Poster B: Software Technologies and Systems

W. Robert Bernecky

Naval Undersea Warfare Center

Ph: (401) 832-8171

Fax: (401) 832-7455

BerneckyWR@npt.nuwc.navy.mil

Software Technologies Dealing with Complexity

- **Software Tools**
  - **Map software components to hardware**
    - **Task mapping**
    - **cache optimization**
    - **power consumption**
  - **Analyze system performance**
    - **Flops, Memory, Power, Heat, I/O Bandwidth**
  - **Ensure system availability**
    - **High availability**
- **Issues**
  - **Availability of tool**
  - **Ease of use**

Programmer Productivity

- High-Level Languages
  - Matlab
- Portability
  - Capture previous-generation software
  - VSIPL
  - Message Passing Interface (MPI)
  - Middle ware
- Issue
  - Program Efficiency
    - % of computational resources u
      - Often, only 5% to 10%

Software Infrastructure

- Embedded and Distributed Operating Systems
- Real-time Operating System
  - Real-Time Linux

Sensor Networks

- Real-time sensors
- Distributed
- Wireless
- Dynamic topology

The Ideal Software Technology

- Easy to use
- Supports large systems
- Optimizes across multiple constraints
- Produces “hand-tuned” performance
- Portable to next-generation hardware
- Low cost