Research Interest Overview

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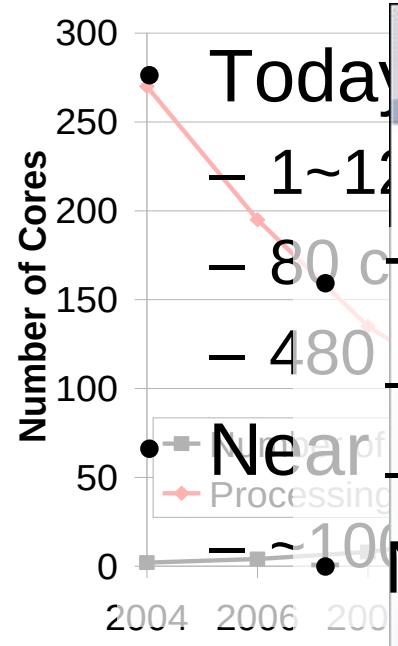
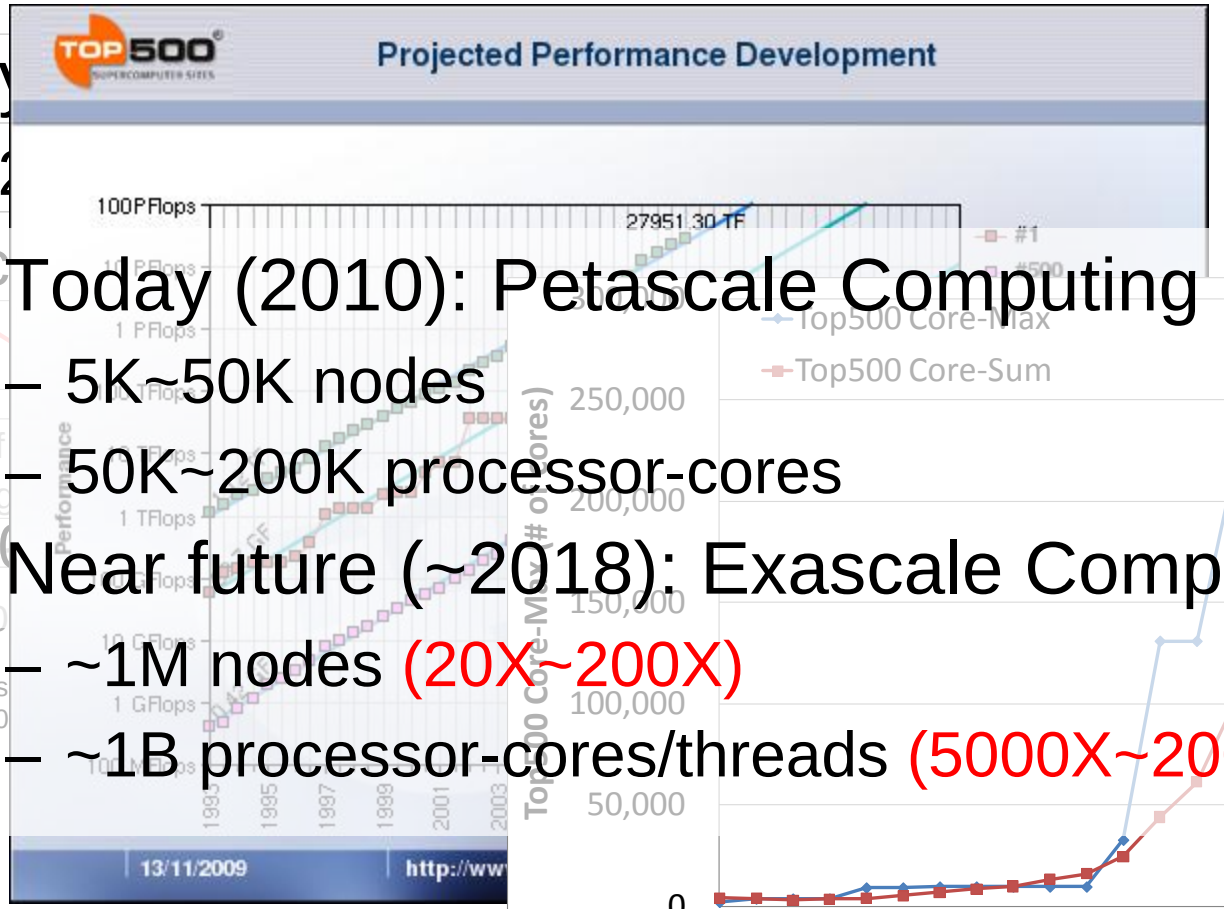
Manycore and Exascale Computing: Projected Growth Trends

- Today (2010): Petascale Computing
  - 5K~50K nodes
  - 50K~200K processor-cores
- Near future (~2018): Exascale Computing
  - ~1M nodes (20X~200X)
  - ~1B processor-cores/threads (5000X~20000X)



Pat Helland, Microsoft, The Irres
Objects, November 9th, 20



Top500 Projected Developm
http://www.top500.org/

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Specific Example

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- Who will be affected?
  - Everyone
- How?
  - Desktops, Datacenters, Cloud Computing, Grid Computing, and Supercomputing
- Applications?
  - Weather modeling, global warming, national security, energy, drug discovery, medical imaging, bioinformatics, biochemistry, data analytics, economic modeling, astronomy, etc…
- My research focus:
  - Resource management at extreme scales
  - Architecting future computing and storage systems
  - Programming models for large-scale parallel/distributed systems
  - Supporting large-scale data/compute-intensive applications

Areas of Possible Collaboration

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- Areas where I can help:
  - Expert in distributed systems and high-performance computing
    - Do you want to port your application from your laptop to a cluster, cloud, or even a supercomputer?
    - Do you want to learn about tools to help you parallelize your applications?
  - Do you have funds to build a small cluster, and want help on designing it to suit your specific needs?
  - Teaching:
    - CS595: Hot Topics in Distributed Systems: Data-Intensive Computing
    - CS550: Advanced Operating Systems (focused on Distributed Systems)
- Areas where I need help:
  - **Real Applications, real datasets, real workloads!!!**
  - **Theory:** I am a systems person, I build real systems, to solve real problems; however, sometimes looking at the problem from a theoretical perspective could be beneficial in design/analysis, especially wh generalizing the work to future hypothetical systems.

10 Seconds