

# Databases status update

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# SPD Information Systems

## Data

- Distributed Computing and Data Management
- EventIndex
- Production and versions register

## Collaboration

- Personnel and Publication Databases

## Detector

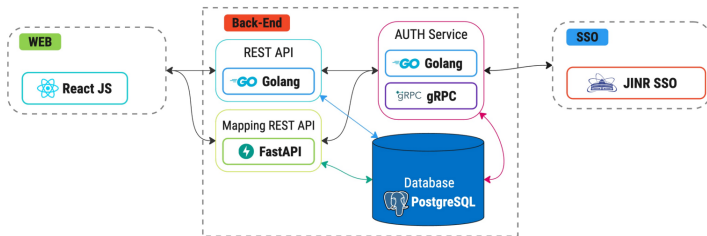
- Hardware and Mapping Database
- Geometry register
- Magnetic field maps register
- Monitoring Information Systems
- Logging and Bookkeeping

# Hardware Database

- A catalog of hardware components that SPD detector consist of.
- It should contain the information about the detectors and the electronic parts, as well as the location history of all items
- It include equipment models, provider, parameters and other (semi)permanent characteristics
- This should help in maintenance of the detector systems and especially helpful in knowledge transfer between team members.
- Filling of the hardware database should take place gradually, and updates will be rare
- The requirements for the speed of recording information in the database are low, as well as for reading of data
- The system should be tailored for the needs of the hardware development and maintenance

# Hardware Database: architecture

- A prototype system is being developed
  - PostgreSQL for a data storage
  - Back-end providing endpoints for access through the REST API
  - Web front-end providing interface for fill, searc and display data
  - JINR SSO for autorization, acces can be requested from web front
- The architecture of the project is built on the basis of microservices
- A stack of modern platforms is used to ensure good performance, flexibility and ease of development and maintenace



# Hardware Database: interface

The screenshot displays the 'Hardware Database' web interface. On the left is a teal sidebar with navigation links: 'Home', 'All Data' (with a dropdown arrow), 'All Groups' (highlighted), 'All Devices', 'Admin', and 'Logout'. The main content area has a teal header with the title 'Hardware Database' and a 'prof' user indicator. Below the header is a 'Create group' button. A table lists storage groups with columns: 'Group Name', 'Created At', 'Updated At', 'Props', and 'Actions'. The table contains four rows of data. Below the table is a pagination control showing '< 1 >'. The table data is as follows:

Group Name	Created At	Updated At	Props	Actions
HDD WD15EARS	2025-02-03	2025-02-03	<a href="#">Show props</a>	<a href="#">Open</a>
HDD	2025-02-03	2025-02-03	<a href="#">Show props</a>	<a href="#">Open</a>
storage	2025-02-03	2025-02-03	<a href="#">Show props</a>	<a href="#">Open</a>
device	2025-02-03	2025-02-03	<a href="#">Show props</a>	<a href="#">Open</a>

- Development of the HW database is put on hold, no urgent demand
- Developers shifted to other projects with higher priorities

# Hardware Database: interface

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NAME	UNITS	PROPERTY TYPE	MIN	MAX	DEFAULT VALUE	ACTIONS
status		enum				<a href="#">Open</a>
speed		float				<a href="#">Open</a>
manufacture date		datetime				<a href="#">Open</a>
5VDC	A	str			0.70	<a href="#">Open</a>
Model		str			WD15EARS-00MVWB0	<a href="#">Open</a>
capacity	TB	float			1.5	<a href="#">Open</a>
spin	RPM	float				<a href="#">Open</a>
buffer	MB	float			64	<a href="#">Open</a>
interface		enum			SATA II	<a href="#">Open</a>
form factor		enum			3.5 in.	<a href="#">Open</a>

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- Developers shifted to other projects with higher priorities

# Database of personnel and documents

- About 400 people are currently participating in the SPD project,
  - number of participants is expected to grow close to experiment start
- In order to organize effective cooperation with the shared use of computing and other resources, it is necessary to have IS for
  - handling of a personnel and organizations data
  - support for working groups: membership, access rights,
  - accounting of the contribution (if implemented)
  - generating reports broken down by various parameters
- Procedures for creating, approving and editing related documents
  - Registration and changes of membership in the collaboration
  - Creating and editing lists of groups and privileges
  - Inclusion in the author's lists

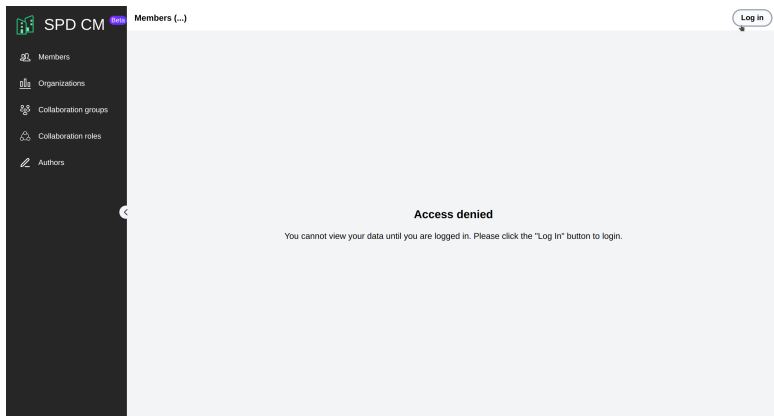
# Collaboration Members Database

- An information system has been created to handle information about collaboration members and participating organizations
- Means to store, add and edit records for members and organizations
- To add and edit roles in a collaboration and groups in a collaboration
- Provides an opportunity to generate the following reports:
  - A general list of the participants of the collaboration, total number
  - A list of participating organizations, with the number of participants;
  - A list of participants in the organization, indicating team leaders.
  - The list of participants by group
  - List of authors
- Provides authorized access to view, add, and edit information.
- Three roles that define the rights to work with the system:
  - 1 Administrator: can assign roles to users and edit information.
  - 2 Editor: can enter, edit, view and delete data, and view transaction logs.
  - 3 Guest: can view summary reports and information in the records.
- A user without a role does not have access to the data in the system.



# Collaboration Members Database: Authorisation

- User authentication in the system is performed using the JINR SSO service.
- During the initial user authentication, an account is created.
- The system administrator either assigns a role or denies access.



# Collaboration Members Database: Authorisation

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The image shows a web form titled "JINR Single Sign-On". At the top right is a logo of a building. Below the title, a red text reminder states: "Reminder: you have agreed to comply with the JINR computing rules". The main section is titled "Sign in with a JINR account" and contains two input fields: "User name:" and "Password:". Below these fields is an orange "Sign in" button. At the bottom of the form is a blue link labeled "Recovery password".

[How to get SSO login for user.](#)  
[Registration SSO service and application.](#)

# Collaboration Members Database: authors

- List of authors and their home institutions
- Clicking on members name bring you form with member information, including JINR and ORCID ID, group membership and home institutions



SPD CM **Authors**

Search...

FULL NAME	ORGANIZATIONS
V. Abazov	Joint Institute for Nuclear Research
L. Atanasyev	Joint Institute for Nuclear Research
R. Akhmedov	Joint Institute for Nuclear Research
V. Alexahin	Joint Institute for Nuclear Research
G. Alexeev	Joint Institute for Nuclear Research
A. Alakhverdieva	Joint Institute for Nuclear Research
V. Anosov	Joint Institute for Nuclear Research
V. Asakhor	Joint Institute for Nuclear Research
N. Azorskiy	Joint Institute for Nuclear Research
A. Baldin	Joint Institute for Nuclear Research
E. Baldina	Joint Institute for Nuclear Research
A. Barnyakov	Budker Institute of Nuclear Physics SB RAS
K. Basharina	Joint Institute for Nuclear Research
E. Belyaeva	Joint Institute for Nuclear Research
Y. Berdnikov	Peter the Great St. Petersburg Polytechnic University
Y. Betspalov	Joint Institute for Nuclear Research

# Collaboration Members Database: authors

- List of authors and their home institutions
- Clicking on members name bring you form with member information, including JINR and ORCID ID, group mebrship and home institutions

The screenshot displays the SPD CM Beta web application interface. On the left is a dark sidebar with navigation links: Members, Organizations, Collaboration groups, Collaboration roles, Authors, and Logout. The main content area is titled 'Dashboard' and shows the profile of 'Fedor Prokoshin'. The profile header includes the name in Russian (Прокошин Федор Валерьевич), his role (DB Coordinator), and whether he is an author (Yes). Below this are sections for Identifiers (JINR ID: 3320, ORCID ID: 0000-0001-6389-5399), Groups (Software & Computing), Organizations (Joint Institute for Nuclear Research), and Contact Information (Email and Phone). A 'prof' label is visible in the top right corner of the dashboard area.

**SPD CM Beta**

**Dashboard** prof

**Fedor Prokoshin**  
Прокошин Федор Валерьевич  
Collaboration role: DB Coordinator  
Is author: Yes

**Identifiers**  
JINR ID: 3320 ORCID ID: 0000-0001-6389-5399

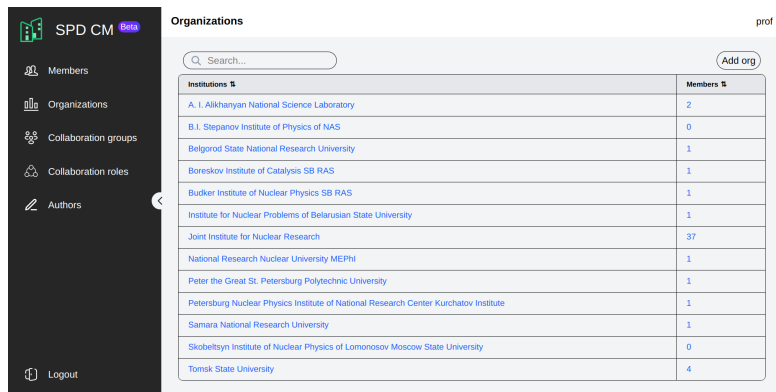
**Groups**  
• Software & Computing

**Organizations**  
• Joint Institute for Nuclear Research (Senior scientist) ✕

**Contact Information**  
Email: [redacted] Phone: [redacted]

# Collaboration Members Database: organizations

- List of participating organizations with number of members
- Clicking on organization name brings you organization details
- Clicking on number brings you list of members from this organization



SPD CM Beta

Members

Organizations

Collaboration groups

Collaboration roles

Authors

Logout

Organizations

prof

Search...

Add org

Institutions %	Members %
<a href="#">A. I. Alikhanyan National Science Laboratory</a>	2
<a href="#">B.I. Stepanov Institute of Physics of NAS</a>	0
<a href="#">Belgorod State National Research University</a>	1
<a href="#">Boreskov Institute of Catalysis SB RAS</a>	1
<a href="#">Budker Institute of Nuclear Physics SB RAS</a>	1
<a href="#">Institute for Nuclear Problems of Belarusian State University</a>	1
<a href="#">Joint Institute for Nuclear Research</a>	37
<a href="#">National Research Nuclear University MEPhI</a>	1
<a href="#">Peter the Great St. Petersburg Polytechnic University</a>	1
<a href="#">Petersburg Nuclear Physics Institute of National Research Center Kurchatov Institute</a>	1
<a href="#">Samara National Research University</a>	1
<a href="#">Skobeltsyn Institute of Nuclear Physics of Lomonosov Moscow State University</a>	0
<a href="#">Tomsk State University</a>	4

# Collaboration Members Database: organizations

- List of participating organizations with number of members
- Clicking on organization name brings you organization details
- Clicking on number brings you list of members from this organization

The screenshot displays the SPD CM Beta web application interface. On the left is a dark sidebar with navigation links: Members, Organizations, Collaboration groups, Collaboration roles, Authors, and Admin. At the bottom of the sidebar is a Logout button. The main content area is titled 'Dashboard' and shows details for 'Tomsk State University TSU'. The organization's name is in bold, followed by its Russian name and address: 'Национальный исследовательский Томский государственный университет ТГУ, Russia, 634050, Tomsk'. Below this is a 'More Information' section with fields for 'Dates of signing (JINR):', 'Dates of signing (ORG):', 'MOU Name:', and 'MOU Status: Signed'. It also shows 'Declared participants:' and 'Members count: 4'. The 'Team Leaders' section lists 'Irina Shreyber' and 'Sergey Filimonov'. The 'Contact Information' section includes 'Email:' and 'Phone:'. A '+ ' button is visible next to the Team Leaders section. The top right corner shows the user 'prof'.

# Collaboration Members Database: organizations

- List of participating organizations with number of members
- Clicking on organization name brings you organization details
- Clicking on number brings you list of members from this organization

SPD CM Beta

Members

Organizations

Collaboration groups

Collaboration roles

Authors

Logout

Collaboration members prof

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Full Name	Collaboration roles
<a href="#">Ilya Shugart</a>	
<a href="#">Dmitry Khramov</a>	
<a href="#">Nikolay Khramov</a>	
<a href="#">Dmitry Khramov</a>	

# Collaboration Members Database: groups

- List of managements and working groups
- Clicking on group name bring you list of group members with their collaboration roles

The screenshot shows the 'Collaboration groups' page in the SPD CM Beta application. On the left is a dark sidebar with navigation links: Members, Organizations, Collaboration groups (selected), Collaboration roles, Authors, and Logout. The main content area is titled 'Collaboration groups' and includes a dropdown menu set to '50', a search bar, and an 'Add group' button. Below these is a table with the following groups listed:

Group Name
<a href="#">Technical Board</a>
<a href="#">Collaboration Management</a>
<a href="#">Collaboration Board</a>
<a href="#">Coordinators</a>
<a href="#">Publication Committee</a>
<a href="#">Executive Board</a>
<a href="#">DAQ</a>
<a href="#">Range System</a>
<a href="#">ZDC</a>
<a href="#">Integration</a>
<a href="#">Test Zone</a>
<a href="#">Straw Tracker</a>
<a href="#">ECal</a>
<a href="#">BBC &amp; Polarimetry</a>
<a href="#">Vertex Detector</a>
<a href="#">Software &amp; Computing</a>



# Collaboration Members Database: groups

- List of managements and working groups
- Clicking on group name bring you list of group members with their collaboration roles

SPD CM 6:14 Collaboration group members prof

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**Members of Group: Executive Board** Add member

Full Name	Collaboration Role	Actions
<a href="#">Victor Kim</a>	Spokesman	<a href="#">Delete</a>
<a href="#">Alexander Korzenev</a>	Technical coordinator	<a href="#">Delete</a>
<a href="#">Vladimir Ladygin</a>		<a href="#">Delete</a>
<a href="#">Armen Tumasyan</a>	CB chair	<a href="#">Delete</a>
<a href="#">Alexey Zhemchugov</a>		<a href="#">Delete</a>
<a href="#">Igor Denisenko</a>	Physics coordinator	<a href="#">Delete</a>
<a href="#">Vladimir Anosov</a>		<a href="#">Delete</a>
<a href="#">Anton Baldin</a>		<a href="#">Delete</a>
<a href="#">Anatoly Kulikov</a>		<a href="#">Delete</a>
<a href="#">Alexey Guskov</a>	Spokesman	<a href="#">Delete</a>

Members Organizations Collaboration groups Collaboration roles Authors Admin Logout

# Collaboration Members Database: further development

- Next step will be generation of mailing lists for the groups of members
- A log of operations on the data in the system, including:
  - The date and time of the operation,
  - The type of operation (addition, modification, deletion),
  - The full name of the editor who made the changes.
- Further development of the role system and access rights management
- Other features may be implemented when need for them arises
- ... like accounting of members and organizations contributions

# Registers

- Development of the SPD software and ongoing large scale production campaign requires creation of a number of databases.
  - Production register
  - Software version register
  - Geometry register
  - Magnetic field map register

## Common features

- These are quite small projects, should be available fast
- No high loads expected
- Low update frequency
- Payloads are normally stored separately, in files or sqlite
- Have to be developed independently, but need for data exchange may arise
- Similar platforms should be used to simplify development and maintenance
- IAM should be used for authentication and access management

# Production register

- Now the google sheet is being used: ▶ 2025 Productions RO
- Production record contains name, description, software version, number of requested events, initial seed and processing types.
  - For every processing type (simu, reco...) location of the macros are specified, as well as output dataset templates and names.
- New production appear twice a week
- Need a database to keep records of the production
- Expected to be filled by 2-3 responsible persons
- Will be used by all members related to the analysis and production
- On the second stage of development automatic generation of the production tasks specification may be implemented

# Software versions register

- Registry will keep information on versions of software used
- Contains software tags, packages used, version descriptions links to the repositories, configuration and condition data compatibilities
- Will be filled by the person responsible for the deployment of the software frameworks (SPDRoot, SAMPO)
- Information should be collected mostly from JINR git repositories
- Will be available through GUI and endpoints for use from other ISs

# Geometries and Magnetic field maps register

## Geometries register

- Geometry is being held as a single file and have to be used by a dedicated SAMPO framework tool
- DB should contain tag for a geometry, its version, metadata and a link to a file on the cvmfs
- Metadata content should be defined lately

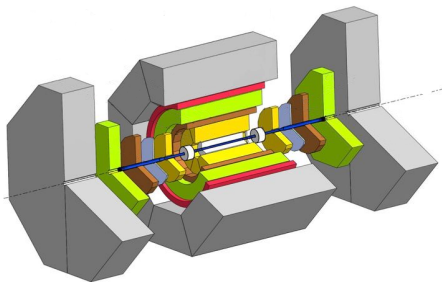
## Magnetic field maps registry

- B-field maps, each having few GB in size will be held in a sqlite DB.
- Updates should be quite rear, few times a year
- DB should contain tag for a map, its version, metadata and a pointer to the map (TBD)
- A special tool for SAMPO is being created to access B-field map, it will define metadata for the field maps and how it should be accessed.



## BACKUP SLIDES





- The SPD Experiment have to produce large amounts of data, both collected from the detector and simulated
- The processing of the experimental data requires a wide variety of auxiliary information from many systems
- Huge volumes of the detector condition and management data should be stored in the databases
  - should be used in every stage of data taking, processing and analysis
  - are essential at nearly every stage of data handling
  - for use in number of versatile applications each with its own requirements