**Final notes**

Container: use cases, docker files v.s LXC(Linux Containers), authentication, network, allocation, cgroups(Linux内核的一个功能，用来限制、控制与分离一个进程组的资源), LXC, use cases of containers and micro services, overall architecture(virtual machine, leverage), high availability, develop and operate

Microservices model, 12 factor apps (different components, why important), DNS, network performance, authentication and authorization, understanding how containers working in enterprise environment, infrastructure, kubernetes, name resolution, network performance

Encryption: symmetric and asymmetric, public key infrastructure, kerberos PKI (generally understanding), OWASP, OAUTH, JWT

**CIA**

Confidential

Integrity

Availability

**AAA**

Authentication

Access Control

Authorization

**JSON, OAUTH,**

What is JWT? What is OAuth2?

**JWT**(Json Web Token) is a token format. It is digitally-signed, self-contained, and compact. It provides a convenient mechanism for transferring data. JWT is not inherently secure, but the use of JWT can ensure the authenticity of the message so long as the signature is verified and the integrity of the payload can be guaranteed. JWT is often used for stateless authentication in simple use cases involving non-complex systems. For more information on JWT, please see https://lrblogs.wpengine.com/engineering/jwt/

**OAuth2** is an authorization protocol that builds upon the original OAuth protocol created in 2006, arising out of a need for authorization flows serving different kinds of applications from web and mobile apps to IoT. OAuth2 specifies the flows and standards under which authorization token exchanges should occur. OAuth2 does not encompass authentication, only authorization. For more information on OAuth2, please see <https://tools.ietf.org/html/rfc6749>

AWS **Multi-Factor Authentication (MFA)** is a simple best practice that adds an extra layer of protection on top of your user name and password

JSON, OAUTH, MFA(Multi-Factor Authentication), CIA, AAA, data vs. systems, security, OSI model, firewall, web application firewall (layer 7), data loss prevention, one-time password, single sign on, VPN no longer used in enterprise, but SSO or OAUTH. VPN vs. tokens, maybe one or two on compliance, sox hippa FedRAMP(general), anything in HW4 (super repeatable)

Configuration: terraform puppet, deployment automation, infra as a code, software automation (pros cons) relationship and how they are work

concurrency, go features,

Map reduce: how it works, what is map and reduce

Batch processing

Stream processing:

1. Use cases
   1. Production line monitoring
   2. Smart device applications
   3. Predictive ….

Data optimization

1. On disk
2. In transit, redundancy
3. WAN acceleration
4. Deduplication

Data serialization

1. YAML, JSON
2. gRPC

Focus on homework assignments, S3 – SQS

Data structures

1. cloudSQL vs. NoSQL: normalization, denormalization, how data is represented, dynamo db, RDS, how cloudSQL works, what might expand multiple regions/zones, what is single region or zone, ACID (compare with CAP)
2. normalization & denormalization: correlation relationship
3. queries, relational modeling
4. normalization: relational DB related
5. SQL vs NoSQL
6. streaming, batch, analytics, etl(general)

25% to 30% from midterm topics

Homework and repeated stuff

























