Opportunities of SMEs in the HPC world

Tomi Ilijas, CEO, Arctur d.o.o. (NCC SLING Slovenia)

Our Values

Reinventive
Contribute to new solutions

Responsible
Commit & deliver

Fair Play
Win-win-win solutions

One Family
#ArcturTeam

Our competences

Creativity and Innovation

Beauty of merging research, science, art and business is in minds thinking and working as one.

HPC & DC management

Exceptional Cloud and HPC services on our own cutting-edge infrastructure with a team of experienced engineers.

Project management

Is what drives our organisation through constant progress and growth while being able to tackle and successfully execute operations no matter their scale and complexity.

Software design and development

Profound understanding and in-depth knowledge in complex IT software design and development enables us to innovate and always stay one step ahead.

Management standards

At Arctur, we hold ourselves to the highest standard of excellence in all aspects of our daily operations.

ISO 9001
Quality management system

ISO 27001
Information security, cybersecurity and privacy protection

ISO 14001
Environmental management system

ISO 13485
Medical devices

R&D

The largest
private-owned HPC provider in Central Europe.

500+
years of combined experience.

50+
European research projects over the last 15 years

Top 20
Research institution in Slovenia.

SMEs, are you ready for HPC?

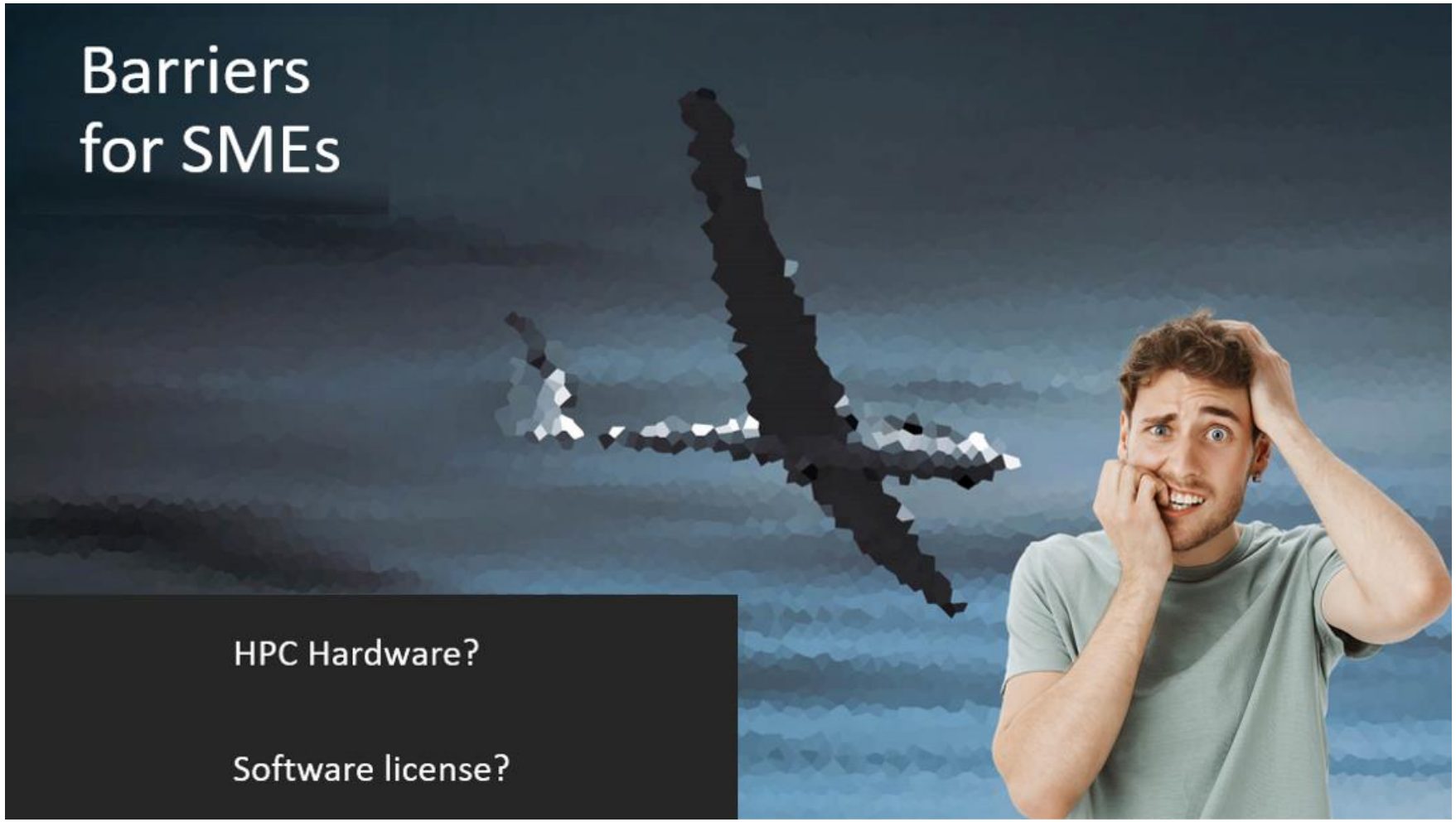
Why utilise HPC for business?

- **Accelerated Innovation**: Faster simulations and analyses speed up product development.
- **Cost Efficiency**: Reduces the need for physical prototypes and testing.
  Saving personnel, materials, and production costs.
- **Data-Driven Decisions**: Enables advanced analytics for better business insights.
- **Optimized Processes**: Improves efficiency in manufacturing and operations.
- **Competitive Edge**: Enhances capabilities in AI, big data, and simulations.
- **Scalability**: Handles increasing workloads as businesses grow.
- **Risk Reduction**: Models scenarios to identify potential issues before implementation.
- **Sustainability**: Improves energy efficiency and supports green initiatives.
- **Personalization**: Supports customized solutions in industries like healthcare and retail.
- **Collaboration**: Facilitates global research and innovation partnerships.

Source: FF4EuroHpc

HPC it is! But …


Barriers
for SMEs
Software license?


Barriers
for SMEs
HPC Hardware?
Software license?

Barriers for SMEs

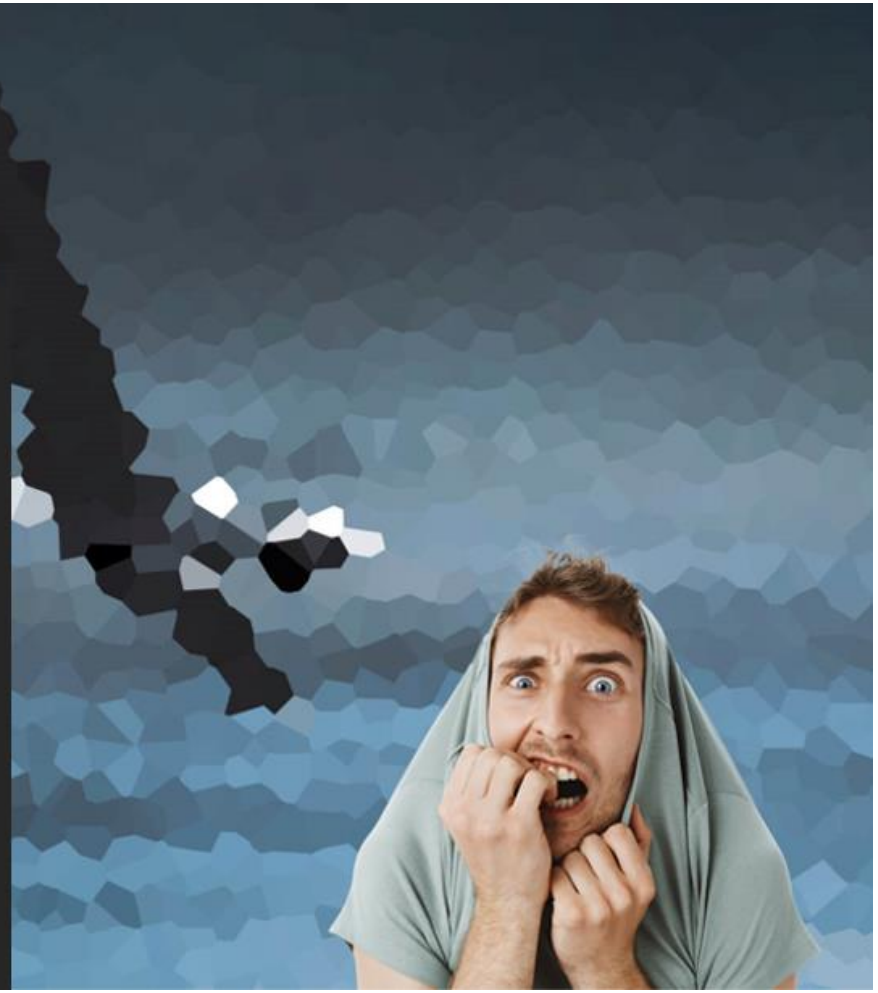
Trust!!

Price, ROI??

Domain knowhow?

HPC Hardware?

Software license?



Why HPC4SME AAT?

SMEs

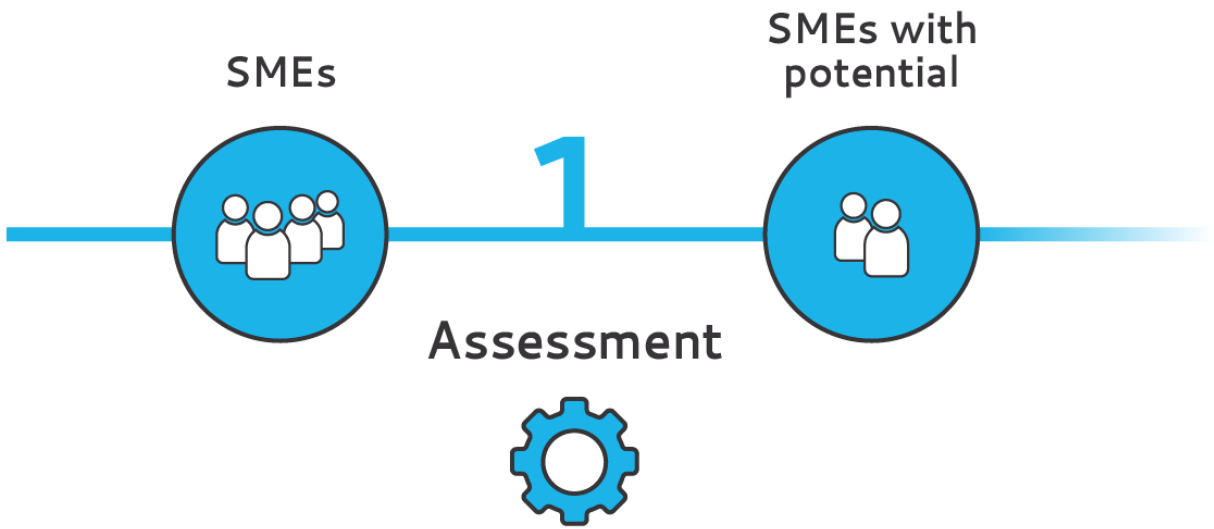
- Discover IF and HOW the organisation can benefit from supercomputing services
- Get support & services from NCCs, get funding opportunities, and access to HPC

- **HPC4SME AAT Questionnaire focuses on three main topics:**

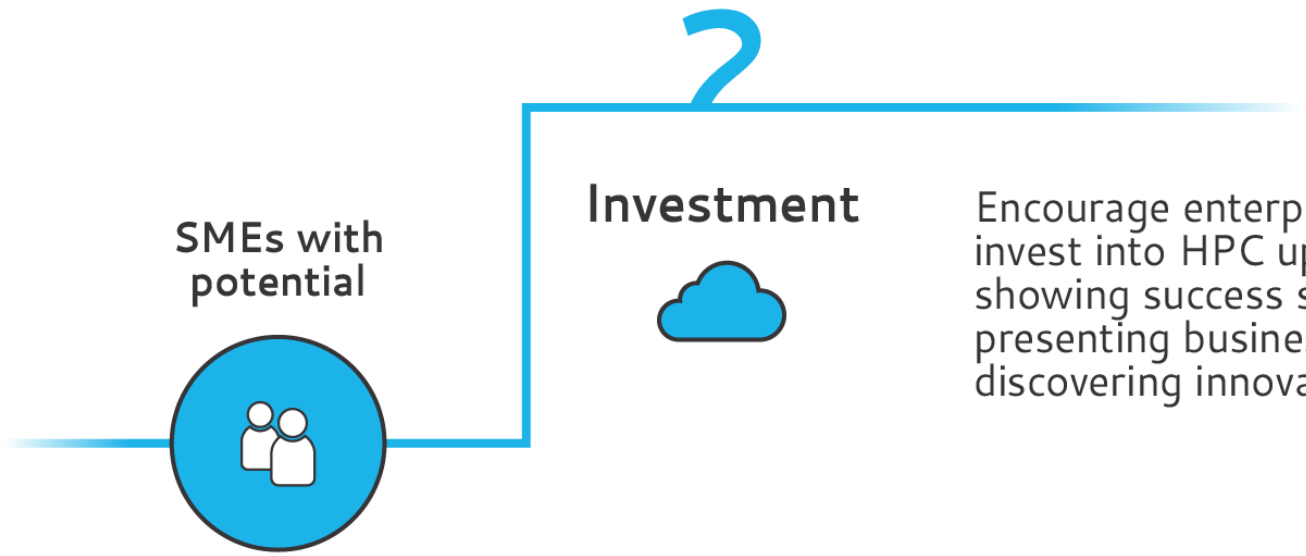
1. Readiness
2. Cloud
3. HPC

- Questionnaire: 30 minutes
- SME receives a valuable report with recommendations
- SME receives support from NCC

Uptake of HPC for SMEs

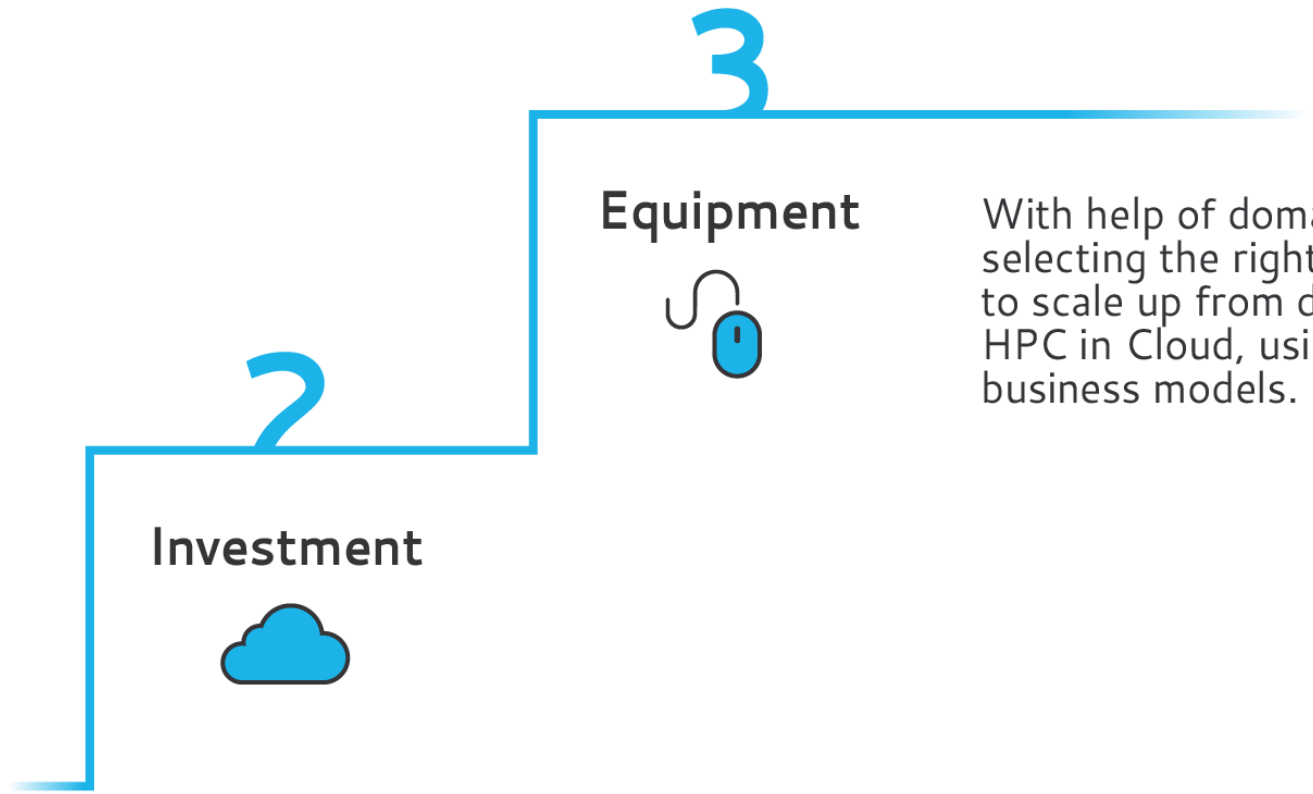


Uptake of HPC for SMEs



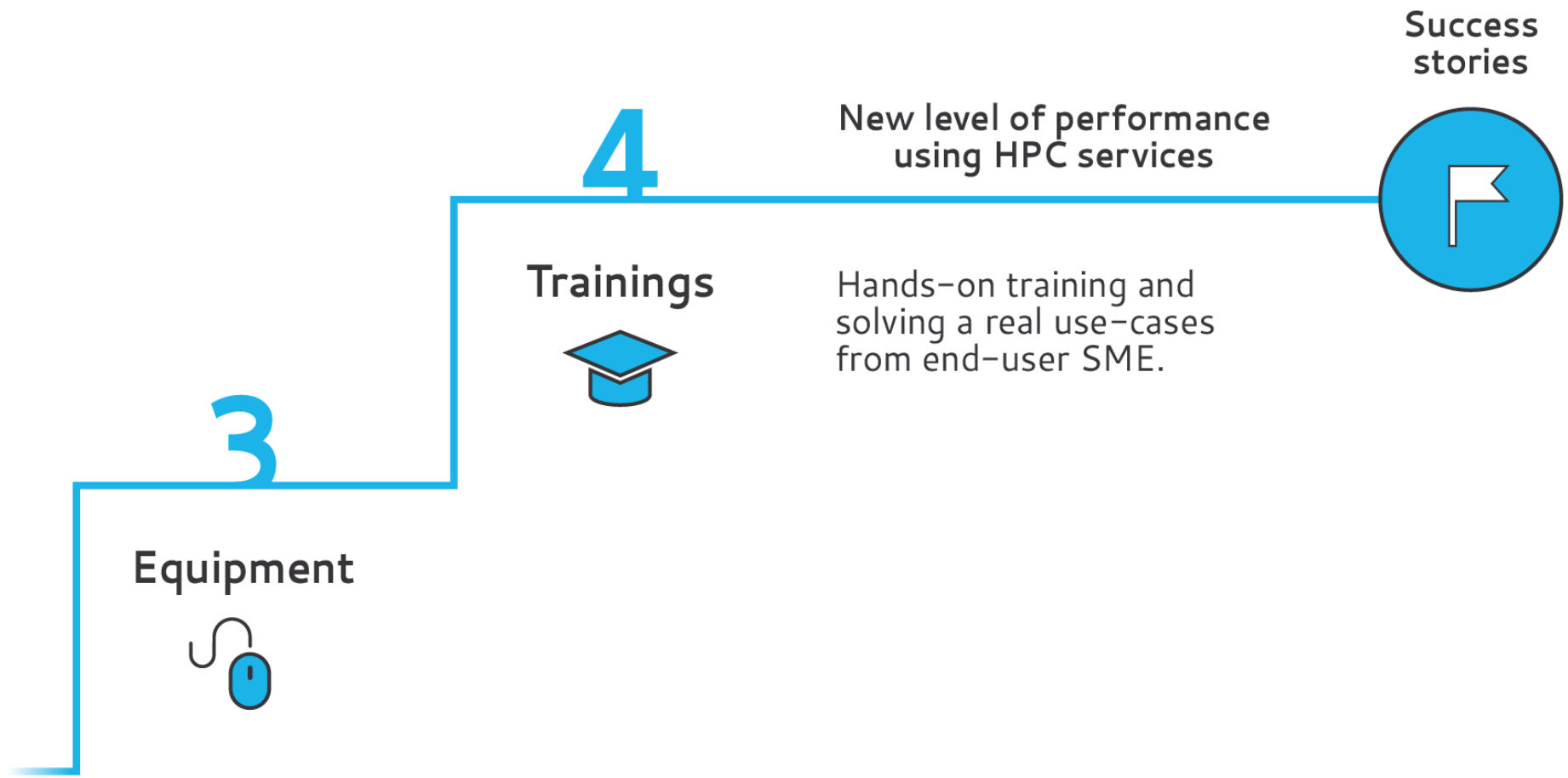
Encourage enterpreneurs to invest into HPC uptake by showing success stories presenting business plans, discovering innovations...

Uptake of HPC for SMEs



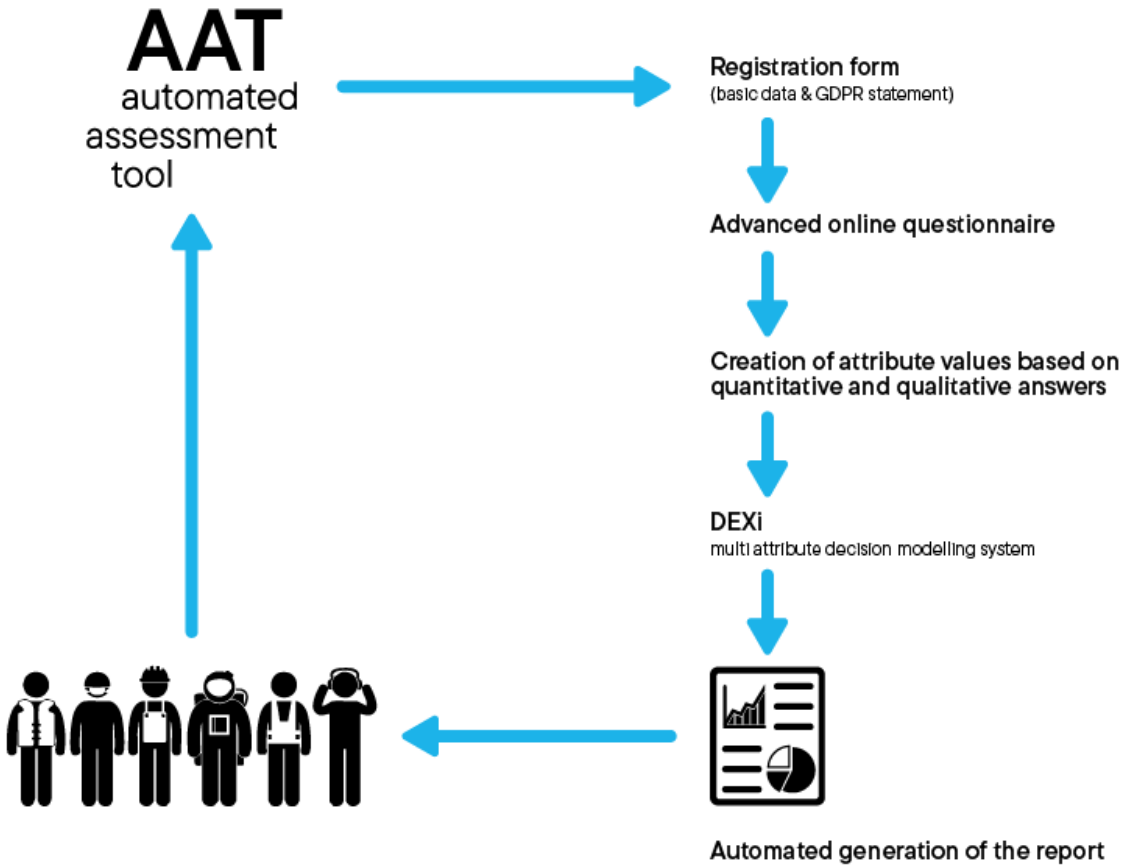
With help of domain experts selecting the right SW & HW to scale up from desktop to HPC in Cloud, using innovative business models.

Uptake of HPC for SMEs

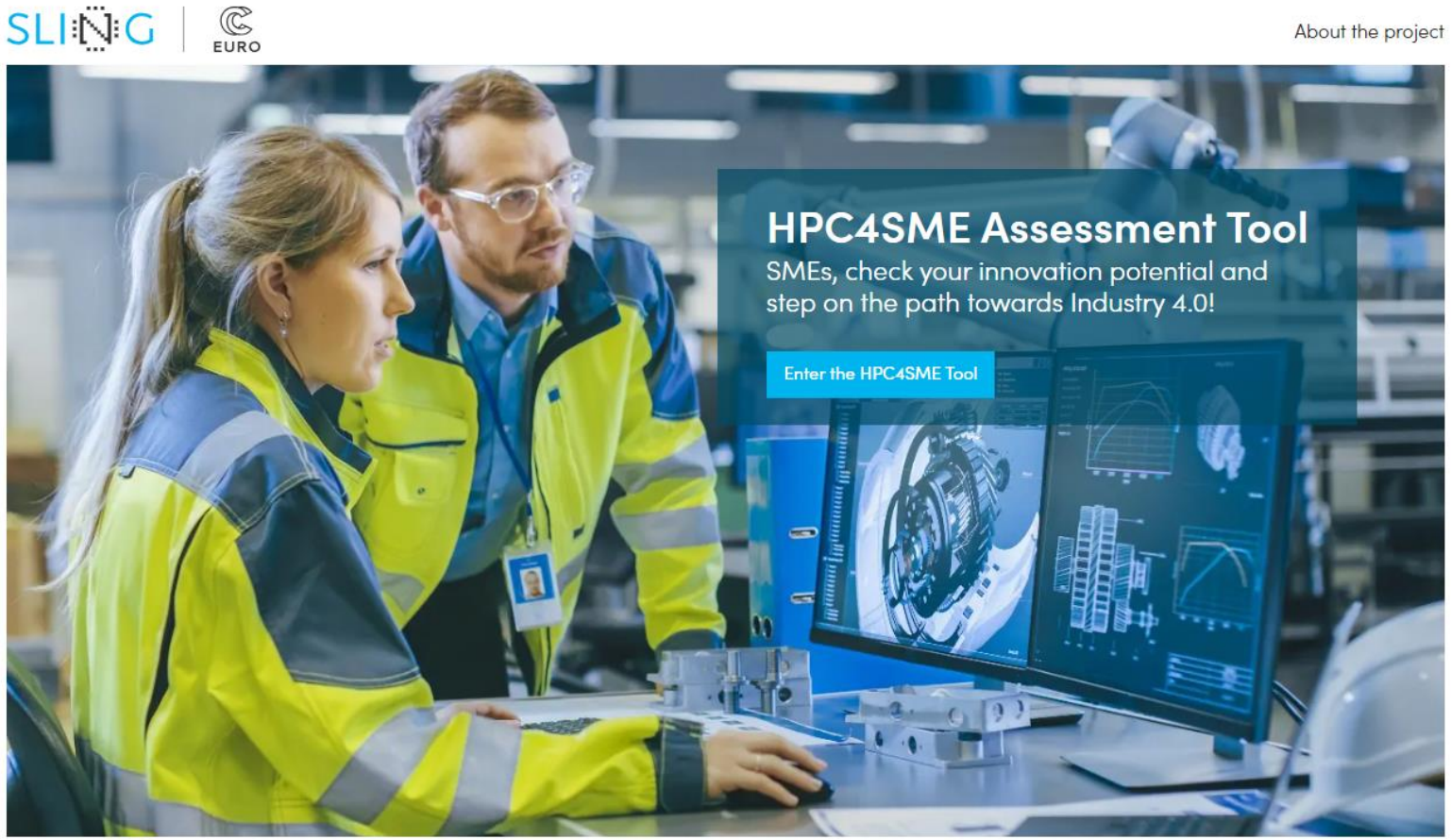


HPC4SME Automated Assessment Tool

- Fully automated assessment process for **large scale assessments**.
- **Personalized recommendations** for each respondent.
- **Multi-attribute decision modelling**.
- **Advanced analysis** of assessment results.



How to start your HPC4SME AAT Journey?



1. Register
2. Choose the nearest NCC from the list
3. Fill in the questionnaire & submit it.
4. Receive the report on your email.
5. Get in touch with your NCC & get free support!

https://hpc4sme.eu/

Detailed questions for Readiness / Cloud / HPC. Pause at any time & get help from your NCC expert. Submit the questionnaire & receive the report.

Readiness/Internal capacity

B3.2 Knowledge

A. What is your current level of general HPC environment knowledge?

	Current status
We have limited knowledge of HPC, and our familiarity with concepts such as cloud computing and computer clusters is mostly limited to general media.	○
We have basic knowledge of HPC environments, and we understand the difference between cloud computing and HPC.	○
We have very good knowledge of HPC environments, and understand terms such as compute nodes, schedulers, MPI, OpenMP and cloud computing.	○

HPC/Computing Demands

D1.2 Demands

A. Can you indicate the number of CPUs/cores your processing software needs to use in parallel?

	Current status
< 32 cores / don't know	○
32 - 256 cores	○
256 - 2048 cores	○
> 2048 cores	○

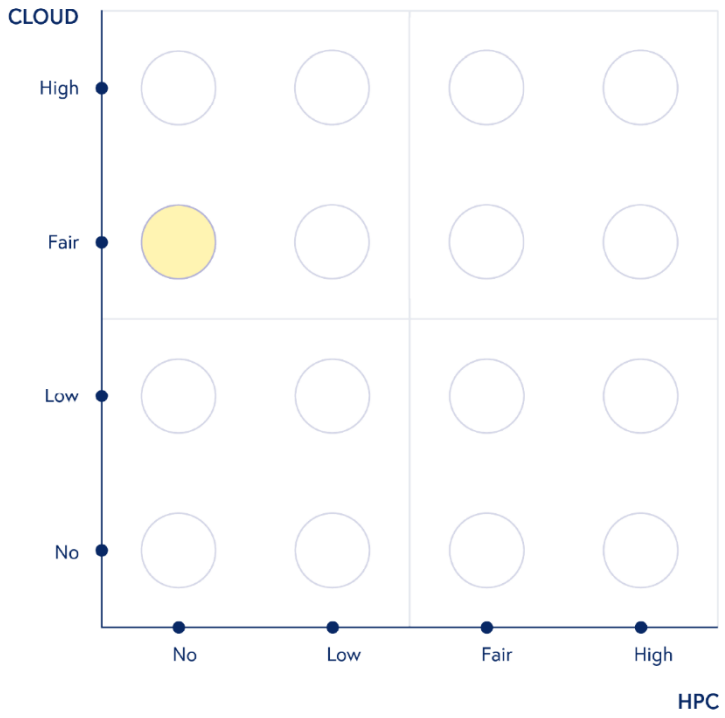
Cloud/Speed

C2.1 Timing

A. How significant would the network bandwidth be for transferring data to and from a remote site where your most computationally intensive HPC job is being performed?

	Current status
Heavy data transfer is likely during, before or after the HPC job. Only an internet connection above 500 Mb/s bandwidth is enough.	○
Uploading or downloading large amounts of input/output data happens before or after the HPC job or not a lot of data movement is needed during the HPC job. A typical internet connection in the range of 100 - 500 Mb/s bandwidth is enough.	○
The HPC job is primarily compute-heavy and data transfer is not a limiting problem. A typical internet connection in the range of up to 100 Mb/s bandwidth is enough.	○

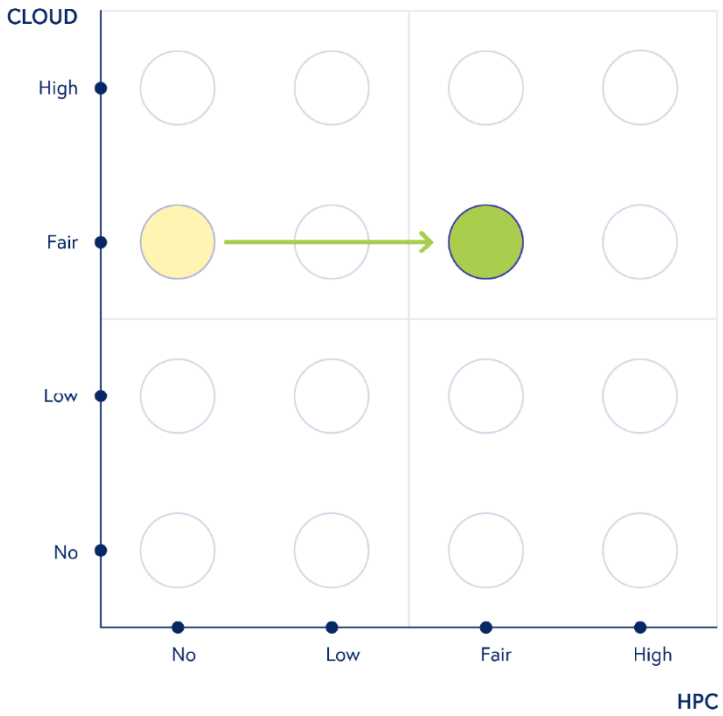
HPC4SME Automated Assessment Tool



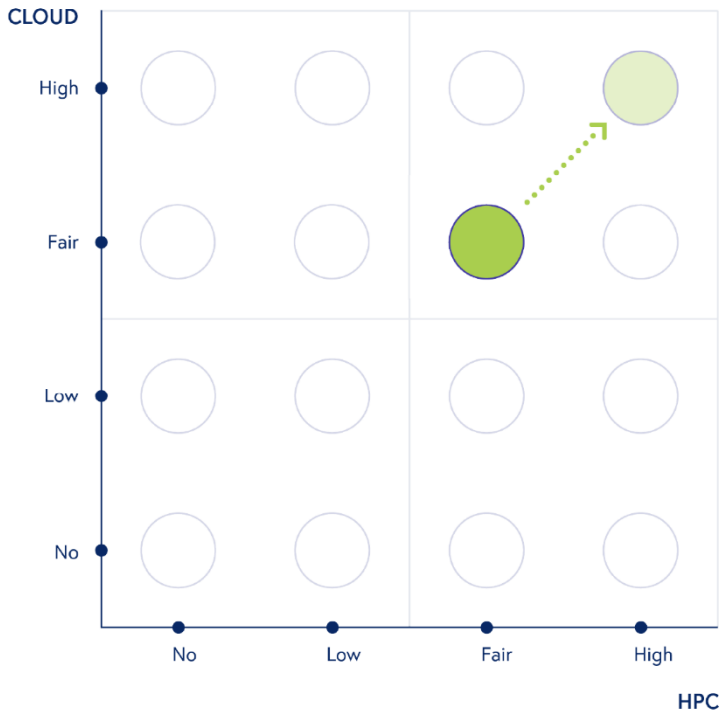
Explanation of the HPC4SME AAT

Persimmon Chart

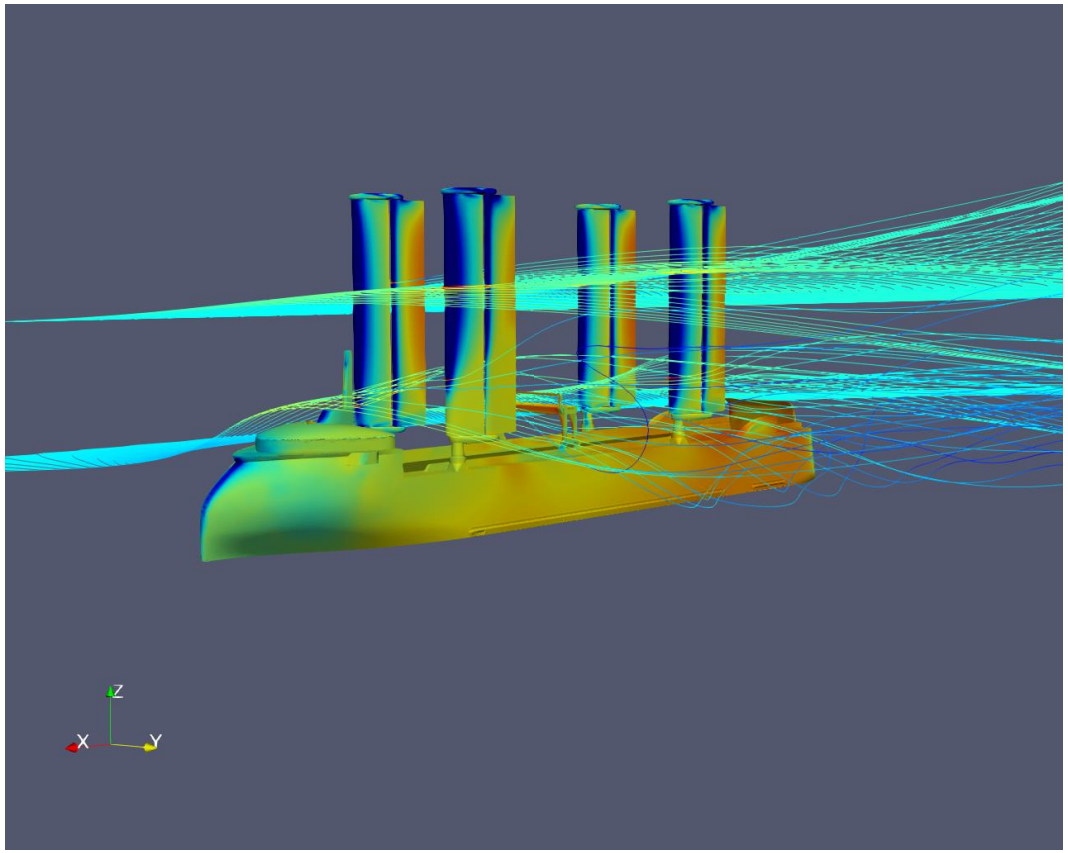
HPC4SME Automated Assessment Tool



HPC4SME Automated Assessment Tool



FORTISSIMO



Copyrights: FF4EuroHPC

Fortissimo Decade

- FFplus is a successor to previous Fortissimo projects (Fortissimo, Fortissimo-2, FF4EuroHPC; 2013-2023).
- Within the Fortissimo projects (2013-2024) **121 success stories were produced in collaboration with 310 partners from over 20 European countries.**
- **72,8 mio EUR (FF: 21,7 mio, FF-2: 11,1 mio, FF4EuroHPC: 10 mio, FFplus: 30 mio)**
- **Success stories from various industrial sectors demonstrate** clear business benefits and impacts of adopting HPC in business models.

Driving SME and Startup Innovation by Unleasing the Potential of HPC and Generative AI

- Call: DIGITAL-EUROHPC-JU-2023-SME-01
- Commenced 1.5.2024; 48 months duration
- Grant amount: 29.99 M€
- Coordinator

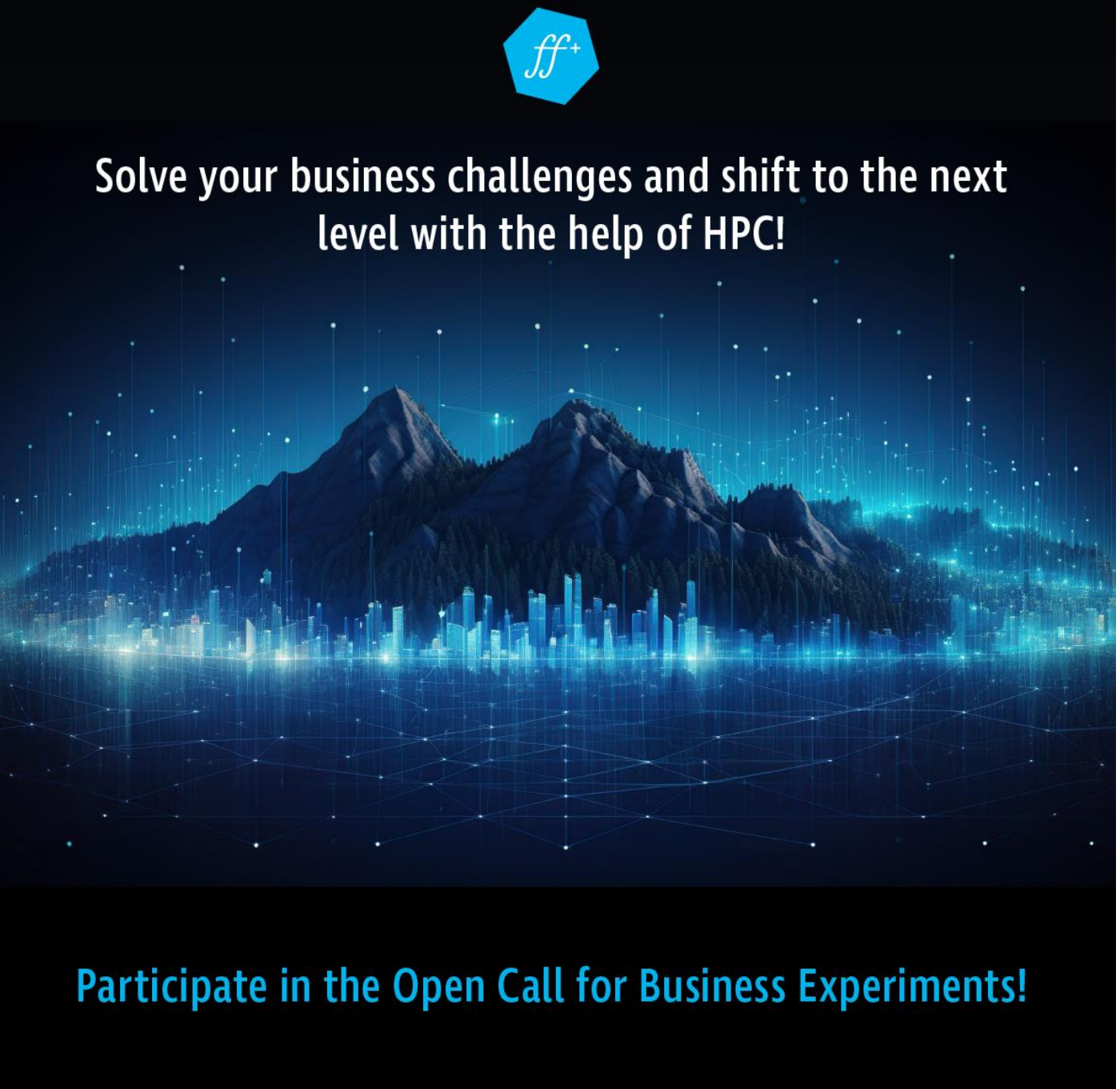
- Other Partners

FFplus Objectives

Empower SMEs and Start-Ups with advanced computational capabilities based on HPC, enabling them to **drive innovation**, enhance competitiveness, and overcome challenges in the digitalisation of R&D and business processes.

FFplus will **execute 6 open calls**

(3 for business experiments,
3 for innovation studies) **with a funding budget of over 24 M€.**



Business experiments

will address the uptake of HPC by SMEs new to using HPC to solve specific business challenges

OC-2 for Business Experiments addressing the uptake of HPC by SMEs

- Deadline: 4 July – 26 August 2025, 17:00 Brussels local time
- Expected duration of business experiments: 15 months, start January 2026
- The indicative total funding budget for all business experiments funded under this call is € 4M.
- The maximum funding for business experiment **is 200 K€.**
- Proposals to address uptake of HPC by SMEs in order to **solve specific business challenges of SMEs** that have had no prior use of, or experience with, HPC services

Innovation studies

will support European SMEs and Start-ups already active in the field of generative AI technology, which lack the necessary computational resources to scale up.

OC-2 call for Innovation Studies for the development of generative AI models

- Deadline: **Q3 2025**
- Expected duration of innovation studies: 10 months
- The indicative total funding budget for all innovation studies funded under this call is € 4M.
- The maximum funding for an innovation study **is 300 K€.**
- Address the needs of SMEs and Start-ups **proficient in generative AI** and HPC for large-to extreme-scale computing resources → and strengthen European SMEs in the area of generative AI.

OPEN CALL-1 STATS

TYPE 1 (HPC)

The Business Experiments Call attracted **126 proposals from 30 countries**, involving 183 SMEs and 40 other organizations.

19 business experiments are funded including participants **from 15 EU countries.**

TYPE 2 (LLM)

The Innovation Studies Call attracted **62 proposals from 24 countries**, involving 83 SMEs and 36 other organizations.

18 innovation studies are funded, including participants from **14 European countries.**

Aeronautics: Pipistrel

HPC-Cloud-based simulation of light-aircraft aerodynamics

- Pipistrel has grown from an enthusiastic hobby hang-glider garage manufacturer into a world-renowned **small aircraft producer**, recognized by leading global aviation authorities.
- With its revolutionary ideas, Pipistrel introduced composites to microlight and light sport aircraft, achieved first ever electric flight of a two- and four-seater, won all **3 NASA Green flight** challenges and won the hearts of passionate aviators on all continents.

- Simulation speedup from **20-30 days to 2-3 days**
- **Much faster design cycle**
- **10x cheaper and 10x faster**

End User: PIPISTREL
HPC Expert: XLAB
HPC Provider: ARCTUR

Manufacturing: Optibike

Robust Lightweight Composite Bicycle design and optimization

- A **user-friendly service** was developed and deployed on HPC to optimize the configuration of the layers of a composite material part, returning, in a reasonable timeframe, the best performing orientation of the layers, and also **analyses the robustness** of the optimal design
- Reduction of **80%** in the time to design and optimize a bicycle that can currently take up to **8 months**
- Reduced number of physical prototypes by **75%**
- **€45,000 saved by the end-user per bike frame model**

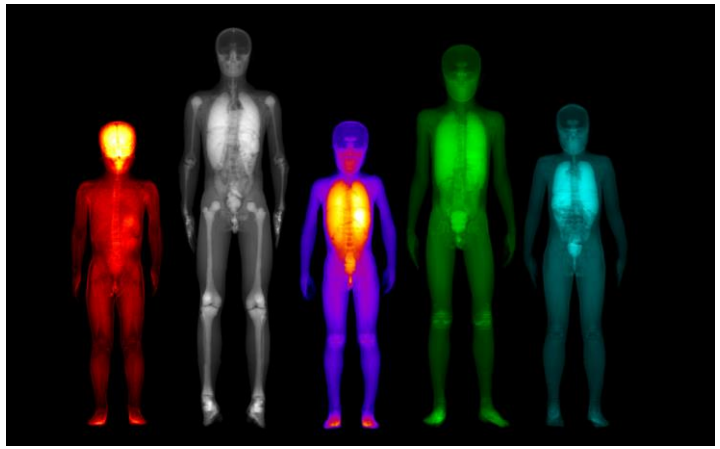
End User: IDEC
HPC Expert: NOESIS & UNITO
HPC Provider: ARCTUR

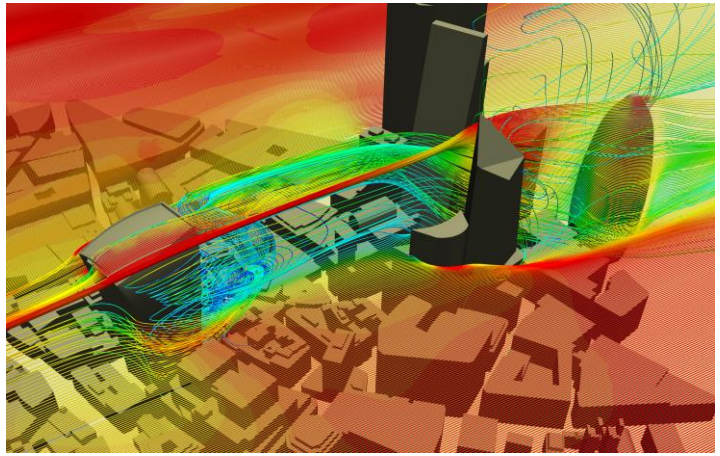
Energy: Zyba

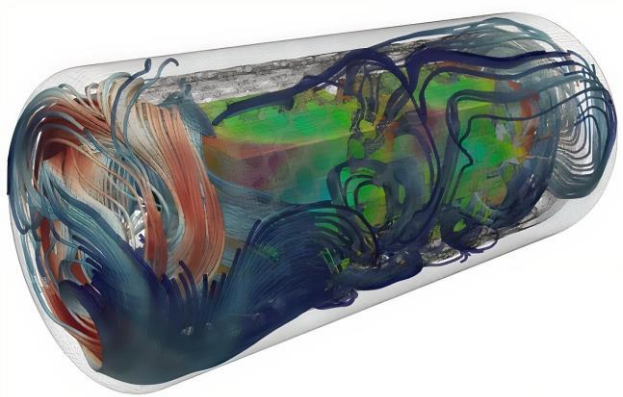
Cloud-based optimisation of a multi-body wave energy device

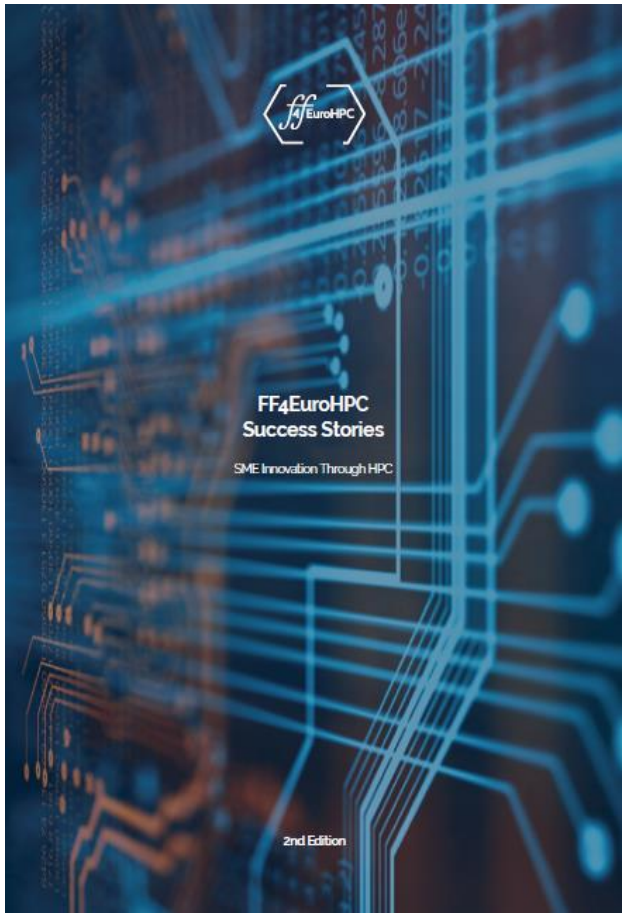
- CCell moves with the waves to simultaneously extract their energy and reduce their impact on the beach while generating electricity.
- An easy-to-use **GUI was developed which allows simulations to be set up quickly**, with a series of scripts/tools written to streamline the workflow on the HPC system.
  - Reduced simulation set-up time **from 2 hours to less than 1 minute**
  - Reduced HPC costs from **0,09€/core-hour to 0,05€/core-hour**
  - Ability to concurrently run simulations improved productivity **by a factor of 7**

End User: ZYBA
HPC Expert & Provider: ARCTUR









Success Stories

GET INSPIRED!

- Website presentation
- Videos
- Success Stories Booklets

Information & inspiration

- Project website

www.ffplus-project.eu

- LinkedIn, YouTube

@ffplusproject

- Newsletter

EuroHPC Joint Undertaking

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The JU receives support from the Digital Europe Programme.

Thank you!

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EuroHPC Joint Undertaking

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA VISOKO ŠOLSTVO, ZNANOST IN INOVACIJE

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