Status of the Geometry Database for using in the BM@N experiment

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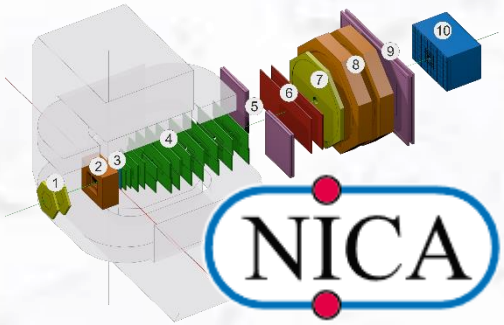

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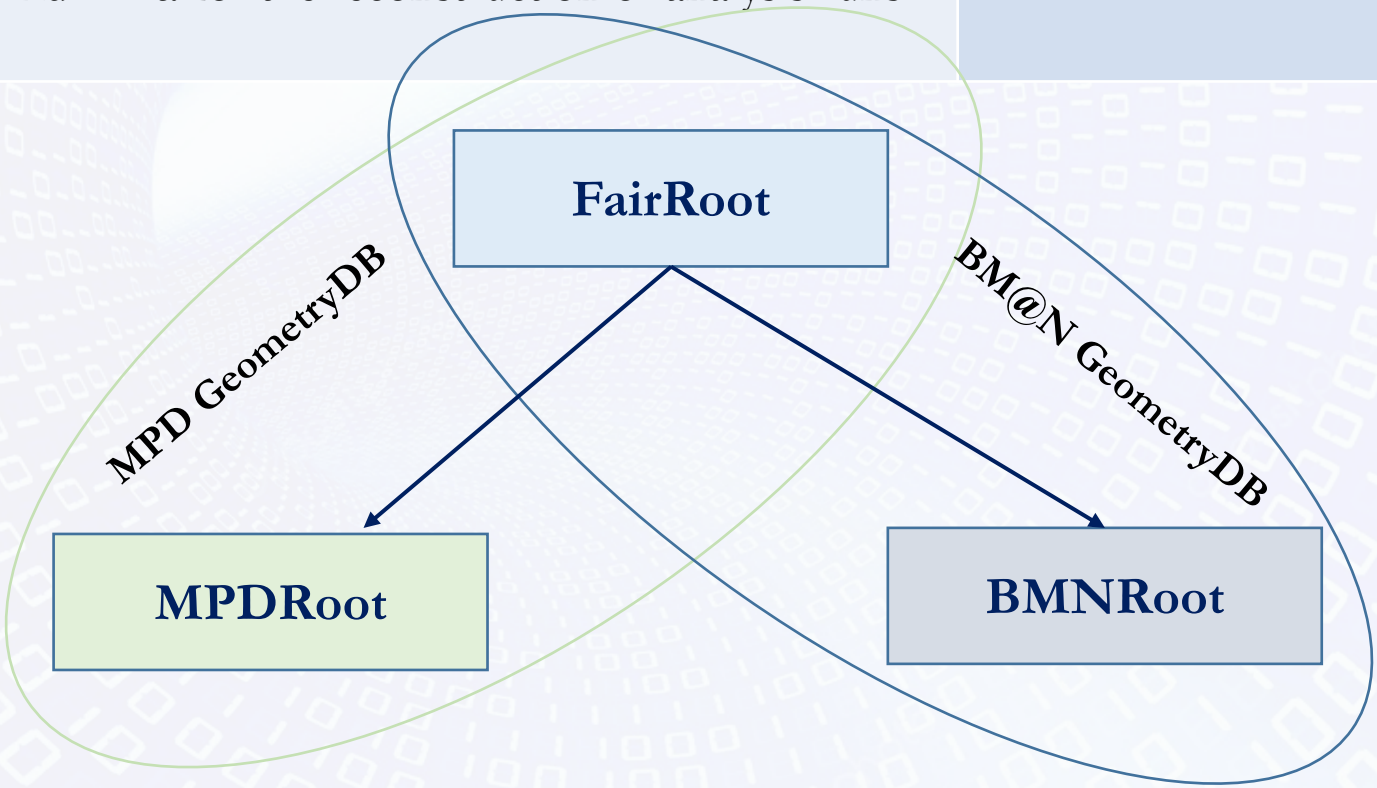
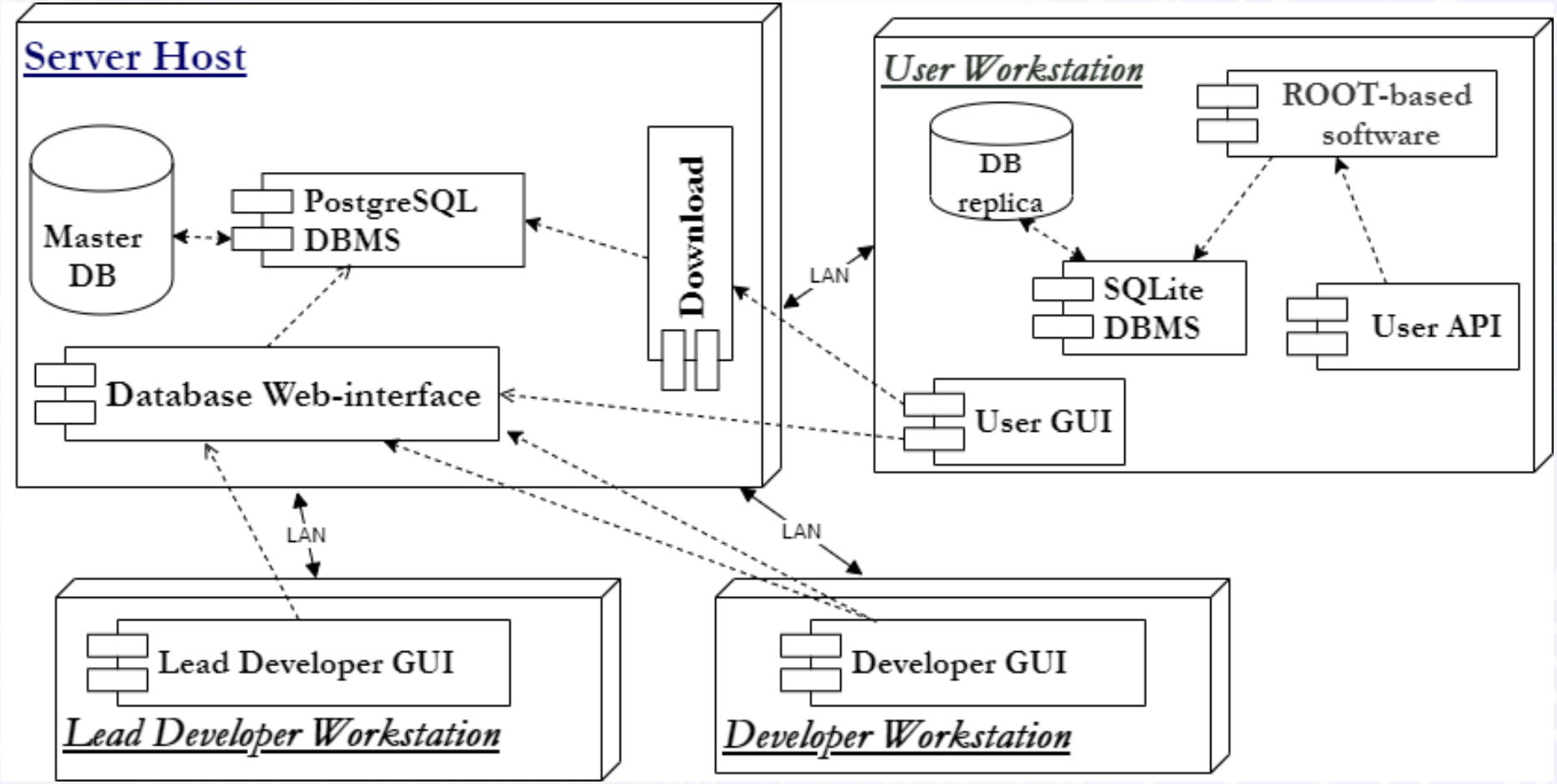
Joint Institute for Nuclear Research

BM@N & MPD

Common features	Differences
Approaches to the methods of simulations and reconstructions	The sets of Detectors
Software: FAIRSOFT, FAIRROOT **RunManager:** ➢ **FairRunSim** for the simulation runs ➢ **FairRunAna** for the reconstruction or analysis runs	



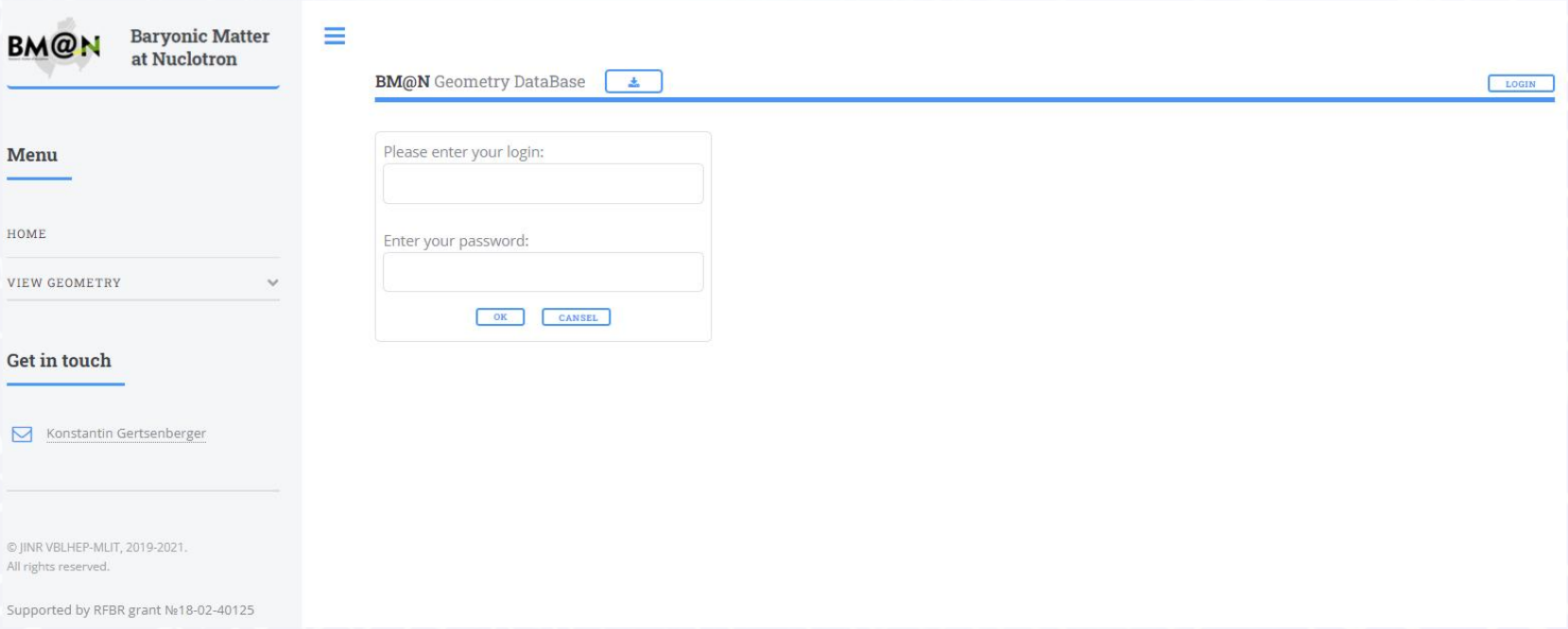
General architecture of the Geometry Information System



Authorization

Supported in one of two ways (set in the database):

- Simple own authorization
- FreeIPA (BMN: https://bmn-ipa.jinr.ru/)



Geometry Setups

Geometry Setups

Tag	Revision	Date	Description	Author	Status	Last Modified	Download Setup	Download Root File
src_run7	21.08.0	2021-09-20	21.08.0	aleksand	Approved			
src_run7	19.10.0	2021-09-14	Run7 version	aleksand	Approved			
src_run7	19.05.0	2021-07-27	Run7a version	aleksand	Approved			
run7	21.08.0	2021-09-14	21.08	aleksand	Approved			
run7	19.10.0	2021-09-13	Run7 version	aleksand	Approved			
run7	19.05.0	2021-07-27	Run7a version	aleksand	Approved			
run6	21.08.0	2021-09-14	Revision 21.08	aleksand	Approved			
run6	19.10.0	2021-09-07	Run6 version	aleksand	Approved			
run6	19.05.0	2021-07-27	Run6 version	aleksand	Approved	2021-09-14		

Tags:

src_run7

run7

run6

Revisions:

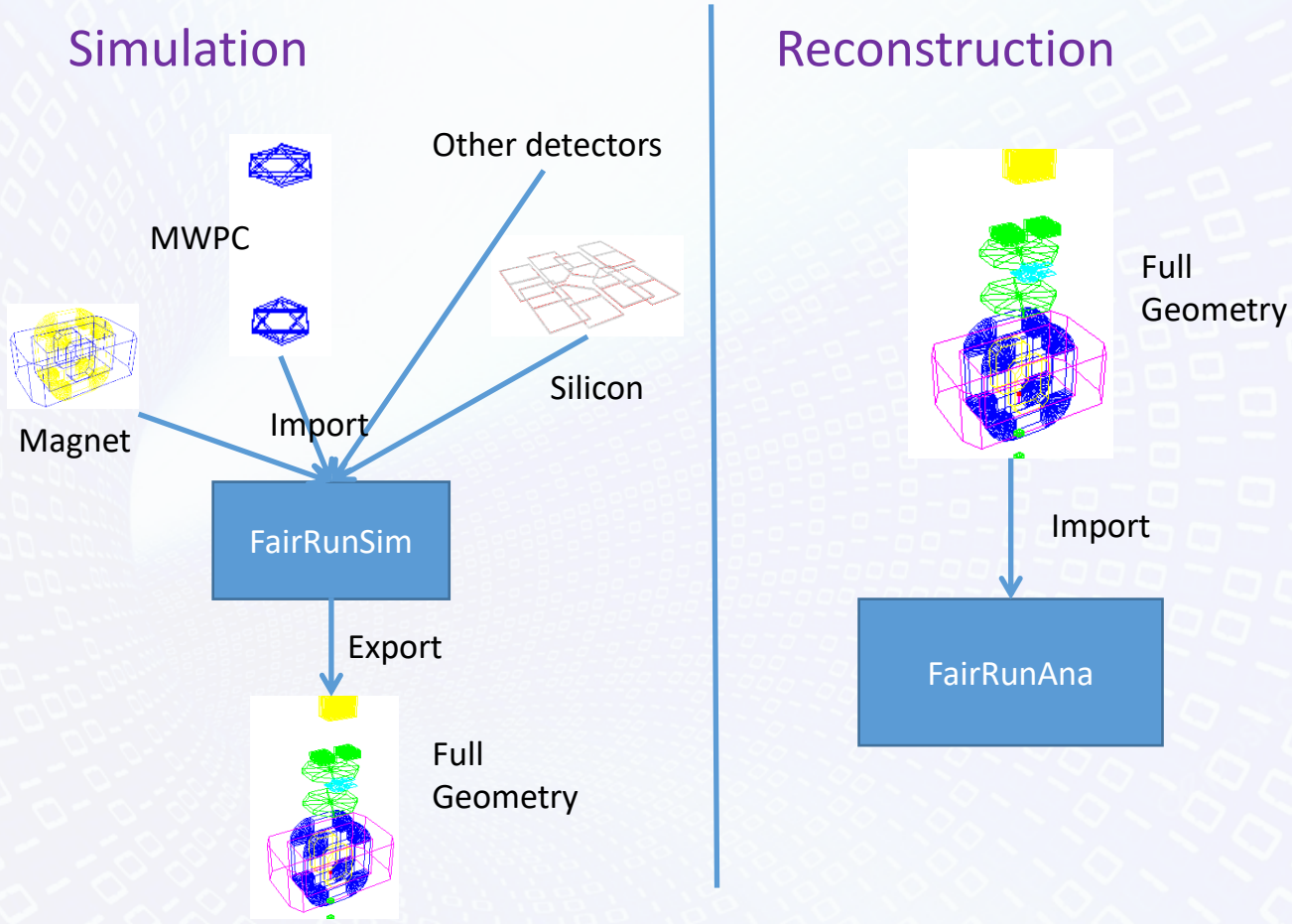
21.08.0

19.10.0

19.05.0

dev (not created because the same as 21.08.0)

RunManager & Geometry



C++ implementation

Class GeoSetup

```
static GeoSetup* Instance();
const char* getParFilePath(TString& mName);
BmnFieldMap* getFieldMap(bool isSim=true, double scale=-1);
```

Load for simulation

```
bool loadSimSetupFromServer(const char* setupTag, const char* url, const char* revision = NULL);
bool loadSimSetup(const char* setupTag, const char* revision = NULL, const char* localSettings = NULL);
```

Load for reconstruction

```
bool loadRecoSetupFromServer(const char* setupTag, const char* url, const char* revision = NULL);
bool loadRecoSetup(const char* setupTag, const char* revision = NULL);
```

Local setting

Local setting is stored in XML file and has following content:

```
▼<setup>
  <setupModule type="SILICON" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="DCH" enable="true" moveX="0" moveY="0" moveZ="500"/>
  <setupModule type="BD" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="MWPC" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="TOF1" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="STS" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="TOF" enable="false" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="MAGNET" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="ZDC" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="CSC" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="FD" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="ECAL" enable="true" moveX="0" moveY="0" moveZ="0"/>
 </setup>
```

If some module type that belongs to setup is absent in XML file the correspond module will be loaded without additional moving.

Examples of using

- Load setup

```
GeoSetup* gSetup = GeoSetup::Instance();
gSetup->loadSimSetup("src_run7","21.08.0");
```

- Create/get magnetic field (load inside)

```
Double_t fieldScale = 1800. / 900.; //for sim can be remove
BmnFieldMap* magField =gSetup->getFieldMap(true,fieldScale);
```

- Get Parameter file

// at the moment it is only possible to get the full path to the file, because there is no general use case

```
gSetup->getParFilePath("csc");
```

Macros

Signature	*Description*	*Call Example*	*Comment*
`void getSetupList();`	***Get the list of available setups.*** Print the list of available setups including tag, date of creation, author and description parameters for each approved setup.	getSetupList.c();	Require set variable **DBL_FILE_PATH** before use.
void installLocalDB.C (const char* urlServer);	***Install local database from server to client.*** Download replica of central database to client computer.	**installLocalDB** ("http://bmn-geodb.jinr.ru");	Require set variable **DBL_FILE_PATH** before use.
void installServerDB.C ();	***Install new server instance***. Install and init PostgreSQL database server, install and init WEB part of Geometry DB to Apache server.	**installServerDB** ();	Required config file with name **geodb.config.xml**

Next steps

- Add dev_run8 setup
- Integrate (change detector code) get parameter file from DB
- Test C++ implementation
- Test and verify all new setups

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