

**EGI-Engage**

VM snapshot support:

OCCI extension, final specification

D4.2

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Abstract

This Report deals with the effort to standardize the process of saving the current state of a virtual machine to allow creation of additional instances based on that state. The standardization of virtual machine snapshotting with OCCI, originally envisioned as a separate extension to the standard, was finally achieved by augmenting the standard during preparation of the OCCI 1.2 release.

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**TERMINOLOGY**

A complete project glossary is provided at the following page: <http://www.egi.eu/about/glossary/>

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# Introduction

The OCCI (Open Cloud Computing Interface)[[1]](#footnote-1) standard is a set of community driven specifications delivered through the Open Grid Forum (OGF)[[2]](#footnote-2), allowing for the development and deployment of interoperable clouds. The OCCI specification[[3]](#footnote-3) consists on several complimentary documents defining the core abstract model, its renderings and the extensions to the core model. Currently, the Infrastructure extension contains the required resource types, attributes and actions needed to manage Infrastructure as a Service (IaaS) resources.

The current version of the standard to the date is OCCI v. 1.1. The new version 1.2 has been developed in the last months, passing through the public comment phase that ended in July 2015. Currently the v. 1.2 version of the standard is going through the OGF processes to be officially released to the public.

A common use case and requirement from IaaS customers is creating copies or snapshots of running virtual machines. This is required when the virtual machine has undergone trough large customizations of its operating system environment, when a long running service wants to be preserved, or when a given virtual machine needs to be duplicated. It is worth to notice that for the purpose of this document, the term “snapshotting” refers to the process of deriving a new VM image form an existing Virtual Machine (Compute) instance, so that new instances can be spawned from the “snapshot” created. This is contrary to another usual use of the term, where snapshots are only the recording of the current state of an instance to allow the same instance to be returned to that state. Therefore, the definition of “snapshotting” should support creation of “snapshots” as first-class VM images with cleanly bootable Operating Systems.

The OCCI standard lacked a clear support for this functionality, as there was no snapshotting or save action available, therefore service providers offering their resources trough the OCCI interface were unable to deliver this functionality.

# Virtual Machine Snapshotting

In the envisioned reference scenario for Virtual Machine snapshotting, a user can have a running Virtual Machine (VM), which they want to use as a basis for further work. They should be able to derive a usable Virtual Machine Image from that machine, and spawn further instances based on that template. Using OCCI terminology, Virtual Machines are modelled as Compute Resources, and VM images as Operating System (OS) Templates.

Up until, and including, OCCI v. 1.1, the OCCI Infrastructure specification only recognized a snapshot action, associated with Storage type resources, hence not being applicable to this context (i.e. Compute type instances).

Therefore, the OCCI Infrastructure definition for OCCI v. 1.2 has been updated, based on comments provided during the public comment stage, to introduce a save action, which, when called for an existing compute instance, creates a new Operating System (OS) Template.

The specification makes it possible for the user to optionally specify a method (hot or deferred) for the save action. The chosen method will, in case of hot, instruct the implementation to make an immediate (potentially inconsistent) copy without interfering with the running instance or, in case of deferred, to gracefully stop the instance, safely copy its data and start it again. An optional name attribute will be available for the user to specify their desired name of the OS Template, and the server may choose to use that name if technically possible.

The save action will then produce an OS template based on the content of the disks of the originating compute instance and, on success, return an identifier of the newly created OS Template. The action target state over the Compute instance will be “active”, via a “stop” and “start” chain if needed.

As a reference, we attach the OCCI 1.2 Infrastructure Extension drafts as for the date of this deliverable. However, it is worth notice that these are not the final documents, as they are subject to the OGF processes that are still ongoing.

## Changes introduced into the standard

The Section 3.1 “Compute” from the OCCI Infrastructure Extension has been augmented as follows:

3.1 Compute

(…)

|  |  |  |
| --- | --- | --- |
| Action term | Target state | Attributes |
| (...) |  |  |
| save | active (via stop and start chain) | method={hot, deferred},  name=String |

(...)

Action “save” is expected to create an OS Template referencing an independent copy of the current state of the Compute instance. The provider MAY choose to respect the “name” given by the client or override it according to its internal policies. A successful execution of this action MUST lead to a response containing the rendering of the newly created OS Template as defined by the chosen rendering and transport protocol.  The provider MAY choose to include a reference to the original Compute instance in Mixin. Attributes of the newly created OS Template.

1. Draft OCCI Infrastructure Specification

<https://documents.egi.eu/document/2643>

1. <http://occi-wg.org/> [↑](#footnote-ref-1)
2. <https://www.ogf.org/> [↑](#footnote-ref-2)
3. <http://occi-wg.org/about/specification/> [↑](#footnote-ref-3)