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 \textit{not} needed
    • Short regions $\Rightarrow$ 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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