# Scalable Computing Software Laboratory Technical Report

## Department of Computer Science

## Illinois Institute of Technology

### Exploring Parallel I/O Concurrency with Speculative Prefetching

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## Abstract

*Parallel applications can benefit greatly from massive computational capability, but their performance usually suffers due to large latency in I/O accesses. Conventional I/O prefetching techniques are conservative and are limited by low accuracy and coverage. As the processor performance has been increasing rapidly and the computing power is virtually free, we introduce a novel speculative approach for comprehensive and aggressive parallel I/O prefetching in this study. We present the design of our approach, as well as challenges, solutions, and the implementation on ROMIO of MPICH2. The experiments have shown promising results in reducing I/O access latency.*

**Keywords**: high performance computing, I/O performance, parallel application performance, speculative prefetching