Site

- Name: **RO-14-ITIM**
- **50-53** Processing work-nodes,
- **Storage capacity**: 100TB, online 70 **TB**
- Virtual Organization: **ATLAS**
- Used Technology: Intel & IBM, HP Blade systems
- Middleware: **EMI v3 for 64 bit**
- Operating system: **SL 6.7**

Other datacenter Information

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- Beginning with Oct 2014, RO-14-ITIM Grid site is part of the **Installation of National Interest**,
- A stable network link of **10 GBps**
- One IBM system of **7 Pflops** dedicated for **MPI processing**
- A **private storage** for backup, just internal use

Are there any backup solution?

What is Outside the data center?

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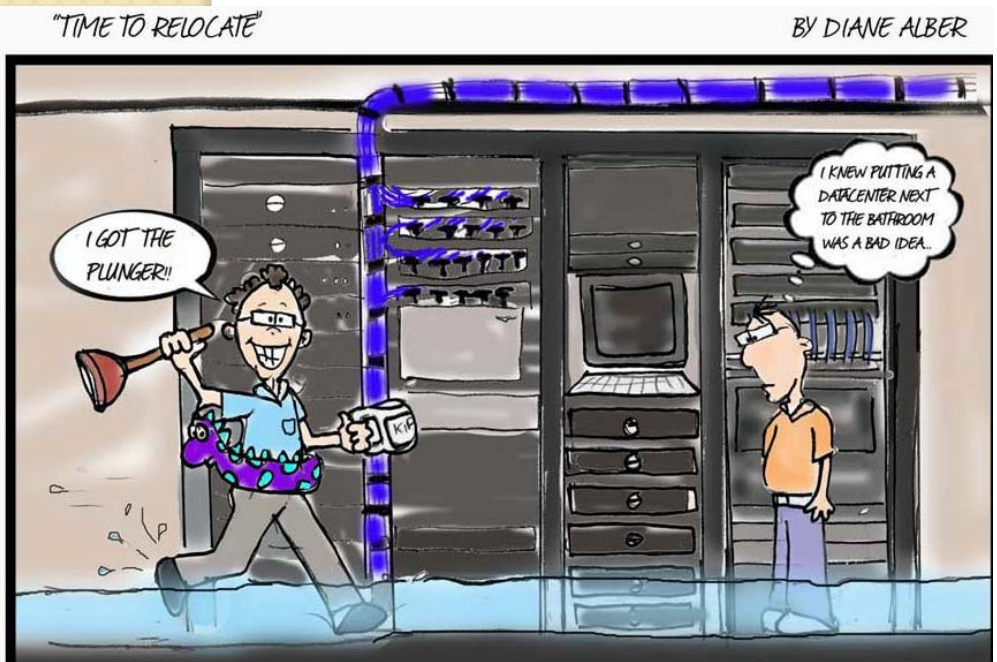
- **Power generator** for emergency situation as power failures;
  - starts in **8 seconds;**
  - Can function up to **8 hours**
- **UPS 96 kVA**, For now the maximum load is **55 kW** for the whole datacenter

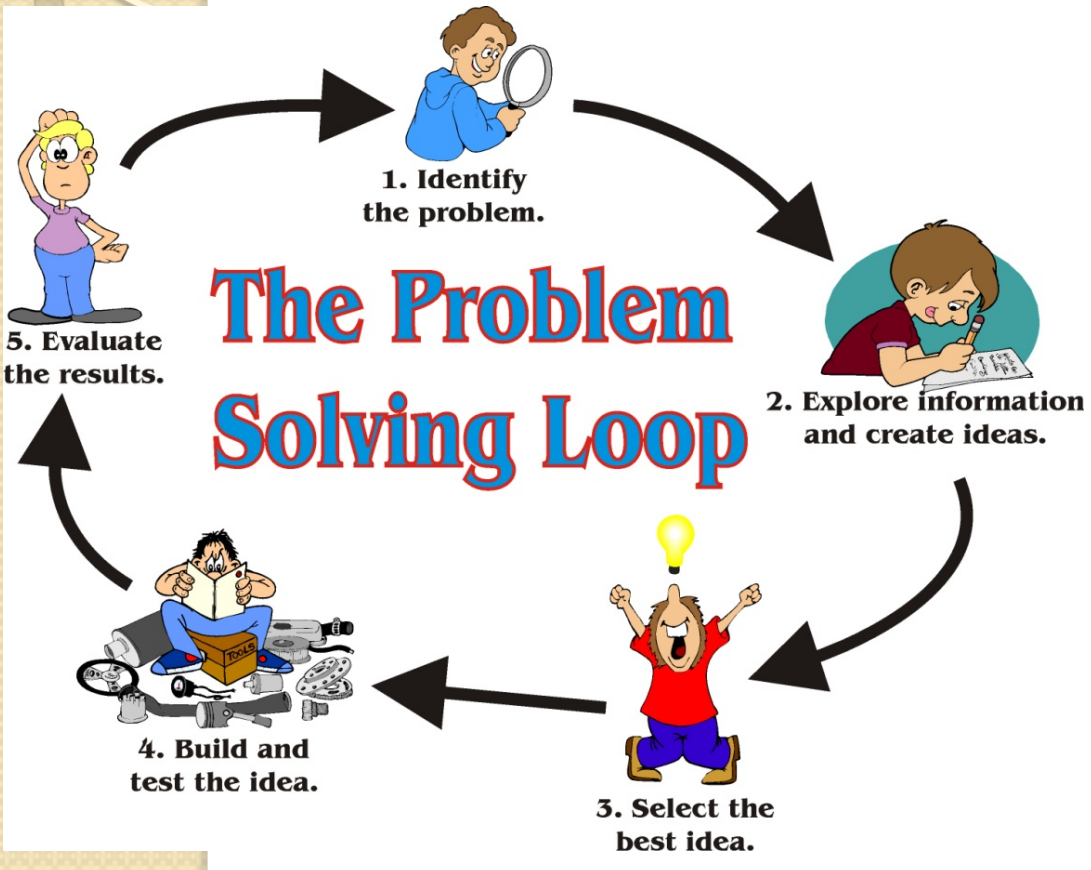
Power generator 275kW

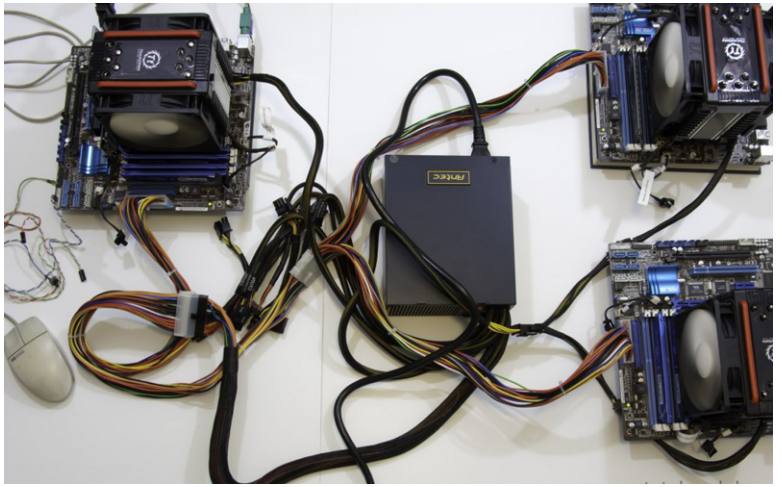
Monitoring Inside the data center?

- Monitoring system:
  - **Temperature** & **Humidity** fluctuation;
  - **Movement** and **Fire** **sensors** for other problem



RO-14-ITIM problems and solutions in 2015





1. Storage failure in March

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- Data lose, **over 1000 files lost, 7.5 TB partition,**

- The solutions:
  - backup of database, each DB had 500 GB
  - Declare all **lost data** of the site
  - Reformat the lost partition, and integrate the in the storage
  - Import the saved databases
  - Cleaning the database as long as the site is in **downtime** using **delrepica.py**
  - Delrepica cleans links of old files from within the database to not existing real files
  - Restart the system and verify if any problem exist in collaboration with cloud experts in our case from France

```
mysqldump -u dpmmgr -p dpm_db>dpm.sql
mysqldump -u dpmmgr -p cns_db>cns.sql
```

2. Unexpected update of torque from version 2.4 to 4.2.10

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- **Problems**: no communication between server and work node
- No connection to trqauthd
- I had to chose from two solution
- (1)Downgrade to the old system, Torque 2.4
- (2)Go on with the new system by configuring it with Torque 4.2.x

root@ecream#: pbsnodes –a
Unable to communicate with ecream server
Cannot connect to specified server host
ecream.itim-cj.ro. pbsnodes: cannot connect
to server ecream.itim-cj.ro, error=111
(Connection refused)

root@ecream#:/usr/bin/pbsnodes:
cannot connect to server ecream, error=
15137 (could not connect to trqauthd)

I was stubborn and chose the second solution

- **Solution:**
  - **Updating all work nodes and ecream server**
  - changing the rights to the following directories: /var/lib/torque/spool /var/lib/torque/undelivered /var/lib/torque/checkpoint into 1777
  - stopping, killing pbs_server,
  - For each work nodes we did the following:
  - stopping pbs_mom
  - removing /var/lib/torque/mom_priv/mom.lock
  - Removing /var/lock/subsys/pbs_mom
  - editing /etc/torque/mom/config for changing the name of the server as follow: "$pbsserver ecream.itim-cj.ro". The initial name after the update was "**localhost**"
  - Recompiling the system
  - Starting pbs_mom, again and monitoring in the log if it is working with the pbs server on ecream.itim-cj.ro

3. **NULL WCLimit (1), and error Critical authorization failed 203 (2)**
   - **(1) solution: increasing the wall time** in qmgr add "set queue ops resources_default.walltime = 02:00:00”
   - **(2)** one solution overlapped the other and the site had now times when it was functioning perfectly and time when it was stopped.
     - **We are studying a viable solution**

4. Moved to Atlas MC8 – perfect, but…

- This is called evolution
- From this point forward every problem occurred
  - Jobs losing
  - We have 270 jobs on queue and max 30 processed , but also 53 station to process

```
server: ecream.itim-cj.ro

Queue            Memory CPU Time Walltime Node  Run Que Lm  State
---------------- ------ -------- -------- ----  --- --- --  -----
ifops              --   48:00:00 72:00:00   --    0   0 --   E R
atlasMC8           --   48:00:00 72:00:00   --   61 358 --   E R
batch              --      --       --      --    0   0 --   E R
ops                --   48:00:00 72:00:00   --    0   0 --   E R
atlas              --   48:00:00 72:00:00   --    0   0 --   E R
                                                 ----- -----
                                                   61   358
```

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Results and question at Grid site RO-14-ITIM

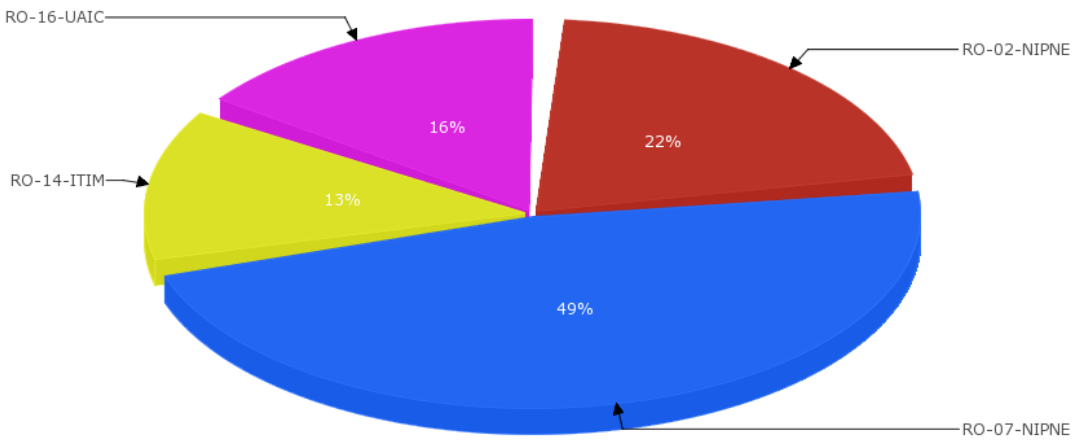
Is the Grid Computing Domain an open competition???

Which is the most important statistic In the Grid sites?

Year 2015

	Total
NIHAM	0.0
RO-02-NIPNE	199.3
RO-07-NIPNE	103.0
RO-11-NIPNE	95.9
RO-13-ISS	88.1
RO-14-ITIM	94.8
RO-15-NIPNE	98.4
RO-16-UAIC	97.6
	116.1

- The whole year we processed from production point of view 243,713 jobs,
- Our CPU efficiency is 94.9 %
- **Is this important???**



CPU Efficiency in the world

The Grid is no competition but…

- … NGI_RO comparing with all NGI's around the world, according to **EGI accounting monitoring system** …(which are updating there data exactly when and how they want)

Key: 0% <= eff < 50%; 50% <= eff < 60%; 60% <= eff < 75%; 75% <= eff < 90%; 90% <= eff < 100%; eff >= 100% (parallel jobs)

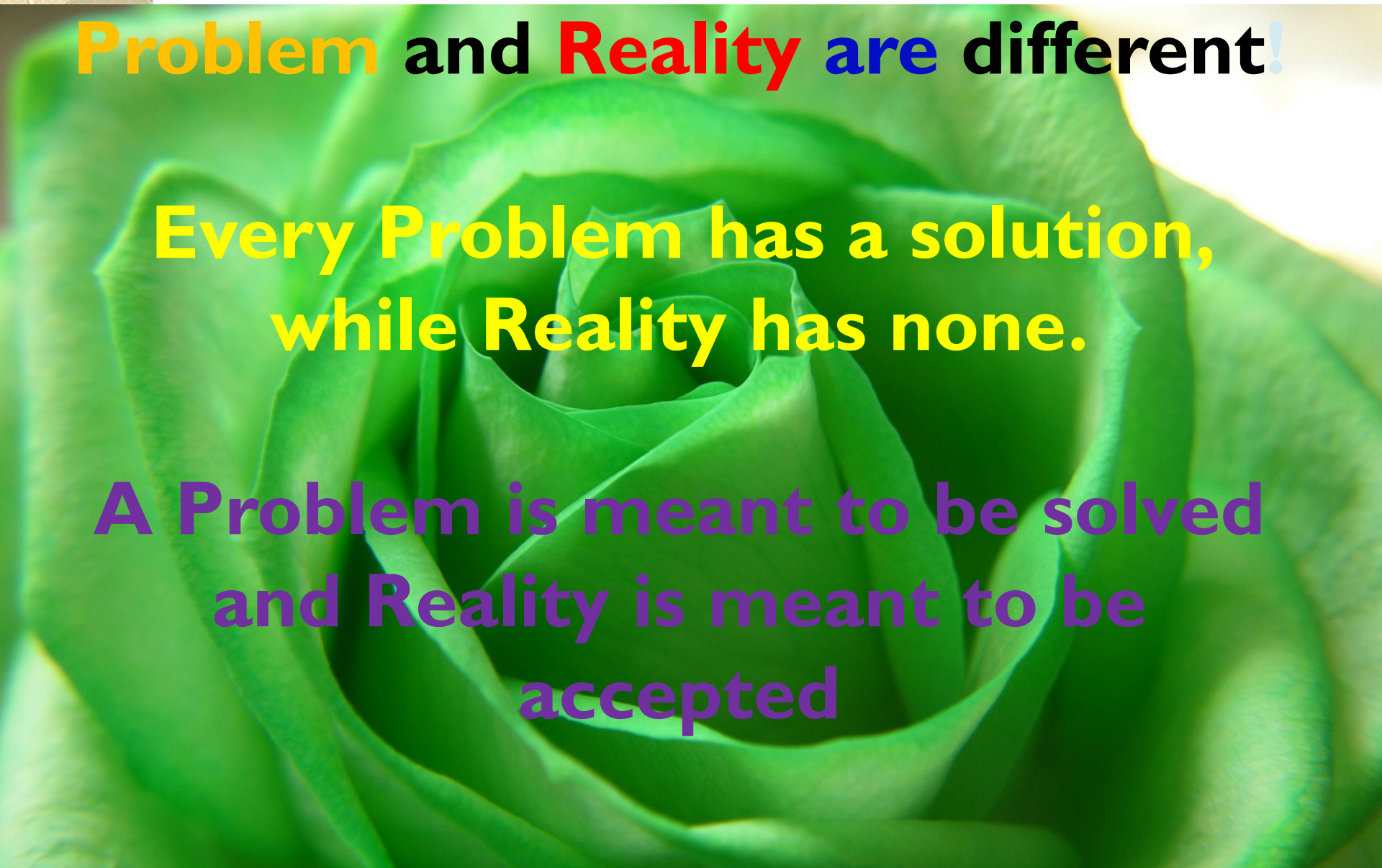
- … is on place number SIX- 6

	alice	atlas	cms	lhcb	Total
NGI_SI		178.9			178.9
ROC_Canada		147.5			147.5
NGI_DE	100.0	176.9	108.4	99.9	137.8
NGI_CH		156.2	100.0	100.0	131.7
NGI_IL		116.7		95.7	116.5
NGI_RO	90.2	143.4		95.9	116.1
NGI_UK	87.2	132.9	90.2	93.6	112.8

Conclusion, future work

- Stabilizing the errors on the site
- Improving processing capacity, through getting better nodes
- Minimizing situation like this year failures
- Maintenance of existing nodes and server and network equipment
- Improving anything which could fail… the years which are coming ☺

Is Grid a Problem or a Reality?



Problem and Reality are different!

Every Problem has a solution, while Reality has none.

A Problem is meant to be solved and Reality is meant to be accepted

Thank you for your attention