



## WP7– Business Models



e-infrastructure



# WP Objectives

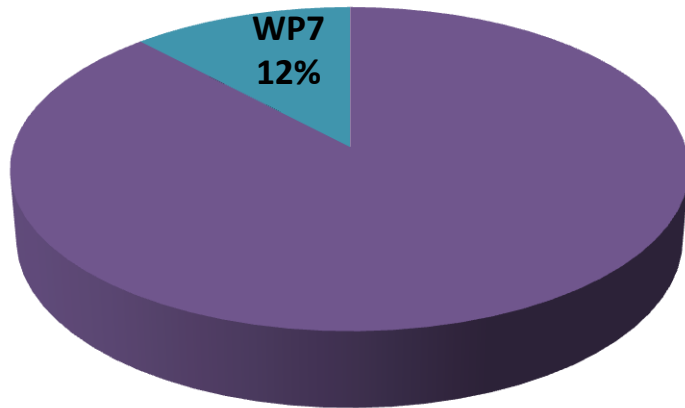
To produce and evaluate possible business models for public-private partnership and support the adoption of these through standard tender templates based on the approach defined in WP3 – note also the iteration between this WP and WP8.

## Specific goals

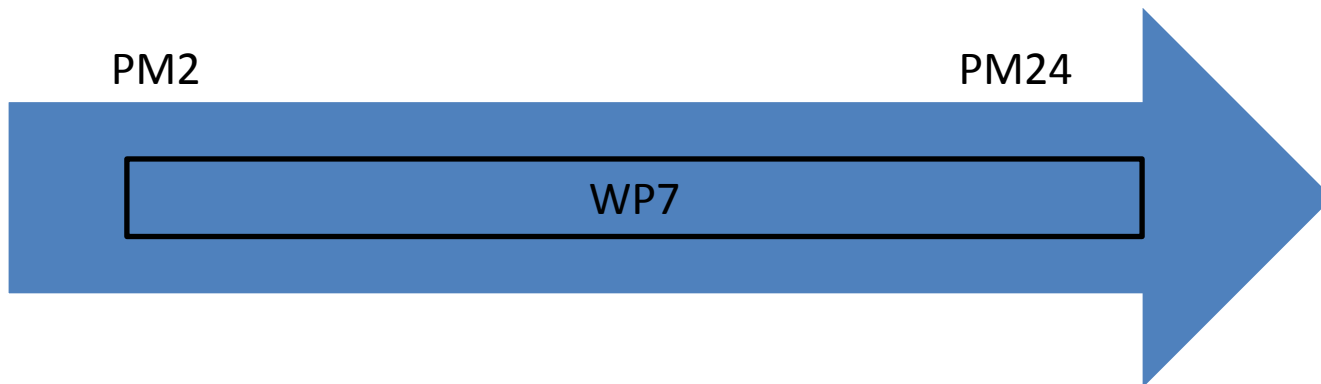
- ☛ Understand the financial implications of ‘utility computing’ for vendors and customers
- ☛ Define mechanisms for quantifying and controlling risk
- ☛ Assess the viability of standard cloud-service procurement templates across jurisdictions

# Effort Contribution

Lead Beneficiary: SAP



Person-Months per Participant	
Participant	Person-months
SAP	23.00
<b>TOTAL</b>	<b>23.00</b>



# Recommendations from P1 review

- The type of services definition and their cost estimation, the requirements gathered in WP3, should be of reference (and eventually updated)
- In the second period of the project, the Framework Contract solution should be analysed with attention to anti-trust and competition regulations
- The scenario where a PPP plays a coordination role is expected as well as possible launch of PPI (public procurement for innovation) for cutting edge solutions (for a European Science Cloud)

# Implementation of recommendations

- ☛ Current service types and costs were considered in business case and in the business model roadmap as a starting point
- ☛ Updated services: service extension based on roadmap from IaaS to InfoaaS.
- ☛ Proposed procurement models which will be elaborated on in the potential Picse project

# Scientific/technical achievements and their impact

- ☞ Business model roadmap
- ☞ Proven economic viability of Generic Cloud Computing for European Big Science
- ☞ Transition to InfoaaS based on roadmap to critical mass.
- ☞ Defined broker, partner and platform roles for effective business operations.
- ☞ Proposed procurement model which will be taken forward in the Picse project.

# Deliverables and Milestones – Period 2

Type	Del. no	Name	Nature	Dissemination level	Date Delivered
Deliverable	7.2	Synthesis and Analysis of Overall Business Models	Report	PU	16.09.2013
Deliverable	7.3	Costing exercise comparing in-house vs. cloud based operation for the CERN flagship use-case and incorporation of qualitative cloud adoption criteria targeting prospect members	Report	PU	20.02.2014
Deliverable	7.4	Information as a Service – Towards Value Co-Creation in a European Cloud Computing Platform Ecosystem	Report	PU	03.02.2014

# Overall modifications, corrective actions, re-tuning of objectives

## D7.3 Focusing on only one flagship CERN

(By choosing the organisation with assumed lowest costs we were able to show significant results)

## D7.4 Elaborate on business models roadmap

(Since we proposed a business model roadmap it was crucial to show the transition between the first business models, instead of focusing on further business cases. )



# Exploitation and use of foreground (Results of Period one and next steps)

## D 7.1

1. Issue: Procurement
2. Challenge: Switching Costs, Investment Risks / Commitment, Transp.

## D 7.2

1. Procurement Models
2. Potential Broker Roles
3. Business Model Roadmap

## D 7.3

3. Cost Analysis of current business model Generic Cloud Computing for European Big Science

## D 7.4

3. Transition from current business model to future business model InfoaaS based on network effects and reaching critical mass

# Collaboration with other beneficiaries

## Consortium

- Business Case
- Procurement

## ESA


- Network Effects and reaching critical mass

## EGI.eu

- Interoperability of public and commercial providers

# Contribution to the dissemination of project results

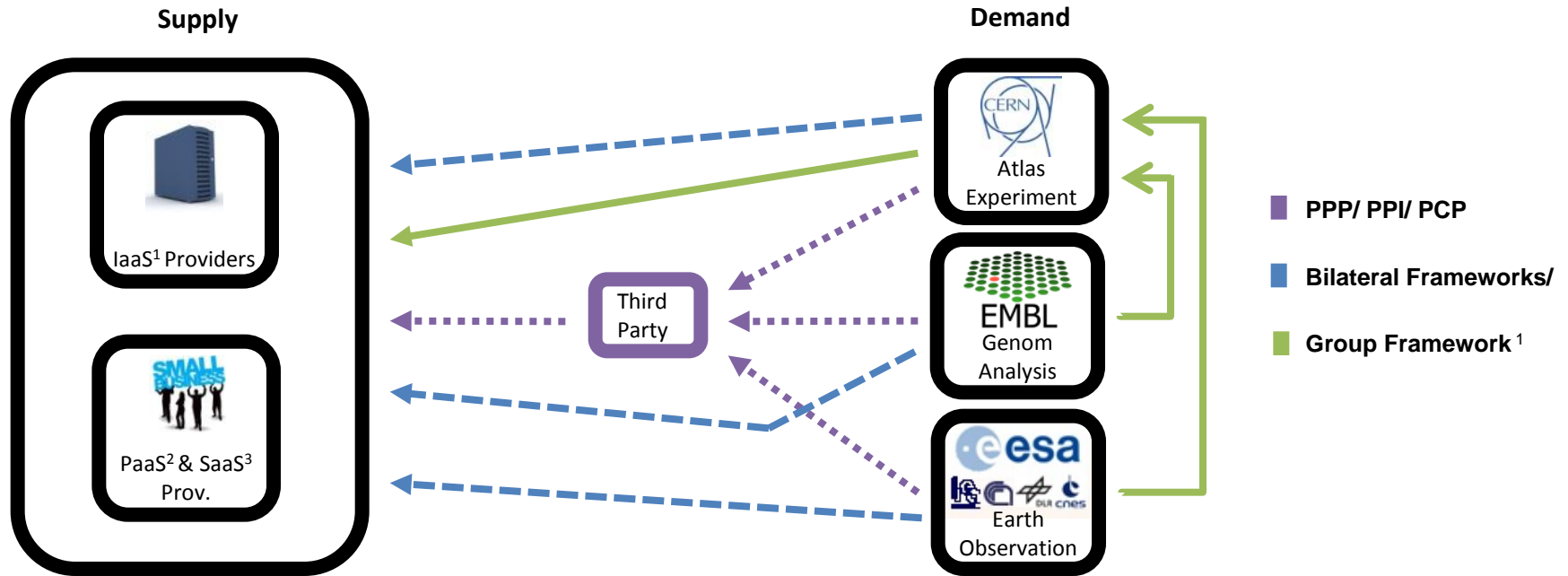
- ☛ We supported a master thesis on Helix Nebula focusing on the establishment of partner ecosystems written by Michael Blaschke. This Master thesis might be integrated into a scientific paper later in the year.
- ☛ Internal & external SAP News article on business model innovation to SAP customers and partners which will refer to the success of the project and its webpage
- ☛ Journal article (360 degree) using Helix Nebula as case study for successful business model innovation



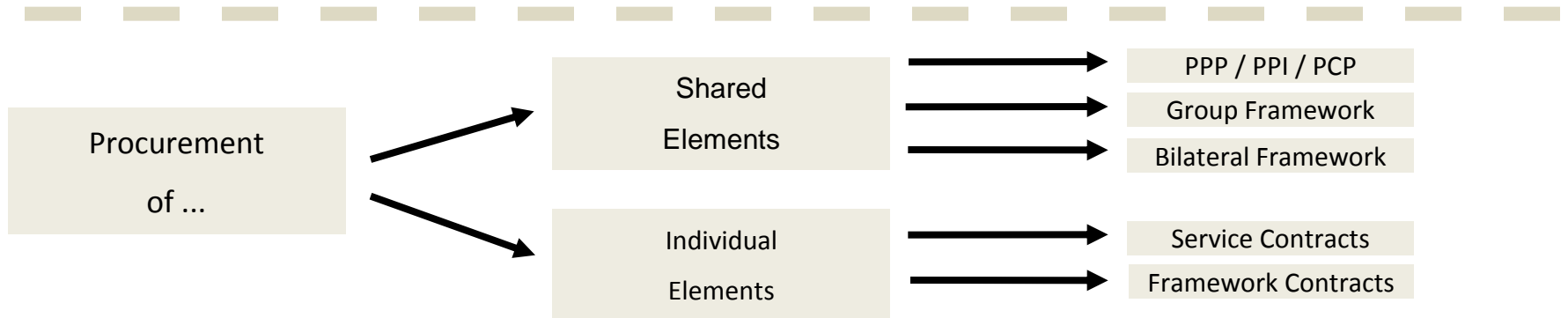
# Business Model Innovation for Helix Nebula D7.2



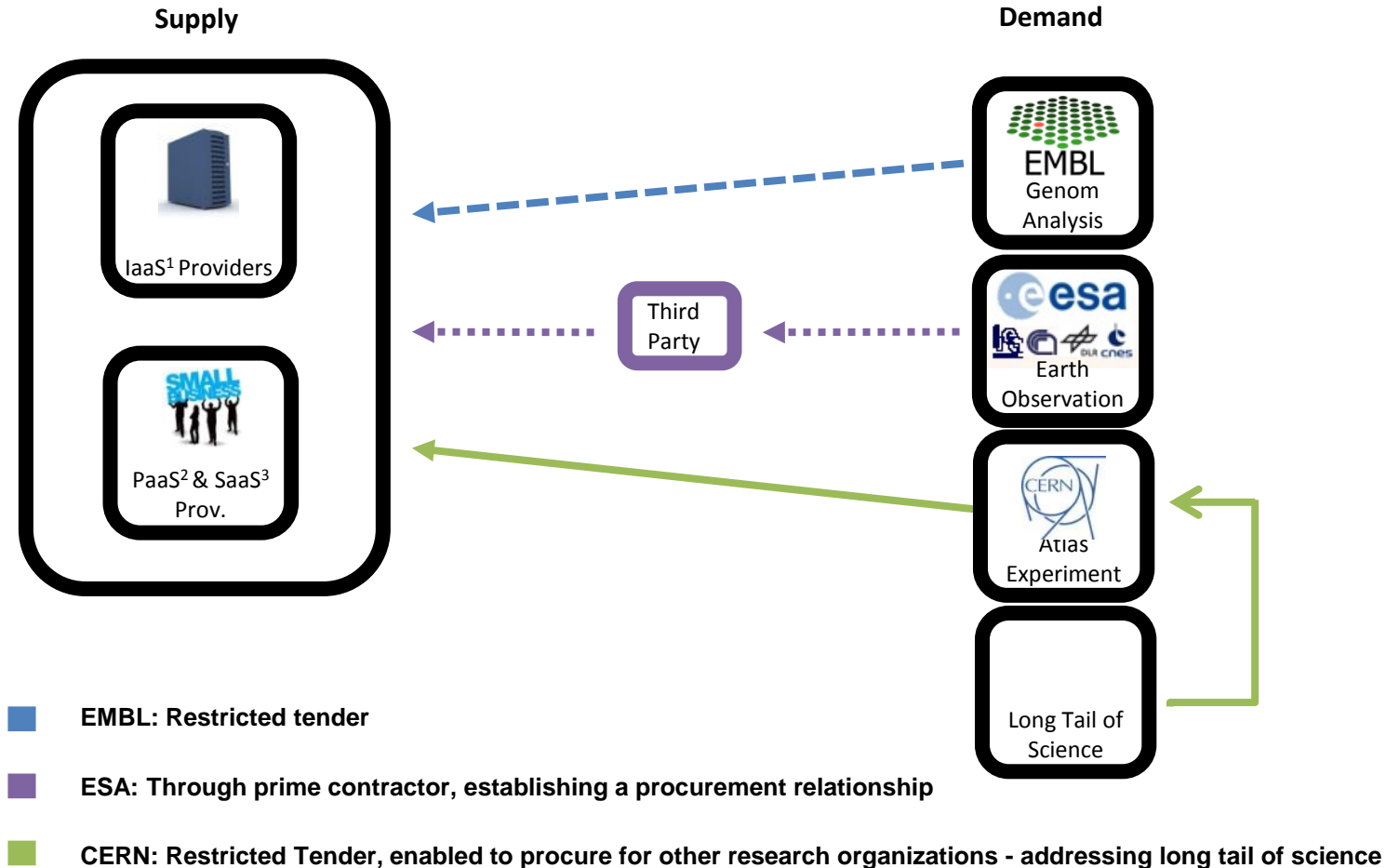
# Public Procurement Models



<sup>1</sup>CERN would be the best choice due to Industry Policy Procurement



# Generic Cloud Computing

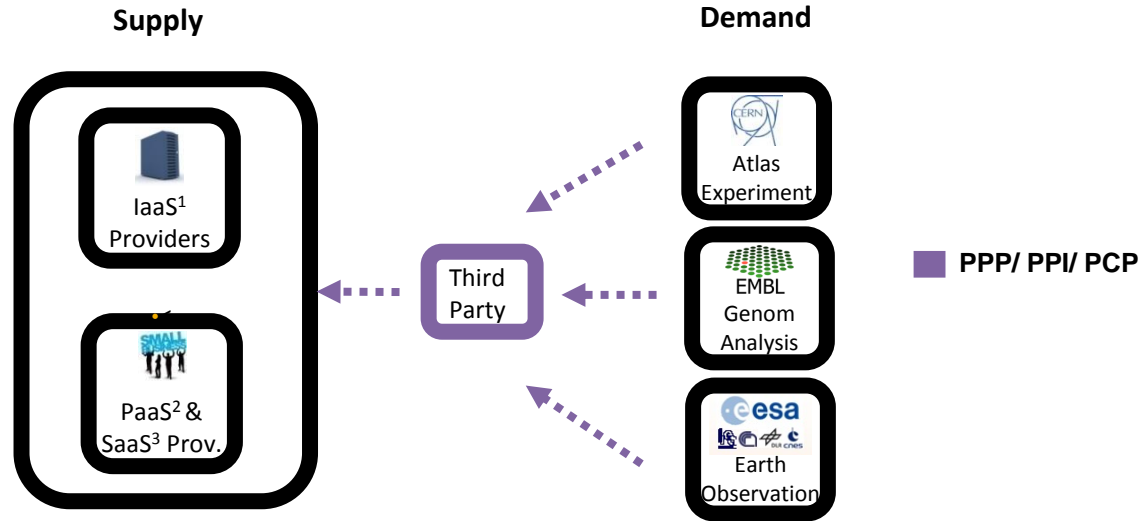


Implementation of framework contracts or PPP take to long

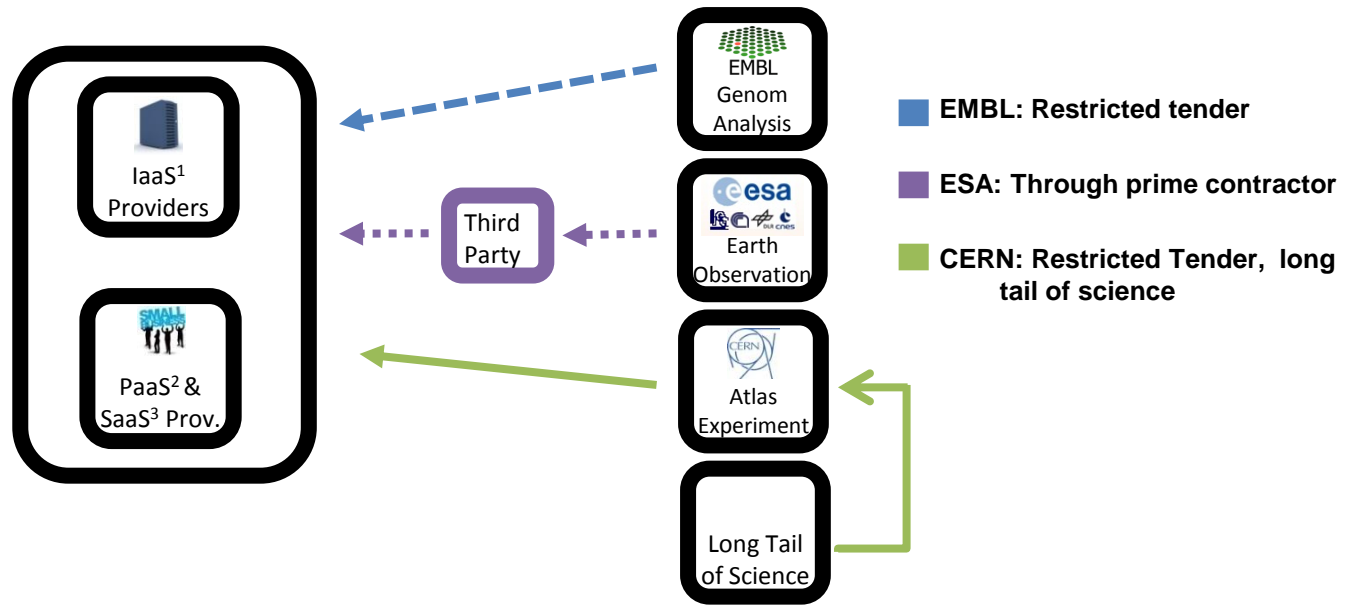
Note: Tender does not assign budget to individual suppliers

# Info as a Service

**1** Funding mechanism to set up the ecosystem, develop first services, align data



**2** Once platform established same model utilized for Generic CC







# Economic Viability D7.3

# Business Case Calculation

The private cloud based on **OpenStack (IaaS)** and **Zenodo**, a digital repository that offers permanent storage for research data for any science domain (SaaS). The private cloud is relying on other departments that are responsible for tendering, purchasing, customizing, deploying, operating, monitoring and maintaining (new) hardware. The SaaS solution Zenodo is in turn naturally depending on the Infrastructure (OpenStack cloud)

## Technical specifications:

- ☛ **Private cloud (OpenStack):** A virtual node with 2 cores, 8 GB memory, 80 GB local disk space (one 8th of a node)
- ☛ **Zenodo service:** 10 VMs, 1 PB of disk space (Dropbox-like), 1.5 PB of Archive Storage

# Business Case Results

In contrast to CERN in-house	AWS	Helix Nebula
Open Stack IaaS Service 1 year commitment	+ 19.4 times	+ 5.6 times
Open Stack IaaS Service 3 year commitment	+ 14.6 times	+ 3.9 times

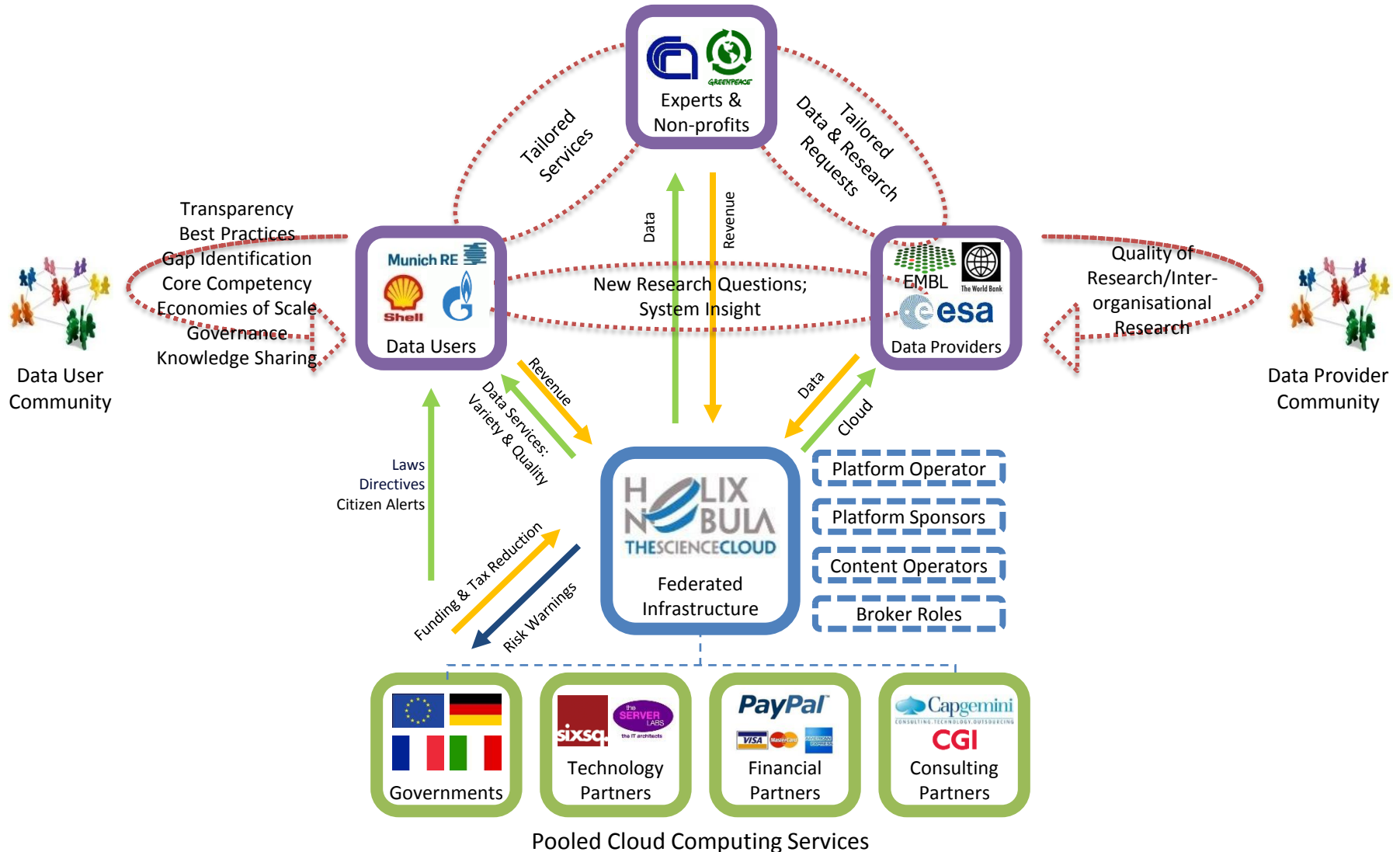
In contrast to CERN in-house	AWS	Helix Nebula
Zenodo SaaS Service 1 year commitment	+ 30%	- 13%
Zenodo SaaS Service 3 year commitment	+ 30%	- 36%

Note: Even without gathering all cost components, HN prices for the Zenodo service are very competitive



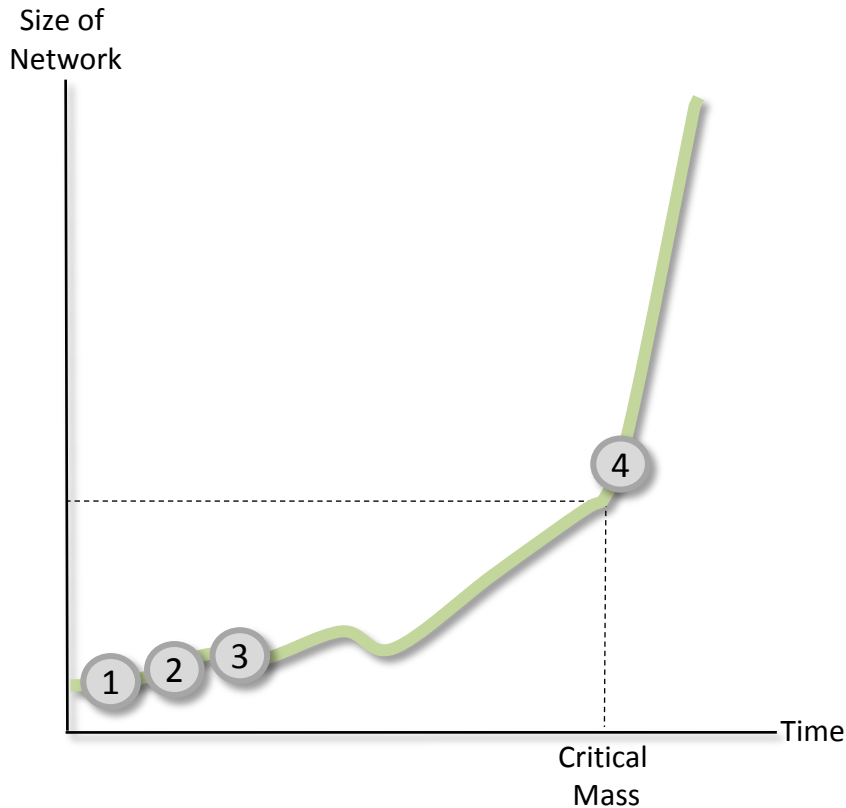
# Roadmap to Critical Mass D7.4

# Network Effects in INFOaaS



# Roadmap: Overview

## Strategic Steps towards Market Tipping



- 1 **Implementation:** Move Early
- 2 **Adoption:** Create User Balance
- 3 **Scaling:** Build Critical Mass
- 4 **Competition:** Extend Business Scope

A community is expected to have enough momentum to become self-sustaining at about 15% from the target community opting in, whereby critical mass is linked to consumer's expectations regarding the performance of a product or service, and the expected final size of the network (Mahler and Rogers 1999). As long as the critical mass point is not exceeded, demand synergies can only develop to a limited extent (Schoder 2000).



Appendix (as potential extension)

# Competition in Markets with Network Effects

**Different Competition:** Competition in Markets with Network Effects is fundamentally different than in conventional, non-network industries.

- **Fierce Competition and Market Tipping:** Network markets are characterized by early, fierce competition due to positive feedback loop inherent in network effects, wherein the biggest networks becomes even bigger. Once a leader becomes clear, bandwagons form, while new adopters begin to favor the leading product over rivals. The market is tipping in favor of one dominant firm or standard, whereas the best product or service doesn't always win (e.g. Playstation 2 vs. XBox).
- **Winner-take-all or winner-take-most markets:** Network markets are often winner-take-all or winner-take-most markets with monopolistic tendencies of one firm dominating all rivals. Leading Networks offer more value and might charge customers more, while they also might have substantial bargaining power over partners (e.g. Apple, controlling over 75 percent of digital music sales).



# Roadmap: Implementation

- ❑ **First Mover Advantage**  
scarce resources (data providers), technology leadership, build up switching costs.
- ❑ **Governance: Define Roles**  
communicate where, how and with whom value can be co-created (IaaS, INFOaaS)
- ❑ **Establish a vivid Community prior to launch**  
HN Marketplace (HNX) is ideal for community development to start INFOaaS.
- ❑ **Scale and optimize data sets and services on the fly**  
gather insights on further required data sets from customers and experts

Example: Sony's PS 2 enjoyed an 18-month lead over Xbox and succeeded in the market, whereas the technically superior PS3 showed up months after Xbox 360 and resulted in losses for Sony.

# A Niche as Starting Point

1. **Start with a niche** by picking a specific target market and try to dominate it. DORIS seems to be a potential starting point for INFOaaS.
2. **Target a small community**, e.g. a specific geographical location, a demographic or niche interest and reach critical mass before spreading to a second, a third and, eventually, open up to the rest of the world
3. **Envision how to logically expand** into larger markets, but only do so when dominating the community. Recognition and momentum is needed to move into a larger segment. In established markets, focus on a single niche an incumbent is either over- or underserving.
4. **Never drop below 15%**. For example, Facebook reached critical mass within a single university before it spread to a second one, and beyond. Thus, Facebook never dropped below the critical mass and secured user value.

# Roadmap: Adoption

- ❑ **Governance**  
12-24 month roadmap indicating where own developments will occur signal long term commitment. Extend IaaS governance e.g security: ensure IP of data.
- ❑ **Develop Complementary Goods**  
Encourage technology partners to develop add-on solutions
- ❑ **Provide high quality content**  
create high demand info services prior to launch based on available data (ESA, EMBL, PIC,..)
- ❑ **Attract major users / providers**  
acquire prestigious participants such as World Bank, United Nations etc.
- ❑ **Offer price reductions or seed funding**  
subsidise price sensitive segments such as research organisations, freemium offer

# Roadmap: Scaling

- ❑ **Governance**  
Document benefits for participants to join such as potential Co-Innovation, Marketing, Sales, PR,.... Define steps to trigger network effects.
- ❑ **Lower Entry Hurdles**  
compatibility with leading standards (IaaS EC2 bridge, EGI/Geant Integration)  
Facilitate switch to HN
- ❑ **Success Stories, Influence Expectations**  
Demonstrate value that users achieve
- ❑ **Foster Exchange**  
provide functionality to support the exchange between users, providers and experts such as collaboration rooms, chats, websites etc.
- ❑ **Win over next segments**

# Roadmap: Competition

- **Extend business Scope sequentially** by leveraging the use user base as an asset to expand into adjacent markets. Remember never dropping below critical mass.  
Example: Amazon way from an online bookstore towards an Online retailer of books, movies, music and games etc.
- **Never stop innovating!** Define strategy to maintain business within a growing competitive environment. The differentiation as part of INFOaaS becomes more mature and HN needs to create new innovation to provide profitable products, not only to differentiate from competitors, but to compensate for the commoditization of some of the services HN provided initially. HN needs a process of continuous change and improvement. As INFOaaS matures, participants' demands grow. Thus, innovation is needed to simply keep existing customers committed while also winning over new customers.
- Complementation and knowledge sharing are ideally enabled by measures that **improve the flexibility and co-learning** to cope with changing, loosely coupled partners. The orchestrator should proactively link unconnected partners from distant parts of the ecosystem (Ozcan and Eisenhardt 2009).