

9th Collaboration Meeting of the BM@N Experiment at the NICA Facility





BM@N Software Progress and Roadmap

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on behalf of the BM@N collaboration





LHЕР ЛФВЭ

BM@N Data Processing Flow



OnElectSoftiev AregSyotkms

Current version of the e-Log Platform



2020 - software team (contact e-mail: gertsen@jinr.ru)

16 September 2022

<u>bmn-elog.jinr.ru</u> ("Detector → BM@N Logbook" on *bmn.jinr.ru*)

e-Log Platform. Notification Service

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e	log	

e-mail notifications

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different types of events: *"shift started" "problem report" "configuration"*



User Cabinet

Event	Subscriptio
New record of the 'Configuration' type.	
New record of the 'Inform All' type.	
New record of the 'New Run' type.	
New record of the 'Other' type.	
New record of the 'Problem Fixed' type.	
New record of the 'Problem report' type.	
New record of the 'Routine' type.	
New record of the 'Shift started' type.	
New record of the 'Shift summary' type.	
New record of the 'Software Installation' type.	

C++ API → REST API (in progress)

Autogenerated class wrappers for the logbook objects allow to access and manage the data in the BmnRoot framework

ElogDbRecord – records written by a shift crew during the experiment runs which describe operating

modes of various systems and detectors and different types of events

ElogDbType – record types: 'Shift started', 'Problem report', 'Configuration', 'New Run', etc.

- ElogDbPerson a list of the experiment staff
- ElogDbTrigger dictionary of all possible trigger types
- <u>ElogDbBeam</u> dictionary of all possible beam particles
- ElogDbTarget dictionary of all possible targets

ElogDbAttachment - files attached to a record for detailed description of the run

<u>ElogConnection</u> – serves to open and close connections to the databases including e-Log <u>ElogSearchCondition</u> – forms criteria for selection of necessary records

The main functions of the e-Log interface: <u>for data objects (static)</u>: *Create*, *Delete*, *Get*, *Search*, *PrintAll*. <u>for attributes (non-static)</u>: *Getters* and *Setters* functions, *Print*.

Online metadata → BM@N Condition Database



O Minlen E Gaffguaati System

Online Configuration System



Web Interface of the OCS. Task monitor

					List of activ	ateu tas	jno		
Menu	Task: Select ta	sk 🗸	Computer:	Select computer 🗸	Module: S	Select mod	lule 🗸 Setup: Select set	up 🗸 Status: Select status	~
			SEARCH	RESET	S	Select mod m4	dule		
CTIVATED TASKS	For more task info	mation , click on the task	name.		n	m11 OnlineCon	trol		
CONFIGURATION DESIGNER		Name	Comput	er Mode	ile n	m4	Start Time	Stop Time	Status
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	Version: 1;								
	Instances: 1;	• . h							
	Start On Boot: V	: v;							
	Property: Name-	DigiMessProperty; Value- v	vrite;						
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Get in touch		ored and _	10 001110				2021 10 15 10115102		

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- Configuration Database: completed
- Configuration Manager: completed

- Web interface: completed
- OCS is under testing now

Online Processing System for BM@N

FairMQ is a messaging library focused on building modular systems for data processing in high energy physics experiments. It represents an abstraction over various messaging technologies such as ZeroMQ, Nanomsg, etc.

DDS (Dynamic Deployment System) is a set of tools that facilitates the process of system deployment. As a Remote Manipulator System (RMS), it initially provides SSH or SLURM, but also allows you to use other methods.





The purpose of the online data processing system is selective data processing (digitization of events and fast reconstruction) and monitoring of the data of the ongoing experiment.

> Ilya Romanov (15 September 13:05) Online Processing System for the BM@N experiment

BM@N Data Processing Flow



OFfin RSoft Fram Systems

BmnRoot Release Preparation: 22.10.0



- Three versions of the tracking are supported: CellAuto for Run 7, L1Tracking for Run 8 in online, VF for Run 8 in offline
- Event simulation with Geant4 is used by default.
- The BM@N tasks are being restructured to support online processing.
- BmnRoot database interfaces have been moved to submodules.
- BmnRoot is currently being tested on distributed clusters before the release.
- All improvements and new features will be described at the release tag.

Event Data Processing in BmnRoot



Cofflitie & Aftrifierd Dystebase

Condition Database Structure



setup geometries, detectors, parameters and parameter values, and generated simulation files

PostgreSQL 12

C++ API → REST API (in progress)

Autogenerated class wrappers for database tables with specific functions allow to access and manage data in the BmnRoot framework

<u>UniDbRunPeriod</u> – describes run periods (a set of runs) of the experiment

UniDbRun - run parameters (number, time, energy, beam, target, magnet field, file path, etc.)

<u>UniDbDetector</u> – detectors of the experiment (detector dictionary)

<u>UniDbParameter</u> – common information about detectors' parameters presented on the previous slides and stored in the database (parameter dictionary)

<u>UniDbDetectorParameter</u> – values of detector parameters for experiment runs

UniDbSimulationFile – describes a set of generated simulation files

The main functions of the database interface:

for data objects (static): Create, Delete, Get, Search, PrintAll.

for attributes (non-static): Getters and Setters functions, Print.



GitLab

Unified Database Architecture



Status of the web service for Unified Database





- visualization of summary data in the form of diagrams and charts
- convenient viewing, managing and searching for up-to-date information on the BM@N experiment in tabular view by collaboration members

Sign Out

Tabular View of the Unified Database

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		7	5180	2018-04-05 10:25:10	2018-04-05 10:41:14	Kr.	2.94	Cu	77.615068	201001	42.538	loopincabim/kspitawiwe/4720-5180_BMN_Kypton/tepd_tun_ingCede_6188.com	-
		7	5179	2010/01/05 09:01:00	2010/01/05 10:24:42	Kr	281	Cu	77.822165	201639	42.525	leosinica.bmn/exp/rev/um7/1720.5185_0/IRU_Kypton/mpd_run_IngCode_5179.data	
		7	5178	2018-04-05 02:00 55	5 2018-04-05 09 30 31	Kr .	2.54	Ci	77 673112	201054	40 412	koonicahmokepitawiuw74720.6186_BMN_Kyptoximpd_run_trigCeds_5178.6xa	
Π	Home	1	6177	2018-04-05 08:25:31	2018-04-05 09:00:27	Kr	2.84	Cu	17/618581	204188	42,940	Jeosincabimilexp/tawtun/14720-5186 BNN Kryston/mpd run IngCode 5177 data	-
		7	5176	2010/04/05 00:13:12	2 2010-01-05 00:25:59	ю	2.94	Cu	77.615752	151049	01.022	/eoshicabmn/exphanion74720.6186_048C_Kypton/mpd_um_trigCode_5178.data	
_		7	5174	2018-04-05 07:37 43	2018-04-05 08:11:55	Kr	2.54	Cu	77.616580	213121	44.951	/costricabmn/csp/tawhur74720-6186_BMN_Ktypton/mpd_run_trigCedc_5174-68ta	
E	Experiment Runs	7	5173	2018-01-05 07:07:50	2018-01-05 07:37:14	Kr.	284	Cu	77.612712	211209	44.600	/eosinicabmn/exp/tawhun7/4720-5185_BMW_Krypton/mpd_tun_tingCode_5173.data	
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	Detectors & Parameters	7	5187	2010/01/05 05:12:03	2010 01 05 05:50:50	Kr	281	Cu	77.600035	36044	7.500	/eos/ricabmn/exp/rawlue7/1720.5185_BMIN_Kypton/mpd_run_trigCode_5167.data	
_		7	5195	2010-04-05 05 23 33	7 2018-04-05 05 28 29	Ri .	2.54	Cu .	77 606005	53759	11 285	www.icabmnhop/tawbur74720.6188_BMN_Kyptox/mpd_twt_HigOeds_5168.dxta	
		1	5 195	2018-04-05 05:08:41	2018-04-05-05-11:06	Kr.	2.54	Cu	14/396/92	53434	11.092	leosincabim/kspitawiwe/4/20-5180_BNN_Kypton/mpd_run_ingCede_5165_cata	-
_	Decementer Malana												

			1.0	ranceer values of the	e batea experiment			
Parameter Values Sele	ector							+ / -
Detector Name	Parameter Name	Stars period	Stant run	End sur-	Real yearing	Descrid	Channel	Paramoter value
DCHI	on	1	12	CES	3			true
TOF1	ad .	1	12	686	0	23657930	1	1.02952 1.78594
10+1	ant (1	12	GES	3	23657930	2	-0.640914 0.625827
TOP1	int	1	12	688	3	23657930	3	0.628893 1.31309
10+1	ant (1	12	085	э	23657930	4	-0.100196 1.49232
TOP1	int	1	19	615	а	23657930	5	0.23191 1.58207
TOF1	ant (1	12	089	э	23657830	6	0.0622361 1.07366
TOP1	int	1	12	013	а	23657930	7	-0.1177.1.85877
TOF1	int	1	12	680	0	20657800	8	0.669479 1.42003
TOF1	int .	1	12	688	3	23667930	9	0.311999 1.30199
TOP1	int	1	12	880	0	20657900	10	0.221616 1.69609
TOF1	in)	1	12	688	3	23667930	н	1.10146 1.24716
TOP1	int	1	12	686	0	23657930	12	1.13431 1.80575
TOF1	ant (1	12	688	3	23667930	13	1.07766 0.650668
TOP1	int	1	12	686	a	23657930	14	-0.0567134.0.799345

Experiment Runs

MON Experiment Runs

	Birochalter Theory disks: BM rold considerant							
					Simulatio	n files of the b	Mer experiment	
Smulaton File S	elector							+/-
Generator Name	Bem	Energy, GeV	Target	Centulity	Event Count	File Size, GB	Simulation File Path	Description
DCHQOSM	м	3.2	м	mb	50048	0.231	eosincabrintsinigenOCMQOSMMAIL_32ACeV_mb3VAIL_32ACeV_mb_10.12	
BCMCGSM	Ar.	3.2	N	mb	50063	0.229	loopincabminisingen/CCMCGSt8/AAII_32AGeV_mb8/AII_32AGeV_mb_100:r12	
DOWOGSM	41	32	A	mb	50034	0.230	tosinicabrintsim/gen/CCM/GSM/4r4L324/GeV_mb/4rL324/GeV_mb_101r12	
DOWQQSM	4	3.2	N	nb	50321	0.230	4eo/ricsbm/sim/gen/CCMQCSM/k/AL_32ACeV_mb/k/L_32ACeV_mb_102112	
BCNCGSM	м	3.2	N	mb	49969	0.230	teosincabmitisimigen/CCM2GSMMAM_3.2AGeV_mb/WAL3.2AGeV_mb_163.r12	
DOWOGSM	41	32	A	mb	50036	0.230	topincabmitsim/gen/CCM/G69M%r4(_3/24GeV_mb/4r4(_3/24GeV_mb_104 r12	
BCWQQSM	м	32	N	nb	50061	0.229	institute the second state of the second state	
DEWCOSM	н	32	N	nb	5031	0.230	eosincabmitisimigen/CCM2CSM/KrAI_3.24CeV_mb/KrAI_3.24CeV_mb_105.r12	
DOWOGSM	Ar.	32	A	mb	50037	0.230	loopincabmitisim/gon/OCI/VQ6SM/KrAI_3.24GeV_mb/ArAI_3.24GeV_mb_117.r12	
RENGRISM	a,	32	N	nb	50001	0.220	institute the second state of the second state	
DCWQGSM	м	3.2	N	mb	50020	0.229	eosincabmitisimigen/CCMQCSMMAN_3.2AGeV_mb/IVAL3.2AGeV_mb_109.r12	
BCWQGSM	Ar.	32	A	mb	50003	0.231	tecsinicabmitsimigen OCINQ6SN/KeNL32AGeV_mb3eAL32AGeV_mb_111r12	
DOWOGSM	Ar	32	А	mb	50073	0.229	teorinicabrentsimigen/CCM/CGSM/Kr4L_32AGeV_mb3kr4L_32AGeV_mb_110 r12	
DCWQQSM	и	32	N	nb	50073	0.230	eosincabrintsim/gen/CCMQCSMMANL3/2AGeV_mb/IVAL3/2AGeV_mb_111/12	
BCNGGSM	м	3.2	N	mb	50035	0.231	tecsincabmn's migen OCM/QGSM/KrAL32AGeV_mb/KrAL32AGeV_mb/L12.12	
		15	Cir	\sim	IC	sti/	on Eiloc	
			SIL	IIC	лС	1110		

Parameter Values

I	Detector List of the BM@N experiment	Parar	neter List of the BM@N experiment	
Detector Selector	+ / -	Parameter Selector		+ /
Detector Name	Description	Parameter Name	Parameter Type	
BC1		BC1_glabal_mapping	trigger mapping	
802		BC2_global_mapping	trigger mapping	
ТО		BD_global_mapping	trigger mapping	
VETO		DCH_mapping	DCH mapping	
ZDC	Zero Degree Calorimeter	GEM_N_ch_X0_big_I	integer	
TOF1	Time-of-Flight near 400cm	GEM_N_ch_X0_big_r	integer	
TOF2	Time-of-Flight near 700cm	GEM_N_ch_X0_middle	integer	
DCHI	first Drift Chamber	GEM_N_dt_X1_big_I	integer	
DCH2	second Drift Chamber	GEM_N_dt_X1_big_r	integer	
BD	Barrel Detector	GEM_N_dh_X1_middle	integer	
GEM	Gas Elector Multiplets	GEM_N_dt_X_small	inleger	
magnet	BildgN magnet	GEM_N_dt_Y0_big_I	integer	
Bingin	whole BMGN delector	GEM_N_dt_Y0_bg_r	integer	
	Пета регредк. 50 👻 1.–13 of 13 🗸 🗲	GEM_N_ch_Y0_middle	integer	

Detector & Parameters

Parameter Values

Simulation Files

Unified Database. File Inspection Service

Report Selecte	or					_		
Type name	Storage name	Check date	Complete date	File count	Errors	Error name	File Path	Error Details
exp, data	NCX	2022-09-01 03:00	2022-09-05 04:00	3635	39	File read error	/eos/nica/bmn/exp/raw/run7/2213-3588_SRC_Carbon/mpd_run_trigCode_3567.data	[Errno 5] Input/output error
exp, data	NCX	2022-08-21 03:00	2022-08-25 05:11	3635	72	File read error	/eos/nica/bmn/exp/raw/run7/3590-4707_BMN_Argon/mpd_run_trigCode_3799.data	[Errno 5] Input/output error
exp, data	NCX	2022-08-11 03:00	2022-08-14 22:05	3635	104	File read error	/eos/nica/bmn/exp/raw/run7/3590-4707_BMN_Argon/mpd_run_trigCode_4260.data	[Errno 5] Input/output error
sim, data	NCX	2022-08-05 03:00	2022-08-05 08:08	23964	8	File read error	/eos/nica/bmn/exp/raw/run7/3590-4707_BMN_Argon/mpd_run_trigCode_3735.data	[Errno 5] Input/output error
exp, data	NCX	2022-08-01 03:00	2022-08-05 12:15	3635	35	File read error	/eos/nica/bmn/exp/raw/run7/3590-4707_BMN_Argon/mpd_run_trigCode_4500.data	[Errno 5] Input/output error
		Items per page: 5	▼ 1 - 5 of	f 51 🛛 🗸	>	File read error	/eos/nica/bmn/exp/raw/run7/3590-4707_BMN_Argon/mpd_run_trigCode_4633.data	[Errno 5] Input/output error
						File read error	/eos/nica/bmn/exp/raw/run7/3590-4707_BMN_Argon/mpd_run_trigCode_4662.data	[Errno 5] Input/output error
	Error Graph					File read error	/eos/nica/bmn/exp/raw/run7/3590-4707_BMN_Argon/mpd_run_trigCode_4689.data	[Errno 5] Input/output error
150	Experimental	Simulated	NCX D	MICC		File read error	/eos/nica/bmn/exp/raw/run7/4720-5186_BMN_Krypton/mpd_run_trigCode_5088.data	[Errno 5] Input/output error
100						File read error	/eos/nica/bmn/exp/raw/run7/2213-3588_SRC_Carbon/mpd_run_trigCode_3455.data	[Errno 5] Input/output error
100						File read error	/eos/nica/bmn/exp/raw/run7/4720-5186_BMN_Krypton/mpd_run_trigCode_5150.data	[Errno 5] Input/output error
						File read error	/eos/nica/bmn/exp/raw/run7/2213-3588_SRC_Carbon/mpd_run_trigCode_3303.data	[Errno 5] Input/output error
50						File read error	/eos/nica/bmn/exp/raw/run7/2213-3588_SRC_Carbon/mpd_run_trigCode_2240.data	[Errno 5] Input/output error
0						File read error	/eos/nica/bmn/exp/raw/run7/2213-3588_SRC_Carbon/mpd_run_trigCode_2687.data	[Errno 5] Input/output error
Apr	Apr '22 May '22 Jun '22 Jul '22 Aug '22 Sep '22				sep 22	File read error	/eos/nica/bmn/exp/raw/run7/3590-4707_BMN_Argon/mpd_run_trigCode_4327.data	[Errno 5] Input/output error
	File read error	or 🔴 F	File not found			File read error	/eos/nica/bmn/exp/raw/run7/3590-4707_BMN_Argon/mpd_run_trigCode_4125.data	[Errno 5] Input/output error
	13							

♠ the Inspection Service

Offlinte Meftadata Systems

Architecture of the Event Metadata System



<u>Web interface</u> for viewing and searching for event metadata stored in the Event Catalogue and retrieving events which satisfy given user parameters

Metadata API for writing new metadata to the Event Catalogue while data processing and requesting events selected by criteria for physics analysis in BmnRoot

Web User Interface of the Event Metadata System

BM@N Event Metadata System 🔅

🧓 🧖 postgres 📑

BM@N Events		rs	Test Events	Storage	File path	# Event	Software	Period	# Run	Total track num	Triggers (string)	Primary vertex
Search Events		ete		data1	/var/file1	150	19.1	7	5100	90	qwe	true
SRC Events		ŭ	Software Version									
I Search Events	7	Period Numb Run Number	Period Number	data1	/tmp/file4	1	19.1	7	5001	25	qwerty	true
Test Events	filte		Run Number	data1	/tmp/file4	2	19.1	7	5001	77	qwerty1	false
	pre	ase	Beam Particle	data1	/tmp/file4	3	19.1	7	5001	25	qwerty	true
	DB	P	Target Particle	data1	/tmp/file4	4	19.1	7	5001	25	qwerty	true
	ion	ers	Energy GeV	data1	/tmp/file4	10	19.1	7	5001	25	qwerty	true
	ndit			data1	/tmp/file4	11	19.1	7	5001	77	qwerty1	false
	Cor	araı	Total track number	data1	/tmp/file4	12	19.1	7	5001	25	qwerty	true
		d þ	Triggers (string)	data1	/tmp/file4	13	19.1	7	5001	77	qwerty1	false
	set	ure	Primary vertex 👻	data1	/tmp/file4	14	19.1	7	5001	25	qwerty	true
	ffol	nfig	Limit [dflt=100]		event poin	ter					1–10 of	f15 < >
	anc	8	Offset							1 . 0		

event metadata are written only if primary vertex has been found in the event

BM@N

Contains summary properties of collision events and references to their storage location

selection

Allows user to quickly search for a set of events required for a particular physics analysis by various parameters

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CollaftoratioSyStemices

Evolution of the BM@N Services



FreeIPA: Single Authentication & Authorization



Monitoring Information Systems



16 September 2022

Email Notifications

BM @Cb Distutiby tEdu Brencessing

Status of Computing Clusters for BM@N

NICA Cluster ncx[101-106].jinr.ru (LHEP, b.216)



OS: CentOS 7.7 Exp. software: **CVMFS** EOS: 1 PB (replicated) GlusterFS: 116 (*replicated*) SGE: 500 slots/user

MICC Tier1/2 Centre Ixui,jinr.ru (LIT, b.134)



OS: Scientific Linux 7.9 Exp. software: **CVMFS EOS: 1 PB** (replicated)

SLURM: cicc - 400 slots/user

HybriLIT platform (HPC Govorun) hydra.jinr.ru (LIT, b.134)



OS: Scientific Linux 7.9 Exp. software: **CVMFS**, **Modules**

ZFS: 280 TB, Fast Storage on Lustre 100 TB_{ssd} SLURM: *bmn* – 192 slots

FairSoft/FairRoot have been installed & configured in JINR CVMFS Automatic software deployment of the BmnRoot on CVMFS with GIT CI

Using BmnRoot at the computing clusters

BM@N Clusters

New FairSoft and FairRoot has been installed in CVMFS





Local Machines with CentOS 7

C++14/17 → GCC 7.2.1+ → devtoolset-7/9... CMake 3.11 or above → CMake3



One Software Storage, CVMFS is used at BM@N DAQ Farm, NCX-cluster, LIT MICC & HybriLIT

run after login every time (or add to .bashrc)

ssh -X [username]@[ncx,hydra,lxui].jinr.ru

. /cvmfs/nica.jinr.ru/centos7/bmn/env.sh # GCC 11.2 + cmake 3.18 + simpath/fairrootpath

Do not forget to run SetEnv.sh script once before building the BmnRoot framework

Manuals: https://bmn.jinr.ru/software-installation/ https://bmn.jinr.ru/nica-cluster/ https://bmn.jinr.ru/micc-complex/ https://bmn.jinr.ru/hybrilit-govorun/

BM@N Software-Computing Architecture (design)



BM@DIKstfillntedvParcessing

BM@N WorkFlow Services via DIRAC



BM@N event processing via **DIRAC**

	Tier-1 (CICC/Tier-	2 Clouds	Govorun 1	NICA Cluste
RawToDigit			Only with CVMFS		
DigitToDst			Only with CVMFS		
GenToSim			Only with CVMFS		
SimToDst			Only with CVMFS		1

Quotas (cores): Tier1: 920 (for NICA) Tier2: 1000 (for NICA) Govorun: 192 (BM@N) NICA cluster: 250 (for NICA) JINR Cloud: 90 (for JINR) Members-states clouds: ~500 (for JINR)

number of running jobs exceeded 1600

Total number of jobs: 18,900

Total wall time: 29 years Average duration: 13 hours



Data-Processing Simulation for BM@N



Simulation Results (Scenario 1)



800 hours \approx 1 300 TB raw data



Completed jobs in 800 hours

RawToDigit $\approx 45\%$ **GenToSim** $\approx 99\%$

DigitToDst ≈ 25% SimToDst ≈ 97%

- the software modelling complex has been upgraded
- Based on the simulation results, we can predict problems that may appear during the experiment and data processing.

BM@N Software Contribution

<u>Peter KLIMAI</u>, Mihail ZELENYY, Artyom DEGTYAREV Development of Information Systems and Services for BM@N Ongoing negotiations with <u>Andrey Rogachev</u> (LPR MIPT) to attract students for BM @N

MIPT group (Head: Tagir AUSHEV)



BM@N Software Contribution <u>Sergei NEMNYUGIN</u>, Anastasia IUSUPOVA Development of an Interactive Virtual Reality application for BM @N Visualization

SPbU group (Head: Sergei NEMNYUGIN)

JINR LIT (Director: Vladimir KORENKOV)

Irina FILOZOVA, Igor ALEXANDROV, Evgeniy ALEXANDROV and staff Development of the Geometry Database and Online Configuration Systems

JINR LHEP (Spokesperson: Mikhail KAPISHIN)

BM@N Software "Group" (2.5 FTE)

Konstantin GERTSENBERGER

Alexander CHEBOTOV, Ilya ROMANOV

ЛФВЭ

BM@N Computing and Technical Contribution

JINR LHEP (Computing Leader: Andrey DOLBILOV)

СНЕР ЛФВЭ

Ivan SLEPOV:

Support of the information services for BM@N on the NICA cluster

BM@N Computing & Technical Contribution

JINR LIT (Director: Vladimir KORENKOV)

Nikita BALASHOV: CVMFS Deployment, GitLab Services, Docker Containers, Document Database Server (with Ivan Sokolov)

Dmitriy PODGAYNY, Oksana STRELTSOVA, Maksim ZUEV HybriLIT and SC Govorun support

Igor PELEVANYUK: DIRAC workload management system

Vladimir TROFIMOV, Daria PRIAKHINA Simulation of BM@N computing infrastructure

Irina FILOZOVA, Tatiana ZAIKINA, Galina SHESTAKOVA **Development of the BM@N Gallery with official figures and images**

Concise Roadmap of the BM@N Software I

Topic	Development Task	FTE/y	Implementer
	BM@N distributed data processing via WMS (DIRAC)	0.5	x
	BM@N distributed data processing using File Catalogue (RUCIO)	0.25	x
	Workflow Service (AirFlow) integration with BM@N systems	0.25	x
ting	NICA-Scheduler support	0.25	K. Gertsenberger
ndm	Benchmarking and testing BM@N clusters to predict failures	0.25	х
@N Co	Modelling System for BM@N computing infrastructure	0.5	V. Trofimov (LIT) D. Pryahina (LIT)
BM	Dockers for BmnRoot: deployment and distributed processing	0.25	x
	Online Processing System using FairMQ & DDS, Event Monitor	0.5	I. Romanov (LHEP)
	Integration of the Online Converter with the Condition Database	0.25	x
	Modern Web Event Display for online and offline visualization	0.5	x
at ng	Implementation of miniDST format	0.25	x
nRoc essii	Implement Trigger Info format and write to the Unified Database	0.25	x
Bmr proc	Automation of BM@N Alignment	0.25	Zafar Tukhliev (LIT) Zarif Sharipov (LIT)

Concise Roadmap of the BM@N Software II

Горіс	Development Task	FTE/y	Implementer
BM@N Information Systems and its Services	Configuration Database and Manager using DDS	0.25	I. Alexandrov (LIT) et al
	Web Interface for the Online Configuration System	0.5	I. Filozova (LIT) et al.
	Geometry Information System and its integration	0.25	I. Alexandrov (LIT) et al
	Event Metadata System	0.5	P. Klimai (MIPT) et al.
	Web interface for the Event Metadata System	0.5	P. Klimai (MIPT) A. Chebotov (LHEP)
	Improving web interface for the Condition Database (UniDB)	0.1	A. Chebotov (LHEP)
	Auxiliary services for the Condition Database	0.25	Mikhail Zelenyi (MIPT)
	REST API interfaces to the Information Systems (Electronic Logbook, Condition DB, Event Metadata, Geometry DB)	0.5	P. Klimai (MIPT) A. Chebotov (LHEP)
	Common Deployment System for all Information Systems	0.25	A. Chebotov (LHEP)
	Development of the Monitoring System for BM@N Software	0.25	x
	Database replication for auto-recovering BM@N systems	0.25	x
	Refinement and support BM@N software systems and services	0.5	X
	Deployment and support the systems on the NC-cluster	0.25	I. Slepov (LHEP)

Concise Roadmap of the BM@N Software III

Topic	Development Task	FTE/y	Implementer	
Collaboration Services	System for publication and report activity: DocDB (Fermilab) & Alternative software solution	0.25	N. Balashov (LIT) et al. I. Filozova (LIT) et al.	
	Web Gallery for officially approved figures	0.25	I. Filozova (LIT) et al.	
	Support of the GitLab pipelines (tests), dockers	0.25	N. Balashov (LIT)	
	Supporting and improving the current BM@N services	0.25	K. Gertsenberger	
	BmnRoot support and evolution	0.5	K. Gertsenberger	
	Correcting error messages and memory bugs in BmnRoot	0.25	x	
	Writing documentation, tutorials, project management system	0.25	x	
	And many other tasks: forgotten tasks, emerging tasks, transition to modern solutions (e-Log redesign, NoSQL for Condition DB	x	x	
The shortage of FTE is a minimum of 4.25				



The BM @N Software Group must be increased from 2.5 to 6 FTE at least to support stable work of the BM @N software

BM@N Software Strategy

without Software Complex



with Software Complex



Software Strategy Issues

Goals and objectives: defined

Resources

Software Fund: no fund, no financial support, own motivation of the non-LHEP participants

- Staff: no regular software group (denied)
- Computing Resources: not enough stable computing resources for future BM@N processing
- Roadmap: defined

Conclusions

- A lot of efforts have been invested to make progress in development of the systems for BM@N online data processing, such as Configuration Information System and process management system via FairMQ and DDS packages.
- Many software information systems of the complex are on the final stage of the implementation and deployment on the NC-cluster to reduce the time of obtaining physics results. The Electronic Logbook and Condition Database with related services are actively employed by the collaboration members. The Geometry Database, Event Metadata and Configuration Systems are on the last stage of the completion.
- Some manual structure improvements in the structure improvement in the structure improvement in the structure improvement is to be employed for mass data processing in Run 8.
- The distributed software-computing architecture of the BM@N data processing has been designed. The work with the DIRAC workload manager is in progress.
- The lack of the software fund, regular staff and stable computing resources poses serious risks for the further BM@N data processing and analysis, and decisions need to be made before the experiment is totally wrapped up in the issues.

Official BM@N Web-site: bmn.jinr.ru



✓ Collaboration
✓ Information
✓ Documents
✓ Software
✓ Databases
✓ Computing Section (NICA Cluster, MICC Complex, HybriLIT & Govorun)

✓ Guides, Manuals

✓ Wiki

✓ Forum

✓ ZOOM room

✓ BM@NMail-lists

✓ etc.

Thank you for your attention!

More information: bmn.jinr.ru nica.jinr.ru

Email: gertsen@jinr.ru



Backup

BM@N User Registration Form

Already registered

freeIPA



bmn.jinr.ru/registration

The required fields are filled in and the request is sent by email to the software coordinator

It is impossible to register yourself on the resources only via sending this request

You must specify the mail, select resources and specify the necessary rights



BM@N REGISTRATION FORM

Please complete all sections and send the signed form to the BM@N official person 💿 🚊 🕖					
□ new JINR user □ new external user □ change of status	JINR department				
Family name	JINR office				
First name (s)	JINR phone number				
Second name (if exists)	JINR email				
Date of Birth (Day.Month.Year):	<i>if not JINR employee</i> Home Institute name				
Contact email					
Contact phone number	Home Institute work phone				
Preferred login	Home Institute work email				
Contract period (or association with BM@N) (Day.Month.Year): from					
Status: Prof. PhD Scientist/Specialist PhD student Student Student					
Nature of activity: Scientific Engineering Technical Administrative Other:					
Team Leader: Work area at BM@N (briefly) Participation in other experiments					

I understand and certify that, for the entire duration of my association with BM@N:

- All BM@N users are expected to participate in Collaboration activities, scientific and technical, in a collegial manner respecting the cultural and ethnic diversity within the Collaboration.
- All BM@N users are expected to abide by the BM@N Bylaws and other adopted policies. They are also expected to abide by the JINR rules and procedures while present at the host premises.
- The scientific results obtained in course of the experiment shall be published only with the consent of all authors. The paper to be published and report to be presented shall be cleared by a Convener of the corresponding Working Group before submission.
- BM@N computing facilities, services and software are intended for the attainment of the experiment's aims. Their use must come within the professional duties of the user and work on the BM@N experiment. The use of the computing facilities and software must cause no material or moral damage to the experiment or any computing facilities, nor disrupt their operation.
- BM@N computing facilities must be used in conformity with their rules of use. The rules for the NICA (NCX) cluster, HybriLIT platform with Govorun and JINR CICC are listed on the official web sites, currently at https://webncx.jinr.ru/start, http://hybrilit.jinr.ru/en/for users and http://lxs-s03.jinr.ru/cicc/index.php/en/home/.
- I am aware of the prohibition on divulging given passwords, the use of unlicensed software, the inadmissibility of attempts of unauthorized access to the services, computer and network resources of the BM@N experiment.
- Although the Collaboration endeavours to maintain and protect its computing facilities and software, it cannot

BM@N Wiki Document Server

i¥:₩IKI		Q ²⁰⁺ [] ≡	
🤌 Registration 🛛 📑 BM@N I	Logbook 🔮 BM@N Forum 🛛 👩 BM@N Database		-X-VVIKI
Menu	🕷 👻 / Document Server for the BM@N experiment 🐃	Tutorials	THE BEST WAY TO ORGANIZE INFORMATION
 > 1. BM@N Subsytems > 2. Run Control > 3. SRC @ BM@N 	Document Server for the BM@N experiment For the treate	1. Create Subcategory2. Create Page (with docs)	Orations
> 4. Documents > 5. Reports			Sections
 6. Meetings 7. Software 8. Commuting 	Documentation of data is essential for best research practice and ensures scientific transparency and data integrity. BM@N WIKI Document Server is	Recently Visited	BM@N Subsystems
- a. Computing	where you can find the Library catalogue (books, ebooks, e-journals, standards) and the scientific output (articles, documents, Reports, etc.)	Recently Created	Run Control
	Subjects BM@N	implementation of the Event Metadata System for the BM@N	SRC program
	Documents Reports Meetings BM@N SRC Run Control Software Computing	experiment 2021.04.13 13. BERDS Meeting 07/04/2021 2323 11. Hyperon meeting 05.04.2021	Common documents
			Reports
	Tags: (+) Created by chebotov on 2018/12/11 11:20		Software
	Attachments (0) History	_	Computing
	No attachments for this page		
	Выбрать файлы Файл не выбран	docker	Alchive
	XWNii 12.5.1		

- Contains all documents of the BM@N experiment
- Located in the Docker at the NICA cluster
- FreeIPA Authentication (Single Account)

Tango (Slow Control) Viewer



BM@N Collaboration Forum





Platform: Discourse

Architecture: Redis + sidekiq + Nginx + PostgreSQL

Forum Topics:

- News
- Support and Questions
- Sections for Working Groups
- Physics Analysis Issues

Moved to the Docker at NICA cluster

Switched to FreeIPA Authentication (Single Account)

BM@N Forum & News system for a quick communication and discussions between collaboration members and groups:

various topics for different groups, subscriptions, comments...