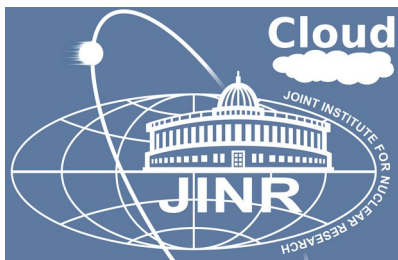




The JINR distributed information and computing environment: participants, features and challenges



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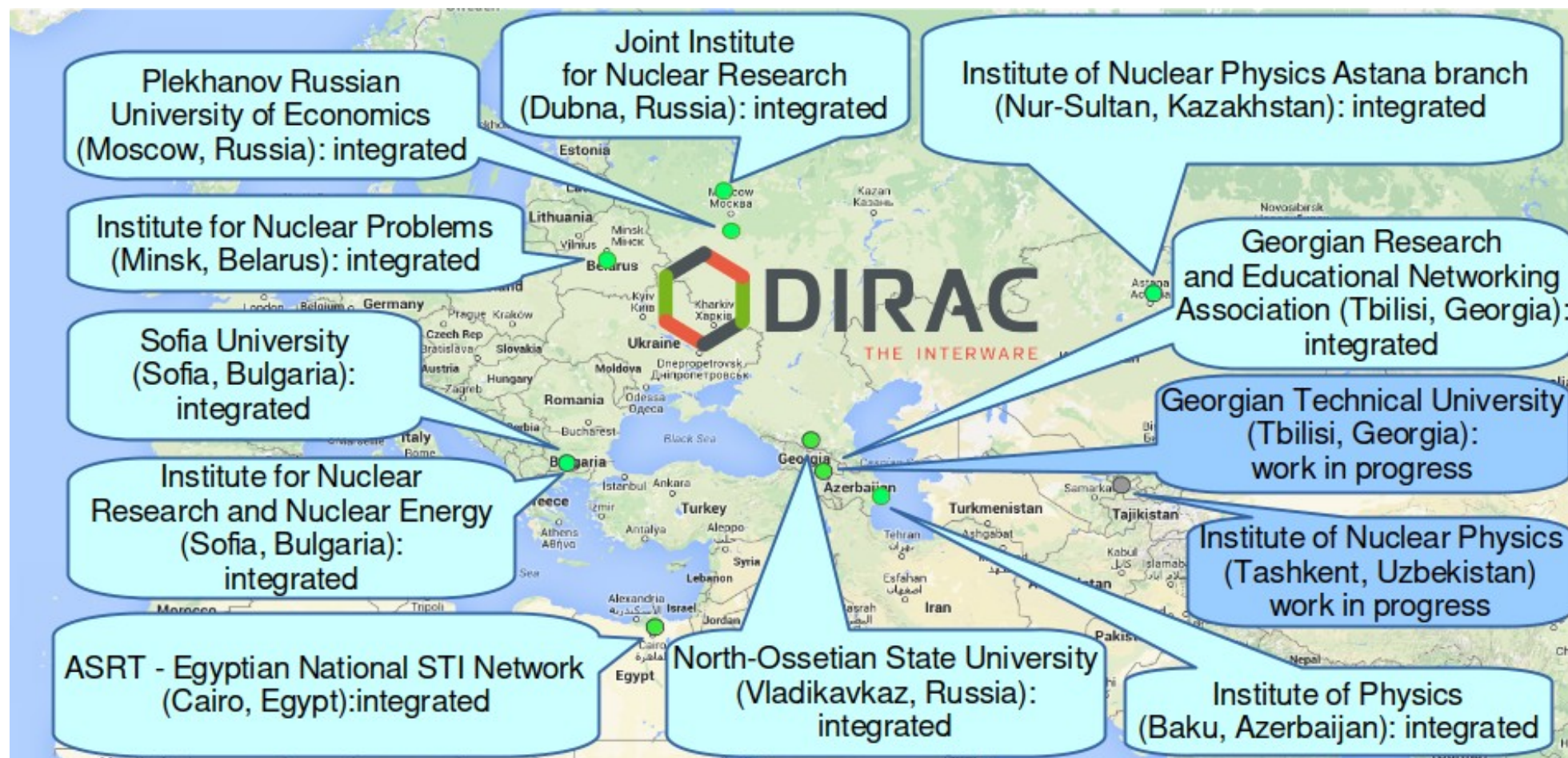
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Clouds integration: participants

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



JINR distributed information and computing environment: resources

Organization	Country	Status	non-HT CPU cores	RAM, GB	Storage, TB
Plekhanov Russian Economic University	RU	integrated	132	608	51.1
Astana branch of the Institute of Nuclear Physics	KZ	integrated	84	840	6.8 (SSD)
Institute of Physics of the National Academy of Sciences of Azerbaijan	AZ	integrated	16	96	56
North Ossetian State University	RU	integrated	84	672	17
Academy of Scientific Research & Technology - Egyptian National STI Network	EG	integrated	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	in progress			
Georgian Technical University	GE	in progress	50	308	20
Total			664	3832	

Hardware inventory

Organizations:

- ASRT
- GTU
- INP
- JINR
- NOSU

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

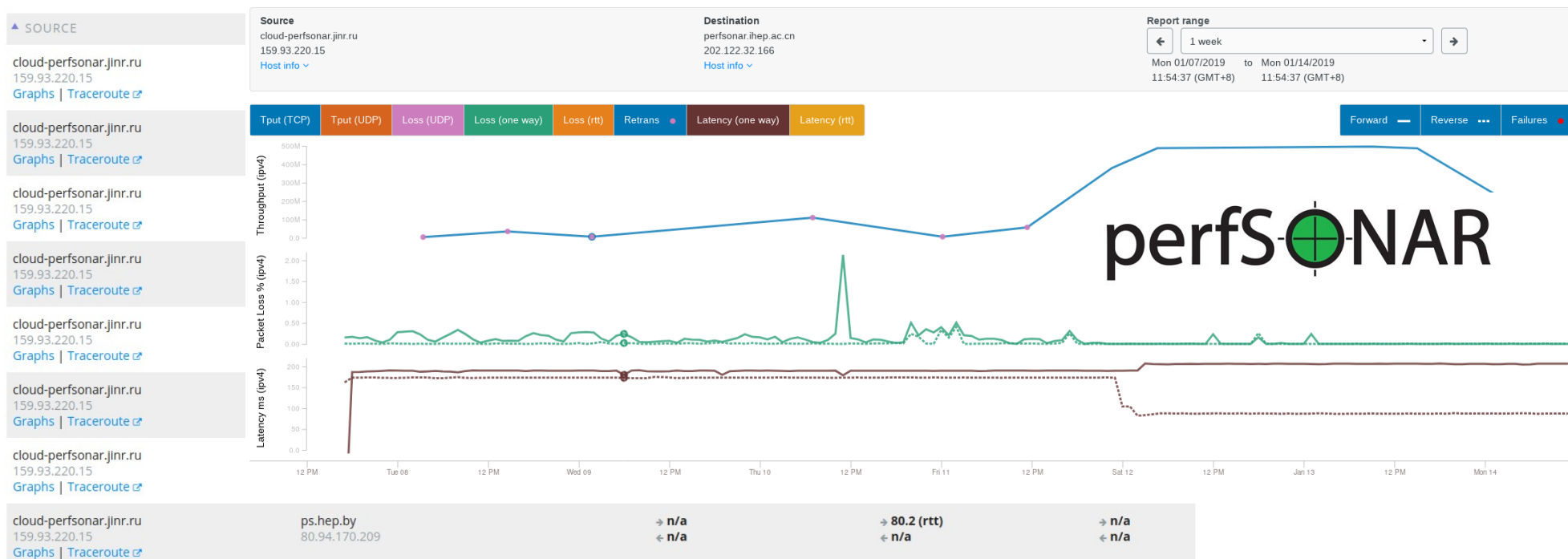
Виртуальная машинаRaft HA VM 3 testbedДобро пожаловатьchn012112Preferences...OverviewServer

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 cep 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 cep 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 cep 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 cep cloud storage node
csn031	Dell	PowerEdge R740xd	Intel(R) Xeon(R) Silver 4214 CPU @ 2.70GHz	128(8x16), 2400 MHz	high	stock	104	192.168.220.31	NOVA cep 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 cep 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 cep 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 cep 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 cep 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 cep 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 cep 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 cep 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>

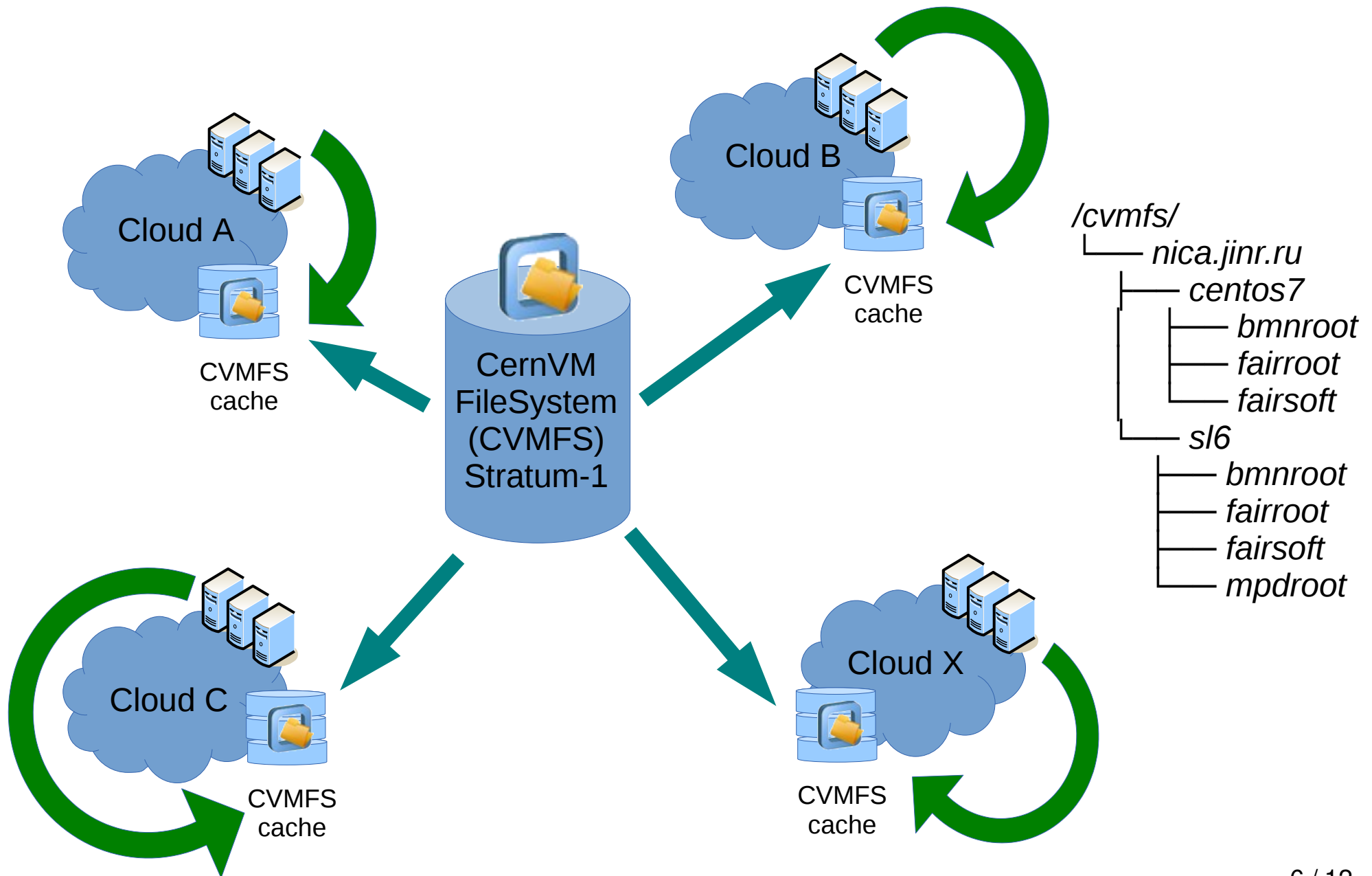


There is a challenge to deploy PS instance at some sites because all cloud VMs are behind NAT

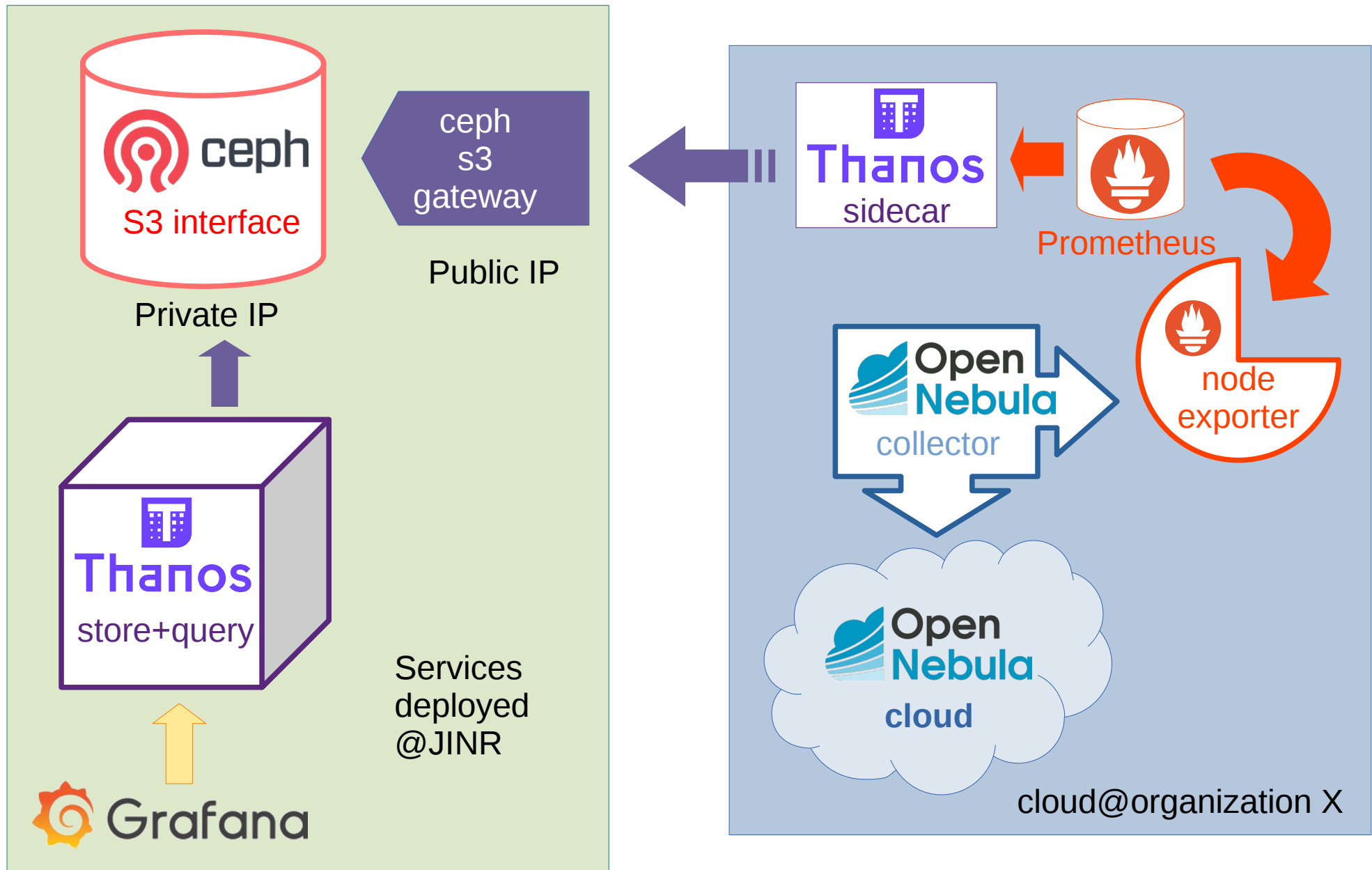
Low external network **bandwidth** (e.g. 100 Mbps shared with the whole organization) is the main contributor into high CPU wall time of jobs

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

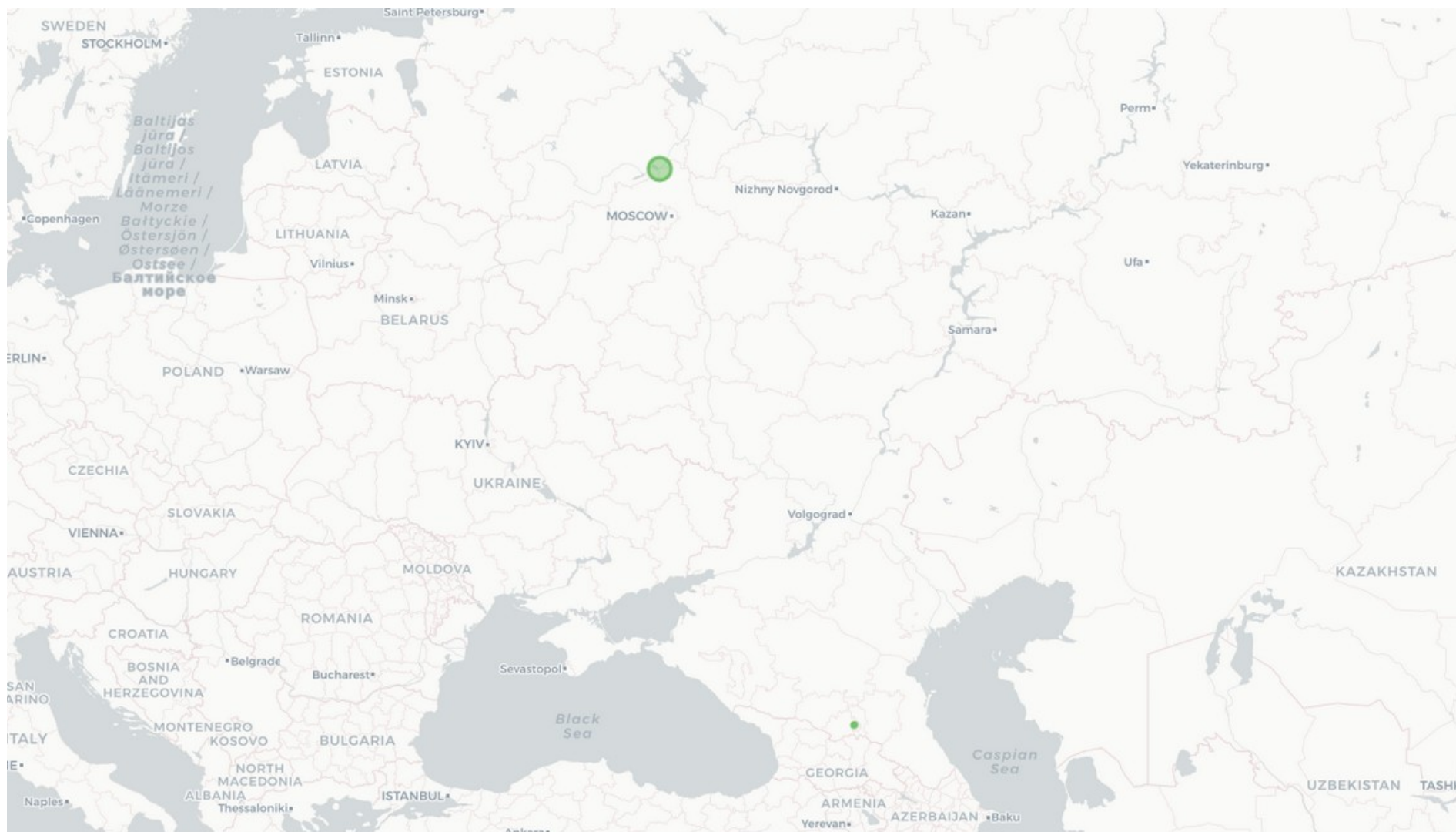
Experiments software distribution model



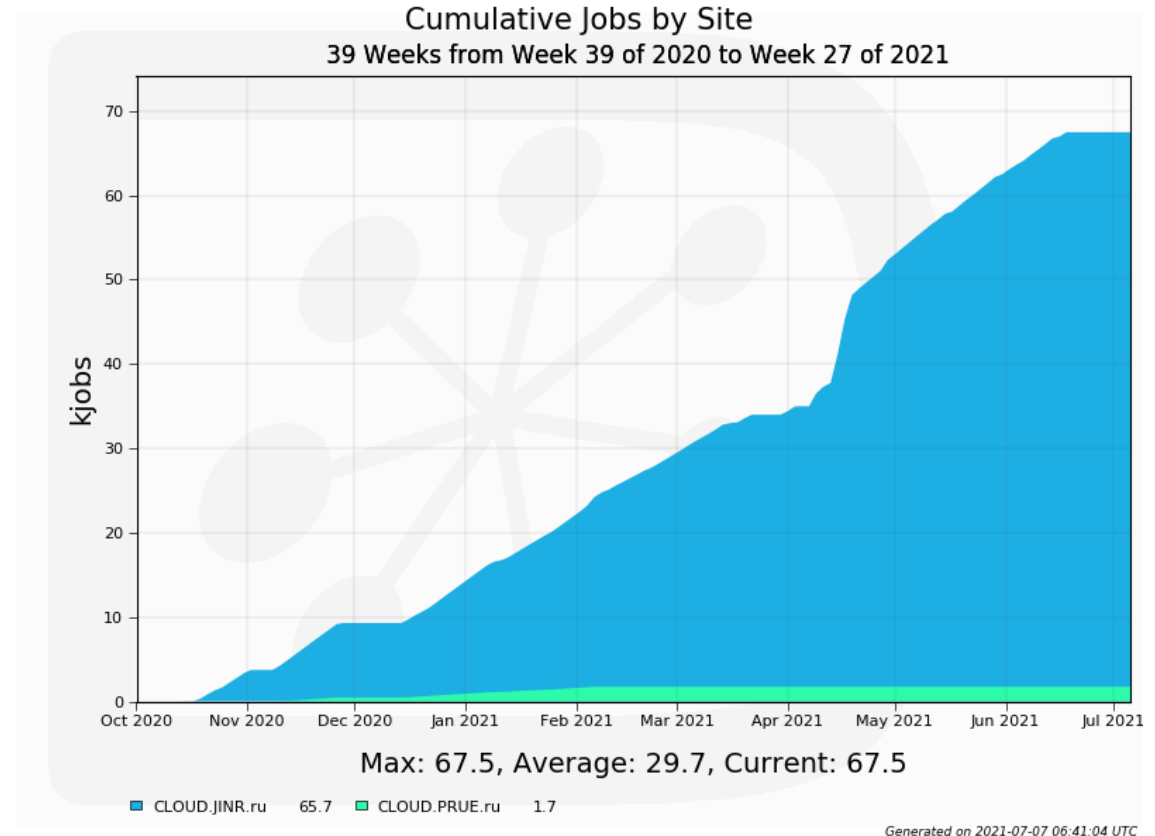
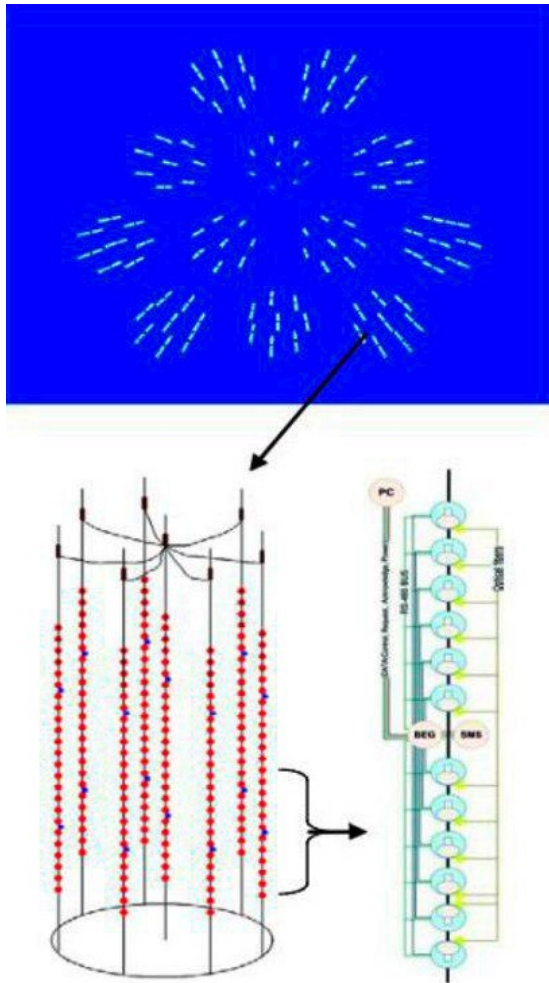
Metrics aggregation



Grafana World Map plugin



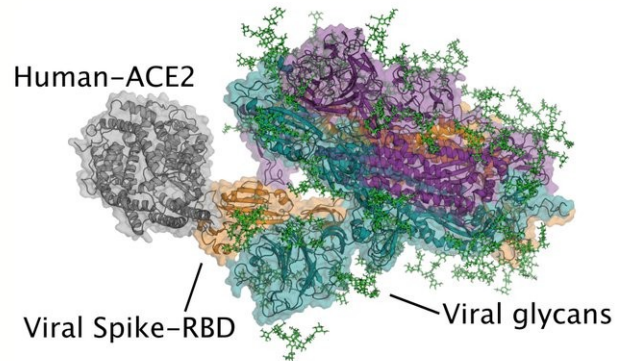
Usage: Baikal-GVD



Main issue: 2.4 GB input file size for each job
For sites with low external network speed it's a problem.

Possible solution: to put it in CVMFS repository. In that case each job (apart from the first one) would download it with a speed of local network from CVMFS caching node.

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



STATISTICS

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Team Statistics

Joint Institute for Nuclear Research
 Rank 7,349

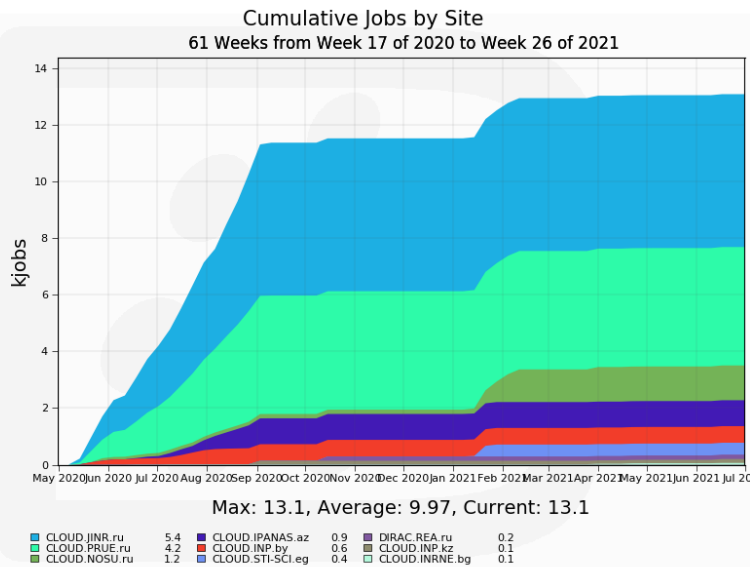
Top 10K Ranked Team

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

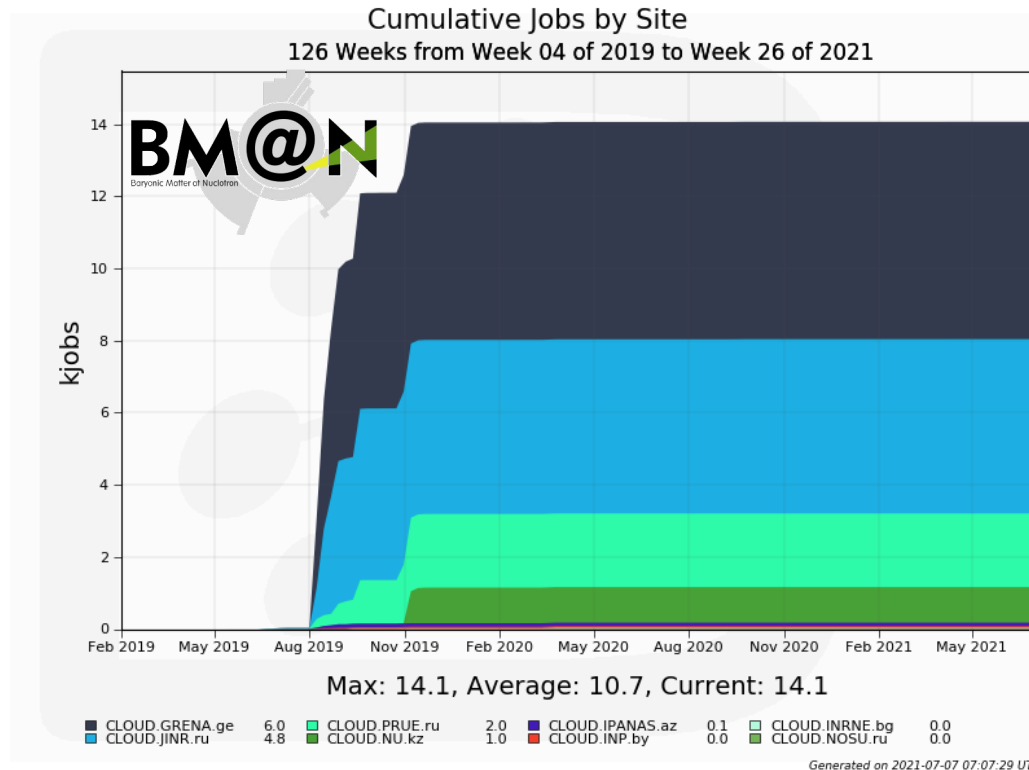
Rank	Donor Name	Score	WUs
89,114	CLOUD.JINR.ru	174385822	5.355
105,315	CLOUD.PRUE.ru	176451176	4.175
158,398	CLOUD.NOSU.ru	191767895	1.352
238,270	CLOUD.IPANAS.az	240838025	910
242,831	CLOUD.INPby	176598058	599
269,612	CLOUD.INPkz	336298929	433
298,521	CLOUD.STI-SCI.eg	451198000	381
356,701	DIRAC.REA-Parallel.ru	377146365	155
434,117	CLOUD.INRNE.bg	191781076	58



Generated on 2021-07-06 13:11:40 UTC

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

Usage: BM@N and SPD



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)

Conclusion

- Number of JINR DICE participants and an amount of its resources is growing as well as number of users
- Only MC jobs with negligible input data are suitable for resources with low external network bandwidth (100 Mbps)
- Technical implementation of OpenNebula metrics aggregation is done. One needs to disseminate that experience to other JINR DICE clouds
- Migration from hand-drawn JINR DICE map to grafana World Map plugin is in progress