# *HPC as a Service for SMEs*

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# Arctur

Arctur-2 *The Hyperconverged Supercomputer*

*Arctur HQ*

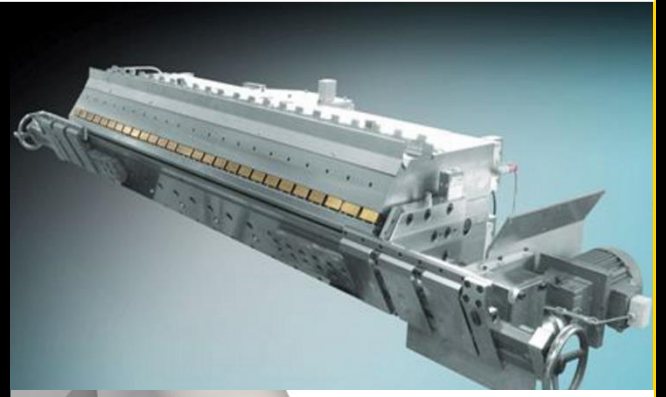
**Arctur** is the leading comercial service provider of supercomputing services in CE Europe. Following the XaaS model, we lease the supercomputer along with the services of system administration, optimizing codes or parallelization, so our customers enjoy the benefits without obtaining their own equipment.

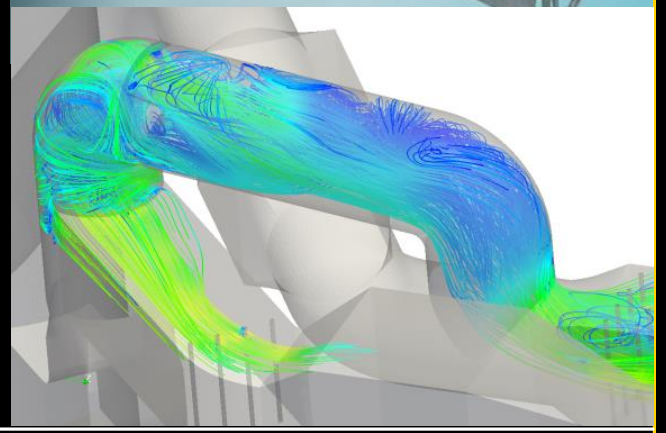
We have a strong focus on R&D and on new technologies and approaches supported by HPC and Cloud technologies and a great network of business and research partners all over the world.

***Arctur - where creativity meets experience!***

# EMO & DHCAE

*EMO*





*DHCAE Tools*

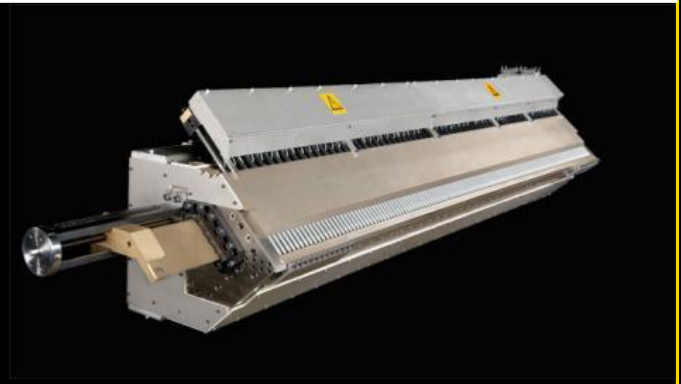
**EMO** Extrusion Molding G.m.b.H (AT) specializes in designing and producing high precision molds for pressure forming of plastics.

Molds upt to 10+ metres long and 15+ tons. Trasport costs from factory to customer can be up to 100k€

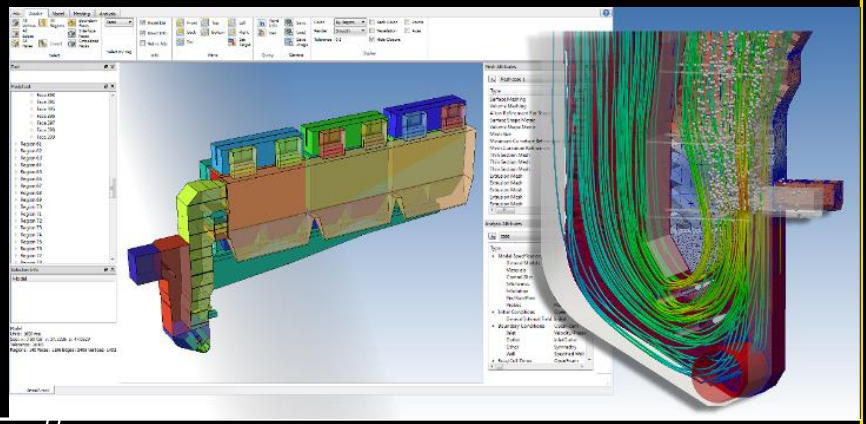
**DHCAE Tools** G.m.b.H. (DE) is a consulting company specializing in CFD and FEM consulting services with OpenSource solution. Developers of propretary custom modules and plugins. Main tools used are OpenFoam and Calculix

# EMO & DHCAE

## usecase



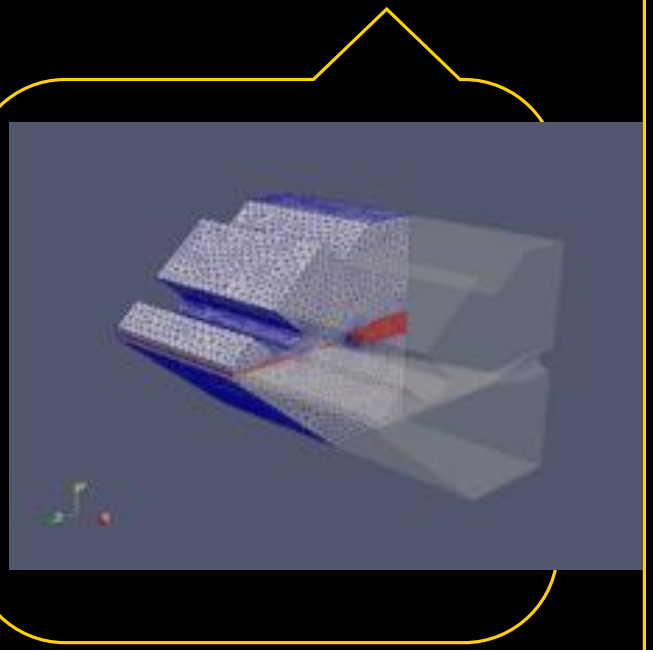
Once constructed the mold must be tested in production. During testing the mold is customized and tweaked to achieve optimal performance. This is a time consuming and expensive procedure. Optimization costs can reach up to 400k€ (depending on material and size of the mold).



## Challenge

The simulation of such mold is a multi-physics and multi-parameter case. Three different parameters are simulated for each time step. The results of this data needs to be then considered in the next time step. The complexity increases with increasing the detail of the simulation.

# *solution and results*

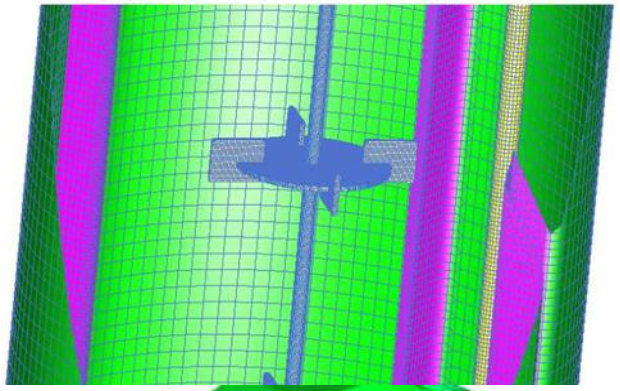


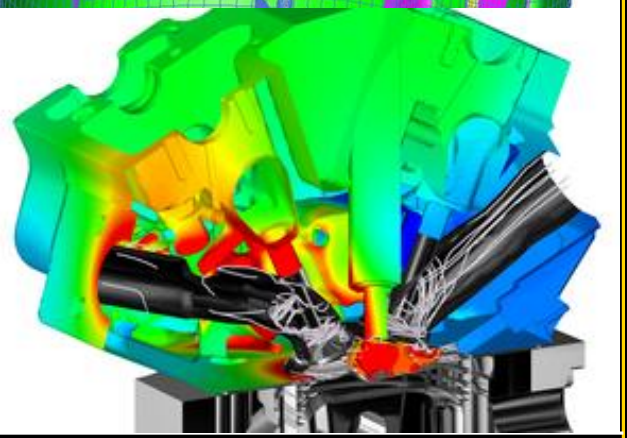
DHCAE prepared a custom solution that simultaneously and interdependently simulates CFD and FEM for a mold.

EMO expects up to 12 recalls less per year due to better input data before producing the mold. The expected savings in costs are in excess of 1MIO€/year. One simulation costs on average 7.000€ to run.

# SES-Tec & AVL

SES-Tec





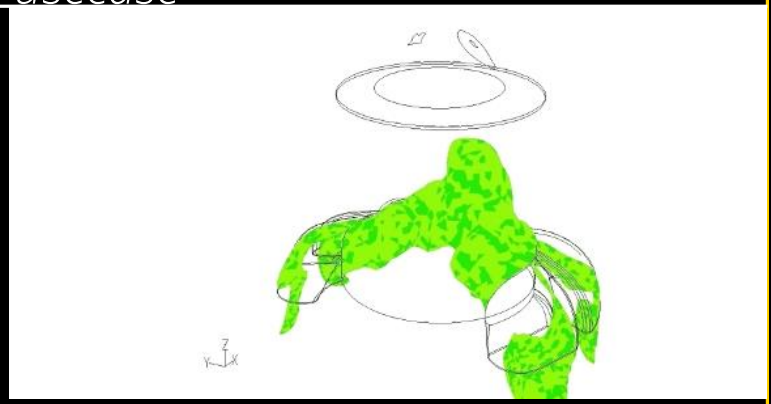
AVL

**SES-Tec** OG (AT) is a consulting company in the field of CFD. They regularly use different OpenSource and licensed CFD solutions. Their goal is to offer to their customers a turnkey solution: they are tipically involved in the full R&D procedure.

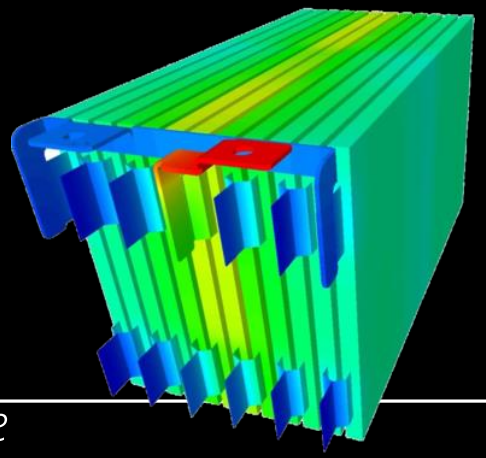
**AVL LIST** G.m.b.H. (AT) is a large independent software provider. Thier main area of expertise is transportation and automotive such as internal combustion engine simulation, drivetrain, electric mobility….

# SES-Tec & AVL

*usecase*



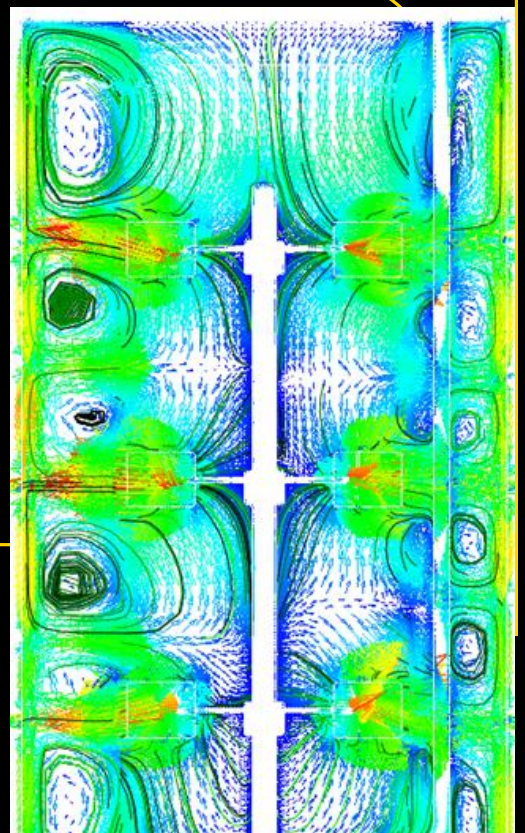
Aerated bio-reactors is one of the most widespread type of bio-reactor. They are used in the fields of vaccines, hormone production, protein, pharmaceuticals….



Typically only the number of new grown cells is being simulated (bio-informatics approach). With the addition of the simulation of oxygen injection, removing $CO_2$, impeller shape, temperature etc., the physical approach is also introduced in the simulation and in such way the all aspects of the bio-reactor are simulated.

*challenge*

# solution and results



SES-Tec developed and implemented it‘s own solution in the Cloud. The semi-automated solution can simulate a large number of variations of mixers.

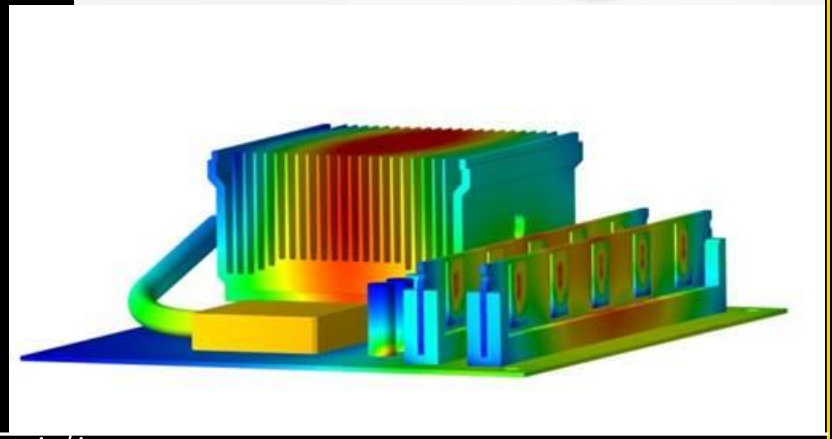
An increase in sales of 20-50k€ per year and 15%of turnover is expected from the increase of consulting services alone.

AVL is looking into the pay-per-use licensing model across the whole line of their SW solutions. Current data shows that an increase of 5% increasee in the sales of licenses can be expected (=150k€/year)

# BOGE & Capvidia

BOGE


**BOGE KOMPRESSOREN Otto Boge GmbH & Co. KG** (DE) is a mid-cap (cca 850 employees), dealing exclusively with development and production of air compressors.

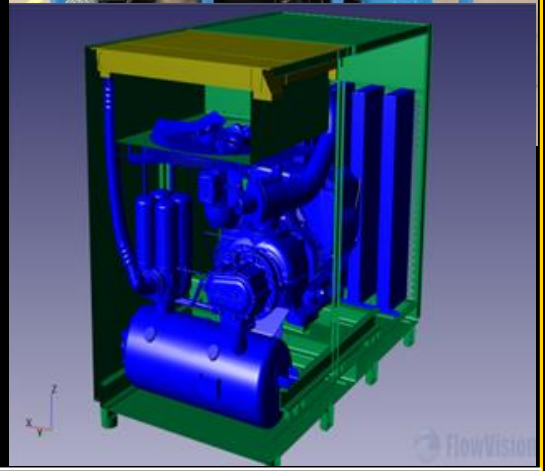


**Capvidia b.V.** (B) is a producer of software solutions for CFD, CAD translation, reverse engineering and MBD. Their HQ is in Belgium with branches in USA, Spain, Germany an Russia.

Capvidia

# BOGE & Capvidia

*Usecase*



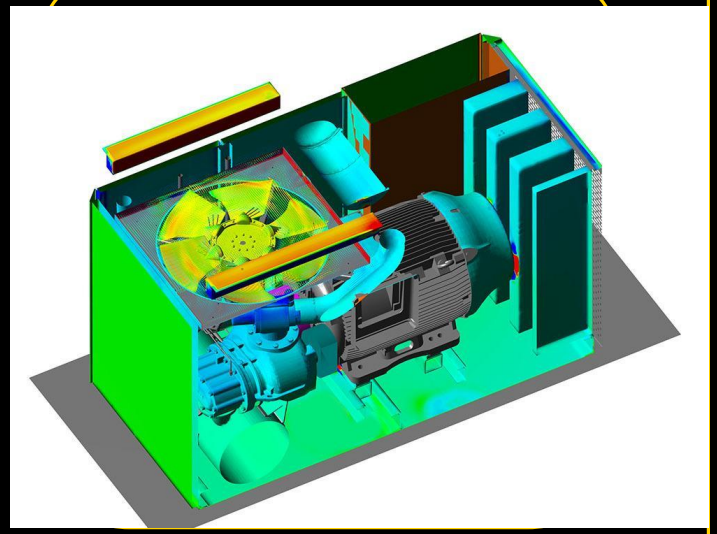
Noise and energy consumption are two of the key factors in the development of new compressor stations. The aim of the simulations is to minimize the energy consumption, optimize noise emissions all while trying to retain the efficiency of the compressor.

*challenge*

The simulation focused on optimizing the compressor.
The parameters that were analyzed were:

- shape of the enclosure
- fan shape
- production time of the compressor station
- reduction of development costs and running costs

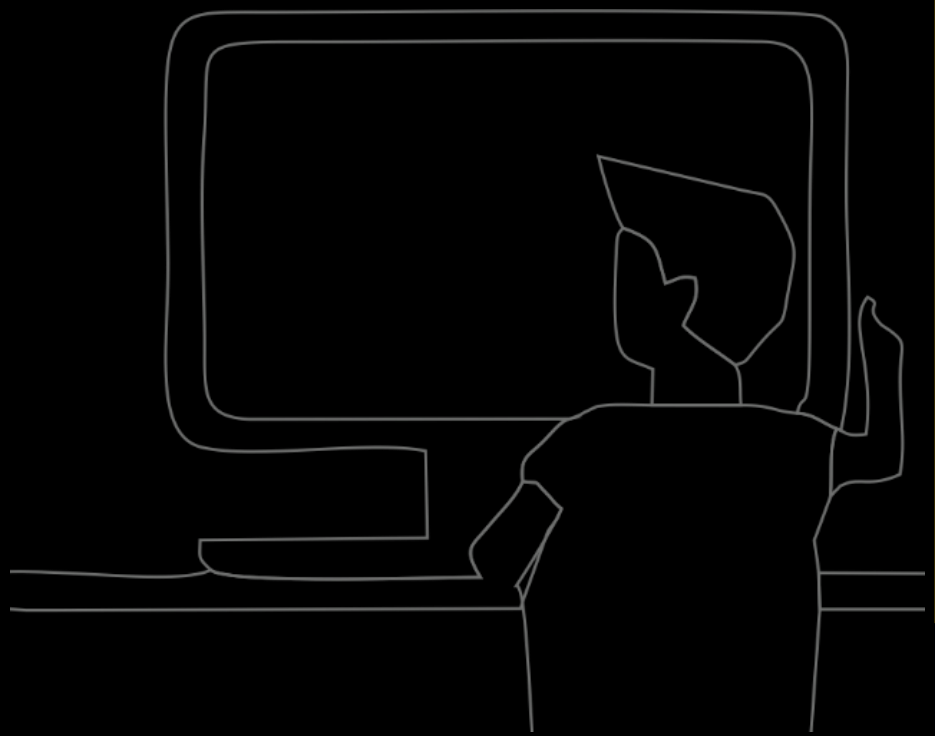
# solution and results



Capvidia adapted their solver to the compressor use case and prepared a full simulation for BOGE. The results achieved were:

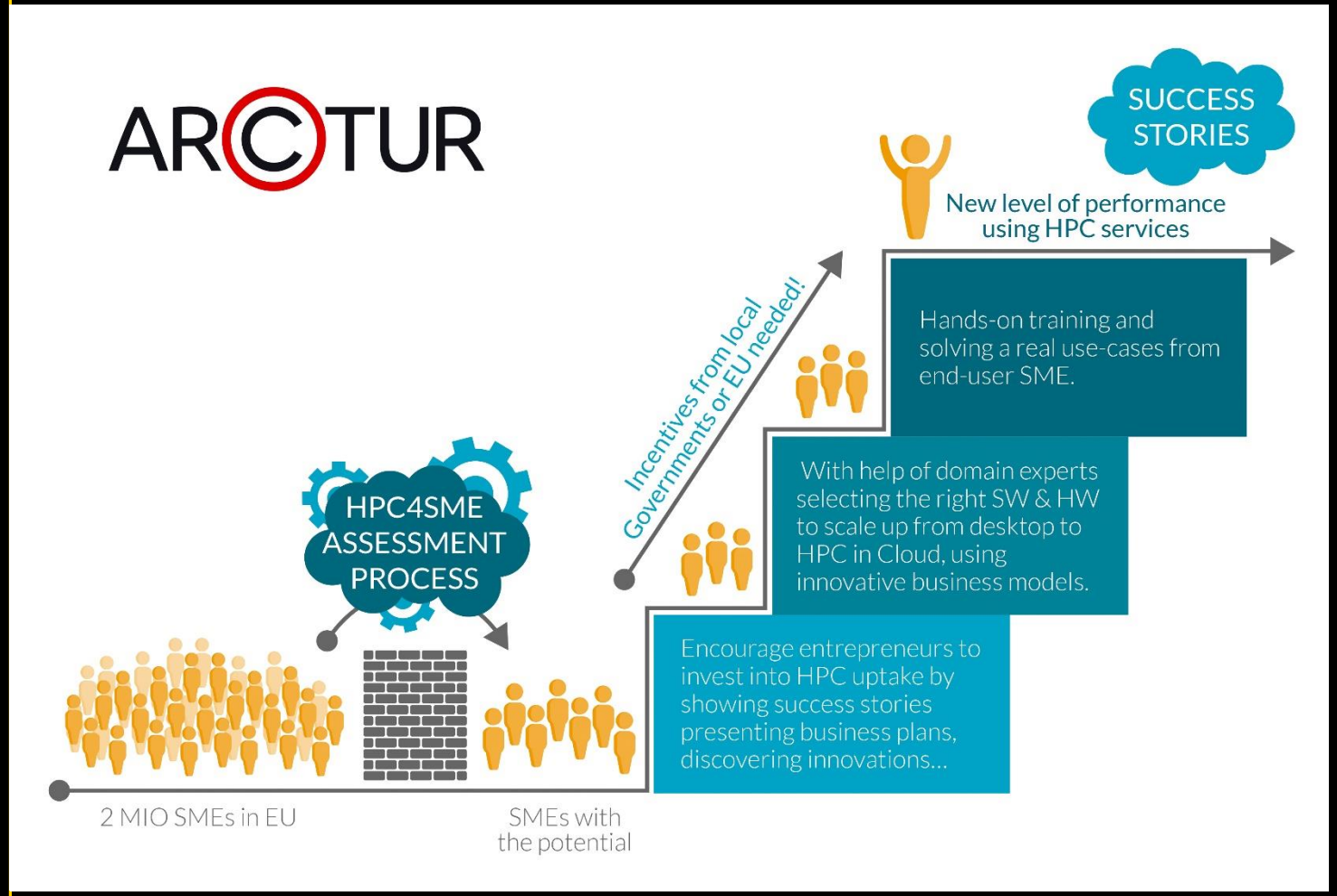
- reduction of energy consumption (-30%)
- reduction of fan noise (before 82,1dB, after 75dB)
- reduction of all-around noise (-0,9dB = 15%)
- less energy consumption = savings for customer
- market advantage for BOGE

# lessons learned



- HPC is applicable in all fields of engineering
- cooperation of different experts (!!!)
- time of adoption can be considerable long
  - importance of free trials
- obvious long-term benefits
- adequate SW solution is imperative
- SW licensing models will have to adapt to the options that the HW already provides („pay-as-you-go“)

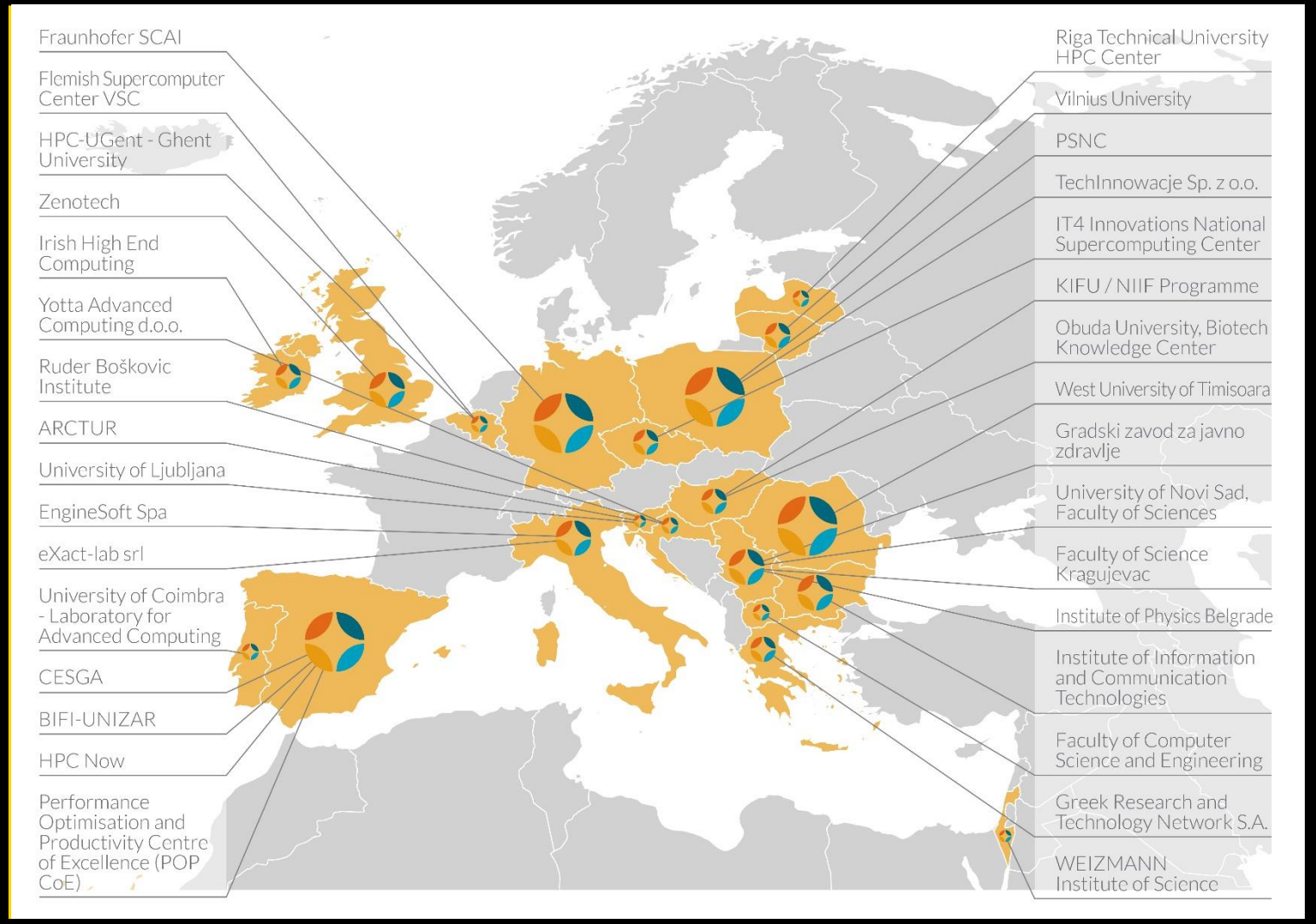
# HPC 4 SMEs Assessment Process



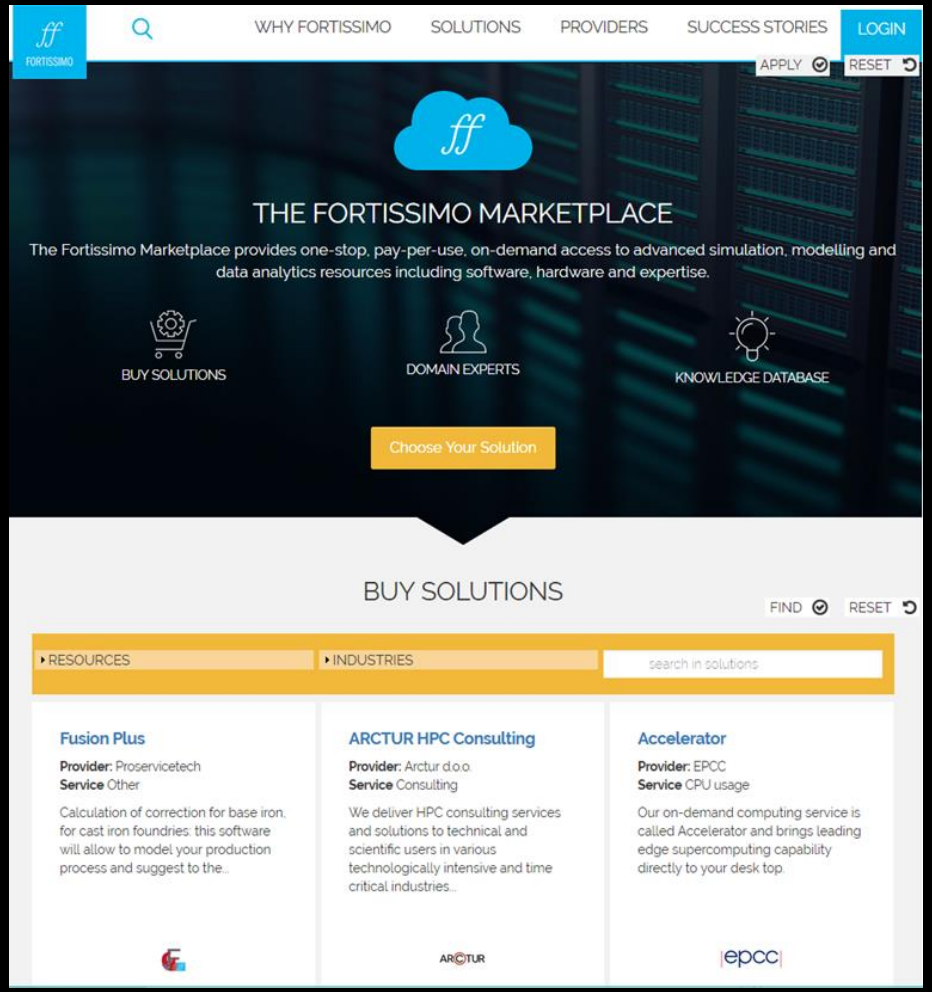
# SesameNET

SIGN UP!!

http://
network.sesamenet.eu



# Fortissimo




## The Fortissimo Marketplace

Advanced Simulation, Modelling & Data Analytics for Industry

The Fortissimo Marketplace provides one-stop, pay-per-use, on-demand access to advanced simulation, modelling and data analytics resources including software, hardware and expertise. The Marketplace helps to find novel solutions to your challenges, discover new opportunities and brings together all necessary actors to construct the exact solution that meets your business requirements.

100% European!

# *Thank you for your attention!*

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