Simulations of the Effect of Neutrons on Stockpile Transistors

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Programmatic justification:

This work will support the Qualification Alternatives to the Sandia Pulsed Reactor (QASPR) program with the goal of understanding neutron and gamma radiation effects on stockpile power bipolar junction transistors (BJTs). Improvements to the scaling of the Trilinos solvers used in this work will benefit other ASC codes.

Goal/Objective of CCC4:

The main objectives of this work are to support and further the goals of the QASPR program and to improve scaling of the Trilinos solvers for large-scale simulations, which will benefit other ASC codes.
The former includes testing and evaluation of preconditioners with the goal of reducing the simulation time for transistors for large-scale high fidelity simulations. Demonstrating, and identifying limitations to, parallel scalability of the Trilinos solvers used for this work will benefit numerous other ASC codes.

Scaling:

The RAMSES/Charon semiconductor physics code was one of the Cielo 6x acceptance codes and has been run over 64k cores.

Experience:

The RAMSES/Charon code has also been run on large processor core counts during CCC3.

C1 Requirements: 2 jobs, 6400 nodes, 4 hrs each
C2 Requirements: 8 jobs, 4096 nodes, 4 hrs each
C3 Requirements: 2 jobs, 2048 nodes, 4 hrs each; 2 jobs, 1024 nodes, 72 hrs each; 20 jobs, 1024 nodes, 4 hrs each
Total Cielo days required for this proposal: 2.0 days

Data Management:

How much data do you expect to store in the /scratch file system? 5 TB

How much data do you expect to store in the LANL HPSS archive? 2 TB
How much data do you expect to transfer across the WAN? 0.1 TB
For data to be transferred across the WAN: will it be destined for a file system, HPSS, or both? File system

Will your application require the use of the read-only "UDSL' file system? No

Visualization

What visualization software/tools will you require on Cielo? paraview

List of users authorized to use this CCC4 bank:
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