

Autotuning Workshop Introduction and Plans

Mary Hall

April 3, 2008

Agenda, Thursday

Thursday, April 3, 1:30PM-5:30PM

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|------|---|----------------------|
| 1:30 | Welcome and Goals for Workshop | Mary Hall |
| 1:50 | KEYNOTE: Integrating Autotuning Into the Application
Development Environment | Bill Gropp |
| 2:35 | Autotuning Libraries | Kathy Yelick |
| 3:00 | <i>BREAK</i> | |
| 3:30 | Automatic Algorithm Selection | Lawrence Rauchwerger |
| 3:55 | Standardized Parameter Space Representation for
Empirical Optimization | Ananta Tiwari |
| 4:20 | Adaptive Sorting | Maria Garzaran |
| 4:55 | DISCUSSION: Autotuning needs of Application and Library Developers | |

Agenda, Friday

Friday, April 4, 8:00 AM-12:00PM

8:00 DISCUSSION: Benchmarking and Grand Challenges

8:30 Achieving accurate and context-sensitive timing for code optimization

Clint Whaley

8:55 Parameterized Performance Modeling and its Potential for Autotuning

Bronis de Supinski

9:20 Continuous Program Optimization

Gheorghe Almasi

9:45 DISCUSSION: Integrating Autotuning into Application Systems

10:00 *BREAK*

10:30 A polyhedral loop transformation framework for automatic parallelization and performance tuning

P. Sadayappan

10:55 Model-guided empirical optimization

Chun Chen

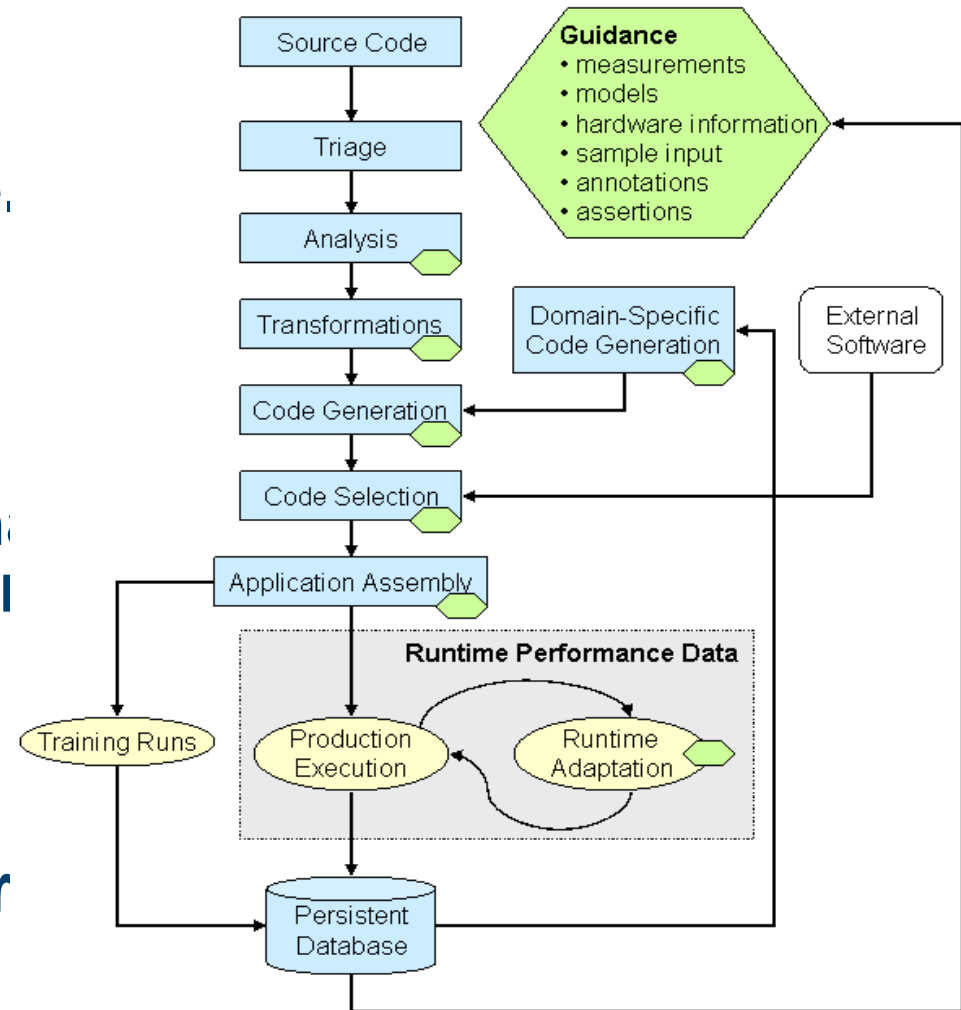
11:20 DISCUSSION: Summary and Plans

Don't forget!

- If you have not already done so, please send a title and abstract
 - Also slides for record of workshop
- I'll have a jump drive for collecting slides or you can email them to me

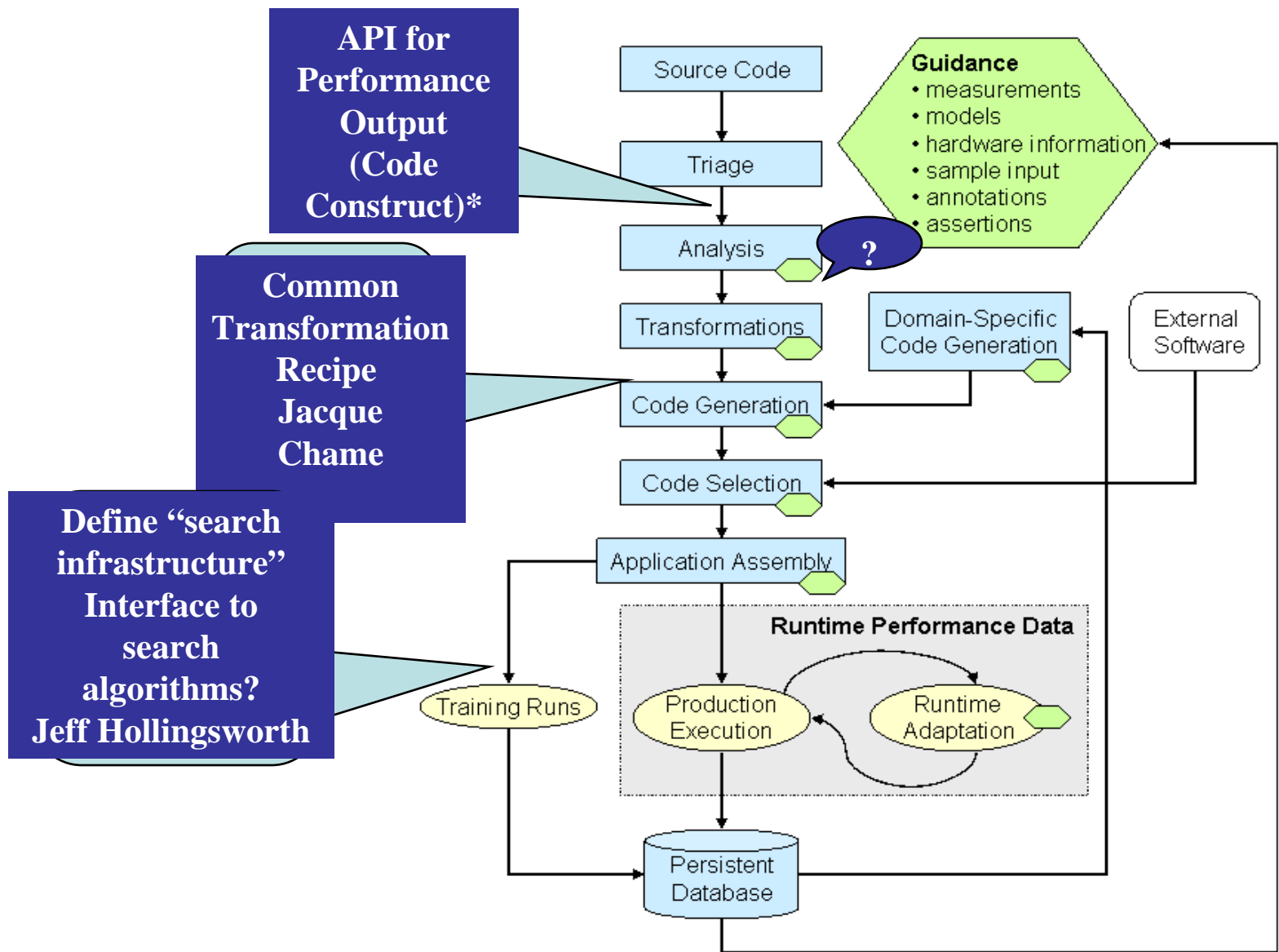
Performance Engineering Research Institute (SciDAC-2)

- Long-term goal is to automate the process of tuning software to maximize its performance.
- Reduces performance portability challenge for computational scientists.
- Addresses the problem that performance experts are in short supply.
- Builds on forty years of human experience and recent success with linear algebra libraries.



PERI automatic tuning framework

Slide source: Bob Lucas and David Bailey



Goals of Workshop

- Third in a series of LACSI workshops begun by Ken Kennedy
 - http://lacsi.rice.edu/symposium/agenda_2005#workshops
 - <http://www.cs.rice.edu/~ken/autotuning/>
- Similar CScaDS workshop series begun last summer
 - <http://cscads.rice.edu/workshops/july2007/autotune-workshop-07>
- Previous workshops largely focused on kernel tuning
 - CScaDS also emphasized new hardware and multi-core

Current workshop theme: How to integrate kernel tuning into systems for application-level tuning

Items for Discussion

- Summary from Autotuning 2005, 2006 and CSCaDS 2007
 - Annotated bibliography
 - Benchmarks
 - Grand challenges
 - Common APIs and interactions between tools
 - Articulation of future research problems
 - Guidance for architects

CAN WE MAKE SOME OF THESE THINGS HAPPEN?

Potential Outcomes of Workshop

- Set up mailing list from various workshops
- Write report of findings?
 - Include previous LACSI and CScaDS results
- Simultaneously, collect annotated bibliography, benchmarks, grand challenges, etc.
- Plans for CScaDS this summer

Proposed Activity: Annotated Bibliography

- We create a reference web site
- Send out email to mailing list
 - All attendees from this and previous workshops
- Each research group contributes a set of entries:
 - Provided in a format that can be converted to Latex or EndNotes, with a couple of sentence description.
 - Selected among a set of categories for the entry. For multiple categories, it only appears in the primary category with cross-link
 - Provide a submitter name for the entry that appears in some views of the bibliography, as an enticement for graduate students and others to submit entries.
 - Possibly a link to where to get a copy of the paper?

SUGGESTIONS ON HOW TO DO THIS?