



# Streamline Clinical Workflows by Improving Mobile Computing

Seamless docking with Intel® processor-powered 2 in 1s, Thunderbolt™ technology, and Ergotron® equipment simplifies the mobile experience, helping improve EMR access, provider productivity, and patient satisfaction

This solution brief describes how to solve business challenges through investment in innovative technologies.

If you are responsible for...

- **Business strategy:**  
You will better understand how an Ergotron® clinical mobile workflow solution will enable you to successfully meet your business outcomes.
- **Technology decisions:**  
You will learn how an Ergotron clinical mobile workflow solution works to deliver IT and business value.

## Executive Summary

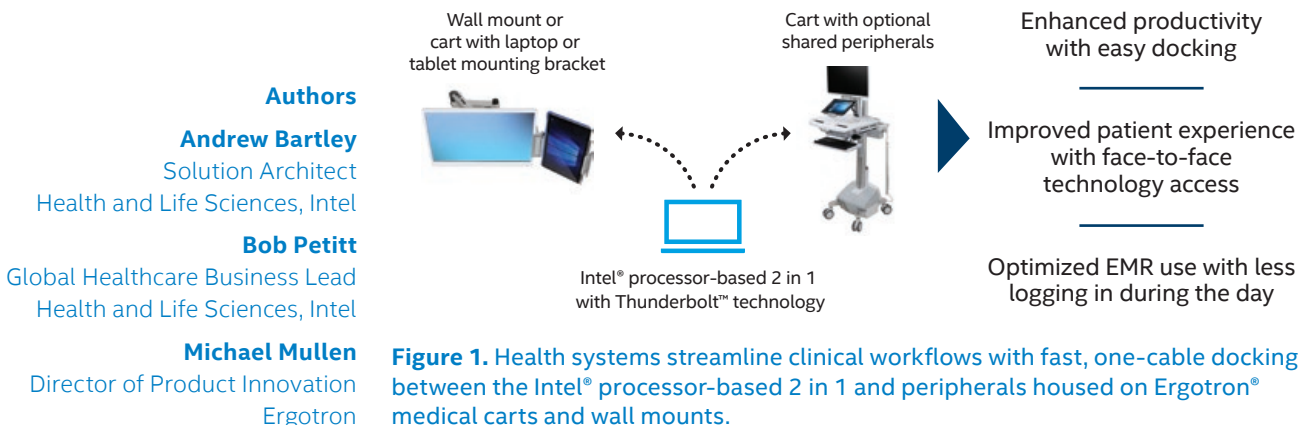
Facing personnel shortages, staff burnout, and skyrocketing demand, hospitals are evolving the Triple Aim to the Quadruple Aim—striving to improve provider satisfaction in addition to population health, cost efficiencies, and the patient experience.<sup>1</sup>

Mobile workflows are a key enabler for the Quadruple Aim. However many health workers still need to move frequently between their mobile device and large-screen monitors and other peripherals for charting, voice dictation, and other tasks. Too often, this back-and-forth movement adds repeated docking hassles, logins, and authentication requirements to an already busy workday.

Seamless docking solutions from Intel and Ergotron® help provide transparent, high-speed communications between Intel® processor-based 2 in 1s and peripherals housed on Ergotron StyleView® medical carts and wall mounts. Powered by 7th generation Intel® Core™ processors with Thunderbolt™ technology, clinicians can better streamline workflows and take advantage of the 2 in 1's high performance while accessing a broad range of peripherals. Health workers reduce extra logins and use electronic medical records on the recommended large-size screen. Hospitals create a more user-centered technology environment that can help deliver the full promise of mobility and achieve the Quadruple Aim.

**ERGOTRON®**

## Ergotron® Wireless Workflows for Healthcare



**Figure 1.** Health systems streamline clinical workflows with fast, one-cable docking between the Intel® processor-based 2 in 1 and peripherals housed on Ergotron® medical carts and wall mounts.

## Business Challenge: Rising Demand, Shrinking Workforce

The challenges to delivering high-quality, cost-efficient care are increasing. Demand for health services is racing ahead of the supply of health professionals. The global population of people over 65, which stood at 617 million in 2015, is growing faster than other age groups and will soar to 1.6 billion by 2050.<sup>2</sup> The world is short 7.2 million clinicians, and this gap will reach 12.9 million workers by 2035.<sup>3</sup> Over half of United States physicians<sup>4</sup> and one-third of hospital nurses<sup>5</sup> report symptoms of burnout.

For all their benefits, electronic medical records (EMRs) and other digital tools can add to workplace stress. In one survey, physicians named paperwork and administration as the top cause of burnout.<sup>6</sup> Another study found that EMR implementation initially reduced productivity by as much as 33 percent, with 85 percent of physicians saying they spent more time documenting and 66 percent reporting they had less time for patient care.<sup>7</sup>

To prevent EMR-related adverse events, the Joint Commission says users should have convenient, ubiquitous access to EMRs and other technologies, and devices should match the requirements of users, locations, and specialties.<sup>8</sup> EMR vendors are working to optimize their applications for smaller screen sizes and touch interfaces, but for many activities today, vendors recommend a high-resolution, 22-inch or larger screen with a full keyboard and mouse.

As a result of these trends and requirements, leading health systems are taking a closer look at how technology can be used to improve provider efficiency in today's digital healthcare environment. Many organizations are updating their focus on the Triple Aim with a fourth goal: improving the provider experience (see Figure 2).

### Healthcare Quadruple Aim



**Figure 2.** Focusing on provider and staff satisfaction helps address personnel shortages while contributing to other elements of the Quadruple Aim.



Users can dock a 2 in 1 on the Ergotron® cart and control the monitor and other peripherals with Thunderbolt™ technology.

## Streamline Clinical Workflows with One-Cable Docking

Mobility is an important element of modern clinical workflows. Well-designed mobile initiatives can enhance providers' overall productivity, satisfaction with using EMRs, patient education, patient communications, and patients' perceptions of their clinicians, among other objectives.<sup>9</sup> Mobility is popular with health workers, who use mobile in their daily lives and expect comparable technology in the workplace. Since burnout affects patient satisfaction and quality of care along with health worker retention, reducing burnout can also advance the other elements of the Quadruple Aim.<sup>10</sup>

Intel® processor-based 2 in 1s have established themselves as popular devices that offer clinicians the benefits of a tablet with the productivity of a laptop. But even with these highly capable mobile devices, many health workers need frequent access to large-screen displays and other peripherals. Each shift from mobile to stationary access typically requires logging in and authenticating through a thin-client terminal, adding steps, clicks, and aggravation, and slowing productivity throughout the day.

Mobile solutions that combine Intel processor-based 2 in 1s with seamless docking to Ergotron equipment help create a more productive, hassle-free workday. With fast, simple, security-focused connectivity between 2 in 1s and peripherals housed on Ergotron equipment, health workers can:

- Take advantage of Thunderbolt™ technology, which uses one wire to both charge the device and provide quick connection to peripherals on Ergotron carts and wall-mount equipment
- Chart into the EMR on a large-screen monitor while reducing the number of system logins and taking advantage of the 7th gen Intel Core processor's high performance
- Use Intel Unite® software to collaborate and share information from the 2 in 1 with clinicians, patients, and family members on a large-screen display

- Mount the 2 in 1 to a medical cart during rounding for ad hoc mobile collaboration
- Rest the 2 in 1 on a custom-designed docking station on the Ergotron mounting solutions to recharge the device and use the device as a second touch-enabled screen
- Use their preferred peripherals to dictate notes with Nuance\* speech recognition technology from a 2 in 1
- Access full-size keyboards, pointing devices, large monitors, printers, cameras, external hard drives, and other devices housed on Ergotron carts and wall mounts

## HEALTHCARE GOES MOBILE



Studies show the global healthcare mobility market is growing at a compound annual growth rate of about 28.4 percent and will reach almost USD 84.8 billion by 2020.<sup>11</sup>

### Solution Value: Driving toward the Quadruple Aim

With effective mobile strategies built around Intel processor-based 2 in 1s and seamless docking to peripherals on Ergotron equipment, health systems empower clinicians to access vital health information systems when and how they need them. These strategies can benefit each element of the Quadruple Aim.

- **Clinician satisfaction and productivity.** Mobile devices help streamline workflows and improve the clinician experience. Transparent docking helps reduce a common irritation, saving time and increasing satisfaction. Clinicians enjoy the full performance of their 2 in 1 devices, whether engaging in their mobile workflow or doing detailed charting with a large-screen monitor.
- **Quality of care.** Seamless docking helps clinicians easily access appropriate technology. Health workers optimize care by using the EMR with recommended peripherals and incorporating both mobile and stationary devices into new use cases such as patient education, videoconferencing, cross-functional care coordination, and remote collaboration.
- **Patient experience.** Using their 2 in 1s, clinicians access technology while engaging in face-to-face contact with the patient. Whether on the 2 in 1's screen or by broadcasting to a large-screen display, clinicians enhance collaborative decision making by sharing diagnostic images, test results, care plans, and other content with patients, families, and colleagues.
- **Cost efficiencies.** Avoiding docking hassles and repeat logins can help save time, enhance productivity, contribute

to operational efficiencies, and avoid the decrease in productivity associated with EMR adoption. Health systems can maximize their investments in infrastructure, EMRs, peripherals, and mobility. They can shift from a static, location-based technology environment to a user-centered model that takes advantage of emerging technologies and use cases. Since improved communications and engagement can be a factor in increasing patient satisfaction, 2 in 1s can help drive revenues by promoting higher scores on publicly reported surveys such as the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS). More engaged patients are also associated with a lower cost of care.<sup>12</sup>

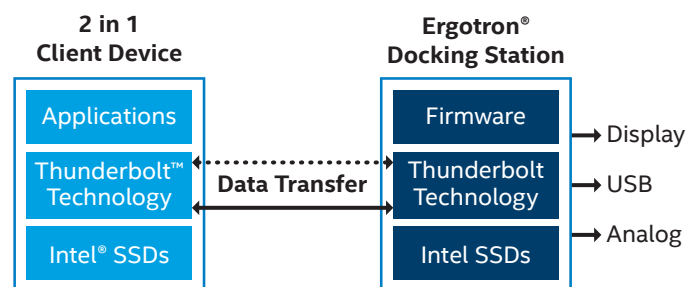
### Solution Architecture: Seamless Docking for Clinical Workflows

Seamless docking combines Intel processor-based 2 in 1s with Thunderbolt™ technology and an Ergotron receiver to help health systems advance toward the Quadruple Aim. Figure 3 provides an overview of the solution architecture.

Intel processor-based 2 in 1s help empower health professionals with ubiquitous access and powerful performance for EMRs and other clinical and productivity applications. The devices offer all-day battery life and the flexibility to shift between tablet operation for rounding and collaboration, and a laptop for more demanding tasks. Adding Intel® Solid State Drives (Intel® SSDs) further improves performance while enhancing privacy and security through full-disk encryption.

Client devices that include Intel® vPro™ platforms with Intel® Active Management Technology allow for remote, hardware-based management of Intel SSDs and 2 in 1s. IT can quarantine and repair compromised clients over wired and wireless networks. Intel® Authenticate™ technology available on 7th gen Intel Core processors adds hardware-enhanced performance for multi-factor authentication.

The solution's seamless docking combines a custom mounting solution for 2 in 1 devices with a Thunderbolt™ 3 cable. The mounting solution can be added to a variety of Ergotron medical cart, desk, or wall-mount platforms and supports a wide range of peripherals.



**Figure 3.** Thunderbolt™ technology in the 2 in 1 works with a receiver mounted on the Ergotron® mounting solutions to provide secure-enabled, one-cable convenience.

Thunderbolt™ 3 technology is an advanced, compact port offering one-cable, USB-C connectivity to multiple devices for both data and power. Speeds of up to 40 Gbps—8 times faster than 5.0 Gbps of standard USB-3.0—help avoid delays and keep health workers productive.<sup>13</sup> Thunderbolt technology also provides power at the same time to ensure that health worker devices last an entire workday. With power and data connectivity on a single port, devices can recharge as they dock, adding further convenience.

## Conclusion

Seamless docking improves the success of mobile initiatives by delivering easy access to relevant tools and technology. By refreshing their mobile environments with Intel processor-based 2 in 1s and implementing seamless docking to equipment on Ergotron platforms, health systems can derive greater value from their investments in mobile technologies, hospital equipment, and EMRs. Hospitals can advance toward the Quadruple Aim with streamlined, productive workflows that increase clinician and staff satisfaction as they support the delivery of efficient, high-quality care.

Find the solution that is right for your organization. Contact your Intel representative or visit [intel.com/healthcare](http://intel.com/healthcare).

## Ergotron®

Ergotron is committed to making ergonomics affordable for computer users everywhere. With a human-centered design, each mount or cart—for computer monitors, notebooks, and tablet PCs—allows computer systems to be easily and ergonomically positioned for any caregiver, minimizing space requirements and maximizing efficiency to help create the connection between caregiver, patient, and information.

## Solutions Proven By Your Peers

Intel Solutions Architects are technology experts who work with the world's largest and most successful companies to design business solutions that solve pressing business challenges. These solutions are based on real-world experience gathered from customers who have successfully tested, piloted, and/or deployed these solutions in specific business use cases. Solutions architects and technology experts for this solution brief are listed on the front cover.

## Learn More

You may also find the following resources useful:

- [7th generation Intel Core processors](#)
- [Thunderbolt™ technology](#)
- [Intel SSDs](#)
- [Intel Authenticate solution](#)
- [Ergotron®](#)

## Solution Provided By:



<sup>1</sup> Thomas Bodenheimer and Christine Sinsky, "From Triple to Quadruple Aim: Care of the Patient Requires Care of the Provider," *Annals of Family Medicine*, November/December 2014, [annfammed.org/content/12/6/573.full](http://annfammed.org/content/12/6/573.full).

<sup>2</sup> Wan He, Daniel Goodkind, and Paul Kowal, "An Aging World, 2015: International Population Reports," US Census Bureau, March 2016. [census.gov/content/dam/Census/library/publications/2016/demo/p95-16-1.pdf](http://census.gov/content/dam/Census/library/publications/2016/demo/p95-16-1.pdf).

<sup>3</sup> World Health Organization News Release, "Global health workforce shortage to reach 12.9 million in coming decades," 11 November 2013, [who.int/mediacentre/news/releases/2013/health-workforce-shortage/en/](http://who.int/mediacentre/news/releases/2013/health-workforce-shortage/en/).

<sup>4</sup> T.D. Shanafelt et al., "Changes in Burnout and Satisfaction with Work-Life Balance in Physicians and the General US Working Population Between 2011 and 2014," *Mayo Clinic Proceedings*, December 2015, [mayoclinicproceedings.org/article/S0025-6196\(15\)00716-8/fulltext](http://mayoclinicproceedings.org/article/S0025-6196(15)00716-8/fulltext).

<sup>5</sup> Matthew McHugh et al., "Nurses' widespread job dissatisfaction, burnout, and frustration with health benefits signal problems for patient care," *Health Affairs*, February 2011, [content.healthaffairs.org/content/30/2/202.full](http://content.healthaffairs.org/content/30/2/202.full).

<sup>6</sup> Bodenheimer and Sinsky, 2014.

<sup>7</sup> Hermant K. Bhargava and Abhay Nath Mishra, "Electronic Medical Records and Physician Productivity: Evidence from Panel Data Analysis," *Management Science*, July 2014, [pubsonline.informs.org/doi/abs/10.1287/mnsc.2014.1934](http://pubsonline.informs.org/doi/abs/10.1287/mnsc.2014.1934).

<sup>8</sup> JCAHO, Sentinel Event Alert 54: Safe Use of Health Information Technology, Issue 54, March 31, 2016, [jointcommission.org/assets/1/6/SEA\\_54\\_HIT\\_4\\_26\\_16.pdf](http://jointcommission.org/assets/1/6/SEA_54_HIT_4_26_16.pdf).

<sup>9</sup> Benjamin Shooley et al., "Impacts of Mobile Tablet Computing on Provider Productivity, Communications, and the Process of Care," *International Journal of Medical Informatics*, issue 88, April 2016, [ncbi.nlm.nih.gov/pubmed/26878764](http://ncbi.nlm.nih.gov/pubmed/26878764).

<sup>10</sup> McHugh, 2011.

<sup>11</sup> MarketsandMarkets, Healthcare Mobility Solutions Market, [marketsandmarkets.com/Market-Reports/healthcare-mobility-solutions-market-1295547.html](http://marketsandmarkets.com/Market-Reports/healthcare-mobility-solutions-market-1295547.html).

<sup>12</sup> Jessica Greene et al., "When Patient Activation Levels Change, Health Outcomes and Costs Change, Too," *Health Affairs*, March 2015, [content.healthaffairs.org/content/34/3/431.abstract](http://content.healthaffairs.org/content/34/3/431.abstract).

<sup>13</sup> [intel.com/content/www/us/en/io/thunderbolt/thunderbolt-technology-general.html](http://intel.com/content/www/us/en/io/thunderbolt/thunderbolt-technology-general.html).

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