

DESIGN AND IMPLEMENTATION OF A COLLABORATIVE FREELANCERS' SOURCING PLATFORM

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Abstract

The Information Age has affected the workforce in several ways. Workers are also being forced to compete in a global job market. Technology has increased job opportunities in developing countries and has promoted the globalization of the workforce. Often, workers in low income or developing countries have a competitive advantage which translates into increased opportunities and higher wages. This research was targeted at providing a platform to which, people can sign up according to their skill set or talents and have access to numerous job opportunities. Therefore, freelancers of different skill sets, and expertise can engage and interact with different opportunities. A place where they can work hand in hand with different people on the same industry or collaborate with fellow freelancers to achieve various tasks assigned. To achieve a high level of scalability and platform performance, PHP, MySQL, JavaScript and Node JS, were used for developing the server-side. Node.js has an event-driven architecture capable of asynchronous I/O. These design choices aim to optimize throughput and scalability in Web applications with many input/output operations, as well as for real-time Web applications. The solution promotes freelancing and self-employment with the use of technology.

1. Introduction

The Information Age has affected the workforce in several ways. It has created a situation in which workers who perform tasks which are easily automated are being forced to find work which involves tasks that are not easily automated (Porter, 2015). Workers are also being forced to compete in a global job market. Lastly, workers are being replaced by computers that can do their jobs faster and more effectively. This poses problems for workers in industrial societies, which are still to be solved.

However, solutions that involve lowering the working time are usually highly resisted. Castells (1999) said that Jobs traditionally associated with the middle class (assembly line workers, data processors, foremen and supervisors) are beginning to disappear, either through outsourcing or automation. Individuals who lose their jobs must either move up, joining a group of "mind workers" (engineers, doctors, attorneys, teachers, scientists, professors, executives, journalists, consultants), or settle for low-skill, low-wage service jobs.

The "mind workers" are able to compete successfully in the world market and receive high wages. Conversely, production workers and service workers in industrialized nations are unable to compete with workers in developing countries and either lose their jobs through outsourcing or are forced to accept wage cuts (Reich,2012). In addition, the internet makes it possible for workers in developing countries to provide

in-person services and compete directly with their counterparts in other nations. This has had several major consequences, including increased job opportunities and the globalization of the workforce.

In Kenya, for example, only half of the more than 50,000 students who graduate annually are suitable for employment. Additionally, of these graduates, more than half are not suited to their career choice (Wesangula, 2014). The unemployment rate in Kenya is 40% this means that 4 out of 10 Kenyans are unemployed. Most of these people are youth in their 20s and have just left school. Unfortunately, they cannot fill in positions as they have spent a lot of their time in school and have no job experience to show (Mwangi et al., 2016).

Many youths in the end choose to go back into school and get more education – which is not what they need. What they need is work experience. The problem is that when someone shows up at your interview with a PhD but only 2 years of work experience, the employer gets worried. Can they be a good manager? Will they be able to navigate the workplace dynamics? Can they deliver under pressure? Can they own up to mistakes and bring viable solutions to the table? (Mwangi et al., 2016). And all of these questions have a certain level of validity to them, but every man/woman has had to start from somewhere, as a novice, an apprentice to master, and with time gained experience to a certain level of competency.

2. Literature Review

The youth, more particularly the educated variety are embroiled in a dilemma after school on whether to seek employment or contemplate the pursuing of a business venture in the face of competition. Competition has made it incumbent upon business to strive to survive tough economic times. Survival has seen retrenchments and layoffs hence pondering serious questions on the future of youth (Omido, 2016).

With the ever-growing number of competitors in the marketplace, talent is the only differentiator. Capital is abundant while technology is easy to access, but the brainpower of knowledge and experienced staff is the most important asset for the modern, progressive organization.

It is, therefore, alarming when more than half — 54.2 per cent — of respondents say that their biggest challenge is retaining top talent, as talent retention increasingly determines the success or failure of many organizations. Further, 50.3 per cent and 43.5 per cent of the employers say providing competitive compensation and managing organizational changes, respectively, is a major hurdle (Ochieng', 2015).

While 37.3 per cent face employee morale challenges, 24.9 per cent experience challenges in recruiting high skilled applicants, 26.6 per cent have problems maintaining productivity levels, 25.4 per cent cite upward mobility for their employees as a challenge, 12.4 per cent mention worker burnout, 16.9 per cent employee engagement and 11.3 per cent indicate that they have experienced the challenge of cutting down on cost per hire (Ochieng', 2015).

Figure 1 indicates the rates at which employers are willing to hire fresh graduates from both public and private universities in Kenya. Figure 1 illustrates the percentages of students accepted to a job after graduating from a public campus, with a sample size of eleven public universities based here in Kenya.

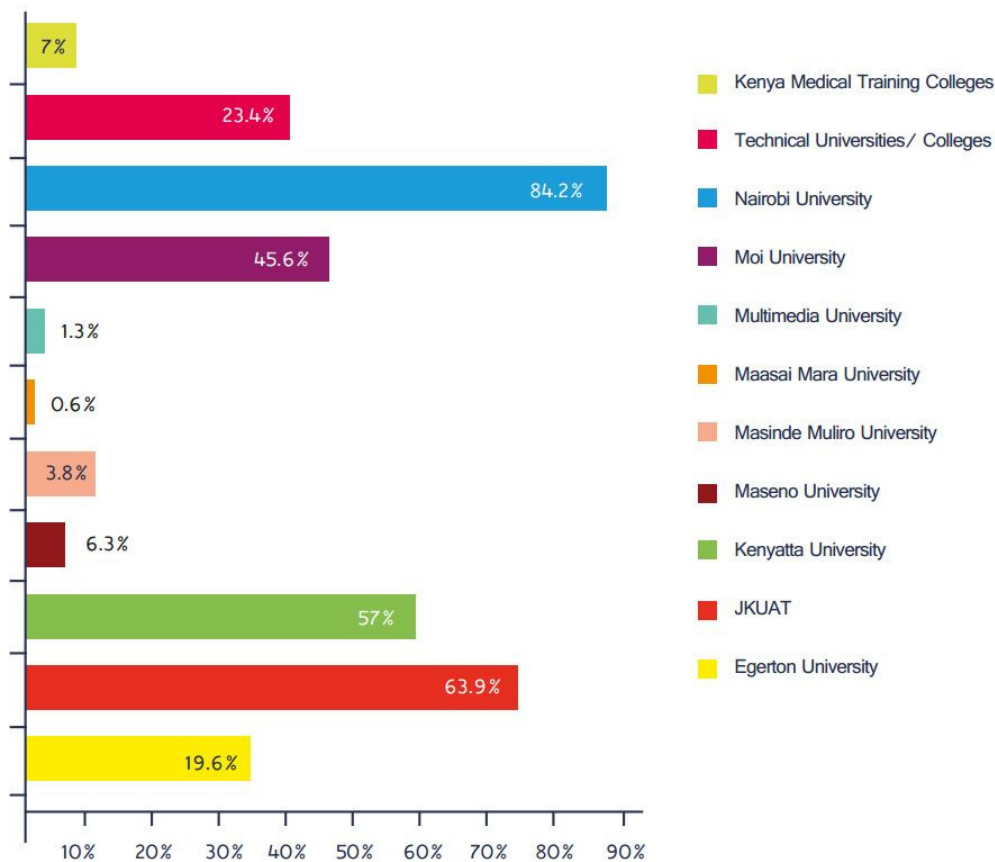


Figure 1 : Public University Job Acceptance Percentages(Adapted From Nation Kenya, 2015)

Figure 2 illustrates the percentages of students accepted to a job after graduating from a private campus. With a sample size of ten private universities based here in Kenya.

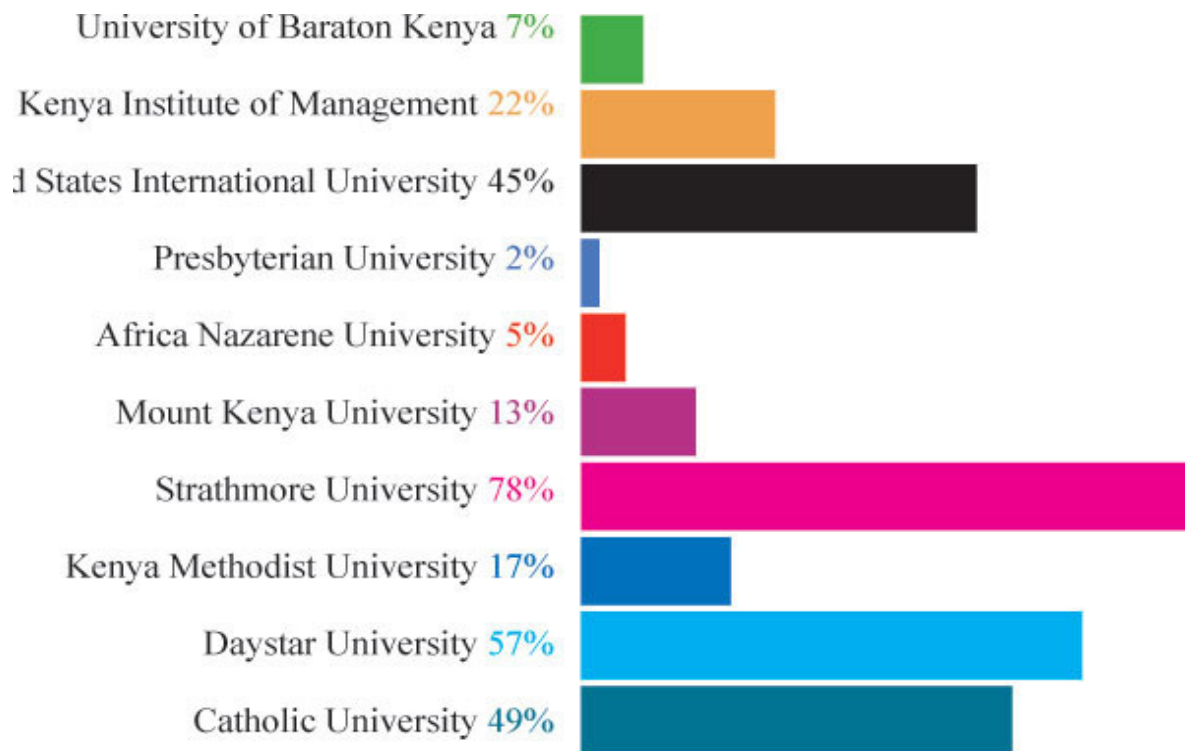


Figure 2: Private University Acceptance Percentages (Adapted from Nation Kenya, 2015)

2.2 Traditional Approach to Freelance Job/Task Acquisition

With the rise in the use of the internet as a medium to helping us enhance the way we do business, it has also revolutionized the way a job search is done. But as the internet impact grows, traditional methods like classified newspaper advertisements, network of the people around you, phone book directories, and such play yet a big role on the shift of job seeking (Clements, 2016).

2.2.1 Job Acquisition Techniques

i. The Cold Cover Letter/Resume

It is estimated that 80% of the job openings are never advertised or published to the public: rather they are filled with from internal postings, through people networking and resumes on a file. 80% is a huge chunk of a market opportunity, which remain untapped. There are success stories that exist using this method of job seeking, but the hugest disaster remains to the tedious and time inefficiency that comes along with the approach (Clements, 2016).

Potential Advantages of Cover Letter Approach

- A) Gaining early consideration for a position that has not yet been advertised
- B) Being part of a company's upcoming expansion plans
- C) Creating a job that previously did not exist
- D) Consideration to fill a position created by an upcoming promotion, transfer, termination or resignation.
- E) Increase your network of contacts and having your resume forward on for more possible considerations

ii. **The Classified Advertisements**

It almost comes with no doubt to how the classified newspaper ads, are losing their place in the job search industry, but there are still many jobs listed in the classified ads especially with local companies and small businesses. Many forget that most countries are still built on the small business owners so unless your heart is set on working for a major; regional, national or international company then the classified ads may have your next job listed. One thing to remember today's small business can be tomorrow's major corporation and how exciting to be part of that growth. We recommend reviewing the major newspapers in your area and also pick up the small local papers they also have local postings. (Clements, 2016)

2.3 Modern Approach to Freelance Job/Task Acquisition

Job searching has seen a great change over the last 10 years or so. The reality is that the internet has truly changed the dynamics of it all. There are aspects of your resume and online profile that can easily date you if you do not take steps to update your approach. This puts you in danger of rejection before you even manage to get an interview. There are aspects of your resume and online profile that can easily date you if you don't take steps to update your approach. This puts you in danger of rejection before you even manage to get an interview ("Traditional versus non-traditional job search techniques," n.d.).

2.3.1 Examples of Freelance Platforms

Whether most freelancers are looking for another way to pay the bills, seeking more professional development opportunities or just love the freedom that freelancing offers, there is no question that millions of people have discovered the benefits of professional freelancing. As trends like the digital nomad lifestyle grow in popularity, the number of freelance resources out there has increased as well(Madden, 2010).

Below is a number of the well-known and established freelancing platforms globally:

A) UpWork

With a whopping number of about 1.5 million clients, UpWork offers something for almost every type of freelancer. UpWork accommodates both long- and short-term projects, hourly or per project work, with expert level and entry level engagements. Regardless of where you are in one's career, UpWork caters for you(Johansson, 2015).

B) Toptal

Toptal offers, a distinctively different approach towards freelancing, Toptal is for seasoned, talented freelancers. It includes a screening process, of which after passing one has access to meaningful projects with great clients such as JP Morgan, AirBnB, and ZenDesk etc. and topped with fair compensation (no low bid contests). Also after the screening process one has opportunity to join the community for frequent meetings and tech weeks(Johansson, 2015).

C) FreeLancer

Indifferent from most platforms, Freelancer in addition to access to a million different projects, Freelancer allows you to compete with other freelancers in contests to prove one's skill set. It promotes a great way to which competitive and confident people at their expertise can contest to prove their skill and acquire more clients(Firdaus, 2007).

D) Craigslist

Over the years, craigslist has been thought to be a platform for selling and buying malicious things, it still remains a great platform to which freelancers acquire new clients. It offers the flexibility to work with companies remotely or locally depending on the freelancers' preference(Firdaus, 2007).

E) Guru

With Guru, they follow a different approach to freelancing and offer a way to which one can easily showcase their past work experiences. To top it up they offer a daily job-matching feature to make sure one does not miss out on any great opportunity available through their platform(Johansson, 2015).

3. Methodology

The project was developed using the systems development life cycle methodology with an aim of solving the problem. This method was chosen because it follows a simple yet efficient means of development of the information system.

The software development life cycle (SDLC) is a framework defining tasks performed at each step in the software development process. SDLC is a structure followed by a development team within the software organization. It consists of a detailed plan describing how to develop, maintain and replace specific software. The life cycle defines a methodology for improving the quality of software and the overall development process. SDLC consists of following activities:

- i. Planning: The most important parts of software development, requirement gathering or requirement analysis are usually done by the most skilled and experienced software engineers in the organization. After the requirements are gathered from the client, a scope document is created in which the scope of the project is determined and documented.
- ii. Implementation: The software engineers start writing the code according to the client's requirements.
- iii. Testing: This is the process of finding defects or bugs in the created software.
- iv. Documentation: Every step in the project is documented for future reference and for the improvement of the software in the development process. The design documentation may include writing the application programming interface (API).
- v. Deployment and maintenance: The software is deployed after it has been approved for release.

4. System Design and Architecture

4.1 Requirements Analysis

A Freelancer can register themselves through the work4fce platform, after which they will have the opportunity to build their profile, or delete their account. He or She can also go ahead and start applying for job vacancies that are listed with the database.

4.1.1 Functional Requirements

The Hound Platform is designed to be a sole platform that helps companies seek professional to expert skills for their projects or team collaboration, and at the same time provide freelancers with a place to which they can acquire work easily, and get paid from the Hound Platform. The proposed Hound platform must be able to implement the following functions: -

- i. **Management of the platform** users, the login-process, password changing, third-party sign-up and sign-in authentication, Facilitated the Hound Payment process for work done, Gathering key user metrics.
- ii. **Data Management:** Managing of job/projects uploads and project acquisition which includes; Project types/categories, Project Budget, Payment Options, Transactions details and authorization.
- iii. **Outputting Reports:** A catalogue report, Job Listing report.
- iv. **Innovation:** Happens in how specific projects are categorized to be in various access portals under the same Hound Platform.

4.1.2 Non-Functional Requirements

In this section, the factors that are not related to the specific functional requirements of the program are mentioned. The application manages a huge volume of database, so the database must be suitable for fast growing data.

Due to the nature of the program, there will be plenty of reports to be generated; therefore, the graphical user interface is a key element that should be paid attention to, it should be user- friendly and easy-to-use especially on the necessary features which the interface must have. In addition, the reports in this program must display enough columns and information that the user needs for making the statistics of the status of asset etc.

Finally, only the people who have responsibility of managing the assets have the privilege to access the system.

As an organization (client), one can also build their profile, set their general hiring rate for the projects. They also list what jobs they are offering, and set all necessary information that the job(project) requires. An organization can at any time receive proposals from interested parties(freelancers) showcasing their interest. And it is up to the organization to choose the right freelancer based on their skillset, past experiences, or the quality of their profile. Figure 3 presents the use case diagram.

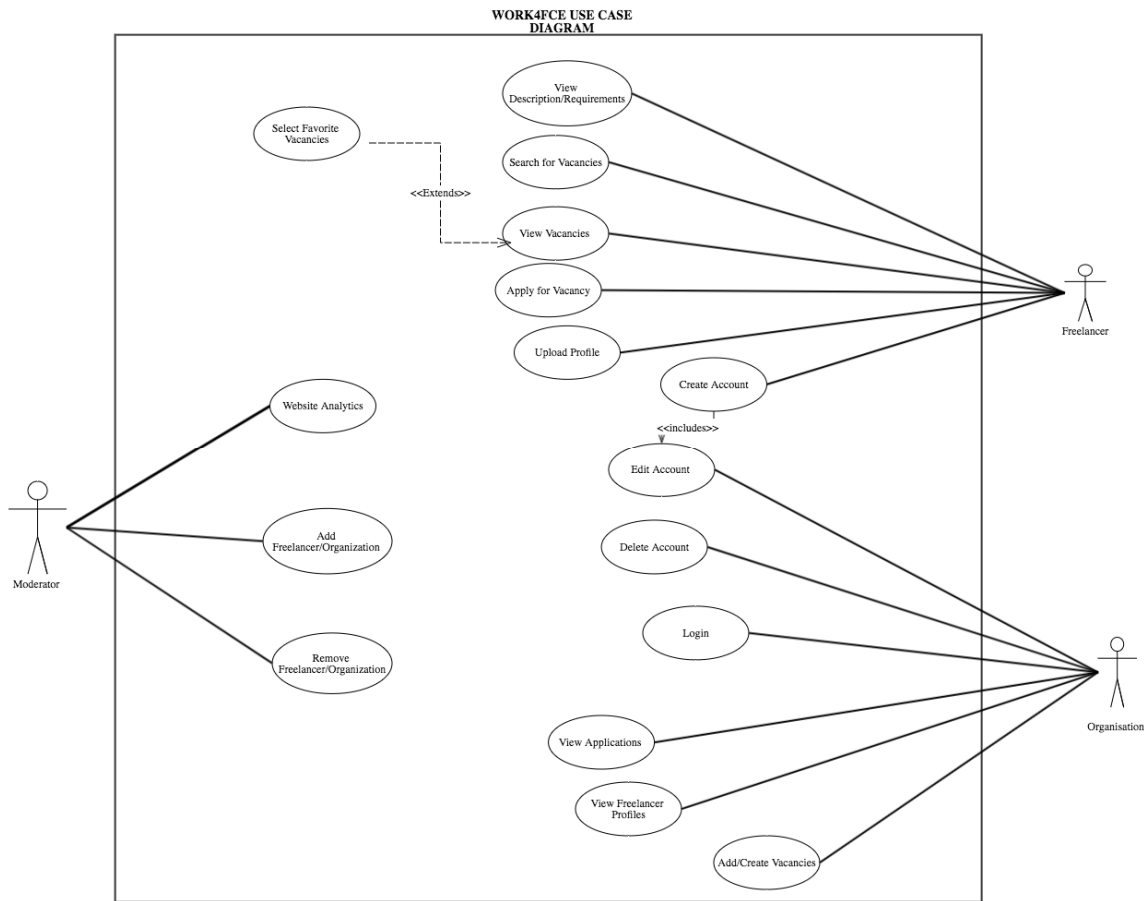


Figure 3: Use Case Diagram

4.2 System Design

Figure 4 presents the class diagram.

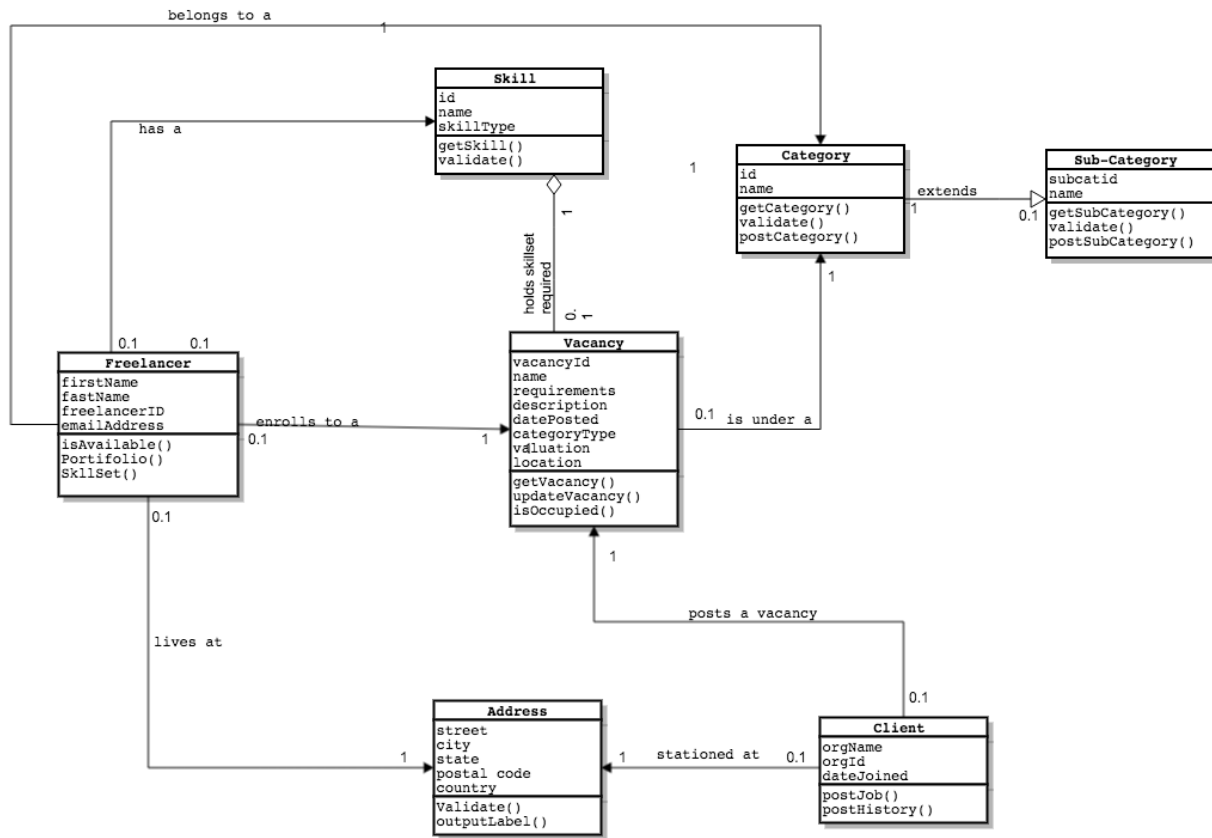


Figure 4: Class Diagram

Figure 5 presents the Database schema.

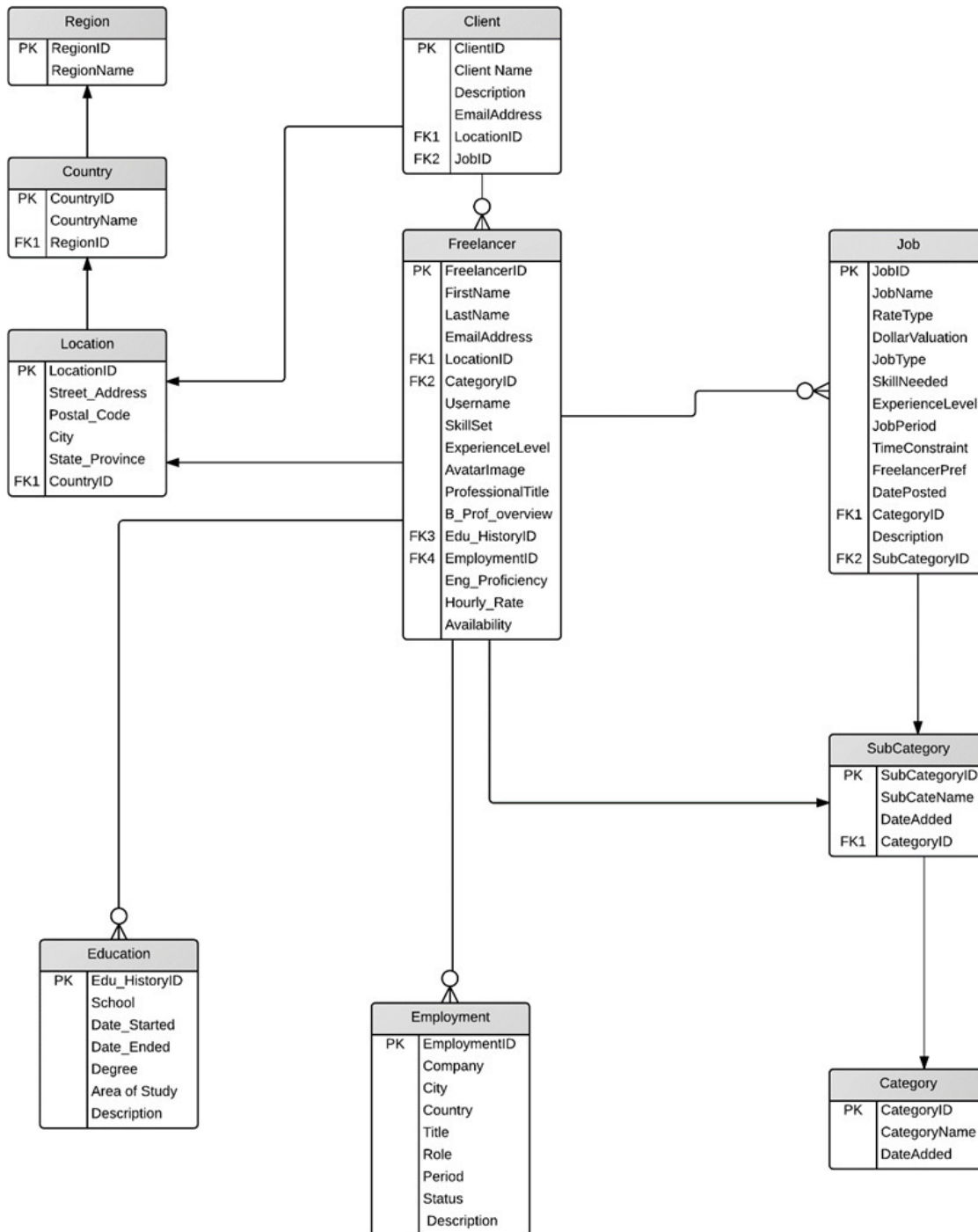


Figure 5: Database Schema

5. Implementation and Testing

Systems Development and Implementation involves the transformation of the initial idea and specific objectives of an intended information system to an actual solution to meet the business needs of an organization. Implementation involves putting the system into place, allowing users to interact with it and making sure users are well conversant and understand how the system is meant to work.

5.2 System Development and Tools Used

- (i) Front end: The web based system was coded using PHP scripting language and CSS (Cascading style sheets) to help structure and design the web-pages that will interact with the system users. The framework used to manipulate and write PHP AND CSS was Laravel. PHP language was chosen because of its widespread use at a global scale with multiple web browsers compatibility across various software platforms and various end user devices.
- (ii) Back end: PHP and JavaScript was used to develop the back end structure to develop system functionality modules. Code Igniter was used to code these two back end languages. PHP was chosen for its compatibility and ability to work seamlessly with HTML. PHP code can easily be embedded in HTML pages as well as process form data collected from HTML pages by storing and retrieving such data to and from a MySQL database.
- (iii) Database and Hosting: SequelPro was used to interact with the database and it acts as a local host environment while testing and implementing the system. SequelPro has a Database GUI module that helped develop the database using MySQL (Structured Query Language). SequelPro was selected for its ability to host PHP pages and run MySQL queries through its GUI.

5.3 System Implementation

As for the minimum requirements of the system, the web server required to host the system will need to be PHP 5.5 and MySQL compatible. End user devices such as laptops or desktops will need to have an updated web browser, Stable and secure internet connection in order to login and make payments and also do the bidding, means of payment such as PayPal to carry out transactions and finally a PDF viewer to be able to read the reports generated by the system. Figure 6 and Figure 7 presents the implementation in form of sample programming code segments.

```
#####
# Home Routes #
#####
Route::get('/', 'HomeController@getIndex');
Route::get('/', 'HomeController@getIndex')->name('/');
Route::resource('newsletter', 'HomeNewsletterController', ['except'=>['create', 'index', 'update', 'show', 'destroy', 'edit']]);

#####
# Freelancing Routes #
#####
Route::get('freelance', ['as'=>'freelance', 'uses'=>'Freelancer\PagesController@login']);
Route::post('freelance', 'AuthLoginController@authFreelancer');
Route::get('signup', 'Freelancer\PagesController@getSignup');

Route::get('signup/verificationcode', 'Freelancer\PagesController@getCode');
Route::post('signup', ['uses'=>'Freelancer\SignupController@store', 'as'=>'signup.store']);

//Authentication Routes
Route::get('login', ['as'=>'login', 'uses'=>'Auth\LoginController@login']);
Route::post('login', 'Auth\LoginController@postLogin');
Route::get('user/signout', ['as'=>'sign.out', 'uses'=>'Auth\LoginController@logout']);

//Registration Routes
Route::get('register', 'Auth\RegisterController@register');

//Freelancer Dashboard Routes//
Route::get('dash', ['as'=>'dash.index', 'uses'=>'Freelancer\PagesController@getDash']);
Route::get('community', ['as'=>'community', 'uses'=>'Freelancer\PagesController@getFreelancers']);

Route::get('jobs', ['as'=>'jobs.index', 'uses'=>'Freelancer\PagesController@getJobs']);
Route::get('project/{slug}', ['as'=>'project.single', 'uses'=>'Freelancer\GetProjectController@index']->where('slug', '\w\d\-\_+');

Route::get('proposals/{id}/all', 'Freelancer\ProposalController@getAll')->name('proposal.all');
Route::get('proposals/{id}', ['as'=>'proposal.index', 'uses'=>'Freelancer\ProposalController@index']);
Route::post('proposals/{id}', ['as'=>'proposal.store', 'uses'=>'Freelancer\ProposalController@store']);
Route::get('proposals/{slug}/show', ['as'=>'myproposal.show', 'uses'=>'Freelancer\ProposalController@show']->where('slug', '\w\d\-\_+');
Route::get('job/save/{id}/{user}', 'Freelancer\ProjectController@create')->name('job.save');

Route::get('personalinfo/{id}/edit', ['uses'=>'Freelancer\PersonalinfoController@edit', 'as'=>'personalinfo.edit']);
Route::put('personalinfo/{id}', ['uses'=>'Freelancer\personalinfoController@update', 'as'=>'personalinfo.update']);

Route::get('educationhist/{id}/edit', ['uses'=>'Freelancer\Educationhistory@edit', 'as'=>'educationhist.edit']);
Route::post('educationhist/{id}/store', ['uses'=>'Freelancer\Educationhistory@store', 'as'=>'educationhist.store']);
Route::put('educationhist/{id}/update', ['uses'=>'Freelancer\Educationhistory@update', 'as'=>'educationhist.update']);

Route::get('employmenthist/{id}/edit', ['uses'=>'Freelancer\Employmenthistory@edit', 'as'=>'employmenthist.edit']);
Route::post('employmenthist/{id}/store', ['uses'=>'Freelancer\Employmenthistory@store', 'as'=>'employmenthist.store']);
Route::put('employmenthist/{id}/update', ['uses'=>'Freelancer\Employmenthistory@update', 'as'=>'employmenthist.update']);

Route::get('overview', ['uses'=>'Freelancer\OverviewController@index', 'as'=>'overview.index']);
```

Figure 6: Handling of Routes within the Application

```
1
2 <!DOCTYPE html>
3 <!--[if lt IE 7]> <html class="no-js lt-ie9 lt-ie8 lt-ie7"> <![endif]-->
4 <!--[if IE 7]> <html class="no-js lt-ie9 lt-ie8"> <![endif]-->
5 <!--[if IE 8]> <html class="no-js lt-ie9"> <![endif]-->
6 <!--[if gt IE 8]><!--> <html class="no-js"> <!--<![endif]-->
7 @include('partials._head')
8 <body>
9 @include('partials._menu')
10 @include('partials._nav')
11 <div id="fh5co-page">
12 <div id="fh5co-wrap">
13 @yield('banner')
14 <div id="fh5co-main">
15 @yield('clients')
16 @yield('categories')
17 @yield('howitworks')
18 @yield('testimonials')
19 @yield('counter')
20 @yield('toptal')
21 @yield('features')
22 @yield('getstarted')
23 @yield('faq')
24 @yield('newsletter')
25 </div>
26 </div>
27 @include('partials._footer')
28 </div>
29 @include('partials._scripts')
30 </body>
31 </html>
32
```

Figure 7: Dynamic Rendering of Pages

Figure 8, Figure 9, Figure 10, Figure 11, Figure 12, Figure 13 and Figure 14 presents sample screenshots of the implementation.

5.3.1 Landing Page

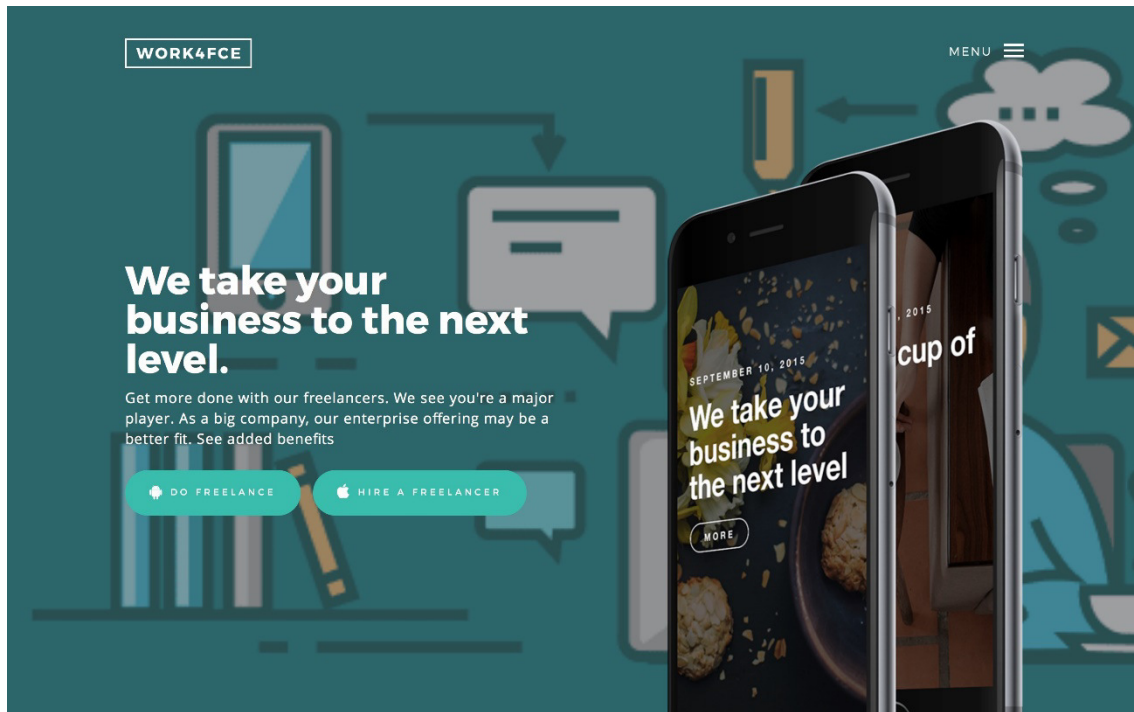


Figure 8: Landing Page

5.3.2 Login Module

Back to Home

Login and get to work

Email
Your unique username to app

Password
Your strong password

☒ Remember login
(if this is a private computer)

Submit

Register

Work4fce - A Freelancers Platform
2016 Copyright

Figure 9: Login Page

5.3.3 Freelancers' Module

Work4fce

Search something special

Ford_Kay Welcome to Work4fce
A step closer to Advancing your career as a Freelancer.

Dashboard information and statistics

4 Jobs since joining work4fce

2 Year Active duration

Account Type: Freelancer

Your Jobs

Job Name	Job Start Date	Job Rate	Job Budget	Date Updated	View Project	Duration	Status
Mobile Dev Master	2017-02-01	KES 2,000/hr	KES 120,000	September 9th, 2016 - 10:55am	pesapoints	1 Month	complete
University Graduation Application Pentesting	2017-02-01	KES 3,000/hr	KES 200,000	November 11th, 2016 - 18:55pm	graduationsu	1 Week	complete
Data Engineer	2017-02-01	KES 2,000/hr	KES 500,000	January 1st, 1970 - 0:00am	bigdata	1 Month	pending
Unity 3D Simple 3D Game Development	2017-02-04	KES 1,500/hr	KES 2,000,000	February 2th, 2017 - 20:58pm	game3d_55	8 Months	pending

Henry Ford
UX/UI Designer
+254-775,623,467

DASHBOARD

FIND WORK

PROFILE

MY JOBS

INCOME

COMMUNITY

PAGE VIEWS

Terms and Conditions

Figure 10: Freelancers' Dashboard

The screenshot shows the 'Freelancer Proposal Submission' interface on the Work4fce platform. On the left is a sidebar with the user's profile (Henry Ford, UX/UI Designer, +254-775,623,467) and navigation links: DASHBOARD, FIND WORK, PROFILE, MY JOBS, INCOME, and COMMUNITY. The main content area is titled 'Twitter API Integration' and contains the following sections:

- Job Details:** A brief description of the project, duration (2 Weeks), start date (2017-02-21), budget (KES 800), and the freelancer's experience level (Beginner).
- Propose Terms:** A section where the freelancer can propose terms. It includes a note: 'Ford_Kay, Your are submitting proposal as a Freelancer. your current rate is set to KES 1,800'.
- Hourly Rate:** A field labeled 'Hourly Rate (This is the amount the client will see on your proposal)' with a value of 1800.
- Service Fee:** A section for the '20% work4fce service fee' with an 'Explain This' link.
- You'll receive:** A field for the estimated amount the freelancer will receive after service fees.
- Cover Letter:** A large text area for the freelancer to write a cover letter.
- Availability/Weekly:** A dropdown menu to select availability.
- Primary Language:** A dropdown menu to select the primary language.
- Attachments:** A section for attachments with a note: 'Attachments (if any, E.g Contract,Agreements e.t.c)' and a link to 'Upload files'.
- Buttons:** 'Submit A Proposal' and 'Cancel' buttons at the bottom.

Figure 11: Freelancer Proposal Submission

The screenshot shows the 'Freelancers' Project Invoice' interface on the Work4fce platform. On the left is the same sidebar as in Figure 11. The main content area is titled 'Strathmore University Invoice' and contains the following sections:

- Invoice Header:** 'Strathmore University Invoice' with a 'Send Invoice' button.
- Invoice Details:** 'Invoice 41383'.
- Freelancer Information:** Henry Ford, UX/UI Designer, Mobile, United States,0900, NewYork, P: +254775623467.
- Client Information:** To: Strathmore University, P: +254.
- Invoice Dates:** Invoice Date: 2017 02 18, Due Date: 2017-03-18.
- Service Table:** A table with columns: The Service Rendered, Start Date, Project Rate, and Total Cost.

The Service Rendered	Start Date	Project Rate	Total Cost
University Graduation Application Pentesting In need of a skilled cyber security analyst, that has extensive knowlege on web and mobile pentesting techniques, to have a look at our new mobile graduation platform.	2017-02-01	KSH 3,000	KSH 200,000
- Summary Table:** A table showing the total costs.

Sub Total :	KSH 200,000
(20%)PLATFORM FEE :	KSH 40000.00
TOTAL :	KSH 160000.00
- Comments:** A section for comments with a note: 'Comments It is a long established fact that a reader will be distracted by the readable content of a page when looking at its layout. The point of using Lorem Ipsum is that it has a more-or-less'.

Figure 12: Freelancers' Project Invoice

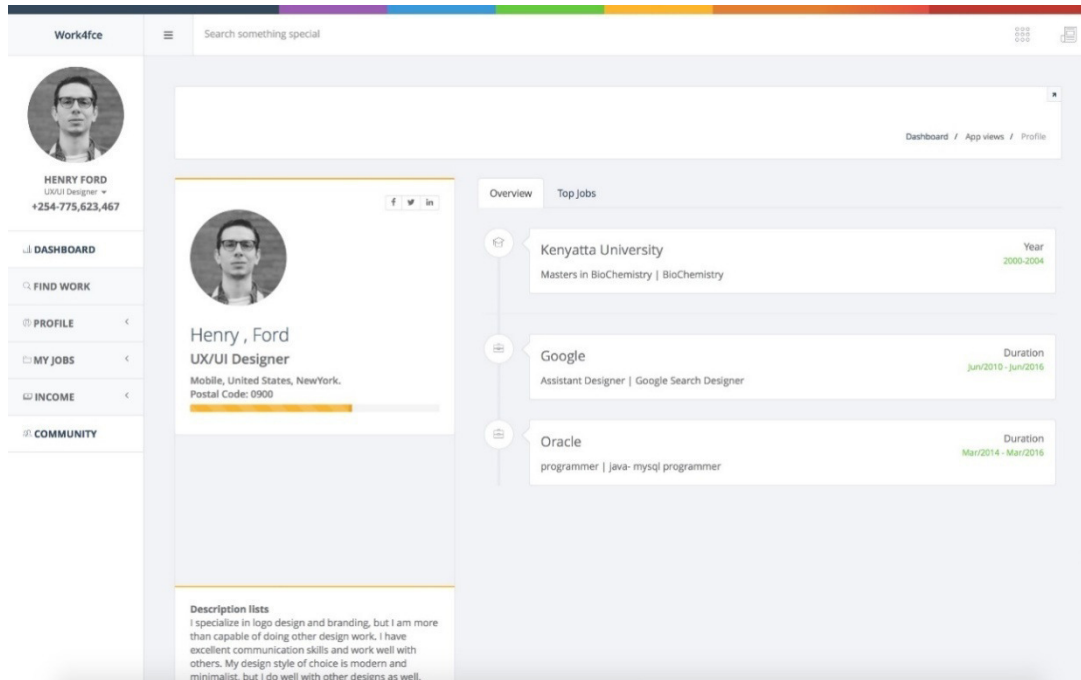


Figure 13: Freelancers' Profile

5.3.4 Organizations' Module

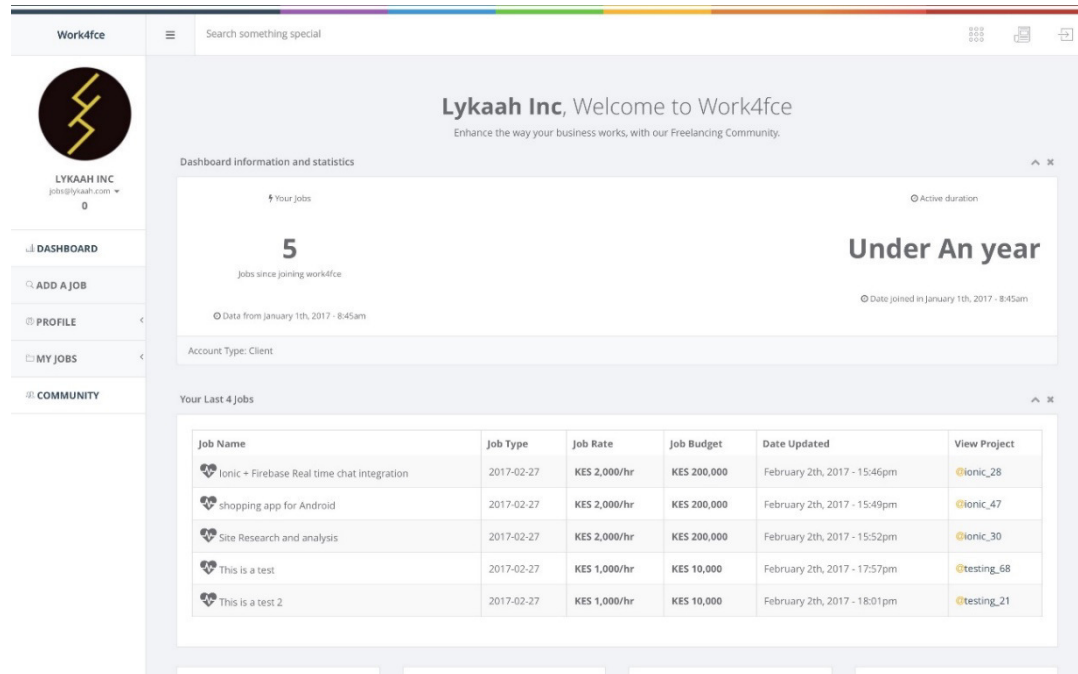


Figure 14: Organizations' Dashboard

6. Conclusion

Organizations and Freelancers can now with a click of a few buttons and browser interactions join a platform that truly works towards achieving a unified goal by signing up on the work4fce platform. People can now utilize their skillset and make a living out of them, dependent on how well they advance in the work4fce community. Organizations on the other hand have a huge pool of competent individuals willing to put in the work, and support the client as if they were employed by them. The work4fce community is what a healthy completion and hiring the right person for your project means, by having freelancers upload proposals and updating their profile to gain better jobs opportunities.

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