

Robust Distributed Secure Storage for Middle Size Networks

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Abstract

Nowadays it is an accepted and popular paradigm to create clusters of personal computers to utilize its CPU and storage capacity. Our research will focus on distributed data storage. The peer to peer communication seems to be the winning solution to provide not only distributed but a robust system. There is no central point of failure, since every entity is equal. There are many articles in the literature deal with distributed storage. Two main approaches appear for us: in the first one the robustness of the system is the goal, here the effectiveness of the storage utilization is not optimal (e.g. Far-site), in the second approach the effective utilization of the storage capacity has priority, the robustness property is weaker (e.g. Zebra).

We would like to study and implement a solution which combines above mentioned main approaches added some new elements. The storage is effectively utilized (above 50%) and the robustness can be optimal (more than 2 failures). Practically our solution can be used in middle size distributed storage facilities (less than 1000 PCs).

We select the following techniques to achieve our goal. In network layer we use IPv4/6 Multicasting, IPv6 Anycast, for the effective usage of available bandwidth. For error correcting coding we use erasure coding techniques during data store e.g.: Reed-Solomon codes. Ensuring durable, reliable data replication the Byzantine replication is suggested. Providing the authentication and authorization the Public Key Infrastructure was selected. The operational environment is the .NET framework.