OpenSHMEM

Event Schedule

Tuesday November 19, 2013

10:00AM - 10:30AM **OpenSHMEM Analyzer** **DOE Booth -1327**

The OpenSHMEM Analyzer is a compiler-based tool that can help users detect errors and provide useful analyses about their OpenSHMEM applications. In this demo, we will show how the tool can be used to detect incorrect use of variables in OpenSHMEM calls, out-of-bounds checks for symmetric data, checks for the correct incorrect initialization of pointers to symmetric data, and symmetric data alias information.

10:35AM - 10:55AM **Analyzing the Energy and For OpenSHMEM** **Texas Advanced CC Booth -2732**

We will discuss the empirical analysis of the energy and power consumption behavior of two factors that are responsible for impacting the scalability of OpenSHMEM applications - synchronization barriers and explicit remote data transfers. We will also discuss our experiments that indicate the energy and power consumption by cores and DRAM handling small data transfers (less 1KB) is lesser than that consumed during bulk message transfers. Additionally, given a xed data transfer size, aggregated transfers result n overall lower energy consumption than multiple initiated transfers.

11:00AM - 11:25AM **Static Synchronization & Multi-valued analysis for OpenSHMEM** **Texas Advanced CC Booth -2732**

We discuss the extensions to the OSA tool, to perform parallel analysis by enable it to analyze the control flow and data flow of a program, analyze the synchronization structure of the program to provide a starting point for concurrent regions analysis based on the multi-valued analysis. Such an analysis which is able to detect the regions in the code where two or more OpenSHMEM calls may run concurrently is useful to detect parallel programming errors due to incorrect usage of OpenSHMEM calls. Our results include the summarization of the analysis conducted within the back-end of the compiler over the control flow graph (CFG) augmented with the data flow information to provide a graphical representation of the program's system dependence graph and synchronization pattern in the form of a barrier expression.

11:30AM - 12:25PM **Vampir and OpenSHMEM Demo** **TU Dreseden Booth -3905**

Vampir is tool-set for performance analysis that traces events and identifies problems in HPC applications. It is the most scalable tracing analysis tool that can scale up-to several hundred thousand processes. It consists of the run-time measurement system VampirTrace and the visualization tools Vampir and VampirServer. In this tutorial, we will present how to use Vampir to trace OpenSHMEM applications at scale.

12:30PM - 1:30PM **Accelerator Programming with OpenACC and OpenSHMEM Demo** **CAPS Booth -1127**

This demo has been designed for those who are interested in porting their OpenSHMEM applications to a hardware accelerator, such as a GPU, using OpenACC. Following a mixture of lectures and demonstrations, we will explore the basic steps to port an application to this hybrid model.

2:00PM - 2:30PM **Parallel Performance Analysis for OpenSHMEM** **TU Dresden Booth -3905**

We will discuss the theoretic and practical aspects whenextending performance analysis tools to support the OpenSHMEM standard for parallel programming. The theoretical part covers the mapping of OpenSHMEM's communication primitives to a generic event record scheme that is compatible with a range of PGAS libraries. The visualization of the recorded events is included as well. The practical parts demonstrate an experimental extension for Cray-SHMEM in Vampir-Trace and Vampir and first results with a parallel example application

2:45PM - 3:00PM **OpenSHMEM and UCCS** **Mellanox Booth -2722**

This talk will present the Universal Common Communication Substrate (UCCS), a low-level network Application Programming Interface (API) for parallel programming models. The API provides a simple, portable, efficient for implementing OpenSHMEM libraries, PGAS Languages and Message Passing Interface, optimized particularly for Remote Direct Memory

3:15PM - 4:45PM **OpenSHMEM Poster Session** **PGAS Booth -432**

This session will present the 'OpenSHMEM library and Specification' poster that will describe the history of OpenSHMEM, describe the specification and the collection of tools that support the the library. We will also present a poster of why is important to use OpenSHMEM to save power/energy requirements and discuss the new OpenSHMEM Analyzer tool. The last poster will present the Universal Common Communication Substrate (UCCS), a highly optimized low level portable API for PGAS languages/models and message passing.

5:00PM - 6:00PM **Accelerator Programming with OpenACC and OpenSHMEM Demo** **Open ACC Booth -4508**

This demo has been designed for those who are interested in porting their OpenSHMEM applications to a hardware accelerator, such as a GPU, using OpenACC. Following a mixture of lectures and demonstrations, we will explore the basic steps to port an application to this hybrid model.

OpenSHMEM

Event Schedule

Wednesday November 20, 2013

10:00AM - 10:50AM — **OpenSHMEM and UCCS Demo** — **Texas Advanced CC Booth -2732**

The University of Houston and ORNL will be presenting a demo on the OpenSHMEM reference implementation library API aimed at helping the standardizing several vendor implementations of SHMEM. The demo will talk about a new OpenSHMEM implementation using the new UCCS API is designed to sit underneath PGAS user-oriented libraries and languages such UPC, CAF and Chapel.

11:00AM - Noon — **OpenSHMEM Tools** — **DOE Booth -1327**

Four demos will be presendted on the state-of-the-art of tools available for OpenSHMEM. The demos will include the OpenSHMEM Analyzer, presented by Oak Ridge, the TAU performance tool presented by University of Oregon and the Vampir Tool presented by TU-Dresden. Allinea will also demo DDT, a debugging tool, currently available for OpenSHMEM. We will also discuss the future roadmap to provide an integrated tools environment for OpenSHMEM.

12:15PM - 12:30PM — **Universal Common Communication Substrate (UCCS)** — **Mellanox Booth -2722**

This talk will present the UCCS, a low-level network Application Programming Interface (API) for parallel programming models. The API provides a simple, portable, efficient for implementing OpenSHMEM libraries, PGAS Languages and Message Passing Interface, optimized particularly for Remote Direct Memory Access (RDMA) network interconnects.

12:15PM - 1:15PM — **PGAS BoF: Partitioned Global Address Space Programming Model** — **Room 401/402/403**

The partitioned global address space (PGAS) programming model strikes a balance between the ease of programming due to its global address memory model and performance due to locality awareness. While developed for scalable systems, PGAS is gaining popularity due to the NUMA memory architectures on many-core chips. Some PGAS implementations include Co-Array Fortran, Chapel, UPC, X10, Phalanx, OpenShmem, Titanium and Habanero. PGAS concepts are influencing new architectural designs and are being incorporated into traditional HPC environments. This BOF will bring together developers, researchers and users for the exchange of ideas and information and to address common issues of concern.

1:30PM - 1:50PM — **Hybrid Programming using OpenSHMEM and OpenACC** — **CAPS Booth -1127**

In this talk we discuss the OpenSHMEM and OpenACC hybrid programming model and and we discuss our experiences of using this model in the NAS-BT MZ benchmark. We also discuss the OpenSHMEM and OpenACC optimizations needed to achieve good performance.

2:00PM - 2:30PM — **OpenSHMEM and UCCS** — **PGAS Booth -432**

This talk will present the Universal Common Communication Substrate (UCCS), a low-level network Application Programming Interface (API) for parallel programming models. The API provides a simple, portable, efficient for implementing OpenSHMEM libraries, PGAS Languages and Message Passing Interface, optimized particularly for Remote Direct Memory Access (RDMA) network interconnects.

2:35PM - 3:05PM — **Programming Abstraction for MPI to PGAS Transitioning** — **PGAS Booth -432**

In this talk, we discuss a set of directives that serve as intermediate expressions for transitioning scientific applications written with MPI to PGAS languages like Chapel that are being developed with parallelism in mind.

3:15PM - 3:50PM — **OpenSHMEM Poster Session** — **PGAS Booth -432**

This session will present the 'OpenSHMEM library and Specification' poster that will describe the history of OpenSHMEM, describe the specification and the collection of tools that support the the library. We will also present a poster of why is important to use OpenSHMEM to save power/energy requirements and discuss the new OpenSHMEM Analyzer tool. The last poster will present the Universal Common Communication Substrate (UCCS), a highly optimized low level portable API for PGAS languages/models and message passing.

4:00PM - 5:00PM — **OpenSHMEM Tools** — **TU Dresden Booth -3905**

Four demos will be presendted on the state-of-the-art of tools available for OpenSHMEM. The demos will include the OpenSHMEM Analyzer, presented by Oak Ridge, the TAU performance tool presented by University of Oregon and the Vampir Tool presented by TU-Dresden. Allinea will also demo DDT, a debugging tool, currently available for OpenSHMEM. We will also discuss the future roadmap to provide an integrated tools environment for OpenSHMEM.

5:30PM - 7:00PM — **OpenSHMEM BoF: Further Developing a Standard for the PGAS & SHMEM Community** — **Room 201/203**

The purpose of this BOF is to engage collaboration and input from users and developers of systems, libraries, and applications to further expand the open organization for OpenSHMEM. The current API of OpenSHMEM is expected to develop with a richer feature set over time to accommodate advances in system design and scale. This BOF is an excellent face-to-face opportunity to provide your input into this ongoing process. We invite attendees to present and discuss contributions to the ecosystem of OpenSHMEM tools and applications, and hardware solutions.