

Telemedicine and Mobile Health for Radiology and EHRs



“The client was looking for a technology partner to compliment their in-house teams.”

The Client:

The client is an influential technology leader in the delivery of web-enabled, secure telemedicine and teleradiology, and RIS/PACS solutions with over 1,000 installations worldwide. Their platforms facilitate electronic acquisition, viewing, communication/transmission, publishing, and storage of medical data captured by numerous modalities and devices, as well as workflow management. The platforms are associated with a variety of medical subspecialties including radiology, orthopedics, dermatology, ophthalmology, stroke evaluation, dentistry, and general exams. Their solutions can be easily integrated with existing HIS and RIS systems. The client's products and solutions are widely used across various healthcare user communities.

The Business Challenge:

The client's biggest challenge is to continue to add value and meaningful services to improve user and community interactions. This requires vast knowledge of domains, standards, integrations with disparate systems like medical informatics, medical imaging, and telemedicine. The client was looking for a reliable technology and development partner to help them with the continuous enhancements and maintenance needed to meet and remain current on the evolutionary changes in healthcare technology.

The Engagement:

Telliant was initially tasked with making substantial changes to the functionality of the client's telemedicine mobile app, along with other maintenance and feature development tasks.

A dedicated team including subject matter experts, development engineers, and testers were involved from the start, working to provide product enhancements including bug fixing, design, and development of new features.

The real challenge for the customer is integrating with a variety of hardware/medical devices for capturing patient vital signs and then communicating with their application to store and share. Telliant successfully integrated and customized the output format as required by the client. Typical format for every vital input differs and we need to provide custom solutions for each. This has been handled efficiently with Telliant's prior domain expertise and technical experience.

To preserve the project timeline, Telliant's dedicated team of engineers were quick with knowledge gathering on all client products. Subject Matter Experts (SMEs) were incorporated with the team to ensure the product upgrades were satisfying regulations. Additional research was done to incorporate real-time data including ECG/EKG, heart rate, respiration level, oxygen rate, steps walked by the patient, postures, etc.

Showcasing the high-performance upgrades of the client product, Telliant's dedicated team delivered a higher quality product after the testing phase. The test cases were performed manually and with automated scripts to ensure the testing was thorough. The testing phase was quick and precise to provide the Client with the efficiency they required of the product and the development team.

Telliant was chosen by the client for the following reasons:

- Telliant has extensive healthcare industry experience and understands the regulatory needs of the health IT industry.
- Telliant's team has proven experience and capability in working on Microsoft technologies and mobile based software development.
- Telliant's team has the necessary bandwidth of resources to expand the team as needed to satisfy additional requirements of the project and additional projects. This client was satisfied with the result of the initial project's outcome and now we work on multiple client products across multiple technologies in both mobile and web platforms.
- Telliant has a great reputation for creating high-quality software with attention to detail.
- Customer service is a core value of the Telliant team and we strive to ensure we meet and exceed the needs and expectations of our clients.



Why should you integrate telemed tech into your products?

Telemedicine makes up nearly **1/4** of the healthIT market

Telehealth is expected to jump to nearly **20** Billion by 2019

Telemed services set to increase to **7** Million patients in 2018, up from less than 350,000 in 2013

Global telemedicine market, was valued at **\$17.8** billion in 2014, it is predicted to grow at a CAGR of of 18.4% from 2014 to 2020

67% of patients have increased satisfaction with medical care

74% of patients in the U.S. would use telehealth services is available



TECHNOLOGY ENVIRONMENT

Telliant's Team was responsible for utilizing the latest technologies:

➤ Languages:

- C#
- Xcode 8.2.1, code written in Objective-C
- ASP.net SignalR library
- .NET

➤ Tools:

- Xamarin
- Directshow

➤ Database:

- SQL Server

➤ Third-party tools:

- Vitalconnect health patch
- Vitalconnect relay library
- iHealth Labs
- WebSync
- WEBRTC

➤ Mobile platform:

- Android
- iOS

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Solution Highlights:

The main intention of this project was to gain full access to fully control the web cameras connected with the application remotely. We improved the application by allowing the user control of the remote camera with pan, tilt and zoom (PTZ) capabilities. We integrated the DirectShow API interface to perform enhanced functions of the camera. To increase and enable the application to stream real-time communications over the internet and to communicate with multiple clients we integrated the WEBRTC interface platform technology.

These integrations were not readymade plug and play components but a custom coded snippet which was used in similar requirements inside the application.

The secondary focus on the client project was to improve and enhance the real-time data capture and communications of the patient vitals to any cloud-based EHR. From heart rate to skin temperature, single-lead EKGs and more. The Telliant team completed the needed upgrades to the applications and product to enable rapid response to emergencies. Full patient vitals data streaming included respiration rate, posture, steps, oxygen levels was included in the connection with the Vitalconnect patch device. This full function telemedicine product and the Vitalconnect patch device allows patients to receive quality care outside of a traditional clinical environment providing a degree of freedom and mobility.

Dashboards were built to handle the huge data volume from the application. The intention of this project is to receive the real-time streaming values of patients from the mobile app and display it on a comprehensive dashboard. The data analytic rules engine will help in configure the rules and trigger alerts to the providers based on the configured range of the vitals.

To build the new dashboard for this client we used ExtJS UI components because of the application's sensitive nature of the data. The purpose of this dashboard is to show the real-time patient vitals from various IOS and Android mobile devices.

Along with the standard IOS development we were tasked with building the interface for the telemedicine product's iPad integration. At the time, the application only worked with iPhones and phone devices. Full Android development is being planned and completed in the next phase.

The application is built on the IOS platform with objective-c. We integrated the Vitalconnect medical patch by way of the Vitalconnect Relay library which allows us to connect and collect the real-time data from the Vitalconnect patch via Bluetooth. We also integrated the iHealthLabs library to associate the real-time data of blood pressure monitor and oximeter into the application which allows real-time logging of the blood pressure and SPO2 of the patient.

Telliant's Technical Differentiators:

Telliant was instrumental with their ASP.Net, IOS, Xamarin, objective-c, ExtJS, Xcode and third-party applications and API experience to ensure the client's requirements with their real-time data communication challenges were satisfied.

The client wanted to establish secure, consistent communication between their client side to client-side products (mobile) and server side to server-side products (web) as periodic real-time updates using WebSync library. Telliant has been a valuable partner and has played the key role for this integration. The WebSync library is a proprietary application used to build in real-time applications like chat, data sharing and signaling/ connection management. WebSync is based on ASP.net signalR library in .NET.

Telliant assembled a team consisting of business analysts, software engineers, QA engineers, and a senior project manager that worked with consultants and domain experts to optimally achieve the objective.

Results Achieved:

Telliant's dedicated team has successfully delivered the scoped feature items in a condensed time frame. Quality and usability testing of the mobile app has increased within the project plan and has yielded high customer satisfaction. The application enhancements have increased performance levels by 120%. With this increased performance, the client has increased their ROI and market share.

The client is extremely satisfied with the results of the services received and project management from Telliant. The client has increased the team size to accommodate the need for new development, support, and maintenance of the project. The client has asked Telliant to evaluate and develop new features on their other product platform.

To learn more about how we can help achieve your goals in the ever-changing world of IT and innovation, please visit www.telliant.com