

University
of Idaho

Speech Therapy Application Engineering EXPO 2020

Team Dielectric

Lucas Jackson (CS)

Ian Wood (CE)

Yiqing Ma (CS)

Sponsored by:



Value Proposition



- About **8% of children need speech therapy** globally and while there are many speech therapy apps intended to help these children, most only supplement typical sessions, require a therapist to use, or are of little use for research.
- This project's aim has been to create an all-in-one computer application for speech therapy utilizing last year's **database** system by implementing: a dynamic **user-interface**, an overhauled **security** system, and features useful to children, therapists, and researchers, alike.

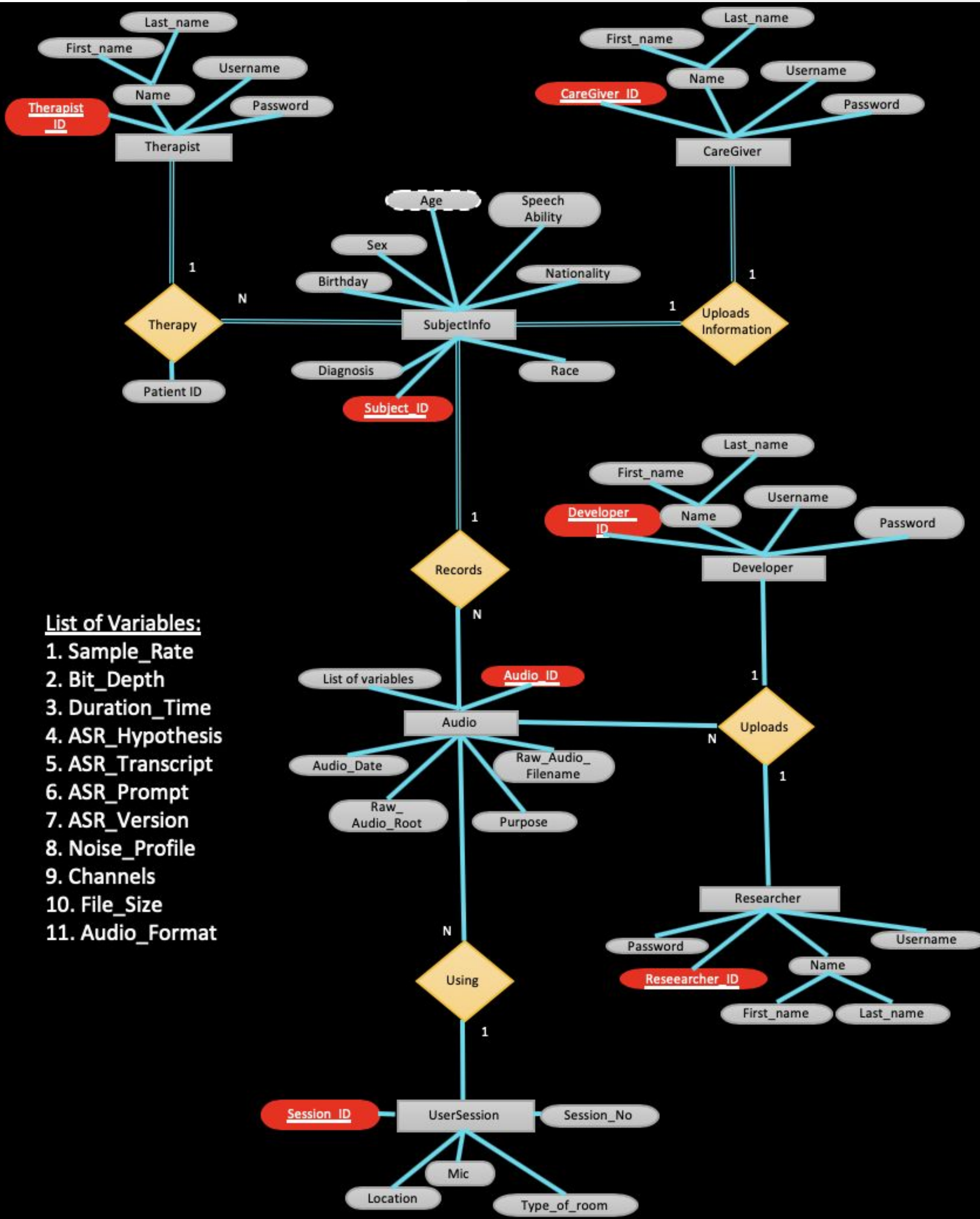


Project Requirements



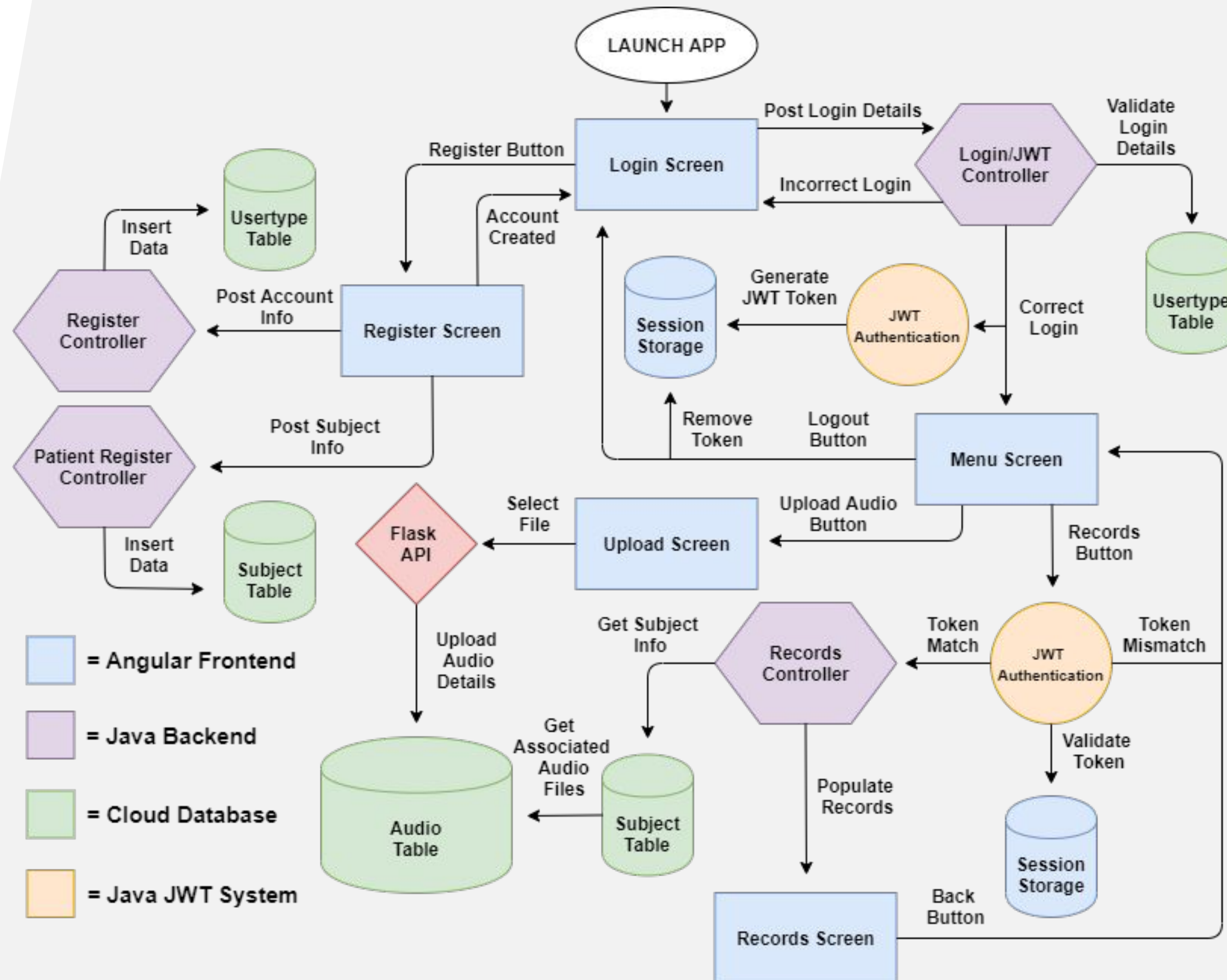
- Create a **user interface** system for therapists, researchers, caregivers, and patients
- Expand upon **security** to keep the project on track for **COPPA** and **HIPAA** compliance
- Give therapists, caregivers, and researchers **viewability** of patient **records**
- Allow for the **upload** of patient **audio** files
- Create a **back-end server** to handle **data transfer** and to control the security layer

The Previous Project



- A relational-database design was created last year for the project to establish storage for the data to used in the application
- It established a **MySQL database** hosted in **Google Cloud** that could be accessed through a **Java** application
- We built our application back-end in Java so we could easily interact with their system and to setup the communication for future work

Full System Diagram



Project Learning and Development



- ❑ Security layer authenticates with a JSON Web Token system utilizing the Java Spring Security framework
- ❑ A matched username and password will generate a unique token for authentication



- ❑ Front-end developed with Google's web framework Angular for its component-based architecture and fast testability
- ❑ The interface loads quickly and boasts expansive libraries for future project additions



- ❑ Back-end developed with Java to remain consistent with the previous team's database system
- ❑ It utilizes various data controllers to pass the database information to and from the front-end while applying the security layer



Interface Design

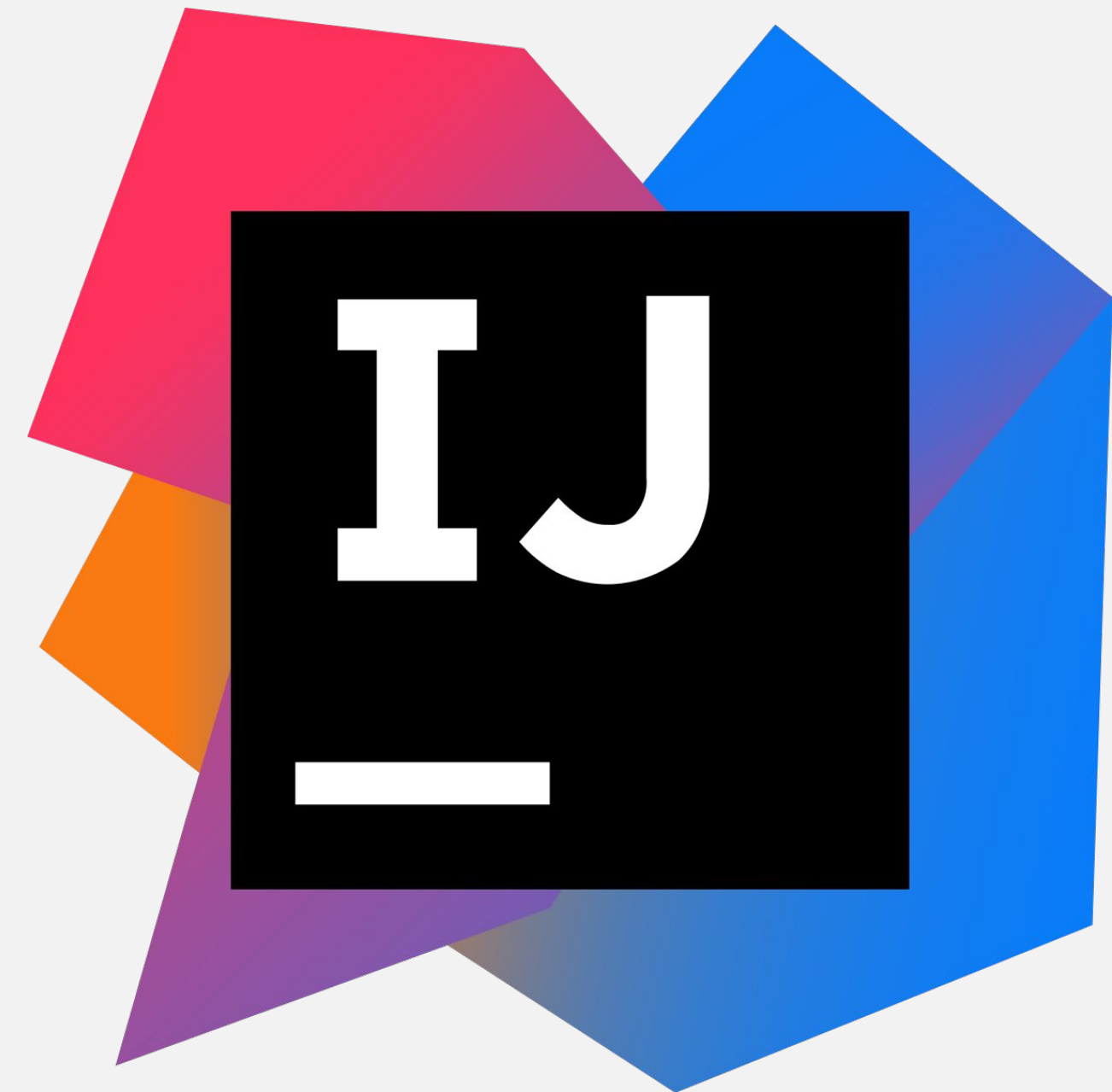


Programming Framework: Angular

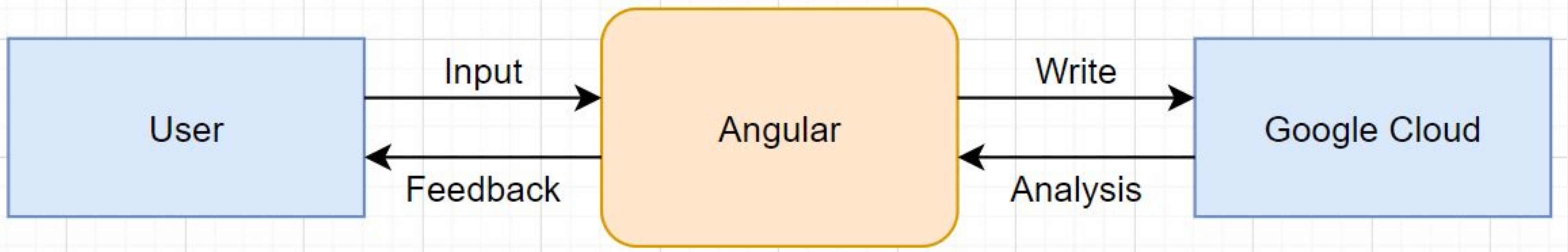
- All-in-one
- Platform agnostic
- Scalability
- Longevity

Source-code Editor

- Vs code
- IntelliJ



Interface Context Diagram

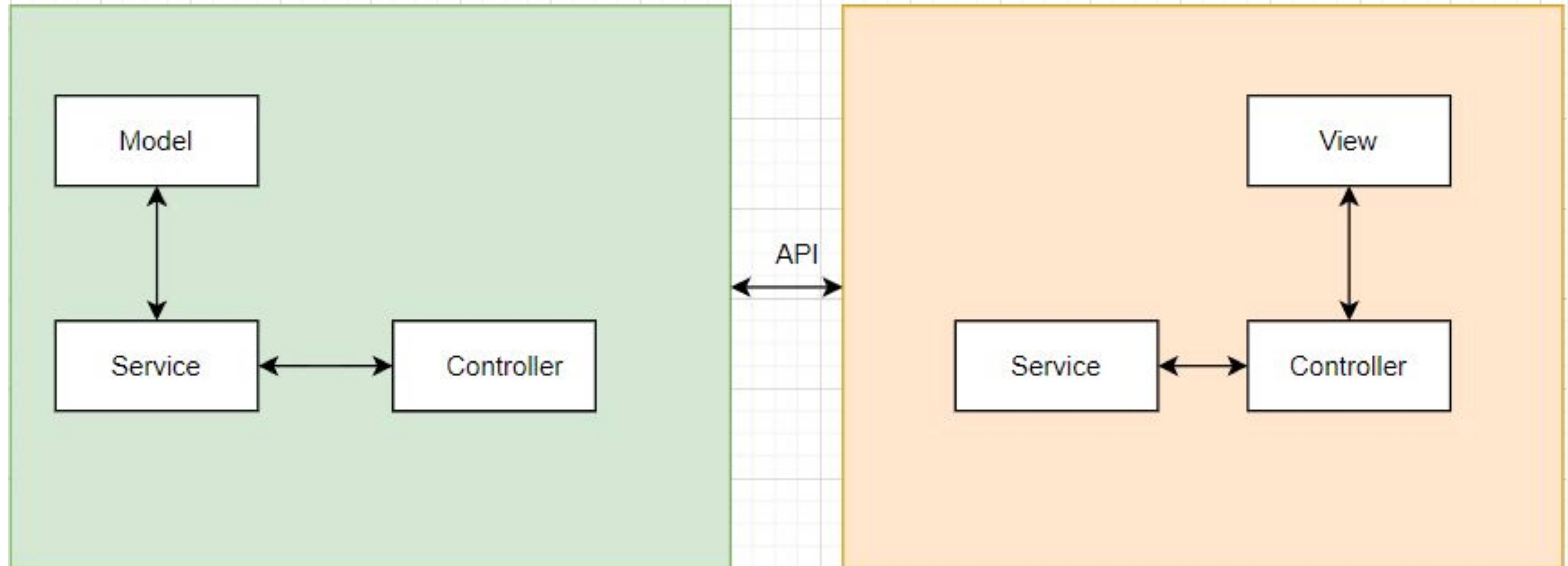


Front-end and Back-end



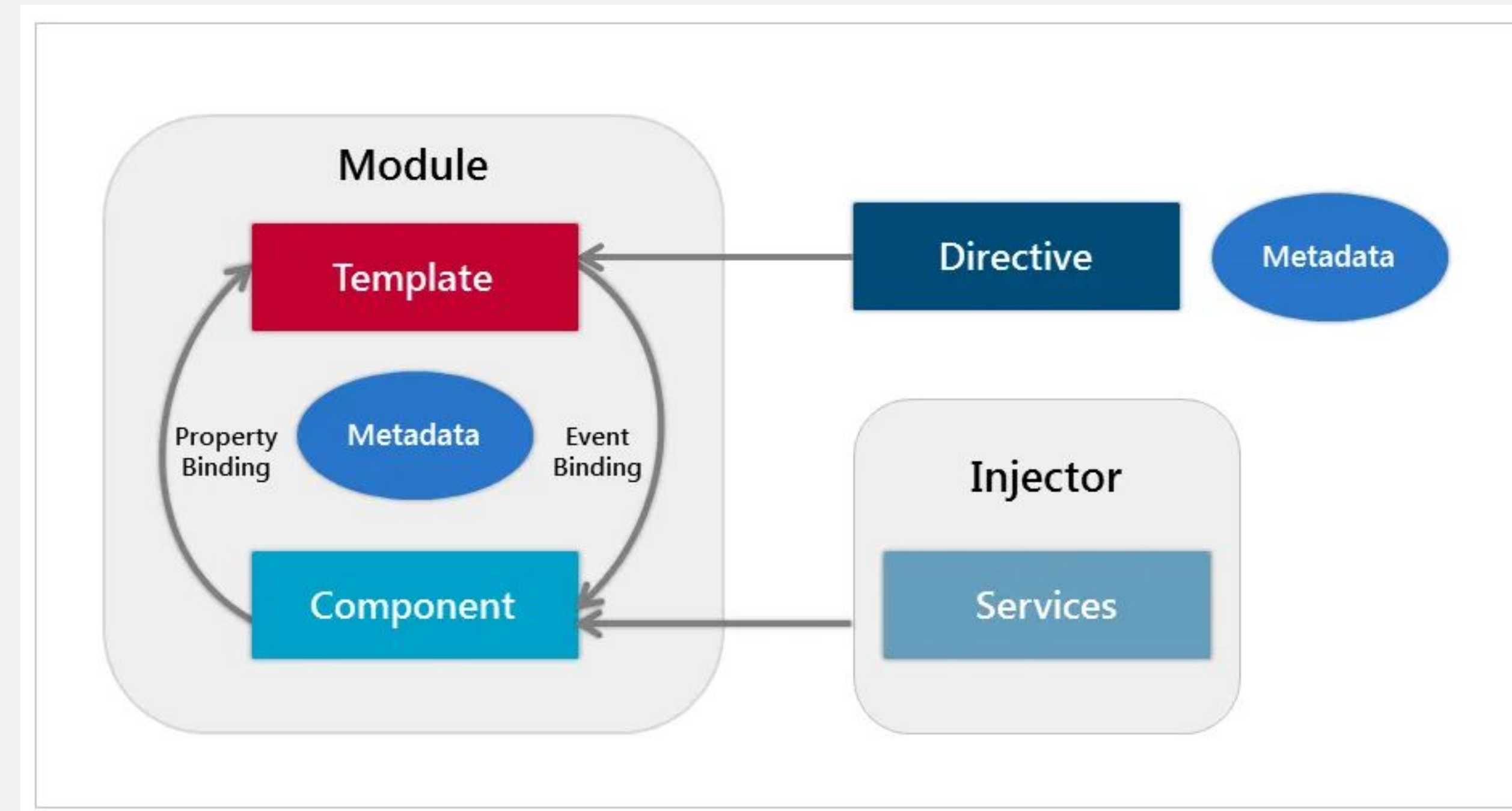
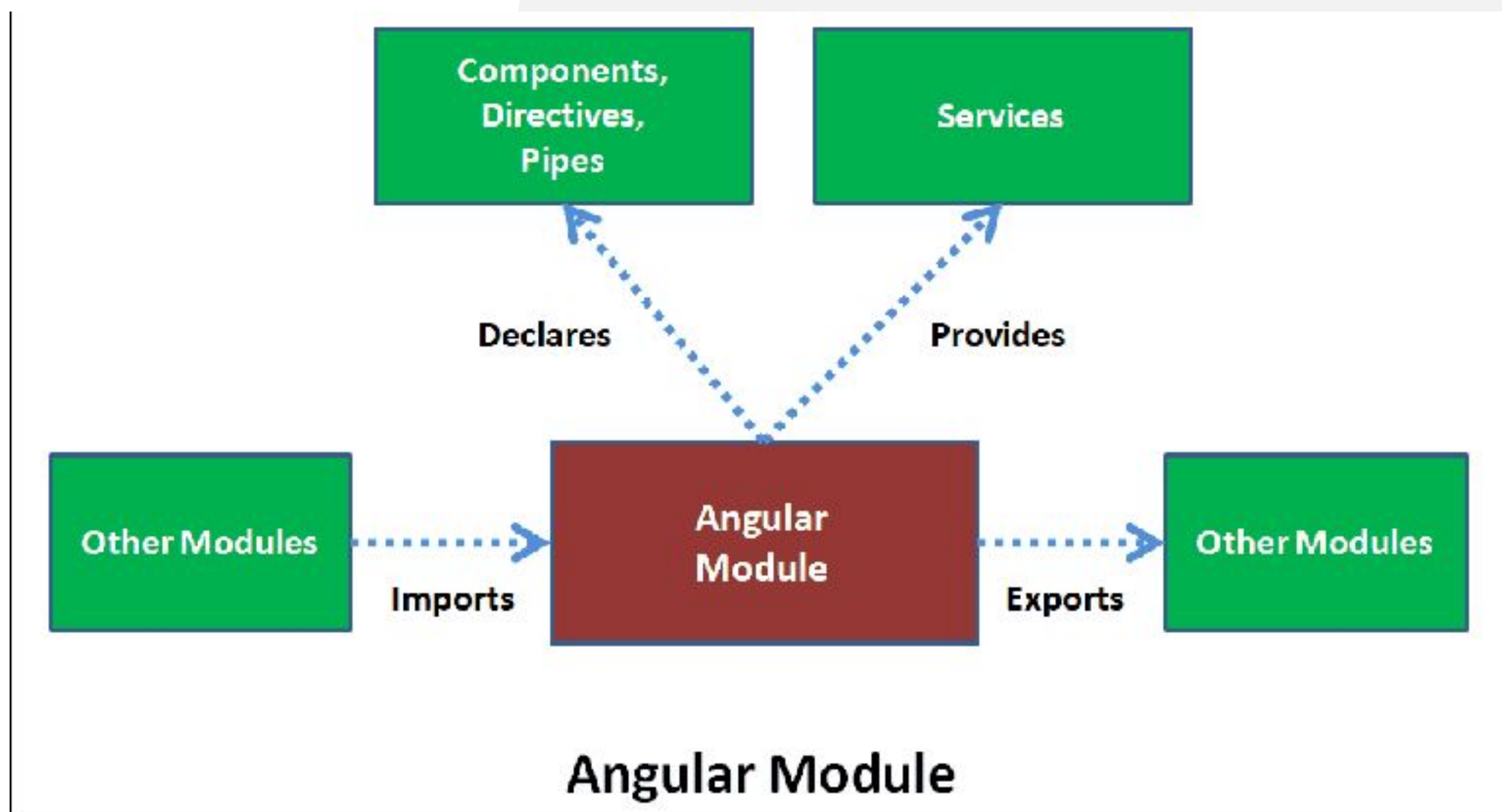
Backend

Frontend



Front-end Module

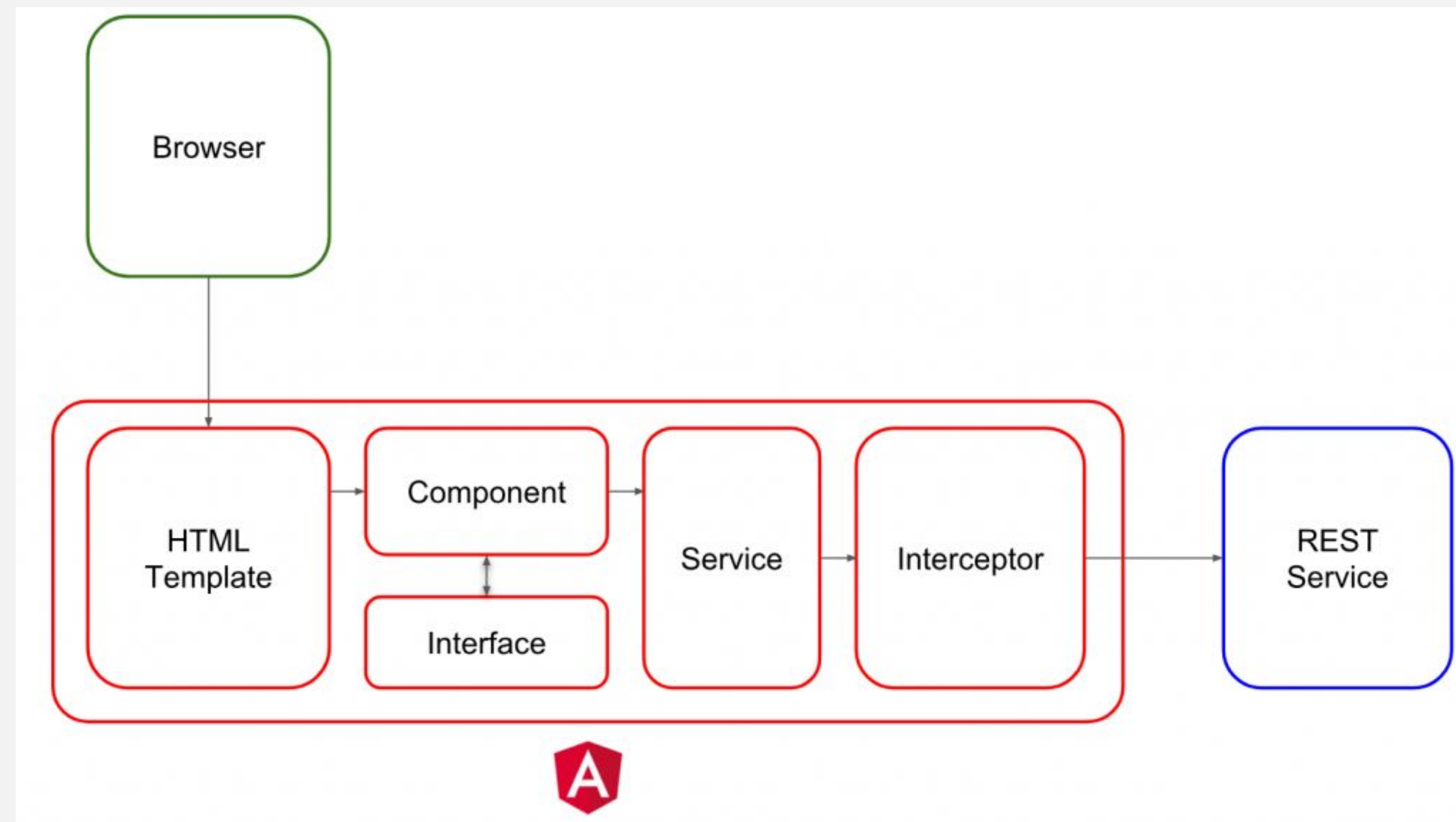
- In Angular, a module is a mechanism to group components, directives, pipes and services that are related, in such a way that can be combined with other modules to create an application.
- Module is a function that takes metadata object whose properties describe the module. Modules are defined using the @NgModule decorator.



Front-end Component



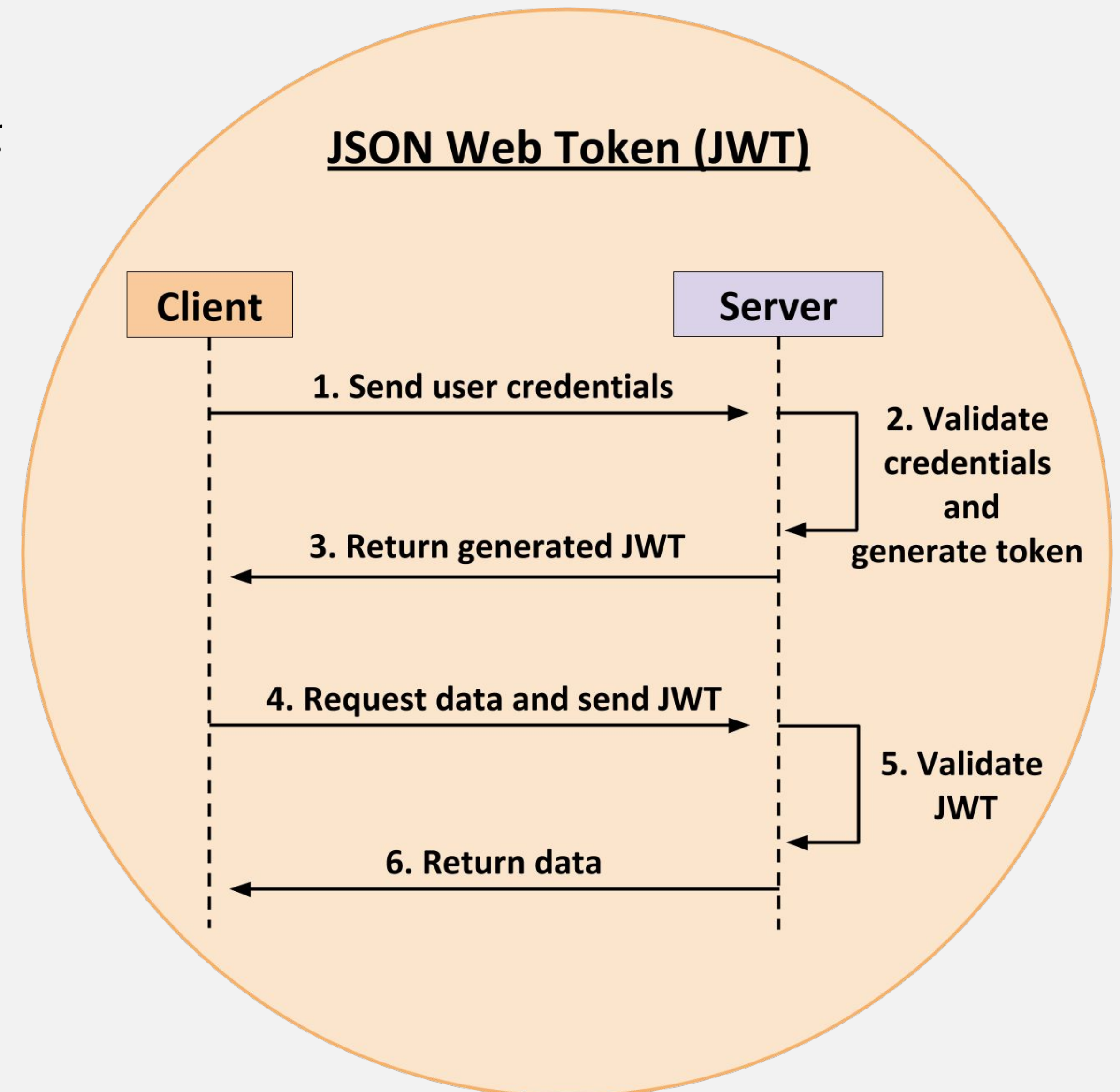
- Components are like the basic building block in an Angular application.
- Components are defined using the `@component` decorator.
- A component has a selector, template, style and other properties, using which it specifies the metadata required to process the component.



Security



- The security layer was developed in **Java** using **Spring Security** libraries
- **Back-end**
 - Request filter
 - Token generator
 - Authentication controller
- **Front-end**
 - Requestinterceptor
 - Authentication guard





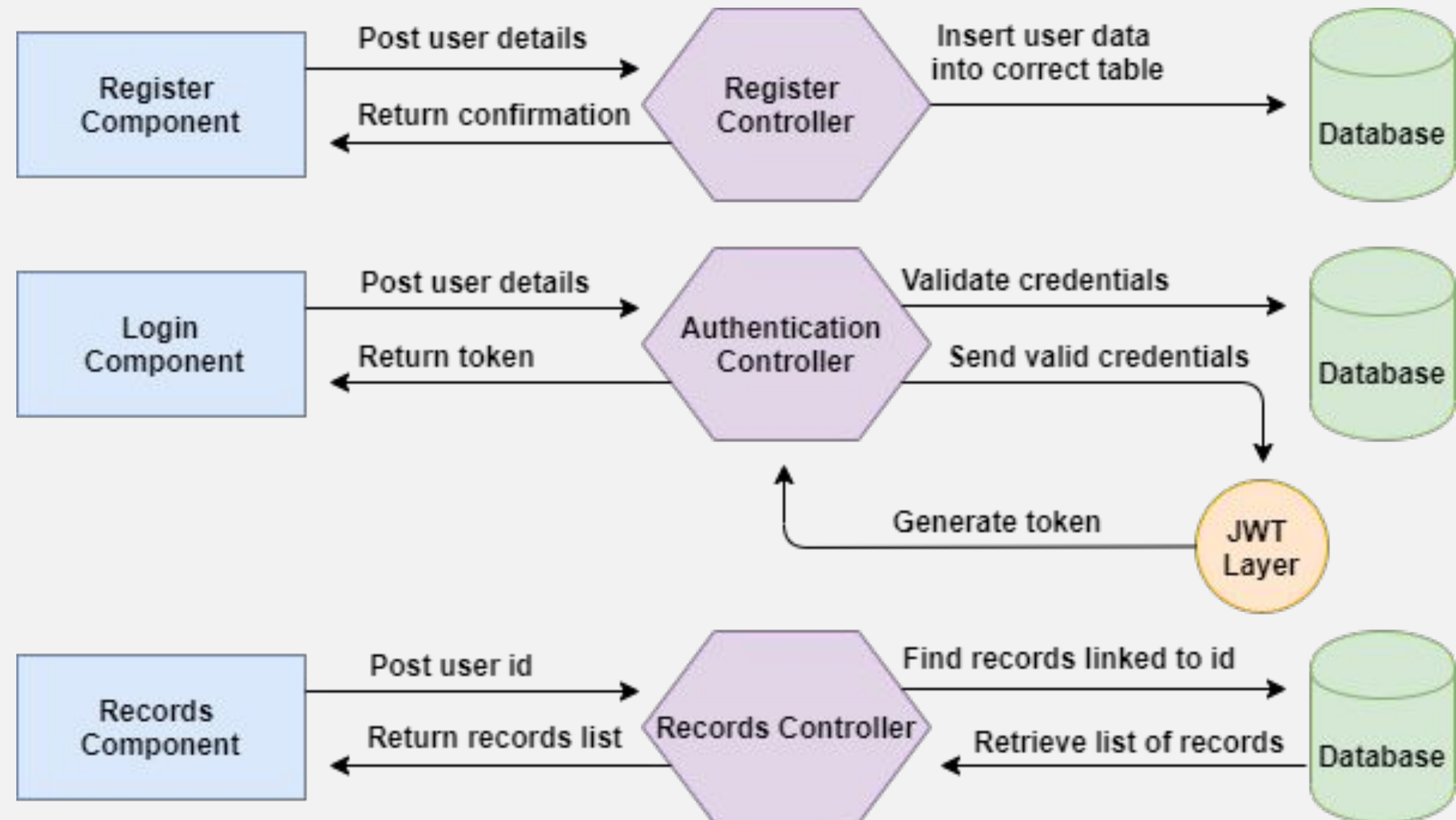
Security Live Demo

Back-end



- Developed in **Java**
- Uses multiple **controllers** to pass data to and from the database to the front-end

- Controllers:
 - Register controller
 - Authentication controller
 - Records controller



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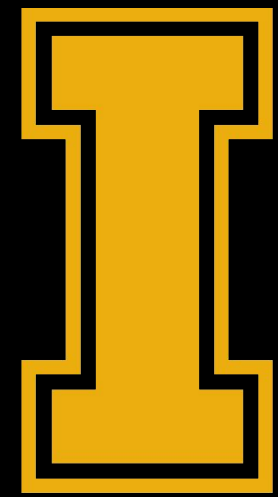


Application Live Demo

Conclusions and Recommendations



- With the implementation of a strong security layer, front-end interface, and back-end server, this project has successfully continued to develop Micron's speech therapy web application
- We recommend continuing work on this project by building off our new framework
- Possible features and fixes that could be added eventually:
 - Adding a meaningful audio parsing system that can provide feedback to patients
 - Expand upon the interface to make it appealing for the consumer market
 - Continue strengthening security to ensure COPPA and HIPAA compliance



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Thank You All!

Any Questions?