



Infrastructure development for BM@N information systems, new services and plans



13-15 May 2025 14th Collaboration Meeting of the BM@N Experiment at NICA <u>Alexander Chebotov</u> Konstantin Gertsenberger Ilya Romanov JINR, LHEP



Partial migration



Condition Database(UniConDa)

The Condition Database is designed for storing and managing parametric information related to the experiment systems, which is essential for data processing.

https://bmn-uniconda.jinr.ru



Geometry System

The geometry information system, based on the geometry database, stores and processes data on the composition and geometric structure of detectors used in experiments, providing a centralized repository for geometries.

https://bmn-geometry.jinr.ru

https://bmn-geometry.jinr.int **Visualization Geometry** BM@N Experiment Run Period number = 7 Run number = 5184 1 16 24 2018-04 0 59 50 2018-04 0 42 30 2018-04 0.25.10 2018-04 9931.03 2018-04-9 00 55 2018-04-8 26 31 2018-04 08.13.12 2018-04-737.42 2018-04 7.07.50 2018-04 0 35 35 2018-04 6 10 13 2018-0https://bmn.jinr.int/file_inspector/ File Inspector Report Selector Check date Complete date File count Errors Type name Storage name ile path Error name Files (FC) 2022-09-01 03:00 2022-09-05 04:00 3635 39 Check date /eos/nica/bmn/sim/non-official/DCMQGSM_CC_3.5AGeV_mb/bmnsim_CC_3.5AGeV_mb_20.root: the checksum exp. data NC) different checksum (Emno 5) input, 45720 /eos/nica/bmn/sim/gen/DCM0GSM/DCM0GSM XeSn 3.9AGeV mb 10k/DCM0GSM XeSn 3.9AGeV mb 10k 30 different checksum 2022-08-21 03:00 2022-08-25 05:11 3635 exp, data NC> (Emno 5) input/output em 17/04/202 56854 In progres Items per page: 10 👻 🛛 K (Ermo 5) input/output error exp, data NCX 2022-08-11 03:00 2022-08-14 22:05 3635 104 15/04/2025 492391 4/04/2025 2 (Ermo 5) input/output erro sim_data sim, data NCX 2022-08-05 03:00 2022-08-05 08:08 23964 (Emno 5) Input/output em Items per page: 3 - 1 - 3 of 4 < > (Ermo 5) input/output erro (Emmo 5) Imput/output error Error Graph Error Statistics (Ermo 5) Input/output err Experimental D Simulated NCX MICC (Ermo t) input/output error sim_data O CICC O DDC O NCX (Emio S) input/output error (Emmo 5) input/output erro (Emmo fi) imput/output error (Emno 5) Input/output emo (Ermo S) input/output erro File read en jtimo 5) input/output erro lêma Si input/output error 2025-04-15 different checksun Apr '22 May '22 Jun '22 Jul '22 Aug '22 **File Inspection Service** Different MD5 checksum Blank MD5 checksum File read error File not found

Daily and Integral Event Statistics



Stack Diversity Issues

System Count by Tools

React 🛹

php

1 Kotlin 🔿 NGI/X

python[™]

3 Angular

2

Why Use Together?

- Speed : Bun + Fastify = ultra-fast backend.
- Modern Stack : React (frontend) + Fastify (API) + Bun (runtime).
- Minimal Setup : Bun handles bundling, TypeScript.



77.9k stars

Release 2023





111k stars

Release 2010 🗖



66.9k stars 33 Release 2010 Re

33.7k stars Release 2011

Improving authentication



Secure Token Storage:

- XSS protection : HttpOnly blocks JS access.
- MITM protection : Secure enforces HTTPS.
- CSRF mitigation : SameSite=Strict/Lax.
- Server-controlled : Tokens managed server-side (Fastify).

HttpOnly *Cookies* (Option 3) – most secure for modern apps.



Optimization of the CoDeS

The Common Deployment System is based on Docker containers and shell scripts



Showcase the BM@N-MEET



https://bmn-meet.jinr.int

Begin by Creating Events

Event Name *				12
Software meeting				
Event Date *				B
April 28, 2025				Ľ.
Start Time *	End Time			k
15:30	17:00			Р
All Day				
Room *				H
Software meeting			0	Г
Repeat		Repeat Rol	I	
Weekly		5		1
Description				U
Реорганизация совещан программной части ВМ@	ИИЙ И СПИСКОВ	рассылки г	ю	
	Reset	Create	Event	I.
				L



Choose Type Calendar



Available Functions

送 Event Activity 借	Calendar -⁄~ Activity 🕕 Statistic	es My Events •••
0 filters × Filter by mee	eting name I The Date start I I I I I I I I I I I I I I I I I I I	Date finish
× Event Details		×
88 Event: Визит делегации ЛФВЭ в Беларусь	Event Details	Event Details
🛱 Date: 10 мая 2025 (08:00- 19:00) [11h 0 min]		B Event: Software meeting
П Room: Главный конференц-зал	🔁 Date: 13 мая 2025 (08:00- 19:00) [11h 0 min]	📇 Date: 28 апреля 2025 (15:30- 17:00) [1h 30 min]
Ct Location: LHEP, building 222, room 222	Room: Main Conference Hall	Room: Software meeting
— Description: 22-23 апреля 2025 года сотрудники Лабора	Dia Location: LHEP, building 222, room 222	成 Location: @ You need to authorize
Стеаted by Alexande 22-23 апреля 2025 года сотрудники	Description: Test Event	Description: Реорганизация совещаний и списков рассыл
Лаборатории физики высоких энергий им. В. И. Векслера и А. М. Балдина посетили Белорусский	Created by Alexander Chebotov (1) 😨 😅	Created by Alexander Chebotov

Delete Event

(#)

(7

(#)

(Z)

Repeat Event

(2)

(#)

Edit Event

государственный университет информатики и радиоэлектроники

Cocation: https://us02web.zoom.us/j/**********

12

BM@N-MEET: Future Enhancements

> MAY 2025			
Tue	Server Unavailab	le _{Thu}	
	Cannot establish conn	ection to the server. Please cheo	:k if server is running.



Subscribes 📑 🔂 🔂

Short-Term Roadmap:

- Event Notifications.
- Subscription System.
- ✤ Advanced Filtering.
- Event Templates.
- Smart Booking
- Community-Driven Features.

ELOG: Shift Assistant Integration (Planned)

	B @ Page: 1 v of 518 B B											
Date 🗘	Shift Leader 🗘	Туре 🗘	N₂ Run ≎	Trigger 🗘	DAQ Status	≎ Beam ≎	Energy, GeV	🗘 Target 🗘	SP-41, A 🗘	SP-57, A	¢ VKM2, A ≎	Comment
2023-02- 02 0:35:27	Vasilisa Lenivenko	Shift Summary	per.8									Набрали 1 М физических данных, Выключили магниты и детекторы. Закрываем установку. Все!
2023-02- 02 0:14:29	Vasilisa Lenivenko	Information	per.8									выключаем газ в детекторах
2023-02- 02 0:11:37	Vasilisa Lenivenko	Information	per.8									выключили Dch, Gems, CSC, ToF40 ToF700
2023-02- 02 9:55:21	Vasilisa Lenivenko	Information	per.8									Готовим установку к выключению!
2023-02- 02 8:51:22	Vasilisa Lenivenko	Information	per.8									Остановка на заливку КГУ
2023-02-	Vasilisa Lenivenko	Physics Run	8427 per.8			Xe	3	Csl (2%)	1370	0	170	ВТ(1999)+ССТ1(229)+МВТ(34)+ССТ МВТ: Before 200/After 100; ВС1L:Before 30/After 30; GEM(М7) н в рабочем режиме (2600 V, 320 mk/ N = 1010 K
	3a 70		ar.8									Смену приняли: Бабкин, Ленивенко Кузнецов
2					Re	eac	t i				, p	odma

Key Directions for ELOG:

- Tech Stack Modernization.
- Deployment Optimization.
- ✤ AI-Powered Features.
- Data Visualization.
- Community-Driven Features.

Ilya Romanov

Development of a virtual assistant for shift operators of the BM@N experiment

Conclusions

Infrastructure Modernization: Streamlined systems (e.g., moved geometry visualization, isolated file inspection).

Tech Stack Standardization: Unified under React + Fastify
+ Bun for consistency, performance, and developer
efficiency.

We have successfully developed BMN-MEET , a centralized web application for event planning and collaboration

Thank you for your attention!



