EXDCI – Supporting the European HPC ecosystem towards the Exascale endeavour

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5th ENES HPC Workshop – Lecce, Italy

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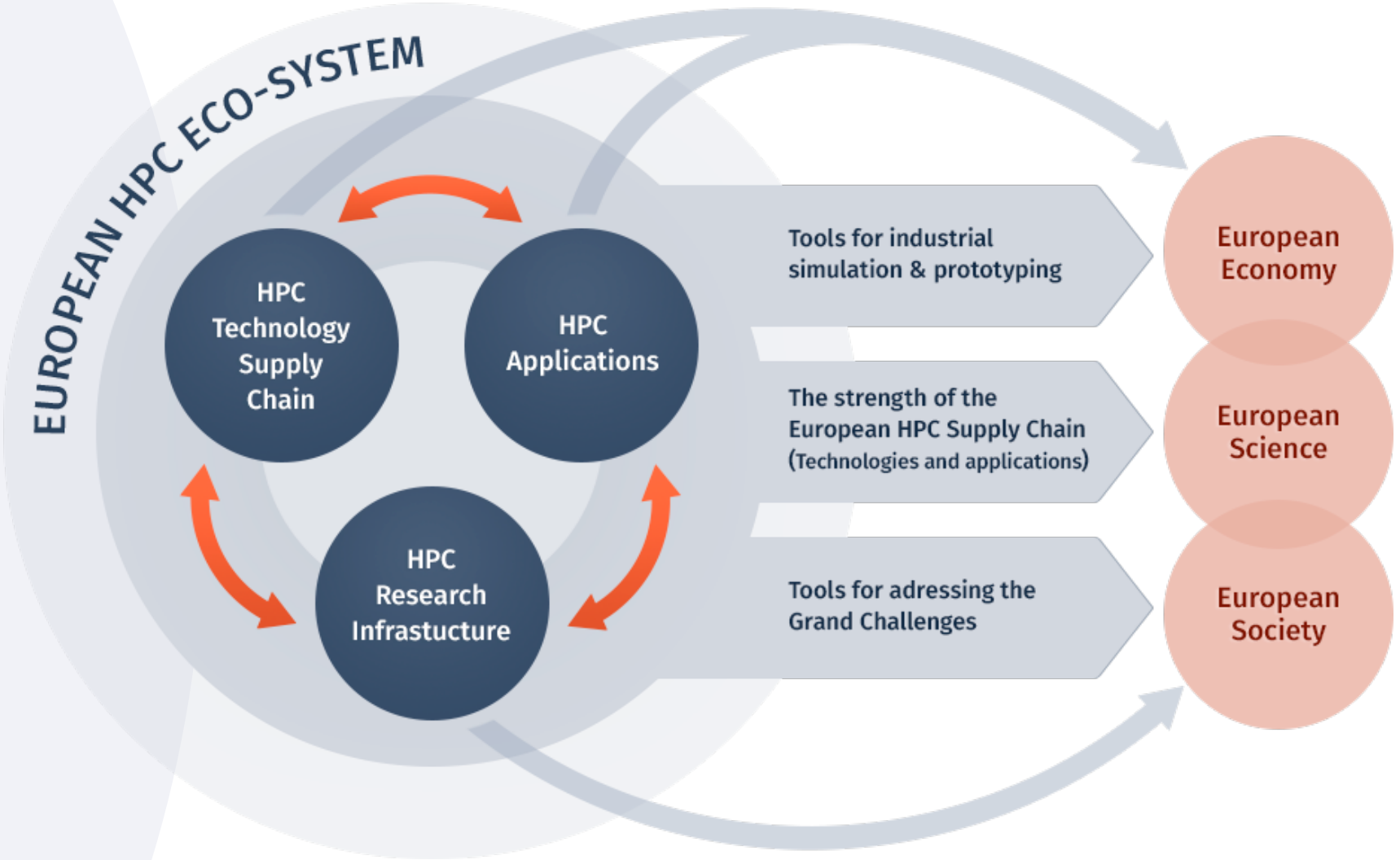
European HPC ECO-SYSTEM



EXDCI in a nutshell

- General objective

  Support the coordination of the development and implementation of a common strategy for the European HPC Ecosystem.

- Strategic goals
  - Support the implementation of a common European HPC strategy through the coordination of activities of stakeholders
  - Support the road-mapping, strategy-making and performance-monitoring activities of the ecosystem
- EXDCI is a 30-month project starting from September 2015 with
  - a budget of € 2.5 million
  - with 173.5 PMs

The Consortium

The EXDCI project consortium has been designed to represent a cross-section of European and international key actors in the field of HPC.

The partnership is composed of:

- **2 contractual partners** which are PRACE AISBL and ETP4HPC.
- **21 third parties** which mainly are HPC centres all over Europe involved directly (though the different committees of the association) or indirectly in HPC activities.
- **8 Subcontractors**

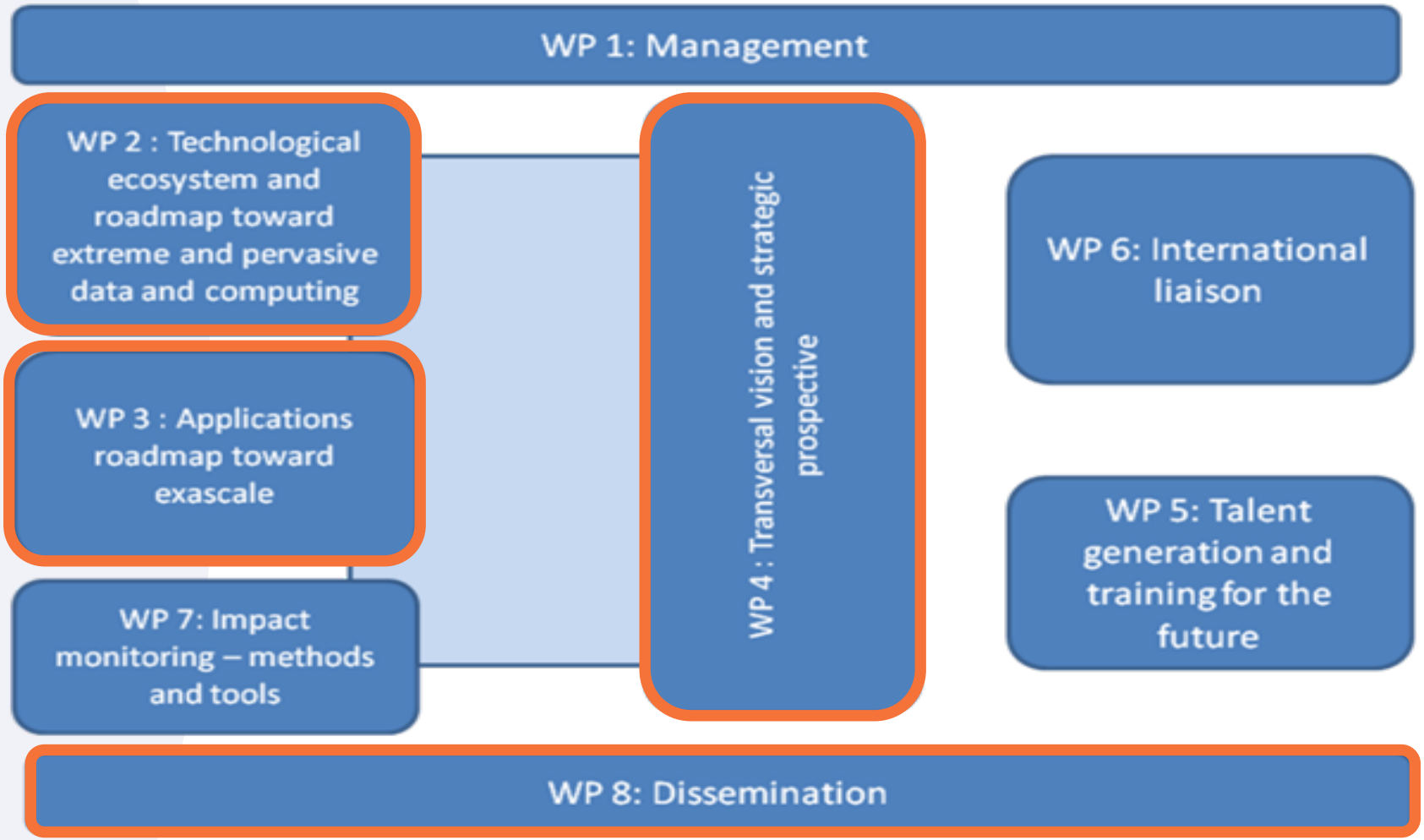
Where Are We Going?

- Next generation of HPC systems is multi-objectives
  - 10^{18} flops of strategic interest for a small community
  - Beyond the traditional HPC, e.g. Smart-cities, IoT
  - Convergence of HPC, HPDA and Cloud computing
  - Machine learning friendly
  - Support for complex workflows (distributed, heterogeneous, interactive, etc.)
    - Combining edges, data centers, supercomputers
- Develop EU technologies
  - Reduce dependencies
- Improve infrastructures
  - Network, storage and systems

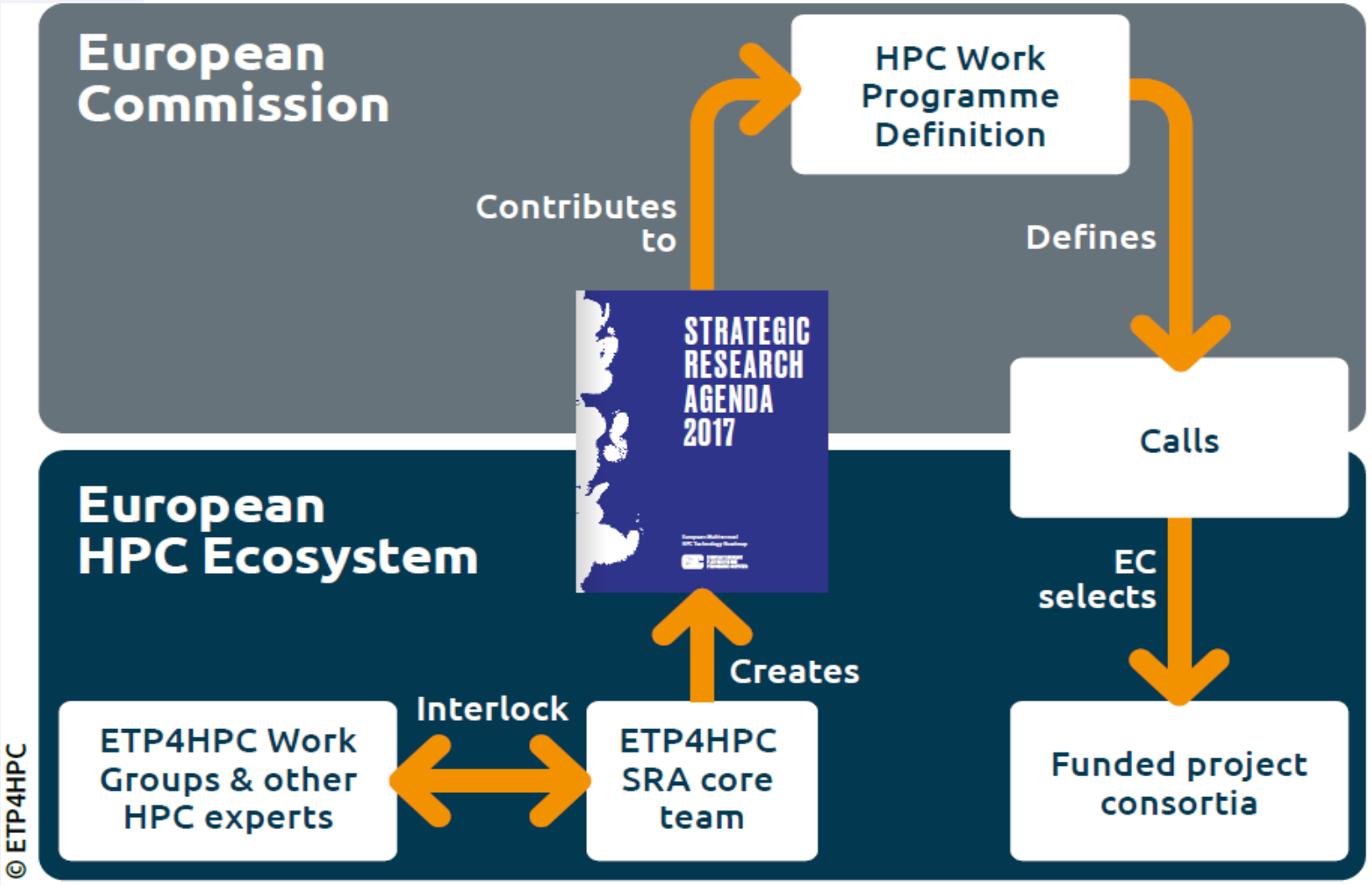
Why Are We going There?

- Science needs more computing power, storage, data analysis
  - Numerical laboratories (in Pathways to convergence document)
- Specific to EU ecosystem
  - After a high expansion period we are losing ground
  - Increased competition
  - HPC at scale becomes more critical for economy, environment and metropolis development (cities systemic models, digital twins, etc.)
  - Entangled with the Big Data economy
  - New policies, e.g. make all scientific data produced by H2020 open by default
- Building a full HPC ecosystem is imperative to ensure long term value creation
  - Part of the innovation and economic growth assets
  - Training new generation of scientists and engineers
  - Securing our own independent HPC system supply

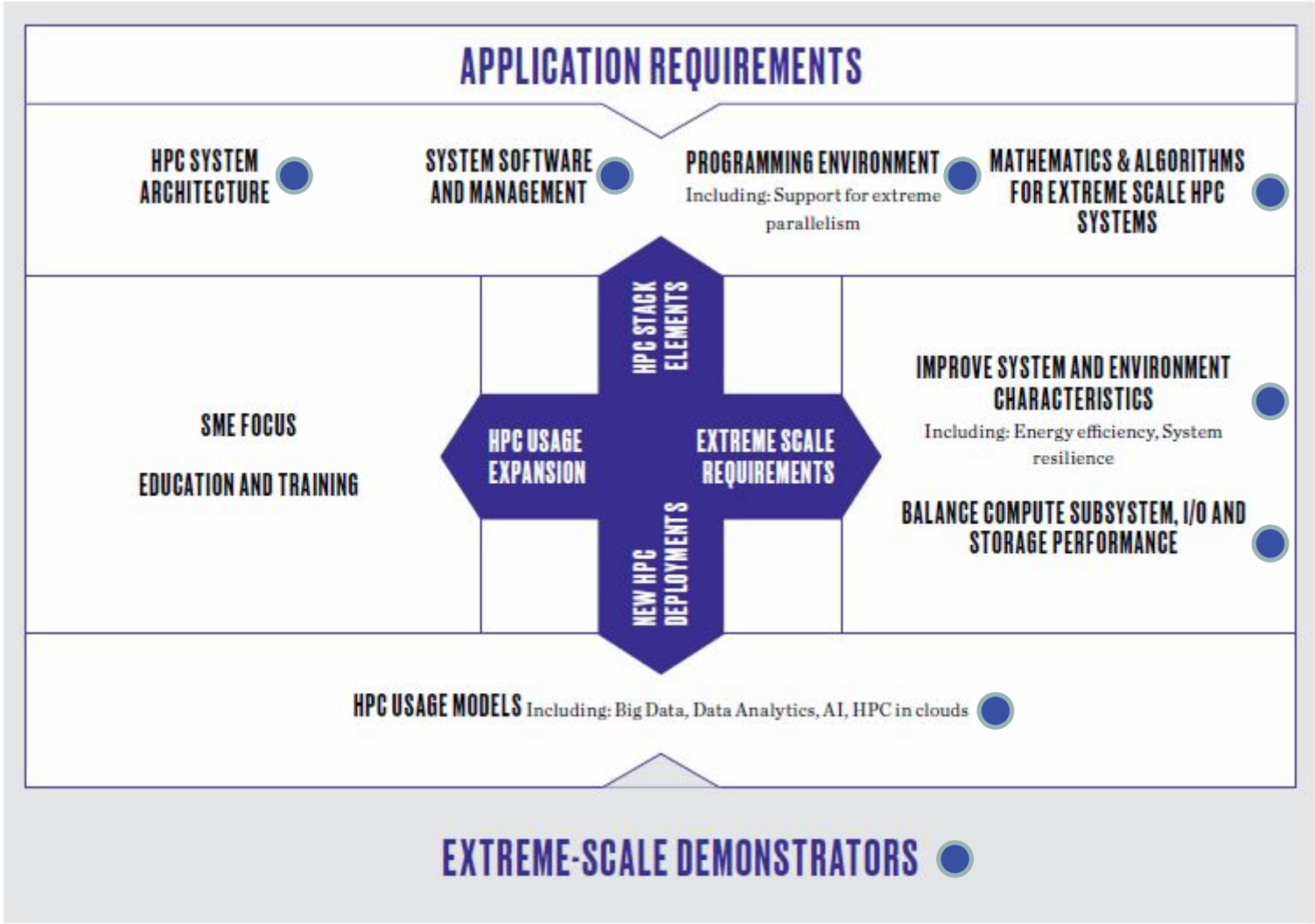
Work Plan


WP 1: Management
WP 2 : Technological ecosystem and roadmap toward extreme and pervasive data and computing
WP 3 : Applications roadmap toward exascale
WP 7: Impact monitoring – methods and tools
WP 4 : Transversal vision and strategic prospective
WP 6: International liaison
WP 5: Talent generation and training for the future
WP 8: Dissemination

The role of the SRA



SRA 3 Model and 8 Technical Working Groups



Applications roadmapping

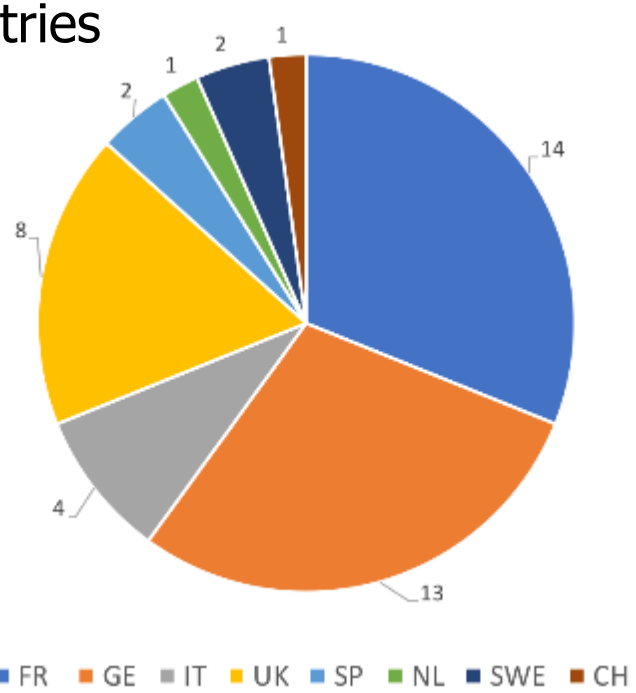
- Organisation
  - 4 working groups of 45 experts
    - ✓ T3.1 : Industrial and engineering applications
      (EDF : Yvan FOURNIER, University of Aachen : Heinz PITSCH)
    - ✓ T3.2 : Weather, Climatology and Solid Earth Sciences
      (Univ. Salento/CMCC : Giovanni ALOISIO, JCA Consultance: Jean-Claude ANDRE)
    - ✓ T3.3 : Fundamental Sciences
      (CEA : A. Sacha BRUN, JSC: Stefan KRIEG)
    - ✓ T3.4 : Life Science & Health
      (BioExcel CoE/ KTH : Rossen APOSTOLOV, CompBioMED / UCL : Peter COVENEY)

  - T3.5: Coordination, consolidation of application roadmaps and inputs to the update of the PRACE Scientific Case

- Deliverables
  - D3.1: "First set of reports and recommendations toward applications" (**M15**)
  - D3.2: "EXDCI Inputs to the PRACE Scientific Case » (**M27**) followed by a 3rd version of the PRACE Scientific Case – provided by the PRACE SSC

Application roadmapping (2)

- Contribution from 45 experts of 8 countries
- Academia & industry



- Strong collaborations with the CoE :

esiwace CENTRE OF EXCELLENCE IN SIMULATION OF WEATHER AND CLIMATE IN EUROPE ⇨ in WG3.2

E-CAM

NOMAD NOVEL MATERIALS DISCOVERY

MAX ⇨ in WG3.3

E·C·E

bioexcel Center of Excellence for Computational Biomolecular Research

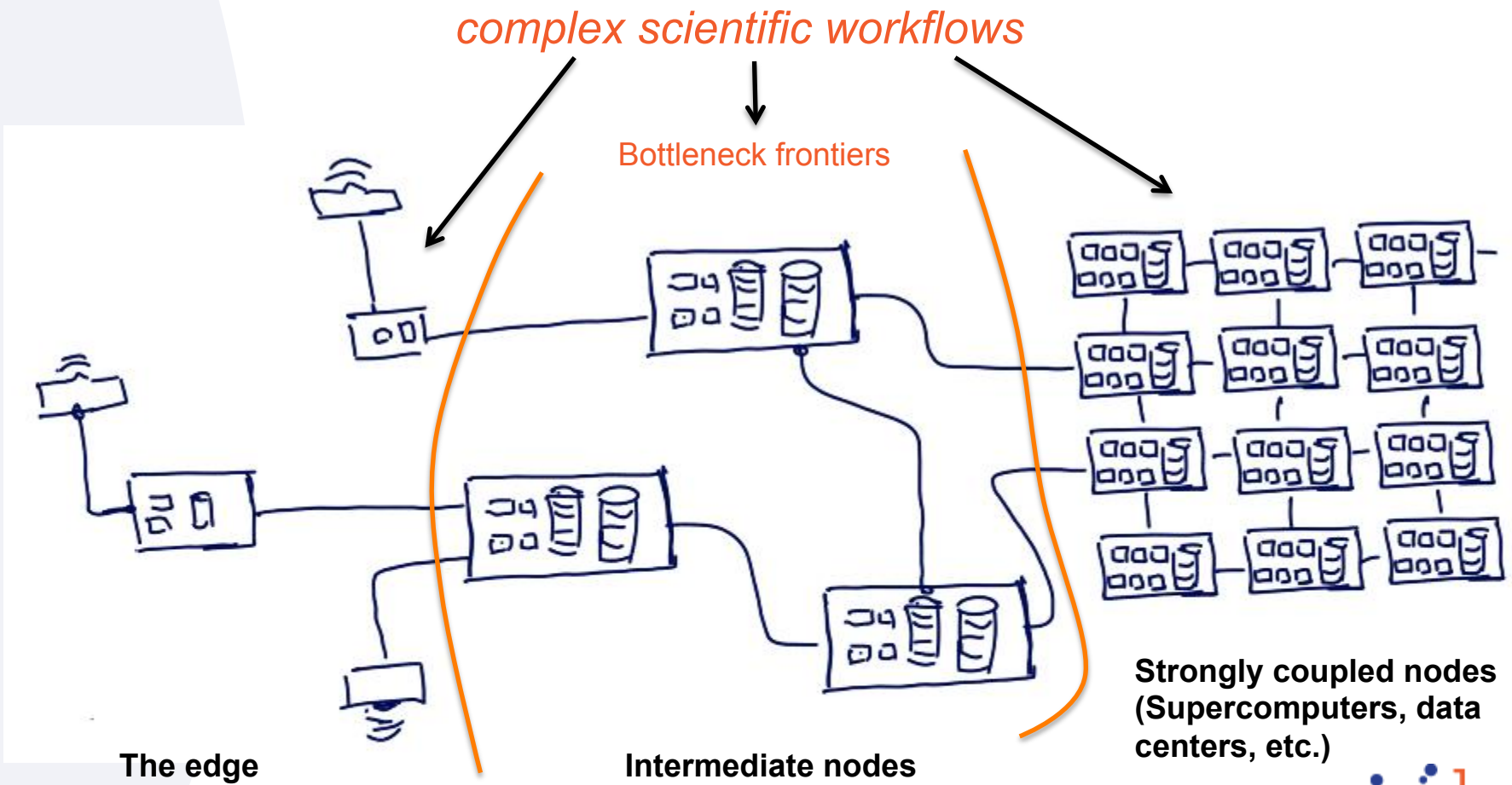
COMPBIOMED ⇨ leading WG3.4

POP ⇨ when collaborating with WP2

edci European Extreme Data & Computing Initiative

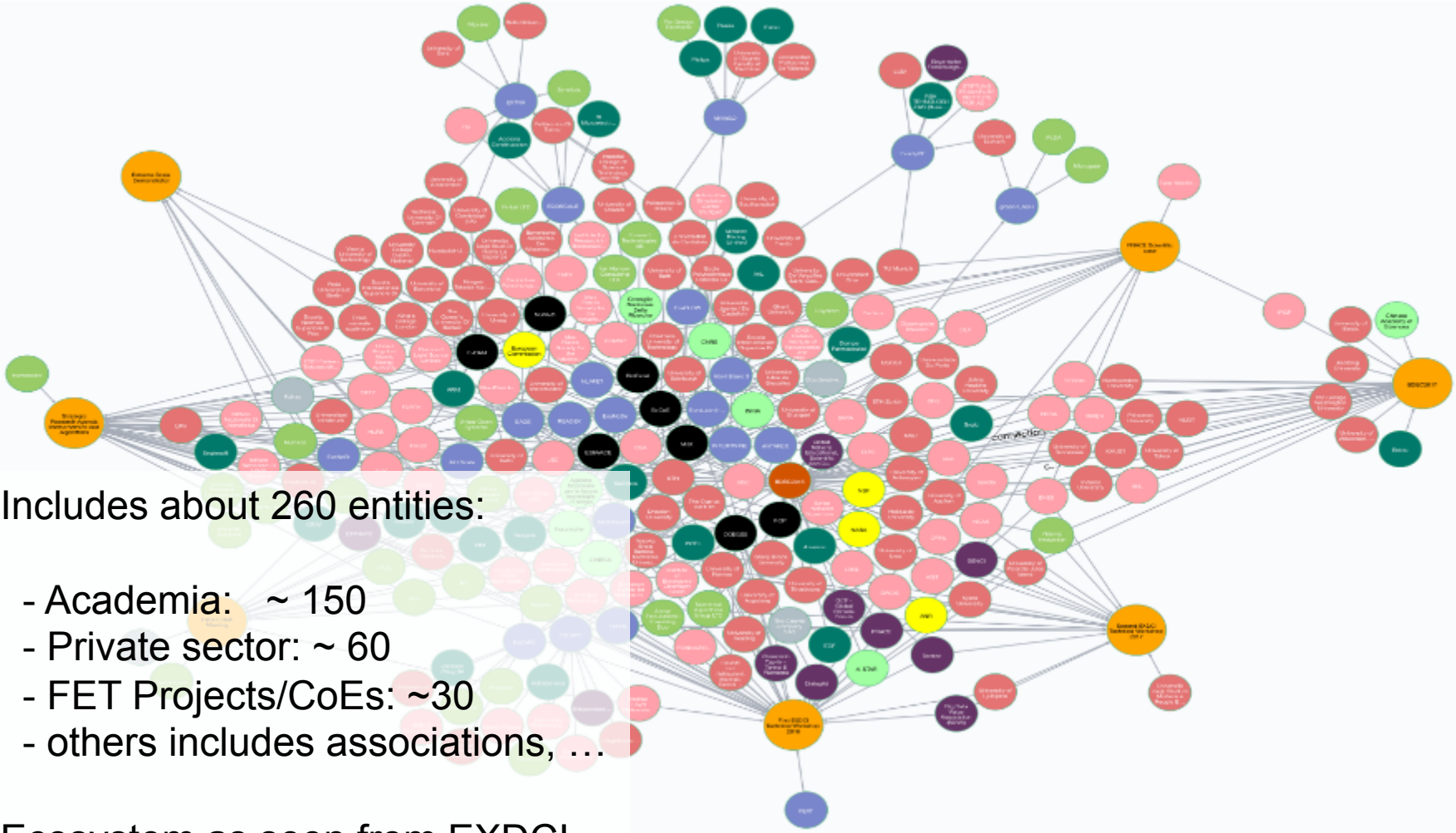
Transverse vision - Support for Complex Workflows

Data location and energy are the critical dimensioning parameters
- We have frontiers where we need a continuum
- Topology oblivious routing scheme is not adequate



A Map of the Ecosystem as Connected by EXDCI

Hundreds of loosely coupled entities to drive in the same direction

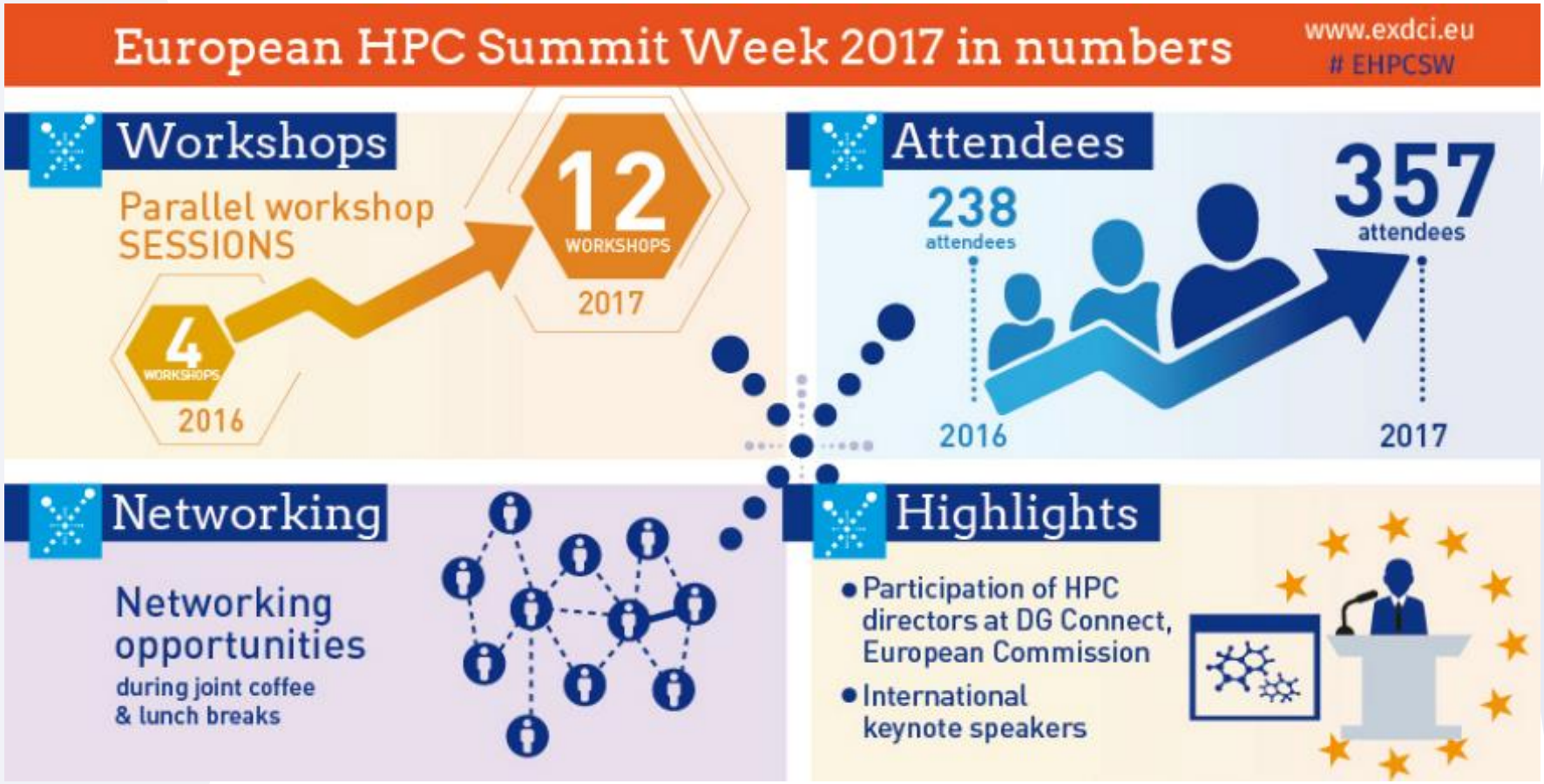


Includes about 260 entities:

- Academia: ~ 150
- Private sector: ~ 60
- FET Projects/CoEs: ~30
- others includes associations, …

Ecosystem as seen from EXDCI

European HPC Summit Week 2016 and 2017



European HPC Summit Week 2018

- 28 May – 1 June 2018 - University of Ljubljana, Slovenia

European HPC Summit Week 2018 Programme

from 28 May to 1 June 2018

www.exdci.eu
#EHPCSW

University of Ljubljana
Pravna fakulteta/Faculty of Law
Poljanska 2
1000 LJUBLJANA, Slovenia

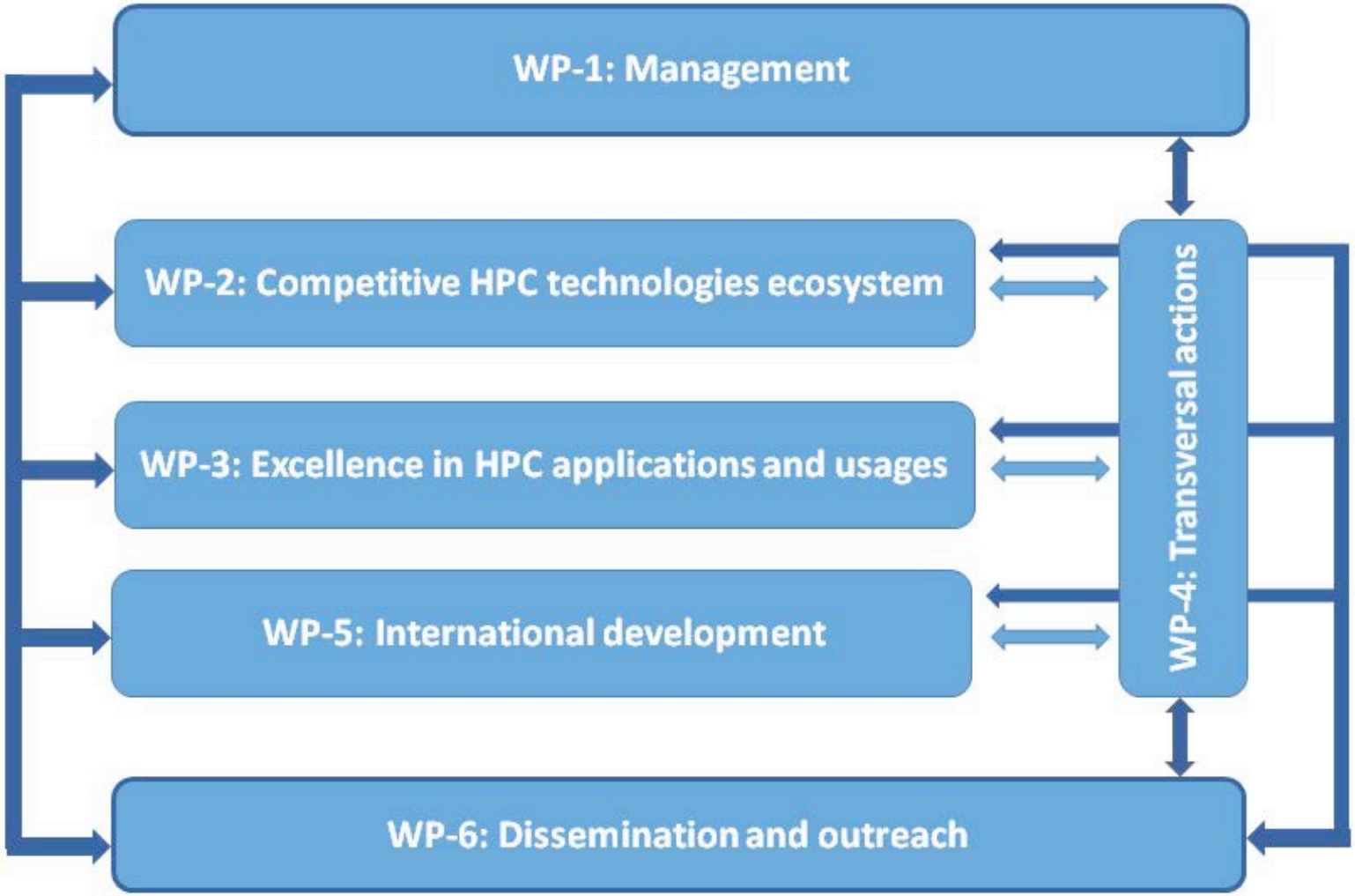
	Monday 28	Tuesday 29	Wednesday 30	Thursday 31	Friday 1
8:00	Registration	Registration	Registration	Registration	Registration
8:30					
Room:		Red	Red		
9:00		Opening of EHPCSW & Opening of PRACEdays18	International keynote: TBC, Political keynote: The European HPC Strategy and the EuroHPC Joint Undertaking, T. Skordas, European Commission; European HPC keynote: Memory Driven Computing, F. J. Pfreund, ITWM		
9:30					
10:00		Coffee break	Coffee break		
10:30					
11:00		Scientific keynote: Binary neutron stars, L. Rezzolla, Institute of Theoretical Physics, Frankfurt; Industrial keynote: Cloud HPC and Containers Supporting Science and Engineering, W. Gentzsch, UberCloud; Keynote: title TBC, J.P. Panziera, ETP4HPC; Keynote: Presentation of the PRACE Scientific Case, E.Lindahl, PRACE Scientific Steering Committee	PRACE User Forum Open Session; PRACE Peer Review Process, M.G. Giufreda, ETH Zurich/CSCS; Brief 2-min historical context of the work of the AC and the RAS Meeting, E. Lindahl, PRACE Scientific Steering Committee; PRACE Peer Review Process: How to prepare a good proposal, L.Rezzolla, Director at the Institute for Theoretical Physics (ITP) and L. Marzella, CSCS; Open discussion and questions from the audience		
11:30					
12:00					
12:30					
13:00					
13:30	Lunch break	Lunch break	Lunch break		
14:30					
Room:	Red	Red / Gold / Violet / Sem. 1 / Sem.2 / Sem. 3 / Sem. 5	Red / Violet / Sem. 3 / Sem. 4		
14:30	EXDCI Workshop	PRACEdays18 Industrial parallel track; PRACEdays18 Scientific parallel track CFD & Engineering; PRACEdays18 Scientific parallel track Materials & Chemistry / Life Sciences & Chemistry; PRACEdays18 Scientific parallel track Plasma & Energy; NEXTGenIO, SAGE Working towards Exascale IO; ALLScale, ANTAREX, READEX, and ExCAPE projects High-Performance Computing Approaches for Monitoring, Exploring, Optimizing and Autotuning (HPCAFE)	ETP4HPC Workshop on energy efficiency in HPC; HPE Memory-centric architectures for exascale; EaPConnect Deep learning and Medical Data Mining; EUDAT Coupling HPC & data services together		
15:00					
15:30					
16:00					
16:30	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
17:00					
17:30	EXDCI Workshop	PRACEdays18 Industrial parallel track; PRACEdays18 Scientific parallel track Astro & Particle; ALLScale, ANTAREX, READEX, and ExCAPE projects High-Performance Computing Approaches for Monitoring, Exploring, Optimizing and Autotuning (HPCAFE); EOSCpilot Meeting Recommendations on Governance and Rules of Participation	EHPCSW Group Photo; Conference Dinner and visit to Postojna Cave Buses to Dinner & Cave		Private Project meetings
18:00					
Room:		Red			
18:30		TBC, H. Weiss, BASF			
Room:		Red			
19:00		Keynote: Large Scale Multiphysics and Multiscale Simulations Based on Meshless Methods, B. Šarler, Laboratory for Fluid Dynamics and Thermodynamics (University of Ljubljana) and Laboratory for Simulation of Materials and Processes (Institute of Metals and Technology)	Visit to Cave (18.30 - 20.30h)	End of day	End of day
19:30					
Room:		Hall and outside terrace of the university			
20:00					
20:30		Welcome Reception & PRACEdays18 Poster Session			
21:00	End of day	End of day	EHPCSW Dinner (20.30h - 22h)		
21:30					
22:00					
22:30			Buses back to venue or nearby hotels		

exdci European Extreme Data & Computing Initiative

EXDCI-2

- General objective
  - Building upon the success of EXDCI, continue the coordination of the HPC ecosystem with important enhancements to better address the convergence of big data, cloud and HPC.
- Strategic goals
  - Development and advocacy of a competitive European HPC Exascale Strategy
  - Coordination of the stakeholder community for European HPC at the Exascale
- EXDCI-2 is a 30-month project started in March 2018 with
  - a budget of € 2.44 million
  - with ~200 PMs

EXDCI-2 Work packages structure



Thank you for your attention

https://exdci.eu/

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