Open Cloud Computing Interface - Infrastructure Models

Status of This Document

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Abstract

This document is part of the Open Cloud Computing Interface (OCCI) specification document series. The OCCI document series describes what each OCCI compatible interface needs to provide. The overall OCCI specification itself is setup modular to be extensbible and includes the following parts:

- The OCCI Core & Models
- The OCCI Infrastructure Models
- OCCI HTTP Header rendering
- (OCCI XHTML5/RDFa rendering) - *to be released*

Each of these parts is described in a separate document so the overall specification comes in the form of a document series. Where as this document describes the OCCI Infrastructure models.

All these parts and the information within are mandatory for implementors (unless otherwise specified). The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119.

1. OCCI Infrastructure

1.1. Introduction

OCCI Infrastructure defines three kinds and various extensions relating to management of cloud infrastructure services (IaaS). With the help of these kinds and possible extensions Virtual Machine deplyoment, management and monitoring can be described.

1.2. Example

```
> GET /us-east/webapp/vm01 HTTP/1.1
> User-Agent: occi-client/1.0 (linux) libcurl/7.19.4 OCCI/1.0
> Host: cloud.example.com
> Accept: */*
```

```
>
< HTTP/1.1 200 OK
< Date: Sat, 10 Oct 2009 12:56:51 GMT
< Content-Type: application/ovf
< Link: </us-east/webapp/vm01;start>;
<       rel="http://purl.org/occi/action#start";
<       title="Start"
< Link: </networks/dmz>;
<       rel="http://purl.org/occi/kind#network";
<       title="DMZ";
<       address="192.168.0.1/24";
<       interface="eth0"
< Link: </storage/disk1>;
<       rel="http://purl.org/occi/kind#storage";
<       title="Quorum Disk";
<       device="sda"
< Link: </us-east/webapp/build.pdf>;
<       rel="related";
<       title="Documentation";
<       type="application/pdf"
< Category: compute;
<       label="Compute Resource";
<       scheme="http://purl.org/occi/kind#"
< Server: occi-server/1.0 (linux) OCCI/1.0
< Connection: close
<
< <?xml version="1.0" encoding="UTF-8"?>
...
```

1.3. Kinds

Cloud infrastructure can be modeled using three primary kinds: `compute`, `network` and `storage`.

Table 1. Kinds

Kind	URI	Description
`compute`	`http://purl.org/occi/kind#compute`	Information processing resources
`network`	`http://purl.org/occi/kind#network`	Interconnection resources
`storage`	`http://purl.org/occi/kind#storage`	Recorded information resources

1.3.1. Compute

A compute resource is capable of conducting computations (e.g. a virtual machine).

1.3.1.1. Attributes

The following attributes apply to this kind:

Table 2. Compute Attributes

Attribute	Type	Description
`occi.compute.architecture`	Enum (x86, x64)	CPU Architecture (e.g. x64)
`occi.compute.cores`	Float	Number of CPU cores (e.g. 1, 2)

Attribute	Type	Description
`occi.compute.hostname`	String	Valid DNS hostname for the resource.
`occi.compute.speed`	Float (10^9 Hertz)	Clock speed in gigahertz (e.g. 2.4)
`occi.compute.memory`	Float (10^9 bytes)	RAM in gigabytes (e.g. 1, 0.512)
`occi.compute.status`	Enum (active, inactive, suspended)	Status of the compute resource

1.3.1.2. Actions

A number of common states are defined:

Table 3. Compute Actions

Actions	Target State	Parameters
`http://purl.org/occi/action#start`	`active`	None
`http://purl.org/occi/action#stop`	`inactive`	*`type`* Enum (*`graceful`* [default], *`acpioff`*, *`poweroff`*)
`http://purl.org/occi/action#restart`	`active`	*`type`* Enum (*`graceful`* [default], *`warm`*, *`cold`*)
`http://purl.org/occi/action#suspend`	`suspended`	*`type`* Enum (*`hibernate`* [default], *`suspend`*)

1.3.2. Network

A network resource is capable of transferring data (e.g. a virtual network or VLAN).

1.3.2.1. Attributes

The following attributes apply to this kind:

Table 4. Network Attributes

Attribute	Type	Description
`occi.network.vlan`	Integer (0..4095)	802.1q VLAN ID (e.g. `4095`)
`occi.network.label`	Token	Tag based VLANs (e.g. `external-dmz`)
`occi.network.address`	IPv4 or IPv6 Address (in CIDR notation)	Internet Protocol (IP) network address (e.g. `192.168.0.1/24`, `fc00::/7`)
`occi.network.gateway`	IPv4 or IPv6 Address (in CIDR notation)	Internet Protocol (IP) network address (e.g. `192.168.0.1/24`, `fc00::1/64`)
`occi.network.allocation`	Enum (`auto`, `dhcp`, `manual`)	Address allocation mechanism: • `auto` is handled automatically by infrastructure and/or guest agent

Attribute	Type	Description
		• `dhcp` uses network-based allocation protocol(s) • `manual` requires preconfiguration or manual allocation

1.3.2.2. Actions

A number of common states are defined:

Table 5. Network Actions

Actions	Target State	Parameters
`http://purl.org/occi/action#down`	`inactive`	None
`http://purl.org/occi/action#up`	`active`	None

1.3.3. Storage

A storage resource is capable of mass storage of data (e.g. a virtual hard drive).

> **Note**
>
> The actions defined here should trigger operations on e.g. virtual images. The implementation of these operations is left to Cloud Storage APIs and the corresponding Storage backend solutions.

1.3.3.1. Attributes

The following attributes apply to this kind:

Table 6. Storage Attributes

Attribute	Type	Description
`occi.storage.size`	Float (10^9 bytes)	Drive size in gigabytes (e.g. `40`, `0.00144`)
`occi.storage.status`	Enum (*`online`*, *`offline`*, *`degraded`*)	Currenty status of the storage resource

1.3.3.2. Actions

A number of common states are defined:

Table 7. Storage Actions

Actions	Target State	Parameters
`http://purl.org/occi/action#backup`	`unchanged`	None
`http://purl.org/occi/action#offline`	`offline`	None
`http://purl.org/occi/action#online`	`online`	None

Actions	Target State	Parameters
`http://purl.org/occi/action#resize`	`unchanged`	*`size`* float (10^9 bytes)
`http://purl.org/occi/action#snapshot`	`unchanged`	None

1.4. Extensions

Various extensions provide for more advanced management functionality such as billing, monitoring and reporting.

Bibliography

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