Architecture Diagram for our CoinFlip Game

Q: How does each piece communicate with the other pieces?

Q: What type of service architecture is this solution using?

Common Classifications for Application Layers:

1. Front-end Software

What defines "front-end"?

What are "front-end" bottlenecks?

What technologies are used for "front-end" development?

Is there "one" front-end?

2. Middleware Software

What defines "middleware"?

What are "middleware" bottlenecks?

What technologies are used for "middleware" development?

Is there one middleware?

How does the middleware interact with the frontend?

3. Backend Software

What defines "backend"?

What are "backend" bottlenecks?

What technologies are used for "backend" development?

Is there one backend?

How does the backend interact with the frontend?

Web APIs:

An Application Programming Interface (API) is used to describe the functionality of any software application. A "Web API" describes the functionality of software you access via a web interface.

There is NO standard way to write a Web API (yet).

However, we can look at "best in class" examples and find elements that should be included in every API:

1. Stripe API
   https://stripe.com/docs/api/

2. GitHub API
   https://docs.github.com/en/rest

3. National Weather Service (NWS)
   https://www.weather.gov/documentation/services-web-api

Common Features in Best in Class API design:

1.

2.

3.

4.

5.

Public Cloud vs. Private Cloud:

Different interfaces require different levels of access. Three terms are commonly used:

- Public Cloud:

- Private Cloud:

- Hybrid Cloud:

The EWS Services You Have

As being part of Grainger, Engineering IT (EngrIT) has provided you with several services:

- **Platform as Service:** linux.ews.illinois.edu
  - Fully functional linux service.
  - Log in with SSH or graphical interface.
  - Runs on the UIUC private cloud.
  - *Available for being in a Grianger course!*

- **Infrastructure as a Service:** Your CS 240 VM
  - Complete VM, identical to AWS EC2 IaaS
  - Just like AWS, you must start/stop the VM
    - *Difference: EngrIT auto-stops it for you every night if you're not actively using it, but you can start it back up when you're using it again.*
  - UIUC private cloud, *available just for CS 240!*

- **Software as Service:** queue.illinois.edu
  - Software to manage office hours queues.
  - Runs on the UIUC private cloud.

- **Software as Service:** PrairieLearn
  - Learning management system.
  - Runs on AWS (public cloud).