

Development of the Condition Database for the experiments of the NICA complex

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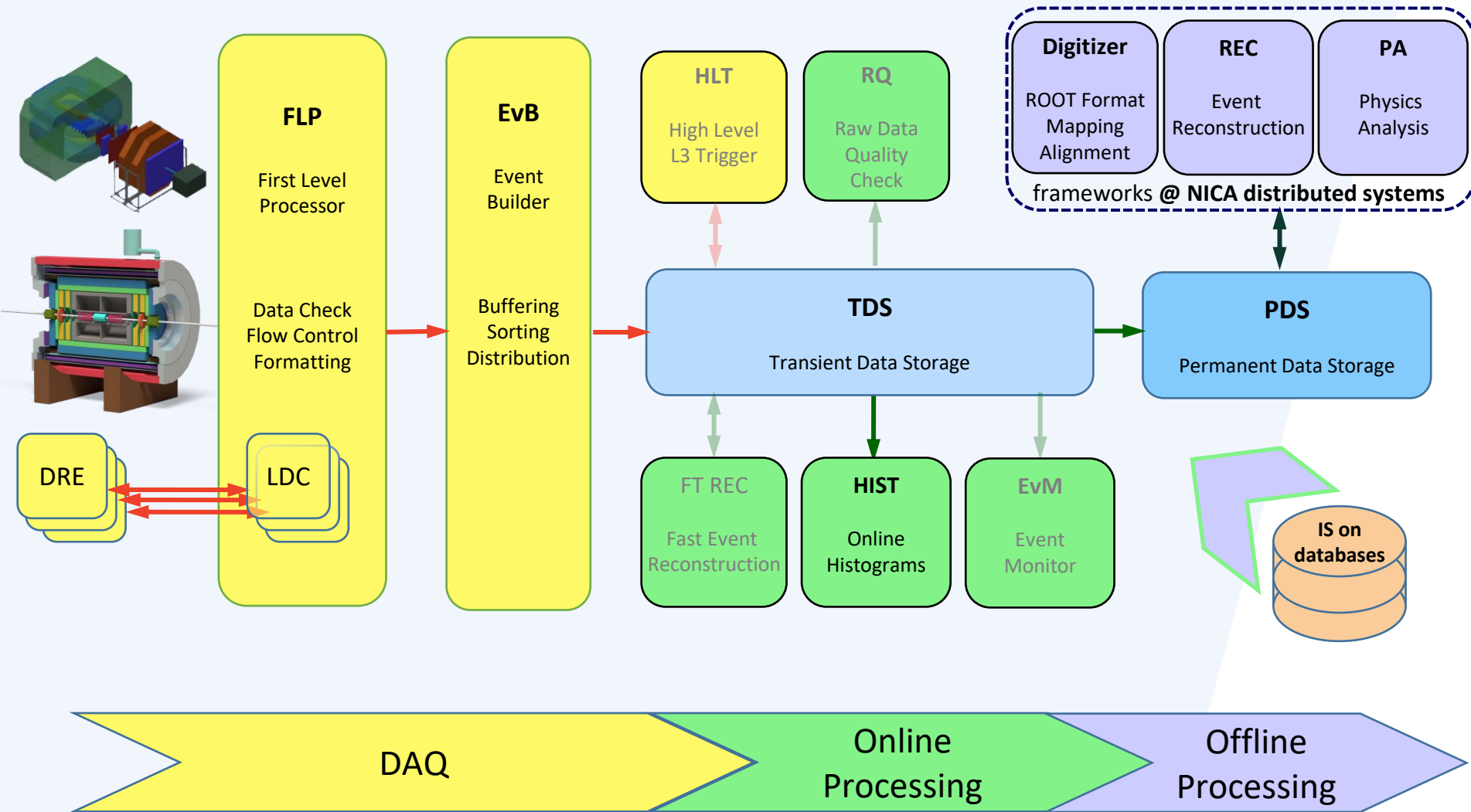
Nuclotron-based Ion Collider fAcility



- Beams: from p, d^{\uparrow} to Au^{79+}
- Luminosity: 10^{27} (Au^{79+}), 10^{32} (p) $cm^{-2}s^{-1}$
- Collision energy: $\sqrt{s_{NN_{Au}}} = 4 - 11$ GeV $E_{lab} = 1 - 6$ AGeV

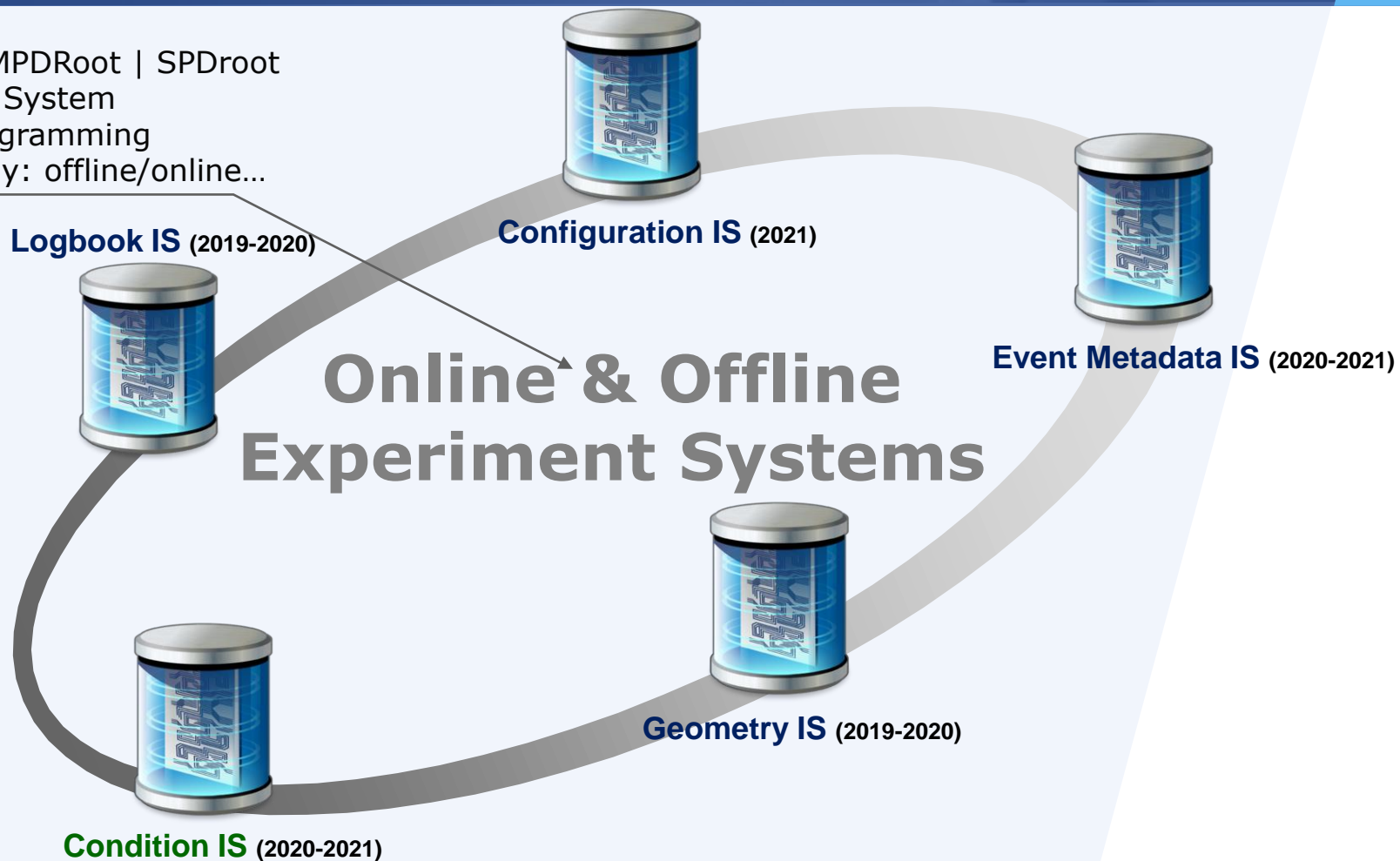
- Fixed target experiment: BM@N (2018)
- 2 interaction points: MPD (2023) & SPD (>2025)
- Official site: nica.jinr.ru

Data Processing Pipeline



Information Systems for online & offline processing

BmnRoot | MPDRoot | SPDroot
Run Control System
Online Histogramming
Event Display: offline/online...



RFBR Grant 2019 – 2021: Development of Information Systems for Online and Offline Data Processing for the Experimental Setups of the NICA Complex

Multiple formats of the BM@N parameters (2015)

~1000 raw files, ~2000 ROOT files, various parameter data

#	File name	Events	Start Time	End Time	Average Rate	BField	detales
1	run688.data	49766	2015-03-15 08:05:39	2015-03-15 08:24:28	44.08	0.05	detales
2	run687.data	3643	2015-03-15 07:56:49	2015-03-15 08:04:39	7.75	0.06	detales
3	run686.data	744	2015-03-15 07:49:25	2015-03-15 07:56:16	1.81	0.07	detales
4	run685.data	6599	2015-03-15 07:39:01	2015-03-15 07:45:37	16.66	55.30	detales
5	run684.data	303520	2015-03-15 07:11:16	2015-03-15 07:38:37	184.96	59.79	detales
6	run682.data	10796	2015-03-15 06:58:37	2015-03-15 06:59:02	431.84	59.80	detales
7	run681.data	49976	2015-03-15 06:55:17	2015-03-15 06:58:03	301.06	59.78	detales
8	run680.data	61053	2015-03-15 06:51:37	2015-03-15 06:55:05	293.52	59.78	detales
9	run675.data	9633	2015-03-15 06:30:37	2015-03-15 06:30:44	1376.14	59.80	detales
10	run672.data	59162	2015-03-15 03:44:00	2015-03-15 03:48:14	232.92	59.75	detales
11	run651.data	59161	2015-03-15 03:44:00	2015-03-15 03:48:14	232.92	59.75	detales
12	run650.data	500572	2015-03-15 02:41:14	2015-03-15 03:36:26	151.14	59.72	detales
13	run649.data	517970	2015-03-15 01:47:00	2015-03-15 02:40:26	161.56	59.73	detales
14	run648.data	540761	2015-03-15 00:49:47	2015-03-15 01:45:38	161.37	59.71	detales
15	run647.data	524991	2015-03-15 00:04:47	2015-03-15 00:48:37	199.62	59.70	detales
16	run646.data	508602	2015-03-14 23:17:23	2015-03-14 23:59:13	202.63	59.70	detales
17	run645.data	378469	2015-03-14 22:25:44	2015-03-14 23:10:37	140.54	59.69	detales
18	run644.data	512338	2015-03-14 20:26:54	2015-03-14 22:01:55	89.87	59.63	detales
19	run643.data	505324	2015-03-14 19:34:33	2015-03-14 20:26:36	161.81	59.61	detales
20	run642.data	454358	2015-03-14 18:48:03	2015-03-14 19:34:15	163.91	59.57	detales
21	run641.data	1765	2015-03-14 18:47:43	2015-03-14 18:47:45	882.50	0.00	detales

HTML

258	d
262	d
266	d
270	d
271	d

Excel

Target	Field Curr., A	Field Fact.	File size
Cu	900	1,00	113 M
Cu	900	1,00	289 M
-	600	0,67	221 M
-	800	0,89	223 M
-	900	1,00	226 M
-	1000	1,11	231 M
-	1100	1,22	223 M
-	1200	1,33	217 M
-	1100	1,22	218 M
-	1100	1,22	244 M
-	1100	1,22	158 M
-	1100	1,22	196 M
-	1000	1,11	211 M
-	1000	1,11	210 M
-	900	1,00	326 M
Cu	900	1,00	194 K
Cu	1100	1,22	324 M
Cu	1100	1,22	249 K
Cu	1100	1,22	127 M

e.g. noise channels

ise_run1_2.txt		
1	run	row
2	slot	chan.
3		
4	077	2
5	15	33-48
6	16	49-64
7		
8	133	1
9	16	49-64
0		
1	151	2
2	15	33-48
3	16	49-64
4		
5	161	1
6	16	49-64
7		
8	172	2
19	9	40 41
20	10	57
21		

Ln : Dos\Windows UTF-8 INS

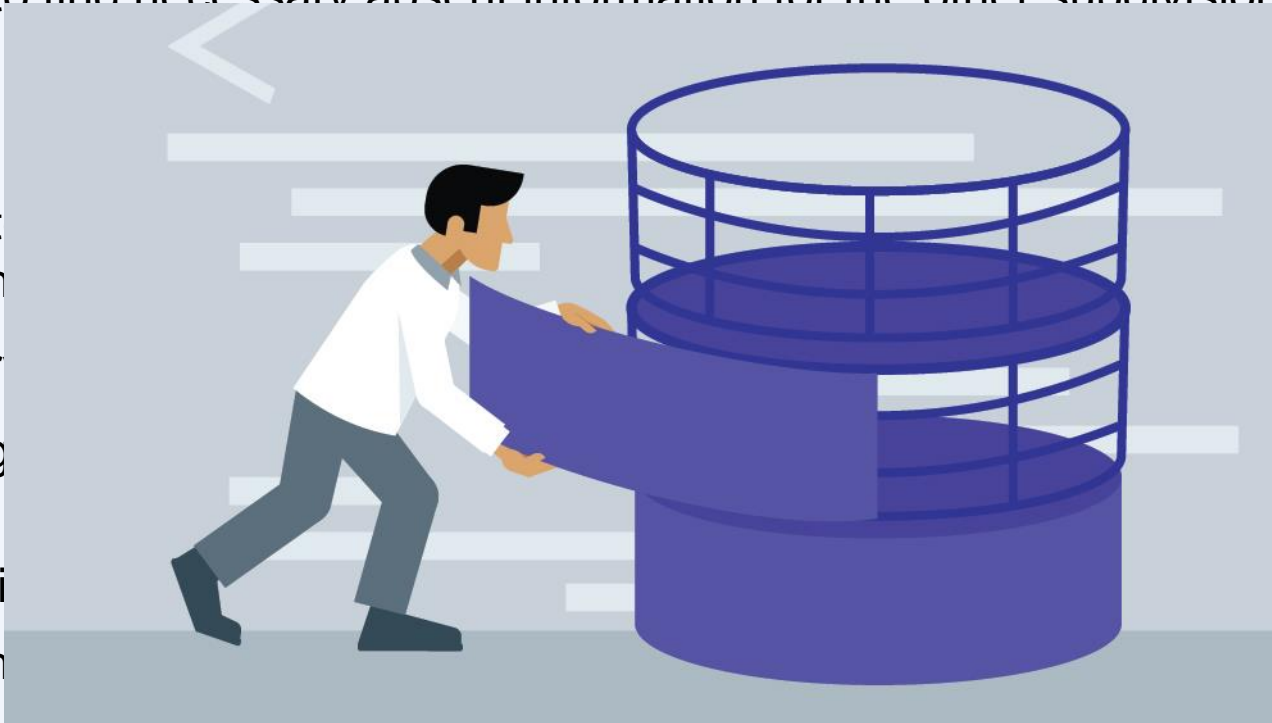
Text

Technical Run 1

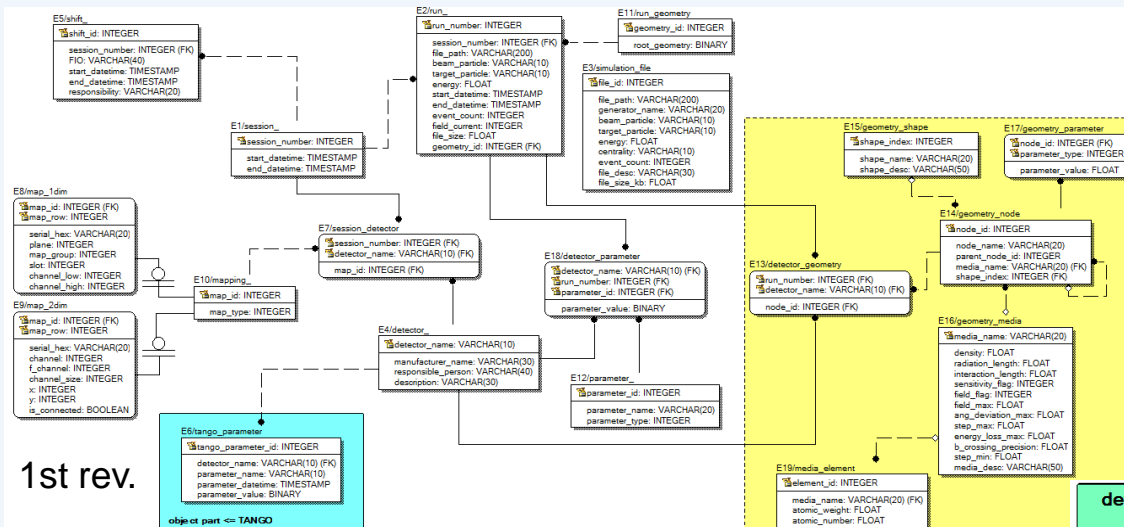
Why should a database system be used?

The lacks of the used file storing approach:

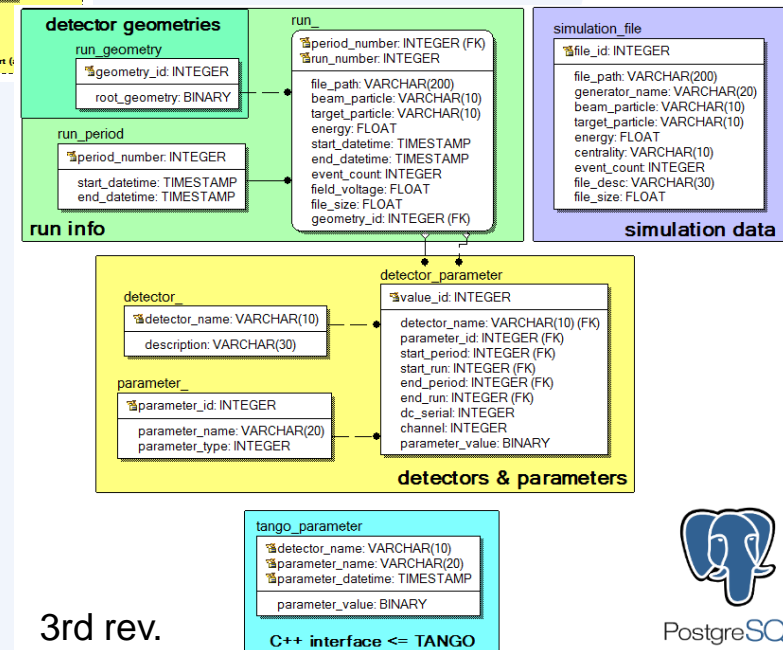
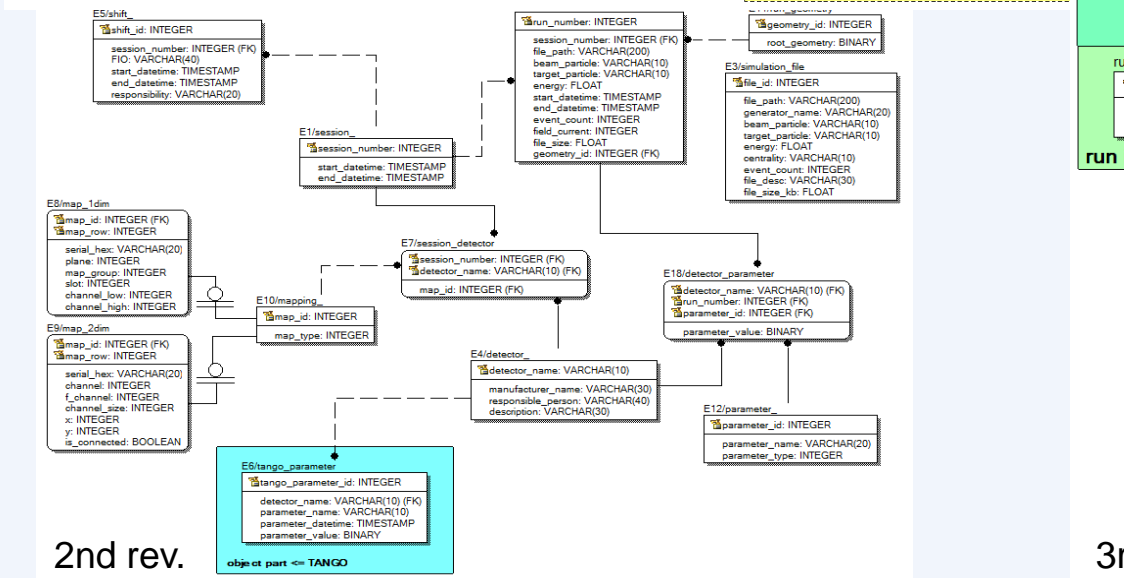
- ❖ parameter data of the experiment is distributed between many subdivisions → it is difficult to find necessary absent information for the other subdivisions
- ❖ required (e.g., text, html, excel, ...)
- ❖ parameter data will not know about changes
- ❖ geometrical data
- ❖ the usage of data is different
- ❖ sequential access
- ❖ no mechanism for access control
- ❖ it is difficult to access and manipulate the data: one needs some dedicated programs
- ❖ uncontrolled concurrent access by multiple users often leads to inconsistencies



Evolution of the Unified Database (2016-2019)



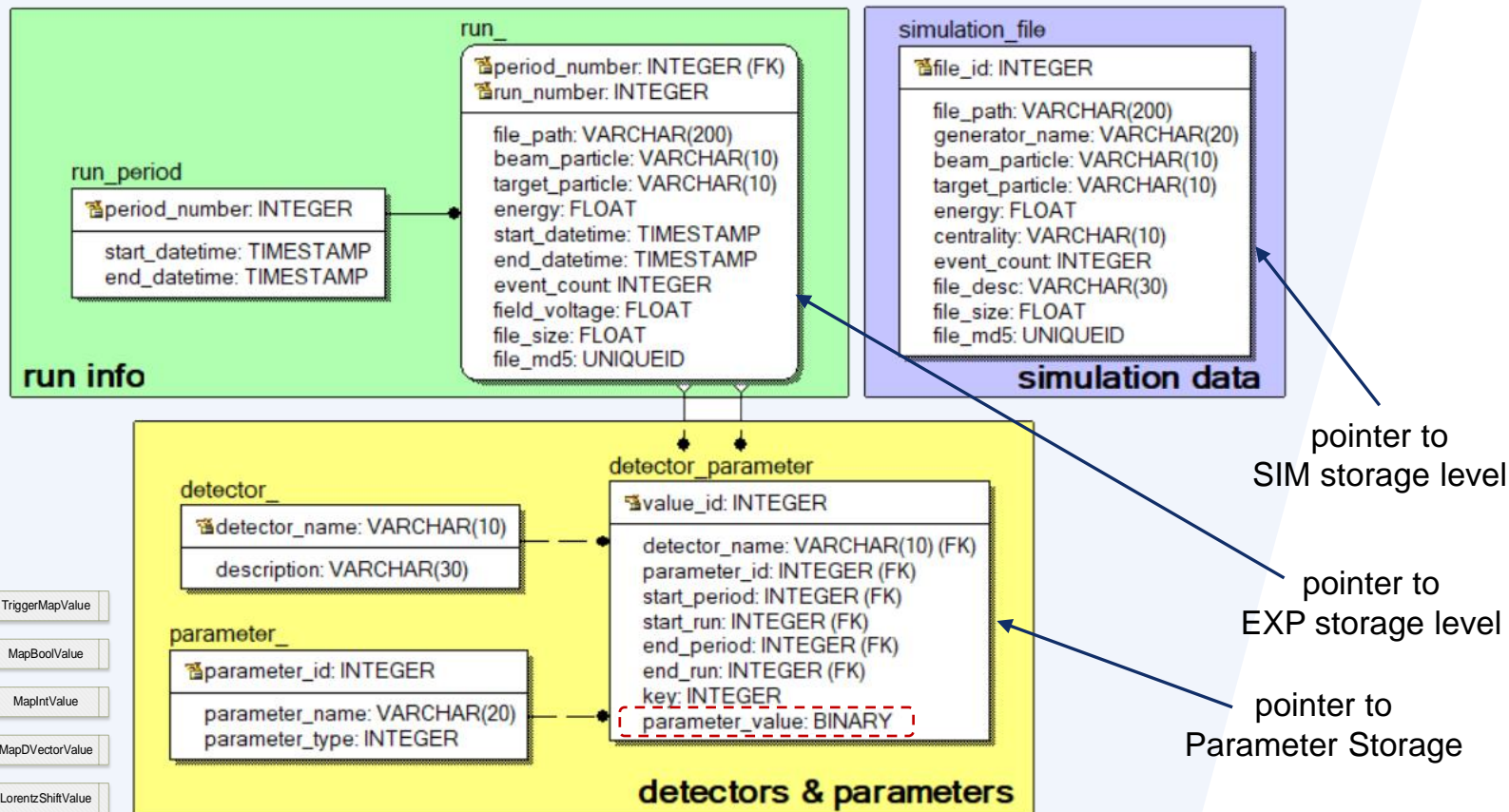
3 SQL DATABASES WALK INTO A
NoSQL BAR...
...A LITTLE WHILE LATER THEY WALK OUT.
BECAUSE THEY COULDN'T FIND A
TABLE
database developers joke



Purposes of the Condition Database

- **central data storage** for offline data analysis (and may be online tasks) in the experiments of the NICA project
- **unified access** and data management for all collaboration members
- correct **multi-user data processing**
- ensuring the **actuality of the information** being accessed (sessions and run parameters, technical and calibration data, etc.), **data consistency and integrity**
- excluding the multiple duplication and use of outdated data
- **automatic backup** of the stored data

{ Unified → Condition } Database Diagram



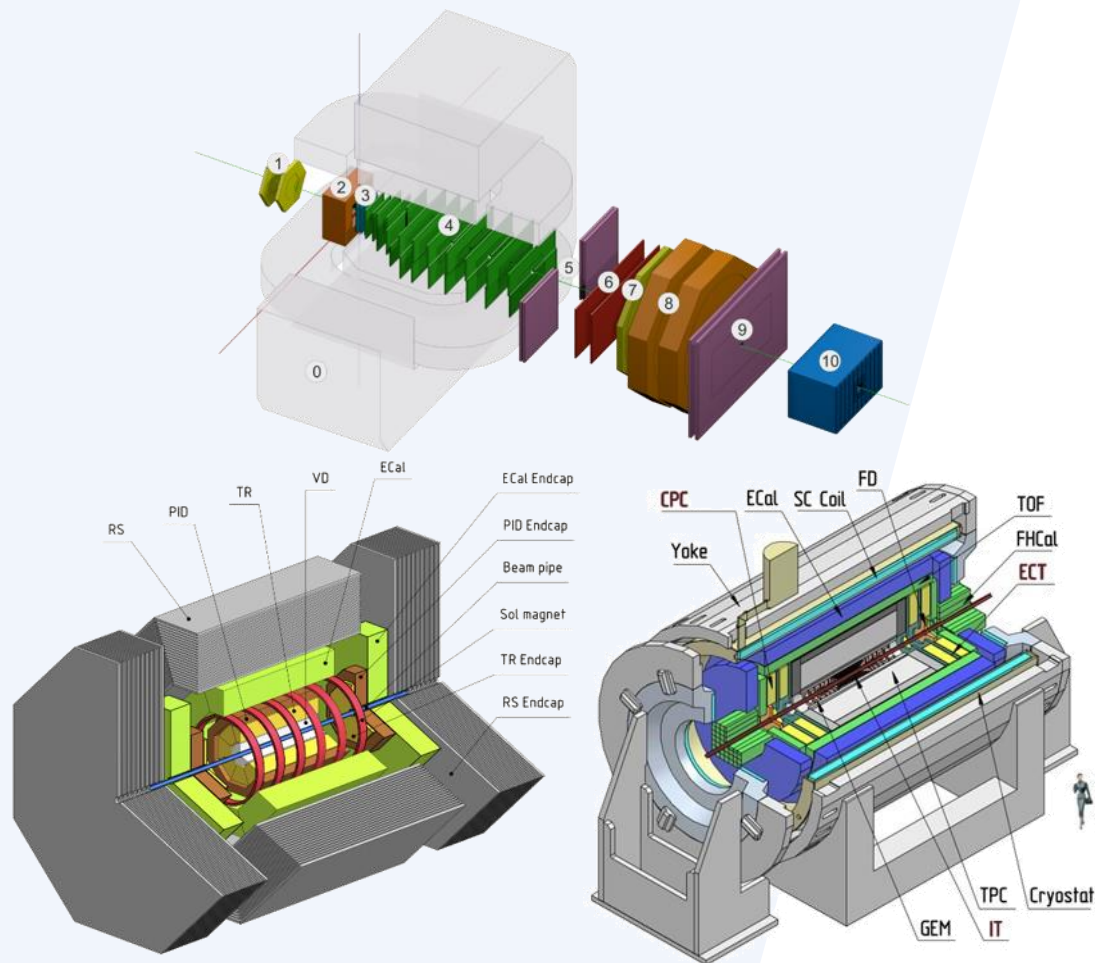
The following solutions were considered to replace old packed structures:
ZeroMQ, MessagePack, BOOST, Protobuf, FlatBuffers, ROOT/TStreamer, **C++ manual serialization.**

storing information on experiment sessions and runs, detectors, parameters and parameter values, and generated simulation files

Integration with the NICA frameworks

The software **BmnRoot**, **MPDRoot** and **SPDroot** are developed for event simulation, reconstruction of experimental and simulated data and following physics analysis of particle collision events registered by the detectors at the NICA collider.

C++ classes, Linux OS support,
based on ROOT and FairRoot



The frameworks are available at GitLab@JINR: <https://git.jinr.ru/nica/>

Application Programming Interface (C++ API)

Autogenerated class wrappers for database tables with specific functions allow to access and manage data without SQL statements in experiment software

UniDbRunPeriod – describes run periods (a set of runs) of the experiment

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

UniDbDetector – detectors of the experiment (detector dictionary)

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

UniDbDetectorParameter – 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*.

- ✦ integrating the database with experiment frameworks based on the ROOT package
 - ✦ using stored information in offline (and online) event data processing
 - ✦ implementing a convenient search for necessary information by various criteria

Condition Database Architecture



detector simulation
raw data processing
event reconstruction
physics analysis

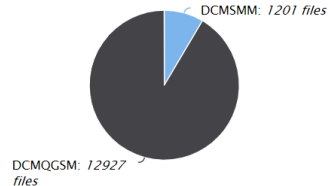
ROOT-based
framework

**C++ database
interface w/o SQL**
(connect, I/O)

Local Condition Database as a local
replica of the central database and
mirroring are under closer consideration

**python script for auto
update of simulation file list**

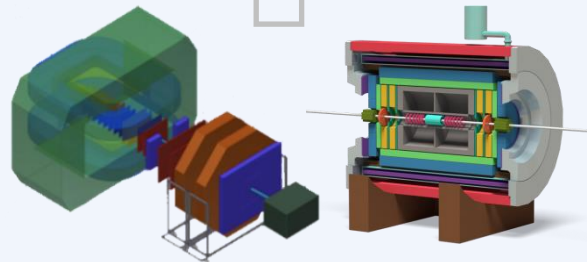
Simulation Data
Distribution of simulation files by generators



**Condition
Database**

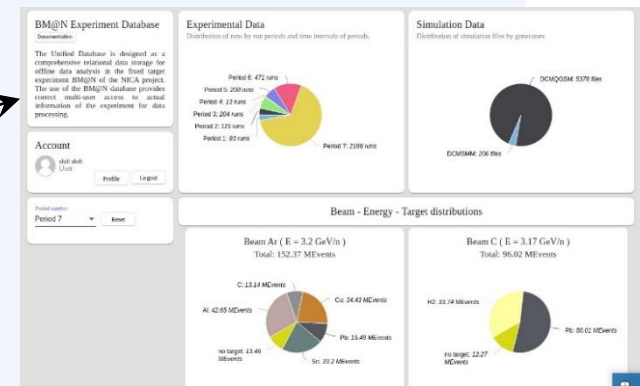
configuration
calibration

parameter and
algorithm data



users

FreelIPA authentication



Web Service

ANGULAR



HIGHCHARTS

node JS



Web service for the Condition Database

Menu

Sign Out

BM@N Experiment Database

Documentation

The Unified Database is designed as a comprehensive relational data storage for offline data analysis in the fixed target experiment BM@N of the NICA project. The use of the BM@N database provides correct multi-user access to actual information of the experiment for data processing.

Account



Konstantin Gertsenberger
Admin

Profile

Logout

Period number

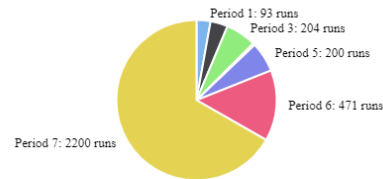
Period 6

Show

Reset

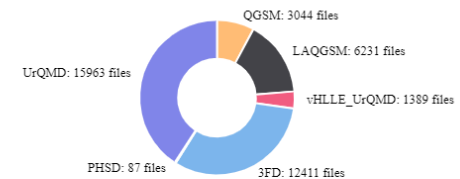
Experimental Data

Distribution of runs by run periods (show time of all periods)



Simulation Data

Distribution of simulation files by generators



Beam - Energy - Target distributions

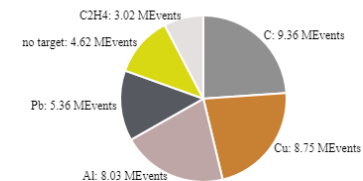
Beam C (E = 5.14 GeV/n)

Total: 0.41 MEEvents



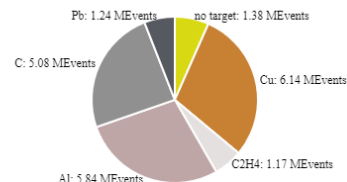
Beam C (E = 4.5 GeV/n)

Total: 39.14 MEEvents



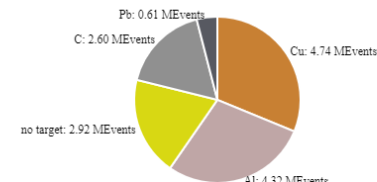
Beam C (E = 4 GeV/n)

Total: 20.85 MEEvents



Beam C (E = 3.5 GeV/n)

Total: 15.19 MEEvents



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

Tabular View of the stored data

Run Selector

BM@N Experiment Runs

Run	Run	Start Time	End Time	Beam	Energy (GeV)	Target	Volume (m ³)	Event Count	File Size (MB)	Simulation File Path	Description
7	5184	2010-04-05 11:50:24	2010-04-05 11:59:31	R	254	Cu	77.61008	107598	22.477	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5184.data	
7	5185	2010-01-05 13:50:30	2010-01-05 11:50:27	R	254	Cu	77.61008	121014	25.038	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5185.data	
7	5187	2010-04-05 13:47:30	2010-04-05 13:59:31	R	254	Cu	77.61008	209460	43.880	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5187.data	
7	5190	2010-04-05 19:20:10	2010-04-05 19:41:14	R	254	Cu	77.61008	201031	42.108	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5190.data	
7	5179	2010-01-05 09:20:30	2010-01-05 19:21:12	R	254	Cu	77.622485	201036	42.028	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5179.data	
7	5175	2010-04-05 09:40:30	2010-04-05 09:30:31	R	254	Cu	77.611197	201054	47.497	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5175.data	
7	5177	2010-04-05 09:20:31	2010-04-05 09:02:27	R	254	Cu	77.61001	204780	42.940	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5177.data	
7	5178	2010-04-05 09:13:12	2010-04-05 09:25:50	R	254	Cu	77.61002	101049	31.802	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5178.data	
7	5174	2010-04-05 07:30:47	2010-04-05 08:11:05	R	254	Cu	77.61009	219131	44.801	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5174.data	
7	5173	2010-01-05 07:30:30	2010-01-05 07:30:11	R	254	Cu	77.612712	219239	41.600	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5173.data	
7	5170	2010-04-05 09:30:30	2010-04-05 09:54:31	R	254	Cu	77.611163	201132	43.476	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5170.data	
7	5190	2010-04-05 09:10:31	2010-04-05 09:30:10	R	254	Cu	77.606713	203884	42.380	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5190.data	
7	5187	2010-01-05 09:10:30	2010-01-05 09:30:30	R	254	Cu	77.630005	303911	7.280	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5187.data	
7	5186	2010-04-05 09:10:31	2010-04-05 09:30:30	R	254	Cu	77.630005	63708	11.285	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5186.data	
7	5185	2010-04-05 09:10:31	2010-04-05 09:30:30	R	254	Cu	77.630005	63708	11.285	neoscabmrun/bgm@n/4720-5185_BM@N_experiment_run_5185.data	

Experiment Runs

Parameter Values Selector

Parameter Values of the BM@N experiment

Detector Name	Parameter Name	Run period	Start run	End run	Run period	Detector	Channel	Parameter value
DCM1	on	1	12	688	3	2367930	1	1.02852 1.78554 ...
TOF1	on	1	12	688	3	2367930	2	-0.04014 0.020627 ...
TOF1	on	1	12	688	3	2367930	3	0.63805 1.31105 ...
TOF1	on	1	12	688	3	2367930	4	-8.105190 1.186202 ...
TOF1	on	1	12	688	3	2367930	5	0.79101 1.65017 ...
TOF1	on	1	12	688	3	2367930	6	0.0022801 1.07066 ...
TOF1	on	1	12	688	3	2367930	7	-4.1177 1.85877 ...
TOF1	on	1	12	688	3	2367930	8	0.88819 1.22003 ...
TOF1	on	1	12	688	3	2367930	9	0.311056 1.30109 ...
TOF1	on	1	12	688	3	2367930	10	0.221916 1.59008 ...
TOF1	on	1	12	688	3	2367930	11	1.10140 1.24716 ...
TOF1	on	1	12	688	3	2367930	12	1.15151 1.80875 ...
TOF1	on	1	12	688	3	2367930	13	1.07190 0.93008 ...
TOF1	on	1	12	688	3	2367930	14	-0.087154 0.790548 ...

Parameter Values

Simulation File Selector

Simulation Files of the BM@N experiment

Detector Name	Beam	Energy (GeV)	Target	Channel	Event Count	File Size (MB)	Simulation File Path	Description
DCM1	Ar	3.2	Ar	nb	8048	0.231	neoscabmrun/bgm@n/3240V_mAAN_3240V_01_12	
DCM1	Ar	3.2	Ar	nb	8050	0.229	neoscabmrun/bgm@n/3240V_mAAN_3240V_02_12	
DCM1	Ar	3.2	Ar	nb	8034	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_03_12	
DCM1	Ar	3.2	Ar	nb	8031	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_04_12	
DCM1	Ar	3.2	Ar	nb	8069	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_05_12	
DCM1	Ar	3.2	Ar	nb	8035	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_06_12	
DCM1	Ar	3.2	Ar	nb	8041	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_07_12	
DCM1	Ar	3.2	Ar	nb	8037	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_08_12	
DCM1	Ar	3.2	Ar	nb	8031	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_09_12	
DCM1	Ar	3.2	Ar	nb	8030	0.229	neoscabmrun/bgm@n/3240V_mAAN_3240V_10_12	
DCM1	Ar	3.2	Ar	nb	8033	0.231	neoscabmrun/bgm@n/3240V_mAAN_3240V_11_12	
DCM1	Ar	3.2	Ar	nb	8073	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_12_12	
DCM1	Ar	3.2	Ar	nb	8073	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_13_12	
DCM1	Ar	3.2	Ar	nb	8073	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_14_12	
DCM1	Ar	3.2	Ar	nb	8073	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_15_12	
DCM1	Ar	3.2	Ar	nb	8073	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_16_12	
DCM1	Ar	3.2	Ar	nb	8073	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_17_12	
DCM1	Ar	3.2	Ar	nb	8073	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_18_12	
DCM1	Ar	3.2	Ar	nb	8073	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_19_12	
DCM1	Ar	3.2	Ar	nb	8073	0.230	neoscabmrun/bgm@n/3240V_mAAN_3240V_20_12	

Simulation Files

Detector List of the BM@N experiment

Detector Name	Description
BC1	
BC2	
TO	
VETO	
ZDC	Zero Degree Calorimeter
TOF1	Time-of-Flight near 400cm
TOF2	Time-of-Flight near 700cm
DCM1	First Drift Chamber
DCM2	Second Drift Chamber
BD	Barrel Detector
GM1	Gas Electron Multiplier
magnet	BM@N magnet
BM@N	whole BM@N detector

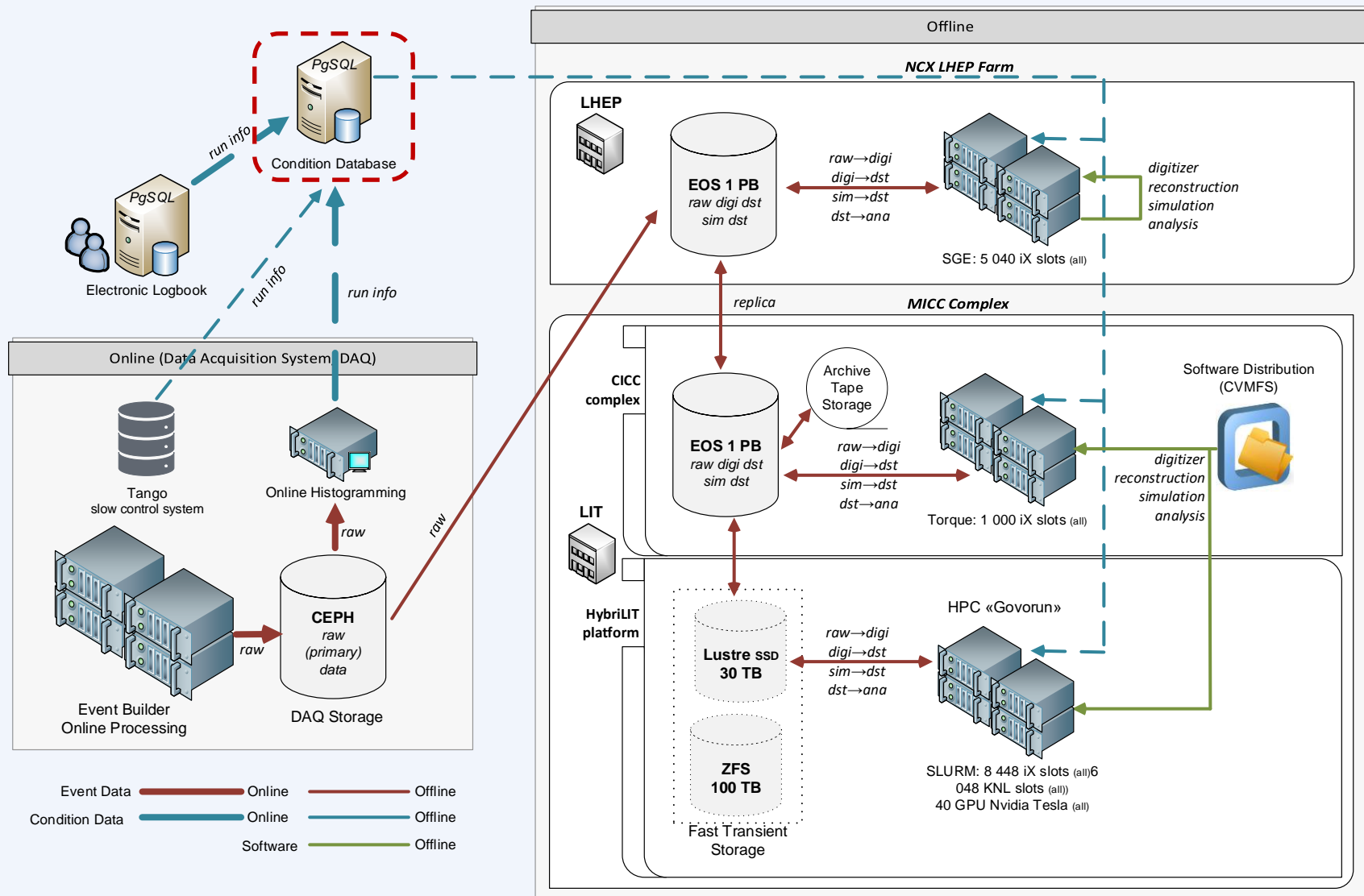
Items per page: 50 1 - 11 of 13

Parameter List of the BM@N experiment

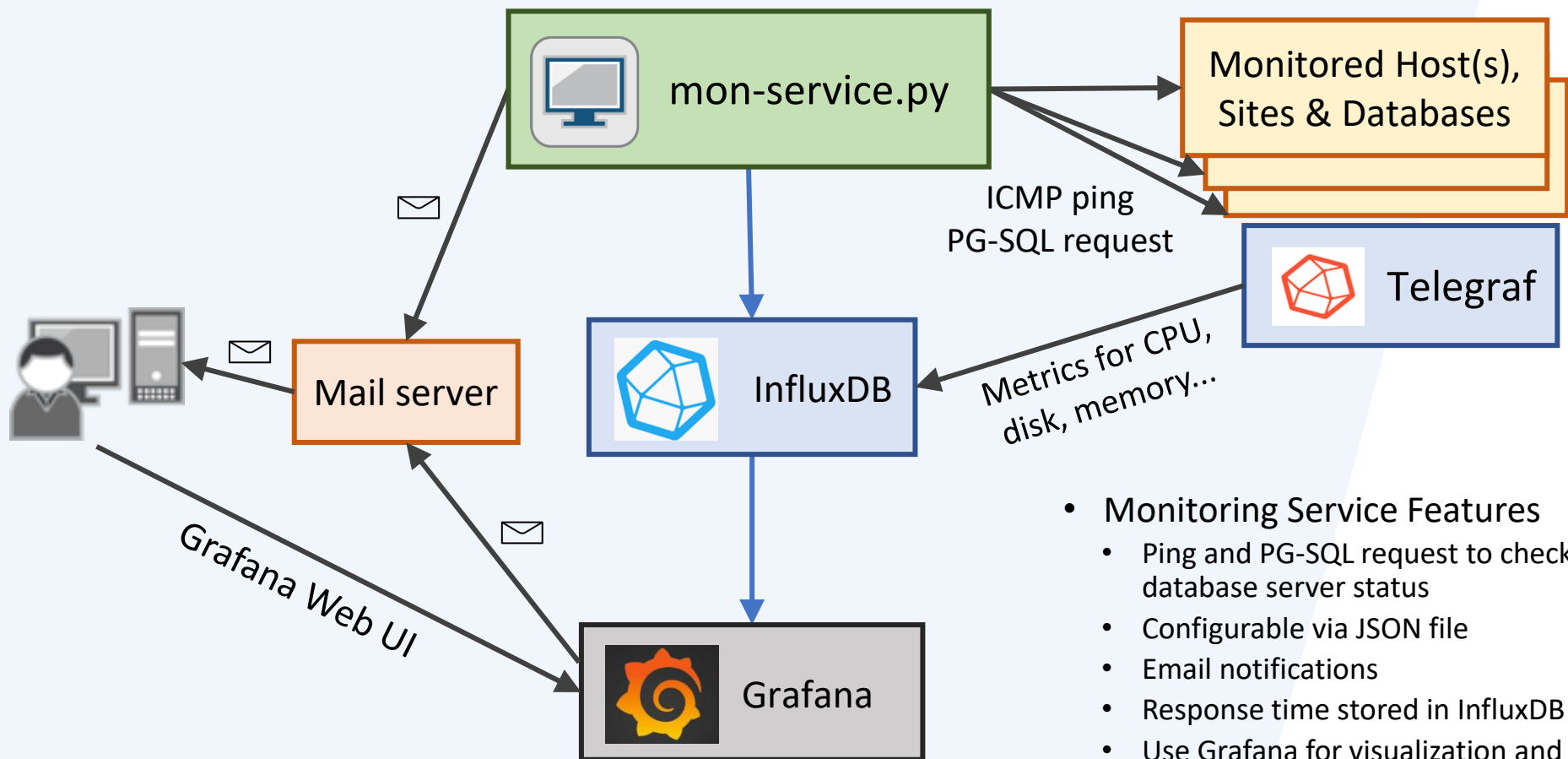
Parameter Name	Parameter Type
BC1_trigger_mapping	trigger mapping
BC2_trigger_mapping	trigger mapping
TO_trigger_mapping	trigger mapping
DCM1_trigger_mapping	DCM-trigger mapping
GEN_N_ch_X0_sig_1	integer
GEN_N_ch_X0_sig_2	integer
GEN_N_ch_X0_sig_3	integer
GEN_N_ch_X1_sig_1	integer
GEN_N_ch_X1_sig_2	integer
GEN_N_ch_X1_sig_3	integer
GEN_N_ch_X1_sig_4	integer
GEN_N_ch_X1_sig_5	integer
GEN_N_ch_X1_sig_6	integer
GEN_N_ch_X1_sig_7	integer
GEN_N_ch_X1_sig_8	integer
GEN_N_ch_X1_sig_9	integer
GEN_N_ch_X1_sig_10	integer
GEN_N_ch_X1_sig_11	integer
GEN_N_ch_X1_sig_12	integer
GEN_N_ch_X1_sig_13	integer
GEN_N_ch_X1_sig_14	integer
GEN_N_ch_X1_sig_15	integer
GEN_N_ch_X1_sig_16	integer
GEN_N_ch_X1_sig_17	integer
GEN_N_ch_X1_sig_18	integer
GEN_N_ch_X1_sig_19	integer
GEN_N_ch_X1_sig_20	integer
GEN_N_ch_X1_sig_21	integer
GEN_N_ch_X1_sig_22	integer
GEN_N_ch_X1_sig_23	integer
GEN_N_ch_X1_sig_24	integer
GEN_N_ch_X1_sig_25	integer
GEN_N_ch_X1_sig_26	integer
GEN_N_ch_X1_sig_27	integer
GEN_N_ch_X1_sig_28	integer
GEN_N_ch_X1_sig_29	integer
GEN_N_ch_X1_sig_30	integer
GEN_N_ch_X1_sig_31	integer
GEN_N_ch_X1_sig_32	integer
GEN_N_ch_X1_sig_33	integer
GEN_N_ch_X1_sig_34	integer
GEN_N_ch_X1_sig_35	integer
GEN_N_ch_X1_sig_36	integer
GEN_N_ch_X1_sig_37	integer
GEN_N_ch_X1_sig_38	integer
GEN_N_ch_X1_sig_39	integer
GEN_N_ch_X1_sig_40	integer
GEN_N_ch_X1_sig_41	integer
GEN_N_ch_X1_sig_42	integer
GEN_N_ch_X1_sig_43	integer
GEN_N_ch_X1_sig_44	integer
GEN_N_ch_X1_sig_45	integer
GEN_N_ch_X1_sig_46	integer
GEN_N_ch_X1_sig_47	integer
GEN_N_ch_X1_sig_48	integer
GEN_N_ch_X1_sig_49	integer
GEN_N_ch_X1_sig_50	integer
GEN_N_ch_X1_sig_51	integer
GEN_N_ch_X1_sig_52	integer
GEN_N_ch_X1_sig_53	integer
GEN_N_ch_X1_sig_54	integer
GEN_N_ch_X1_sig_55	integer
GEN_N_ch_X1_sig_56	integer
GEN_N_ch_X1_sig_57	integer
GEN_N_ch_X1_sig_58	integer
GEN_N_ch_X1_sig_59	integer
GEN_N_ch_X1_sig_60	integer
GEN_N_ch_X1_sig_61	integer
GEN_N_ch_X1_sig_62	integer
GEN_N_ch_X1_sig_63	integer
GEN_N_ch_X1_sig_64	integer
GEN_N_ch_X1_sig_65	integer
GEN_N_ch_X1_sig_66	integer
GEN_N_ch_X1_sig_67	integer
GEN_N_ch_X1_sig_68	integer
GEN_N_ch_X1_sig_69	integer
GEN_N_ch_X1_sig_70	integer
GEN_N_ch_X1_sig_71	integer
GEN_N_ch_X1_sig_72	integer
GEN_N_ch_X1_sig_73	integer
GEN_N_ch_X1_sig_74	integer
GEN_N_ch_X1_sig_75	integer
GEN_N_ch_X1_sig_76	integer
GEN_N_ch_X1_sig_77	integer
GEN_N_ch_X1_sig_78	integer
GEN_N_ch_X1_sig_79	integer
GEN_N_ch_X1_sig_80	integer
GEN_N_ch_X1_sig_81	integer
GEN_N_ch_X1_sig_82	integer
GEN_N_ch_X1_sig_83	integer
GEN_N_ch_X1_sig_84	integer
GEN_N_ch_X1_sig_85	integer
GEN_N_ch_X1_sig_86	integer
GEN_N_ch_X1_sig_87	integer
GEN_N_ch_X1_sig_88	integer
GEN_N_ch_X1_sig_89	integer
GEN_N_ch_X1_sig_90	integer
GEN_N_ch_X1_sig_91	integer
GEN_N_ch_X1_sig_92	integer
GEN_N_ch_X1_sig_93	integer
GEN_N_ch_X1_sig_94	integer
GEN_N_ch_X1_sig_95	integer
GEN_N_ch_X1_sig_96	integer
GEN_N_ch_X1_sig_97	integer
GEN_N_ch_X1_sig_98	integer
GEN_N_ch_X1_sig_99	integer
GEN_N_ch_X1_sig_100	integer

Detector & Parameters

Condition Database in distributed computing



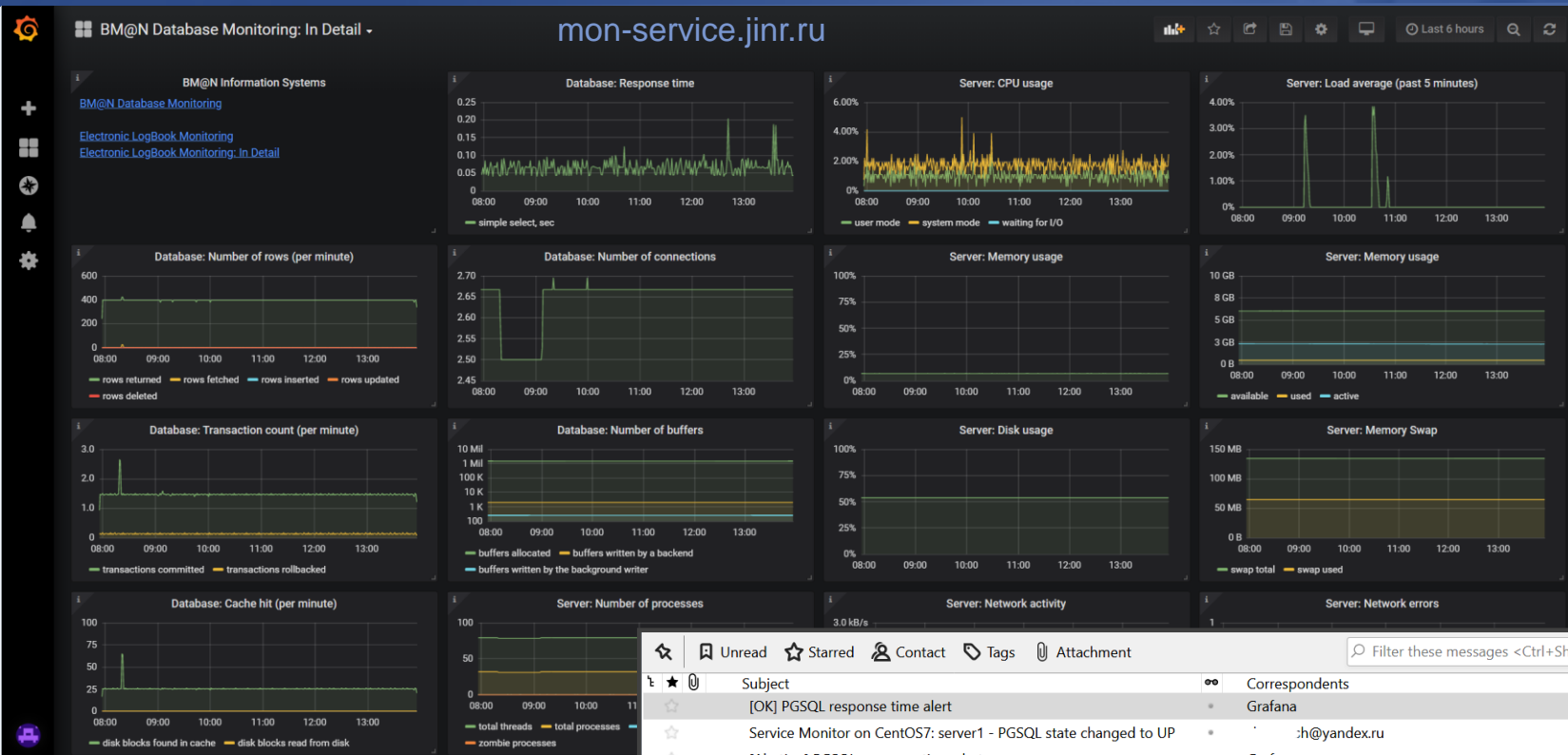
Monitoring Service



- Monitoring Service Features
 - Ping and PG-SQL request to check database server status
 - Configurable via JSON file
 - Email notifications
 - Response time stored in InfluxDB
 - Use Grafana for visualization and additional alerting
 - Monitor server parameters such as Disk, CPU, Memory, etc.

Monitoring Information Systems

Grafana View



Condition Database + detailed

Email Notifications

✪ Unread ☆ Starred 👤 Contact 🏷 Tags 📎 Attachment 🔍 Filter these messages <Ctrl+Shift+K>

✪ ☆ 📎	Subject	Correspondents	🕒 Date
✪ ☆ 📎	[OK] PGSQL response time alert	Grafana	🕒 2:41 PM
✪ ☆ 📎	Service Monitor on CentOS7: server1 - PGSQL state changed to UP	h@yandex.ru	🕒 2:40 PM
✪ ☆ 📎	[Alerting] PGSQL response time alert	Grafana	🕒 2:01 PM
✪ ☆ 📎	Service Monitor on CentOS7: server1 - PGSQL state changed to ***	h@yandex.ru	🕒 1:54 PM

From Grafana <h@yandex.ru> ☆

Subject [OK] PGSQL response time alert

To Me ☆

[OK] PGSQL response time alert

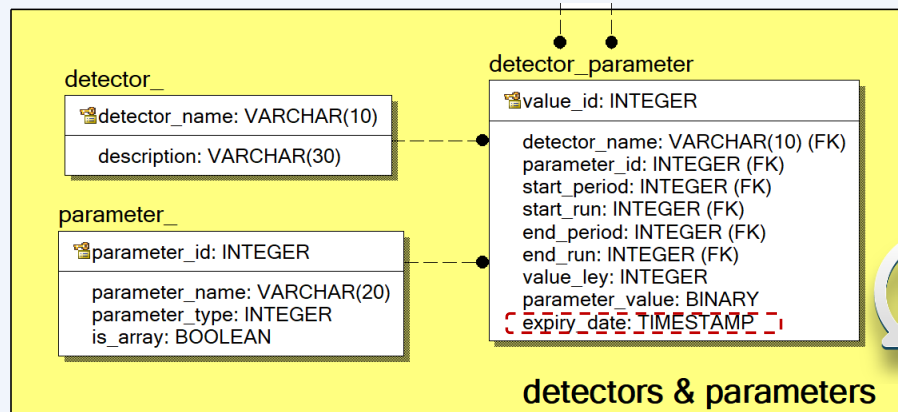
Grafana: Database monitoring warning!

PGSQL response time

0.12

Work on the Condition Database in progress

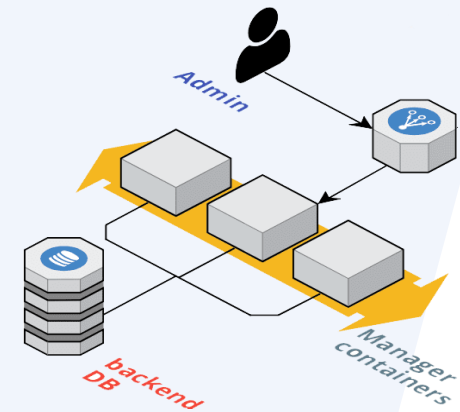
Historical Preservation of Parameter Values



Parameter values need to be retained in case of updating. When parameter values are updated, the database saves the replaced data with the current expiry date.

It allows to repeat event data processing with outdated parameters used in the past

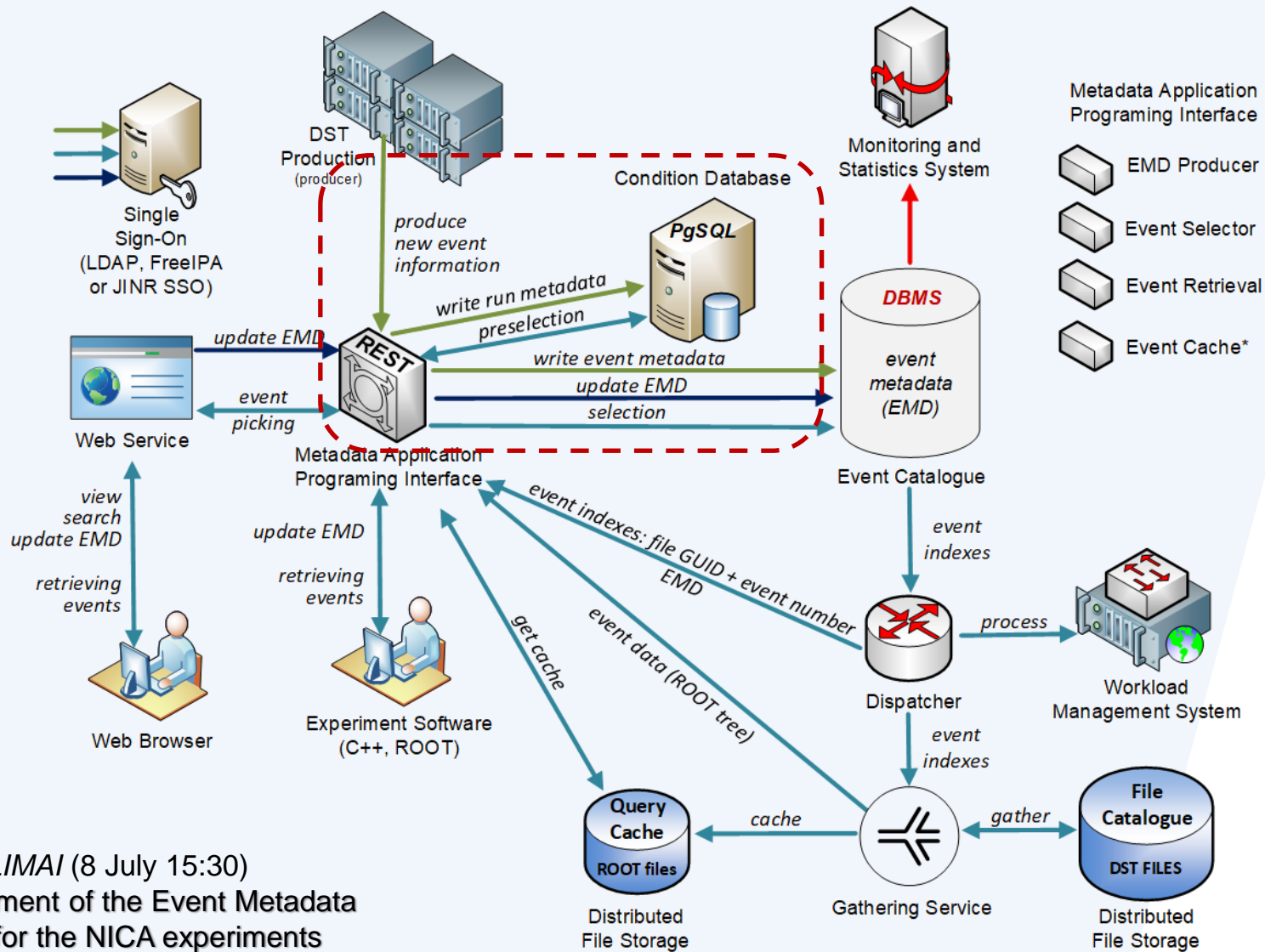
Configuration and Deployment System



The common Configuration and Deployment System is planned to be based on Docker containers and shell scripts

It allows to conveniently deploy the Condition Database and its services for all the experiments of the NICA project taking into account some specifics of the experiments

Condition Database in Event Processing System



Peter KLIMAI (8 July 15:30)
Development of the Event Metadata
System for the NICA experiments

Conclusions

- The Condition Database developed on PostgreSQL is an important component of implementing complex of the information systems and a centralized storage to provide unified access and management of various parameters of the experiments for event data processing, including simulation, reconstruction and physics analysis.
- The current version of the Condition Database has been deployed in the NICA cluster of the Laboratory of high-energy physics and is actively used in distributed data processing of the BM@N experiment, the first experiment of the NICA project.
- The C++ interface (API) has been implemented to use information stored in the Condition Database for processing of simulated and experimental data in the experiment frameworks based on the ROOT environment.
- The Web service, single authorization and monitoring systems have been already developed to simplify viewing and managing information on the experiments by users over the Web.
- The Common Deployment System and additional services are under development to install the Condition Database for all the experiments of the NICA project taking into account some specifics of the experiments.

Thank you for your attention!

Alexander NOZIK: PhD, senior researcher
Peter KLIMAL: PhD, researcher...

MIPT participants



JINR LIT participants



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***We are open for
cooperation!***