Sharing grid support for ALICE, ATLAS and LHCb at RO-07-NIPNE

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Outline

- RO-07-NIPNE overview
- Network & monitoring
- RO-07-NIPNE activity
- 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+dCache)
- Resource manager: HTCondor fair-share policies
- Single core and multicore queues (ALICE and ATLAS - 8core)
- Ansible for upgrades
- Top-BDII, VOBOX and VOMS (eli-np.eu,ronbio,etc)

RO-07 overview

- dCache storage used for Romanian ATLAS diskless sites
- dCache upgraded from 7.2 to 8.2 to support token authentication
- 2x100Gbps external network
- 2 location: “computing room” and “storage room” with 100Gbps link interconnectivity
- Site upgraded(more then 160 machines) from CentOS7 to AlmaLinux9
- All the services upgraded using Leapp:
- CentOS7->AlmaLinux8->AlmaLinux9
- WNs using dual stack IPv4/IPv6 – VLANs configured on each node

RO-07 overview

- APC InRow Chilled Water Cooling
- APC UPS 160KVA
- **>6000** CPU

(**~1000** CPU belongs to ATLAS Bucharest Group)

- Blade + ”pizza boxes”

16, 20, 32 cores/server

DC1->

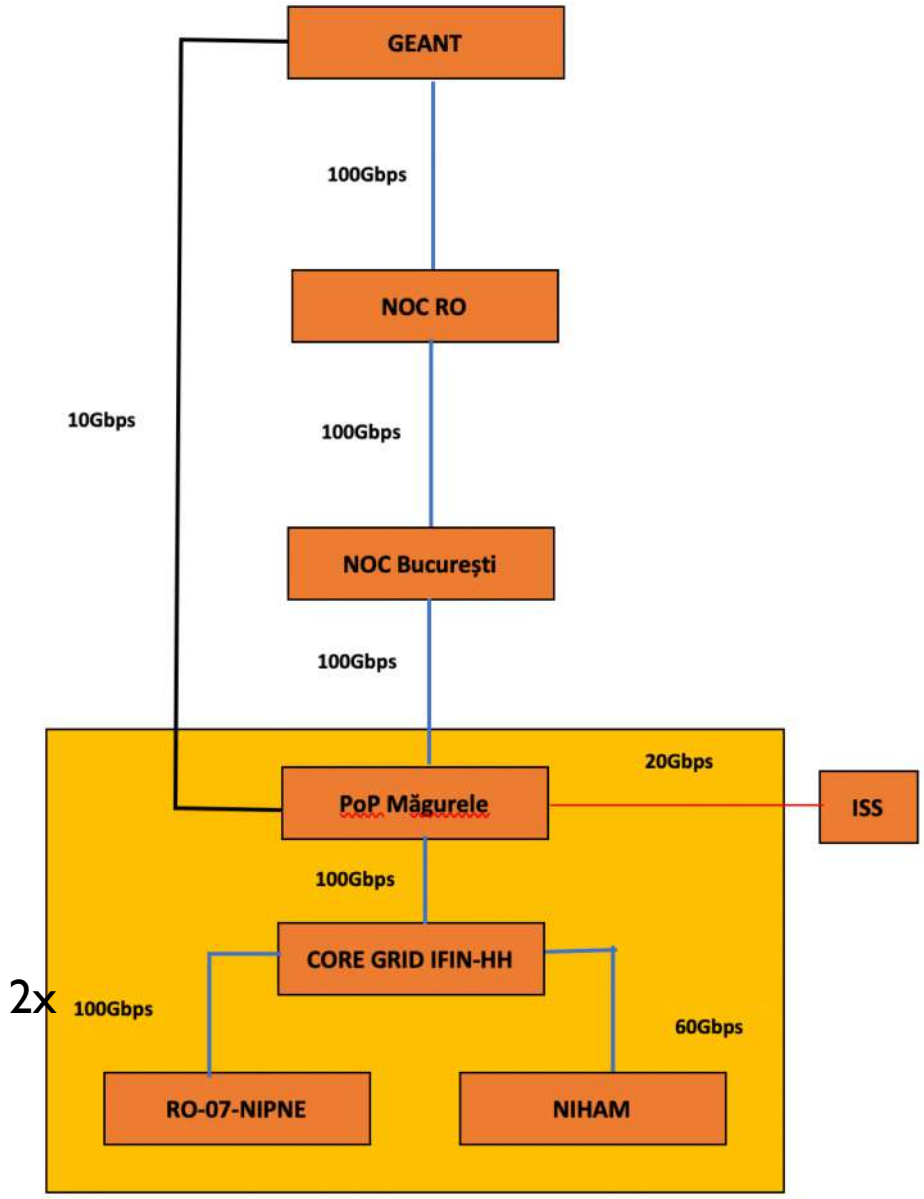
RO-07 overview

4x80KVA UPS Emerson
dCache(**5**xDisk servers)
EOS (**2**xFTS servers)
6PB total capacity
4PB used capacity

DC2->

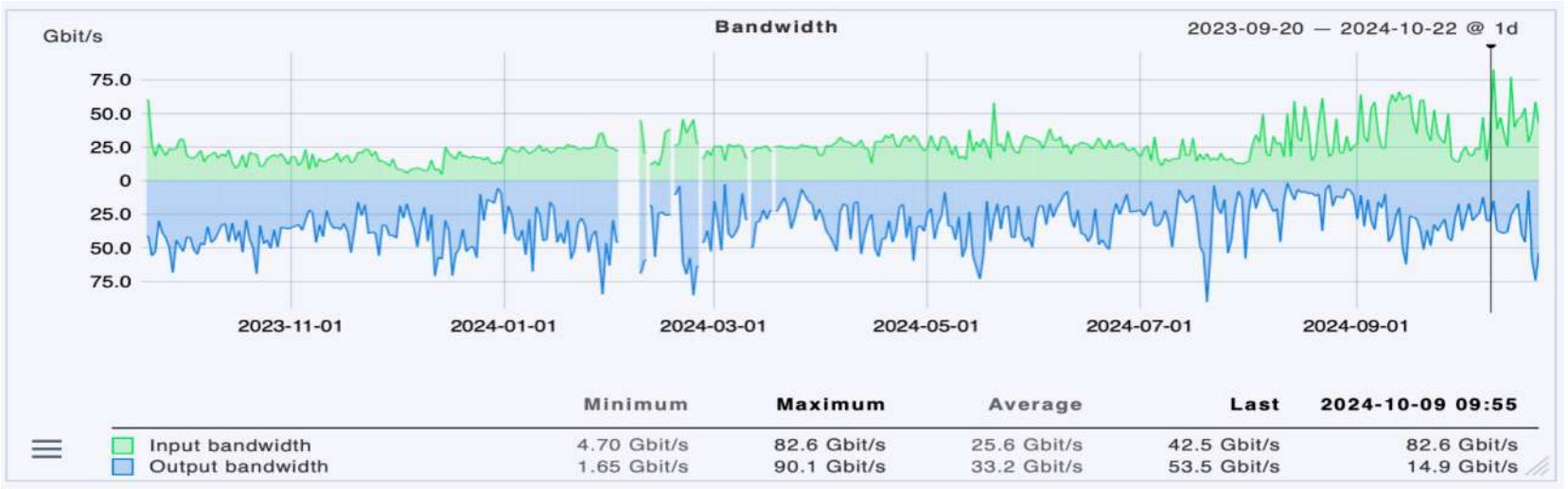
IFIN-HH Network

- 100Gbps uplink PoP – NOC – Bucuresti
- **100**Gbps link IFIN-HH(WLCG) – PoP
- **2x100**Gbps link RO-07-NIPNE – IFIN-HH (WLCG)
- **10**Gbps back-up uplink
- Network bandwidth(100/**10**Gbps) shared between grid sites and users network
- Integrated in LHCONE network dual stack IPv4/IPv6 for storage systems
- Implemented IPv6 for CE and WNs

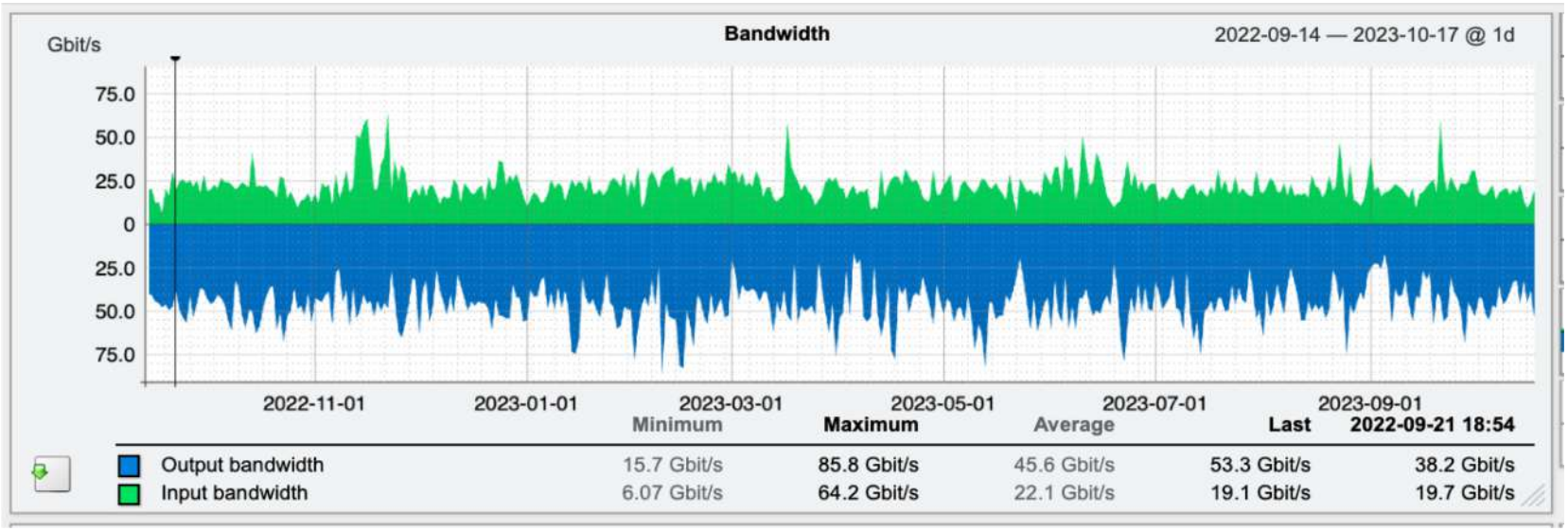


IFIN-HH Network

IFIN-HH WLCG uplink connection – 2024 traffic:



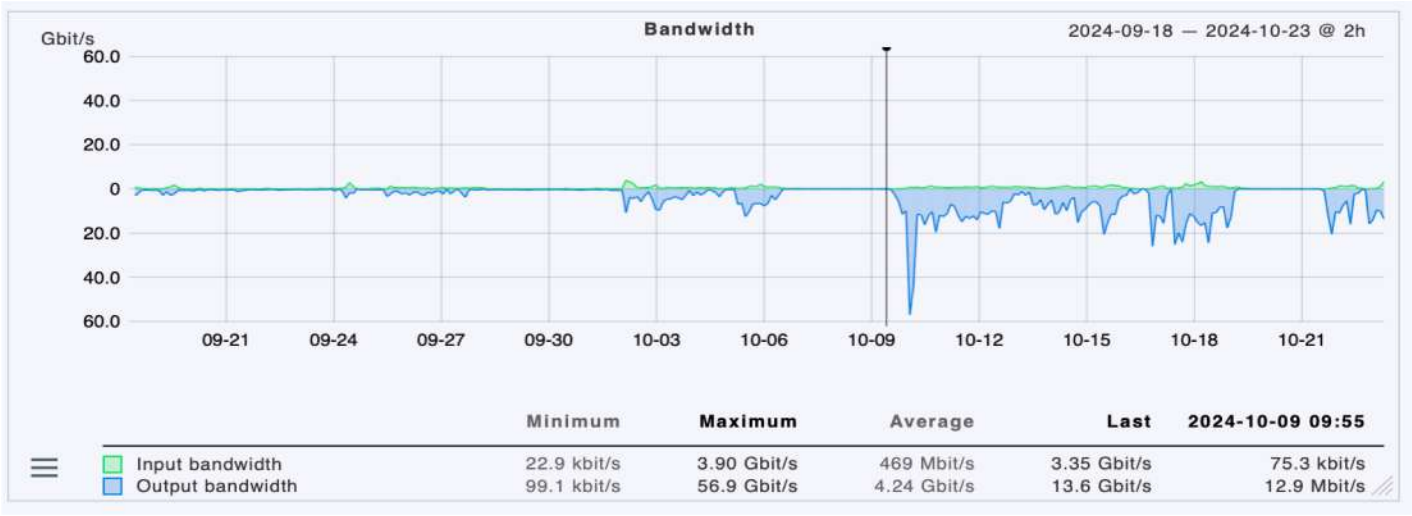
IFIN-HH WLCG uplink connection – 2023 traffic:



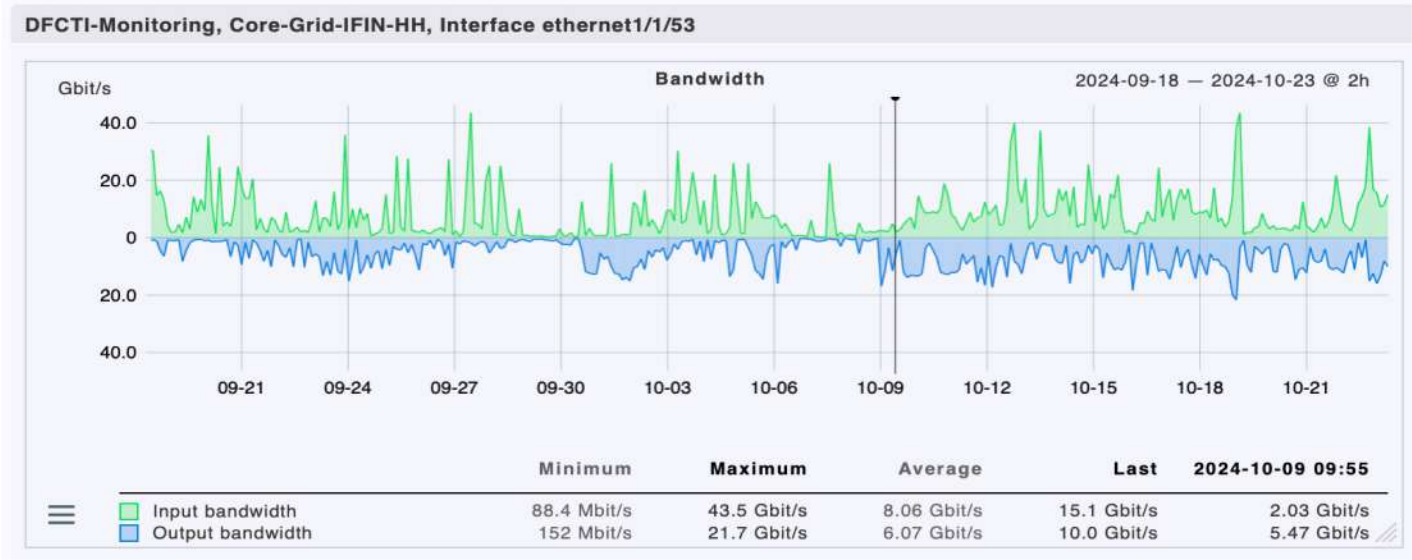
RO-07 External Network

2x100 Gbps external uplinks

RO-07-NIPNE external WNs traffic:



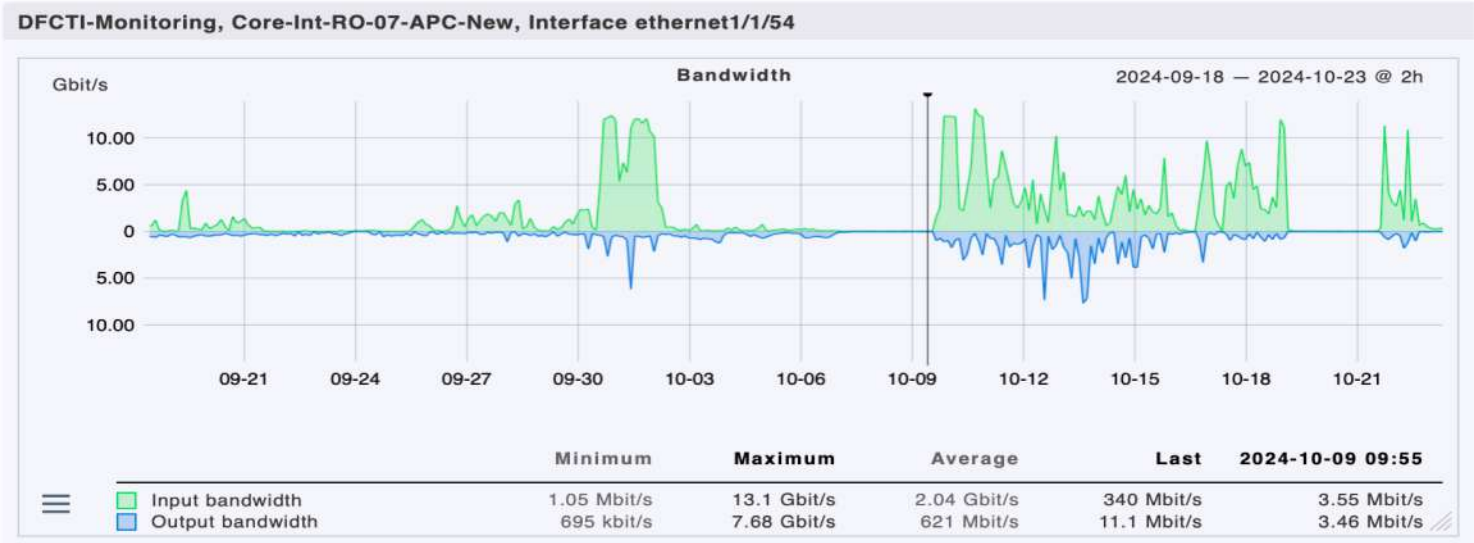
RO-07-NIPNE external storage traffic:



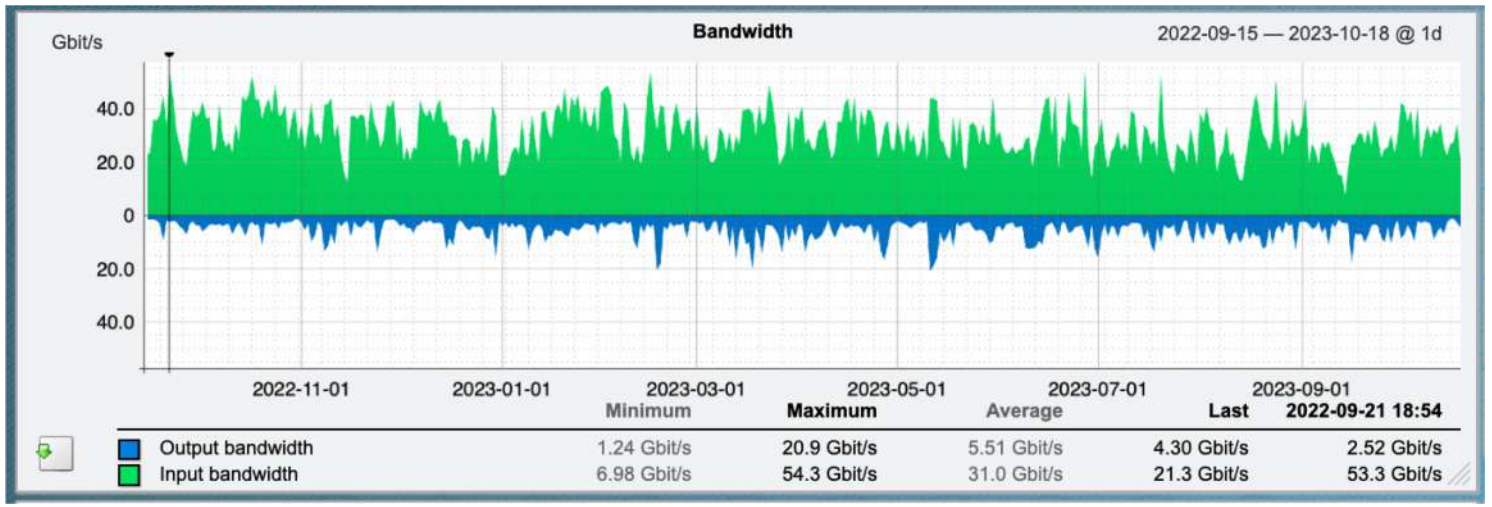
RO-07 External Network

100 Gbps internal uplink:

RO-07-NIPNE internal traffic:

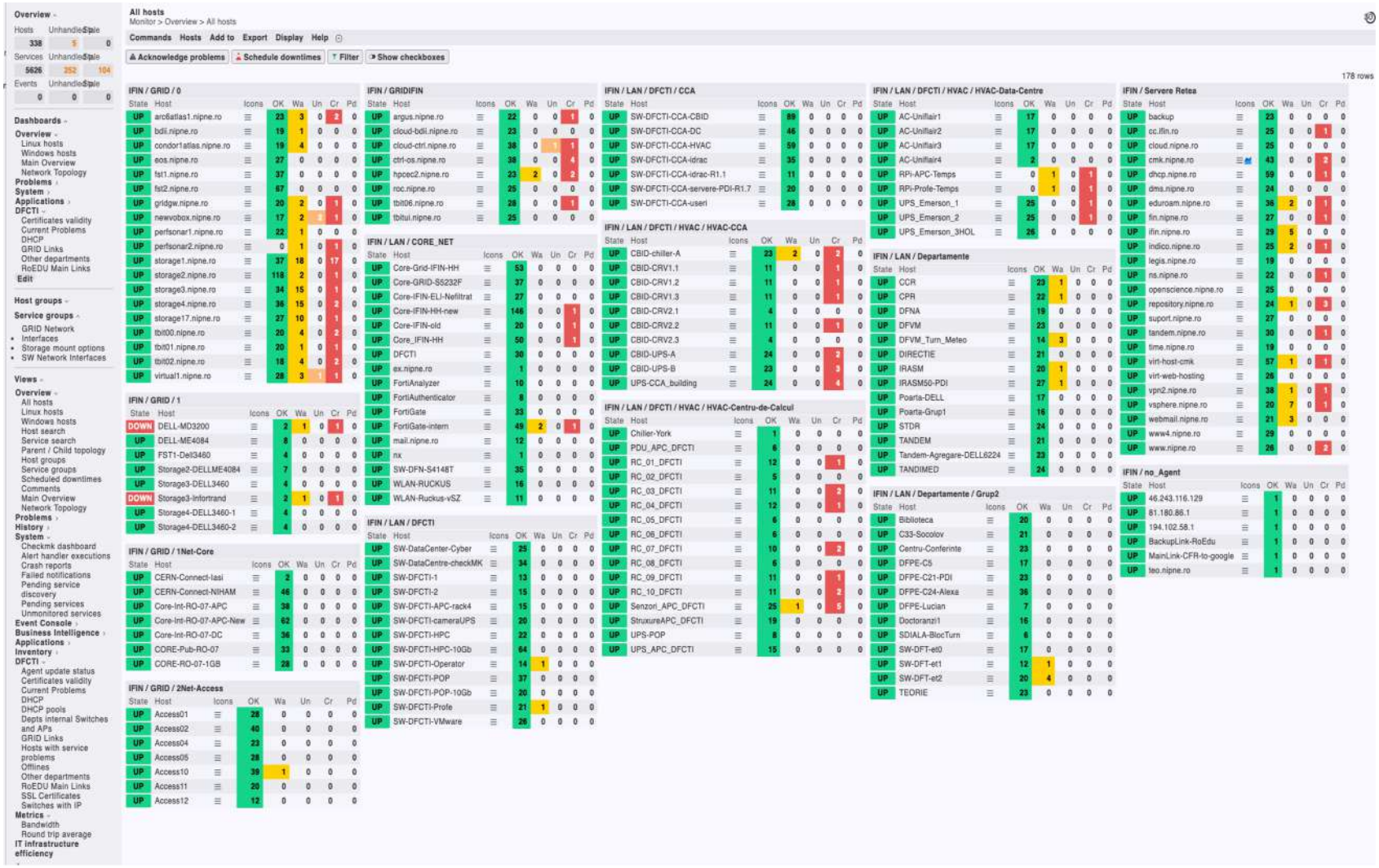


RO-07-NIPNE internal traffic from last year:



RO-07 Monitoring & Alarms

- Check-mk +nagios, e-mail, sms, automatic stop for bad nodes
- ~340hosts with 3500 -> 6300 services



RO-07 Monitoring

RO-07-NIPNE infrastructure:

IFIN / GRID / 0

State	Host	Icons	OK	Wa	Un	Cr	Pd
UP	arc6atlas1.nipne.ro	☰	23	3	0	2	0
UP	bdii.nipne.ro	☰	19	1	0	0	0
UP	condor1atlas.nipne.ro	☰	19	4	0	0	0
UP	eos.nipne.ro	☰	27	0	0	0	0
UP	fst1.nipne.ro	☰	37	0	0	0	0
UP	fst2.nipne.ro	☰	67	0	0	0	0
UP	gridgw.nipne.ro	☰	20	2	0	1	0
UP	newvobox.nipne.ro	☰	17	2	2	1	0
UP	perfsonar1.nipne.ro	☰	22	1	0	0	0
UP	perfsonar2.nipne.ro	☰	0	1	0	1	0
UP	storage1.nipne.ro	☰	37	18	0	17	0
UP	storage2.nipne.ro	☰	118	2	0	1	0
UP	storage3.nipne.ro	☰	34	15	0	1	0
UP	storage4.nipne.ro	☰	36	15	0	2	0
UP	storage17.nipne.ro	☰	27	10	0	1	0
UP	tbit00.nipne.ro	☰	20	4	0	2	0
UP	tbit01.nipne.ro	☰	20	1	0	1	0
UP	tbit02.nipne.ro	☰	18	4	0	2	0
UP	virtual1.nipne.ro	☰	28	3	1	1	0

IFIN / GRID / 1

State	Host	Icons	OK	Wa	Un	Cr	Pd
DOWN	DELL-MD3200	☰	2	1	0	1	0
UP	DELL-ME4084	☰	8	0	0	0	0
UP	FST1-Dell3460	☰	4	0	0	0	0
UP	Storage2-DELLME4084	☰	7	0	0	0	0
UP	Storage3-DELL3460	☰	4	0	0	0	0
DOWN	Storage3-Infortrand	☰	2	1	0	1	0
UP	Storage4-DELL3460-1	☰	4	0	0	0	0
UP	Storage4-DELL3460-2	☰	4	0	0	0	0

IFIN / GRID / 1Net-Core

State	Host	Icons	OK	Wa	Un	Cr	Pd
UP	CERN-Connect-Iasi	☰	2	0	0	0	0
UP	CERN-Connect-NIHAM	☰	46	0	0	0	0
UP	Core-Int-RO-07-APC	☰	38	0	0	0	0
UP	Core-Int-RO-07-APC-New	☰	62	0	0	0	0
UP	Core-Int-RO-07-DC	☰	36	0	0	0	0
UP	CORE-Pub-RO-07	☰	33	0	0	0	0
UP	CORE-RO-07-1GB	☰	28	0	0	0	0

IFIN / GRID / 2Net-Access

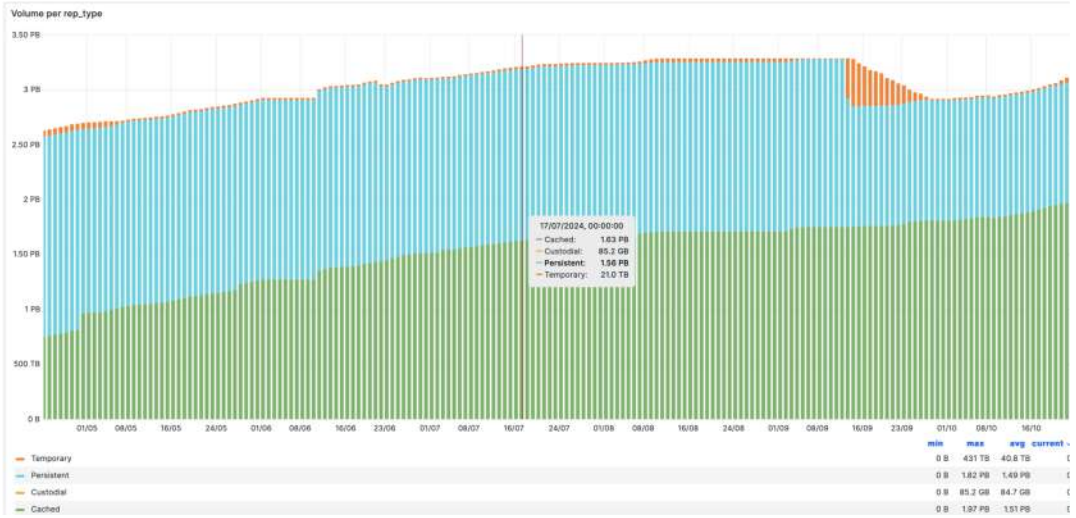
State	Host	Icons	OK	Wa	Un	Cr	Pd
UP	Access01	☰	28	0	0	0	0
UP	Access02	☰	40	0	0	0	0
UP	Access04	☰	23	0	0	0	0
UP	Access05	☰	28	0	0	0	0
UP	Access10	☰	39	1	0	0	0
UP	Access11	☰	20	0	0	0	0
UP	Access12	☰	12	0	0	0	0

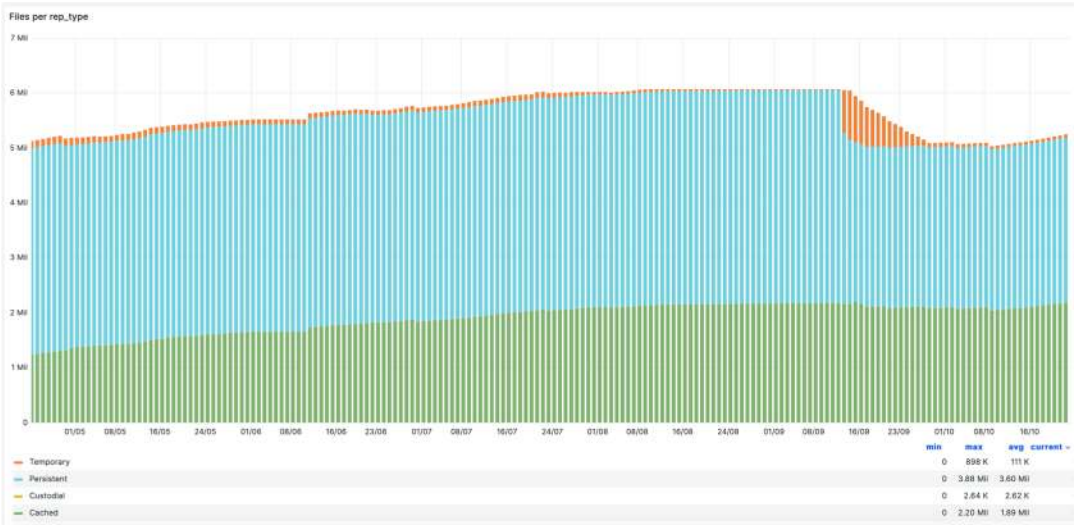
IFIN / LAN / DFCTI / HVAC / HVAC-Centru-de-Calcul

State	Host	Icons	OK	Wa	Un	Cr	Pd
UP	Chiller-York	☰	1	0	0	0	0
UP	PDU_APC_DFCTI	☰	6	0	0	0	0
UP	RC_01_DFCTI	☰	12	0	0	1	0
UP	RC_02_DFCTI	☰	5	0	0	0	0
UP	RC_03_DFCTI	☰	11	0	0	2	0
UP	RC_04_DFCTI	☰	11	1	0	1	0
UP	RC_05_DFCTI	☰	6	0	0	0	0
UP	RC_06_DFCTI	☰	6	0	0	0	0
UP	RC_07_DFCTI	☰	11	0	0	1	0
UP	RC_08_DFCTI	☰	6	0	0	0	0
UP	RC_09_DFCTI	☰	11	0	0	1	0
UP	RC_10_DFCTI	☰	11	0	0	2	0
UP	Senzori_APC_DFCTI	☰	24	2	0	5	0
UP	StruxureAPC_DFCTI	☰	19	0	0	0	0
UP	UPS-POP	☰	8	0	0	0	0
UP	UPS_APC_DFCTI	☰	15	0	0	0	0

RO-07 Activity

- dCache spacetokens deployed dedicated for ATLAS used also by the other romanian ATLAS sites (diskless) and for LHCb 4,6PB
- dCache upgraded from 7.2 to 8.2 for enable token authentication
- Head-node and disk servers migrated from CentOS7 to AlmaLinux9





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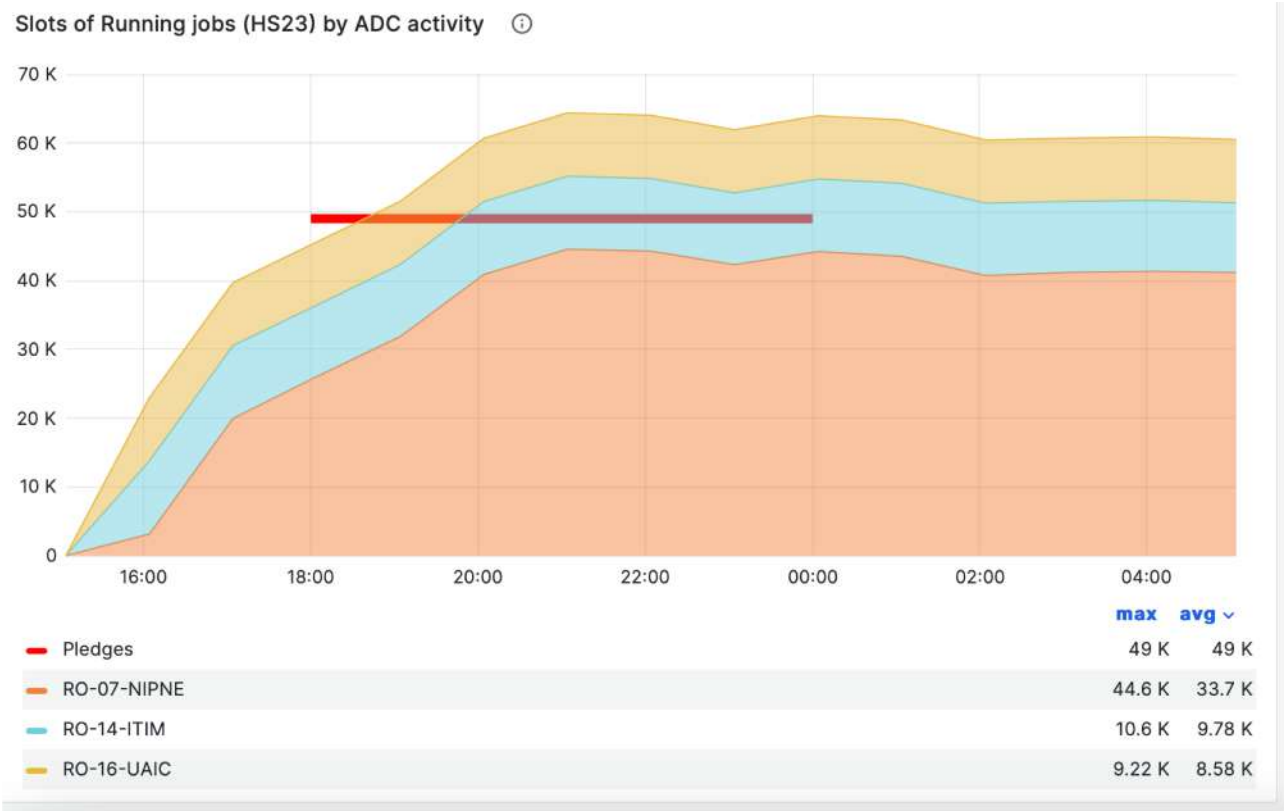
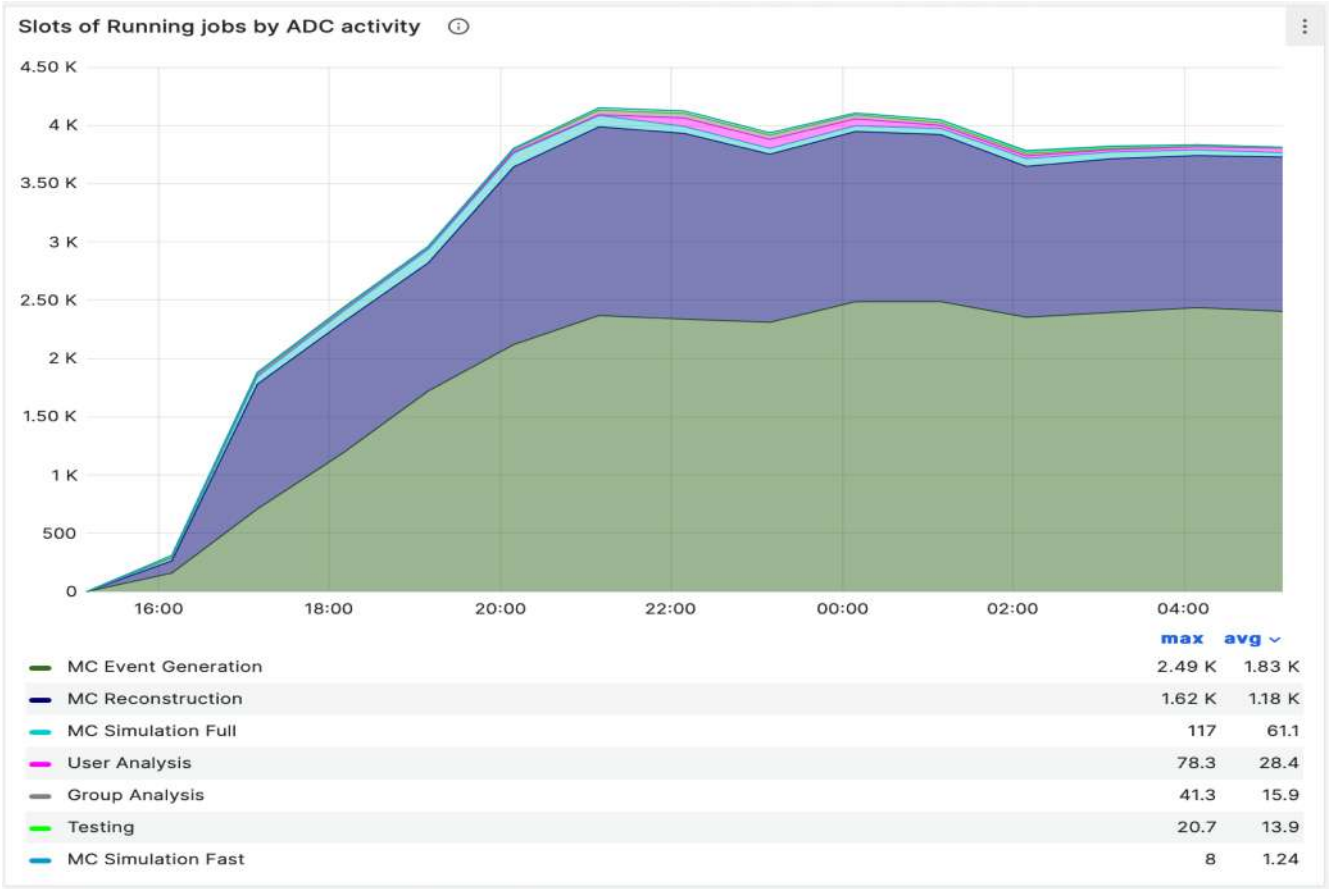


RO-07 Activity

- EOS storage dedicated to Alice experiment of 1PB capacity



Future plans

By the end of 2024

- Replace Cisco ASR 9006 router with Cisco ASR 9902 router, that support 100Gbps interfaces
- Install and configure ~1PB of storage for ATLAS and LHCb
- Decommison old storage(due to slow transfer and lack of spare disks)

2025

- Increase the number of computing nodes(depends on the future budget)
- Increase the storage(depends on the future budget)
- Increase the back-up connectivity bandwidth

Present & Future

Present & Future

Thank you!
Any question?