CSE/ESE 569M Introduction

Note Title 1/13/2009

- Parallel Arch.
- Prog Env.
  - shared memory
  - message passing
- Issues in parallel codes
- Applications

⇒ www.cs.uwstl.edu/~rogir/569m.html

CMS
- find Doc file in Intro module
- find discussion board

grading

	approx.
assignments turn in .zip file	20%
project	20%
midterm	30%
final	30%

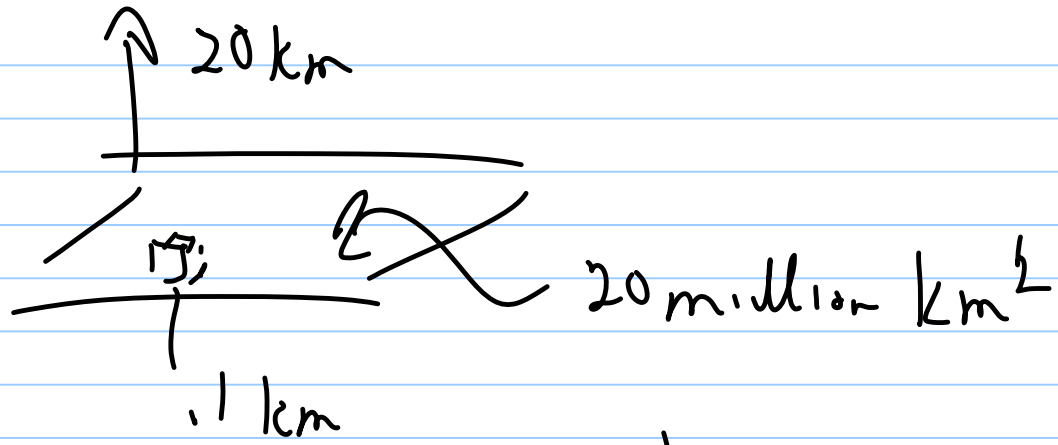
IPDPS.org

need for computing

e.g., weather, atm. modeling

use cubic grid

- each cube 0.1 km / side
- cover U.S. & Canada
  ~ 20 million km^2
- cover height of 20 km



$$\#\text{ of grid pts} \approx (2.\times 10^7)(20)(10^3)$$

$$\text{km}^2 \quad \text{km} \quad \text{cubes/km}^3$$

$$\text{area} \quad h$$

$$= 4 \times 10^{11}$$

- 100 inst. / grid pt.

$\Rightarrow 4 \times 10^{11} \times 100 = 4 \times 13^{13}$ inst

- want 1 / hr for two days

$4 \times 10^{13} \times 48 \approx 2 \times 10^{15}$ inst

machine 1 gigaflop = 1000 mflops

$= 10^9$ inst/sec

$$\text{time} \rightarrow \frac{2 \times 10^{15} \text{ inst}}{10^9 \text{ inst/sec}} = 2 \times 10^6 \text{ sec} = 23 \text{ days}$$

1 teraflop $= 10^{12}$ inst/sec

$$\text{time} \rightarrow \frac{20 \times 10^{15} \text{ inst}}{10^{12} \text{ inst/sec}} = 2000 \text{ sec} \approx \frac{1}{2} \text{ hour}$$

cover earth area 5×10^8 km^2

$2^5 \times$ prev. area

time now 13 hours

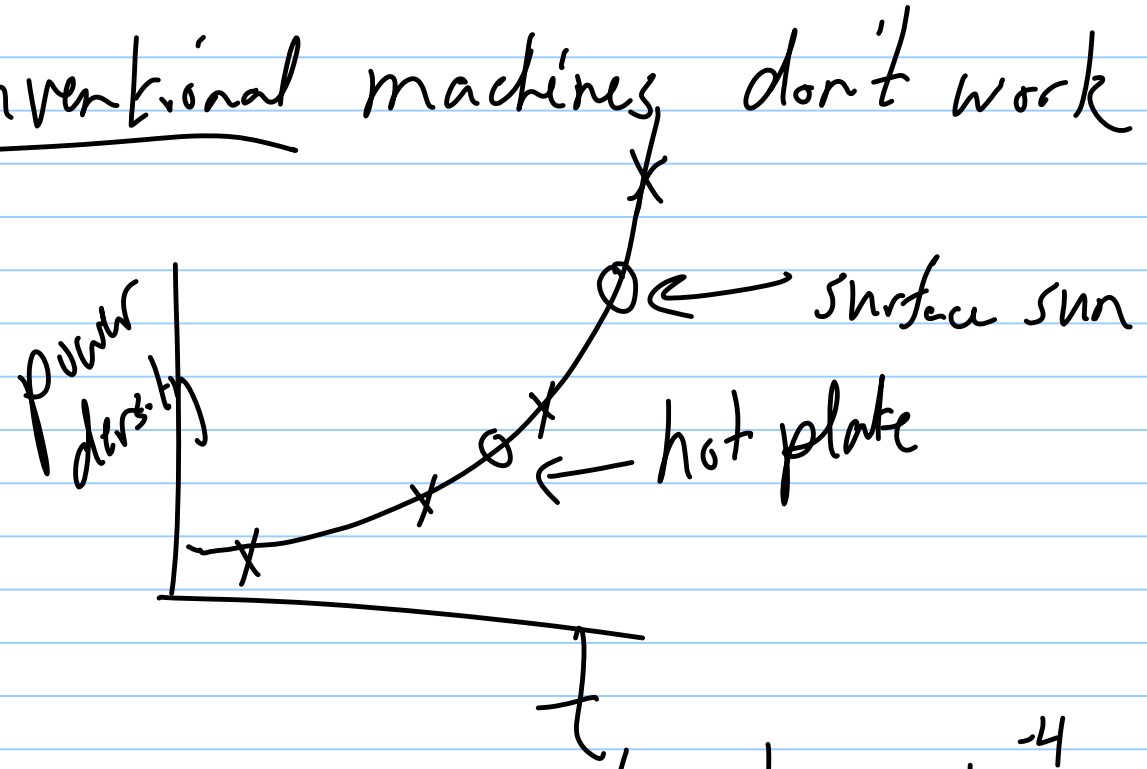
Grand Challenge Problems

Quantum Chromodynamics Very Large Discrete-Event Sim

Blood flow in heart

Evolution of galaxies

conventional machines don't work



10^{12} mem elements

10^{6} dist in 10^{-4} sec

10^{-10} meters / element size of atom

Class exp. infrastructure

8 proc. (4 dual-core) AMD Opterons

rote. cet. wustl. edu

Lopata 400 30 machines quad cores

Sun Grid Engine