HPC Programmers Deserve Nice Things Too

Brad Chamberlain, Chapel Team, Cray Inc.

Parallel Programming Panel, ISC 2016, Frankfurt

June 21st, 2016

Panel Questions

1. What in your view are the biggest challenges facing developers of parallel programs? Make sure you define the population of developers that you are considering (e.g., legacy applications, new applications, graph analytics)
2. What solutions already exist, but are not widely known/used/robust enough? E.g., the things you're working on. What still remains to be done to make these solutions sufficient for your target audience?
3. What does the community need to do to advance solutions to the parallel programming challenge? E.g., try out new model A, provide feedback or challenge problems, craft RFPs to encourage new approaches?

Q0: Target Audience

All programmers who care about parallelism and locality

- HPC programmers, naturally
- But let’s not make the mistake of stopping there

Q1: Biggest Challenges?

Technical:

- the increasing diversity of processor + node architectures
  - the resulting impact on software / programmers
- the historical lack of attractive + adopted HPC languages

Social:

- ennui
- new and existing talent gravitating away from HPC

Q2a: Possible Solutions?

Chapel: http://chapel.cray.com

- a general parallel programming language
- focuses on expressing parallelism and locality…

  …abstractly w.r.t. a system's capabilities

  …in a user-extensible way
- open-source, portable, collaborative

Q2b: What remains?

Technical:

- depends on the user:
  - for some: spit and polish
  - for others: performance, memory management improvements

Social:

- avoiding assumptions that Chapel today is as it was *n* years ago
- community growth: early adopters and open-source contributors

Q3: How to advance solutions?

Technical:

- impartial evaluation frameworks
- pair-programming opportunities for users × language developers

HPC

The ^Computer Language Benchmarks Game

Social:

- community desire to evolve beyond the status quo
- “can do” attitudes / avoid contributing to self-fulfilling prophesies
  - (”I’d like to work with/on Chapel but it’ll never catch on”)