CEO’s Report

Larry Meadows
on behalf of
Sanjiv Shah, CEO, OpenMP ARB

IWOMP 2005, Eugene, June 1-2, 2005
Agenda

- The OpenMP ARB
- Activities over the last year
- Activities for the next year
- Beyond 3.0
The care of OpenMP is in the hands of the OpenMP Architecture Review Board (the ARB).

The ARB:
- Interprets OpenMP
- Writes new specifications - keeps OpenMP relevant.
- Works to increase the impact of OpenMP.

Organizations join the ARB - not individuals
- Current members
  - Permanent: Fujitsu, HP, IBM, Intel, NEC, SGI, Sun, PGI
  - Auxiliary: ASCI, cOMPunity, EPCC, KSL, NASA

New member since last report: NASA
OpenMP ARB Current Organization

OpenMP ARB (Administrative)
One representative per member

OpenMP Officers
Sanjiv Shah, CEO
David Poulsen, CFO
Nawal Cpty, Secretary

OpenMP Committees (Actual Work)
One representative per member
Language, Mark Bull
Debug, Bronis de Supinski

OpenMP Board of Directors
Greg Astfalk, HP (Chair)
Sanjiv Shah, KSL/Intel
Josh Simons, Sun
Koh Hotta, Fujitsu
Charles Grassl, IBM
Agenda

- OpenMP history and the ARB
- Activities over the last year
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Activities over last year

- Workshops continue
  - WOMPAT 2004 (Barbara Chapman); another good Lab session
  - WOMPEI 2004, (can anyone report?)
- IWOMP 2005 inaugurates the merged conference
- Website finally under ARB control
- Debug committee published a whitepaper
- And most importantly...
OpenMP 2.5 is released!

Congratulations and thanks to Mark Bull and all of the omp-lang team for releasing a specification for the ages.

What the critics say:

I must congratulate the committee on a work well done. It's been quite a challenge to unify the spec for Fortran AND c/c++, but in my opinion you have succeeded well. (Nils Smeds, KTH)

let me first congratulate you to this very fine piece of work
(Michael Suess, University of Kassel)

I laughed, I cried, I couldn’t put it down. Two thumbs up!
(Anonymous parallel programmer)
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OpenMP 3.0

- Mark Bull will chair the committee
- Schedule to be fixed in advance (timeline and milestones)
- Feature list
  - Must have features
  - Desirable features
  - Drop those from desirable list that can’t be done in time
- Target release: September 2006
  - Work backwards to create schedule
3.0 High Priority Features

- WorkQueuing
- Standardized variables for
  - stack size control
  - idle-thread behavior
- Additional SCHEDULE kinds
- Reductions with user defined functions
- REDUCE construct
3.0 High Priority Fixes

- Remove storage reuse for private
- THREADPRIVATE persistence and nesting
- C/C++ directive grammar
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- ARB
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- **Beyond 3.0**
OpenMP Libraries

- All successful languages encourage libraries; more modern languages are mostly about libraries (MFC, STL, Java class libraries, LAPAK, BLAS, ...)

- Parallel languages need libraries even more:
  - Parallel programming is hard
  - Parallel algorithms can be developed by experts and used by novices
  - Modern languages (C++, C#) allow expressing parallelism via metaprogramming (like STL)
OpenMP: Problems for Libraries

- There is no ABI for OpenMP
  - Even on the same hardware; e.g., PGI, Intel, Microsoft, and Pathscale all have x86-64 compilers; can you mix and match OpenMP code compiled with different compilers?
  - There’s a gcc project to do OpenMP. Do we really want another gcc compatibility race?

- There is no analogy to MPI communicators
  - Threads have a “global” scope; need a “library” scope
  - Nested parallelism/Orphaning enough?
Suggestions for action

- Subcommittee to work on libraries
  - Canned algorithms: Graph/numerical/search/media algorithms (mp3, mpeg, imaging, LAPACK, BLAS2/3, FFT, …)
  - Metaprogramming: C++ container classes implementing parallel versions of classic algorithms (hashes, sorting, lists, stacks, …)

- ABI discussions
  - This needs to be driven by the vendors
  - Will we ever agree? Very hard, but our users suffer …
  - If we don’t do something, we’ll be forced to accept whatever gcc comes up with
OpenMP Features

- We want 3.0 to be done quickly
  - Nothing substantial has changed since 2.0 (really 1.1)
  - There is a real need for flexible parallel languages, given the HW architecture progression
- We need a plan for 3.0+
- Research is fertile ground for “new” ideas:
  - DARPA HPCS
    - See Sun’s Fortress, Cray’s Chapel, IBM’s X10
  - Atomic blocks (transactional memory semantics)
  - Futures/continuations
  - ...

OpenMP