SPD Production System Status

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IX SPD Collaboration Meeting
Yerevan, Armenia
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Progress since the previous collaboration meeting

- All our services now running with certificates issued by JINR certification authority

- We've moved all internal interactions like voms-proxy-init from VOMS to IAM and, thus, has finished transition from VOMS to IAM

- Users now can submit their tasks to PanDA using JWT authentication

- Production manager control panel was put into pre-production, there were many productions have been processed during last several months

- Infrastructure monitoring was deployed

- A dedicated EOS instance for the SPD was deployed, details in the talk by Andrey Kiryanov

JINR Certification Authority

- Address: ca.jinr.ru

- Finally in production, thanks to the LIT network operation service

- JINR CA is online CA, certificates are issued immediately, which allowed us to optimize our operations a lot

- Any user with JINR SSO account can request user certificate

- LIT CICC computing and storage resources were configured to support JINR CA certificates

- YUM repo with the rpm was prepared to ease installation process

- Can be used as a JINR-centric certification authority for all JINR hosted experiments

ⓘ Петросян Артем Шмавонович - Petrosyan Artem Shmavonovich

Мои действительные Host сертификаты: 14

Серийный номер	Имя сертификата
33528083866260844099513	CN=cric.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU
330556999940689005096270	CN=vm221-125.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU
325831556579249782268863	CN=vm221-128.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU
321119164890131102487796	CN=spd-iam.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU
382510806361247941477048	CN=10-220-18-146.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU
368331973398402739946155	CN=spd-rucio.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU
476943422706006476611360	CN=vm221-122.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU
491123808586845481041803	CN=spd-fts.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU
524181107038056702859853	CN=spd.ssau.ru,OU=hosts,OU=GRID,O=JINR,C=RU
604447717501248574804455	CN=10-220-18-77.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU
609173767607013757762429	CN=cric-dev.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU
628062448815069815103336	CN=10-220-16-10.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU
632795307202027113861823	CN=spd-cric.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU
637506996081636867403667	CN=vm221-126.jinr.ru,OU=hosts,OU=GRID,O=JINR,C=RU

Identity and Access Management
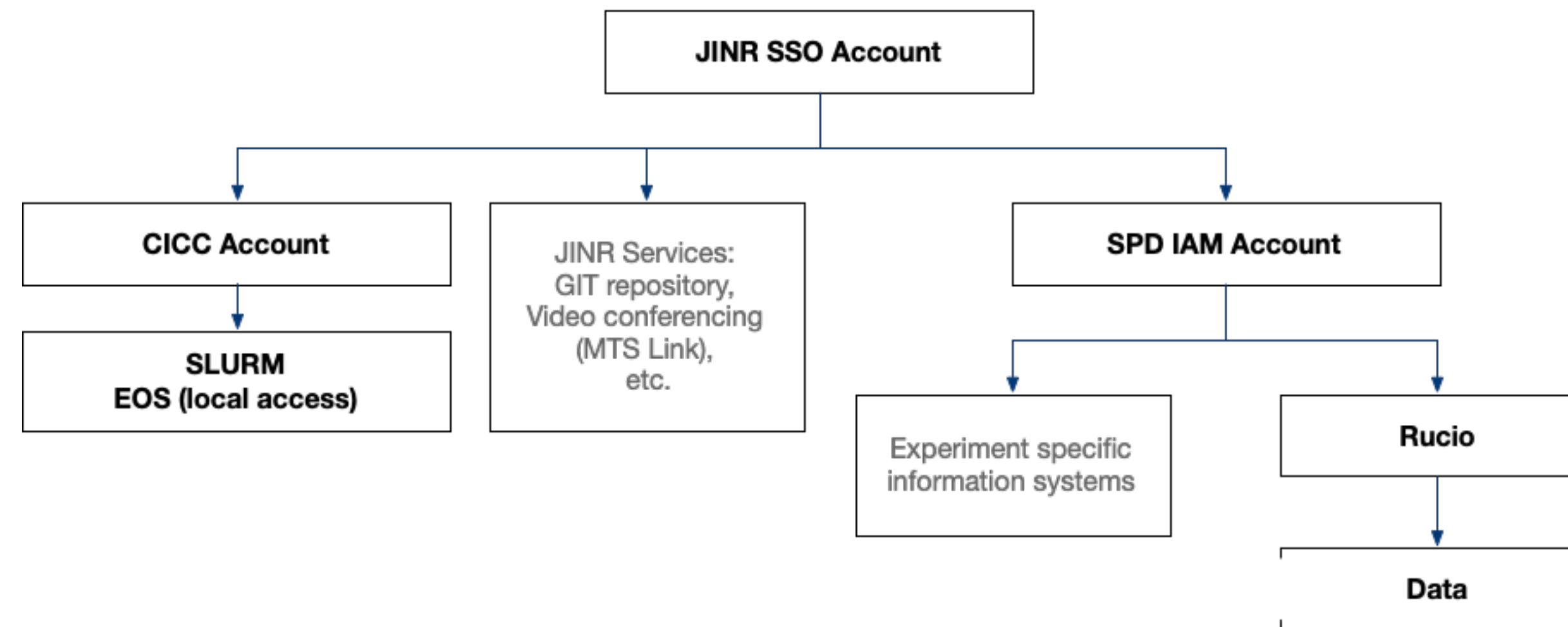
- Address: spd-iam.jinr.ru

- We moved all internal operations between middleware services based on X.509 proxy from the VOMS service to the SPD IAM service

- lxui.jinr.ru, CICC computing and storage resources were configured to work with the SPD IAM as VOMS provider

- A rpm which helps adding IAM VOMS configuration to any computing site was prepared

- An integration between SSO and IAM is now finished, users can log in to IAM (and all underlying services) using JINR SSO account (use JINR Keycloak button at the SPD IAM login page)

- Now we can say that we have finally finished transition from VOMS to IAM and we have one entry point for all our computing services — the SPD IAM
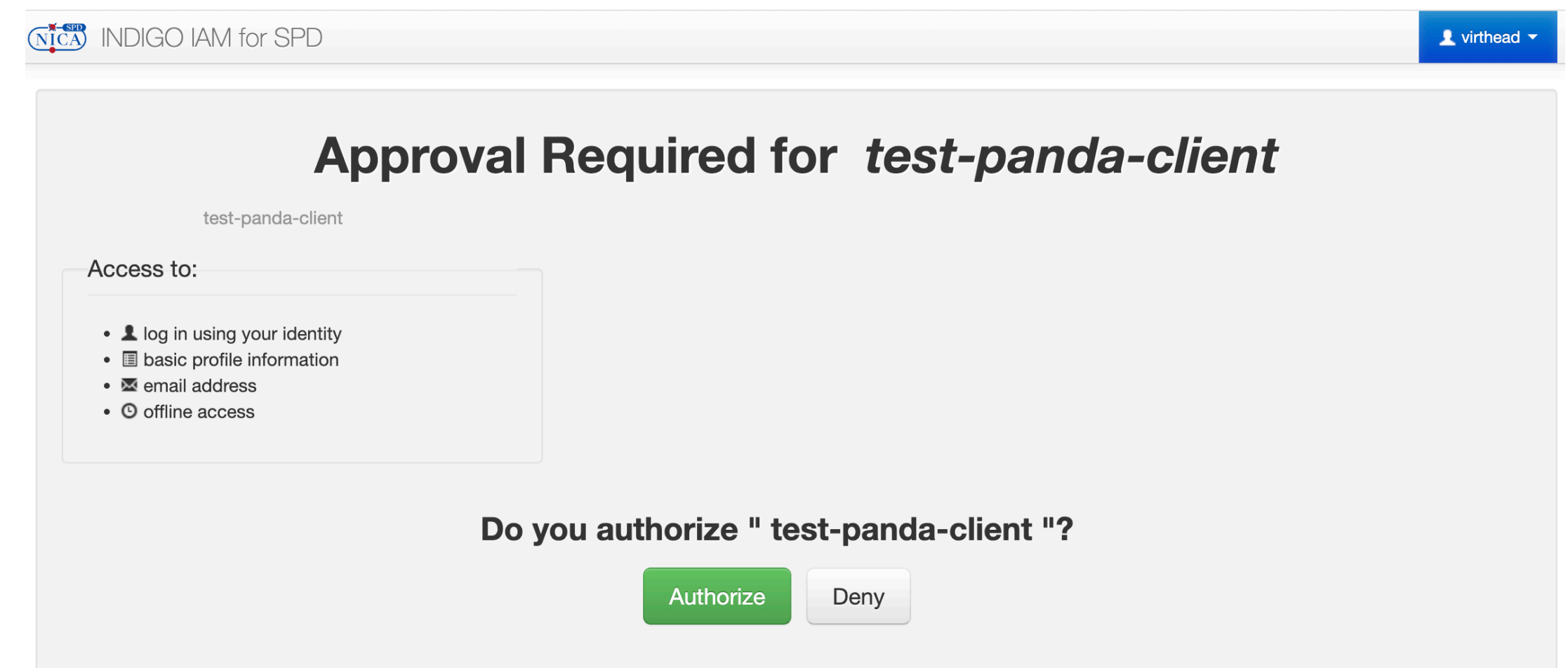
PanDA JWT Integration

- We finished configuring a JWT based authentication in PanDA

- Users can submit tasks via command line client or (preferable) via the Control Panel

- During task submission, in order to identify themselves, users being redirected to the SPD IAM

- The same identity is now used to log in to the Control Panel and to submit a task, it allows us to set up an end-to-end accounting

- PanDA supports auto-registration, so, unlike Rucio, there is no need to develop any identity import service

```
(test) [virthead@vm221-128 task]$ export PANDA_URL=http://vm221-128.jinr.ru:25080/server/panda
(test) [virthead@vm221-128 task]$ export PANDA_URL_SSL=https://vm221-128.jinr.ru:25443/server/panda
(test) [virthead@vm221-128 task]$ export PANDA_CONFIG_ROOT=/home/virthead/pandaclient
(test) [virthead@vm221-128 task]$ export PANDA_USE_NATIVE_HTTPLIB=1
(test) [virthead@vm221-128 task]$ export PANDA_AUTH=oidc
(test) [virthead@vm221-128 task]$ export PANDA_VERIFY_HOST=off
(test) [virthead@vm221-128 task]$ export SSL_CERT_DIR=/etc/grid-security/certificates/
(test) [virthead@vm221-128 task]$ export PANDA_AUTH_VO=spd.nica.jinr:production
(test) [virthead@vm221-128 task]$ python testOpenCharm_simu.py
INFO : Please go to https://spd-iam.jinr.ru/device?user_code=Y1XBDB and sign in. Waiting until authentication is completed
INFO : Ready to get ID token?
[y/n]
y
INFO : All set
(0, [True, 330, None])
```


INDIGO IAM for SPD   👤 virthead ▾

Approval Required for *test-panda-client*

test-panda-client

Access to:
- 👤 log in using your identity
- 🗐 basic profile information
- ✉ email address
- ⏲ offline access

Do you authorize " test-panda-client "?

[Authorize] [Deny]

	jeditaskid [PK] bigint	taskname character varying (256)	status character varying (64)	username character varying (128)
266	346	PROD2025-009.SIM.1	done	Elena Zemlyanichkina
267	347	PROD2025-009.RECO.1	finished	Elena Zemlyanichkina
268	348	MC2025_S1-003-SIM.1	aborted	Artem Petrosyan
269	349	MC2025_S1-003-SIM.1	aborted	Artem Petrosyan
270	350	MC2025_S1-003-SIM.1	aborted	Artem Petrosyan
271	351	MC2025_S1-003-SIM.3	aborted	Artem Petrosyan
272	352	MC2025_S1-003-SIM.3	failed	Artem Petrosyan
273	353	MC2025_S1-003-SIM.4	done	Artem Petrosyan
274	354	PROD2025-010.SIM	done	Elena Zemlyanichkina
275	355	PROD2025-010.RECO	finished	Elena Zemlyanichkina

Productions Requests Spreadsheet

| Production name/ID | Status | Description | | | | | Software type/version | Short description (for datasets naming) | Number of events | Events per file | Initial seed | Processing type |
		Stage	Collision type	Geometry type	Energy	Polarization						
PROD2025-010	Done ▼	S1	dd	Micromegas, TS, ECal, RS, BBC, ZDC (sketch)	4 GeV	UU	spdroot-dev-4.1.7.1	dd-minbias-FTF-spdroot4171-dev	5 000 000	4000	1-1250	reco
PROD2025-011	Done ▼	S2	pp	DSSD, TS, TOF, ECal, FARICH, RS, BBC, ZDC (sketch)	27 GeV	UU	spdroot-dev-4.1.7.2	minbias-P8-spdroot4172-dev test	5 000 000	4000	1-1250	simu / reco
PROD2025-012	Done ▼	S2	pp	DSSD, TS, TOF, ECal, FARICH, RS, BBC, ZDC (sketch)	27 GeV	UU	spdroot-dev-4.1.7.2	minbias-P8-spdroot4172-dev test	40 000 000	4000	1-10000	simu / reco
PROD2025-013	Done ▼	S2	pp	DSSD, TS, TOF, ECal, FARICH, RS, BBC, ZDC (sketch)	27 GeV	UU	spdroot-dev-4.1.7.2	minbias-P8-spdroot4172-dev test	40 000 000	4000	10001-20000	simu / reco
PROD2025-014	Runnig ▼	S2	pp	DSSD, TS, TOF, ECal, FARICH, RS, BBC, ZDC (sketch)	27 GeV	UU	spdroot-dev-4.1.7.2	minbias-P8-spdroot4172-dev test	40 000 000	4000	20001-30000	simu / reco
PROD2025-015	Ready ▼	S2	pp	DSSD, TS, TOF, ECal, FARICH, RS, BBC, ZDC (sketch)	27 GeV	UU	spdroot-dev-4.1.7.2	minbias-P8-spdroot4172-dev test	40 000 000	4000	30001-40000	simu / reco
PROD2025-016	Ready ▼	S2	pp	DSSD, TS, TOF, ECal, FARICH, RS, BBC, ZDC (sketch)	27 GeV	UU	spdroot-dev-4.1.7.2	minbias-P8-spdroot4172-dev test	40 000 000	4000	40001-50000	simu / reco

- We've agreed to keep all production requests in the Google doc spreadsheet

Control Panel of the Production Manager

Task ID	Task name ↑ ↓	Status	Start date	End date	Walltime	Total events	Events per job	Total jobs	Out DS size, GB	Out Log size, GB
364	PROD2025-014.SIM	done	03 May 2025	04 May 2025	24612	40000000	4000	10000	18358.86	1.96
363	PROD2025-013.RECO	finished	02 May 2025	04 May 2025	20	None	None	9992	18536.20	5.06
362	PROD2025-013.SIM.2	done	30 Apr 2025	02 May 2025	24899	40000000	4000	10000	18357.95	1.93
359	PROD2025-012.RECO	finished	28 Apr 2025	29 Apr 2025	24	None	None	9993	18546.74	5.08
358	PROD2025-012.SIM	done	25 Apr 2025	26 Apr 2025	23316	40000000	4000	10000	18360.80	1.89
357	PROD2025-011.RECO	done	23 Apr 2025	24 Apr 2025	10	None	None	1250	2319.57	0.63
356	PROD2025-011.SIM	done	22 Apr 2025	23 Apr 2025	22496	5000000	4000	1250	2295.55	0.24
355	PROD2025-010.RECO	finished	18 Apr 2025	18 Apr 2025	37	None	None	1244	287.74	0.49
354	PROD2025-010.SIM	done	17 Apr 2025	17 Apr 2025	0	5000000	4000	1250	259.39	0.13
353	MC2025_S1-003-SIM.4	done	17 Apr 2025	17 Apr 2025	0	1000	100	10	0.21	0.00

- An application allowing users to easily define a MC chain processing via Web UI has been put into pre-production

- During several last months a couple dozens of productions were processed basing on requests done by our production manager, Elena Zemlyanichkina

- More about this application in the talk by Nikita Monakov

Infrastructure Monitoring
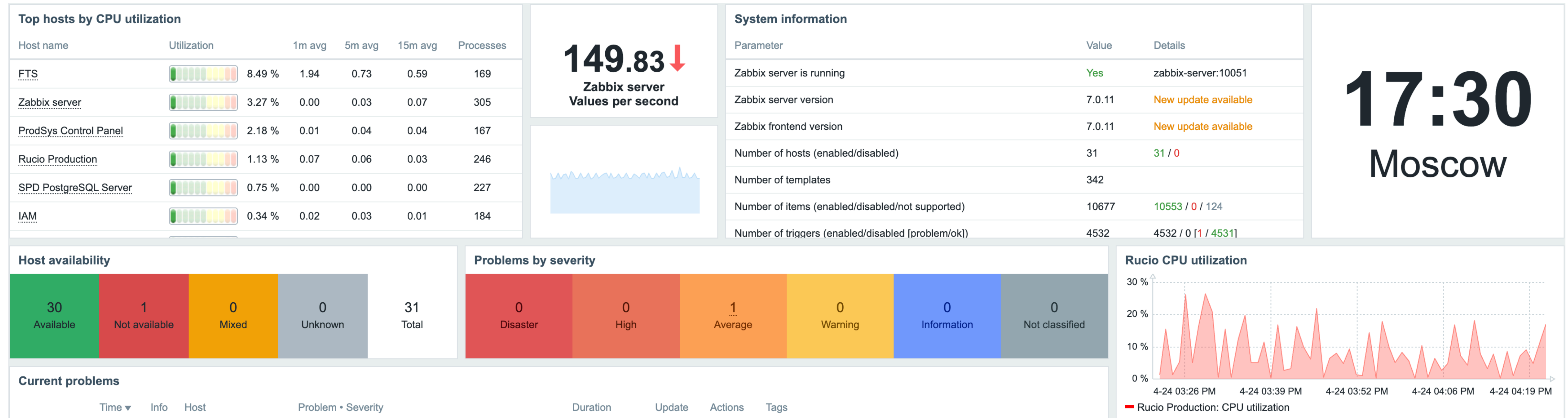
- We deployed instance of Zabbix in order to enable monitoring of our growing infrastructure

- At the moment it is very basic setup but we expect to have an integrated monitoring with panels from service-specific metrics, not only OS metrics like CPU utilization, etc.

Services and Infrastructure Overview 1/3

- IAM

  - 1 VM, production

- FTS

  - 1 VM, production

  - Recently upgraded from CentOS 7 to AlmaLinux 9

- CRIC

  - 3 VMs: current production, development and future production

  - New version is deployed at the AlmaLinux 9 machine

  - Now the future production instance is being filled up with the data, once it's done we'll migrate and remove the old production instance

  - More in the talk by Alexey Anisenkov

Top hosts by CPU utilization

Host name	Utilization		1m avg	5m avg	15m avg	Processes
FTS		86.17 %	23.81	21.92	20.71	191
Zabbix server		9.43 %	1.00	0.76	0.65	309
SPD PostgreSQL Server		8.81 %	0.35	0.34	0.37	228
Rucio Production		7.96 %	0.27	0.36	0.42	227
ProdSys Management Panel		2.06 %	0.11	0.08	0.03	165
IAM		0.38 %	0.00	0.00	0.00	182

Services and Infrastructure Overview 2/3

- Rucio

  - 3 VMs: development, integration and production

  - More in the talk by Alexey Konak

- Harvester

  - 2 VMs: production on CentOS 7 and future production at AlmaLinux 9

  - Migration is ongoing, once done the old one will be removed

- PanDA

  - 1 VM: production on CentOS 7

  - Given the constant load on the existing instance, it becomes impossible to make any changes on it, and we'll need to deploy an additional one for development

Services and Infrastructure Overview 3/3

- PanDA Monitoring

  - 1 VM, development, once we come to some production-looking stage, the second VM will be deployed for the production

- Control panel of the production manager

  - 1 VM, pre-prod

  - The same situation as with PanDA server — the service is used by the production manager, so we plan to deploy one more instance at another machine and leave the current one for development purposes only

- PostgreSQL

  - 1 VM, production

- Zabbix

  - 1 VM, production

Plans

- Finish data replication between eos.jinr.ru and spd-eos.jinr.ru and start using the second one as primary storage

- Finish ongoing migrations: CRIC, Harvester

- Given the fact (we did not expect such high level of interest) that we can not change PanDA server and ProdSys panel because they are intensively used by the production manager, we plan to deploy development instances of PanDA server and ProdSys panel, this will allow us to unlock development of these components and concentrate on bringing back jobs submissions to the remote computing resources

- Upgrade PanDA server to the latest suitable version and deploy it at AlmaLinux 9

- We're looking for a summer student for R&D in order to work out X.509 to JWT migration in the interactions between middleware services

- Concentrate on monitoring of the

  - Processing

  - Infrastructure

Manpower

- IAM — Alexander Baranov, Artem Petrosyan, MLIT JINR

- CRIC — Alexey Anisenkov, Novosibirsk State University

- Rucio — Alexey Konak, MLIT JINR

- PanDA — Artem Petrosyan, MLIT JINR

- PanDA Monitoring — Fjodor Shuvalov, Saint Petersburg State University

- ProdSys Control Panel — Nikita Monakov, Moscow Engineering Physics Institute/MLIT JINR

- FTS — Artem Petrosyan, MLIT JINR

- Infrastructure Monitoring — Alexander Kubrakov, Dubna University

- EOS instance — Andrey Kiryanov, Petersburg Nuclear Physics Institute

- JINR CA, Keycloak — JINR Network Operation Service: Andrey Dolbilov, Vladimir Fariseev, Anton Balandin, MLIT JINR

- MLIT CICC services — Valery Mitsyn, MLIT JINR

Thank you!