**CPSC 4910 Learning Documentation**

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Amazon ElasticLoadBalancing:

AWS documentation: <https://aws.amazon.com/elasticloadbalancing/>

The load balancer that is most applicable to this project is Amazon’s classic load balancer. Classic Load Balancer provides basic load balancing across multiple Amazon EC2 instances and operates at both the request level and connection level. Classic Load Balancer is intended for applications that were built within the EC2-Classic network. Amazon has two other types of load balancers, the Application Load Balancer and the Network Load Balancer, but these are used for projects much bigger than ours.

Benefits of ElasticLoadBalancing:

* Elasticity. Elastic Load Balancing is capable of handling rapid changes in network traffic patterns. Additionally, deep integration with Auto Scaling ensures sufficient application capacity to meet varying levels of application load without requiring manual intervention.
* Flexibility. Elastic Load Balancing also allows you to use IP addresses to route requests to application targets. This offers you flexibility in how you virtualize your application targets, allowing you to host more applications on the same instance. This also enables these applications to have individual security groups and use the same network port to further simplify inter-application communication in microservice-based architecture.
* Security. Elastic Load Balancing works with Amazon Virtual Private Cloud (VPC) to provide robust security features, including integrated certificate management, user-authentication, and SSL/TLS decryption. Together, they give you the flexibility to centrally manage TLS settings and offload CPU intensive workloads from your applications.

AWS Guide for setting up Classic Load Balancer: <https://docs.aws.amazon.com/elasticloadbalancing/latest/classic/elb-getting-started.html>

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Amazon CloudWatch:

AWS Documentation: <https://aws.amazon.com/cloudwatch/>

Amazon CloudWatch is a monitoring and observability service built for DevOps engineers, developers, site reliability engineers (SREs), and IT managers. CloudWatch provides you with data and actionable insights to monitor your applications, respond to system-wide performance changes, optimize resource utilization, and get a unified view of operational health. CloudWatch collects monitoring and operational data in the form of logs, metrics, and events, providing you with a unified view of AWS resources, applications, and services that run on AWS and on-premises servers. You can use CloudWatch to detect anomalous behavior in your environments, set alarms, visualize logs and metrics side by side, take automated actions, troubleshoot issues, and discover insights to keep your applications running smoothly.

Benefits of CloudWatch:

* Amazon CloudWatch enables you to set alarms and automate actions based on either predefined thresholds, or on machine learning algorithms that identify anomalous behavior in your metrics. For example, it can start Amazon EC2 Auto Scaling automatically, or stop an instance to reduce billing overages.
* Monitoring your AWS resources and applications is easy with CloudWatch. It natively integrates with more than 70 AWS services such as Amazon EC2, Amazon DynamoDB, Amazon S3, Amazon ECS, Amazon EKS, and AWS Lambda, and automatically publishes detailed 1-minute metrics and custom metrics with up to 1-second granularity so you can dive deep into your logs for additional context.
* To optimize performance and resource utilization, you need a unified operational view, real-time granular data, and historical reference. CloudWatch provides automatic dashboards, data with 1-second granularity, and up to 15 months of metrics storage and retention.

Static Alarm Setup Tutorial: <https://docs.aws.amazon.com/AmazonCloudWatch/latest/monitoring/ConsoleAlarms.html>

We can send Alarms to other pieces of software such as Slack if we setup and Connect an AWS Lambda function but for now I think it is best to just setup normal AWS alarms.

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Additional Amazon Services:

We are currently planning on using CloudWatch and ElasticLoadBalancing, but I wanted to do some more research to see if there were anymore that we could add or if there were some services that were more applicable.

* S3
* CloudFront
* VPC
* SNS

S3:

Amazon Simple Storage Service (Amazon S3) is an object storage service that offers industry-leading scalability, data availability, security, and performance. This means customers of all sizes and industries can use it to store and protect any amount of data for a range of use cases, such as websites, mobile applications, backup and restore, archive, enterprise applications, IoT devices, and big data analytics. Amazon S3 provides easy-to-use management features so you can organize your data and configure finely-tuned access controls to meet your specific business, organizational, and compliance requirements. Amazon S3 is designed for 99.999999999% (11 9's) of durability, and stores data for millions of applications for companies all around the world.

Implementation Guide: <https://aws.amazon.com/s3/getting-started/?trk=ps_a134p000006BgalAAC&trkCampaign=acq_paid_search_brand&sc_channel=ps&sc_campaign=acquisition_US&sc_publisher=google&sc_category=storage&sc_country=US&sc_geo=NAMER&sc_outcome=acq&sc_detail=amazon%20s3&sc_content=S3_e&sc_segment=432339156183&sc_medium=ACQ-P|PS-GO|Brand|Desktop|SU|Storage|Product|US|EN|Sitelink&s_kwcid=AL!4422!3!432339156183!e!!g!!amazon%20s3&ef_id=CjwKCAjw74b7BRA_EiwAF8yHFPWWFEpA7GXHdXGtCtW4oVqHI-fmqsJ_PC4DcmwyOxmAcoxVrpUIwhoCftUQAvD_BwE:G:s&s_kwcid=AL!4422!3!432339156183!e!!g!!amazon%20s3>

CloudFront:

Amazon CloudFront is a fast content delivery network (CDN) service that securely delivers data, videos, applications, and APIs to customers globally with low latency, high transfer speeds, all within a developer-friendly environment. CloudFront is integrated with AWS – both physical locations that are directly connected to the AWS global infrastructure, as well as other AWS services. CloudFront works seamlessly with services including AWS Shield for DDoS mitigation, Amazon S3, Elastic Load Balancing or Amazon EC2 as origins for your applications, and Lambda@Edge to run custom code closer to customers’ users and to customize the user experience. Lastly, if you use AWS origins such as Amazon S3, Amazon EC2 or Elastic Load Balancing, you don’t pay for any data transferred between these services and CloudFront.

Implementation Information: <https://aws.amazon.com/cloudfront/getting-started/S3/>

VPC:

Amazon Virtual Private Cloud (Amazon VPC) lets you provision a logically isolated section of the AWS Cloud where you can launch AWS resources in a virtual network that you define. You have complete control over your virtual networking environment, including selection of your own IP address range, creation of subnets, and configuration of route tables and network gateways. You can use both IPv4 and IPv6 in your VPC for secure and easy access to resources and applications.

Implementation Information: <https://docs.aws.amazon.com/vpc/latest/userguide/vpc-getting-started.html>

SNS:

Amazon Simple Notification Service (SNS) is a fully managed messaging service for both system-to-system and app-to-person (A2P) communication. It enables you to communicate between systems through publish/subscribe (pub/sub) patterns that enable messaging between decoupled microservice applications or to communicate directly to users via SMS, mobile push and email.

Implementation Information: <https://docs.aws.amazon.com/sns/latest/dg/sns-getting-started.html>