Strengthening competences with a focus on industry within the EuroHPC ecosystem

Bastian Koller, HLRS

Why use HPC in business?

- High Performance Computing (HPC), High Performance Data Analytics (HPDA), Internet-of-Things (IoT), Artificial Intelligence (AI) and Machine Learning (ML): Indispensible tools for INDUSTRY 4.0

- The current digital revolution is driven by data and intelligence and builds on those tools.

- The increasingly complex, connected and digitized world creates a flood of data – HPC and the new technologies allow us to generate meaning and knowledge from the data ➜ better products, models or processes in virtually all applications

- Advanced HPC services can enable European companies to focus on quality and innovation – and thus be able to prosper in the global marketplace

- Many industrialized economies (both developed and developing) have identified HPC as a key tool for innovation – in the U.S. the phrase "to out compute is to out compete" has been used to make the case to Government

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Why use HPC in business?

BENEFITS OF HPC
(SOURCE: COUNCIL OF COMPETITIVENESS)

Pie chart with the following segments:
- Other 1%
- Utilization rate 8%
- Improvement in quality or features 9%
- Reduced costs compared to physical methods 16%
- ROI 19%
- Inability to solve the problem by any other means 23%
- Time to solution 24%

Stimulating the innovation potential of SMEs

FF4EuroHPC´s Mission

➤ To successfully extend and continue the mission of Fortissimo and Fortissimo2

➤ Increase the innovation potential of industry, and in particular of SMEs, using advanced High Performance Computing (HPC) infrastructures, applications and services.

➤ Provide access to HPC-based infrastructures and services to a wide range of users for new and emerging data and compute-intensive applications and services.

➤ Foster wider innovations, for example by exchanging and promoting best practice use cases or application experiences.

➤ Provide an effective mechanism for inclusion of innovative, agile SMEs lowering the barriers for small actors to enter the market and exploit new business opportunities.

➤ Achieve a portfolio of business-oriented application "experiments" that are driven by SME end-users needs

➤ Support of and collaboration with future national HPC Competence Centres

Competence Centres

Strengthening competences with a focus on industry within the EuroHPC ecosystem

The European HPC Strategy

Infrastructure

Technologies

Competences

Applications

EuroHPC Systems
- 5 Petascale Systems
- 3 Pre-Exascale Systems

EuroHPC Systems
- 5 Petascale Systems
- 3 Pre-Exascale

Strengthening competences with a focus on industry within the EuroHPC ecosystem

From European to National Level

- HPC+ = HPC and associated technologies (i.e. AI, HPDA…)

European Level

| European Infrastructures | European Research | European Centres of Excellence | European Technology Platforms | European Strategic Activities | European … |

„The level glue"

National Level

| National Infrastructure | National Applications | National Training | National Research and Knowledge | National … |

Strengthening competences with a focus on industry within the EuroHPC ecosystem

Towards National Competence Centres

- ## National Competence Centres (NCCs)
  - ### Catalogue and increase national HPC competences, High-Performance Data Analytics (HPDA) and Artificial Intelligence (AI) capabilities
  - ### Provisioning of a broad service portfolio tailored to the needs of industry, academia and public administrations

Strengthening competences with a focus on industry within the EuroHPC ecosystem

EuroCC

Mission:

Set up 33 National Competence Centres (NCCs)

In the fields:
- High-Performance Computing (HPC)
- High-Performance Data Analytics (HPDA)
- Artificial Intelligence (AI)

Participating countries (33)

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Montenegro, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

Supported by **CASTIEL** (Coordination and Support Action)

Strengthening competences with a focus on industry within the EuroHPC ecosystem

Structure of a NCC

Strengthening competences with a focus on industry within the EuroHPC ecosystem

CASTIEL

Mission:
Support and Connect the NCCs

CASTIEL sets the framework of activities that support the evolution of each single National Competence Centre (NCC) and enable them step by step to get closer together in terms of capabilities and expertise.

→ Tackling the challenge of diversity in maturity

CASTIEL will take the role of a single and central reference point at the European Level to coordinate and support the National Competence Centres.

CASTIEL in close interaction with FF4EuroHPC to raise awareness on National level.

Strengthening competences with a focus on industry within the EuroHPC ecosystem

FF4EuroHPC in the context

within the EuroHPC ecosystem

Conclusion

- Obviously a lot of activities on National and European Level around different user groups (amongst others, industry)

- Competences are needed, not only in terms of technology, but e.g. also in terms of interaction with the different user groups

- EuroCC and CASTIEL to explore synergies and to support knowledge and experience transfer in Europe

- FF4EuroHPC as the booster for exploring further potentials for use of HPC+ by industry

Strengthening competences with a focus on industry
within the EuroHPC ecosystem

Thank You!

FF4EuroHPC

Support to business development and exploitation of experiments' results

Samir Ben Chaabane, Teratec
27/07/2021 Webinar FF4EuroHPC OC2

Overview

- WP4 objectives
    - Exploitation
    - Support to Business Development
- Interaction and collaboration with NCCs
- Methodology
    - Questionnaire
    - KER identification
    - Lean Canvas

WP4 objectives

1. Support the business development of FF4EuroHPC activities:
   - Helping the relevant DIHs and industry associations to express their interest in the FF4EuroHPC approach and involve them in the promotion of our ecosystem

   - Defining with the ISVs how they can reference the experiments in which they are involved
   - Assisting the National HPC CCs to collaborate effectively with the SMEs involved in the program
2. Sustain the experiments participants, in particular the SMEs, to maximise their innovation potential arising from experiment outcomes and help them to communicate on it.

Ensure the maximum output for the overall FF4EuroHPC activities and help experiment participants to develop their business

Task 4.1 Exploitation

Enable the best use of the experiments results

- Collect and analyse the needs of the SMEs in term of Business development

- Extract the real outputs of the experiments and help disseminate them
  - Extraction of Key Exploitable Results for each of the experiments
  - Help the participants market the innovations ➔ Preparation of Lean Canvas

- Establish collaboration with NCCs, DIH and industrial association for a better exploitation of the experiments' outputs

Task 4.2: Business development support to the experiments

Provide Business Development support to SMEs:

- Monitor and adapt the BD SMEs' needs.

- Investigate in collaboration with the NCCs the way they will support the innovation of their SMEs, participating in the FF4EuroHPC program.

- Collect the SMEs development priorities and check the degree of implementation of the planned developments and actions, in collaboration with the NCCs.

- Define with the technological suppliers (ISVs & Services providers) the way they will reference the experiments.

Methodology

© Members of the FF4EuroHPC Consortium

Interaction and collaboration with NCCs & DIHs

FF4EuroHPC is a key tool to foster a partnership between the SMEs and their national HPC Competence Centres by exploring business experiments which go beyond the funded activity

➤ Investigate in collaboration with the NCCs the way they will support the innovation of their SMEs, participating in the FF4EuroHPC program.

➤ Study and define the way in which the experiments will be referenced by the relevant technological suppliers (DIHs, ISVs & Services providers).

➤ Collect the SMEs development priorities and check the degree of implementation of the planned developments and actions, in collaboration with the NCCs.

➤ Produce and disseminate **Success stories** extracted from the experiments

➤ Raise awareness of the NCCs & DIHs to the importance of supporting SMEs wishing to invest in HPC

Interaction and collaboration with NCCs & DIHs

➢ Support the SMEs involved in the project to a best exploitation of the experiments outcomes

➢ Help the participants to identify new business challenges, new collaborations and new partners

➢ Assist the SMEs to develop business based on exploitable results issued from the experiments

➢ Support the implementation of the decided actions to foster the use of HPC by the SMEs.

Help FF4EuroHPC to maximize the impact of the project

Questionnaire

A Good knowledge of SMEs' uses and needs

- Questionnaire to identify
  - Numerical simulation uses
  - Current and future projects in HPC
  - Needs in terms of HPC
  - Needs in terms of Business development

- All the SMEs involved in the experiments will be asked to answer the questionnaire

- Will help to set up the process for a best exploitation of the experiments' results and to support the involved partners develop their business.

Key Exploitable Results

Key Exploitable Results (KERs)

- A result is defined as "*any tangible or intangible output of the action, such as data, Knowledge or information whatever their form or nature, whether or not they can be protected, which are generated in the action as well as any attached rights, including intellectual property rights*" *.

- A **K**ey **E**xploitable **R**esult (KER) is an identified main interesting result which has been **selected and prioritised** due to its high potential to be "exploited" (to make use and to derive benefits) downstream the value chain of a product process or solution.

- To select and prioritise results we will use the following criteria
    - Degree of innovation
    - Exploitability
    - Impact

* https://webgate.ec.europa.eu/funding/display/ECResearchGMS/Projects+and+results

Key Exploitable Results

For each experiment we will prepare KER drafts (tables):

- **KER Characterisation:** Full description of the exploitable result
  - Key innovative aspects of the result,
  - Market opportunities,

- **Partner contributions:** Contribution of involved partners to the specific result.

- **Exploitation form:** Identify the steps for the exploitation of the KER (commercialisation, development, licensing…)

- **IPR management:**
  - Identify the possible claims of different partners related to the IP of the KER.
  - Identifies how the partners plan to collaborate in the exploitation of the KER.

- **Risk management:**
  - Identify the critical risk factors related to the exploitation of the result preventing its full exploitation.
  - Indicate the planned actions for the mitigation of these risks

The full involvement of the participants to a successful exploitation of the results

Lean Canvas

ff4EuroHPC

Problem

Top 3 Problems
What is the crucial problem faced by your consumers? Capture their central frustration.

Existing Alternatives
Define one clear, direct competitor. Consider the other ways customers can address their problems. What products or services exist as alternatives to what you're offering?

Solution
Top 3 solutions
What is your solution to consumers' problems? Present the defining elements of your service: what makes it the top tool for addressing consumers' needs?

Key Metrics
Key Activities You Measure
How will you track consumer engagement, excitement, and usage of your product?

Unique Value Proposition
Clear and Compelling Message
This message should explain what you do, how you are different, and why you are worth investing in. What is your promise to consumers? highlight what stands out about product you provide.

High level concept
How does your product fit into the bigger picture; where does it fall in the grand scheme of things?

Unfaire Advantage
Your Differentiator
How do you stand out from competitors? What puts you ahead of the pack? Why should consumers have confidence in your service above others?

Channels
How will you interact with consumers, inform them of your developments and services? Print ads, social media platforms, promotional events, or even word of mouth— consider the most effective ways to reach users.

Customer Segment
Target Customers
Who can you help? Identify 3 to 4 user personas you envision turning to you for solutions. Try our User Persona Creator tool.

Early Adopters
Define the specific characteristics of your early adopters.

Cost Structure
List your fixed and variable costs.
Customer acquisition costs
Distribution costs
Hosting
People

Revenue Streams
List your sources of revenue.
Revenue Model
Life Time Value
Revenue
Gross Margin

Questions?

Contact : samir.ben-chaabane@teratec.eu

https://www.ff4eurohpc.eu/

Thank you

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Irish Centre for High-End Computing

- ICHEC is the
    - National centre for HPC & related technologies in Ireland.
    - EuroHPC National Competence Centre in Ireland.

- Funded by the Irish Government.

- Hosted by National University of Ireland, Galway.

- Compute- & data-driven platforms and technologies.

- Operational provision, R&D, co-development, skills development.

- Engagement with academia, industry & public sector.

Irish Centre for High-End Computing

Compute and Data Management Platforms and Services
- Operational provision of national HPC infrastructure and services
- Operational provision of environmental, climate and satellite data services at national and European levels
- National Quantum Learning Platform
- European hybrid HPC-Quantum Computing system

HPC Performance Engineering
- Performance analysis and optimisation
- Processor architectures and programming models
- Data storage systems
- Cloud systems

Quantum Computing
- Hybrid HPC-Quantum Computing systems and software integration
- Quantum algorithms (particularly, NLP, Chemistry, ML)
- Quantum computing software and programming tools
- HPC simulation of quantum systems

Irish Centre for High-End Computing

AI and Edge Computing

- Workflow & performance for ML/DL training & inference
- AI for Earth Observation
- AI for data enhancement
- AI-augmented modelling
- Data management and aggregation on edge platforms

Big Data and Analytics

- (Federated) Data management principles and services
- Data curation, enhancement and high-performance analytics
- DevOps for data analytics and machine learning
- Data visualisation tools and services

Training and Skills Development

- Technology briefings
- Workshops and/or tutorials
- Knowledge transfer through co-design/development exercises

Environmental Sciences and Climate Informatics

- Global climate modelling & high-resolution regional climate projections
- Historical reconstruction of Irish and UK climate
- Impact of climate change on biodiversity
- Earth Observation data analytics and applications
- National wind and solar energy forecasts
- Environmental and related urban Digital Twins
- Environmental and climate informatics

EuroCC Ireland

Academic Flagship Programme

- Increase competitiveness of Irish academic groups for computational research on Tier-0 and EuroHPC systems.

- 2-year support for performance engineering and scaling-up application codes.

- Access to national computing and storage resources.

- PIs to apply for access to Tier-0 and/or EuroHPC systems.

- Application domains include:
  - Optimising open QCD for accelerator-based architectures
  - 3D Simulations of Nebulae Around Massive Stars
  - First-principles machine-learning infrastructure for materials discovery
  - Kernel polynomial methods for quantum spin chains
  - Hydrodynamic simulations to model formation and growth of black holes
  - Privacy Preserving Federated Recommender Systems
  - Optimisation for large system calculations based on DFT and quantum transport

SME Accelerator Programme

- Supporting startups and SMEs in the adoption of HPC, AI and data analytics in products, processes and services.

- Co-location of staff for 1-1 mentoring and blended teams.

- Co-design and performance optimisation.

- Skills development & knowledge transfer.

- Access to HPC platform resources as required.
  - National HPC, QC systems
  - European HPC, QC systems
  - Cloud computing resources

- 1 SME engagement = 6-month, 3 PM.

- Twin Transition = Digital + Green.

SME Accelerator – Engagements

Telenostic Limited

- Company
  - Irish SME specialising in animal infection testing.

- Project outline
  - ML/DL-aided solutions for monitoring parasitic infection levels in feacal samples.
  - Add post-detection filtering methods for improved prediction accuracy.
  - Enhance DL model to identify additional feacal egg characteristics (improved egg sizing, masking for partial egg shaping, etc.).
  - DL model enhancement approaches for masking and size differential analysis.
  - Performance optimisation of model training and inference through efficient use of HPC.

- Industry/business advantage
  - Timely, cost effective, accurate diagnosis to inform analysis and treatment of parasitic threat to animals.

SME Accelerator – Engagements

Fathom Tech

- Company
  - Designs and builds digital projects/services for enterprise and public sector clients.

- Project outline
  - ML/DL-aided platform for predicting seaweed biomass as a source of bioenergy using Earth Observation data.
  - Current model can map and predict spatial extent and biomass of single species over a target zone.
  - Improve features, scale and accuracy of model to cater for additional seaweed species (currently single species).
  - Introduce multi-modal and multi-temporal approaches for additional species and varied coastlines.
  - Development and operationalisation of workflow as a service on commercial public cloud platform.

- Industry/business advantage
  - Operationalisation of commercial service at scale targeted at the public sector.

SME Accelerator – Engagements

Evercam

- Company
  - Designs and provides advanced camera software solutions for the construction inudstry.

- Project outline
  - High-resolution video recordings captured from 350+ live cameras from 50+ user sites.
  - Software model based on multiple autonomous servers responsible for communicating with each camera (storage, analysis, indexing, replay, AI-based analytics).
  - AI & data managemet (CV tools, image reading & annocation, DL models for event recognition), UX (automated 4D BIM integration and multi-camera volumetric visualisation with interactive virtual mobility).
  - Scale and performance optimise model training, inference, analytics and UX workflow for efficient data management, low-latency and high frame rates.

- Industry/business advantage
  - 200 years worth of video recorded on constructure sites on which to build analytics and AI models.
  - Scalable, near-real time, interactive data interaction and analytics service is a game changer in construction industry.

SME Accelerator – Engagements

Ubotica

- Company
  - Solutions for extractig meaning from visual data at source (edge).

- Project outline
  - Build on state-of-the-art DL for in-orbit processing of Earth Obseration data on European satellites.
  - Platform exists for deploying and updating DL models onboard satellites, demonstrated with pilot use-case.
  - Enable Ubotica in identifying and testing of additional commercial applications.
  - Support includes assistance with expertise in performance engineering, model optimisation and EO datasets.

- Industry/business advantage
  - Operationalisation of cutting-edge DL in Space solutions for commercial, environmental and public-sector use-cases.

SME Accelerator – Engagements

Nuritas

- Company
  - Combines AI and peptidomics to discover bioactive peptides (protein fragments) from natural sources.

- Project outline
  - Understanding suitability of peptide analysis using quantum computing methods.
  - Review and identify approaches to encode peptide information/data as quantum states.
  - Given the encoding strategy, identify suitable quantum computing algorithms for processing peptide sequences.
  - Report on the viability of the above steps for generalised peptide processing use-cases.

- Industry/business advantage
  - Peptide analysis is an inherently quantum problem that could be exponentially faster if encoded on a Quantum Computer.
  - Early pursuit of this technology represents a clear advantage for Nuritas once Quantum Computing technology matures.

SME Accelerator – Engagement Model

Awareness & adoption of HPC & related-technologies
Skills development
Access to platforms and expertise

Enterprises
(startups, SMEs)

EuroCC SME Accelerator

(European) Digital Innovation Hubs

Expert support HPC, AI & HPDA
Knowledge transfer
Twin Transition (Digital + Green)
European visibility

Test before invest (HPC, AI, Cybersecurity)
Skills development
Networking
Funding opportunities

EuroCC Ireland

Thank you

HPC and Smart Data for SMEs – Best Practice

Dr. Andreas Wierse

SICOS BW GmbH

The SICOS BW Tasks

Facilitate SME-Access to HPC Systems and Large Scale Data Facilities

Support SMEs in finding Competence Partners

Support the Centers in the Optimization of their Offering towards Industry

Find the SMEs!!

Public Relations

Press articles

- FAZ (Special: SMEs)

- IT & Production

- :K CAD CAM

- IHK Magazine Karlsruhe

- PLM IT-Report (Article)

- Perspektive Mittelstand

- Handelsblatt

- Autocad & Inventor Magazin

- :K/CAD CAM Blog und Magazin

- Standortmagazin der Region Stuttgart

Buid a (Regional) Network

Go to where they are

Events

- IHK Tübingen/Bioinformatik RT
- World of Energy Solutions/ e-mobil bw
- CAE regular's table
- Industrial Services event at HLRS
- Strategy Workshops Landesagentur Leichtbau

- LS-Dyna users forum
- Workshop HPC-Simulation für den Mittelstand
- Technology Mountains IHK VS Info-Event
- Open Source Info-Event (IHK)
- Hannover Fair MobiliTec

The Second Challenge

Convince them!

What is a Supercomputer?

That depends on whom you ask!

If you ask us …

This is a Supercopmuter

The HLRS System

2020 HPE Apollo 9000 "Hawk"

5632 Compute Nodes, each with 128 Cores and 256 GB RAM

= 720.896 Compute Cores!

+ 1,4 PB Main Memory

~27 PFlop/s PeakPerformance

26 PB Flash supported parallel file system

Access to HPSS

Linux operating System

But:

But:

This Computer is also usable for YOU!

But:

This Computer is also usable for YOU!

This computer is even AFFORDABLE for you!!!

But:

This Computer is also usable for YOU!

This computer is even AFFORDABLE for you!!!

Plus: you only have to pay, what you use:

Rechenanlage	bwuni-cluster**	smp Knoten	VISP100, Pre- &Postprocessing 128 GB	Pre- und Postprcessing 256 GB	Pre- und Postprcessing 512 GB	SKL- 192GB	Haswell 128 GB	Haswell 256 GB	Cascade lake 384 GB	Graphik-server AMD	Graphik-server NVDIA	Vektor-knoten Aurora	CS Storm*	CS 500 - Spark	URIKA	HAWK 128 GB	HAWK 256 GB
Rechenzeit		Core 0,26 €	Knoten 2,92 €	Knoten 2,88 €	Knoten 5,64 €	Knoten 1,41 €	Knoten 0,44 €	Knoten 0,49 €	Knoten 1,31 €	Knoten 1,65 €	Knoten 2,25 €	Knoten 5,70 €	GPU 2,01 €	Knoten 2,37 €	Knoten 1,03 €	Knoten 1,15 €	Knoten 1,31 €
Mindestgebühr pro Rechnung und Abrechnungszeitraum	keine																
	* Es werden nur Knoten abgerechnet ** Abrechnung erfolgt nur nachrichtlich Die Preise verstehen sich zzgl. der gesetzlichen Mehrwertsteuer																
Gebühr für Speichermanagementsystem HPSS Quobyte	0,01 € /GB/Monat 6,81 € TB/Monat																

Systems and Cost

	CPU	nodes/ cores per node	cores in total	RAM per node	€ per node hour (net, incl. 20% handling)
HPE Hawk	AMD Rome 2,25 GHz	5632/128	720.896	256 GB	1,38
NEC Vulcan	Cascade Lake 2,50 GHz	96/40	3.840	384 GB	1,57

The Third Challenge

Make it easy for them!

We Support You!

Energy Solution Center

EnSoC is a network of partners from science and industry,
who have along-term common interest in research for solutions
in the field of energy and High Performance Computing (HPC).
(Emphasis: energy economics)

Automotive Solution Center for Simulation

- non-universitarian, non-profit Research Association (founded in 2008)

- network of members and cooperation partners from science and industry to bundle competencies around numerical HPC-simulation

Soft-/Hardware HPC

Automotive Industry

Science

← application oriented

Smart Data Solution Center BW

Access to „Smart Data"

The three pillars of SDSC BW …

The Economic Impact

Support for SMEs with „Big Data" (used smart)

„Big Data" not necessarily „huge" amount of data

Analyse new complex topics quickly

Integrate topic into their value chain

Provide required resources

ROI (Return On Invest) as quick as possible

Optimal project idea & the right partners

Strengthen competitiveness

Studio 100 Media GmbH

The Fortissimo Projects

- Building a Cloud of HPC Resources to solve SMEs' business challenges
- One of the I4MS* projects within the "Factories of the Future" initiative
- Focus on problem solving – not technology development
- Brings together all of the players in a marketplace
- €22m costs, €16m EC funding, 45 partners growing to 90+ over the 3 year duration
- Optimized financial and legal structure to assist SMEs

Keep them as Users!!

10 employees, University spin-off

Own simulation code:
RECOM-AIOLOS, a 3D-simulation environment for the simulation of industrial furnaces and boilers.

Uses HPC systems as well as the HLRS 3D-Virtual-Reality-Environment.

Works world-wide for large power-plant builders and owners.

Success Story Medium: Optima Pharma

550 employees, Filling and packaging technology

Simulation of air flow in clean room environments

OpenFOAM based solution established in co-operation with HLRS

Uses the HLRS 3D-Virtual-Reality-Environment

HLRS Customers (Selection)

Key Success Factors

× aim for short term financial viability (ROI)

× allow limited/calculable risk

× provide high flexibility

× ease of use

× give excellent support

× develop high level of trust

Thank you

Fortissimo success story: Massively parallel virtual testing of AI-based systems

Dr.-Ing. Andreas Piater, Spicetech GmbH

The Company

Founded in 2016

12 AI and software experts

5 Research projects

Data Analysis   Software Engineering

AI   IT

Machine Learning   HPC / Cloud

SPICETECH

The Idea: Testing the Unexpected

Source: https://www.youtube.com/watch?v=LfmAG4dk-rU

Everything is cheese?

$\varrho(x,y,z)$

Cheese Picture Source: ©Switzerland Cheese Marketing

The VALICY Approach

System to be validated

Szenario variation

Multi-dimensional

Test system / virtual model

VALICY

AI

Scalable using HPC

Evolution

How does VALICY Work?

Multi-dimensional input parameters

Variation of a test dimension: example of fog

Multi-dimensional output parameters

AI-based suggestions of new tests

VALICY

AI-based monitoring of tested cases

VALICY Success Story

Initiated in the frame of FF2

3 pilot customers /
official release in Q4/2021

Supports any kind of
AI-based systems

Autonomous driving example
in cooperation with FKFS Stuttgart

Thank you

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FF4EuroHPC
Enabling SMEs to benefit from HPC

Participating in the FF4EuroHPC Open Call

Guy Lonsdale, scapos AG

Overview

- Background & reminders: The Fortissimo Approach and past experiences, FF4EuroHPC Call 1 and the selected experiments

- Call-2: changes wrt Call-1, expectations and objectives, proposal submission

- Q&A

The Fortissimo Approach

- Central theme: the successful execution of „experiments" with SMEs, delivering **real business impact** through use of HPC

- The bulk of project funding is used for these experiments and the highest quality, innovative SME-oriented experiments are acquired through the execution of **open calls for proposals**

- Two prior projects (Fortissimo and Fortissimo-2) executed 92 experiments generating 79 impressive, business-oriented success stories

Fortissimo Success Stories
Fortissimo's Small & Medium, Manufacturing Enterprises

Lessons Learned

The best experiments

- Properly planned their work from the start
- Picked an achievable project – not too small, not too large
- Made sure they had access to all of the software required or understood how it would be developed
- Put together a clear business case – where the business benefit over the subsequent 3-5 years greatly exceeded the funding requested
- Planned how to go from the initial experiment to production use from the outset

The FF4EuroHPC Project

- **FF4EuroHPC: HPC Innovation for European SMEs**
- Funded under the H2020-JTI-EuroHPC-2019-2 Call
- Commenced 1.9.2020; 36 months duration
- Coordinator:

- Other Partners:

The FF4EuroHPC Methodology

- Support the EuroHPC initiative to promote industrial uptake of HPC technology and increase the innovation potential of European industry
→ focus: small and medium sized enterprises (SMEs)

- Extend and continue the Fortissimo Approach:
Portfolio of business-oriented application "experiments" that are driven by SME end-users needs – selected through two open calls for proposals

- Furthermore…

  - Collaboration with the national HPC Competence Centres (plus EuroHPC projects CASTIEL & EuroCC)

  - Support the participating SMEs in establishment of HPC-related innovation

Response to FF4EuroHPC Call-1

- 68 Proposals were received involving 202 organisations and participants from 25 European countries

- Wide range of application areas

Submitted Experiment Proposals by Country

Experiments Submitted and Selected by Area

Experiments Selected in FF4EuroHPC Call-1

- 16 proposals selected for funding, with a funding budget just in excess of € 3M
  - Involving 53 organisations, 27 of which being SMEs
- Strong SME participation and range of themes addressed

Funding for Selected Experiments per Country

SME and non-SME Partners by Country

Weather Prediction
NLP   ML CFD
Risk Management
Coupled Simulations
3D Rendering
Video Analytics
Molecular Dynamics
Ocean Simulation
Monte Carlo

Are There Differences Between Call-1 and Call-2?

YES.

The key changes affect the selection process and have been introduced to:

(i)   give a higher priority to experiments addressing the business benefits of manufacturing SMEs;

(ii) achieve a broad geographical distribution of participants.

Unchanged: the core concept

"The key concept behind FF4EuroHPC is to demonstrate to SMEs how they can strongly benefit from the use of advanced HPC services (for example, modelling & simulation, data analytics, machine-learning and AI, and possibly combinations thereof) and thereby take advantage of these innovative ICT solutions for their business benefit."

(From the Call-2 documentation)

Call-2 Objectives

- Experiments should address business challenges from European SMEs from varied application domains

    - Preference being given to engineering and manufacturing, or sectors able to demonstrate fast economic growth or particular economic impact for Europe.

    - The highest priority is given to proposals directly addressing the business challenges of manufacturing SMEs

    - Research-focused business models are not within the scope of the Call

- Priority will be given to consortia centred on SMEs that are new to the use of advanced HPC services

Expectations for Experiments – 1/2

- <u>Involve all necessary parties</u>
  - required for the effective and efficient execution of the investigation and impact demonstration to address SME business challenges through the use of HPC
- <u>Define the resources they need and budget for them</u>
  - FF4EuroHPC will not be in a position to provide computing resources.
- Define the data protection and data/information access issues that impact its proposed work plan and ensure that the operation of the experiment adheres to those requirements

Expectations for Experiments – 2/2

- Generate publishable success stories based on solution of the SME's real-world problems that clearly identify the business benefits realised or obtained.

- Align, where appropriate, with regional priorities, such as industrial specialisation areas.

- Be complementary to those already included in the past Fortissimo and Fortissimo 2 projects and to those selected in FF4EuroHPC Call-1

Evaluation

- The criteria for evaluation will comprise
    1. Impact including industrial relevance and exploitation plans
    2. Soundness of concept, innovation and quality of the work plan
    3. Quality of the consortium as a whole and of the individual proposers
    4. Effective and justified deployment of resources

- Criteria 1 to 4 will carry a score ranging from 0 to 5.

- Criterion 1 will have a weight of 2×, Criteria 2 to 4 a weight of 1×

- Maximum score is 25 points

- A threshold score of 3 will apply to the first three criteria

- Prioritisation of experiments involving manufacturing SMEs
    - The maximum score on Criterion 1 that will be assigned to a proposal not directly addressing the business challenges of manufacturing SMEs will be 4.0 points.

Selection of Experiments for Funding – 1/2

- Two-phase process - specific intent to increase the geographic distribution of FF4EuroHPC experiments

- FF4EuroHCP Call-1 selected proposals involving organisations from the following 9 countries: Croatia, France, Germany, Greece, Italy, Montenegro, Serbia, Spain, and the United Kingdom.

- Phase 1:
  - A selection of experiments with a cumulative funding of **up to € 3 M**
  - Selection from will be made from those proposals **with a score exceeding 17 points** and taking, for each country **not in the aforementioned list**, the highest ranked proposal involving an organisation from that country (if any).

- Phase 2 will use the ranking of all remaining proposals irrespective of country affiliations to select the remaining experiments for funding with the budget not used in the first phase

Selection of Experiments for Funding – 2/2

Evaluation Process → Rate all proposals

Proposals above threshold → Rank proposals for each Phase 1 country with score > 17 points

Proposals not selected → Rank proposals for all countries

Sub-threshold proposals

✗

Not eligible for funding

Best proposal for each Phase 1 country

✓

Selected for funding

Phase 1 selections using x < 3 M€

Best *n* proposals within the remaining budget

✓

Selected for funding

Phase 2 selections using (5 – x) M€

Funding of Experiments

- FF4EuroHPC will make use of the Financial Support for Third Parties method to enable the inclusion of new experiment partners.

  - Funding of Third Parties to follow the same principles as used for FF4EuroHPC beneficiaries, which receives European Commission funding within the R&D&I programme of the EuroHPC Joint Undertaking. In particular, Third Parties will receive 100% funding of eligible costs arising.

- The funding for an individual experiment may not exceed 200 K€ (covering all participants).

- The maximum funding that can be allocated to any Third Party, across all FF4EuroHPC experiments in which that Third Party is involved, is 150 K€.

- The participation of certain FF4EuroHPC beneficiaries in experiments is eligible, but the costs for their activities in experiments are not included within the requested funding for experiments.

- Note: Proposals to FF4EuroHPC Call-2 that do not adhere to the abovementioned funding restrictions will be rejected without further evaluation

What will be funded?

Taken from the Proposal Part B Exemplar (embedded Excel sheet)

Participant Number	Participant short name	Requested Funding rate	Estimated eligible costs						Requested Funding (€)
			Effort (PM)	Personnel Costs (€)	Subcontracting (€)	Other Direct costs (€)	Indirect costs (€)	Total costs	
1	Eg-Industry	100%	12	80.000	-	10.000	22.500	112.500	112.500
2	Eg-non-profit	100%	12	35.000		10.000	11.250	56.250	56.250
3	Eg-HPC Expert	100%	3	10.000	-	10.000	5.000	25.000	25.000
4	Eg-FF4EuroHPC partner	100%	3	5.000		10.000	3.750	18.750	-
		Total	30	130.000	-	40.000	42.500	212.500	193.750

Computing costs, in terms of the required core hours, should be scoped for the whole value chain of the proposed experiment and assigned under "Other Direct costs". The need for the requested computing resources should be substantiated.

Costs for subcontracting and other direct costs, including computing costs need to be clearly explained.

Indirect costs are to be calculated as 25% of direct costs (i.e. personnel costs + other direct costs)..

Key Call Details

- Submission Deadline: *29th September 2021, 17:00 Brussels local time*

- Funding for Call-2: The indicative total funding budget is 5 M€
  Expected duration of experiments:
  maximum 15 months with expected commencement 1st March 2022

- Maximum funding request per proposal:
  EUR 200,000 € (covering all participants)

- Proposal submission: in electronic form

- Language: English

- Submission site:

https://www.ff4eurohpc.eu/calls/submission

Proposal Submission

- Proposals must be submitted in English & must comprise 2 parts: Part A (administrative information), Part B (body of the proposal).

    - Part A: cover page and a set of tables to provide administrative data – no additional info to be included!

    - Part B: Cover page + max. 10 pages

- Proposals not adhering to the page limit & content guidelines will be rejected!

- Detailed instructions for proposal submission, together with information about the evaluation criteria to be applied, are provided online at:

    https://www.ff4eurohpc.eu/calls/submission

- Submission will be exclusively in electronic form and all submissions must be made by 17:00 Brussels local time, 29th September, 2021.

FF4EuroHPC CALL-2 Documentation

- Documents:

  - Announcement and Proposer's Guide

  - Proposal Exemplar as Word documents (Part A & Part B "exemplars")

- Online info (sub-pages):

  - Proposer-Evaluator check-list ("check-list")

  - Frequently Asked Questions ("FAQ")

Available at: **www.ff4eurohpc.eu/open-call**

Have More Questions?

- Online FAQ: **www.ff4eurohpc.eu/en/open-calls/faq/**

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Still have questions?
ff4eurohpc-calls@scapos-tools.de

Thank you