# Software Requirements Specifications

Preliminary Design

The Center for Socially Relevant Computing Website

*Team 47*

## Contents

# I. <u>Introduction</u>

## i. **Purpose**

The CSRC needs a website to promote it’s good works. It needs to be able to bring together students and teachers from various universities and help form a nation-wide community. It has to facilitate project design management and implementation among the community members and should enable them to solicit supporters and investors.

A dynamic website serving the cause and at the same time being simplistic and easily navigable needs to reflect what the CSRC is and needs to clearly outlines its mission and its goals. A set of pages, which contain the features and functionality as mentioned in the functional requirements would have to be designed and built.

This document is intended to outline the various requirements and is a complete description of the behavior of the system to be developed. It includes the Software Architectural Block Diagrams, which indicate the major software modules and how communication happens between these modules. It also shows the various data storage destinations.

Further we list down the various dependencies, assumptions and constraints of the system that will be developed. We also provide a change management form, which will be used in cases when the customer requests a requirement change.

## ii. **Definitions**

- **SRS** – Software Requirements Specification
- **Django** – High level web development framework, built with Python programming language. It provides an Admin Interface, CMS customizability and ORM functionality.
- **CMS** – Content Management System
- **ORM** – Object Relational Mapping – Data management using techniques which allow data convertibility and inherent CRUD (Create, Read, Update, Delete) functionality.
- **SRC** – Socially Relevant Computing
- **CSRC** – Center for Socially Relevant Computing
- **HTTP** – Hypertext Transfer Protocol
- **AJAX** – Asynchronous JavaScript and XML – Web development technologies used on the client side for creating asynchronous web applications.
- **mod_wsgi** – A web server module which provides an interface for hosting Python based web applications.
- **API** – Application Programming Interface

## iii. <u>**System Overview**</u>

The software system to be developed for the CSRC website helps manage software projects and brings together a community of like-minded people working towards a single goal.

The users of this system could be students working on various projects and/or those who are interesting in working on new projects and in taking new initiatives. It provides them various pages like “Get Involved”, “Projects”, “Publications”, “Gallery”, “Resources” which will create interest in the community and help spread the word through sharing options.

The admin interface provides administrators of the website with options of adding a new page, editing existing pages, deleting existing pages. It also provides the admin with the option of adding, modifying and deleting projects from the database.

The major modules in the system are the User Interface, the Web Backend, Databases and the external Payment Gateway, which will be integrated using third-party API.

## II. Overall Description

### i. Functional Requirements

As illustrated below in Fig 1, the major functional software modules are:

- User Interface
- Web Backend
- Databases
- Third Party Applications/Tools

#### User Interface

For any visitor to the CSRC website, the user interface is the collection of all pages which could be shown. These pages as mentioned in Figure 2 could be categorized into the following:

- Static Pages

  Pages like the About CSRC page, Press/Media/Publications pages, Gallery Page, Resources Page and the Thank You Page can be termed as Static Pages. These pages can be maintained using the CMS functionality provided by Django.
- Dynamic Pages

  Pages like the Get Involved page, Projects Page, Login Page and the Contact CSRC page would be developed and maintained using the Django views and controllers which provides options for integrating the HTML templates with Django forms and model objects.
- Special Pages

  These are specific pages like the 404 Page Not Found page, 500 Internal Server Error Page, 503 Service Unavailable page etc. All pages, which return specific HTTP Status Codes, would be categorized under this.

#### Admin Pages

The administrator of the website has special privileges. She/he can login to the admin interface using a LOGIN Page. Once logged in they will be taken to the admin page which will in turn provide them options to add/edit/delete any pages to the website. They will also be able to view, add, modify, delete projects from the database.

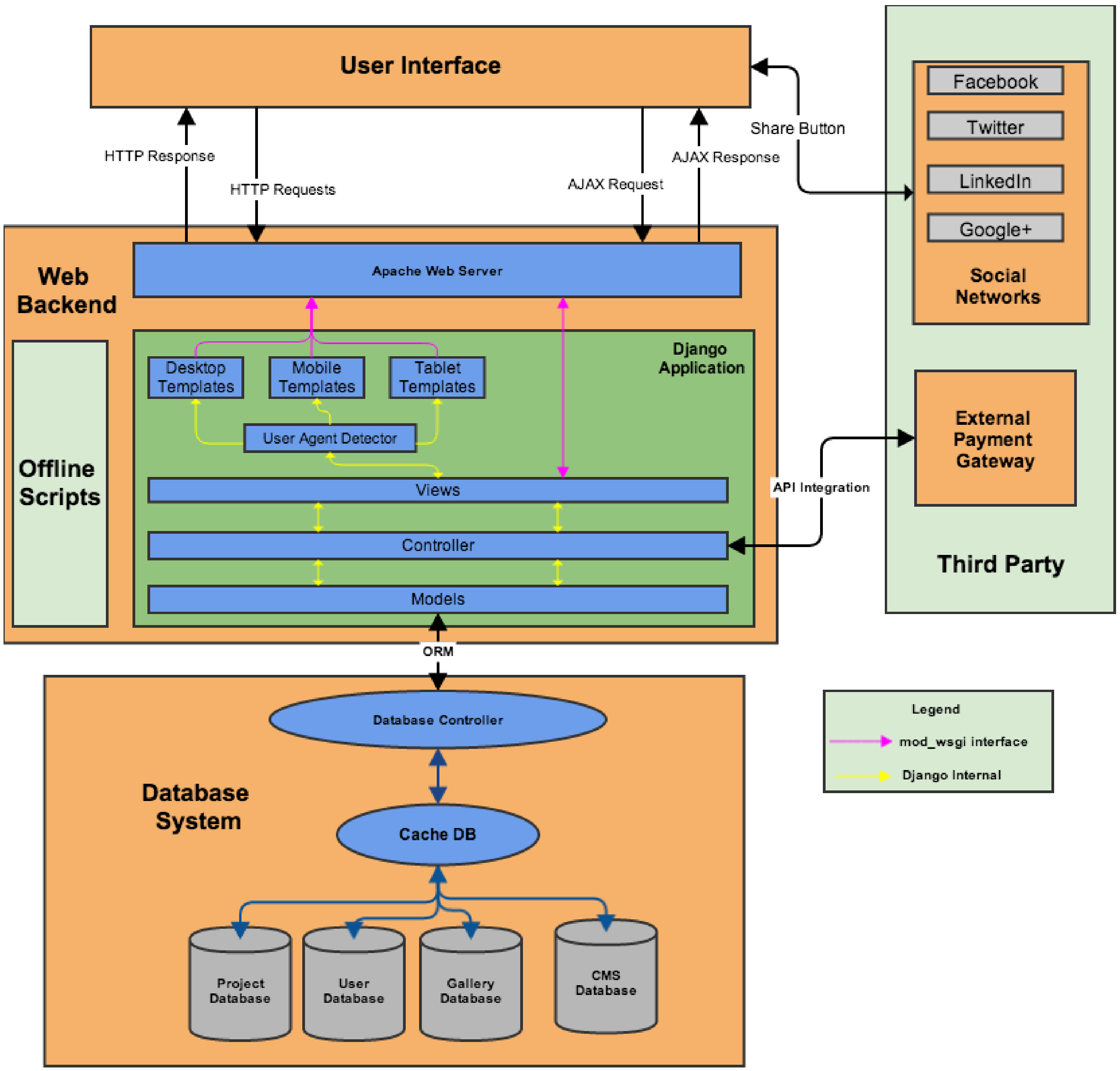


**Figure 1 – Top Level Diagram**

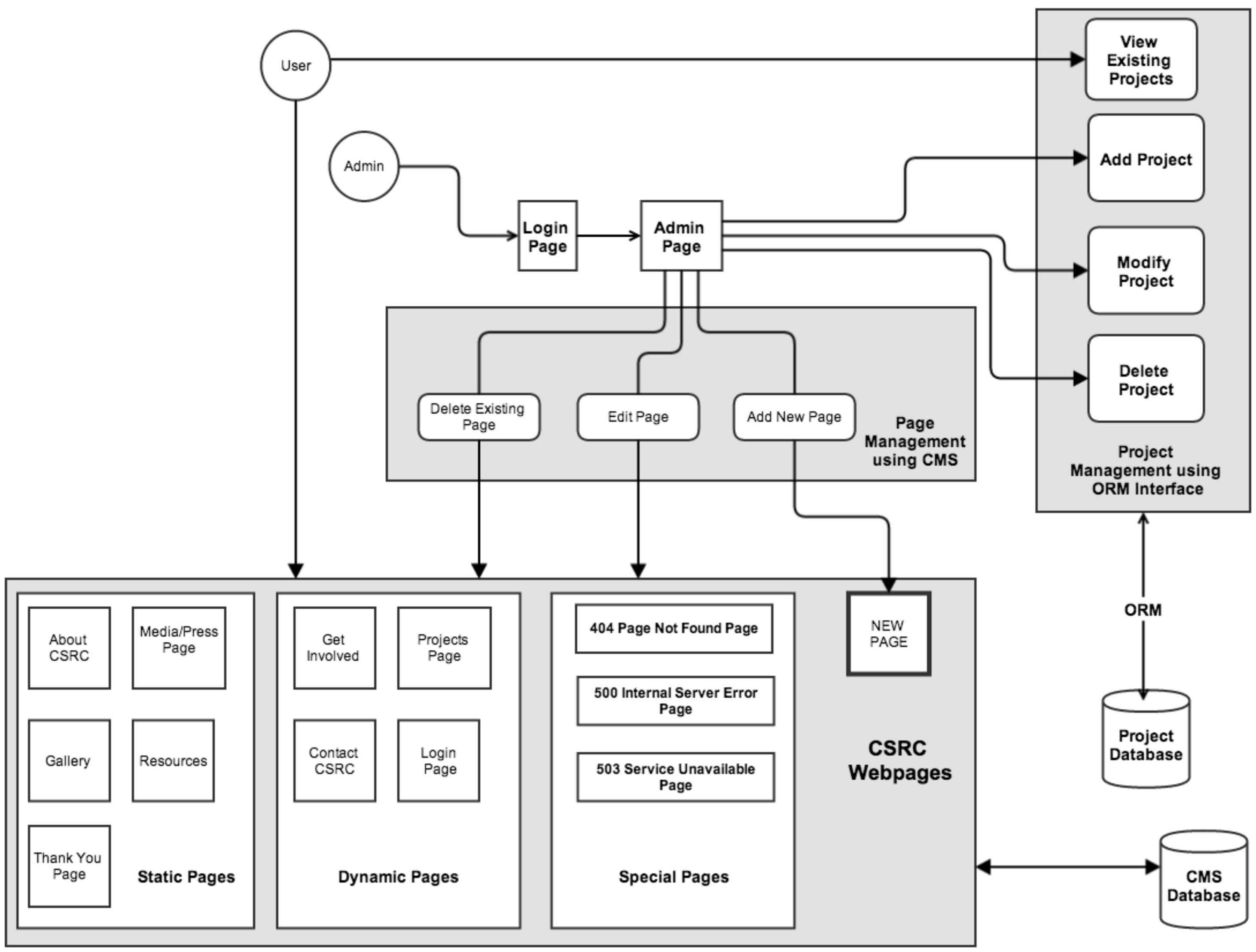


Figure 2 - User Interface Diagram

## Web Backend

This includes the various software that is present in the web server. These include the entire LAMP Stack, viz,

Linux,
Apache,
MySQL,
Python.

- The web application framework used is Django and a web application is created using that.
- It is integrated with the Apache HTTP Web server
- Integration between web server and Django application is done using mod_wsgi which is an HTTP Server module for integrating Python based applications.
- The Django application is further subdivided into Models, Views, Controller, and Templates.
    - **Models** – For integrating with the database (MySQL) using the Django ORM.
    - **Views** – These are the part of the code which decide which templates are to be rendered for what URLs.
    - **Controller –** This part of the Django application contain code that integrate the views with the models. These also contain code to integrate with third party tools and applications like the External Payment Gateway.
    - **User Agent Detector –** This is a middleware which sniffs the user agent received in the request and decides which kind of template is to be returned.
    - **Templates –** These are Django templates which are built using Django forms and HTML/CSS which are in turn rendered in the user's Web Browser.
- The server backend also contains **Offline Scripts** for sending notifications to users. This also sends the welcome mails to users.

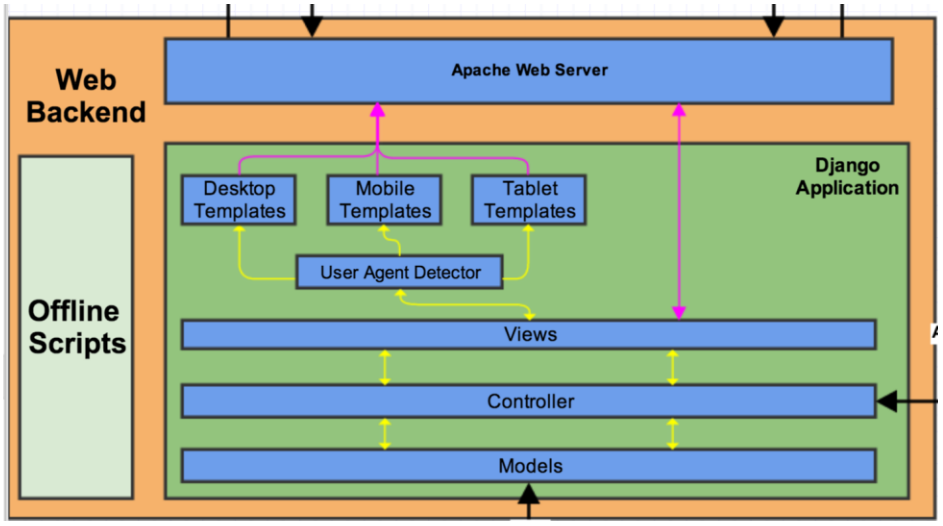


Figure 3 - Web Backend

## Databases

Various types of databases are used to store the relevant information generated using this application. They are listed as follows:

- Project Database

  They contain information about the various student projects that are/were listed on the website. They could be current projects, completed projects, suggested projects etc.
- User Database

  This contains information about the various backers who had signed up for email notifications. This database also contains information about the various students, mentors, faculty members and community participants.
- Gallery Database

  This database is a document-oriented database that contains images and videos related to various projects.
  It also stores images related to the generic pages.
- CMS Database

  This database stores all the content that is shown on various pages.
  These can be modified through the admin interface using CMS.

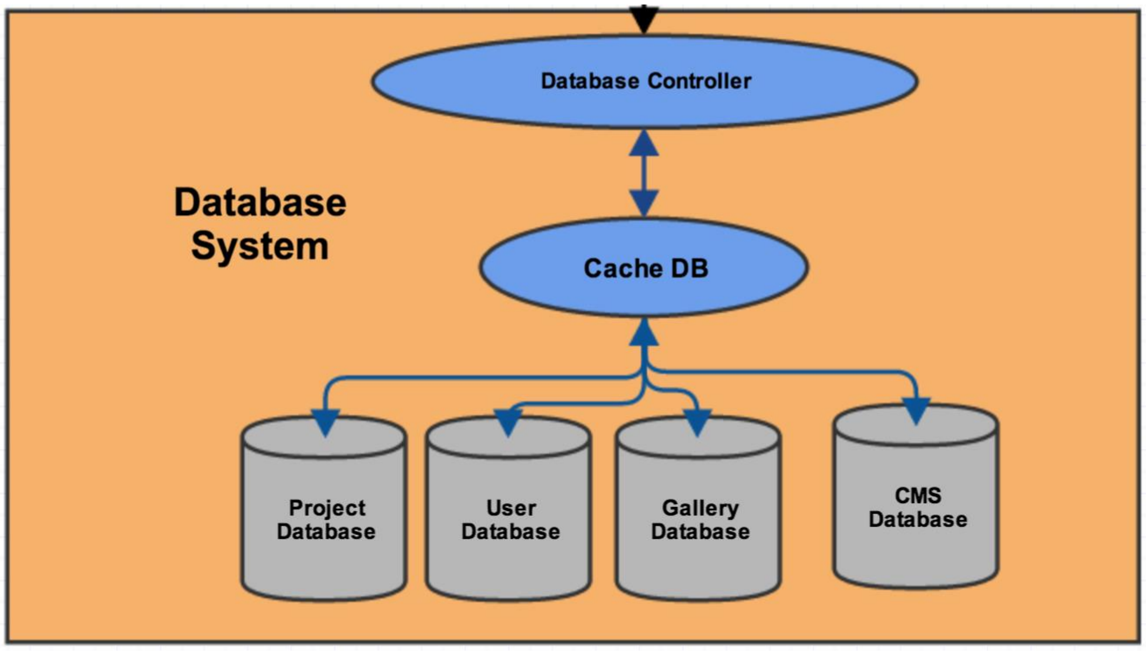


Figure 4 - Databases

## Payment Gateway

- The website's Project Page and the Get Involved pages contains links for visitors to become backers of the project.
- On clicking the link they will be taken to a page where the project description is shown and the user is asked to enter some preliminary information.
- Once the user enters these values, we make a request to the Payment Gateway (PG) API and when successful, redirect the customer to a **secure** page on the PG website.
- The user is prompted to enter credit/debit card details.
- The user is prompted to enter billing information.
- Once the user confirms, the money is withdrawn from his account and the user is then redirected to the CSRC website's Thank You Page.

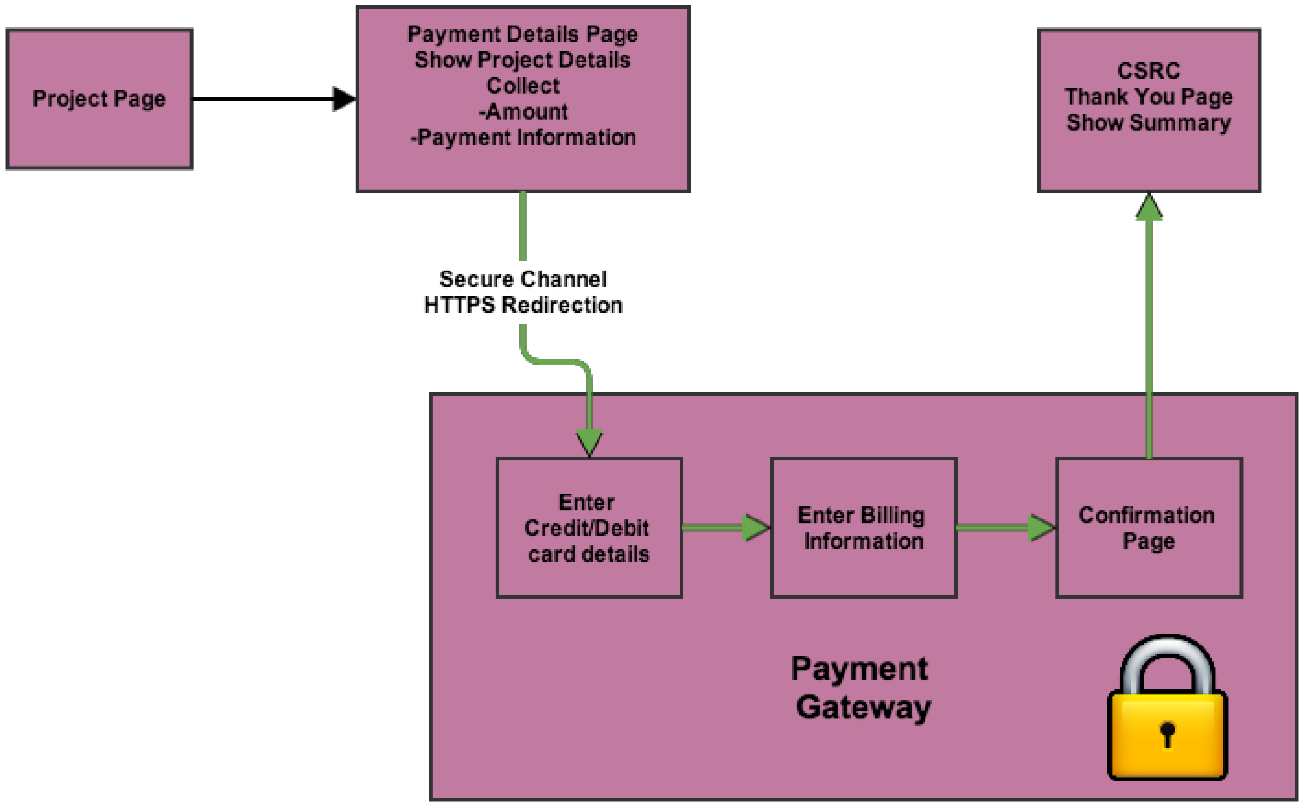
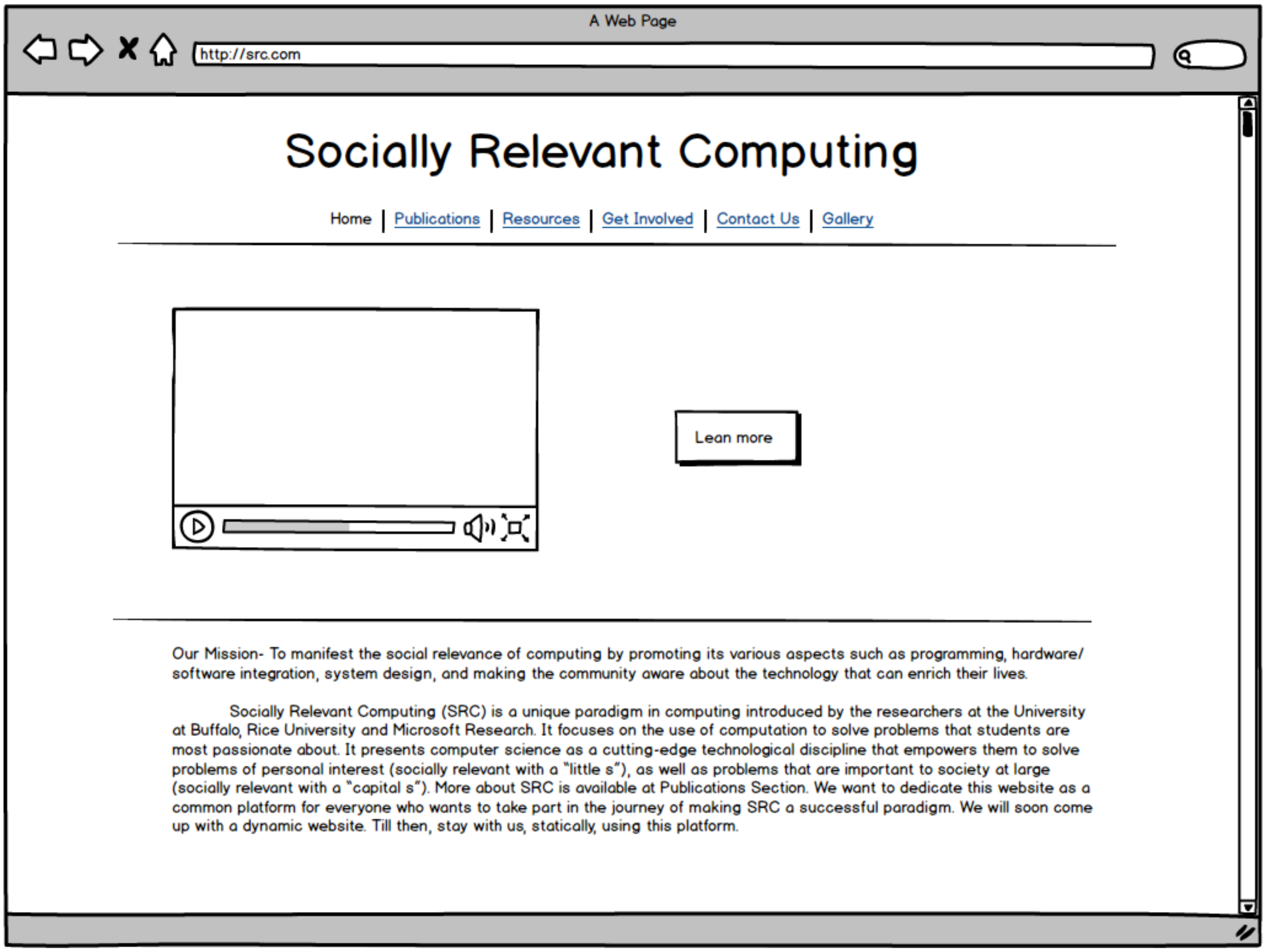


Figure 5 - Payment Gateway

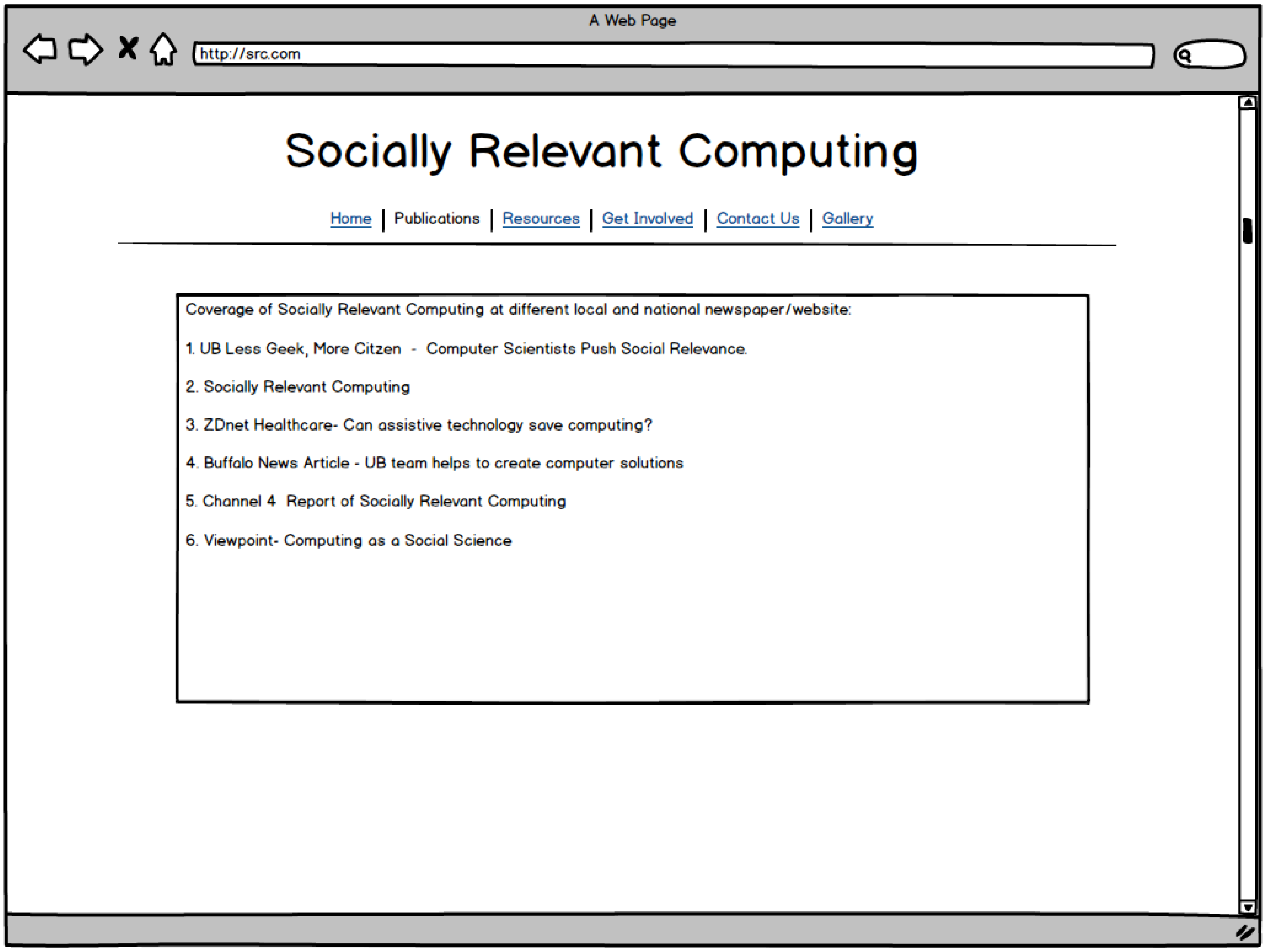
## User Screens


A Web Page
http://src.com
Home | Publications | Resources | Get Involved | Contact Us | Gallery
Lean more

Socially Relevant Computing

Our Mission- To manifest the social relevance of computing by promoting its various aspects such as programming, hardware/software integration, system design, and making the community aware about the technology that can enrich their lives.

Socially Relevant Computing (SRC) is a unique paradigm in computing introduced by the researchers at the University at Buffalo, Rice University and Microsoft Research. It focuses on the use of computation to solve problems that students are most passionate about. It presents computer science as a cutting-edge technological discipline that empowers them to solve problems of personal interest (socially relevant with a "little s"), as well as problems that are important to society at large (socially relevant with a "capital s"). More about SRC is available at Publications Section. We want to dedicate this website as a common platform for everyone who wants to take part in the journey of making SRC a successful paradigm. We will soon come up with a dynamic website. Till then, stay with us, statically, using this platform.



Socially Relevant Computing

Home | Publications | Resources | Get Involved | Contact Us | Gallery

Coverage of Socially Relevant Computing at different local and national newspaper/website:

1. UB Less Geek, More Citzen - Computer Scientists Push Social Relevance.

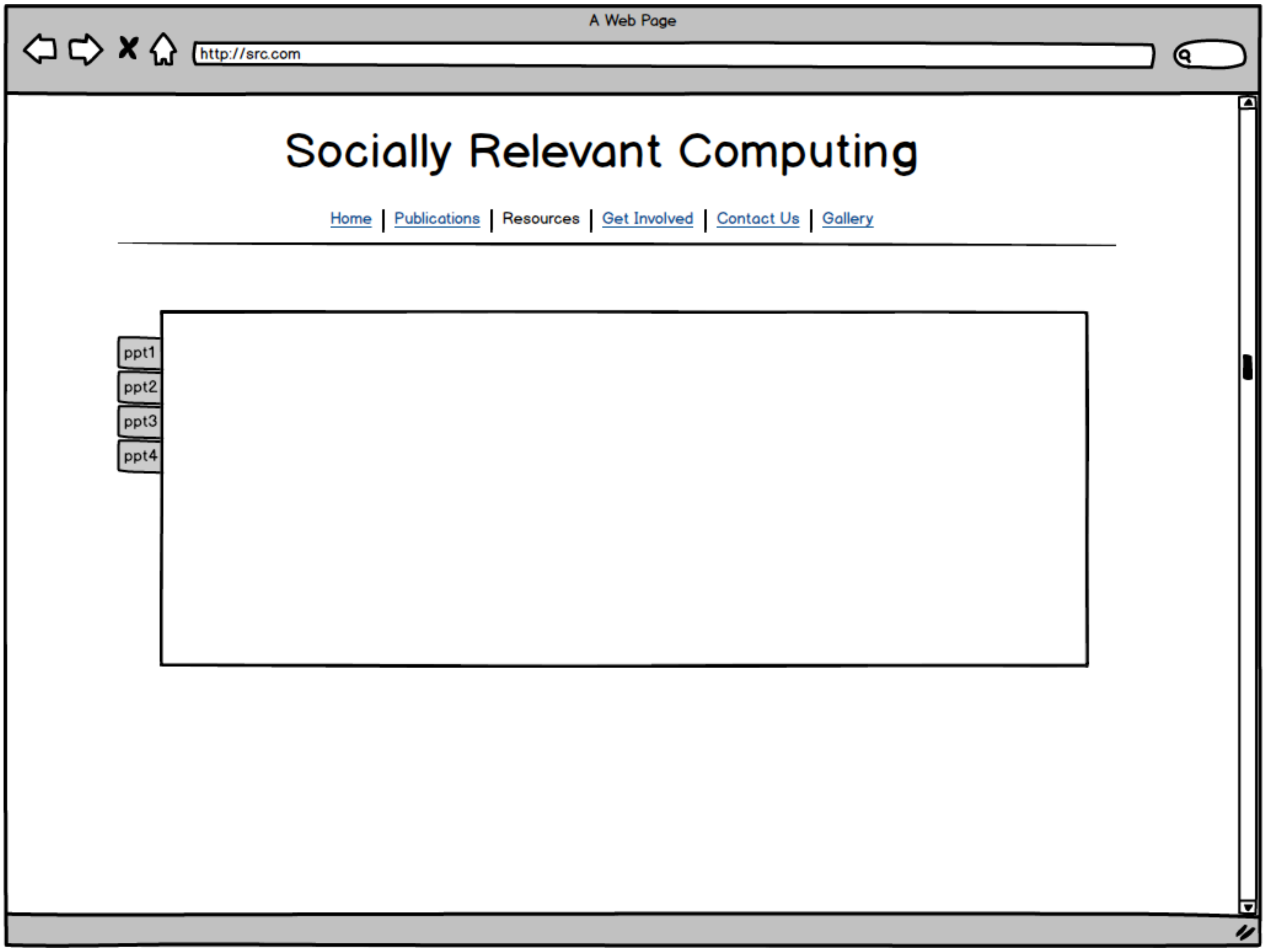
2. Socially Relevant Computing

3. ZDnet Healthcare- Can assistive technology save computing?

4. Buffalo News Article - UB team helps to create computer solutions

5. Channel 4 Report of Socially Relevant Computing

6. Viewpoint- Computing as a Social Science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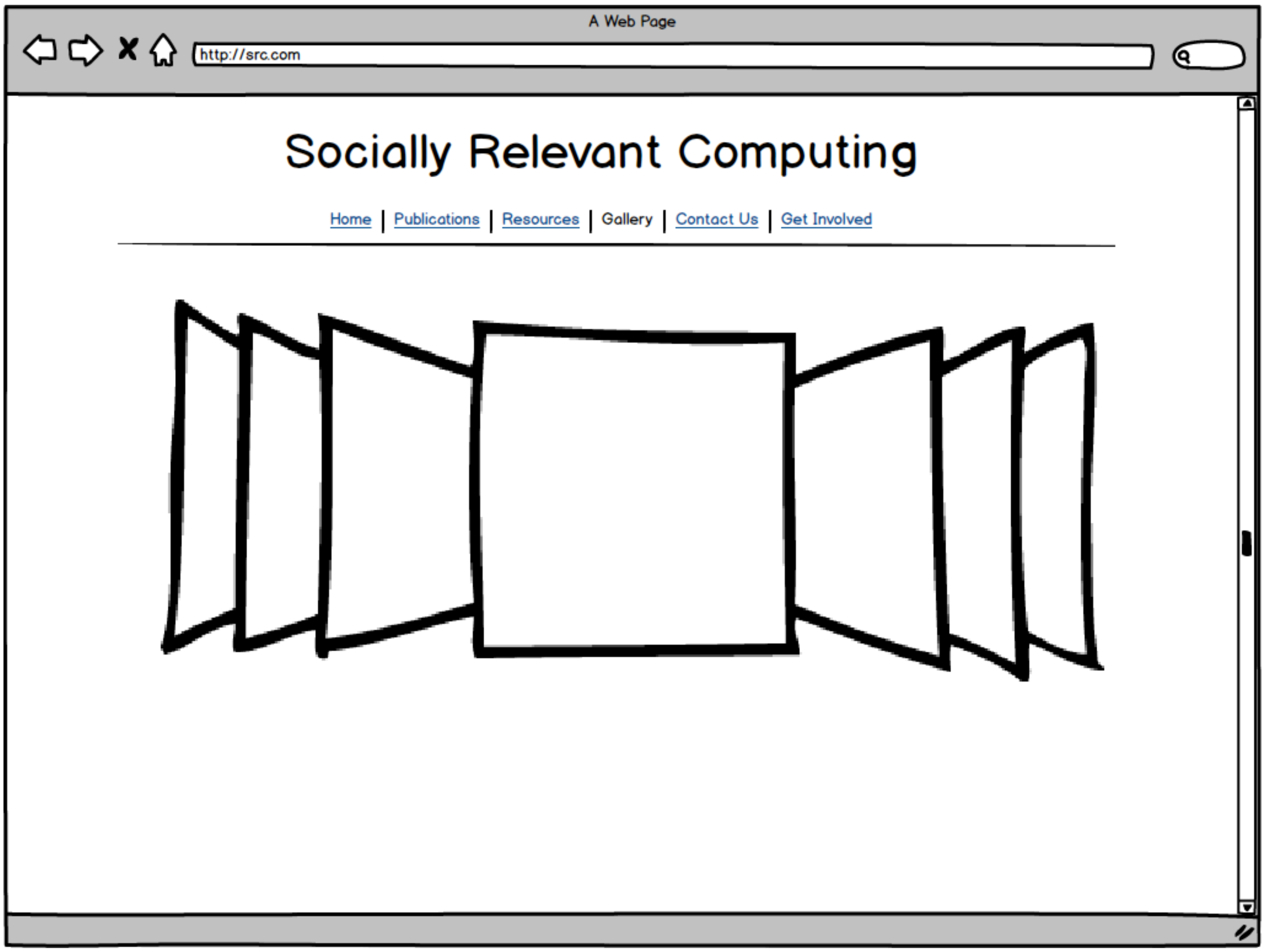
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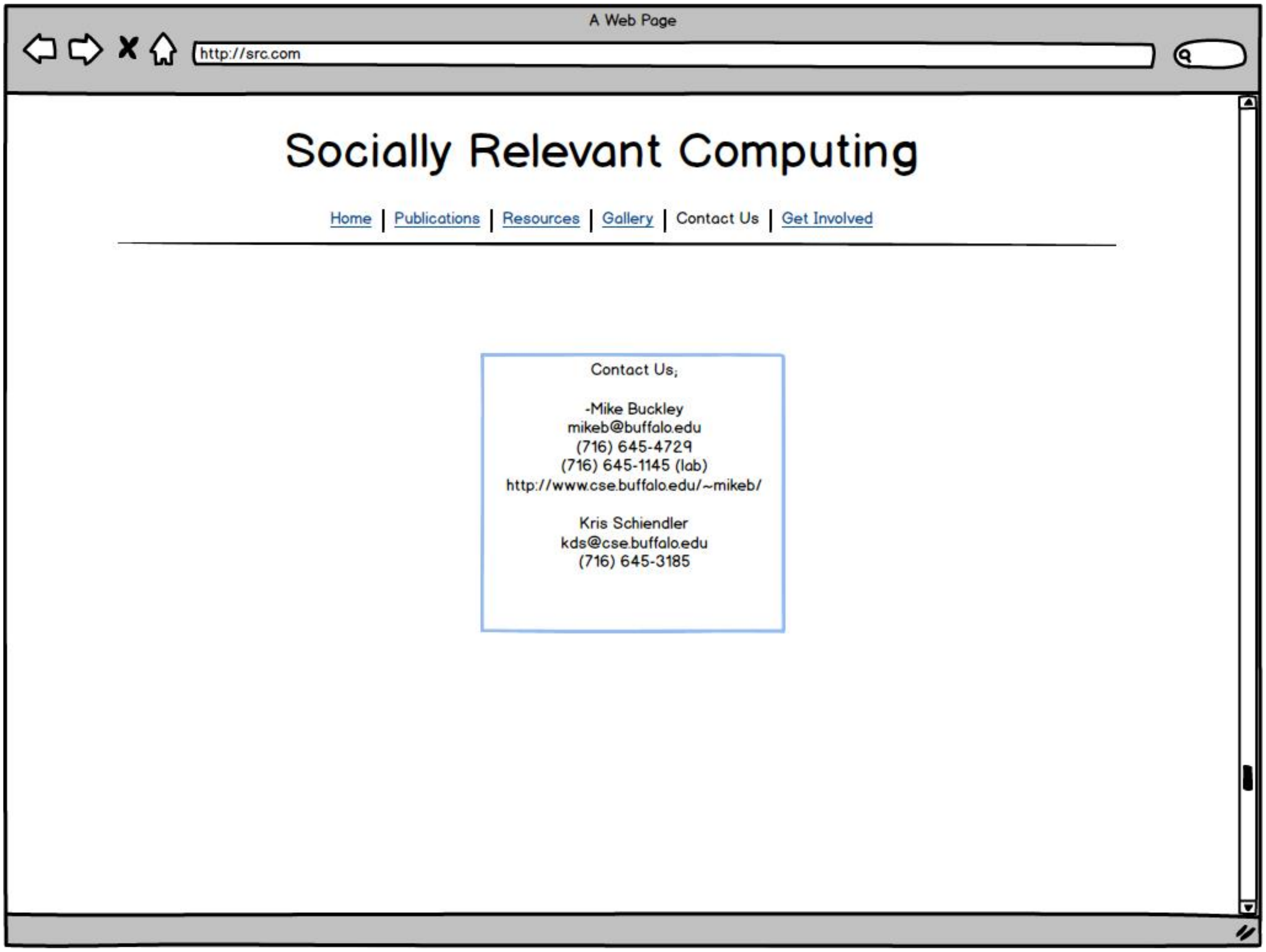
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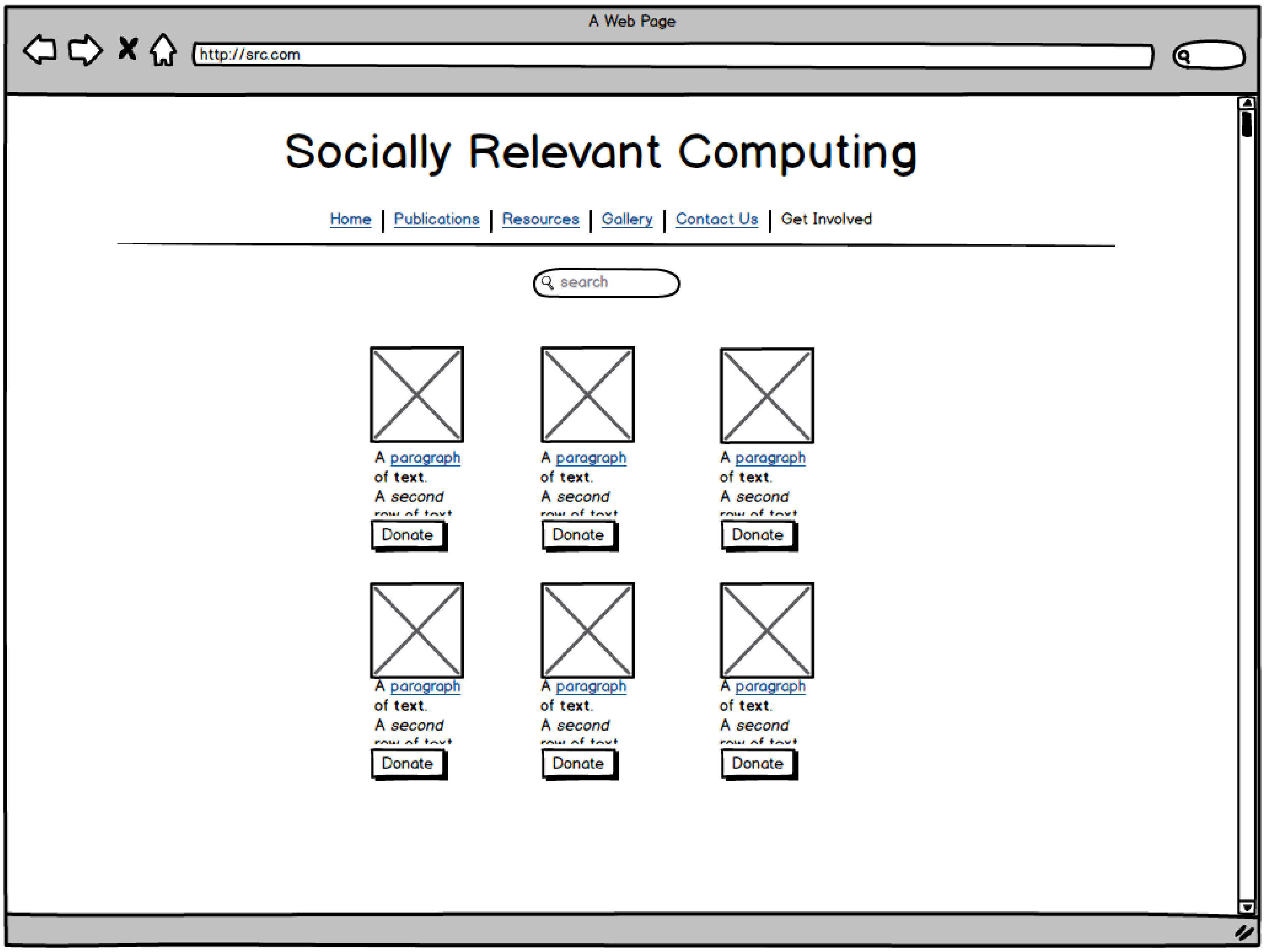
Socially Relevant Computing

Contact Us;

-Mike Buckley
mikeb@buffalo.edu
(716) 645-4729
(716) 645-1145 (lab)
http://www.cse.buffalo.edu/~mikeb/

Kris Schiendler
kds@cse.buffalo.edu
(716) 645-3185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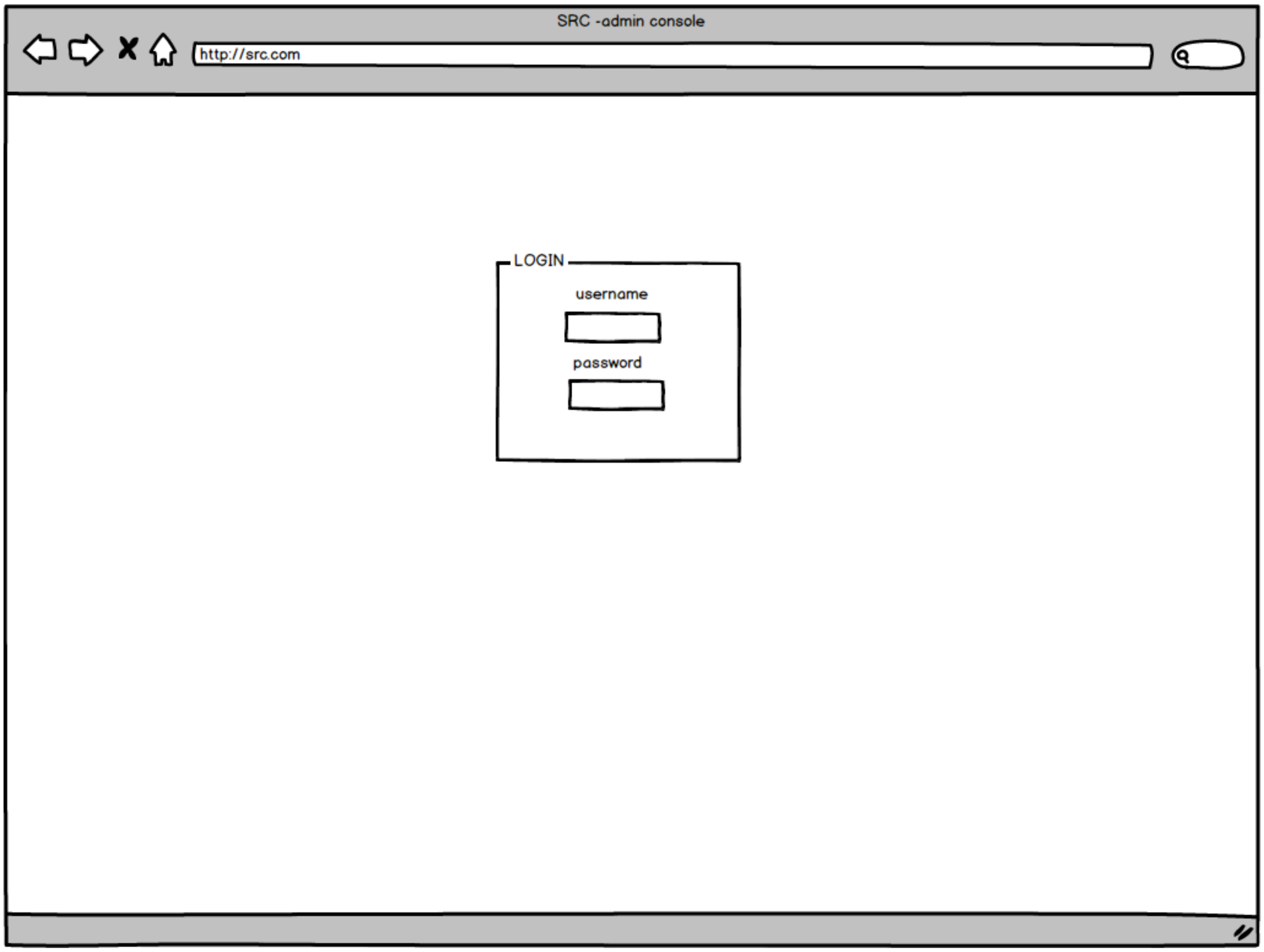
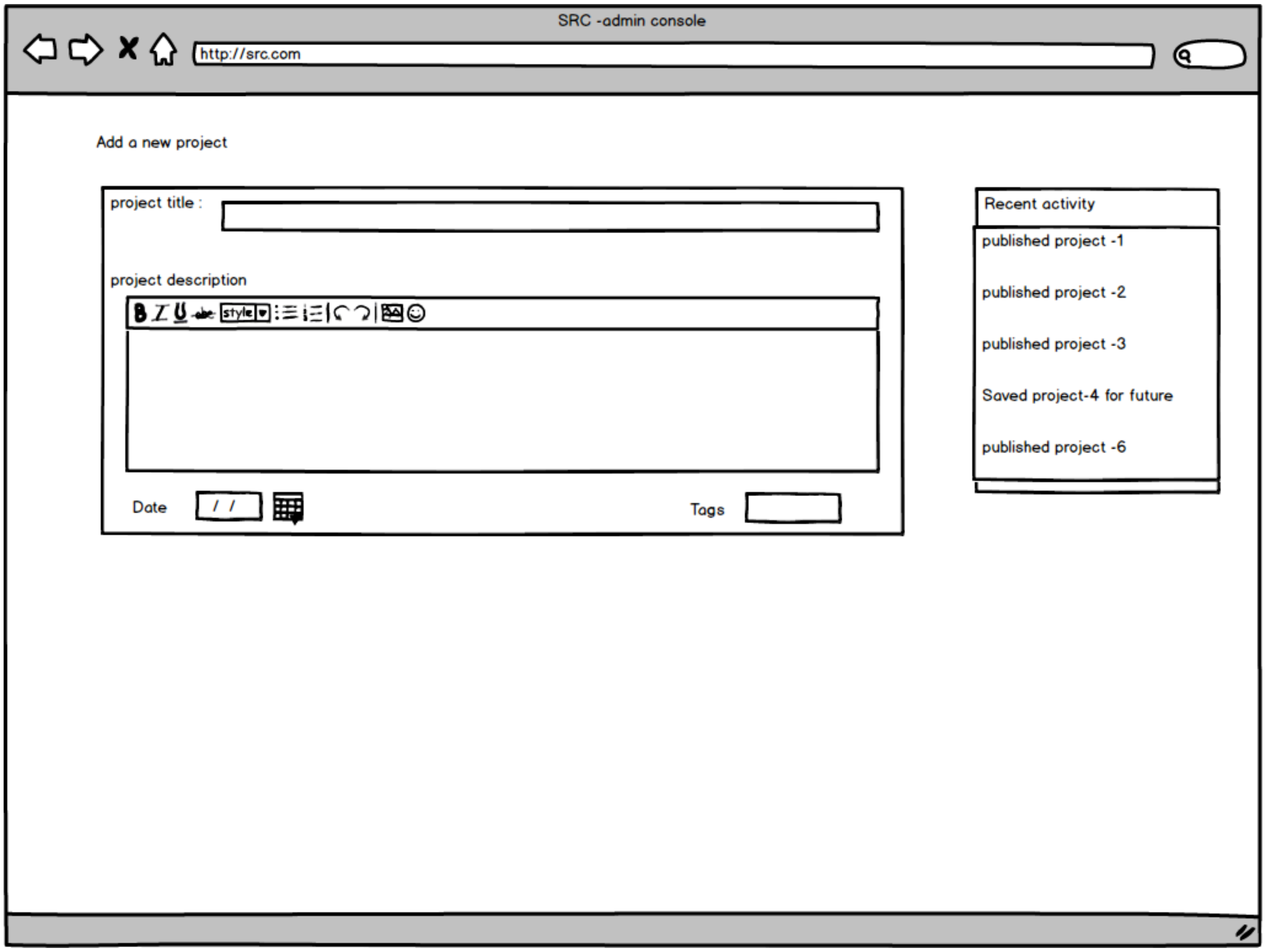
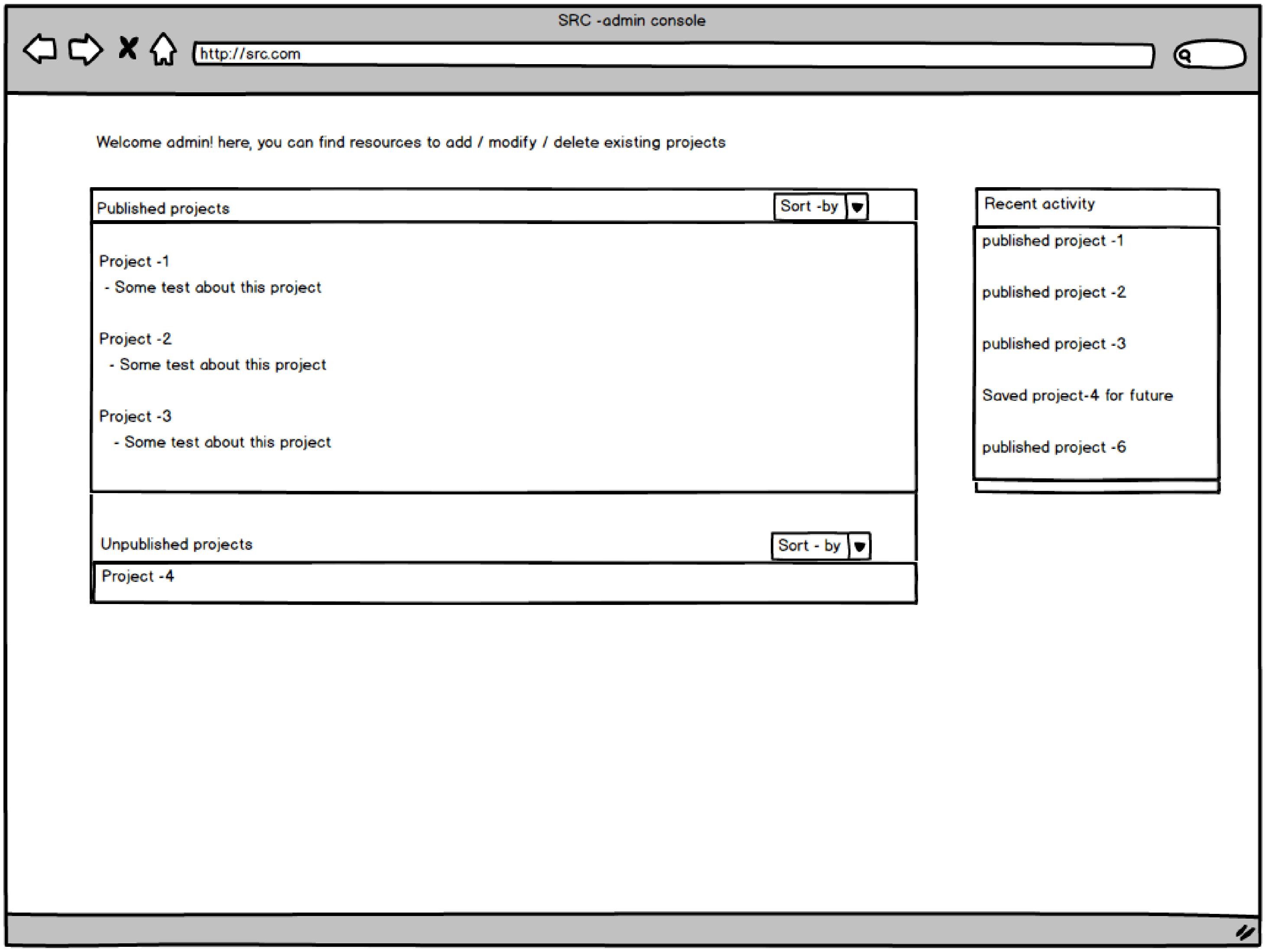

SRC -admin console
http://src.com
LOGIN
username
password


SRC -admin console
http://src.com
Add a new project
project title :
project description
style
Date
/ /
Tags
Recent activity
published project -1
published project -2
published project -3
Saved project-4 for future
published project -6



Welcome admin! here, you can find resources to add / modify / delete existing projects

Project -1
- Some test about this project

Project -2
- Some test about this project

Project -3
- Some test about this project

Project -4

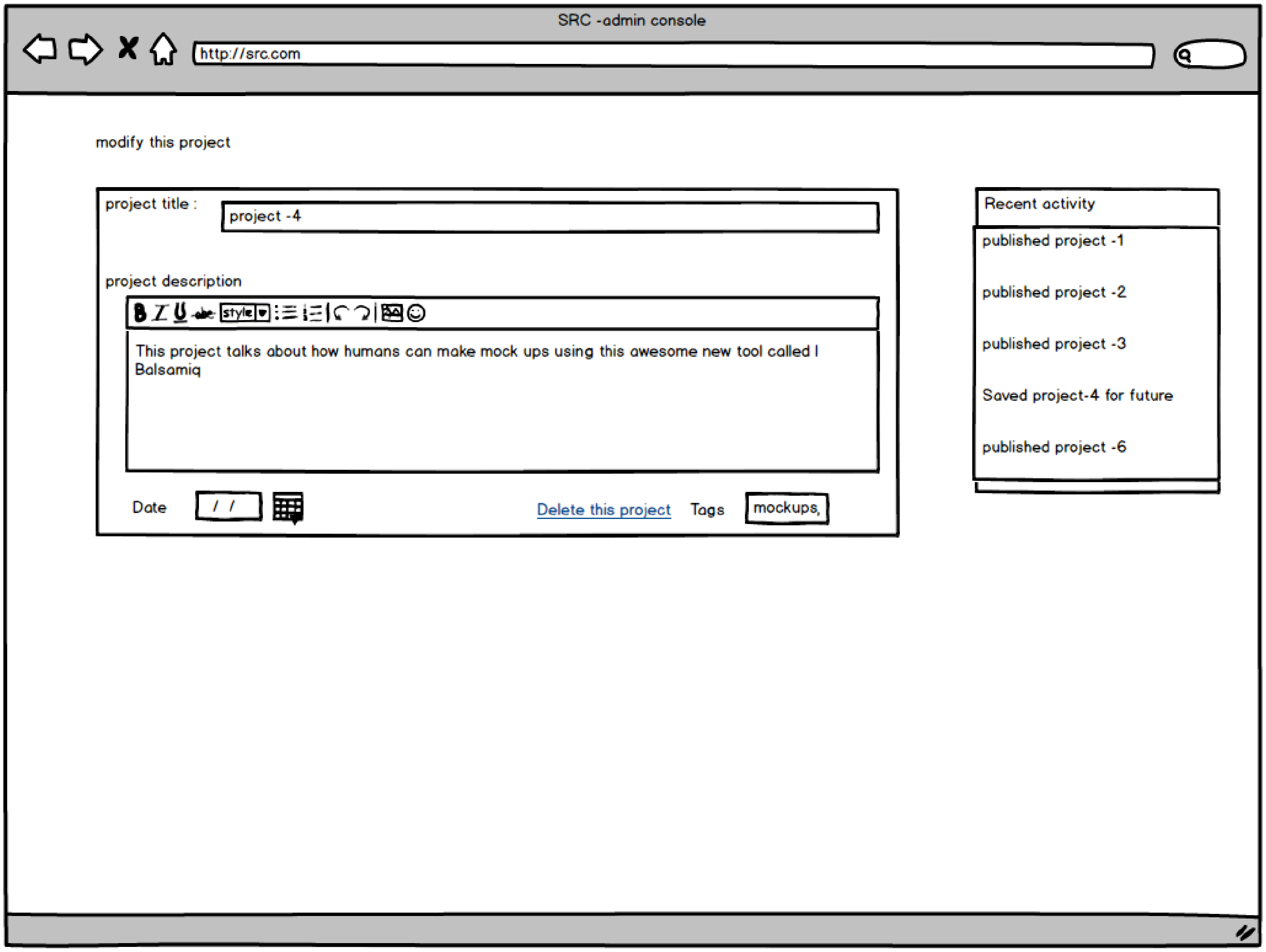
published project -1

published project -2

published project -3

Saved project-4 for future

published project -6



modify this project

project title : project -4

project description

This project talks about how humans can make mock ups using this awesome new tool called Balsamiq

Date / /

Delete this project

Tags mockups,

Recent activity

published project -1

published project -2

published project -3

Saved project-4 for future

published project -6

## Dependencies, Constraints & Limitations

### Assumptions

- We assume that the material required for the projects to be included is already provided.
- The server will be initially hosted from university server, later it will be moved to independent server.
- Currently, University at Buffalo and Rice University are the only two participants. All other universities can participate by contacting the administrator.
- The primary goal is to show how computer science can be applied to solving problems in social challenges.
- Anyone who is interested is free to support a project by donating for it and spread the word across social networks.

### Limitations / Constraints

- Sponsors will be funding the projects based on their interest, so the projects need not be executed in the time order they posted. There might be an indeterminate delay.
- This concept should be marketed well in order to get more sponsors. In this way there will be a momentum to make it bigger.
- Maintenance of the website is not only a major constraint but increases cost as the database requires some high quality servers as the SRC grows bigger.
- If sponsors do not support a project then there will be difficulties in proceeding further with it. As there is no monetary regulation on the users, there won't be a suitable replacement to sponsors for projects involving lot of money.
- The primary goal of this project is to provide an interactive platform for students, corporates and organizations. Also advertisements might be allowed, as they will increase the revenue.
- Though the website is designed in a user-friendly way, we assume that a basic computer and Internet knowledge is required for users.
- Collecting the materials required for the course and projects available from various universities, online resources would require coordination among people involved.
- All the backer credentials will be stored in database.

## ***Request form for changes to SRC website***

*If you would like to make any changes to the project description, including new features, feature cuts, limitations, etc., please fill out this form send it to talkingheadcompanion@gmail.com as soon as possible.*

### Customer Information:

**Name:**

**Email Address:**

**Phone #:**

**User Profile:**

**Organization:**

**Date:**

### Type of Change:

○ **Functional** ○ **User Interface** ○ **Other (specify)**

| **Priority:** | **Impact:** |
|---|---|
| ○ **High** ○ **Medium** ○ **Low** | ○ **High** ○ **Medium** ○ **Low** |

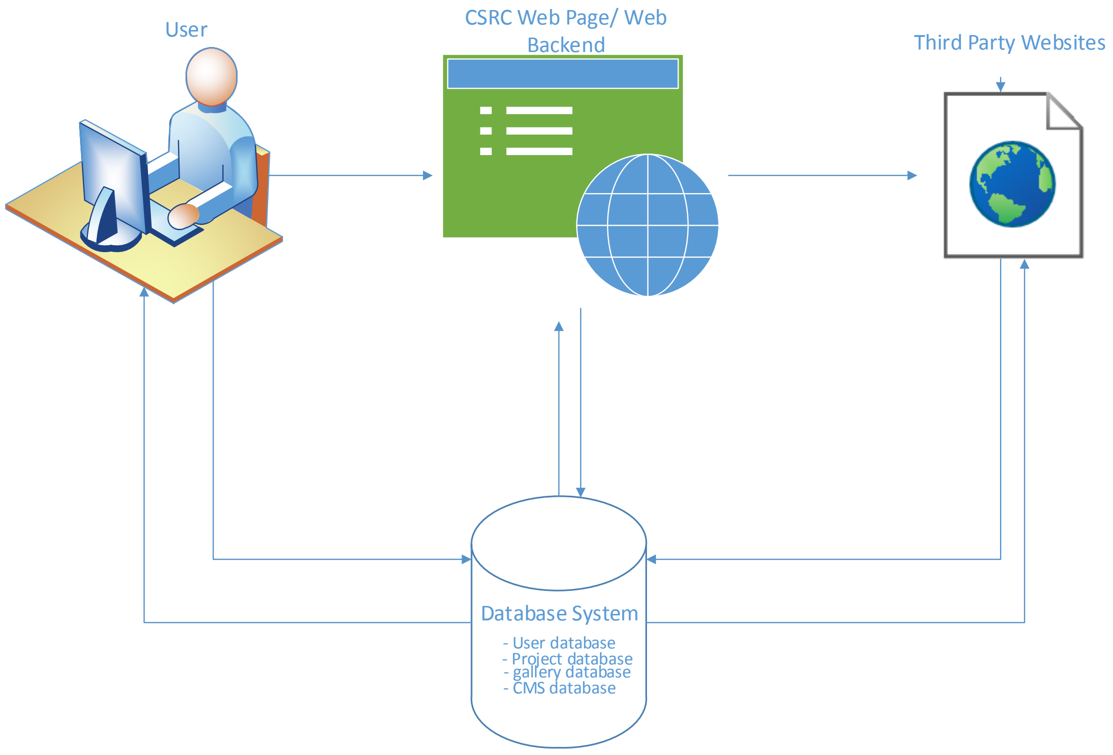
### Reasons for change:

### Describe required change:

## Cross Reference Listing:

| No. | Module | System Specification | Software Requirement Specification |
|---|---|---|---|
| 1 | Static Pages | Functional requirements (page 6) | Page 6,7,8 |
| 2 | Admin Interface | Functional requirements (page 6) | Page 6,7,8 |
| 3 | Projects Page | Functional requirements (page 6) | Page 6,7,8 |
| 4 | CMS Functionality | Functional requirements (page 6) | Page 6,7,8 |
| 5 | Functional Requirements | Page 6 | Page 6 |
| 6 | SRC Website management | Page 6 | Page 9 |
| 7 | Funding a project | Page 6 | Page 11 |
| 8 | Mobile phone integration | Page 6 | Page 6 |
| 9 | Notifications | Page 6 | Page 6 |
| 10 | Donation | Functional requirements (page 6) | Page 11 |

## V. Integration thread



Above is a diagram of the SCR project from a simplified perspective. The design of the website revolves mostly on the four major components: the user, the CSRC webpage/ Web backend, the database system, and the third party/application tools. Communication between these components are needed for the site to work. Perhaps the most vital of these is the database system. The database system is a collection of four sub databases: User database, project database, gallery database and the cms database (see page 10). Upon visiting the CSRC website, the user would come across the static view of the site. To view and access the more dynamic material and personally-interactive features, one would be required to login. Once the individual's credentials are put in, it is then compared to the list of members on the user database. Depending on the whether it is a client or the admin, the features and webpage would vary. Updates from the user/admin would done in connection to the user, project and cms databases.

One interesting added feature is the availability of a third party interaction. One can choose to fund the CSRC through third party payment website and also social website sharing is included. Social sites such as Facebook, twitter, Google+ and LinkedIn would amongst the few sites to be included so user can share, update and promote certain projects and the CSRC itself. More features and databases for a smooth and connections and usability can be added in the future.