

# Post Prototype, Refinement Of Design

## Customer Relationship Management System (CRM)

**Kieran Williams**

### How I Obtained Feedback On My Prototype And Used It To Refine My System

To get feedback for my web based Customer Relationship Management System, I sent links to some potential end users (told them what on the site was functional and what was not), then let them use it to see how they found it without any instruction on how to use it. I did this so that I could get good feedback on if my system was actually intuitive and easy to use / navigate through. After they had used the system on their own I video called the potential users and explained to them how to use it by going through all the functionality outlined in the prototype document. I then conducted an interview with a number of potential end users after walking them through the system to get some feedback on specific things that they liked and didn't like, it also gave me the chance to ask for suggestions on improvements. After I had obtained multiple pieces of feedback, I constructed a questionnaire and sent it out so that I could see what feedback was general amongst all potential users. After getting the potential user's feedback, I also wanted to get some more technical feedback and did so from students studying computer science at university, my peers in my class, and from lecturers. From all that feedback I was then able to refine the UI and objectives, to better match what the users want.

Kieran Marcus Williams

## Feedback From Potential Users

Ref	Feedback	Accept or Reject	Justification
1	"The website domain name would be hard to remember, is there any way you could change it to something more simple, without the heroku part in it"	Reject	It would cost money to buy a domain name and so I will not be doing that for a coursework project
2	"can you ensure to make the site is secure from hackers"	Accept	Although I have a basic understanding of sql injection, cross site scripting, insecure storage, cookie stealing, etc... I will not be able to make it as secure as it possibly can be but I will ensure to make a conscious effort as confidential client information could get stored on the site
3	"Is there any chance the website could also have an open source version of it without the log in functionality so that people could make different versions of the site with various different functionality so that your CRM is a basic barebones version of what other developers could extend from to make CRM's for more niche fields with specific handy tools"	Accept	As this system was never intended to generate any money, it would make sense to put the system up so that users could set up their own version of the system, it would also make the overall system more secure as it wouldn't be one central site, rather a site being hosted on various servers and managed by different people, with no link to each other. (if one site got compromised others wouldn't be affected at all)
4	"would you be able to make a mobile optimised version of the site so that I could also access it from my mobile"	Reject	This would require a lot of time to get the site to render nicely on a mobile resolution. It would take a while because I would have to redefine the styles sheet of every webpage on the site when the site is loaded on a mobile resolution.
5	"The menu on the contacts viewing page seems overly cluttered with functionality I would never use. The things I would use include: the search, sort, and adding of contacts. The export contacts and import contacts are no use to me"	Accept	If the menu is too cluttered and has redundant functionality, it makes sense to remove the redundant features.
6	"I like how the system is laid out, everything is intuitive to use. However, could you make the add contact button bigger so that it is easier to find as it took me some time to realise it was there."	Accept	Adding a contact is part of the systems core functionality and so the user should be able to easily find a button that allows them to do that.

Ref	Feedback	Accept or Reject	Justification
7	"I like the idea of being able export my contacts but I don't see the need to be able to import contacts as I only have a small number of contacts anyways so I could just add the contacts again myself if I ever lost them for whatever reason. The main thing I need is that I am able to back up the contacts by downloading them"	Accept	If it is functionality that the user does not need then there is no point in adding it in
8	"would it be possible to upload images to the website or any other file types"	Reject	It would be insecure to all uploading of any file types as someone could install a shell script on the server allowing them full access with a reverse shell into the site where they could preform anything they want on the site as root
9	"I think that the graphs do a good job of showing how the business is doing however the graphs are quite small, would it be possible to get rid of the number of clients graph as it isn't really needed when you have the other two graphs"	Accept	By removing a graph it will be less functionality to implement and the time can then be spent on implementing features that the users actually want and need
10	"can the time scale option on the analytics page allow me to view clients over the past few days, over the pas few weeks and over the course of the months in the past year"	Accept	Was unsure if there was a specific time scale that the users would want to see presented or a range of time scales. Still unsure on the exact number of days and months but that can be found out in the questionnaire
11	"can the conversion rate be presented as a both the ratio and percentage like it is in the prototype as it could get confusing when the ratio gets into high numbers. A conversion rate is typically represented as a ratio so it should be kept also."	Accept	I was unsure on if I should show the conversion rate as a ratio and a percentage and now know what the users would find most beneficial and it should be relatively easy to implement.
12	"on the individual contact's page, the contacts status is always lower case and with recontact lead for example, it'd show it separated with a dash rather than a space, is that something you could fix"	Accept	As it was only a prototype I was just outputting the name of the option the server received back from the form and as a result it had a '-' between the words. Will need to be fixed as it doesn't make for a very polished website

### Technical Feedback From Peers And Lecturers

Ref	Feedback	Accept or Reject	Justification
13	"the ratio for the conversion rate should be made to be in it's lowest form"	Accept	This will be good for making the ratio easier to look at when the numbers start getting large in the leads lost or the clients gained
14	"Your encrypted notes section looks cool, although I don't see why it needs functionality of displaying notes as both encrypted and normal in the same text field, It all seems too confusing. It also seems pointless as you have a normal notes section which is separate. Maybe make the the extra notes section just for encrypted notes?"	Accept	I don't want to confuse the user by adding too much functionality and options so if the users agree, it will be logical to make the extra notes section an encrypted notes section only.
15	"When storing data in the database you should compress it so that doesn't take up much storage"	Reject	It will slow down the speed of which data could be accessed and stored if everything would get compressed. The users are likely not going to want to have to wait a few seconds every time they go on a page to view a contact as it would take time for all contacts or other outputted data to get decompressed.
16	"you should add google analytics to the site and a facebook pixel so that you can gain a greater understanding on how users are using your site"	Reject	Although that data would be interesting to look at. As I do not intend to profit on the site at all, that data does not seem to be important to start collecting at this stage. Although in future versions it could be a consideration.
17	"it would be good if the details the user typed in about the contacts such as names got capitalised upon being submitted"	Accept	This is a good idea as many people will often forget to capitalise names and this make all the names and business names look more consistent.

Ref	Feedback	Accept or Reject	Justification
18	"Messages that give an update to the user on an action that they have performed would be useful. For example, if the user has added a contact, it should let the user know that it was successful or unsuccessful"	Accept	I like that idea as it is a good way of keeping an engagement with the user. By having messages to the user, about how the system is handling/ handled their request, they will feel more immersed into the whole experience
19	You could just store files in csv files to prevent SQL injection attacks?	Accept	If the system takes the open source approach, storing files locally could be an option

### Implications Of The Accepted Feedback On The System

Ref	How Will The Changes Improve The System
2	confidential client information could get stored on the site and if there are vulnerabilities in the system all that confidential information could be accessed. Through access to the site a hacker could also modify the code so that the user would download a backdoor onto their computer along with the csv file which then result in users of my site getting affected. This clearly needs to be addressed and preventions from things like need to be in place.
3	it would make the overall system more secure as it wouldn't be one central site, rather a site being hosted on various servers and managed by different people, with no link to each other. (if one site got compromised others wouldn't be affected at all). This would also mean that I would not have to implement a log in and manage multiple users all with their own data.
5	By removing features that the user is unlikely to use on the contacts menu it will be easier to use as the few limited features would be easy to access.
6	By drawing attention to the add contact button the user would be able to navigate through the system with greater ease.
7	By removing the import contacts functionality, the menu on the contacts list page would be less cluttered. This would mean that it will be easier to use as there won't be too many features that the user might not understand how to use.
9	By having 2 larger graphs rather than 3 small graphs, the user will be able to analyse the data with greater ease as they will have less to make sense of.
10	By having a time scale change option the user will be able to analyse the data over differing periods of time. This will mean that they can see how they have been performing over the past few days and then also how they have been performing over the past few months
11	By having both the ratio and percentage, if the ratio numbers started getting large, then the percentage value would become useful. But a conversion rate is typically represented as a ratio so it should be kept also.
12	The site will look more polished if there aren't little quirks in it such as dash's between words where there shouldn't be.

Ref	How Will The Changes Improve The System
12	The ratio will be easier to make sense of if it is in its lowest form (25:40) is more convoluted compared to (5:8)
13	Will make using the Extra notes section easier to use and therefore the user is more likely to want to use it.
17	It will increase the engagement with the user. By having messages to the user, about how the system is handling/ handled their request, they will feel more informed and enjoy using the system more
18	By having files stored locally in csv files, the website is less vulnerable to sql injection attacks

### Questionnaire To Confirm What Changes Should Be Made

This questionnaire will be used to ensure the suggestion from one of the users is in general agreement amongst all the potential users.

**Do you want the site to be based around users and accounts or would you rather the system be open source for users to host the system on their own server (this is more likely to secure from hackers)**

*Yes No*

**Do you think you would make use of the import contacts from a csv file feature at the expense of a more cluttered menu on the contacts list page**

*Yes No*

**Do you think you would make use of the export contacts to a csv file (download) feature at the expense of a more cluttered menu on the contacts list page**

*Yes No*

**Please select the graphs that you would like to see on the analytics page (the less number of graphs, the larger the graphs will be)**

*Clients Gained Clients Lost Leads Lost Number Of Clients*

**in the time scale option daily on the analytics page, how many days worth of data points would be appropriate for the graphs data points**

*3 days 5 days 7 days 14 days 21 days*

**in the time scale option weekly on the analytics page, how many weeks worth of data points would be appropriate for the graphs data points**

*1 week 2 weeks 6 weeks 12 weeks 24 weeks*

**in the time scale option monthly on the analytics page, how many months worth of data points would be appropriate for the graphs data points**

*2 months 4 months 6 months 12 months 24 months*

**how should the conversion rate be presented on the analytics page**

*ratio percentage both*

**should the extra notes section on the individual contacts page be:**

*encrypted only normal text only able to store text as encrypted and normal*

## Results From The Questionnaire

The results from the questionnaire were obtained by choosing the most popular option selected for each of the questions:

They want the site to be open source and for the users to be able to host the site themselves.

Users would not make use of the import contacts functionality.

Users would make use of the export contacts functionality.

The most popular combination of graphs were the clients gained and clients lost graphs

The most popular time scales were 14 days for daily, 12 weeks and 12 months

The users wanted the conversion rate to be displayed as both a percentage and a ratio

Users wanted the extra note section to be encrypted only



## **Refinements Of The System**

Make the add contacts button bigger.

Ensure to sanitise any text fields/ text areas and post requests to prevent cross site scripting attacks.  
(add to the success criteria of how the system security will be tested: try to gain access into the site via cross site scripting, sql injection)

Create objective to make the conversion rate ratio into its lowest form at all times.

Text inputs when creating a contact should get capitalised where appropriate (names, business names, addresses)

Remove all objectives regarding user accounts with objective to make the web app easy for a user to set up on their own server.

Remove the import contacts feature from the system and any objectives relating to it.

Change the graphs to be presented to the user to only 'clients gained' and 'clients lost' graphs

Add objective to create 3 different time scale options on the graphs with time scales of 14 days for daily, 12 weeks and 12 months

Create objective to add functionality of both conversion rate as a ratio and as a percentage

Modify objective regarding the extra notes to be to create the extra notes with encrypted notes only rather than the dual functionality of normal notes along with the option of encrypting them.

## Refined Objectives

\*\*\*\* Yellow highlights indicate a change that has been made to the objectives and to the Success criteria to meet the new refined design of the system \*\*\*\*

**Objective 1:** The site must be accessible with a domain name typed into a web browser.

**Success Criteria:** Upon entering the site's domain name, the website's home page should appear.

**Objective 2:** There should be an easy way for the users to get the system set up

**Success Criteria:** There must be a public git hub repository set up for the system so that people can download the system. It should also include a step by step guide on how to set the system up on a server.

**Objective 3:** Conversion rate in ratio form should be in its lowest form

**Success Criteria:** will be successful if when typed into an online calculator that puts a fraction into its lowest form version, the top fraction value and bottom fraction value match the ratio values

**Objective 4:** Text field form inputs containing names of people, business names or address names should get capitalised before getting saved to the database

**Success Criteria:** both test values of capitalised and non capitalised values as input in the relevant text fields should get saved with the words capitalised and should be seen in all outputs of them values as being capitalised.

**Objective 5:** No passwords should be directly saved into the database

**Success Criteria:** successful if no passwords are directly stored anywhere on the site, only used in a calculation to verify access or decode data.

**Objective 6:** The ability to export the contacts in a CSV format.

**Success Criteria:** The exported file should contain all contacts that can be seen in the contacts list table and contain all of their details.

**Objective 7:** Accurate graphical representations of clients gained and lost over a period of time

**Success Criteria:** The data points should display the correct number of matches for that period of time when the cursor hovers over any data point and the graph should also look representative of the results. Will be successful if the number of matches displayed is equal to the number of matches for every possible time scale stored in the database.

**Objective 8:** There should be an accurate display of the current conversion rate for the month

**Success Criteria:** the conversion rate displayed will be at least 90% accurate. This will allow for any rounding or truncation on the percentage (calculation to test it:  $((\text{truncated value} / \text{full value}) \times 100)$ )

**Objective 9:** Have an easy to navigate through system

**Success Criteria:** at least 30% whitespace on each page, links only available upon clicking a different link should only go one layer deep.

**Objective 10:** A relational database that is in third normal form with tables: Users, Contacts, Scheduling's, Notes, Conversions, Clients Lost.

**Success Criteria:** the ability to add, edit and delete data in all the tables.

**Objective 11:** There must be a page that allows the user to input that a conversion has been made, a lead was lost or a client has been lost, which gets recorded into the database.

**Success Criteria:** all inputs must get put into a database provided there is an Internet connection and the client is connected to the web server at the time of the operation.

**Objective 12:** There must be good website security

**Success Criteria:** no encrypted notes can be made with a password that isn't at least 8 characters, with at least one uppercase letter, one lowercase letter, and one number. No cross site scripting attacks or sql injection attacks should be possible, will test by trying to execute xxs script into every text field that sends data to the server. Will test sql injection by trying to get data from the database by entering sql queries into the url bar on every page.

**Objective 13:** There must be a way of scheduling tasks/ appointments from the dashboard.

**Success Criteria:** providing there's an internet connection, all tasks and appointments will be added into a database

**Objective 14:** Things scheduled for the day should be made clear on the dashboard

**Success Criteria:** Anything scheduled for the day must be displayed.

**Objective 15:** A notes section will be on the contact's page where the notes will get saved into the database.

**Success Criteria:** All notes that are saved while there is an internet connection must get saved into the database

**Objective 16:** Notes relating to a contact should get displayed in chronological order

**Success Criteria:** All notes must be displayed to the user in the order of them being saved provided they are saved at least a minute apart.

**Objective 17:** There needs to be a text area on the contact page that can store data encrypted through the use of a password.

**Success Criteria:** The text in the text area must only be readable through decryption using the correct password. And the text stored in the database must be the encrypted text if the text gets encrypted with a password.

**Objective 18:** The encrypted notes should get saved into the database and when decrypted, the data should only be displayed to the user never saved into the database as unencrypted

**Success Criteria:** successful if the data is never stored in the database through every step of the encryption and decryption stage of the system

**Objective 20:** There should be adequate validation for any data input.

**Success Criteria:** At least 80% of invalid data input should be caught by the validation methods

**Objective 21:** There should be adequate verification.

**Success Criteria:** At least 60% of inputs that add, modify or delete data should include verification before the function is carried through.

**Objective 22:** The contacts in the contact view page must be sortable

**Success Criteria:** There must be at least 2 different ways the contacts can get sorted with accuracy down to a minute time stamp (if sorted by date and time) and 100% alphabetically correct.

**Objective 23:** There must be a way to sort the contacts in both ascending and descending order

**Success Criteria:** The contacts sorted in ascending order of any field must be in the complete reverse order when put in descending order.

**Objective 24:** The contacts in the contact view page must be searchable

**Success Criteria:** There must be at least 2 fields which get searched through. All contacts that contain the data in the search bar in either of the fields that get search through, will remain in the list. All contacts not meeting the specified criteria must be removed from the display list.

**Objective 25:** The project must be GDPR compliant.

**Success Criteria:** Users will need to be informed on any information that is collected on them with specification on how long their data will be stored. The use of SSL. All consent forms are to be set to unchecked. There must be an easy way for users to ask what data is being stored on them. Give the user the right “to be forgotten”, meaning they are able to have all data stored on them removed.

**Objective 26:** There must be a way of adding, modifying and deleting contacts

**Success Criteria:** The data on any contacts stored in the database must also get affected 100% correctly to the operations preformed in the system. This is provided that the database isn't full and there is a connection to the internet at the time of doing so.

**Objective 27:** There must be a way of viewing all contacts that are stored in a list on a page

**Success Criteria:** The page must not crash and must show all contacts that user has created and are stored in the database.

**Objective 28:** There must be a way of viewing all details of each individual contact on a page

**Success Criteria:** The page must show all up to date data that has been stored or modified on a contact (whatever the database has stored for the contact's details, the page should output).

**Objective 29:** There must be a way of only accessing the site if you are the authorised user of the site

**Success Criteria:** someone accessing the sites url must only be able to gain access to the site if they are authorised to have access to that site.

## Refinement Of The System's Design

### The Contacts List Page

The contacts import contacts button should be removed and the add contacts button made slightly bigger

Before:

Contacts

Search

Sort By

☐ Date

☐ City

☒ Business Name

Ascending

Name	Bussiness	City	Email	Telephone
John Doe	Fresh Doe Pizzas	Swansea	johndoe@gmail.com	01792 119283

After:

Contacts

Search

Sort By

☐ Date

☐ City

☒ Business Name

Ascending

Name	Bussiness	City	Email	Telephone
John Doe	Fresh Doe Pizzas	Swansea	johndoe@gmail.com	01792 119283

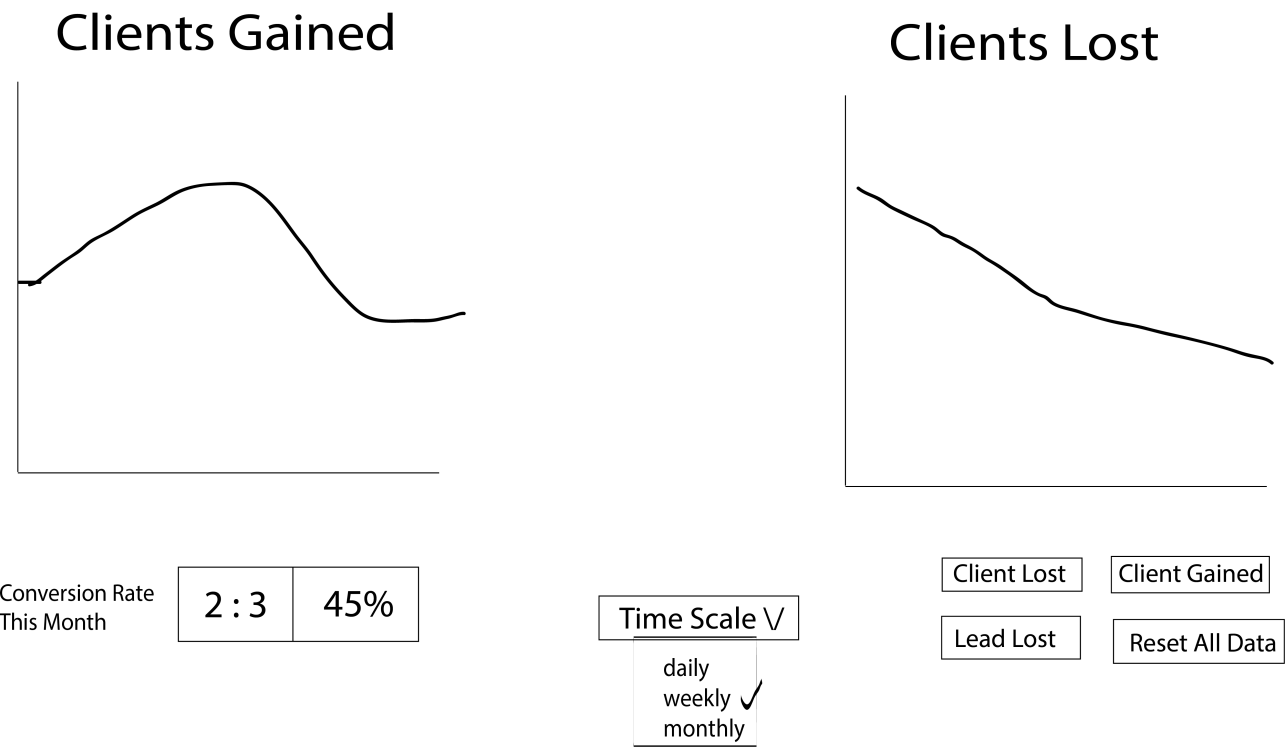
The Analytics Page

The number of clients graph should be removed, graphs need to be larger and the time scale options have been decided

Before:



After:





**Individual contact's page**

Needed to modify the extra notes so that when the user clicks save, it will make the user encrypt the notes with a password. Need to change the UI on the extra notes form so that encrypt notes button reads "Decrypt Notes"

Before:

\* Contact's Name \*

\* Contact's Business Name\*

\* Contact's Email \*

\* Contact's Phone Number \*

\* Contact's City \*

\* Contact's Postcode \*

\* Contact's Address \*

\* Contact's Lead Status \*

Add Note

Save

Edit Contact Delete Contact

Extra Notes

Save Encrypt Notes

Date	Notes
21/10/2018	* Note from the add note text box *
20/10/2018	* Note from the add note text box *

After:

**Extra Notes**

Save Decrypt Notes

I also need to make the form that will take the users password before encrypting the notes

## Encrypt Notes With Password

New Password

Confirm Password

See Password

☒

Password must be longer than 8 charecters, and must contain:  
upper and lowercase charecters, as well as a special charecter

Submit

## Conversion Rate In It's Lowest Form Pseudocode

```
// will be able to find the greatest common divisor shared between the clients gained number against leads lost number
```

```
greatestCommonDivisor( input: valueOne, input: valueTwo)
```

```
    integer: remainder = 0
```

```
    if ( valueTwo == 0 )
```

```
        return valueOne
```

```
    remainder = valueOne MOD valueTwo
```

```
    greatestCommonDivisor (valueTwo, remainder)
```

```
// returns the ratio as a string with both values inputed divided by their greatest common divisor, this will then put the ratio into it's
```

```
// lowest form
```

```
getConversionRateRatioInLowestForm (input: numOfClientsGained, input: numberOfLeadsLost)
```

```
    integer: gcd = greatestCommonDivisor(numberOfClientsGained, numberOfLeadsLost)
```

```
    return (numOfClientLost/gcd).toString() + ':' + (numOfLeadsLost/gcd).toString()
```

## Changes To The Entity Relationship Diagram

Client Lost Table	
PK	<b><u>Client Lost ID</u></b>
	Creation Time Stamp

Client Gained Table	
PK	<b><u>Client Gained ID</u></b>
	Creation Time Stamp

Lead Lost Table	
PK	<b><u>Lead Lost ID</u></b>
	Creation Time Stamp

Scheduled Table	
PK	<b><u>Scheduled ID</u></b>
	Creation Time Stamp
	Scheduled Date
	Scheduled Time
	Subject
	Message

