

NHR Container Workshop

Azat Khuziyakhmetov
azat.khuziyakhmetov@gwdg.de

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hpc@gwdg.de
GWDG – Gesellschaft für wissenschaftliche Datenverarbeitung mbH Göttingen



NHR Workshops

NHR Workshops

Workshop week

Workshop week Schedule

Monday 13.12.2021 [NHR Container Workshop](#)

Tuesday 14.12.2021 HPC Certification for the German HPC Community

Thursday 16.12.2021 Security Workshop

Friday 17.12.2021 Data Lakes

<https://s.gwdg.de/BvzSEe>

NHR Workshops

NHR Container Workshop

The workshop is organized by the NHR-project:
“Container and Container Management”

In this workshop we will see the solutions that are already in place by data centers, share experience and discuss future improvements of containers in HPC

NHR Container Workshop

Agenda

- 13:00 NHR-Container project overview
- 13:30 Container use on Taurus: FEM simulations with the DUNE framework in C++
- 14:00 Container build without root
- 14:20 SPANK plugin to start root VMs for building Singularity containers
- 14:40 Podman experiences
- 15:00 **Break and networking**
- 15:15 Enroot and Pyxis - first experiences at NHR@KIT
- 15:35 Deploying Containerized Applications on HPC Production Systems at LRZ
- 15:55 JupyterHub as a service using Docker and Singularity
- 16:15 Containers and Slurm
- 16:45 **Discussion**

Most of the presentations are short and 15-20 minutes long:

- During the talk, please **write** your questions in the chat, speaker will respond during or after the presentation
- After the talk, there will be Q&A where you can ask questions via **voice** function of BigBlueButton or chat

For longer presentation speakers might explicitly allow to interrupt via voice during their talk

Longer discussions will be held during the **break and networking session** as well as in the end in **Discussion session**

NHR-Container project

NHR-Container project

Overview

Project partners:

NHR@GÖTTINGEN, NHR@KIT, NHR@ZIB, NHR@ZIH,
NHR4CES@RWTH, NHR4CES@TUDa

The project is in 2 phases, in 2022 the 2nd phase should begin.

Objectives are to implement solutions for:

- running performance oriented software in containers
- using containerized services in HPC
- providing cloud-like resources on HPC systems via containers

NHR-Container project

Surveys

We have conducted a survey among 9 NHR HPC centers. The questions were divided into 2 groups:

1. Container platforms
2. Container management solutions

highlights are on the following slides

Survey. Container platforms platforms for users

In production:

9/9 Singularity

1/9 enroot

1/9 Podman

Planned:

1/9 enroot

1/9 charliecloud

Survey. Container platforms platforms for admins

In production:

5/9 Docker

3/9 Singularity

1/9 nspawn

1/9 Podman

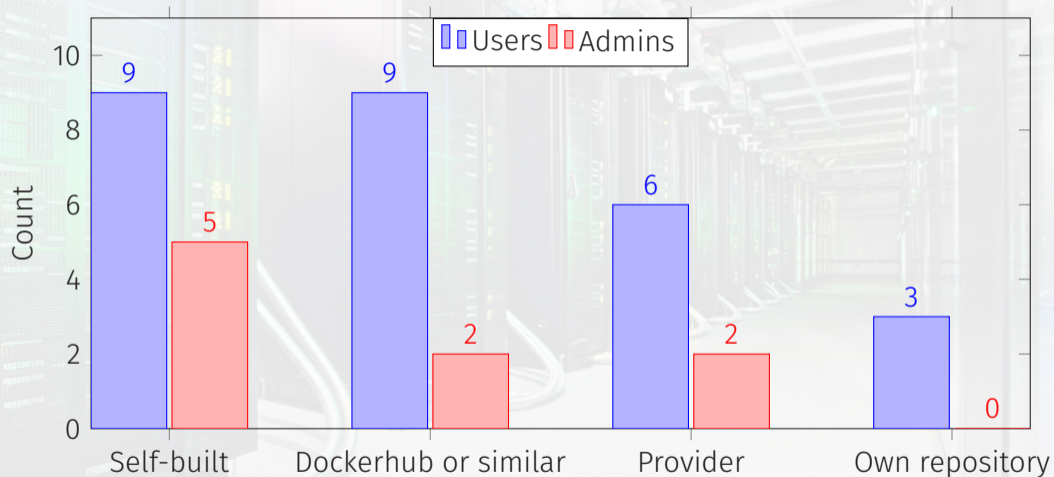
Planned:

1/9 podman

1/9 Docker

Survey. Container platforms

Container sources



Survey. Container platforms

Why to use containers

- 9/9 users want to run containers from various sources
- 8/9 users want to run their containers on other HPC
- 8/9 users can build software easily by themselves
- 7/9 admins need to maintain less software
- 6/9 could be easily stored to reproduce the computations etc.
- add Complex software with non HPC software stack
- add Software with partially incompatible dependencies

Survey. Container platforms

Reasons for choosing a particular container platform

- Activity and the community of the platform
- Usage in other HPC centers
- Runs without a daemon
- Security. CVEs are fixed fast enough
- GPU compatibility
- Performance oriented
- Support of Docker images

Survey. Container management solutions platforms in production

no single solution used widely.

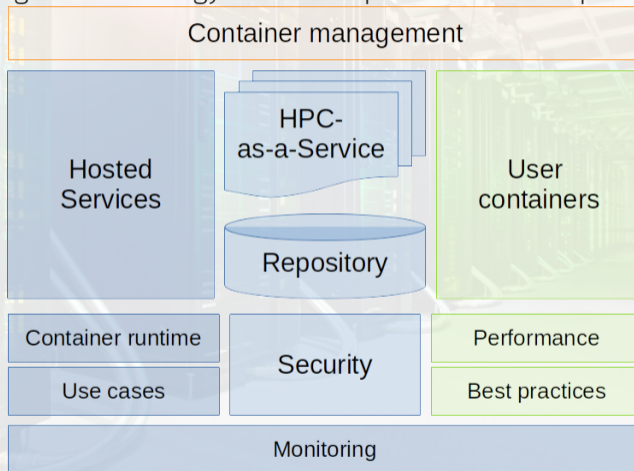
The list of used container management solutions:

- Slurm + Pyxis
- Docker Swarm-Mode
- systemd
- systemd+Pacemaker

NHR-Container project

Strategy

The general strategy could be split into the components:



Q&A