

## AAI Development Platform based on Apache Mesos

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#### Outline

- Development Platform
  - Architecture
  - Features
- AAI Software
  - From monolithic app to micro-services
- Conclusions





# New development model for AAI based on **microservices** and **docker containers** that are portable and easily managed



The infrastructure needs to be agile as well



### **EVEN Platform solutions**

- From INDIGO-DataCloud project:
  - Apache Mesos for resource management
  - Marathon for long-running services
  - Chronos for scheduled jobs, e.g. backup tasks
  - Ansible for configuration management
  - INDIGO Orchestrator/Openstack HEAT for resource provisioning







#### Mesos Cluster @ReCas-Bari Cloud



External Storage



- High-availability & fault-tolerance
- Scalability & Elasticity
- Resource Isolation
- Service discovery & Load-balancing
  - services are automatically registered in Consul as soon as they are deployed on the cluster
  - Haproxy LB conf is dynamically adjusted when services are scaled up/down
- User-friendly interfaces for deploying/monitoring services and jobs:
  - REST APIs
  - Web UI



### **Specific features** (required by AAI team)

- Support for **stateful** services (e.g. databases):
  - NFS for data shared among multiple containers
  - Cinder volume for single application data (using Rex-Ray driver)
- SSL-enabled endpoints for services deployed on the cluster
- Support for docker image download from private registry (baltig)
- Health checks for running services



### **Monolithic VS Micro-services**





### **Monolithic VS Micro-services**



GODiVA as Micro-services



#### Micro-service architecture scale very well and achieve as is HA, business continuity, etc..

#### we can have more instances of the same service And the service registry help to find each one





- All architecture is built on Java Spring Cloud Framework
- Router service implemented on Spring cloud Netflix ZUUL
- Service Registry implemented on Spring cloud Netflix Eureka



https://netflix.github.io

https://spring.io

https://en.wikipedia.org/wiki/Representational\_State\_Transfer





A base lib has been created and published on (<u>https://sysinfo-artifactory.cnaf.infn.it/artifactory</u>) to being used as base of all our services, it automatically manage:

- service registration
- documentation publishing
- token verification
- api for call external api from other service







#### Documentation is done using swagger (https://swagger.io)

- automatically create documentation for all spring rest controller using java annotation
- expose web frontend with all api doc
- expose standard json file that permit to create client on different language







GET /echo/test/{value} Example api that realize an ECHO operation	
The result of the echo is the input value of the api	
Parameters	Try it out
Name	Description
<b>value *</b> <sup>required</sup> string (path)	Is the value that will be returned in post operation
Responses	Response content type */*
<b>Code</b> 200	Description
401	Example Value   Model  {     "body": {},     "statusCode": "100",     "statusCodeValue": 0     }  //nauthorized
403	Forbidden
404	Not Found





- Porting AAI services into the Mesos-based platform required an initial brief break-in time
  - After that the developers were completely autonomous
- The adoption of the container orchestration platform allows the dev team to focus more on coding and less on the IT "plumbing":
  - The services are completely managed by the platform that takes care of restarting/rescheduling the containers in case of failures
  - The infrastructure is scalable and implements fail-over and high-availability
- The whole platform **can be easily re-installed on different environments** (bare-metal, clouds, private and public)
  - Using ansible recipes and TOSCA/HOT templates





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