



Contribution ID: 321 Contribution code: WED 04

Type: Poster

AI-based approach for provider selection in the INDIGO PaaS Orchestration System of INFN Cloud

Wednesday 23 October 2024 16:00 (15 minutes)

The Italian National Institute for Nuclear Physics (INFN) has recently launched the INFN Cloud initiative, aimed at providing a federated Cloud infrastructure and a dynamic portfolio of services to scientific communities supported by the Institute. The federative middleware of INFN Cloud is based on the INDIGO PaaS orchestration system, consisting of interconnected open-source microservices. Among these, the INDIGO PaaS Orchestrator receives high-level deployment requests in the form of TOSCA templates and coordinates the process of creating deployments on the IaaS platforms made available by the federated providers.

Through internal projects like INFN DataCloud and European initiatives such as interTwin and AI4EOSC, INFN is working to improve the orchestration system by integrating artificial intelligence to optimize deployment scheduling. This contribution outlines the preparatory work to identify the key features and their sources (e.g., databases, logs, monitoring tools), followed by the data preprocessing necessary for in-depth analysis of different AI techniques. The first implemented approach involves the design of two models: one for the deployment success/failure classification and another for the deployment time regression. The combination of the output of the two models trained on recent and sliding time windows aims to define the ordered list of providers that the orchestrator can use for deployment submission.

An alternative solution for an AI-based Orchestrator could involve a Reinforcement Learning approach, in which an agent is trained as if it has to win a game and learns which provider is best suited to user demand.

Primary author: Dr GIOMMI, Luca (INFN CNAF)

Co-authors: Dr COSTANTINI, Alessandro (INFN-CNAF); Mr DEBIASE, Francesco (INFN); DONVITO, Giacinto (INFN-Bari); VINO, Gioacchino (INFN Bari (IT)); SAVARESE, Giovanni (INFN-BA); ANTONACCI, Marica (INFN)

Presenter: VIANELLO, Enrico (INFN-CNAF)

Session Classification: Poster session

Track Classification: Track 7 - Computing Infrastructure