Starr/Fieldhouse Fellowship Research Progress Report

Introduction

I am very glad to be supported by the Starr/Fieldhouse Fellowship to work on the interrupt optimization research for high-performance computing (HPC). In the past decade, multi-core processors have changed the conventional hardware structure and provided a new dimension to scale up the potential computing capacity for high-performance computing (HPC)[6]. To exploit the additional cores on interrupt handling, an I/O-aware interrupt scheduling scheme has been proposed by us to coordinately schedule I/O interrupts onto the same core with the application issued the request. This scheme keeps processor affinity between the I/O data and the computing task, reduces data migration cost on every I/O request, and improves the performance of the computing task.

Works have been done

Over almost half year’s research, I have completed the investigations about the different network I/O interrupt processing on Linux and Solaris. The bottlenecks and deficits have been identified by our amount of experiment on their existing interrupt scheduling scheme. An academic paper, titled “An Evaluation of Parallel Optimization for Network Stack in OpenSolaris”, has been submitted to the 35th IEEE conference on Local Computer Networks (LCN). These works has been the foundation for the further research on interrupt optimization. I have designed a new interrupt scheduling scheme to match the current high performance I/O requests.

Future Work

Based on the above the experiment and design, the novel I/O-aware interrupt scheduling scheme is developing and verifying on this summer. After the development of the new interrupt scheduling scheme, the related academic paper would be submitted to publish our research results. Thanks again for the support of the Starr/Fieldhouse Fellowship on my research.

Reference


