Ushering in the Future of Health

Accelerating digital transformation and improving patient outcomes with help from AWS Partner Innovators.
Table of contents

Introduction
Balancing the complexities of care:
Learn how AWS empowers healthcare and life sciences.

Hafod
How artificial intelligence is supporting vulnerable adults living alone.

University Hospital Bonn
Developing an artificial intelligence system to help scientists
eliminate a disease commonly known as river blindness.

Thermo Fisher Scientific
Protecting critical scientific and medical materials—
from irreplaceable genetic samples to lifesaving vaccines.

U.S. Army Telemedicine &
Advanced Technology Research Center
A cloud-based telehealth solution connects healthcare workers across the
United States to help expand lifesaving, critical care during emergencies.

Johnson & Johnson
Connecting supply chain practices and product flow to the cloud with help
from IBM Consulting helps Johnson & Johnson deliver medicine reliably.

Meet the partners
Powering patient-centered care

Healthcare and life sciences organizations are looking to digital transformation to help them speed innovation, improve collaboration, make data-driven clinical and operational decisions, and decrease the cost of care. But many organizations lack the internal resources to navigate this transformation on their own. Working with Amazon Web Services (AWS) and AWS Partners, healthcare and life sciences organizations can more easily discover, assess, and deploy cloud solutions that help them achieve business goals and better patient outcomes.

In this ebook, you'll read how AWS and AWS Partners are working together to help organizations deliver on their missions, like enhancing in-home care for at-risk adults living alone by using Amazon Echo devices. Or, accelerating clinical trials for drugs that could prevent millions of people from going blind.

You'll also read how AWS and AWS Partners are helping to protect critical scientific and medical data, extend the reach of critical care with advanced telemedicine solutions, and optimize supply chains to make sure nothing stands in the way of reliable medicine delivery.

Together, we can help make healthcare access, diagnosis, and delivery better, faster, and more cost-effective, and ultimately drive better outcomes.
Why AWS and AWS Partners?

Amazon Web Services (AWS) and AWS Partners—including global system integrators (GSIs)—are working together to help usher in the future of healthcare.

AWS is the trusted technology and innovation partner to the global healthcare and life sciences industry, providing unmatched reliability, security, and data privacy. AWS for Health provides proven and easily accessible capabilities that help organizations increase the pace of innovation, unlock the potential of health data, and develop more personalized approaches to therapeutic development and care.

GSIs are AWS Partners that have the vision and aptitude to turn complex challenges into new business possibilities. They bring dedicated teams with healthcare and life sciences expertise to help customers more easily discover, assess, and deploy cloud solutions that support better patient outcomes, achieve business goals, and accelerate their transformation.
Hafod

Working with Accenture

How artificial intelligence is supporting vulnerable adults living alone.
A digital assistant bridges in-home care and independent living

As communication technology advances, it's easy to forget that many people don’t find connection so simple. For older people living alone, the challenges can be significant. In the United Kingdom, 30 percent of older adults have said they speak to less than one person a day.
Hafod has delivered in-home care and other support in Wales for over 50 years, so its teams are well aware of how loneliness can seriously impact older adults. However, the problem worsened during the COVID-19 pandemic. Hafod teamed up with Accenture and Swansea University to find out how technology could help. Teams interviewed roughly 1,400 members of at-risk groups by phone to understand what support people needed most, and that feedback informed a pilot project called HomeCare, which complements real-world care with personalized digital services.

Using an Amazon Echo Show Device, HomeCare can help participants maintain daily routines, such as sending reminders to take medicines or lock the front door. It can also guide them to sign up for social events and manage food delivery or food bank services. Behavioral data capture and machine learning algorithms can even help HomeCare monitor participants’ health and detect anomalies, like a sudden decrease in activity, and prompt caretakers to check in—potentially addressing a problem before it becomes a crisis.

Ultimately, the device makes it easier to stay connected with people that matter. The voice-activated solution is purpose-built with personalization, privacy, and ease in mind. Running on Amazon Web Services (AWS), it can scale and adapt to serve different organizations or use cases, so more people who need it can enjoy all the benefits of a daily, caring connection.
Project Highlights

Customer Obsession
Accenture and Amazon Web Services (AWS) helped build a user-friendly solution that lowers the technology barrier for daily communication and personalized digital support, enhancing home-care services for vulnerable people living alone.

Think Big
The technology gives Hafod teams real-time access to vulnerable customers. By enabling Hafod staff to prioritize those who need services the most, HomeCare can help more efficiently deploy resources across teams.

Invent and Simplify
Built using Alexa Skills Kit for Amazon Echo Show Device, HomeCare uses privacy-by-design as a key principle, and it has been awarded a patent for its hyper-personalized voice artificial intelligence experience.
University Hospital Bonn

Working with Capgemini

Developing an artificial intelligence system to help scientists eliminate a disease commonly known as river blindness.
Accelerating the search for a cure with artificial intelligence

According to the World Health Organization (WHO), nearly 200 million people in Africa and the Americas are at risk of contracting the debilitating disease onchocerciasis, or river blindness\(^1\). The parasitic infection spreads by blackfly bites, causing extreme skin irritation.

Treatments are available, but they can be logistically challenging to implement for remote populations or children. Left untreated, the infection can cause permanent blindness. To effectively eliminate the disease, a visionary solution is needed.

But clinical trials necessary to develop new treatments are time-consuming. Previously, only a handful of experts were trained to carry out the specialized—and manual—analysis of hundreds of complex images. Meanwhile, an estimated 20 million people are already affected by the disease. Capgemini wanted to help move the process forward, faster, using the power of artificial intelligence (AI).

Utilizing the scaling capabilities of Amazon Web Services (AWS), Capgemini hosted a hackathon with almost 1,000 participants. Teams created AI models that could review tissue samples provided by the Institute of Medical Microbiology at University Hospital Bonn, directed by Prof. Dr. med. Achim Hoerauf. The winning model generated close to human-level performance, or 90 percent accuracy, which could potentially shave months off the research process, reduce time-to-market for future treatments, and help more people before the disease advances.

Capgemini and University Hospital Bonn teams continue to develop the AI system, exposing the system to more images—and a greater variety of image quality—so the AI can learn what anomalies to ignore as much as what to look for. Within a few years, if teams are successful in minimizing disagreement between AI and human analysts, scientists predict the AI could eventually perform a majority of the review, with human experts verifying its work.

There is more to be done before the fight against river blindness is won, but with innovative technology doing some of the heavy lifting, a cure could be in sight sooner than anticipated.
Success and Scale Bring Broad Responsibility

The Global Data Science Challenge is designed to harness Capgemini’s technology expertise in service of addressing real-world challenges. Working with University Hospital Bonn and Amazon Web Services (AWS), Capgemini team members are developing an artificial intelligence (AI) system that can potentially speed up the development of treatments for onchocerciasis, or river blindness.

Think Big

Using AI to accelerate the examination of tissue samples is not only expected to shave several months off the time required to evaluate the results of clinical studies—it expands the knowledge base for the project. So even as experts retire or change jobs, the AI system can offer necessary consistency that keeps research moving steadily forward.

Built with

- Amazon SageMaker
- Amazon Simple Storage Service (Amazon S3)
- Amazon CloudWatch
- Amazon Relational Database Service (Amazon RDS)
Thermo Fisher Scientific

Working with Cognizant

Protecting critical scientific and medical materials—from irreplaceable genetic samples to lifesaving vaccines.
Safeguarding healthcare with help from the cloud

Thermo Fisher Scientific serves the global scientific community through a combination of innovative technologies, purchasing convenience, and pharmaceutical services, empowering its customers to create a cleaner, safer, healthier world. The company has a long history as a leader in the scientific community and became much more widely known since the start of the COVID-19 pandemic, first by accelerating the delivery of testing kits and more recently through its ultra-low temperature freezers that allow vaccines to be shipped and stored safely.
To turn the massive amounts of data Thermo Fisher’s refrigerators generate into actionable insights, Thermo Fisher worked with Cognizant. The teams built Thermo Fisher Connect, a cloud computing platform that links IoT data with advanced analytics tools. The platform continuously monitors remote devices and optimizes conditions for scientific samples and products, including irreplaceable genetic materials and temperature-sensitive vaccines.

Using the Thermo Fisher Connect platform, scientists and critical medical delivery customers can eliminate the operational risks of sample, material and data loss as well as the risk of being out of regulatory compliance through predictive and condition-based maintenance. They’re also able to improve mean time to repair, first-call case resolution, and first-time fix, which are all critical metrics when systems are down and time is of the essence.

When it comes to protecting vaccines, customers use the Connect platform to monitor the health of their freezers, which must be kept at a specific temperature range to prevent spoilage. The freezers emit telemetry data, which is connected through the device link and the instrument connect to the Connect platform.

Ultimately, the Thermo Fisher Connect platform enables Thermo Fisher customers to leverage IoT technology to drive meaningful results when they’re needed most.
Project Highlights

**Insist on the Highest Standards**

When it comes to protecting vaccines, customers use the Connect platform to monitor the health of their freezers, which must be kept at a specific temperature range to prevent spoilage.

**Invent and Simplify**

Thermo Fisher Scientific and Cognizant established a data lake using Amazon Simple Storage Service (Amazon S3) to facilitate the information sharing required to drive dynamic reporting and artificial intelligence/machine learning. To automate workflows and customer engagement, the platform needed to interface with Thermo Fisher’s existing business systems to pull customer, contract, and contact data.
A cloud-based telehealth solution connects healthcare workers across the United States to help expand lifesaving, critical care during emergencies.
When medical teams need secure access to trained specialists, reinforcements are standing by on the cloud

During the COVID-19 pandemic, many US hospitals met a surge of critically ill patients without an adequate number of intensive care unit beds, let alone specialists on staff. Medical teams put in heroic efforts, working long hours and stepping up to deliver treatment beyond their normal training.

In response, the federal government funded the US Army Telemedicine & Advanced Technology Research Center (TATRC) to find a way to help relieve and reinforce providers during the pandemic and enhance preparedness for future medical emergencies.
TATRC selected Deloitte Consulting LLP and two other performers to build a HIPAA-compliant, cloud-based, standalone health information system. Known as National Emergency Tele-Critical Care Network (NETCCN, pronounced “Netson”), the resulting application enables physicians to consult at virtually any bedside via audio/video calls or chats. Built on cloud-native Amazon Web Services (AWS) products, it can be downloaded onto most smartphones, where caregivers can access on-demand, 24/7 virtual assistance from a network of vetted, licensed clinicians.

NETCCN has been successfully deployed in Guam, Puerto Rico, Iowa, Minnesota, and the Dakotas, where it has already delivered game-changing results. For example, one hospital nurse at an under-resourced facility found herself caring for multiple, intubated COVID-19 patients—with no local physician available. Communicating via the NETCCN smartphone app, an experienced physician coached her through diagnosing and successfully treating a tension pneumothorax, a life-threatening condition the nurse had not seen first-hand before.

After initial success in supporting COVID-19 care, Deloitte continues to expand NETCCN capabilities to augment military medics’ capabilities in austere facilities and natural disaster sites, where patient transport is out of the question. Deloitte even integrated AWS Wickr and AWS Private 5G to offer a highly secure, private cellular network that can accommodate soldiers in areas with poor connectivity.

Supported by Deloitte and AWS, NETCCN is designed to help care providers deliver lifesaving procedures with expert support on standby, no matter the location or conditions.

“Ultimately, the solution can improve the survivability of patients.”

Matt Quinn, Science Director, US Army Telemedicine & Advanced Technology Research Center (TATRC)
Project Highlights

Invent and Simplify
Designed by Deloitte Consulting LLP to enhance, not complicate, healthcare, the National Emergency Tele-Critical Care Network (NETCCN) can immediately extend the reach of experts during emergencies almost anywhere via a smartphone app.

Dive Deep
NETCCN enables voice-to-text transcription for efficient note-taking and automated patient flow so high-risk patients receive care first. An artificial intelligence-driven virtual health assistant can answer patients’ non-emergency questions, giving clinicians more time to focus on critical care.

Think Big
Using real-time data visualization of patient vitals and labs, NETCCN also facilitates remote home monitoring. This can be a lifeline to overstretched clinics because it enables earlier discharges and diverts some patients from having to be admitted—delivering healthcare to all while also allowing providers more time with patients most in need.
Connecting supply chain practices and product flow to the cloud with help from IBM Consulting helps Johnson & Johnson deliver medicine reliably.
Pinpointing every possible improvement in the medicine supply chain

Aided with observability, reliability, and predictability made possible by Amazon Web Services (AWS) and IBM Consulting, Johnson & Johnson (J&J) is able to get the right information into the right hands at the right time.

For on-the-ground workers handling and distributing components of pharmaceuticals and medical devices, even a seemingly small interruption in the supply chain—such as a printer driver outage or scanner failure—can create a ripple effect.

The processes of manufacturing and delivering is known as product flow. For J&J, which develops and sells medical devices, pharmaceuticals, and consumer packaged goods in more than 175 countries, precision of product
flow is required at every stage in delivery. The company knows that the infrastructure that runs behind the scenes and on the ground is essential to drug and device development and delivery. Because if you can’t scan products or goods in a warehouse, you can’t keep information moving. If you can’t print labels and invoices, you can’t ship packages. But finding the sources of these disruptions can be like the proverbial search for a needle in a haystack.

J&J sought a solution to provide critical insights into what is happening where in its supply chain and to help its team members conduct root cause analysis—meaning to find the outage and why it is happening.

Cloud technology solutions enable efficient traceability even in a complex network of tools across J&J’s critical business applications. For example, IBM identified a complex reporting query and leveraged various tools to aggregate relevant statistical data into a common data storage location. Artificial intelligence and machine learning (AI/ML) algorithms are used to trace, context-stitch, and present the results through a dynamic visualization. And all of this is done in a scalable manner within the production environment.

Now, J&J is aided with observability, reliability, and predictability made possible by AWS and IBM, enabling J&J to get the right information into the right hands at the right time and ensuring those hands can continue to manufacture and deliver products that make lives better.
Project Highlights

**Insist on the Highest Standards**
AWS enables speed, scale, security, and compliance. For Johnson & Johnson (J&J), all are essential—but adherence to rigorous security and compliance standards is mission-critical and met by AWS.

**Invent and Simplify**
J&J’s highly connected and complex global enterprise resource planning (ERP) system features thousands of integrations with more than two petabytes of data spanning 4,000+ servers. AWS and IBM solutions improve the observability and reliability of this complex environment, and now J&J is looking to expand the implementations to other lines of its business.

**Think Big**
With automated remediation response and proactive alerts, J&J can improve business user experience, reporting—and even aid new product launches.

**Built with**
- Amazon CloudWatch
- Amazon Lex
- AWS Lambda
- Amazon DevOps Guru
- Amazon OpenSearch Service
- AWS Systems Manager
- Amazon EventBridge
- AWS Config
- AWS X-Ray
Meet the partners

These AWS Partner Innovators have demonstrated technical expertise and customer success in building healthcare and life sciences solutions on AWS.

**Accenture**
HQ: CHICAGO, IL, US
Accenture is a global professional services company providing end-to-end solutions to migrate to and manage operations on AWS. Accenture’s staff of 700,000+ includes more than 40,000 trained with more than 30,000 AWS Certifications.

**Capgemini**
HQ: PARIS, FRANCE
With a team of 265,000 people in over 40 countries, Capgemini can address the breadth of clients’ opportunities in the evolving world of cloud, digital, and platforms.

**Cognizant**
HQ: TEANECK, NJ, US
Cognizant transforms clients’ business, operating, and technology models for the digital era. Its industry-based, consultative approach helps clients envision, build, and run more innovative and efficient businesses.

**Deloitte**
HQ: LONDON, UK
Deloitte Consulting LLP is one of the largest professional services firms in the world and a leader in digital transformation strategy. Deloitte assists clients in turning complex business issues into opportunities.

**IBM**
HQ: ARMONK, NY, US
IBM solutions cater to hybrid cloud requirements with end-to-end management of cloud services. Its tiered service model and integrated brokerage platform help organizations choose services designed for the cloud.

Ushering in the future of health

Learn more about AWS for Health.