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Profiling and Debugging HPC Applications on Emerging Memory Technologies

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The emergence of non-volatile memory technologies in high performance servers has resulted in multiple initiatives to exploit these new technologies for scientific computing. Traditionally challenges for adopting new technologies in HPC has focused on CPU technologies –however the paradigm shift of new ways of exploiting memory technologies presents new challenges.

As part of the NextGenIO project Arm, formerly Allinea, have been looking at how to support application developers adopt non-volatile memory DIMMs (NVDIMMs) for HPC and scientific computing applications. By adapting the existing Arm Forge product line, we have introduced new capabilities for debugging and profiling applications which make use of NVDIMM technologies.

In this presentation we will present of existing methodologies for debugging and profiling applications using existing memory technologies and detail the development of the new capabilities and how they can be utilized for real applications.

Specifically, we will focus on debugging NVDIMMs when accessed through the Persistent Memory Development Kit (using the pmemobj library). For profiling we will present on a newly developed custom metrics plugin for MAP which captures additional detail of NVDIMM usage. In both cases we will illustrate the features with real world code examples.

Keywords

Debugging Profiling Arm Tools

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