

Design and Implementation of User-level Remote Memory Extension Library

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Abstract— The increase of memory capacity has not kept up with the continuous increase of large memory applications. Therefore, approaches to utilize remote memory like a local memory has been considered as a cost effective way to run large memory application in the cluster environment where computing nodes are connected via high speed network. For the users of HPC cluster to run large memory application without administrator's support, we suggest a user-level remote memory extension method. We designed and implemented a remote memory library model which extends the virtual address space of the large memory application process to remote memory. It includes user-level API and page fault handling mechanism, temporal page pool management and remote page prefetching algorithm. We also developed a performance test program to show if the user-level remote memory extension library works well. From the experimental test, we found that user-level remote memory extension library works well for applications with sequential access pattern.

Keyword— Remote memory, Large memory application, Memory Extension, remote memory library



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