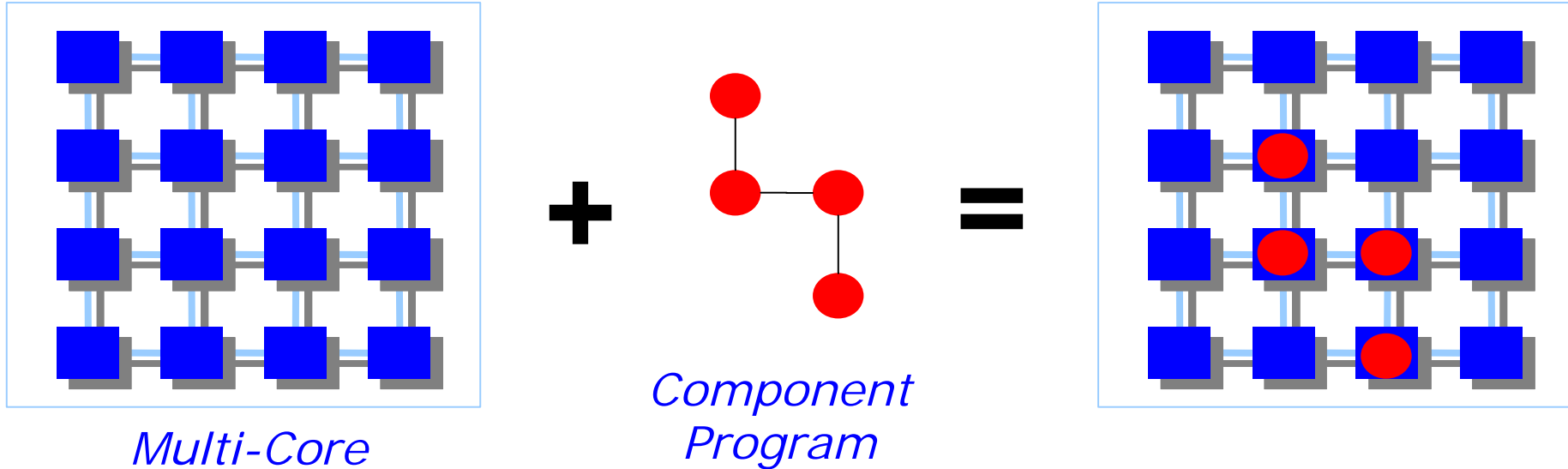




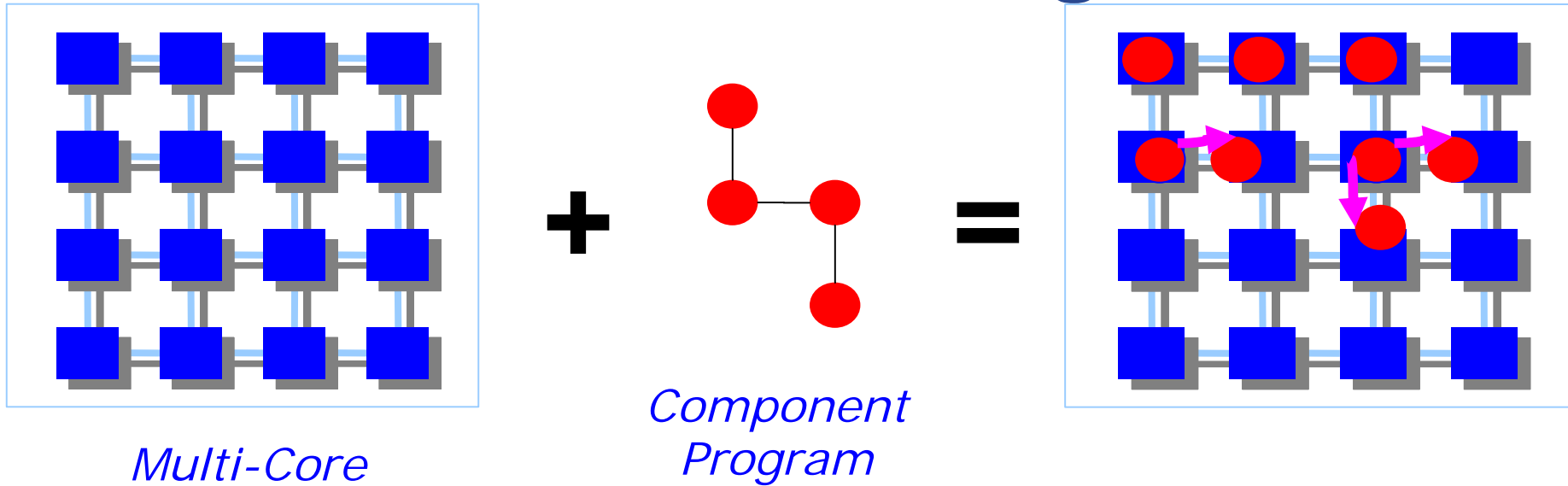
# CAPSULE

# Software & Hardware Trends Blend Well



- Software engineering not only driven by performance (productivity,...)
- Piggy-Back software components trend:
  - Program decomposition
  - Isolation of program parts
  - Explicit communication links

# Component Programming Is Not Enough

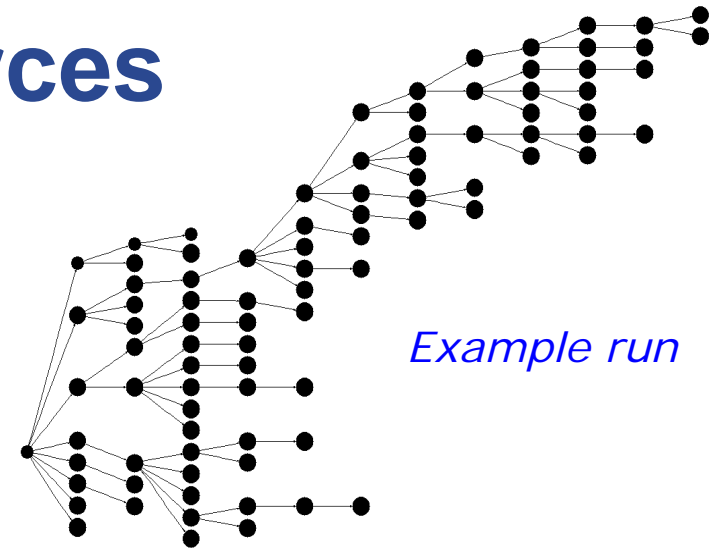


- **BUT** component programming  $\neq$  finding parallelism
- Augment program parts with ability to **divide**
- Architecture or run-time support manage granularity, mapping
- User: **where** division occurs;
- System: **when/if** division occurs  $\Rightarrow$  **conditional** divisions ( $\neq$  Cilk)

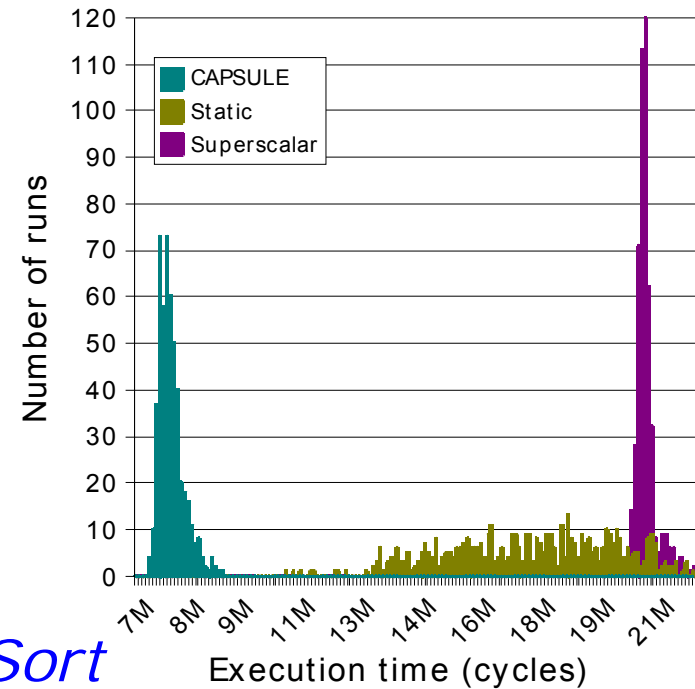
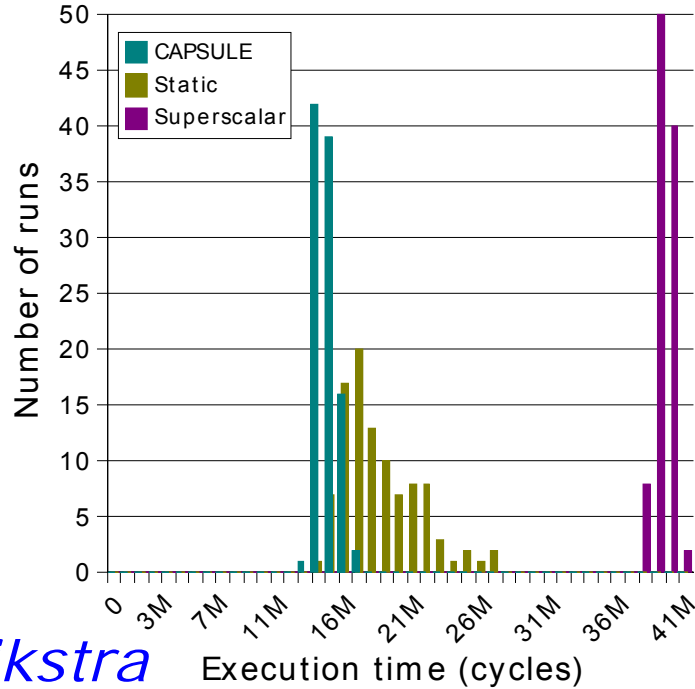
Simple and intuitive programming model

# Dynamic Exploitation of Resources

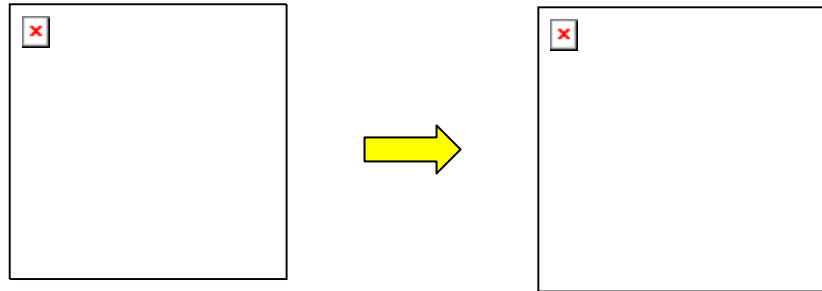
- Load-Balancing properties
- Performance stability across data sets (real-time implications)



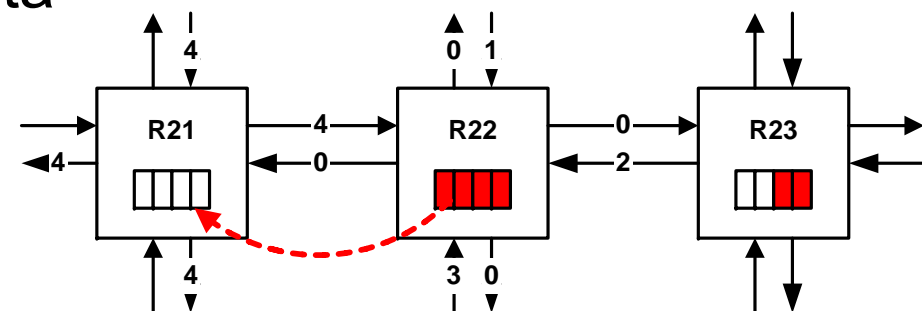
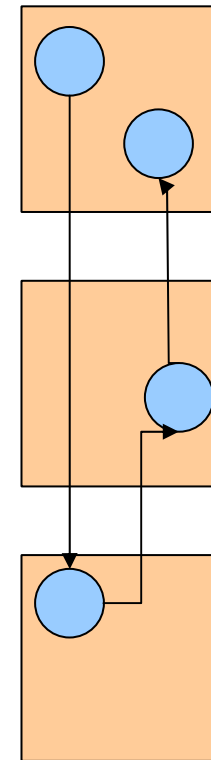
*MICRO 2006,  
DATE 2008*



# Distributed-Memory Multi-Cores



- Distributed-Memory architectures more scalable; one of our main targets
- Two new features required:
  - Automatic movement of data
  - Support for fast probing across network



# Execution Example

