Project Status, Next Steps
This presentation may contain forward-looking statements that are based on our current expectations. Forward looking statements may include statements about our financial guidance and expected operating results, our opportunities and future potential, our product development and new product introduction plans, our ability to expand and penetrate our addressable markets and other statements that are not historical facts. These statements are only predictions and actual results may materially vary from those projected. Please refer to Cray's documents filed with the SEC from time to time concerning factors that could affect the Company and these forward-looking statements.
A Year in the Life of Chapel

- **Two major releases per year** (April / October)
  - latest release: version 1.10, October 2\textsuperscript{nd}, 2014
  - a month later: detailed release notes
    - release and notes available at: http://chapel.cray.com/download.html

- **SC activities** (Nov)
  - Chapel tutorials (most years)
  - CHUG meet-up / happy hour (past four years)
  - lightning talks BoF (past three years)
  - educators forum (past two years)
  - talks, posters, emerging technology booth, etc. (whenever possible)

- **CHIUW: The Chapel Implementers and Users Workshop** (May-June)
  - Highlighting Chapel work being done around the community in talks and discussion

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Chapel version 1.10 Highlights

- lighter-weight tasking via Sandia’s Qthreads
- initial support for Intel Xeon Phi Knights Corner (KNC)
- renewed focus on standard libraries
- support for Lustre and cURL-based data channels
- expanded array capabilities
- improved semantic checks, bug fixes, third-party packages, …
- significant performance improvements

https://github.com/chapel-lang/chapel/releases/tag/1.10.0
Implementation Status -- Version 1.10 (Oct 2014)

Overall Status:

- **User-facing Features**: generally in good shape
  - some require additional attention (e.g., strings, OOP)
- **Multiresolution Features**: in use today
  - their interfaces are likely to continue evolving over time
- **Error Messages**: not always as helpful as one would like
  - correct code works well, incorrect code can be puzzling
- **Performance**: hit-or-miss depending on the idioms used
  - Chapel designed to ultimately support competitive performance
  - effort to-date has focused primarily on correctness

This is a good time to:

- Try out the language and compiler
- Use Chapel for non-performance-critical projects
- Give us feedback to improve Chapel
- Use Chapel for parallel programming education
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● PGAS: Partitioned Address Space Programming Model (Wed @ 12:15, room 273)
Chapel Lightning Talks 2014

Chapel Overview
Greg Titus, Cray Inc.

CoMD in Chapel: The Good, the Bad, and the Ugly
David Richards, Lawrence Livermore National Laboratory

Chapel for Python Programmers
Simon Lund, University of Copenhagen

Chapel Iterators: Providing Tiling for the Rest of Us
Ian Bertolacci, Colorado State University

Chapel I/O: Getting to Your Data Wherever It Is
Tim Zakian, Indiana University

LLVM-based Communication Optimizations for Chapel
Akihiro Hayashi, Rice University

COHX: Chapel on HSX + XTQ
(Adventures of a PGAS Language in a Heterogenous World)
Deepak Majeti, Rice University

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CHIUW 2014 Talks and Speakers

User Experiences with a Chapel Implementation of UTS
Jens Breitbart, Technische Universität München

Evaluating Next Generation PGAS Languages for Computational Chemistry
Daniel Chavarria-Miranda, Pacific Northwest National Laboratory

Programmer-Guided Reliability in Chapel
David E. Bernholdt, Oak Ridge National Laboratory

Towards Interfaces for Chapel
Chris Wailes, Indiana University

Affine Loop Optimization using Modulo Unrolling in Chapel
Aroon Sharma, University of Maryland

Keynote: Walking to the Chapel
Robert Harrison, Stony Brook University / Brookhaven National Laboratory

LLVM Optimizations for PGAS Programs
Akihiro Hayashi, Rice University

Opportunities for Integrating Tasking and Communication Layers
Dylan T. Stark, Sandia National Laboratories

Caching in on Aggregation
Michael Ferguson, Laboratory for Telecommunication Sciences
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Chapel: the next five years

● **Harden prototype to production-grade**
  ● optimize performance
  ● add/improve lacking features
  ● improve interoperability

● **Target more complex/modern compute node types**
  ● e.g., Intel MIC, CPU+GPU, AMD APU, …

● **Continue to grow the user and developer communities**
  ● including nontraditional circles: desktop parallelism, “big data”
  ● transition Chapel from Cray-managed to community-governed
The Cray Chapel Team (Summer 2014)
Chapel...

...is a collaborative effort — join us!
Chapel and Education

● When teaching parallel programming, I like to cover:
  ● data parallelism
  ● task parallelism
  ● concurrency
  ● synchronization
  ● locality/affinity
  ● deadlock, livelock, and other pitfalls
  ● performance tuning
  ● …

● I don’t think there’s been a good language out there…
  ● for teaching all of these things
  ● for teaching some of these things well at all
  ● until now: We believe Chapel can play a crucial role here

(see http://chapel.cray.com/education.html for more information and http://cs.washington.edu/education/courses/csep524/13wi/ for my use of Chapel in class)
Chapel: Educator Advocates

- And now, educators are making the argument for us:

http://chapel.cray.com/education.html
“I like Chapel… How can I help?”

Give Chapel a try to see whether it’s on a useful path for your computational idioms
● if not, help us course correct
● pair programming with us is a good approach
● evaluate performance based on potential, not present

Let others know about your interest in Chapel
● your colleagues and management
● Cray leadership
● the broader parallel community (HPC and mainstream)

Contribute to the project
● code contributions, research collaborations, funding
For More Information: Online Resources

Chapel project page: http://chapel.cray.com
  ● overview, papers, presentations, language spec, …

Chapel Facebook page: https://www.facebook.com/ChapelLanguage

Chapel GitHub page: https://github.com/chapel-lang
  ● download 1.10.0 release, browse source repository

Chapel SourceForge page: https://sourceforge.net/projects/chapel/
  ● join community mailing lists; alternate release download site

Mailing Lists:
  ● chapel_info@cray.com: contact the team at Cray
  ● chapel-announce@lists.sourceforge.net: read-only list for announcements
  ● chapel-users@lists.sourceforge.net: user-oriented discussion list
  ● chapel-developers@lists.sourceforge.net: developer discussion
  ● chapel-education@lists.sourceforge.net: educator discussion
  ● chapel-bugs@lists.sourceforge.net: public bug forum
Overview Papers:

  - a detailed overview of Chapel’s history, motivating themes, features

  - a higher-level overview of the project, summarizing the HPCS period

For More Information: Suggested Reading
Blog Articles:

  - a short-and-sweet introduction to Chapel

- **Why Chapel?** (part 1, part 2, part 3), Cray Blog, June-August 2014.
  - a current series of articles answering common questions about why we are pursuing Chapel in spite of the inherent challenges

  - a series of technical opinion pieces designed to combat standard arguments against the development of high-level parallel languages
Surveys
Please take the time to fill out and return the surveys
(both ours and SC14’s)

Thanks!
For your interest in Chapel and your feedback
Any Remaining Questions about Chapel?

Or, anything you’d like to see in a live demo?
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