



# Scientific Cloud Computing Infrastructure for Europe

Bob Jones,  
IT department, CERN



# Origin of the initiative

- Conceived by ESA as a prospective for providing cloud services to the space sector in Europe
- Presented to the IT working group of the EIROforum where other members (CERN, EMBL) joined
- Two workshops held during 2011
  - June: hosted by ESA in Frascati
  - October: hosted by EMBL in Heidelberg

EIROforum: CERN, EFDA-JET, EMBL, ESA, ESO, ESRF, European XFEL, ILL

## Strategic Plan for a Scientific Cloud Computing infrastructure for Europe

- 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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### Contacts

Dr. Maryline Lengert  
ESA - European Space Agency  
Senior Advisor  
Maryline.Lengert@esa.int  
Tel +39 06 941 80430

Dr. Bob Jones  
CERN – European Organization for Nuclear Research  
IT department  
Bob.Jones@cern.ch  
Tel. +41 22 767 14 82

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# A Collaboration Initiative

**European Commission  
& relevant projects**

**User organisations  
*Demand-side***

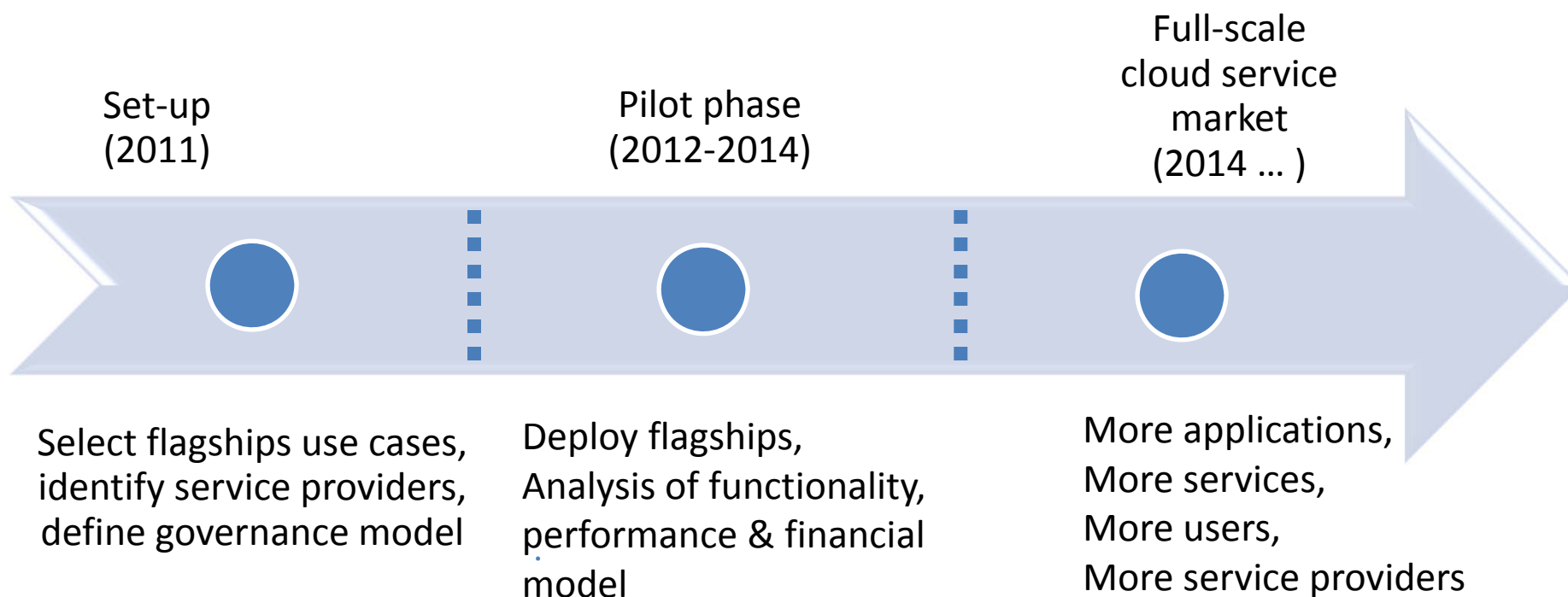
**European  
Cloud Computing  
Strategy**

**Commercial Service  
Providers  
*Supply-side***

Bringing together all the stakeholders to establish a public-private partnership

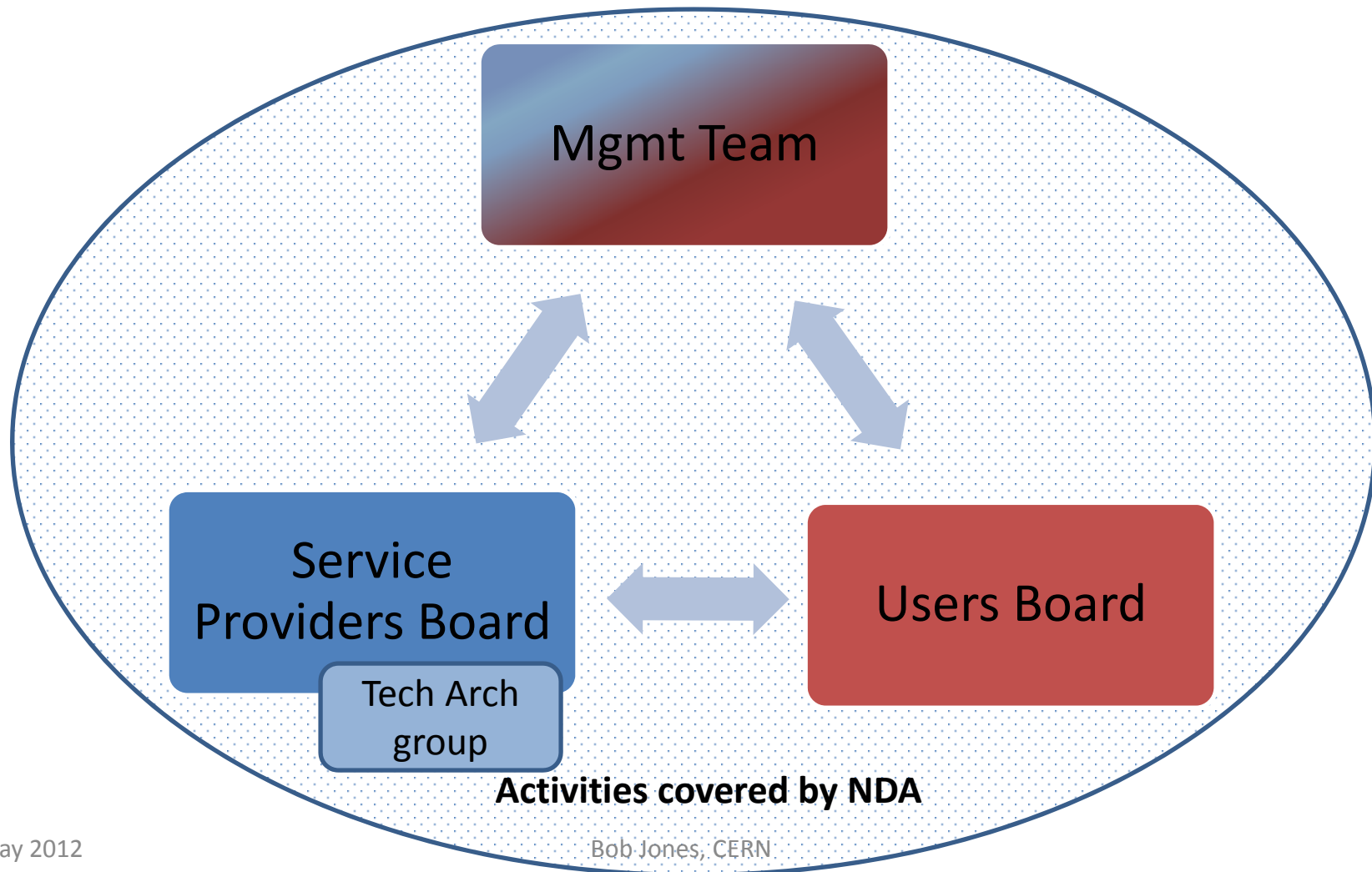


# Timeline





# Governance Model for Proof of Concept stage in the Pilot Phase





# Consortium membership

- Consortium includes all participating supply-side and demand-side companies/organisations
  - Member status and adopter status
  - All sign a non-disclosure agreement
  - “interested parties” can also register
- Initial membership is defined
  - More members and adopters will be added following the Proof of Concept stage within the Pilot Phase (summer 2012)



# Pilot Phase

- Through the pilot phase we expect to explore/push a series of perceived barriers to Cloud adoption:
  - **Security:** Unknown or low compliance and security standards
  - **Reliability:** Availability of service for business critical tasks
  - **Data privacy:** Moving sensitive data to the Cloud
  - **Scalability/Elasticity:** Will the Cloud scale-up to our needs
  - **Network performance:** Data transfer bottleneck; QoS
  - **Integration:** Hybrid systems with in-house/legacy systems
  - **Vendor lock-in:** Dependency on vendors once data & applications have been transferred to the Cloud
  - **Legal concerns:** Such as who has legal liability
  - **Transparency:** Clarity of conditions, terms and pricing





# Service Procurement

- Assuming pilot phase proves successful, the provision of commercial Cloud services would need to be integrated into the ICT procurement process of the demand-side organisations
- For the initial flagships this implies:
  - Inter-governmental organisations
    - Jurisdiction (governing laws & arbitration), tax-free status, etc.
    - Return on Investment: preference for procurement from each organisation's member-states
  - Pool of commercial service providers that can respond to calls for tender
  - Cannot integrate procurement processes of all demand-side organisations but can converge:
    - Technical specifications & standards
    - Terms and conditions
- EC published Guide for the procurement of standards based ICT Elements of Good Practice (21 Dec 2011)



# Flagship use cases

- **Proposed by demand-side user organisations addressing scientific challenges with societal impact**
  - High-profile applications that catch the public imagination and encourage others to use the services
  - Innovate in terms of functionality, performance, scope, business opportunities or impact
- **Sponsored by user organisations**
  - Must be prepared to contribute their own resources during the pilot phase to port application (manpower) and contribute to the cost of procuring required services from the supply-side (cash)
  - Must participate in a costing exercise where the total cost of deploying and operating the flagship application in-house can be compared to the cost of procuring the services via Helix Nebula
- **Want to propose a flagship?**
  - Send email to [contact@helix-nebula.eu](mailto:contact@helix-nebula.eu)



# Initial flagships use cases

- Call for proposals
  - Proposals received in format following template agreed by demand and supply side
  - Reviewed and analysed with cloud service suppliers
- Eligibility review of collected proposals (user-side) resulted in 3 recommended flagships
  - CERN: ATLAS High Energy Physics Cloud Use
  - EMBL: Genomic Assembly in the Cloud
  - ESA / CNES / DLR: SuperSites Exploitation Platform



# 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			•



# Flagship deployments

- Proof of Concept stage within the Pilot Phase started January 2012
- Each flagship is being deployed with several providers independently
- Sequence:
  - CERN-ATLAS (CloudSigma, T-Systems,...)
  - EMBL (T-Systems, CloudSigma,...)
  - ESA (Logica, ...)
- Expect to have completed initial proof of concept by summer 2012



# Flagship use cases Participating Suppliers in Proof of Concept stage

**Atos**

**CloudSigma**

**interoute**  
from the ground to the cloud

**logica**  
be brilliant together

terraviva 20

**sixsq**

**...T...Systems...**

the  
**SERVER**  
LABS

the IT architects



# Network connectivity

- Need to link the research community to the commercial data centres
- The pilot phase deployments of the flagship applications offer an opportunity to investigate ability of NRENS to offer access to commercial data centres

See related talk “The missing link between NREN and IaaS” by Paul Dekkers (SURFnet) Thursday 09:00 in Cloud Infrastructure session



# Helix Nebula EC project

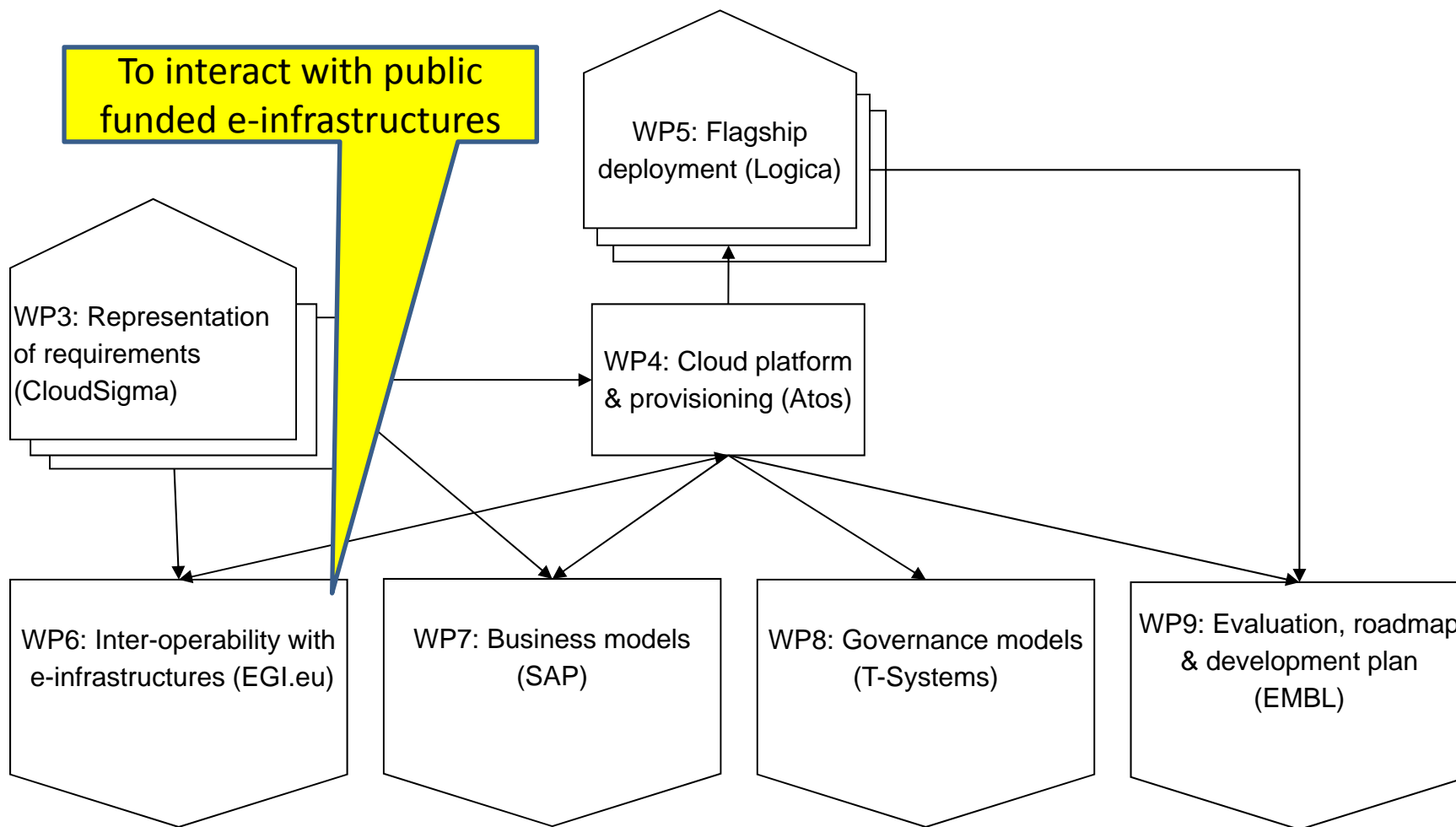
Coordination action under call INFRA-2012-3.3

- Start-date 1<sup>st</sup> June 2012, duration 24 months
- Total budget ~3M€ (1.8M€ EC funding)

no.	Organisation name	Short name	Country
1 (coord)	European Organization for Nuclear Research	CERN	CH
2	STICHTING EUROPEAN GRID INITIATIVE	EGI.eu	NE
3	European Molecular Biology Laboratory	EMBL	DE
4	ATOS	Atos	NE
5	T-Systems International GMBH	T-Systems	DE
6	CLOUDSIGMA AG	CloudSigma	CH
7	SAP AG	SAP	DE
8	Logica Deutschland GmbH & Co KG	Logica	DE
9	CONSIGLIO NAZIONALE DELLE RICERCHE	CNR	IT
10	Cloud Security Alliance Europe	CSA	UK



# Helix Nebula EC project



WP1: Management (CERN)

WP2: Dissemination/Outreach (CSA)



## Relevance of this work for the network community

### e-IRG's reaction to the findings and recommendations of the report of the GÉANT Expert Group

*Editor: Kees Neggers*

#### Foreword

Through the successful development of GEANT, Europe has a good starting position, but now needs to adapt to a rapidly changing global environment through embracing the vision of the GÉANT 2020 end-to-end, inclusive commons as proposed by the GEANT Expert Group (GEG). To realize this vision, Europe needs to adapt the governance structures as advocated by the GEG. Furthermore, it will be essential to accelerate innovation activities through increased funding, diverse consortia, and dedicated project management, as recommended by the GEG.

The final FP7 call, to be issued this summer, is an excellent opportunity to prepare for the HORIZON 2020 period and stimulate the further development and innovation of the research network services needed for the coming generation of researchers. e-IRG offers to contribute as a broad stakeholder's platform for facilitating the implementation of the GEG report.

*Gudmund Høst  
e-IRG Chair  
March 2012*

[http://www.e-irg.eu/images/stories/e-irgs\\_reaction\\_geg\\_a5.pdf](http://www.e-irg.eu/images/stories/e-irgs_reaction_geg_a5.pdf)

Helix Nebula provides:

**Opportunity for network community to work with the research communities and commercial cloud service providers to deploy flagship applications and investigate how a public-private cloud serving the research community could exist.**

# 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



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



Email: [contact@helix-nebula.eu](mailto:contact@helix-nebula.eu) Twitter: [HelixNebulaSC](https://twitter.com/HelixNebulaSC) Facebook: [HelixNebula.TheScienceCloud](https://www.facebook.com/HelixNebula.TheScienceCloud)