

The genesis and evolution of Systems Integration in the OR

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With millions of inpatient surgeries performed annually across the nation, today's busy surgeons demand a holistic, robust workflow solution that provides them with the comprehensive diagnostic imaging and data they need to perform operations successfully.

However, for many years, there was no easy answer to this need in the operating room.

Historically, surgeons were forced to view multiple monitors to see images captured from minimally invasive devices, X-ray machines, and ultrasound equipment, for example. Surgeons often had to look at as many as five different pieces of equipment—all while trying to remove an organ or save a life. Because the technologies were not built to work together, surgeons spent a good deal of time swiveling their heads, changing their vantage point, making it very challenging to operate effectively.

Neck strain was a problem, but the least of it. After all, like actors and athletes, a surgeon's job requires the highest degree of concentration—and there's a whole lot more at stake than a failed performance or a lost game. There is a vulnerable patient on the table. Yet this disorganized way of viewing images and data in the OR impeded a surgeon's ability to focus—a critical quality in ensuring positive patient outcomes.

Ultimately, surgeons and OR managers turned to their minimally invasive device manufacturers to help address this quandary. Eventually, a solution was born that could take all of the imaging that was generated in the OR—from rigid endoscopes, flexible endoscopes, X-rays, ultrasounds, and more—and would route them to monitors so that the surgeon had a holistic view of everything needed to properly perform procedures and care for patients.

Here's how it worked. The image and video routing was accomplished the same way—using the same cabling—as your home television system or computer desktop. The S-video cables, DVI cables, and copper and HDMI cables behind your TV were (and in most cases, still are) the same cables used to route images from a surgeon's surgical scope to the monitor in the OR.

That process is the genesis of what is now known as Systems Integration—a solution initially driven by surgeons, OR managers, and surgical device manufacturers. Now, as the field has evolved, there is a growing role for the IT team when it comes to helping surgeons and OR managers better understand and choose the optimal Systems Integration solution for their OR.

Advancing technologies drive a shift to IT

Like most industries, Systems Integration has seen a technological shift in the last few years. Instead of routing images throughout the OR using copper cables, this entire process is becoming network-based, which opens up a world of possibilities for both OR and IT professionals.

In a network-based protocol, OR professionals need not link devices through DVI/ HDMI connectors to have a full patient picture. Now, as devices are plugged into IP routers, all of the information—data, clinical images, videos—can move freely and securely, not only within the OR, but also throughout the entire health system.

It's much the same way we receive and enjoy contemporary entertainment. When we listen to music on Sonos or watch

movies on Netflix, it's wireless. Gone is the need for a CD or DVD player. Basically, our world of entertainment revolves around online streaming and that's very similar to what has happened with Systems Integration for the OR. We've cut out the need for wires and multiple bulky devices.

Why is this important? It allows for higher utilization and a more secure free-flow of pertinent patient information. It provides for efficient and secure accessibility of patient images and data from anywhere in the health system, breaking down the metaphorical walls around the OR, and making interoperability a possibility. Ultimately, a network-based protocol enhances collaborative care and boosts the chances of better patient outcomes.

By better organizing all of the imaging and data acquired in the OR, and creating the ability to unlock previously unorganized data streams, the IP network approach enables the ability to utilize Artificial Intelligence (AI) in a field presently underutilizing the technology.

Without a device being connected to the IP network Systems Integration solution, an AI vendor would have to independently connect to each device, which would not only be extremely costly, but would be impractical to manage.

But the shift to a network-based Systems Integration solution not only helps with hospital interoperability and image/data management, it also allows for remote issues prevention and management. A network-based solution allows for continuous remote monitoring of the happenings in the OR—mitigating potential issues pertaining to connectivity, image storage, and other technical challenges.

This is important for a number of reasons. For starters, a hospital's IT department is rarely located in the same place as the OR. A network-based solution will allow for remote intervention should any issues arise, minimizing the need to travel over to the OR, and saving precious time when a patient is on the table.

In addition, remote monitoring means IT staff can detect potential issues before they arise, preventing workflow disruptions in the OR. Anything that advances proactivity in an OR is valuable. Period!

From a hygiene and infection prevention standpoint, the ability to eliminate the antiquated legacy in-OR routers is highly desirable. By moving to an IP network based solution, hospital ORs can eliminate the traditional matrix routers within each OR which generate heat, noise, and dust due to cooling fans on the legacy equipment.

A key takeaway regarding the evolution of Systems Integration is not only about what and how the process works, but also about who is involved in the process. Because Systems Integration solutions are becoming network-based, that is, involving networks and servers—the decision-making has expanded from surgeons and OR managers to include CIOs and other healthcare IT professionals.

So, what started as a surgeon- and medical device manufacturer-driven industry has evolved into an industry with IT professionals in the driver's seat.

Industry shift requires vendor re-evaluation

The shift toward a network-based protocol in systems integration is having an impact on a health system's vendor selection. There are new factors to consider when choosing a partner.

Historically, surgeons and OR managers were likely inclined to tap into their minimally invasive device manufacturers for a systems integration solution. After all, they had an established relationship and the trust that comes with that.

But in reality, while these vendors have expertise in minimally invasive devices, they very often do not have the proven IT legacy that's required for the kind of scalable, vendor-neutral offering that healthcare facilities need in a quality systems

integration solution.

This is where IT staff can be of great value. The best systems integration solutions today involve sophisticated technology, beyond the purview of most surgeons and OR managers. The information that's being moved around via a systems integration solution is being controlled by IT technology. So it is no surprise that the IT departments have become highly involved in making the decision for which Systems Integration vendor to pursue.

Hospital administration, CIOs, and IT departments weigh many considerations and explore critical technology-driven questions when evaluating Systems Integration vendors. For example, they might ask, 'Does this solution fit within our existing enterprise imaging strategy?', 'Is this solution vendor-neutral and able to integrate with our existing systems?', 'Does this vendor offer other solutions, like a PACS or VNA, to work toward a desired single-vendor IT approach?', and, 'Is this a scalable and future-ready solution that won't require repeated infrastructure overhauls?'

This is why it's important for health systems to select vendors who not only have a proven history in medical imaging, but a demonstrated history in healthcare IT and enterprise imaging. In short, IT expertise coupled with diagnostic imaging expertise is the ideal when seeking a systems integration vendor. It will double your chances for boosting efficiency, productivity and successful outcomes in the OR.

Education and teamwork lead to a better OR

Most people plan to buy an engagement ring only once. It's a huge decision. You get inundated with information as you try and understand the 4C's and ensure your big-ticket purchase goes well. And at the end of all this education, you buy the ring and immediately never have to remember all that you just learned. It's a lot of education for a single decision (as important as it may be).

That's a little bit like investing in systems integration technology.

Most OR managers and IT professionals will only make this purchasing decision—a full systems integration solution—once in their entire career. It's a purchase that occurs when there's a big remodel, or when a new hospital is being built, and when the time comes to make the decision, it's not easy to quickly become an expert in the field. What's more, during this process, the amount and nature of the information coming at you can be overwhelming and confusing.

OR directors are experts in what they do. They are experts in care providing, they're experts in working with surgeons, but rarely are they IT experts—that is not their job. But Systems Integration technology does come from their budget. So it is the industry's responsibility to educate all of the players involved in and impacted by this kind of decision.

In summary, in considering the history of this industry and the transitions that have happened, it's important for both IT professionals and OR managers to understand the shift happening in this space. It will help everyone involved—the entire team of surgeons, OR managers, CIOs, and healthcare IT staff—to join forces to make more informed, wiser decisions for the OR and the patients it serves.

About the author: Devon Bream, MPH, FACHE is the global vice president of endoscopy and general manager of systems integration at FUJIFILM Medical Systems U.S.A., Inc. Bream's extensive knowledge in the OR Systems Integration industry comes from more than 25 years of professional experience and leadership in a variety of medical device companies.