



SIPEARL

Designing the European high-performance low-power microprocessor for supercomputing and AI inference

It will help solve sovereign strategic scientific societal and environmental challenges with a reduced carbon footprint

June 2024



Philippe Notton

CEO & Founder of SiPearl

Our vision

Because major challenges for Europe in medical research, security, energy management or climate modelling require processing huge volumes of strategic data in a fraction of a second, SiPearl is building the high-performance low-power backdoor-free security microprocessor dedicated to supercomputing and AI inference.

We are thus contributing to the technological sovereignty of Europe in scientific, societal and environmental fields with a reduced carbon footprint.

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Generative AI



Energy



Big computers

Big challenges

need



Climate

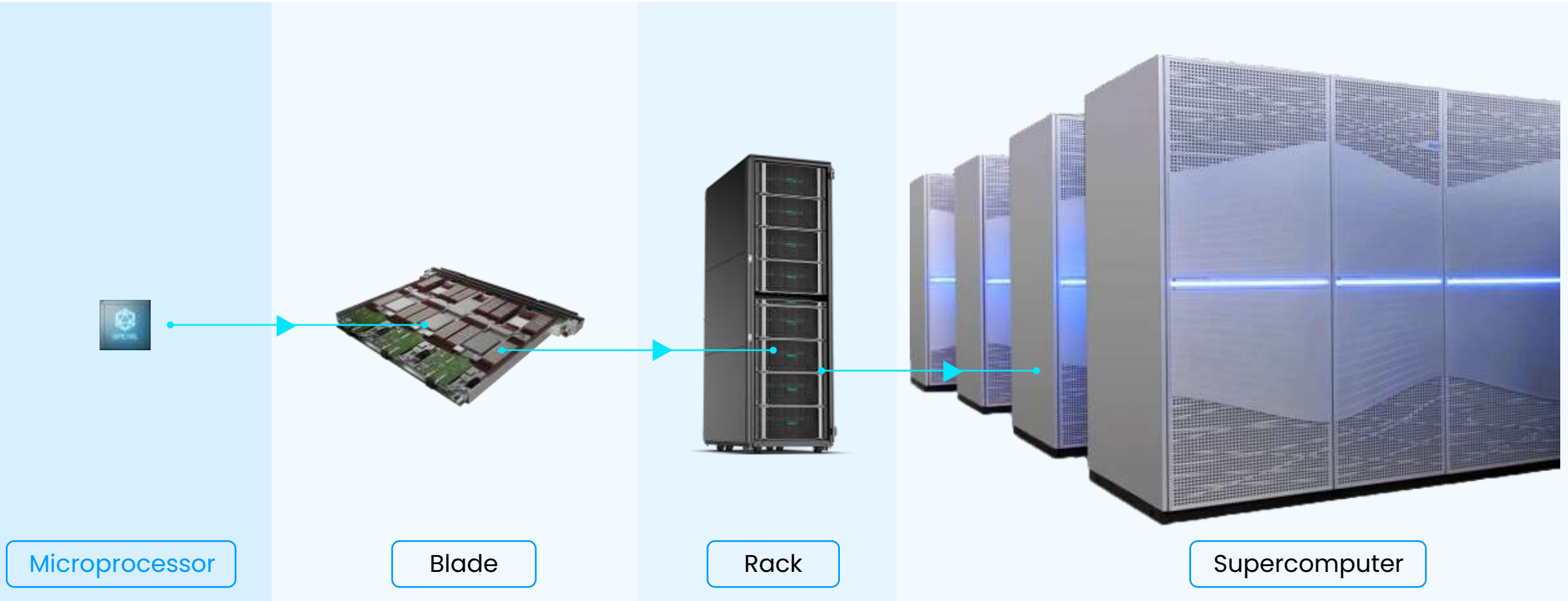


Health



Supercomputers are essential to ensure Europe's technological sovereignty by addressing major scientific, societal and environmental challenges.

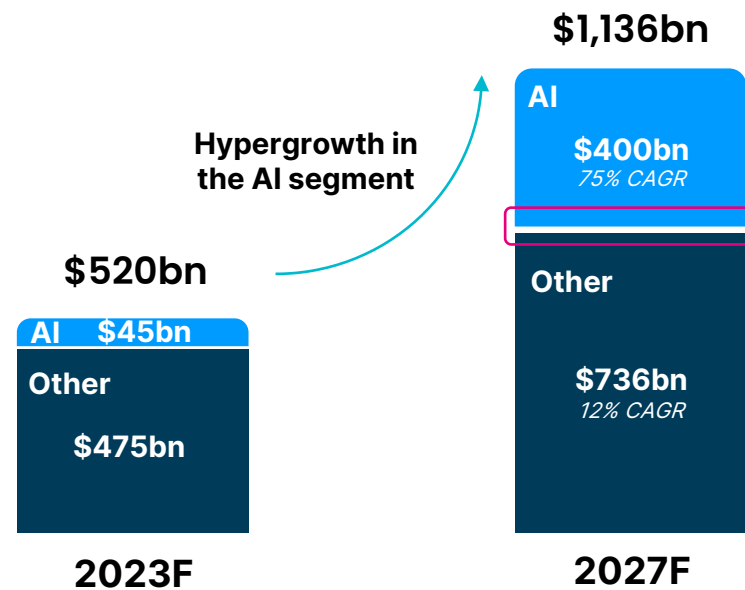
Our business: the high-performance energy-efficient microprocessor dedicated to HPC⁽¹⁾ and AI inference



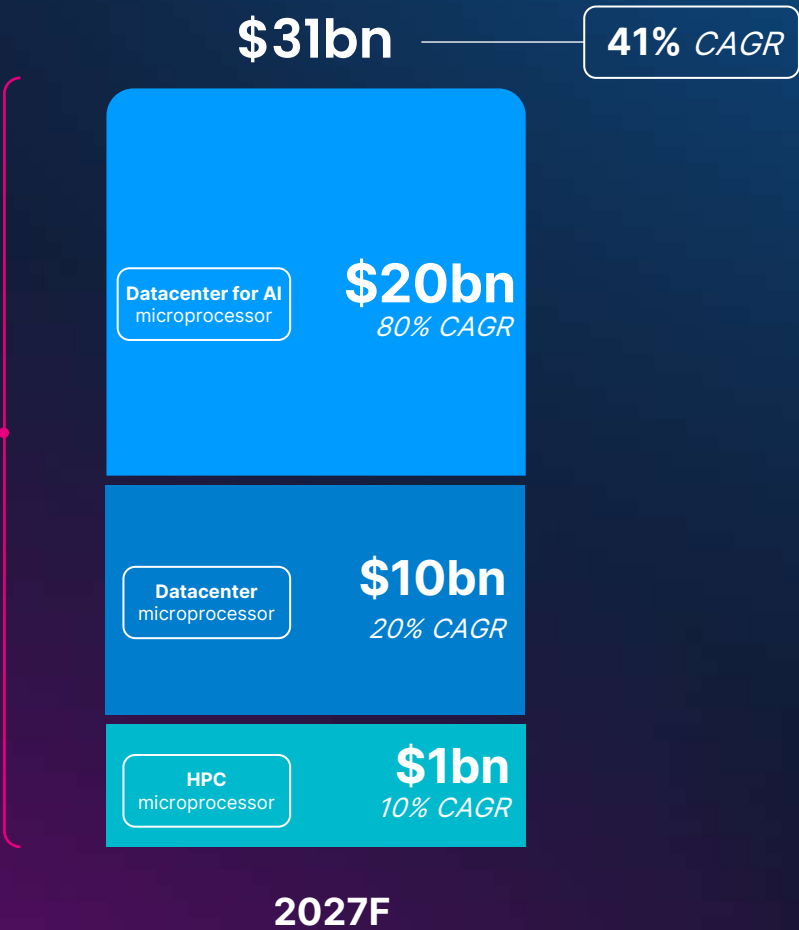
Tens of thousands of microprocessors in a supercomputer

SiPearl's target market: 41% CAGR to reach \$31bn by 2027

Global semiconductor sales⁽¹⁾



SiPearl markets



(1) Source: Semiconductor Industry Association (Dec-23), AMD (Dec-23), NewStreet Research (Jan-24), Statista (Jan-24), Silverpeak (Jan-24)

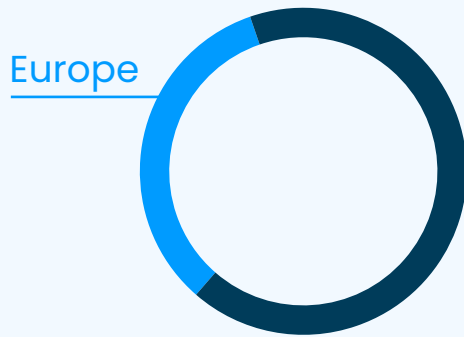


Focus: European Union

European Union behind the curve

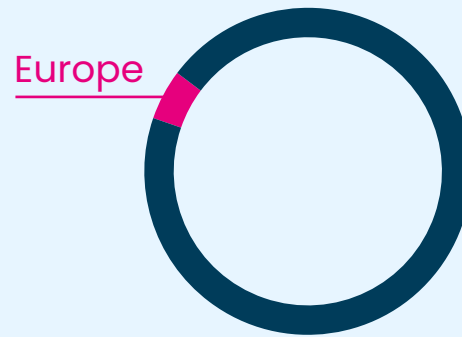
1/3

of global supercomputing
ressources are consumed
by Europe⁽¹⁾.



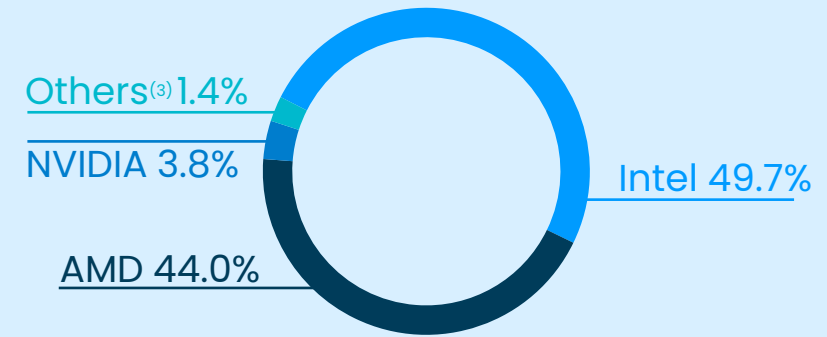
1/20

of global supercomputing
equipment are supplied
by Europe⁽¹⁾.



0%

of the microprocessors
powering Europe supercomputers
are European⁽²⁾.



This lack of homegrown technology has serious implications
on Europe sovereignty, intellectual property and security.

European Union response

September 2018



Launch of the EuroHPC JU backed by a €8bn budget to deploy in Europe a world class exascale⁽¹⁾ supercomputing infrastructure.

(1) Exascale: billion of billion calculations per second

December 2018



Launch of a call for proposals in 2017 for developing a new generation of high-end European microprocessors

- Budget: €150m
- Target: high-performance and energy-efficiency

Coordinated by Bull (Atos Group), the European Processor Initiative (EPI) consortium won this call for proposals. It has currently 30 members:

- Scientists: research institutes, universities and supercomputing centres
- Industry: European leaders, IT, electronics and automotive specialists

June 2019



SiPearl is the private company created within the EPI to launch a strategic industry for Europe.

Supercomputing EU sovereignty is on track!

Thanks to EuroHPC program:

Europe ranked 3 machines in the TOP10 most powerful supercomputers⁽¹⁾



No5: LUMI in Finland
379.7 million billion calculations / s



No7: Leonardo in Italy
241.2 million billion calculations / s



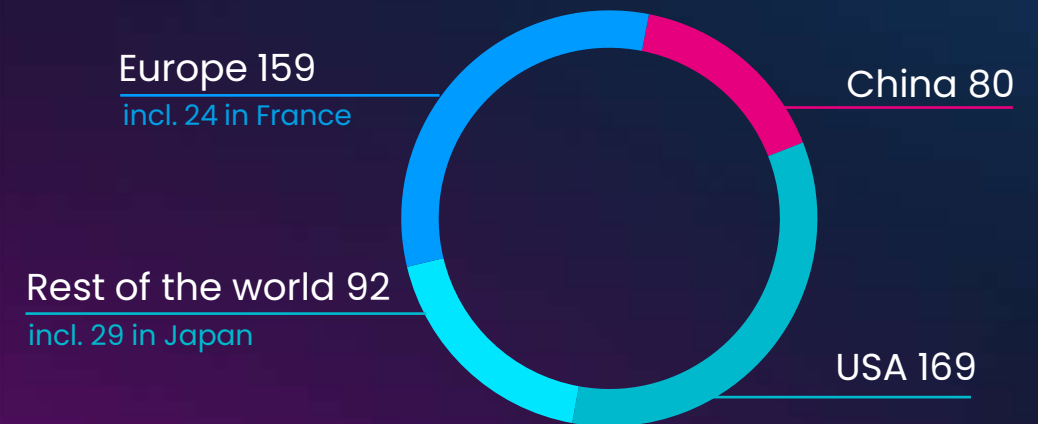
No8: MareNostrum5 in Spain
175.3 million billion calculations / s

And also:

Meluxina (Luxemburg, No89), Karolina (Czech Republic, No135), Discoverer (Bulgaria, No188), JEDI (Germany, No189), Deucalion (Portugal, No219), Vega (Slovenia, No226).

June 2024

Europe ranks **159** supercomputers
in the Global TOP500
vs **97⁽²⁾** before the launching of EuroHPC in 2018



Soon, a "*designed in Europe*" microprocessor inside

to meet strategic scientific industrial and societal challenges
for Europe sovereignty



Health

Medical research, vaccine development, clinical trials, personalized medicine.



Gen. AI

Generative AI inference, Large Language Model



Climate

Localized weather forecasts, prediction of storm pathways, climate change mitigation.



Energy

Optimization of renewable energy parks, power grid management.



Engineering

Design of new land and air vehicles, crash test simulation, creation of greener materials.



Security

Cybersecurity, armies, nuclear deterrent force.



Academic

Fundamental and applied research



Geology

Optimization of oil and gas prospecting and acquisition, early detection of earthquakes.



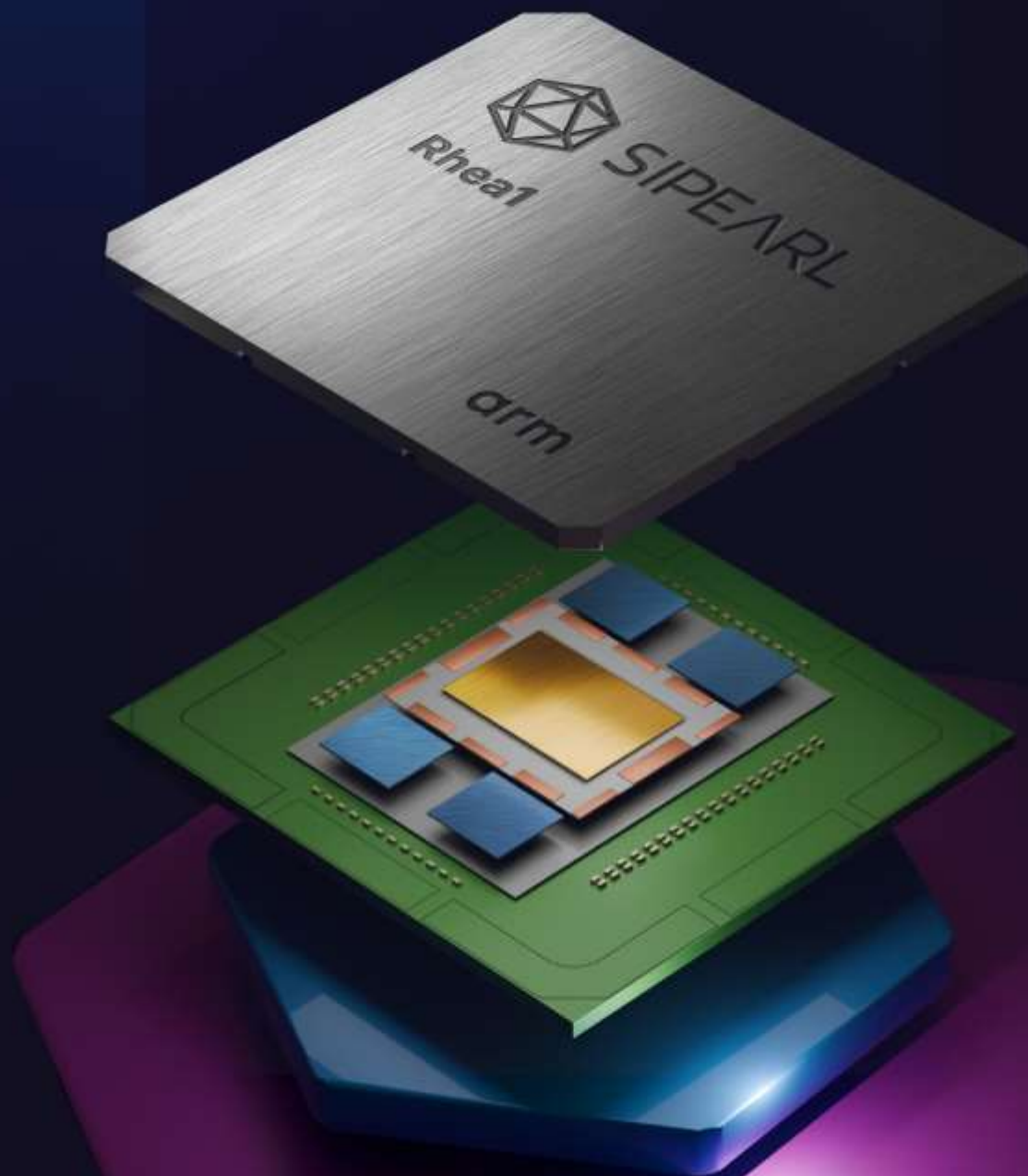
RHEA1

HPC and AI inference microprocessor

80 arm® Neoverse V1 cores
with 2 x 256 SVE each

4 x HBM

4 x DDR5 interfaces



Rhea1, our 1st generation microprocessor

Designed with high-performance energy-efficient Arm Neoverse V1 platform



High performance per watt: Arm ISA power efficiency

Very high memory bandwidth

Built-in HBM

- Ideal performances for Generative AI inference

Unique memory architecture: High Byte/Flop

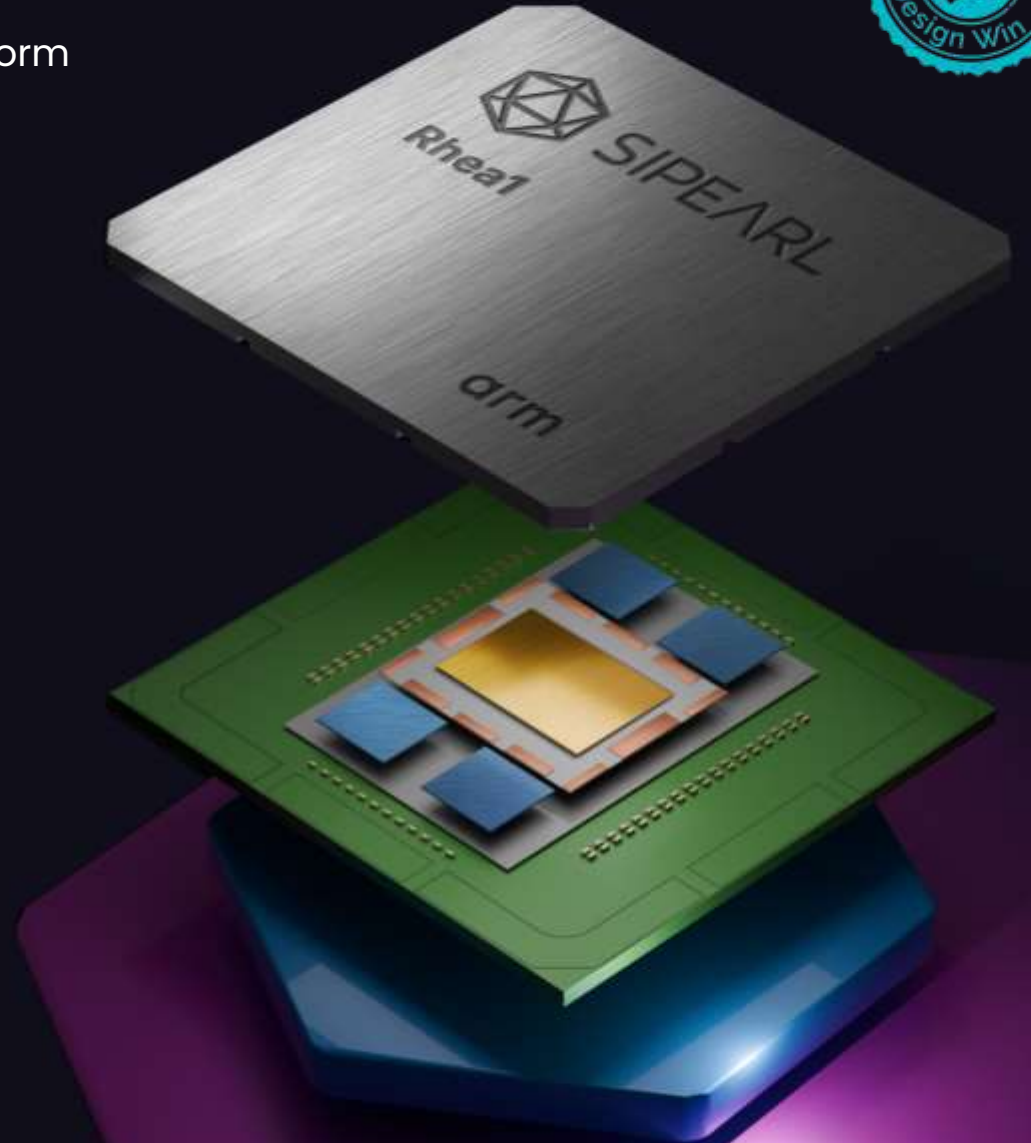
Openness

- Arm ecosystem from IoT/edge to HPC and cloud

Fully auditable – backdoor-free

Pre-integration with proven accelerator (AMD, Graphcore, Intel, Nvidia)

Rhea1 will deliver extraordinary performance and efficiency with an unmatched Byte/Flop ratio.



Rhea1 in 5 key benefits

The European high-performance low-power microprocessor dedicated to HPC and AI inference.



High Performance

To surpass the performance of 10,000,000 desktop computers.



Energy-efficiency

To halve power consumption for equivalent computing power.



Flexibility

Designed to work with any third-party accelerator (GPU, artificial intelligence, quantum).



Backdoor-free security

To protect data with secure end-to-end network transmission.



Sovereignty

To further Europe's technological leadership and independence.

JUPITER, lead customer

JUPITER, 1st European exascale supercomputer owned by EuroHPC, operated by Jülich (Germany)

Built by a European consortium

- Eviden: the Atos Group business leading in advanced computing
- ParTec: the German modular supercomputing company

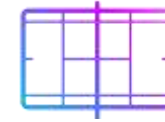
General-purpose Cluster Module of JUPITER to be based on Rhea1

- Very high memory bandwidth
- Extraordinary compute performance and efficiency

JUPITER Key Figures



€273m
expected budget



4 tennis courts
equivalent surface



10 million desktop computers
equivalent power



260km
high-performance cabling



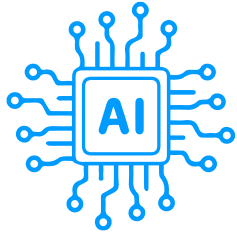
SIPE[^]RL

Company

At the nexus of the semiconductor industry's most powerful disruptive forces

1. Pervasive AI

Advanced compute
is everywhere



Opportunity for SiPearl

Semiconductor market for AI⁽¹⁾

- +80% CAGR to \$400bn by 2027
- incl. \$20bn for SiPearl's segment

2. Sustainability

Energy efficiency
is a must



Opportunity for SiPearl

Arm architecture used by SiPearl

- Energy efficiency x 2
for the same computing power

3. Sovereignty

Europe requires
technology independence



Opportunity for SiPearl

Strong EU & governmental support

- Captive market
- Access to capital

(1) Source: NewStreet Research (January 2024)

SiPearl in a nutshell

Building the European high-performance low-power microprocessor



Incorporated

In June 2019



Funded

By the European Union



Arm architecture

Energy-efficiency quick time to market, proven ecosystem



Financing

Series-A to date: €113m
(€105m equity + €8m bank loans)

arm

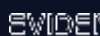


EVIDEN



Key partnerships

Joint-offering with



Identified customers

Server manufacturers based on user specifications: First, EuroHPC ecosystem before going global.

+200

Employees

from



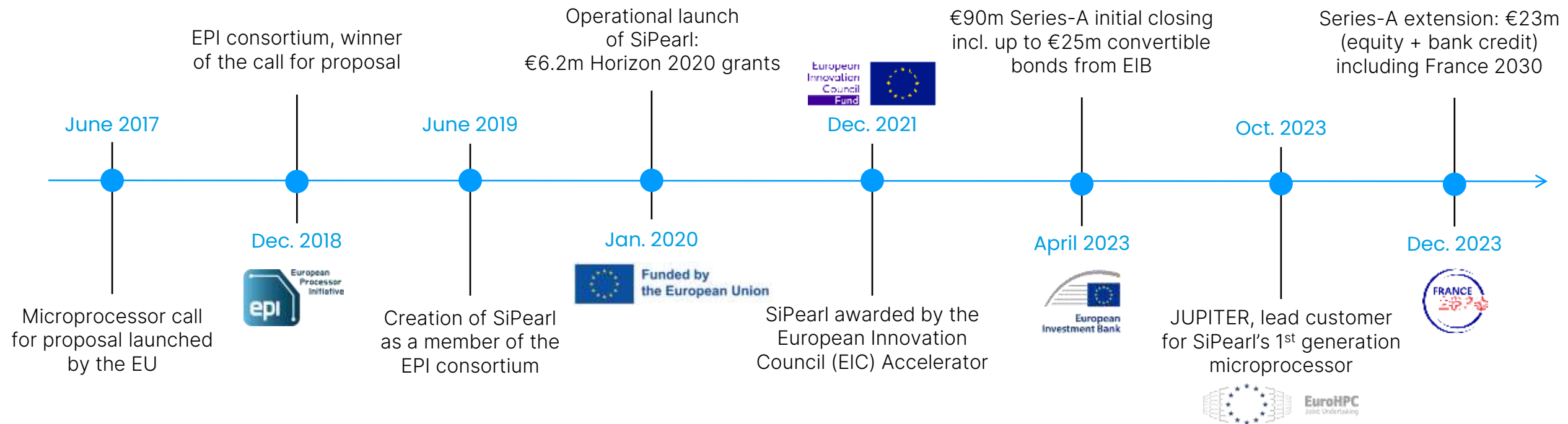
7 locations

Maisons-Laffitte (HQ), Barcelona, Bologna, Duisburg, Grenoble, Massy, Sophia Antipolis



From a European Union concern to SiPearl's ramp-up

Our common goal: fostering the return of high-performance, low-power microprocessor technologies in Europe.



Leadership

Board



Ian Jenks
Chairman





an atos business



CEO



Philippe Notton
CEO-founder



Country Heads



Frank Gorris
Germany





Anna Riverola
Spain





Matteo Tonelli
Italy



Research



Ying-Chih Yang
CTO



Development



Vincent Casillas
VP Software R&D



Finance & IR



Jean-Yves Quentel
Group CFO & IR



Sales & Marketing



Christophe Menard
Chief Commercial Officer



HR & Legal



Laure Perfetti
HR Director



IT



Sylvain Chapdelaine
CIO



Operation



Frédéric Hannyoy
COO





Vivian Blanchard
VP Hardware





Pierre Marchal
CFO





Craig Prunty
VP Marketing





Cornelia Emmerlich
Group General Counsel



Our EPI partners, a powerful ecosystem

Close collaboration with our partners of the EPI consortium

Scientists: research institutes, universities and supercomputing centres.

Industry: European leaders, IT, electronics and automotive specialists.

A joint project involving 200 engineers since December 2018

- Development of elementary hardware and software technological bricks.

Stakeholders

- Privileged access to IP of European leaders and innovative startups.

End-users

- Supercomputing centres.



Technology partnerships

with leading providers



Our main partner

SiPearl, the only European licensee to use arm Neoverse V1 platform



EDA software



Validation of semiconductor power integrity, minimization of power consumption



Hardware emulation with Veloce Strato emulation platform

- 128 new generation cards
- x 1,000 simulation speed
- Unique in Europe



Advanced High-Bandwidth Memory solution for Rhea

- Speed
- Energy
- Thermal resistance



Manufacturing initially entrusted to the Taiwanese TSMC

Etching: 6nm or better for next generations

SiPearl sovereign design and data centre

196

Servers

108 in Eppes
88 in Reims

8,000 cores

150 TB RAM

41
networks (DC)

Switch / firewall

22
Storage

12 storage
10 synology

1 PB

5
Backup server

Cohesity & Veritas
technologies
Eppes & Reims



**Investment to date: €15m
x2 in 2024**

World leading industrial partnerships

Our ecosystem to accelerate Europe's adoption of exascale supercomputers

Leading manufacturers

EVIDEN

Europe No1



**Hewlett Packard
Enterprise**

Global leader



Developing joint solutions for HPC applications

Acceleration specialists



Instinct™ accelerators
with ROCm™ open software

GRAPHCORE

Intelligence Processing Unit (IPU), designed
to support artificial intelligence workloads



GPU Ponte Vecchio
with the open unified software stack oneAPI



Portfolio of world-leading accelerated
computing and networking solutions



SIPEARL

Outlook

SiPearl involved in core European projects to ensure sovereignty

Cloud



Developing an open-source software ecosystem needed to optimize the efficiency of EPI hardware and facilitate the integration of SiPearl's microprocessors in the cloud.



Developing the 1st all-European RISC-V cloud server infrastructure, significantly enhancing Europe's open strategic autonomy.



Developing a custom cloud installation with the guarantee that an entirely European solution can be deployed reproducibly.

Centres of Excellence



Making some of the most used HPC application suites in engineering and manufacturing work on exascale EuroHPC supercomputers based on SiPearl's microprocessors.



Developing materials modelling, simulations and discovery technologies, and making them accessible to a vast community of researchers.

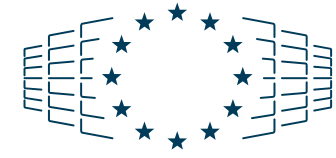


Promoting scientific and technological progress in key areas such as magnetic confinement fusion, industrial plasmas, medical applications...

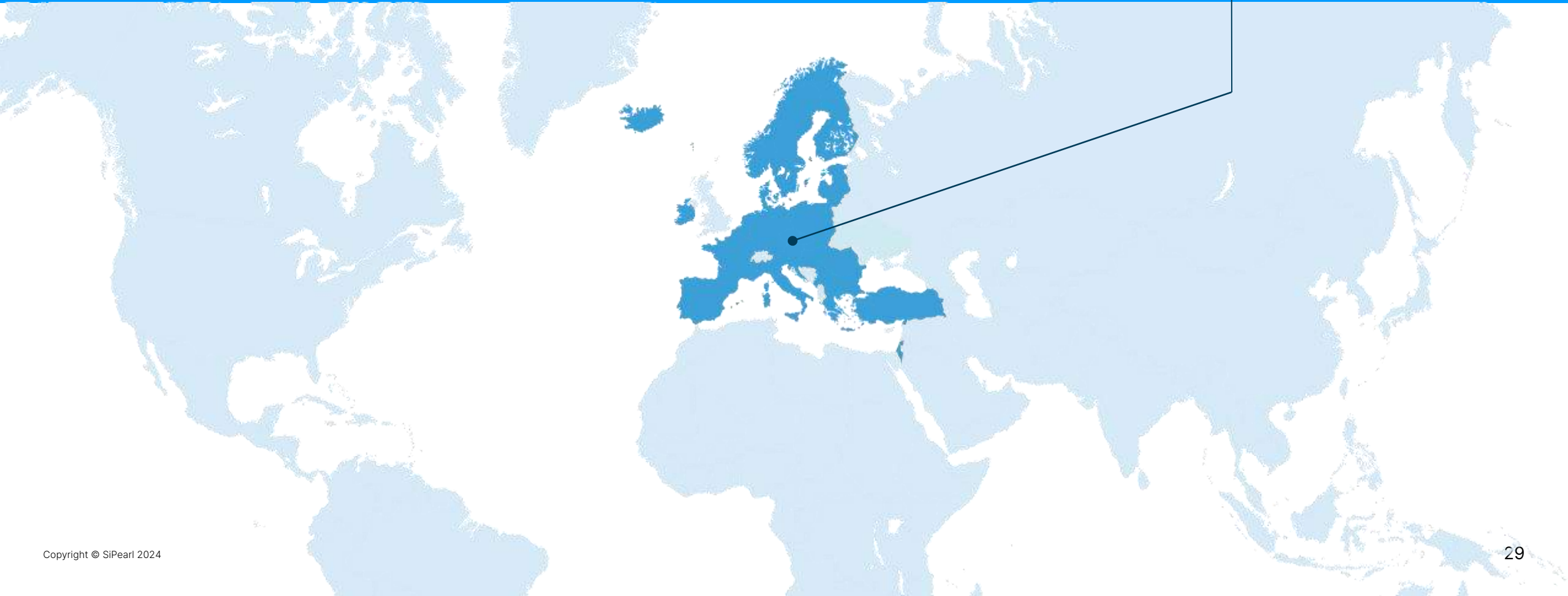
And also regional projects:
Emopass (France), FlexFMM (Germany)

Our strategy for Rhea

Deployment on the EuroHPC market,
then worldwide



EuroHPC
Joint Undertaking



SiPearl corporate vision and strategy

A range of HPC & AI inference microprocessors with a reduced environmental footprint to conquer the European market and beyond

HPC & AI inference

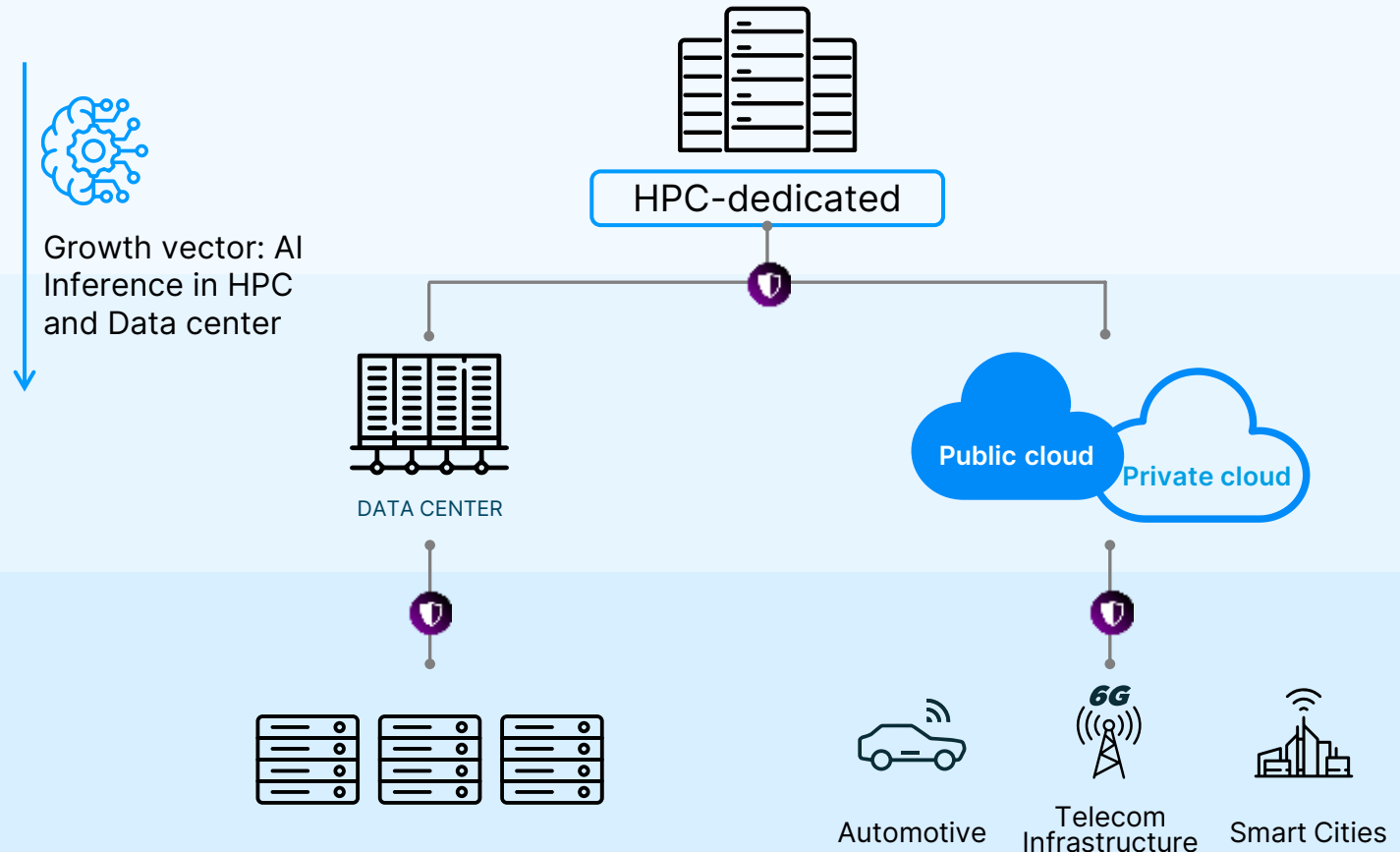
SiPearl entry business: European HPC & AI

Data center-Central

Data centers, private and public cloud

Data center-Edge

Small Compute Farms
around 6G infrastructure



About... SiPearl

SiPearl is building the European high-performance low-power microprocessor dedicated to supercomputing and AI inference. This new generation of microprocessors will first target EuroHPC Joint Undertaking ecosystem, which is deploying world-class supercomputing infrastructures in Europe for solving strategic sovereign challenges in medical research, generative AI, security, energy management and climate with a reduced environmental footprint.

SiPearl is working in close collaboration with its 30 partners from the European Processor Initiative (EPI) consortium - leading names from the scientific community, supercomputing centres and industry - which are its stakeholders, future clients and end-users.

SiPearl employs more than 200 people in France (Maisons-Laffitte, Grenoble, Massy, Sophia Antipolis), Italy (Bologna), Germany (Duisburg) and Spain (Barcelona).

SiPearl is part of French Tech 120 programme 2024 class.

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