

Website Redesign and Database Connection

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# Executive Summary

## Reasons for the Submission of this Proposal

The advancement of technology in the last several years has made a significant portion of Rainbow Records' online infrastructure outdated. This resulted in a website interface that is incompatible with a large portion of user devices, a database that does not interact with the website, and a purchasing system that requires extreme amounts of manual labor to operate. Because of the issues in the current system, Turing Technical proposes a redesign of the website, as well as connecting the website with the SQL database.

## Overview of the Project Benefits

Updating the website interface to conform to modern design standards will allow it to perform reliably across all user devices. We will build the website with the latest technology so that loading times are fast and interaction with the navigation features are accessible and fully functional. These changes will result in a website that is more appealing and inviting, which will help to generate an increased online customer base for the company by building trust in the website.

We plan to automate the labor-intensive purchase and order fulfillment process by connecting the website to the warehouse database. Currently, orders are received by email and shipping information is compiled by hand. This is a time-consuming and difficult process to scale up. Rainbow Records will require an improved system to be put in place in order to manage its continuing growth.

By establishing a direct link between the website, database, and warehouse, Turing Technical will be able to eliminate Rainbow Records’ logistics shipping issues. We plan to have the shipping requests arrive directly at the warehouse, printed out, and documented automatically, which will greatly reduce the time and energy required to process new orders.

## How we Plan to Complete this Project

### Tools and Software

To accomplish these tasks we will be using an assortment of the latest development software and applications available. Our selection of tools includes but is not limited to HyperText Markup Language (HTML), Cascading Style Sheets (CSS), React, Bootstrap, NodeJS, Express, Structured Query Language (SQL), and Amazon Web Services (AWS). Please refer to Project Details for additional toolset information.

### The Dedicated Team

Our team will be composed of two separate groups working in unison. We will be assigning a group of skilled web developers and database experts to assist with the updating process every step of the way.

Our website team will be composed of twelve developers with expertise in design, programming, and user-accessible interface layouts. The database team will be made up of three members, with expertise in database management, hardware, and programming. We also expect the assistance of Rainbow Records’ staff member Alex for the database portion of the project, as his knowledge of the current system will be an asset.

### The Schedule

We plan to complete both the website design and database integration simultaneously over the span of three months. During this time the website team will gather details and requirements, program and design the website, host it on AWS, assist with connecting it to the database, test it, and finally make it available to the public.

The Database team will be working for the final two months of the project. During this time, they will first assess and improve the current database and program the needed modules to connect it to the website. Then we will install the hardware needed to print shipping labels to the warehouse, connect it to the website, and monitor it to ensure the system performs reliably.

## Reasons for Approval

Rainbow Records has clearly expressed its challenges related to the inability to comfortably manage increased customer growth and difficulties with its outdated digital infrastructure. However, we are confident that, by following our plan outlined in this proposal, we will be able to eliminate these issues and allow Rainbow Records to take full advantage of their current growth opportunity.

# Introduction

This proposal presents our plan to design, develop, and launch a new responsive website to improve the user interface and to meet Rainbow Records' needs for an integrated database system. This will allow for the automation of order processing and shipping label generation, along with communication between the website and database that will help support increasing business growth.

## Issues Concerning the Current System

### Outdated User Interface

The website was originally designed to be accessed from a desktop browser. This means that it lacks the ability to scale and adjust to the varying sizes of devices that customers may use to access the site (i.e. mobile devices) in the modern day. This contributes to reduced customer experience and satisfaction when using the website. The lack of an appealing user interface further reduces the amount of traffic that the company receives. This limits Rainbow Record’s ability to expand its market presence by reducing customer reach.

### Inadequate Site Navigation and Functionality

The current website is cluttered and difficult to navigate. The lack of organization causes the website to appear unorganized, which increases the risk of customers clicking off the site and not returning. The search function also does not work properly, which makes it difficult and frustrating for users to find the products they want.

### Absence of Database Integration and Purchasing Automation

Currently, the sales portal and warehouse database do not interact, placing unnecessary challenges on what should be simple operations. The majority of tasks required for the processing and distribution of orders are handled manually by dedicated staff. This places a large burden on Rainbow Records to manually sort emails, generate shipping labels, and communicate with its warehouses for shipping arrangements. The lack of an interconnected database system and slow order processing harms the company's ability for growth and international expansion.

## Proposed Solutions for the Present Issues

### Redesigning a Responsive Website

Turing Technical is confident in our ability to correct all major issues concerning the current state of the website and related database. We plan to redesign and create a responsive website to increase accessibility and improve user navigation.

Responsive Web Design (RWD) is a web development approach that creates dynamic changes to the appearance of a website, depending on the screen size and orientation of the device being used to view it [1].

During our design process, we plan to use RWD to add support for all devices and improve user displays. We will also create an intuitive and easy navigable layout that will help attract new customers. Redesigning the website will allow us to use the latest technology and discard the outdated and nonfunctional features present in the current version.

### Connecting the Website and Database

We plan to connect the website and the existing Structured Query Language (SQL) database to allow for the automation of order processing and shipping label generation. This means that requests for products coming in from the website will be sent directly to the warehouse, rather than emailed to the staff. Doing so will remove the manual process currently in place and introduce an automated website-to-warehouse communication system.

Automating order processes will remove the strain and costs associated with the manual processing system that Rainbow Records currently uses. This will reduce the company’s labor cost and increase its ability to handle large-scale expansion while increasing processing time.

## The Benefits Associated with our Proposal

### Increased Website Functionality and Customer Potential

There are many benefits to the solutions we propose in this document such as added support for all devices, which will greatly improve the user experience on the website and help increase customer reach. As well as this, a website with an intuitive interface is more likely to draw in new customers and lead to an increase in sales profit. A complete redesign of the website will renew the life expectancy of the system, and allow us to discard the outdated features present in the current version.

### Automatic Order Processing and Reduction of Labor Costs

By integrating the existing SQL database to the website, Rainbow Records will be able to greatly reduce the unnecessary labor requirements currently associated with the operations of the website purchasing system. With a connection between the warehouse and website established directly, significant time and resources can be redirected into other areas of the company. This database alteration will help to decrease human error, reduce the time needed to process orders, and increase the company’s ability to handle its expanding user base.

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# Project Details

In this section, we will further detail the methods, equipment, labor, facilities, and materials required to complete the proposed project. Furthermore, we will outline the research that supports our selection and the details concerning how we plan to use these resources.

## Details Concern the Redesign of the Website

### Development Strategy for the Website

The goal of redesigning the website will be to create a simple, aesthetically pleasing, intuitive, and responsive user experience. We will develop this from a Mobile First perspective to ensure that the updated system is compatible with portable user devices.

Mobile First is a term first popularized by Luke Wrobewski in 2009, and refers to the process of developing websites from the perspective of a mobile device user before the completion of a PC interface[2]. The benefits of Mobile First are an increased user device market reach, a focus on simplicity, and access to unique mobile device capabilities[3]. Since 2009, Mobile First has gone from a new and uncommon development strategy to essentially mandatory with the rise in smartphone ownership globally.

### Selection of Tools

In order to perform a Mobile First strategy, we will use a responsive website design to conform to different use screens. Most of our responsive design elements will be created using Bootstrap and customized with Cascading Style Sheets (CSS). The language we will use to write the logical functionality of the website is JavaScript.

The software we will use is HyperText Markup Language (HTML) and React for the construction of front-end web page components, CSS and Bootstrap for graphical interface styling, and Node.js in combination with Express for back-end processing.

#### HTML, CSS, and JavaScript

HTML, CSS, and JavaScript form the backbone of all web pages. HTML is the standard language used to design and structure web content [4]. CSS is a language used along with HTML to describe how the page will appear and be presented [5]. JavaScript is a programming language that is most commonly used for web development to add functionality to web pages [6].

#### React

React is a free, open-source collection of JavaScript resources developed by Meta and community contributors that is used for building user interfaces [7]. Notable examples of websites built with React are Facebook, Netflix, and Salesforce. Its popularity is in part due to its reusability and performance.

Web pages and applications are built upon many smaller components, and React allows developers to write the logic once and reuse it whenever. This means that projects built with React are more cost-effective and are easier to maintain.

Websites built with React also load and refresh faster because of how it inherently handles updates to a page. A user interface that is quick to respond reliably is an important aspect for building trust with users and enhancing the user experience.

#### Bootstrap

Bootstrap is a free, open-source collection of CSS resources developed by Twitter and community contributors that is popularly used for creating responsive mobile-first websites [8]. It provides many customizable templates for web page components such as buttons, forms, and navigation tools. This means that we can create functional webpages quicker and with less work, saving project development time and costs.

#### NodeJS

NodeJS is a free, open-source JavaScript development platform designed to build scalable applications [9]. Notable examples of companies that use NodeJS in production are Uber, Walmart, and eBay.

It is popular among web developers in part due to its fast loading time and high performance, all inherent in its design. It is also designed to be cross-platform compatible, meaning that the same code will run on any platform from Windows, Linux, and to OS X [10]. This means that less time is required to write code in different languages to ensure support across multiple platforms.

#### Express

In programming, a framework is composed of “ready-made components or solutions that are customized in order to speed up development” [11].

Express is a free, open-source application framework based on Node.js and is used to build web applications [12]. It is used to simplify Node.js and add additional features, allowing for reduced coding time.

#### Amazon Web Services

Since the database is hosted on Amazon Web Services (AWS), we will also be hosting the new website on AWS. This will make it easier to manage and control both systems as they will be under the same service.

### Process for Designing the Website

Twelve of our in-house designers and website developers will be tasked with completing the tasks required for this project over two months. Since the data required is already gathered and stored and a majority of the required features are known, we are confident in our team's ability to complete the necessary steps in this time period.

The design of the website will take approximately two months and involve four basic stages:

1. First, we will hold meetings with Rainbow Records and interviews with users across 3 days. During this time, we will gather the system requirements from Rainbow Records and its user base. Once all the details are confirmed with Rainbow Records in the third meeting, we will begin the design phase.
2. During the initial design phase, we will draft three interface mock-ups. Once completed, we will submit the designs to Rainbow Records for review and allow them to select the most suitable one. This will require 2 weeks.
3. During the second stage of the design phase, we will code the basic layout and design of the website without programmed functionality. These documents will then be submitted to Rainbow Records for review. Final requests and changes will be accepted and fulfilled up until the end of this stage. This will require 4 weeks.
4. Once the interface is finalized and approved, no further changes will be accepted and we will move on to the programming stage.

Once the new website is created, we will host, test, and finally replace the previous website:

1. First, we will host the new website on AWS.
2. Once hosted, we will connect it to the SQL database.
3. After the website is operational, we will perform tests to ensure that all the requirements are met, such as device compatibility, online purchasing abilities, and product search functions. We will also test for security flaws such as SQL injections, load tolerance, and ensuring the system firewall is functioning.
4. Once testing is complete and the website is deemed to be operational, we will replace the old website with the new one and provide customer access to it.
5. After the new website is launched, we will maintain the hosting of the old website for a period of one week while we continue monitoring the new system for potential issues. This will allow us to switch back to the old system if the new one fails for any reason.

After the website has been made operational, additional maintenance will be billed separately and will need to be negotiated at a later time.

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## Plans to Establish the Interconnected Database

As part of this project, we will need to complete the integration of the current warehouse database with the new website. The goal of this is to automate the processing of website purchases and remove the manual labor currently needed to handle logistics.

### Required Personal for the Project

For this portion of the project, we will require a team of three of our database experts to assist in the integration process over the span of one month. We will also require the assistance of Alex, Rainbow Records’ warehouse database manager, who has experience with the system.

### Role of our Database Team

We will be assigning one database management expert to assess and reorganize the database structure. This will ensure that the system can properly manage and scale to meet the new purchasing requirements. Alex’s input will be critical during this stage, as he is familiar with the current system.

Once the database is set up according to the requirements, we will assign one programmer to create the necessary Node.js logic to link it to the new website. In parallel, we will assign a hardware expert to create the necessary systems for order processing automation.

For the automation of the ordering process, we plan to create a system that will trigger whenever a customer places an order:

1. First, the database will confirm the order by ensuring the product is available, and then remove the item(s) from inventory.
2. The database will generate and record order information, such as customer name, address, time of order, contents of the order, and amount spent.
3. A shipping label will then be generated and printed at the warehouse, informing the warehouse operator that an order is to be fulfilled.

From here the operator will be able to handle the order manually. While further automation is possible, that is beyond the scope of this project.

### Tools Required to Connect the Database

We will require the use of NodeJS server-side programs for connecting the database to the website, and hardware for printing shipment requests. Hardware requirements will be determined after the current system has been assessed. The database itself will continue to be hosted on Amazon Web Services (AWS) and will use Structured Query Language (SQL) queries for content interaction.

### Phases Needed for the Database

We expect to begin this portion of the project approximately halfway through the development of the website, so that the completion of the website and its connection to the database can happen simultaneously.

The first stage of development will take approximately one week. During this time, we will assign our database management expert to work on-site with the assistance of Alex. This stage will include:

* Assessment of the current database and warehouse infrastructure.
* Update of the database structure to enhance management of website traffic and shipment details.

Once the database refactoring is complete, we will assign an additional programmer and hardware expert to create the necessary code and hardware to interact with the website and the warehouse systems. We will also keep our database management expert on-call as necessary at this stage. This phase will require three weeks:

1. The necessary server-side programming will be written in NodeJS, so that the database can send and receive data from the website.
2. The hardware needed for automatically printing labels and notifying the warehouse will be installed.
3. We will then connect the database to the website once the development of the website has been completed and the implementation stage begins.
4. Finally, we will test the connectivity between the website and database, and ensure that the two are operating as expected.

The database should already be connected to the warehouse systems, however, if any further integration is required it will be managed at this stage.

Please note that while we plan to complete the stages necessary for the installation and integration of the necessary database features, maintenance is not included in this proposal and will need to be renegotiated at a later time.

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# Schedule

The schedule is composed of two separate but concurrent timelines:

* Timeline one (task IDs 1-7) consists of work to be completed by the Web team, who are responsible for redesigning and creating the new website.
* Timeline two (task IDs 9 to 14) consists of tasks to be completed by the Database team, who are responsible for connecting the website to the database.

*(Note that task ID 8 is left blank to differentiate the two team schedules.)*

## Website Team Schedule

The Website team will complete the following phases:

1. (3 days) Working with Rainbow Records directly to gather requirements and gain a strong understanding of the company’s expectations for the completed system.
2. (2 weeks, 2 days) Three design drafts will be created and submitted to Rainbow Records for review, at which point the most suitable design will be selected and any additional input will be received.
3. (4 weeks) The final website design will be created and completed, before the addition of functional programming in the following stages.
4. (3 weeks) The programming for the website will be completed. This stage will focus on front-end functionality, but will include the setting up of back-end NodeJS scripts, which will be tested and improved upon at a later stage.
5. (2 days) Once the website is complete, we will publish it to AWS. Note that while the new website will be published, it will not yet be made public at this time.
6. (3 days) After the website is made privately available, we will connect it to the SQL database system. Since all of the programming was mostly completed in an earlier stage, we do not expect this to take a significant amount of time.
7. (2 weeks) Finally, we will test the system and then make it publicly accessible. During this two-week period, we will also keep the old website available in case the new system fails in any way.

## Database Team Schedule

The database team will be creating the systems needed to successfully connect the new website to the currently available warehouse database at rainbow records. This team will be responsible for completing the following tasks:

1. (1 week) During the first stage, our Database Expert will be working on-site to assess the current state of the database with the help of the warehouse technician.
2. (4 weeks) During this stage, our representative will be working with the database itself to update the system for the necessary website requirements. After the first week, we do not expect them to be dedicated to this project full time. However, they will be available on call during the programming stages to assist with the project as needed.
3. (3 weeks) Once the database is prepared for the increased requirements, we will create the necessary programming for the website to interact with it.
4. (2 weeks) At this stage, the hardware needed to communicate with the database will be added to the warehouse as needed. This will enable the system to print shipping labels directly to the warehouse automatically.
5. (1 week) During this phase, our two teams will collaborate to complete the necessary connections between the website and database systems.
6. (2 weeks) Once the website is successfully connected, we will continue to monitor the operations of the database to verify that it is behaving as expected.

While we are confident in the abilities of our team to complete the project according to the outlined schedule, unforeseen issues may occur, which will need to be addressed accordingly. Additional compensation and renegotiations may be necessary in these events.

# Conclusion

To conclude, the website redesign and SQL database connection proposed by Turing Technical will help Rainbow Records reach a wider device audience, and allow for the automation of its currently labor-intensive shipping procedures. This project will ensure a reliable fix for Rainbow Records’ current technical issues related to website design and database connectivity.

We will dedicate a team of fifteen personnel to this project, divided into two groups. One group will be responsible for the creation of the website while the other will integrate the database. We expect it to be completed over the span of 3 months.

For this project, we will be using the latest software tools and resources available, including but not limited to: HTML, CSS, JavaScript, React, Bootstrap, NodeJS, Express, and AWS. We will be using them in combination with development strategies such as RWD and Mobile-First to create a website that is reliable and accessible to as many users as possible. By doing so, we hope to help maintain and increase the customer base for Rainbow Records.

Through the use of NodeJS, hardware improvements, AWS, and SQL, we plan to connect the database directly to the website and allow for purchasing automation.

Should this proposal be accepted within 2 weeks, Turing Technical will begin work immediately. Please contact us at any time for any further questions or concerns.

## Recommendations

We recommend Rainbow Records thoroughly review the proposal, and begin outlining their desired requirements, expected outcomes, and behaviors for the new systems. This will allow for rapid progress during the initial meetings Turing Technical and Rainbow Records will hold to discuss the project details.

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