

CASE STUDY

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Medtronic Seamlessly Integrates Nerve Monitoring System With Backend EHR



Going into the hospital for surgery makes most people nervous. The imagination runs wild thinking of everything that could possibly go wrong, from anesthetic errors to operations performed on the wrong side of the body and other urban legends. Most of these fears are overblown, of course, but a very real risk is nerve damage, especially in delicate procedures like thyroid surgery.

Improved Business Operations And Surgical Workflow

Medtronic, the largest maker of surgical equipment in the world, offers the NIM nerve monitoring system to help surgeons avoid accidents that can diminish or even destroy nerve function. Launched in 2004, NIM has been updated over the years to become a very feature-rich product. In addition to real-time monitoring during operations, the unit produces historic reports that are added to patient charts after surgery. While operating room staff can copy reports from the NIM to their electronic health records (EHR) system using a USB memory stick or by printing and then scanning reports, neither approach is very elegant. Medtronic wanted to offer a more seamless integration with back-end systems. As Paul Cox, Senior Principle Engineer at Medtronic explains, “the legacy export options were not just cumbersome for users, they were also expensive to maintain.”

For instance, since the NIM is regulated patient equipment, the printer connected to it also has to be certified and sold exclusively by Medtronic, including all consumables and replacement parts. This effectively makes them a printer distributor. Printer models refresh roughly every nine months, so the three to six month cycle of selecting, certifying and writing drivers for new printers is almost continuous.

Software Surgery

When Cox approached Macadamian to address these challenges, he was already familiar with their reputation for solving tough healthcare workflow challenges with end-to-end project expertise that delivers purpose-build solutions. He recalls, “I had met some Macadamian folks at a conference, and it was clear even from that brief introduction that they really understood the unique challenges of applying technology to health care problems.” He explains that other companies they talked to were basically integrators more

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interested in selling components than working together as a solution partner, but a major update like the one they envisioned for the NIM is a bit like surgery itself: it takes methodical planning and a holistic engagement that starts with consultations and careful listening, and ends after the under-the-hood engineering work is done and, much like a patient, the software is stable and functioning fully again. Macadamian gave them the confidence that they would bring the same sense of responsibility to working on NIM that a surgeon brings to a patient.

The planning started with an on-site alignment workshop where, working with Medtronic, Macadamian explored a range of options for integrating the NIM into back-end EHR systems. These included cloud-based solutions, Interface Engines, FHIR, and HL7, two data-interchange standards commonly used in healthcare. They settled on a combination of FHIR integrated into the NIM units for patient record look-up — important because patient mismatches increase the complexity on data submission — and HL7 to do the actual data updates. Macadamian has extensive experience with these technologies and understood the advantages. Since each is well understood in the healthcare sector, skilled support for tasks like integration is readily available. This allowed Medtronic to avoid the need to provide professional services to support each NIM deployment. Unlike cloud and web-service solutions, FHIR and HL7 are also technologies that communicate directly with the hospital back-end, and since transferring records through the cloud added no value, they also avoided unnecessary security complexities.

Within a few months of starting the project, Macadamian had designed and built a working prototype for the next generation NIM.

The revised device will allow reports to be uploaded to a hospital’s EHR system over Bluetooth or Wi-Fi with a couple of button presses. And it will be future proof too, since FHIR is quickly becoming one of the most popular standards for

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health data exchange in the industry. As Geoffrey Parker, Director of Healthcare Software Development at Macadamian explains, this is important not just because FHIR offers better interoperability and lower integration costs for hospitals, but also because “important markets like Germany are starting to mandate digital integration between medical equipment and systems, and this trend will only accelerate as governments combat rising costs.” Since Medtronic is a global company, they needed a solution that could be sold world-wide, and Macadamian’s FHIR-based design can be launched into new markets with minimal modification.

Macadamian’s extensive experience in the healthcare industry combined with data interoperability and secure cloud services development enabled the team to quickly create a proof of concept dashboard for device-specific information. This cloud-based functionality took only a week to develop and showcases some of the potential benefits of cloud-based service and support for Medtronic. Cox explains that this is particularly important because “cloud integration gives us business intelligence we’ve never had before, and that opens the door to all sorts of possibilities, from better product planning to novel revenue models.”

With the next-generation NIM rolling out to operating rooms, doctors and support staff will have one less thing to be nervous about during delicate surgery.

Thank you.



Creating the future of healthcare

At Macadamian, our goal is to explore the full potential of digital and connected health technologies. We aim for solutions that are simple and meaningful, and that prioritize the experience of the patient and the business needs of our clients.

Get in touch with us. Our expertise can help you contribute to a better healthcare system and the enhanced well-being of people who count on it.

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