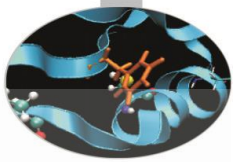
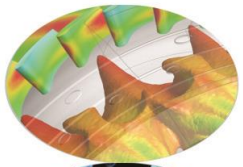
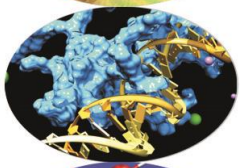
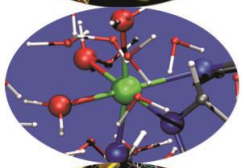
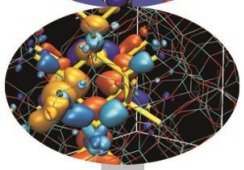
CINECA SCAI
SuperComputing Applications and Innovation

t2i
trasferimento tecnologico e innovazione

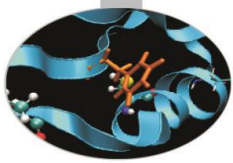


Cineca ongoing projects for CAE applications

Claudio Arlandini, CINECA

CINECA

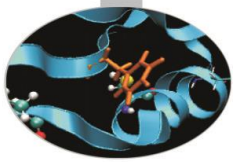


The Fortissimo model

https://www.fortissimo-project.eu/

FORTISSIMO

HPC and economic growth



To compete in the global marketplace companies need to **innovate**

HPC is a **key tool** for innovation

"to out compute is to out compete"

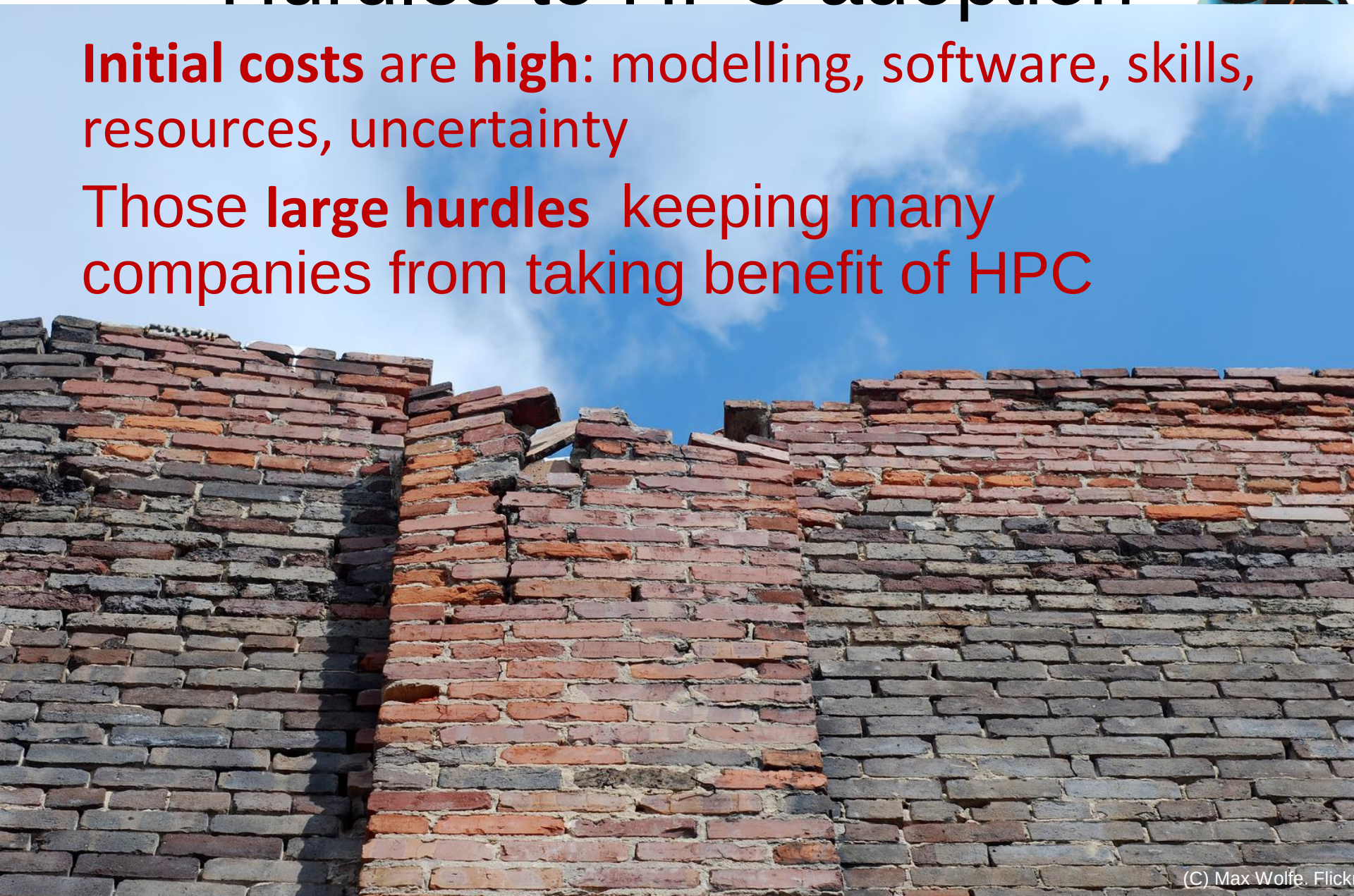
IDC: "*HPC is one of the best investments many companies can make*."

Source: Steve Conway, IDC research vice president for HPC, IDC study "HPC: ROI You Can't Ignore!", Nov 2013, http://www.idc.com/getdoc.jsp?containerId=244316

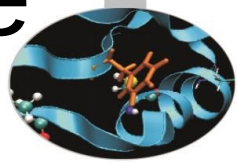
Hurdles to HPC adoption

Initial costs are **high**: modelling, software, skills, resources, uncertainty

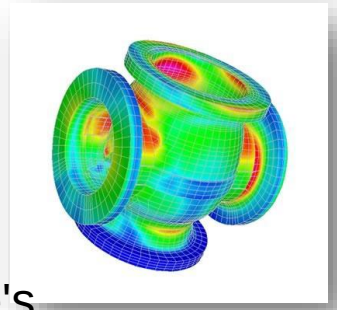
Those **large hurdles** keeping many companies from taking benefit of HPC



Fortissimo's Goal: Overcome barriers

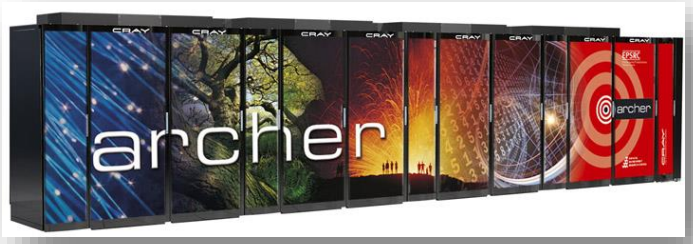


Fortissimo helps companies overcome hurdles & benefit from HPC routinely



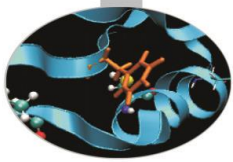
Using Europe's world class HPC assets & expertise

Leverage best practice of working with SMEs



Economic growth for Europe

Fortissimo Vision



"Sustainable Simulation-as-a-Service Cloud"

FF HPC Cloud of simulation services:

Single, unified interface to an elastic HPC cloud targetting:

- Low cost of entry
- Resource Elasticity
- On demand access to services, systems resources, expertise, tools …
- Security and user confidentiality

The Fortissimo Marketplace:

A **one-stop shop** including hardware, expertise, applications, visualisation and tools

The Fortissimo Projects - Context

Fortissimo 1&2 are I4MS projects within the "Factories of the Future" initiative

I4MS
ICT Innovation for Manufacturing SMEs

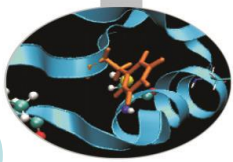
FoF

HORIZON 2020

I4MS' goal is to advance the use of ICT in European manufacturing SMEs

Supporting projects by dissemination & events

Fortissimo 1 & 2 – scale & structure

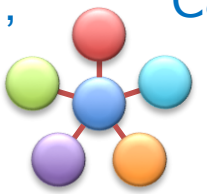


Fortissimo 1 (FP7)

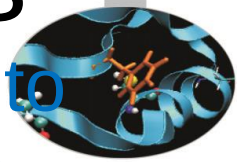
- €22m costs, €16m EC funding
- July 2013 – Dec 2016
- 45 partners growing to 123
  - 14 core partners
- 53 Experiments
  - 20 initial Experiments ("tranche 1", WPs 401-420)
  - 22 Exp. in Call-1 ("tranche 2", 501-522)
  - 11 Exp. in Call-2 ("tranche 3", 601-611)

Fortissimo 2 (H2020)

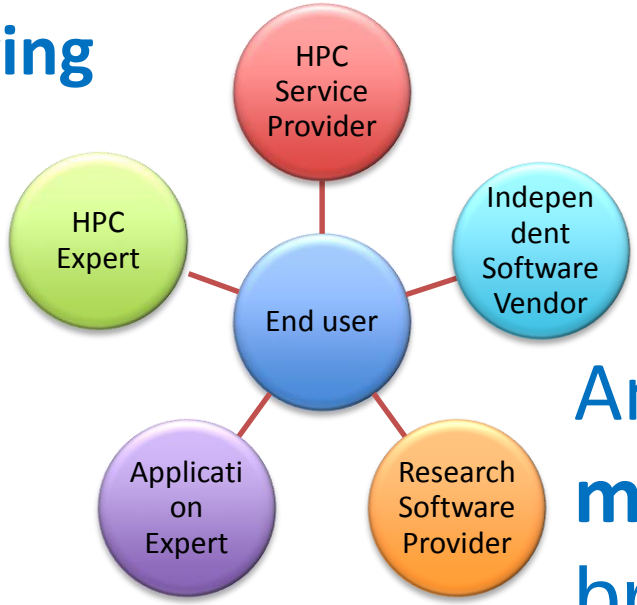
- €11m costs, €10m EC funding
- Nov 2015 – Oct 2018
- 38 partners ➔ ~ 60 (Call-1)
  - 14 core partners
- 24 Experiments (so far)
  - 14 initial Experiments (701-714)
  - 10 Experiments in Call1 (801-810)
  - 15 Experiments in Call2 (901-915)



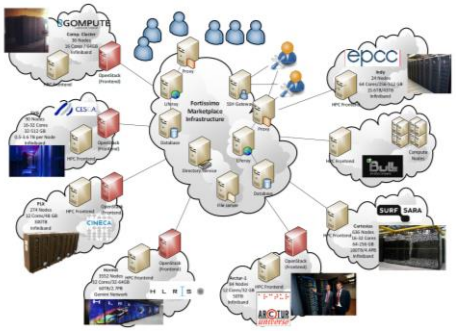
The Fortissimo Projects



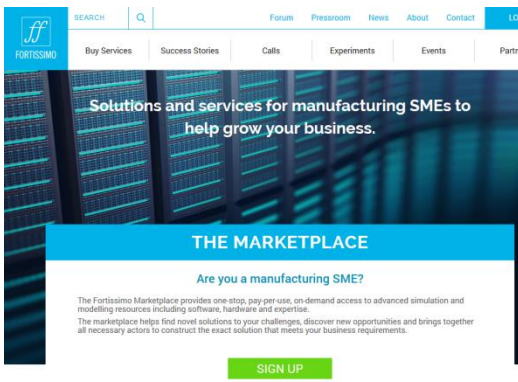
Experiments focusing on **problem solving** for SMEs

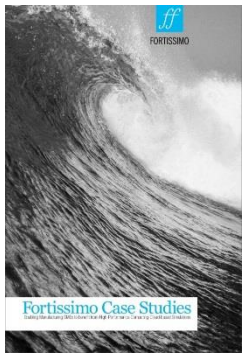


An HPC-Cloud to solve **business challenges**



An open **marketplace** bringing together all players

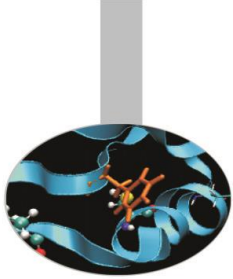




Success stories demonstrating **real benefits**

FORTISSIMO

Fortissimo Marketplace



End User
End User
End User
End User
End User

Marketplace

HPC Service Provider
Independent Software Vendor
Research Software Provider
Application Expert
HPC Expert
End user

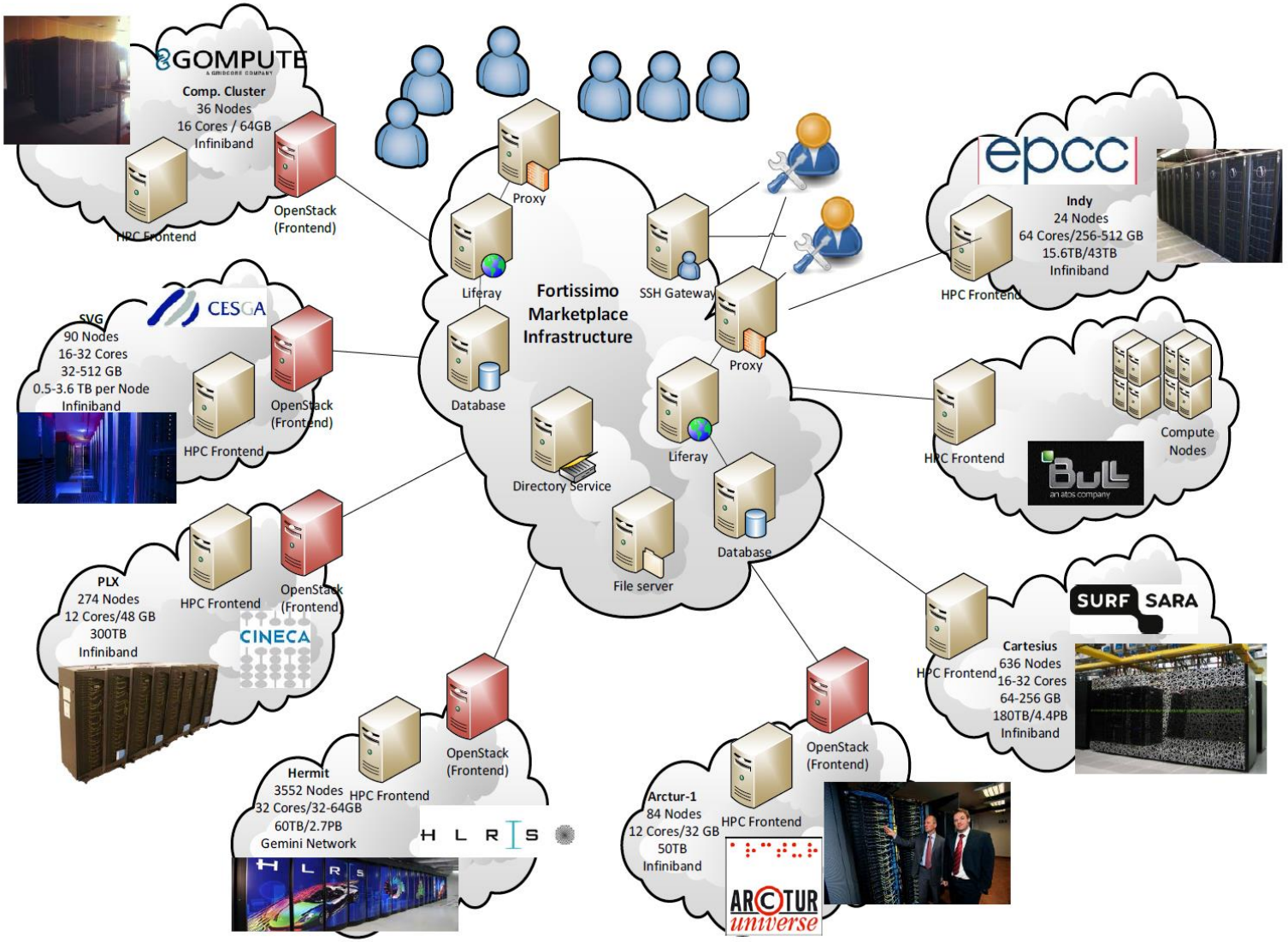
FORTISSIMO Experiments

FORTISSIMO Cloud of HPC Resources

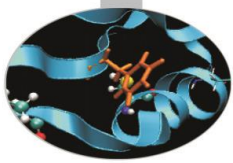
FORTISSIMO Marketplace

Bringing together all components

The Fortissimo HPC-Cloud



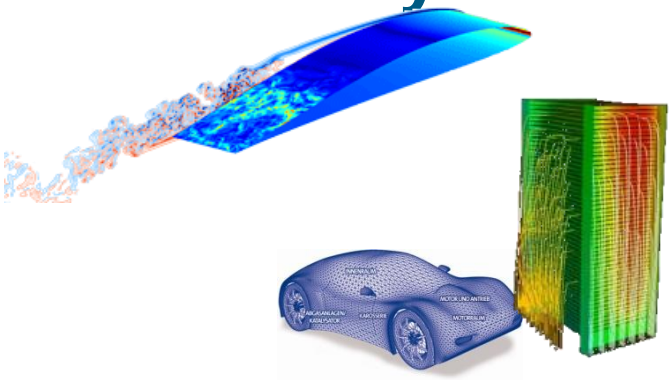
www.prace-ri.eu



PRACE offers services to the Industry

Access to leading edge resources

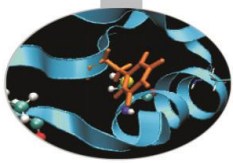
- To assess the scalability on a wide number of HPC architectures
- To give access to HPC resources based on scientific excellence, free of charge, alone or in collaboration with labs



Access to high value services

- Training (PRACE Advanced Training Centers, opened to industrial users)
- Code enabling (Open Source codes for industry, etc)

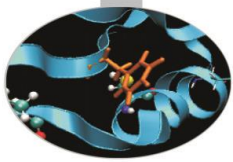
- To foster technology transfer between academia and industry
- To access to the competences enabling to build new methodologies (multiscale, multi physics, disruptive, uncertainties…)



PRACE SHAPE
SME HPC Adoption Programme in Europe

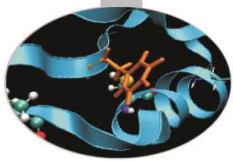
Pan-European, PRACE-based, programme supporting HPC adoption by SMEs.

- Raise awareness and equip European SMEs with the expertise necessary to take advantage of the innovation possibilities opened up by HPC thus increasing their competitiveness.
- Overcome the barriers to HPC adoption:
  - Lack of expertise in knowledge of the possibilities of HPC and advanced numerical simulation;
  - Lack of resources to facilitate the HPC adoption process;
  - The entry costs of implementing new technologies.
- SHAPE facilitates the process of defining a workable solution based on HPC
- SHAPE helps to define an appropriate business model.



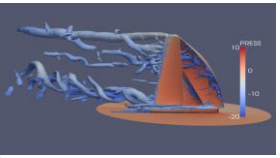
PRACE SHAPE
SME HPC Adoption Programme in Europe

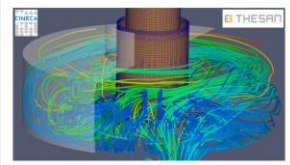
- The main focus is to work on a one-to-one basis with SMEs willing to adopt a new HPC-supported solution
- Based on an integrated set of services:
  - **networking,**
  - **training in PRACE Centres**
  - **expertise provided by HPC and domain-specific experts,**
  - **access to PRACE HPC systems (R&D model)**
  - **support for identifying funding sources**
- Support SMEs up to a proof-of-concept
- The objective is to equip the participating SMEs with knowledge that will allow them to make an informed decision on the selected solution
- After the SHAPE demonstration, companies will have a clear view about
  - **potential of HPC**
  - **investments to perform,**
  - **skills to hire**
  - **software or methodologies to develop,**
  - **next HPC Services:**
    - PRACE services for Open R&D services
    - buying their own HPC facilities
    - access remote HPC services on commercial Cloud platforms.

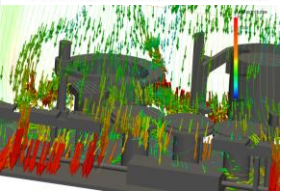


Some SHAPE results

- 4 calls: 35 projects funded from 9 different countries
- 5th call closed on May 9th 2017
- Different computational fields: hydraulic turbine design, life science, audio technologies, LES turbulence models in race boat sail, airflow simulations, electromagnetic behavior of products, virtual test bench for centrifugal pumps, CFD simulation of innovative hull, etc







Participation in the Programme has been monitored to evaluate possible benefits, ROI and business impact obtained by the SMEs:

- SHAPE is of real value to the SMEs
- Many positive outcomes for the businesses involved in the activity
- Tangible measures of the ROI in many of the projects:
  - new staff people hired
  - contracts have been won
  - costs have been reduced
  - HPC Access
  - in house HPC systems installed
- Optimism that the improvement in the service will lead to an increase in customer numbers
- Adopting HPC: Companies R&D will be accelerated along with reduced costs
- Commitment to continue working with HPC: in-house or via access to PRACE resources

For any information:
www.prace-ri.eu/shape
shape@prace-ri.eu