

Approaches for accelerating HPC impact in industry

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Outlines

Key players driving HPC impact for industry

LUMI and collaboration models for industry

Examples of HPC impact for industry

OUR PURPOSE

We bring together people,
business, science and technology,
**TO SOLVE THE WORLD'S
BIGGEST CHALLENGES,**
creating sustainable growth,
jobs and wellbeing.



Non-Profit
Special purpose
Organization



Turnover 2021

56,4 M€



Owned by the
Finnish state (70%)
Finnish higher
education
institutions (30%)



**Provides IT support and modeling,
computing and information services
for academia, research institutes and
companies in Finland**



566

Employees
(1.9.2022)

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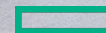
LUMI and collaboration models for industry

Examples of HPC impact for industry

Large Unified Modern Infrastructure (LUMI)

LUMI is a HPE Cray EX Supercomputer

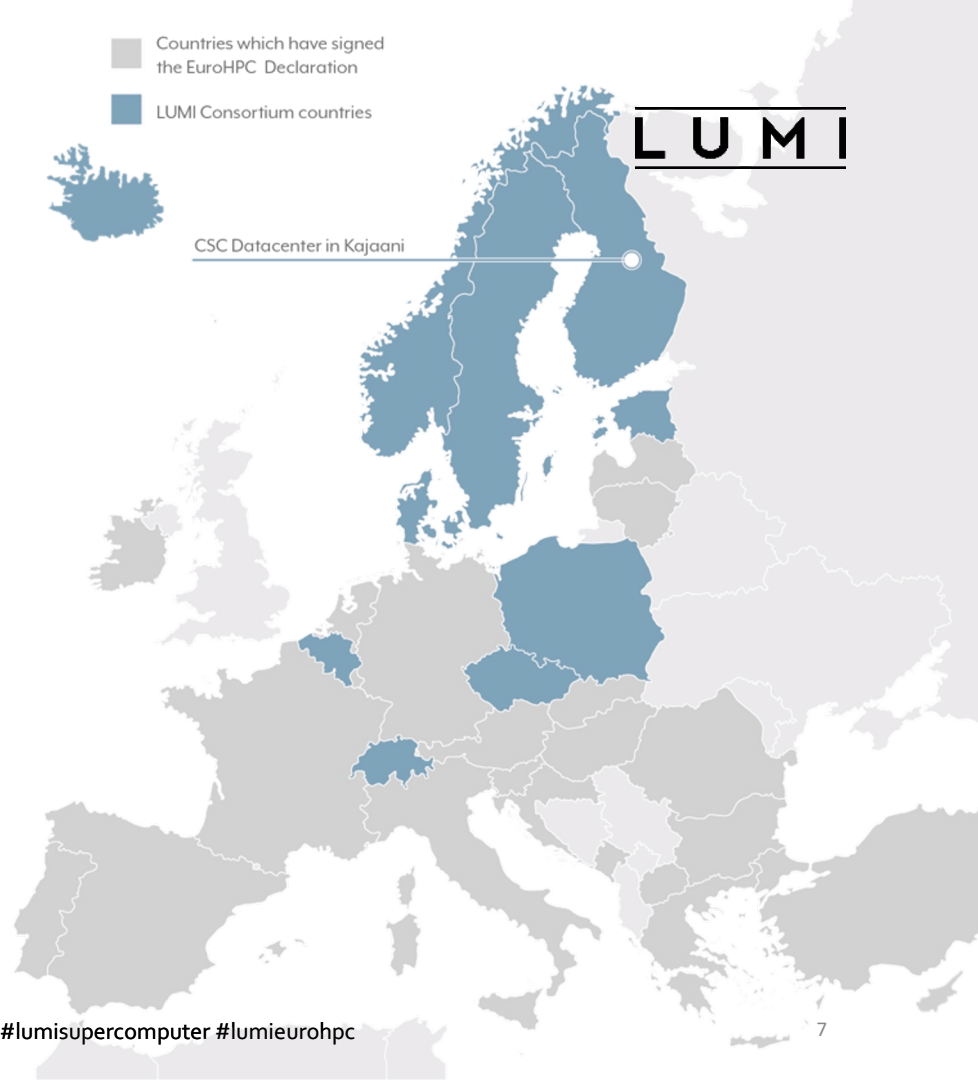
L U M I



Hewlett Packard
Enterprise

LUMI-consortia

- **First time a centralized model for HPC collaboration over countries**
- LUMI-research infrastructure offers high quality, cost effective and sustainable HPC-environment for **European collaboration**
- **LUMI-consortia:** Finland, Belgium, Czech Republic, Denmark, Estonia, Iceland, Norway, Poland, Sweden, and Switzerland





UP TO 20%

OF LUMI's CAPACITY
IS RESERVED FOR
INDUSTRY AND SMEs



EuroHPC
Joint Undertaking



The acquisition and operation of the EuroHPC supercomputer is funded jointly by the EuroHPC Joint Undertaking, through the European Union's Connecting Europe Facility and the Horizon 2020 research and innovation programme, as well as the Participating States FI, BE, CH, CZ, DK, EE, IS, NO, PL, SE.




Leverage from
the EU
2014–2020



Key success factor is to help industry to find right challenges where HPC can add value.

It is also important to ensure that company has capabilities or support to use HPC competences.

Collaboration models for industry users (at the moment)

PRIVATE-PUBLIC ENGAGEMENT	PAY PER USE	BUSINESS FINLAND FUNDING
<ul style="list-style-type: none">• A project in collaboration with University or Research organization (academy partner)• Project manager comes from academy partner• Free of charge, if results are published	<ul style="list-style-type: none">• National LUMI-capacity: A company pays market price to CSC• EuroHPC JU's capacity: A company pays market price to JU.<ul style="list-style-type: none">• SMEs can get funding through PRACE SHAPE- and EuroHPC JU -programs <div></div>	<ul style="list-style-type: none">• Start up –and small enterprises can apply HPC-grant 20 000-80 000€ Can be added also to ongoing projects.• Large and midsize enterprises can include HPC capacity to their R&D projects budgets (with 40% own funding demand)• Capacity is market priced <div></div>

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LUMI

Development of own toolsets and collaboration that is carried nationally/locally with FCAI (AI expertise) and CSC (hardware)

Full coverage for specific materials and manufacturing processes

Computational materials research and directly associated activities @ VTT

High-throughput and high-performance systems

Integrated Computational Materials Engineering

Multiscale materials modeling

Primarily microstructural, meso-scopic, atomistic

Materials Acceleration Platform Artificial Intelligence

Three materials modeling research groups:
1) ICME, 2) soft materials, 3) data sciences and AI;
roughly ~45+ staff researchers

Autonomous systems

Especially i) powder based materials, ii) engineered biomaterials and iii) energy storage and/or electrochemistry

Material Synthesis

Collaboration with in-house groups to integrate synthesis capabilities: powders, films/coatings, composites, alloys, soft materials

In-situ, operando and small scale characterization

SEM/TEM scale characterization the focal area

VTT ProperTune® HPC & HTC use cases

Use case type: Optimize a material solution (microstructure)

CATERPILLAR

- Optimization of protective coatings



Outcome: coating solution performance improvement 40%

Use case type: New steel grade design


ArcelorMittal

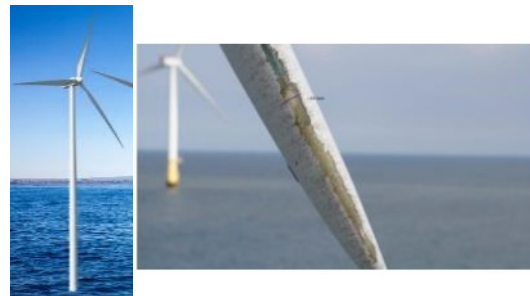
- Discovery and design of new steel grades



Outcome: New steel performance improved ~200-250%

Use case type: New material discovery and optimization

- New material to a persisting performance problem



Outcome: Lifetime improvement by an order of magnitude

Collaboration

LUMI

ABB

CLEANERGY



EATON

FORESHIP
AT THE SHARP END

innoluce

KONE

KONECRANES®

NOKIA



POSIVA

SKANVEIR

TRAFOTEK

VAISALA

VTI
TECHNOLOGIES

SHAPE
SME NPC Adoption Programme in Europe

DISIOR
Analytics



**BUSINESS
FINLAND**

GROKE

inscripta

Speechly