

Jan 28th, 2013 - 10:00 am

Analyzing Data Movements and Identifying Techniques for Next-generation Networks

Large bandwidth provided by today's networks requires careful evaluation in order to eliminate system overheads and to bring anticipated high performance to the application layer. As a part of the Advance Network Initiative (ANI) project, we have conducted a large number of experiments in the initial evaluation of the 100Gbps network prototype. We needed intense fine-tuning, both in network and application layers, to take advantage of the higher network capacity. Instead of explicit improvements in every application as we keep changing the underlying link technology, we require novel data movement mechanisms and abstract layers for end-to-end processing of data. Based on our experience in 100Gbps network, we have developed an experimental prototype, called MemzNet: Memory-mapped Zero-copy Network Channel. MemzNet defines new data access methods in which applications map memory blocks for remote data, in contrast to the send/receive semantics. In one of the early demonstrations of 100Gbps network applications, we used the initial implementation of MemzNet that takes the approach of aggregating files into blocks and providing dynamic data channel management. We observed that MemzNet showed better results in terms of performance and efficiency, than the current state-of-the-art file-centric data transfer tools for the transfer of climate datasets with many small files. In this talk, I will mainly describe our experience in 100Gbps tests and present results from the 100Gbps demonstration. I will briefly explain the ANI testbed environment and highlight future research plans.

Bio: Mehmet Balman is a researcher working as a computer engineer in the Computational Research Division at Lawrence Berkeley National Laboratory. His recent work particularly deals with efficient data transfer mechanisms, high-performance network protocols, bandwidth reservation, network virtualization, scheduling and resource management for large-scale applications. He received his doctoral degree in computer science from Louisiana State University (LSU) in 2010. He has several years of industrial experience as system administrator and R&D specialist, at various software companies before joining LSU. He also worked as a summer intern in Los Alamos National Laboratory.