



Joint Institute for Nuclear Research

# CI/CD pipeline status and perspectives for BM@N

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# CI/CD Pipeline in Docker

- The whole bmnroot pipeline now runs in Docker-containers
- Two shared runners with Docker support used instead of dedicated shell runners:
  - Gitlab-shared-runners – used to run tests
  - Gitlab-shared-runners-no-cvmfs – used to run deploy jobs
- The shared runners are:
  - shared among all git.jinr.ru users
  - dynamically provisionned in the JINR Cloud
  - which leads to better resource utilization and simpler system administration
- To build and store container images a new GitLab project was created:  
**“NICA/Docker Images”**

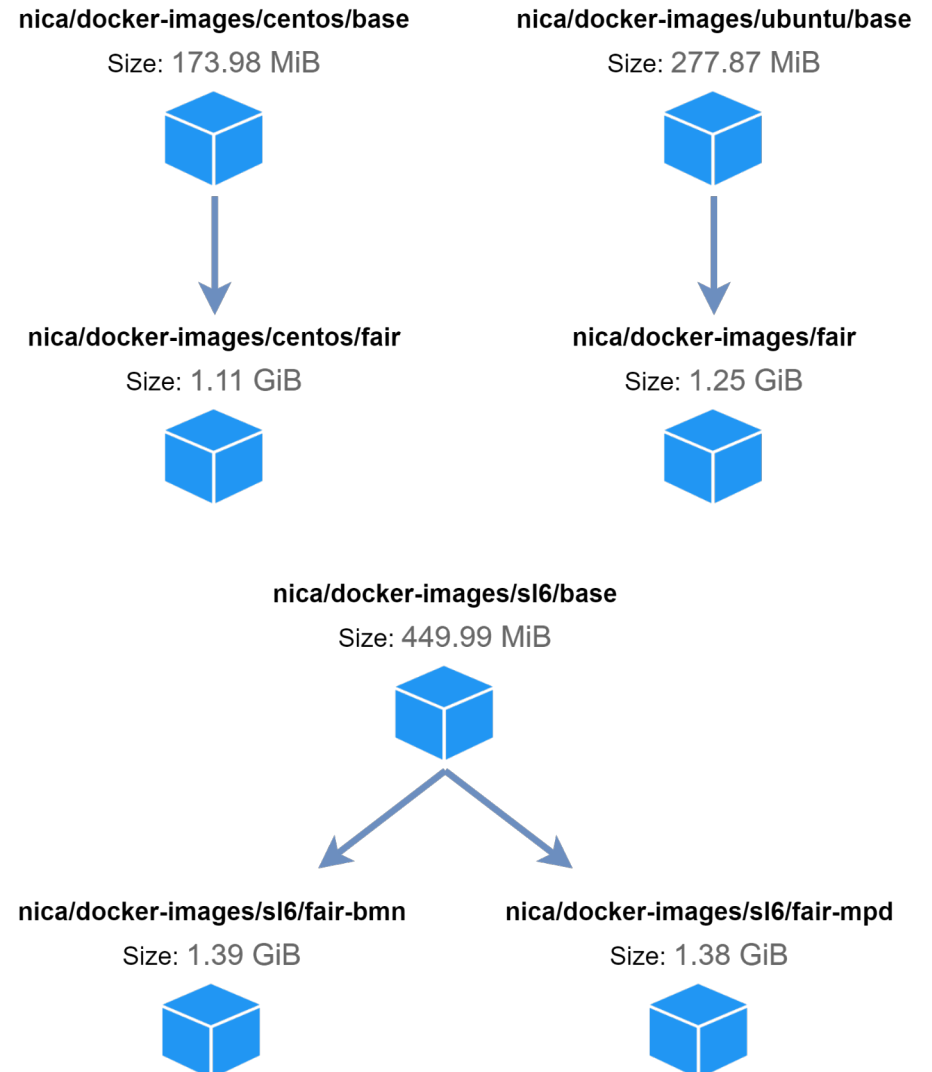
# Currently Available Images

- CentOS7/Ubuntu18.04/SL6 **base** images

- Standard OS + extra packages needed to install FAIRSOFT/FAIRROOT
- Used to run CI jobs

- CentOS7/Ubuntu18.04/SL6 **FAIR** images

- Built on top of the base images + FAIRSOFT/FAIRROOT
- Used in deploy jobs



# Containers: what's next

- Decommission specific runners after spdroot migrates its pipeline to docker
- Setup regular updates of container images using GitLab built-in pipeline scheduling mechanism
- Automate FAIRSOFT/FAIRROOT build and publishing system
- Evaluate possible options for running grid/batch jobs in containers
- User docker containers:
  - No need to install software – just run a container
  - I dont's have time to work out a decent solution

# Future Pipeline Changes



- **Check\_permission**

- Used to restrict access to .gitlab-ci.yml and prevent its modification by non-maintainers
- Slows down pipeline execution
- Can be removed if we move the .gitlab-ci.yml to external project

- **Make use of DAG**

- Jobs in one stage wait for all the jobs of the previous stage even if they depend on it only partially
- New “**need**” keyword makes it possible to build a DAG representing job dependencies more accurately
- Had serious bugs, but claimed to be fixed in recent GitLab release – we need to test it

# Computational Jobs in Containers

- Eases software support:
  - Support single OS
  - Same environment on different hosting clusters: you can run CentOS 7 container in an SL6 cluster
- Which technology to use: Docker or Singularity
  - Which are supported by most of our clusters?
  - What are the trends?
- How to store and use container images in CVMFS
  - Singularity: convert docker images and publish them in CVMFS
  - Docker: CernVM-FS graph driver plugin for Docker
- Where to store the software
  - Use base OS image and mount software from CVMFS
  - Build images with all the required software included

# Conclusions

- CI/CD pipeline migration to docker is finished for **bmnroot** and **mpdroot** projects – waiting for **spdroot**
- There're a couple technical changes planned to speed up pipeline
- User image is half-baked
- I plan to invest most of the time in evaluating container usage in batch systems

Thanks!