# Hospitality Property Management IS

## Analysis

Project documentation for the purpose of BIE-SWI course.

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# 1. Project Specification

## 1.1 Agenda

The agenda of the system includes:

1. Creating a user-friendly platform for property owners to list their properties, providing comprehensive details and images to attract potential guests.
2. Facilitating seamless booking processes for customers, allowing them to search for properties, view details, make reservations, and handle payments securely.
3. Implementing verification mechanisms for user identities and property details, ensuring authenticity and reliability on the platform.
4. Enabling effective communication between hosts and guests throughout the booking process and post-stay interactions.
5. Managing post-stay actions such as additional charges, refunds, and feedback collection to ensure a satisfactory experience for both hosts and guests.
6. Providing transparency and accountability through features such as booking history access and report investigation for suspicious activities.
7. Maintaining the overall quality and credibility of the platform through continuous monitoring, verification, and resolution of reported issues.

## 1.2 Description of the Problem Domain

The problem domain revolves around the challenges associated with property management and rental transactions in the hospitality industry. Property owners often face difficulties in effectively marketing their properties and managing reservations, while potential guests encounter hurdles in finding suitable accommodations and ensuring a seamless booking experience. Moreover, ensuring the authenticity and reliability of user identities and property listings presents significant concerns for both hosts and guests. Addressing these challenges requires a robust and efficient property management platform that streamlines processes, enhances communication, and maintains trust and credibility.

## 1.3 Goal of the Intended System

The goal of the system is to provide a user-friendly and efficient platform for property owners to list their properties and for customers to find and book accommodations that meet their needs. The system aims to streamline the booking process, enhance communication between hosts and guests, and maintain the quality and reliability of listed properties. Ultimately, the system strives to optimize the user experience for both hosts and guests while fostering trust and satisfaction.

## 1.4 Main Idea

The main idea of the intended system is to create a comprehensive property management platform that connects hosts with potential guests (customers) seeking accommodations. The platform facilitates the entire lifecycle of property rental transactions, from property listing and booking to post-stay actions, ensuring seamless interactions between hosts and guests. Additionally, the system aims to maintain trust and reliability by verifying user identities and property details through platform inspectors.

# 2. Listing Process
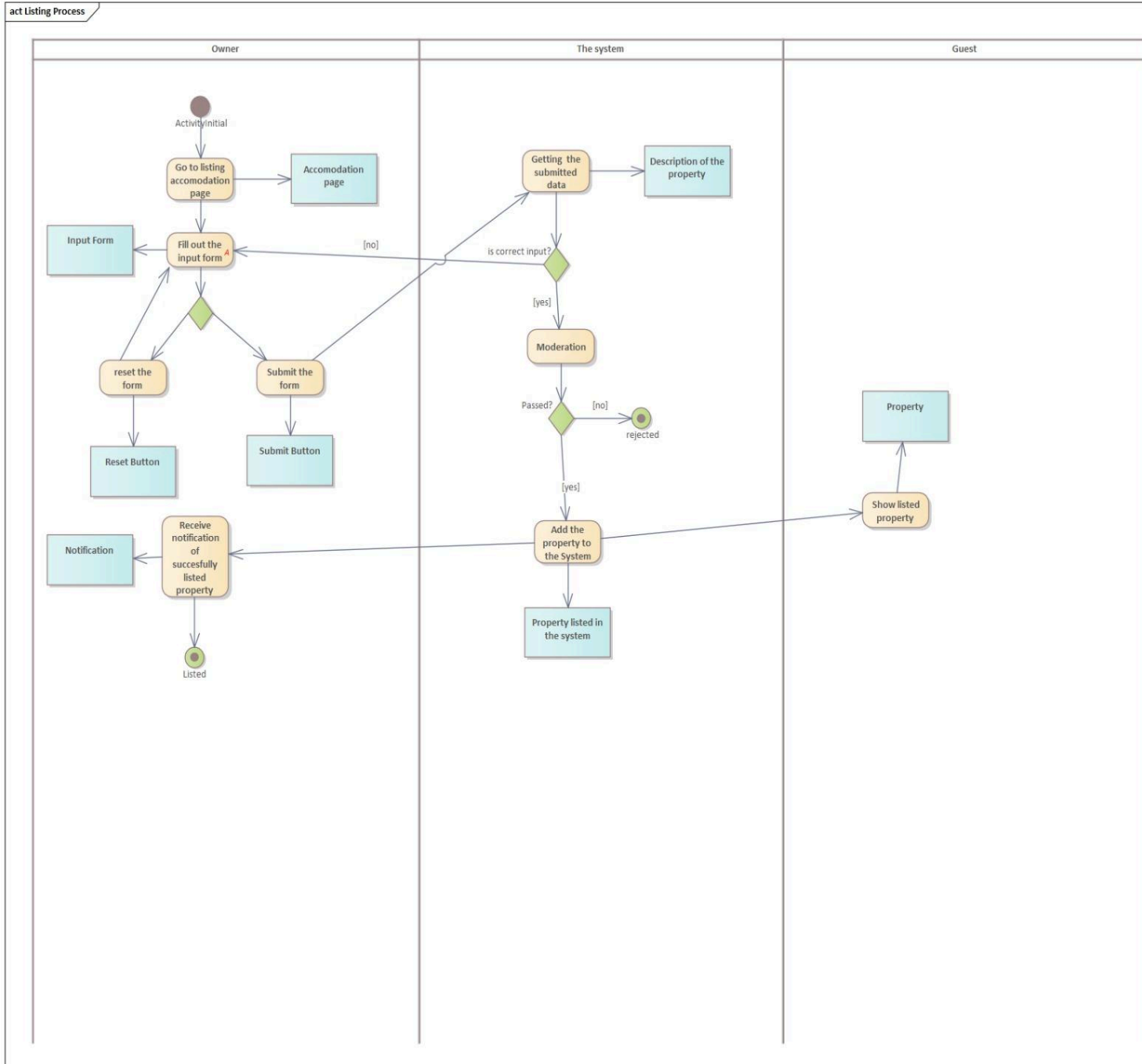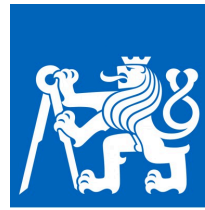
# 3. Booking Process
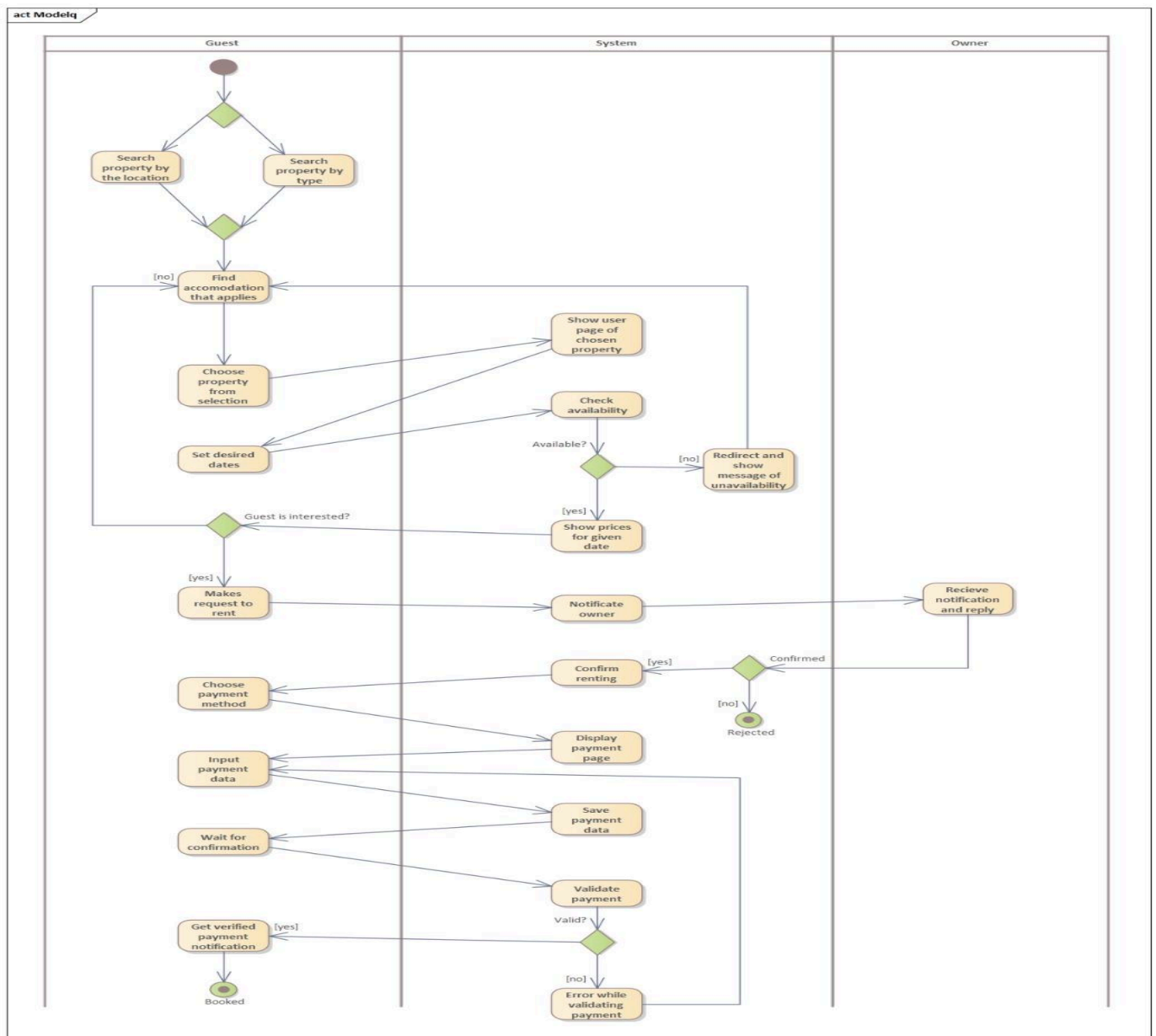
# 4. Bookings Management Process
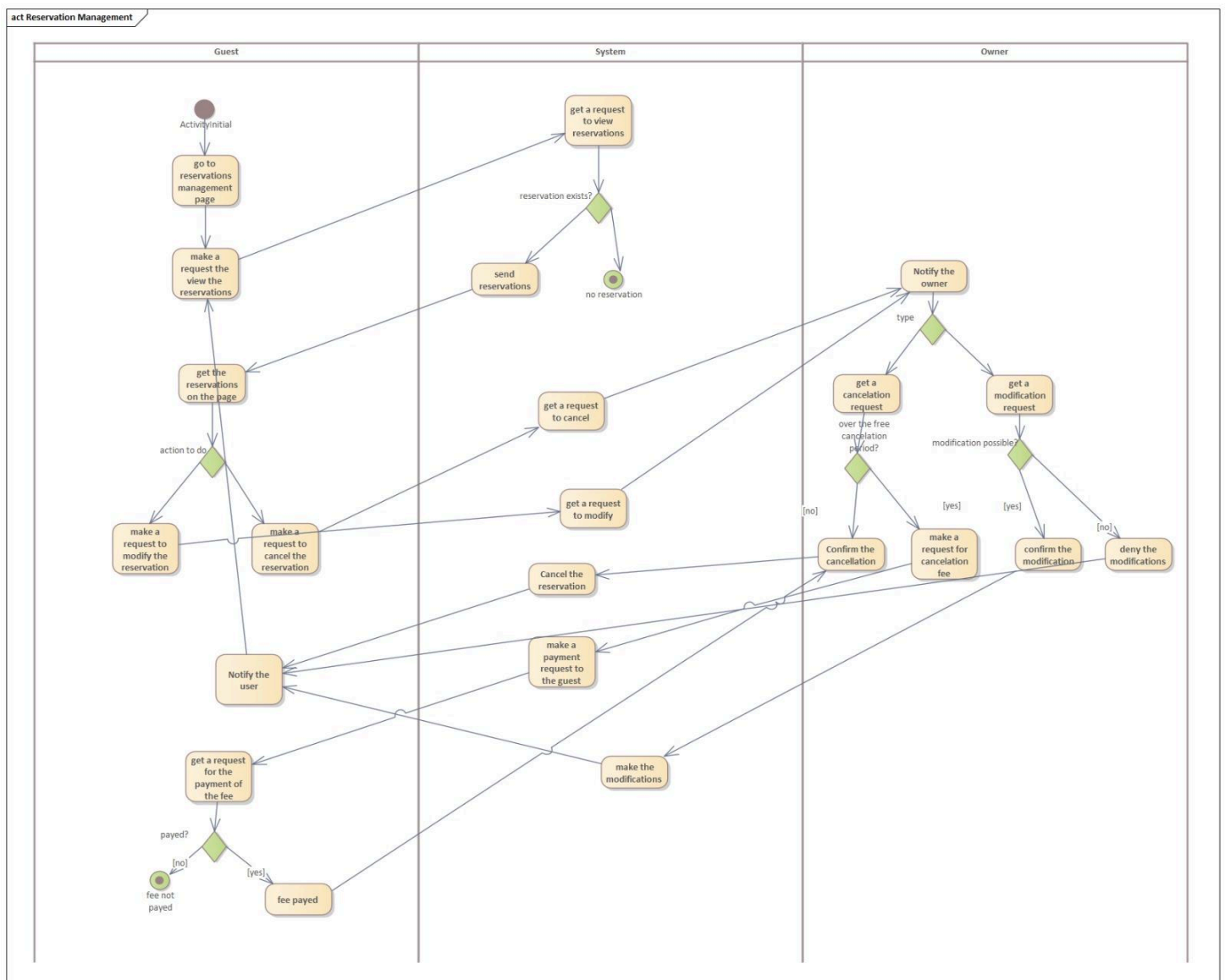
### 4.1.1  Listing Process

The listing process involves property owners providing details about their accommodations, including descriptions, prices, and images. This information is collected, verified for accuracy, and then displayed on the platform. A user-friendly interface guides property owners through this process, ensuring that their listings meet the platform's standards.

### 4.1.2  Booking Process

During the booking process, guests search for properties based on their preferences, such as location and price range. Once they find a suitable option, they can make a reservation and complete the booking transaction securely. Notifications are sent to both guests and property owners to confirm the booking details, ensuring a smooth experience for all parties involved.

### 4.1.3  Booking Management Process

In the bookings management process, property owners use dashboards to oversee reservations, update availability, and handle payments. They can accept or reject booking requests and charge fees for damages or cleaning issues after guests' stays. Integration with inspection services ensures that property conditions are verified before and after each stay, maintaining the quality of accommodations.

# 5. Functional Requirements



*(from Analysis)*

Figure 2 - Functional Requirements

**Actors**
- + Cleaning Personnel
- + Platform Inspector
- + User
- + Authenticated User
- + Customer (Guest)
- + Host

**User Management**
- + UC01: View Website
- + UC02: Register
- + UC03: Log-In
- + UC04: Sign-Out

**Verification Management**
- + UC05: User Verification
- + UC06: Property Verification
- + UC07: Report Investigation
- + UC08: Access Registered Data

**Property Maintenance Management**
- + UC09: Task Assignment
- + UC10: Communication and Feedback

**Customer Management**
- + UC11: Browsing and Searching for Properties
- + UC12: Create Reservation
- + UC13: Make Payment
- + UC14: Provide Feedback
- + UC15: Payment (Post-Stay)

**Host Management**
- + UC16: Listing a Property
- + UC17: Manage Bookings
- + UC18: Post-Stay Actions

**Public Information**
- + UC19: Show List of Property
- + UC20: Show Property Details
- + UC21: Show Host Profile

**Booking Data**
- + UC22: View Booking History
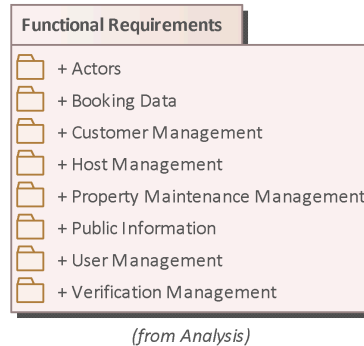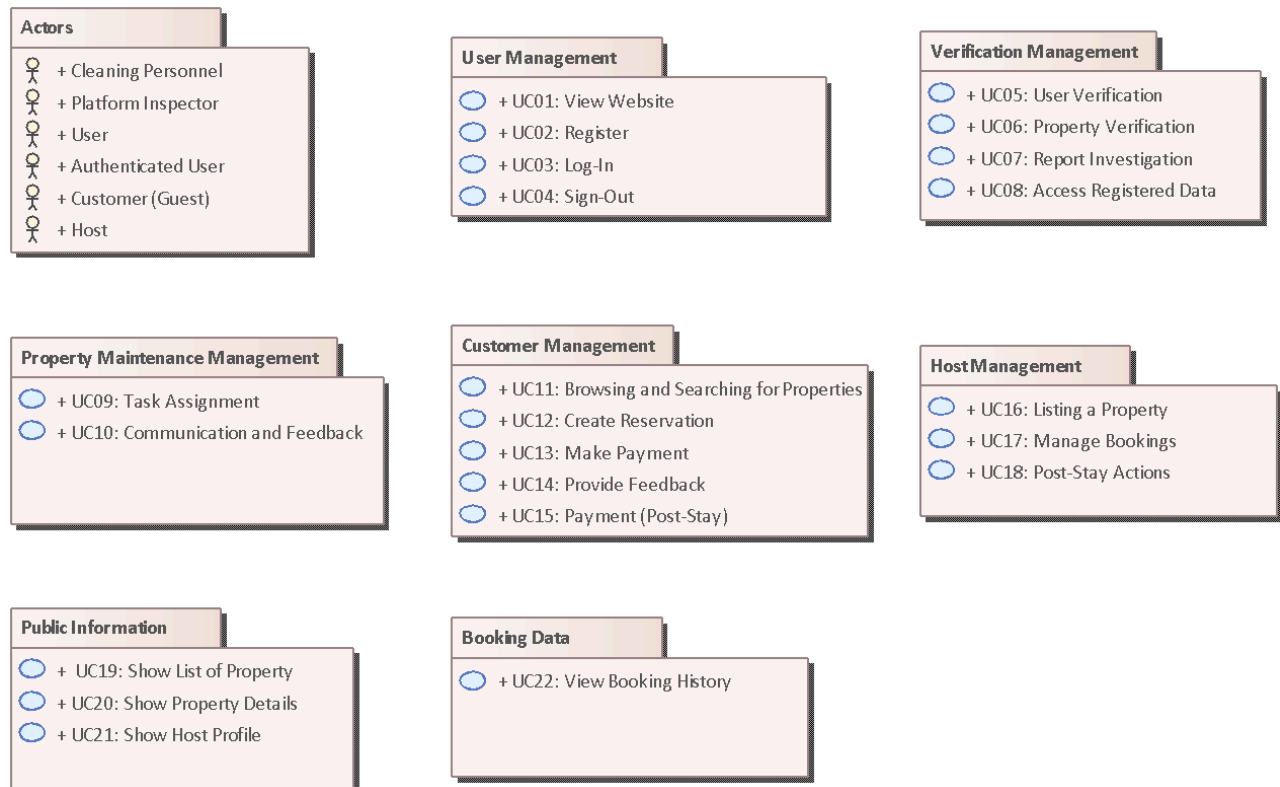
Figure 3 - Use Case Model

## 5.1  Actors

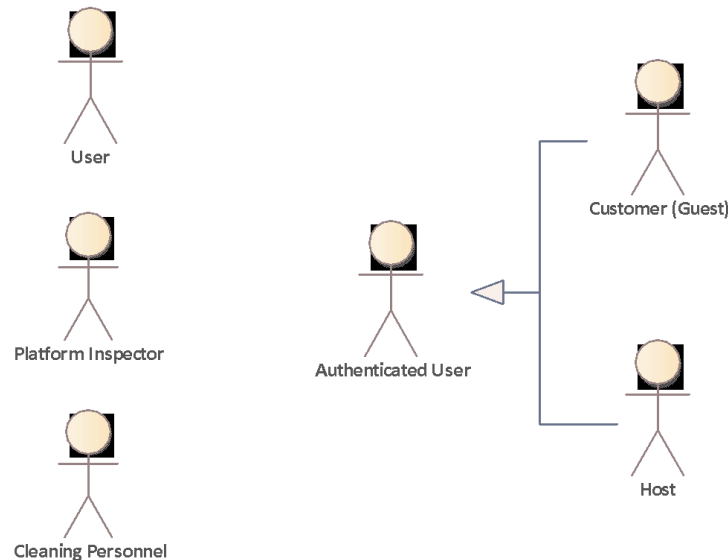Contains Actors that represent the roles that users play with respect to the system.



Figure 4 - Actors

### 5.1.1  Cleaning Personnel

Tasked with maintaining the cleanliness and presentation of properties listed on the platform. They receive notifications and perform cleaning tasks promptly after guests check out, ensuring that properties are well-prepared for incoming guests. Cleaning personnel play a crucial role in enhancing guest satisfaction and maintaining the overall quality of listed properties

### 5.1.2  Platform Inspector

Responsible for verifying user identities and the properties listed on the platform. They meticulously validate the authenticity of user-provided information, including personal details and documentation, to maintain a secure and trustworthy user base. Additionally, platform inspectors verify property details to uphold the credibility and reliability of the platform for both users and stakeholders.

### 5.1.3  User

Represents individuals interacting with the system, representing both visitors exploring the system without authentication and users who have logged in. Users can access public information, and perform other non-authenticated actions.

### 5.1.4  Authenticated User

An authenticated user is an individual or entity who has successfully proven their identity to a system or application through a specified authentication process. This process typically involves providing some form of credentials, such as a username and password, or other means, to verify their identity.

### 5.1.5 Customer (Guest)

Refers to authenticated users who utilize the web application to browse and search for properties, make reservations, provide feedback on their stay experiences, and handle post-stay payments. Customers engage in various activities within the platform, contributing to the booking and feedback processes.

### 5.1.6 Host

Represents property owners who list their properties on the platform. Hosts fulfill responsibilities such as creating and verifying property listings, managing booking requests, reviewing guest feedback, and handling post-stay actions such as charges or refunds. They play a crucial role in maintaining property listings and ensuring a seamless experience for guests.

## 5.2 Booking Data
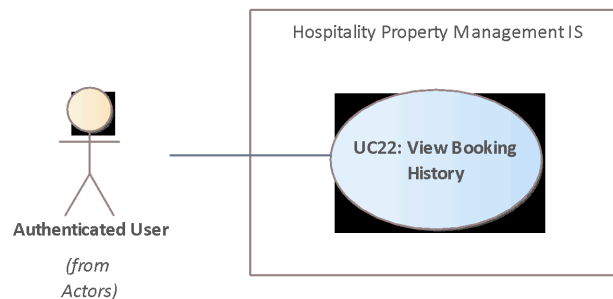


Figure 5 - Booking Data

### 5.2.1 UC22: View Booking History

This use case enables authenticated users to access and review their booking history on the platform, allowing them to track past reservations and upcoming stays.

**Basic Path: View Booking History**
1. The authenticated user navigates to the booking history section within their account settings.
2. The system fetches the booking records associated with the their account from the database.
3. The system presents the authenticated user with a list of their past bookings and upcoming reservations.
4. The authenticated user selects a specific booking from the list to view its details.
5. The system displayed the detailed information about the selected booking, including dates, property details, guest/host information, and any additional notes.

**Alternate: No Booking History**
1. The authenticated user navigates to the booking history section within their account settings.
2. The system fetches the booking records associated with the their account from the database.
3. If the authenticated user has no booking history (either past or upcoming), the system displays a message indicating that there are no bookings to show.

## 5.3  Customer Management
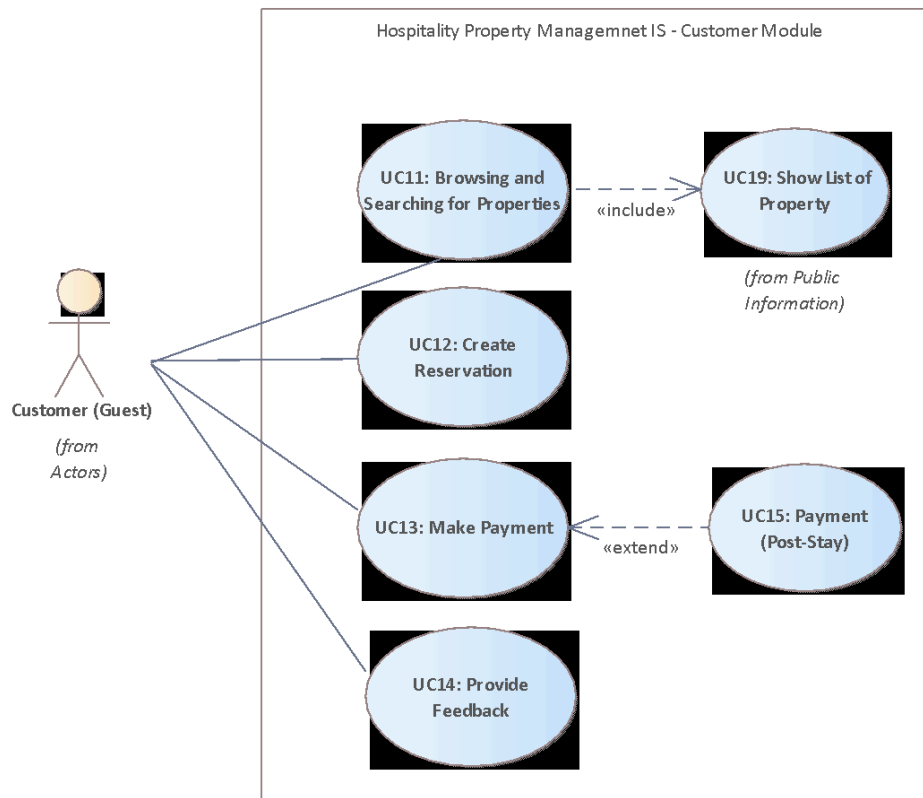


Figure 6 - Customer Management

### 5.3.1  UC11: Browsing and Searching for Properties

Customers searching for suitable accommodations according to their preferences and requirements. They utilize search functionalities to explore available listings, apply filters, and find properties that align with their needs.

**Basic Path: Browsing and Searching for Properties**

The scenario describe the process of browsing and searching for properties.

1. Customer accesses the browsing/searching feature within the system.
2. Customer views available search criteria and filters (e.g., location, price range, property type).
3. Customer selects or enters desired search criteria and filters.
4. System retrieves properties matching the specified criteria from the database.
5. System presents the user with a list of matching properties, including relevant details and images.
6. Customer reviews the list of properties and may further refine the search criteria if needed.
7. Customer selects a property of interest to view more details.
8. System displays comprehensive information about the selected property.
9. Customer may take further actions such as saving the property for later, contacting the host, or continuing to browse.

**Alternate: No result found**

This scenario describes the situation when the search criteria of a customer is not found.

1. After the customer specifies the search criteria and filters and initiates the search, the system retrieves properties from the database.
2. The system determines that there are no properties that match the user's specified criteria.
3. The system displays a message to the user indicating that no properties matching their search parameters were found. The message may include suggestions for adjusting the search criteria to broaden the scope or refine it for better results.
4. The customer may choose to modify their search criteria based on the system's suggestions and try again.
5. Alternatively, the customer may choose to exit the search and return to other functionalities of the system.
6. The system maintains the customer's previous search parameters, allowing them to easily modify or refine their search in subsequent attempts.

## 5.3.2 UC12: Create Reservation

In this use case, customers initiate and confirm reservations for selected properties. They specify booking details such as desired dates, the number of guests, and any special requests. Once the reservation is made, customers receive confirmation and booking details.

**Basic Path: Create Reservation**
1. This use case starts when the customer selects a property from the available listings.
2. Initiating the reservation process, the customer provides essential booking details such as preferred dates, the number of guests, and any special requests through the system's interface.
3. The system validates the provided information and checks the availability of the selected property for the specified dates.
4. Upon confirming the availability, the system calculates the total booking cost based on the provided details, including any applicable fees or taxes.
5. The customer reviews the booking details, including the total cost, and proceeds to confirm the reservation.
6. If payment is required, the system facilitates the payment process securely through integrated payment gateways.
7. After successful payment processing, the system generates a booking confirmation containing the reservation details, such as booking ID, property information, dates, and total cost.
8. The system sends the booking confirmation to the customer via email or displays it on-screen for immediate access.
9. The customer receives the booking confirmation and acknowledges the successful reservation.
10. The reservation is now confirmed, and the property is reserved for the specified dates, marking the completion of the reservation process.
11. The customer may further interact with the system regarding the reserved booking, such as modifying booking details or contacting support if needed.

**Alternate: Payment Failure**
1. After the customer confirms the reservation and proceeds to make the payment, the system initiates the payment processing.
2. The customer provides the necessary payment information and attempts to complete the transaction.
3. However, during the payment processing, the system detects that the payment cannot be authorized due to reasons such as insufficient funds, expired card, or other payment issues.
4. The system immediately notifies the customer of the payment failure through an on-screen message or email notification.
5. The notification includes details of the payment failure reason and may suggest alternative payment options.
6. The customer may choose to Provide an alternative payment method, Contact customer support or Cancel the reservation if unable to proceed with payment.
7. If the customer selects an alternative payment method, they reinitiate the payment process.
8. Once the payment is successfully processed, the system generates the booking confirmation and sends it to the customer.

9. If the issue persists or the customer decides not to proceed with the reservation, the system cancels the reservation process and returns to the previous state, allowing the customer to explore other options or exit the system.

### 5.3.3 UC13: Make Payment

### 5.3.4

Customers handle payments related to their reservations, which may include upfront deposits or full payments. Payment methods are securely processed through the platform, providing convenience and security for guests.

### 5.3.5 UC14: Provide Feedback

After the stay, customers have the opportunity to provide feedback on various aspects such as cleanliness, amenities, and service quality.

### 5.3.6 UC15: Payment (Post-Stay)

After their stay, customers settle any outstanding payments or additional charges incurred during their visit. This may include charges for additional services availed during the stay or adjustments to the initial reservation costs. Payments are processed post-stay to ensure accuracy and transparency in billing.
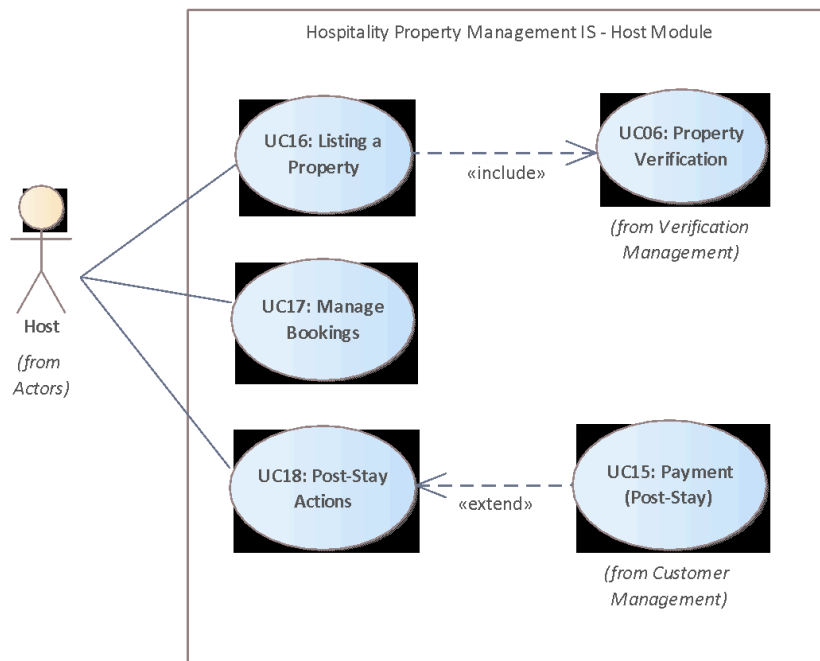
## 5.4 Host Management



Figure 7 - Host Management

### 5.4.1 UC16: Listing a Property

This use case enables hosts to create and verify property listings on the platform. Hosts provide detailed information about the property, including descriptions, amenities, photos, pricing, and availability. It ensures that property listings accurately represent the properties to attract potential guests.

**Basic Path: Listing a Property**

This scenario describe the use case where the use case wherein a host seeks to list a property within the system.

1. Host initiates the process of listing a property.
2. Host accesses the property listing section on the platform.
3. Host provides comprehensive details about the property, including descriptions, amenities, photos, pricing, and availability.
4. Host submits the property listing for verification to the system.
5. The platform inspector reviews the property listing and associated details.
6. If the property meets platform standards, the inspector approves the listing by click "Allowed", otherwise click "Rejected".
7. The system send notification to the host.

**Alternate: Discrepancies in Listing**

This scenario pertains to instances where discrepancies exist within the listings.

1. After the property listing is submitted for verification, the platform inspector begins reviewing the details provided by the host.
2. The platform inspector click on "Discrepancies" if discrepancies is found within the listings.
3. The system will notify the host of the identified discrepancies and request clarification or corrections.
4. After the property owner updates the listing to the system, the system will prompt the inspector to re-evaluate the revised details.
5. If the inspector finds that the discrepancies have been adequately addressed and the listing now meets platform standards, the inspector click "Allowed".
6. Once verified, the system notifies the host of the property's verification status.

### 5.4.2 UC17: Manage Bookings

In this use case, the host handle reservation requests from guests. They have the authority to accept or decline booking requests based on availability, suitability, or other factors. Additionally, property owners prepare their properties for guest arrivals, ensuring that accommodations are clean, well-maintained, and equipped with necessary amenities.

### 5.4.3 UC18: Post-Stay Actions

After guests' stays, property owners may need to handle post-stay actions, such as charging for additional services or damages incurred during the guest's visit. Property owners review charges, if necessary, and ensure that any post-stay transactions are accurately processed and communicated to the guests.

## 5.5 Property Maintenance Management
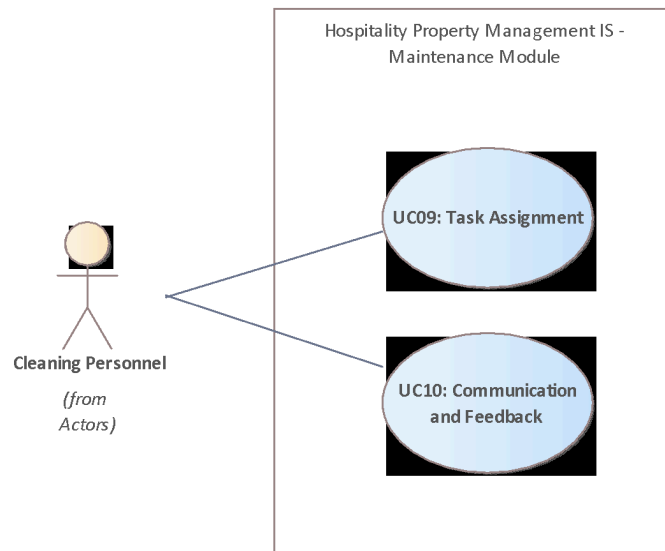
Figure 8 - Property Maintenance Management

### 5.5.1 UC09: Task Assignment

After guests check out, the system assigns cleaning personnel to tasks within a limited time frame. This ensures efficient turnaround between guest stays and maintains cleanliness standards.

### 5.5.2 UC10: Communication and Feedback

It focuses on facilitating communication between cleaning personnel and host. Cleaning personnel may need to report any issues or concerns encountered during the cleaning process.

## 5.6 Public Information

Figure 9 - Public Information

## 5.6.1 UC19: Show List of Property

Users of the platform can access a list of properties. The list provides basic information about each property, such as the property name, location, and brief description, allowing users to browse available options.
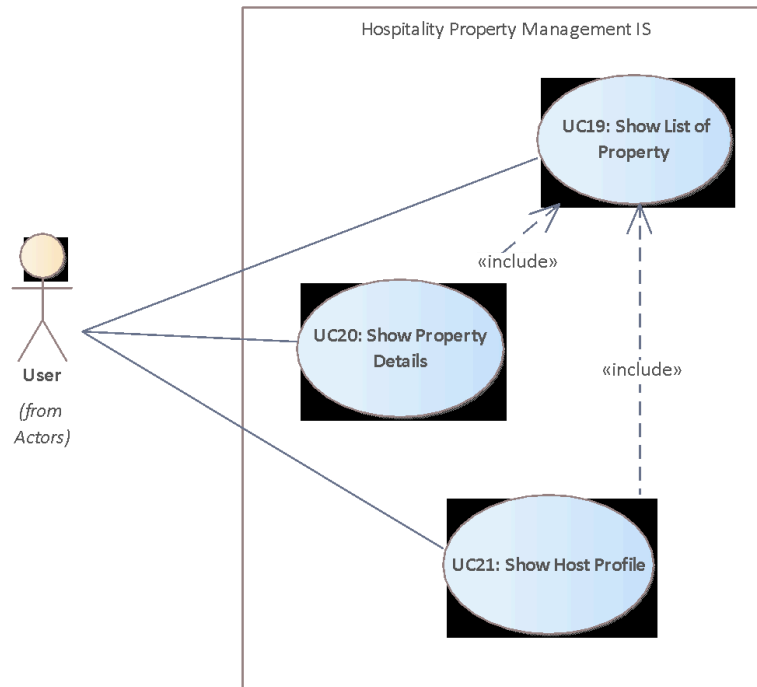
**Basic Path: Basic Path**
1. User accesses the property listings section of the platform.
2. User utilizes search filters or enters specific criteria to refine the property list.
3. The system retrieves a list of available properties from the database based on the user's search criteria.
4. The system displayed the list to the user, showing basic information about each property, such as name, location, and brief description.
5. User selects a property from the list to view its details.

**Alternate: No Property Available**
If there are no properties available for listing:
1. System displays a message indicating that no properties are currently available.
2. User may be prompted to refine their search criteria or check back later.
3. The system encourages the user to refining the search criteria.

## 5.6.2 UC20: Show Property Details

Users can view detailed information about a specific property by selecting it from the list. Property details include comprehensive information about the property, such as photos, descriptions, amenities, pricing, availability, and any additional features or policies.

## 5.6.3 UC21: Show Host Profile

Users can access the profile of the host or property owner associated with a particular property. The host profile provides information about the property owner, including their name, contact information, profile picture, and any additional details or credentials they choose to share. This allows users to learn more about the host and establish trust before making a reservation.

## 5.7  User Management
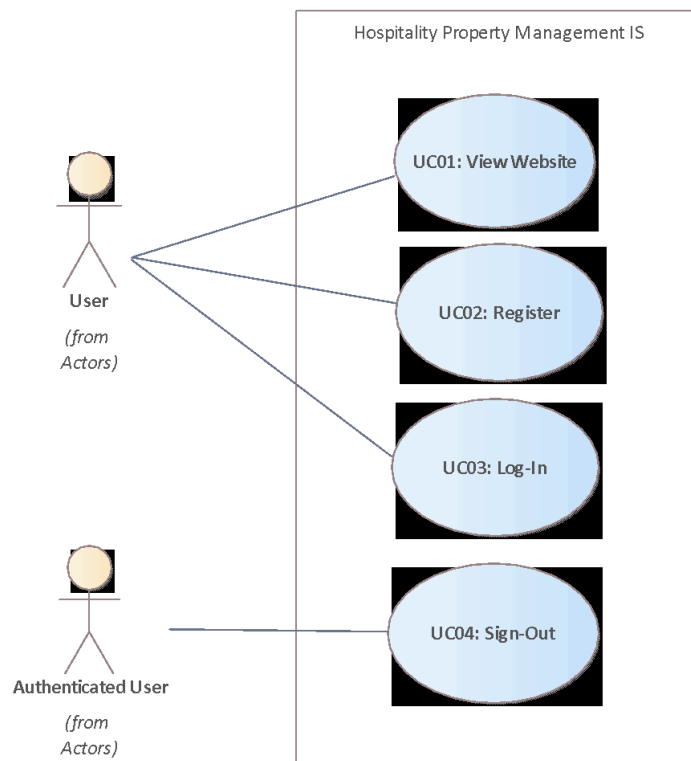
Figure 10 - User Management

### 5.7.1  UC01: View Website

Allows users to browse the web application and view available properties without the need for authentication. Users can explore various listings, search for properties, and access general information about the platform's services and features.

### 5.7.2  UC02: Register

Enables users to create a new account on the platform, granting them access to additional functionalities such as booking properties or leaving reviews.

### 5.7.3 UC03: Log-In

In order to access the system, users are required to input their email address and password, which must correspond to the stored credentials. If the provided information does not match, users are notified, without disclosing whether the email is registered or indicating which credential (email or password) was incorrect.

### 5.7.4 UC04: Sign-Out

Once authenticated, users have the option to log out of the system, thereby lost access to any functions associated with their role.
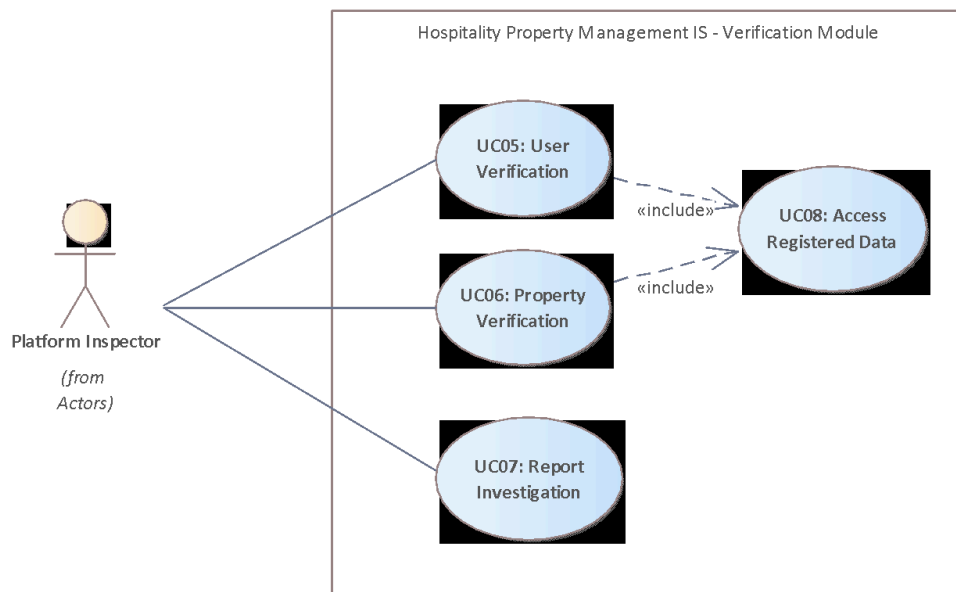
## 5.8 Verification Management



Figure 11 - Verification Management

### 5.8.1 UC05: User Verification

This use case involves the verification of the identities of new hosts and customers joining the platform. Platform inspectors are responsible for validating the authenticity of user-provided information, such as personal details and documentation, to maintain a secure and trustworthy user base.

**Basic Path: User Verification**

This scenario describes the process of verifying user's identity.
1. The user navigates to the user verification section within the platform.
2. The user submits personal details and required documentation for verification.
3. An inspector reviews the provided user information and documentation.
4. The inspector verifies the authenticity of the information against specified criteria.
5. If verification is successful, the system displays a notification confirming successful verification to the user. If verification fails, the system displays a notification informing the user of the rejection.

**Alternate: Insufficient Documentation**
This scenario is when the information is insufficient.
1. Following the same process as described above, the user submits their personal details and initial documentation.
2. The inspector receives the submitted information and begins the review process.
3. Upon examining the submitted documentation, the inspector identifies that certain required documents are missing or insufficient for verification.
4. The system sends a notification to the user, informing them of the deficiency in their submitted documents and requesting additional documentation. This notification may include specific instructions on the types of documents needed.
5. The user responds to the system's request by uploading the requested additional documentation through the platform interface.
6. Once the user uploads the additional documents, the inspector reviews them alongside the previously submitted information, reassessing the user's identity verification.
7. If the verification is successful after the submission of additional documentation, the system notifies the user of the successful verification. If verification fails again, the system notifies the user of the rejection

## 5.8.2  UC06: Property Verification

Platform inspectors are tasked with confirming the existence and accuracy of properties listed on the platform. This process involves conducting thorough inspections or audits to ensure that the properties meet the platform's standards and accurately reflect their descriptions. By verifying property details, platform inspectors help uphold the credibility and reliability of the platform for both users and stakeholders.

**Basic Path: Property Verification**
1. A platform inspector logs into the platform and navigates to the "Property Verification" section.
2. Within the Property Verification section, the inspector selects a property listing to review.
3. The inspector clicks on "Allowed" if it meets the standard, otherwise click on "Reject".
4. If the property meets platform standards, the system generates a notification or message displayed on the inspector's dashboard, confirming the successful verification of the property.

**Alternate: Discrepancies in Listing**
1. The inspector navigates to the "Property Verification" section within the platform.
2. Within the Property Verification section, the inspector selects a specific property listing to review.
3. If the inspector identifies inconsistencies or discrepancies between the listed information and the available data, the inspector click on "Discrepancy"
4. The system send the notifcation about the discrepancies to the host.
5. The host provides additional information or making necessary corrections to the listing into the system.
6. After receiving the updated information from the host, the inspector re-evaluates the property listing.
7. If the re-evaluation confirms that the property now meets platform standards, the system notifies the inspector of the successful verification, and host viewing the listing will see an indication of the updated verification status.

## 5.8.3  UC07: Report Investigation

Platform inspectors investigate and resolve reports submitted by users regarding suspicious activities, violations of platform policies, or discrepancies in property listings. This may involve gathering additional information and taking appropriate actions to address the reported issues, such as issuing warnings, suspending accounts, or removing listings.

**Basic Path: Report Investigation**
1. The platform inspector logs into the platform and clicks on the Report Investigation section.
2. Within the Report Investigation section, the inspector selects a reported issue to review. They carefully examine the details provided by the reporting user, including descriptions, evidence, and any other relevant information.

3. If violations are confirmed, the system issues warnings, suspends accounts, or removes listings as appropriate. If no violations are found, the inspector closes the report without taking further action.

**Alternate: Insufficient Evidence**

1. The platform inspector, using the system's interface, will review the evidence gathered during the investigation and conclude that it is insufficient to make a determination.
2. Utilizing the system's messaging or notification features, the platform inspector will directly notify the reporting user about the insufficiency of evidence and request additional information or clarification.
3. The system will await additional evidence or clarification from the reporting user before proceeding further with the investigation.
4. If additional evidence is provided by the reporting user, the system will automatically review and incorporate this new information into the investigation process.
5. The platform inspector will use the new information provided by the reporting user to re-evaluate the reported issue and determine if it warrants further action.

### 5.8.4 UC08: Access Registered Data

This use case encompasses the information provided by users seeking authentication. This data includes both personal information, such as identification details, as well as property-related data, including listings, descriptions, and associated details.

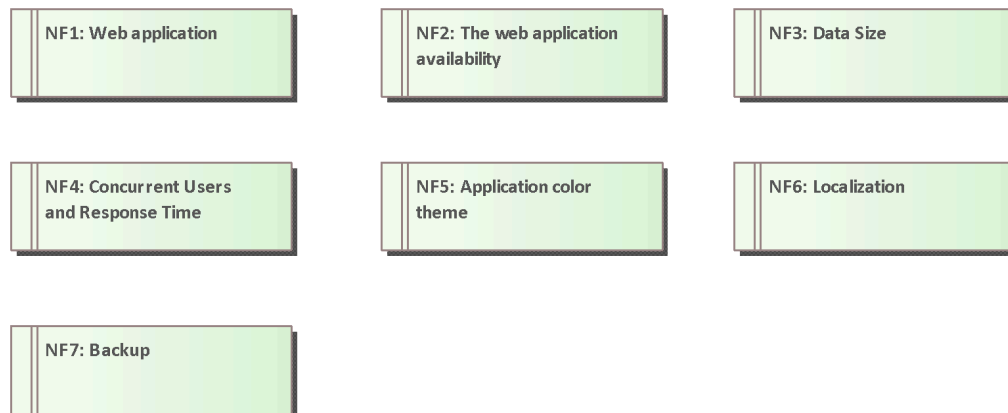# 6. Non-functional Requirements

| NF1: Web application | NF2: The web application availability | NF3: Data Size |
| --- | --- | --- |
| **NF4: Concurrent Users and Response Time** | **NF5: Application color theme** | **NF6: Localization** |
| **NF7: Backup** | | |

Figure 12 - Non-functional Requirements
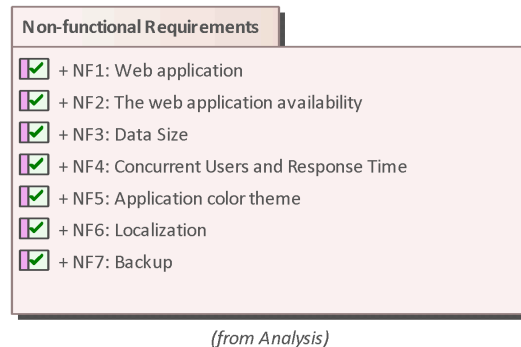
*(from Analysis)*

Figure 13 - Non-functional Requirements

## 6.1 NF1: Web application

The web application should function as a platform accessible via web browsers. Users, including Customers (Guests), Property Owners (Hosts), and Platform Inspectors, must be able to access the application's functionalities seamlessly. The web application must be hosted on the same server as the central database. Additionally, it is imperative that the application is compatible with Microsoft Edge, Firefox version 109 and above, and Chrome version 110 and above to ensure optimal performance and user experience.

## 6.2 NF2: The web application availability

The web application for book information must maintain a minimum availability of 95%.

## 6.3 NF3: Data Size

Tha application should be capable of managing data for the listed accommodations and users. This includes information for properties listed by Property Owner(Hosts), details of customers (Guests) making booking, and records of Platform Inspectors verifying property accuracy and user identities. Specifically, the system must accommodate details for up to 1,000 properties and their respective bookings, as well as records for 1000 users and their interactions with the platform, including bookings and inspections.

## 6.4 NF4: Concurrent Users and Response Time

The application must be capable of handling up to 500 users accessing the platform simultaneously.

## 6.5 NF5: Application color theme

The system must be realized in the platform color theme of white and black.
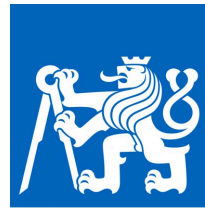
## 6.6 NF6: Localization

The system will be localized in Czech and English. Only English will be delivered with application

## 6.7 NF7: Backup

The application must perform daily backups of user and booking data, including information on customer(Guests), Property Owner(Hosts), and Platform Inspectors. This backup process should be completed within a maximum of 10 minutes and should occur automatically during nighttime hours.
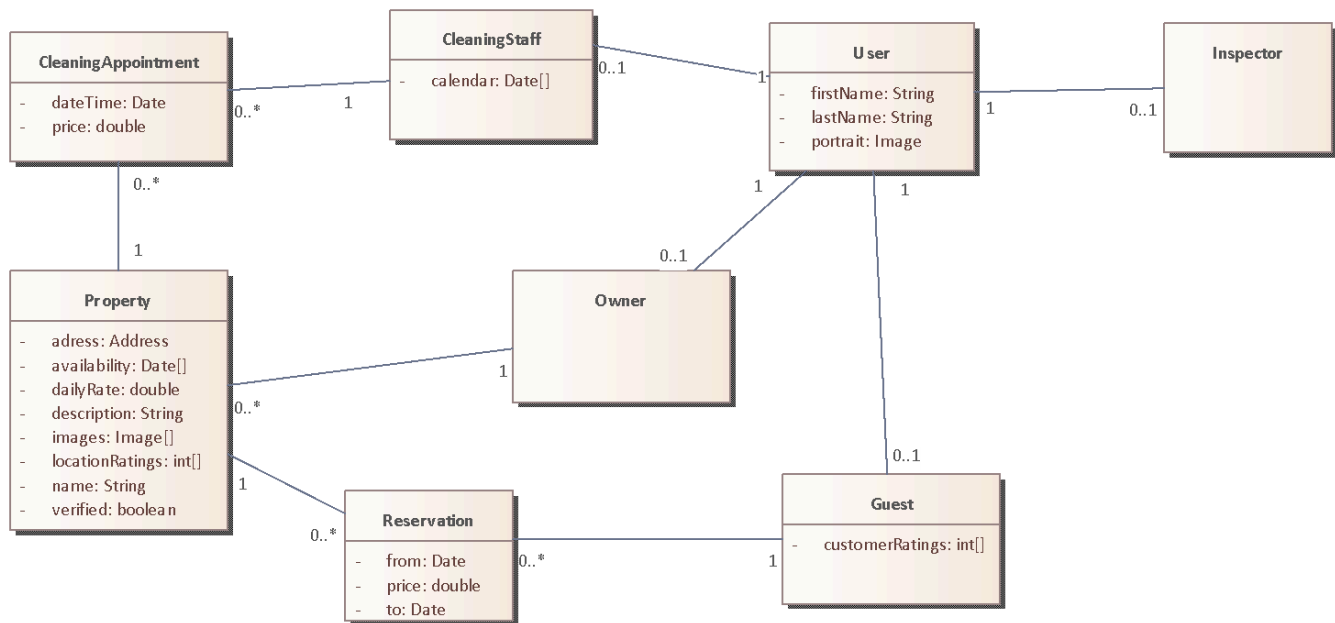
# 7. Domain Model



Figure 14 - Class Diagram

Class diagram showing the project's entities

## 7.1  CleaningAppointment

A cleaning appointment is requested by a owner for a property to a cleaning staff user. Once accepted it is set and then once the property is cleaned it goes into an archive.

| Attribute name | Description |
|---|---|
| dateTime | Time slot for the appointment |
| price | Cost of hiring the cleaning staff |

### 7.1.1  Cleaning Appointment State Diagram

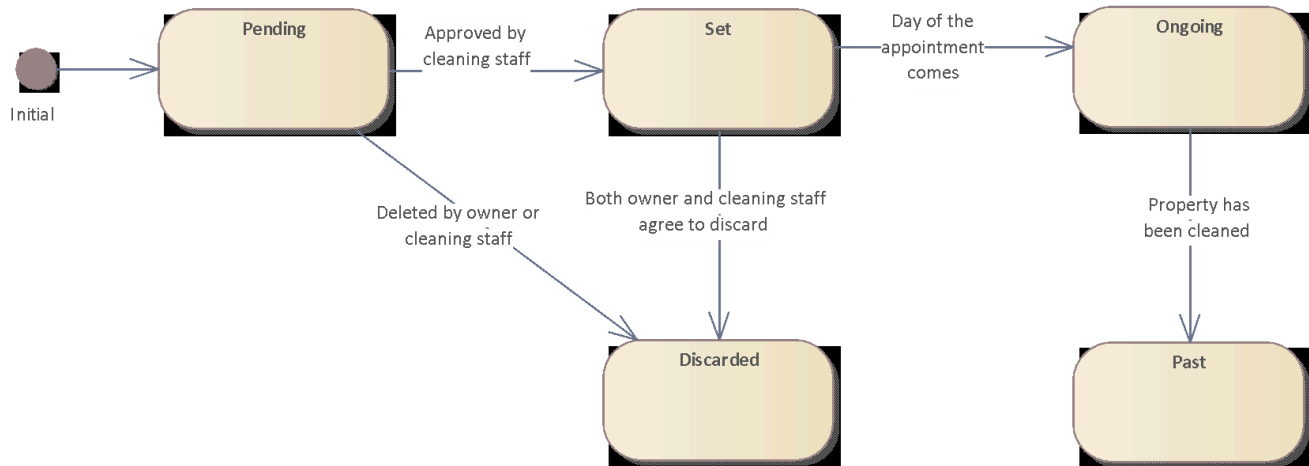This section describes the state model of the CleaningAppointment.

Figure 15 - Cleaning Appointment State Machine

### 7.1.1.1    Booked
There is at least one booking in the future can be seen by the public and more bookings can be made on available periods

### 7.1.1.2    Discarded
Past information is kept but cannot be seen by either the owner or the cleaning staff.

### 7.1.1.3    Ongoing
The guest is staying at the property. Both the

### 7.1.1.4    Past
The property has been cleaned. Both parties can see the history of the appointments they were a part of.

### 7.1.1.5    Pending
Made by a owner on a single property for a certain time.

### 7.1.1.6    Unregistered with booking(s)
Only the people with bookings can see the property apart from the owner

### 7.1.1.7    Set
Shows up for both the owner and the cleaning staff. In case both party want to cancel, it can be canceled. If both parties accept it can also be modified.

## 7.2  CleaningStaff
A user that has the role of cleaning properties when owners request. They can manage their cleaning appointments.

| Attribute name | Description |
|---|---|
| calendar | A calendar showing when the cleaning staff member has appointments |

## 7.3 Guest

The guests are the ones making reservations to rent properties. They can look at all properties, sort them and make bookings when said properties are available.

| Attribute name | Description |
|---|---|
| customerRatings | Owners can leave a rating out of 20 after a guest stays at their property. |

## 7.4 Inspector

The inspectors work directly for the system. They are in charge of verifying the identities of other users and of properties.

## 7.5 Owner

They are the owners of properties available for rent.

## 7.6 Property

Properties are the main point of the system. They can be rented by guests from owner. They can be cleaned.

| Attribute name | Description |
|---|---|
| adress | This is where the property is. See Address data type |
| availability | This is a timetable showing when the property is booked and when it is being cleaned. |
| dailyRate | |
| description | Short description of what the property looks like. |
| images | Images showing what the property looks like. |
| locationRatings | Guests can leave a rating out of 10 for a property after their visit |
| name | A name for the property ex. Sunny Lake Cabin |
| verified | Once a property is verified by an inspector this is True |

### 7.6.1 Address

Street
City
State
Postal Code

### 7.6.2 Property State Diagram

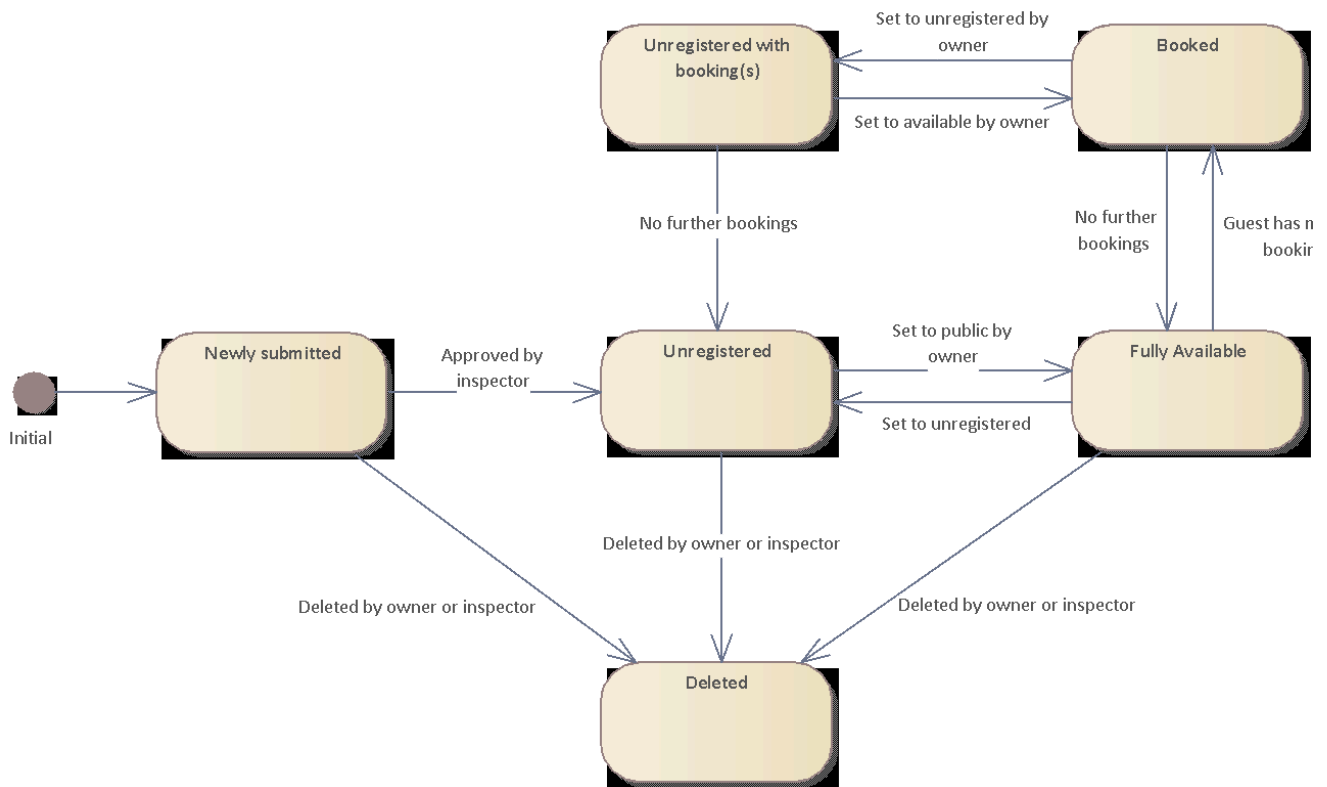This is a state diagram showings different states for a property.

Figure 16 - Property State Machine

## 7.6.2.1    Booked

There is at least one booking in the future can be seen by the public and more bookings can be made on available periods

## 7.6.2.2    Deleted

Past information is kept but cannot be seen by either the owner or the public

## 7.6.2.3    Fully Available

Can be seen by the public and with a calendar showing availability. No reservations have been made

## 7.6.2.4    Newly submitted

Owner has submitted a property by providing all necessary information

## 7.6.2.5    Unregistered with booking(s)

Only the people with bookings can see the property apart from the owner

## 7.6.2.6    Unregistered

Cannot be seen by the public, only the owner. In case of som

## 7.7 Reservation

A reservation is between a property and a guest.

| Attribute name | Description |
|---|---|
| from | Day and time of the arrival of the guest |
| price | Cost of renting the property. |
| to | Day and time at which the guest leaves |

## 7.8 User

This is the basic user type. All user types have this basic information. A user can have many roles.

| Attribute name | Description |
|---|---|
| firstName | First name of the person |
| lastName | Last name of the person |
| portrait | A picture showing the person's face |