

## Open Cloud Computing Interface - Infrastructure Models

1. OCCI Infrastructure .....	1
1.1. Introduction .....	1
1.2. Example .....	1
1.3. Kinds .....	2
1.4. Extensions .....	5
2. Contributors .....	5
3. Intellectual Property Statement .....	6
4. Disclaimer .....	6
5. Full Copyright Notice .....	6

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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 extensible and includes the following parts:

- The OCCI Core & Models
- The OCCI Infrastructure Models
- OCCI HTTP Header rendering
- (OCCI XHTML5 rendering)<sup>1</sup>

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 deployment, 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)
occi.compute.hostname	String	Valid DNS hostname for the resource.
occi.compute.speed	Float (10 <sup>9</sup> Hertz)	Clock speed in gigahertz (e.g. 2.4)

Attribute	Type	Description
<code>occi.compute.memory</code>	Float (10 <sup>9</sup> bytes)	RAM in gigabytes (e.g. 1, 0.512)
<code>occi.compute.status</code>	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
<code>http://purl.org/occi/action#start</code>	active	None
<code>http://purl.org/occi/action#stop</code>	inactive	<i>type</i> Enum ( <i>graceful</i> [default], <i>acpi</i> <i>off</i> , <i>poweroff</i> )
<code>http://purl.org/occi/action#restart</code>	active	<i>type</i> Enum ( <i>graceful</i> [default], <i>warm</i> , <i>cold</i> )
<code>http://purl.org/occi/action#suspend</code>	suspended	<i>type</i> Enum ( <i>hibernate</i> [default], <i>suspend</i> )

### 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
<code>occi.network.vlan</code>	Integer (0..4095)	802.1q VLAN ID (e.g. 4095)
<code>occi.network.label</code>	Token	Tag based VLANs (e.g. external-dmz)
<code>occi.network.address</code>	IPv4 or IPv6 Address (in CIDR notation)	Internet Protocol (IP) network address (e.g. 192.168.0.1/24, fc00::/7)
<code>occi.network.gateway</code>	IPv4 or IPv6 Address (in CIDR notation)	Internet Protocol (IP) network address (e.g. 192.168.0.1/24, fc00::1/64)
<code>occi.network.allocation</code>	Enum (auto, dhcp, manual)	Address allocation mechanism: <ul style="list-style-type: none"> <li>• <i>auto</i> is handled automatically by infrastructure and/or guest agent</li> <li>• <i>dhcp</i> uses network-based allocation protocol(s)</li> </ul>

Attribute	Type	Description
		<ul style="list-style-type: none"> <li>manual requires preconfiguration or manual allocation</li> </ul>

### 1.3.2.2. Actions

A number of common states are defined:

**Table 5. Network Actions**

Actions	Target State	Parameters
<code>http://purl.org/occi/action#down</code>	inactive	None
<code>http://purl.org/occi/action#up</code>	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
<code>occi.storage.size</code>	Float (10 <sup>9</sup> bytes)	Drive size in gigabytes (e.g. 40, 0.00144)
<code>occi.storage.status</code>	Enum ( <i>online</i> , <i>offline</i> , <i>degraded</i> )	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
<code>http://purl.org/occi/action#backup</code>	unchanged	None
<code>http://purl.org/occi/action#offline</code>	offline	None
<code>http://purl.org/occi/action#online</code>	online	None
<code>http://purl.org/occi/action#resize</code>	unchanged	<i>size</i> float (10 <sup>9</sup> bytes)
<code>http://purl.org/occi/action#snapshot</code>	unchanged	None

## 1.4. Extensions

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

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