OOKAMI PROJECT APPLICATION

Date: **26/01/2021**

Project Title: **Evaluating A64FX Using NCAR Weather and Climate Benchmarks**

Usage:

☒ Testbed

☐ Production

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Usage Description:

One of the missions of the Computer & Information System Laboratory (CISL) within the National Center for Atmospheric Research (NCAR) is to track technology trends and its impact on the Center's scientific objectives. This technology tracking has allowed us to understand how to modify existing applications to best take advantage of current and emerging computing architectures. As a former Intel Parallel Computing Center (IPCC) we have also contributed to the refinement of the Intel compiler software stack for the Knights Landing and Xeon architecture. Our team also has extensive experience working with NVIDIA to refactor codes for CPU-GPU performance portability using OpenACC. We have developed a number of single node kernels and multi-node benchmarks which are representative of the types of calculations our full applications perform. We intend to use these kernels, some of which were used to procure the recently-announced, next-generation supercomputer system at the NCAR-Wyoming Supercomputing Center, to compare the performance of the A64FX versus other contemporary processors. In addition to informing NCAR of the viability of an A64FX system, we hope to also identify potential weaknesses in the ARM software ecosystem.

Computational Resources:

Total node hours per year:

1350 node-hours for MPAS-A dycore and kernel benchmarking

Size (nodes) and duration (hours) for a typical batch job:

1 node for 4-8 hours
6 nodes for 10 hours
{6,12,18,24,30,36,42,72,96,128,144,168} nodes for 5 - 30 minutes

Disk space (home, project, scratch):

10 GB for home
80 GB for project
500 GB for scratch

Personnel Resources:

While the team is experienced with porting and optimizing code on a number of platforms, it would be helpful to have contact with experts in the A64FX software stack. This contact will likely take the form of sporadic email contact to discuss A64FX specific compiler flags.

Required software:

Fortran, C/C++ compiler, NetCDF library, Optimized math and MPI libraries

If your research is supported by US federal agencies:

Agency: National Science Foundation

Grant number(s): NCAR's core funding is provided Cooperative Agreement No. 1852977; The EarthWorks project for moving climate models to exascale architectures is funded under NSF Grant No. 2004973.