**DriverPass Business Requirements Document**

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Table of Contents

[System Components and Design 3](#_Toc120000429)

[Purpose 3](#_Toc120000430)

[System Background 3](#_Toc120000431)

[Objectives and Goals 4](#_Toc120000432)

[Requirements 4](#_Toc120000433)

[Nonfunctional Requirements 4](#_Toc120000434)

[Performance Requirements 5](#_Toc120000435)

[Platform Constraints 5](#_Toc120000436)

[Accuracy and Precision 6](#_Toc120000437)

[Adaptability 6](#_Toc120000438)

[Security 7](#_Toc120000439)

[Functional Requirements 8](#_Toc120000440)

[User Interface 9](#_Toc120000441)

[Assumptions 10](#_Toc120000442)

[Limitations 10](#_Toc120000443)

[Gantt Chart 11](#_Toc120000444)

[References 12](#_Toc120000445)

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# System Components and Design

## Purpose

The purpose of this project is to provide a Business Requirements Document for our client DriverPass based on their desire to implement a driving training system. DriverPass has identified a void in the marketplace with regards to providing training to people who need to take the driving exam at their local Department of Motor Vehicles (DMV). The system they are proposing is intended to make driving training easily accessible on the web and available on mobile, laptop, and personal computing devices.

## System Background

DriverPass has identified that 65% of students fail their driving exam the first time they take it. DriverPass attributes this to lack of available training, or that driver training is not easily accessible, and therefore students do not have the tools to prepare adequately for the exam. DriverPass wants to fix this problem by offering online training courses and practice tests, as well as to easily schedule on-the-road driving lessons.

The system they want to implement has the following the following components:

* Cloud-based architecture
  + Cloud provider should provide infrastructure, backup, and security features
  + Web-based interface accessible from PC or mobile devices
* Security
  + Role-based access control (RBAC) (rights and privileges for accounts)
  + Record auditing (who and when somebody changes a record)
  + Printable activity reports
  + Password change management
* A relational database management system (RDMS)
* Online training courses and practice tests
* Registration system
* Reservation system for scheduling on-the-road driving lessons
* Lesson Packaging
* Reports that can be downloaded in various formats (excel, etc) to be used offline
* Interface with DMV system to get up-to-date policies, rules, and sample questions
  + Get notification when there are updates

The system will also consist of physical resources that will be represented as objects of the system:

* Customers, drivers, and employees (owner, secretary, IT administrator)
* 10 vehicles

## Objectives and Goals

Upon project completion, the system will provide the user with the following functions and measurable tasks:

* View the DriverPass web-application from any device
  + Register as a new student using web-based form, phone call, or office visit
  + Choose among three lesson packages to enroll in
  + Attend online training classes and complete practice tests
    - View status of tests that are in-progress and completed
  + Make reservations to take on-the-road training
    - Reserve a day, timeslot in 2-hour increment, and vehicle
    - Set a pickup and drop off location
    - Identify special needs
  + Make changes to their profile information, as well as reset their password

Upon project completion, the system will provide DriverPass with the following functions and measurable tasks:

* + Implementation of security, auditing, access, and accountability controls via cloud provider
  + Ability to track changes to accounts and reservations
  + Ability to view and download security reports
  + View, maintain, and access data from web using any type of device
  + Ability to download reports for offline access
  + View and maintain student progress
  + View, maintain, and perform student registration and reservations
  + Ability to customize, add, or delete packages in the future
  + Maintain compliance of DMV rules, policies, and exam questions
  + Get notification when there are changes to DMV rules, policies, and exam questions

# Requirements

## Nonfunctional Requirements

The following section details nonfunctional requirements associated with the proposed DriverPass system.

### Performance Requirements

The main requirement of this system is that shall be accessible from any type of device, and from anywhere. This premise supports the whole driver for the system: increasing accessibility of driving exam preparation will improve the rate of passing exams on the first attempt. To that end, the system will be designed and implemented as a web-based, online application. A customer shall be able to access training courses and tests from any type of device: mobile phone, tablet, personal computer, laptop, and any other type of device that has online capability.

One of the keys to building our customer is proving our product is reliable and viable in the online environment. It is essential that our website is responsive, fast, and reliable.

* Responsiveness ensures that the website will adapt according to whatever device the customer is using. We can no longer think that customers will be using a standard screen size, as online devices today have varying screen sizes and resolution capabilities. Therefore, our web code will include CSS features and styles that are designed to detect and adapt to device settings when presenting webpages.
* To instill confidence in our product, the website must be fast and accurate. Our web pages should render within two seconds. When submitting information to the server via the website, the information exchange should complete with two seconds. Furthermore, the customer should get notification within the two second window that information has posted and updated on the backend servers.
* To further instill confidence the website should have 99% uptime. The website will be hosted in the cloud, which means we don’t have total control of availability. However, we would still have a limitation of availability if we used servers in-house. The 1% downtime accounts for the availability limitation, as well as any time spend updating servers. It is our plan to only update servers once per month, or if there is a critical security update that needs to be installed.

### Platform Constraints

As stated previously, a primary requirement of the system is that it should be accessible online from any type of device. This leads to a web-driven design and means that we need to ensure the system is available from any web browser, and from any devices such as phones, tablets, laptops, PC’s, and even gaming consoles with web-based application access. To satisfy this, we will be implementing the backend with web-based API code that has inherent interfaces to web protocols. The challenge will be ensuring that we use backend code that is platform independent, therefore all the API’s we use need to be platform independent. To satisfy this, we will be implementing the backend code using Java and the built-in JAX-RS API along with the Jersey API for extended REST-based functionality.

To support the application and most of the requirements identified in this document, we will need to implement multiple databases. We will be using MS Azure for our cloud-based solution, so it makes sense to also use Azure SQL Database to host our databases. We will have databases for tracking security events, storing employee and user accounts, car and driver information, lesson packages, orders, and exam information.

### Accuracy and Precision

The system shall be designed to distinguish between different users.

* When a user registers for an account, they will be required to complete a profile. The profile will ask for pertinent information to identify the user. For example, it will ask for username, first name, last name, home address, email address, phone number, state, and their credit card information (number, billing address, expiry date, and security code).
  + A customer object will be created with this information and stored as attributes of the object.
  + The username, first name, and last name entries will case sensitive.
  + If the user attempts to register an account with the same email address, then the registration will fail, and the user will be notified there is already an account with that email address. An event log of this error will be created, and an email notification will be sent to administrators.

### Adaptability

The system shall be designed in a way that will eliminate or minimize backend code changes when performing platform updates, modifying accounts, and enabling IT administrators to perform operations.

* We will be implementing a role-based access control (RBAC) system for user accounts. IT administrators will have administrator level privileges to perform operations on the entire system. However, the operations will be constrained to operations that do not require making changes to code. They will be able to make changes, add, and delete user accounts through Active Directory.
* The system will be made up of cloud-based servers for administrative and account- based functions. These functions will be completed isolated from the backend, which will be stored on separate servers.
* System updates will be scheduled using Windows Server Update Services (WSUS). We will schedule and perform updates to servers to ensure the website maintains 99% uptime, only performing updates once per month, or as is required for critical security updates.

### Security

The following security requirements are based on the interview conducted with the client, as well as requirements we know based on the technologies required to implement the system.

* DriverPass expects the system to be available from any type of online device over the web. This by default means that we will be using inherent security protocols associated with web and browser technologies. All web browsers today support HTTPS and SSL, so our backend servers and code will be designed with these protocols, as well.
* DriverPass expects to be able to download reports. This leads to secure approach for transferring files. This can be handled with the secure file transfer protocol (FTPS) and it uses SSL by creating a secure SSH channel which is also encrypted.
* There is a requirement to communicate securely with the DMV to ensure DriverPass has the most up to date policies and example test questions. To implement this, we will be utilizing FTPS and SSH.
* There will be employees with various roles, and therefore we will need to implement a role-based access control (RBAC) system so that rights and privileges can be assigned respective for each role. By implementing RBAC, the owner will be able to enable and block accesses for employee accounts. Using Microsoft Windows Server and Active Directory, the owner will be able to unlock employee user accounts.
* They system shall also track security related events. This is an inherent security feature using MS Server, so that if there are problems with an account, the owner will have access to logs.
* The system shall also track changes made to the appointment reservation system. Whenever a reservation is made, or if there is a change to an existing reservation, the transaction will be logged to a backend database. A record of all transactions can be viewed online or downloaded as a report.
* A customer will be required to authenticate via a login process to gain access to the website. This will be handled through SecureAuth, a server-side implemented authentication system. This will also require the customer to use multi-factor authentication. If an existing forgets their password, the system shall enable the customer to reset their password online, without requiring intervention from the DriverPass team.
* As a security precaution, if somebody tries to log in to their account unsuccessfully more than three times in a minute, then the account will be locked out for thirty minutes.

## Functional Requirements

Functional requirements for the system are presented below from the perspective of users, employees, and system support:

* Users
* The system shall enable users to create a user profile on the website by filling out a form and entering their pertinent information.
* The system shall enable users to log in to the website securely.
* The system shall enable users to update their profile information.
* The system shall enable users to register for a lesson package.
* The system shall enable users to register for on-the-road training.
* The system shall enable users to take a practice test.
* The system shall enable users to view status of their progress through a lesson plan.
* The system shall enable users to view their exam status.
* The system shall enable users to reset their password.
* The system shall enable users to print training material
* Employees
* The system shall enable the owner to modify, create, and block account access.
* The system shall enable the secretary to register a customer who calls in, or registers at the brick-and-mortar storefront.
* The system shall enable the secretary and IT administrator to modify user accounts.
* The system shall enable employees to print and download reports (this includes security reports, student status reports, etc.).
* The system shall enable DriverPass to disable a lesson package.
* The system shall enable drivers to view the appointment schedule
* The system shall enable drivers to view student information
* System
* The system shall have a synchronize function that communicates with DMV systems to obtain new and updated policies and practice exam questions.
* The system shall have a log event function so that all registration events (modification, add, delete) are tracked.
* The system shall have an alert function that sends notifications to the owner and admins when there is a security alerts.

## User Interface

The user interface shall consist of multiple webpages based on what the user needs to accomplish. The front-facing webpage will provide the user login feature, company contact information, links to DMV information, and a synopsis of what the company offers on the website. Other pages associated with the website include an online course registration page, on-the-road registration page, an account profile page, a catalog page for viewing products, a page to display the shopping cart and completing the check-out process, an employee page for login by the owner, administrators, drivers, and the secretary. It will also provide DMV related information, and long with statistics related to driving, exams, and policies applicable to all drivers. Therefore, a user might visit the website to learn or just to obtain reference material.

A user who is a customer will need to be able to perform the following functions from the interface:

* Register as a new user by completing the profile form, including entering any special needs.
* Upload a photo.
* Log in to the website with username and password credentials.
* Reset their password.
* Make modifications to their profile.
* View their profile information.
* Select a lesson package via the catalog.
* Create an appointment for an on-the-road driving session, to include selecting a car, pickup and drop off location, and if desired, select a driver.
* View their shopping cart and complete the checkout process.
* View the progress of their online courses.
* View the progress of their exams, including exams completed. This will show the exams taken, time, score, and status.
* View notes and results supplied by instructors from on-the-road driving sessions. This will include the lesson time, start hour, end hour, and driver comments.

A driver will need to perform the following functions:

* Log in to the website.
* Create a profile, including uploading a photo.
* View appointment and student information.
* Add notes and grade to the student record for the driving session.

The owner and administrators will need to perform the following functions:

* Log in to the website.
* Make modifications to accounts, view and download reports, and review customer progress.

The secretary will need to perform the following functions:

* Log in to the website
* Complete registration of new users if they register by phone and in-person.
* Make modifications to appointments.

## Assumptions

Since this is a cloud-based, web-driven system, a primary assumption is that we will have 24/7 availability of the system via internet access. Users will be accessing the system from a myriad of localized internet providers across a wide area network owned by a myriad of providers as well. Furthermore, we are using Azure to host the website, databases, and administrative servers. There is no way we can control all the variables associated with internet connectivity; therefore, we must assume it will be available. However, if there is a disruption in internet connectivity from any provider or source, then the system will not be accessible. This naturally applies to all users of the system (customers, employees, etc.). If a user does not have a device capable of online access, then they will not be able to take the online course material (although, they will be able to take on-the-road driving sessions). Administrators who lose online connectivity will not be able to perform administrative duties such as maintenance, updating accounts, and troubleshooting any problems. If the owner loses online activity, then he will not be able to review system status, view event logs, receive error alerts, and view and download reports.

## Limitations

One limitation is associated with the cloud-based solution of this system. All our servers and data will be hosted in the cloud, which can be concerning because we will not have direct control of our systems, and there is a potential of data breach. Based on our research, we decided to use MS Azure because of their extremely good reputation for performance, availability, security, and customer support. MS Azure is considered one of the top three cloud providers in the world. Therefore, we can be reasonably assured that our systems will stable, secure, and perform at a high-level. Furthermore, we can be reasonably assured that if we need technical support, we will get responsive and high-level customer support.

Another main limitation is association with the DMV as credibility of the DriverPass system is entirely based on ensuring the system can get new and updated policies, and official practice exam questions. Without the ability to receive updates, customers will have inferior information, and therefore be more at risk of not passing the exam. This would defeat the entire purpose of the system. Therefore, coordination with DMV technical support must occur to ensure we can interface with the DMV updating system. Furthermore, we must ensure that we get the updates without requiring manual intervention and that we receive notification when updates occur.

## Gantt Chart

The following is the Gantt Chart that defines the timeline and resources required to complete the project:

Table

Description automatically generated with medium confidence

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