Cloud Services for Research

CERN – 26 June 2014

Bob Jones (CERN)

http://cdsweb.cern.ch/record/1374172/files/CERN-OPEN-2011-036.pdf

Strategic Plan for a Scientific Cloud Computing infrastructure for Europe

CERN-OPEN-2011-036
08/08/2011

1.1

8th August 2011

- **Establish a sustainable multi-tenant cloud computing infrastructure in Europe**
- **Initially based on the needs for the European Research Area & space agencies**
- **Based on commercial services from multiple IT industry providers**
- **Adhere to internationally recognised policies and quality standards**
- **Governance structure involving all stakeholders**

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Timeline

2011

- Endorse the Common **Strategy**
- Agree on the **Partnership**
- Select **flagships** use cases
- Define **governance** model

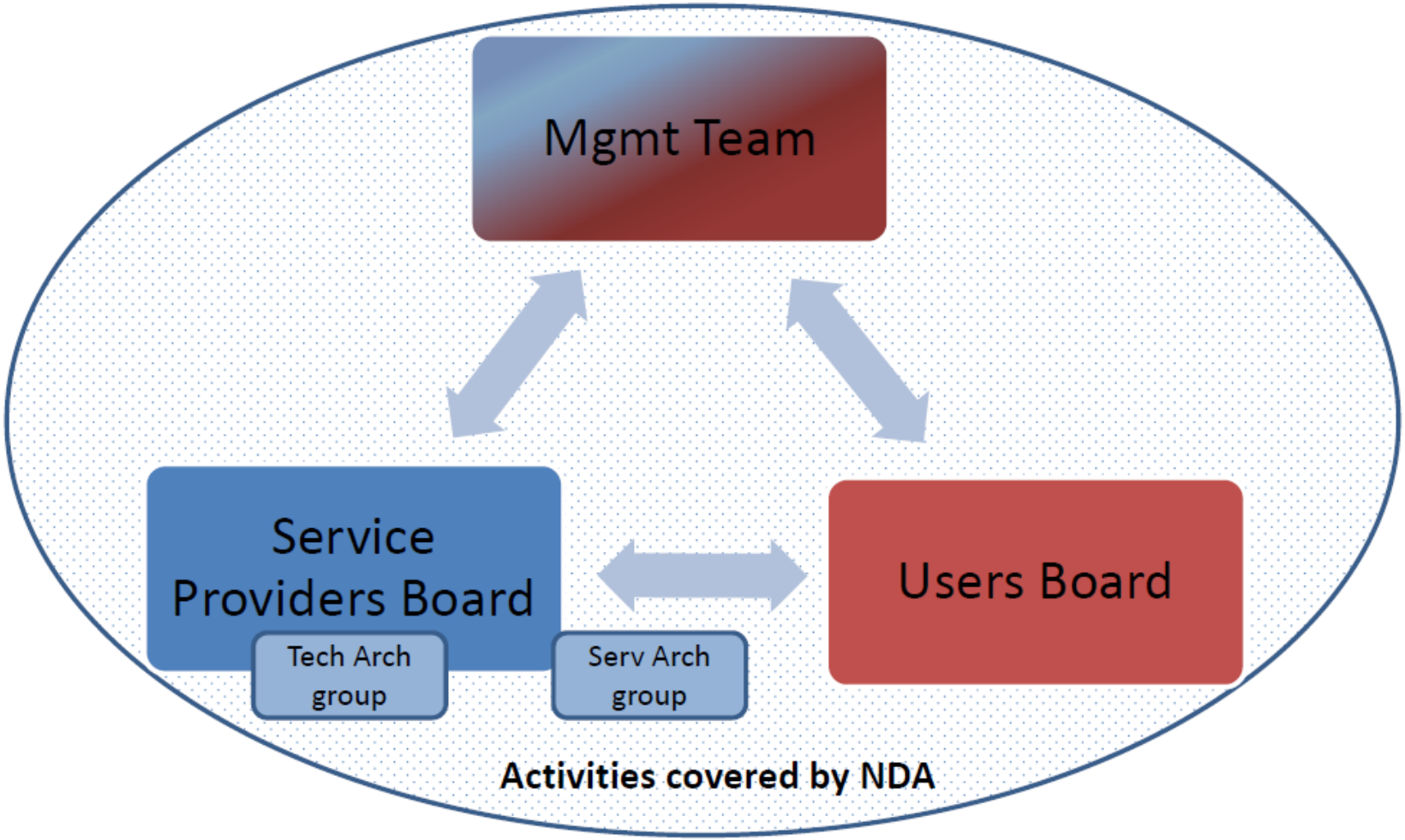
2012-2013

- **Pilot** Phase
- **Deploy** flagships,
- **Analysis** of functionality, performance & financial model

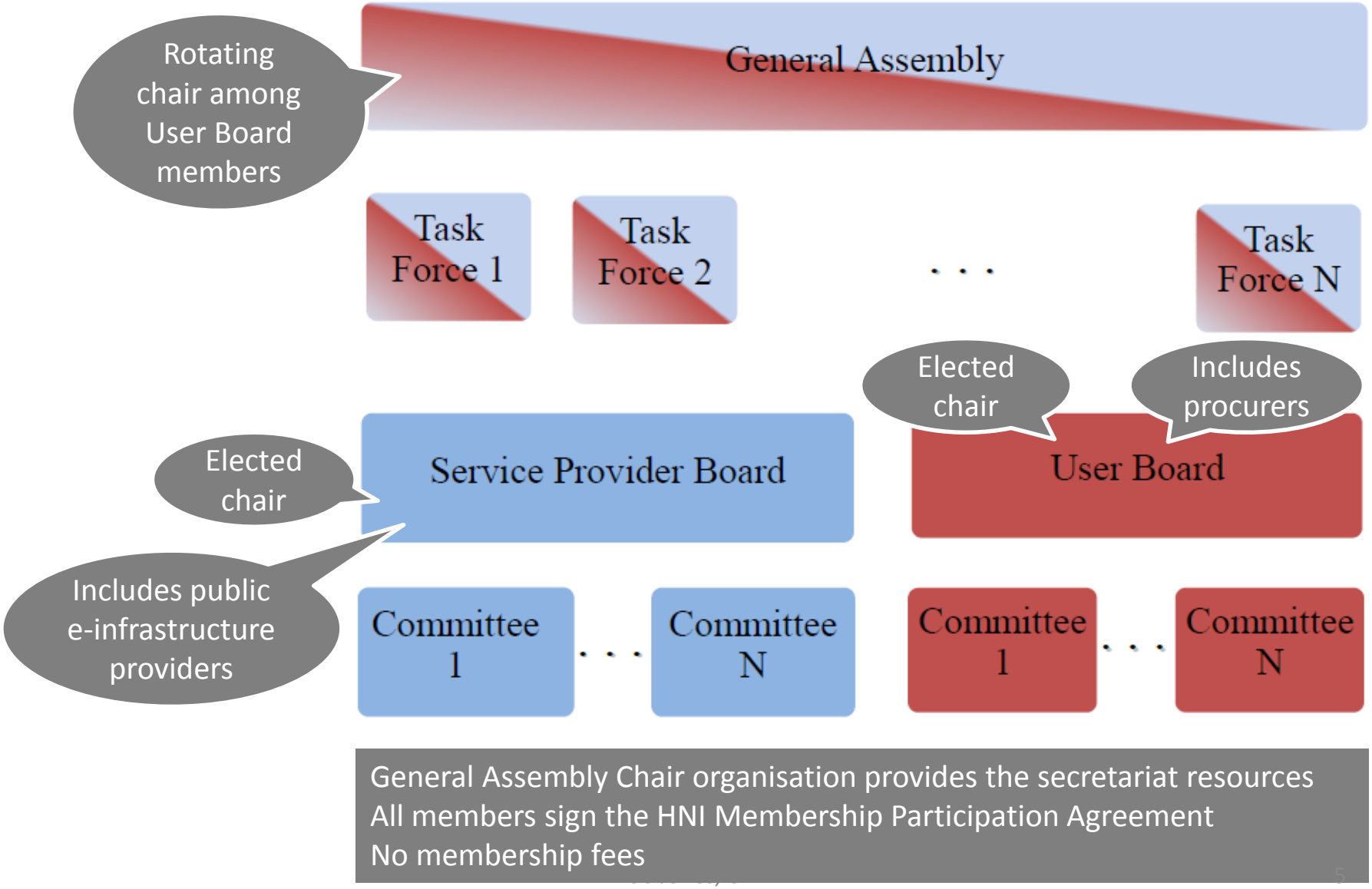
2014-2015

- **First** procurements
- **Large-scale** deployments
- **Revised** governance model

Governance Model for pilot phase



The new Helix Nebula Initiative governance model



General Assembly Chair organisation provides the secretariat resources
All members sign the HNI Membership Participation Agreement
No membership fees

The European cloud public-private partnership

HELIX NEBULA THESCIENCECLOUD

Strategic Plan

- Establish multi-tenant, multi-provider cloud infrastructure
- Identify and adopt policies for trust, security and privacy
- Create governance structure
- Define funding schemes

CERN

To support the computing capacity needs for the ATLAS experiment

EMBL

Setting up a new service to simplify analysis of large genomes, for a deeper insight into evolution and biodiversity

esa

cnes

To create an Earth Observation platform, focusing on earthquake and volcano research

PIC port d'informació científica

To improve the speed and quality of research for finding surrogate biomarkers based on brain images

Additional Users: ECMWF, ESO, ESRF, ILL NEUTRONS FOR SCIENCE

Suppliers

Atos, CLOUDEO, CloudSigma, Cloudwatt, DataCentred, Deutsche Börse Cloud Exchange, EGI, exoscale, GÉANT, interoute, Prologue, sixsq, SWITCH, T-Systems, the SERVER LABS, ultimum technologies

Adopters

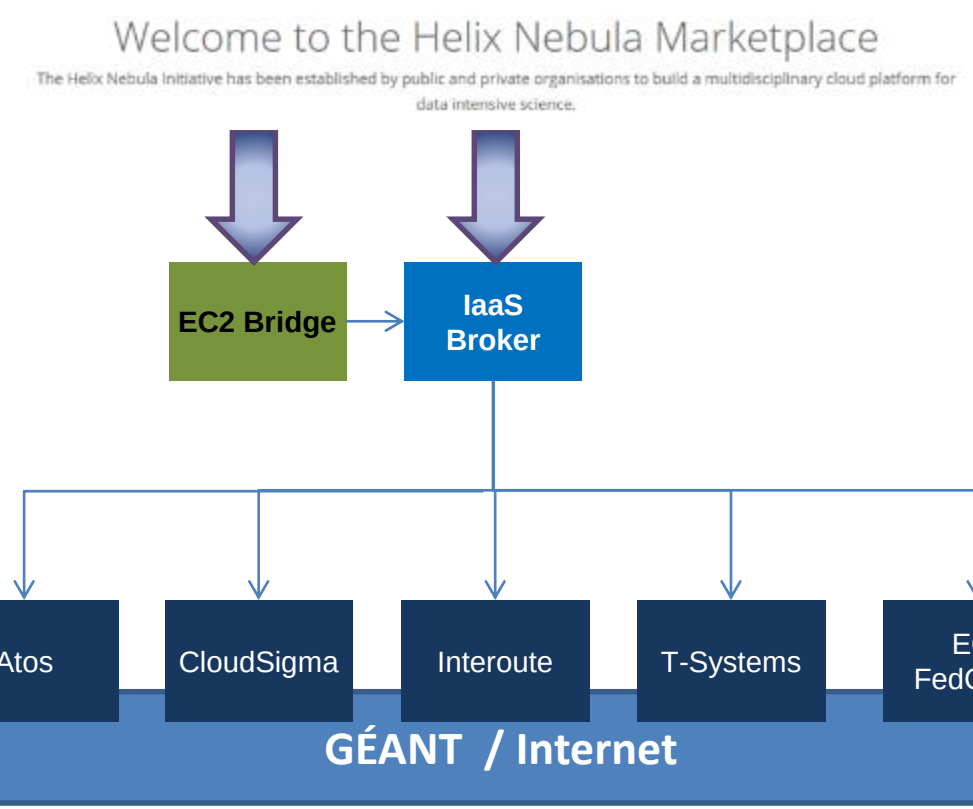
AWST, Capgemini, CSA cloud security alliance, deac, Ifremer, MEMSET, orange Business Services, RHEA, terradue, THALES, Trust-IT, vito, VU, Yandex

June 2015

HNX CLOUD MARKETPLACE

Branded-product # 1: HNX

HELIX NEBULA THESCIENCECLOUD

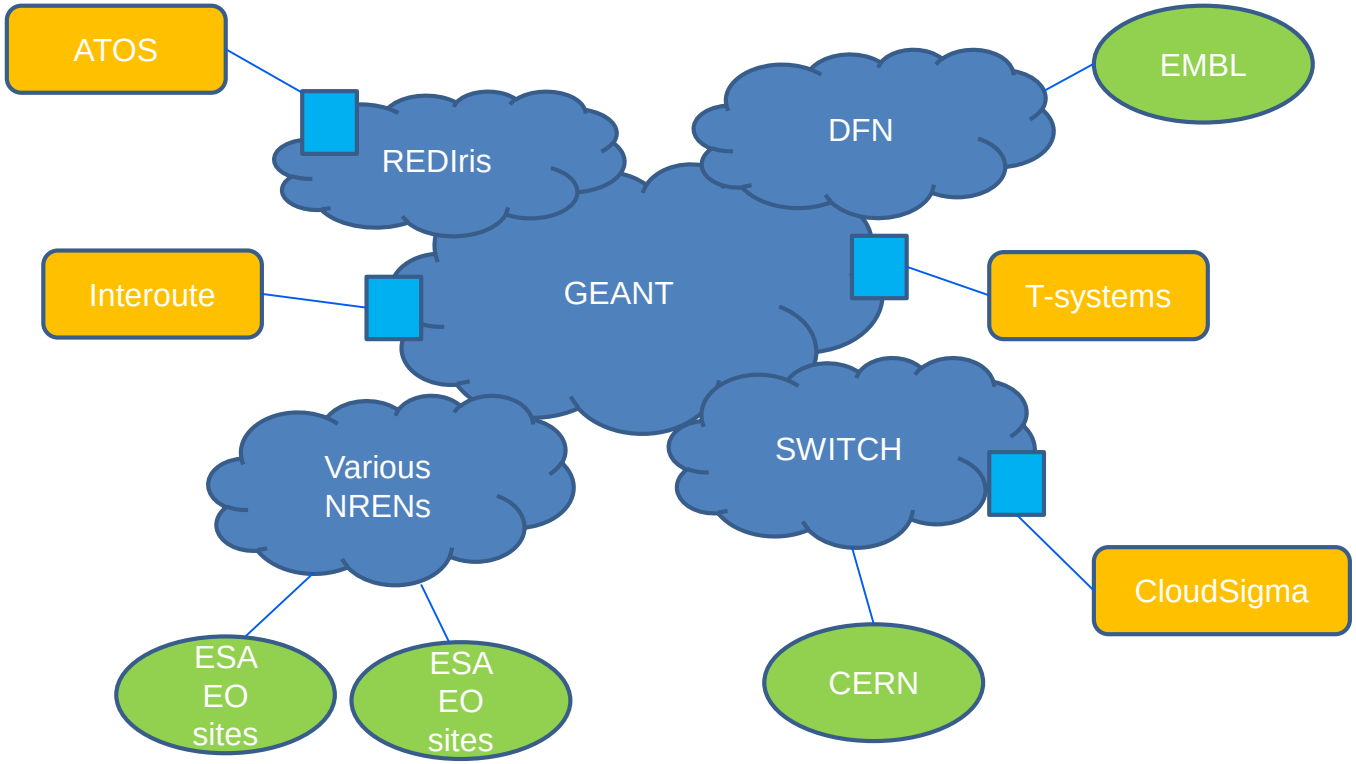


Building the hybrid cloud

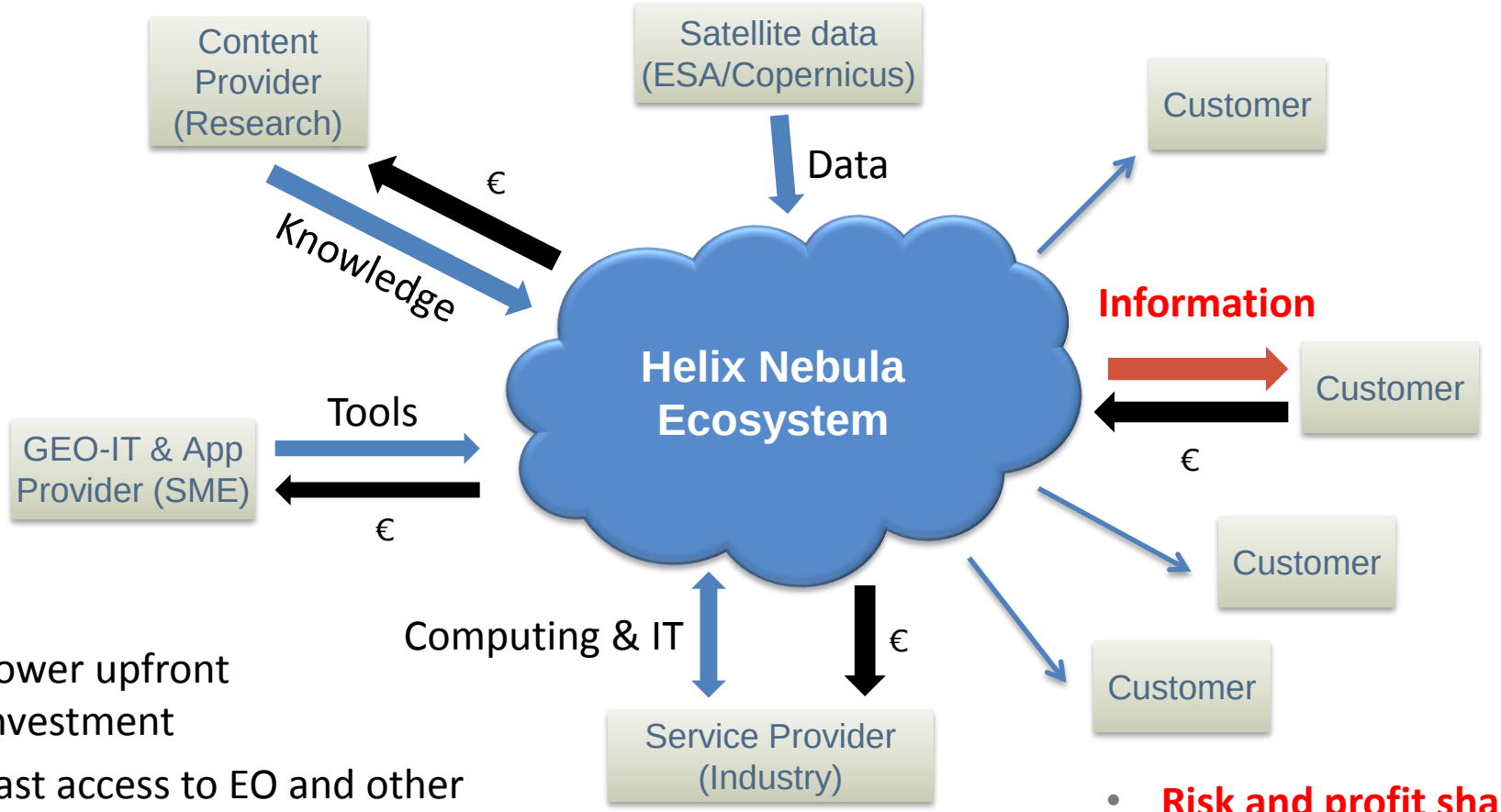
Connecting commercial cloud providers to GÉANT/NRENs

GEANT Association offering free IP connectivity in GÉANT for research traffic during the pilot phase

NRENs have different commercial agreements (usually they apply a fee)



Information as a Service: Science interfacing with private sector



- Lower upfront investment
- Fast access to EO and other geodata resources
- Disruptive technology

- **Risk and profit sharing**
- **Sustainability**
- **Data Value Chain**

Example HNX procurement

CERN issued a price enquiry for a small fraction of the resources necessary to run the ATLAS experiment simulation software

- Several valid responses were received and Atos (data centre in Tenerife, Spain) was awarded the contract accessed via the SlipStream broker and provisioning engine (from SixSq SME) and delivered over the GÉANT network
- 1.2 million CPU hours over 6 weeks producing 11.5 million GEANT4 $t\bar{t}$ events with a high level of efficiency for CPU intensive workload

PICSE Wizard

Cloud service procurement made easy

Public research organisations and digital libraries are among the largest consumers of cloud services. Now more than ever, procurement officials, IT managers and procurement initiators need to know how best to procure cloud services. The PICSE wizard is an easy-to-use service to help you make informed decisions about how to procure cloud services.

Find the best cloud procurement model for you

Answer just 8 questions and find out which cloud service procurement model is most suitable for you. Be it pre-commercial, commercial or public procurement of innovation, the PICSE wizard will equip you with the right information to make the best choices.

Start Now

Assess how suitable your current procurement process is for procuring cloud services

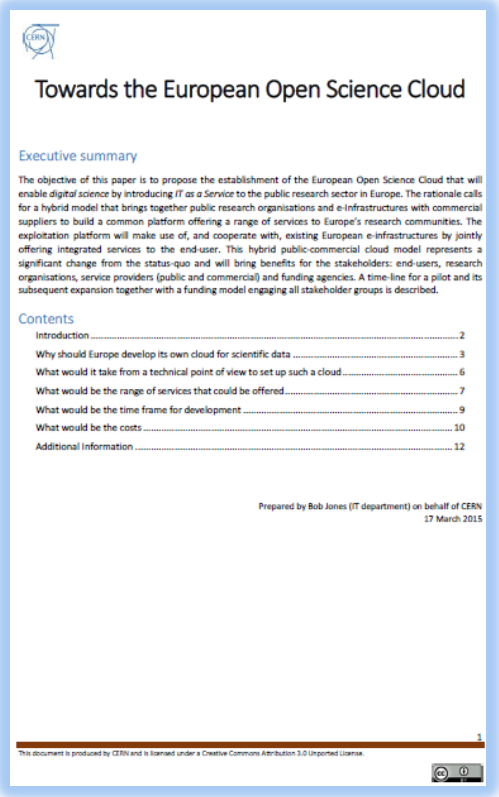
Complete our short interactive questionnaire and find out how you can enhance your current procurement process so that it suits the cloud environment. Compare your existing process with the PICSE best practice model to identify gaps and areas for improvement.

Start Now

The tools have been developed by the PICSE consortium (www.picse.eu) with the support of recognised experts (www.picse.eu/picse-task-force). The tools include references to consolidated literature documents and existing tools. The results of the tool have to be considered as guidelines in the procurement process of cloud services for public research organisations and libraries. The information, views and tips set out in the PICSE Wizard are those of the PICSE Consortium and its experts and cannot be considered to reflect the views of the European Commission. These guidelines are not meant to be exhaustive and cannot replace the legal & procurement advice provided by experts.

What is the European Open Science Cloud?

- **Hybrid** – link public research organisations, e-Infrastructures & commercial cloud services
  - Use GEANT network to link Research Infrastructures, repositories (EUDAT, OpenAIRE), EGI, PRACE etc. to commodity commercial cloud services (multiple providers)
  - A cornerstone of the Open Science Commons*
- **Trust** - Researchers keep control of the cloud and their data
  - Guarantee a copy of all the data is kept on public resources
  - Ensure long-term preservation of the data
  - Insulate users from changes of service supplier and technology
- **Economy** - Must be cheaper than the '*build our own*' approach
  - Avoid separate 'silos' for each Research Infrastructure/Community
  - Profit from the economies of scale in commercial data centres



Towards the European Open Science Cloud

Executive summary

The objective of this paper is to propose the establishment of the European Open Science Cloud that will enable *digital science* by introducing *IT as a Service* to the public research sector in Europe. The rationale calls for a hybrid model that brings together public research organisations and e-Infrastructures with commercial suppliers to build a common platform offering a range of services to Europe's research communities. The exploitation platform will make use of, and cooperate with, existing European e-infrastructures by jointly offering integrated services to the end-user. This hybrid public-commercial cloud model represents a significant change from the status-quo and will bring benefits for the stakeholders: end-users, research organisations, service providers (public and commercial) and funding agencies. A time-line for a pilot and its subsequent expansion together with a funding model engaging all stakeholder groups is described.

Contents

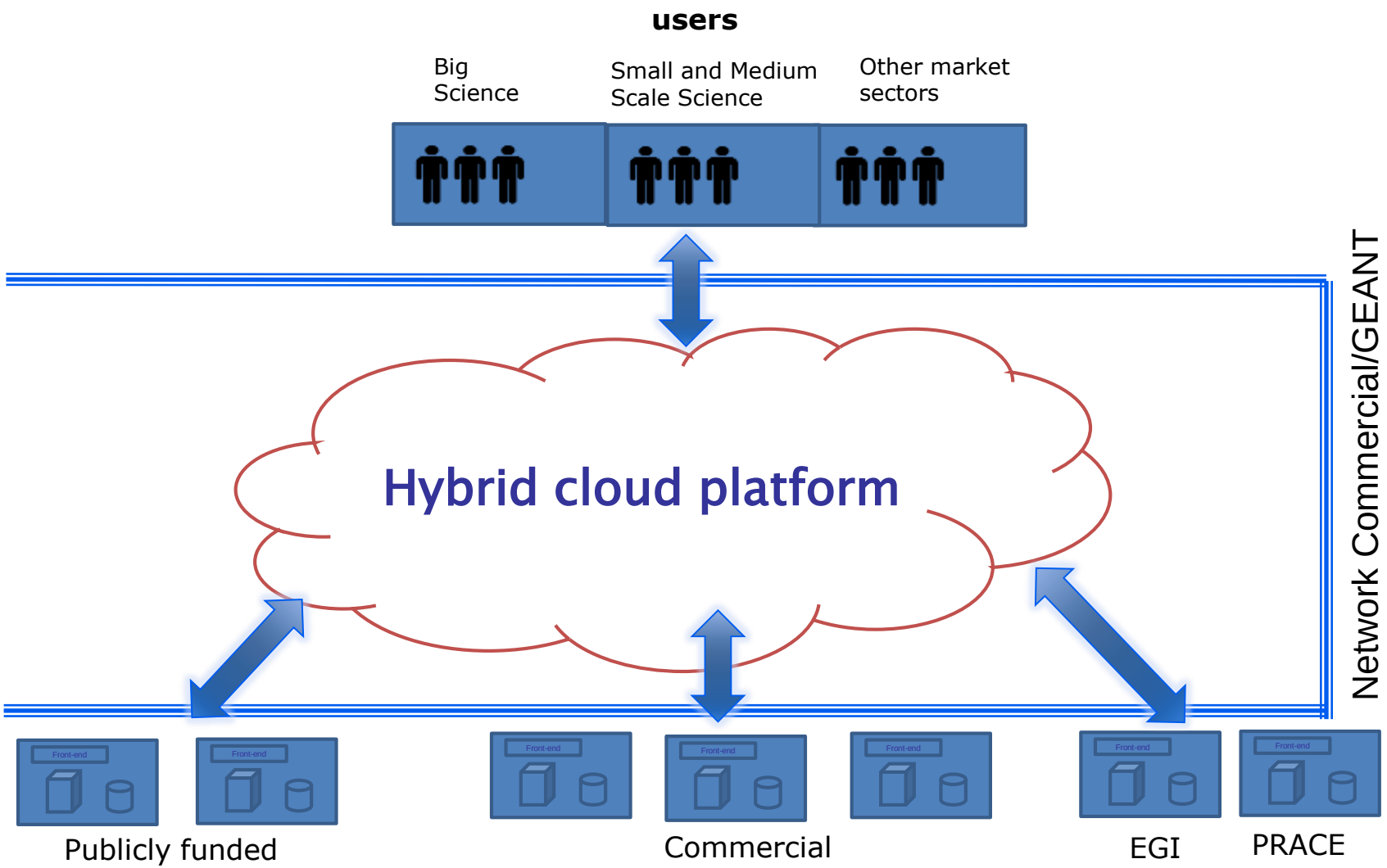
Prepared by Bob Jones (IT department) on behalf of CERN

17 March 2015

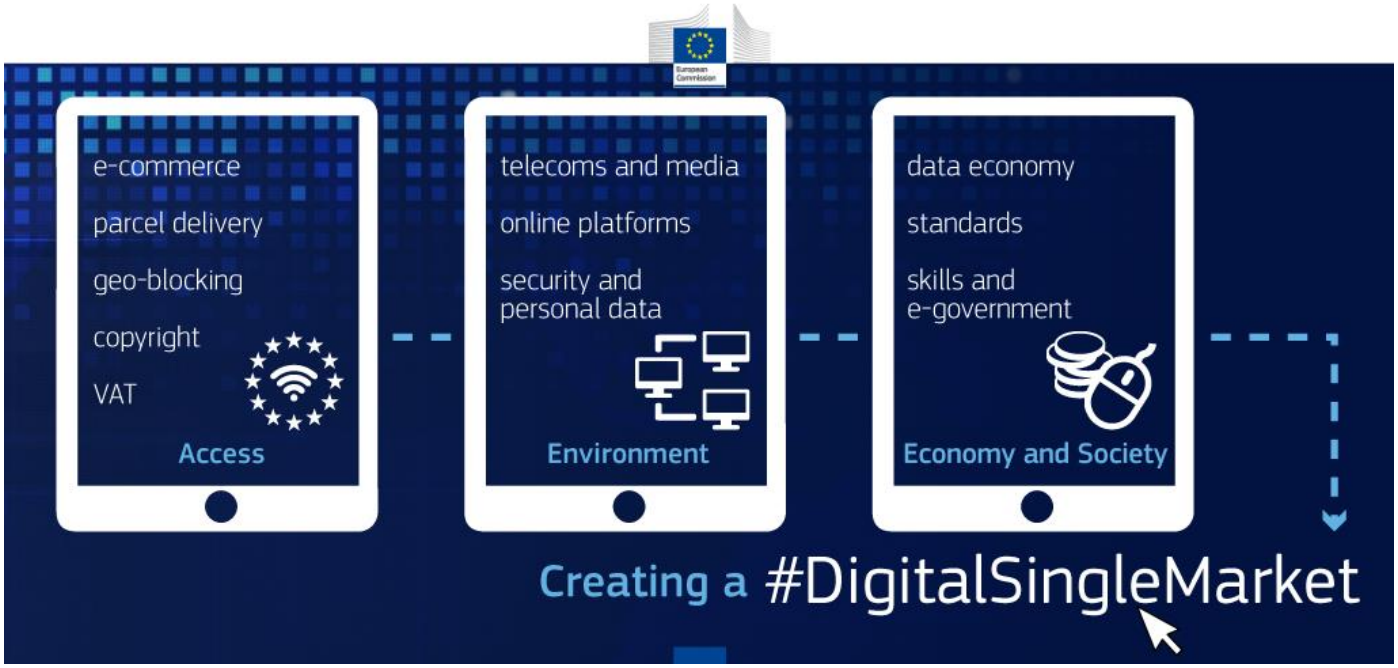
* http://go.egi.eu/osc

http://dx.doi.org/10.5281/zenodo.16140

Helix Nebula Hybrid Cloud Model



European Open Science Cloud and the Digital Single Market



"The Commission will launch a European Cloud initiative including cloud services certification, contracts, switching of cloud services providers and a ***research open science cloud****."*

May 2015

CONFERENCE

A NEW START FOR EUROPE

22-23 JUNE 2015
Charlemagne Building, Brussels

OPENING UP TO AN **ERA** OF **INNOVATION**

HELIX NEBULA
THESCIENCECLOUD

"we are preparing a call for European Science Cloud Project in order to identify the possibility of creating a cloud for our scientists" Commissioner Moedas

Objectives of the day

- Explore how to build a **European Open Science Cloud** taking into account
  - What already exists in the public and private sectors
  - The challenges of Big Data
  - Financial Models