Crossroads

Advanced Simulation & Computing (ASC)
Advanced Technology System (ATS)

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Performance, Portability and Productivity in HPC Forum

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LANL's (recent) path to Crossroads

Roadrunner
2008 - 2013
1 PF
IBM
PowerXCell 8i 3.2 Ghz /
Opteron DC 1.8 GHz
#1 June 2008

Cielo
2010 - 2015
1.37 PF
Cray XE6
AMD Opteron™ 8-core
"Magny-Cours" 2.4 GHz
#10 2010

Trinity
2015 - 2021

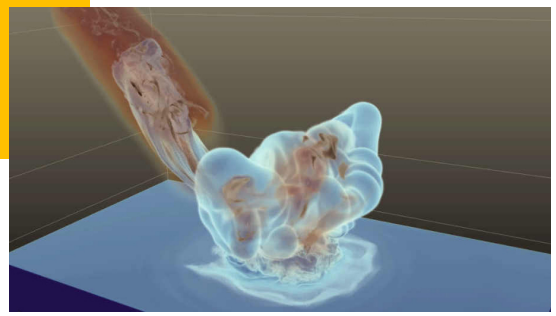
Cray XC40	
Intel Xeon E5-2698v3 "Haswell"	Intel Xeon Phi 7250 "Knights Landing"
9436 nodes	9984 nodes
Dual socket, 16 cores/socket, 2.3 GHz	1 socket, 68 cores, 1.4 GHz, > 3 Tflops/KNL
128 GB DDR4	96 GB DDR4 + 16GB HBM
1.15 PB on-node memory	1.12 PB on-node memory
#6 on Top500 (2015) 8.1 PF	**Currently #11 on Top500 20.2 PF**

Crossroads
FY22 - FY26

Crossroads: Mission & Efficiency

Mission: To support the success of the National Nuclear Security Administration (NNSA) Stockpile Stewardship Program (SSP)

- Support 1–4 workflows simultaneously at 0.5PiB – 2PB of memory/workflow
- Enable more frequent longer-running higher fidelity 3D weapons performance simulations
- Provide a significant stockpile simulation capability for large-scale multi-physics applications
- Explore and exploit alternate technologies
  - Provide vendor diversity while presenting the weapons design/code community with reasonable needed changes to exploit the architecture



- The goal of the Crossroads platform procurement is Efficiency.
  - **Porting efficiency**
    The ease in which NNSA mission codes can be ported to execute on the proposed architecture. Minimal change to the existing code base is of high value.
  - **Performance efficiency**
    The achieved performance of the application once ported to the proposed platform.
  - **Workflow efficiency**
    The efficiency that a complete NNSA workflow executes on the proposed platform.

Crossroads Project

- Collaboration:
  - ACES *(**A**lliance for **C**omputing at **E**xtreme **S**cale)* is a collaboration between Sandia National Laboratories (SNL) and Los Alamos National Laboratory (LANL)
- Leadership:
  - Jim Lujan (LANL) and Jim Laros (SNL)

- Sited at Los Alamos National Laboratory
- Serve the NNSA ASC tri-lab simulation community—LLNL, LANL and SNL

Crossroads Updates

- Timeline
  - January 2019 – RFP released
  - ….. Procurement fun
  - March 2020 - Crossroads contract awarded
  - ….. Finalize technologies
  - More information coming soon!

QUESTIONS? … ONLY THOSE THAT I CAN ACTUALLY ANSWER.