



Jet Stream

*Setting the stage to include Cloud Computing in our
Technology Vision*

Version 0.1.2 (working draft – please do not circulate)

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www.ow2.org



Agenda (and summary)

→ The Context

- Cloud computing is a complex model still in its infancy. Driven by IT commoditization and Internet-based IT usages it will have a long-term impact on the IT industry.

→ The Opportunity

- One of the fastest growing segment in the IT market, cloud computing requires openness for its development. The OW2 Consortium is strategically positioned to offer some of the open source software that will enable openness.

→ The Discussion

- JetStream is OW2 Consortium effort to include Cloud Computing in its technology vision. OW2 must position itself in a redefined industry environment. What do we really want to do?



Agenda

➔ The Context

- Cloud Computing: a Definition
- The many faces of Cloud Computing
- Cloud service layers and main offerings positioning
- Not ready yet, but Cloud computing is here to stay
- Cloud computing's two long-term industry drivers
- Current barriers to cloud computing adoption

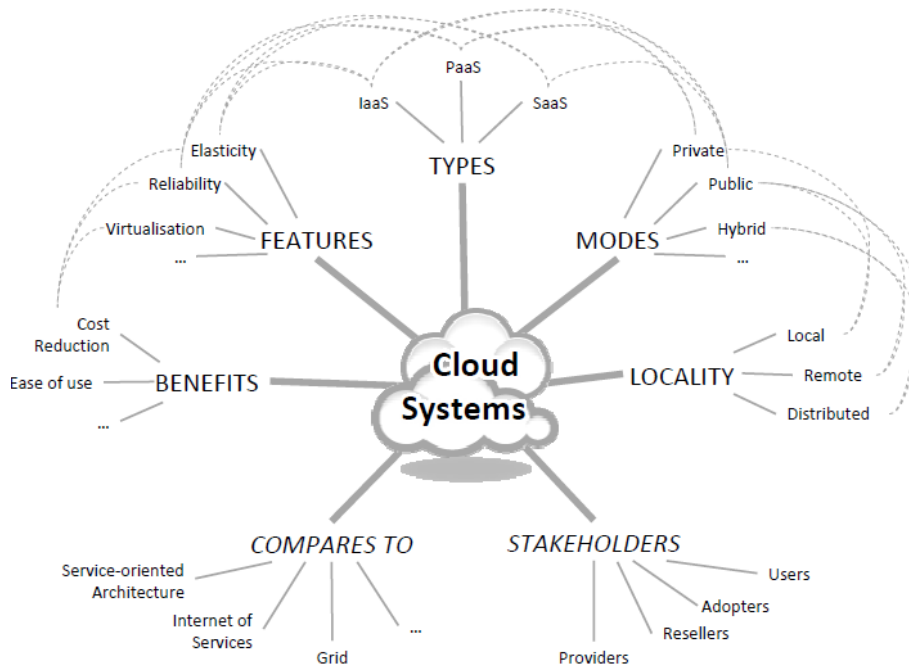


Not yet well defined; here is a definition of Cloud Computing

"Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."

- ➔ **"a model"**
 - Not a product, not a "technology"...
- ➔ **"convenient, on-demand"**
 - Easy to use, hassle-free
- ➔ **"network access"**
 - Cloud = Internet...
- ➔ **"shared pool"**
 - Not owned by users, mutualized
- ➔ **"configurable"**
 - Can be controled, programmed
- ➔ **"computing resources (e.g., networks, servers, storage, applications, and services)"**
 - Covers the whole IT spectrum
- ➔ **"rapidly provisioned and released"**
 - Agility is key
- ➔ **"minimal management effort or service provider interaction"**
 - Basically works self-service

The many faces of Cloud Computing



- ➔ **“Clouds” are not such a new concept**
 - Data centers for data management
 - Telecommunication industry for load balancing
 - Web server hosts for access control and load balancing etc.
 - Utility computing was announced already in 1961 by John McCarthy
 - Became popular with Amazon’s “Elastic Clouds”.
- ➔ **At the convergence of several trends**
 - Virtualization
 - SaaS, On-Demand billing model
 - Thin client, web-based computing
- ➔ **A FAD? Everything is being repainted “Cloud”...**
 - No clear understanding of the term
 - Variety of use cases, scenarios and business models
 - Various companies have rebranded their services with / into “clouds”
- ➔ **Wide variety of open issues**

Generally accepted service layers and main offerings positioning

Software as a Service **SaaS**

- Complete end-user-oriented applications customizable within limits.
- The broadest market. In this case the provider allows the customer only to use its applications.
- The software interacts with the user through a user interface.

- **SalesForce.com**
- **GoogleDoc**

Platform as a Service **PaaS**

- API to build higher-level applications. Pre-built application components
- A set of software and development tools hosted on the provider's servers.
- Developers can create applications using the provider's APIs and underlying data models and constructs.
- No interoperability standards (yet), so some providers may not allow customers to move applications to another platform

- **Google Apps**

Infrastructure as a Service **IaaS**

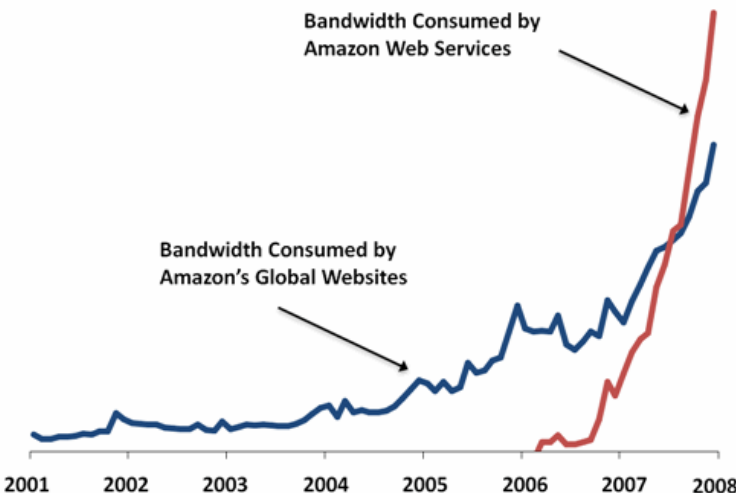
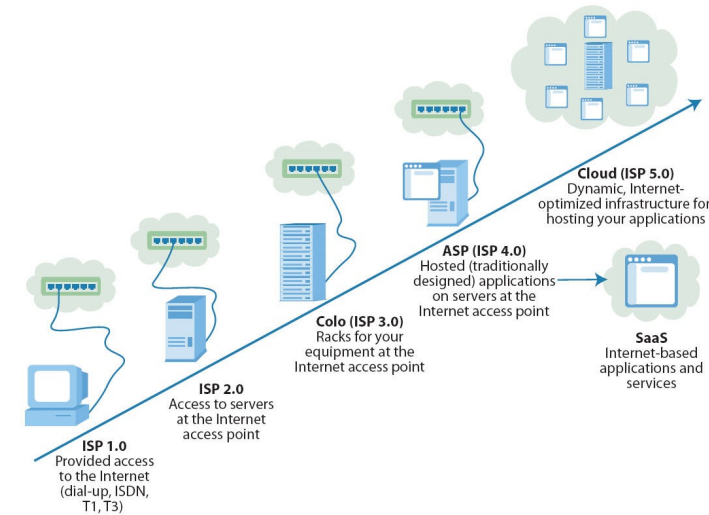
- Execution resources, servers, storage and network
- Provides virtual servers with unique IP addresses and blocks of storage on demand.
- Customers can pay for exactly the amount of service they use: this service is also called utility computing.

- **Amazon Web Services (AWS)**
- **Google AppEngine**
- **Microsoft Azure**
- **RackSpace Mosso**

Source: http://www.cloudbzz.com/wp-content/uploads/2009/05/screenhunter_0134.jpg
<http://www.ibm.com/developerworks/linux/library/l-cloud-computing/figure3.gif>

Not ready yet, but Cloud computing is here to stay

Figure 3 Cloud Computing: The Latest Evolution Of Hosting



Source: <http://blog.karmona.com/wp-content/uploads/2009/01/cloud-computing-the-latest-evolution-of-hosting.jpg>

- ➔ “Is Cloud Computing Ready For The Enterprise?” ...
 - “Not Yet, But This Disruptive Innovation Is Maturing Fast” ...
 - “Infrastructure and operations professionals can try to ignore it as it is **just in its infancy**, but doing so may be a mistake as cloud computing is looking like a classic disruptive technology.”
 - (Is Cloud Computing Ready For The Enterprise? by James Staten | Forrester)
- ➔ IDC on Cloud Computing: “This is about the **IT industry’s new model for the next 20 years**”, Vernon Turner, head of enterprise infrastructure, consumer and telecoms research.
- ➔ Merrill Lynch estimates that by **2012**, the annual global market for cloud computing will surge to \$95 billion and that **12% of the worldwide software market would go to the cloud** in that period.
- ➔ In January of 2008 Amazon announced that the **Amazon Web Services now consume more bandwidth than do the entire global network of Amazon.com retail sites...**

Cloud computing's two long-term industry drivers

➔ Commoditized enterprise IT

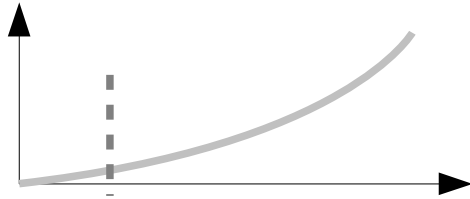
- Commoditized hardware, software and networks and standardized enterprise usage are key enablers
- Commoditized applications require a model for the provision of good-enough functionality at minimized acquisition and running costs (1)
- In many segments of the software industry "the traditional business model of enterprise software companies has matured. There will be very little further growth in perpetual license sales of proprietary software products." (2)

➔ New Internet-based IT usage

- The very size and scope of modern software and software usage require new economic models in order to remain cost effective. (3)
- Users running Web 2.0 based applications which must be able to absorb fluctuating or peak demands would rather rent computing power for short duration

Source: (1) Cedric Thomas, unpublished paper
(3) <http://www.sandhill.com/opinion/editorial.php?id=74>
(2) <http://blogs.zdnet.com/Hinchcliffe/?p=303>

Current barriers to cloud computing adoption



➔ Lack of maturity and concerns about:

- infrastructures security,
- performance, availability,
- Service Level Agreements (SLA) and auto-scaling,
- cloud services packaging, deployment and management,
- storage and network management.
- integration with legacy information systems

➔ Market fear of risks and uncertainties

- technological lock-in
- lack of inter-operability
- huge investments needed in the construction and operation of large data centres
- legal issues in terms of software licensing management, data location and movement
 - e.g. Health or eGovernment sectors

Agenda

➔ The Context

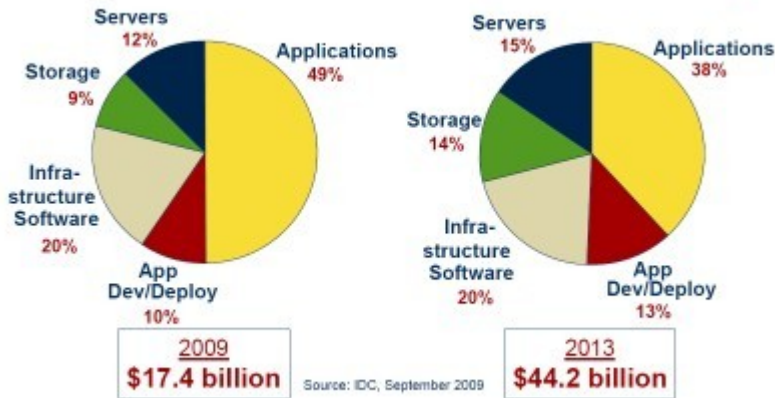
➔ The Opportunity

- Worldwide Market Evaluation
- European Market Evaluation
- The EU defines the OW2 opportunity
- There is more to Cloud openness than just open source software
- Open source software is critical for cloud computing openness
- OW2 membership and code base are "Cloud Aware"
- Where OW2 can contribute



Worldwide Market Evaluation

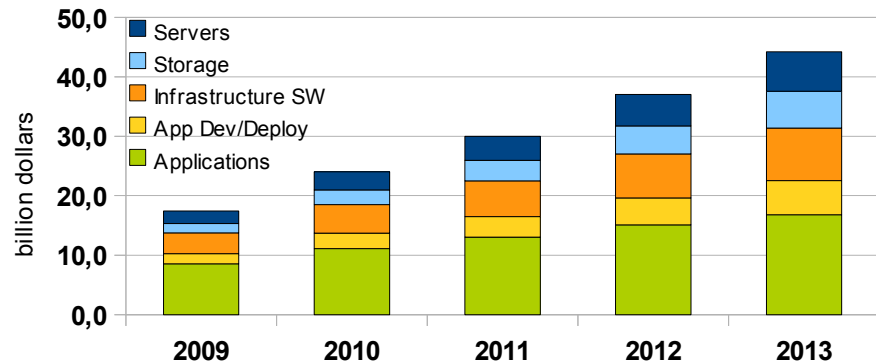
Worldwide IT Cloud Services Revenue* by Product/Service Type



- ➔ "These numbers don't represent private clouds"
- ➔ "Private clouds--or at least internal enterprise applications that use the same principles--will undoubtedly become a major trend over the next five years"
- ➔ Through 2012, according to Gartner, IT organizations will spend more on **private cloud computing investments** than on offerings from public cloud providers.

- ➔ "The five-year growth outlook remains strong, with a five-year annual growth rate of 26 percent--over six times the rate of traditional IT offerings."
- ➔ "cloud services are in their infancy and that the market is ripe for further disruption"
- ➔ "companies adapt their IT plans to take advantage of services that require far less capital expenditure"

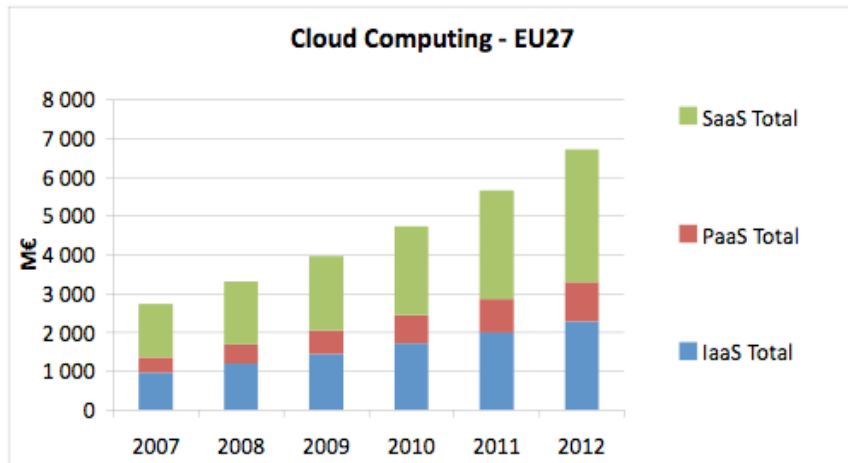
Worldwide IT Cloud Revenue by Product/Service Type



Source IDC, September 2009

Source: <http://news.cnet.com/business-tech/?keyword=IDC>
<http://www.gartner.com/it/page.jsp?id=1239813>

European Market Evaluation

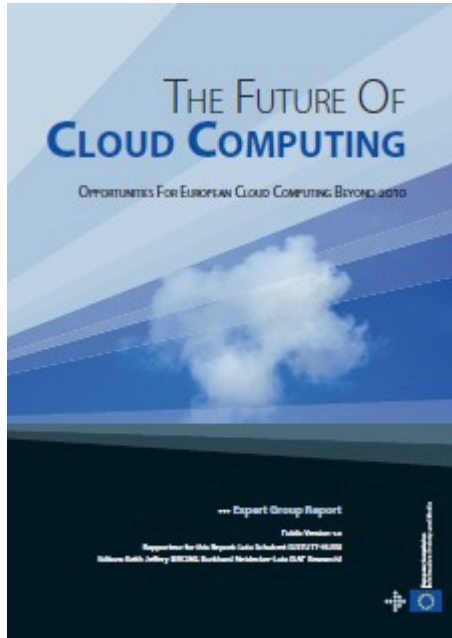


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- **Europe 27 Cloud computing market**
 - 4b€ in 2009
 - +20% growth
 - Growth should be sustained until 2015
 - Represents 1,5% of SW and Sces market
 - Will represent 15% in 2015
- **New players**
 - Global players: Amazon, Google, Salesforce.com etc.
 - Telco come-back
- **Private cloud development will be main segment**

Source: PAC Press release

The EU defines the OW2 opportunity

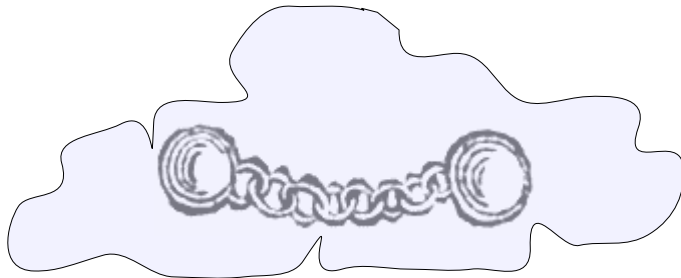


- ➔ (...) many of the open source technologies developed in Europe are exploited by US companies.
- ➔ According to one estimate, 90% of the business derived from open source systems is generated by non-European players.
- ➔ Furthermore, **most consortia managing open source development and marketing are based in the United States and funded by US IT companies.**
- ➔ If the cloud computing research aims at realizing a sustainable European economic opportunity as envisioned in i2010, **this imbalance needs to be addressed.**
- ➔ A thoughtful “utilization” framework, which allows the broadest set of European companies with diverse business models to leverage this asset, could be beneficial.

Does that mean Europe should actually "avoid" OSS??

The OW2 opportunity...

There is more to Cloud openness than just open source software



linux-magazine.com » Online » News » Richard Stallman: Cloud Computing a Trap

Richard Stallman: Cloud Computing a Trap

Oct 01, 2008 As an original founder of Open Source, Richard Stallman cautions in interview with the British Guardian newspaper about the repercussions of cloud computing. His main objection: dependency and loss of control.

➔ The need for openness

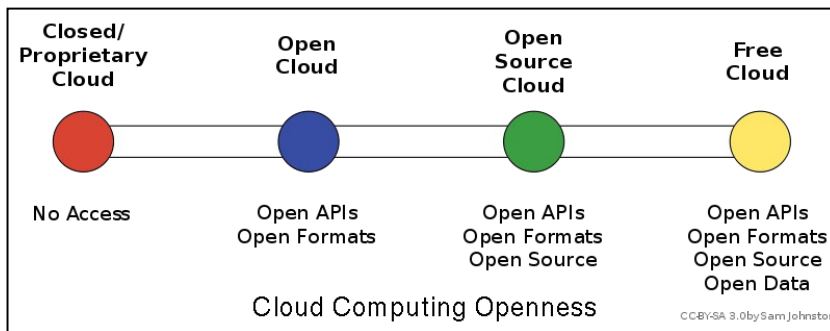
- Corporate customers and consumers alike will want to be **able to shift from one cloud to another** in search of **the best experience and the best pricing**, and they'll want the cloud services they choose to be able to interact with each other, in the background, on their behalf.

➔ All vendors will pledge 'Cloud Openness'...

- In the 90s, all hardware vendors were selling 'open systems' ;-)

➔ OSI-like criteria for Cloud Openness

- No barriers to entry
- No barriers to exit
- No discrimination
- Interoperability
- Free/Open source licenses
- Technological neutrality
- Transparency



Sources:

<http://www.linux-magazine.com/Online/News/Richard-Stallman-Cloud-Computing-a-Trap>
<http://commons.wikimedia.org/wiki/File:Chain-shot2.gif>
http://www.businessweek.com/blogs/globespotting/archives/2009/03/a_tech_industry.html
<http://samj.net/2009/03/introducing-open-cloud-principles-ocp.html>

Open source software is critical for cloud computing openness

➔ While openness seems still a distant reality...

- Openness has different meanings for different players
- Key players have proprietary core business
- Rival initiatives, consortiums, etc.
- Few consensus about standards

➔ ...Open Source Software (OSS) is now critical for Cloud Computing

- General consensus in the Cloud Industry
- Help reduce development costs
- Openness facilitates adoption of new technologies and services
- Most key players are open source contributors for pragmatic reasons (open APIs)
- OSS fosters open standards which are key for cloud openness

➔ OSS is already at the heart of Cloud Infrastructure

- Virtualization technologies
 - Xen.org
 - KVM.org
 - VirtualBox.org
- Infrastructure management
 - OpenNebula,
 - Eucalyptus,
 - Apache Hadoop
 - Etc.

➔ OSS a valid proposition for

- Interoperability
- Privacy
- Security

OW2 membership and code base are already "cloud aware"

⇒ Members have unique expertise

- From Academy to Industry

⇒ OW2 as a renown player of OSS World

- Cloud computing is a key opportunity for OSS Future

⇒ OW2 friendly relationships with other OSS players

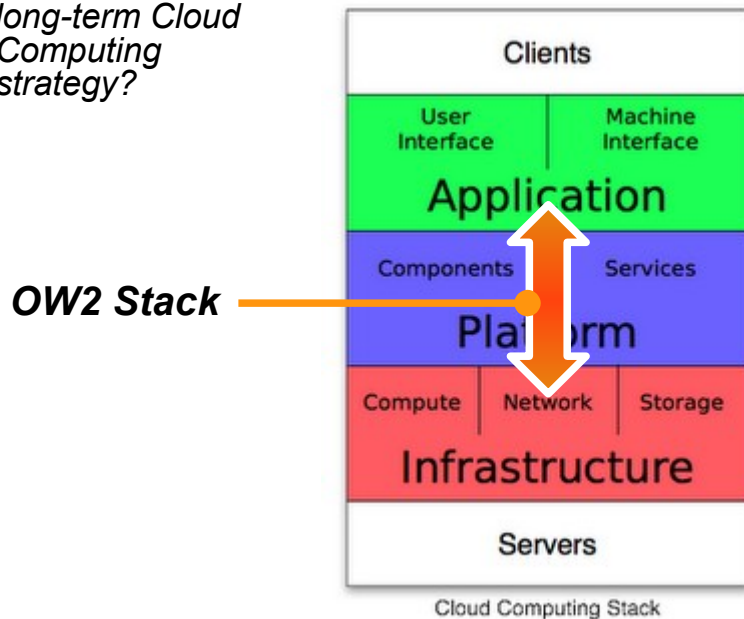
- Apache
- Eclipse
- Jboss
- Linux
- etc.

⇒ OW2 membership is ready

- Academy
 - INRIA: >20 Labs
 - Fraunhofer Fokus
 - Unifor
- Industry
 - Bull, Orange & JOnAS
 - Engineering, Thales
 - Red Hat, Ingres, Jaspersoft
- SME & Start Ups
 - ActiveEon
 - BonitaSoft
 - Exo
 - Petals
 - Usharesoft
 - Xwiki, etc.

Tentative mapping of OW2 existing projects

...But do members have a mid- to long-term Cloud Computing strategy?



* **OW2 Stack:** JOnAS/JASMINe, PEtALS, eXo, xWiki, Talend, JORAM, Bonita, Spago, Orbeon, ...

- ⇒ **SaaS platform**
 - OW2 Spagic, Talend, Xwiki,
- ⇒ **"on-demand" information System**
 - includes OW2 middleware stack + OW2 architecture (Fractal, Dream, Chameleon)
- ⇒ **Development and composition environment**
 - OW2 Acceleo, Chameleon/Cilia mediation, Talend
- ⇒ **Cloud testing and cloudified testing platform**
 - OW2 CLIF
- ⇒ **VM (appliance) building and management**
 - to be used for development, testing, pre-prod, production
 - embedded OW2 middleware in the VM
 - includes JOnAS/JASMINe, PEtALS, eXo, xWiki, Talend, JORAM, Bonita, Spago, Orbeon, ...
 - management of such VMs (versioning, deployment)
 - OW2 JASMINe, UShareSoft partnership
- ⇒ **Autonomic Cloud Application Servers**
 - JASMINe evolutions (Context of ANR SelfXL project)
- ⇒ **SLA verification**
 - OW2 Chameleon/Cilia mediation
- ⇒ **Open Cloud (IaaS)**
 - Cloud interoperability, migration between clouds providers
 - ProActive
- ⇒ **Personal Storage Cloud**
 - OW2 Funambol, OpenMobileIS, Ingres
- ⇒ **Mobile Cloud**
 - OW2 Funambol, OpenMobileIS
- ⇒ **Cloud Networking**
 - Outside the OW2 scope?

Agenda

➔ The Context

➔ The Opportunity

➔ The Discussion

- Jet Stream: Cloud in our vision?
- The EU paves the way for OW2 roadmap
- OW2 to interact with existing open source cloud communities
- OW2 to align with most current cloud open standards
- Homework



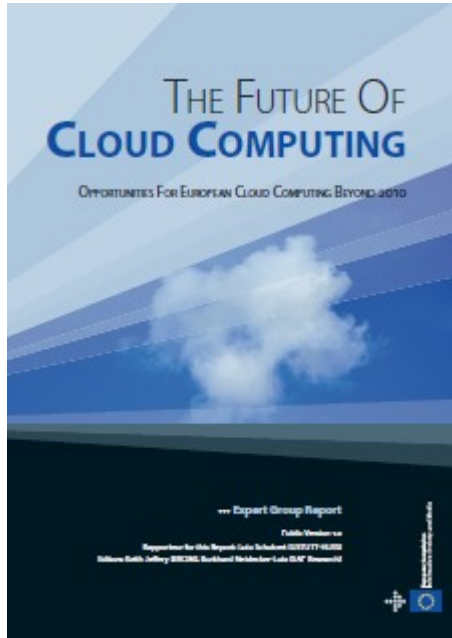
JetStream: Cloud computing in our technology vision?



- ➔ Develop, integrate, deliver and promote the "OW2 Cloud Stack"
- ➔ Drive OW2 projects evolution toward cloud computing
- ➔ Drive OW2 alignment with relevant standards
- ➔ Foster OW2 OSS for cloud computing
- ➔ Develop a network of cloud-oriented partners
- ➔ Promote and integrate "best of breed" Cloud Floss
- ➔ Generally promote OW2 and its projects and members

*A path from
«Cloud Aware»
to CloudWare*

The EU paves the way for OW2 roadmap



➔ Additional recommendation n°3:

- The EC should encourage the development and production of
 - (a) CLOUD interoperation standards
 - (b) **an open source reference implementation**
- The development of standards and a reference implementation would assist European SMEs in particular in ensuring their products and service offerings in the cloud environment have the widest possible market and customer acceptability.
- The standards should encourage all suppliers to be able to interoperate; the **reference implementation is to allow plug-tests to prove standards compliance.**

... but what is the business model of such a reference implementation?

➔ Additional recommendation n°4:

- The EC should promote the European leadership position in software through **commercially relevant open source approaches.**
- Maintaining an **open source approach for research results and cloud infrastructure support tools** ensures uptake and simplifies adaptation to different environments. The European open source movement should thereby **work strongly together with industry** to support commercial cloud based service provisioning.

OW2 to foster Cloud projects to be funded within EU "Future of Internet" programmes and PPP mechanisms

OW2 to interact with existing open source cloud communities



➔ Virtualization technologies

- KVM.org
- VirtualBox.org
- Xen.org
 - Incl. Xen Cloud Platform initiative
- OpenVZ



➔ Infrastructure mgt technologies

- Open Nebula
- Eucalyptus
- LibVirt
- Apache Hadoop



➔ HPC on demand technologies

- XtremOS



➔ Pthers - Non open source

- Enomaly (Infra Mgt)
- Open Cirrus (Open but not OSS)
- Sabalcore (HPC on demand)



OW2 to align with most current cloud open standards



➔ Areas to follow include

- data and application portability,
- cloud interoperability
- management, monitoring, metering
- security and privacy
- HPC

➔ Many standard bodies

- DTMF
- Cloud incubator, includes OVF (Open Virtualization Format)
- Open Grid Forum (OGF)
- Open Cloud Computing Interface (OCCI) working group
- Open Cloud Consortium (OCC)
- Cloud Computing Interoperability Forum (CCIF)
- Cloud Security Alliance

Homework

- ➔ **What is our definition of Cloud computing?**
- ➔ **Is Cloud computing an opportunity for OW2?**
- ➔ **What is our window of opportunity?**
- ➔ **Should OW2 develop a Cloud computing strategy and how?**
- ➔ **What can OW2 contribute to Cloud computing? What are our resources?**
- ➔ **Which OW2 members have an interest in Cloud computing? A strategy?**
- ➔ **What do we want to do? What can OW2 do?**
- ➔ **What should we expect from the TC do? From the MO?**



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