



# RO-07-NIPNE operations and plans

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Bucuresti | Alice T1/2 workshop  
May, 2019



# Outline

- RO-07-NIPNE overview
- Network & monitoring
- LHC VOs overview
- Future plans





# RO-07 overview

- RO-07-NIPNE part of RO-LCG Federation – member in WLCG collaboration
- Computing resources dedicated to 3 LHC VOs: ALICE, ATLAS, LHCb
- Storage resources dedicated to 3 LHC VOs: ALICE, ATLAS, LHCb(EOS+DPM)
- 3 different resource managers: PBS/Torque+Maui, SLURM,HTCondor
- Single core and multicore queue (8core)
- Upgrades using Ansible
- Top-BDII, VOBOX and VOMS (eli-np.eu,ronbio,etc)
- DPM storage used for Romanian ATLAS diskless sites
- 40Gbps uplink network
- 2 location: “computing room” and “storage room” with 100Gbps link interconnectivity



# RO-07 overview

APC InRow Chilled Water  
Cooling  
160KVA UPS  
Around 4300 CPU  
Blade + "pizza boxes"  
8,12, 16, 20, 32 cores/server

DCI->





# RO-07 overview

4x80KVA UPS Emerson  
8 DPM-Disk servers  
1 EOS (FTS) server  
2,6PB total capacity  
2,2PB used capacity

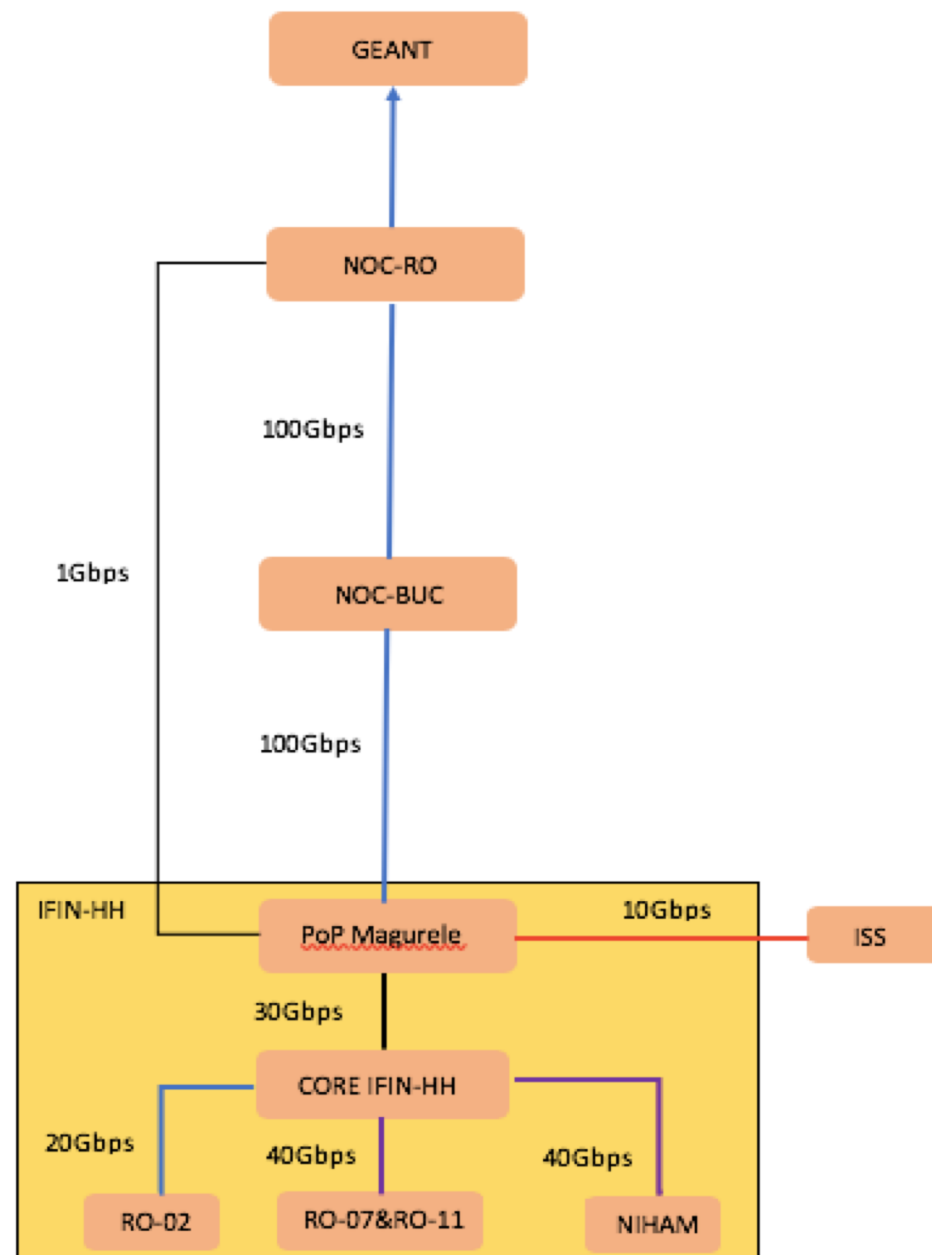
DC2->





# IFIN-HH Network

100Gbps uplink PoP – NOC-  
Bucuresti  
30Gbps link IFIN-HH(WLCG) -  
PoP  
1Gbps back-up uplink  
Network bandwidth(100/1Gbps)  
shared between grid sites and  
users network  
Integrated in LHCONE network



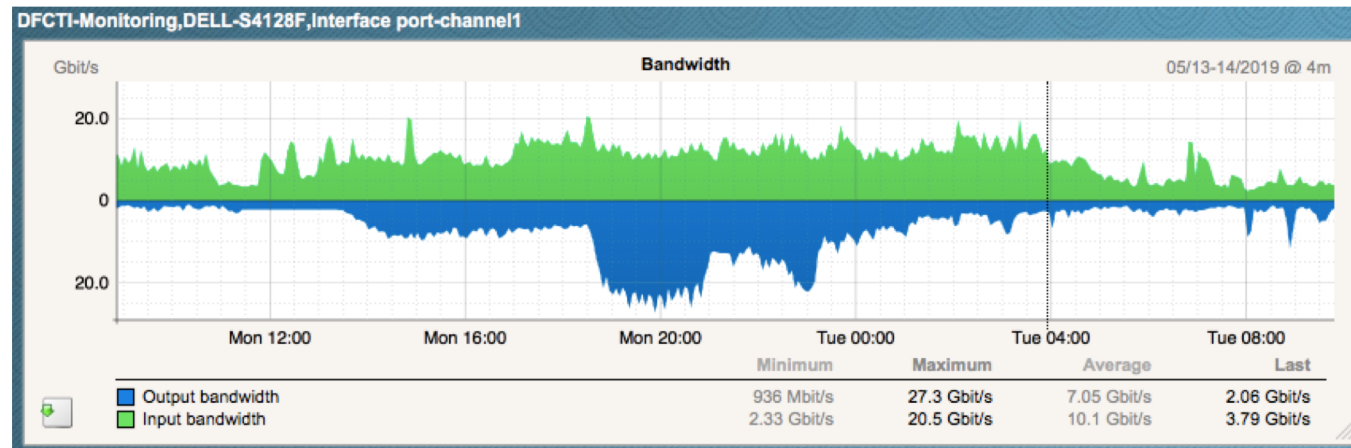




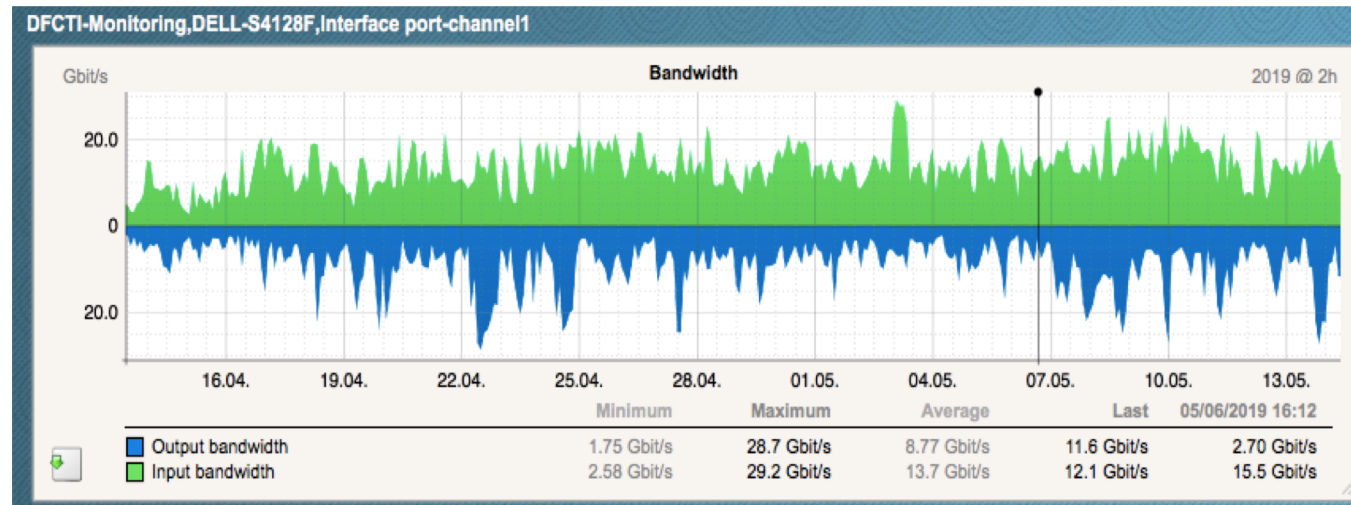
# IFIN-HH Network

30Gbps uplink

IFIN-HH WLCG  
Uplink traffic  
yesterday



IFIN-HH WLCG  
Uplink traffic  
last month

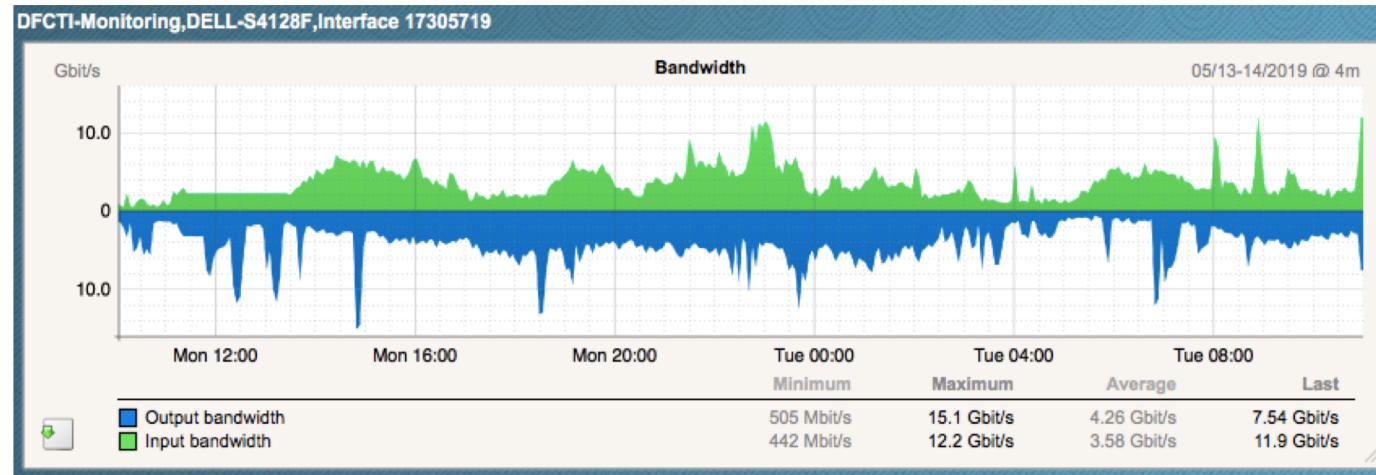




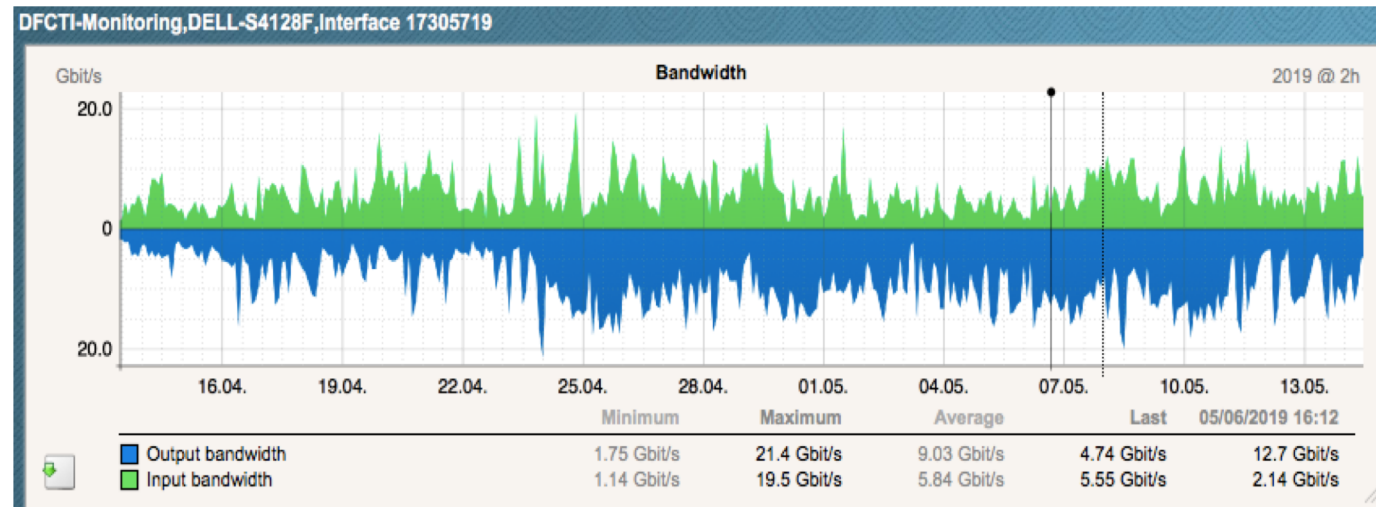
# RO-07 External Network

40Gbps uplink

RO-07 traffic yesterday



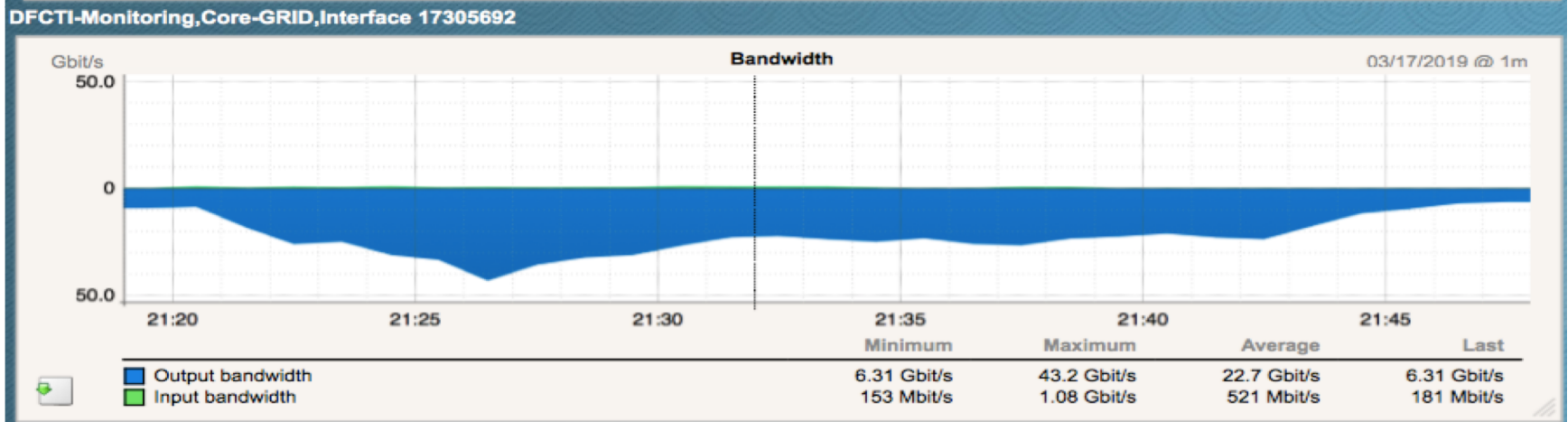
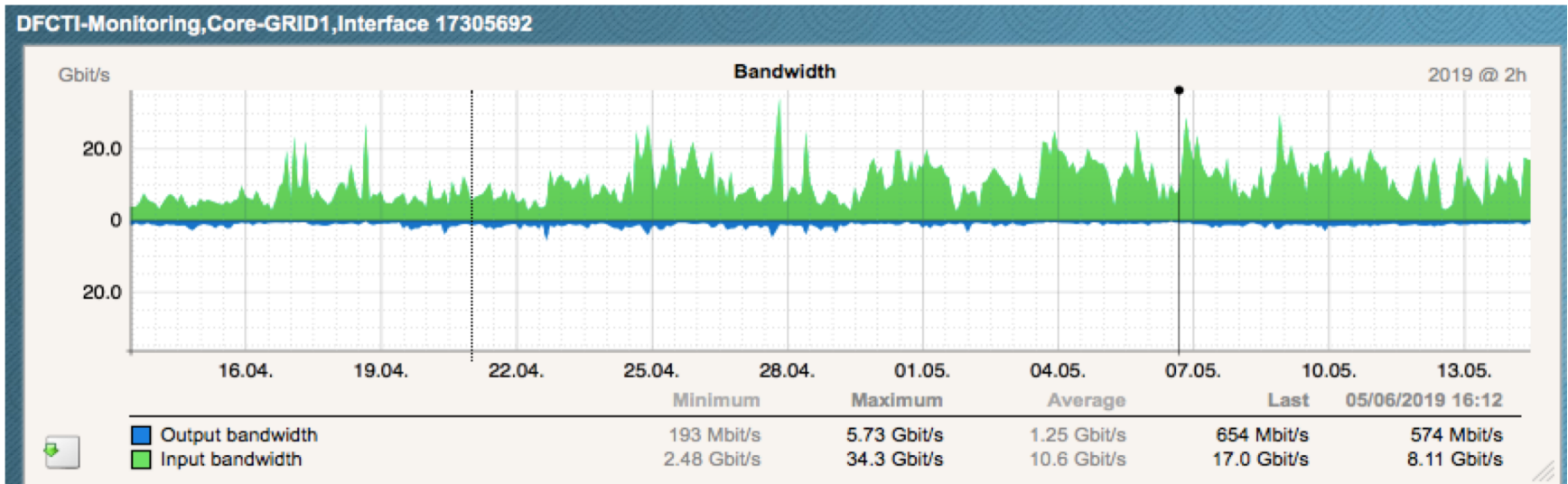
RO-07 traffic last month





# RO-07 Internal Network

- 100Gbps link between the “storage room” and “computing room”
- All the storage machines have 10Gbps connectivity
- Traffic peaks over 40Gbps







# RO-07 Monitoring

- Check-mk +nagios
- More then 150 hosts
- Around 3500 services

IFIN / GRID							IFIN / GRIDIFIN							IFIN / LAN / Dept-DFCTI							IFIN / Servere Retea										
state	Host	Icons	OK	Wa	Un	Cr	Pd	state	Host	Icons	OK	Wa	Un	Cr	Pd	state	Host	Icons	OK	Wa	Un	Cr	Pd	state	Host	Icons	OK	Wa	Un	Cr	Pd
UP	DELL-MD3200		0	1	0	0	0	UP	argus.nipne.ro		19	1	0	0	0	UP	AP-DFCTI-1		28	0	0	0	0	UP	backup		22	0	0	0	0
UP	FSC-Etemus		1	0	0	0	0	UP	cloud-bdil.nipne.ro		22	1	0	0	0	UP	AP-DFCTI-2		28	0	0	0	0	UP	cc.ifin.ro		22	1	0	0	0
UP	arc-htc.nipne.ro		24	1	0	0	0	UP	cloud-ctrl.nipne.ro		33	2	0	0	0	DOWN	SW-CCA-DataCenter-8132F		17	2	0	1	0	UP	cloud.nipne.ro		22	1	0	0	0
UP	arc.nipne.ro		30	1	0	0	0	UP	hpec2.nipne.ro		20	1	0	0	0	UP	SW-CCA-useri		10	1	0	0	0	UP	dfcti.ifin.ro		21	1	0	0	0
UP	bdil.nipne.ro		20	1	0	0	0	UP	hpec.nipne.ro		25	0	0	0	0	UP	SW-Centru_de_Calcul-POP		30	1	0	0	0	UP	dhcp.nipne.ro		48	1	0	1	0
UP	condor.nipne.ro		21	1	0	0	0	UP	lfc.nipne.ro		19	1	0	0	0	UP	SW-DFCTI-1		26	1	0	0	0	UP	eduroam.nipne.ro		21	0	0	0	0
UP	eos.nipne.ro		21	1	0	0	0	UP	roc.nipne.ro		28	1	0	0	0	UP	SW-DFCTI-2		19	1	0	0	0	UP	ifin.nipne.ro		24	1	0	0	0
UP	fst1.nipne.ro		44	1	0	0	0	UP	segl.nipne.ro		19	2	0	1	0	UP	SW-DFCTI-HPC		25	2	0	0	0	UP	monitorizare_checkmk		36	1	0	0	0
UP	gridgw.nipne.ro		21	1	0	0	0	UP	tbit06.nipne.ro		19	1	0	1	0	UP	ns.nipne.ro		25	1	0	0	0	UP	repository.nipne.ro		24	1	0	0	0
UP	newvobox.nipne.ro		0	1	0	0	0	UP	tbitul.nipne.ro		21	1	0	1	0	UP	UPS_Emerison_1		1	0	0	0	0	UP	suport.nipne.ro		21	0	0	0	0
UP	perfonar1.nipne.ro		1	0	0	0	0	IFIN / LAN / CORE_NET							UP	UPS_Emerison_2		1	0	0	0	0	UP	tandem.nipne.ro		26	1	0	0	0	
UP	slum.nipne.ro		22	1	0	0	0	UP	CATALYST-2960-DFCTI		25	0	0	0	0	UP	UPS_Emerison_3HOL		1	0	0	0	0	UP	vpn.nipne.ro		20	1	2	0	0
UP	storage1.nipne.ro		40	1	0	0	0	UP	DELL1-NOC-DFCTI		21	1	0	0	0	IFIN / LAN / HVAC							IFIN / Servere Retea / for-ELI-NP								
UP	storage2.nipne.ro		39	1	0	0	0	UP	DELL2-NOC-DFCTI		22	1	0	0	0	state	Host	Icons	OK	Wa	Un	Cr	Pd	state	Host	Icons	OK	Wa	Un	Cr	Pd
UP	storage3.nipne.ro		54	2	0	0	0	UP	DELL-S4128F		32	0	0	0	0	UP	AP-CCR		28	0	0	0	0	UP	cloud.eli-np.ro		24	1	0	0	0
UP	storage4.nipne.ro		41	2	0	0	0	DOWN	FortiGate		14	1	0	1	0	DOWN	AP-DAT2		27	2	0	1	0	UP	mail.eli-np.ro		23	1	0	0	0
UP	storage6.nipne.ro		33	1	0	0	0	UP	FortiNew		17	0	0	0	0	UP	AP-DAT-Cladire-noua		28	0	0	0	0	UP	www.eli-np.ro		23	1	0	0	0
UP	storage15.nipne.ro		40	1	0	0	0	UP	POP-N4064F		40	1	0	0	0	UP	AP-DFT1		28	0	0	0	0	IFIN / Servere Retea / no_Agent							
UP	storage16.nipne.ro		40	0	0	0	0	UP	WLAN-RUCKUS		12	1	0	0	0	UP	AP-DFT2		28	0	0	0	0	state	Host	Icons	OK	Wa	Un	Cr	Pd
UP	storage17.nipne.ro		39	7	0	0	0	IFIN / LAN / Departamente							DOWN	AP-DFT3		0	2	0	0	0	UP	81.180.86.1		1	0	0	0	0	
UP	storage18.nipne.ro		46	0	0	0	state	Host	Icons	OK	Wa	Un	Cr	Pd	UP	AP-Directie-DirGen		16	2	0	1	0	UP	194.102.58.1		1	0	0	0	0	
UP	tbit00.nipne.ro		32	1	0	0	0	UP	Biblioteca		19	0	0	0	0	UP	AP-Directie-Etaj1		28	0	0	0	0	UP	RoEdu-GW		1	0	0	0	0
UP	tbit01.nipne.ro		28	1	0	0	0	UP	CCR		21	1	0	0	0	UP	AP-Directie-Parter		28	0	0	0	0	UP	finnou1.nipne.ro		1	0	0	0	0
UP	tbit02.nipne.ro		21	1	0	0	0	UP	CPR		20	0	0	0	0	UP	AP-Directie-SalaConsiliu		28	0	0	0	0	UP	finnou2.nipne.ro		1	0	0	0	0
UP	tbit03.nipne.ro		28	1	0	0	0	UP	Centru-Conferinte		20	0	0	0	0	UP	AP-IRASM-50		30	0	0	0	0	UP	teo.nipne.ro		1	0	0	0	0
UP	tbit07.nipne.ro		33	1	0	0	0	UP	DFNA		22	0	0	0	0	UP	AP-IRASM-R300		30	0	0	0	0	UP	turing.nipne.ro		1	0	0	0	0
UP	vobox.nipne.ro		20	1	0	1	0	UP	DFPE		21	0	0	0	0	UP	FAP-Biblioteca-etaj1		1	0	0	0	0	UP	www2.nipne.ro		1	0	0	0	0
IFIN / GRID / Net							UP	DFVM		23	0	0	0	0	UP	FAP-Biblioteca-parter		1	0	0	0	0	UP	www.google.ro		1	0	0	0	0	
UP	Access01		27	2	0	0	0	UP	DIRECTIE		18	2	0	0	0	UP	FAP-SalaFestivitati		1	0	0	0	0								
UP	Access04		25	0	0	0	0	UP	IRASM		24	2	0	0	0																
UP	Access05		31	0	0	1	0	UP	IRASM-50		16	0	0	0	0																
UP	Access06		24	0	0	0	0	UP	Reactor		17	0	0	0	0																
UP	Access07		30	0	0	0	0	UP	STDR		22	1	0	0	0																
UP	Access08		26	2	0	0	0	UP	TANDEM		18	0	0	0	0																
UP	Access09		26	0	0	1	0	UP	TANDIMED		29	1	0	0	0																
UP	Access10		31	0	0	1	0	UP	TEORIE		24	0	0	0	0																
								UP	sw-registratura		11	1	0	0	0																





# RO-07 Monitoring

RO-07 servers  
& switches

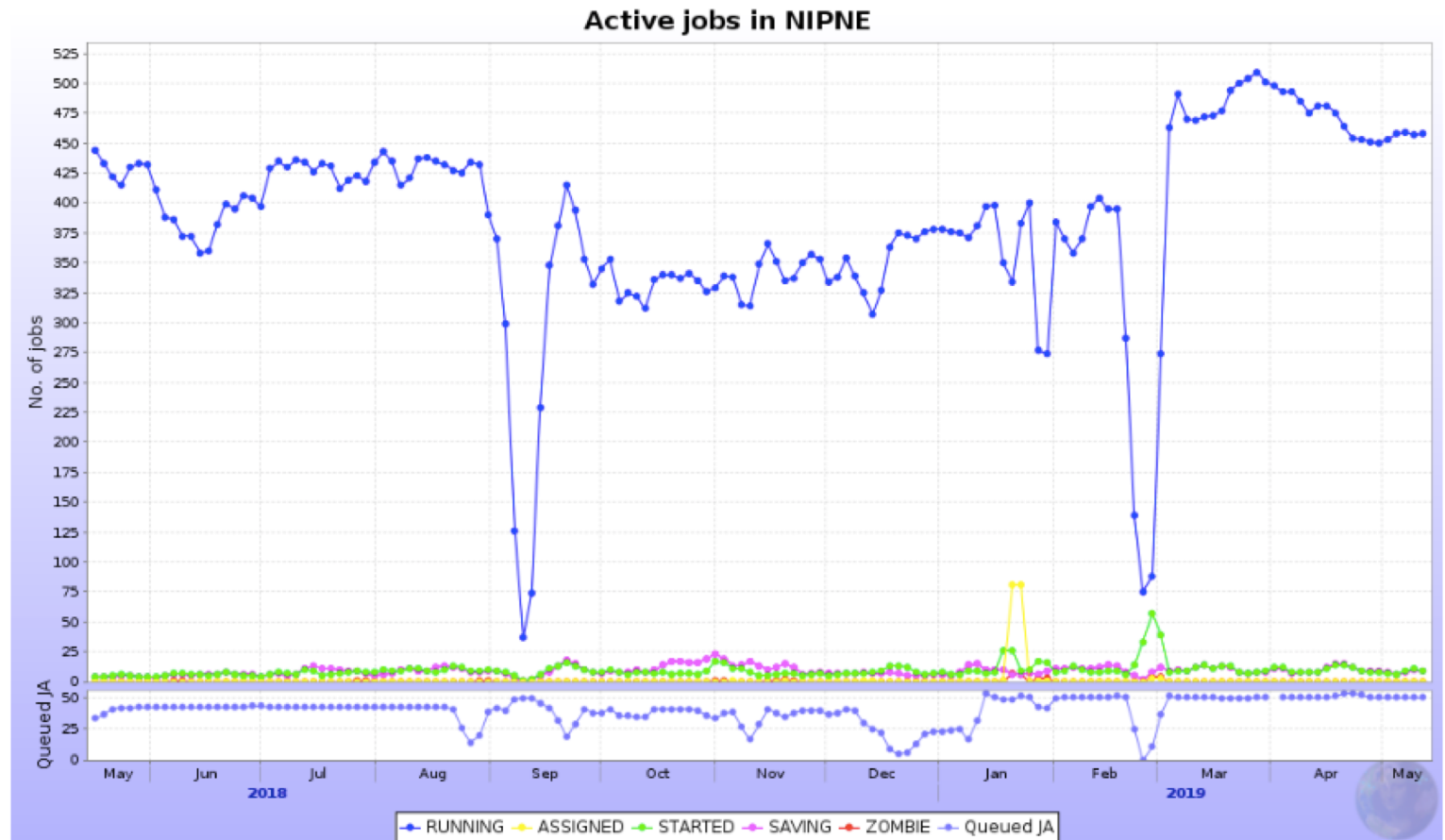
IFIN / GRID							
state	Host	Icons	OK	Wa	Un	Cr	Pd
UP	DELL-MD3200	📶	0	1	0	0	0
UP	FSC-Eternus	📶	1	0	0	0	0
UP	arc-htc.nipne.ro	📶	24	1	0	0	0
UP	arc.nipne.ro	📶	29	1	0	1	0
UP	bdii.nipne.ro	📶	20	1	0	0	0
UP	condor.nipne.ro	📶	21	1	0	0	0
UP	eos.nipne.ro	📶	21	1	0	0	0
UP	fst1.nipne.ro	📶	44	1	0	0	0
UP	gridgw.nipne.ro	📶	21	1	0	0	0
UP	newvobox.nipne.ro	📶	0	1	0	0	0
UP	perfonar1.nipne.ro	📶	1	0	0	0	0
UP	slurm.nipne.ro	📶	22	1	0	0	0
UP	storage1.nipne.ro	📶	40	1	0	0	0
UP	storage2.nipne.ro	📶	39	1	0	0	0
UP	storage3.nipne.ro	📶	54	2	0	0	0
UP	storage4.nipne.ro	📶	41	2	0	0	0
UP	storage6.nipne.ro	📶	33	1	0	0	0
UP	storage15.nipne.ro	📶	40	1	0	0	0
UP	storage16.nipne.ro	📶	40	0	0	0	0
UP	storage17.nipne.ro	📶	39	7	0	0	0
UP	storage18.nipne.ro	📶	46	0	0	0	0
UP	tbit00.nipne.ro	📶	32	1	0	0	0
UP	tbit01.nipne.ro	📶	28	1	0	0	0
UP	tbit02.nipne.ro	📶	21	1	0	0	0
UP	tbit03.nipne.ro	📶	28	1	0	0	0
UP	tbit07.nipne.ro	📶	33	1	0	0	0
UP	vobox.nipne.ro	📶	20	1	0	1	0

IFIN / GRID / Net							
state	Host	Icons	OK	Wa	Un	Cr	Pd
UP	Access01	📶	27	2	0	0	0
UP	Access04	📶	25	0	0	0	0
UP	Access05	📶	31	0	0	1	0
UP	Access06	📶	24	0	0	0	0
UP	Access07	📶	30	0	0	0	0
UP	Access08	📶	26	2	0	0	0
UP	Access09	📶	26	0	0	1	0
UP	Access10	📶	31	0	0	1	0
UP	Access11	📶	22	0	0	0	0
UP	Access12	📶	17	0	0	0	0
UP	CORE-RO-07	📶	24	0	0	1	0
UP	CORE-RO-07-1GB	📶	25	1	0	0	0
UP	Core-GRID1	📶	28	0	0	0	0
UP	Core-GRID	📶	30	0	0	0	0



# RO-07 Alice

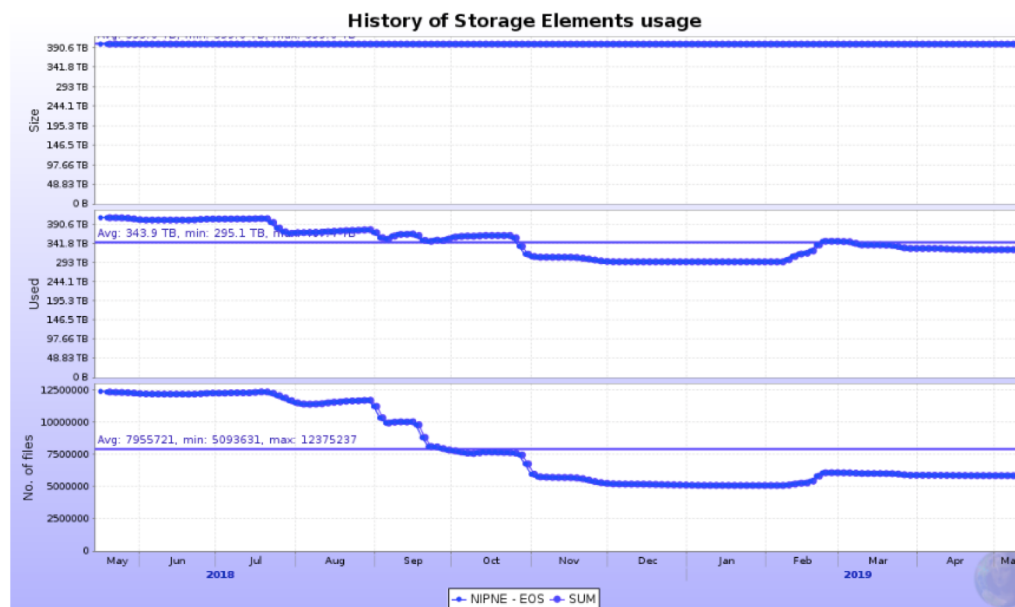
VOBOX + CREAM-CE on SL6 ~500 slots  
New VOBOX on CentOS7 installed  
EOS + 1 FST ~400TB





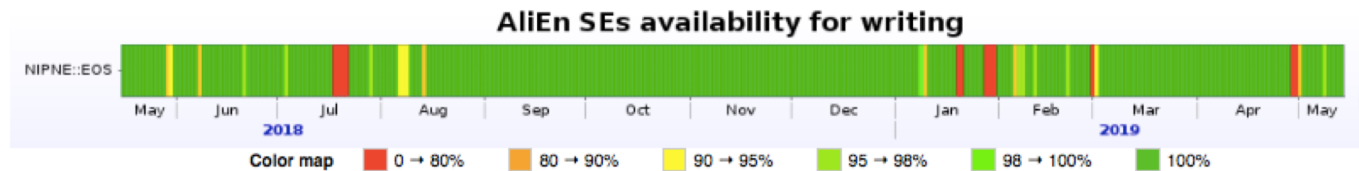
# RO-07 Alice

Storage usage



Storage avail.

Size					Used					Number of files				
Series	Last value	Min	Avg	Max	Series	Last value	Min	Avg	Max	Series	Last value	Min	Avg	Max
1. NIPNE - EOS	399.6 TB	399.6 TB	399.6 TB	399.6 TB	1. NIPNE - EOS	325.8 TB	295 TB	344.2 TB	407.5 TB	1. NIPNE - EOS	5819858	5093199	7970942	12473182
<b>Total</b>	<b>399.6 TB</b>		<b>399.6 TB</b>		<b>Total</b>	<b>325.8 TB</b>		<b>344.2 TB</b>		<b>Total</b>	<b>5819858</b>		<b>7970942</b>	

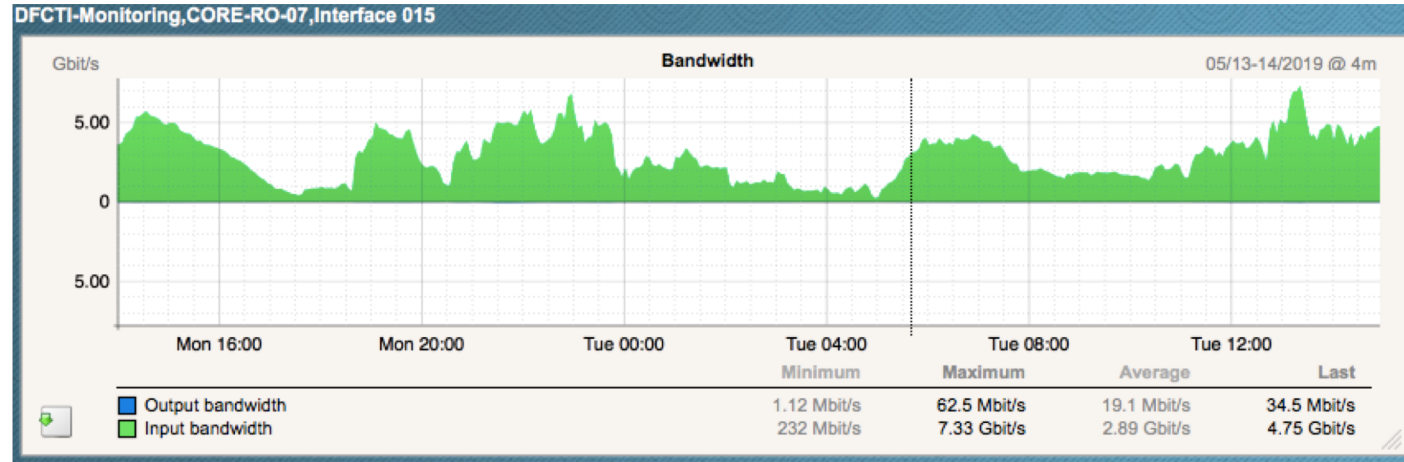


Link name	Data		Individual results of writing tests			Overall
	Starts	Ends	Successful	Failed	Success ratio	
	NIPNE::EOS	15 May 2018 15:15	14 May 2019 14:52	8458	225	

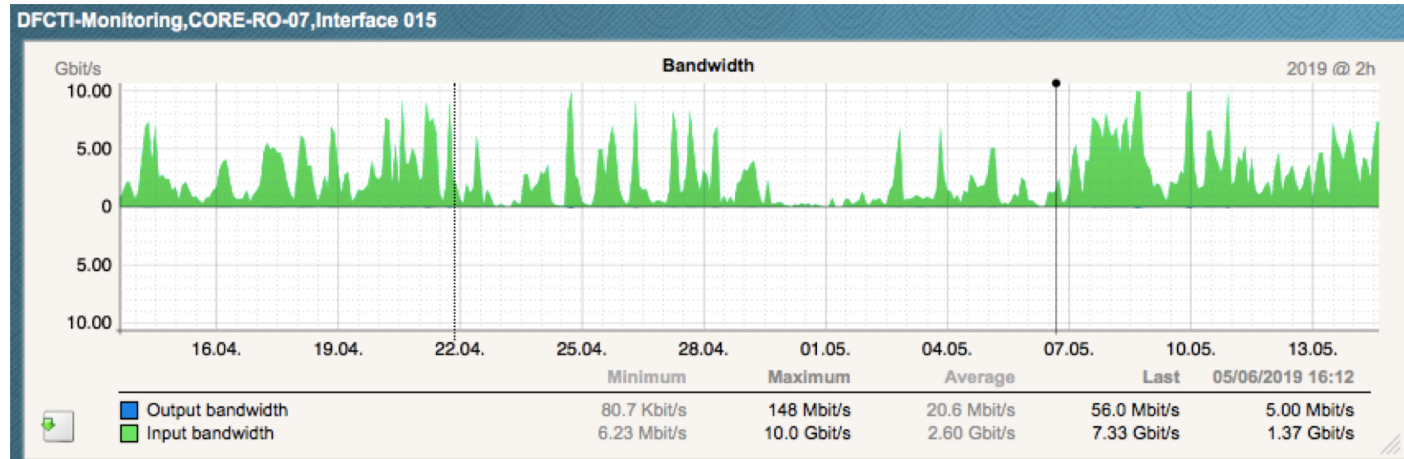


# RO-07 Alice

External traffic yesterday



External traffic last month

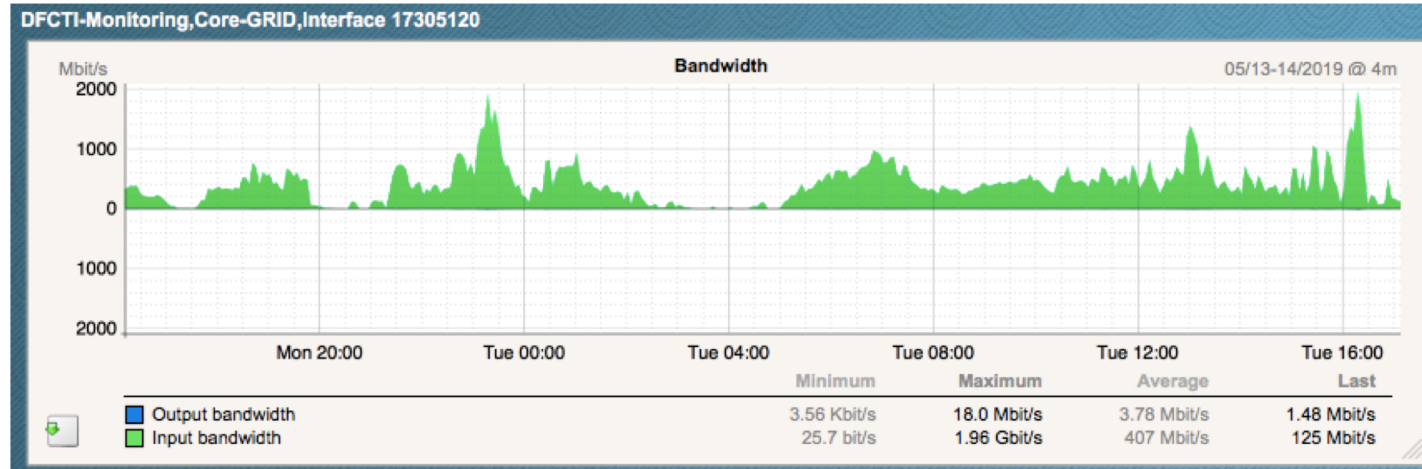




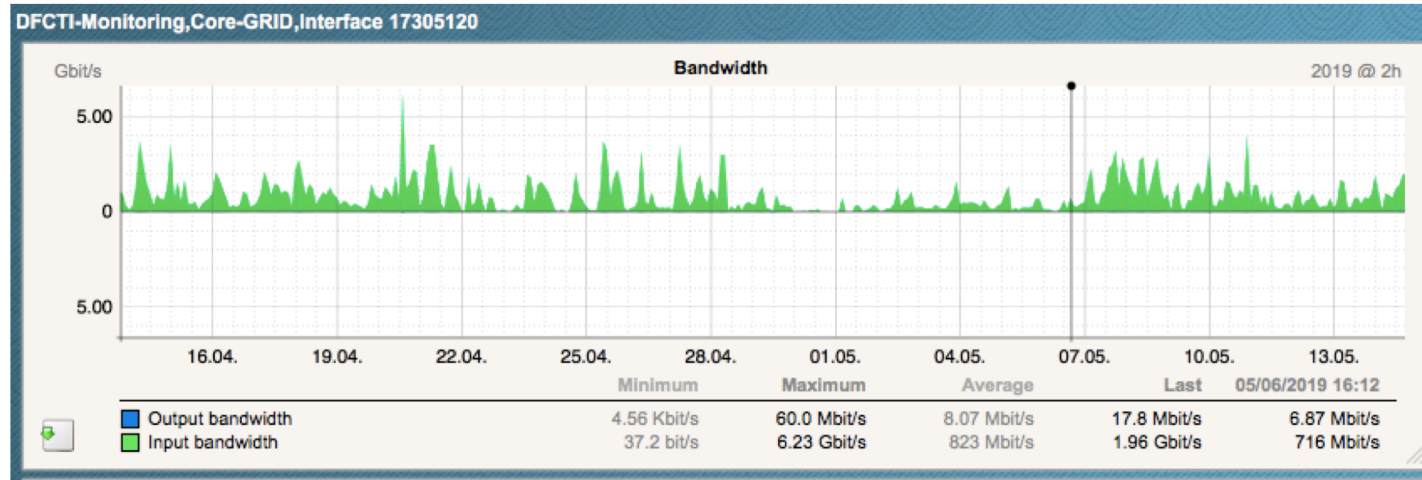


# RO-07 Alice

Internal traffic  
last day



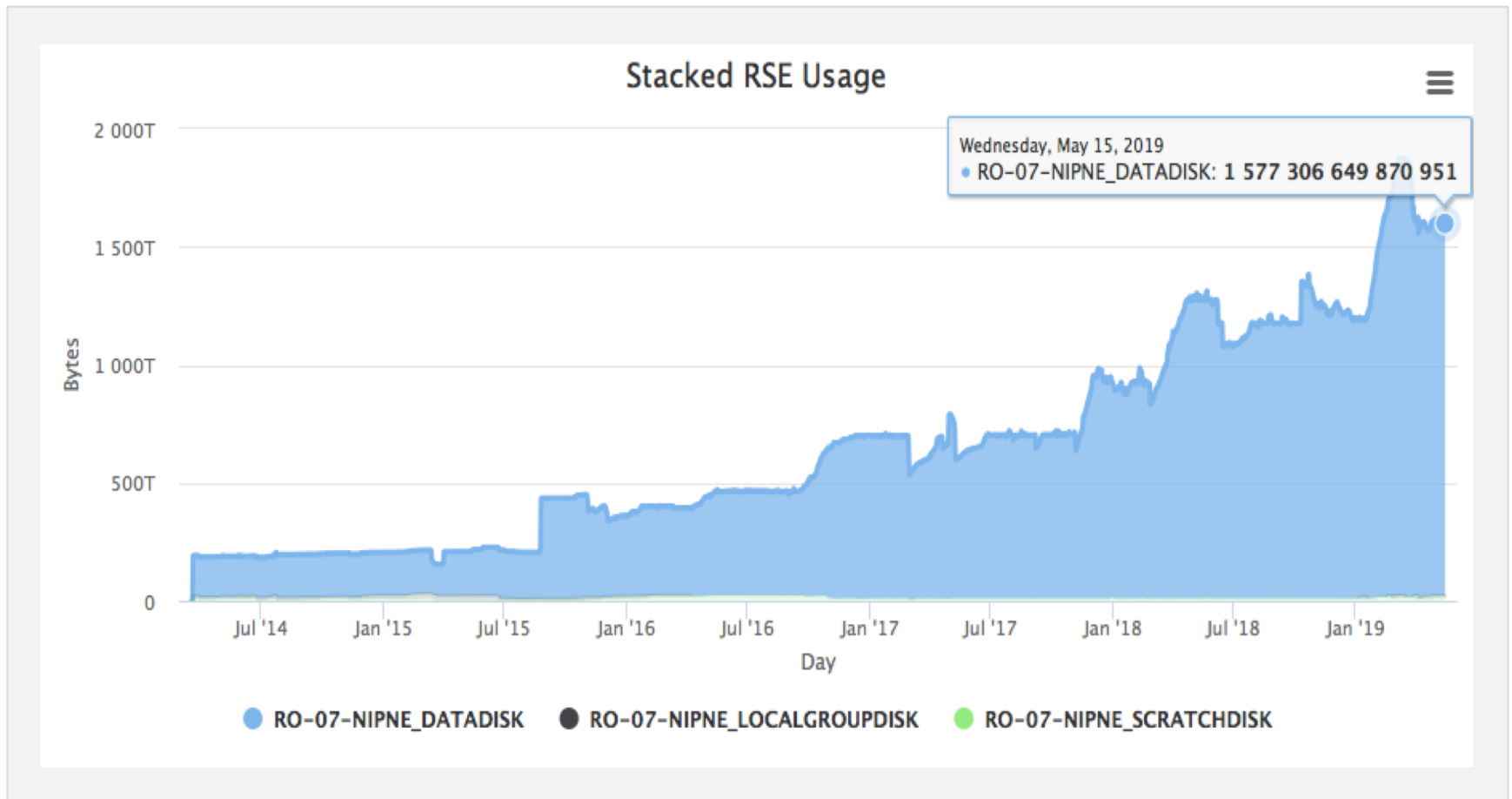
Internal traffic  
last month





# RO-07 Atlas

- DPM spacetokens deployed dedicated to ATLAS used also by the other romanian ATLAS sites (diskless)
- Running single core and multicore jobs: 1 CREAM-CE + 1 ARC-CE+SLURM + 1 ARC-CE+HTCondor+Docker

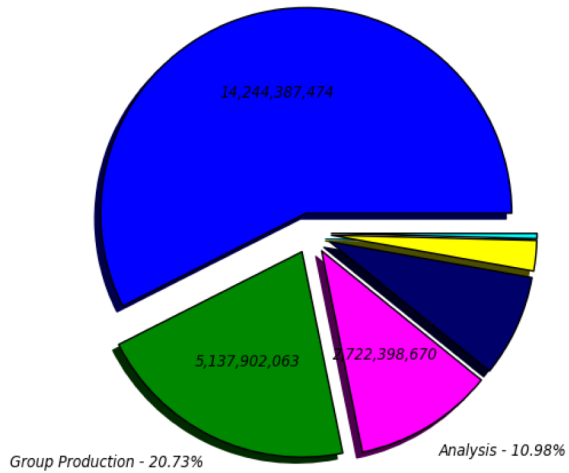




# RO-07 Atlas



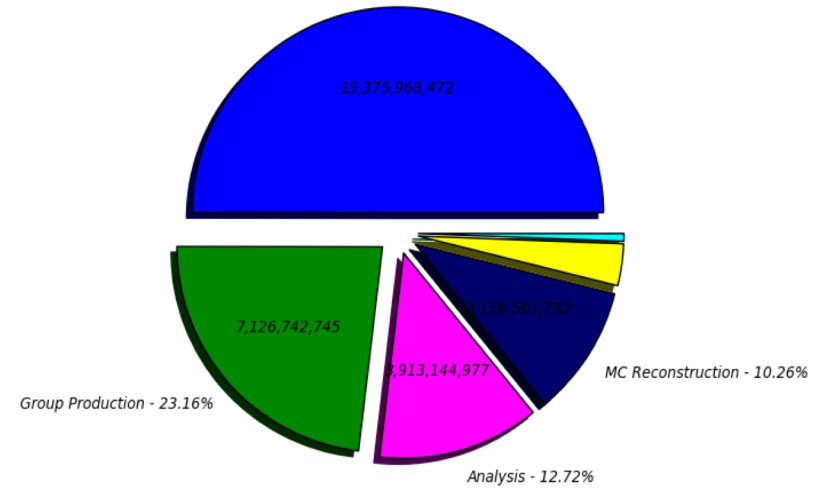
CPU consumption Good Jobs in seconds (Sum: 24,789,204,865)  
MC Simulation - 57.46%



- MC Simulation - 57.46% (14,244,387,474)
- Analysis - 10.98% (2,722,398,671)
- Data Processing - 2.40% (593,821,855)
- Group Production - 20.73% (5,137,902,063)
- MC Reconstruction - 8.03% (1,991,667,283)
- Others - 0.40% (99,027,519)



Wall Clock consumption Good Jobs in seconds (Sum: 30,767,457,106)  
MC Simulation - 49.97%



- MC Simulation - 49.97% (15,375,968,472)
- Analysis - 12.72% (3,913,144,977)
- Data Processing - 3.29% (1,011,885,008)
- Group Production - 23.16% (7,126,742,745)
- MC Reconstruction - 10.26% (3,156,501,782)
- Others - 0.60% (183,214,122)

CPU consumption last 12 months

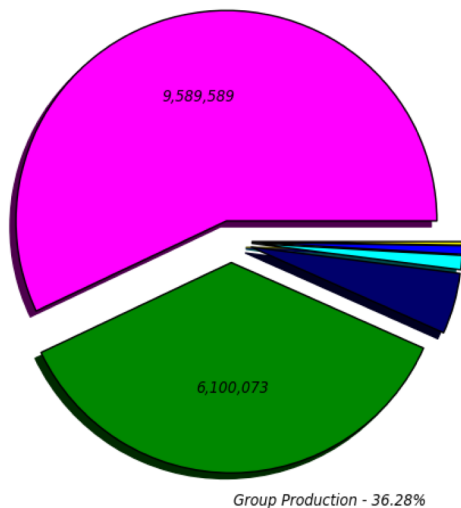
Wall Clock consumption last 12 months



# RO-07 Atlas



NBytes Processed in GBs (Pie Graph) (Sum: 16,811,833)  
Analysis - 57.04%

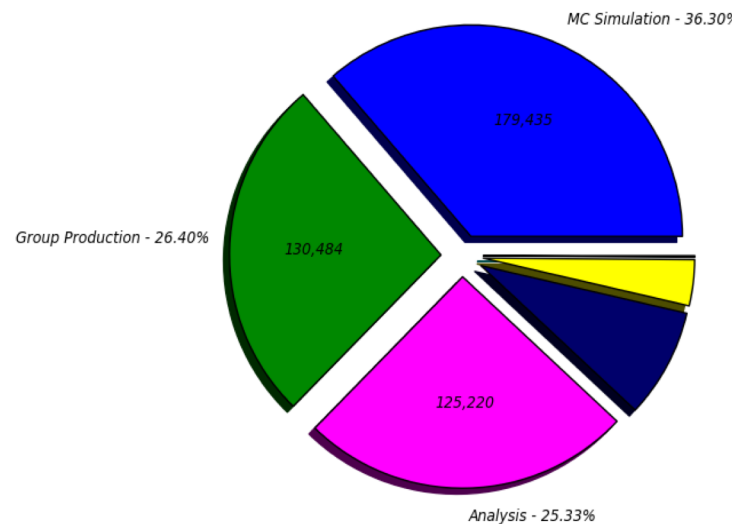


Analysis - 57.04% (9,589,589)    Group Production - 36.28% (6,100,074)    MC Reconstruction - 4.67% (785,351)  
Others - 1.09% (183,489)    MC Simulation - 0.65% (108,582)    Data Processing - 0.27% (44,748)

Data processed in the last 12 months



NBytes Produced in GBs (Pie Graph) (Sum: 494,335)  
MC Simulation - 36.30%



MC Simulation - 36.30% (179,436)    Group Production - 26.40% (130,484)    Analysis - 25.33% (125,221)  
MC Reconstruction - 8.35% (41,269)    Data Processing - 3.51% (17,347)    Others - 0.12% (579,00)

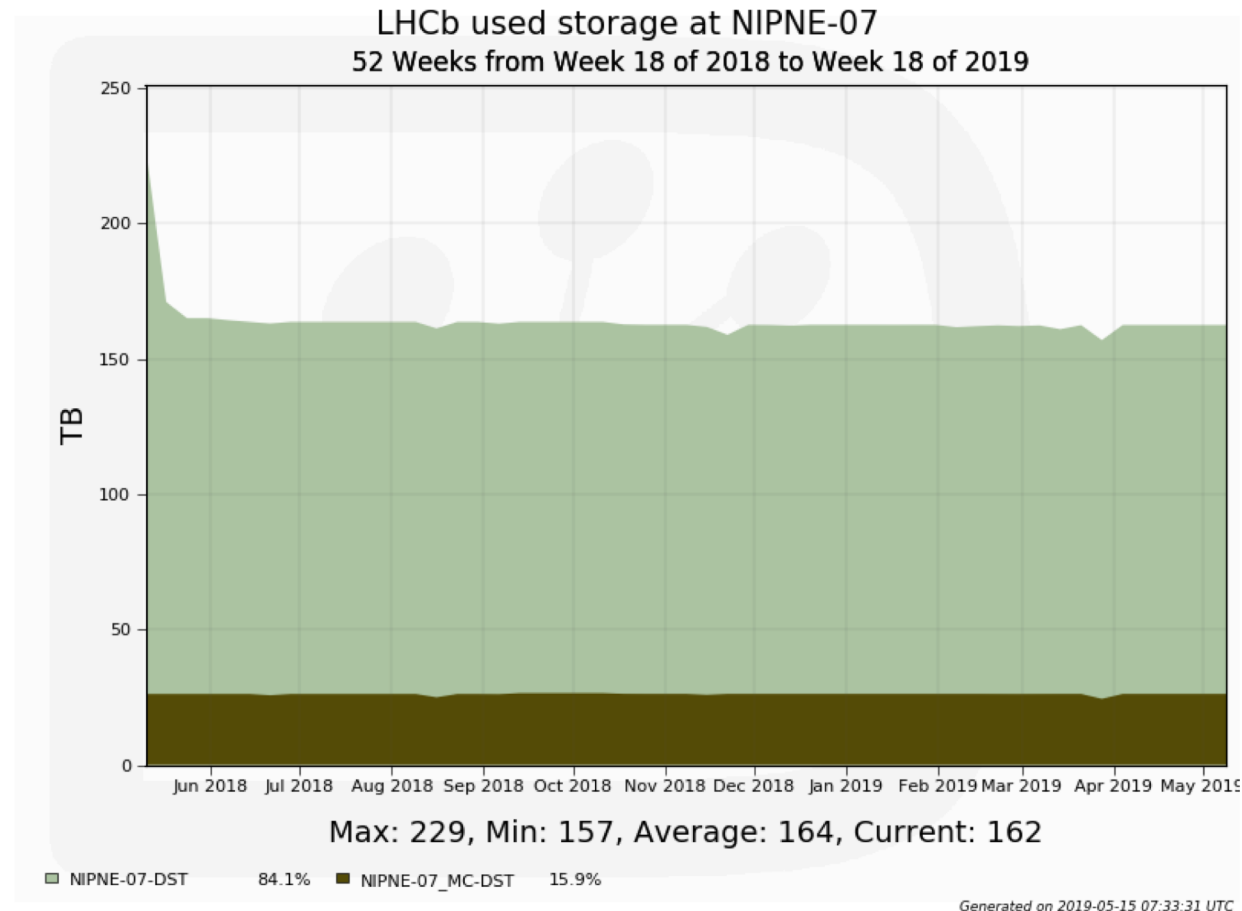
Data produced in the last 12 months





# RO-07 LHCb

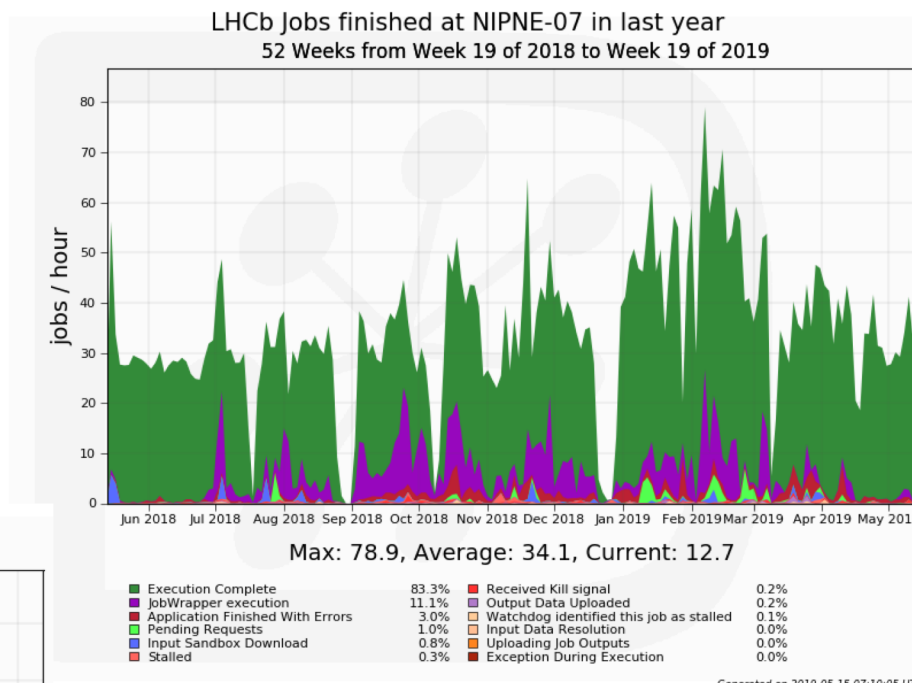
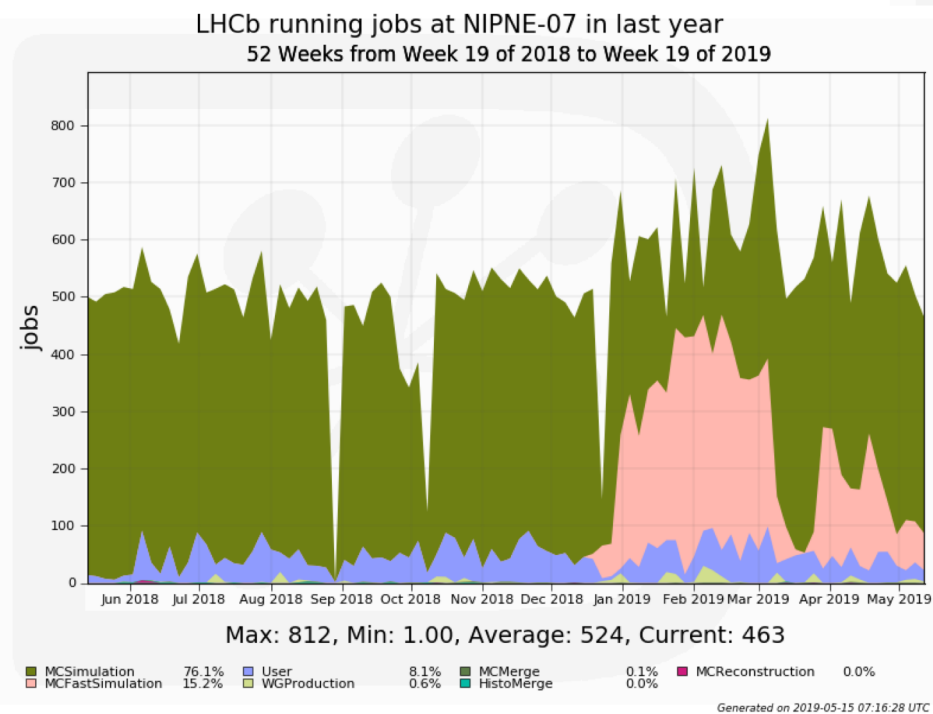
- CREAM-CE PBS+MAUI around 500 cores
- T2D LHCb site
- DPM spacetoken 400TB (162TB)





# RO-07 LHCb

## Running jobs over the last year



## Finished jobs over the last year



# Future plans

## Network

- Upgrade IFIN-HH back-up connection to 10Gbps
- Increase the bandwidth from 30Gbps to 60Gbps
- Migrate to dual stack IPv4/IPv6

## Alice

- Upgrade to 600 cores and 600TB
- Migration from CREAM-CE to ARC-CE
- Upgrade EOS version
- WNs to be migrate to CentOS7



# Future plans

## **Atlas**

- Upgrade with 128 cores and 400TB
- On-going migration to CentOS7 (by June)
- Decommissioning CREAM-CE (by June)

## **Atlas+LHCb**

- On-going migration to DPM+DOME (by June)

## **DataCenter**

- Next year to move slowly to the new DataCenter
- 300sqm, 1MW electrical power





# Future plans







# Future plans





**Thank you!**  
**Any question?**