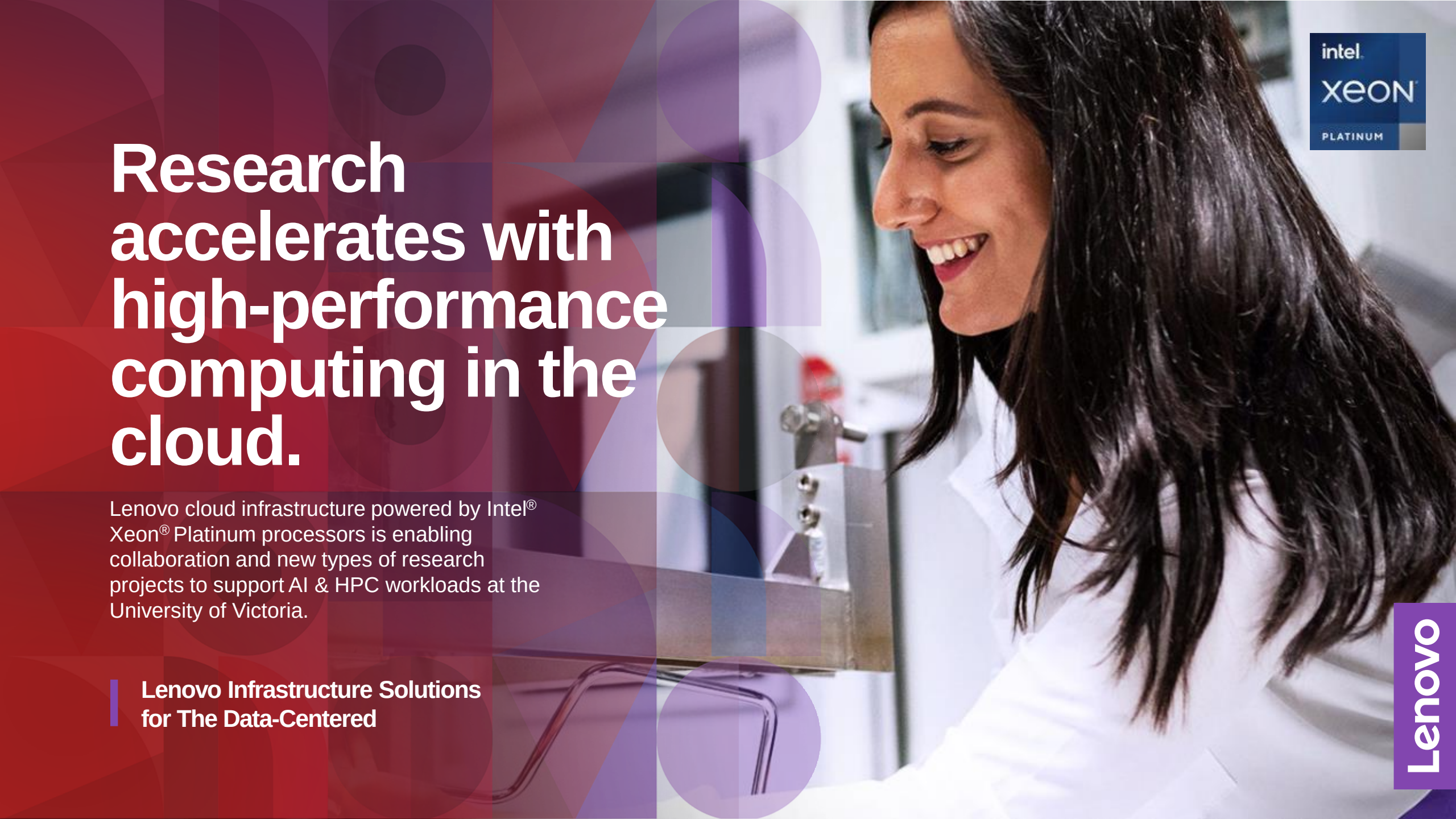
Research accelerates with high-performance computing in the cloud.

Lenovo cloud infrastructure powered by Intel® Xeon® Platinum processors is enabling collaboration and new types of research projects to support AI & HPC workloads at the University of Victoria.

Lenovo Infrastructure Solutions for The Data-Centered



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Background

The University of Victoria (UVic) is one of Canada's leading research universities. Its campus on Vancouver Island is home to more than 22,000 students and hundreds of researchers, as well as some of the country's leading research institutes.

A Compute Canada Advanced Research Computing (ARC) data center on campus provides high-performance computing (HPC) infrastructure and services not only to research teams at the university itself, but also to other institutions across Canada and around the world. The research projects that the center supports involve online machine learning, big data analytics, and collaborative computing.

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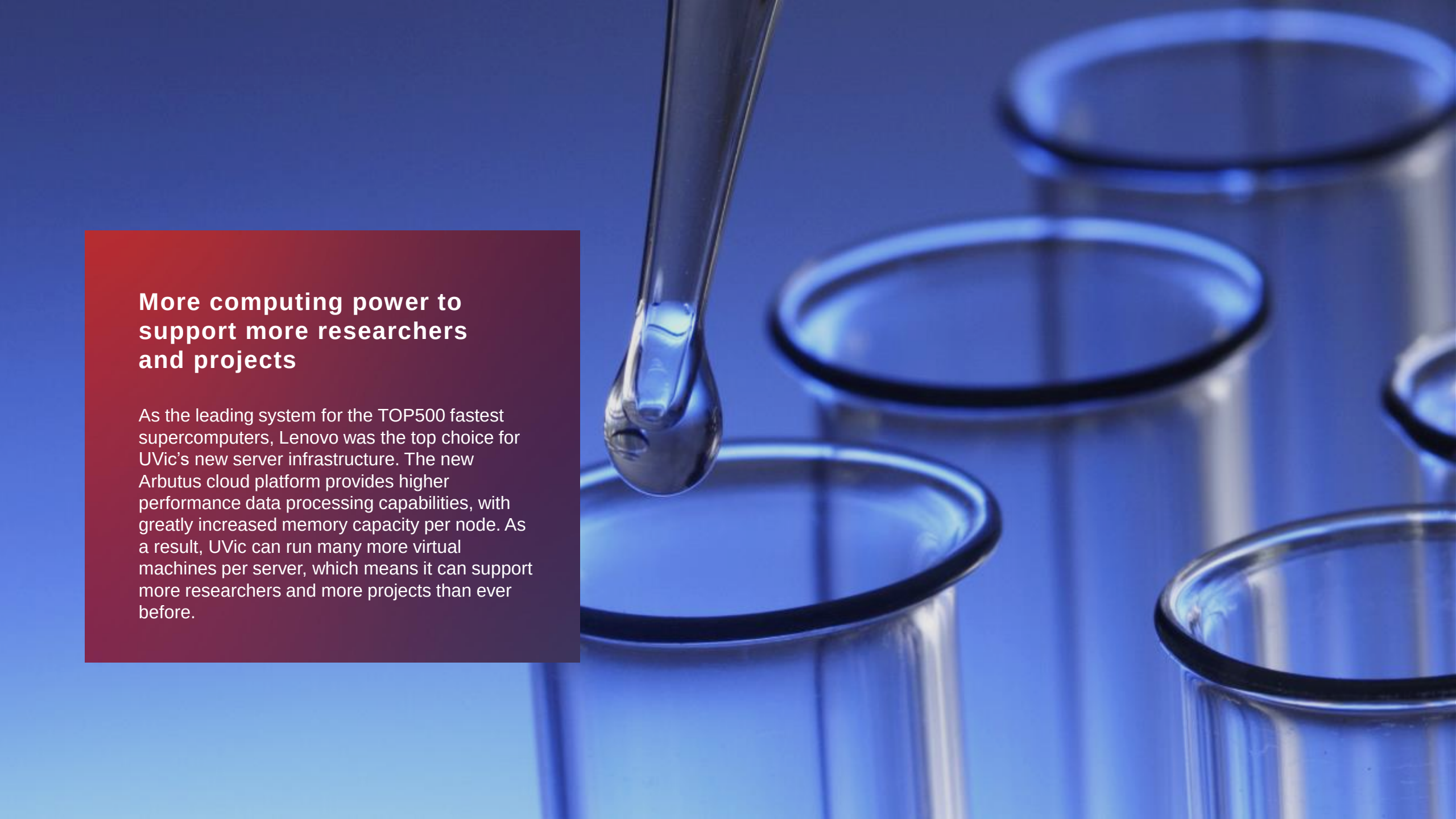
Challenge

UVic's IT department originally created the Arbutus OpenStack infrastructure to provide the services their researchers needed -- high-availability collaborative platforms, customized web sites, root access, micro-services environments, and other cloud computing services. Their initial deployment was capable of supporting thousands of virtual machines, each of which could be configured for the precise needs of individual research projects. The project was so successful that its popularity grew. Over four years, many more teams and projects started using Arbutus' storage, memory and advanced computing resources. UVic decided to expand the infrastructure so that more researchers could benefit.

> Our existing IT services did not have the infrastructure that could provide answers to some of our researchers' advanced computing needs. We had HPC clusters, but researchers were in dire need of high-availability collaborative platforms, customized web sites, root access, micro-services environments, and other cloud computing services.
>
> **Belaid Moa, Ph.D.**
> Advanced Research Computing
> Specialist, University of Victoria



More computing power to support more researchers and projects

As the leading system for the TOP500 fastest supercomputers, Lenovo was the top choice for UVic's new server infrastructure. The new Arbutus cloud platform provides higher performance data processing capabilities, with greatly increased memory capacity per node. As a result, UVic can run many more virtual machines per server, which means it can support more researchers and more projects than ever before.

An essential service for many researchers

University of Victoria's newest deployment, Arbutus Phase 2, adds 208 Lenovo ThinkSystem SR630, SR670 and SD530 nodes, and nearly 8,000 more cores to the cluster with 2nd Gen Intel® Xeon® Scalable processors. Each node features an average of 119 GB of Lenovo ThinkSystemTruDDR4 Memory plus 1 TB of Intel® Optane™ persistent memory.

The new infrastructure enables the second-generation Arbutus cloud platform to offer higher performance data processing capabilities, with greatly increased memory capacity per node. As a result, UVic is able to run many more virtual machines per server, which means it can support more researchers and more projects than ever before.

The platform is now well-equipped to support AI/ML workloads, allowing researchers to easily compile their AI/ML code.

> Built on cutting-edge Lenovo and Intel technologies, the Arbutus platform has become as important as HPC clusters and an essential ARC service for many researchers.

Belaid Moa, Ph.D.
Advanced Research Computing Specialist, University of Victoria

Most of my projects over the past 15 years have revolved around studying how molecules interact with surfaces. For example, my team studies how proteins in the human body interact with plastics such as catheters, stents, sutures, and artificial organs, trying to get at the molecular basis of biocompatibility.

Dennis K. Hore, Ph. D.
Professor of Chemistry and Computer Science, University of Victoria

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Results

In addition to supporting a much larger number of projects, Arbutus Phase 2 provides a more comprehensive and flexible range of cloud services. And, research teams can ramp up more quickly because they can create their own virtual labs much more quickly. Many AI/ML jobs can now be run in parallel on smaller clusters of nodes over longer periods of time, which reduces the waiting time for a window on a larger cluster.

Most importantly, more research teams can use UVic's new computing power to make a positive contribution to society – and even to save lives. For example, Dennis K. Hore, Ph. D., Professor of Chemistry and Computer Science at UVic has launched a project that uses big data and machine learning to help improve the lives of people using non-prescription drugs by attempting to reduce the number of overdoses.

UVIC

- **Better support of AI/ML workloads**
- **More virtual machines per server**
- **Faster system restarts for less down time**

When a researcher requests an environment, what we consider their own virtual lab, we set up the network and hardware to support their work. They can then create their own virtual lab in minutes, with or without support from our services. Some virtual labs are even running small-scale HPC workloads, such as GROMACS, the molecular dynamics software used for studying things like the SARS-CoV-2 virus.

Belaid Moa, Ph.D
Advanced Research Computing Specialist

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