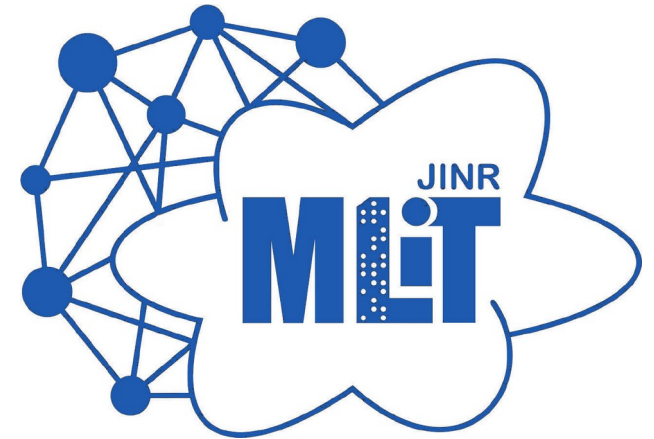
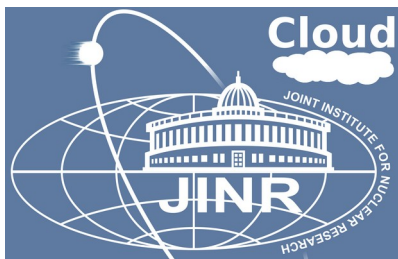




Changes and challenges at the JINR and its Member states cloud infrastructures

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N. A. Kutovskiy¹, A.N. Makhalkin¹,
Ye. Mazhitova^{1,3}, I.S. Pelevanyuk¹,
R. N. Semenov¹



¹ Meshcheryakov Laboratory of Information Technologies, JINR

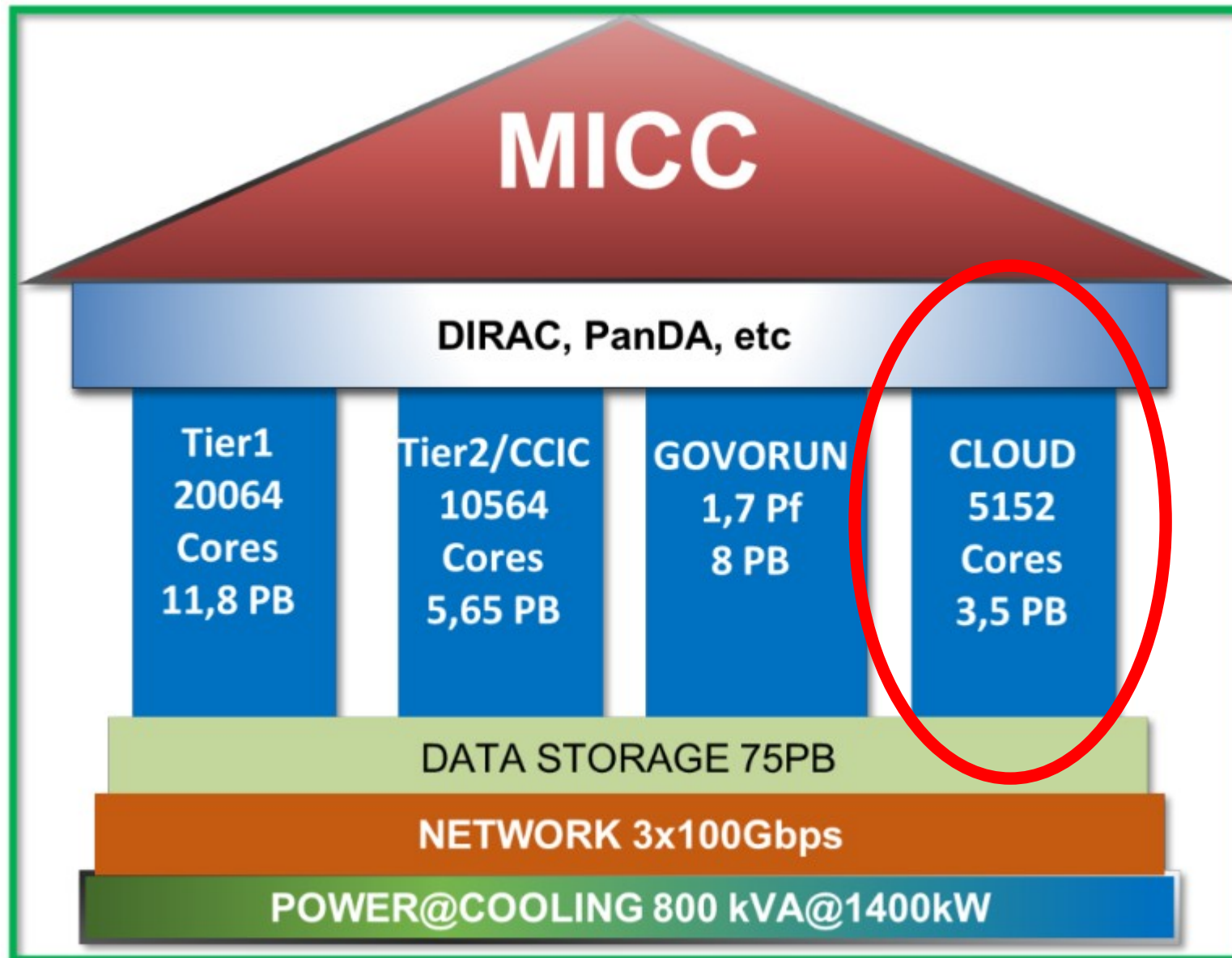
² X5 Digital, Moscow, Russia

³ Institute of Nuclear Physics, Almaty, Kazakhstan

Plan

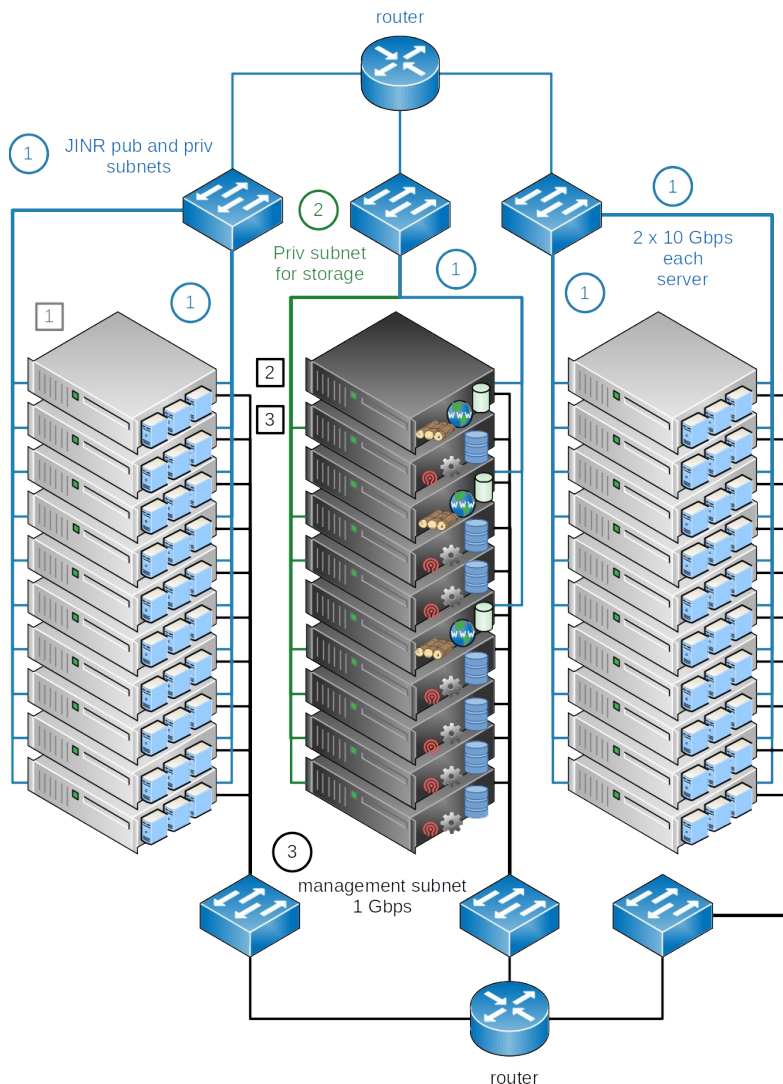
- JINR cloud
- Distributed informational and computing environment (DICE) based on the resources of JINR Member State organizations

JINR cloud as part of MICC



Picture is taken from V.V. Korenkov's presentation
"Status and perspectives of the JINR multifunctional
information and computing complex"

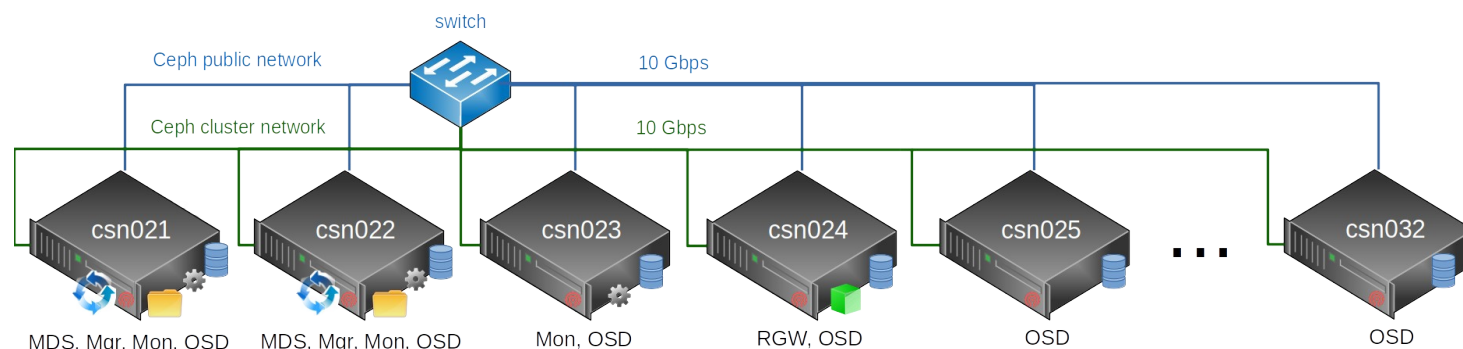
JINR cloud highlights



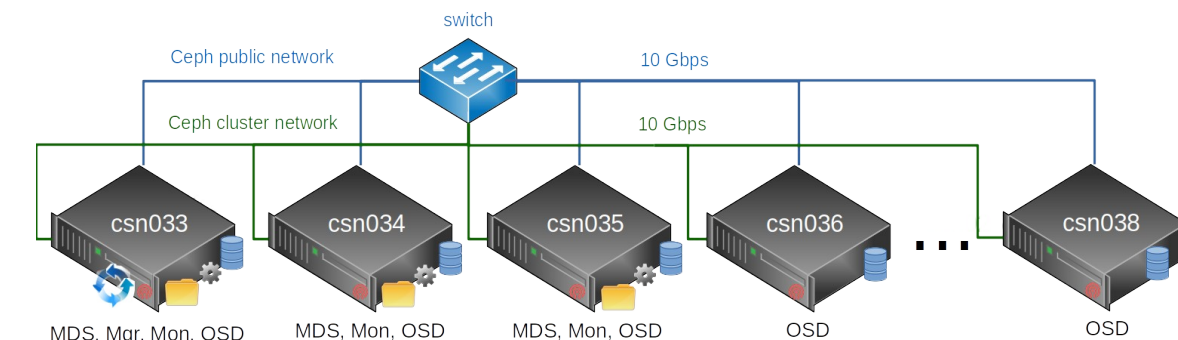
HA setup: 3 FNs, leader elections based on raft consensus algorithm
Distributed storage: ceph, 3x replicas

- Purpose
 - increase the efficiency of hardware and proprietary software utilization
 - improve IT-services management
- Implementation:
 - Cloud platform: OpenNebula (v5.12.0.4 CE)
 - Virtualization: KVM
 - Storage back-end for KVM VM images: ceph block-device
 - user interfaces: web GUI and command line interface
 - Authentication in the cloud web-GUI : JINR central user database (LDAP+Kerberos)
 - VM access: rsa/dsa-key, Kerberos credentials, local AA
- Hardware
 - 174 servers for VMs:
 - +1 new server (since Grid2021)
 - -3 old servers (since Grid2021)
 - >5000 non-HT CPU cores (+128, -60)
 - 20 .. 32 non-HT CPU cores per physical server
 - >60 TB of RAM (+512 GB, -384 GB)
 - RAM per non-HT CPU core: 5.3 GB..16 GB
 - 24 servers for ceph storages with 3 PB of raw HDD disk capacity (+3 servers as reserve)
- Web-interface URL: <http://cloud.jinr.ru>

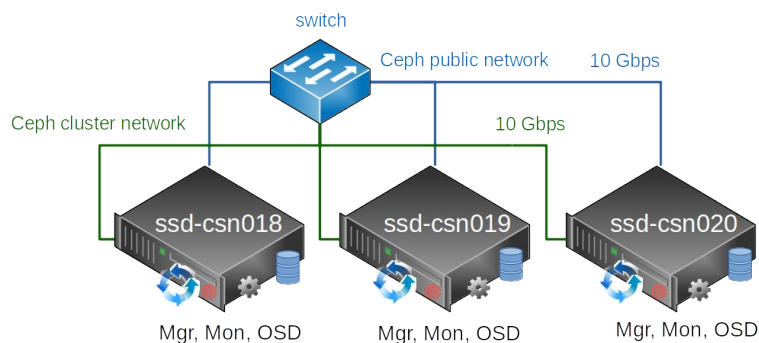
Ceph-based software defined storages (1/2)



General purpose storage
Disk type: HDD
ceph version: 14.2.22
Total raw capacity: 1.2 PiB
Replication: 3x
Connectivity: 2x10GBase-T



NOvA storage
Disk type: HDD
ceph version: 15.2.11
Total raw capacity: 1.5 PiB
Replication: 3x
Connectivity: 2x10GBase-T



Pure SSD storage
Disk type: SSD
ceph version: 15.2.17
Total raw capacity: 419 TiB
Replication: 3x
Connectivity:
100Gbps – used
+100Gbps – reserved
+4x10GBase-T – reserved



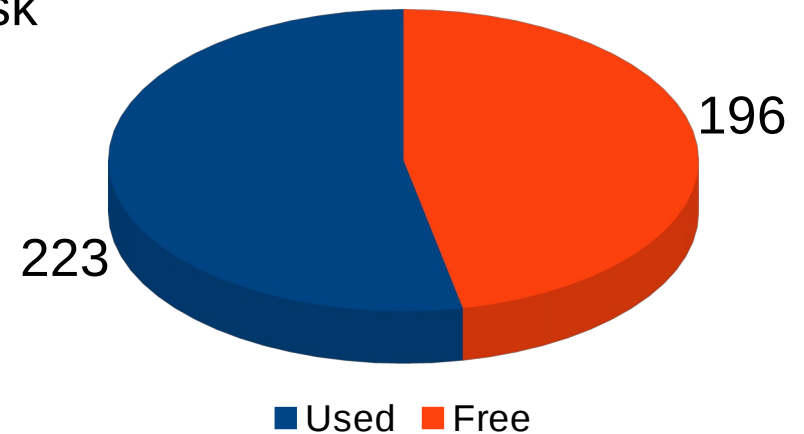
Works on the storage for the NOvA experiment were supported by the grant of the Russian Science Foundation (project № 18-12-00271).

Ceph-based software defined storages (2/2)

- SSD-based ceph storage:

- For users and services VMs with high disk I/O requirements
 - Prometheus DB
 - COMPASS critical services
 - git@JINR
 - etc

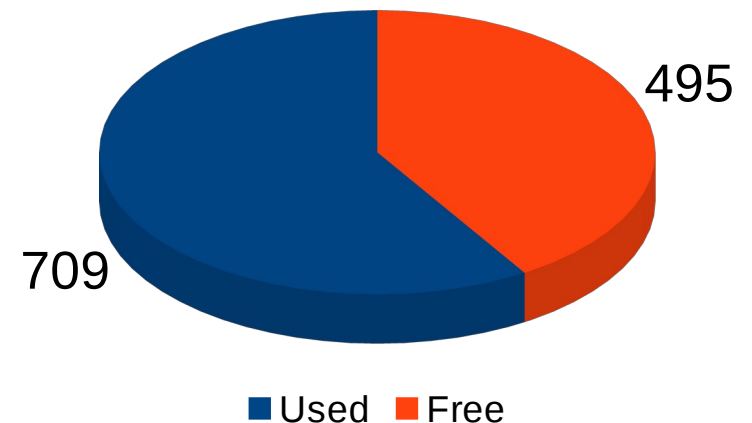
Used and free space in SSD-based ceph storage, TiB



- HDD-based ceph storage:

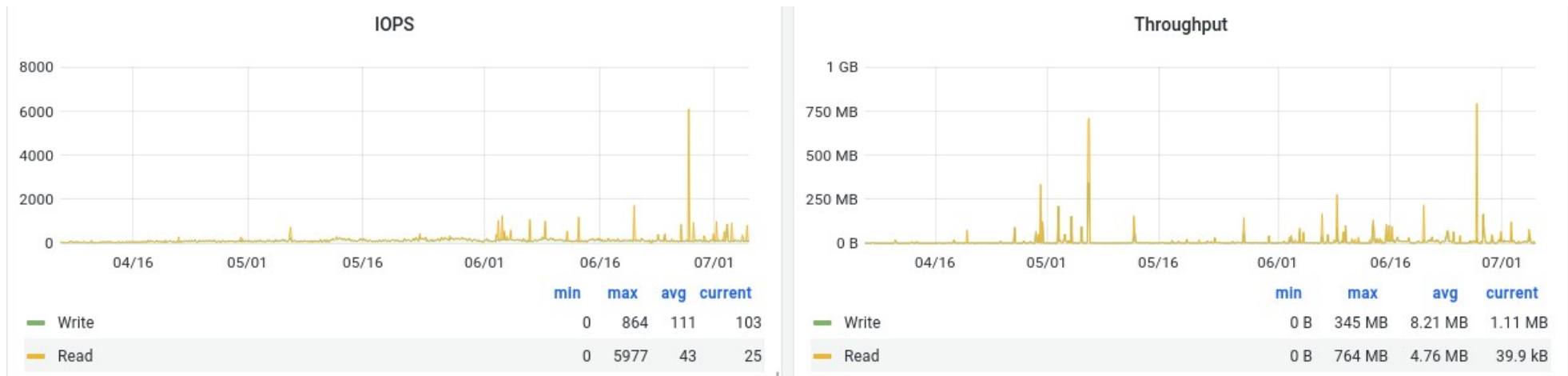
- For users and services VMs with mild/low disk I/O requirements
- Data preservation for relatively small data volumes (large data volumes are for EOS@JINR)

Used and free space in HDD-based ceph storage, TiB



HDD-based ceph storage performance issue

- Thousands of jobs create sufficient load on the HDD ceph storage (VMs disks are Rados ceph block devices)
- A lack of HDD-based ceph storage performance led to decrease QoS of other services deployed in the JINR cloud
- VMs' disks migration from HDD-based ceph storage to SSD-based one was started
- Most of the VMs with high demanding disk I/O have been already migrated to SSD-based ceph storage. New users' VMs disks are created now on SSD-based ceph storage

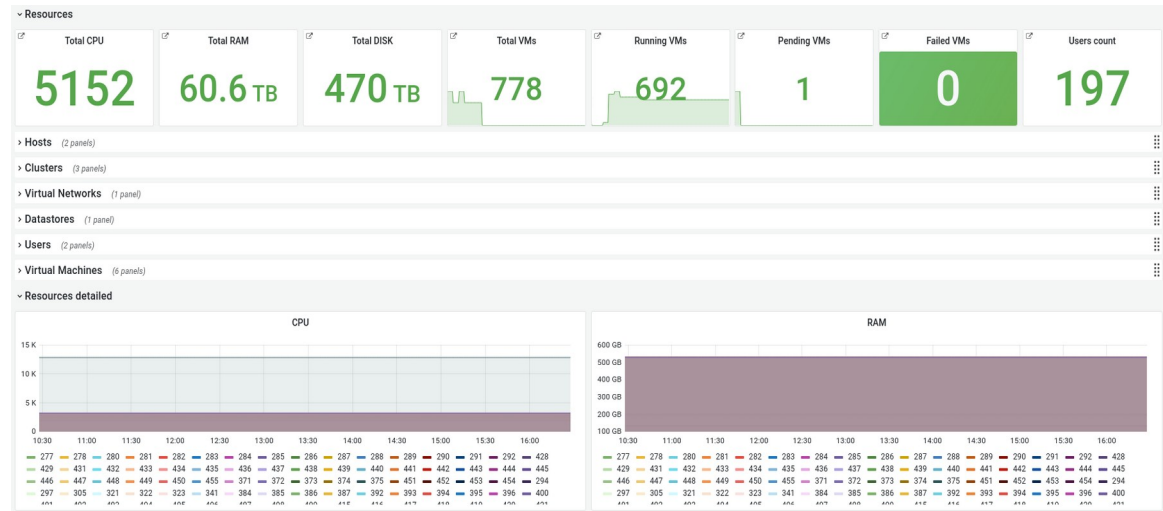
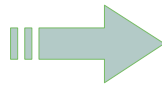


SSD-based ceph storage performance last 90 days

Monitoring and accounting

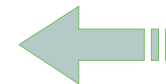
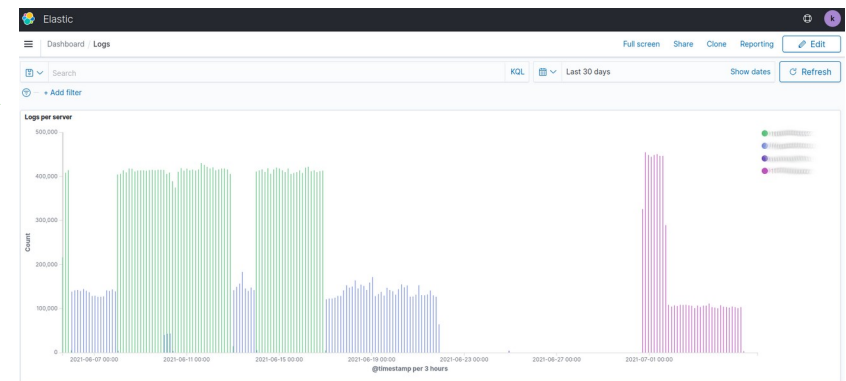
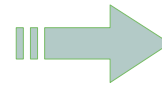
Custom OpenNebula metrics collector

- Prometheus (TSDB + alertmanager)
- **InfluxDB - retired**
- Grafana for visualization
- Migration from nagios to prometheus alarms is in transition phase

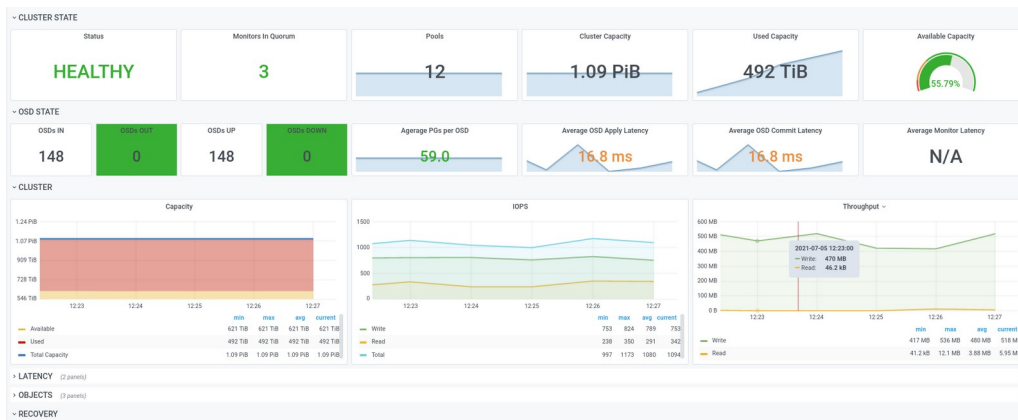


OpenDistro for Elasticsearch

- OpenNebula logs
- Kibana for visualization



Ceph prometheus module
+ prometheus + grafana



Hardware inventory

ОИЯИ

Welcome

Configuration Management

- Overview
- Contacts
- New contact
- Search for contacts
- Locations
- New CI
- Search for CIs
- Documents
- Software catalog
- Groups of CIs

Helpdesk

Incident Management

Problem Management

Change management

Service Management

Data administration

Admin tools

Виртуальная машина > Raft HA VM 3 testbed > Добро пожаловать > cfn012 > 112 > Сервер > Preferences... > Overview

Your Search

Infrastructure

Rack: 10 Enclosure: 2 Server: 205 Network Device: 143 Storage System: 0 SAN Switch: 0 NAS: 0 Tape Library: 0 Power Connection: 4

Create a new Rack Search for Rack objects Create a new Enclosure Search for Enclosure objects Create a new Server Search for Server objects Create a new Network Device Search for Network Device objects Create a new Storage System Search for Storage System objects Create a new SAN Switch Search for SAN Switch objects Create a new NAS Search for NAS objects Create a new Tape Library Search for Tape Library objects Create a new Power Connection Search for Power Connection objects

Virtualization

Виртуальная машина > Raft HA VM 3 testbed > Добро пожаловать > cfn012 > 112 > Preferences... > Overview > Server

Create a new Farm Search for Farm objects

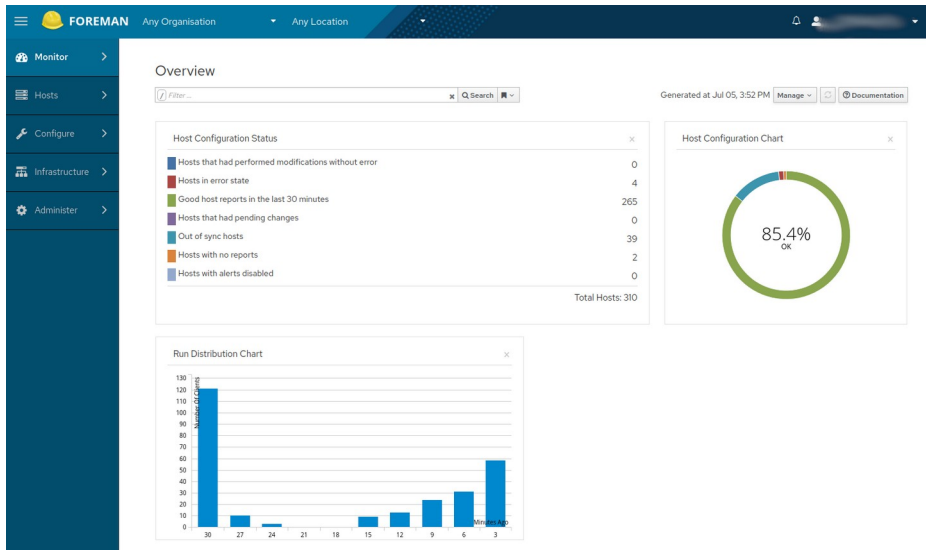
Create a new PC Search for PC objects

Create a new Middle Search for Middle objects

Create a new Patch Search for Patch objects

csn023	Dell	PowerEdge R730xd	Intel Xeon CPU E5-2660 v4 @ 2.00GHz	128.0	high	production	104	192.168.220.123	ceph cloud storage node	
csn024	Dell	PowerEdge R730xd	Intel Xeon CPU E5-2660 v4 @ 2.00GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.124	ceph cloud storage node	
csn025	Dell	PowerEdge R730xd	Intel Xeon CPU E5-2660 v4 @ 2.00GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.125	ceph cloud storage node	
csn026	Dell	PowerEdge R730xd	Intel Xeon CPU E5-2660 v4 @ 2.00GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.126	ceph cloud storage node	
csn027	Dell	PowerEdge R730xd	Intel Xeon CPU E5-2620 v4 @ 2.10GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.127	NOvA ceph cloud storage node	283
csn028	Dell	PowerEdge R730xd	Intel Xeon CPU E5-2620 v4 @ 2.10GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.128	JUNO ceph cloud storage node	cts
csn029	Dell	PowerEdge R740xd	Intel Xeon Silver 4114 CPU @ 2.20GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.129	NOvA ceph cloud storage node	
csn030	Dell	PowerEdge R740xd	Intel Xeon Silver 4114 CPU @ 2.20GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.130	NOvA ceph cloud storage node	
csn031	Dell	PowerEdge R740xd	Intel Xeon Silver 4114 CPU @ 2.20GHz	128(8x16), 2400 MHz	high	stock	104	192.168.220.31	NOvA ceph cloud storage node	
csn032	Dell	PowerEdge R740xd	Intel(R) Xeon(R) Silver 4214 CPU @ 2.70GHz	128(8x16), 2400 MHz	high	stock	104	192.168.220.32	NOvA ceph cloud storage node	n: 0
csn033	HP	ProLiant XL420 Gen10	Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz	384(12x32), 2933MHz	high	production	414	192.168.220.33	NOvA ceph cloud storage node	ects
csn034	HP	ProLiant XL420 Gen10	Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz	384(12x32), 2933MHz	high	production	414	192.168.220.34	NOvA ceph cloud storage node	
csn035	HP	ProLiant XL420 Gen10	Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz	384(12x32), 2933MHz	high	production	414	192.168.220.35	NOvA ceph cloud storage node	
csn036	HP	ProLiant XL420 Gen10	Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz	384(12x32), 2933MHz	high	production	414	192.168.220.36	NOvA ceph cloud storage node	
csn037	HP	ProLiant XL420 Gen10	Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz	384(12x32), 2933MHz	high	production	414	192.168.220.37	NOvA ceph cloud storage node	
csn038	HP	ProLiant XL420 Gen10	Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz	384(12x32), 2933MHz	high	production	414	192.168.220.38	NOvA ceph cloud storage node	
cwn1001	HP	ProLiant DL360 Gen10	Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	192(6x32), 2666MHz	high	production	414	192.168.221.1	NOvA KVM CN	
cwn1002	HP	ProLiant DL360 Gen10	Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	192(6x32), 2666MHz	high	production	414	192.168.221.2	NOvA KVM CN	
cwn1003	HP	ProLiant DL360 Gen10	Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	192(6x32), 2666MHz	high	production	414	192.168.221.3	NOvA KVM CN	
cwn1004	HP	ProLiant DL360 Gen10	Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	192(6x32), 2666MHz	high	production	414	192.168.221.4	NOvA KVM CN	
cwn1005	HP	ProLiant DL360 Gen10	Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	192(6x32), 2666MHz	high	production	414	192.168.221.5	NOvA KVM CN	
cwn1006	HP	ProLiant DL360 Gen10	Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	192(6x32), 2666MHz	high	production	414	192.168.221.6	NOvA KVM CN	
cwn1007	HP	ProLiant DL360 Gen10	Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	192(6x32), 2666MHz	high	production	414	192.168.221.7	NOvA KVM CN	
cwn1008	HP	ProLiant DL360 Gen10	Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	192(6x32), 2666MHz	high	production	414	192.168.221.8	NOvA KVM CN	
cwn1009	HP	ProLiant DL360 Gen10	Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	192(6x32), 2666MHz	high	production	414	192.168.221.9	NOvA KVM CN	

Infrastructure management



- Infrastructure as a Code (IaaS)
- Foreman + puppet
 - Profile + role model
- Physical servers and virtual machines
- Hosts autodiscovery feature
- Puppet manifests management is done via git
- Sensitive information is kept in HashiCorp Vault

Usage (1/2)

Virtual Machines



778

TOTAL

2

PENDING

0

FAILED

System



197

USERS

34

GROUPS

Images



600

IMAGES

177.3 TB

USED

Virtual Networks



99

VNETS

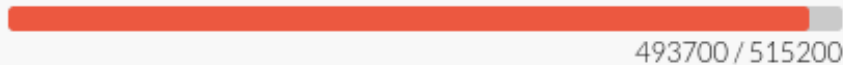
990

USED IPs

Hosts

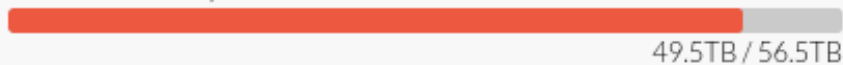


Allocated CPU



493700 / 515200

Allocated Memory



49.5TB / 56.5TB

170

MONITORED

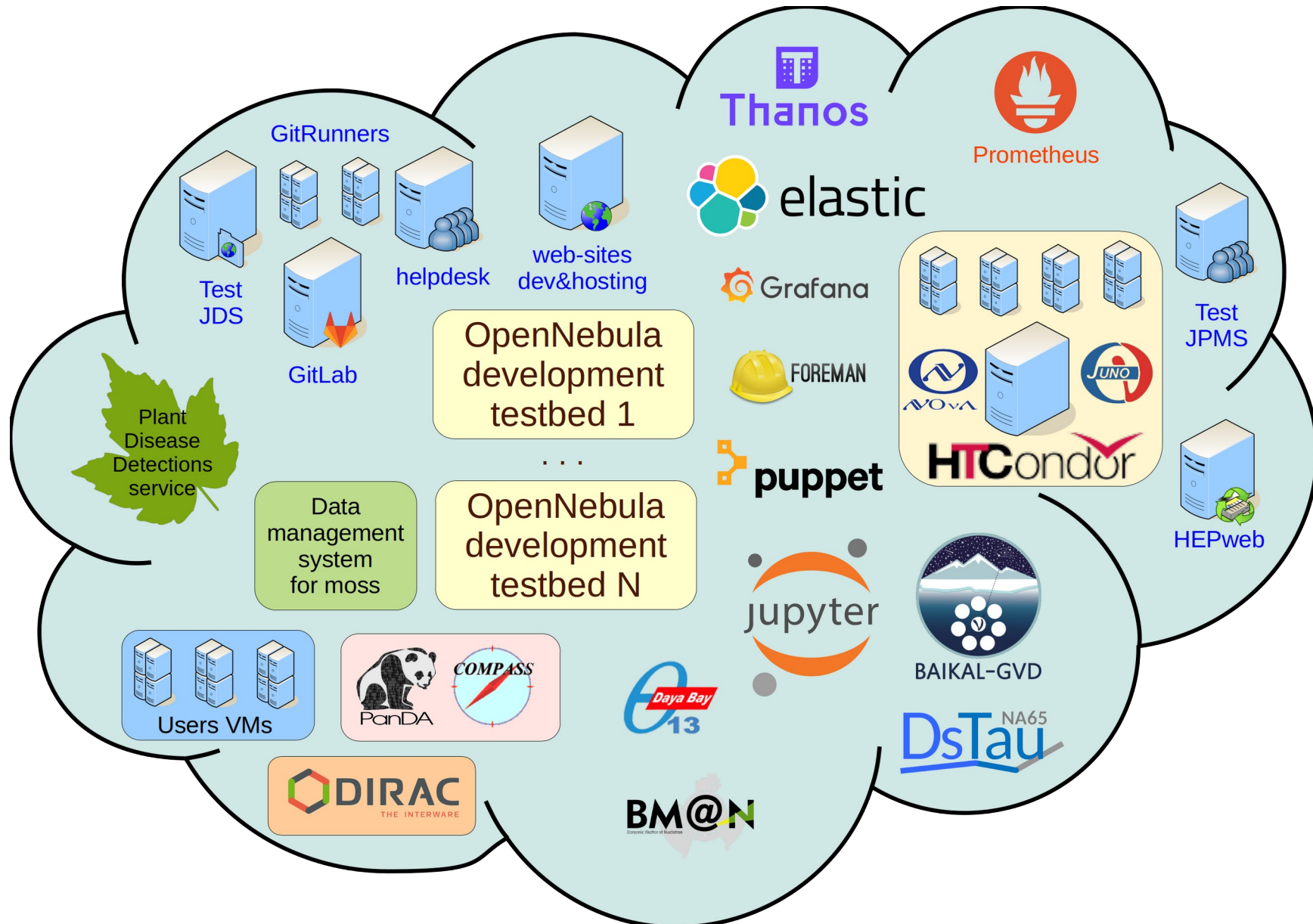
6

DISABLED

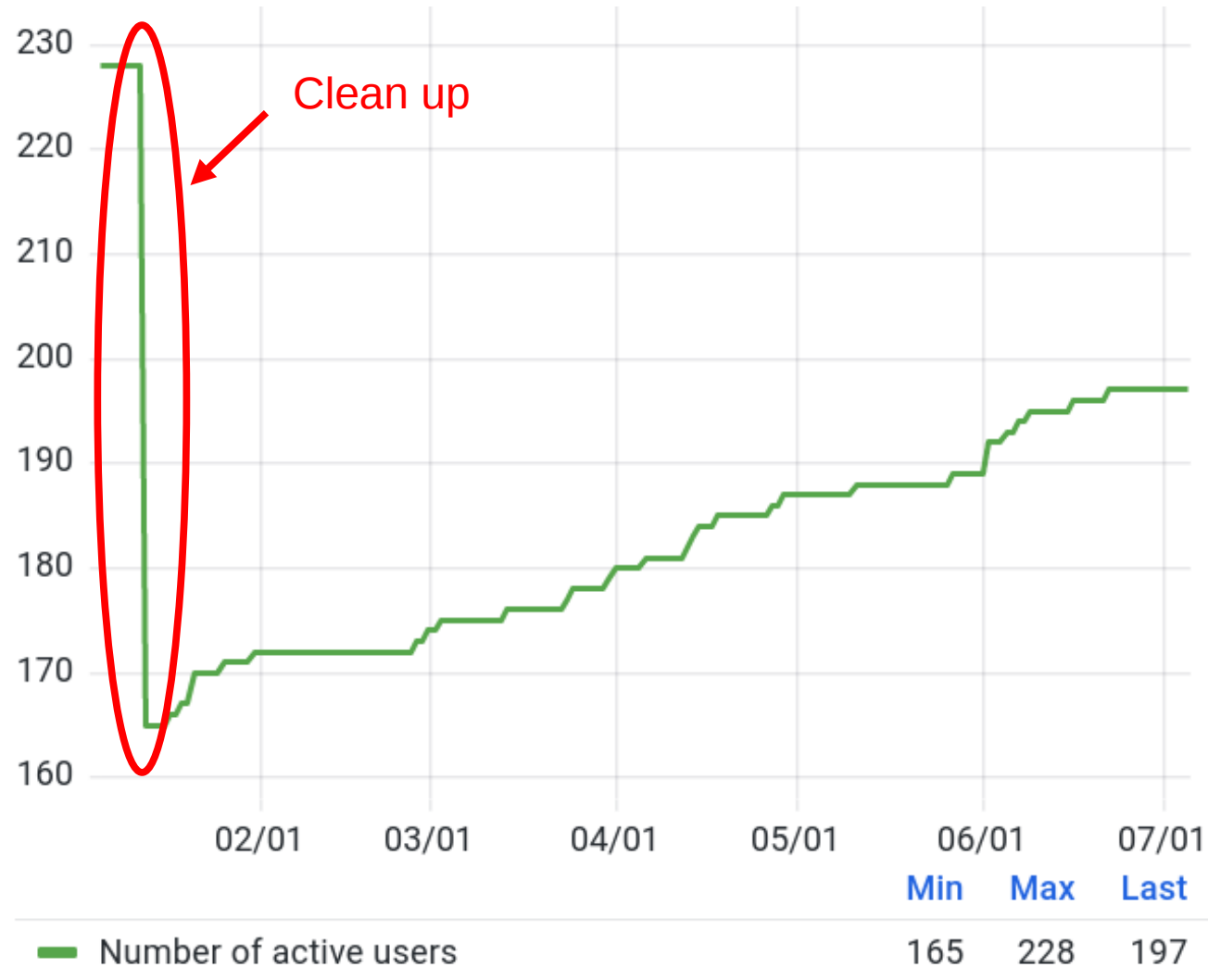
0

FAILED

Usage (2/2)



Number of active cloud users



Inefficient resources utilization

- Some users don't care about an efficiency of resources utilization
 - Users ask more resources they use in fact → query to cut amount of allocated resource to used ones
 - CPU load on some VMs is around zero pretty long time → query to either delete VM or to undeploy it
 - Regular clean up of unused VM images

User support

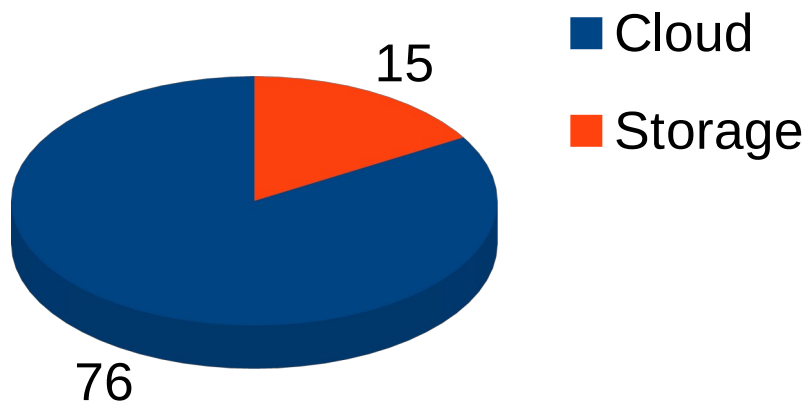
User support is done on basis of Helpdesk@JINR service (running on iTop software)



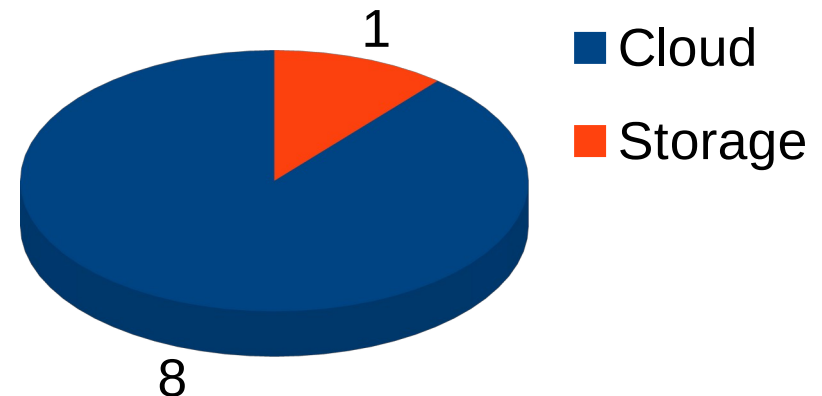
Search for User Request Objects

Ref:	Organization: * Any * v	Title:	Description:
Start date:	Resolution date:	Close date:	Status: * Any * v
Operational status: * Any * v	Caller: v	Origin: * Any * v	Request Type: * Any * v
Impact: * Any * v	Urgency: * Any * v	Priority: * Any * v	Service: * Any * v
Service subcategory: * Any * v	Team: * Any * v	Agent: v	Hot Flag: * Any * v
Resolution code: * Any * v	User satisfaction: * Any * v	SLA tto passed:	SLA ttr passed:

Number of user requests on cloud resources during last 365 days



Number of incidents on cloud resources during last 365 days



Cooperation with DLNP

DLNP neutrino experiments contribution into JINR cloud components

	Total number of CPU cores, items	Total amount of RAM, TB	Total amount of storage, TB
Baikal-GVD	84	0.768	0
JUNO	2976	35.97	128
NOvA/DUNE	1000	5.72	2144
TAIGA	0	0	120

One of the way to increase Neutrino Computing Platform (NCP) resources utilization efficiency is to organize resources sharing across NCP participants

HTCondor-CEs:

- v9.0.11
- IAM-based token authentication support
- ~3400 CPU cores in total

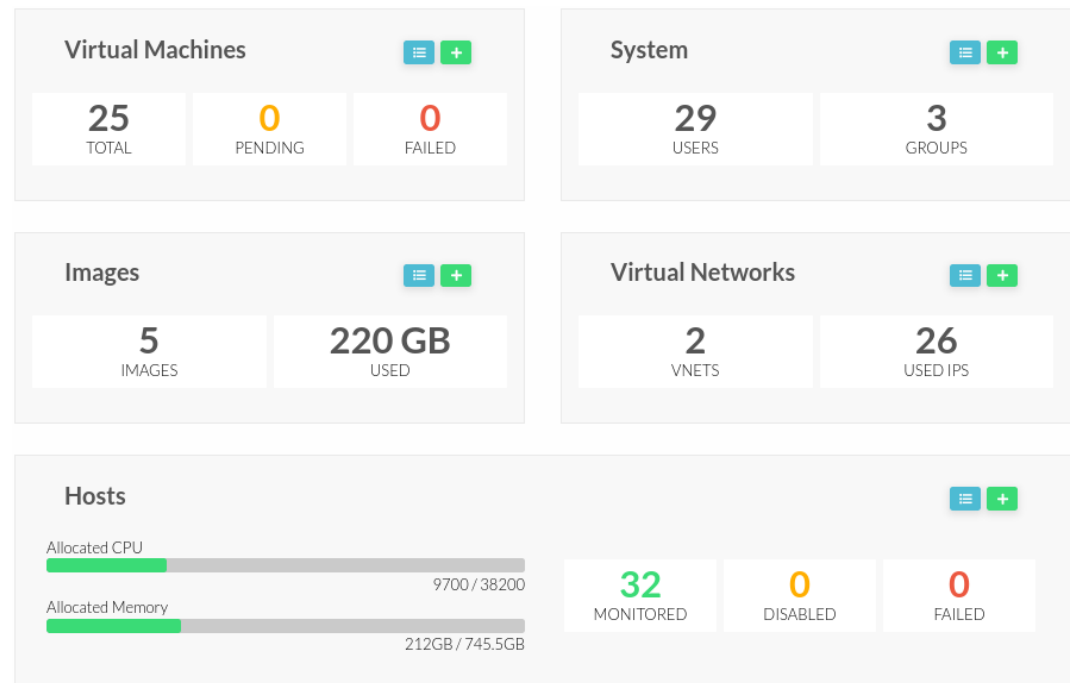


Conclusion&Plans

- Most efforts on JINR cloud are focused on increasing QoS now
 - VMs disks migration from HDD-based ceph storage to SSD-based one
- Migration from nagios/icinga-based monitoring to prometheus-based is still in progress
- Increase a degree of automation by adding more profiles and roles in foreman/puppet

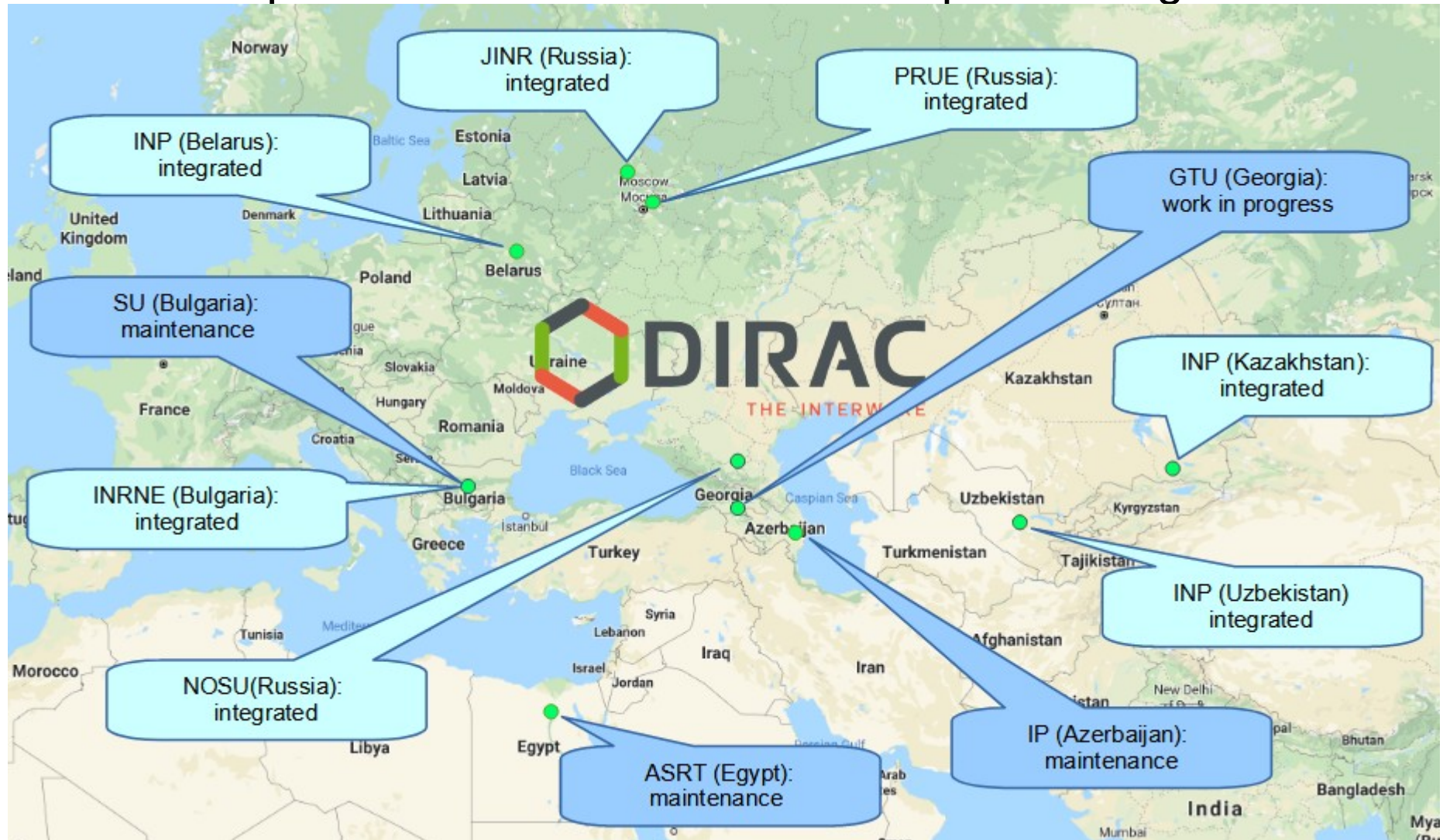
Training and testing JINR cloud (t-cloud)

- For user and admin trainings as well as for development and testing
- Servers for VMs:
 - 32 x Supermicro X8DTT-F: Intel(R) Xeon(R) CPU X5650@2.67GHz (12 CPU cores, 24 GB of RAM)
- Ceph (v17.2.5)
 - 3x Supermicro X9DR3-F
 - ~400 TB of raw disk space
 - Triple replication
 - 2x 10GBase-T
- OpenNebula
 - 6.0.0.2
 - Web-interface: <http://t-cloud.jinr.ru>



JINR DICE: participants

- To join resources for solving common tasks as well as to distribute a peak load across resources of partner organizations



JINR DICE: resources

Organization	Country	Status	non-HT CPU cores	RAM, GB	Storage, TB
Plekhanov Russian Economic University	RU	integrated	132	608	51.1
Institute of Nuclear Physics	KZ	integrated	84	840	6.8 (SSD)
Institute of Physics of the National Academy of Sciences of Azerbaijan	AZ	maintenance	16	96	56
North Ossetian State University	RU	integrated	84	672	17
Academy of Scientific Research & Technology - Egyptian National STI Network	EG	maintenance	98	704	13.8
Institute for Nuclear Research and Nuclear Energy	BG	integrated	20	64	4
St. Sophia University «St. Kliment Ohridski»	BG	integrated	48	250	4.7
Scientific Research Institute of Nuclear Problems of the Belarusian State University	BY	integrated	132	290	127
Institute of Nuclear Physics	UZ	integrated	98	890	6.6 (SSD)
Georgian Technical University	GE	in progress	50	308	20
Total			762	4722	

Hardware inventory

Organizations:

- EG-ASRT
- GE-GTU
- KZ-INP
- JINR
- RU-NOSU
- UZ-INP

Infrastructure

Rack: 11Enclosure: 2Server: 218Network Device: 161Storage System: 1SAN Switch: 0NAS: 0Tape Library: 0Power Connection: 4

Create a new RackSearch for Rack objectsCreate a new EnclosureSearch for Enclosure objectsCreate a new ServerSearch for Server objectsCreate a new Network DeviceSearch for Network Device objectsCreate a new Storage SystemSearch for Storage System objectsCreate a new SAN SwitchSearch for SAN Switch objectsCreate a new NASSearch for NAS objectsCreate a new Tape LibrarySearch for Tape Library objectsCreate a new Power ConnectionSearch for Power Connection objects

Virtualization

Farm: 0Hypervisor: 1Virtual Machine: 11

Create a new FarmSearch for Farm objectsCreate a new HypervisorSearch for Hypervisor objectsCreate a new Virtual MachineSearch for Virtual Machine objects

End user devices

Slide 4PC: 0Phone: 0IP Phone: 0Mobile Phone: 0Tablet: 0Printer: 0Peripheral: 0RAID: 185

Create a new PCSearch for PC objectsCreate a new PhoneSearch for Phone objectsCreate a new IP PhoneSearch for IP Phone objectsCreate a new Mobile PhoneSearch for Mobile Phone objectsCreate a new TabletSearch for Tablet objectsCreate a new PrinterSearch for Printer objectsCreate a new PeripheralSearch for Peripheral objectsCreate a new RAIDSearch for RAID objects

Software and applications

Middleware: 0DB Server: 0Web server: 0PC Software: 0Other Software: 0Middleware Instance: 0Databases: 0

Create a new MiddlewareSearch for Middleware objectsCreate a new DB ServerSearch for DB Server objectsCreate a new Web serverSearch for Web server objectsCreate a new PC SoftwareSearch for PC Software objectsCreate a new Other SoftwareSearch for Other Software objectsCreate a new Middleware InstanceSearch for Middleware Instance objectsCreate a new DatabaseSearch for Database objects

Miscellaneous

Network Interface: 251Subnet: 10VLAN: 1Logical Volume: 0Business Process: 4Application Solution: 0

Create a new Network InterfaceSearch for Network Interface objectsCreate a new SubnetSearch for Subnet objectsCreate a new VLANSearch for VLAN objectsCreate a new Logical VolumeSearch for Logical Volume objectsCreate a new Business ProcessSearch for Business Process objectsCreate a new Application SolutionSearch for Application Solution objects

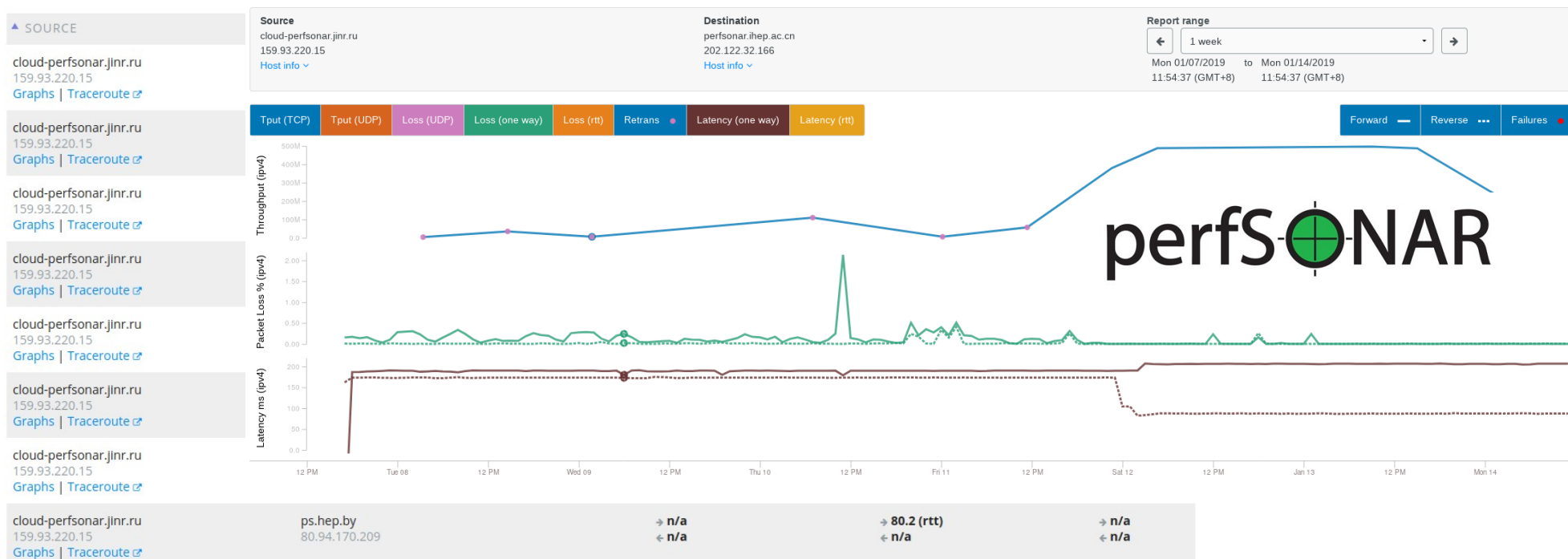
Виртуальная машинаRaft HA VM 3 testbedДобро пожаловатьchn012112Preferences...OverviewServer

csn023	Dell	PowerEdge R730xd	Intel Xeon CPU E5-2660 v4 @ 2.00GHz	128.0	high	production	104	192.168.220.123	ceph cloud storage node
csn024	Dell	PowerEdge R730xd	Intel Xeon CPU E5-2660 v4 @ 2.00GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.124	ceph cloud storage node
csn025	Dell	PowerEdge R730xd	Intel Xeon CPU E5-2660 v4 @ 2.00GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.125	ceph cloud storage node
csn026	Dell	PowerEdge R730xd	Intel Xeon CPU E5-2660 v4 @ 2.00GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.126	ceph cloud storage node
csn027	Dell	PowerEdge R730xd	Intel Xeon CPU E5-2620 v4 @ 2.10GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.127	NOVA ceph cloud storage node
csn028	Dell	PowerEdge R730xd	Intel Xeon CPU E5-2620 v4 @ 2.10GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.128	JUNO ceph cloud storage node
csn029	Dell	PowerEdge R740xd	Intel Xeon Silver 4114 CPU @ 2.20GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.129	NOVA ceph cloud storage node
csn030	Dell	PowerEdge R740xd	Intel Xeon Silver 4114 CPU @ 2.20GHz	128(8x16), 2400 MHz	high	production	104	192.168.220.130	NOVA ceph cloud storage node
csn031	Dell	PowerEdge R740xd	Intel Xeon Silver 4114 CPU @ 2.20GHz	128(8x16), 2400 MHz	high	stock	104	192.168.220.31	NOVA ceph cloud storage node
csn032	Dell	PowerEdge R740xd	Intel(R) Xeon(R) Silver 4214 CPU @ 2.70GHz	128(8x16), 2400 MHz	high	stock	104	192.168.220.32	NOVA ceph cloud storage node
csn033	HP	ProLiant XL420 Gen10	Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz	384(12x32), 2933MHz	high	production	414	192.168.220.33	NOVA ceph cloud storage node
csn034	HP	ProLiant XL420 Gen10	Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz	384(12x32), 2933MHz	high	production	414	192.168.220.34	NOVA ceph cloud storage node
csn035	HP	ProLiant XL420 Gen10	Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz	384(12x32), 2933MHz	high	production	414	192.168.220.35	NOVA ceph cloud storage node
csn036	HP	ProLiant XL420 Gen10	Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz	384(12x32), 2933MHz	high	production	414	192.168.220.36	NOVA ceph cloud storage node
csn037	HP	ProLiant XL420 Gen10	Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz	384(12x32), 2933MHz	high	production	414	192.168.220.37	NOVA ceph cloud storage node
csn038	HP	ProLiant XL420 Gen10	Intel(R) Xeon(R) Gold 6226 CPU @ 2.70GHz	384(12x32), 2933MHz	high	production	414	192.168.220.38	NOVA ceph cloud storage node
cwm1001	HP	ProLiant DL360 Gen10	Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	192(6x32), 2666MHz	high	production	414	192.168.221.1	NOVA KVM CN
cwm1002	HP	ProLiant DL360 Gen10	Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	192(6x32), 2666MHz	high	production	414	192.168.221.2	NOVA KVM CN
cwm1003	HP	ProLiant DL360 Gen10	Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz	192(6x32), 2666MHz	high	production	414	192.168.221.3	NOVA KVM CN
					high	production	414	192.168.221.4	NOVA KVM CN
					high	production	414	192.168.221.5	NOVA KVM CN
					high	production	414	192.168.221.6	NOVA KVM CN
					high	production	414	192.168.221.7	NOVA KVM CN
					high	production	414	192.168.221.8	NOVA KVM CN
					high	production	414	192.168.221.9	NOVA KVM CN

Virtual Machine	Organization	Status	Business criticity	IP	Move to production date	Name
NAT	АНИТ	production	high	195.43.16.35	2020-12-18	NAT
one-fn	ИЯФ	production	high	10.0.2.2	2020-07-02	one-fn
one-fn	СОГУ	production	high	10.55.0.10	2020-03-24	one-fn
one-fn	АНИТ	production	high	195.43.16.34	2020-12-14	one-fn
perfSONAR	АНИТ	production	high	195.43.16.36	2020-12-21	perfSONAR
Raft HA VM 1	ОИЯИ	production	high	10.220.0.101		Raft HA VM 1
Raft HA VM 1 testbed	ОИЯИ	production	low	10.220.31.243		Raft HA VM 1 testbed
Raft HA VM 2	ОИЯИ	production	high	10.220.0.102		Raft HA VM 2
Raft HA VM 2 testbed	ОИЯИ	production	low	10.220.31.244		Raft HA VM 2 testbed
Raft HA VM 3	ОИЯИ	production	high	10.220.0.103		Raft HA VM 3
Raft HA VM 3 testbed	ОИЯИ	production	low	10.220.31.245		Raft HA VM 3 testbed

PerfSONAR

- To monitor network connectivity of participants
 - <http://cloud-perfsonar.jinr.ru>

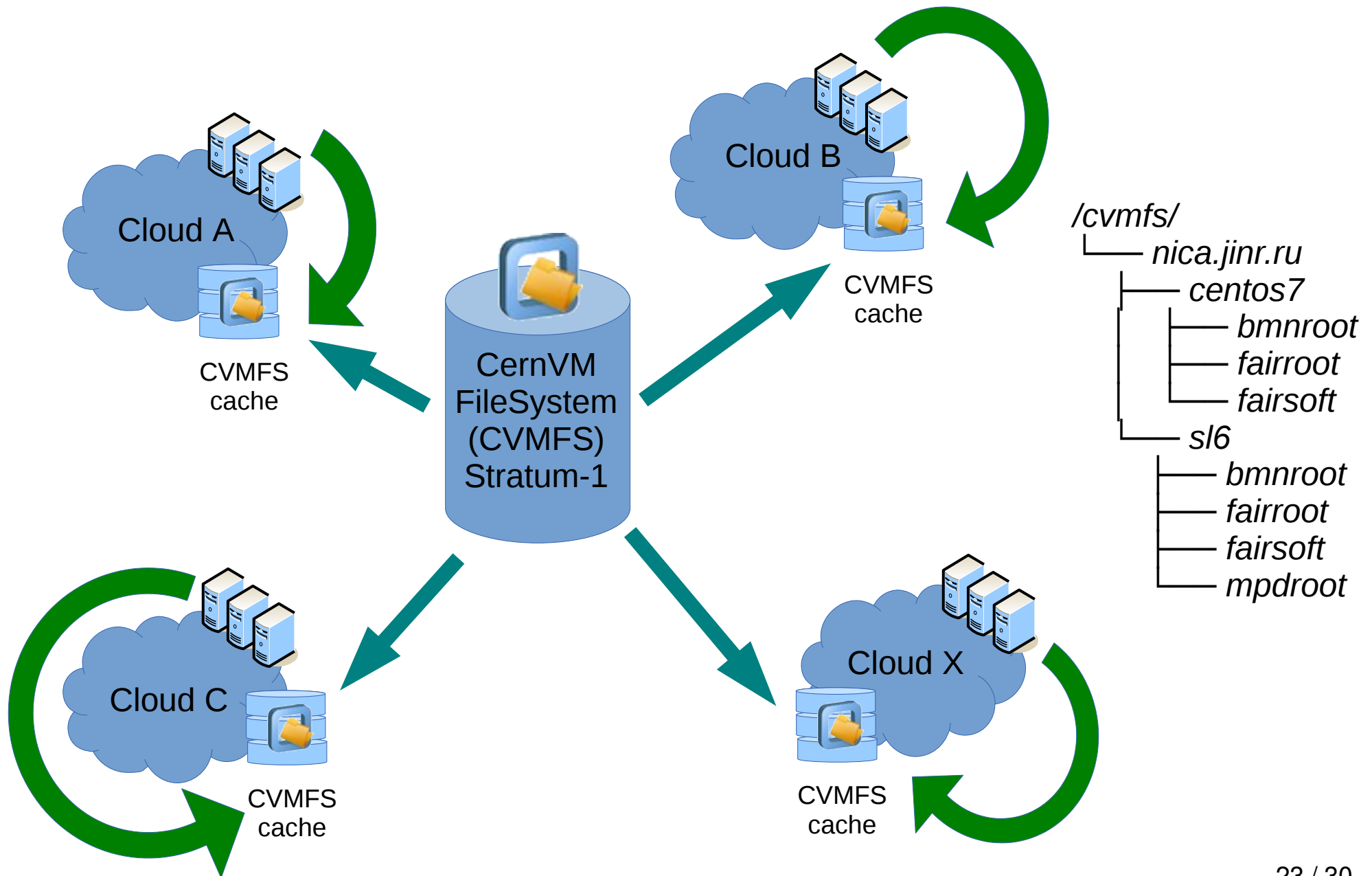


There is a challenge to deploy PS instance at some sites because all cloud VMs are behind NAT

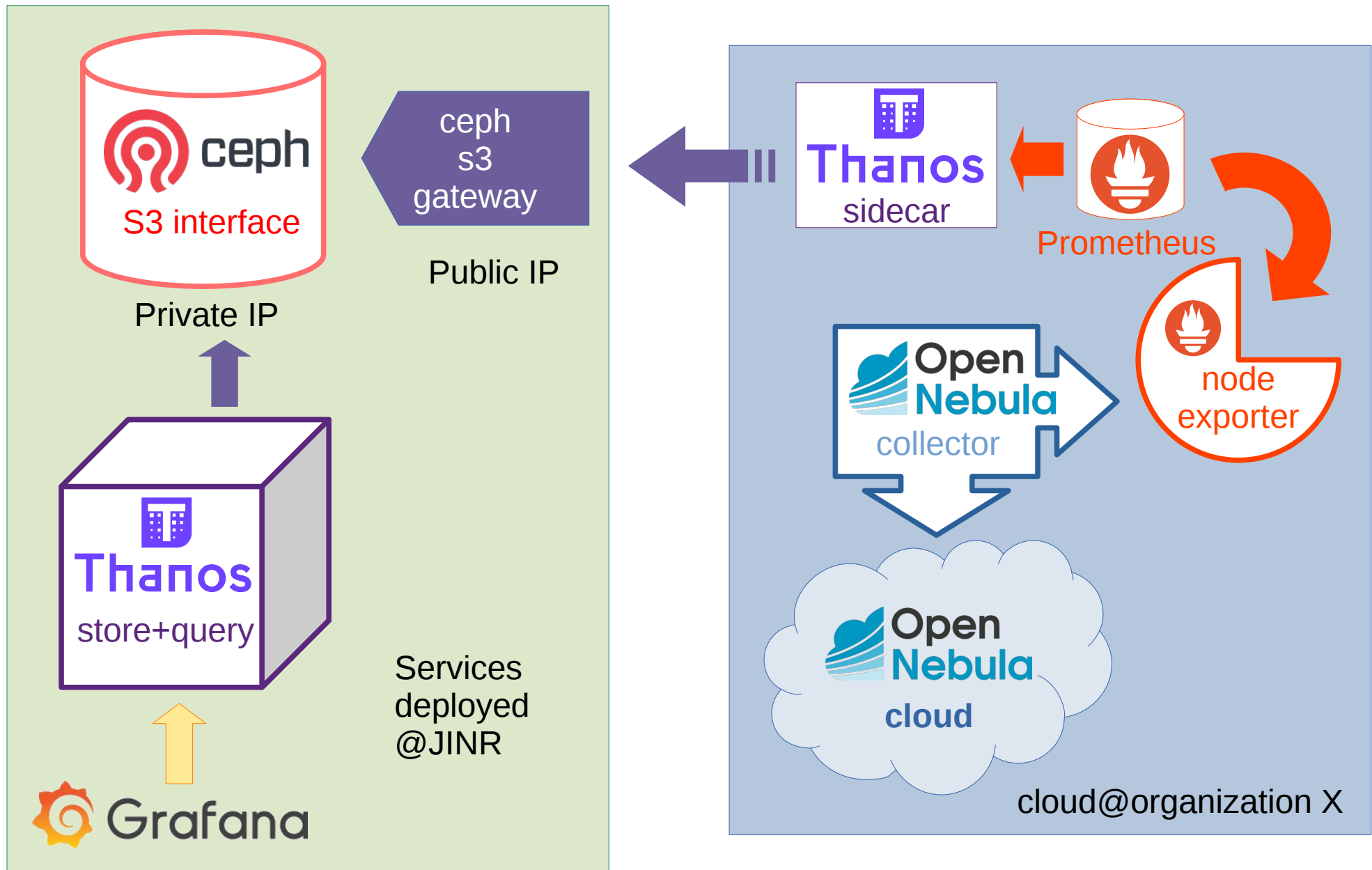
Low external network **bandwidth** (e.g. 100 Mbps shared with the whole organization) is the main contributor into high CPU wall time of jobs

Most **suitable** type of jobs for such kind of resources is **MC with negligible input data**

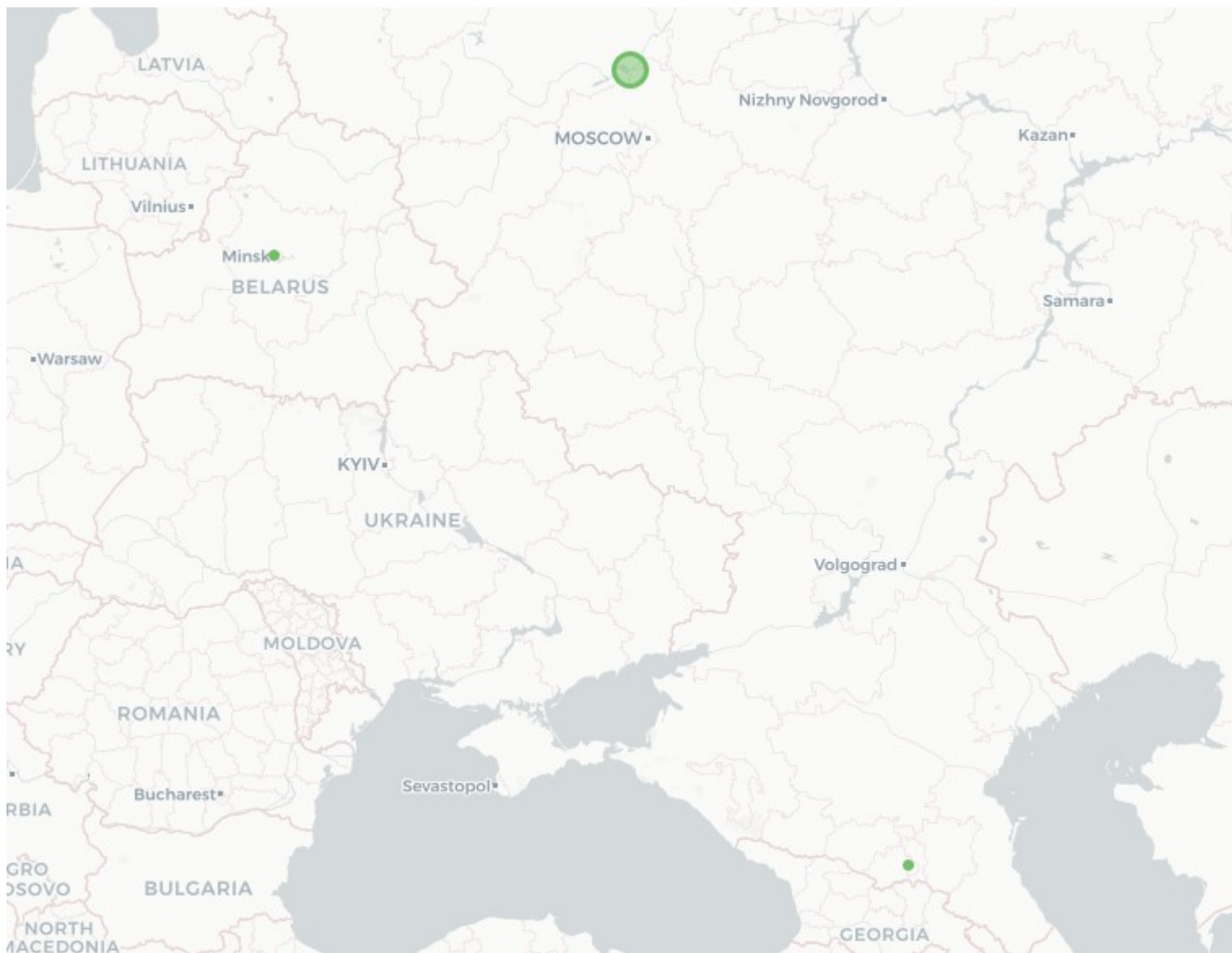
Experiments software distribution model



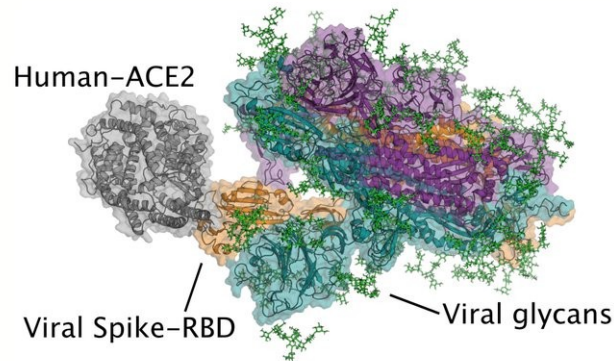
Metrics aggregation



Grafana World Map plugin



Usage: SARS-CoV-2 research via F@H



FOLDING@HOME | **STATISTICS** | Home | Team | Donor | Project | OS

Team Statistics

 **Joint Institute for Nuclear Research**
Rank 7,349

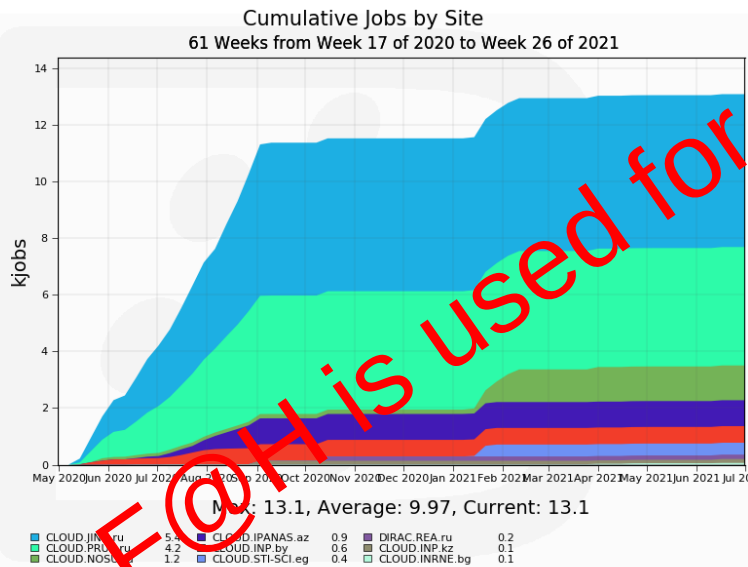
Top 10K Ranked Team

Team was founded by Igor Pelevanyuk and has earned 31,898,062 points by contributing 13,418 work units.

Team Website: | ID: 265602

Team Donors

Rank	Donor Name	Score	WUs
8,114	CLOUD.JINR.ru	174385822	5,355
105,315	CLOUD.PRUE.ru	176451176	4,175
158,398	CLOUD.NOSU.ru	191767895	1,352
238,270	CLOUD.IPANAS.az	240838025	910
242,831	CLOUD.INPby	176598058	599
269,612	CLOUD.INPkz	336298929	433
298,521	CLOUD.STI-SCI.eg	451198000	381
356,701	DIRAC.REA-Parallel.ru	377146365	155
434,117	CLOUD.INRNE.bg	191781076	58



<https://stats.foldingathome.org/team/265602>

Usage: BM@N, SPD and Baikal-GVD



BM@N workflow with simulation jobs was tested successfully.



Simulation and reconstruction SPD jobs was tested successfully as well but not yet on production storage (EOS)



Baikal-GVD tried to use JINR DICE resources (apart from the JINR cloud) but results were poor due to insufficient network bandwidth at some clouds

Issues

- RU-NOSU:
 - often power cuts
 - Additional public IP address for perfSONAR instance
- KZ-INP:
 - slow response on hardware interventions requests
 - Too strict firewall
 - Additional public IP address for perfSONAR instance
- UZ-INP:
 - Too strict firewall
 - Additional public IP address for perfSONAR instance
- EG-ASRT
 - Not accessible from the JINR subnet
 - No reply from technical specialists
- AZ-IP:
 - Under maintenance pretty long time
- GE-GTU:
 - Due to COVID-related restrictions a hardware has not been delivered yet to GTU

JINR DICE web-portal



Infrastructure

A distributed infrastructure is a powerful communication channels and special software different organizations into a single information tasks.

The integration of computing power of the joint organizations into a unified distributed information task, the solution of which would signify scientific results.

The relevance of creating such an environment and resources in solving fundamental and applied impossible without the use of new approaches of systems for distributed storage of large amounts

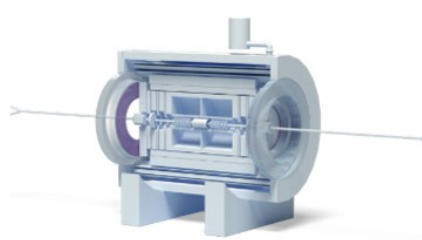


Communication with the experiments

The JINR DICE cloud segment resources are configured to support the following virtual organizations (VOs) representing a scientific experiment and/or collaboration: BM@N, MPD, and Baikal-GVD. More than 15,000 Monte-Carlo simulation jobs for the BM@N VO were successfully completed as well as about 9000 jobs for Baikal-GVD VO. Testing jobs for MPD were performed on the distributed cloud infrastructure.



BAIKAL-GVD



<http://dice.jinr.ru>
dice@jinr.ru



- Participants of the DICE
- Technical details
- Communication with the experiments
- Research on the SARS-CoV-2
- Tutorials
- Publications
- JINR Cloud Infrastructure



Contact person

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Email: dice@jinr.ru

Conclusion

- Number of JINR DICE participants and an amount of its resources is dynamically changed
- Only MC jobs with negligible input data are suitable for resources with low external network bandwidth
- Technical implementation of OpenNebula metrics aggregation is done. Its dissemination over JINR DICE clouds is in progress
- Migration from hand-drawn JINR DICE map to grafana World Map plugin is in progress
- JINR DICE web-portal is running:
 - Technical information about JINR DICE infrastructure
 - tutorials, publications
 - contacts