University of Gothenburg adopts application platform for data science

Sweden's University of Gothenburg is one of Northern Europe's largest and oldest universities, dating back to 1891. When it decided to build a new website in 2020, it realized its virtual machine (VM) environment would slow development. Today, Red Hat OpenShift provides the foundation for the new website and various research projects. The application platform requires minimal management, freeing up IT staff to focus on higher-value work. Self-service capabilities also mean research projects can progress faster. Red Hat OpenShift Virtualization, included as an operator with Red Hat OpenShift, allows the university to run VMs alongside containers so it can containerize legacy applications with ease and consistency. Additionally, the university was able to create an MLOps platform for testing and learning using Open Data Hub, OpenShift Virtualization, and Red Hat OpenShift Dev Spaces.

Gothenburg, Sweden

Headquarters

Education

6,600 staff
54,000 students

Benefits

▸ Accelerated development with self-service

▸ Onboarded developers and students in minutes

▸ Allowed VMs and containers to run side by side

▸ Provided a multiuser solution for teaching

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Johan Kindstrand
Senior Consultant, Atea, University of Gothenburg

Contributing to a better future

Founded in 1891, the University of Gothenburg is the third-oldest of the current Swedish universities. Lying in the heart of Sweden's second-largest city, its strong research and appealing study programs attract scientists and students from around the world. Around 54,000 students and 6,600 staff study and work across its 8 faculties and 38 departments. The university also has a large number of research centers of expertise, which span several academic disciplines. These focus on meeting societal challenges, with their new knowledge and new perspectives contributing to a better future.

The university chose Red Hat Enterprise Linux® as its standard distribution over a decade ago. When deciding to build a new web platform in 2020, it recognized that an application platform would make it faster and easier for developers to test, deploy, and launch new services. However, building an application platform on the university's legacy VMs would be slow; it could take up to 3 months to deliver the new environment.

"An application platform would give research teams access to the IT environments they need much faster, and our IT unit would be able to manage resources centrally," said Carl-Johan Schenström, IT Infrastructure Specialist at the University of Gothenburg. "What is more, with the application platform's built-in networking, we would not need to rely on our networking team to set up ports manually so our research teams' projects can communicate with other systems."

Adopting a hybrid cloud application platform for internal and research projects

The university began building the website on OKD, the open source community version of OpenShift. Technology partner Atea Sverige (Atea) suggested adopting Red Hat OpenShift. "We are only 2 people, so the enterprise-level support that comes with Red Hat OpenShift is essential; everyone else is supporting our legacy systems," said Johan Kindstrand, Senior Consultant, Atea, University of Gothenburg. "And Red Hat OpenShift will make it easier for us to find new talent when we need it."

The university purchased a Red Hat OpenShift Platform Plus academic license. "The licensing cost is very attractive, and we are very interested in using Red Hat Advanced Cluster Management for Kubernetes, Advanced Cluster Security for Kubernetes, and Red Hat Quay," said Kindstrand. "Red Hat Advanced Cluster Management will allow us to manage our Red Hat OpenShift clusters centrally as their numbers grow. Red Hat Advanced Cluster Management will quickly become essential."

Atea and the university's IT unit deployed Red Hat OpenShift on VMs using user-provisioned infrastructure (UPI) and migrated the university website from OKD. "The Red Hat Knowledge Base was really helpful. There are lots of great resources in there," said Schenström.

The university plans to deploy more clusters for development and testing in addition to production. "Many departments are looking into using Red Hat OpenShift," said Schenström. Those projects include building a trusted environment for research projects and a marine biology "research vessel," which stores the data it collects in Red Hat OpenShift. Internal projects will be deployed on VMs and research projects on bare metal.

A Red Hat Solution Architect keeps the partners informed about upcoming features. "Our developers really like learning about new features," said Schenström. "They loved the OpenShift Dev Spaces demo, for instance." Other important features include the Open Data Hub, an open source project providing tools for running large and distributed artificial intelligence (AI) workloads on Red Hat OpenShift. The tools support monitoring and data storage and also include distributed AI and machine learning (ML) workflows and the Jupyter Notebook development environment.

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>
> **Carl-Johan Schenström**
> IT Infrastructure Specialist
> University of Gothenburg

Supporting operations, developers, researchers, and teachers alike

Accelerated development with self-service

Self-service tools built into Red Hat OpenShift means developers no longer need to wait for the IT unit to manually provision and configure VMs according to each project's needs. Developers and researchers are a lot less dependent on IT and can get moving with their projects sooner on the application platform, and the IT unit has more time available to support projects in other ways.

"We can create a namespace in Red Hat OpenShift in a few minutes. They can then install their collecting application, and they are good to go," said Schenström, highlighting how the marine biology department can now create research vessels. "Previously, we would set up a VM, configure it according to the project's needs, talk with the networking people, and set the ports for communicating with all the sensors—and that would have taken a few days, a week, or even more."

The namespaces integrate with the university's Active Directory for credentials and roles. Once they are created, developers can deploy whatever applications they need in any environment. Future plans include using Red Hat OpenShift to provide more self-service so developers can create namespaces themselves.

Onboarded developers and students in minutes

The university has also recently started using OpenShift Dev Spaces, a collaborative Kubernetes-native solution for rapid application development. OpenShift Dev Spaces delivers consistent developer environments on Red Hat OpenShift, allowing anyone with a browser to contribute code in under 2 minutes.

"OpenShift Dev Spaces allows us to onboard developers within minutes," said Schenström. "We like how it provides developers—whether in our IT unit or more widely across individual departments—with a consistent, secure, and zero-configuration development environment."

Allowed VMs and containers to run side-by-side

The trusted environment Schenström and his team are building for sensitive research projects uses OpenShift Virtualization to allow VMs to run alongside containers on the same platform, simplifying management and improving time to production.

"We use OpenShift Virtualization to run Windows infrastructure—the Active Directory Controllers and remote updates, for instance—on VMs in Red Hat OpenShift," said Schenström. "We then deploy a virtual Windows server with remote desktop services to create an isolated bubble for each research team."

Provided a multiuser solution for teaching

The university has a lot of projects using the Jupyter Notebook. The School of Business, Economics, and Law has been using the multiuser version (JupyterHub) to support 3 courses with up to 160 students each since 2021.

"JupyterHub allows a smaller number of teachers to teach and support a greater number of students. We can easily enter students' servers to help and support," said Mari Paananen, Associate Professor at the University of Gothenburg.

JupyterHub means students do not need to install software on their computers, which can cause installation problems and waste around 20% of the allocated teaching time. "It levels the playing field among students, as they all have access to the same processing power, regardless of the capacity of their own computer, and provides students with instant access to the same data from a shared folder," said Paananen.

Expanding data science use cases with hybrid cloud

The University of Gothenburg is expanding use cases for the Red Hat application platform, including for data science projects. "We have users who want to use graphics processing units (GPUs) for AI, ML, and, in the future, high-performance computing (HPC) projects," said Schenström, explaining how projects buying physical servers with dedicated GPUs and then IT managing those servers is not resource effective. "We would like to provide a data science platform based on Red Hat OpenShift with shared access to GPU and CPU resources. We are looking at hybrid cloud for those compute-heavy applications," said Schenström. "The auto-scaling provided by public cloud environments will help us manage costs."

The University of Gothenburg uses Open Data Hub, an open source AI platform designed for the hybrid cloud, to provide their data scientists with a Jupyter-as-a-service collaborative environment for use cases like a chatbot for Alzheimer's research. They are also considering OpenShift AI, Red Hat's commercial product based on Open Data Hub, which provides a flexible, scalable MLOps platform that gives teams the tools they need to build, deploy, and manage AI-enabled applications.

Plans for the future include containerizing legacy applications, including internally developed Windows applications. "We can now modernize our legacy Windows applications and get rid of some of our legacy physical servers," said Schenström. OpenShift Virtualization makes containerizing .NET applications straightforward. Windows developers write their applications as they normally would, but instead of deploying onto a Windows server, they deploy to Red Hat OpenShift.

"Red Hat OpenShift is critical to our future success," said Kindstrand. "It frees up our IT unit, allows projects to progress faster, and we can onboard new developers fast. We are excited about containerizing our .NET applications and expanding our Red Hat OpenShift use cases to include AI, ML, and HPC projects."

About the University of Gothenburg

The University of Gothenburg is a multidisciplinary university that dates back to 1891. Its large number of research and centers of expertise span several academic disciplines, serving as a meeting point for students, researchers, and representatives from the commercial, industrial, and public sectors.

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