# Container Fundamentals applied to scientific research

13 dic 2023, 09:00 → 14 dic 2023, 22:00 UTC
Cupola Fiore (OA Brera)

Descrizione


## Overview

Modern scientific research challenges require new technologies, integrated tools, reusable and complex experiments in distributed computing infrastructures. But above all, computing power for efficient data processing and analyzing. Container technologies have emerged as a new paradigm to address such intensive scientific applications problems. Their easy deployment in a reasonable amount of time and the few required computational resources make them more suitable.

Containers enable performance isolation and flexible deployment of complex, parallel, and high-performance systems. Moreover, they gained popularity to modernize and migrate scientific applications in computing infrastructure management. Additionally, they reduce computational time processing and the struggle of managing applications, code and pipelines in heterogeneous environments.

## Objectives

1. Build a solid foundation on container technologies.
2. Work with containers to bundle applications with all its dependencies and deploy it on the platform of our choice.
3. Use containers on different platforms to share and execute applications
4. Orchestrate containers for complex applications toward microservices approach.

## Specification

In this Course, we first give an overview of virtualization and containerization technologies. We discuss the main advantages and disadvantages of using containers in daily research activities (including performance and portability). We present a micro-servicing approach and how it is linked to the container's technologies. We identify the most important and used container engines and their typical application. We will introduce container orchestration.

After completing this course, attendees should be able to do container and image operations with different container runtimes, manage network and storage (volumes) with containers, build and run multi-container applications.

## Location

The course will be held in-person and on-line. Lectures will be registered and made available to the students. The course will be organized in the noon-to-noon fashion (14:00 - 17:30 the first day and 09:00 - 13:00 the second day with tech lunch).

**Please note that due to logistical reasons, hands on session will only be given for people in presence.**

Due to limited seating capacity, we encourage individuals to register (no fee is due) using this Indico page before November 23th, 2023 noon, and select their preferred mode of attendance (in-person or remote) by checking the appropriate box. **If the number of registrants exceeds the room's capacity after the registration period ends, priority will be given to Ph.D. students and young researchers, with the remaining spots allocated on a first-come, first-served basis**. In case of a large oversubscription, a second similar event might be planned in the next months.

### Venue

Osservatorio Astronomico di Brera - Cupola Fiore

via Brera Milano (MI)

## Max Number of Participants

This event is limited to 25 participants in person.

## SOC/LOC

***INAF Unità Scientifica Centrale 8 Computing***

Giuliano Taffoni

Marco Landoni

## Contacts for info

Please drop us an email to container-course-usc8 [at] inaf.it

Iscrizione Participants

Partecipanti

Alessandro Ballone, Alessandro Marassi, Alessandro Tacchini, Alessio Gorgi, Alfio Puglisi, Alfonso Veropalumbo, Andrea Adelfio, Andrea Bignamini, Andrea Di Dato, Andrea Enia, Andrea Lorenzani, Andrea Rossi, Antonietta Fara, Bruno Martino, Carlo Gaibisso, Carlo Giocoli, Carmelita Carbone, Chiara Moretti, Cosimo Volpicelli, Cristiano Urban, Cristina Bernasconi, Daniela Paoletti, Danilo Selvestrel, Davide Resta, Dominik Pacholski, Elena Fedorova, Eleonora Veronica Lai, Elisabetta Carella, emanuele scalise, Enrico Licata, Ezequiel J. Marchesini, Fabio Ragosta, Fiore De Luise, Francesco Ceraudo, Francesco Iraci, francesco visconti, Fulvio Gianotti, Gabriele Bruni, Gabriele Panebianco, Giacomo Coran, Giovanna Jerse, Giovanni De Cesare, Giovanni La Mura, Giovanni Naldi, Giuliano Taffoni, Giuseppe Carboni, Giuseppe Di Persio, Giuseppe Dilillo, Giuseppe Pupillo, Giuseppe Riccio, Ismam Abu, Kamal Sant, Leonardo Pelonero, Leonardo Primavera, Lorenzo Monti, Lorenzo Piga, Marcello Lodi, Marco Citossi, Marco De Benedetto, Marco Landoni, Marco Molinaro, Marco Tugnoli, Mariano Muscas, Marta Burgay, Martin Topinka, Massimiliano Ruscio, Massimo Sponza, Matteo Stagni, Matteo Trudu, Michele Mastropietro, Nicolo' Parmiggiani, Paolo Di Marcantonio, Patrizia Romano, Ricardo Zanmar Sanchez, Riccardo Campana, Roberto Regni Ponzeveroni, Rosanna Sordo, Sara Gelsumini, Stefano Covino, Stefano Vercellone, Vito Capobianco

SOC container-course-usc8@inaf.it

MERCOLEDÌ 13 DICEMBRE

**14:00** → 16:00 **Containers: Session 1**

Containers fundamentals theory
Docker, PodMan
Network, Volumes, Images
Dockerhub and Docker compose

Exercises
Application to Astrophysics

**16:00** → 16:30 **Coffee Break** 30m

**16:30** → 18:00 **Containers: Containers : Session 2**

Containers fundamentals theory
Docker, PodMan
Network, Volumes, Images
Dockerhub and Docker compose

Exercises
Application to Astrophysics

GIOVEDÌ 14 DICEMBRE

**09:00** → 10:30 **Orchestration: Session 1**

**10:30** → 11:00 **Coffee Break** 30m

**11:00** → 13:00 **Orchestration: Session 2**

**13:00** → 14:00 **Lunch Tech (offered) @ OA Brera**