

European HPC Ecosystem

“Once upon a time in Europe...”

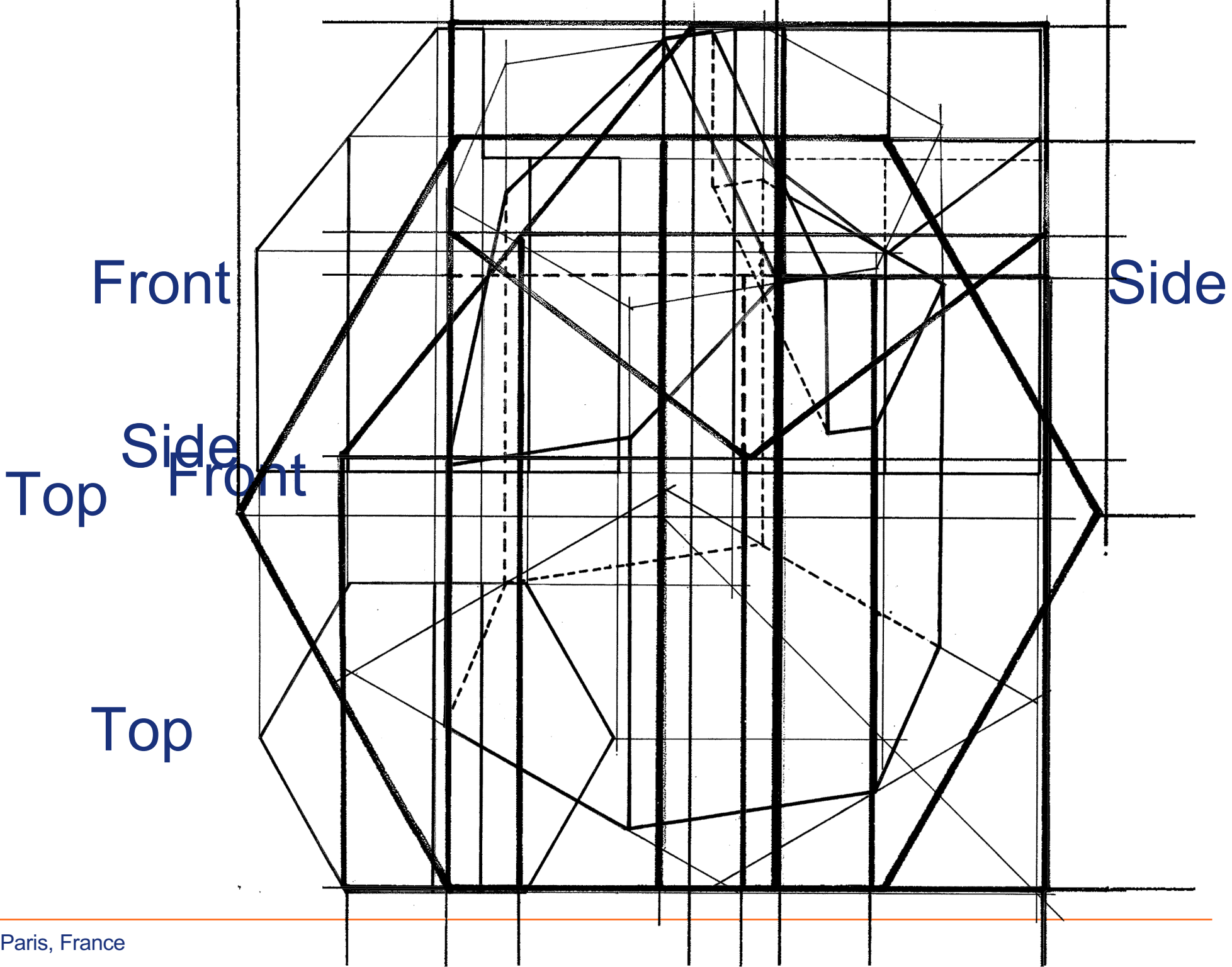
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PRACE aisbl

Contributors

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Disclaimer





European HPC Ecosystem before EuroHPC

▶ 2002 **DEISA** (preparing petascale)

- ▶ Distributed European Infrastructure for Supercomputing Applications
- ▶ 2002 - 2011
 - ▶ *Peer to peer exchange*
 - ▶ *Diversity in architecture favouring exchange of cycles*
 - ▶ *Not scale up*
- ▶ There was a need to pool top level world class system (and services around)

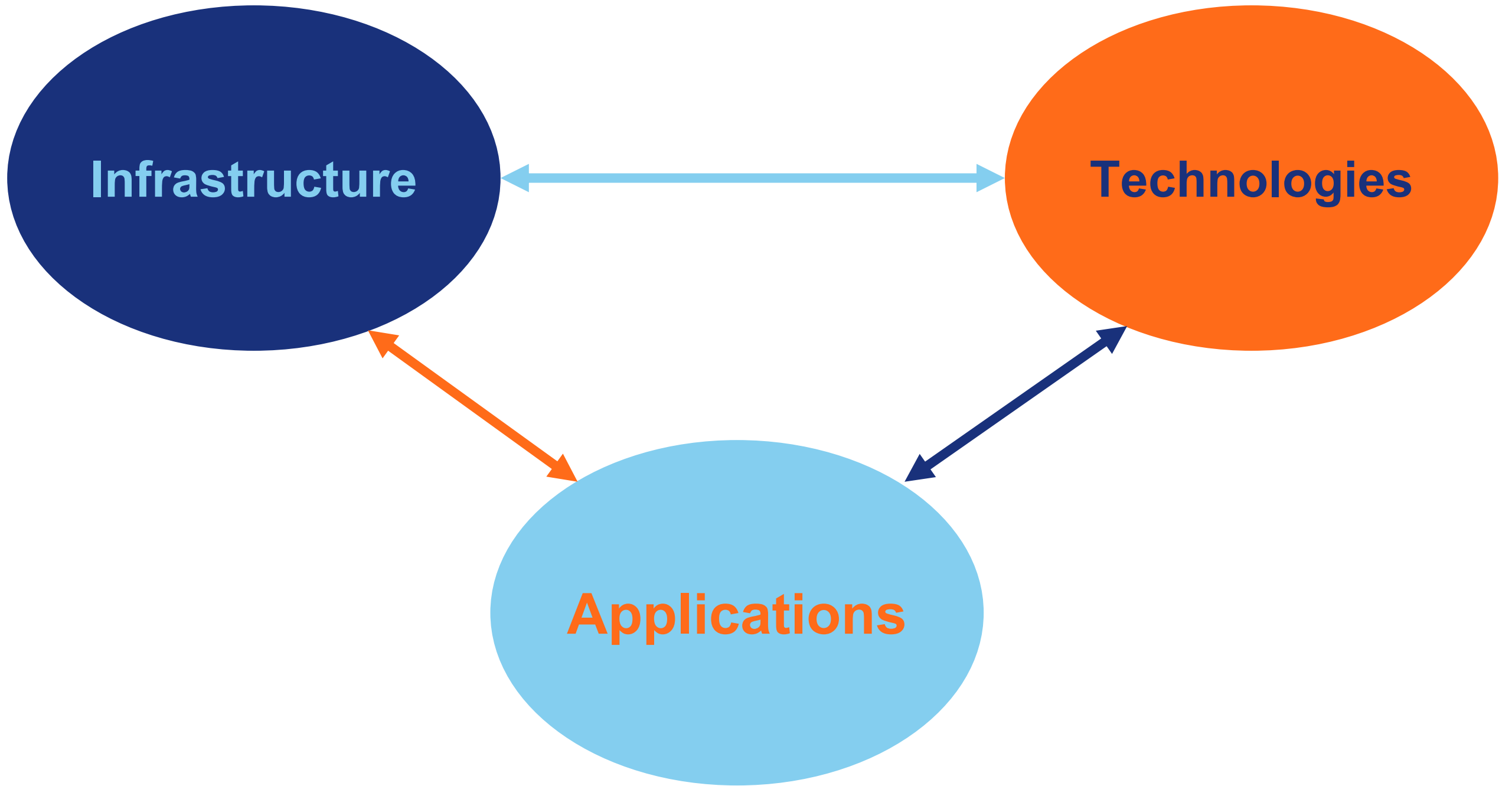


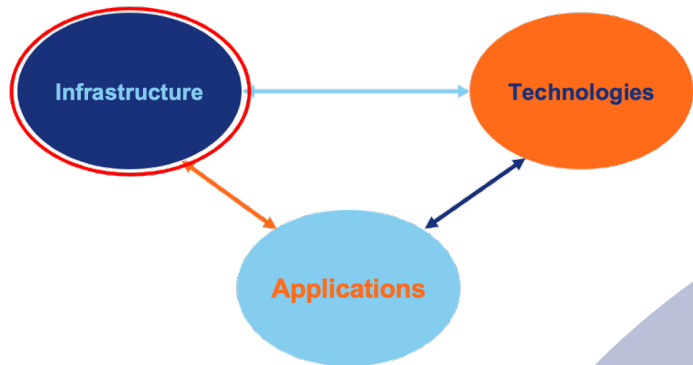
▶ 2010 **PRACE** (preparing exascale)

- ▶ **PaRtnership for Advanced Computing in Europe**
- ▶ ESFRI Research Infrastructure landmark with pyramidal model of
 - ▶ *Tier - 0: 7 systems from 4 – then 5 – PRACE Hosting Members*
 - ▶ *Tier - 1: National systems, keeping using DEISA Exchange of Cycles DECI*
 - ▶ *Tier - 0 & Tier - 1 being linked by a portfolio of PRACE activities through PRACE-nIP Implementation Phase projects (from PP to 6IP rated “excellent”)*



▶ The ecosystem getting more complicated, structured through 3 pillars



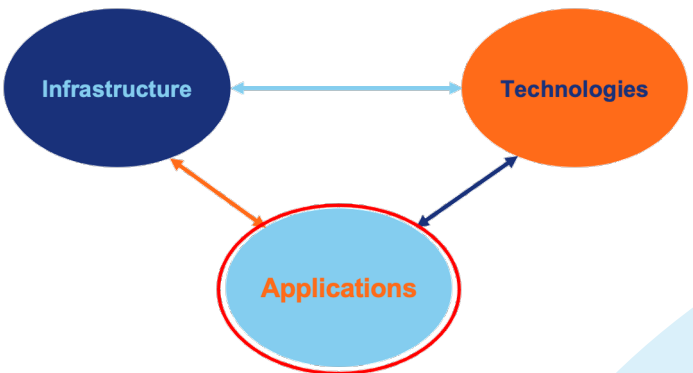


PRACE

GÉANT

Infrastructure

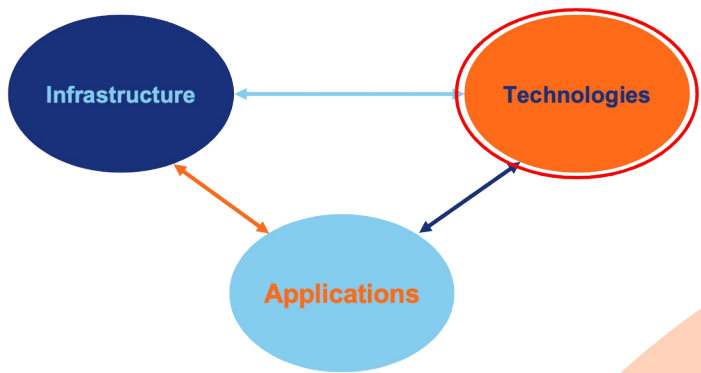
FENIX
RESEARCH INFRASTRUCTURE



FocusCoE



- ▶ Concerted action for the European HPC CoEs
- ▶ Coordinated by SCAPOS AG (Germany)
- ▶ <https://www.hpccoe.eu>
- ▶ Goals:
 - ▶ Initiated HPC3 (HPC CoE Council) comprising all active HPC CoEs, aiming at strengthening the role of applications in the European HPC ecosystem
 - ▶ FocusCoE is supporting the operations of HPC3
 - ▶ Establish connection with other players: CASTIEL, EuroCC or the petascale and pre-exascale consortia
 - ▶ Supports the CoE by organising various events
 - ▶ PRACE is one of the 11 partners of FocusCoE



Technologies

Core Technologies



Exascale HW SW Building blocks



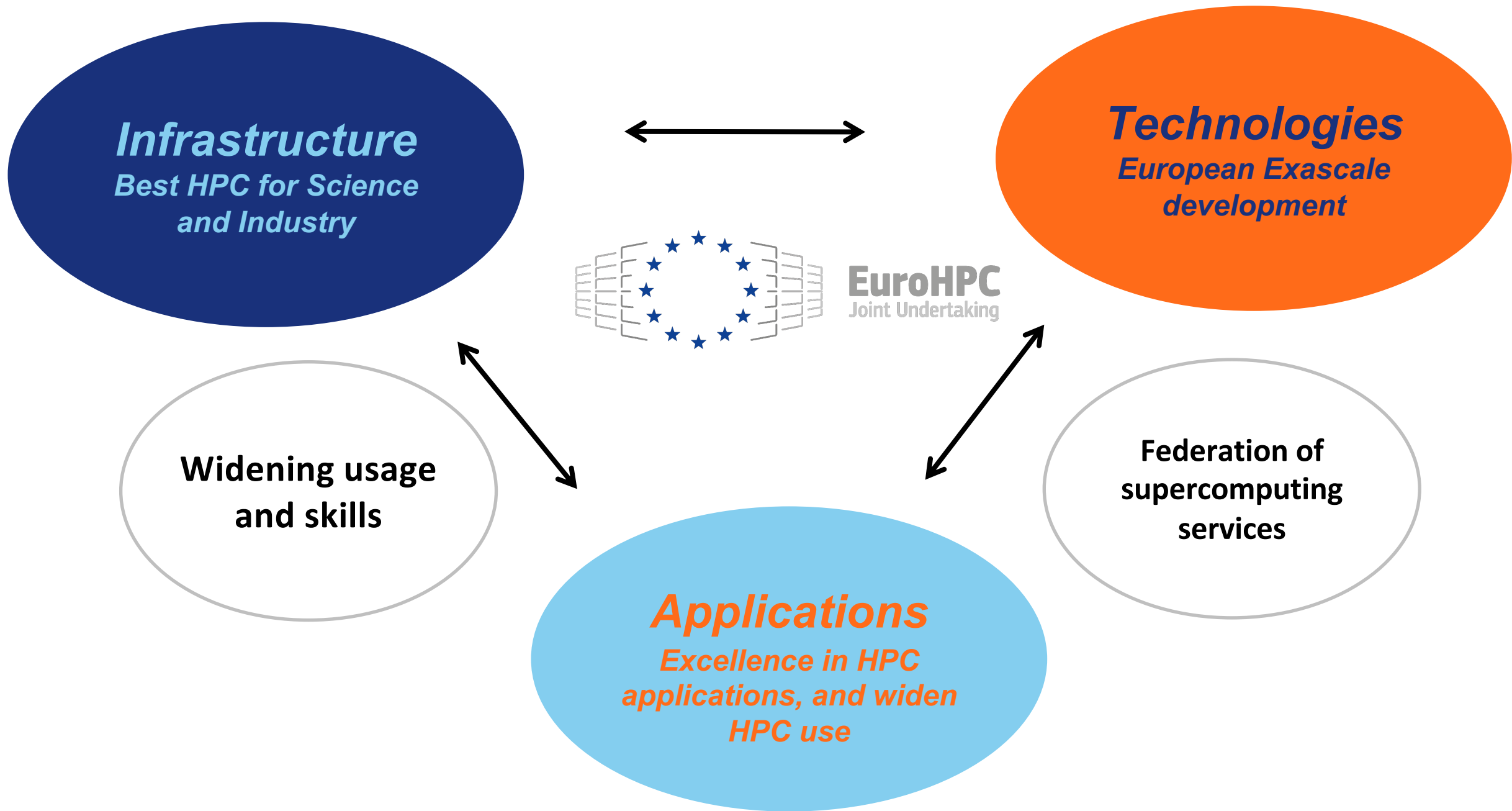


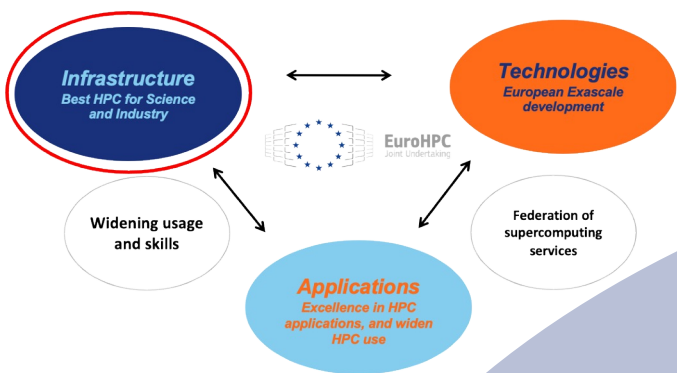
EuroHPC
Joint Undertaking

CHANGE

- ▶ Based on 2 EU Council Regulations:
 - ▶ 2018/1488
 - ▶ 2021/1173

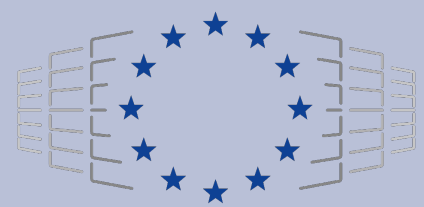
- ▶ Objectives
 - ▶ Built and operate a world class integrated HPC and data infrastructure
 - ▶ Enable MS to improve HPC competency
 - ▶ Foster HPC skills, education and training
 - ▶ Develop HPC core technology
 - ▶ *European Processor Initiative (EPI)*
 - ▶ *Energy efficient HPC*
 - ▶ *Quantum Computing*





Infrastructure
Best HPC for Science and Industry

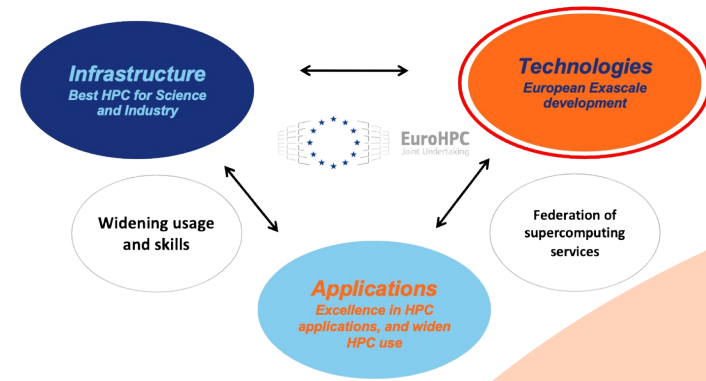
HPC systems co-funded by



EuroHPC
 Joint Undertaking



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Technologies

Core Technologies

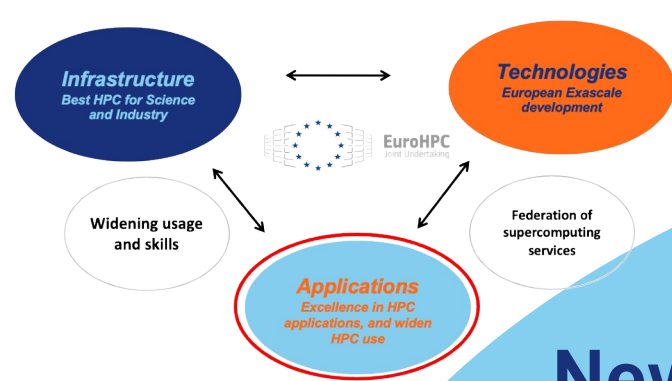


Exascale HW SW Building blocks



EuroHPC Pilots





New Calls in the EuroHPC JU WP 2022

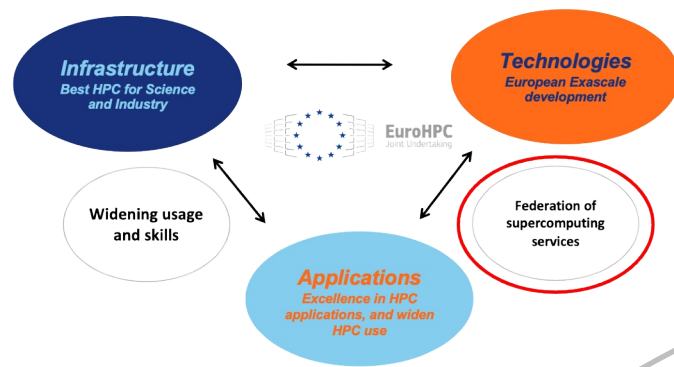
→ CoE, New algorithms for applications on EU exascale supercomputers

Applications

Excellence in HPC applications, and widen HPC use

A collection of logos for various research centers and projects, including:

- bioexcel
- MAX
- pop (Performance Optimisation and Productivity)
- ChEESE (Center of Excellence for Exascale in Solid Earth)
- RAISE (Center of Excellence)
- NOMAD
- esiwace
- EXCELLERAT
- oec (Center of Excellence in Combustion)
- Per Med COE
- EoCoE
- CompBioMed
- HiDALGO
- TREX (Targeting Real chemical accuracy at the EXascale)

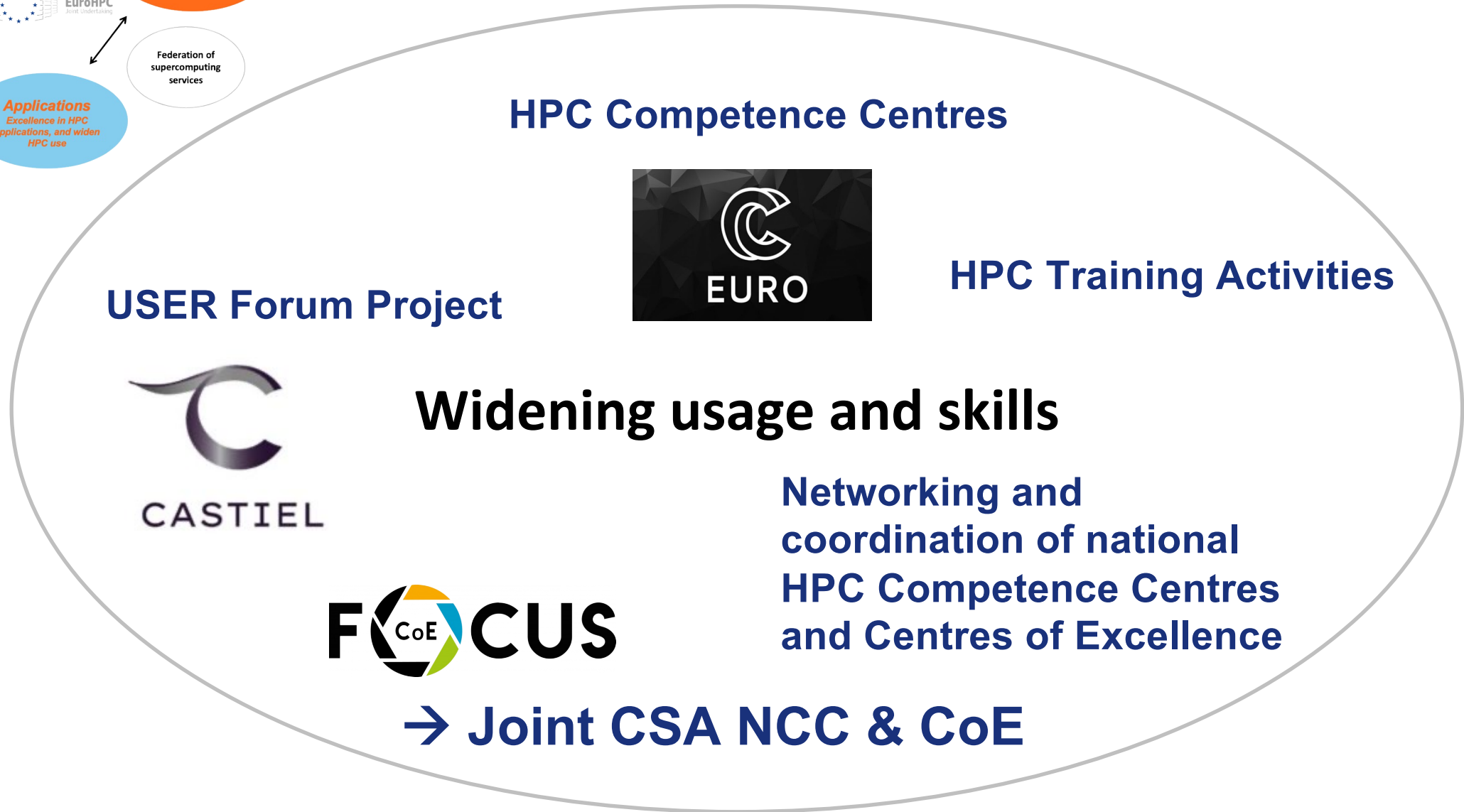
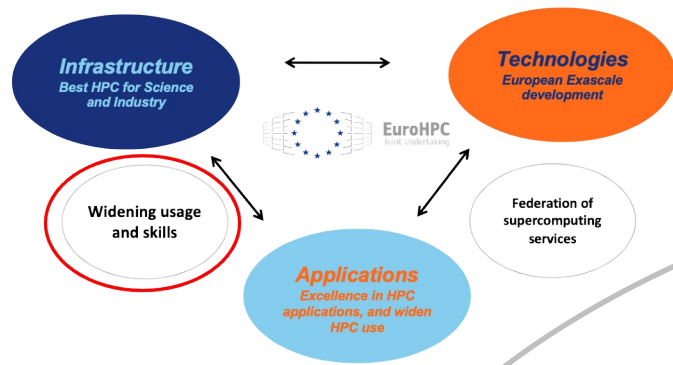


High Level support Teams for EuroHPC systems

Federation of supercomputing services

Federation of supercomputing and data resources





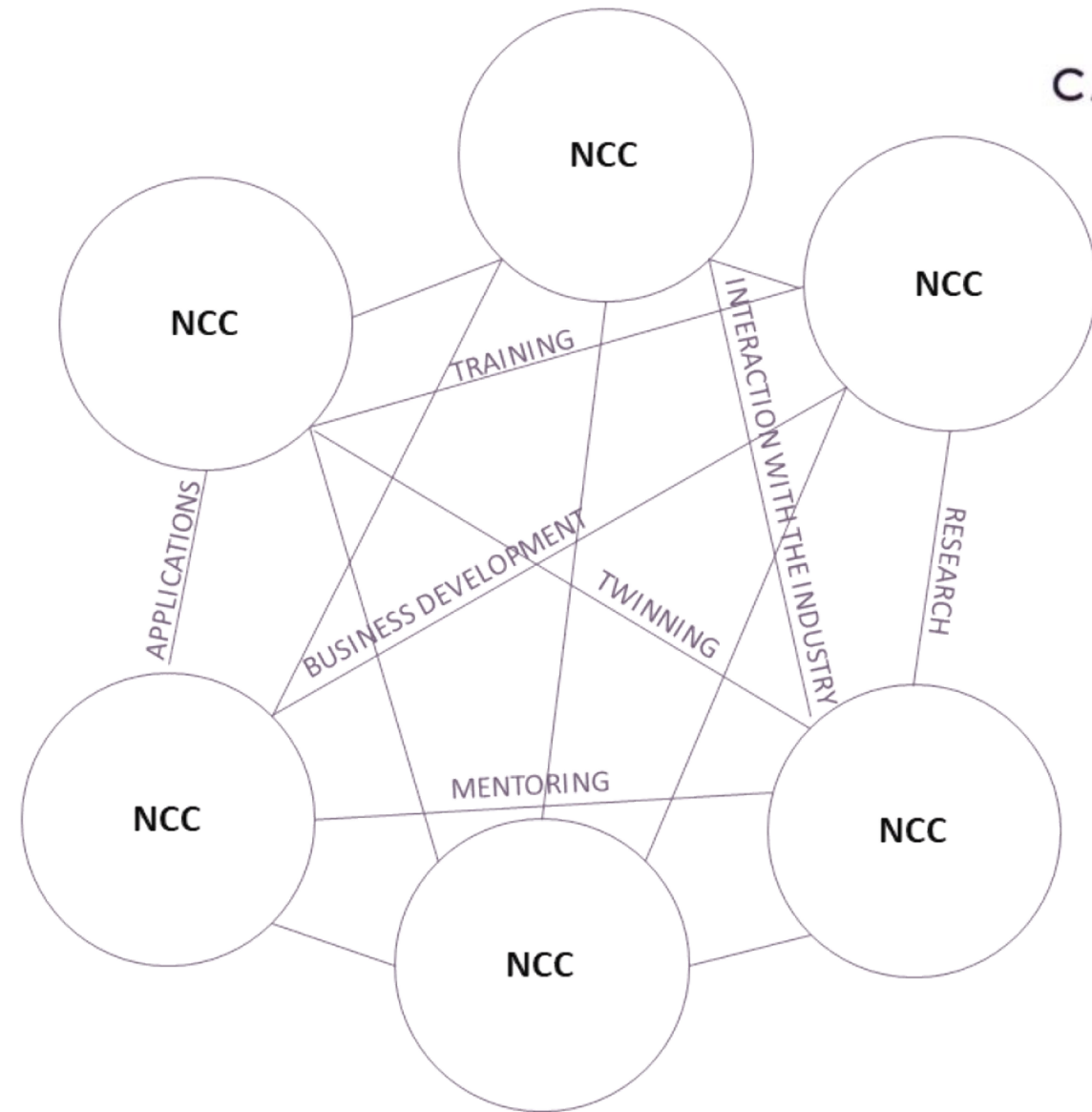
National Competence Centres



- ▶ Central points of contact for HPC and related technologies in their country
- ▶ <https://www.eurocc-access.eu/>
- ▶ Funded by EuroCC (33 members, coordinated by HRLS)
 - ▶ establish NCCs in the participating countries
 - ▶ responsible for surveying and documenting the core HPC, HPDA, and AI activities and competencies in their respective countries
- ▶ Coordinated by CASTIEL
 - ▶ aims to elevate the participating countries to a common high level in the fields of HPC, HPDA and AI
 - ▶ Goal: make HPC available to different users from science, industry, public administration, and society

CASTIEL

- ▶ CSA for National Competence Centres on a European Level
- ▶ Coordinated HLRS, Germany
- ▶ Closely associated with EuroCC
- ▶ Combines the National Competence Centres (NCC) formed in EuroCC into a pan-European network



FF4EUROHPC



- ▶ Support EuroHPC to promote the industrial uptake of HPC, in particular by SMEs
- ▶ Business-oriented application “experiments” driven by the SME end-users needs
- ▶ Support the future NCC and SME
- ▶ Widen industrial HPC user communities



What we have not covered in this introduction:

- ▶ Link with the outside world:

- ▶ European Open Science Cloud
- ▶ Transcontinuum initiative
- ▶ International cooperation
- ▶ International competition



- ▶ Industry

- ▶ Offers for industry, cloud offers
- ▶ Industry involvement



- ▶ Other stakeholders

- ▶ Citizen and their relationship to science (and its understanding)
- ▶ New user communities, such as Social Science and Humanities
- ▶ Diversity, Equality, Inclusivity... Attractivity of STEM... Talent shortage...

More information:



Conclusions

- ▶ Investments in HPC in Europe are important and needed for keeping pace in the global race
- ▶ Europe must be inclusive and excellent, taking advantage of all different and diverse contributions in the EU
- ▶ People matters (the most) - beside HW also SW and people using and operating HPC are essential to be successful
- ▶ Coordination is key in a complex ecosystem

**THANK YOU FOR YOUR
ATTENTION**

www.prace-ri.eu
