CRAY
THE SUPERCOMPUTER COMPANY

Chapel: Wrap Up

Outline

- About Chapel v1.1
- Implementation status
- External collaborations

Chapel Version 1.1

- Features
  - Open source at http://sourceforge.net/projects/chapel/
  - Distributed under the BSD Open Source license
  - Ported to Linux/Unix, Mac, Cygwin
- Contents
  - Compiler, runtime, standard modules, third-party libraries
  - Language spec, quick reference, numerous examples
- Highlights
  - Most data-parallel operations execute in parallel
  - Improved control of data parallelism
  - Completed Block and Cyclic distributions

Implementation Status

- Language Basics
  - No support for inheritance from multiple or generic classes
  - Incomplete support for sparse arrays and domains
  - No support for skyline arrays
  - Several internal memory leaks
- Task Parallelism
  - No support for atomic statements
  - Memory consistency model is not guaranteed
- Data Parallelism
  - Promoted functions/operators do not preserve shape
  - No partial scans or reductions

Collaborations

- **Notre Dame/ORNL** (Peter Kogge, Srinivas Sridharan, Jeff Vetter) Asynchronous software transactional memory over distributed memory
- **UIUC** (David Padua, Albert Sidelnik, Maria Garzaran) CPU-GPU computing
- **BSC/UPC** (Alex Duran) Chapel over Nanos++ user-level tasking
- **U. Malaga** (Rafa Asenio, Maria Gonzales, Rafael Larossa) Parallel file I/O
- **OSU** (Gagan Agrawal, Bin Ren) User-defined reductions over FREERIDE
- **U. Colorado** (Jeremy Siek, Jonathan Turner) Interfaces and generics
- **PNNL/CASS-MT** (John Feo, Daniel Chavarria) Hybrid computing in Chapel; Cray XMT performance tuning; ARMCI port
- **ORNL** (David Bernholdt *et al.*, Steve Poole *et al.*) Code studies – Fock matrices, MADNESS, Sweep3D, coupled models, ...
- **Berkeley** (Dan Bonachea, Paul Hargrove *et al.*) Efficient GASNet support; collective communication
- **U. Oregon/Paratools Inc.** (Sameer Shende) Performance analysis with Tau

Chapel Interns

- Mackale Joyner (‘05 – Rice)
- Robert Bocchino (’06 – UIUC)
- James Dinan (’07 – Ohio St.)
- Andy Stone (’08 – Colorado St.)
- Jacob Nelson (‘09 – U. Wash.)
- Albert Sidelnik (‘09 – UIUC)
- Jonathan Turner (’10 – U. Colorado)
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