

Academic Genomic Research with Wasabi + Packet

INDUSTRY

Life Sciences

USE CASES

Custom Application Development

CHALLENGE

Running Genomics Research with Minimal Budget

SOLUTION

Wasabi hot cloud storage + Packet bare metal compute + open source

RESULTS

- Low-cost yet high performance cloud storage keeps budgets in check
- Bare metal servers provide next-gen compute with high performance

“The lack of transfer costs between Wasabi and Packet is a major advantage for our research. This holds a lot of promise in the Big Data world of biological sciences, scientific research in general, and even more so for academic researchers.”

Abhinav Sharma, bioinformatics lead

Overview

A collaborative group of researchers led by Dr. Emilyn Costa Conceição, from the Instituto Nacional de Infectologia Evandro Chagas of Fundação Oswaldo Cruz, Rio de Janeiro, with other team members working from India, Pakistan, Mozambique, Switzerland, Germany, France, Malaysia and Portugal are doing genomic research regarding tuberculosis (TB)- focusing in molecular epidemiology, phylogeny and genetic diversity the variations.

Using a combination of Wasabi (scalable storage), Packet (on-demand compute), rclone (open source tool to transfer data between cloud services including Wasabi, Azure, OneDrive, Dropbox) and the Bioconda collection of open source bioinformatic tools, they have been able to greatly reduce the cost of performing academic genomic research, while increasing the speed with which they can research collaboratively. Both are important for this team, as they are self-funding their research while simultaneously pursuing grant-based funding.

Challenge: Genomics Research on a Budget

The rise of Cloud 1.0 providers like AWS has not been as useful as academic researchers had hoped due to the total costs of first-generation cloud storage and compute including egress and API call charges. These overall costs make large dataset-intensive research like genomics too expensive for most academic budgets. While the on-demand nature of Cloud 1.0 was attractive, it wasn't enough.

Local computing, in this case, the equipment of individual researchers was also not enough, despite the open source tools themselves being freely available. The CPU and connectivity requirements to share files across the globe, combined with required local storage (up to 9 TB at a time) simply were not viable options. The extensive delays introduced by forcing individual researchers to run their analysis independently, or to share large datasets across slow and often unstable internet connections, add to the problems of multi-country collaboration, slowing research considerably.

Solution: Wasabi + Packet + High-Speed Cloud Connectivity

“We found Wasabi through HackerNews and Reddit - and reading about the partnership with Packet was key,” explains bioinformatics lead, Abhinav Sharma, currently pursuing a Master’s Degree in Data Science through IIT-Bangalore and Liverpool John Moores University. “We had evaluated S3, and the cost of storage plus hard to predict fees was prohibitively expensive for us. We also evaluated EC2, but found the pricing and organizational structure was both too expensive and complicated to explain to scientific researchers. Using Packet’s bare metal servers produced a much simpler, affordable solution, with better performance.”

Wasabi’s on-demand, scalable storage, means that it is now affordable to maintain both the original source files containing the raw genomes, as well as intermediate files produced during the course of analysis. No more need to manually move data between researchers thousands of miles or even local storage. Having enough storage capacity for any given analysis is no longer a concern, and the price is significantly less expensive and less risky than storing it locally, where the danger of drive failures and power spikes are a concern.

Results: Affordable, Powerful, Next-gen Cloud for Genomics

On top of the overall price and performance benefits, they found that the capabilities of these next-generation cloud providers provided benefits they hadn’t anticipated. For example, the high-speed internet connections between Wasabi, Packet and other cloud tools used by the team make it possible for researchers to work in parallel, rather than serially, and at a significantly faster pace than previous solutions allowed.

Because the researchers are distributed across a variety of countries, using their own internet connections, bandwidth both in uploading / downloading is restricted and often unstable, making it difficult to move multi-terabyte files across individual researcher’s machines around the world.

For example, moving selective copies between Wasabi and Dropbox using rclone from a Packet-hosted server, allows the researchers to take advantage of the much higher speed connectivity and peering of professional cloud providers compared to connections that an individual researcher would have.

“The high-speed networking infrastructure between Wasabi and Packet dramatically changes the pace with which we can get the right data, visualizations and analysis in the hands of the researchers,” says Abhinav, “And the best thing about using bare metal - everything is much faster than a standard virtual compute instance in our comparisons.”

ABOUT WASABI

Wasabi is the hot cloud storage company delivering low-cost, fast, and reliable cloud storage. Wasabi is up to 80% cheaper and 6x faster than Amazon S3, with 100% data immutability protection and no data egress fees. Created by Carbonite co-founders and cloud storage pioneers David Friend and Jeff Flowers, Wasabi is on a mission to commoditize the storage industry. Wasabi is a privately held company based in Boston, MA.

ABOUT PACKET

Packet is the leading bare metal cloud for developers. Its proprietary technology automates physical servers and networks without the use of virtualization or multi-tenancy - powering over 60k deployments each month across 18+ global locations. Committed to automating infrastructure no matter what it is or where it lives, Packet also provides its infrastructure automation solution via on-premise and private deployment models

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