Hewlett Packard Enterprise | **SCALITY**

FIGHTING CANCER—ONE PERSON AT A TIME

University Hospital Basel turns Big Data into an asset for advancing research in personalized treatments for complex diseases

Life-changing care and research

Imagine a world in which every individual receives medical care and treatment based on their unique genetic makeup. Instead of fighting diseases like cancer with broad-spectrum approaches, doctors could attack the disease as it is manifested in each person using precisely targeted therapies to maximize positive outcomes and minimize negative side effects. This is a world that the University Hospital Basel envisions and strives for daily.

One of five university hospitals in Switzerland, the University Hospital Basel (in German, Universitätsspital Basel, abbreviated USB) has been pioneering advanced medical procedures for more than 150 years. For example, through its clinical care and extensive research capabilities, University Hospital Basel was one of the first university hospitals to successfully perform a kidney transplant. Now it is taking on cancer, applying technologies such as artificial intelligence to massive amounts of data to help researchers develop personalized immunotherapy treatments.

Markus Müller, head of University Hospital Basel's Data Center Management, remarks, "The university hospital is committed to putting humans and their needs at the heart of everything we do, from disease prevention to palliative care. Today, data is an absolutely vital part of our important work."

Müller's challenge is to provide clinicians and researchers with access to the massive amounts of data required to achieve medical breakthroughs that improve the lives of humans. It is a monumental, yet essential, task to enable physicians to make faster, more accurate diagnoses, and to help researchers develop life-changing therapies for treating cancer and other diseases.

Demand for a lifetime of data

The Big Data that Müller is responsible for managing and protecting spans everything from personal health data and genetic sequences to radiological images, even video footage of surgical procedures. The data must be collected over long

⊁|− Universitätsspital Basel

INDUSTRY: HEALTHCARE

REGION: SWITZERLAND

VISION

Provide doctors and researchers with ready access to historical and current data to aid diagnoses and development of new medical treatments

STRATEGY

Build a universal medical archive, leveraging Scality RING and HPE Apollo 4000 systems to preserve and secure all types of data indefinitely

OUTCOMES

- Simplifies accessing clinical and patient data vital to research
- Enables greater medical collaboration across organizations
- Scales easily to support growing volumes of Big Data

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periods of time that can span decades, even lifetimes. And it all must be securely archived for access by clinicians and researchers at any time in the future.

This data is the foundation for the university hospital's work to improve cancer treatments and advance toward personalized medicine. For example, by analyzing a combination of genetic data, personal health data, and environmental data from patients throughout their lives, researchers hope to come up with treatments not just for lung cancer in general, but for an individual's unique manifestation of lung cancer. This same principle applies to virtually any type of complex disease like cancer.

For Müller, the challenge was how to manage a variety of different storage and archival systems based on each type of data and the application generating it, such as computer tomography (CT) or magnetic resonance imaging (MRI). Finding the needed information, and then retrieving it from the respective system was difficult and time-consuming, slowing researchers and hampering doctors in diagnosing complex cases.

Müller saw an opportunity to resolve this situation by building a central medical archive as a private cloud that is universally accessible across all areas of the university hospital. He notes, "Today our data archive is unified, secure, and easily accessible. Researchers can now analyze older data sets more readily to support their work toward personalized medicine, and doctors can view older, point-in-time patient data to make better diagnoses."

The solution: Universal medical archive

Recognizing that doctors and researchers want access to all data on every individual from pre-natal to the end of their lives, Müller needed to take a fresh look at the university hospital's storage and archiving infrastructure. The traditional file systems that his organization had long relied on were no longer adequate. Those systems had volume limits of 300 GB and the amount of data coming from departments like pathology and other laboratories had exploded to hundreds of terabytes in recent years.

"Our customers within the university hospital want the ability to access data at anytime from anywhere, even if it is in a long-term archive," Müller says. "We have data from radiology and raw genetic data, as well as tissue samples for histopathology, which are digitized by robots. We needed a solution to securely archive Big Data of all types yet make it universally accessible."

After a careful evaluation of the various proposed options, Müller and his team selected Hewlett Packard Enterprise (HPE) who offered a private cloud storage solution in partnership with Scality. USB has since deployed Scality RING, running on HPE Apollo 4510 systems, in three data centers across the university hospital campus.

The Scality RING solution provides the foundation for the universal medical archive Müller envisioned, with the ability to store, protect, and secure all types of data—from radiological images and clinical data to video footage and scanned images of paper patient records. Moreover, it can scale virtually without limits by simply adding storage nodes to the universal archive.

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Müller points out, "Our customers within the university hospital emphasize that we cannot delete their data and that it must be kept for 10, 20 years or longer. The advantage of Scality RING is that when we reach current capacity, the system can simply be expanded online. This would not have been so easy with our previous solution."

Scality RING also brings Müller and his team another capability never before possible for the university hospital: integration with public clouds for seamless data movement between Scality RING and the public cloud. "We will soon tackle the challenge of synchronizing data externally to the public cloud, which will make it easier for us to share our data and collaborate with other research organizations."

Cornerstone of advanced medical research

Archival data of all types is a cornerstone of research at the University Hospital Basel. To ensure data integrity over long periods of time, data security and durability are essential. Müller is confident Scality RING will support these fundamental requirements. "With the Scality RING architecture stretched across three data centers, we have assurance that if we have a failure in one data center, the other two will continue to operate. To prevent the data from ever being altered or deleted, we set the file properties via Scality to read-only. Compared to when we only had a picture archive in the basement, we have made tremendous progress!"

As Müller continues to bring data into the universal medical archive from additional sources, researchers are gaining the vital information they need to pursue new discoveries for treating disease and improving overall wellness. For example, some teams are applying artificial intelligence to the massive volumes of diverse data that's been collected for projects such as digital pathology (pathology from digitized specimen slides), to enable automated diagnosis support, as well as to explore new possibilities for improving health that have yet to be discovered.

With more and more data collected every day, researchers at the University Hospital Basel are well equipped to shape the future of personalized medicine and improve the health and wellness of people around the world. For his part, Markus Müller is determined to ensure that data is preserved and easily accessible to support their mission.

Müller concludes, "My theory has always been, 'never crash into a wall'—always have a way forward. I look for technology that takes away problems and provides flexibility to adapt when our customers within the university hospital come to us with new demands. HPE and Scality have taken the problem of archiving data away from me; they've eliminated that worry. And anything I don't have to worry about is a good thing."

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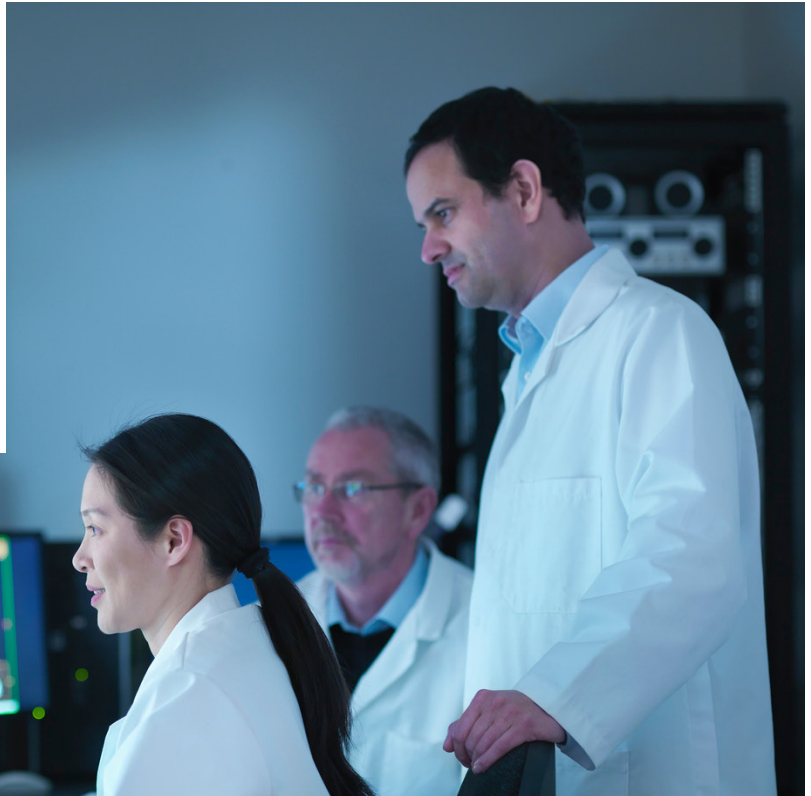
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