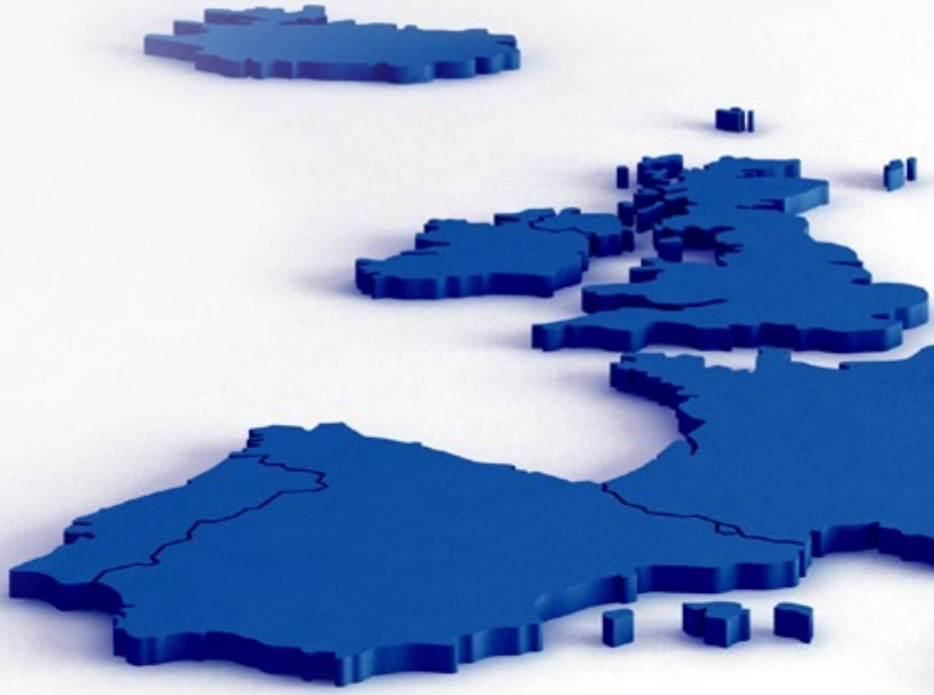
YOUR SUPERCOMPUTING PARTNER

TOGETHER, CREATING COMPETITIVE ADVANTAGES
WITH SUPERCOMPUTING

IMPROVE TIME TO MARKET

TACKLE LARGER PROBLEMS

SAVE COSTS



Proud members of

EuroHPC Joint Undertaking

EURO LUXEMBOURG

LuxProvide is **Luxembourg's one-stop-shop High Performance Computing Centre**, with missions to provide high performance computing capabilities, high-speed connectivity and advanced applications on a national, European and international scale, serving the public and private sectors.

LuxProvide offers tailor-made **HPC**, **HPDA** and **AI services** with the easiest onboarding and highest quality assistance, in a confidential, trusted and cybersecured environment.

Luxembourg is highly regarded as a **digital trust centre** in Europe and prides itself on its **excellent ICT infrastructure** in the field of connectivity and data centres. LuxProvide further supports the digital transition of the economy by facilitating the competitiveness and innovation of companies, with a particular focus on **SMEs and start-ups**.

Industry 5.0

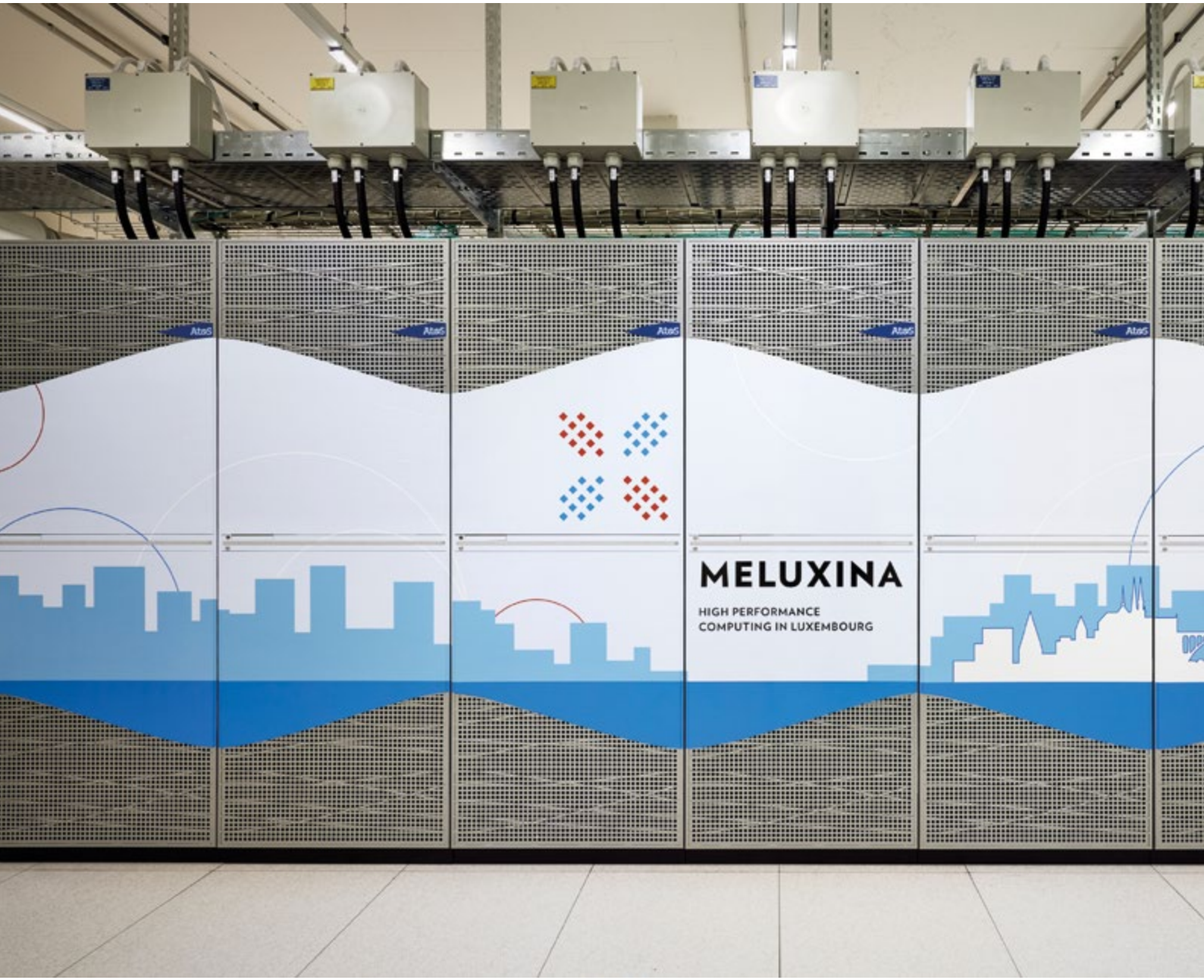
Ecotech
(circularity
smart mobility)

Healthtech

Logistics

Space

Financial
Services


MELUXINA
HIGH PERFORMANCE
COMPUTING IN LUXEMBOURG

Luxembourg's national supercomputer Meluxina

has been built to serve a large variety of complex, data-driven computational workloads. Its design is forward-looking, responding to the convergence of simulation, modeling, data analytics and artificial intelligence. This enables predictive analytics simulations.

90.000
HPC CPU Cores

5.120
Cloud vCPUs

800
GPU-AI accelerators

Infiniband HDR
200
Gb/s

20
Petabytes high performance storage

300+
Tailored software packages

MELUSINA'S LEGEND

The love story between a mermaid and Count Siegfried of Luxembourg is one of the country's founding legends.

In homage to this legend, LuxProvide's supercomputer was named MeluXina, as it is water cooled and also represents a founding brick in the Luxembourgish digital ecosystem.

Performance

Compute

18 FP64 PetaFlops

500 AI PetaFlops

Data

500+ GB/s Scratch storage

190+ GB/s Project storage

Interconnect

200 Gb/s on Cluster nodes

400 Gb/s on Accelerator and large memory nodes

In June 2021, the **MeluXina** accelerator module has been ranked **36th in the Top500** World ranking of supercomputers, **4th greenest in the world** and **greenest in the EU**.

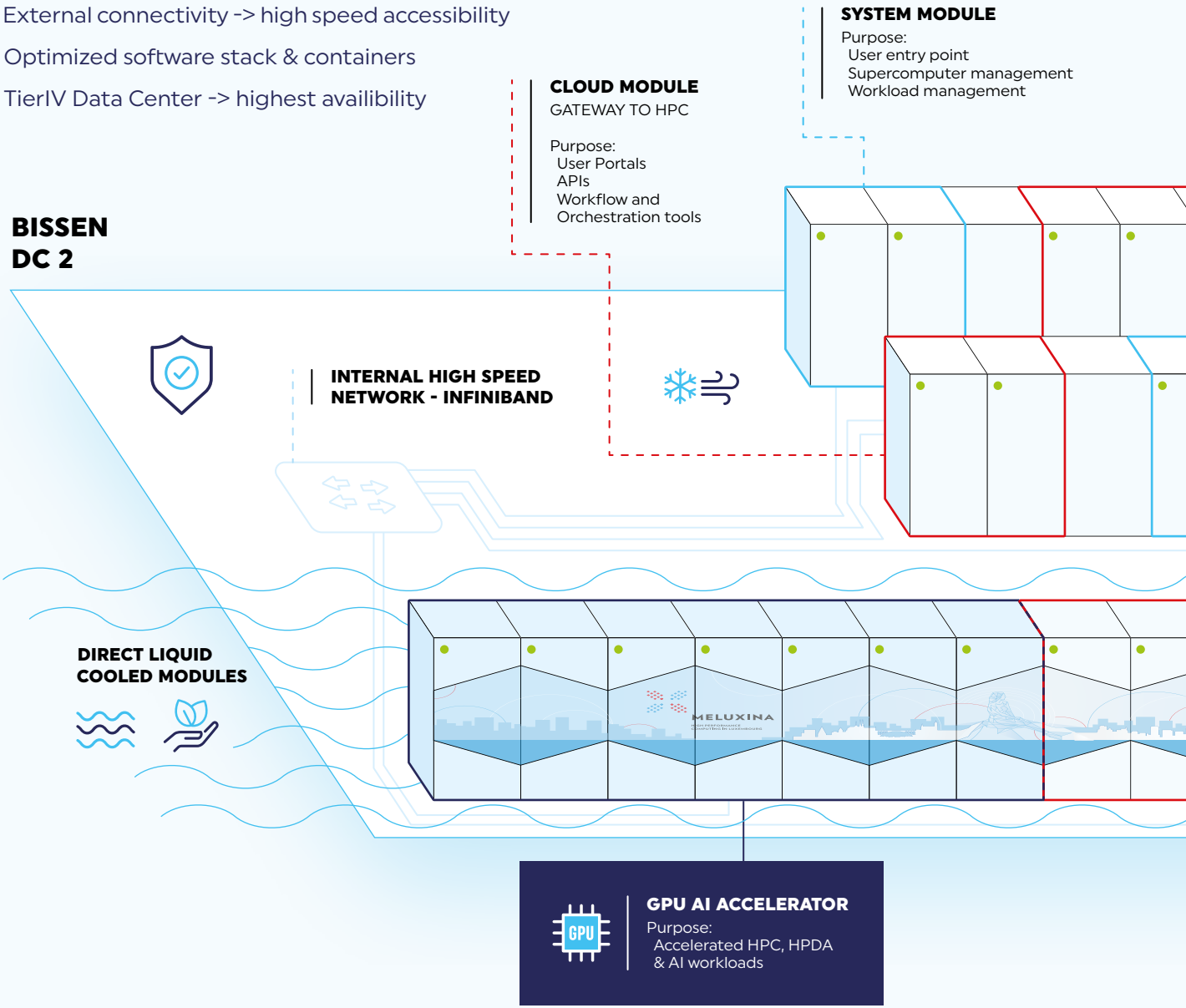
The acquisition and operation of the EuroHPC supercomputer is funded jointly by the EuroHPC Joint Undertaking, through the European Union's Connecting Europe Facility and the Horizon 2020 research and innovation programme, as well as the Grand Duché du Luxembourg.

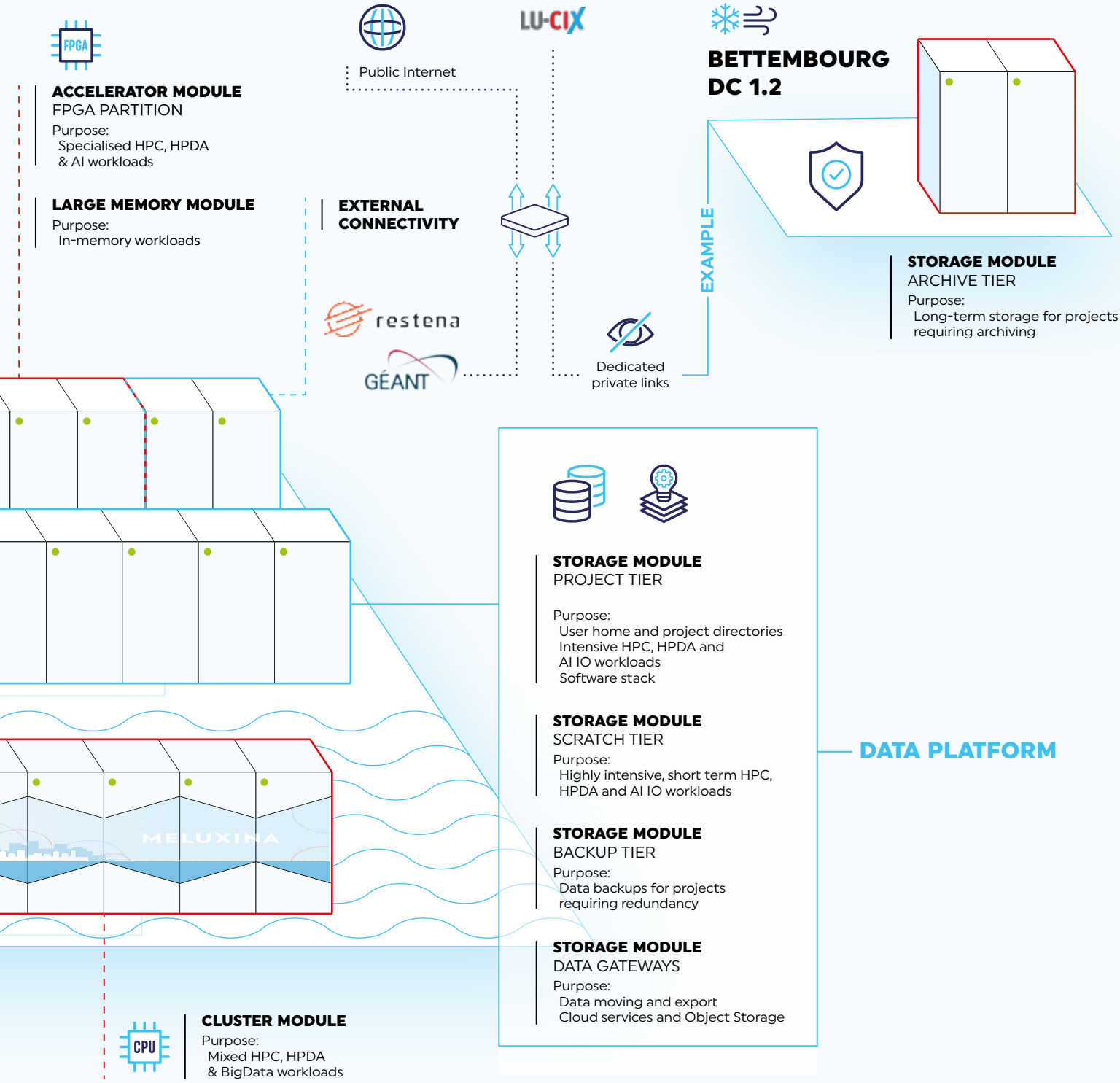
Supercomputing is an enabler and accelerator for driving true impact on society and economy. We have the ambition to be a pillar of the data-driven, sustainable circular economy for the decades to come, building the platforms and providing the knowledge needed for digitalisation and transformation.

Valentin Plugaru, CTO LuxProvide

MeluXina's Architecture

+ Modular design -> versatility
+ Liquid cooled -> efficiency
+ External connectivity -> high speed accessibility
+ Optimized software stack & containers
+ TierIV Data Center -> highest availibility




FPGA
ACCELERATOR MODULE
FPGA PARTITION
Purpose:
Specialised HPC, HPDA
& AI workloads
LARGE MEMORY MODULE
Purpose:
In-memory workloads
Public Internet
LU-CIX
EXTERNAL
CONNECTIVITY
restena
GÉANT
Dedicated
private links
BETTEMBOURG
DC 1.2
EXAMPLE
STORAGE MODULE
ARCHIVE TIER
Purpose:
Long-term storage for projects
requiring archiving
STORAGE MODULE
PROJECT TIER
Purpose:
User home and project directories
Intensive HPC, HPDA and
AI IO workloads
Software stack
STORAGE MODULE
SCRATCH TIER
Purpose:
Highly intensive, short term HPC,
HPDA and AI IO workloads
STORAGE MODULE
BACKUP TIER
Purpose:
Data backups for projects
requiring redundancy
STORAGE MODULE
DATA GATEWAYS
Purpose:
Data moving and export
Cloud services and Object Storage
DATA PLATFORM
MELUXINA
CPU
CLUSTER MODULE
Purpose:
Mixed HPC, HPDA
& BigData workloads

Sustainability

There are **3 main layers** to sustainability in the HPC sector and LuxProvide is strongly committed to all of them:

1 TOWARDS A CARBON NEUTRAL DATA CENTER

Data Centers are large energy consumers but the one that hosts **MeluXina is cutting edge when it comes to sustainability and social responsibility**.

- Certified 100% **Green Electricity** supplied from hydroelectric power sources
- Optimised use of **Free Cooling**
- **Biomass** recycling representing a yearly reduction in CO_2 in excess of 27,000 metric tons
- **PUE** of the Data Centers constantly measured and monitored
- Continuous improvement plan for **Energy Efficiency** supervised by the government agency Klima-Agence
- **Waste heat** from servers used to heat office space and preheat diesel generators

2 MELUXINA'S ENERGY EFFICIENCY

In the greater supercomputing world, sustainability refers to **sustained output in terms of floating-point operations per second per watt (FLOPS/W)**.

In June 2021, MeluXina's GPU AI Accelerator module has been ranked 4th greenest in the world and greenest in the EU.

The GREEN 500

The list measures **performance in FLOPS/W** using the TOP 500 measure of high performance LINPACK benchmarks at double-precision floating-point format.

3 ENVIRONMENTAL SOCIAL AND GOVERNANCE IMPACT

In the context of **ESG solutions**, however, sustainability means the efficient utilization of resources. Better utilization of resources, coupled with shorter timeframes, means improved environmental sustainability.

HPC can deliver on that goal as demonstrated through a variety of use cases.

- **Weather prediction and climate change**: Timely and more precise weather forecasting with a better understanding of climate change adaptation for optimised scheduling and impact.
- **Energy and utilities**: Developing real-time wind and solar maps for energy optimisation and improved photovoltaic efficiency.
- **Drug development**: Accelerating drug discovery and developing personalised healthcare.
- **Discrete manufacturing**: Reducing or eliminating the need for physical testing, predictive and prescriptive maintenance, automation of product lifecycle management, and shortened design cycles.

A Unique Value Proposition

delivered by a **team of experts** that advises customers and supports them with a smooth and efficient onboarding based on a **Pay Per Access model**.

Providing high-performance computing capabilities to businesses is at the heart of LuxProvide's mission, that has developed its platform and team with a specific business-oriented focus.

Our HPC, AI & Data experts are LuxProvide's core differentiators. We allow businesses to gain significant competitive advantage by scaling up their use cases to unprecedented levels. Concretely, it means increased degree of realism and accuracy of simulation and improved AI algorithms assimilating massive amounts of data.

Matthieu Lefebvre, Head of Supercomputing & Data Solutions

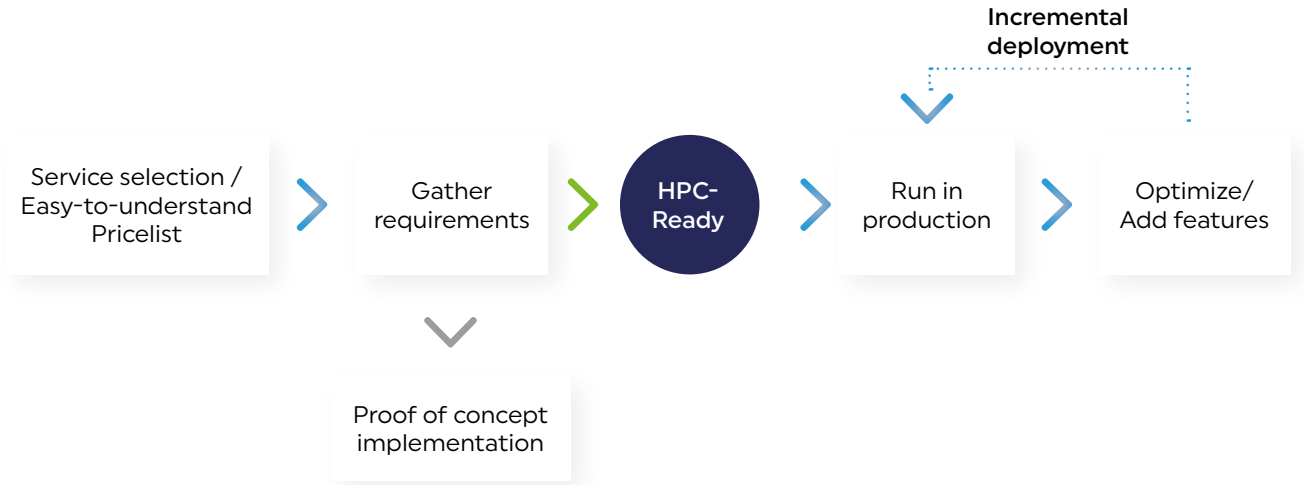
Solution Engineering

Training

Tailored Services

Fast Onboarding

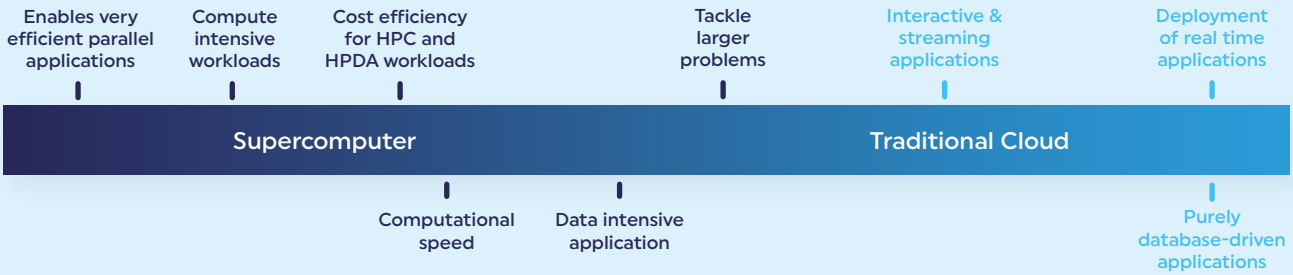
THE ONBOARDING PROCESS IS SMOOTH AND FOR HPC-READY COMPANIES, ACCESS TO THE SUPERCOMPUTER IS GRANTED IN A MATTER OF DAYS



THE CLOUD ENABLED SUPERCOMPUTER

Supercomputers and Cloud facilities are **complementary platforms** that play together in a digital continuum. Supercomputers deliver superior results for applications that require massive data and processing speed, whereas traditional Cloud is better suited for real-time and interactive applications.

MeluXina features a Cloud module that helps bridging traditional Cloud with HPC.



WE PROVIDE
EXPERT AND TAILOR-MADE SUPPORT
ON ALL ASPECTS

SCALING

software solutions to efficiently handle much larger amounts of data than they were originally developed for

PARALLELIZING

solutions to gain an optimal speed-up on a high number of processors

ACCELERATING

software by leveraging the power of GPUs (graphic processing units), providing potentially hundreds of times acceleration factors

OPTIMIZING

software to maximize the benefit coming from the variety of available resources in the supercomputer

PROFILING, MONITORING & DEBUGGING

software so that it will be designed and remain as efficient as possible. Various aspects of the algorithms are analyzed, including execution time, memory usage, existing bottlenecks, etc.

DESIGNING & PROTOTYPING

software solutions that are fully tailored to customers' needs, increasing their level of digitalization

CONSULTING

on defining the journey to become HPC and/or HPDA ready

They have already trusted us

LUXPROVIDE TEAM




















... AND MORE

Graphic design: **SO Graphiste** ♻ Recyclable Paper

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