

Status of the offline computing system

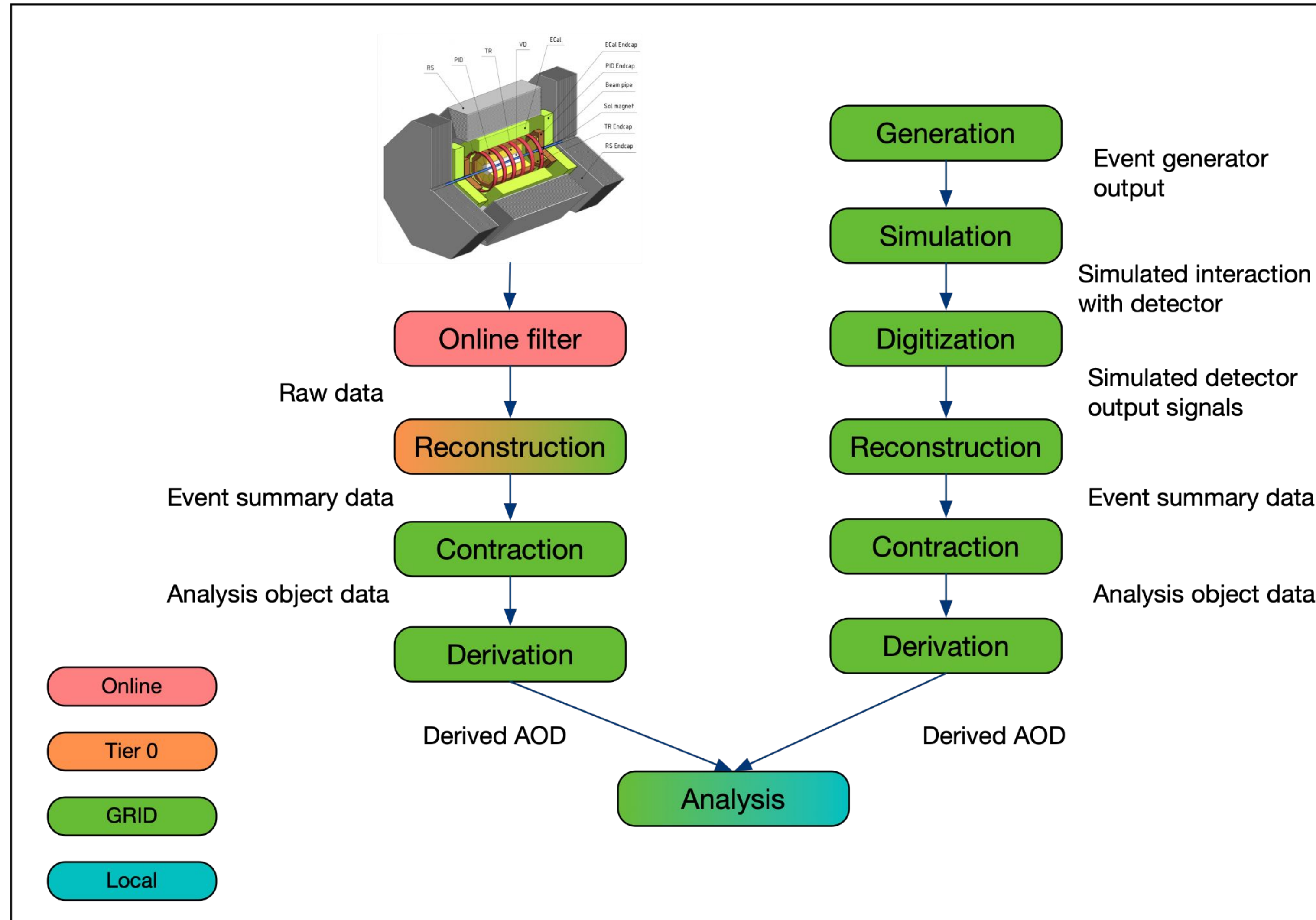
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SPD S&C Meeting
April 26, 2022

Expected data volumes

- The SPD detector during the low luminosity run will produce up to 2-4 Gb/sec of raw data, which is 10 PB of raw data per year
- The same amount of data will be generated during the Monte-Carlo simulation
- Keeping in mind all intermediate data, we can expect to get 25-30 PB of data per year

Data flow



Now available computing and storage resources at JINR

- Computing
 - Computing centre at LHEP
 - Computing centre at LIT
 - MICC
 - Govorun HPC
- Storage
 - EOS at LHEP
 - EOS at LIT
 - 2 tape storage systems at LIT

Data processing

- To process such amounts of data in the heterogeneous computing environment we have to build a highly automated data processing system, which will hide complexity of the underlying components and guarantee high processing rate
- Components of the system:
 - An orchestrator, workflow management system (WFMS) – top level system which manages all other lower ones, to define tasks, chains of tasks, data processing companies and so on
 - Information system (IS) – to define computing, storage and other resources and services and their topology and relations
 - Workload management system (WMS) – to build a central jobs queue and to hide the diversity of computing resources and to provide the expected load
 - Data management system (DMS) – to build a single namespace and hide all different types of the storage resources and to define and manage data lifecycle policies
 - File transfer system (FTS) – to organize mass data transfers

Existing services of the offline computing system

- VOMS based authorization – centrally supported by LIT
- Applied software distribution and caching service (CVMFS) – centrally supported by LIT
- Work which was done by the future magisters of the Dubna University:
 - The orchestrator: framework deployed, integrated with JINR SSO authentication system, being filled with workflows
 - The information system: deployed, integrated with JINR SSO
 - The workload management system and its components, such as client, pilots delivery service, pilot, redesign and implementation of data import service from IS to WMS, etc.: deployed, being adopted to run SPDRoot container payloads

CRIC Web UI 1/7

The screenshot displays the CRIC Web UI interface. At the top, there is a navigation bar with a home icon, a dropdown menu containing 'Core', 'Core API', 'NICA', 'NICA API', 'Admin', and 'Logs', a 'Help' icon, a user profile 'virthead', a search icon, and a power icon. The main content area features the CRIC logo (Computing Resource Information Catalog) on the left, a 'Welcome to the CRIC Web Portal' message, and a 'Resources' section with links for 'Federations', 'Resource C', 'Service list', and an ellipsis. A central dropdown menu is open, listing various features and operations. On the right, there is a 'WebUI' section with a 'list of available features' and an 'Operations' section with links for 'Create new RC site', 'Create new Federation', 'Create Service', and an ellipsis.

Core Core API NICA NICA API Admin Logs Help virthead

CRIC
Computing Resource Information Catalog

Welcome to the CRIC Web Portal

Resources

- Federations
- Resource C
- Service list
- ...

WebUI

list of available features.

Operations

- Create new RC site
- Create new Federation
- Create Service
- ...

Topology

- NICA Sites
- PanDA Sites
- PanDA Queues
- DDMEndpoints
- PanDA Queue parameters

Blacklisting

- PanDA Queue blacklisting
- PanDA Queue Status History
- PanDA Queue availability

DDMEndpoint blacklisting

DDMEndpoint Status History

Operations

- Create NICA Site
- Create new RSE
- Create new PandaQueueStatus
- Create new DDMEndpointStatus

CRIC Web UI 2/7

Home Core Core API NICA NICA API Admin Logs Help virthead

Export Filter Reload Columns 11/82 Show 100 entries Search:

NICA Site	PanDA Site	PanDA Queue	State	type	cap	rtype	Cloud	Tier	Corepower	Maxdiskio
JINR-BM@N	JINR-BMN-PS	JINR_BMN_PROD	ACTIVE	production	ucore	GRID	JINR	T0	10 10	null null
JINR-SPD	JINR-SPD-PS	JINR_SPD_DL_PROD	ACTIVE	production	ucore	GRID	JINR	T0	10 10	null null
JINR-SPD	JINR-SPD-PS	JINR_SPD_PROD	ACTIVE	production	score	GRID	JINR	T0	10 10	null null
PNPI-SPD	PNPI-SPD-PROD	PNPI_SPD_DL_PROD	ACTIVE	production	score	GRID	RU	T2	10 10	null null
PRUE-SPD	PRUE-SPD-PS	PRUE_SPD_DL_PROD	ACTIVE	production	ucore	GRID	RU	T2	10 10	null null
NICA Site	PanDA Site	PanDA Queue	State	type	cap	rtype	Cloud	Tier	Corepower	Maxdiskio

Showing 1 to 5 of 5 entries Previous 1 Next

CRIC Web UI 3/7

Home Core Core API NICA NICA API Admin Logs Help virthead

Name JINR_SPD_PROD
PanDA Site [JINR-SPD-PS](#)
Type production
Description
Corecount 1
Corepower 10.0

State

Object state ACTIVE
State comment Object was cloned from BMN_JINR_PROD via WebUI
Last modification date 2022-04-25 11:12:22.372914

Edit Clone

Associated Params

No Params associated

Add Param

Associated Queues

Search:

CE	Queue	flavour	version	qstatus	site	cputime	wclock	ETF	Ops
https://lcgce01.jinr.ru:443	tier2	ARC-CE	None	production	JINR	0	0	no	i ✎

Showing 1 to 1 of 1 entries

Manage attached Queues

CRIC Web UI 4/7

Home Core Core API NICA NICA API Admin Logs Help virthead

General Information

Flavour: ARC-CE
Endpoint: https://lccge01.jinr.ru:443
Job manager: SLURM
Type: CE
Architecture: ARC-CE
Implementation: None
Description: RR URL
Virtual Instance: False
Monitored: False
In Report: False
Site: [JINR](#)
Last Modified: 2022-02-18 17:47:36.802043

Status Information

Object state: ACTIVE
State comment: Object was created via WebUI
State Updated: 2021-11-30 16:41:43.869886
GOCDB/OIM Status: None

Edit

Queues

ID	Name	cpu time	wallclock	ETF	Status	Last Modified	State	PanDA Queues	Ops
3	tier2	0	0	no	production	Feb. 18, 2022, 5:19 p.m.	ACTIVE	JINR_BMN_PROD JINR_SPD_DL_PROD JINR_SPD_PROD	Info Edit

Showing 1 to 1 of 1 entries

Add Queue

CRIC Web UI 5/7

Home Core Core API NICA NICA API Admin Logs Help virthead

State

Object state: ACTIVE
State comment: Object was created via WebUI
Last modification date: 2022-02-17 10:03:07.657963

Edit Clone

Associated Params

Search:

Parameter	type	value	Param description	Allowed values	Ops
maxWorkers	integer	16		- any -	edit delete

Showing 1 to 1 of 1 entries

Add Param

Associated Queues

Search:

CE	Queue	flavour	version	qstatus	site	cputime	wclock	ETF	Ops
https://v012.pnpi.nw.ru:8443	nicaspd	ARC-CE	ARC6.1	production	PNPI	3600	3600	no	info edit

Showing 1 to 1 of 1 entries

Manage attached Queues

CRIC Web UI 6/7

Home Core Core API NICA NICA API Admin Logs Help virthead

Export Filter Reload Columns 13/16 + new RSE Show 100 entries Search:

RSE Name	Experiment site	StorageUnit	Tier	Type	Endpoint	State	Resource	cache	determ	volat	mkdir	Space method
BMN_DATADISK	JINR-BM@N	BMN_JINR_DATA	T0	DATADISK	users/ayachmen	ACTIVE	BMNDATADISK@JINR_EOS	✗	✓	✓	✗	storage
SPD-DATADISK	SPbSU-SPD	SPD-SPbSU-DATA	T2	DATADISK		ACTIVE	SPDDATADISK@SPbSU-EOS	✗	✓	✓	✗	storage
SPD-DL-DATADISK	JINR-SPD	SPD-JINR-DL	T0	DATADISK		ACTIVE	SPD-DLTEST-DISK@JINR_DataLake	✗	✓	✓	✗	

Showing 1 to 3 of 3 entries

Previous 1 Next

CRIC Web UI 7/7

Home Core Core API NICA NICA API Admin Logs Help virthead

GOCDB/OIM Status None

Edit Clone

Associated Service Protocols

Search:

Name	flavour	basepath	endpoint	status	door type	Capabilities	monit	Ops
JINR_EOS_xrootd	XROOTD	/eos/nica/	root://eos.jinr.ru:1094		external	delete_wan/0 read_lan/0 write_lan/0	yes	i edit

Showing 1 to 1 of 1 entries

[+ Define new Service Protocol](#)

Manage protocols for capability:

DELETE LAN DELETE WAN READ LAN READ WAN Third party copy WRITE LAN WRITE WAN

Resources

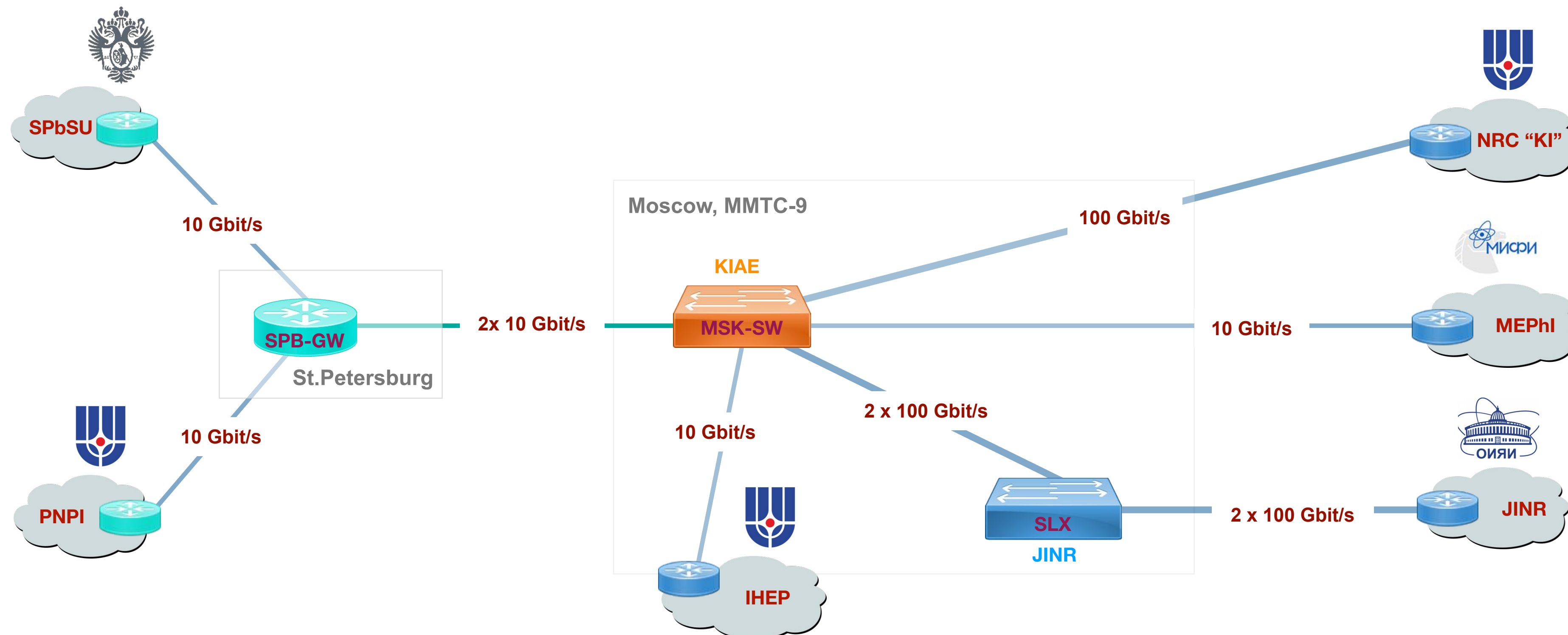
ID	Name	Basepath	Endpoint	Last Modified	State	Operations
2	BMNDATADISK		bmn/	Jan. 31, 2022, 4:07 p.m.	ACTIVE	i edit
5	SPDDATADISK		spd/	Jan. 31, 2022, 4:38 p.m.	ACTIVE	i edit

Showing 1 to 2 of 2 entries

Add resource

Russian network infrastructure for Megascience projects

JINR, PNPI, SPbSU, IHEP data centers already settle high throughput network, which is one of the keys for creation of distributed system



Status and plans

- Status
 - A full scale setup of the future data processing system is ready
 - Integration of the PNPI computing centre was done in March, the site is ready to receive payloads
 - SPDRoot container jobs are being tested at the LIT MICC, we're working with the site admins to solve minor issues with RAM allocation
- Plans
 - Run a set of jobs, i.e. implement a task
 - Run SPDRoot container payloads at PNPI
 - Data organization, transfers, processing chains definition
 - Continue of the sites integration process

Activities and manpower

- Activities
 - Support of the existing infrastructure: WFMS, IS, WMS services
 - Deployment and integration of the FTS, DMS, Monitoring services
 - Workflows development
 - Implementation of applied software support in the Pilot application
 - Work on external sites integration, especially on non standard ones, such as HPCs
- Status
 - 3 students will leave us in two months after defending their magister works
 - We have only me and Danila
 - We need more people

Thank you!