Mobile and Web Timecard

PROJECT PLAN

sdmay18-14
Genova Technologies
Advisor: Neil Gong
Team Members
Andrew Hoelscher - Lead Tester
Christian Wesseler - Lead Designer/Documentation Keeper
Cole Stephan - Lead Server Engineer
Connor McCann - Lead Andriod Engineer
Jason Thomas - Team Administrative Lead
Nicholas Flege - Lead iOS Engineer
Thomas Reins - Lead Web Engineer
sdmay18-14@iastate.edu
sdmay18-14.sd.ece.iastate.edu

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1 Introductory Material

1.1 Acknowledgement

Genova Technologies has provided and will continue to provide significant guidance in the form of technical advice, tools, and financial aid. Bi-weekly meetings are held to review the progress of the senior design team, and more frequent meetings will likely be necessary with our technical lead from Genova, Tom Sidebottom, to continue answering our technical problems. Genova has set the senior design team up with accounts in the Agile tool, Rally, to allow us to document our progress in a uniform way. Genova has committed up to $20,000 in financial support to aid in the completion of the project.

1.2 Problem Statement

The problem we are aiming to solve with this project is Genova Technology's lack of user-friendly and well-liked method to track time spent on projects. Genova previously had a time card which most employees enjoyed using. A change in the accounting software used by Genova left this old time card incompatible with the new accounting software. Because of this incompatibility Genova was forced to go back to an old and disliked time tracking application. Genova hopes the senior design team can develop an iOS, Android, and web time tracking application that is compatible with the accounting software and user-friendly.

The senior design team will solve this problem by developing an iOS, Android, and web time card application. We will accomplish this by utilizing industry standard software development tools and an Agile development style working in two week iterations. The iterations allow the team to deliver the user's highest priority needs first and facilitate adaption to change, so every possible need the users may have does not need to be planned ahead of time. Data will be stored and retrieved to and from a database server hosted via Microsoft Azure. The backend codebase will be built on a Microsoft application server and coded in C#. The frontend will be coded differently depending on whether it is the iOS (Swift), Android (Java), or web app (Javascript).

1.3 Operating Environment

Since this is a software project the operating environment is fairly straightforward and we don't have to worry about any physical conditions. The iOS application will run on an Apple iOS device, the Android application will run on an Android device and operating system, and the web app will run on a standard web browser.

1.4 Intended Users and Intended uses

The end users for this product will be the employees of Genova Technologies, and potentially the employees of any companies Genova sells the software to. The mobile and web time card application must provide easy and user-friendly functionality to allow the

Genova employees to quickly and efficiently track their time spent on different projects. Additionally it must provide a simple way for the administrators to login to the application to review and approve the timecards. If a timecard is denied, there will be an option to add a note describing why it was denied, and the timecard will go back to the employee to be changed and resubmitted. Once timecards are approved the data must be exported to the compatible accounting software so Genova's customers can be properly billed for their time.

1.5 Assumptions and Limitations

Assumptions:

- Application will only be used by Genova employees and the companies Genova may potentially sell the software to; therefore the maximum number of concurrent connections will be limited number of employees and consultants
- Users will not access time-card application from multiple platforms (on the same account) concurrently
- Multiple language support not necessary
- Voiceover support not necessary
- Application will not be used outside the United States

Limitations:

- Time-card application will have a minimum of feature parity with old system
- Time-card application must run natively on iOS and Android operating systems
- Server costs will be covered by client

1.6 Expected End Product and other Deliverables

The end product will be an iOS, Android, and web application which will store and retrieve data to and from a server hosted via Microsoft Azure. This application will provide an easy, user-friendly way for Genova's employees to track their time spent on different projects. Once the timecards have been completed the administrator will review the timecards and have the option to approve or deny them. Once approved the timecard data will be sent to the accounting software, so the customer/client can be properly billed.

The mobile and web timecard will be completed by the end of April 2018.

2 Proposed Approach and Statement of Work

2.1 Functional requirements

The Genova time card should be accessible through Android devices, iOS devices, and through a web portal. It must be able to log times related to the projects worked on and

any notes the developer might have. The admin features will be limited to the web application.

2.2 Constraints considerations

The time card should mirror the design from Genova's previous time card. The database should be quickly accessible and simple to use.

All coding standards will follow guidelines for their respective coding languages and abide by IEEE standards. No unethical practices will be followed and client data will not be shared.

We will specifically try to adhere to "730-2014 - IEEE Standard for Software Quality Assurance Processes" so that we can ensure our software solution is properly tested to meet its high standards. Additionally we will adhere to "1633-2016 - IEEE Recommended Practice on Software Reliability" to ensure that the time card we produce is a reliable piece of software that will operate as intended for its full life-cycle. Another is "12207-2017 - ISO/IEC/IEEE Draft International Standard - Systems and software engineering -- Software life cycle processes" so that we can develop the software in such a way that it will be able to be maintained easily over its life-cycle.

2.3 Technology considerations

iOS design requires the use of compatible Apple systems. Designing the iOS time card will force the team to delegate work to those with the hardware capable of running xcode. This may pose issues with cross-platform communication. Similar coding styles should allow for easier integration across multiple platforms. There are some softwares that allow cross-platform development, but would need to be cleared with Genova before utilization.

2.4 Safety considerations

All work performed is digital and presents no physical hazards to any party involved. It is important in the development of the timecard that all private information is kept secure and confidential to protect our client's assets.

2.5 Previous Work and Literature

There are hundreds of similar time card systems that companies use. Genova had a previous system, but due to software updates it was no longer compatible. They provided the design notes on source material of their previous time card system to help guide us. There are other options available to Genova, but they would rather have their own in-house software that they can control more and change as they please. Because of this, other software programs are inherently less efficient for them.

Some disadvantages of Genova's current timecard solution is that it is not liked by most employees and is less intuitive than their previous systems. One of the first things Genova emphasized when we began meeting with them was how well-liked the previously used

time card was. The time card they are currently using has received wide and loud negative feedback, this is another thing Genova emphasized. They also do not have much control over their existing solution since they did not develop it themselves. The other disadvantage of the current system is that it is only accessible via the web.

Our solution is a mobile-first design approach that improves ease of access and user experience. In addition to being focused on the mobile aspect of the timecard we are developing, we are using the documentation which Genova has provided us with on the well-liked time card they previously had. By using this documentation to guide our development we will be able to create a solution which will be more user-friendly and cause fewer complaints from those who use the timecard every day, Genova's employees.

Other applications exist to manage and track time such as Tsheets, Zenefits, or Timesheets. These applications provide subscription services that companies and pay for to provide employees with a web and mobile app to track their hours. A disadvantage of these apps is that they do not integrate with Genova's existing accounting systems. The apps also do not allow for Genova to host the required servers and databases themselves.

2.6 Possible Risks and risk management

Our development team is not entirely familiar with all the platforms we are developing on. This presents a challenge in generating accurate time and cost estimations. To overcome our team's unfamiliarity, we are working closely with Genova to learn and utilize the tools we will be using for project development.

Working with databases presents a security risk for the data being communicated. Data in Genova's timecard will store client and project information, as well as financial information. It is important that all iterations are tested on test data before being implemented on live data.

Creating an application responsible for billing clients presents a financial risk for all informed parties. Incorrect tracking of labor can result in overbilling or underbilling and cuts into profits. Before release, the product must be tested for accuracy to ensure a seamless system.

2.7 Project Proposed Milestones and evaluation criteria

Android functionality, iOS functionality, server and database functionality, and Web service functionality are the main milestones. We will be testing that they work as intended by Genova, that they work with the other parts of the project, and that they work with Genova's systems overall.

Design Specifications/Evaluation Criteria

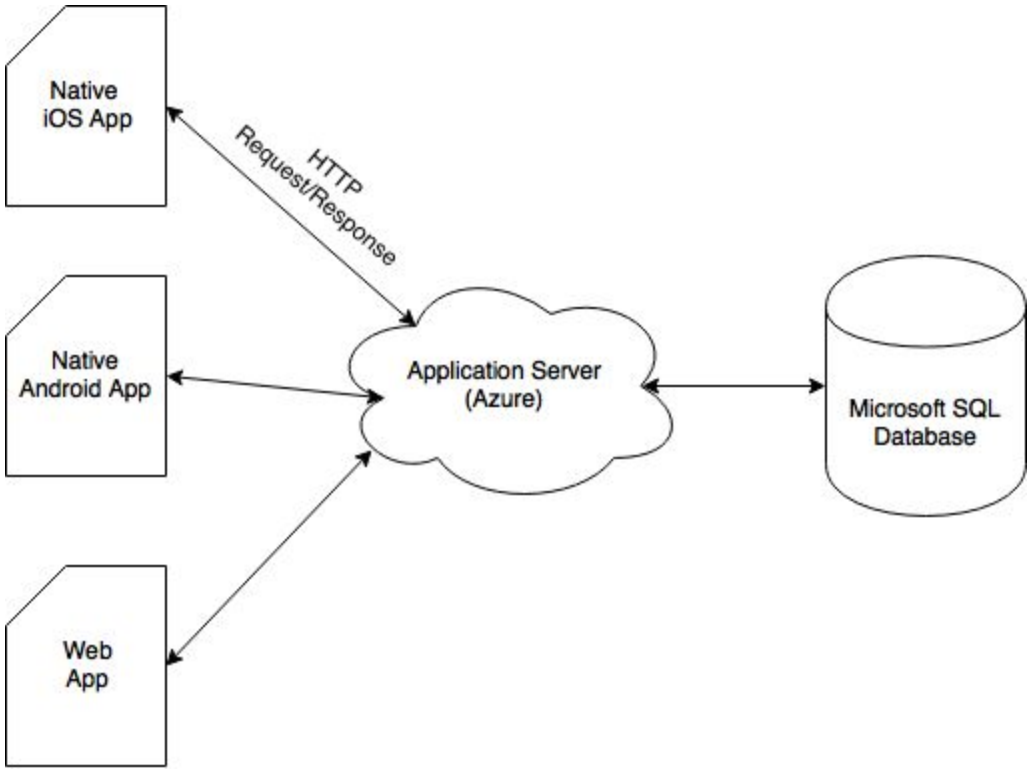
- Mobile Timecard app will function on iOS and Android devices
- Web version will support Internet Explorer, Edge, Chrome, Firefox, and Safari browsers

- Timecard backend interacts with Dynamics, Genova's accounting system
- Web and Mobile Specifications
    - User can log in with their Genova email address and password
    - New users can can create accounts and passwords with their Genova email addresses
    - Mobile devices will automatically store user credentials upon first log in
    - Users can create a new time card, limited to one per week
    - Users can record time worked for a specific client, project, and task.
    - Users can record time in both block and start/end time formats
    - Users can complete and submit timecard to manager for approval
    - Users can view reports of previously submitted timecards (year-to-date or last five weeks, whichever is greater)
    - Users can log out of timecard
- Web-specific Specifications
    - Managers/Reviews can review and approve their direct reports' timecards
    - Admin can view summaries of all users in timecard system
    - Admin can create timecard for another user
    - Admin can edit/complete timecard for another user
    - Admin can submit timecards for given pay period to Dynamics accounting system

2.8 Project tracking procedures

We will be using a service provided to use by Genova called Rally. We can have a list of user stories that need to be worked on and assigned in one section, what is being worked on and by who on another, and then what has been completed and by who in the final section. Genova will continuously track that we are using and updating Rally and hold us accountable for any people who are not pulling their weight.

2.9 Objective of the task



Our end goal is to have a software product in the form of an app. It will be multiplatform so that any Genova employee can use it. The client applications will interface with a Microsoft application server hosted on Azure through a REST API. The application server will process the client requests and retrieve the necessary data from the SQL database and send it as a response to the clients. The clients will then process the response data and present it to the user.

Some alternatives to this approach are to use a Linux server and along with an SQL or NoSQL database. The server and database could also be hosted with another cloud platform such as Amazon Web Services. Technologies exist to create mobile apps in a single programming language that can then be compiled into separate iOS and Android applications. A specific requirement from Genova was to build native mobile apps, and this prevented us from implementing such technologies.

The advantage of using a Microsoft stack for the development of this app is its integration with other Genova systems. Genova runs Microsoft software to manage their employees and financials. Since we are using a Microsoft stack, we determined using Microsoft Azure for our cloud service is the most advantageous. It has optimization for .NET web applications and integrations with Visual Studio that make deployment simple and straightforward.

2.10 Task approach

The project will be broken down into tasks or user stories organized by the tool Rally. Each task will be a single feature of the overall application (i.e. Design database tables and relationships, etc.). Each user story will be assigned a point value that correlates to the amount of time a task is estimated to take.

2.11 Expected Results and Validation

By the end of the spring semester, we expect to have a working time card system working on iOS, Android, and Web and have it available for Genova employees to use.

We are expected to create the fully functional, multi-platform electronic time card system for Genova's company use. Genova employees will be able to clock in and out through the app on iOS and Android devices as well as online. Our solution will be confirmed as working when it is able to be integrated into their internal systems fully functional and without causing any issues with other systems they have in place.

3 Estimated Resources and Project Timeline

3.1 other resource requirements

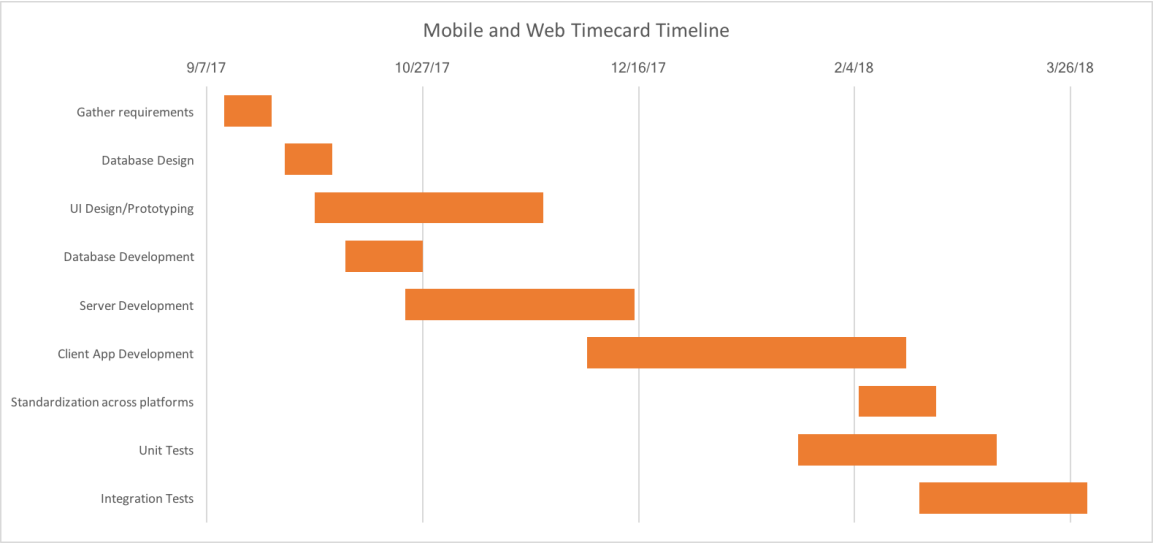
- Previous iteration design documents
- Microsoft Azure database and application server
- Android Studio
- Mac computer with Xcode
- Windows OS with Visual Studio

3.2 Financial requirements

The financial requirements consist of Microsoft Azure monthly usages costs for server and database as well as any equipment necessary to test the time card system. Through the use of a free development tier, the financial requirement is estimated to be very small during development and only slightly larger once application is deployed to production. See details for Azure pricing here.

Based on Azure's price rate of $0.013/hour as linked above, it will cost $113.88 per year to maintain hosting the app on Azure's cloud server.

3.3 Project Timeline



The requirements for the project must be known before any work can begin. Once the requirements have been defined, the database is designed. Once database design is completed, development on the database can begins. The UI design and prototyping for the client applications starts shortly after database design and will continue until client app development starts. Server development starts immediately after the database is setup. Client side app development cannot start until a majority of the server development is complete. Near the end of client app development, testing phases will begin, both unit and integration tests. There is also a period to ensure standardization across the various client applications.

4 Closure Materials

4.1 Conclusion

After Genova's previous time card system starting causing conflicts with the rest of their systems from an update they switched to a less desirable application to track the hours spent on projects. As a software company, they would like to develop their own time card system again that will continue to cooperate with their other systems. This new application should be accessible on iOS, Android, and other web devices. To accomplish this, our team is using a service called Rally to create an action tracker that we use to list out all the steps needed to complete the project through the guidance of Genova's teams. When completed, Genova will have overseen the project throughout its development and have approved the process.

4.2 References

Android Documentation https://developer.android.com/index.html

Apple Documentation https://developer.apple.com/documentation/

Microsoft Azure https://docs.microsoft.com/en-us/azure/

Timesheets https://www.timesheets.com

Tsheets https://www.tsheets.com

Zenefits https://www.zenefits.com