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## [4] From Pascaline to Piz Daint in the Alps infrastructure: a modern day view of computing in science

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"Piz Daint" is our flagship supercomputer system at CSCS. The current instance was introduced in 2017 and includes five thousand computing nodes accelerated with general purpose graphic processing units (GPGPU) NVIDIA dubbed "Pascal". It has been the workhorse of our User Laboratory over the past decade, leading the way for Europe's adoption of GPGPU in scientific computing.

While the allure of supercomputing system's arithmetic performance remains, physics has forced the balance of computing devices to change, and we now must pay much more attention to data flow than arithmetic efficiency. Moreover, as we embrace the evolving digital age, the demands of scientific computing are shifting towards more complex workflows. These were the primary motivations to begin developing the new "Alps" infrastructure. As "Piz Daint" transitions into the "Alps" infrastructure, it will essentially become a software-defined cluster within "Alps." The current Pascal accelerators will be substituted with the latest GPGPUs, with vastly improved memory performance.

Observing the progression of energy efficiency is intriguing; however, performance enhancements come at the cost of higher power consumption. These performance gains now come at higher cost, making a new trend that underscores the dusk of Moore's Law.

## **Theoretical Work**

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