

Update: OpenMP Profiling API

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Outline

- Performance Issue with Profiling API
 - The problem
 - The fix
- States in the Profiling API
- OpenMP 3.0 Profiling Support: Open discussion
 - Tasks
 - Other issues

Performance of the Profiling API, I

- The Problem:
 - Callstack reconciliation depends on fork callstacks
 - Parallel Region durations may be very short
 - Overhead of unwind at fork is significant
 - Data volume for fork event callstacks is very high
 - However, most fork callstacks are *not* needed
 - Short regions ==> no profile events within region

Performance of the Profiling API, II

- The Fix:
 - Recognize that callstack at fork == callstack at join
 - Do not record callstack at fork
 - But do track region ID, and keep a “used” bit associated with it
 - At join:
 - If “used” bit is off, do nothing
 - If “used” bit is on, unwind and record callstack
- Results
 - Overhead reduction to just a few percent
 - e.g., no collect: 70.1 s.; new collect 71.6 s.; old collect: 128.3 s.

States in the Profiling API

- “OMP Work” can be greater than User CPU Time
 - Happens on Solaris, with microstate accounting
 - That's intuitively wrong
 - “OMP Work” is what the runtime thinks is happening, but it's not necessarily what the target is doing
- Fix: remap state if target is not in User CPU State
 - Will be true if target is waiting for some reason
 - In that case, change from “OMP Work” to “OMP Wait”

Profiling for OpenMP 3.0

- Open discussion ...
 - How should tasks be handled?
 - What is user model?
 - What should the user-model callstack look like inside task?
 - How constrained is the implementation?
 - Will task code be outlined (made into function)?
 - Is that an implementation option?
 - How can we avoid performance problems in profiling tasks?
 - Any other changes that affect profiling?

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