



# Initial Report

CM3203 - One Semester Individual Project  
40 Credits

## Content Management System for a Real-Time e-Commerce Marketplace

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## Project Description

The purpose of this project is to create an e-commerce content management system to enable real-time trading of items on the second-hand market. This system would allow items to be traded among consumers in a live bidding marketplace similar to the stock market. Sellers can post an asking price for their item, and a buyer can either buy at the asking price or place a counter-bid.

Currently, buying and selling items on the second hand market requires users to search through potentially hundreds of listings for a product, all with different prices and descriptions for the same product, whereas this system would simplify the process, as there would be a single listing for an item, containing everything you need to make an informed purchase. Marketplaces similar in style to this exist in areas such as currency trading and stock markets, as well as a marketplace called StockX, where users can buy and sell luxury clothing, handbags and timepieces in a live marketplace. Researching these implementations can aid me in creating the system, such as looking at the technologies that are used and the compromises they have made.

The advantages that a system like this has over traditional e-commerce options such as eBay and Amazon are two-fold: the system can simplify the buying process and make the buyer more informed - reducing the risk of being charged an unfair price. This system could use the data generated from sellers' asking prices, buyers' bids and completed sales to generate valuable information about the marketplace for specific items, providing real-time data-driven pricing for items. This information is valuable to buyers and sellers, as it can be difficult to judge the value of an item from traditional consumer-to-consumer marketplaces - where a user looking to purchase an item can encounter hundreds of listings of the same item at varying price-points. Allowing buyers and sellers to be better informed will make the market more fair and make buying and selling items much easier.

Designing and developing a system like this will allow me to gain knowledge and experience with software design and engineering, web technologies that enable real-time applications, database architecture, security and more. In order to provide real-time pricing information, the system will require real-time communication of with buyers and sellers. This can be done with current web-technologies such as Socket.io or real-time databases (also known as data stream networks) such as PubNub and Firebase. Experience with these technologies is valuable, as many areas of technology are implementing real-time functionality, such as IoT, healthcare technologies and more.

# Project Aims and Objectives

## Core Aims & Objectives

- Explore the features of web applications - particularly content management systems and real-time applications.
- Gain experience with underlying networked application technologies, such as frameworks and databases.
- Produce a live-marketplace style system where sellers can post an asking price for an item and buyers can either purchase or place a bid for the item.
  - Bids, asks and completed sales update the system in real-time, and the information is displayed to users in real-time, with no need for a page refresh.
- Create a secure and robust back-end to support a scalable web application
  - Implement a secure and scalable database
  - Implement a system that facilitates real-time bids, asks and orders.
  - Create an API to interact with the long-term and real-time databases
- Design a front-end visual interface that follows good HCI and UX principles.
- Implement features that allow users to analyse the market for items using statistics and historical data.
  - Design and implement useful visualisations for the data.
  - Have the visualisations update as new data comes in real-time
- Create a homepage that explains how to use the system and how it works, and highlights products based on specified criteria.
- Evaluate the system with potential users and gather feedback on their experience.

## Desirable Aims & Objectives

- Build the system in a way that another front-end such as an iOS/Android app could be made with little or no changes to the back-end.
- Implement tools to export data from the system and convert to a useful format to be used for further analysis.
- Add user profiles to the system, that include information such as the following:
  - Reviews and feedback for buyers and sellers.
  - User portfolios: what users own and have up for sale.
  - User want-list: displaying what open bids users have placed.

# Work Plan

## ~~Week 0 (November 2017)~~

- Initial meeting with supervisor. Discuss areas and previous implementations to research over the Christmas break.

## ~~Week 1 - Starting 29th January~~

- Meet with supervisor and carry out some background research on requirements.

## Week 2 - Starting 5th February

- Complete and submit initial plan document
- Research and discuss with supervisor:
  - Existing similar projects (pros, cons, compromises made)
  - Enabling technologies (Frameworks, libraries, etc.).
  - Social, legal and ethical issues affecting the project.
  - Ensuring the system is secure.
  - How to evaluate the success of the project.

## Week 3 - Starting 12th February

- Requirements gathering, define a list of functional and non-functional requirements
- Identify and assess potential risks to the project. Create mitigation strategies.
- Research UX design and human computer interaction (HCI) principles to apply to the UI design.

*Milestone: Complete requirements gathering and risk assessment.*

## Week 4 - Starting 19th February

- Design front end of the system, initially on paper.
- Create mockups of the front-end designs.
- Research libraries, frameworks and software I can use to aid development.
- Meet with supervisor to get feedback on the designs.

## Week 5 - Starting 26th February

- Design the application structure and database(s)
- Begin implementation of backend, creating a database and API to interact with it.
- Produce sample data to populate the database.

*Milestone: Complete UI and architecture design.*

## Week 6 - Starting 5th March

- Continue development of backend.

*Milestone: Have a working API that enables CRUD functionality for user accounts in the database.*

*Milestone: Have a working API that enables CRUD functionality for marketplace items in the database.*

#### **Week 7 - Starting 12th March**

- Begin implementing the front-end of the system to interact with the database API.
- Continue development.

*Milestone: Have a front-end that uses the back-end to facilitate account creation and adding items to the marketplace.*

#### **Week 8 - Starting 19th March**

- Continue development

*Milestone: Have functionality for users to place bids and asks on items, and to add an item to their cart.*

#### **Easter Break - Starting 26th March**

- Continue development
- Begin writing a first draft of the final report.

*Milestone: Begin writing the report.*

*Milestone: Have bids, asks and completed sales update the product page in real-time with no need for a page-refresh.*

#### **Week 9 - Starting 16th April**

- Continue development
- Begin testing the system

*Milestone: Complete development.*

#### **Week 10 - Starting 23rd April**

- Begin testing
- Development, fixing bugs uncovered by testing
- Report writing

#### **Week 11 - Starting 30th April**

- Testing
- Report writing

*Milestone: Complete testing*

**Week 12 - Starting 7th May**

- Finalise and submit report for 11th May 2018

*Milestone: Submit the final report.*

## Appendix

“The Sharing Economy” CM3202, Lecture by Omer Rana, School of Computer Science and Informatics Cardiff University

Richardson, L. and Ruby, S. (2007). *RESTful web services*. Beijing: O'Reilly.

<https://www.pubnub.com/blog/2014-11-10-what-is-realtime-technology-and-what-is-a-realtime-app/>

<http://uk.businessinsider.com/dan-gilbert-cofounded-stockx-a-stock-market-for-sneakers-2016-6?r=US&IR=T>

<https://dba.stackexchange.com/questions/81349/what-are-the-advantages-and-disadvantages-of-firebase-for-a-database>

MongoDB: The Definitive Guide, Second Edition by Kristina Chodorow (O'Reilly). Copyright 2013 Kristina Chodorow, 978-1-449-34468-9.