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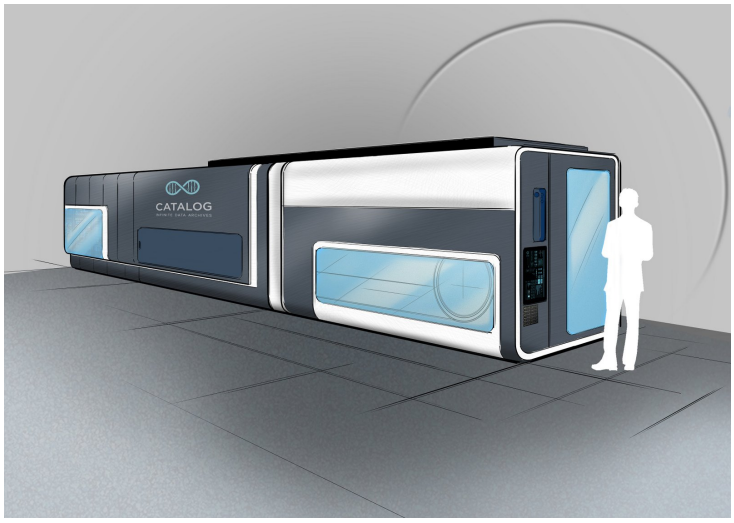
Cambridge Consultants, CATALOG reveal plans for scalable DNA data encoding machine

04 October 2018 | News

Data centres are soon to be replaced by DNA data storage.



Singapore - Breakthrough innovation specialists Cambridge Consultants and CATALOG Technologies, a company which develops DNA data storage, revealed a partnership and plans for a machine that will encode data in DNA. The machine will scale the encoding process, making it affordable and fast enough for commercial pilots slated for next year. With this technology, the information content of entire data centres can fit into the palm of your hand.

Having proven their proprietary method for encoding data in DNA, CATALOG has engaged Cambridge Consultants to support the scaling up of their platform, designing and building a machine that will encode the data at a speed of one terabit (Tb) in 24 hours. That's equivalent to 64 hours of 1080p HD video. Such leaps in speed will help make it economically attractive to use DNA as the medium for long-term archival of data.

As soon as 2025, conventional mediums of storing data – hard drives in data centres, often accessed as cloud services – will no longer be capable of meeting our data storage needs. DNA data storage, which uses synthetic DNA, is space effective, highly sustainable and can fit enormous quantities of data into a tiny footprint.

Today's data centres take up acres of land and consume hundreds of megawatts of energy in maintaining their sensitive conditions, particularly for cooling. By encoding data in DNA, data is stored using a fraction of the energy consumed by data centres. DNA storage can be safely stored at room temperature, is space efficient and has a lifespan of 1,000 years – compared to just a few years for hard drives – if kept in a cool and dry place. With no power requirements, there is no need for active cooling.

Scientists have been researching DNA data storage for decades, but it was not expected to be commercially viable in the near term. It has been prohibitively slow and expensive, until now.

CATALOG's proprietary method takes an entirely different approach than traditional thinking on DNA data storage. As an analogy, assume the information to be stored is a book, which can be stored by copying it. The traditional approach would go about this by transcribing the book from start to finish, letter for letter. This is a time consuming and expensive process. Further, if you want to store a different book, you have to start again from scratch, meaning the cost would be doubled. The CATALOG approach can be thought of as building a printing press with typefaces. The company rearranges the typefaces (pre-made DNA molecules) to match the contents of the book. Because of this, the process is faster and cheaper. The incremental cost for printing different additional books is also significantly lower.

This new machine can be thought of as a printing press that utilizes the typefaces to create the different combinations. Data will be encoded using the fragments of synthetic DNA and then stored in dry powder form, in a test tube.

Building a machine that can encode information into DNA at such speeds is a complex, multidisciplinary challenge. To achieve 1Tb in 24 hours the machine must perform tens of billions of operations, at microscopic scale and highly-parallel, to very high accuracy. Cambridge Consultants has constructed a project team with a unique combination of expertise in microfluidics, process automation, software development, machine design and synthetic biology.

"Making DNA data storage commercially viable requires significant advances in scalability – it's simply too slow and expensive to be used for business and government use cases as it stands today," said Hyunjun Park, co-founder and CEO, CATALOG Technologies. "The machine we are developing with Cambridge Consultants will bring DNA data storage out of the research lab and into the real world, for the first time in history."