

Grid site development at RO-14-ITIM

Felix Farcas, Radu Trusca , Jefte Nagy

Location

***National Institute for R&D
of Isotopic and Molecular Technology
CLUJ-NAPOCA, ROMÂNIA***

web: www.itim-cj.ro , e-mail: itim@itim-cj.ro

grid: grid.itim-cj.ro



Datacenter



Team modification in time

Team in 2014



Team in 2018



Working for datacenter

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



Datacenter Logical Schema

RoEduNet

CISCO Catalyst 6509

IPv4 and IPv6 addressing

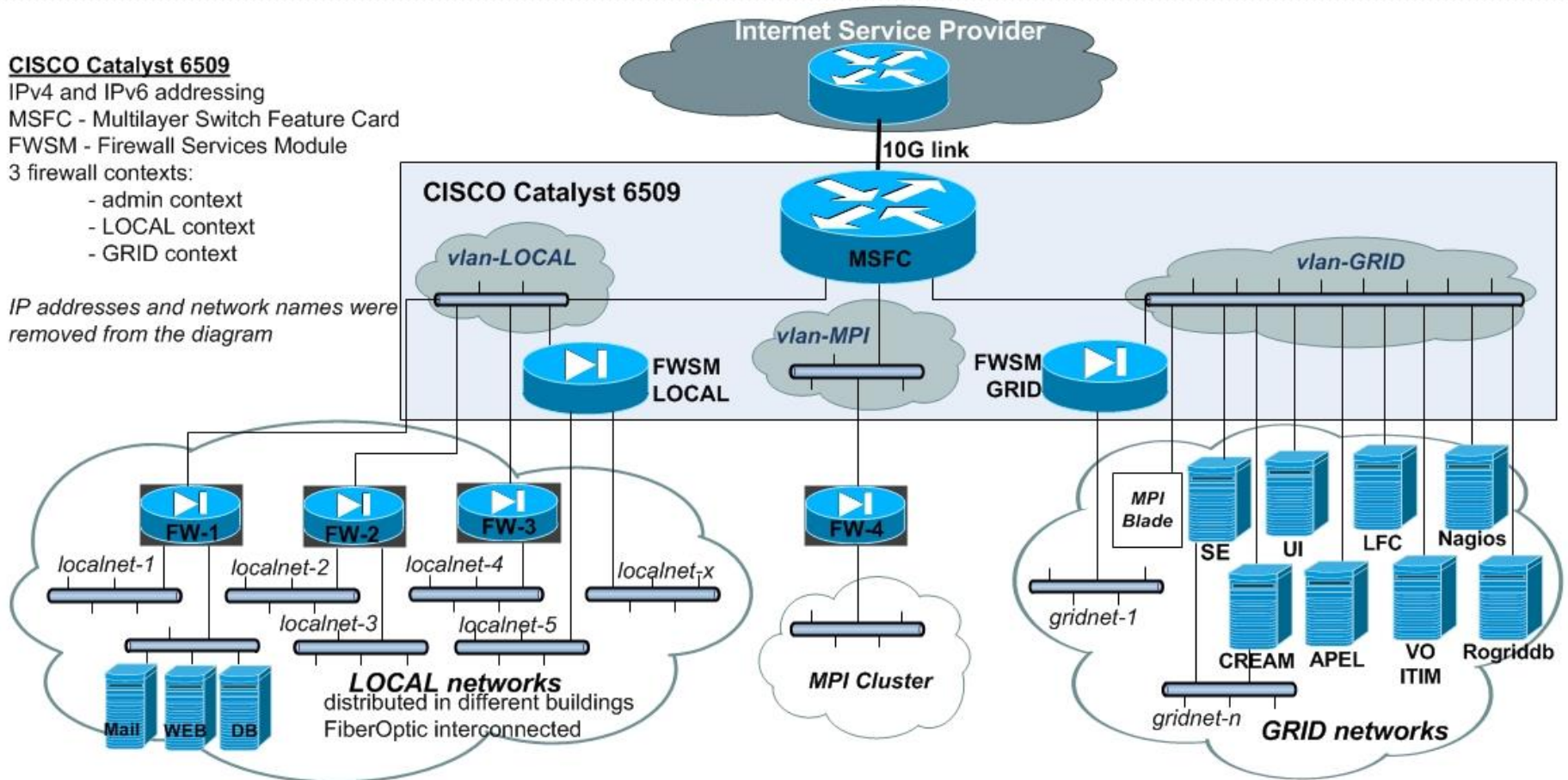
MSFC - Multilayer Switch Feature Card

FWSM - Firewall Services Module

3 firewall contexts:

- admin context
- LOCAL context
- GRID context

IP addresses and network names were removed from the diagram



Security improvements

- For Hardware:
 - Movement sensors
 - Inside and Outside cameras
- For Software:
 - Denyhost program for Linux server against brute force attacks
 - Linux Firewall
 - Hardware firewall Cisco ASA 5525-X with FirePOWER
 - Redundant Firewall for the whole system
 - The Grid site can get 90% of the bandwidth in case of necessity.



Monitoring Inside the data center?

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



"TIME TO RELOCATE"

BY DIANE ALBER





BACKUP

Are there any
backup
solution?



What is Outside the data center?

- **1 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

Financial Resources over the years

1. 12 /8/6 EU – ConDeGrid / 2009 – present
2. 15 /7/5 EU 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/07.10.2008-2010, Value, 30.034.930 lei, The value of the MPI Cluster was **1.000.000 lei**

Grid site - **RO-14-ITIM**

- A total of **66 processing units**, varying from **8 core / Worknode** to **24 core / work node** in two different queues
- Used Technology: Intel pizza server, IBM and HP Blade system
- Operating system: SL 6.x and Centos 7.x
- Virtual Organization: **ATLAS, ops**



Improvements and Upgrades



2018 improvements to Grid

- We have 53 station from which in the last 3 years, were dying 7 work-nodes,
 - We had no clue why,
 - No money for replacement
- I decided in 2018 to **clone there HDD** from a functional work-node
- And ... **the result** was - the work-nodes are functioning
- => we are back to 53 online work nodes in the cream queue

2018 Upgrades at the Grid site

- Perf-Sonar installed with OS: Centos 7.x and the last software
- IPv6 installed on them but not routable, we are working at that problem
- The beginning of a new production server and work nodes dedicated to ATLAS
 - OS: Centos 7.x
 - NorduGrid Software
 - Instead of maui we chose **Slurm**
 - We have one management station named arc-node.itim-cj.ro and 6 working nodes in tests for ATLAS
- If they are functioning I do not know!





Results and Conclusion



Nr jobs and HepSpec January – October 2018

- Nr jobs: **305.063**
- -> 3,32 %

- Normalized CPU SUM: **10.814.488**
- -> 6,25%

CPU efficiency

- CPU efficiency for RO-14o-ITIM in 2018 is 91%

NGI_RO — CPU Efficiency (%)

Resource Centre	Total
NIHAM	0%
RO-02-NIPNE	86.15%
RO-03-UPB	66.51%
RO-07-NIPNE	61.81%
RO-11-NIPNE	99.02%
RO-13-ISS	60.2%
RO-14-ITIM	91%
RO-16-UAIC	90.54%
Total	70.42%

Regarding SAM3 Reports for Atlas

- The site had a fluctuating availability and reliability in the last 4 month

Federation & Sites	Availability	Reliability	Unknown	Jul-2018	Aug-2018	Sep-2018
RO-14-ITIM	85%	85%	0%	32%	92%	98%

and ARGO

Site	2018-06			2018-07			2018-08			2018-09			2018-10		
RO-14-ITIN	6.67	6.67	.00	100.00	100.00	.00	93.54	93.54	.00	100.00	100.00	.00	100.00	100.00	.00
			.00			.00			.13			.00			.00

According to SAM3 visualization

Algorithm for calculating the Site and Service Availability

Legends for Metric Result Status

Status:	OK	WARNING	CRITICAL	UNKNOWN	MAINTENANCE
Legend:	OK	W	C	U	MT

Note: darkest colors: test is 0 - 12 hours old, ... lightest colors: test is more that 12 hours old

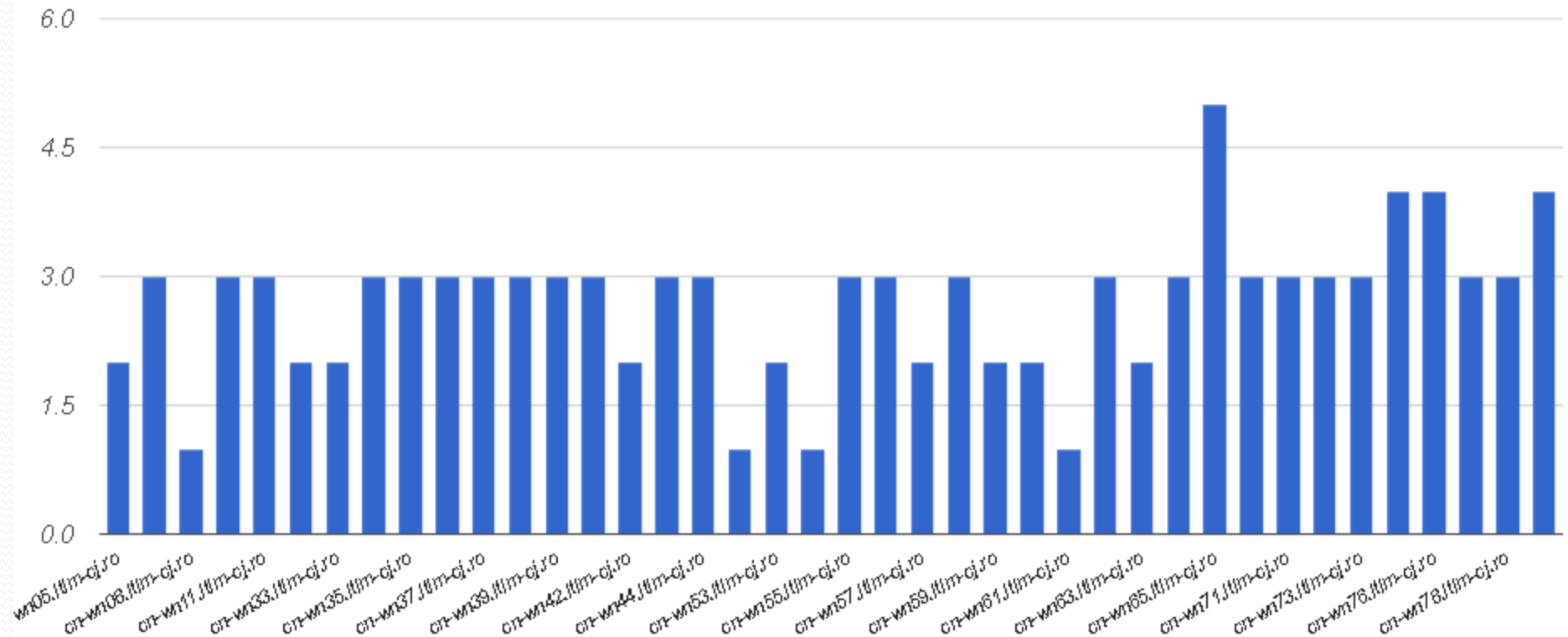
Legend	Metric Name
1	org.atlas.WN-swspace (/atlas/Role_lcgadmin)
4	org.sam.CONDOR-JobSubmit (/atlas/Role_lcgadmin)

Link to data

Sitename	Flavour	Host status in profile	Hosts	1		4	
				OK	OK	1	4
RO-14-ITIM	CREAM-CE	OK	ecream.itim-cj.ro	OK	OK	1	4
	ARC-CE	OK	arc-node.itim-cj.ro	OK	OK		

Regarding to BigPanda site, atlas, multi core jobs on ecream queue

Finished jobs per WN slot



But can say that **ARC single** and **MultiCore** queue are functioning

Worker node slot performance at RO-14-ITIM-ARC_MCORE

<i>WN summary for RO-14-ITIM-ARC_MCORE</i>									
<i>WN</i>	<i>nSlots</i>	<i>nJobs</i>	<i>defined</i>	<i>running</i>	<i>holding</i>	<i>merging</i>	<i>transferring</i>	<i>finished</i>	<i>% failed</i>
<i>All</i>		44		10	1		30	3	0
<i>Average</i>		7.00	0.00	1.00	0.00	0.00	5.00	0.00	0
<i>awn-001.itim-cj.ro</i>	1	6		2			4		0
<i>awn-002.itim-cj.ro</i>	1	10		2			7	1	0
<i>awn-003.itim-cj.ro</i>	1	6		2			4		0
<i>awn-004.itim-cj.ro</i>	1	11		1	1		7	2	0
<i>awn-005.itim-cj.ro</i>	1	4		1			3		0
<i>awn-006.itim-cj.ro</i>	1	7		2			5		0

Instead of Conclusion

- Move everything in the future to ARC queue
- Make IPv6 routable for perf-Sonar stations until the GGUS ticket is not going into **red state** (Now it is amber)
- Hope to get some finances for improving the site





**Thank you for your attention,
Any question**

