



Using IoT to Improve Patient Care and Hospital Safety

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— Tracy Rausch, CEO, DocBox

DocBox offers healthcare organizations an Internet of Things (IoT)-enabled platform that helps improve patient care, reduce medical errors, and decrease healthcare costs. The company's solution is a point-of-care platform that enables real-time data analytics, real-time clinical decision support, and data visualization.

Challenge

Only in recent years have health systems sought to tackle the high-volume challenge of analyzing real-time data from medical devices, such as ventilators, pumps, and monitors, at the patient bedside. Such information, processed with an analytical engine and presented in a thoughtful, patient-centric manner, can alert clinicians to subtle changes in patient health, reduce alert fatigue, and guide treatments. However, according to Tracy Rausch, CEO of DocBox, it has been prohibitively expensive to implement, store, process, and analyze this massive, continually expanding, volume and variety of data using traditional health IT solutions.

“At any given time, a single ICU bed could have over 300 parameters coming from the many medical devices connected to a patient,” said Rausch.

Solution

DocBox teamed with **Cloudera** to create a real-time, medical IoT platform for patient data that is collected close to the patient or at the point of care. It also worked with Cloudera to develop a platform that enables real-time clinical decision support by integrating, processing, and analyzing data. DocBox and third-party clinical apps will use the data from connected medical devices (such as multi-parameter monitors and ventilators) and other clinical data, including electronic medical record (EMR) data, for real-time feedback. The platform also stores that data historically at a granular level. On average, the DocBox platform ingests one-and-a-half to two gigabytes (GB) of data per patient every day.

“The DocBox platform and the Cloudera cluster together provide the data that health systems have never had before,” said Rausch. “Cloudera's modularity allowed us to meet the needs of health systems in a cost-effective way.”

Implementation

During implementation, DocBox embraced medical and health IT standards, including the Integrated Clinical Environment (ICE) architecture standard. This includes supporting standards related to how data is collected, stored, and shared. “We need to capture not only a patient's heart rate and blood pressure, but also the metadata about that device to confirm the accuracy of the device,” said Rausch. “You can't make good decisions without having that metadata.”



Key Highlights

Industry

- Healthcare

Location

- Headquarters: Newton, Massachusetts, USA

Business Applications Supported

- A real-time analytics and decision support platform
- An IoT-enabled platform for real-time clinical decision support through apps

Impact

- Increases nurse productivity for improved patient care
- Helps reduce medical errors
- Improves operational efficiency to reduce healthcare costs

Data Sources

- Medical devices
- Hospital information systems

Solution

- Modern Data Platform: Cloudera Enterprise
- Workloads: Analytic Database, Data Science & Engineering
- Components: Apache Impala (incubating), Apache Kafka, Apache Spark

Big Data Scale

- 1.5-2 GB per patient daily

Results

By automatically capturing the full context of a patient's care, DocBox reduces the time nurses spend capturing data so they can focus on care delivery. Additionally, administrators can use the insights to guide operational improvements, purchasing decisions, and safety protocols.

"Having this data available will help our health system partners and customers become more data-driven and improve the efficiency and safety of healthcare delivery worldwide," said Rausch.

One challenge DocBox's platform helps health systems solve is alarm fatigue in intensive care units (ICU). "Device alarms go off all the time in the ICU, and some alarms are simply due to device interference," said Rausch. "For example, if a patient has a pulse oximeter, the finger clip that monitors oxygen saturation, and a blood pressure cuff on the same arm, every time the blood pressure cuff goes off to record the patient's blood pressure, the pulse oximeter will drop below the normal level and sound an alarm. Apps will be able to use multiple sources of data to distinguish between real and false alarms so that nurses aren't constantly responding to unnecessary alarms."

About Cloudera

Cloudera delivers the modern platform for machine learning and advanced analytics built on the latest open source technologies. The world's leading organizations trust Cloudera to help solve their most challenging business problems by efficiently capturing, storing, processing and analyzing vast amounts of data. Learn more at cloudera.com.

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