



CODESOURCERY

A General Framework for Multicore Programming with Sourcery VSIPL++

HPEC Workshop

September 23-25, 2008

Brooks Moses, Jules Bergmann, Stefan Seefeld, Don McCoy, Mike LeBlanc

CodeSourcery, Inc

{brooks, jules, stefan, don, mike}@codesourcery.com

888-776-0262 x726

- **Multicore Programming is Hard.**
- Dividing array operations into blocks is (often) simple; scheduling them is difficult.
 - Data dependencies.
 - Communication latency.
- A solution: Automatic scheduling.
 - We are extending our Sourscery VSIPPL++ library to do this.



- Framework is based on a dataflow description.
 - Tasks: Operations on array blocks.
 - Can reference implementations on multiple architectures.
 - Array Conduits: Move array blocks between tasks.

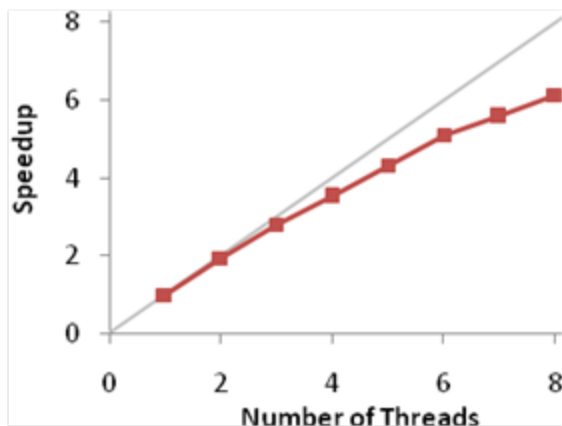
```

Conduit matrix A, B, C, T, Z;
...
forall_index i (0, A.n_blocks(0));
  forall_index j (0, A.n_blocks(1));
    T(i, j) = task_mult(B(i, j), C(i, j));
    Z(i, j) = task_add(A(i, j), T(i, j));
  
```

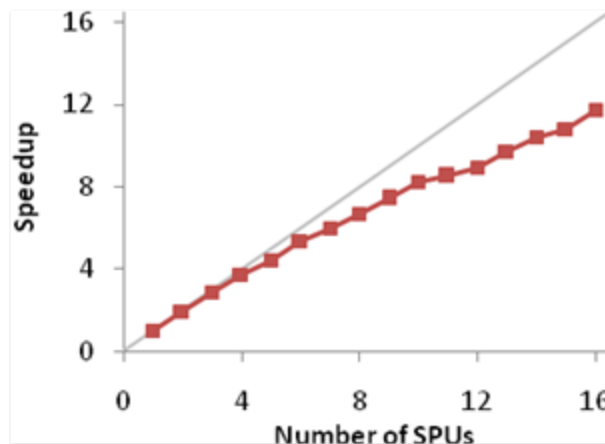
- Portability: Most of this is architecture-independent.



- Proof-of-Concept Demonstration.
 - Portability.
 - Performance:



Multicore x86



Cell / B.E. SPUs

- Design in progress: We'd like feedback!