

Introduction to Chapel: a Next-Generation HPC Language

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CRAY

What is Chapel?

- A new parallel language being developed by Cray Inc.
- Part of Cray's entry in DARPA's HPCS program
- **Main Goal:** Improve programmer productivity
 - Improve the **programmability** of parallel computers
 - Match or improve upon the **performance** of current prog. models
 - Provide better **portability** than current programming models
 - Improve **robustness** of parallel codes
- Target architectures:
 - multicore desktop machines
 - clusters of commodity processors
 - Cray architectures
 - platforms from other vendors
- A work in progress



Chapel: a next-generation HPC language (2)



The Chapel Team

- Brad Chamberlain



- Steve Deitz



- Samuel Figueroa



- David Iten



- Lee Prokowich



Interns

- Robert Bocchino ('06 – UIUC)
- James Dinan ('07 – Ohio State)
- Mackale Joyner ('05 – Rice)
- Andy Stone ('08 – Colorado St)

Alumni

- David Callahan
- Roxana Diaconescu
- Shannon Hoffswell
- Mary Beth Hribar
- Mark James
- John Plevyak
- Wayne Wong
- Hans Zima

Goals For Today

- Provide an overview of next-generation HPC languages
- Introduce you to the Chapel language in depth
- Give you experience...
 - ...using the Chapel compiler
 - ...writing Chapel code
- Get your feedback on the language and compiler
- Point you toward resources to use after today
- Look for collaboration opportunities

Who are You?

- Affiliation: academia, industry, lab, other
- Favorite language(s)
- Familiarity with C/C++/Java
- Interest in next-generation HPC languages/Chapel
- What you hope to get out of this tutorial

Rough Schedule

- 9:00 – Welcome
- 9:15 – [Chapel Background](#)
- 9:30 – [Base Language](#)
- 10:00 – *Coffee Break*
- 10:15 – [Task Parallelism](#)
- 11:15 – *Break*
- 11:30 – [Data Parallelism](#)
- 12:30 – *Lunch*
- 14:00 – [Locality and Affinity](#)
- 14:30 – [Status and Future Directions](#)
- 15:00 – *Coffee Break*
- 15:15 – [Hands-on Session](#)
- 17:00 – *Break*
- 17:15 – [Hands-on Session](#) (continued)
- 19:00 – *Done*