



# Helix Nebula Science Cloud



1<sup>st</sup> December 2017  
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(on behalf of the HNSciCloud collaboration)



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



# HNSciCloud Joint Pre-Commercial Procurement



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

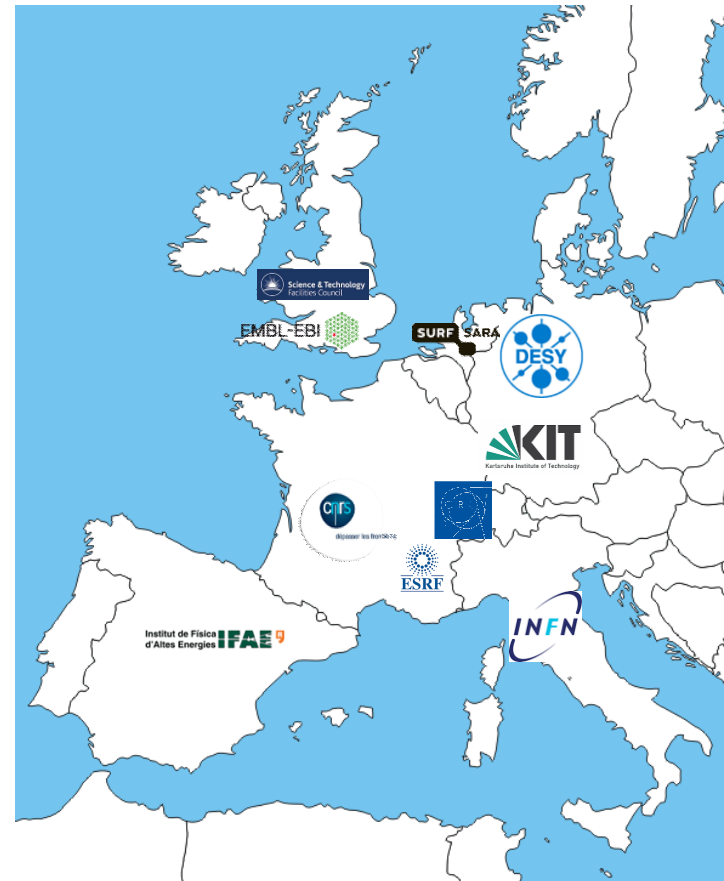
The group of procurers have committed

- 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 >5M€**

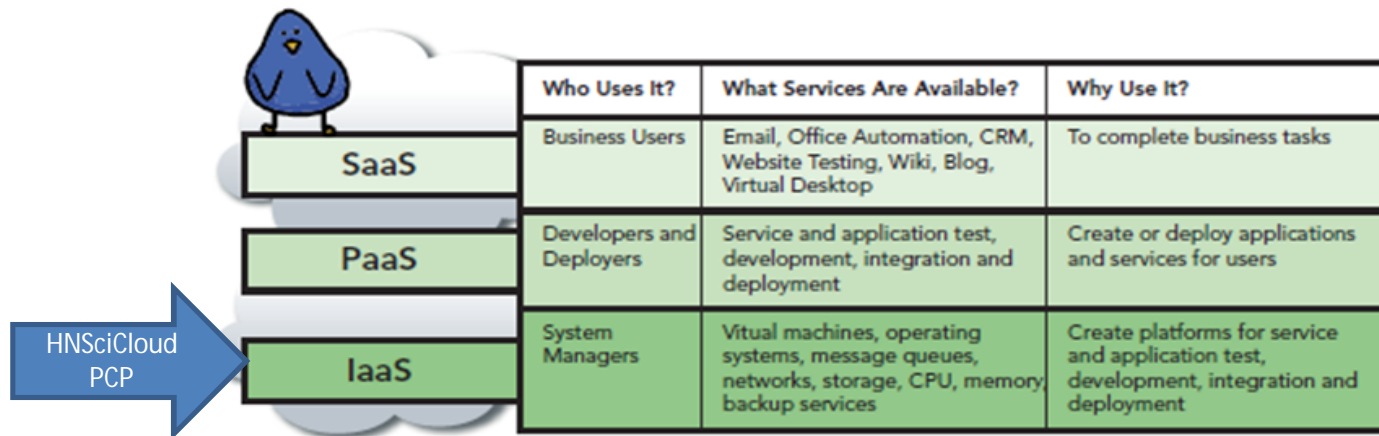


# What is being procured

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 developed to be integrated with Resources in data centres operated by the Buyers Group

# Challenges



Innovative IaaS level services integrated with procurers in-house resources and public e-infrastructure as part of a hybrid cloud 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

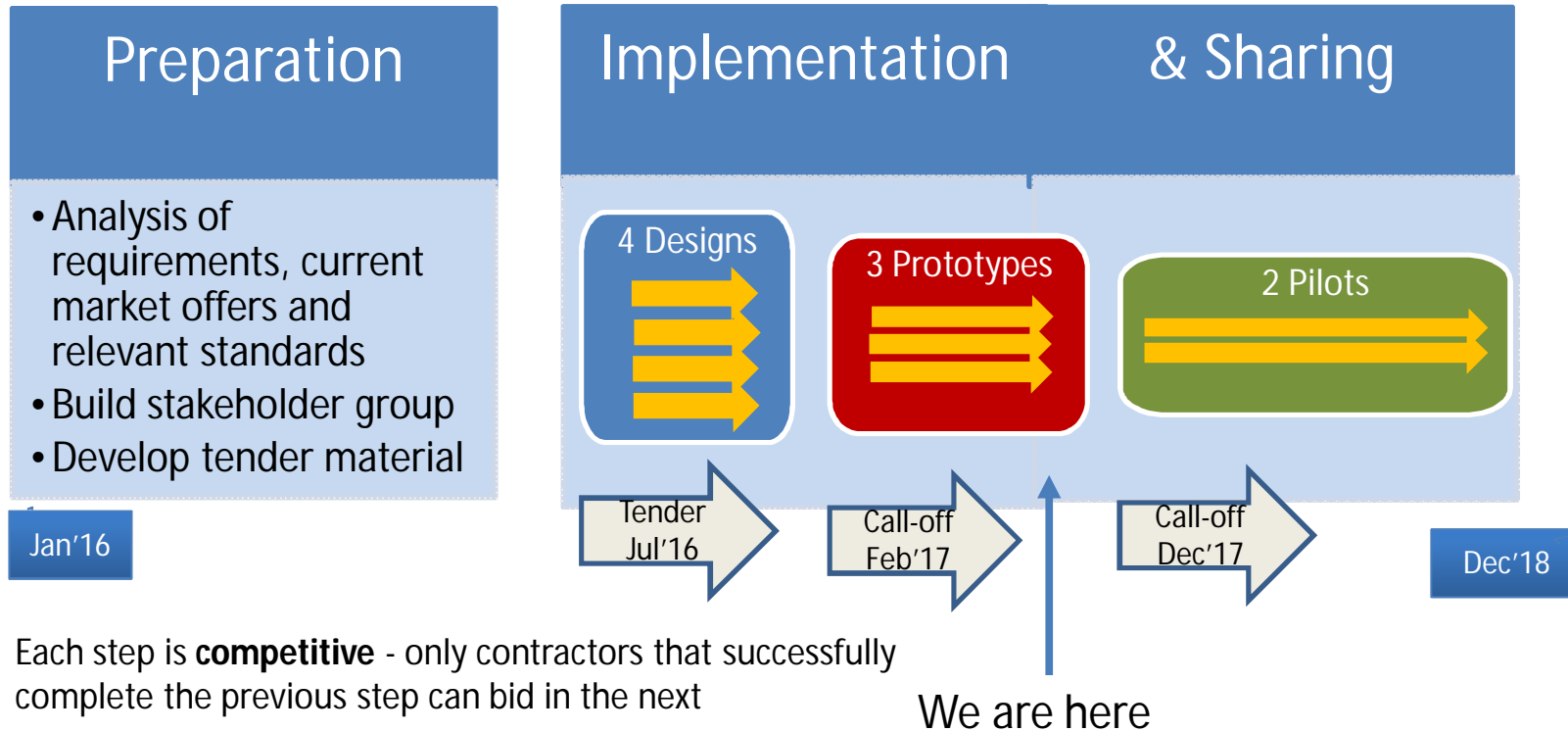
## *☛ Network Connectivity and Federated Identity Management*

- ☛ 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

# HNSciCloud project phases



# HNSciCloud test suite



## CERN

- Edugain AAI
- CERN Benchmark Suite
- S3 Endpoint
- PerfSONAR Network
- VM Provisioning and Personalisation
- Grid Jobs in Docker
- Dockerized deployment of EOS+CERNBOX+SWAN

## CNRS

- IAAS access via EduGain and local accounts

## DESY

- HDF5\_IO

## EMBL

- CLOUD\_BENCHMARK
- ELIXIR\_AAI
- data\_transparency

## ESRF

- FDMNES

## IFAE

- monitoring-accounting
- image creation and contextualization

## INFN

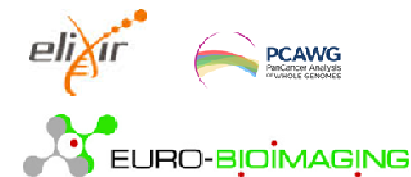
- BelleII\_SIM
- COMPASS/TGEANT\_IO
- INFN/GPFS\_AFM
- Dynfarm

## KIT

- static-batch-extension
- dynamic-batch-extension
- AFM-deployment-test

## SURFsara

- BBMRI\_data
- dCache\_io
- kubertest



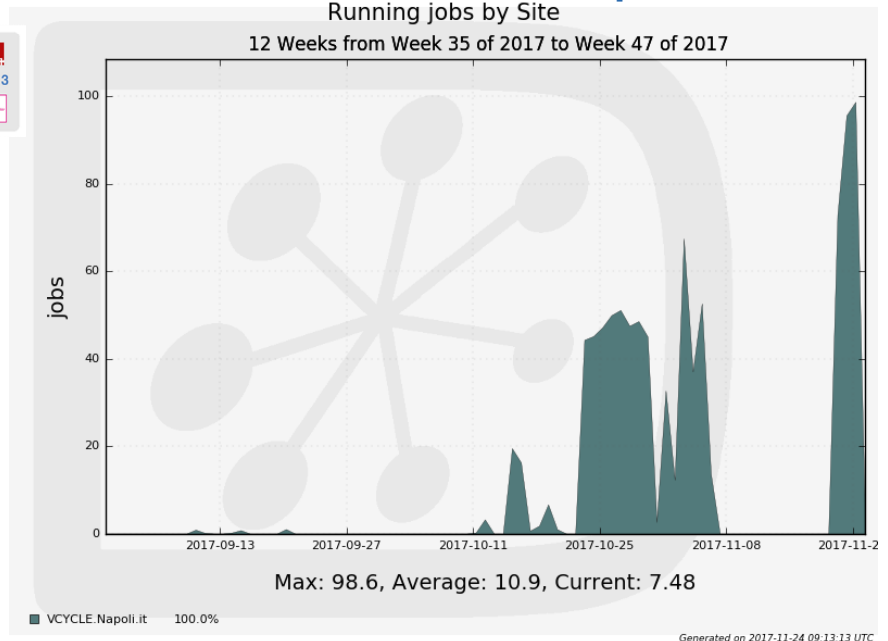
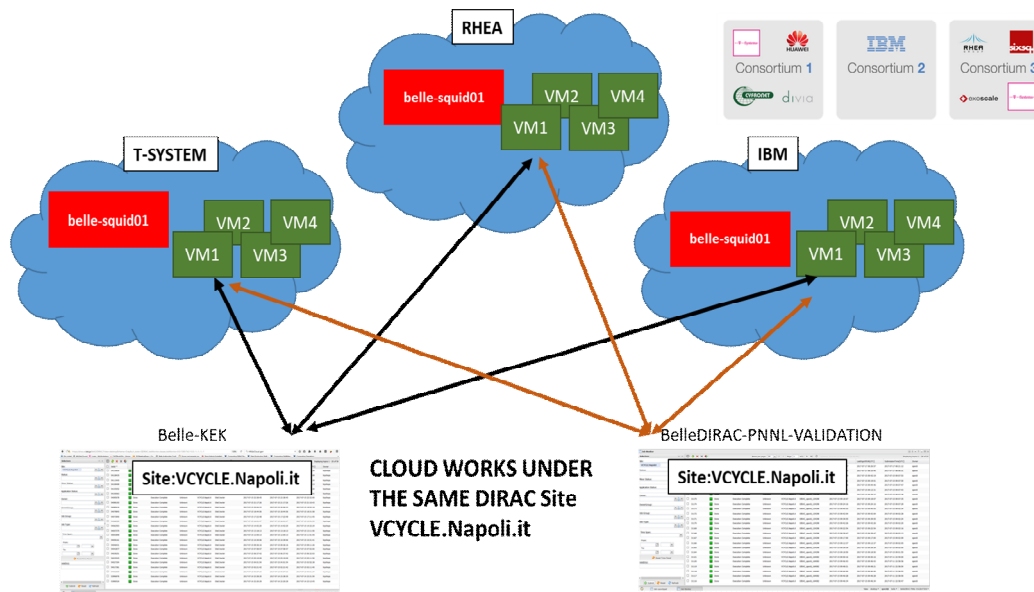
# The BELLE II test case

- Test name: BelleII\_SIM
  - SubTest Number 1: Belle II Environment Setup
  - SubTest Number 2: Local Simulation and Reconstruction
  - SubTest Number 3: Virtual Machine Performance Evaluation
  - SubTest Number 4: Integration of Cloud Endpoint in the DIRAC framework for MC production
    - Create a local squid-server
    - Create a local vcycle-server
    - Integrate the vcycle-server in DIRAC
  - SubTest Number 5: Network Performance
  - SubTest Number 6: Cloud Storage



Credits:  
 Dr. Silvio Pardi – INFN-NAPLES  
 Dr. Davide Michelino - GARR fellowship

## Aggregation of Job running on the HNSciCloud contractors for the last Belle II MC9 Campaign (Jul17)



# Pilot Phase 2018

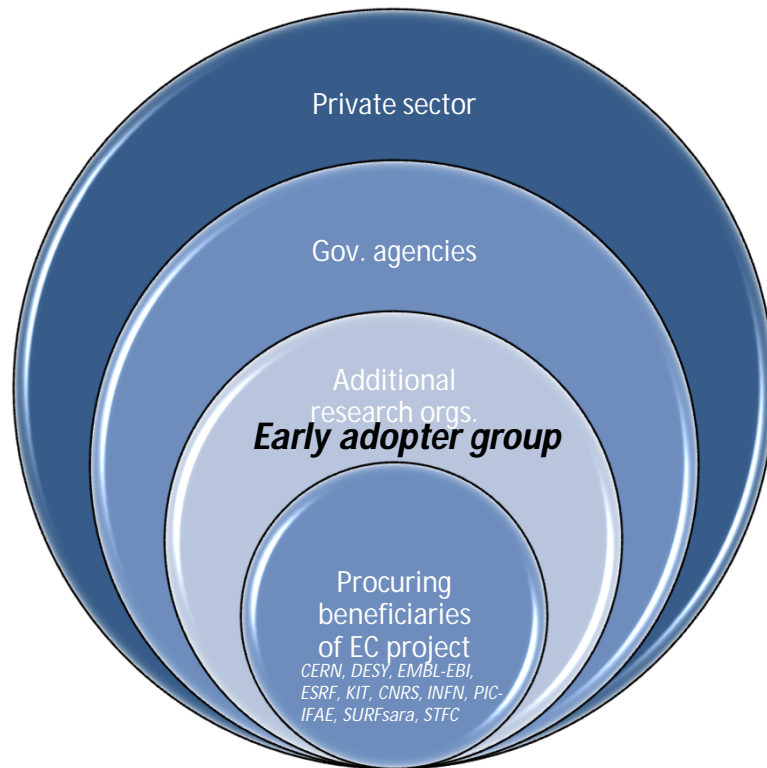


- ☛ Kick-off event 6-8 Feb 2018 (@INFN-CNAF in Bologna)
- ☛ Progressively scale-up IaaS resources
  - ☛ totalling 20k cores, 2PB storage
- ☛ Scalability testing
- ☛ Deployment of applications
- ☛ Assess procurement/payment models





# Growing the buyers group



The initial group of buyers is the set of research organisations that committed their resources at the start and became beneficiaries of the H2020 project

Now starting to grow the buyers group by including more publicly funded research organisations: **Early adopter group**

## Benefits

- Access commercially supported cloud services selected and tested by HNSciCloud research community procurers
- No need to perform your own tender
- Ability to fund the use of the services via your regional, national or EC projects
- Use the legal framework and access conditions established by HNSciCloud

# Summary

- 3 hybrid cloud prototypes (IBM, RHEA, T-Systems) have been procured, deployed and tested by a group of 10 research organisations
- 2 prototypes will be selected for large-scale pilots in 2018
- The *Early adopter group* will allow more research organisations to procure the resulting services
- HNSciCloud will become part of the future European Open Science Cloud