# CS 255 Business Requirements Document Template

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# CS-255 System Analysis and Design

## System Components and Design

### Purpose

Liam, the owner of DriverPass and their IT officer are looking to contract our team to develop an online system to help address the high failure rate at local DMV driving tests. This system will give drivers enhanced training, support, practice tests, and schedule in-person training. The modern platform for DriverPass will not only enable customers to succeed at their driver tests but also help DriverPass manage their operations more efficiently. Cloud infrastructure will be leveraged to offer a resilient and scalable system, facilitating access by computer and mobile devices, further supporting business expansion.

### System Background

We are tasked with building a system that can facilitate the entire DriverPass training process from registration and scheduling to tracking progress and staying up to date with DMV regulations and sample questions. This system will not only prepare customers for their driving test, but it will also help employees manage day-to-day business operations. Several key components are needed to complete this project.

User management to help separate employees from customers will help organize data while keeping it secure. Multiple roles may be necessary to support multiple levels of staff and clients.

A registration module is needed that must support online and offline scheduling. Customers should be able to book an appointment by calling our office or through the website using their mobile phone or computer. The ability to track available drivers, vehicles, and lesson times will be necessary as well as an intuitive interface to display this data.

Tracking and reporting are also key aspects of the DriverPass system. Real time updates on test progress should be accessible for client convenience, while a history of user and employee activities should be recorded to ensure accountability.

A compliance module should be developed to ensure constant updates from the DMV are applied to all training material and practice tests.

An administration module is essential to ensure smooth operation of the entire system. Key personnel will access this module to update documentation, reservations, and manage user accounts. There should also be a dashboard for key systems and business metrics to help inform everyday business decisions.

### Objectives and Goals

Upon completion of the project, we should have a functional system that can accomplish the following:

The system should leverage cloud infrastructure and be accessible from any computer or mobile device. Through cloud deployment for the DriverPass system, we can provide an accessible system that ensures high uptime, while also allowing the cloud platform to handle some basic security and network tasks.

There should be a robust registration system to capture the clients' personal and payment details, while being able to handle many users, at least 10,000 to start. We can leverage our cloud infrastructure to increase this number as the company grows. The registration system should be flexible and allow users a selection of services to register for.

The system should allow users to book, cancel, and modify driving lessons through an online interface or by contacting the DriverPass office. Updates made to any bookings should be reflected in real time to keep the system accurate and up to date.

User and employee activity should be recorded and archived to ensure accountability and provide audit logs for reservations and any modifications. These audit logs should be made available in the administration dashboard in real time for easy monitoring and management.

The system will ensure all training material, practice tests, and supporting documents are up to date and in compliance with DMV regulations. The system will be automated to update the system during low-traffic hours every business day to ensure 100% compliance.

Support for multiple user roles will keep user and employee data and privileges separate. This ensures that users and employees only have the access and privileges they need. Key personnel will be able to manage user and employee roles through the administration dashboard.

## Requirements

### Nonfunctional Requirements

#### Performance Requirements

The DriverPass system should operate efficiently in a web-based environment, accessible via both desktop and mobile devices. This will ensure maximum accessibility for users and employees.

The system should be responsive, with page load times of under 1.5 seconds for all major operations. Real-time updates for booking and scheduling should occur within 1 second. The system should monitor the speed of requests and responses and flag support staff of any potential issues.

The system should be updated during the hours the system experiences the least amount of network traffic, with regular updates scheduled quarterly and emergency updates should be deployed as needed.

#### Platform Constraints

The system should be cross-platform compatible, which is achieved through its web interface. This will allow the system to be accessible from Windows, Mac, Linux, and Mobile devices. This will allow users and employees to connect and access the system regardless of their platform and location.

The system should be deployed to a Linux-based server, leveraging open-source libraries and frameworks to avoid licensing fees and save on development costs. A robust database management system such as PostgreSQL or MySQL is needed to manage user data, booking information, and other critical data.

#### Accuracy and Precision

A robust and flexible role management system is needed to distinguish between users and employees. Users will be identified by unique usernames and require an email address for registration.

The system will be able to handle case-sensitive input to ensure data integrity, which is essential to allow users to select secure passwords and unique usernames.

A real-time notification system should be implemented for employees. This internal notification system can be used to inform employees of issues such as failed updates, data breaches, or system downtime. Noncritical issues can be saved to an internal log that is checked daily.

#### Adaptability

Employees should be able to manage user roles through an internal dashboard, and it should be accessible through a user-friendly interface. This will give employees the ability to elevate a user's privileges as needed.

Platform updates should be designed to cause minimal disruption to business activities. The system can monitor the network traffic and evaluate the best times to update critical infrastructure, providing minimal impact to clients. Employees should have the ability to modify or override these scheduled downtimes and updates through an internal dashboard.

IT admins will need access to system configurations, database management configurations, and daily logs. They should have access to the tools used to monitor network traffic and the data to perform security audits as needed.

#### Security

Users must log in with a unique username and password. User accounts also require a valid email address that should be verified with a verification email pre-registration. Multi-factor authentication through SMS or 3rd party authenticator can also be provided to enhance user security.

All data sent between server and client should be encrypted to ensure secure communications. Server security certificates must be acquired and maintained to improve user confidence in the security of their connection.

Users who forget their password can recover their account through a recovery process through their verified email address. The user can opt to provide security questions as a fallback recovery method. Administrators can assist with password resets in extenuating circumstances, but only if the user can provide personal identifying information that matches their active DriverPass account.

The system should sanitize inputs of dangerous characters as well as monitor system authentication traffic to detect any brute-force attacks, where a user attempts to repeatedly log in to a user account in rapid succession. The system should rate-limit requests to vulnerable endpoints, limiting users to a few requests within a reasonable amount of time. This will not only protect user accounts from brute-force attacks but can also help prevent denial of service attacks.

### Functional Requirements

* The system shall validate user credentials upon logging in.
* The system shall allow users to register for an account with a unique username, password, and email address.
* The system shall enable users to book, cancel, and modify driving lessons online or over the phone.
* The system shall provide real-time updates on bookings and modifications.
* The system shall track and report client progress through their tests and modules.
* The system shall maintain proper logs of both user and employee activities and interactions for audit purposes.
* The system shall be regularly updated with new training material and ensure all modules and tests are up to date with DMV regulations and requirements.
* The system shall provide multiple user roles. This supports different privileges and actions for employees, admins, and clients.
* The system shall generate and archive business metrics and system analytics, accessible through an internal dashboard.
* The system shall leverage modern TLS/SSL encryption to secure server client connections.
* The system shall allow users to reset their passwords through a secure process.
* The system shall monitor the network for brute-force and denial of service attacks and provide security logs for all network events.
* The system shall provide a real-time notification system for employees and administrators for critical systems and user issues.
* The system should automatically apply system updates during low-traffic hours.

### User Interface

* *The user interface should be intuitive and easy to use. It should also be accessible for users with limited hearing or vision.*
* *The layout of the web interface should be responsive. This will improve accessibility on various devices with different display sizes.*
* *Navigation should be prominent and clear. A main navigation bar and be displayed at the top of the layout and provide drop down menus for related features and pages.*
* *Navigation, buttons, and other user interfaces should be colorful and prominent, allowing for both mobile and desktop users to easily navigate with either a keyboard and mouse or mobile touch device.*
* *The different users that will utilize the interface include clients who will book lessons, access practice tests, and training modules. Employees who will manage client bookings, track lessons, and update training material. Admins who will oversee system operations, user accounts, and audit logs.*
* *The primary ways all users will interact with the system will be through a mobile or desktop web browser, providing high accessibility across platforms.*

### Assumptions

* *Users have access to modern web browsers and have a reliable internet connection.*
* *Clients and employees have basic computer skills.*
* *The technologies used to build the platform will support scaling as the users grow.*
* *The DMV has an accessible application programming interface (API) and has digitized their rules and regulations for easy implementation.*

### Limitations

There are several key limitations at the system level and resource level to consider.

**System Level Limitations**

* Dependent on DMV updates for regulation compliance. As mentioned in the assumptions, we are dependent on the DMV providing access to modern and up-to-date training material and regulations.
* Potential latency in real-time updates during peak usage. Under heavy user load, real-time notifications could degrade if not engineered appropriately.
* Training material is currently limited to learning modules, practice tests, and scheduled in person lessons. Other innovative methods like games, virtual experiences, and other digital solutions have not been considered.

**Resource Limitations**

* A limited initial budget can restrict the scope of features and overall size of the development team.
* Time constraints may prioritize essential features over desired ones.
* A highly scalable system requires specialized developers who can engineer scalable systems to serve many users. These specialized developers and systems can **potentially** increase development and operations costs.

### Gantt Chart

A gantt chart was created to help facilitate the development of the application within the specified timeframe for the project.

