

OOKAMI PROJECT APPLICATION

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Project Title:

HEP Software Performance on Ookami – Phase 1) Porting

Usage:

- Testbed

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Usage Description:

The aim is to analyse the performance of Ookami for high-energy physics (HEP) use cases. As the software in this field is rather complex, the first phase of the study would be the porting of the most essential pieces of software to this platform. The first challenge will be the behaviour of the customized C++ compiler, and where the special vector instruction set will be applied. Independent of using the vector instruction set, we plan to analyse the performance of this platform in terms of caching and memory behaviour as well.

On the technical side, we plan to use spack for the compilation of the stack. The intention is to push every Ookami-specific fix upstream. In terms of HEP software to be compiled, we aim for the following order of porting:

- Compilation of HEP-SPEC06 (as it is still the de-facto standard in the field)
- Compilation of the Geant4 package and its main benchmarks
- Compilation of the ROOT package and benchmarks based on this.
- Compilation of the key4Hep stack as complete example stack of a HEP experiment

The order of this project is by increasing complexity of the C++ standard required. Necessary external dependencies will need to be ported alongside.

Computational Resources:

- Total node hours per year: unknown
- Size (nodes) and duration (hours) for a typical batch job: testjobs will be in the order 1 node, 1h
- Disk space (home, project, scratch): 10 GB / 100 GB / 100 GB

Personnel Resources (assistance in porting/tuning, or training for your users):

Estimate 8h / one working day in total for help in setting up resources and getting started.

Required software:

Basic development environment. Porting required software and externals is part of the project.