

Mapping PC Samples for Intel GPUs

Scalable Tools Workshop 2024

The Problem

- Intel's latest software stack generates GPU binaries that are hard to interpret
 - Multiple text segments that all start at address 0
- Full DWARF information
 - Separate line map for each function and segment
- Different from CPU binaries with a single text segment
- Different from NVIDIA GPU binaries with a idiosyncratic line map that contains inlining information

HPCToolkit's Approach

- Goal
 - Attribute PC samples to (GPU binary, offset)
 - Intel GPU binaries naturally have each kernel at offset 0
- Approach
 - Relocate separate text segments to non-overlapping locations
 - The offset in the binary where the text segment starts
- Difficulties
 - Elfutils doesn't understand the relocation codes in Intel GPU binaries
 - Some of the relocations appear to be relative to the wrong text segment

Action Items

- Coordination between Rice, Red Hat, and Intel to
 - Understand if the binaries are correct or not
 - Develop a version of elfutils that understands Intel GPU binaries
 - Develop strategy to relocate text segments and kernels so that Dyninst can understand them