

Helix Nebula The Science Cloud

CERN – 14 May 2014

Bob Jones (CERN)



Why do we need Helix Nebula?



Paradigm shift – scientific innovation dependent on large-scale data collection, processing and access enabling interdisciplinary science



Vision 2030 - identifies the benefits and costs of accelerating the development of a fully functional e-infrastructure for scientific data

Realisation that no single provider could address all the needs of the European Research Area and that a simple customer-supplier model will be unable to support the full scientific lifecycle

Strategic Plan for a Scientific Cloud Computing infrastructure for Europe

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 ...

Towards an **open market for Science**

Long Term Goal

To create a multi-tenant '**Open Market Place for Science**', where data, scientists, funding bodies, SMEs and downstream industry meet to work towards common interests

An ecosystem to transform data into valuable information

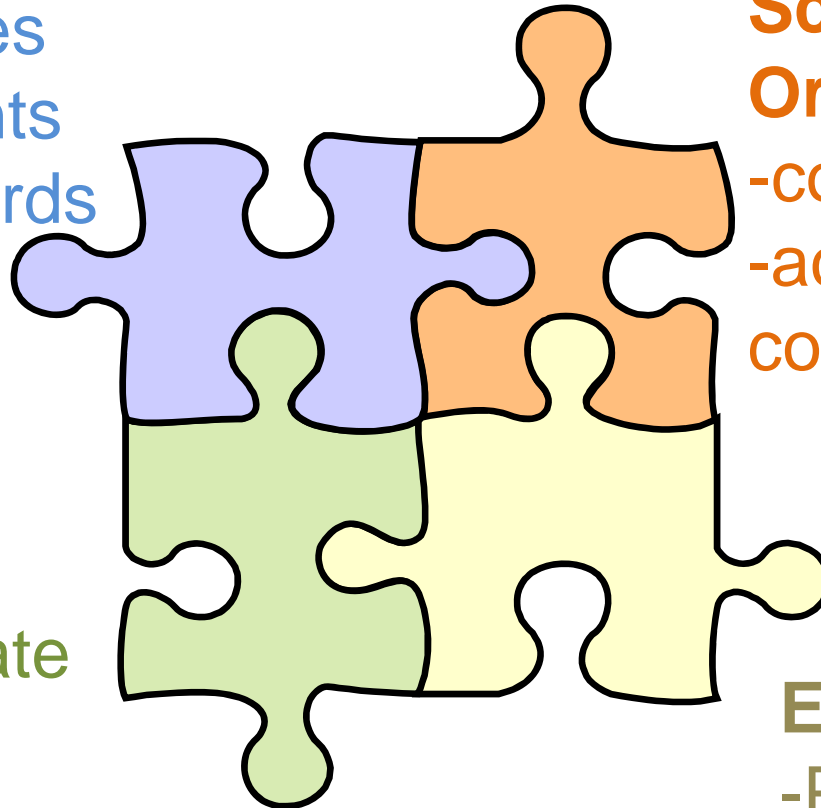
Partnership – Who & How?

IT Providers

- commit resources
- share investments
- agree on standards & interoperability

SME's

Bring expertise
& agility to innovate
new services



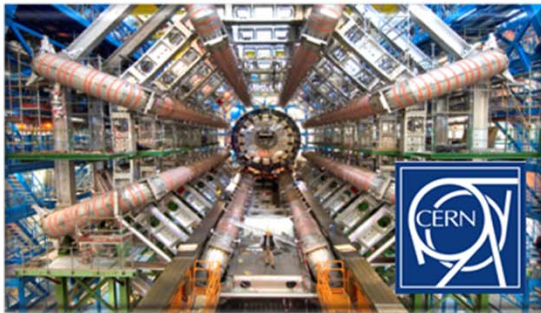
Scientific and Space Organizations

- commit resources
- access to data & user communities

EC supports with
-Policy & Strategy

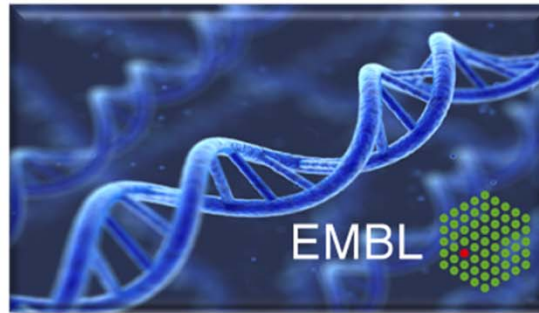
Initial Flagship Use Cases

ATLAS High Energy Physics Cloud Use



To support the computing capacity needs for the ATLAS experiment

Genomic Assembly in the Cloud



A new service to simplify large scale genome analysis; for a deeper insight into evolution and biodiversity

SuperSites Exploitation Platform



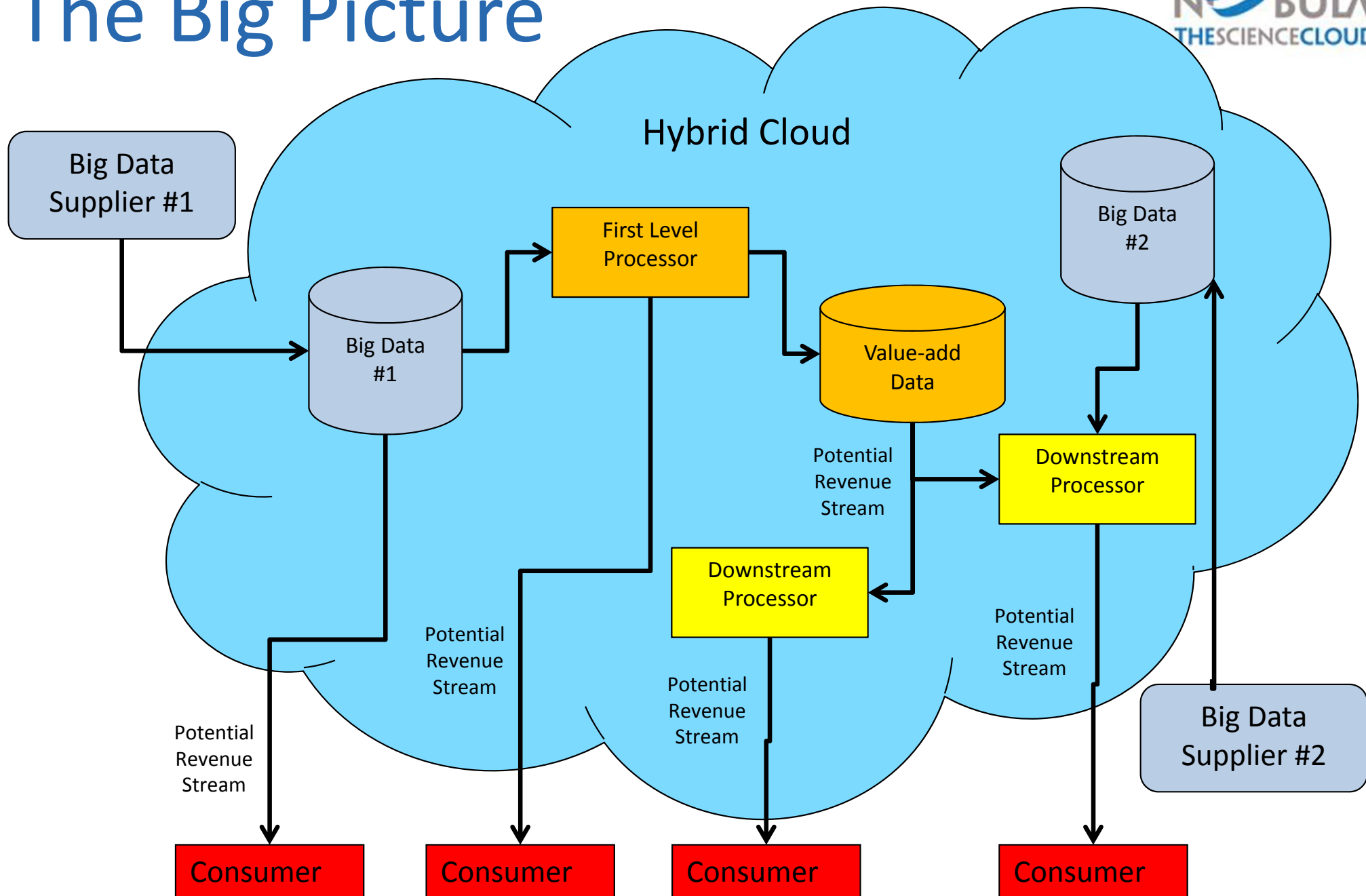
To create an Earth Observation platform, focusing on earthquake and volcano research

- Scientific challenges with societal impact
- Sponsored by user organisations
- Stretch what is possible with the cloud today

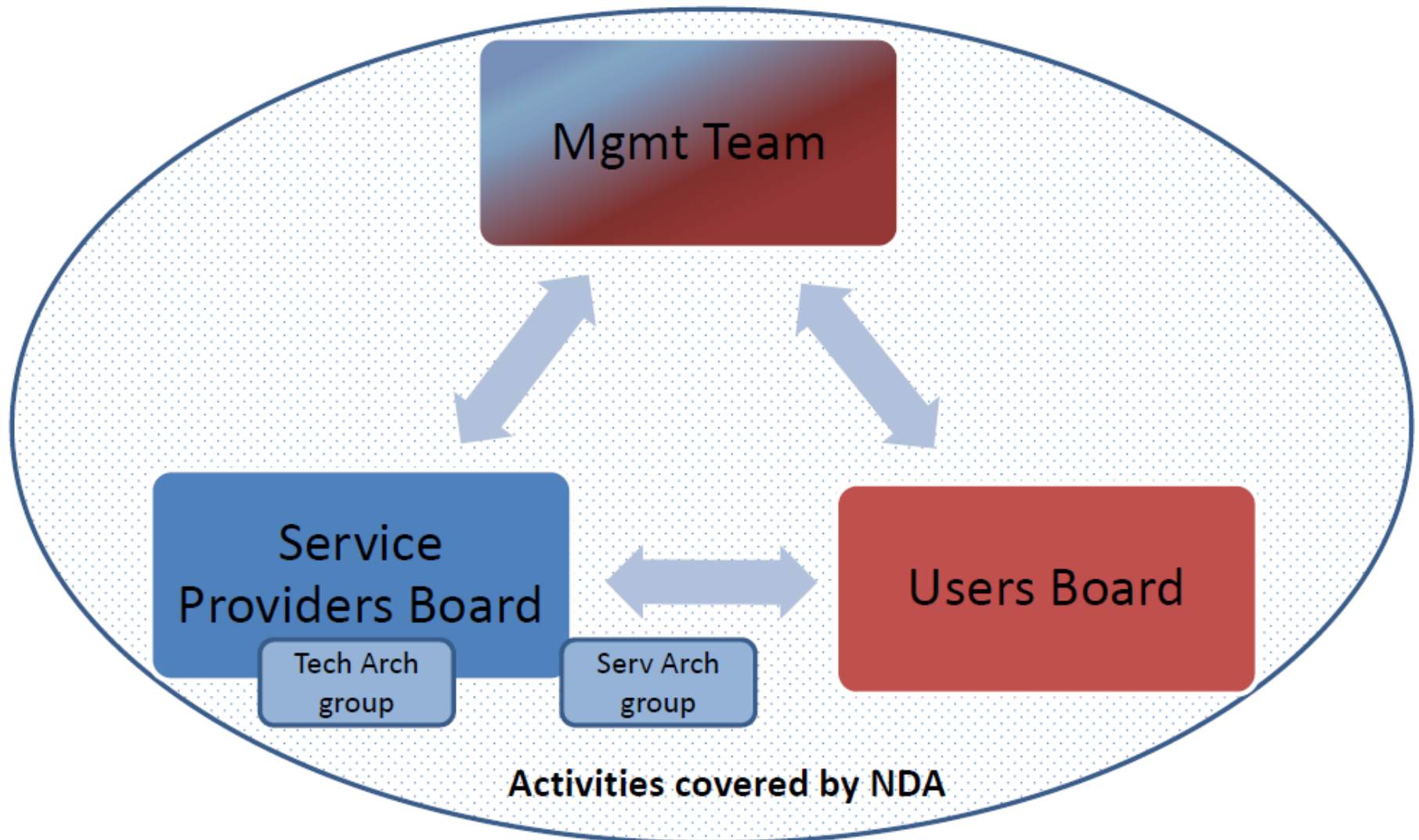
Flagship use cases

	ATLAS H.E.P. Cloud Use (CERN)	Genomic Assembly in the Cloud (EMBL)	SuperSites Exploitation Platform (ESA/CNES/DLR)
Scientific goal/society impact/photogenic	•	•	•
Scale of resources used	•	•	
Federation/Aggregation of datasets		•	•
Long-term archiving of data			•
On-demand processing	•	•	•
Impact on community & benefits	•	•	•
Potential increase of users	•	•	•
Interoperability	•	•	•
Data security	•	•	•
Maturity	•	•	•
Access to license-controlled sw			•

The Big Picture



Governance Model for pilot phase



- Membership rules published
- # participants has increased from 20 to over 40

May 2014: A European cloud computing partnership: big science teams up with big business



Strategic Plan

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



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



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



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

Suppliers



Adopters





From cloud-ACTIVE to cloud-PRODUCTIVE

14 May 2014

CERN Globe for Science and Innovation
Geneva, Switzerland



What you will see today:

- A first production environment providing a basis for future expansion
- Scientific flagship applications successfully deployed
- Future directions