

Bringing Disruptive Technology to Competition: Purdue and SiCortex

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Our Team

Our SiCortex

- SCI458 with 6 boards
- 972 cores at 500MHz!
- 4GB/node
- All under 26A of power...

Learning Curves...

- Cross-compiled most applications
- Some applications caused more trouble than others... (POY)
- Other applications just compiled and ran (RAxML)
- The rest needed just a little bit of work

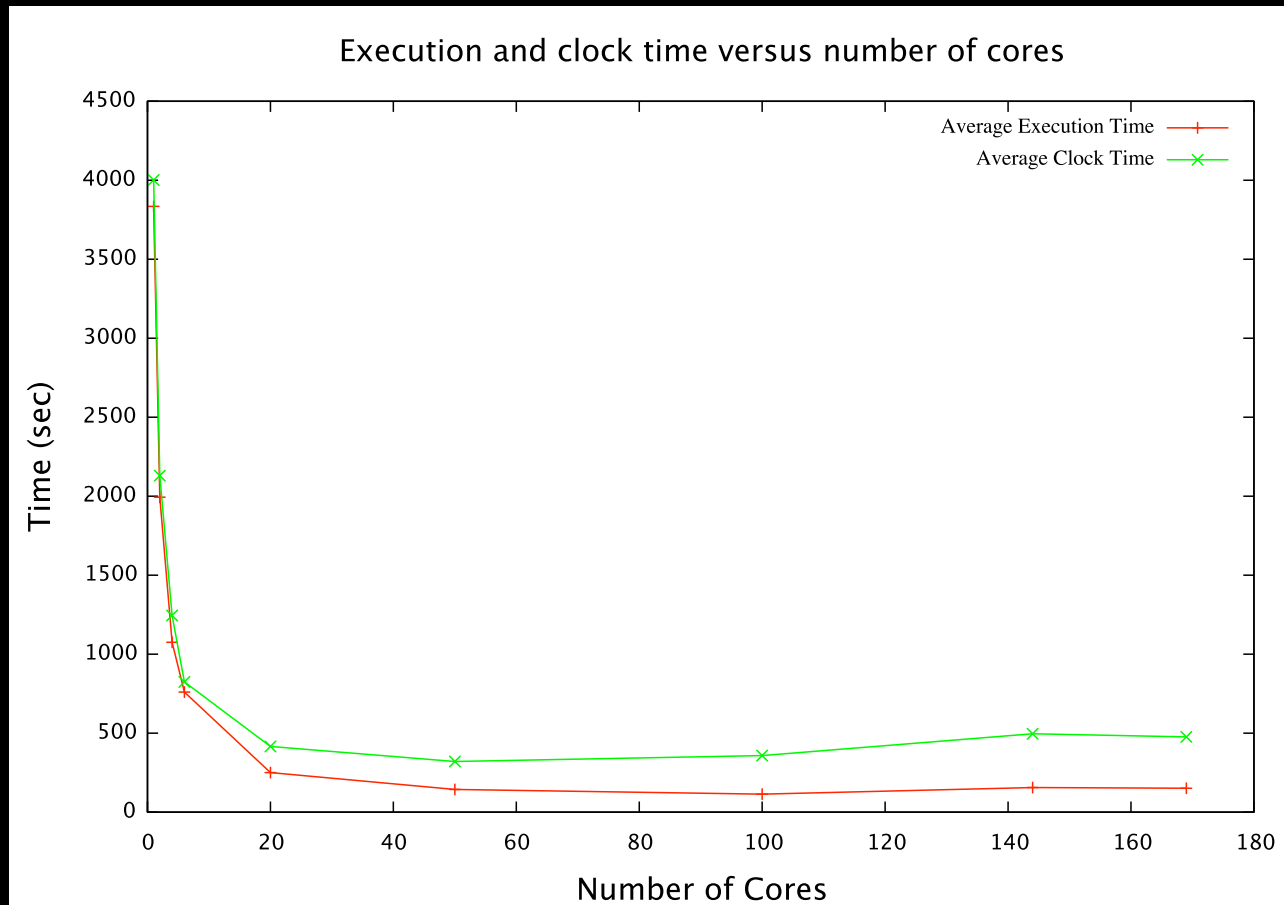
Preparation

- Two team members acted as “sys-admins”
 - Maintained the machine and compiled apps
- Others learned their applications and performed scaling tests

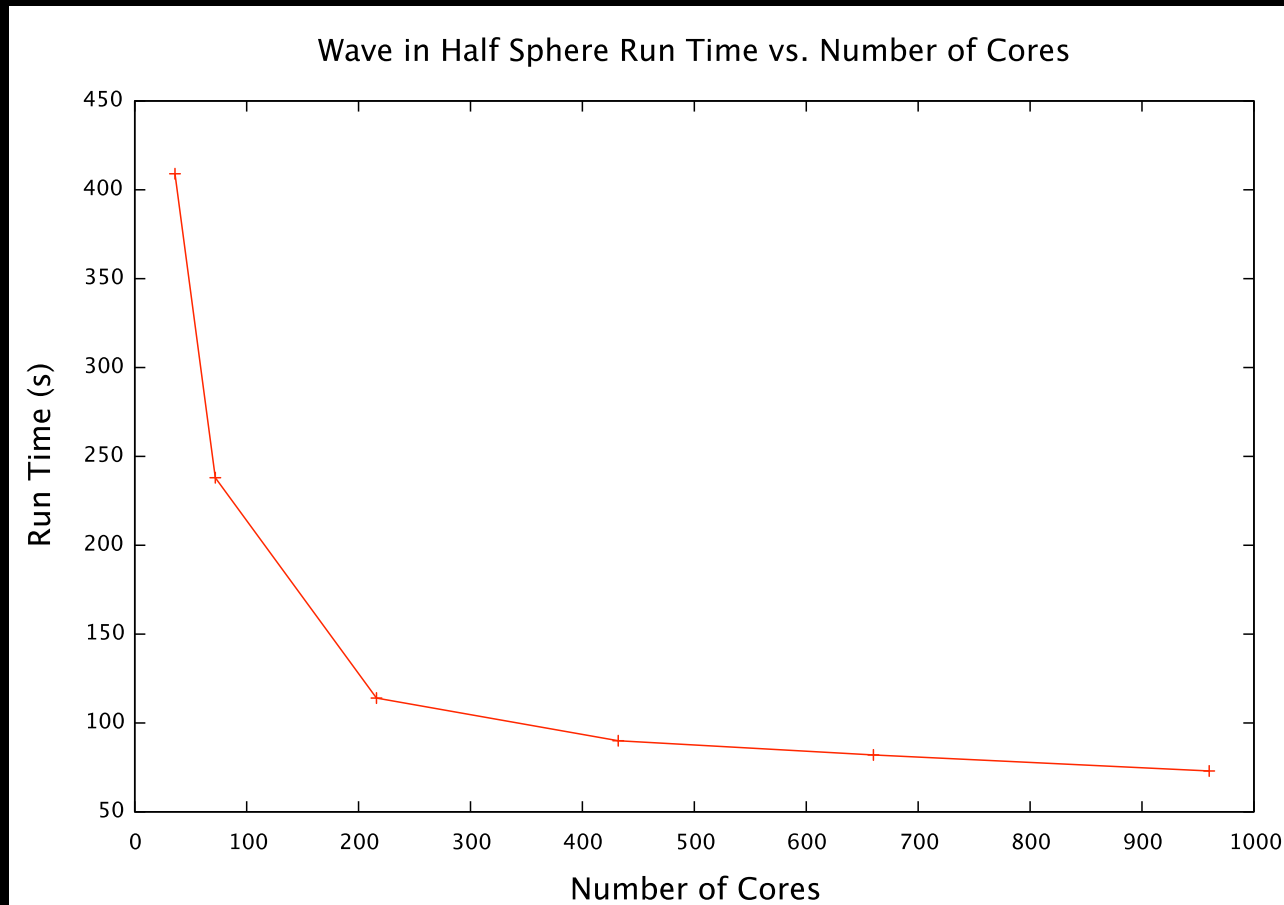
Scaling Tests

- Tested each application to find optimum number of cores
- Most applications couldn't use all cores effectively

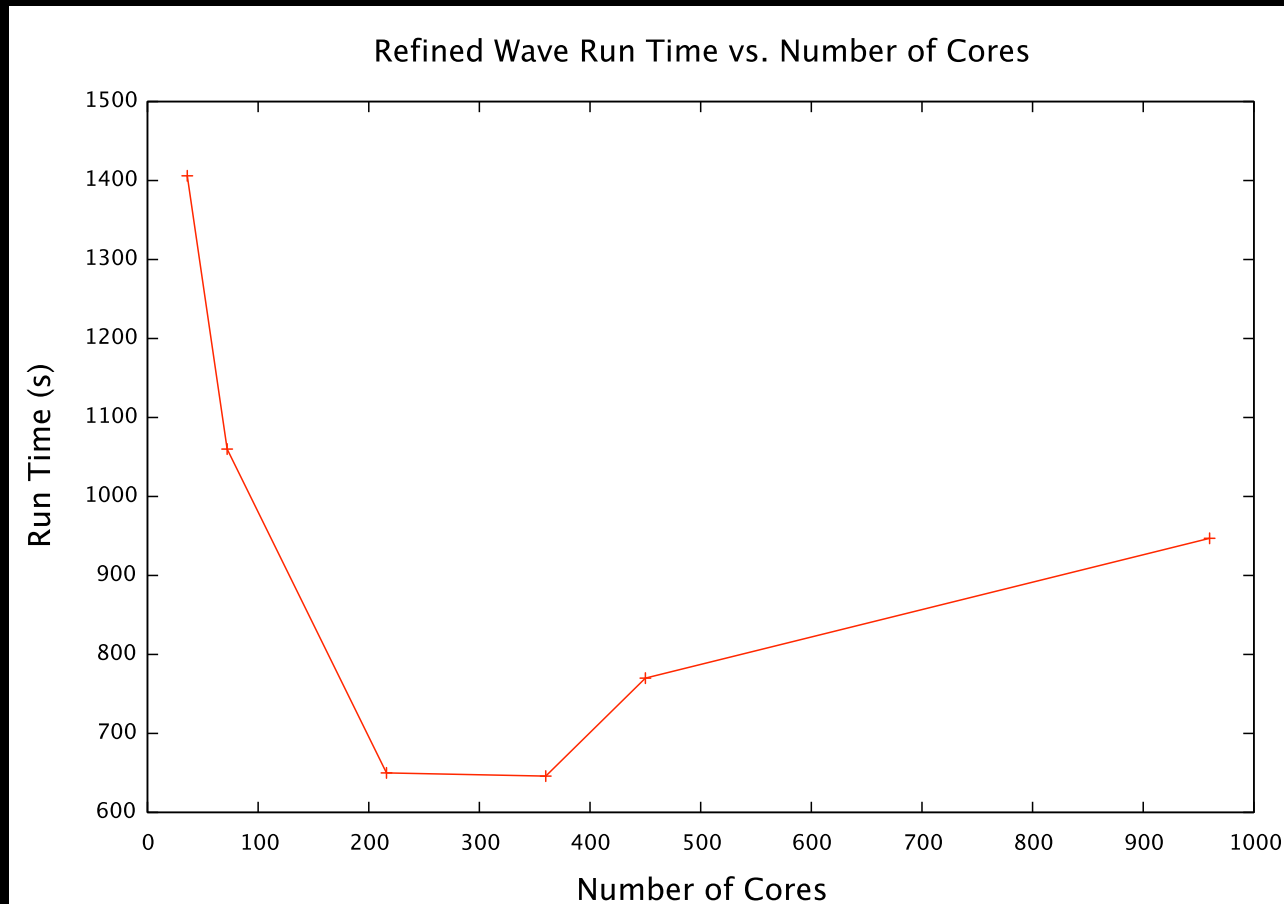
Scaling tests for OpenFOAM



Scaling Tests for WPP



Scaling Tests for WPP



At the competition

- Since none of our apps scaled across the entire machine...
- Run them all at the same time!
- Some of the performance was unexpected...

Scaling of CC08 Data

- OpenFOAM datasets scaled as expected
- WPP runs didn't finish, even though they should have had enough time
 - Possibly ran out of memory and deadlocked

Hardware failure

- Board died on Monday during HPCC benchmarking
- Quick replacement solved our problems

Benefits of the SiCortex

- No fighting over whose job gets to run first
- Extremely power efficient
- Excellent vendor support!

Most power efficient cluster

SiCortex was well enough integrated that the Purdue team was able to push the machine to become the first machine at the competition to achieve ITFlop using the Linpack benchmark and provided great enough power efficiency to win the “Cluster Challenge 2008 Most Power Efficient” award.

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