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OGF OCCI Implementation on OpenNebula

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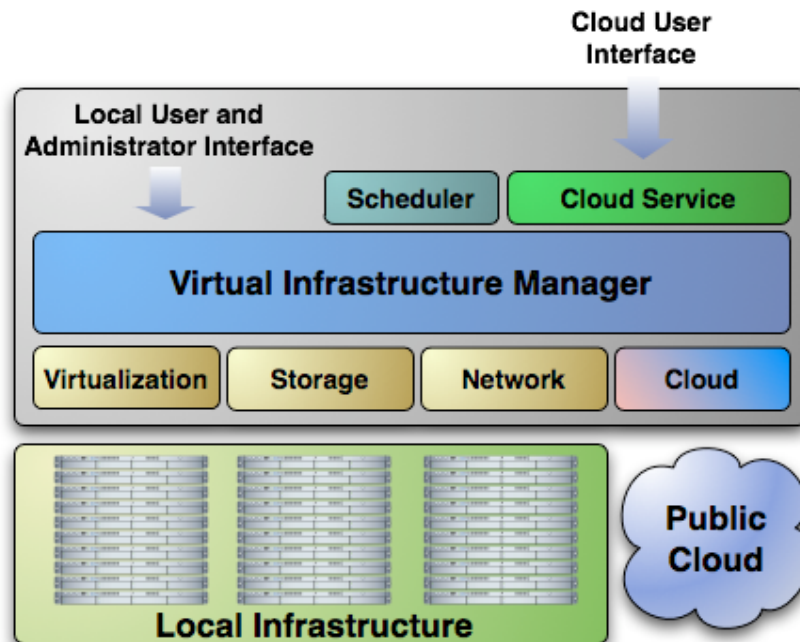
OpenNebula Overview

OpenNebula Overview

What is OpenNebula?

Open-Source Toolkit for Building Cloud Infrastructures

- Orchestrates storage, network and virtualization technologies to enable the dynamic placement of multi-tier services on distributed infrastructures, combining both data center resources and remote cloud resources, according to allocation policies
- Provides internal and Cloud administration and user interfaces for the full management of the IaaS Cloud platform



Private Cloud: Management of virtual infrastructure in the data-center or cluster

Hybrid Cloud : Combination of private with Cloud resources

Public Cloud: Cloud interfaces for the full management of services

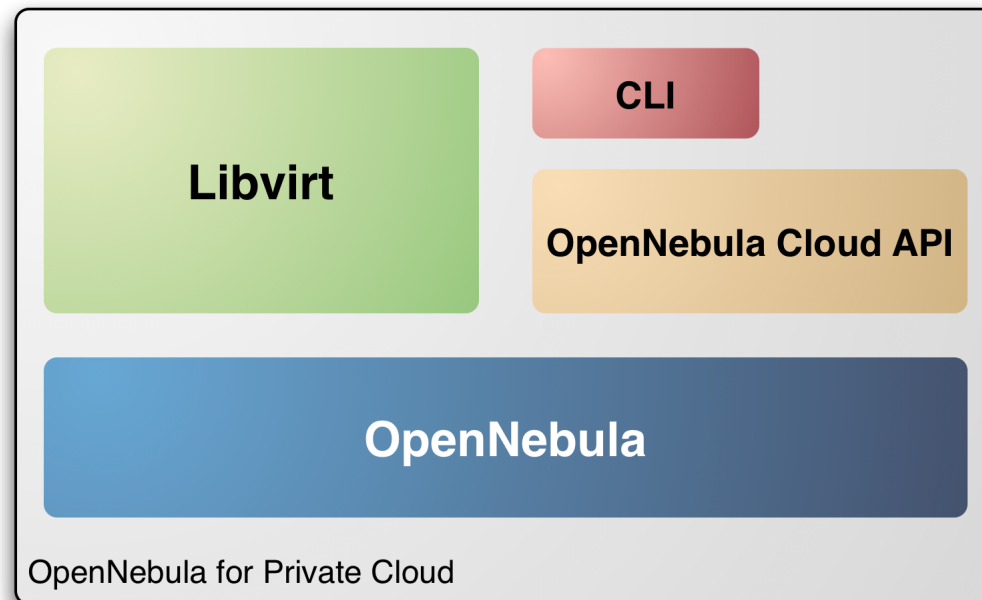


Implementation History

Implementation History

The OCA Interface

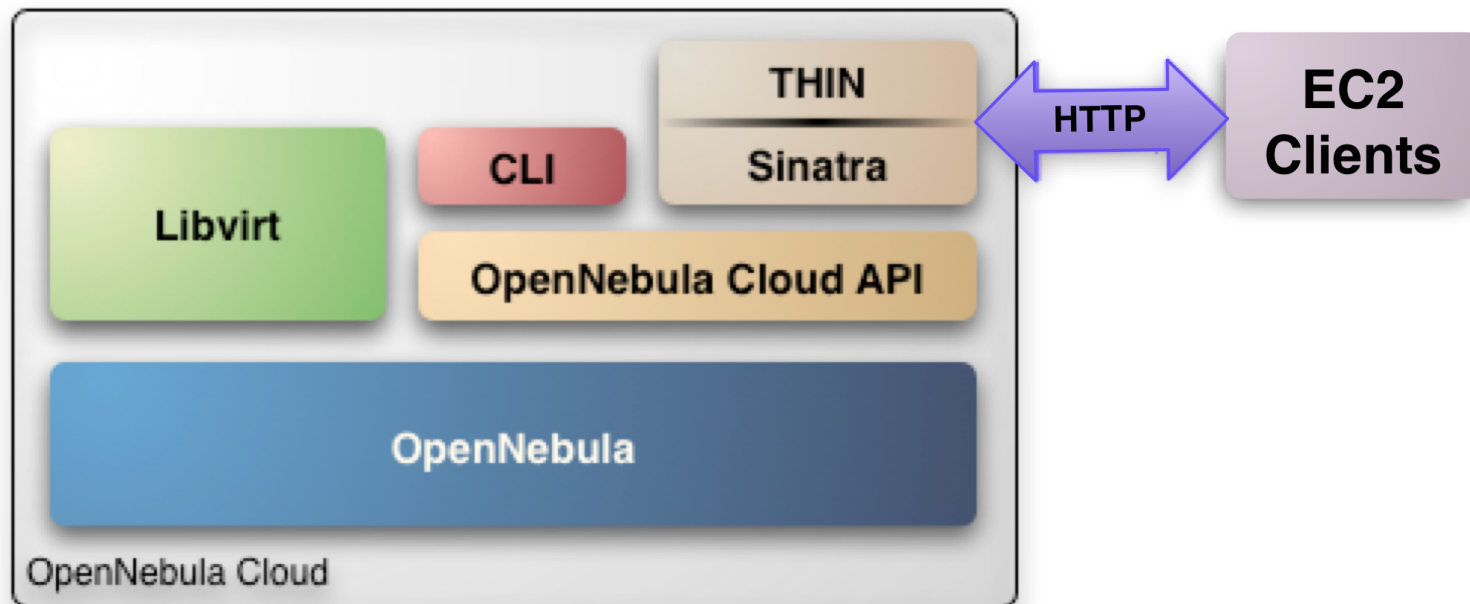
- OCA : OpenNebula Cloud APi
- Abstraction of VM management
 - Defines semantics for the VM
 - OS
 - NETWORK
 - DISK



Implementation History

The EC2 Interface

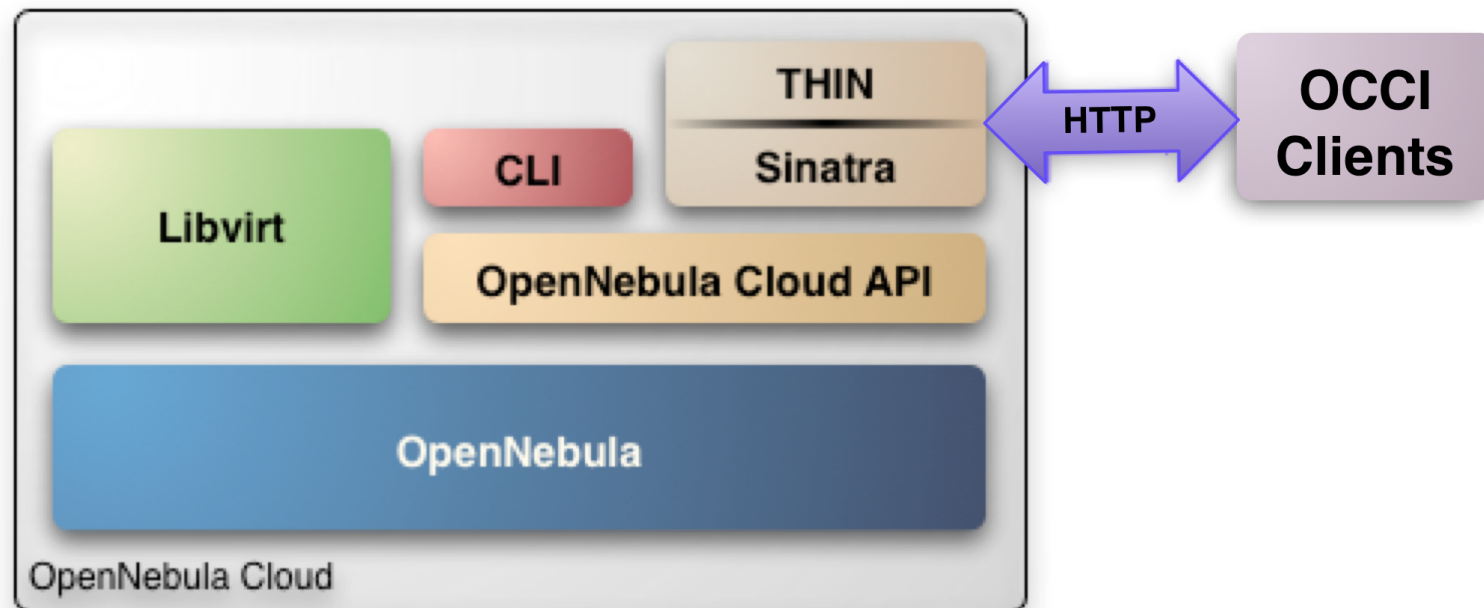
- EC2 Query Interface
- Infrastructure for Public Cloud Service



Implementation History

The OCCI Interface

- Based on preliminary specification
- Uses developed infrastructure for EC2



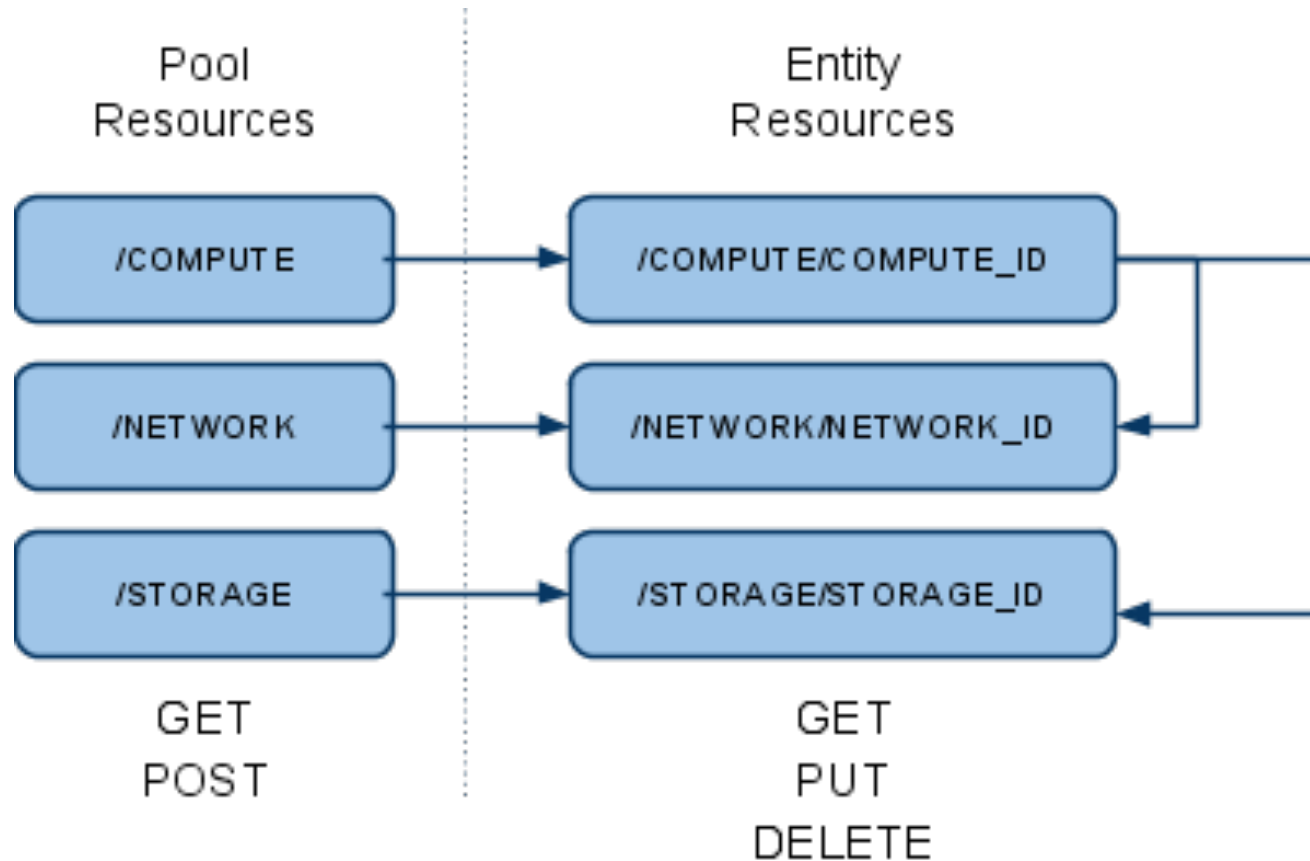


OpenNebula OCCI Implementation

OpenNebula OCCI Design

Overview

- OpenNebula OCCI RESTful web service
 - Launches and manages images, virtual networks and virtual machines
 - Uses an unfinished draft of the OGF OCCI API specification
 - Update planned for v1.6



OpenNebula OCCl Design

Pool Resources

The “COMPUTE” Pool

- HTTP Methods : GET, POST

```
<COMPUTES>
  <COMPUTE href="http://www.occi.org/compute/234">
  <COMPUTE href="http://www.occi.org/compute/432">
  <COMPUTE href="http://www.occi.org/compute/123">
</COMPUTES>
```

The “STORAGE” and “NETWORK” Pool

- HTTP Methods : GET, POST
- Similar structure

OpenNebula OCCI Design

Entity Resources

The “STORAGE” Object

- HTTP Methods : GET, DELETE

```
<DISK>
  <ID>123</ID>
  <NAME>Ubuntu 9.04 LAMP</NAME>
  <SIZE>2048</SIZE>
  <URL>file:///images/ubuntu/jaunty.img</URL>
</DISK>
```

The “NETWORK” Object

- HTTP Methods : GET, DELETE

```
<NETWORK>
  <ID>123</ID>
  <NAME>Blue Network</NAME>
  <ADDRESS>192.168.0.1</ADDRESS>
  <SIZE>C</SIZE>
</NETWORK>
```

- HTTP Methods : GET, PUT, DELETE

```
<COMPUTE>
  <ID>123AF</ID>
  <NAME>Web Server</NAME>
  <TYPE>small</TYPE>
  <STATE>running</STATE>
  <DISKS>
    <DISK image=http://www.occi.org/storage/234 dev=sda1/>
    <SWAP size=1024 dev=sda2/>
    <FS size=1024 format=ext3 dev=sda3/>
  </DISKS>
  <NICs>
    <NIC network=http://www.occi.org/network/123
ip="19.12.1.1"/>
    <NIC network=0/>
  </NICs>
</COMPUTE>
```



OpenNebula OCCI Design

Command Line Interface

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- Managing “**compute**” resources
 - `occi-compute {create, list, show, update, delete}`
- Managing “**network**” resources
 - `occi-network {create, list, show, delete}`
- Managing “**storage**” resources
 - `occi-storage {create, list, show, delete}`



Implementation Assumptions and Details



OpenNebula OCCI Design

Implementation choices

- OCCI Specification incomplete (at the time)
- Assumptions:
 - Representation format
 - XML
 - Resource attributes set by OpenNebula needs
 - Specification not clear about linking resources
 - XML nesting
 - Specification of local devices
 - OpenNebula uses unix devices with “dev” attributes
 - e.g. : `<DISK image="ab5c9770-7ade-012c-f1d5-00254bd6f386" dev="sda1"/>`
 - Management verbs not well defined (for stop, resume, etc)
 - Update representation through PUT chosen
 - More RESTful
 - Sometimes can be misleading
 - Storage POST not well defined
 - Upload image through HTTP multipart



OpenNebula OCCI Design

Future Work

- Link Headers
- XHTML5 Rendering
- More?

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OCCI Implementation on top of OpenNebula

THANK YOU FOR YOUR ATTENTION!!!

More info, downloads, mailing lists at
www.OpenNebula.org

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www.reservoir-fp7.eu/

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