Resilience algorithms to cope with fail-stop and silent errors

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Résumé

This talk focuses on resilience algorithms at extreme scale. Many papers deal with fail-stop errors, many others deal with silent errors (or silent data corruptions), but very few papers deal with fail-stop and silent errors simultaneously. However, HPC applications will obviously have to cope with both error sources. This talk presents a unified framework

and optimal algorithmic solutions to this double challenge. Silent errors are handled via verification mechanisms (either

partially or fully accurate) and in-memory checkpoints. Fail-stop errors are processed via disk checkpoints. All verification and

checkpoint types are combined into computational patterns. We provide a unified model, and a full characterization of the optimal

pattern. Our results nicely extend several published solutions and demonstrate how to make use of different techniques to solve the double threat of fail-stop and silent errors.

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