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# FEASIBILITY STUDY - PLACEMENT COORDINATION SYSTEM

TEAM NAME: **SE-2019-D2**
SECTION: **D**

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### REVISION HISTORY

| Revision # | Date | Author | Where | Change | Approved by |
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# Contents

# 1. Problem Statement

Placements at many colleges happen in a very haphazard way. Taking our own college as an example, students do not know where the online test is going to be conducted neither do they have reliable information regarding the schedule of the visit to the campus. This project will focus on managing this entire process with an application that will have various kinds of functionalities. The main aim will be to make the entire process smooth, efficient and reduce any kind of confusion.

# 2. Executive Summary

Placements are perennial activities that play a crucial role in the life of a student. While the current system relies on a mail based mechanism, there have been various cases of the information not being made available to the entire student body. Certain situations of malpractices have also been lost under the radar. Better execution of this procedure can play a pivotal role in easing the mindset of a student as he/she enters the examination hall. With the goal of combating these difficulties, this project has been proposed. It aims to build a central and transparent platform that students can rely on completely for all things related to placements. Powered by the cloud, this would be a one stop portal that contains information regarding the details of the respective company, a tentative list of the inbound hirers, as well as a uniform seating allotment system assigned beforehand that would ensure minimal overall chaos.
This document covers the current systems and processes in existence for dealing with some of these problems. It then moves on to mention its shortcomings, and proposes a system that would tackle these problems. A high level block diagram is provided to delineate the workings of the proposed system, followed by a depiction of the basic user interface. An overview of the implementation details are covered in the technology considerations section, along with the customer benefits and potential marketing strategies for the product. The various issues that a developer may come across are also listed, along with a few plausible assumptions and constraints. An alternative solution is described, which provides a perspective on the advantages of the current chosen path. A plan of the project is also formalised towards the end, which aids in defining the end goals in concordance with a tangible timeline.

# 3. Current Systems and Processes

## 3.1 Current Operations

Main operations in the placement coordination system are:

1. **Sharing company details**: Every student receives company details through email. Eligible students have to fill the google form or register on PESU App.

2. **Check every student meets eligibility criteria:** If the company has any eligibility criteria, they send the shortlist for the eligible candidates for the first round. The location of the pre-placement talk is shared.
3. **Pre Placement talk:** Company talks about the job description, work culture, benefits, etc.
4. **Written Test:** The placement head announces the location of the written test. Eligible students take the written test under a proctored environment.
5. **Shortlisting students:** Based on cut off marks, students are shortlisted and they are called for the interview process.
6. **Interview:** We need to make sure that all shortlisted students attend the interview. If someone fails to attend the same, further action has to be taken.

## 3.2 Physical Environment

1. **Computer labs** -Once the company is done with the initial shortlisting of students based on the CGPA cutoff, computer labs are needed to conduct online exam which is a part of the placement process.
2. **Email service** - Currently, to communicate and share company information with the students, email service is being used. Company registration forms are being sent through emails where student fills his details and notes down the date.
3. **Rooms** - After round-1 is over, to conduct face to face interview for the eligible students, rooms are allotted based on the number of students shortlisted for the interview process.

## 3.3 User Organization

Since the system is used in various colleges and universities, users of the system are 3rd and 4th year students aiming to get a job/internship. This system is being used by the placement office to fetch information and status of students registered for placement and any other relevant details.

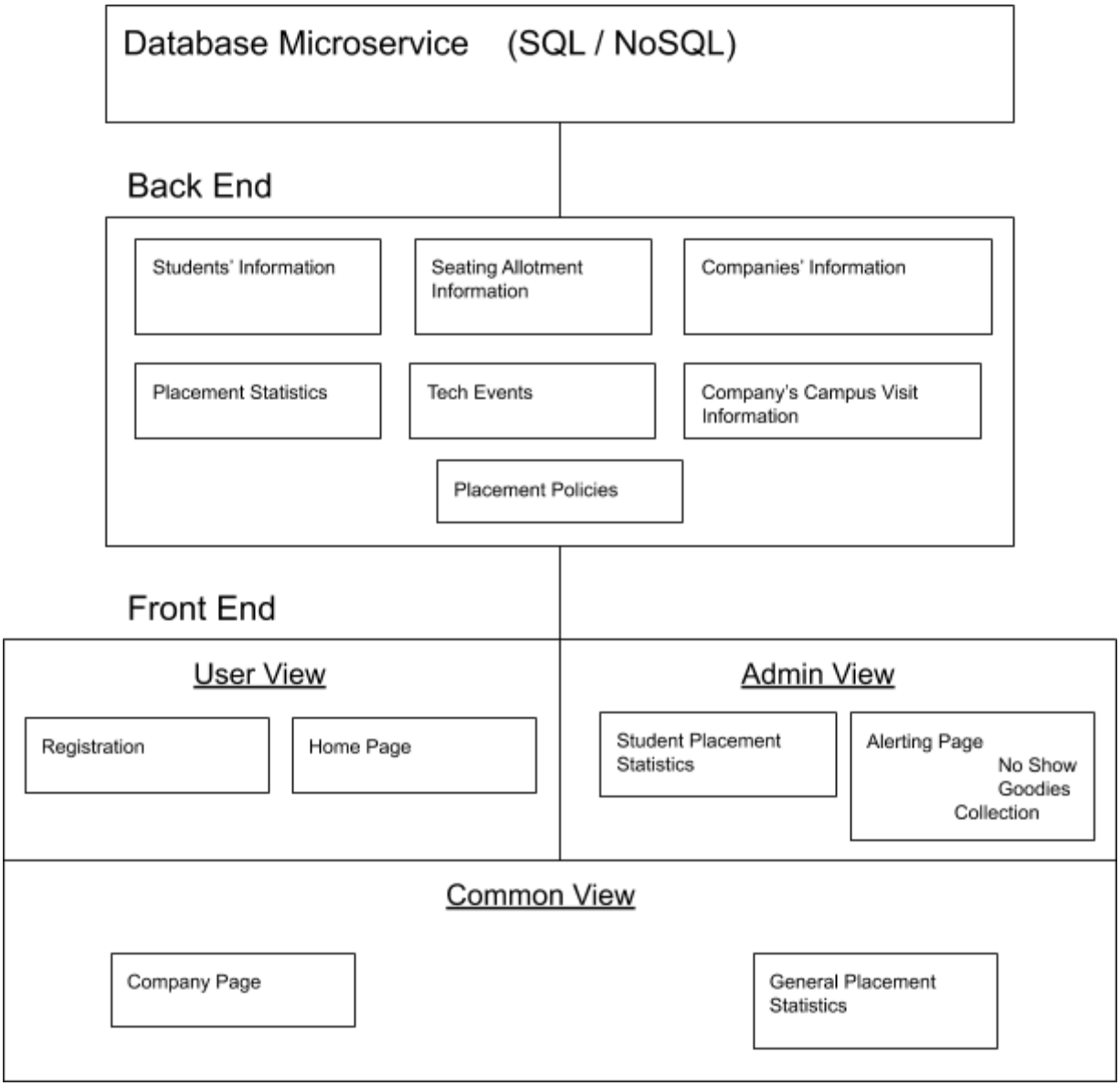
# 4. System Objectives

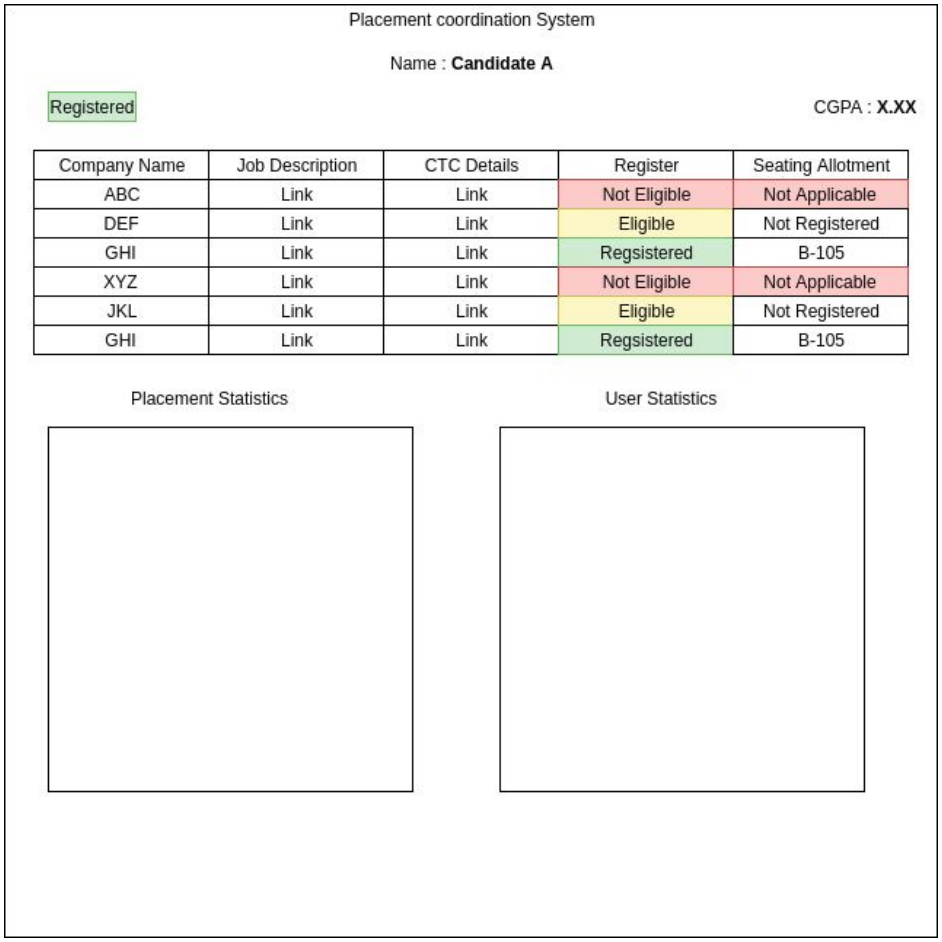
## 4.1 Description of Products and Services

There are a lot of companies that visit the campus every year. Keeping track of each and every company becomes difficult. The current system sends a mail to students every time and students have to register in a google form repeatedly. We are trying to reduce this labour by creating a web application that would include all the details provided by the students and will have all the information related to the company in one place. Many students also give fake data to qualify the first round. This system will reduce such cases. It will also include the seating allotment information for eligible students to appear for Round-1. This system will automatically disallow students who already have an offer (only fte or only internship or fte+internship) or are not part of the placement cycle. Doing so will ensure that the placement process is fast, easy and

efficient. By providing notifications for any last minute changes, students will be aware of the situation and there will be minimal confusion and chaos.

## 4.2 High Level Block diagram showing the solution






## 4.3 Targeted Customers and Benefits

This entire software will benefit both students and the placement office. Students can keep track of the companies that they have registered and get relevant information regarding the whole process with just one click and placement office can upload all the details of the company at one particular place rather than sending mails to all the branch groups.

This software helps students to keep track of the companies that are to visit the campus. It is difficult to keep track of the online tests and the interviews of several companies that are to visit over a week. This software alarms them with a reminder about the upcoming tests and interviews which they have registered.This software helps the placement office to post the schedule and the seating allotment and send it to the registered students.

## 4.4 Technology Considerations

The placement department currently does not have an on-site IT team to implement the digital solution, and has previously tied up with the PES Academy to deploy it on the PESU App. But it is highly unreliable, since there are issues with real-time updates and inconsistent usage of the application, since the department asks students to register through the PESU App only for some of the companies, and relies on emails for the others. The placement department can either outsource this to a company or tie up with the CS department to implement this. Since students of the CS department have the required technical skills, the latter option allows the CS students to develop and test the application. The hindrance here might be the students' hectic schedule, which may result in a delayed deployment. Collaborating with a company can lead to faster deployment, with reliability since there will be dedicated engineers working on application, but is expensive.

The department's IT infrastructure currently consists of desktops in every cabin, with access to high speed internet, which is enough to use the application in real time.

The application will follow a microservices based architecture. The user interface application will be implemented using either Angular 6 or ReactJS. The backend will be split into a set of services, and each of these services will be a small Django application. Each of these services will be deployed in a container and will communicate with each other via REST APIs. This ensures modularity and ease of development. To address scalability concerns, we may implement a Kubernetes based solution in the future, to automate scaling of individual services. NoSQL and Relational databases will be used for storage, which will eventually depend on the type of data that needs to be stored.

The department should consider using AWS/GCP to host the application since it ensures reliability, speed and cost-effectiveness. On the other hand, keeping an in-house server requires a lot of investment upfront, along with reliable power supply.

The placement department will not have to be concerned about the adoption of the application, since the technology literacy of the students as well as the placement department is already very high.

## 5. Product/Service Marketplace

The primary idea of our placement coordination system is to keep track of inbound companies, registration of students and also seating arrangement of students. As placements at many colleges happen in a very haphazard way, our software can be used by the PESU Placement cell. This software can be used by other colleges and software organizations too.

Upwork, LinkedIn, Glassdoor and many more job portals already have very well maintained and established online presence for off campus placements. As there's no such portals available for on campus placements, this software is going to provide a convenient way for students, placement cell and also companies.
Talking about placements in our college, registrations and all the updates are done through either PESU app or Email. Our platform will include features like one-click registration, calender system for notifications, keep track of offered students, seating allotment etc.

### Why should you use this software?

- It will *create awareness among students regarding available career options and help them in identifying their career objectives*.
- It will ensure *Time efficiency*.
- Seating allotment information for every placement activity.
- Reducing malpractices by keeping track of the students who are offered internships, tier-1 company, etc.
- One click registration for students which means students don't have to fill their information for each and every companies which *reduces data generation and unnecessary updates*.

## 6. Marketing Strategy

The first step of the marketing strategy is to showcase the current drawbacks with the fragmented placement process to the authorities. After highlighting the drawbacks, a list of advantages with respect to our software can be listed out. For example, one click registration of students. After this, continuous demo of sub products or partial deliverables could be shown to attract the placement office to use the software. After this, in a beta version, we could run a demo with the full software and show them all the specifications.

In the later stages we are trying to spread the application across others colleges and college students. As most of the college students are active on social media we can use paid advertisements and internet marketing to spread our idea. But not all of them are attracted towards social media ,so we can visit targeted college campus and conduct seminars, workshops, or presentation that creates a buzz through word-of-mouth. This is a great way to involve students and show them what we have to offer. To attract the placement offices we can post the demo of our sub products on youtube.

## 7. Organization and Staffing

Currently there will be 11 students working on this project in various domains like front-end, back-end, data analytics, and cloud computing. Once the software is up and running, a minimum of 5 people would need to maintain the software for long run. There can be multiple updates that need to be done based on the dynamic nature of how placement happens every year. To make it even simpler, a shift to an android application might be desirable to make it more convenient and additional staffing for android developers need to be created. Since the company is thinking of expanding every year, additional staffing of at least 50 might be needed

## 8. Schedule

Placement Coordination system project is expected to take two -three months from project approval to launch. The following is a high level schedule of some significant milestones for this initiative:

### High Level Overview (Subject to Change)

| **Date** | **Task** |
|---|---|
| **Aug 20th, 2019** | Initiate Project |
| **September 2nd, 2019** | Project kickoff meeting and Database creation and population begins. |
| **September 8th, 2019** | Database populated. Assigning work to the subteam. |
| **September 15th, 2019** | Basic UI completed |
| **September 29,2019** | Work on backend |
| **October 20th, 2019** | Completion of the backend and Starting Integration |
| **October 25th, 2019** | Completion of Integration, Testing begins |
| **November 10th, 2019** | Completion of the project |

## 9. Financial Projections

The financial projections for the placement coordination system is highlighted below.
Assumptions are:

1. Year-1: Only one college uses this software
2. Year-2 : colleges in Bengaluru use the software
3. Year-3 : Karnataka colleges use the software
4. Year-4 : All Indian colleges use the software

| **Measure** | **Year-1** | **Year-2** | **Year 3** | **Year 4** | **4 year total** |
|---|---|---|---|---|---|
| Application sales projection | Rs 50 lakhs | Rs 4.73 crores | Rs 30 crores | Rs 100 crores | Rs 135.23 crores |
| | | | | | |
| Cloud computing costs | Rs 1 lakh | Rs 20 lakhs | Rs 1 crore | Rs 10 crores | Rs 11.21 crores |
| Additional staffing costs | Rs 20 lakhs | Rs 1 crore | Rs 10 crores | Rs 30 crores | Rs 41.20 crores |
| Training for sales and marketing staff | Rs 10 lakhs | Rs 5 lakhs | Rs 3 lakhs | Rs 2 lakhs | Rs 0.20 crores |
| Design and Build of Online platform | Rs 5 lakhs | Rs 15 lakhs | Rs 1 crore | Rs 10 crore | Rs 11.20 crores |
| **Total additional costs** | Rs 36 lakhs | Rs 1.4 crores | Rs 12.03 crores | Rs 50.02 crores | Rs 63.81 crores |
| | | | | | |
| Cash inflow | Rs 14 lakhs | Rs 3.33 crores | Rs 17.97 crores | Rs 49.98 crores | Rs 71.42 crores |

# 10. ISSUES

After a detailed prognosis, the following points have been mentioned as commonly encountered issues:

1. Susceptibility of the Database to Race Conditions - in scenarios where the database is accessed simultaneously by a large number of users, it is possible to encounter race conditions.
2. Immunity to Security Issues:
    a. SQL Injections - a type of web application security vulnerability in which an attacker attempts to use application code to access or corrupt database content.

   b. Cross Site Scripting (XSS) - which targets an application's users by injecting code, usually a client-side script such as JavaScript, into a web application's output. The concept of XSS is to manipulate client-side scripts of a web application to execute in the manner desired by the attacker, allowing them to execute scripts in the victim's browser which can hijack user sessions, deface websites or redirect the user to malicious sites.
   c. Broken Authentication & Session Management - possibility to wreak havoc on the seating allotment.
   d. Insecure Direct Object References - when a web application exposes a reference to an internal implementation object (files, database records, directories and database keys) to gain access to a user's personal data.
3. Scalability of the system according to the traffic of users - a kubernetes orchestration tool should be in place for overcoming this issue.
4. Learning Curve - knowledge of React and Django required to develop the full stack of the application.
5. Reduction of downtime of the system - ensured via High Availability.
6. Ability of the application to serve data dynamically.

# 11. Assumptions and Constraints

The assumptions made are:

1) The application will be up and running throughout the year since the placement happens throughout the year.
2) The application will have a team monitoring it, and will change the business logic in scenarios where the placement rules might change sometime in the future. The team will also need to address any scalability issues, since the number of students are increasing year by year.
3) The application should be the go-to solution for the placement department. This means that the placement department should adopt this application to suit their needs 100%. If not, they may run into the current fragmented process all over again.
4) The placement department should allocate a fixed budget every year to update the application to the latest standards, along with migration to future device platforms.

The constraints are:

1) The proposed budget to maintain the application may be out of scope for the placement department.
2) The adoption of this application will require approval from multiple levels of authority.

# 12. Alternatives

## 12.1 Alternative 1

A possible alternative for placement coordination system would be to manually handle the placements . Students can be informed about companies visiting campus via email, which could

be automatically synced to their calendar and registration can happen as and when companies arrive through google forms. Student information can be verified by getting details from the COE. A general seating is provided by allocating labs and rooms. Any last minute changes or any urgent notices will have to be broadcast to all students via email.Tracking of students that have offers will also have to be handled manually or maintained in a database.

This alternative offers less cost and resources, but is also time consuming, labour intensive and inefficient since tracking students happen manually. Students need to keep filling the form repeatedly with the same set of information.

# 13. FINDINGS AND RECOMMENDATIONS

Based on the information presented in this feasibility study, it is recommended that the university adopts the proposed Placement Coordination System. The findings of this feasibility study show that this initiative will be highly beneficial to the organization and has a high probability of success. Key findings are as follows:

## 13.1 Project objectives

- Summary of issues concerning:
    - Development and Implementation: The learning curve for the backend and frontend, as well as the scalability issue, are crucial for the implementation of this project.
    - Assumptions, constraints and limitations: Monetary constraints, though minimum, still play a pivotal role in the success of this project.
    - Project scope: By the end of this project, we aim to establish a transparent system that ensures a smooth operation throughout the placement season.

- Results of Research:

Technology:

- The existing authentication system of the PES application would be continued as it has already been well established.
- The database would be leveraged using Amazon's AWS.
- The backend of the application would be developed using Django - a Python web framework - and the frontend would be built using Angular. These have been chosen to ensure extensibility of the application.

- Once in place this technology is simple to operate and maintain for a relatively low cost.

Marketing:

- This initiative will allow the Placement Cell to reach out to a larger number of companies via a more methodical procedure.
- It will also ease the process of taking tests/interviews by leveraging the more transparent system.
- Malpractices would also be lowered to a great extent.

Organizational:

- There would not be any change to the existing organizational structure.
- No new facilities are required since the entire application is cloud based.
- Capital Investments would be minor, limited to the credits required for the online infrastructure.

Significant risk factors

Feasibility recommendation

## PROJECT PLAN

1. **Deliverables of the Project:** A web based application to manage the entire placement process hosted on cloud.
2. **Process Model which you intend to follow:** We intend to follow an agile model since people and interactions are emphasized rather than process and tools. Customers, developers and testers constantly interact with each other and working software is delivered frequently.

3. **Identification of the upstream-downstream partners needed for the product:**
    a. **Upstream Partners:** Respective Companies and the Placement Cell
    b. **Downstream Partners:** The Student Body
4. **Resources needed for the project/product:** Cloud infrastructure
5. **How are you organizing your team in the project:** We will be splitting the entire team into a team of 3 and divide the task equally within these teams.
6. **Standards-Guidelines-Procedures:** The entire project will be orchestrated via Github.
7. **Communication Mechanism:** There will be regular skype call and in person meeting with the team and a google sheet will be maintained to keep track of where each of us is in the task assigned to us.
8. **Risks:** Inherent schedule flaws due to other events in college.
9. **Quality Criteria:**
    a. No software bugs of high severity and high priority are discovered in the course of manual and automated testing
    b. The application meets the requirements specified above
    c. All the application functions and features are successfully implemented
10. **Work Packages :** Since the team is going to be further divided into 3 teams, each team gets to work on the subset of the functionalities that are expected. This included front-end as well as back-end.
11. **Delivery Means:** A web-application that will be used by both the placement office and students to manage and get information about placement activities