

## Data Storage, Servers, and Data Center Infrastructure in Space



Data storage is moving from the ground to the cloud to outer space. The exponential growth in data supports increased capacity and technological advances for each. Currently, the focus is on satellites. In 2020 [1,283 satellites were launched](#), the highest number of satellite launches in a year. This year, more than **850** satellites have already been launched. The growth in the number of satellites over the last decade was mainly driven by the development of the smaller [CubeSat](#), which allows a large number of small sized satellites to launch at the same time, earlier rockets were used only to launch one or two satellites at a time. [SpaceX](#) launched 172 Starlink satellites in just three launches.

Google has [partnered with SpaceX](#) to use the Elon Musk's space company's satellite internet service, [Starlink](#). SpaceX will install Starlink terminals at Google's cloud data centers around the world. Starlink customers can use the cloud and Google can use the internet serve for its enterprise cloud customers. SpaceX has launched 1,625 Starlink satellites, with about 1,550 currently in orbit. Amazon plans to launch 3000 satellites into the same orbit as Starlink, also to provide internet service and leverage internet connectivity from the [Kuiper project](#) to supercharge its AWS cloud services.

[Cloud Constellation](#) has a network of 10 low earth orbit satellites, [Spacebelt](#), for space-based secure cloud data storage and will launch an entire data center into space by the end of the year using a network of small satellites, each with 1 petabyte of data storage. [IBM](#) plans to store their AI systems, Watson, on [Cloud Constellation satellites](#).



Datacenters on the ground, which store info in the cloud, are among the largest consumers of [energy](#). However, [Viasat](#), a company headquartered in Carlsbad, CA, challenged expansion of Starlink based on [environmental grounds](#) and arguing for [review of \\$900M in rural broadband subsidiaries](#) granted to Starlink, saying they were not even granted the opportunity to apply. So far, all of their legal maneuvers have been denied, during which time, SpaceX has continued to launch satellites. SpaceX says they are working with astronomers to minimize any light pollution impacts. Each satellite is about as big as an office desk and weighs 500 pounds (photo).



[LyteLoop Technologies](#) recently raised \$40M to make a space-based data storage center. They will launch 6 proof-of-concept satellites in the next 3 years and plan to offer live data storage service in 5 years. They see the benefit of scalability as a prime driver for this approach because they use angle multiplexing (by creating more paths for light to travel, they can add more storage capacity).

*“We are a storage company. We are storing data in a different medium – on photons – and in our case, in space. The essence is that we have communications links and photons going back and forth. That back and forth is the storage medium.”*

[Ohad Harley](#), Chief Education Officer, LyteLoop Technologies

According to the [Index of Objects Launched into Outer Space](#), maintained by the United Nations Office for Outer Space Affairs, there were **7,389** individual satellites in space at the end of April, 2021. **11,139** satellites have been launched, out of which only 7,389 are in the space, while the rest have either been burnt up in the atmosphere or have returned to Earth in the form of debris.

*“Building a shoebox-sized satellite can cost between \$100,000 and \$300,000. It costs about as much to launch an app as it does to make and launch a satellite.”*

[Sunil Nagaraj](#), Founding Partner of [Ubiquity Ventures](#)

His former firm invested over \$50M in three space companies — [Skybox](#), [Rocket Lab](#), and small satellite maker [Spire](#).

