Session 1 : Basics of AWS Route-53 and its Functions .....DNS and how it Works

• We can use Route-53 to register new domains,transfer existing domains,route traffic for our domains to our AWS and external resources and monitor the health of our resources
• DNS TCP port number is 53.....This is the reason why amazon used the name Route 53

Route-53 Functions :

1.DNS Management
2.Traffic Management
3.Availability Monitoring
4.Domain Registration

Session 2 : Route-53 Functions and Steps

Route-53 performs three main functions :

1.Register a domain
2.As a DNS,it routes internet traffic to the resources for our domain
3.Check the health of our resources
□ Route-53 sends automated requests over the internet to a resource(can be a webserver) to verify that the server is,reachable functional or available
□ Also we can choose to receive notifications when a resource becomes unavailable and choose to route internet traffic away from unhealthy resources

• We can use Route-53 for any combination of these functions :
□ EX : We can use Route-53 both to register our domain name and to route internet traffic for the domain
□ Or we can use Route-53 to route internet traffic for a domain that we registered with another domain register

• When we register a domain with Route-53,the service automatically makes itself the DNS service for the domain by doing the following :
1. It creates a hosted zone that has the same name as our domain
2.It assigns a set of four name servers to the hosted zone,unique to the account
□ When someone uses a browser to access our website,these name servers inform the browser where to find our resources,such as a web server or an Amazon S3 bucket
□ It gets the name servers from the hosted zone and adds them to the domain

AWS Supports :

1.Generic Top level Domains.....com,.org,.net etc.....
2.Geographic Top Level Domains.....in,.us,.me etc

Registering a domain with Route-53 :

• We can register a domain with route-53 if the TLD is included on the supported TLD list
• If the TLD is not included,we can't register the domain with route-53

Using Route-53 as our Service :

• We can use Route-53 as the DNS service for any domain,even if the TLD for the domain is not included on the supported TLD list

Note : Each amazon Route-53 account is limited to a maximun of 500 hosted zones and 10,000

resource record sets per hosted zone. We can increase this limit by requesting to AWS

Steps to configure Route-53 :

1.We need to register a domain,this can be route-53,or another DNS registrar,but then we connect our domain name in that registrar to route-53
2.Create hosted zone on route-53(if we purchased domain from registrar other than route-53),this is done automatically if we registered our domain using route-53
□ Inside the hosted zone,we need to create record sets

Delegate to Route-53 :

• This step connects everything and make it works
• Connect the domain name to the route-53 hosted zone.This is called delegation
• Update our domain registrar with the correct name servers for our route-53 hosted zone
• No other customer hosted zone will share this delegation set with us
• Doing this means route-53 DNS service will be serving DNS traffic for the domain of the hosted zone
• If we registered our domain with a diff registrar,we need to configure the route-53 NS's list in our registrar DNS database for our domain

When we are using another domain provider and we did all the changes :

• When we migrate from one DNS provider to another,For an existing domain this change can take upto 48 hours to be effective
• This is because name server DNS records are typically cached across the DNS system globally on the internet for upto 48 hours(TTL) periods

Transferring a Domain to Route-53 :

• We can transfer a domain to route-53 if the TLD is included on the Amazon supported TLD list
• If the TLD is not included,we cant transfer the domain to Route-53
• For most TLD,we need to get authorization code from the current registrar to transfer a domain

Session 3 : Name Server and SOA

Route-53 Hosted Zone :

• A route 53 hosted zone is a collection of records for a specified domain
• We create a hosted zone for a domain and then we create records to tell the domain name system how we want traffic to be routed for that domain
• Basically a hosted zone is a container that holds information about how we want to route traffic for domain and its sub domains
• We can create public(internet) hosted zone or private(internal) hosted zone
• For each public hosted zone that we create amazon route 53 automatically creates name server(ns) record and a start of authority(SOA) record.Dont change these records
• Route 53 automatically creates a name server(ns) record with the same name as our hosted zone
• It list the four name servers that are authoritative name servers for our hosted zone
• Do not add,change or delete name servers in this record
• When we create a hosted zone,amazon route-53 automatically creates a name server(ns) records and a start of authority record(SOA) for the zone
• The ns record identifies the four name servers that we give to our registrar or our DNS service so that DNS queries are routed to route53 name servers
• By default route-53 assigns a unique set of four name servers(known collectively as a delegation set)
• Ex : ns-1337 awsdns-39.com
ns-895 awsdns-47.net

ns-428 awsdns-53.org
ns-1597 awsdns-07.co.uk

Route 53 as our Authoritative DNS :

• Once we update the route 53 NS settings with our domain registrar to include the route 53 name server,route 53 will be responsible to respond to DNS queries for the hosted Zone
• This is true whether we do have a functioning website or not
• Route53 will respond with information about the hosted zone whenever someone types the associated domain name in a web browser
• We can create more than one hosted zone with the same name and add diff records to each hosted zone
• Route 53 assigns four name servers to every hosted zone
• The name servers are diff for each of them
• When we update our registrars name server records, be careful to use the route 53 name servers for the correct hosted zone the one that contains the records that we want route 53 to use when responding to queries for our domain
• Route 53 never returns values for records in other hosted zone that have the same name

Route 53 Hosted zone default entries :

• Inside the hosted zone by default we have two entries :
□ *NS Entry :* Contains the unique sets of name servers for this hosted zone
□ *SOA entry :* Contains information about the hosted zone

Session 4 : DNS Record Types

• If we are currently using another DNS service and we want to migrate to Amazon Route 53 :
□ Start by creating Hosted Zone
□ Route 53 automatically assigns the delegation sets,the four name servers to our hosted zone
□ To ensure that the DNS routes queries for our domain to the route 53 name servers
□ Update our registrar's or our DNS servers NS records for the domain to replace the current Name servers with the names of the four Route 53 name servers for our hosted zone
□ The method that we use to update the NS rcords depends on which registrar or DNS service we are using
□ Some registrar only allow us to specify name servers using IP addresses they dont allow us to specify fully qualified domain names
□ If our registrar requires using Ip addresses,we can get the IP addresses for our name servers using the dig utility (for mac and Linux) and nslookup(for windows)

Transferring a domain between accounts within AWS :

• Transferring a domain to a diff AWS account :
□ If we registered a domain with one aws account and we want to transfer the domain to another AWS account,we can do so by contacting the AWS support center and Requesting the transfer

Migrating a hosted zone to a diff AWS account :

• If we are using Route53 as the DNS service for the domain,route53 does not transfer the hosted zone when we transfer a domain to a diff AWS account
• If domain registration is associated with one account and the corresponding hosted zone is associated with another account,neither domain registration nor DNS functionality is affected
• The only effect is that we will need to sign into the route 53 console using one account to see the domain and sigin using the other account to see the hosted zone

Supported DNS Record Types by Route 53 :

1.A record : Address Record maps domain names to IP Address(32 bit IPv4 Address)....www.techguftugu.com in A 5.5.5.5

2.AAAA Record : IPv6 address record maps domain name to an IPv6 address(128 bit IPv6 address so the name AAAA[32bits*4])

3.CNAME Record : Canonical name record maps an alias to a hostname....web in CNAME techguftugu.com

4.NS record : Name server Record used for delagating zone to a nameserver.....techguftugu.com in NS ns1.techguftugu.com

5.SOA Record : Start of Authority Record

6.MX record : Mail echange defines where to deliver mail for user@domain name....techguftugu.com in MX 10 mail.techguftugu.com

NS record : It defines which name server is a authoritative to a particular zone or domain name and point us to other DNS servers

• A/AAAA are called host records,like business cards
• CNAME is an alternative records,or an alias for another record
□ Helpful in redirection or if we want to hide details about our actual servers from the user

SOA Record :

• Every single zone has one and only SOA resource record at the beginning of the zone
• It is not an actual record,it includes the following info :
□ Who the owner is(email for the domain)
□ The authoritative server
□ The serial number which is incremental with changes to the zone data
□ The refreshing time/cycle info and the time to live(TTL)

CNAME Record :

• A CNAME value element is the same format as a domain name
• The DNS protocol does not allow us to create a CNAME record for the top node of a DNS namespace,also known as the zone apex(or root domain)
• For EX : if we register the DNS name techguftugu.com,the zone apex is techguftugu.com and we cannot create a CNAME for techguftugu.com
• However we can create CNAME records for WWW.techguftugu.com,support.techguftugu.com and so on
• In addition,if we create a CNAME record for a subdomain we cannot create any other record for that Subdomain
• EX: If we create a CNAME for www.techguftugu.com we cannot create any other records for which the value of the name field is www.techguftugu.com

Session 5 : Route53 Routing Policies-Simple,Failover,Geo Location,Latency,Geo Proximity,Weighted and Multi-Value Policy

• When we create a record,we choose a routing policy,which determines how amazon route 53 respond to Queires
□ Simple,Failover,Geo Location,Latency,Geo Proximity,Weighted and Multi-Level Routing Policies

Failover Routing Policy :

• Failover routing lets us route trafiic to a resource when the resource is healthy if the main resource is not healthy,then route traffic to diff resource
• The primary and secondary records can route traffic to anything from an amazon S3 buccket that is configured as a website to a complex tree of records
• Failover routing policy is applicable for public hosted zone oly

Geolocation ROuting :

• It lets us choose the resources that serves our traffic based on the geographic location of our users i.e the location that DNS queries originate from
• Ex : We may have presence in europe and asia and we want users in the asia to be served in the asia and those in europe to be served by servers in europe

Benefits :

• We can localize our content and present some or all of our website in the language of our users
• We can also use geolocation routing to restrict distribution of content to only the locations in which we have distribution rights
• We can specify geographic locations by continent,by country or by state in the US
• If we create seperate records for overlapping geographic regions for ex : one record for North America and one for Canada-priority goes to the smallest geographic region(canada)
• Geolocation works by mapping IP address to location.However some IP address are not mapped to geographic location

Latency based Routing :

• If our application is hosted in multiple amazon ec2 regions,we can improve performance for our users by serving their request from the amazon ec2 region that provides the lowest latency
• To use this routing we need to create latency records for our resources in multiple ec2 regions
• When amazon route 53 receives a DNS query for our domain or subdomain
□ It determines which amazon ec2 region we have created latency record for
□ Determine which regions gives lowest latency to users
□ Then select a latency record for that region
• Ex : Suppose we have ELB in US-East and in asia pacific(mumbai) region
• We created a latency record for each load balancer
• Here's what happened when a user in londen enters the name of our domain in browser
• DNS routes the request to a route 53 name server
• Route 53 refers to its data on latency between london and the mumbai region and between london and N.virginia
• If latency is lower between london and N.verginia,route 53 respond to the query with the IP address for the N.verginia LB

Weighted Routing Policy :

• It lets us associate multiple resources with a single domain name or subdomain name and choose how much traffic is routed to each resource
• This can be useful for a variety of purposes,including load balancer and testing new versions of software
• Weights can assign any number from 1 to 255
• Weighted routing policy can be applied when there are multiple resource that performs the same function...Ex : Webserver serving the same website
• To configure weighted routing,we create records that have the same name and type for each of our resources
• Amazon route 53 sends traffic to a resource based on weight that we assign to the record as a proportion of the total weight for all records in the group
• Ex : Suppose for www.tg.com has three resource record sets with weights of 1(20%) ,1(20%) and 3(60%).....Sum =5
• On average,route 53 select each of the first two resources record set one-fifth of the time and

returns the third resource record set three-fifth of the time

Geo Proximity Routing Policy :

• Use when we want to route traffic based on the location of our resources and optionally,shift traffic from resources in one location to resources in another
• We can also optionally choose to route more traffic or less to a given resource by specifying a value,known as a ‘bias’.A bias expand or shrinks the size of the geographic region from which traffic is routed to a resource

Multivalue Answer Routing Policy :

• Use this,when we want route 53 to respond to DNS queries with upto eight healthy record selected at random
• This lets us configure amazon route 53 to return multiple values,such as ip addresses for our webservers in response to DNS queries.We can specify multiple values for almost any record,but multivalue answer routing also lets us check,the health of each resource,so route 53 returns only values for healthy resources.Its not a substitute for our load balancer but the ability to return multiple health checkable IP addresses is a way to use DNS to improve availability and load balancing

Name	Type	Value	TTL	Set ID	H.C(Hea Check)
www.tg.com	A record	192.0.2.2	60	Web1	A
www.tg.com	A record	198.50.100.1	60	web2	B
www.tg.com	A record	200.1.1.1	60	web3	C
www.tg.com	A record	192.0.3.3	60	web4	D

LAB :

Session 6 : AWS Route 53 DEMO