Apache Mesos has been widely adopted by large organizations like Apple, Twitter, AirBnB, eBay for running their production workloads. Yet, configuring a Mesos cluster can be complex and time-consuming. Therefore it is important to leverage tools that automate the installation and configuration.

In this respect, we have implemented a suite of tools that allow to deploy a fully functional cluster in a straightforward way.

## Apache Mesos and its Frameworks

**Apache Mesos** is an open-source cluster manager that provides efficient resource isolation and sharing across distributed applications (frameworks) ensuring automated self-healing and scalability.

Mesos implements a **two-level meta-scheduler** that provides **primitives** to express a wide variety of scheduling patterns and use cases.

Mesos offers a layer of software that organizes the machines (physical servers and/or VMs and/or cloud instances) letting applications draw from a single pool of intelligently- and dynamically-allocated resources.

Examples of Mesos frameworks include:
- **Marathon** - a production-grade container orchestration platform designed to launch long-running applications;
- **Chronos** - a distributed fault-tolerant job scheduler; it can be used to run processing tasks.

### Automation, automation, automation

In the framework of the project INDIGO-DataCloud we have implemented:

- A set of **docker** images published on the **Docker Hub**:
  - All the components of the cluster have been dockerized ensuring:
    - portability: the same image can be run on bare metal or virtual machines;
    - isolation: each service is segregated and can use also different versions of libraries and applications.

- A set of **ansible** roles shared on **Ansible-Galaxy**:
  - The deployment of the several cluster components is managed through dedicated ansible recipes organized into roles:
    - services can be easily orchestrated and distributed across the cluster machines;
    - customized configurations can be enabled/disabled using role variables

**WIP**: in addition to Marathon and Chronos, we will provide the possibility to automatically configure frameworks for data analytics like Hadoop/Spark.

## Production-ready Mesos Cluster

The suite of tools implemented in the framework of the project INDIGO-DataCloud allows to deploy a fully functional cluster with the following features:

- **High-availability** of the master nodes;
- **HA Load-balancing**;
- **Service discovery** through Consul;
- **Persistent storage** through RexRay driver;
- **Virtual networks** using Calico;
- **Cluster elasticity** through INDIGO Clues plugin.

A simple **ansible playbook** can be used to deploy the Mesos cluster on bare metal and/or VMs just specifying the hosts, their roles and a few parameters.

Moreover we have prepared some templates in two different formats, HOT and TOSCA, that make use of the developed **ansible roles**. This means that we can exploit both **Heat** on the single IaaS (Openstack) or the **INDIGO PaaS Orchestrator** to instantiate the Mesos cluster on different cloud providers, including **AWS** and OpenNebula.

---

**References**

2. [https://mesos.github.io/marathon/](https://mesos.github.io/marathon/)
5. [https://mesos.apache.org/](http://mesos.apache.org/)