

SMART HEALTH INSURANCE MANAGEMENT SYSTEM

PS-3

A Role Based Full Stack Insurance Platform

PRESENTED BY
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Problem Statement

Manual Paper Based Process

Heavy reliance on physical documentation leads to inefficiencies and storage challenges

Delayed Approvals

Lengthy claim processing times frustrate customers and hospitals making the whole process exhausting and long

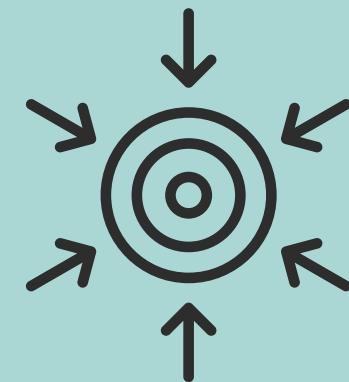
Fragmented Systems

Multiple stakeholders operate without a unified platform, causing data inconsistencies

Limited Transparency

Customers lack visibility into policy status, claims progress, and payment history

The Solution



Centralized Platform

Web-based insurance management system unifying all stakeholders on a single interface.



Automated Business Rules

Intelligent automation for policy lifecycle, premium calculations, claims processing, renewals, and notifications



Role-Based Workflows

Customized dashboards and access controls for Admin, Agents, Customers, Hospitals, and Claims Officers with restrictions on access



Security & Compliance

JWT authentication with strict authorization ensuring only active users and hospitals can access the system

TECHNOLOGY STACK AND IMPLEMENTATION

FRONT END

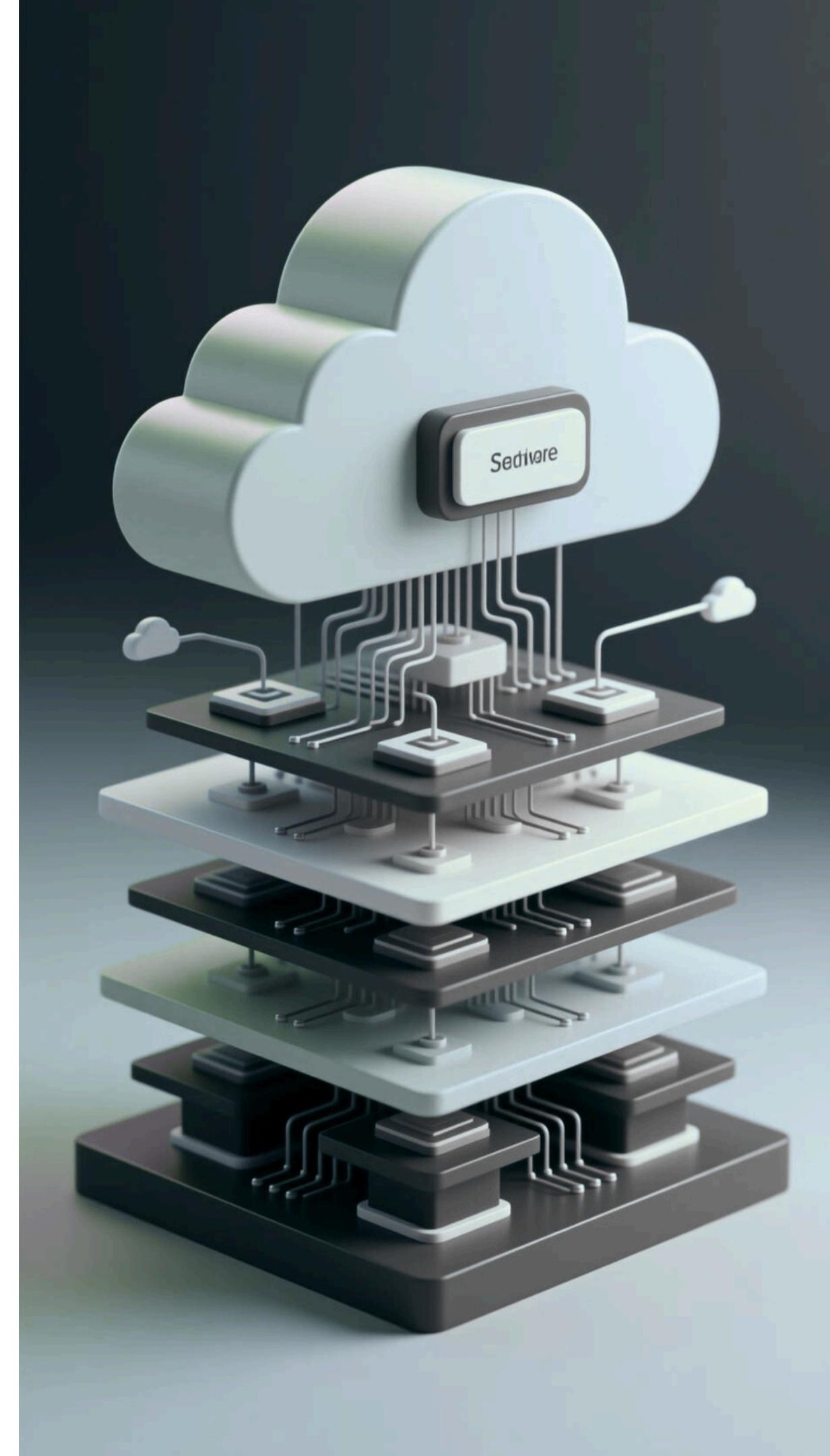
- Angular framework with Material Design
- Reactive Forms for validation
- Snackbar notifications
- Pipes for data transformation
- Pagination, search & filter functionality
- TypeScript interfaces for type safety

BACK END

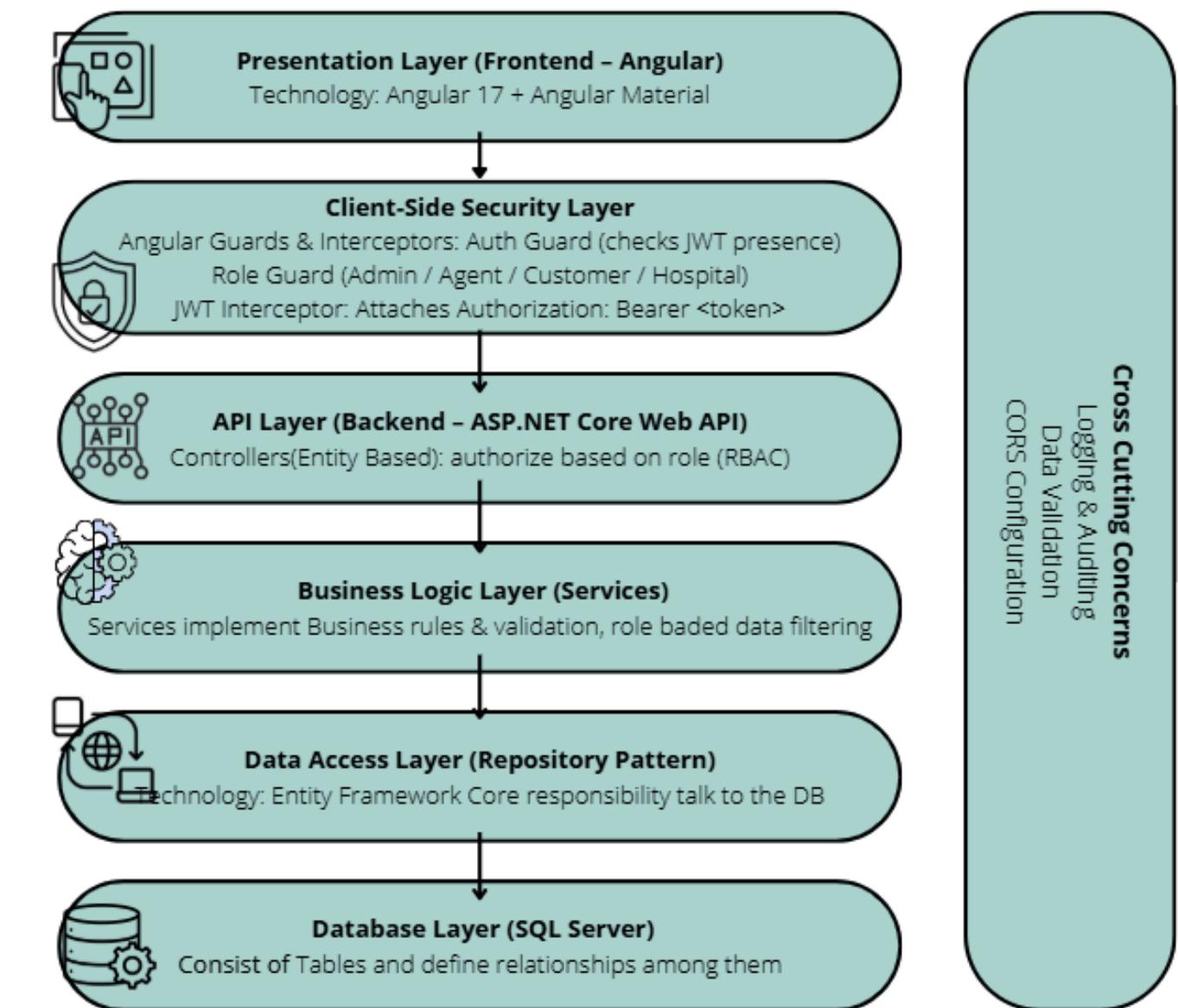
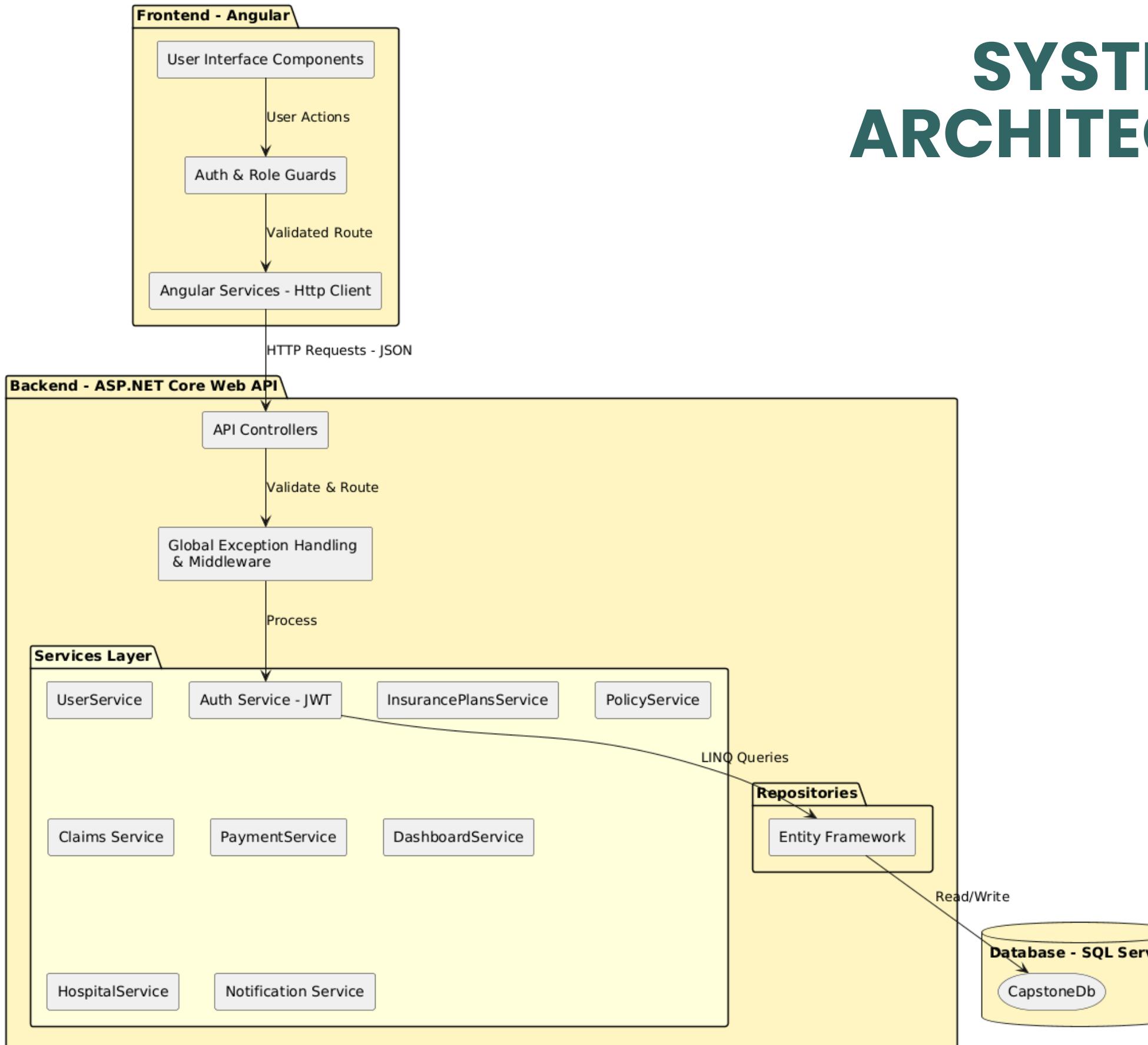
- ASP.NET Core Web API
- Entity Framework Core ORM
- ASP.NET Identity framework
- JWT token authentication
- Role-Based Access
- LINQ usage
- DTO usage to avoid exposing entities
- Repository pattern Layered architecture
- Comprehensive validation logic and error messages

DATABASE

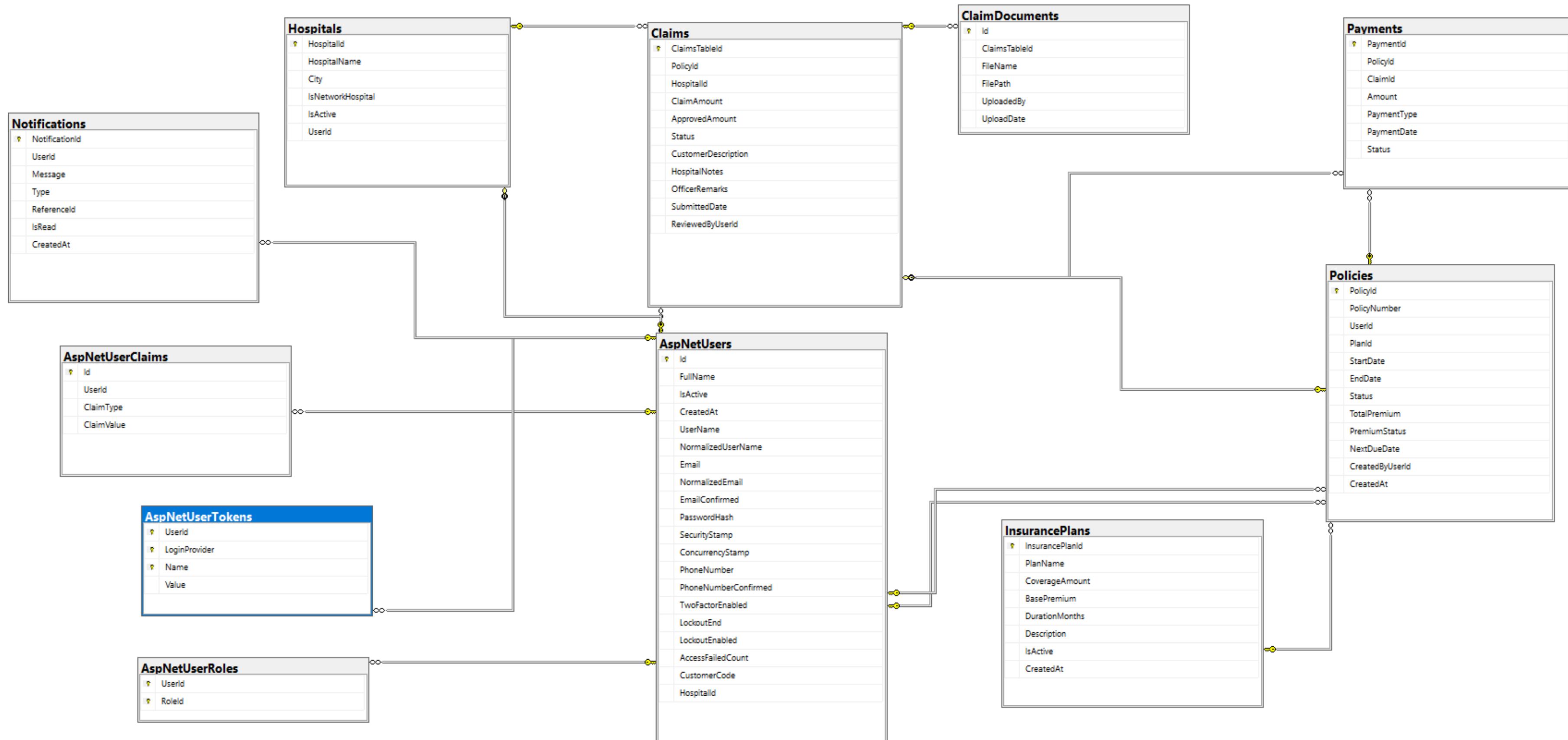
SQL Server database | Swagger/Postman API documentation & testing
|Git version control| Identity DB Seeder for initial setup



SYSTEM ARCHITECTURE



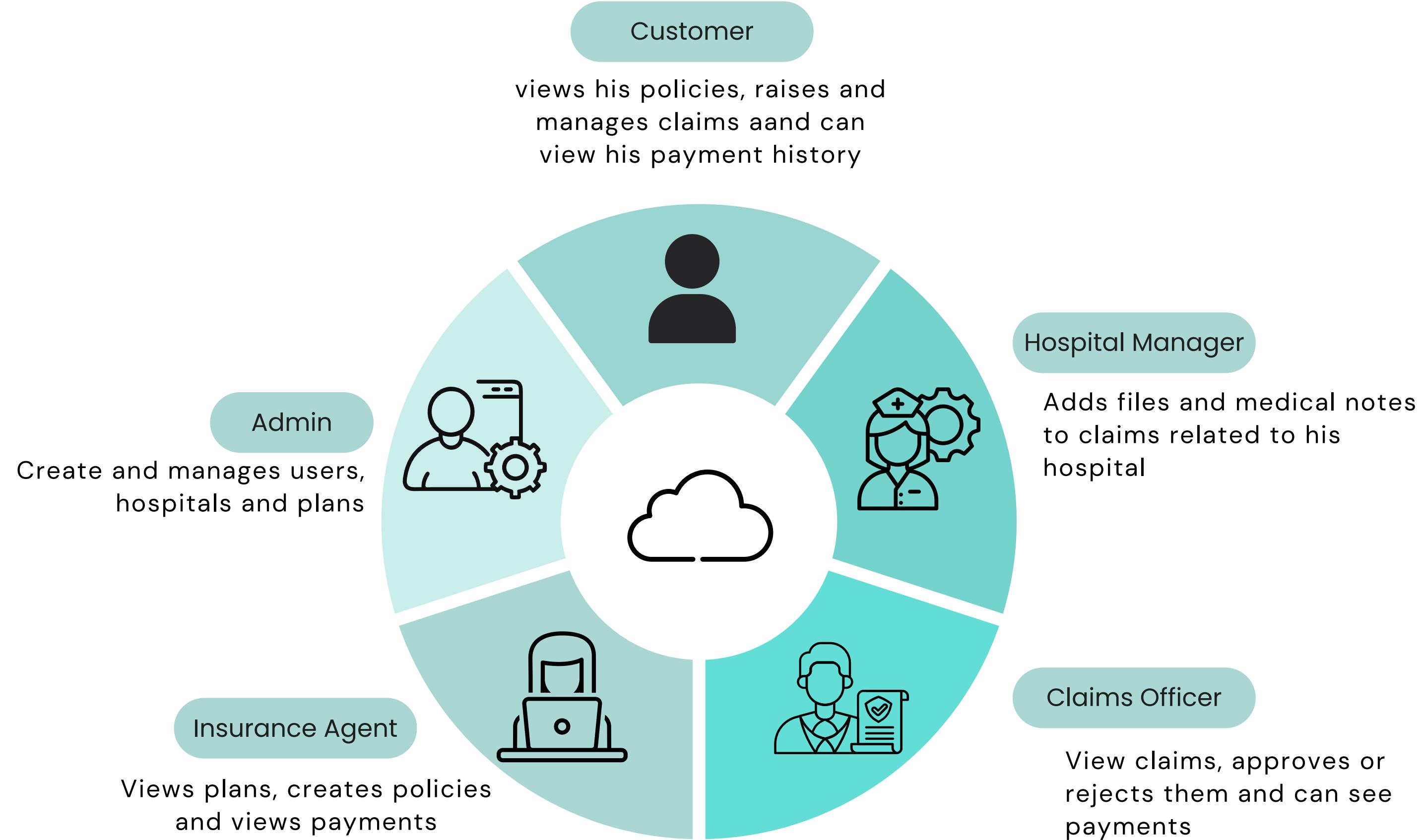
ER DIAGRAM



BACKEND APIs

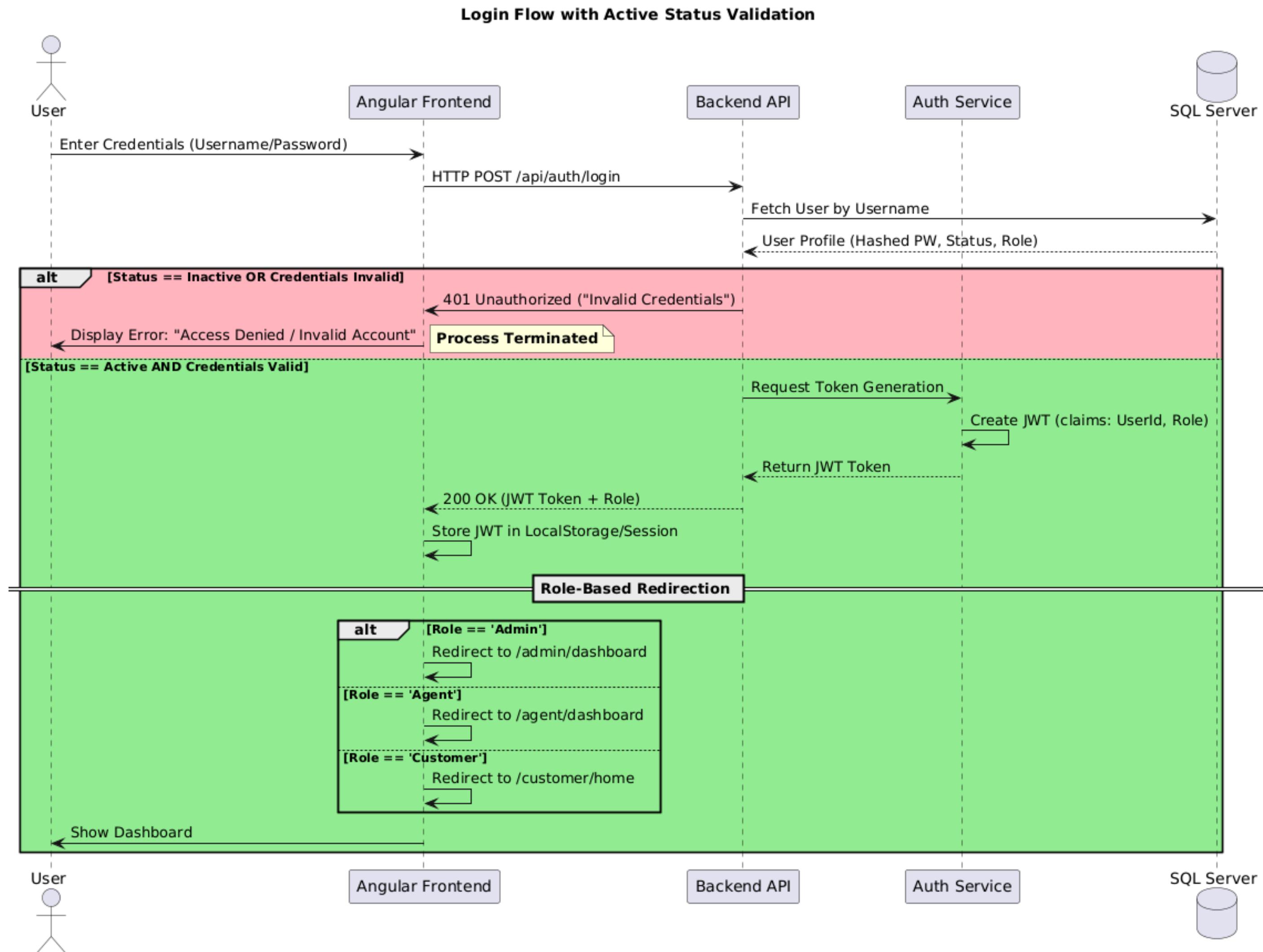
[Authorize](#)**Auth****POST** /api/auth/register**POST** /api/auth/login**CapStoneAPI****GET** /**Claims****POST** /api/claims**GET** /api/claims**PUT** /api/claims/{claimId}/medical-notes**PUT** /api/claims/{claimId}/review**Dashboard****GET** /api/dashboard/summary**GET** /api/dashboard/claims-by-officer**GET** /api/dashboard/policies-by-status**GET** /api/dashboard/claims-by-status**GET** /api/dashboard/claims-by-hospital**GET** /api/dashboard/high-value-claims**GET** /api/dashboard/hospital/summary**Documents****POST** /api/Documents/upload**GET** /api/Documents/claim/{claimId}**GET** /api/Documents/{id}**Hospital****GET** /api/hospitals**POST** /api/hospitals**PUT** /api/hospitals/{hospitalId}**PUT** /api/hospitals/{hospitalId}/status**InsurancePlans****GET** /api/plans**POST** /api/plans**PUT** /api/plans/{planId}**PUT** /api/plans/{planId}/status**Notifications****GET** /api/notifications**PUT** /api/notifications/{id}/read**Payments****POST** /api/payments/premium**GET** /api/payments**Policy****POST** /api/policies**GET** /api/policies**GET** /api/policies/{policyId}**PUT** /api/policies/{policyId}/suspend**POST** /api/policies/{policyId}/renew**Test****GET** /api/test/admin**GET** /api/test/agent**GET** /api/test/claims-officer**GET** /api/test/hospital**GET** /api/test/customer**Users****GET** /api/users**POST** /api/users**PUT** /api/users/{userId}/status**POST** /api/users/hospital-managers

User Roles



System Flows

Authorization Flow



System Flows

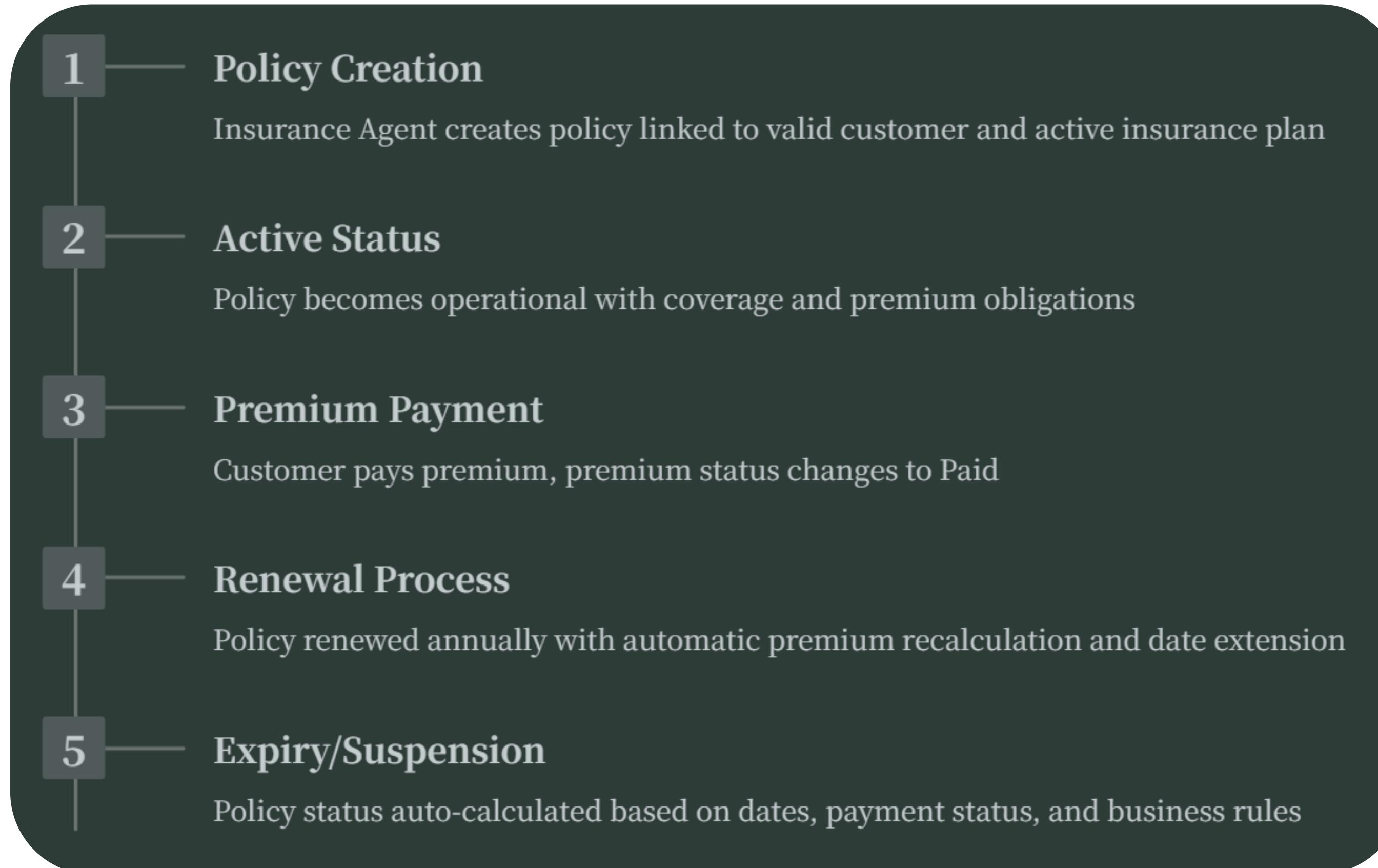
Policy Life Cycle

Base Premium Formula

Total Premium = 5% of
Coverage Amount
Calculated automatically
upon policy creation

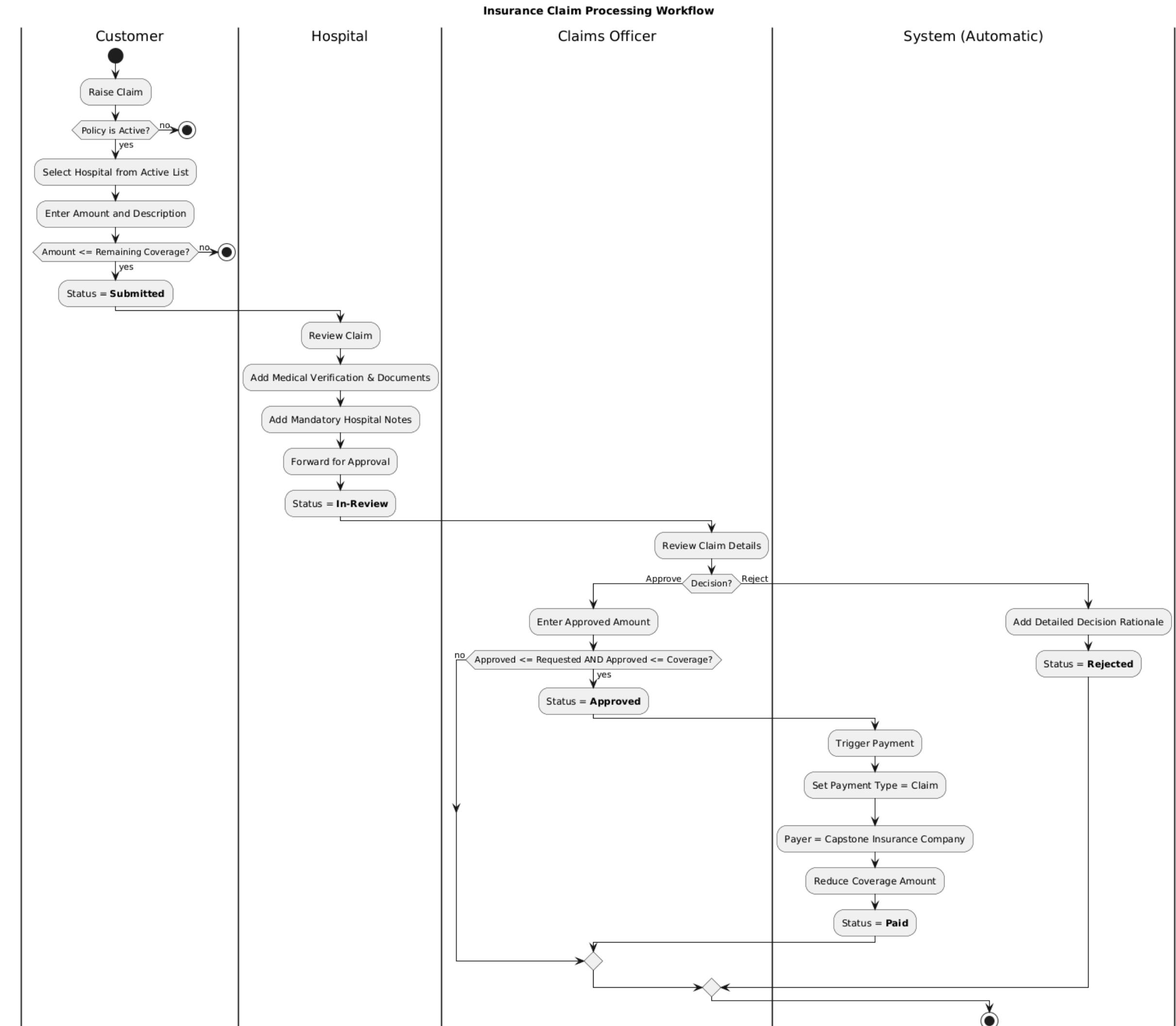
Annual Renewal Increase

Premium increases by 2% of
coverage and validity by 1
year

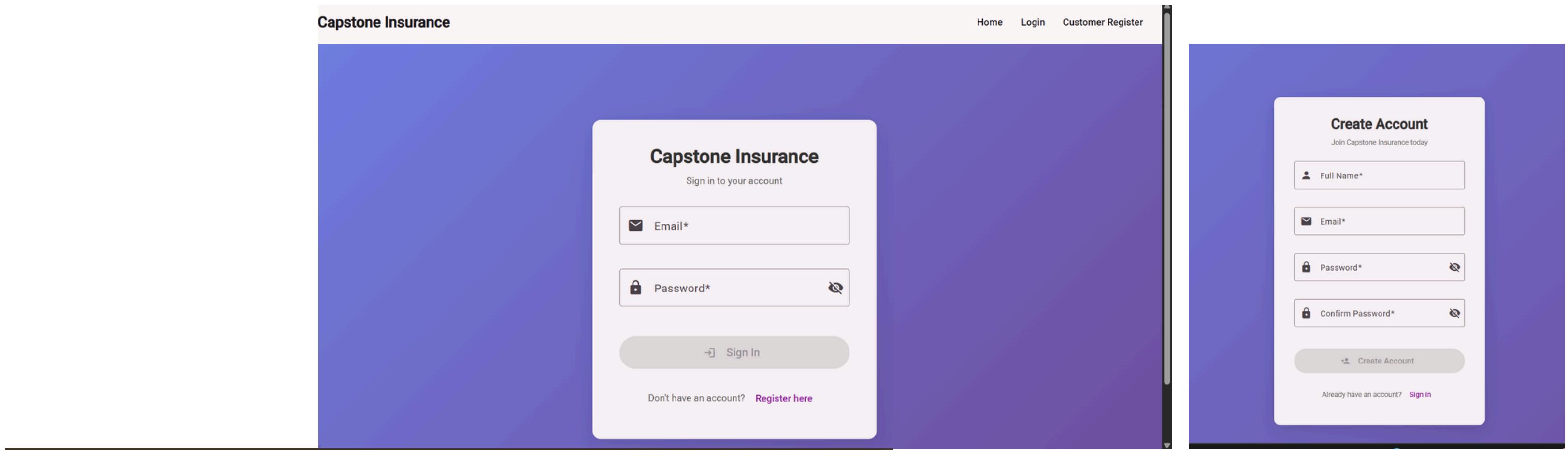


System Flows

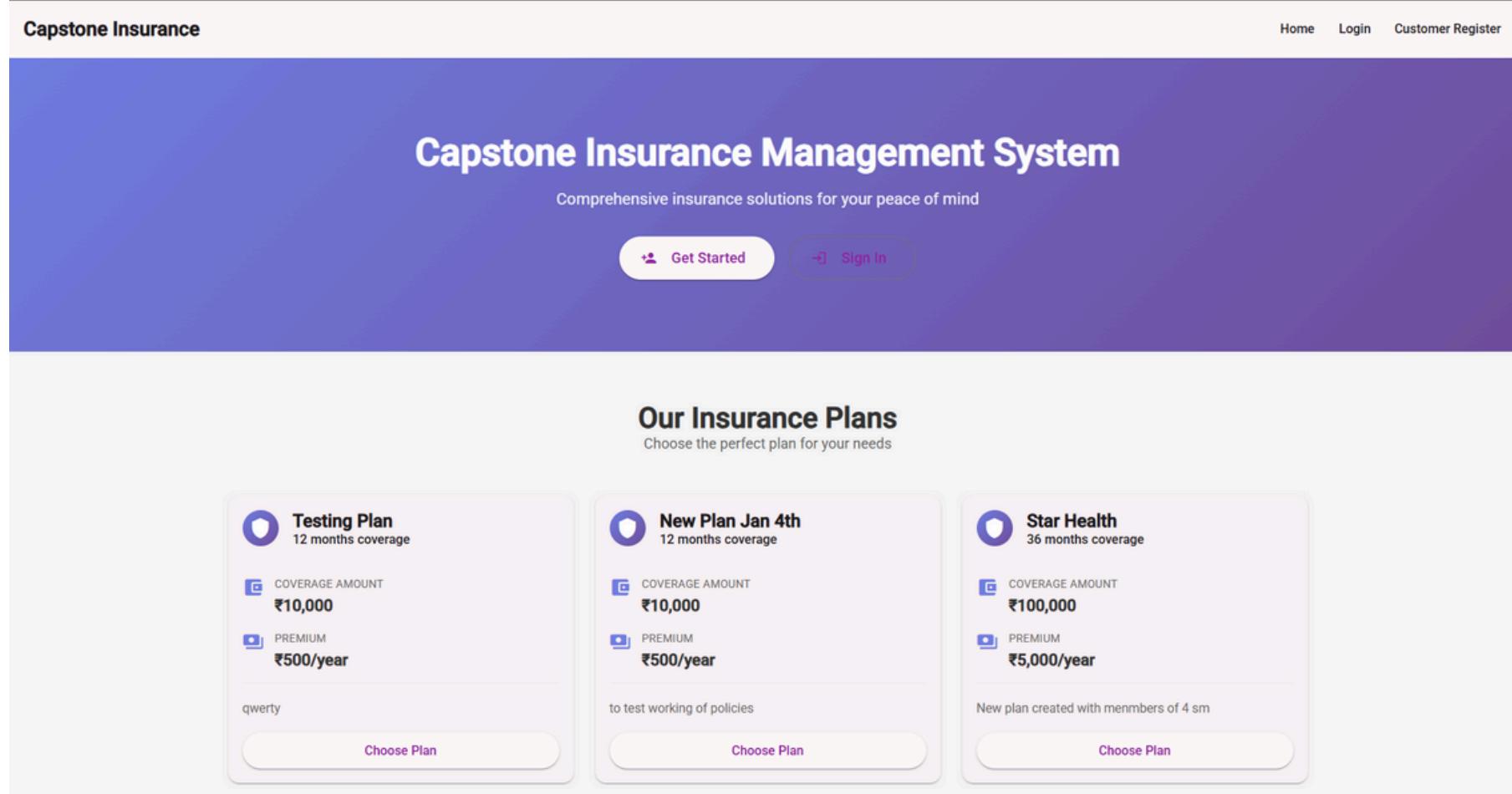
Claim Processing flow



UI Screen Shots



Login/Register Pages



Home Page

UI Screen Shots

Admin

Capstone Insurance - Admin

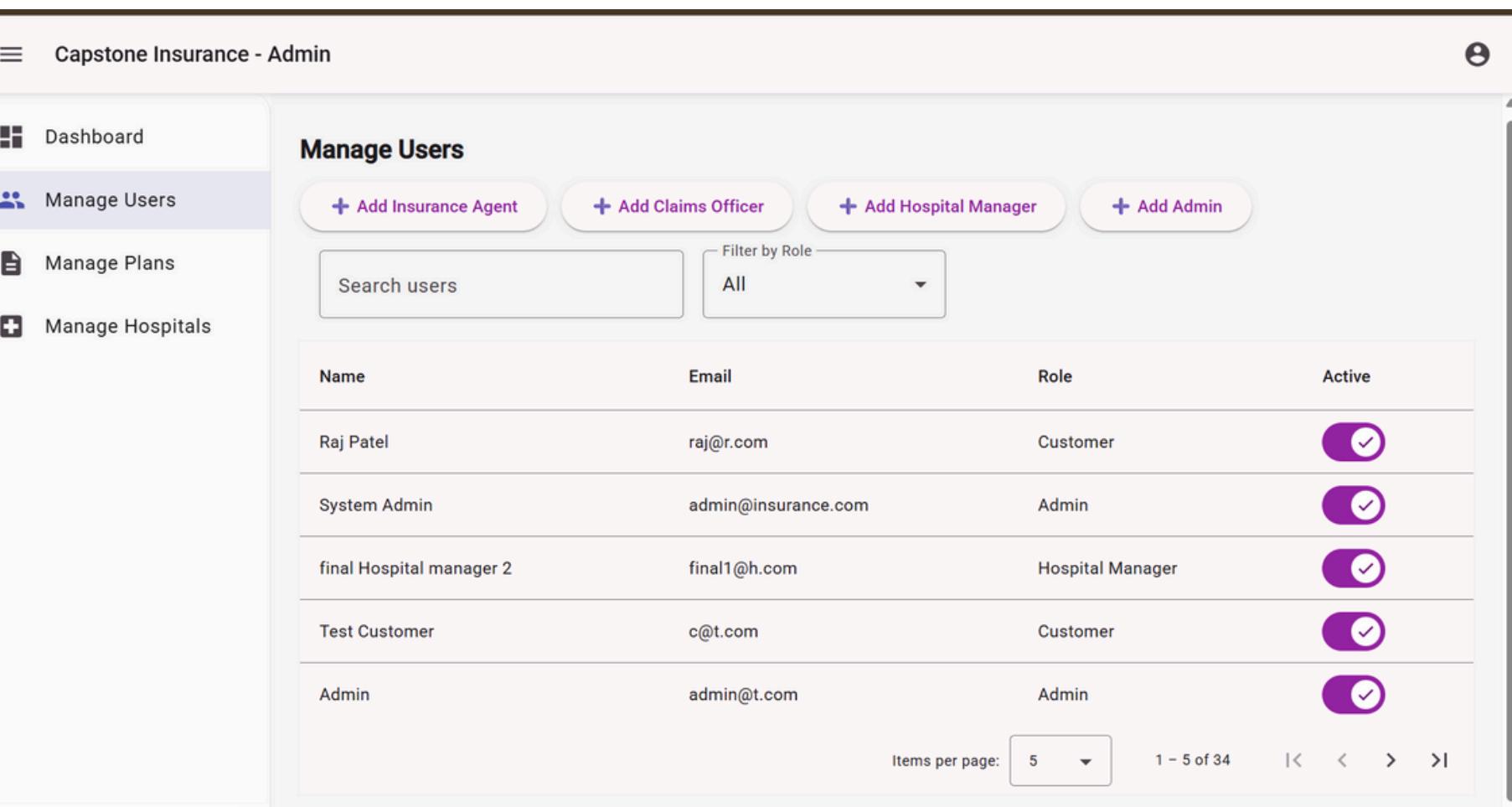
Manage Users

+ Add Insurance Agent + Add Claims Officer + Add Hospital Manager + Add Admin

Search users Filter by Role: All

Name	Email	Role	Active
Raj Patel	raj@r.com	Customer	<input checked="" type="checkbox"/>
System Admin	admin@insurance.com	Admin	<input checked="" type="checkbox"/>
final Hospital manager 2	final1@h.com	Hospital Manager	<input checked="" type="checkbox"/>
Test Customer	c@t.com	Customer	<input checked="" type="checkbox"/>
Admin	admin@t.com	Admin	<input checked="" type="checkbox"/>

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Manage Users

Manage Plans

Create Plan

Plan Name*

Coverage Amount (₹)* 0

Duration (Months)* 0

Description

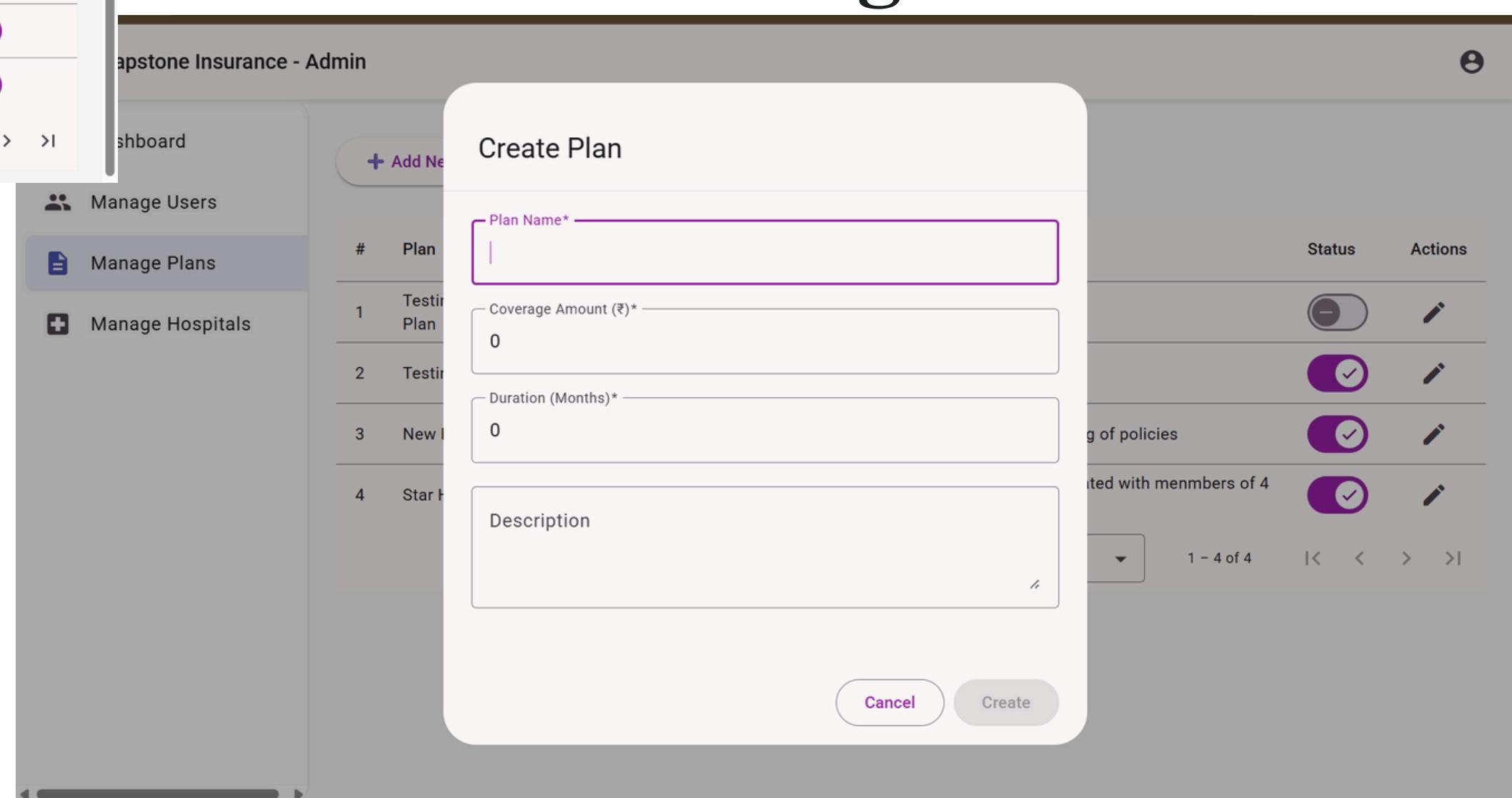
Cancel Create

Dashboard + Add New

Manage Users Manage Plans Manage Hospitals

#	Plan	Status	Actions
1	Testing Plan	<input type="checkbox"/>	<input type="button"/>
2	Testing	<input checked="" type="checkbox"/>	<input type="button"/>
3	New I	<input checked="" type="checkbox"/>	<input type="button"/>
4	Star H	<input checked="" type="checkbox"/>	<input type="button"/>

1 - 4 of 4 < >



UI Screen Shots

Insurance Agent

Capstone Insurance - Agent

Dashboard Policies Payments View Plans

+ Create Policy

Search policies Filter by Status All

Policy ID	Customer	Total Premium	Status	Premium	Start	End	Next Due	Actions
5	Test Customer	₹500.00	ACTIVE	DUE	Jan 4, 2026	Jan 4, 2027	Jan 4, 2026	
6	Test Customer	₹500.00	ACTIVE	DUE	Jan 4, 2026	Jan 4, 2027	Jan 4, 2026	
7	Test Customer	₹500.00	ACTIVE	DUE	Jan 4, 2026	Jan 4, 2027	Jan 4, 2026	
8	Test Customer	₹500.00	ACTIVE	DUE	Jan 4, 2026	Jan 4, 2027	Jan 4, 2026	
10	Rachana Bandari	₹5,000.00	ACTIVE	DUE	Jan 5, 2026	Jan 5, 2029	Jan 5, 2026	

Manage Policies



UI Screen Shots

Claims Officer

Capstone Insurance - Claims Officer

Payments

ID	Customer Code	Customer Name	Amount	Type	Date
5	C006	Rachana Bandari	₹ 500	PREMIUM	Jan 5, 2026
4	C006	Rachana Bandari	₹ 700	PREMIUM	Jan 5, 2026
3	C006	Rachana Bandari	₹ 500	PREMIUM	Jan 5, 2026
2	C006	Rachana Bandari	₹ 1000	CLAIM	Jan 5, 2026
1	C006	Rachana Bandari	₹ 1000	CLAIM	Jan 5, 2026

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Payments Page

Capstone Insurance - Claims Officer

Claims

Claim Review #1012 InReview

[View Documents](#)

Submitted	Actions
Jan 6, 2026	View
Dec 31, 2025	View
Dec 31, 2025	View
Dec 31, 2025	View
Jan 5, 2026	View

Claim Information

POLICY #	POLICY STATUS
POL-0a749196	Active
PREMIUM STATUS	POLICY PERIOD
Due	Jan 5, 2026 → Jan 5, 2029
HOSPITAL ID	HOSPITAL NAME
5	Final Testing Hospital
PLAN ID	PLAN NAME
4	Star Health
TOTAL COVERAGE	USED COVERAGE
₹100,000	₹0
REMAINING COVERAGE	CLAIM AMOUNT REQUESTED
₹100,000	₹100

Notes

Customer Description:
123

Hospital Notes:
yes docs uploaded

Review Action

Approve Reject

[Close](#) [Submit Review](#)

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Claim Review Dialog

UI Screen Shots

Hospital Manager

Hospital Claims Page

The screenshot shows the 'Hospital Claims' page. The left sidebar has 'Claims' selected. The main area displays a table of claims with columns: Claim ID, Customer, Policy, Status, Submitted, and Actions. A context menu is open over the third claim (Claim ID 6), showing options 'Upload Document' and 'View Documents'. The status for claim 6 is 'Paid'.

Claim ID	Customer	Policy	Status	Submitted	Actions
1012	Rachana Bandari	10	InReview	Jan 6, 2026	⋮
5	Rachana Bandari	4	Rejected	Dec 31, 2025	Upload Document
6	Rachana Bandari	4	Paid	Dec 31, 2025	View Documents
7	Rachana Bandari	3	Paid	Jan 2, 2026	⋮
8	Rachana Bandari	2	Paid	Jan 3, 2026	⋮

The screenshot shows the 'Hospital Payments' page. The left sidebar has 'Payments' selected. The main area displays a table of payments with columns: Payment ID, Claim ID, Insurance Company, Customer Code, Customer Name, Amount, and Date. The table shows two entries, both from Capstone Insurance Company to Rachana Bandari.

Payment ID	Claim ID	Insurance Company	Customer Code	Customer Name	Amount	Date
2	12	Capstone Insurance Company	C006	Rachana Bandari	₹1,000.00	Jan 5, 2026
1	10	Capstone Insurance Company	C006	Rachana Bandari	₹1,000.00	Jan 5, 2026

Hospital Payments Page

UI Screen Shots

Customer

Capstone Insurance - Customer Portal

My Policies

Search policies

Filter by Status: All

Policy ID	Status	Premium	Start	End	Actions
10	ACTIVE	DUE	Jan 5, 2026	Jan 5, 2029	View Details Raise Claim
3	ACTIVE	PAID	Dec 31, 2025	Dec 31, 2026	View Details Raise Claim
4	ACTIVE	PAID	Dec 31, 2025	Dec 31, 2027	View Details Raise Claim
9	ACTIVE	PAID	Jan 4, 2026	Jan 4, 2027	View Details Raise Claim
2	SUSPENDED	PAID	Dec 31, 2025	Dec 31, 2031	View Details Raise Claim

Items per page: 5 1 - 5 of 5

Dashboard

My Policies

My Claims

My Payments

Notifications

Customer Policies Page

Policy Details Dialog

Insurance - Customer Portal

Policy Details #4

My Policies

Search Policy ID

Policy ID: 10

STATUS: ACTIVE

PREMIUM STATUS: PAID

PLAN NAME: Testing Plan

TOTAL COVERAGE: ₹10,000.00

USED COVERAGE: ₹5,000.00

REMAINING COVERAGE: ₹5,000.00

TOTAL PREMIUM: ₹700.00

START DATE: Dec 31, 2025

END DATE: Dec 31, 2027

NEXT PREMIUM DUE: Jan 5, 2027

Actions

[View Details](#) [Raise Claim](#)

[Close](#)

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My Payments

Notifications

UI Screen Shots

Customer

The screenshot shows the 'My Claims' section of the customer portal. On the left, a sidebar menu includes 'Dashboard', 'My Policies', 'My Claims' (which is selected and highlighted in blue), 'My Payments', and 'Notifications'. The main area displays a table of claims with columns: Claim ID, Status, Claimed, Approved, Submitted On, and Actions. One claim (ID 1012) is marked as 'IN REVIEW'. Another (ID 11) is 'APPROVED'. A notification overlay at the top right indicates that claim ID 1012 has been submitted and is under review. A search bar and a filter dropdown ('All') are also present.

The screenshot shows the 'Payments' section of the customer portal. It features a 'Pay Premium' button and a 'Select Policy' dropdown menu where 'Policy #10 Premium: Due' is chosen. Below this, a table lists payment history. A modal dialog titled 'Pay Premium' is open, prompting the user to select a policy and enter the amount to pay (₹5000). The dialog includes a 'Cancel' button and a prominent 'Pay Now' button.

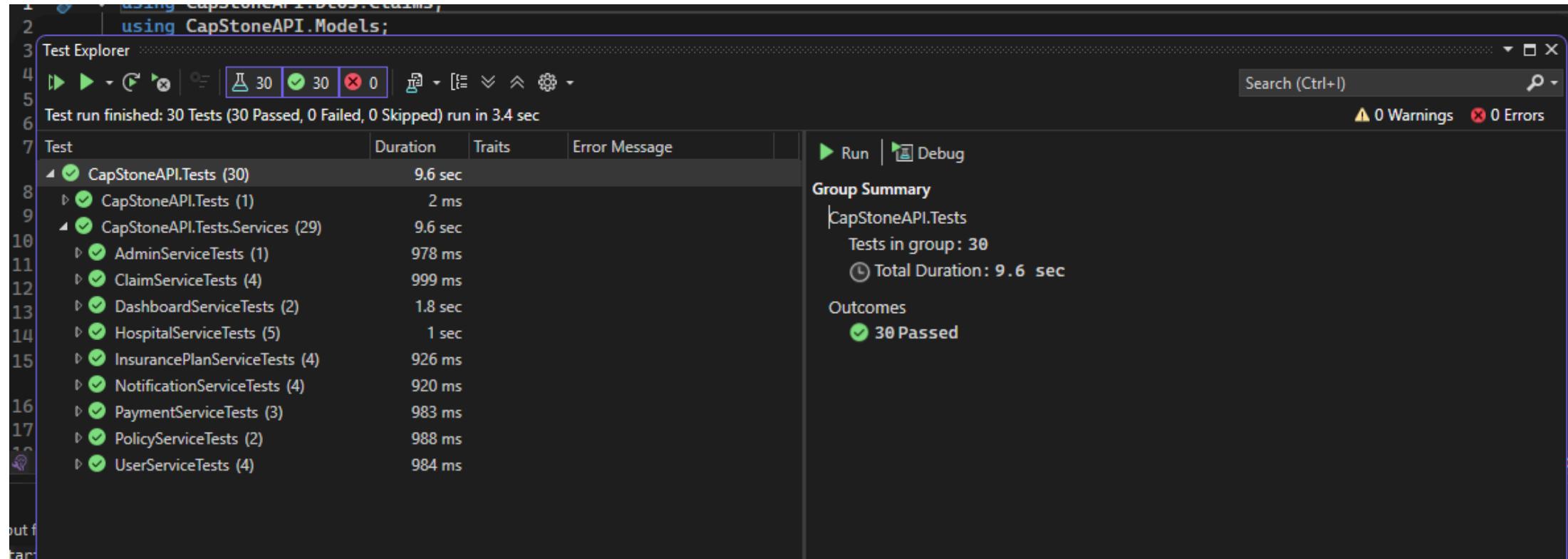
Customer Claims Page

Payment Dialog

Testing

Capstone Insurance

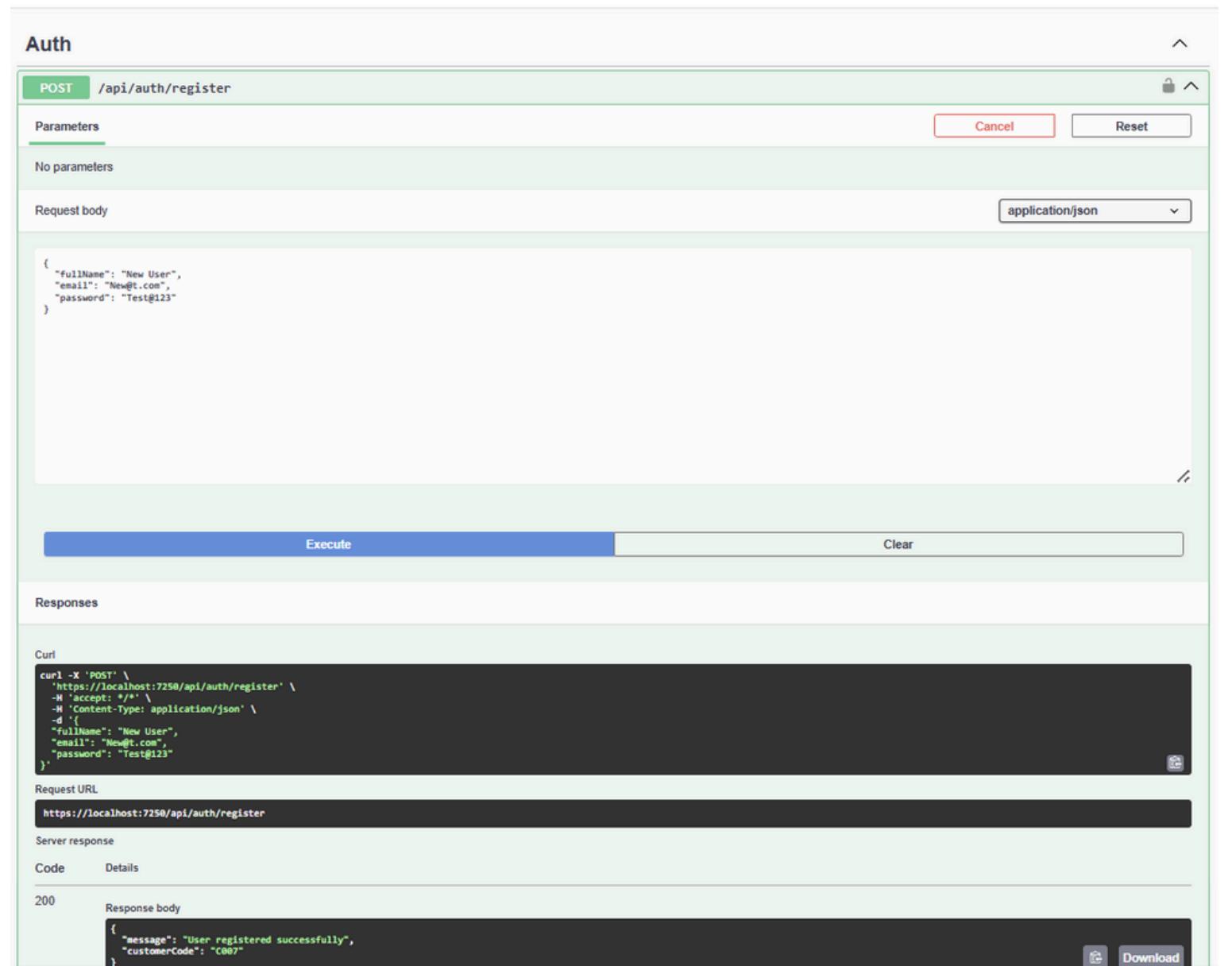
Unit Testing



A screenshot of a unit testing interface, likely from Visual Studio. The top status bar shows "Search (Ctrl+I)" and "0 Warnings 0 Errors". The Test Explorer window displays a summary: "Test run finished: 30 Tests (30 Passed, 0 Failed, 0 Skipped) run in 3.4 sec". The tree view shows test results for various service tests:

Test	Duration	Traits	Error Message
CapStoneAPI.Tests (30)	9.6 sec		
CapStoneAPI.Tests (1)	2 ms		
CapStoneAPI.Tests.Services (29)	9.6 sec		
AdminServiceTests (1)	978 ms		
ClaimServiceTests (4)	999 ms		
DashboardServiceTests (2)	1.8 sec		
HospitalServiceTests (5)	1 sec		
InsurancePlanServiceTests (4)	926 ms		
NotificationServiceTests (4)	920 ms		
PaymentServiceTests (3)	983 ms		
PolicyServiceTests (2)	988 ms		
UserServiceTests (4)	984 ms		

Run and Debug buttons are visible at the top right. A Group Summary panel on the right shows "CapStoneAPI.Tests" with 30 tests in group, total duration of 9.6 sec, and 30 Passed outcomes.



A screenshot of a REST API testing tool, likely Postman. The request details for a POST /api/auth/register endpoint are shown:

- Method:** POST
- URL:** /api/auth/register
- Parameters:** No parameters
- Request body:** application/json
- Body:**

```
{  
    "fullName": "New User",  
    "email": "New@t.com",  
    "password": "Test@123"  
}
```

The "Responses" section shows a successful response (200 OK) with the following details:

- Curl:** curl -X 'POST' \'<https://localhost:7250/api/auth/register>' \'-H 'accept: */*' \'-H 'Content-Type: application/json' \'-d '{
 "fullName": "New User",
 "email": "New@t.com",
 "password": "Test@123"
}'
- Request URL:** <https://localhost:7250/api/auth/register>
- Server response:** Response body content:

```
{"message": "User registered successfully",  
 "customerCode": "C007"}
```

API Testing

Live Demo

Project Demonstration

Outcomes & Learnings

Digitized the complete insurance lifecycle:

- Policy creation
- Premium payments
- Renewals
- Claims processing
- Claim settlements

Implemented real-world business rules instead of basic CRUD

Achieved secure access control using JWT and role-based authorization

Ensured data integrity and consistency through backend validations

Delivered separate dashboards tailored for each stakeholder

Improved transparency and traceability for customers and administrators

Designed a scalable and maintainable architecture



**Thank you
very much!**

ANY QUESTIONS?