

New Developments in the APGAS Programming Model and X10

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The objective of our BOF was to provide a forum to discuss the APGAS (Asynchronous Partitioned Global Address Space) programming model and the X10 programming language. APGAS is one of the first models for concurrency and communication that has integrated constructs for asynchrony within a node and messaging between nodes. The APGAS programming model is realized natively in the X10 programming language. Via the new APGAS runtime, the APGAS model is now also directly available to C++ programmers who desire to write efficient, asynchronous, multi-node, programs. The BOF will also introduce Resilient X10, an extension of APGAS with support for fault tolerance and place elasticity.

Approximately 30 people attended the BOF session. About 1/3 of those present had some prior experience programming in X10.

After introductions, the BOF speakers (Dave Grove, Vijay Saraswat) covered the following topics:

- An overview of the APGAS programming model, its implementation in the X10 language, and a quick sketch of the highlights of the recent X10 2.4.0 release (September 2013).
- Highlights from the 2013 X10 HPC Challenge Class II submission (also being presented concurrently in the HPCC BOF). The 2013 X10 HPCC Submission featured results for the Stream, FT, HPL, UTS, and BC benchmarks run on BlueGene/Q, Power775 and the K computer.
- A preview of the upcoming PpoPP'14 paper "Resilient X10" which extends X10 and APGAS with support for place failure. Quite a few questions were asked about Resilient X10 and several people present expressed interests in using it as soon as it was available. The implementation of Resilient X10 is open source and is included in the X10 2.4.1 release (released after SC in December 2014).

Overall, the organizers were pleased with the interactivity of the BOF and with the opportunity to inform potential new members of the APGAS/X10 community of current research and development activities in the X10 open source project.