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Exascale: challenges and opportunities in a power constrained world

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The top500 list of last November shows for the first time a clear sign of slow down in the growing rate of supercomputers power. Not only just one new system enter in the top10 (wrt June 2014), but also the last system of the top500 display very little performance improvement.

It is not a mistary that the long standing Moore's low is approaching an inevitable decline.

Two factors mostly contribute to this trend: little improvement in silicon chips and power constraints. For many datacenters the capacity in term of electrical power is coming to its limit, and without a dramatic improvement in computing efficiency this limit determine the maximum size of the high-end system that can be deployed.

To make Exascale a reality by the ends of the decade dramatic changes in datacenters, architectures and in particular software paradigm need to be faced.

In this talk the challenges and opportunities related to these changes will be discussed and confronted with the roadmap to exascale systems.

Presenter: Dr CAVAZZONI, Carlo (CINECA)

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