PVM and Cray Computer Systems

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Agenda

I. How did Cray Research choose PVM?

II. Why did Cray Research choose PVM?

III. What is Cray Research doing with PVM?

IV. Summary

I. How did Cray Research choose PVM?

- investigated tools for distributing scientific applications
- requirements:
    - provide good performance with CRAY systems
    - support heterogeneous computing
    - usable from Fortran and C
- looked at commercial, public domain, and research packages

How... (cont'd)

- looked at:
    - RPCs
    - visual languages
    - parallel languages
    - subroutine toolkits
- late in effort, Cray Research decision to develop MPP system
    - needed message-passing library for CRAY T3D
    - needed support for distributing applications with CRAY T3D

II. Why did Cray Research choose PVM?

- message-passing model
  - single interface for:
    - distributing applications
    - CRAY MPP message-passing
- focus on scientific computing
  - not a systems programming tool
- focus on heterogeneous computing
  - designed in from the beginning

Why... (cont'd)

- good performance
  - vsend/vrecv with 2.4, direct task-task link in 3.1
- wide and increasing availability
  - de facto standard
- free
  - no restrictions on what we could do with it

III. What is Cray Research doing with PVM?

- Cray Research versions of PVM:
    - distributed applications
    - CRAY T3D programming

Distributed Applications

- Network version of PVM
- Cray PVM/HeNCE 1.0
    - released August 1992
    - consists of PVM 2.4.1 and HeNCE 1.2
    - no cost to customer
    - support provided

Distributed Applications (cont'd)

- Cray PVM/HeNCE 2.0
  - planned for release 3Q93
  - consists of PVM 3.x and HeNCE 2.x
  - plan to include support for distribution with CRAY T3D

CRAY T3D Programming

- PVM included in initial CRAY T3D software release (4Q93)
    - user-level message-passing interface
    - interface matches PVM 3.1
    - PE-PE communications all new code -- optimized
- support for T3D--Y-MP (and into the network)
    - based on PVM 3.1 (socket) implementation

CRAY T3D (cont'd)

- some extensions added
  - null group => all PEs
    - global **`pvm_bcast`**
    - global **`pvm_barrier`**
  - simple/fast send/receive interface
  - support for asynchronous transfers
  - **`pvm_tid`** -> PE translation
  - runtime option setting
- have discussed these with PVM developers

CRAY T3D (cont'd)

- CRAY T3D emulator
    - CRAY Y-MP based development tool for CRAY T3D
    - release planned for June 1993
    - includes PVM implementation
        - matches CRAY T3D interface
        - implementation uses CRAY Y-MP multitasking
        - provides estimated T3D communications costs

IV. Summary

- Cray Research is supporting PVM as a common interface for:
    - distributing applications
    - programming the CRAY T3D
    - and combinations...
- Cray Research is working with PVM developers to:
    - ensure common semantics
    - exchange ideas, fixes, etc.