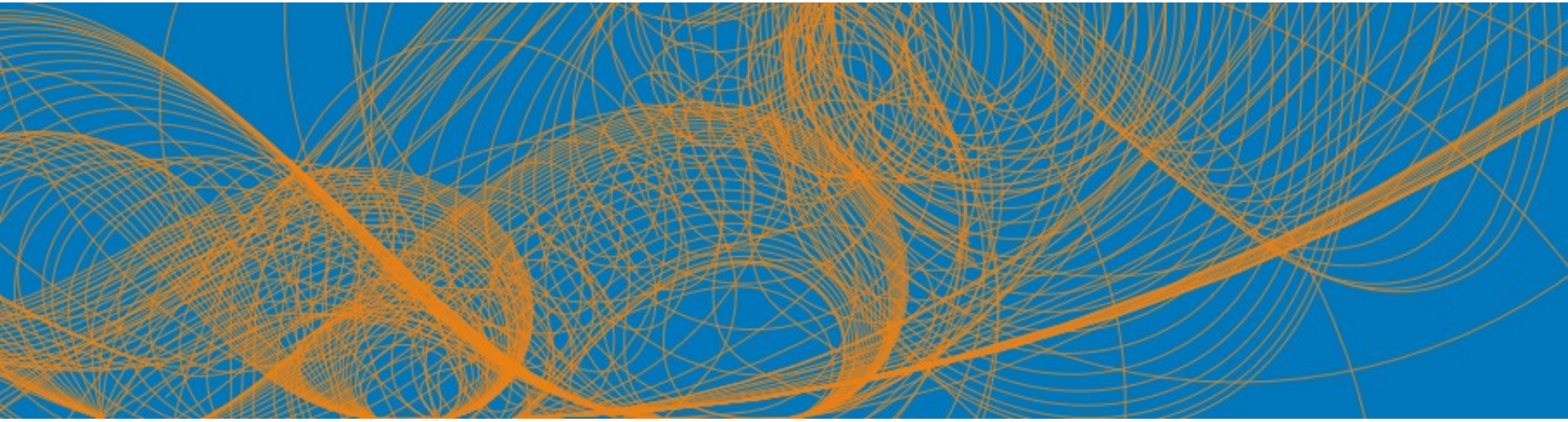


A&B in SmartLM. CESGA Experience

Carlos Mouriño
CESGA

CESGA

ESTABLISHED IN 1993 IN SANTIAGO DE COMPOSTELA (SPAIN)

CESGA

CESGA Fundation

To provide high performance computing and communication resources and services to the scientific community of Galicia and to the National Research Council (CSIC), as well as, to institutions and enterprises with R&D activity.

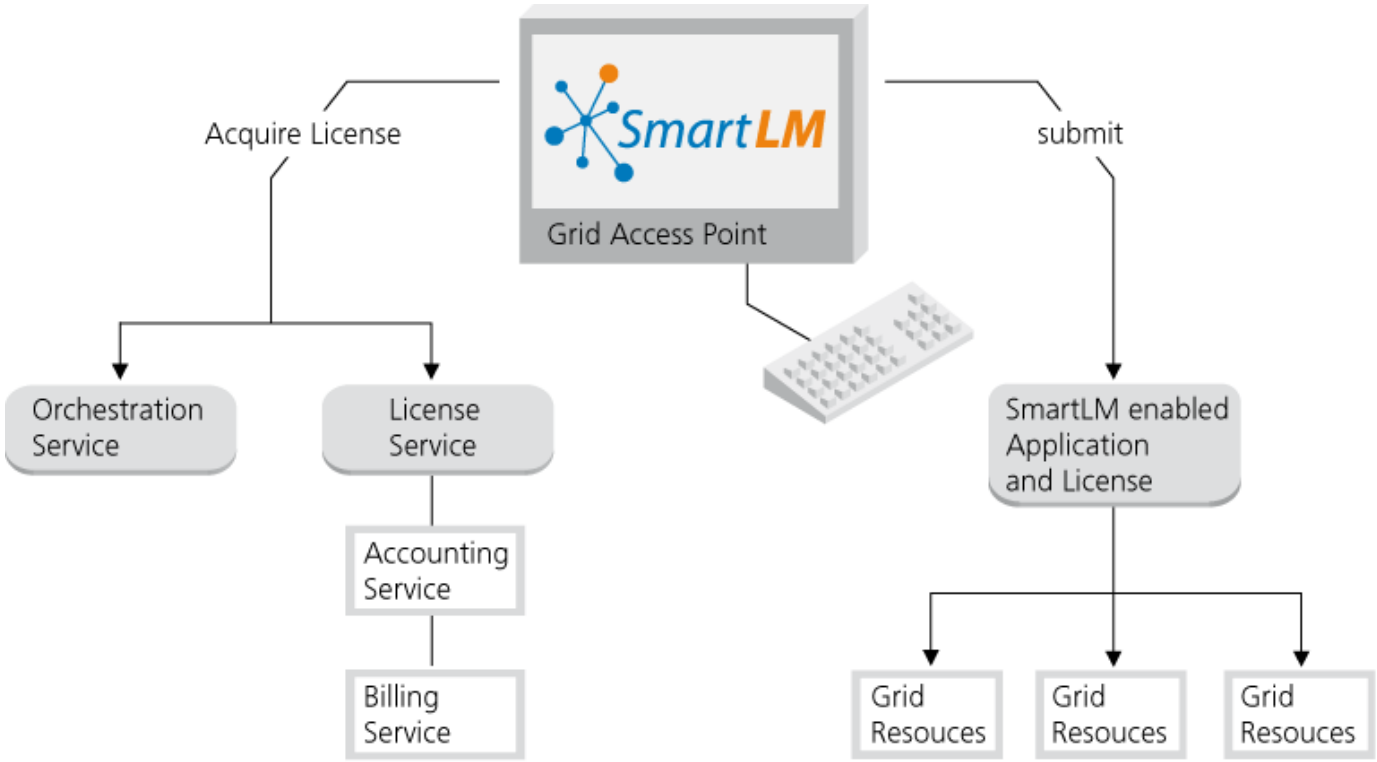
To promote the use of new information and communication technologies applied to research within the scientific community of Galicia.

To become a consolidated RTD Centre of Excellence serving as international scientific and technological reference in the field of computing science and numerical simulation.

SmartLM Overview

- Dynamic software licensing framework for multidomain environments
- Overcome the limitation of current license mechanism in SOA
- Based on standards: WS-Agreement
- **New business models** for ISVs, ASPs and Users
  - Suitable for distributed SOA and Grid environments
  - Satisfying the interest of the parties involved
- Support these business models in distributed environments
  - Secure, flexible, location independent license mechanism
  - Framework for Grid/SOA license management
- Different payment schemes (including **pay-per-use**)
- Aggregated Accounting & Billing for ISVs, ASPs and Users

Target Architecture



SmartLM´s distributed architecture

SmartLM

Requirements

- The SmartLM server should run on Virtual Machines
- At least in Vmware and Xen
- The server should be migrated on-the-fly
- The server must not be cloned
- The license token must not be cloned either

SmartLM

VSP Collaborative Topics

- Accounting & Billing for virtualized resources.
  - CPU Time is not a good measure unit
    - Different and heterogeneous hardware
    - Virtualization overhead (between 2 and 5% in HPC applications)
    - Several VMs sharing the same physical resource
  - Web Service Accounting is a research topic
  - Consolidated accounting and billing from many resources: network, CPU, Applications, etc.
  - Billing: Accounting + QoS + SLAs

- License Management in VEnvironment
  - License tokens can be cloned if VM is replicated
  - License servers can be cloned with VM
  - VM unique identifier? Hardware key (means, no migration)?

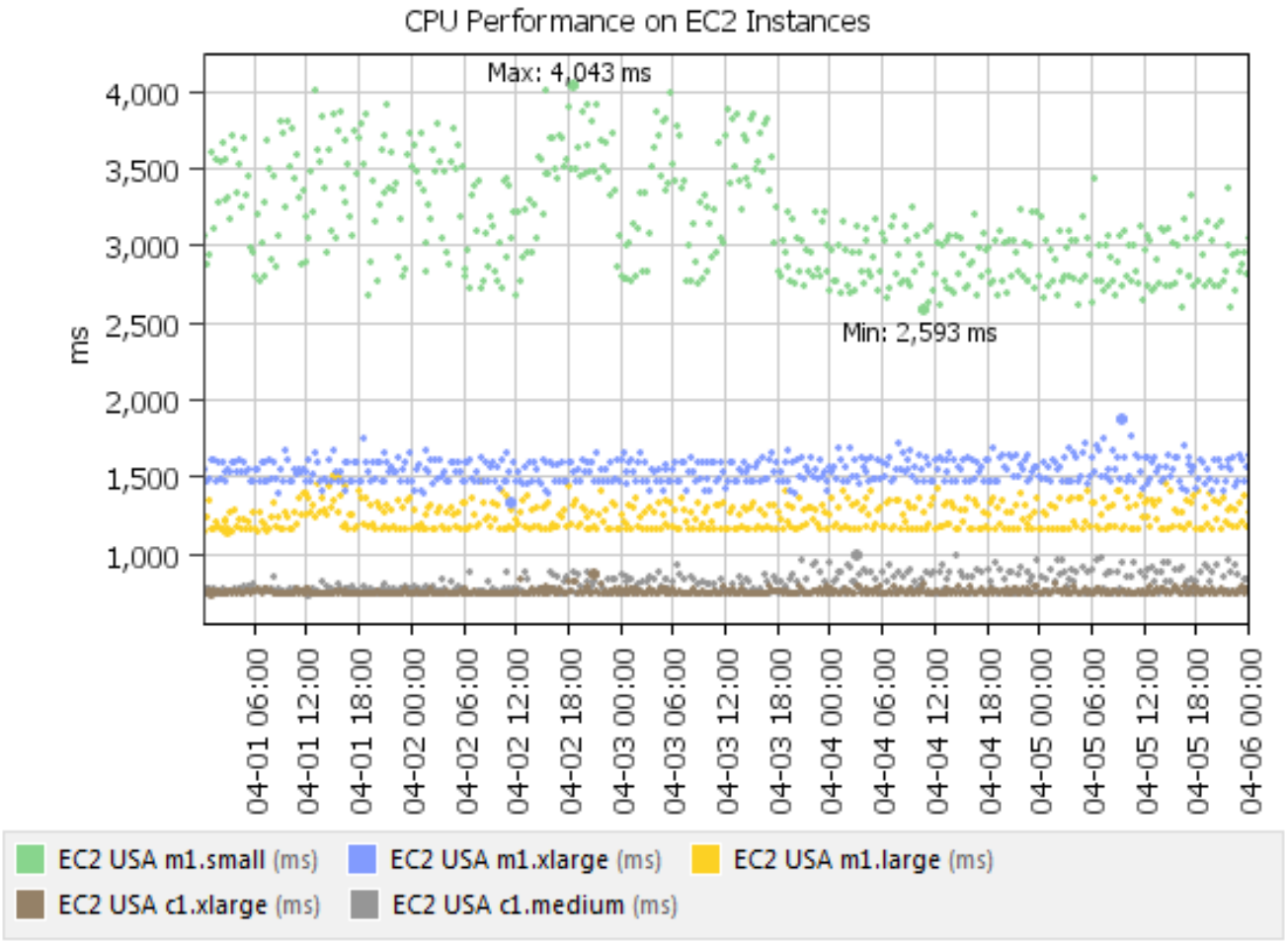
SmartLM

Application Software in Cloud Computing

- **Above the clouds: A Berkeley View of Could Computing**. *Michael Armburst et al*.,Technical Report Berkeley University, Feb 2009.
  - "*Application Software needs to both scale down rapidly as well scale up, which is a new requirement. Such software also needs a pay-for-use licensing model to match the needs of Cloud Computing*"
  - Top 10 Obstacles and Opportunities for Growth of Cloud Computing
    - 10th Obstacle: Software Licensing
    - 10th Opportunity: Pay-for-use licenses; Bulk use sales.

SmartLM

Cloud Performance



Hardware Independent pay-per-use

- Normalized CPU (EGEE)
- Microbenchmarks ⇨ not representative
- Features (number of iterations, calculus done, …) ⇨ Application dependent
- Hardware Counters
  - Memory
  - I/O
  - CPU: Operations (flops, ints), branches, load/store
  - Communications (MPI)

IW = Σ counters * α

being α a power consumption factor

- Not only Applications -> What about the the VM itself?
  - License should be taken into account during deploy process