

# The evolution of the RO-16- UAIC grid site



UNIVERSITATEA "ALEXANDRU IOAN CUZA" din IAȘI



Ciprian Pinzaru

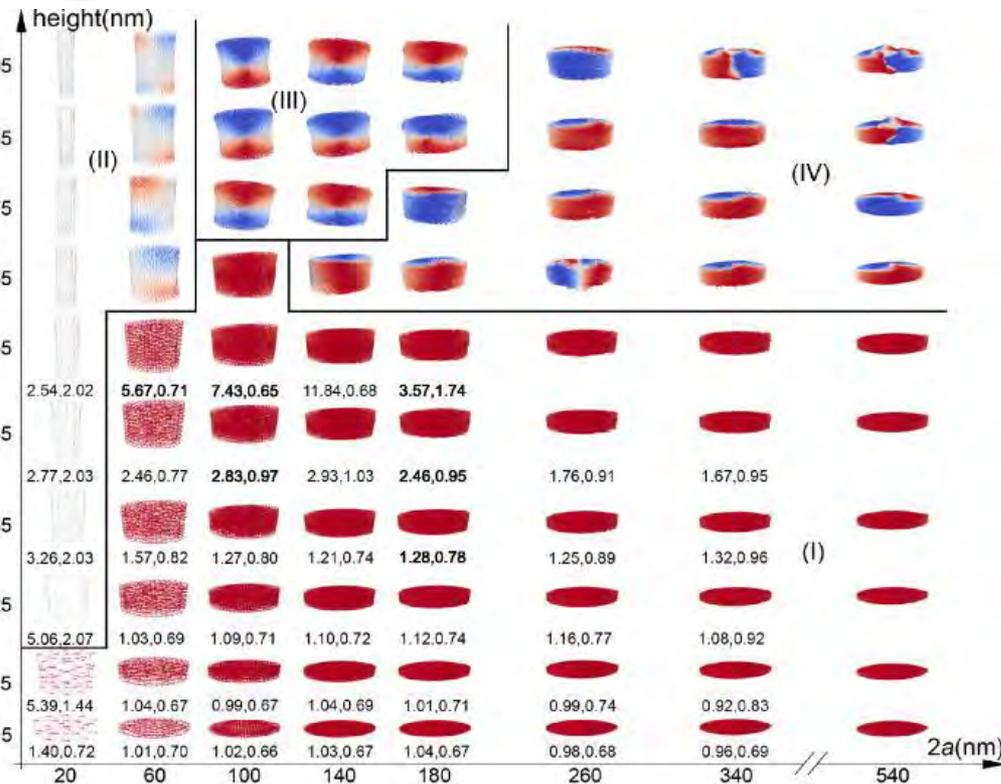
Paul Gasner, Valeriu Vraciu, Octavian Rusu

*E-mail: [ciprian.pinzaru@uaic.ro](mailto:ciprian.pinzaru@uaic.ro)*

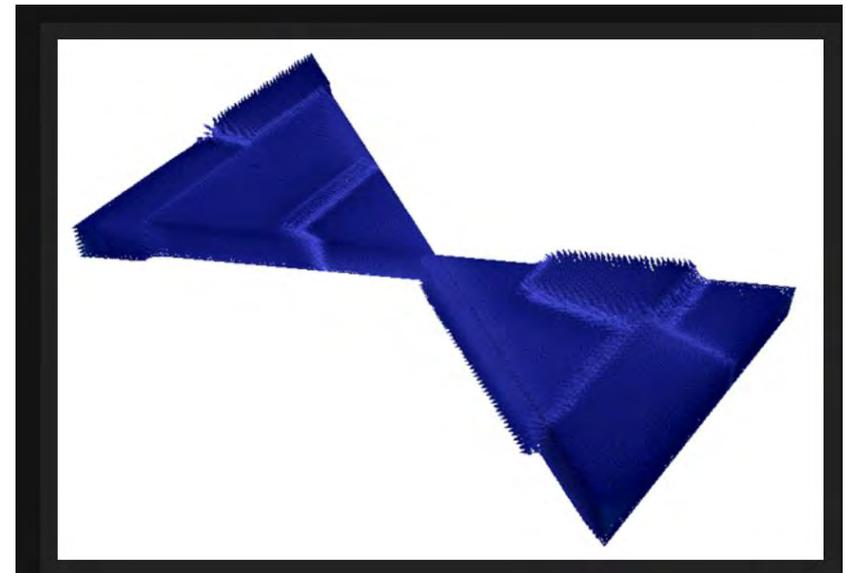


- INTRODUCTION
- THE RO-16-UAIC ARCHITECTURE
- RESULTS OF RO-16-UAIC
- NETWORK MONITORING AND SECURITY  
IMPLICATIONS
- CONCLUSIONS

# Introduction



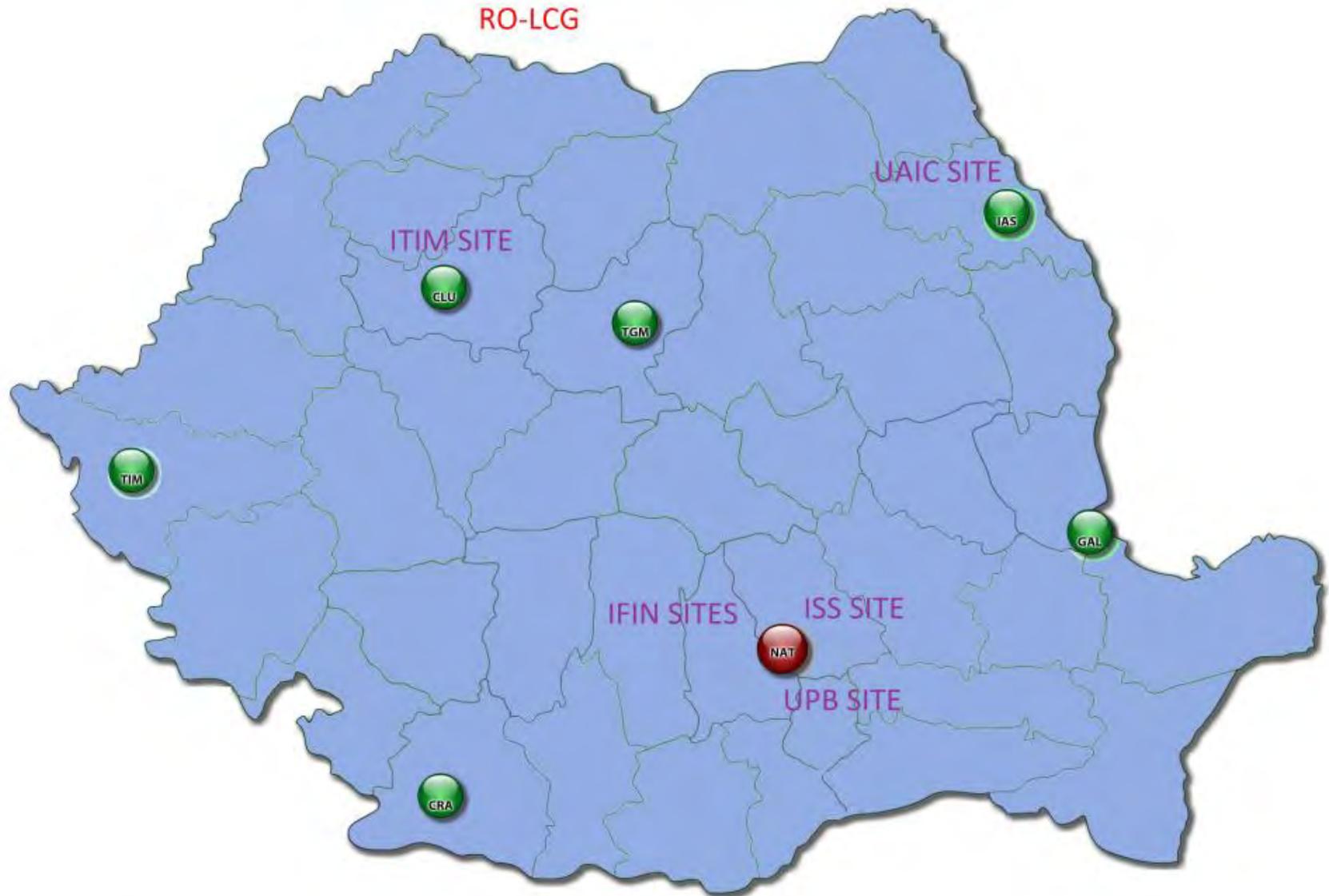
Parallel computation  
on Ramona



- more than 25 ISI
- more than 50 conferences

L. Stoleriu, C. Enachescu, A. Stancu, *NATURE MATERIALS* vol. 15, issue 6 (2016)  
L. Stoleriu, C. Pinzaru, A. Stancu, *Appl. Phys. Lett.* 100, 122404 (2012)  
C. Pinzaru, L. Stoleriu, A. Stancu, *IEEE Transactions on Magnetics* 02/2014; 50(7)

# Introduction



# Introduction



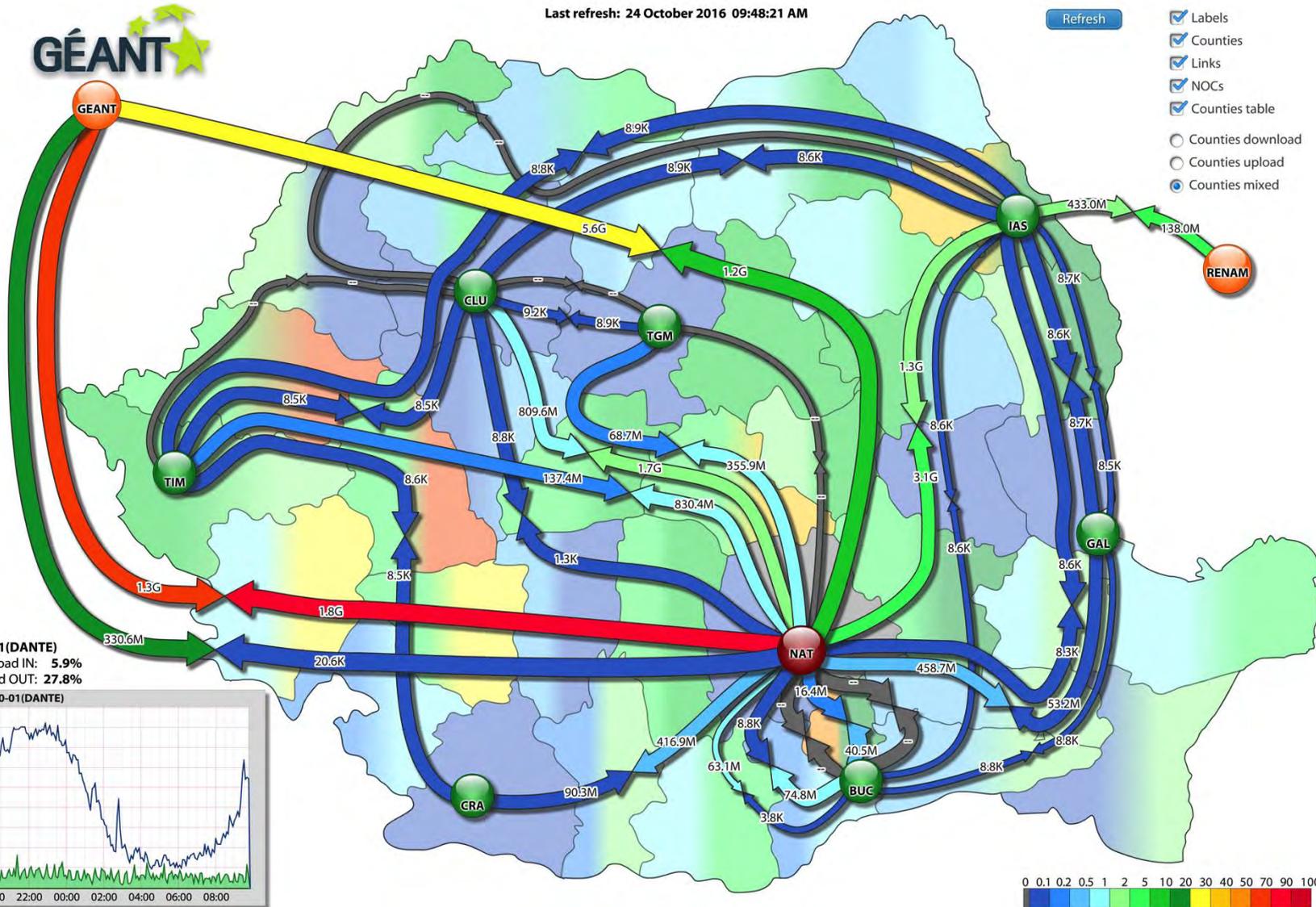
	Upload	Download
Alba	908.8K	2.0M
Argeș	34.2M	78.9M
Arad	4.6M	62.2M
Bacău	5.8M	325.5K
Bihor	10.9M	5.3K
Bistrița-Năsăud	340.1K	506.1K
Brăila	506.5K	1.5M
Botoșani	391.7K	841.6K
Brașov	38.8M	394.7M
Buzău	3.9M	15.1M
Cluj	9.4K	28.1K
Călărași	237.7K	1.7M
Caraș-Severin	991.6K	22.3M
Constanța	502.5K	10.3M
Covasna	1.2M	6.6M
Dâmbovița	1.2K	1.4K
Dolj	10.5K	30.6K
Gorj	3.7M	22.5M
Galați	10.8K	28.3K
Giurgiu	107.8K	687.8K
Hunedoara	4.7M	51.5M
Harghita	8.4M	8.2M
Ilfov	4.4G	1.3G
Ialomița	304.6K	1.9M
Iași	3.1G	1.3G
Mehedinți	197.3K	827.2K
Maramureș	2.5M	46.3M
Mureș	11.5K	27.0K
Neamț	885.3K	2.1M
Olt	152.3K	1.9M
Prahova	-1.0	-1.0
Sibiu	20.2M	79.8M
Sălaj	233.7K	2.8M
Satu Mare	1.2M	5.6M
Suceava	7.0M	67.9M
Tulcea	603.5K	3.2M
Timiș	828.4M	137.2M
Teleorman	507.5K	2.1M
Vâlcea	492.7K	19.7K
Vrancea	2.5K	4.2K
Vaslui	1.5M	17.0M



Last refresh: 24 October 2016 09:48:21 AM

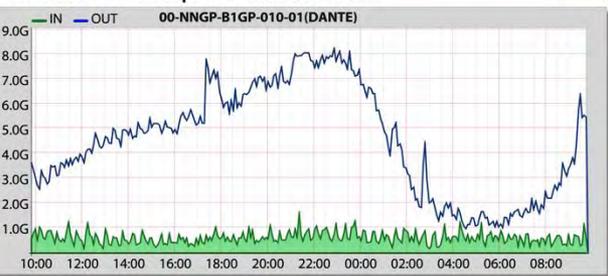
Refresh

- Labels
- Counties
- Links
- NOCs
- Counties table
- Counties download
- Counties upload
- Counties mixed



00-NNGP-B1GP-010-01(DANTE)

Traffic IN: 1.2Gbps Load IN: 5.9%  
 Traffic OUT: 5.6Gbps Load OUT: 27.8%



# Introduction



## Installed Capacities

Year: 2016 Month: 10

Infrastructure	Site Name	Physical CPU	Logical CPU	HEPSPEC06	Disk (GB)	Tape (GB)
EGI	NIHAM	665	3,322	26,769	984,032	0
EGI	RO-02-NIPNE	86	752	7,285	213,624	0
EGI	RO-07-NIPNE	212	2,257	23,964	1,271,128	0
EGI	RO-11-NIPNE	2	304	2,955	0	0
EGI	RO-13-ISS	88	416	2,784	121,491	0
EGI	RO-14-ITIM	55	440	3,960	58,554	0
EGI	RO-16-UAIC	110	472	4,248	171,987	0
<b>Total</b>		<b>1,218</b>	<b>7,963</b>	<b>71,965</b>	<b>2,820,816</b>	<b>0</b>

Showing 1 to 7 of 7 entries

## Federation Pledges

Year: 2016

Pledge Type	ALICE	% of Req.	ATLAS	% of Req.	CMS	% of Req.	LHCb	% of Req.	SUM	% of Req.
CPU (HEP-SPEC06)	17,800	8%	20,350	4%			6,300	8%	44,450	5%
Disk (Tbytes)	1,280	5%	1,420	2%			360	13%	3,060	3%

Showing 1 to 2 of 2 entries

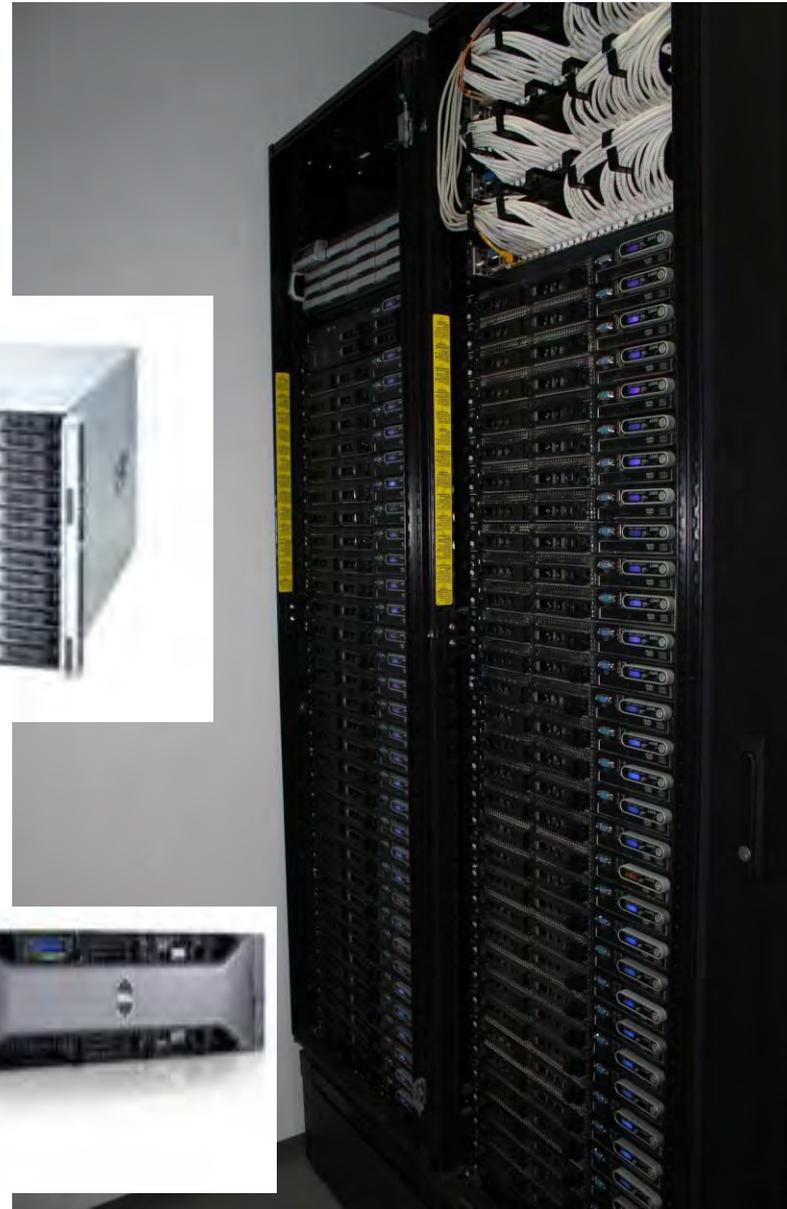
# THE RO-16-UAIC ARCHITECTURE



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www.uaic.ro

- ❖ 3 Gigabit Ethernet switches with 48 Gigabit ports and two Ten Gigabit Ethernet ports
- ❖ 31 servers used for WN with 8 cores (2.66GHz), 16GB RAM, 2 Gigabit interfaces, 160 GB disk storage per computer
- ❖ 1 server used for NFS, DHCP, DNS with 8 cores (2.66GHz), 24 GB RAM, 4\* 160 GB disks storage
- ❖ 1 storage with 8 TB in Raid 6
- ❖ 1 storage server used for SE with 16 cores (2.4GHz), 24GB RAM(1333MHz), 6 Gigabit interfaces and 80TB in Raid 6
- ❖ 2 servers will be used for back-up virtualization system in CREAM, BDII, UI, with 12 cores (2.66GHz), 32GB RAM, 2 Ten Gigabit Ethernet
- ❖ 4 servers used for WN with 24 cores (2.5GHz), 32GB or 64GB RAM, 10 Gigabit interface,



# THE RO-16-UAIC ARCHITECTURE



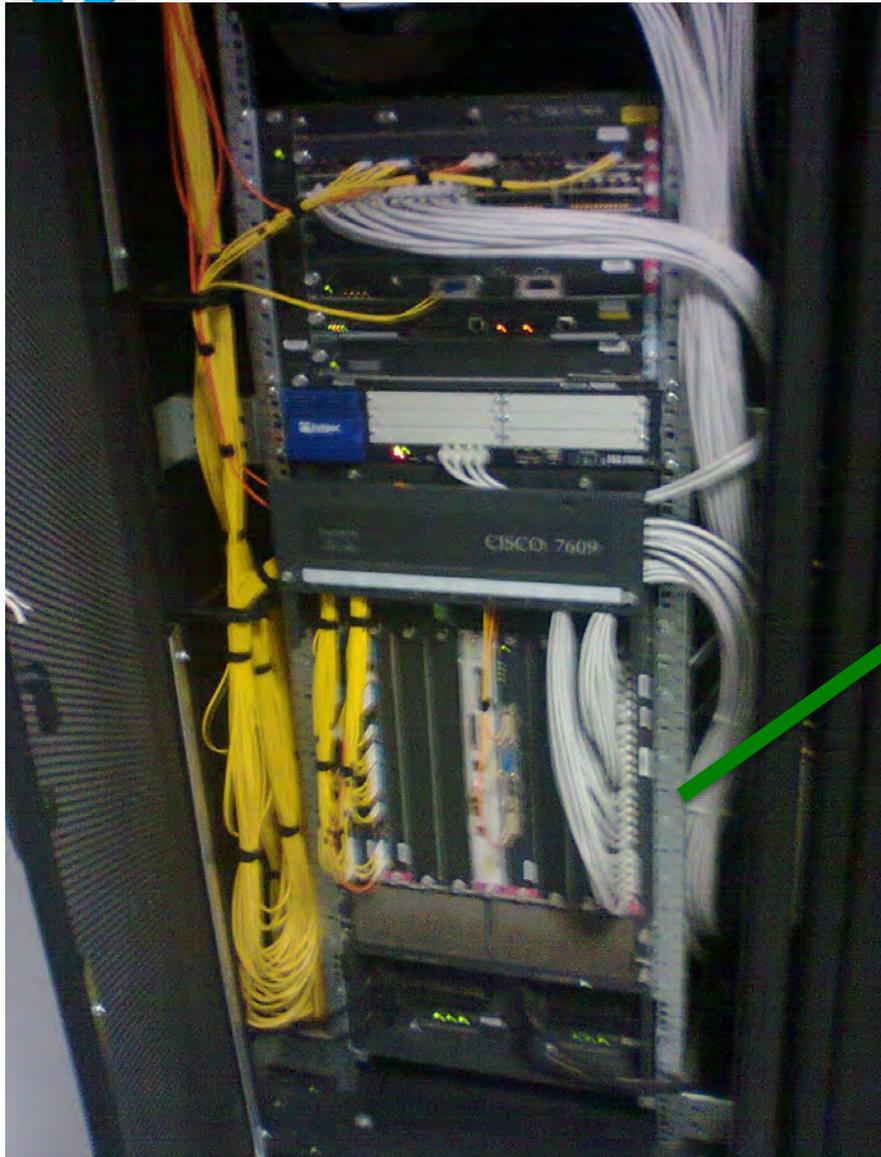
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2 \* server M630  
20 core processors at 2.5Ghz  
96GB RAM at 2.1 Ghz  
2\* 200 GB SSD  
1\*10Gbps Ethernet



# THE RO-16-UAIC ARCHITECTURE

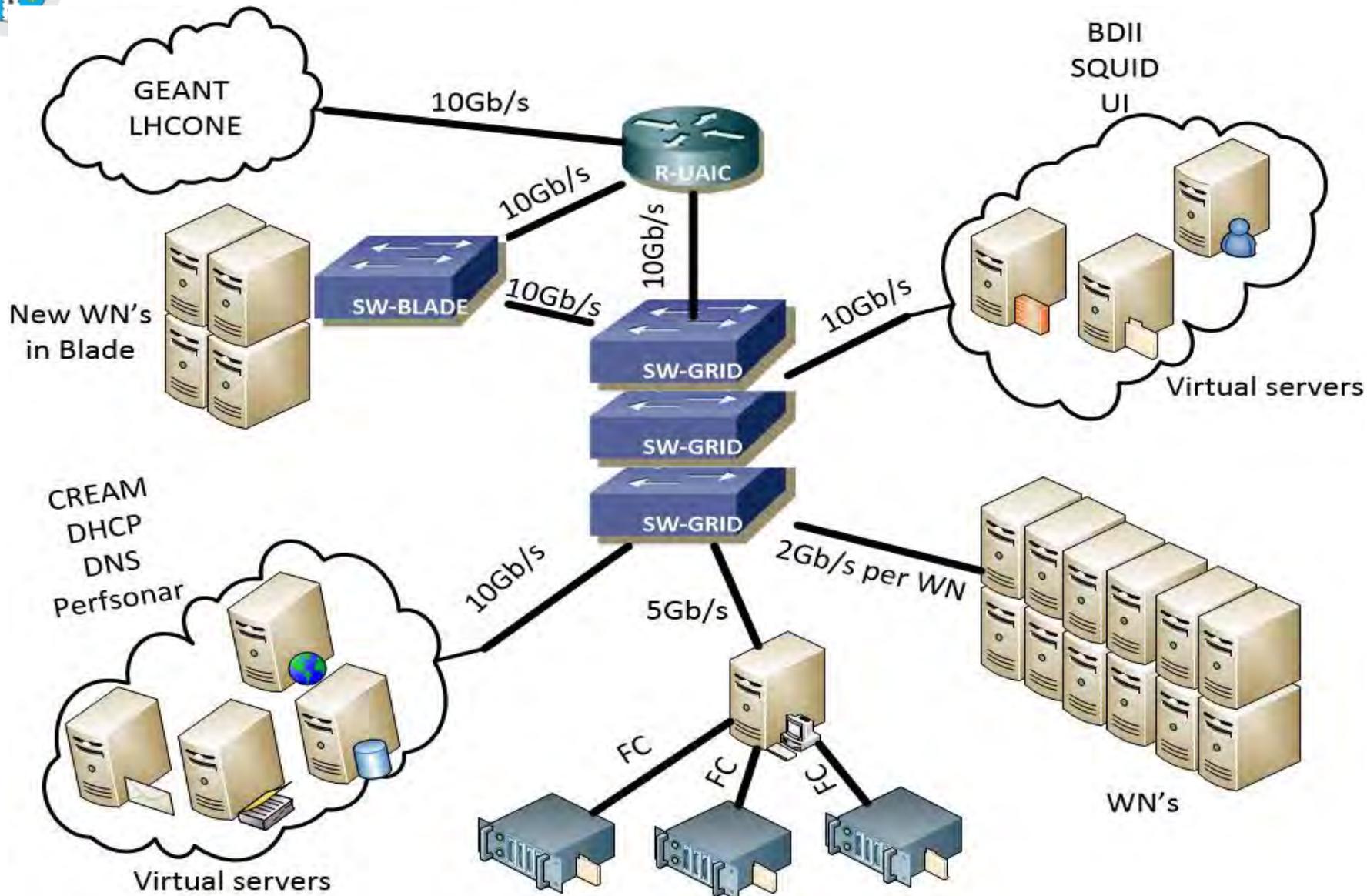


router from 2007



New router with capacity to install 100Gbps cards

# THE RO-16-UAIC ARCHITECTURE



# THE RO-16-UAIC ARCHITECTURE

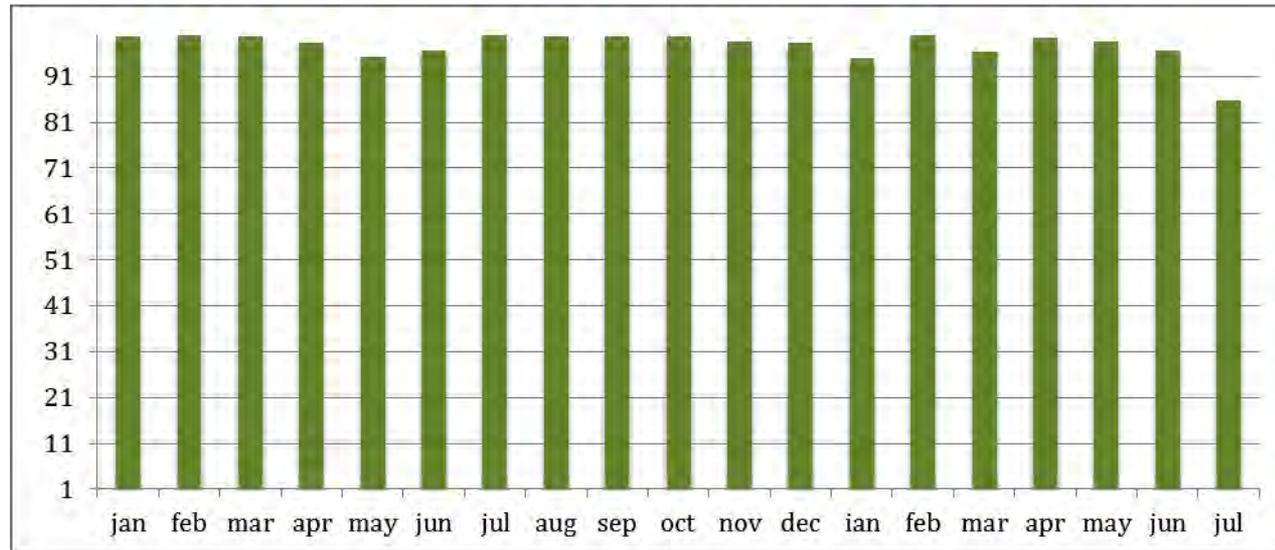


Server tip	No.	Obs.
Cream	1	Virtual server
BDII	1	Virtual server
UI/APEL	1	Virtual server
Squid	1	Virtual server
Network man.	1	Virtual server
Perfsonar BW.	1	Virtual server
Perfsonar LAT.	1	Virtual server
WN	56+1	475 CPU
SE	1	170TB

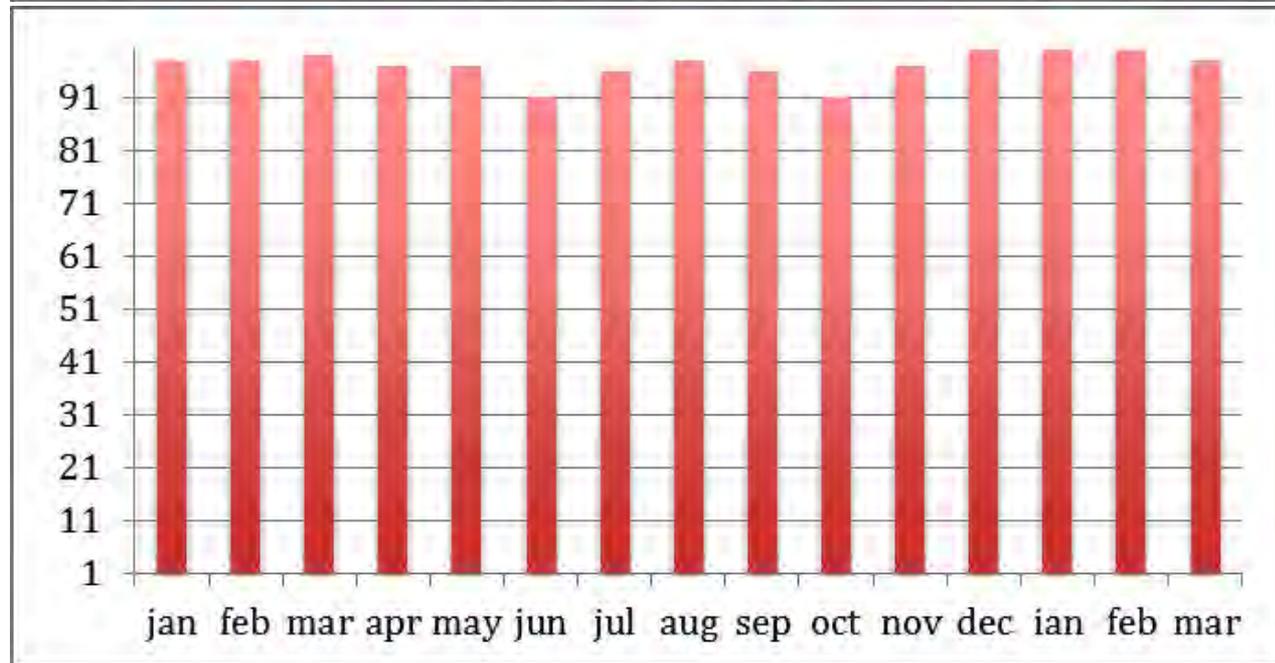
# RESULTS OF RO-16-UAIC



SITE AVAILABILITY  
OPS - 98,45%



ATLAS  
AVAILABILITY -  
97,01%



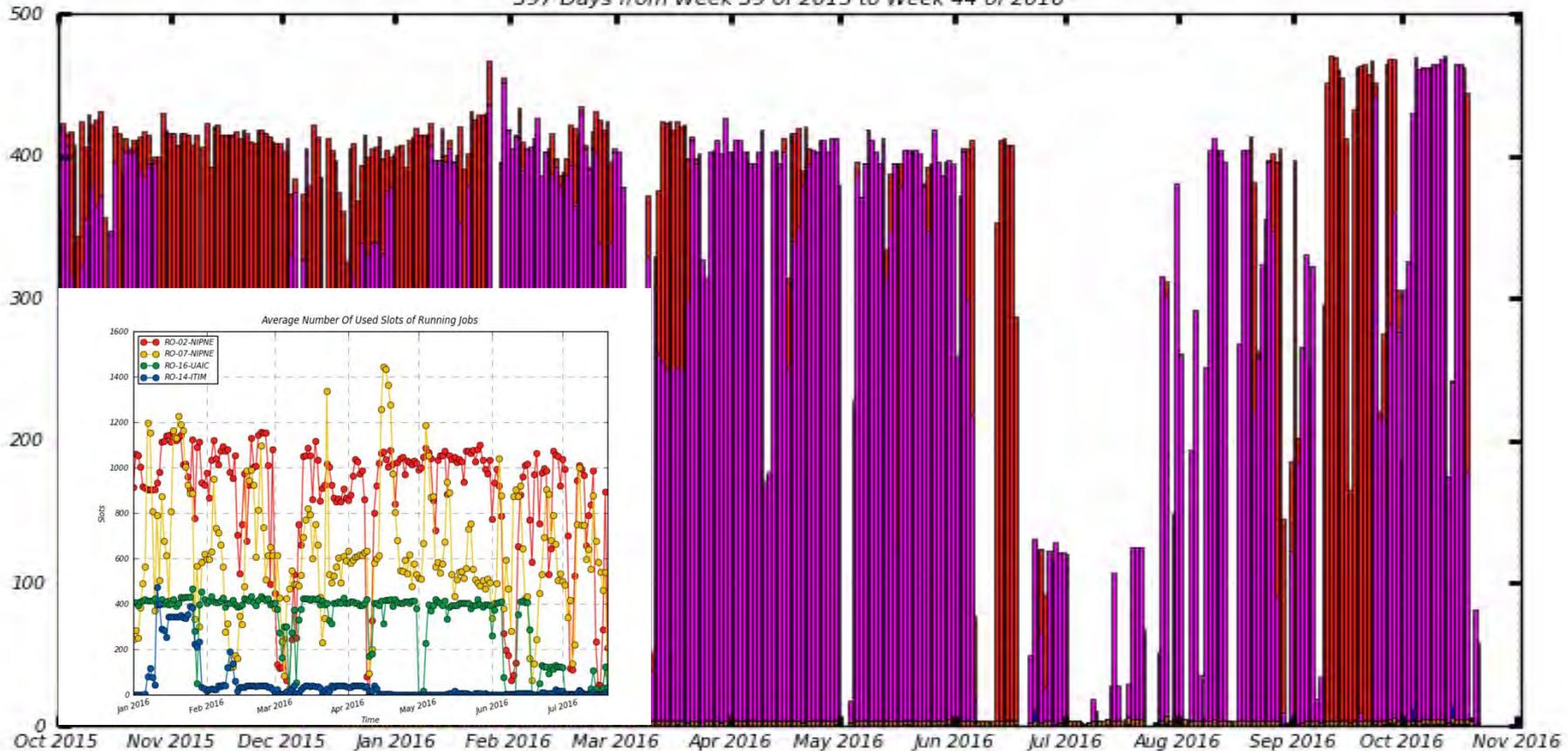
# RESULTS OF RO-16-UAIC



dashboard

## Slots of Running Jobs

397 Days from Week 39 of 2015 to Week 44 of 2016



- evgen
- simul
- urgent
- install
- gangarobot-pft
- gangarobot-new
- gangarobot-rctest
- gangarobot-celpft
- hammercloud
- pmerge
- gangarobot-mcore
- gangarobot-celmcore
- gangarobot-test
- gangarobot-rcmtest

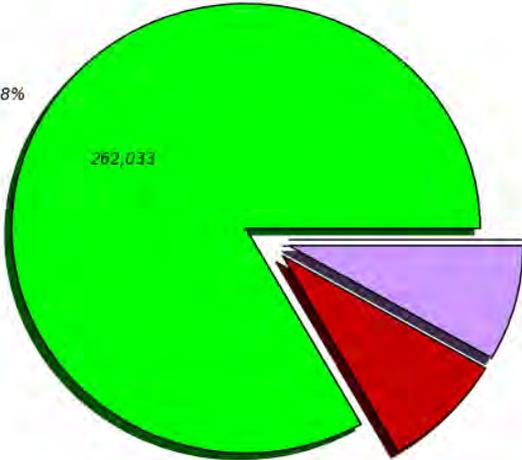
Maximum: 471.00 , Minimum: 0.00 , Average: 329.34 , Current: 58.00

# RESULTS OF RO-16-UAIC



Number of Successful and Failed Jobs (Pie Graph) (Sum: 315,007)

Number of Successful Jobs - 83.18%



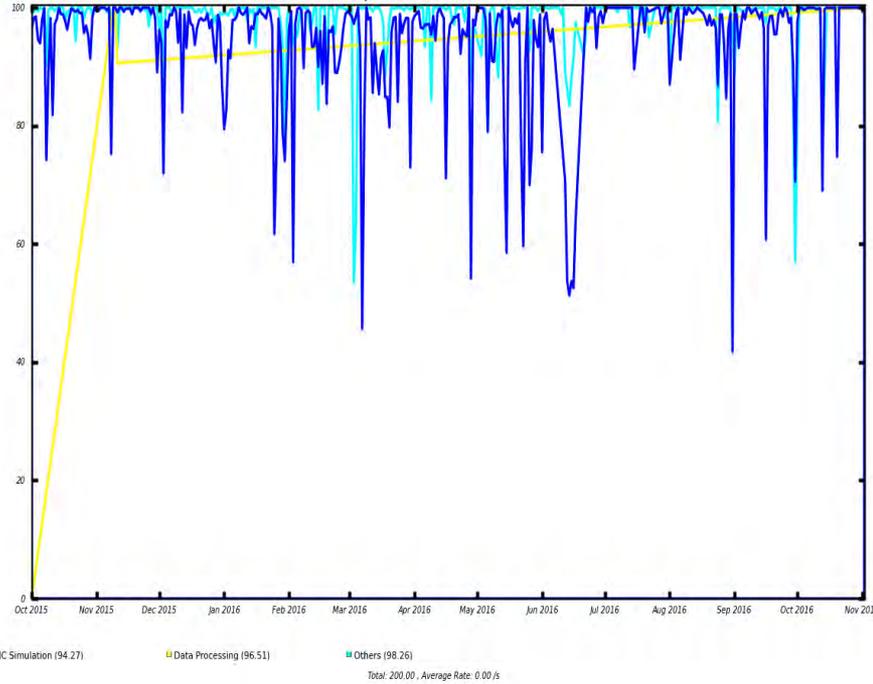
Number of Successful Jobs - 83.18% (262,034)  
Number of Cancelled Jobs - 8.34% (26,262)

Number of Failed Jobs - 8.48% (26,711)  
Number of Unknown-Status Jobs - 0.00% (0.00)

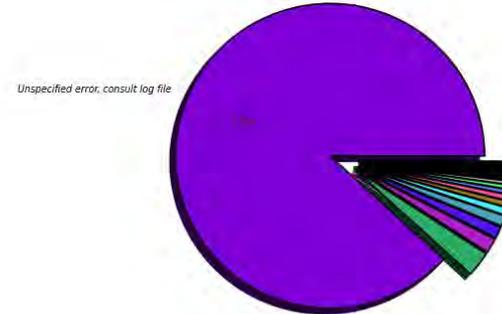


WallClock Efficiency over time based on success/all accomplished jobs

397 Days from Week 39 of 2015 to Week 44 of 2016



Transformation Failures by ExitCode (Sum: 6,474)



- Unspecified error, consult log file (5,709)
- Transformation not installed in CE (100.00)
- ATH\_FAILURE - Athena non-zero exit - cancelled (72.00)
- Transform received signal SIGBUS (40.00)
- Problem trying to generate requested outputs from given inputs - graph give no path to do this (31.00)
- Transform setup error (26.00)
- TRF\_UNKNOWN - unknown transformation error (12.00)
- Transform received signal SIGTERM - Payload stdout file too big (8.00)
- Transform received signal SIGKILL - No space left on local disk (7.00)
- Unspecified error, consult log file - cancelled (3.00)
- General exception raised which the transform did not handle (173.00)
- Internal transform error (82.00)
- Athena crash - consult log file (51.00)
- New trf: Transform received signal SIGABRT; Old trf: Athena core dump or timeout, or conddb DB conn (40.00)
- Transform received signal SIGTERM - No space left on local disk (29.00)
- No events to be processed in the input file - skipEvents is higher than actual event number (15.00)
- Unspecified error, consult log file - Athena ran out of memory (11.00)
- Transform received signal SIGTERM - Reached batch system time limit (8.00)
- Transform received signal SIGBUS - No space left on local disk (6.00)
- plus 27 more...

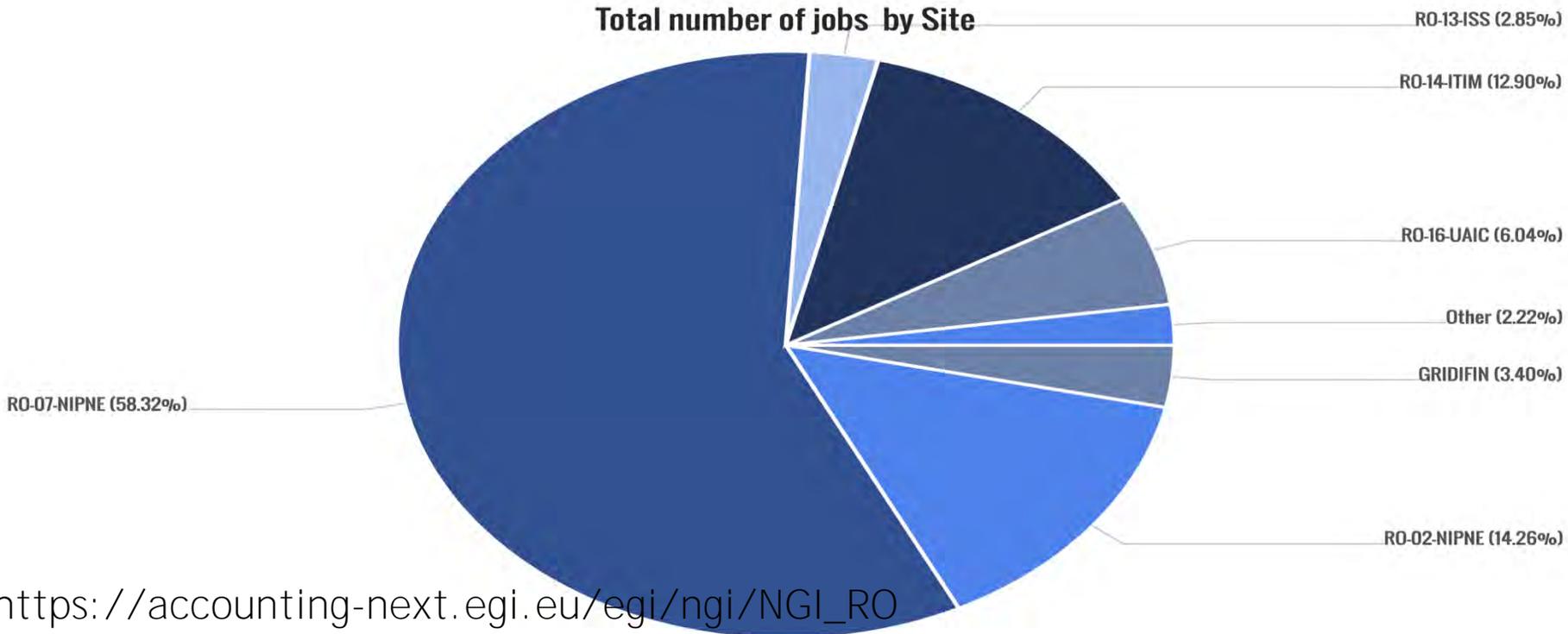
# JOBS STATISTIC

Site	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2016	Jun 2016	Jul 2016	Aug 2016	Sep 2016	Oct 2016	Total	Percent
GRIDIFIN	5,666	107,821	41,074	48,666	35,927	53,547	50,779	15,595	21,824	34,146	37,672	25,175	5,577	483,469	3.40%
NIHAM	5,809	5,740	5,485	4,912	6,887	6,904	6,120	5,658	7,502	7,874	7,902	7,547	4,050	82,390	0.58%
RO-02-NIPNE	224,053	94,756	145,759	170,890	168,395	205,995	164,920	156,861	152,574	183,319	129,632	158,120	71,271	2,026,545	14.26%
RO-07-NIPNE	831,647	771,125	1,226,925	906,311	828,807	871,251	498,207	482,858	441,055	481,203	459,128	294,319	196,951	8,289,787	58.32%
RO-11-NIPNE	16,919	13,174	10,690	8,692	12,426	16,004	14,792	10,701	10,416	12,023	15,381	11,330	9,995	162,543	1.14%
RO-13-ISS	64,895	62,588	18,216	25,291	25,513	27,869	27,220	28,264	57,158	26,695	19,790	22,102	0	405,601	2.85%
RO-14-ITIM	23,555	6,616	12,248	18,363	27,836	91,859	28,344	319,548	242,942	181,913	224,540	353,416	302,930	1,834,110	12.90%
RO-15-NIPNE	3,544	6,266	6,967	4,560	6,474	6,211	8,793	8,282	5,228	8,598	6,394	0	0	71,317	0.50%
RO-16-UAIC	64,865	49,257	40,284	35,358	29,716	86,272	66,330	63,598	101,359	46,596	126,358	124,002	24,543	858,538	6.04%
<b>Total</b>	<b>1,240,953</b>	<b>1,117,343</b>	<b>1,507,848</b>	<b>1,223,043</b>	<b>1,141,981</b>	<b>1,365,912</b>	<b>865,505</b>	<b>1,091,365</b>	<b>1,040,058</b>	<b>982,867</b>	<b>1,026,797</b>	<b>996,011</b>	<b>615,317</b>	<b>14,214,300</b>	
<b>Percent</b>	<b>8.73%</b>	<b>7.86%</b>	<b>10.61%</b>	<b>8.60%</b>	<b>8.03%</b>	<b>9.61%</b>	<b>6.09%</b>	<b>7.68%</b>	<b>7.32%</b>	<b>6.91%</b>	<b>7.22%</b>	<b>7.01%</b>	<b>4.33%</b>		

1-9 of 9 results

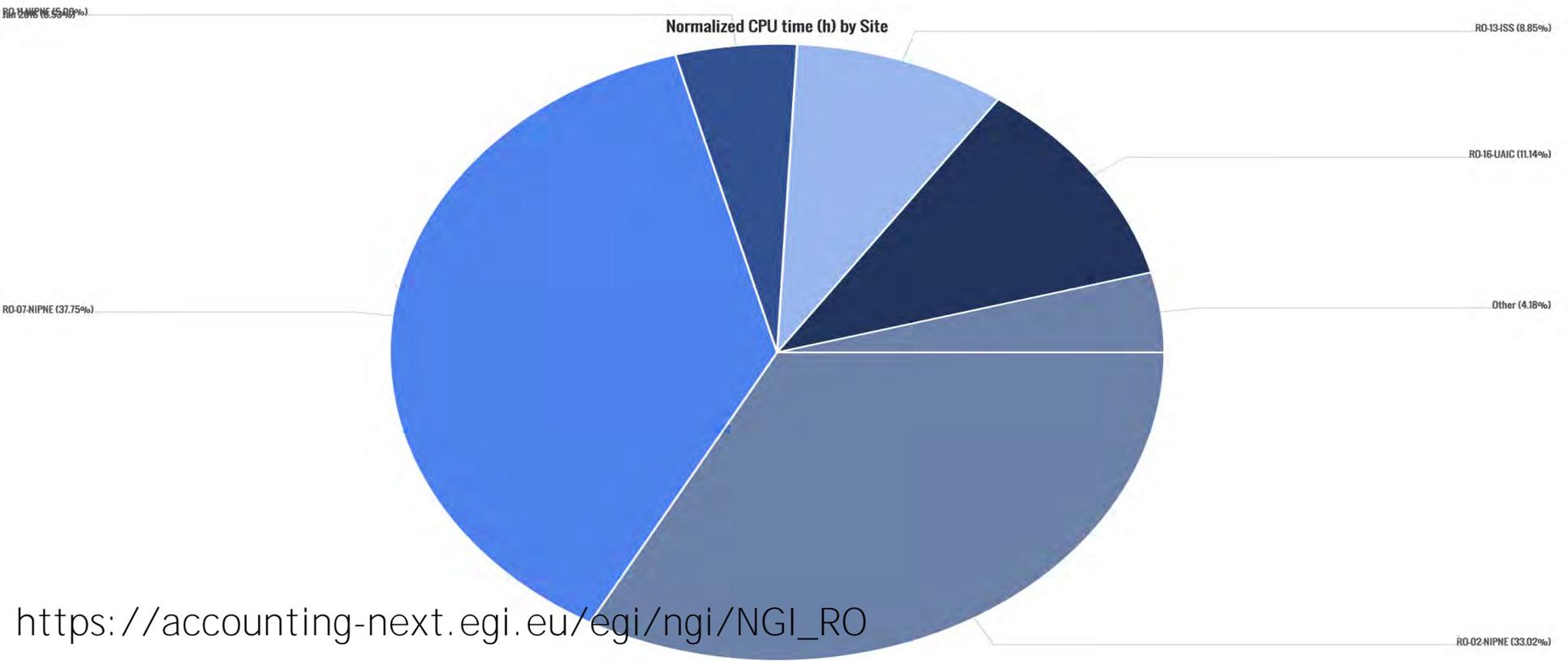
Number of rows per page 30

Total number of jobs by Site



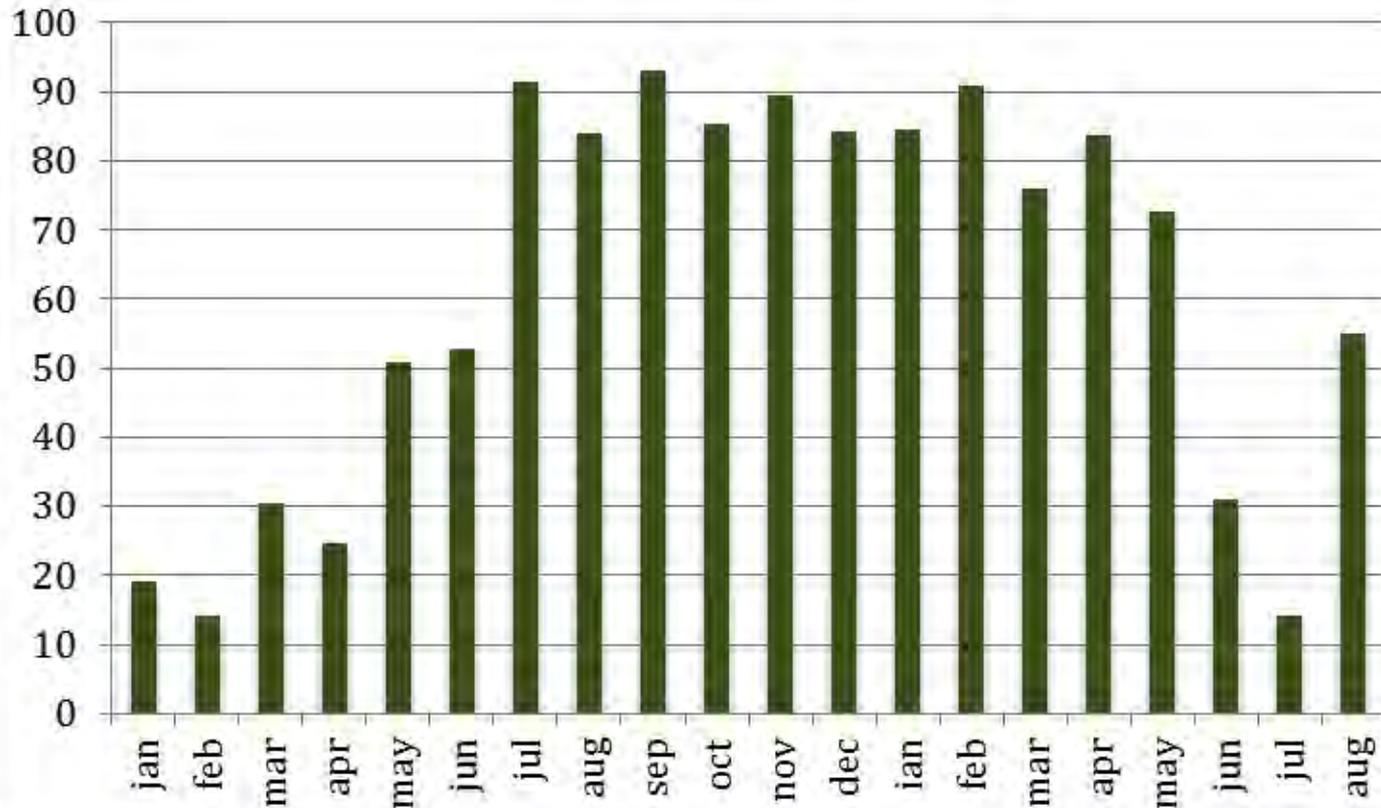
# JOBS STATISTIC

Site	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2016	Jun 2016	Jul 2016	Aug 2016	Sep 2016	Oct 2016	Total	Percent
GRIDFIN	250	7,398	301,016	371,112	298,137	653,420	585,508	227,760	374,163	602,591	559,992	205,436	95,409	4,282,133	1.93%
NIIFAN	5	6	5	6	6	8	6	6	7	8	9	7	4	82	0.00%
RO-02-NIPNE	5,708,984	5,439,900	5,848,113	7,237,490	6,261,018	4,923,392	6,131,165	6,902,039	5,270,688	4,681,233	5,367,065	6,512,068	2,839,838	73,122,992	33.02%
RO-07-NIPNE	3,584,196	5,977,936	5,484,231	5,539,944	4,776,544	5,603,134	6,490,529	6,388,110	5,898,717	16,552,087	6,480,804	7,148,533	3,664,421	83,589,186	37.75%
RO-11-NIPNE	1,317,708	689,622	564,484	371,576	663,997	1,206,000	1,326,840	1,022,271	846,410	727,761	1,004,885	735,472	732,337	11,209,362	5.06%
RO-13-ISS	2,066,187	1,871,334	1,334,130	1,749,039	1,053,699	1,771,383	1,937,698	1,807,544	1,890,824	1,994,825	1,201,155	929,418	0	19,607,234	8.85%
RO-14-ITIM	815,434	47,856	278,711	1,070,882	196,148	147,611	94,540	18,636	27,355	35,322	61,393	69,319	46,270	2,909,477	1.31%
RO-15-NIPNE	94,520	213,478	248,750	157,147	182,609	263,943	160,987	221,974	219,321	228,623	69,218	0	0	2,060,570	0.93%
RO-16-UAIC	2,420,049	2,457,700	2,388,963	2,398,540	2,409,815	2,157,973	2,297,112	2,066,214	853,720	403,209	1,558,407	2,183,607	1,078,222	24,673,529	11.14%



[https://accounting-next.egi.eu/egi/ngi/NGI\\_RO](https://accounting-next.egi.eu/egi/ngi/NGI_RO)

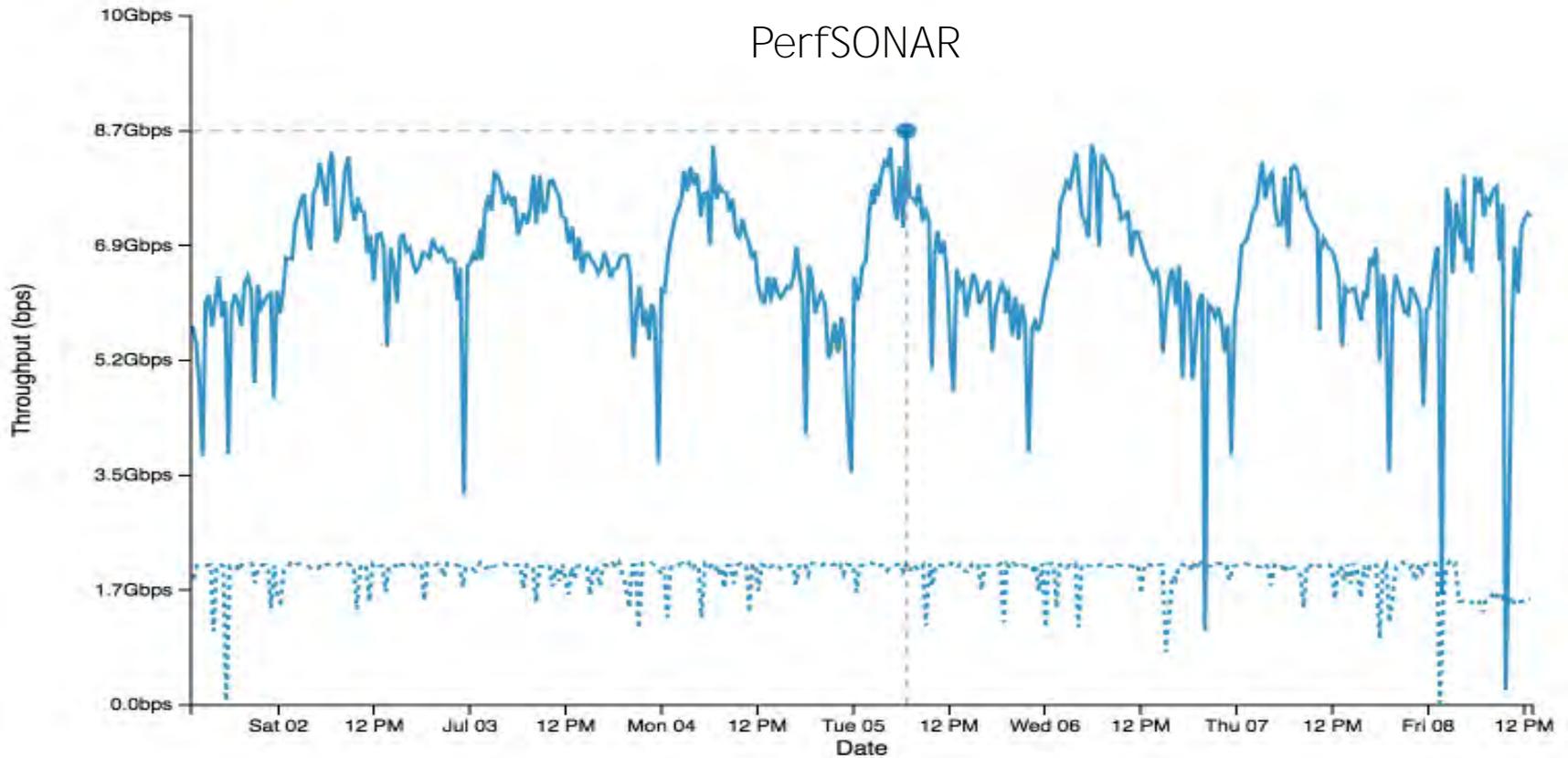
# JOBS STATISTIC



Average usage coefficient  $\langle U \rangle = 61,4\%$

Site	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2016	Jun 2016	Jul 2016	Aug 2016	Sep 2016	Oct 2016	Total
GRIDIFIN	27.13%	53.87%	97.28%	97.12%	92.13%	92.48%	96.29%	90.73%	94.18%	92.9%	91.62%	88.11%	77.83%	92.92%
NIHAM	3.12%	3.06%	1.89%	0.86%	1.35%	1.41%	1.25%	1.56%	1.07%	1.64%	1.74%	1.62%	1.45%	1.48%
RO-02-NIPNE	94.89%	96.51%	95.31%	95.4%	95.44%	95.38%	92.73%	90.73%	96.34%	93.63%	90.99%	92.23%	96.58%	94.13%
RO-07-NIPNE	84.93%	81.05%	73.19%	77.76%	78.59%	79.87%	76.32%	81.54%	88.12%	42.42%	68.4%	65.18%	67.25%	65.69%
RO-11-NIPNE	96.61%	96.87%	97.56%	97.37%	97.16%	97.05%	96.77%	96.45%	97.58%	97.17%	96.87%	95.05%	96.98%	96.84%
RO-13-ISS	88.74%	84.52%	84.36%	91.52%	85.39%	91.45%	92.86%	89.37%	91.95%	94.02%	94.76%	34.97%	0%	83.72%
RO-14-ITIM	94.92%	91.81%	96.11%	90.85%	86.83%	77.23%	89.42%	32.37%	56.95%	65.35%	70.91%	67.75%	74.42%	87.81%
RO-15-NIPNE	97.84%	99.23%	98.32%	98.92%	98.99%	99.19%	98.75%	99.46%	99.33%	97.64%	96.66%	0%	0%	98.74%
RO-16-UAIC	95.23%	96.18%	96.71%	95.24%	96.84%	94.95%	94.8%	90.87%	73.7%	92.34%	92.79%	96.01%	98.25%	94.21%
Total	91.85%	88.98%	86.06%	88.95%	89.11%	89%	86.97%	87.46%	90.94%	52.27%	81%	73.88%	81.1%	80.2%

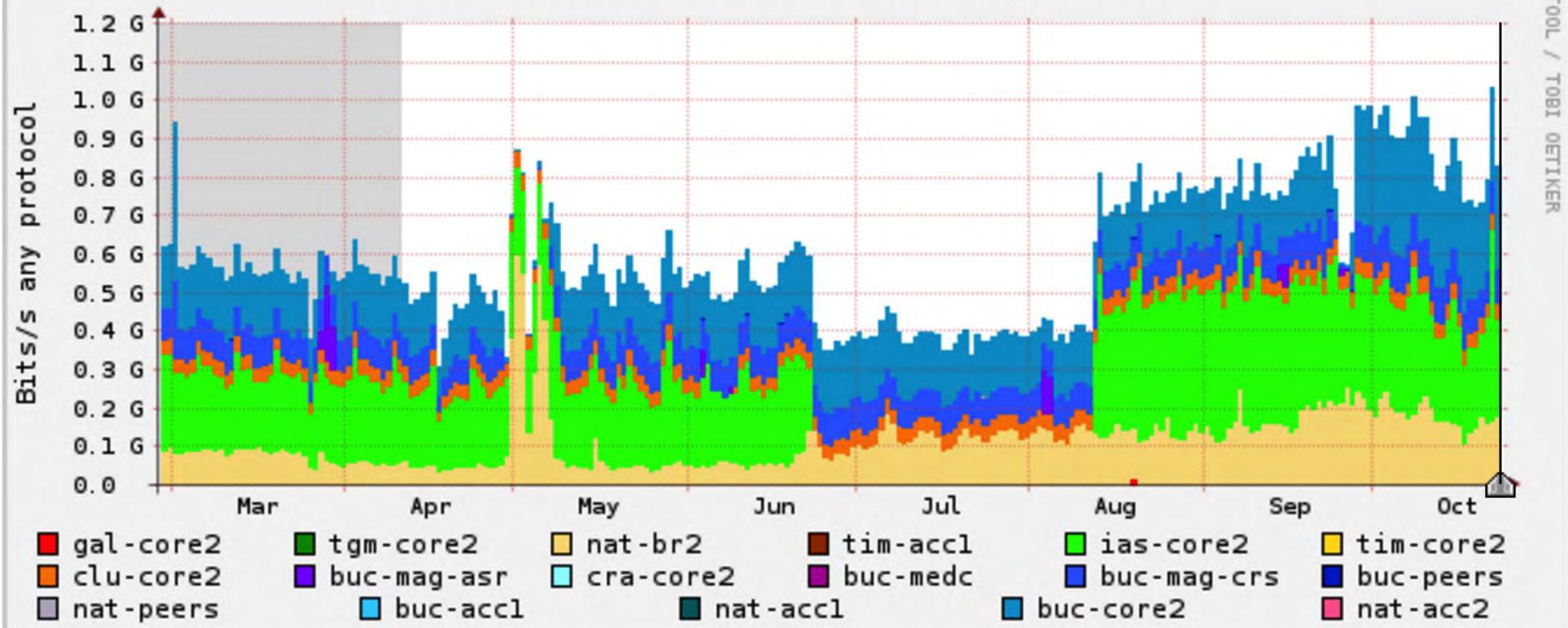
# NETWORK MONITORING



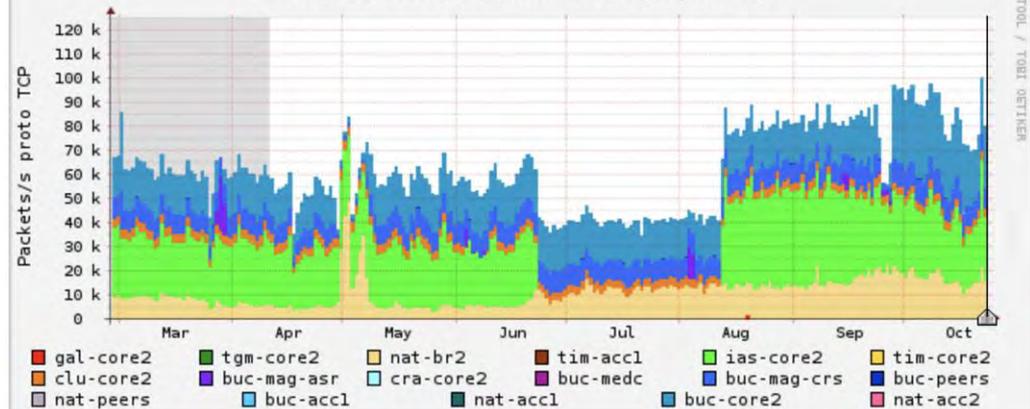
\* test bandwidth and latency between RO-16-UAIC site and others WLCG sites

# NETWORK MONITORING

Sun Oct 23 21:00:00 2016 Bits/s any protocol



Sun Oct 23 21:00:00 2016 Packets/s proto TCP



# NETWORK MONITORING



Download					Upload				
	Src IP Addr	Packet s (M)	Bytes (GB)	Flows (No.)		Dst IP Addr	Packet s (M)	Bytes (GB)	Flows (No.)
1	131.154.130.10 9	187.3	1636	49185	1	81.180.86.29	46.1	387.2	2578
2	131.154.130.99	174.2	1525	41348	2	81.180.86.30	42.3	371.8	2221
3	192.108.47.157	549.7	780.3	13094	3	81.180.86.42	39.8	352.8	2023
4	192.108.46.8	410.8	583.2	11077	4	81.180.86.31	39.5	346.2	2245
5	192.108.46.34	406.2	576.6	10467	5	192.84.128.49	138.4	207.0	1485
6	192.108.46.15	397.4	563.3	10221	6	131.154.130.9 9	100.6	186.3	143745
7	192.108.46.35	372.1	527.7	9581	7	131.154.130.1 09	107.6	179.3	258883
8	192.108.46.14	367.7	521.0	9992	8	192.84.128.48	108.4	161.7	1438
9	193.109.172.41	61.5	519.6	11909	9	130.92.9.145	106.9	152.1	1438

Top n statistics for RO-16-UAIC in one month

# NETWORK MONITORING



Protocol	Number of attacks
SSH (22)	275508
SUNRPC TCP (111)	990641
SUNRPC UDP (111)	18613314
TFTP (69)	19458
MDNS (5353)	8460

Location Src IP Addr :Port	Dst IP Addr :Port
<b>Italy :60733</b>	85.122.31.52:22
<b>Bulgaria :51223</b>	85.122.31.31:22
<b>Greece :38367</b>	85.122.31.2:22
<b>Brazil :37090</b>	85.122.31.32:22
<b>Thailand :39583</b>	85.122.31.30:22
<b>Vietnam:57205</b>	85.122.31.46:22

Brute force attacks on SSH service

# Conclusion



- ✓ number of jobs 800 K;
- ✓ Normalized CPU time (hour) 24 M;
- ✓ CPU Efficiency 94.5 % for single job;

# Thank you!

*E-mail: [ciprian.pinzaru@uaic.ro](mailto:ciprian.pinzaru@uaic.ro)*

