

Logons, Printers, Applications, and Patient Records How Context Aware Computing Solves Healthcare IT's Four Biggest Challenges

Imagine this situation: You're a medical professional in a hospital...

Patients are everywhere, and so are you. Like any day, your job is defined by the running. It's always room to room, never actually running but never really walking either. Your schedule gives you fifteen minutes per patient, although you've learned over the years that the real number is somewhere closer to eleven.

Your fourth patient of the day is an easy one: Otitis media, a common ear infection. An antibiotics prescription gets that one quickly out the door. The fifth patient isn't so lucky. The charts suggest angina pectoris, but your gut keeps whispering hypertrophic cardiomyopathy, and that means an entirely different course of treatment.

You make a note in the patient's EMR and recommend them to a specialist.

Checking your watch, you see you're running a bit early. Four minutes, to be exact. That's just enough time to swing past the office and email Dr. Czajkowski about yesterday's odd peptic ulcer case. All signs pointed to the usual H. pylori infection, but there was something about the patient's heart rate, and their recent vacation to a CDC hot spot. The only thing better than Dr. Czajkowski's nine iron is his knowledge of infectious diseases.

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Finishing up, you realize that writing the email took two minutes longer than expected – how does one spell "mycobacterium", anyway? Jogging towards patient six's examination room you hear your name called out over the intercom. Emergency. Patient six will have to wait. Twenty-eight seconds later you find an elderly patient on the floor and a nurse practitioner handing you a printout. Their patient record notes COPD, along with a host of other age-related problems.

You sigh. Worst part of the job, this one might not make it...

IT Isn't Healthcare IT

There's Information Technology, and then there Healthcare Information Technology. For all their name similarity, the two could almost be entirely different industries. In many cases the technologies are the same. But the tools, approaches, and daily tactics that work for a regular office don't even come close to the time-sensitivity and precise orchestration that medicine requires.

And that story above? That was forty-four minutes in the shoes of any prototypical general practitioner anywhere. Three patients, three diagnoses. A six-minute spin past the office to get an email out, the answer to which might just save a man's life. And then, on the way to the next appointment, an emergency arises that requires immediate information and fast action.

With that kind of pace, it's no wonder why technology's incorporation into medicine has occurred at a glacial pace. Most "regular office" technologies were never designed to fulfill medicine's everywhere and all-the-time requirements.

Consider Microsoft Windows. It's the world's most-popular operating system, and perhaps the one best suited for the evolving graphical nature of EMR data. You simply can't *see a patient's X-ray* on a green screen terminal. You can't *peer into their last MRI* using a text-based mainframe.

Those mainframes are blazingly fast, for sure, but only when the data you need is perfectly formatted to fit in their innumerable underscored fields.

What's Wrong With Windows?

You already know the answer: It isn't fast enough, and it was never designed to be situationally aware, at least in the ways medicine requires.

Its speed problems are largely centered on logons and logoffs. A really good Windows 7 logon time might take, what, a minute? And that's with an operating system running atop the fastest hard drives and the best equipment.

In a world that's measured in eleven-minute increments, losing just one to an inefficient logon process incurs a 9% reduction in efficiency. When there are lives on the line, 9% just isn't good enough.

Healthcare IT has for years been attempting to end-run around that nasty logon process. Rumors have it that Windows Terminal Services was originally conceived to solve this problem for healthcare IT. Some argue that application virtualization technologies share a similar genesis.

To fix that problem many of us have tried Terminal Services, or any of its more-recent brethren: Remote Desktop Services, Citrix Presentation Server, Citrix XenApp, the list goes on.

These technologies have assisted in part by eliminating the logon process entirely. With them, the traditional logoff-and-then-logon cycle has been replaced by disconnection and reconnection. Swipe a badge, and a physician quickly reconnects to an already logged-in Windows instance. That's fast, and it has to date presented a workable solution for ameliorating the logon problem.

But it does nothing for context awareness.

Context-Aware is Recognizing the Situation

You'll notice we haven't even gotten to printing yet. That's because printing, applications, patient records, and even that interminable logon process aren't really resolved with remote desktop technologies alone. Remote and virtual desktops might enable a user's session to remain resident, waiting for wherever their next connection might come from. But they do nothing towards recognizing and adapting to each new situation at each connection.

That's the problem context awareness attempts to resolve. You can deconstruct its approach down into two independent activities. For the first, a context-aware IT environment must *recognize the situation*. This recognition activity must occur constantly as users perform their jobs across many different locations.

Windows can't do this by itself. Windows profiles alone suffer from intrinsic limitations native to their entire delivery architecture. There's simply nothing in that architecture that can engender the kinds of recognition medical professionals require in each possible situation.

Now, what are those situations? They're perhaps best explained by way of example. Let's go back to that initial story and reread it again. What might seem like a forty-four minute stream of consciousness is in fact a series of quantifiable situations:

Situation #1: Patient four is sitting in an examination room for a low-criticality issue. Medical records might be important here, but the physician here is better served by instant access to a prescription application.

Once finished with the first patient transaction, the physician then moves to a new location. There, Situation #2 begins:

Situation #2: The physician meets patient five in a different examination room. That means a different piece of hardware, but also an entirely different context for what the physician needs. Diagnosing this patient requires analyzing medical history and providing an appropriate referral. These activities might require a different set of applications. Even if they don't, this patient's EMR must be ready for analysis without fear of disclosing previous patient information.

With minutes to spare, the physician stops by their office to send a critical email to a colleague. That need initiates Situation #3:

Situation #3: A physician's office is by nature a more trusted location. There the physician can access their email. That's an application that for security reasons should not be available in patient areas. Time, however, is critical. At the same time that physician also needs patient medical history. With four minutes of time to complete the task, this activity can't afford delays either.

With the email complete, the physician heads to their next appointment but gets called to an unplanned emergency. This action sets up Situation #4:

Situation #4: Having been rerouted from their next appointment, the physician arrives ready to triage the situation. That activity requires fast access to emergency applications and locally-available printouts of critical medical information.

Each of these represents a context that benefits from proactive management. *Lacking context-awareness, the Windows environment in each situation begins in exactly the same state that it left in the previous situation.* That's a problem, because each situation has different requirements:

- Which applications should be ready for use?
- Which should be specifically denied for security or regulatory reasons?
- What patient records should be preloaded?
- Which printers and other devices are physically appropriate for each location?

Windows alone can't answer these questions, nor can Windows profiles unaided. Required is an added solution that can recognize the situation and add the necessary context-awareness into the Windows computing experience.

Context-Aware is Adapting the Workspace

Yet recognition is only the first activity. The second involves *doing something with that added situational awareness*, proactively adapting the user's workspace to meet the requirements of each new context. As you can imagine, this second activity in context awareness is where its greatest value lies.

Now think one last time about the story above, but this time with the goal of adapting the user's workspace to meet the needs of each new situation. What results is a kind of predictive computing environment that dynamically shapes the configuration of printers, applications, and patient records to meet the physician's needs:

Situation #1: The prescription application is preloaded and ready for data entry. The examination room's printer is automatically connected, enabling a prescription to be quickly printed.

Situation #2: The prescription application is no longer available. It is replaced with the EMR application, with the current patient's information ready for physician review. The default printer is reconfigured to the new examination room, enabling the referral to be quickly printed.

Situation #3: The EMR application remains available. The physician's email application is also made available for use, as is the printer in their office.

Situation #4: Both the EMR application and the default printer are adjusted for the new and unexpected physical location.

Notice here how context awareness enables the Windows operating environment to dynamically adjust its configuration with each new connection. This ability to constantly adapt that environment's configuration without reloading profiles or incurring a logout-and-login cycle facilitates the moment-to-moment needs today's medicine requires.

Recognize :: Adapt

You should now see how solutions that augment Windows with context awareness are not single sign-on, nor are they merely workspace or profile management. They are instead a combination of situational recognition with the ability to constantly adapt each user's workspace.

That adaptation can be assigning a locationally-appropriate printer or other device. It can be pre-launching one or more suitable applications. It can also be preloading patient EMR data into those applications for quick access, or really any other configuration change that optimizes each Windows experience.

Aventura HQ Delivers Context Awareness to the Windows Experience

Aventura makes work flow. Aventura's Enterprise Context Engine (ECE) and Enterprise Context Engine (ECE) provides near-instant access to the information doctors and nurses need, where and when they need it. Aventura uses awareness of location, user context, access rules, and other environmental attributes to overcome many of the current limitations involving Virtual Desktop Infrastructure (VDI) and Server Based Computing (SBC). Think of it as the nervous system within your hospital's computing enterprise that orchestrates events and actions on behalf of the end-user, enabling an entire new level of control, flexibility, and efficiency.

About the Author

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