Sodalite

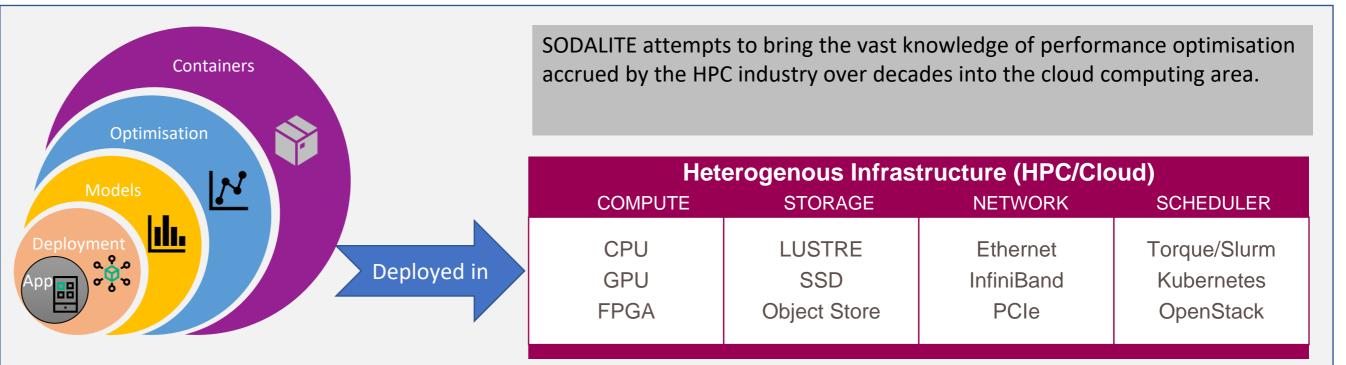
SOFTWARE DEFINED APPLICATION INFRASTRUCTURES MANAGEMENT AND ENGINEERING

Simplify & fully exploit benefits of heterogeneous platforms

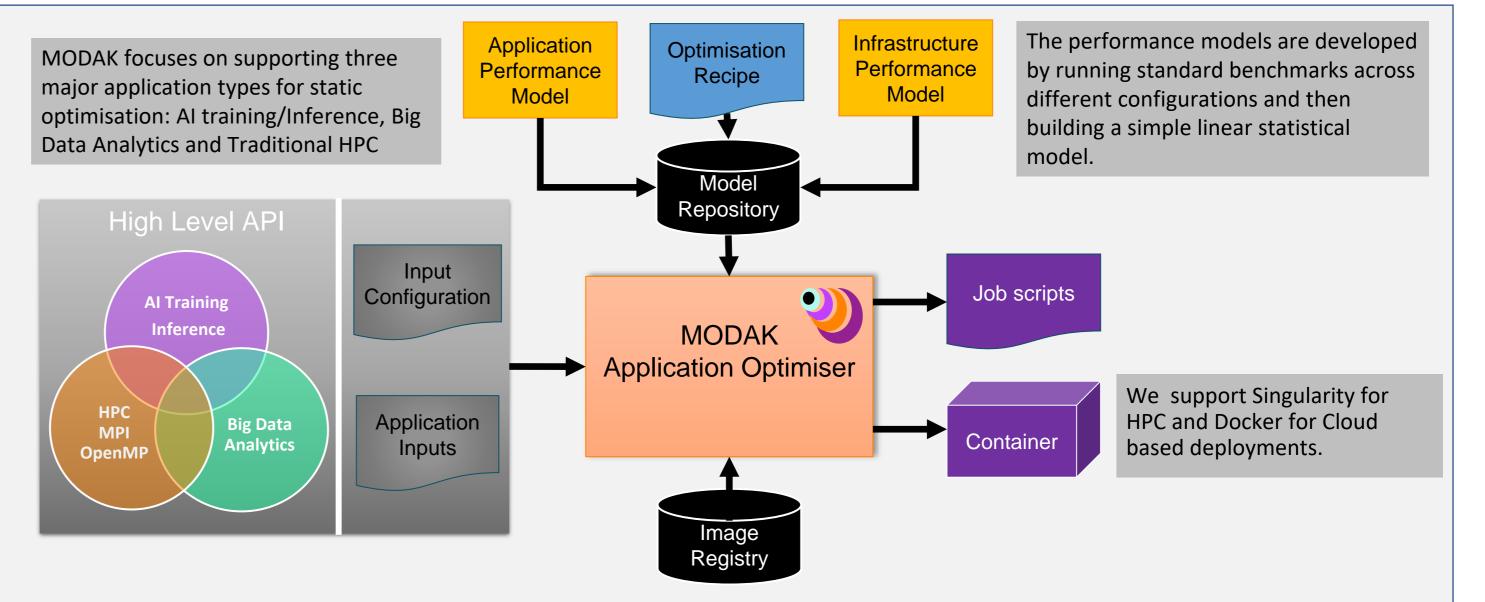
HPC Application Optimisation in Sodalite

Nina Mujkanovic, Alfio Lazzaro (HPE), Elisabetta Di Nitto (POLIMI) Daniel Vladušič, Dragan Radolović, Joao Pita Costa (XLAB), Maria Carbonell (ATOS), Kalman Meth (IBM)

Performance Requirements



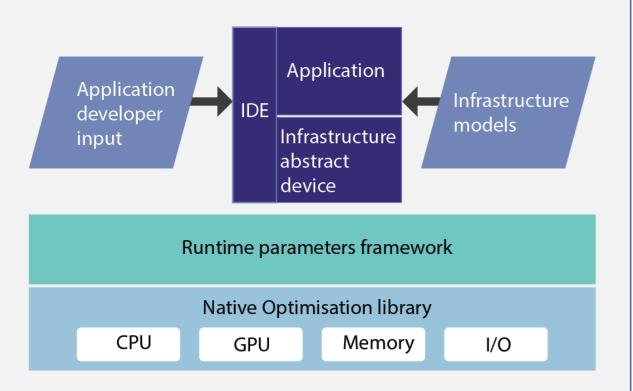
MODAK - Model based Optimiser for Deployment of Application (with Kontainers)



Vision

Simpler and faster development, deployment, operation and execution of heterogeneous apps in HPC, Cloud & SW-defined computing environments

Architecture



A **pattern-based abstraction library** that includes application, infrastructure, and performance abstractions

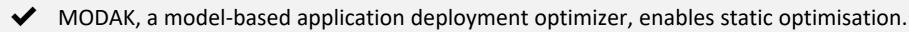
An **automatic Infrastructure as Code (IaC)** engine that facilitates the development process, and also reduces deploying errors

A **design and programming model** for applications and infrastructures based on the abstraction library.

A **deployment framework** that enables the static optimization of abstracted applications onto specific

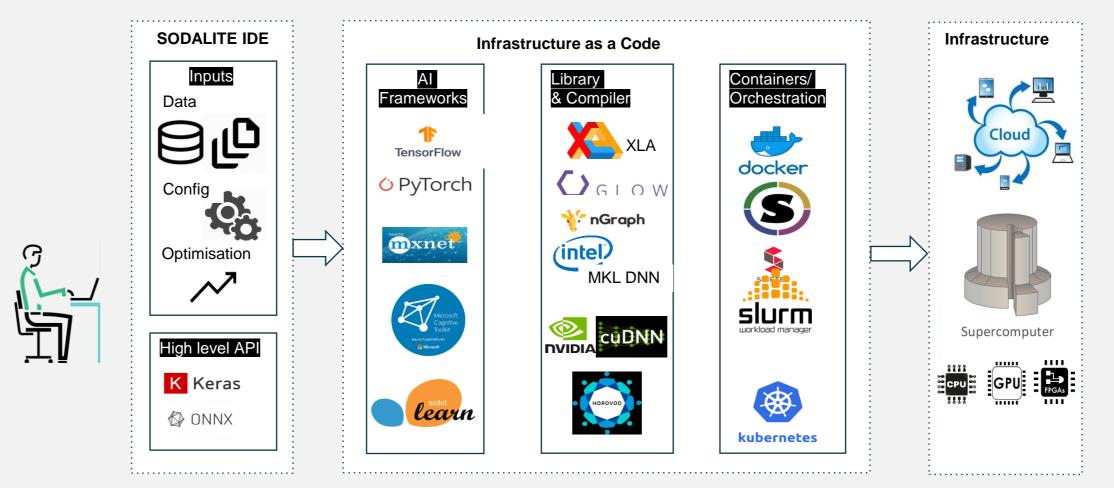
infrastructure.

Automated static and run-time **optimization and management of applications**.

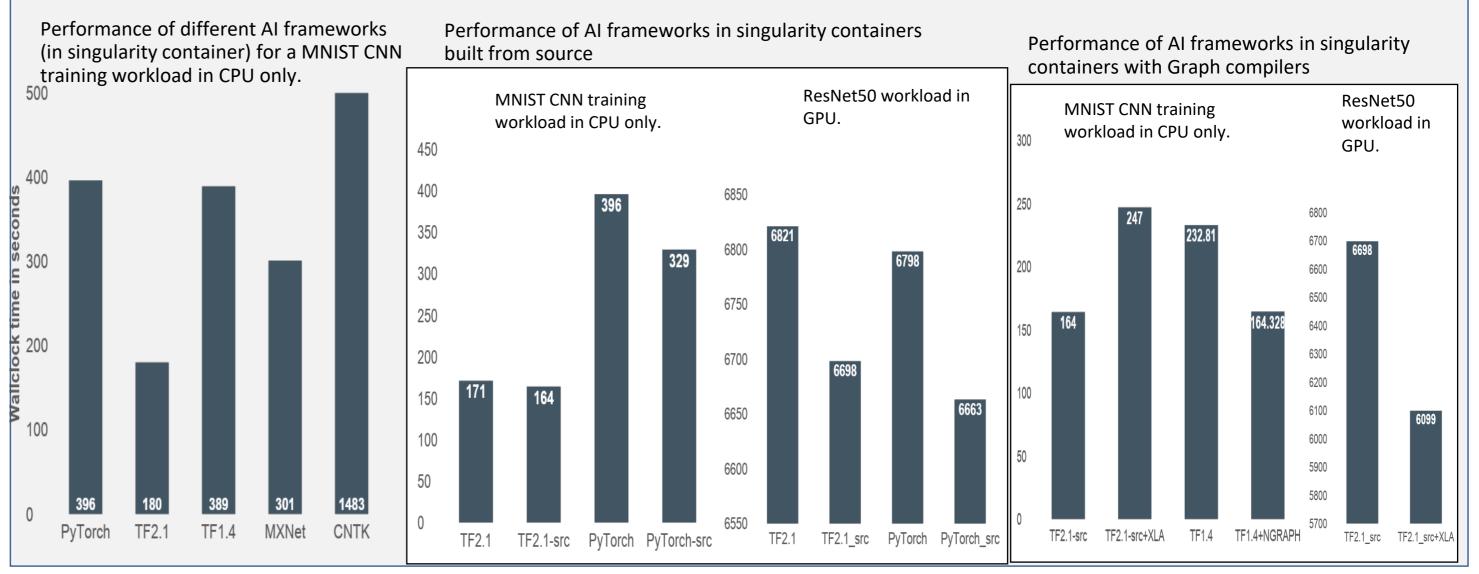


- ✓ An application's performance can be predicted using the performance models of the application and infrastructure.
- These models characterize how the application parameters (like input data size and format) influence the performance as well as the performance characteristics of the target infrastructure, such as peak performance and memory bandwidth.
- Based on AoE selected optimisations (Optimisation recipe), MODAK maps the optimal application parameters to the infrastructure target and builds an optimised container (using prebuilt images from the image registry).

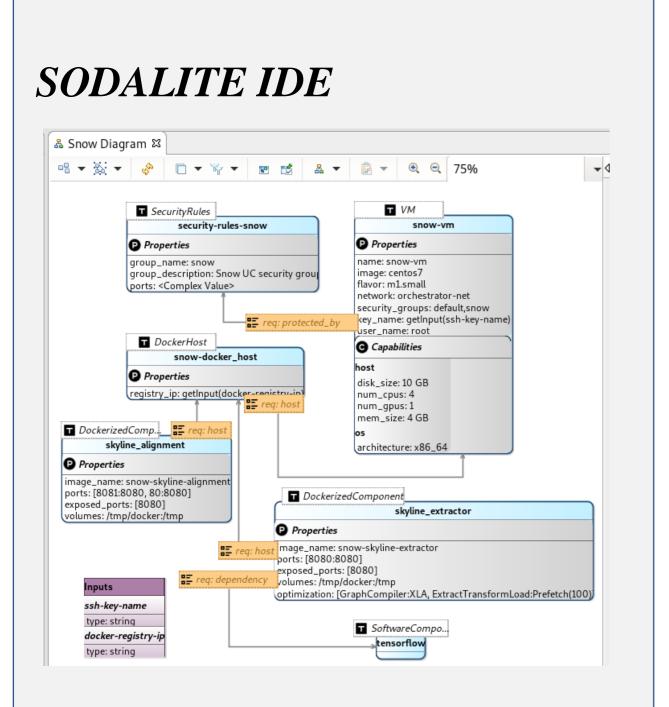
AI Example



Comparison of AI Frameworks



AI example shows how the data scientist will use the SODALITE framework by specifying the data, config and optimisations options while deploying an AI network written in a high-level API. The SODALITE application optimiser will select a preferred AI framework, optimised library and compiler and then build an optimised container. This will then be deployed to an HPC or Cloud infrastructure.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825480.

