

Chapter 1: Information Technology Requirements

Introduction

Bachelor of Commerce, Major in Business Analytics, and Bachelor of Information Technology, Major in Web and Mobile App Development. I will be writing from the Information Technology standpoint. This will allow me to provide the IT knowledge that will allow our commerce teammates to focus on their strengths.

Solution Description

The GradeUp education platform will be a web application accessible via desktop or mobile. Students will be provided a username and password from their schools to access the platform. From there, they can complete modules, play educational games, and download resources stored in the MongoDB Atlas database.

Educators and tutors will have access to the platform via a username and password. This will give them a different interface in order to upload resources and check student progression. The platform will be hosted on dedicated GoDaddy servers to reduce performance problems. A custom domain name will be used to create an easy to remember URL.

The development team will utilize Microsoft Office and GitHub Teams to complete their work and maintain the codebase. Further, the development team will have access to Adobe Photoshop to help create a visually appealing platform.

Staffing Requirements

1 Senior developer

The senior developer will be responsible for leading the development and maintenance of the platform. This person will act as a role model and mentor for the junior developers. As such, this person will have a major input regarding the GradeUp platform.

Responsibilities:

- Liaise with customers to understand their problems, needs, and preferences to improve the platform.
- Provide support (in-business hours) for technical problems.
- Lead and upskill the junior developers.
- Maintain and upgrade the codebase to support new modules, functionalities, and other progressions for the platform.
- Provide administrative support for the junior developers.
- Perform unit testing and lead user testing to ensure all code is quality and error free.

Requirements:

- 5+ years of relevant experience.
- Evidence of leading a team.
- Knowledge and understanding of Agile methodologies, the software development lifecycle, and programming best practices such as DRY.

Desired but not required:

- Customer service and interaction skills
- Knowledge of modern technologies and methodologies such as Azure, .NET, DevOps etc. Knowing how to use them is not important, but rather knowing how they could be used for future development and platform improvements.
- Working With Childrens Check.
- Graphic design skills.

Salary:

- **\$120'000 per year*.**
 - * Based on the lower end of average senior developer salaries (Glass Door 2023). A lower salary is required given the platform being small in the first 3 years before major expansion nation-wide.
 - Role taken by CTO, Tynnan Conquit.

2 Junior developers

Junior developers will be the future of the GradeUp development team. These individuals will be motivated, willing to learn, and eager to dive right into an agile development environment. These individuals will learn from a senior developer and be given the opportunity to grow into senior roles, or specializations, in line with the expansion of GradeUp. This role is open those willing to learn and grow, not just those who have the below qualities.

Responsibilities:

- Liaise with customers to understand their problems, needs, and preferences to address issues and improve the platform.
- Provide support (in-business hours) for technical problems.
- Maintain and upgrade the codebase to support new modules, functionalities, and other progressions for the platform.
- Perform basic unit testing and user testing to ensure all code is quality and error free.

Requirements:

- Evidence of working in a team environment.
- 1+ years of relevant experience OR undergraduate degree in a relevant field.
- Knowledge and understanding of Agile methodologies, the software development lifecycle, and programming best practices such as DRY.

Desired but not required:

- Customer service and interaction skills
- Knowledge of modern technologies and methodologies such as Azure, .NET, DevOps etc. Knowing how to use them is not important, but rather knowing how they could be used for future development and platform improvements.
- Working With Childrens Check.
- Graphic design skills.

Salary:

- \$70'000 per year*.
 - * Based on the lower end of average junior developer salaries (Glass Door 2023). A lower salary is required given the platform being small in the first 3 years before major expansion nation-wide.

Software and Hardware Requirements

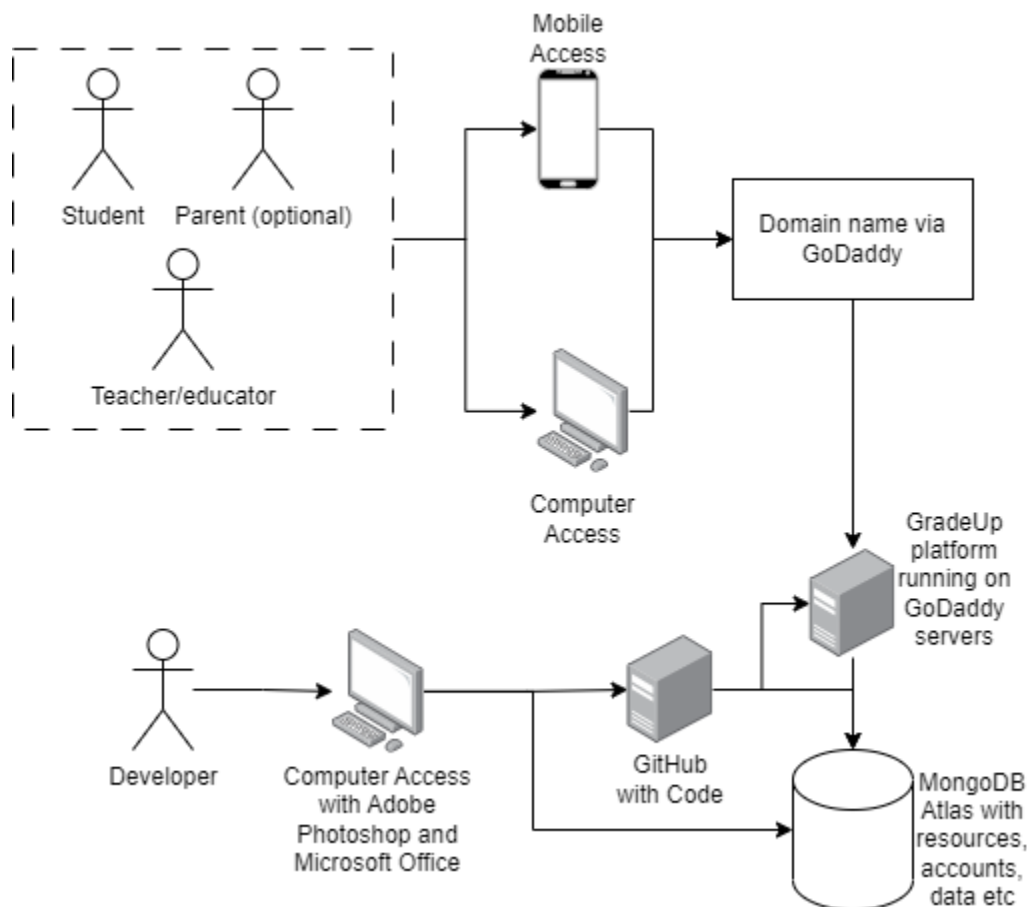


Figure 1: System architecture diagram for the GradeUp platform and development system (Self made).

Software

Dedicated server hosting

GoDaddy Dedicated Servers

Price: \$279.95/month (GoDaddy 2023)

Description: DS-64 dedicated servers are remotely accessed to allow the GradeUp platform to operate on powerful hardware leased from GoDaddy. 64GB of DDR4 RAM, server monitoring, single-tenant infrastructure, and RAID-1 are amongst the features creating a reliable platform where attacks and errors are easy to address (GoDaddy 2023).

Domain Name, Web Host and Email

GoDaddy

Price: \$7.95/month (GoDaddy 2023)

Description: GoDaddy offers a plan containing a custom domain name and email address, packaged with one website (GoDaddy 2023). This provides the professional URL necessary to access GradeUp, and allows for a unified naming convention across web browsing, email, social media etc.

Database

MongoDB Atlas

Price: \$57/month (MongoDB n.d.)

Description: MongoDB Atlas on dedicated servers provides a range of features creating a powerful platform for storing, managing, and monitoring data. This cloud service will allow for data to be reliably and securely accessed even during high traffic periods, and the flexibility available will be beneficial during the growth of the platform.

Graphic design software

Adobe Photoshop

Price: \$29.99/month (Adobe 2023)

Description: Adobe Photoshop will provide the developers with the ability to create custom and high-quality visuals. This also contributes to creating a professional looking website to appeal to schools and other stakeholders.

Collaborative development environment

Github

Price: \$4/user/month (GitHub 2023)

- \$12/month for the 3 membered GradeUp IT team.

Description: GitHub will allow the developers to store and share code in a central repository. This can provide version control, allow for remote access, and make monitoring for unauthorized changes easier.

Word editing/general office software

Microsoft Office for businesses

Price: \$8.20/user/month (Microsoft 2023)

- \$24.60/month for the 3 membered GradeUp IT team. This can be expanded to include members from other departments.

Description: This suite of software will provide the basic word editing, spreadsheets, cloud storage and other functionalities that are used day to day in any business. This also includes Microsoft Teams, allowing for messaging and video conferencing.

Hardware

Computers: Price: ~\$1400/user (Empower IT n.d.).

Description: A good computer for development will generally perform better with more RAM and a newer CPU, such as the 16GB RAM and i5 offered in the Inspiron desktop (Dell n.d.). This purchase assumes the inclusion of a standard monitor, mouse, and keyboard.

Level 0 Data flow diagram

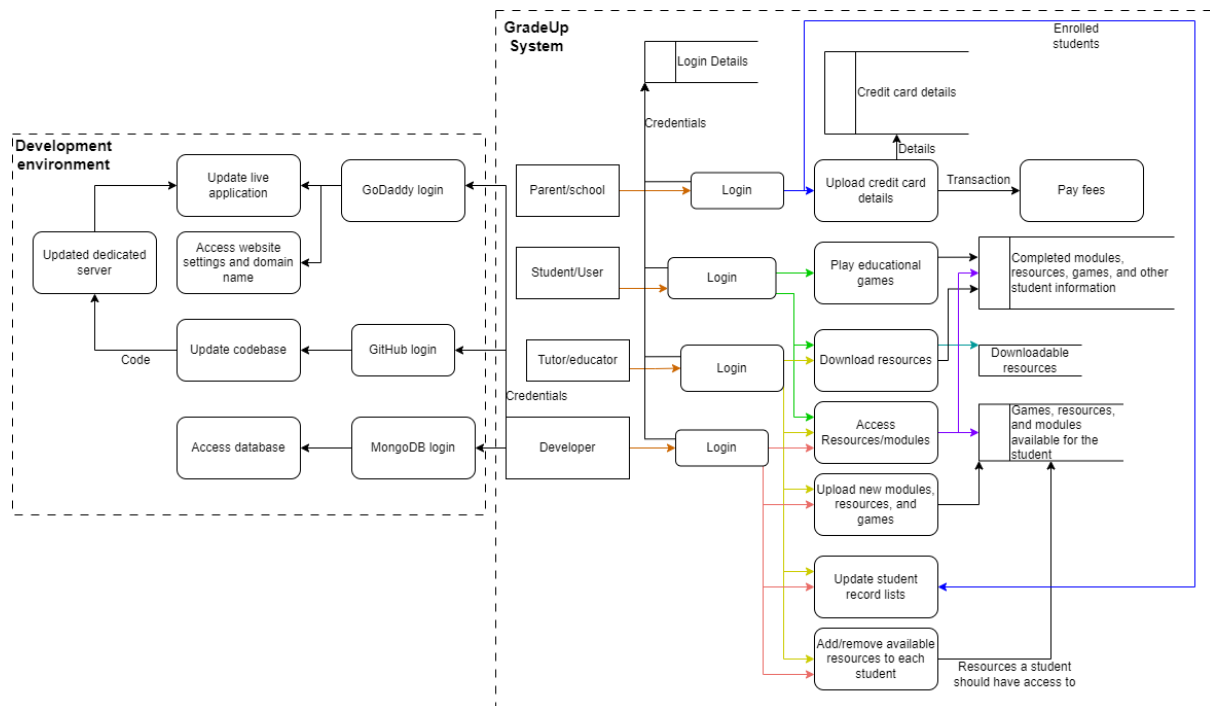


Figure 2: Level 0 Data flow diagram of GradeUp and the development environment (Self-made). Coloured lines are for readability, they provide no additional information.

System Architecture Diagram

Security Considerations

An online platform like this will face many challenges. Credentials can become leaked leading to stolen credit card information. The privacy of personal information regarding minors is vital. Passwords made by children will be easily guessed etc. Some basic security techniques include:

- Utilize Hypertext transfer protocol secure (HTTPS) for the web application. This will allow for the encryption of data being sent between senders and receivers, making it harder to read and steal data.
- Enforcing passwords are complex, using letters, numbers, and special characters. Further, ensure passwords are updated regularly as part of a business security protocol to prevent credential scraping. Children however will struggle with complex passwords. Thus, a unified login for all school resources, including GradeUp, could be considered to reduce the number of passwords the children require. This will also allow for security monitoring on one, not multiple, school resources, reducing complexity.
- Limit the amount of user data stored and used. The less valuable the data, the less likely it is to be targeted.

There are many more issues that must be considered in a detailed security analysis beyond the scope of this document.

Alternative solutions

The current solution focuses on in-house development. However, outsourcing development is also an option. This would involve hiring 1 senior developer and utilize services and businesses offering IT solutions. These businesses will create a platform and website, organize resources, perform upgrades, handle errors, and address user problems. However, as the business grows, keeping development and data related activities in-house will be vital. This will provide increased security as company data and code will be under GradeUp's control and won't be exposed by other companies' poor practices. Thus, the switch to hiring developers is an inevitable outcome.

Outsourcing development will cost \$110/user/month (Steadfast Solutions 2020) (TechPath n.d.).

Timeframe for Testing, MVP, Public Release, Planned Upgrades

The expected time frame for a basic MVP will be around 6 months (SPD Load n.d.) (Jones 2022). Beyond this, a plan has been established for upgrades and growth of the customer base.



Conclusion

To conclude, this chapter outlines how a 3 member IT team will lead the application development and maintenance of the online GradeUp platform. This platform, hosted by GoDaddy, will utilise the highly flexible MongoDB Atlas database platform in order to securely store data, and make monitoring easy. Finally, the IT team will have access to a range of tools to aid in developing an easy to use, visually appealing, and easy to upgrade application. The flexibility provided through in-house development means the application can be entirely catered to the desires of the students and teachers. Finally, keeping development in-house will help keep data security in our control. These will combine to make an application that will attract students' attention, gamify learning, and provide access from any platform to allow education to happen anytime, anywhere.

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