



# DUG DELIVERS GREEN HIGH-PERFORMANCE COMPUTING-AS-A-SERVICE

## Summary

**Company:**

DUG Technology

**Industry:**

Science, technology, and energy

**Business Challenges:**

Enable high-performance computing-as-a-service to support scientific analysis

**Technology Solution:**

- MX204 Universal Routing Platform

**Business Results:**

- Built global high-throughput network to support next-generation scientific computing
- Enabled high-performance computing service delivery to new regions without building out local points of presence
- Eliminated shipping massive data sets on physical storage media to run compute workloads

Many tech origin stories start in a garage. DUG Technology’s (DUG) story is a little different. Matt Lamont and Troy Thompson, both geophysicists, built a high-performance computing rig called DownUnder GeoSolutions to support their research in a backyard shed in the suburbs of Perth, Australia. That was nearly two decades ago. Today, that company—rebranded as DUG—offers high-performance computing-as-a-service (HPCaaS) anywhere in the world. The foundation of its global communications strategy is Juniper Networks routing.

DUG operates some of the greenest and most powerful computing centers in the world to support next-generation scientific computing. That achievement comes from a fanatical attention to detail and thinking differently.

“Every aspect of the systems we create matters,” explains Mark Lommers, chief engineer for DUG. “That is the ethos of how DUG operates.”

To sustain more than 30 petaflops of compute power, DUG designed and patented an innovative cooling method. Instead of inefficient air cooling, DUG uses immersion cooling with synthetic fluids to greatly reduce energy usage and increase the life and efficiency of servers and storage.

## A High-Throughput Global Network

DUG’s business has expanded beyond Perth to Houston, London, and Kuala Lumpur, delivering green HPCaaS for “big data” user industries such as geophysics, astrophysics, and genome sequencing to diagnose COVID-19 faster. DUG’s HPCaaS is either delivered direct-to-client or via its DUG McCloud platform, a secure, customer-focused, private cloud solution.

“A global network enables us to be closer to our clients,” Lommers says.

Before that global network was established, transferring data to DUG for analysis was a very different experience for its customers. Data transfer typically meant shipping a pallet of physical storage media via air freight.

*“Our global Juniper network backbone enables us to seamlessly transfer data at full line rate. All of our clients and staff can work autonomously and effectively at any time.”*

- Mark Lommers, chief engineer, DUG

“Without a high-throughput network, it was a very laborious process to get all of the data into the system,” Lommers says. “We wanted to break down the barriers.”

Designing a network to transport many petabytes of scientific data isn't easy. DUG created specialized software to optimize data transfer, minimizing latency and ensuring that the individual packets that comprise the massive data sets arrive in the right order.

To interconnect its global data centers, DUG uses Juniper Networks® MX204 Universal Routing Platform, a 10GbE/100GbE ultra-high-density router in a compact, space- and power-optimized form factor.

“Our global Juniper network backbone enables us to seamlessly transfer data at full line rate,” Lommers says. “All of our clients and staff can work autonomously and effectively at any time.

“Juniper was the best fit for DUG because the MX204 is cost effective and reliable,” he continues. “Juniper had the right options for our specifications, including the interfaces we needed and the ability to support our data transfer volumes.”

## Flexible Supercomputing Workloads

A global network has allowed DUG to transform the customer experience, eliminating weeks of waiting time while media is shipped around the globe and providing customers with on-demand computing so they can focus on their science. Behind the scenes, DUG runs workloads at its optimal data center.

“We can work with clients in any country,” Lommers says. “Clients have real-time access to our machines through our global network.”

DUG is also connected to the Australian Academic and Research Network (AARNet), giving researchers and scientists direct access to supercomputing power.

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“Our university clients around Australia have access to our facilities from their desktops,” Lommers says. “Researchers don't need to deal with logging into a traditional cloud system through a VPN. They can simply click a button, and they can securely access our facilities.”

A global network enables DUG to expand into new markets beyond its compute centers. “For example, the Houston team can work directly with clients in South America, without having to ship tapes around the world,” Lommers says. “The network has opened up international markets to us.”

A high-throughput network also enables DUG to be even more operationally efficient. “Now that we have been able to connect, we can diversify our operations and staffing,” Lommers says. “We can hedge power and compute around the world.”

## About Juniper Networks

Juniper Networks brings simplicity to networking with products, solutions and services that connect the world. Through engineering innovation, we remove the constraints and complexities of networking in the cloud era to solve the toughest challenges our customers and partners face daily. At Juniper Networks, we believe that the network is a resource for sharing knowledge and human advancement that changes the world. We are committed to imagining groundbreaking ways to deliver automated, scalable and secure networks to move at the speed of business.

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