JINR SPD EOS deployment status

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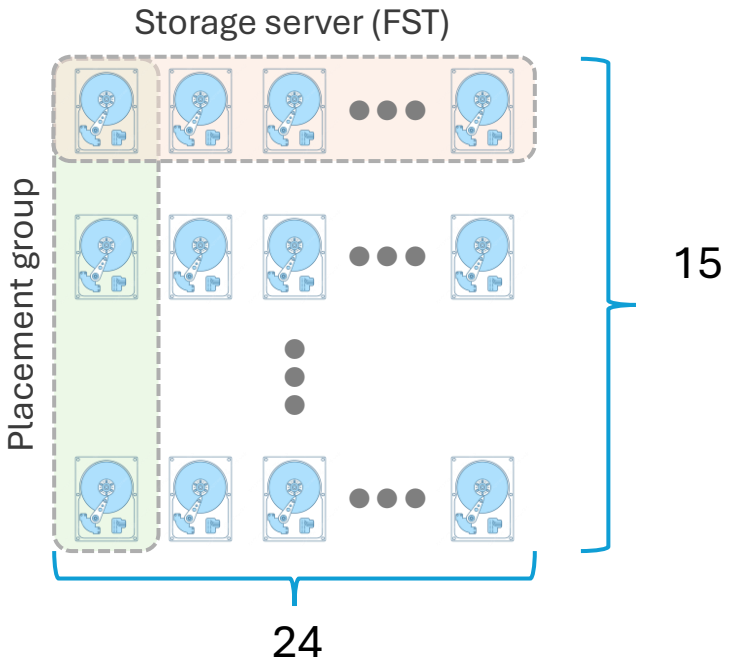
Background

- There were some technical and operational issues with central EOS instance *eos.jinr.ru* at the end of 2024
  - Caused an exodus to dCache instance to save data and performance
  - After discussion with the MLIT Director it was decided to deploy a dedicated storage for SPD at MLIT
  - Equipment was secured around mid-February 2025

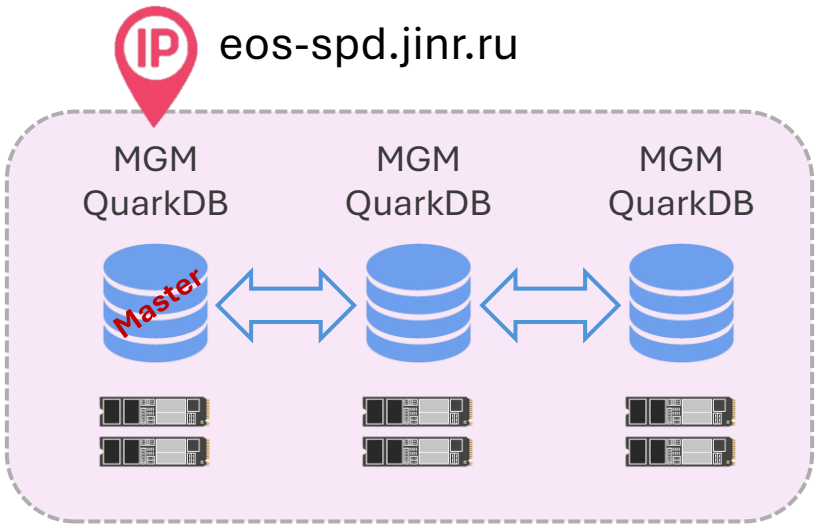
Hardware

- 18 servers
  - 3 head (metadata) nodes with quad 1.5TB NVMe drives
  - 15 disk nodes with 24 SAS drives of 20TB
- 7.2 PB raw capacity
- 100Gbps network interfaces
- 512 GB RAM per server
- 64/48-core Intel Xeon CPUs

EOS deployment



7.2 PB of raw disk storage
24 placement groups
15 stripes per group
11+4 QRAIN layout (27% overhead)
5.3 PB of usable space



HA MGM/QuarkDB on 3 nodes
1.5 TB of namespace
Floating IP alias follows master

Deployment details

- EOS configuration is scripted with clustershell
  - Node configuration only takes about a minute
  - No differences between nodes because of human errors, typos, etc.
  - Configuration is reproducible, including access keys
- No JINR-specific dependencies except for Kerberos/LDAP
  - Only affects user access with krb5 auth scheme
  - No dependency on AFS, CVMFS, etc.
- Plans to migrate configuration to Puppet
  - “Official” EOS Puppet templates are dated and do not seem to be maintained

Access protocols

- xrootd for direct access
  - No TPC with delegated credentials (X.509)
- https (davs) for third-party copy
  - Used by FTS for replication between instances

- Access with IAM-issued X.509 VOMS proxy certificate
  - Transition to IAM Tokens in the future (not yet implemented)
- JINR Kerberos realm
  - You must be in *spd* or *spd-prod* groups

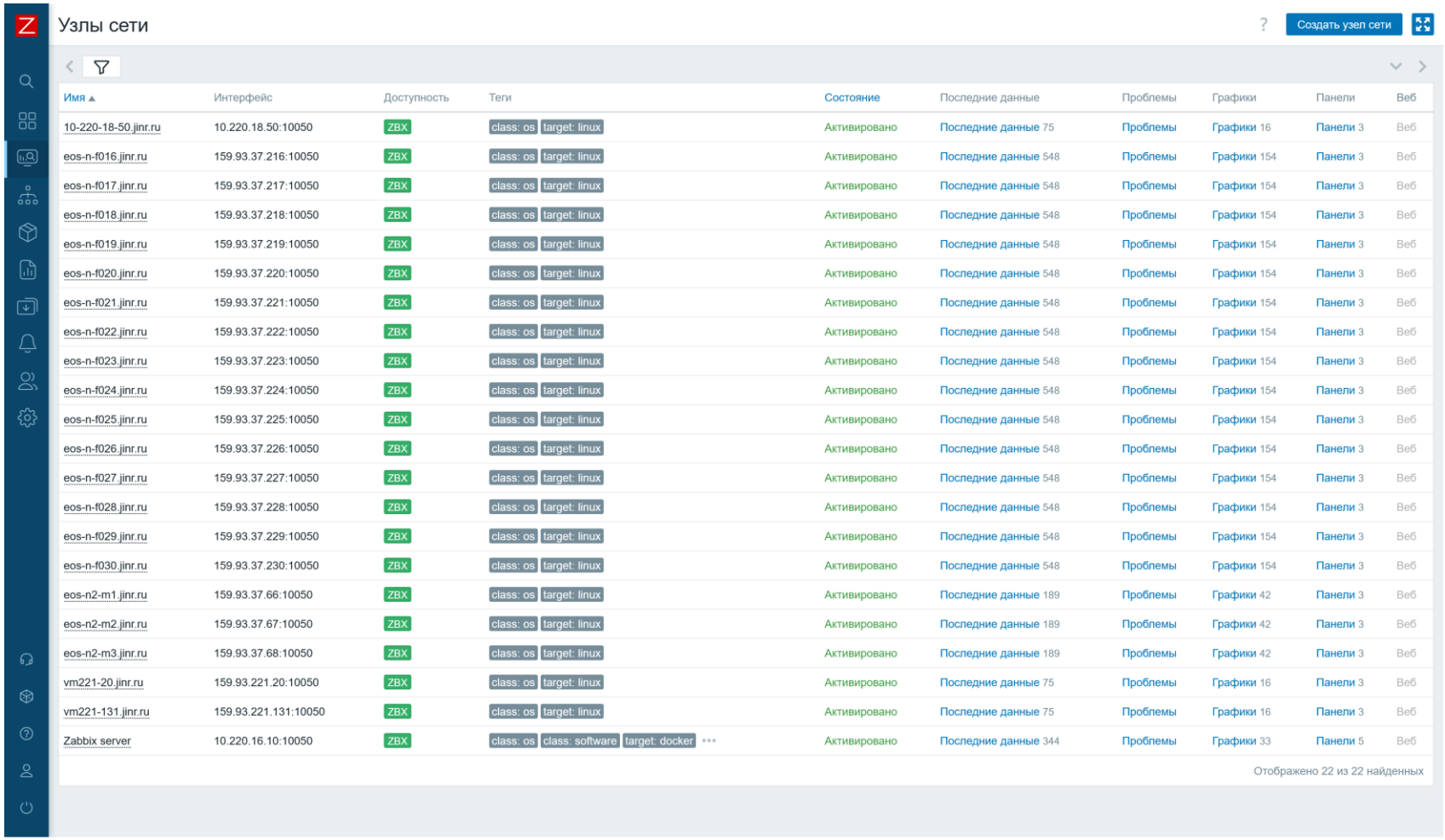
Data placement

- /rucio/production/ - Rucio-managed Production System data
- /rucio/users/ - Rucio-managed user data

- /scratch/users/ - Local users scratch area
- /scratch/shared/ - Shared scratch area

- Rucio-managed data is expected to occupy 90% of the volume with 10% available to the scratch area

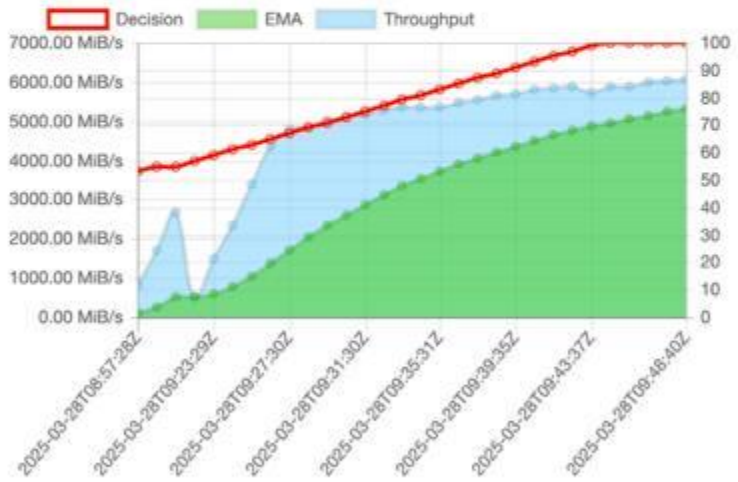
Monitoring with Zabbix

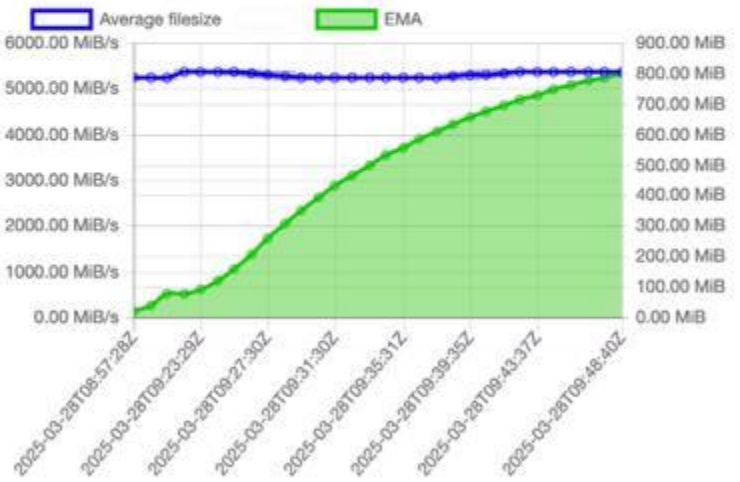


Replication tests (1)

Details for https://juno-se-dr01.jinr.ru → https://eos-spd.jinr.ru

Storage	Current active transfers	Max. active transfers
https://juno-se-dr01.jinr.ru	0	200
https://eos-spd.jinr.ru	0	200





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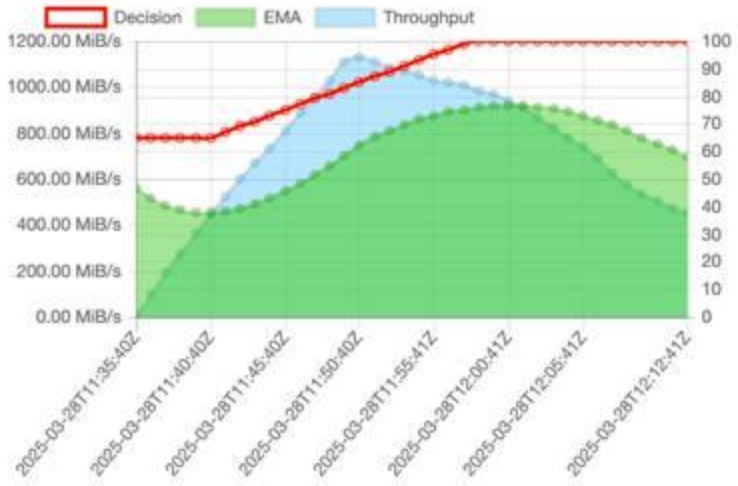
Replication tests (2)

Details for https://mss3.pnpi.nw.ru → https://eos-spd.jinr.ru

Storage	Current active transfers	Max. active transfers
https://mss3.pnpi.nw.ru	100	200
https://eos-spd.jinr.ru	100	200



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Thank you!