

MICHIGAN STATE
UNIVERSITY

Project Plan

LIMElight: Life Insurance Made Easy

The Capstone Experience

Team USAA

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From Students...
...to Professionals

Functional Specifications

- Generate accurate life insurance quote using machine learning
- Improve experience of receiving a insurance quote by creating a responsive mobile-friendly web application
- Demonstrate practicality of storing and accessing health record data on a blockchain for general underwriting purposes

Design Specifications

- Provide a web application for users to answer questions and receive a life insurance quote instantly
- Provide a separate web application to allow underwriters to query health record data via a Blockchain web API

Screen Mockup: Quoting Process

The mockup shows a web browser window with the URL <https://www.limelight.usaa.com/get-quote>. The page features the USAA logo and tagline "We know what it means to serve®". A navigation bar contains three links: "Get a Quote", "Manage Health Records", and "Admin". The main heading is "Get a Term Life Insurance Quote". Below this, there are radio buttons for gender (M is selected) and input fields for age (37), weight (180), and height (6' 1"). At the bottom, there are radio buttons for "Do you smoke?" (N is selected) and "Do you exercise?" (Y is selected). A large "GET A QUOTE" button is at the bottom center.

Get a Quote

[Get a Quote](#) [Manage Health Records](#) [Admin](#)

Get a Term Life Insurance Quote

M ☒ F ☐

Age

Weight

Height

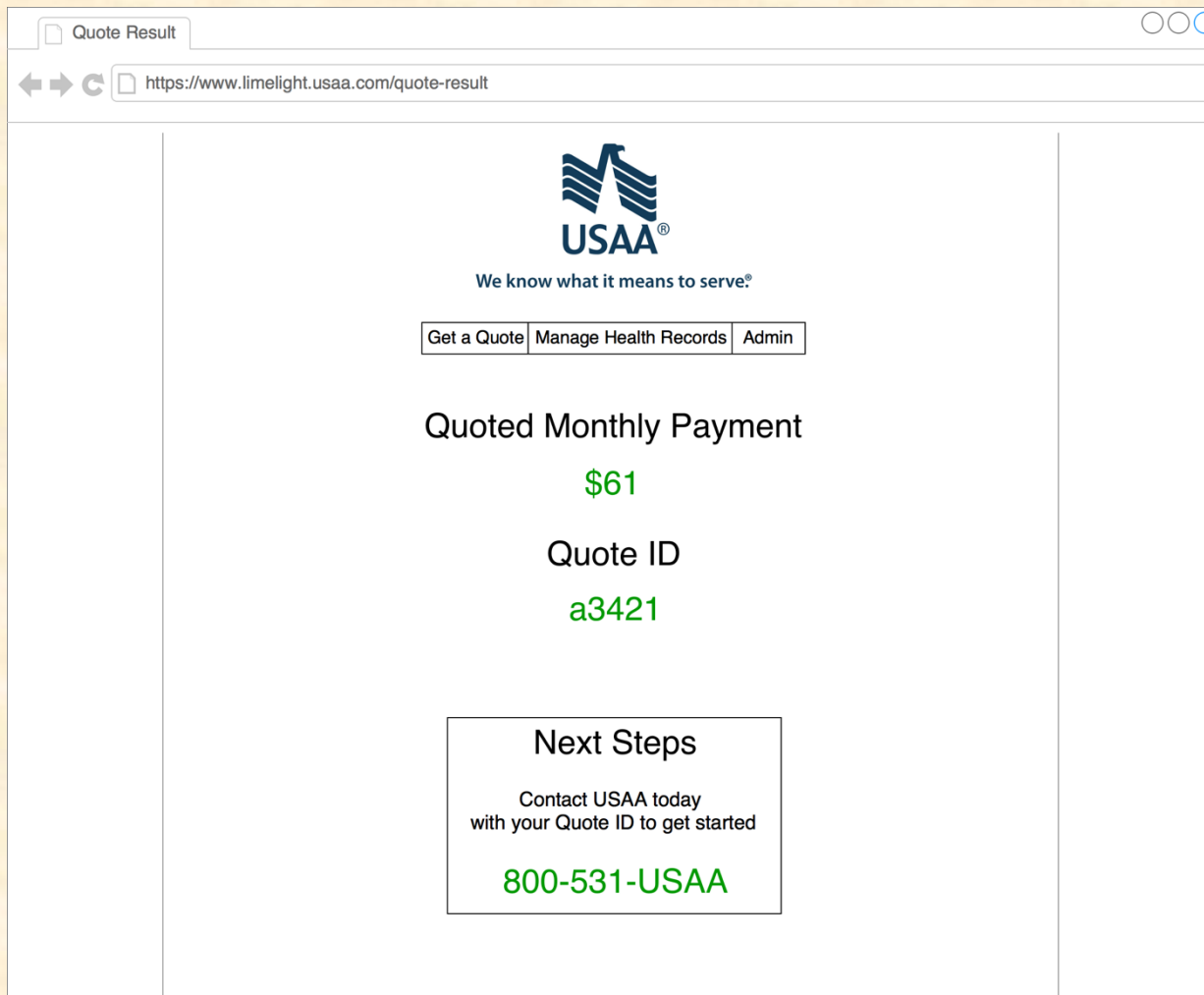
Do you smoke? Y ☐ N ☒

Do you exercise? Y ☒ N ☐

[GET A QUOTE](#)



Screen Mockup: Quoting Process




Screen Mockup: Underwriter Login

The mockup shows a web browser window with the title 'Underwriter Portal' and the URL 'https://www.limelight.usaa.com/underwriter-portal'. The page features the USAA logo and the tagline 'We know what it means to serve®'. Below this is a navigation bar with three links: 'Get a Quote', 'Manage Health Records', and 'Admin'. The main heading is 'Underwriter Portal'. The login form consists of two fields: 'Username' with the value 'Sally' and 'Password' with masked characters '*****'. A blue 'Login' button is positioned below the password field.

Underwriter Portal

https://www.limelight.usaa.com/underwriter-portal


We know what it means to serve®

[Get a Quote](#) [Manage Health Records](#) [Admin](#)

Underwriter Portal

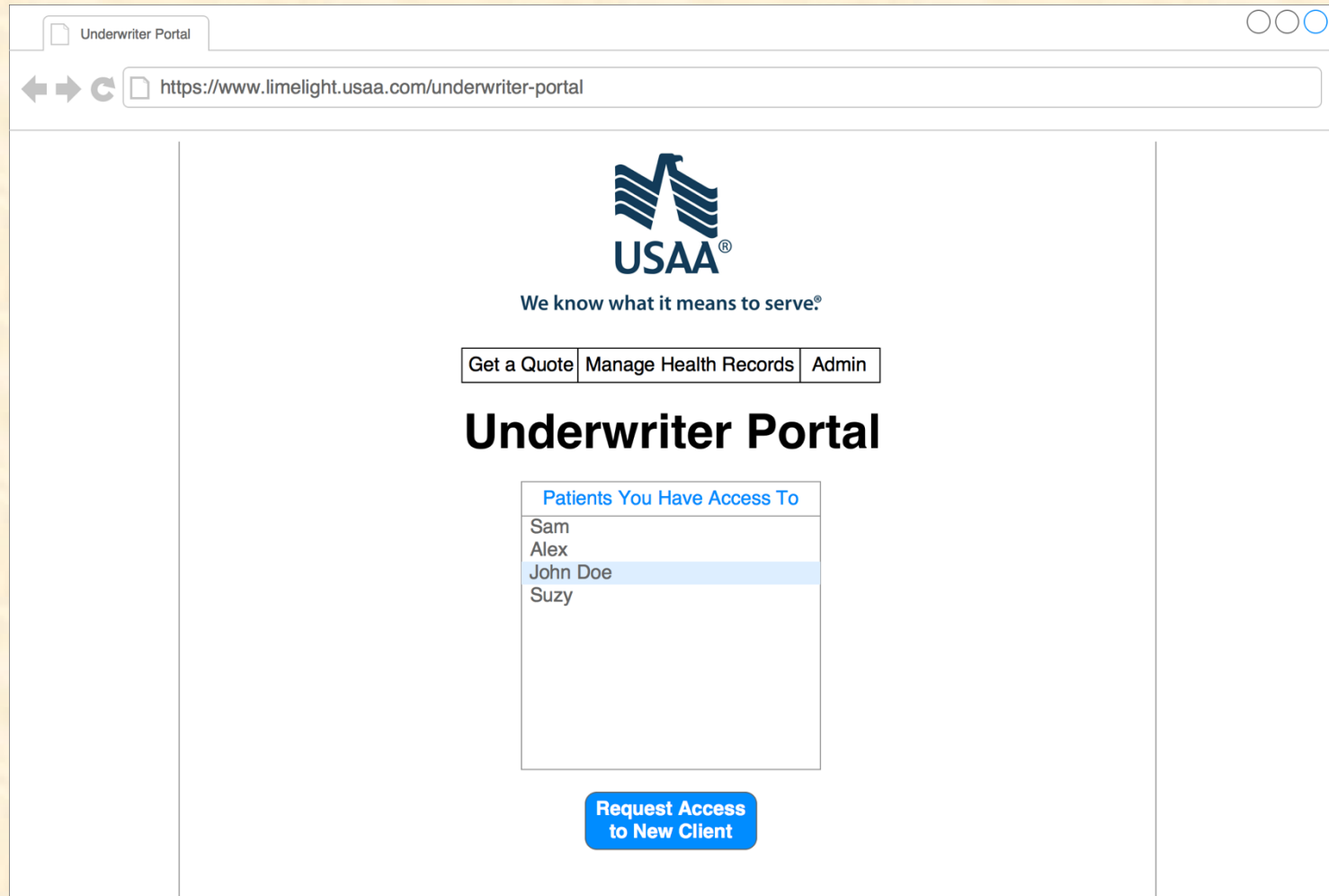
Username

Password

Login




Screen Mockup: Underwriter Patient Selection



Screen Mockup: Underwriter's Medical Record View

View Record

https://www.limelight.usaa.com/medical-record-view



We know what it means to serve®

[Get a Quote](#)[Manage Health Records](#)[Admin](#)

Medical Record View

Patient Name John Doe

Medical Record Type Encounter: Emergency

Encounter Summary

Symptom I Irregular heartbeat

Symptom II Chest Pain

Symptom III Short of Breath

Medications Administered Aspirin

Encounter Outcome Transferred to Cardiac Unit

[Previous](#)[Next](#)




Screen Mockup: Patient Login

The mockup shows a web browser window with a single tab titled "Patient Portal". The address bar displays the URL "https://www.limelight.usaa.com/patient-portal". The page content features the USAA logo at the top, followed by the tagline "We know what it means to serve®". Below this is a horizontal navigation bar with three links: "Get a Quote", "Manage Health Records", and "Admin". The main heading "Patient Portal" is centered. The login form consists of two input fields: "Username" with the value "Bob" and "Password" with masked characters "*****". A prominent blue "Login" button is positioned below the password field.

Patient Portal

https://www.limelight.usaa.com/patient-portal


USAA®
We know what it means to serve®

Get a Quote | Manage Health Records | Admin

Patient Portal

Username

Password


Login



Screen Mockup: Patient Login

Record Mgt

https://www.limelight.usaa.com/manage-health-records



We know what it means to serve.®

[Get a Quote](#)[Manage Health Records](#)[Admin](#)

Manage Who Can View Your Health Records

Entity	Permission	
	Y	N
USAA	<input checked="" type="radio"/>	<input type="radio"/>
Sparrow Health	<input type="radio"/>	<input checked="" type="radio"/>

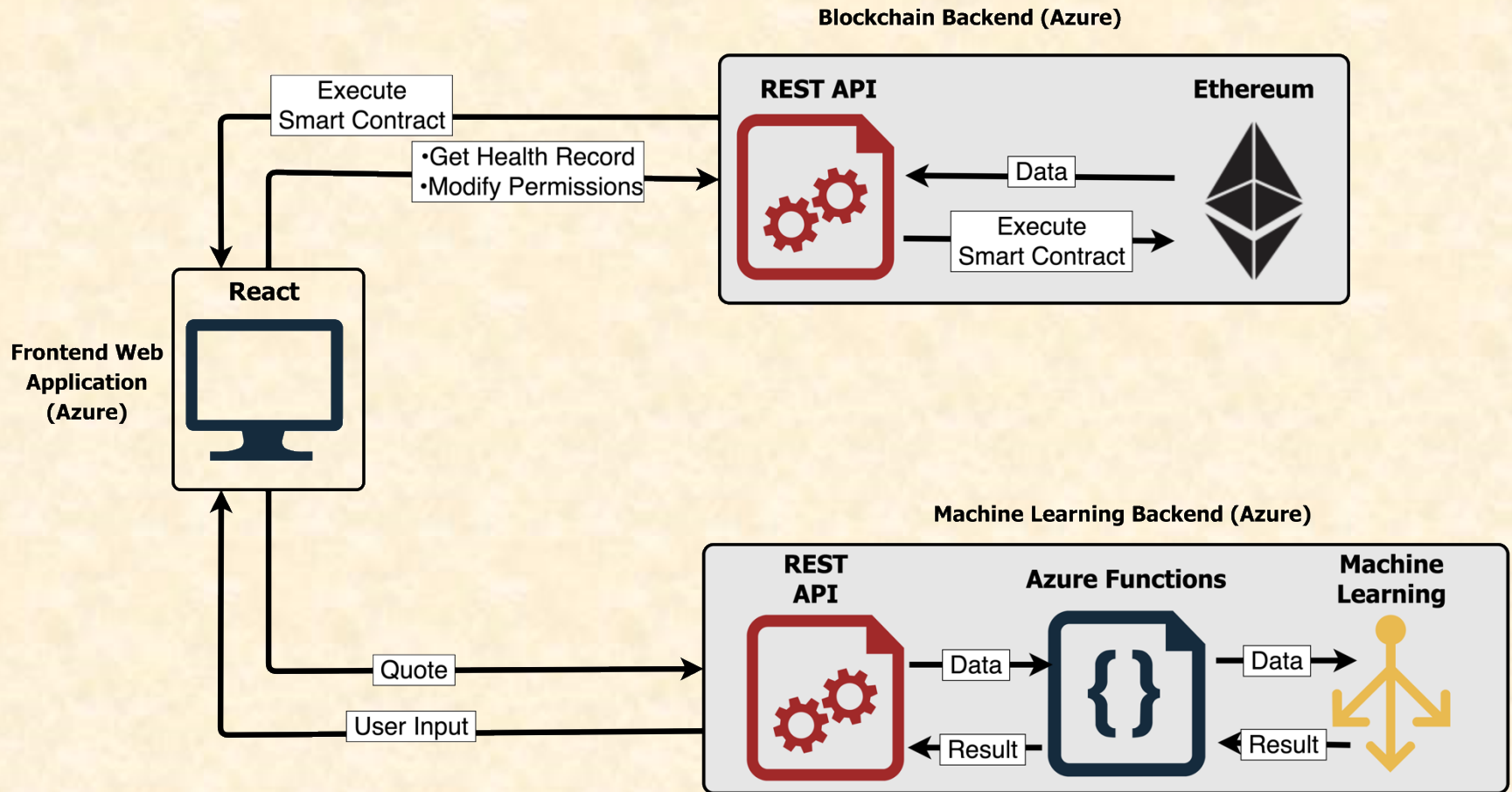
Update



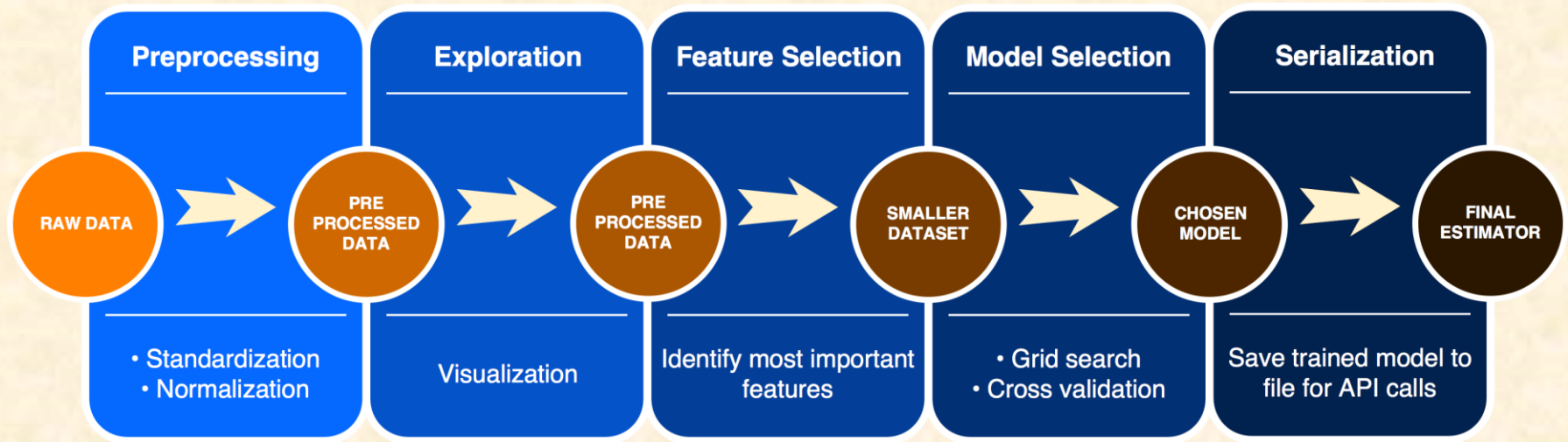
Technical Specifications

- Build the web application using React web framework.
- Use *Scikit-learn* to train and test insurance-quoting model.
- Construct *REST APIs* to expose the different services provided by the system.
- Build a simple blockchain that can be used to store and retrieve health record data while allowing users to set access permissions to their data.

System Architecture

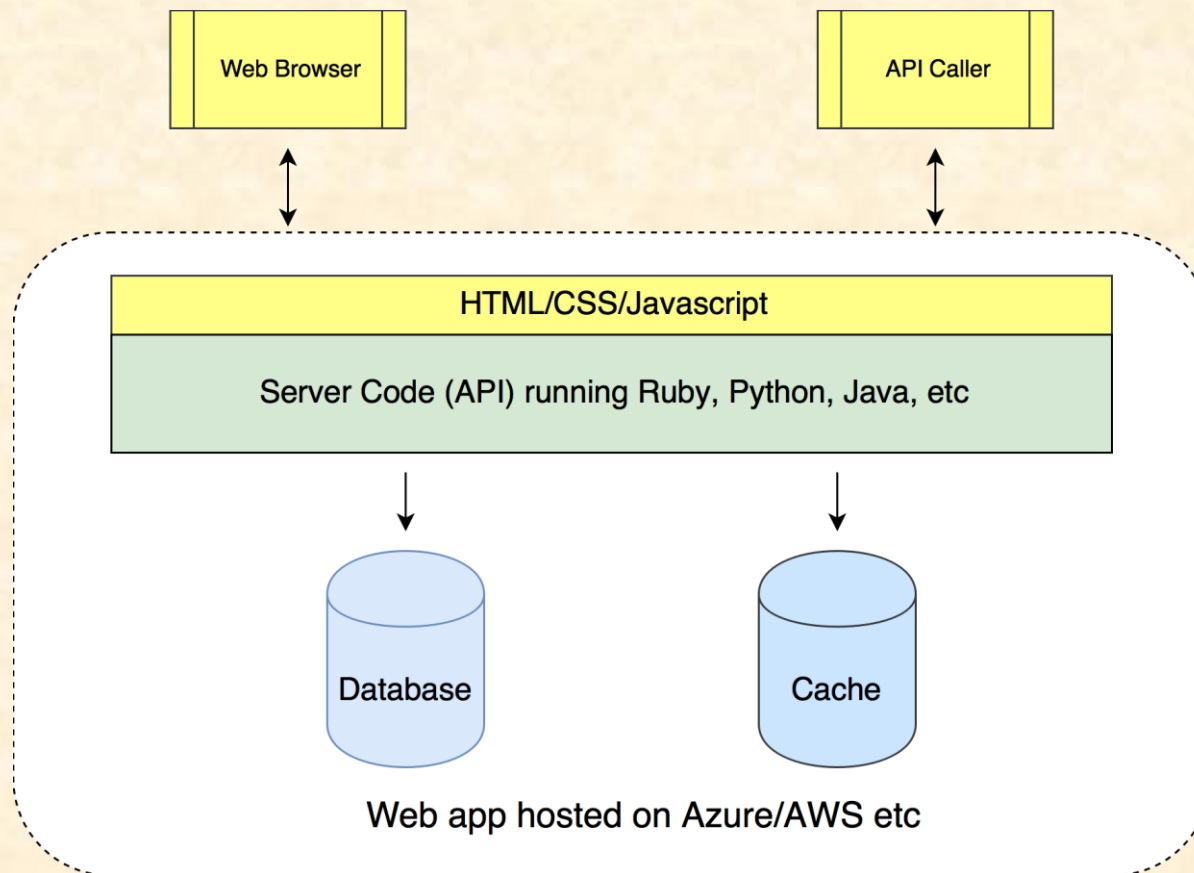


System Architecture: Machine Learning



Blockchain Crash-Course

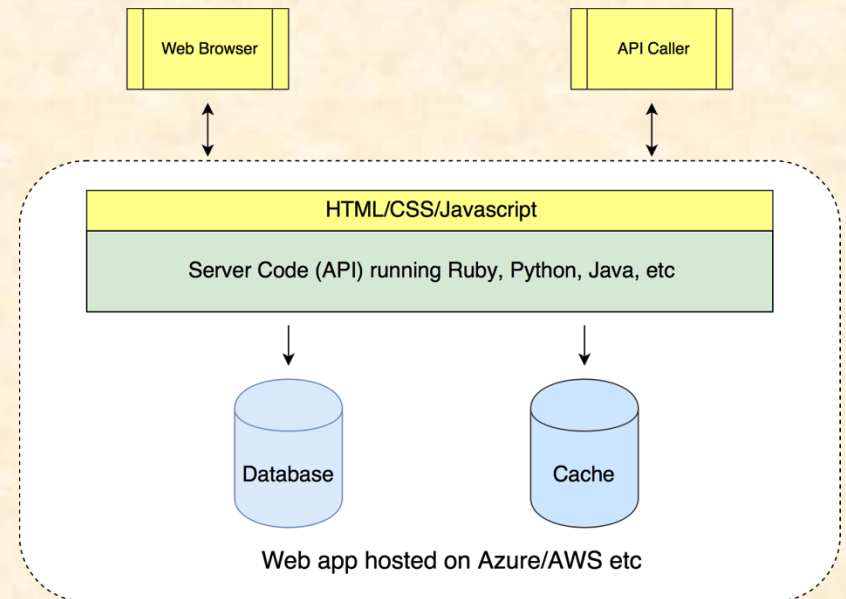
Traditional Web App Architecture



Blockchain Crash-Course

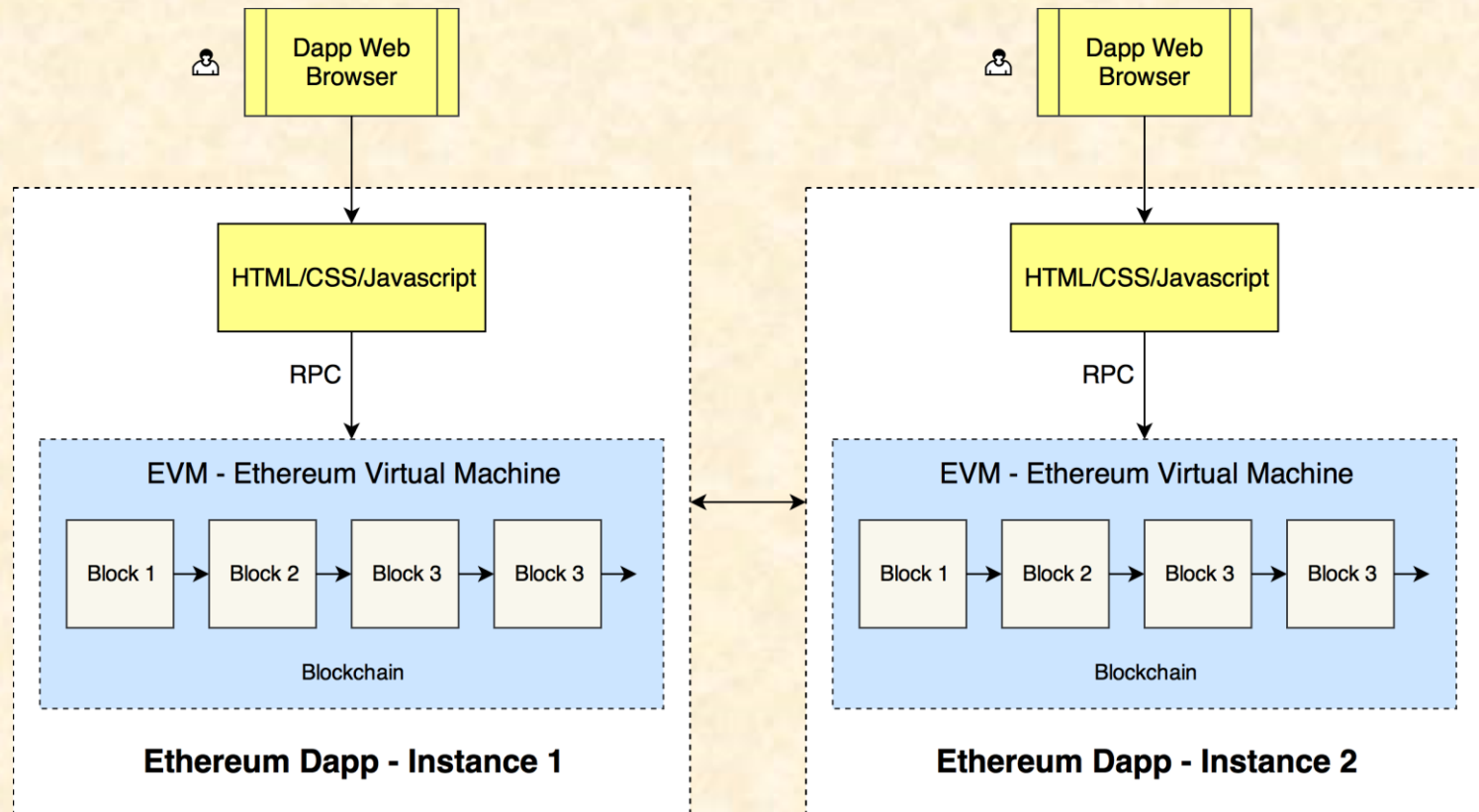
Storing Health Records: **Cons**

1. Centralized
2. Inaccessible
3. Single point of failure



Blockchain Crash-Course

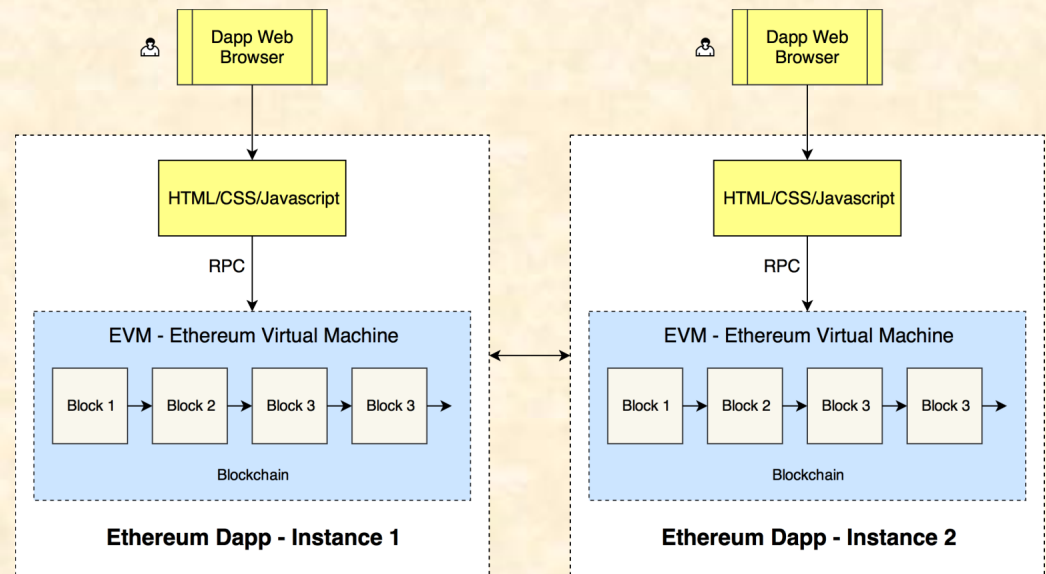
Ethereum Blockchain Web App Architecture



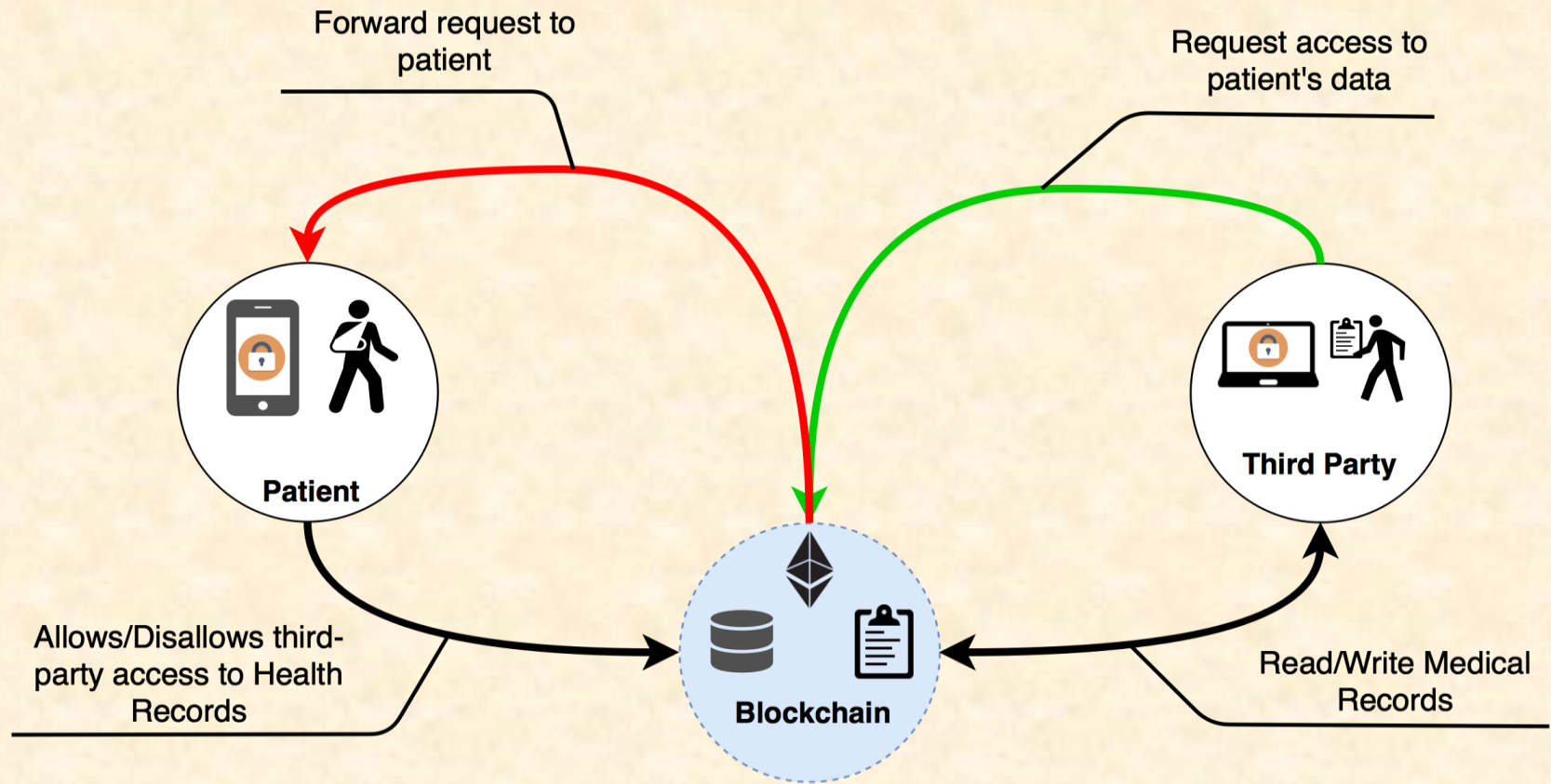
Blockchain Crash-Course

Storing Health Records: **Solutions**

1. Decentralized
2. Fully Accessible
3. Distributed



Blockchain Crash-Course



System Components

- Hardware Platforms
 - All hardware will be hosted on Microsoft Azure
- Software Platforms / Technologies
 - Python for Machine Learning
 - Scikit-learn, Pandas, Matplotlib
 - React for the web apps
 - JAX-RS for the REST APIs
 - Ethereum Consortium Blockchain
 - Microsoft Azure SQL Database

Risks

- Blockchain Implementation
 - Complexity of implementation using smart contract
 - Enrolled in Ethereum Udemy course, utilizing online Ethereum tutorials
- Accurate Life Insurance Quotes
 - Model may struggle to produce an accurate life insurance quote with minimal applicant input
 - Review academic research about most significant factors affecting an applicant's riskiness
- Lack of Knowledge in Life Insurance
 - Group does not have any experience with life insurance industry
 - Connect with underwriters and actuaries at USAA

Questions?

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