AN INTRODUCTION TO AWS ROUTE 53

All websites, computers and connected devices communicated with each other using IP addresses. Since the IP address are difficult to remember, the IP address is assigned a domain name that's usually easy to remember and type into the browser search bar. For instance, if Google has an IPv4 format IP address: 216.58.211.110, it's rather easy to just type the URL domain name Google.com instead. A service that maps IP addresses to domain names and allows users to access the website or a target server using a domain name is called a DNS service.

AWS Route 53 is a DNS service that connects the Internet traffic to appropriate servers hosting the requested Web application. Amazon takes its offering beyond traditional DNS management that merely register website domains and direct user requests to the hosting infrastructure. The subscription-based AWS service allows users to register domain names, apply routing policies, perform infrastructure health checks and manage configurations without coding requirements using the AWS Management Console. Unlike traditional DNS management services, Amazon Route 53, together with a range of AWS services, enables scalable, flexible, secure and manageable traffic routing.

AWS Route 53 takes its name with reference to Port 53, which handles DNS for both the TCP and UDP traffic requests; the term Route may signify the routing, or perhaps the popular highway naming convention. Route 53 is an Authoritative DNS service, which contains information about the mapping of IP addresses to domain names.

(This tutorial is part of our AWS Guide. Use the right-hand menu to navigate.)

Here's a brief description of how the AWS Route 53 service works for routing traffic between end-users and the hosted Web apps:

1. The domain name is first registered with AWS Route 53, which is then configured to route Internet traffic to the servers hosting the domain name. The servers can be both AWS public cloud or a private cloud infrastructure.
2. End-users enter the domain name or the complete URL into the browser search bar.
3. The ISP routes the request to a DNS resolver, a tool that converts the domain name into its IP address.
4. The DNS resolver then forwards the user request to a DNS root name server, which is then directed to its Top Level Domain (TLD) server and ultimately, to AWS Route 53.
5. The Route 53 name server returns the IP address of the domain name to the DNS resolver.
6. Now that the DNS resolver has the required IP address, it can forward the user request to the appropriate server hosting the content as per the configurations of the AWS Route 53 service.
7. AWS Route 53 also checks the health of backend servers. The service feature called the DNS Failover checks the endpoints for availability. If the endpoint is deemed unhealthy, Route 53 will route traffic to another healthy endpoint. An alarm will be triggered using the AWS CloudWatch functionality to inform the specified recipient regarding the necessary actions.

Here's a brief description of the current AWS Route 53 Features:

- **Resolver:** DNS resolution between local networks and VPC can be performed using the Route 53 Resolver. Users can forward DNS queries from the local network to a Route 53 Resolver and apply conditional configurations to forward DNS queries from AWS instances to a local network. AWS Route 53 supports both IPv4 and IPv6 formats.
- **Traffic Flow:** Intelligent traffic routing based on key parameters including proximity, health of endpoints and latency, among others.
- **Geo DNS and Latency Based Routing**: Reduce latency and improve end-user experience by routing traffic from servers closest to end-users.
- **Private DNS for Amazon VPC:** Configure Route 53 to respond to DNS queries within private hosted VPC zones. As a result, the DNS resolution data is not exposed to the public networks.
- **Health Checks, Monitoring and Failover:** Route 53 directs internet traffic to healthy target instances as per the specified configurations. In event of an outage, the health-checking agents will route the traffic to healthy endpoints. The health check feature generates CloudWatch metrics that can further trigger AWS Lambda functions to perform appropriate corrective actions.
- **Domain Registration:** The scalable DNS management service allows users to transfer management of existing domains or register new domain names to AWS Route 53. This feature consolidates management and billing associated with delivering Web hosted services.
- **S3 and CloudFront Zone Apex Support:** Create Custom SSL certificates without requirements for proprietary code or complicated configurations. Zone Apex support allows Route 53 to return requests for root domain such as example.com in the same was as the complete URL scheme of example.com without incurring any performance penalty as an additional proxy server is not required to access the backend servers.
- **Amazon ELB Integration**: AWS Elastic Load Balancing capability allows the traffic load to be distributed between multiple AWS target instances to maximize service availability and performance. AWS ELB allows users to increase the fault tolerance of their Web services to healthy target instances within AWS and on-premise infrastructure resources.
- **Weighted Round Robin:** A service for developers to configure how often a DNS response is returned. This capability is useful for service testing purposes as well as balancing traffic between target instances.

- **Management Console:** A simple and intuitive management console allows users to view resources and perform operational tasks. The management console is also offered as a mobile app. Users can further manage Route 53 controls such as the DNS record modification permission using the AWS Identity and Access Management service.

Amazon Route 53 capabilities of policy-based routing, health check and monitoring, support for bi-directional query resolution for hybrid cloud environments, and integration with an exhaustive set of AWS services give it a leading edge over its competition. Routing policies such as Multi-Value Routing and Weighted Routing give users more control and management capability over their internet traffic. Route 53 is also designed to work with a range of AWS services necessary to run apps hosted on the AWS infrastructure. The close integration of services allows users to perform changes to their architecture and scale resources to accommodate increasing Internet traffic volume without significant DNS resolution, configuration and management requirements.