EXDCI – European eXtreme Data and Computing Initiative

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EXDCI Coordinator

March, 17 2016
Objectives

- **Coordinate** the development and implementation of a common strategy for the European HPC Ecosystem
Organisation

- Project Kick-off organised in Brussels, September 2015
- EXDCI Management Board and Technical Board
- Project Management Office established in Brussels
- Collaborative internal workspace
- Quality Assurance Process for the projects deliverables
- Templates for deliverables and reports
Technological ecosystem and roadmap toward extreme and pervasive data and computing
We welcome your comments on the current SRA
http://www.etp4hpc.eu/strategic-research-agenda/
Next SRA-related events in H1 2016

• Extreme-Scale Demonstrators Workshop @ HPC summit/May 12th
  • focussed on the EsD definition (engage potential players, further implementation details)
  • at this event the three pillars for the EsD mission (CoE, HPC centres and the FETHPC1 project speakers) are invited

• ISC16 – June 23rd
  • Scope: Feedback session on SRA directions, content and value to shape the next update
  • Invited are:
    • End-users, ISVs
    • International HPC experts
    • Members from SRA workgroups

• Level set with HPC application experts (EXDCI Technical meeting) – September 21&22
• Technical workshop with Big Data Value Association (BDVA) May/June
Applications roadmap towards Exascale
Objectives

- Provide updated roadmaps of needs and expectations of scientific applications
- Provide inputs to the update the PRACE Scientific Case in order to support PRACE in the deployment of its (Pre)Exascale pan European HPC research infrastructure

Initiative to create an update of the Scientific Case and capture the current and expected future needs of the scientific communities

- Weather, Climatology and solid Earth Sciences
- Astrophysics, HEP and Plasma Physics
- Materials Science, Chemistry and Nanoscience
- Life Sciences and Medicine
- Engineering Sciences and Industrial Applications
Applications roadmap towards Exascale: Ingredients

- PRACE Scientific Case
- Issued end of 2012 by the PRACE Scientific Steering Committee
- Needs and roadmaps from different scientific and industrial communities
- Key recommendations:
  - Persistent Pan EU HPC infrastructure;
  - Development of algorithms and system tools;
  - Integrated compute & data;
  - Education & Training;
  - Thematic centers (aka CoE)...
Applications roadmap towards Exascale: Ingredients

The EESI2 reports and recommendations

- Issued mid 2014 and mid 2015
- 5 Applications working groups
- 43 experts from 10 countries, academia & industry
- 3 specific reports on applications published
- Active participation on EESI2 global recommendations includes:
  - Parallelisation in Time with examples on applications
  - Uncertainty Quantification in massively parallel codes
  - In-situ Data Processing in Extreme Simulations
  - Efficient Couplers for Extreme Computing
  - Data Centric Approach in turbulent flows
Applications roadmap towards Exascale: Structure in a nutshell

• Organisation
  • 4 working groups of around 30+ experts
    • Industrial and engineering applications
      (EDF : Yvan Fournier, University of Aachen : Heinz PITSCH)
    • Weather, Climatology and Solid Earth Sciences
      (Univ. Salento/CMCC : Giovanni ALOISIO, JCA Consultance: Jean-Claude Andre)
    • Fundamental Sciences
      (CEA : A. Sacha BRUN, JSC: Stefan KRIEG)
    • Life Science & Health
      (BioExcel CoE/ KTH : R. Apostolov)
  • Coordination, consolidation of application roadmaps and inputs to the update of the PRACE Scientific Case

• Outcome and deliverables
  • First set of reports and recommendations toward applications (November 2016)
  • Third version of the PRACE SSC Scientific Case – a full bottom-up new version of PRACE SSC Scientific Case, following the last one published in 2012 (November 2017)
Transversal vision and strategic prospective
Transversal vision and strategic prospective: Targets

- **Objectives**
  - Building a global vision of the roadmaps, towards a shared European e-infrastructure roadmap (with DG-CNECT, DG-RTD, ESFRI, e-IRG)
  - Identifying synergies to lead to a co-design approach

- **Ecosystem transversal relationships**
  - Centres of Excellence, FET HPC Projects, Eurolab4HPC

- **SME**
  - Support Start-Ups and SMEs and see how to accelerate the creation of new start-ups that could potentially be created due to the technological progress achieved within the Horizon 2020 FETHPC Program.
  - Interest for identification of start-ups creation opportunities in the scope of the CoEs and the FET HPC projects
  - Needs of SMEs participating in CoEs and FET HPC projects
  - Survey recommendations continuity (e.g. from EESI)
Transversal vision and strategic prospective: Actions

• Status
  • Coordination for establishing “questionnaire” common to ETP4HPC and PRACE to collect ecosystem progresses (available at https://exdci.eu/questionnaire-coe-fet-hpc)
  • Coordination with EuroLab4HPC
  • Participating to the exchanges events: ISC 2016 Bof, European HPC Summit Week, Big Data and Extreme Scale Computing (BDEC) workshops
  • Identification of potential technological disruptions

• Next steps
  • SME actions discussion at the European HPC Summit week
  • Building a first set of recommendations based on the ecosystem inputs
Talent generation and training for the future
Talent and training: Objectives

- Addressing the shortage of HPC skills in academia and industry, by:
  - Promoting HPC and HPC skills to young people as exciting and rewarding areas for study and employment;
  - Supporting employers in job specification and recruitment of staff with appropriate HPC skills;
  - Undertaking training gap analysis across the whole HPC Ecosystem, with a view to producing a synthesised training roadmap for Europe;
  - Supporting the development of a community of HPC training providers.
Talent and training: Tasks

- Supporting Talent Generation
  - To promote the importance of HPC skills to young people.
  - Creating material to present at eg local science festivals, university visits, etc:
    - To present HPC in a gender-neutral way, to try to improve the gender balance within the HPC community;
    - To highlight the many and varied jobs that exist, both in HPC community and professions combining modelling skills with domain expertise, eg engineering, climate modelling.
  - Initial set of 5 HPC career case studies produced; more to follow
    - [http://www.exdci.eu/CaseStudies/]
Facilitating HPC Staff Recruitment

- “Job Centre” portal to be set up, providing:
  - Sample job descriptions (to help employers specify the skills they need);
  - Links to sites where HPC jobs are listed;
  - Details of jobs offered by PRACE, ETP4HPC and EESI partners, specifically promoting opportunities in Europe.

Identifying and Meeting Future Training Needs

- A searchable portal of training courses and providers will be created.
- A Synthesised Training Roadmap will be produced, based on Gap Analysis and future requirements.
- A community of training providers will be established, to coordinate European efforts in HPC training and education.
International liaison
World-wide presence

- **Objectives**
  - Mapping and analysis of national and international R&I programs/activities/research agendas in HPC towards exascale, and convergence of Exascale with Exabyte (big compute and big data).
  - Coordination with and participation in relevant international activities.
  - Establish and maintain a global network of expertise and funding bodies in the area of Exascale computing.
  - Act as a proactive European voice and representative in the International Exascale Software Community and BDEC initiative.

- **Coordination with**
  - SPPEXA (Germany-France-Japan).
  - Belmont Forum CRA on e-infrastructures and data (14 countries).
  - Coordinated Research on E-infrastructures (CRE) (DG-CNECT, RDA).
  - BDEC (EU-USA-Japan)
Collaborations between European projects and non-EU actions

• Opportunities:
  • Analysing the activities of the European projects (mainly the ones from the FET HPC 1 call) and other HPC Ecosystems actions with an objective to identify the areas of:
    • (1) technology provision,
    • (2) infrastructure and
    • (3) application resources that can benefit from international collaboration.
  • Federating the international contacts to prevent each project from having to develop its own network.
  • Identifying tools suitable for fostering such relationships
Impact monitoring – Methods and tools
Impact monitoring

• Create the necessary analysis tools to support informed decision-making in relation to:
  • the development of the European HPC Ecosystem
  • the impact of the Research &Innovation activities linked to the HPC cPPP strategy
• It is of upmost importance to measure and show the effectiveness of H2020 HPC programmes and to involve all stakeholders in this effort – especially for the collection of some data which is needed for proper monitoring.
• ETP4HPC and PRACE are joining forces in this effort, building on previous work
  • PRACE KPIs have been defined and implemented, and are regularly updated
  • ETP4HPC and the EC set-up a set of KPIs to be monitored within the HPC cPPP
  • Use of surveys and direct interaction with FETHPC projects, CoEs, ETP4HPC members to collect data and consolidate methodology
• See https://exdci.eu/activities/kpi
Overview of cPPP Performance Indicators

• A. Indicators for Industrial Competitiveness and Socio-Economy Impact
  • KPI 1: Global market share of European HPC
  • KPI 2: HPC additional investments
  • KPI 3: Jobs
  • KPI 4: Innovation Environment in HPC

• B. Indicators for the operational aspects of the programme
  • KPI 5: Research programme effectiveness and coverage
  • KPI 6: Performance of HPC technologies developed
  • KPI 7: People, education, training and skills development
  • KPI 8: HPC use
  • KPI 9: HPC Software ecosystem
  • KPI 10: Patent, inventions and contributions to standards in HPC by H2020 funded projects

• C. Indicators for management aspects of the programme
  • KPI 11: Efficiency, openness and transparency of the PPP Consultation Process
  • KPI 12: Dissemination and Awareness
Dissemination
European HPC Summit Week

EXDCI Workshop  ➤ Monday 9 to Tuesday 10
PRACEdays16 ➤ Tuesday 10 to Thursday 12
ETP4HPC Extreme-Scale Demonstrators Workshop ➤ Thursday 12

from 9 to 12 May 2016
Prague
Czech Republic

The European Extreme Data & Computing Initiative (EXDCI) objective is to coordinate the development and implementation of a common strategy for the European HPC Ecosystem. The two most significant HPC bodies in Europe, PRACE and ETP4HPC, join their expertise in this 30-month project with a budget of € 2.5 million, starting from September 2015. EXDCI aims to support the road-mapping, strategy-making and performance-monitoring activities of the ecosystem, i.e.:

- Producing and aligning roadmaps for HPC Technology and HPC Applications
- Measuring the implementation of the European HPC strategy
- Building and maintaining relations with other international HPC activities and regions
- Supporting the generation of young talent as a crucial element of the development of European HPC
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<thead>
<tr>
<th>Event</th>
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<th>Location</th>
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<tr>
<td>EXDCI workshop</td>
<td>Rome, Italy</td>
<td>29-30 September 2015</td>
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<tr>
<td>European HPC Summit Week: EXDCI workshop</td>
<td>Prague, Czech Republic</td>
<td>9 -12 May 2016</td>
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<td>ISC’16: shared booth with European Exascale Projects</td>
<td>Frankfurt, Germany</td>
<td>19-23 June 2016</td>
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<td>SC16: shared booth with PRACE booth</td>
<td>Salt Lake City, USA</td>
<td>13-18 November 2016</td>
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2nd EXDCI workshop @ European HPC Summit Week

Monday, May 9, 2016

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<tr>
<td>08:45</td>
<td>Registration</td>
<td>Congress Hall 1</td>
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<tr>
<td>09:15</td>
<td>Welcome and EXDCI introductions</td>
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<tr>
<td>09:25</td>
<td>EC presentation</td>
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<td>09:45</td>
<td>Highlights on exascale's SC and ISC participation</td>
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<td>10:00</td>
<td>Strategic Research Agenda - updated</td>
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<td>10:20</td>
<td>Scientific case, schedule, preparation and contributions</td>
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<td>10:40</td>
<td>International cooperation, DEEs and additional cooperations</td>
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<td>11:00</td>
<td>Break</td>
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<td>ExConE</td>
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Tuesday, May 10, 2016

Parallel Session 1 at Congress Hall 1

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Parallel Session 2 at Congress Hall 1

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Joint Session at Congress Hall 1

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<td>13:45</td>
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Standing cocktails at the foyer
Thank you for your attention

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