

# Future Internet Assembly

Collaboration Meeting for FP6 & FP7 Projects

Brussels, 10 & 11 June 2009

## OpenNebula/RESERVOIR to Support the FIRE European Experimental Facility

Ruben S.Montero & Ignacio M. Llorente

[dsa-research.org](http://dsa-research.org)

Distributed Systems Architecture Research Group  
Universidad Complutense de Madrid



# Objectives

*The OpenNebula/RESERVOIR to Support the FIRE European Experimental Facility*

- IaaS Clouds as a suitable **platform for experimentation and testing** of new Internet service paradigms in large-scale environments.
- IaaS Clouds to **interconnect existing and new testbeds** for emerging or future Internet technologies.
- **OpenNebula/RESERVOIR a ready-to-use** technology to build IaaS Clouds

# Cloud Computing in a Nutshell

The OpenNebula/RESERVOIR to Support the FIRE European Experimental Facility

## What

## Who

### Software as a Service

On-demand access to any application

### End-user

(does not care about hw or sw)



facebook

### Platform as a Service

Platform for building and delivering web applications

### Developer

(no managing of the underlying hw & sw layers)



Windows Azure

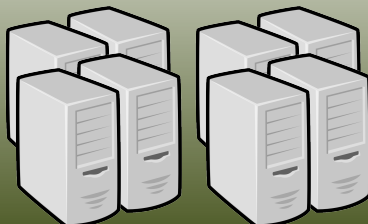
force.com  
platform as a service

### Infrastructure as a Service

Delivery of a *raw* computer infrastructure

### System Administrator

(complete management of the computer infrastructure)



Physical Infrastructure



# The IaaS Clouds: A Four-Point Checklist

*The OpenNebula/RESERVOIR to Support the FIRE European Experimental Facility*

- **Simple Web Interface**
- **Raw *Infrastructure* Resources**
  - Total control of the resources
  - Capacity leased in the form of Vms
  - Complete Service-HW decoupling
- **Pay-as-you-go (On-demand access)**
  - A single user can not get all the resources
  - Multi-tenancy
- **Elastic & “infinite” Capacity**

# Service Deployment in the Cloud

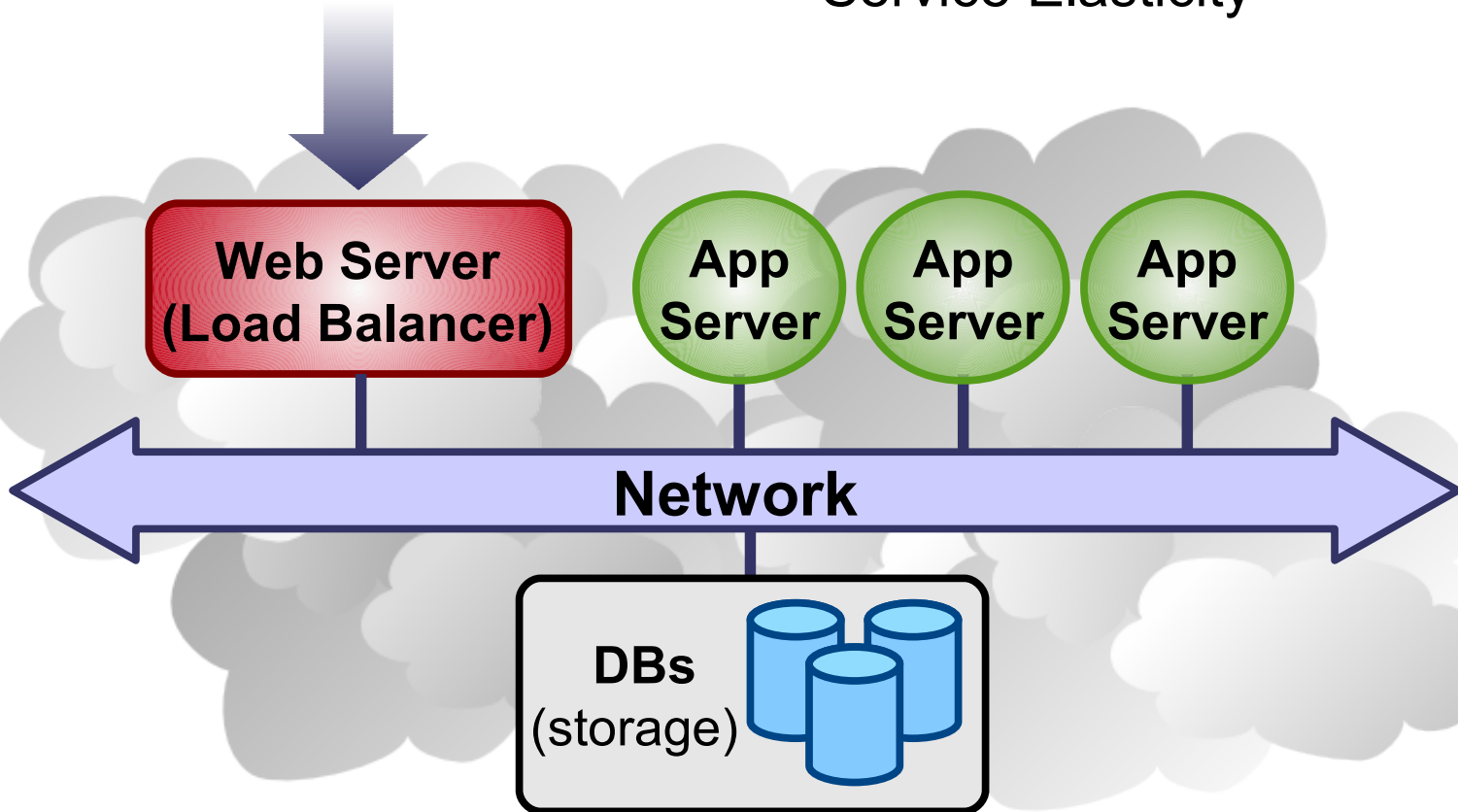
*The OpenNebula/RESERVOIR to Support the FIRE European Experimental Facility*



**Service  
End-Users**

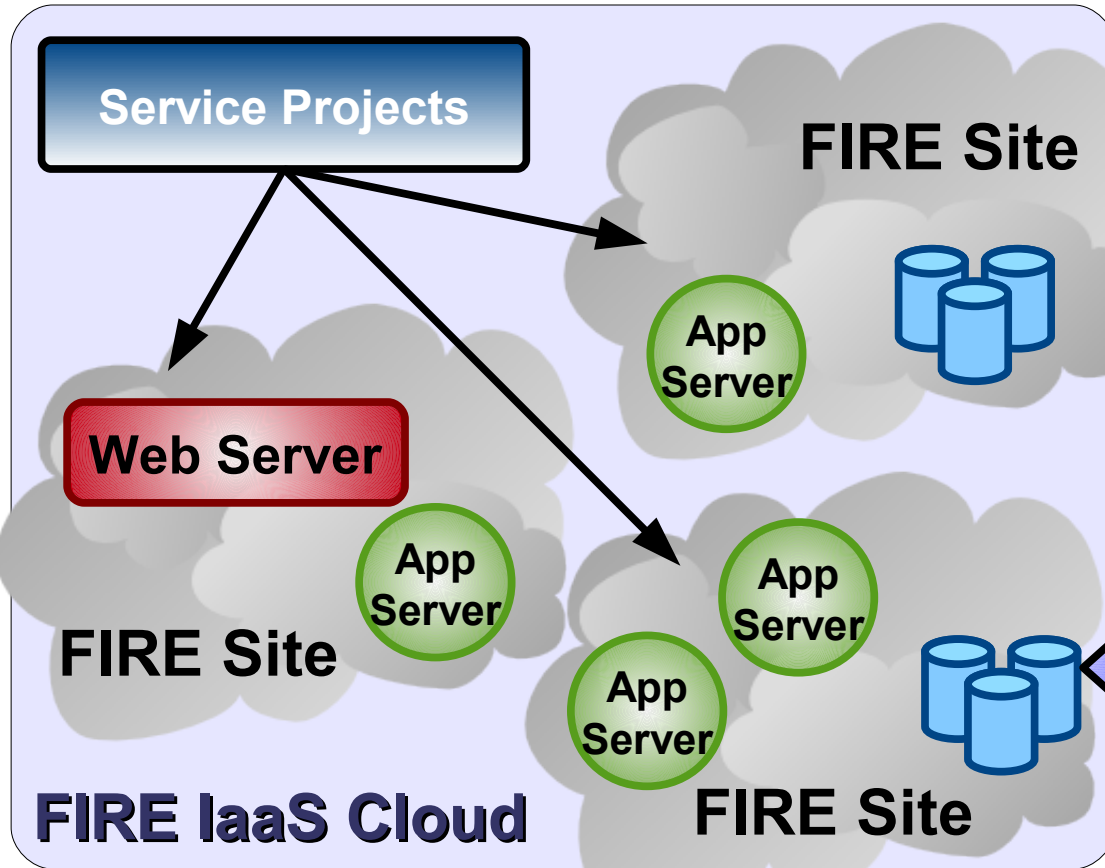
## Total control of service layout

- Software Stack
- Type & Number of components
- Service Elasticity



# A Cloud for FIRE

*The OpenNebula/RESERVOIR to Support the FIRE European Experimental Facility*



- Large-Scale
- Total customization
- Novel scenarios
- Service agnostic
- R&D Service Platform
- Further Federated



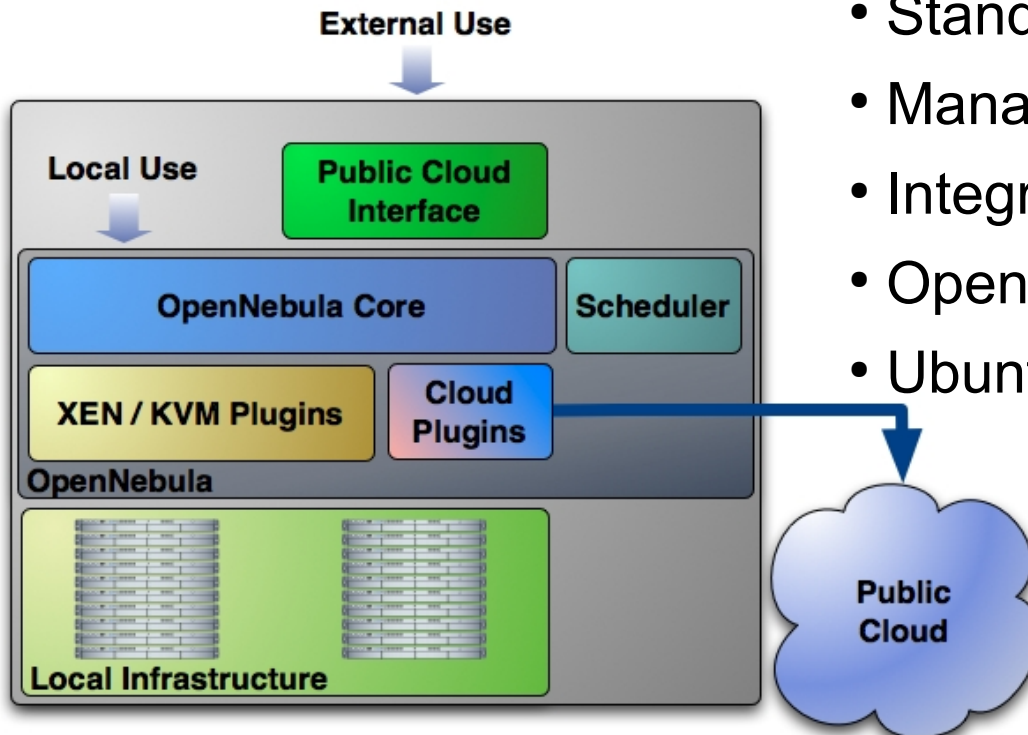


# Build your own with OpenNebula/RESERVOIR

The OpenNebula/RESERVOIR to Support the FIRE European Experimental Facility

## OpenNebula/RESERVOIR

- Flexible & Open Design
  - Third-party Components
  - Easily adapted & extended
  - Integrates Virtualization, Storage & Network technologies



- Standard commitment (OCCI)
- Management of *Virtual Services*
- Integrated with other clouds
- Open Source – Apache2
- Ubuntu 9.04 (server)

- The **laaS** model is a **flexible resource provisioning model** for the execution of virtualized services
- **Federation of clouds** as *infrastructure mechanism* to **interconnect testbeds** and easily run services across sites
- **OpenNebula and RESERVOIR** technology **available for download** to build laaS clouds



More info, downloads, mailing lists at  
[www.OpenNebula.org](http://www.OpenNebula.org)

OpenNebula is partially funded by the “RESERVOIR– Resources and Services Virtualization without Barriers” project  
EU grant agreement 215605



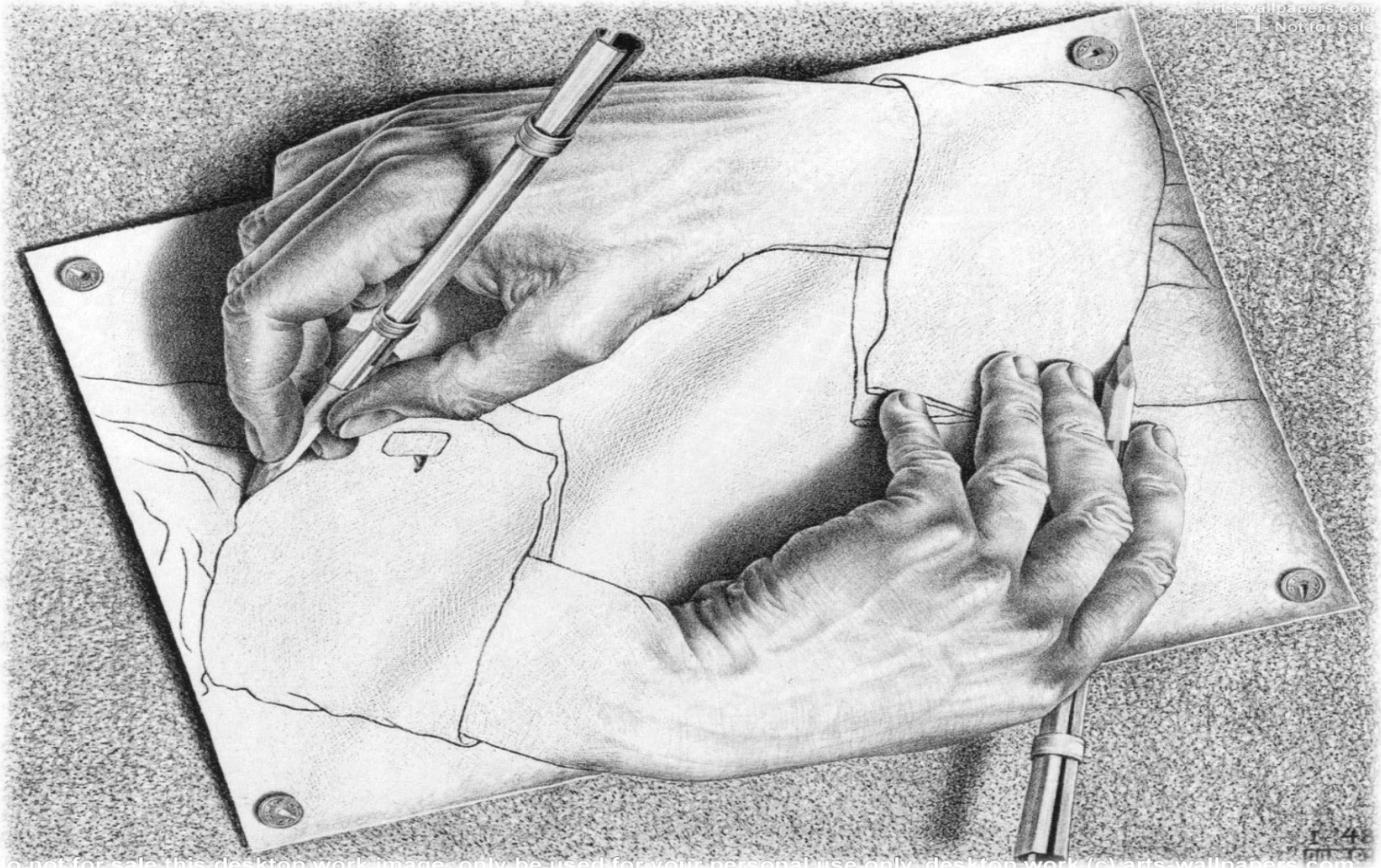
[www.reservoir-fp7.eu/](http://www.reservoir-fp7.eu/)

### The OpenNebula Team

---

- Ignacio M. Llorente ([llorente@dacya.ucm.es](mailto:llorente@dacya.ucm.es))
- Ruben S. Montero ([rubensm@dacya.ucm.es](mailto:rubensm@dacya.ucm.es))
- Rafel Moreno ([rmoreno@dacya.ucm.es](mailto:rmoreno@dacya.ucm.es))
- Tino Vazquez ([tinova@fdi.ucm.es](mailto:tinova@fdi.ucm.es))
- Javier Fontan ([jfontan@fdi.ucm.es](mailto:jfontan@fdi.ucm.es))

# THANK YOU FOR YOUR ATTENTION



## QUESTIONS?