**Open Cloud Computing Interface - Infrastructure Models**

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<u>Abstract</u>

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 XHTML5 rendering

- OCCI HTTP Header rendering

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).

# 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 megabytes (e.g. 16, 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:<br>• `auto` is handled automatically by |

| Attribute | Type | Description |
|---|---|---|
| | | infrastructure and/or guest agent<br><br>• `dhcp` uses network-based allocation protocol(s)<br><br>• `manual` requires preconfiguration or manual allocation |

<u>1.3.2.2. Actions</u>

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).

<u>1.3.3.1. Attributes</u>

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 |

<u>1.3.3.2. Actions</u>

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 |
| `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

Informative References

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## 2. Contributors

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