

Joint Institute for Nuclear Research

Software Distribution System for the BmnRoot Framework

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Outline

- New CernVM-FS repository bmn.jinr.ru
- Auxiliary `bmndist` GitLab project
- Overview of the new user container
- Running batch jobs in containers

New CernVM-FS Repository

- The nica.jinr.ru repo is shared with MPD and SPD
 - Periodic open transaction conflicts
 - No common file structure leading to confusion and mess
 - Other experiments have full access to published [BM@N](#) software and can accidentally (or intentionally) modify it
- New bmn.jinr.ru is exclusive to [BM@N](#)
- The nica.jinr.ru repo is now considered legacy in context of [BM@N](#) and will not be updated anymore

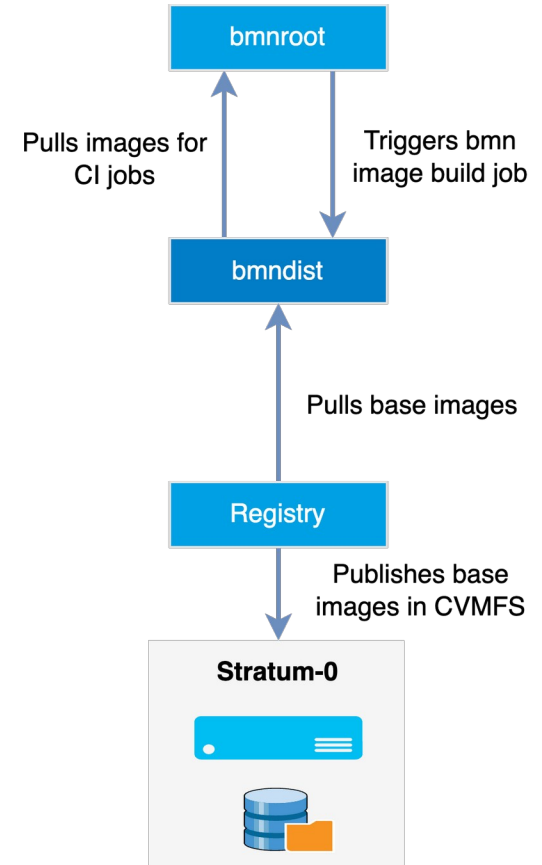
New CernVM-FS Repository Structure

- Old scheme:
/cvmfs/nica.jinr.ru/OS/sw_type/version
- New scheme:
/cvmfs/bmn.jinr.ru/sw_type/version/architecture-OS

```
/cvmfs/bmn.jinr.ru
├── bmn
│   └── x86_64-centos7
├── bmnroot
│   └── x86_64-centos7
│       └── dev
├── fairroot
│   ├── bmn -> /cvmfs/bmn.jinr.ru/fairroot/v18.6.8
│   ├── latest -> /cvmfs/bmn.jinr.ru/fairroot/v18.6.8
│   └── v18.6.8
│       ├── x86_64-alma9
│       ├── x86_64-centos7
│       └── x86_64-ubuntu2204
└── fairsoft
    ├── apr22
    │   ├── x86_64-alma9
    │   ├── x86_64-centos7
    │   └── x86_64-ubuntu2204
    ├── bmn -> /cvmfs/bmn.jinr.ru/fairsoft/apr22
    └── latest -> /cvmfs/bmn.jinr.ru/fairsoft/apr22
```

Auxiliary bmndist project

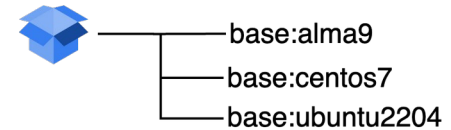
- git.jinr.ru/nica/bmndist is the replacement for the **Docker Images** project dedicated to BM@N
- Docker Images will be archived (made read-only) after agreement with SPD (MPD already moved to nicadist)
- **bmndist** serves as a container registry, but is planned to be extended to also publish FAIRSOFT and FAIRROOT in CVMFS
- Connection with other projects:
 - Rebuilds of user containers are triggered on every new push to bmndist Git repository
 - git.jinr.ru/cvmfs-container-sync/registry periodically converts base image to singularity format and publishes it in CVMFS



Supported Containers

- Three container flavors: **base**, **fair** and **bmj**
- **base** includes OS and packages required to build FAIRSOFT and FAIRROOT
 - Used as a base for other images, in CI jobs of bmnroot project and can be used in batch systems
 - **alma9**, **centos7**, **ubuntu2204** tags are supported
- **fair** is built on top of **base** with the addition of FAIRSOFT and FAIRROOT
 - Used as a base for **bmj** images and CI jobs of bmnroot project
 - {FAIRSOFT_VERSION}-{FAIRROOT_VERSION}-{OS_VERSION}[-ci] (e.g. apr22_v18.6.8-alma9-ci)
 - Same OSes as of base images are supported
- **bmj** is based on **fair** and includes bmnroot
 - Is supposed to be used only on personal machines
 - {BMNROOT_VERSION}-{OS}[-cvmfs] (e.g. dev-ubuntu2204)
 - Only alma9 and ubuntu2204 are supported

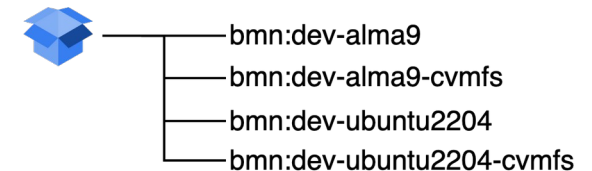
Base Images



FAIR Images



User Images

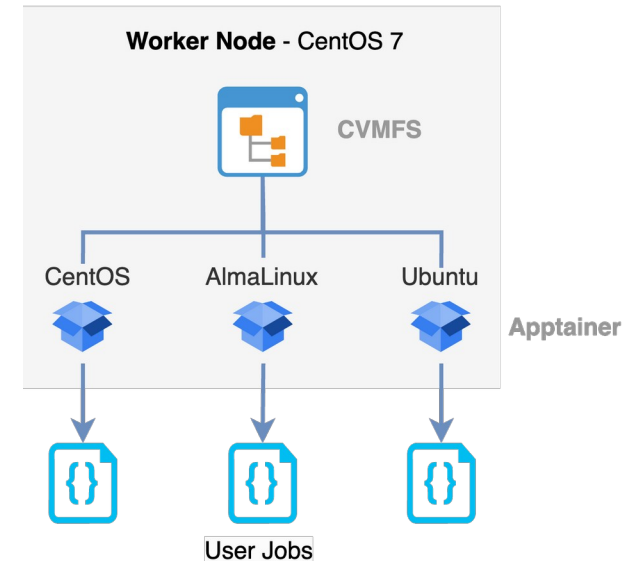


User Container

- New software distribution system for use on personal computers developed by **Rinat Nizamov**
- Consists of a set of container images and an installation script (<https://git.jinr.ru/nica/bmndist/-/tree/main/images/bmn>)
- The installation script installs Apptainer (former Singularity), downloads the **bm**n image from the bmndist registry and adds shell command aliases to start/rebuild the container
- Two OS versions of containers are available: AlmaLinux 9 and Ubuntu 22.04
- There are also two flavors of user images:
 - Cvmfs-based – smaller in size, but requires network to fetch FAIRSOFT/FAIRROOT
 - Self-contained
- When installed, it is basically just a new folder `$HOME/bmn-container` with the filesystem of the container

Running Batch Jobs in Containers

- Make jobs independent of cluster OS
 - It is like running a job in a lightweight virtual machine
- Apptainer runtime is most widely used in Grid infrastructures
 - Available at CICC
 - Request to install at HybriLIT/Govorun is pending
- Container images can be installed in cvmfs
 - Images can be added through the image publication service: <https://git.jinr.ru/cvmfs-container-sync/registry> (see [JINR Container Distribution Service](#) at GRID2023 for details)
 - base:centos7 and base:alma9 images already available in [/cvmfs/container.jinr.ru/nica/bmndist](https://cvmfs/container.jinr.ru/nica/bmndist)



Thanks!

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