

Joint Institute for Nuclear Research

Automated BM@N Software Distribution and Testing: Current Status

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12th Collaboration Meeting of the BM@N Experiment at the NICA Facility

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Outline

- General changes
- FAIRSOFT/FAIRROOT automated deployment
- All macros test
- Automated docs
- Style tests

General Changes

- Reminder: BM@N software in the /cvmfs/nica.jinr.ru repo is not updated anymore - switch to using /cvmfs/bmn.jinr.ru
- Cluster environment setup script has moved to /cvmfs/bmn.jinr.ru/config/x86_64-centos7/cluster_config.sh
- Automatic retry of failed reco jobs
- New FAIRSOFT jan24 and FAIRROOT v18.8.1 versions are the defaults now
- EL 7 distros (CentOS, ScientificLinux) are EOL in June
 - Clusters are being prepared to be updated to new OS, presumably AlmaLinux 9
 - Apptainer containers can be used during transition period
 - Consider using AlmaLinux 9 container as a default option
- Incorrect bmnroot paths are being fixed to adhere to the path scheme structure
 - Needs to be sw_version/os_version instead of os_version/sw_version (legacy structure from /cvmfs/nica.jinr.ru)
 - New tags will adhere to the correct structure automatically
 - dev is already published under new path, othe tags will be republished soon

FAIRSOFT/FAIRROOT Automated Deployment

- FAIRSOFT and FAIRROOT used to be built and deployed manually to cvmfs
- Use fair docker images to publish FAIRSOFT and FAIRROOT in the cvmfs repo
- Pros:
 - Reduced manual intervention with the repository
 - Changes are tracked in the commits history
- Pipeline jobs are generated dynamically for every fair image version available in the container registry
- Deployment of individual versions is triggered manually
- Short instruction is in the [README](#) file

deploy

- ✓ deploy-apr22_v18.6.8-alma9
- ⚙️ deploy-apr22_v18.6.8-centos7
- ⚙️ deploy-apr22_v18.6.8-ubuntu2204
- ⚙️ deploy-jan24_v18.8.1-alma9
- ⚙️ deploy-jan24_v18.8.1-centos7
- ⚙️ deploy-jan24_v18.8.1-ubuntu2204

generate-pipeline

- ✓ generate-fairsoft-deploy-pipeline

trigger-pipeline

- ✓ trigger-fairsoft-deploy-pipeline
Trigger job

Downstream

- ✓ trigger-fairsoft-d... #49889
Child

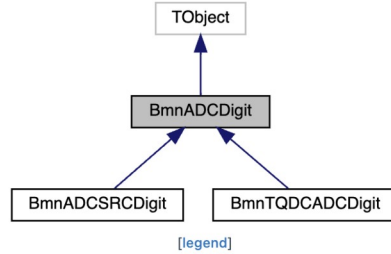
Code Reference

- PsdSignalFitting
- std
- _Tof1TDCCCompare
- AlignmentValue
- AllHistos
- batch_commands
- BinaryValue
- Bmn_Tof2_map_element_new
- Bmn_ZDC_map_element
- BmnAbstractDigit
- BmnAbstractThread
- BmnAcceptanceFunction
- BmnADCDigit**
- BmnAdcProcessor
- BmnAdcQA
- BmnADCSRCDigit
- BmnAddress
- BmnAlignCorrections
- BmnAnalysisTask
- BmnArmTrig
- BmnArmTrigHit
- BmnArmTrigHitProducer
- BmnArmTrigPoint
- Bmn...

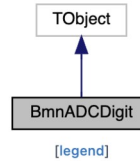
BmnADCDigit Class Reference

```
#include <BmnADCDigit.h>
```

Inheritance diagram for BmnADCDigit:



Collaboration diagram for BmnADCDigit:

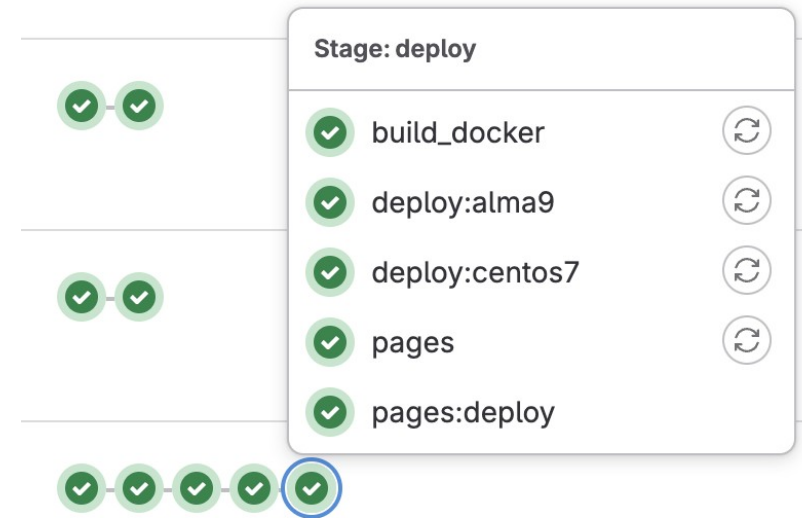


Public Member Functions

- `BmnADCDigit ()`
- `BmnADCDigit (UInt_t iSerial, UShort_t iChannel, UInt_t n, vector< UShort_t > &iValue)`

Documentation in GitLab Pages

- <http://nica.pages.jinr.ru/bmnroot>
- Doxygen is used to build the static web-site
 - Scans all of the code and builds the code reference
 - Markdown files are also compiled and added as separate pages
- Doxygen Awesome theme is used to give it a more modern look
- Automatically published via GitLab Pages:
 - <http://nica.pages.jinr.ru/bmnroot>
- Needs clean up and structuring
- [Documenting the code](#)



Documenting a Function Example

```
/**
 * Macro for reconstruction of simulated or experimental events.
 *
 * @param bmdstFileName output file with reconstructed data.
 * @param nStartEvent number of first event to process (starts with zero), default: 0.
 * @param nEvents number of events to process, 0 - all events of given file will be
 *         processed, default: 10000.
 * @param alignCorrFileName
 * \parblock
 *     argument for choosing input file with the alignment
 *     corrections.
 *
 *     If alignCorrFileName == 'default', (case insensitive) then corrections are
 *     retrieved from UniDb according to the running period and run number.
 *
 *     If alignCorrFileName == '', then no corrections are applied at all.
 *
 *     If alignCorrFileName == '<path>/<file-name>', then the corrections are taken
 *     from that file.
 * \endparblock
 */
void run_reco_bmn(TString inputFileName = "$VMCWORKDIR/macro/run/bmnsim.root",
                 TString bmdstFileName = "$VMCWORKDIR/macro/run/bmdst.root",
                 Int_t nStartEvent = 0, Int_t nEvents = 10, Int_t proofThreads = -1)
{
```

Documenting a Function Example

◆ run_reco_bmn()

```
void run_reco_bmn ( TString inputFileName = "$VMCWORKDIR/macro/run/bmnsim.root" ,
                  TString bmnDstFileName = "$VMCWORKDIR/macro/run/bmndst.root" ,
                  Int_t   nStartEvent = 0 ,
                  Int_t   nEvents = 10 ,
                  Int_t   proofThreads = -1
                  )
```

Macro for reconstruction of simulated or experimental events.

Parameters

bmnDstFileName output file with reconstructed data.

nStartEvent number of first event to process (starts with zero), default: 0.

nEvents number of events to process, 0 - all events of given file will be processed, default: 10000.

alignCorrFileName argument for choosing input file with the alignment corrections.

If alignCorrFileName == 'default', (case insensitive) then corrections are retrieved from UniDb according to the running period and run number.

If alignCorrFileName == "", then no corrections are applied at all.

If alignCorrFileName == '<path>/<file-name>', then the corrections are taken from that file.

Definition at line 125 of file [run_reco_bmn.cxx](#).

References [BmnFunctionSet::CheckFileExist\(\)](#), [BmnFunctionSet::CreateDirectoryTree\(\)](#), [BmnFunctionSet::EnableProof\(\)](#),

All Macros Test

pipeline

passed

failed macros

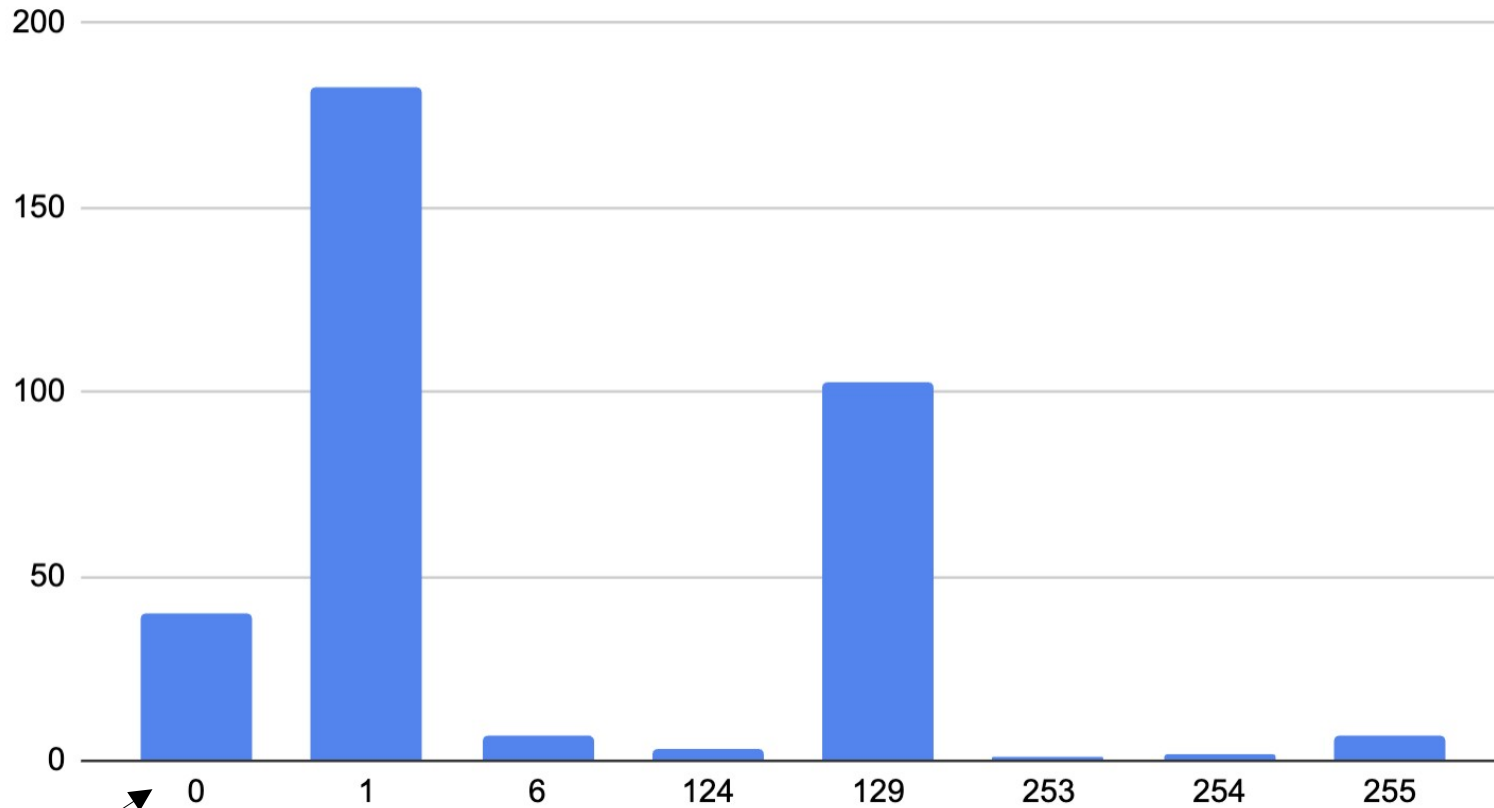
347

- Help identify non-working and out-of-date macros
- Check all of the macros nightly
- GitLab Status badge showing the number of failed macros
- A dedicated [page](#) on the [bmn.jinr.ru](#) site with the table of macro run statuses and links to the execution logs
- Consider fixing the macros to keep non-working code out of the repo

Generated on Sun May 12 21:36:56 UTC 2024

Macro name	Exit code
/macro/raw/GemDigitsAnalysis.C	1
/macro/raw/DchDigitsAnalysis.C	1
/macro/raw/BmnRawToDigi.C	0
/macro/raw/BmnDataToRootParallel.C	1
/macro/raw/BmnWriteRawInfo.C	1
/macro/raw/MwpcDigitsAnalysisHist.C	1
/macro/raw/tdc72_ChannelConverter.C	1
/macro/raw/DchDigitsAnalysisHist.C	1
/macro/raw/BmnDataToRoot.C	0
/macro/raw/BmnDataToRaw.C	254
/macro/profiling/size/calculate_size.C	1
/macro/profiling/bmnloadlibs.C	0
/macro/cbm/run_reco_gem_r7.C	129
/macro/cbm/rootlogon.C	0

Macros Exit Codes



Only 40 succeeded

Upcoming Code Style Test

- Keeping code formatting consistent helps the code readability
- Adopted [Mozilla](#)-based formatting [rules](#) taken from FAIRROOT
 - Closer to industry standards
 - Compliance with the parent project
- clang-format is used to do the check and can be used to do the actual formatting
- Pipeline adjustments
 - Nightly check of all of the source codes in dev via scheduled pipeline job
 - A badge showing the number of files not complying to the formatting rules
 - Permissive check of the changed files in the main pipeline run in user branches

Style Check Example

```
--- online/run/runBmnOnlineDigitizer.cxx      (original)
+++ online/run/runBmnOnlineDigitizer.cxx      (reformatted)
@@ -1,9 +1,11 @@
-#include <fairmq/runDevice.h>
#include "BmnOnlineDigitizer.h"
- namespace bpo = boost::program_options;
+#include <fairmq/runDevice.h>
-void addCustomOptions(bpo::options_description &options) {
+namespace bpo = boost::program_options;
+
+void addCustomOptions(bpo::options_description& options)
+{
    // clang-format off
    options.add_options()
        ("verbose", bpo::value<Int_t>()->default_value(10), "Verbosity level")
@@ -12,4 +14,7 @@
    // clang-format on
}
-std::unique_ptr<fair::mq::Device> getDevice(fair::mq::ProgOptions &) { return std::make_unique<BmnOnlineDigitizer>(); }
+std::unique_ptr<fair::mq::Device> getDevice(fair::mq::ProgOptions&)
+{
+    return std::make_unique<BmnOnlineDigitizer>();
+}
```

unsorted includes

incorrect indents

misplaced braces

ignore formatting

inline function body

Thanks!

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