

Computer Science Grids and research in Grid Computing

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1. Short overview

The Computer Science discipline, especially in large scale distributed systems like Grids and P2P systems and in high performance computing areas, tends to address issues related to increasingly complex systems, gathering thousands to millions of non trivial components. Theoretical analysis, simulation and even emulation are reaching their limits. Like in other scientific disciplines such as physics, chemistry and life sciences, there is a need to develop, run and maintain generations of scientific instruments for the observation and the experimentation of complex distributed systems running at real scale and under reproducible experimental conditions. Grid'5000 is a large scale system designed as scientific instruments for researchers in the domains of Grid, P2P and networking. More than a testbed, Grid'5000 has been designed as a "Computer Science Fully Reconfigurable Large Scale Distributed and Parallel System". It allows researchers to share experimental resources spanning over large geographical distances, to allocate resources, to configure them, to run their experiments, to realize precise measurements and to replay the same experiments with the same experimental conditions. Computer scientists use this platform to address issues in the different software layers between the hardware and the users: networking protocols, OS, middleware, parallel application runtimes, applications. In this talk, we will present: 1) the motivations, design and current status of Grid'5000, 2) some key results at different level of the software stack, 3) the impact of this system as research tools, 4) ALADDIN, the INRIA initiative to make Grid'5000 a sustainable research platform.

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