Hamilton improves and saves lives with data

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NetApp ONTAP and E-Series storage unite performance and security in a data fabric.

Hospitals, laboratories, research, and industries rely on life science precision instruments from Hamilton. With or without a pandemic, customers around the globe expect safe and available products—a big challenge in times of rapid growth. Hamilton had massively expanded to meet the demand for ventilators, pipetting robots, and sensors. As unit volumes increased, so did data and storage load. Supported by its IT partner Diwega, Hamilton renewed its data fabric powered by NetApp® storage and technology.

"We wanted NetApp again because the storage is simple. The necessary protocols are onboard. There is no need for Windows file servers because this function is a part of ONTAP."

Roman Janett
Team leader ICT Platform, Hamilton

Simplicity as a principle

In the 1950s, with the first microliter precision syringe, Clark Hamilton not only set a laboratory standard, he also founded Hamilton. The company operates in 13 countries today and employs more than 3,000 people, a good third of them in Switzerland.

Whether it's faster sample processing with a magnetic pipette or ventilation control using a software-assisted system, Hamilton's success is based on innovations that simplify complex processes. Data management also follows a simple principle: Hamilton uses a data fabric powered by NetApp.

Data as central as possible and as local as necessary

The data fabric's core consists of central data storage systems in Bonaduz, Switzerland. All 24 Hamilton sites across the United States, Europe, and China have access to it. Manufacturing sites in Massachusetts and Romania have their own NetApp® systems. Wherever data is generated, Hamilton backs it up and archives it in Switzerland according to compliance requirements. The approach has been successful since 2009 and has evolved constantly.

During the COVID-19 pandemic, Hamilton was growing fast. A new production facility was built in Reno, Nevada. The Swiss sites in Bonaduz and Domat/Ems significantly expanded staff and floor space. In these and other sites, Hamilton needed to increase daily shifts to three instead of two. Hamilton's production is highly automated and complies with numerous regulations. Because each product created a new data footprint, the load on the NetApp systems rose with the output.

Shaping the future with storage

"To ensure that our IT and business processes could run smoothly, we had to act and upgrade our storage as our systems were working almost at their performance limit," said Roman Janett, team leader of Information Communication Technology (ICT) Platform at Hamilton in Bonaduz.

The decision was based on workloads, functionality, and cost. Because NetApp offers solutions for every storage need, Hamilton could select a perfect fit.

After 6 years of operation, the three central systems were replaced by a 6-node cluster with NetApp ONTAP® data management and 300TB of capacity. Now, with two storage classes, it was possible to distribute workloads efficiently. Four nodes deliver flash performance for VMware, Microsoft databases, and their applications. Disk storage with two nodes serves file and WORM (write once, read many) data. Three sites in China, Romania, and the United States received entry-level flash systems. Two cost-effective NetApp E-Series systems, located at two Swiss sites, substituted the previous ONTAP system as backup storage.

"We also considered other vendors. But we wanted NetApp again because the storage is simple. The necessary protocols are onboard. There is no need for Windows file servers because this function is a part of ONTAP. Everything else, from migration to operation, would have been more complex and, especially with the WORM data, very time-consuming and costly," said Janett.

Backup and compliance from a single source

Life science precision instruments must work safely, and Hamilton has to document their safety with test certificates or scans of critical components, and this documentation must remain unchanged for up to 40 years. As the products become more digital, the amount of data they create increases. Customers can manage their devices by using a single app, and the log data of their products gets stored, evaluated, and archived on NetApp storage at Hamilton.

To keep the data available and secure, Hamilton uses ONTAP for backup and compliance.

NetApp Snapshot™ technology enables fast file system copies and recovery directly from production storage. Hamilton combines it with Commvault backup software to consistently and completely protect distributed database applications and services. The software controls the complex timing of a simultaneous application freeze on the storage and triggers a Snapshot copy. And it manages the replication of the backups to the E-Series systems in Bonaduz and Domat/Ems. With NetApp SnapLock® Compliance, data becomes immutable and remains quickly accessible.

Migration made easy

Because writing data to storage never stops in a global company, the migration had to happen in live mode. The team chose a protocol-by-protocol approach, starting with the central VMware environment that uses NFS and the large SQL cluster with iSCSI connectivity, followed by the CIFS and WORM volumes. After the team had all ONTAP versions updated, NetApp SnapMirror® and NetApp SnapVault® software replicated the data 1:1 to the new production and backup systems. Moving 475

servers and 200 clients went smoothly using VMware vMotion. NetApp and VMware products are tightly integrated, which simplifies day-to-day operations.

"VMware and NetApp software link seamlessly through the NFS plug-in for VMware VAAI. Both harmonize perfectly and make monitoring and provisioning storage for nearly 700 systems very convenient," said Carli Braschler, storage specialist at Hamilton in Bonaduz.

Because Hamilton chose NetApp again, it only had to move the WORM area without copying data or validating new systems. There was no need to prove complete retention periods and lossless migration. Checking whether every single file still exists and is identical would have been a Herculean task with about half a billion documents.

Diwega accompanied the entire project from start to finish. "Our long-standing partner Diwega advised us on everything from the equipment to the procedure. We could also count on Diwega's expertise at any time during implementation," said Janett.

Everything's fine

The performance improvement was tremendous. The central cluster's CPU load is just 20% to 30% in normal operation mode. Latency is now <1ms—an improvement of more than 50%. Virtual systems and file shares run more smoothly than before, and Hamilton can create more backups without noticeably affecting the production system. Even the incremental backups became two times faster. Because each volume in the cluster can move on demand, the team can address maintenance and updates more quickly.

New regulations were easy to fulfill. Because data created in China must remain in the country, the team simply implemented a local flash system. The team still keeps the primary data in Switzerland but replicates backup data to the on-site system.

With the new cluster, Hamilton can store and protect large amounts of data cost-effectively and has plenty of room for future growth. Today, one in four ventilators, two in three automated Corona PCR test systems, and sensors for almost all vaccine producers worldwide come from Hamilton. The demand for consumables is high. Also, the products are in demand in other industries, such as health, genetics, robotics, food, and environmental fields.

Life science in the cloud

What's next for IT? The team plans to restructure volumes so that they can bill IT services internally. More cloud is also on the agenda. With Microsoft 365, Workday, ServiceNow, or Azure resources for development, Hamilton is already pursuing a hybrid strategy.

Roman Janett is fully satisfied with what has been achieved so far. "Thanks to the optimizations we made, performance and capacity are back in the green zone and everything is running smoothly. In addition, we have expanded our data fabric and can now access a Swiss public cloud if needed, making us even more flexible," he said.

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