CEO's Report

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on behalf of
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IWOMP 2005, Eugene, June 1-2, 2005

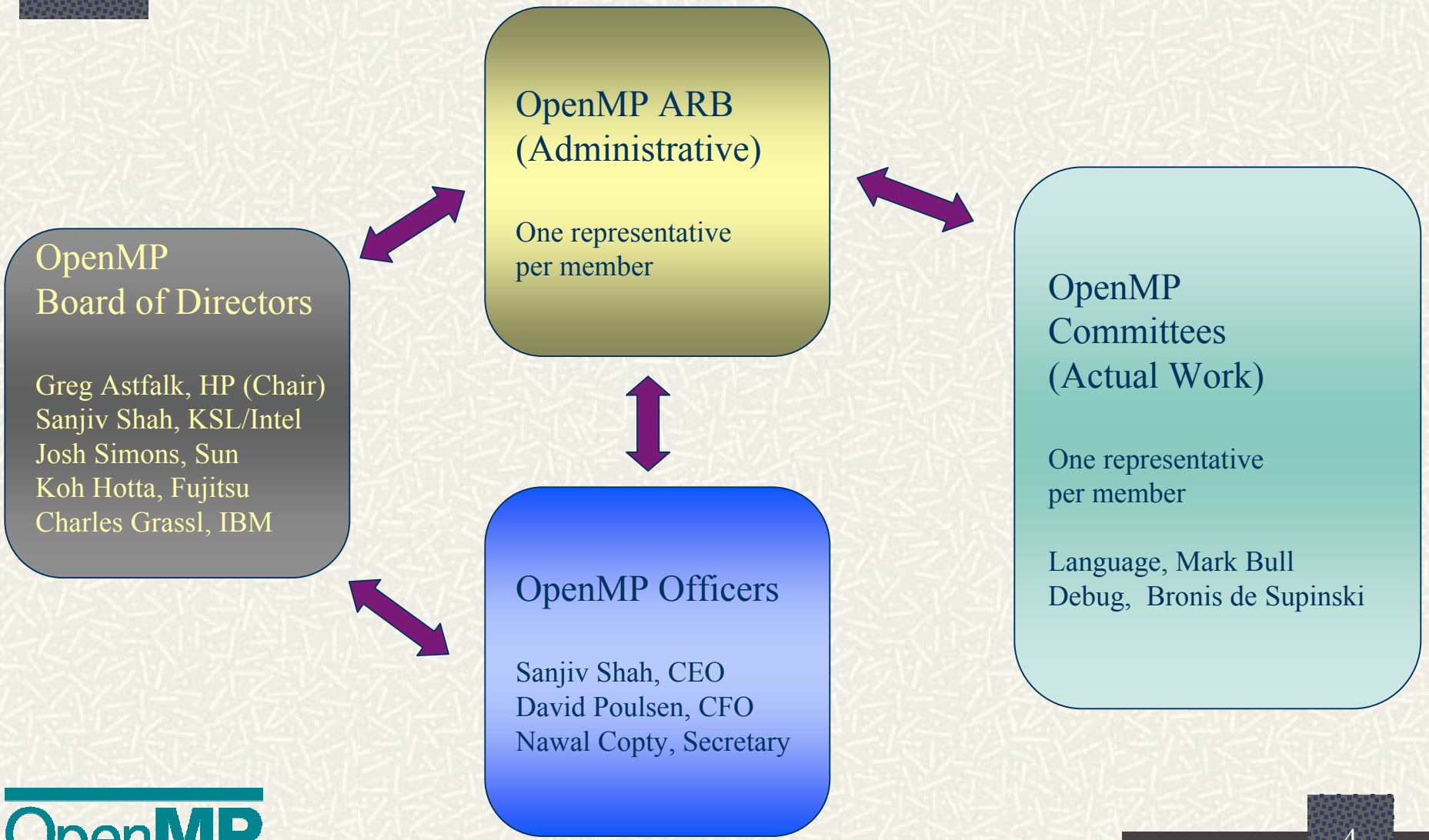
Agenda

- **The OpenMP ARB**
- Activities over the last year
- Activities for the next year
- Beyond 3.0

The OpenMP ARB

- 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



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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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
  - ...