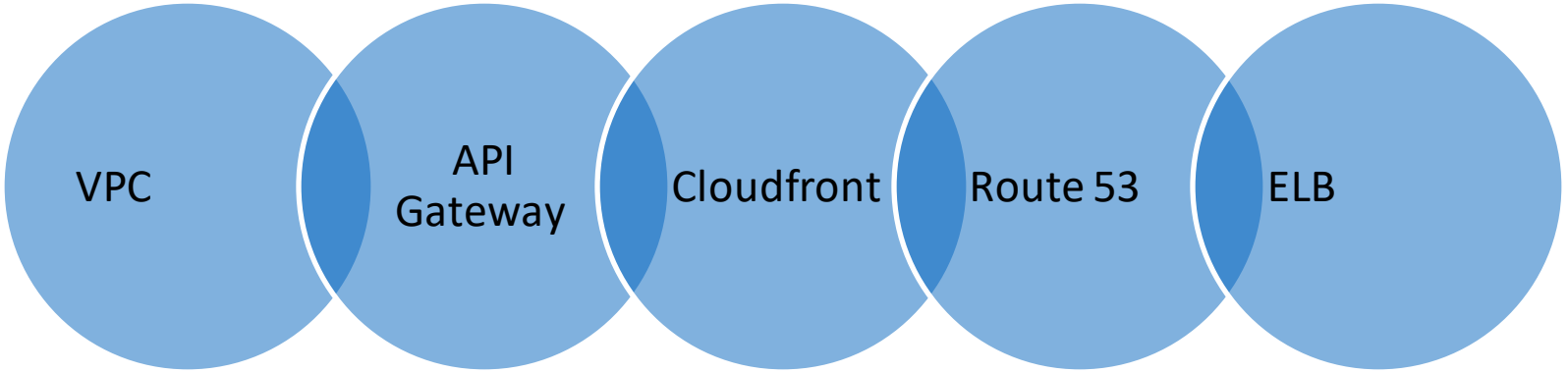
Amazon Web Services

By Shreyal Shah

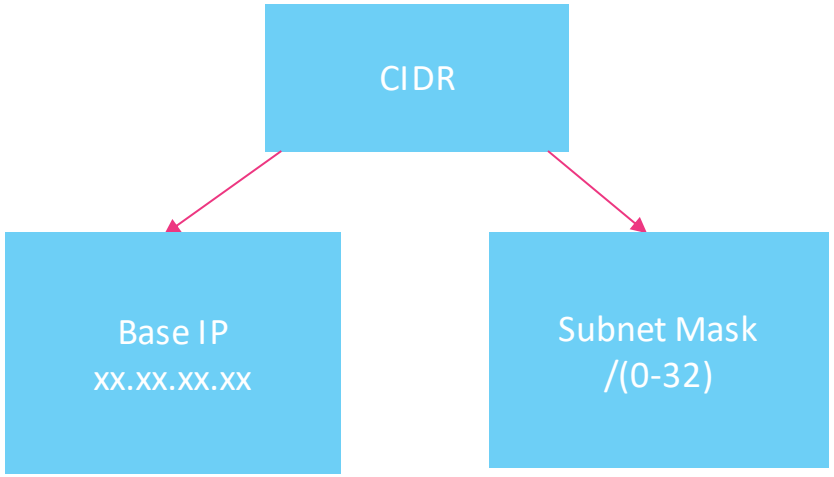
- **Day 2: Networking and Content Delivery**



What is **VPC**?

- Isolating a section of AWS for your use
- Complete control over virtual networking
- IP range
- Define your own subnets
- Define which subnets are private and which are public
- Multiple layers of security
- Network ACL (Firewall for Subnet)
- Security groups (Firewall for instance)
- Hardware VPN to connect to Corporate Datacenter
- Direct Connect service to provide reliable, dedicated, direct connectivity between your Datacenter and your
- AWS VPC

CIDR

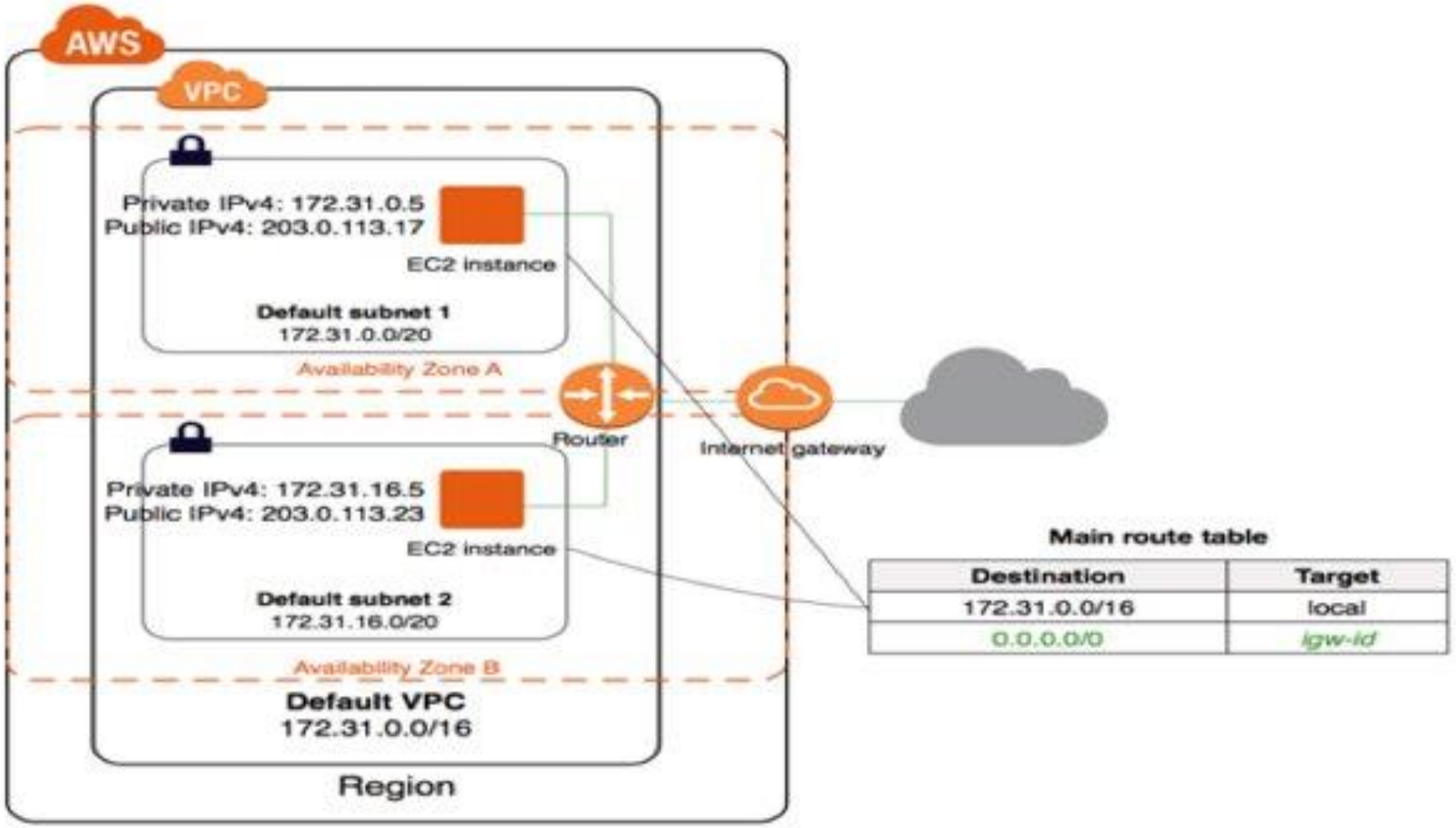


- CIDR: Classless Inter Domain Routing
- Helps define an IP Address Range
- 192.168.0.0/26 allows 64 IP addresses
- https://www.ipaddressguide.com/cidr

- /32 ->2^0
- /31 ->2^1
- /30->2^2
- And so on…

Subnet

- Amazon VPC- Networking layer for Amazon Elastic Compute Cloud (Amazon EC2),and it allows you to build your own virtual network within AWS.
- Subnet - A range of IP address in your VPC
- Subnets can be Private or Public
- https://docs.aws.amazon.com/vpc/latest/userguide/VPC_Scenario2.html


AWS
VPC
Private IPv4: 172.31.0.5
Public IPv4: 203.0.113.17
EC2 instance
Default subnet 1
172.31.0.0/20
Availability Zone A
Router
Internet gateway
Private IPv4: 172.31.16.5
Public IPv4: 203.0.113.23
EC2 instance
Default subnet 2
172.31.16.0/20
Availability Zone B
Default VPC
172.31.0.0/16
Region
Main route table
Destination
Target
172.31.0.0/16
local
0.0.0.0/0
igw-id

API Gateway

- **Interfaces**
  - CLI – command line interface
  - GUI – graphical user interface
  - WUI – Web user interface
  - API – application programming interface
- API is a set of subroutine definitions, communication protocols, and tools for building software.
- In general terms, it is a set of clearly defined methods of communication among various components
- With advent of automation there was a need to provide API interface to your applications, so other applications could talk to your application directly

API Gateway

- Amazon API Gateway is a fully managed service that makes it easy for developers to create, publish, maintain, monitor, and secure APIs at any scale.
- With a few clicks in the AWS Management Console, you can create an API that acts as a “front door” for applications to access data, business logic, or functionality from your back-end services, such as workloads running on Amazon Elastic Compute Cloud (Amazon EC2), Amazon Elastic Container Service (Amazon ECS) or AWS Elastic Beanstalk, code running on AWS Lambda, or any web application.
- Amazon API Gateway handles all the tasks involved in accepting and processing up to hundreds of thousands of concurrent API calls, including traffic management, authorization and access control, monitoring, and API version management

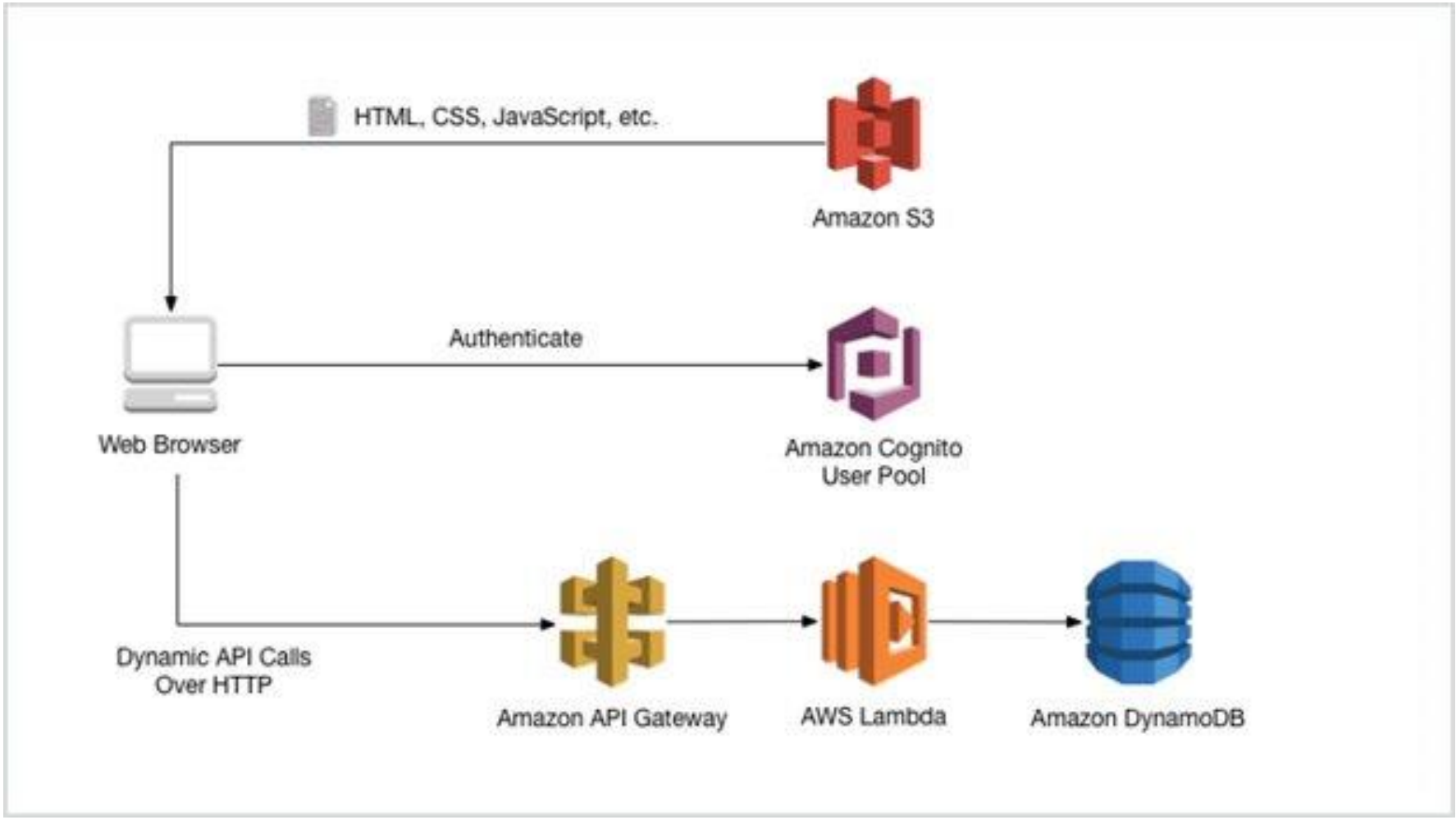
API Gateway

- API Gateway provides the ability to throttle API requests from users/clients. Throttling ensures that API traffic is controlled to help your backend services maintain performance and availability.
- Provides throttling at multiple levels including global and by service call
- Throttling limits can be set for standard rates and bursts
- With usage plans you can set throttling limits for individual API keys

API Gateway

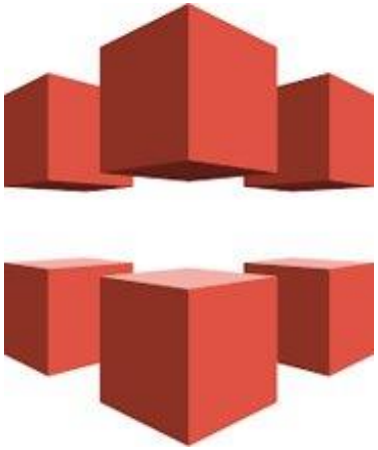
- API caching
  - You can enable API caching in Amazon API Gateway to cache your endpoint's response
  - With caching you can reduce the number of calls made to your endpoint and also improve the latency of the requests to your API.
  - When you enable caching for a stage, API Gateway caches responses from you endpoint for a time-to-live
  - (TTL) period specified in seconds. API Gateway then responds to the request by looking up the endpoint response from the cache instead of making request to your endpoint

API Gateway

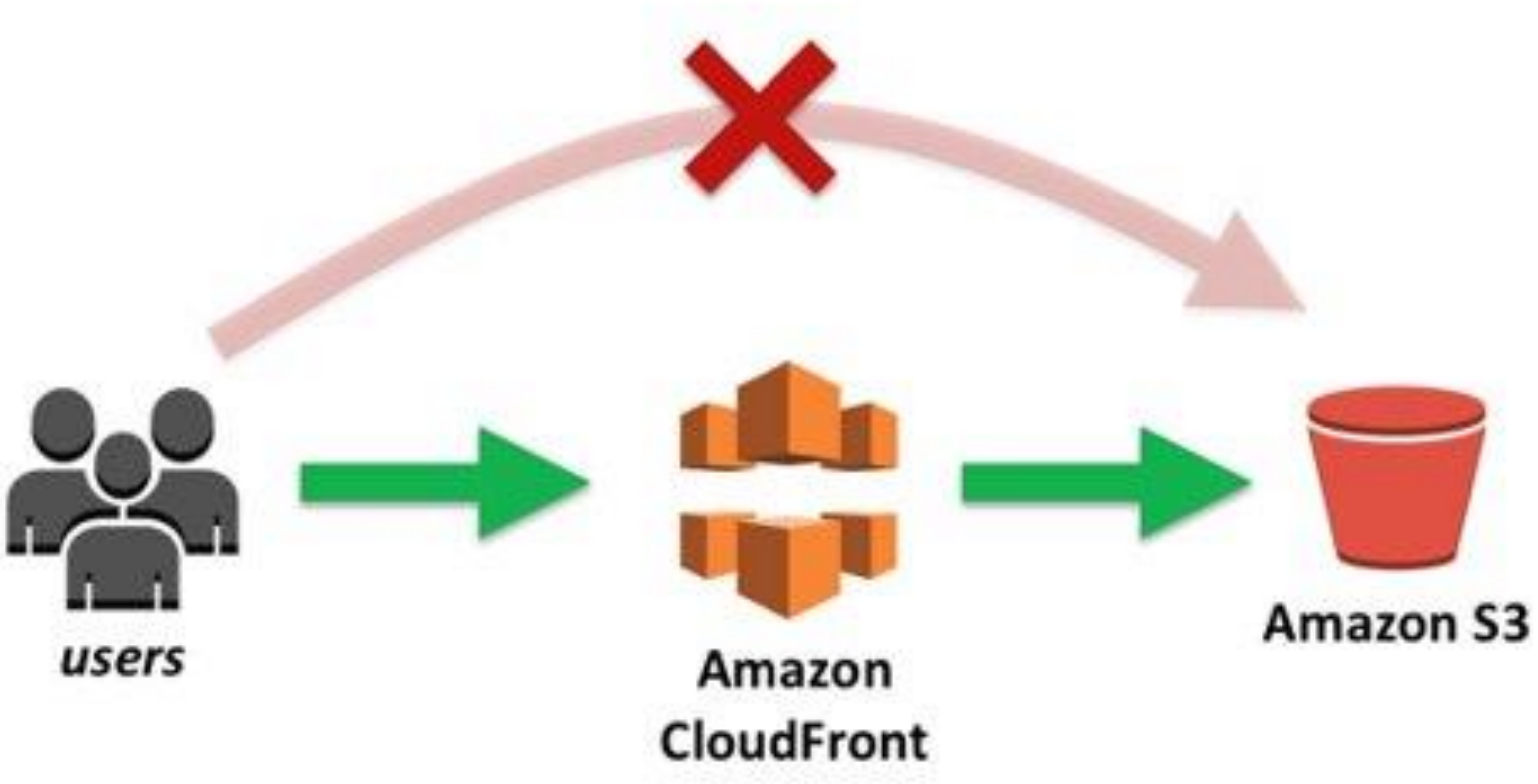


Cloudfront

- Amazon CloudFront is a global *Content Delivery Network (CDN: Large system of caching servers distributed across the internet)* service.
- It integrates with other AWS products to give developers and businesses an easy way to distribute content to end users with low latency, high data transfer speeds, and no minimum usage commitments.
- Enables content to be distributed
  - With Low Latency
  - With High Data Transfer Speeds
- Files delivered to end users using a global network of edge locations
- No upfront fee for the service



Cloudfront – Static Website



Route 53

•Route 53 is Amazon's highly available and scalable Domain Name System that provides secure and reliable routing of requests both for services within AWS and infrastructure that is outside of AWS

•This is a Global service

•Amazon Route 53 performs three main functions:

- Domain registration—Amazon Route 53 lets you register domain names, such as example.com.
- •DNS service—Amazon Route 53 translates friendly domain names like www.example.com into IP addresses like 192.0.2.1. Amazon Route 53 responds to DNS queries using a global network of authoritative DNS servers, which reduces latency.
- •Health checking—Amazon Route 53 sends automated requests over the Internet to your application to verify that it’s reachable, available, and functional.

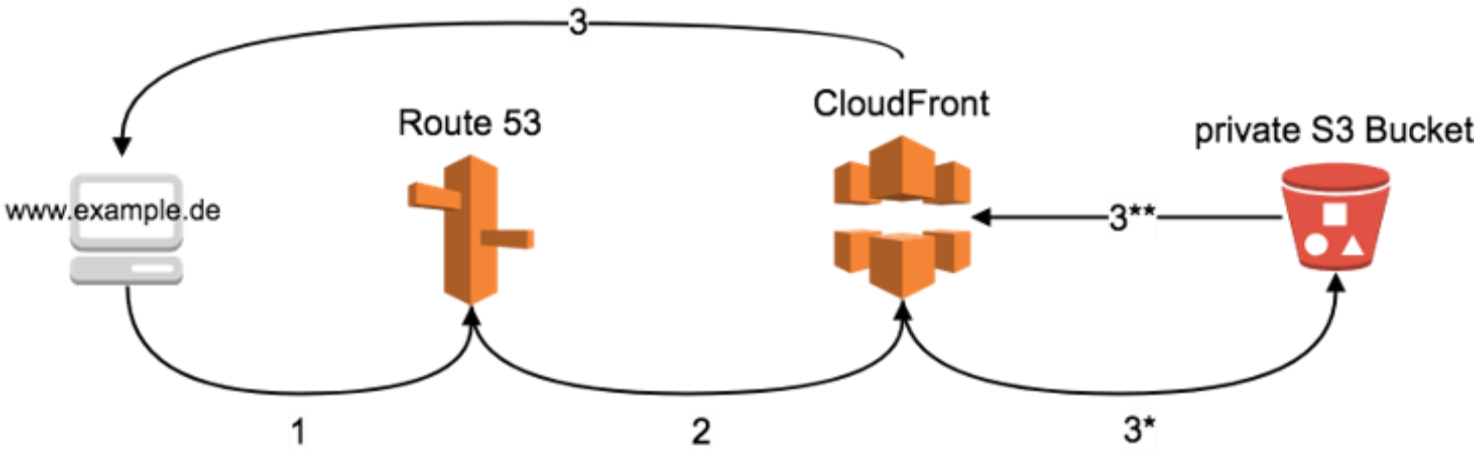
Route 53

- Hosted Zone
  - A container for records, which include information about how you want to route traffic for a domain (such as example.com) and all of its subdomains (such as www.example.com, retail.example.com, and seattle.accounting.example.com).
  - A hosted zone has the same name as the corresponding domain.
  - When you create a hosted zone there will be 2 records created SOA and NS
- Recordsets
  - An object in a hosted zone that you use to define how you want to route traffic for the domain or a subdomain.
    - A – ipv4. Domain name to ipv4 IP address to mapping.
    - AAAA –ipv6. Domain name to ipv6 IP address mapping.
    - MX – mail exc
    - CNAME – canonical name – Can be used to resolve one domain to another domain name.
    - Change record – To point to your Mail server
    - Alias – URL to an AWS Resource
    - NS – name server record – Used by Top level DNS servers to point to the Content DNS servers which contain the authoritative DNS records
    - https://www.cloudflare.com/learning/dns/dns-records/

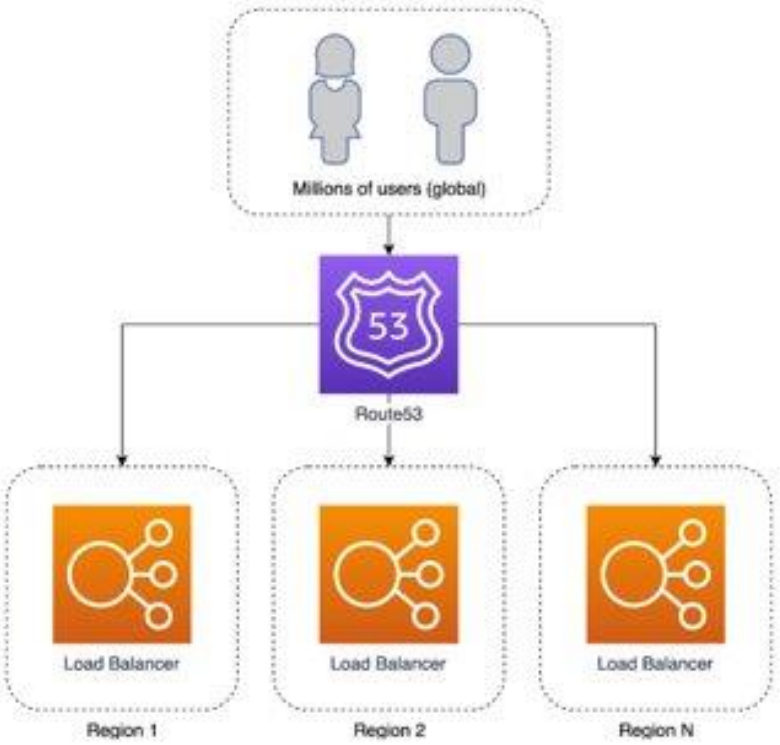
Route 53 Routing Policies

- Simple—Most commonly used when you have a single resource that performs a given function for your domain
- Weighted—Used when you want to route a percentage of your traffic to one particular resource or resources
- Latency-Based—Used to route your traffic based on the lowest latency so that your users get the fastest response times
- Failover—Used for DR and to route your traffic from your resources in a primary location to a standby location
- Geolocation—Used to route your traffic based on your end user's location

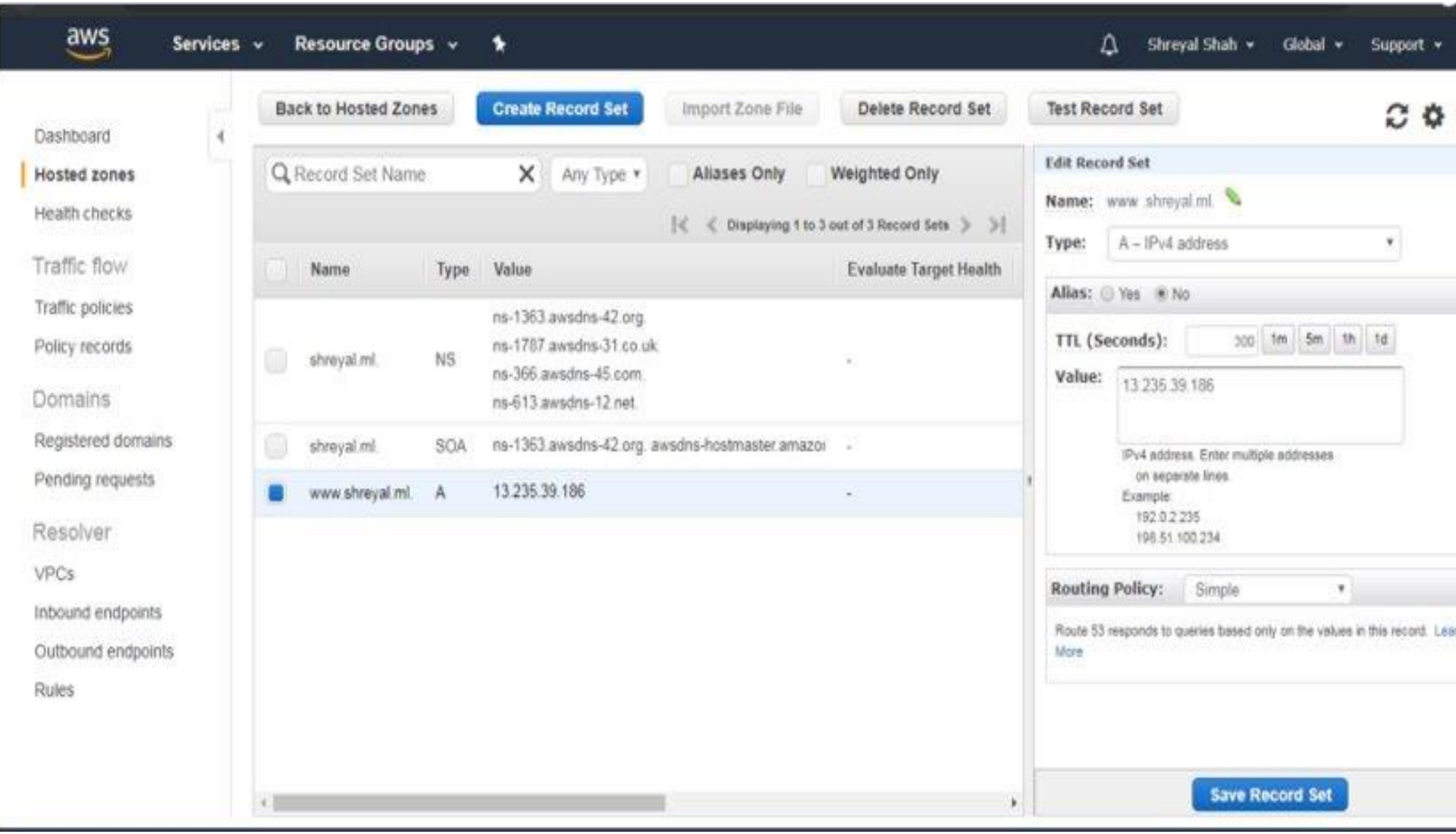
Route 53



Route 53



Route 53



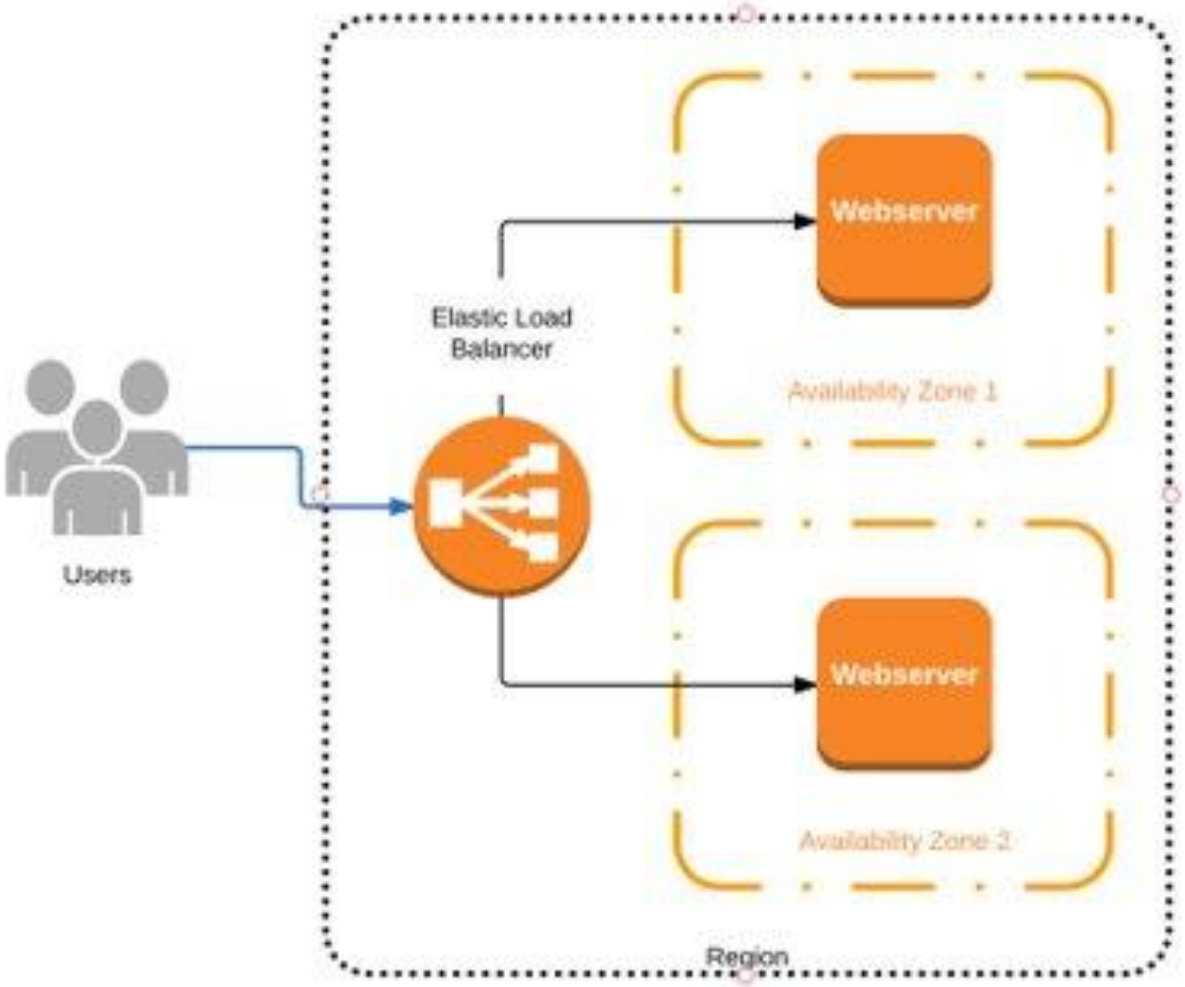
ELB : Elastic Load Balancer

- ELB allows you to distribute traffic across a group of Amazon EC2 instances in one or more Availability Zones in a Region, enabling you to achieve high availability for your applications.
- AWS manages the availability of ELB and capacity of ELB as traffic to ELB increases
- Uses round robin algorithm for request routing to back-end EC2 instances
- You can enable Sticky session for the ELB with either application generated cookies or ELB generated cookie with Time-to-live (TTL) for the cookie.
- Sticky session allows to stick a user's session to one back-end server.
- Health checks allow monitoring the availability of the application running on the back-end EC2 instances and to take instances Out-of-service if they are not healthy and return In-service once they are healthy .

ELB : Elastic Load Balancer

- Provides Cross zone load balancing capability to evenly distribute load across all the instances in all the AZs enabled for the ELB
- Auto scaling can be configured with ELB to automatically launch additionally instance if workload increases and add these to the ELB to distribute load across this additional capacity
- Cloud watch alarm can be used to monitor ELB metrics
- ELB access log can be enabled on ELB and configured to deliver the logs to S3 bucket

ELB : Elastic Load Balancer



ELB : Elastic Load Balancer

Classic Load Balancer

Application Load Balancer (HTTP Traffic)

Network Load Balancer (TCP Traffic)

https://aws.amazon.com/elasticloadbalancing/features/

Thank You