WEHI and XENON Design Private Cloud For Next Generation Cancer, Disease and Medical Research

New infrastructure for research computing helps scientists with faster testing and discovery

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XENON's role was to recommend the right technology and design the infrastructure that realised that vision. Now we have a commercial grade private cloud that enables the on-demand and efficient computing and processing our scientists need."

Jakub Szarlat
eResearch Manager at The Walter and Eliza Hall Institute (WEHI)

Background

The Walter and Eliza Hall Institute (WEHI) is the oldest research institute in Australia and celebrated its centenary in 2015. Its scientists undertake research in a range of areas, including breast, ovarian and blood cancers, type 1 diabetes, rheumatoid arthritis, coeliac disease and malaria.

Around 100 clinical trials based on discoveries made at the Institute are underway. These include trials of vaccines for type 1 diabetes, coeliac disease and malaria, and trials of a new class of anti-cancer agents for treating patients with leukaemia.

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Institute of Medical Research
DISCOVERIES FOR HUMANITY

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WEHI houses fourteen research divisions with around 80 laboratories and 1000 staff and students. There are around 60 bioinformaticians in the institute and around 30 biologists who analyse their own data on high-performance computing equipment. These researchers play an essential role in the institute's scientific output.

Challenge

With an ever increasing demand for high-performance computing resources due to accelerating data growth and a growing number of bioinformaticians and computational biologists the Institute needed to expand its research computing resources.

Typically, most research organisations don't have the capacity to perform the full range and depth of analysis required in biomedicine.

This was certainly the case for WEHI. Coupled with the fact that its existing cluster was ageing it became clear that its computing infrastructure was ready for an overhaul. Pockets of teams were using it, with one alternative approach to queue up to process a 'job' on the VLSCI cluster – which sometimes took up to a month to test and run. If things didn't work out as planned, it was back to the drawing board - not reflective of the world-class research institution that WEHI is.

Jakub Szarlat, eResearch Manager at WEHI explains, "Today, progress is all about an agile approach. For our bioinformaticians, at a simplified level that's about building code, testing it against research, processing, analysing, learning, and repeating. If you need to wait a month before you can test your code with real data, then have it fail, you go back, rework, and then queue again to test at the appropriate scale. That makes for slow progress and doesn't suit the 24x7, outcomes-based nature of our scientists.

Solution

WEHI went to market for a new high performance computing cluster. Mr Szarlat emphasises that the new platform needed to have broad appeal within WEHI and be accessible to all of the sciences, to avoid siloed use as had previously been the case. "We wanted to find a way for everyone to use the same platform, and encourage teams who traditionally wouldn't consider using the platform, to do so."

While Mr Szarlat had a concept of what he wanted to build, the tender was deliberately vague to encourage innovative responses, however at a broad scale WEHI needed:

▸ Compute Hardware
▸ Storage
▸ Network
▸ Private Cloud Management (including proposed architecture)
▸ Batch Job Queuing Systems
▸ Self Serve Virtual Machines.

Walter and Eliza Hall Institute Director Professor Doug Hilton at the Milton Launch.

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XENON Systems presented a sophisticated Compute, Storage and Networking design that included a commercial-grade private cloud implementation with a software stack based around VMWare. The response was based on technology that has been well established, but never in the proposed configuration. This aligned to Mr Szarlat's vision of pooling and providing resources in a virtualized environment instead of a system of individual but shared machines. This approach of using virtual machines would also ensure that all processes gain equal use of the infrastructure at any time.

"In some ways, this turned the way we approached our computing upside down, and it's this approach, and the subsequent services and support that set XENON apart," explains Mr Szarlat.

XENON's proposal was accepted, and is now implemented as WEHI's Research Computing Cloud, also known as "Milton".

"We liked XENON's approach from the moment they responded to our tender. They demonstrated an inquisitive and collaborative nature, and gave us confidence they were flexible in their approach. This turned out to be a guiding factor in the project's success. What we were doing had never been done before. Sure, it was a highly planned and well calculated risk, but there was room for things to go wrong. But XENON worked with us relentlessly to resolve each issue," says Mr Szarlat.

XENON is a specialist in developing customised high performance computing platforms and has worked with most of Australia's academic and research institutions. Each environment has different requirements and the XENON team is able to design and deliver solutions based on its broad experience and the latest technologies.

"The new private cloud solution greatly expands and accelerates our research capability in computational biology through provision of fast and flexible platform while offering a convenient user experience."

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Speakers at the Milton launch event.
Back Row: Werner Scholz (XENON), Jakub Szarlat (WEHI), Phil Brown (WEHI), Dragan Dimitrovici, (XENON), Peter McGonigal (XENON)
Front row: George Siamos (JUNIPER), Michael Shing (QUANTUM), Tony Papenfuss (WEHI), Michael Carolan (WEHI), Miffy Edwards (WEHI), Adrian Sharkey (QUANTUM), Bruce Coulthard (QUANTUM)

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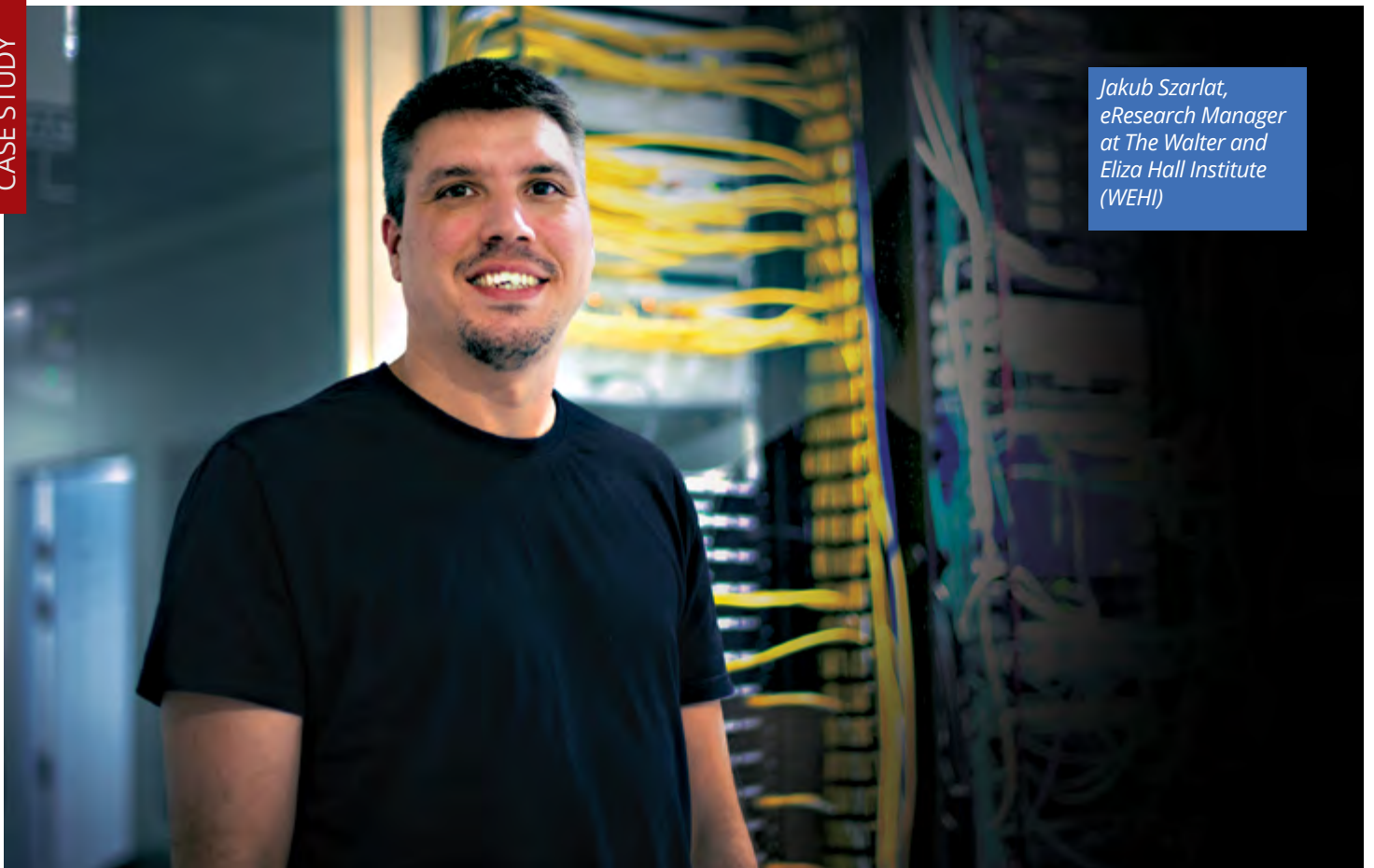
Jakub Szarlat, eResearch Manager at The Walter and Eliza Hall Institute (WEHI)

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About WEHI

The Walter and Eliza Hall Institute is the oldest research institute in Australia and celebrated its centenary in 2015.

Our scientists undertake research in a range of areas, preventing and treating diseases including cancer, immune disorders such as type 1 diabetes, rheumatoid arthritis and coeliac disease, and infectious diseases including malaria and hepatitis B.

Around 100 clinical trials based on discoveries made at the Institute are underway. These include trials of vaccines for type 1 diabetes, coeliac disease and malaria, and trials of a new class of anti-cancer agents for treating patients with leukaemia.

About XENON Systems

XENON is an Australian leader in High Performance Computing solutions. XENON's innovative products and technology are designed to tackle the most data intensive and complex visualisation challenges, allowing its clients to focus on breaking new ground in their respective fields.

Whether it's high performance computing, network design, server and storage solutions or visual workstation technology being sought, it has delivered tailored solutions in a variety of demanding environments including science, defence, manufacturing, precision medicine, finance, broadcasting, motor racing, education and telecommunications.

Recognised and trusted as a partner to achieve the extraordinary, its talent lies in applying new thinking and ideas to create pioneering solutions that uniquely address client's needs.

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