



## Parallel Computing and I/O

### Performance and Energy Efficiency Analysis of Distributed File Systems on a Cluster of ARM-Based Single-Board Computers

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Ever-increasing demands on capacity and data throughput of storage clusters lead to growing systems and growing energy consumption. Currently, storage clusters are built from regular x86-based servers that are not energy-proportional and have a high idle power consumption. Most distributed file systems cannot fully utilize servers leading to low energy efficiency. ARM-based processors were designed for energy efficiency and low power consumption. Therefore, an ARM-based single-board computer storage cluster was built using the Odroid HC4. This cluster is evaluated using different distributed file systems, workloads, metrics, and a comparable x86-based setup as reference. Results show that ARM-based single-board computer storage clusters are an energy-efficient alternative to traditional x86-based clusters while providing comparable performance. However, based on the experiences with the Odroid HC4, future single-board computers for storage clusters should have a higher network throughput and should provide access to more storage devices.