



Development of a Cloud Service for Scientific Computing on the MICC

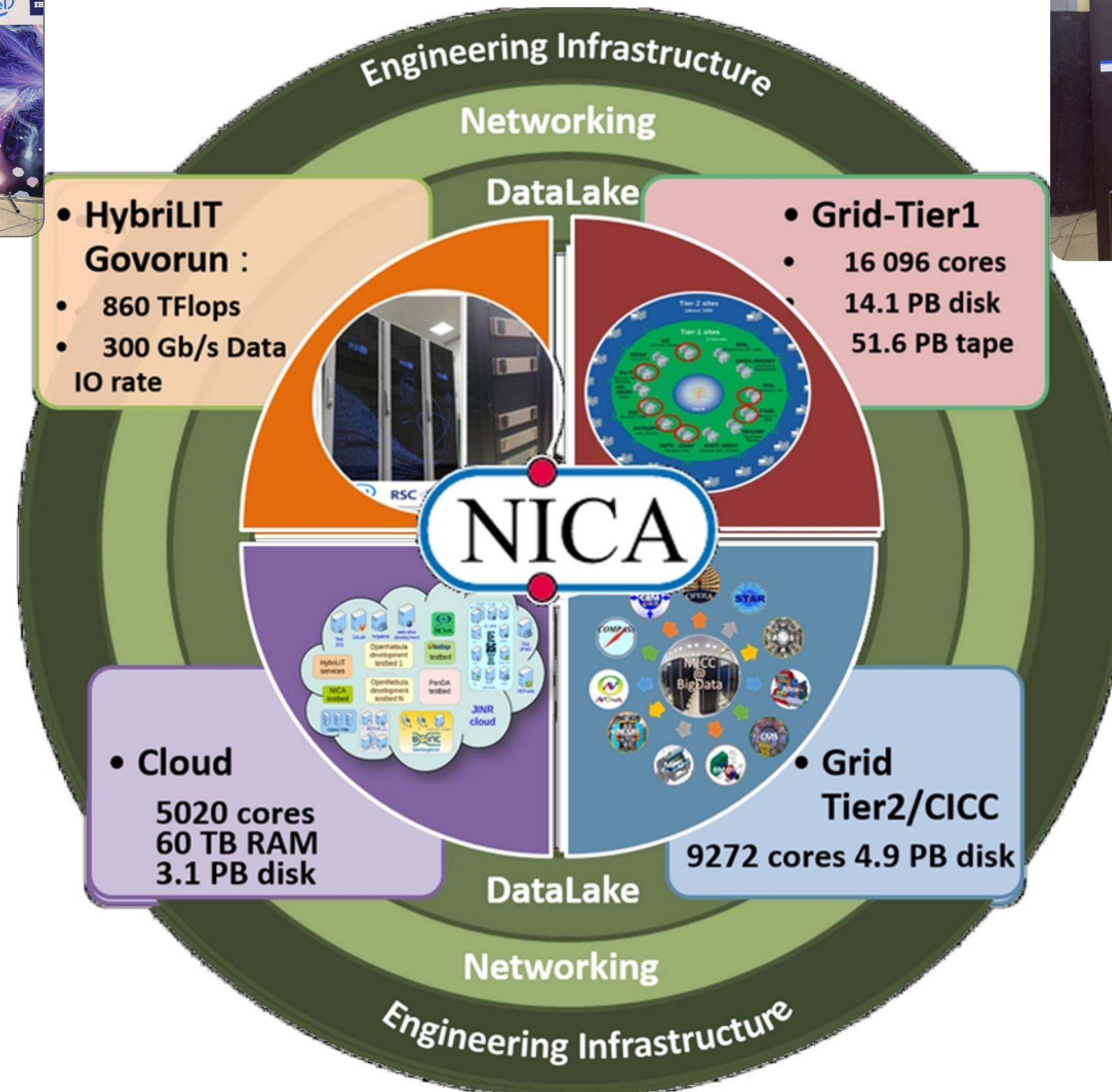
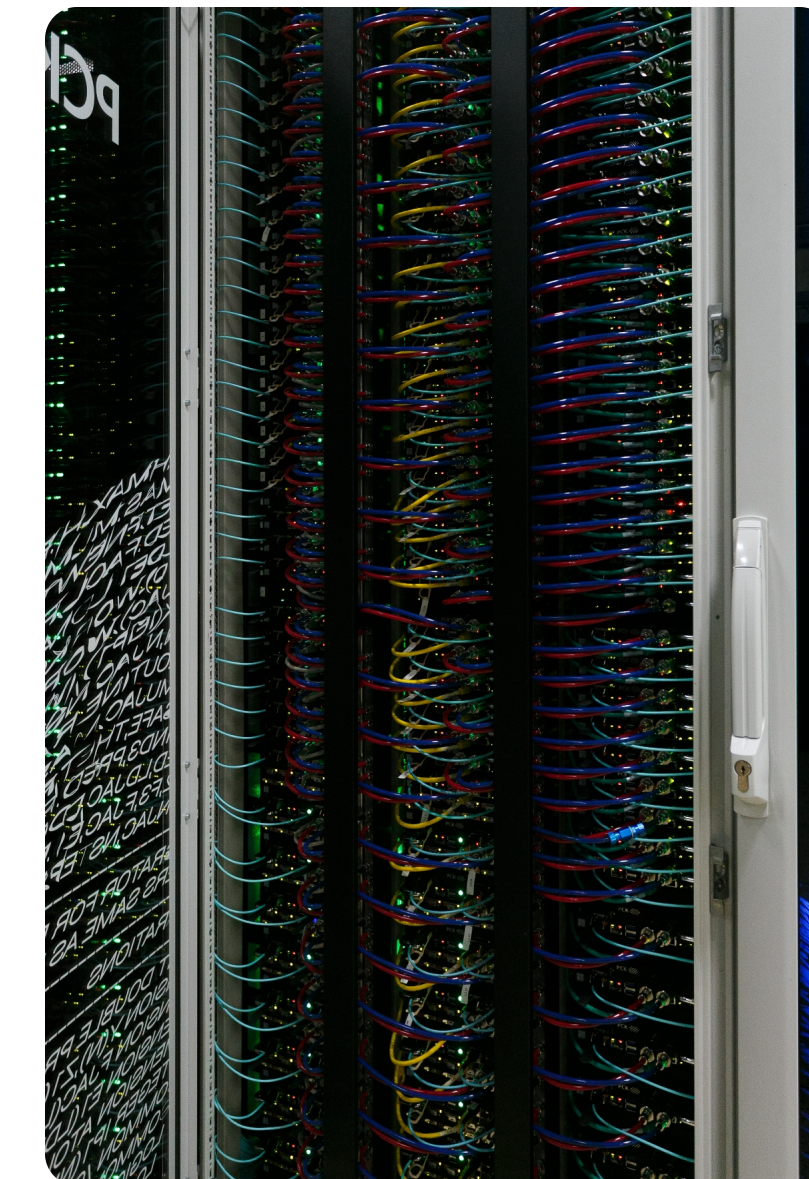
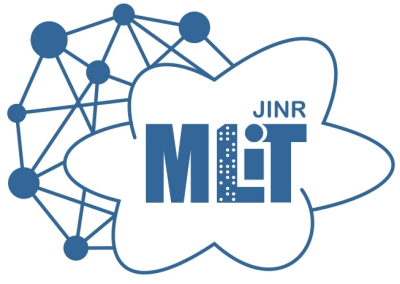


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The Multifunctional Information and Computing Complex (MICC)



- Major time-eaters when entering a typical research project
 - Learning the MICC usage
 - Setting up the software environment
- Some categories of users have time limits, e.g. summer students

The goal of the project is to give simple access to the MICC resources and software

- Provide a single entry point via web access
- Hide complexity of MICC structure
- Give administration tools for research supervisors

Benefits

- Reduce time spent on technical issues
- Prevent malicious usage of resources
- Free up time to spend on the actual research

Cloud Service for Scientific Computing on the MICC has been developed

- Currently available resources
 - JINR Cloud infrastructure
 - HybriLIT platform
- Currently available applications
 - Long Josephson junctions stack simulation
 - Superconductor-Ferromagnetic-Superconductor JJs
 - Annular Array of JJs average
 - Long Josephson junction coupled with the ferromagnetic
 - Stack of short JJ with LC shunting
 - Stack of short JJ

A screenshot of a web interface for 'CLOUD SERVICE for Scientific Computing'. The title is centered at the top. Below it are two blue buttons: 'Sign in via JINR Single Sign-On' and 'Demo'. At the bottom, there is a line of text: 'This work is supported by the Russian Science Foundation under grant #18-71-10095'.

CLOUD SERVICE
for Scientific Computing

Sign in via JINR Single Sign-On

Demo

This work is supported by the Russian Science Foundation under grant #18-71-10095

Main Service Components

1. JINR SSO as the authentication system

2. Web-portal

- Fixed number of applications available
- Common compute resource parameters
- Simple Data Visualization

3. Meta-scheduler

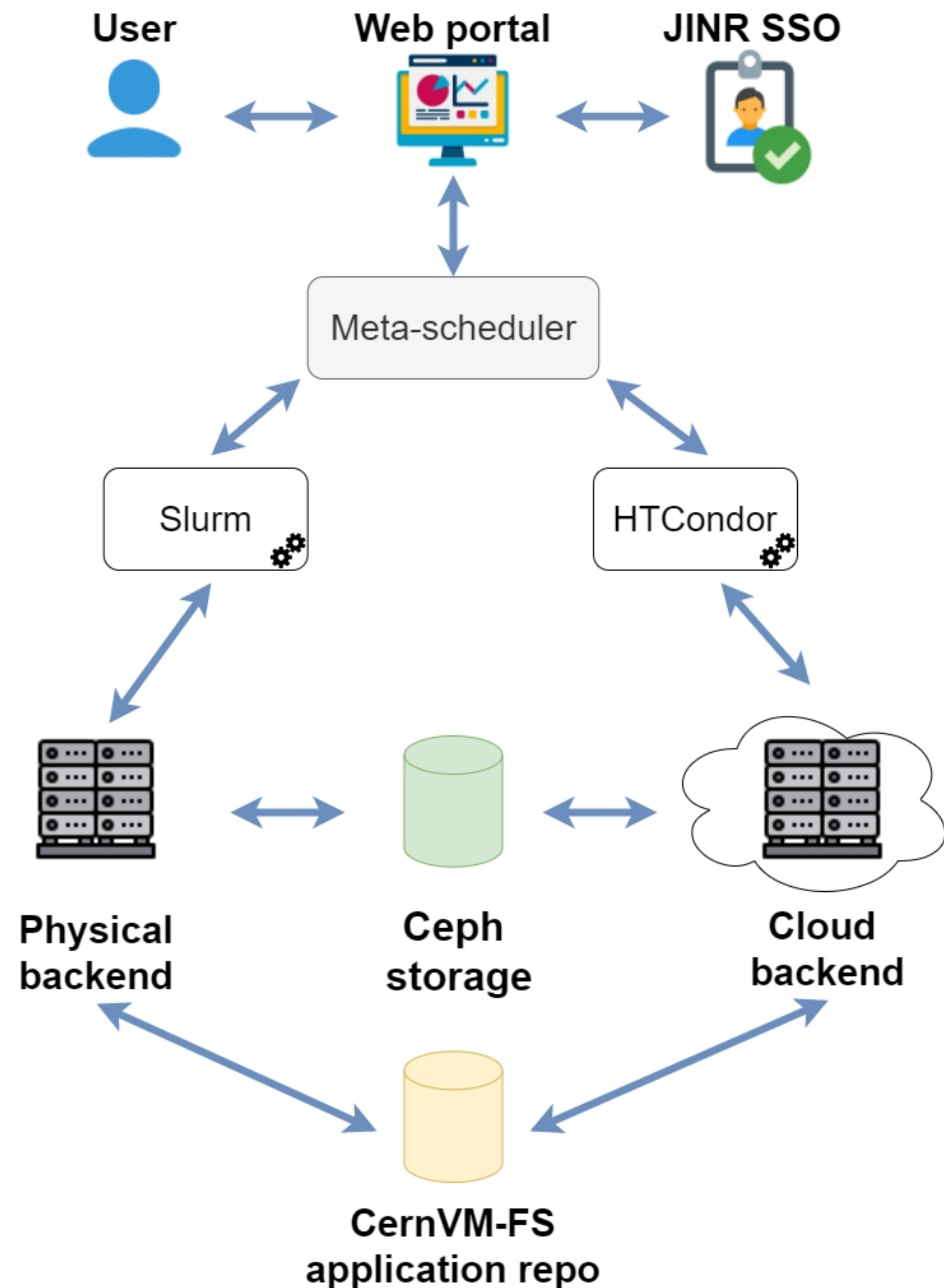
- Handles job submission
- Currently supported resources include
 - JINR Cloud via HTCondor
 - HybriLIT via Slurm

4. Data storage

- CephFS pool of the Cloud storage
- Simple web-access

5. CernVM-FS as application storage

11.06.2022



JINR cloud SaaS

Creating a job Jobs results App Management Logout Manual

This work is supported by the Russian Science Foundation under grant

App

JINR cloud SaaS

Creating a job Jobs results App Management Logout Manual

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Long Josephson junctions stack

Superconductor-Ferromagnetic

Annular Array of JJs average

Long Josephson junction coupling

Stack of short JJ with LC shunt







Stack of short JJ

Jobs

List of jobs

Show entries

Search:

Job ID	URL with job results	Storage time of result	Details	Status
48	http://saas.jinr.ru:8081/e2c2baf87f584036899d5c927f85dfdd	Removed		done  
47	http://saas.jinr.ru:8081/7bb0c95d1d914169a58296db55bc4f	Removed		done  

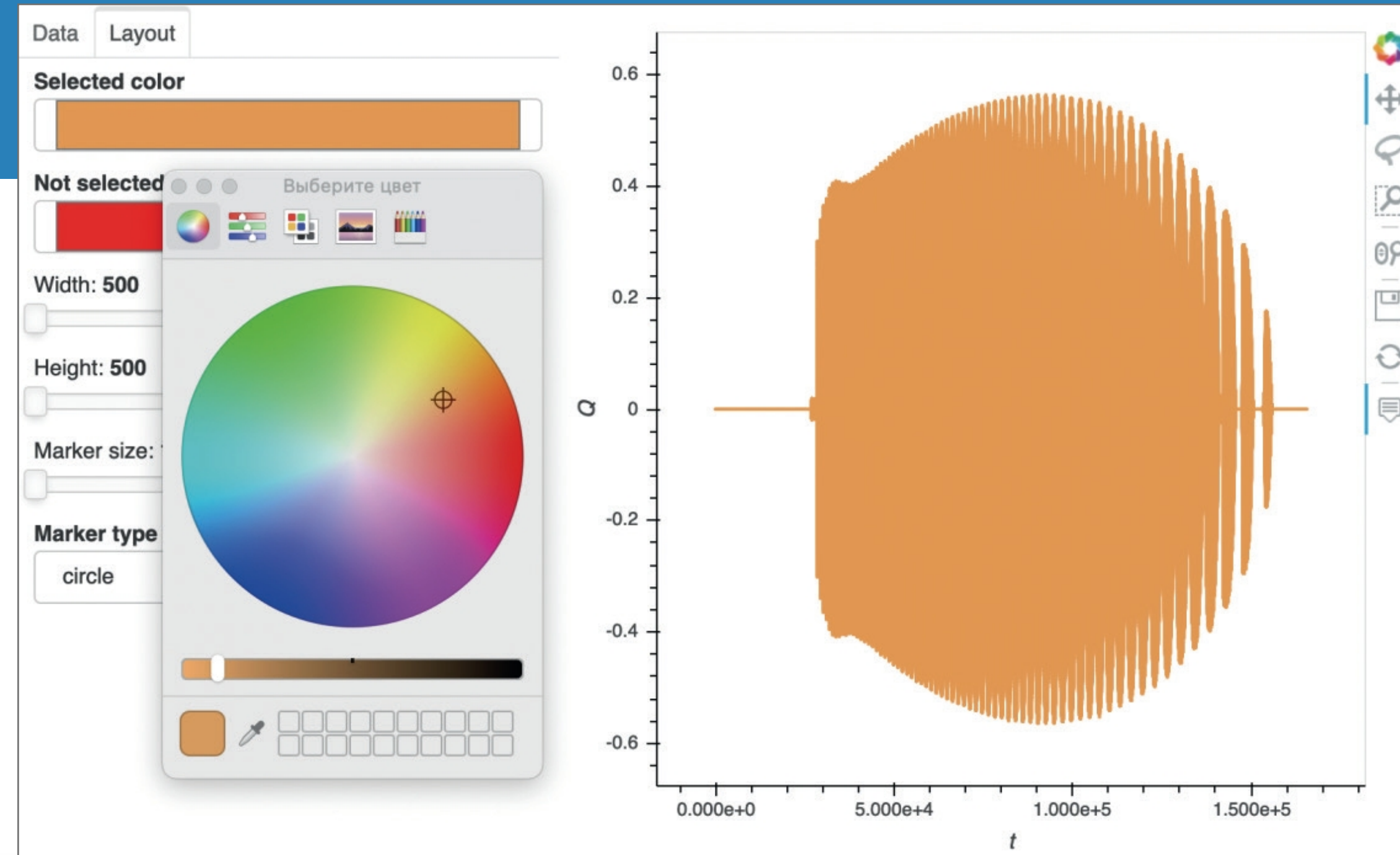
App	Resources
Long Josephson junctions stack simulation	JINR cloud
Superconductor-Ferromagnetic-Superconductor Josephson junction	HybriLIT cluster
Annular Array of JJs average	
Long Josephson junction coupled with the ferromagnetic thin film	
	Number of VMs: 9 / 20
	CPU per VM: 14 / 22
	<input type="text" value="1"/>
	<input type="text" value="1"/>

Job parameters		
Physical parameters		
N:	M:	a:
<input type="text" value="10"/>	<input type="text" value="0"/>	<input type="text" value="1"/>
α :	Amp:	ω :
<input type="text" value="0.1"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

Web portal: «Jobs results»



- Monitor the status of running jobs
- Download the results of completed jobs
- View the details of jobs
- Control jobs (cancel or resubmit)
- Visualize the results of the completed jobs

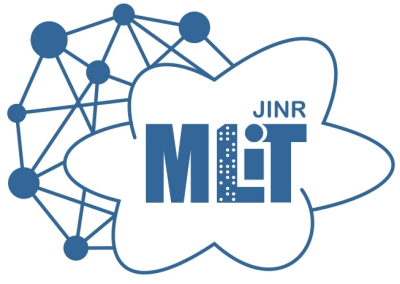


List of jobs

ow entries Search:

Job ID	URL with job results	Storage time of result	Details	Status	
508	http://vm221-63.jinr.ru:8081/afdda7d714b044378a9580d1863b18c4	-		cancelled	
507	http://vm221-63.jinr.ru:8081/2ff7664328ae43cbb42a632a5e514fc1	Removed		done	
499	http://vm221-63.jinr.ru:8081/8465a4ab503c4e1bb4eb9bc975569f50	Removed		done	

New Features: Admin panel access control system



- Introduce roles and groups in the service
- Restrict access to specific interface components base on user roles
- Define a limited set of apps for users based on groups access control

SaaS administration

Site administration

AUTHENTICATION AND AUTHORIZATION

Groups	+ Add	✎ Change
Users	+ Add	✎ Change

JJNANO

Compute resources	+ Add	✎ Change
User apps	+ Add	✎ Change





New Features: Interface for managing applications



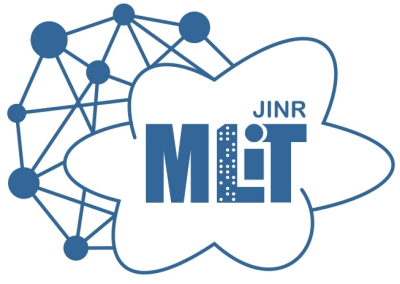
- Control panel
- Add a new application
- Edit the existing applications parameter sets
- Determine computing resources for applications

Applications management

List of apps Add New

ID	Name	Description	Actions
2	Long Josephson junctions stack simulation	Long Josephson junctions stack simulation	 
4	Superconductor-Ferromagnetic-Superconductor Josephson junction simulation	Superconductor-Ferromagnetic-Superconductor Josephson junction simulation	 

Demo mode



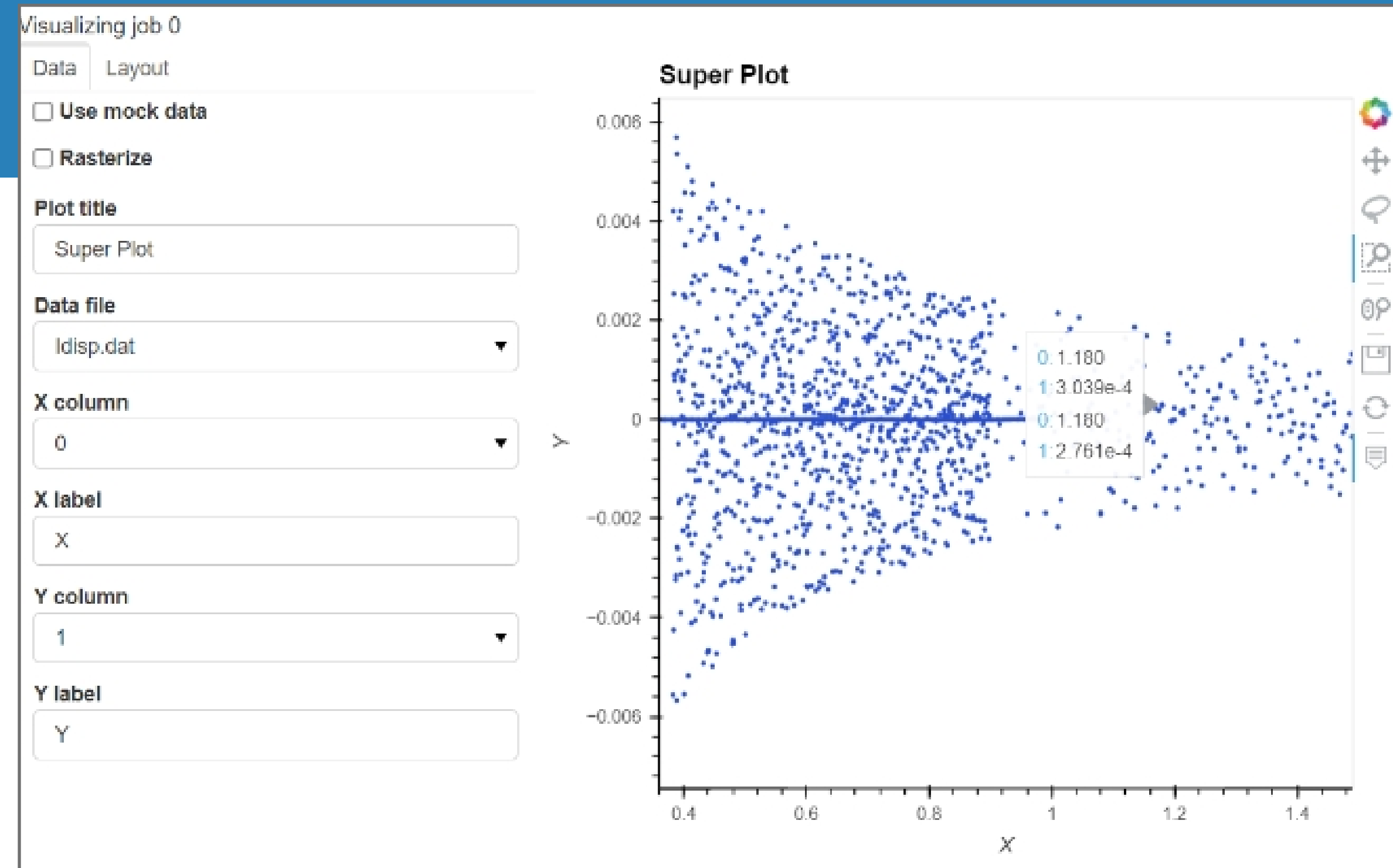
Available at saas.jinr.ru/demo

CLOUD SERVICE
for Scientific Computing

Sign in via JINR Single Sign-On

Demo

This work is supported by the Russian Science Foundation under grant #18-71-10095



List of jobs

Show 10 entries

Search:

Job ID



URL with job results

Storage time of result

Details

Status



0

<http://saas.jinr.ru:8081/demo>

09/06/2025



done



Showing 1 to 1 of 1 entries

Previous

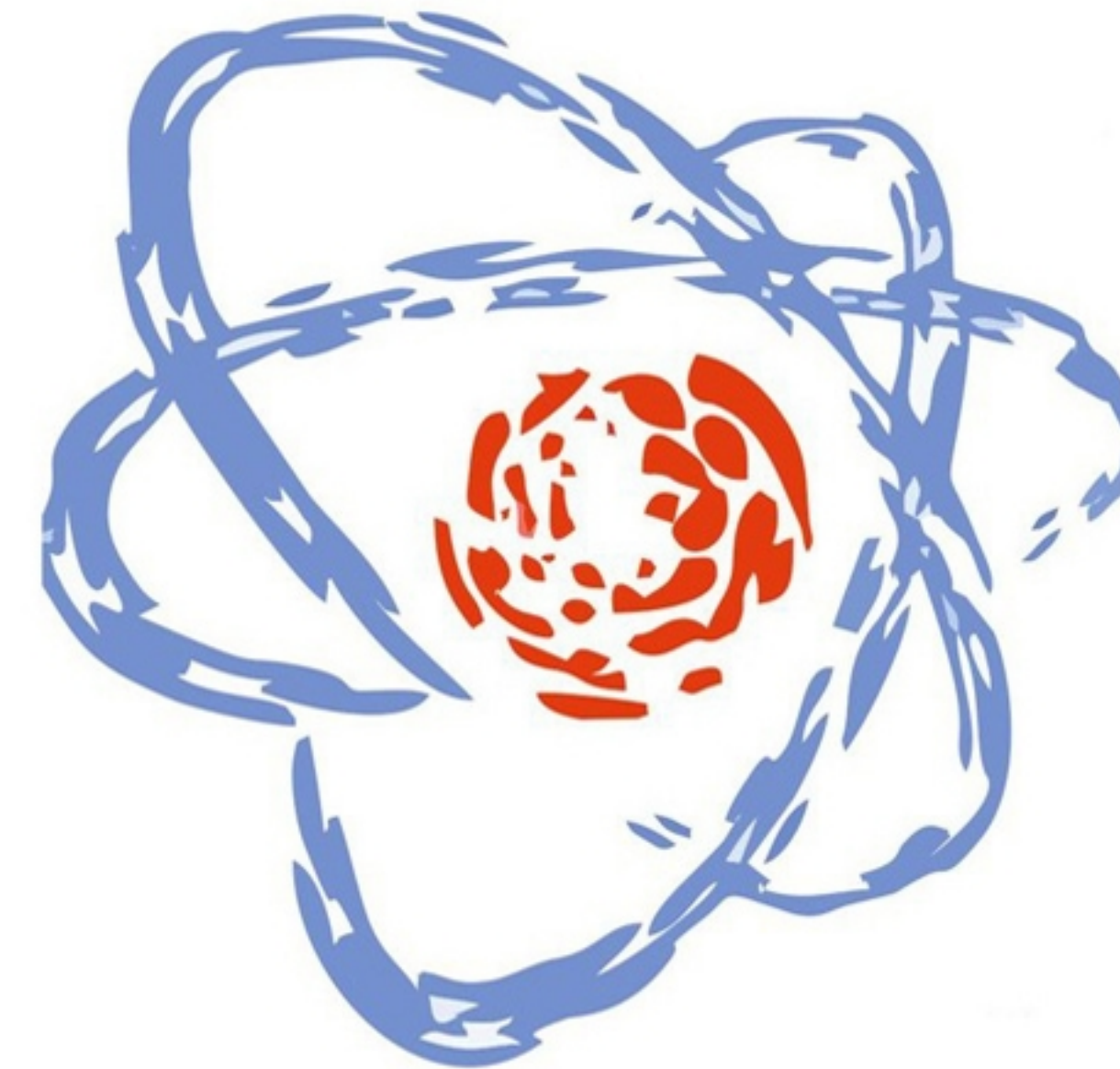
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Next

Future Development



- Add new applications
- Improve the Admin panel and the user interface
- Consider creating a common OS environment via containerization technology
- Add support for the DIRAC interware



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Thank you for your attention!