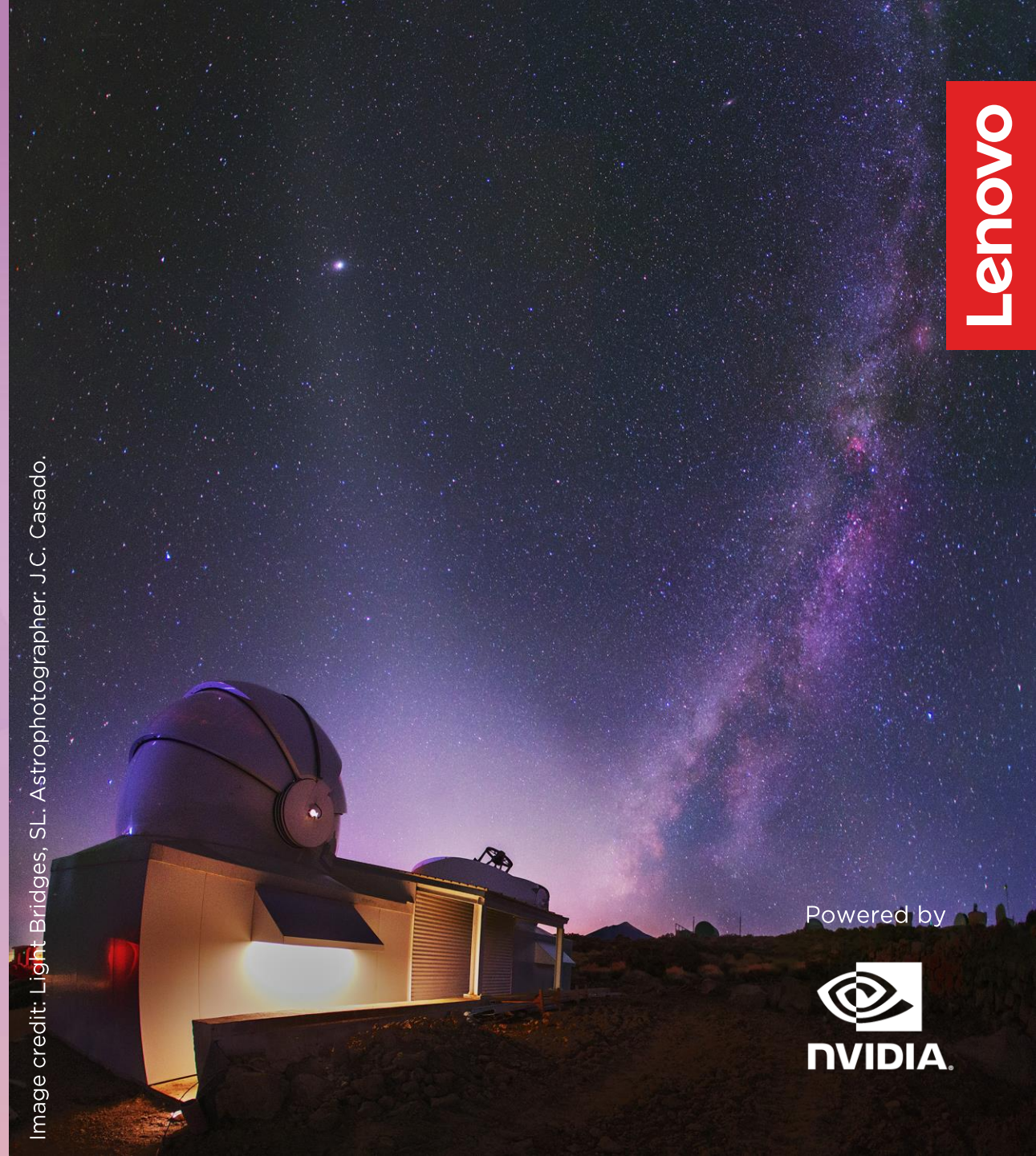
Academic Research

Finding new answers among the stars

Light Bridges

With a new high-performance computing (HPC) cluster from Lenovo and NVIDIA, Light Bridges helps astronomers crunch vast volumes of observational data faster, so they can delve deeper into the mysteries of our universe.



1

Who is Light Bridges?

Light Bridges promotes new ways of public-private partnership in scientific research and development, with a focus on professional astronomy. Based in Spain's Canary Islands, a place with unmatched atmospheric quality, the company provides a faster and more flexible way for scientists to access the tools and funding they need to advance vital research.

In partnership with the Instituto de Astrofísica de Canarias (Astrophysics Institute of the Canaries), Light Bridges has established a private network of telescopes at the Teide Observatory on Tenerife. Its first installation is the Two-meter Twin Telescope (TTT), four professional robotic telescopes used to study near-earth objects like asteroids and comets, along with other cosmic phenomena including supernovae, active galaxy nuclei, exoplanets, and black holes.

Light BRIDGES

2

The Challenge

For millennia, humanity has looked to the stars to learn more about our place in the universe. Modern telescopes and sensitive detectors have dramatically deepened that understanding. But they also create new technical challenges, namely the need to read, store, index, and analyze astronomically large quantities of data.

It's a challenge with which Light Bridges became well acquainted through its work on the TTT project. On a clear night, each one of its telescopes captures roughly 300 MB of image data every few seconds. That adds up to masses of data that must be processed on the fly and stored somewhere.

Dr. Antonio Maudes, Co-founder & CEO of Light Bridges, admits: "We didn't know what we were going to do about all the data. At first, we had the idea of building a small data center with a server and several terabytes of hard disks. But we quickly realized that the data generated by the telescopes would fill up the available capacity and blow through our IT budget in less than a month. We needed a creative solution that could meet our high demands for compute power and raw storage capacity at the best available cost."

Image credit: Light Bridges, SL. Astrophotographer: J.C. Casado.

“Our role is to support and speed up science—and that makes our choice of computing infrastructure crucial. We need systems that can handle huge amounts of data and return results always faster, so IT becomes an enabler of research and not an impediment to it.”

Dr. Antonio Maudes
Co-founder & CEO, Light Bridges

Building a big data platform

In need of a helping hand, Light Bridges turned to the experts: Wesco, a leading IT services provider and Lenovo Gold Partner. As Dr. Maudes recalls: “We explained our situation to Wesco, and they came up with a solution that combined a high-performance computing [HPC] cluster from Lenovo with all-flash storage from VAST.”

With support from Wesco and Lenovo, Light Bridges established an HPC cluster built on Lenovo ThinkSystem SR670 V2 servers. They’re outfitted with the ultra-powerful NVIDIA® HGX A100 GPU offering. This GPU-rich system is the perfect match for complex, data-intensive astronomy analytics, making it possible to power through complex calculations involving vast volumes of telescopic data in no time.

Hardware

Lenovo ThinkSystem SR670 V2
Lenovo Neptune™ hybrid liquid cooling
NVIDIA® HGX A100 GPUs

Software

VAST Data Platform

Image credit: Light Bridges, SL. Astrophotographer: J.C. Casado.

> “The future of ground-based observational astronomy involves the construction and operation of large telescopes and arrays of smaller telescopes. This second path has unique advantages, such as monitoring large areas of the sky simultaneously and its immediate adaptation to changing observing needs. This approach requires the capability to process and analyze a huge amount of dynamic data. This is where the development of advanced computational systems, artificial intelligence, and GPUs plays a crucial role. Thanks to the extremely high-performance Lenovo solution, our telescope network operates every night at Teide Observatory.”

Dr. Miquel Serra-Ricart
Co-founder & CSO, Light Bridges

The ThinkSystem servers also feature Lenovo Neptune™ hybrid liquid-to-air cooling, which dissipates heat through a unique closed loop liquid-to-air heat exchanger. This allows Light Bridges to reap the many benefits of liquid cooling—including higher density, lower power consumption, and higher performance—without added plumbing.

For data storage and indexing, Light Bridges makes use of the VAST Data Platform. VAST's unique efficiency algorithms and scale-out storage architecture dramatically reduce the cost of all-flash storage while enabling exabyte-level scaling. For now, Light Bridges has provisioned 1.3 PB of flash storage on VAST, with plans to easily scale to 42 PB in the near future—providing plenty of headroom for growth.

Partner perspective: Wesco

"Our partnership with Wesco is fantastic. They showed us possibilities that we wouldn't have been able to realize on our own. Together, we've built a solution that's both state-of-the-art in terms of today's technology and fit for the future. We see this platform supporting our astronomy infrastructures and pioneering business models for at least the next 10 years."

Dr. Antonio Maudes
Co-founder & CEO, Light Bridges

Image credit: Light Bridges, SL. Astrophotographer: J.C. Casado.

3

Results

Lenovo and Wesco were able to engineer an elegant solution to Light Bridges' big data dilemma. Now, the company can efficiently handle the ever-expanding amounts of data generated by astronomical research projects.

According to Dr. Serra: "A year ago, we had no way of managing even 100 terabytes of data. Now that's chump change to us. Storage capacity and speed are no longer limiting factors; it's going to be a major advantage not to have to worry about those things as demand for the TTT and our computing cluster takes off."

- 30x increase in storage capacity planned, supporting future growth
- Minutes-to-seconds improvement for certain analytical queries
- Strengthens Light Bridges' reputation as an enabler of vital research projects

On top of impressive storage capacity, the Lenovo-NVIDIA cluster delivers optimal performance for data processing and analytics workloads—and this has major implications for how quickly researchers are able to query observational data. Light Bridges estimates that it's been able to accelerate certain analytical queries from minutes and hours to mere seconds on its HPC cluster.

Such speed is also a boon for scientists studying fast-moving asteroids, which can be notoriously difficult to detect. "With many asteroids, you have about a 72-hour window to spot the orbit. If you're too slow in calculating its trajectory, then you'll miss it. It's situations like these where Lenovo gives our researchers a real edge."

Image credit: Light Bridges, SL. Astrophotographer: J.C. Casado.

“With Lenovo, we've established a critical long-term partnership. Their hardware has become essential to our business strategy. We are dedicated to providing astronomers globally with unparalleled observational tools and technology, enabling profound explorations of the cosmos and our role within it.”

Mr. Gerardo Morales
Co-founder, Light Bridges

Why Lenovo?

Lenovo came highly recommended by Wesco based on its high-density, high-performance design—enabled in large part by NVIDIA HGX A100 GPUs and Lenovo's Neptune hybrid liquid cooling technology. This unique combination allowed Light Bridges to pack more computing power into a smaller footprint, saving valuable space, money, and energy.

For a new startup on the scientific scene, having the backing of global partners like Lenovo and Wesco makes a big difference. Together, they've helped Light Bridges to build a world-class computing infrastructure in just six months—one that's already attracting serious interest from major research groups and universities.

"To offer researchers the best, we need the best technology and partners," notes Dr. Serra. "Having Lenovo and Wesco by our side makes us even stronger; we wouldn't have the capacity to do what we do without their solutions and support."

How do you help scientists to study more of the sky in less time?

Helping astronomers to probe farther and faster into the cosmos with Lenovo and NVIDIA technology.

Explore Lenovo HPC Solutions

Powered by

NVIDIA