



Customer Case Study – Medical equipment manufacturer

Cerapedics accelerates medical device production using AI and AWS.

Improving the yield of a break-through biologic bone graft required a deeper dive into real-time data and predictive analytics.

Our customer

Cerapedics is a company dedicated to enhancing the science of bone repair. Its lead technology platform, i-FACTOR, is for patients with spinal issues.

The obstacles they faced

Experiencing rapid growth and with a desire to minimize production losses while maximizing yields, Cerapedics set out to transition to a smart factory.


How we helped

Professional Services – Serverless, Strategy, Data Modernization, Data Analysis and Modeling, IoT, AI and Machine Learning; Managed Public Cloud – Amazon Web Services (AWS), Amazon DynamoDB, Amazon S3, AWS Lambda, Amazon Kinesis, Amazon QuickSight

What we achieved together

A working proof-of-concept was built within weeks, demonstrating the benefits of the smart factory model and adhering to strict FDA compliance requirements.





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Edward Sawyer,
General Manager,
Cerapedics

Modernizing medical device production

Cerapedics is an innovator in biologic bone graft. Its lead technology platform, i-FACTOR, is one of only two drug-device combination products approved by the U.S. Food and Drug Administration (FDA) through the Premarket Approval process and supported by level 1 clinical data for use in spinal fusion surgeries.

Known for its well-established mechanism of action and the level of clinical data that strongly supports its safety and efficacy, i-FACTOR has driven millions of dollars in revenue, and resulted in a period of rapid growth. Cerapedics therefore decided to

transition to a smart factory. This would minimize production losses and improve the yield of manufacturing batches through the use of predictive analytics and maintenance.

It was important to work with the right partner. The Cerapedics FDA-approved production process has multiple steps, with a large amount of data that must be tracked and recorded for compliance and production purposes. Already using AWS, but lacking in-house expertise across several cloud disciplines, the company decided to partner with Rackspace Technology.

Managing a smart factory transition

As an AWS Premier Partner with extensive expertise in IoT, machine learning, advanced data analytics and the healthcare industry, Rackspace Technology was ideally placed to help Cerapedics achieve its vision to improve cost-effectiveness, efficiency and analytics capabilities, and enable real-time monitoring of the entire three-week production process.

This process involves a wide variety of equipment that generates a tremendous amount of data. Given the length of the process and the volume of product lost if a batch were to fail, it was mission-critical to

use real-time data and insight to develop the ability to carry out predictive analytics and maintenance that would improve yield and minimize losses.

The transition to a smart factory would enable Cerapedics to better manage this vast amount of data and use it to maintain and enhance production. But in creating an FDA-regulated product, there are strict compliance requirements. Any changes made to production processes would have to undergo a rigorous approval process.

Creating a proof of concept

To mediate concerns inherent with this kind of transformation, Cerapedics and Rackspace Technology decided to work on a pilot project. Generating a proof of concept would demonstrate the benefits of an IoT-enabled production process. This could be shared with quality, operations and compliance teams, demonstrating the system's potential for compliant monitoring.

“I’m amazed at how quickly we got to a working proof-of-concept. We thought it would take months and Rackspace Technology got it done in weeks.”

Edward Sawyer – General Manager, Cerapedics

The Cerapedics team decided to focus on a single piece of equipment: the sterilizer. This was partly down to the sterilizer generating a large volume of data and being a key part of the production that can't be easily outsourced — and the potential to be a production bottleneck. “Sterilization is one of the last steps in the process, prior to packaging,” explained TC Thompson, Cerapedics Process Engineering Manager, “and failure during this step can cost us significantly. We thought this would be a good place to start, to see what data could be gathered.”

Working with data

Rackspace Technology crafted a proof-of-concept IoT solution that connected the digital and analog sensors on the sterilizer, extracted that data and sent it to the AWS cloud. Key data was then displayed in a

dashboard to enable real-time monitoring of the performance of the sterilizer.

Data and analytics experts worked with Cerapedics to define and optimize a data model, data types and connectors needed for Open Automation Software (OAS), which was responsible for local communication to the device, to send data to AWS IoT. During this phase, one major challenge the team overcame was correlating multiple disparate pieces of data to present a cohesive message to the AWS backend.

Rackspace Technology defined the authentication, device identification, MQTT topic hierarchy and a flexible payload format — allowing for future expansion — and then built a hardware simulator in its lab environment. The serverless backend received data via AWS IoT, classified it and enriched it using Amazon Kinesis Data Streams and a series of AWS Lambda functions. It was then stored in Amazon DynamoDB and Amazon Simple Storage Service (S3) for real-time and historical analysis use cases.

Realizing a modern vision

By using AWS managed services, the pipeline scales automatically, is resilient to outage, and is cost-effective for a workload of any size. A series of Amazon QuickSight dashboards provides near-real time visibility into device performance. Additionally, Cerapedics can define threshold-based alerts to trigger notifications for anomalies or other interesting events.

Although the smart factory streamlines the production process, it does not eliminate the need for skilled staff on-site. But it does drastically reduce required time for monitoring, optimizing labor time spent on direct production activities.

The value of the predictive maintenance, real-time alerts and analytics capabilities greatly benefits Cerapedics in lowering costs, mitigating potential risks and helping to address issues in a timely manner. Armed with a deeper level of data, the company's team can focus on proactive monitoring and maintenance, anticipating problems before they result in lost productivity and costs.

Looking to the future

Working with Rackspace Technology, Cerapedics appreciated the use of an agile methodology with sprint structures, and found the Rackspace Technology team receptive to needs and requests during planning meetings.

“I’m amazed at how quickly we got to a working proof-of-concept,” said Edward Sawyer, General Manager of Cerapedics. “We thought it would take months and Rackspace Technology got it done in weeks.”

About Rackspace Technology

Rackspace Technology is the multicloud solutions expert. We combine our expertise with the world's leading technologies — across applications, data and security — to deliver end-to-end solutions. We have a proven record of advising customers based on their business challenges, designing solutions that scale, building and managing those solutions, and optimizing returns into the future.

As a global, multicloud technology services pioneer, we deliver innovative capabilities of the cloud to help customers build new revenue streams, increase efficiency and create incredible experiences. Named a best place to work, year after year according to Fortune, Forbes, and Glassdoor, we attract and develop world-class talent to deliver the best expertise to our customers. Everything we do is wrapped in our obsession with our customers' success — our Fanatical Experience™ — so they can work faster, smarter and stay ahead of what's next.

Learn more at www.rackspace.com or call **1-800-961-2888**.

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