FC with RG – Near Memory

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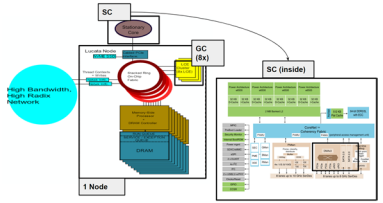
DMA Project

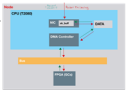
Goals

- Minimizing stationary core involvement as the middleman in DMA transfers to gossamer cores.



Progress

- Built kernel from source.
- Rebooted the system - resulted in a node off the network due to improper configurations.
- Came up w/ a development process
- In the design phase.



Lessons Learned and Next Steps

- Better coordination with the Lucata people on what we should have permission to do and scheduling development time.
- Next Steps: Documentation of system. Retry rebooting the kernel with the new configuration. Build hello world module. More studying of driver code & linux kernel.

HPCG Project

Goals

- Porting HPCG benchmark, one designed for stressing memory subsystem, on the Lucata Pathfinder.
- Comparing the performance and scalability of HPCG benchmark on the Lucata Pathfinder and a x86 cluster.

Progress

- Have run the optimized test on Frozone (x86 cluster).
- 1st Attempt: Using EMU-CC and the Lucata toolchain (memoryweb lib) successfully compiled the benchmark. However, linker issues pointing to some Lucata Pathfinder libs happened - Unable to build and emulate the benchmark executable.
- 2nd Attempt: Breaking up the benchmark into 4 computational cores: DotProduct/SpMV/SymGS/WAXPBY. However, changes need to be done accounting for different memory and programming models.
- Not sure if the result from the 2nd attempt is still compatible with the original HPCG benchmark.

Lessons Learned and Next Steps

- Compatibility issues always exist when porting code.
- For a new HW architecture, adapting to a different memory model is difficult, and the optimization would be even harder.
- Next step: look inside to the HPCG cores and implemented the HPCG-Compatible framework then.

Micro-Bench Project

Goals

- Compare the performance of several functions on an x86 platform and the Pathfinder.
- Create a notebook to run these functions and compare the performance on an x86 platform and the Pathfinder.

Progress

- Struggled initially with having compilation issues with the preexisting microbench project.
- Progress picked up once we had access to Lucata's internal mirror
- Created notebook 7, lucata benchmarking, that benchmarks and profiles the performance of pointer chase.
- Edited existing microbench code to profile the functions, similar to how it was done in notebook 2.
- Able to get benchmarks for pointer chase visualized.

Lessons Learned and Next Steps

- Reaching out for help, especially when it comes to compiling issues or the like, is better done sooner than later.
- Next Steps: Continue updating the notebook to have all the functions from microbench featured, and work on getting x86 benchmarking available.