PRACE-3IP PCP: A journey to the Energy Efficient HPC
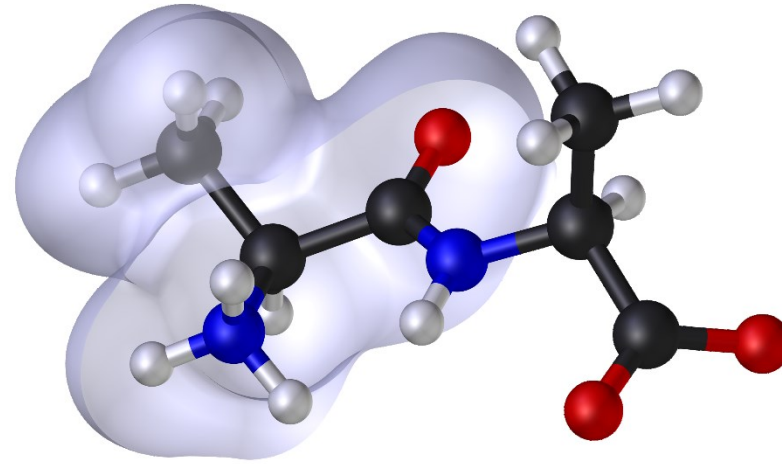
Dr. Piero Altoè, **E4 Computer Engineering**
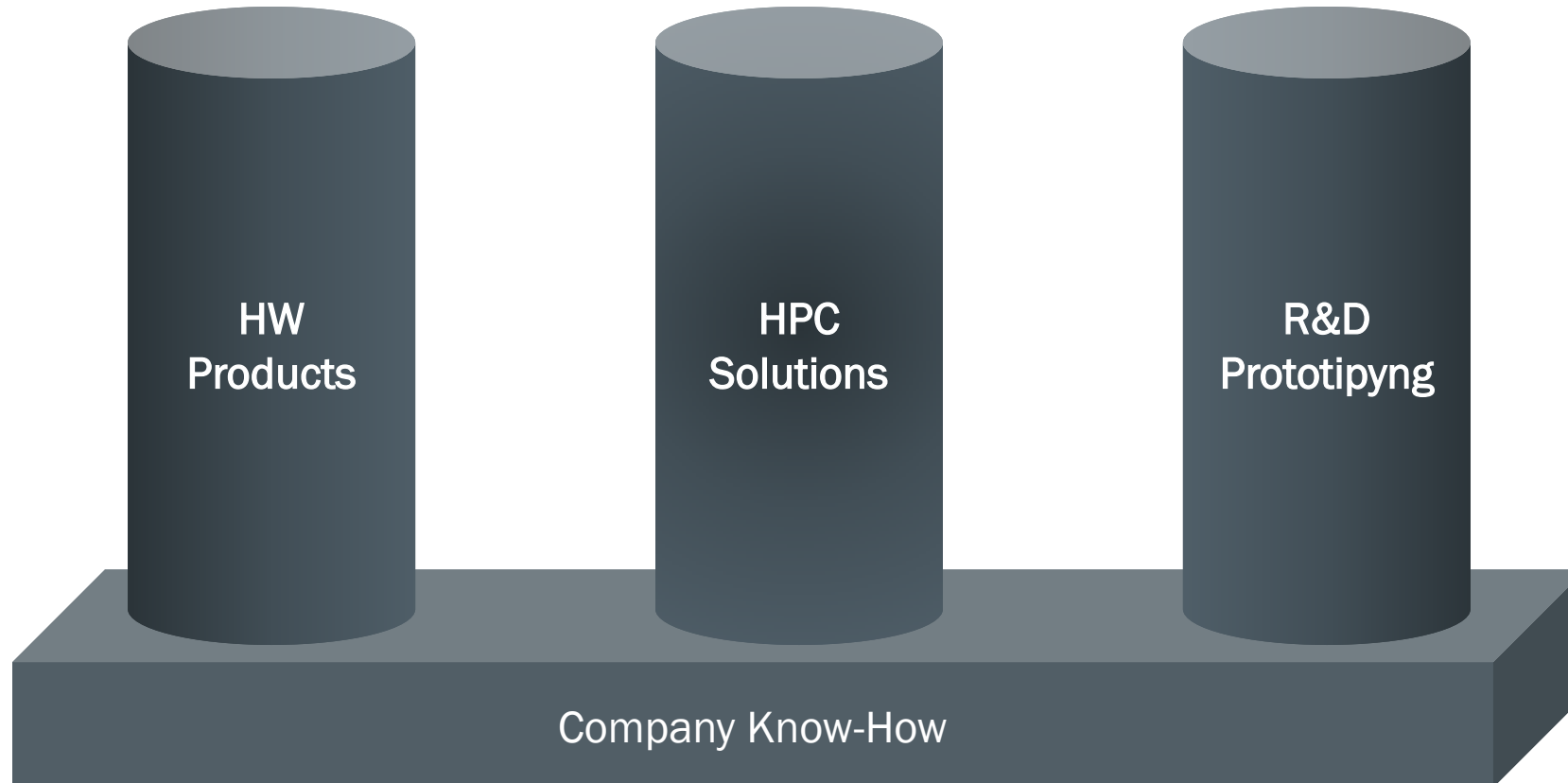
E4® Computer Engineering S.p.A. specializes in the **manufacturing of high performance IT systems of medium and high range.**
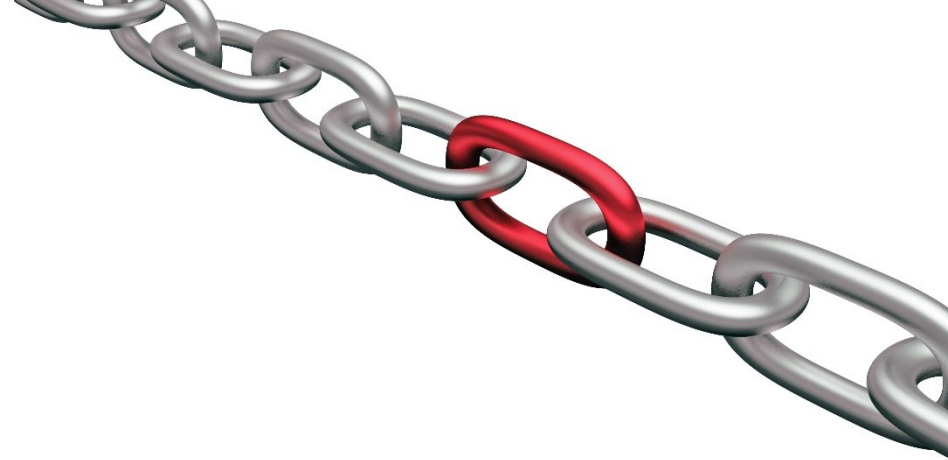
Our products aim to meet both industrial and scientific research requirements with range fit for many environments, from universities to computing centers.

Thanks to the established experience acquired through the years, E4 is a valued technology's supplier acknowledged and appreciated by many worldwide organizations.
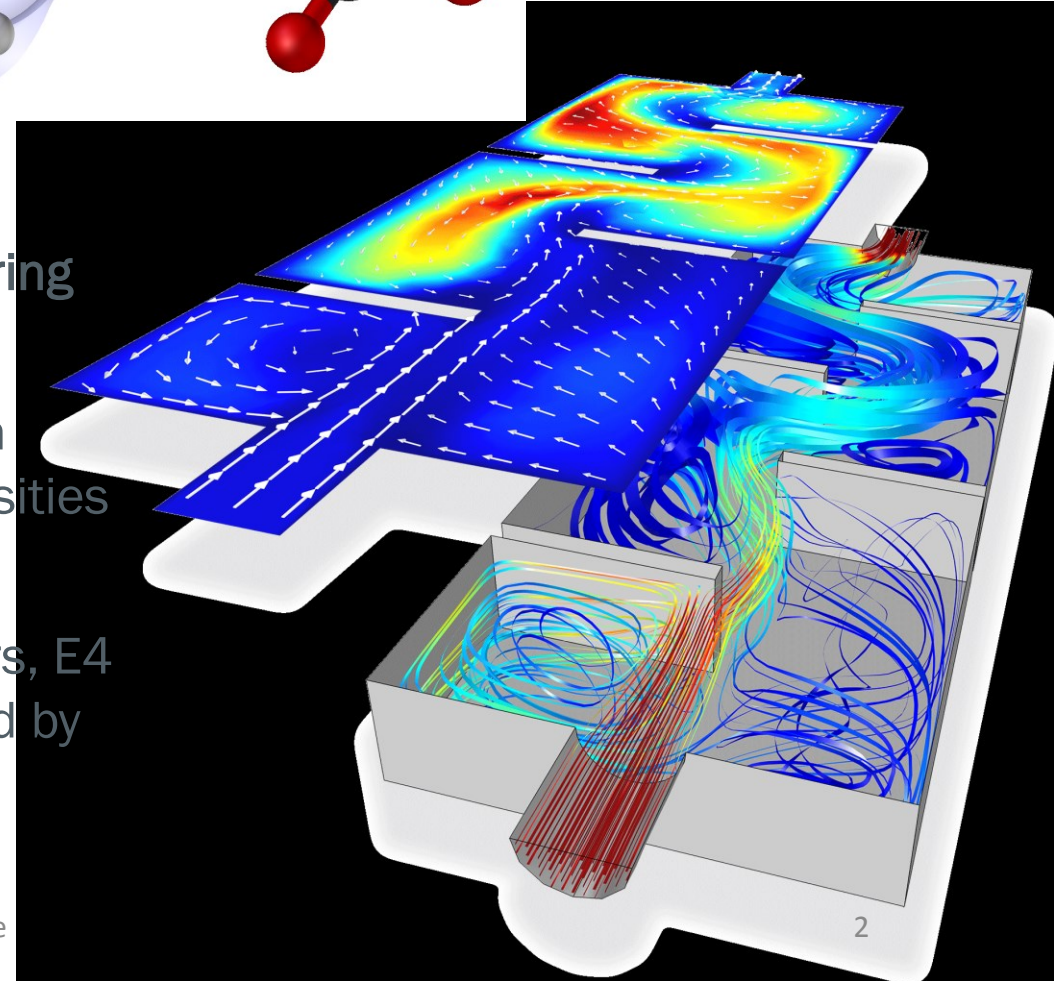
The Three Company Pillars

HW
Products

HPC
Solutions

R&D
Prototipyng

Company Know-How

Active in the design of prototypes:

1. Pedraforca cluster as a part of MontBlanc Project (FP7)
2. Design of HPC Compute nodes based on ARM SoC
3. Design of Whole HPC solution for 3IP-PCP Tender awarded to E4 Phase I & II
4. OpenPOWER member

Supporter for the design of exascale applications:

1. E4 Is member of the MAX Center Of excellence of material science (H2020)
2. Direct economical support to port scientific applications on ARM and ARM+GPU architectures

Highly involved in the energy awareness computing

1. E4 is designing hardware components for high frequency energy sampling
2. Co-organize initiatives spread the knowledge of energy awareness on the scientific computing, such as COLA workshop (https://agenda.infn.it/conferenceDisplay.py?confId=10434)

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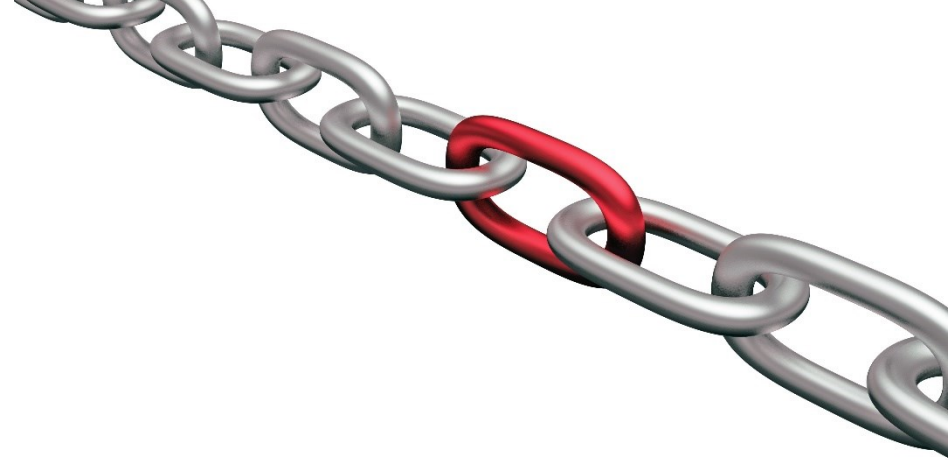4. OpenPOWER member

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What mean design a whole system on 3IP-PCP ?

Take in mind 3IP-PCP is a tender and not an H2020 project.

Energy efficiency cannot be ascribed to a single aspect of a system, but should be addressed at all levels, from the material science in the transistor design to thermo-hydraulic engineering for the design of the cooling system or even computational.

Energy efficiency must be demonstrated by measuring total energy-to-solution for a representative set of scientific HPC applications on a self-contained pilot system. This pilot system has to be deployed and operated as a "pre-production" system at the site of a PRACE member.

Is it challenge? Yes !!!!

1. Get the idea or better ideas

2. Make a feasibility study: brakes down of costs and timeline

3. Create the right connections with the technology suppliers

4. Connect all the technologies together

5. Manage risks not only connected with your entity

What about EsD projects

1. Great opportunity to develop European Know-how

2. It should be driven by private company (EU SMEs?), with a tender like formalization (not H2020). This ensure to achieve production quality

3. It must be seen as a join forces activity between players on several area: hardware manufacturing, integration, storage design, middleware, application porting and design

EsD and E4

1. Contribution in the system integration

2. Design of hardware sub-system and component

3. Energy aware centric vision of the computing

4. Coordination of the activities and relationship with Technology designer