Introducing OpenSHMEM

Presented by
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**U.S. Department of Defense
Introducing OpenSHMEM

- Oak Ridge National Laboratory
- University of Houston
- Open Source Software Solutions
- Department of Defense
Introducing OpenSHMEM

- **SHared MEMory**

- **SHMEM** is a *1-sided* communications library
  - C and Fortran PGAS programming model
  - Point-to-point and collective routines
  - Synchronizations
  - Atomic operations

- Can take advantage of hardware offload
  - Performance benefits
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• All processors see symmetric variables
  – Global Address Space

• All processors have own view of symmetric variables
  – Partitioned Global Address Space

• A PGAS model
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PE 0

Symmetric memory

PE 1

Symmetric memory
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Symmetric allocation

\[ x = (\text{int } \ast) \text{ shmalloc}\text{sizeof(int)}; \]

Symmetric memory

PE 0

PE 1
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Symmetric allocation

PE 0

Symmetric memory

\[ x = (\text{int}*) \text{shmalloc} \text{sizeof(int)}; \]

PE 1

Symmetric memory
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Symmetric allocation

PE 0

\[ x = (\text{int} *) \text{shmalloc} \text{sizeof(int)}; \]

Symmetric memory

x

PE 1

Symmetric memory

x

Put to symmetric memory

\[ \text{shmem_putmem}(&x, &a, \text{sizeof(int)}, 1);\]
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Symmetric allocation

PE 0

Symmetric memory

x = (int *) shmalloc(sizeof(int));

PE 1

Symmetric memory

a = 123

Put to symmetric memory

shmem_putmem(&x, &a, sizeof(int), 1);"
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Broadcast
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Broadcast

Collect/Reduce
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- OpenSHMEM 1.\(x\) will define a standard, open, portable version of SHMEM
- OpenSHMEM 2.0 will extend that standard with important new capabilities
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Outreach and participation

• Community web site (under construction)
  – Wiki
  – Documentation: FAQ, cheat sheet, specifications
  – Training material and tutorials
  – Source code, suites, applications downloads

• Conferences / workshops / mailing lists
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To get involved

• OpenSHMEM mailing list
  
  https://email.ornl.gov/mailman/listinfo/openshmem

• OpenSHMEM web site
  
  COMING SOON!
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Birds of a Feather Meeting

“SHMEM for the PGAS community at large”
Wednesday, 5:30pm – 7:00pm, Room 390

Booth presence

- PGAS (#1233)
- Oak Ridge National Laboratory (#3325)
- Gulf Coast Academic Supercomputing (#2401)
- Cray (#2829)
- SGI (#3313)
Contact

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