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Federating and orchestrating resources across the EOSC infrastructures

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The INDIGO PaaS is a middleware that allows to federate distributed computing and storage resources using a TOSCA-based orchestration system.

The development started during the H2020 INDIGO-DataCloud project (2015-2017) and then continued in the following projects: DEEP-HybridDatacloud, eXtreme-Datacloud and EOSC-Hub.

During these years, the stability, reliability and scalability of the core services have been greatly improved. Moreover, several new features have been added: for example, there's the possibility of deploying virtual computing environments (based on VM or container) with GPUs; the management of failures and timeouts has been improved; user management has been revised, introducing greater control over roles (regular user / admin). Another important update concerns the support for multi-tenancy and the integration with multiple authentication systems based on OpenID-Connect (in particular INDIGO-IAM and EGI-Checkin) to facilitate the adoption in different contexts, from INFN Cloud to EGI Federated Cloud. Moreover, it is now possible to federate not only private cloud infrastructures, such as Openstack, and public clouds such as Amazon AWS, and Mesos clusters, but also Kubernetes clusters: a plugin has in fact been added to manage Helm chart deployments. Finally, a web dashboard has been developed that greatly simplifies user interaction with PaaS services. The INDIGO PaaS Orchestrator is one of the services available in the EOSC marketplace (https://marketplace.eosc-portal.eu/services/infn.paas_orchestrator) and maintained by INFN.

Currently it is being exploited in further projects, in particular C-Scale and EGI-ACE. The latter is implementing the compute platform of the European Open Science Cloud; our ambitious goals are now 1) to enlarge as much as possible the number of sites federated by the INDIGO PaaS in order to provide users with a transparent access to the distributed compute resources; 2) to provide high-level services ready to be deployed on demand by the end-users (e.g. JupyterHub as a service, Spark, TensorFlow, etc.). While in C-Scale the PaaS Orchestrator will be leveraged for supporting the EO use cases.

Speaker bio:

From 2003 to 2012 Marica Antonacci worked as a Software Engineer for an Italian private company developing software and technologically advanced solutions in the field of Earth Observation. In 2013 she started to work for INFN (Istituto Nazionale di Fisica Nucleare) gaining experience and skills in cloud computing technologies. She has been contributing to several European projects, like INDIGO-DataCloud, DEEP Hybrid-DataCloud, eXtreme-DataCloud, EOSC-Hub, EOSC-Pillar, EGI-ACE, etc. She has the role of system administrator of the production cloud site at the ReCaS datacenter (INFN-CLOUD-BARI) and is responsible for its integration in the EGI Federated Cloud.

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