ICCLab

Future Internet Research and Cloud Computing

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www.cloudcomp.ch

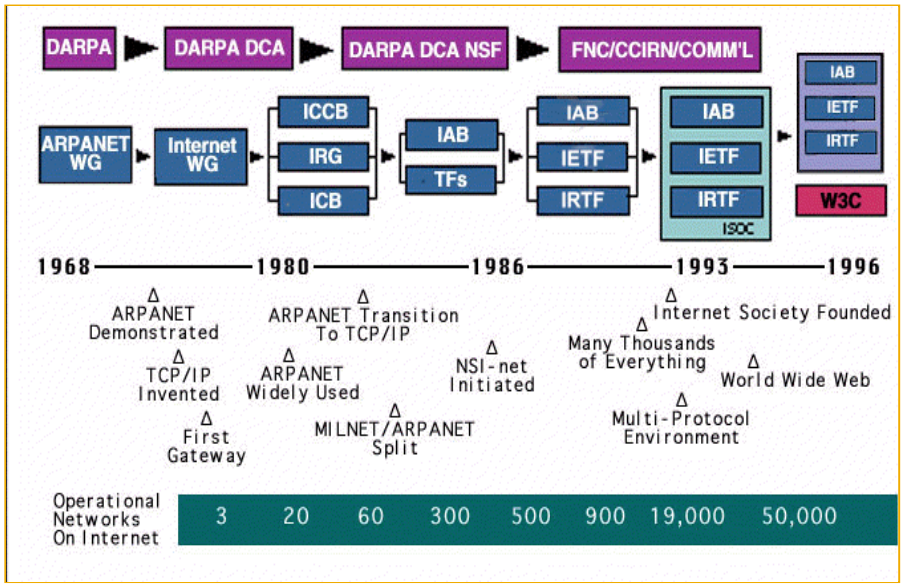
Future Internet Genesis

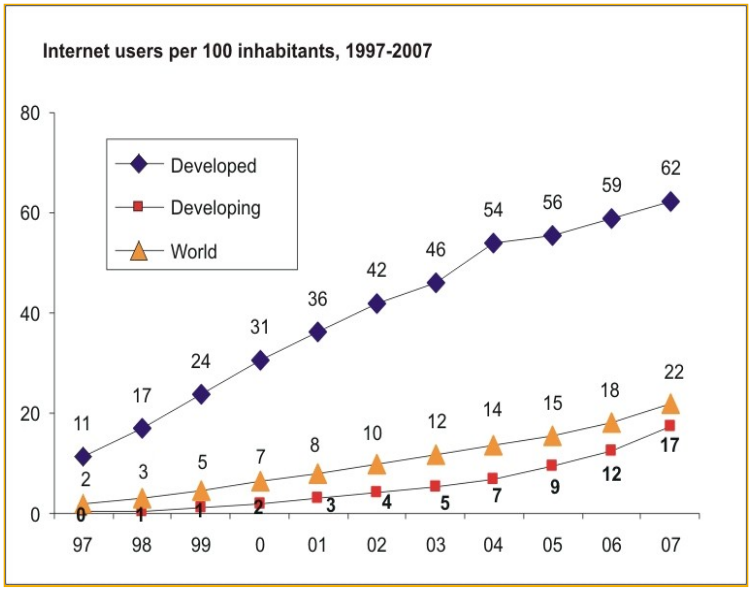
„The Internet is broken.“

David D. Clark, MIT

In an article in MIT Technology Review, 2005

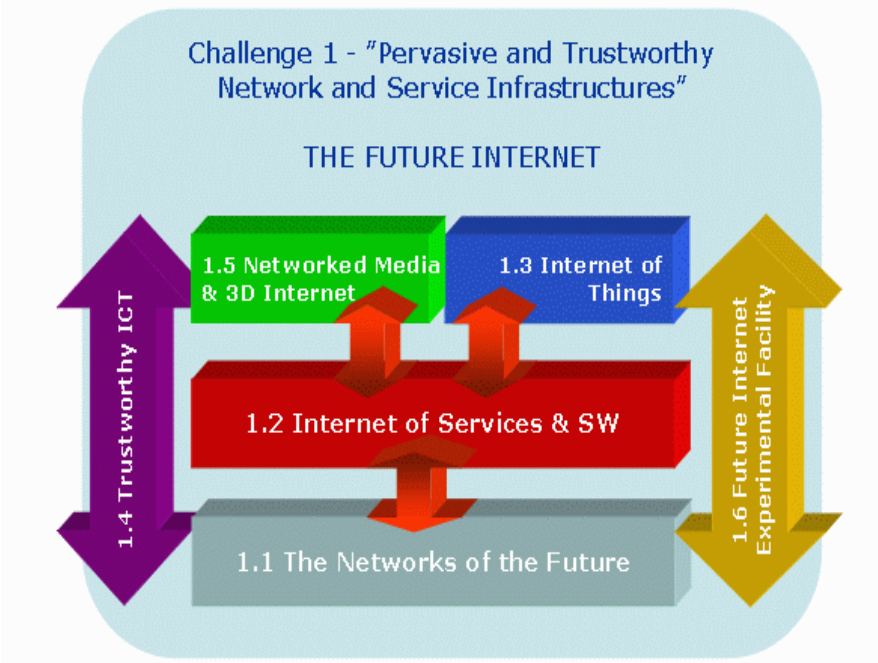
Future Internet Genesis



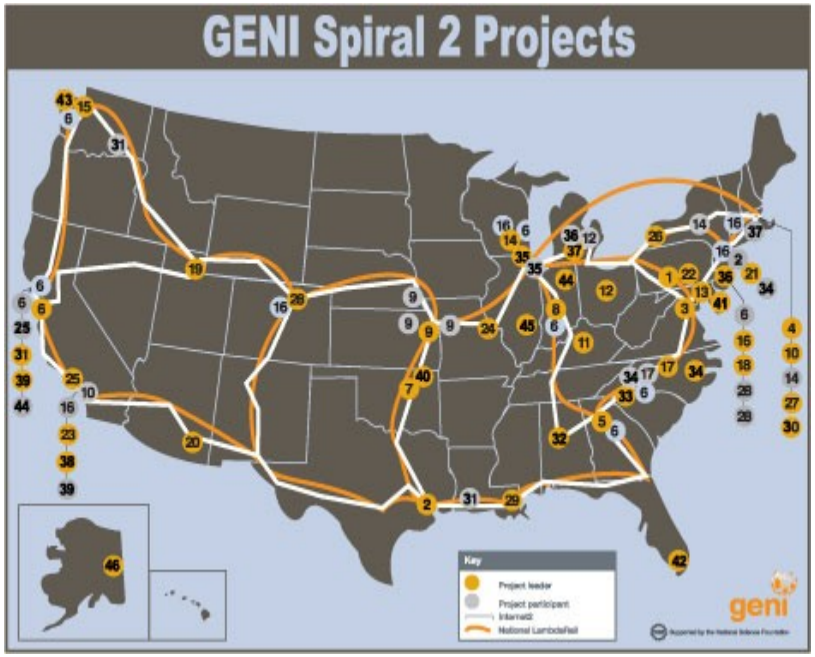


Future Internet Genesis

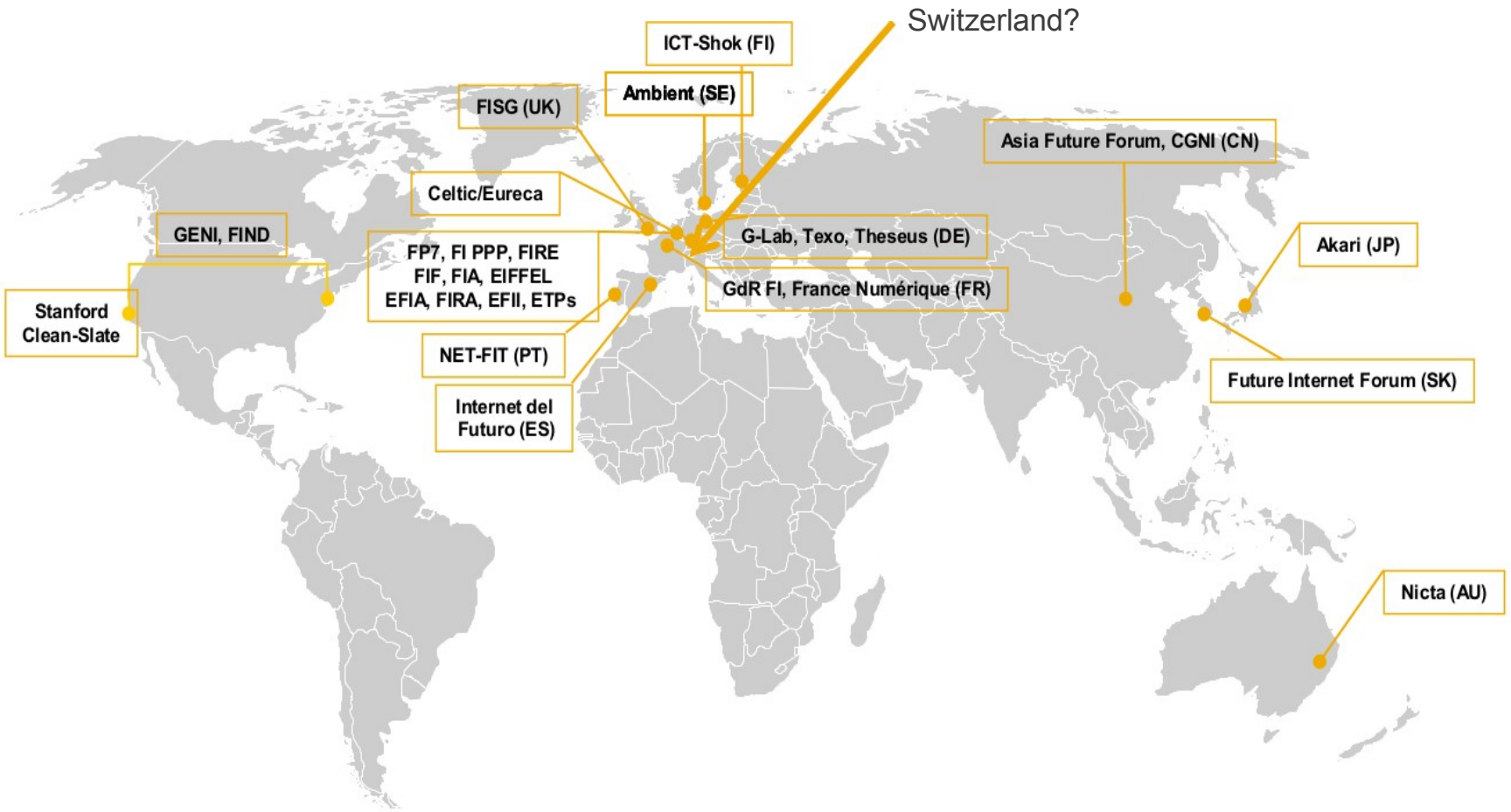
Europe



USA



Future Internet Genesis



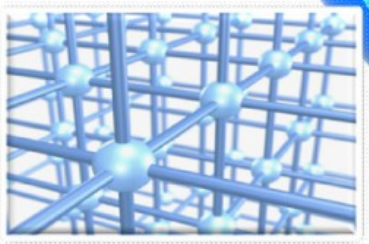
Appr 5B Euro investment in R&D worldwide over the past 7years

Future Internet Genesis

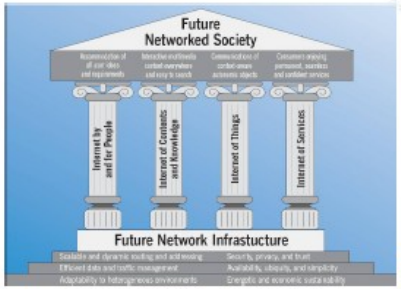
Internet of Things

Internet of Services

Network of the Future



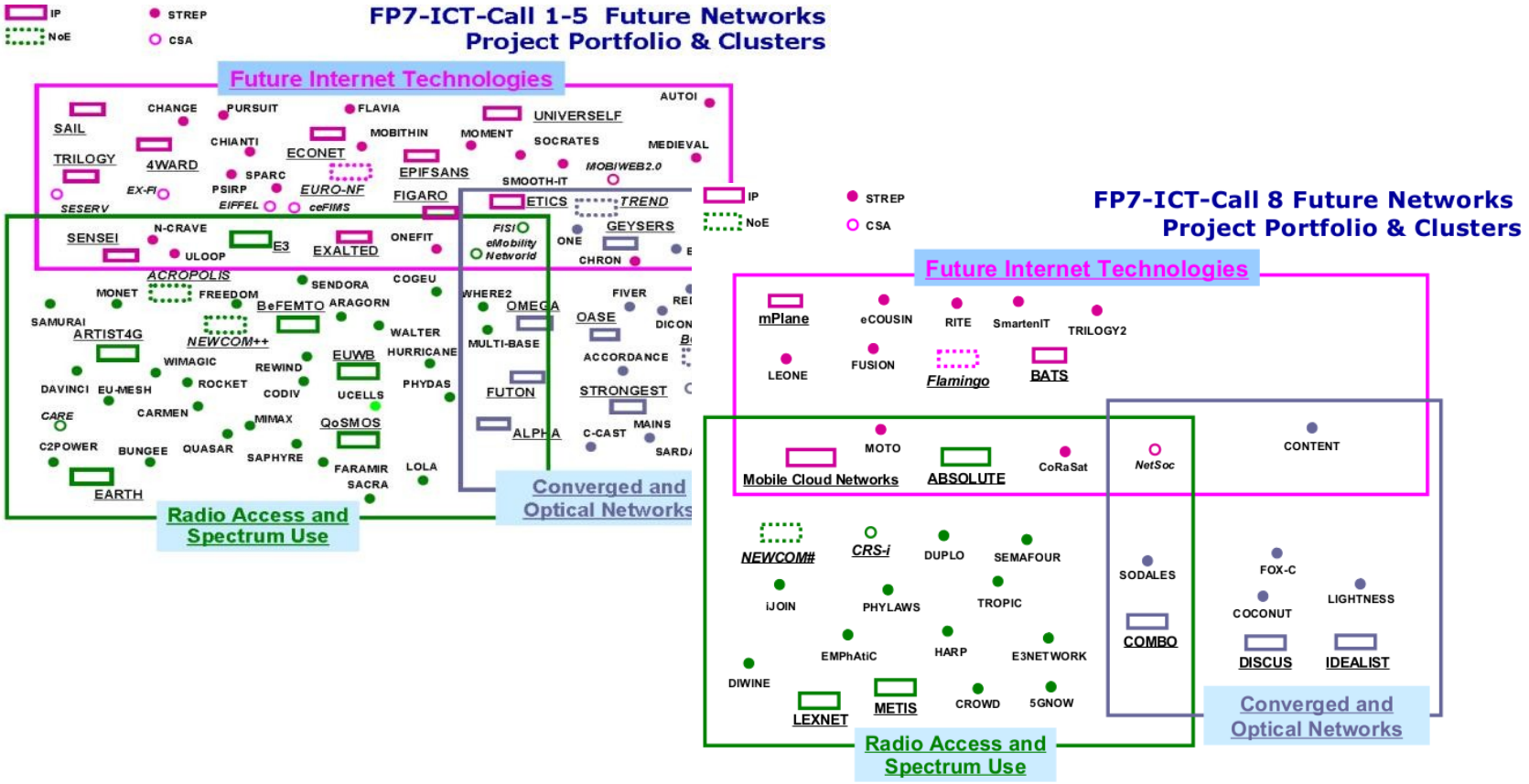
Cloud Computing



Source: X-ETP Vision

Future Internet Genesis

In Europe roughly 100 concurrent Future Internet projects (challenge one alone)

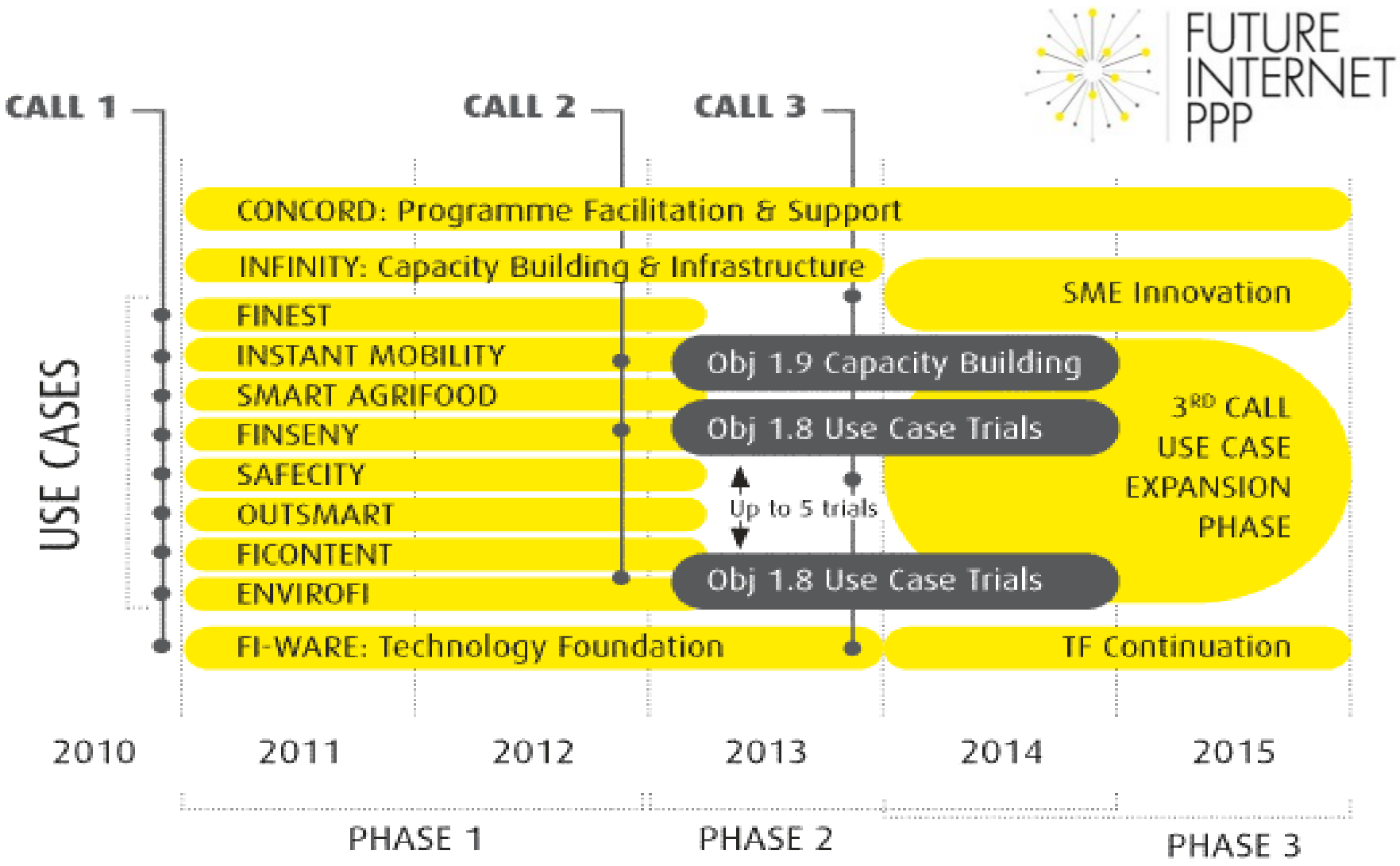


Future Internet Genesis

Very good, but:
The (Future) Internet is no set of individual domains

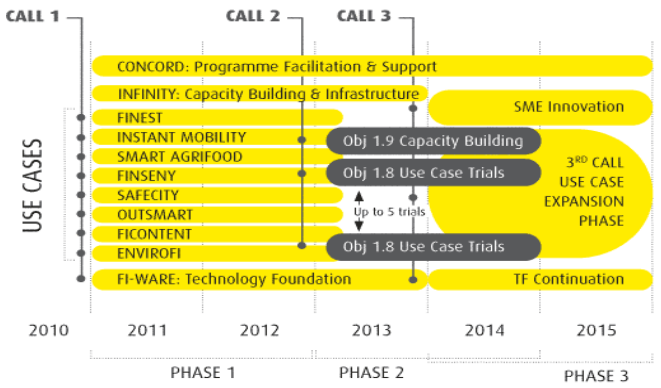
Hence:
How to consolidate existing research results into a Future Internet

The Future Internet PPP



The Future Internet PPP

FUTURE INTERNET PPP



2x € 300 MILLION

INVESTMENT BY THE EUROPEAN COMMISSION & PROGRAMME PARTICIPANTS

158 PARTNER ORGANIZATIONS AND COMPANIES

INDUSTRY SHARE IN THE PROGRAMME **68%**

23 COUNTRIES REPRESENTED (2 FROM OUTSIDE EUROPE)

18 ACADEMIC INSTITUTIONS

Switzerland and the Future Internet PPP

Total funding : 2.2 MEuro (based on proposal data)

ABB Schweiz AG
Zurich University of Applied Sciences (ZHAW)

IBM Research (USA)
Kuehne + Nagel (DE)
Walt Disney Studios Schweiz (USA)
Martel Consulting (UK)

FUTURE INTERNET PPP

The Future Internet PPP

Mind: It's a Public-Private Partnership

Pub-Priv power sharing ...

… unique opportunity

… (nearly) lost opportunity

The Future Internet PPP

… lost opportunity …

… only nearly ...

The Future Internet PPP

Cloud Computing : very prominent in the FI-PPP

The Future Internet PPP

Cloud Computing : A Swiss Strength

Cloud Computing Swiss Perspective

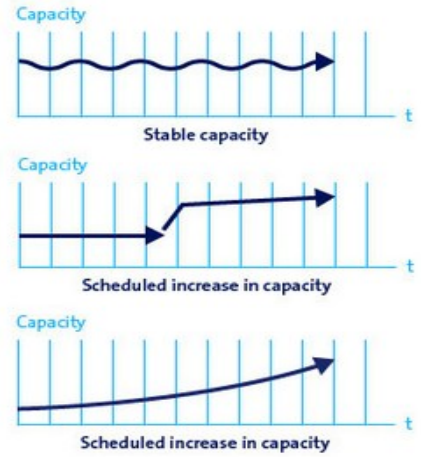
CloudSigma

TECHTOUR 25 SELECTED COMPANIES

CloudSigma ist ein innovativer Anbieter auf dem Gebiet Infrastructure-as-a-Service (IaaS) mit Sitz in Zürich in der Schweiz. CloudSigma wurde gegründet, um die wachsende Nachfrage nach einem reinem IaaS, der seinen Nutzern beim Einsatz ihrer EDV-Ressourcen kaum oder keine Einschränkungen auferlegt, zu befriedigen.

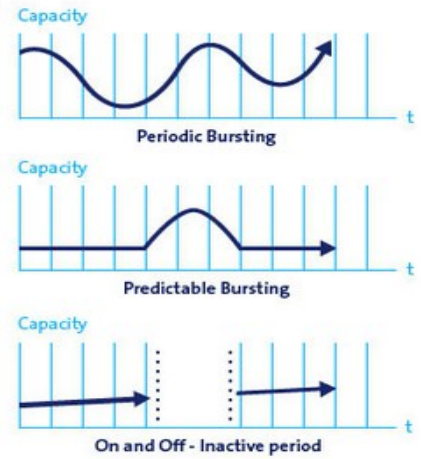
CloudSigma reagiert dabei auf die aktuellen Marktangebote, die Nutzern zur Migration ihrer aktuellen Server-Konfigurationen in die Cloud zahlreiche komplizierte Schritte abverlangen. Weiterhin beschränken viele andere IaaS-Angebote die Auswahl der nutzbaren Betriebssysteme, die Größe der verfügbaren Server und mehr; Server verschwinden mit dem Anhalten, Datenspeicher sind nicht persistent usw. Das CloudSigma-Produkt wurde entwickelt, um genau diese Probleme anzugehen.

swisscom



Ringier Google Apps

Jüngst hatte Samuel Hügli, CFO und Leiter Corporate Center von Ringier, in der “Computerworld” die Gelegenheit, sich in einem Interview ausführlich über den Wechsel hin zu Google Apps und die daraus erwachsenen rechtlichen Herausforderungen zu äussern. Sein bestechendes Fazit zur Datensicherheit in Googles Cloud: “Durch einen hausinternen Setup des IT-Systems könnten wir nie diese Ausfallsicherheit erreichen. Unmöglich!”



Many more: www.cloud-finder.ch

Cloud Computing Swiss Perspective

Colocation Switzerland

» Index » Switzerland

Currently there are **45** colocation data centers from **14** areas in Switzerland (Schweiz).
Save the trouble of contacting the providers, check out our **quote service**.

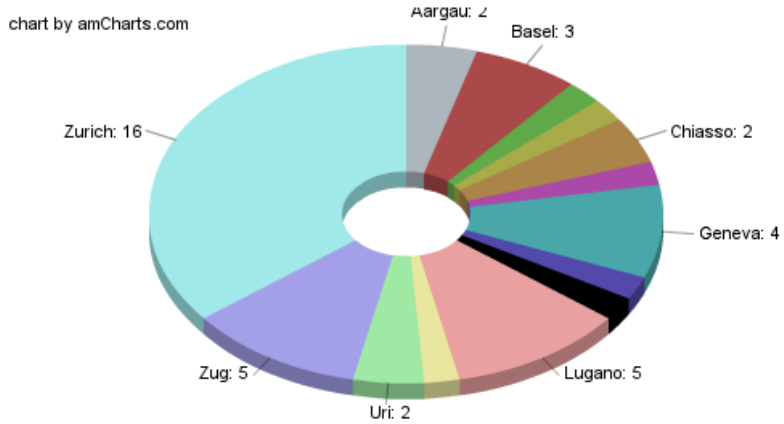
Aargau (2)	Chur (1)	Solothurn (1)
Basel (3)	Geneva (4)	Uri (2)
Bern (1)	Jura (1)	Zug (5)
Biel (1)	Lausanne (1)	Zürich (16)
Chiasso (2)	Lugano (5)	

Click here to see other countries in the region Western Europe, or change the view mode of this country to an area map or data center map via the menu in the right side.

Need services in Switzerland?

Save the hassle of contacting individual providers by requesting a quote via our free **quote service**.
Providers can bid on your request, giving you a perfect overview of your options without any obligations.

Colocation Data Center Statistics, Switzerland



Cloud Computing Swiss Perspective

Cloud Center in Zurich

Develops OpenShift in Switzerland

Cloud Service Center in Zurich

CloudFoundry evangelist in Geneva

Cloud evangelist in Zurich

CloudStack evangelist in Geneva

Many more: www.cloud-finder.ch

Cloud Computing
Swiss Academic Perspective

Slowly building momentum

Mind:
Cloud Computing result of applied research

Proposal: Cloud Computing SIG

- **Accessibility**
- **CHOOSE**: Swiss Group for Object-Oriented Systems and Environment
- **DBTA Informationssysteme**

Cloud Computing: Swiss Group for Infrastructure, Platform, and Software-as-a-Service

- **donna informatica**: Informatikerinnen in der Schweiz
- **Financial-IT - Standards und Prozesse**
- **Freelancers**
- **Green IT**
- **Informatik & Gesellschaft**
- **IT-Compliance**
- **Metadaten**
- **Networking & Cloud Services**
- **Open Data**
- **SAUG**: Swiss APL User Group
- **SGAICO**: Swiss Group for Artificial Intelligence and Cognitive Science
- **SigMo**: Swiss Informatics Group for Modelling
- **SI-GRAVIS**: Computer Graphics
- **SI-SE**: Software Engineering
- **Software Ergonomics**
- **The SEE Group** Software Estimation and Economics

Proposal: Cloud Computing SIG

Cloud Computing: Swiss Group for Infrastructure, Platform, and Software-as-a-Service

Schweizer Informatik Gesellschaft SI

Gruppierungsreglement (Gr-Reglement)

Art. 1 Zweck

1.1 Innerhalb der Schweizer Informatik Gesellschaft (SI) können sich Mitglieder zu Gruppierungen zusammenschliessen, um Teilbereiche der Informatik und die daran interessierten Personen besser fördern zu können.

1.2 Gruppierungen können ihr Interesse auf regionale, fachliche oder andere Themen ausrichten, müssen sich aber in das Gesamtinteresse der SI einordnen.

1.3 Die Zusammenarbeit zwischen der SI und ihren Gruppierungen soll allen Beteiligten Vorteile bringen.

Dieses Gruppierungsreglement wurde an der SI-Generalversammlung vom 7. Mai 2012 in Bern zusammen mit der SI-Statutenänderung genehmigt und in Kraft gesetzt.

Proposal: Cloud Computing SIG

Cloud Computing: Swiss Group for Infrastructure, Platform, and Software-as-a-Service

Proposed next steps

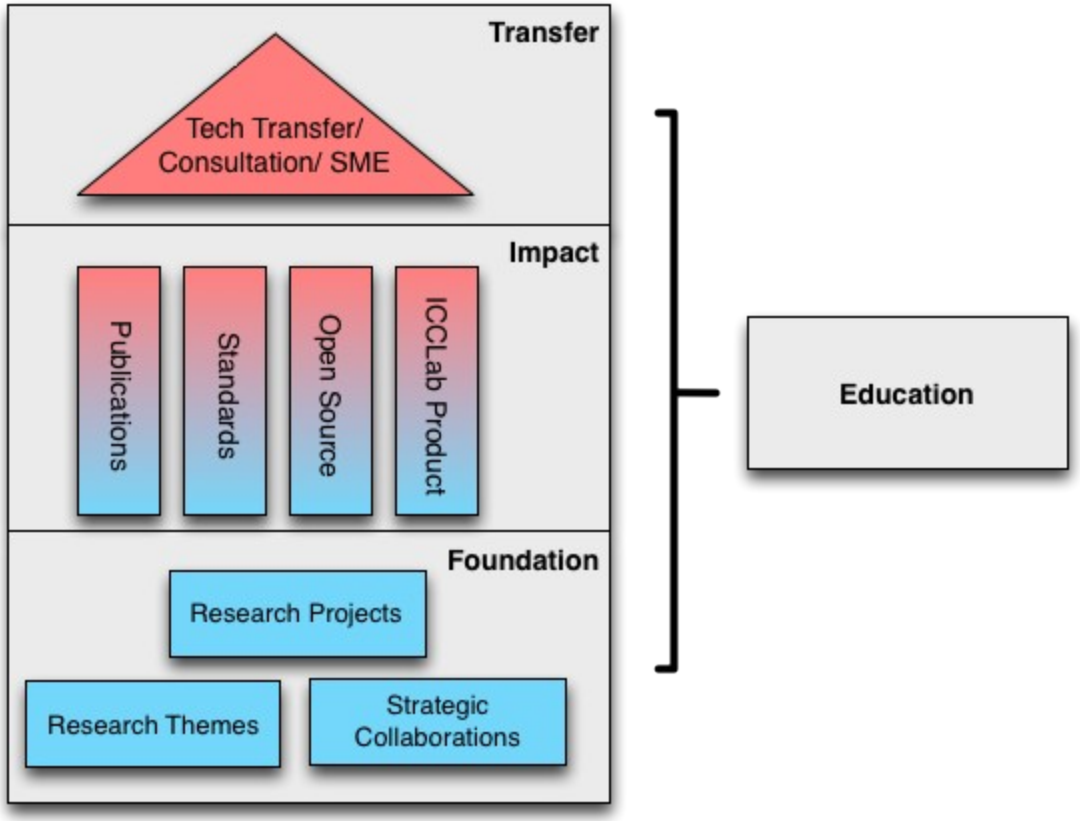
December 2012	Proposal and evaluation
February 2013	Initial members of CC SIG identified
February 2013	Initial draft of CC-SIG mission statement
March 2013	Governance structure established
March 2013	Formal integration into SI completed
April 2013	Kick-off Meeting (KOM)
April 2013	Mission statement approved and published
April 2013	Liaisons with Swiss OpenStack User Group, /CH-Open/SwissICT

Questions

Swiss OpenStack User Group
http://tinyurl.com/bpd4jab

Backup

ICCLab Applied Research Approach



“From
Research Themes
to Projects
creating Impact
and Transfer
for Educational Excellence”

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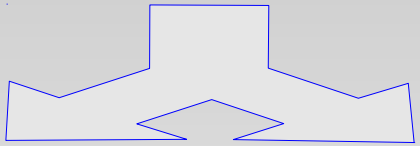
Research Themes and Assets

Themes

Dependable Cloud, Interoperable Cloud

- Infrastructure as a Service
- Platform as a Service
- Mobile Cloud Computing



Research Activities and Assets

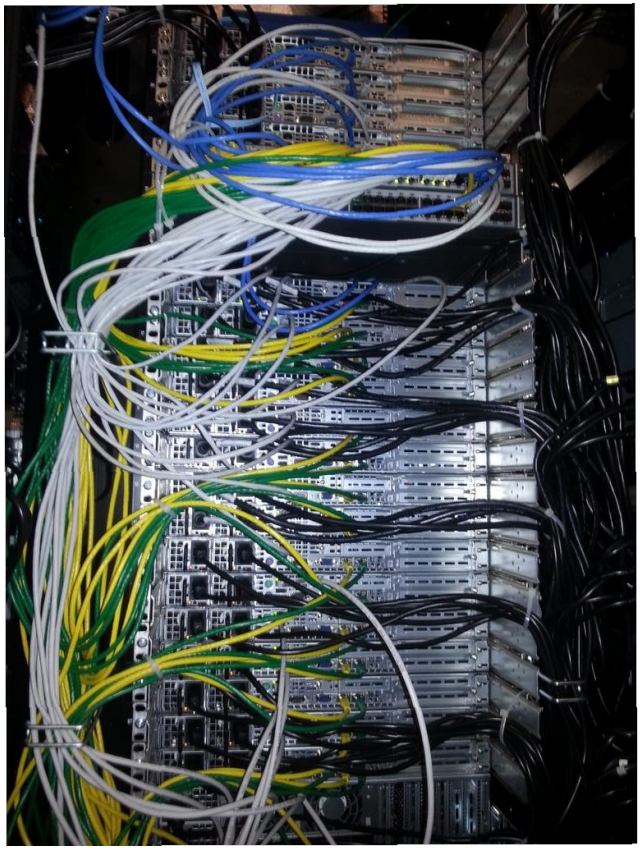
- Rating, Charging, Billing
- Hadoop as a Service
- Cloud Automation
- Virtualization and Performance
- SDN for Clouds
- Cloud Monitoring
- Object-based Storage
- Efficient Cloud Middleware
- Cloud Resource Orchestration
- Open Cloud Computing Interface

ICCLab Cloud

Second SWISS OpenStack Proof-of-Concept (next to CERN)

Fully operational Cloud (IaaS)

- Computing units, 8×2.4 Ghz Cores, 64GB RAM and 4×1TB local storage per unit.
- 12TB NFS or iSCSI Storage
- 10Gbit Ethernet (data) 1Gbit (ctrl)



Hadoop as a Service

Open Cloud Computing Interface

Cloud Monitoring

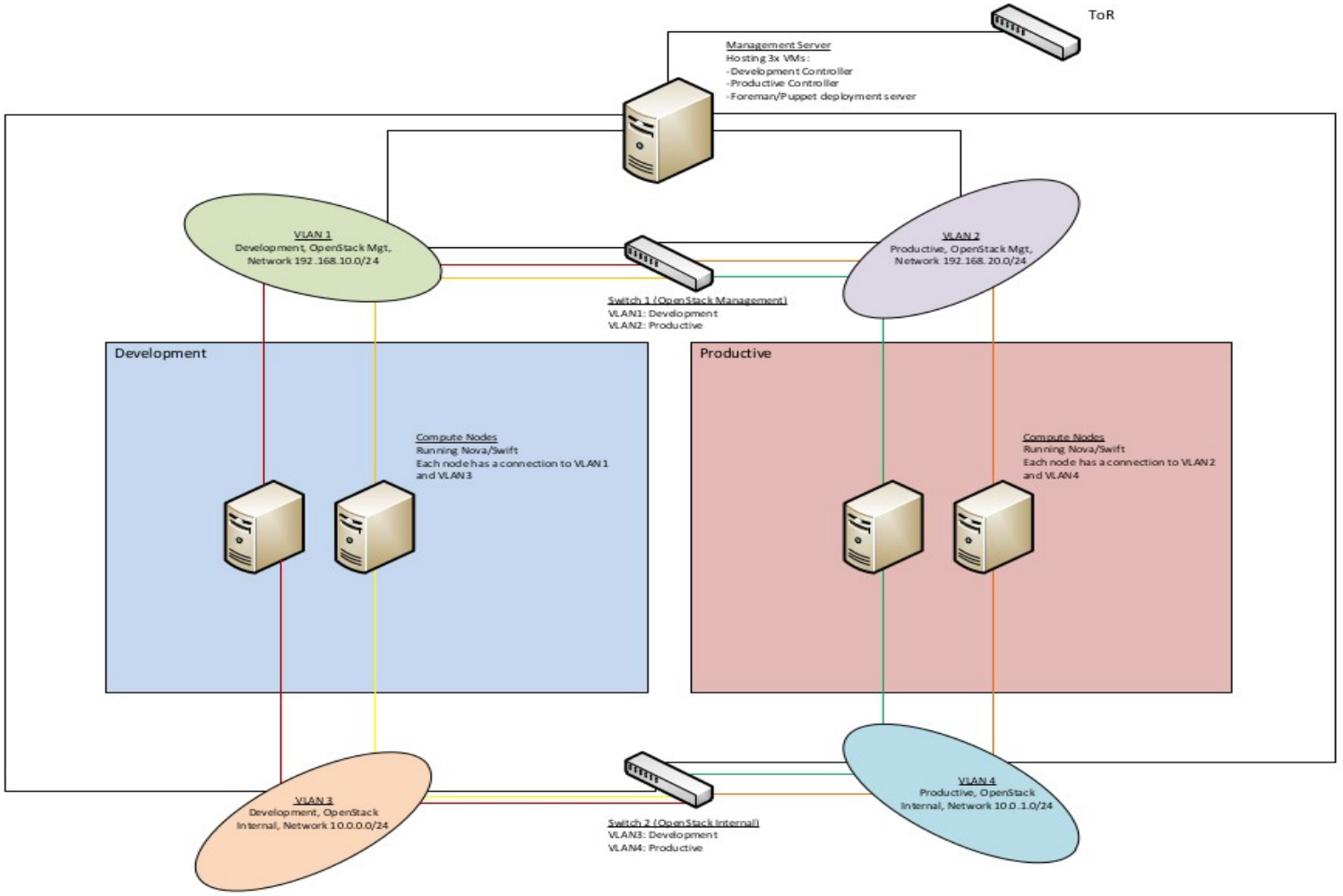
Object-based Storage

openstack™

www.cloudcomp.ch

ICCLab IaaS Deployment

ICCLab – Development / Productive Environment



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Commercial Cloud Provider

Google App Engine

Joyent

amazon web services™

Los Angeles Hong Kong Miami Dallas Expanding St Louis Seattle Tokyo Frankfurt Washington DC the San Francisco Amsterdam Dublin London New York City Cloud

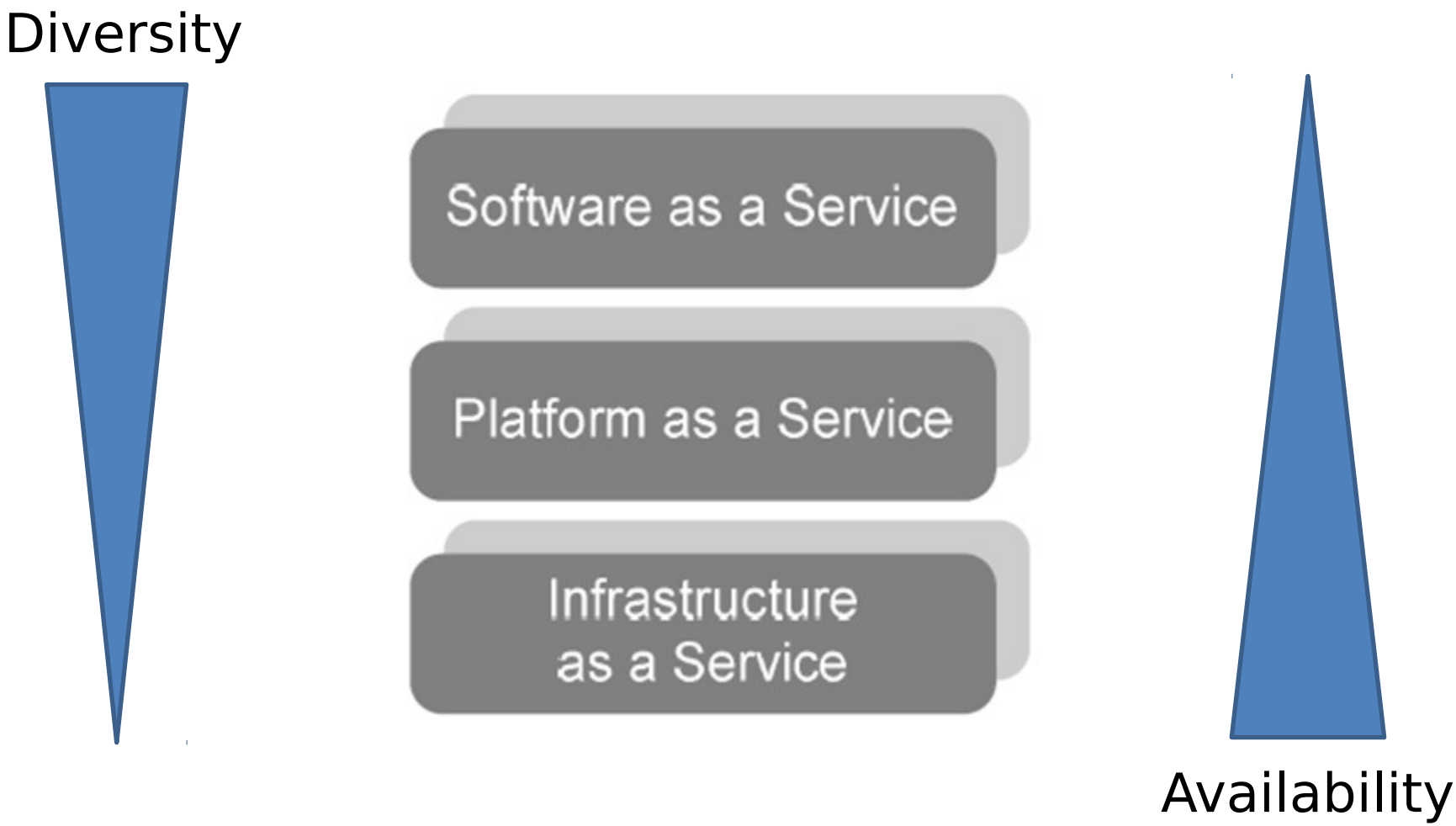
IBM

the rackspace cloud

CloudSigma

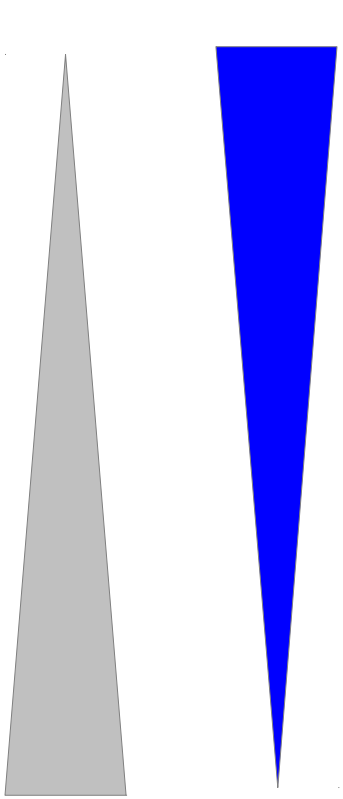
www.cloudcomp.ch

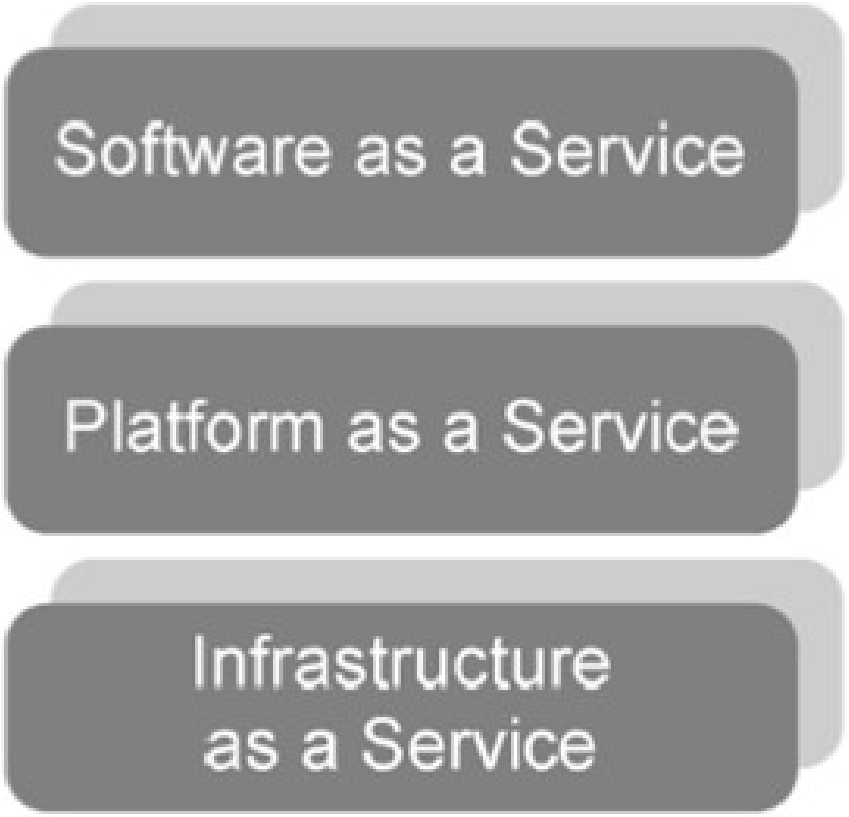
Challenges


Diversity
Software as a Service
Platform as a Service
Infrastructure
as a Service
Availability

Considerations

Ease of Use, Reliance





User

Developer

IT Department

Tech Skill, Control

Threats

Lock-in

Alternatives

Open Source
&
Open Standards

Cloud Computing Enablement

Open Source

- Xen, Xen Cloud Platform (XCP)
- KVM – Kernel-based Virtualization
- VirtualBox - Oracle supported Virtualization Solutions
- OpenVZ - Container-based, Similar to Solaris Containers or BSD Zones
- LXC – User-space chroot’ed installs

Open Source Software-as-a-Service

Very fuzzy ...

Is Hotmail a Cloud Service? → Cloud Washing!

OSS Platform-as-a-Service

	Genesis	Sponsors	Supported Plattforms
CLOUD FOUNDRY	2011	VMware	Java/Spring, Node.js, Grails, Ruby/Rails, Ruby/Sinatra, *)
OPENSHIFT	2011	RedHat	JavaEE6/JBoss, Ruby, PHP, Python, Perl, Node.js
WSO2 Stratos	2010	WSO2	JavaEE6, JBoss
SmartOS	2011	Joyent	Node.js

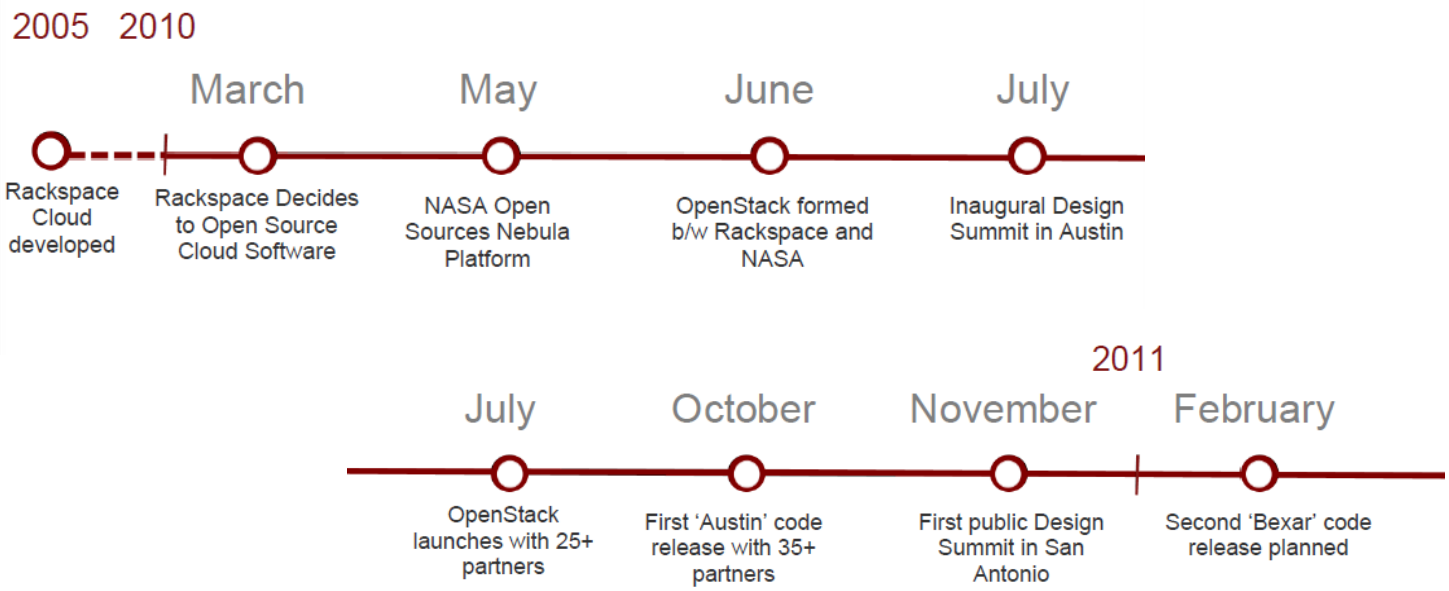
*) some derived products (AppFog, Stackato,...) also support PHP, Perl, Python, Erlang, Scala, Clojure, .Net

OSS Infrastructure-as-a-Service

	Genesis	License	Supported Hypervisors
EUCALYPTUS	2006	GPL	Xen, KVM, VMware*
cloudstack open source cloud computing	2008	Apache 2 (since 2012)	Xen, KVM, VMware, OracleVM
OpenNebula	2008	Apache 2	Xen, KVM, VMware
openstack™	2010	Apache 2	Xen, KVM, VMware, VirtualBox, Hyper-V, qcow2

*) not in OpenSource Version

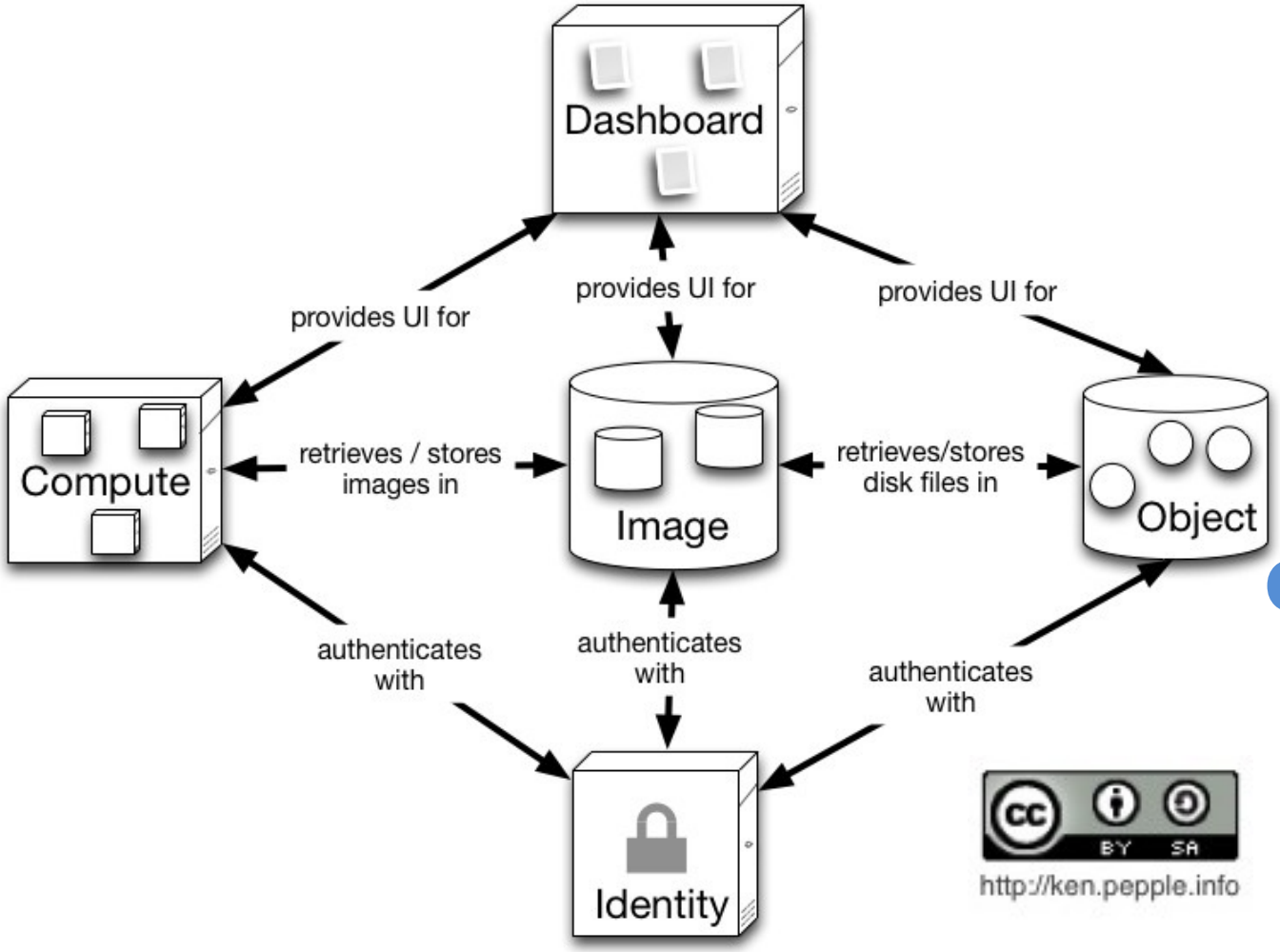
Genesis of OpenStack



openstack™

Oct, 2012:
OpenStack 2012.2 (Folsom)
Delivers Pluggable Cloud Operating System to Power Global Clouds with Powerful Networking, Compute, and Storage Capabilities

OpenStack Architecture



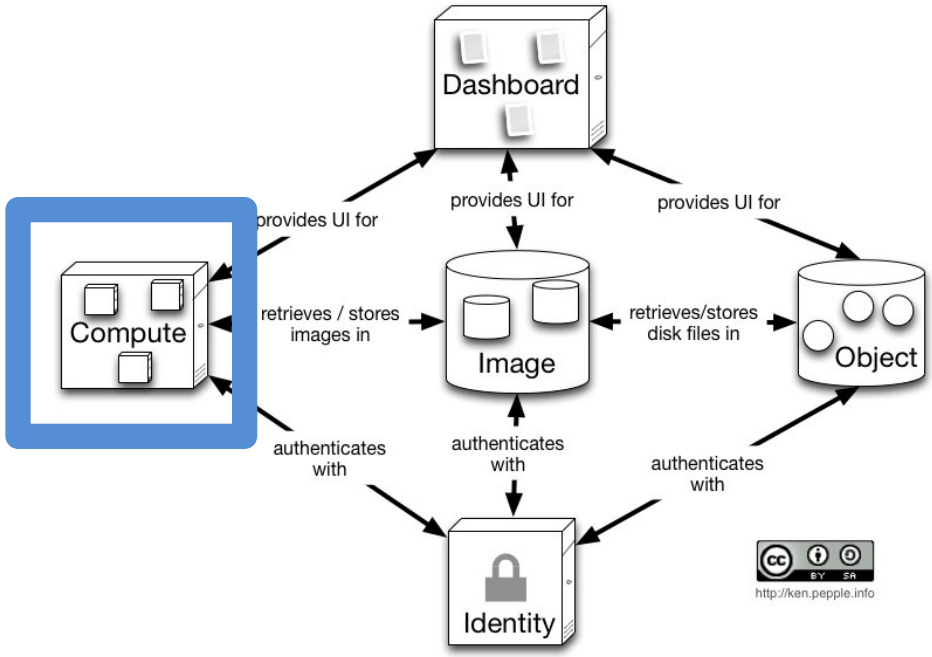
Everything has an API

Message based

Discrete Pluggable Components

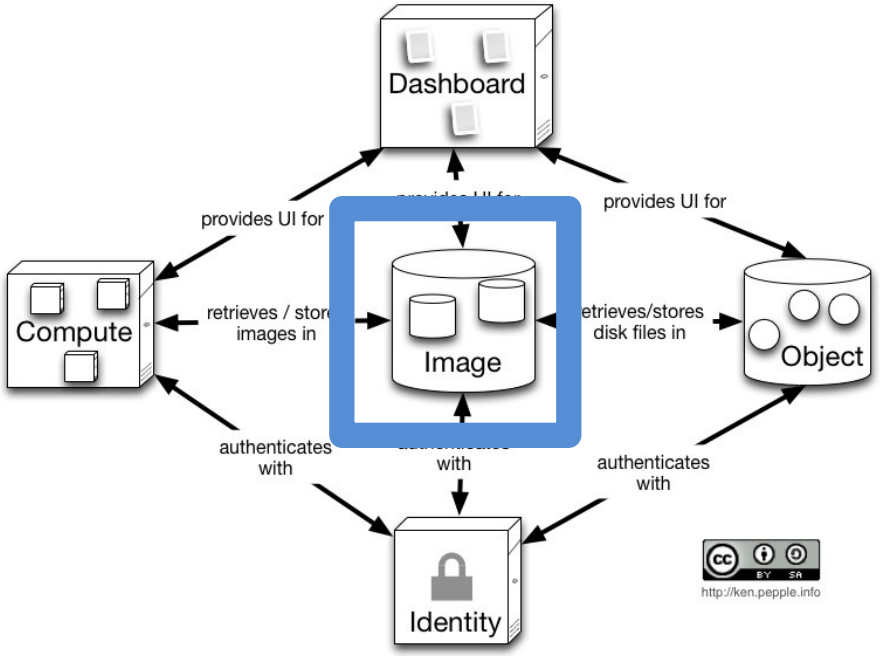
Key Component: Compute

- **Nova:** Provides virtual servers on demand
  - KVM, Xen, VMware, HyperV, VirtualBox,LXC
- Looks after scheduling, networking & Block Storage
  -



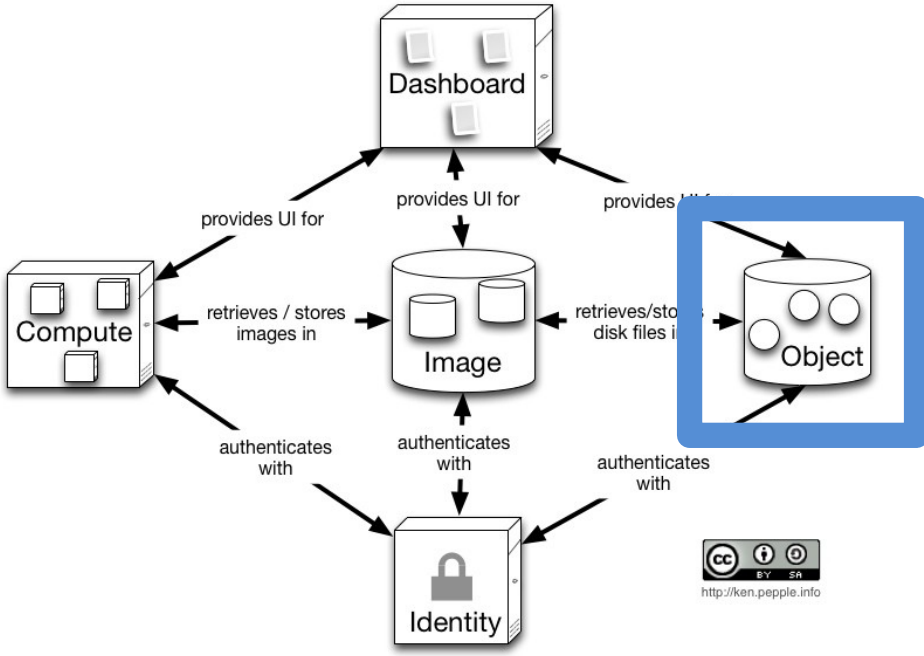
Key Component: Image

- **Glance:** Virtual Machine Image Registration and Storage
  - Storage via pluggable backends



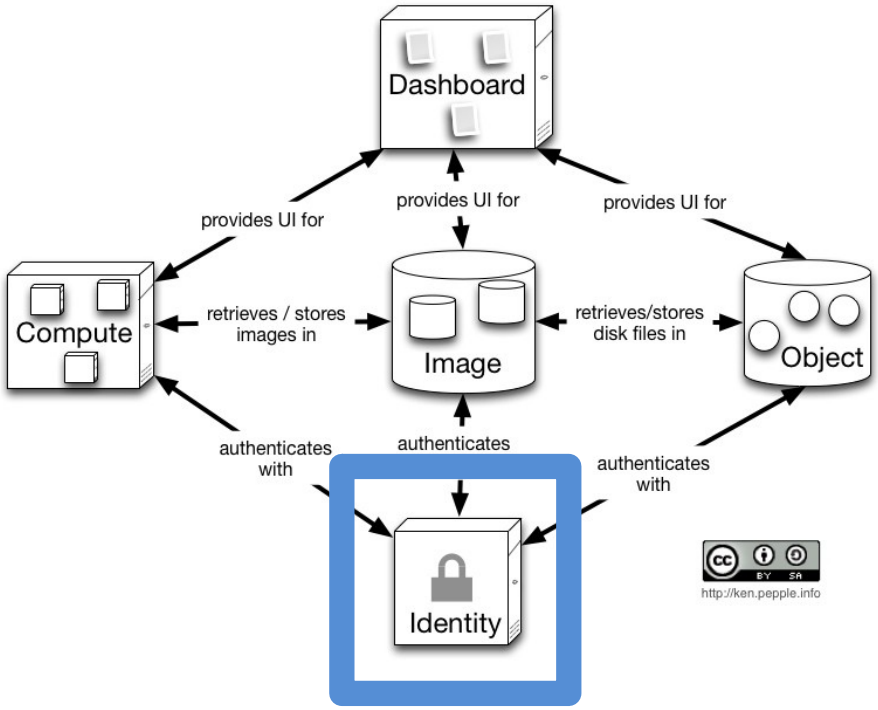
Key Component: Object Storage

- **Swift:** Store & Retrieve data
- Data (*objects*) are stored in buckets (*containers*)
- Eventually consistent design



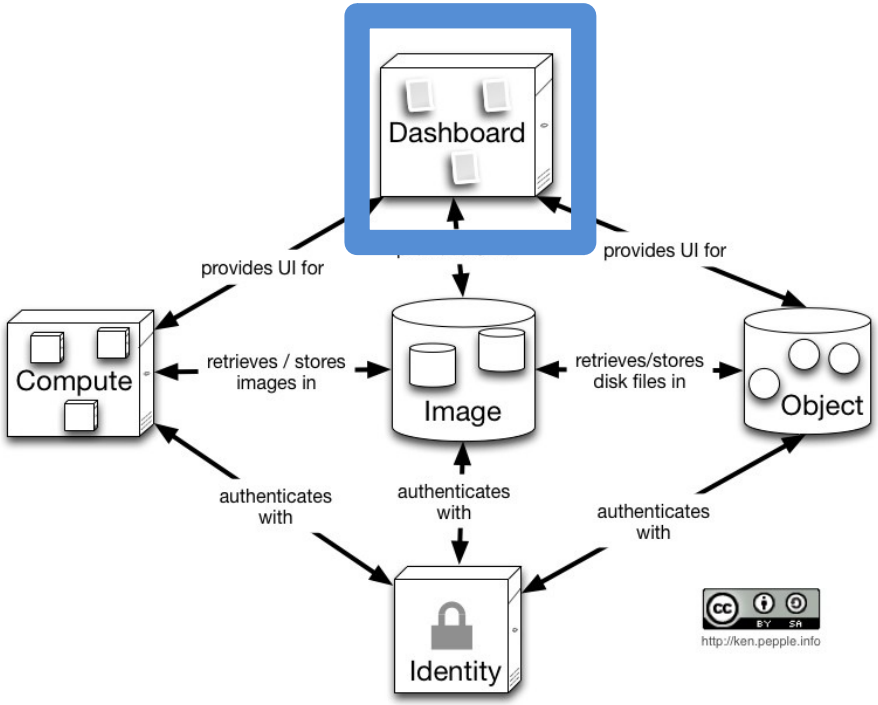
Key Component: Identity

- **Keystone:** authentication and authorization
  - all the OpenStack services.
- Service type catalog of services.
- Pluggable front and back ends



Key Component: Dashboard

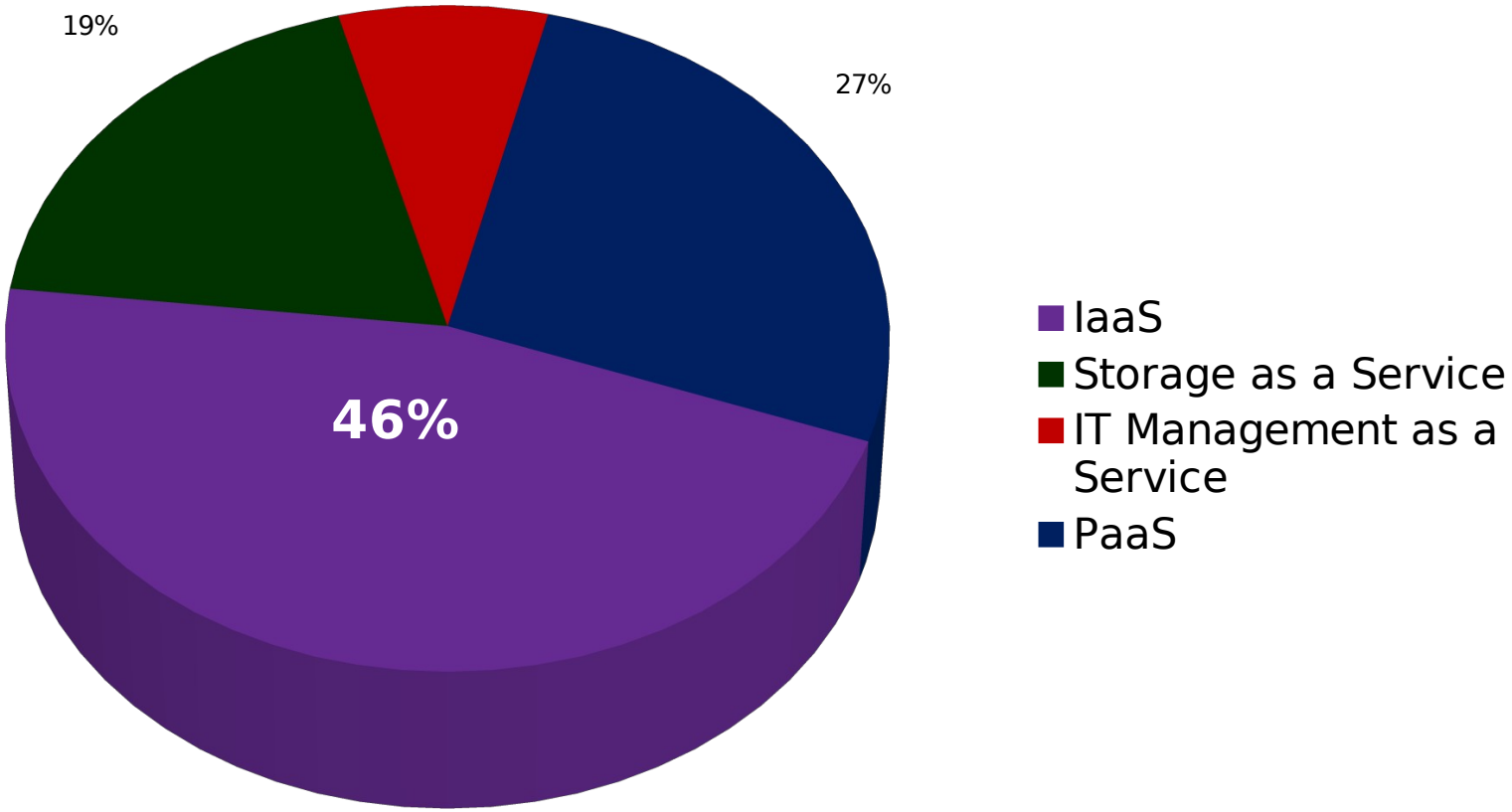
- **Horizon:** A modular web-based user interface for all the OpenStack services
- Core functionality
  - Other via cmd. line



Usable ... Useful ... Used

www.cloudcomp.ch

Commercially relevant?



Estimated 2012 Cloud Revenue Breakdown by Subsector – Total $4.3bn (220+ vendors)

Source: Cloud Adoption in the Enterprise: From the Playground to Production
William Fellows, VP Research, 451 Research

How can **YOU** take part?

Swiss OpenStack User Group!

Join in!

@openstackch

http://linkd.in/os-ugch