Andrew Zurn

Weekly Article Summary #1

CSCI 373 – Heroux

09/03/2013

Summarized Article: <http://cacm.acm.org/magazines/2013/8/166306-a-new-approach-to-information-storage/fulltext>

Article #2: <http://arstechnica.com/business/2013/08/five-things-radically-changing-what-enterprise-means/>

In his article, Samuel Greengard presents a wide variety of new advances within the technical field regarding biological digital storage. As of recent, George Church, who is a geneticist at Harvard Medical School, was able to “produce 70 billion copies of his book.” His book, *Regenesis: How Synthetic Biology Will Reinvent Nature and Ourselves*, went straight past the traditional book formats, past hard drives, and right past many other forms of online digital storage. Instead of these customary formats, Church was able to store his book on DNA that amounted to no “larger than a speck of dust.” In his research, Church exclaims that there is “an opportunity to create storage systems that are a million to a billion times more compact than existing technology and provide a level of longevity that is unheard of today.”

Greengard goes into some specifics as to how the technology works, and further, into what is driving this shift towards biological storage. Greengard states that “the data was built from code based on the four constituents of DNA: adenine (A), guanine (G), cytosine (C), and thymine (T), and converted to binary code.” A 3D printer is later used to “attach the data to the DNA strands and build a physical storage device.” Finally, the data was read back from the medium, with near 100% success.

Greengard does talk to some of the points that Church's article describes as the moving force for this field of exploration. Mainly, these include the technological limitations (Moore's Law) of the current computing structure, and how “DNA sequencing is advancing at a 10-fold increase per year.” In addition to this, he also exclaims that the amount of data generated each year, which is only ever increasing, is presenting challenges that present storage technology is finding hard to overcome, in addition to the fact that that technology is becoming obsolete as fast as it is being produced and always prone to failure. A final point that Greengard did make known, in which I found intriguing, is that in this format, data can be stored for “years without electricity... [and] could in some cases, eliminate vast networks and provide significant environmental benefits.”

Biological digital storage is not something new that I just came across when reading this article, but after reading it, I am a lot more interested in seeing this field hopefully grow and produce great discoveries. Knowing that our technology stack is beginning to run into many obstacles such as walls in computational power, enormous electrical requirements as more and more storage is needed to hold the world's wealth of information, and the growing scarcity of resources, it would be great to see that a more human approach, that is using DNA as storage, becomes financial plausible. Although Greengard's article does point to the high costs in the field of research, and the even higher costs to even write one megabyte to DNA storage (which is $16,365), I feel that biological computing is a well vested interest, and one that should be supported as more and more discoveries such as this one come out in the coming years.

Works Cited

Greengard, Samuel. “A New Approach to Information Storage.” Communications of the ACM. Aug. 2013. Sep. 2013. <http://cacm.acm.org/magazines/2013/8/166306-a-new-approach-to-information-storage/fulltext>