



Accelerating Axom Refining the Software Pyramid

Kae Suarez
WCI-HEDP

Mentor: Arlie Capps, Chris White; Client/User: Kenneth Weiss

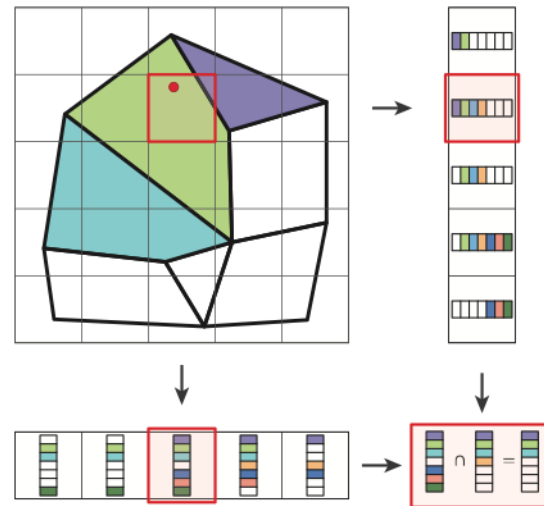




Motivation

Improve efficiency of Axom's ImplicitGrid class via RAJA

- Axom
 - A collection of classes and abstractions which serve as a foundation for physics applications and computational tools
- ImplicitGrid
 - A class for efficient spatial indexing
 - Often used with 1000s of queries at a time
- RAJA
 - A collection of abstractions to enable easier portability of code with regards to accelerators



Process



- Documentation
 - Reading user and developer documentation, both to understand the proper code style, and how to employ existing code
- Code
 - Tracing dependencies, in order to select targets for modification (or, in some cases, stop using a dependency)
 - Determined important loops to target
 - Reviewing compilation error logs, for bug fixing and easier dependency tracing
- Interpersonal
 - Collaboration and communication enabled a better understanding and faster modification of various code

Accomplishments



- Implemented bitwise operators as reduction policies in RAJA
 - Bitwise operators were an unknown foundational component of future work
- Bugfix in ImplicitGrid
 - Constructor referred to uninitialized data
- Task was larger in scope than originally thought, foundation for future work was laid
 - Documented necessary targets for task completion

**Disclaimer**

This document was prepared as an account of work sponsored by an agency of the United States government. Neither the United States government nor Lawrence Livermore National Security, LLC, nor any of their employees makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States government or Lawrence Livermore National Security, LLC. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States government or Lawrence Livermore National Security, LLC, and shall not be used for advertising or product endorsement purposes.