Joint procurement of cloud services
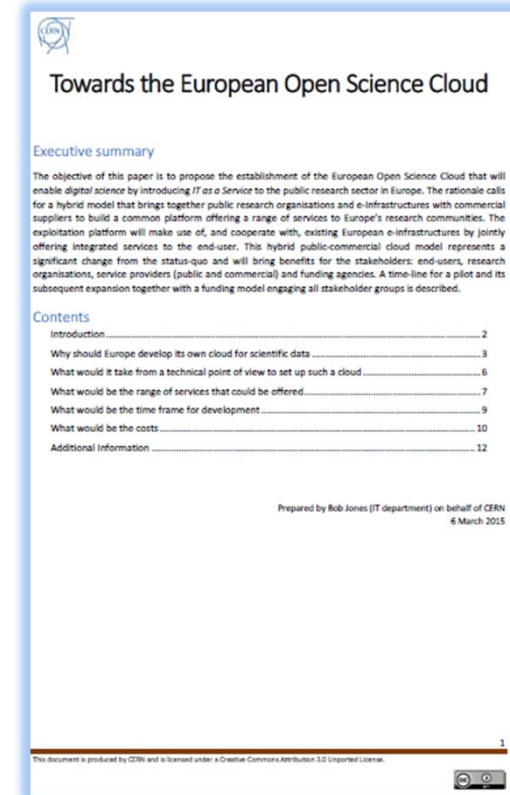
Bob Jones (CERN)
8 March 2015

Towards the European Open Science Cloud

Address the growing needs of data intensive research

Build a build a common platform offering a range of services by bringing together

      public research organisations

      e-Infrastructures
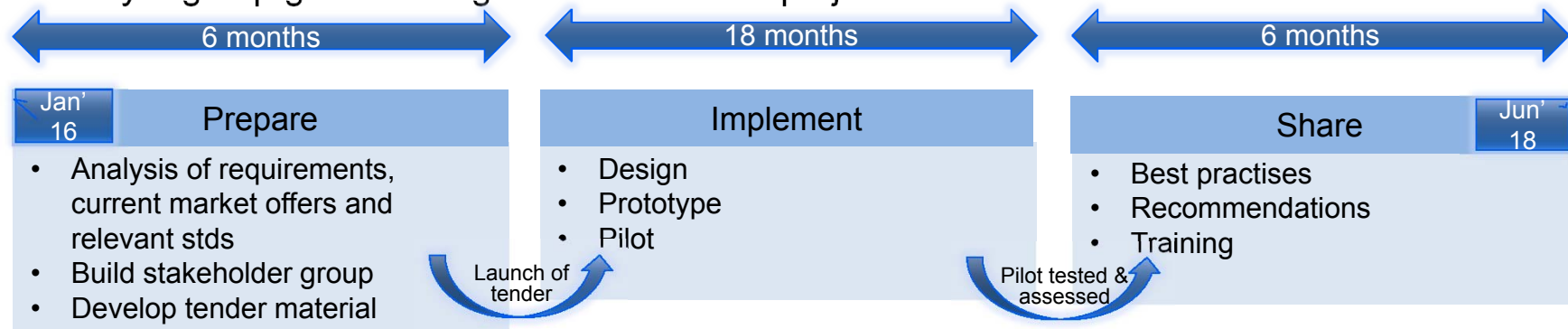
      commercial suppliers

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
6 March 2015

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European Science Cloud Pilot Project

- Bring together the stakeholders
  - Research Infrastructures *(ESFRI, etc.)*
  - Research Organisations (WLCG, *EIROforum members, etc.)*
  - European e-Infrastructures *(GEANT, EGI, PRACE, EUDAT, OpenAIRE)*
  - Commercial cloud service providers *(Helix Nebula, etc.)*
  - End-users including the *long-tail of science*

- Deliver the pilot
  - Technical architecture for the hybrid cloud
  - Security model compatible with EU data protection legislation
  - Assemble and deploy a 10% scale prototype
  - Verify the business model to ensure it can be sustained beyond the pilot
  - Governance structure avoiding monopoly of any research group or service provider
  - Roadmap for full-scale implementation

3

How to Fund the European Science Cloud Pilot using existing H2020 instruments

- A group of research organisations pledge procurement money to the European Science Cloud
- They submit a Pre-Commercial Procurement (PCP) proposal to the EC in April 2015
- The project develops a set of specifications (technical and contractual) suitable for tender with industry to assemble and deploy a limited-scale pilot
- The group procures innovative cloud R&D services from multiple providers which are then integrated with public e-infrastructures to form a hybrid cloud and end-users test it with their applications
- The EC co-funding is used to partially reimburse the procurements
- The buyer group grows during the course of the project

← 6 months →	← 18 months →	← 6 months →
Jan' 16		**Jun' 18**
Prepare	**Implement**	**Share**
• Analysis of requirements, current market offers and relevant stds • Build stakeholder group • Develop tender material	• Design • Prototype • Pilot	• Best practises • Recommendations • Training

Launch of tender

Pilot tested & assessed

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Why commercial cloud services?

- Deployment tests have been made with IaaS providers (ATOS, CloudSigma, T-Systems) directly and via a common broker (HNX)
    - ATLAS & CMS groups have also made tests with AWS & Google

- ATLAS simulation jobs (up to 1000 VMs in parallel) were used as a test application (CPU intensive, cloud storage used as a short-term cache) and confirmed
    - the use of commercial IaaS is technically feasible for simulation workloads
    - variations in APIs can be overcome with reasonable technical effort
    - independent monitoring of the quality of service and resources consumed is essential

- In Dec 2014 a price enquiry requesting 2000 concurrent VMs for 6 weeks produced interesting prices which meant the difference when compared to the cost of in-house provisioning was significantly reduced

ICT 8 – 2015: Boosting public sector productivity and innovation through cloud computing services

http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/9081-ict-08-2015.html#tab1

Deadline 14 April'15 - funded projects could start Jan'16.
Foresee to fund projects with a large EC contribution (5 – 8M€)

- Pre-commercial procurement for public sector cloud computing services (**PCP**)
  - common requirements and terms of reference for future procurement of cloud computing services (9M€)

- Public procurement of innovative cloud computing solutions (**PPI**)
  - organizing joint procurement of innovative cloud services by public authorities (12M€)
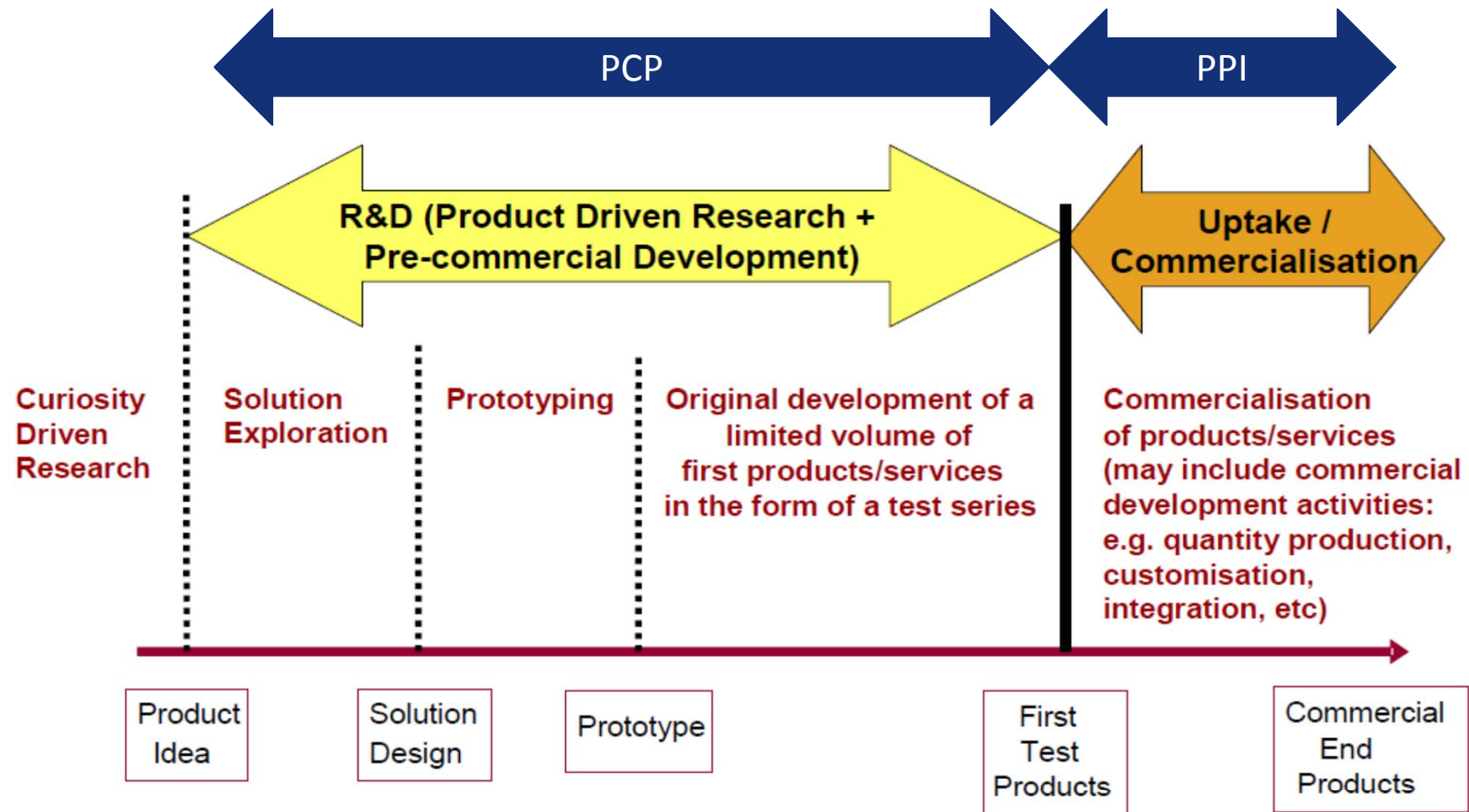
Typical Product Innovation Life Cycle

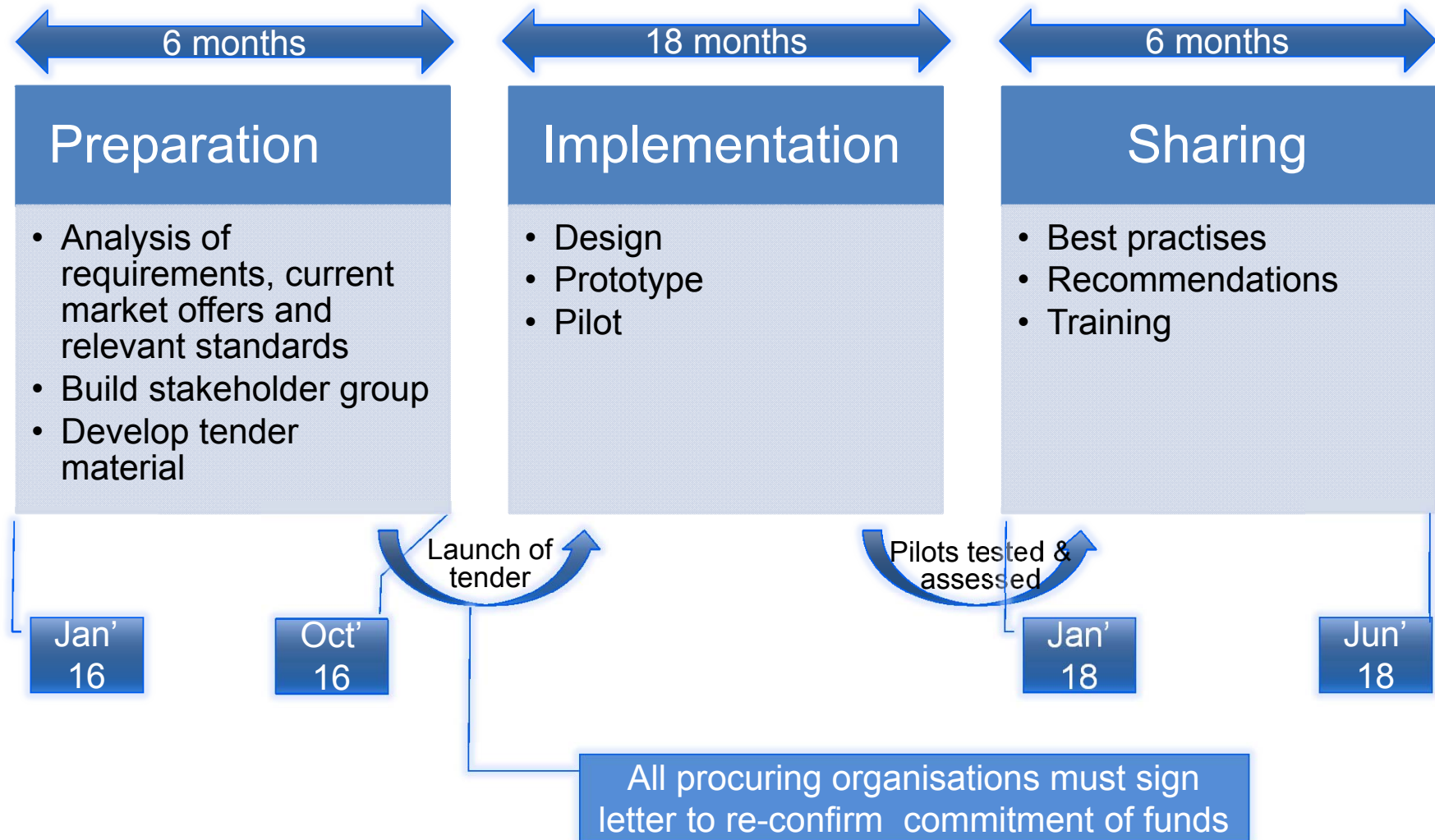# Special conditions apply to PCP/PPI projects

http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-e-inproc_en.pdf

- Procurement must be competitive for ***innovative*** solutions
  - *'Pre-commercial procurement'* means procurement of R&D services involving risk-benefit sharing under market conditions, and competitive development in phases, where there is a clear separation between the procurement of the R&D services procured from the deployment of commercial volumes of end-products
  - *'Public procurement of innovative solutions (PPI)*' means procurement where contracting authorities act as a launch customer of innovative goods or services which are not yet available on a large-scale commercial basis, and may include conformance testing

- Procurement process must be compliant with EC rules
  - Open to all suppliers across the 28 EC member states
    - '*Procurers should avoid the use of selection criteria based on disproportion qualification requirements*'
  - Published in the official EU journal of public procurement
  - Propose to take a third party as the lead procurer and include a specialised PCP legal consultant in the project.

- EC co-funding is proportional to the procurement commitment of the partners
  - The bigger the procurement the more funds that can be requested from the EC
  - **NOTE: "*Potential providers of solutions sought for by a PCP/PPI cannot be beneficiaries in an action during which this PCP/PPI is planned or undertaken*"**

Buyers group

- The buyer for the PCP pilot are public organisations that are member of the WLCG collaboration and commit to contribute to a joint procurement
    - Primary research community to benefit from the procurements will be the HEP community
    - Procured services will count towards the buyers pledges in WLCG
- Other research communities will also benefit from access to a fraction of the procured services

PCP project phases

← 6 months →	← 18 months →	← 6 months →
Preparation	**Implementation**	**Sharing**
• Analysis of requirements, current market offers and relevant standards • Build stakeholder group • Develop tender material	• Design • Prototype • Pilot	• Best practises • Recommendations • Training

Launch of tender

Pilots tested & assessed

Jan' 16

Oct' 16

Jan' 18

Jun' 18

All procuring organisations must sign letter to re-confirm commitment of funds

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PCP project Preparation phase

- Preparation phase requires the involvement of all buyers to define common tender specifications (technical and contractual)

- E-infrastructures & Suppliers will need to be consulted to ensure we don't develop a tender to which it is not possible to respond or integrate into the European Open Science Cloud

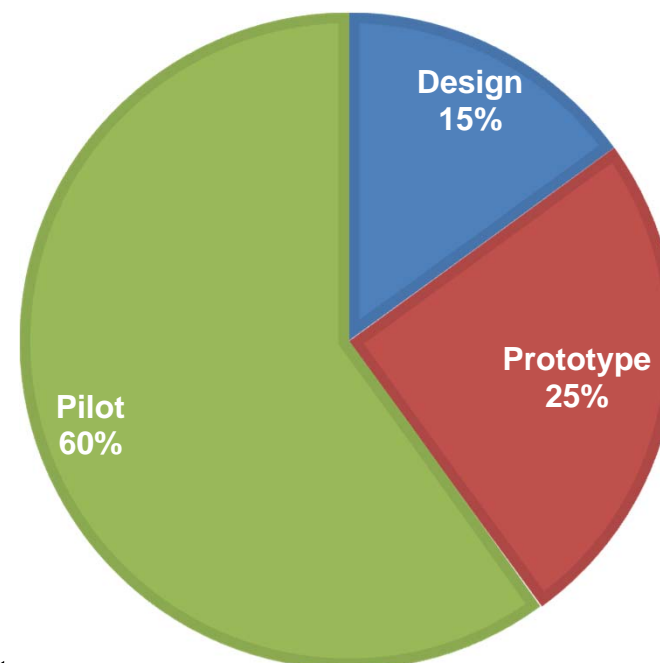# Technical and Contractual requirements

- A expert with experience in EC PCP tenders will be part of the consortium

- Technical
  - Commercial data analysis services
    - Service to be integrated within a hybrid cloud model (public-private)
    - Support federated identity management
    - Be accessible via GEANT network
    - Data management aspects
    - Service portals hosted by public research orgs as point of entry for users
    - Integrate with security incident response teams (CSIRTs)
    - Integrate with user support structure (GGUS)
    - Etc.

- Contractual
  - Define terms and conditions for procurement of cloud services
  - Request unit prices for services so the full cost of the procurement over all phases can be assessed
  - Ensure that as the procurement phases progresses, unit prices track market prices (estimate - 5%/year) – cloud broker expert will monitor market prices
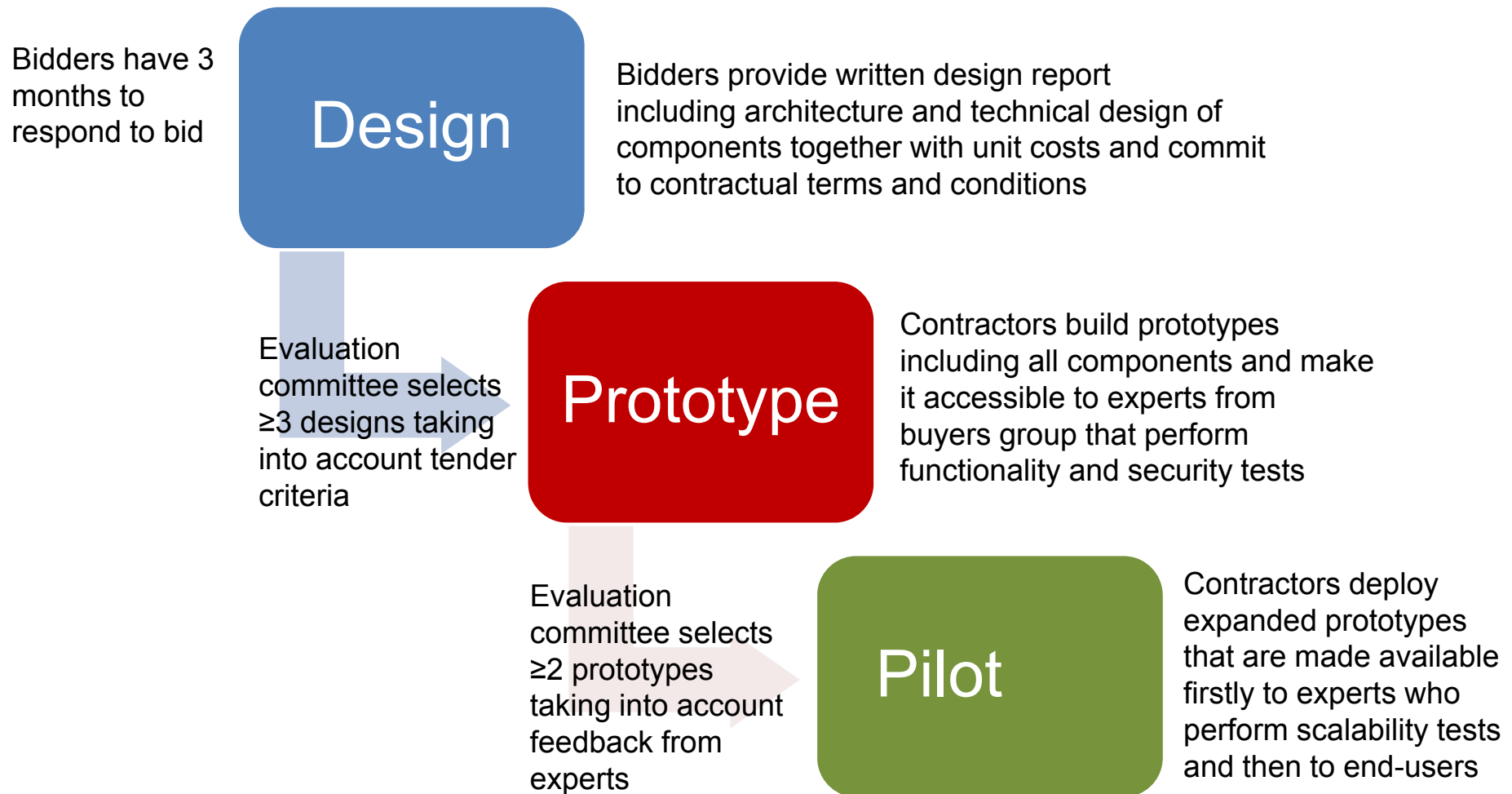
Project Evaluation committees

- Replies to the tender are to be evaluated by international evaluation committee against criteria published with tender material
  - Administrative committee (contractual & financial aspects)
  - Technical committee
- Each buyer can nominate a representative for each committee
  - Progression from the prototype to pilot phases will take into account feedback from testing

PCP project implementation phase

- 3 phases:
  - Solution design
    - ≥3 designs
    - 3 months
    - 15% tender budget
  - Prototype development
    - ≥3 prototypes
    - 6 months
    - 25% tender budget
  - Deployment of limited scale prototypes
    - ≥2 pilot deployments
    - 6 months (access to continue into the 'sharing' phase as well – hence total of 12 months)
    - 60% tender budget

PCP project implementation phase

Bidders have 3 months to respond to bid

Design

Bidders provide written design report including architecture and technical design of components together with unit costs and commit to contractual terms and conditions

Evaluation committee selects ≥3 designs taking into account tender criteria

Prototype

Contractors build prototypes including all components and make it accessible to experts from buyers group that perform functionality and security tests

Evaluation committee selects ≥2 prototypes taking into account feedback from experts

Pilot

Contractors deploy expanded prototypes that are made available firstly to experts who perform scalability tests and then to end-users

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PCP Project Sharing Phase

- Access to the pilot services for the users continues during the sharing phase

- Promote project deliverables
  - Best practises – written report
  - Recommendations – written report
  - Demo – video made available online (for users)
  - Training – video of presentation made available online (for procurers)

- To stakeholder groups during 1H2018
  - LHC experiments: dedicated event where demo & training videos can be recorded
  - Research communities: at CHEP-spring'18, WLCG workshops, HEPiX etc. RDA plenary Mar'18
  - Infrastructure providers: at HN general assembly, EGI, Terena conf., etc.
  - Member states: eIRG workshop
  - EC: CloudScape event in Brussels: Feb'18, EC organised procurement events
  - ESFRI projects via ESFRI event

- Prepare follow-on activities
  - Would the procurement group be willing to proceed to a PPI as the next step?
  - Would a 2nd PCP for higher-level services (PaaS, SaaS) make sense?

PCP and the Helix Nebula Initiative

The Helix Nebula Initiative is a forum bringing together cloud service suppliers (commercial and public e-infrastructures) and procurers