

# CLOUD STANDARDS INTEROPERABILITY: STATUS UPDATE ON OCCI & CDMI IMPLEMENTATIONS

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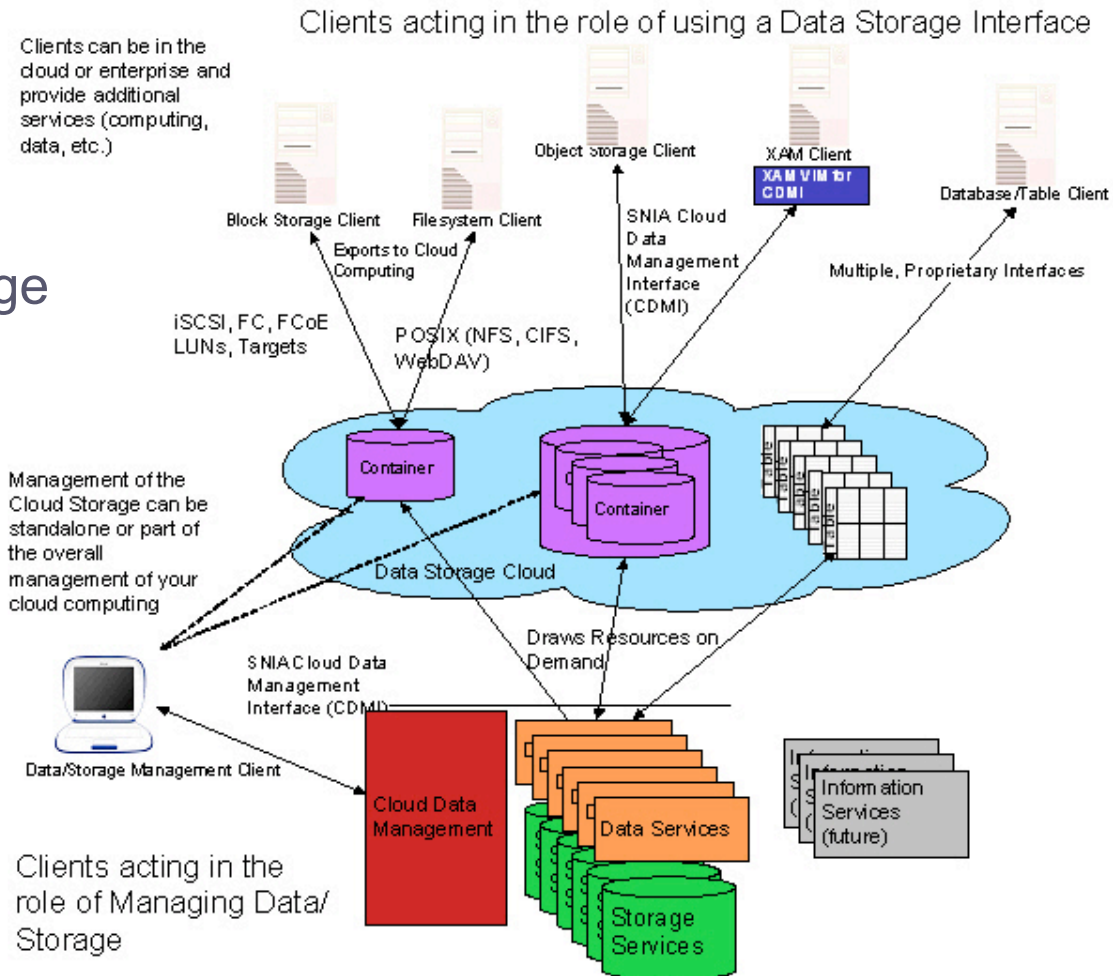
Florian Feldhaus  
TU Dortmund

# Overview OCCI

- RESTful API for Service Management (IaaS and more)
- consisting of 3 parts (OGF proposed recommendations)
  - Core – defines the OCCI model
  - Rendering – defines RESTful rendering using text/plain or text/occi (JSON and XML in next version)
  - Infrastructure – defines IaaS resource parameters
    - compute
    - storage
    - network
- easily extendible by
  - linking to new or external objects and services
  - adding new attributes to existing objects
- very flexible API
- active development and existing implementations

# Overview CDMI

- RESTful API for Cloud Data management
- developed by SNIA
- main concepts
  - object storage
  - support for legacy storage
  - containers for grouping
  - metadata
  - simple management



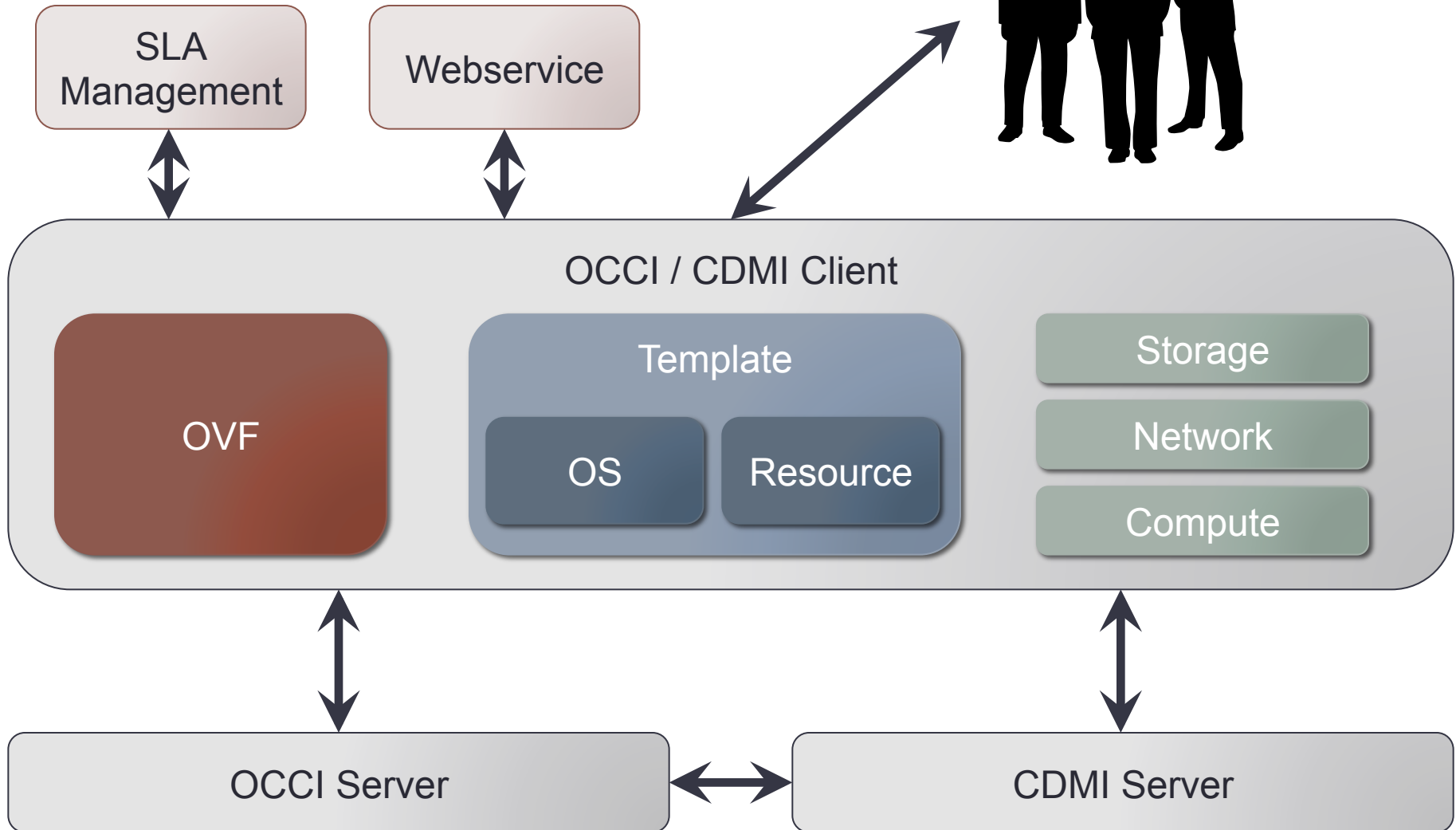
# SNIA Cloud Plugfest

- purpose is for vendors to bring their implementations of CDMI and OCCl to test, identify, and fix bugs in a collaborative setting
- organised by Storage Networking Industry Association
  - 1st plugfest April 2011 at SNIA Technology Center
  - 2nd plugfest July 2011 at SNIA Technology Center
  - 3rd plugfest will be Sep. 19 – Sep 22. 2011 in Santa Clara
  - 4th plugfest will be spring 2012 in Europe
- remote participation encouraged
- implementations and test instances will be collected in a wiki
  - <http://plugfest.sniacloud.com/wiki/index.php>

# Status OCCI Implementations

- OCCI 1.1 Client / Server frameworks
  - OCCI for OpenNebula – Ruby framework, **OpenNebula, SLA@SOI**
  - occi-py – Python Framework, developed by **OGF (Ralf Nyren)**
  - occi4java – Java Framework, developed by **TU Dortmund University**
  - pyocci – Python module, part of Service Sharing Facility developed by **Platform Computing**
- OCCI Client libraries
  - R2AD-Cloud-Client – JavaFX + Android implementation developed by **R2AD**
  - jClouds integration – soon to be released by **SLA@SOI EU project**
- OCCI Verification Suite
  - developed by **OGF OCCI WG** to verify standard conformity
- more implementations and information:
  - <http://occi-wg.org/community/implementations/>

# OCCI / CDMI usage



OCCI / CDMI Client

← → × ↑

Upload OVF file

Select Operating System template

- Red Hat Enterprise Linux 6
- SUSE Enterprise Linux 11 SP 1
- Ubuntu 10.04 LTS

Select architecture  32bit  64bit

Select Resource template

- Medium instance
- Large instance
- HPC instance

**Compute**

Select architecture  32bit  
 64bit

Number of cores  4 cores

Hostname

Speed  1.7 GHz

Memory  8 GiB

Select Network  ▼  
Public institute network  
Demilitarized Zone

Select Storage object  ▼  
SUSE Enterprise Linux 11 SP1 64bit Image  
Ubuntu 10.04 CD ISO Image 64bit



**Storage**

Use CDMI object  
 Create empty storage  
 Upload image

Use CDMI Storage Object

Create empty Storage object  40 GB

Upload Image

Network

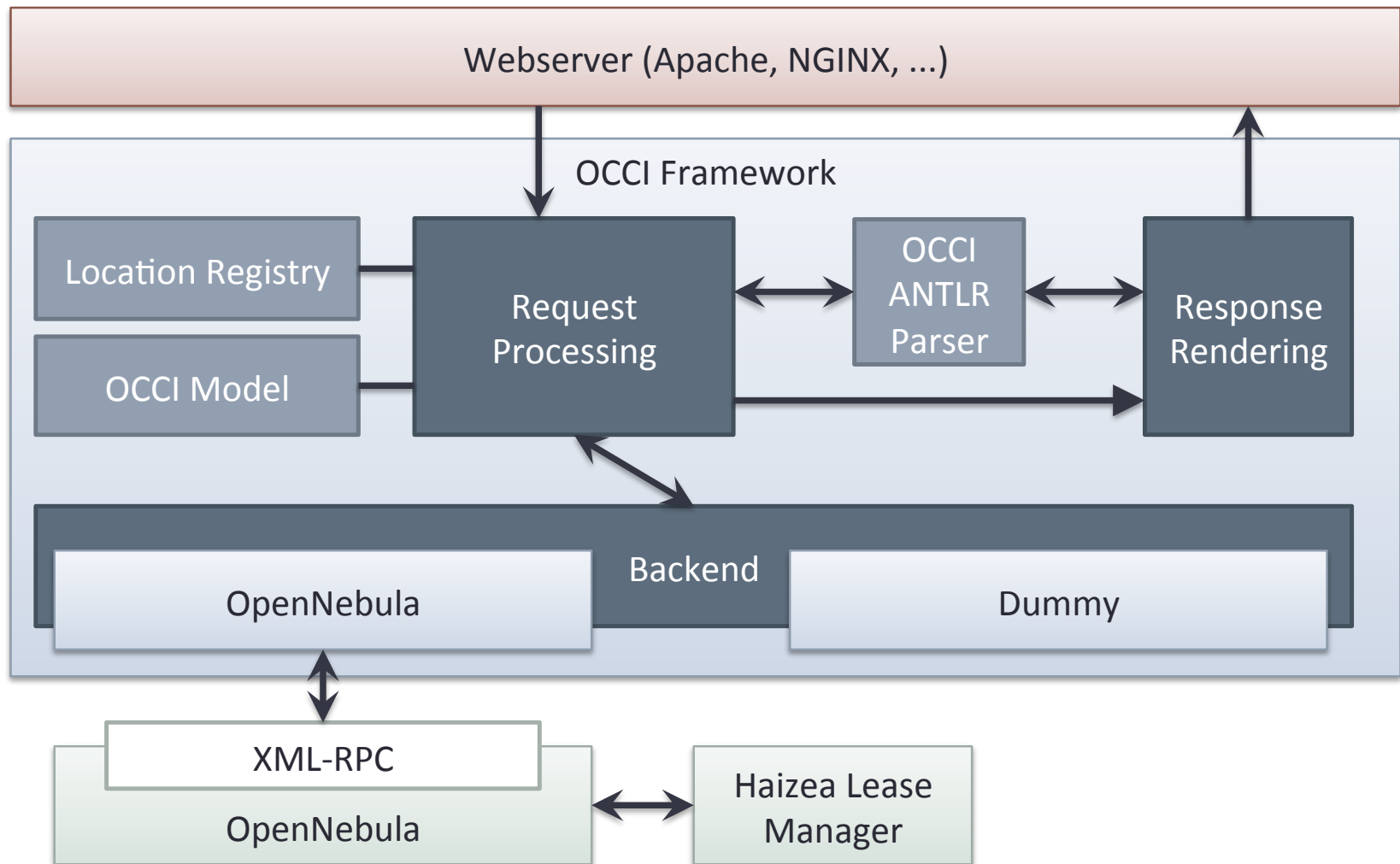
VLAN ID  VLAN Label

Network Address

Network Gateway

Network Allocation  dynamic  static

# OCCI for OpenNebula



# OCCI compute object GET

```
X-OCCI-Attribute: occi.compute.cores="1"  
X-OCCI-Attribute: occi.core.summary="A short summary"  
X-OCCI-Attribute: occi.core.title="My VM"  
X-OCCI-Attribute: opennebula.vm.web_vnc=  
  http://localhost:5900/vnc\_auto.html?host=localhost&port=5900  
X-OCCI-Attribute: occi.core.id=  
  "38381d16-b001-11e0-8d67-00163e211160"  
X-OCCI-Attribute: occi.compute.memory="4096"  
X-OCCI-Attribute: occi.compute.state="active"  
X-OCCI-Attribute: occi.compute.architecture="x86"  
Link: </storage/...>;...  
Link: </network/...>;...  
Link: </compute/...?action=restart>;...  
Link: </compute/...?action=start>;...  
Link: </compute/...?action=stop>;...  
Link: </compute...?action=suspend>;...  
Category: compute; ...  
Category: vnc; ...
```

The diagram consists of two arrows. One arrow starts from the text 'VNC Mixin' and points to the 'Category: vnc; ...' line. A second arrow starts from the 'Category: vnc; ...' line and points to the URL 'http://localhost:5900/vnc\_auto.html?host=localhost&port=5900' in the 'X-OCCI-Attribute: opennebula.vm.web\_vnc=' line.

noVNC

noVNC

http://ls31.itmc.tu-dortmund.de:5

Connected (unencrypted) to: QEMU (one-27)

```

> hostname: ttylinux_host

/dev/hda1: clean, 744/10200 files, 9468/40792 blocks
root file system checked ..... [ OK ]
file systems checked ..... [ OK ]
mounting local file systems ..... [ OK ]
setting up system clock (Mon Jul 18 05:41:12 UTC 2011) ..... [ OK ]
mount: mounting /dev/hdc on /mnt/context failed: No such device or address
umount: can't unmount /mnt/context: Invalid argument
initializing random number generator ..... [ OK ]
startup klogd ..... [ OK ]
startup syslogd ..... [ OK ]
bringing up loopback interface lo ..... [ OK ]
bringing up Ethernet interface eth0 ..... [ OK ]
set up default gateway ..... [ OK ]
/etc/rc.d/rc.startup/10.network: line 78: ./ifup-eth0.template: No such file or
directory
startup dropbear ..... [ OK ]
startup inetd ..... [ OK ]

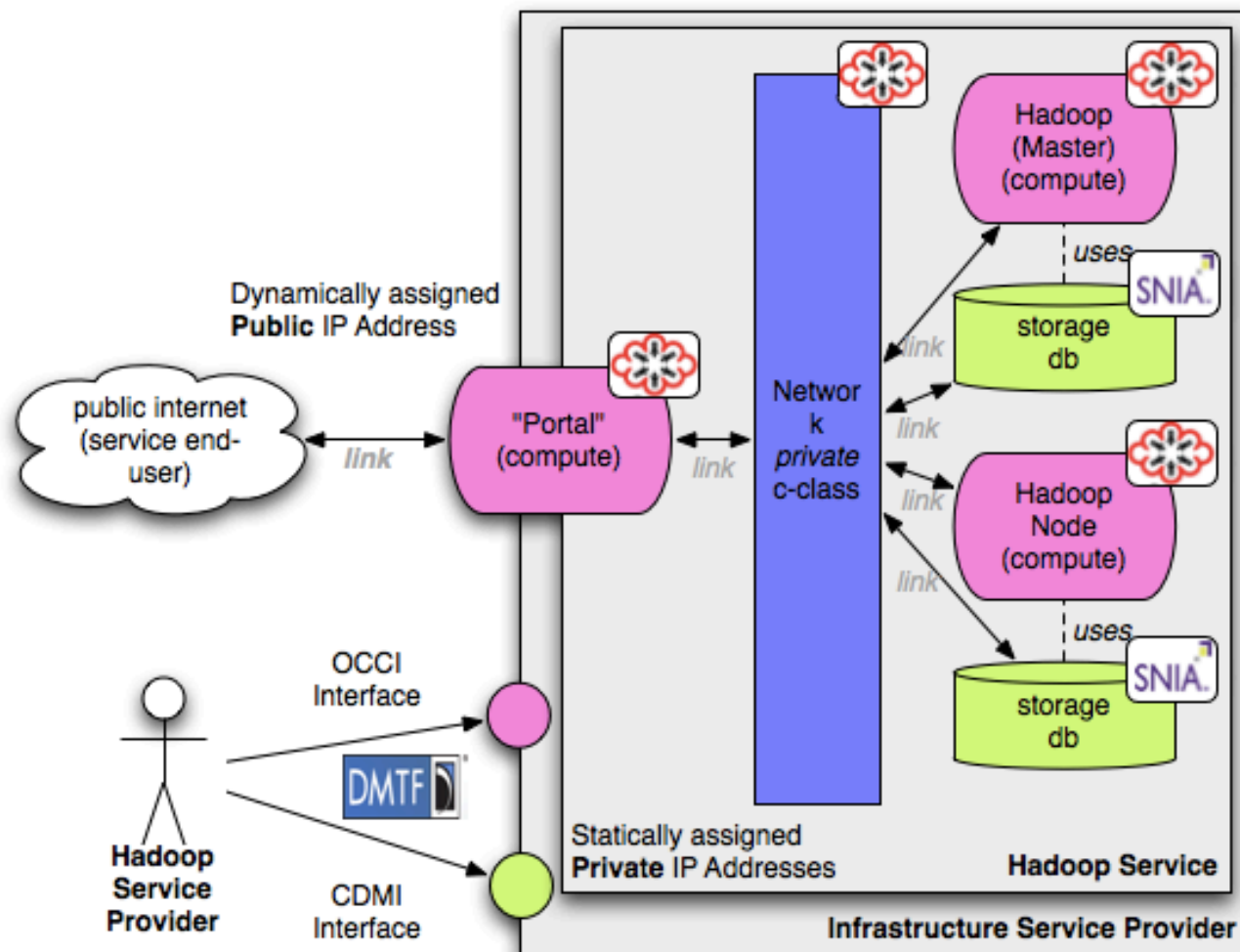
ttylinux ver 9.0 [RC1]
i486 class Linux kernel 2.6.20 (tty1)
The initial root password is "password".
ttylinux_host login: _

```

# Status CDMI Implementations

- **SNIA CDMI Reference Implementation**
  - reference implementation & installation with OCCI / CDMI support
  - developed by **SNIA**
- **NetApp CDMI Server**
  - developed as closed source by **NetApp**, but testing instance available to Plugfest participants
- **CDMI-Proxy**
  - CDMI proxy server for public cloud backends e.g. AWS, Azure
  - developed as part of **VENUS-C EU project** under BSD license
- **CDMI client libraries**
  - Python – developed by **VENUS-C**, BSD license
  - Java – developed by **VENUS-C**, BSD license
  - Ruby (under dev.) – developed by **OpenNebula**, Apache 2.0 license

# OCCI / CDMI Integration Scenario Hadoop



# Outlook

- several active OCCI and CDMI implementations
  - progressing well into production ready solutions
- integration of OCCI and CDMI works well
- OVF integration under active development
- SNIA Cloud Plugfest important for testing interoperability
- next steps:
  - advance standards using experience from implementations
  - write implementation experience guides
  - develop combined OCCI / CDMI / OVF verification suite
  - stress/scaling testing
  - interoperability testing
  - extending OCCI with monitoring / reservation capabilities



# More information

- OCCI WG website: <http://www.occi-wg.org>
- SNIA CDMI website: <http://www.sniacloud.com/>
- OCCI specification: <http://www.ogf.org/gf/docs/>
- CDMI specification: <http://cdmi.sniacloud.com/>
- Cloud Standards Wiki
  - <http://cloud-standards.org/wiki/index.php>
- OCCI Mailinglist
  - <http://www.ogf.org/mailman/listinfo/occi-wg>
- Cloud-Demo Google Group
  - <http://groups.google.com/group/cloud-demo>
- Open Standards, An Open Cloud – DMTF APTS mtg. 2011  
by Andy Edmonds, Thijs Metsch, Eugene Luster

**Thank you for your attention!**