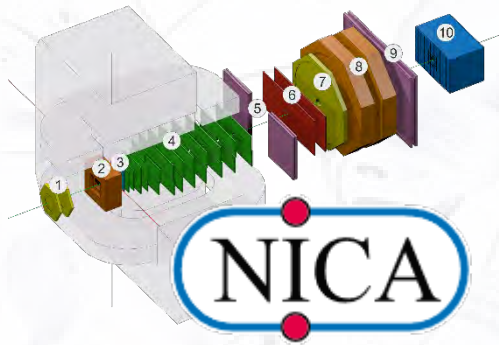


Production of the Configuration Information system for the BM@N experiment

*Evgeny Alexandrov¹, Igor Alexandrov¹, Alexander Chebotov¹,
Irina Filozova¹, Konstantin Gertsenberger¹,
Daria Priakhina¹, Ilya Romanov¹, Galina Shestakova¹,
Alexander Yakovlev¹*



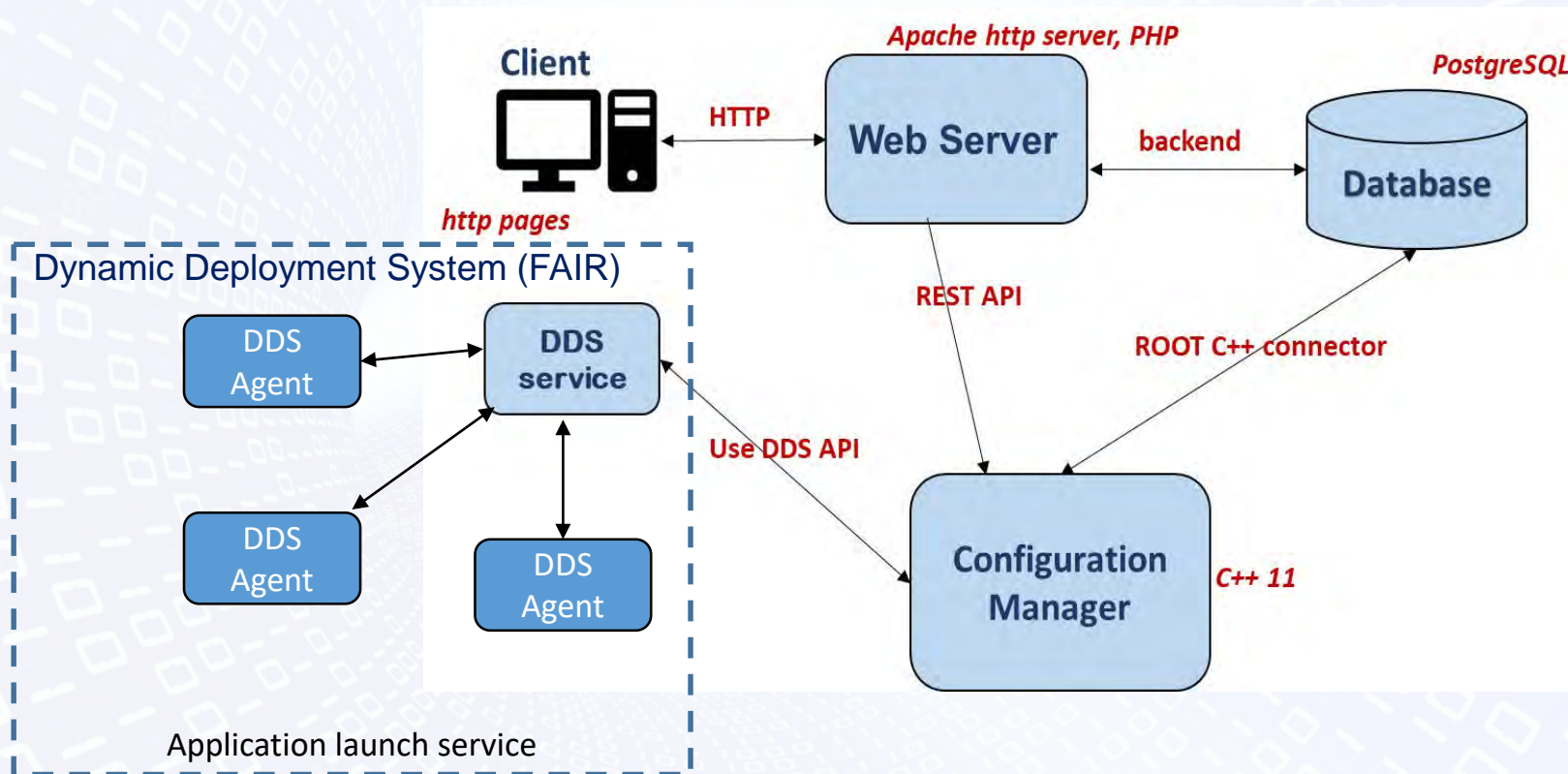
¹JINR, Dubna

[MMCP, Yerevan, Armenia, 20-25 October, 2024](#)

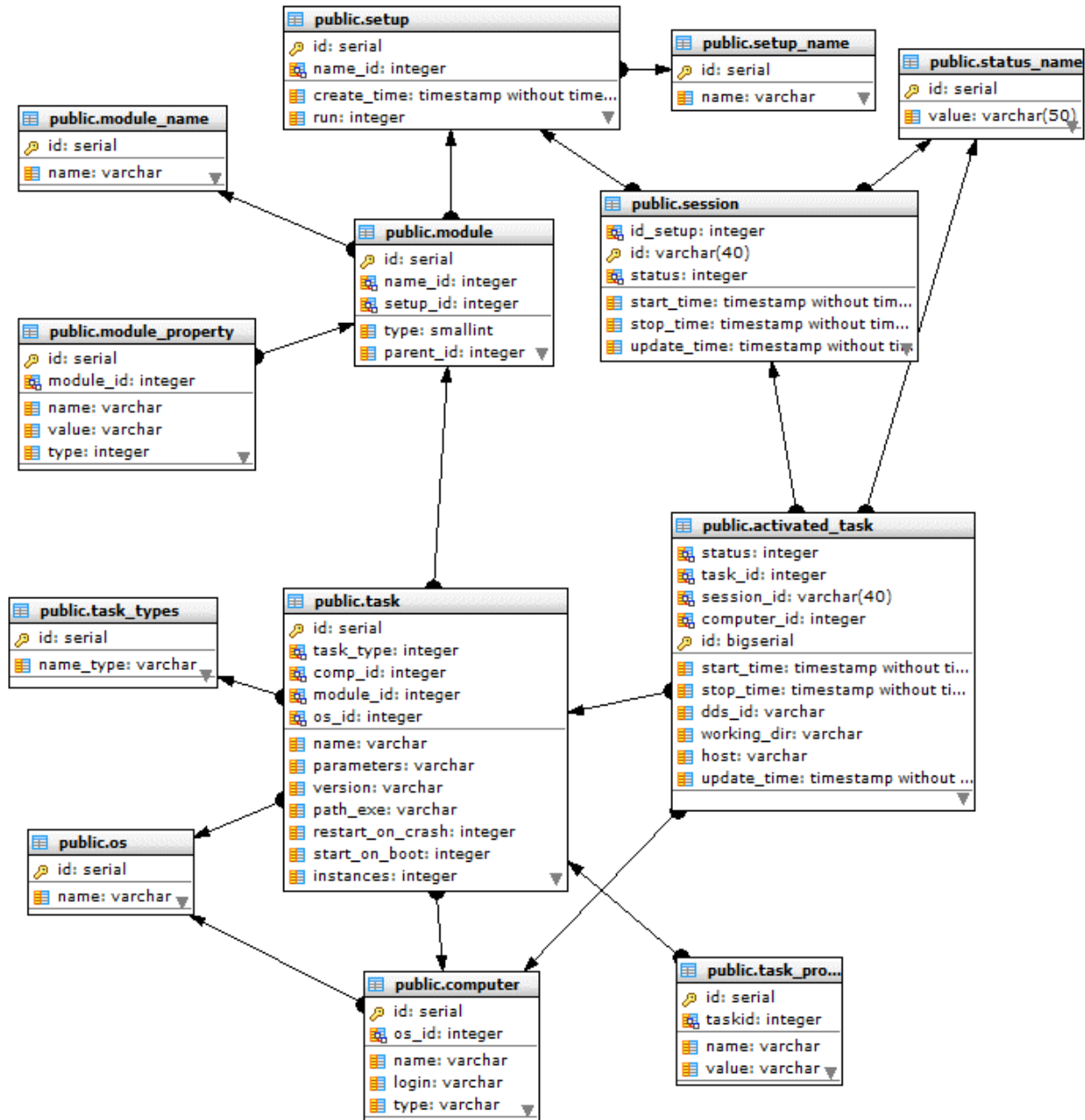
Configuration Information system Possibilities

- can store and provide configuration data for online processing
 - set of various detectors configuration parameters (working voltage etc.)
 - setup data including sequences of software tasks with their dependencies
- can start, stop and monitor setup tasks during experiment sessions
- can use web interface to supports data bases and operations with setup tasks

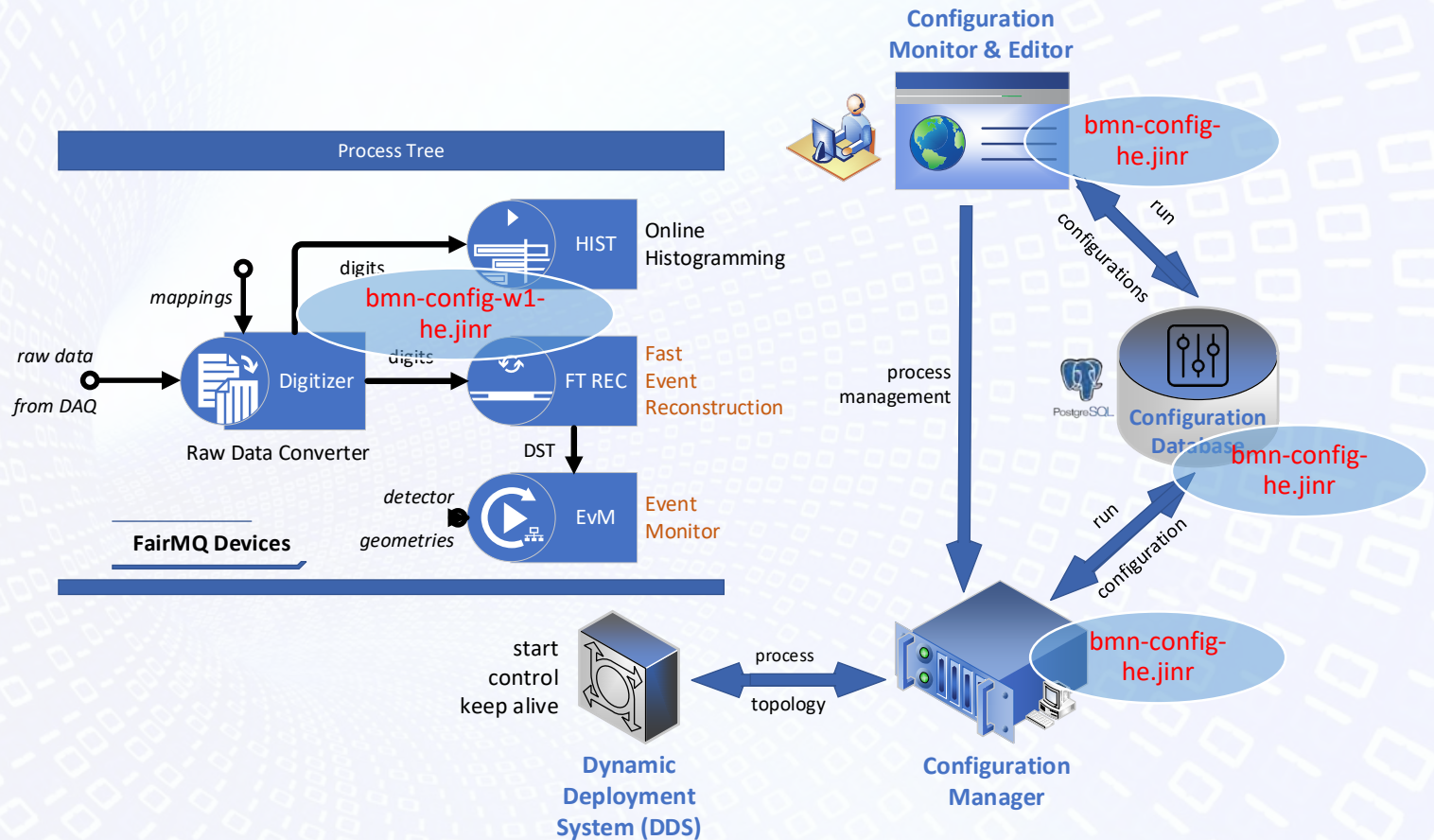
General Architecture of the BM@N Online Configuration System



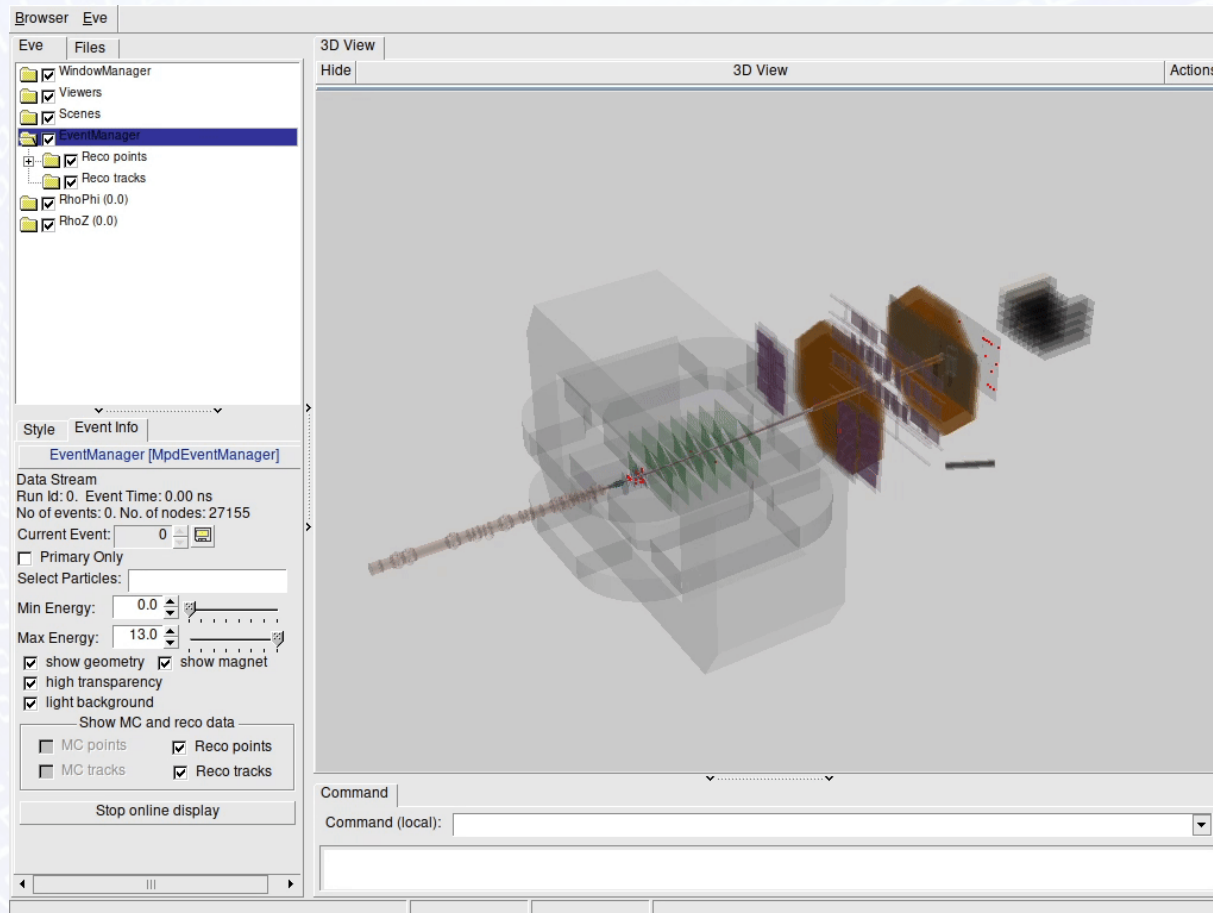
DB Object model



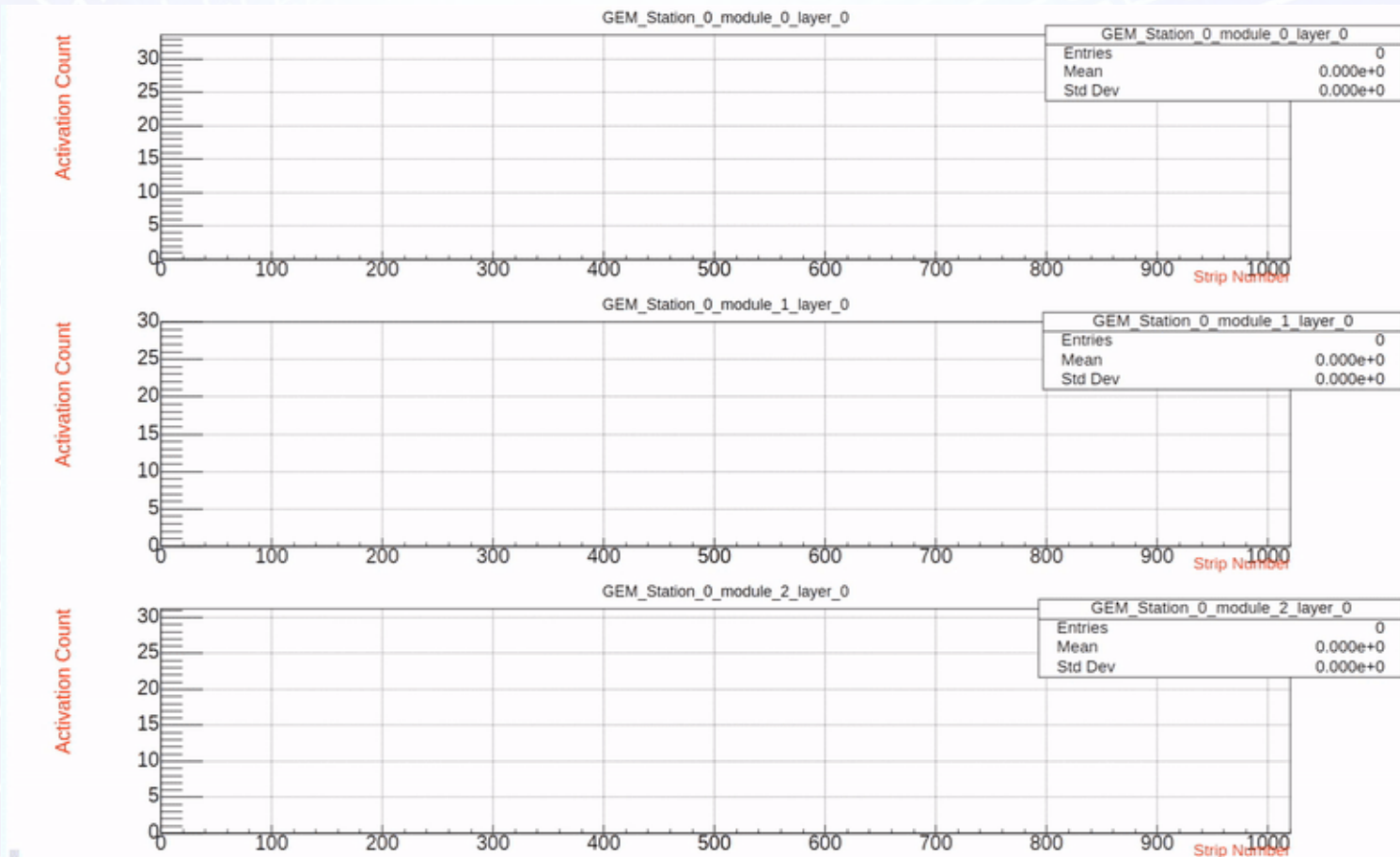
BM@N Configuration Information System and online processes diagram



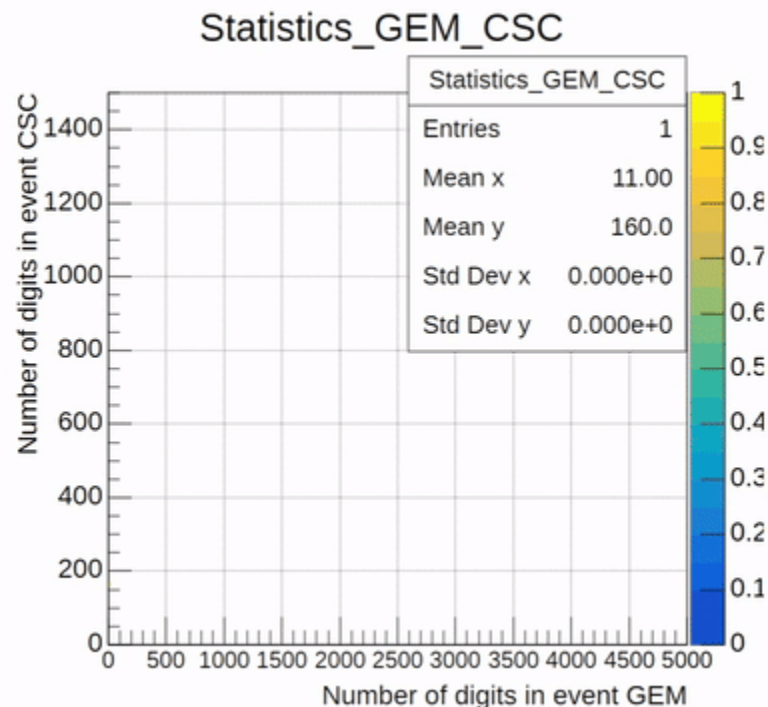
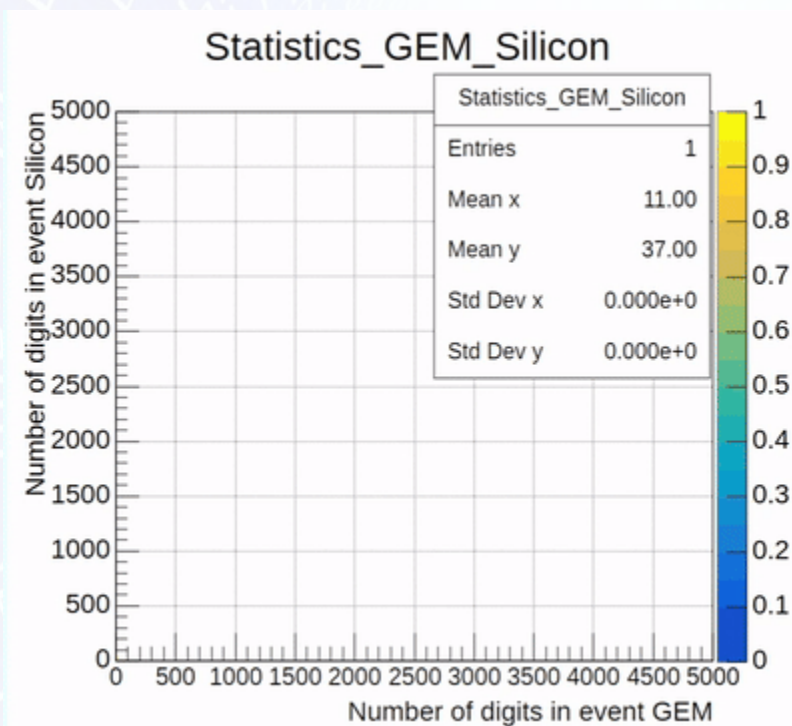
BM@N online processes to be controlled by Configuration manager



BM@N online processes to be controlled by Configuration manager



BM@N online processes to be controlled by Configuration manager



Configuration Manager: functionality

- listens and performs commands (REST API in use)
 - Start all setup tasks
 - Stop all setup tasks
 - Update setup
 - Get log of the activated task
 - Check if configuration manager is alive
 - Stop configuration manager
 - Get agent session log
- reads from DB setup data using setup ID
- prepares tasks for start using DDS system (convert data into DDS topology form)
- starts all tasks of topology using DDS
- gets from DDS server info about all started tasks
- stores in the DB the info about DDS session and tasks

Configuration Manager: session/task states

- States of the session and its tasks
 - Starting
 - Configuration Manager (ConfigMan) got command to start setup, activated the command and have sent response to sender
 - NotInited
 - Problem with task start
 - Started
 - ConfigMan got response from DDS server that task was started and updated database with this info
 - Stopping
 - ConfigMan got command to stop setup, activated this operation and have sent response to sender
 - Stopped
 - ConfigMan got response from DDS server that task is stopped and updated database with this info
 - Done
 - Task was finished
 - Crashed
 - Task was crashed

Configuration Manager started panel.

BM@N Baryonic Matter at Nuclotron

Menu

- TASK MONITOR
- RUN MANAGER
- SESSION LOGS
- DICTIONARY SET

Get in touch

Konstantin Gertsenberger

© JINR VBLHEP-MLIT, 2024
All rights reserved.

BM@N Configuration System User: test [LOGOUT](#)

Run Manager

Select Setup Run: BM@N test 4 Ru...

Control panel **START** STOP

Configuration Manager Logs


Created	Data	Status
2024-10-07 19:34:38	***** RestService::socketListenRun() STARTED	INFO
2024-10-07 19:34:38	!!!! config_manager: start socketListenRun !!!!!	INFO
2024-10-07 19:34:38	Configuration manager START	SYSTEM_INFO
2024-10-07 19:34:37	ConfigurationSupport::setManRunNumber in use. Configuration manager number = 145	INFO

[ADD SETUP MODULE](#)

Module Name	Parent Name	Actions
Online Test 4		

nager

Configuration Manager finished panel.



**Baryonic Matter
at Nuclotron**

BM@N Configuration System *

User: test LOGOUT

Menu

TASK MONITOR

RUN MANAGER

SESSION LOGS

DICTIONARY SET ▼

Get in touch

[Konstantin Gertsenberger](mailto:Konstantin.Gertsenberger)

© JINR VBLHEP-MLIT, 2024
All rights reserved.

Run Manager

Select Setup Run:

BM@N test 4 Ru...
+

Control panel
START
STOP

Configuration Manager Logs

Created	Data	Status
2024-09-16 11:38:36	Configuration manager FINISH	SYSTEM_INFO
2024-09-16 11:38:32	ConfigurationSupport::stopSession: Can not stop session for ID null	WARNING
2024-09-16 11:38:32	Configuration manager FINISH	SYSTEM_INFO
2024-09-16 11:38:32	Caught signal 2	INFO
2024-09-16 11:38:13	RestService::performRequest for command="stop" FINISHED!!	INFO
2024-09-16 11:38:13	STOP command finished	INFO
2024-09-16 11:38:13	RestService::writeHttpRes%%%%%%%%% httpHeader=HTTP/1.1 200 OK Connection: keep-alive Content-Type: text/html; charset=utf-8 Content-Length: 30	DEBUG
2024-09-16 11:38:12	res=2 PGRES_TUPLES_OK=2 size=0 request= select id from log where session_id=2d866afb-e5ae-4db2-99f2-5	DEBUG

ADD SETUP MODULE

Module Name	Parent Name	Actions
Online Test 4		📄 ✖

nager

Configuration: Example of task view (zoomed)

Task Name	Host	Actions		
<i>bm-n-online-digitizer</i>	<i>bm-n-config-w1.he.jinr.ru</i>			
<i>bm-n-online-processor</i>	<i>bm-n-config-w1.he.jinr.ru</i>			
<i>monStreamDecoder</i>	<i>bm-n-config-w1.he.jinr.ru</i>			

View Task for **OnlineDataProcessing** Module

CANCEL

Task Name	bm-n-online-processor
Host	bm-n-config-w1.he.jinr.ru
Task Type	2
Environment	/home/ocs/bm-nroot/build/config.sh
Path	bm-n-online-processor
Parameters	--id Bm-nOnlineProcessor1 --channel-config name=bm-n-processor-in,type=pull,method=connect,address=tcp://bm-n-config-w1.he.jinr.ru:5556,rateLogging=0 name=bm-n-processor-out,type=push,method=bind,address=tcp://bm-n-config-w1.he.jinr.ru:5557,rateLogging=0 --verbosity veryhigh --control static
Version	1
Instance	1
OS	AlmaLinux 9
Restart	Yes

Example of task view

BM@N Baryonic Matter at Nuclotron

Menu

- TASK MONITOR
- CONFIGURATION MANAGER
- SESSION LOGS
- DICTIONARY SET

Get in touch

Konstantin Gertsenberger

© JINR VBLHEP-MJIT, 2024
All rights reserved.




©Module Tasks Module Properties ADD MODULE TASK

Task Name	Host	Actions
<i>bmn-online-digitizer</i>	<i>bmn-config-w1.he.jinr.ru</i>	
<i>bmn-online-processor</i>	<i>bmn-config-w1.he.jinr.ru</i>	
<i>monStreamDecoder</i>	<i>bmn-config-w1.he.jinr.ru</i>	

View Task for OnlineDataProcessing Module CANCEL

Task Name	bmn-online-processor
Host	bmn-config-w1.he.jinr.ru
Task Type	2
Environment	/home/ocs/bmnroot/build/config.sh
Path	bmn-online-processor
Parameters	--id BmnOnlineProcessor1 --channel-config name=bmn-processor-in,type=pull,method=connect,address=tcp://bmn-config-w1.he.jinr.ru:5556,rateLogging=0 name=bmn-processor-out,type=push,method=bind,address=tcp://bmn-config-w1.he.jinr.ru:5557,rateLogging=0 -verbosity veryhigh --control static
Version	1
Instance	1
OS	AlmaLinux 9
Restart	Yes
Boot	Yes
Properties	No properties

Example of task view (zoomed)

Task Name	Host	Actions
<i>bmn-online-digitizer</i>	<i>bmn-config-w1.he.jinr.ru</i>	  
<i>bmn-online-processor</i>	<i>bmn-config-w1.he.jinr.ru</i>	  
<i>monStreamDecoder</i>	<i>bmn-config-w1.he.jinr.ru</i>	  

View Task for **OnlineDataProcessing** Module

CANCEL



Task Name	bmn-online-processor
Host	bmn-config-w1.he.jinr.ru
Task Type	2
Environment	/home/ocs/bmnroot/build/config.sh
Path	bmn-online-processor
Parameters	--id BmnOnlineProcessor1 --channel-config name=bmn-processor-in,type=pull,method=connect,address=tcp://bmn-config-w1.he.jinr.ru:5556,rateLogging=0 name=bmn-processor-out,type=push,method=bind,address=tcp://bmn-config-w1.he.jinr.ru:5557,rateLogging=0 --verbosity veryhigh --control static
Version	1
Instance	1
OS	AlmaLinux 9
Restart	Yes





Web-interface. Configuration Manager and Task Monitor panels

The screenshot displays the BM@N Configuration System web interface. The top header includes the logo 'BM@N Baryonic Matter at Nuclotron', the system name 'BM@N Configuration System', and the user 'alexand' with a 'LOGOUT' button. A left sidebar contains a 'Menu' with options: TASK MONITOR, CONFIGURATION MANAGER (selected), SESSION LOGS, and DICTIONARY SET. Below the menu is a 'Get in touch' section with an email icon and the name 'Konstantin Gertsenberger'.

The main content area is divided into two sections:

- Configuration Manager:** Features a 'Select Setup Run' dropdown set to 'BMN Run 7' with a '+' icon. To the right is a 'Control panel' with 'UPDATE' and 'STOP' buttons. An 'ADD SETUP MODULE' button is located above a table with the following data:

Module Name	Parent Name	Actions
OnlineControl		 
- Task Monitor:** Includes filter controls: 'Select task', 'Select setup', 'Select module', 'Started', and 'Select host', followed by 'FILTER' and 'RESET' buttons. Below these is a table of tasks:

Task Name	Setup:Run	Module	Status	Log	Start Time	End Time	Host
bmn_event_display_imit	BMN:7	OnlineControl	Started		2023-05-05 18:39:16		vps104.jinr.ru
bmn_fast_event_reco_imit	BMN:7	OnlineControl	Started		2023-05-05 18:39:16		vm221-85.jinr.ru
bmn_online_histo_imit	BMN:7	OnlineControl	Started		2023-05-05 18:39:16		vps104.jinr.ru
bmn_root_digi_imit	BMN:7	OnlineControl	Started		2023-05-05 18:39:16		vps104.jinr.ru

[MMCP, Yerevan, Armenia, 22 October, 2024](#)

Configuration manager log states

Enter a part of object name here

config_db - 10.220.16.194:5432

- Databases
 - config_db
 - Schemas
 - public
 - Tables
 - activated_task
 - Columns
 - Constraints
 - Foreign Keys
 - Indexes
 - Dependencies
 - References
 - Partitions
 - Triggers
 - Rules
 - Policies
 - computer
 - config
 - log
 - log_manager
 - log_status_name
 - module
 - module_name

Properties | Data | ER Diagram

log_status_name *Enter a SQL expression*

	id	value
1	5	SEVERE_ERROR
2	4	ERROR
3	3	WARNING
4	2	INFO
5	1	DEBUG

Configuration manager log in DB

The screenshot displays a database management tool interface. On the left, a tree view shows the database structure for 'config_db', including schemas, public tables, and views. The 'log_manager' table is selected. The main window shows a table of log entries with the following columns: id, data, created, status, session_id, and manager_id. The log entries include various system messages and configuration-related actions.

id	data	created	status	session_id	manager_id
6125	LogSupport:getRemoteFileSize 2: command itself in quotes="stat -c %s /home/ocs/4a	2024-04-26 10:16:07.161	5	4ac5d1e4-21e9-48fe	124
6126	LogSupport:getRemoteFileSize 3: command with SHH: ssh ocs@10-220-18-54.jinr.ru	2024-04-26 10:16:07.211	5	4ac5d1e4-21e9-48fe	124
6127	LogSupport:getRemoteFileSize 5: command=scp ocs@10-220-18-54.jinr.ru/home/oc	2024-04-26 10:16:07.609	5	4ac5d1e4-21e9-48fe	124
6128	LogSupport:readNumberFrFile line=8368 size=8368f	2024-04-26 10:16:08.027	5	4ac5d1e4-21e9-48fe	124
6129	LogSupport:getSessionRemoteLogSize remote file size=8368f	2024-04-26 10:16:08.101	5	4ac5d1e4-21e9-48fe	124
6130	ResponseCallback: updateTaskAsStarted and updateSessionFromLog done for task dd	2024-04-26 10:16:08.261	5	4ac5d1e4-21e9-48fe	124
6131	Starting setup... requestSlotInfo called.	2024-04-26 10:16:08.370	4	4ac5d1e4-21e9-48fe	124
6132	***** ConfigurationSupport:getDDSTopology started	2024-04-26 10:16:08.452	5	4ac5d1e4-21e9-48fe	124
6133	***** ConfigurationSupport:getDDSTopology found	2024-04-26 10:16:08.594	5	4ac5d1e4-21e9-48fe	124
6134	***** ConfigurationSupport:getDDSID: DDSTopology FOUND!!!	2024-04-26 10:16:08.752	5	4ac5d1e4-21e9-48fe	124
6135	Session:updateActiveTasksByLog. Loop number=1 Agent_host=10-220-18-54.jinr.ru	2024-04-26 10:16:08.894	5	4ac5d1e4-21e9-48fe	124
6136	Session:getAgentByHostName for host=10-220-18-54.jinr.ru STARTED!	2024-04-26 10:16:09.011	5	4ac5d1e4-21e9-48fe	124
6137	>>>Session:getAgentByHostName <<< Agent for host=10-220-18-54.jinr.ru FOUND	2024-04-26 10:16:09.161	5	4ac5d1e4-21e9-48fe	124
6138	LogSupport:getSessionRemoteLogSize: host=10-220-18-54.jinr.ru user=ocs workDir	2024-04-26 10:16:09.253	5	4ac5d1e4-21e9-48fe	124
6139	LogSupport:getRemoteFileSize 1: remotePath=/home/ocs/4ac5d1e4-21e9-48fe-a35f	2024-04-26 10:16:09.319	5	4ac5d1e4-21e9-48fe	124
6140	LogSupport:getRemoteFileSize 2: command itself in quotes="stat -c %s /home/ocs/4a	2024-04-26 10:16:09.578	5	4ac5d1e4-21e9-48fe	124
6141	LogSupport:getRemoteFileSize 3: command with SHH: ssh ocs@10-220-18-54.jinr.ru	2024-04-26 10:16:09.678	5	4ac5d1e4-21e9-48fe	124
6142	LogSupport:getRemoteFileSize 5: command=scp ocs@10-220-18-54.jinr.ru/home/oc	2024-04-26 10:16:10.116	5	4ac5d1e4-21e9-48fe	124
6143	LogSupport:readNumberFrFile line=8368 size=8368f	2024-04-26 10:16:10.542	5	4ac5d1e4-21e9-48fe	124
6144	LogSupport:getSessionRemoteLogSize remote file size=8368f	2024-04-26 10:16:10.697	5	4ac5d1e4-21e9-48fe	124
6145	***** ConfigurationSupport:getDDSTopology started	2024-04-26 10:16:10.811	5	4ac5d1e4-21e9-48fe	124
6146	***** ConfigurationSupport:getDDSID: DDSTopology found	2024-04-26 10:16:10.902	5	4ac5d1e4-21e9-48fe	124
6147	***** ConfigurationSupport:getDDSID: DDSTopology FOUND!!!	2024-04-26 10:16:10.952	5	4ac5d1e4-21e9-48fe	124
6148	ConfigurationSupport:getNumRunningTsk for setup id=4 corresponding ddsid=4ac5	2024-04-26 10:16:10.994	5	4ac5d1e4-21e9-48fe	124
6149	getNumRunningTsk=2f	2024-04-26 10:16:11.097	4	4ac5d1e4-21e9-48fe	124
6150	START setup will be FINISHED after line: slotThr= new std::thread(&SlotInfoRequestT	2024-04-26 10:16:11.164	5	4ac5d1e4-21e9-48fe	124
6151	***** ConfigurationSupport:getDDSTopology started	2024-04-26 10:16:11.197	5	4ac5d1e4-21e9-48fe	124
6152	RestService:requestSlotInfoInActive() started	2024-04-26 10:16:11.231	5	4ac5d1e4-21e9-48fe	124
6153	***** ConfigurationSupport:getDDSTopology found	2024-04-26 10:16:11.264	5	4ac5d1e4-21e9-48fe	124
6154	***** ConfigurationSupport:getDDSID: DDSTopology FOUND!!!	2024-04-26 10:16:11.297	5	4ac5d1e4-21e9-48fe	124
6155	ConfigurationSupport:getNumRunningTsk for setup id=4 corresponding ddsid=4ac5	2024-04-26 10:16:11.331	5	4ac5d1e4-21e9-48fe	124
6156	getNumRunningTsk=2f	2024-04-26 10:16:11.381	4	4ac5d1e4-21e9-48fe	124
6157	***** ConfigurationSupport:getDDSTopology started	2024-04-26 10:16:11.429	5	4ac5d1e4-21e9-48fe	124
6158	***** ConfigurationSupport:getDDSTopology found	2024-04-26 10:16:11.456	5	4ac5d1e4-21e9-48fe	124
6159	***** ConfigurationSupport:getDDSID: DDSTopology FOUND!!!	2024-04-26 10:16:11.489	5	4ac5d1e4-21e9-48fe	124
6160	ConfigurationSupport:getNumRunningTsk for setup id=4 corresponding ddsid=4ac5	2024-04-26 10:16:11.522	5	4ac5d1e4-21e9-48fe	124
6161	getNumRunningTsk=2f	2024-04-26 10:16:11.556	4	4ac5d1e4-21e9-48fe	124
6162	START setup finished. The number of running tasks is 2	2024-04-26 10:16:11.589	4	4ac5d1e4-21e9-48fe	124
6163	RestService:performRequest for command="start" FINISHED!!!	2024-04-26 10:16:11.622	4	4ac5d1e4-21e9-48fe	124
6164	ConfigurationSupport:intComputers: addComputer id=1 fullName=ocs@10.220.18.54	2024-04-26 10:16:11.767	5	4ac5d1e4-21e9-48fe	125

Configuration manager log view

```
| DEBUG |  ConfigurationSupport::requestSlotInfo for setupid=4 and the corresponf ddsID=36202cc0-2344-476a-8053-6594904a0b81
| DEBUG | ##### DDSCommunicator::ddsStartAttachSession for ddsSesId on input =36202cc0-2344-476a-8053-6594904a0b81
| INFO | ##### DDSCommunicator::ddsStartAttachSession:: session attached for id=36202cc0-2344-476a-8053-6594904a0b81
| INFO | !!!!! DDSCommunicator::requestSlotInfo(Session_session): started
| DEBUG | Slot 0: agentID (4114021393541468340), slotID (3699528277112806928), taskID (3629843431963531952), state (2), host (10-220-18-54.jinr.ru), wrkDir ("/home/ocs/36202cc0-2344-476a-8053-6594904a0b81/wn1/")
0-2344-476a-8053-6594904a0b81
| DEBUG | ***** ConfigurationSupport::getDDSTopology started
| DEBUG | ***** ConfigurationSupport::getDDSTopology found
| DEBUG | Info ResponseCallback: runPath="main/Online_Test_4/bmn_online_histo_test_0"
runName="bmn_online_histo_test"
| INFO | act= NULL --> new active task ( _info.m_taskID != 0, but no slotID in DB
)
| DEBUG | requestSlotInfo: runPath=main/Online_Test_4/bmn_online_histo_test_0
| DEBUG | >>>Session::getActiveTaskByParentTaskId<<< activated task for parentTskId=7 FOUND in Session map
| DEBUG | Session:updateAgentList START
| DEBUG | Session:updateAgentList new Agent host=10-220-18-54.jinr.ru atsk->getComputerId()=1 atsk->getWorkDir()=/home/ocs/36202cc0-2344-476a-8053-6594904a0b81/wn1/ atsk->getLoginUser()=ocs
| DEBUG | ConfigurationSupport::updateTaskInDb request:
update activated_task set update_time = CURRENT_TIMESTAMP, status =3, dds_id='3629843431963531952', task_id=7, computer_id=1, working_dir='/home/ocs/36202cc0-2344-476a-8053-6594904a0b81/wn1/', host='1
| DEBUG | Session::getAgentByHostName for host=10-220-18-54.jinr.ru STARTED
| DEBUG | >>>Session::getAgentByHostName<<< Agent for host=10-220-18-54.jinr.ru FOUND in Session map
| DEBUG | ConfigurationSupport::updateSessionFromLog: found Agent with host=10-220-18-54.jinr.ru working dir='/home/ocs/36202cc0-2344-476a-8053-6594904a0b81/wn1/'
| DEBUG | LogSupport::getSessionRemoteLogSize: host=10-220-18-54.jinr.ru user=ocs workDir=/home/ocs/36202cc0-2344-476a-8053-6594904a0b81/wn1/ remotePath=/home/ocs/36202cc0-2344-476a-8053-6594904
| DEBUG | LogSupport::getRemoteFileSize 1: remotePath=/home/ocs/36202cc0-2344-476a-8053-6594904a0b81/wn1/dds*.log host=10-220-18-54.jinr.ru user=ocs tmpPath=d4d0-e554-4225-c785
| DEBUG | LogSupport::getRemoteFileSize 2: command itself in quote="stat -c %s /home/ocs/36202cc0-2344-476a-8053-6594904a0b81/wn1/dds*.log >d4d0-e554-4225-c785"
| DEBUG | LogSupport::getRemoteFileSize 3: command with SSH: ssh ocs@10-220-18-54.jinr.ru "stat -c %s /home/ocs/36202cc0-2344-476a-8053-6594904a0b81/wn1/dds*.log >d4d0-e554-4225-c785" 2>/dev/null
| DEBUG | LogSupport::getRemoteFileSize 5: command=scp ocs@10-220-18-54.jinr.ru:d4d0-e554-4225-c785 d4d0-e554-4225-c785 >/dev/null 2>/dev/null
| DEBUG | LogSupport::readNumberFrFile line=8372 size=8372
| DEBUG | LogSupport::removeRemoteFile: cmd="ssh ocs@10-220-18-54.jinr.ru 'rm d4d0-e554-4225-c785'"
| DEBUG | LogSupport::getSessionRemoteLogSize remote file size=8372
| ERROR | Agent::updateLogFile: size of log file for host "10-220-18-54.jinr.ru" was changed. OLD size=0 curSize=8372
```


Configuration information system status

- **All parts of the system are ready for production**
- **Configuration information system to be used in next BM@N run.**

Conclusion

- Possibilities of the system were clarified
- Design of the Configuration information system was developed
- Database is implemented in PostgreSQL
- WEB interface implementation was produced
- Dynamic Deployment System (DDS, FAIR) is used for applications launch
- Configuration manager that control application using DDS API is implemented
- Configuration information system is ready for production and supposed to be used in next BM@N run.