Cloud Interoperability Week-CloudPlugfest; Madrid, Spain & Santa Clara, CA, US; 16-20 September 2013

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1 Executive Summary

The Cloud Interoperability Week - CloudPlugfest was held from:

- 16 to 18 September 2013 in Santa Clara, CA, US, during the Storage Developers Conference, and

- 18 to 20 September in Madrid (Spain), during the European Grid Infrastructure Technical Forum

This event was co-organized by ETSI, OGF, SNIA, DMTF, OASIS, OW2 and the Ocean Project. It aimed to test the interoperability of different client and server implementations of OCCI, CDMI, OVF, CAMP and CIMI specifications, as well as some cases of multi-standards interworking.

11 companies participated in this event executing more than 86 interoperability tests:

Site 1) Santa Clara, CA US

- 3 organisations,

- 6 different implementations

Site 2) Madrid, Spain

- 7 organisations,

- 11 different implementations.

- 1 test tool

Remote)

- 1 organisation

- 1 test tool

Several groups of test cases where offered to participants, each of them addressing a different combination of the set of standards in scope:

- OCCI Interoperability

- CDMI Interoperability

- CAMP Interoperability

- OVF Interoperability

- OCCI + CDMI Interworking

- CAMP + OVF Interworking

- CIMI + OVF Interworking

In addition, there were some sessions dedicated to CDMI Conformance.

76% of the executed tests indicated interoperability.

The highlights were that:

- Most of the interoperability issues were observed on early implementations where some features were not fully implemented.

- The detailed test description document, explaining step by step how to proceed on each test, and clearly specifying the fail/pass criteria were found to be very helpful in this CloudPlugfest.

- For CDMI, some kind of profile definition, that would allow to the determine the applicable subset of test descriptions that should be run, would be very beneficial for a future CloudPlugfest

2 Introduction

This Interoperability Event aimed to verify the interoperability between implementations of Cloud protocols OCCI, CDMI, CAMP, OVF and CIMI.

Server implementations run remotely and were accessible over the internet and client implementations run either remotely (when participants were remote) either run locally in participants' laptops in Santa Clara or Madrid.

An enhanced version of the Cloud Interoperability Test Description document was produced. This new version included the test descriptions for OCCI and CDMI already available in previous CloudPlugfest:

- 29 interoperability test descriptions for OCCI

- 58 interoperability test descriptions for CDMI

- 9 interworking test descriptions for OCCI + CDMI

And added the following new test descriptions:

- 22 interoperability test descriptions for CAMP

- 16 interoperability test descriptions for OVF

- 91 interoperability test descriptions for CIMI

- 2 interworking test descriptions for CAMP + OVF

- 2 interworking test descriptions for CIMI + OVF

In addition a CDMI Conformance test suite, containing 50 test cases was run by one of the test tool providers.

ETSI CTI provided, configured and supported their Plugtests tool suite: wiki, scheduler and Test Reporting Tool.

3 Abbreviations

CAMP	Cloud Application Management Protocol
CDMI	Cloud Data Management Interface
CIMI	Cloud Infrastructure Managements Interface
EUT	Equipment Under Test
IOP	Interoperability
NO	Test is recorded as NOT successfully passed.
NA	Test is not applicable.
OCCI	Open Cloud Computing Interface
OK	Test is recorded as successfully passed.
OT	Test is recorded as not being executed due to lack of time.
OVF	Open Virtualisation Format
Test Session	A paring of implementers that test together during a given time slot.
TSR	Test Session Report. Report created during a test session.

4   Acknowledgement

Many thanks to the following people for helping to make this event successful:

- The cloud testing experts that contributed to and reviewed the new version of the test descriptions for their hard work to have it ready for the Cloud Interoperability Week.

- CloudPlugfest planners from OGF, SNIA, Ocean, OW2 and ETSI for their work on designing and planning this event

- CloudPlugfest Participants, for making this event happen.

5   Participants

The organisations that participated to the Cloud Interoperability Week - CloudPlugfest are listed in the table below:

Table 1: List of organisations

#	Company Name	Location
1	Activeeon	Madrid
2	BSC	Madrid
3	CERN	Madrid
4	CESNET (NGI_CZ)	Madrid / Remote
5	CompatibleOne	Madrid
6	FZ Juelich	Madrid
7	Oracle	Santa Clara
8	R2AD	Santa Clara
9	Scality	Santa Clara
10	TCS	Remote
11	University of Stuttgart	Madrid

6   Technical and Project Management

All the information presented in this chapter is an extract of the participants' wiki
https://services.plugtests.net/wiki/2013-CloudWeek/index.php/Company_Information (Access restricted to registered
participants only).

6.1   Test Plan

The original Test Descriptions document containing 96 interoperability tests was written by a team of CDMI, OCCI and
Test Methodology experts under the supervision of ETSI CTI for a previous CloudPlugfest event. For this edition, CTI
managed a new team of experts that created 133 additional test descriptions for CAMP, OVF and CIMI.

The tests were grouped by base specification (OCCI, CDMI, CAMP, OVF, CIMI, OCCI + CDMI, CAMP + OVF,
CIMI). The features covered by these tests are listed below:

6.1.1   OCCI Mandatory Tests

Table 2: OCCI Mandatory Tests

1	TD/OCCI/CORE/DISCOVERY/001	Retrieving all OCCI Categories supported by the OCCI Server

6.1.2   CDMI Mandatory Tests

Table 3: CDMI Mandatory Tests

1	TD/CDMI/CAPABILITIES/READ/001	Retrieve root CDMI Capability Object
2	TD/CDMI/CAPABILITIES/READ/002	List children of the root CDMI Capability Object
3	TD/CDMI/CAPABILITIES/READ/003	Read capabilities field from existing CDMI Capability Object
4	TD/CDMI/CAPABILITIES/READ/004	Retrieve the Capabilities of a CDMI object

6.1.3   CAMP Mandatory Tests

Table 4: CAMP Application Mandatory Tests

1	TD/CAMP/APPLICATION/CREATE/001	Register a Platform Deployment Package (PDP)
2	TD/CAMP/APPLICATION/CREATE/002	Instantiating an Application
3	TD/CAMP/APPLICATION/UPATE/001	Suspending an Application
4	TD/CAMP/APPLICATION/UPDATE/002	Resuming an Application
5	TD/CAMP/APPLICATION/DELETE/001	Deleting an Application Instance
6	TD/CAMP/APPLICATION/DELETE/002	Deleting a Deployed Application

6.1.4   OVF Mandatory Tests

Table 5: OVF Mandatory Tests

1	TD/OVF/VAPP/CREATE/001	Export a single virtual system into an OVF package
2	TD/OVF/VAPP/READ/001	Import a single virtual system from an OVF package
3	TD/OVF/VAPP/READ/003	OVF Consumer rejects an imported OVF package if a disk image is corrupted
4	TD/OVF/VAPP/READ/004	OVF Consumer rejects an imported OVF package if signature is not valid
1	TD/OVF/VAPP/CREATE/001	Export a single virtual system into an OVF package

6.1.5   CIMI Mandatory Tests

Table 6: CIMI System Mandatory Tests

1	TD/CIMI/SYSTEM/READ/001	Retrieve the description of an existing System Template resource
2	TD/CIMI/SYSTEM/READ/002	Retrieve the description of an existing System resource

Table 7: CIMI Machine Mandatory Tests

1	TD/CIMI/MACHINE/CREATE/001	Create a machine template resource
2	TD/CIMI/MACHINE/CREATE/002	Create a machine resource
3	TD/CIMI/MACHINE/CREATE/003	Starting a machine
4	TD/CIMI/MACHINE/CREATE/004	Create a machine image
5	TD/CIMI/MACHINE/READ/001	Retrieving a representation of an instantiated compute resource (machine) (JSON)
6	TD/CIMI/MACHINE/READ/002	Retrieving a information about a disk collection (JSON)
7	TD/CIMI/MACHINE/READ/003	Retrieving a information about a MachineVolume collection (JSON)
8	TD/CIMI/MACHINE/READ/004	Retrieving a information about a MachineNetworkInterface collection (JSON)
9	TD/CIMI/MACHINE/READ/005	Retrieving a information about a MachineNetworkInterfaceAddress collection (JSON)
10	TD/CIMI/MACHINE/UPDATE/005	Stopping an instantiated machine
11	TD/CIMI/MACHINE/DELETE/001	Deleting a machine template resource
12	TD/CIMI/MACHINE/CREATE/002	Deleting a machine resource

Table 8: CIMI Volume Mandatory Tests

1	TD/CIMI/VOLUME/CREATE/001	Create a volume template resource
2	TD/CIMI/VOLUME/CREATE/002	Create a volume resource
3	TD/CIMI/VOLUME/CREATE/003	Create a volume configuration resource
4	TD/CIMI/VOLUME/READ/001	Retrieving information of volume resource
5	TD/CIMI/VOLUME/UPDATE/001	Updating a volume resource
6	TD/CIMI/VOLUME/DELETE/001	Deleting a volume resource
7	TD/CIMI/VOLUME/DELETE/002	Deleting a volume template resource
8	TD/CIMI/VOLUME/DELETE/003	Deleting a volume configuration resource

Table 9: CIMI Network Mandatory Tests

1	TD/CIMI/NETWORK/READ/001	Retrieve the description of an existing NetworkTemplate resource instance
2	TD/CIMI/NETWORK/READ/002	Retrieve the description of an existing Network resource
3	TD/CIMI/NETWORK/READ/003	Retrieve the description of an existing Network Configuration
4	TD/CIMI/NETWORK/READ/004	Retrieve the description of an existing Address
5	TD/CIMI/NETWORK/READ/005	Retrieve the description of an existing Network Port

6.1.6 OCCI Optional Tests

Table 10: OCCI Core Optional Tests

	TD/OCCI/CORE/DISCOVERY/002	Retrieving the OCCI Categories with an OCCI Category filter from the OCCI Server
2	TD/OCCI/CORE/CREATE/001	Create an OCCI Resource
3	TD/OCCI/CORE/CREATE/002	Create an OCCI Resource with an OCCI Mixin
4	TD/OCCI/CORE/CREATE/003	Create an OCCI Resource with an OCCI Link to an existing OCCI Resource
5	TD/OCCI/CORE/CREATE/004	Create an OCCI Link
6	TD/OCCI/CORE/CREATE/005	Create an OCCI Link with an OCCI Mixin
7	TD/OCCI/CORE/CREATE/006	Add an OCCI Mixin definition
8	TD/OCCI/CORE/READ/001	Retrieve the URLs of all OCCI Entities belonging to an OCCI Kind or OCCI Mixin
9	TD/OCCI/CORE/READ/002	Retrieve the URLs of the OCCI Entities belonging to an OCCI Kind or OCCI Mixin and related to an OCCI Category filter
10	TD/OCCI/CORE/READ/003	Retrieve the URLs of the OCCI Entities belonging to an OCCI Kind or OCCI Mixin which contain a specific Attribute
11	TD/OCCI/CORE/READ/004	Retrieve the descriptions of all OCCI Entities belonging to an OCCI Kind or Mixin
12	TD/OCCI/CORE/READ/005	Retrieve the descriptions of the OCCI Entities belonging to an OCCI Kind or OCCI Mixin and related to an OCCI Category filter
13	TD/OCCI/CORE/READ/006	Retrieve the description of an OCCI Entity
14	TD/OCCI/CORE/UPDATE/001	Full update of a specific OCCI Entity
15	TD/OCCI/CORE/UPDATE/002	Partial update of a specific OCCI Entity
16	TD/OCCI/CORE/UPDATE/003	Full update of a specific OCCI Mixin Collection
17	TD/OCCI/CORE/DELETE/001	Delete an OCCI Entity
18	TD/OCCI/CORE/DELETE/002	Delete all OCCI Entities belonging to an OCCI Kind
19	TD/OCCI/CORE/DELETE/003	Delete an OCCI Mixin
20	TD/OCCI/CORE/MISC/001	Trigger OCCI Action on existing OCCI Entity
21	TD/OCCI/CORE/MISC/002	Trigger OCCI Action on all OCCI Entities belonging to an OCCI Kind or OCCI Mixin
22	TD/OCCI/CORE/MISC/003	Associate OCCI Entities with OCCI Mixin
23	TD/OCCI/CORE/MISC/004	Disassociate OCCI Entities from OCCI Mixin

Table 11: OCCI Infrastructure Optional Tests

1	TD/OCCI/INFRA/CREATE/001	Create an OCCI Compute Resource
2	TD/OCCI/INFRA/CREATE/002	Create an OCCI Storage Resource
3	TD/OCCI/INFRA/CREATE/003	Create an OCCI Network Resource
4	TD/OCCI/ INFRA/CREATE/004	Create an OCCI Compute Resource using an OS and resource template
5	TD/OCCI/INFRA/CREATE/005	Create an OCCI Compute Resource with an OCCI Storagelink and an OCCI Networkinterface
6	TD/OCCI/INFRA/CREATE/006	Create an OCCI Storagelink between an existing OCCI Compute and OCCI Storage Resource
7	TD/OCCI/INFRA/CREATE/007	Create an OCCI Networkinterface between an existing OCCI Compute and OCCI Network Resource

6.1.7   CDMI Optional Tests

Table 12: CDMI Data Object Optional Tests

1	TD/CDMI/DATA/CREATE/001	Create a new CDMI Data Object
2	TD/CDMI/DATA/CREATE/002	Create a reference to an existing CDMI Data Object
3	TD/CDMI/DATA/CREATE/003	Copy an existing CDMI Data Object or CDMI Queue to a new OCCI Data Object
4	TD/CDMI/DATA/CREATE/004	Move a CDMI Data Object
5	TD/CDMI/DATA/CREATE/005	Create a new CDMI Data Object by deserializing an existing CDMI Data Object
6	TD/CDMI/DATA/CREATE/006	Create a new CDMI Data Object by serializing an existing CDMI object
7	TD/CDMI/DATA/READ/001	Read all fields from existing CDMI Data Object
8	TD/CDMI/DATA/READ/002	Read metadata from existing CDMI Data Object
9	TD/CDMI/DATA/READ/003	Read value from existing CDMI Data Object
10	TD/CDMI/DATA/READ/004	Read first 10 bytes from the value of an existing CDMI Data Object
11	TD/CDMI/DATA/UPDATE/001	Modify an existing CDMI Data Object
12	TD/CDMI/DATA/UPDATE/002	Modify the metadata of an existing CDMI Data Object
13	TD/CDMI/DATA/UPDATE/003	Modify the value of an existing CDMI Data Object
14	TD/CDMI/DATA/UPDATE/004	Modify the first 10 bytes of the value of an existing CDMI Data Object
15	TD/CDMI/DATA/DELETE/001	Delete an existing CDMI Data Object

Table 13: CDMI Container Optional Tests

1	TD/CDMI/CONTAINER/CREATE/001	Create a new CDMI Container
2	TD/CDMI/CONTAINER/CREATE/002	Create a reference to an existing CDMI Container
3	TD/CDMI/CONTAINER/CREATE/003	Copy a CDMI Container
4	TD/CDMI/CONTAINER/CREATE/004	Move an existing CDMI Container
5	TD/CDMI/CONTAINER/CREATE/005	Create a new CDMI Container by deserializing an existing CDMI Data Object
6	TD/CDMI/CONTAINER/READ/001	Read all fields from existing CDMI Container
7	TD/CDMI/CONTAINER/READ/002	Read metadata from existing CDMI Container
8	TD/CDMI/CONTAINER/READ/003	List children of an existing CDMI Container
9	TD/CDMI/CONTAINER/READ/004	List first 2 children of an existing CDMI Container
10	TD/CDMI/CONTAINER/UPDATE/001	Modify an existing CDMI Container
11	TD/CDMI/CONTAINER/UPDATE/002	Modify the metadata of an existing CDMI Container
12	TD/CDMI/CONTAINER/UPDATE/003	Create a snapshot of the contents of an existing CDMI Container
13	TD/CDMI/CONTAINER/UPDATE/004	Add an export protocol to an existing CDMI Container
14	TD/CDMI/CONTAINER/DELETE/001	Delete an existing CDMI Container

Table 14: CDMI Domain Optional Tests

1	TD/CDMI/DOMAIN/CREATE/001	Create a new CDMI Domain
2	TD/CDMI/DOMAIN/CREATE/002	Copy an existing CDMI Domain
3	TD/CDMI/DOMAIN/CREATE/003	Create a new CDMI Domain by deserializing an existing CDMI Data Object
4	TD/CDMI/DOMAIN/READ/001	Read all fields from existing CDMI Domain
5	TD/CDMI/DOMAIN/READ/002	Read metadata from existing CDMI Domain
6	TD/CDMI/DOMAIN/READ/003	List children of existing CDMI Domain
7	TD/CDMI/DOMAIN/UPDATE/001	Modify an existing CDMI Domain
8	TD/CDMI/DOMAIN/UPDATE/002	Modify the metadata of an existing CDMI Domain
9	TD/CDMI/DOMAIN/DELETE/001	Delete an existing CDMI Domain

Table 15: CDMI Queue Optional Tests

1	TD/CDMI/QUEUE/CREATE/001	Create a new CDMI Queue
2	TD/CDMI/QUEUE/CREATE/002	Create a reference to an existing CDMI Queue
3	TD/CDMI/QUEUE/CREATE/003	Copy an existing CDMI Queue
4	TD/CDMI/QUEUE/CREATE/004	Move an existing CDMI Queue
5	TD/CDMI/QUEUE/CREATE/005	Create a new CDMI Queue by deserializing an existing CDMI Data Object
6	TD/CDMI/QUEUE/READ/001	Read all fields from existing CDMI Queue
7	TD/CDMI/QUEUE/READ/002	Read metadata from existing CDMI Queue
8	TD/CDMI/QUEUE/READ/003	Read value of oldest enqueued object of existing CDMI Queue
9	TD/CDMI/QUEUE/READ/004	Read first 10 bytes of oldest enqueued object value of existing CDMI Queue
10	TD/CDMI/QUEUE/READ/005	Read queue values from existing CDMI Queue
11	TD/CDMI/QUEUE/UPDATE/001	Modify an existing CDMI Queue
12	TD/CDMI/QUEUE/UPDATE/002	Modify the metadata of an existing CDMI Queue
13	TD/CDMI/QUEUE/DELETE/001	Delete an existing CDMI Queue
14	TD/CDMI/QUEUE/ENQUEUE/001	Enqueue a data value to an existing CDMI Queue
15	TD/CDMI/QUEUE/ENQUEUE/002	Copy an existing CDMI Data Object or CDMI Queue to an existing CDMI Queue
16	TD/CDMI/QUEUE/ENQUEUE/003	Move an existing CDMI Data Object or CDMI Queue to an existing CDMI Queue
17	TD/CDMI/QUEUE/DEQUEUE/001	Dequeue oldest data value from an existing CDMI Queue
18	TD/CDMI/QUEUE/DEQUEUE/002	Dequeue the two oldest values from existing CDMI Queue

6.1.8 CAMP Optional Tests

Table 16: CAMP Resource Optional Tests

1	TD/CAMP/RESOURCE/READ/001	Read Information about a Platform Resource
2	TD/CAMP/RESOURCE/READ/002	Read Information about an AssemblyTemplate Resource
3	TD/CAMP/RESOURCE/READ/003	Read Information about an ApplicationComponentTemplate Resource
4	TD/CAMP/RESOURCE/READ/004	Read Information about an ApplicationComponentRequirement Resource
5	TD/CAMP/RESOURCE/READ/005	Read Information about an ApplicationComponentCapability Resource
6	TD/CAMP/RESOURCE/READ/006	Read Information about a PlatformComponentTemplate Resource
7	TD/CAMP/RESOURCE/READ/007	Read Information about a PlatformComponentRequirement Resource
8	TD/CAMP/RESOURCE/READ/008	Read Information about a PlatformComponentCapability Resource
9	TD/CAMP/RESOURCE/READ/009	Read Information about a Assembly Resource
10	TD/CAMP/RESOURCE/READ/010	Read Information about a ApplicationComponent Resource
11	TD/CAMP/RESOURCE/READ/011	Read Information about a PlatformComponent Resource
12	TD/CAMP/RESOURCE/READ/012	Read Information about a Format Resource
13	TD/CAMP/RESOURCE/READ/013	Read Information about a Formats Resource
14	TD/CAMP/RESOURCE/READ/014	Read Information about a TypeDefinitions Resource
15	TD/CAMP/RESOURCE/READ/015	Read Information about a TypeDefinition Resource
16	TD/CAMP/RESOURCE/READ/016	Read Information about a AttributeDefinition Resource

6.1.9 OVF Optional Tests

Table 17: OVF Optional Tests

1	TD/OVF/VAPP/CREATE/002	Export a single virtual system into a single file package
2	TD/OVF/VAPP/CREATE/003	Provides information about installed operating system
3	TD/OVF/VAPP/READ/002	Import a single virtual system as a single file package
4	TD/OVF/VAPP/READ/005	Virtual hardware configuration is transferred
5	TD/OVF/VAPP/READ/006	Support for virtual disks shared between multiple virtual systems
6	TD/OVF/VAPP/READ/007	Support for virtual network to interconnect multiple virtual systems
7	TD/OVF/VAPP/READ/008	Support for virtual systems startup ordering
8	TD/OVF/VAPP/READ/009	An initial boot process can be set to install and/or configure the guest software
9	TD/OVF/VAPP/READ/010	Support runtime customization with environment files
10	TD/OVF/VAPP/READ/011	Support for license verification
11	TD/OVF/VAPP/READ/012	Support for license verification

6.1.10   CIMI Optional Tests

Table 18: CIMI System Optional Tests

1	TD/CIMI/SYSTEM/CREATE/001	Create a System template which defines a system comprise of one machine one volume.
2	TD/CIMI/SYSTEM/CREATE/002	Create a System Template resource by utilizing an OVF package which defines a System which comprise of one machine with one volume
3	TD/CIMI/SYSTEM/CREATE/003	Create a System which comprise of one machine with one volume by specifying system attributes
4	TD/CIMI/SYSTEM/CREATE/004	Create a System which comprise of one machine with one volume by referencing a System Template
5	TD/CIMI/SYSTEM/READ/002	Export an existing System as an OVF package
6	TD/CIMI/SYSTEM/UPDATE/001	Update an existing System Template resource
7	TD/CIMI/SYSTEM/UPDATE/002	Partially update an existing System Template resource
8	TD/CIMI/SYSTEM/UPDATE/003	Update an existing System resource
9	TD/CIMI/SYSTEM/UPDATE/004	Partially update an existing System resource
10	TD/CIMI/SYSTEM/UPDATE/005	Start an instantiated System
11	TD/CIMI/SYSTEM/UPDATE/006	Stop a running System
12	TD/CIMI/SYSTEM/UPDATE/007	Re-start a stopped System
14	TD/CIMI/SYSTEM/UPDATE/008	Pause a running System
15	TD/CIMI/SYSTEM/UPDATE/009	Suspend a running System
5	TD/CIMI/SYSTEM/DELETE/001	Delete an existing System Template
16	TD/CIMI/SYSTEM/DELETE/002	Delete an existing System resource

Table 19: CIMI Machine Optional Tests

1	TD/CIMI/MACHINE/CREATE/005	Capturing a machine
2	TD/CIMI/MACHINE/CREATE/006	Snapshotting an instantiated machine
3	TD/CIMI/MACHINE/READ/006	Retrieving a information about a MachineSnapshot collection (JSON)
4	TD/CIMI/MACHINE/READ/007	Retrieving a information about a MachineMeter collection (JSON)
5	TD/CIMI/MACHINE/UPDATE/001	Updating a machine template resource
6	TD/CIMI/MACHINE/UPDATE/002	Partial update of a machine template resource
7	TD/CIMI/MACHINE/UPDATE/003	Updating a machine resource
8	TD/CIMI/MACHINE/UPDATE/004	Partial update of a machine resource
9	TD/CIMI/MACHINE/UPDATE/006	Restarting an instantiated machine
10	TD/CIMI/MACHINE/UPDATE/007	Pausing an instantiated machine
11	TD/CIMI/MACHINE/UPDATE/008	Suspending an instantiated machine
12	TD/CIMI/MACHINE/UPDATE/009	Starting a suspended machine
13	TD/CIMI/MACHINE/UPDATE/010	Restoring a machine

Table 20: CIMI Volume Optional Tests

1	TD/CIMI/VOLUME/CREATE/004	Create a volume image
2	TD/CIMI/VOLUME/READ/002	Retrieving information about a volume collection
3	TD/CIMI/VOLUME/READ/003	Retrieving information of a volume template resource
4	TD/CIMI/VOLUME/READ/004	Retrieving information about a volume template collection
5	TD/CIMI/VOLUME/READ/005	Retrieving information of a volume configuration resource
6	TD/CIMI/VOLUME/READ/006	Retrieving information about a volume configuration collection
7	TD/CIMI/VOLUME/READ/007	Retrieving information of a volume image resource
8	TD/CIMI/VOLUME/READ/008	Retrieving information about a volume image collection
9	TD/CIMI/VOLUME/UPDATE/002	Updating a volume collection resource
10	TD/CIMI/VOLUME/UPDATE/003	Updating a volume template resource
11	TD/CIMI/VOLUME/UPDATE/004	Updating a volume template collection resource
12	TD/CIMI/VOLUME/UPDATE/005	Updating a volume configuration resource
13	TD/CIMI/VOLUME/UPDATE/006	Updating a volume configuration collection resource
14	TD/CIMI/VOLUME/UPDATE/007	Updating a volume image resource
14	TD/CIMI/VOLUME/UPDATE/008	Updating a volume image collection resource
15	TD/CIMI/VOLUME/DELETE/004	Deleting a volume image resource

Table 21: CIMI Network Optional Tests

1	TD/CIMI/NETWORK/CREATE/001	Create a Network Template resource
2	TD/CIMI/NETWORK/CREATE/002	Create a Network resource
3	TD/CIMI/NETWORK/CREATE/003	Create a Network Configuration
4	TD/CIMI/NETWORK/CREATE/004	Create an Address
5	TD/CIMI/NETWORK/READ/001	Retrieve the description of an existing NetworkTemplate resource instance.
6	TD/CIMI/NETWORK/READ/002	Retrieve the description of an existing Network resource
7	TD/CIMI/NETWORK/READ/003	Retrieve the description of an existing Network Configuration
8	TD/CIMI/NETWORK/READ/004	Retrieve the description of an existing Address
9	TD/CIMI/NETWORK/READ/005	Retrieve the description of an existing Network Port
10	TD/CIMI/NETWORK/UPDATE/001	Update an existing Network Template resource
11	TD/CIMI/NETWORK/UPDATE/002	Partially update an existing Network Template resource
12	TD/CIMI/NETWORK/UPDATE/003	Start an instantiated Network resource
13	TD/CIMI/NETWORK/UPDATE/004	Stopping of an instantiated Network resource
14	TD/CIMI/NETWORK/UPDATE/005	Update an existing Network Configuration
15	TD/CIMI/NETWORK/UPDATE/006	Partially update an existing Network Configuration
16	TD/CIMI/NETWORK/UPDATE/007	Update an existing Address
17	TD/CIMI/NETWORK/UPDATE/008	Partially update an existing Address
18	TD/CIMI/NETWORK/UPDATE/009	Start an instantiated Network Port
19	TD/CIMI/NETWORK/UPDATE/010	Stopping of an instantiated Network Port
20	TD/CIMI/NETWORK/UPDATE/011	Update an existing Network Port
21	TD/CIMI/NETWORK/UPDATE/012	Partially update an existing Network Port
22	TD/CIMI/NETWORK/DELETE/001	Delete an existing Network Template resource
23	TD/CIMI/NETWORK/DELETE/002	Delete an existing Network
24	TD/CIMI/NETWORK/DELETE/003	Delete an existing Network Configuration
25	TD/CIMI/NETWORK/DELETE/004	Delete an existing Address
26	TD/CIMI/NETWORK/DELETE/005	Delete an existing Network Port

6.1.11   Interworking Optional Tests

Table 22: OCCI+CDMI Interworking Tests

1	TD/INTER/OCCI+CDMI/CREATE/001	Create an OCCI Storagelink between an existing OCCI Compute Resource and existing CDMI Container
2	TD/INTER/OCCI+CDMI/CREATE/002	Create an OCCI Compute Resource with an OCCI Storagelink to an existing CDMI Container
3	TD/INTER/OCCI+CDMI/CREATE/003	Create a CDMI Container and connect it to an existing OCCI Compute Resource using an OCCI Storagelink
4	TD/INTER/OCCI+CDMI/READ/001	Retrieve the description of an OCCI Compute Resource with an OCCI Storagelink to a CDMI Container
5	TD/INTER/OCCI+CDMI/READ/002	Read OCCI export protocol field from existing CDMI Container
6	TD/INTER/OCCI+CDMI/UPDATE/001	Add permission for an existing OCCI Compute Resource to access an existing CDMI Container
7	TD/INTER/OCCI+CDMI/UPDATE/002	Remove permission for an existing OCCI Compute Resource to access an existing CDMI Container
8	TD/INTER/OCCI+CDMI/DELETE/001	Delete an OCCI Compute Resource with an OCCI Storagelink to a CDMI Container
9	TD/INTER/OCCI+CDMI/DELETE/002	Delete an existing CDMI Container with access permission for an OCCI Compute Resource
10	TD/INTER/OCCI+CDMI/DELETE/003	Delete the OCCI Storagelink between an OCCI Compute Resource and a CDMI Container

Table 23: CAMP+OVF Interworking Tests

1	TD/INTER/CAMP+OVF/CREATE/001	Create a CAMP Platform Deployment Package (PDP)
2	TD/INTER/CAMP+OVF/CREATE/001	Deploy a CAMP Platform Deployment Package (PDP)

Table 24: CIMI+OVF Interworking Tests

1	TD/INTER/CIMI+OVF/CREATE/001	Create a System Template resource by utilizing an OVF package which defines a System which is comprised of one machine with one volume
2	TD/INTER/CIMI+OVF/READ/001	Export an existing System as an OVF package

6.2   Test Scheduling

The preliminary test schedule was developed before the event started and was circulated to all the participants in advance for comments. The initial test schedule allowed each company to test against a fair number of other companies which led to an initial proposal of 25 face to face test sessions. Every test slot had duration of 4h. The day was organized in one morning test session from 8:30 to 12:30 and one afternoon test session from 13:30 to 17:30. The important time difference between Madrid, Santa Clara and the remote testers in India, made it very difficult to find common time slots to enable inter-site test sessions. This was enabled by providing 24/24 access to the servers and providing access to a password protected chartroom http://webconf.soaphub.org/conf/room/cloudplugfest where local and remote participants could exchange anytime.

The restricted duration of this edition of the CloudPlugfest resulted in a very tight schedule with not many unallocated test sessions. Despite that, additional ad-hoc test sessions were setup to enable additional and re-testing sessions (after fixing previously detected issues).

During the event the test schedule was constantly updated according to the progress of the test sessions. These changes were discussed and agreed in the chartroom, during the wrap-up meetings at the end of each day or during face-to-face meetings with the concerned participants.

The figure below shows the preliminary version of the test schedule.

		OCCI 1	OCCI 2	CDMI 1	CDMI 2
Thu 19	8:30-12:30	cesnet CESNET rOCCI Client CompatibleOne CompatibleOne OCCI Server	CERN CERN OCCI Client CompatibleOne CompatibleOne OCCI Server	TCS TCS CDMI Client Scality Scality CDMI Server	R2AD R2AD CDMI Client Scality Scality CDMI Server
	13:30-17:30	CERN CERN OCCI Client cesnet CESNET rOCCI Server	Activeeon Activeeon OCCI Server CompatibleOne CompatibleOne OCCI Client	cesnet CESNET rOCCI Server cesnet CESNET rOCCI Framework	
Fri 20	8:30-12:30	CERN CERN OCCI Client FZ Juelich FZJ OCCI Server	CERN CERN CDMI Client Scality Scality CDMI Server	cesnet CESNET rOCCI Server CompatibleOne CompatibleOne OCCI Client	FZ Juelich FZJ CDMI Server Scality Scality CDMI Client
	13:30-17:30	FZ Juelich FZJ OCCI Server CompatibleOne CompatibleOne OCCI Client	Activeeon Activeeon OCCI Server cesnet CESNET rOCCI Client	CERN CERN CDMI Client FZ Juelich FZJ CDMI Server	FZ Juelich FZJ CDMI Server TCS TCS CDMI Client

Figure 1: Preliminary Test Schedule

6.3 Test Infrastructure

The Cloud Interoperability Week - CloudPlugfest was held in 2 sites in parallel: Hotel Melia Castilla in Madrid, Spain and Hyatt Santa Clara, CA, US. Remote participation was also supported during this event.

Server implementations run remotely and were accessible over the internet and client implementations run either remotely (when participants were remote) either locally in participants' laptops in Santa Clara or Madrid. A dedicated internet access over wifi was setup in both event venues with unrestricted access to any port for outgoing traffic to enable client to server's seamless connections.

6.4   Interoperability Test Procedure

Each test execution followed the steps below:

1)   Check server availability over the internet (ping)

2)   Connects client implementation to a server implementations of the same standard (OCCI/CDMI/..) from a different participant (over the internet)

3)   Open a Test Session Report in the ETSI Test Reporting Tool (TRT)

4)   Perform tests following the concerned test list (OCCI/CDMI/...)

5) Test Result analysis:

    a. Result OK: Report results in TRT. Run next test.

    b. Result NOK: check monitor traces and implementations' logs to identify source of error. Report Result and enter comment in the TRT. Run next test.

6) Once all the tests in the list executed, review and agree Test Session Report (by both parties) and submit.

7 Achieved Results

The recorded results show that the level of interoperability of the implemented features is quite satisfactory: 76% Furthermore the vast majority of the implementations performed well on the basic operations and there was a high level of conformance for the fully implemented features.

However, many implementations attending the CloudPlugfest were prototypes, where not all the features described by the base standards and covered by the test plans were implemented. It was generally observed that when features were fully implemented, then, high interoperability levels were observed.

Highlights of the test sessions were that:

   - Many implementations did not implement the full set of features described by the base standards and covered by the test list: an implementation check list would be most useful to prioritize the test cases during the test sessions and avoid spending time on non implemented features.

   - The CloudPlugfest test description guide explaining what and how to test step by step and providing clear pass/fail criteria that was made available by ETSI CTI for this Cloud Plugfest event has been considered to be very useful to make CloudPlugfests more efficient and test results easier to consolidate. However, it has been observed that this test plan covers many features that have not yet been addressed by Cloud Standards implementers. This conducted to a high percentage of NA (Not applicable/not implemented test results)
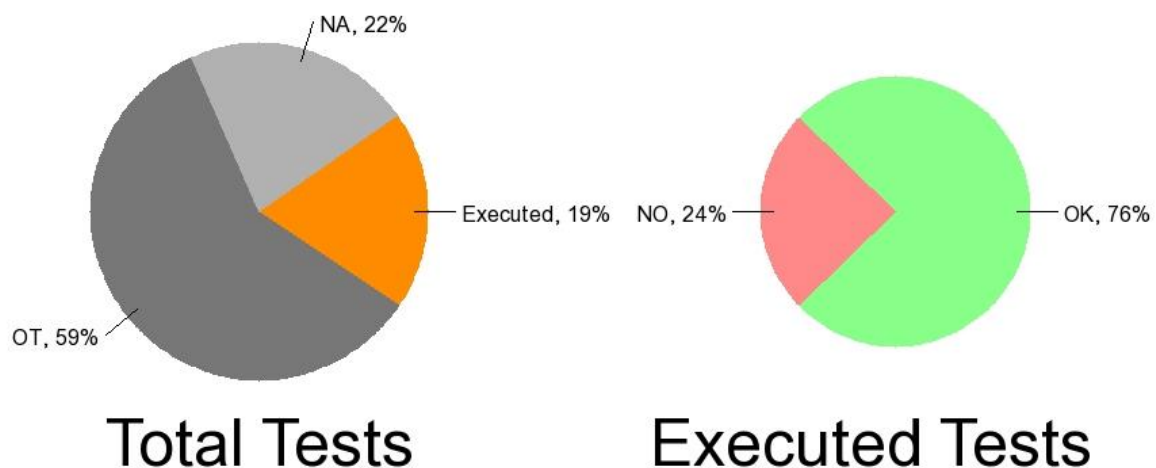

Figure 2: Global Results

7.1 Overview of CDMI Interoperability tests

There were 58 tests cases to be executed for CDMI on each test session. The experience on previous Cloud Plugfest events showed that the scope of the test list was probably too wide for the time allocated for each test session and the number of features actually implemented by the CDMI clients and servers.

On previous CloudPlugfest event, the lack of mature implementations of CDMI clients, made it impossible to record any interoperability test session record. During the Cloud Interoperability Week – CloudPlugfest an important progress in that aspect was observed and the results of 14 interoperability test cases were successfully recorded.

The execution rate of 12% is a direct consequence of the fact that the event was mainly attended by implementation of CDMI servers and early prototypes that did not support the full set of features described by the standards.

57% of the test verdicts were PASS with a higher level of interoperability on the read operations.
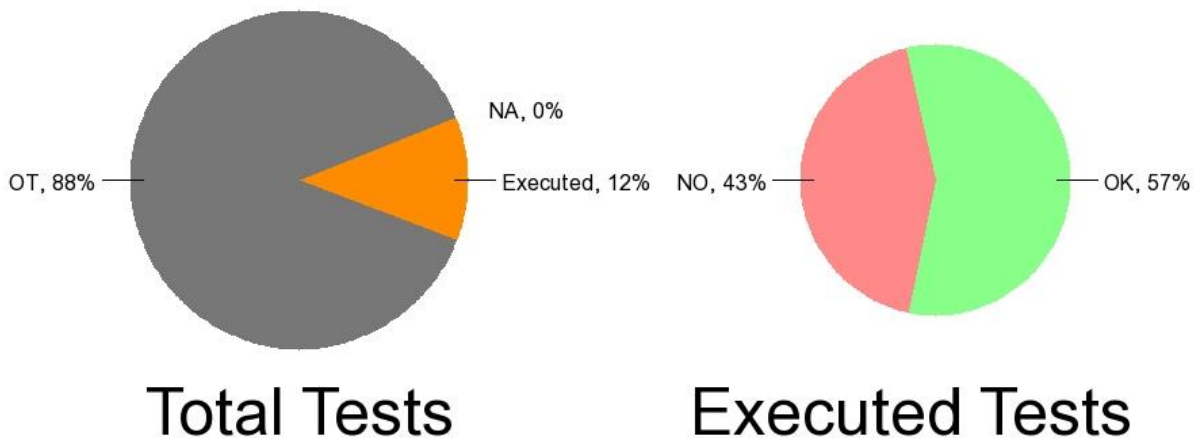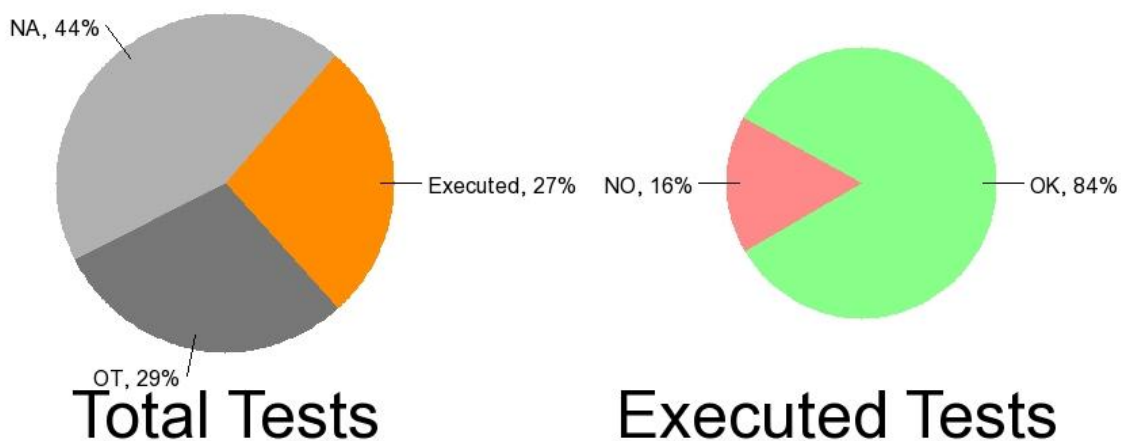
Figure 3: Interoperability Results for CDMI

In addition, the presence of a CDMI Test Tool allowed performing conformance testing of the available CDMI servers.

7.2 Overview of OCCI Interoperability tests

There were 29 tests cases to be executed for OCCI on each test session. The experience showed that the 4 hours allocated for each test session were more convenient than the 2 hours test sessions allocated in previous editions of the CloudPlugfest.

The execution rate of 27%, quite lower than the rate observed in previous events, is a direct consequence of the fact that the event was attended by both mature implementations and early prototypes that did not support the full set of features.

84% of the test verdicts were PASS which shows a good level of maturity of the base standards. 44 % of the tests could not be executed due to non implemented features.

Figure 4: Interoperability Results for OCCI

7.3 CDMI Interoperability Test results

Detailed (per group) CDMI tests results show that none of the CDMI Client or Servers attending the CloudPlugfest supported the queue resource, and, as a consequence, running this group of test cases was not possible.

However, it was observed that for basic features (capability, container) and READ operations, the level of interoperability was in the range of 67%-100%.

Results per Group

Group	Interoperability			Not Executed			Totals	
	OK	NO		NA	OT		Run	Results
CDMI/CAPABILITIES/READ	4 (66.7%)	2 (33.3%)		0 (0.0%)	2 (25.0%)		6 (75.0%)	8
CDMI/CONTAINER/CREATE	0 (0.0%)	1 (100.0%)		0 (0.0%)	9 (90.0%)		1 (10.0%)	10
CDMI/CONTAINER/DELETE	0 (0.0%)	1 (100.0%)		0 (0.0%)	1 (50.0%)		1 (50.0%)	2
CDMI/CONTAINER/READ	4 (100.0%)	0 (0.0%)		0 (0.0%)	4 (50.0%)		4 (50.0%)	8
CDMI/CONTAINER/UPDATE	0 (0.0%)	0 (0.0%)		0 (0.0%)	8 (100.0%)		0 (0.0%)	8
CDMI/DATA/CREATE	0 (0.0%)	1 (100.0%)		0 (0.0%)	11 (91.7%)		1 (8.3%)	12
CDMI/DATA/DELETE	0 (0.0%)	0 (0.0%)		0 (0.0%)	2 (100.0%)		0 (0.0%)	2
CDMI/DATA/READ	0 (0.0%)	0 (0.0%)		0 (0.0%)	6 (100.0%)		0 (0.0%)	6
CDMI/DATA/UPDATE	0 (0.0%)	0 (0.0%)		0 (0.0%)	8 (100.0%)		0 (0.0%)	8
CDMI/DOMAIN/CREATE	0 (0.0%)	0 (0.0%)		0 (0.0%)	6 (100.0%)		0 (0.0%)	6
CDMI/DOMAIN/DELETE	0 (0.0%)	0 (0.0%)		0 (0.0%)	2 (100.0%)		0 (0.0%)	2
CDMI/DOMAIN/READ	0 (0.0%)	0 (0.0%)		0 (0.0%)	6 (100.0%)		0 (0.0%)	6
CDMI/DOMAIN/UPDATE	0 (0.0%)	1 (100.0%)		0 (0.0%)	3 (75.0%)		1 (25.0%)	4
CDMI/QUEUE/CREATE	0 (0.0%)	0 (0.0%)		0 (0.0%)	10 (100.0%)		0 (0.0%)	10
CDMI/QUEUE/DELETE	0 (0.0%)	0 (0.0%)		0 (0.0%)	2 (100.0%)		0 (0.0%)	2
CDMI/QUEUE/DEQUEUE	0 (0.0%)	0 (0.0%)		0 (0.0%)	4 (100.0%)		0 (0.0%)	4
CDMI/QUEUE/ENQUEUE	0 (0.0%)	0 (0.0%)		0 (0.0%)	6 (100.0%)		0 (0.0%)	6
CDMI/QUEUE/READ	0 (0.0%)	0 (0.0%)		0 (0.0%)	10 (100.0%)		0 (0.0%)	10
CDMI/QUEUE/UPDATE	0 (0.0%)	0 (0.0%)		0 (0.0%)	4 (100.0%)		0 (0.0%)	4

Figure 5: CDMI Results per group

7.4 OCCI Interoperability Test results

Detailed (per group) OCCI test results show that very few OCCI Client or Servers attending the CloudPlugfest supported the update operation, and, as a consequence, running this group of test cases was not possible.

However, it was observed that for the test cases that were actually run, the level of interoperability is in the range of 83%-100%, which indicates a good maturity level of the base standard and implementations.

Results per Group

Group	Interoperability			Not Executed			Totals	
	OK	NO		NA	OT		Run	Results
OCCI/CORE/CREATE	6 (100.0%)	0 (0.0%)		2 (16.7%)	4 (33.3%)		6 (50.0%)	12
OCCI/CORE/DELETE	5 (100.0%)	0 (0.0%)		3 (25.0%)	4 (33.3%)		5 (41.7%)	12
OCCI/CORE/DISCOVERY	3 (100.0%)	0 (0.0%)		3 (37.5%)	2 (25.0%)		3 (37.5%)	8
OCCI/CORE/MISC	0 (0.0%)	1 (100.0%)		10 (62.5%)	5 (31.3%)		1 (6.3%)	16
OCCI/CORE/READ	7 (70.0%)	3 (30.0%)		12 (42.9%)	6 (21.4%)		10 (35.7%)	28
OCCI/CORE/UPDATE	0 (0.0%)	0 (0.0%)		6 (50.0%)	6 (50.0%)		0 (0.0%)	12
OCCI/INFRA/CREATE	5 (83.3%)	1 (16.7%)		15 (53.6%)	7 (25.0%)		6 (21.4%)	28

Figure 6: OCCI Results per group

7.5 Other Interoperability Tests

During the Cloud Interoperability Week – CloudPlugfest, the lack of a sufficient number of mature implementations of CAMP, CIMI and OVF, and the restricted number of available test sessions, made it impossible to run these Interoperability and Interworking test cases.

8   Summary of Wrap Up Sessions

8.1   IOP Issues

- Comparing to previous CloudPlugfest editions, there was a significant reduction of the ramp up time. The following best practices helped to achieve this improvement:

    o   Circulating an implementation check list among participants before the Plugfest so that the features in the scope of the testing for each implementation peering could be identified in advance.

    o   Sharing the previous version of the test descriptions, explaining what and how to test step by step and clear pass/fail criteria, with participants as soon as the event was launched

    o   The management of multiple time zones and locations adds an important amount of complexity to the test event. It is very difficult for remote participants to guaranty a permanent availability during the test sessions. The planner team contacted participants one by one to obtain a clear view of their availability before establishing the preliminary test schedule.

- Additional best practices could allow to make further improvement in this domain in future events:

    o   Proposing newcomers and prototype implementations to pre test following the IOT test descriptions before the start of the Plugfest, in order to bring them to the same stage of interoperability level.

- Other issues:

    o   There were some issues with X.509 certificates. This problem could be workaround by participants in a timely manner by disabling security via a proxy; however, the planners team should investigate if there is a general interest in providing developer and server text certificates for use with X.509 authentication workflows for future events.

    o   An HTTP issue was identified when testing OCCI. One of the OCCI Servers had implements a redirection mechanism that some OCCI Clients have trouble to handle properly. In fact, this OCCI server does not use the default HTTPS port 443 but a custom port instead; which can be a problem for many open source HTTP libraries.

8.2   Base Spec Issues

8.2.1   CDMI

It was noticed that due to the wide scope of the CDMI specification most implementation only address very specific parts of it, and that some kind of profile definition, that would allow to the determine the applicable subset of test descriptions that should be run would be very beneficial for a future CloudPlugfest

8.2.2   OCCI

TD/OCCI/CORE/READ/004-005 revealed some JSON rendering/parsing issue where experimented by participants; further investigation on the current status of the OCCI JSON Rendering specification would be advisable

TD/OCCI/INFRA/CREATE/005 showed that some OCCI Servers did not consider "runnable" images to be storage elements; they were not listed as storage -- clarification in the OCCI specification might be necessary (Occi::Infrastructure::Storage)

Change History

Document history		
V0.0.1	September 2013	First draft SAM
V0.0.2	October 2013	Comments from CloudPlugfest planners incorporated