Project: Grid computing for finding deletion correcting codes  
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Grid computing is a computational model whereby unused resources within a network are applied to the solving of computationally expensive tasks. For example, grids are used in the analysis of SETI data, the factoring of large numbers and the analysis of drugs. Grids are virtual supercomputers, which while they may have less processing power, use existing infrastructure to significantly reduce costs. Grids are scalable and can be spread across multiple architectures, unlike supercomputers which are difficult to scale and often designed for a particular purpose.

The Globus Toolkit [1] is an open source software toolkit used for building Grid systems and applications. In particular it was designed to allow seamless secure interaction between different organisations with different architectures. The Toolkit contains numerous modules containing tools for dealing with different aspects of Grids, for example data analysis, security, monitoring and discovery.

The aim of this project is to use the Globus Toolkit to distribute the computation of Generalised—Reed—Solomon Code based deletion correcting codes. The project will build on existing work [2, 3], which has been hampered somewhat by the extensive resources required to thoroughly search for the codes. We propose designing and implementing a Globus Toolkit based distributed computation framework that uses idle CPU’s. We will use the definitions and framework in [1] to evaluate the performance of the system.

The outcomes of this project will be threefold:

(i) A report describing the design of a distributed computational system using the Globus Toolkit.

(ii) An implementation and performance analysis of the system.

(iii) Some deletion correcting codes with properties better than currently known ones.

Reference:
[2] L F McAven and R Safavi—Naini, Classification of the deletion capacities of \( k=1 \) unit multiplier Generalised Reed—Solomon codes. Submitted to: IEEE Transactions on Information Theory