

CS7346 Lab 6: The Domain Name System and Network Routing

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To support the following lab exercises, please read the following chapters in the AWS Certified Solutions Architect Study Guide.

Chapter 8

Lab: Please complete the following lab exercises in the AWS Certified Solutions Architect Study Guide. When you are done, delete all the resources that you provisioned to avoid charges.

8.1 through 8.4 (inclusive)

Environment

Laptop: MacBook Air M2 2022, macOS 13.3

Chapter 8

8.1

EXERCISE 8.1

Create a Hosted Zone on Route 53 for an EC2 Web Server

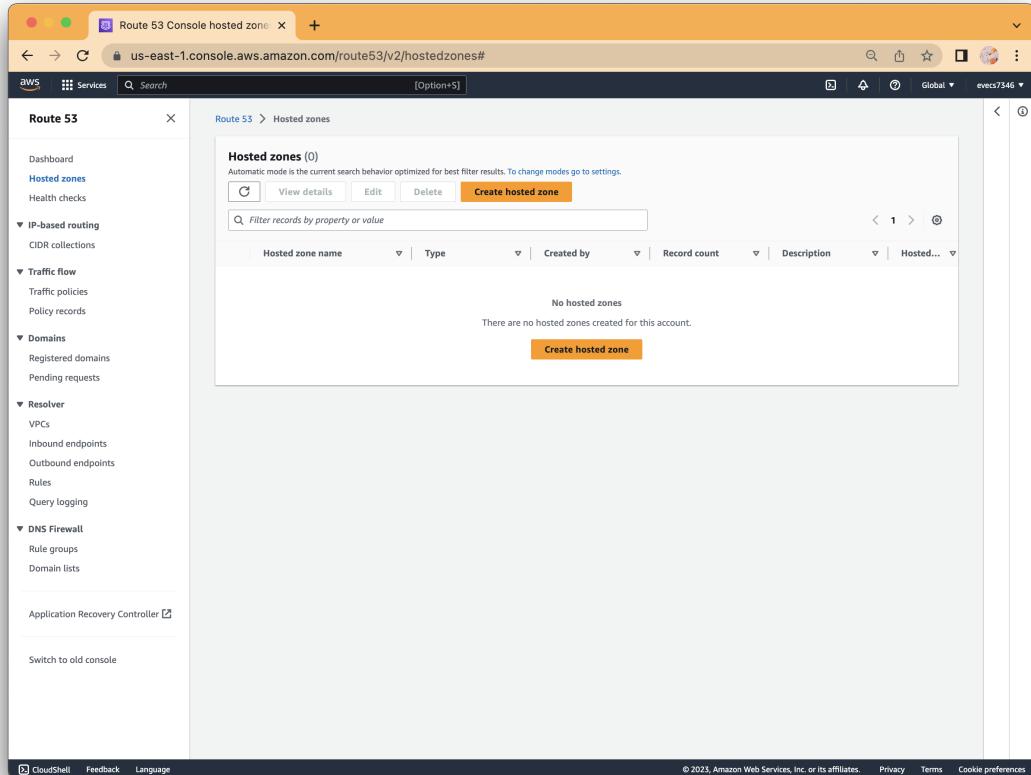
1. Click the Hosted Zones link and then the Create Hosted Zone button in the Route 53 dashboard.
2. Enter a valid domain name that's currently not managed and select the Public Hosted Zone type. If you don't already have an existing domain on Route 53 and don't want to create a new one just for this exercise, use a fake domain—even something like example.com. Of course, you won't be able to fully test the zone if you're not using a real domain name. Either way, remember that leaving the hosted zone up for more than 12 hours will incur a monthly hosting charge—that's currently only \$0.50.
3. You'll be given name server and SOA record sets. Select those records one at a time and spend a few minutes exploring.
4. From the Amazon EC2 Dashboard, create an AWS Linux AMI-based instance the way you did in Exercise 2.1 in Chapter 2, "Compute Services." You'll configure this instance as a simple web server so that you can test the domain. When configuring your security group, confirm that port 22 (SSH) is open and open HTTP port 80 (and HTTPS port 443 if necessary) so that web traffic can get in.
5. Log into your instance (as you did in Exercise 2.1) and run the following commands to update the software repository, install the Apache web server, create a default index.html web page (add some text to the page when the text editor opens, and, when you're done, save and exit using Ctrl+X and then Y; this will later help you know that everything is working), and start up the Apache process.

```
sudo yum update -y  
sudo yum install -y httpd  
sudo nano /var/www/html/index.html  
sudo systemctl start httpd
```

6. You can confirm your web server is working by pointing your browser to the instance's public IP address. You may want to keep this instance running, as it will also be helpful for the next exercise.
7. Back in the Route 53 Dashboard, click the Create Record button to create an A record to map your domain name to the IP address of a web server instance running on EC2. Leave the Name field to the left of the example.com value blank and enter your server's IP address (or any realistic fake address if your domain isn't real) in the Value field. Click Create.
8. Click Create Record Set once again to create a second A record. This time, you'll enter www in the Name field.
9. Click the Yes radio button next to Alias, click once inside the AliasTarget field, and select the example.com value that should be among those that appear.

Solution:

1.



Hosted zone - create

Route 53 > Hosted zones > Create hosted zone

Create hosted zone [Info](#)

Hosted zone configuration

A hosted zone is a container that holds information about how you want to route traffic for a domain, such as example.com, and its subdomains.

Domain name [Info](#)
This is the name of the domain that you want to route traffic for.

Valid characters: a-z, 0-9, ! " # % & ' () * + , - / ; : < = > ? @ { } ^ _ ` { } . ~

Description - optional [Info](#)
This value lets you distinguish hosted zones that have the same name.

The description can have up to 256 characters. 0/256

Type [Info](#)
The type indicates whether you want to route traffic on the internet or in an Amazon VPC.

Public hosted zone
A public hosted zone determines how traffic is routed on the internet.

Private hosted zone
A private hosted zone determines how traffic is routed within an Amazon VPC.

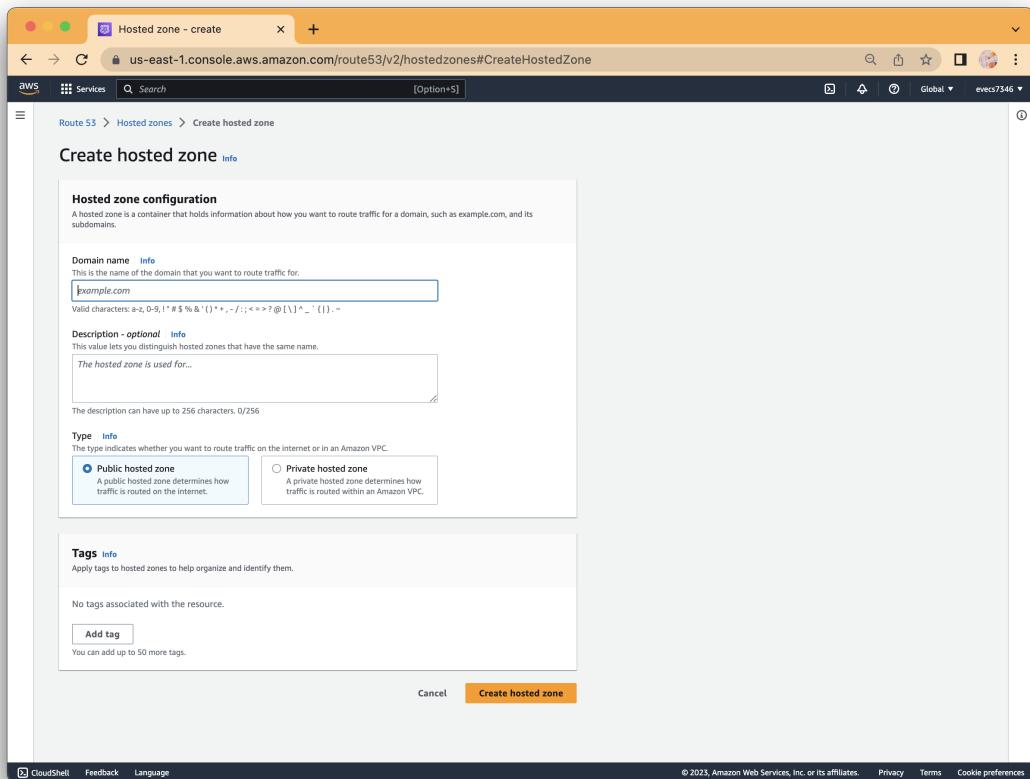
Tags [Info](#)
Apply tags to hosted zones to help organize and identify them.

No tags associated with the resource.

[Add tag](#)
You can add up to 50 more tags.

Cancel [Create hosted zone](#)

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2.

Hosted zone - create

us-east-1.console.aws.amazon.com/route53/v2/hostedzones?region=us-east-1#CreateHost...

Route 53 > Hosted zones > Create hosted zone

Create hosted zone Info

Hosted zone configuration
A hosted zone is a container that holds information about how you want to route traffic for a domain, such as example.com, and its subdomains.

Domain name Info
This is the name of the domain that you want to route traffic for.

Valid characters: a-z, 0-9, ! * # \$ % & ^ () * + , - / ; < = > ? @ [\] ^ _ ` { } . ~

Description - optional Info
This value lets you distinguish hosted zones that have the same name.

The description can have up to 256 characters. 0/256

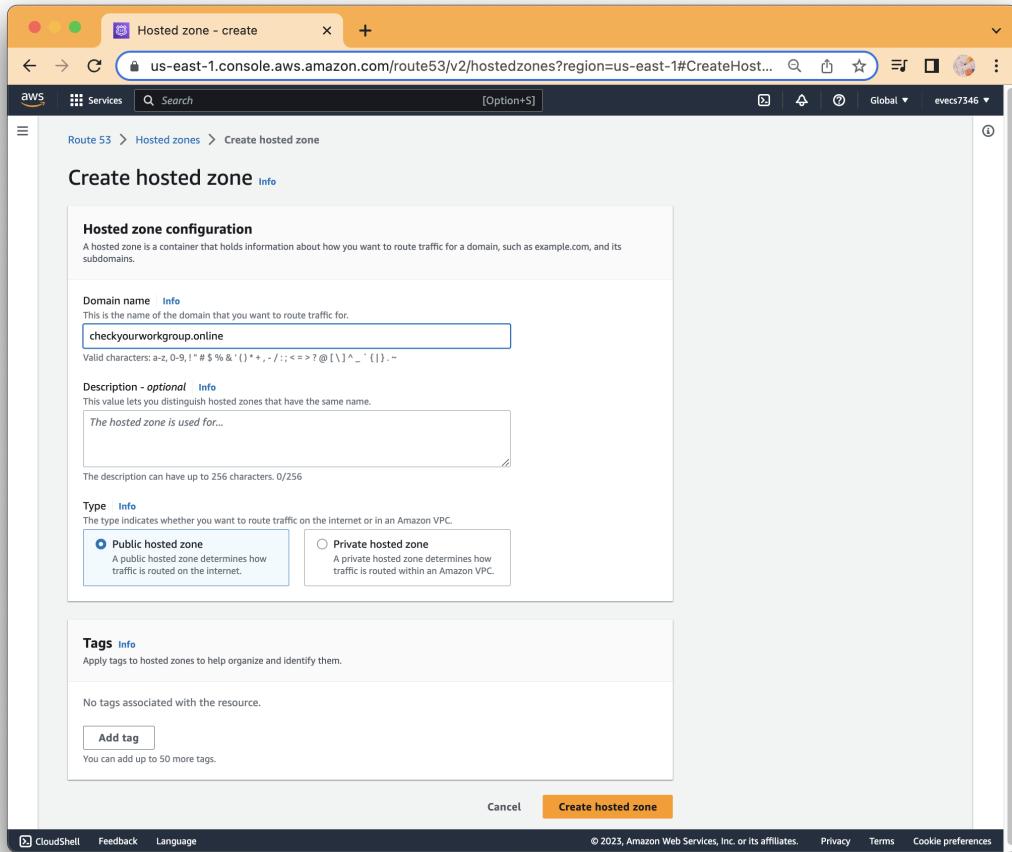
Type Info
The type indicates whether you want to route traffic on the internet or in an Amazon VPC.
 Public hosted zone
A public hosted zone determines how traffic is routed on the internet.
 Private hosted zone
A private hosted zone determines how traffic is routed within an Amazon VPC.

Tags Info
Apply tags to hosted zones to help organize and identify them.
No tags associated with the resource.
[Add tag](#)
You can add up to 50 more tags.

[Cancel](#) **Create hosted zone**

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CloudShell Feedback Language



3.

Route 53

Hosted zones

Records (4)

Record ...	Type	Routin...	Differ...	Alias	Value/Route traffic to	TTL (s...)	Health ...	Evalu...
checkyour...	NS	Simple	-	No	ns-6.awsdns-00.com, ns-1739.awsdns-25.co.uk. ns-570.awsdns-07.net. ns-1210.awsdns-23.org.	172800	-	-
checkyour...	SOA	Simple	-	No	ns-6.awsdns-00.com.awsdns...	900	-	-
subdomain...	A	Simple	-	No	54.236.65.98	300	-	-
www.chec...	A	Simple	-	Yes	subdomain.checkyourworkgr...	-	-	Yes

4.

Instance details | EC2 Manager

EC2 > Instances > i-06d7011976cf680a2 (Route 53 instance) Info

Instance ID	i-06d7011976cf680a2 (Route 53 instance)	Public IPv4 address	54.236.65.98 open address
IPv6 address	-	Private IPv4 addresses	172.31.28.120
Hostname type	Private IP DNS name (IPv4 only)	Public IPv4 DNS	ec2-54-236-65-98.compute-1.amazonaws.com open address
IP name: ip-172-31-28-120.ec2.internal	ip-172-31-28-120.ec2.internal		
IPv4 (A)	t2.micro	Elastic IP addresses	-
Auto-assigned IP address	54.236.65.98 [Public IP]	AWS Compute Optimizer finding	Opt-in to AWS Compute Optimizer for recommendations. Learn more
IAM Role	vpc-008024c6794f21b94	Auto Scaling Group name	-
IMDSv2 Required	Subnet ID	subnet-0b8f9b6de09e2792c	

5.

```
ec2-user@ip-172-31-28-120:~$ ec2-user@ip-172-31-28-120:~ (ssh) %1 + Last login: Tue Jul 11 01:32:50 on ttys000  
↳ ~ cd Downloads  
↳ Downloads chmod 400 routeinstance.pem  
↳ Downloads ssh -i "routeinstance.pem" ec2-user@ec2-54-236-65-98.compute-1.amazonaws.com  
The authenticity of host 'ec2-54-236-65-98.compute-1.amazonaws.com (54.236.65.98)' can't be established.  
ED25519 key fingerprint is SHA256:w70400BLroHSD7omcwEVh+V0yjUNQWXP9xLraJVF75Y.  
This key is not known by any other names  
Are you sure you want to continue connecting (yes/no/[fingerprint])? s  
Please type 'yes', 'no' or the fingerprint: yes  
Warning: Permanently added 'ec2-54-236-65-98.compute-1.amazonaws.com' (ED25519)  
to the list of known hosts.  
          #  
     ~\ _ ##### Amazon Linux 2023  
     ~~ \_ #####  
     ~~   \|##|  
     ~~    \|/\ https://aws.amazon.com/linux/amazon-linux-2023  
     ~~     V~'__>  
     ~~~      /  
     ~~~ . / /  
     ~~~ . / /  
     ~~~ . / /  
[ec2-user@ip-172-31-28-120 ~]$ |
```

```

ec2-user@ip-172-31-28-120:~ (ssh)
[ec2-user@ip-172-31-28-120 ~]$ sudo yum update -y
Last metadata expiration check: 0:01:26 ago on Tue Jul 11 17:14:49 2023.
Dependencies resolved.
Nothing to do.
Complete!
[ec2-user@ip-172-31-28-120 ~]$ sudo yum install -y httpd
Last metadata expiration check: 0:01:38 ago on Tue Jul 11 17:14:49 2023.
Dependencies resolved.
=====
Package          Arch    Version        Repository      Size
=====
Installing:
httpd           x86_64  2.4.56-1.amzn2023   amazonlinux   48 k
Installing dependencies:
apr              x86_64  1.7.2-2.amzn2023.0.2  amazonlinux   129 k
apr-util         x86_64  1.6.3-1.amzn2023.0.1  amazonlinux   98 k
generic-logos-httpd noarch  18.0.0-12.amzn2023.0.3  amazonlinux   19 k
httpd-core       x86_64  2.4.56-1.amzn2023   amazonlinux   1.4 M
httpd-filesystem noarch  2.4.56-1.amzn2023   amazonlinux   15 k
httpd-tools      x86_64  2.4.56-1.amzn2023   amazonlinux   82 k
libbrotli        x86_64  1.0.9-4.amzn2023.0.2  amazonlinux   315 k
mailcap          noarch  2.1.49-3.amzn2023.0.3  amazonlinux   33 k
Installing weak dependencies:
apr-util-openssl x86_64  1.6.3-1.amzn2023.0.1  amazonlinux   17 k
mod http2        x86_64  2.0.11-2.amzn2023   amazonlinux   150 k
mod_lua          x86_64  2.4.56-1.amzn2023   amazonlinux   62 k
=====
Transaction Summary
=====
Install 12 Packages

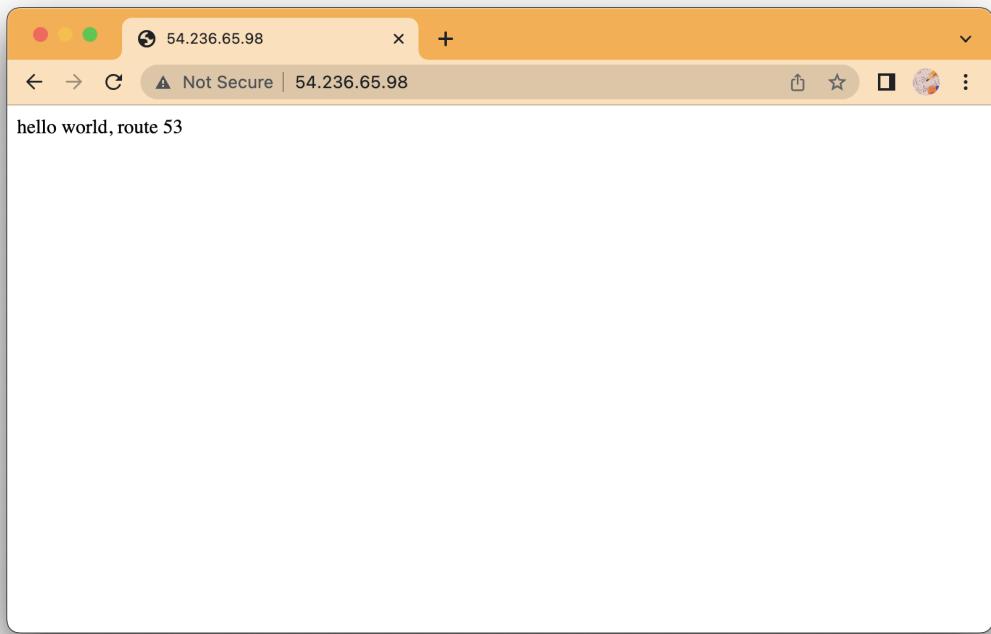
Total download size: 2.3 M
Installed size: 6.9 M
Downloading Packages:
(1/12): apr-util-openssl-1.6.3-1.amzn2023.0.1.x 148 kB/s | 17 kB  00:00
(2/12): httpd-tools-2.4.56-1.amzn2023.x86_64.rpm 1.9 MB/s | 82 kB  00:00
(3/12): libbrotli-1.0.9-4.amzn2023.0.2.x86_64.r 1.9 MB/s | 315 kB  00:00
(4/12): httpd-core-2.4.56-1.amzn2023.x86_64.rpm 7.8 MB/s | 1.4 MB  00:00
(5/12): apr-1.7.2-2.amzn2023.0.2.x86_64.rpm 6.2 MB/s | 129 kB  00:00
(6/12): mod_lua-2.4.56-1.amzn2023.x86_64.rpm 3.1 MB/s | 62 kB  00:00
(7/12): httpd-2.4.56-1.amzn2023.x86_64.rpm 1.9 MB/s | 48 kB  00:00
(8/12): apr-util-1.6.3-1.amzn2023.0.1.x86_64.rpm 3.9 MB/s | 98 kB  00:00
(9/12): mailcap-2.1.49-3.amzn2023.0.3.noarch.rpm 1.4 MB/s | 33 kB  00:00
(10/12): mod_http2-2.0.11-2.amzn2023.x86_64.rpm 4.3 MB/s | 150 kB  00:00
(11/12): httpd-filesystem-2.4.56-1.amzn2023.noarch 524 kB/s | 15 kB  00:00
(12/12): generic-logos-httpd-18.0.0-12.amzn2023 1.2 MB/s | 19 kB  00:00
-----
Total                                         7.3 MB/s | 2.3 MB  00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing          : 1/1
  Installing        : apr-1.7.2-2.amzn2023.0.2.x86_64 1/12
  Installing        : apr-util-1.6.3-1.amzn2023.0.1.x86_64 2/12
  Installing        : apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64 3/12
  Installing        : mailcap-2.1.49-3.amzn2023.0.3.noarch 4/12
  Installing        : httpd-tools-2.4.56-1.amzn2023.x86_64 5/12
  Installing        : generic-logos-httpd-18.0.0-12.amzn2023.0.3.noarch 6/12
  Running scriptlet: httpd-filesystem-2.4.56-1.amzn2023.noarch 7/12
  Installing        : httpd-filesystem-2.4.56-1.amzn2023.noarch 7/12
  Installing        : httpd-core-2.4.56-1.amzn2023.x86_64 8/12
  Installing        : mod_lua-2.4.56-1.amzn2023.x86_64 9/12
  Installing        : mod_http2-2.0.11-2.amzn2023.x86_64 10/12
  Installing        : libbrotli-1.0.9-4.amzn2023.0.2.x86_64 11/12
  Installing        : httpd-2.4.56-1.amzn2023.x86_64 12/12
  Running scriptlet: httpd-2.4.56-1.amzn2023.x86_64 12/12
  Verifying          : libbrotli-1.0.9-4.amzn2023.0.2.x86_64 1/1
  Verifying          : apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64 2/1

```

```
ec2-user@ip-172-31-28-120:~  
ec2-user@ip-172-31-28-120:~ (ssh)  
GNU nano 5.8  
/var/www/html/index.html  
hello world, route 53
```

```
ec2-user@ip-172-31-28-120:~  
ec2-user@ip-172-31-28-120:~ (ssh)  
7/12 Verifying : apr-util-1.6.3-1.amzn2023.0.1.x86_64  
8/12 Verifying : mod_http2-2.0.11-2.amzn2023.x86_64  
9/12 Verifying : mailcap-2.1.49-3.amzn2023.0.3.noarch  
10/12 Verifying : httpd-filesystem-2.4.56-1.amzn2023.noarch  
11/12 Verifying : generic-logos-httpd-18.0.0-12.amzn2023.0.3.noarch  
12/12  
Installed:  
apr-1.7.2-2.amzn2023.0.2.x86_64           apr-util-1.6.3-1.amzn2023.0.1.x86_64  
apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64 generic-logos-httpd-18.0.0-12.amzn2023.0.3.no  
arch  
httpd-2.4.56-1.amzn2023.x86_64           httpd-core-2.4.56-1.amzn2023.x86_64  
httpd-filesystem-2.4.56-1.amzn2023.noarch   httpd-tools-2.4.56-1.amzn2023.x86_64  
libbrotli-1.0.9-4.amzn2023.0.2.x86_64     mailcap-2.1.49-3.amzn2023.0.3.noarch  
mod_http2-2.0.11-2.amzn2023.x86_64        mod_lua-2.4.56-1.amzn2023.x86_64  
  
Complete!  
[ec2-user@ip-172-31-28-120 ~]$ sudo nano /var/www/html/index.html  
[ec2-user@ip-172-31-28-120 ~]$ sudo nano /var/www/html/index.html  
[ec2-user@ip-172-31-28-120 ~]$ sudo systemctl start httpd  
[ec2-user@ip-172-31-28-120 ~]$ |
```

6.



7.

The screenshot shows the AWS Route 53 Dashboard. On the left, a sidebar menu includes options like Dashboard, Hosted zones, Health checks, IP-based routing, CIDR collections, Traffic flow, Traffic policies, Policy records, Domains, Registered domains, Requests, Resolver, VPCs, Inbound endpoints, Outbound endpoints, Rules, Query logging, DNS Firewall, Rule groups, Domain lists, Application Recovery Controller, and a link to Switch to old console.

The main content area displays the following sections:

- DNS management**: Shows 1 Hosted zone.
- Traffic management**: A visual tool for creating policies for multiple endpoints in complex configurations. Includes a "Create policy" button.
- Availability monitoring**: Monitors applications and web resources. Includes a "Create health check" button.
- Domain registration**: Registers domains. Includes a "Register domain" button.

Below these sections is a "Register domain" form with fields for "Enter a domain name" and a "Check" button. There is also a "Notifications" section with a search bar and a table showing one notification entry.

At the bottom, there are links for CloudShell, Feedback, Language, and a footer with copyright information and links to Privacy, Terms, and Cookie preferences.

The screenshot shows the AWS Route 53 Hosted zones page. The sidebar menu is identical to the dashboard page.

The main content area shows a table titled "Hosted zones (1)". The table has columns for Hosted zone name, Type, Created by, and Record count. One row is listed:

Hosted zone name	Type	Created by	Record count
checkyourworkgroup.online	Public	Route 53	2

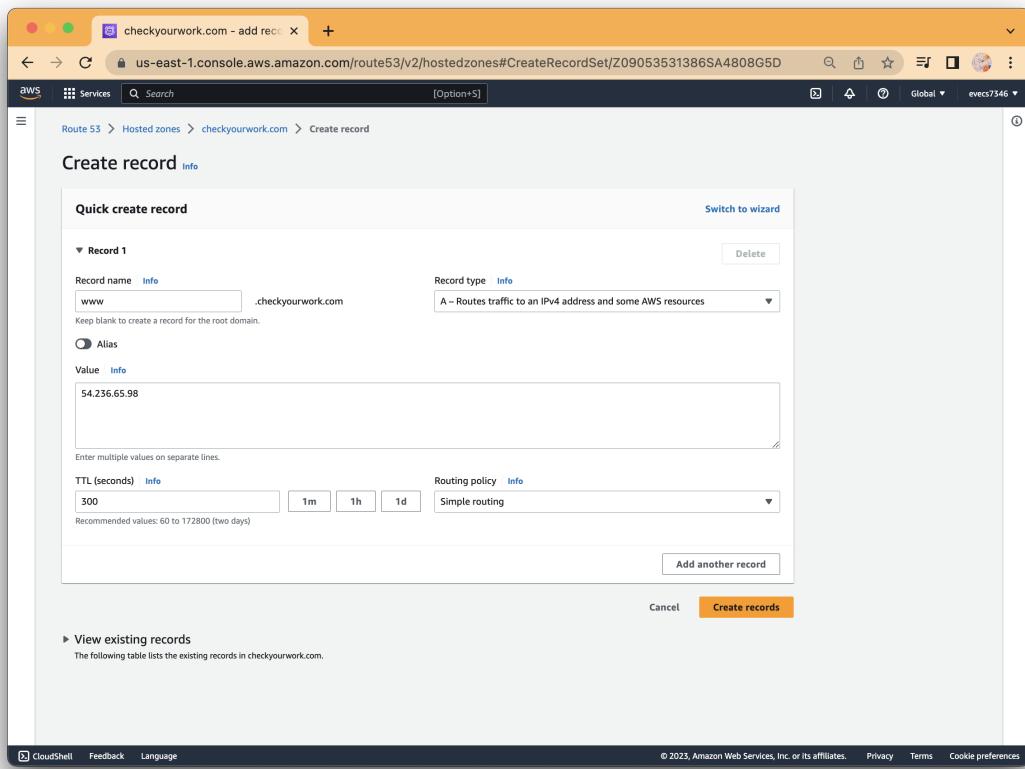
A message on the right side says "0 hosted zone selected" and "Select a hosted zone to see its details".

At the bottom, there are links for CloudShell, Feedback, Language, and a footer with copyright information and links to Privacy, Terms, and Cookie preferences.

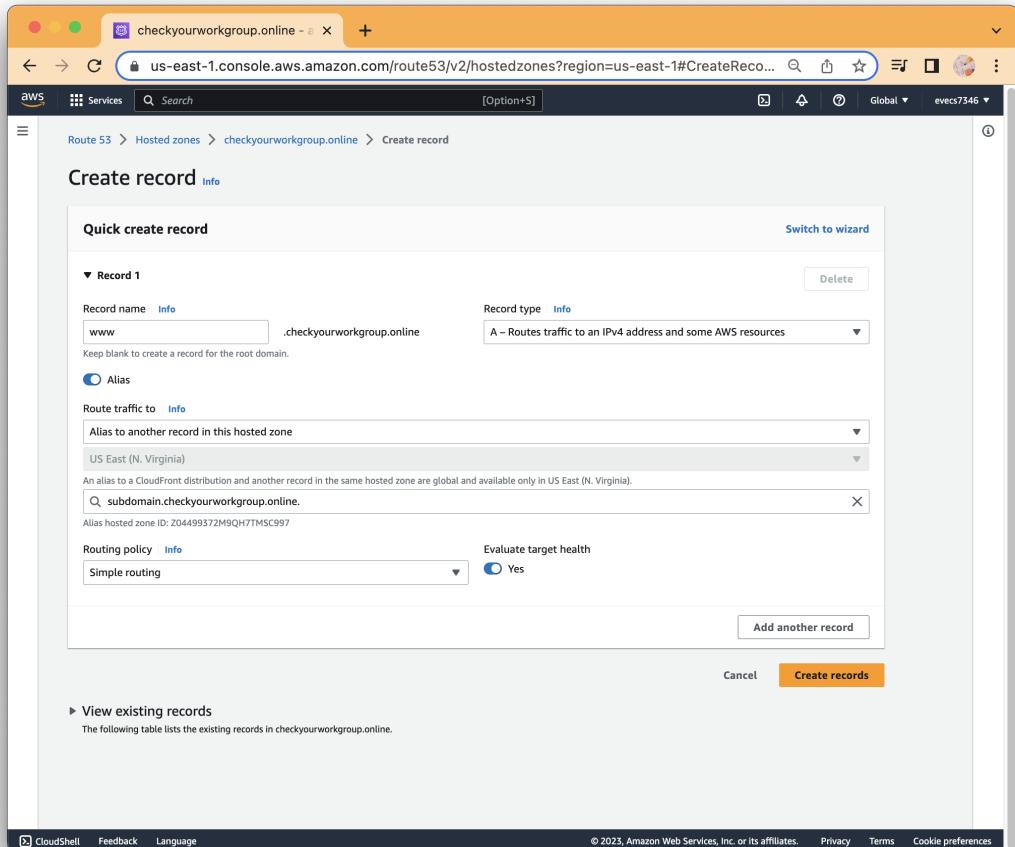
The screenshot shows the AWS Route 53 Hosted Zones console. The left sidebar navigation includes: Dashboard, Hosted zones (selected), Health checks, IP-based routing, CIDR collections, Traffic flow, Traffic policies, Policy records, Domains, Registered domains, Pending requests, Resolver, VPCs, Inbound endpoints, Outbound endpoints, Rules, Query logging, and DNS Firewall. The main content area displays the 'checkyourworkgroup.online' hosted zone details. It shows 2 records: an NS record for 'ns-6.awsdns-00.com' and an SOA record for 'ns-6.awsdns-00.com'. The right sidebar indicates '0 records selected'.

The screenshot shows the 'Create record' wizard for the 'checkyourworkgroup.online' zone. The 'Quick create record' step is active. It allows creating a new record named 'subdomain' under the root domain '.checkyourworkgroup.online'. The record type is set to 'A' (IPv4). The value is '54.236.65.98'. Other fields include TTL (300 seconds), Routing policy (Simple routing), and a note about recommended values (60 to 172800). Buttons for 'Add another record' and 'Create records' are present at the bottom.

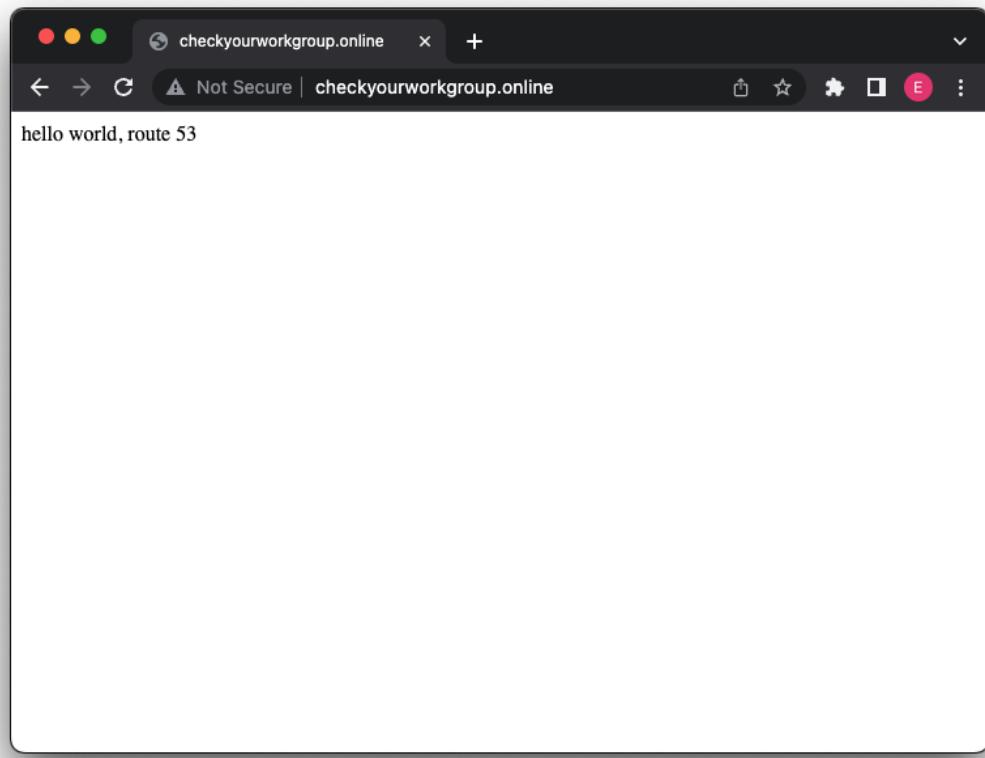
8.



9.



10.



8.2

EXERCISE 8.2

Set Up a Health Check

1. In the Route 53 GUI, click Create Health Check.
2. Give your check a name and select the Endpoint radio button for What To Monitor. You can use the web server you created in Exercise 8.1 as the health check endpoint.
3. With the IP address radio button selected for Specify Endpoint By, choose either HTTP or HTTPS for the protocol (this will depend on how you configured Transport Layer Security [TLS] encryption for your website—HTTP is a good bet if you’re not sure).
4. Enter your server’s IP address, and enter either **80** or **443** for the Port value (again, this will depend on your site’s TLS settings—80 is a good bet if you’re not sure).
5. Enter the name of a file in the web root directory of your website as the Path value. This is the resource the health check will try to load to test your site’s health. You could use `index.html` (or `index.php`, if you happen to have a PHP application running), but, over the long term, that will probably cause a lot of unnecessary overhead. Instead, consider creating a small file called something like `test.html` and entering that for Path.
6. You can create an alarm to alert you to failed tests or simply click Create Health Check.

Solution:

1.

The screenshot shows the AWS Route 53 Management Console with the URL us-east-1.console.aws.amazon.com/route53/healthchecks/home?region=us-east-1#/. The left sidebar is collapsed, and the main content area displays the "Welcome to Route 53 health checks" page. A blue banner at the top says "Health checks console feedback collection" with the subtext "To help us improve the Health Check user experience, please take 5 minutes to complete this survey." Below this, there's a section titled "Health check concepts" with two main items: "Availability and performance monitoring" (represented by a computer monitor icon with a checkmark) and "DNS failover" (represented by a shield with a stethoscope and a plus sign). Each item has a brief description and a "Learn more" link.

The screenshot shows the "Hosted zone - create" page with the URL us-east-1.console.aws.amazon.com/route53/v2/hostedzones#CreateHostedZone. The page title is "Create hosted zone". It contains several configuration sections: "Hosted zone configuration" (with a sub-note about what a hosted zone is), "Domain name" (set to "example.com"), "Description - optional" (left empty), "Type" (set to "Public hosted zone"), and "Tags" (left empty). At the bottom, there are "Cancel" and "Create hosted zone" buttons.

2.

The screenshot shows the 'Create health check' page in the Route 53 Management Console. The URL in the browser is us-east-1.console.aws.amazon.com/route53/healthchecks/home?region=us-east-1#/create. The page is titled 'Configure health check'. It includes a sidebar with 'Step 1: Configure health check' and 'Step 2: Get notified when health check fails'. The main content area has a heading 'Monitor an endpoint' with a note: 'Multiple Route 53 health checkers will try to establish a TCP connection with the following resource to determine whether it's healthy.' Below this is a 'Learn more' link. The configuration form is as follows:

Name:	checkhealth
What to monitor:	<input checked="" type="radio"/> Endpoint <input type="radio"/> Status of other health checks (calculated health check) <input type="radio"/> State of CloudWatch alarm
Specify endpoint by:	<input checked="" type="radio"/> IP address <input type="radio"/> Domain name
Protocol:	HTTP
IP address *:	54.236.65.98
Host name:	www.example.com
Port *:	80
Path:	/images

At the bottom of the configuration section is a 'Advanced configuration' link. The footer of the page includes links for CloudShell, Feedback, Language, and navigation icons for the AWS console.

3.

This screenshot shows the same 'Create health check' page as the previous one, but with additional information filled in. The URL in the browser is the same: us-east-1.console.aws.amazon.com/route53/healthchecks/home?region=us-east-1#/create. The configuration form now includes:

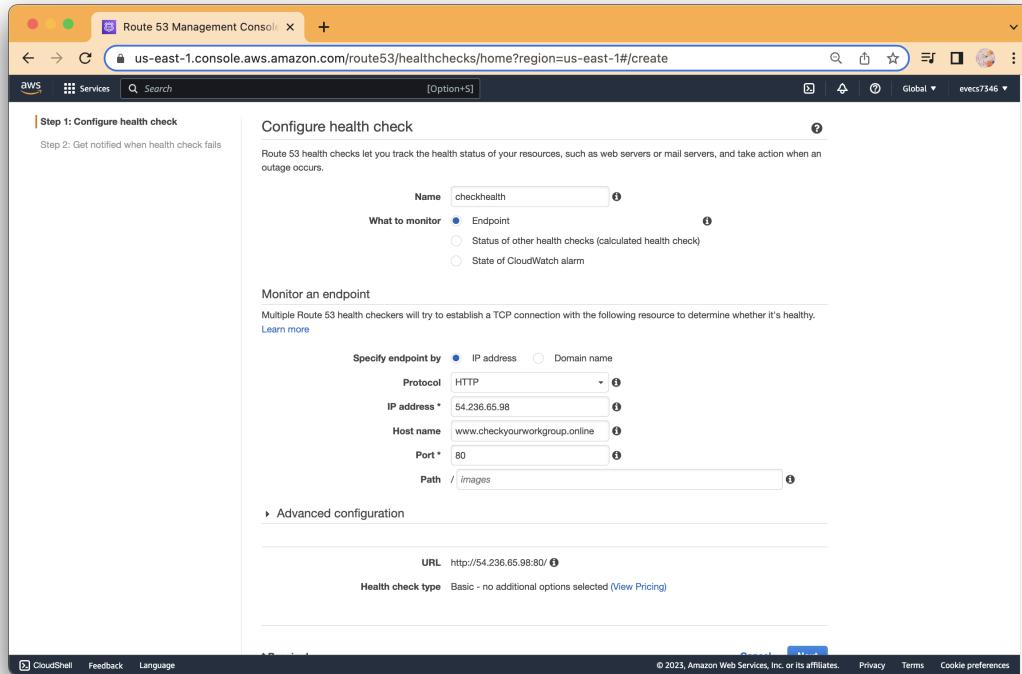
Name:	checkhealth
What to monitor:	<input checked="" type="radio"/> Endpoint <input type="radio"/> Status of other health checks (calculated health check) <input type="radio"/> State of CloudWatch alarm
Specify endpoint by:	<input checked="" type="radio"/> IP address <input type="radio"/> Domain name
Protocol:	HTTP
IP address *:	54.236.65.98
Host name:	www.checkyourworkgroup.online
Port *:	80
Path:	/images

Below the configuration form, there is a summary section:

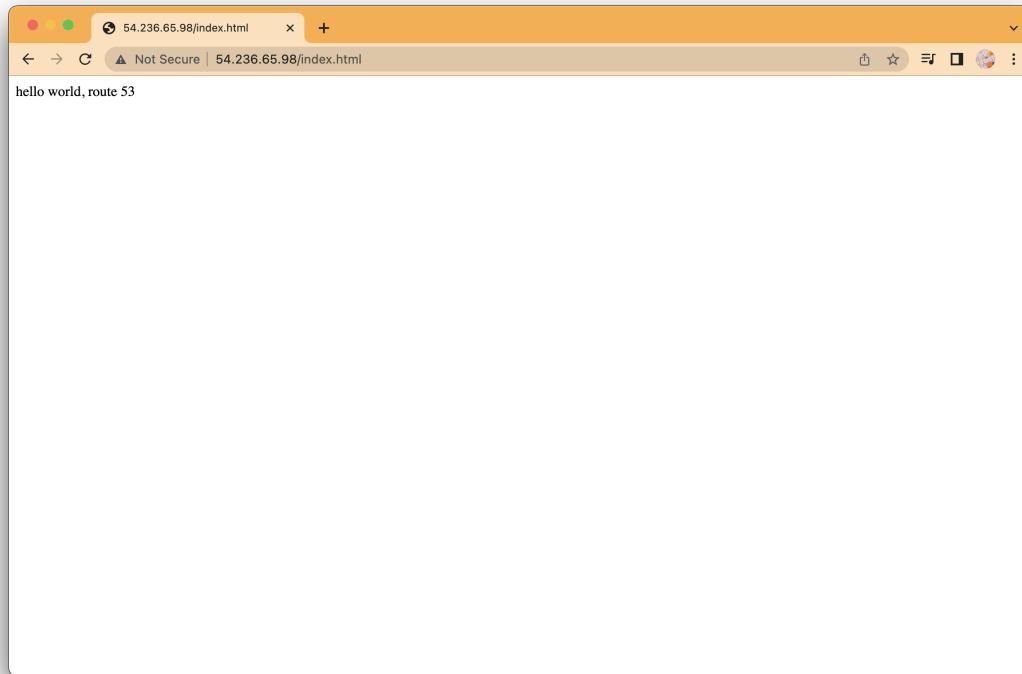
URL:	http://54.236.65.98:80/
Health check type:	Basic - no additional options selected (View Pricing)

The footer of the page remains the same as in the first screenshot.

4.



5.



Route 53 Management Console

Step 2: Get notified when health check fails

Route 53 health checks let you track the health status of your resources, such as web servers or mail servers, and take action when an outage occurs.

Name: checkhealth

What to monitor: Endpoint

- Status of other health checks (calculated health check)
- State of CloudWatch alarm

Monitor an endpoint

Multiple Route 53 health checkers will try to establish a TCP connection with the following resource to determine whether it's healthy.

[Learn more](#)

Specify endpoint by: IP address

Protocol: HTTP

IP address: 54.236.65.98

Host name: www.checkyourworkgroup.online

Port: 80

Path: /index.html

[Advanced configuration](#)

URL: http://54.236.65.98:80/index.html

Health check type: Basic - no additional options selected ([View Pricing](#))

* Required

[Cancel](#) [Next](#)

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6.

Route 53 Management Console

Dashboard Hosted zones Health checks IP-based routing CIDR collections Traffic flow Traffic policies Policy records Domains Registered domains Pending requests Resolver VPCs Inbound endpoints Outbound endpoints Rules Query logging DNS Firewall Rule groups Domain lists Application Recovery Controller

Health checks console feedback collection To help us improve the Health Check user experience, please take 5 minutes to [complete this survey](#).

[Create health check](#) [Delete health check](#) [Edit health check](#)

Name	Status	Description	Alarms	ID
checkhealth	Unknown	http://54.236.65.98:80/index.html	⚠ 1 of 1 in INSUFFICIENT DATA	Oede3042-deaf-4862-ae3e-ce05878a5b34

No health check selected.

No health check selected.

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Route 53 Management Console

us-east-1.console.aws.amazon.com/route53/healthchecks/home?region=us-east-1#/

Dashboard Hosted zones Health checks IP-based routing CIDR collections Traffic flow Traffic policies Policy records Domains Registered domains Pending requests Resolver VPCs Inbound endpoints Outbound endpoints Rules Query logging DNS Firewall Rule groups Domain lists Application Recovery Controller

Create health check Delete health check Edit health check

Health checks console feedback collection To help us improve the Health Check user experience, please take 5 minutes to complete this survey.

Name	Status	Description	Alarms	ID
checkhealth	Healthy	http://54.236.65.98:80/index.html	1 of 1 in OK	0ede3042-deaf-4962-ae3e-ce

No health check selected.

No health check selected.

Info Monitoring Alarms Tags Health checkers Latency

CloudShell Feedback Language

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The screenshot shows the AWS Route 53 Management Console interface. The left sidebar contains navigation links for various services like Dashboard, Hosted zones, and Health checks. The main content area is titled 'Health checks' and shows a table of existing health checks. One entry, 'checkhealth', is listed with a green status bar indicating it is 'Healthy'. Below the table, there are tabs for 'Info', 'Monitoring', 'Alarms', 'Tags', 'Health checkers', and 'Latency'. A survey pop-up window is overlaid on the top of the page, asking for feedback on the health check user experience. At the bottom, there are links for CloudShell, Feedback, and Language, along with standard AWS footer links for privacy, terms, and cookie preferences.

8.3

EXERCISE 8.3

Configure a Route 53 Routing Policy

1. Make sure you have two separate web-facing resources running. You could create a second Apache web server instance in addition to the one you launched in Exercise 8.1, or perhaps create a simple static website in S3 the way you did in Exercise 3.4 in Chapter 3, “AWS Storage.” In this case, though, your bucket name will have to exactly match the domain name. That might mean something like secondary.example.com.
2. Configure a health check for each of your resources. You create a health check for an S3 static website by selecting Domain Name for Specify Endpoint By. Note that you’ll need to strip off the http:// and trailing / characters from the endpoint before the health check configuration will accept it.
3. Assuming you have an active hosting zone (perhaps the one from Exercise 8.1), use the Route 53 GUI to create a record set for each of your instances. You might enter domain names like server1.example.com and server2.example.com—it’s up to you.

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EXERCISE 8.3 (*continued*)

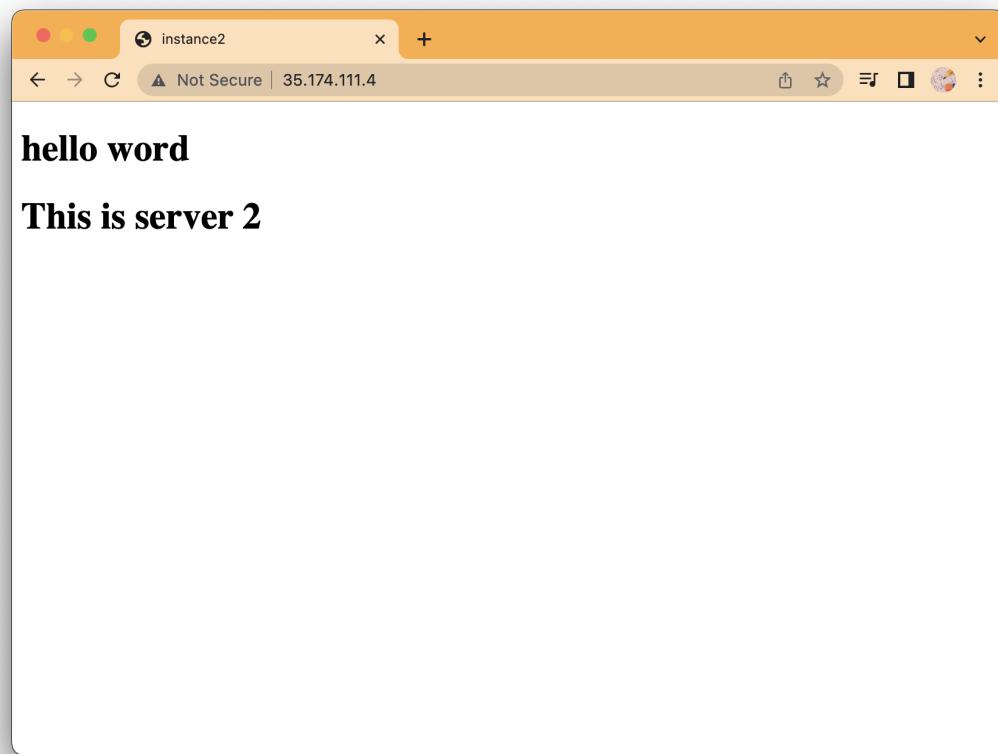
4. Create a regular A record type if you’re pointing to an EC2 instance, and enter the instance’s IP address as the record’s Value. If you’re using an S3 static website for one or both of your resources, click Yes for Alias in the record set, click once within the Alias Target box that will appear, and select the appropriate S3 resource from among those that appear. Your static website must live in the same AWS account.
5. For Routing Policy, select Failover and choose either Primary or Secondary from the Failover Record Type drop-down menu. The Set ID value will automatically change according to your choice. Make sure the record set for one of your resources is designated as Primary.
6. Select Yes for Evaluate Target Health, and select Yes for Associate With Health Check. Select the health check that matches the resource you’re working with.
7. Test your configuration by first loading the primary website by its normal URL. Now, disable your primary website. You could do that by deleting or renaming its index.html file, by blocking HTTP access in the instance security group, or in the case of an S3, by disabling the static website setting. Point your browser to the same primary URL. If failover is working, you should see the index.html web page from your secondary resource.

Solution:

1.

The screenshot shows the AWS EC2 Management console with the URL [us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#instances:instanceState=running;v=3;\\$case=tags:true...](https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#instances:instanceState=running;v=3;$case=tags:true...). The left sidebar is collapsed, and the main area displays a table of instances. The table has columns for Name, Instance ID, Instance state, Instance type, Status check, Alarm status, Availability Zone, and Public IPv4 DNS. Two instances are listed: server1 (Instance ID i-06d7011976cf680a2, t2.micro, 2/2 checks passed, No alarms, us-east-1b, ec2-3-90-248-29) and server2 (Instance ID i-0c5d574349571477f, t2.micro, 2/2 checks passed, No alarms, us-east-1a, ec2-35-174-111-1). A search bar at the top is set to "Instance state = running".

The screenshot shows a web browser window with the URL 54.87.63.184. The page title is "Not Secure | 54.87.63.184". The content of the page is "hello world, route 53, this is server1".



2.

A screenshot of the Route 53 Management Console. The left sidebar shows various options like Dashboard, Hosted zones, IP-based routing, Traffic flow, Domains, Resolver, DNS Firewall, and Application Recovery Controller. The main pane is titled 'Health checks console feedback collection' and shows a table of health checks. The table has columns for Name, Status, Description, Alarms, and ID. It contains two entries: 'server1' and 'server2', both of which are marked as 'Healthy' with green bars. The 'Status' column shows 'an hour ago' for both. The 'Description' column shows URLs for each server. The 'Alarms' column indicates 'No alarms configured.' for both. The 'ID' column shows unique IDs for each server.

3.

Record name	Type	Routing policy	Alias	Value/Route traffic to
checkyourworkgroup.online	A	Failover	Primary	54.87.63.184
checkyourworkgroup.online	A	Failover	Secondary	35.174.111.4
checkyourworkgroup.online	NS	Simple	-	ns-6.awsdns-00.com. ns-1739.awsdns-25.co.uk. ns-570.awsdns-07.net. ns-1210.awsdns-23.org.
checkyourworkgroup.online	SOA	Simple	-	ns-6.awsdns-00.com.awsdns...

4.

Record name	Type	Routing policy	Alias	Value/Route traffic to
checkyourworkgroup.online	A	Failover	Primary	54.87.63.184
checkyourworkgroup.online	A	Failover	No	35.174.111.4
checkyourworkgroup.online	NS	Simple	-	ns-6.awsdns-00.com.awsdns...
checkyourworkgroup.online	SOA	Simple	-	ns-6.awsdns-00.com.awsdns...

Record details

 Record name: checkyourworkgroup.online
 Record type: A
 Value: 54.87.63.184
 Alias: No
 TTL (seconds): 10
 Routing policy: Failover
 Failover record type: Primary
 Health check ID: 04d6bcdf-e260-4d9e-93cb-c552ed7fe4a1
 Record id: Primary

5.

Record name	Type	Routing policy	Alias	Value/Route traffic to	
checkyourworkgroup.online	A	Failover	Primary	No	54.87.63.184
checkyourworkgroup.online	A	Failover	Secondary	No	35.174.111.4
checkyourworkgroup.online	NS	Simple	-	No	ns-6.awsdns-00.com ns-1739.awsdns-25.co.uk ns-570.awsdns-07.net ns-1210.awsdns-23.org
checkyourworkgroup.online	SOA	Simple	-	No	ns-6.awsdns-00.com awsdns...

6.

The screenshot shows the AWS Route 53 Management Console with the URL us-east-1.console.aws.amazon.com/route53/healthchecks/home?region=us-east-1#/. The left sidebar is collapsed. The main area displays a table of health checks. A modal window titled "Health checks console feedback collection" is open at the top, asking for user feedback. The table has columns: Name, Status, Description, Alarms, and ID. One entry is visible:

Name	Status	Description	Alarms	ID
checkhealth	Healthy	http://54.236.65.98:80/index.html	1 of 1 in OK	0ede3042-deaf-4962-ae3e-ce

Below the table, there are tabs for Info, Monitoring, Alarms, Tags, Health checkers, and Latency. The Info tab is selected. A message "No health check selected." is displayed.

7.

The screenshot shows a web browser window with the URL checkyourworkgroup.online. The page content is "hello world, route 53, this is server1". The browser status bar indicates "Not Secure".

Route 53 Management Console

us-east-1.console.aws.amazon.com/route53/healthchecks/home?region=us-east-1#

Health checks

Health checks console feedback collection
To help us improve the Health Check user experience, please take 5 minutes to complete this survey.

Create health check Delete health check Edit health check

Name	Status	Description	Alarms	ID
server1	Unhealthy	http://54.87.63.184:80/index.html	No alarms configured.	04d8bcdf-e260-4d9e-93cb-c552ed7fe4a1
server2	Healthy	http://35.174.111.4:80/index.html	No alarms configured.	c840e2f5-4ee3-4756-beb8-10fe9747ba4e

CloudShell Feedback Language

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instance2

Not Secure | checkyourworkgroup.online

hello word

This is server 2

8.4

EXERCISE 8.4

Create a CloudFront Distribution for Your S3-Based Static Website

1. Create a static website in S3 the way you did in Exercise 3.4 in Chapter 3.
2. From the CloudFront dashboard, start a new distribution.
3. Click once inside the Origin domain box, and a list of all the available resources within your account will be displayed. The S3 bucket containing your website files should be included. Select it.

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4. Scroll down and select a price class in the Distribution Settings section. Using the All Edge Locations setting will provide the best performance for the greatest number of customers, but it will also cost more. By the way, if you're only creating this as an experiment and you're unlikely to get more than a few hundred requests, then don't worry about the cost; it'll be in the low pennies.

The next three steps will apply only if you have a valid DNS domain to work with.

5. Add the DNS domain names you want to use for this distribution to the Alternate domain name (CNAMEs) box. Those might include server1.example.com and www.example.com. If you don't do this, your encryption certificate might not work for all content requests.
6. Click the Request Certificate link beneath the Custom SSL Certificate box and follow the simple instructions to request a certificate for your registered domain name. Once your request has been granted, your certificate will appear in the Custom SSL Certificate box. You can select it.
7. When you're satisfied with your settings, click Create Distribution.
8. In the Route 53 console, create (or edit) a record set that points your domain name to the CloudFront distribution you just created. Wait for the new settings to propagate and confirm that you can access the S3 content through a domain using HTTPS (encryption).

Solution:

- 1.

The screenshot shows the AWS S3 console interface. On the left, a sidebar titled 'Amazon S3' contains sections for 'Buckets', 'Access Points', 'Object Lambda Access Points', 'Multi-Region Access Points', 'Batch Operations', 'IAM Access Analyzer for S3', 'Block Public Access settings for this account', 'Storage Lens', 'Dashboards', 'AWS Organizations settings', and 'Feature spotlight'. The main content area is titled 'ex84bucket' and shows the 'Info' tab selected. Below it, the 'Objects' tab is active. A table displays one object: 'index.html' (Type: html), which was last modified on July 14, 2023, at 02:03:15 (UTC-04:00), has a size of 137.0 B, and is stored in the Standard storage class. Action buttons for 'Actions' (Copy S3 URI, Copy URL, Download, Open, Delete, Create folder, Upload) are available above the table. A search bar and a 'Show versions' button are also present.

The screenshot shows a web browser window titled 'Ex8_4 Bucket'. The address bar indicates the URL is 'ex84bucket.s3.amazonaws.com/index.html'. The page content consists of the text 'Hello world!' and 'Ex8_4 bucket'.

2.

The screenshot shows the Amazon CloudFront homepage. At the top, it says "Securely deliver content with low latency and high transfer speeds". Below this, there's a section titled "Benefits and features" with two columns: "Reduce latency" and "Improve security". The "Reduce latency" section describes how CloudFront's global network of edge locations reduces latency. The "Improve security" section discusses CloudFront's security features like AWS Shield Standard and AWS WAF. To the right, there's a "Get started with CloudFront" box with a "Create a CloudFront distribution" button, and a "AWS Free Tier" section listing free resources. At the bottom, there's a "Pricing (US)" section and a footer with links to CloudShell, Feedback, Language, and other AWS services.

The screenshot shows the "Create distribution" wizard. Step 1 is "Origin". It requires selecting an origin domain (a dropdown menu labeled "Choose origin domain"), an optional origin path (a text input field labeled "Enter the origin path"), and an origin name (a text input field labeled "Enter origin name"). There are also sections for adding custom headers and enabling Origin Shield. Step 2, "Default cache behavior", is partially visible below.

3.

4.

The screenshot shows the 'Create distribution' wizard on the 'Origin' step. The 'Origin domain' field contains 'ex84bucket.s3.us-east-1.amazonaws.com'. The 'Origin path - optional' field is empty. The 'Name' field also contains 'ex84bucket.s3.us-east-1.amazonaws.com'. Under 'Origin access', the 'Public' radio button is selected. There are three other options: 'Origin access control settings (recommended)', 'Legacy access identities', and 'Add custom header - optional'. The 'Enable Origin Shield' section has the 'No' radio button selected. At the bottom, there's a 'Next Step' button.

5.

The screenshot shows the 'Create distribution' wizard on the 'Settings' step. It includes sections for 'Price class', 'Alternate domain name (CNAME)', 'Custom SSL certificate', 'Supported HTTP versions', 'Default root object', 'Standard logging', and 'IPv6'. The 'Price class' section has 'Use all edge locations (best performance)' selected. The 'Custom SSL certificate' section shows a dropdown menu with 'Choose certificate' and a 'Request certificate' button. The 'Supported HTTP versions' section has 'HTTP/2' checked. The 'Default root object' section is empty. The 'Standard logging' section has 'Off' selected. The 'IPv6' section has 'On' selected. At the bottom, there's a 'Next Step' button.

The screenshot shows the 'Create - Distributions - CloudFront' page in the AWS Management Console. The 'Settings' tab is selected. Under 'Price class', the 'Use all edge locations (best performance)' option is chosen. In the 'Alternate domain name (CNAME) - optional' section, 'distribution.checkyourworkgroup.online' is listed. Under 'Custom SSL certificate - optional', there is a dropdown menu for 'Choose certificate'. 'Supported HTTP versions' includes 'HTTP/2' (selected) and 'HTTP/3'. 'Default root object - optional' is empty. 'Standard logging' is set to 'Off'. 'IPv6' is also off. At the bottom, there are links for 'CloudShell', 'Feedback', and 'Language'.

6.

The screenshot shows the 'AWS Certificate Manager (ACM)' page. The 'Request certificate' section is active. It displays a message about launching ECDSA certificates and viewing certificates. Under 'Request certificate', the 'Certificate type' dropdown is set to 'Request a public certificate'. Below it, there is a note about requesting a private certificate authority (CA). At the bottom right are 'Cancel' and 'Next' buttons.

AWS Certificate Manager (ACM)

Request public certificate

Domain names

Fully qualified domain name: [distribution.checkyourworkgroup.online](#)

Add another name to this certificate

Validation method

DNS validation - recommended

Email validation

Key algorithm

RSA 2048

ECDSA P 256

ECDSA P 384

Tags

Add tag

Request

AWS Certificate Manager (ACM)

Launch announcement

View all of your certificates

Successfully requested certificate with ID fe09ab92-3cba-44eb-946e-f6577610040

Certificates (0)

There are no certificates in your account.

The screenshot shows the AWS Certificate Manager (ACM) console. On the left, there's a sidebar with options like 'List certificates', 'Request certificate', 'Import certificate', and 'AWS Private CA'. The main area is titled 'Certificates (1)' and displays a table with one row. The columns are: Certificate ID, Domain name, Type, Status, In use, Renewal eligibility, and Key algorithm. The data in the table is:

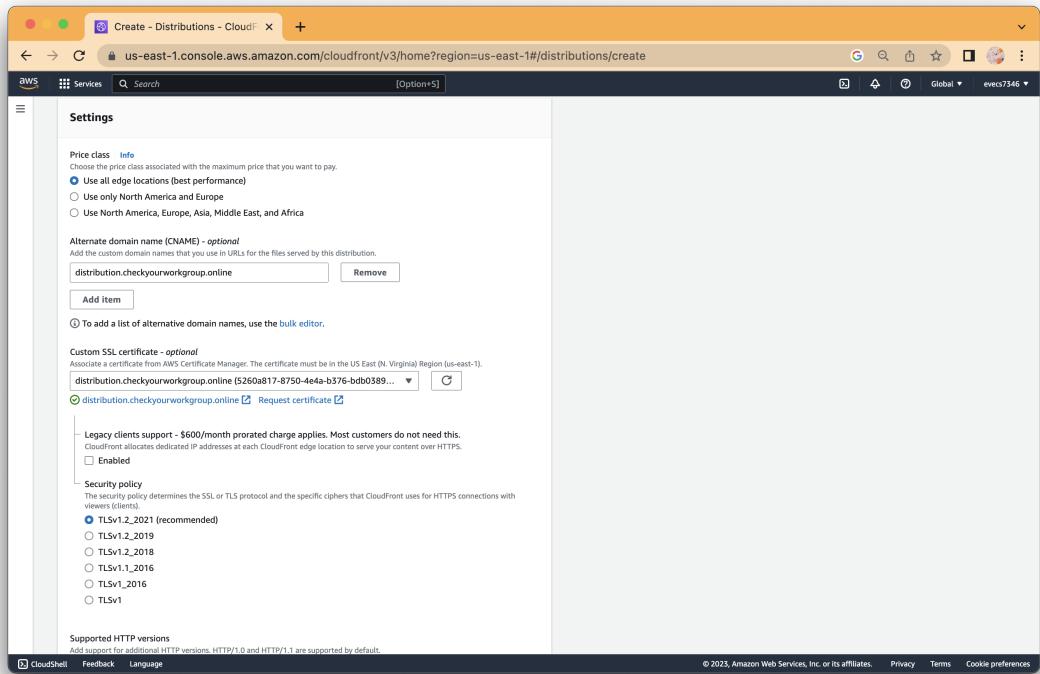
Certificate ID	Domain name	Type	Status	In use	Renewal eligibility	Key algorithm
5260a817-8750-4e4a-b376-bdb0389d5dfd	distribution.checkyourworkgroup.online	Amazon Issued	Pending validation	No	Ineligible	RSA 2048

This screenshot is similar to the first one but includes a success message at the top: 'Successfully created DNS records' and 'Successfully created DNS records in Amazon Route 53 for certificate with ID 5260a817-8750-4e4a-b376-bdb0389d5dfd.' The main table data is identical to the first screenshot.

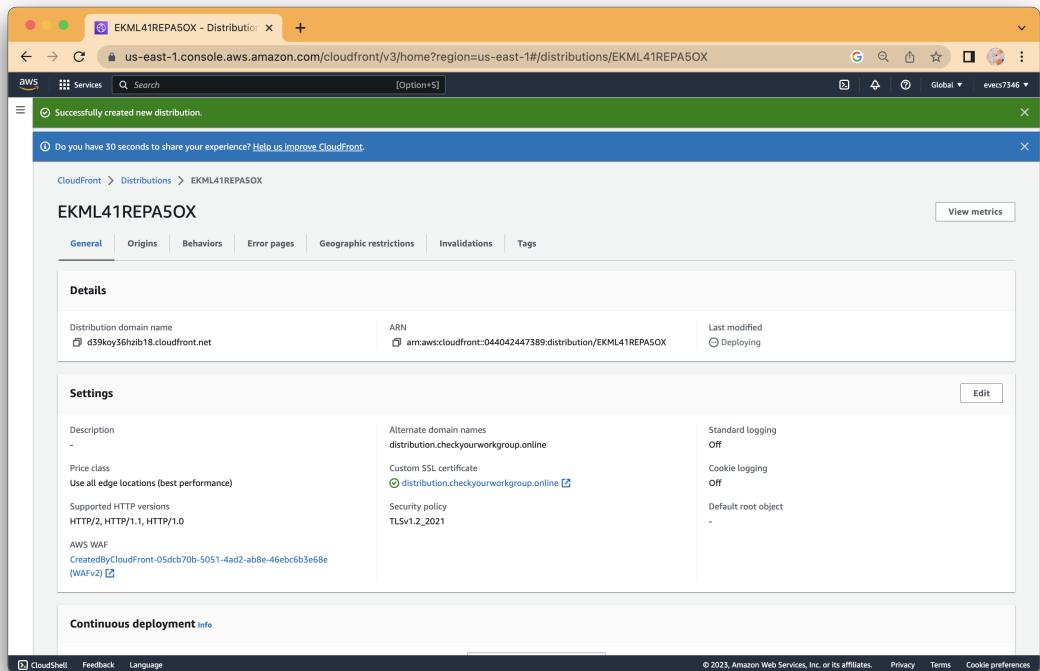
A sidebar on the right is titled 'Validating domain ownership' and contains the following text:

Before the Amazon certificate authority (CA) can issue a certificate for your site, AWS Certificate Manager (ACM) must prove that you own or control all of the domain names that you specified in your request. You can choose to prove your ownership with either Domain Name System (DNS) validation or with email validation at the time you request a certificate. Validation requires that you have a valid certificate issued by ACM. ACM does not validate domain ownership for imported certificates or for certificates signed by a private CA.

Below this, there's a 'Learn more' link and a 'Validating domain ownership' section.



7.



8.

The screenshot shows the AWS CloudFront 'Edit settings' page for distribution EKML41REPASOX. The 'Web Application Firewall (WAF)' section has the 'Do not enable security protections' option selected. The 'Settings' section includes a 'Price class' dropdown set to 'Info', a 'Custom SSL certificate' dropdown showing 'distribution.checkyourworkgroup.online (S260a817-8750-4ea-b376-bdb0389...)', and a 'Security policy' dropdown set to 'TLSv1.2_2021 (recommended)'. The 'Supported HTTP versions' section indicates support for 'HTTP/1.0, HTTP/1.1, and HTTP/2.3'.

The screenshot shows the AWS CloudFront distribution settings page for distribution ID EKML41REPA5OX. The page is titled "Edit settings - EKML41REPA5OX" and is part of the "AWS Certificate Manager" section.

Alternate Domain Name (CNAME) - optional
Add the custom domain names that you use in URLs for the files served by this distribution.
distribution.checkyourworkgroup.online
 To add a list of alternative domain names, use the bulk editor.

Custom SSL certificate - optional
Associate a certificate from AWS Certificate Manager. The certificate must be in the US East (N. Virginia) Region (us-east-1).
distribution.checkyourworkgroup.online (5260a817-8750-4ea-b376-bdd0389...

Legacy clients support - \$600/month prorated charge applies. Most customers do not need this.
CloudFront allocates dedicated IP addresses at each CloudFront edge location to serve your content over HTTPS.
 Enabled

Security policy
The security policy determines the SSL or TLS protocol and the specific ciphers that CloudFront uses for HTTPS connections with viewers (clients).
 TLSv1.2_2021 (recommended)
 TLSv1.2_2019
 TLSv1.2_2018
 TLSv1.1_2016
 TLSv1_2016
 TLSv1

Supported HTTP versions
Add support for additional HTTP versions. HTTP/1.0 and HTTP/1.1 are supported by default.
 HTTP/2
 HTTP/1

Default root object - optional
The object (file name) to return when a viewer requests the root URL (/) instead of a specific object.
index.html

Standard logging
Get logs of viewer requests delivered to an Amazon S3 bucket.
 Off
 On

IPv6
 Off
 On

Description - optional

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The screenshot shows the AWS CloudFront Distribution Details page for distribution ID EKML41REPASOX. The top navigation bar includes tabs for General, Origins, Behaviors, Error pages, Geographic restrictions, Invalidations, and Tags. A 'View metrics' button is located in the top right corner. The main content area is divided into sections: 'Details' (containing the ARN and last modified information), 'Settings' (with tabs for Description, Price class, Supported HTTP versions, and AWS WAF), and 'Continuous deployment' (with a 'Create staging distribution' button). The 'General' tab is currently selected.

