Introduction to Amazon Route 53

SPL-30 - Version 2.0.3

Overview

This lab will give you a basic understanding of Amazon Route 53 and will demonstrate the steps required to get started with Route 53.

Topics covered

By the end of this lab you will be able to:

- Create a hosted zone for your domain
- Create DNS records for Amazon EC2 instances
- Add a Route 53 health check to an Amazon EC2 Web Server
- Configure a DNS Failover to an Amazon S3 static website
- Test the health check and failover

Introducing the Technologies

Amazon Route 53
Amazon Route 53 is a highly available and scalable cloud Domain Name System (DNS) web service. It is designed to give developers and businesses an extremely reliable and cost effective way to route end users to Internet applications by translating names like www.example.com into the numeric IP addresses like 192.0.2.1 that computers use to connect to each other, often using a process called recursion.
CNAME Record
A Canonical Name record (CNAME) is a type of resource record in the Domain Name System (DNS) used to specify that a domain name is an alias for another domain, the "canonical" domain. All information, including subdomains, IP addresses, etc. are defined by the canonical domain.

Canonical Domain
Canonical Domain is another name for the CNAME DNS record type. The CNAME record is used to create an alias for the canonical domain.

Alias Record
Alias resource record sets provide an Amazon Route 53 specific extension to DNS functionality. Instead of an IP address or a domain name, an alias

resource record set contains a pointer to a CloudFront distribution, an ELB load balancer, an Amazon S3 bucket that is configured as a static website, or another Amazon Route 53 resource record set in the same hosted zone. When Amazon Route 53 receives a DNS query that matches the name and type in an alias resource record set, Amazon Route 53 follows the pointer and responds with the applicable value.

Amazon Route 53 Health Check
Amazon Route 53 health checks monitor the health and performance of your web applications, web servers, and other resources. At regular intervals that you specify, Amazon Route 53 submits automated requests over the Internet to your application, server, or other resource to verify that it's reachable, available and functional.

Amazon Route 53 Failover
If you have multiple resources that perform the same function, for example, web servers or email servers, and you want Amazon Route 53 to route traffic only to the resources that are healthy, you can configure DNS failover by associating health checks with your resource record sets. If a health check determines that the underlying resource is unhealthy, Amazon Route 53 routes traffic away from the associated resource record set.

Resource Record Set
Resource record sets are the basic information elements of the domain name system. Each record set includes the name of a domain or a subdomain, a record type, and other information applicable to the record type.

The Name Server (NS) Resource Record Set
Amazon Route 53 automatically creates a name server (NS) resource record set when you create a new hosted zone with the same name as your hosted zone. It lists the four name servers that are the authoritative name servers for your hosted zone. Do not add, change, or delete name servers in this resource record set.

For Example:

- *ns-2048.awsdns-64.com*
- *ns-2049.awsdns-65.net*
- *ns-2050.awsdns-66.org*
- *ns-2051.awsdns-67.co.uk*

The Start of Authority (SOA) Resource Record Set
The start of authority (SOA) resource record set is a record that identifies the base DNS information about the domain, including the host that created the

SOA record, the administrator email address, an incremental number tracking changes to the zone file, minimum time to live (TTL), as well as several other details.

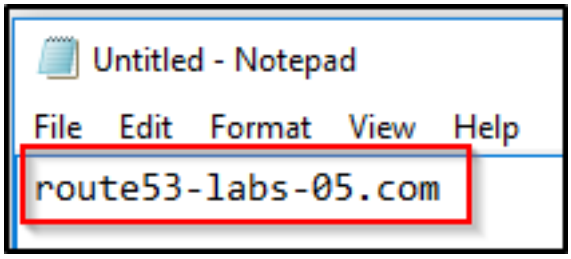
Additional services and tools used in this Route 53 lab
Amazon EC2: Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud. It is designed to make web-scale cloud computing easier for developers. EC2 reduces the time required to obtain and boot new server instances to minutes, allowing you to quickly scale capacity, both up and down, as your computing requirements change.
Amazon S3: Amazon Simple Storage Service (Amazon S3), provides developers and IT teams with secure, durable, highly-scalable object storage. Amazon S3 is easy to use, with a simple web service interface to store and retrieve any amount of data from anywhere on the web.
Notepad: Notepad is a generic text editor included with all versions of Microsoft Windows that allows you to open and read plaintext files. TextEdit is the equivalent on Mac OS X systems.
Getting Started with Amazon Route 53

Task 1: Create a Hosted Zone For Your Domain

In this task, you will create a hosted zone in Route 53 for a test domain name. A test domain has already been set up for you to use in the lab environment. A hosted zone is a collection of resource record sets hosted by Route 53. Like a traditional DNS zone file, a hosted zone represents a collection of resource record sets that are managed together under a single domain name. Each hosted zone has its own metadata and configuration information.

- On the **Services** menu, click **Route 53**.
  To create a hosted zone, you need to know the domain name you are working with.

- In the left navigation pane, click **Registered domains**.
- Copy the domain name to a text editor.



There should only be one domain in the account in the form *route53-labs-XX.com*, where XX will be a number. Now that you know your domain name, you can create your hosted zone.

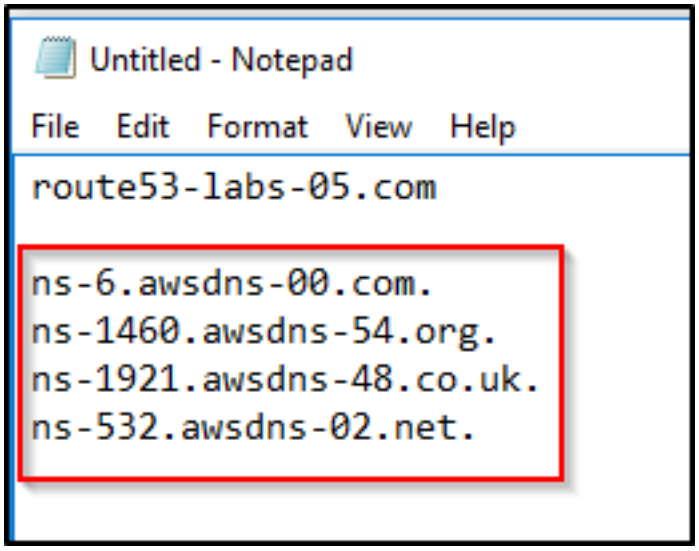
- In the left navigation pane, click **Hosted zones**.
- Click **Create Hosted Zone**
- Click **Create Hosted Zone** again to open the wizard.
- In the **Create Hosted Zone** window on the right, configure:
  - **Domain Name:** Paste the domain name you copied to your text editor
  - **Comment:**
  - **Type:** *Public Hosted Zone*
  - Click **Create**

You will see the newly created hosted zone for your domain name. Two records have been added to the hosted zone as part of the process: one NS record and one SOA record. These are required to allow the hosted zone to work correctly and should not be changed.

To link your domain name to the hosted zone, you must update the name servers that are automatically assigned to your hosted zone at your domain registrar. In this case, the registrar for the domain you are working with is Route 53.

- In the row where the **Type** is **NS**, select **route53/**.
  The details of the record will appear in a pane to the right of the screen.

- Copy all of the name server values to your text editor.
  These values are located in the **Values** box to the right of the screen.



The name server values have a trailing dot that is used in absolute DNS entries and is implied if not present. It does not matter if you include or omit the trailing dot.

Update the Domain at the Registrar

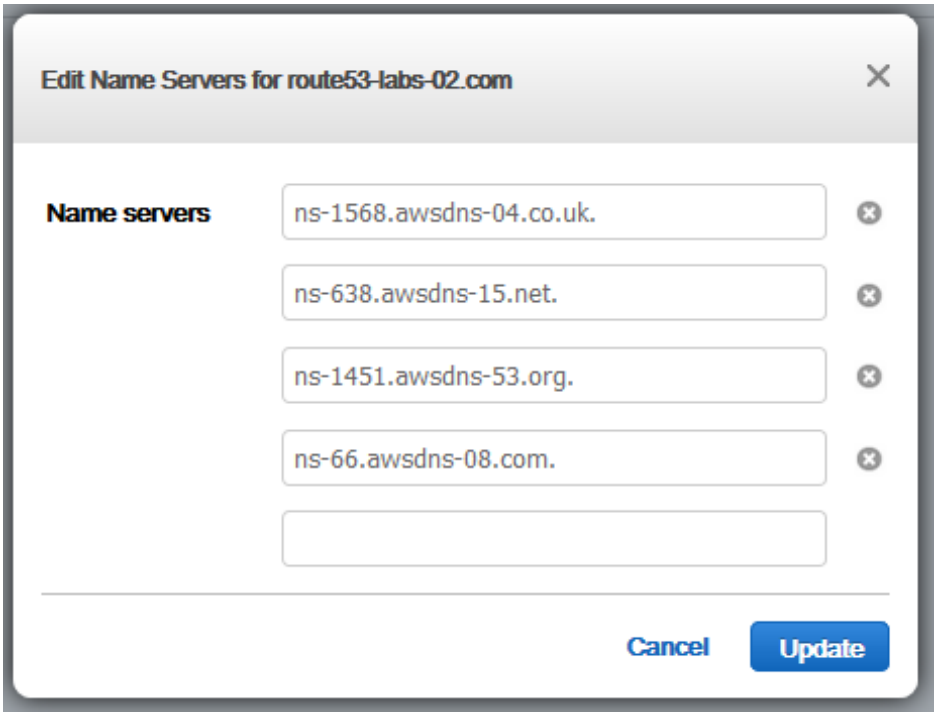
- In the left navigation pane, click **Registered domains**.
- Click your domain name.

This screen displays all the information for the registered domain, such as contact information for the domain registrant, administrator, and technical contact. It also contains technical information, such as the name servers associated with this domain. For the purpose of this lab, you only have the ability to edit the name servers.

- Next to **Name servers**, click the link **Add or edit name servers**.
- In the **Edit Name Servers for route53*** window, configure the following:
  - Remove all of the entries.
  - Add the name server entries that you copied to your text editor.

There should be one entry per line.

When complete, it should look similar to the example below:



- Click **Update**
  This process can take a few minutes. A notification appears stating that you will receive an email when updates are complete. Ignore this notification.

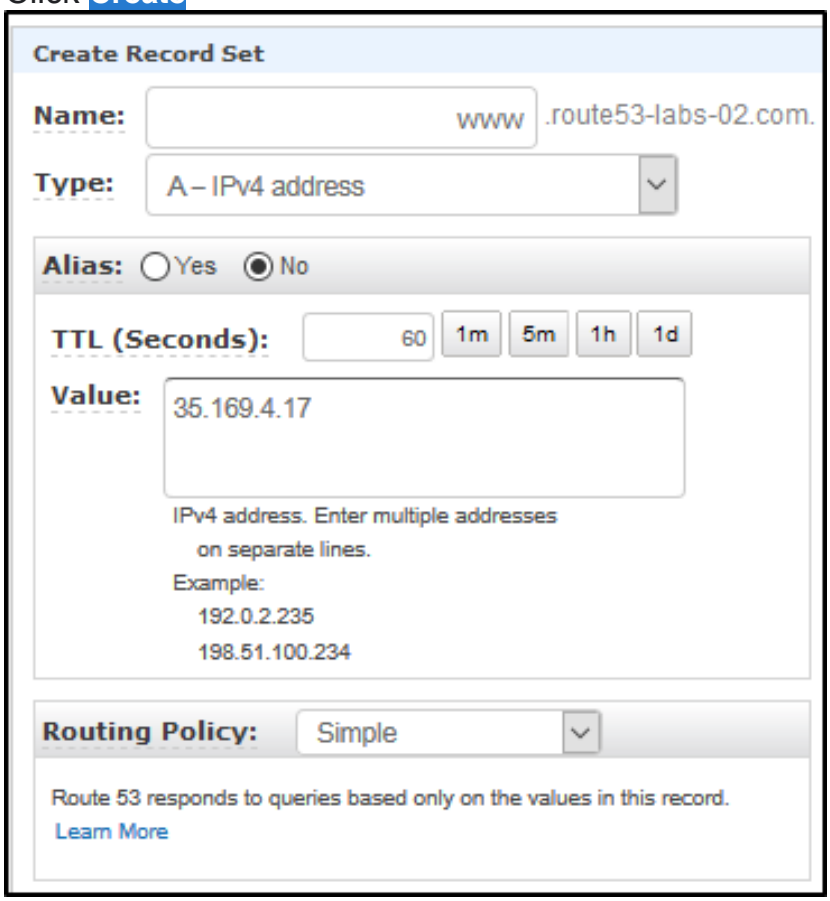
Task 2: Create DNS Records For Amazon EC2 Instances

Now that the domain is associated with your hosted zone, you can create records that point to the endpoint for your website/application. In this task, you will create a record in the hosted zone that points to an EC2 instance.

- On the **Services** menu, click **EC2**.
- In the left navigation pane, click **Instances**.
  Your instance should be checked . If not, check it.
- In the **Description** tab, copy the **Elastic IPs** value to your text editor.
  If you do not see your Elastic IP, wait a few more minutes for your instance to boot. You do not need to copy the *.
- Return to the **Route 53** Console. (Services menu > Route 53)
- In the navigation pane on the left, click **Hosted zones**.
- Click your domain name (route53-*).
- Click **Create Record Set** then configure:
  - **Name:**

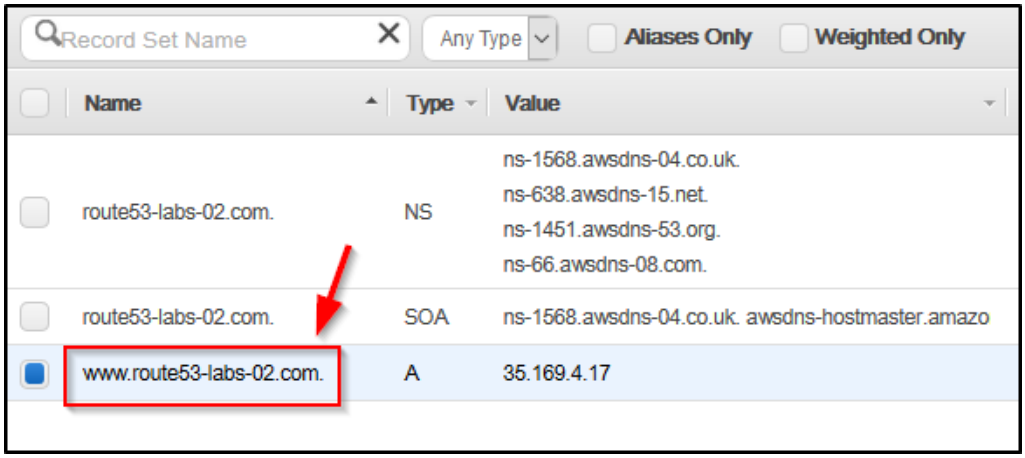
- **Type:** *A-IPv4 address*
- **Alias:** *No*
- **TTL (Seconds):**
- **Value:** Paste the Elastic IP value that you copied to your text editor
- **Routing Policy:** *Simple*

- Click **Create**

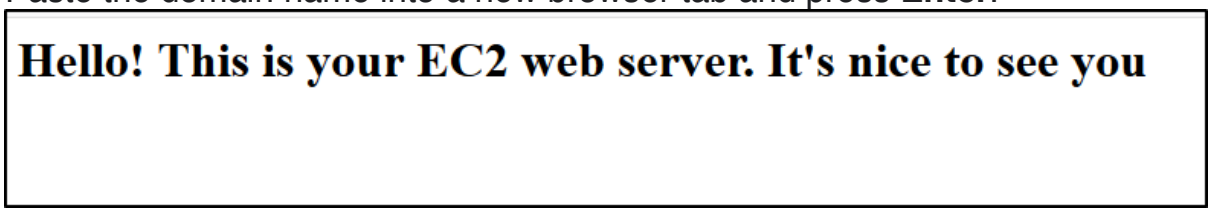


You can now test that the A record for your domain is working correctly.

- In the row where the **Type** is **A**, copy the domain name (www.route53*) to the left of **A**.



- Paste the domain name into a new browser tab and press **Enter**.



You should see the following message in the browser: **Hello! This is your EC2 web server. It's nice to see you.**

Task 3: Add a Route 53 Health Check to an Amazon EC2 Web Server

In this task, you will add a Route 53 Health Check to an EC2 Web server. Route 53 health checks monitor the health and performance of your web applications, web servers, and other resources. In case your EC2 instance is terminated or becomes unavailable for any reason, having a health check in place allows you to use DNS Failover and alarms to ensure that your website or application is always reachable by your end users. It also ensures that you are notified about its current state.

- In the **Route 53 Management Console**, in the left navigation pane, click **Health checks**.
- Click **Create health check** then configure:
  - **Name:**
  - **What to monitor:** *Endpoint*
  - **Specify endpoint by:** *IP address*
  - **Protocol:** *HTTP*
  - **IP address*:** Paste the Elastic IP value you copied to your text editor
  - **Port *:**
  - At the bottom of the screen, click **Next**
- For **Step 2: Get notified when health check fails**, configure:
  - **Create alarm:** *Yes*
  - **Send notification to:** *New SNS topic*
  - **Topic name:**
  - **Recipient email addresses:** Enter your email address
  - Click **Create health check**

  This creates the health check and displays the status of your health check, which will be *Unknown* at first.
- After a minute, click the **refresh** button.
  The status of your health check should change to *Healthy*.

- Sign into your email account.
  You will see a notification from AWS to confirm the SNS subscription for your health check alarm.

- Click **Confirm subscription**.
  This health check will check the state of your application and will send you an email if the EC2 endpoint is not reachable.

  Now that you have this health check in place, you can create a backup endpoint, such as a duplication EC2 server that provides end users with an identical experience. Alternatively, you can create an S3 static website that says *Under Construction* or *Down for Maintenance*, which provides end users with a better experience than a page that does not load.
  The first step is to create the backup endpoint.

Task 4: Configure a DNS Failover to an Amazon S3 Static Website

In this task, you will revise the simple DNS record that you initially pointed to the EC2 server and turn it into a Primary Failover record. You will also create a Secondary Failover record pointing to an Amazon S3 static website.

In your own account and configurations, you can use any endpoint as you backup. In this lab, you use an Amazon S3 static website feature for a simple, reliable, and low-cost way to deploy a backup website.

- In the **Route 53 Management Console**, click **Hosted zones**.
- Click your domain name.

- In the row where the **Type** is **A**, check **route53**.
- In the **Edit Record Set** window on the right, configure:
  - **Routing Policy:** *Failover*
  - **Failover Record Type:** *Primary*
  - **Associate with Health Check:** *Yes*
  - **Health Check to Associate:** *healthCheckTest*
  - Click **Save Record Set**

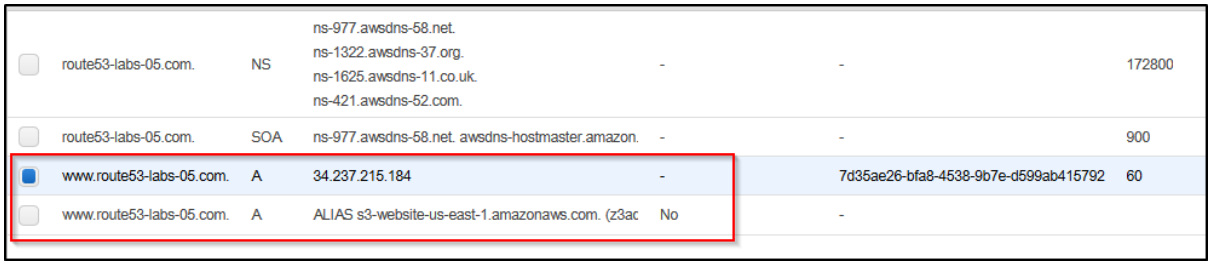
  Now that your primary endpoint is configured, you can also configure your secondary or backup endpoint. To begin, you need to know what that endpoint is.

- On the **Services** menu, click **S3**.
- Click you domain name bucket (www.route53*).
- Click the **Properties** tab.
- Click **Static website hosting**.
- In the **Static website hosting** window, copy the **Endpoint:** address to your text editor.
- Go back to the **Route 53 Management Console**. (Services menu > Route 53)
- Click **Hosted zones**.
- Click your domain name.

- Click **Create Record Set** then configure:
  - **Name:**
  - **Type:** *A-IPv4 address*
  - **Alias:** *Yes*
  - **Alias Target:** Select the S3 website Endpoint (e.g. s3-website*) - If you don't see the target, repeat the step above for creating a record set.
  - **Routing Policy:** *Failover*
  - **Failover Record Type:** *Secondary*
  - Click **Create**

  It can take up to 10 minutes after the start of the lab for the endpoint to populate in your list.

- Click refresh every few minutes till you see the new endpoint.
  This creates a new Alias A record as a secondary failover record.



route53-labs-05.com.	NS	ns-977.awsdns-58.net. ns-1322.awsdns-37.org. ns-1625.awsdns-11.co.uk. ns-421.awsdns-52.com.	-	-	172800
route53-labs-05.com.	SOA	ns-977.awsdns-58.net. awsdns-hostmaster.amazon.	-	-	900
www.route53-labs-05.com.	A	34.237.215.184	-	7d35ae26-bfa8-4538-9b7e-d599ab415792	60
www.route53-labs-05.com.	A	ALIAS s3-website-us-east-1.amazonaws.com. (z3ac	No	-	

  Now you have a health check that is checking your primary endpoint, and a secondary endpoint in case the primary endpoint becomes unreachable.

- In the left navigation pane, click **Health checks**.
  The status should be **Healthy**.
- In your browser refresh the page for your domain (e.g. www.route53*).
  You should still see the following message in the browser: **Hello! This is your EC2 web server. It's nice to see you.**

Task 5: Test the Health Check and Failover

In this task, you will terminate your EC2 instance and cause your health check to return an *Unhealthy* status. Based on this status, your DNS configuration will failover to the secondary endpoint.

- In **AWS Management Console**, on the **Services** menu, click **EC2**.
- In the left navigation pane, click **Instances**.
  Your instance should be selected.

- In **Actions** menu, click **Instance State** > **Stop**.
- In the **Stop Instances** window, click **Yes Stop**
- Return to the **Route 53 Management Console** (Services menu > Route 53).
- In the left navigation pane, click **Health checks**.
- Select **healthCheckTest**.
- Click the **Monitoring** tab.
- Click the refresh every few seconds till the **Status** displays *Unhealthy*.
  This can take up to two minutes to register as *Unhealthy*, but you should see the test connections start to fail in under a minute.
- Open a new browser tab, and then:
- Enter the URL for your Route53 domain name (e.g. www.route53*)
- Press **Enter**
  You should see the following message in the browser: **Hello! Under Construction**. This might take a few minutes to update.
  You have successfully configured a few DNS records with DNS Failover.

End Lab