## Abstract

Deploying large scale data storage solutions continues to present problems in terms of cost and operation for research, education and commercial applications. Commercial products exist but their for-profit, proprietary nature makes them inflexible and cost ineffective for a variety needs, especially in academic or research environments. This project develops a scalable storage system focused on low cost of manufacture, deployment and operation. The resulting design provides a modular system with high storage density and minimum complexity of assembly and maintenance effort. Modern maker technologies, including additive manufacturing and PCB small batch manufacturing, are used and demonstrate methods that provide unique, reconfigurable components to reduce part count, cost and simplify assembly and maintenance while supporting flexibility of required features.

The resulting storage solution is focused on providing cost effective and flexible data storage services in areas of research and high impact practices in computer science, computer information and STEM disciplines. The modular nature of the design can also be leveraged in a distributive manner to support geographically separated collaborative efforts. The primary outcome of this project is a cost effective and high performance petabyte-scale storage system. This project provides a complete set of manufacturing designs suitable for recreating and deploying such a storage system by other researchers or institutions. The designs are intended for modification to support unique requirements. Configuration details and deployment examples with performance metrics are also generated and made available in order to simplify implementation of similar storage systems.