Prove IT

HomeTrumpeter

Tenant

Consult and schedule repairs and maintenance using one of the verified service experts in the blink of an eye.

Home Owner

Easily liaise between tenants and service providers and automate payment collection systems for rent and other property management-related costs.

Service Provider

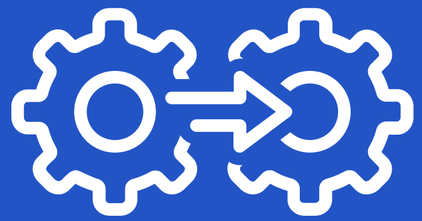
Issue and track the progress of property maintenance requests from tenants and home owners.

Problems

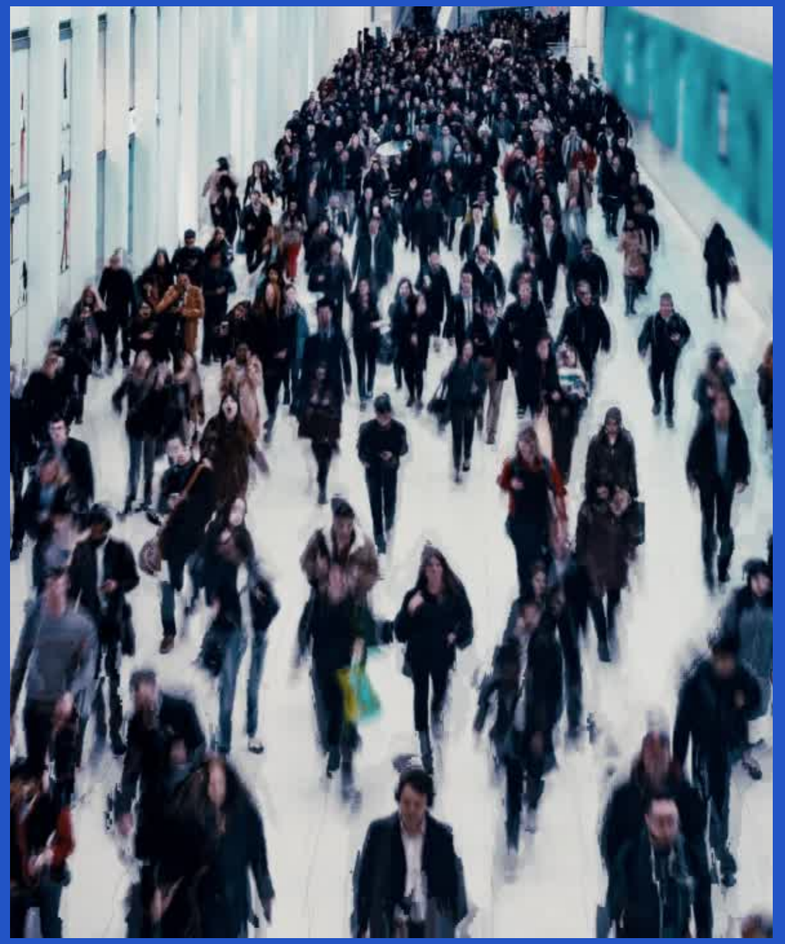
It is very difficult to see how the API will work in the real world.

Security

Integration



Feedback



Solutions

The solutions provided should uphold the mission and vision of HomeTrumpeter LLC. In pursuit of API integration and testing, various factors will be taken into consideration that may affect the business model.

Integration

The solutions should test the HomeTrumpeter API by using the most **up-to-date technologies** and **frameworks**.

Scalability

The solutions should leverage the shift towards **cloud computing** and **re-usability** of complex software components

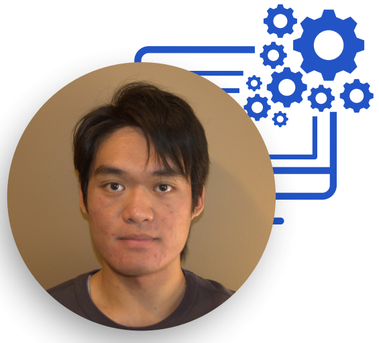
Security

The solutions will ensure security by conducting **comprehensive tests** against the **‘black box’** API.

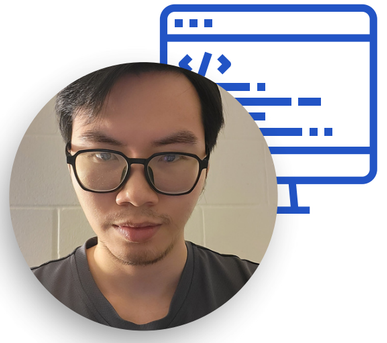
End User

The solutions offered need to be based on **sound market decisions** so that they can have **impact**.

Liam Kristjanson
Scrum Master, Product Owner, Project Leader



Xiao Zhang
Technical Leader



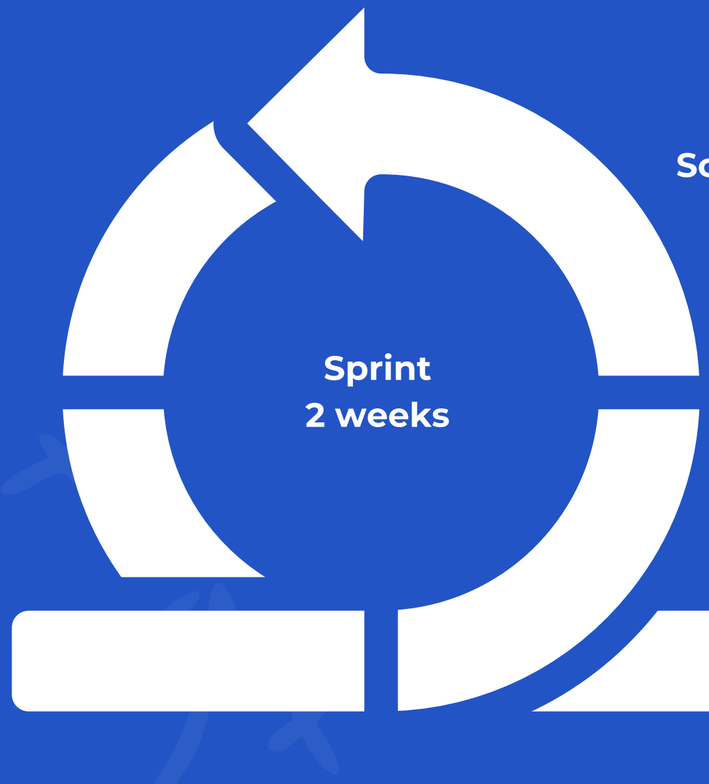
Vi Le
Lead Developer

Arshjot Ghuman
Lead Quality Assurance Engineer

Usmaan Sahar
Lead Systems Analyst / Designer

W A Shadman
Lead DevSecOps Engineer

Agile Release Plan



Scrum 3 times/week

Development

Sprint Planning

Sprint Backlog

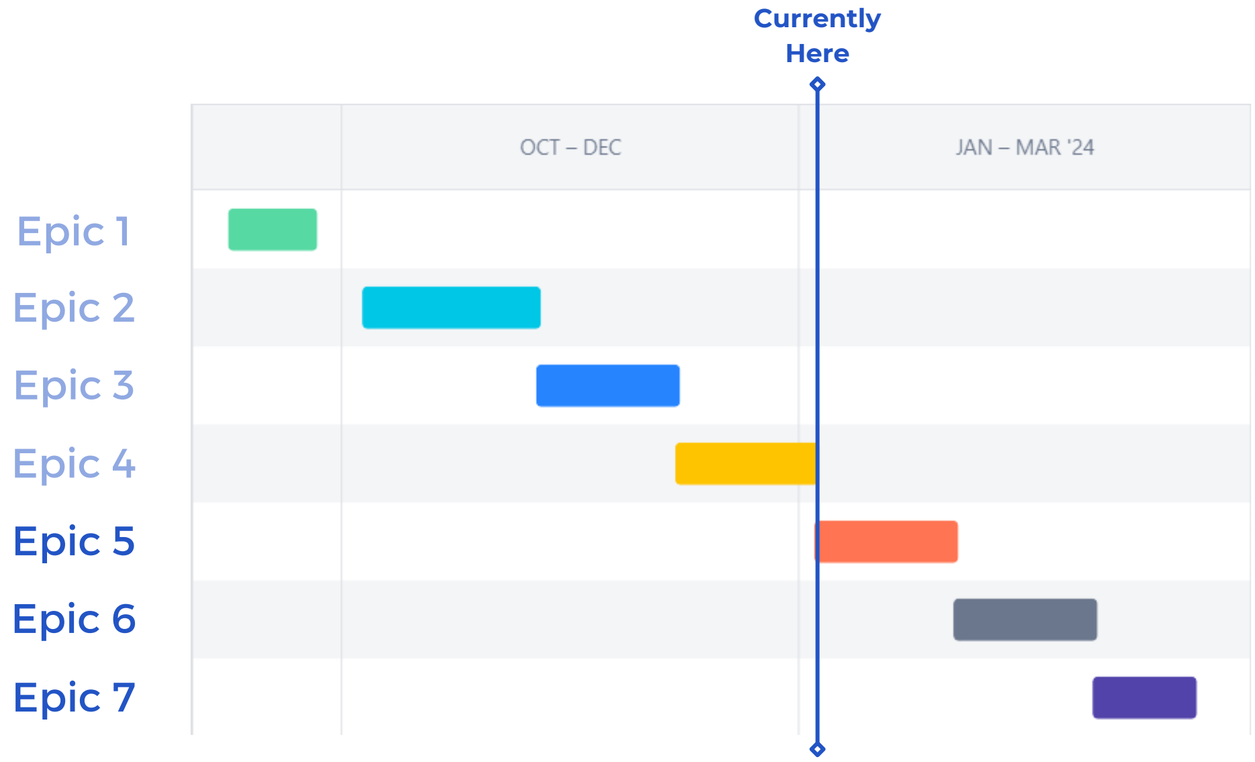
Sprint Review

Sprint Retrospective

High-Level Requirements

1. **Login Portal Using the API Gateway** ☑
2. **Tenant Onboarding** ☑
3. **Service Provider Onboarding** ☑
4. Service Request Creation
5. Background Check and Notification
6. Service Provider Behavior Prediction Model

Timeline



Tentative timeline. More sprints will be added/updated based on stakeholder feedback, as development continues.

2023 Q3

~~Project Proposal~~

2023 Q4

~~Infrastructure~~

~~CI/CD Pipeline~~

~~Login and Account Creation~~

~~Tenant Onboarding~~

2024 Q1

Services

Service Provider Onboarding

- Dashboard
- Invite system
- Add/remove/edit services

Service Provider Background Check

- Public service provider 'market'
- Transaction process

Service Request Creation

- Homeowner request
- Tenant request
- Confirmation of completion

Product Backlog

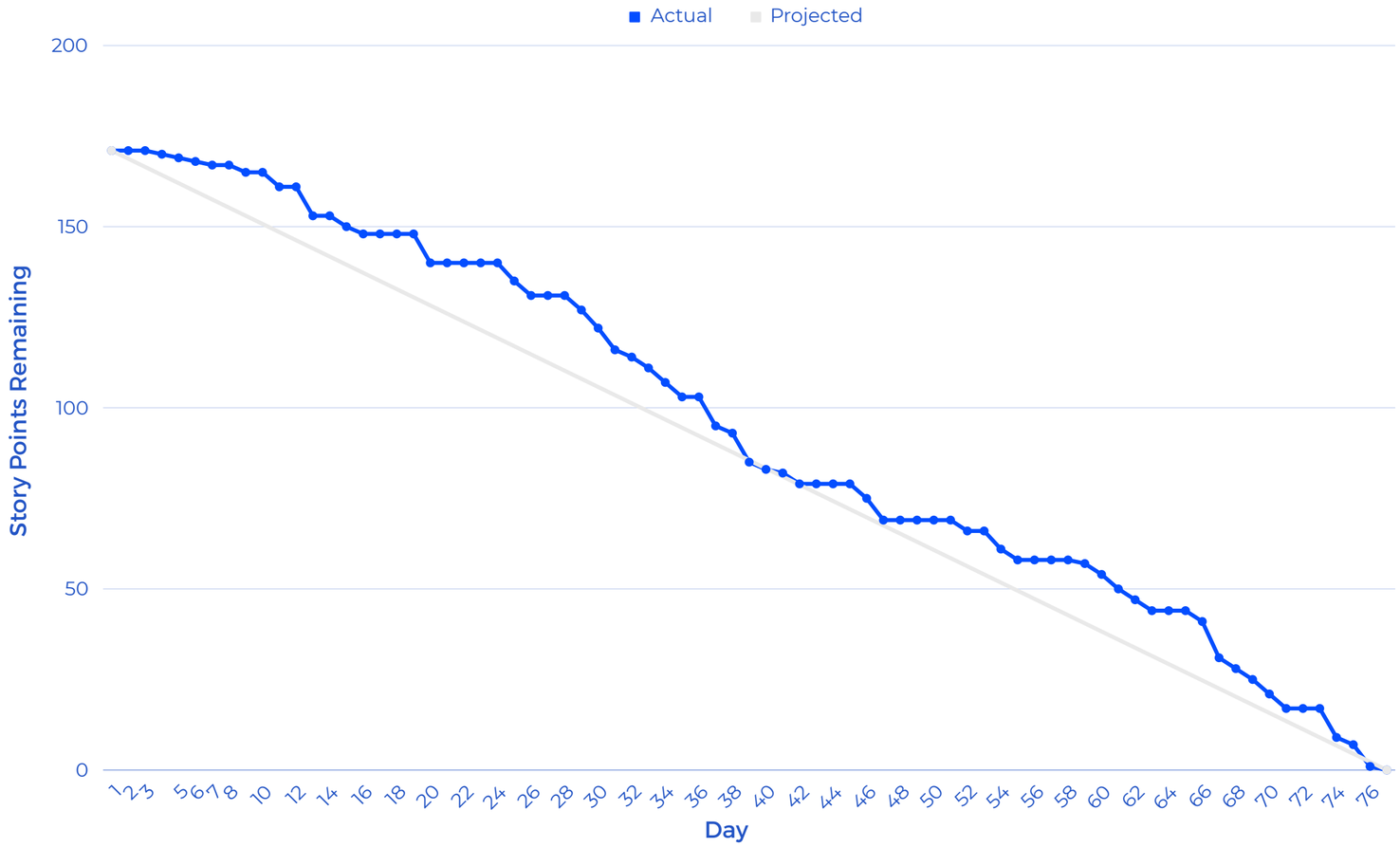
Task Number	Task Name	Resource	Duration	Story Points	Start	Finish	Status
1.0	**User Stories**			**11**			
1.1	Identify Key Stakeholders	Project Team		2	06 Sep 2023 1:00PM	06 Sep 2023 2:15PM	Done
1.2	Form Project Team	Project Manager		1	06 Sep 2023 1:00PM	06 Sep 2023 2:15PM	Done
1.3	Project Proposal	Project Team		8	06 Sep 2023 1:00PM	25 Sep 2023 11:59PM	Done
2.0	**Product Backlog**			**4**			
2.1	Create Product Backlog	Product Owner		3	13 Sept 2023 1:00PM	30 Sept 2023 12:00PM	Done
2.2	Assign Story Point Estimations	Product Owner		1	27 Sept 2023 1:00PM	1 Oct 2023 12:00PM	Done
3.0	**High Level Sprint Planning**			**3**			
3.1	Create Project Plan	Project Manager		3	27 Sept 2023 1:00PM	06 Oct 2023 11:59PM	Done
3.2	Approve Project Plan	Stakeholders		0			Done
4.0	**Sprint - 1 - Infrastructure and Learning**			**4**			
4.1	Sprint 1 - Planning Meeting	ALL		0	05 Oct 2023 6:00PM	05 Oct 2023 7:00PM	Done
4.3	Login Gateway Wireframe	Usmaan		2	05 Oct 2023 7:00PM	12 Oct 2023 10:00AM	Done
4.4	Add Property Wireframe	Usmaan		2	05 Oct 2023 7:00PM	12 Oct 2023 10:00AM	Done
5.0	**Sprint - 2 - Login with API Portal I**			**27**			
5.1	Sprint 2 - Planning / Sprint 1 Demo	ALL		0	12 Oct 2023 6:00PM	12 Oct 2023 7:00PM	Done
5.2	Develop CI/CD Pipeline - Simple Deployment	QA Engineer		3	05 Oct 2023 7:00PM	16 Oct 2023 7:30PM	Done
5.3	Homeowner/Manager Create Account	Lead Programmer		8	18 Oct 2023 12:00PM	25 Oct 2023 12:00PM	Done
5.4	Homeowner/Manager Login	Technical Lead		5	12 Oct 2023 6:00PM	18 Oct 2023 12:00PM	Done
5.6	Prototype - Create Account/Login	Product Owner		1	12 Oct 2023 6:00PM	13 Oct 2023 12:00PM	Done
5.7	Prototype - Add Property	Product Owner		1	13 Oct 2023 12:00PM	13 Oct 2023 6:00PM	Done
5.8	Prototype - Invite Tenant	Product Owner		1	13 Oct 2023 6:00PM	16 Oct 2023 6:00PM	Done
5.9	Prototype - Invite Service Provider	Lead Designer		1	12 Oct 2023 6:00PM	21 Oct 2023 12:00PM	Done
5 10	Prototype - Create Service Request	Lead Designer		1	12 Oct 2023 6:00PM	21 Oct 2023 12:00PM	Done
5 11	Research Testing Requirements and Tools	DevSecOps		3	16 Oct 2023 12:00PM	20 Oct 2023 12:00PM	Done
5 12	Research and Select Tech Stack	Technical Lead		3	12 Oct 2023 6:00PM	18 Oct 2023 2:00PM	Done
6.0	**Sprint - 3 - Login with API Portal II**			**37**			
6.1	Sprint 3 - Planning / Sprint 2 Demo	ALL		0	26 Oct 2023 6:30PM	26 Oct 2023 7:30PM	Done
6.1.1	Sprint 2 Retrospective	Project Team		0	26 Oct 2023 7:30PM	26 Oct 2023 8:00PM	Done
6.2	Protect Routes	Technical Lead		5	26 Oct 2023 7:30PM	27 Oct 2023 12:00PM	Done
6.3	CI/CD Pipeline - Promotion of Environments	QA Engineer		8	26 Oct 2023 7:30PM	6 Nov 2023 12:00PM	Done
6.4	Implement Unit Testing Framework	QA Engineer		5	26 Oct 2023 7:30PM		Done
6.5	CI/CD Pipeline - Implement Security Scans	QA Engineer/DevSecOps		3	26 Oct 2023 7:30PM	31 Oct 2023 12:0PM	Done
6.6	Homeowner - Dashboard Skeleton	Lead Developer		3	26 Oct 2023 7:30PM	3 Nov 2023 12:00PM	Done
6.8	Identify Abuse Cases	DevSecOps		2	1 Nov 2023 12:00PM	8 Nov 2023 12:00PM	Done
6.9	Threat Modelling	DevSecOps/Lead Design		3	1 Nov 2023 12:00PM	8 Nov 2023 12:00PM	Done
6.1	Homeowner - Verify Phone Number	Project Lead		2	26 Oct 2023 7:30PM	1 Nov 2023 12:30PM	Done
6.1	Select Account Role	Project Lead		1	30 Oct 2023 12:00PM	1 Nov 2023 12:30PM	Done
6 10	Login API - Testing	QA Engineer		5			Done
7.0	**Sprint - 4 - Tenant Onboarding I**			**34**			
7.1	Sprint 4 - Planning / Sprint 3 Demo	ALL		0	09 Nov 2023 6:30PM	09 Nov 2023 7:30PM	Done
7.2	Backend Server/API Proxy	Technical Lead		8			Done
7.4	Standardize Styling Rules	Lead Designer		2			Done
	CI/CD Pipeline - Deploy New Backend	QA Engineer/Project Lead		8			Done
	Refactor Project - Divide Frontend/Backend	Lead Developer/Tech Lead		2			Done
	CI/CD Pipeline - Link Frontend with new backend	QA Engineer / Project Lead		3			Done
7.6	Research Secure Backend Server/API Proxy	DevSecOps Engineer		3			Done
7 10	**System Study Review**	Project Team		8	13 Nov 2023 1:00PM	13 Nov 2023 2:15PM	Done
8.0	**Sprint - 5 - Tenant Onboarding II**			**19**			
8.1	Sprint 5 - Planning / Sprint 4 Demo	ALL		0	30 Nov 2023 6:30PM	30 Nov 2023 7:30PM	Done
	Implement Sessions for Authorization	Technical Lead/DevSecOps		8	23 Nov 2023 6:30PM		Done
8.9	Landing Page	Project Manager		3	23 Nov 2023 6:30PM	27 Nov 2023 12:30PM	Done
	Direct user to email on account creation	Unassigned		1	27 Nov 2023 2:00PM		Done
	Fix React Refresh Issue	Project Manager		2	27 Nov 2023 8:00PM	1 Dec 2023 12:00PM	Done
	Homeowner - Add Property Hook/Backend	Lead Developer		5	23 Nov 2023 6:30PM		Done
8.0	**Sprint - 5.5 - Tenant Onboarding II**			**6**			
7.8	Homeowner - Add Property React Pages	Lead Designer		3			Done
7.9	Homeowner Dashboard - View Properties	Project Manager		3			Done
9.0	**Sprint - 6 - Tenant / Service Provider Onboarding I**			**44**			
9.1	Sprint 6 - Planning / Sprint 5 Demo	ALL		0	07 Dec 2023 6:30PM	07 Dec 2023 7:30PM	Done
	Implement Rate Limiting on Backend	Technical Lead		3	19 Dec 2023 12:00PM	21 Dec 2023 7:30PM	Done
7.7	Implement Standard Testing Practices	QA Engineer		5	10 Dec 2023 12:00PM	12 Dec 2023 7:30PM	Done
8.4	Homeowner Dashboard - View Tenants	Lead Developer		5			Done
	Address Validation	Lead Developer		3	13 Dec 2023 12:00PM	16 Dec 2023 6:00PM	Done
	CI/CD Pipeline - Deploy to Both Data Centres	QA Engineer		3	13 Dec 2023 12:00PM	16 Dec 2023 6:00PM	Done
8.3	Send Tenant Invitation Hook/Backend	Project Manager		8	14 Dec 2023 12:00PM	17 Dec 2023 6:00PM	Done
8.5	Tenant Dashboard	Lead Designer		3			Done
8.7	Tenant Create Account	Project Manager		5	14 Dec 2023 12:00PM	17 Dec 2023 6:00PM	Done
8.8	Tenant Login	Unassigned		3	14 Dec 2023 12:00PM	17 Dec 2023 6:00PM	Done
	Send Tenant Invitation React Page	Project Manager		2	14 Dec 2023 12:00PM	17 Dec 2023 6:00PM	Done
8.6	Tenant Accept Invitation	QA Engineer		3	14 Dec 2023 12:00PM	17 Dec 2023 6:00PM	Done
8 10	Dashboard - Delete Property	Lead Developer		1	18 Dec 2023 12:00PM	19 Dec 2023 6:00PM	Done
10.0	**Sprint - 7 - Service Provider Onboarding II**			**27**			
10.1	Sprint 7 - Planning / Sprint 6 Demo	ALL		0	21 Dec 2023 6:30PM	21 Dec 2023 7:30PM	Done
	GROUP LUNCH / Board Games	ALL		0	03 Jan 2023 11:00AM	03 Jan 2023 12:30PM	Done
	Improve Aesthetics of Homeowner Dashboard	Lead Designer		3			Done
8.2	Implement Basic Penetration Testing Plan	DevSecOps/QA Engineer		5	21 Dec 2023 7:30PM	03 Jan 2023 12:30PM	Done
9.2	Invite Service Provider Wireframe	Lead Designer		2			Done
9.3	Send Service Provider Invite	Project Manager		3	27 Dec 2023 9:00AM	28 Dec 2023 12:00PM	Done
9.4	Create Service Provider Account	Project Manager		5	27 Dec 2023 9:00AM	28 Dec 2023 12:00PM	Done
	Validate service provider address	Project Manager		1	29 Dec 2023 9:00AM	29 Dec 2023 9:00PM	Done
	Implement Forgot Password Functionality	Project Manager		2	30 Dec 2023 10:00AM	30 Dec 2023 10:00PM	Done
9.5	Service Provider Login	Project Manager		3	27 Dec 2023 9:00AM	28 Dec 2023 12:00PM	Done
	Basic Service Provider Dashboard	Lead Designer		3	1 Jan 2023 12:00PM	3 Jan 2023 12:00PM	Done

Product Backlog

11.0	**Sprint - 8 - Service Request Creation I**		**42**			
11.1	Sprint 8 - Planning / Sprint 7 Demo	ALL	0	04 Jan 2024 6:30PM	04 Jan 2024 7:30PM	Done
10.3	Add Services	Project Manager	3	04 Jan 2024 7:30PM		In Progress
	Homeowner Dashboard - View Tenants	Lead Developer	5	27 Dec 2023 12:00PM		In Progress
	Homeowner Dash - Approve Tenant Questionnaire	Project Manager	5			Not Started
	View Property Details	Lead Developer	3			Not Started
11.4	Homeowner - Request Quote For Service	Unassigned	2			Not Started
11.5	Service Provider Dashboard - View Service Requests	Unassigned	3			Not Started
11.6	SP Dashboard - View Service Request Details	Unassigned	2			Not Started
10.2	Service Provider Dashboard - View My Services	Unassigned	3			Not Started
11.3	Create Service Request - Tenant Initiate	Project Manager	3			In Progress
11.7	**Detailed Design Review**	ALL	13	15 Jan 2024 1:00PM	15 Jan 2024 2:00PM	Not Started
12.0	**Sprint - 9 - Service Request Creation II**		**24**			
12.1	Sprint 9 - Planning / Sprint 8 Demo	ALL	0	18 Jan 2024 6:30PM	18 Jan 2024 7:30PM	Not Started
12.2	Send Proposal	Unassigned	2			Not Started
12.3	View Proposed Quotes	Unassigned	3			Not Started
12.4	View Proposed Quote Details	Unassigned	2			Not Started
12.5	Approve Proposed Quote	Unassigned	2			Not Started
12.6	Proposal Notification	Unassigned	2			Not Started
12.7	Proposal Approval Notification	Unassigned	2			Not Started
	Mark Job as In Progress, Completed	Unassigned	3			Not Started
12.8	Service Request - Testing	Unassigned	8			Not Started
13.0	**Sprint - 10 - Background Check I**		**26**			
13.1	Sprint 10 - Planning / Sprint 9 Demo	ALL	0	01 Feb 2024 6:30PM	01 Feb 2024 7:30PM	Not Started
13.2	Background Check Prototyping	Unassigned	2			Not Started
13.3	Apply for Public Service Provider	Unassigned	3			Not Started
13.4	Send Certn Background Check Request	Unassigned	5			Not Started
13.5	View Status of Background Check	Unassigned	3			Not Started
13.6	Port Homeowner Features to React Native	Unassigned	13			Not Started
14.0	**Sprint - 11 - Background Check II**		**16**			
14.1	Sprint 11 - Planning / Sprint 10 Demo	ALL	0	15 Feb 2024 6:30PM	15 Feb 2024 7:30PM	Not Started
14.2	Process Completed Background Check from Certn	Unassigned	8			Not Started
14.3	Grant Public Service Provider Status	Unassigned	3			Not Started
14.4	Background Check - Testing	Unassigned	5			Not Started
14.5	Port Tenant Features to React Native	Unassigned	13			Not Started
15.0	**Sprint - 12 - Service Provider ML Model**		**19**			
15.1	Sprint 12 - Planning / Sprint 11 Demo	ALL	0	29 Feb 2024 6:30PM	29 Feb 2024 7:30PM	Not Started
15.2	Research for ML Model	Unassigned	3			Not Started
15.3	Development of ML Model	Unassigned	8			Not Started
15.4	Integration of ML Model into System	Unassigned	8			Not Started
15.5	Port Service Provider Features to React Native	Unassigned	13			Not Started
16.0	**Sprint - 13 - Service Provider ML Model**		**24**			
16.1	Sprint 13 - Planning / Sprint 12 Demo	ALL	0	14 Mar 2024 6:30PM	14 Mar 2024 7:30PM	Not Started
16.2	Testing of ML Model	Unassigned	8			Not Started
16.3	Testing of Model Integration	Unassigned	5			Not Started
16.4	System Sign Off	Project Team	3	20-Mar-24	20-Mar-24	Not Started
16.5	Project Completion Seminar	Project Team	8	20-Mar-24	20-Mar-24	Not Started

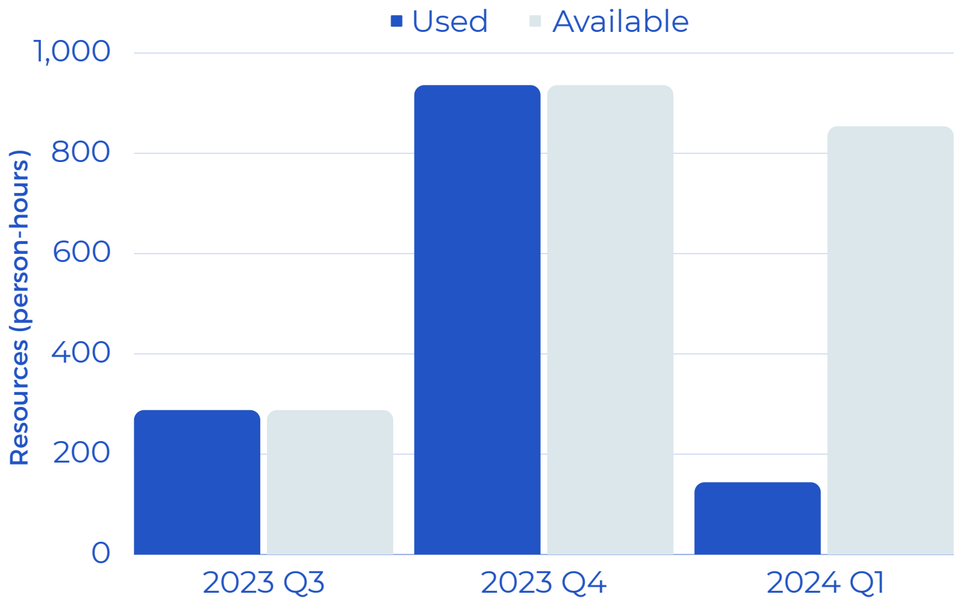
Progress

Sprints 1 to 7



2088 person-hours total

72 person-hours / week

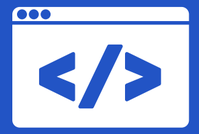


Current Sprint

11.0	**Sprint - 8 - Service Request Creation I**		**42**			
11.1	Sprint 8 - Planning / Sprint 7 Demo	ALL	0	04 Jan 2024 6:30PM	04 Jan 2024 7:30PM	Done
10.3	Add Services	Project Manager	3	04 Jan 2024 7:30PM		In Progress
	Homeowner Dashboard - View Tenants	Lead Developer	5	27 Dec 2023 12:00PM		In Progress
	Homeowner Dash - Approve Tenant Questionnaire	Project Manager	5			Not Started
	View Property Details	Lead Developer	3			Not Started
11.4	Homeowner - Request Quote For Service	Unassigned	2			Not Started
11.5	Service Provider Dashboard - View Service Requests	Unassigned	3			Not Started
11.6	SP Dashboard - View Service Request Details	Unassigned	2			Not Started
10.2	Service Provider Dashboard - View My Services	Unassigned	3			Not Started
11.3	Create Service Request - Tenant Initiate	Project Manager	3			In Progress
11.7	**Detailed Design Review**	ALL	13	15 Jan 2024 1:00PM	15 Jan 2024 2:00PM	Not Started

Architecture

Front-End

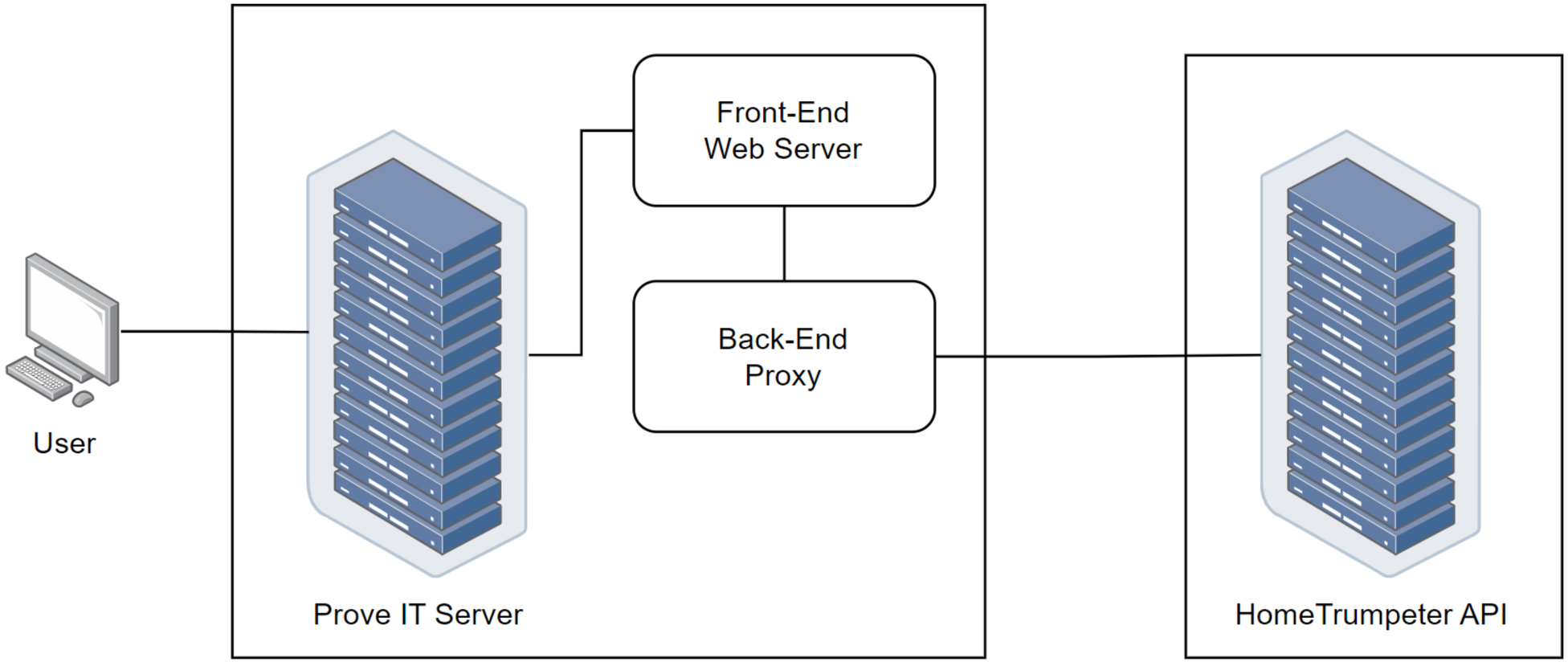


Back-End

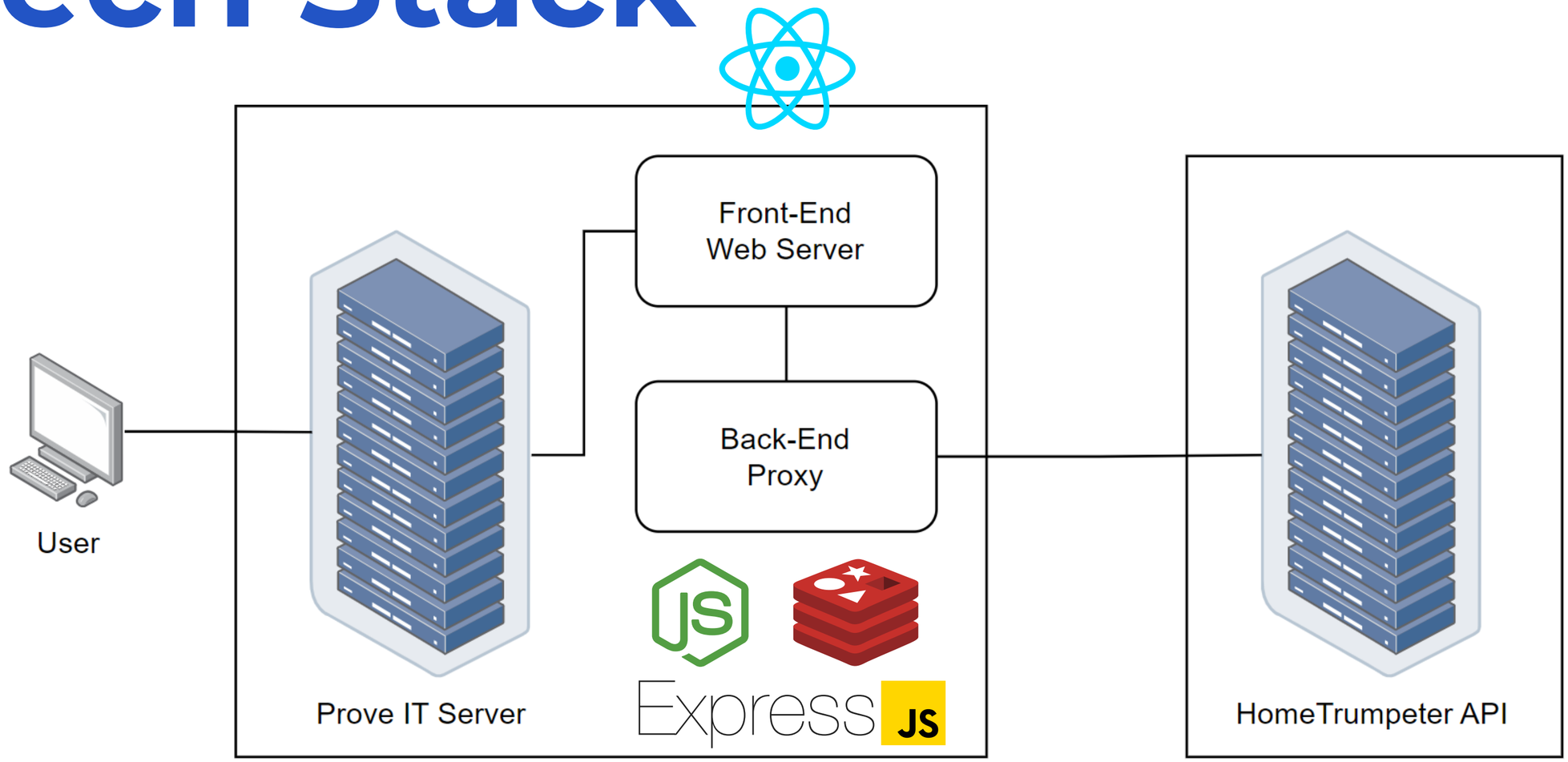
API

Our system comprised of a full-stack application, utilizing the most popular front-end and back-end frameworks.

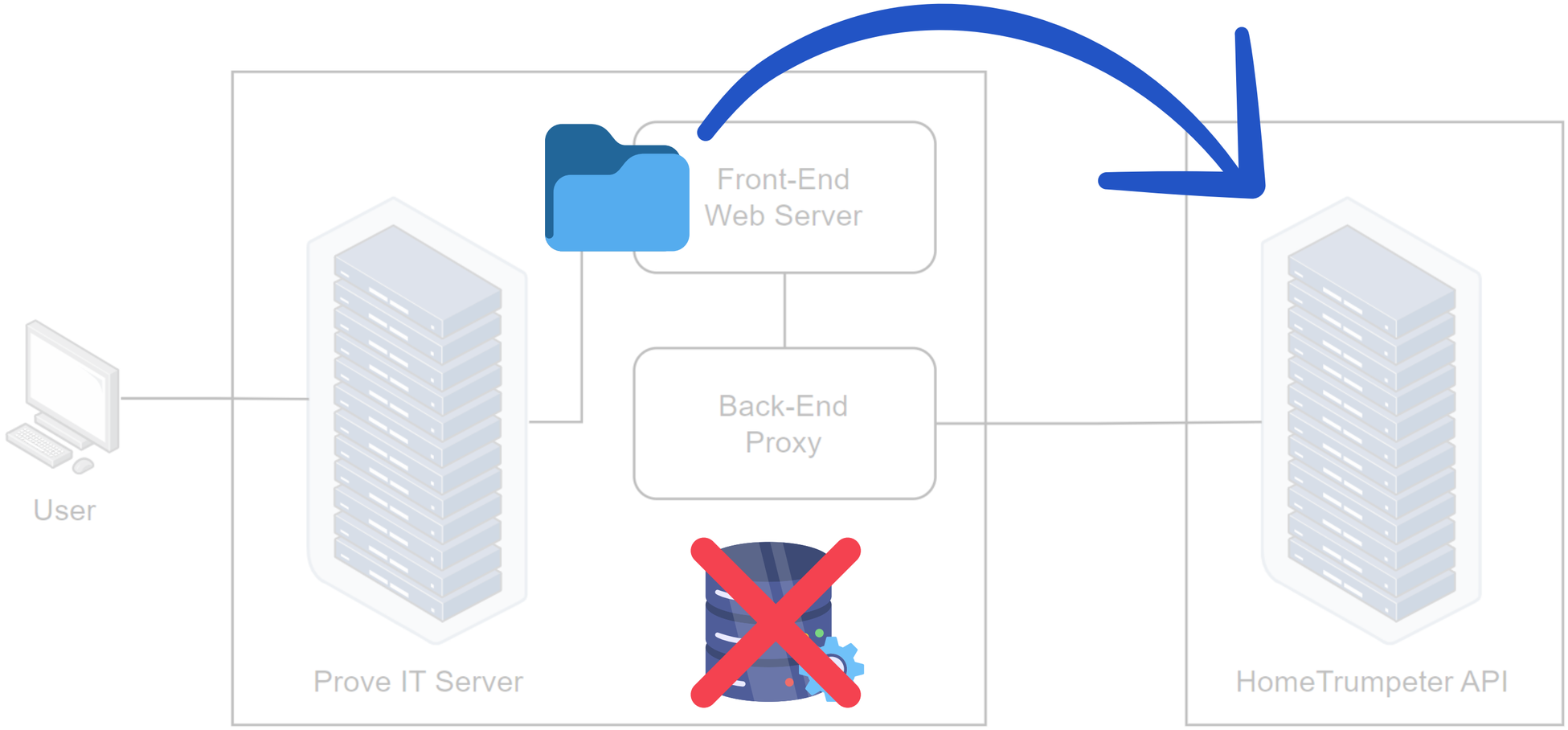
Full-Stack


Front-End
Web Server
Back-End
Proxy
User
Prove IT Server
HomeTrumpeter API

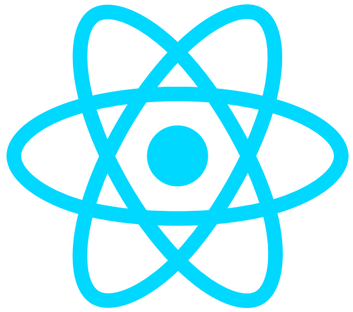
Tech Stack


Front-End
Web Server
Back-End
Proxy
User
Prove IT Server
Express JS
HomeTrumpeter API

Database


Front-End
Web Server
Back-End
Proxy
User
Prove IT Server
HomeTrumpeter API

Front-End

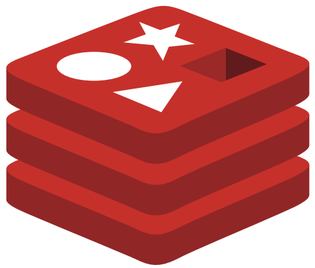


React JS

Bootstrap

React Router

Back-End



Express JS

Axios

Node Mailer

Redis

Dependencies

esri

stripe

React Router

AXIOS

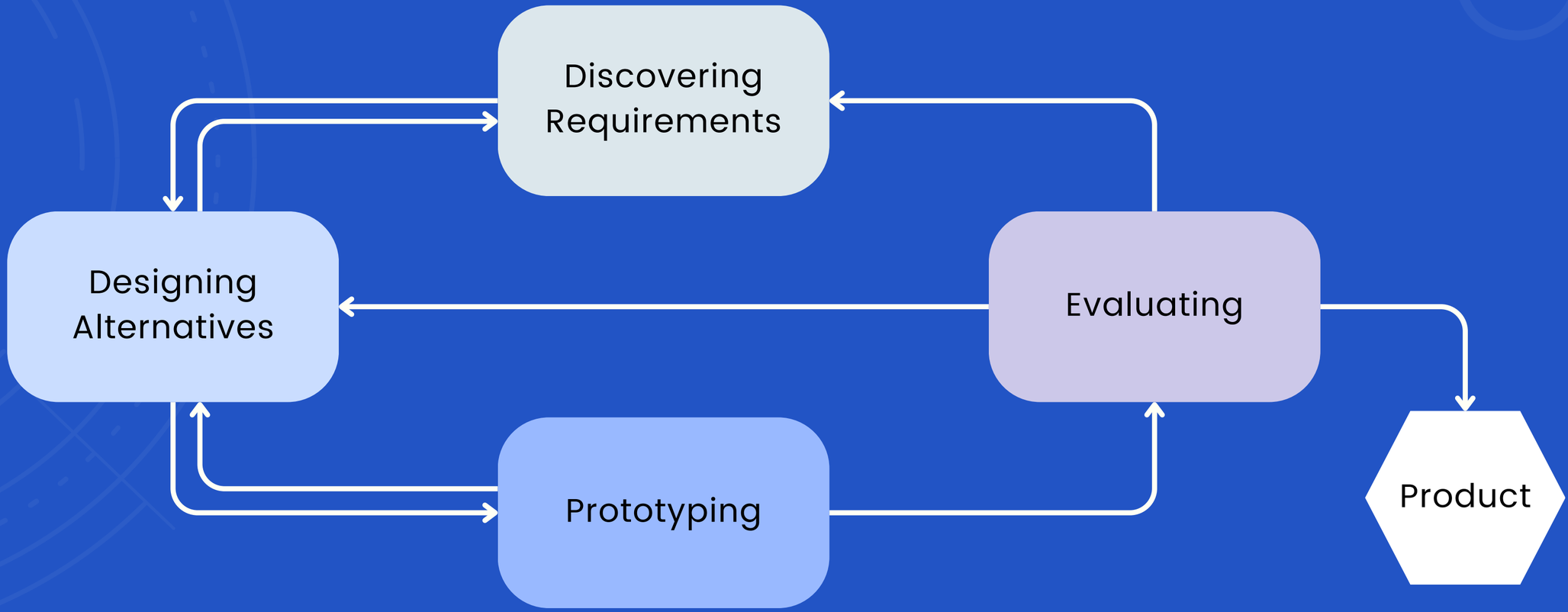
Nodemailer

HomeTrumpeter API

Frontend

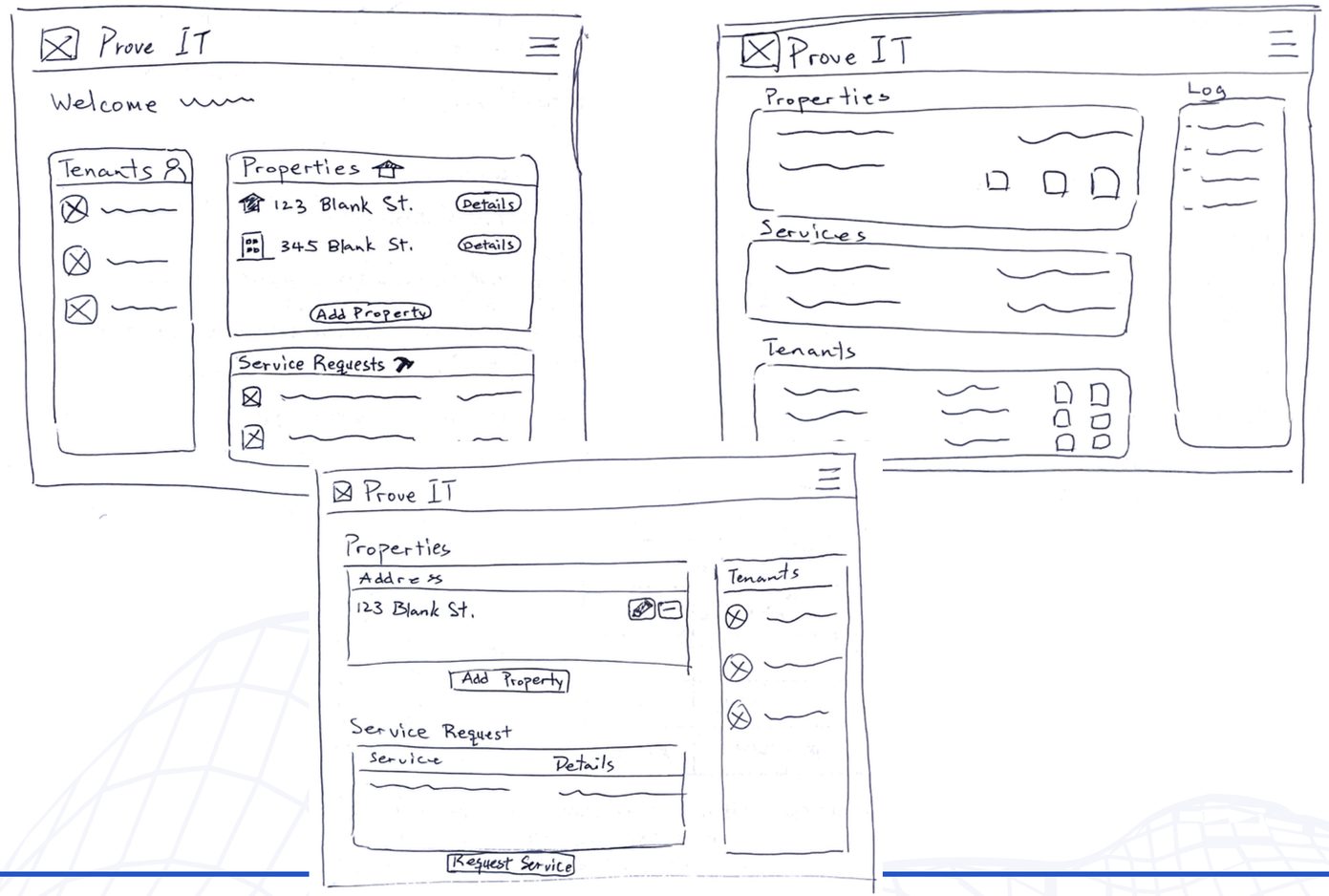
Backend

User Interface



Prototypes

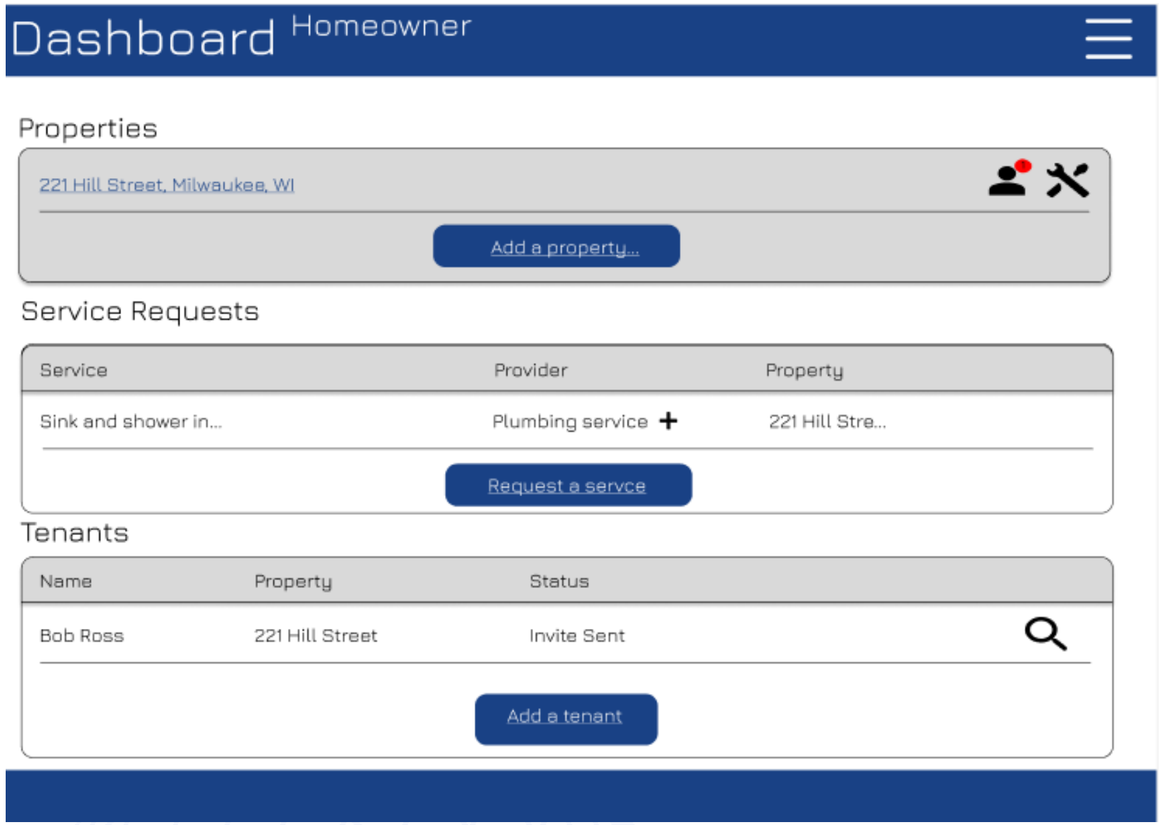
Rapid Prototyping using User Stories

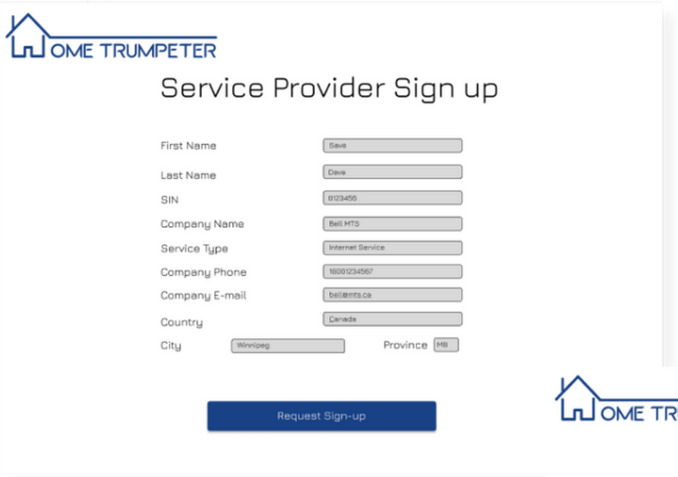


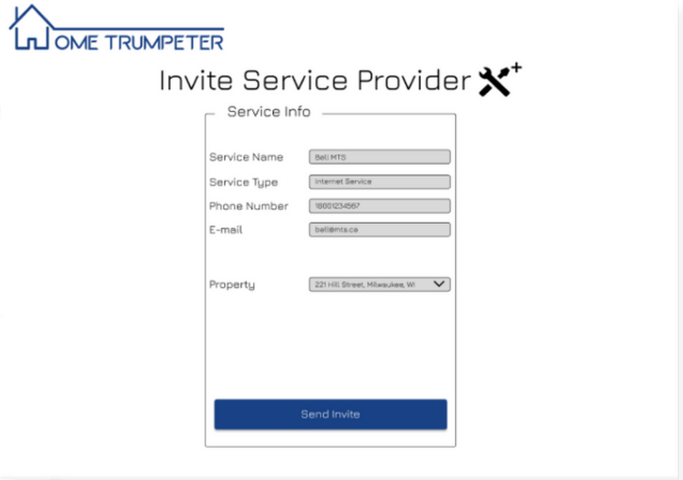
Entities	Task
Homeowner	As a homeowner, I would like to sign up for the services, so that I can add/save/edit my information.
	As a homeowner, I would like to add properties, so that I can keep track of them.
	As a homeowner, I would like to invite tenants, so that I can rent my properties to them.
	As a homeowner, I would like to approve tenants, so that I can ensure my tenants are all up to certain standards.
	As a homeowner, I would like to invite private service providers, so that I can assign them to fix issues with my properties.
	As a homeowner, I would like to allocate tasks to service providers, so that I can track who is working on what.
	As a homeowner, I would like to add/save/edit the status of a ticket, so that I am as flexible as possible with my services.
Service Provider	As a service provider, I would like to accept invitations from homeowners, so that I can provide service to them.
	As a service provider, I would like to sign up, so that I can add/save/edit my information.
	As a service provider, I would like to submit maintenance tickets, so that I can track my work.
	As a service provider, I would like to update the status of a ticket, so that I can notify the homeowner and tenant of the service progress.
	As a service provider, I would like to be able to mark my job as completed, so that I can finalize the work and get paid.
Tenant	As a tenant, I would like to accept invitations from homeowners, so that I can become a tenant at the respective property.
	As a tenant, I would like to sign up, so that I can add/save/edit my personal information.
	As a tenant, I would like to submit maintenance tickets, so that I can request services.
	As a tenant, I would like to track the status of my tickets, so that I know the progress of my service request.
	As a tenant, I would like to confirm the completion of service requests, so that the invoice can be finalized.

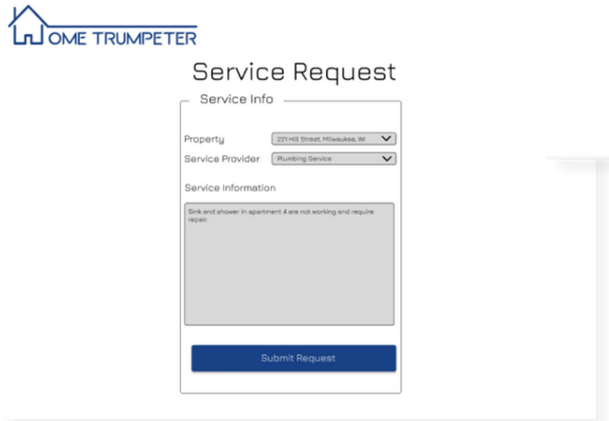
Prototypes

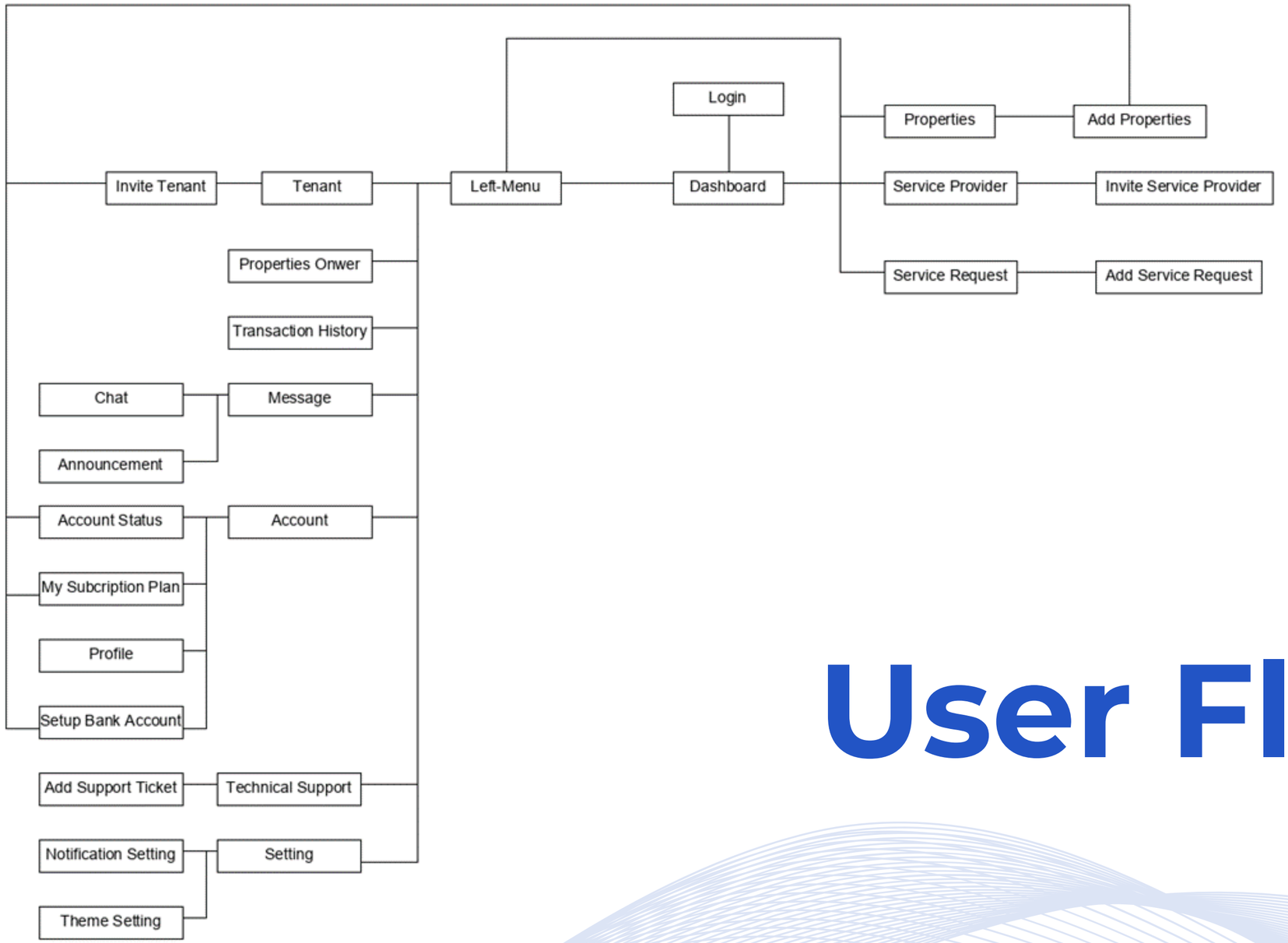
Hi-Fi Prototypes









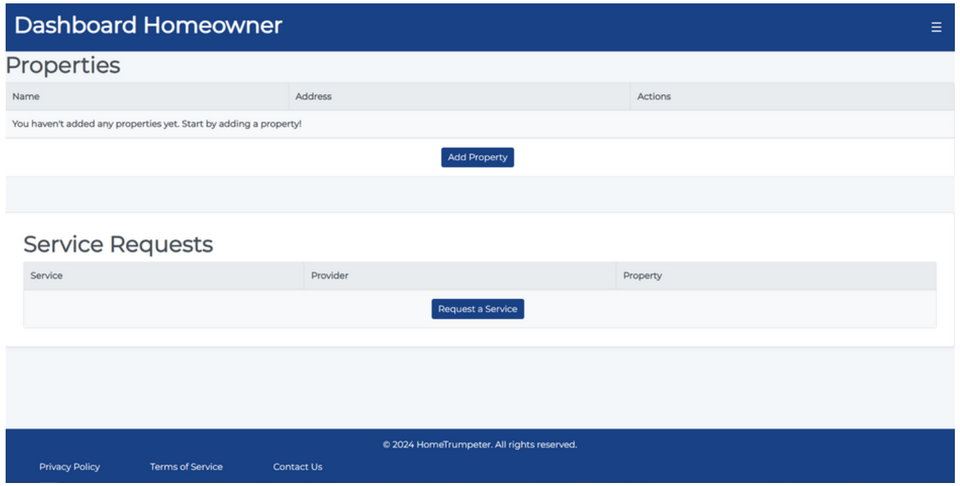

Login
Properties
Add Properties
Invite Tenant
Tenant
Left-Menu
Dashboard
Service Provider
Invite Service Provider
Properties Onwer
Service Request
Add Service Request
Transaction History
Chat
Message
Announcement
Account Status
Account
My Subcription Plan
Profile
Setup Bank Account
Add Support Ticket
Technical Support
Notification Setting
Setting
Theme Setting

User Flow

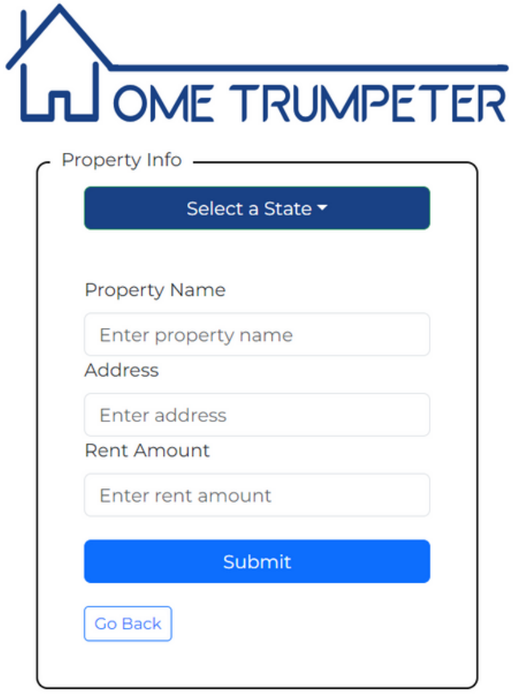
Design Principles

Visibility is established by maintaining a **brand kit**, which provides **consistent and recognizable** colour schemes, logos, icons, and fonts.

Feedback is provided by **hover effects** and **loading icons** when action is taken.



Flexbox and **grid** layouts in CSS are used to create **logical mappings**.



External consistency allows users to exploit **pre-existing knowledge** of similar systems, as well as hinting possible actions, which provides **affordances**.

API

HomeTrumpeter has built a Restful API that includes features required to build a comprehensive property management system for property managers, homeowners, tenants, and service providers.

HomeTrumpeter API

Proxy

HomeTrumpeter API

Major Dependencies

stripe

Categorization

- user
- verification
- customer
- files
- plan
- intro-slider
- location
- school
- admin
- settings
- template
- support-ticket
- property-management
- service-provider
- ticket
- job
- service-request
- notification
- chat
- video
- payment-processing
- stripe
- agreement
- background-check
- general
- mail

JSON Web Token (JWT)

Signature

JWT tokens used in the Prove IT system are digitally signed using a secret, which is stored ONLY in the HomeTrumpeter system.

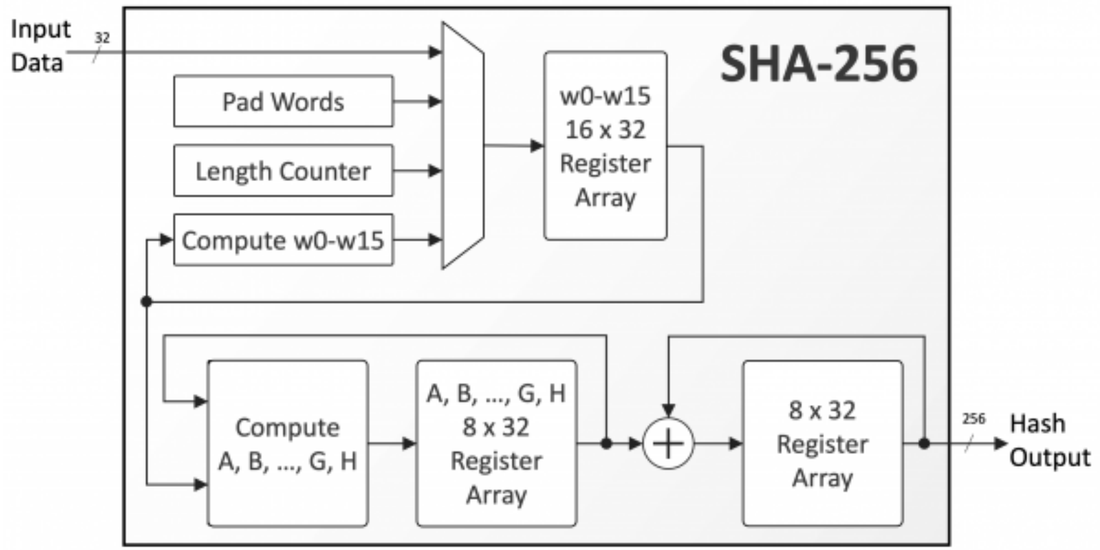
The token is composed of:

- **Header**
- **Payload**
- **Signature**

```
eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.
eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4
gRG9lIiwiaXNTb2NpYWwiOnRydWV9.
4pcPyMD09olPSyXnrXCjTwXyr4BsezdI1AVTmud2fU4
```

SHA256

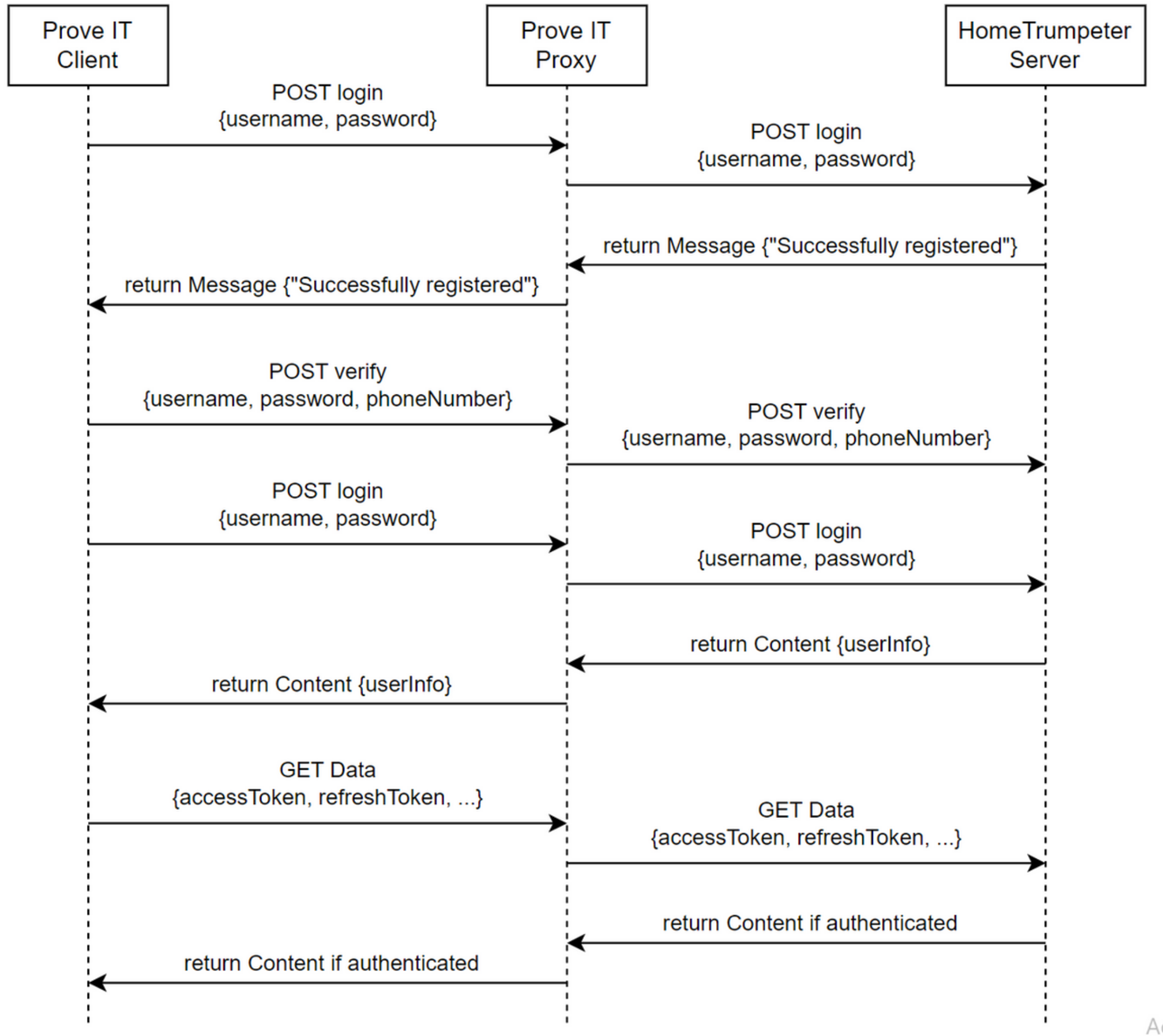
SHA256 encryption is used to ensure confidentiality of the signature, which is used to verify integrity of the information transferred.



Source: CAST, inc.

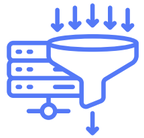
JWT Session Management

Session management is implemented using the JWT tokens provided in the HomeTrumpeter API. The access tokens will be stored in localStorage of the web browser and retrieved for POST and GET requests.



Proxy

Functions



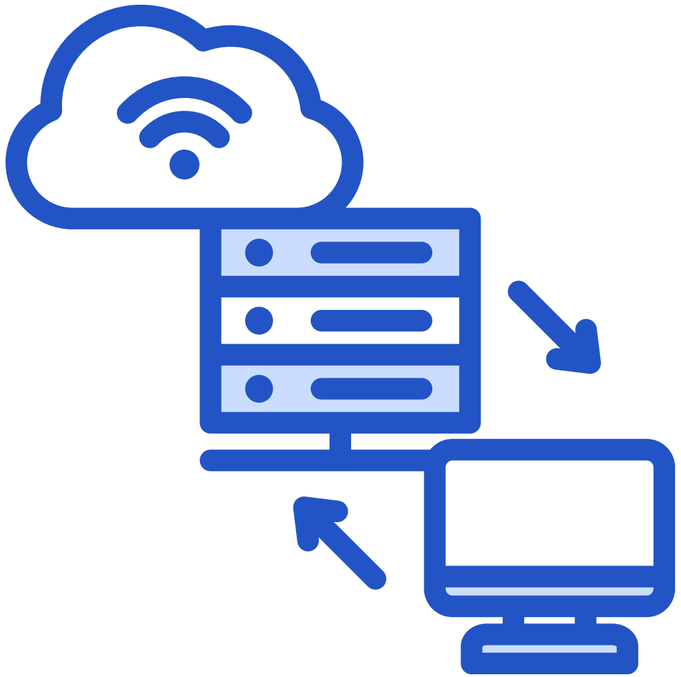
Rate-Limiting

Hide Business Logic

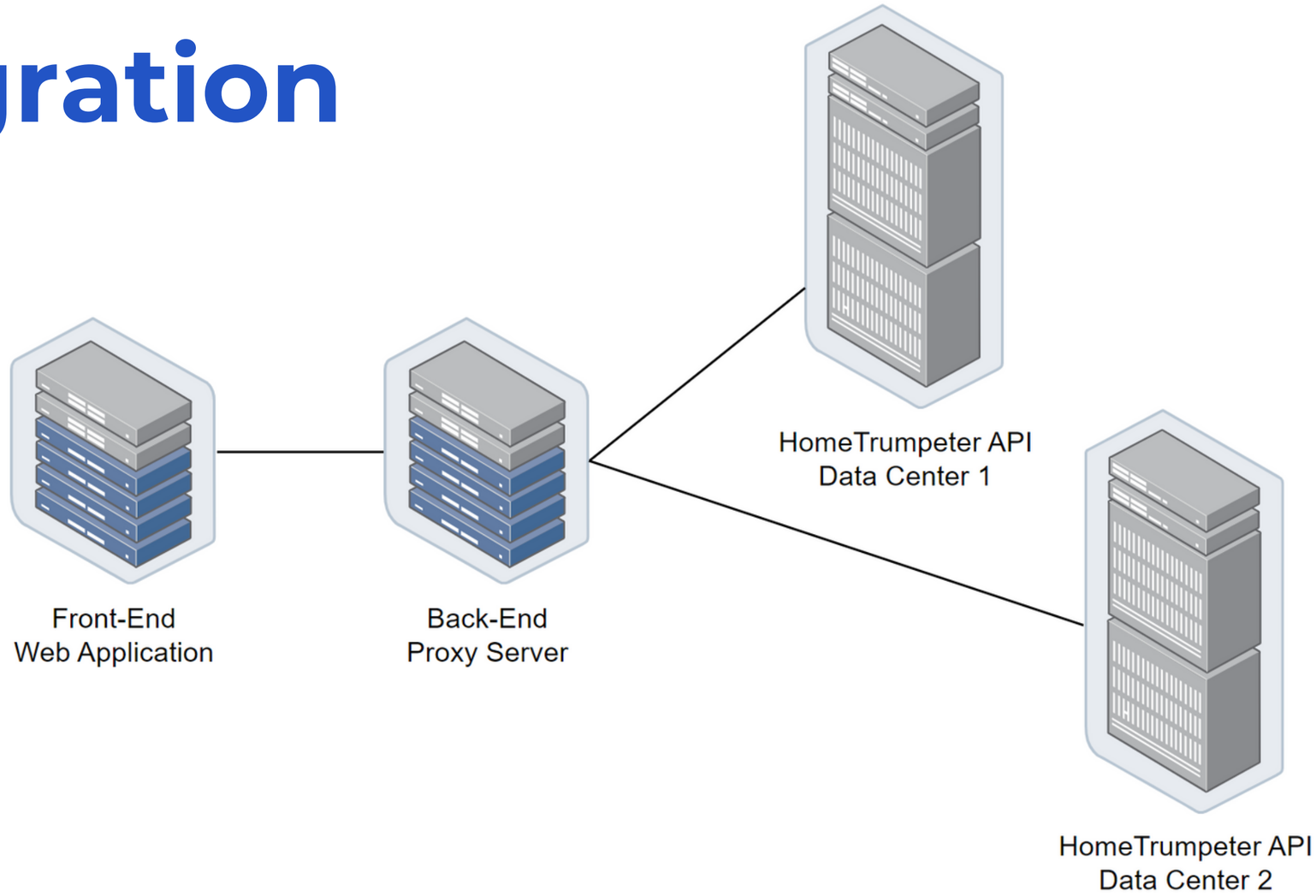
Caching

A common issue when using private API keys is including the API key in the source code or client-side HTTP requests. In order to avoid exposing the API key, a proxy server is used as a middle-man between the application and API server. This will redirect all API calls to the HomeTrumpeter API, along with the required authorization headers and bearer tokens.

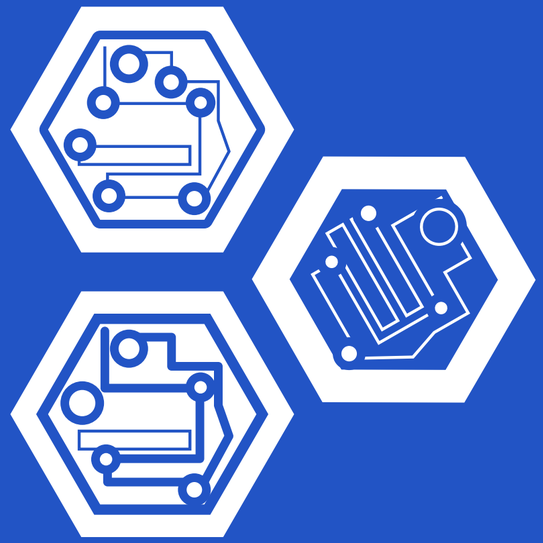
Furthermore, the proxy server will allow scaling of the system through methods such as rate-limiting, load-balancing, and traffic splitting. It also permits us to manipulate the API responses to include the minimal information needed by the client, thus exposing less surface for attackers to exploit.



Integration



Detailed System Design



The following slides will explain some specific reasons as to why certain components were chosen for this project

Design Implications

React JS

The front-end system used ReactJS as a foundational framework for building the user interfaces of the web application.

React Router

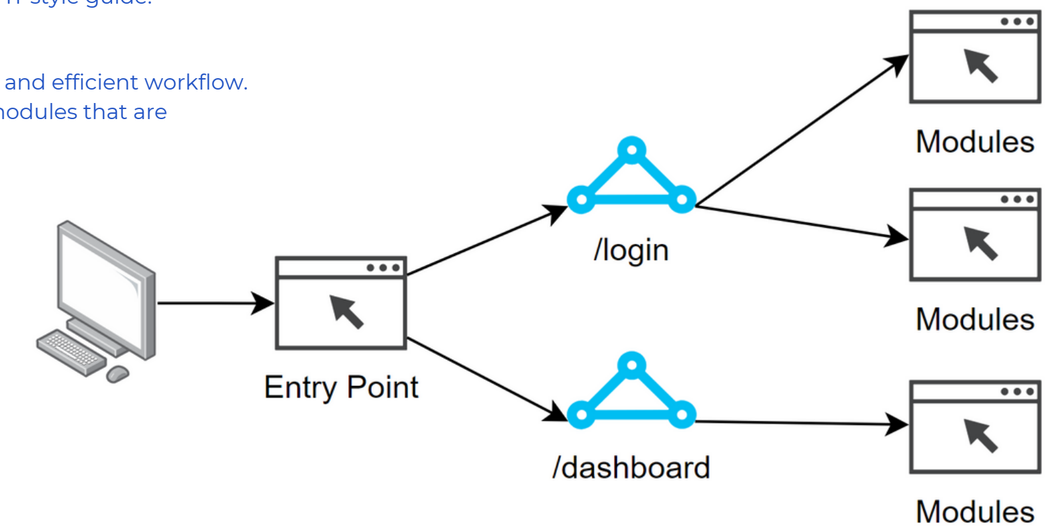
Routing was implemented using ReactRouter to point URLs to respective web pages. React contexts were used in conjunction to enforce user access to their respective permission levels.

Bootstrap

Design of the UI was done using React Bootstrap, which includes functional components. These were further manipulated through custom CSS to fit the Prove IT style guide.

Vite

Vite was used as a development server and bundler to ensure a quick and efficient workflow. This ensures that routes accessed by users are only required to load modules that are immediately used, which reduces loading latency significantly.



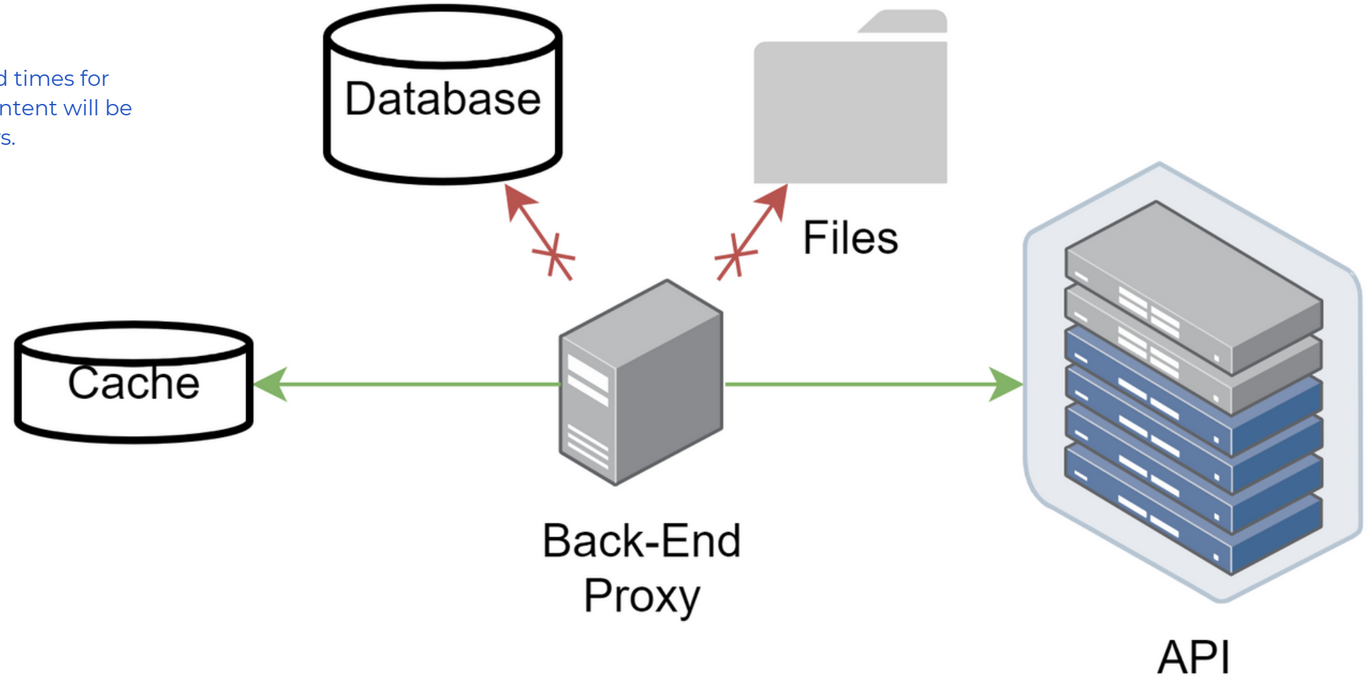
Design Implications

Express JS

The back-end system uses ExpressJS. Routing is implemented using the built-in router and components are functionalized to allow maximum reusability. No database or filesystem will be used, as the back-end will only serve as a proxy between the web application and the HomeTrumpeter API.

Redis

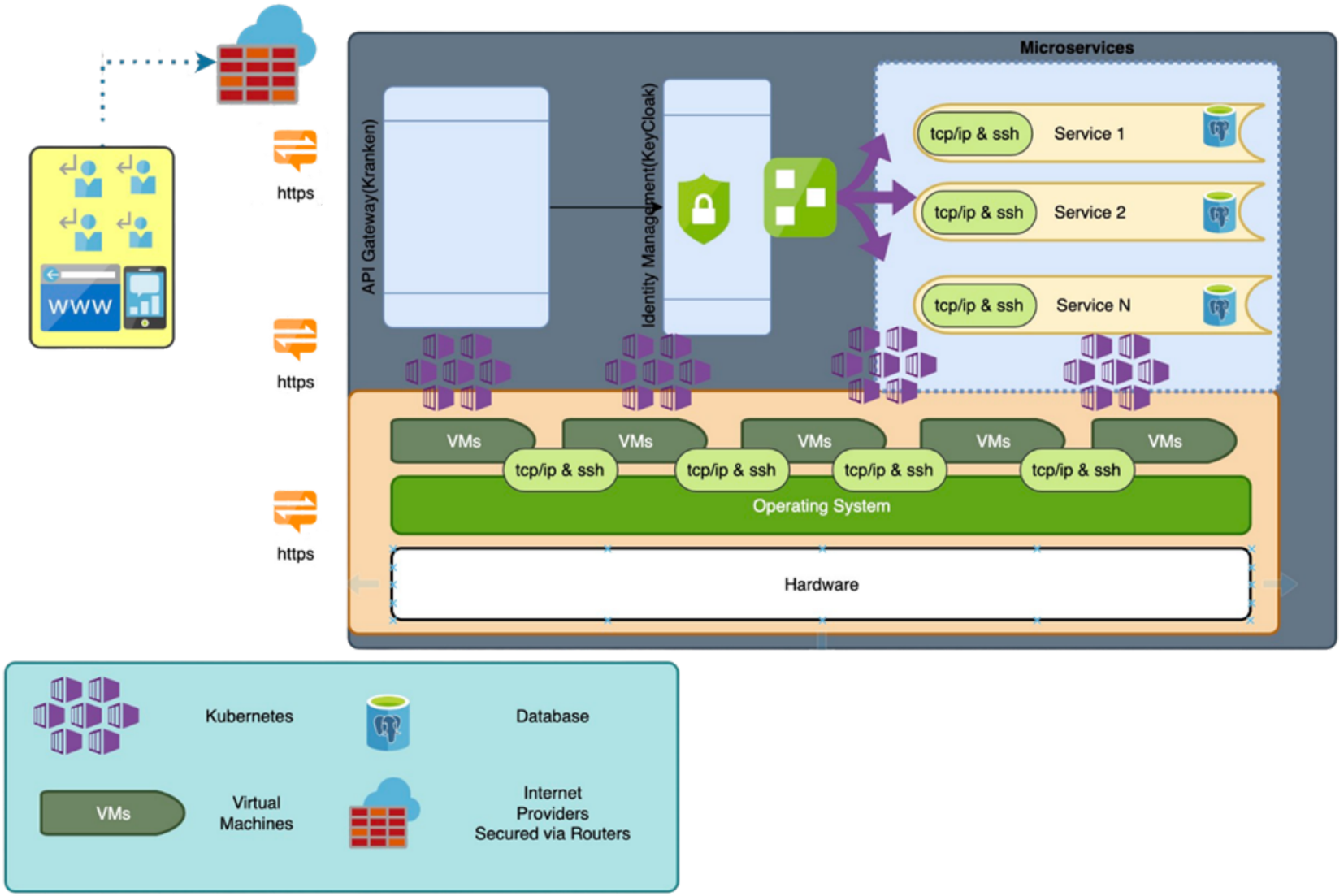
Caching with Redis will significantly improve load times for frequently accesses pages and content. Static content will be served directly as to eliminate unnecessary delays.



Security

Security measures are implemented to ensure integrity of the system

System


https
https
https
www
Microservices
API Gateway(Kranken)
Identity Management(KeyCloak)
tcp/ip & ssh
Service 1
tcp/ip & ssh
Service 2
tcp/ip & ssh
Service N
VMs
VMs
VMs
VMs
VMs
tcp/ip & ssh
tcp/ip & ssh
tcp/ip & ssh
tcp/ip & ssh
Operating System
Hardware
Kubernetes
Database
VMs
Virtual Machines
Internet Providers Secured via Routers

Threats

Assets

A01: Homeowner Data

A02: Tenant Data

A03: Property Details

A04: Tickets and Tasks Details

A05: Payment Details and History

A06: Credentials

A07: Sensitive Application Data

A08: Infrastructure

A09: Applications

Threat Agents

TA01: Unauthorized External Users

TA02: Unauthorized Internal Users

TA03: Authorized Homeowners, Tenants, and Service Providers with Malicious Intent

TA04: Man-in-the-Middle Attackers

TA05: API Attackers

TA06: Viruses, Worms, Ransomware, etc.

Controls

C01: Network Security

C02: Container Security

C03: Kubernetes Security

C04: API Security

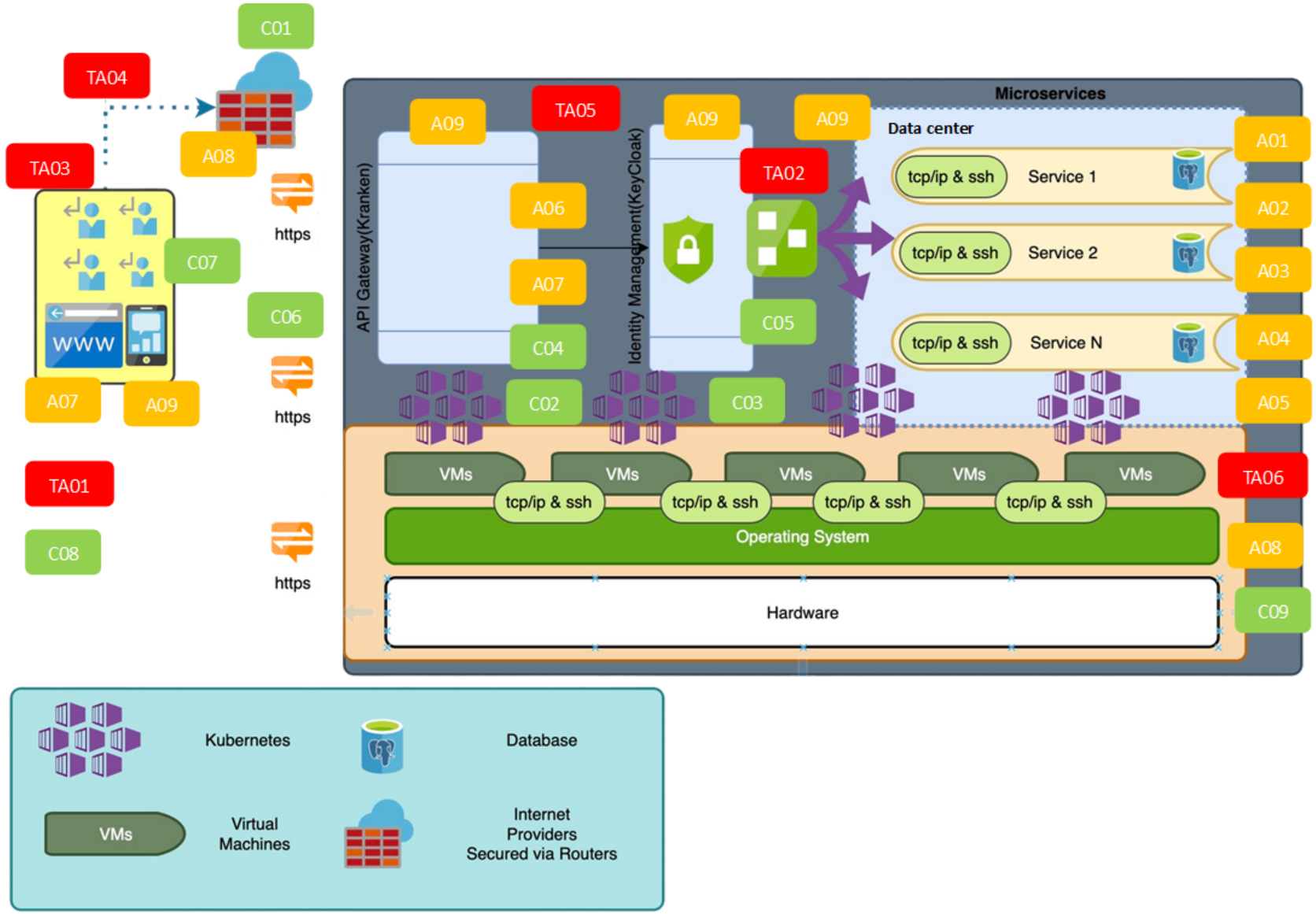
C05: Identity Management

C06: Encryption

C07: Regular Patching

C08: Monitoring and Logging

C09: User Training



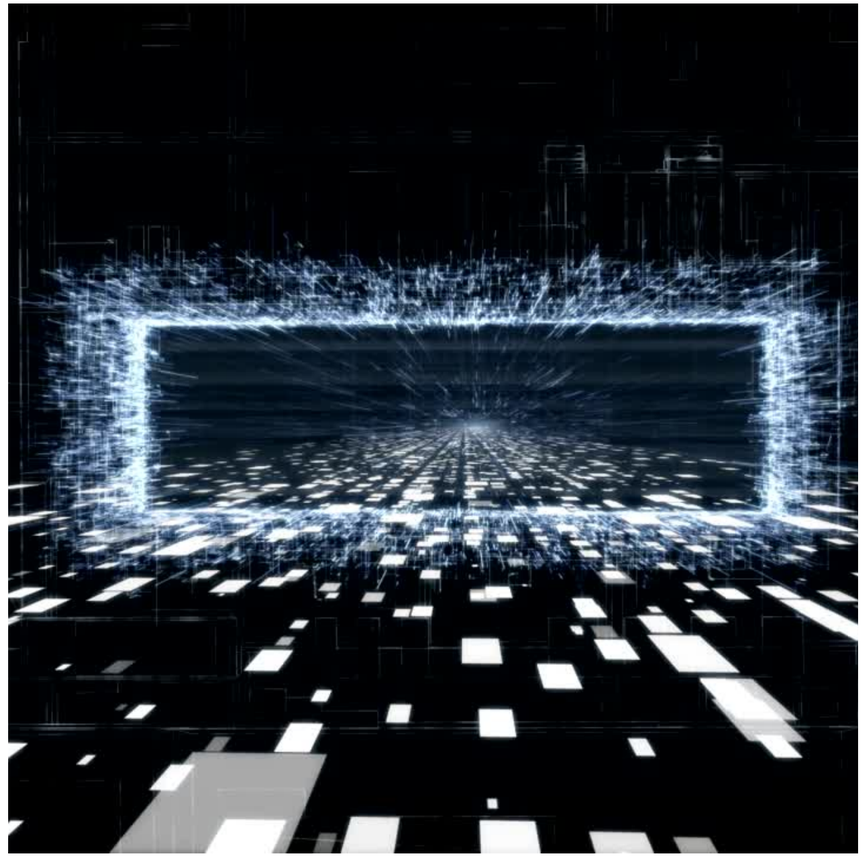
Detecting Vulnerabilities

OWASP ZAP

Open-source application penetration testing tool. Acts as a daemon between the user and application to intercept packages and analyze for vulnerabilities.

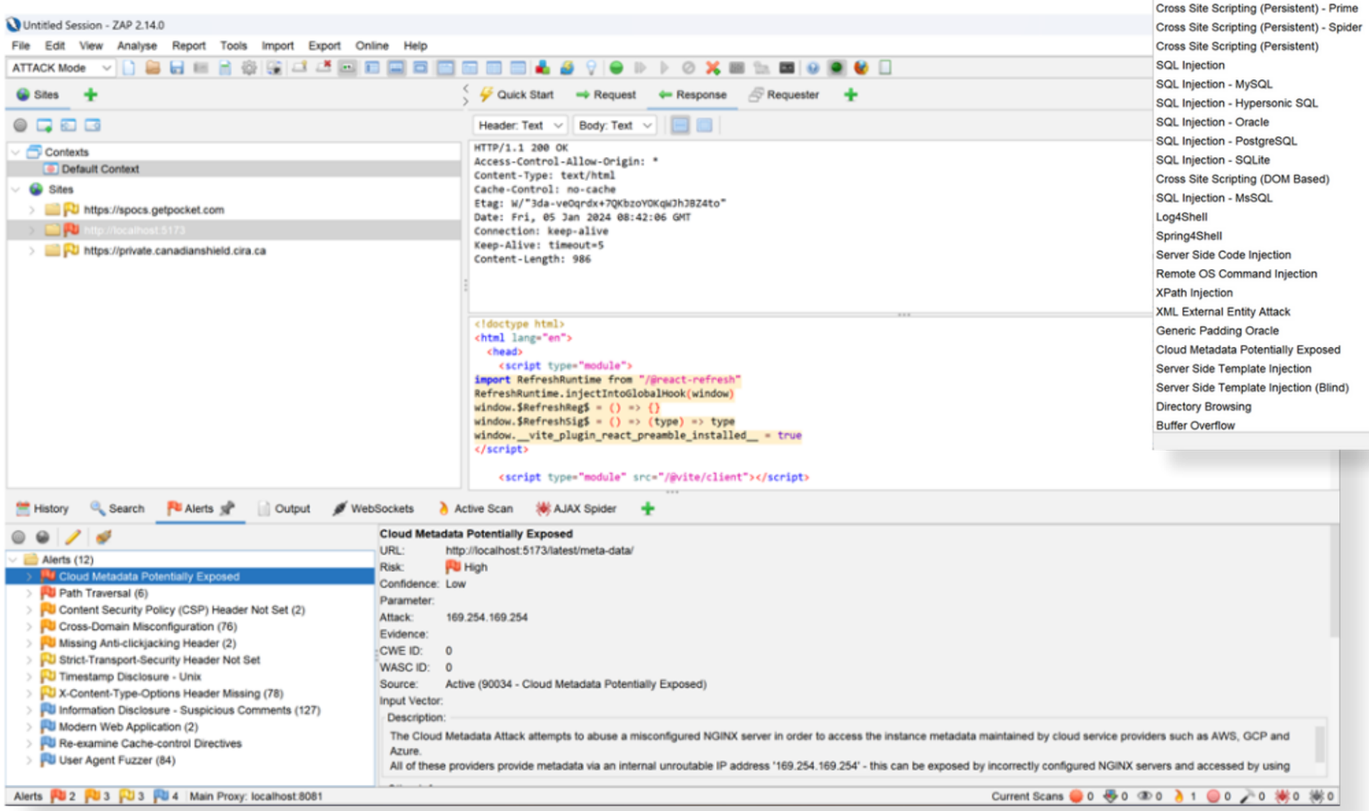
Snyk

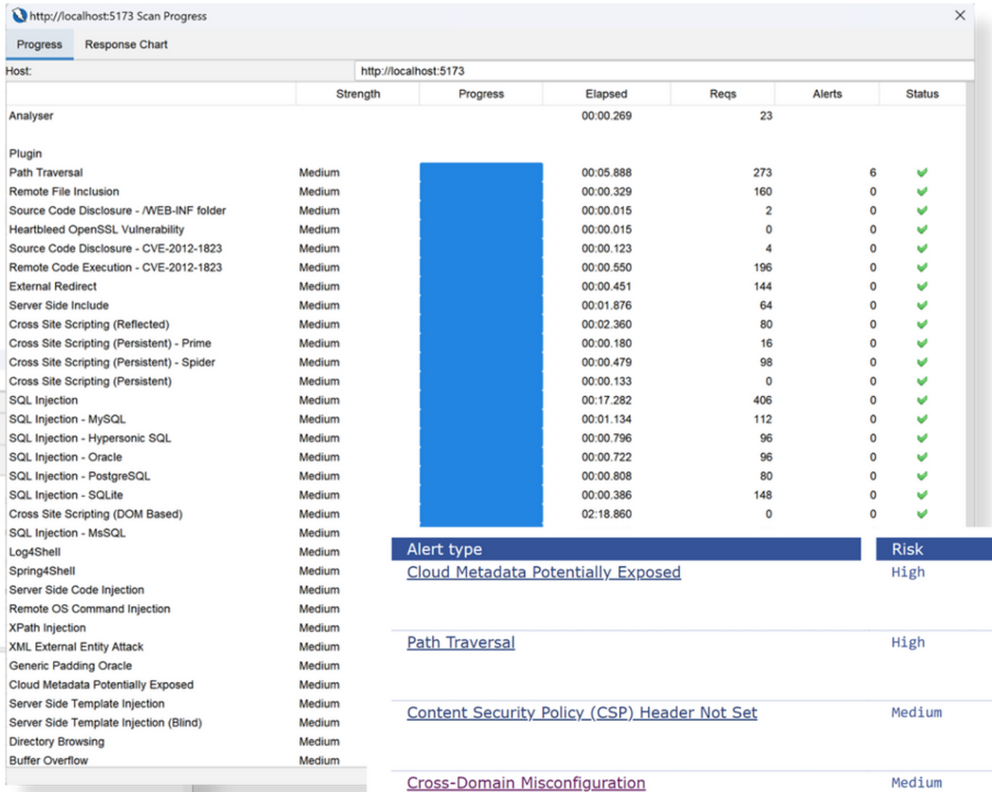
Vulnerability scanning for the entire deployment process. Covers source code, deployment scripts, infrastructure as code, etc.



OWASP ZAP

OWASP ZAP





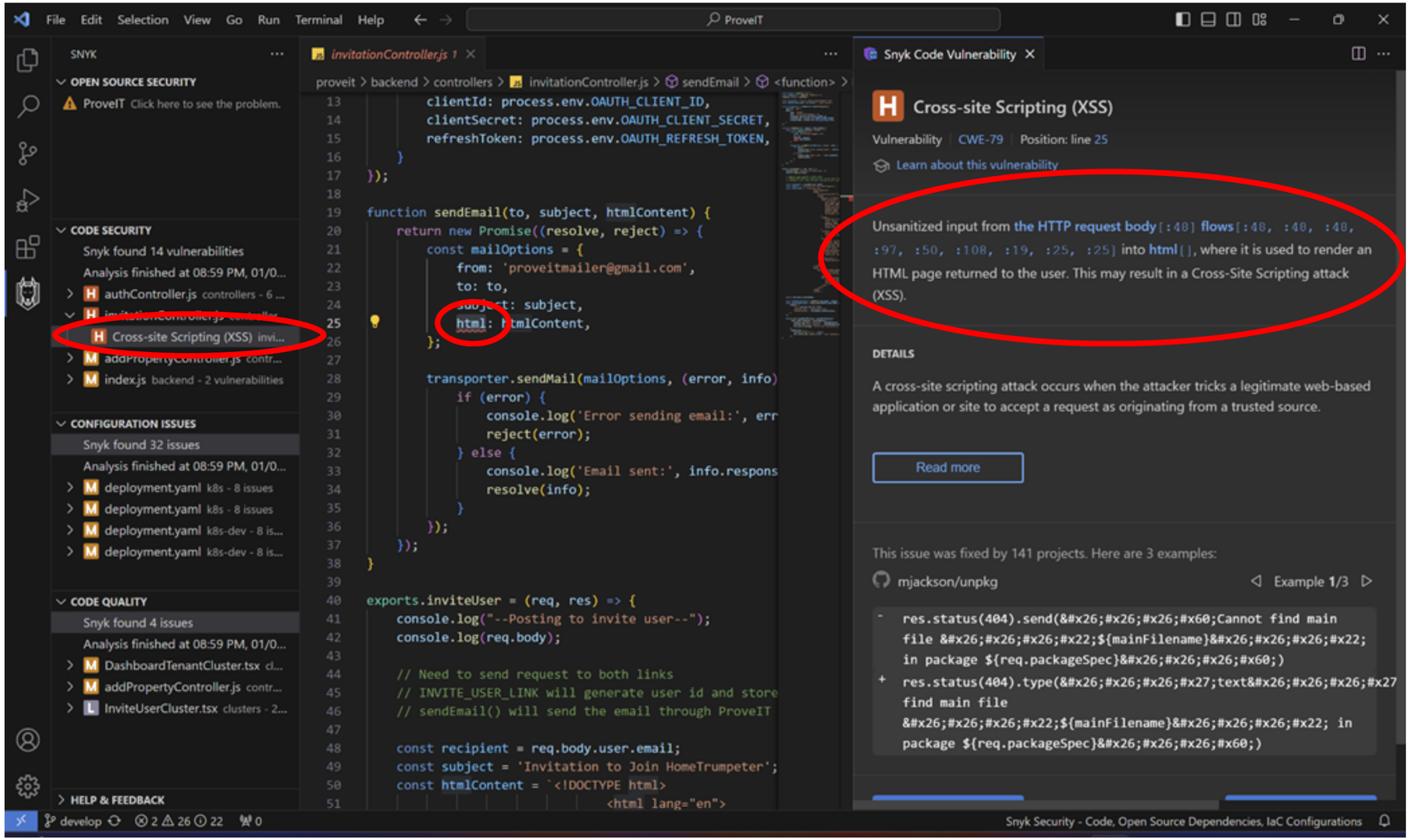
Alert type	Risk	Count
Cloud Metadata Potentially Exposed	High	1 (12.5%)
Path Traversal	High	6 (75.0%)
Content Security Policy (CSP) Header Not Set	Medium	1 (12.5%)
Cross-Domain Misconfiguration	Medium	72 (900.0%)
Missing Anti-clickjacking Header	Medium	1 (12.5%)
X-Content-Type-Options Header Missing	Low	72 (900.0%)
Information Disclosure - Suspicious Comments	Informational	126 (1,575.0%)
Modern Web Application	Informational	1 (12.5%)
Total		8

Snyk

CWE-79

Cross-Site Scripting (XSS) attack vulnerability a **line 25** in the invitationController.js file.

Examples of solutions from other open-source projects on GitHub are shown.



Testing

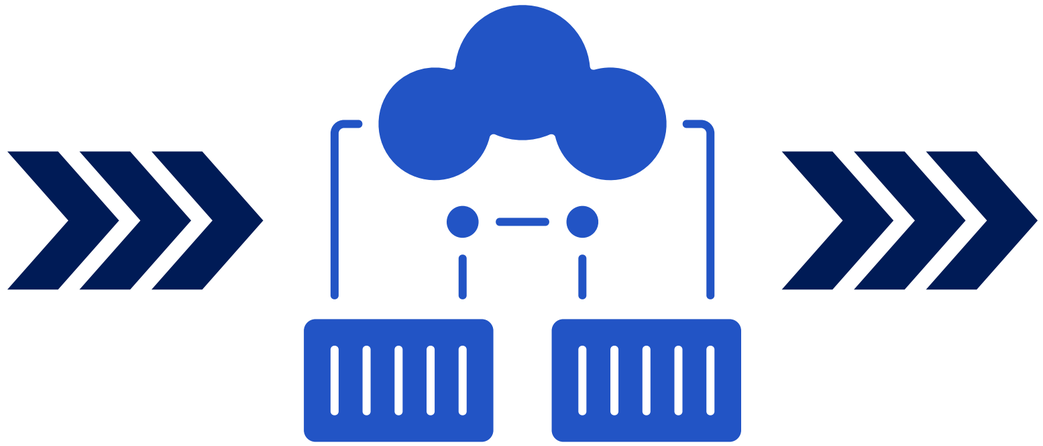
Various testing strategies are implemented to ensure a robust system is delivered to the user, without risk of failure.

Deployment

Infrastructure as Code (IAC)

```
$var1 = “Joe”
$var2 = “VM”
```

```
1 Definition:
2     Name: $var1
3     System: $var2
```

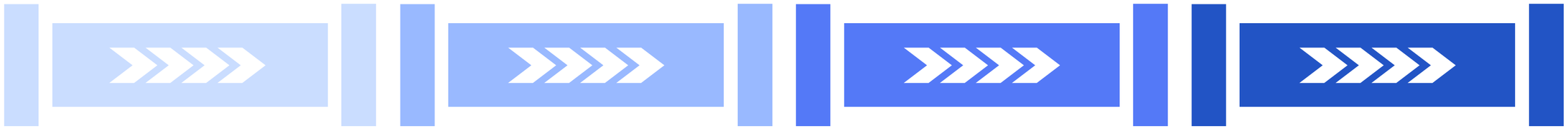


Adjust parameters for each deployment

Package and ship to the cloud

Deploy in **isolation** and test in simulated real-world scenarios

Pipeline



Commit change

- Trigger build
- Build
- Notify of build outcomes

Run tests

- Notify of test outcomes

Deliver to UAT

- Merge to develop

Run tests on UAT

- Notify of test outcomes

Deploy to production

- Merge to main

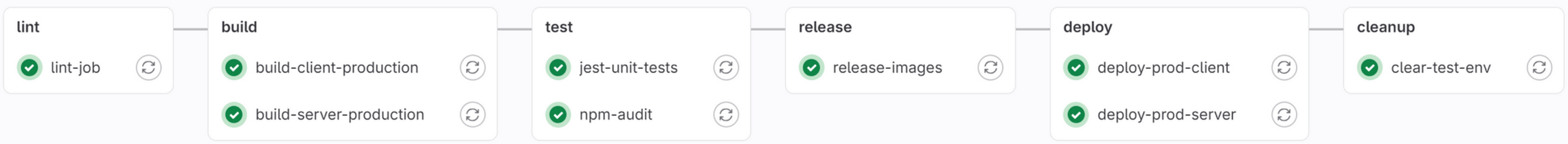
Pipeline

Merge branch 'develop' into 'main'

Passed **Arshjot Ghuman** created pipeline for commit `ec0d9012` finished 3 weeks ago

For `main`

latest 9 Jobs 9.9 7 minutes 16 seconds, queued for 1 seconds



Testing Strategies

Unit Testing

Validate individual components, functions, or units of code

Test-Driven Development (TDD) using Jest

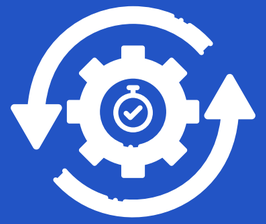
QA team writes tests for functional components

Integration Testing

Verifies the interactions and compatibility between different components

Simulating real-world usage scenarios

Ensures that various parts of the system work harmoniously together



Regression Testing

Re-running previously executed tests

Detect and prevent the introduction of new bugs or issues as code evolves

Testing Strategies

User Acceptance Testing

Last stage of testing where change requests are accepted

Users perform real-world tasks in real-world environments and provide feedback

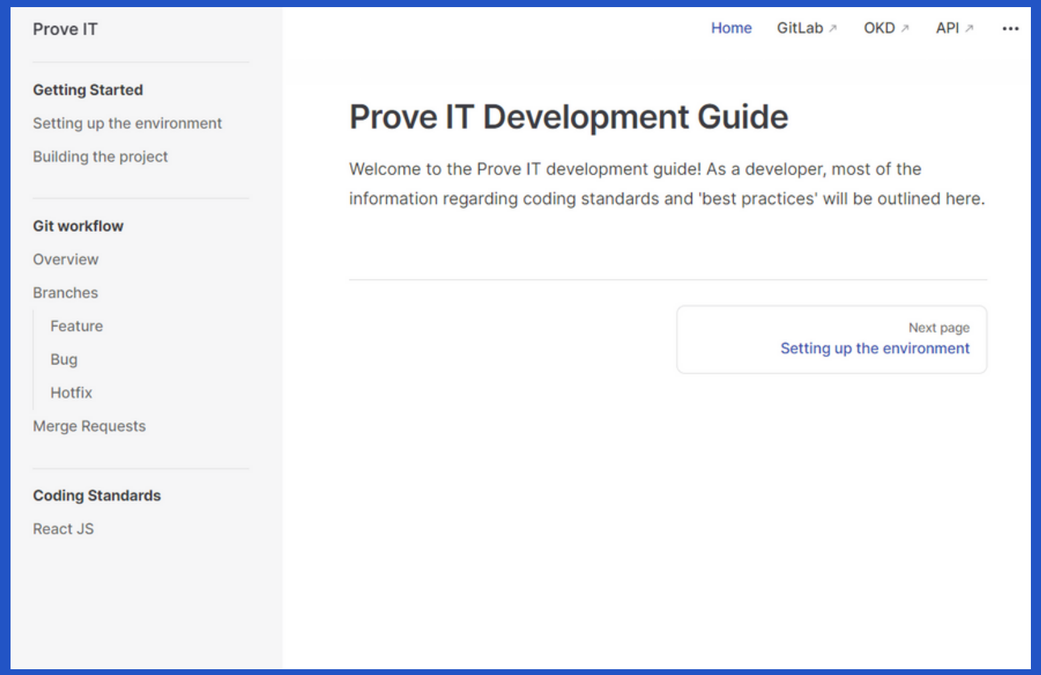
End-to-End Testing

Simulate user interactions with the application

Check the entire flow from start to finish

Documentation

Comprehensive documentation is provided to the development team to ensure established standards are met. Coding documentation ensures consistent codebase for ease of maintenance. Deployment documentation ensures robustness of the delivered product.

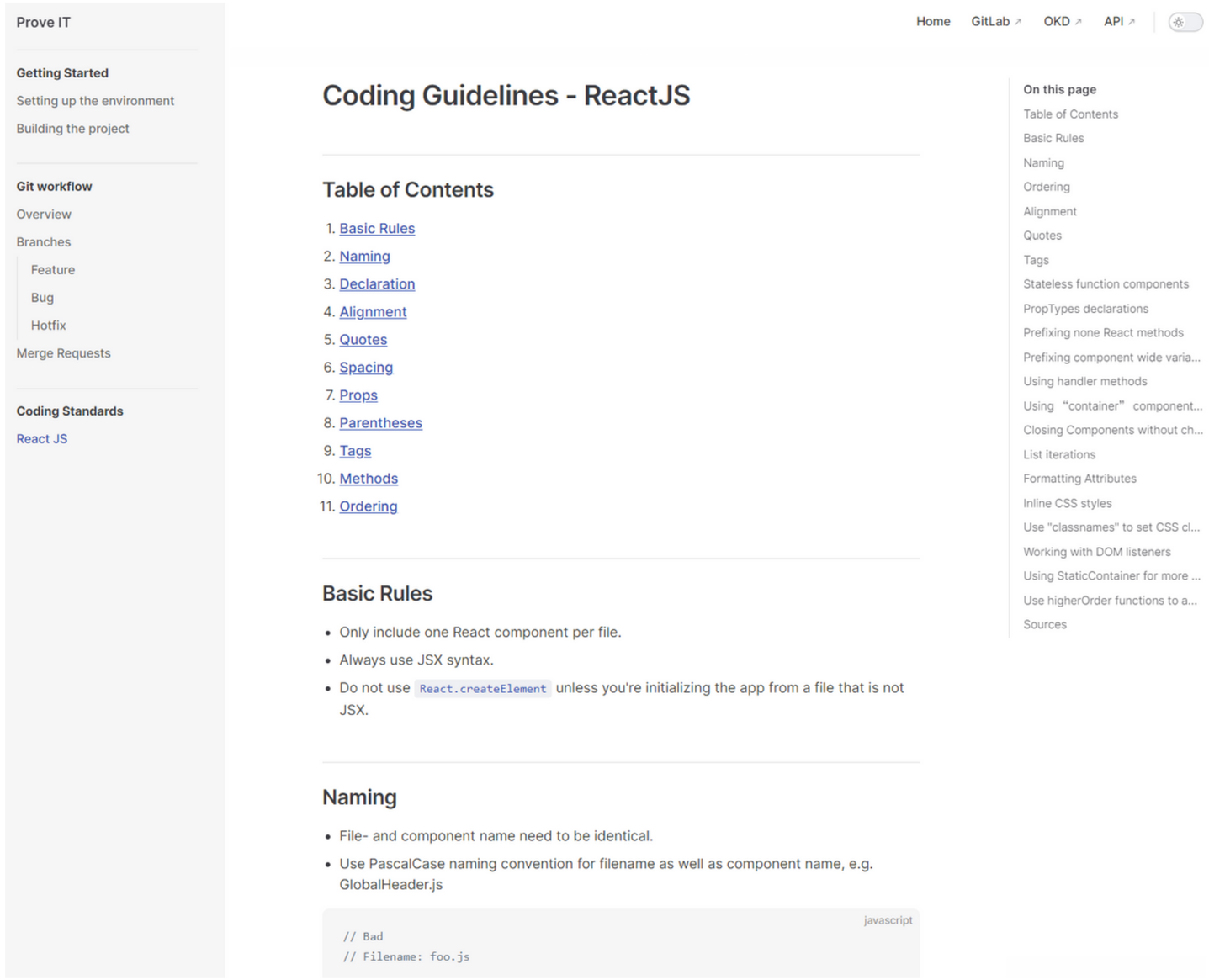


Coding Standards

Deployment Instructions

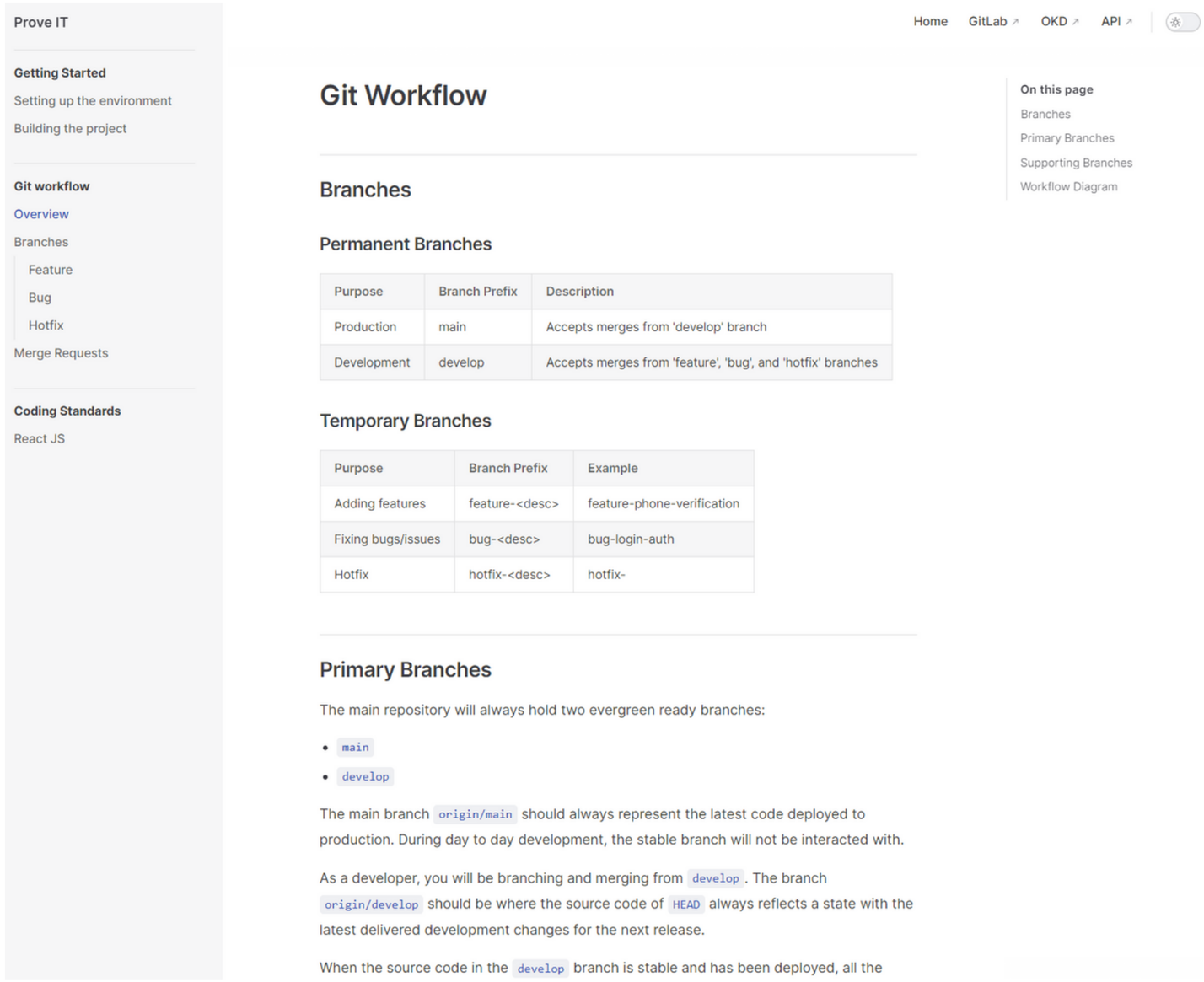
Coding

Prove IT developers have access to documentation that outlines coding and integration standards. Coding standards enforce basic syntactic patterns to guarantee a uniform code base. Functional programming guidelines are also in place for ReactJS development to increase reusability of various components.



Deployment

A workflow for Git integration is provided to embrace the idea of “infrastructure as code”, enabling the team to easily test functionality and integration prior to delivering the source code.



Thank You

We are here to “Prove IT” is possible to develop an API economy to revolutionize property management with a cutting-edge and easy-to-use system for property managers, homeowners, tenants, and service providers.

The Ultimate Property Management System