ETP4HPC General Assembly
15th March 2016
Barcelona
Catalunya

Agenda

Time	Topic
10:30	Registration
11:00	Welcome Address - ETP4HPC Chairman & BSC
11:05	Panos Tsarchopoulos, EC/DCNECT – Update from the European Commission
11:20	Mateo Valero, BSC - Guest Presentation
11:50	Activity and Financial Reports for 2015 - ETP4HPC Chairman
12:20	Strategic Research Agenda 2015 and Q&A - Michael Malms & SRA Team of ETP4HPC
13:00	LUNCH (it will be served outside, weather permitting)
14:00	Follow-up on SC'15 and international networking involving Exascale projects - Marcin Ostasz/ETP4HPC
14:20	Impact Assessment and Monitoring and discussion - Jean-Philippe Nominé/ETP4HPC
14:40	2016 Perspectives (Chair et al.)
15:10	New Members' Presentation
15:50	General Discussion
16:30	Closing

Invited speakers

- **Dr. Panagiotis Tsarchopoulos**
  EC/DCNECT, Responsible for HPC at FET-unit of the European Commission

- **Mateo Valero**

  Director of Barcelona Supercomputing Center

Report on 2015 Activities and Financial Report

- Introduction and membership statute
- Main activities
- CoEs , HPC projects
- Ecosystem relationships and outreach
  - BDVA
  - Events
  - Social media
- Financial report
- Vote on resolutions

2015 activities

2015 : strong development for ETP4HPC

- Membership beginning of 2015 : 64 members

- End of 2015 : 70 organisations involved in HPC technology research based in Europe
  - 23 Associated / 47 Full members
  - 24 SMEs (Full+Associated)
  - 26 RTO/Full+ 4 Associated

- Real interest
  - Thanks to the work done
  - Thanks to the cooperation with the European Commission

Our members in March 2016 (72)

Main activities

- cPPP implementation
  - FET HPC call : 19 R&D research projects launched (RIA) + 2 CSA
  - CoE call : 8 (9) Centers of Excellence selected
  - Good dialogue with the EC

- New SRA for Work Programme 2016-2017
  - see following presentation

Main activities

- Start of the support action European eXtreme Data and Computing Initiative
  - Key element for the coordination of HPC ecosystem in Europe
- Development of our relationship
  - Other organisations : Big Data Value
  - International : see following presentation
  - Events and outreach
- Office development

The European HPC Eco-system

- Specifications of exascale prototypes
- Technological options for future systems

PRACE

ETP 4 HPC
THE EUROPEAN TECHNOLOGY PLATFORM FOR HIGH PERFORMANCE COMPUTING

- Collaboration of HPC Supercomputing Centres and application CoEs
- Provision of HPC capabilities and expertise

- Identify applications for co-design of exascale systems
- Innovative methods and algorithms for extreme parallelism of traditional & emerging applications

esiwace
CENTRE OF EXCELLENCE IN SIMULATION OF WEATHER AND CLIMATE IN EUROPE

E CAM

POP

MAX

New!
CompBioMed

EoCoE

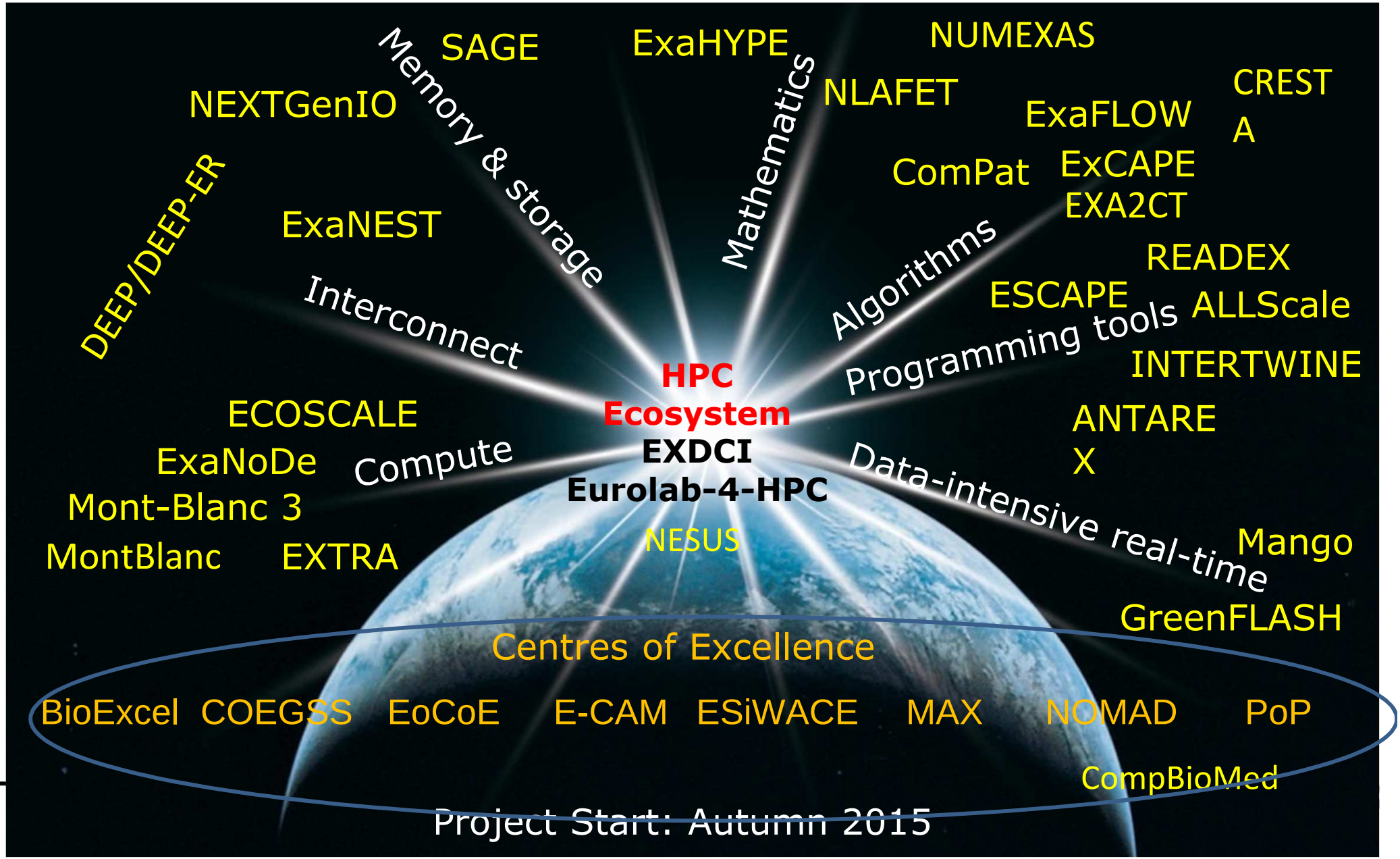
bioexcel

NOMAD
NOVEL MATERIALS DISCOVERY

CoeGSS
Centre of excellence for GLOBAL SYSTEMS SCIENCE

ETP 4 HPC

The European HPC Project Landscape



CoEs – Centres of Excellence in Computing Applications

New!
CompBioMed

Acronym	Title
EoCoE	Energy oriented Centre of Excellence for computer applications
BioExcel	Centre of Excellence for Biomolecular Research
NoMaD	The Novel Materials Discovery Laboratory
MaX	Materials design at the eXascale
ESiWACE	Excellence in SImulation of Weather and Climate in Europe
E-CAM	An e-infrastructure for software, training and consultancy in simulation and modelling
POP	Performance Optimisation and Productivity
COEGSS	Center of Excellence for Global Systems Science

ETP4HPC – BDVA position document

Objectives :

align the messages

be prepared of common actions are needed

Coordinated actions

1. Align their SRIAs to highlight the complementary nature of their technical roadmaps:
   - A work session session in May/June (input for WP 2018/19 at that time) with participation of BDVA

2. Provide an update to the board/strategic committee of each association at least once a year
   - To be discussed: a session during a SB meeting of ETP4HPC and an analogous meeting on the BDVA side followed by an occasional participation in cPPP meetings (if there are topics of mutual strategic interest...)

3. Actively participate within the events organized by both associations (i.e. BDVA Summit, HPC Summit) including workshops to focus on the interactions of stakeholder
   - HPC summit in Prague in the week of May 9th to 13th. Workshop on EsDs. We could have also input from BDVA
   - BDVA summit in Spain in the fall. ETP4HPC could be present (as last time).

4. Appoint liaisons to support interaction and to increase cooperation
   - Is this something for one of our ETP4HPC vice-chairmen?

5. Annual Technical interlock workshop between both associations
   - Another deep dive workshop in April to work out HPC related research priorities and elements for the next call 2018/19. A few prep calls should help to sync on the approach for defining meaningful metrics and goals.

Events in 2015

January 2015

Third BDEC Workshop in Barclona

June 2015

- **SRA Workshop** with HPC End users
- **Forum Teratec** : ETP4HPC Booth
- **SRA Workshop** with ISVs
- **BDVA Summit,** Madrid

July 2015

- **ETP4HPC-booth** at ISC 2015
- **BoF session** "Update on European HPC Ecosystem Development"

Events in 2015

September 2015

- **EXDCI – Kick-off-Workshop** (Rome)
- **e-Infrastructures Workshop** (Paris)

October 2015

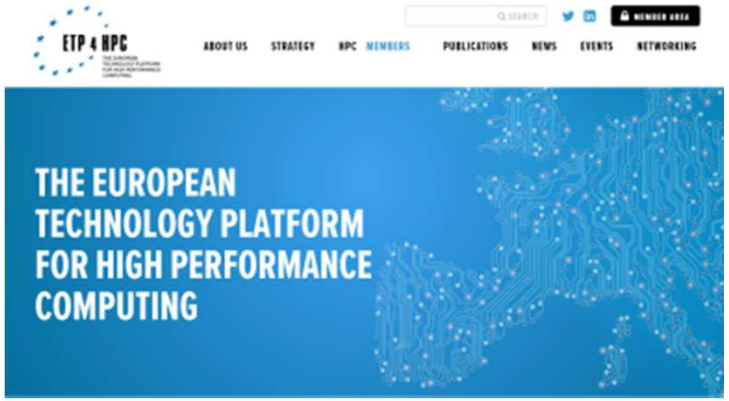
- **ICT 2015 - Innovate, Connect, Transform** (Lisbon):
  Booth and Networking sessions
- **CAE Conference** (Verona, Italy)

November 2015

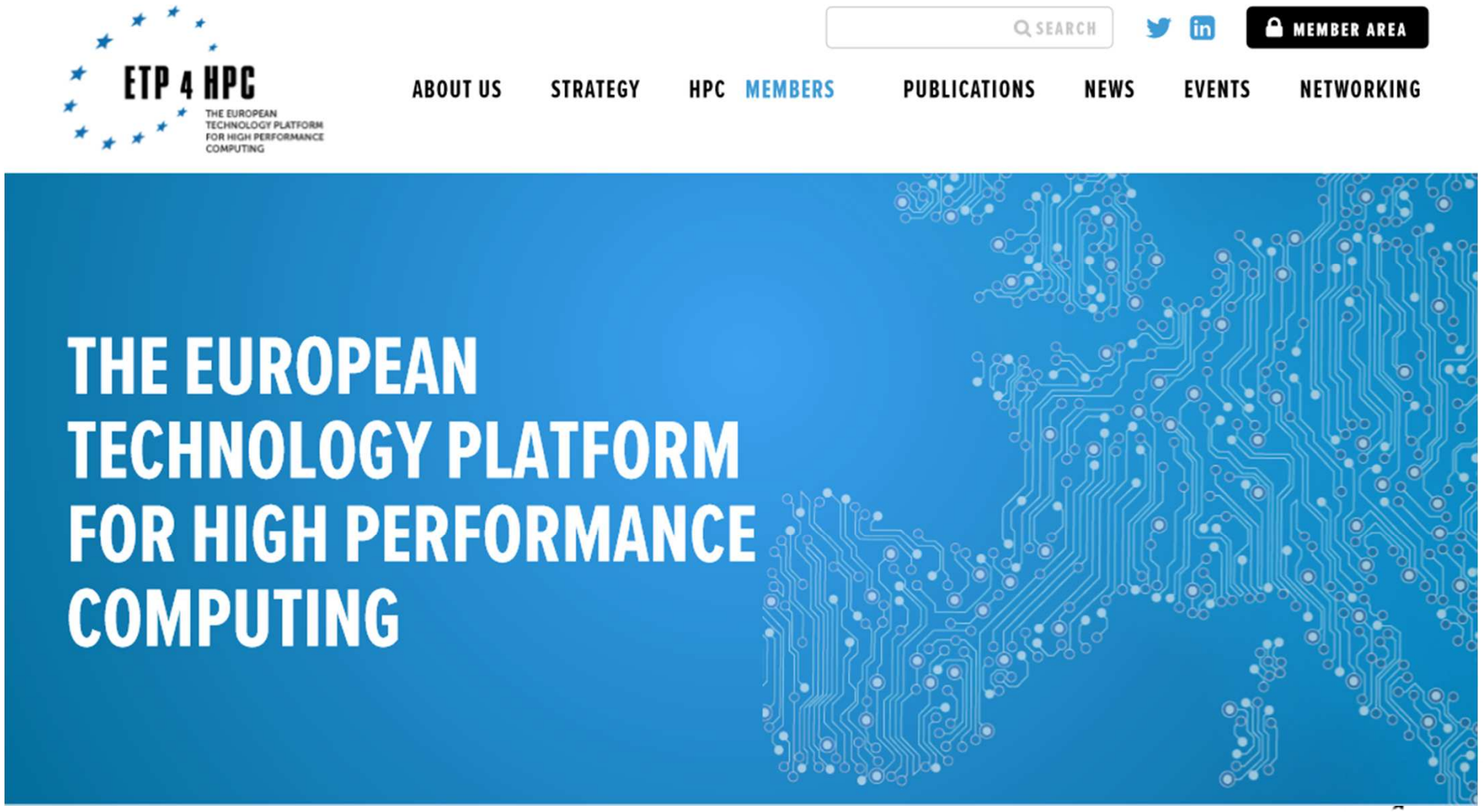
Supercomputing'15 in Austin, Texas

Outreach and Communication

- Revamped Website : on-going
- LinkedIn
- Twitter



ETP4HPC's revamped website will be launched very soon




THE EUROPEAN TECHNOLOGY PLATFORM FOR HIGH PERFORMANCE COMPUTING
Latest News
SC14
hpc matters.
ETP4HPC ORGANISED A SUCESSFUL BOF SESSION DURING SC14
At this occasion Jean-François Lavignon, ETP4HPC Chair, presented the European approach to boosting the continental...
ETP4HPC PARTICIPATED IN A CROSS-ETP WORKSHOP IN BRUSSELS
ETP4HPC participated in a cross-ETP workshop in Brussels, organised by the Policy Development for Industrial Innovation Unit, DG Enterprise...
Europe
HPC
HOW TO MAKE HIGH-PERFORMANCE COMPUTING HAPPEN IN EUROPE
Horizon 2020 (The EU Framework Programme for Research and Innovation) writes about how to make High-performance computing happen in Europe...
Upcoming Events
ETP4HPC General Assembly
March 15 2016 in Barcelona
Venue:- BSC-CNS, Barcelona Super Computing Center – Centro Nacional de Supercomputación (on the campus of UPC – Universitat Politècnica de Catalunya)
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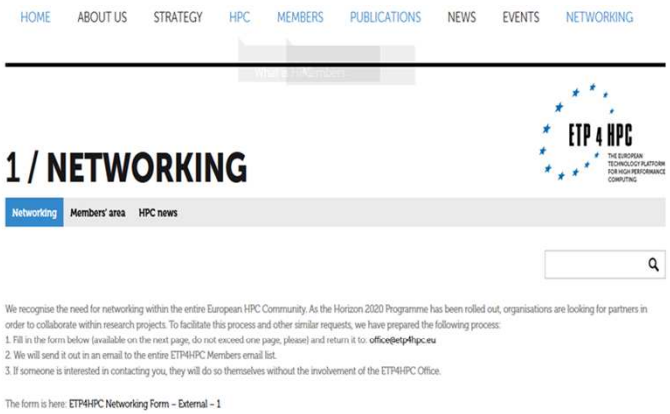
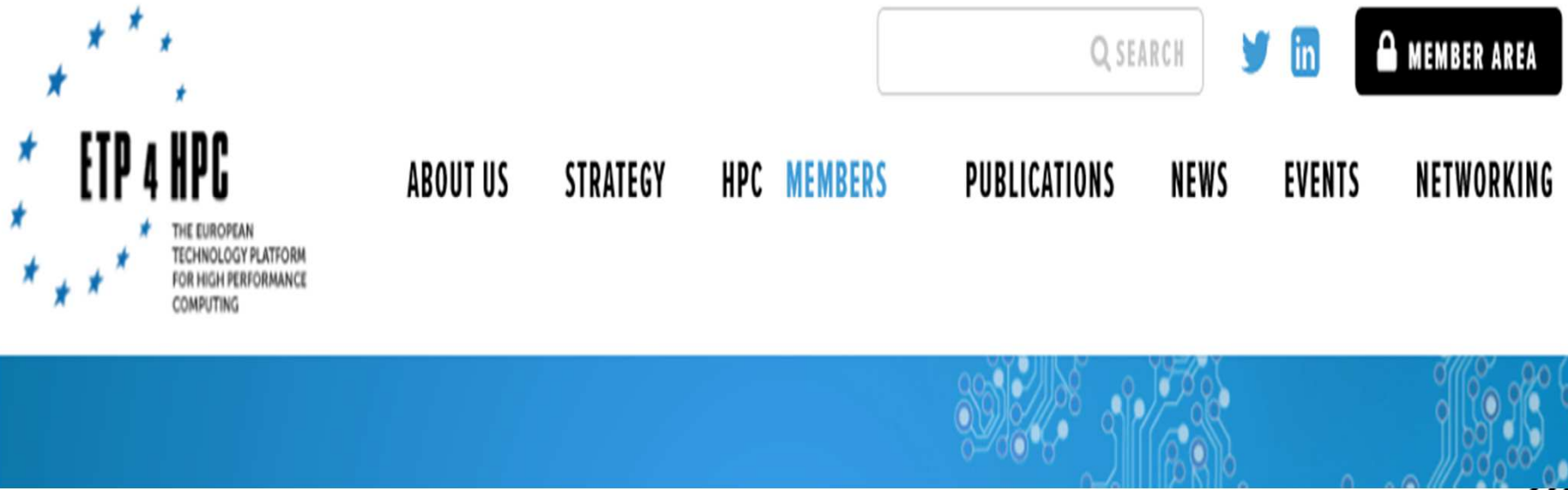
MailChimp
Name
E-Mail
SEND
Last Tweets
Tuits
Tuits i respostes
Fotos i vídeos

The new revamped website will include an improved version for its ‘Networking’





LinkedIn

Search for people, jobs, companies, and more...

Home | Profile | My Network | Jobs | Interests

Catherine Gleeson
ETP4HPC - European Technology Platform for HPC

Recent Activity (6) | Published (15) | Drafts | Followers (2,588)

Call for comments 'Open consultation on...
February 15, 2016
133 6
Edit · Delete

ETP4HPC will participate in the European HPC...
February 3, 2016
38 8
Edit · Delete

International Supercomputing
February 1, 2016
111 6 1
Edit · Delete

TWEETS 71 | FOLLOWING 182 | FOLLOWERS 114 | LIKES 221 | LISTS 23

ETP4HPC
@Etp4H

Amsterdam, The Netherlands
etp4hpc.eu

Tweets | Tweets & replies | Photos & videos

ETP4HPC @Etp4H · Feb 22
Consultations on #H2020 next work programme in #FET_eu newsletter

Adrian Jackson liked a Tweet you were mentioned in — Feb 19
Feb 18: Interested in #HPC, give your feedback on the @Etp4H Strategic Research Agenda! bit.ly/1o9reFf
pic.twitter.com/aMWnblPvYQ

Adrian Jackson Retweeted a Tweet you were mentioned in — Feb 19
Feb 18: Interested in #HPC, give your feedback on the @Etp4H Strategic Research Agenda! bit.ly/1o9reFf
pic.twitter.com/aMWnblPvYQ

Quantum ESPRESSO and **ts68er** followed you — Feb 18

FET_EU @fet_eu · Feb 18
Interested in #HPC, give your feedback on the @Etp4H Strategic Research Agenda! bit.ly/1o9reFf

Financial report

2015 financial report : income statement

Operating Results (Euro)	Notes	2015	2014
		€	€
Revenues from services	7	184.100	237.350
Total income		**184.100**	**237.350**
Operating costs			
Commercial services	8	-30.317	-24.185
General and administrative costs	9	-155.407	-146.855
Payroll costs			-
Other provisions and other costs	10	-17.000	-7.000
Other revenues		-	-
Profit before depreciation an amortisation (EBITDA)		**-18.624**	**59.310**
Depreciation & amortisation		-	-
Operating profit		**-18.624**	**59.310**
Finance expense		-	-56
Finance income		-	-
Proft (loss) before taxes		**-18.624**	**59.254**
Income tax		-	-
Net profit (loss)		**-18.624**	**59.254**

2015 financial report : balance statement

Balance Sheet (Euro)	Notes	December 31st 2015	December 31st 2014
		€	€
Inventories		-	-
Debtors	1	64.910	41.200
Other tax receivables	5	4.552	260
Other currect assets		28	-
Cash & cash equivalents	2	397.746	160.911
Total current assets		**467.236**	**202.371**
Total assets		**467.236**	**202.371**
Liabilities and equity			
Share capital			-
Reserves		157.371	98.117
Addition Contribution	3	-18.624	59.254
Contributions		**138.747**	**157.371**
Other non-current liabilities		-	-
Total non-current liabilities		**-**	**-**
Account payables	4	50.736	45.000
Other tax liabilities	5	-	-
Other current liabilities	6	277.754	-
Total current liabilities		**328.490**	**45.000**
Total liabilitues		**328.490**	**45.000**
Total liabilities and equity		**467.236**	**202.371**

ETP 4 HPC

Auditor's opinion

Opinion with respect to the financial statements

In our opinion, the financial statements give a true and fair view of the financial position of European Technology Platform For High Performance Computing as at December 31, 2015 and of its result for the year then ended in accordance with the guidelines for financial statements Dutch Standard C1, "Small non-profit entities".

Breda, 10 March 2016
Van Oers Audit B.V.

W.K. Kruisifikx RA

2016 Budget proposal

Incomes

	Fee	Budget 2016	2015
large company	6 000	66 000	66 000
academic	3 000	75 000	75 000
smes	2 100	21 000	18 900
associated members except sme	2 000	20 000	20 000
associated members sme	350	5 250	4 200
subtotal		**187 250**	**184 100**
additional resource from CSA		180 000	
total		**367 250**	**184 100**

2016 Budget proposal

(Outflow)

	Budget 2016	2015
Experts	120 000	92 794
Support of experts	87 000	12 000
Communication and office	40 000	39 100
Administration accounting auditing	50 000	9 859
Events	40 000	30 317
Costs	30 000	18 654
	367 000	202 724

Vote #1

Resolution 2016-03-15#1

The General Assembly approves the Financial report presented for calendar year 2015.

Vote #2

Resolution 2016-03-15#2

The Associated member fees for 2016 are established like follows:

- Associated SME members = 350 €
- Associated individual members = 250 €
- Associated members - neither SME nor individuals = 2,000 €

The Full member fees for 2016 are established like follows :

- Category A SME = 2100 €
- Category B Research = 3000 €
- Category C Corporate European = 6000 €
- Category D International = 6000 €

Vote #3

Resolution 2016-03-15#3

The General Assembly approves the Activity Report presented for calendar year 2015.

Vote #4

Resolution 2016-03-15#4

The General Assembly gives mandate to the Steering Board to appoint if needed an auditor to achieve all necessary actions for financial reporting of the Association activities.

ETP4HPC
Strategic Research Agenda (SRA)

GA meeting Barcelona, March 15th 2016

In progress….

- 2 calls in Work Programme 2016-2017
  - FET HPC 1 2016 : Co-design of HPC systems and applications
    - budget : 41 M€ - deadline : 27 September 2016
  - FET HPC 2 2017 : Transition to Exascale Computing
    - 5 subtopics :
      - High productivity programming environments for exascale
      - Exascale system software and management
      - Exascale I/O and storage in the presence of multiple tiers of data storage
      - Supercomputing for Extreme Data and emerging HPC use modes
      - Mathematics and algorithms for extreme scale HPC systems and applications working with extreme data
    - budget : 40 M€ - deadline : 26 September 2017
- On-going discussion on additional Horizon2020 programme
- New HPC initiative by the European Commission

ETP4HPC in EXDCI support action

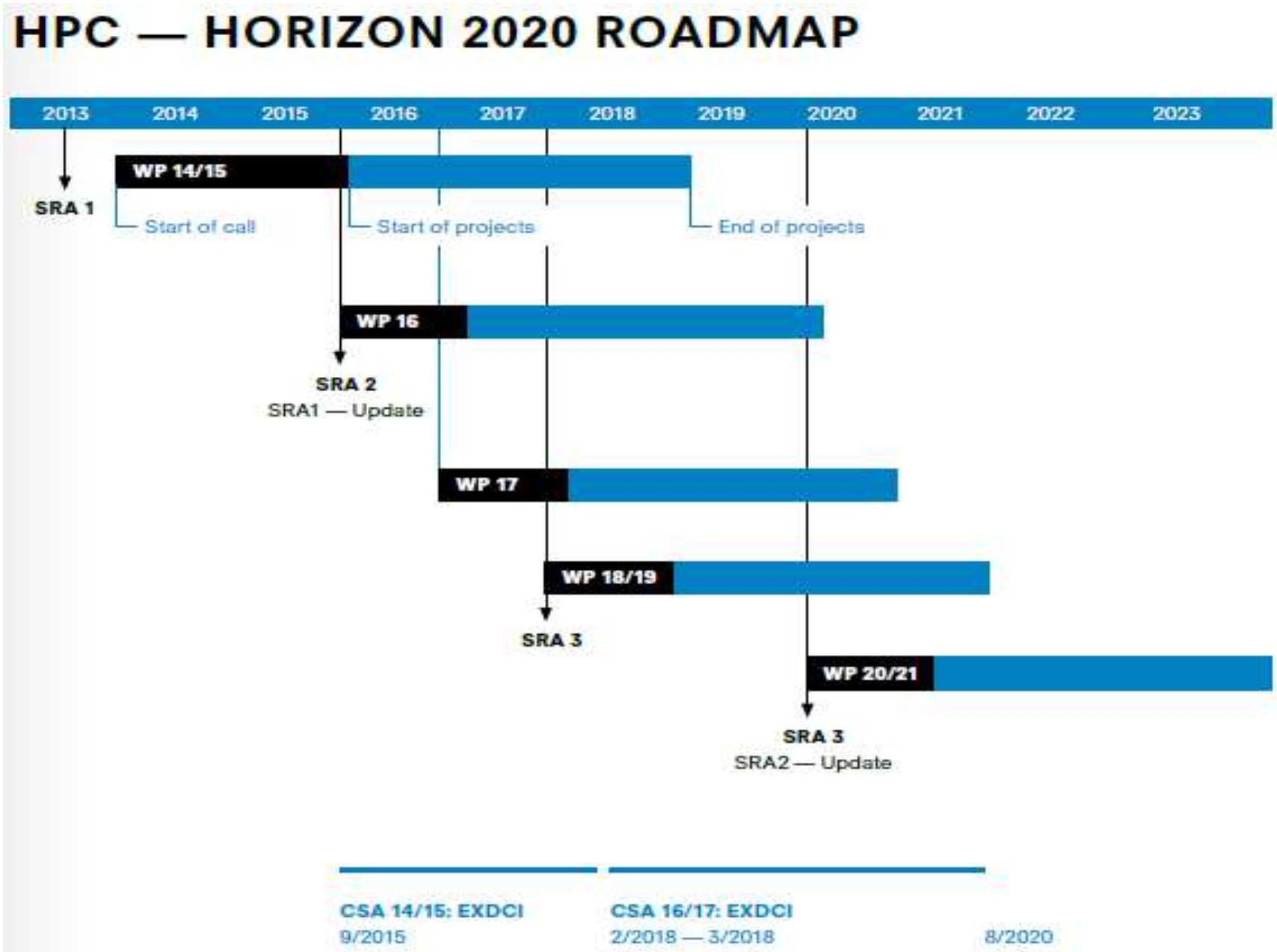
- EXDCI
  - –managed by PRACE and ETP4HPC
  - –started in Sept 2015
  - –supporting:
    - roadmap : technical (SRA), scientific cases
    - cross cutting topics : technical topics, training, SMEs
    - international cooperation
    - monitoring

Strategic Research Agenda

SRA

a multi-annual roadmap towards
Exascale High-Performance Computing Capabilities

Horizon 2020 WPs and SRAs

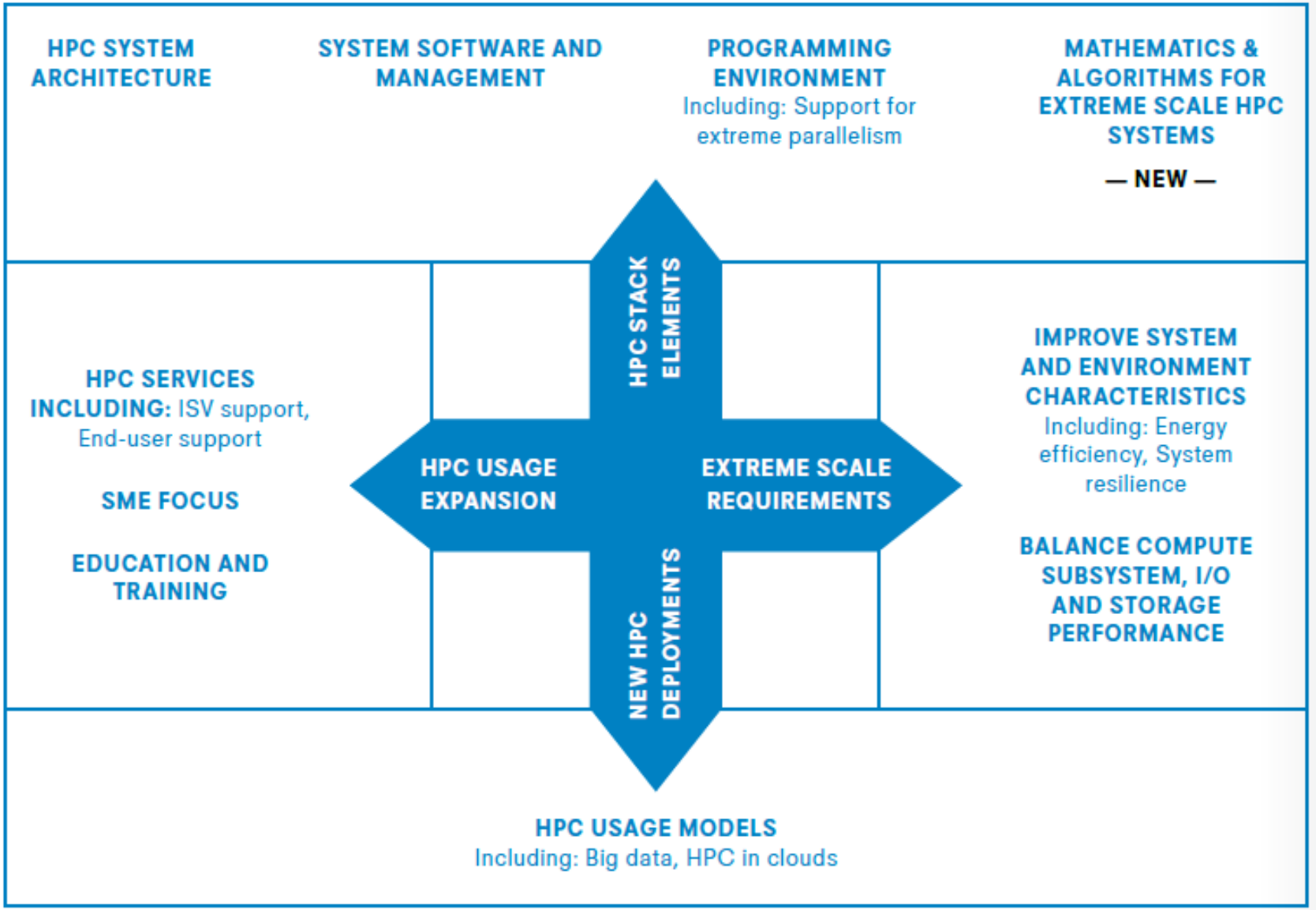


Priorities

- There is a demand for R&D and innovation in both extreme performance systems and mid-range HPC systems
  - –Scientific domain and some industrial users want extreme scale
  - –ISVs and part of the industry expect more usability and affordability of mid-range system

- The ETP4HPC HPC technology providers are also convinced that to build a sustainable ecosystem,
  - –their R&D investments should target not only the exascale objective (too narrow a market)
  - –an approach that aims at developing technologies capable of serving both the extreme-scale requirements and mid-market needs can be successful in strengthening Europe's position.

4 dimensions of the SRA



Transversal issues to be addressed

- Three technical topics:
  - Security in HPC infrastructures to support increasing deployment of HPDA
  - Resource virtualisation to increase flexibility and robustness
  - HPC in clouds to facilitate ease of access

- Two key element for HPC expansion
  - Usability at growing scale and complexity
  - Affordability (focus on TCO)

How was the SRA been built?

8 Workgroups covering the 8 technical focus areas:

SRA 2015 technical focus areas

- HPC System Architecture and Components
- Energy and Resiliency
- Programming Environment
- System Software and Management
- Big Data and HPC usage Models
- Balance Compute, I/O and Storage Performance
- Mathematics and algorithms for extreme scale HPC systems
- Extreme scale demonstrators

- 48 ETP4HPC member orgs/companies involved in these workgroups
- Members named 170 individual experts to contribute, 20-30 per working group

Other interactions

- Feedback sessions with end-users and ISVs at Teratec Forum
  - –20 end-users outline their deployment of HPC, future plans and technical recommendations
  - –Very diverse set of priorities (performance &scale, robustness, ease of access, new workflows etc.)
  - –No ‘One size fits all’ – approach possible
- Technical session with Big Data Value Association (BDVA) to understand architectural influences of HPDA
  - –Technical dialogue started, much more to be done over next 1-2 years
  - –BDVA has issued an update to their SRIA in Jan 2016

The technical domains and the ESD proposal

Trends and recommended research topics – a few examples

HPC System Architecture, Storage and I/O, Energy and Resiliency

- Major trends - a subset:
  - Increased use of accelerators (e.g. GPUs, many core CPUs) in heterogeneous system architectures
  - Compute node architectures efficiently integrate accelerators, CPUs with high bandwidth memory
  - Non volatile memory types open up new interesting memory and caching hierarchy designs
  - System networks to significantly scale up and cut latencies, introducing virtualisation mechanisms
  - Storage subsystems to become more 'intelligent' to better balance compute and I/O
  - Increased activities in object storage technologies with major architectural revamp in the next years
  - Focus on architectural changes to improve energy efficiency and reduce data movement

- Research topics to be addressed (examples)
  - Compute node deep integration with embedded fast memory and memory coherent interfaces
  - Silicon photonics and photonic switching in HPC system networks
  - Global energy efficiency increases with targets of 60kW/PFlops in 2018 and 35 kW in 2020
  - Active storage technologies to enable 'in situ' and 'on the fly' data processing
  - Research in methods to manage 'energy to solution'
  - Prediction of failures and fault prediction algorithms

HPC System Architecture, Storage and I/O: milestones

M-ARCH-1: New HPC processing units enable wide-range of HPC applications.	2018
M-ARCH-2: Faster memory integrated with HPC processors.	2018
M-ARCH-3: New compute nodes and storage architecture use NVRAM.	2017
M-ARCH-4: Faster network components with 2x signalling rate (rel. to 2015) and lower latency available.	2018
M-ARCH-5: HPC networks efficiency improved.	2018
M-ARCH-6: New programming languages support in place.	2018
M-ARCH-7: Exascale system energy efficiency goals (35kW/PFlops in 2020 or 20 kW/Pflops in 2023) reached.	2020-2023
M-ARCH-8: Virtualisation at all levels of HPC systems.	2018
M-ARCH-10: New components / disruptive architectures for HPC available.	2019

M-BIO-1: Tightly coupled Storage Class Memory IO systems demo.	2017
M-BIO-2: Common I/O system simulation framework established.	2017
M-BIO-3: Multi-tiered heterogeneous storage system demo.	2018
M-BIO-4: Advanced IO API released: optimised for multi-tier IO and object storage.	2018
M-BIO-5: Big Data analytics tools developed for HPC use.	2018
M-BIO-6: 'Active Storage' capability demonstrated.	2018
M-BIO-7: I/O quality-of-Service capability.	2019
M-BIO-8: Extreme scale multi-tier data management tools available.	2019
M-BIO-9:Meta-Data + Quality of Service exascale file i/o demo.	2020
M-BIO-10: IO system resiliency proven for exascale capable systems.	2021

Energy and resiliency: milestones

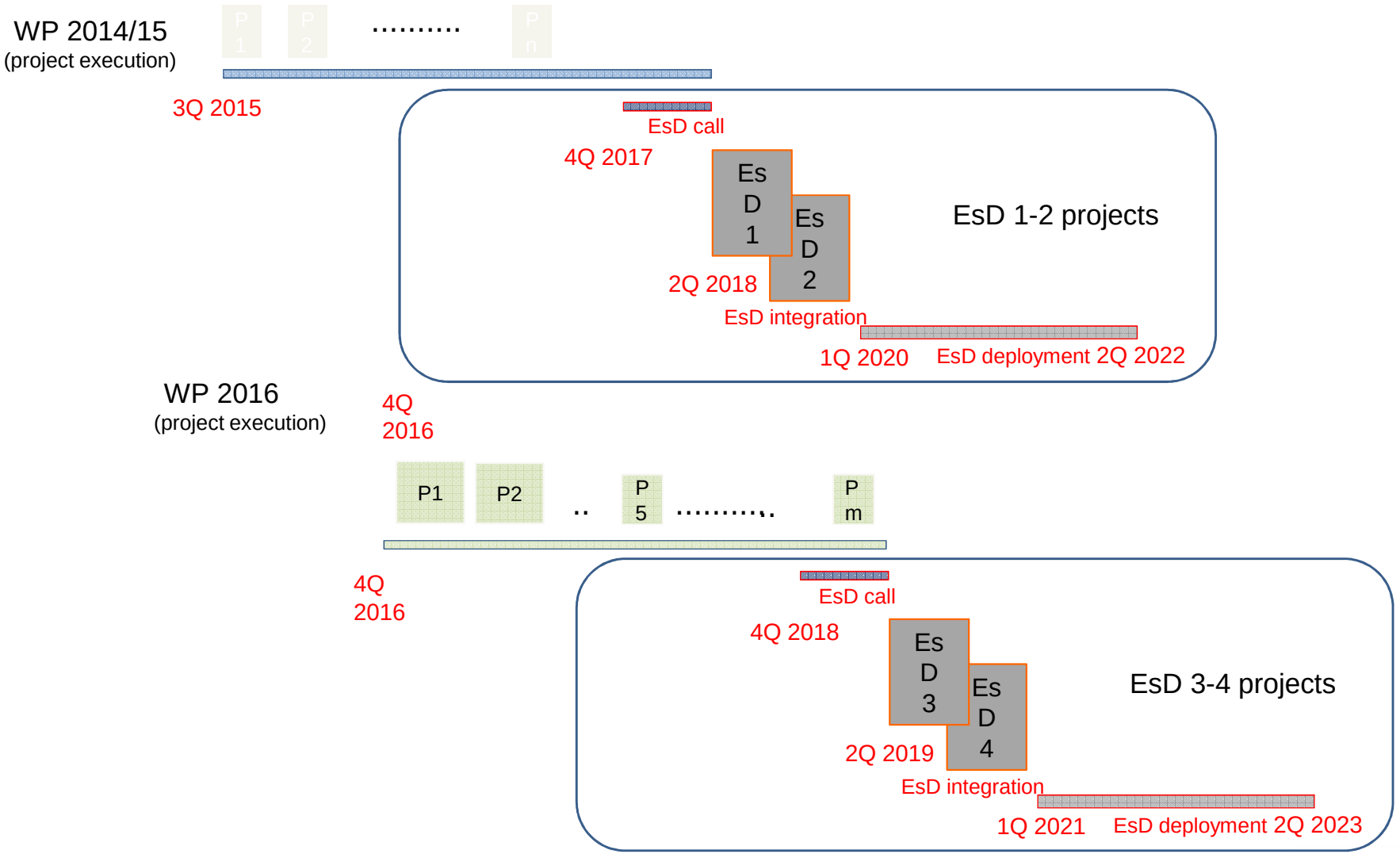
M-ENR-MS-1: Quantification of computational advance and energy spent on it.	2017
M-ENR-MS-2: Methods to steer the energy spent.	2017
M-ENR-MS-3: Use of idle time to increase efficiency.	2018
M-ENR-AR-4: New levels of memory hierarchy to increase resiliency of computation.	2017
M-ENR-FT-5: Collection and Analysis of statistics related to failures.	2018
M-ENR-FT-6: Prediction of failures and fault prediction algorithms.	2019

M-ENR-FT-10: Application survival on unreliable hardware.	2019
M-ENR-AR-7: Quantification of savings from trade between energy and accuracy.	2018
M-ENR-AR-8: Power efficient numerical libraries.	2019
M-ENR-MS-9: Demonstration of a sizable HPC installation with explicit efficiency targets.	2019

Extreme-Scale Demonstrators

- Characteristics
  - Complete prototype HPC systems
  - high enough TRL to support stable production
  - using technologies developed in the previous projects
  - based on application – system co-design approach
  - large enough to address scalability issues (at least 1/10 of top performance systems)
- Two project phases:
  - phase A : development, integration (of results from R&D projects) and testing
  - phase B : deployment and use, code optimisation, assessment of the new technologies

Extreme scale Demonstrators call-integration-deployment schedule

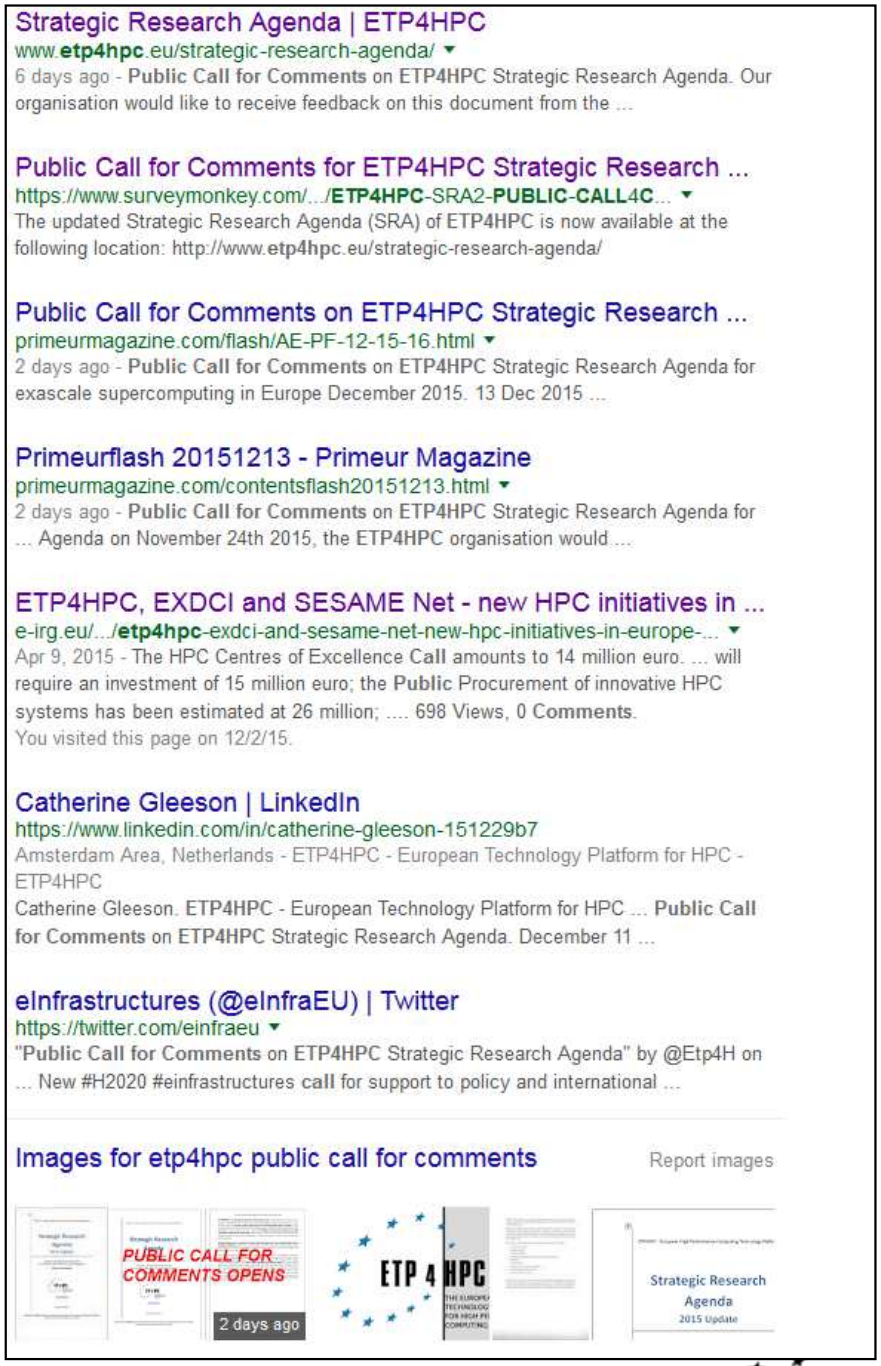


SRA – next actions

Google

« Public Call for comments on SRA “

We will welcome your comments on the current SRA
http://www.etp4hpc.eu/strategic-research-agenda/



Next SRA-related events in 1H2016

- 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 WP3) – September 21&22
- Technical workshop with Big Data Value Association (BDVA) May/ June

THANK YOU!

For more information visit

www.etp4hpc.eu

contact: office@etp4hpc.eu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End of Part I

Update on International Collaboration Activities

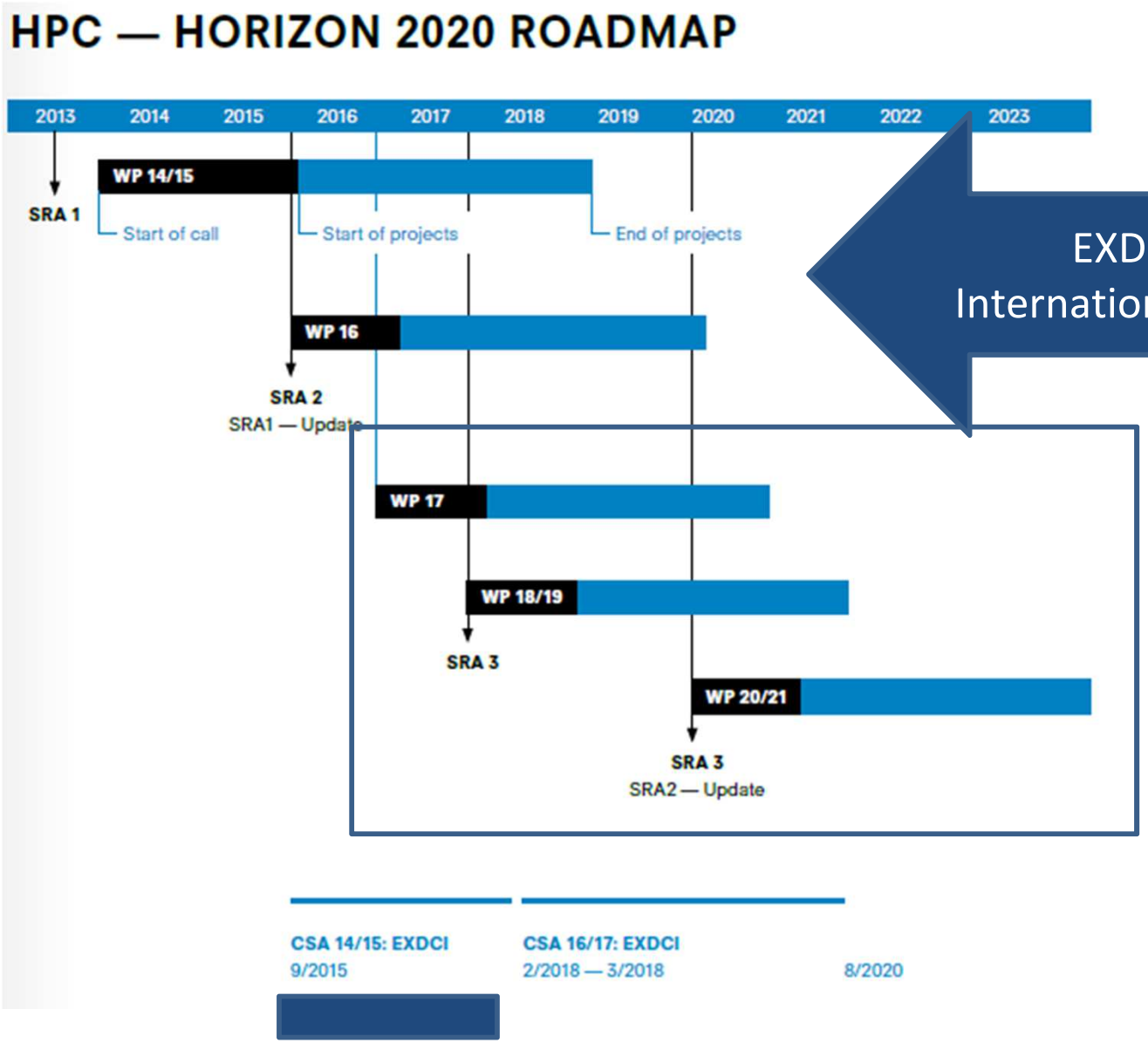
Marcin Ostasz, ETP4HPC Office

ETP4HPC GA, 15th March 2016, BCN

What you should know by the end of this talk

- The context of **EXDCI** Task 6.2 – Facilitating International Collaboration in the area of HPC Technology
- The outcome of the **SC'15 BOF** and related activities
- Other actions initiated
- The **plans going forward** and how your organisation/project can contribute (SC'16 BOF and other activities)

The Context



EXDCI Task 6.2
International Collaboration

European Extreme Data & Computing Initiative

EXDCI WP6 Task 6.2: Facilitate International Collaboration Opportunities

The objective of this task is to increase the international collaborations that will be set up between the European projects and actions occurring outside Europe.

ETP4HPC/Marcin Ostasz, M1-M30, 6PM's for ETP4HPC in total

6.2 and 6.3

D6.2 **Analysis** of international collaboration opportunities for the European projects (M 12)

D6.3 Final international identification report: this report will collect all inputs of task 6.2 and will present a **synthesis** of the collaborations that will have been established (M 30)

Establishing relationships – integrating networking

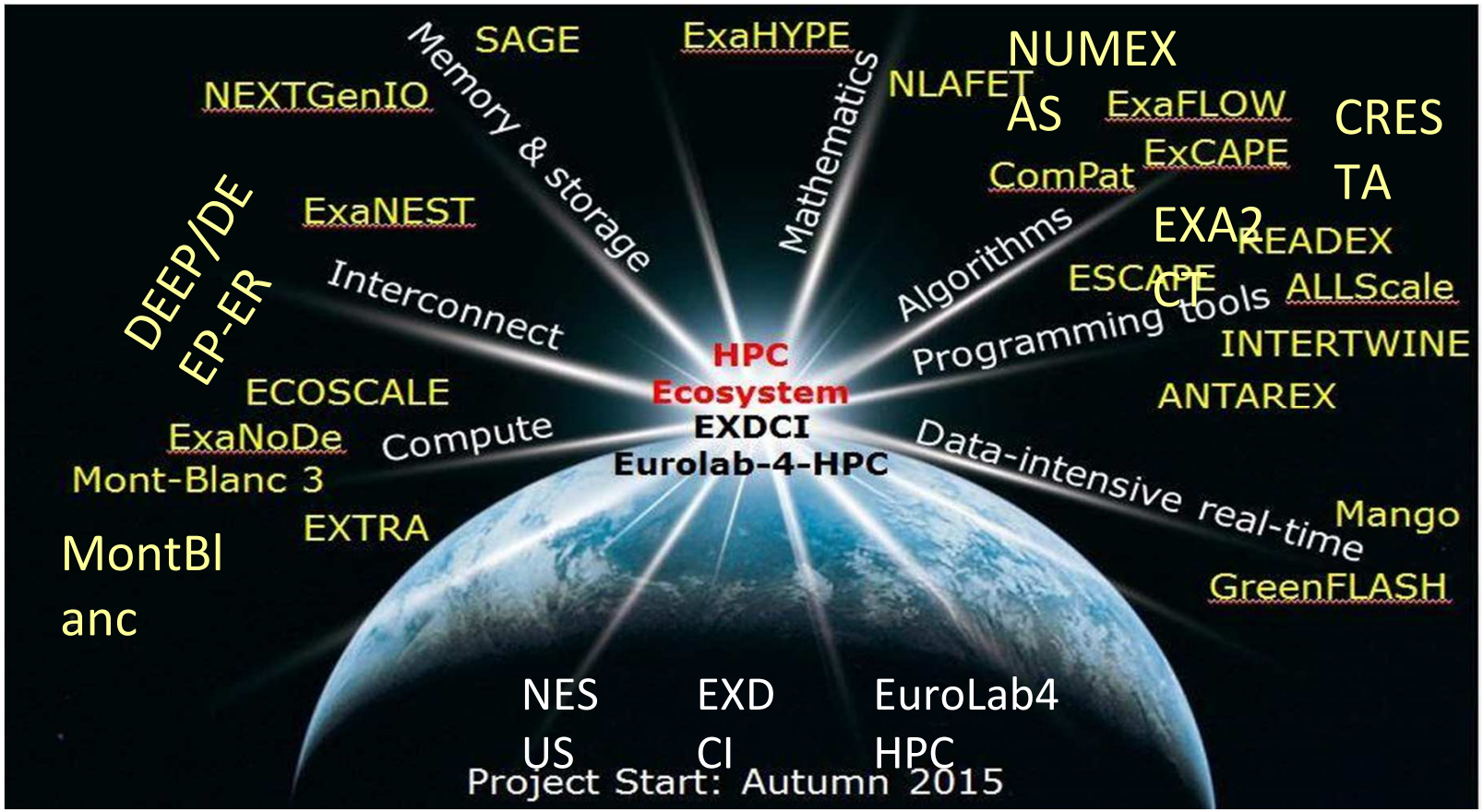
Presentation of projects

Tools/mechanisms

'Best practice guide'

SC'15 BOF and related activities

- A Bird-of-a-Feather (**BOF**) session at Supercomputing Conference 2015 (**SC'15**, 19th Nov 2015, Austin, Texas)
- **FP7** and H2020 **FETHPC** Projects alike



SC'15 BOF Abstract

1. **The established EU-funded Exascale projects** and initiatives (**CRESTA, DEEP/DEEP-ER, MontBlanc, NUMEXAS, EXA2CT, EPiGRAM and NESUS**) will present their status, lessons learnt and potential cross-region synergies.

2. An update on the **new 19 H2020 FETHPC1** projects with an emphasis on **international collaboration opportunities and mechanisms** needed to integrate different approaches, both in hardware and software.

Prior to SC'15 BOF

- **Marketing** prior to and at SC15 – we advertised the event through our channels (web, LinkedIn, Twitter, contact lists) and also at the event
- Implementation of **a survey** aimed at determining the objectives and the international collaboration potential of the European FETHPC and FP7 HPC technology projects (and tools or mechanisms needed)
- Publication of the European Exa-scale Projects **Handbook** including both FP7 and FETHPC projects – now available at: http://www.etp4hpc.eu/european-exascale-projects-2/

SC'15 BOF - Delivery

Taking on Exascale Challenges: Key Lessons & International Collaboration Opportunities

Birds-of-a-Feather Session at SC15

Jointly organised by European Exascale Projects and ETP4HPC

Date: Thursday, November 19

Time: 3:30-5:00pm

Location: Room 13A, Austin Convention Centre

Abstract

The European HPC Technology eco-system has entered a stage of rapid development. This acceleration is due to the progress of the established EU-funded projects ((CRESTA, DEEP/DEEP-ER, Mont-Blanc, NUMEXAS, EXA2CT, EPiGRAM and NESUS) and also the 19 new projects within the first part of the Horizon 2020 programme addressing: HPC core technologies and architectures, programming methodologies, languages and tools, APIs and system software, new mathematical and algorithmic approaches.

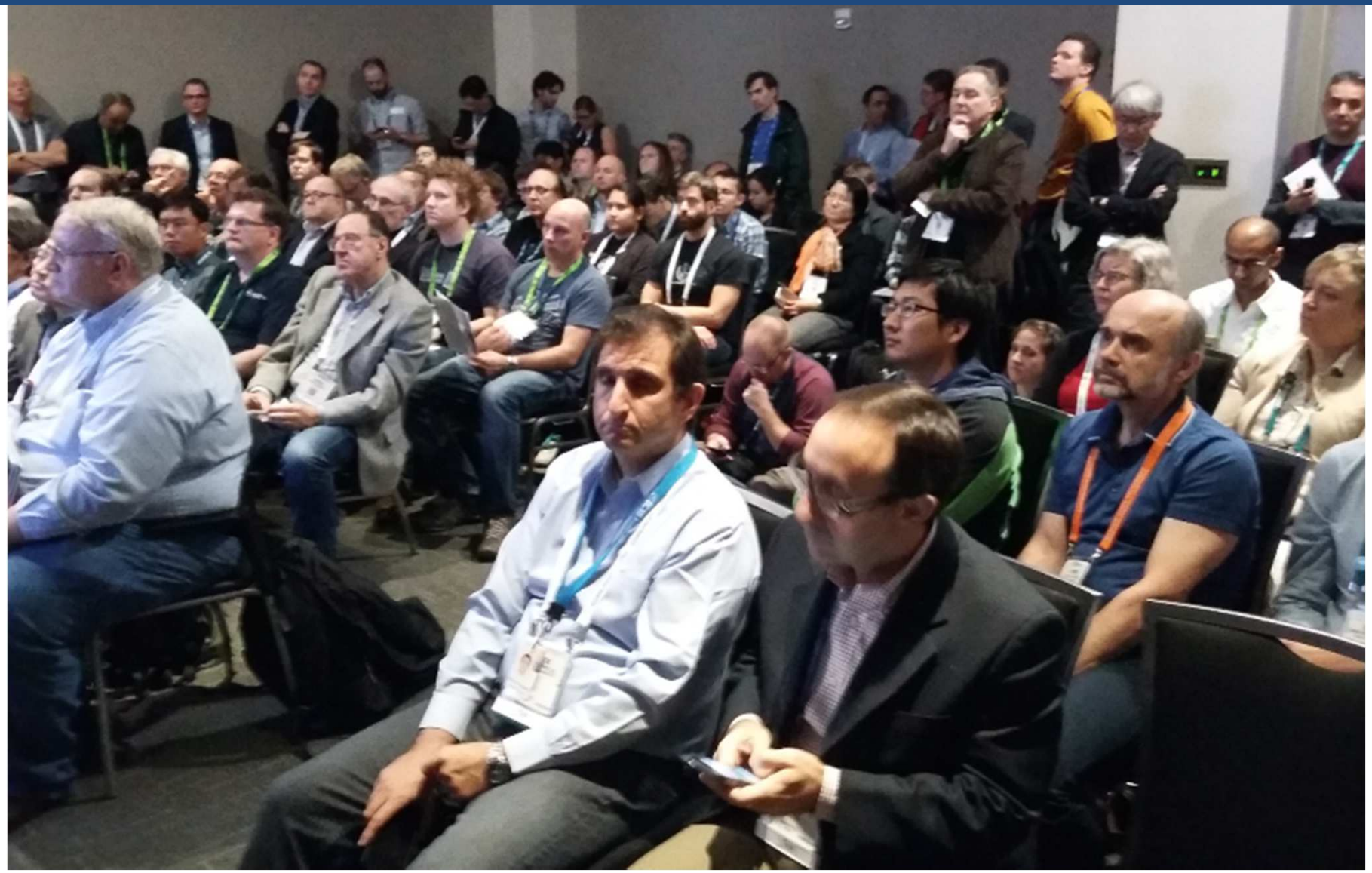
SC'15 BOF - Delivery

Programme

Introduction 15 min	Overview on the European Exascale Landscape By Jean-François Lavignon, ETP4HPC Chairman and Atos
Talks 30 min	**Presentation of Focus Technology Research Areas** Area 1: Architecture & Compute By Filippo Mantovani, Technical Project Coordinator Mont-Blanc, Barcelona Supercomputing Centre Area 2: Interconnect, Memory & Storage and Data-intensive Real-Time By Prof. Jesus Carretero, Computer Architecture Professor, Computer Science and Engineering Dep. University Carlos III of Madrid Area 3: Programming Tools, Algorithms & Mathematics By Stefano Markidis, Assistant Professor, KTH Royal Institute of Technology
Panel Discussion 45 min	International Collaboration Opportunities arising and mechanisms needed *Featuring distinguished international guests:* Mitsuhisa Sato, Co-project leader of Post-K, University of Tsukuba & RIKEN AICS Franck Capello, Argonne National Laboratory, Senior Computer Scientist, Director of the INRIA, UIUC, ANL, BSC, JSC and Riken Joint Laboratory on Extreme Scale Computing Eric Van Hensbergen, Senior Principal Research Engineer, ARM ***Moderated* by Sai Narasimhamurthy, Staff Engineer, Research, Seagate**

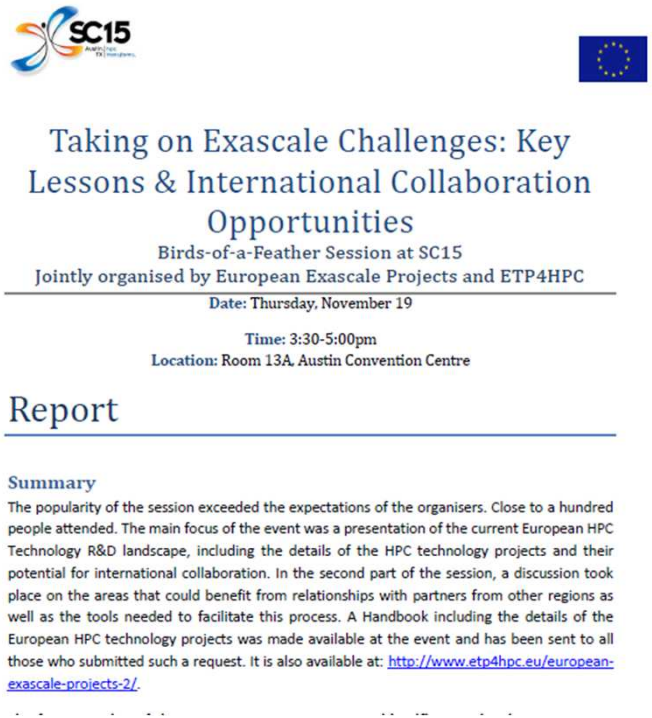

ETP 4 HPC
AUSTIN
SC15

Full House!!! >100



Post SC'15 BOF

- Publication of a post-BOF report and related material (http://www.etp4hpc.eu/european-exascale-projects-2/)



Taking on Exascale Challenges: Key Lessons & International Collaboration Opportunities

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Report

Summary

The popularity of the session exceeded the expectations of the organisers. Close to a hundred people attended. The main focus of the event was a presentation of the current European HPC Technology R&D landscape, including the details of the HPC technology projects and their potential for international collaboration. In the second part of the session, a discussion took place on the areas that could benefit from relationships with partners from other regions as well as the tools needed to facilitate this process. A Handbook including the details of the European HPC technology projects was made available at the event and has been sent to all those who submitted such a request. It is also available at: http://www.etp4hpc.eu/european-exascale-projects-2/.

Post SC'15 BOF - Some conclusions

- The fragmentation of the European HPC resources was identifies as a key issue
- We should focus on some key areas and let go of some other areas
- Alignment of different funding across continents (e.g. there were good projects, not continued)
- It is hard to have common calls in Europe
- Support actions in the EU may help cover some of these fragmentation issues (eg: EXDCI)

- EU needs to be taking risks that other regions would not take. (this is the way we could compete as the other regions are better funded)

Other activities

- Discussions initiated with Japanese partners – Fujitsu and Riken (meetings at ISC'15 and SC'15)
- A **document issued for Riken** on the European HPC Eco-system (we are expecting a similar document in return).

- **Meeting with Riken – tomorrow in Paris.** We will present an update on the European HPC Eco-system

SC'16 BOF - Ideas

- **Ask for a bigger room**
- Present an update on:
  - The progress of all European HPC Technology Project
  - The development of the entire European HPC Eco-system – SRA, EsDs, other programmes and projects, etc.
- Issue and distribute an updated **Handbook** on European HPC Technology Projects
- Have all project representatives in the room – and let them identify themselves
- Identify 2-3 tools/events that would facilitate this collaboration

What is next?

- You will hear from us!
- Please submit **your ideas** for the next SC'16 BOF and other activities – send an email to the Office (we have already asked the Projects for input)
- You will be asked to fill in an **EXDCI Survey** in order to prepare the BOF and the Handbook
- Advertise the **BOF** and be present at it – you will be sent the details
- **If you need any help with e.g. establishing a contact – just ask!**

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Update on
Impact Assessment and Monitoring Activities

Jean-Philippe Nominé, ETP4HPC Office

What you should be aware of by the end of this talk (and convinced of…)

- The context of **EXDCI** WP7– Impact monitoring
- The approach we are developing and how we try to optimize stakeholders contributions and minimise inconvenience
- Questionnaires approach and the importance of YOUR contribution

https://exdci.eu/activities/kpi

Impact Monitoring-methods and Tools

EXDCI pretends to generate and gather data and also to create the necessary analysis tools to support informed decision-making in relation to:

- the development of the European HPC Ecosystem; and,
- 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. EXDCI will pay special attention to the design of the related surveys, so as to minimise respondent efforts, and then, providing provide periodic feedback.
EXDCI will deliver the following:

- A set of methodologies (covering data gathering, impact and performance metrics and analysis tools) to be used in the measurement of ecosystem development and progress. Linked to this will be a definition of processes, which will deliver and monitor the related metrics on a regular basis. One key output will be a template for the operation of an HPC Ecosystem Balanced ScoreCard.
- KPI reports, accomplished through the operation of the HPC Ecosystem Balanced ScoreCard, which will allow the periodic monitoring of the implementation of the HPC cPPP Strategy. This monitoring will include recommendations on the strategies adopted. Feedback will be provided through regular cPPP meetings, and through a mid-term assessment of the HPC cPPP in mid-2017.
- An Ecosystem Map identifying all players and their capabilities in joint effort with PRACE

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 will set-up a set of KPIs to be monitored within the HPC cPPP

EXDCI WP7 - Impact Monitoring – Methods and Tools

- Dr. Jean-Philippe Nominé, CEA, ETP4HPC Office
- Ms. Maike Gilliot, TERATE & ETP4HPC Office
- Dr. Guy Lonsdale, SCAPOS
- Dr. F-J. Pfreundt, Dr. Valeria Bartsch, FHG/ITWM

- WP7 Objectives
  - Determine Key Performance Indicators (KPI) reflecting the progress of the Ecosystem
  - Measure the progresses
  - Building on the **HPC cPPP and PRACE KPI**
    - Indicators for Industrial Competitiveness and Socio-Economy Impact
    - Indicators for the operational aspects of the programme
    - Indicators for management aspects of the programme
    - Implementing data collection and processing
    - Delivering periodic score cards (incl. for cPPP mid-term review of 2017)

Summary of Key Performance Indicators (KPIs) for the HPC cPPP

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

cPPP report 2014

- There was a questionnaire to ETP4HPC members, mostly focussed on Additional Private Investment (R&D efforts)
- This (and other sources) fed the report – ETP4HPC activities, H2020 calls data (before submitted projects evaluation…)
- This report has not been made public (yet?) by the EC

Contents

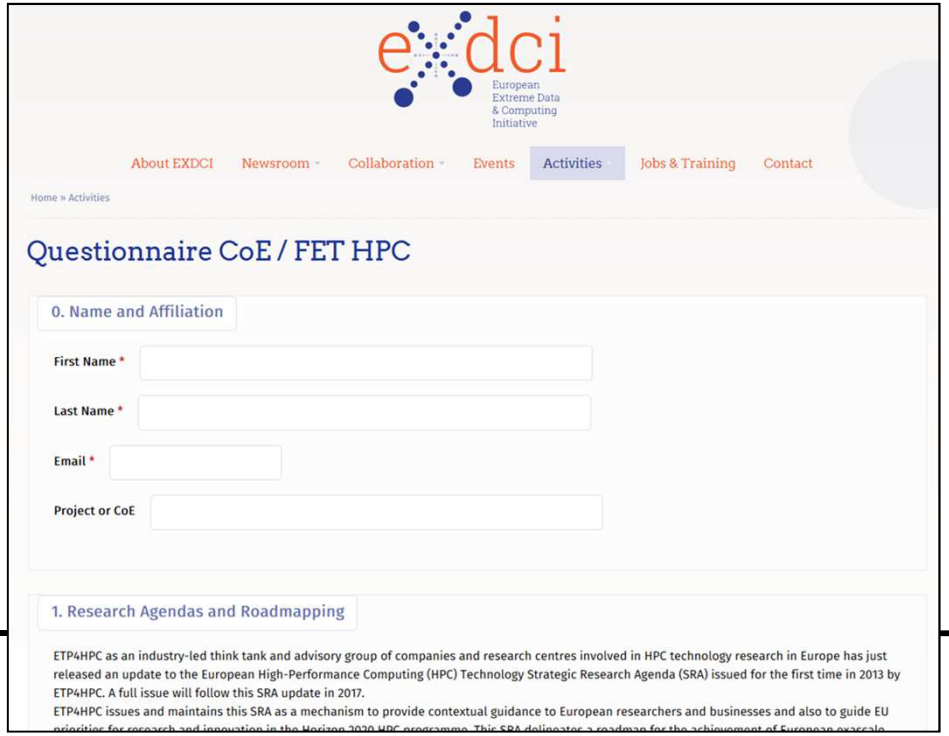
- Highly standardised outline (all cPPPs…)
- We had a concertation meeting with the EC and other cPPPs last December in BXL

2015 approach

- EXDCI WP7 now supports this KPI/monitoring effort
- Important milestone = mid-term review of the cPPPS mid 2017 – this will be next year, based on 2016 annual report
- This year a ‘consolidation’ one
  - We have data on FETHPC and CoE projects selected
  - We want to enrich data collection on most KPIs and consolidate baselines
- Dual questionnaire
  - EXDCI general one, incl. WP7 questions and others, all-in-one and towards FETHPC and CoE projects
  - Internal ETP one ~same as last year, (hopefully) improved

EXDCI questionnaire

- Ready…
- https://exdci.eu/activities/questionnaire-coe-fet-hpc
- Kick-off webinar planned
- Then some direct interviews as well

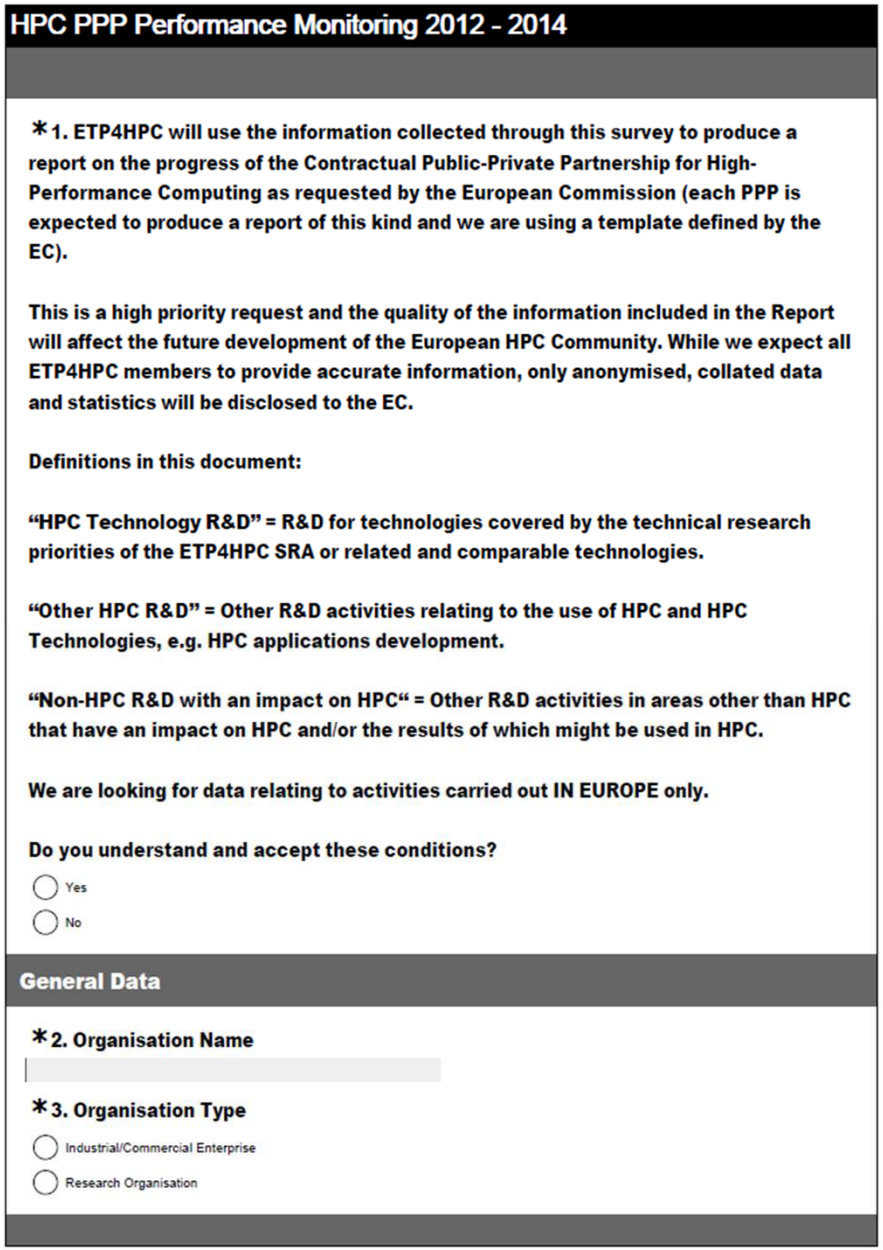


EXDCI questionnaire sections

- **Research Agendas and Roadmapping**
- **Training and talent generation**
- **International collaboration**
- **Impact assessment – innovation, technology transfer**
- **Monitoring European Key Performance Indicators**

ETP4HPC questionnaire

- Being finalised for deployment….
- Hints on R&D efforts (funded vs. in-house)
- Hints on patents, standardisation… job dynamics
- SME specific hints



HPC PPP Performance Monitoring 2012 - 2014

***1. ETP4HPC will use the information collected through this survey to produce a report on the progress of the Contractual Public-Private Partnership for High-Performance Computing as requested by the European Commission (each PPP is expected to produce a report of this kind and we are using a template defined by the EC).**

This is a high priority request and the quality of the information included in the Report will affect the future development of the European HPC Community. While we expect all ETP4HPC members to provide accurate information, only anonymised, collated data and statistics will be disclosed to the EC.

Definitions in this document:

"HPC Technology R&D" = R&D for technologies covered by the technical research priorities of the ETP4HPC SRA or related and comparable technologies.

"Other HPC R&D" = Other R&D activities relating to the use of HPC and HPC Technologies, e.g. HPC applications development.

"Non-HPC R&D with an impact on HPC" = Other R&D activities in areas other than HPC that have an impact on HPC and/or the results of which might be used in HPC.

We are looking for data relating to activities carried out IN EUROPE only.

Do you understand and accept these conditions?

◯ Yes
◯ No

General Data

***2. Organisation Name**

***3. Organisation Type**

◯ Industrial/Commercial Enterprise
◯ Research Organisation

Conclusion

- We need contributions
- Rather a partial answer than no answer at all!
- We preserve anonymity (global data is only used at the end…)
- We make important efforts (with EXDCI) to minimise your effort…
- We will deliver feedback…

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2016 Directions

Main activities

- Recommendation for WP2018-2020
- New opportunities for HPC
- New activities
  - 2 new working groups
- Development of the ecosystem and links
  - Industrial users
  - International

IPCEI

- Initiative led by Member States
  - LU (leader), FR, SP, IT
  - Important Project of Common European Interest
    - objective so important that some regulations can be overridden : aggregation of fundings from EC sources, national sources and private origine to support the project, state aids regulations, competition regulation
- Topic : HPC and big data enabled applications
  - 3 pilars :technology, infrastructure, large scale pilots
  - smart mobility, industry 4.0, smart pace, smart agriculture, smart cities, fin tech
- Budget foreseen : 6 B€

New EC communication

- « European Cloud Initiative – Building a competitive data and knowledge economy in Europe »

- 3 directions :
  - European Open Science Cloud
  - European Data Infrastructure
  - Widening access and building trust

WP 2018-2020

- The context :
  - on going FET-HPC projects and CoEs
  - WP2016-2017 with 2 FET-HPC calls
  - IPCEI
  - new EC communication

- HPC cPPP in Horizon2020 WP 2018-2020
  - budget around 450 M€
  - in the scope
    - technology development
    - demonstration
    - CoEs

A gap between new ambition and Horizon2020 WP2018-2020

- WP2018-2020 time line
  - start of actions at the earliest beginning of 2019
  - research projects would end beginning of 2022
  - even ESD would give a feedback at end of 2020 at the earliest
- Ambition mentioned in EC communication
  - production systems (pre exascale) in the top three in 2020
  - production system (exascale) in the top three in 2022
- The current pace of Horizon2020 R&D do not support the ambition

High level recommendations

- to keep diversity in architecture is important : several design points that can address convergence of workload
- to promote a ecosystem: to develop the expertise, know-how and the HPC community in Europe
- to keep the game open to SMEs (especially for the ESDs, please refer to ETP4HPC SME recommendations)
- to leverage the European excellence in applications

How to optimize WP2018-2020

- Technology
  - Projects focusing on key components : compute, interconnect, storage, system software stack, system architecture
  - Projects focusing on low level TRL (disruptive technology, new technology, hard problem)
- Demonstrators
  - ESD as proposed in SRA2
  - Still some question on the implememtation
- CoEs
  - See next slide
- Support actions
  - HPC ecosystem developmemt
  - Joint action
    - Big Data
    - Cloud
  - International cooperation

CoEs

- The CoEs should play a central role in co-design
- The successful ones need to continue their work
- HPC systems will develop their reach in new domain:
  - Artificial intelligence
  - Big data
  - Control of complex real time System

  perhaps CoEs in these domains could help
- Some domains have functional requirements, some infrastructural requirements, the laters are more mature for CoEs (a balance is needed)
- CoEs on Technics that can apply to different fields are welcome (as CFD, artificial intelligence)

Budget recommendation WP2018-2020

- Technology: 170 M€
  - Projects high TRL : 130 M€
  - Projects low TRL : 40 M€
- Demonstrators
  - ESDs : 200 M€
  - 2 as early as possible , 2 later to include WP 2016 results
- CoEs : 69 M€
  - Existing : 44 M€ with concentration
  - New : 25 M€
- Support actions : 11 M€
  - HPC ecosystem developmemt : 5M€
  - Joint action : 4 M€
    - Big Data
    - Cloud
  - International cooperation : 2M€

New work groups and activities

Energy Efficiency Working Group

ETP4HPC Working Group on Energy Efficiency

- Potential Members
  - HPC Centres
  - Hardware Vendors
  - System Software Providers
  - Users
- Focus
  - Promote energy-efficient design and use of HPC systems and infrastructures

Tasks

- Liaise with the FET HPC project on topics relevant to energy efficiency
- Liaise with the Energy Efficient HPC Working Group
- Establish and promote methods and metrics to assess energy efficiency at the infrastructure, system, and node level
- Define tools and means to monitor and optimize energy efficient operation
- Establish dialogue with SRA Energy & Resiliency WG to bring extra value or insight

Energy Efficient HPC Working Group Approach

Home | Webinars | Links & Events | Meetings | Groups | Conferences | Contacts | Join Us | Publications

Energy Efficient High Performance Computing Working Group (EE HPC WG)

Welcome to the EE HPC Working Group website, where your comments, suggestions, and questions are always welcome.
Please use *Google Chrome* or *Firefox* web browsers to view this site correctly.

Mission:

To encourage implementation of energy conservation measures, energy efficient design in high performance computing (HPC), and share ideas.

Vision:

- Reduce expenditure and curb environmental impact through increased energy efficiency in HPC centers.
- Encourage the HPC community to lead in energy efficiency as they do in computing performance.
- Develop and disseminate best practices for maximizing energy efficiency in HPC facilities and systems.
- Serve as a forum for sharing of information (peer-to-peer exchange) and collective action.

Current Activities:

A bi-monthly EE HPC WG membership meeting reviews current team activities led by the Infrastructure, Systems and Conferences Sub-Groups.

This meeting is held the second Tuesday of February, April, June, August, October and December. Minutes summarize team activities.

Background:

Demand for High Performance Computing (HPC) is growing in both the public and private sectors. It is also highly energy-intensive. The Federal government is required by the Energy Independence and Security Act of 2007 (EISA) to reduce energy intensity in all facilities, including laboratories and industrial buildings, by 30% by 2015. The increasing need for HPC and the attendant energy intensity threatens to derail the progress toward this and other goals. Through meeting mandated energy reductions, the Federal government is poised to lead by example in energy efficiency.

The HPC industry is responding to the demand for more powerful equipment, and consequently, creating increasingly energy intensive products. However, as profit-maximizing entities, businesses have a clear need for energy efficient computing due to the uncertainties in energy markets. The Energy Efficient HPC Working Group (EE HPC WG) will
target both public and private HPC owners, operators and users to increase collective knowledge and stimulate demand for energy efficient HPC.

Priorities:

Energy efficient design guidelines and specifications for super computer centers.

The Working Group will serve as a forum for discussing and distributing information about design guidelines and specifications. While the group may not specifically create these guidelines and specifications, group members are encouraged to share pertinent documents, such as the ones developed by the Federal Energy Management Program (FEMP).

HPC Software Working Group

HPC Software WG - Motivation

- Scalable software key to Exascale success
  - If scientific software does not scale, how can we exploit Exascale systems?
- Need to increase long-term impact of software
  - Many projects, national or H2020, produce software
  - Need to increase software reuse and improve quality
- Software engineering for extreme scale parallelism must be better understood
  - How many scientific software developers are **also** trained in software engineering?

Topics for the HPC Software WG

- **Scalability**
  - Collating information on scalability of HPC software (including applications, system level software and libraries)
  - Which domains do well? Which are lagging behind?
- **Defining best practice in software engineering and software design for HPC**
  - What should the software development process entail?
- **Sustainability**
  - Making software outputs more easily ‘discoverable’. Introduce an Open Source HPC software repository?
  - Increase quality. Introduce a software quality seal?

Industry Contact Group

Development of relationship with industrial users

- In the past effort to recruit industrial users as members
  - No success yet
  - difficulties to convince management

- New proposal : Industry Contact Group
  - Interacting with industrial users willing to interact with the ETP outside formal membership
  - Possible representation at the Steering Board meetings (observer/guest selected by this Group)

Presentation of new members
(Separate presentation)

General discussion

Thanks for attending!

We welcome your feedback