License Management System - Knowledge Transfer Document

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System Overview

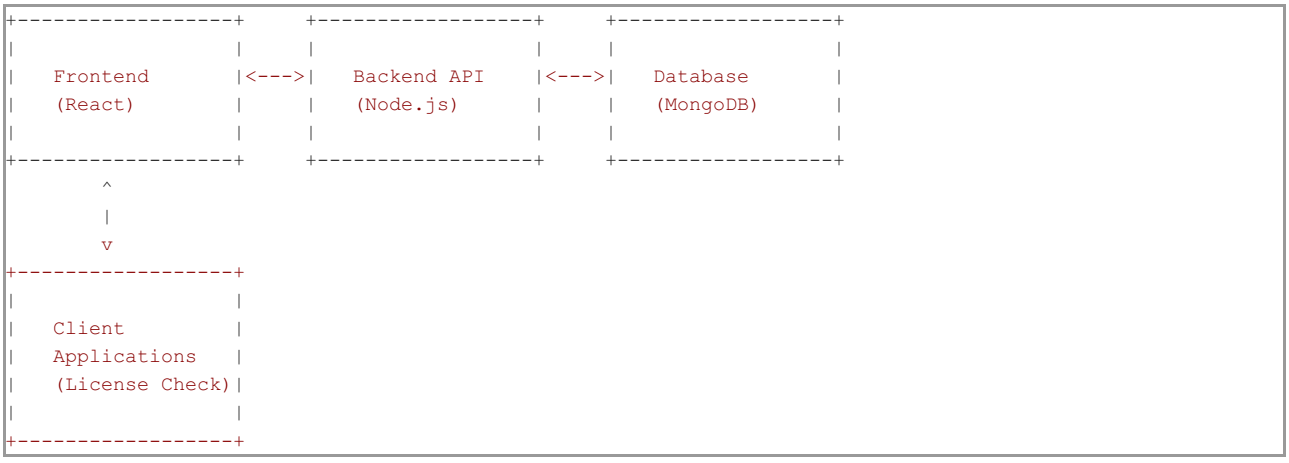
The License Management System (LMS) is a comprehensive solution designed to manage software licenses, user access, and product activations. The system provides a secure and scalable way to manage software distribution, track license usage, and ensure compliance with licensing agreements.

Key Features

- User authentication and authorization
- License key generation and management
- Product catalog management
- Purchase and activation tracking
- User and role management
- Dashboard and reporting
- License activation simulation

System Architecture

High-Level Architecture



Component Architecture

1. **Frontend (React.js)**
    - User Interface components
    - Dashboard and reporting
    - Admin console
    - User management interface
2. **Backend (Node.js/Express)**
    - RESTful API endpoints
    - Authentication service

    - License management service
    - Product management service
    - User management service

3. **Database (MongoDB)**
    - Users collection
    - Products collection
    - Licenses collection
    - Purchases collection

4. **Client Library**
    - License validation
    - Machine binding
    - Activation management

Technical Stack

Frontend

- **Framework**: React.js
- **State Management**: Redux/Context API
- **UI Components**: Material-UI
- **Routing**: React Router
- **HTTP Client**: Axios

Backend

- **Runtime**: Node.js
- **Framework**: Express.js
- **Authentication**: JWT (JSON Web Tokens)
- **Database**: MongoDB with Mongoose ODM
- **Validation**: Joi
- **Logging**: Winston

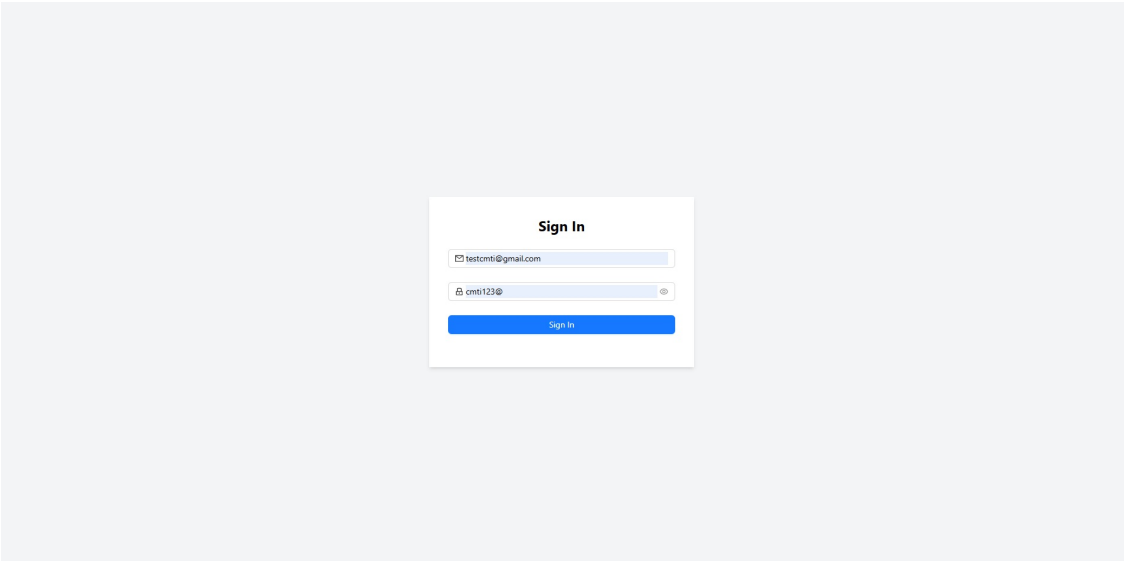
Client Library

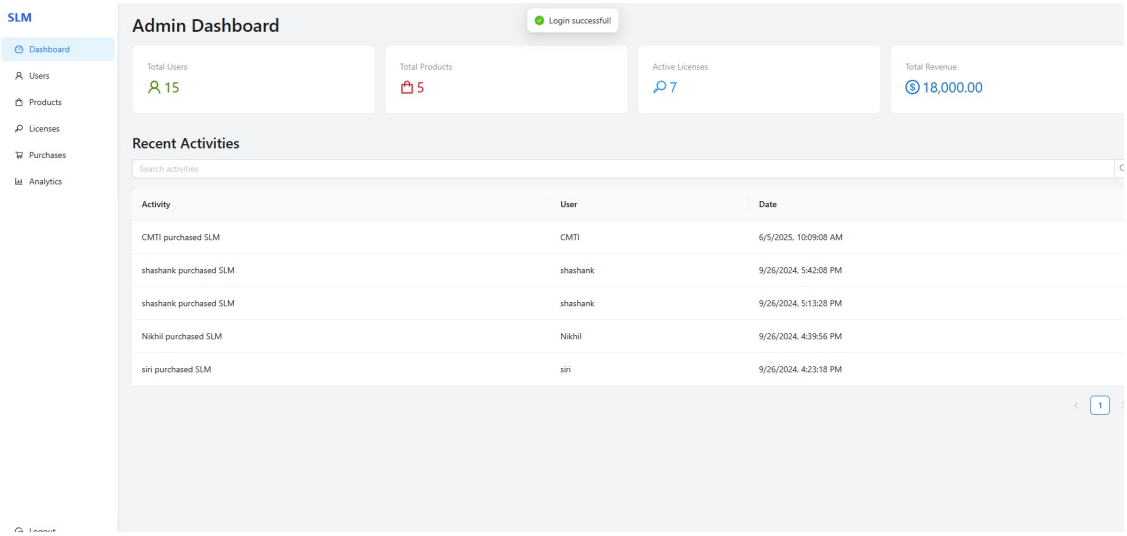
- **Language**: JavaScript/Node.js
- **Cryptography**: crypto-js
- **HTTP Client**: Axios
- **Persistence**: File system for local storage

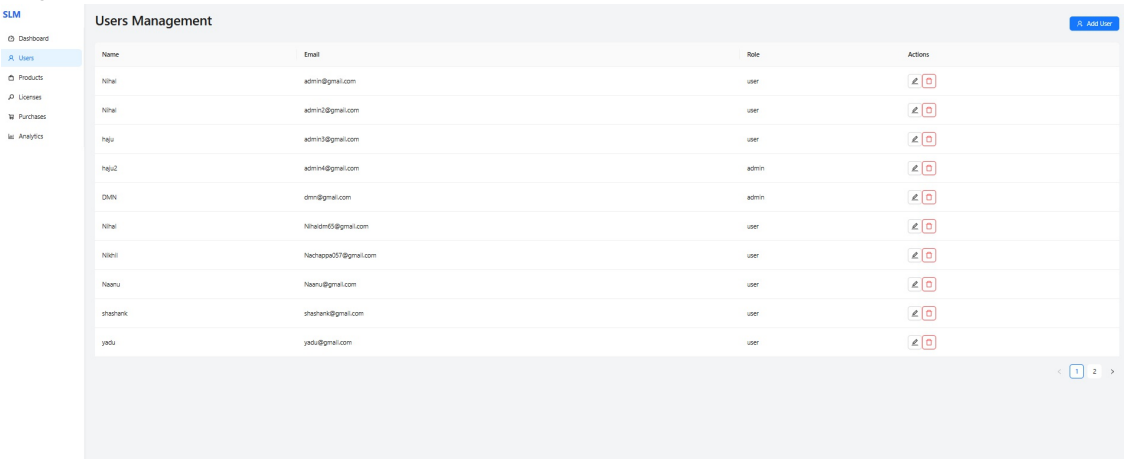
User Workflows

Admin Workflow

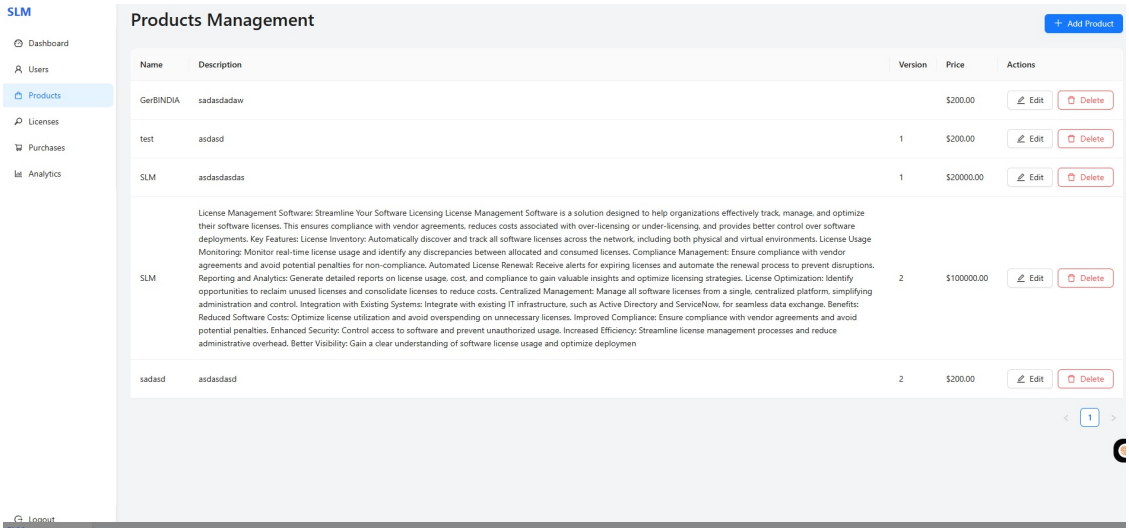
1. **Login**
    - Access admin dashboard with elevated privileges

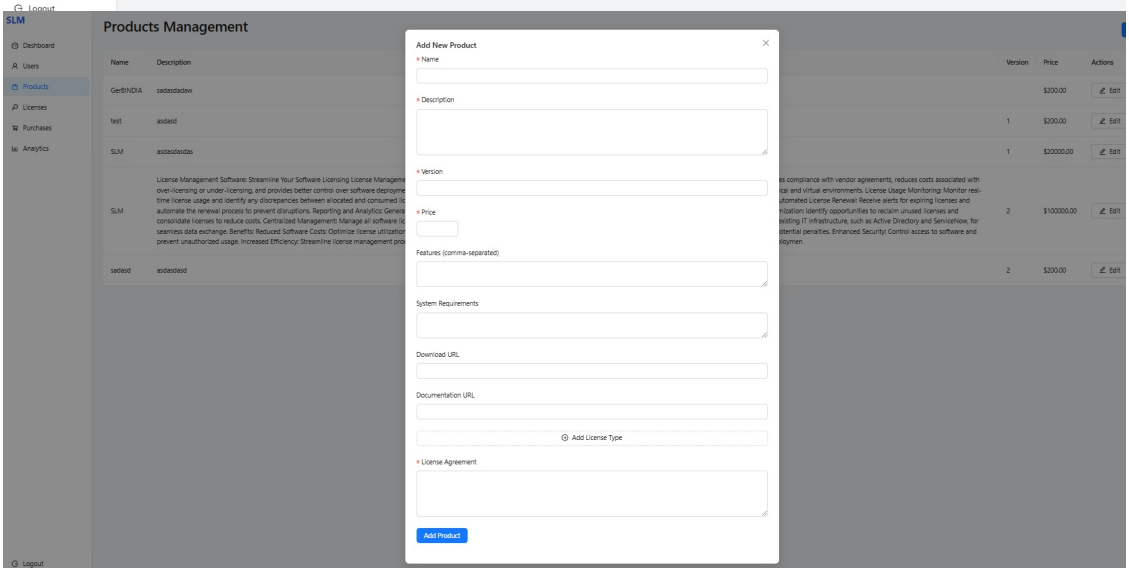
- 

2. **Dashboard**
    - Overview of system metrics
    - Quick access to key functions
    - 

3. **User Management**
    - View and manage all users
    - Assign roles and permissions
    - 

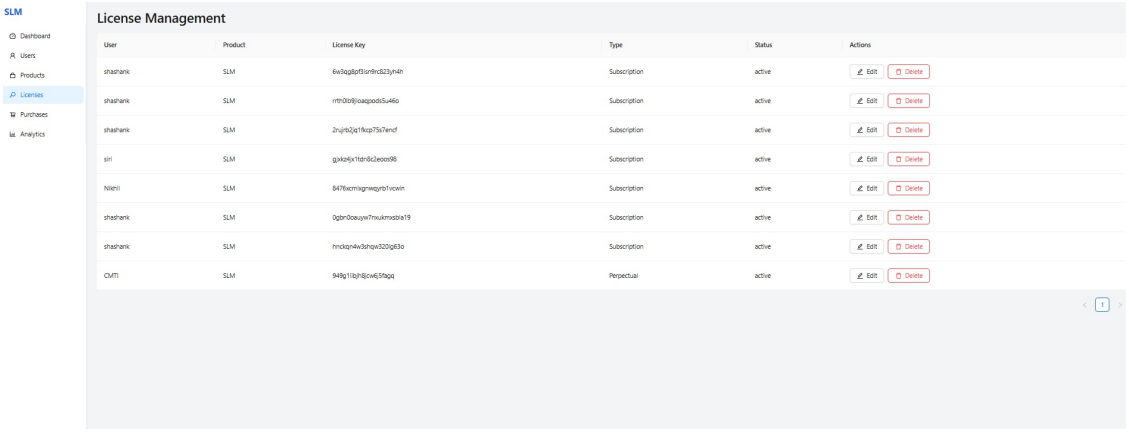
4. **Product Management**
    - Add/Edit/Remove products
    - Configure product details and licensing options

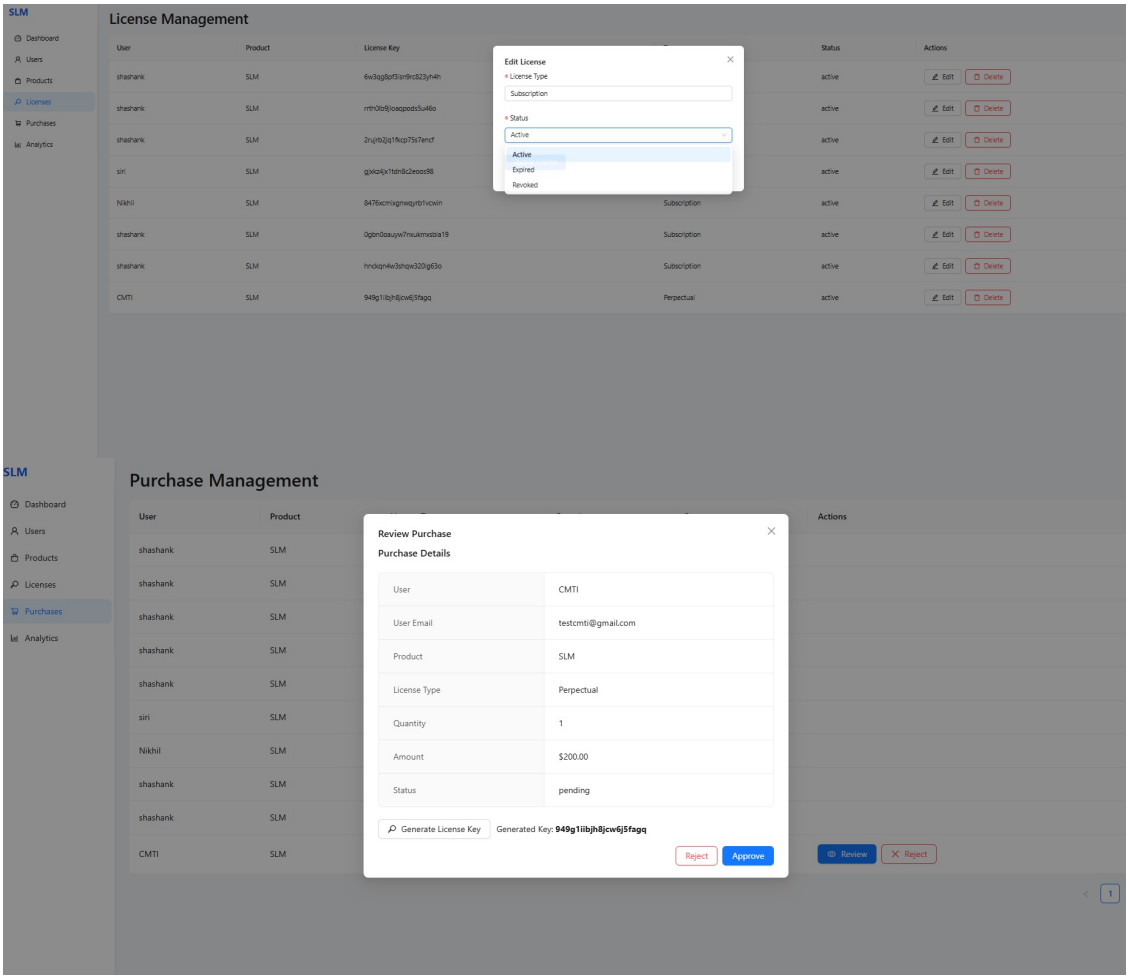




5. **License Management**

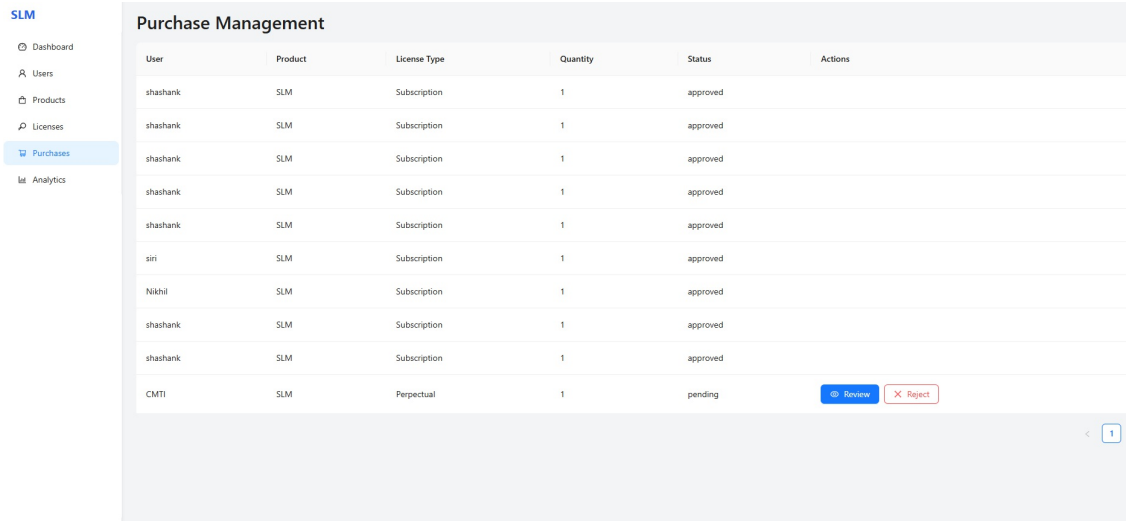
- Generate and manage license keys
- View activation status
- Revoke/reactivate licenses

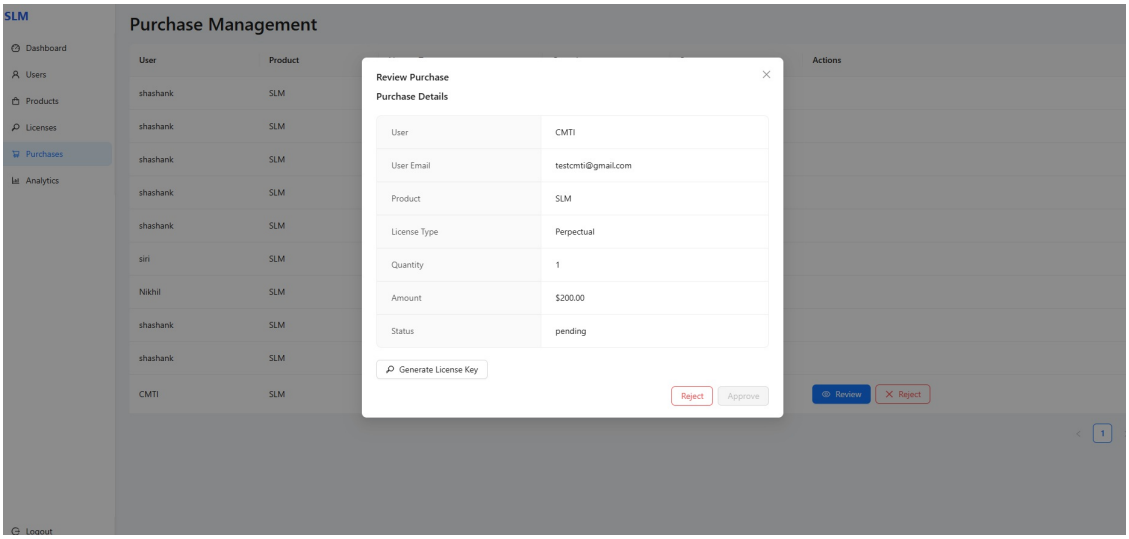




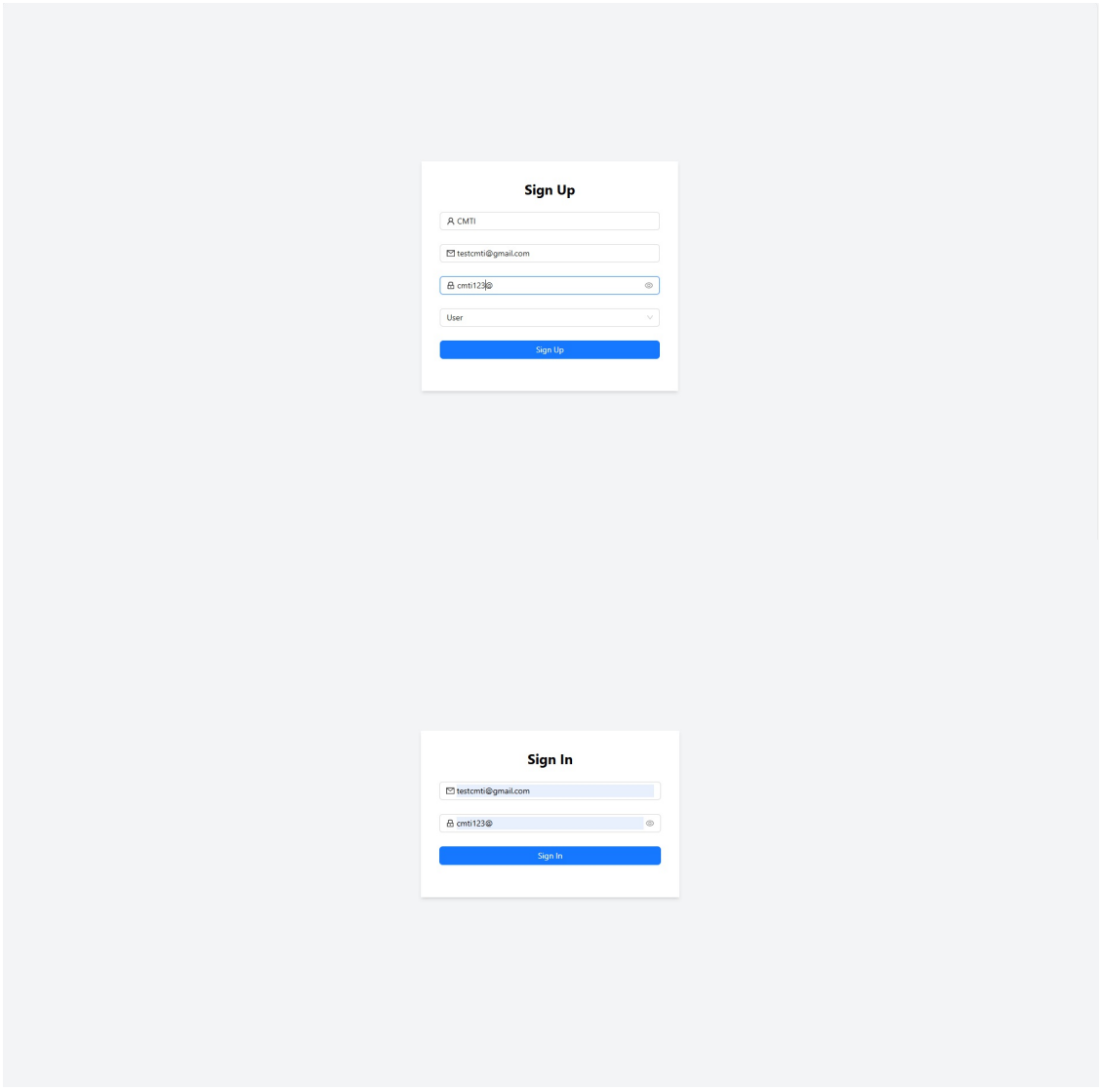
6. **Purchase Management**

   - Track purchases and subscriptions
   - Process refunds/upgrades

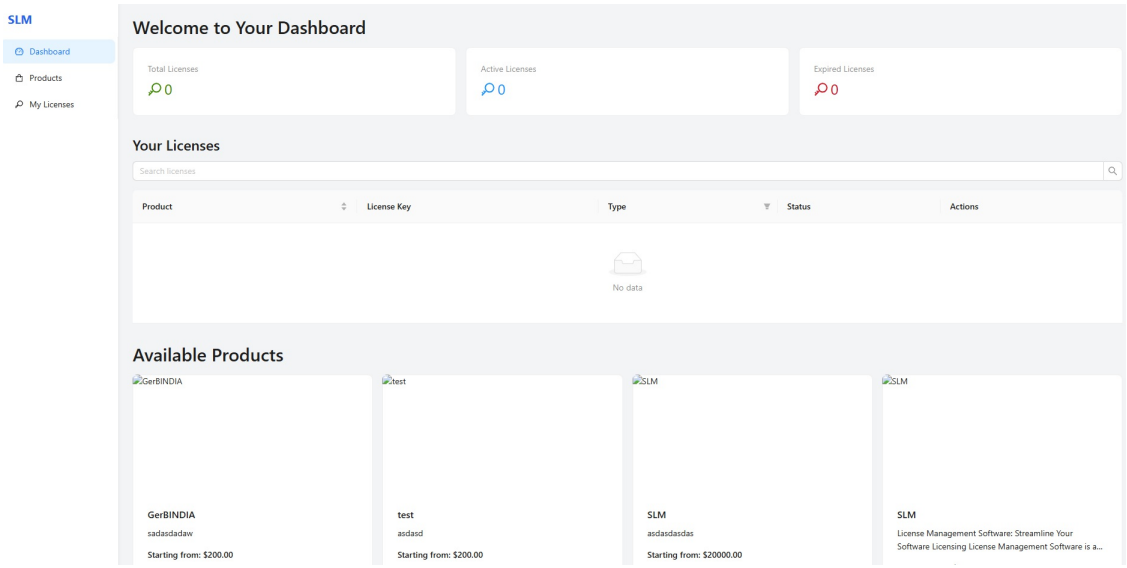


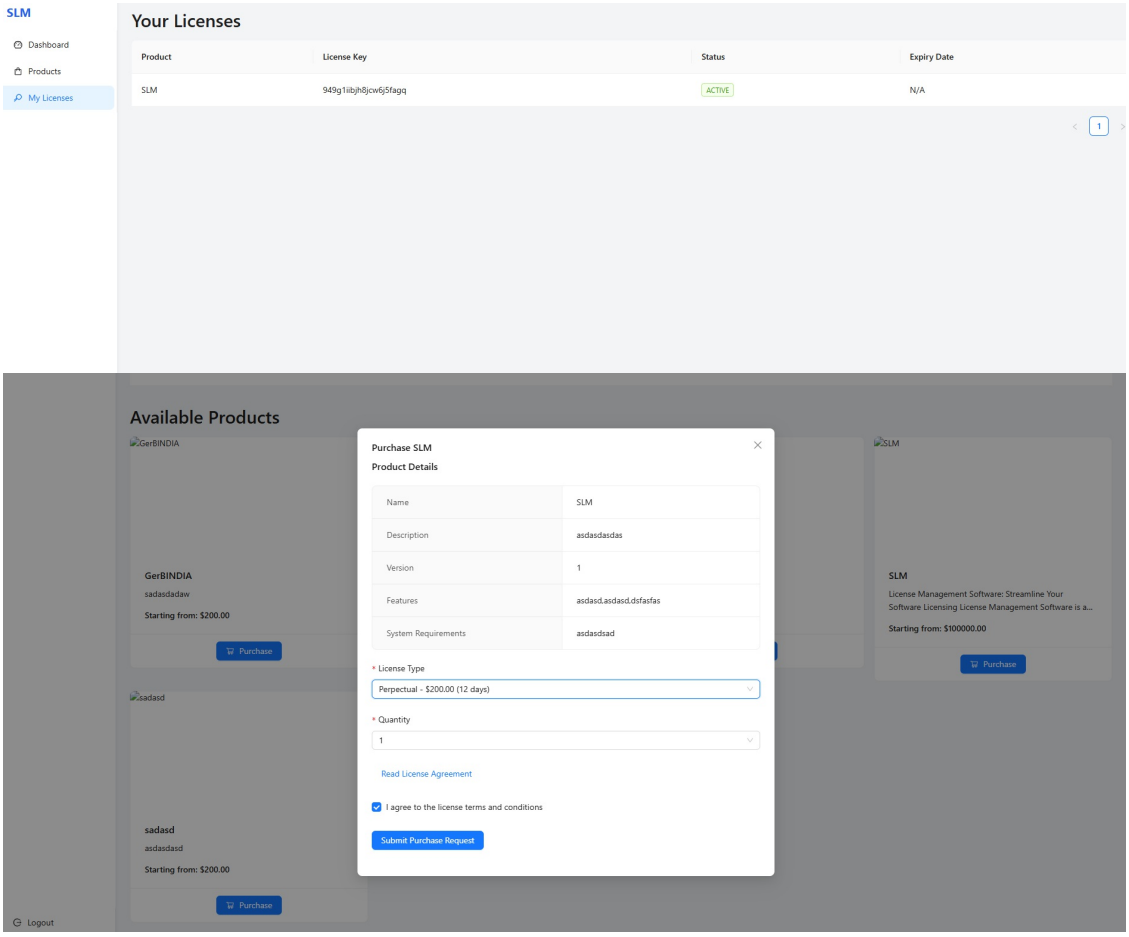
- 

End User Workflow

1. **Registration/Login**
    - Create an account or log in
    - 

2. **User Dashboard**
    - View purchased licenses
    - Access download links

- 

3. **License Management**
    - View and manage licenses
    - Activate/deactivate installations
    - 

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4. **License Activation**
    - Activate software using license key
    - Manage activated devices

```
PS D:\Naanu\Codes\CMTI\License_managment\LMS_Simulation> node activation.js
🚀 Starting license activation process...
Checking for existing license...
No existing license file found, attempting to activate...
Attempting to activate license: an10ypfuzg8zhki92twrm
Entering activateLicense function
Request body: {
  licenseKey: 'an10ypfuzg8zhki92twrm',
  machineId: '151366df81d31c39409b87692204905c3cdf766af53b74612ec0a7c0aba70838'
}
License activation response: {
  message: 'License activated successfully',
  license: {
    _id: '68412508d60b36487ad6757a',
    userId: '68411f11d60b36487ad67468',
    productId: '66e96eeb7a7149dee0d6f4fd',
    licenseKey: 'an10ypfuzg8zhki92twrm',
    type: 'perpetual',
    startDate: '2025-06-05T05:03:04.826Z',
    status: 'active',
    activations: [ [Object] ],
    createdAt: '2025-06-05T05:03:04.827Z',
    updatedAt: '2025-06-05T05:03:58.031Z',
    __v: 1
  }
}
License data saved successfully
✅ License activated successfully. Access granted to the application.
🚀 Application started successfully!
```

Integration Points

API Endpoints

- **Authentication**: `/api/auth/*`
- **Users**: `/api/users/*`
- **Products**: `/api/products/*`
- **Licenses**: `/api/licenses/*`
- **Purchases**: `/api/purchases/*`

Webhooks

- License activation events
- Purchase notifications
- System alerts

Client Integration

```
const LicenseManager = require('./licenseManager');
const license = new LicenseManager(API_URL, LICENSE_FILE_PATH);

// Check license
const isValid = await license.verifyLicense();

// Activate license
await license.activateLicense(LICENSE_KEY);
```

Troubleshooting Guide

Common Issues

1. **Activation Fails**

- Verify internet connection
- Check license key validity
- Ensure machine ID hasn't changed

2. **Login Issues**
    - Reset password if necessary
    - Check account status (active/suspended)
3. **License Validation Failures**
    - Check system date/time
    - Verify license expiration
    - Check for blacklisted keys
4. **API Connectivity**
    - Verify API endpoint URL
    - Check CORS configuration
    - Verify network connectivity

FAQs

General

Q: How do I reset my password?
A: Use the "Forgot Password" link on the login page.

Q: How many devices can I activate?
A: This depends on your license type. Check your license details.

Licensing

Q: What happens if I change my hardware?
A: Contact support to reset your activations if you've reached your limit.

Q: How do I upgrade my license?
A: Navigate to the upgrade section in your dashboard.

Technical

Q: How do I integrate the license check in my application?
A: Include the client library and follow the integration guide.

Q: What data is collected during activation?
A: Only machine ID and license details are collected for validation.

Document last updated: June 5, 2025