



University of Stuttgart
Institute of Aerodynamics and Gas Dynamics



GALÆXI

LUMI Hackathon Goals

- Extend device support code (memory management, kernel launches, etc) to support HIP
- Build with HIP compiler
- Complete adjustments to kernels (if needed)
- Code can run test problem on LUMI-G nodes
- Familiarize with AMD profiling tools
- Tuning and optimization
- Start looking at hybrid architectures

LUMI Hackathon Goals

- ~~Extend device support code (memory management, kernel launches, etc) to support HIP~~
- Build with HIP compiler
 - Add full support for AMD/HIP and Cray compiler to CMake build
 - Updates to Fortran host code to allow build with Cray compiler
 - Attempted to build CUDA sources as HIP files (failed)
 - Build CUDA source files as C++ and link HIP (-xhip)
- Complete adjustments to kernels (if needed)
- Code can run test problem on LUMI-G nodes
- Familiarize with AMD profiling tools
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- ~~Extend device support code (memory management, kernel launches, etc) to support HIP~~
- ~~Build with HIP compiler~~
- Complete adjustments to kernels
 - Had to change approach for passing keys for device pointer hash map (characters → integers)
 - Change interfaces for memory management methods to please Cray Fortran compiler
 - Compute kernels (so far) required no AMD changes
 - Unit tests of memory management and compute kernels pass
- Code can run test problem on LUMI-G nodes
- Familiarize with AMD profiling tools
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LUMI Hackathon Goals

- ~~Extend device support code (memory management, kernel launches, etc) to support HIP~~
- ~~Build with HIP compiler~~
- ~~Complete adjustments to kernels~~
- Code can run test problem on LUMI-G nodes
 - Able to initialize problem and output correct initial state
 - Currently experiencing issue in one simple kernel at end of timestep (source still unknown)
- Familiarize with AMD profiling tools
- Tuning and optimization
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Going Forward...

- Continue debugging run of test problem
- Check that NVIDIA and CPU build support unaffected by new changes
- Profiling and optimization for both vendors (support from LUST)
- Support for hybrid architectures
- Multi-GPU
- Features, features, features!