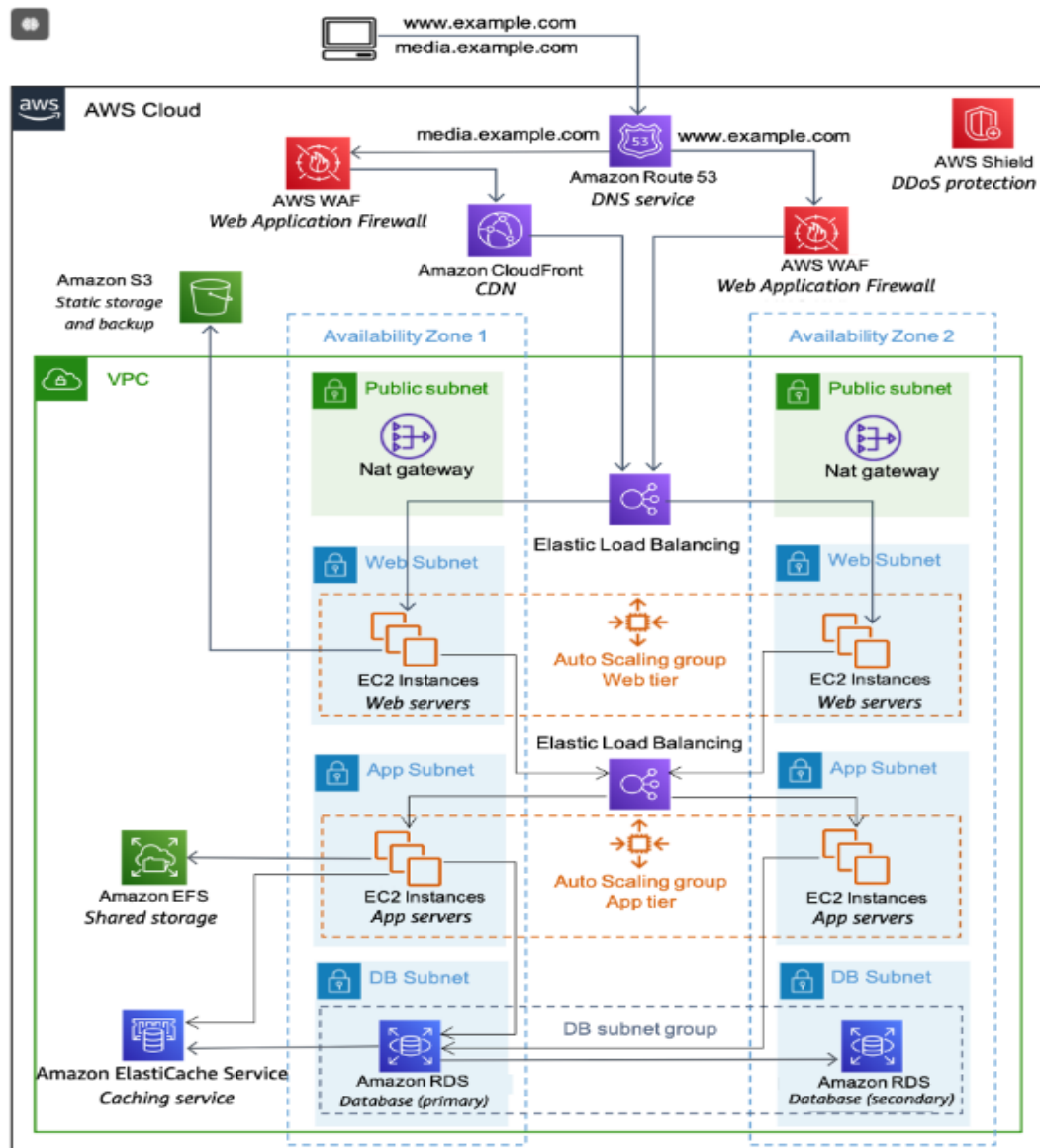# Complete Guide to AWS Services: Real-time Examples from Flipkart & Instagram

AWS offers a broad set of services that can help businesses scale quickly, improve security, and manage massive workloads. In this post, we explore key AWS services with real-time examples from **Flipkart** and **Instagram**.

This diagram shows a basic AWS architecture for reference. It illustrates some key services but doesn't include all mentioned in the notes.

Compute Services

1. **Amazon EC2 (Elastic Compute Cloud)**

- **What it is**: Virtual servers in the cloud that allow you to run applications. You can choose from different configurations based on your compute requirements (CPU, memory, storage, etc.).
- **Example**: Flipkart uses EC2 instances to handle thousands of concurrent shopping sessions, process orders, and manage inventory. During events like the "Big Billion Days" sale, the EC2 instances auto-scale to handle traffic spikes.
- **Key Features**:
  - Auto-scaling
  - Customizable instances
  - Pay-as-you-go
  - Elastic IP for static public IP addresses.

2. **Amazon ECS (Elastic Container Service)**
   - **What it is**: A fully managed container orchestration service for Docker containers.
   - **Example**: Instagram could use ECS to manage microservices for image storage, processing, and delivery to millions of users. Different containers can manage tasks like feed generation, messaging, and notifications.
   - **Key Features**:
     - Integration with AWS Fargate (serverless containers)
     - Scalable container orchestration.

3. **Amazon ECR (Elastic Container Registry)**
   - **What it is**: A fully managed Docker container registry to store, manage, and deploy container images.
   - **Example**: Flipkart can use ECR to store Docker images for different microservices like catalog search, payment gateway integration, and recommendation engines.
   - **Key Features**:
     - Secure image storage
     - Integration with ECS and EKS.

4. **Amazon EKS (Elastic Kubernetes Service)**
   - **What it is**: A fully managed Kubernetes service to run Kubernetes applications at scale.
   - **Example**: Instagram could use EKS for deploying and scaling its Kubernetes workloads like managing stories, direct messages, and live streaming.
   - **Key Features**:
     - Managed Kubernetes control plane
     - Seamless integration with other AWS services.

5. **AWS Lambda**
   - **What it is**: A serverless compute service where you can run code without provisioning or managing servers.
   - **Example**: Flipkart might use Lambda to trigger events when a user adds an item to their cart or make real-time recommendations based on browsing history.
   - **Key Features**:
     - Event-driven architecture
     - Pay only for compute time
     - Automatic scaling.
6. **Amazon API Gateway**
   - **What it is**: A fully managed service for developers to create, publish, and monitor APIs.
   - **Example**: Instagram uses API Gateway to manage its public APIs for developers and to connect different services within its platform for functionalities like authentication and user feed delivery.
   - **Key Features**:
     - Scalable API management
     - Supports WebSocket APIs for real-time communication.

Storage Services

7. **Amazon S3 (Simple Storage Service)**
   - **What it is**: Object storage service that can store unlimited amounts of data.
   - **Example**: Instagram uses S3 to store user-uploaded photos and videos, ensuring that files are stored securely and accessed globally.
   - **Key Features**:
     - Highly durable (11 nines of durability)
     - Lifecycle management (archive to Glacier)
     - Static website hosting.
8. **Amazon EFS (Elastic File System)**
   - **What it is**: A scalable file storage service for use with EC2 instances.
   - **Example**: Flipkart might use EFS to share file data across multiple instances for things like product images or transactional logs.
   - **Key Features**:
     - Scalable file system
     - Accessible across multiple instances.
9. **Amazon EBS (Elastic Block Store)**

- **What it is**: Block storage designed for use with EC2 instances for data that needs to be accessed quickly.
- **Example**: Flipkart uses EBS to store databases and application data that require low-latency access.
- **Key Features**:
  - Highly available and durable
  - Snapshots for backups.

Database Services

10. **Amazon RDS (Relational Database Service)**
    - **What it is**: A managed relational database service that supports MySQL, PostgreSQL, Oracle, and more.
    - **Example**: Flipkart uses RDS to store its vast catalog of products, users, and transactions in a structured relational database format.
    - **Key Features**:
      - Automated backups
      - Multi-AZ deployments for high availability.
11. **Amazon DynamoDB**
    - **What it is**: A fully managed NoSQL database service designed for low-latency and high throughput.
    - **Example**: Instagram might use DynamoDB to store user session data, feed content, and follower lists since it's optimized for fast, flexible storage.
    - **Key Features**:
      - Fully managed, serverless
      - Global tables for multi-region replication.

Networking & Content Delivery

12. **Amazon VPC (Virtual Private Cloud)**
    - **What it is**: Allows you to create isolated networks within AWS and define IP ranges, subnets, route tables, and gateways.
    - **Example**: Flipkart uses VPCs to create secure, isolated environments for its applications, databases, and services.
    - **Key Features**:
      - Network isolation
      - VPN and Direct Connect support.

13. **Subnet**
    - **What it is**: Subdivisions of a VPC, used to divide and organize networks.
    - **Example**: Flipkart might use public subnets for its web servers and private subnets for databases and backend services.
    - **Key Features**:
        - Public and private subnets for organizing resources.
14. **NAT Gateway**
    - **What it is**: Allows instances in a private subnet to connect to the internet while preventing inbound traffic.
    - **Example**: Flipkart uses a NAT Gateway to provide internet access for backend services running in private subnets.
    - **Key Features**:
        - Secure outbound internet access for private instances.
15. **Internet Gateway**
    - **What it is**: A VPC component that allows communication between instances in your VPC and the internet.
    - **Example**: Flipkart uses Internet Gateway to connect its web applications to the internet.
    - **Key Features**:
        - Provides internet access to instances in public subnets.
16. **Route Tables**
    - **What it is**: Rules that determine the path network traffic will take in your VPC.
    - **Example**: Flipkart defines route tables to manage traffic between public and private subnets and to direct traffic through a NAT Gateway.
    - **Key Features**:
        - Manage routing between subnets, gateways, and instances.
17. **Amazon Route 53**
    - **What it is**: A highly available and scalable DNS web service.
    - **Example**: Instagram uses Route 53 to manage its global DNS and direct users to the nearest server for the lowest latency.
    - **Key Features**:
        - Global DNS management
        - Health checking and routing policy.

Security & Identity

18. **AWS IAM (Identity and Access Management)**
    - **What it is**: Allows you to control access to AWS resources securely.

- **Example**: Flipkart uses IAM to define user roles, giving developers and operations teams controlled access to the AWS environment.
- **Key Features**:
  - Fine-grained access control
  - Multi-factor authentication.

19. **AWS KMS (Key Management Service)**
- **What it is**: A service that lets you create and manage cryptographic keys for securing data.
- **Example**: Flipkart uses KMS to encrypt sensitive customer information like credit card details.
- **Key Features**:
  - Centralized key management
  - Integration with AWS services for encryption.

20. **AWS WAF (Web Application Firewall)**
- **What it is**: Protects your web applications from common exploits.
- **Example**: Flipkart employs WAF to safeguard its website from DDoS attacks, SQL injection, and other common threats.
- **Key Features**:
  - Protection against common web exploits.

21. **AWS Secrets Manager**
- **What it is**: A service that helps manage and retrieve database credentials, API keys, and other secrets securely.
- **Example**: Flipkart stores its database credentials and API keys in Secrets Manager, ensuring that they are securely rotated and retrieved during runtime.
- **Key Features**:
  - Automated secret rotation
  - Centralized secrets management.

DevOps Services

22. **AWS CodeCommit**
- **What it is**: A source control service to store Git repositories.
- **Example**: Flipkart developers use CodeCommit to store and version control their code for microservices and applications.
- **Key Features**:
  - Fully managed, scalable Git repository.

23. **AWS CodeBuild**

- **What it is**: A fully managed build service that compiles source code, runs tests, and produces software packages.
- **Example**: Flipkart uses CodeBuild to automate building and testing of its applications after each code commit.
- **Key Features**:
  - Automated build process
  - Scalable build infrastructure.

24. AWS CodeDeploy
- **What it is**: Automates code deployments to EC2 instances, Lambda functions, or on-premise servers.
- **Example**: Flipkart uses CodeDeploy to automatically roll out application updates to production EC2 instances with zero downtime.
- **Key Features**:
  - Automated, seamless deployments.

25. AWS CodePipeline
- **What it is**: A CI/CD service to automate application release processes.
- **Example**: Flipkart uses CodePipeline to automate its entire release process, from code changes to deployment, ensuring fast and reliable software delivery.
- **Key Features**:
  - Fully automated CI/CD pipeline
  - Integration with other AWS services.

Monitoring & Logging

26. Amazon CloudWatch
- **What it is**: A monitoring service for collecting and tracking metrics, logs, and events from AWS resources and applications.
- **Example**: Flipkart uses CloudWatch to monitor its application performance, generate real-time alerts on errors, and create dashboards to track important metrics like order volumes.
- **Key Features**:
  - Real-time monitoring and alerting
  - Log collection and analysis.

27. AWS CloudTrail
- **What it is**: A service that provides governance, compliance, and operational auditing for AWS accounts.
- **Example**: Flipkart uses CloudTrail to audit all API calls and track changes across its AWS resources for security and compliance purposes.

- **Key Features**:
  - Tracks all API activity
  - Detailed logs for auditing and compliance.

Additional Services

28. **Cloudflare (3rd Party)**
    - **What it is**: A web performance and security company that provides content delivery network (CDN) and DDoS protection.
    - **Example**: Flipkart uses Cloudflare to cache content close to users and protect against DDoS attacks to ensure their platform remains fast and secure globally.
    - **Key Features**:
      - Global CDN
      - Security protection against DDoS and malicious attacks.

Conclusion

Using AWS services like **EC2, Lambda, S3, DynamoDB**, and others enables companies like **Flipkart** and **Instagram** to scale massively, handle complex workloads, and provide a seamless experience for millions of users. These services allow them to quickly adapt to traffic surges, manage data efficiently, and ensure security and uptime.