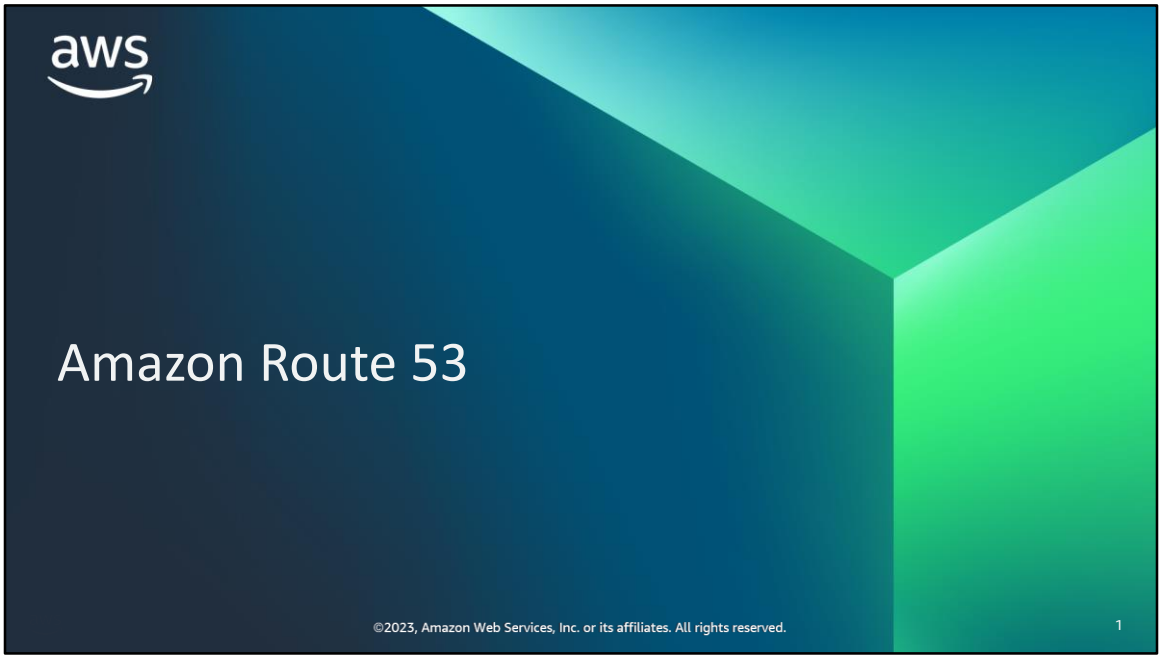

At the core of the lesson

You will learn how to describe Amazon Route 53 features and routing options.

What is Route 53?

Amazon Route 53

- Route 53 is a scalable Domain Name System (DNS) web service.
- With this service you can do the following:
  - Register or transfer a domain name.
  - Resolve domain names to IP addresses.
  - Connect to infrastructure.
  - Distribute traffic across Regions.
  - Support high availability and lower latency.

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You can use Elastic Load Balancing (ELB) and Amazon EC2 Auto Scaling to achieve highly flexible, scalable, and resilient architectural designs. But what if you want to distribute traffic across Amazon Web Services (AWS) Regions? You might have various reasons for distributing traffic across Regions, including the following:

- Disaster recovery for widespread outages
- Reduced latency that provides services closer to where users are located

Amazon Route 53 provides a highly available and scalable cloud Domain Name System (DNS) web service. Route 53 is designed to provide a reliable and cost-effective way to route users to internet applications. It translates URLs, such as www.example.com, into the numeric IP addresses that computers use to connect to each other, such as 192.0.2.1.

Route 53 also connects user requests to infrastructure that is running in AWS. Examples of such infrastructure are Amazon Elastic Compute Cloud (Amazon EC2) instances, ELB load balancers, or Amazon Simple Storage Service (Amazon S3) buckets. It can also be used to route users to infrastructure outside AWS. You can also use Route 53 to configure DNS health checks. In this way, it can route traffic to healthy endpoints or independently monitor the health of your application and its endpoints.

You can use Route 53 to manage traffic globally through various routing types, including latency-based routing, geoproximity or geolocation-based routing, and weighted round robin. These routing types can be combined with DNS failover to enable a variety of low-latency, fault-tolerant architectures.

Route 53 also offers domain name registration. You can purchase and manage domain names, such as example.com, and Route 53 will automatically configure the DNS settings for your domains.

Using Route 53 with ELB

Associating a DNS name with ELB

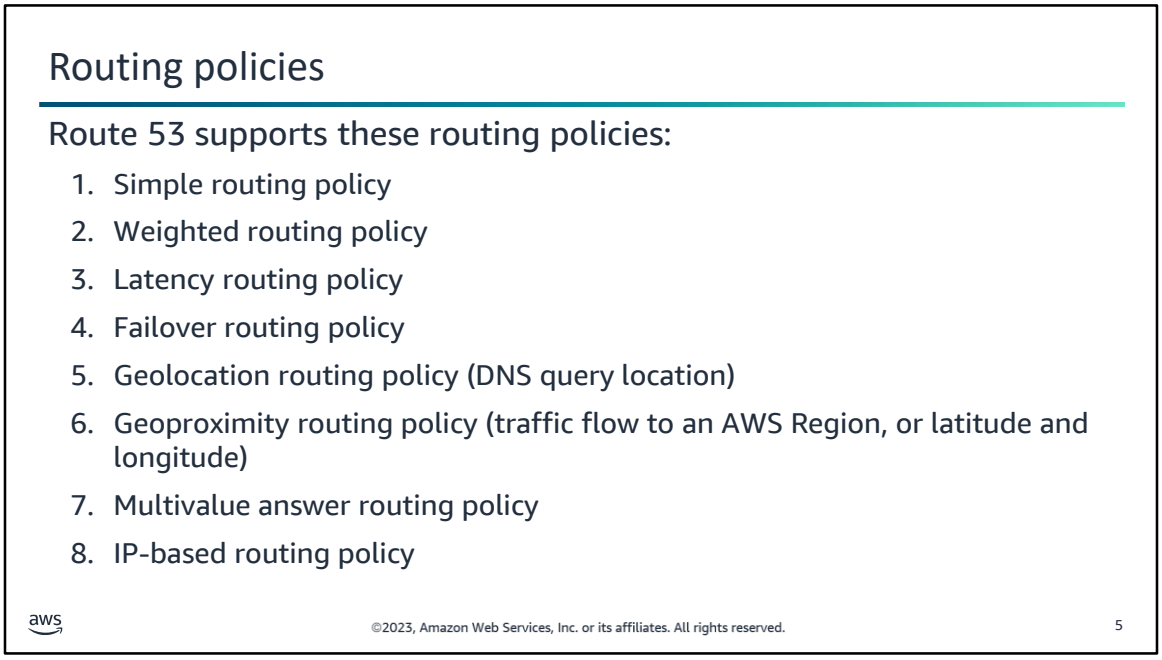
- By default, AWS assigns a hostname to your load balancer that resolves to a set of IP addresses.
- Assign your own hostname by using an alias resource record set.
- Create a Canonical Name Record (CNAME) that points to your load balancer.

Recall that an ELB load balancer distributes workloads across multiple compute resources, such as virtual servers. Using a load balancer increases the availability and fault tolerance of your applications.

When you create an ELB load balancer, it is given a default DNS name, as in the example. You can choose to use the default DNS name, or you can associate your own DNS name, which you could manage by using Route 53. For example, you could register a domain name, such as example.com, for your website or web application. Then, you could route internet traffic to the resources in your AWS account.

A Canonical Name Record (CNAME) can redirect DNS queries to any DNS record. For example, you can create a CNAME that redirects queries from apex.example.com to acme.example.com or acme.example.org.

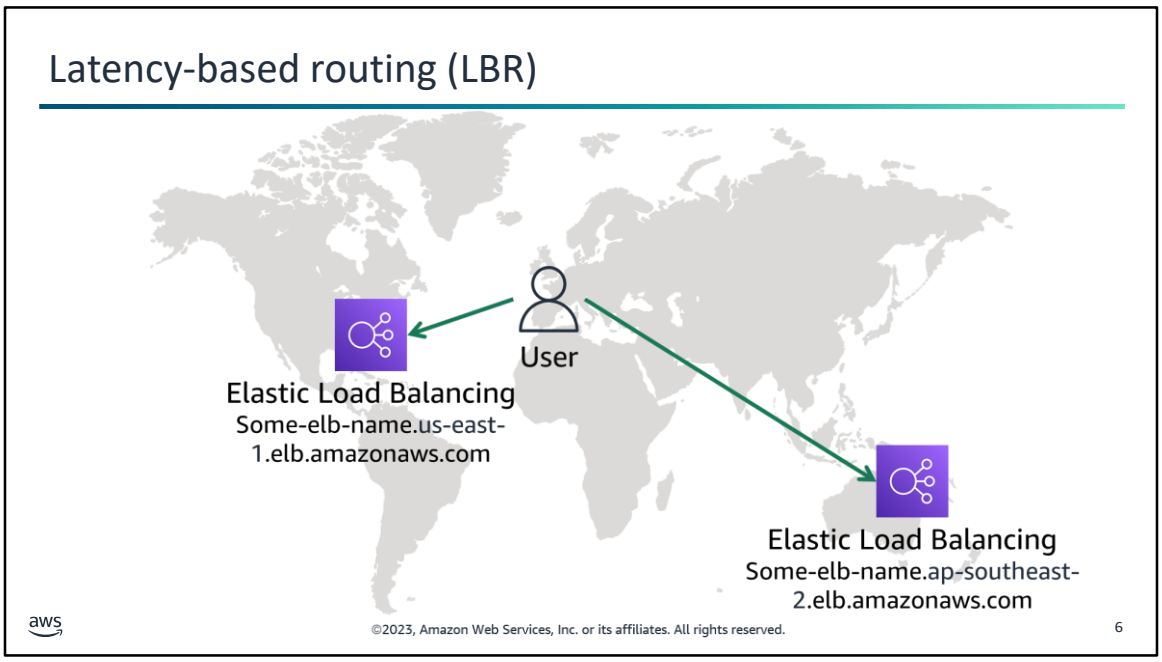
An alias record can redirect queries to only selected AWS resources. Examples of these resources might be S3 buckets, Amazon CloudFront distributions, or another record in the Route 53 hosted zone where you create the alias.



Route 53 supports several different routing policies:

1. Simple routing policy: Use for a single resource that performs a given function for your domain—for example, a web server that serves content for the example.com website.
2. Weighted routing policy: Use to route traffic to multiple resources in proportions that you specify.
3. Latency routing policy: Use when you have resources in multiple AWS Regions and you want to route traffic to the Region that provides the lowest latency.
4. Failover routing policy: Use when you want to configure active-passive failover.
5. Geolocation routing policy: Use when you want to route traffic based on the location of your users.
6. Geoproximity routing policy: Use to route traffic based on the location of your resources and, optionally, shift traffic from resources in one location to resources in another location.
7. Multivalue answer routing policy: Use when you want Route 53 to respond to DNS queries with up to eight healthy records that are selected at random.
8. IP-based routing policy: Use when you want to route traffic based on the location of your users and have the IP addresses that the traffic originates from.

For more information on routing policies, see “Choosing a Routing Policy” at https://docs.aws.amazon.com/Route53/latest/DeveloperGuide/routing-policy.html.

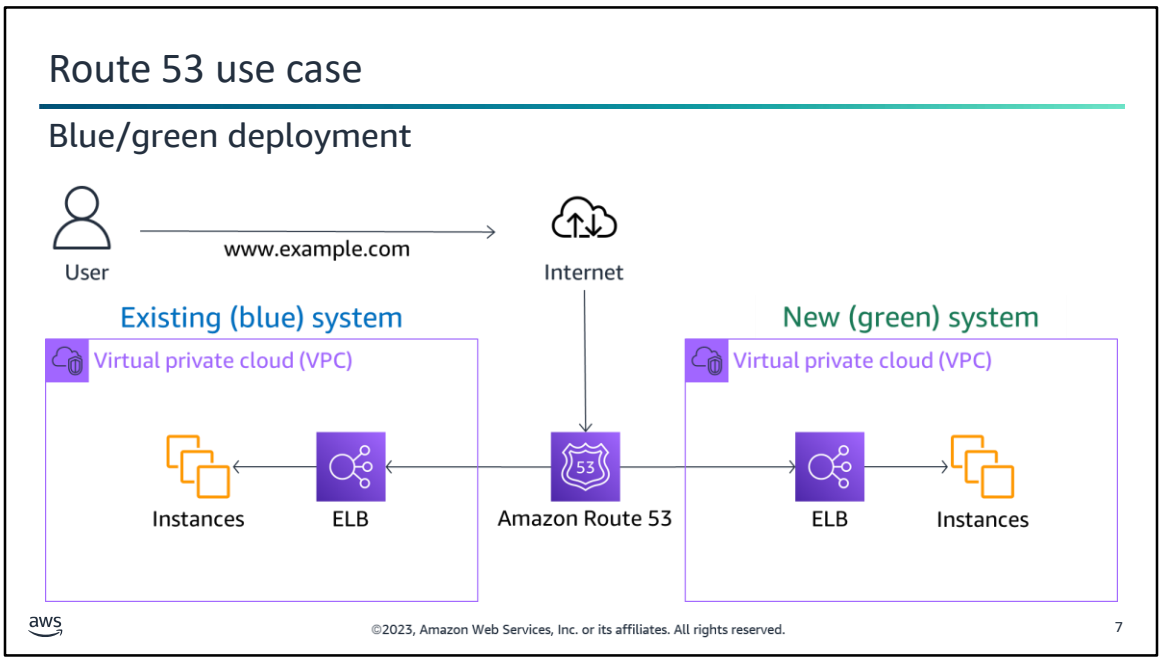


Assume that you want to distribute your deployment architecture across several Regions around the world and provide users with the fastest response time. Often—but not always—the Region that is geographically closest to the user provides the fastest response times.

For these situations, you can use Route 53 to perform what is known as latency-based routing (LBR). LBR gives you the ability to use the DNS to route user requests to the AWS Region that will give your users the fastest response.

For example, assume that you have load balancers in the US East (N. Virginia) Region and in the Asia Pacific (Sydney) Region. You created a latency resource record set in Route 53 for each load balancer. A user in Barcelona, Spain, enters the name of your domain in a browser. DNS routes the request to a Route 53 name server. Route 53 refers to its data on latency between the different Regions and routes the request appropriately.

In most cases, the result is that your request is routed to the nearest geographical location. For example, it is routed to Australia for a user in New Zealand, or Virginia for a user in Canada.

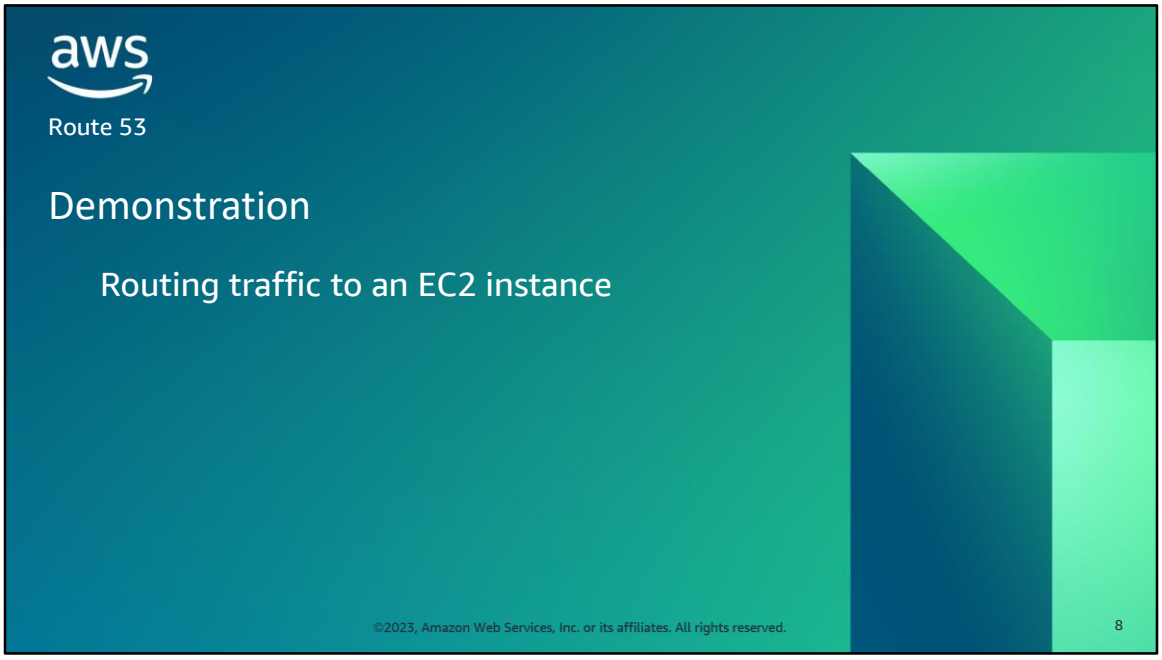


A blue/green deployment is a deployment that reduces the risk of the site or application becoming unavailable because you run two matching production environments. One environment is referred to as the blue environment, and the other environment is referred to as the green environment.

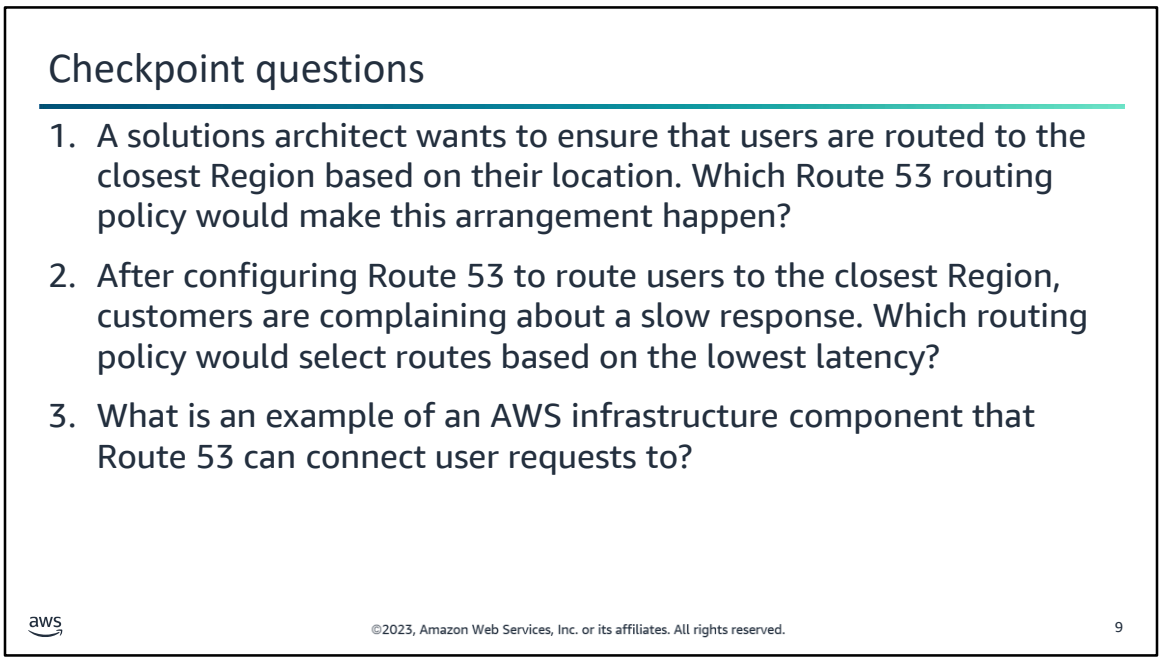
The diagram shows an example of a blue/green deployment. Notice the two parallel environments, each with its own ELB load balancer and Amazon EC2 Auto Scaling configuration. The Route 53 weighted routing feature is then used to begin shifting users over from the existing (blue) environment to the new (green) environment. This process might be done to migrate users to the new or upgraded green environment.

You can use services such as Amazon CloudWatch and Amazon CloudWatch Logs to monitor the green environment. If problems are found anywhere in the new environment, Route 53 weighted routing can be deployed to shift users back to the running blue servers.

When the new green environment is fully up and running without issues, the blue environment can gradually be shut down. Because of the potential latency of DNS records, a full shutdown of the blue environment can take anywhere from a day to a week.



For more information about this demonstration, see “Routing Traffic to an Amazon EC2 Instance” at https://docs.aws.amazon.com/Route53/latest/DeveloperGuide/routing-to-ec2-instance.html.



The answers to the questions are as follows:

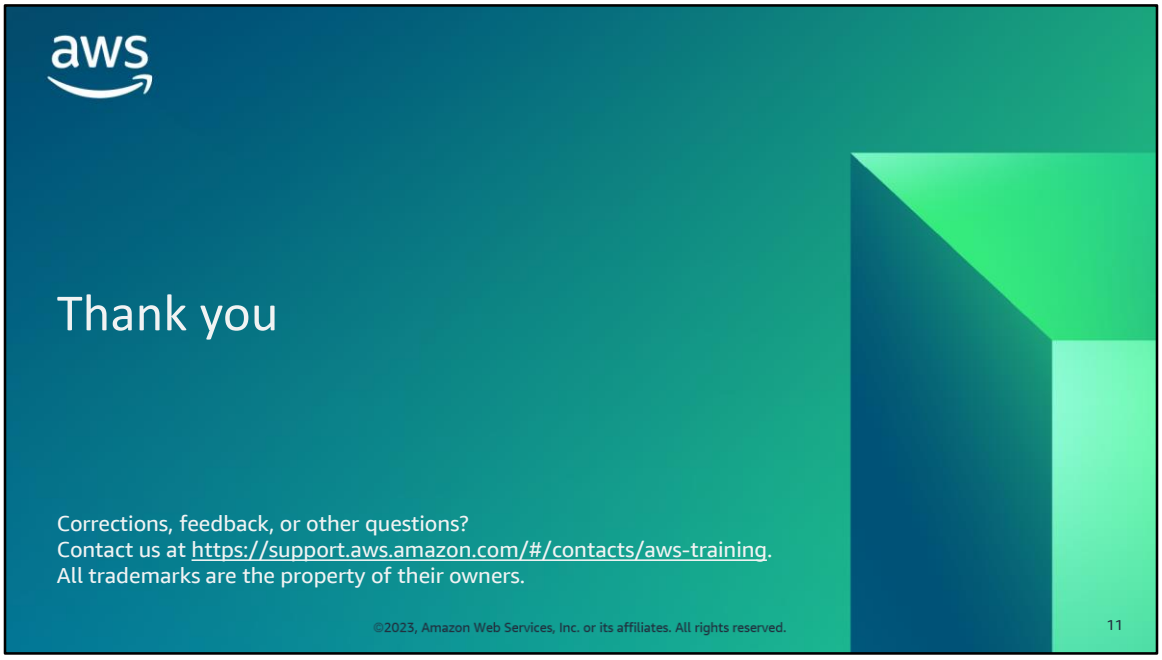
1. A solutions architect wants to ensure that users are routed to the closest Region based on their location. Which Route 53 routing policy would make this arrangement happen?
   Use the geolocation routing policy.

2. After configuring Route 53 to route users to the closest Region, customers are complaining about a slow response. Which routing policy would select routes based on the lowest latency?
   Use latency-based routing.

3. What is an example of an AWS infrastructure component that Route 53 can connect user requests to?
   EC2 instances, ELB load balancers, or S3 buckets.

Key ideas

- Route 53 supports multiple routing policies, which include simple, weighted, latency, failover, geolocation, geoproximity, and multivalue answer routing policies.
- Route 53 helps to do the following:
  - Register or transfer domain names.
  - Resolve domain names to IP address.
- Route 53 can route traffic to resources in different AWS Regions and on-premises resources.
- With latency-based routing (LBR), you can use DNS to route user requests to the AWS Region that will give your users the fastest response.



Thank you

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