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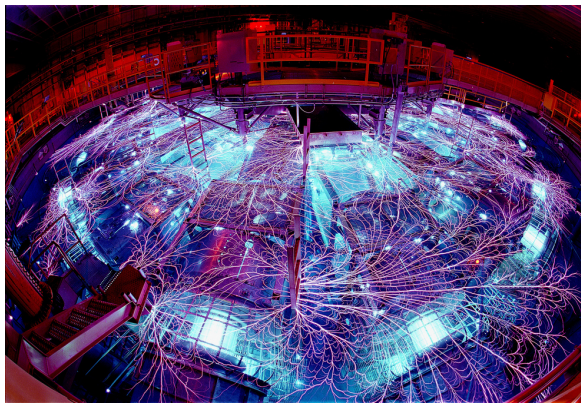

A Wonderful Sample Slidedeck

This is the subtitle

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8/21/14

U.S. DEPARTMENT OF ENERGY | NNSA National Nuclear Security Administration

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Performance levels

- Peak performance
  - Summ of all speeds of all FP units in system
  - Theoretical upper bound on performance
- LINPACK
  - The “Hello World” of parallel performance codes
  - Solve Ax=B using Gaussian elimination, highly tuned
- Gordon Bell Prize-winning application performance
  - Right application + right algorithm + right platform + years of effort
- Average sustained application performance
  - What one can reasonably expect for standard applications

When reporting performance results, these levels are often confused, even in reviewed publications

Performance levels (NERSC-5)

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- Peak advertised performance: 100 Tflop/s
- LINPACK (TPP): 84 Tflop/s
- Best climate application: 14 Tflop/s
  WRF code benchmarked in December 2007
- Average sustained application performance: ??
  Probably less than 10% peak

Logistics

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- Web page and/or Google group and/or...
  - Depends on class composition and preference
  - Reading list posted this weekend
  - Round-robin student presentations and group discussion
- Some lecture on certain topics
- Guest lectures
- Hands-on
  - 3 or 4 programming assignments
  - First assignment Monday: warmup / refresh on concurrency / multithreading
  - CCI cluster hopefully available, CS cluster
- Term project: larger scale
  - Propose something, or I have a few candidates
  - Make this effort do double duty if possible
  - Implementation and performance evaluation
  - Teams OK if we have enough people and scope is right

List of topics

Subject to change as we go along:

- Architectures: performance characteristics of parallel machines, shared-memory (NUMA, multicore) and distributed memory
- Applications: scientific and engineering applications
- Decomposition methods - domain, functional, pipelining, divide/conquer
- Programming and OS constructs and models (emphasis)
- Parallel I/O and storage systems
- Interconnection networking
- Lightweight Kernels
- Virtualization