OCCIware Open Standards Challenges

Contribution on the
"Consultation on Cloud Computing Research Innovation Challenges"

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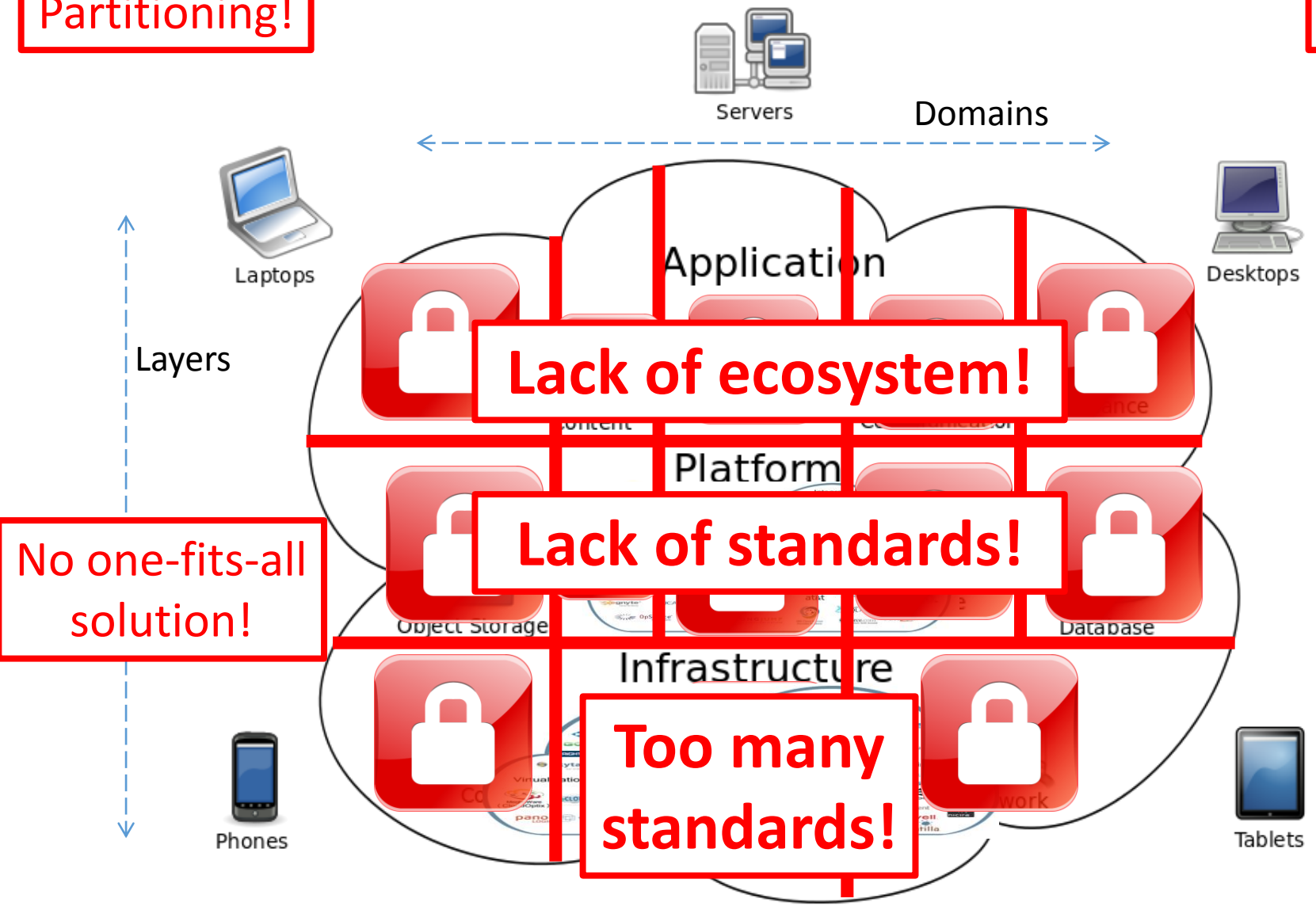
OCCIware Factsheet

- 72 man month, 5,6m€ budget
- 3 academics, 5 companies, 2 associations
- To lower Cloud Computing adoption costs and **break up barriers** between its various implementations, layers, domains
  - Especially Data Center, deployment, Big Data, Linked Data
- By bringing to the Open Cloud Computing Interface (**OCCI**) the power of **formal** languages and **model** driven engineering (MDE)

Cloud Computing – the problem

Partitioning!

Lock in!



Cloud Computing

OCCIware output

- A formal, model-driven platform to manage any Cloud resource
  - Formal model of OCCI (Open Cloud Computing Interface)
  - Eclipse tooling – OCCIware Studio
  - Models@runtime
  - Deploy@OCCIware
- 4 Use cases
  - Data Center as a Service / IaaS
  - Big Data / HPC
  - Linked Data
  - Deployment interoperability
- Open Source (OW2, Eclipse) and standardization (OGF)

Partners and Contributions

- **Inria** – formal model, **Scientific Coordinator**
- **Obeo** – modelers, tooling
- **IMT / TSP** – simulation, OCCI experience
- **ActiveEon** - HPC / Big Data, deployment (workflow)
- **Scalair** : Data Center, administration
- **Linagora** : deployment, monitoring
- **UJF** : deployment (dependancies, optimization)
- **Open Wide/Smile** : Linked Data core, **Project Coordinator**
- **OW2** : Open Source community

Challenges

- Standards and Openness
- Elasticity
- Hybrid cloud
- Extended Cloud (P2P, Fog, Edge)
- Data-Centric Clouds
- Cloud Management

Standards and Openness

- Theory of Cloud Computing
  - Various standards
    - OVF, DMTF, CIMI, OASIS CAMP, OGF OCCI, OASIS TOSCA
    - Each one covers only one part of cloud interoperability
    - Not supported by all cloud offers
  - Cloud computing is a collection of informal and ambiguous definitions
  - Lack in theory
    - To provide formal definition
    - Prove the foundation, semantic interoperability
    - Capture and specify characteristics
    - For IaaS, PaaS, SaaS .. And Everything aaS (XaaS)

Standard and Openness

- Further cloud standards
  - Open APIs and open implementations
  - To avoid vendor lock-in
  - More interoperability
  - Extended cloud to Fog/Edge
  - EU Open Source can compete US software and service providers

Elasticity

- Thresholds definition and prediction estimation
- Hybrid elasticity (VMs and Containers)
- optimal tradeoff between user requirement and providers interests
- Cost-effective and flexible Cloud resource allocation
- Including the Edge with predictive workload management
- Elasticity “à la carte”
  - One-size-fits-all solution
  - Elasticiy=Scaling+Automtion+Optimization

Hybrid Cloud

- Private, Public, but also Edge and P2P
- ProActivity in resource management
  - Predictive and Adaptive monitoring
- Optimal Things provisioning in Cloud/Fog
- Security, scalability, elasticity and continuous deployment
- Cloud migration (especially at PaaS level)
- Devops, continuous delivery

Data Centric Cloud

- Real-time big data processing
  - Cloud/Edge Computing
- Adaptive Cloud resource management
  - Resource allocation for big data applications
  - Big Data workload management
- Scalable, federated management of Heterogenous data and models
  - Open data access
- Data Analytic deployment decision making
- Unified view of data processing

Cloud Management

- Self management
  - Controllable SLA
- Monitoring
  - All levels and traversal (IaaS, PaaS, SaaS, XaaS)
- Distributed run-time support
- Virtual machine
  - collapsing the different virtualization layers
- Devops tools

Thank you

OCCIware project home page
http://occiware.org/