

## Rootless containers with udocker

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udocker (<https://github.com/indigo-dc/udocker>) is a tool that addresses the problematic of executing Linux containers in user space, i.e. without installing additional system software, without requiring administrative privileges and respecting resource usage policies, accounting and process controls. udocker empowers users to execute applications encapsulated in containers easily across a wide range of Linux distributions and systems including computing clusters.

udocker implements a subset of Docker commands aimed at searching, pulling, importing, loading and executing containers. The self installation allows a user to transfer udocker and execute it to pull the required tools and libraries. All required binary tools and libraries are provided with udocker and compilation is not required. udocker is an integration tool that incorporates several execution methods giving the user several options to run their containers according to the host capabilities. Several interchangeable execution modes are available, that exploit different technologies and tools, enabling udocker to run in older and newer Linux distributions. Currently udocker supports four execution modes: system call interception and pathname rewriting via PTRACE, dynamic library call interception and pathname rewriting via shared library preload, Linux unprivileged namespaces via runC, and Singularity when locally available. Each approach has its own advantages and limitations, and therefore an integration tool offers flexibility and freedom of choice to better match the applications to the host characteristics. udocker has more than 500 stars on github and is commonly used to execute HTC, HPC and GPGPU applications across datacenters and infrastructures. udocker was developed by LIP in the context of the INDIGO-DataCloud project and is being further extended in DEEP-Hybrid-DataCloud.

This communication will provide an overview of the udocker capabilities, development status and evolution.

**Primary authors:** GOMES, Jorge (LIP / INCD); DAVID, Mário (LIP); PINA, João (LIP / INCD); MARTINSJ, João (LIP / INCD)

**Presenters:** GOMES, Jorge (LIP / INCD); DAVID, Mário (LIP)

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