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Microsoft's Project Natick

When I was a kid, my parents often told me to get my head out of the clouds and get serious about school, or financially I would end up underwater. Truth is, today most of us have our digital life (work done on computers and smartphones) stored

about school. Natick is a Microsoft project that is now taking storage clouds underwater (Photo 1). The judges of the World Changing Ideas Awards committee listed Project Natick as a 2017 finalist for an award for their innovative approach to cloud storage.

(For the full list of winners and finalists, visit <https://www.fastcompany.com/3068873/announcing-the-winners-of-the-2017-world-changing-ideas-awards>.)

The thinking behind the con-

cept of building an underwater cloud was simple, though full execution required the same level of expertise as it takes to build a communication satellite network. Purchasing land for a datacenter is expensive, and it takes years to get local approval before the construction of the center

can even begin. The ocean is rent free, has a built-in cooling system, and small self-contained datacenter vessels could be produced in factories for quick installation off the coast of any continent anywhere in the world.

Photo 2 shows the core Natick team that designed the water-tight vessel and decided how much cloud storage could be housed within its limited space (Photo 3). They built the Natick system to take on the characteristics of a satellite: once it is launched underwater, it will perform its tasks on its own without ever being internally serviced. Component failure that could cause data loss will be handled the same way it's handled by land-based storage centers—data storage redundancy stored in multiple locations.

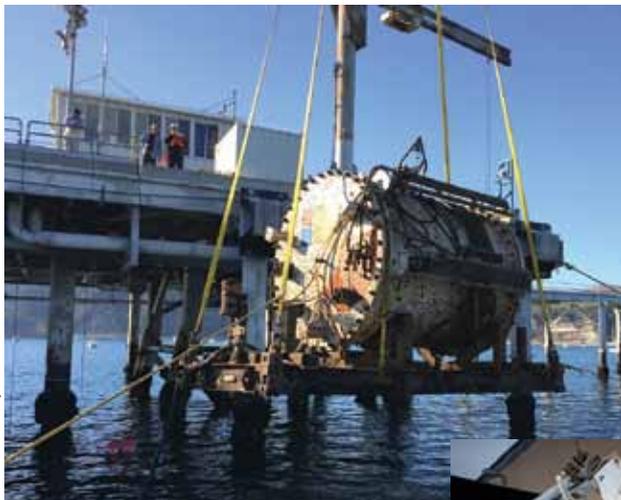
A catastrophic Natick vessel failure would be handled the same way it is handled with satellites—having multiple satellites provide system redundancy until a replacement can be deployed. Here, the other units in the underwater datacenter pod would cover until a new Natick

unit could be shipped to the location and anchored underwater. Each underwater datacenter would have lots of Natick vessels all anchored reasonably close together to provide the equivalent storage capacity of a land-based cloud datacenter.

If all the underwater testing remains positive and if their research shows enough global interest to purchase these systems, Microsoft will be ready to move forward. At that point, underwater data

storage will become a reality. Just like solar panels, cars, and other mass-produced products, the greater

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Photos courtesy Microsoft

Photo 1—Your digital life is already up in the clouds. Microsoft is finalizing its research to take your digital life underwater.

or backed-up in the clouds. These clouds are warehouse-size computer datacenters, usually located in low-rent areas with access to cheaper electricity, and a very fast connection to the Internet.

Indirectly, they provide service to you since your digital life ends up on their servers from Microsoft, Google, or Apple when you backup your computer or smartphone. Just in case you feel none of your data is in the cloud, because you backup everything locally, all financial institutions and the U.S. government all use off-site secure cloud storage.

My parent's warning when I was a kid was taken out of context, since the clouds and water they were talking about meant getting serious



Photo 2—The Microsoft team that developed Project Natick in front of their test vessel

cept of building an underwater cloud was simple, though full execution required the same level of expertise as it takes to build a communication satellite network. Purchasing land for a datacenter is expensive, and it takes years to get local approval before the construction of the center



Photo 3—The team not only developed the vessel concept, they also had to determine how much hardware you can safely stuff into its limited space.

the demand the cheaper it will become to manufacture the pods.

The architects of Natick have decided that it will be cheaper to replace a vessel than to retrieve it and

clean off the sea life, so it can be opened and serviced. A properly designed unit should last long enough for its built-in storage systems to be antiquated by the time it is necessary to replace it. The goal will be to recover out-of-service units at the same time the replacement unit is installed, then fully decommission it, clean out the vessel, and completely refurbish it with all new hardware.

The goal is to have Natick cloud datacenters powered by “renewable energy sources such as offshore wind, wave, tide, or (ocean) current.” For communication Microsoft envisions plugging into the already existing “subsea cables which allow the Internet to span the oceans, connecting devices and datacenters around the world.”

At this point the Natick undersea datacenters are still listed as a Microsoft research project, and is still being tested and evaluated. If all testing proves the validity of the sys-

tem, and the pods are manufactured, “Natick datacenter deployment is intended to last up to five years, which is the anticipated lifespan of the computers contained within. After each five-year deployment cycle, the datacenter would be retrieved, reloaded with new computers, and redeployed. The target lifespan of a Natick datacenter is at least 20 years. After that, the datacenter is designed to be retrieved and recycled.” For more details, visit <http://natick.research.microsoft.com/>.

Taking It a Step Further

1. How would a city’s proximity to a coast line determine if it can take advantage of Natick technology?

2. Some renewable sources of energy are listed in this column. The location of a Natick datacenter could affect which type of renewable energy source would be most efficient. Research what environmental factors might influence which renewable energy source would be available to be chosen for four different locations around the world. ☺

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