



elasticLM:
A Novel Approach for Software
Licensing in Distributed
Computing Infrastructures

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- SmartLM Project
- Challenges
- Goals
- Architecture
- Technological Cornerstones
- Cloud Specific Extensions
- Next steps
- Conclusions

FP7 Project, 1st call, Software and Service Architectures and Infrastructures



11 Partners:

Atos Origin – Spain
Co-ordinator

Fraunhofer SCAI – Germany
Scientific Co-ordinator

FZ-Jülich – Germany
CINECA – Italy

The 451 Group – UK

INTES – Germany
ANSYS Germany – Germany
LMS International – Belgium

T-Systems – Germany
CESGA – Spain
Gridcore Aktiebolag - Sweden

Duration:

30 months, starting February 2008

Software licensing practices are limiting the acceleration of grid adoption.

(Grid Computing - The impact of Software Licensing applications, 451 Group, March 2005)

Current technology is not sufficiently flexible to support Grids or Clouds that include resources beyond the own administrative domain.

Even worse: Current business models restrict both parties to this technology or make the price for Grid or Cloud licenses unaffordable.

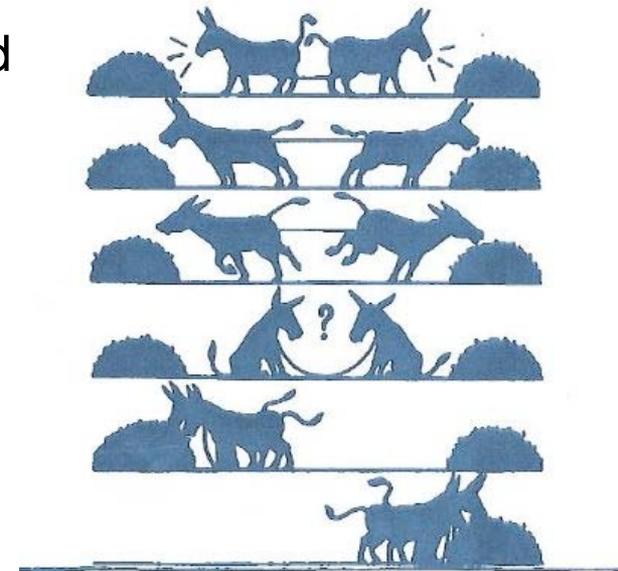
- **Technological**

- Current licensing systems focus on local (cluster) usage
- No technological support for, e.g.
 - use in distributed environments like Grids, Clouds, SOA
 - temporary transfer of licenses to an ASP
 - aggregation of licenses from different sources for a single application

- **Legal & business models**

- Current license models don't support most technically feasible methods of distributed license use
- Current business models of ISVs link increasing flexibility with increasing cost

- Develop new business models
 - Analyse existing business models
 - Analyse current vendor and user issues
 - Examine the impact of new license mechanisms
 - Determine new business models
 - Define and implement new service-oriented business models, e.g. pay per use, SaaS, use of remote resources for application execution
 - To reflect up to date technologies for both e-Science and commercial use in ASP environments
 - To create a Win-Win Situation for ISVs and users



- Overcome technical limitations
 - Support use of licensed applications across organisation boundaries.
 - Implement licensing technology that supports distributed use of licenses
 - Support for commercial ASP environments and e-Science Grids
 - Support for Clouds
 - Provide a generic and flexible licensing virtualisation technology.
 - Use open standards to create this licensing virtualisation framework.
 - Adapt a number of widely-used license-protected commercial applications to be executed under control of the new licensing mechanisms.

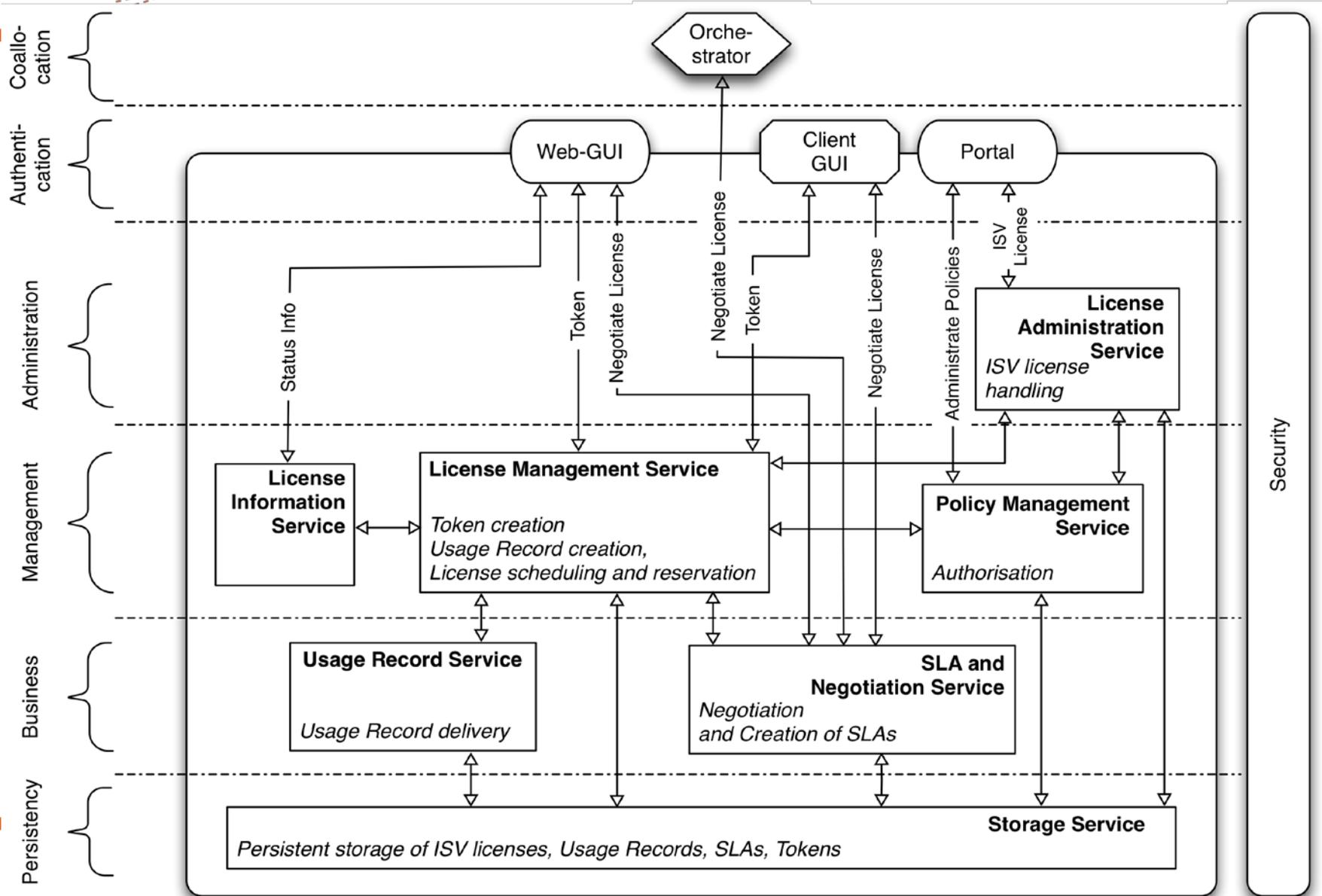
Goals (3)

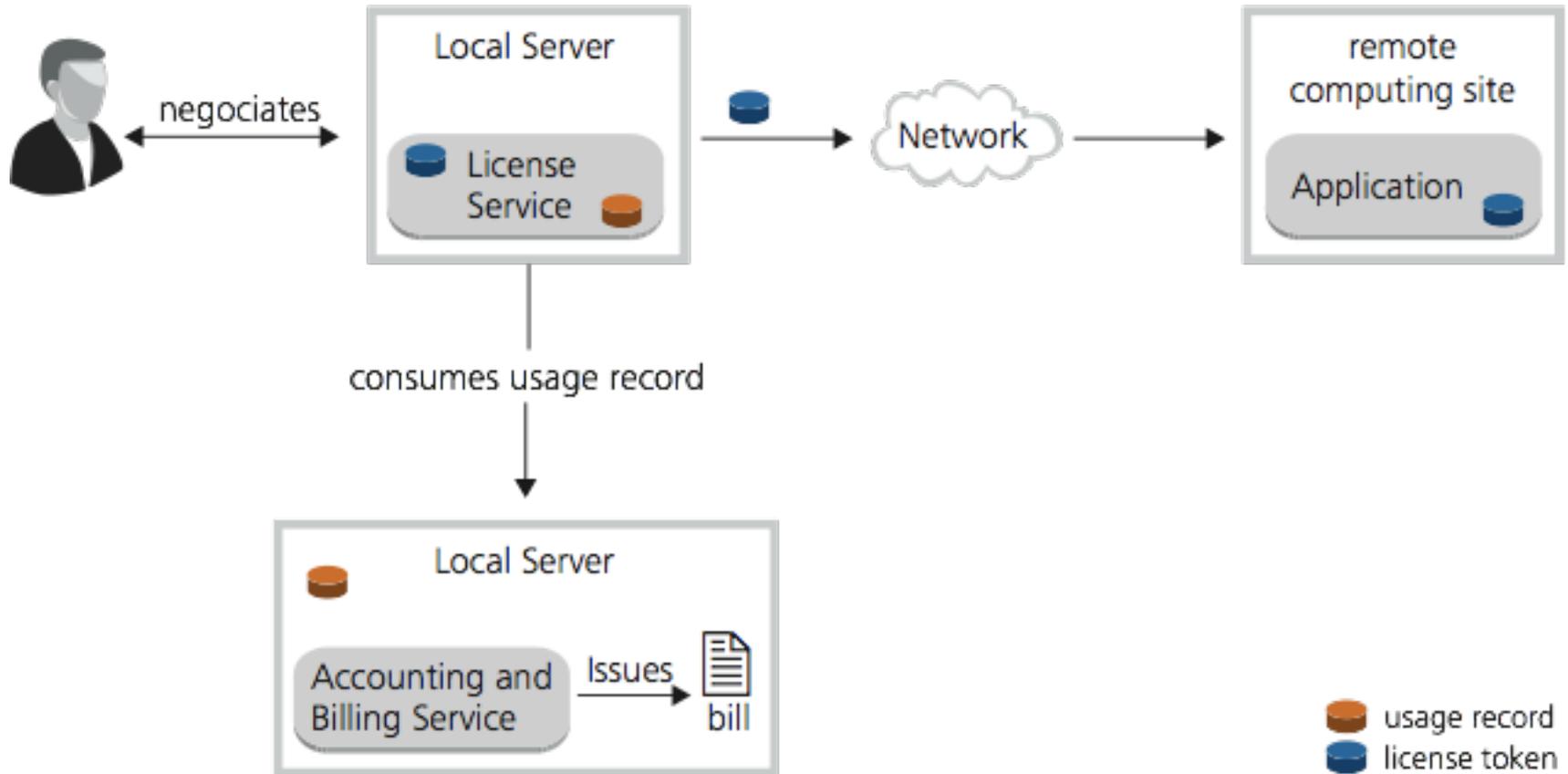
- Using and contributing to standards
 - for ease of integration in existing environments
 - to leverage interoperability
 - to allow third party extensions
- Standards used
 - ITU
 - X.509 Certificates
 - OASIS
 - XACML, WSRF, SAML, WS-Notification
 - W3C
 - WS-Security, xmldsig, xmlenc
 - OGF
 - WS-Agreement, JSDL, Usage Record, GLUE 2.0
 - and others





elasticLM Architecture

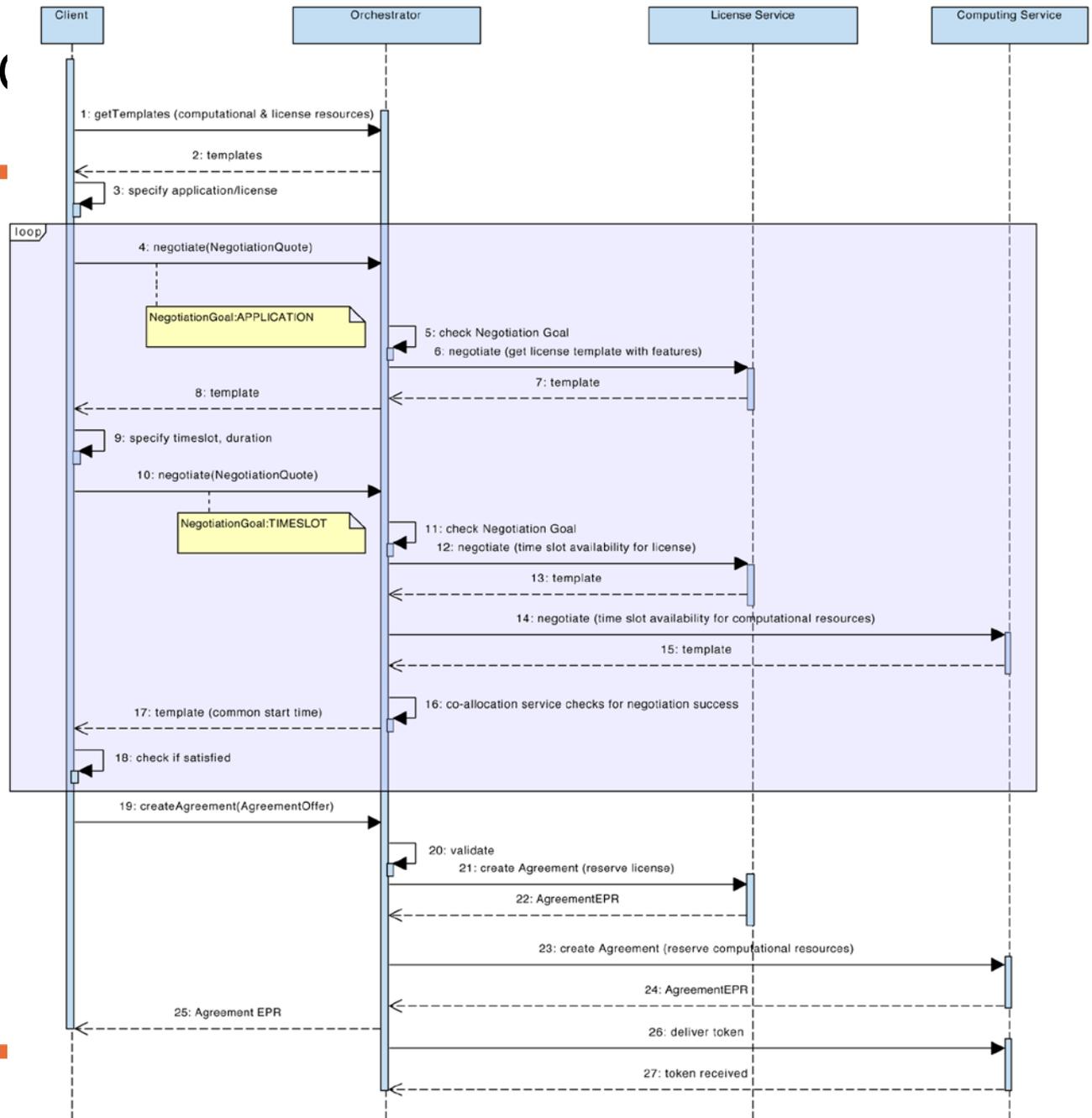




- Run license protected applications on (remote) Grid or Cloud resources using licenses from your local license pool
- ASP outsourcing
 - ASP forwarding large jobs to another ASP
 - Reuse of existing licenses
- Test licenses in virtualised environments
 - Provide licensing infrastructure for freelance software developers
- License brokering
- Aggregation of licenses
 - Use your own + Broker's or ASP's licenses
- Local use in (multi-)cluster environments without Grid or Cloud infrastructure
- Advance reservation of licenses, co-scheduling of licenses and other resources
- Extend/Reduce license terms when job is running (re-negotiation)
- Deploy license service in the Cloud

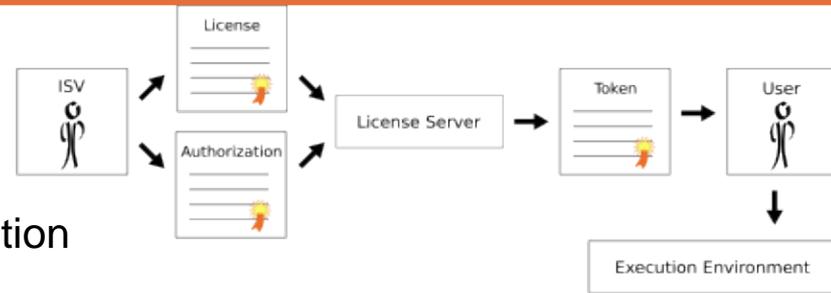
- Implemented as a set of Web-Services
- Flexible Authorisation of License Usage through policies
 - defined by the ISV as part of the license
 - defined by the local site
 - based on user attributes, e.g. from VOs or an IDP
- Integrated License Scheduler
 - Helps to optimise License usage
 - Support for advance reservation of licenses
- User specific pricing for license usage
 - price fixed before usage as part of a Service Level Agreement
- Orchestrator available for co-allocation of resources
- Central management of all elasticLM licenses

- **Successful user's license request results in a Service Level Agreement**
 - covers all terms of the license to be used
 - includes the (maximum) price for the license usage
 - links to a Service Level Agreement with the resource provider when using an orchestrator
- **Using WS-Agreement for SLA in elasticLM**
 - WSAG4J Framework
- **Supporting two ways for creating agreements**
 - Single-step
 - Negotiation
- **Modifications of WS-Agreement for multi-round negotiation**
 - compatible with WS-Agreement 1.0
 - extension of WS-Agreement states
 - additional operation for negotiation
- **Support for modification of existing agreements**
 - Re-negotiation
 - New agreement supersedes the previous one



- elasticLM comes with an Accounting & Billing System
- Persistent storage of usage data in a database
- Different views of the data for different groups
 - user, license manager, billing department, administrator, ...
- Extensible
 - integrate site-specific analysis or billing procedures
- Interface to determine a user-specific license usage cost when a user requests a license, based on
 - local policies
 - previous usage
- Support for budget control
- Usage information may include use of computational resources
 - allows single bill integrating all cost

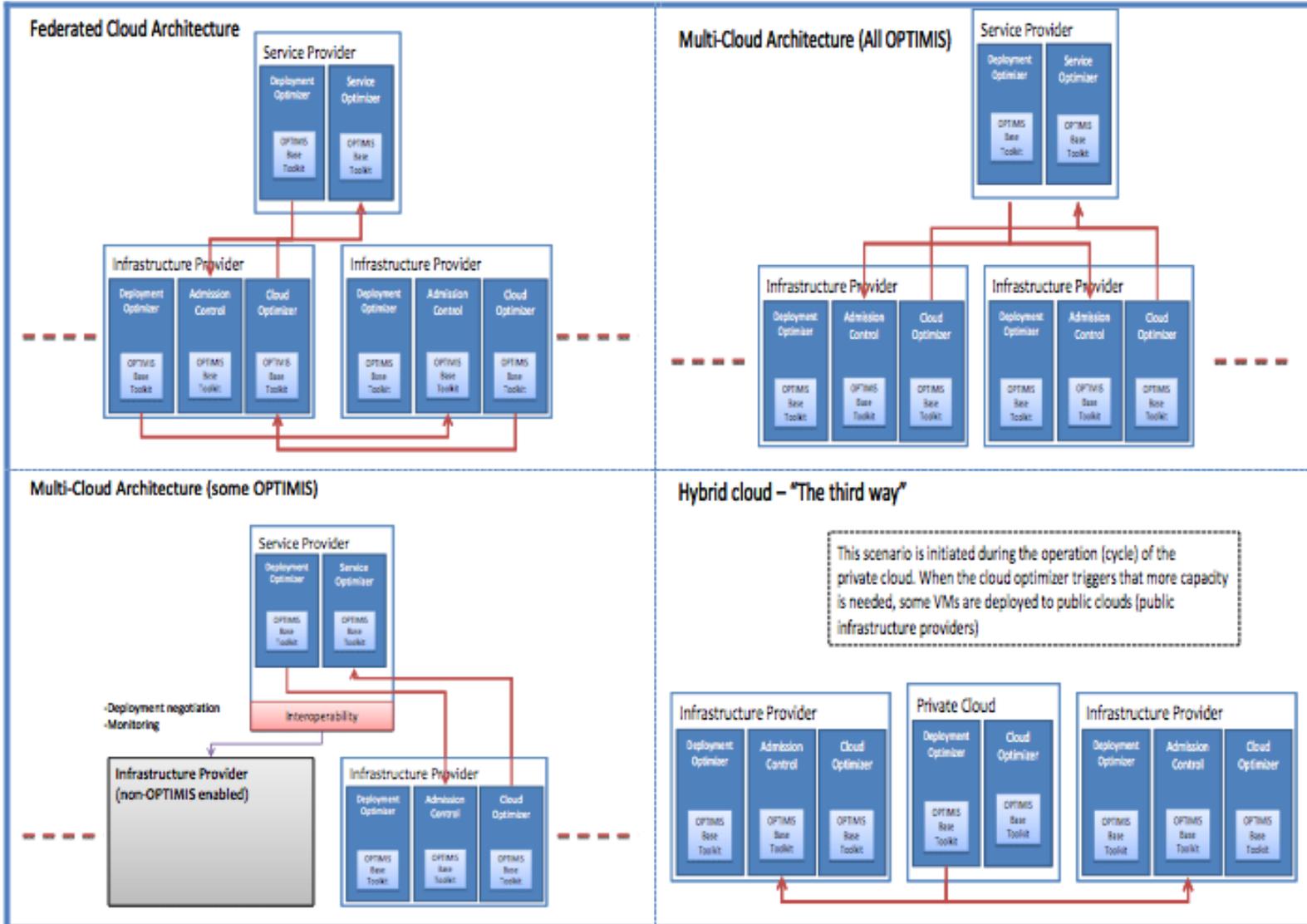
- Authenticity and privacy
 - Encryption and Signing
 - Using W3C XML Signature and XML Encryption
- Authentication
 - Actors in SmartLM are identified by X.509 certificates
- Authorisation
 - Policy driven approach
- Non-Repudiation
 - Requirement for a legally binding billing
- No certificate infrastructure
 - Local use: userid, passwd
 - Support for Shibboleth
 - Short Lived Credentials



New European Project
OPTIMIS started June 2010



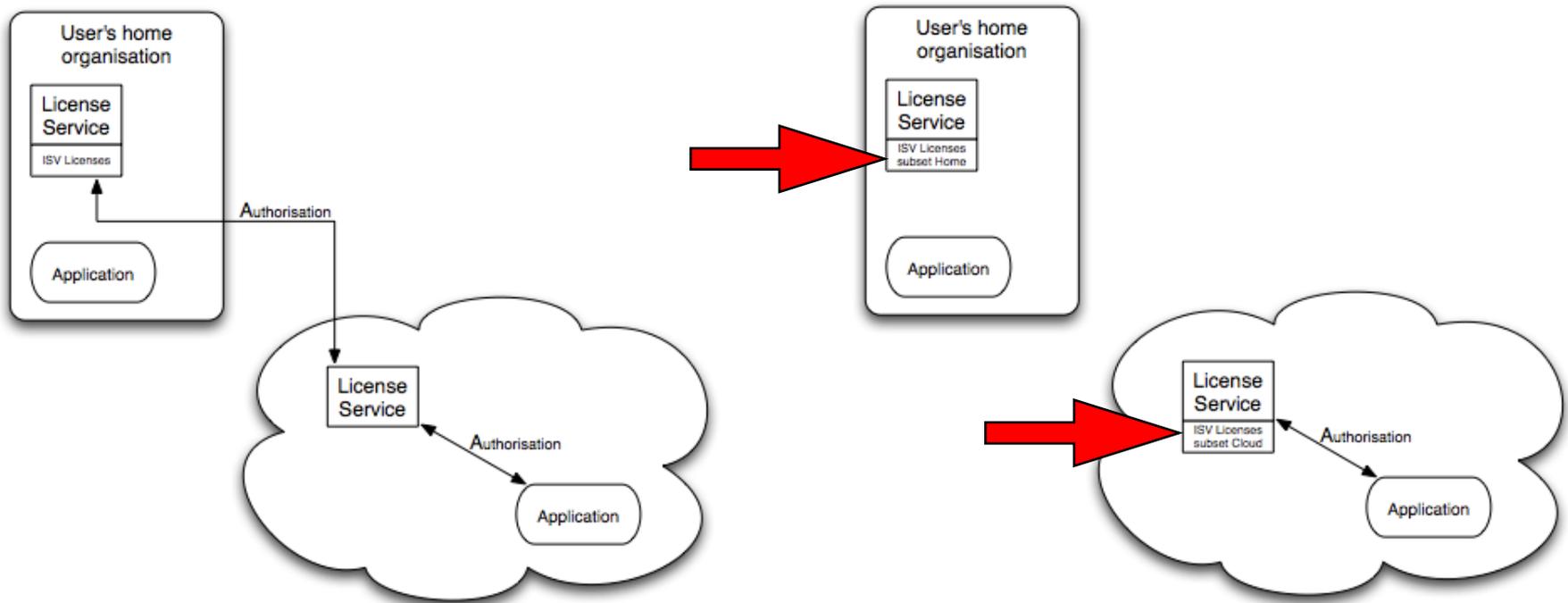
- Optimised Infrastructure Services
- Focus on Cloud Federation
- Hybrid Clouds consisting of private Clouds interacting with a rich ecosystem of public and other Cloud providers.
- OPTIMIS is aimed at enabling organizations to automatically externalize services and applications to trustworthy and auditable Cloud providers in the hybrid model.



Service providers in Clouds benefit from additional features of software license management:

- Trusted Entity
- Deployment of License Service in the Cloud
- Trusted Clock
- Additional Token security

License Server Deployment in the Cloud



Where subset Home \cap subset Cloud = ISV Licenses

- Transform SmartLM prototype into product *elasticLM* until end of 2010
- Finalising integration with SCAI applications, e.g. FEMzip, MpCCI
- Implementing the identified extensions for improved Cloud support
- Dissemination and marketing campaign starting fall 2010
- Co-operations with early adopters from ISVs starting Spring 2010
- First Release for productive use spring 2011

- *elasticLM* is about the **evolution** of current licensing mechanisms and models.
- *elasticLM* features can **fill in** current **gaps** in Grid and Cloud computing.
- *elasticLM* provides features and benefits that help software licensing **adapt** to current **IT trends** and **changing business needs**.
- *elasticLM* enables vendors offering **flexibility** and more **value** to users, and at the same time help them **increase revenue growth**.
- *elasticLM* features are **dynamic** and **secure**, and allow for a **100% accurate** and **trustworthy accounting** and **billing**.

More information

www.elasticlm.com

www.optimis-project.eu
