Architecture Description of the Simplified Condo Management System for HomeHaven

SOEN-390

Team 19

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Concordia University

Contents

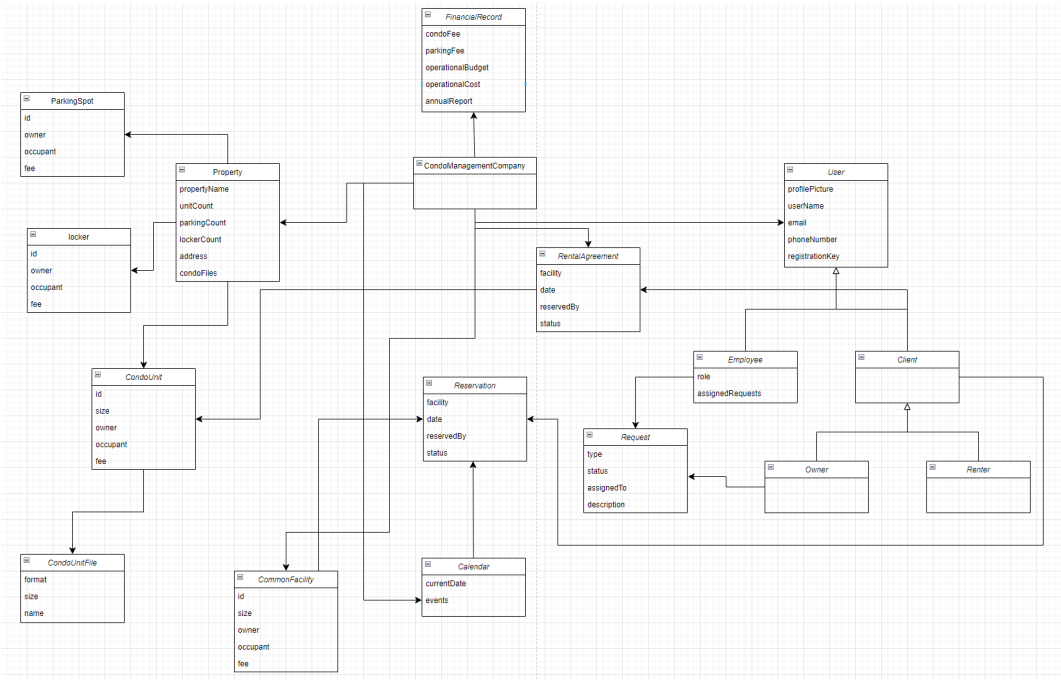

Figure 1: Domain Model

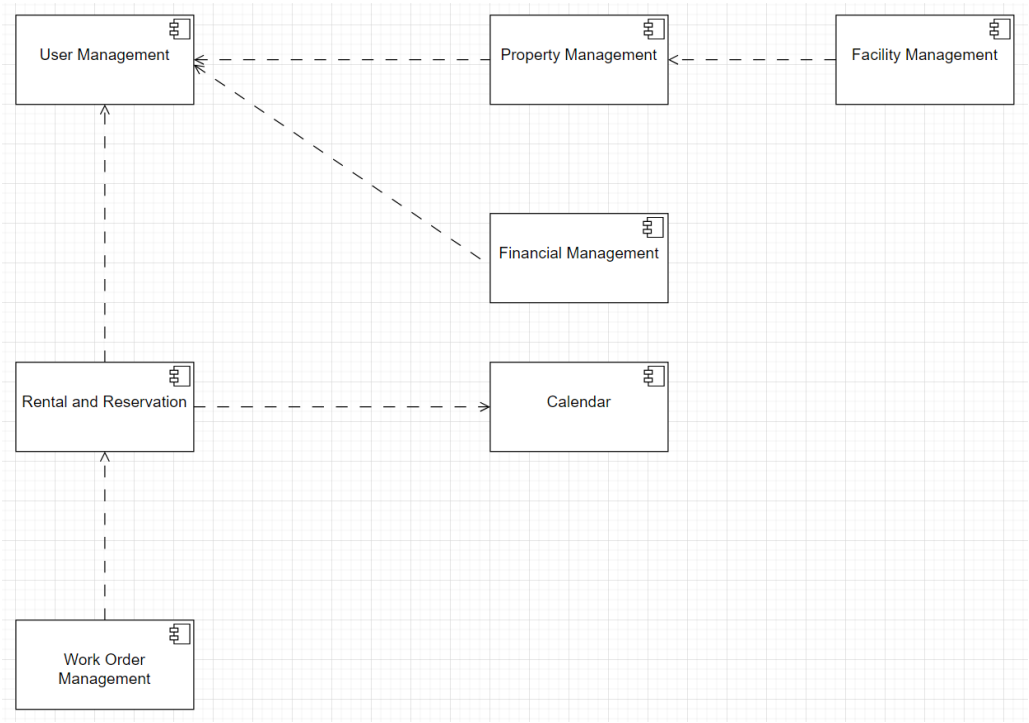

Figure 2: Component Diagram

1 Introduction

This chapter describes introductory information items of the AD, including identifying and supplementary information.

1.1 Identifying information

The Simplified Condo Management System architecture description pertains to a software-intensive system designed to facilitate condo management operations. This system-of-interest encompasses an application and companion website aimed at various stakeholders, including public users, condo owners, rental users, and condo management companies. It integrates functionalities such as user profile management, property management, financial management, reservation system for common facilities, and request handling, thereby serving as a comprehensive platform for managing condominium properties, their owners, and occupants.

1.2 Supplementary information

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2 Stakeholders and concerns

This chapter contains information items for stakeholders of the architecture, the stakeholders' concerns for that architecture, and the traceability of concerns to stakeholders.

2.1 Stakeholders

- Users (Condo Owners and Rental Users);
- Operators (Property Managers and Operational Staff);
- Acquirers (Condo Management Companies);
- Owners (Condo Association Boards);.
- Suppliers (Software Development Companies);
- Developers (Technical Development Team).

2.2 Concerns

- usability;
- accessibility;
- security;
- reliability;
- ability to efficiently manage properties or rental agreements;
- handling requests;
- cost-effectiveness;
- scalability;
- long-term sustainability;
- data privacy;
- integration with existing systems or platforms;
- technical specifications;
- development tools;
- testing environments;
- installation processes;
- deployment strategies.

2.3 Concern–Stakeholder Traceability

This association can be recorded via a simple table or other depiction.

Table 2.1: Example showing association of stakeholders to concerns in an AD

	Users	Operators	Acquirers	Owners
usability	X	–	–	–
accessibility	X	X	–	–
reliability	X	X	–	–
efficiently manage…	X	–	–	–

3 Viewpoints+

3.1 Accessibility Viewpoint

Inclusive design or universal usability viewpoint

3.2 Overview

The Accessibility Viewpoint focuses on ensuring that the Simplified Condo Management System is usable by all individuals, including those with disabilities. This viewpoint addresses the concerns of users and operators regarding the usability and accessibility of the system, emphasizing the need for inclusive design and compliance with international accessibility standards.

3.3 Concerns and stakeholders

Architects looking for an architecture viewpoint suitable for their purposes often use the identified concerns and typical stakeholders to guide them in their search. Therefore it is important (and required by the Standard) to document the concerns and stakeholders for which a viewpoint is intended.

3.3.1 Concerns

Usability for All: Ensuring the system is navigable and usable by people with a wide range of abilities.

Compliance with Standards: Adhering to international accessibility standards such as the Web Content

Accessibility Guidelines (WCAG) 2.1.

Adaptive Interfaces: Providing interfaces that can be easily used by people with disabilities, including those who use screen readers, keyboard navigation, or alternative input devices.

Content Clarity: Ensuring all information and instructions are clear, concise, and easily understandable.

3.3.2 Typical stakeholders

Stakeholders include:

Users: Interested in easy and barrier-free access to manage their properties or rental agreements.

Operators: Require an accessible system to efficiently manage properties, handle requests, and perform daily tasks.Ddevelopers: Responsible for implementing accessibility features and ensuring the system meets relevant standards.

3.4 Model kinds+

3.5 User Interface (UI) Flow Diagrams

3.5.1 User Interface (UI) Flow Diagrams conventions

Screens/Pages:

Representation: Typically represented by rectangles or rounded rectangles.

Convention: Each rectangle contains the name of the screen or page it represents, sometimes with a brief description or key elements noted inside.

Actions/User Interactions:

Representation: Arrows or lines connecting screens/pages.

Convention: Actions that lead from one screen to another are labeled with the action taken or the decision made by the user, such as "clicks login" or "selects reservation."

Decision Points:

Representation: Diamonds or branching paths.

Convention: Points where a user decision leads to different paths are marked with a question or condition, leading to different outcomes or screens based on user choices.

Inputs/Forms:

Representation: Parallelograms or annotated within screens.

Convention: Areas where users need to input information are indicated, specifying the type of interaction (e.g., text entry, selection).

3.5.3 User Interface (UI) Flows Diagrams correspondence rules

1. Alignment with Accessibility Standards
Rule: Every UI component represented in the UI Flow Diagrams must correspond to WCAG (Web Content Accessibility Guidelines) standards, ensuring that components are designed and implemented to be accessible.
Application: Verify that each UI element in the diagram has associated WCAG criteria (e.g., contrast ratios, keyboard navigability) and document compliance.

2. Consistency Across Views and Models
Rule: Information represented in UI Flow Diagrams must be consistent with other architectural models and views, such as data models or security models, particularly where user data or actions intersect with accessibility features.
Application: Ensure that user actions requiring accessibility accommodations in the UI Flow Diagrams are also reflected in the data model with appropriate annotations or metadata.

3.6 Operations on views

Operations define the methods to be applied to views and their models. Types of operations include:

- **construction methods** are the means by which views are constructed under this viewpoint. These operations could be in the form of process guidance (how to start, what to do next); or work product guidance (templates for views of this type). Construction techniques may also be heuristic: identifying styles, patterns, or other idioms to apply in the synthesis of the view.
- **interpretation methods** which guide readers to understanding and interpreting architecture views and their models.
- **analysis methods** are used to check, reason about, transform, predict, and evaluate architectural results from this view, including operations which refer to model correspondence rules.
- **implementation methods** are the means by which to design and build systems using this view.

Another approach to categorizing operations is from Finkelstein et al. [2]. The work plan for a viewpoint defines 4 kinds of actions (on the view representations): *assembly actions* which contains the actions available to the developer to build a specification; *check actions* which contains the actions available to the developer to check the consistency of the specification; *viewpoint actions* which create new viewpoints as development proceeds; *guide actions* which provide the developer with guidance on what to do and when.

4 Views+

Much of the material in an AD is presented through its architecture views. Each view follows the conventions of its governing viewpoint. A view is made up of architecture models.

4.1 View: Accessibility Perspective

User Interfaces (UIs): Detailed representations of various user interfaces, including web pages, mobile app screens, and kiosks, highlighting accessibility features like text resizing, color contrast options, and alternative navigation methods.

Interaction Flows: Diagrammatic representations of user interaction flows, showcasing paths through the system for completing tasks with emphasis on keyboard navigation, voice commands, and other assistive technologies.

Assistive Technology Integration: Connections to external assistive technologies (e.g., screen readers, speech recognition software) demonstrating compatibility and integration points.

Feedback Mechanisms: Depiction of the feedback loop for reporting accessibility issues, including UI elements for feedback submission and the backend process for handling and responding to user inputs.

Accessibility Testing & Compliance Checks: Visual representation of the process for ongoing accessibility testing and compliance checks, including automated testing tools and manual review processes

5 Consistency and correspondences

This chapter describes consistency requirements, recording of known inconsistencies in an AD, and the use and documentation of correspondences and correspondence rules.

5.1 Known inconsistencies

None to note for now.

5.2 Correspondences in the AD

Correspondence: Accessibility Features Integration Participating AD Elements: User Interface (UI) Components, Assistive Technology Integration Layer, Content Management System (CMS), Feedback and Reporting System. Correspondence Rule: All UI components must be designed and implemented to support accessibility features, such as keyboard navigation and screen reader compatibility, which must be validated through the CMS for content accessibility and the Feedback System for user-driven improvements.

Correspondence: User Input and Accessibility Support Participating AD Elements: User Input Handling, User Interface (UI) Components. Correspondence Rule: User input mechanisms (e.g., keyboard, voice commands) must be fully functional with all UI components, facilitating accessible navigation and interaction for users with diverse needs.

Correspondence: Content Accessibility Compliance Participating AD Elements: Content Management System (CMS), User Interface (UI) Components. Correspondence Rule: Content provided through the CMS must meet accessibility standards (e.g., providing alt text for images, ensuring video content has subtitles) and be compatible with UI components designed for accessibility.

Correspondence: Feedback Loop for Accessibility Enhancement Participating AD Elements: Feedback and Reporting System, all other system components. Correspondence Rule: The feedback system must be accessible and facilitate the reporting of accessibility issues, which should correspond to a process for addressing these issues across all system components.

5.3 Correspondence rules

Accessibility Standards Compliance: Every design element and feature in the system architecture must adhere to established accessibility standards (e.g., WCAG). This includes visual design, content presentation, and interactive elements.

Inclusive Design and User Engagement: The system must be designed with consideration for the broadest possible range of users, engaging directly with users with disabilities to inform design decisions and validate usability.

Continuous Improvement Through Feedback: Accessibility features and compliance must be continuously evaluated and improved based on user feedback, ensuring the system evolves to meet user needs effectively.

Traceability and Documentation: Correspondences between accessibility features and system components must be clearly documented, with traceable links ensuring that accessibility considerations are integrated at every level of the system's architecture.

Testing and Validation: Accessibility features must be regularly tested and validated, both through automated tools and user testing, to ensure they function as intended and meet the needs of users with disabilities.