

The OpenACC team put together Birds of a Feather (BoF) session on “Evolution and Experiences with OpenACC” on Nov 20, 2013. The main aim of the BoF was to bring together the OpenACC community to discuss the recent changes in the OpenACC standard. The focus this year’s BoF was the major 2.0 update and gathering feedback from users on the new features and changes.

->The stage was set by Duncan Poole, President of OpenACC, who emphasized that accelerators are of increasing interest since they offer high ratios of performance and power. But programming these accelerators are a challenge. OpenACC, an emerging standard, aims to simplify programming heterogeneous systems. The standard was created to provide a portable solution with the agility to respond to evolving hardware environments.

->A talk on one of the emerging efforts where the OpenACC programming standard is being integrated into the open source GCC compiler suite by Mentor Graphics was given by Nathan Sidwell from Mentor Graphics. GCC has been the default compiler for most of the Linux distributions and is readily available on other platforms, including Mac and Windows. This implementation will expand access to the language and will facilitate the development and testing of OpenACC applications on smaller systems such as workstations and clusters.

->James Bayer from Cray discussion about OpenACC 2.0 and the standard’s roadmap. As information to the OpenACC users, Cray has already released their compiler with complete support for OpenACC 2.0. PGI and CAPS will soon be announcing their respective compiler support for 2.0. James also spoke about other features that are currently under discussion within the community. Those features include defining API interface to profile/trace tools, defining error behavior for directives and API routines, more asynchronous behavior, more capable Fortran interfaces to API data routines and so on. Active discussion with the users is also helping the community to implement/consider features outside off the existing feature set.

->Scientists from Oak Ridge National Lab (ORNL), Fernanda Foertter and Oscar Hernandez highlighted the challenges on programming accelerators that include programmers deciding best placement of work, applications needing to run on a wide range of systems, programming solutions dominated by proprietary solutions and so on. ORNL has also been the driving force to drive OpenACC requirements. ORNL is also the leading advocate for users of OpenACC. There are several large scientific applications that have been ported to OpenACC so far. Those include S3D from ORNL and Sandia, ICON from CSCS, NIN, FIM, Weather Models from NOAA, UPACS, Genesis from Tokyo Tech. Few that is in progress include HFODD, CAM/SE, WL-LSMS3, Denovo – ORNL, XGC1 – ORNL, Delta5d – Cray, ORNL, Quantum Trajectory Dynamics – UTK.

->Message was conveyed that Open Source compilers would help the community to do research, recognize application needs and build tools eco-systems. This aligns

with the OpenACC schedule and roadmap. University of Houston (OpenUH) and ORNL (OpenARC) have also been developing robust Open Source OpenACC compilers. There are applications that act as drivers for open source OpenACC compilers. Those include LSMS-3 and Denovo.

An OpenACC validation suite is being built by University of Houston in close collaboration with OpenACC in order to validate the implementations of OpenACC API and its conformance to the standard.

The floor was then opened to discussions and active conversations with the audience to know more about the programming challenges and porting difficulties faced by application scientists. Scientists from NOAA and ORNL talked about their OpenACC experiences.