Prototyping Parallel Code: Intel® Advisor

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Intel® Parallel Advisor 2011

- Prototypes parallelism in existing serial programs:
  - Helps developers identify portions of applications that are candidates for parallelization
  - Analyzes potential parallelism benefit through simulation
  - Enables the developer to evaluate the return on their investment *before* committing to the process of parallelizing their application.
Intel® Parallel Advisor 2011

4 steps to prototype parallelism solutions for applications

**Survey Target** – Identify likely source code locations for parallelism.

**Annotate Sources** – Insert parallelism prototyping macro calls into sources.

**Check Suitability** – Use simulation to approximate performance gain due to parallelism changes.

**Check Correctness** – Helps developers by identifying data issues (races) in the parallel experiment.

The Advisor Workflow window guides the developer through the methodology.
Intel® Parallel Advisor 2011 – Survey Target

Focuses developers attention to the hot call trees and loops as locations to experiment with parallelism.

Developers can drill into the source code.

Top down list of call sites & loops.
Developers insert **annotations** into their sources to describe parallel experiments for the hot calls and loops identified by Survey.

Parallel Advisor annotations are *macros*. They do not impact the developer’s application when Parallel Advisor is not present.

Assistance with the creation and insertion of Advisor annotations.
Intel® Parallel Advisor 2011 – Check Suitability

Developers evaluate their parallel experiments based on projected performance improvements.

Program impact

Scalability of selected site

Developer’s tasks and locks that were executed within the selected site

How to maximize the performance benefit of the selected site

Help when the developer needs it
Developers evaluate the data sharing problems that prevent correct parallel execution.

Observation details:

Problems and Messages

Observation problem sets
Developers can quickly identify the parallel experiments to focus on based on projected performance gains and the number of correctness problems.

Summary of Correctness findings

Summary of Suitability performance projection
Demonstration
Intel® Parallel Advisor 2011 - Summary

• Intel® Parallel Advisor 2011 is available as a standalone product or as part of Intel Parallel Studio 2011
  - Microsoft Windows*, Visual Studio*, C/C++ native applications
  - 30 day evaluation license
  - Intel Parallel Studio web page:
References

• “A Theory of Data Race Detection”, Banerjee, Bliss, Ma, Petersen
  http://cs.ucsb.edu/~arch/spr07-seminar/papers/threadchecker06.pdf

• “Finding Data Race Conditions: Intel® Inspector XE”, Carleton, 2011 Par Lab Boot Camp

• “Threading Assistant Tool from Intel”

• “Using Intel® Parallel Advisor 2011 to determine if your Intel® Threading Building Blocks application will scale”, Jackson Marusarz
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