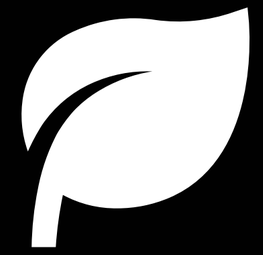
Tell us what you think

Cloud Foundations Session 03



Presented by Vansh Sood

SHIFTKEY LABS

SHIFTKEY LABS

From hackathons to the Startup Residency program, ShiftKey Labs makes sure students have the skills & support they need to pursue their most innovative ideas!

HIGHLIGHTS

NASA Space Apps Challenge

Global Game Jam

Generative AI Hackathon

Workshops & Talks

- REACT
- Blockchain
- Prototyping
- Startups
- Freelancing
- Cybersecurity

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info@shiftkeylabs.ca

About Me

- Third-year BCS, Researching in AI, TA at Dalhousie University
- Tech coordinator for Shiftkey Labs and Faculty of Health
- Freelancing for over 6 years
- Worked with 25+ startups and small businesses
- Helped startups raise over $100,000 in funding
- Founder of a 6 figure web and mobile development agency
- Building a food tech startup Bean
- AWS Solutions Architect
- Google Code-In Grand Prize Winner (Global Top 50)

Course Overview

NEXT LECTURE IS MARCH 4th 6pm Kenneth C Rowe 1014

Over these 4 weeks, you'll learn about cloud computing and AWS services.

By the end of the course, you'll have the knowledge needed for the AWS Cloud Practitioner certification.

You will get knowledge to practice AWS and I highly recommend giving the AWS Certification and get Reimbursed by ShiftKey

HEY DAL STUDENTS!

ShiftKey's Reimbursement Program can put MONEY BACK IN YOUR POCKET!

SCAN HERE

Questions? Email Or Denemark at Or@dal.ca or check our website for more

This program is only eligible for Dalhousie students

How is this going to help?

Development Skills

Learn the necessary tools and techniques in cloud, specifically focused on AWS.

Certification Completion

Walk away with a certificate you've completed from start to finish, demonstrating your ability to turn ideas into workable applications.

Career Boost

Reliable, practical skills, and a polished certificate to showcase to potential employers, will be a highlight on your resume.

What are you taking away from this?

Apart from the food? A whole lot of knowledge.

You can choose to just listen, or you can choose to actually work on an application that will teach you more than two development courses in university will.

Work on this for four days, and I guarantee you will have an amazing project with a whole lot of skills up your sleeve.

And even though I'm not a big fan of resumes, this will be an excellent addition to your resume.

Getting the Certificate

What is absolutely necessary?

- Join 3/4 sessions
- Go home and practice!!!
- Give the final exam (date to be announced)
    - Can be replaced with AWS CCP
- Submit 1 min video solution (mock interview)

What can be done?

- Use Cloud regularly
- Give AWS CCP / Other Foundational exams
- Have fun

What is the primary pricing benefit of using EC2 Spot Instances?

A) They allow unlimited scaling with a fixed hourly rate.
B) They offer significant cost savings by using spare AWS capacity.
C) They provide dedicated instances for high-security workloads.
D) They allow customers to reserve instances for predictable pricing.

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A) AWS Elastic Load Balancing
B) AWS Auto Scaling
C) Amazon Route 53
D) AWS CloudTrail

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B) Network Load Balancer (NLB)
C) Application Load Balancer (ALB)
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A company needs a managed relational database for an enterprise application with automatic failover and multi-AZ replication. Which AWS service should they choose?

A) Amazon DynamoDB
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D) Amazon S3

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A mobile app developer needs a highly available, serverless NoSQL database that scales automatically. Which AWS service should they use?

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Networking


I HAVE A PARTICULAR SET OF SKILLS...
NETWORK SECURITY, CLOUD SOLUTIONS, DATA RECOVERY, AND 24/7 MANAGED SERVICES

How to build a community on LinkedIn

jk

Networking on Cloud

Virtual Private Cloud

- Purpose: Provides a logically isolated network environment within AWS where resources can be deployed securely.
- A VPC allows you to define an IP address range and create subnets, route tables, and gateways for better control over network traffic.
- Supports both public and private subnets, ensuring security and accessibility.
- Enables customization with security groups and network ACLs to filter inbound and outbound traffic.
- No cost

VPC Components

Subnets

Divide the VPC into smaller sections for organizing resources.

Route Tables

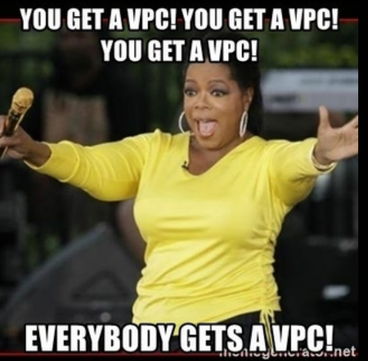
Define how traffic is directed within the VPC.

Security Groups

Act as virtual firewalls to control inbound and outbound traffic.

VPC Peering

Connect two VPCs to enable direct communication.



AWS Direct Connect

- Purpose: Establishes a dedicated, high-speed, low-latency network connection between on-premises data centers and AWS.
- Description:
  - Provides a private connection that bypasses the public internet, reducing network congestion and improving security.
  - Ideal for hybrid cloud setups where businesses need to integrate AWS with their on-premises infrastructure.
  - Available in multiple speeds and supports multiple VPCs through Direct Connect Gateway.
- Pricing: Charged based on port speed (1 Gbps - 100 Gbps) and data transfer out.

Amazon Route 53

- Purpose: A highly scalable Domain Name System (DNS) service that helps route end-user requests to AWS resources efficiently.
- Description:
  - Supports domain registration, DNS resolution, and health checks for high availability.
  - Enables routing policies like latency-based, geolocation, and failover routing for traffic optimization.
  - Integrated with AWS services such as S3 and CloudFront for seamless content delivery.
- Pricing: Charges for domain registration, DNS queries, and health checks.

AWS Transit Gateway

- Purpose: Simplifies network management by enabling communication between multiple VPCs and on-premises networks using a central hub.
- Description:
  - Reduces complexity by eliminating the need for multiple VPN connections between VPCs.
  - Provides scalable, high-performance connectivity for large enterprises with multiple AWS accounts and VPCs.
  - Can integrate with Direct Connect and Site-to-Site VPN for hybrid cloud networking.

Elastic Load Balancing (ELB)

Purpose: Distributes incoming traffic across multiple resources to ensure high availability and reliability.

Use Cases:

- High Availability: Distribute traffic to EC2 instances across multiple AZs for fault tolerance.
- Microservices: Route traffic to specific containers or services.
- SSL Termination: Handle SSL/TLS encryption and decryption for secure communication.

Pricing:

- Charged by the number of hours the load balancer is running and the amount of data processed.

ELB Types

Application Load Balancer (ALB)

Best for HTTP/HTTPS traffic, with routing based on content.

Network Load Balancer (NLB)

Best for handling high-throughput and low-latency traffic at the network layer.

Classic Load Balancer (CLB)

Older version; best for simple web applications.

AWS PrivateLink

- Purpose: Securely connects AWS services and applications across different VPCs without exposing traffic to the public internet.
- Description:
  - Uses VPC endpoints to allow private communication between AWS services.
  - Reduces attack surfaces by keeping traffic within AWS's internal network.
  - Commonly used for connecting to services like Amazon S3, DynamoDB, and third-party SaaS providers.

AWS Global Accelerator

- Purpose: Enhances global application performance by directing traffic to the optimal AWS endpoint.
- Description:
  - Uses AWS’s global network to route requests based on health, geography, and performance metrics.
  - Reduces latency by automatically rerouting traffic away from unhealthy or slow regions.
  - Works well for latency-sensitive applications such as gaming, media streaming, and financial transactions.

AWS VPN

- Purpose: Provides secure connections between on-premises networks and AWS VPCs over the internet.
- Description:
  - Offers two types of VPNs:
    - Site-to-Site VPN – Connects an entire on-premises network to AWS.
    - Client VPN – Enables individual users to securely access AWS resources remotely.
  - Supports encryption protocols like IPsec for secure data transfer.
  - Often used for hybrid cloud setups and remote workforce access.

AWS CloudFront

- Purpose: A content delivery network (CDN) that speeds up the distribution of static and dynamic web content.
- Description:
  - Caches content at edge locations worldwide to reduce latency and improve performance.
  - Integrates with AWS Shield and AWS WAF for DDoS protection and security.
  - Commonly used for websites, APIs, and video streaming services.

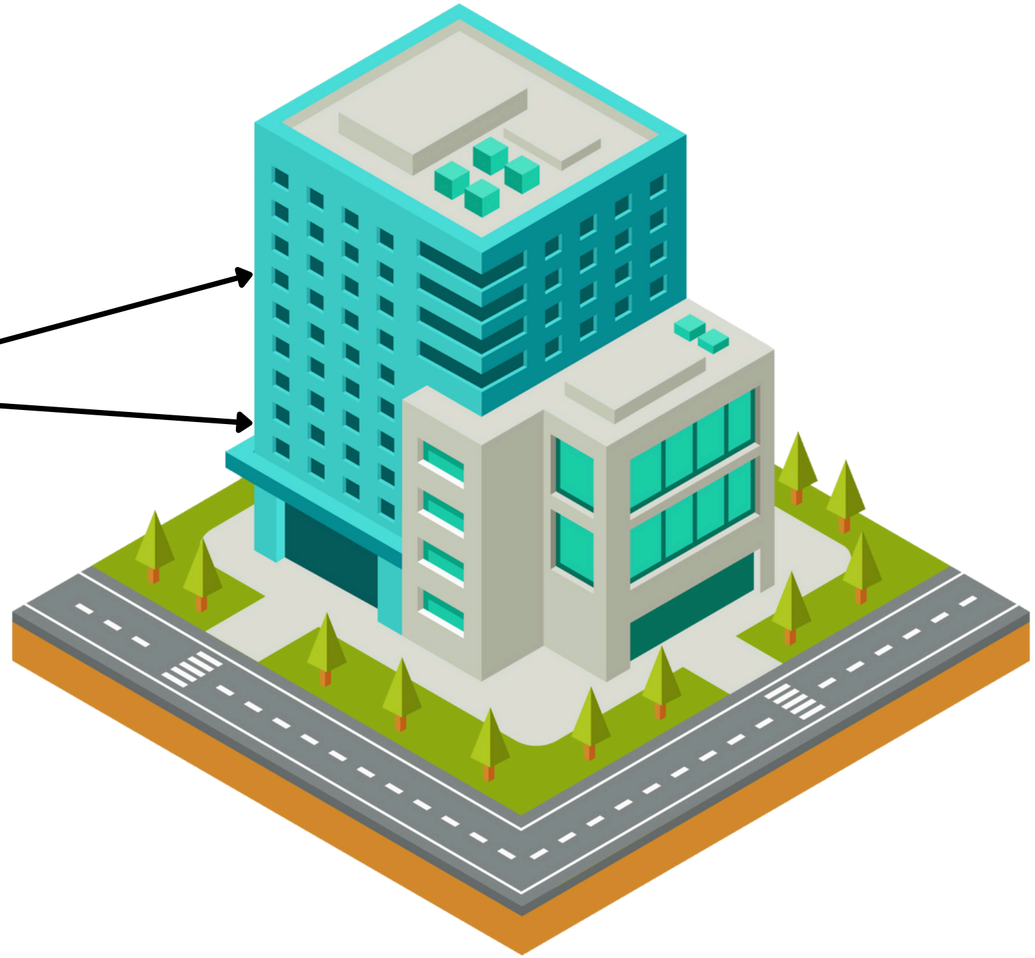
AWS App Mesh

- Purpose: A service mesh that manages communication between microservices for better observability and security.
- Description:
  - Provides traffic routing, retries, and security policies for distributed applications.
  - Integrates with AWS Fargate, EC2, and Kubernetes to simplify service-to-service communication.
  - Enhances monitoring by collecting metrics and logs for debugging and optimization.

VPC

VPC

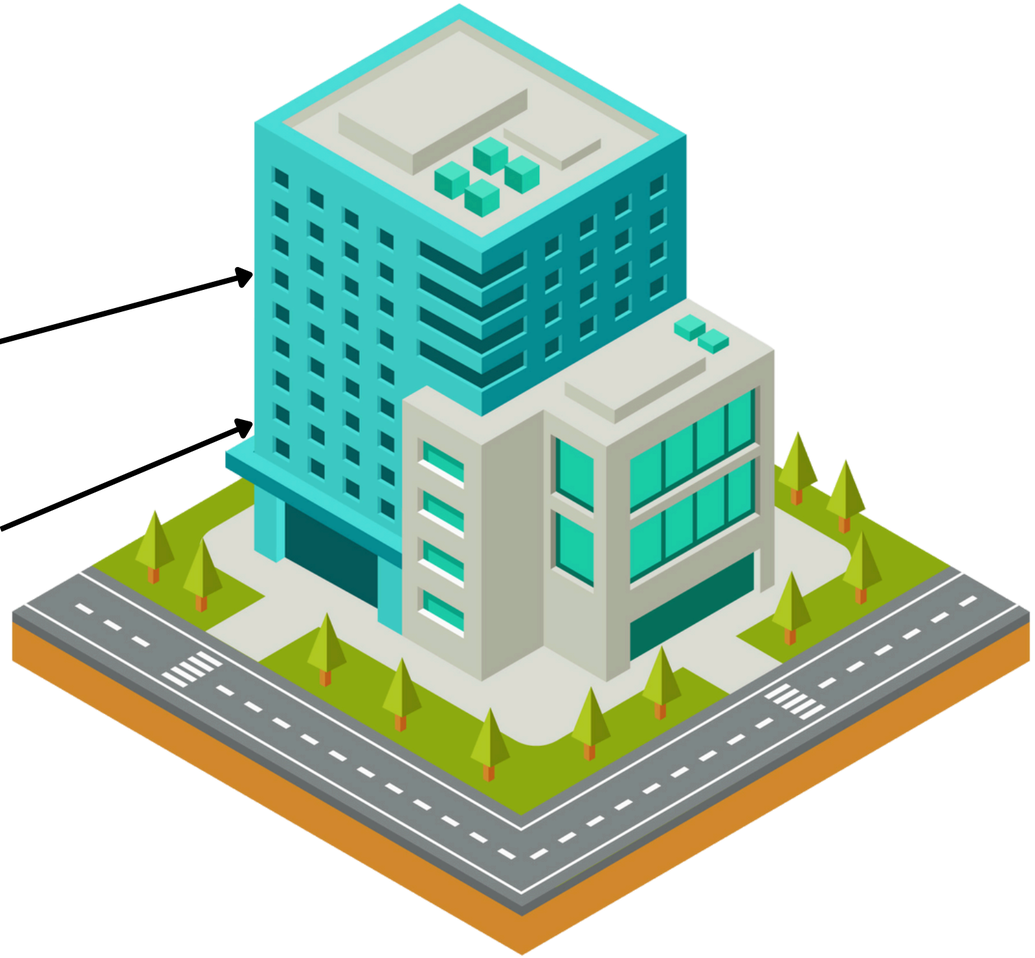
Subnets



VPC

Private Subnets

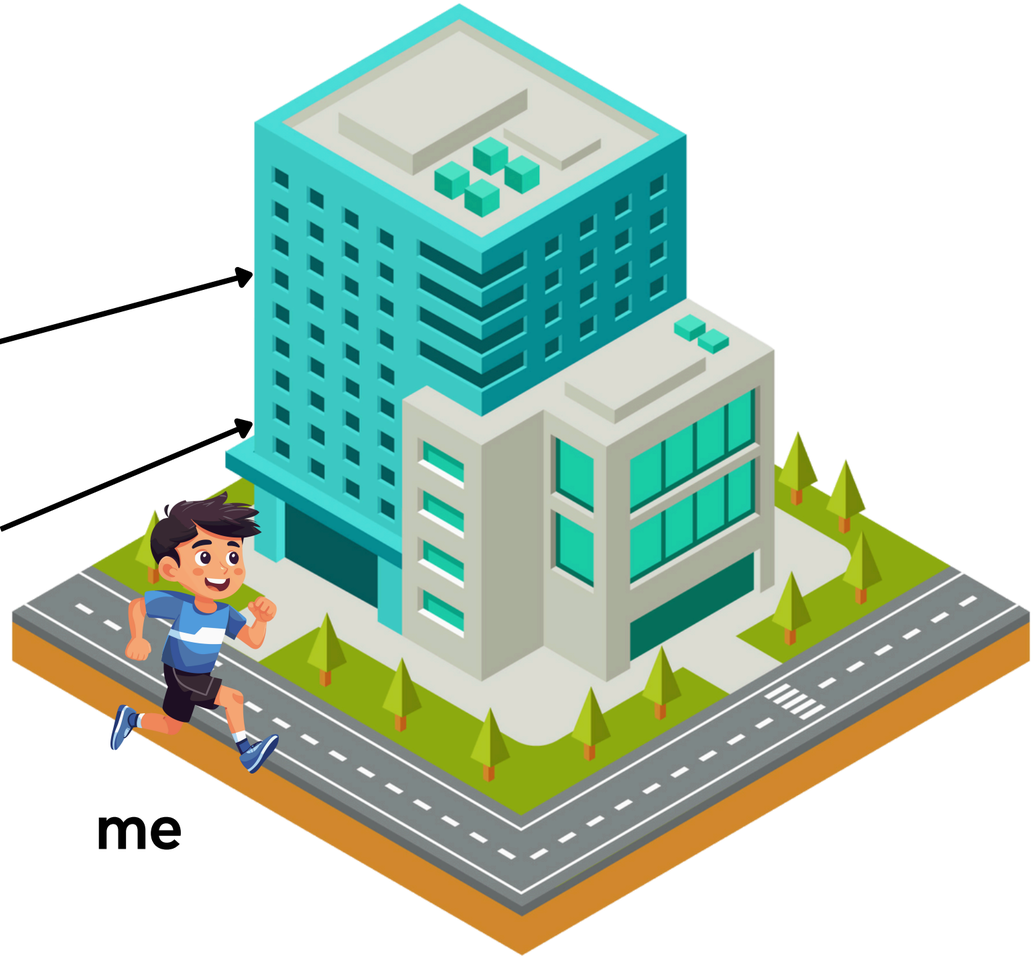
Public Subnet



VPC

Private Subnets

Public Subnet

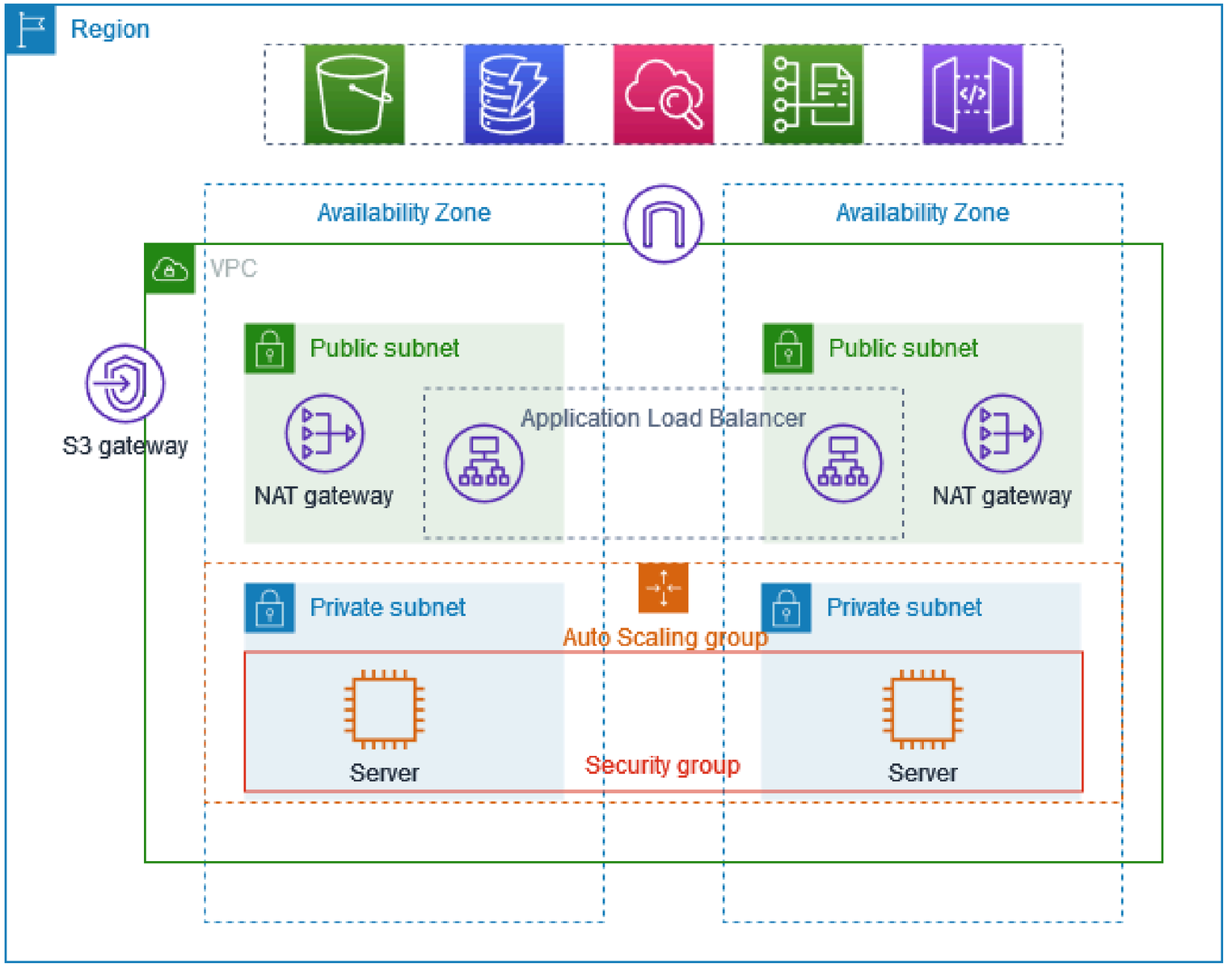


me

Network ACL

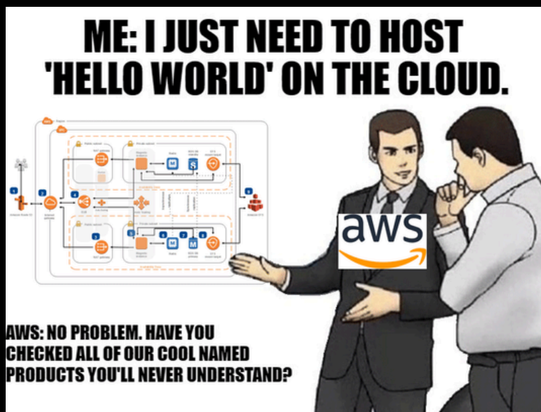
VPC

- AWS VPC is your office building.
- Subnets are floors inside the building.
- Internet Gateway is the main entrance.
- NAT Gateway is a special employee-only exit.
- Route tables guide network traffic.
- Security groups act as keycards for access.
- Network ACLs function as security guards on each floor.
- VPC Peering is a private walkway between buildings.
- VPN/Direct Connect is a private highway to another office.



https://docs.aws.amazon.com/vpc/latest/userguide/vpc-example-private-subnets-nat.html

Questions?


ME: I JUST NEED TO HOST
'HELLO WORLD' ON THE CLOUD.
aws
AWS: NO PROBLEM. HAVE YOU
CHECKED ALL OF OUR COOL NAMED
PRODUCTS YOU'LL NEVER UNDERSTAND?

Security

Security Groups

- Purpose: Controls inbound and outbound traffic at the instance level.
- Description:
  - Acts as a stateful firewall, allowing or denying traffic based on rules.
  - Default behavior: Denies all inbound traffic and allows all outbound traffic.
  - Works at the instance level, meaning each EC2 instance can have its own security group.
- Benefits:
  - Enhances security by only allowing necessary traffic.
  - Flexible configuration for different applications and environments.

Network ACLs (Access Control Lists)

- Purpose: Controls traffic at the subnet level.
- Description:
  - Acts as a stateless firewall, meaning return traffic must be explicitly allowed.
  - Default behavior: Allows all inbound and outbound traffic unless rules are modified.
  - Applied at the subnet level, affecting all resources within that subnet.
- Benefits:
  - Adds an extra layer of security to protect against unauthorized access.
  - Useful for logging and monitoring suspicious network traffic.

AWS WAF (Web Application Firewall)

- Purpose: Protects web applications from common threats like SQL injection and cross-site scripting (XSS).
- Description:
  - Uses rule-based filtering to block, allow, or monitor web traffic.
  - Can be integrated with CloudFront, ALB, and API Gateway.
- Benefits:
  - Shields against OWASP Top 10 vulnerabilities.
  - Provides real-time monitoring and automatic updates.

AWS Shield

- Purpose: Protects AWS resources from DDoS (Distributed Denial of Service) attacks.
- Description:
  - AWS Shield Standard: Automatically protects all AWS customers against common DDoS attacks.
  - AWS Shield Advanced: Offers enhanced monitoring, cost protection, and rapid response support.
- Benefits:
  - Reduces downtime from DDoS attacks.
  - Integrates with Route 53, ELB, and CloudFront for better protection.

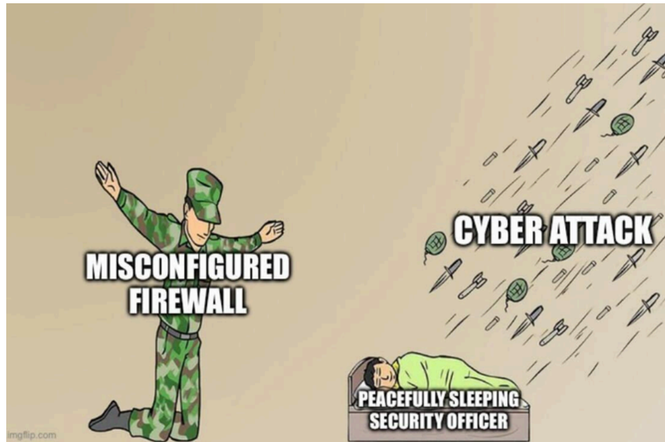
AWS IAM (Identity and Access Management)

- Purpose: Manages user access and permissions in AWS.
- Description:
  - Uses policies to define what actions users/services can perform.
  - Supports MFA (Multi-Factor Authentication) for extra security.
- Benefits:
  - Helps enforce least privilege access.
  - Centralized user management for security compliance.

AWS Trusted Advisor

- Purpose: Provides recommendations to improve security, cost efficiency, and performance.
- Description:
  - Analyzes AWS resources for misconfigurations and best practices.
  - Includes Security Checks like exposed ports, root account usage, and IAM role policies.
- Benefits:
  - Improves security posture with actionable insights.
  - Reduces costs and performance bottlenecks.

Questions


MISCONFIGURED FIREWALL
CYBER ATTACK
PEACEFULLY SLEEPING SECURITY OFFICER
imgflip.com

Lets play

Thank you

Reach out to me:
https://www.linkedin.com/in/vanshsood/