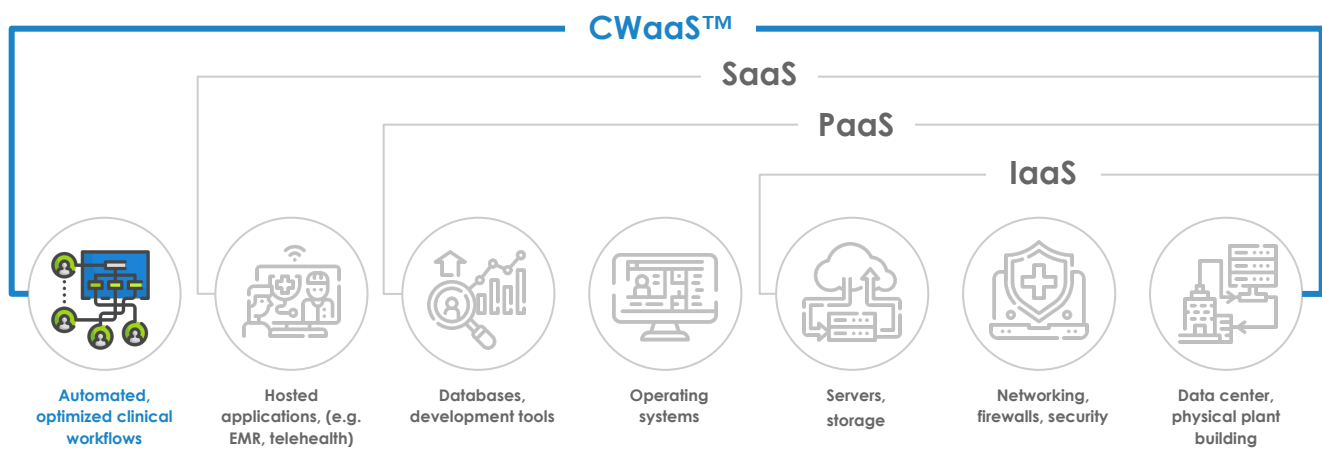# Clinical Workflow as a Service™ (CWaaS™)

Introduction

Workflows are the core of a hospital's clinical operations. Optimized workflows lead to better, faster, safer, and less costly healthcare. Health system operations are exquisitely sensitive to workflows – even a small negative impact on workflow can have large effects on the quality, speed, and cost of care. Technology impacts workflows and can dramatically improve or worsen workflows with significant reverberations throughout the health system. Large, multi-stakeholder teams often work together over months or years to design, plan, deploy, and manage technology in the hopes of improving workflows with surprisingly variable results.

The newest and best technology companies help customers avoid these issues by providing a product as a service. Servers that were once managed by customers continue to be migrated to the cloud to be optimally managed – Infrastructure as a Service (IaaS). Then software platforms were built on IaaS to be managed by cloud technology providers – Platform as a Service (PaaS). Layered onto these, software applications were built on PaaS to be managed as a cloud technology – Software as a Service (SaaS). By implementing hardware infrastructure, software platforms, and software applications as services, the costs, risks, and time to optimal success have all improved considerably.

Now these benefits have been expanded to enhance healthcare operations with a new paradigm – Clinical Workflow as a Service™ (CWaaS™).

CWaaS™

SaaS

PaaS

IaaS

| Automated, optimized clinical workflows | Hosted applications, (e.g. EMR, telehealth) | Databases, development tools | Operating systems | Servers, storage | Networking, firewalls, security | Data center, physical plant building |

Workflows for Acute Care

Workflows enable interactions between healthcare providers. Some are relatively simple, others are complex. Unlike the simpler, one-to-one, scheduled workflows that typify the outpatient environment, acute care inpatient and emergency department workflows tend to be unscheduled, complex, and event driven. Forcing a system designed for simple outpatient workflows onto the acute care hospital environment can be like trying to fit a square peg into a round hole, leading to slower, costlier, less optimal care. On the other hand, workflows designed from the ground up for the challenging inpatient or emergency settings have the opposite effect, streamlining operations by intelligently orchestrating workflows to achieve better, faster, safer care at lower cost.

FIVE CORE CLINICAL WORKFLOW ARCHETYPES

System Components

CWaaS™ allows healthcare providers to use devices to interact with one another and with patients, collaborating to optimize care, even when the parties involved are not in the same physical location.

The challenge is orchestrating the workflows of unscheduled interactions in a busy, acute care environment to make them seamless, even though they are ad hoc, to reduce the likelihood of interruptions, waits, and misconnections that bring workflow to a standstill. The usual methods to connect to a remote provider in simple workflows can cause problems when applied to unscheduled acute care: calls (whether audio or video) are interruptive or go unanswered, texts involve waits of unknown duration, and broadcasts are widely disruptive and can garner an over-large response or no response at all (everyone thinks someone else will respond).

EmOpti has defined a number of prototypical base workflows, or "archetypes" that cover the majority of such interactions in the acute care environment, either directly or by combining them like building blocks. Since we have built these directly into our cloud-based system, new users to the service immediately garner the speed, efficiency, and quality gains enabled by these built-to-task workflows. As users and health systems realize the benefits of these streamlined workflows, most users become even more proficient at extracting the benefits of these archetypes, and other work processes outside and around the system adjust in beneficial ways as users no longer have to execute complex workarounds to address inefficiencies. The end result is a virtuous cycle of continuous improvement.

Clinical Workflow-as-a-Service™ (CWaaS™) is enabled by a Smart Clinical Routing™ system that intelligently finds the desired connection and, if busy, determines and executes the best next step (re-route or queue). The heart of Smart Clinical Routing™ is the interaction between *Requestors* and *Responders*. One or more Requestors initiate an interaction with one or more Responders. For example, a nurse (as Requestor) in a treatment room with a patient initiates a remote interaction with a doctor (as Responder).

1. Virtual Team Clinical Workflow

This archetype enables a smaller number of Responders to service a large number of Requestors, ensuring no chance of unwanted interruption during an ongoing interaction and also minimized waits when there are multiple concurrent requests.

The system ensures that only an appropriate Responder will receive the interaction request, so a geriatrician will not be the Responder when a nurse wants to speak with a physician about an 8-year old patient.

In the example shown above, an ED triage nurse is sitting with a patient after completing the triage assessment. The nurse consults a remote provider-in-triage using cloud-connected software on the workstation. The provider may be a physician or an advanced practice provider (nurse practitioner or physician's assistant).

- The system applies rules to determine the provider(s) appropriate to respond and places it on their queues. These various Responders may be at one site, at multiple sites, in each of their homes, or any combination of these locations.

  - If a provider is available, the patient's information can be reviewed in the EHR and the triage consult can start immediately.

  - If a provider is unavailable, the request is queued for the first available provider. Information about each patient displays in the queue, so clinical factors can drive provider decisions about which patient to see next.

- When the consultation begins, a tablet display allows the patient and provider to see and hear one another during the virtual encounter.

- After the consultation ends, the provider enters orders into the EMR initiating patient care – diagnostic and therapeutic – directly from triage.

- Now the provider is free to take the next patient.

This optimized triage workflow leads to fewer patients who leave prior to treatment, faster door-to-doctor times, faster time-to-treatment for patients, more rapid time-to-diagnosis, more rapid relief of symptoms, and reduced ED room cycle times (because test results are ready earlier). These enable greater patient volumes to be seen in the same physical space with enhanced safety and patient satisfaction.

As an archetype, this workflow can be applied to other contexts, such as "Virtual Hospitalist," where fewer hospitalists can care for many nursing units across multiple hospitals.

2. Virtual Bedside Clinical Workflow

With this workflow archetype, a single Requestor can quickly and easily initiate an audiovisual interaction with any specific Responder available in a list. For example, it can be used for a doctor to do rounds remotely on patients.

As always, this CWaaS™ archetype is designed with real end-user needs built into the system from the ground up.

- Requestors see a contextually appropriate list of Responders. For example, a physician rounding on his/her patients might only see a list of their own patients (with the ability to expand the list to see other patients as needed, if appropriate).

- Responders in this workflow archetype may not be able to physically interact with the device to "accept" the interaction. For example, a patient may be too confused to do so, or a nurse in the room may be actively resuscitating the patient. So, this archetype does not require the Responder to "accept" the interaction – it starts when a Requestor initiates it.

- At the same time, a Responder may not be ready to accept the interaction, for example, if the patient is in a state of undress. Therefore, the interaction begins only as an audio interaction. When the patient tells the doctor that he/she is ready, the doctor starts the video feed.

As an archetype, this workflow can be applied to other contexts beyond physician rounds, such as nurse rounds, APP rounds, and physician-nurse communications about a specific patient.
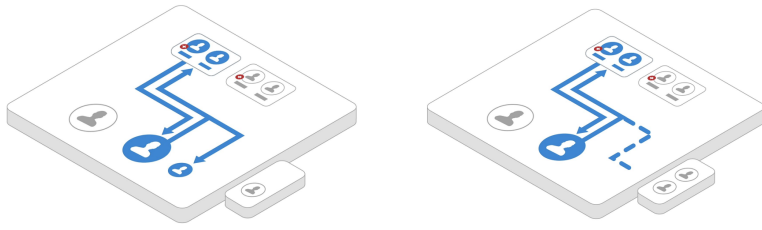
3. Virtual Assistant Clinical Workflow

This CWaaS™ archetype is similar to Virtual Team, and differs from it by allowing Requestors to define preferred Responders, while allowing re-routing to an alternate Responder if the preferred one is busy. This enables fewer assistants to support more Requestors.

For example, physicians may be working with scribes to enhance their productivity and efficiency. Commonly, physicians have a preferred scribe with which they like to work, and this workflow retains that preferred relationship while allowing a physician to switch to an alternate scribe if the preferred scribe is busy.

- When the physician requests a scribe consult, if the preferred scribe is available then the audiovisual interaction can start immediately.

- If the preferred scribe is not available, then the physician may choose:

  - To wait for the preferred scribe.

  - To select an alternate scribe.

  - To let the system be configured to auto-route to the first available scribe.

As an archetype, this workflow can be applied to other contexts beyond physician scribes, such as scribes for other clinicians, or dedicated clinical interpreters.
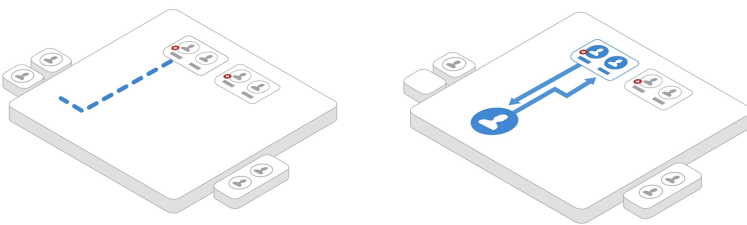
4. Virtual Consultant Clinical Workflow

This CWaaS™ archetype is similar to Virtual Assistant, but utilized when there is not one or more dedicated Responders waiting at a Responder Device to respond. For example, this archetype may commonly be used for physicians requesting a specialty consult.

This archetype provides alternative methods to reach the consultant (such as text messaging), methods for the consultant to provide a response timeframe, and re-routing to alternate consultants if the preferred consultant will not be available in a timely fashion.

As an archetype, this workflow can be applied to other contexts, such as a nurse requesting translation services from a non-dedicated Responder or requests for assistance from bed managers regarding bed availability.

5. Virtual Conference Clinical Workflow

This CWaaS™ archetype is utilized when more than two parties need to connect, for example a multi-party consultation between a radiologist, oncologist, and surgeon.

Workflow Switching and Combining allows users to combine workflows in order to put together the multi-party consultation, such as a hospitalist using Virtual Visit to connect with a patient, Virtual Consultant to add a specialist to the discussion, and Virtual Assistant to have a scribe help document the interaction.

As an archetype, this workflow can be applied to other contexts, such as complex virtual translator scenarios and team meetings with a patient, family, and provider.

Conclusion

Clinical Workflow as a Service™ (CWaaS™) allows institutions to realize the benefits of streamlined workflows in plug-and-play fashion. Better workflows lead to greater patient satisfaction, higher provider satisfaction, and more efficient operations. The end result: better, faster, safer and less costly care for all.