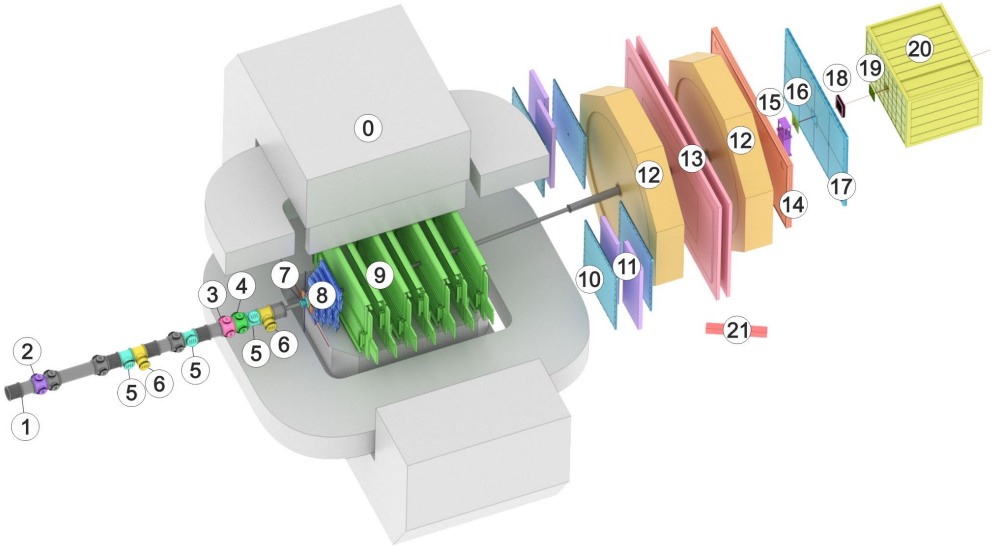
BM@N 12th collaboration meeting

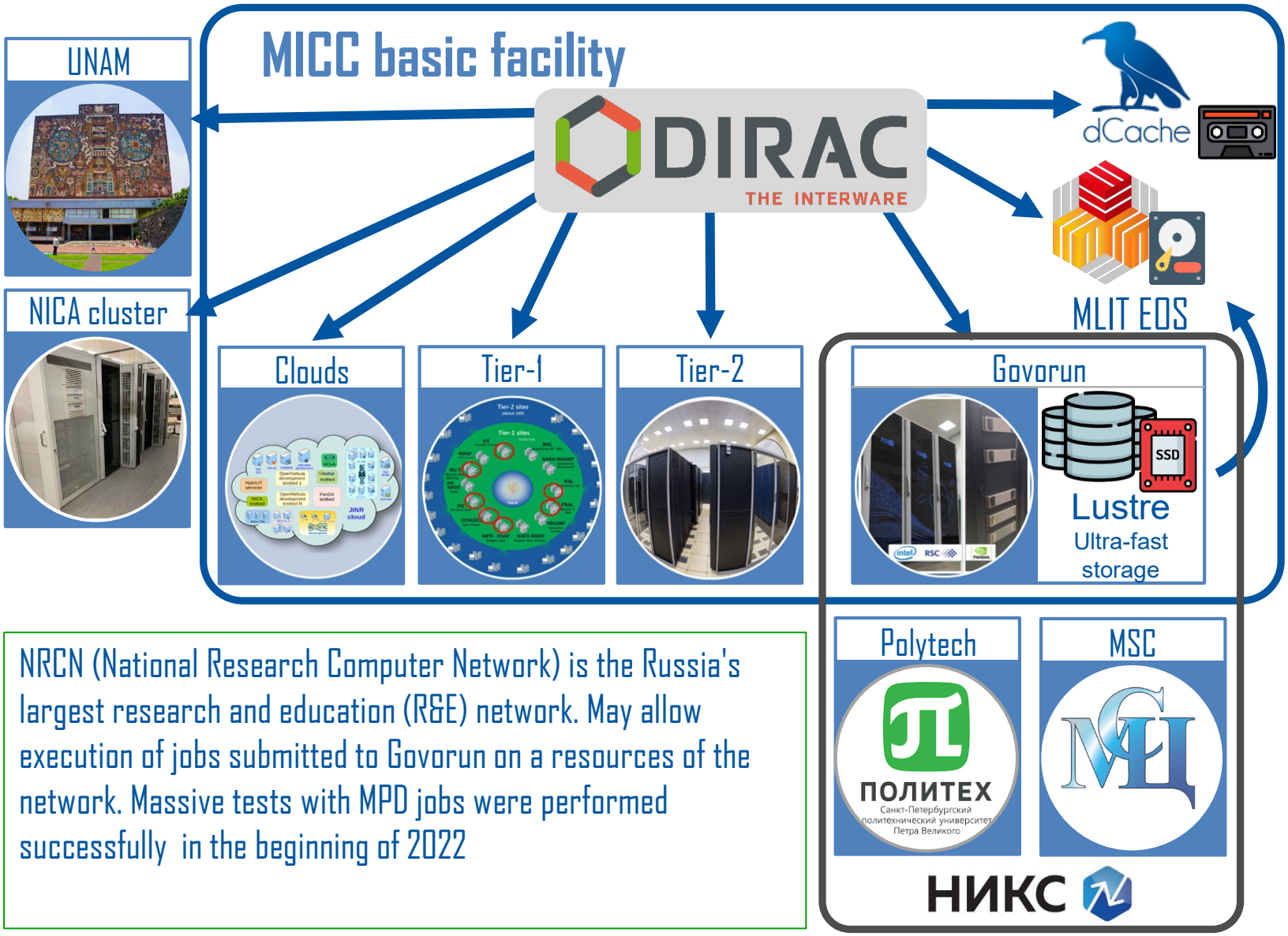
# BM@N distributed computing
## status and analytics

Konstantin Gertsenberger, Igor Pelevanyuk
LHEP MLIT




Status report
16.05.2024

# DIRAC in JINR




NRCN (National Research Computer Network) is the Russia's largest research and education (R&E) network. May allow execution of jobs submitted to Govorun on a resources of the network. Massive tests with MPD jobs were performed successfully in the beginning of 2022

# Summer EOS Failure®

- July-August 2023: Fail occurred due to the bug in the EOS source code. This bug activates only during high load, so it is not observable during initial functionality tests.
  - All files larger than 500 MB were in risk.
  - Around 3-7 % of files under DIRAC Dat… t system were affected(subjectiv… ct on BM@N production pr…
  - Partial BM@N data … was performed for half of runs

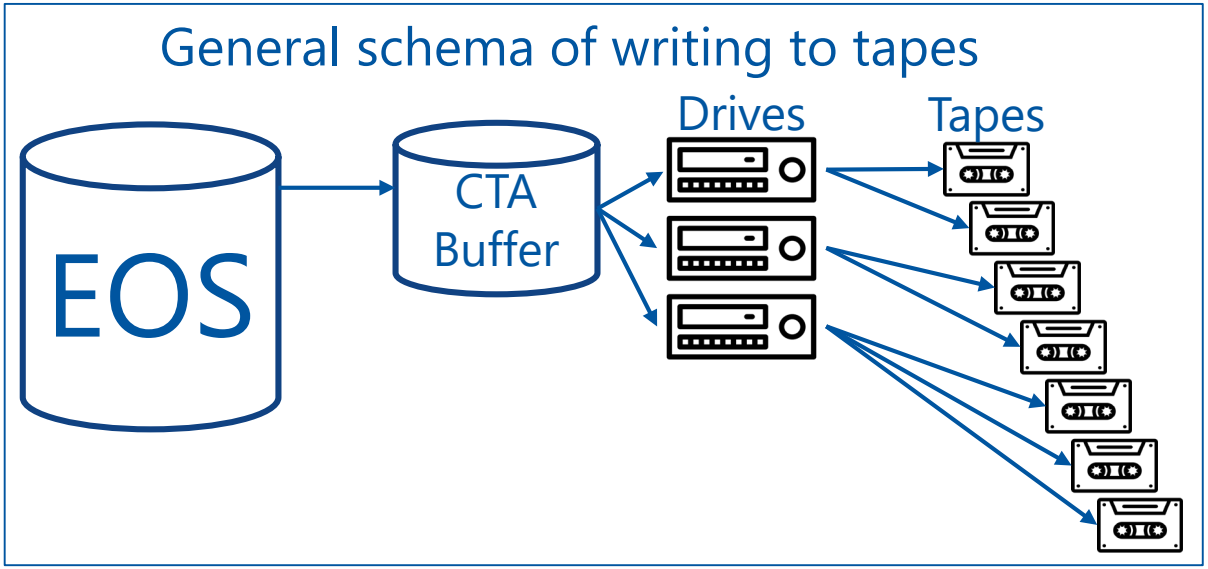
Fixed on EOS level

From BM@N 11th collaboration meeting

# Use of tapes by BM@N

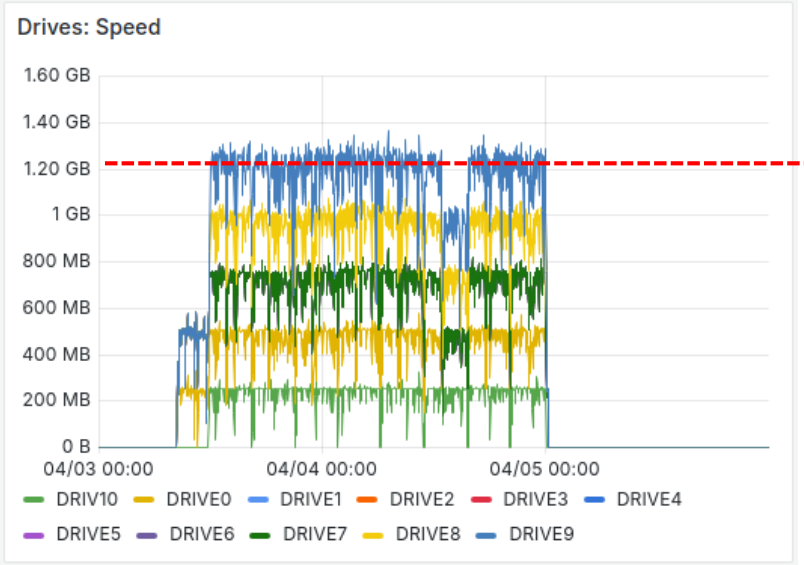
## (with Vladimir Trofimov)

- CTA Tape library in MLIT was successfully integrated to DIRAC and used for Run8 raw data backup. (March 2024)
- BM@N is “the most active CTA user“ with 417 TB written, and 50% occupied quota.
- But, reading from tapes is not so straight forward. Yet.



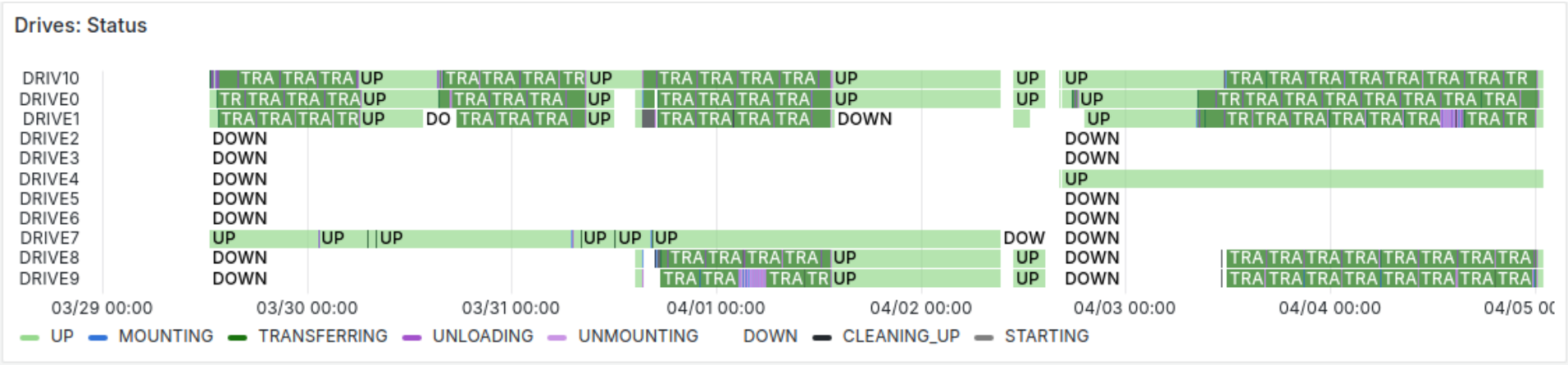
# Use of tapes by BM@N

## (with Vladimir Trofimov)

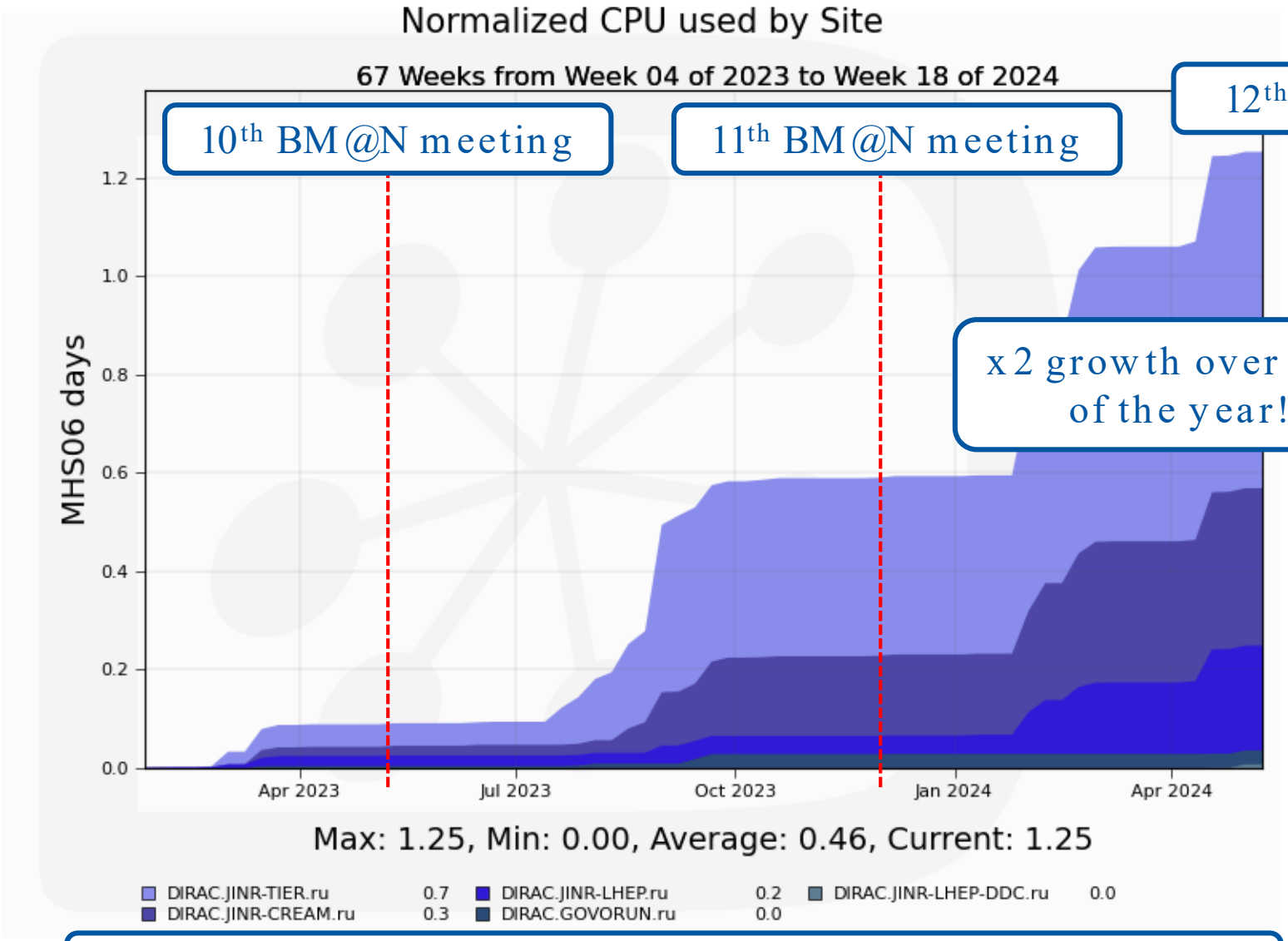



Achieved Drive ->Tape writing speed

1.25 GB/s

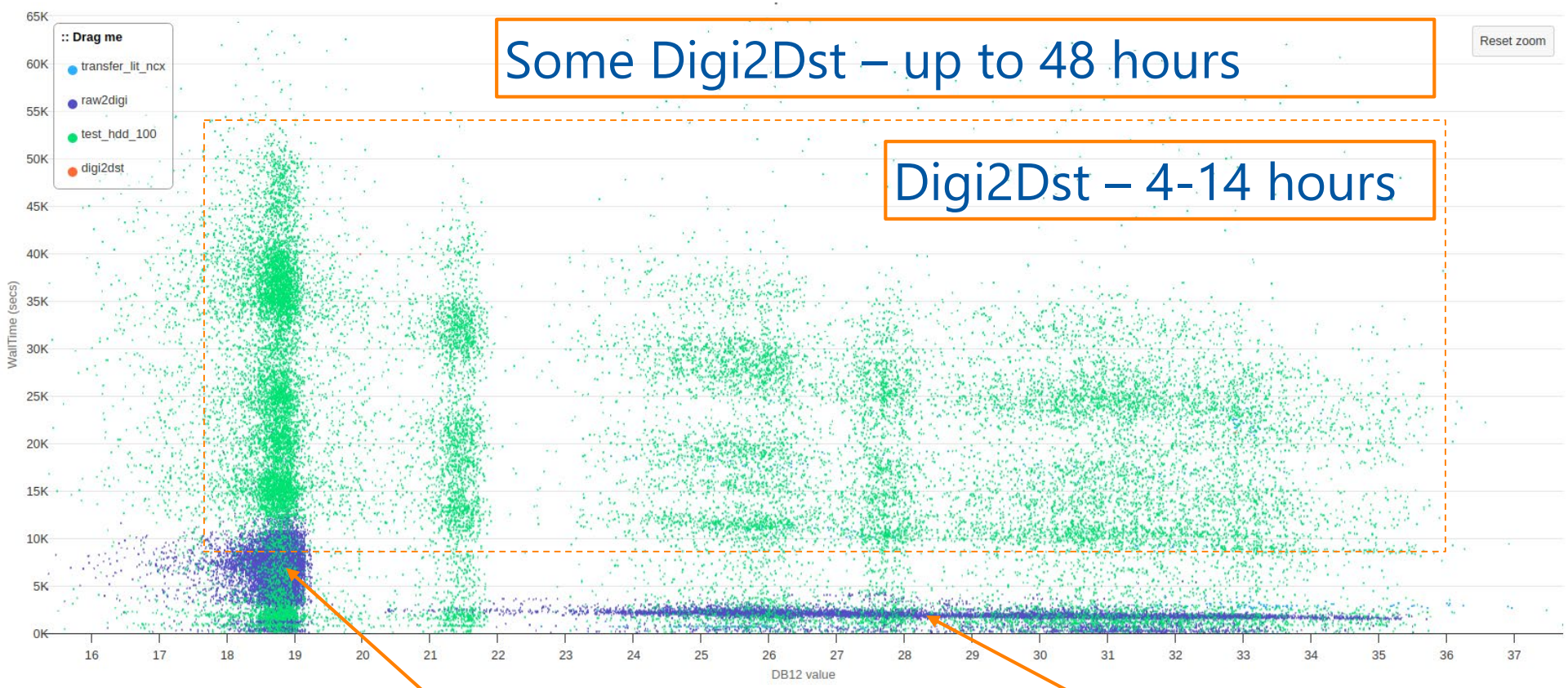


# Use of DIRAC resources




3 major productions since last meeting

# BM@N jobs duration



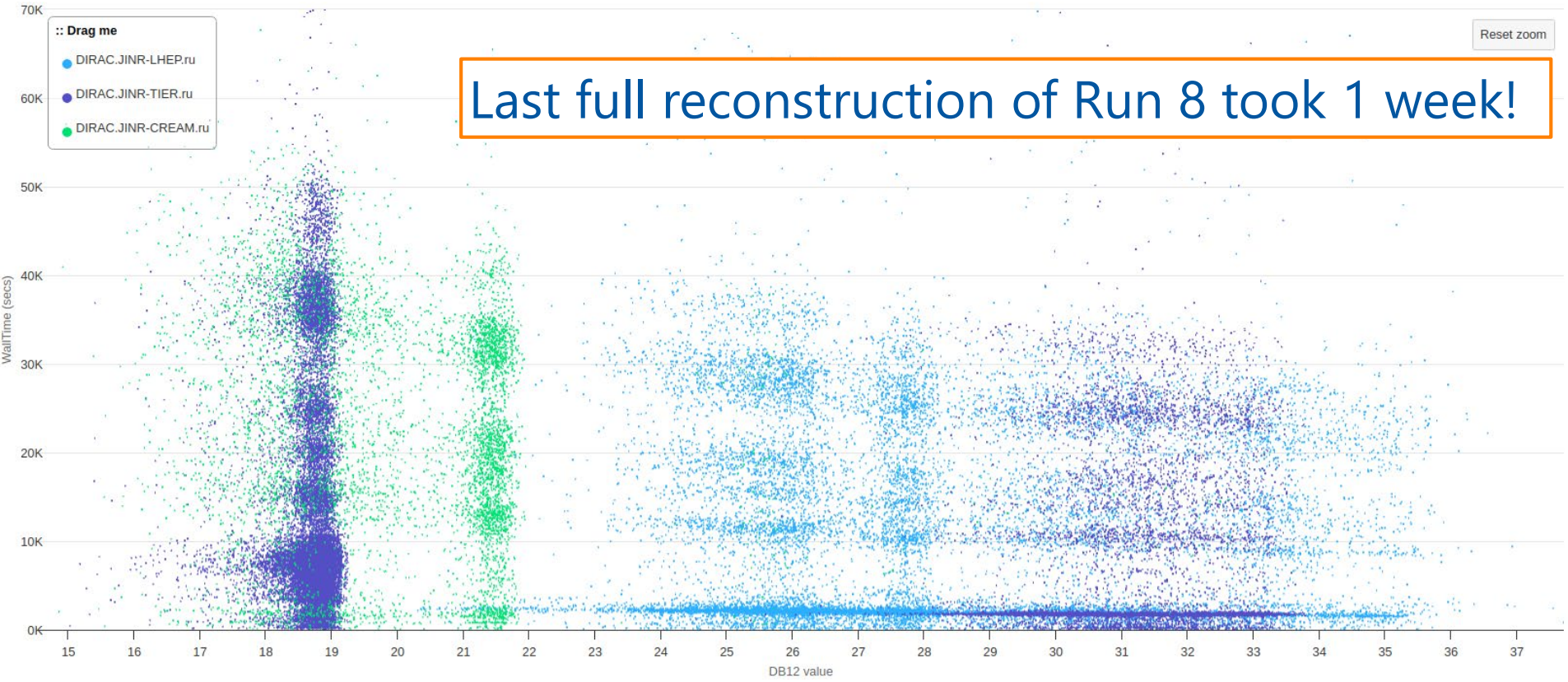

Some Digi2Dst – up to 48 hours

Digi2Dst – 4-14 hours

Raw2Digi – 2 hours

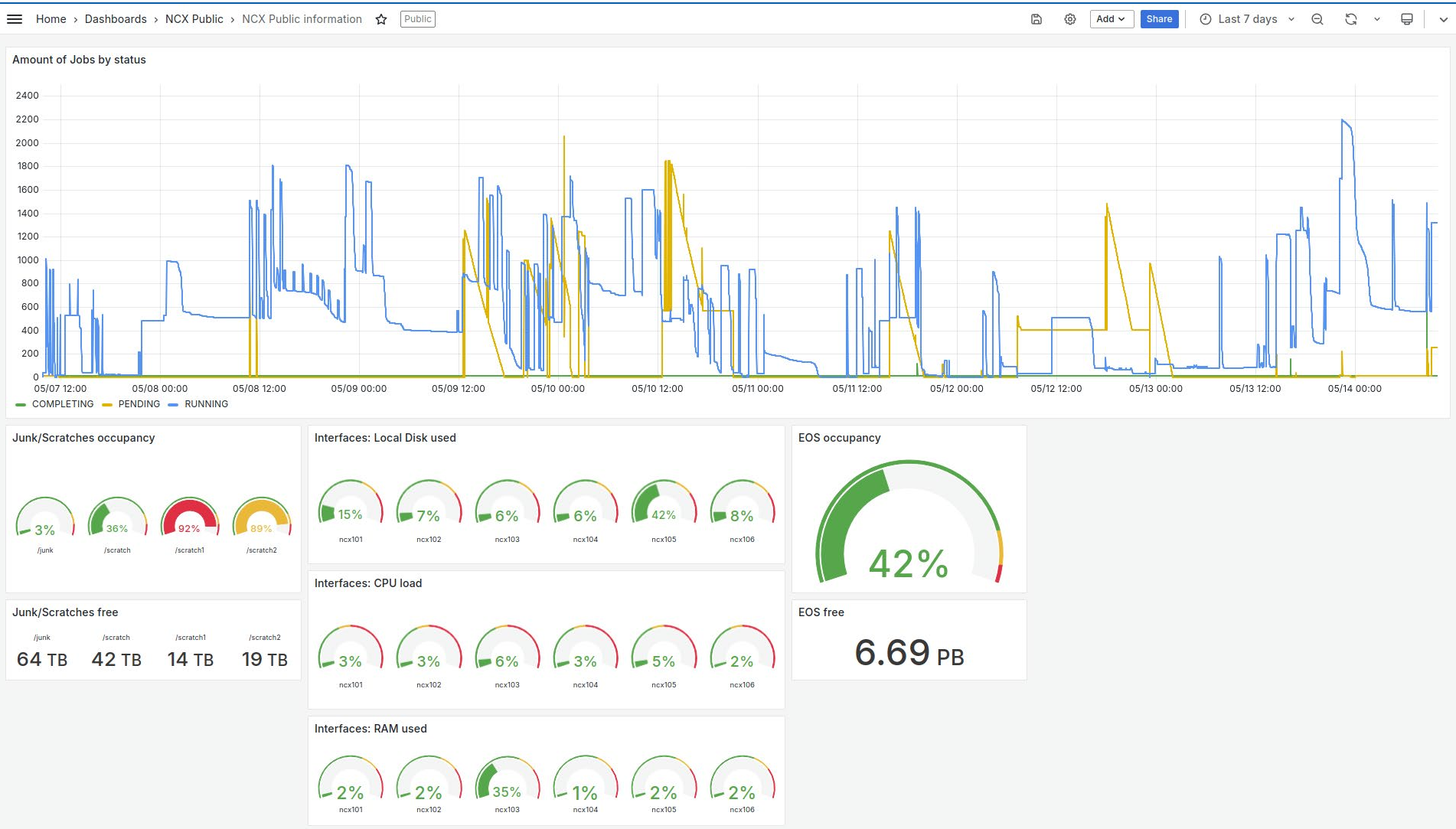
Raw2Digi – 40 min

# BM@N jobs duration




| Computing resource | Amount of cores |
|---|---|
| Tier1 (DIRAC.JINR-TIER.ru) | 1500 |
| Tier2 (DIRAC.JINR-CREAM.ru) | 1000 |
| NCX (DIRAC.JINR-LHEP.ru) | 1000 |

# NCX monitoring (with Ivan Slepov)






https://mon-service.jinr.ru/public-dashboards/8b96e1af3eff417492f97ae76dae020b?orgId=13

# DDC cluster (with Ilia Slepnev)

For more information about DAQ Data Center (DDC) see the talk from BM@N 10th Collaboration meeting: https://indico.jinr.ru/event/3531/contributions/20556/

In short:

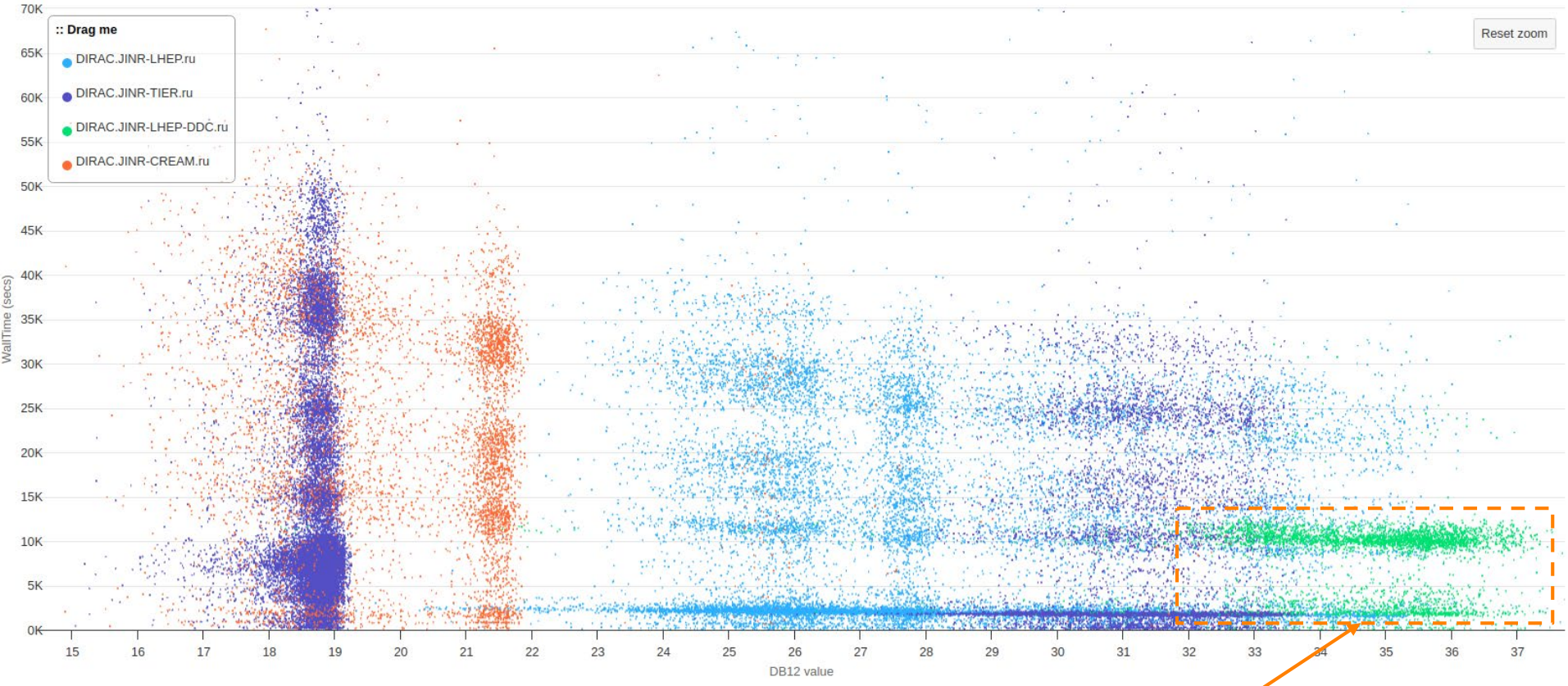
- DDC is the key computing component of BM@N DAQ
- It is possible to use it for offline computing when we do not collect data
- There are around 1000 powerful CPU cores accessible.
- Virtualization is used.
- SSD and HDD network storages attached to each virtual server.
- CVMFS – available.
- Network connection to EOS in MLIT and NCX is available.
- Network connection to DIRAC services – available.

# DDC cluster (with Ilia Slepnev)

The main idea is to use DDC cluster as a computing resources for Digi2Dst jobs.
Integration procedure:

- ☑ Integration with DIRAC
- ☑ Test Digi2Dst job execution
- ☑ 100 cores performance test (SSD/HDD)
- ☑ 500 cores performance test (SSD/HDD)
- ☑ 1000 cores performance test (SSD/HDD)
- ☒ Network throughput test
- ☒ Real usage for BM@N productions

# DDC cluster (with Ilia Slepnev)




Digi2Dst on DDC

# List of participants

**DIRAC:** Igor Pelevanyk
**BM@N:** Konstantin Gertsenberger

**Responsible for resources:**
**Tier-1,Tier-2, EOS:** Valery Mitsyn
**CTA Tape library:** Vladimir Trofimov
**Govorun:** Dmitry Podgainy, Dmitry Belyakov, Aleksandr Kokorev, Maxim Zuev
**NICA cluster:** Ivan Slepov
**DDC cluster:** Ilia Slepnev
**Network:** Andrey Dolbilov

# Results

- EOS is great again!
- But it is nice to have BM@N Run8 backup on CTA Tapes

- Duration of BM@N jobs somehow stabilized. Anticipated duration of full Run8 reconstruction is around 1 week (not counting transfer to NCX). **If the infrastructure is free.**

- NCX cluster is a powerful resource!
  Sorry for occupying it by DIRAC (no more than 1000 cores). But in exchange the monitoring was developed and presented.

- DDC is the next big resource which can potentially increase amount of available resources from 3500 to 4500 (28% growth).


JINR
MLiT