

Composition and Deployment of Complex Container-Based Application Architectures on Multi-Clouds

DI4R

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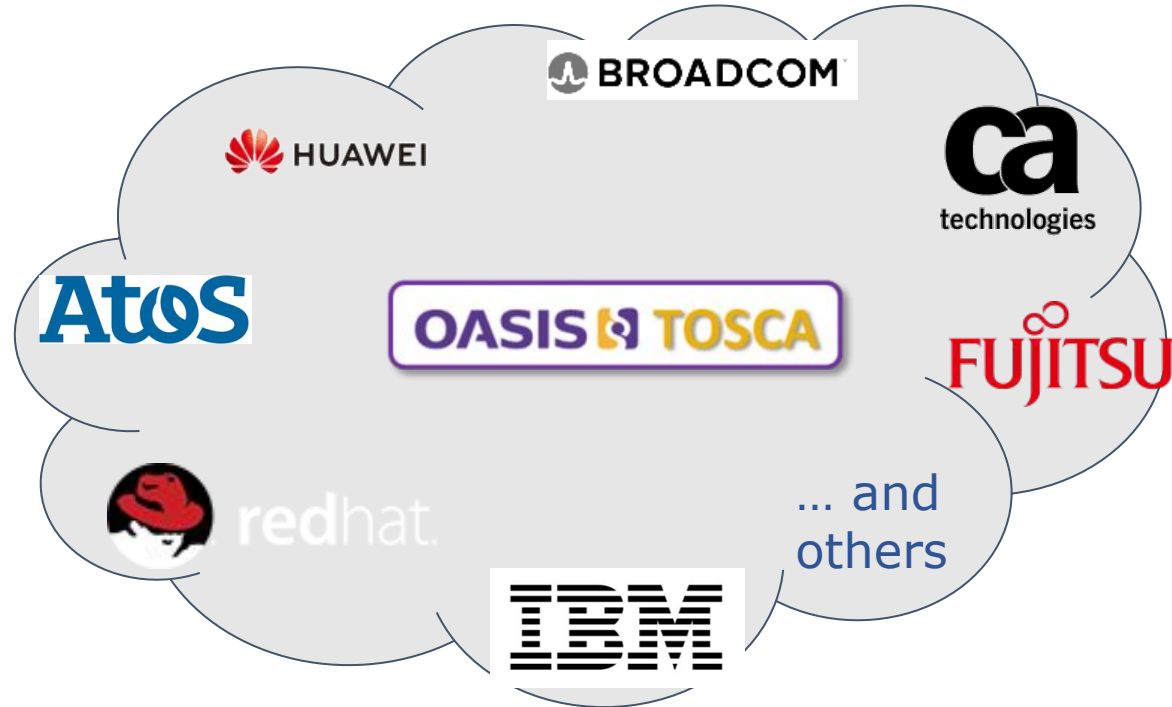
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The Problem. The Why.

- Universal infrastructure support
 - Or at least close to
 - Bare clouds, Kubernetes clusters, **Mesos/Marathon** clusters, Docker Swarm
- Let's speak the same (descriptive) language
- Academia+industry standard
- Extensible
- Approachable to non-IT fellows

- Topology and Orchestration Specification for Cloud Applications
- Standard created by the OASIS Consortium



TOSCA main web page: https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=tosca#overview
Committee full list: https://www.oasis-open.org/committees/membership.php?wg_abbrev=tosca

TOSCA template general skeleton

tosca_definition_version: toscasimpleyaml_1_0

description: Insert your description here

imports:

List your imports, each on a new line, each line starting with a hyphen

topology_templates:

inputs:

List your inputs, each on a new line

node_templates:

List your nodes, each on a new line

outputs:

List outputs, each on a new line

TOSCA example

```
node_templates:  
  mesos_master_server:  
    type: toasca.nodes.indigo.Compute  
    capabilities:  
      scalable:  
        properties:  
          min_instances: 1  
          max_instances: 1  
          count: 1  
          default_instances: 1  
    os:  
      properties:  
        gpu_driver: true  
        cuda_support: true  
        image: "ubuntu-16.04"  
        instance_type: "g5.large"
```

endpoint:

endpoint:

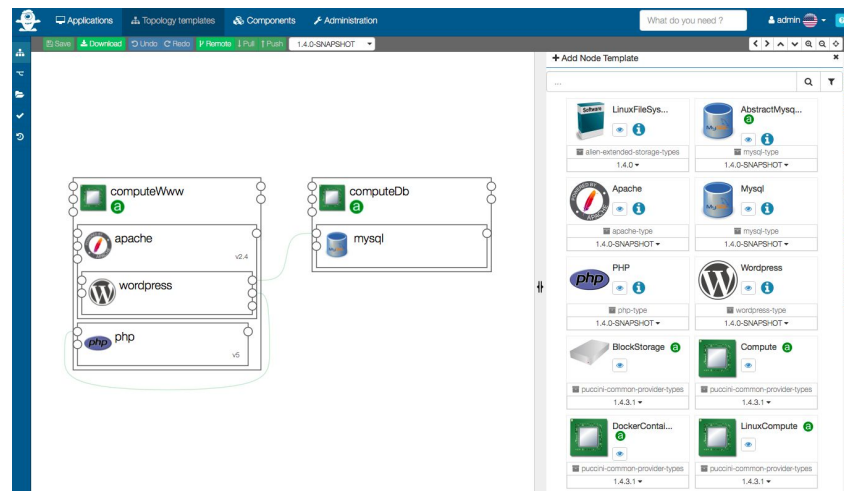
```
  properties:  
    dns_name: mesosserverpublic  
    private_ip: true  
    ports:  
      marathon_port:  
        protocol: tcp  
        source: 8443  
    secure: false  
    network_name: PUBLIC  
  host:  
    properties:  
      num_gpus: 1  
      mem_size: "2 GB"  
      Num_cpus: 2
```

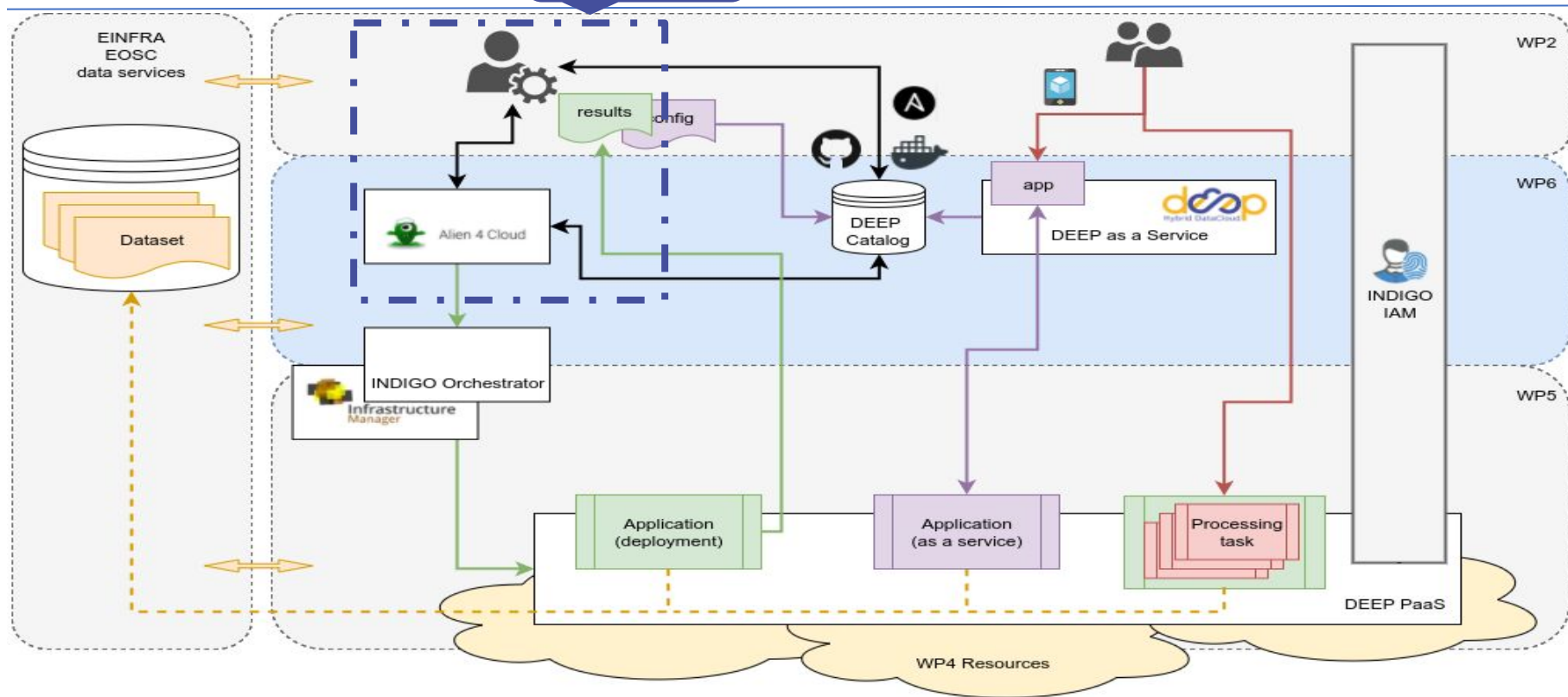
properties



Topology building/composing

- One can use
 - A simple text editor
 - Even Notepad would do
 - A GUI
 - Eclipse Winery
 - OpenTosca
 - Cloudify
 - Alien4Cloud

- Portal to graphically edit YAML-based TOSCA templates
- Built in Java + HTML5 (Spring Boot, Angular)
- Open - Source on Github; Apache 2.0
 - <https://github.com/alien4cloud>
- Extensible - Plugin based
 - Easy to add new orchestrators
 - An orchestrator creates the actual infrastructure using a TOSCA topology Defined by the user





- User's entry point
- Plugin to communicate with our Orchestrator
- Freely at (as bundle Alien4Cloud + plugin, under Apache 2.0)
 - indigo-dc/alien4cloud-deep on 
 - indigodatacloud/alien4cloud-deep on 
- Next, video deployment **Jupyter+Tensorflow on Mesos/Marathon**
 - Use **GPUs**
 - 3 x Virtual Machines
 - 1 x **Mesos Master** to control (running **Marathon** too)
 - 1 x **Mesos Slave** doing the hard work
 - 1 x **Load Balancer - Marathon-LB (HAProxy)** exposed to internet

Alien4Cloud in action

Define Marathon's password as an input parameter using the `get_input` method.

| Property | Value |
|-------------------|-------|
| mesos_master... | |
| mesos_slave1... | |
| mesos_slave2... | |
| mesos_slave3... | |
| mesos_slave4... | |
| mesos_slave5... | |
| mesos_slave6... | |
| mesos_slave7... | |
| mesos_slave8... | |
| mesos_slave9... | |
| mesos_slave10... | |
| mesos_slave11... | |
| mesos_slave12... | |
| mesos_slave13... | |
| mesos_slave14... | |
| mesos_slave15... | |
| mesos_slave16... | |
| mesos_slave17... | |
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| mesos_slave82... | |
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| mesos_slave86... | |
| mesos_slave87... | |
| mesos_slave88... | |
| mesos_slave89... | |
| mesos_slave90... | |
| mesos_slave91... | |
| mesos_slave92... | |
| mesos_slave93... | |
| mesos_slave94... | |
| mesos_slave95... | |
| mesos_slave96... | |
| mesos_slave97... | |
| mesos_slave98... | |
| mesos_slave99... | |
| mesos_slave100... | |

Thank you!

Want more? Check us on:



<https://deep-hybrid-datacloud.eu/>



@DEEP_eu



What's the idea

- Standardizes the language to describe:
 - The structure of an IT Service (its topology model)
 - How to orchestrate operational behavior (plans such as build, deploy, patch, shutdown, etc.)
 - Declarative model that spans applications, virtual and physical infrastructure