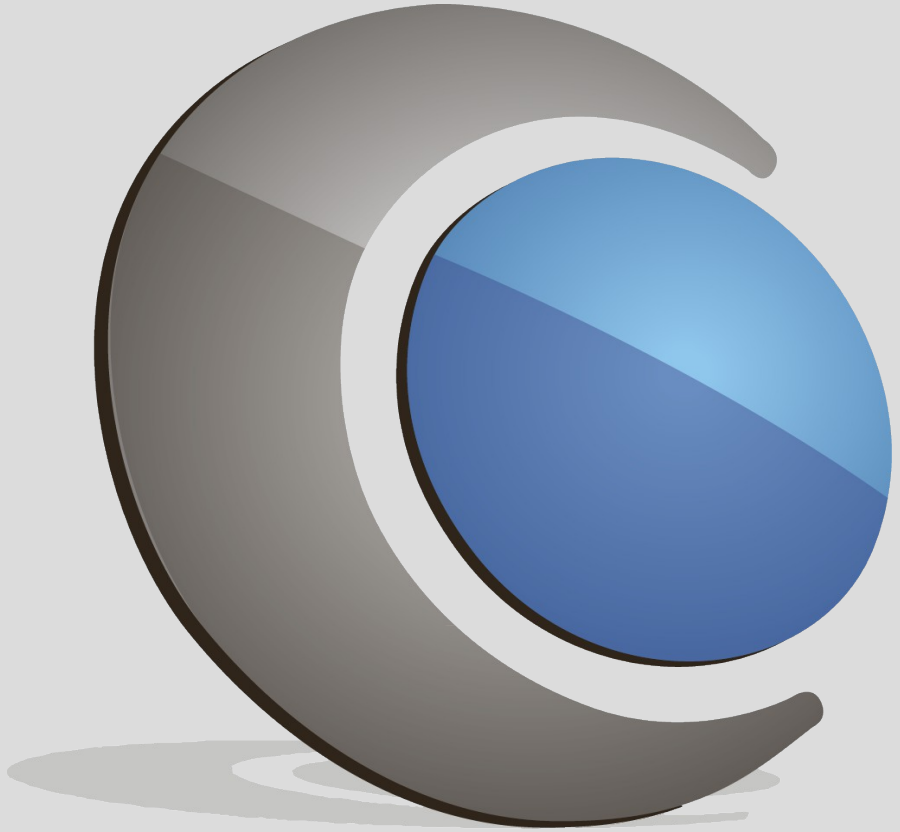
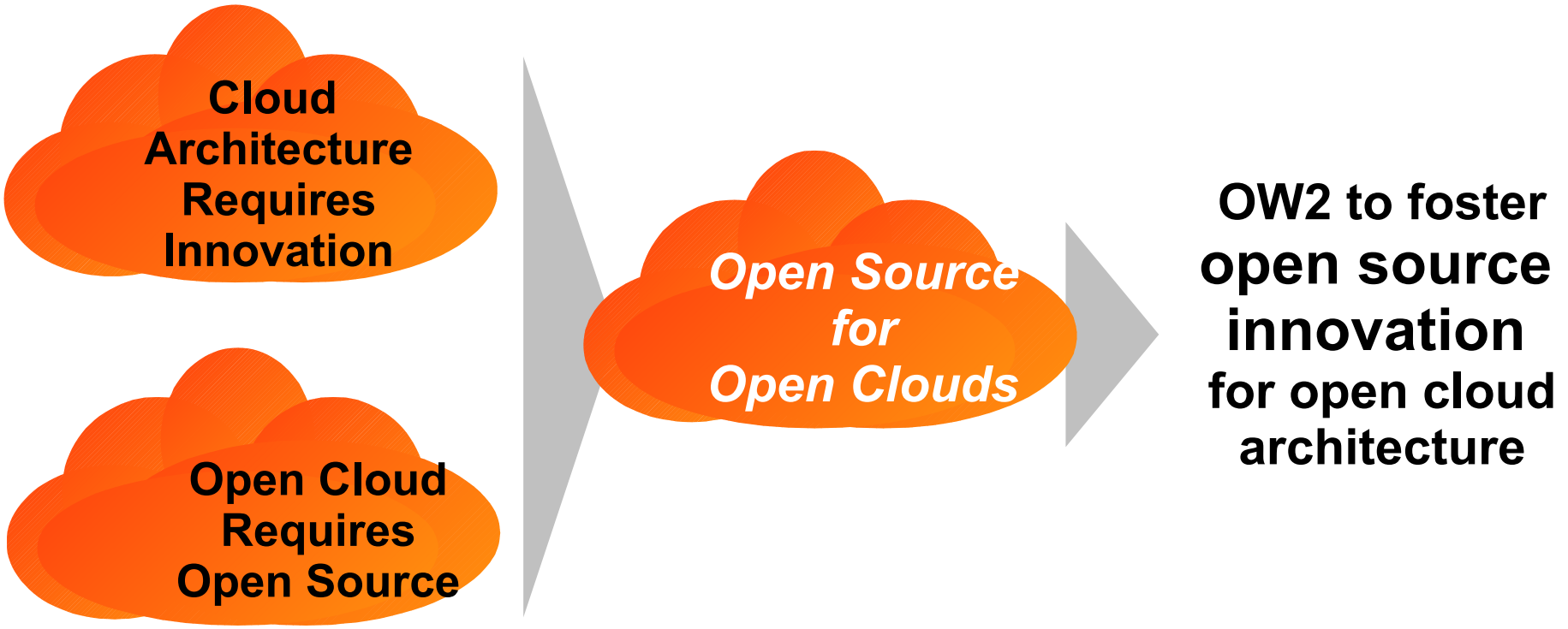


WHAT IS CompatibleOne

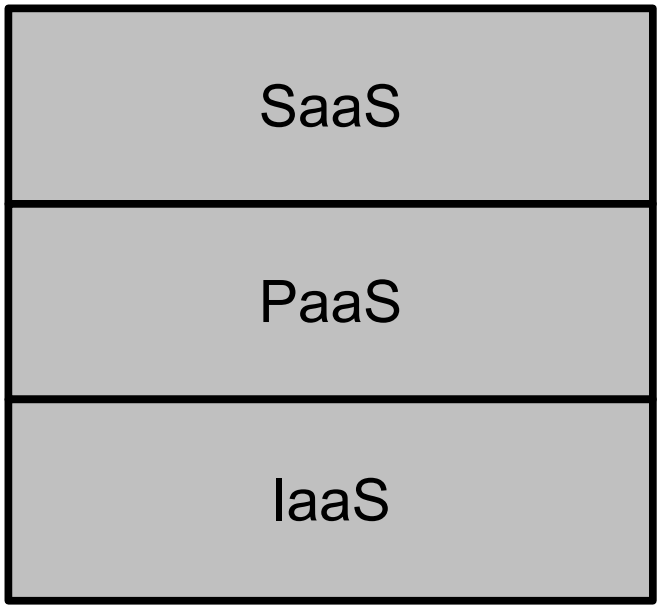
The cloud computing opportunity


Cloud Architecture Requires Innovation
Open Cloud Requires Open Source
Open Source for Open Clouds
OW2 to foster open source innovation for open cloud architecture

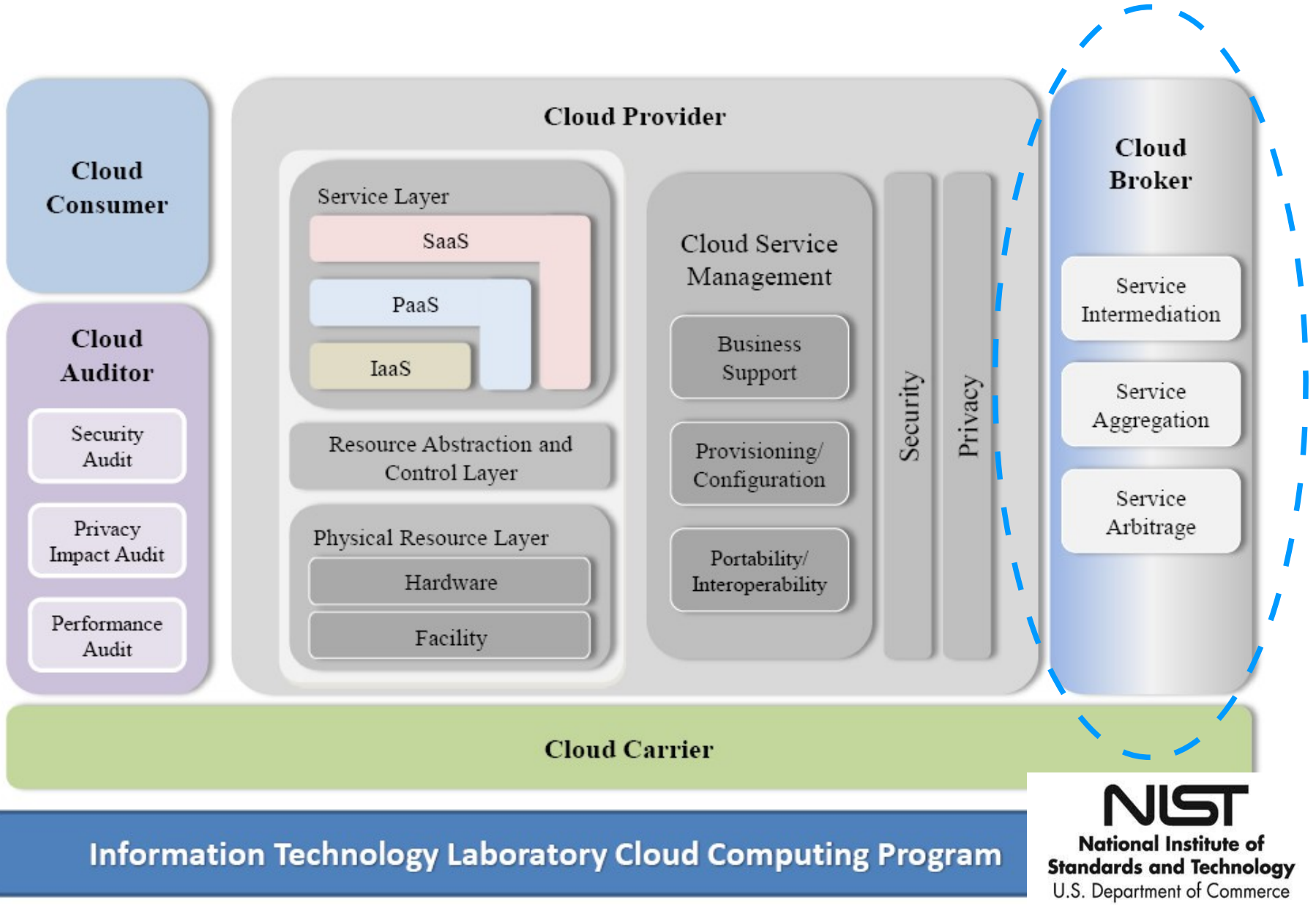
compatibleone

Open Source Drives Cloud Innovation

- **Libraries / APIs**: Deltacloud, jCloud, libvirt, libCloud,...
- **VM**: Aeolus, Abiquo, Convirt, KVM, OpenVZ, Qemu, VirtualBox, Xen, …
- **Development**: CloudBees, Java EE, Eclipse, OpenShift, POJO, Spring, Seam, Struts, GWT, Groovy, JRuby, V8,...
- **IaaS**: ControlTier, Enomaly, Eucalyptus, Joyent SmartOS, OpenNebula, NiftyName, Nimbus, OpenStack, OpenQRM, ProActive, Puppet, RabbitMQ, Reservoir,Traffic Server, Ubuntu,...
- **PaaS**: Appscale, CloudFoundry, Gearman, Heroku, WaveMaker, …
- **SaaS**: Coadunation, Cornelios, eyeOS, Guacamol, TioLive,...
- **Deployment / Admin / Monitoring / Test:** Bitnami, Capistrano, CDT, Cfengine,Chef, CloudForms, collectd, Bcfg2, Etics 2, Fabric, ganeti, Juju, Maven, Piston, Puppet, Zabbix, Zenoss,...
- **Storage and NO/SQL**: Cassandra, CouchDB, DRDB, Drizzle, Flare, Memcached, MongoDB, Neopod, ExtremFS, ...
- **File Systems**: Ceph, CloudStore, GlusterFS, Gpfs, Hdfs, Pohmelfs,...
- **Auto scalability**: Scalr,...
- **Data processing**: Hadoop, MapReduce, Pig Zookeeper,...
- **Green IT / Smart Grid**: Nedo, SelfXL, …
- **Billing**: Jbilling, …


SaaS
PaaS
IaaS

NIST Reference Architecture



State of the Art

Interoperability between cloud services: **to be constructed**

Portability between cloud services: **much more difficult**

- SaaS, IaaS, PaaS, BPaaS, etc. have very different APIs

Significant gaps on SLA and Security

"*De facto*" standards vs. open standards

- No incentive for cloud service providers to let their customers go away: why should they participate to open standards?
- Consumer's pressure may influence their decision

No mature **standards** for cloud computing *(except HTTP)*

- DMTF OVF / CIMI, OGF OCCI, SNIA CDMI, ... have not (yet) been adopted by cloud providers
- Some standards are OK for IaaS but not for other layers (cf. OASIS TOSCA)

→ **Interoperability and portability to be provided and maintained by Cloud Service Brokers**

- *Gartner: "Cloud Interoperability Can be Brokered" by Daryl C. Plummer*

Risks

Today's cloud computing model is not compliant with the original « *utility* » model

- Electricity system or telephone system
  - *“Public and private clouds offer their end consumers a "pay as you go" model - a powerful shift for computing, towards a utility model like the electricity system, the telephone system, or more recently the Internet. However, unlike those utilities, clouds cannot yet federate and interoperate.” IEEE 2011 Annual SRII Global Conference*

Interoperability in « *silos* »

- Specific ecosystems of Cloud Service Providers and Vendors to address targeted markets, aggregated by specific contracts, patents, IPR, etc.
- Limited possibilities to interoperate with other silos *(except for B2B)*
- Extension of the « **vendor lock in** » concept

The cloud broker

What is a Cloud Broker?

- *Sources*
  - **NIST**
    Cloud Computing Standards Roadmap Version 1.0
    by Cloud Computing Standards Roadmap Working Group
    Natl. Inst. Stand. Technol. Spec. Publ. 500-291, 83 pages, 5 July 2011
  - **Gartner**
    Defining Cloud Service Brokerage:
    Taking Intermediation to the Next Level
    by Daryl C. Plummer, Benoit J. Lheureux, Frances Karamouzis
    8 October 2010 G00206187
  - **Forrester**
    Cloud Broker — A New Business Model Paradigm
    Deriving More Business And Economic Models From Cloud Computing
    by Stefan Ried, Ph.D.
    August 10, 2011 | Updated: September 22, 2011

Actors and Interactions

Actor	Definition
Cloud Consumer	Person or organization that maintains a business relationship with, and uses service from, *Cloud Providers*.
Cloud Provider	Person, organization, or entity responsible for making a service available to *Cloud Consumers*.
Cloud Auditor	A party that can conduct independent assessment of cloud services, information system operations, performance, and security of the cloud implementation.
Cloud Broker	An entity that manages the use, performance, and delivery of cloud services, and negotiates relationships between *Cloud Providers* and *Cloud Consumers*.
Cloud Carrier	The intermediary that provides connectivity and transport of cloud services from *Cloud Providers* to *Cloud Consumers*.

Table 1 – Actors in Cloud Computing

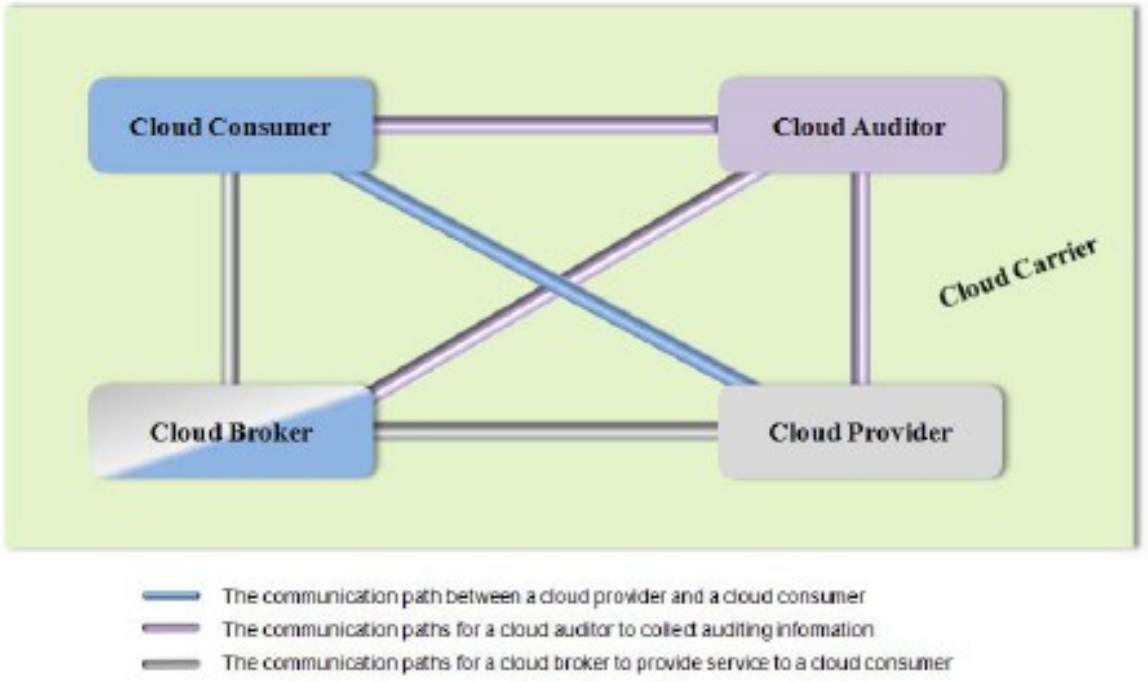


Figure 1 – Interactions between the Actors in Cloud Computing

NIST
National Institute of Standards and Technology
U.S. Department of Commerce

Cloud Business Ecosystem

Cloud builder: Capgemini, CSC, HP, and IBM

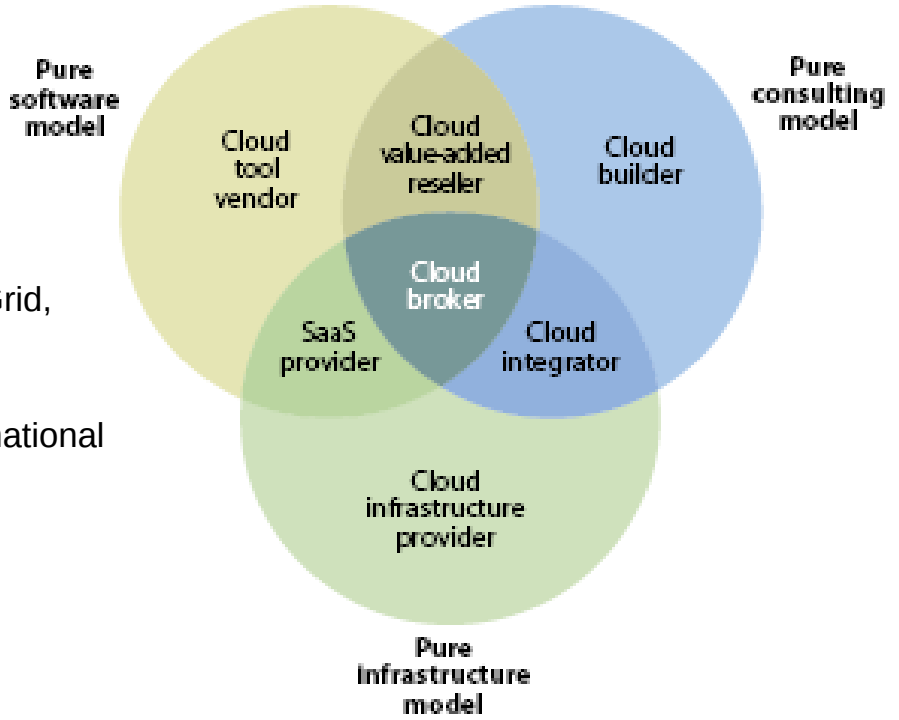
Cloud tool vendor:
Cloud.com, Eucalyptus Systems, RightScale
IBM, Microsoft, Oracle, and VMware.

Cloud infrastructure provider: Amazon.com, GoGrid, Rackspace, T-Systems International

Cloud integrator: Dell, HP, IBM, and T-Systems International

SaaS provider: NetSuite, salesforce.com

Cloud value-added reseller (VAR): Capgemini



Cloud broker: *the **most complex business model**, offering a wide value contribution in the emerging cloud space. Essentially, this model leverages skills and capabilities from all three of the traditional business models of **software**, **consulting**, and **infrastructure**.*

FORRESTER®

Cloud Broker Key Functions

- Intermediation
- Aggregation
- Arbitrage

> “Cloud Services Broker provides a single consistent interface to multiple differing providers, whether the interface is for business or technical purposes.”

The OW2 Open Source Cloudware intiative

More than 30 participants and
over 60 million euros in R&D investment

open Cloudware

Cloud computing application lifecycle management

xlcloud

Management of distributed VMs for HPC applications

CHOREOS
Large Scale Choreographies
for the Future Internet

Ultra-large-scale management of web services

CompatibleOne

When Interoperability Matters
For the engagement of workload over heterogeneous cloud service providers

The open source cloud broker

The CompatibleOne project


compatibleone

Current Contributors

The freedom to control how you use cloud computing

- *Freedom to choose your cloud providers*
- *Freedom to use any type of hardware or software*
- *Freedom and control on your infrastructure and your applications*
- *Freedom to distribute your services between public and private clouds*
- *Freedom to move your applications where you want, when you want*
- *Freedom to adapt the code to your needs*
- *Control over the security and QoS*

Enable application deployment over a federation of clouds

Cloud architecture abstraction

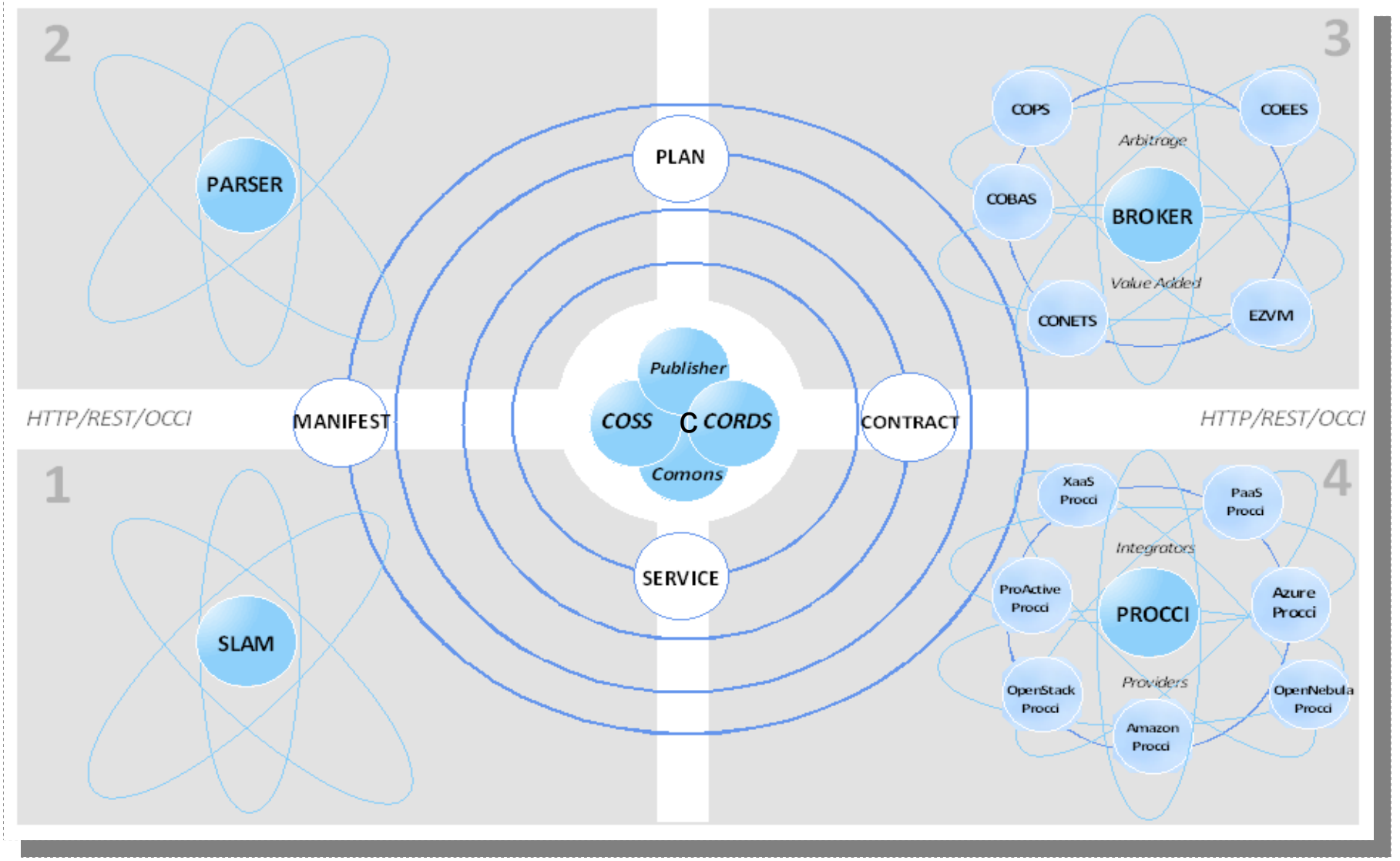
Reference implementation

Use cases / Demonstrators

- *EUREVA*: Distributed remote 3D rendering
- *MANDRIVA*: Physical platform migration
- *NEXEDI*: Accounting and billing
- *NUXEO*: Documentation management
- *XWIKI*: Collaborative applications

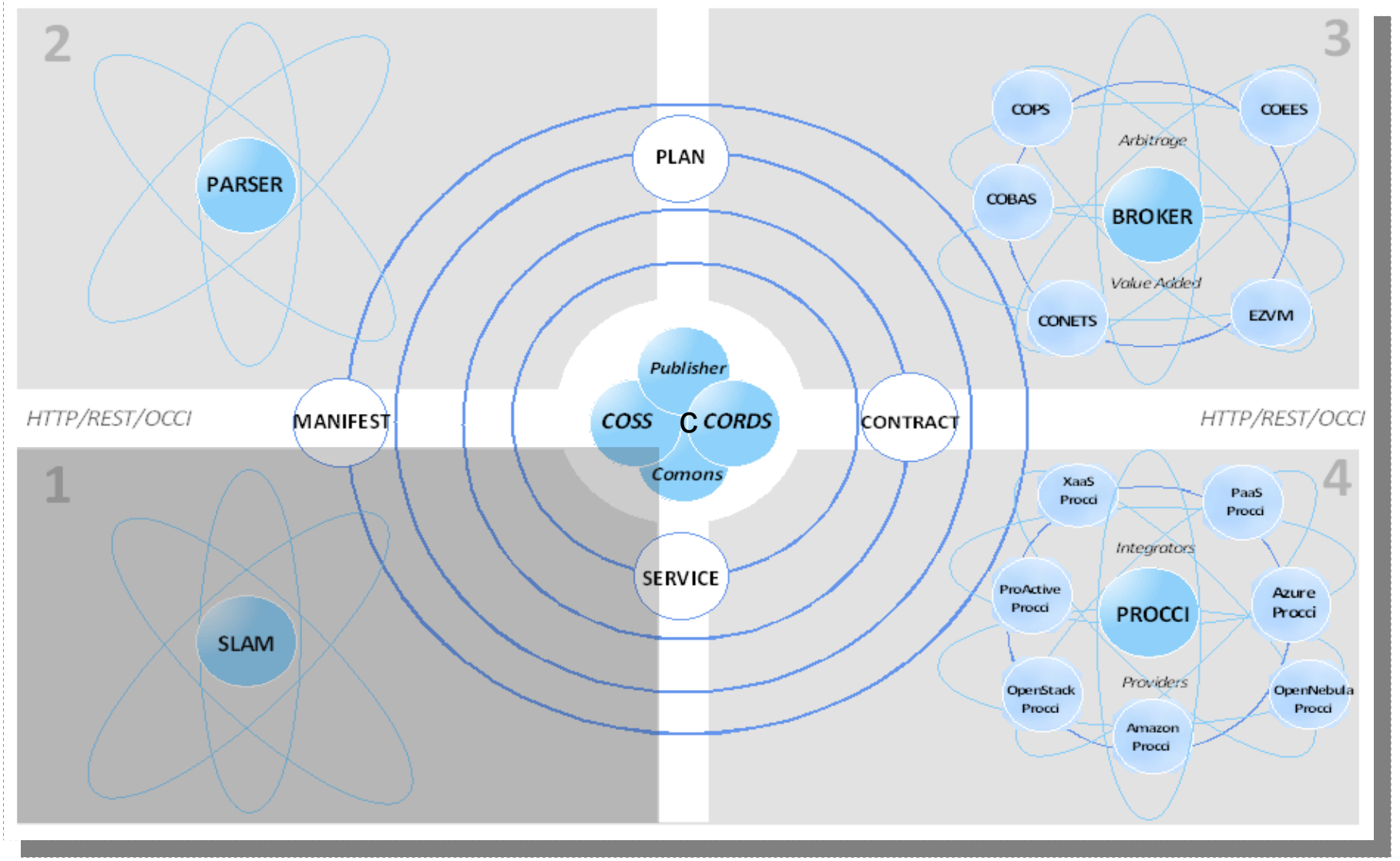
The ACCORDS platform

The ACCORDS Platform



ACCORDS : Advanced Capabilities for CORDS

The ACCORDS Platform



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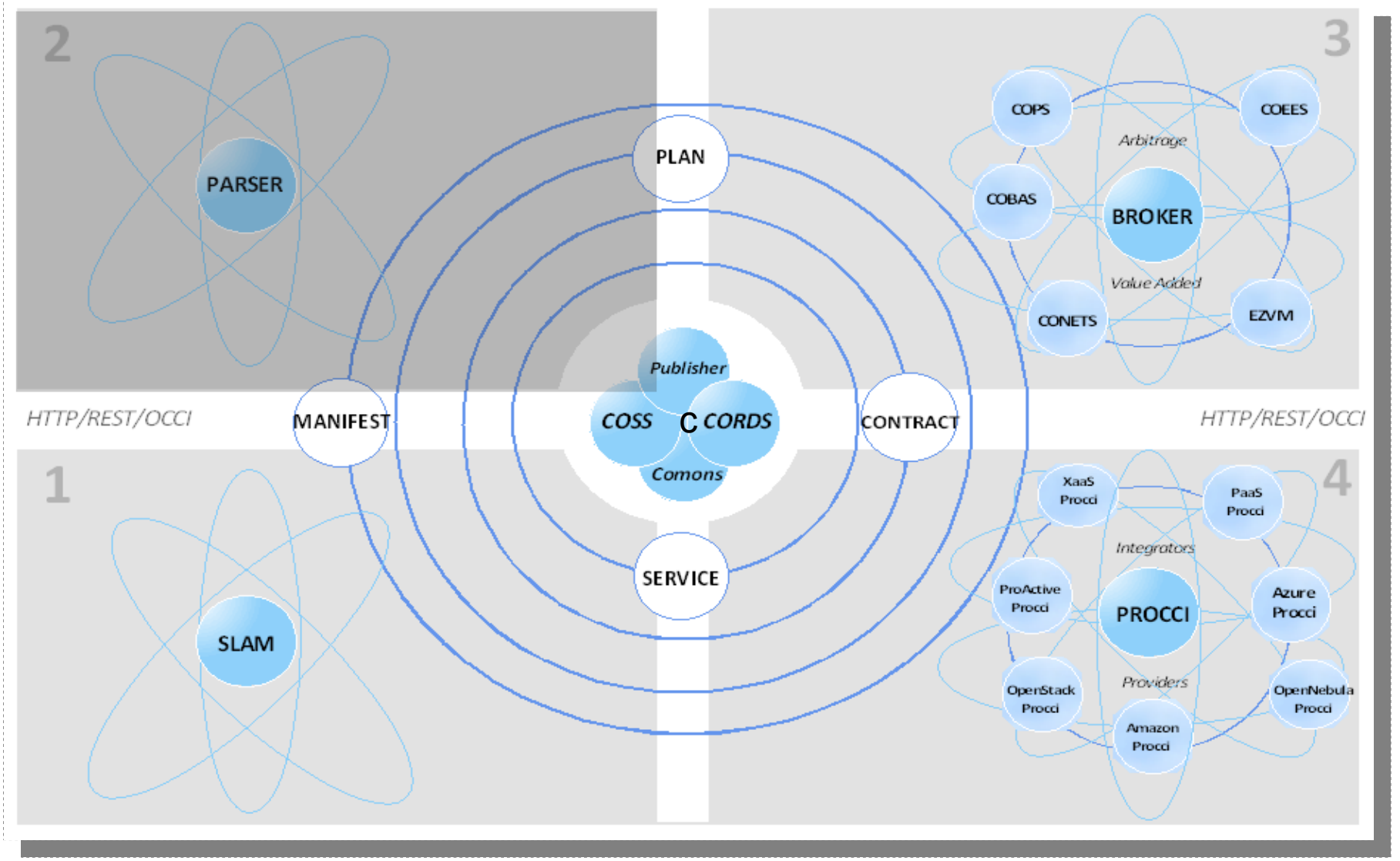

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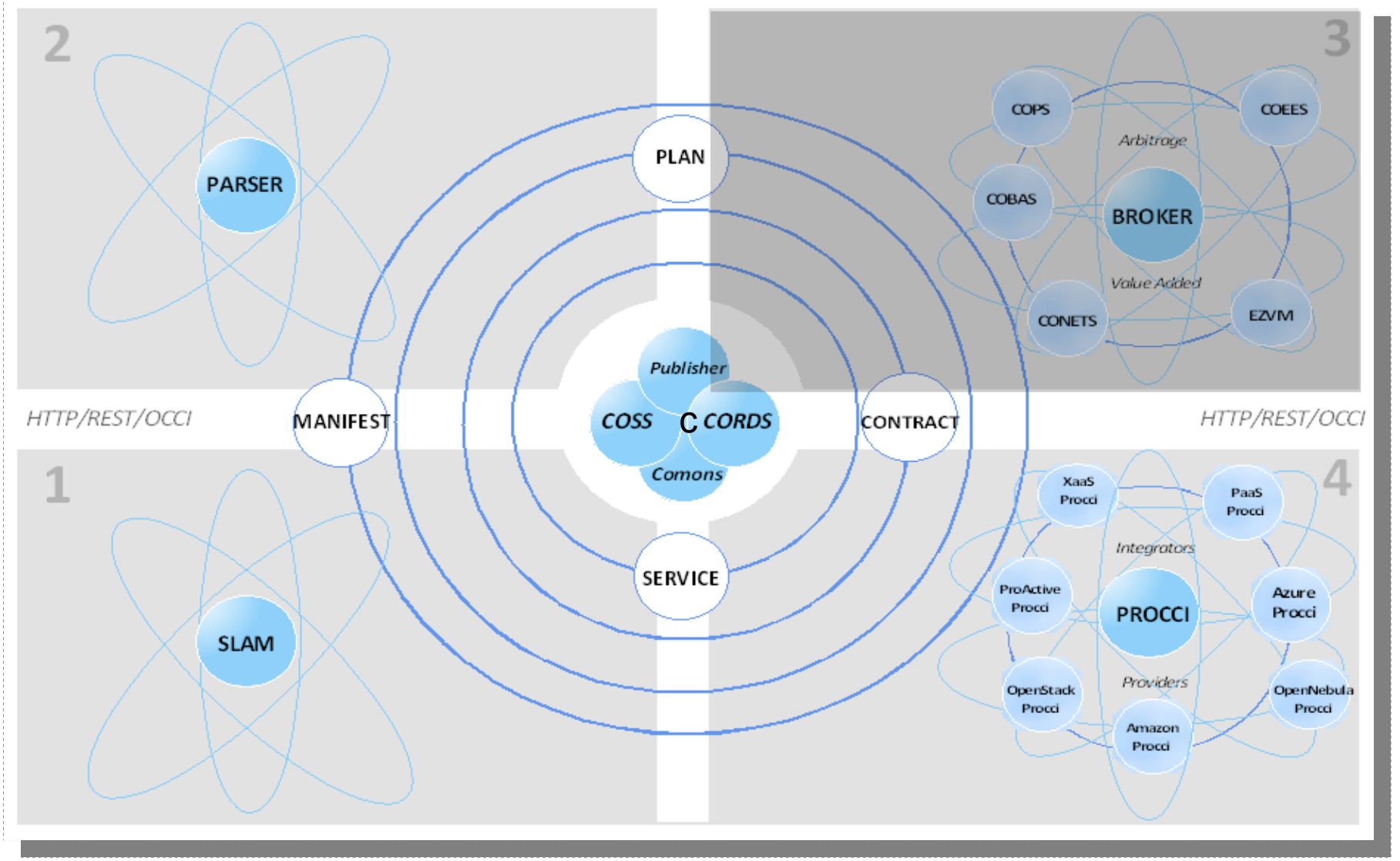

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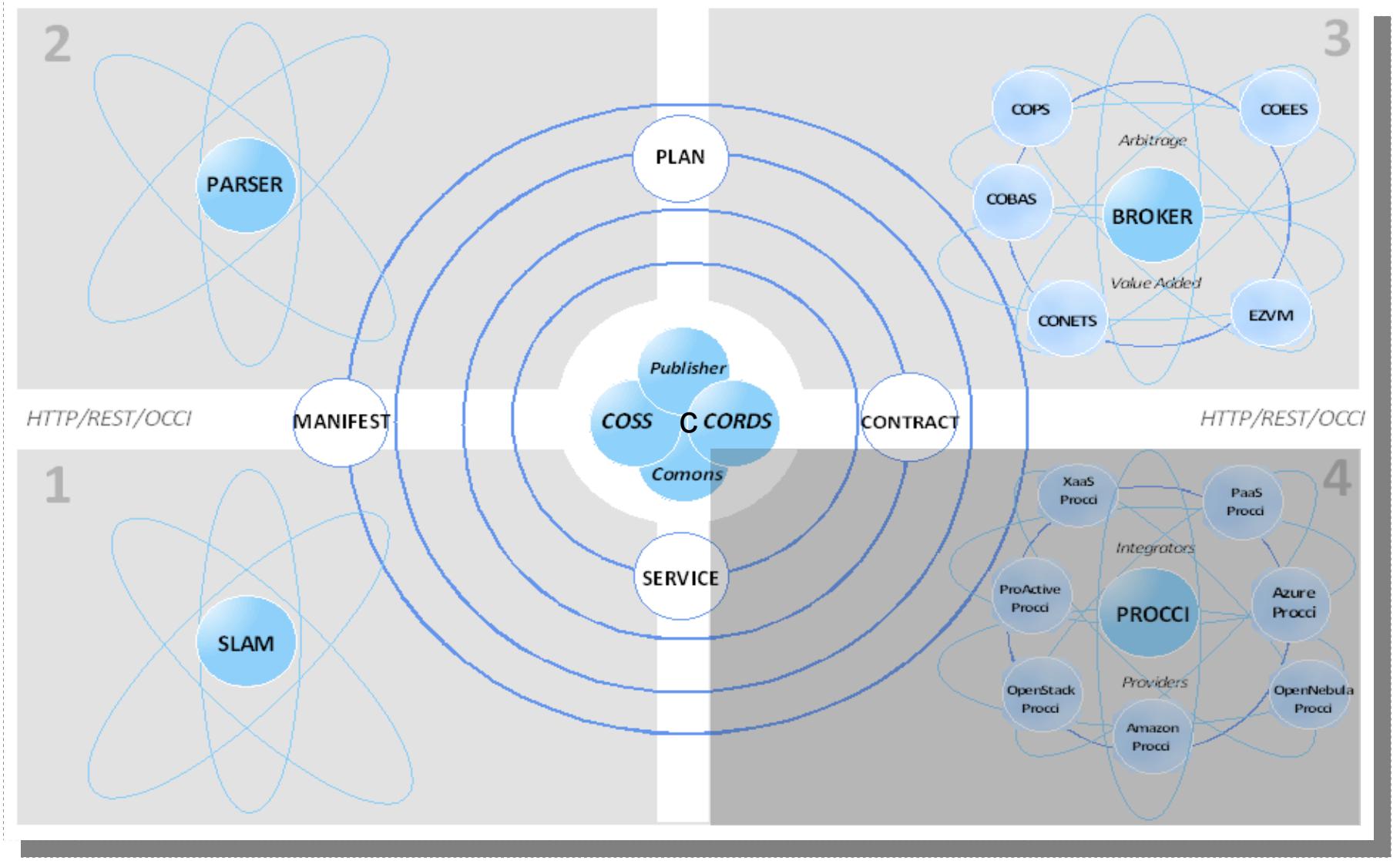
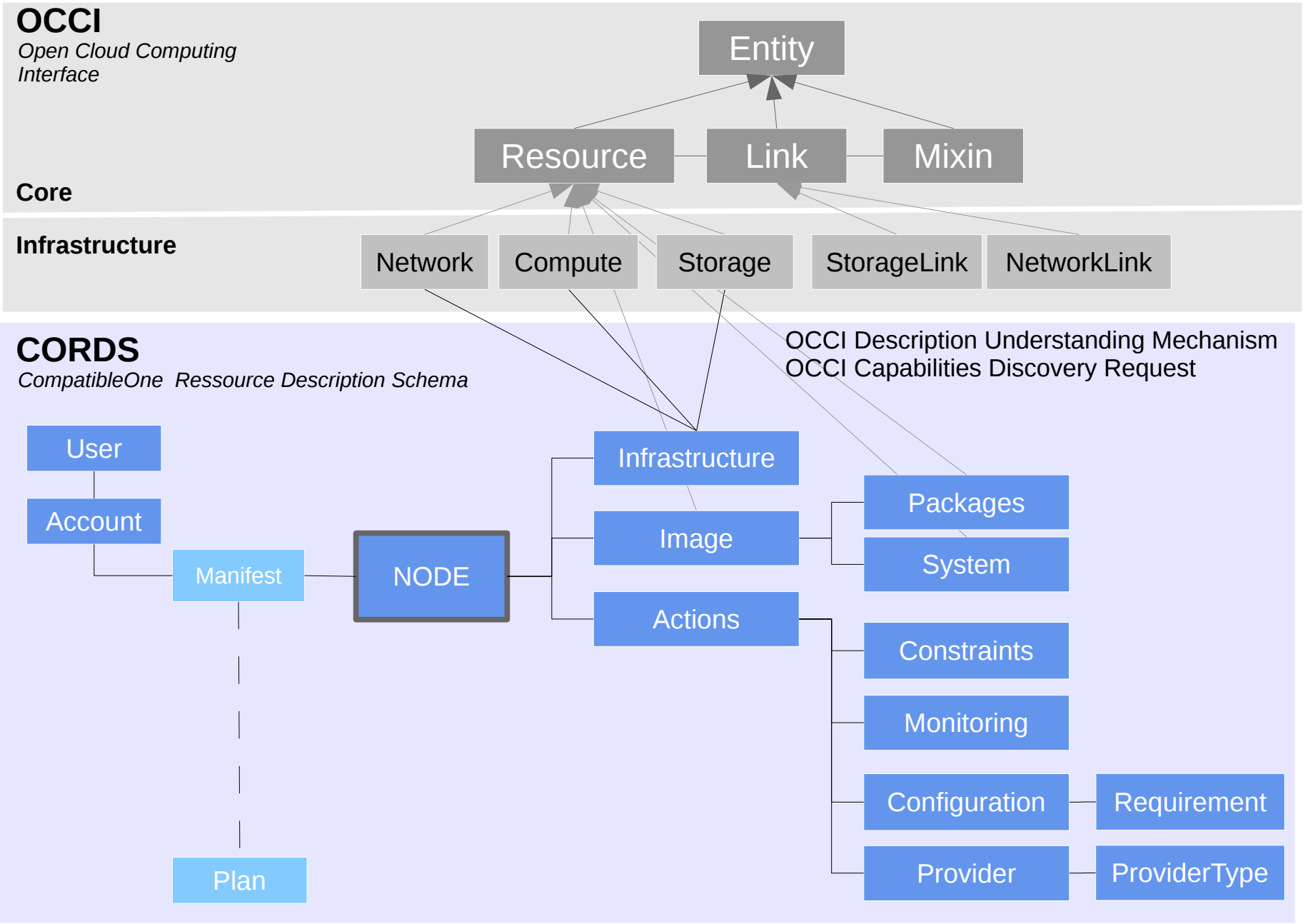
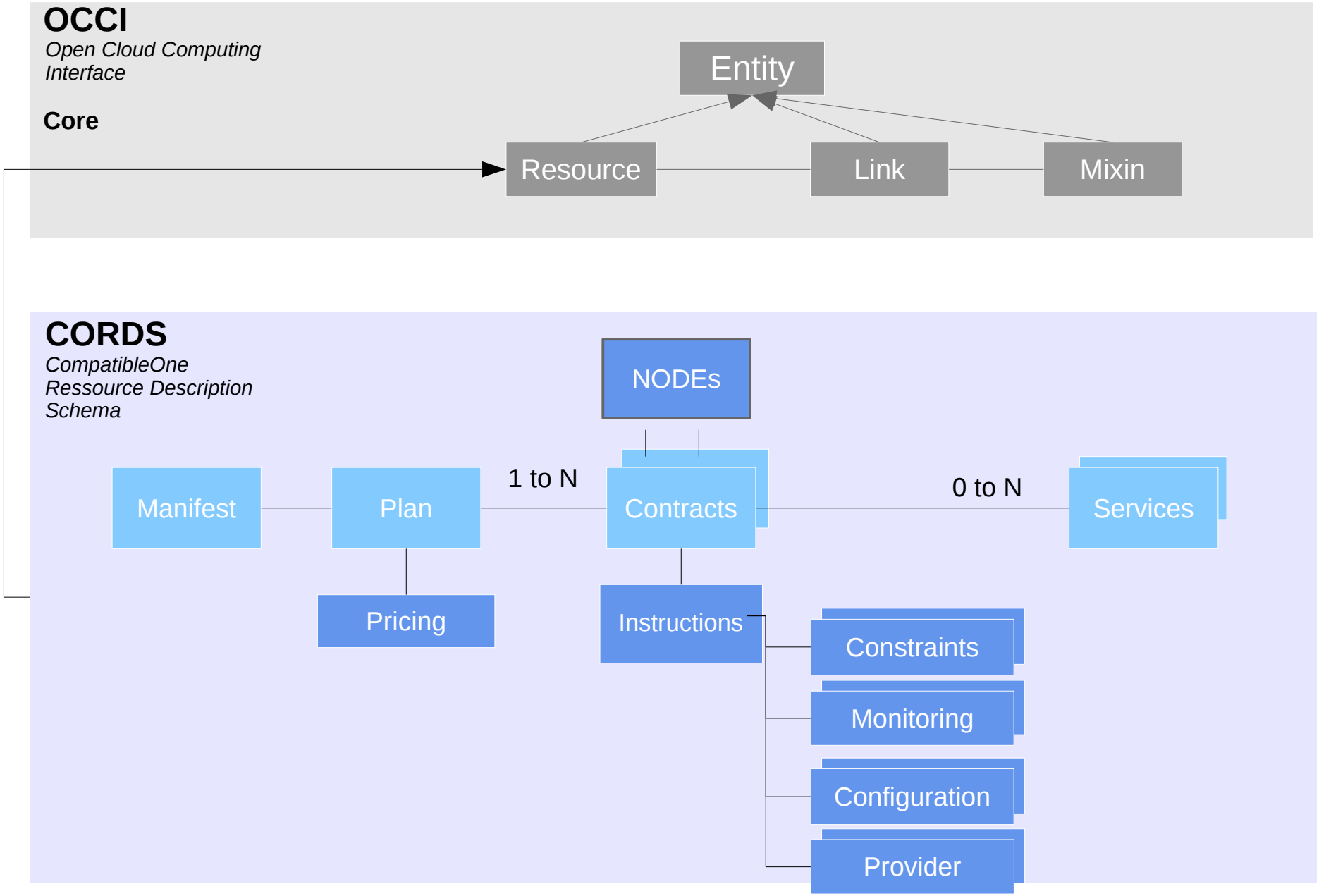


ACCORDS : Advanced Capabilities for CORDS

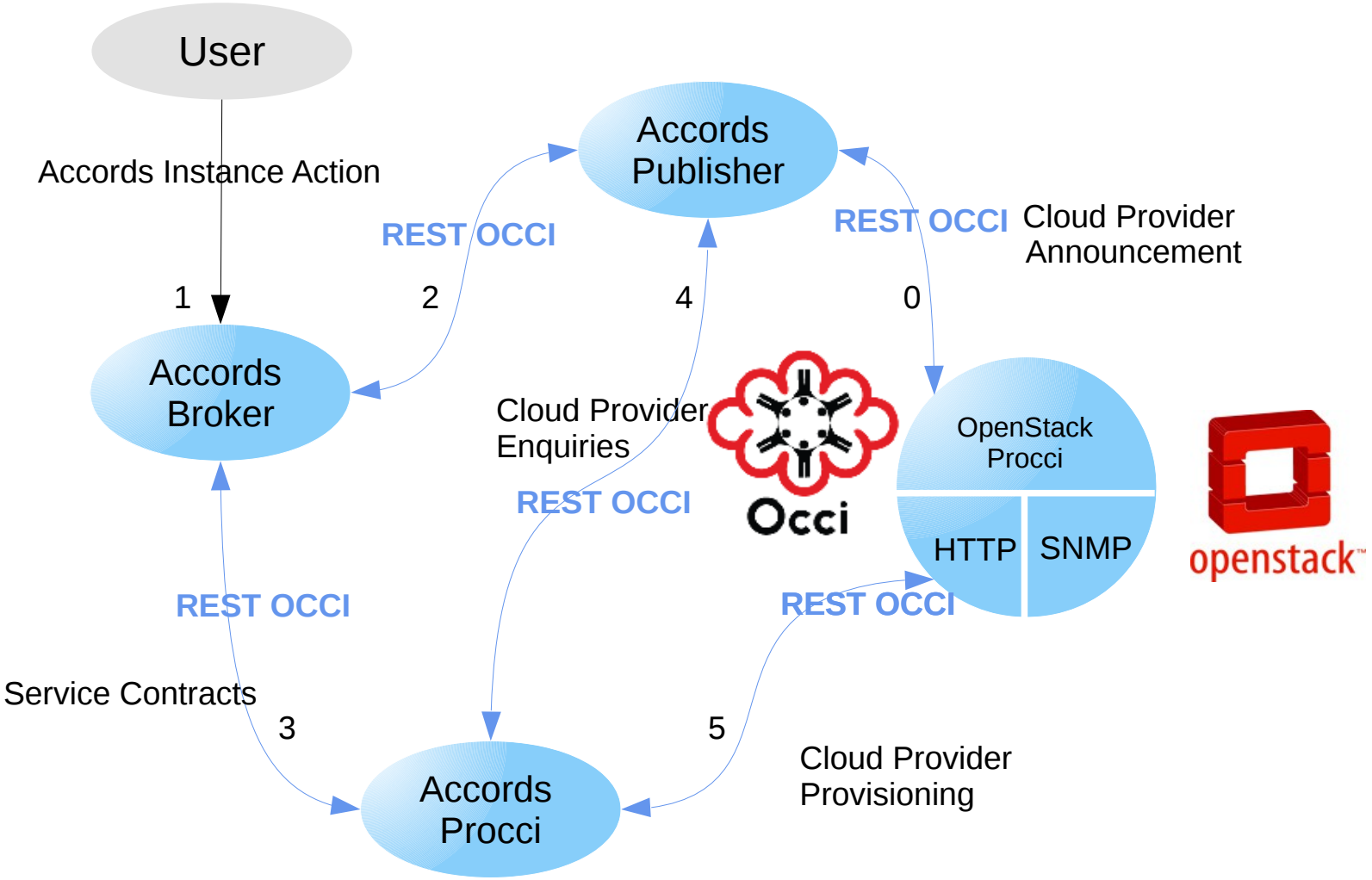
DESCRIPTION MODEL
Logical View



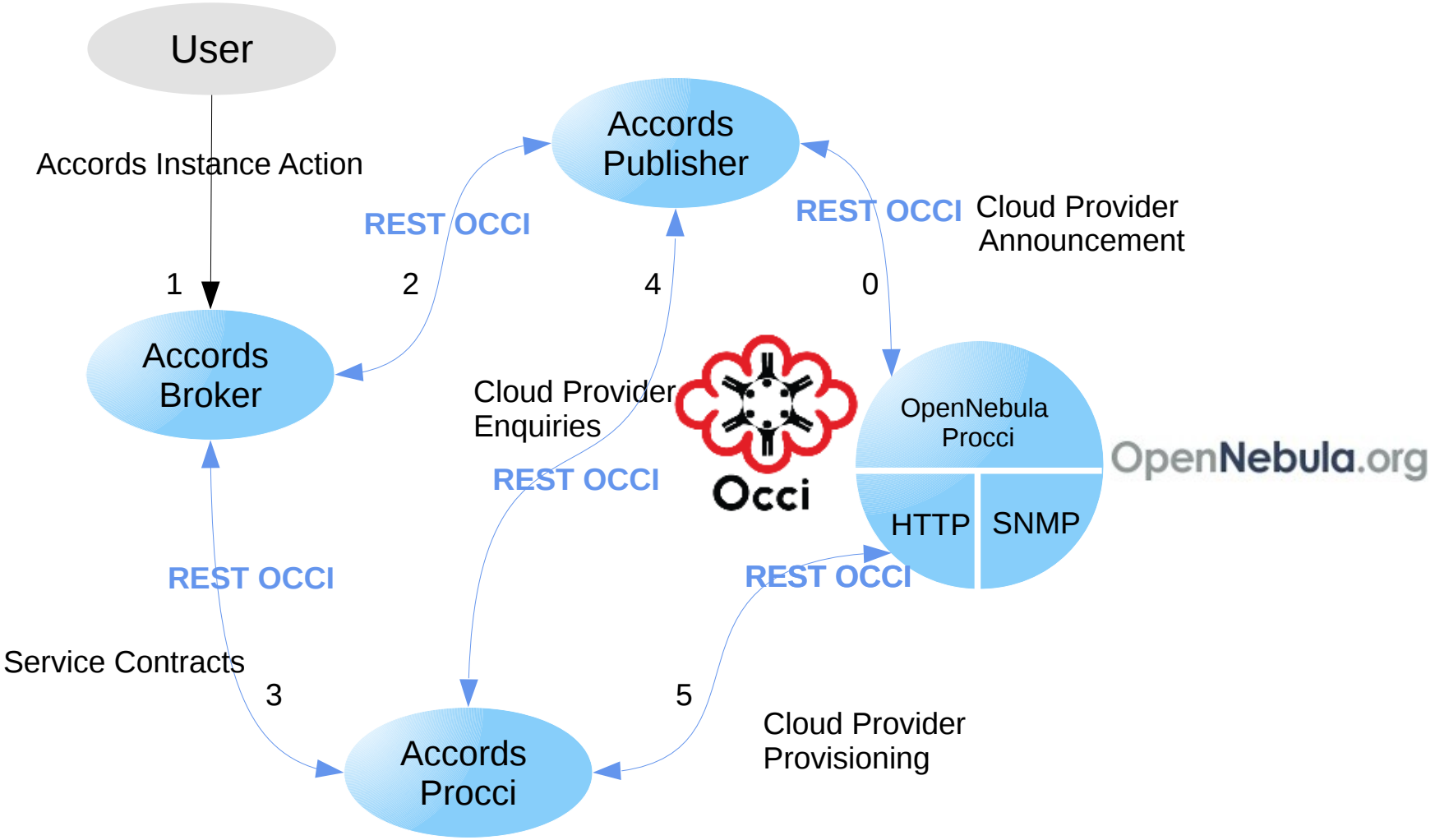
DESCRIPTION MODEL
Virtual Instance View



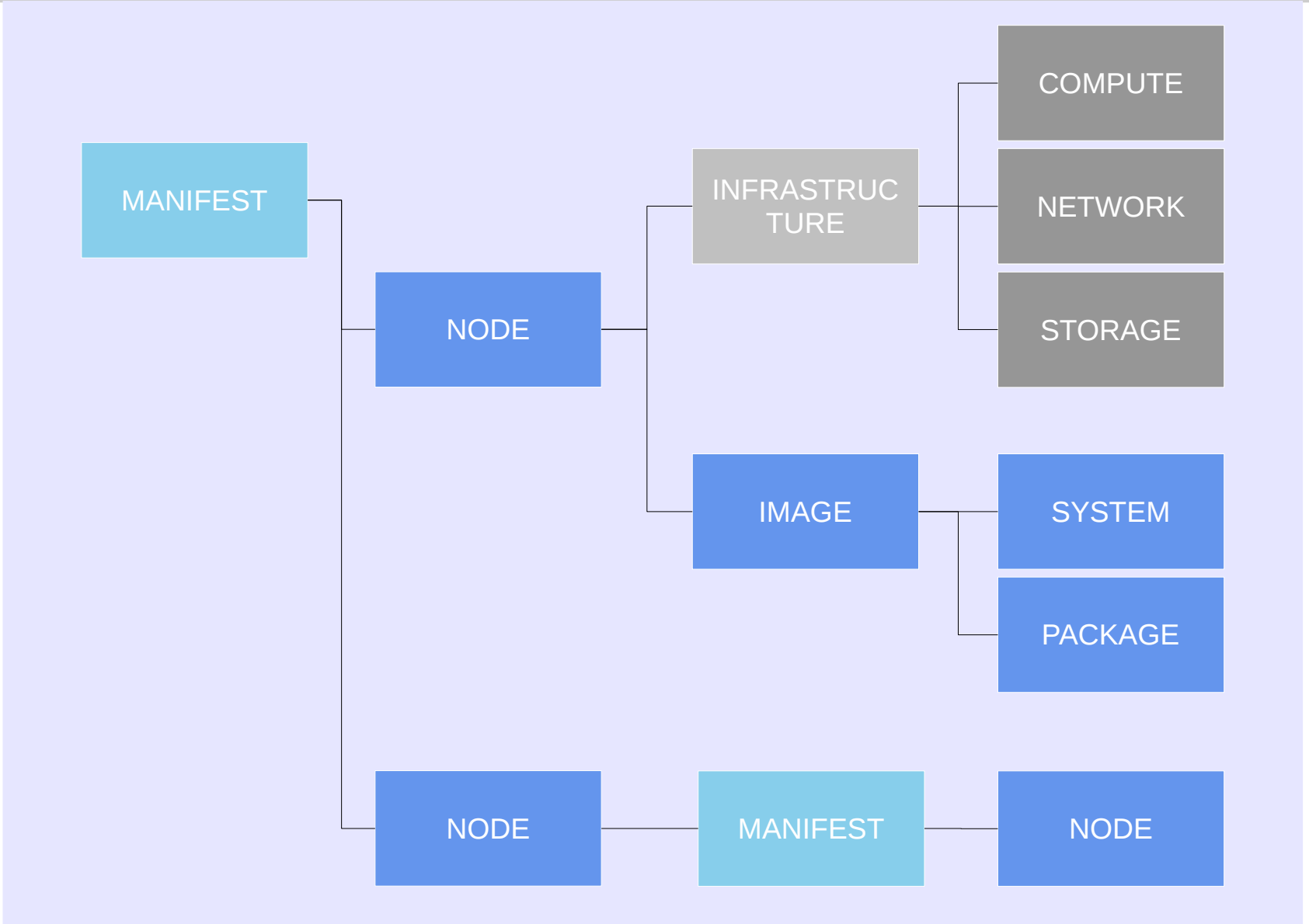
ACCORDS
OpenStack Nova Provisioning



ACCORDS
OpenNebula Provisioning



CORDS Version 2



KEY COMPONENTS

- *CompatibleOne provides an open source cloudware* allowing creation, deployment and management of interoperable private, public and hybrid cloud platforms*
- CORDS CompatibleOne Resource Description Schema
- ACCORDS Advanced Capabilities for CompatibleOne Resources Distribution Services
- EZVM Virtual Machine Interoperability
- PaaS4DEV Runtime OSGI
- UNIDATA Data Interoperability

** cloud computing middleware*

OPEN CLOUD

Cloud Expo West Demos

- Customer specific SLA delivery
- Fully automated provisioning
- Auto scalability
- Commercial provisioning
- Energy efficiency

- Enablement of **services arbitration** and multi-tenancy in a context of stringent customer requirement.
- Mnagement of **selective placement** on a multi-cloud environment and resource **aggregation across different providers**.
- Leverage of **load-balancing mechanisms** to automatically adjust its resource provisioning to changes in workload.
- Organization of service delivery across heterogeneous commercially available cloud technologies starting with **OpenStack, Amazon and Azure**.
- Live **energy monitoring** of resources provisioned by CompatibleOne and shows how to support energy aware and energy efficient cloud components.

Let's Work **Together!**

Promoting freedom in the cloud

http://compatibleone.org/

- **Contribute**
- **Share**
- **Spread the word**

OW2 Open Source Cloudware Initiative

Useful Resources

- CompatibleOne web
  - www.compatibleone.org
- For the latest components version
  - http://gitorious.ow2.org/ow2-compatibleone/accords-platform?page=1
- For packages ready to install
  - https://build.opensuse.org/package/show?package=accords&project=Virtualization%3ACloud%3ACompatibleOne
- Developers Mailing list
- compatible-dev_contrib@ow2.org
- In Progress
  - CompatibleOne platform to test your manifests
  - Openstack and Opennebula to connect to your CompatibleOne platform

FOR OPEN CLOUDS, CHOOSE

CompatibleOne