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).