





# The Helix Nebula Pre-Commercial Procurement

Astronomy ESFRI and Research Infrastructure Cluster Grant Agreement No 653477.




**1<sup>st</sup> ASTERICS-OBELICS  
Workshop**



Science data cloud & Computing models in Astronomy & Astroparticle physics through users and e-infrastructures engagement.

**Dates:** 12-14 December 2016 **Venue:** Casa I CAPPUCINI, Rome, Italy.

Bob Jones, CERN  
Bob.Jones <at> cern.ch



Helix Nebula – The Science Cloud

Helix Nebula – The Science Cloud with Grant Agreement 687614 is a Pre-Commercial Procurement Action funded by H2020 Framework Programme



# The Helix Nebula Science Cloud public-private partnership



## 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



PIC  
port d'informació científica

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

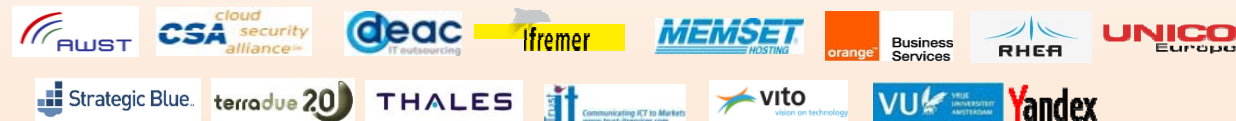
Additional Users:



Suppliers

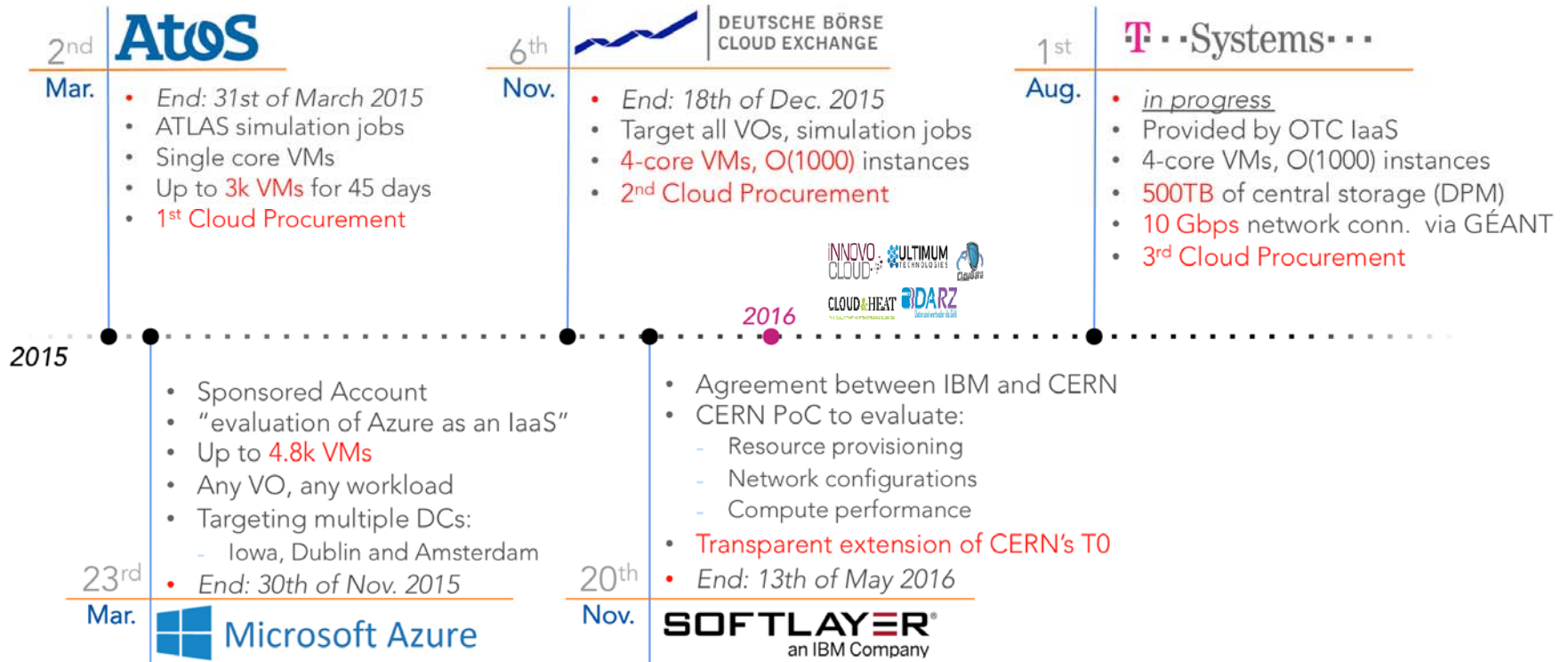


Adopters



Updated  
October 2016

# CERN cloud procurements 2015-2016

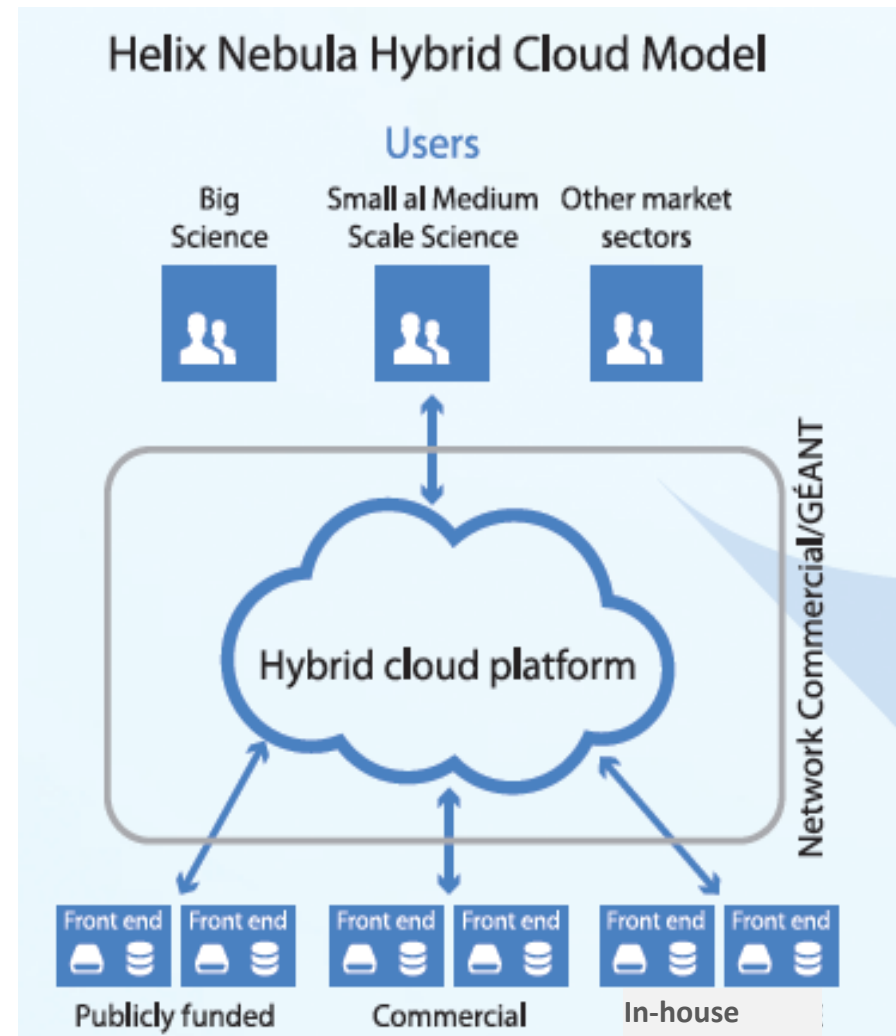


# The Hybrid Cloud Model

Brings together

- research organisations,
- data providers,
- publicly funded e-infrastructures,
- commercial cloud service providers

In a hybrid cloud with procurement and governance approaches suitable for the dynamic cloud market





# Major challenges

1. **Cloud computing is disrupting the way IT resources are provisioned**
2. **In-house resources, publicly funded e-infrastructure and commercial cloud services are not integrated** to provide a seamless environment
3. Current **organisational and financial models are not appropriate**
4. The new way of **procuring cloud services is also a matter of skills and education**
5. **Legal impediments exist**





# The PICSE Roadmap

- Provides a **landscape of cloud procurement in the European** public research sector
- **Makes pragmatic recommendations for the procurement of cloud services** by PROs in Europe
- **Provides a guide to cloud procurement**, supported by best practices adopted worldwide
- **Proposes actions within the pillar three of the Digital Single Market Strategy** which focus on maximising the growth potential of the digital economy

[www.picse.eu/roadmap](http://www.picse.eu/roadmap)



## Helix Nebula Science Cloud Joint Pre-Commercial Procurement

Procurers: CERN, CNRS, DESY, EMBL-EBI, ESRF, IFAE, INFN, KIT, STFC, SURFSara  
Experts: Trust-IT & EGI.eu

The group of procurers have committed

- Procurement funds
- Manpower for testing/evaluation
- Use-cases with applications & data
- In-house IT resources

Resulting services will be made available to end-users from many research communities

Co-funded via H2020 Grant Agreement 687614

**Total procurement budget >5.3M€**



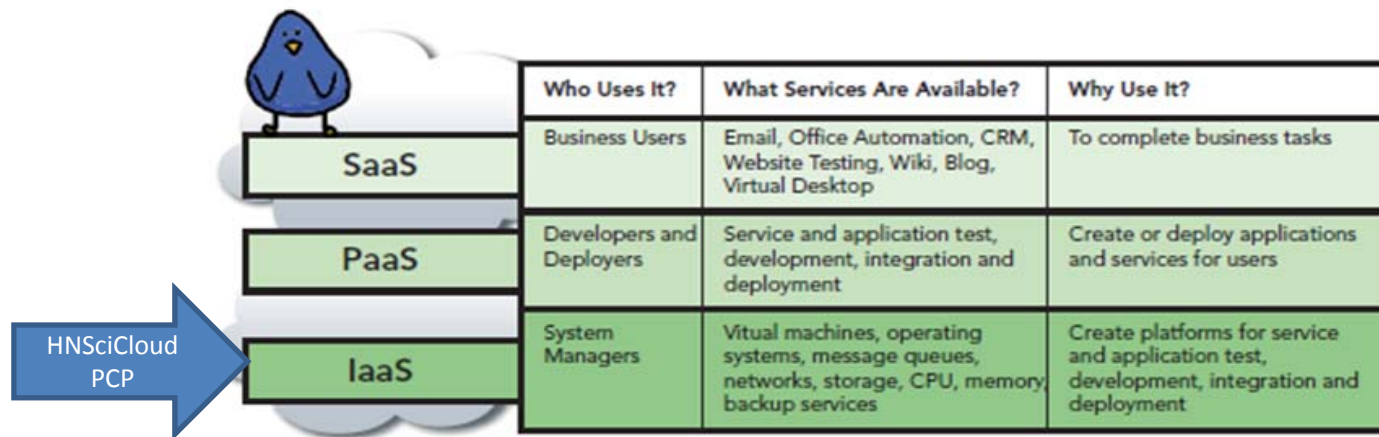


# What will be procured

A hybrid cloud platform for the European research community



Combining services at the IaaS level to support science workflows



Source: CloudComputing for Govies, DLT Solutions, David Blankenhorn, Van Ristau and Caron Beesley

The R&D services to be developed are to be integrated with Resources in data centres operated by the buyers group GEANT network



# Challenges



Innovative IaaS level cloud services integrated with procurers in-house resources and public e-infrastructure to support a range of scientific workloads

## *☛ Compute and Storage*

- ☛ support a range of virtual machine and container configurations including HPC working with datasets in the petabyte range

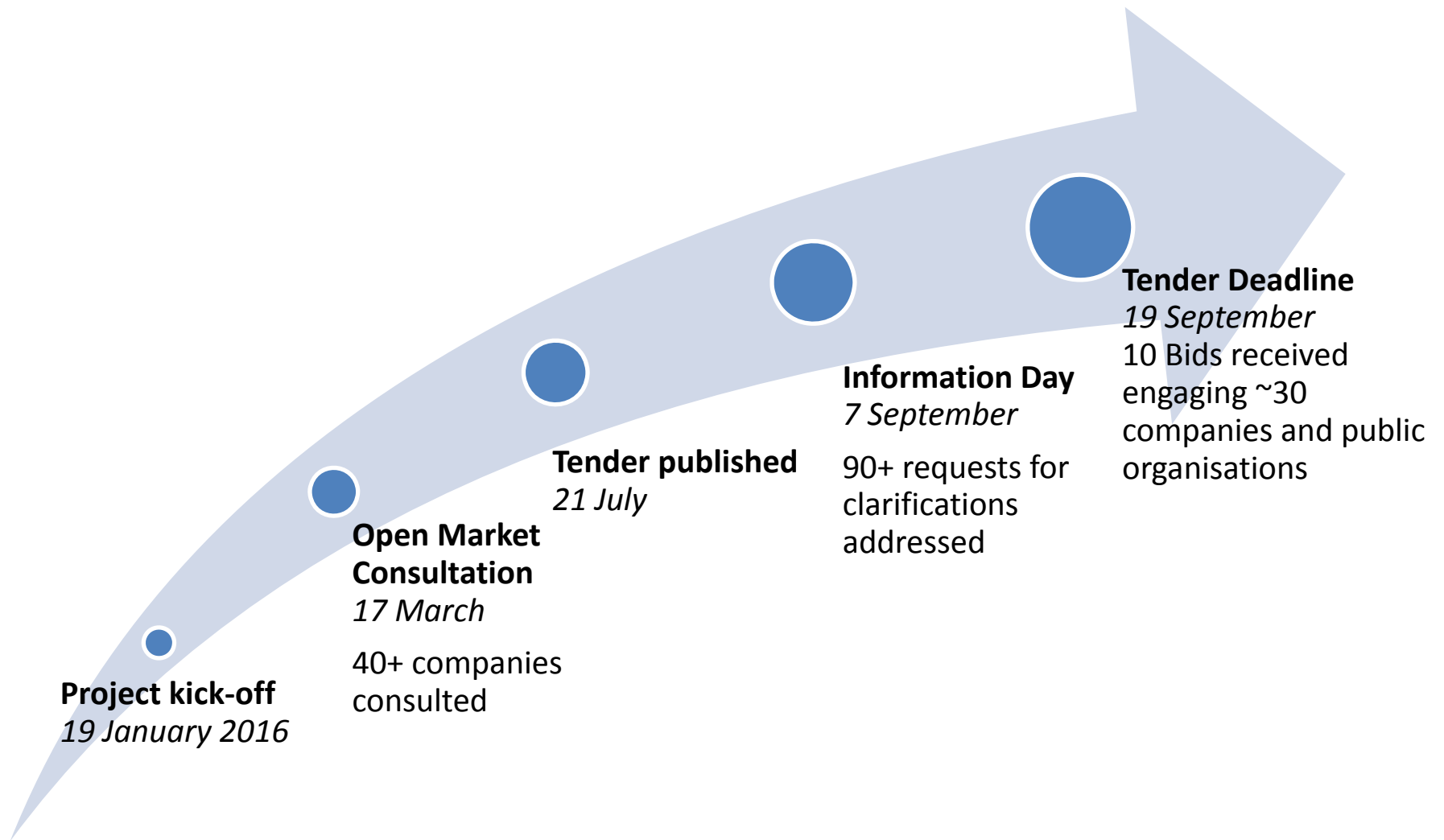
## *☛ Network Connectivity and Federated Identity Management*

- ☛ provide high-end network capacity via GEANT for the whole platform with common identity and access management

## *☛ Service Payment Models*

- ☛ explore a range of purchasing options to determine those most appropriate for the scientific application workloads to be deployed

# The story so far . .




**HOLIX  
NEBULA**  
THESCIENCECLOUD  
2 November 2016 @ 2pm CET  
Lyon, France  
Webcast: [www.hnscicloud.eu](http://www.hnscicloud.eu)

# HNSciCloud PCP Tender Results Announcement Ceremony

@HelixNebulaSC #HNtenderawards

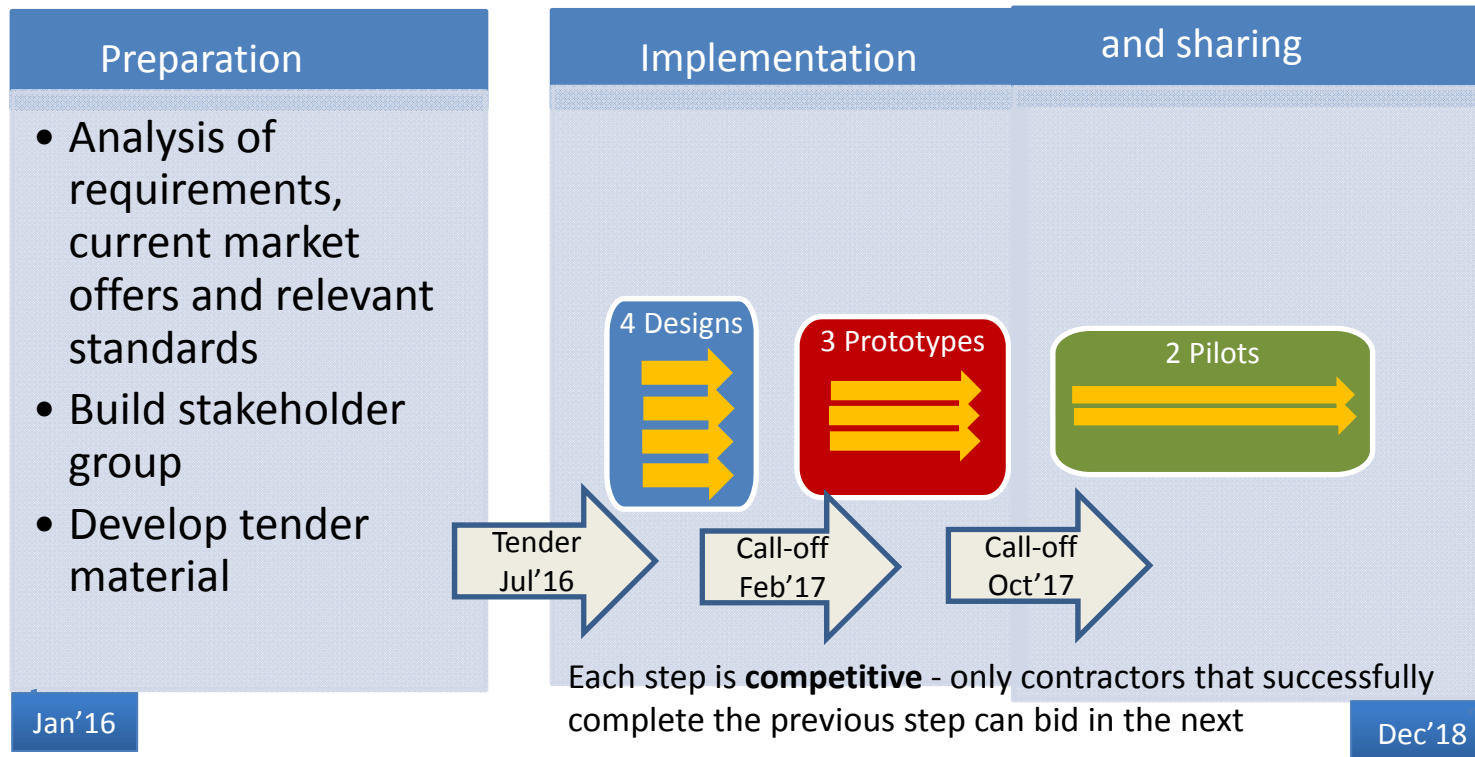
## HNSciCloud winning consortia

 <p>Consortium 1</p>	 <p>Consortium 2</p>	 <p>Consortium 3</p>	 <p>Consortium 4</p>
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Awards ceremony, 2<sup>nd</sup> November 2016 , hosted by CNRS in Lyon

# HNSciCloud project phases



ESFRI PROJECTS				
	NAME	FULL NAME	ROADMAP ENTRY (YEAR)	OPERATION (YEAR)
ENERGY	ECCSEL	European Carbon Dioxide Capture and Storage Laboratory Infrastructure	2008	2016
	EU-SOLARIS	European SOLAR Research Infrastructure for Concentrated Solar Power	2010	2020*
	MYRRHA	Multi-purpose Hybrid Reactor for High-tech Applications	2010	2024*
	WindScanner	European WindScanner Facility	2010	2018*
ENVIRONMENT	ACTRIS	Aerosols, Clouds and Trace gases Research Infrastructure	2016	2025*
	DANUBIUS-RI	International Centre for Advanced Studies on River-Sea Systems	2016	2022*
	EISCAT_3D	Next generation European incoherent scatter radar system	2008	2021*
	EPOS	European Plate Observing System	2008	2020*
	SIOS	Swalbard Integrated Arctic Earth Observing System	2008	2020*
HEALTH & FOOD	AnaEE	Infrastructure for Analysis and Experimentation on Ecosystems	2010	2018*
	EMBRC	European Marine Biological Resource Centre	2008	2016
	EMPHASIS	European Infrastructure for multi-scale Plant Phenomics and Simulation for food security in a changing climate	2016	2020*
	ERINHA	European research infrastructure on highly pathogenic agents	2008	2018*
	EU-OPENSREEN	European Infrastructure of Open Screening Platforms for Chemical Biology	2008	2018*
	Euro-BiImaging	European Research Infrastructure for Imaging Technologies in Biological and Biomedical Sciences	2008	2017*
	ISBE	Infrastructure for Systems Biology Europe	2010	2018*
	MIRRI	Microbial Resource Research Infrastructure	2010	2019*
PHYSICAL SCIENCES & ENGINEERING	CTA	Cherenkov Telescope Array	2008	2023*
	EST	European Solar Telescope	2016	2026*
	KM3Net 2.0	KM3 Neutrino Telescope 2.0: Astroparticle & Oscillations Research with Cosmics in the Abyss	2016	2020*
	E-RIHS	European Research Infrastructure for Heritage Science	2016	2022*



ESFRI LANDMARKS				
	NAME	FULL NAME	ROADMAP ENTRY (YEAR)	OPERATION (YEAR)
	JHR	Jules Horowitz Reactor	2006	2020*
	EMSO	European Multidisciplinary Seafloor and water-column Observatory	2006	2016
	EURO-ARGO ERIC	European contribution to the international Argo Programme	2006	2014
	IAGOS	In-service Aircraft for a Global Observing System	2006	2014
	ICOS ERIC	Integrated Carbon Observation System	2006	2016
	LifeWatch	e-infrastructure for Biodiversity and Ecosystem Research	2006	2016
	BBMRI ERIC	Biobanking and BioMolecular resources Research Infrastructure	2006	2014
	EATRIS ERIC	European Advanced Translational Research Infrastructure in Medicine	2006	2013
	ECRIN ERIC	European Clinical Research Infrastructure Network	2006	2014
	ELIXIR	A distributed infrastructure for life-science information	2006	2014
	INFRAFRONTIER	European Research Infrastructure for the generation, phenotyping, archiving and distribution of mouse disease models	2006	2013
	INSTRUCT	Integrated Structural Biology Infrastructure	2006	2012
	E-ELT	European Extremely Large Telescope	2006	2024*
	ELI	Extreme Light Infrastructure	2006	2018*
	EMFL	European Magnetic Field Laboratory	2008	2014
	ESRF UPGRADES	Phase I Phase II: Extremely Brilliant Source	2006 2016	2015 2022*
	European Spallation Source ERIC	European Spallation Source	2006	2025*
	European XFEL	European X-Ray Free-Electron Laser Facility	2006	2017*
	FAIR	Facility for Antiproton and Ion Research	2006	2022*
	HL-LHC	High-Luminosity Large Hadron Collider	2016	2026*
	ILL 20/20	Institut Max von Laue-Paul Langevin	2006	2020*
	SKA	Square Kilometre Array	2006	2020*
	SPIRAL2	Système de Production d'Ions Radioactifs en Ligne de 2e génération	2006	2016
	CESSDA	Consortium of European Social Science Data Archives	2006	2013
	CLARIN ERIC	Common Language Resources and Technology Infrastructure	2006	2012
	DARIAH ERIC	Digital Research Infrastructure for the Arts and Humanities	2006	2019*
	ESS ERIC	European Social Survey	2006	2013
	SHARE ERIC	Survey of Health, Ageing and Retirement in Europe	2006	2011

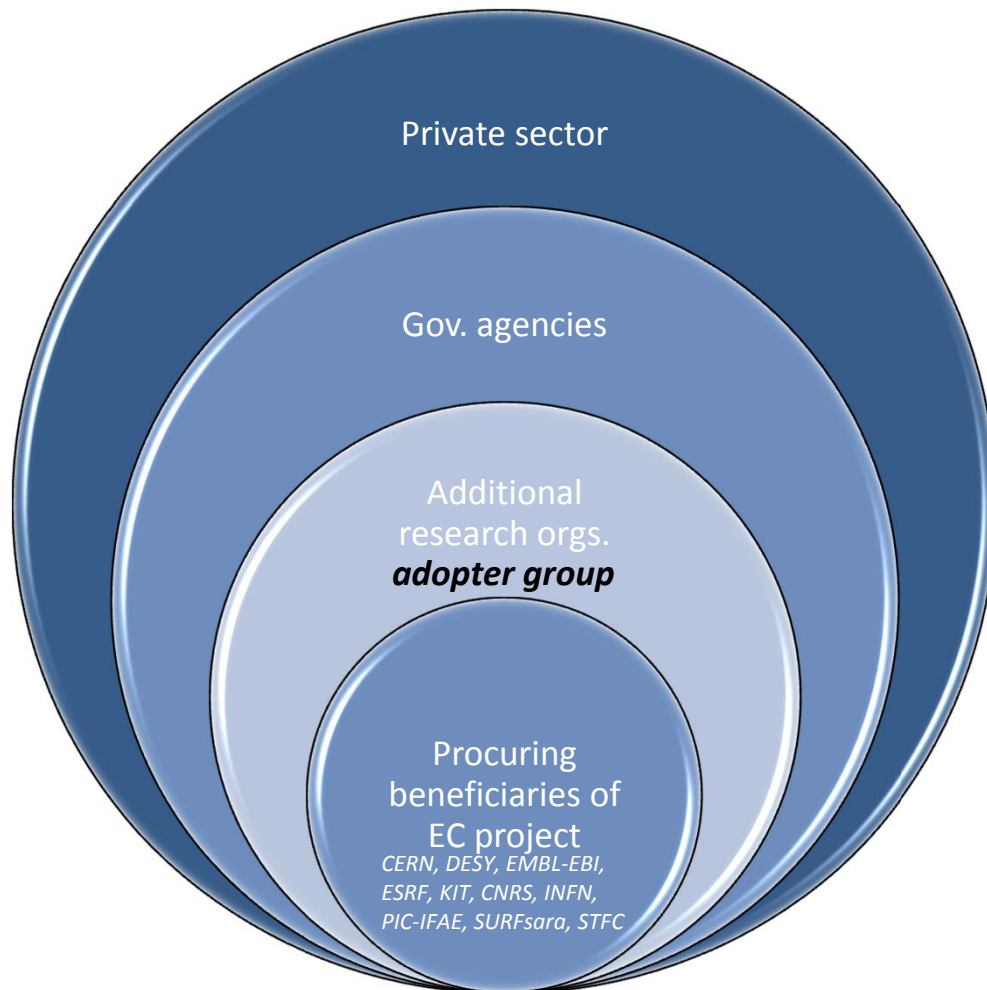


Bob Jones, CERN

Research Infrastructures are facilities, resources or services of a unique nature identified by European research communities to conduct top-level research activities in all fields

*Other interested Research Infrastructures will form an adopter group*

# Growing the buyers group



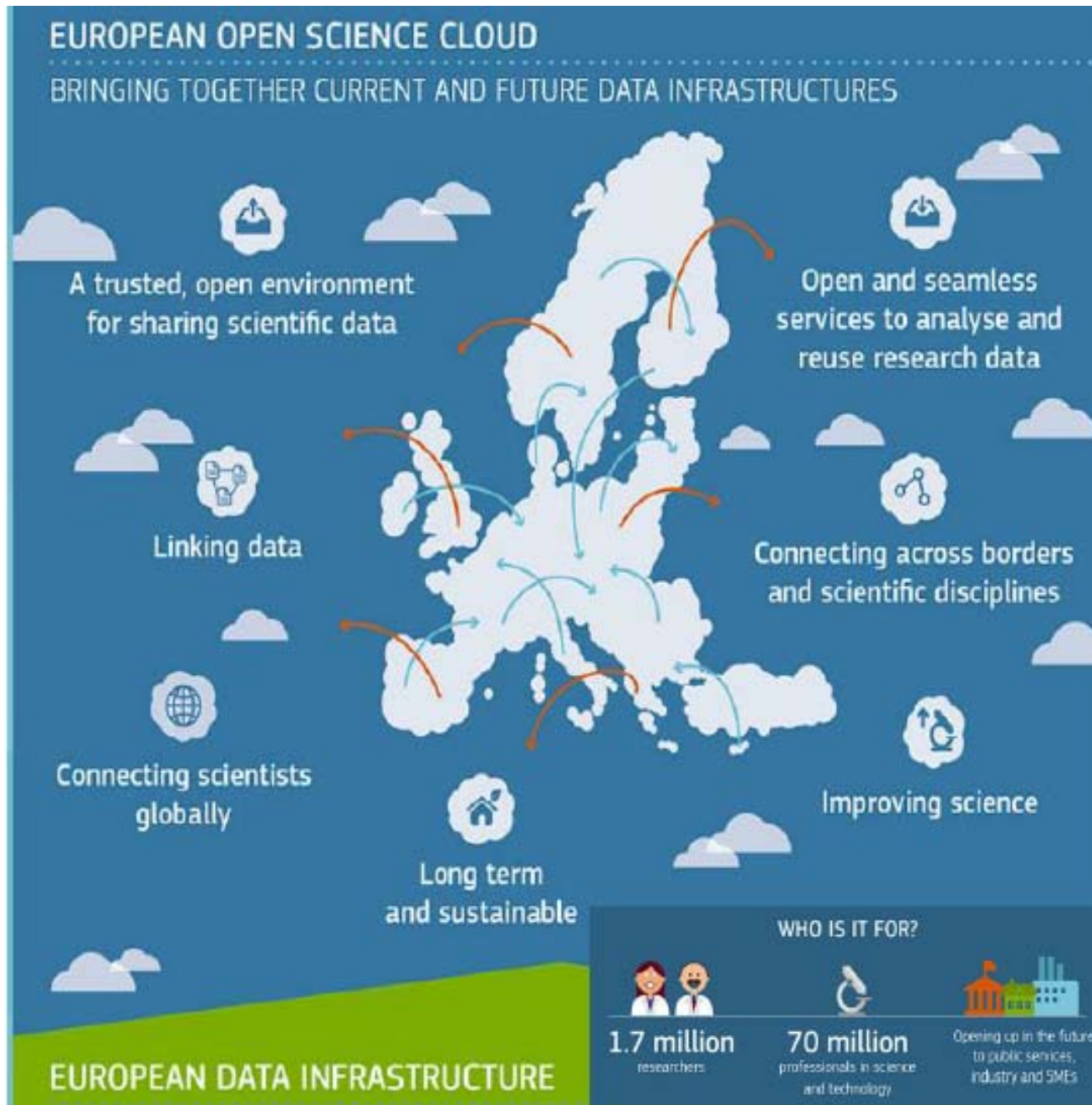
The initial group of buyers is the set of research orgs. that committed their resources at the start of the project and became beneficiaries of the EC project

Goal is to progressively grow the buyers group by including more publicly funded research organisations: ***adopter group***

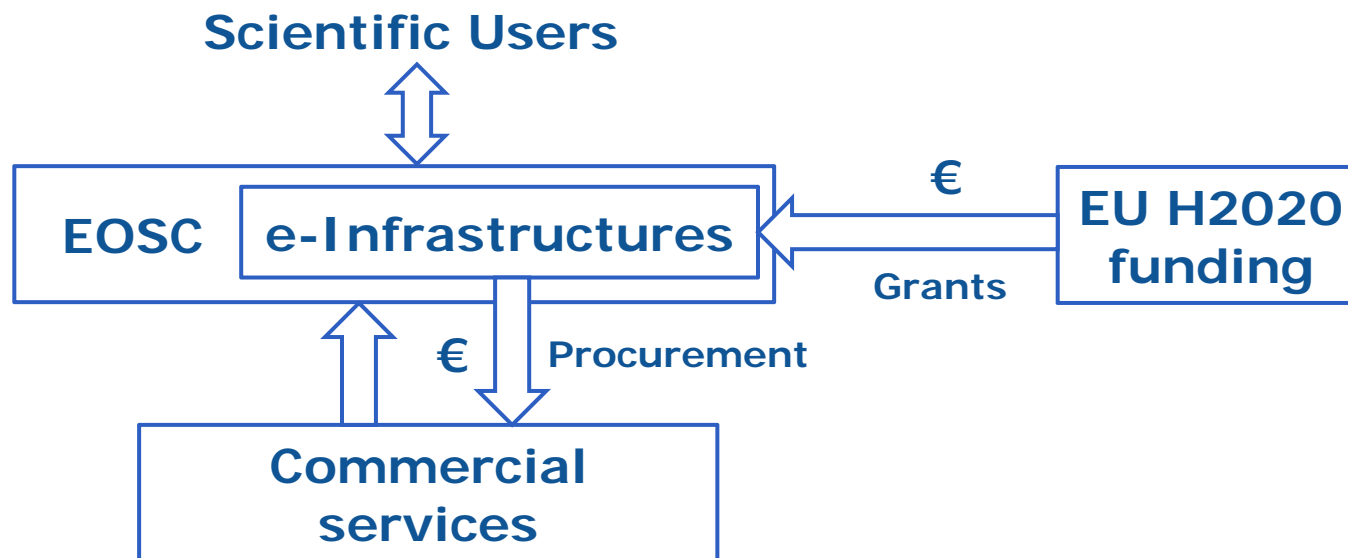


# Adopter Group

- ☞ Provides wider access to IaaS services during the HNSciCloud pilot phase (2018)
  - ☞ Opportunity to use the commercially supported cloud services that have been selected and tested by the HNSciCloud procurers
  - ☞ No need to perform your own tender
  - ☞ Profit from the legal framework and access conditions negotiated by HNSciCloud
  - ☞ Be able to fund the use of the cloud services via your own EC projects



## Widening access (2/2): e-Infras as aggregators of demand



*Augusto Burgueño Arjona, head of the Unit "eInfrastructure & Science Cloud", DG CNECT, EC, Sept'16*

# Summary

- ☛ The hybrid cloud model leverages investments made in both the public and private sectors while ensuring trust and continuity
- ☛ Changes to the procurement process are necessary to benefit from the dynamic commercial cloud services market
- ☛ HNSciCloud demonstrates the PCP instrument can be used to incite public and commercial providers to develop innovative, open-source based and standards-compliant services that satisfy the needs of Europe's research communities
- ☛ Different funding instruments will be required at different phases of the service lifecycle
- ☛ **Helix Nebula Science Cloud** is part of a foreseen series of EC co-funded procurement projects which will contribute to the European Open Science Cloud