**DNA as a Storage Medium for Efficient and Reliable Cloud Data Archiving**

**Abstract**

Cloud storage is a model of data storage which is typically owned and managed by a hosting company. Digital data is stored in logical pools, the physical storage spans multiple servers. The data volume of global information has grown exponentially in recent years, but the development of silicon-based memory has entered a bottleneck period. Efficient cloud storage solutions are needed for organizations to make sure they reap maximum benefits from data. As a promising storage media, DeoxyriboNucleic Acid (DNA) storage provides a much higher data density and superior durability, compared with state-of-the-art media. This project enables molecular-level data storage into DNA molecules by leveraging biotechnology advances in synthesizing, manipulating and sequencing DNA to develop archival storage. The basic process of DNA data storage comprises four main steps: encoding, synthesis, sequencing, and decoding. In DNA data storage, Low-Density Parity-Check (LDPC) codes are utilized during both encoding and decoding phases. During encoding, LDPC introduces redundancy to the DNA sequence to facilitate error correction. Chemical synthesis involves physically creating the designed DNA sequence, including LDPC-encoded data. The MinION sequencer is employed for DNA sequencing. Base calling algorithms interpret the sequencing data, and LDPC-based error correction is applied during the decoding process, ensuring accuracy. This integrated approach, involving LDPC codes, chemical synthesis, and sequencing technologies, represents a comprehensive strategy in DNA data storage research for efficient and reliable information storage in DNA molecules.