



Harnessing the Power of Technology for Electronic Case Management

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1.0 Introduction

Electronic case management software applications have been around in some form for the greater part of the last decade. Within this time, there has been a change in underlying technologies, design methodologies, and end-user skill levels. With all these technological changes, it's vital to stay on top of the landscape and its potential organizational impact.

2.0 Case Management Today

Case management systems vary greatly, and the adoption of these systems is even more fragmented. Many organizations still use pen and paper or some form of Excel-based documentation. The chances for errors and compliance issues increases significantly when not on a system specifically designed for case management. Along with compliance issues, user workflows are arduous, leaving employees tired and frustrated. With low morale, the use of such systems (or lack of systems) feeds on itself and ultimately causes staff burnout.

“This is a significant public health problem, because it affects the functioning of all of our health systems,” Bryan Bohman, MD, senior advisor to the WellMD Center at Stanford Medicine, told *The Nation's Health*. “Imagine a problem that affects quality of care, results in high turnover, reduces productivity, destroys people’s personal lives and increases the risk of suicide. That’s what burnout is, except it tends to work undercover.”¹

¹ <http://thenationshealth.aphapublications.org/content/48/8/1.3>

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3.0

Technology – Features and Trends

In years past, case management software applications were primarily installed on desktop computers. While this is still common, the trend is moving toward web-based and mobile applications. People in the healthcare field are not always sitting at their desktops documenting client details. Their positions are dynamic and fluid. Client visits are often done in the client's home or the field, as case managers need to see their clients in their homes to fully assess their needs and environment. Case management software needs to work with case managers, not against them.

Desktop or web-based?

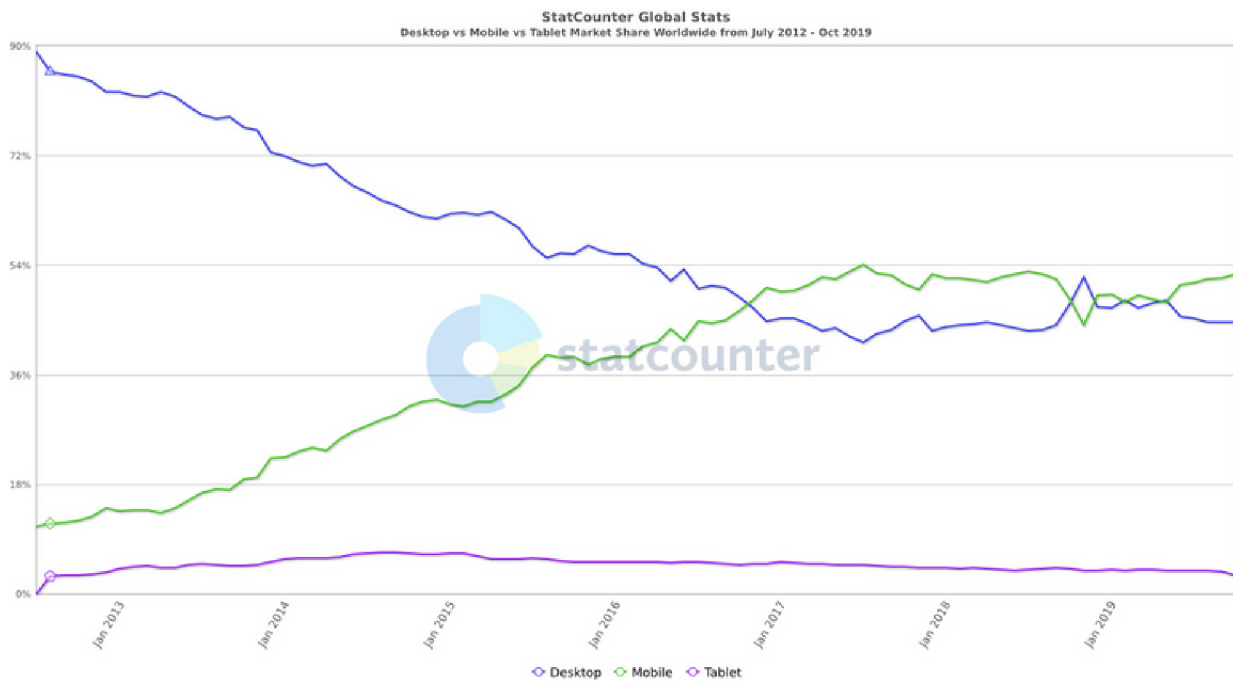
Desktop applications have the benefit of harnessing more computing power than web-based applications. This can be especially helpful when crunching large datasets, looking at extremely large image files, or working with large documents. This extra computer power shines in these cases; however, case management systems in

general are quite a bit lighter in CPU usage and demands on processing power. With this lighter need for raw processing power, leveraging the web is a natural choice as a software platform.

Browsers

As more and more people are using the internet at both home and work, more applications are harnessing the browser for this purpose. While not as powerful as native desktop applications, web applications can cover most, if not all, case management needs. Hypertext markup language (HTML) is a standardized system for tagging text files to achieve font, color, graphic and hyperlink effects on web pages. With advancements in HTML, browsers are ever increasing in performance.

As the graph below shows, the internet has been accessed by more mobile devices than desktops since late 2016.



Going Mobile

Mobile devices can use installed apps downloaded from the device's app store or use a browser to navigate the application. In both instances, the applications use an SSL, which is a cryptographic protocol to ensure data sent over the wire is encrypted and protected while in transit. There are some pros and cons with native apps versus web applications that run on a mobile device.

Native Applications

Native mobile applications are developed for each specific mobile platform, such as iOS and Android. The benefits of the native apps, like desktop applications, is their ability to harness the power of the mobile device itself. This includes graphics,

geolocation, CPU and memory allocation that can process data faster.

Mobile Web

Software applications that run in the browser can be accessed from a mobile device, in the same secure manner as a desktop computer. Websites that can adapt to the user's device (desktop, tablet, mobile) are called 'responsive'. A responsive website doesn't require the user to pinch and scroll to see the needed data. It simply arranges the content and data in a manner that best suits the device being used. While responsive websites are not as powerful as native apps, they cover most features that are needed by case management systems.

4 Usability

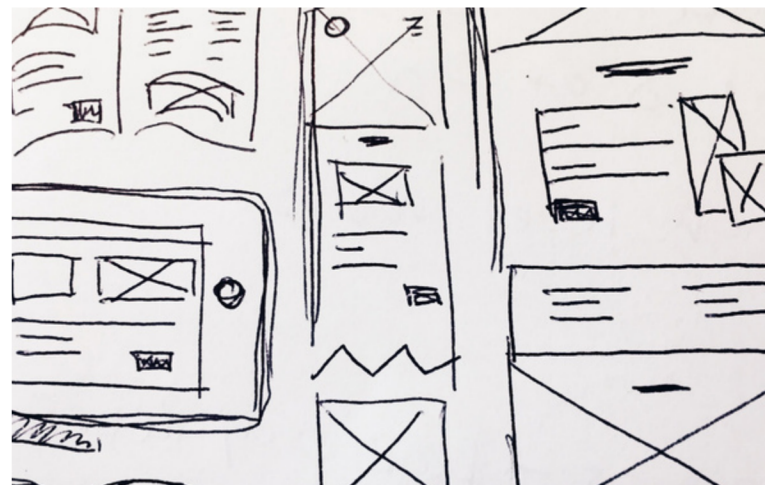
The usability of these software applications, whether desktop, web, or mobile, has improved significantly in recent times. While not every vendor has a well-designed user interface (UI), frameworks and design patterns associated with the user experience (UX) have improved and have made building user-friendly applications within reach to more software vendors than ever before.

What is UI?

User interface is the process of making interfaces in software or computerized devices with a focus on looks and style. In the software industry, they call this the graphical user interface (GUI). The GUI is a subset of the UI. It was first created by Ivan Sutherland in 1963 ². While having a nice-looking interface doesn't always mean happy users, it is an important element. On the flip side, having extraneous mouse clicks or taps to jump down hidden paths won't please the users even if the application looks beautiful. This is where UX comes into play and why it's so important.

What is UX?

The user experience (UX) is what the user of a product experiences when using that product. The term was coined in 1995 by a cognitive scientist named Donald Norman ³. UX focuses on the user experience and helps shape the UI that is being developed. This discipline relates to the human side of things and how users interact with the system. When done right, users will experience less friction and the system will just “work.” The best case is when both disciplines (UI and UX) are applied together to bring the best possible experience to the user.



² https://en.wikipedia.org/wiki/Graphical_user_interface#History

³ https://en.wikipedia.org/wiki/User_experience_design#History

5.0 Integrations

Integration in software is the ability for one software system to communicate with or “talk” to another software system. Integration is important for case management systems as they are highly focused on performing their respective functions. Large, enterprise- type software packages are often modified to work in a manner that best suites the end-user, but not the software package. Modifications to these software packages disrupt the original flow of the application and frequently exceed budgets by wide margins. This leads to user-frustration, poor data collection, and a patchwork system that nobody wants to use.

To alleviate this issue, integration between systems can be leveraged to allow software systems to talk to each other. Systems talk to each other via an application programming interface API).

APIs

An application programming interface (API) is an interface or communication protocol between a client and a server. In layman’s terms, it’s a technology used to bring disparate systems together and share data. An example of this would be an electronic medical record (EMR) interacting with a case management system to get notes for a given client. Another example would be an EMR sending requests to a lab and then the lab sending the results of those tests back to the EMR. The use of this technology will continue to expand and integrate a greater number of systems to help improve patient care.



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6.0 Healthcare-Specific Technologies

Health Level 7 (HL7) is the standard by which data is transferred between clinical and administrative software applications

⁵. Having these standards in place allows software development to occur in a uniform and consistent manner. This standard helps speed up the development of such systems as the formats are not unique to one organization or another.

Fast Healthcare Interoperability Resource (FHIR) combines the best features of the progressive versions of HL7 and Clinical Documentation Architecture (CDA), while leveraging the latest web service technologies.

EPIC, Cerner, AthenaHealth and several other EMRs have their own app stores, like Android and iOS. These app stores allow software vendors to create unique software applications that can interact with EMRs in a safe and organized manner, extending features and benefits not covered by the EMRs. Continue to look for case management systems to work with EMRs in this manner.

Telemedicine

Video conferencing adoption in business has increased dramatically over the past five years and the use of it in healthcare has expanded as well. In healthcare, video conferencing is called telemedicine ⁶ and its benefits are vast, including increasing patient access, reducing cost, and providing 24/7 coverage.



⁴ <https://techcrunch.com/2016/05/21/the-rise-of-apis/>

⁵ https://en.wikipedia.org/wiki/Health_Level_7

⁶ <http://legacy.amicantelemed.org/about/about-telemedicine>

7. Hosting

Case management software is either self-hosted and maintained by an internal IT department or hosted by a software-as-a-service vendor.

Self-Hosted

When a software application is hosted by the client's IT team, the burden of support falls on the IT team or, worse, the actual agency that is using the software.

Software as a Service

Software as a service (SaaS) is a software distribution model in which a third-party provider hosts an application and makes it available to customers over the Internet. SaaS is one of three main categories of cloud computing, alongside infrastructure as a service (IaaS) and platform as a service (PaaS) ⁷. The software-as-a-service model (SaaS) can be a much better option for case management software for a variety of reasons, some of which are:

1. Maintenance

The burden of maintenance falls on the vendor so if there are any issues with the product, the agency's IT team is not burdened with the responsibility to support

a system that could be entirely out of their skillset.

2. New features and integrations

New features and integrations happen at an increased rate as the code can be maintained and updated more quickly. This results in more features and integrations that benefit the users.

3. Staff

Since the software is hosted with the vendor, staffing costs drop significantly as this is all handled by the vendor.

4. Available anytime, anywhere

This is vital for staff to access the application from either their work computers, mobile devices or tablets from any location, any time.

5. Data exchange

Data coming from multiple sources allows for discrepancies. SaaS is the central point for bringing this together resulting in less errors or data exposure, and increased interoperability for the client.

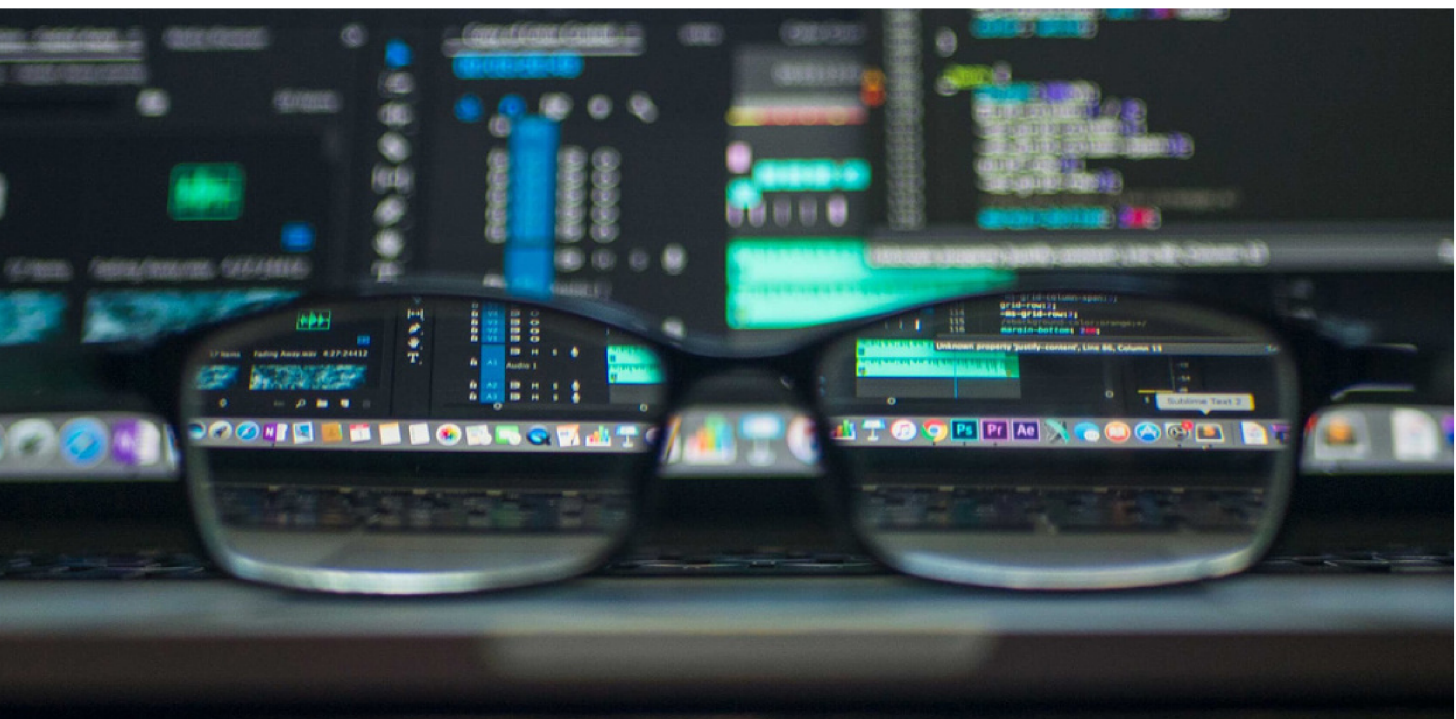
⁷<https://searchcloudcomputing.techtarget.com/definition/Software-as-a-Service>

8 Security

Data security for case management applications, and healthcare organizations in general is of the utmost importance. Protocols and security measures must be put in place and adhered to for the technical side of the house, but often overlooked is the human side of security. Across all sizes and sectors, people remain the biggest security weakness, whether through human error or by creating opportunities for social engineering hacks ⁸. This is so important that in 1996, HIPAA was put into place.

HIPAA

Patient privacy is protected under Public Law 104-91, also known as the Health Insurance Portability and Accountability Act (HIPAA). The rule requires healthcare professionals and practices to secure protected health information (PHI) from data breaches, deletions, and other problems. There are three areas of HIPAA compliance: ⁹



⁸<https://www.coalfire.com/News-and-Events/Press-Releases/Coalfire-Labs-Releases-Cybersecurity-Risk-Report>

⁹<https://www.hhs.gov/hipaa/index.html>

- » Administrative - measures to ensure patient data is correct and accessible to authorized parties.
- » Physical - measures to prevent physical theft and loss of devices containing electronic PHI.
- » Technical - technology-related measures to protect your networks and devices from data breaches and unauthorized access.

The above-listed components represent nearly every supporting aspect of a business: policies, record keeping, technology, and building safety.

Cloud

Cloud computing is the on-demand availability of computer resources without direct management of these systems. Usage of the cloud has taken off in many industries over the past five years, but adoption is often lacking in healthcare due to misconceptions regarding security ¹⁰.

Business Associates Agreement

A business associate contract or business associate agreement (BAA) is a written arrangement that specifies each party's responsibilities when it comes to PHI. The

satisfactory assurances must be in writing, whether in the form of a contract or other agreement between the covered entity and the business associate ¹¹.

Limitations

Health Information Security (HIS) is often considered one of the most important areas for the healthcare industry. Despite this importance, the most common cause of a HIPAA data breach is actually a lost or stolen laptop, computer, hard drive, or other device. According to Redspin, a leading provider of HIPAA security risk assessments and penetration testing services ¹², this accounts for nearly 35 percent of breaches

¹³. Having well-documented procedures in place for staff and regular training helps reduce these types of incidents.

¹⁰ Abrar H, Hussain SJ, Chaudhry J, Saleem K, Orgun MA, Al-Muhtadi J, et al. Risk Analysis of Cloud Sourcing in Healthcare and Public Health Industry. IEEE Access 2018;PP:1–1. doi:10.1109/ACCESS.2018.2805919

¹¹ <https://www.hhs.gov/hipaa/for-professionals/privacy/guidance/business-associates/index.html>

¹² <https://cynergistek.com/news/acquires-redspin/>

¹³ <https://www.redspin.com/resources/download/breach-report-2013-protected-health-information-phi/>

9.0 The Role of Technology in the Future of Case Management

What does the future hold for electronic case management software? No one can be entirely sure, but technology is evolving quickly and that could help users of health care applications and, more importantly, clients. Here are two technologies on which an eye should be kept.

Voice

Many people are familiar with Siri, Alexa and Google voice assistants in their homes and on their mobile devices. While these devices exist on our personal devices, the technology is not yet a standard in the healthcare industry, although strides have been made. Currently, there is at least one patent pending for a voice system for facilitating clinical workflow ¹⁴. Voice technology has emerged as the new frontier for self-service promising a more “human” experience enabling users to access information quickly without navigating a complicated interface. Expect to see an increase in technology in the next five years as voice will be integral to our daily lives.

Artificial Intelligence

Artificial Intelligence (AI) is not just confined to voice assistants. It will likely also be used in applications for disease management, data collection/organization, and cost reduction.

As voice and AI continue to evolve, the road to implementation for these technologies will be slow and challenging.



¹⁴ <https://patents.google.com/patent/US7289825B2/en>

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Conclusion

Harnessing technology for electronic case management is the key to successful case management. Electronic case management ensures accessibility of information, elimination of redundancies, and ease of sharing data, all of which are easily accomplished through the automation of manual processes.



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