

Mobile Application Development in Real Time



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THE original Axxess company, Axxess Healthcare Consult, began in 2007, as a technology advisor/consultant for Home Health Agencies in Dallas, TX. The consulting company conducted performance reviews, enabled agencies to operate utilizing seamless processes, advised agencies during their formation, during their compliance surveys, and, served as an education/training provider as an accreditor for the American Nurses Credentialing Center (a division of the American Nurses Association), and as such, conducted training events for educational purposes. Home Health continues to be a business that requires immense learning challenges for its operators from a clinical quality, operational process and general regulatory standpoint. Axxess throughout its history has sought to address that difficult challenge with training and education tailored to the needs of home health professionals. In 2009, Axxess, through an in depth industry analysis, determined that a state-of-the-art Electronic Medical Record system, delivered from “the cloud”, was unavailable in the home health (Medicare Certified Home Health) marketplace. Axxess Technology Solutions was formed to launch the software segment of the business, as a Software-as-a-Service, subscription-based business model, and after a year-and-a-half long development cycle, began its EMR solution, with a 4/15/2011 “go live” date. The Agencycore platform was built with Scalability, Redundancy, and Availability in mind using the Microsoft Visual Studio development environment, and operates in the .NET (Active Server Page/Java Script) environment. Scalability, Extensibility, Redundancy, and Availability are characteristics of the .NET development environment, as well as Sustainability into the future. The .NET Framework is a technology that supports building and running the “next generation” of applications and XML Web services. The .NET Framework is designed to fulfill the following objectives: To provide a consistent object-oriented programming environment whether object code is stored and executed locally, executed locally but Internet-distributed, or executed remotely. To provide a code-execution environment that minimizes software deployment and versioning conflicts. To provide a code-execution environment that promotes safe execution of code, including code created by an unknown or semi- trusted third party. To provide a code-execution environment that eliminates the performance problems of scripted or interpreted environments. To make the developer experience consistent across widely varying types of applications, such as Windows-based applications and Web-based applications. To build all communication on industry standards to ensure that code based on the .NET Framework can integrate with any other code. As our Agencycore platform began growing in number of users and features and functionality, it became obvious that a functional, integrated Mobile Application feature was necessary in order to facilitate the visiting clinician’s ability to document all aspects of the patient’s condition at the Point Of Care. Shortly after “go live”, in early 2012, our mobile applications team began its work.

Methods: The Software Engineering team at Axxess evolved their software development process over the years since 2010. As the team grew so did our processes. Being a SaaS environment, we push enhancements and fixes rapidly, at least bi weekly. We have always followed the Agile – Scrum process for our development. This ensures rapid delivery to our customers. While other EMRs update their software platforms once every few months or quarterly, we push out new features at-least once a week. Initially, our software deployment process was a tedious and manual process. Now, using a continuous delivery process, we have automated our deployment process, which helps us with shipping more software features. Collaboration was key to our organic growth within the engineering team. We have refined our development process to enable seamless collaboration. As we expanded our product suite, we embraced team collaboration tools and moved away from physical scrum boards. Bug tracking, issue tracking, and project management tools are being employed to manage our work backlog. Although our team is divided into different product teams, everyone follows the same agile principles. This is at the core of our success as a software team.

Results: Our Axxess Mobile solutions currently focus on point of care. Anything a clinician needs to document at the patient’s home, they will be able to using our Apps. Access to the software via Smart Phones and Tablets has enabled our clinicians to work more efficiently and spend more time on patient care, not paperwork. Axxess mobile app continues to be the first (and only) native mobile app that works on both platforms (iOS and Android) in home health. The Axxess Mobile App is unique in that it provides Electronic Visit Verification (EVV) - an accountability feature that uses GPS and automatic time stamps to track location and time of visit to the patient’s home. This tool allows organizations to document proof of their organization’s compliance and eliminate potential fraud charges by recording the date, time, and location while focusing on patient care. A clinician can collaborate with care-givers within their agency by sending HIPAA-complaint messages via the App. They can review patient information, and contact their patients ahead of their visits. They are able to navigate to the patient’s home and plan their day better. While at the patient’s home our clinicians have access to the patient’s medication profile, Allergy profile, Pharmacies and Physicians associated with their patient. They can also reach out to emergency contacts and other caregivers actively treating their patient. Clinicians find that adding orders and

communications to the patient profile can be done in a jiffy with talk-to-text enabled data fields. In rural areas, Clinicians need to visit rural areas, our mobile apps let our users access information offline. To remain HIPAA-compliant and keep data secure, we use encryption techniques to secure mobile data even before it's uploaded to the server, ensuring that information is secure at every point. The code within our apps, itself, is obfuscated, that is, it only communicates with approved Axxess services (unlike other commercial apps that share data).

Discussion: There are many challenges facing engineers in our mobile app development team, including ongoing maintenance, on a week-to-week, and day-to-day basis. The world of enterprise apps can get extremely complicated with all the data thrown at the users. Being an Agile team, we continuously deliver useful features hence ensuring customer satisfaction. User Focused: People and interactions are emphasized rather than process and tools. Customers, developers and testers constantly interact with each other. User Friendly: Our approach to technology is all about making it user-friendly, helping home health provider clinicians (nurses, therapists and aids, who are not always comfortable with technology) seamlessly and painlessly employ technology to work smarter and more efficiently. Customer enhanced: To achieve this, we in engineering and other experts from the industry sit down with real customers to understand firsthand what works, what can be improved and what is the next opportunity for innovation that raises the bar. Real Time Updates: From a business perspective, being Agile is extremely beneficial. Late changes in requirements are welcomed which ensures the best possible outcome. Working software is delivered frequently. Being Agile helps both Engineering and Business Development, as internal client focused partners, be more collaborative, tackling challenges in the ever-changing world of healthcare regulations. When you are agile, there is continuous attention to technical excellence and good design. We constantly monitor availability and usability of our software. Every room in Engineering has a screen with our current request ratios, server and database load. Within the mobile team we use Google, Apple and Fabric – analytics to monitor accessibility as well as our user device demographics. This helps better cater to our user's needs while monitoring industry trends within the mobile device space. As the mobile team develops features to work in unison with our web-based platforms, Agile can prove to be challenging at times. Mobile is always focused on rapid deliverables where as our web-based application requires maintainability updates as well as large features. When it comes to large deliverables it becomes difficult to assess effort required, in the beginning. This in turn can affect the timeline across platforms as they all pass through the same testing environment. Inter-dependencies of deliverables create challenging road blocks for our product managers. In Agile, designing and documentation happens as you go. This can cause misunderstandings between business requirements and implementation. Product Managers need have a clear understanding of our business as well as understand what technical effort is required to build features. At Axxess, we have addressed this potential issue of communication by employing Health-Care industry experts as Product Managers. They work closely with the project team leads to create meaningful sprints for business and engineering. People play an extremely important part in Agile development, within Axxess we have noticed a productivity decline when we move resources from one part of our development team to another. This is mainly due to each product being so unique. For example – Billing and Payroll for Home Healthcare(Medicare Certified/Clinical) vs. Private Pay. To help reduce these knowledge gaps we have Role-play sessions once a month, where members of the engineering team act and use our software as real customers would.

Conclusion: The development of native Mobile Apps for both Android and iOS systems is a challenging characteristic that has not been achieved by any other software company in the Home Health space. Most of our competitor software companies utilize a third party app development contractor to manage their app development tasks, if they have attempted to develop an app. This is problematic for them since outsourced developers rarely have an in-depth understanding of the industry. Our regular updates require our mobile app developers to remain fully utilized. Not only do we have to pay close attention to features and functionality for our client agencies, we must research our relative compliance with the evolving standards for Electronic Visit Verification across each of the United States. Our in-house counsel is researching the statutory requirements the states we serve (45 states so far). The key issue is whether the state has recognized GPS as an acceptable method for Visit Verification rather than twenty-year-old- plus CTI telephony integration technology. Looking forward, we realize the Home health industry is slightly behind the currently available technology but we also see the immense potential for innovation. With the advent of Wearable and Bluetooth enabled measurement devices for a patient's vital signs, as well as various patient movement related apps, Remote Patient Monitoring will become more achievable and cost-effective, from within the app. Mobile devices bring with them an array of features such as sensors, touch interaction, location awareness. Many of our future enhancements will take advantage of these features. We want to continue to harness this technology to provide innovative solutions for patients and Clinical and Functional practitioners in the industry.