

Initial Architecture Document

Team 16

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Project Name: Truck Trackers

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² 2955696

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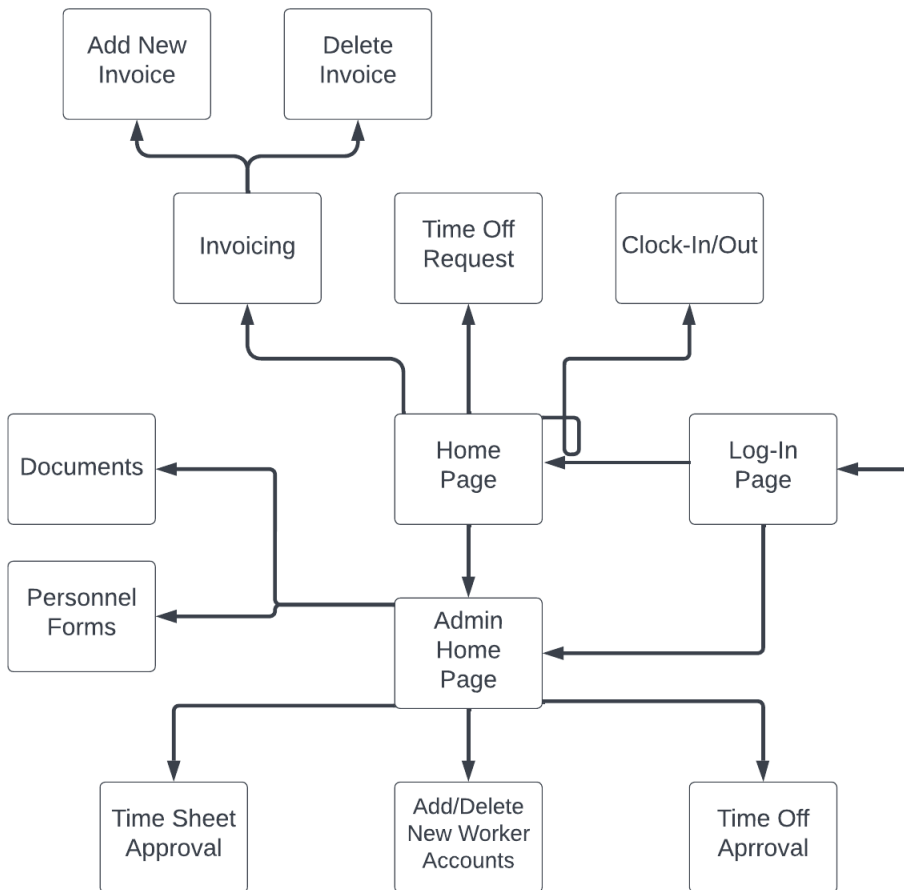
⁴ 2975904

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Project Synopsis

Designing and developing a full stack, multi-platform application, enabling companies to track and manage truck invoices and employee information.

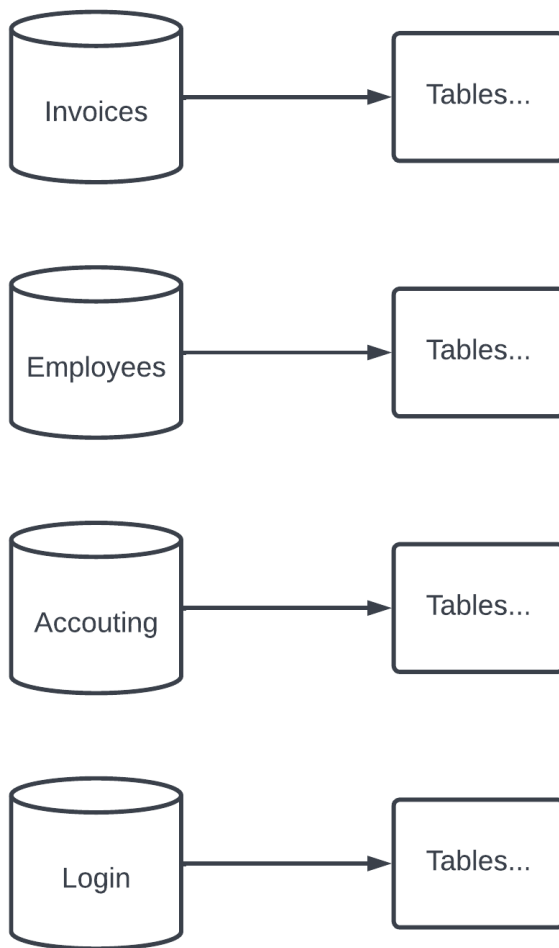
Architecture



UI Design Diagram

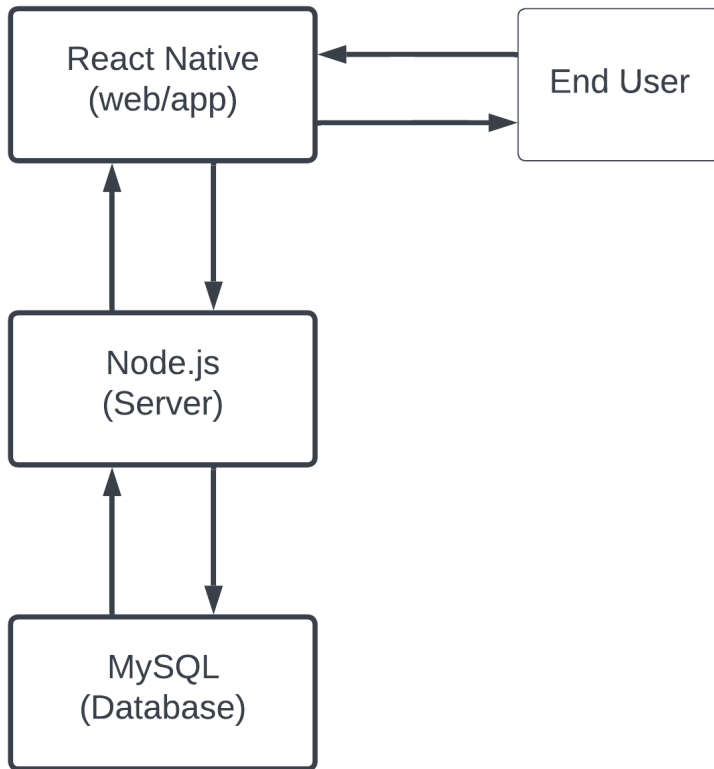
Diagram of the flow of our application. Represents how you can transverse the webpages as well as the types of features the admin will have compared to a regular user

Databases



Database Design

Shows all the tables that will be in our database pointing to "Tables..." which represent the columns and data stored inside which have not yet been set



Full Stack Implementation

To understand how the different components of this project interact with each other. A visualization of the full stack implementation for this application.

Narrative (1000+ words)

The Truck Trackers application is meant to be a business application for a local trucking company based out of Kansas City, Kansas. The company does not currently have a designated business operating system or record tracking application of any sort, which is why it was the ideal project to tackle. This application is going to be designed and developed from start to finish by the team, incorporating all of the professional skills learned throughout electrical engineering and computer science courses. The end goal is to deliver a product that the client feels meets his needs and improves their current business structure.

The trucking company is Loaiza & Sons TKN LLC. They were founded in 2018 starting off with a single dump truck hauling for local asphalt plants with just the owner-operator managing the company. The trucking company is now made up of 11 dump trucks, with either 1 or 2 drivers assigned to each truck, hauling various materials for a dozen different local companies. This means that the traditional pen and paper approach is no longer a viable option for a growing company, the amount of accounting hours in the office has grown exponentially, resulting in inefficient use of employees time used on tedious tasks. The client would like a general purpose business application that stores and handles the company's information in an organized fashion and allows for employee features for logging their work.

The team decided to take on this project because the idea of designing and creating a full stack application from start to finish would create a reasonable challenge. This includes learning how full stack apps work, researching the best frameworks for the app, and there would be a real client with active end users to test and give feedback as the project evolves. The trucking company consists of drivers who are not the most tech savvy individuals who are generally older. This means that there are now end users to adapt to in this project for the employee end of the app as well as office employees to adapt to for the administrative side of the app. Another advantage of taking on this project is the availability of real data that would be growing on a weekly basis.

The application would be split up into sections, with different team members being able to grow skills and knowledge in each. This includes the database design and creation, the backend server, and the frontend. All members would contribute and understand each section for better overall development; however, each member can also take charge on each portion for instances where new functionality is added or debugging is required. This will allow for everyone to contribute efficiently to areas they are personally interested in or simply want more exposure to. It was decided that for the database MySQL would be used. This is because all the team members have been previously exposed to SQL databases in previous courses and would be the best way to get the app up and running as soon as possible. Other considerations included GraphQL. The server we would use is still being researched, as we are not as familiar with this

portion of full stack apps. From preliminary research it appears that Node.js is a good platform to get started, but this may change as the project develops. Lastly, it was decided that React Native would be the best option for the front end. React Native will allow for the application to be used for mobile operating systems like Android and iOS as well as for the web. This was an important consideration when researching the end users, because not all of them own a laptop and use their smartphones as their primary technological device. This means that creating a portable app in a framework such as React would allow for it to be written once and be automatically adapted on different platforms. Additionally, React in general appears to be an industry leading Javascript framework that would give us exposure to what is commonly used today, making it an attractive option.

There have been multiple team meetings and revisions to the road map for this project. Having evolving requirements and breaking down tasks into smaller chunks has really helped in understanding the project better. The requirements stack is particularly useful for this because it not only gives the general overlay of what can be expected to get done during each sprint but allows for better organization with sequential order. Setting up the basics, downloading the right files, and ensuring that everyone has access to everything is important so that each member can contribute on their own time and so everyone can have the most up to date version of this project. The game plan is to design and set up the database. A basic user interface will also be developed in order to have a working app. The initial setup will be determined by prior knowledge and experience and then be molded into what the client expects as time goes on. It is expected that the client wants to change the layout frequently as it will be an application that is meant to be used day to day and should be intuitive for the employees and drivers.

The current insight into the day to day operations is brief, but enough to get started. The goal of this app is not to recreate an accounting app, or to simply digitize existing documents, although both are components of the final product, but rather provide the client with automated and digital solutions to the current system. It is known that a lot is done on paper, a lot of tasks are repeated on a daily or weekly basis, and that Microsoft Excel is the current platform for invoicing clients. A driver's typical day is them showing up to pick up the dump truck, do their daily vehicle inspection, arrive at the job site where they will run about a dozen loads of material from material plant to customer location, receiving a load ticket full of information for each load, then drop off the dump truck and write down the information from the load tickets on pen and paper or on Google Sheets. It would be preferable that instead of having over a dozen Google Sheets and physical pieces of paper that will then need to be then inserted into appropriate Excel files based on the company, that the drivers directly upload ticket information on the app and consequently into the database. Then the database would be able to automatically generate invoices for each company and record invoice summary. This would eliminate the need to open several tabs, files, reduce human error, and decrease the amount of hours spent on this. Having to invoice all the companies can take up to two days due to mistakes, corrections, and accidental

file manipulation according to the client. This is just an example of the driver side of the application that would benefit the client. Being able to securely store employee information and other general company information accessible via the app would be efficient compared to the current physical file cabinets storing everything on paper. The drivers currently have to access a few different websites in order to retrieve information, localizing everything into a single company app would reduce the learning curve for these older drivers using their phones. Peace of mind and simple user interface is important for any employee or employer.

In conclusion, the goal is to provide Loaiza & Sons a solution to their current company system, allowing the team to tackle a full stack application start to finish, and being able to adapt to user feedback and evolving client requirements.