

Team Optimizers – Wake n' Bake

Final Project Presentation

The slide features a central 3D block diagram representing a network structure or cloud computing system. The blocks are arranged in a grid-like pattern, with red arrows indicating connections between them. Several small windows or cards are attached to the blocks, displaying various images and text, such as 'References', 'Network Structure & Cloud Computing', and 'Optimizers'. To the right of the diagram, a team credit reads: 'By Mansi Jain, Piyush Saxena, Riddhi Chouhan, Swarna Dommeti, Vivek Dalal'. On the left, there is a placeholder icon for 'add logo here'. In the bottom left corner, the Prezi logo is visible.

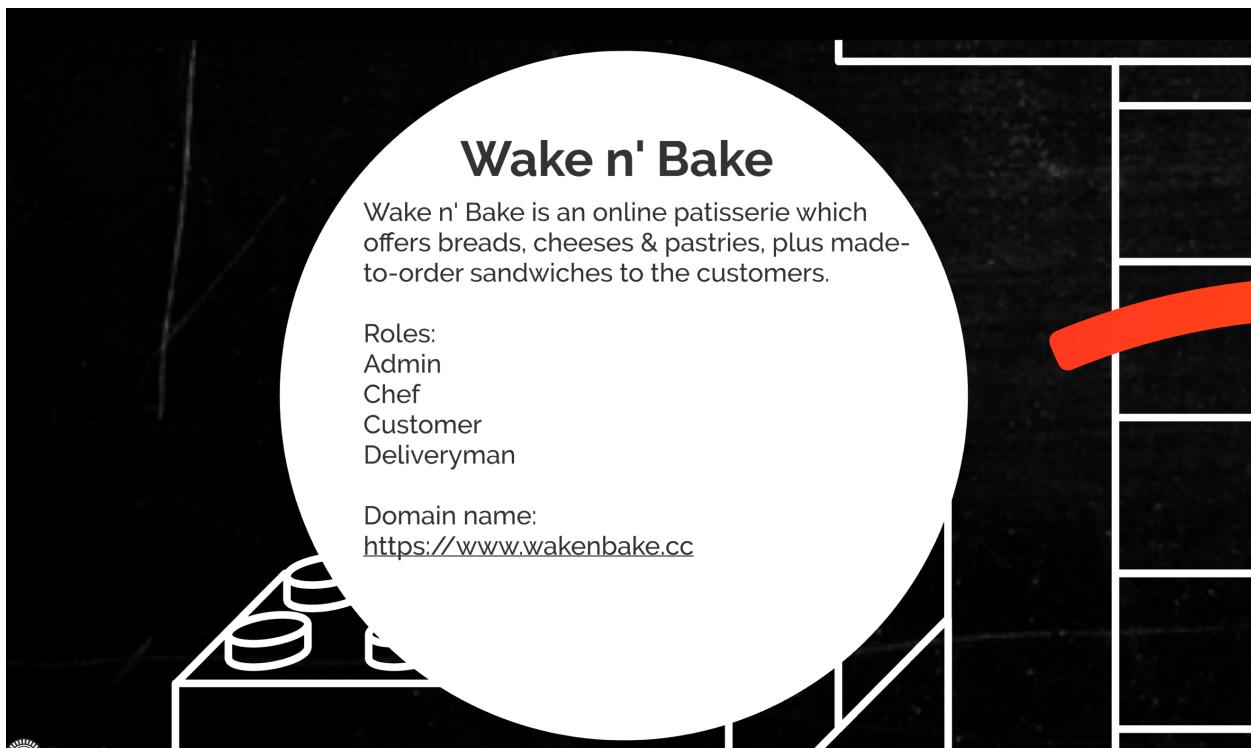
add logo here

Prezi

References

Network Structure & Cloud Computing
"Optimizers"

By
Mansi Jain
Piyush Saxena
Riddhi Chouhan
Swarna Dommeti
Vivek Dalal

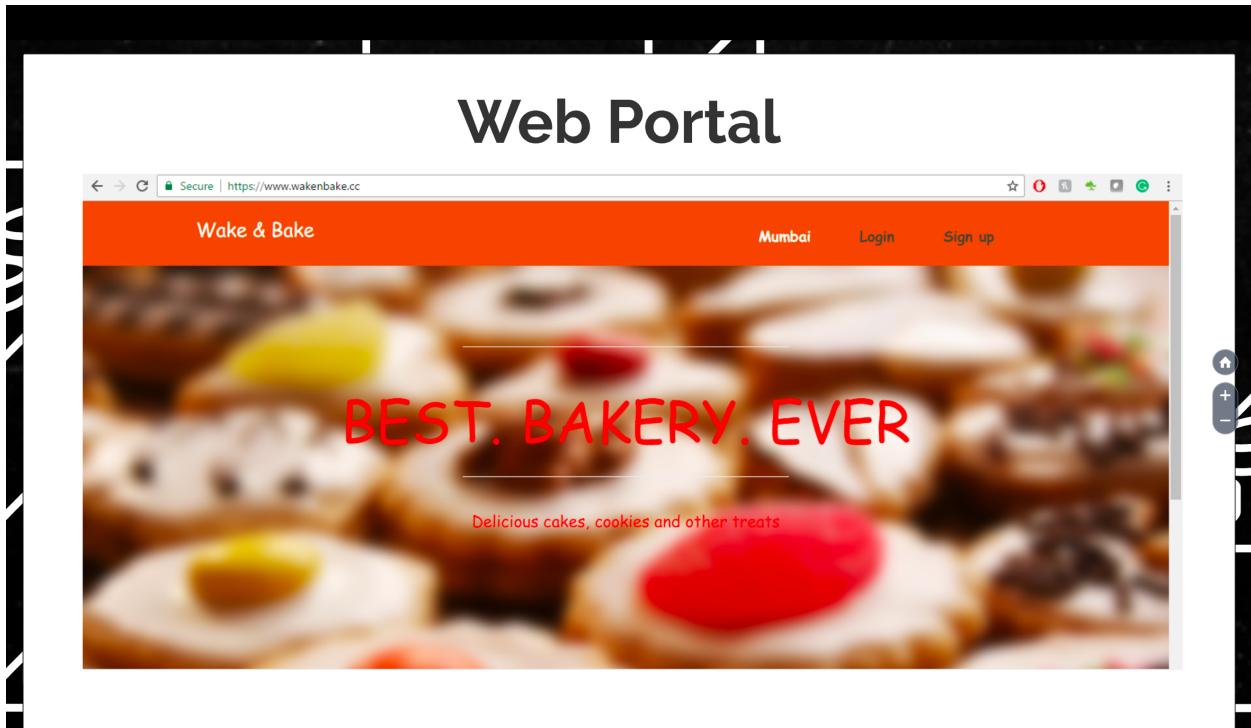


Roles:

Admin
Chef
Customer
Deliveryman

Domain name:

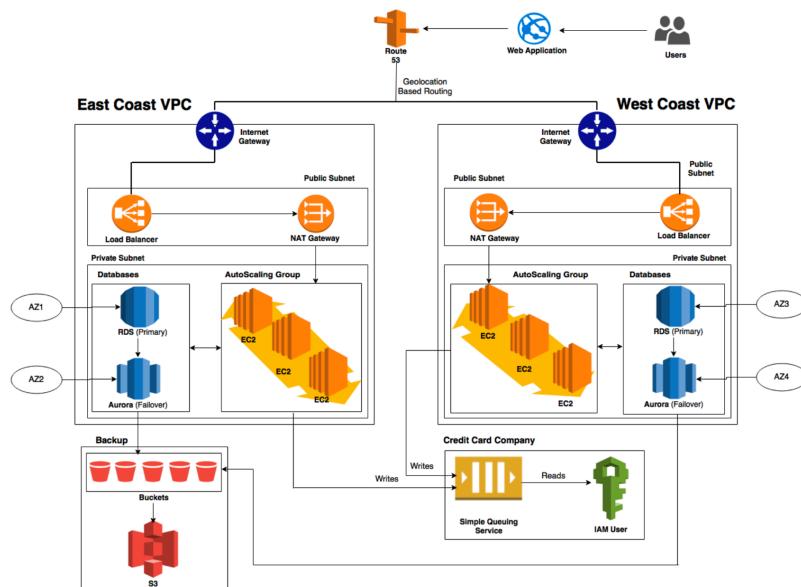
<https://www.wakenbake.cc>



Technology Stack

- Database
 - RDS
 - Aurora Replica
- Web Application
 - Spring
 - Hibernate
 - Spring Security
 - Maven
- Network and Content Delivery
 - Route 53
 - VPC
- Compute
 - Elastic Beanstalk
 - EC2
- Server
 - Apache Tomcat 7
- Cloud Watch
- Security, Identity and Compliance
 - Certificate Manager
 - IAM
- Messaging
 - Simple Queue Service

Architecture



Route 53

Geo-location routing policy which responds to DNS queries based on the location of the user that is, California, Boston, Mumbai and Canada

The screenshot shows the AWS Route 53 service dashboard. On the left, there's a navigation menu with options like Dashboard, Hosted zones, Health checks, Traffic flow, Traffic policies, Policy records, Domains, Registered domains, and Pending requests. The main area is titled "Record Set Name" and shows a list of records. One record is selected: "www.wakenbake.cc." with Type "A" and Value "ALIAS custom-env-2.qgdbsyuvv3.us-east-1.elasticb...". The "Routing Policy" dropdown is set to "Geolocation". Below the table, there's a note about Route 53 responding to queries based on the locations from which DNS queries originate, and a link to create a Default location resource record set.

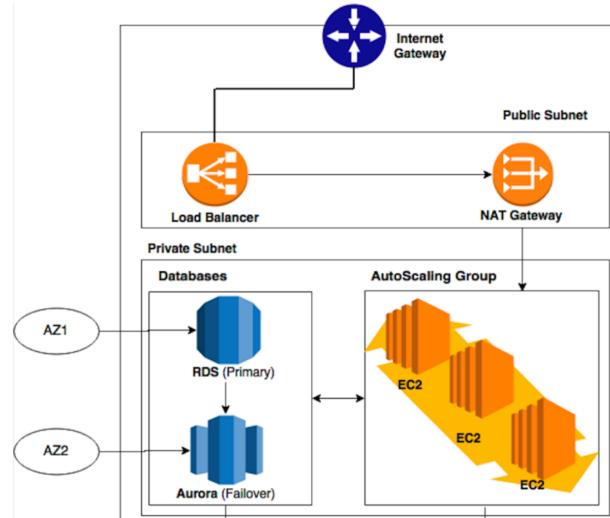
Virtual Private Cloud

Provides logical isolation from other virtual networks in AWS cloud

Our architecture consists of 2 VPC's

Every VPC consists of :

- Internet Gateway
- Public subnet
 - Load Balancer
 - NAT Gateway
- Private subnet
 - Database
 - Availability zone
 - RDS - zone 1
 - Aurora - zone 2
 - EC2 instances



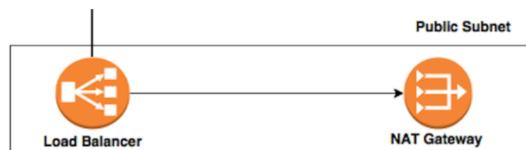
Public Subnet

Elastic Load Balancer

- Automatically distributes incoming application traffic across multiple Amazon EC2 instances
- Enables to achieve fault tolerance
- Created Classic Load Balancer with an HTTPS Listener
 - SSL certificate (Certificate Manager) is deployed on the load balancer to encrypt the communication from load balancer to instance.

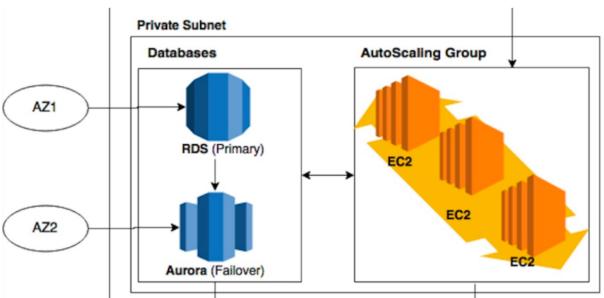
Network Address Translation (NAT) Gateway

- Enable instances in a private subnet to connect to the Internet or other AWS services, but prevent the Internet from initiating a connection with those instances



Prezi

Private Subnet



Elastic Bean Stalk

- Automatically handles the deployment, from capacity provisioning, load balancing, auto-scaling
- Retains full control over the AWS resources powering your application and access to the underlying resources at any time
- Database
 - RDS (MySQL)
 - Easy to set up, operate, and scale a relational database in the cloud
 - Provides cost-efficient and re-sizeable capacity managing time-consuming database administration tasks
 - Amazon Aurora
 - Amazon Aurora is a MySQL-compatible database engine providing high speed, availability and cost
 - Aurora Replicas are independent that can be distributed across the availability zones that a DB cluster spans within a region

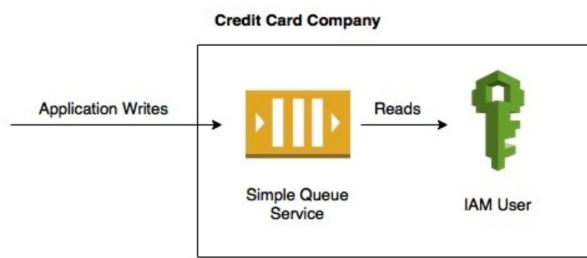
S3 Backup and Storage

- Amazon Simple Storage Service (Amazon S3) is object storage with a simple web service interface to store and retrieve any amount of data from anywhere on the web

The screenshot shows the Amazon S3 console interface. At the top, there are buttons for 'Create bucket', 'Delete bucket', and 'Empty bucket'. Below this, a search bar and a table showing '3 Buckets' and '3 Regions'. The table lists three buckets: 'elasticbeanstalk-us-east-1-688578843959' (Region US East (N. Virginia), Date created Feb 27, 2017 7:54:50 PM), 'elasticbeanstalk-us-west-1-688578843959' (Region US West (N. California), Date created Mar 21, 2017 6:13:15 PM), and 'rds-backup-walkbake' (Region US West (Oregon), Date created Apr 16, 2017 8:29:58 PM). The 'Management' tab is selected. On the right, a detailed view of the 'rds-backup-walkbake' bucket shows a list of objects starting with 'logBackup2017-04-17-01-33-35-F50D62E2EE3C415'. A diagram on the left illustrates the backup process, showing 'Backup' pointing to 'Buckets' (represented by five red containers), which then point to 'S3'.

Simple Queuing Services

- Fully-managed message queuing service for reliable communication among distributed software components and micro-services
- Simple and cost-effective to decouple and coordinate the components of a cloud application
- Improves scalability and reliability, and is best practice design for modern applications
- Created an IAM user - Credit Card Company
 - Used by third party credit card employee to view and process transaction
 - Access restricted to only SQS



Load Testing with JMeter

JMeter Test Plan Structure:

- Test Plan
 - Thread Group
 - HTTP Request
 - HTTP Cookie Manager
 - HTTP Header Manager
 - HTTP Cache Manager
 - View Results Tree
 - View Results in Table
 - View Results in Tree
 - View Assertion
 - View Data
 - View Transaction Results
 - View Cache Results Tree
 - View Thread Group
 - View Results Tree

Monitoring Dashboard:

Overview:

- Healthy Host Count: 2.8
- CPU Utilization: 48.2% (Red Alert)
- Average Latency: 145.7 ms
- Sum Requests: 5.8K
- Max Network In: 2MB
- Max Network Out: 4MB

Monitoring Metrics:

- Average Latency in seconds: Shows a sharp spike around 145ms.
- Sum Requests by count: Shows a peak of over 2000 requests at approximately 14:30.
- Max Network In in bytes: Shows a peak of over 1000MB at approximately 14:30.
- Max Network Out in bytes: Shows a peak of over 1000MB at approximately 14:30.
- CPU Utilization in percent: Shows a fluctuating trend with several spikes reaching up to 50%.

Pricing Policy

Monthly bill estimate:
Estimated cost per zone : \$52.86
Current cost across four zones : \$113.13

Service	Description	Total
Data Transfer	\$113.13	
Elastic Compute Cloud	\$56.11	
Key Management Service	\$0.00	
RDS Service	\$43.98	
Route 53	\$12.00	
Simple Notification Service	\$0.00	
Simple Queue Service	\$0.00	
Simple Storage Service	\$0.01	
CT to be collected	\$0.00	
GST to be collected	\$0.00	
US Sales Tax to be collected	\$0.00	
VAT to be collected	\$0.00	

Key Parameters

- Safety
 - Independent database per zone
 - SQS
 - Aurora replica per RDS
- Security
 - Spring security
 - SSL certificate
 - Virtual Private Cloud
- Cost
 - Used AWS free tier components
 - Estimated monthly cost of around \$52.86 per zone
- Performance
 - Route 53 Geo-location helps reduce latency
 - Auto scaling over a specific CPU utilization
 - Handles more than 10k hits per minute



Challenges

- Geo location traffic routing using Route 53
- Setting up VPC for both the zones (East and West)
- Handling security issues
- Designing a secured architecture

References

- [1] www.whatiscloud.com
- [2] <https://aws.amazon.com>
- [3] https://en.wikipedia.org/wiki/AWS_Elastic_Beanstalk
- [4] https://en.wikipedia.org/wiki/Cloud_computing
- [5] https://en.wikipedia.org/wiki/AWS_Elastic_Beanstalk

▼
Thank you!

