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Title:	LANL code team outbriefs from the El Cap Hackathon, October 2023
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LANL code team outbriefs from the El Cap Hackathon, October 2023

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El Cap COE Hackathon: Ristra

- Goals:
  - Fix multi-GPU strong scaling for Moya (FleCSI-Legion backend).
- We test compiled with the MI300A flags (gfx940 or gfx942)
  - Not there
- Accomplishments:
  - Reorganized sorting of ghost elements except sides, and faces.
  - Learned to use Nsight.
- Blockers encountered:
  - spack Kokkos build for mi300 failed (needed rocm5.7.2 on tioga).
  - Did you open a JIRA ticket? no
- Lessons Learned:
  - Bring our DevOps person along.

El Cap COE Hackathon: Capsaicin

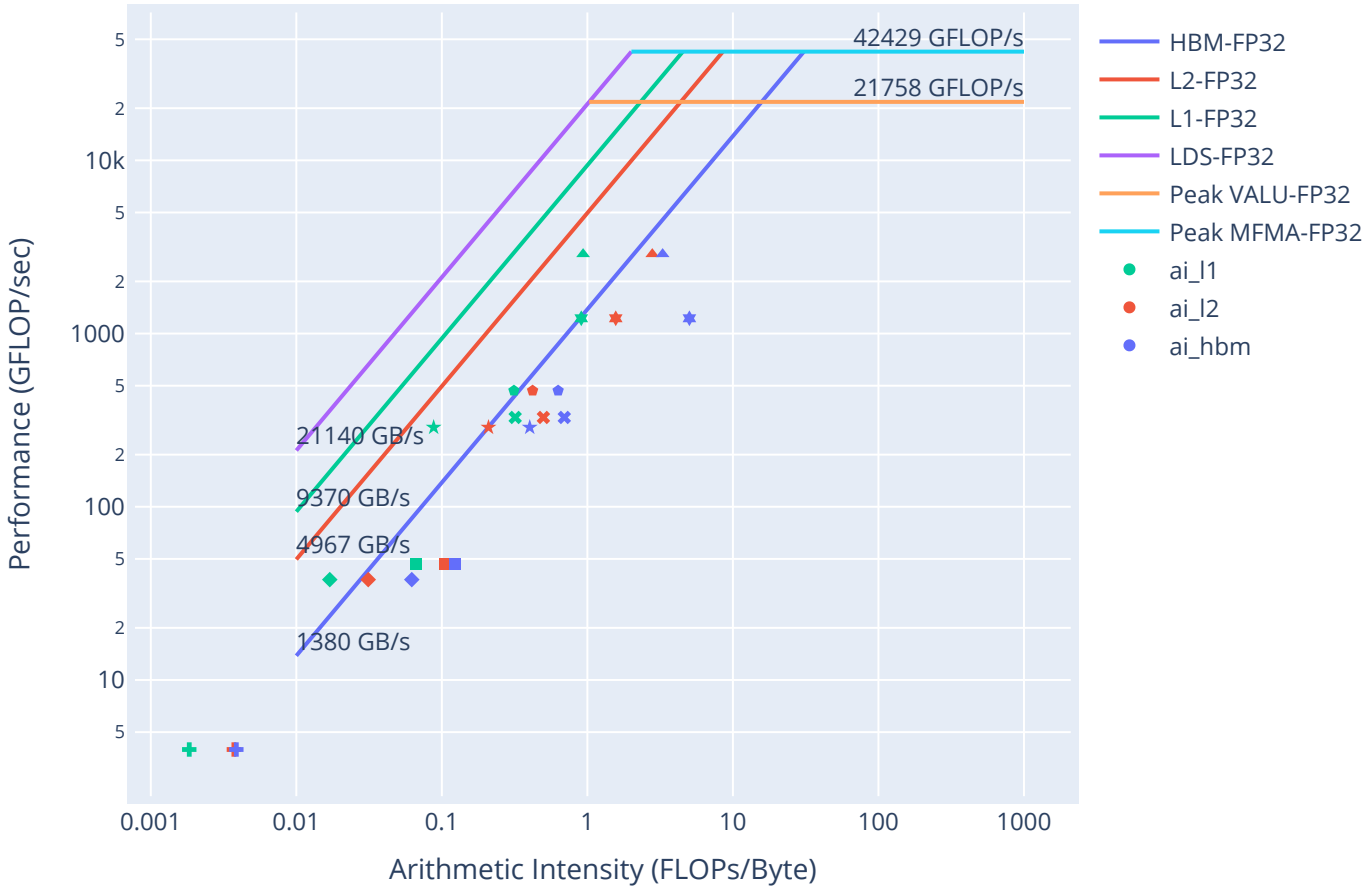
- Goals:
  - See if gfx940 will compile
  - Look into newer rocm improvements (?) on register usage
  - Explore shared memory in kernels
- We test compiled with the MI300A flags (gfx940 or gfx942)
  - We can compile!
    - Had to hack around some env vars in our build system
    - Something in the cce15 magic wrappers (I think) seems to be injecting multiple gfx90 flags
- Accomplishments:
  - Successfully did a mixed build with cce15 and rocm570 w/ amdclang++
  - Started exploring shared mem in a 2D kernel, grab perf numbers this afternoon?
  - Tried to parse occupancy results, looking good
- Blockers encountered:
  - Wifi, potential ihpc downtime.
- Lessons Learned:
- To Be Improved: Anything that could be improved for future hackathon events
  - Can I expense Starlink?
- Wishlist
  - Looking forward to new hardware!

El Cap COE Hackathon: EAP (xRage)

- Goals:
  - Update to more modern RZVernal compilers
  - Test build and run with Kokkos HIP RadDiff implementation
  - Stretch goal: performance evaluation and comparison
- We test compiled with the MI300A flags (gfx940 or gfx942)
  - Success compiling dependencies (Kokkos, hypre) and xrage source code with gfx940 (needed to use custom spackage for kokkos)
- Accomplishments:
  - Compiled with cce@16, rocm@5.5.1
  - Ran xrage + Kokkos + RadDiff – running on AMD GPU
  - Got roofline data
- Blockers encountered:
  - Wi-Fi issues
- Lessons Learned:
  - xrage inputs need careful consideration for “multistage” profiling (most control inputs default for “progressive” runs, not short restarting)
- To Be Improved
  - Badging and login logistics
  - EAP infrastructure (move from ”hacked to get working” to robust and comprehensible)
  - Omniperf analyze should “read-only” profile output (hit a bug where profile data got overwritten).
- Wishlist
  - Omniperf should give kernel names as full-verbose or “left-collapsed” (should be “`[…]my_kernel_that_adds`”, not “`hip_parallel_stuff<stuff<stuff<my_k[…]`”)

El Cap COE Hackathon: EAP (xRage)

- Got roofline



El Cap COE Hackathon: SAP

- Goals:
  - Build out Spack environment on rzvernal
  - Build Pagosa on rzvernal
- Accomplishments:
  - We were able to build out our Spack environment, but not Pagosa.
- Blockers encountered:
  - Wifi issues
  - Various spack issues
  - Time required to build spack packages
- Lessons Learned:
  - Gained a better understanding of which cce/rocm/llvm versions are compatible with one another.
- To Be Improved: Anything that could be improved for future hackathon events
  - Connection to ihpc-gate/rzvernal was unreliable.
- Wishlist
  - More reliable connection to ihpc-gate/rzvernal