

MICHIGAN STATE

UNIVERSITY

Project Plan

Secure Application Layer API Proxy

The Capstone Experience

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*From Students...
...to Professionals*

Functional Specifications

- Problem
 - Developers want to use a more modern web protocol when integrating VIP with their applications
- Solution
 - Build a secure proxy to wrap the existing interface and provide a more modern web transfer protocol.
- Translation between protocols
- Secure authentication
 - Client and Proxy
 - Proxy and VIP
- Robust Testing Plan

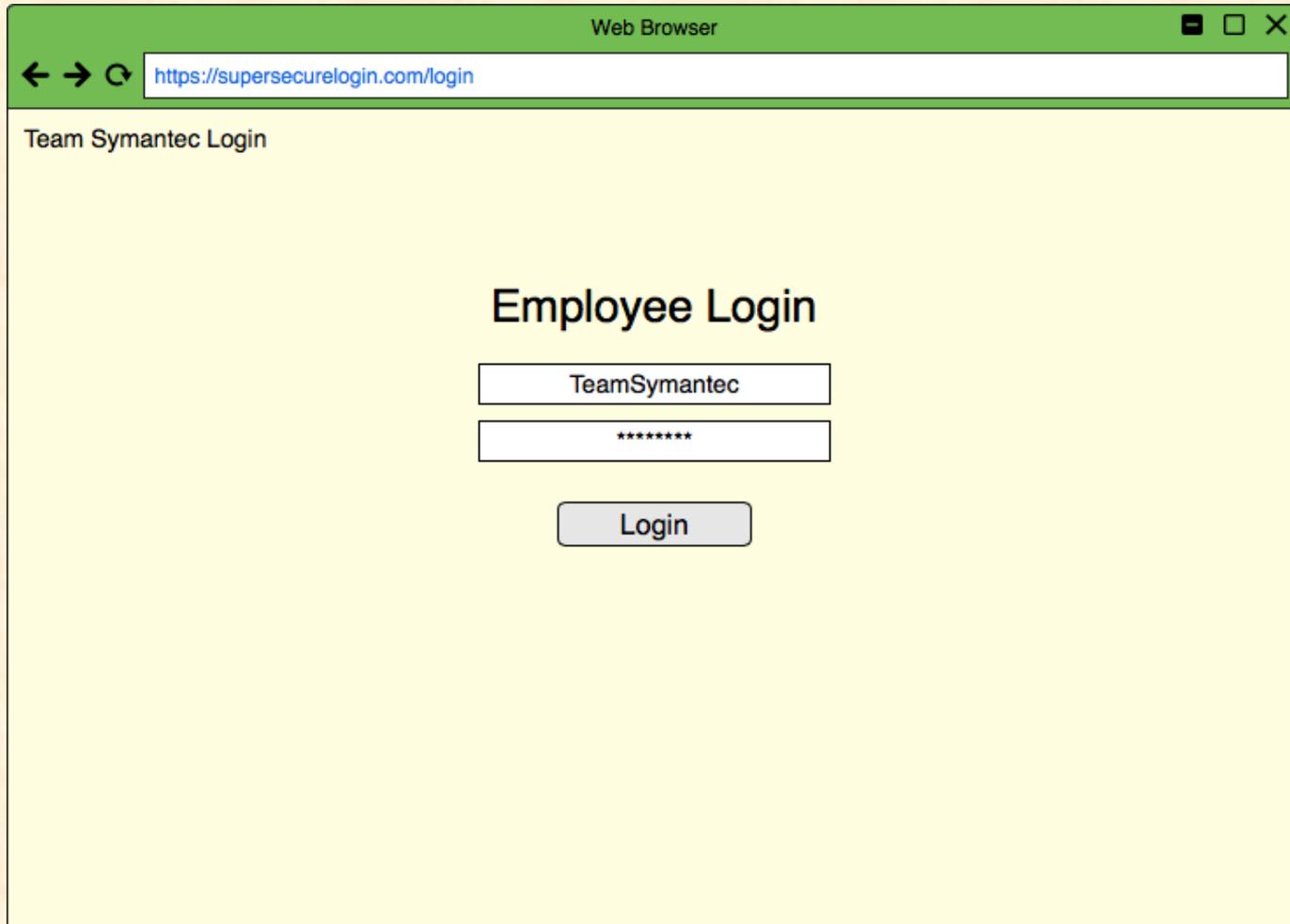


Design Specifications

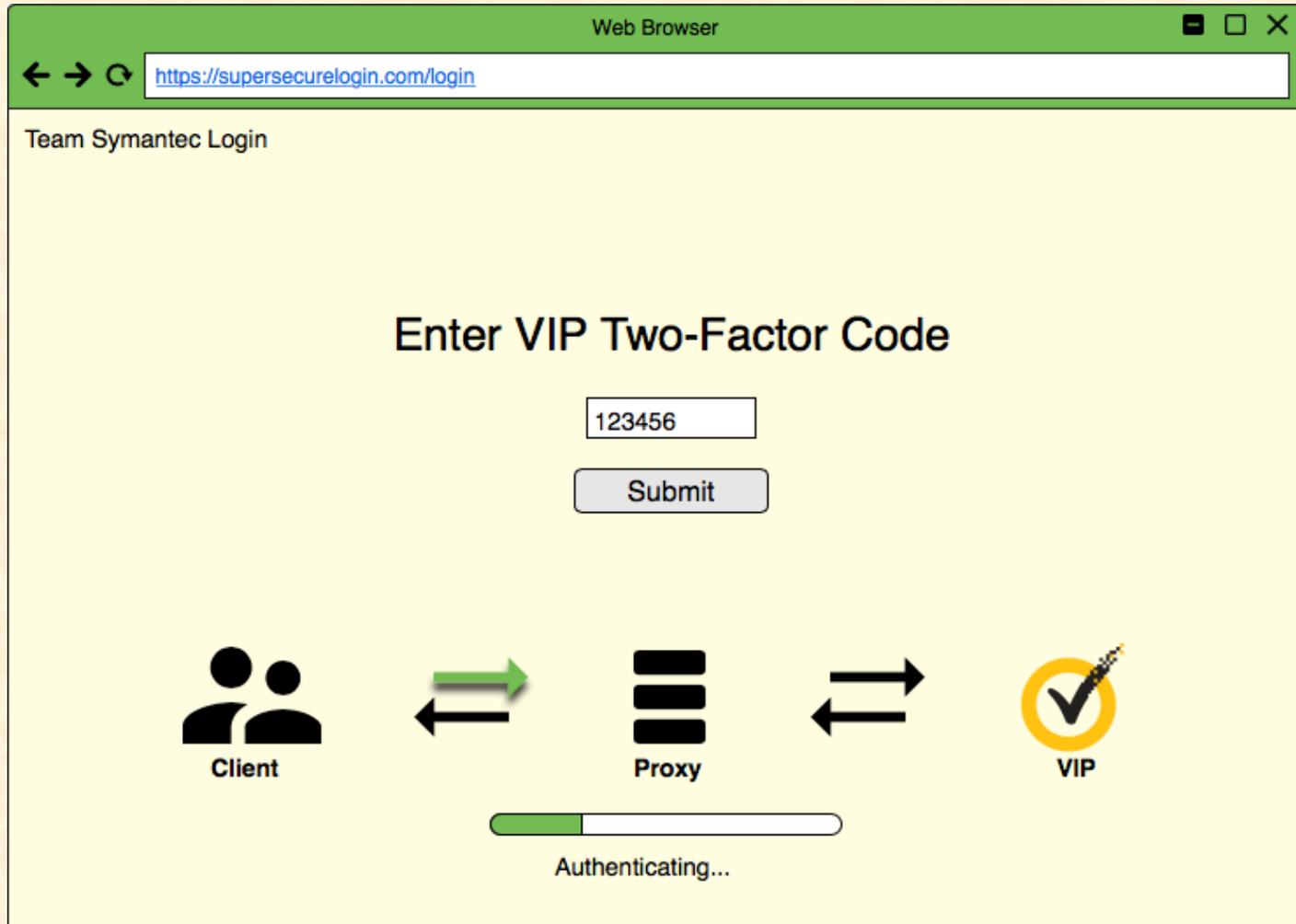
- No front-end design
 - Used by developers
 - API calls
- Visualization using a basic web application
 - Show what logging in with VIP looks like
 - Walk through steps happening in the background



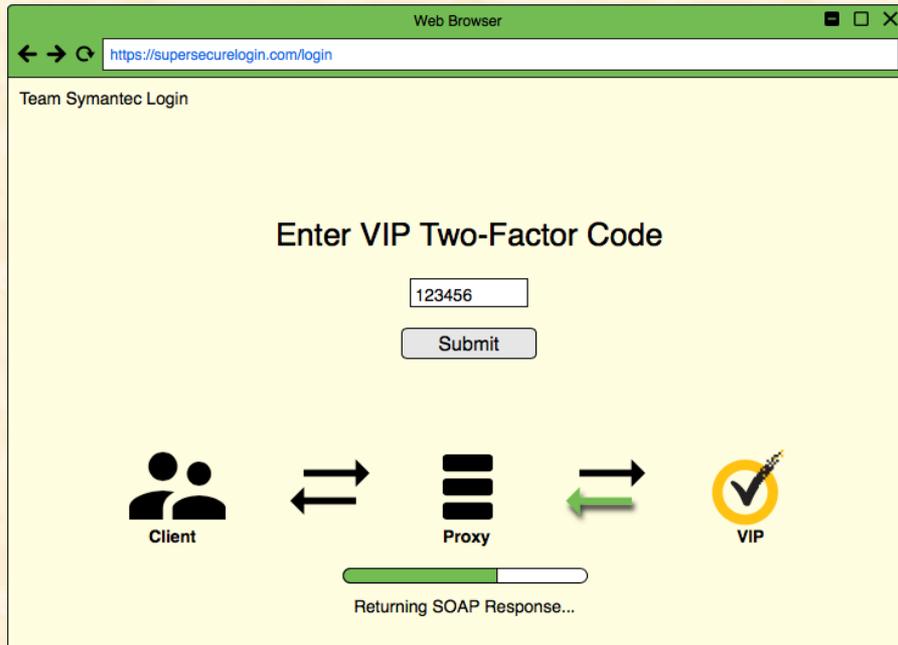
Screen Mockup: Initial Login page



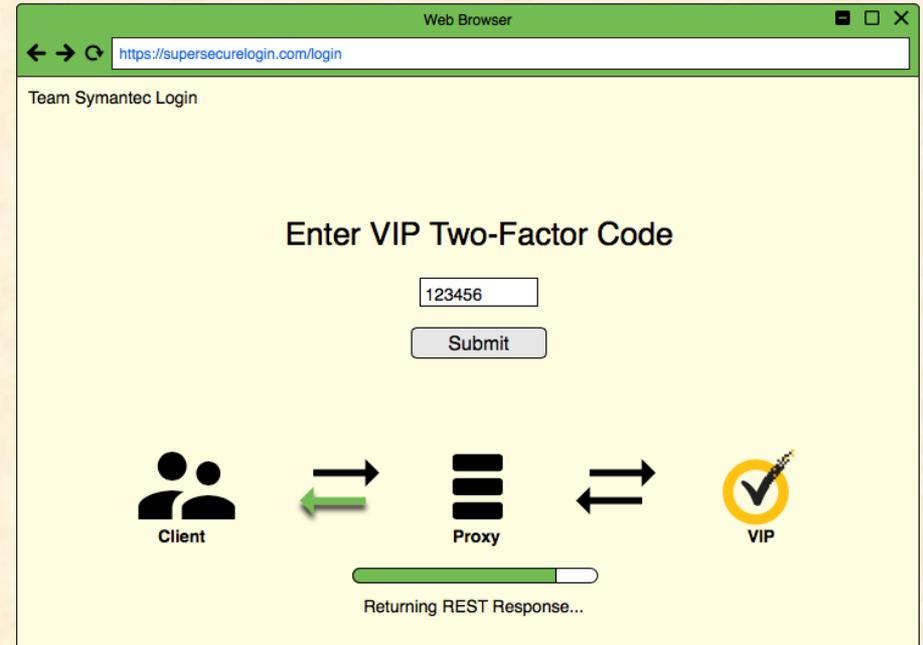
Screen Mockup: 2-Factor Submission



Screen Mockup: Converting SOAP to REST



Returning SOAP Response



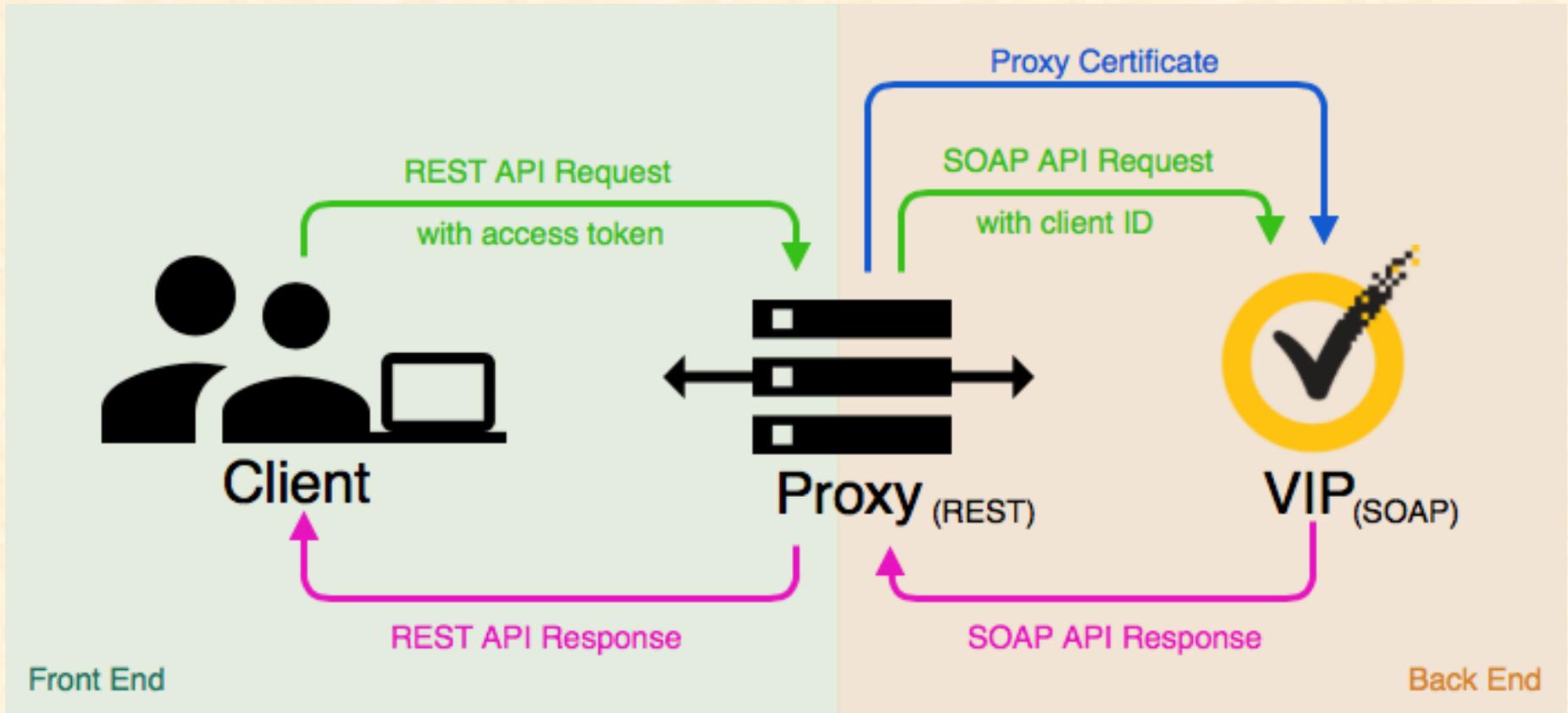
Returning REST Response

Technical Specifications

- Translating between REST and SOAP
 - Mapping REST requests to SOAP requests
 - Converting JSON to XML
 - Converting XML to JSON
- Authentication
 - JSON Web Tokens (JWT)
 - VIP Certificates
 - HTTPS/SSL
- Testing
 - Exhaustive integration tests
 - 100% code coverage with unit tests



System Architecture



System Components

- Software Platforms / Technologies

- Development

- ASP .NET Core (C#)
 - VIP .NET SDK
 - NUnit testing framework
 - Gitlab
 - SoapUI

- Authentication

- JHASH
 - JWT
 - VIP Access Manager

- Protocols

- SOAP
 - ❖ XSD
 - ❖ WSDL
 - ❖ XML
 - REST
 - ❖ OpenSSLv3
 - ❖ JSON



Testing Plan

- Two separate integration tests per API endpoint
 - Pass
 - Expected Fail
- Unit tests
 - Verify XML and JSON conversion
 - Ensure feature-parity with SOAP API
- Performance under load



Risks

- **Load Testing Ability**

- **Difficulty:** Medium
- **Description:** Our ability to load test our proxy is limited. We need to be able to simulate several hundred to thousand requests per second to properly test the scalability of our API.
- **Mitigation:** Talking with client about multiple mock accounts.

- **Client Side Authentication**

- **Difficulty:** Medium
- **Description:** We are required to implement client side authentication without an existing or building an authentication server. This blocks us from using technologies such as OAuth2.
- **Mitigation:** Work with client and research to figure out a client-proxy authentication method that does not rely on an authentication server.

- **VIP API documentation**

- **Difficulty:** Easy
- **Description:** The documentation provided is cumbersome and does not thoroughly explain how to communicate with the SOAP API.
- **Mitigation:** Searching for more API related documentation and working with client to identify and clarify misunderstandings.



Questions?

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