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NYRIAD®

CASE STUDY

NYRIAD

The first commercial spin-off from the SKA is revolutionising the way the world manages big data. Nyriad's game-changing technology was developed in partnership with ICRAR on the Murchison Widefield Array radio telescope.

"We think that this architecture may be the future of all storage," said tech entrepreneur Alex St. John of his company's new product. "We've pioneered a solution that's economically so distinctly more efficient than anything else that's out there."

St. John is the co-founder and chief technology officer of Kiwi start-up Nyriad, the first commercial spin-off from the Square Kilometre Array (SKA). He is talking about the company's flagship NSULATE product, a new way of storing data originally developed for the Murchison Widefield Array (MWA) telescope.

The future of all storage? It's a big call. But many seem to agree. Nyriad raised $12 million in venture capital in 2017 and now has more than 100 employees. The company launched NSULATE at the GPU Technology Conference in San Jose in March 2018, where it scored an endorsement from Nvidia founder and chief executive Jensen Huang. But before NSULATE caught the attention of tech royalty, St. John remembers a time when it was just a great idea for the company's first customer—ICRAR.

St. John said Nyriad started when he and co-founder Matthew Simmons met at an SKA colloquium in Auckland. St. John—an expert in GPU computing—and Simmons—an expert in power efficiency and cooling systems—hit it off with a physicist at the conference. The pair were fascinated by the challenges associated with the SKA. St. John, an American expat who created Microsoft's DirectX platform in the 1990s, did some free consulting work on the project.

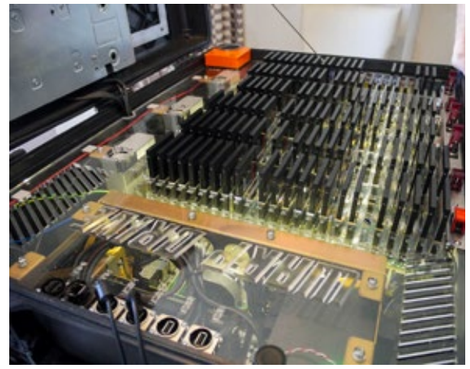
One of the problems was that the cost of the power needed for the computers was so great, the ten countries involved couldn't support the power bill alone, St. John said. "I was asked, 'what kind of idea would you have to radically change the computer architecture to make it a lot more power efficient?' So Matt and I proposed a new architecture for storage that would eliminate a huge amount of computer infrastructure. [ICRAR's head of data intensive astronomy Professor Andreas Wicenec] and the folks at ICRAR said 'that's a really interesting project, we'll fund it for you guys to build a prototype and see if it works'."

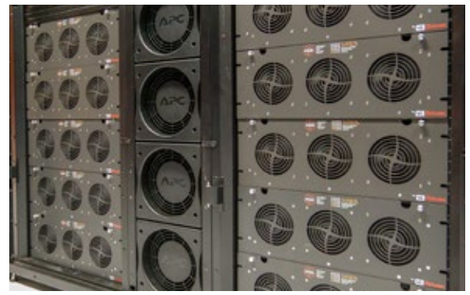
"We've pioneered a solution that's economically so distinctly more efficient than anything else that's out there."

So ICRAR became Nyriad's first customer, helping produce a prototype of the storage architecture. That was successful, and Nyriad went on to build a larger version sponsored by the New Zealand Government under a strategic technology alliance with Australia.

Cover Close up of the Nyriad Warp Drive, a demonstration system built to showcase Nyriad's NSULATE technology at the Supercomputing Conference in Denver, Colorado, November 2017.

Right Nyriad team with partners Advanced HPC and ThinkParQ, launching the first NSULATE storage server at NVIDIA's GPU Technology Conference in Silicon Valley, March 2018.





Left Co-founder and Chief Technology Officer Alexander St. John presents NSULATE at the Supermicro booth at the 2017 Supercomputing Conference.

Top Right The prototype "warp drive" server built to demonstrate the technology is now being substituted with commercial systems built by storage and server vendor Supermicro.

Bottom Right ICRAR servers running NSULATE

St. John said the system, which was later commercialised as NSULATE, is a GPU-accelerated storage architecture. This means the same computers doing the supercomputing are also managing their own storage. "By using those supercomputers to manage their own storage locally, we thought we would get rid of all the huge power-hungry and expensive storage fabric that the supercomputer usually requires," St. John said.

"I don't think I ever would have conceived this way if I hadn't been working on such a unique project. "

ALEX ST. JOHN
NYRIAD

If a component fails, the system mathematically error corrects the data across the storage array, making it super resilient, bottle-neck free and very fast. The result is a storage architecture that is faster and cheaper than the current technology.

"Using a GPU, which is a supercomputer, to calculate error correction, allows you to put more drives in parallel," St. John said. "And it allows you to use cheaper, lower-quality drives, because the more drives you put in parallel, the more resilient the array becomes to loss or failures. You can actually use cheaper equipment, and it goes faster at the same time. You get speed and cost efficiency in the same solution."

St. John said the SKA presents a lot of opportunities for companies to innovate. But he ultimately puts Nyriad's success down to the collision of "crazy tech industry entrepreneurs" and astrophysicists. "Our success is a very unique combination of ICRAR being very receptive and open to working with industry, being really innovative—they really want to tackle new solutions—and happening to encounter some very entrepreneurial start-up people who got involved," he said.

Without ICRAR, Nyriad would not be where it is today, St. John said. "We learned everything we know about it from ICRAR," he said. "Tackling storage and computing problems like this was something I never thought about until I got involved with ICRAR and started understanding the scale and the kinds of computing problems they had. And then I found them fascinating."

"The architecture we've built is really revolutionary, it's very divergent from anything anybody else does in storage. I don't think I ever would have conceived this way if I hadn't been working on such a unique project. We may have invented together the next generation of exascale storage technology."