



High Performance Computing (HPC) refers to computing technologies used by **clustered computers** to have high-performance computing capabilities, using parallel computing. In fact, the best Italian expression that can be used instead of the acronym is "**high performance calculation**". Installations to address these needs are complex systems; these technologies have been constantly evolving in recent times also for the attention to sustainability and consumption, as well as for the democratization of the very concept of HPC in progress.

Current computing systems that leverage **Hpc technologies** are installations that require important investments and their management the use of **high-level specialized personnel**, but also able to interact and **collaborate** with end users, to allow effective use for individual purposes. There is talk, for 2020, of a market worth **more than 41 billion dollars globally** that analysts estimate will continue to grow at least until 2028, worth **more than 66 billion dollars**.

It is also contributed by a small **all-Italian company, E4 Computer Engineering**, born in 2002 in Scandiano, in the province of Reggio Emilia, and today in continuous evolution and in the process of expansion abroad. Francesco **Morsiani CEO** and Simone Zanotti talk **about**



Francesco Morsiani, Ceo E4 Computer Engineering

it, sales and marketing director. "We were born and partly still operate **as a server factory**- **Morsiani** begins - focused on high performance computing and we collaborate with the largest university **centers**, which represent our main catchment area; in southern Europe we can say that there is no important computing centre, which can be described as such that it does not use at least **one E4 cluster**. First we used **the GpUs** for the super-calculation (the continuous collaboration with Nvidia is consolidated and "historic", but not only...), we first **created an Arm cluster with Mellanox** (for the Japanese market) and participated in important projects in Italy and Europe. In addition to the research market, our solutions are now also required **by automotive companies, pharmaceutical companies and large finance companies.**

Among the projects that deserve to be mentioned, undoubtedly that of **Cineca**, in Rome but also the continuous collaboration with **Cern**. Since 2018, **E4 Computer Engineering** has been part of **Openlab** and has been collaborating on major R&D projects in the fields of artificial intelligence and high-performance data analysis, designing and developing computing and storage architectures equipped with the latest technologies. In addition, there is participation in the **Epi consortium**.

The European Processor Initiative (Epi) is a research project aimed at developing European know-how on the design and implementation of processors for HPC, with a view to greater independence and autonomy of Europe in the high-tech field. These are low-power processors for **extreme scale computing**, high-performance **big data** and a wide range of emerging applications. Finally, the company is involved in a long series of European initiatives and active member in several HPC consortia (**Max, Etp4Hpc, HiPeac, among others**). Fundamental, in the context of the collaboration with companies, the projects conducted with **Leonardo, Eni, Marelli**.

Last year, **E4 Computer Engineering** also opened an **office in Germany, in Munich**, with the aim of promoting the growth of the company in the Central European area, supporting existing projects and offering high-level advice on further possible design and implementation activities.

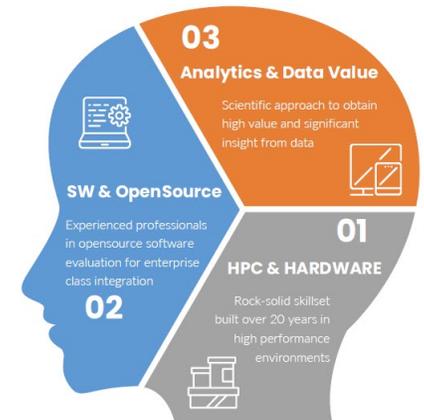
E4 Computer Engineering, three operational areas

Above all, over time, in addition to Hpc hardware computing **systems**, **E4 Computer Engineering** has extended its scope to **software and open source development** and **analytics**. And from hardware integrator today E4 can be called all-round a **solution manufacturer and solution provider**, in fact an *"atypical vendor"*. *"This is a natural development in many respects," zanotti points out. Today, the **open sourcesoftware** component, and the third component related to data and value **extraction** from unsostructured data are intrinsically related to computing capabilities.*

And to address these needs it is **necessary to keep high attention to skills**, true *"corporate treasure"*. More than 50% of the staff are engineers who select, test, integrate, install and configure hardware and software components, *"but many talents in other disciplines (chemicals, mathematicians and physicists, for example)"*, **zanotti explains**.

E4 Computer Engineering's business is growing and evolving also **with regard to the market approach**. If today more than 60% of customers are part of **academic realities**, for about 70% of the total turnover of E4, the slice is still fundamental (about 40%) of customers related to the enterprise realities of in **the automotive, pharma** and **finance** sectors (for 30% of the total turnover).

E4 directs its efforts **with five commercial** resources, a new branch general manager (for Germany), and a dozen partners and system **integrators**.



E4 Computer Engineering – Operational Scopes



Zanotti: *"We do not want a rigid and excessively structured and formalized channel, we are looking instead for partners with whom to collaborate to achieve greater capillarity on the market, and model ourselves on the territory according to needs".* The **cohesion between the technical area and the market** approach should therefore prove functional to the idea of *"slow growth"* that the company aspires to and identifies as a model to tend, without distorting itself.

While in the past **the Hpc proposal** represented the only "core" business to be supported with a sartorial approach, today, considering on the one hand the evolution of high-

performance computing itself, on the other hand the close relationship between systems and data, **E4 Computer Engineering** has evolved its offer and its "method", without sacrificing – on Hpc projects – *the "sartorial approach next to the customer"*; has first inserted a completely agile methodology in the development phase, and now uses a **hybrid** approach able to support *"the industrialization of innovation"* in progress, and break down the **entry** threshold with the offer of predefined solutions, and simplified matrices, "to be able to bring complex technologies to the shelf and thus bring customers *closer together* , without, however, putting in the background **the offer of granular skills** that the company can put in place for the necessary customizations".

The technological offer

The E4 Computer Engineering factory today involves the use of a **Continuous Integration/Continuous Deployment (CI/CD) approach** based in fact on a virtuous technological **agnosticism** for which the company chooses in the projects from time to time exclusively the technologies functional to the success of the same, without therefore ever foreclosing the possibility of intervening directly to "optimize the project".

In fact, four **software solutions are proposed which, combined** with hardware infrastructure, allow IT to *"make complex technologies accessible to users"*. All solutions are born with cloud operating and use logics with monitorable, measurable and scalable services, with the idea of automation at the center, as a keyword.

In detail, **Kaptain** allows you to manage complex multicontainer applications, leveraging infrastructure that can orchestrate containers. This is the main function of **Kubernetes**, integrated into Kaptain. **Medooza** is proposed as a **flexible Hpc** structure that in a single infrastructure layout allows you to add nodes or interface with the cloud, without having to change the architecture of the system adds to hpc clusters the intuitive, flexible and easy-to-maintain approach of traditional infrastructure, virtualization and the cloud.

Fluctus, on the other hand, is proposed as a cloud platform built and designed according to the principles of open infrastructure, it is **based on Openstack**, it can be expanded as needed, in terms of additional resources and functionality, without hardware or software constraints. That is **why Fluctus** can be called the *"infrastructure-as-code" proposal*. **Finally, Gaia is the enabling platform to implement AI solutions in the company** and reduce their time to market. Fully engineered by E4, Gaia harnesses the power **of parallel computing performed on Gpu** for reduced execution time and flexibility in workload

execution. At the base of the proposal – portfolioed for several years – **E4 Computer Engineering** offers **Vstone** enterprise solutions for virtualization (convergent, hyperconvergent and mirrored) based **on VMware, Netapp and Veeam technologies.**

They allow **to transform DC by combining the different components of computing, storage and networking**, but precisely, with the advantage of predefined layouts and a fast time to market, because the end user only has to choose the size of the infrastructure, and the level of service. The adoption of one of the high-performance solutions (**Kaptain, Medooza, Fluctus, Gaia**) or **the Enterprise Virtualization** family includes all the services necessary for the implementation and configuration and the first year of remote support **of Level 3**, the highest level of support for the management of the most difficult problems, support provided by developers **and those who know the code and backend of** the product.

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