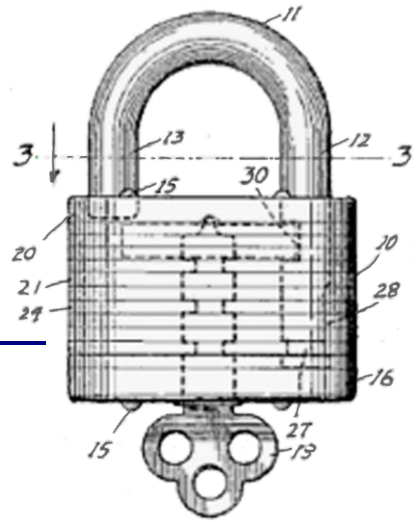
UCLA EXTENSION X.460.1

# AWS FINAL PROJECT

## SOLUTION TEMPLATE

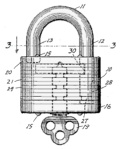



STUDENT NAME__LOUIS ATALLAH_____

*ADD PAGES AND SUPPLEMENT AS NEEDED*

# OBJECTIVES

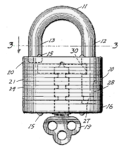
- Project Plan
  - Determine the region, VPCs, subnets, and Availability Zone requirements.
  - Document encryption and security details.
  - Design a plan for storage and backups.
  - Using what you learned in class, determine how to resolve the issues concerning the Web, App, and Database Tiers.
  - Use this document as your implementation plan.
  - Build the infrastructure in the lab based on this document.



# VPC Details

| VPC | Region | Purpose | Subnets | AZs |
|---|---|---|---|---|
| 1 | US East (Virginia) | Main | 2 | 1a |
| 2 | US East (Virginia) | Back up | 2 | 1b |

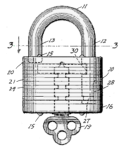
| Subnet Name | VPC | Subnet type (Public/private) | AZ |
|---|---|---|---|
| Private Subnet 1 | 1 | Private | 1a |
| Public Subnet 1 | 1 | Public | 1a |
| Private Subnet 2 | 2 | Private | 1b |
| Public Subnet 2 | 2 | Public | 1b |
| | | | |
| | | | |



# Security Details

| Security Group | SG Name | Rule | Source |
|---|---|---|---|
| ELB load balancer | Sg-ELB | From Web Tier | Web tier |
| Web Tier | Sg-Web | Accessible to anyone | 0.0.0.0/0 |
| App Tier | Sg-App | From Web Tier | ELB |
| Database Tier | Sg-DB | From App Tier | App Tier |

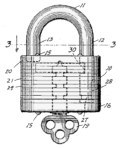
| Other Security Options | Justification |
|---|---|
| Web Tier (inbound) | Allowing traffic HTTP on port 80 |
| | |
| | |
| | |



# Encryption Options

- Based on the requirements, list your encryption options:

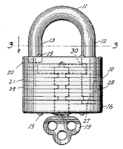
| Requirement | Solution |
| --- | --- |
| Encryption option for data at rest | S3 |
| Encryption option for data in transit | Via Internet Gateway, AWS KMS, CloudHSM |



# INSTANCE DETAILS

Describe the type, size, and justification for the instances you will use for each tier.

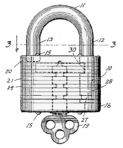
| Tier | AMI | Type | Size | Justification | # of instances |
|---|---|---|---|---|---|
| Web | Linux Enterprise Server 12 | R4.large | 15.25 GB | Same OS as the Web Tier on premise infrastructures. No | 1 |
| App | Linux Enterprise Server 12 | R5a.xlarge | 32 | Exactly the same configuration as the on-premise. No coding modifications needed. | 1 |
| DB | Linux Enterprise Server 12 | R4.2xlarge | 61 | Same as above. Same number of vCPUS and enough memeory | 1 |



# RPO Options

**Q.** How would you achieve a Recovery Point Objective (RPO) of four hours?

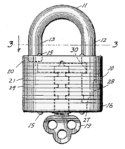
- 1. Define the recovery objectives (4 hours)
- 2. Backup and Restore clauses
- 3. Warm Standby
- 4. Test & Validate the procedure
- 5. Route the recovery plan to another Region.



# Document Storage

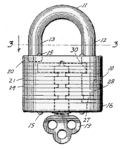
How would you design document storage based on the requirements?

| Storage/Archive Option | Detail |
| --- | --- |
| Main MySQL 5.6.22 DB in 1a AZ | Storage 5.5 TB. Read and write capacities |
| Replica MySQL 5.6.22 DB in 1b AZ | Storage 5.5 TB. Read only. To not overload the main DB with reading requests. |



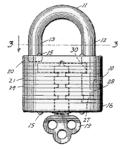
# Web Tier Requirements

| Requirement | Solution |
| --- | --- |
| Architecture must be flexible and handle any peak in traffic or performance. | Setting an Auto Scaling Group. |
| The overall acceptable incoming network bandwidth is between 300 Mbps and 750 Mbps. | CloudWatch metrics. |
| Application administrators want to be notified by email if there are more than 100 “400 HTTP errors” per minute in the application. | Implementing an AWS Lambda function with the SNS Service. |



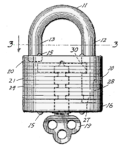
# App Tier Requirements

| Requirement | Solution |
| --- | --- |
| Architecture must be flexible and handle any peak in traffic or performance. | Auto scaling group. |
| Overall memory and CPU utilization should not go above 80% and 75% respectively or below 30% for either. | Setting CloudWatch metrics to scale out or scale in instances. |
| Internet access is required for patching and updates without exposing the servers. | Setting an Internet Gateway. |



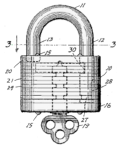
# Database Tier Requirements

| Requirement | Solution |
| --- | --- |
| Database needs consistent storage performance at 21,000 IOPS. | Amazon RDS Provisioned IOPS |
| High availability is a requirement. | ELB with two Azs. Smart traffic router between instances. |
| No change to the database schema can be made at this time. | Access not granted to any user. |



# ADDITIONAL SERVICES

- List any additional AWS services that you would use for your solution and why?
- Specifically note in this section any services (if any) that are part of your design, but will not be implemented in AWS due to ***qwiklabs*** or scope limitations.
- Added to all services mentioned in the template, I would suggest to use CloudFromation to unify the template and have the same test/production environment.
- CloudFront for the cache and fast access to static contents.
- CloudTrail for login and identification.
- S3 Buckets for storing and encryption at rest.
- Glacier for rarely requested files.



# COST CONSIDERATIONS

- Determine the following:
  - Type of instances and payment models
  - Number of instances
    - 3 Linux instances meeting the on-premise requirements
  - Estimated monthly cost for the solution (Optional)
- Provide a short description as to how the design is cost conscious
  - AWS is based on paying what you are using. If the number of instances increases, then the cost rises, and otherwise. Obviously, within the boundaries defined in the auto scaling groups.