http://www.consorzio-cometa.it/s-sicilia/

http://s-sicilia.unime.it

# Enabling business applications over a Grid infrastructure

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# Outline

- Introduction
- Background
- The S-Sicilia Project
- Scenarios
- Results
- Conclusion and future work

# Introduction

- **The problem:**
  - Enabling the Grid paradigm for commercial solution
- **Our answer:**
  - The S-Sicilia Project aims to setup a Grid-based business infrastructure with guaranteed QoS over gLite

# Background

**The business element adds complexity to the Grid approach:**

- Distributed data management
- Service composition
- Security
- Privacy
- SLA management
- Accounting and billing
- Business models
- Trust
- Risk assessment

# Background

## Issues we focused:

- **Service composition:**
  *Composition of services across multiple domains*
  *Web services and SOA*

- **SLA management:**
  *Regulation of B2B and B2C interactions through a management system that deals with contracts*
  *SLA, services design,QoS parameters definition*

- **Accounting and billing**
  *Provided QoS for completed services have to be taken into account and not raw machine resource consumption*
  *New models and frameworks*

# The S-Sicilia Project

S-Sicilia is a 2-year collaboration between the **Cometa Consortium** and **ORACLE**

## The designed and implemented system:

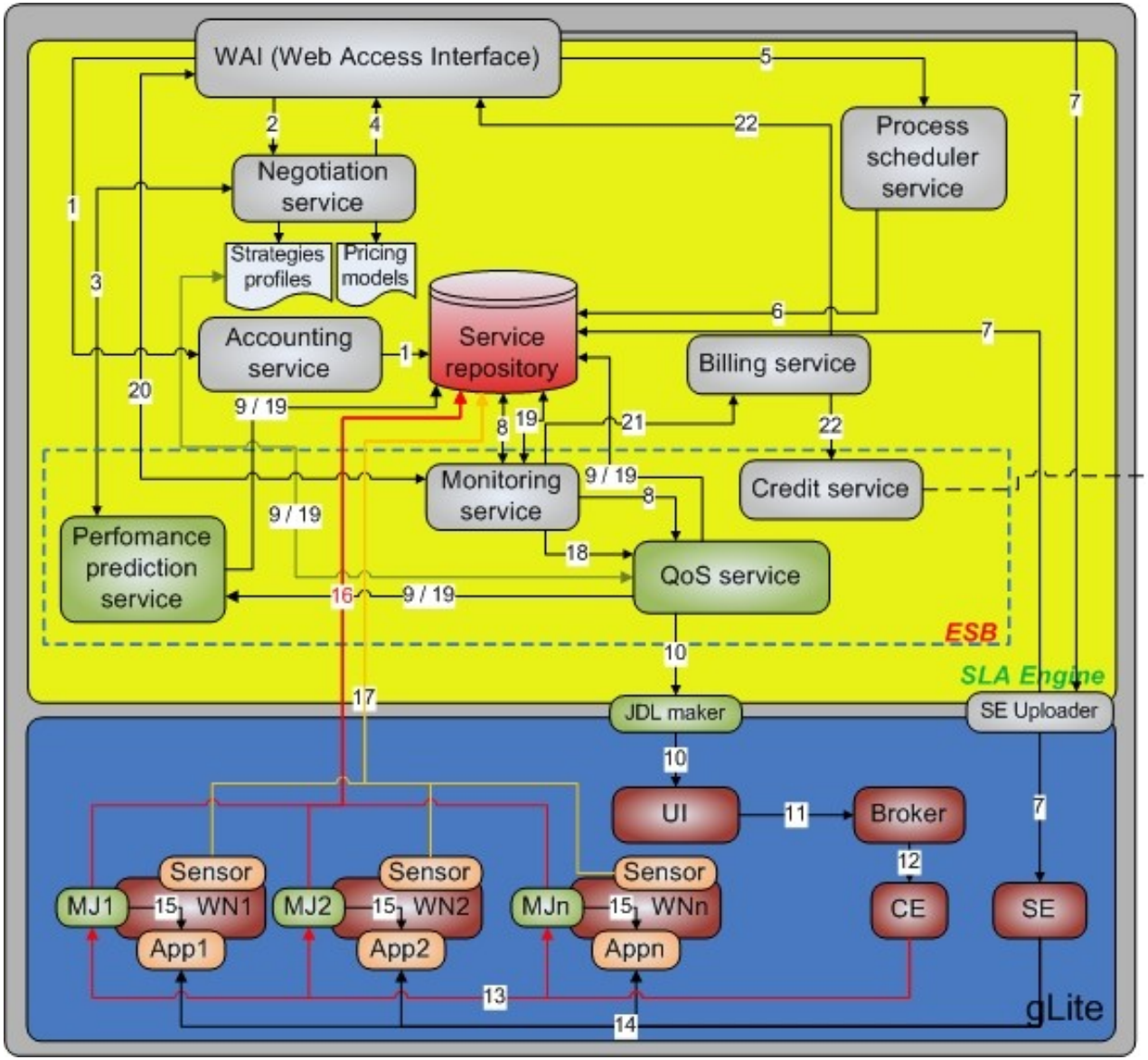
- Is based on **gLite Grid** infrastructure which provides no QoS guarantees
- Does not pretend to address all aspects related to Business Grid but be a sort of **benchmark**
- Aims to create **real business services** for SME companies with guaranteed quality
- Creates a **business processes platform** over a Grid infrastructure
- Provides the ability to **scale with service demand**

# The S-Sicilia Project

**Main features:**

- Services are defined and managed through SLAs.
- We used WSLA schema
- Contracts are monitored and due actions are taken such as service re-configuration, service re-location and resources re-allocation
- Customers are billed not for raw resources but for services and QoS provided. Contracts are specified in business terms
- The system has been designed to do not rely on a particular middleware

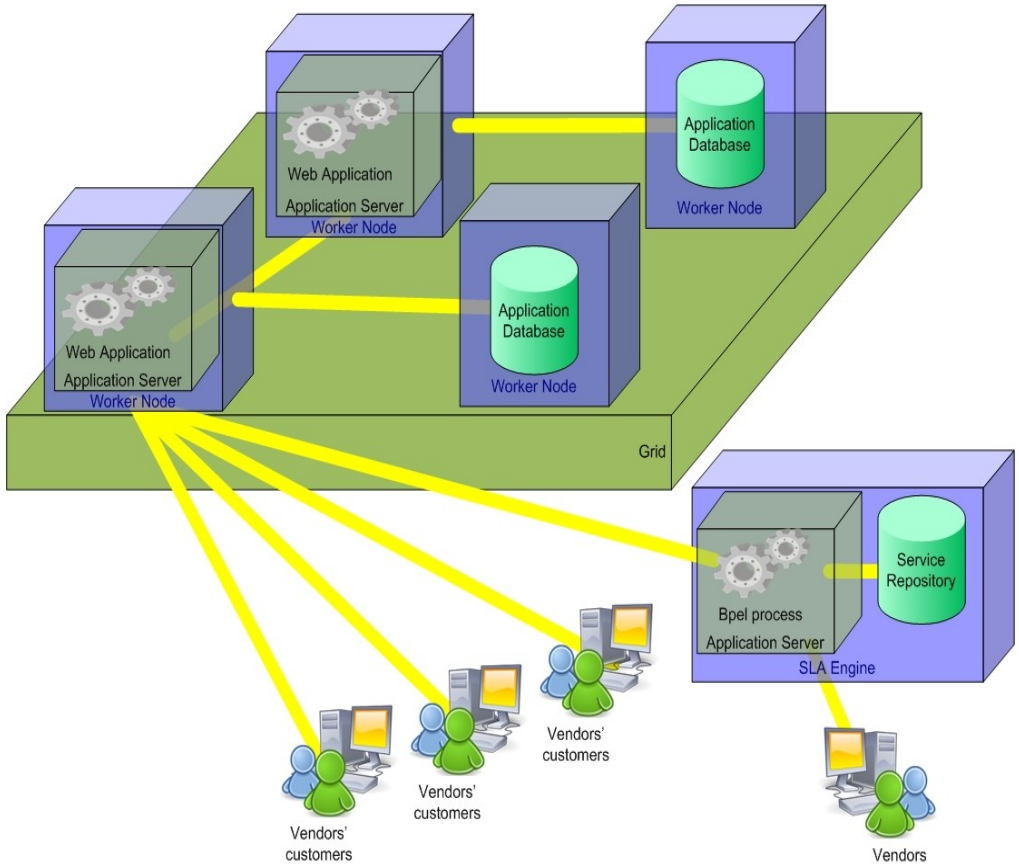
# System Architecture



# Scenarios

- **Web applications hosting**
  - Hosting solution for web applications:
    - e-commerce
    - CMS
    - web-site builders
    - ...
  - Test with the ORACLE e-commerce application SOADemo
- **Virtual office**
  - Virtualization solution for
    - Legacy applications
    - Productivity software
    - Applications with specific needs, such as OS

# Web Hosting Scenario




- Vendors buy a Web hosting service setting up an SLA
- Vendors send their application
- Applications are setup automatically
- Vendors'customers access vendor website
- SLAengine monitors vendors' application and makes necessary adjustments according to SLA agreed

# Web Hosting Scenario

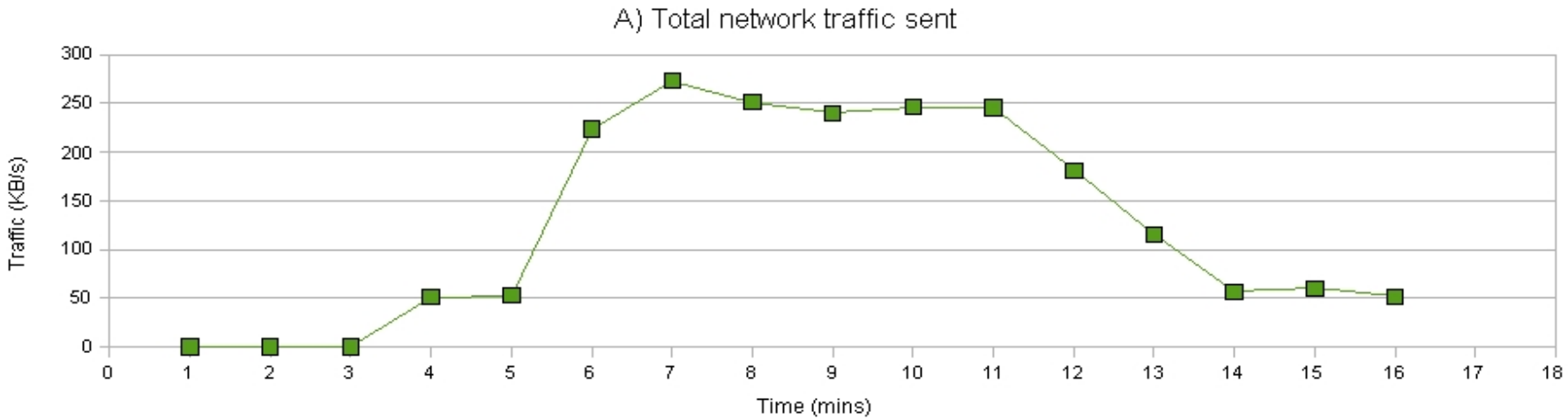
**Test to assess basic functionality of the system:**

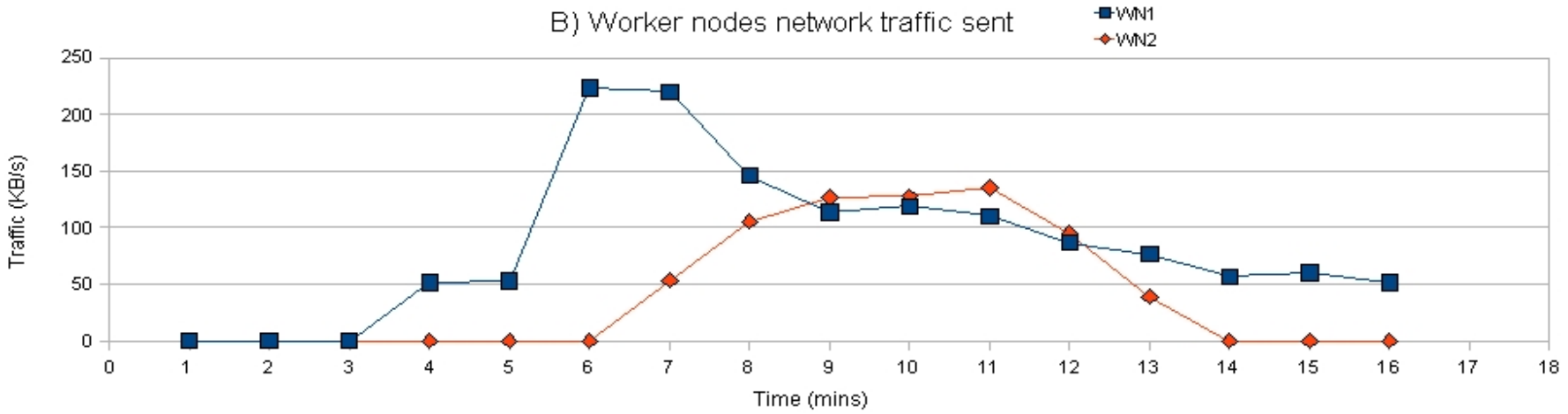
- Vendor's requirement: 300 transactions per second
- Worker node threshold: 150 Kb/sec

**Phases:**

- **First phase:** 10 concurrent users (7 operations each)
  - WN1 is able to take all the load
- **Second phase:** 40 concurrent users (7 operations each)
  - WN2 share the load with WN1 (SLA has right to more resources)
- **Third phase:** 10 concurrent users (7 operations each)
  - WN2 is no more necessary

# Results

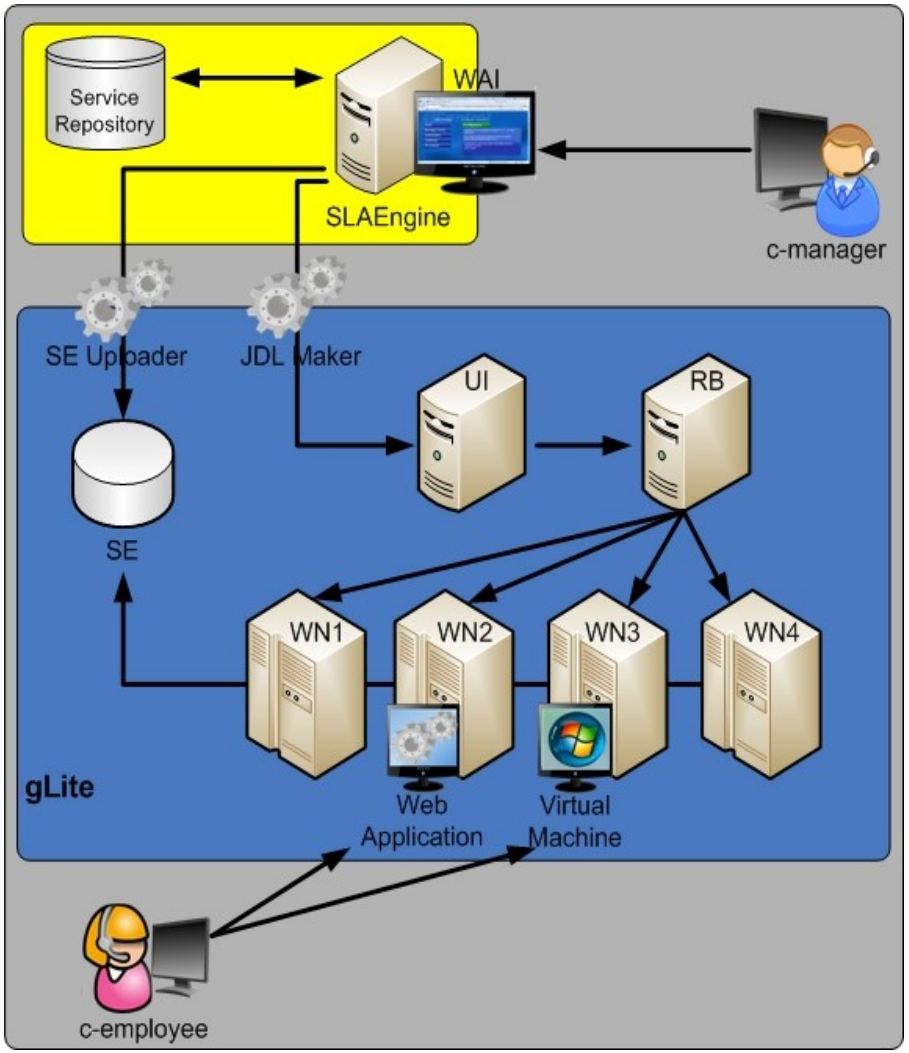



- **First phase:** from start to minute 5
- **Second phase:** from minute 5 to minute 11
- **Third phase:** from minute 11 to end

# Virtualization Scenario

- Enterprise buys a Virtualization service setting up an SLA based on different classes of services:
  - Gold (one user per VM)
  - Silver (three users per VM)
  - Bronze (five users per VM).
- Enterprise downloads VM image, installs necessary SW and uploads it back to the system
- Web front-end and VM are setup automatically
- Enterprise's employees access VMs
- SLAengine monitors Enterprise's Vms number of connections and makes necessary adjustments according to SLA agreed



# Identified problems

- **High submission delay**
- **Incomplete, slow and heavy monitoring**
- **Submission on specific Worker Node not possible**

**Our system can inspire a QoS oriented RB, because:**

- it is service based, not job based;
- it is able to manage the QoS through SLA basing it upon service results and not raw resources;
- it looks upon the condition of the single WN for the service activation;
- it allows dynamic resources reallocation based on the actual load;
- it is able to transparently manage virtualized services as shown previously

# Conclusions and future work

- The system behaves correctly and delivers QoS services
- Demonstrated the flexibility of the system with different scenarios
- Moving towards the Cloud model
- Obviously more tests are needed with both scenarios
- Adoption of WS-Agreement in place of WSLA is currently under study

# Published work


- C. Ragusa, F. Longo, A. Puliafito, Experiencing with the Cloud over gLite. To appear on ICSE-Cloud 2009: International Conference on Software Engineering - Cloud. Vancouver May 2009.
- C. Ragusa, F. Longo, A. Puliafito, On the Assessment of the S-Sicilia Infrastructure: a Grid-based Business System. In Proceedings of GECON 2008: 5th International Workshop on Grid Economics & Business Models. J. Altmann, D. Neumann, and T. Fahringer (Eds.): LNCS 5206, pp. 113–124, 2008. Springer-Verlag Berlin Heidelberg 2008.
- C. Ragusa, S. Arinisi, F. Longo, A. Puliafito, A Grid-based infrastructure for business applications. Published on Grid Open Days at the University of Palermo , 6-7 December 2007.