

AWS Certified Developer Associate Certification and Beyond

Preface:

The screenshot shows the 'DASHBOARD' section of the Practice Resources interface. At the top, there's a header with a bell icon and a 'SHARE FEEDBACK' button. Below the header, the title 'AWS Certified Developer Associate Certification and Beyond' is displayed, along with a subtitle: 'A comprehensive guide to help you succeed in the AWS DVA-C02 certification exam'. To the left of the title is a thumbnail image of the book cover. Below the title, there are four expandable sections: 'Mock Exams', 'Chapter Review Questions', 'Flashcards', and 'Exam Tips', each represented by an icon and a descriptive label.

[BACK TO THE BOOK](#)



AWS Certified Developer Associate Certification and Beyond
Rajesh Daswani, Dorian Richard

Chapter 1: Introduction to AWS Accounts and Global Infrastructure

Practice Resources

DASHBOARD > CHAPTER 1

Introduction to AWS Accounts and Global Infrastructure

Summary

This chapter discussed the importance of a multi-account architecture, examining the vast use cases for setting up and managing multiple AWS accounts. It falls within *Domain 2: Security in the AWS Certified Developer Associate exam* with a particular focus on the task statement, *Implement authentication and/or authorization for applications and AWS services*. Specifically, you learned that hosting different workloads and even different environments in separate AWS accounts is essential for ensuring higher levels of security and reducing the impact of mishaps in one environment affecting workloads in another. With multiple AWS accounts, you can separate individual applications and even have a separate account for their development lifecycle.

With multiple AWS accounts, you can also separate internal applications and workloads from customer-facing ones, further enhancing security. In this chapter, you learned how to manage AWS accounts using AWS Organizations. You learned how to apply service control policies to prevent member accounts from specific services, resources, and regions. The management account in an AWS organization has the highest authority, and you can even prevent administrators of member accounts from leaving the organization.

Although AWS Organizations offers the ability to build guardrails for your member accounts, who or what can work with those permitted services and make API calls still needs to be defined using AWS IAM or by defining resource-based policies. We perform a deep-dive study of the IAM services in the next chapter.

Chapter Review Questions

The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

Select Quiz

Quiz 1 [SHOW QUIZ DETAILS](#) ▾ [START](#)

Practice Resources

DASHBOARD

AWS Certified Developer Associate Certification and Beyond

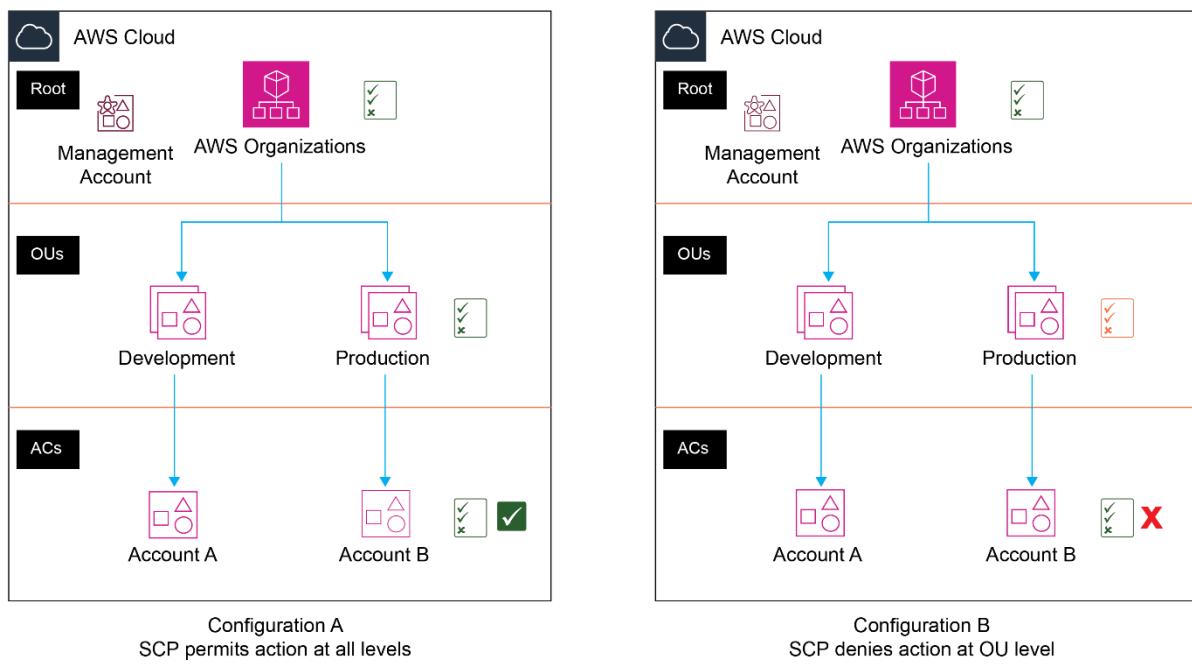
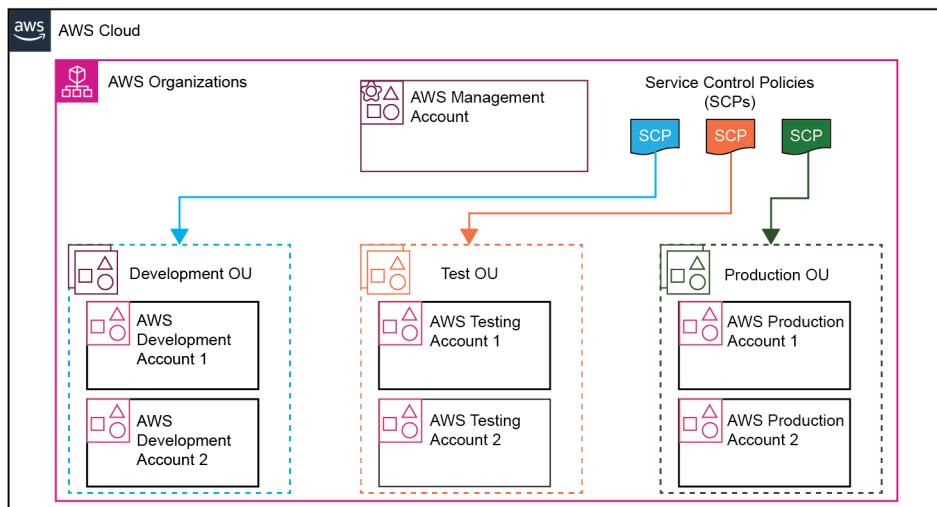
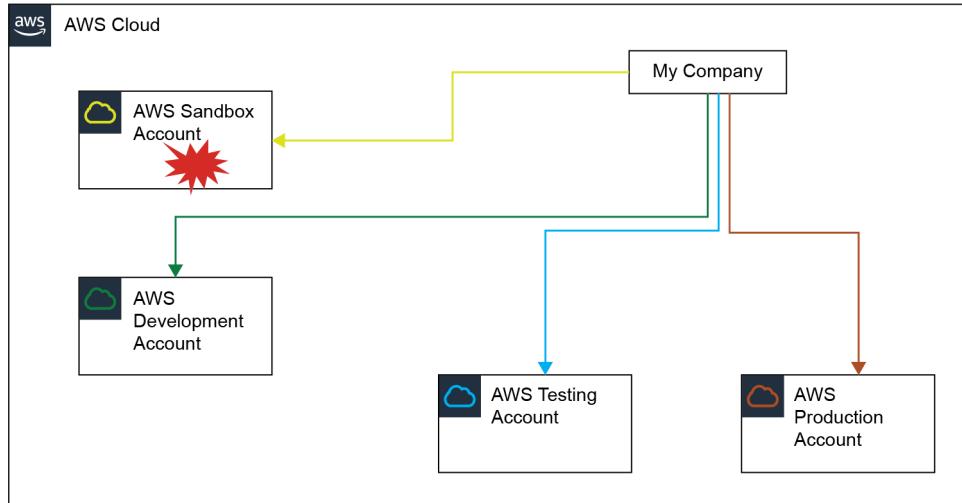
A comprehensive guide to help you succeed in the AWS DVA-C02 certification exam

[Mock Exams](#) ▾ [Chapter Review Questions](#) ▾

[Flashcards](#) ▾ [Exam Tips](#) ▾

[BACK TO THE BOOK](#)

 AWS Certified Developer Associate Certification and Beyond
Rajesh Daswani, Dorian Richard



S | Services | N. Virginia ▾ | Management ▾

Console Home Info

Actions ▾

Recently visited Info

 EC2	 S3
 VPC	 IAM
 RDS	 API Gateway
 Trusted Advisor	 Lambda
 CloudWatch	 Amazon Simple Email Service
 Elastic Beanstalk	 DynamoDB
 Simple Notification Service	

   N. Virginia ▾ Management ▾



Sign up for AWS

Explore Free Tier products with a new AWS account.

To learn more, visit aws.amazon.com/free.



Root user email address
Used for account recovery and some administrative functions

AWS account name
Choose a name for your account. You can change this name in your account settings after you sign up.

[Verify email address](#)

OR

[Sign in to an existing AWS account](#)

Explore Free Tier products with a new AWS account.

To learn more, visit aws.amazon.com/free.



Sign up for AWS

Confirm you are you

Making sure you are secure -- it's what we do.

We sent an email with a verification code to
[REDACTED] ([not you?](#))

Enter it below to confirm your email.

Verification code

[Verify](#)

[Resend code](#)



Sign up for AWS

Confirm your identity

Verify code

[Continue \(step 4 of 5\)](#)

Having trouble? Sometimes it takes up to 10 minutes to retrieve a verification code. If it's been longer than that, [return to the previous page](#) and try again.

[IAM](#) > [Dashboard](#)

IAM Dashboard

Security recommendations 1



⚠ Add MFA for root user

Add MFA for root user - Enable multi-factor authentication (MFA) for the root user to improve security for this account.

[Add MFA](#)

✔ Root user has no active access keys

Using access keys attached to an IAM user instead of the root user improves security.

Set up device Info

Authenticator app

A virtual MFA device is an application running on your device that you can configure by scanning a QR code.

1

Install a compatible application such as Google Authenticator, Duo Mobile, or Authy app on your mobile device or computer.

[See a list of compatible applications](#)

2

[Show QR code](#)

Open your authenticator app, choose **Show QR code** on this page, then use the app to scan the code. Alternatively, you can type a secret key. [Show secret key](#)

3

Fill in two consecutive codes from your MFA device.

MFA code 1

MFA code 2

The screenshot shows the AWS Management Console Home page. At the top, there's a search bar and navigation links for Services, Help, and Management. Below the header, the main content area has a title "Console Home" with a "Info" link. A "Recently visited" section shows a single entry: "No recently visited services". Below this, a message encourages users to "Explore one of these commonly visited AWS services." with links to IAM, EC2, S3, RDS, and Lambda. To the right, a sidebar titled "Console Home" provides information about the widget and links to "Customize your Console Home" and "Learn more".

AWS Services Search results for 'aws organizations'

AWS Organizations

Search results for 'aws organizations'

Services (157)

- Invitations
- Services
- Policies
- Settings
- Get started

Features (413)

Resources **New**

Documentation (629,727)

Knowledge Articles (1,688)

Marketplace (3,965)

Services

AWS Organizations ☆

Central governance and management across your AWS accounts.

Resource Access Manager ☆

Share AWS resources with other accounts or AWS services.

AWS Organizations > AWS accounts

AWS accounts

Add an AWS account

The accounts listed below are members of your organization. The organization's management account is responsible for paying the bills for all accounts in the organization. You can use the tools provided by AWS Organizations to centrally manage these accounts. [Learn more](#)

Organization

Organizational units (OUs) enable you to group several accounts together and administer them as a single unit instead of one at a time.

Actions ▾

Find AWS accounts by name, email, or account ID. Find an OU by the exact OU ID.

Hierarchy List

Organizational structure Account created/joined date

Root r-eo9r

Management management account Joined 2023/04/09

Tags

Tags are key-value pairs that you can add to AWS resources to help identify, organize, and secure your AWS resources.

Key	Value - optional	
<input type="text" value="Name"/> X	<input type="text" value="DevelopmentOU"/> X	Remove
<input type="text" value="Project"/> X	<input type="text" value="ProductivityApps"/> X	Remove

Add tag

You can add 48 more tags.

Organization

Actions ▾

Organizational units (OUs) enable you to group several accounts together and administer them as a single unit instead of one at a time.

Search by name, email, account ID or OU ID.

Hierarchy

List

Organizational structure

Account created/joined date

▼ Root

r-8ayk

▶ DevelopmentOU

ou-8ayk-17ehmf2d

▶ ProductionOU

ou-8ayk-jzuvv4oc

Todo Plus Management

management account

Joined 2023/07/29

AWS accounts

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Hierarchy

List

Organizational structure

Account created/joined date

▼ Root

r-8ayk

▼ DevelopmentOU

ou-8ayk-17ehmf2d

Todo Plus Development

441639934710 | developer [REDACTED]

Created 2023/07/29

▼ ProductionOU

ou-8ayk-jzuvv4oc

Todo Plus Production

069865199514 | product [REDACTED]

Created 2023/07/29

Todo Plus Management

management account

402236444459 | manager [REDACTED]

Joined 2023/07/29

```
1 Version: "2012-10-17",
2 Statement: [
3   {
4     Effect: "Deny",
5     Action: [
6       "organizations:LeaveOrganization"
7     ],
8     Resource: "*"
9   }
10 ]
11 ]
12 }
```

Service control policies

[Disable service control policies](#)

Service control policies (SCPs) enable central administration over the permissions available within the accounts in your organization. This helps ensure that your accounts stay within your organization's access control guidelines. [Learn more](#)

Available policies			
	Name	Kind	Description
<input type="checkbox"/>	DenyOrgLeave	Customer managed policy	Deny administrators of member accounts from being able to leave the organization
<input type="checkbox"/>	FullAWSAccess	AWS managed policy	Allows access to every operation

Confirm leaving the organization?



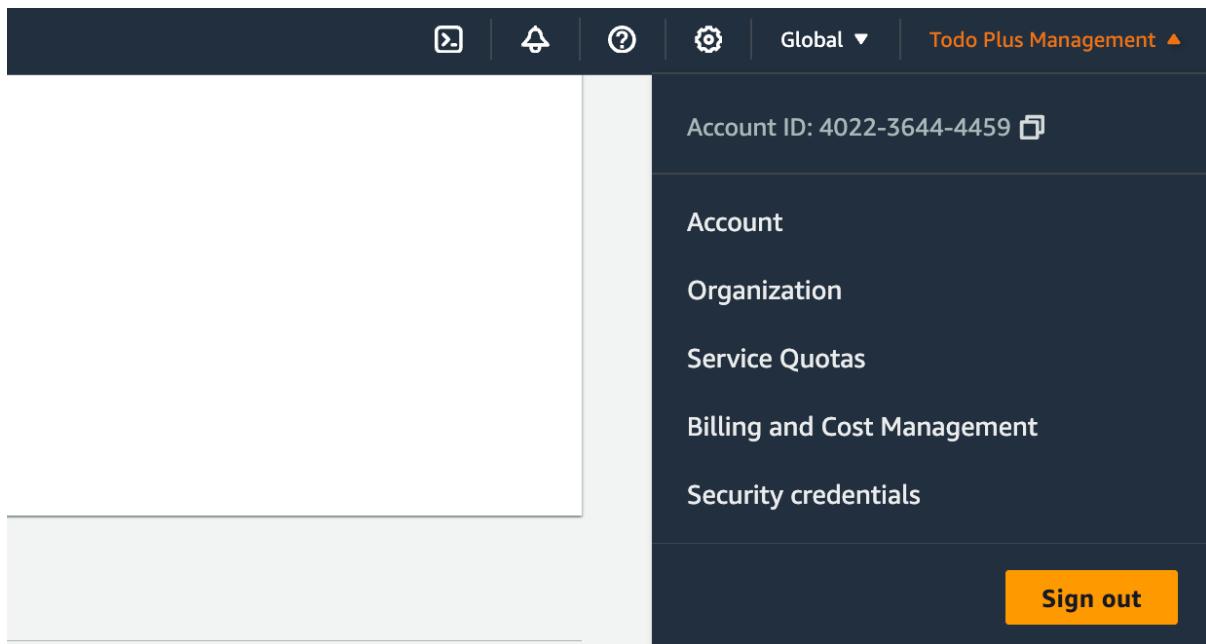
Are you sure you want to leave this organization?

After your AWS account leaves the organization, you are responsible for paying your own bill. If you later want to join the organization again, you must receive and accept another invitation to join the organization. [Learn more](#)

You don't have permissions to access this resource.

[Cancel](#)

[Leave organization](#)



AWS Billing > Billing Preferences

Billing preferences Info

Invoice delivery preferences <small>Info</small> PDF invoices delivery by email <input type="checkbox"/> Deactivated	Alert preferences <small>Info</small> AWS Free Tier alerts <input type="checkbox"/> Not delivered CloudWatch billing alerts <input type="checkbox"/> Not delivered
---	---

Conditions

Threshold type

Static

Use a value as a threshold

Anomaly detection

Use a band as a threshold

Whenever EstimatedCharges is...

Define the alarm condition.

Greater

> threshold

Greater/Equal

>= threshold

Lower/Equal

<= threshold

Lower

< threshold

than...

Define the threshold value.

25

USD

Must be a number

Send a notification to the following SNS topic

Define the SNS (Simple Notification Service) topic that will receive the notification.

- Select an existing SNS topic
- Create new topic
- Use topic ARN to notify other accounts

Create a new topic...

The topic name must be unique.

TodoPlus-Billing-Alarm

SNS topic names can contain only alphanumeric characters, hyphens (-) and underscores (_).

Email endpoints that will receive the notification...

Add a comma-separated list of email addresses. Each address will be added as a subscription to the topic above.

man [REDACTED]

user1@example.com, user2@example.com

[Create topic](#)

[Add notification](#)

 Practice Resources

DASHBOARD > CHAPTER 1

Introduction to AWS Accounts and Global Infrastructure

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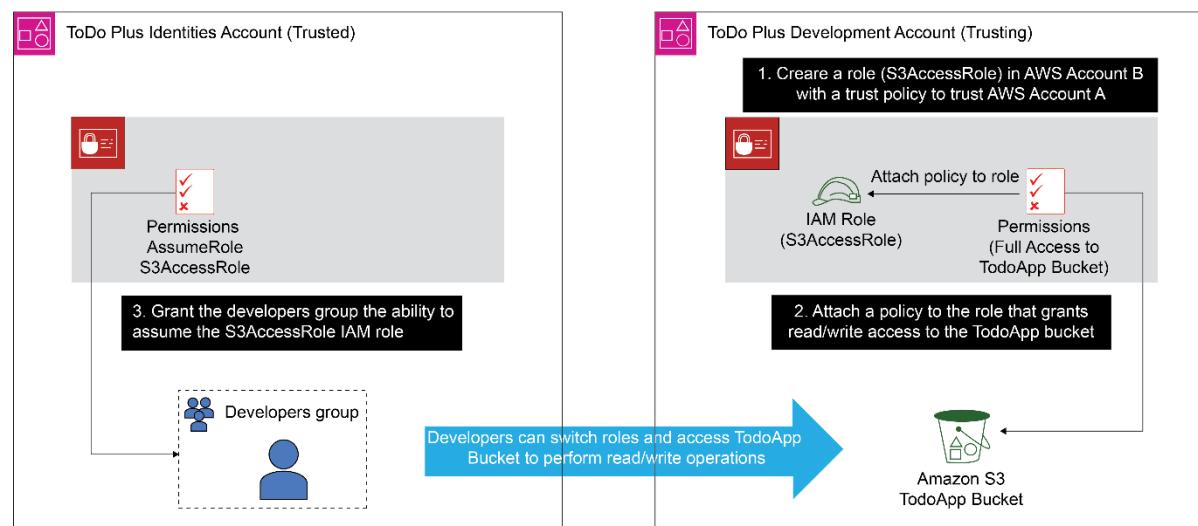
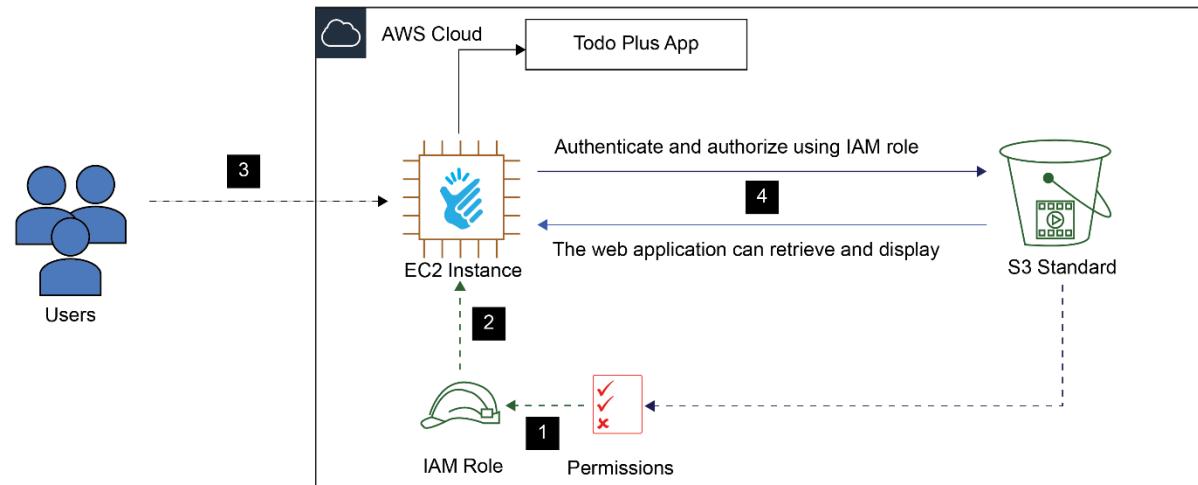
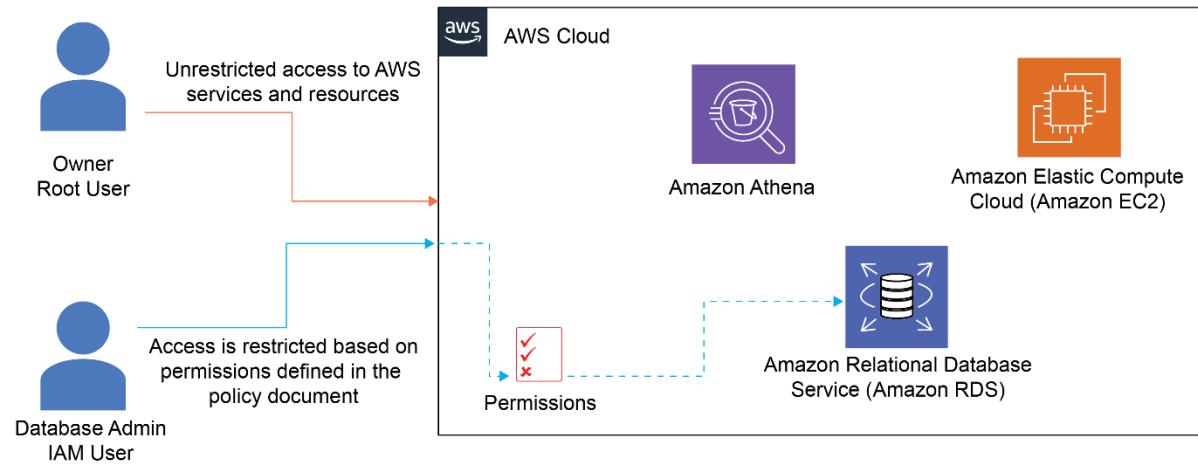
Chapter Review Questions

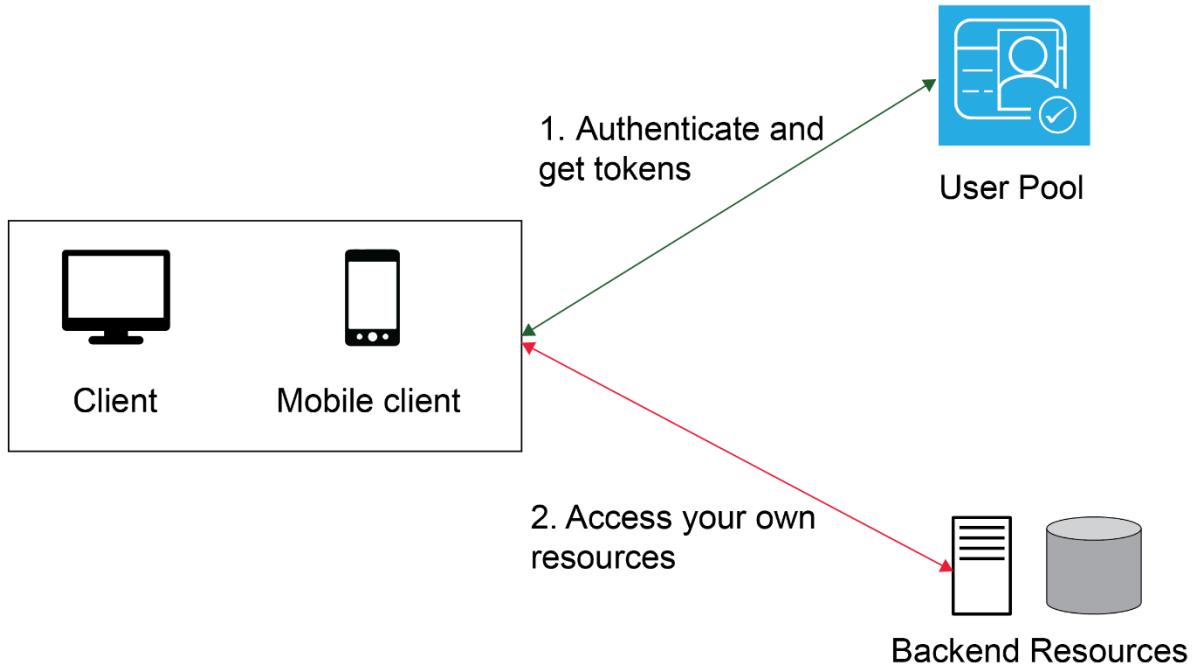
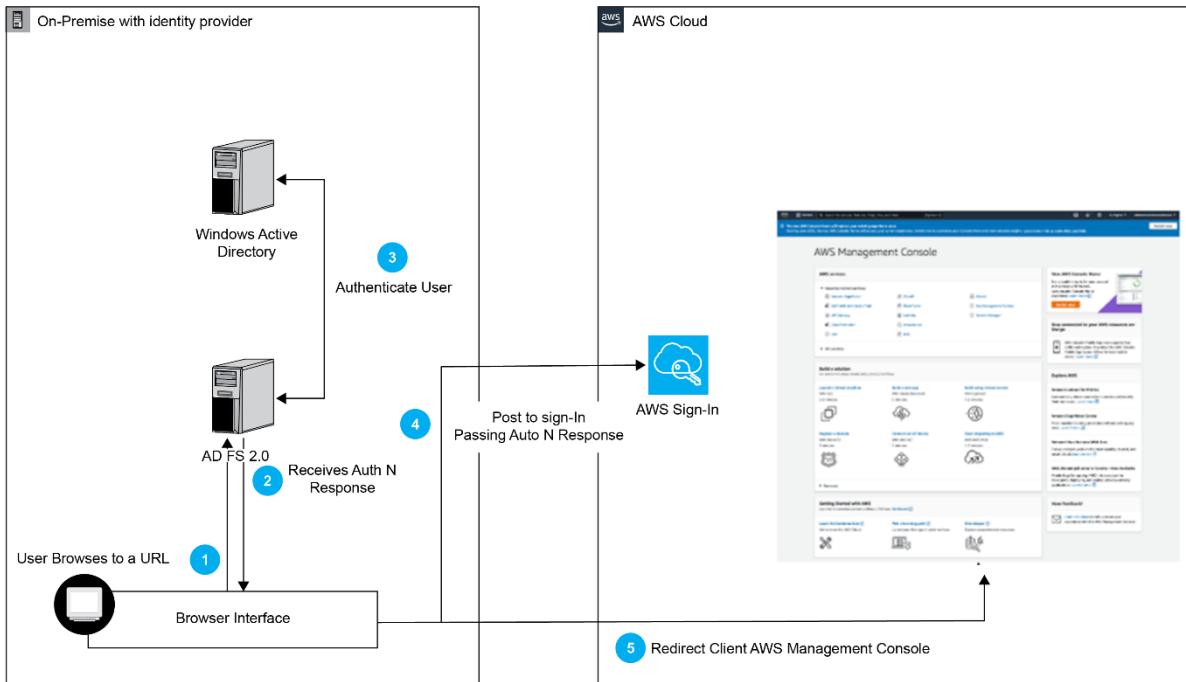
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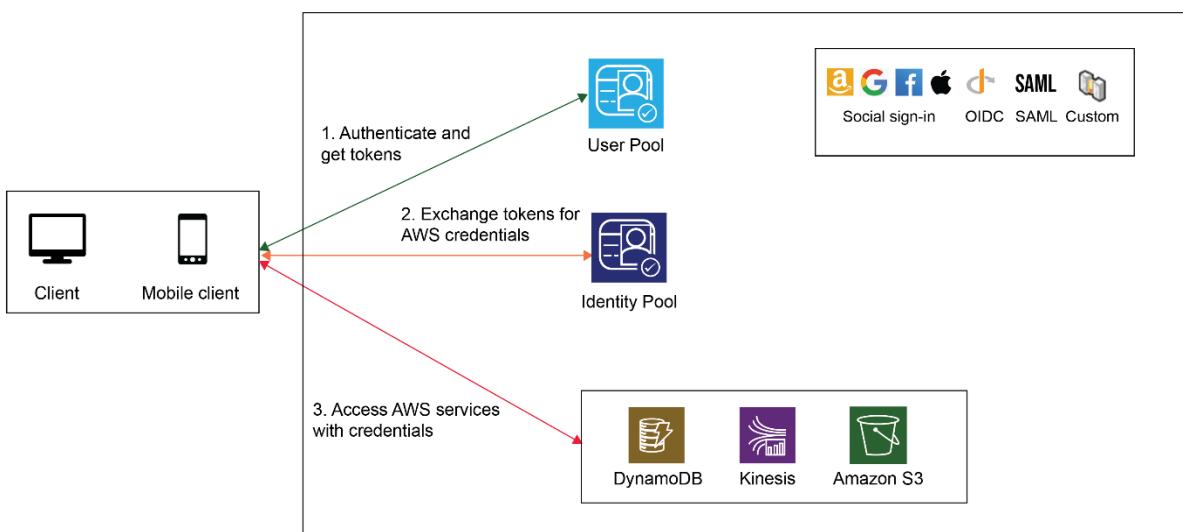
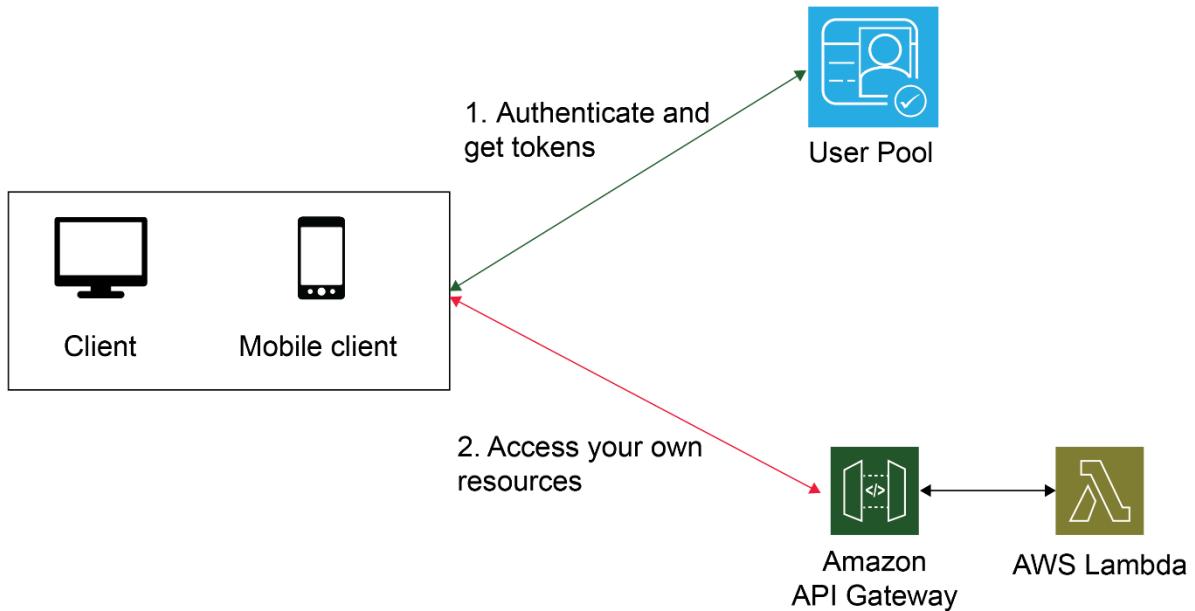
Select Quiz

Quiz 1 [SHOW QUIZ DETAILS](#) [START](#)

Chapter 2: Securing Access with AWS Identity and Access Management







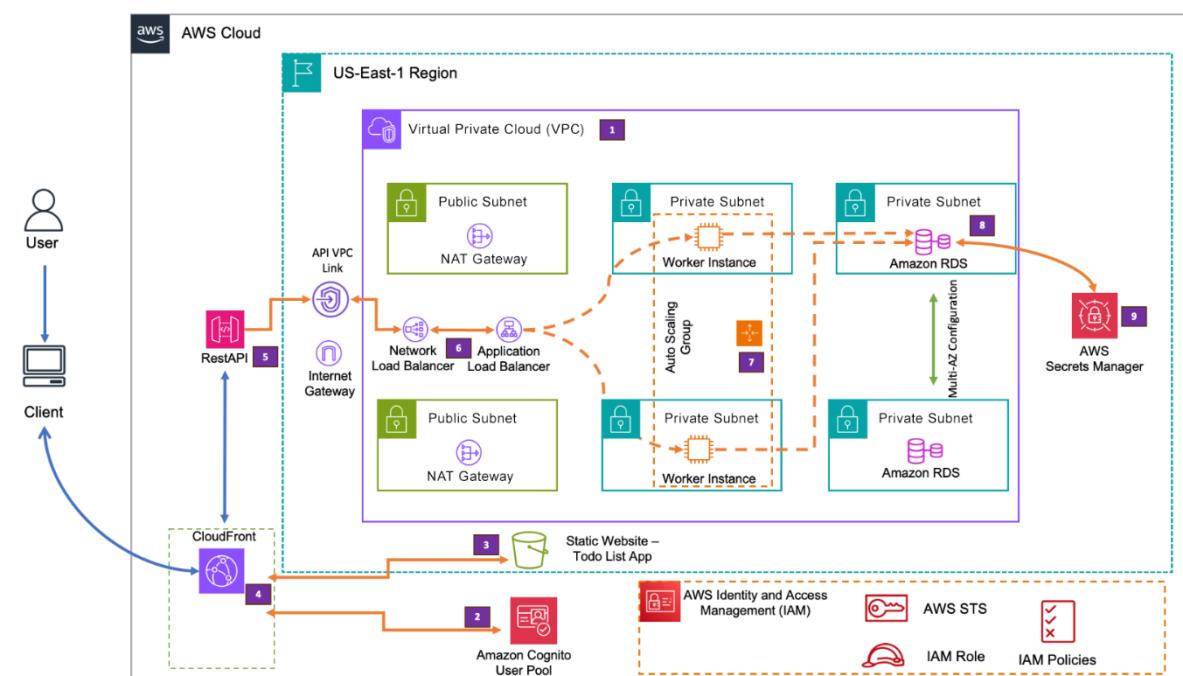
Permissions | **Trust relationships** | Tags | Access Advisor | Revoke sessions

Trusted entities

Entities that can assume this role under specified conditions.

```

1  {
2    "Version": "2012-10-17",
3    "Statement": [
4      {
5        "Sid": "",
6        "Effect": "Allow",
7        "Principal": {
8          "Service": "ec2.amazonaws.com"
9        },
10       "Action": "sts:AssumeRole"
11     }
12   ]
13 }
```



Services | **IAM**

Search results for 'IAM'

Services (9)

- Features (19)
- Resources **New**
- Blogs (1,546)

Services

IAM ☆
Manage access to AWS resources

See all 9 results ►

Create user group

Name the group

User group name

Enter a meaningful name to identify this group.

developers

Maximum 128 characters. Use alphanumeric and '+,-,.,@-_ ' characters.

Attach permissions policies - *Optional* (840) Info

You can attach up to 10 policies to this user group. All the users in this group will have permissions that are defined in the selected policies.

A screenshot of a search interface for attaching permissions policies. The search bar at the top contains the text 'Administrator'. Below the search bar is a table header row with columns for 'Policy name' and 'Type'. The table body is currently empty, showing two small placeholder icons.

Permissions options

Add user to group

Add user to an existing group, or create a new group. We recommend using groups to manage user permissions by job function.

Copy permissions

Copy all group memberships, attached managed policies, and inline policies from an existing user.

Attach policies directly

Attach a managed policy directly to a user. As a best practice, we recommend attaching policies to a group instead. Then, add the user to the appropriate group.

User groups (1/1)

Create group

Search groups

< 1 >

Group name ▲

▼ Users

▼ Attached policies ▲

▼ Created

developers

0

AdministratorAccess

2023-04-27 (5 minutes ago)

Retrieve password

You can view and download the user's password below or email users instructions for signing in to the AWS Management Console. This is the only time you can view and download this password.

Console sign-in details

Email sign-in instructions ↗

Console sign-in URL
https://944469751782.signin.aws.amazon.com/console

User name
Alice

Console password
***** Show

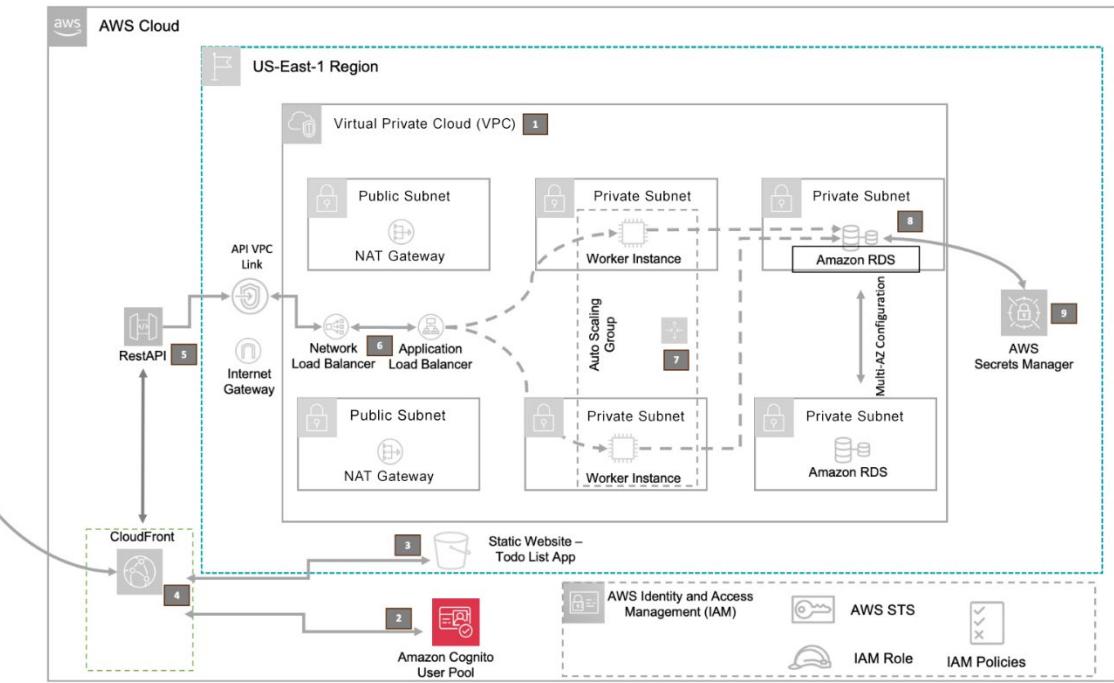
Download .csv file Return to users list

aws Services Search [Option+S] N. Virginia ▾ Alice @ 9444-6975-1782 ▾

Console Home Info Reset to default layout + Add widgets

Recently visited Info

- Elastic Beanstalk
- EC2
- S3
- VPC
- IAM
- RDS



Security, Identity & Compliance

Amazon Cognito

Secure identity and access management for apps

Amazon Cognito user pools let you add registration and sign-in to your apps. With Amazon Cognito identity pools, you can provide AWS credentials for access to your cloud resources.

Start from your business case

Add user directories to your app ▾

Amazon Cognito user pools are a managed service that lets you add secure authentication and authorization to your apps, and can scale to support millions of users.

Create user pool

Authentication providers

Configure the providers that are available to users when they sign in.

Provider types

Choose whether users will sign in to your Cognito user pool, a federated identity provider, or both. Amazon Cognito has different pricing for federated users and user pool users. [Learn more about pricing](#)

Cognito user pool

Users can sign in using their email address, phone number, or user name. User attributes, group memberships, and security settings will be stored and configured in your user pool

Federated identity providers

Users can sign in using credentials from social identity providers like Facebook, Google, Amazon, and Apple; or using credentials from external directories through SAML or Open ID Connect. You can manage user attribute mappings and security for federated users in your user pool.

Cognito user pool sign-in options | [Info](#)

Choose the attributes in your user pool that are used to sign in. If you select only one attribute, or you select a user name and at least one other attribute, your user can sign in with all of the selected options. If you select only phone number and email, your user will be prompted to select one of the two sign-in options when they sign up.

- User name
- Email
- Phone number

 Cognito user pool sign-in options can't be changed after the user pool has been created.

User account recovery

Configure how users will recover their account when they forget their password. Recipient message and data rates apply.

Self-service account recovery | [Info](#)

Enable self-service account recovery - Recommended

Allow forgot-password operations in your user pool. In the hosted UI sign-in page, a "Forgot your password?" link is displayed. When this feature is not enabled, administrators reset passwords with the Cognito API.

Delivery method for user account recovery messages | [Info](#)

Select how your user pool will deliver messages when users request an account recovery code. SMS messages are charged separately by Amazon SNS. Email messages are charged separately by Amazon SES. [Learn more about pricing](#)

Email only

SMS only

Email if available, otherwise SMS

SMS if available, otherwise email

SMS if available, otherwise email, and allow a user to reset their password via SMS if they are also using it for MFA

Email provider | [Info](#)

Send email with Amazon SES -

Recommended

Send emails using an Amazon SES verified identity in your account. We recommend this option for higher email volume and production workloads.

Send email with Cognito

Use Cognito's default email address as a temporary start for development. You can use it to send up to 50 emails a day.

You must have configured a verified sender with [Amazon SES](#) to use the SES feature. [Learn more](#)

SES Region | [Info](#)

US East (N. Virginia)

FROM email address | [Info](#)

By default "no-reply@verificationemail.com" will be used. You can also choose a different email address that you have previously verified with Amazon SES.

no-reply@verificationemail.com



REPLY-TO email address - *optional* | [Info](#)

If you set an invalid reply-to address, sending restrictions may be imposed on your account.

Enter an email address

[Cancel](#)

[Previous](#)

[Next](#)

▼ Advanced app client settings

We have populated suggested authentication flows, OAuth 2.0 grant types, and OIDC scopes based on the selections you made earlier.

Authentication flows | [Info](#)

Choose authentication flows that your app will support. Refresh token authentication is always enabled. We have populated options based on your app type.

Select authentication flows

ALLOW_REFRESH_TOKEN_AUTH X
Refresh token based authentication

ALLOW_USER_SRP_AUTH X
SRP (secure remote password) protocol based authentication

ALLOW_USER_PASSWORD_AUTH X
User name and password authentication

Authentication flow session duration | [Info](#)

3 minutes

Must be between 3 and 15 minutes.

Advanced security configurations - *optional*

Enable token revocation [Info](#)

Amazon Cognito will add new claims to access and id tokens to enable revocation. This increases the size of tokens.

Prevent user existence errors [Info](#)

Amazon Cognito authentication APIs return a generic authentication failure response, indicating either the user name or password is incorrect, instead of indicating that the user was not found.

Accept additional user context data [Info](#)

Your app client accepts an IP address that your app adds to unauthenticated requests. This IP address, and a device fingerprint, contribute to risk evaluation by Amazon Cognito advanced security features. When you don't accept additional user context data, your app client only accepts the device fingerprint.

Your user pool isn't set up to accept additional user context data. Make the following changes to your app client and user pool to activate this feature.

- After you create your user pool, enable Amazon Cognito advanced security features from the **App integration** tab.

The screenshot shows the 'Users' section of the AWS Cognito console. At the top, there are tabs for 'Users', 'Groups', 'Sign-in experience', 'Sign-up experience', 'Messaging', 'App integration', and 'User pool properties'. Below the tabs, it says 'Users (0) [Info](#)'. It provides instructions: 'View, edit, and create users in your user pool. Users that are enabled and confirmed can sign in to your user pool.' There are buttons for 'Delete user' and 'Create user'. A search bar with dropdown options for 'User name' and 'Email address' is present. Below the search bar is a table header with columns: 'User name', 'Email address', 'Email verified', 'Confirmation status', and 'Status'. The table body below the header is empty, showing 'No users found'. A 'Create user' button is located at the bottom left of the table area.

Create user Info

► User pool sign-in and security requirements

Review the user pool security configuration that will be enforced when you create this user.

User information

Configure this user's verification and sign-in options.

Invitation message Info

Configure invitation message templates in the [Messaging tab](#) ↗

- Don't send an invitation
- Send an email invitation

Email address

Enter this user's email address. A user's email address can be used for sign-in, account recovery, and account confirmation.

- Mark email address as verified

Temporary password

Amazon Cognito will send the password you generate to the user in an email message.

- Set a password
- Generate a password

todo-list-app-user-pool Info

[Delete user pool](#)

User pool overview

User pool name
todo-list-app-user-pool

ARN
arn:aws:cognito-idp:eu-north-1:1441639934710:userpool/eu-north-1_js8ikX9To

Created time
September 10, 2023 at 17:14 GMT+1

User pool ID
eu-north-1_js8ikX9To

Estimated number of users
1

Last updated time
September 10, 2023 at 17:14 GMT+1

► Getting started

[Users](#) [Groups](#) [Sign-In experience](#) [Sign-up experience](#) [Messaging](#) [App integration](#) [User pool properties](#)

Users (1) Info

View, edit, and create users in your user pool. Users that are enabled and confirmed can sign in to your user pool.

[Edit user](#) [Create user](#)

Property:

< 1 >

User name	Email address	Email verified	Confirmation status	Status
<input type="radio"/> f60e75c6-2903-46a5-93da-a7dc1db...	██	No	Force change password	 Enabled



Securing Access with AWS Identity and Access Management

Summary

In this chapter, you have learned about the AWS IAM service. AWS IAM offers authentication and authorization services to allow you to define who or what can access your AWS accounts, its services, and resources. You have covered the concepts of IAM users, groups, and roles, and how these features of IAM can help you address different access requirements.

Amazon Cognito was also discussed, which allows you to build an authentication and authorization service for your web and mobile applications. With Amazon Cognito, you can create a user pool to host your own user directory or federate with external IdPs such as those that are OIDC and SAML 2.0 compatible.

Finally, we looked at the new AWS Identity Center, which is a more streamlined process of managing your workforce identities and offers SSO features with external IdPs, such as Microsoft AD.

In the next chapter, we introduce you to the different types of storage services and specifically focus on Amazon S3, which is AWS's object storage offering. Amazon S3 is highly scalable, reliable, and cost effective. It is particularly designed to host data for modern web and mobile applications and even fulfill data-related regulatory and compliance requirements. We also look at options for distributing data globally with minimum latency and building hybrid cloud storage offerings.

Chapter Review Questions

The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

Select Quiz

Quiz 1

[SHOW QUIZ DETAILS ▾](#)

START

Chapter 3: Understanding Object Storage with Amazon S3, Hybrid Storage, and Static Website Hosting

Intelligent-Tiering Archive configurations (1)

Enable objects stored in the Intelligent-Tiering storage class to tier-down to the Archive Access tier or the Deep Archive Access tier which are optimized for objects that will be rarely accessed for long periods of time. [Learn more](#)

	Name	Status	Scope	Days until transition to Archive Access tier	Days until transition to Deep Archive Access tier
<input type="radio"/>	archive	Enabled	Entire bucket	90	180

todoplus-project-data [Info](#)

Lifecycle rule configuration

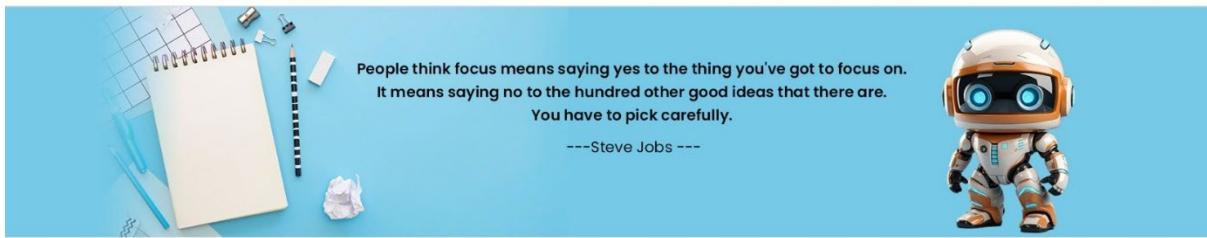
Lifecycle rule name todoplus-project-data	Prefix -	Minimum object size -
Status <input checked="" type="radio"/> Enabled	Object tags -	Maximum object size -
Scope Entire bucket		

Review transition and expiration actions

Current version actions	Noncurrent versions actions
Day 0 <ul style="list-style-type: none">Objects uploaded ↓	Day 0 <ul style="list-style-type: none">Objects become noncurrent ↓
Day 90 <ul style="list-style-type: none">Objects move to Standard-IA ↓	Day 30 <ul style="list-style-type: none">0 newest noncurrent versions are retainedAll other noncurrent versions move to Glacier Instant Retrieval
Day 365 <ul style="list-style-type: none">Objects move to Glacier Instant Retrieval	



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Full Name

Name

Email

Email ID

Password

[Register](#)

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[Amazon S3](#) > [Buckets](#) > [todoapprepo](#) > Edit transfer acceleration

Edit transfer acceleration [Info](#)

Transfer acceleration

Use an accelerated endpoint for faster data transfers. [Learn more](#)

Transfer acceleration

- Disable
- Enable

Accelerated endpoint

todoapprepo.s3-accelerate.amazonaws.com

Use the accelerated endpoint for faster data transfers, which will incur an additional fee. See [Amazon S3 pricing](#)

Destination

ⓘ Before Amazon S3 can publish messages to a destination, you must grant the Amazon S3 principal the necessary permissions to call the relevant API to publish messages to an SNS topic, an SQS queue, or a Lambda function. [Learn more](#)

Destination

Choose a destination to publish the event. [Learn more](#)

Lambda function

Run a Lambda function script based on S3 events.

SNS topic

Fanout messages to systems for parallel processing or directly to people.

SQS queue

Send notifications to an SQS queue to be read by a server.

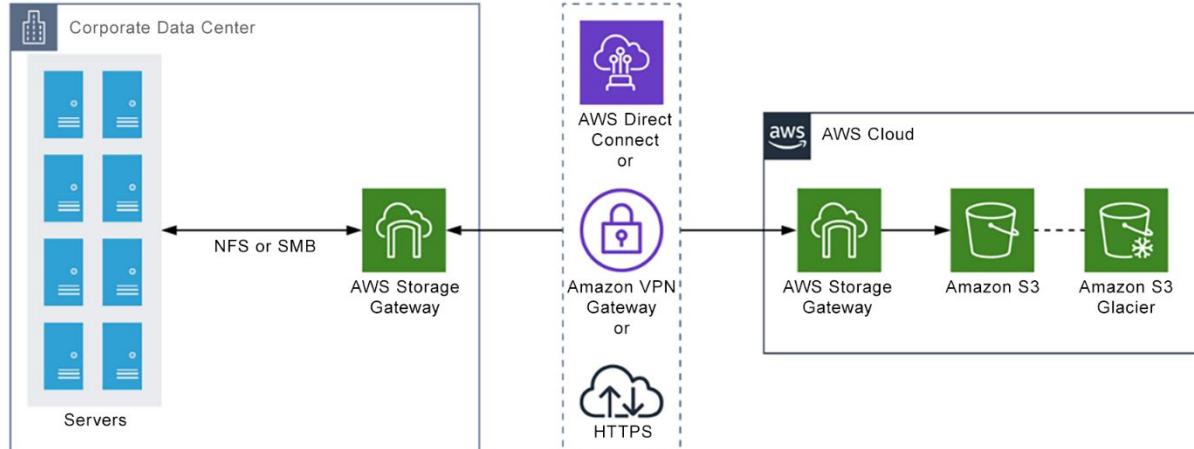
Specify Lambda function

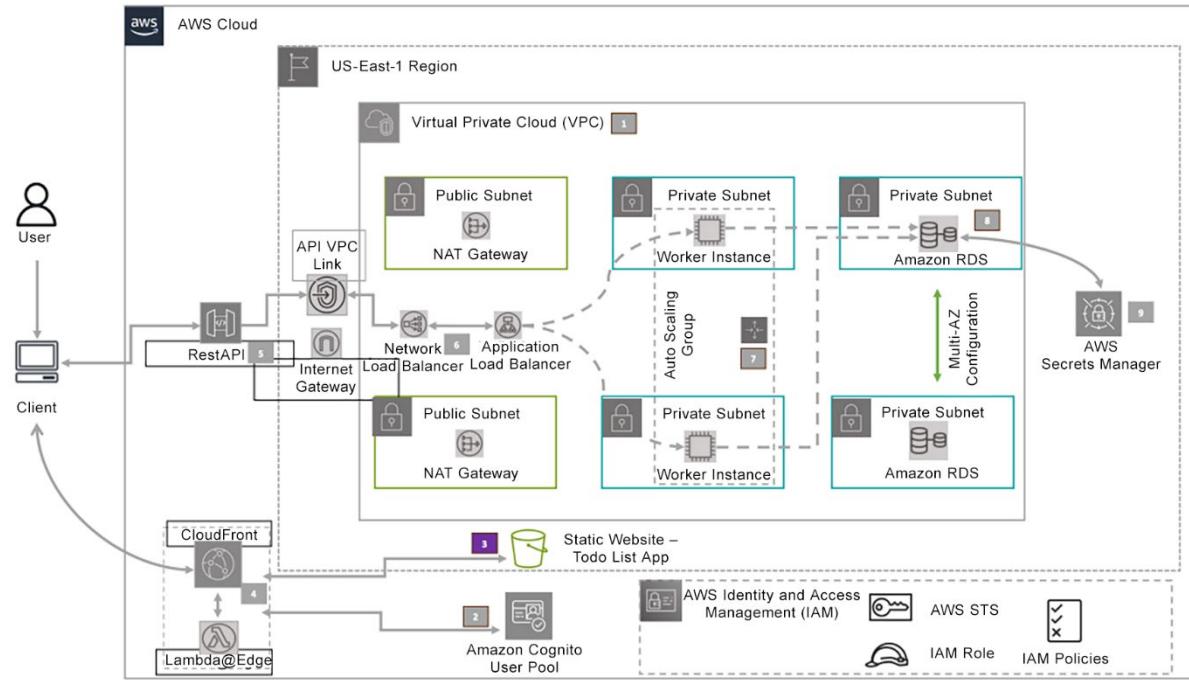
Choose from your Lambda functions

Enter Lambda function ARN

Lambda function

[Choose Lambda function](#)





Name

> assets

index.html

Block Public Access settings for this bucket

Public access is granted to buckets and objects through access control lists (ACLs), bucket policies, access point policies, or all. In order to ensure that public access to this bucket and its objects is blocked, turn on Block all public access. These settings apply only to this bucket and its access points. AWS recommends that you turn on Block all public access, but before applying any of these settings, ensure that your applications will work correctly without public access. If you require some level of public access to this bucket or objects within, you can customize the individual settings below to suit your specific storage use cases. [Learn more](#)

Block all public access

Turning this setting on is the same as turning on all four settings below. Each of the following settings are independent of one another.

Block public access to buckets and objects granted through new access control lists (ACLs)

S3 will block public access permissions applied to newly added buckets or objects, and prevent the creation of new public access ACLs for existing buckets and objects. This setting doesn't change any existing permissions that allow public access to S3 resources using ACLs.

Block public access to buckets and objects granted through any access control lists (ACLs)

S3 will ignore all ACLs that grant public access to buckets and objects.

Block public access to buckets and objects granted through new public bucket or access point policies

S3 will block new bucket and access point policies that grant public access to buckets and objects. This setting doesn't change any existing policies that allow public access to S3 resources.

Block public and cross-account access to buckets and objects through any public bucket or access point policies

S3 will ignore public and cross-account access for buckets or access points with policies that grant public access to buckets and objects.



Turning off block all public access might result in this bucket and the objects within becoming public

AWS recommends that you turn on block all public access, unless public access is required for specific and verified use cases such as static website hosting.

I acknowledge that the current settings might result in this bucket and the objects within becoming public.

mytodolistapp [Info](#)

[Objects](#) | [Properties](#) | [Permissions](#) | [Metrics](#) | [Management](#) | [Access Points](#)

Objects (0)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permission. [Learn more](#)

[Delete](#) [Actions](#) [Create folder](#)

Find objects by prefix

< 1 > ⌂

Name	Type	Last modified	Size	Storage class
------	------	---------------	------	---------------

No objects

You don't have any objects in this bucket.

Amazon S3 > Buckets > mytodolistapp > Upload

Upload [Info](#)

Add the files and folders you want to upload to S3. To upload a file larger than 160GB, use the AWS CLI S3 REST API. [Learn more](#)

Drag and drop files and folders you want to upload here, or choose Add files.

Files and folders (0)

All files and folders in this table will be uploaded.

Find by name

Name	Folder	Type	Size
No files or folders			
You have not chosen any files or folders to upload.			

Favourites

- AirDrop
- Recents
- Applications
- Desktop
- Documents
- Downloads
- Creative Cloud Files

iCloud

- iCloud Drive

Locations

- OneDrive
- Network

Tags

- queue system
- Red
- Orange
- Yellow
- Green
- Blue



mytodolistapp [Info](#)

[Objects](#) [Properties](#) [Permissions](#) [Metrics](#) [Management](#) [Access Points](#)

Objects (2)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket.

[Delete](#)

Find objects by prefix

<input type="checkbox"/>	Name	Type
<input type="checkbox"/>	assets/	Folder
<input type="checkbox"/>	index.html	html

mytodolistapp Info

Objects Properties Permissions Metrics Management Access Points

Permissions overview

Access

Objects can be public

Edit static website hosting Info

Static website hosting

Use this bucket to host a website or redirect requests. [Learn more](#)

Static website hosting

- Disable
- Enable

[Edit](#)

Static website hosting

Use this bucket to host a website or redirect requests. [Learn more](#)

Static website hosting

Enabled

Hosting type

Bucket hosting

Bucket website endpoint

When you configure your bucket as a static website, the website is available at the AWS Region-specific website endpoint of the bucket. [Learn more](#)

<http://mytoc...site-us-east-1.amazonaws.com>



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People think focus means saying yes to the thing you've got to focus on.
It means saying no to the hundred other good ideas that there are.
You have to pick carefully.

---Steve Jobs ---



Register

Login

Full Name

Name

Email

Email ID

Password

Register

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kp Practice Resources



SHARE FEEDBACK

DASHBOARD > CHAPTER 3

Understanding Object Storage with Amazon S3, Hybrid Storage, and Static Website Hosting

Summary

In this chapter, you have discovered one of the critical services on AWS – Amazon S3. This service is popular due to its low cost, durability, and reliability. It allows AWS users to store an incredible variety of data, from archiving through to designing cost-effective data lakes for data engineering and analytics projects.

One key feature of Amazon S3 is its ability to host static websites that can act as the entry point to most contemporary applications. Furthermore, this feature of Amazon S3 lends itself well to designing complete end-to-end serverless architectures, which is discussed later in this book.

In addition to providing storage solutions in the cloud, it is also possible to build private networks in the cloud. AWS offers a feature called [Virtual Private Cloud \(VPC\)](#) that allows you to define and configure private networks, enabling you to separate workloads.

With VPC, you can separate applications that may be running within the same AWS account by establishing separate networks to contain them. This offers additional security as well as better management of how resources are provisioned and distributed.

In the next chapter, you will be introduced to networking in the cloud and explore virtual private networks. You will also explore Amazon Route 53, which offers domain naming services as well as helping you design how traffic is directed to your resources, both over the internet and within VPCs.

Chapter Review Questions

The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

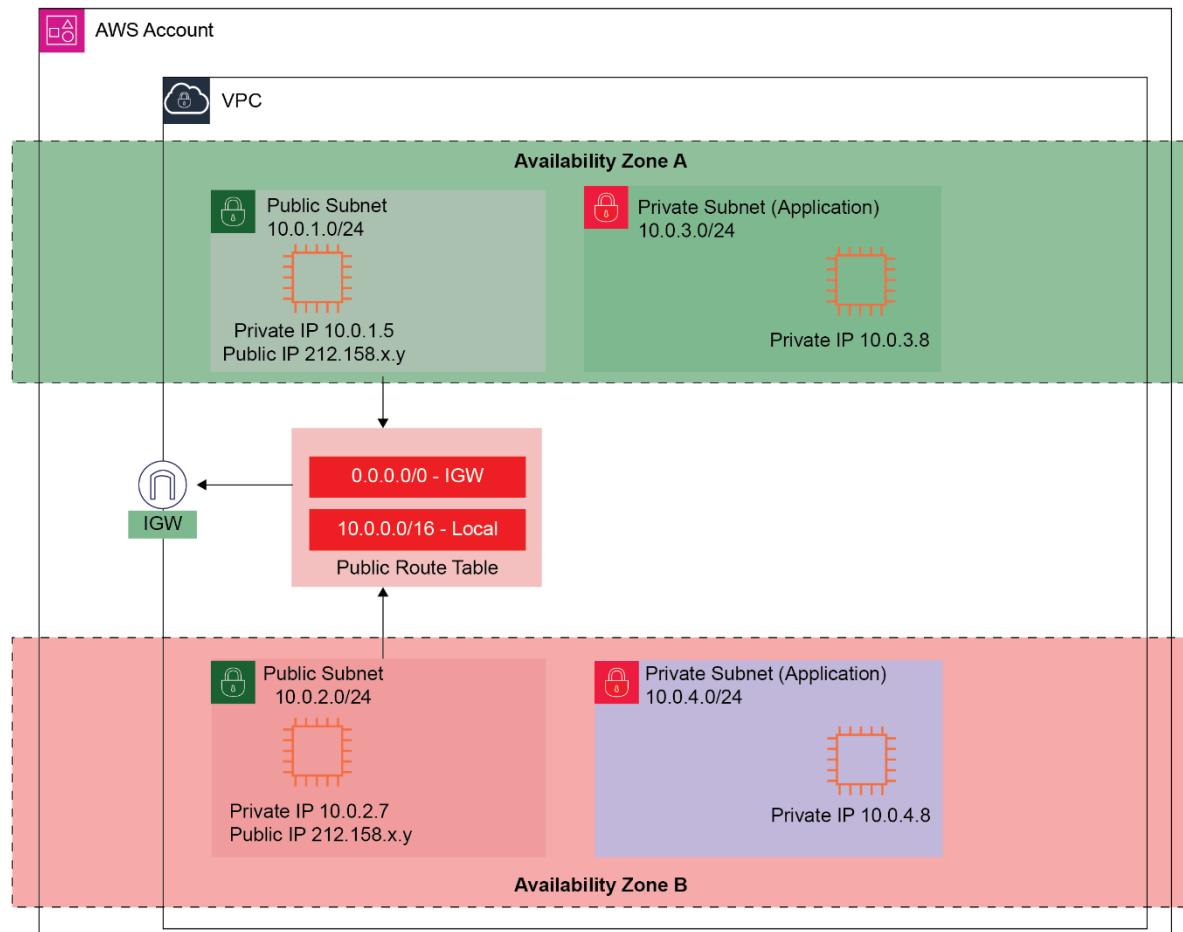
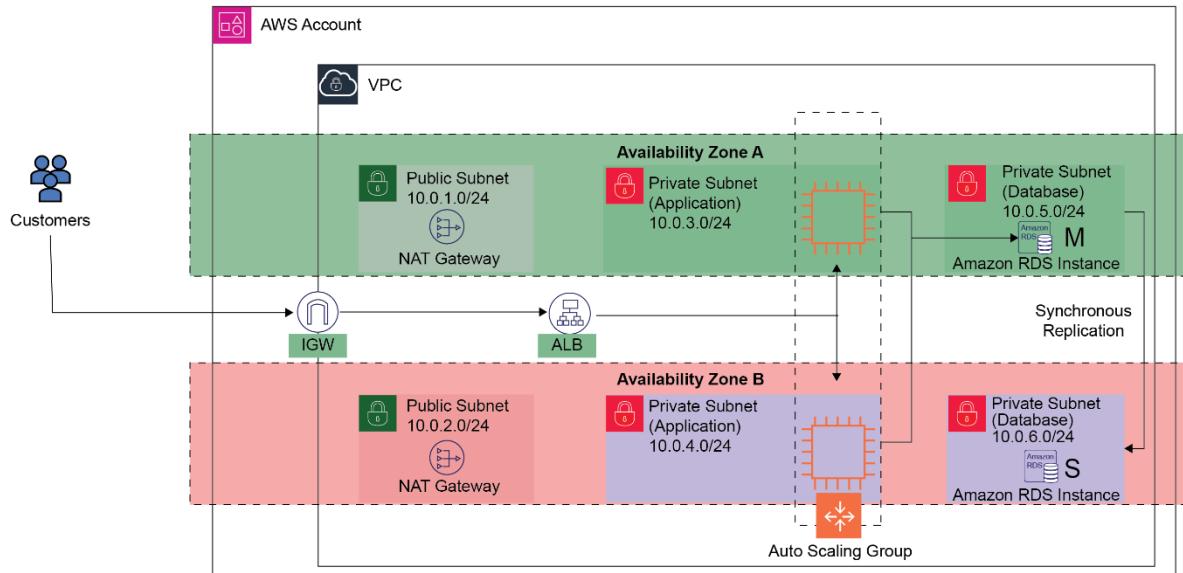
Select Quiz

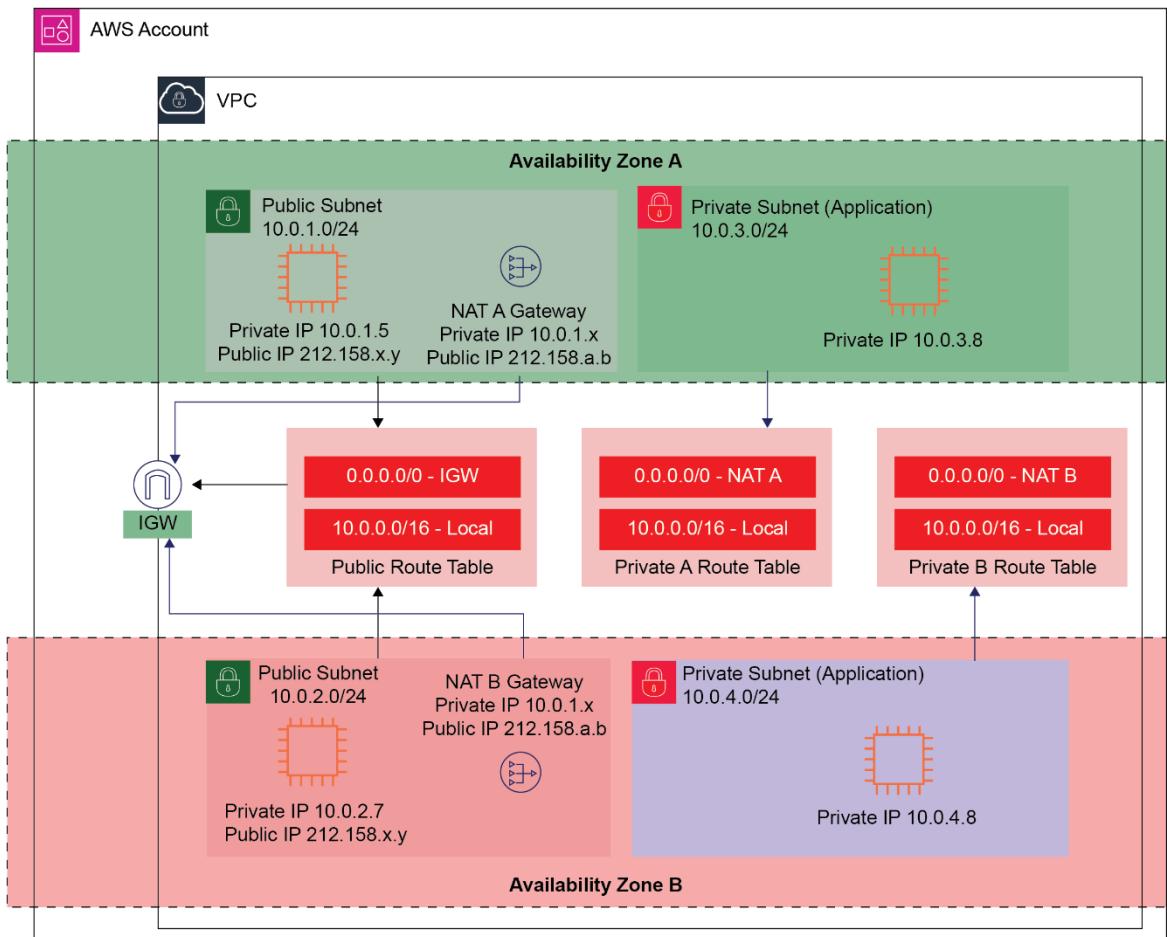
Quiz 1

[SHOW QUIZ DETAILS](#) ▾

START

Chapter 4: Building Private Networks in the Cloud with Amazon VPC





sg-09f7cbeddd04d3580 - MyWebServer-SG

Details				Actions ▾																					
Security group name MyWebServer-SG	Security group ID sg-09f7cbeddd04d3580	Description Allow inbound HTTP traffic from Internet	VPC ID vpc-a83f38d2																						
Owner 586446671042	Inbound rules count 1 Permission entry	Outbound rules count 1 Permission entry																							
Inbound rules Outbound rules Tags																									
Inbound rules (1/1) <table border="1"> <thead> <tr> <th colspan="2">Filter security group rules</th> <th>< 1 ></th> <th>Manage tags</th> <th>Edit inbound rules</th> </tr> <tr> <th>Name</th> <th>Security group rule...</th> <th>IP version</th> <th>Type</th> <th>Protocol</th> <th>Port ra...</th> <th>Source</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/> Allow-HTTP</td> <td>sgr-02091b4ab2917cd...</td> <td>IPv4</td> <td>HTTP</td> <td>TCP</td> <td>80</td> <td>0.0.0.0/0</td> <td>Allow inbound traffic on port 80...</td> </tr> </tbody> </table>					Filter security group rules		< 1 >	Manage tags	Edit inbound rules	Name	Security group rule...	IP version	Type	Protocol	Port ra...	Source	Description	<input checked="" type="checkbox"/> Allow-HTTP	sgr-02091b4ab2917cd...	IPv4	HTTP	TCP	80	0.0.0.0/0	Allow inbound traffic on port 80...
Filter security group rules		< 1 >	Manage tags	Edit inbound rules																					
Name	Security group rule...	IP version	Type	Protocol	Port ra...	Source	Description																		
<input checked="" type="checkbox"/> Allow-HTTP	sgr-02091b4ab2917cd...	IPv4	HTTP	TCP	80	0.0.0.0/0	Allow inbound traffic on port 80...																		

acl-2ba7c956 / MyNACL

Details [Info](#)

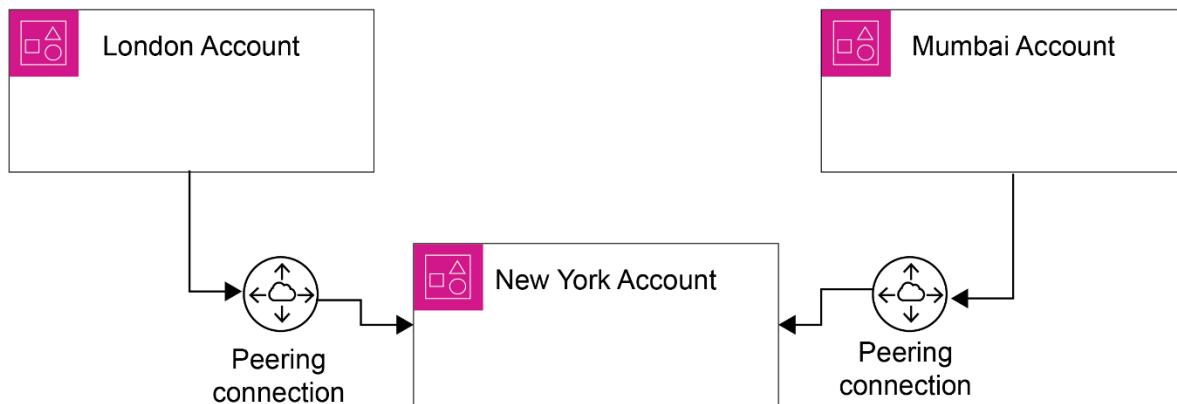
Network ACL ID acl-2ba7c956	Associated with 6 Subnets	Default Yes	VPC ID vpc-a83f38d2
Owner 586446671042			

Inbound rules [Outbound rules](#) [Subnet associations](#) [Tags](#)

Inbound rules (3)

[Edit inbound rules](#)

Rule number	Type	Protocol	Port range	Source	Allow/Deny
50	HTTP (80)	TCP (6)	80	81.97.31.155/32	Deny
100	HTTP (80)	TCP (6)	80	0.0.0.0/0	Allow



Log events

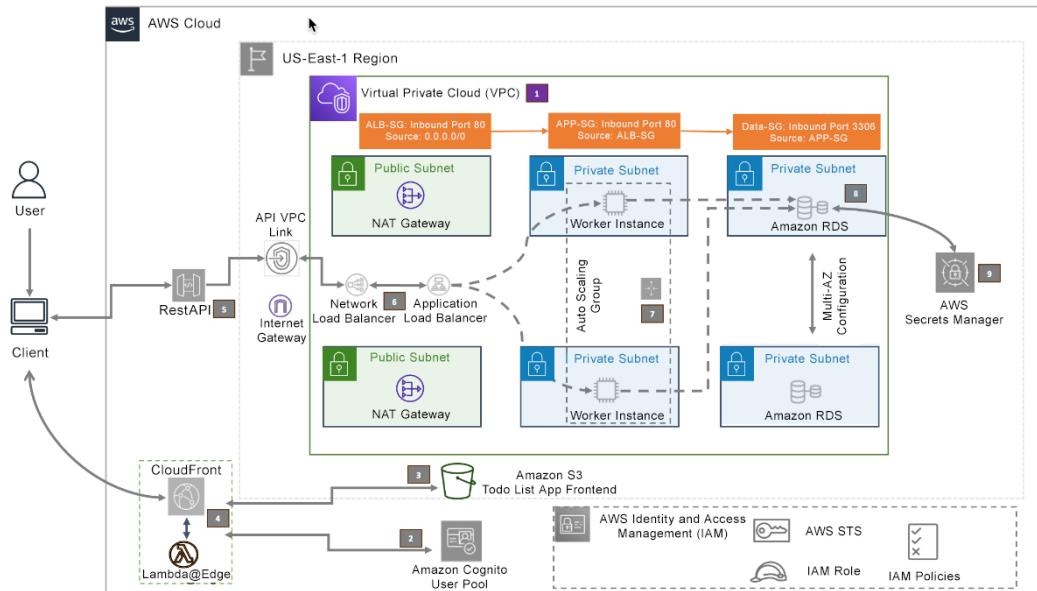
You can use the filter bar below to search for and match terms, phrases, or values in your log events. [Learn more about filter patterns](#)

View as text [C](#) [Actions](#) [Create metric filter](#)

Filter events [Clear](#) [1m](#) [30m](#) [1h](#) [12h](#) [Custom](#) [@](#)

Timestamp	Message
No older events at this moment. Retry	
2022-10-26T19:42:43.000+01:00	2 552730982124 eni-03e52c3ac550ce80c 147.203.255.20 10.0.1.254 41140 161 17 1 71 1666809763 1666809789 ACCEPT OK
2022-10-26T19:42:43.000+01:00	2 552730982124 eni-03e52c3ac550ce80c 10.0.1.254 10.0.3.244 443 57616 6 24 7209 1666809763 1666809789 ACCEPT OK
2022-10-26T19:42:43.000+01:00	2 552730982124 eni-03e52c3ac550ce80c 54.239.25.99 10.0.1.254 443 43274 6 18 6595 1666809763 1666809789 ACCEPT OK
2022-10-26T19:42:43.000+01:00	2 552730982124 eni-03e52c3ac550ce80c 10.0.4.166 10.0.1.254 54148 443 6 22 5305 1666809763 1666809789 ACCEPT OK
2022-10-26T19:42:52.000+01:00	2 552730982124 eni-03e52c3ac550ce80c 10.0.1.254 52.119.197.249 55514 443 6 22 5313 1666809772 1666809790 ACCEPT OK

VPC Flow Logs version	interface-id	Dstaddr (Destination Address)	Dstport (Destination Port)	Packets	Start (Unix time seconds)	Action (Accept or Reject)
2 552730982124	eni-03e52c3ac550ce80c	10.0.1.254	10.0.3.244	443	57616	6
Account ID	Srcaddr (Source Address)	Srcport (Source Port)	Protocol	Bytes	End (Unix time seconds)	Log-status
7209	1666809763	1666809789	ACCEPT OK			



Create VPC Info

A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.

VPC settings

Resources to create Info

Create only the VPC resource or the VPC and other networking resources.

VPC only

VPC and more

Name tag - *optional*

Creates a tag with a key of 'Name' and a value that you specify.

todolist-vpc

Your VPCs (2) <small>Info</small>						<small>C</small>	Actions ▾	<small>Create VPC</small>
<input type="text"/> Find resources by attribute or tag						<	1	>
Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR				
-	vpc-05962c3737ed847b0	<input checked="" type="radio"/> Available	172.31.0.0/16	-				
todolist-vpc	vpc-08192228f70f81390	<input checked="" type="radio"/> Available	10.0.0.0/16	-				

Create internet gateway Info

An internet gateway is a virtual router that connects a VPC to the internet. To create a new internet gateway specify the name for the gateway below.

Internet gateway settings

Name tag

Creates a tag with a key of 'Name' and a value that you specify.

todolist-igw

Tags - *optional*

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key

Value - *optional*

Name

todolist-igw

X

Remove

Add new tag

You can add 49 more tags.

Cancel

Create internet gateway

VPC > Internet gateways > Attach to VPC (igw-09c52a0904eb2527f)

Attach to VPC (igw-09c52a0904eb2527f) Info

VPC
Attach an internet gateway to a VPC to enable the VPC to communicate with the internet. Specify the VPC to attach below.

Available VPCs
Attach the internet gateway to this VPC.

Select a VPC

vpc-08192228f70f81390 - todolist-vpc

▶ AWS Command Line Interface command

Cancel **Attach internet gateway**

Route tables (1/2) Info

Create route table

Name	Route table ID	Explicit subnet...	Edge associati...	Main	VPC
-	rtb-013d7f3807c6548c0	-	-	Yes	vpc-05962c3737ed847b0
<input checked="" type="checkbox"/> -	rtb-0d48acbd05b9b5453	-	-	Yes	vpc-08192228f70f81390 todolist-vpc

Routes **Subnet associations** **Edge associations** **Route propagation** **Tags**

Routes (1) **Edit routes**

Filter routes Both

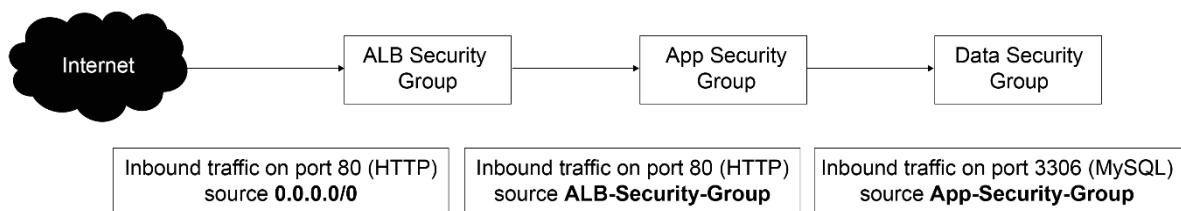
Destination	Target	Status	Propagated
10.0.0.0/16	local	Active	No

Route tables (1/3) [Info](#)

Name	Route table ID	Explicit subnet...	Edge associati...	Main	VPC
-	rtb-013d7f3807c6548c0	-	-	Yes	vpc-05962c3737ed847b0
tololist-mainrt	rtb-0d48acbd05b9b5453	-	-	Yes	vpc-08192228f70f81390 tololist-vpc
tololist-publicrt	rtb-0b008948a3dc895a4	-	-	No	vpc-08192228f70f81390 tololist-vpc

rtb-0b008948a3dc895a4 / tololist-publicrt

Details	Routes	Subnet associations	Edge associations	Route propagation	Tags
Explicit subnet associations (0)					
Edit subnet associations <input type="text" value="Find subnet association"/>					
Name	Subnet ID	IPv4 CIDR	IPv6 CIDR		
No subnet associations					
You do not have any subnet associations.					



Inbound rules [Info](#)

Type Info	Protocol Info	Port range Info	Source Info	Description - optional Info
HTTP	TCP	80	Any... <input type="button" value="▼"/>	<input type="text" value="Inbound traffic on HTTP"/> <input type="text" value="0.0.0.0"/> <input type="button" value="X"/>
<input type="button" value="Add rule"/>				

Security Groups (1/3) [Info](#)

Name	Security group ID	Security group name	VPC ID	Description	Owner
ALB-Security-Group	sg-05ad73bb2d2d8e658	ALB-Security-Group	vpc-08192228f70f81390	Security Group for App...	44163993
-	sg-0eea9b92f24416a5d	default	vpc-08192228f70f81390	default VPC security gr...	44163993
-	sg-04be49b131afb96cd	default	vpc-05962c3737ed847b0	default VPC security gr...	44163993

Security group name **Info**

Name cannot be edited after creation.

Description **Info**

VPC **Info**

Inbound rules **Info**

Type Info	Protocol Info	Port range Info	Source Info
HTTP	TCP	80	Cust... <input type="button" value="▼"/>
<input type="button" value="Add rule"/>			

0.0.0.0/32
::/0
::/16
::/32
::/48
::/64

Security Groups

- default | sg-0eea9b92f24416a5d
- ALB-Security-Group | sg-05ad73bb2d2d8e658 ALB-Security-Group**

Prefix lists

Description - optional **Info**

 Practice Resources

DASHBOARD > CHAPTER 4

Building Private Networks in the Cloud with Amazon VPC

Summary

In this chapter, you learned about the Amazon VPC. A VPC represents an isolated network environment within the AWS platform that is used to host certain compute, storage, and database resources. VPCs span entire Regions and this means you can define an architecture that takes advantage of multiple AZs to host your application. Depending on how you provision your resources, you can ensure that the replica workloads that support your application are distributed across those AZs, which offers greater resilience and redundancy.

Multiple VPCs can also be connected to each other using VPC peering. This means that you can connect VPCs in different Regions to each other where traffic between those VPCs always resides on the AWS backbone network and only requires private IP addressing. This not only reduces costs but also ensures security and high bandwidth connectivity between those VPCs. You can also build hybrid cloud solutions by connecting your on-premises network to your VPCs using VPNs or Direct Connect.

In the next chapter, you will move on to compute services on AWS. Now that you have built a secure VPC environment, the next chapter will teach how to provision EC2 instances (virtual servers) and deploy them within your VPC for your application.

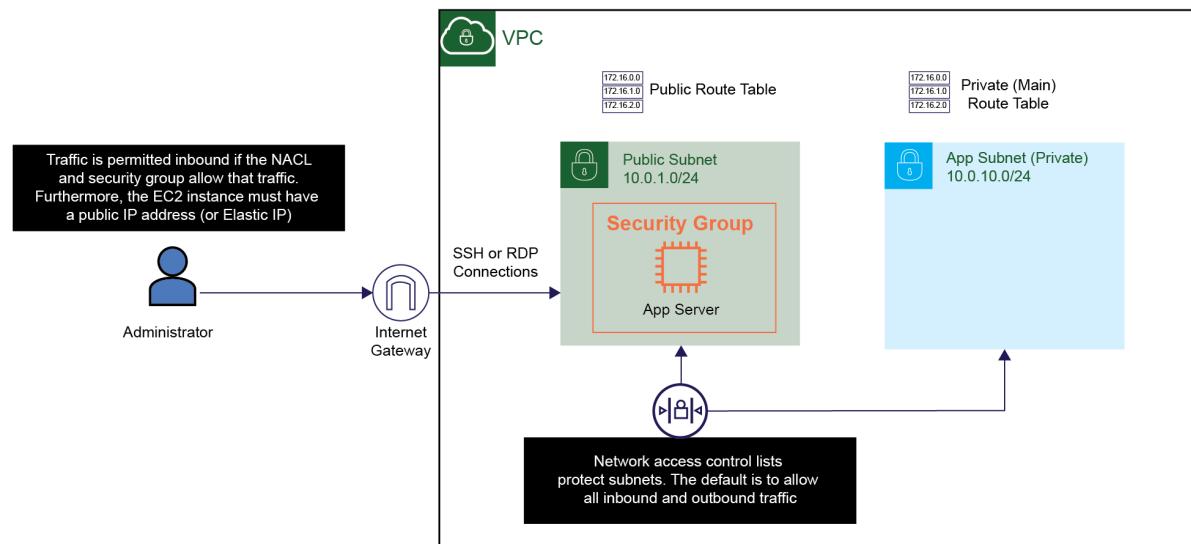
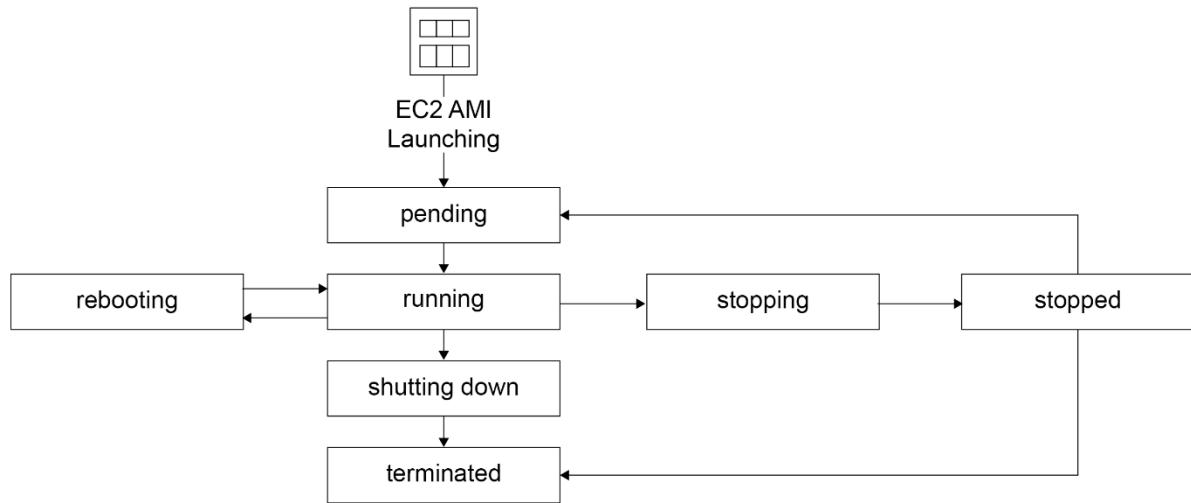
Chapter Review Questions

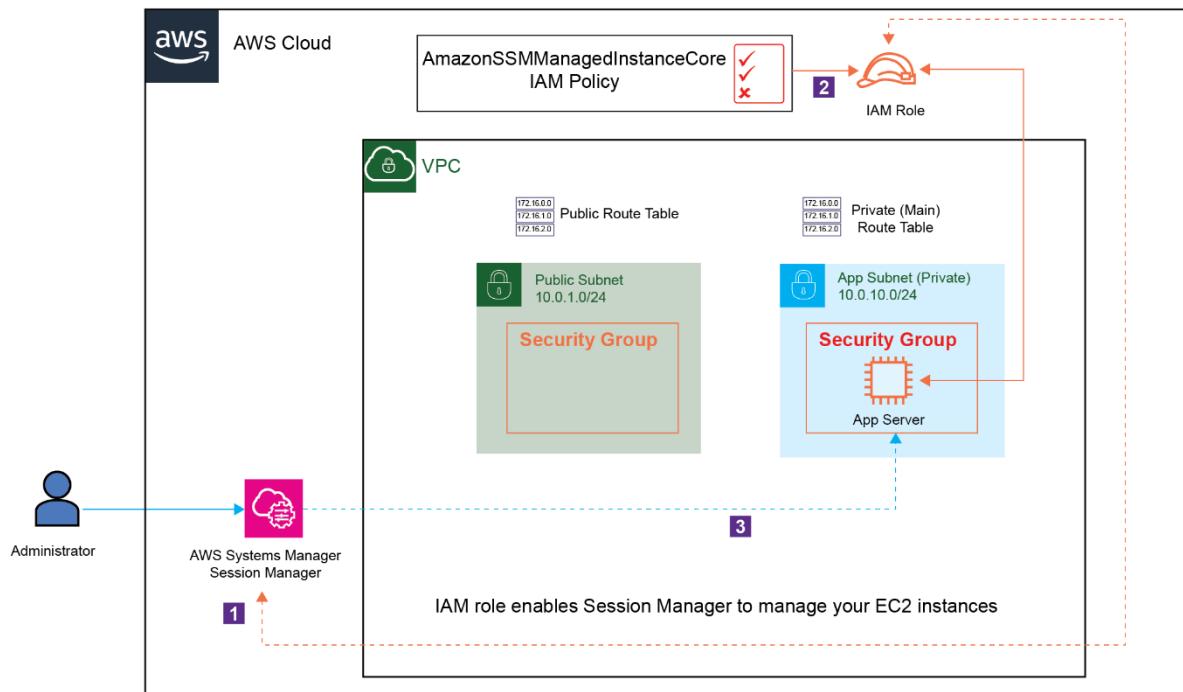
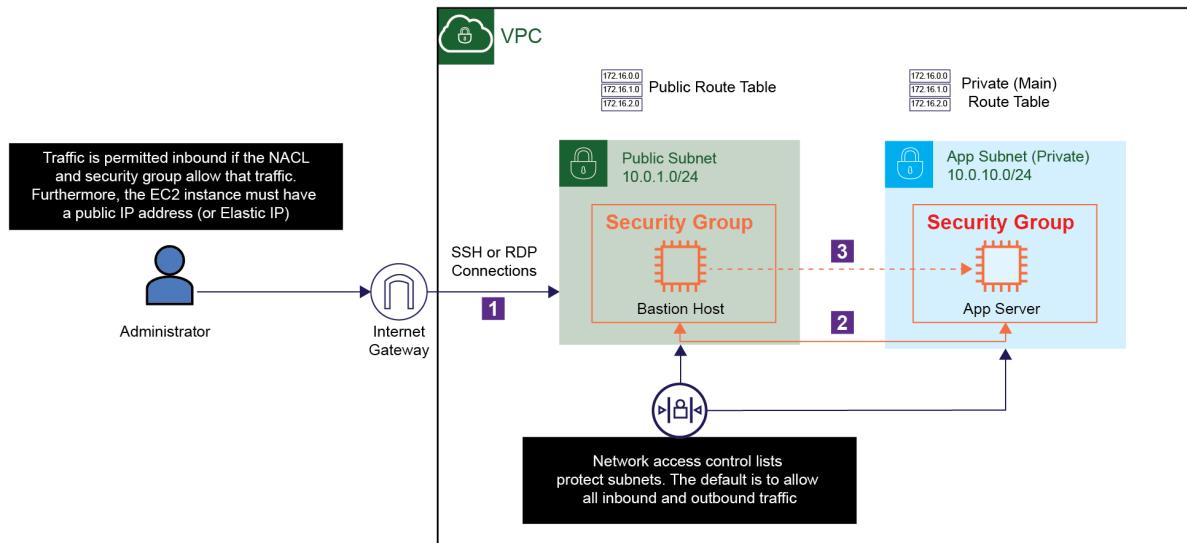
The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

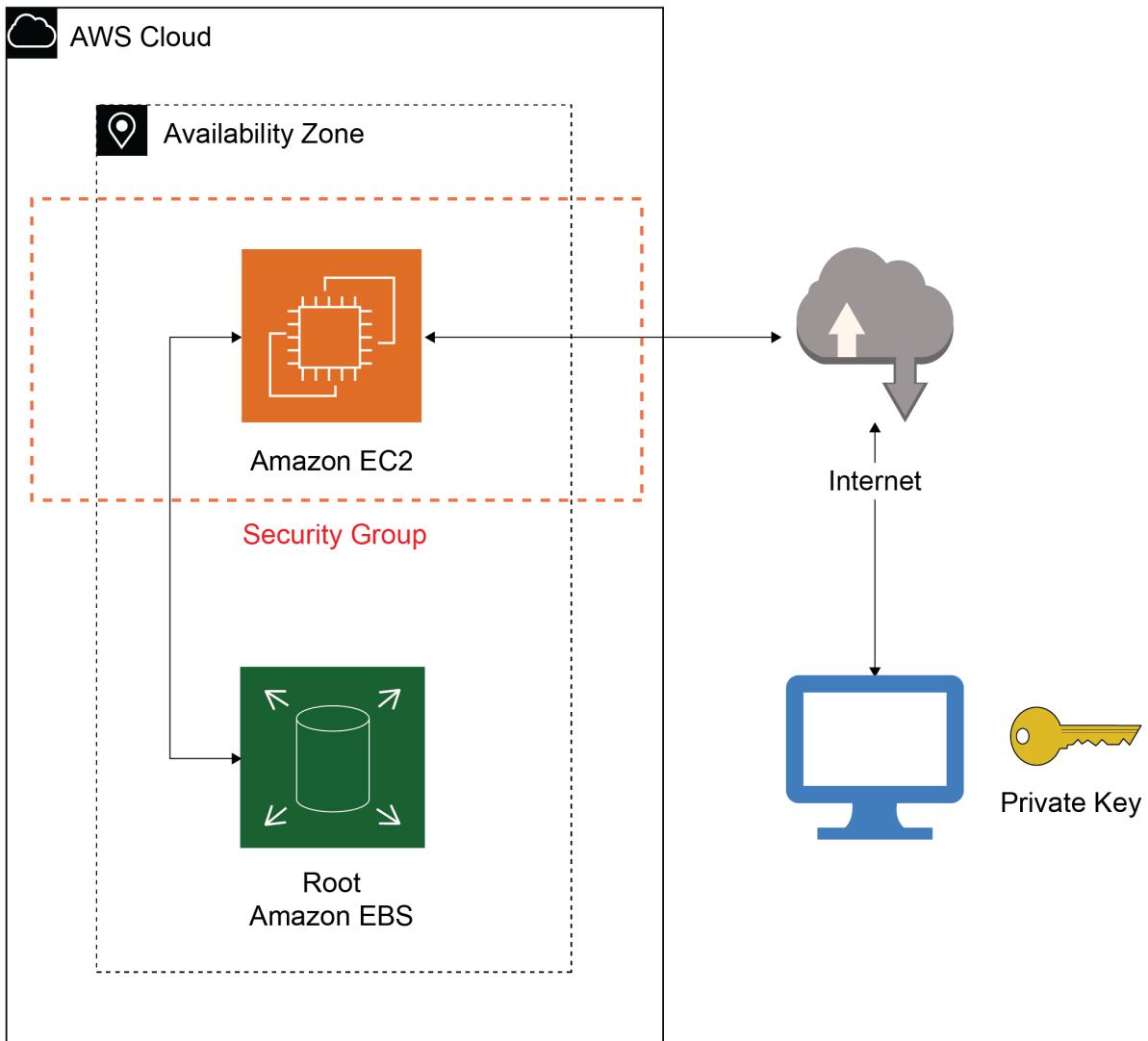
Select Quiz

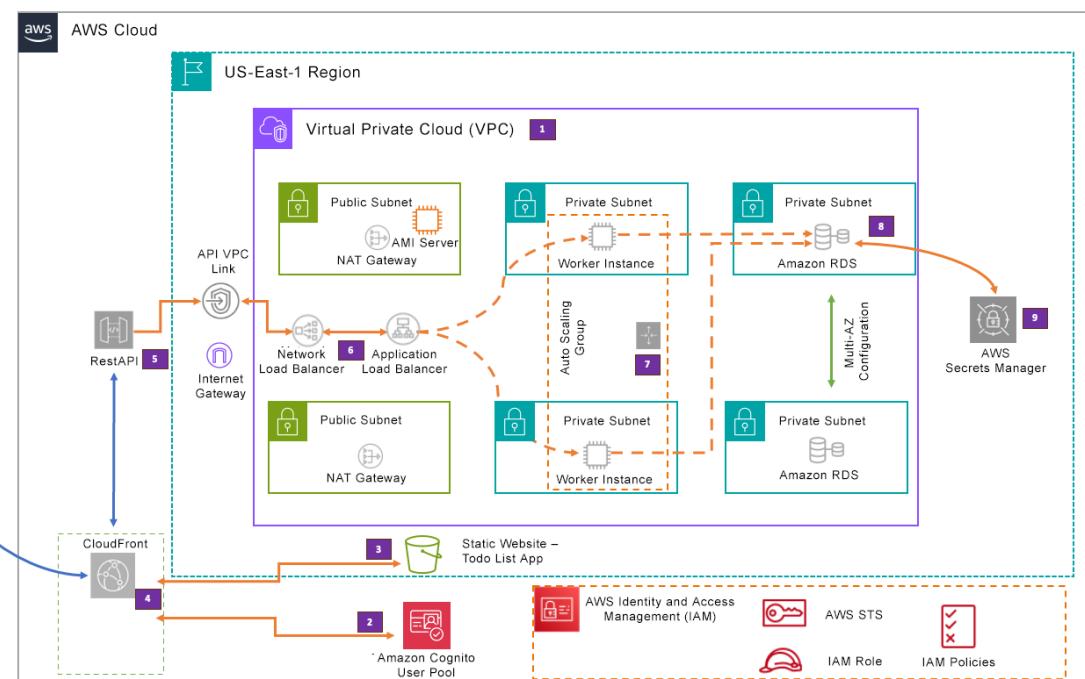
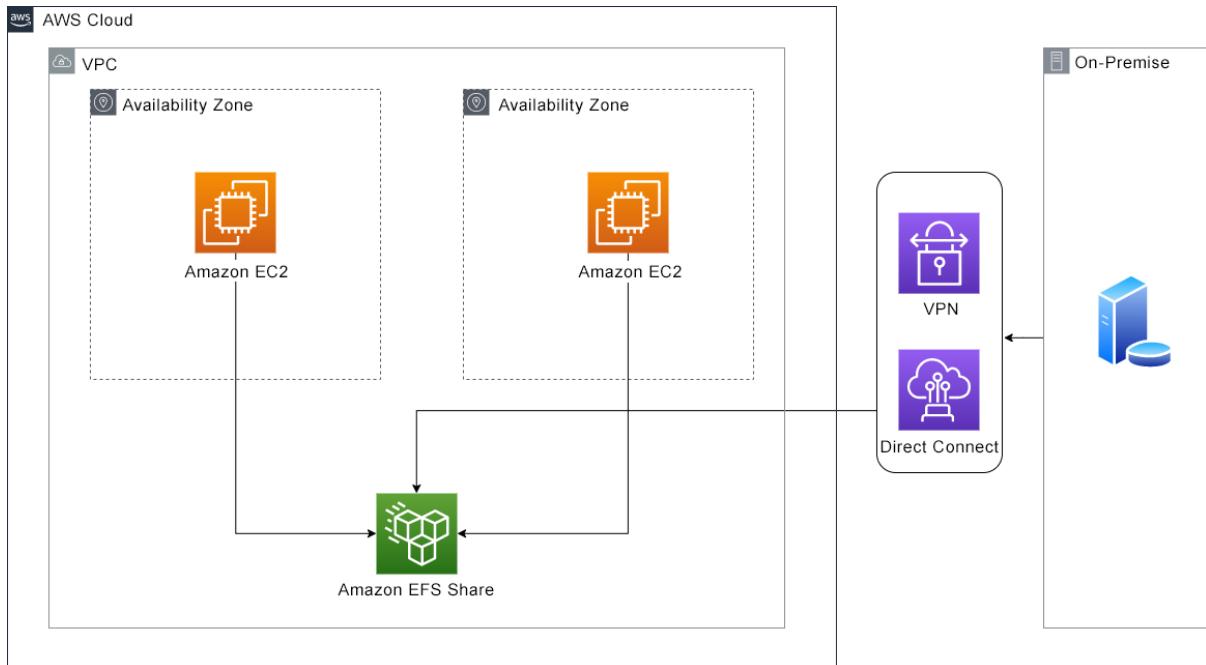
Quiz 1 [SHOW QUIZ DETAILS](#)

Chapter 5: Understanding AWS Compute Services with Amazon EC2 and Storage Options









MANAGEMENT TOOLS

AWS Systems Manager

Gain Operational Insight and Take Action on AWS Resources.

[Get Started with Systems Manager](#)

View operational data for groups of resources, so you can quickly identify and act on any issues that might impact applications that use those resources.

Management and Governance

AWS Quick Setup

Automated and simplified setups based on best practices

AWS Quick Setup helps you configure frequently used AWS services and features across your organization with fewer clicks.

Get started with Quick Setup

To begin, choose a home AWS Region for Quick Setup. Quick Setup creates the AWS resources used to deploy your configurations in the Region you specify. The home Region can't be changed once chosen.

Choose a home Region

us-east-1 ▾

[Get started](#)

Select trusted entity Info

Trusted entity type

AWS service

Allow AWS services like EC2, Lambda, or others to perform actions in this account.

AWS account

Allow entities in other AWS accounts belonging to you or a 3rd party to perform actions in this account.

Web identity

Allows users federated by the specified external web identity provider to assume this role to perform actions in this account.

SAML 2.0 federation

Allow users federated with SAML 2.0 from a corporate directory to perform actions in this account.

Custom trust policy

Create a custom trust policy to enable others to perform actions in this account.

Roles (12) Info		
<input type="checkbox"/>	Role name	Trusted entities
<small>An IAM role is an identity you can create that has specific permissions with credentials that are valid for short durations. Roles can be assumed by entities that you trust.</small>		
<input type="checkbox"/>	SecretsManagerRDSSQLRot-SecretsManagerRDSSQLRot-xdJLmEuzqTdY	AWS Service: lambda
<input type="checkbox"/>	SecretsManagerRDSSQLRot-SecretsManagerRDSSQLRot-xdJLmEuzqTdY	9 days ago
<input type="checkbox"/>	todo-ec2-iam-master-role	AWS Service: ec2

Quick Start



[Browse more AMIs](#)

Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

Amazon Linux 2023 AMI	Free tier eligible
ami-01bc990364452ab3e (64-bit (x86)) / ami-0900a8f768a21540a (64-bit (Arm)) Virtualization: hvm ENA enabled: true Root device type: ebs	

Description

Amazon Linux 2023 AMI 2023.2.20231026.0 x86_64 HVM kernel-6.1

Architecture	AMI ID	Verified provider
64-bit (x86)	ami-01bc990364452ab3e	

▼ Network settings [Info](#)

VPC - required [Info](#)

vpc-08192228f70f81390 (todolist-vpc)
10.0.0.0/16

Subnet [Info](#)

subnet-00e2933bd237d2957 todolist-pub-subnet01
VPC: vpc-08192228f70f81390 Owner: 441639934710 Availability Zone: us-east-1a
IP addresses available: 250 CIDR: 10.0.1.0/24

Create new subnet [\[+\]](#)

Auto-assign public IP [Info](#)

Enable

Additional charges apply when outside of [free tier allowance](#)

Firewall (security groups) [Info](#)

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Create security group Select existing security group

Common security groups [Info](#)

Select security groups

default sg-0eea9b92f24416a5d X
VPC: vpc-08192228f70f81390

Compare security group rules

Security groups that you add or remove here will be added to or removed from all your network interfaces.

Instances (1) [Info](#) [C](#) Connect Instance state Actions [Launch instances](#)

Find Instance by attribute or tag (case-sensitive) Running

Name Instance ID Instance state Instance type Status check

Todo AMI Image Instance i-03a5f1ab... Running t2.micro 2/2 checks passed...

Session ID: root-0851091c7f8c00bb2 Instance ID: i-0062f78b3c52b8462

```
sh-5.2$
```

Instances (1) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
Todo AMI Image Instance	i-03a5f1ab...	Running	t2.micro	2/2 checks passed...	View alarms +	us-east-1b

Instances (1/1) Info

Name	Instance ID	Instance state	Instance type	Status check	Actions	Launch instances
Todo AMI Image Instance	i-03a5f1ab3...	Stopped	t2.micro	-	Create image Create template from instance	Image and templates Monitor and troubleshoot

Amazon Machine Images (AMIs) (1) Info

Name	AMI name	AMI ID	Source	Owner	Visibility	Status	Actions
todolist-worker-ami	ami-01a828...	441639934...	4416399347...	Private	Available	Available	Launch instance from AMI

Practice Resources

DASHBOARD > CHAPTER 5

Understanding AWS Compute Services with Amazon EC2 and Storage Options

Summary

In this chapter, you have learned how to create and manage virtual servers called Amazon Elastic Compute Cloud (EC2) instances to run applications and services in the cloud. You have also learned about Amazon machine images (AMIs), which are pre-configured templates that make launching EC2 instances faster and easier.

Additionally, you have learned how to attach Elastic Block Store (EBS) storage to your EC2 instances, which provides the ability to store data on virtual hard drives that can be easily attached and detached. You also learned about Amazon Elastic File System (EFS), a fully managed and scalable file storage service used to create and provision file systems in the cloud. The AWS Certified Developer Associate exam will test your knowledge of core concepts around EC2 services as well as the EBS and EFS storage services. You will also be tested on AMIs, the use of user data and metadata, and security features.

The next chapter will cover database services on AWS, focusing on exploring the different database platforms available, including Amazon Relational Database Service (RDS) for relational databases and Amazon DynamoDB for non-relational databases.

Chapter Review Questions

The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

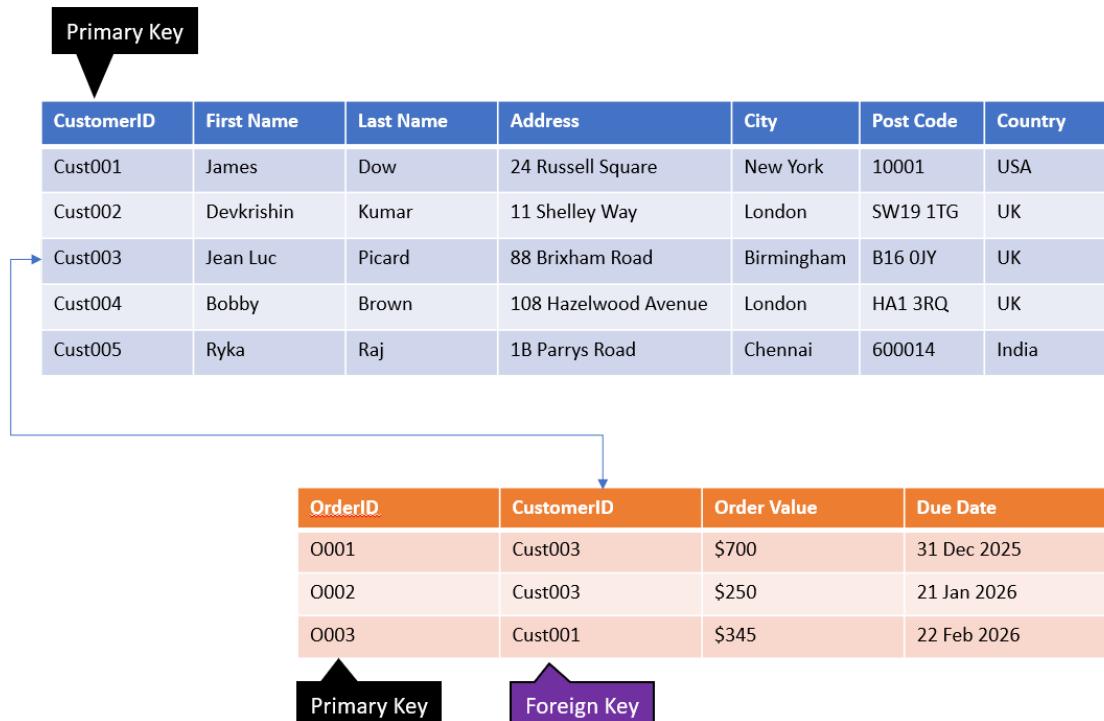
Select Quiz

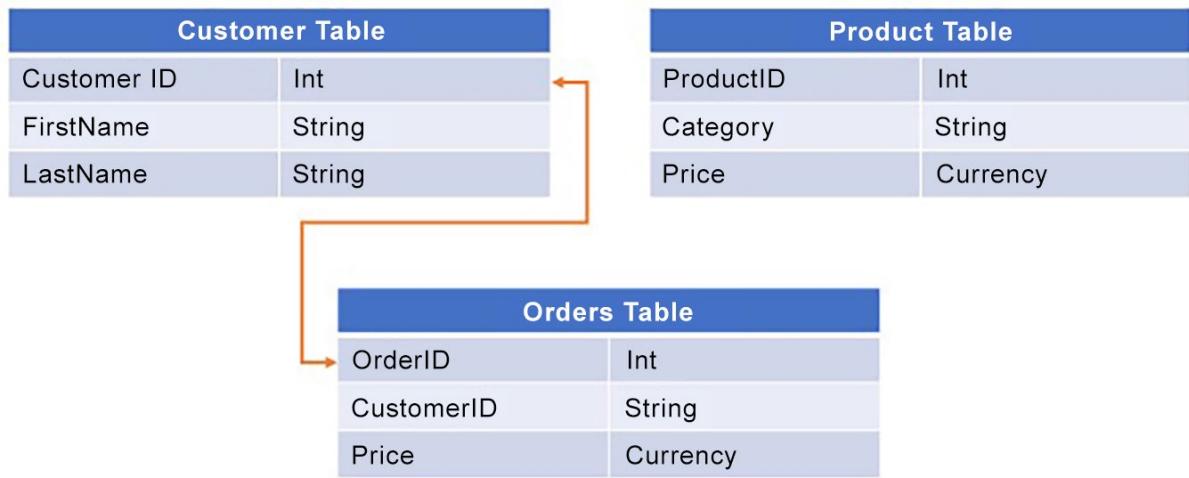
Quiz 1
[SHOW QUIZ DETAILS](#)

[START](#)

Chapter 6: Managing Multiple Datasets with AWS Relational and Non-Relational (NoSQL) Databases

CustomerID	First Name	Last Name	Address	City	Post Code	Country	Order No.	Item	Cost
Cust001	James	Dow	24 Russell Square	New York	10001	USA	101	iPhone	749
Cust001	James	Dow	24 Russell Square	New York	10001	USA	102	iPad	399
Cust001	James	Dow	24 Russell Square	New York	10001	USA	103	HP Laptop	549
Cust002	Bobby	Brown	108 Cavendish Avenue	London	HA1 3RQ	UK	104	Samsung S22	999
Cust002	Bobby	Brown	108 Cavendish Avenue	London	HA1 3RQ	UK	105	MacBook Air	999





DB instance class [Info](#)

- Standard classes (includes m classes)
- Memory optimized classes (includes r and x classes)
- Burstable classes (includes t classes)

db.m6i.large

2 vCPUs 8 GiB RAM Network: 10,000 Mbps

Include previous generation classes

Storage

Storage type [Info](#)

General Purpose SSD (gp2)

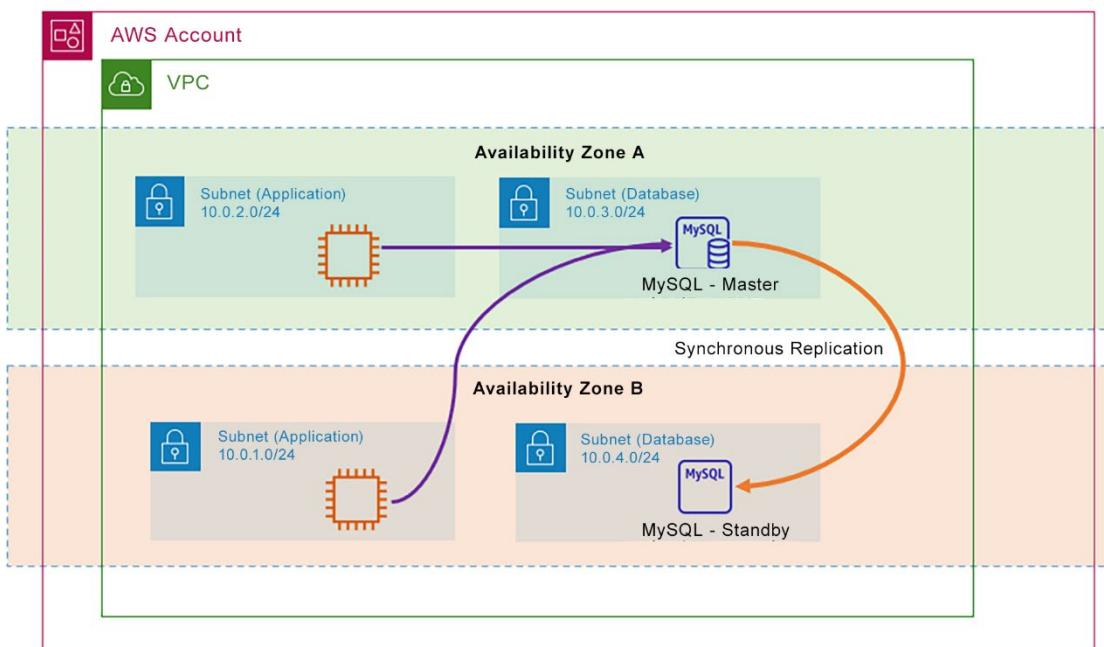
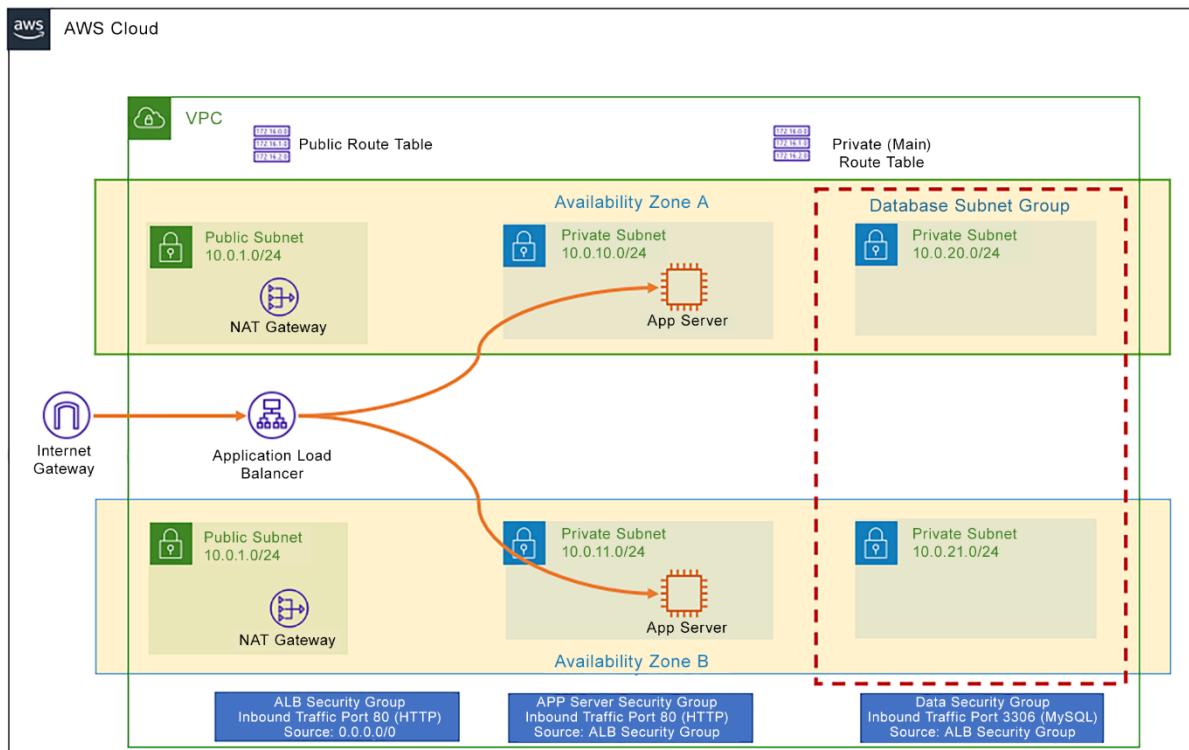
Baseline performance determined by volume size

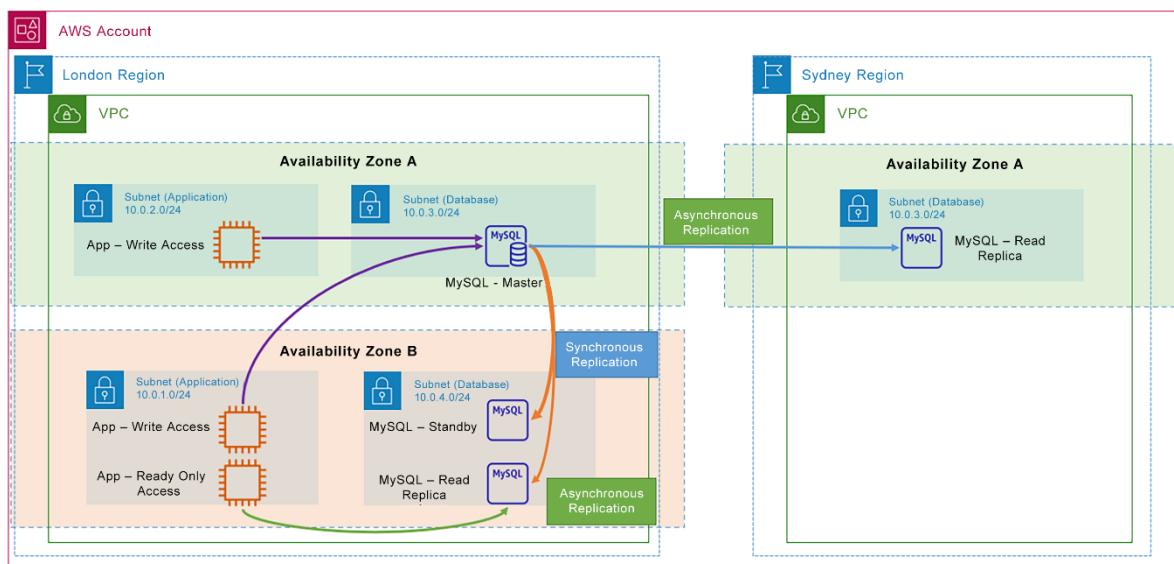
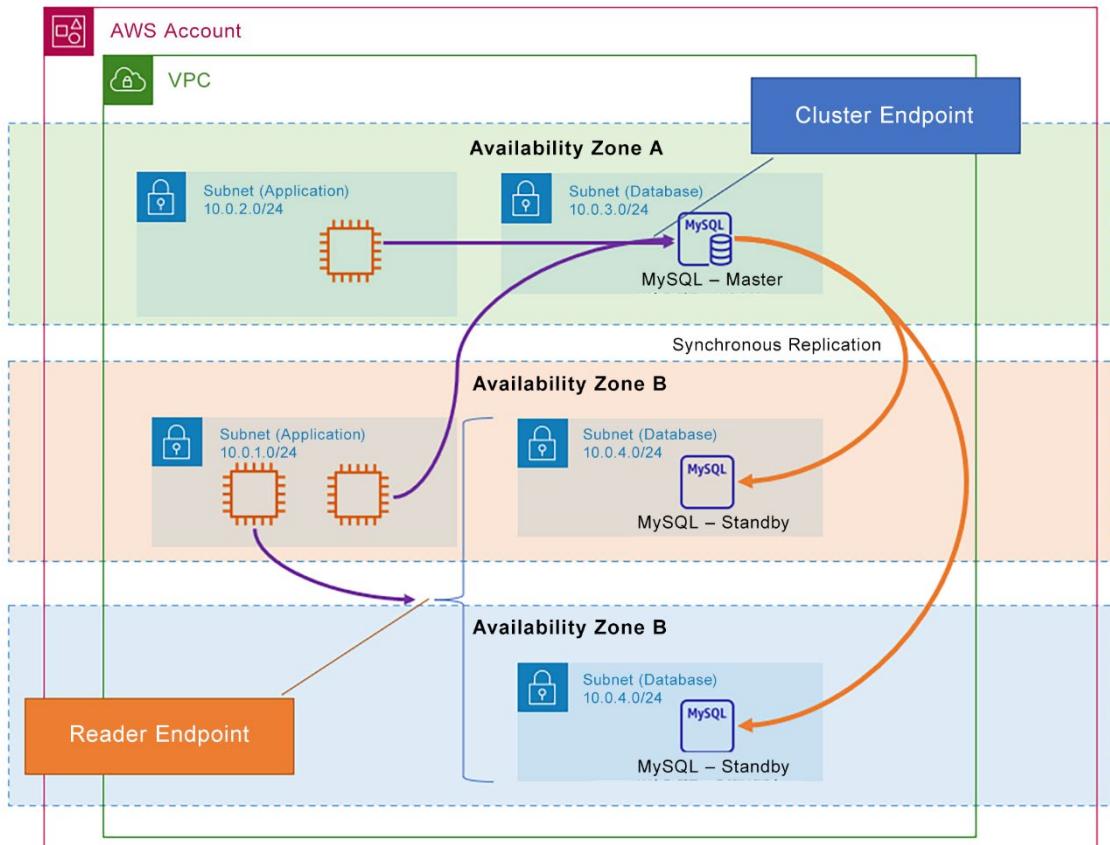
Allocated storage

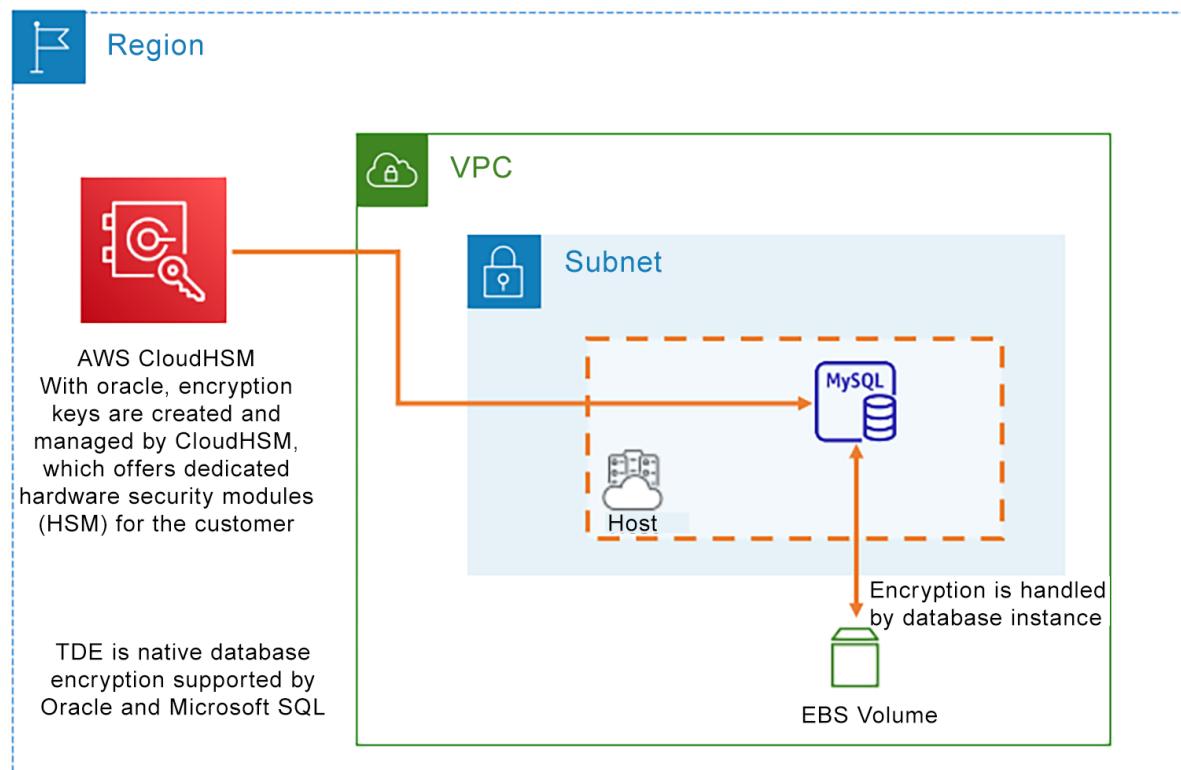
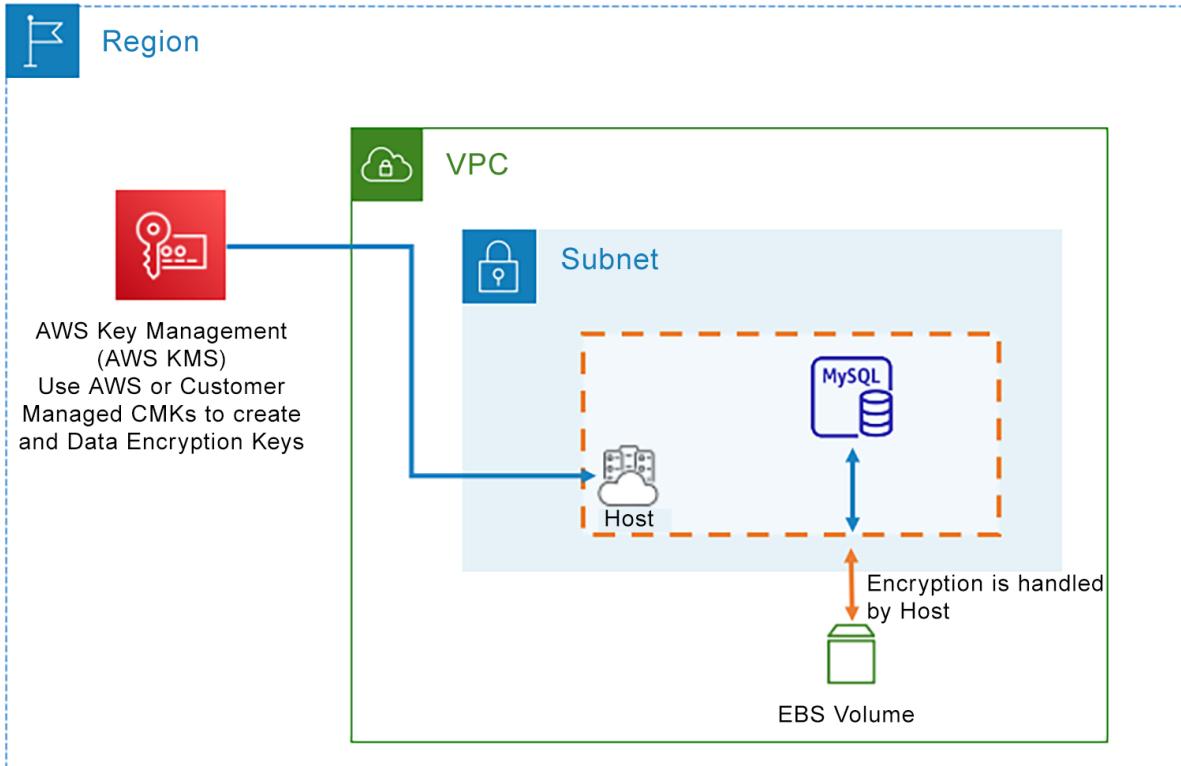
200

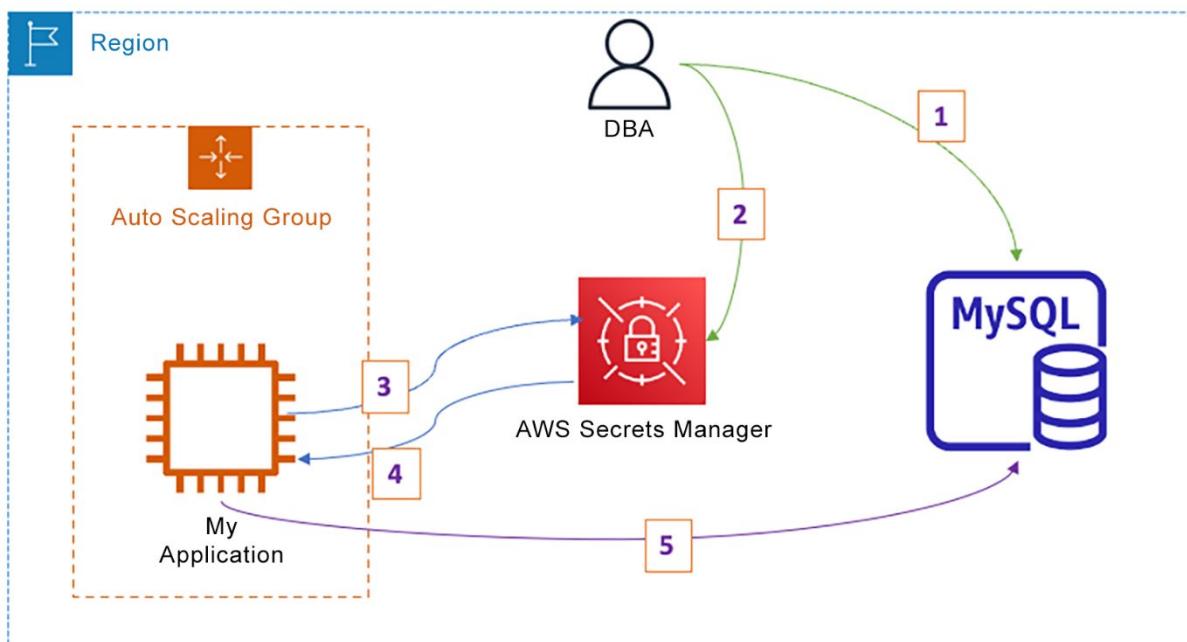
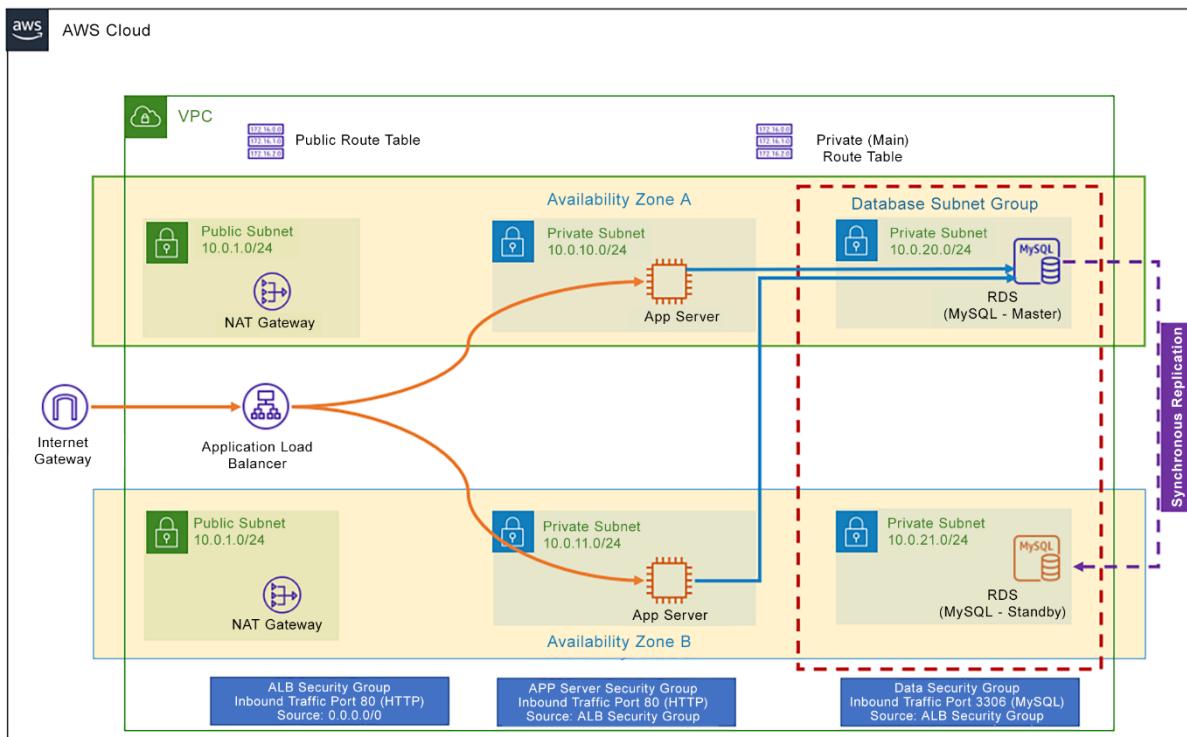
GiB

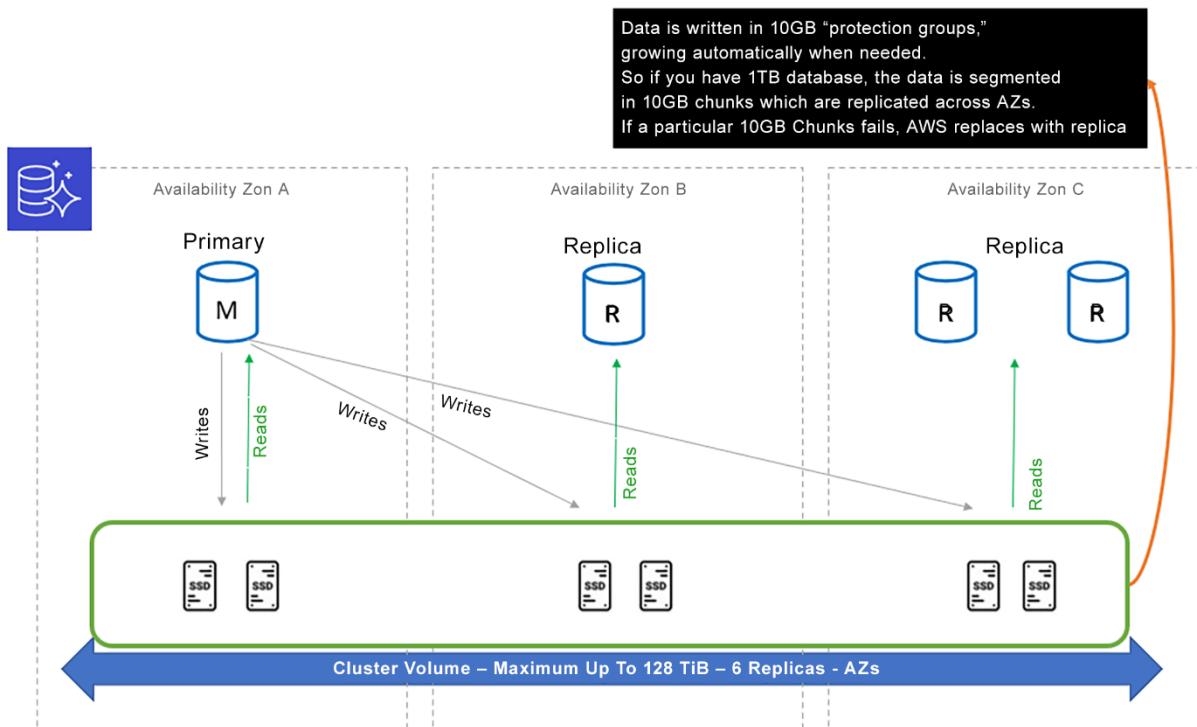
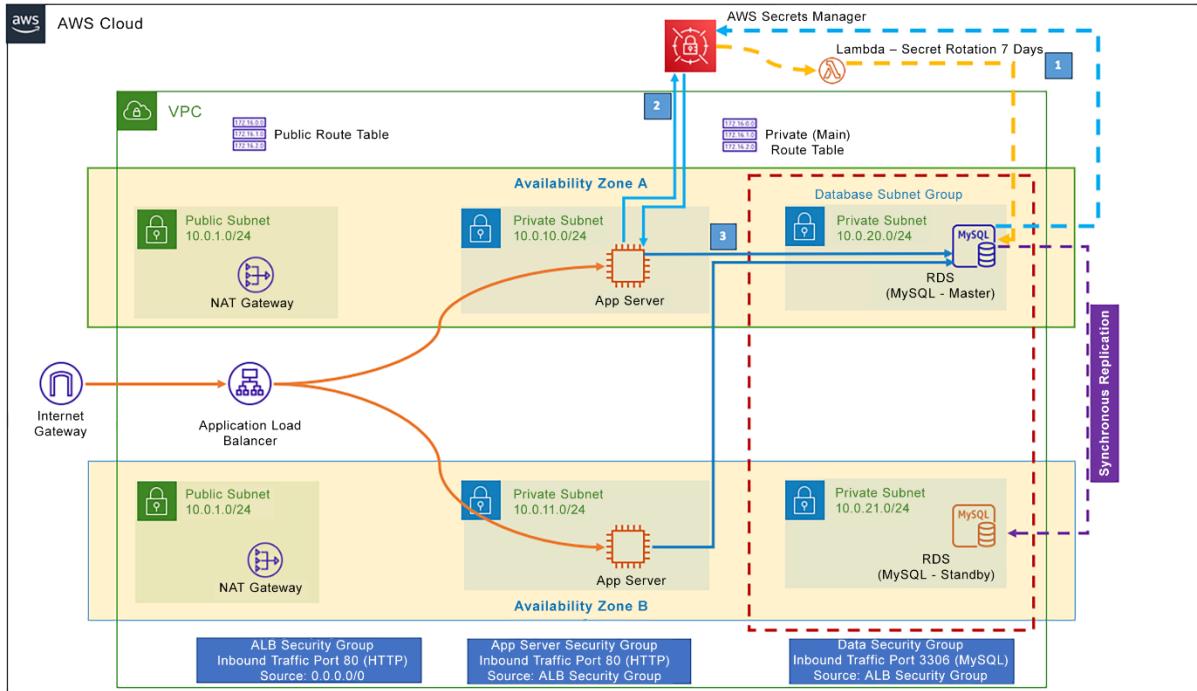
The minimum value is 20 GiB and the maximum value is 65,536 GiB

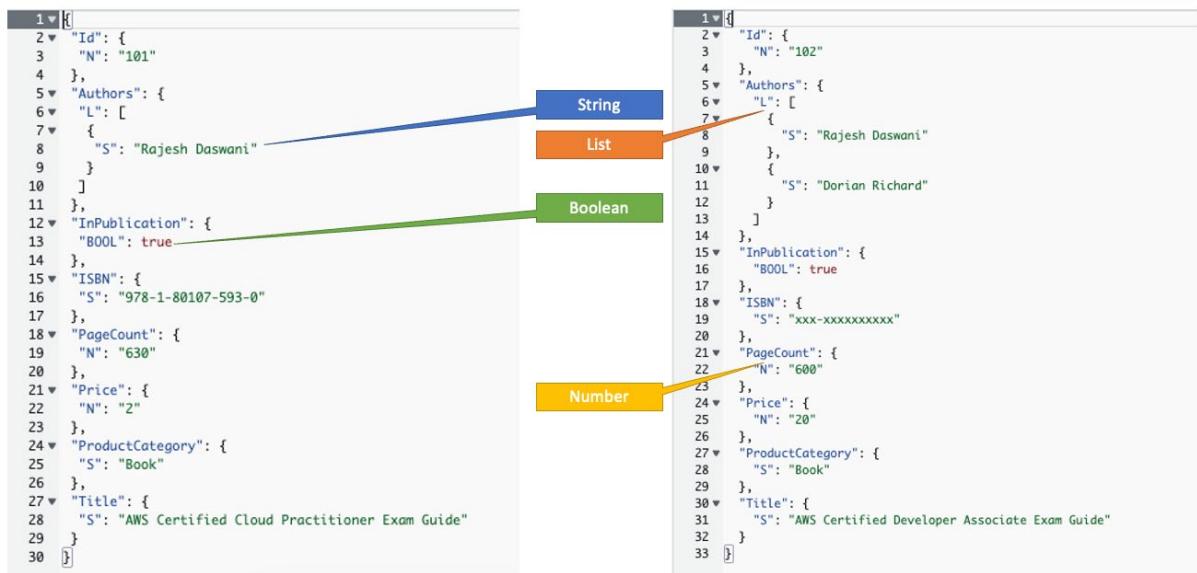
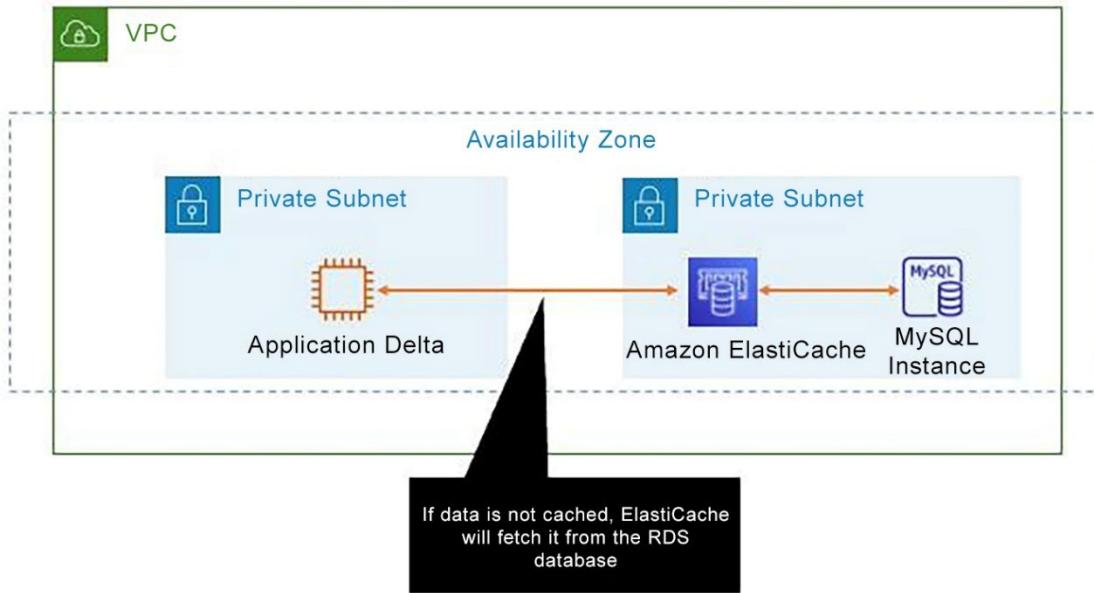


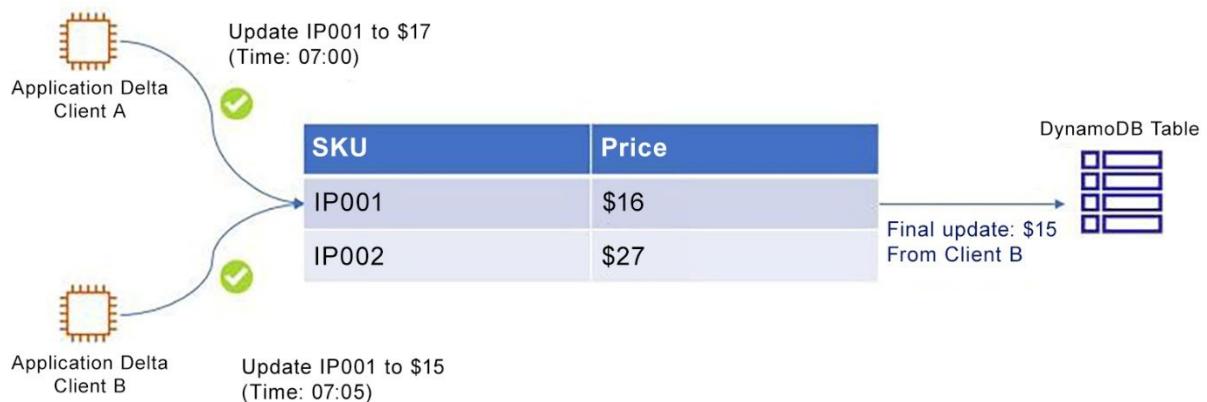
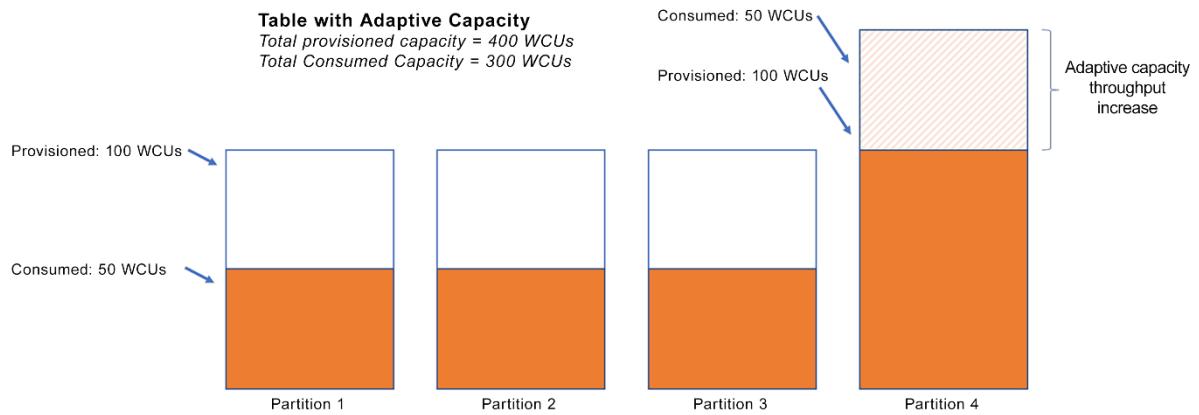


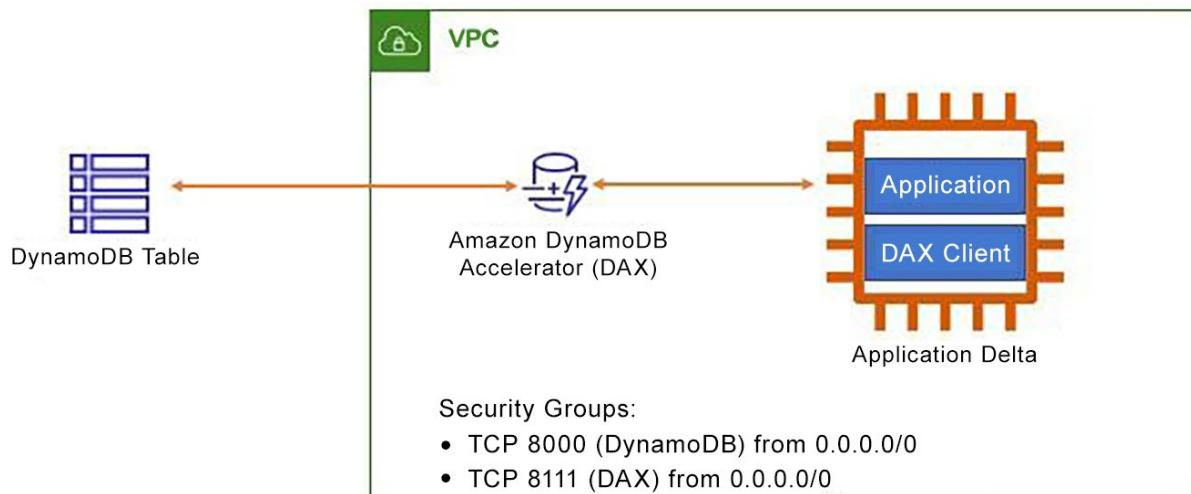
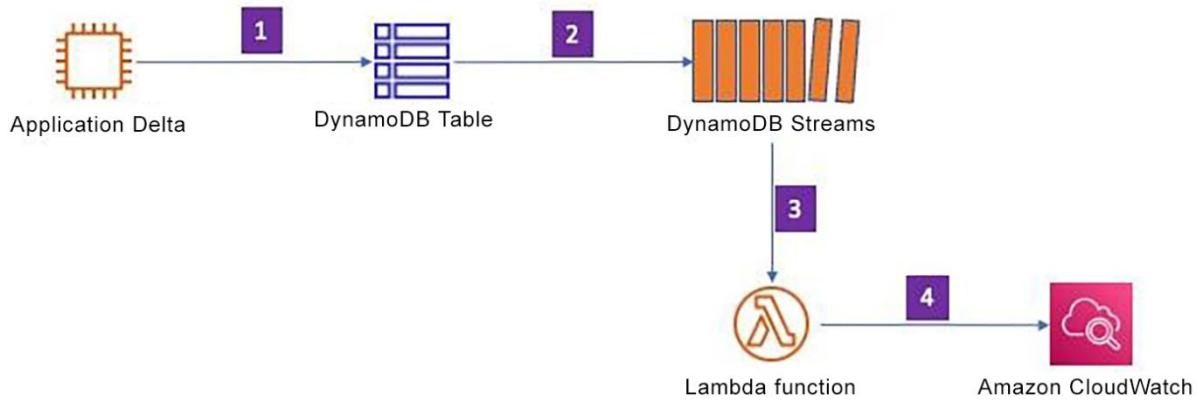












Subnets (6) [Info](#)

Find resources by attribute or tag

[VPC:vpc-08192228f70f81390](#) [X](#) [Clear filters](#)

<input type="checkbox"/>	Name	Subnet ID	State	VPC	IPv4 CIDR
<input type="checkbox"/>	todolist-app-subnet01	subnet-0da90144bce993455	Available	vpc-08192228f70f81390 todo...	10.0.10.0/24
<input type="checkbox"/>	todolist-app-subnet02	subnet-0872444131d8229d1	Available	vpc-08192228f70f81390 todo...	10.0.11.0/24
<input checked="" type="checkbox"/>	todolist-data-subnet01	subnet-0aa3392ecc1bca7c25	Available	vpc-08192228f70f81390 todo...	10.0.20.0/24
<input checked="" type="checkbox"/>	todolist-data-subnet02	subnet-0cf0f446e803c6bd5	Available	vpc-08192228f70f81390 todo...	10.0.21.0/24
<input type="checkbox"/>	todolist-pub-subnet01	subnet-00e2933bd237d2957	Available	vpc-08192228f70f81390 todo...	10.0.1.0/24
<input type="checkbox"/>	todolist-pub-subnet02	subnet-09ccb8a900ce5c001	Available	vpc-08192228f70f81390 todo...	10.0.2.0/24

Add subnets

Availability Zones

Choose the Availability Zones that include the subnets you want to add.

Choose an availability zone ▾

us-east-1a X

us-east-1b X

Subnets

Choose the subnets that you want to add. The list includes the subnets in the selected Availability Zones.

Select subnets ▾

subnet-0cf0f446e803c6bd5 (10.0.21.0/24) X

subnet-0aa3392ec1bca7c25 (10.0.20.0/24) X

Storage

Storage type [Info](#)

Provisioned IOPS SSD (io2) storage volumes are now available.

General Purpose SSD (gp2)

Baseline performance determined by volume size ▾

Allocated storage [Info](#)

20

GiB

The minimum value is 20 GiB and the maximum value is 6,144 GiB

ⓘ After you modify the storage for a DB instance, the status of the DB instance will be in storage-optimization. Your instance will remain available as the storage-optimization operation completes. [Learn more](#) ↗

▼ Storage autoscaling

Storage autoscaling [Info](#)

Provides dynamic scaling support for your database's storage based on your application's needs.

Enable storage autoscaling

Enabling this feature will allow the storage to increase after the specified threshold is exceeded.

Existing VPC security groups

Choose one or more options ▾

Data-Security-Group 

Availability Zone

No preference ▾

Databases (1)

Group resources



Modify

 Filter by databases

DB identifier	Status	Role	Engine	Region & AZ
<input type="radio"/> tododb	 Available	Instance	MySQL Community	us-east-1a

NAT gateway settings

Name - optional

Create a tag with a key of 'Name' and a value that you specify.

tololist-nat

The name can be up to 256 characters long.

Subnet

Select a subnet in which to create the NAT gateway.

subnet-00e2933bd237d2957 (tololist-pub-subnet01) ▾

Connectivity type

Select a connectivity type for the NAT gateway.

Public

Private

Elastic IP allocation ID

Assign an Elastic IP address to the NAT gateway.

Select an Elastic IP

Allocate Elastic IP

NAT gateways (1) [Info](#)

Find resources by attribute or tag

Name	NAT gateway ID	Connectivity...	State
○ todo... nat-0ae974b81e65a2...	nat-0ae974b81e65a2...	Public	<input checked="" type="checkbox"/> Available

0.0.0.0/0 X

NAT Gateway ▼

nat-0ae974b81e65a28ea X

[Add route](#)

Inbound rules [Info](#)

Security group rule ID	Type Info	Protocol Info	Port range	Source Info
Info				
sgr-0d7899428cd9a7d47	MySQL/Aurora ▼	TCP	3306	Custom ▼ <input type="text"/> sg-04fc19a822274f7fe X
-	MySQL/Aurora ▼	TCP	3306	Custom ▼ <input type="text"/> Data-Security-Group sg-0f Data-Security-Group

Security, Identity and Compliance

AWS Secrets Manager

Easily rotate, manage and retrieve secrets throughout their lifecycle

AWS Secrets Manager helps you protect access to your applications, services and IT resources. You can easily rotate, manage and retrieve database credentials, API keys and other secrets throughout their lifecycles.

Get started

You can store database credentials or any other type of secret.

[Store a new secret](#)

Database Info			
<input type="text"/> Search instances			
DB instance	DB engine	Status	Creation date
• tododb	mysql	available	7 July 2024 at 20:20...

[Cancel](#)
Next

Rotation schedule

Schedule expression builder
 schedule expression

Time unit Days
 Days 7

Window duration - optional
 4h

Enter the time in hours.

Rotate immediately when the secret is stored. The next rotation will begin on your schedule.

Rotation function [Info](#)

Create a rotation function

Use a rotation function from your account

Lambda rotation function

Secrets Manager adds the prefix 'SecretsManager' to your function name.

SecretsManager `todolist-latest`

Function name including prefix must be a maximum of 64 alphanumeric characters, hyphens and underscores.

Rotation strategy [Info](#)

Single user

The user must have permission to update their password.

Alternating users

This strategy clones the initial user and stores both sets of credentials in one secret. One set of credentials is always valid. You must provide admin credentials in a separate secret.

[Cancel](#)

[Previous](#)

[Next](#)

Rotation configuration [Info](#)

[Rotate secret immediately](#)

Rotation status

Enabled

Rotation schedule

rate(7 days)

Secret value [Info](#)

Retrieve and view the secret value.

[Close](#)

Key/value	Plaintext
Secret key	Secret value
username	<input type="text"/> admin
password	<input type="text"/> CBIU0 [REDACTED]
engine	<input type="text"/> mysql
host	<input type="text"/> tododb.c3wzi [REDACTED]
port	<input type="text"/> 3306
dbname	<input type="text"/> tododb
dbInstanceIdentifier	<input type="text"/> tododb

kp Practice Resources

DASHBOARD > CHAPTER 6

Managing Multiple Datasets with AWS Relational and Non-Relational (NoSQL) Databases

Summary

In this chapter, you learned about relational and non-relational databases on AWS. At the heart of every application is data; you need a tool not only to store that data in an efficient and cost-effective manner but also to scan, query, and ultimately manipulate that data to derive critical information from it.

Depending on the application requirements, you may need to deploy either traditional relational database engines such as MySQL or Oracle or non-relational key-value store databases such as Amazon DynamoDB. In addition, your application may also require in-memory caching engines that help to improve latency and reduce costs. Regardless of which database model you opt for, understanding the fundamentals of databases and how they should be configured and deployed is critical for any application.

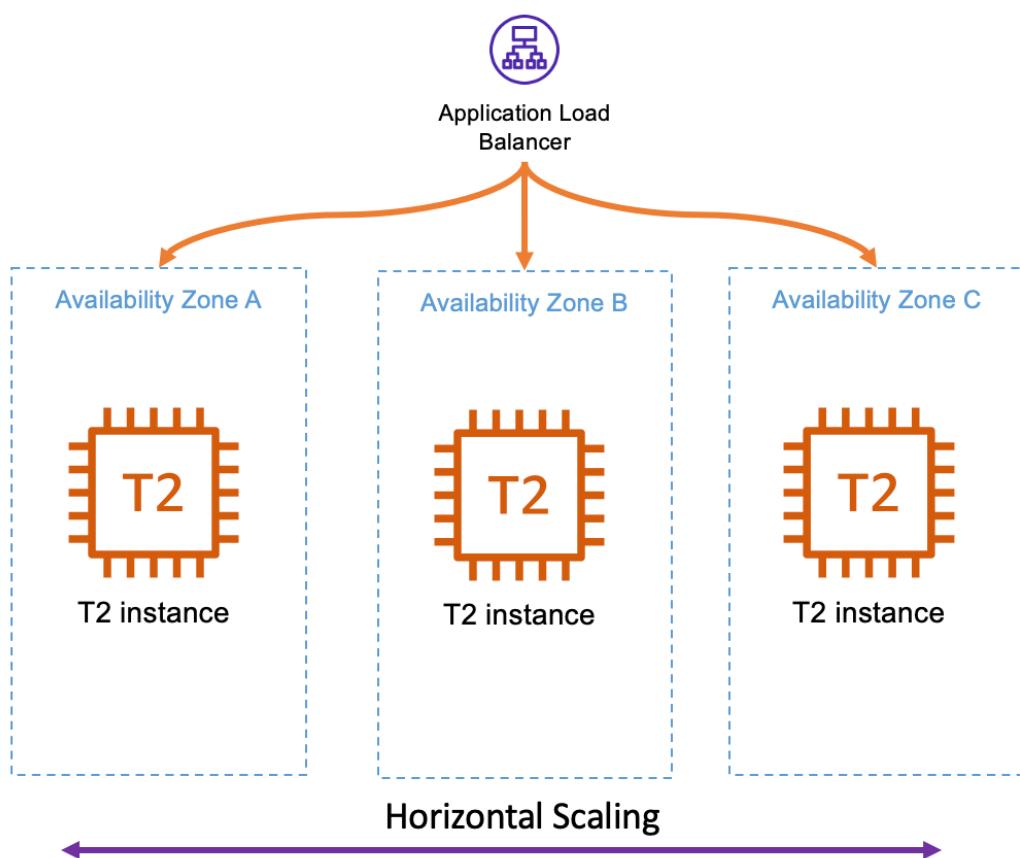
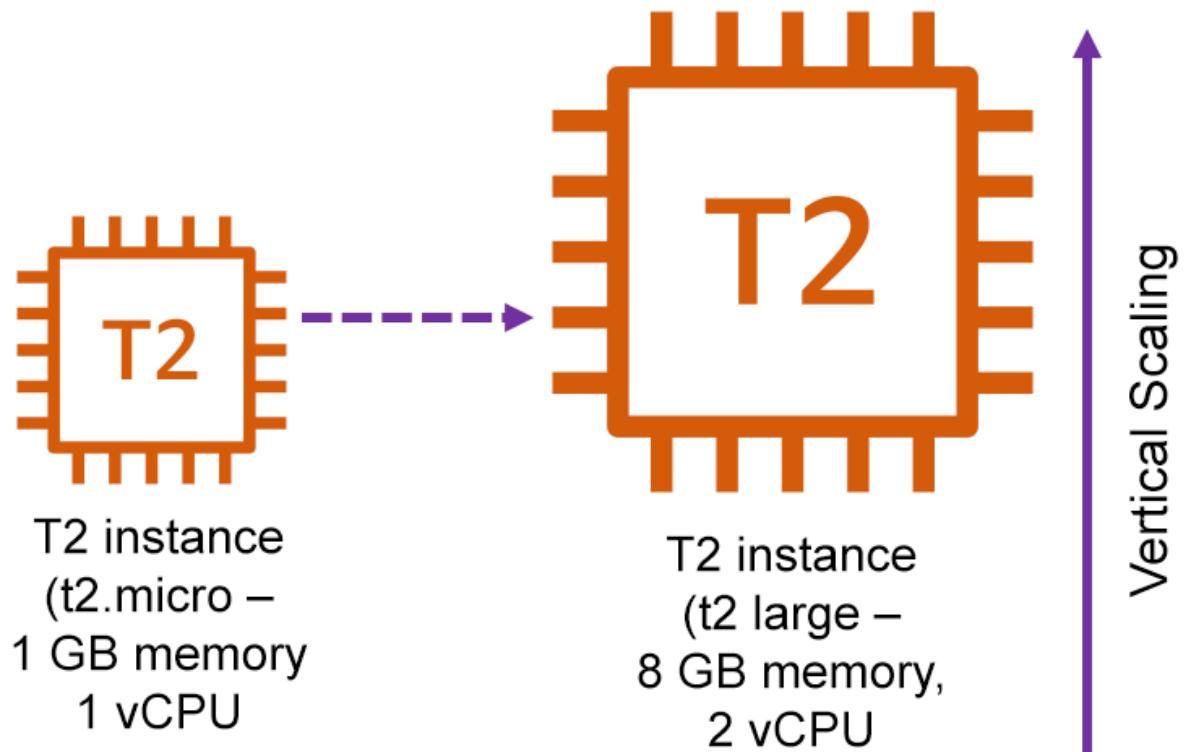
So far, you have learned about the core infrastructure services offered by AWS, primarily comprising compute, network, storage, and, in this chapter, databases. These four key infrastructure components form the basis of any multi-tier application architecture. In the next chapter, you will examine how you can deploy a multi-tier solution using these four key technologies. You will also explore more about the tools that you can use to ensure that your application solution is highly available and scalable.

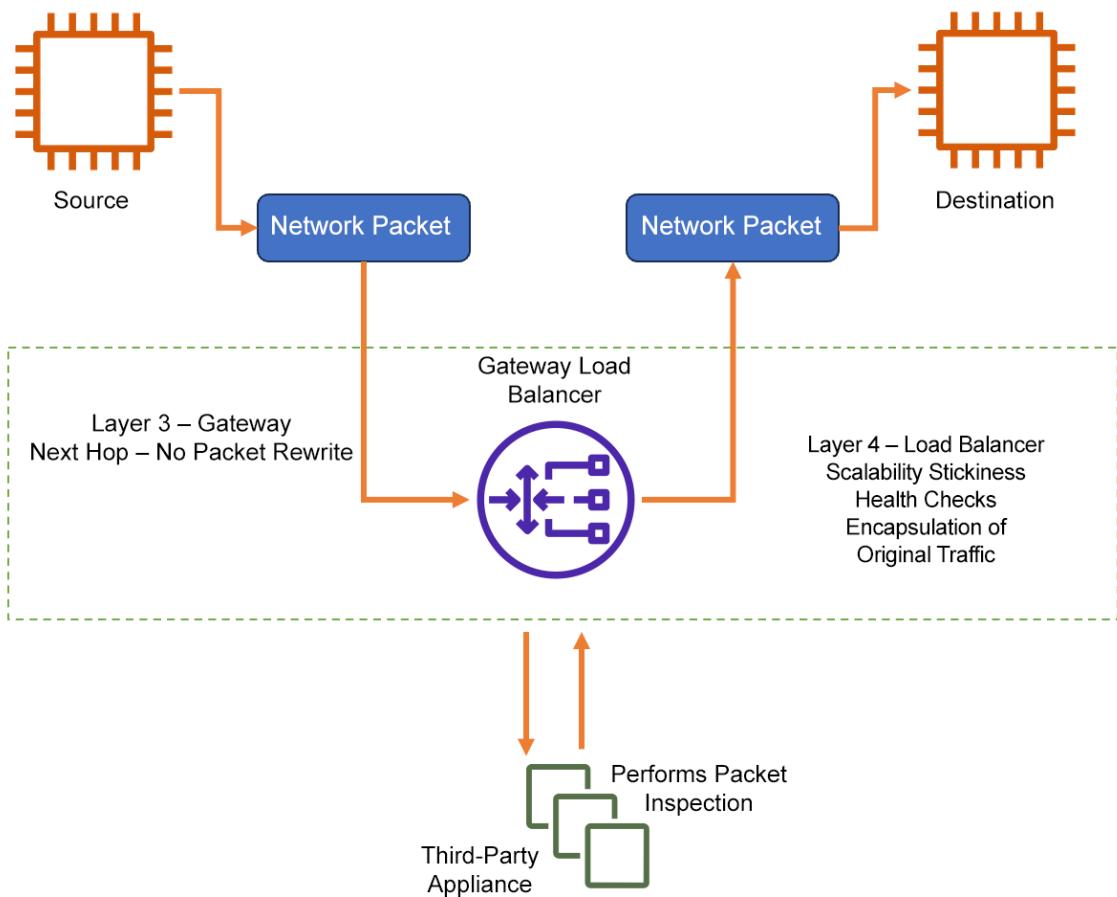
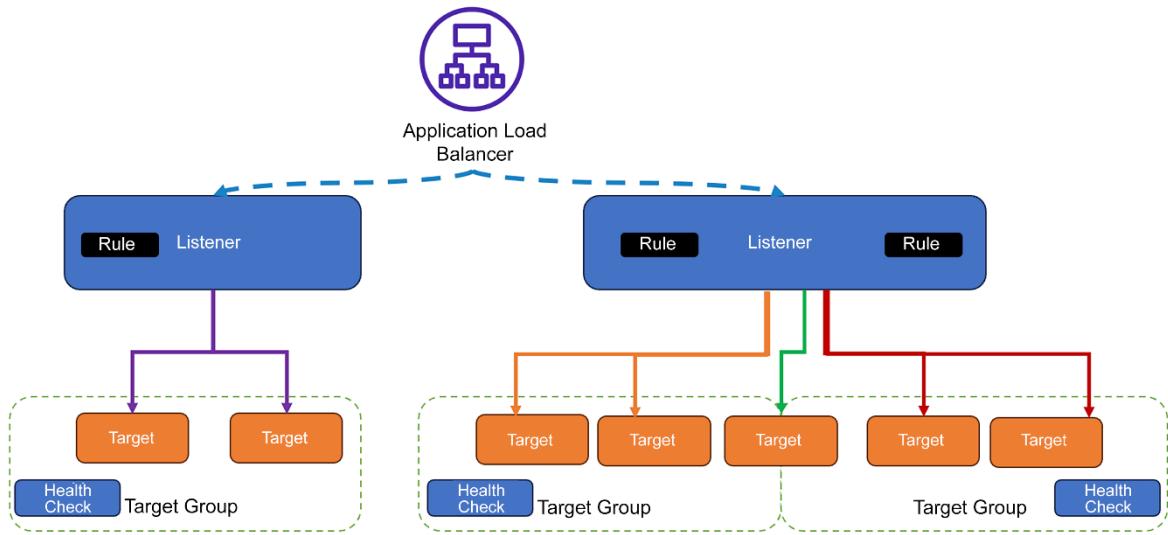
Chapter Review Questions

The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

Select Quiz

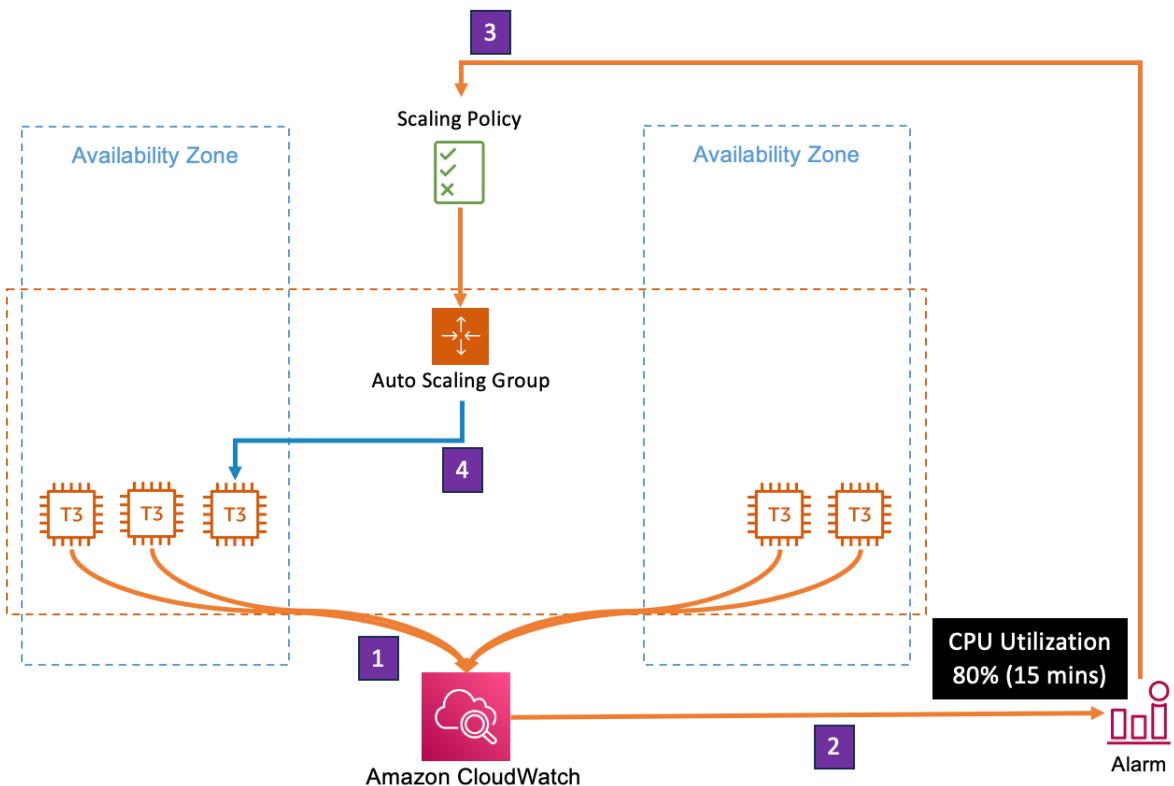
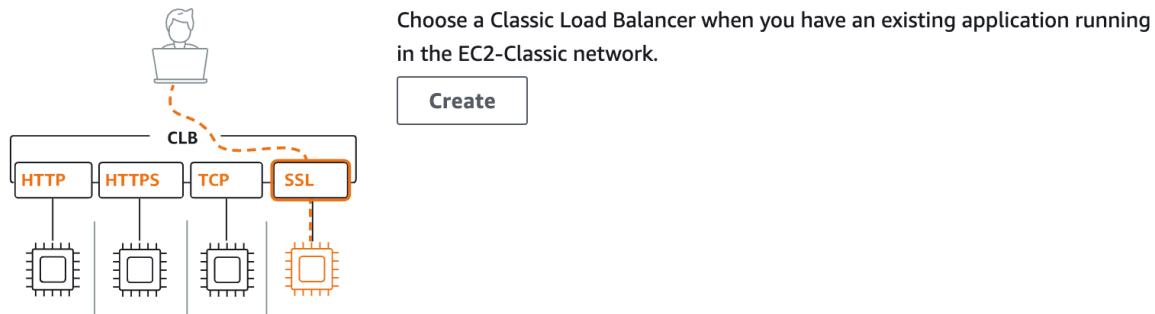
Quiz 1 [SHOW QUIZ DETAILS](#) [START](#)

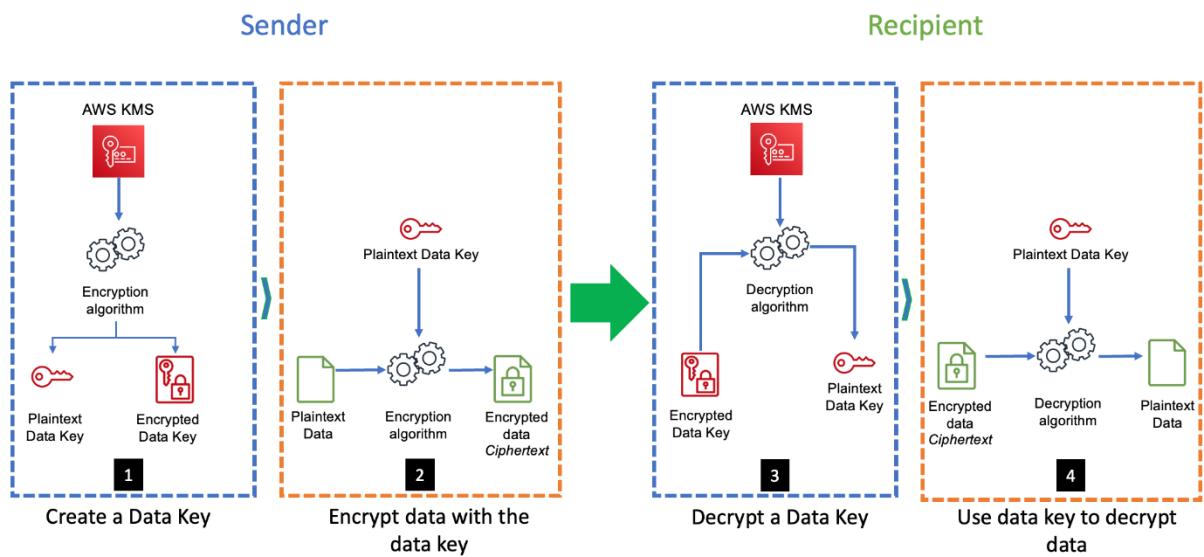




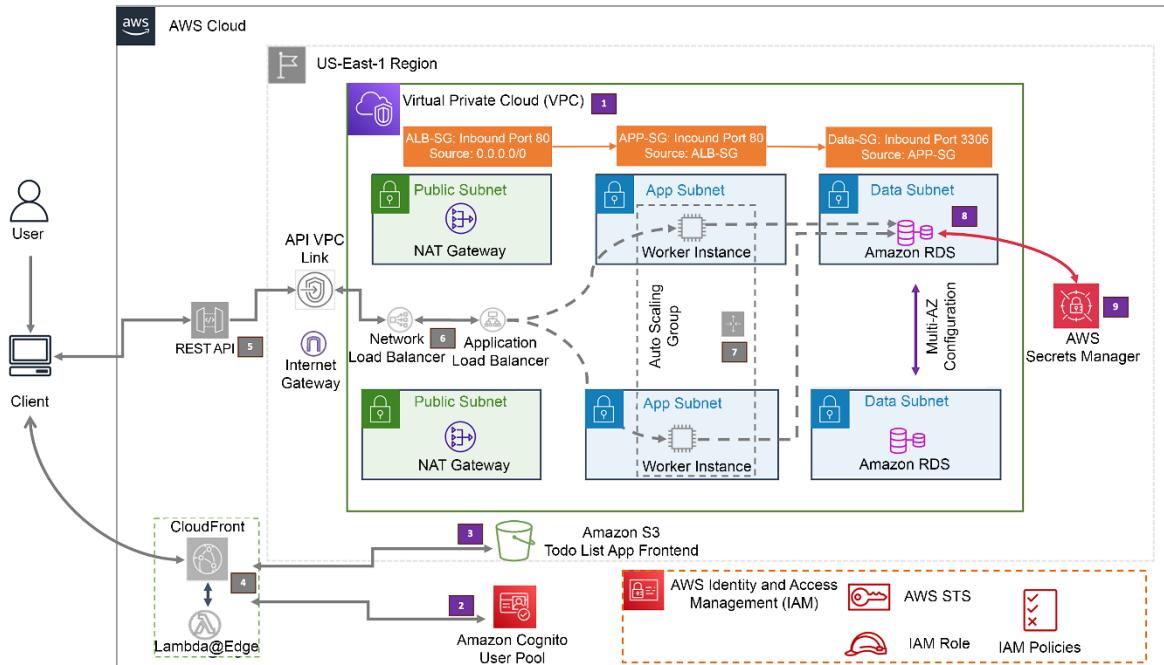
▼ Classic Load Balancer - previous generation

Classic Load Balancer [Info](#)





```
1  "Version": "2012-10-17",
2  "Id": "PutObjPolicy",
3  "Statement": [
4      {
5          "Sid": "DenyIncorrectEncryptionHeader",
6          "Effect": "Deny",
7          "Principal": "*",
8          "Action": "s3:PutObject",
9          "Resource": "arn:aws:s3:::<bucket_name>/*",
10         "Condition": {
11             "StringNotEquals": {
12                 "s3:x-amz-server-side-encryption": "AES256"
13             }
14         }
15     },
16     {
17         "Sid": "DenyUnEncryptedObjectUploads",
18         "Effect": "Deny",
19         "Principal": "*",
20         "Action": "s3:PutObject",
21         "Resource": "arn:aws:s3:::<bucket_name>/*",
22         "Condition": {
23             "Null": {
24                 "s3:x-amz-server-side-encryption": true
25             }
26         }
27     }
28 ]
29 }
30 ]
```



Create bucket Info

Buckets are containers for data stored in S3. [Learn more](#)

General configuration

Bucket name

`myawsbucket`

Bucket name must be unique within the global namespace and follow the bucket naming rules. [See rules for bucket naming](#)

AWS Region

US East (N. Virginia) us-east-1

Copy settings from existing bucket - optional

Only the bucket settings in the following configuration are copied.

[Choose bucket](#)

Amazon S3 > Buckets > todoapprepo

todoapprepo [Info](#)

[Objects](#) [Properties](#) [Permissions](#) [Metrics](#) [Management](#) [Access Points](#)

Objects (0)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

[Delete](#) [Actions ▾](#) [Create folder](#) [Upload](#)

[Find objects by prefix](#) [Show versions](#) [1](#)

<input type="checkbox"/>	Name	Type	Last modified	Size	Storage class
No objects You don't have any objects in this bucket.					

Files and folders (1 Total, 108.4 KB)

All files and folders in this table will be uploaded.

[Add files](#) [Add folder](#) [1](#)

<input type="checkbox"/>	Name	Folder	Type	Size
<input type="checkbox"/>	todo-plus-nodejs.zip	-	application/zip	108.4 KB

Destination

Destination
<s3://todoapprepo>

▶ **Destination details**
Bucket settings that impact new objects stored in the specified destination.

▶ **Permissions**
Grant public access and access to other AWS accounts.

▶ **Properties**
Specify storage class, encryption settings, tags, and more.

[Cancel](#) [Upload](#)

todoapprepo Info

Objects Properties Permissions Metrics Management

Bucket overview

AWS Region

US East (N. Virginia) us-east-1

Amazon Resource Name (ARN)

 arn:aws:s3:::todoapprepo

Step 2: Add Statement(s)

A statement is the formal description of a single permission. See [a description of elements](#) that you can use in statements.

Effect Allow Deny

AWS Service All Services ('*')

Use multiple statements to add permissions for more than one service.

Actions All Actions ('*')

Amazon Resource Name (ARN)

ARN should follow the following format: arn:aws:s3:::\${BucketName}/\${Key}.
Use a comma to separate multiple values.

[Add Conditions \(Optional\)](#)

[Add Statement](#)

Policy JSON Document



Click below to edit. To save the policy, copy the text below to a text editor.
Changes made below will **not be reflected in the policy generator tool**.

```
{  
    "Version": "2012-10-17",  
    "Statement": [  
        {  
            "Sid": "Stmt1700830761340",  
            "Action": [  
                "s3:GetObject"  
            ],  
            "Effect": "Allow",  
            "Resource": "arn:aws:s3:::todoapprepo/*"  
        }  
    ]  
}
```



▼ Secrets Manager

Allow 1 Action



Specify what actions can be performed on specific resources in Secrets Manager.

▼ Actions allowed

Specify actions from the service to be allowed.

Filter Actions

Effect
 Allow Deny

Manual actions | [Add actions](#)

All Secrets Manager actions (secretsmanager:*)

[Expand all](#) | [Collapse all](#)

Access level

► List (2)

▼ Read (Selected 1/5)

All read actions

[DescribeSecret](#) [Info](#)

[GetRandomPassword](#) [Info](#)

[GetResourcePolicy](#) [Info](#)

[GetSecretValue](#) [Info](#)

[ListSecretVersionIds](#) [Info](#)

dev/todolist/mysql

Secret details

Encryption key aws/secretsmanager	Secret description Enable application to access the SQL DB for Todo List Application
Secret name dev/todolist/mysql	
Secret ARN arn:aws:secretsmanager:us-east-1:441639934710:secret:dev/todolist/mysql-WHJmHU	

Actions ▾

▼ Resources

Specify resource ARNs for these actions.

- All
- Specific

Secret | Info

⚠ Specified Secret resource ARN for the **CancelRotateSecret** and 19 more actions.

Add ARNs to restrict access.

Any in this account

Attach policy to todo-ec2-iam-master-role

▶ Current permissions policies (1)

Other permissions policies (2/891)

Filter by Type			
Q todo	X	All types	▼ 2 matches
<input checked="" type="checkbox"/> Policy name	▲	Type	▼ Description
<input checked="" type="checkbox"/> todo-list-s3-sourcecode-access-policy	Customer managed	This policy grants any EC2 instances ac...	
<input checked="" type="checkbox"/> todo-list-secret-access-policy	Customer managed	Policy to enable EC2 instances to get c...	

Cancel

Add permissions

Target group name

todo-list-ec2-target-group

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

Protocol : Port

Choose a protocol for your target group that corresponds to the Load Balancer type that will route traffic to it. Some protocols now include anomaly detection for the targets and you can set mitigation options once your target group is created. This choice cannot be changed after creation

HTTP

▼

80

1-65535

▼ Application and OS Images (Amazon Machine Image) [Info](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Search our full catalog including 1000s of application and OS images

Recents **My AMIs** Quick Start

Don't include in launch template

Owned by me

Shared with me



Browse more AMIs

Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

todolist-worker-ami

ami-01a828b0668b883e1
2024-03-21T06:35:32.000Z Virtualization: hvm ENA enabled: true Root device type: ebs

▼ Network settings [Info](#)

Subnet [Info](#)

Don't include in launch template

Create new subnet

When you specify a subnet, a network interface is automatically added to your template.

Firewall (security groups) [Info](#)

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Select existing security group

Create security group

Security groups [Info](#)

Select security groups

Compare security group rules

App-Security-Group sg-04fc19a822274f7fe

VPC: vpc-08192228f70f81390

► Advanced network configuration

```
1 #!/bin/bash
2
3 AWS_REGION=us-east-1
4 SECRET_NAME=[Secret Name]
5 DB_HOST=[Database Endpoint]
6 DB_PORT=3306
7
8 yum update -y
9 aws s3 cp s3://[S3 Bucket Name]/todo-plus-nodejs.zip /var
10 unzip /var/todo-plus-nodejs.zip -d /var
11 cd /var/todo-plus-nodejs
12 npm install
13 npm run build
14
15 echo "export AWS_REGION=$AWS_REGION" >> ~/.bashrc
16 echo "export SECRET_NAME=$SECRET_NAME" >> ~/.bashrc
17 echo "export DB_HOST=$DB_HOST" >> ~/.bashrc
18 echo "export DB_PORT=$DB_PORT" >> ~/.bashrc
19 source ~/.bashrc
20 pm2 start dist/main.js+
```

Launch template [Info](#)

i For accounts created after May 31, 2023, the EC2 console only supports creating Auto Scaling groups with launch templates. Creating Auto Scaling groups with launch configurations is not recommended but still available via the CLI and API until December 31, 2023.

Launch template

Choose a launch template that contains the instance-level settings, such as the Amazon Machine Image (AMI), instance type, key pair, and security groups.

todo-list-launch-template	▲
<input type="text" value="Search launch templates"/>	
todo-list-launch-template	✓

Network Info

For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.

VPC

Choose the VPC that defines the virtual network for your Auto Scaling group.

▼

[Create a VPC](#)

Availability Zones and subnets

Define which Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.

▼

us-east-1a | subnet-0da90144bce993455 (todolist-app-subnet01)
10.0.10.0/24



us-east-1b | subnet-0872444131d8229d1 (todolist-app-subnet02)
10.0.11.0/24



[Create a subnet](#)

Attach to an existing load balancer

Select the load balancers that you want to attach to your Auto Scaling group.

Choose from your load balancer target groups

This option allows you to attach Application, Network, or Gateway Load Balancers.

Choose from Classic Load Balancers

Existing load balancer target groups

Only instance target groups that belong to the same VPC as your Auto Scaling group are available for selection.

▼

todo-list-ec2-target-group | HTTP



Load balancer: Not associated with any load balancer

Scaling Info

You can resize your Auto Scaling group manually or automatically to meet changes in demand.

Scaling limits

Set limits on how much your desired capacity can be increased or decreased.

Min desired capacity

2

Equal or less than desired capacity

Max desired capacity

2

Equal or greater than desired capacity

Automatic scaling - optional

Choose whether to use a target tracking policy | [Info](#)

You can set up other metric-based scaling policies and scheduled scaling after creating your Auto Scaling group.

No scaling policies

Your Auto Scaling group will remain at its initial size and will not dynamically resize to meet demand.

Target tracking scaling policy

Choose a CloudWatch metric and target value and let the scaling policy adjust the desired capacity in proportion to the metric's value.

Group size Info

Set the initial size of the Auto Scaling group. After creating the group, you can change its size to meet demand, either manually or by using automatic scaling.

Desired capacity type

Choose the unit of measurement for the desired capacity value. vCPUs and Memory(GiB) are only supported for mixed instances groups configured with a set of instance attributes.

Units (number of instances) ▾

Desired capacity

Specify your group size.

2

Scaling Info

You can resize your Auto Scaling group manually or automatically to meet changes in demand.

Scaling limits

Set limits on how much your desired capacity can be increased or decreased.

Min desired capacity

2

Equal or less than
desired capacity

Max desired capacity

2

Equal or greater than
desired capacity

Automatic scaling - optional

Choose whether to use a target tracking policy Info

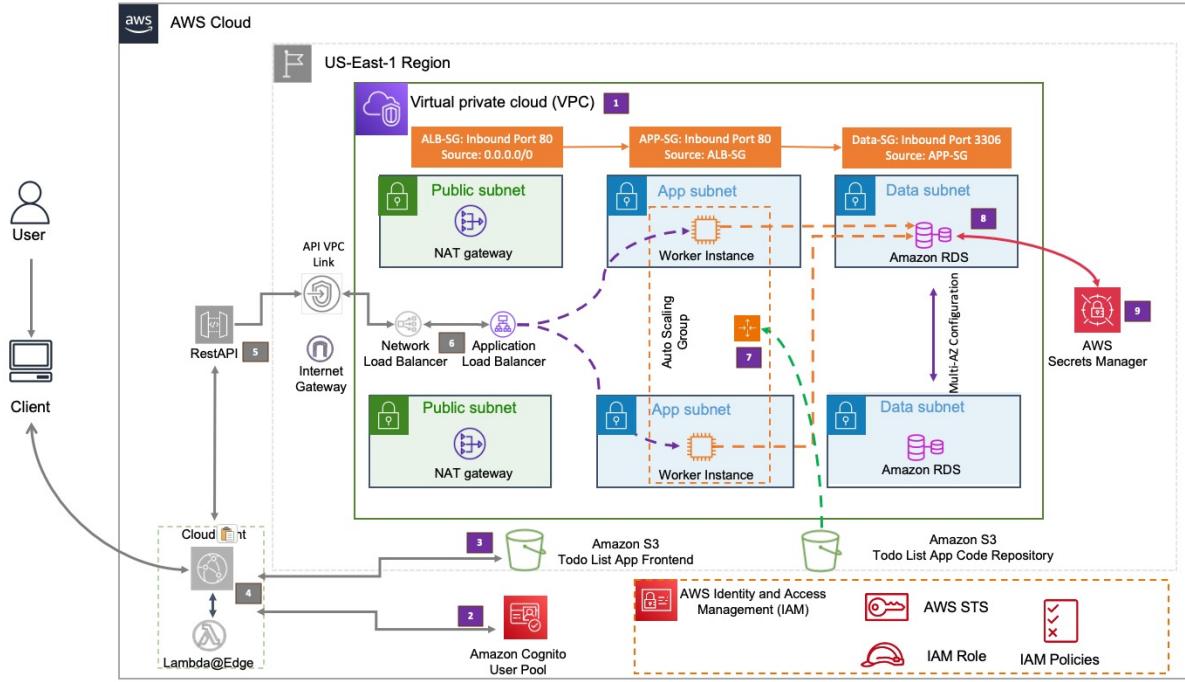
You can set up other metric-based scaling policies and scheduled scaling after creating your Auto Scaling group.

No scaling policies

Your Auto Scaling group will remain at its initial size and will not dynamically resize to meet demand.

Target tracking scaling policy

Choose a CloudWatch metric and target value and let the scaling policy adjust the desired capacity in proportion to the metric's value.



Basic configuration

Load balancer name

Name must be unique within your AWS account and can't be changed after the load balancer is created.

todo-list-alb

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

Scheme | [Info](#)

Scheme can't be changed after the load balancer is created.

Internet-facing

An internet-facing load balancer routes requests from clients over the internet to targets. Requires a public subnet. [Learn more](#)

Internal

An internal load balancer routes requests from clients to targets using private IP addresses. Compatible with the **IPv4** and **Dualstack** IP address types.

Load balancer IP address type | [Info](#)

Select the type of IP addresses that your subnets use. Public IPv4 addresses have an additional cost.

IPv4

Includes only IPv4 addresses.

Dualstack

Includes IPv4 and IPv6 addresses.

Network mapping Info

The load balancer routes traffic to targets in the selected subnets, and in accordance with your IP address settings.

VPC Info

Select the virtual private cloud (VPC) for your targets or you can [create a new VPC](#). The selected VPC can't be changed after the load balancer is created. To confirm the VPC for your targets, view your [target groups](#).

todolist-vpc

vpc-08192228f70f81390
IPv4 VPC CIDR: 10.0.0.0/16



Mappings Info

Select at least two Availability Zones and one subnet per zone. The load balancer routes traffic to targets in these Availability Zones only. Availability Zones that are not supported by the load balancer or the VPC are not available for selection.

us-east-1a (use1-az1)

Subnet

subnet-0da90144bce993455 todolist-app-subnet01 ▾

IPv4 address

Assigned from CIDR 10.0.10.0/24

us-east-1b (use1-az2)

Subnet

subnet-0872444131d8229d1 todolist-app-subnet02 ▾

IPv4 address

Assigned from CIDR 10.0.11.0/24

Registered targets (2) Info

i Anomaly mitigation: Not applicable



Deregister

Register targets

Target groups route requests to individual registered targets using the protocol and port number specified. Health checks are performed on all registered targets according to the target group's health check settings. Anomaly detection is automatically applied to HTTP/HTTPS target groups with at least 3 healthy targets.

<input type="checkbox"/>	Instance ID	Name	Port	Zone	Health status
<input type="checkbox"/>	i-069c9a4881b9896bd		80	eu-west-2b	Healthy
<input type="checkbox"/>	i-07f8476f18d9d3ba9		80	eu-west-2b	Healthy



Building Application Solutions with High Availability, Elasticity, and Data Security

Summary

In this chapter, you have discovered how to deploy highly available architectures on the AWS cloud. High-availability systems are trustworthy because they keep running even if some parts break. These systems are also robust, meaning they can absorb shocks to their operation without damaging their functionality and quickly and easily recover after experiencing a setback. The percentage of available time is a standard metric for gauging availability at a high level. The number of nines is often used as an indicator of extreme availability. An uptime of "four nines," for instance, indicates that the system is available 99.99% of the time and has no more than 1 hour of downtime annually.

While load balancers offer the ability to build highly available systems, Auto Scaling is a service that enables you to design elasticity for your application. As demand for your application increases, AWS Auto Scaling can rapidly accommodate by deploying additional EC2 instances to cope with the load. Using innovative scaling policies, you can configure the same service to terminate unnecessary instances when demand drops, ensuring that costs are controlled.

At this stage, you have built out the primary components of the application. The load balancer will offer high availability, and the Auto Scaling service will ensure elasticity and scalability. The next chapter introduces the API Gateway service and how it allows you to create, manage, and secure APIs that enable access to backend application data, logic, and functionality. In the case of our Todo List application, these backend components will enable interaction with the database, which will host the end user's to-do list items and allow the user to create and update their to-do items.

Chapter Review Questions

The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

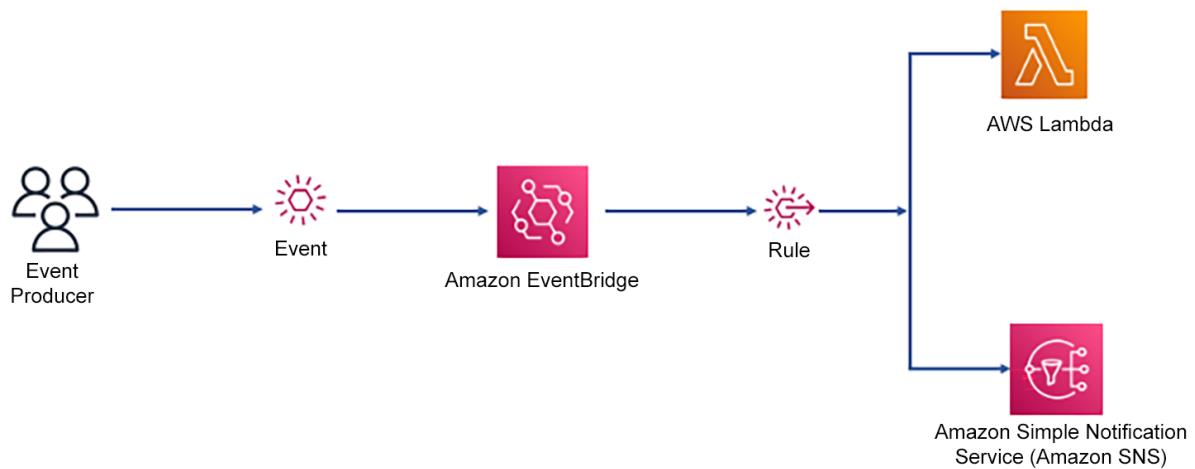
Select Quiz

Quiz 1

[SHOW QUIZ DETAILS ▾](#)

START

Chapter 8: Event-Driven Computing with AWS Lambda and Securing Access to Backend APIs with Amazon API Gateway



Layers Info					Edit	Add a layer
Merge order	Name	Layer version	Compatible runtimes	Compatible architecture		
1	AWSLambdaPowerToolsTypeScript	29	nodejs16.x, nodejs18.x, nodejs20.x	-		

Versions (2) Info						Delete	Publish new version	
<input type="text"/> Find versions						<	1	>
	Version	Aliases	Description	Last modified	Architecture			
○	4	-	prod-env	16 seconds ago	x86_64			
○	3	-	test-env	4 minutes ago	x86_64			

Concurrency

Edit

Function concurrency

Use unreserved account concurrency

Unreserved account concurrency

10

Provisioned concurrency configurations



Edit

Remove

Add

To enable your function to scale without fluctuations in latency, use provisioned concurrency. You can use Application Auto Scaling to automatically adjust provisioned concurrency to maintain a configured target utilization. Provisioned concurrency runs continually and has separate pricing for concurrency and execution duration. [Learn more](#)

Find configuration

Qualifier



Type



Provisioned concurrency



Status



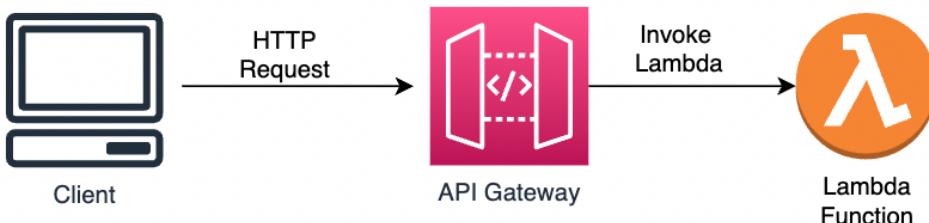
Details

No configurations

Add configuration

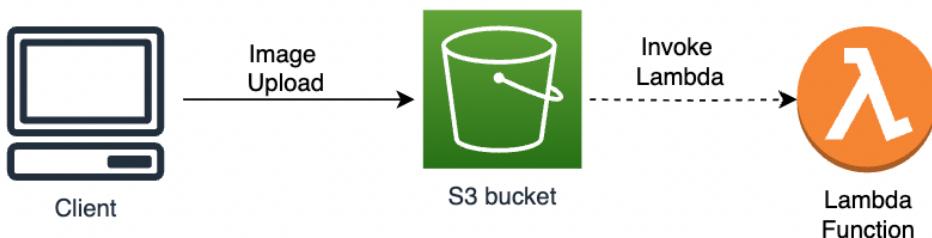
Synchronous Invocation

- (1). Trigger Lambda from API Gateway with HTTP requests from clients



Asynchronous Invocation

- (2). Trigger Lambda from an S3 event



Event Source Mapping

- (3). Trigger Lambda with Event Source Mapping



AWS side

Download
the code

Container
setup

User side

Initialization
and start of
the code

Code
execution

Cold start time

Total time

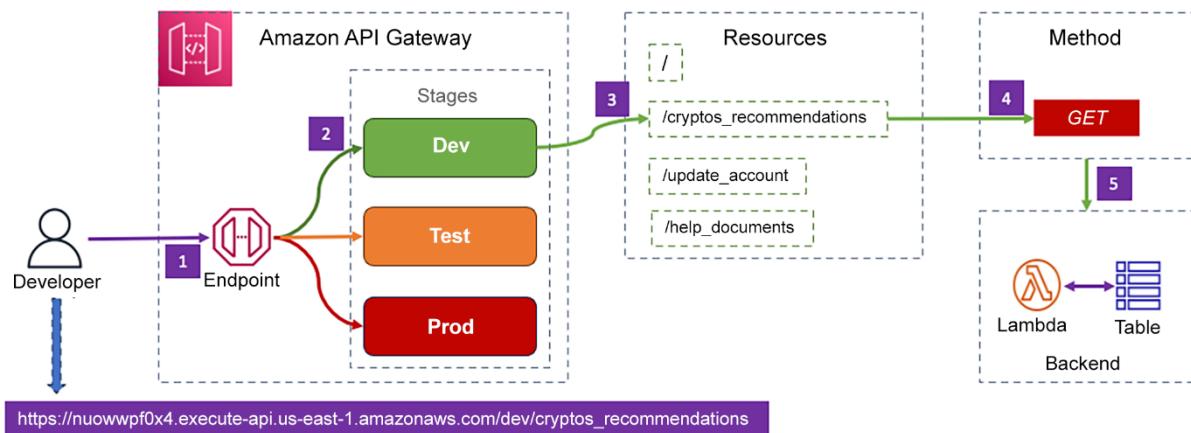
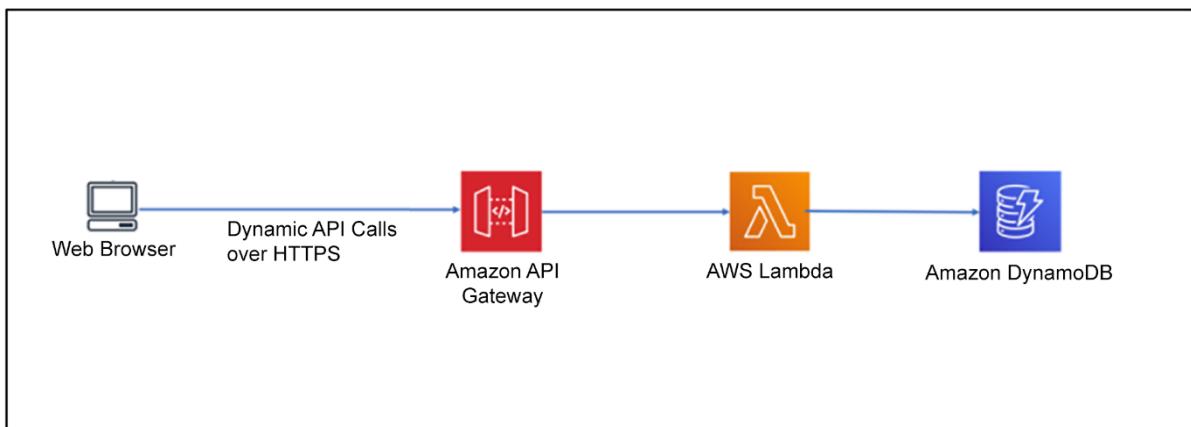
Environment variables (2)

Edit

The environment variables below are encrypted at rest with the default Lambda service key.

Find environment variables

Key	Value
API_KEY	u98734jdf07w394u09ud09u304
DYNAMODB_YABLE	prod-customers



Resources

API actions ▾

Deploy API

[Create resource](#)

⋮ /

 ⋮ /cryptocurrency

 GET

 ⋮ /cryptos_recommendations

 ⋮/{id}

 GET

 ⋮ /delete_user_answers

 ⋮/{id}

 GET

 ⋮ /questions

 GET

 ⋮ /update_user_answers

 ⋮/{id}

/cryptocurrency - GET - Method execution

[Update documentation](#)

[Delete](#)

ARN

arn:aws:execute-api:eu-west-1:972622074325:3xqrwyn316/*:GET/cryptocurrency

Resource ID

ey6c3b



Client



Method
request



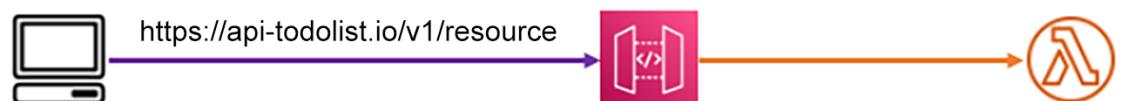
Integration
request



Method
response



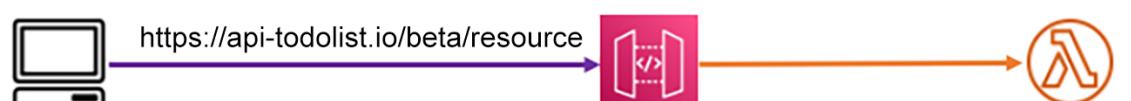
Integration
response
Proxy
integration



Clients – V1

API Gateway
V1 Stage

Lambda – V1



Clients – Beta

API Gateway
Beta Stage

Lambda –
Beta

Basic details

Security group name [Info](#)

NLB-Security-Group

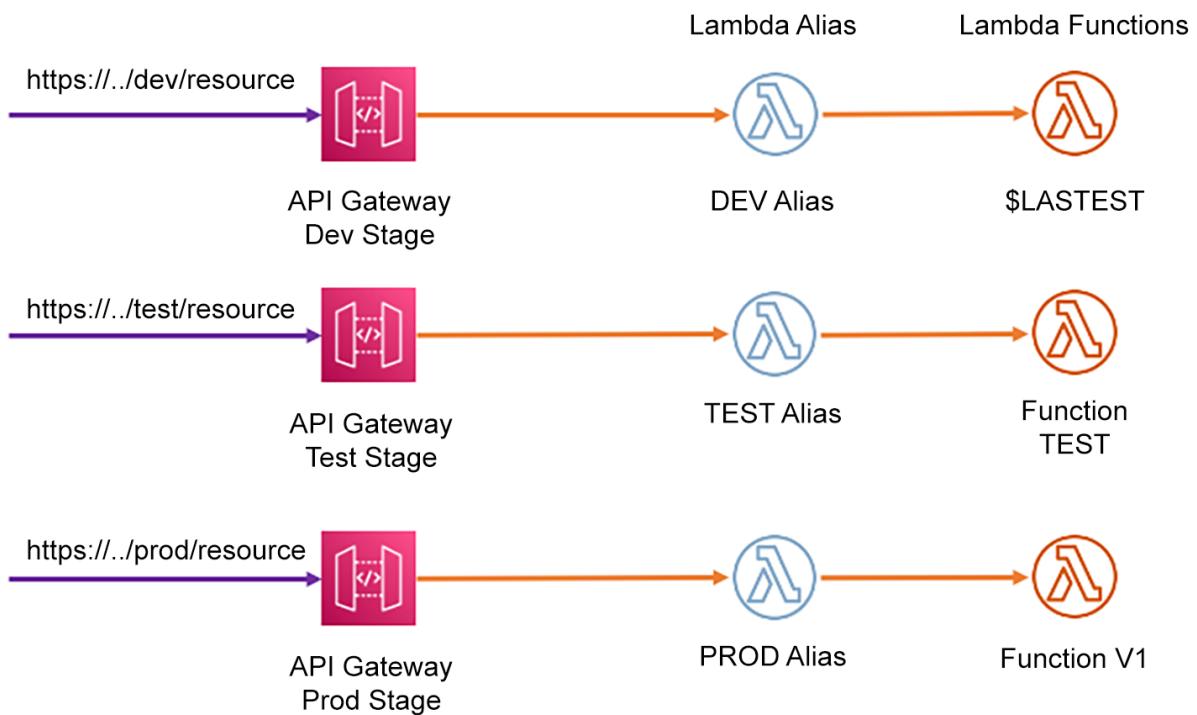
Name cannot be edited after creation.

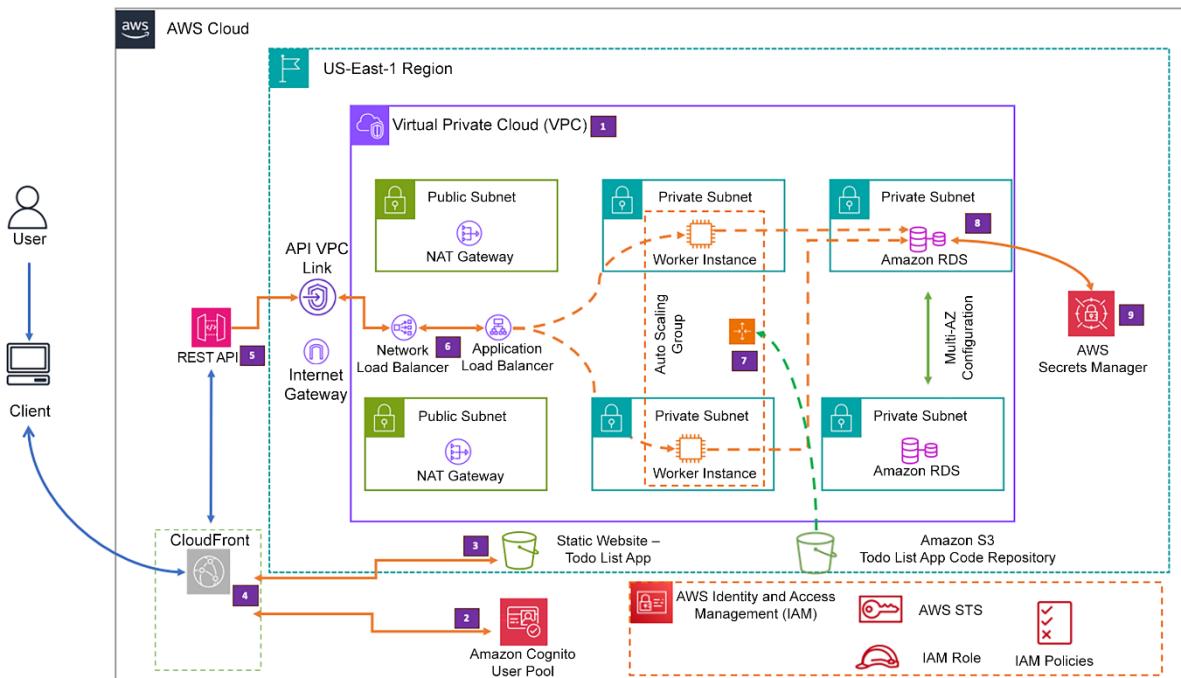
Description [Info](#)

Allows inbound connection from API gateway

VPC [Info](#)

vpc-08192228f70f81390 (todolist-vpc)





Register Application Load Balancer

You can specify a single Application Load Balancer as the target. The Application Load Balancer you specify must have a listener on the same port as the target group you're creating.

Register now

Register later

Application Load Balancer

Choose an Application Load Balancer from the list, or create a new one and refresh the list to select it. You can [create an Application Load Balancer here](#).

todo-list-alb



✓ [todo-list-alb](#) has a listener on port 80.

Cancel

Previous

Create target group

Basic configuration

Load balancer name

Name must be unique within your AWS account and can't be changed after the load balancer is created.

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

Scheme

Scheme can't be changed after the load balancer is created.

Internet-facing

An internet-facing load balancer routes requests from clients over the internet to targets. Requires a public subnet. [Learn more](#) 

Internal

An internal load balancer routes requests from clients to targets using private IP addresses.

Load balancer IP address type [Info](#)

Select the type of IP addresses that your subnets use.

IPv4

Includes only IPv4 addresses.

Dualstack

Includes IPv4 and IPv6 addresses.

Mappings

Select at least one Availability Zone and one subnet for each zone. We recommend selecting at least two Availability Zones. The load balancer will route traffic only to targets in the selected Availability Zones. Zones that are not supported by the load balancer or VPC can't be selected. Subnets can be added, but not removed, once a load balancer is created.

us-east-1a (use1-az1)

Subnet



IPv4 address

Assigned from CIDR 10.0.10.0/24

Private IPv4 address

Assigned from CIDR 10.0.10.0/24

Enter IP from CIDR 10.0.10.0/24

us-east-1b (use1-az2)

Subnet



IPv4 address

Assigned from CIDR 10.0.11.0/24

Private IPv4 address

Assigned from CIDR 10.0.11.0/24

Enter IP from CIDR 10.0.11.0/24

Listeners and routing Info

A listener is a process that checks for connection requests using the port and protocol you configure. The rules that you define for a listener determine how the load balancer routes requests to its registered targets.

▼ Listener TCP:80

[Remove](#)

Protocol : TCP
Port : 80
1-65535

Default action [Info](#)

Forward to **todo-list-alb-target-group**
Target type: Application Load Balancer, IPv4

TCP ▾



[Create target group](#)

Listener tags - optional

Consider adding tags to your listener. Tags enable you to categorize your AWS resources so you can more easily manage them.

[Add listener tag](#)

You can add up to 50 more tags.

Security groups

A security group is a set of firewall rules that control the traffic to your load balancer. Select an existing security group, or you can [create a new security group](#).

Security groups

Select up to 5 security groups



NLB-Security-Group

sg-065112cec7a227cfb VPC: vpc-0c24c2e4dea2af45a



Security setting

Enforce inbound rules on PrivateLink traffic

[Cancel](#)

[Save changes](#)

Create resource

Resource details

Proxy resource Info

Proxy resources handle requests to all sub-resources. To create a proxy resource use a path parameter that ends with a plus sign, for example {proxy+}.

Resource path

/

Resource name

{proxy+}

CORS (Cross Origin Resource Sharing) Info

Create an OPTIONS method that allows all origins, all methods, and several common headers.

Cancel

Create resource

Load balancers (1/2)



Actions ▾

Create load balancer

Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

Filter load balancers

< 1 >

-	Name	DNS name	State
<input checked="" type="checkbox"/>	todo-list-nlb	<input type="text"/> todo-list-nlb-3795248f67...	<input checked="" type="checkbox"/> Active
<input type="checkbox"/>	todo-list-alb	<input type="text"/> internal-todo-list-alb-962...	<input checked="" type="checkbox"/> Active



VPC proxy integration

Send the request to your HTTP endpoint without customizing the integration request or integration response.

HTTP method

ANY

VPC link

todolist-vpc-link

Endpoint URL

http://todo-list-nlb-3795248f67e6a5d9.elb.us-east-1.amazonaws.com/{proxy}



Default timeout

The default timeout is 29 seconds.

Resources

API actions ▾

Deploy API

Create resource



/

/ {proxy+}

ANY

OPTIONS

Resource details

Update documentation

Enable CORS

Path

/

Resource ID

n0gvh35gwf

Methods (0)

Delete

Create method

Method type ▲

Integration type ▼

Authorization ▼

No methods

No methods defined.

VPC proxy integration

Send the request to your HTTP endpoint without customizing the integration request or integration response.

HTTP method

ANY

VPC link

todolist-vpc-link

Endpoint URL

http://todo-list-nlb-3795248f67e6a5d9.elb.us-east-1.amazonaws.com

Default timeout

The default timeout is 29 seconds.

Stages

Stage actions ▾

Create stage

+ development

Stage details Info

Edit

Stage name
development

Rate Info

-

Web ACL

Cache cluster Info

⊖ Inactive

Burst Info

Client certificate

-

Default method-level caching

-

⊖ Inactive

Invoke URL

https://nuowwpf0x4.execute-api.us-east-1.amazonaws.com/development



Event-Driven Computing with AWS Lambda and Securing Access to Backend APIs with Amazon API Gateway

Summary

This chapter explored serverless computing on AWS, focusing on the critical components like AWS Lambda and API Gateway. It was designed to impart practical skills and deep understanding, enabling you to build and manage serverless applications on the AWS platform effectively.

The chapter began with an overview of AWS Lambda, introducing the fundamentals of this serverless compute service. You learned about event-driven architecture and how Lambda functions can be triggered by various AWS services. This section laid the groundwork for understanding serverless computing paradigms and the operational efficiency of AWS Lambda.

Moving beyond the basics, the chapter delved into more sophisticated topics, such as environment variables, tagging for resource management, and running Lambda functions within a VPC. This advanced knowledge enabled you to optimize Lambda functions for security, cost-efficiency, and better resource management.

The focus then shifted to API Gateway. You were guided through the process of creating and managing REST and HTTP APIs. This section was crucial for understanding how to expose backend services securely and efficiently, dealing with topics such as API routing, data transformation, and securing APIs against unauthorized access.

Chapter Review Questions

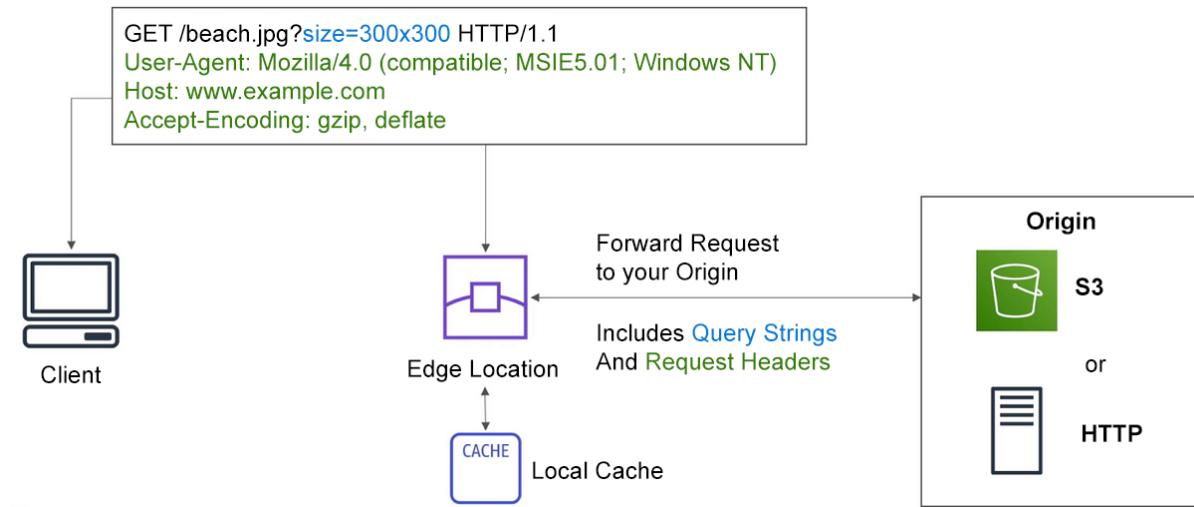
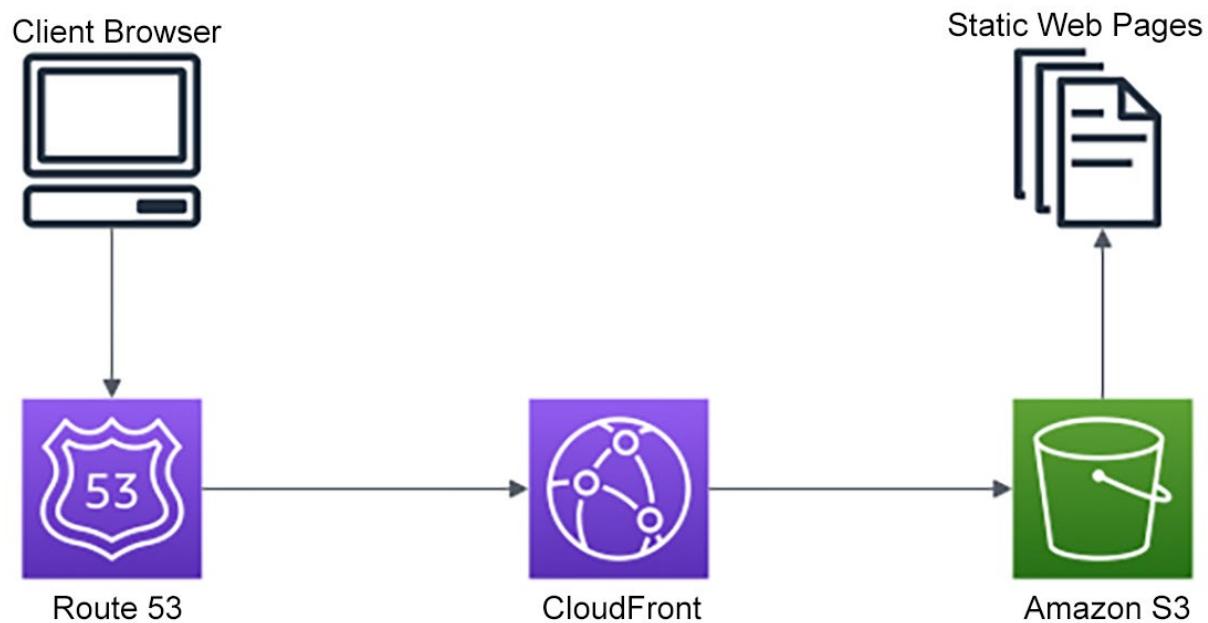
The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

Select Quiz

Quiz 1
[SHOW QUIZ DETAILS](#) ▾

START

Chapter 9: Incorporating Edge Network Services to Connect to Your Application with Amazon CloudFront and Route 53



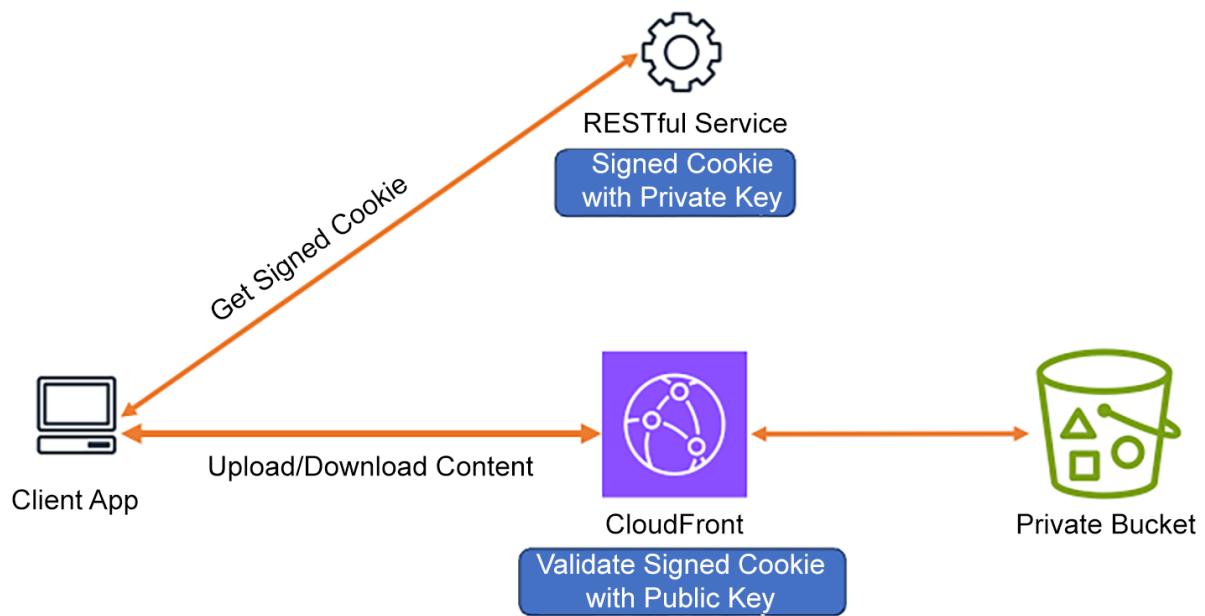
▼ CloudFront geographic restrictions

Restriction type

- No restrictions
- Allow list
- Block list

Countries

Select countries



Identity and Access Management (IAM)

Search IAM

Dashboard

▼ Access management

User groups

Users

Roles

Policies

CloudFront key pairs (0)

Actions ▾

Upload

Create CloudFront key pair

You use key pairs in Amazon CloudFront to create signed URLs. You can have a maximum of two CloudFront key pairs (active or inactive) at a time.

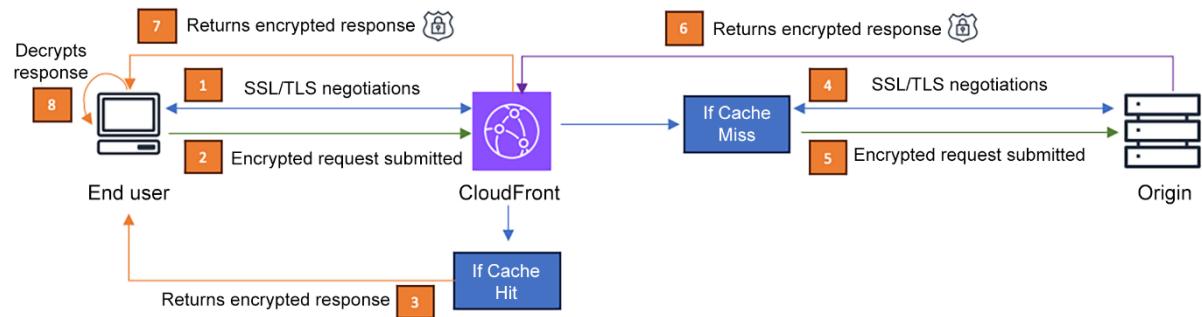
Creation time

CloudFront key ID

Status

No CloudFront key pairs

Create CloudFront key pair



Create distribution

Origin

Origin domain

Choose an AWS origin, or enter your origin's domain name.

justdwebsite.s3-website.eu-west-2.amazonaws.com X

Protocol [Info](#)

HTTP only

HTTPS only

Match viewer

HTTP port

Enter your origin's HTTP port. The default is port 80.

80

ExmpleFunction

[Throttle](#)

[Copy ARN](#)

[Actions ▾](#)

▼ Function overview [Info](#)

[Export to Application Composer](#)

[Download ▾](#)

[Diagram](#)

[Template](#)



[+ Add trigger](#)

[+ Add destination](#)

Description

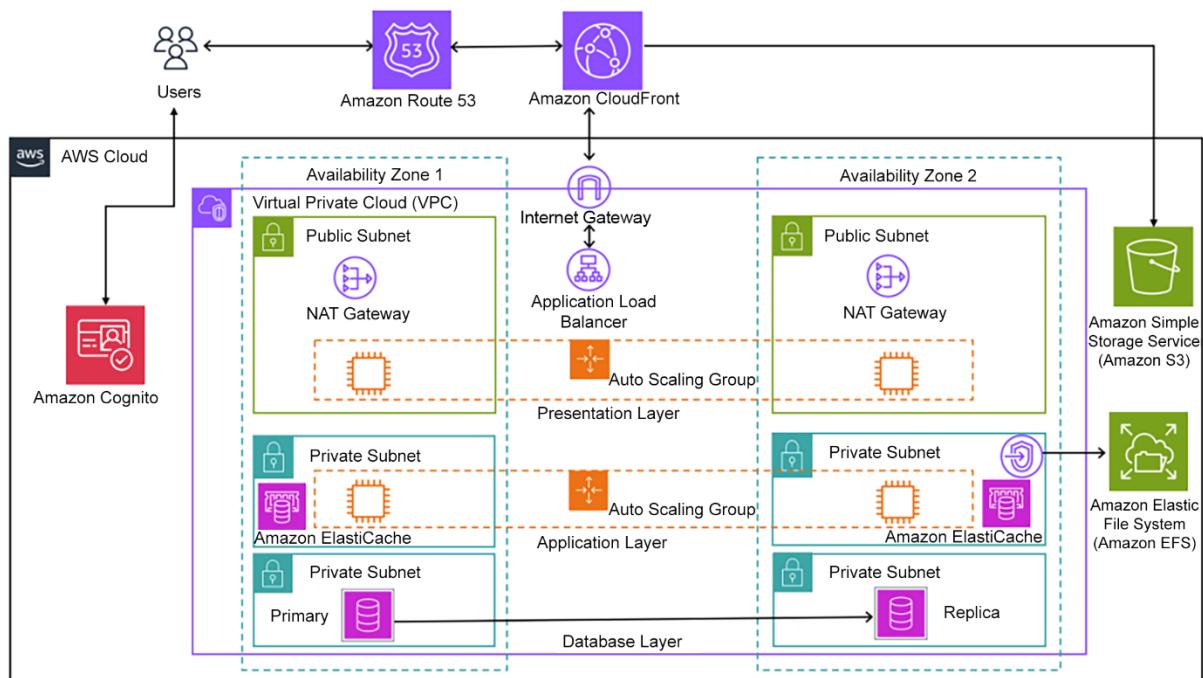
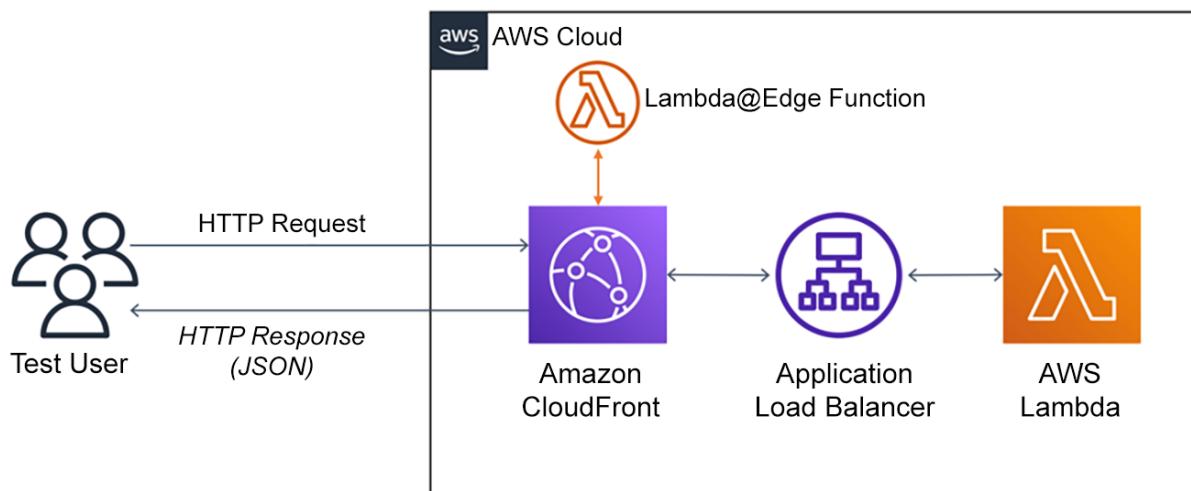
Last modified

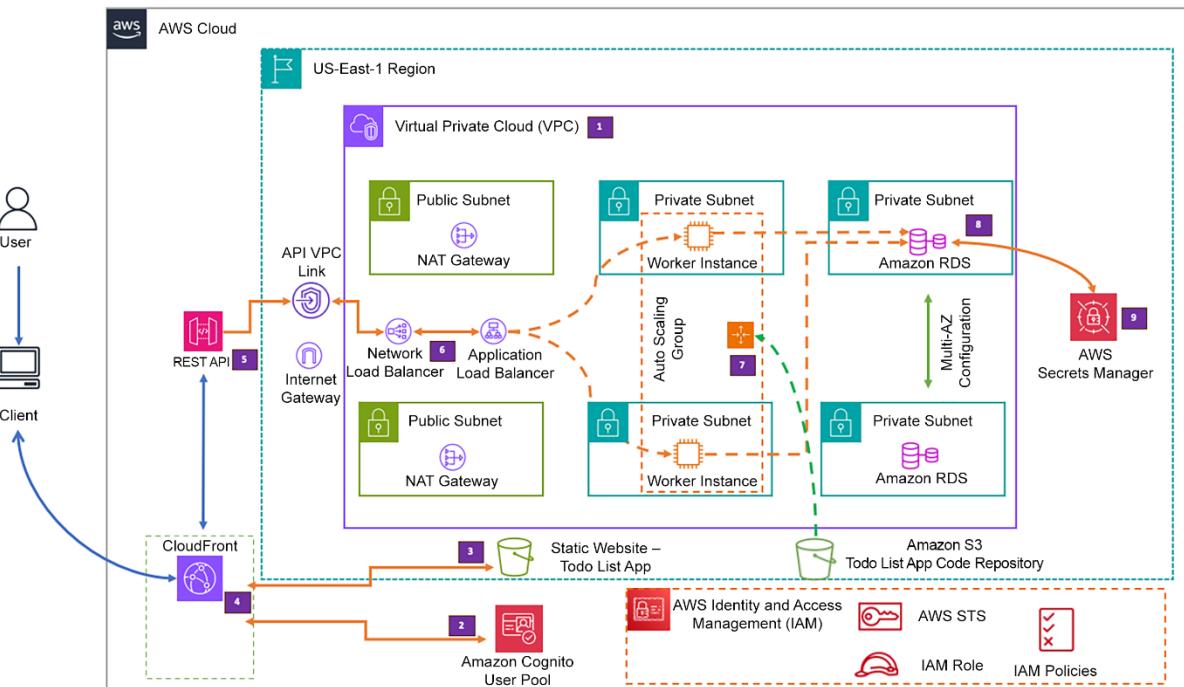
15 seconds ago

Function ARN

arn:aws:lambda:us-east-1:44163993471
0:function:ExmpleFunction

Function URL [Info](#)





todoapprepo Info

Objects (1) Info

<input type="button" value="Copy"/>	<input type="button" value="Copy S3 URI"/>	<input type="button" value="Copy URL"/>	<input type="button" value="Download"/>	<input type="button" value="Open"/>	<input type="button" value="Delete"/>
<input type="button" value="Actions ▾"/>	<input type="button" value="Create folder"/>	<input type="button" value="Upload"/>			
Objects are the fundamental entities stored in Amazon S3. You can use Amazon S3 inventory to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. Learn more					
<input type="text" value="Find objects by prefix"/>					
<input type="checkbox"/> Show versions	<input type="button" value="<"/> <input type="button" value="1"/> <input type="button" value=">"/> <input type="button" value="⚙"/>				
<input type="checkbox"/>	Name	Type	Last modified	Size	
<input type="checkbox"/>	todo-plus-nodejs.zip	zip	March 8, 2024, 04:27:31 (UTC+00:00)		

todoapprepo [Info](#)

Objects (1) [Info](#)

[C](#) [Copy S3 URI](#) [Copy URL](#) [Download](#) [Open](#) [Delete](#) [Actions ▾](#)

[Create folder](#) [Upload](#)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For other objects, you'll need to explicitly grant them permissions. [Learn more](#)

[Find objects by prefix](#) [Show versions](#)

<input type="checkbox"/>	Name	Type	Last modified	Size
<input type="checkbox"/>	todo-plus-nodejs.zip	zip	March 8, 2024, 04:27:31 (UTC+00:00)	

Instances (2/2) [Info](#)

[C](#) [Connect](#) [Instance state ▾](#)

[Instance state = running](#) [X](#) [Clear filters](#)

<input checked="" type="checkbox"/>	Name	Instance ID	Instance state	Instanc...	Status check	Alarm status	Availability Zone	P
<input checked="" type="checkbox"/>	i-07a74320f8ff81...	i-07a74320f8ff81...	Running @ Q	t2.micro	2/2 checks passed..	View alarms +	us-east-1b	Details
<input checked="" type="checkbox"/>	i-0de6ee65582b2...	i-0de6ee65582b2...	Running @ Q	t2.micro	2/2 checks passed..	View alarms +	us-east-1a	Details

[Stop instance](#) [Start instance](#) [Reboot instance](#) [Hibernate instance](#) [Terminate instance](#)

Activity history (4)

[Filter activity history](#)

Status	Description	Cause	Start time
Successful	Launching a new EC2 Instance: i-0a2f62f631825d045	At 2024-02-20T11:28:57Z an instance was launched in response to an unhealthy instance needing to be replaced.	2024 February 20, 04:58:59 PM +05:30
Successful	Terminating EC2 Instance: i-07a74320f8ff81bbd	At 2024-02-20T11:28:57Z an instance was taken out of service in response to an EC2 health check indicating it has been terminated or stopped.	2024 February 20, 04:58:57 PM +05:30
Successful	Launching a new EC2 Instance: i-0b5c9c0fdab0562ec	At 2024-02-20T11:26:57Z an instance was launched in response to an unhealthy instance needing to be replaced.	2024 February 20, 04:56:59 PM +05:30
Successful	Terminating EC2 Instance: i-0de6ee65582b2bf2d	At 2024-02-20T11:26:57Z an instance was taken out of service in response to an EC2 health check indicating it has been terminated or stopped.	2024 February 20, 04:56:57 PM +05:30

todoList-userpool Info

User pool overview

User pool name	ARN
todoList-userpool	arn:aws:cognito-idp:us-east-1:441639934710:userpool/us-east-1_pPdrk2LJ
User pool ID	Estimated number of users
us-east-1_pPdrk2LJ	1

▶ Getting started

[Users](#) [Groups](#) [Sign-in experience](#) [Sign-up experience](#) [Messaging](#) [App integration](#) [User pool properties](#)

```
000
899
900    <!-- Vendor JS Files -->
901
902
903    <!-- Template Main JS File -->
904    <script src="main.js"></script>
905
906    <script>
907        window.cognitoClientId = "Enter Your Cognito Client ID Here!"; // Put your client id here
908        window.BASE_URL = "/development"; // Put your base path here (if different)
909    </script>
910
911
912    </body>
913
914    </html>
```

frontend

Name	Date Modified
assets	Today at 21:02
index.html	29 Jun 2024 at 21:44
main.js	11 Apr 2024 at 09:48

mytodolistapp Info

Objects | Properties | Permissions | Metrics | Management | Access Points

Objects (3) Info

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

< 1 >

<input type="checkbox"/>	Name	Type	Last modified
<input type="checkbox"/>	assets/	Folder	-

Resources

Create resource

/

ANY

{proxy+}

ANY

OPTIONS

Resource details

Path

/

Methods (1)

Method type	Integration type
ANY	VPC link

Create authorizer Info

Authorizer details

Authorizer name

Authorizer type Info

Choose to authorize your API calls using one of your Lambda functions or a Cognito User Pool.

Lambda

Cognito

Cognito user pool

Select the Cognito user pool that will authenticate requests to your API.



Token source

Enter the header that contains the authorization token.

Token validation - optional

Enter a regular expression to validate tokens.

[Cancel](#)

[Create authorizer](#)

Resources

[Create resource](#)

/

ANY

/{proxy+}

ANY

OPTIONS

Resource details

Path

/

Methods (1)

Method type



Integration type



[ANY](#)

VPC link

Resources

Create resource

Path /

ANY

/{proxy+}

ANY

OPTIONS

Resource details

Path /

Methods (1)

Method type	Integration type
ANY	VPC link

[API Gateway](#) > [APIs](#) > [Resources - todo-list-api \(nuowwpf0x4\)](#) > Edit method request

Edit method request

Method request settings

Authorization

todolist-cognito-authorizer	▲
None	
AWS IAM	
Cognito user pool authorizers	
todolist-cognito-authorizer	✓
None	▼

Resources

API actions ▾ Deploy API

Create resource

/

ANY

/proxy+ ANY

OPTIONS

/ - ANY - Method execution

Update documentation Delete

ARN arn:aws:execute-api:us-east-1:441639934710:nuowwpf0x4/*/ Resource ID jy8c4d3ic

Client → Method request → Integration request
← Method response ← Integration response

General Security Origins Behaviors Error pages Invalidations Tags

Details

Distribution domain name d[REDACTED].net ARN arn:aws:cl[REDACTED]/E3A0[REDACTED] Last modified Deploying

Create origin

Settings

Origin domain

Choose an AWS origin, or enter your origin's domain name.



nuowwpf0x4.execute-api.us-east-1.amazonaws.com



Protocol

[Info](#)

- HTTP only
- HTTPS only
- Match viewer

HTTPS port

Enter your origin's HTTPS port. The default is port 443.

443

Create behavior

Settings

Path pattern | [Info](#)

/development/* X

Origin and origin groups

nuowwpf0x4.execute-api.us-east-1.amazonaws.com ▼

Compress objects automatically | [Info](#)

- No
 Yes

Viewer

Viewer protocol policy

- HTTP and HTTPS
 Redirect HTTP to HTTPS
 HTTPS only

Allowed HTTP methods

- GET, HEAD
 GET, HEAD, OPTIONS
 GET, HEAD, OPTIONS, PUT, POST, PATCH, DELETE

Cache HTTP methods

GET and HEAD methods are cached by default.

- OPTIONS

Cache key and origin requests

We recommend using a cache policy and origin request policy to control the cache key and origin requests.

Cache policy and origin request policy (recommended)

Legacy cache settings

Headers

Choose which headers to include in the cache key.

None

Query strings

Choose which query strings to include in the cache key.

None

Cookies

Choose which cookies to include in the cache key.

None

Object caching

Use origin cache headers

Customize

Minimum TTL

Minimum time to live in seconds.

0

Maximum TTL

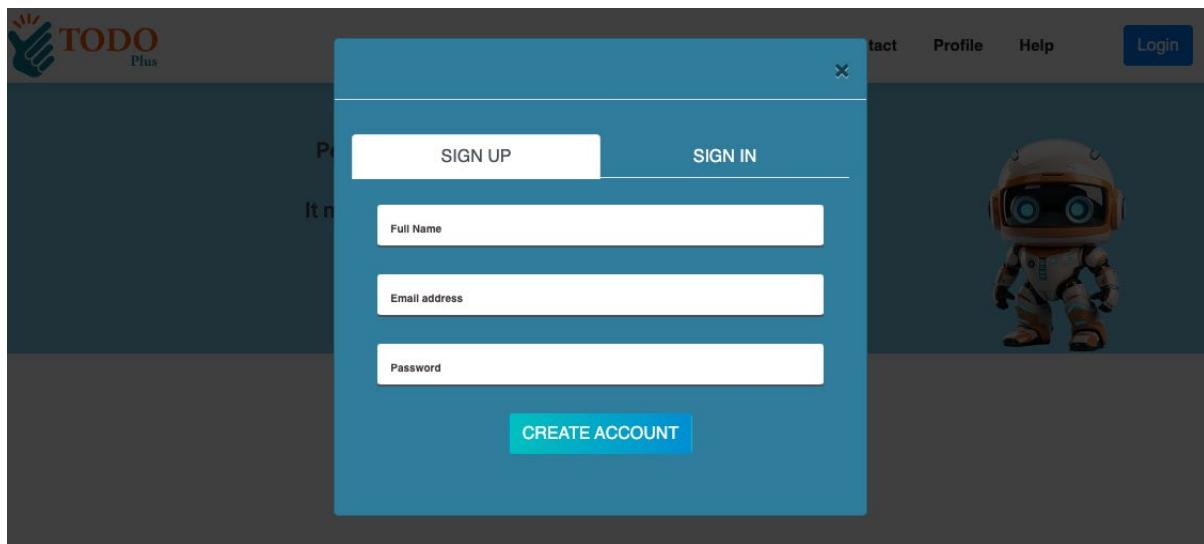
Maximum time to live in seconds.

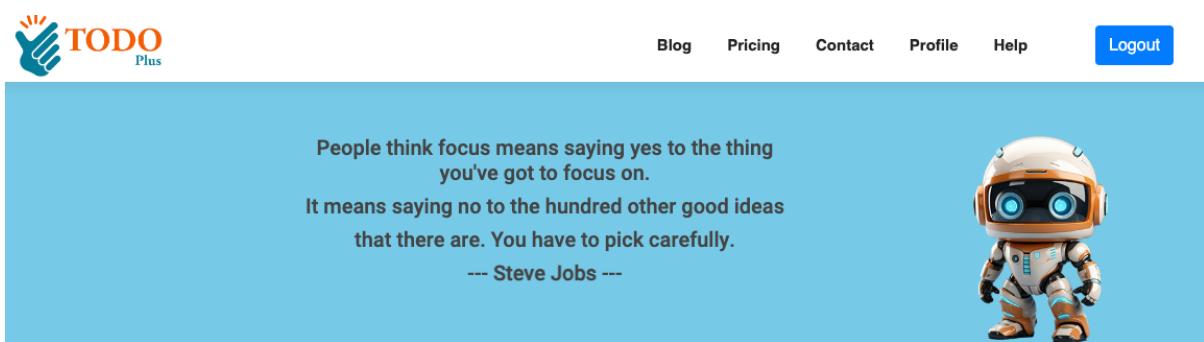
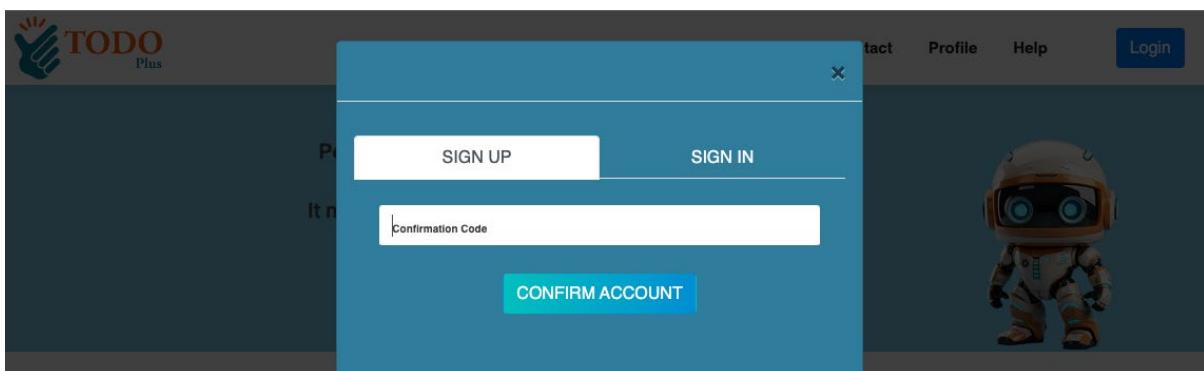
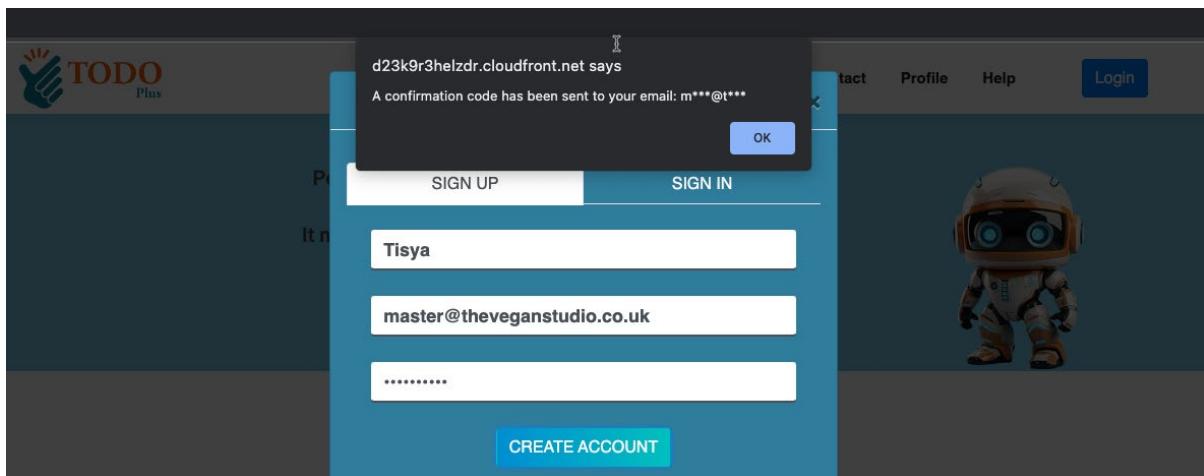
0

Default TTL

Default time to live in seconds.

0





#	Task Type	Task Description	Date	Status



Blog Pricing Contact Profile Help

Logout

People think focus means saying yes to the thing
you've got to focus on.

It means saying no to the hundred other good ideas
that there are. You have to pick carefully.

--- Steve Jobs ---



My To Do List

Add Task

#	Task Type	Task Description	Date	Status	Progress Bar
1	Work	Complete Chapter 9	21/02/2024	In-Progress	<div style="width: 80%; background-color: #ffcc00;"></div>
2	Work	Complete Chapter 10	29/02/2024	Not started	<div style="width: 0%; background-color: #6f707d;"></div>
3	Health	Start Good Gut Diet Program	26/02/2024	Started	<div style="width: 50%; background-color: #1e90ff;"></div>

Practice Resources



SHARE FEEDBACK

DASHBOARD > CHAPTER 9

Incorporating Edge Network Services to Connect to Your Application with Amazon CloudFront and Route 53

Summary

In this chapter, you have explored the roles of Amazon CloudFront and Route 53 in enhancing the performance, routing, and accessibility of your applications on AWS. This exploration has provided deep insights into how these services work individually and in tandem to optimize the user experience of your global web applications.

You learned about Amazon CloudFront, AWS's CDN service, examining its key features and functionalities. This chapter discussed how CloudFront accelerates the delivery of your web content by caching it at edge locations closest to your users, thereby significantly reducing latency and improving load times. You also explored CloudFront's security capabilities, including integration with AWS Shield for DDoS protection and AWS WAF for web application security.

Next, you learned about Amazon Route 53, exploring its critical role in domain name management and DNS services. Route 53's functionalities in DNS routing, health checking, traffic routing, and seamless integration with other AWS services were highlighted. You discovered some advanced features such as latency-based routing, geolocation routing, and failover routing, which are essential for managing global traffic and ensuring the high availability and resilience of your applications.

Chapter Review Questions

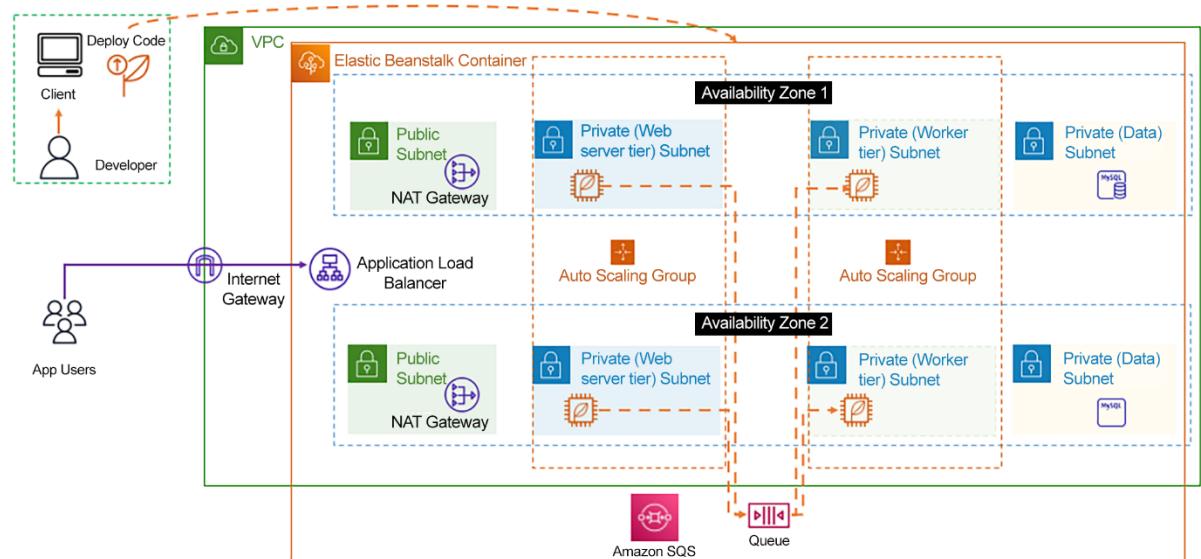
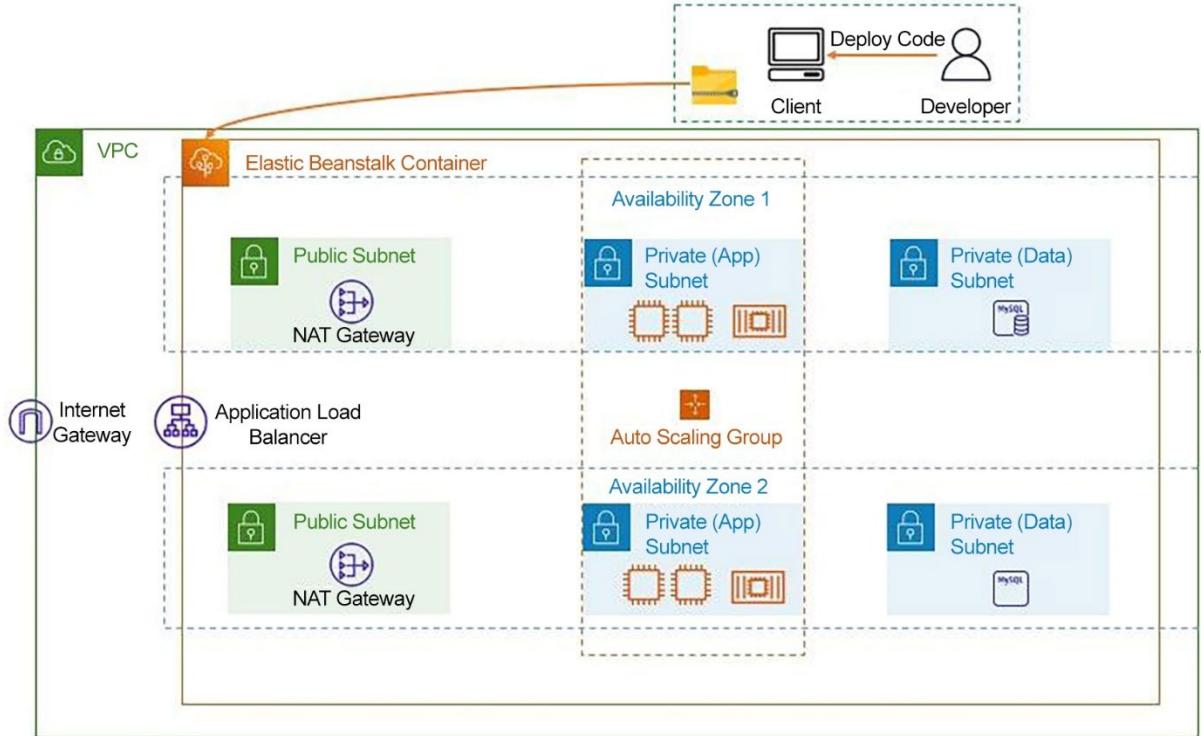
The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

Select Quiz

Quiz 1
[SHOW QUIZ DETAILS](#) ▾

START

Chapter 10: Designing Deployment Strategies with AWS Elastic Beanstalk



Platform Info

Platform type

Managed platform

Platforms published and maintained by Amazon Elastic Beanstalk. [Learn more](#) 

Custom platform

Platforms created and owned by you. This option is unavailable if you have no platforms.

Platform

Node.js



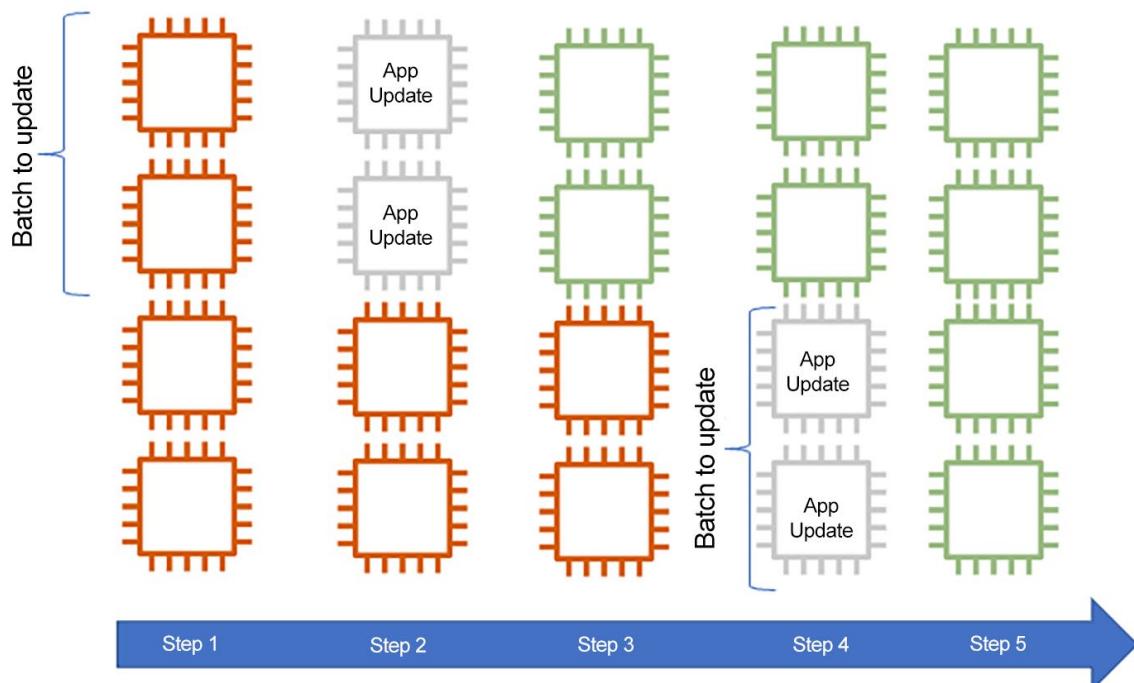
Platform branch

Node.js 20 running on 64bit Amazon Linux 2023

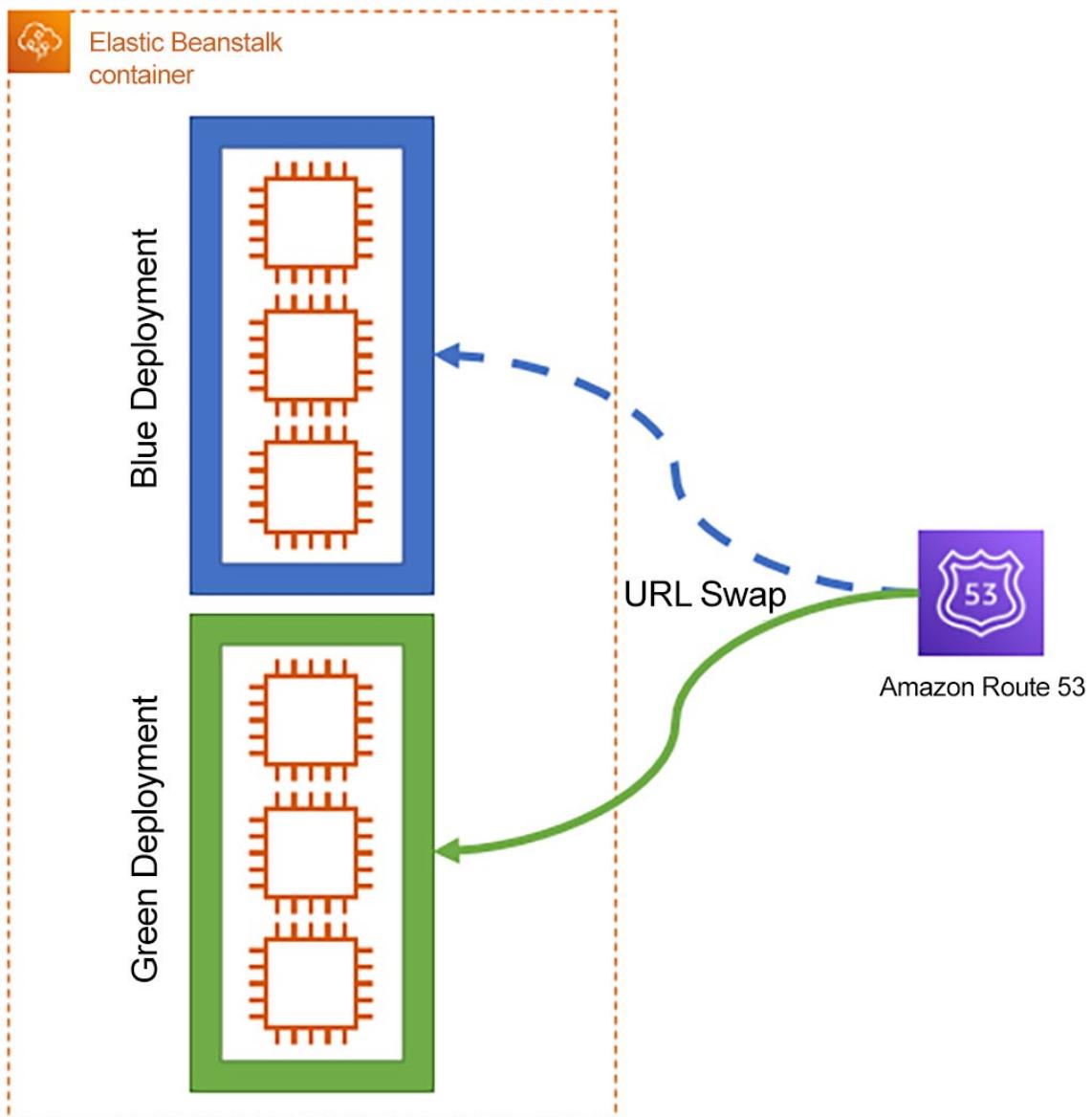


Platform version

6.1.7 (Recommended)







Database deletion policy

This policy applies when you decouple a database or terminate the environment coupled to it.

- Create snapshot**

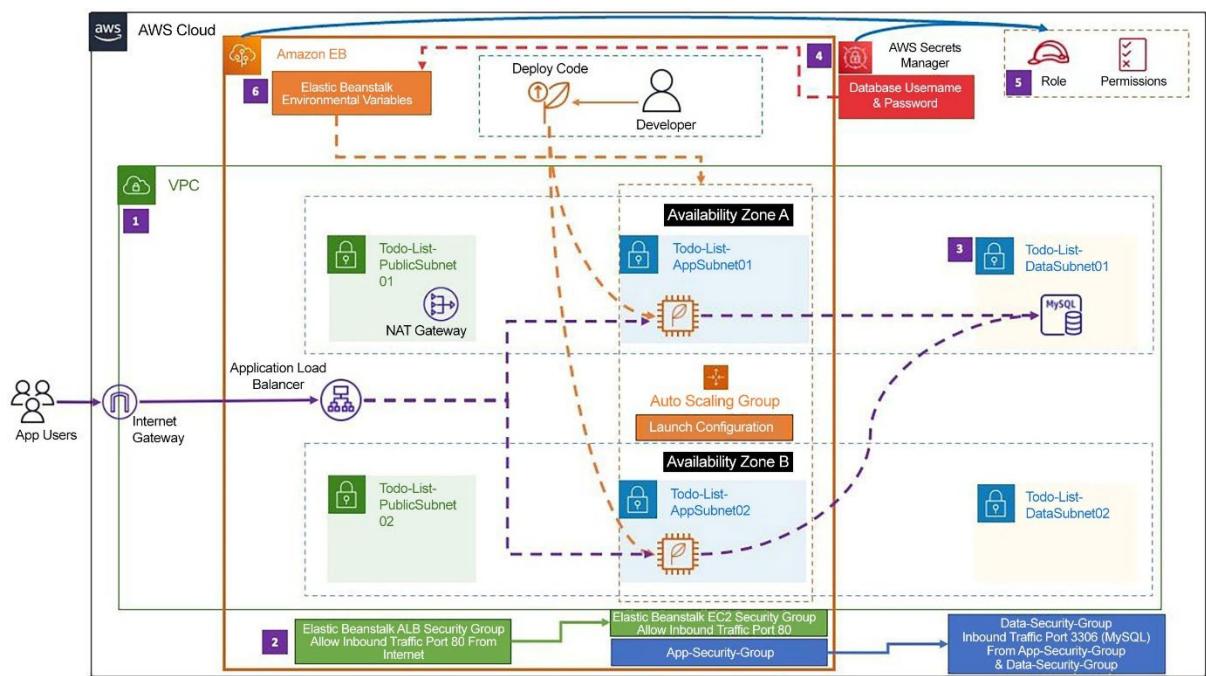
Elastic Beanstalk saves a snapshot of the database and then deletes it. You can restore a database from a snapshot when you add a DB to an Elastic Beanstalk environment or when you create a standalone database. You might incur charges for storing database snapshots.

- Retain**

The decoupled database will remain available and operational external to Elastic Beanstalk.

- Delete**

Elastic Beanstalk terminates the database. The database will no longer be available.



VPC settings

Resources to create [Info](#)

Create only the VPC resource or the VPC and other networking resources.

VPC only

VPC and more

Name tag auto-generation [Info](#)

Enter a value for the Name tag. This value will be used to auto-generate Name tags for all resources in the VPC.

Auto-generate

IPv4 CIDR block [Info](#)

Determine the starting IP and the size of your VPC using CIDR notation.

10.5.0.0/16

65,536 IPs

CIDR block size must be between /16 and /28.

IPv6 CIDR block [Info](#)

No IPv6 CIDR block

▼ Customize subnets CIDR blocks

Public subnet CIDR block in eu-west-2a

10.5.1.0/24	256 IPs
-------------	---------

Public subnet CIDR block in eu-west-2b

10.5.2.0/24	256 IPs
-------------	---------

Private subnet CIDR block in eu-west-2a

10.5.10.0/24	256 IPs
--------------	---------

Private subnet CIDR block in eu-west-2b

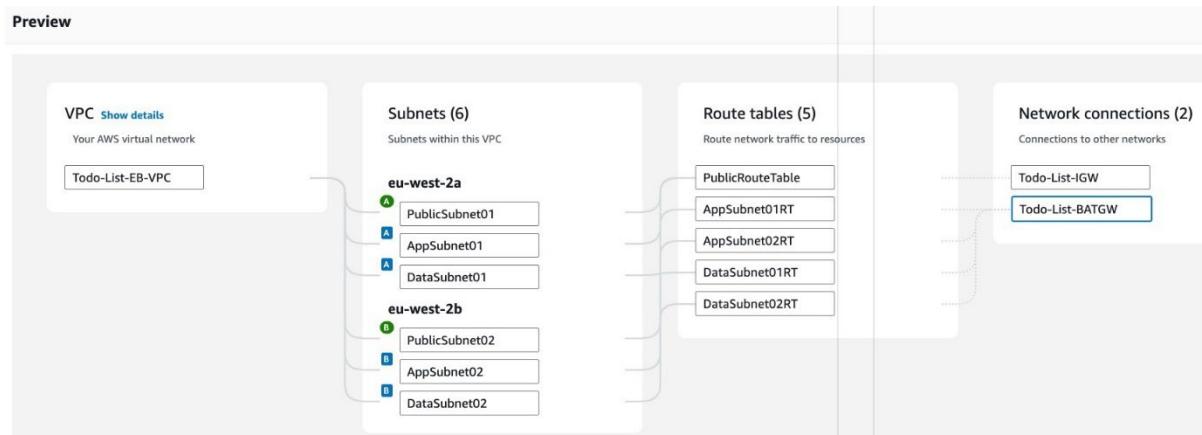
10.5.11.0/24	256 IPs
--------------	---------

Private subnet CIDR block in eu-west-2a

10.5.20.0/24	256 IPs
--------------	---------

Private subnet CIDR block in eu-west-2b

10.5.21.0/24	256 IPs
--------------	---------





Inbound rules Info

Type <small>Info</small>	Protocol	Port range <small>Info</small>	Source <small>Info</small>	Description - optional <small>Info</small>
MySQL/Aurora	TCP	3306	C... <small>▼</small>	<input type="text" value="::/64"/> Security Groups App-Security-Group sg-0e3a5e3d29a40896a App-Security-Group
Add rule				

Outbound rules Info

Type <small>Info</small>	Protocol	Port range <small>Info</small>	Source <small>Info</small>	Description - optional <small>Info</small>
MySQL/Aurora	TCP	3306	C... <small>▼</small>	<input type="text" value="sg-0e3a5e3d29a40896a"/> X Data-Security-Group sg-089e9508940c13c12 Data-Security-Group
Add rule				

Add subnets

Availability Zones

Choose the Availability Zones that include the subnets you want to add.

Choose an availability zone ▾

eu-west-2a X

eu-west-2b X

Subnets

Choose the subnets that you want to add. The list includes the subnets in the selected Availability Zones.

Select subnets ▾

subnet-0985f4861cc5fed46 (10.5.21.0/24) X

subnet-063fba592df567d4f (10.5.20.0/24) X

 For Multi-AZ DB clusters, you must select 3 subnets in 3 different Availability Zones.

▼ Credentials Settings

Master username [Info](#)

Type a login ID for the master user of your DB instance.

postgres

1 to 16 alphanumeric characters. The first character must be a letter.

Credentials management

You can use AWS Secrets Manager or manage your master user credentials.

Managed in AWS Secrets Manager - most secure

RDS generates a password for you and manages it throughout its lifecycle using AWS Secrets Manager.

Self managed

Create your own password or have RDS create a password that you manage.

VPC security group (firewall) [Info](#)

Choose one or more VPC security groups to allow access to your database. Make sure that the security group rules allow the appropriate incoming traffic.

Choose existing

Choose existing VPC security groups

Create new

Create new VPC security group

Existing VPC security groups

Choose one or more options



App-Security-Group

ency, and security.

Data-Security-Group

ditional costs. For more

default

Databases (1)

Group resources



[Modify](#)

[Actions ▾](#)

[Restore from S3](#)

[Create database](#)



Filter by databases



1



DB identifier ▲

Status ▾

Role ▾

Engine ▾

Region & AZ ▾



[tododb](#)

Available

Instance

MySQL Community

eu-west-2a

Encryption key [Info](#)

You can encrypt using the KMS key that Secrets Manager creates or a customer-managed KMS key that you create.

[Add new key](#)

Database [Info](#)

< 1 >

DB instance	DB engine	Status	Creation date
-------------	-----------	--------	---------------

<input checked="" type="radio"/> tododb	mysql	available	7 July 2024 at 20...
---	-------	-----------	----------------------

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

Rotation function [Info](#)

Create a rotation function

Use a rotation function from your account

Lambda rotation function

Secrets Manager adds the prefix 'SecretsManager' to your function name.

SecretsManager todo-list-secrets

Function name including prefix must be a maximum of 64 alphanumeric characters, hyphens and underscores.

Roles (45) [Info](#)

[Delete](#)[Create role](#)

An IAM role is an identity you can create that has specific permissions with credentials that are valid for short durations. Roles can be assumed by entities that you trust.



2 matches

< 1 >



Role name

▲ Trusted entities

Todo-EB-SM-IAM-Role

AWS Service: ec2

▼ Read (Selected 1/5)

- All read actions
 - DescribeSecret** | Info
 - GetRandomPassword** | Info
 - GetResourcePolicy** | Info
 - GetSecretValue** | Info
 - ListSecretVersionIds** | Info
- Write (11)
- Permissions management (3)
- Tagging (2)

▼ Resources

Specify resource ARNs for these actions.

- All
- Specific

Secret | Info

arn:aws:secretsmanager:eu-west-2:441639934



Any in this account

[Add ARNs to restrict access.](#)

Application code Info

Sample application

Existing version

Application versions that you have uploaded.

Upload your code

Upload a source bundle from your computer or copy one from Amazon S3.

Version label

Unique name for this version of your application code.

v1

Source code origin. Maximum size 500 MB

Local file

Upload application

 Choose file

 File name: eb-rds-todo-app-code-v3.zip

File must be less than 500MB max file size

Public S3 URL

Instance subnets

 Filter instance subnets

<input type="checkbox"/>	Availability Zone	Subnet	▲	CIDR	Name
<input checked="" type="checkbox"/>	eu-west-2a	subnet-00c162...		10.5.10.0/24	AppSubnet01
<input type="checkbox"/>	eu-west-2a	subnet-0107e5...		10.5.1.0/24	PublicSubnet01
<input type="checkbox"/>	eu-west-2a	subnet-063fba...		10.5.20.0/24	DataSubnet01
<input type="checkbox"/>	eu-west-2b	subnet-0985f4...		10.5.21.0/24	DataSubnet02
<input type="checkbox"/>	eu-west-2b	subnet-0a577b...		10.5.2.0/24	PublicSubnet02
<input checked="" type="checkbox"/>	eu-west-2b	subnet-0ed45b...		10.5.11.0/24	AppSubnet02

Load balancer subnets

<input type="text"/> Filter load balancer subnets				
	Availability Z...	Subnet	CIDR	Name
<input type="checkbox"/>	eu-west-2a	subnet-00c16...	10.5.10.0/24	AppSubnet01
<input checked="" type="checkbox"/>	eu-west-2a	subnet-0107e...	10.5.1.0/24	PublicSubnet01
<input type="checkbox"/>	eu-west-2a	subnet-063fb...	10.5.20.0/24	DataSubnet01
<input type="checkbox"/>	eu-west-2b	subnet-0985f...	10.5.21.0/24	DataSubnet02
<input checked="" type="checkbox"/>	eu-west-2b	subnet-0a577...	10.5.2.0/24	PublicSubnet02
<input type="checkbox"/>	eu-west-2b	subnet-0ed45...	10.5.11.0/24	AppSubnet02

Processes

For each environment process, you can specify the protocol and port that the load balancer uses to route requests to the process. You can also specify how the load balancer performs process health checks.

	Name	Port	Protocol	HTTP code	Actions ▲	Add process
<input checked="" type="radio"/>	default	80	HTTP	/	<input type="button" value="Edit"/> <input type="button" value="Remove"/>	<input type="button" value="Disabled"/>

Add process



Name

default

Port

80

Protocol

HTTP



▼ Health check

HTTP code

HTTP status code of a healthy instance in your environment.

200

Path

Path to which the load balancer sends HTTP health check requests.

/health.html

Cancel

Save

Environment properties

The following properties are passed in the application as environment properties. [Learn more](#)

Name	Value
SECRET_NAME	tododbsecret

[Remove](#)

Name	Value
DB_ENDPOINT	tododb.cni6y4s24who.eu-west-2.rds.amazonaws

[Remove](#)

Name	Value
DB_NAME	tododb

[Remove](#)

Todo-List-EB-App-env [Info](#)

Environment overview		Platform
<div>Health Green</div>	Environment ID e-7g7jnpj89b	Platform PHP 8.2 running on 64bit Amazon
<div>Domain Todo-List-EB-App-env.eba-wnns6h3t.eu-west-2.elasticbeanstalk.com</div>	Application name Todo-List-EB-App	Running version v4

[Events](#) [Health](#) [Logs](#) [Monitoring](#) [Alarms](#) [Managed updates](#) [Tags](#)

Events (21) [Info](#)

Filter events by text, property or value

Time	Type	Details
May 21, 2024 09:47:53 (UTC+5:30)	INFO	Successfully launched environment: Todo-List-EB-App-env
May 21, 2024 09:47:52 (UTC+5:30)	INFO	Application available at Todo-List-EB-App-env.eba-wnns6h3t.eu-west-2.elasticbeanstalk.com.
May 21, 2024 09:47:36 (UTC+5:30)	INFO	Adding instance 'i-09548f07d175077dd' to your environment.

Task Schedule

Not Secure todo-list-eb-app-env.eba-wmns6h3t.eu-west-2.elasticbeanstalk.com

"Deciding What NOT To Do Is As Important As Deciding What To Do"
-- Steve Jobs

Get focused, organized, and calm with our ultimate To-Do List.

Date	Time
21/5/2024	17:59:52

My To Do List

Task Type Task Description
 Due Date Status

SUBMIT

Task Type Status SEARCH REFRESH

Show 10 entries Search:

#	Task Type	Task Description	Date	Status
1	Work	Complete Chapter 10	21-05-2024	In-Progress
2	Work	Review Chapter 7	26-05-2024	Started

Showing 1 to 2 of 2 entries Previous 1 Next

The distance between DREAMS and REALITY is called ACTION
Make Things Happen



Designing Deployment Strategies with AWS Elastic Beanstalk

Summary

AWS Elastic Beanstalk is a PaaS solution that is designed to help you quickly and easily deploy your application without focusing too much on the underlying infrastructure. AWS Elastic Beanstalk can set up and configure all the necessary infrastructure to support your application and its various environments (stages). You have complete control over how the underlying infrastructure is built, whether you are deploying as a single test server or within a multi-tier architecture that supports high availability and scaling capabilities.

The service supports a wide range of development environments and programming languages, including Apache Tomcat for Java applications, Apache HTTPS Server for PHP and Python, and Microsoft IIS 7.5, 8.0, and 8.5 for .NET applications.

AWS Elastic Beanstalk uses Amazon CloudFormation to build the underlying infrastructure required for your applications. While you can define standard configuration items as part of your architecture, you can also use Elastic Beanstalk configuration files stored in a folder called .ebextensions to further customize how your resources are provisioned within your environment. The configuration files should be written in either YAML or JSON with a .config extension, placed with your application source code bundle, and deployed into your Elastic Beanstalk environment. You can use this file to make various configuration changes and customizations – for example, you can install packages on your Linux instances that your application may be dependent on.

An important feature of Elastic Beanstalk is managing the life cycle of your application through various deployment options. These include all-at-once deployment, rolling, rolling with additional batch, immutable deployment, traffic splitting, and blue/green deployment.

Another important concept to be aware of is that while you can incorporate a backend database such as Amazon RDS as part of your overall Elastic Beanstalk configuration and environment setup, you may wish to deploy the database outside of the configuration to ensure it is kept separate from the application life cycle. This approach also facilitates blue/green deployment capabilities.

Finally, in this chapter, you learned how to improve your application security posture and protect your database by using AWS Secrets Manager to store and manage sensitive data such as database credentials and API keys. You would need to ensure that your application is designed to then retrieve any necessary data from Secrets Manager at runtime but this additional design effort will protect your environment from malicious attacks.

In the next chapter, we extend our knowledge of the software development life cycle by examining DevOps concepts and principles. You will learn about **continuous integration and continuous development/deployment (CI/CD)** tools and the AWS process involved in managing application development, release, and updates. DevOps plays a fundamental role in helping organizations streamline their application development, testing, and deployment life cycle, and incorporating its core framework into your application design and management is fundamental to working in an agile environment.

Chapter Review Questions

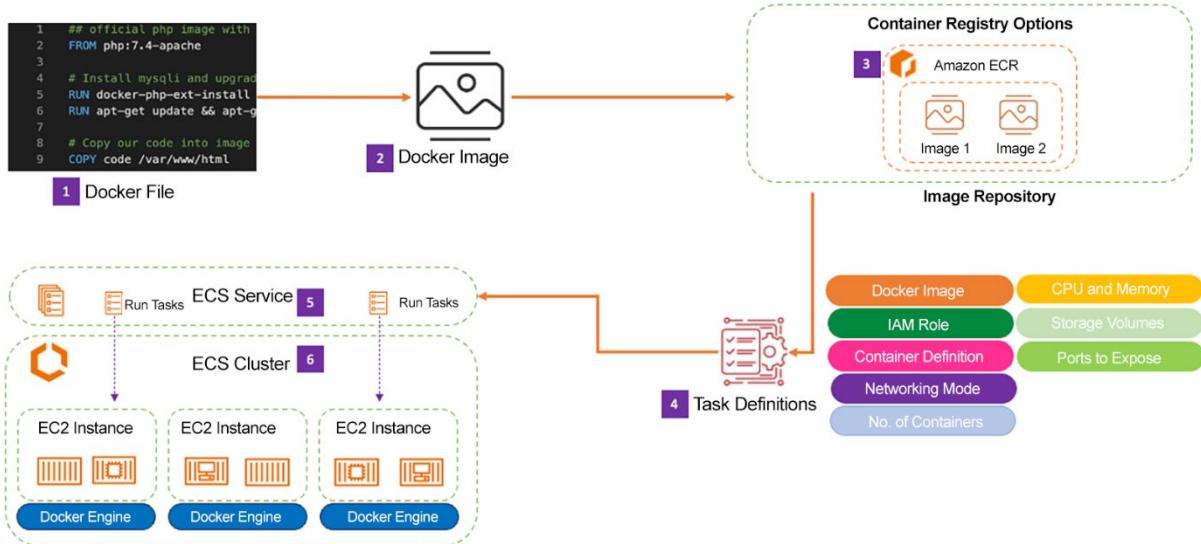
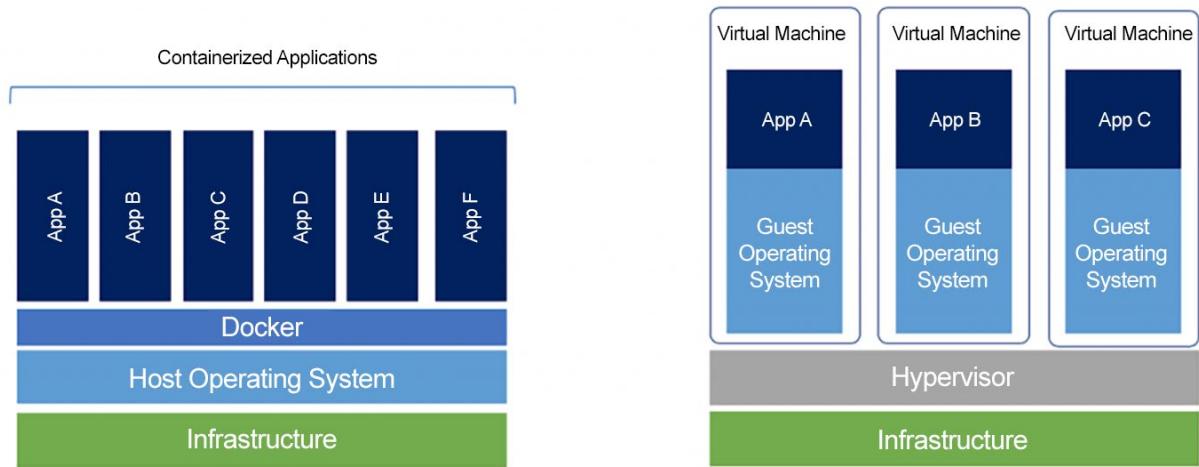
The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

Select Quiz

Quiz 1
[SHOW QUIZ DETAILS](#) ▾

START

Chapter 11: Deploying a Multi-Tier Application Stack with Amazon ECS, Fargate, and EKS



▼ Compute configuration (advanced)

Compute options | [Info](#)

To ensure task distribution across your compute types, use appropriate compute options.

Capacity provider strategy

Specify a launch strategy to distribute your tasks across one or more capacity providers.

Launch type

Launch tasks directly without the use of a capacity provider strategy.

Launch type | [Info](#)

Select either managed capacity (Fargate), or custom capacity (EC2 or user-managed, External instances). External instances are registered to your cluster using the ECS Anywhere capability.

FARGATE ▾

Platform version | [Info](#)

Specify the platform version on which to run your service.

1.4.0 ▾

Placement

Placement templates

Customised

Customise how tasks are placed by applying strategies and constraints. [Learn more](#)

Strategy Info

A placement strategy defines how tasks are placed by spread, bin pack, or random. You can use multiple placement strategies together and the order is used to find the best match.

Type

Spread

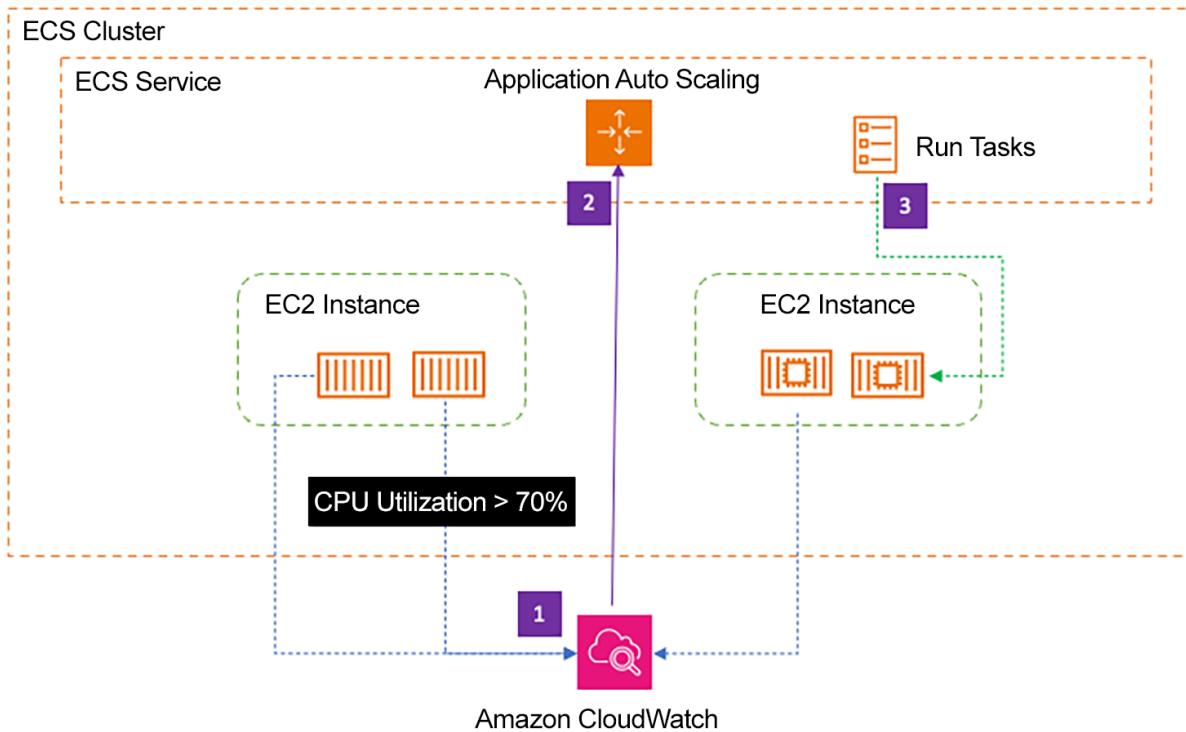
Field

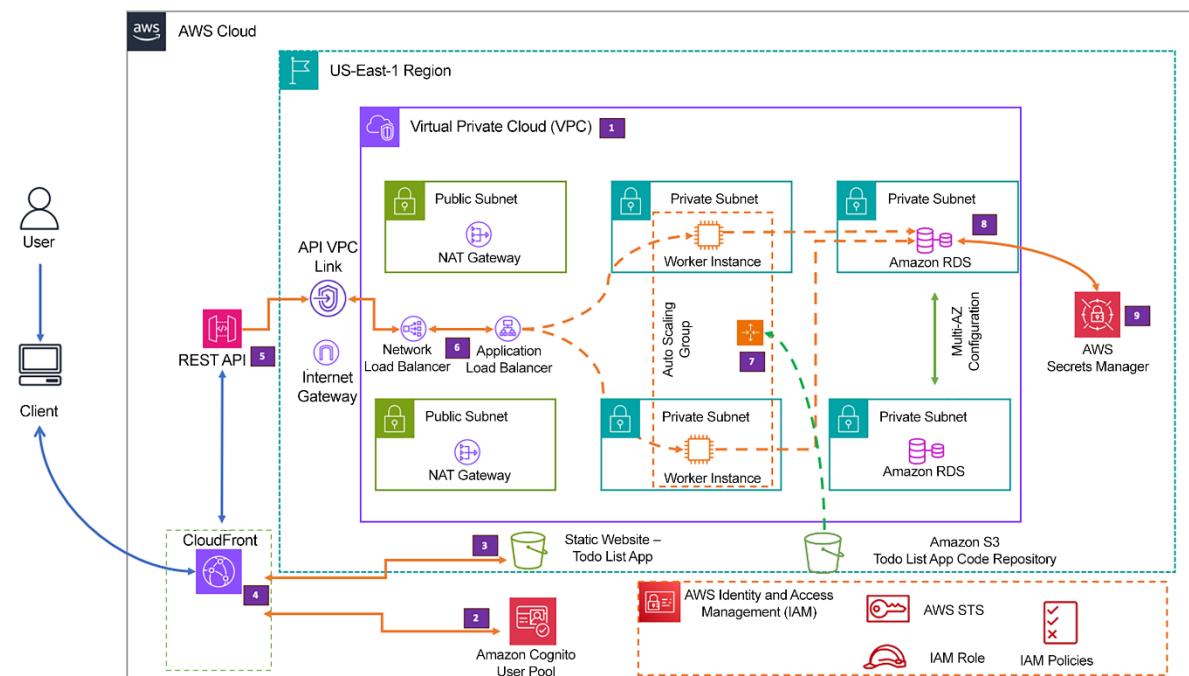
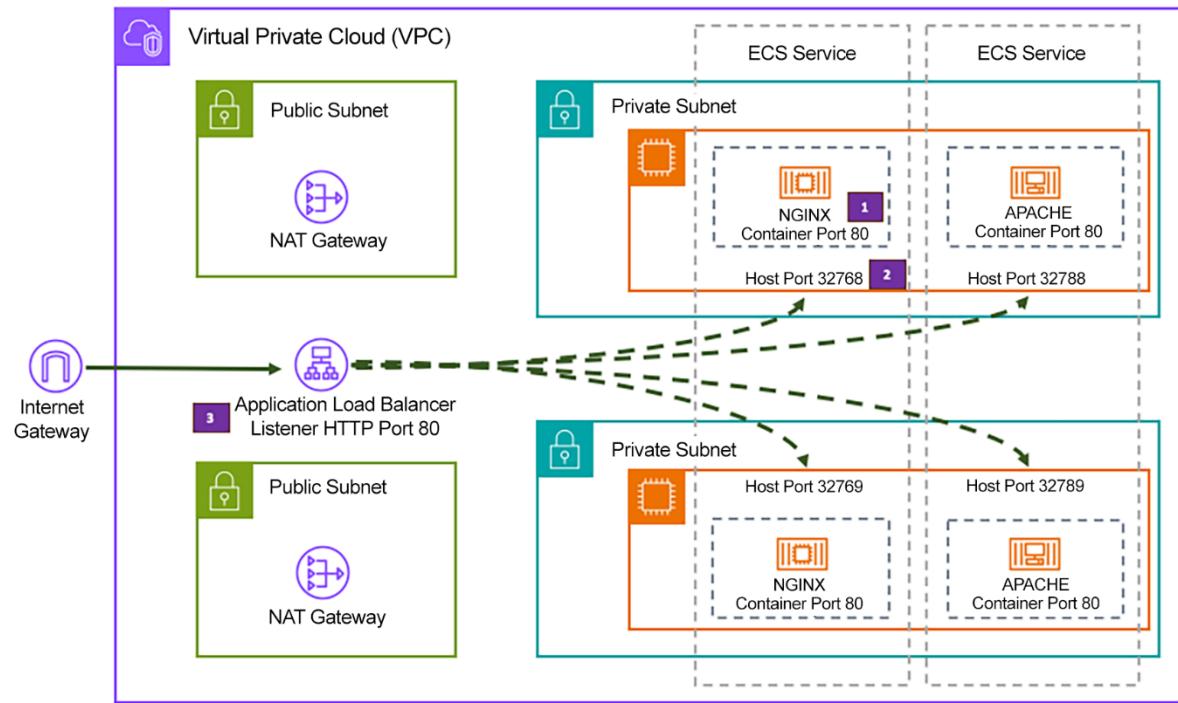
attribute:ecs.availability-zone

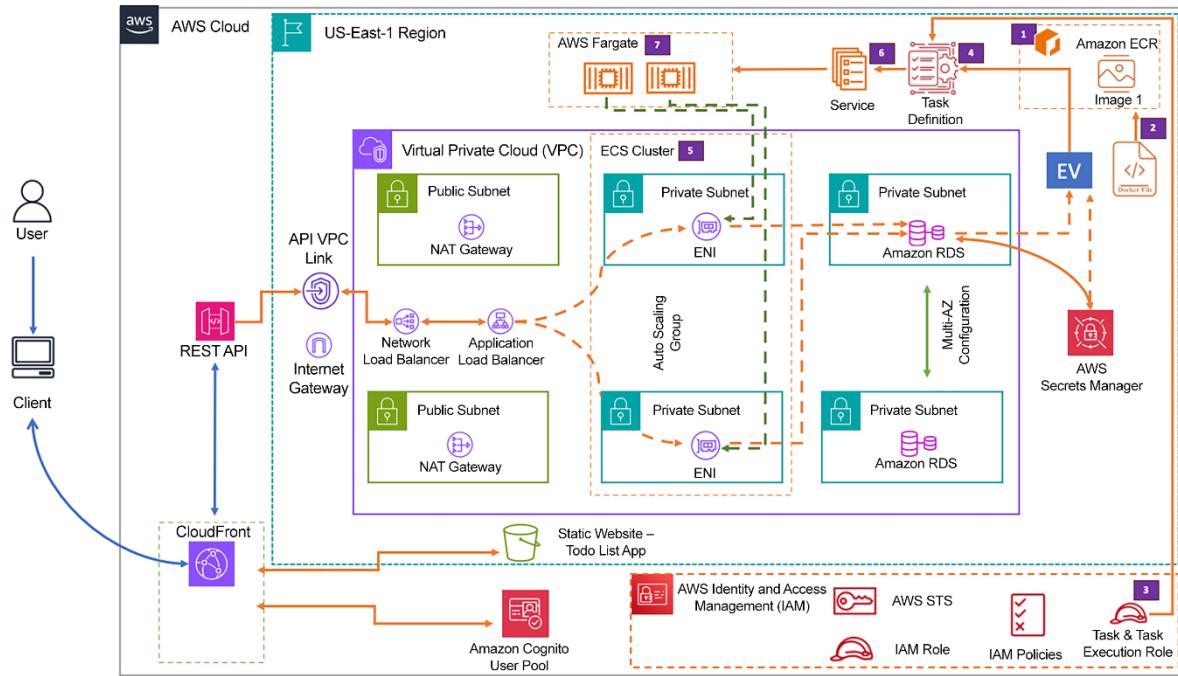
Remove

Add placement strategy

You can add 4 more placement strategies.







Create repository

General settings

Visibility settings

[Info](#)

Choose the visibility setting for the repository.

Private

Access is managed by IAM and repository policy permissions.

Public

Publicly visible and accessible for image pulls.

Repository name

Provide a concise name. A developer should be able to identify the repository contents by the name.

441639934710.dkr.ecr.eu-west-2.amazonaws.com/

Step 2: Add permissions

[Edit](#)

Permissions policy summary

Policy name	Type	Attached as
AmazonSSMManagedInstanceCore	AWS managed	Permissions policy
EC2InstanceProfileForImageBuilder	AWS managed	Permissions policy

▼ Network settings [Info](#)

VPC - required [Info](#)

vpc-08192228f70f81390 (todolist-vpc)
10.0.0.0/16

Subnet [Info](#)

subnet-0da90144bce993455	todolist-app-subnet01
VPC: vpc-08192228f70f81390 Owner: 441639934710 Availability Zone: us-east-1a	
IP addresses available: 247 CIDR: 10.0.10.0/24	

Create new subnet [\[?\]](#)

Auto-assign public IP [Info](#)

Disable

Instances (1/8) Info		G	Connect	Instance state ▾	Actions ▾	Launch instances ▾
Find Instance by attribute or tag (case-sensitive)				All states ▾		[<] 1 [>] [?]
Name	Instance ID	Instance state	Instanc...	Status check	Alarm	
<input checked="" type="checkbox"/> DockerImage-Server-01	i-0c63378cb...	Running [?] [Q]	t2.micro	2/2 checks passed.. [?] [Q]	View	

Connect to instance [Info](#)

Connect to your instance i-0c63378cbca225913 (DockerImage-Server-01) using any of these options

[EC2 Instance Connect](#) [Session Manager](#) [SSH client](#) [EC2 serial console](#)

Session Manager usage:

- Connect to your instance without SSH keys, a bastion host, or opening any inbound ports.
- Sessions are secured using an AWS Key Management Service key.
- You can log session commands and details in an Amazon S3 bucket or CloudWatch Logs log group.
- Configure sessions on the Session Manager [Preferences](#) [\[?\]](#) page.

[Cancel](#) [Connect](#)

Session ID: root-7rtyphzgodxtqmx67gsdvppjce

Instance ID: i-0ff02a553fb1b10af

```
sh-5.2$
```

```
Installed:
  containerd-1.7.11-1.amzn2023.0.1.x86_64           docker-25.0.3-1.amzn2023.
  iptables-libs-1.8.8-3.amzn2023.0.2.x86_64         iptables-nft-1.8.8-3.amzn
  libcgroup-3.0-1.amzn2023.0.1.x86_64              libnetfilter_conntrack-1.
  libnftnetlink-1.0.1-19.amzn2023.0.2.x86_64        libnftnl-1.2.2-2.amzn2023
  pigz-2.5-1.amzn2023.0.3.x86_64                  runc-1.1.11-1.amzn2023.0.
```

Complete!

sh-5.2\$ █

```
sh-5.2$ sudo service docker start
Redirecting to /bin/systemctl start docker.service
sh-5.2$
```

Session ID: root-b4lr55s6jdndfxpsv27s2ntbti

Instance ID:

```
sh-5.2$ sudo su ec2-user
[ec2-user@ip-10-0-1-28 bin]$
```

```
[ec2-user@ip-10-0-1-141 bin]$ cd /
[ec2-user@ip-10-0-1-141 /]$ ls
bin  boot  dev  etc  home  lib  lib64  local  media  mnt  opt  proc
[ec2-user@ip-10-0-1-141 /]$ cd home
[ec2-user@ip-10-0-1-141 home]$ ls
ec2-user  ssm-user
[ec2-user@ip-10-0-1-141 home]$ █
```

```
[ec2-user@ip-10-0-1-141 ~]$ ls
todo-plus-nodejs  todo-plus-nodejs-updated.zip
[ec2-user@ip-10-0-1-141 ~]$ cd todo-plus-nodejs/
[ec2-user@ip-10-0-1-141 todo-plus-nodejs]$ ls
Dockerfile  docker-compose-mysql.yml  package-lock.json  prisma  test          tsconfig.json
README.md    nest-cli.json          package.json       src      tsconfig.build.json  user-data.sh
[ec2-user@ip-10-0-1-141 todo-plus-nodejs]$ █
```

```
=> [internal] load build context
=> => transferring context: 410.87kB
=> [2/7] WORKDIR /usr/src/app
=> [3/7] COPY package*.json .
=> [4/7] RUN npm install
=> [5/7] COPY . .
=> [6/7] RUN npm run init
=> [7/7] RUN npm run build
=> exporting to image
=> => exporting layers
=> => writing image sha256:a08b8c4ede724521879372bcc6f52581bce76cc9dbbf30fa054602bad7657c2c
=> => naming to 441639934710.dkr.ecr.eu-west-2.amazonaws.com/todo-plus
[ec2-user@ip-10-0-1-141 todo-plus-nodejs]$
```

```
[ec2-user@ip-10-0-1-141 todo-plus-nodejs]$ docker images
REPOSITORY                                TAG      IMAGE ID      CREATED     SIZE
44163993...amazonaws.com/todo-plus      latest   a08b8c4ede72  3 minutes ago  469MB
[ec2-user@ip-10-0-1-141 todo-plus-nodejs]$
```

1. Retrieve an authentication token and authenticate your Docker client to your registry. Use the AWS CLI:

```
aws ecr get-login-password --region [REDACTED] docker login --username AWS --password-stdin
441639...amazonaws.com
```

Note: if you receive an error using the AWS CLI, make sure that you have the latest version of the AWS CLI and Docker installed.

2. Build your Docker image using the following command. For information on building a Docker file from scratch, see the instructions [here](#). You can skip this step if your image has already been built:

```
docker build -t todo-plus .
```

3. After the build is completed, tag your image so you can push the image to this repository:

```
docker tag todo-plus:latest 441639...amazonaws.com/todo-plus:latest
```

4. Run the following command to push this image to your newly created AWS repository:

```
docker push 441639...amazonaws.com/todo-plus:latest
```

```
[ec2-user@ip-172-31-36-126 todo-plus-nodejs]$ docker images
REPOSITORY                                TAG      IMAGE ID      CREATED     SIZE
441639934710.dkr.ecr.eu-west-2.amazonaws.com/todo-plus      latest   d738e4d999a4  48 seconds
[ec2-user@ip-172-31-36-126 todo-plus-nodejs]$ aws ecr get-login-password --region eu-west-2
word-stdin 441639934710.dkr.ecr.eu-west-2.amazonaws.com
WARNING! Your password will be stored unencrypted in /home/ec2-user/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
[ec2-user@ip-172-31-36-126 todo-plus-nodejs]$
```

```
[ec2-user@ip-172-31-36-126 todo-plus-nodejs]$ docker push 441639934710.dkr.ecr.eu-west-2.amazonaws.com/todo-plus
The push refers to repository [441639934710.dkr.ecr.eu-west-2.amazonaws.com/todo-plus]
4e0aaac5ef6c: Pushed
829996855214: Pushed
3b2a5cf4d1b0: Pushed
9658d9a6d0e7: Pushed
a75abb530afa: Pushed
aadd1dadf998: Pushed
28576ee1ff32: Pushed
daa732f7b271: Pushed
7cc8f366b357: Pushed
78561cef0761: Pushed
latest: digest: sha256:1124572859015b677979a74c836143c7485ffef24d6e332c6b5b63fd8a2d47ac size
[ec2-user@ip-172-31-36-126 todo-plus-nodejs]$
```

todo-plus

[View push commands](#)

Images (1)						
<input type="checkbox"/>	Image tag	Artifact type	Pushed at	Size (MB)	Image URI	Digest
<input type="checkbox"/>	latest	Image	25 July 2024, 14:59:02 (UTC+01)	178.08	Copy URI	sha256:1124572859015b677979a74c836143c7485ffef24d6e332c6b5b63fd8a2d47ac

Use case

Allow an AWS service like EC2, Lambda, or others to perform actions in this account.

Service or use case

Elastic Container Service



Choose a use case for the specified service.

Use case

Elastic Container Service

Allows ECS to create and manage AWS resources on your behalf.

Elastic Container Service Autoscale

Allows Auto Scaling to access and update ECS services.

Elastic Container Service Task

Allows ECS tasks to call AWS services on your behalf.

EC2 Role for Elastic Container Service

Allows EC2 instances in an ECS cluster to access ECS.

Step 2: Add permissions

Edit

Permissions policy summary

Policy name	Type	Attached as
AmazonECSTaskExecutionRolePolicy	AWS managed	Permissions policy
todo-list-secret-access-policy	Customer managed	Permissions policy

Launch type | [Info](#)

Selection of the launch type will change task definition parameters.

AWS Fargate

Serverless compute for containers.

Amazon EC2 instances

Self-managed infrastructure using Amazon EC2 instances.

OS, Architecture, Network mode

Network mode is used for tasks and is dependent on the compute type selected.

Operating system/Architecture | [Info](#)

Linux/X86_64 ▾

Network mode | [Info](#)

awsvpc ▾

Task size | [Info](#)

Specify the amount of CPU and memory to reserve for your task.

CPU

Memory

.5 vCPU ▾

1 GB ▾

▼ Container – 1 [Info](#)

Container details

Specify a name, container image and whether the container should be marked as essential. Each task definition must have at least one essential container.

Name

Image URI

Essential container

todo-list-app

441639934710.dkr.ecr.us-east-1.amazonaws.com/tu

Yes

Up to 255 letters (uppercase and lowercase), numbers, hyphens, underscores, colons, periods, forward slashes, and number signs are allowed.

Up to 255 letters (uppercase and lowercase), numbers, hyphens, underscores, colons, periods, forward slashes, and number signs are allowed.

▼

Private registry | [Info](#)

Store credentials in Secrets Manager, and then use the credentials to reference images in private registries.

Private registry authentication

Port mappings | [Info](#)

Add port mappings to allow the container to access ports on the host to send or receive traffic. For port name, a default will be assigned if left blank.

Container port

Protocol

Port name

App protocol

80

TCP ▾

container-port-f

HTTP ▾

▼ Environment variables - optional

Environment variables [Info](#)

Add individually

Add a key-value pair to specify an environment variable.

Key	Value type	Value	
AWS_REGION	Value	us-east-1	Remove
SECRET_NAME	Value	dev/todolist/msq	Remove
DB_HOST	Value	tododb.cni6y4s24who.	Remove
DB_PORT	Value	3306	Remove
Add environment variable			

Cluster configuration

Cluster name

Cluster name must be 1 to 255 characters. Valid characters are a-z, A-Z, 0-9, hyphens (-), and underscores (_).

Default namespace - optional

Select the namespace to specify a group of services that make up your application. You can overwrite this value at the service level.

 [!\[\]\(5fc77f3fc0b5a0aaafb39f22e9589658_img.jpg\)](#)

▼ Infrastructure [Info](#)

Serverless

Your cluster is automatically configured for AWS Fargate (serverless) with two capacity providers. Add Amazon EC2 instances.

AWS Fargate (serverless)

Pay as you go. Use if you have tiny, batch or burst workloads or for zero maintenance overhead. The cluster has Fargate and Fargate Spot capacity providers by default.

Services Tasks Infrastructure Metrics Scheduled tasks Tags

Services (0) [Info](#) [Manage tags](#) [Update](#) [Delete service](#) [Create](#)

Filter services by value

Filter launch type [Any launch type](#) Filter service type [Any service type](#) < 1 >

Service name	▲	ARN	Status	Service...
--------------	---	-----	--------	------------

No services
No services to display.

[Create](#)

▼ Compute configuration (advanced)

Compute options [Info](#)

To ensure task distribution across your compute types, use appropriate compute options.

Capacity provider strategy

Specify a launch strategy to distribute your tasks across one or more capacity providers.

Launch type

Launch tasks directly without the use of a capacity provider strategy.

Launch type [Info](#)

Select either managed capacity (Fargate), or custom capacity (EC2 or user-managed, External instances). External instances are registered to your cluster using the ECS Anywhere capability.

[FARGATE](#) ▾

Platform version [Info](#)

Specify the platform version on which to run your service.

[LATEST](#) ▾

Deployment configuration

Application type | [Info](#)

Specify what type of application you want to run.

Service

Launch a group of tasks handling a long-running computing work that can be stopped and restarted. For example, a web application.

Task

Launch a standalone task that runs and terminates. For example, a batch job.

Task definition

Select an existing task definition. To create a new task definition, go to [Task definitions](#).

[Specify the revision manually](#)

Manually input the revision instead of choosing from the 100 most recent revisions for the selected task definition family.

Family

Revision

todo-plus-task-definition

1 (LATEST)

Service name

Assign a unique name for this service.

todo-plus-ecs-service

Subnets

Choose the subnets within the VPC that the task scheduler should consider for placement.

[Choose subnets](#)

[Clear current selection](#)

subnet-0da90144bce993455 [X](#)

todolist-app-subnet01
us-east-1a 10.0.10.0/24

subnet-0872444131d8229d1 [X](#)

todolist-app-subnet02
us-east-1b 10.0.11.0/24

Security group | [Info](#)

Choose an existing security group or create a new security group.

Use an existing security group

Create a new security group

Security group name

Choose an existing security group.

[Choose security groups](#)

sg-04fc19a822274f7fe [X](#)

App-Security-Group | App-Security-Group

Public IP | [Info](#)

Choose whether to auto-assign a public IP to the task's elastic network interface (ENI).

Turned off

Load balancer

Select the load balancer you wish to use to distribute incoming traffic across the tasks running in your service.

[todo-list-alb](#)

Health check grace period | [Info](#)

0

seconds

Listener | [Info](#)

Specify the port and protocol that the load balancer will listen for connection requests on.

Create new listener

Listener

Use an existing listener

[80:HTTP](#)

Target group [Info](#)

Specify whether to create a new target group or choose an existing one that the load balancer will use to route requests to the tasks in your service.

Create new target group

Use an existing target group

Target group name

todo-list-ecs-target-group

Protocol

HTTP

Deregistration delay

The amount of time to wait before the state of a deregistering target changes from draining to unused.

300

seconds

Path pattern

/

Max size: 128 characters.

Evaluation order

1

1 - 50000

Health check protocol

HTTP

Scaling policy type [Info](#)

Create either a target tracking or step scaling policy.

Target tracking

Increase or decrease the number of tasks that your service runs based on a target value for a specific metric.

Step scaling

Increase or decrease the number of tasks that your service runs based on a set of scaling adjustments, known as step adjustments, that vary based on the size of the alarm breach.

Policy name

todo-list-autoscale-cpu-70

ECS service metric

ECSServiceAverageCPUUtilization

Target value

70

Services (1) [Info](#)



Manage tags

Update

Delete service

Create

Filter services by value

Filter launch type

Any launch type

Filter service type

Any service type

Service name

todo-plus-ecs-s...

ARN

Status

Service...

Deployments and tasks

Last deploy...

Active

REPLICA

1/1 tasks running

Completed

[EC2](#) > [Target groups](#) > todo-list-ecs-target-group

todo-list-ecs-target-group

Details

arn:aws:elasticloadbalancing:us-east-1:441639934710:targetgroup/todo-list-ecs-target-group/b8c16a5a53933a04

Target type

Protocol : Port

Protocol version

IP

HTTP: 80

HTTP1

IP address type

Load balancer

IPv4

[todo-list-alb](#)

1

Total targets

1

Healthy

0

Unhealthy

0

Unused

0 Anomalous

[Listeners and rules](#)

[Network mapping](#)

[Resource map - new](#)

[Security](#)

[Monitoring](#)

[Integrations](#)

[Attributes](#)

[Tags](#)

Listeners and rules (1/1) [Info](#)

A listener checks for connection requests on its configured protocol and port. Traffic received by the listener is routed according to the associated rules.

Filter listeners



[Manage rules](#) ▾

[Manage listener](#) ▲

[Add listener](#)

[View listener details](#)

al rules.

[Edit listener](#)

1 >

[Add SSL certificates for SNI](#)

[Manage tags](#)

licy

[Delete listener](#)

Forward to target group

Default actions | [Info](#)

The default action is used if no other rules apply. Choose the default action for traffic on this listener.

Routing actions

Forward to target groups

Redirect to URL

Return fixed response

Forward to target group | [Info](#)

Choose a target group and specify routing weight or [Create target group](#).

Target group

todo-list-ecs-target-group

HTTP ▾

Target type: IP, IPv4

Weight Percent

1

100%

0-999

[Add target group](#)

You can add up to 4 more target groups.

[CloudFront](#) > [Distributions](#) > E1771XGV8OAKX5

E1771XGV8OAKX5

[View metrics](#)

[General](#)

[Security](#)

[Origins](#)

[Behaviors](#)

[Error pages](#)

[Invalidations](#)

[Tags](#)

Details

Distribution domain name



d23k9r3helzdr.cloudfront.net

ARN



arn:aws:cloudfront::4416399347
10:distribution/E1771XGV8OAK
X5

Last modified

July 24, 2024 at 8:34:33 PM UTC



Blog Pricing Contact Profile Help Logout

People think focus means saying yes to the thing
you've got to focus on.

It means saying no to the hundred other good ideas
that there are. You have to pick carefully.

--- Steve Jobs ---



My To Do List

Add Task

#	Task Type	Task Description	Date	Status
1	Work	Complete Chapter 9	21/02/2024	Completed
2	Work	Complete Chapter 10	29/02/2024	In-Progress
3	Health	Start Good Gut Diet Program	26/02/2024	Started

Activity history (14)

Filter activity history

Status	Description	Cause
⌚ Successful	Terminating EC2 Instance: i-08694f994c0a0af73	At 2024-03-09T09:34:32Z a user request update of AutoScalingGroup constraints to min: 0, max: 0, desired: 0 changing the desired capacity from 2 to 0. At 2024-03-09T09:34:45Z an instance was taken out of service in response to a difference between desired and actual capacity, shrinking the capacity from 2 to 0. At 2024-03-09T09:34:45Z instance i-09b26461e364f6ca5 was selected for termination. At 2024-03-09T09:34:45Z instance i-08694f994c0a0af73 was selected for termination.
⌚ Successful	Terminating EC2 Instance: i-09b26461e364f6ca5	At 2024-03-09T09:34:32Z a user request update of AutoScalingGroup constraints to min: 0, max: 0, desired: 0 changing the desired capacity from 2 to 0. At 2024-03-09T09:34:45Z an instance was taken out of service in response to a difference between desired and actual capacity, shrinking the capacity from 2 to 0. At 2024-03-09T09:34:45Z instance i-09b26461e364f6ca5 was selected for termination. At 2024-03-09T09:34:45Z instance i-08694f994c0a0af73 was selected for termination.



Deploying a Multi-Tier Application Stack with Amazon ECS, Fargate, and EKS

Summary

This chapter explored the intricacies of orchestrating systems with Amazon ECS and EKS, highlighting the pivotal shift toward containerization in software development for enhanced efficiency, scalability, and reliability. It began with an introduction to containerization, underscoring Docker's significant role in revolutionizing application packaging and deployment. We then explored Amazon Elastic Container Service (ECS) and Amazon Elastic Kubernetes Service (EKS), AWS's premier solutions for container orchestration.

Containerization ensures consistent deployment across diverse environments by encapsulating applications and their dependencies into containers. Docker's emergence as a leading tool has simplified building, sharing, and running containerized applications. However, the complexity and scale of modern applications necessitate advanced orchestration tools, a need met by Amazon ECS and EKS. These services facilitate containerized applications' efficient management and scaling, offering flexibility, scalability, and reliability.

Amazon ECS simplifies container management, enabling the deployment, management, and scaling of Docker containers on a cluster of Amazon EC2 instances or with AWS Fargate, thereby eliminating the overhead of managing a container orchestration platform. Amazon EKS brings the robustness of Kubernetes to the AWS cloud, automating the deployment, scaling, and management of containerized applications. ECS and EKS create a comprehensive ecosystem for managing containerized applications at scale.

This chapter provided you with a thorough understanding of container orchestration within AWS. It covered detailed explanations, hands-on examples, and best practices for leveraging ECS and EKS to orchestrate containerized applications effectively. This knowledge is crucial for deploying microservices architectures, managing batch processing jobs, and scaling applications across multiple environments.

In summary, this chapter has equipped you with the knowledge to navigate the complexities of container orchestration on AWS. It focused on the technical aspects of managing containers and the broader implications for innovation, efficiency, and resilience in modern application development and deployment.

Chapter Review Questions

The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

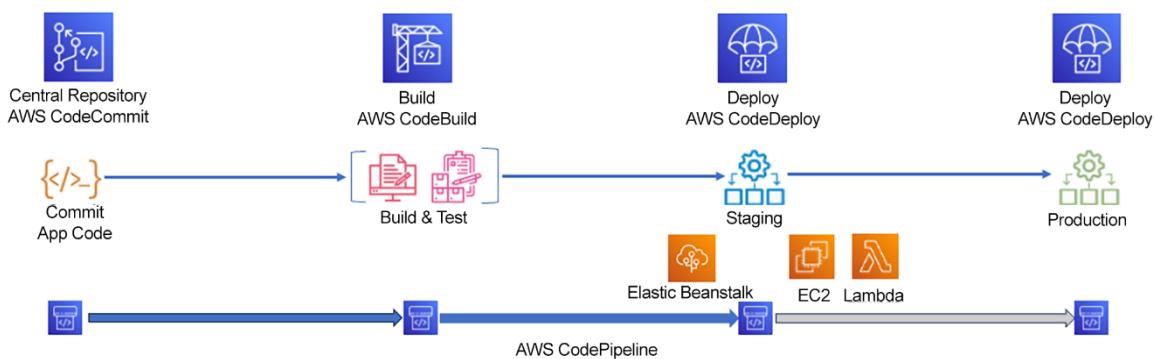
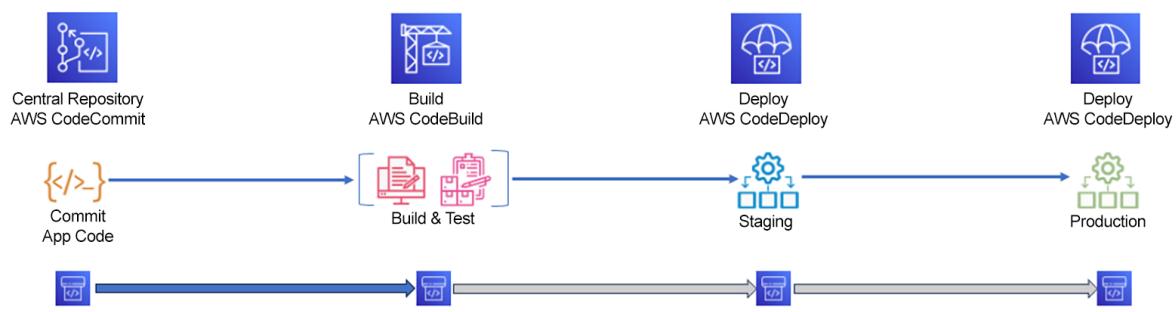
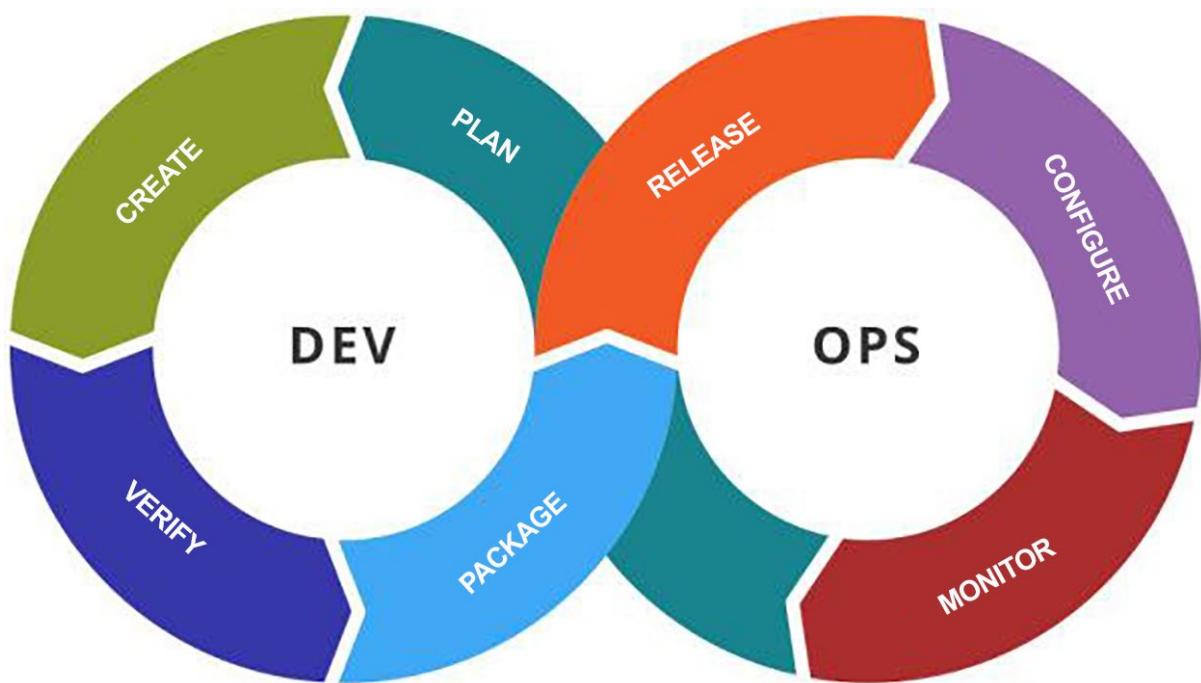
Select Quiz

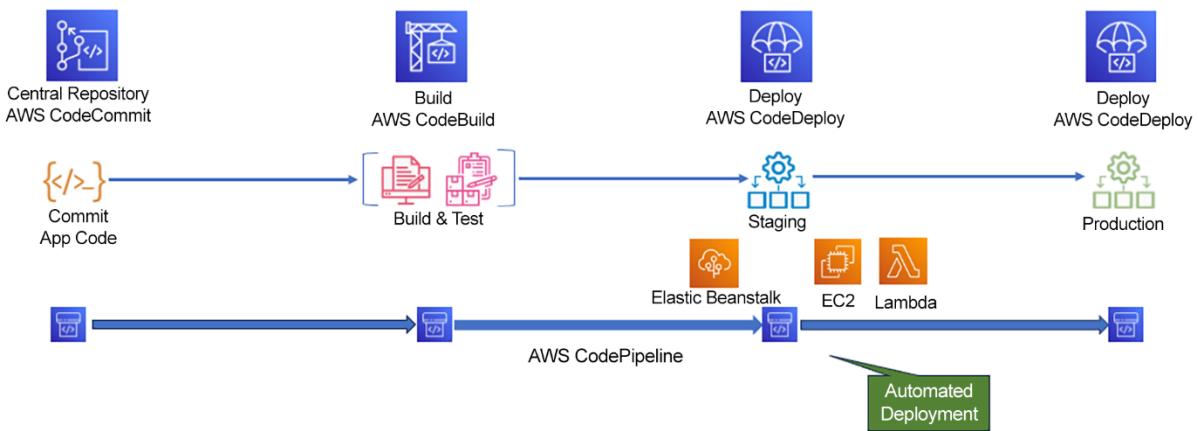
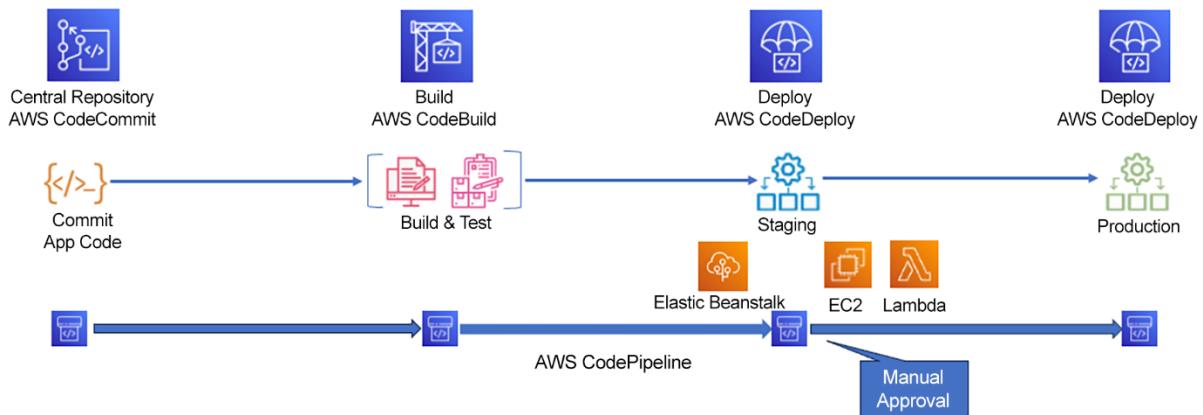
Quiz 1

[SHOW QUIZ DETAILS](#) ▾

START

Chapter 12: Getting to Grips with DevOps Using AWS CI/CD Tools





```

1  version: 0.2
2
3  phases:
4    build:
5      commands:
6        - npm i && npm run build
7        # Please change the s3 bucket URI
8        - aws s3 cp --recursive dist/ s3://todo-plus-frontend/
9        # Please change the distribution id
10       - aws cloudfront create-invalidation --distribution-id E2A4WHGXZQDJJ8 --paths "/*"

```

Developer Tools X

CodeBuild

- ▶ Source • CodeCommit
- ▶ Artifacts • CodeArtifact
- ▼ Build • CodeBuild
 - Getting started
 - Build projects
 - Build project**
 - Settings
 - Build history
 - Report groups
 - Report history
 - Compute fleets New
- Account metrics

web-app

Actions ▾ **Create trigger** **Edit** **Clone** **Debug build**

Start build with overrides **Start build**

Configuration			
Source provider Amazon S3	Primary repository todoapprepo/todo-plus-nodejs.zip	Artifacts upload location -	Service role arn:aws:iam::441639934710:role/service-role/codebuild-web-app-service-role
Public builds Disabled			

Build history **Batch history** **Project details** **Build triggers** **Metrics**

Deployment settings

Traffic rerouting

Choose whether traffic reroutes to the replacement environment immediately or waits for you to start the rerouting process

- Reroute traffic immediately**
- Specify when to reroute traffic**

Deployment configuration

Choose from a list of default and customised deployment configurations. A deployment configuration is a set of rules that determines how fast an application is deployed and the success or failure conditions for a deployment.

CodeDeployDefault.ECSAllAtOnce	▲	or	Create deployment configuration
CodeDeployDefault.ECSAllAtOnce	✓	Termination has started, you cannot roll back manually	
CodeDeployDefault.ECSTimeBasedRollingDeployment	▼	Minutes	0
CodeDeployDefault.ECSLinear10PercentEvery1Minutes	▼		▼
CodeDeployDefault.ECSLinear10PercentEvery3Minutes	▼		▼
CodeDeployDefault.ECSCanary10Percent5Minutes	▼		▼
CodeDeployDefault.ECSCanary10Percent15Minutes	▼		▼

```
1  version: 0.0
2  os: operating-system-name
3  files:           I
4  |  source-destination-files-mappings
5  permissions:
6  |  permissions-specifications
7  hooks:
8  |  deployment-lifecycle-event-mappings
```

```
1  resources:
2  |  - name-of-function-to-deploy:
3  |  |  type: "AWS::Lambda::Function"
4  |  |  properties:
5  |  |  |  name: name-of-lambda-function-to-deploy
6  |  |  |  alias: alias-of-lambda-function-to-deploy
7  |  |  |  currentversion: version-of-the-lambda-function-traffic-currently-points-to
8  |  |  |  targetversion: version-of-the-lambda-function-to-shift-traffic-to
```

```
1  Resources:
2  |  - TargetService:
3  |  |  Type: AWS::ECS::Service
4  |  |  Properties:
5  |  |  |  TaskDefinition: "task-definition-arn"
6  |  |  |  LoadBalancerInfo:
7  |  |  |  |  ContainerName: "ecs-container-name"
8  |  |  |  |  ContainerPort: "ecs-application-port"
```



```

1 version: 0.0
2 os: linux
3 files:
4   - source: Config/config.txt
5     destination: /webapps/Config
6   - source: source
7     destination: /webapps/myApp
8 hooks:
9   BeforeInstall:
10    - location: Scripts/UnzipResourceBundle.sh
11    - location: Scripts/UnzipDataBundle.sh
12   AfterInstall:
13    - location: Scripts/RunResourceTests.sh
14      timeout: 180
15   ApplicationStart:
16    - location: Scripts/RunFunctionalTests.sh
17      timeout: 3600
18   ValidateService:
19    - location: Scripts/MonitorService.sh
20      timeout: 3600
21      runas: codedeployuser

```

Sample appsec.yml

⌚ **Source** Succeeded
Pipeline execution ID: [bcf91be3-f24a-4347-89ba-9d1126807142](#)

Source
[AWS CodeCommit](#)

⌚ **Succeeded** - 3 months ago
[144d7df2](#)

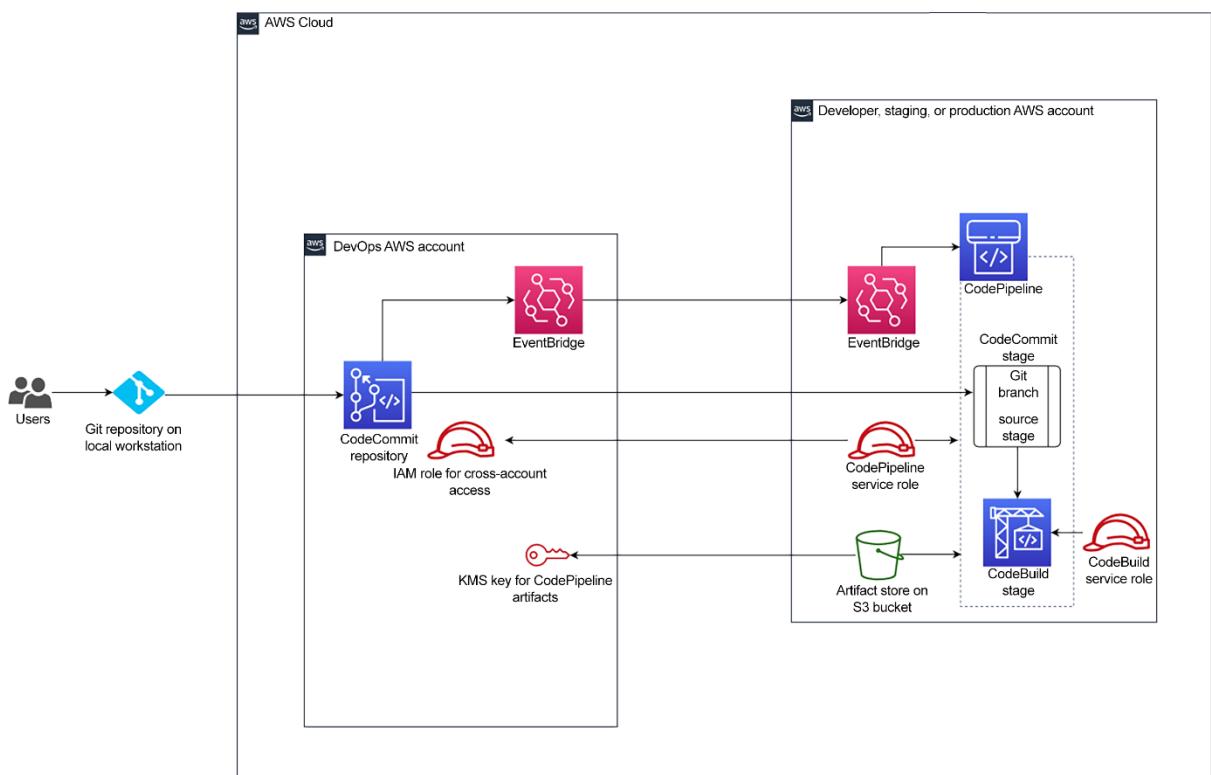
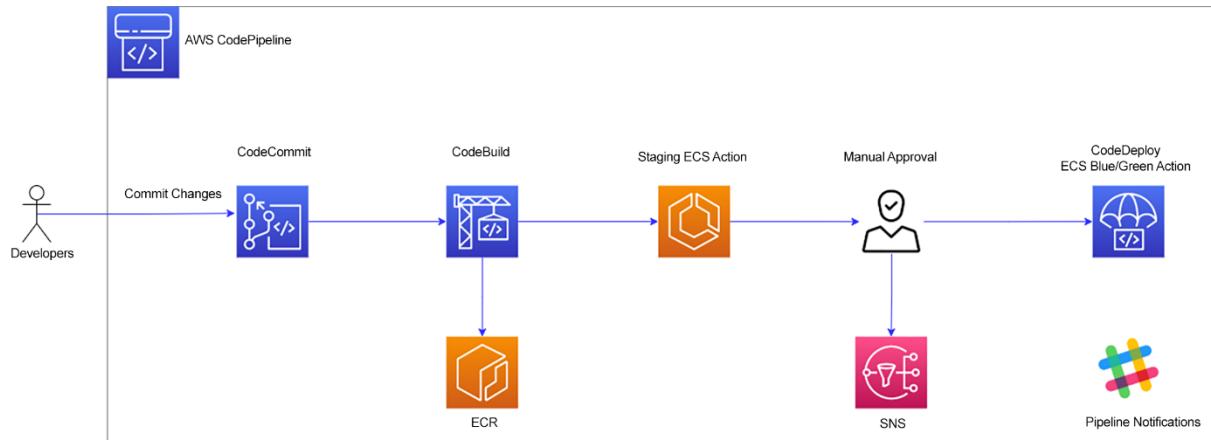
[View details](#)

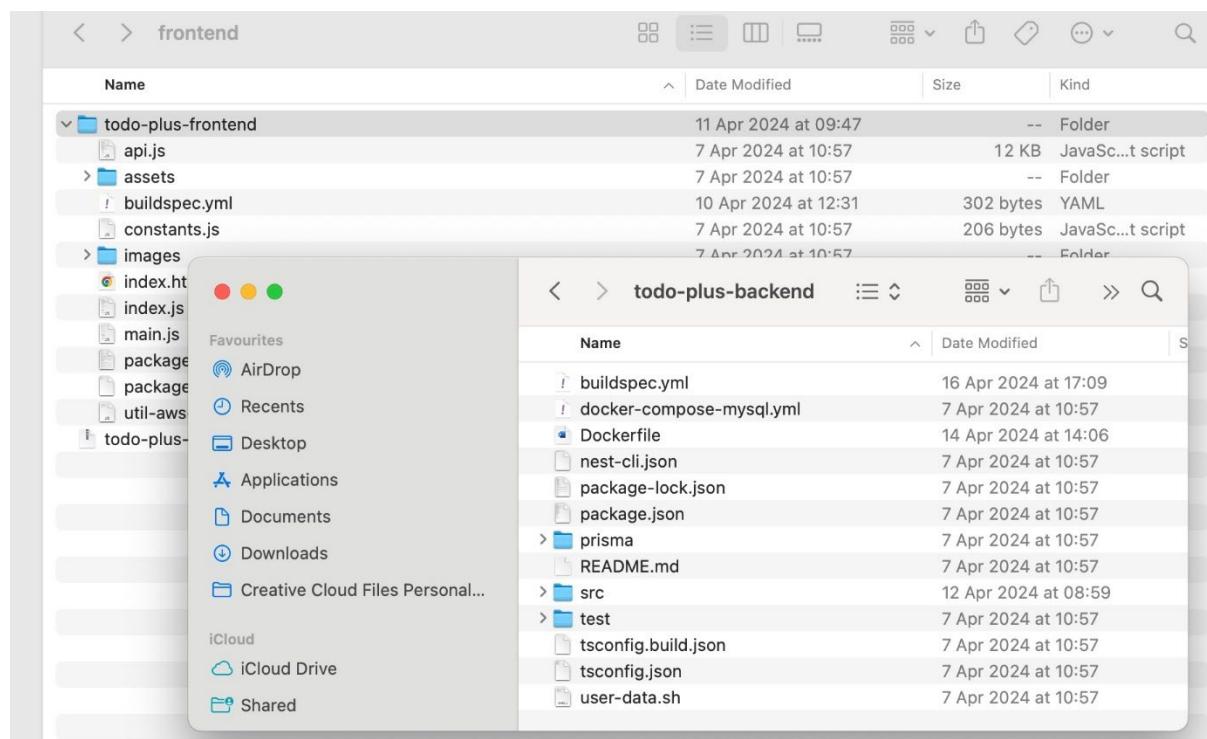
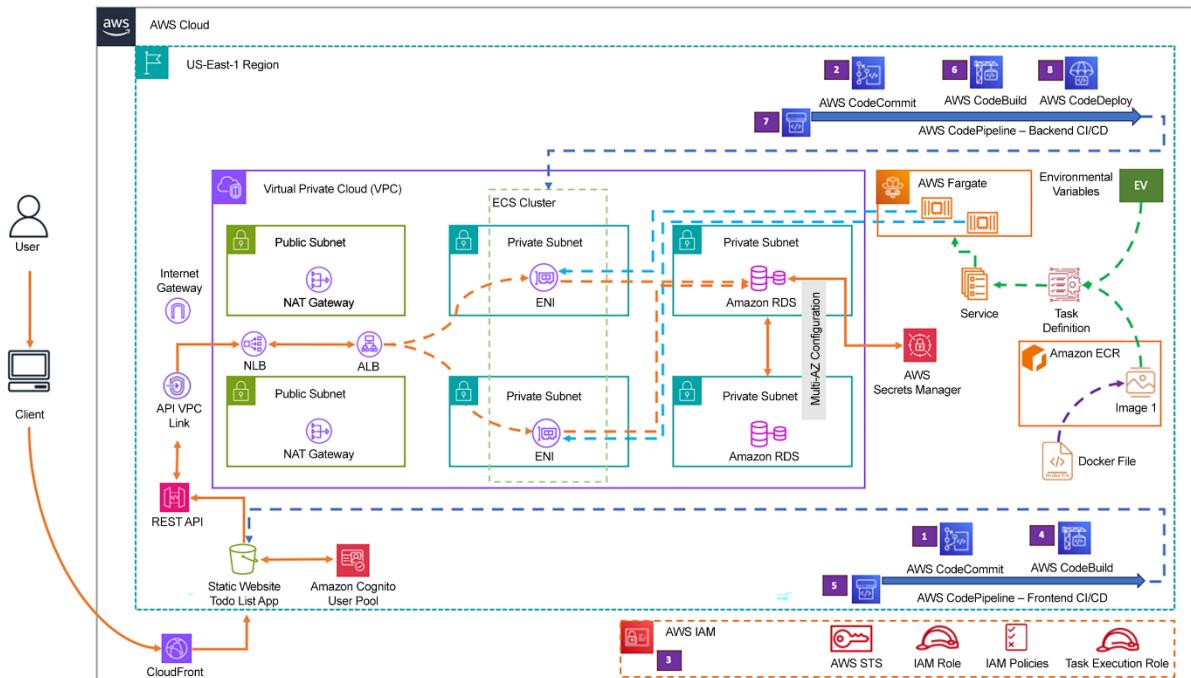
[144d7df2](#) Source: updated docker file and buildspec

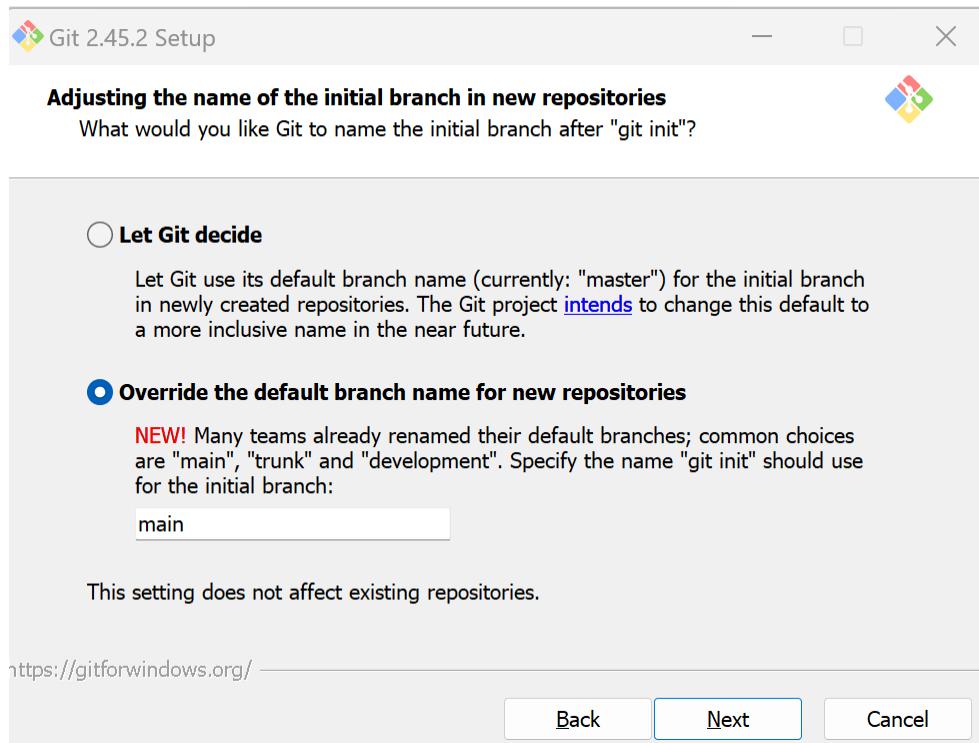
[Disable transition](#)

⌚ **Build** ⓘ Succeeded
Pipeline execution ID: [bcf91be3-f24a-4347-89ba-9d1126807142](#)

[Start rollback](#)







```
iaasacademycreator@IaaS-MacBook-Air ~ % git --version
git version 2.39.0
iaasacademycreator@IaaS-MacBook-Air ~ %
```

Step 3: Edit Local SSH Configuration

Edit your SSH configuration file named config in your local `~/.ssh` directory. Add the following lines to the file, where the value for User is the SSH Key ID you copied in Step 2.

```
Host git-codecommit.*.amazonaws.com
User Your-IAM-SSH-Key-ID-Here
IdentityFile ~/.ssh/Your-Private-Key-File-Name-Here
```

Once you have saved the file, make sure it has the right permissions by running the following command in the `~/.ssh` directory.

```
chmod 600 config
```

Step 4: Clone the repository

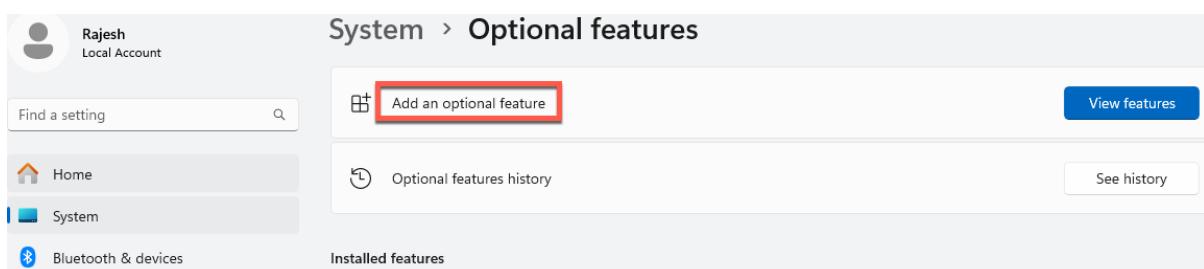
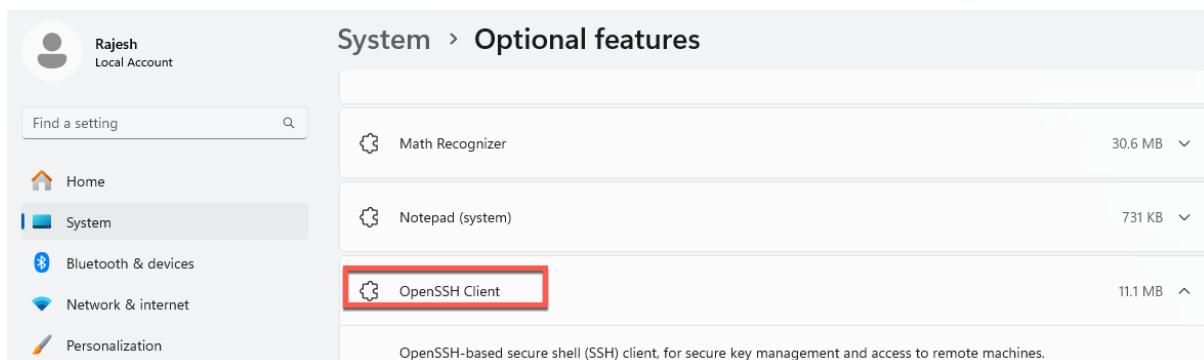
Clone your repository to your local computer and start working on code. Run the following command:

```
git clone ssh://git-codecommit.eu-west-2.amazonaws.com/v1/repos/todolist-f
```

[Copy](#)

Additional details

You can find more detailed instructions in the documentation. [View documentation](#)



```
Command Prompt + v

Microsoft Windows [Version 10.0.22631.3296]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Rajesh\ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (C:\Users\Rajesh/.ssh/id_rsa):
Created directory 'C:\\\\Users\\\\Rajesh/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in C:\Users\Rajesh/.ssh/id_rsa
Your public key has been saved in C:\Users\Rajesh/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:DgZruNGrlhUIH5YdCJmWI6sR3rnffI1/ppabBxxW7qU rajesh@Development
The key's randomart image is:
+---[RSA 3072]---+
|..+... |
|*= . . |
```

```
.ssh -- zsh - 75x14

iaasacademycreator@IaaSs-MacBook-Air ~ % cd ~/.ssh
iaasacademycreator@IaaSs-MacBook-Air .ssh %
```

```
iaasacademycreator@IaaSs-MacBook-Air .ssh % ssh-keygen
Generating public/private ed25519 key pair.
Enter file in which to save the key (/Users/iaasacademycreator/.ssh
/id_ed25519): id_rsa1
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in id_rsa1
Your public key has been saved in id_rsa1.pub
The key fingerprint is:
SHA256:N1E29C5IYN7Qt19pLw5SXxiTsMZETAJoAVp0v3XwPuU iaasacademycreat
or@IaaSs-MacBook-Air.local
The key's randomart image is:
+---[ED25519 256]---+
| ..*+.oB+=. . |
| o +o=.o.O..+ |
```

```
iaasacademycreator@IaaSs-MacBook-Air .ssh % ls
config          id_ed25519.pub  id_rsa1           known_hosts.old
id-rsa.save      id_rsa        id_rsa1.pub
id_ed25519      id_rsa.pub    known_hosts
iaasacademycreator@IaaSs-MacBook-Air .ssh % cat id_rsa.pub
|ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQDuAjTPRV0m+jDYFOHUpalTGxQRMSK7ileBRgaMgyegva{Kw1eHJyfTWeEnNEcHTG13Fq2S489245MXMrDQTe+vVfMhVUJNCwkR9TGHdGXBgGKt4bMl2KEaC5mcw30VHdB/fPbZII06ni+wn+2cyr+7lb+wBoEGPEaeGUJCu6UCuI1Ur7ZCCIsQNDqBPDIB870gbQWqz1/8o7vUsjDVM;TpHAwSwthQRfrBe/xrNSAJw7dV7f3Q2HkBm2NDFGJxT+0sdmy7rhfdFrEqVFu0Cw8Yp0/v77stG7vjv9+K1:
```

AWS IAM credentials AWS CodeCommit credentials Amazon Keyspaces credentials

SSH public keys for AWS CodeCommit (1) Actions ▾ **Upload SSH public key**

User SSH public keys to authenticate access to AWS CodeCommit repositories. You can have a maximum of five SSH public keys (active or inactive) at a time. [Learn more](#)

SSH Key ID	Uploaded	Status
id_rsa	2023-07-10 10:00:00	Active

AWS IAM credentials AWS CodeCommit credentials Amazon Keyspaces credentials

SSH public keys for AWS CodeCommit (0) Actions ▾ **Upload SSH public key**

User SSH public keys to authenticate access to AWS CodeCommit repositories. You can have a maximum of five SSH public keys (active or inactive) at a time. [Learn more](#)

SSH Key ID	Uploaded	Status
	No SSH public keys	

Upload SSH public key

Upload SSH public key

X

Paste the contents of the SSH public key into the following field.

```
ssh-rsa
AAAAB3NzaC1yc2EAAAQABAAQgQDuAjTPRV0m+jDYFOHUpIaITGxQRMSK7ileB
RgaMgyegva8Kw1eHJyfTWeEnNEcHTG13Fq2S489245MXMrDQTe+vVfMhVUJNCwkR
9TGHdGXBgGKt4bMI2KEaC5mcw30VHdnB/fPbZII06ni+wn+2cyr+7lb+WBoEGPEaeG
UJCu6UCul1Ur7ZCCIsQNDqBPDI870gbQWqzl/8o7vUsjDVMzTpHAvgSwthQRfrBe/xrN
SAJw7dV7f3Q2HkBm2NDFGJxT+0sdmy7rhfdFrEqVFuOCw8YpO/v77stG7vjjv9+Kl2y2e
NZAQX7tyPKAloe68UoDUbj2vF2lT4lK9ZegCkp5oa+6CyyRlO1njWTJvk16C3+HMeFM
HPsZK58spv6rj30mobqGUNNbpIGbD13EmJ5ydM4JgNNTj6O8qr2UsZEn8OcPvyNjh
QofKXgqxQqiZLWSa31SBYZSEquBcbiCy3/dKsXhhEPEl9M98i0YWDwuukeJn1xgUbAA
9kB5
```

Cancel

Upload SSH public key

AWS IAM credentials

AWS CodeCommit credentials

Amazon Keyspaces credentials

SSH public keys for AWS CodeCommit (1)

User SSH public keys to authenticate access to AWS CodeCommit repositories. You can have a maximum of five SSH public keys (active or inactive) at a time. [Learn more](#)

SSH Key ID	Uploaded
<input checked="" type="radio"/> APKAWNU6KTL3LGP5QZWN	Now

```
iaasacadem [REDACTED] .ssh % ssh -i git-codecommit.us-east-1.amazonaws.com
The authenticity of host 'git-codecommit.us-east-1.amazonaws.com (52.94.226.180)' can't be established.
RSA key fingerprint is SHA256:eLMY1j0DKA4uvDZcl/KgtIayZANwX6t8+8isPtotBoY.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'git-codecommit.us-east-1.amazonaws.com' (RSA) to the list of known hosts.
Enter passphrase for key '/Users/iaasacademycreator/.ssh/id_rsa':
You have successfully authenticated over SSH. You can use Git to interact with AWS CodeCommit. Interactive shells
are supported. Connection to git-codecommit.us-east-1.amazonaws.com closed by remote host.
iaasacadem [REDACTED] .ssh %
```

```

todo-plus-frontend -- zsh -- 84x20
iaasacademycreator@IaaSs-MacBook-Air codecommit % ls
backend      frontend
iaasacademycreator@IaaSs-MacBook-Air codecommit % cd frontend
iaasacademycreator@IaaSs-MacBook-Air frontend % ls
todo-plus-frontend todo-plus-frontend.zip
iaasacademycreator@IaaSs-MacBook-Air frontend % cd todo-plus-frontend
iaasacademycreator@IaaSs-MacBook-Air todo-plus-frontend % ls
api.js          images          package-lock.json
assets          index.html     package.json
buildspec.yml   index.js       util-aws-sdk.js
constants.js    main.js
iaasacademycreator@IaaSs-MacBook-Air todo-plus-frontend %

```

Users > iaasacademycreator > Desktop > codecommit > frontend > todo-plus-frontend > [index.html](#) > [body](#)

```

313  <body>
899    <!-- Vendor JS Files -->
900
901
902    <!-- Template Main JS File -->
903    <script src="main.js"></script>
904
905    <script>
906      window.cognitoClientId = ""2ip6ded8t1buteqdtu8isf7120" // Put your client id here
907      window.BASE_URL = ""/development"; // Put your base path here (if different)
908    </script>
909
910    <script type="module" src="index.js"></script>
911
912  </body>
913
914  </html>

```

[CloudFront](#) > [Distributions](#) > E1771XGV8OAKX5

E1771XGV8OAKX5

General | Security | Origins | **Behaviors** | Error pages | Invalidations | Tags



Behaviors

[Save](#)

[Filter behaviors by property or value](#)

Preced...	Path pattern	Origin or origin group	Viewer protocol policy
0	/development/*	nuowwpf0x4.execute...	Redirect HTTP to HTTPS
1	Default (*)	mytodolistapp.s3-web...	HTTP and HTTPS

Repositories [Info](#)

	Name	Description	Last modified	Clone URL
<input type="radio"/>	todolist-backend	Todo List Backend Application Repository	3 hours ago	HTTPS SSH HTTPS (GRC)
<input type="radio"/>	todolist-frontend	Todo List Application Frontend Repository	23 hours ago	HTTPS SSH HTTPS (GRC)

```
[iaasacademycreator@IaaSs-MacBook-Air todo-plus-frontend % git push -u origin main
Enter passphrase for key '/Users/iaasacademycreator/.ssh/id_rsa':
Enumerating objects: 30, done.
Counting objects: 100% (30/30), done.
Delta compression using up to 8 threads
Compressing objects: 100% (29/29), done.
Writing objects: 100% (30/30), 3.11 MiB | 1.54 MiB/s, done.
Total 30 (delta 0), reused 0 (delta 0), pack-reused 0
remote: Validating objects: 100%
To ssh://git-codecommit.us-east-1.amazonaws.com/v1/repos/todolist-frontend
 * [new branch]      main -> main
branch 'main' set up to track 'origin/main'.
```

[aws](#) | [Services](#) | [Search](#) [Option+S]

Developer Tools X

CodeCommit

- ▼ Source • CodeCommit
 - Getting started
 - Repositories
 - Code**
 - Pull requests
 - Commits
 - Branches
 - Git tags
 - Settings
- Approval rule templates
- Artifacts • CodeArtifact

[Developer Tools](#) > [CodeCommit](#) > [Repositories](#) > [todolist-frontend](#)

todolist-frontend

todolist-frontend [Info](#)

	Name
<input type="checkbox"/>	assets
<input type="checkbox"/>	images
<input type="checkbox"/>	.gitignore
<input type="checkbox"/>	api.js
<input type="checkbox"/>	buildspec.yml

Containers Info				
Container name	Image	Private re...	Essential	CPU
todo-list-app	441639934710.dkr.ecr.us-east-1.amazonaws.com/todo-list-app:0.2	-	Yes	0

```

1  version: 0.2
2
3  phases:
4    build:
5      commands:
6        - docker build -t $REPOSITORY_URI:$CODEBUILD_RESOLVED_SOURCE_VERSION
7        - aws ecr get-login-password --region us-east-1 | docker login --use-aws-credentials
8        - docker push $REPOSITORY_URI:$CODEBUILD_RESOLVED_SOURCE_VERSION
9        - printf '[{"name":"'CONTAINER NAME","imageUri":"%s"}]' $REPOSITORY_URI
10 artifacts:
11   files: taskdef.json
12

```

```

iaasacademycreator@IaaSs-MacBook-Air todo-plus-backend % git push -u origin main
Enter passphrase for key '/Users/iaasacademycreator/.ssh/id_rsa':
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 8 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 286 bytes | 286.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Validating objects: 100%
To ssh://git-codecommit.us-east-1.amazonaws.com/v1/repos/todolist-backend
  144d7df..7482fa3  main -> main
branch 'main' set up to track 'origin/main'.
iaasacademycreator@IaaSs-MacBook-Air todo-plus-backend %

```

```

1  version: 0.2
2
3  phases:
4    build:
5      commands:
6        - npm i && npm run build
7        # Please change the s3 bucket URI
8        - aws s3 cp --recursive dist/ s3://mytodolistapp/
9        # Please change the distribution id
10       - aws cloudfront create-invalidation --distribution-id E1771XGV80AKX5 --paths "/*"

```

E1771XGV8OAKX5

[View metrics](#)

General Security Origins Behaviors Error pages Invalidations Tags

Details

```
|iaasacademycreator@IaaSs-MacBook-Air todo-plus-frontend % ls
api.js           images          package-lock.json
assets           index.html      package.json
buildspec.yml    index.js       util-aws-sdk.js
constants.js     main.js
|iaasacademycreator@IaaSs-MacBook-Air todo-plus-frontend % git add .
|iaasacademycreator@IaaSs-MacBook-Air todo-plus-frontend % git commit -m "buildspec file updated"
[main 00387d3] buildspec file updated
 1 file changed, 2 insertions(+), 2 deletions(-)
|iaasacademycreator@IaaSs-MacBook-Air todo-plus-frontend % git push
Enter passphrase for key '/Users/iaasacademycreator/.ssh/id_rsa':
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 8 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 350 bytes | 350.00 KiB/s, done.
Total 3 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Validating objects: 100%
To ssh://git-codecommit.us-east-1.amazonaws.com/v1/repos/todolist-frontend
 dbdac8..00387d3  main -> main
iaasacademycreator@IaaSs-MacBook-Air todo-plus-frontend %
```

⌚ Project created

You have successfully created the following project: todolist-frontend-build

todolist-frontend-build

[Actions ▾](#) [Create trigger](#) [Edit](#) [Debug build](#)

Configuration

Source provider
AWS CodeCommit

Primary repository
[todolist-frontend](#)

Artifacts upload location
-

Policy name	Type	Attached entities
CodeBuildBasePolicy-todolist-frontend-build-us-east-1	Customer managed	1
todolist-frontend-policy-s3-and-cloudfront	Customer inline	0

todolist-frontend-policy-s3-and-cloudfront

```

1  {
2    "Version": "2012-10-17",
3    "Statement": [
4      {
5        "Sid": "VisualEditor0",
6        "Effect": "Allow",
7        "Action": [
8          "s3:PutObject",
9          "s3:GetObject",
10         "cloudfront:CreateInvalidation"
11       ],
12       "Resource": [
13         "arn:aws:cloudfront::441639934710:distribution/E1771XGV80AKXS",
14         "arn:aws:s3:::mytodolistapp/*"
15       ]
16     }
17   ]
18 }
```

Branch name

Choose a branch of the repository.



Change detection options

Choose a detection mode to automatically start your pipeline when a change occurs in the source code.

Amazon CloudWatch Events (recommended)

Use Amazon CloudWatch Events to automatically start my pipeline when a change occurs

AWS CodePipeline

Use AWS CodePipeline to check periodically for changes

Output artifact format

Choose the output artifact format.

CodePipeline default

AWS CodePipeline uses the default zip format for artifacts in the pipeline. Does not include Git metadata about the repository.

Full clone

AWS CodePipeline passes metadata about the repository that allows subsequent actions to do a full Git clone. Only supported for AWS CodeBuild actions.

[Cancel](#)

[Previous](#)

[Next](#)

Developer Tools > CodePipeline > Pipelines > todolist-frontend-pipeline

todolist-frontend-pipeline

Pipeline type: V2 Execution mode: QUEUED

Source Succeeded
Pipeline execution ID: 04fd2c0d-3c45-458b-bdfc-19da82276f6a

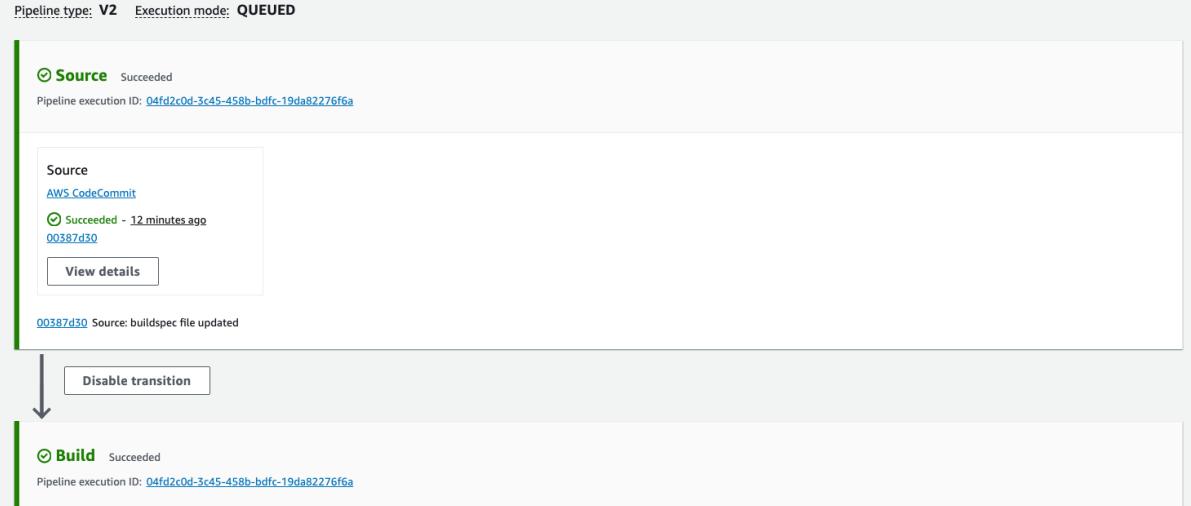
Source
AWS CodeCommit
Succeeded - 12 minutes ago
00387d30

View details

00387d30 Source: buildspec file updated

Disable transition

Build Succeeded
Pipeline execution ID: 04fd2c0d-3c45-458b-bdfc-19da82276f6a



Amazon S3 > Buckets > mytodolistapp

mytodolistapp

Info Publicly accessible

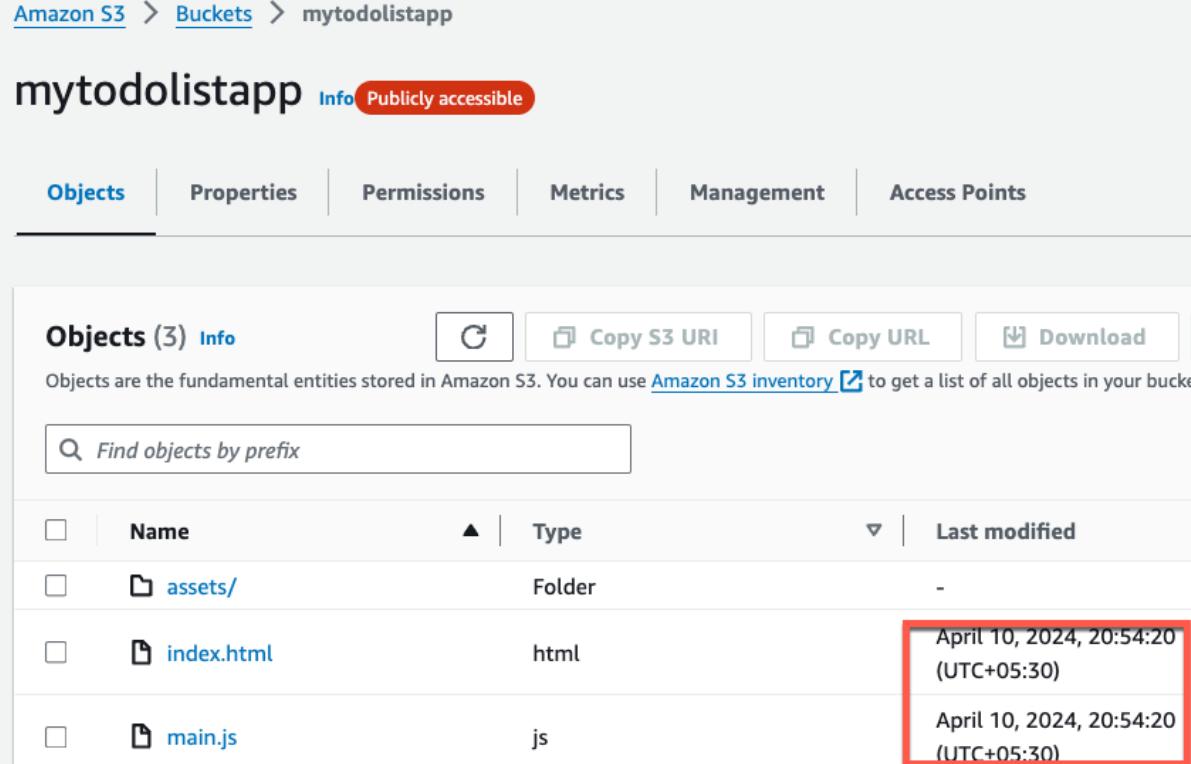
Objects Properties Permissions Metrics Management Access Points

Objects (3) Info

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket.

Find objects by prefix

<input type="checkbox"/>	Name	Type	Last modified
<input type="checkbox"/>	assets/	Folder	-
<input type="checkbox"/>	index.html	html	April 10, 2024, 20:54:20 (UTC+05:30)
<input type="checkbox"/>	main.js	js	April 10, 2024, 20:54:20 (UTC+05:30)



Private repositories



Upgraded basic scanning

Switch to the improved version of basic scanning, powered by AWS native scanning technology. [Find out more](#)

Repositories (1)



[View push](#)

Filter status

Repository name	URI	Created at
todo-plus	441639934710.dkr.ecr.us-east-1.amazonaws.com/todo-plus	07 March 2024, 16:00:33 (UTC+05.5)

Environment variables

Name	Value	Type	Remove
REPOSITORY_URI	441639934710.dkr.ecr.u:	Plaintext	▼

[Add environment variable](#)

[Create parameter](#)

todolist-backend-build

Actions ▾

Create trigger

Edit

Debug build

Start build with overrides

Start build

Configuration

Source provider
AWS CodeCommit

Primary repository
todolist-backend

Artifacts upload location

Service role
arn:aws:iam::441639934710:role/service-role/codebuild-todolist-backend-build-service-role

Public builds
Disabled

todo-plus

Images (3)

Search artefacts

<input type="checkbox"/>	Image tag	Artifact type	Pushed at
<input type="checkbox"/>	c66a480ae4ba739bb8414ee71431227c988ea10e	Image	12 April 2024, 13:01:03 (UTC+05.5)
<input type="checkbox"/>	v2	Image	27 March 2024, 12:32:35 (UTC+05.5)
<input type="checkbox"/>	latest	Image	07 March 2024, 19:49:37 (UTC+05.5)

Add build stage Info

Step 3 of 5

Build - optional

Build provider

This is the tool of your build project. Provide build artifact details like operating system, build spec file, and output file names.

AWS CodeBuild

Region

US East (N. Virginia)

Project name

Choose a build project that you have already created in the AWS CodeBuild console. Or create a build project in the AWS CodeBuild console and then return to this task.

todolist-backend-build

X

or

Create project 

✔ Build Succeeded

Pipeline execution ID: [77702e3c-616b-443f-b249-e3630c625f23](#)

Build

[AWS CodeBuild](#)

✔ Succeeded - 1 hour ago

[View details](#)

[e99d5fd0](#) [REDACTED]

[Disable transition](#)

✔ Deploy Succeeded

Pipeline execution ID: [77702e3c-616b-443f-b249-e3630c625f23](#)

Deploy

[Amazon ECS](#) [REDACTED]

✔ Succeeded - 1 hour ago

[View details](#)

[e99d5fd0](#) [REDACTED]



Blog Pricing Contact Profile Help

Logout

It means saying no to the hundred other good ideas

that there are. You have to pick carefully.

--- Steve Jobs ---



My To Do List

Add Task

Task Type		Status	SEARCH	REFRESH	
#	Task Type	Task Description	Date	Status	Action
1	Work	Complete Chapter 12	17/03/2024	Completed	
2	Work	Complete Chapter 13	31/03/2024	In-Progress	
3	Work	Complete Chapter 14	13/04/2024	In-Progress	
4	Work	Module 3	19/04/2024	Completed	
5	Finance	Invest in Mutual Funds	21/04/2024	In-Progress	

kp Practice Resources



SHARE FEEDBACK

DASHBOARD > CHAPTER 12

Getting to Grips with DevOps Using AWS CI/CD Tools

Summary

This chapter was dedicated to helping organizations implement a DevOps approach to software development and deployment with the help of AWS CI/CD tools. The chapter emphasized the importance of DevOps, a philosophy that promotes collaboration and communication between developers and operations teams to expedite the delivery of high-quality software. It also introduced various AWS CI/CD tools, such as AWS CodeBuild, AWS CodeDeploy, and AWS CodePipeline. It demonstrated how these tools can be used to automate the software application's build, test, and deployment.

Moreover, the chapter provided best practices for utilizing AWS CI/CD tools, including controlling access to resources with AWS IAM policies and regulating access to resources within each account with AWS resource-level permissions. The chapter concluded by emphasizing the significance of continuous improvement and the need to monitor and enhance the pipeline as the project evolves continually.

Chapter Review Questions

The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

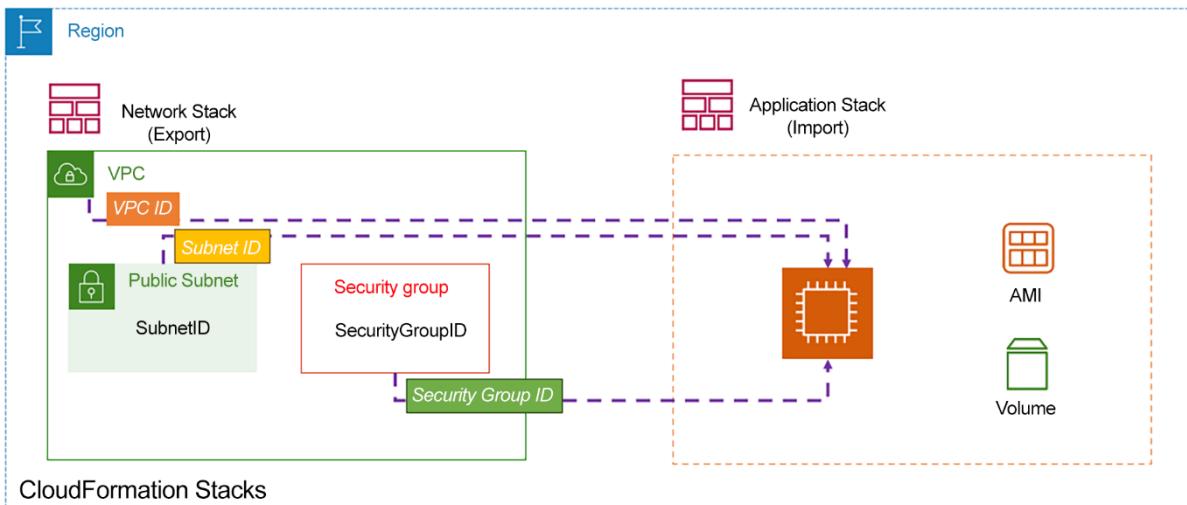
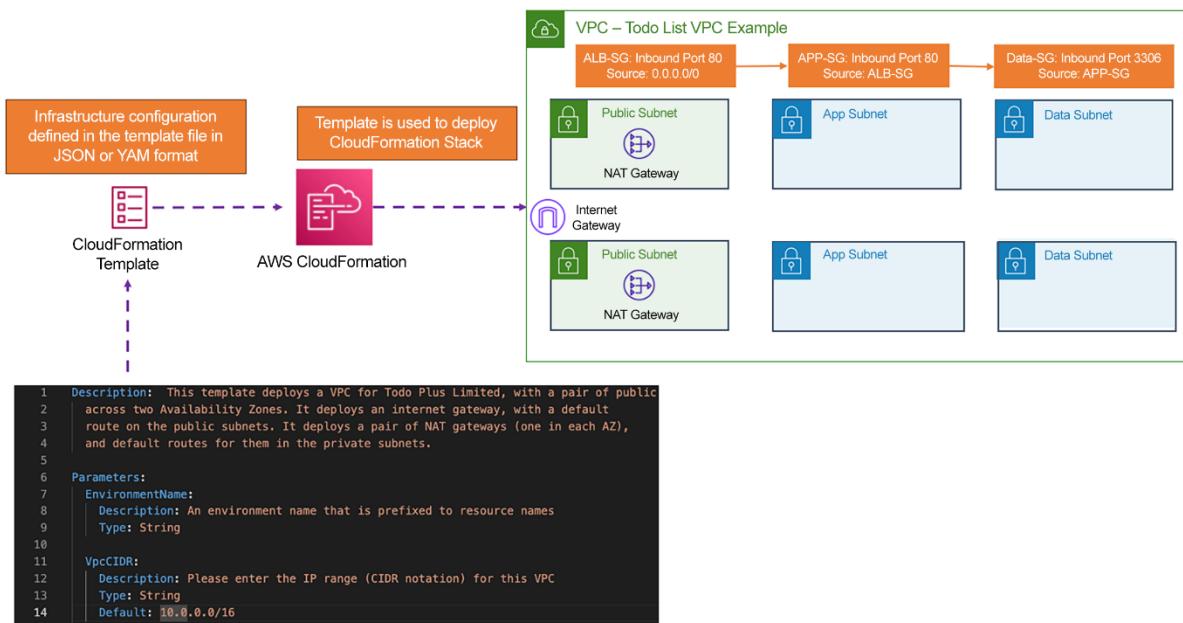
Select Quiz

Quiz 1

SHOW QUIZ DETAILS

START

Chapter 13: Building Infrastructure Using Code with CloudFormation and the Cloud Development Kit (CDK)s



Capabilities

i The following resource(s) require capabilities: [AWS::IAM::ManagedPolicy]

This template contains Identity and Access Management (IAM) resources. Check that you want to create each of these resources and that they have the minimum required permissions. In addition, they have customised names. Check that the customised names are unique within your AWS account. [Learn more](#)

I acknowledge that AWS CloudFormation might create IAM resources with customised names.

Events (5)
[Detect root cause](#)

 Search events


Timestamp	Logical ID	Status	Detailed status	Status reason
2024-05-03 09:21:44 UTC+0530	EC2Instance	CREATE_COMPLETE	-	-
2024-05-03 09:21:43 UTC+0530	MyInstances	CREATE_COMPLETE	-	-
2024-05-03 09:21:12 UTC+0530	MyInstances	CREATE_IN_PROGRESS	-	Resource creation Initiated
2024-05-03 09:21:09 UTC+0530	MyInstances	CREATE_IN_PROGRESS	-	-
2024-05-03 09:21:07 UTC+0530	EC2Instance	CREATE_IN_PROGRESS	-	User Initiated

Changes (1)


Preview how proposed changes to a stack will impact running resources. Click on "View details" to preview the impact on property values for a resource.

 Search changes


1



Action	Logical ID	Resource type	Replacement	Property-level changes	Policy action
Modify	MyInstances	AWS::EC2::Instance	True	View details	ReplaceAndDelete

Events (13)
[Detect root cause](#)

 Search events


Timestamp	Logical ID	Status	Detailed status	Status reason	
2024-05-03 10:22:13 UTC+0530	EC2Instance	UPDATE_COMPLETE	-	-	
2024-05-03 10:22:13 UTC+0530	MyInstances	DELETE_COMPLETE	-	-	
2024-05-03 10:21:39 UTC+0530	MyInstances	DELETE_IN_PROGRESS	-	-	
2024-05-03 10:21:38 UTC+0530	EC2Instance	UPDATE_COMPLETELEANUP_IN_PROGRESS	-	-	
2024-05-03 10:21:37 UTC+0530	MyInstances	UPDATE_COMPLETE	-	-	
2024-05-03 10:21:05 UTC+0530	MyInstances	UPDATE_IN_PROGRESS	-	Resource creation Initiated	
2024-05-03 10:21:03 UTC+0530	MyInstances	UPDATE_IN_PROGRESS	-	Requested update requires the creation of a new physical resource; hence creating one.	

Stack failure options

Behaviour on provisioning failure

Specify the roll-back behaviour for a stack failure. [Learn more](#)

Roll back all stack resources

Roll back the stack to the last known stable state.

Preserve successfully provisioned resources

Preserves the state of successfully provisioned resources, while rolling back failed resources to the last known stable state. Resources without a last known stable state will be deleted upon the next stack operation.

Delete newly created resources during a rollback

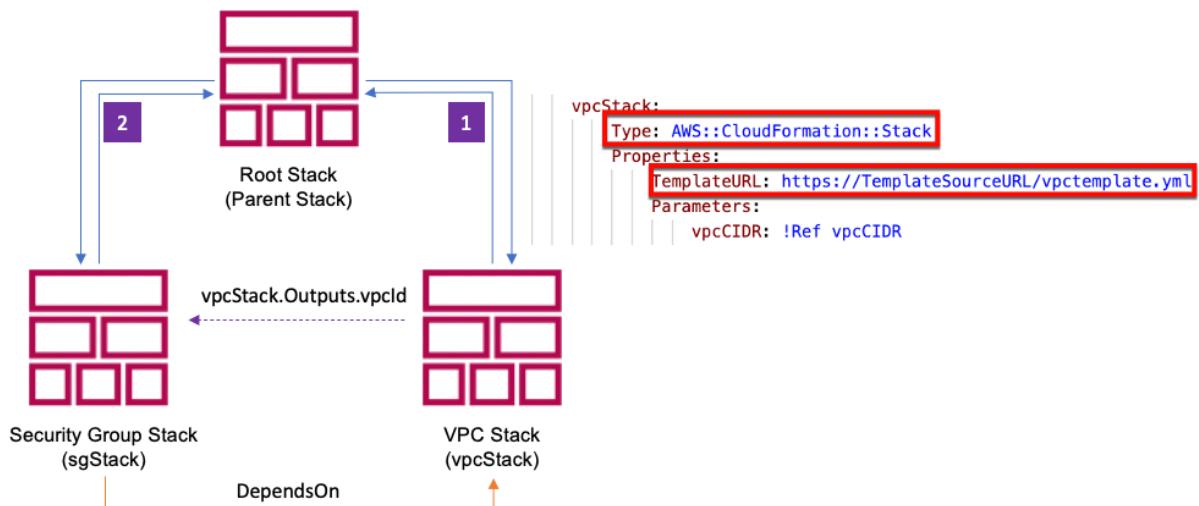
Specify whether resources that were created during a failed operation should be deleted regardless of their deletion policy. [Learn more](#)

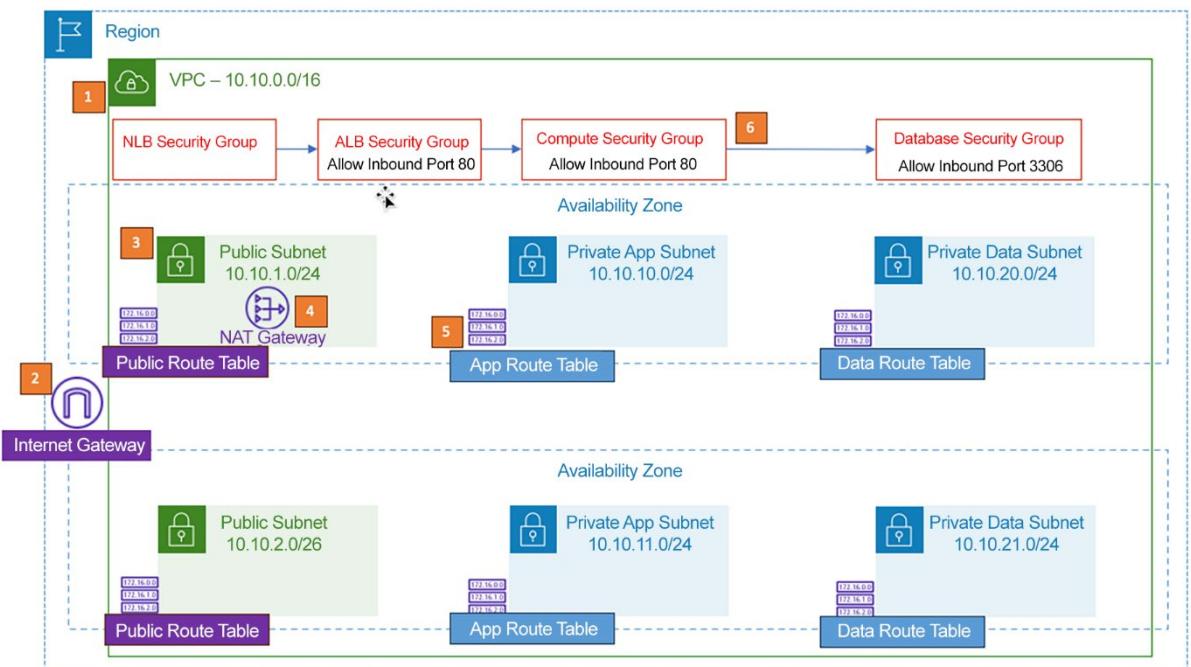
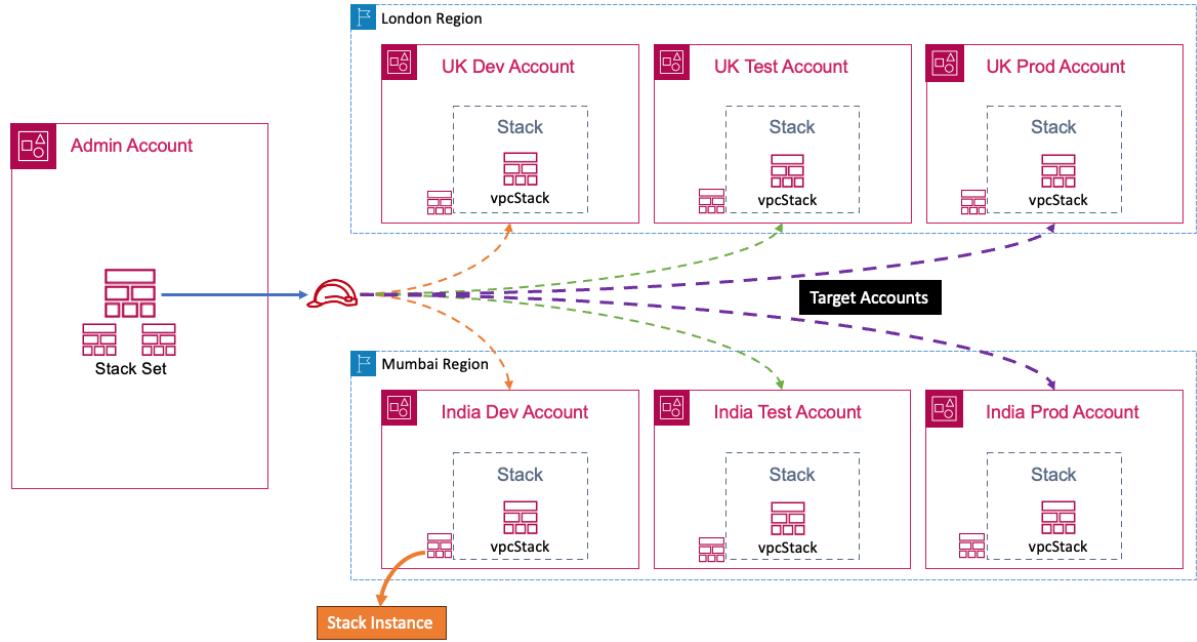
Use deletion policy

Retains or deletes created resources according to their attached deletion policy.

Delete all newly created resources

Deletes created resources during a rollback regardless of their attached deletion policy.







Root user sign in ⓘ

Email: production@todoplus.io

Password

[Forgot password?](#)

[Sign in](#)

[Sign in to a different account](#)

[Create a new AWS account](#)

Prerequisite – Prepare template

Prepare template

Every stack is based on a template. A template is a JSON or YAML file that contains configuration information about the AWS resources in your stack.

Choose an existing template

Upload or choose an existing template.

Use a sample template

Choose from our sample template library.

Specify template Info

A template is a JSON or YAML file that describes your stack's resources and properties.

Template source

Selecting a template generates an Amazon S3 URL where it will be stored.

Amazon S3 URL

Provide an Amazon S3 URL to your template.

Upload a template file

Upload your template directly to the console.

Upload a template file

 **Choose file**

JSON or YAML formatted file

Stack info

Events

Resources

Outputs

Parameters

Template

Changesets

Events (1)

 *Search events*

Timestamp

Logical ID

Status

Detailed status

2024-07-27 16:47:18
UTC+0100

ec2-b

 **CREATE_IN_PROGRESS**
S

Todo-List-App-Prod



Delete

Update

Stack Info | **Events** | Resources | Outputs | Parameters | Template | Changesets | Git sync - new

Events (100+)

Search events

Timestamp	Logical ID	Status	Detailed status
2024-05-07 12:40:07 UTC+0530	Todo-List-App-Prod	✓ CREATE_COMPLETE	-
2024-05-07 12:40:06 UTC+0530	DefaultPrivateRoute1	✓ CREATE_COMPLETE	-
2024-05-07 12:40:06 UTC+0530	DefaultPrivateRoute4	✓ CREATE_COMPLETE	-

Find resources by attribute or tag

< 1 >

⚙

Name	Subnet ID	State
todo-plus-production Private Subnet (for compute EC2/ECS etc) (AZ1)	subnet-020488e715af36...	✓ Available
todo-plus-production Private Subnet (for compute EC2/ECS etc) (AZ2)	subnet-00a896326dcdd...	✓ Available
todo-plus-production Private Subnet (for database) (AZ1)	subnet-0b4d7b613b6be...	✓ Available
todo-plus-production Private Subnet (for database) (AZ2)	subnet-09ffc27897e21d...	✓ Available
todo-plus-production Public Subnet (AZ1)	subnet-0b4a8f94d5a5c0...	✓ Available
todo-plus-production Public Subnet (AZ2)	subnet-0639973a767fb...	✓ Available

kp Practice Resources



SHARE FEEDBACK

DASHBOARD > CHAPTER 13

Building Infrastructure Using Code with CloudFormation and the Cloud Development Kit (CDK)

Summary

This chapter covered two critical AWS services for managing infrastructure as code. CloudFormation allows you to define and deploy AWS resources using YAML or JSON templates. The AWS CDK is a software development framework for defining cloud infrastructure in code and provisioning it through AWS CloudFormation.

This chapter explained the main components of CloudFormation and the AWS CDK and provided a sample CloudFormation template that creates a VPC with subnets, gateways, route tables, and security groups.

The chapter also highlighted some best practices for using CloudFormation, such as defining and testing templates before deployment, creating change sets, and strategies for varying configuration options such as StackSets and nested stacks, and discussed the CloudFormation template anatomy in detail.

CloudFormation and the CDK can help you create repeatable and reproducible applications and infrastructure solutions in minutes. You avoid configuration drift and ensure your environments are built as expected. In addition, you can enforce governance and security in your deployments.

Chapter Review Questions

The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

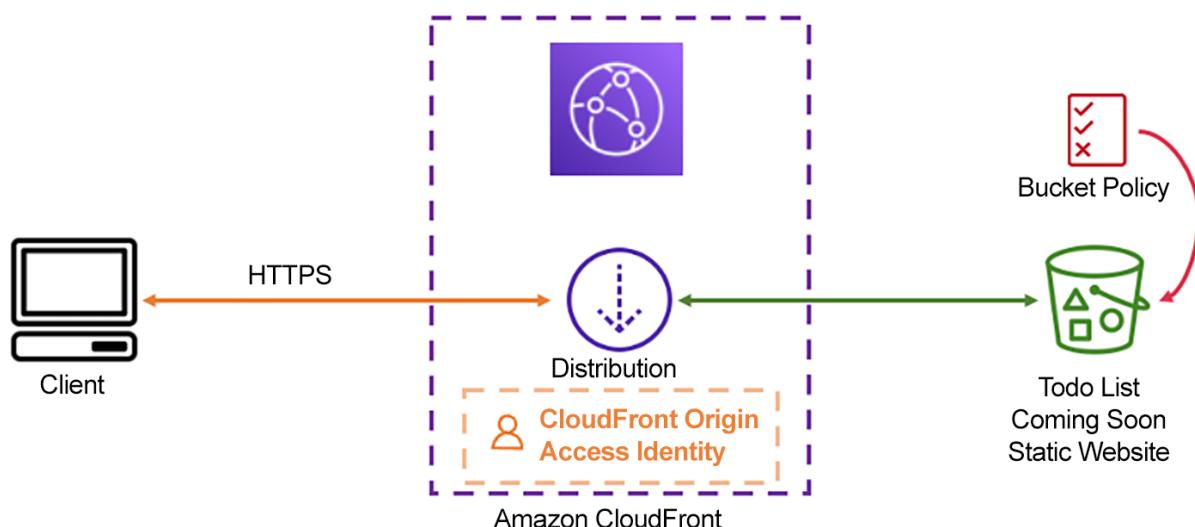
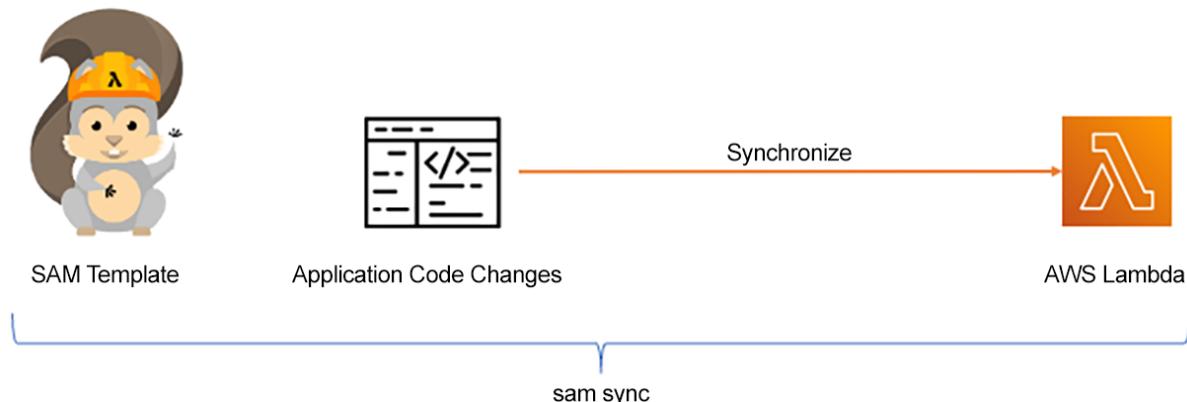
Select Quiz

Quiz 1

SHOW QUIZ DETAILS

START

Chapter 14: Designing Serverless Applications with AWS Serverless Application Model (SAM) and AWS AppSync



```
iiasacademycreator@IaaSs-MacBook-Air ~ % aws --version
aws-cli/2.9.13 Python/3.9.11 Darwin/23.5.0 exe/x86_64 prompt/off
iiasacademycreator@IaaSs-MacBook-Air ~ %
```

```
iiasacademycreator@IaaSs-MacBook-Air ~ % sam --version
SAM CLI, version 1.118.0
iiasacademycreator@IaaSs-MacBook-Air ~ %
```

```
iaasacademycreator@IaaSs-MacBook-Air ~ % aws configure
AWS Access Key ID [*****RLKM]: [REDACTED]
AWS Secret Access Key [*****d9ur]: [REDACTED]
Default region name [us-east-1]: us-east-1
Default output format [json]:
iaasacademycreator@IaaSs-MacBook-Air ~ %
```

```
38     TargetOriginId: s3-todo-website
39     # Requiring HTTPS for communication between viewers and CloudFront
40     ViewerProtocolPolicy : redirect-to-https
41
42     S3Bucket:
43         Type: AWS::S3::Bucket
44         Properties:
45             # Change the bucket name below to the name of your website. When creating the
46             BucketName: <YOURWEBSITEBUCKETNAME.COM>
47
48     S3BucketPolicy:
49         Type: AWS::S3::BucketPolicy
50         Properties:
51             Bucket: !Ref S3Bucket
```

```
iaasacademycreator@IaaSs-MacBook-Air /users % cd ~/Desktop
iaasacademycreator@IaaSs-MacBook-Air Desktop %
iaasacademycreator@IaaSs-MacBook-Air Desktop %
```

MacOS

```
Select Command Prompt
C:\>cd users/[REDACTED]/desktop
C:\Users\[REDACTED]\Desktop>
```

Windows

```
iaasacademycreator@IaaSs-MacBook-Air todoimagesam % sam init
You can preselect a particular runtime or package type when using the `sam init` experience.
Call `sam init --help` to learn more.

Which template source would you like to use?
  1 - AWS Quick Start Templates
  2 - Custom Template Location
Choice:
```

```
[iaasacademycreator@IaaSs-MacBook-Air todoimagesam % ls  
sam-app  
[iaasacademycreator@IaaSs-MacBook-Air todoimagesam % cd sam-app  
[iaasacademycreator@IaaSs-MacBook-Air sam-app % ls  
README.md      events          samconfig.toml  tests  
__init__.py    hello_world     template.yaml  
iaasacademycreator@IaaSs-MacBook-Air sam-app %
```

Name	Date Modified
__init__.py	7 Jun 2024 at 11:43
> events	7 Jun 2024 at 11:43
> hello_world	7 Jun 2024 at 11:43
README.md	7 Jun 2024 at 11:43
samconfig.toml	17 Jul 2024 at 10:47
template.yaml	7 Jun 2024 at 10:53
> tests	7 Jun 2024 at 11:43
✓ website	11 Jun 2024 at 10:51
> assets	11 Jun 2024 at 10:51
index.html	1 Jun 2024 at 16:01

```
[iaasacademycreator@IaaSs-MacBook-Air sam-app % ls  
README.md      events          samconfig.toml  tests  
__init__.py    hello_world     template.yaml  website  
[iaasacademycreator@IaaSs-MacBook-Air sam-app % aws s3 mb s3://todolistapp.sam --region=us-east-1  
make_bucket: todolistapp.sam  
[iaasacademycreator@IaaSs-MacBook-Air sam-app %
```

```

Users > iaasacademycreator > Desktop > todolistsam > todolistsam > samconfig.toml
1 # More information about the configuration file can be found here:
2 # https://docs.aws.amazon.com/serverless-application-model/latest/developerguide/serverless-sam-reference.html#samconfig
3 version = 0.1
4
5 [default]
6 [default.deploy]
7 [default.deploy.parameters]
8 stack_name = [YOURSTACKNAME]
9 region = "us-east-1"
10 capabilities = "CAPABILITY_IAM"
11 confirm_changeset = true
12 s3_bucket = [YOURWEBSITEBUCKETNAME.SAM] # Change the name of the S3 bucket you created

```

```

[iaasacademycreator@IaaSS-MacBook-Air sam-app % ls
README.md      events          samconfig.toml  tests
__init__.py     hello_world    template.yaml  website
[iaasacademycreator@IaaSS-MacBook-Air sam-app % sam build
Build Succeeded

Built Artifacts  : .aws-sam/build
Built Template   : .aws-sam/build/template.yaml

Commands you can use next
=====
[*] Validate SAM template: sam validate
[*] Invoke Function: sam local invoke
[*] Test Function in the Cloud: sam sync --stack-name {{stack-name}} --watch
[*] Deploy: sam deploy --guided
[iaasacademycreator@IaaSS-MacBook-Air sam-app % sam package --output-template-file packaged
l --s3-bucket todolistapp.sam
Successfully packaged artifacts and wrote output template to file packaged.yaml.
Execute the following command to deploy the packaged template
sam deploy --template-file /Users/iaasacademycreator/Desktop/todoimagesam/sam-app/packaged.
l --stack-name <YOUR STACK NAME>
[iaasacademycreator@IaaSS-MacBook-Air sam-app %

```

```

Waiting for changeset to be created..

CloudFormation stack changeset


| Operation | LogicalResourceId              | ResourceType                                    | Replacement |
|-----------|--------------------------------|-------------------------------------------------|-------------|
| + Add     | CloudFrontOriginAccessIdentity | AWS::CloudFront::CloudFrontOriginAccessIdentity | N/A         |
| + Add     | CloudfrontDistribution         | AWS::CloudFront::Distribution                   | N/A         |
| + Add     | S3BucketPolicy                 | AWS::S3::BucketPolicy                           | N/A         |
| + Add     | S3Bucket                       | AWS::S3::Bucket                                 | N/A         |


Changeset created successfully. arn:aws:cloudformation:us-east-1:441639934710:changeSet/samcli-deploy172210352
601-4960-ace1-a66b6a6958af

Previewing CloudFormation changeset before deployment
Deploy this changeset? [y/N]: 

```

CloudFormation events from stack operations (refresh every 5.0 seconds)

ResourceStatus	ResourceType	LogicalResourceId	ResourceStatusReason
CREATE_IN_PROGRESS	AWS::CloudFormation::Stack	todolistsam-stack	User Initiated
CREATE_IN_PROGRESS	AWS::S3::Bucket	S3Bucket	-
CREATE_IN_PROGRESS	AWS::CloudFront::CloudFrontOriginAccessIdentity	CloudFrontOriginAccessIdentity	-
CREATE_IN_PROGRESS	AWS::S3::Bucket	S3Bucket	Resource creation Initiated
CREATE_IN_PROGRESS	AWS::CloudFront::CloudFrontOriginAccessIdentity	CloudFrontOriginAccessIdentity	Resource creation Initiated
CREATE_COMPLETE	AWS::CloudFront::CloudFrontOriginAccessIdentity	CloudFrontOriginAccessIdentity	-
CREATE_COMPLETE	AWS::S3::Bucket	S3Bucket	-
CREATE_IN_PROGRESS	AWS::S3::BucketPolicy	S3BucketPolicy	-
CREATE_IN_PROGRESS	AWS::CloudFront::Distribution	CloudfrontDistribution	-
CREATE_IN_PROGRESS	AWS::S3::BucketPolicy	S3BucketPolicy	Resource creation Initiated
CREATE_COMPLETE	AWS::S3::BucketPolicy	S3BucketPolicy	-
CREATE_IN_PROGRESS	AWS::CloudFront::Distribution	CloudfrontDistribution	Resource creation Initiated
CREATE_IN_PROGRESS	AWS::CloudFront::Distribution	CloudfrontDistribution	Eventual consistency check initiated
CREATE_IN_PROGRESS	AWS::CloudFormation::Stack	todolistsam-stack	Eventual consistency check initiated
CREATE_COMPLETE	AWS::CloudFront::Distribution	CloudfrontDistribution	-
CREATE_COMPLETE	AWS::CloudFormation::Stack	todolistsam-stack	-

Successfully created/updated stack – todolistsam-stack in us-east-1

<input type="radio"/>	todolistapp.com	US East (N. Virginia) us-east-1
<input type="radio"/>	todolistapp.sam	US East (N. Virginia) us-east-1

EAZSOFA6N5BPA

[General](#) [Security](#) [Origins](#) [Behaviors](#) [Error pages](#) [Invalidations](#) [Tags](#)

Details

Distribution domain name

 d3ai0fpi15t4jx.cloudfront.net

ARN



arn:aws:cloudfront::069865199514:d
PA

```
 sam-app -- -zsh -- 133x40
iaasacademycreator@TaaSs-MacBook-Air sam-app % aws s3 sync website/ s3://todolistapp.com
upload: website/.DS_Store to s3://todolistapp.com/.DS_Store
upload: website/assets/img/logo.png to s3://todolistapp.com/assets/img/logo.png
upload: website/assets/.DS_Store to s3://todolistapp.com/assets/.DS_Store
upload: website/assets/img/stay2.jpg to s3://todolistapp.com/assets/img/stay2.jpg
upload: website/index.html to s3://todolistapp.com/index.html
upload: website/assets/img/fav.png to s3://todolistapp.com/assets/img/fav.png
upload: website/assets/js/main.js to s3://todolistapp.com/assets/js/main.js
upload: website/assets/css/style.css to s3://todolistapp.com/assets/css/style.css
upload: website/assets/img/steve-jobs.png to s3://todolistapp.com/assets/img/steve-jobs.png
upload: website/assets/img/bg.jpg to s3://todolistapp.com/assets/img/bg.jpg
upload: website/assets/img/head-1.png to s3://todolistapp.com/assets/img/head-1.png
upload: website/assets/img/banner-bg.png to s3://todolistapp.com/assets/img/banner-bg.png
iaasacademycreator@TaaSs-MacBook-Air sam-app %
```



Blog Pricing Contact

People think focus means saying yes to the thing you've got to focus on.

It means saying no to the hundred other good ideas that there are.

You have to pick carefully.

--- Steve Jobs ---



COMING SOON

The ultimate productivity tool to manage your daily tasks!

Register Sign In

* Names _____

* Email address _____

Password _____

CREATE ACCOUNT

Objects (2) [Info](#)

[C](#) [Copy S3 URI](#) [Copy URL](#) [Download](#) [Open](#) [Delete](#) [Upload](#)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. [Learn more](#)

Find objects by prefix

<input checked="" type="checkbox"/>	Name	Type	Last modified	Size
<input checked="" type="checkbox"/>	assets/	Folder	-	
<input checked="" type="checkbox"/>	index.html	html	July 17, 2024, 10:19:27 (UTC+01:00)	



Designing Serverless Applications with AWS Serverless Application Model (SAM) and AWS AppSync

Summary

In this chapter, you learned about AWS SAM, an open source framework that simplifies the development, testing, and deployment of serverless applications on AWS. SAM uses AWS CloudFormation to help build underlying infrastructure that supports your serverless application. It provides a syntax for expressing functions, APIs, and databases, allowing you to define and manage your IaC.

You also discovered the integration of AWS AppSync with Amazon DynamoDB, showcasing the powerful combination these services offer for building scalable, serverless, and real-time applications. By defining the GraphQL schema in AWS AppSync and configuring resolvers that map GraphQL operations directly to data operations in DynamoDB, you learned about the seamless interaction for efficient data synchronization and management without the need for intermediate layers, making it a highly effective solution for developing modern applications.

With AppSync, you can run queries and mutations to interact with DynamoDB, utilizing direct data mappings and AWS Lambda for more complex logic. Using real-time capabilities facilitated by GraphQL subscriptions, you discovered how AppSync can deliver live updates to client applications as data changes in the database.

This integration simplifies the backend infrastructure and accelerates development processes, allowing you to focus more on creating compelling user experiences rather than managing database operations and data flow. Whether you are building mobile apps, web applications, or complex systems with multiple data sources, the combination of AppSync and DynamoDB offers a scalable and efficient solution to meet modern application demands.

Chapter Review Questions

The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

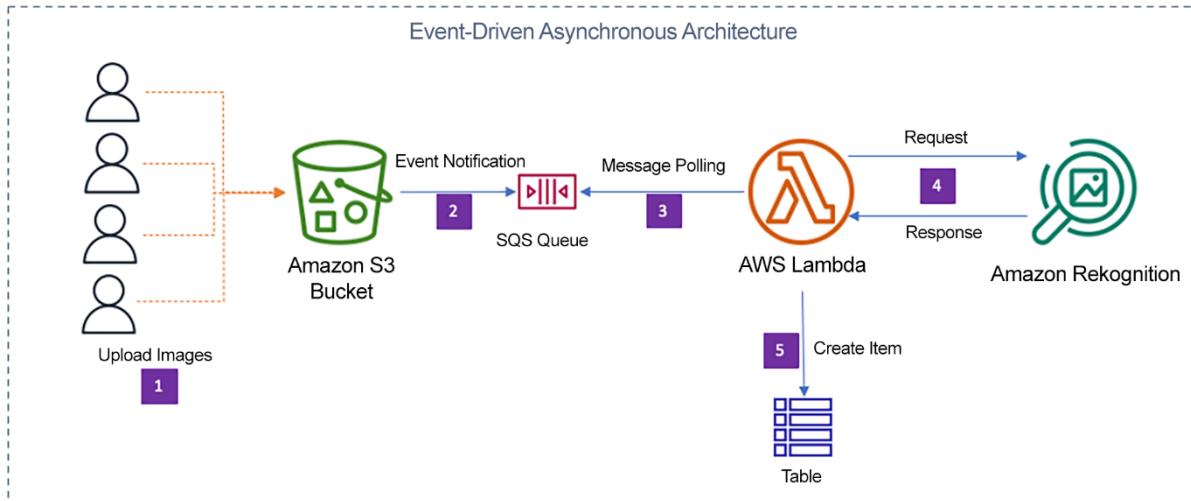
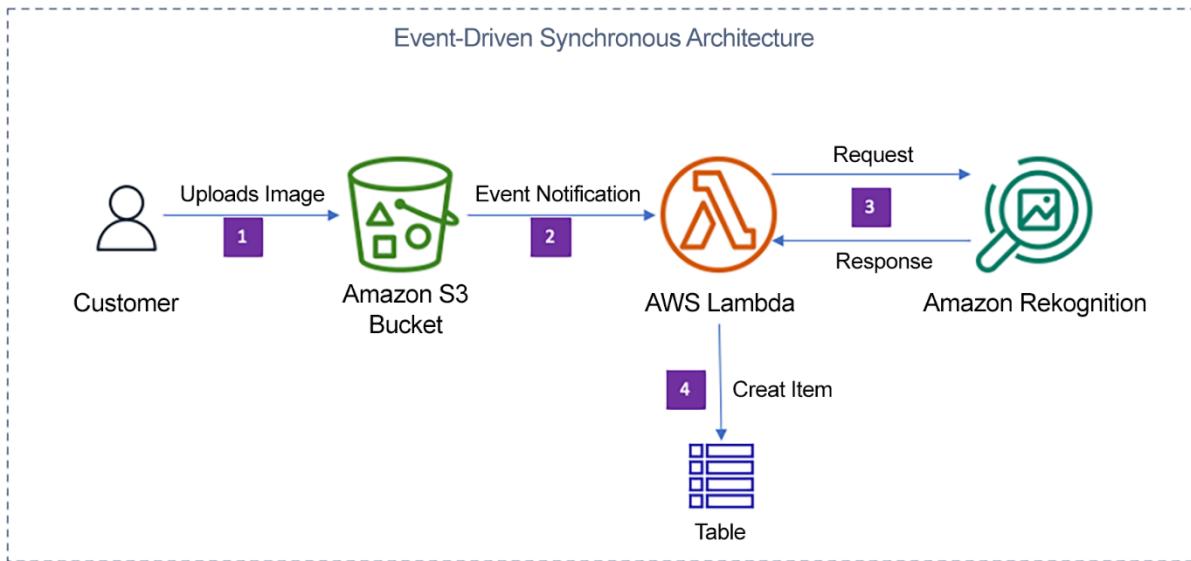
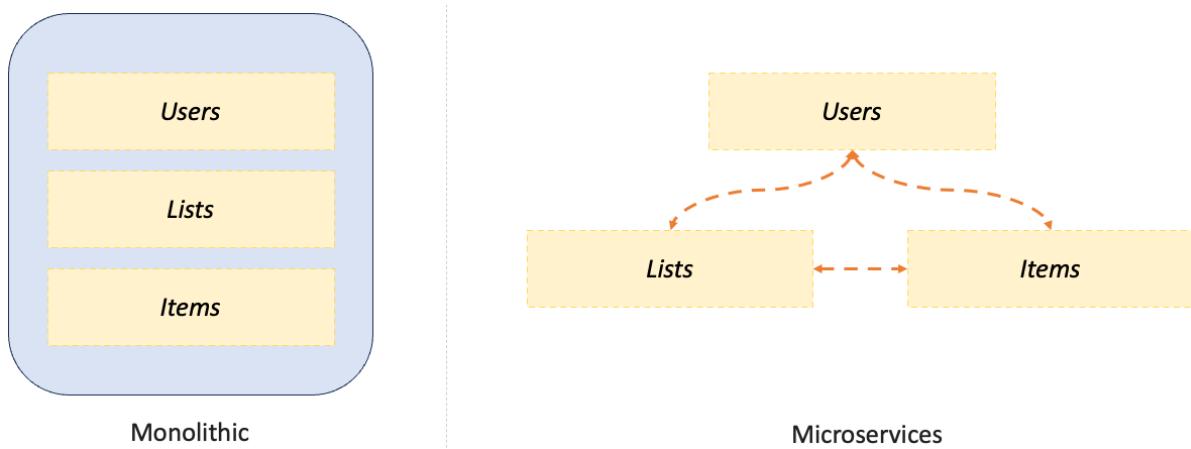
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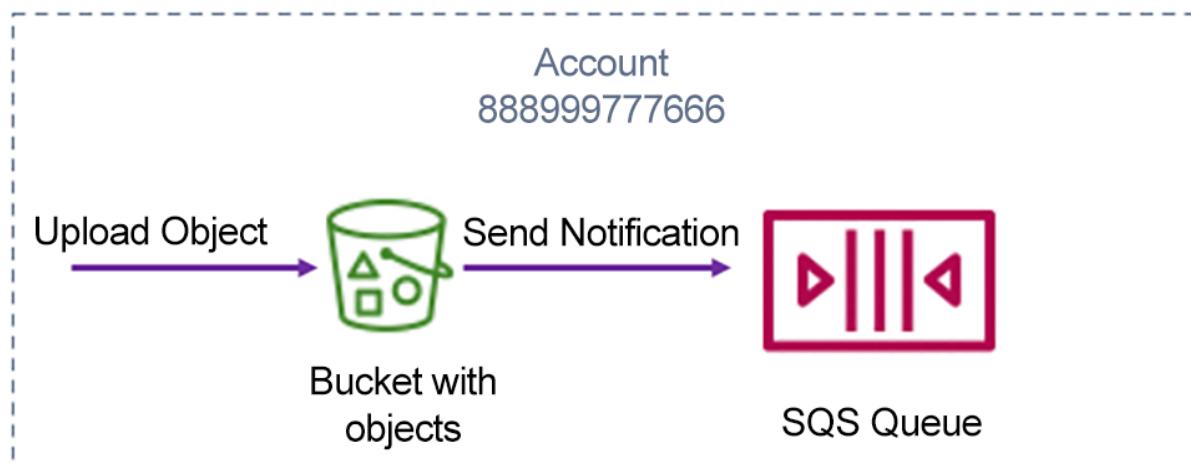
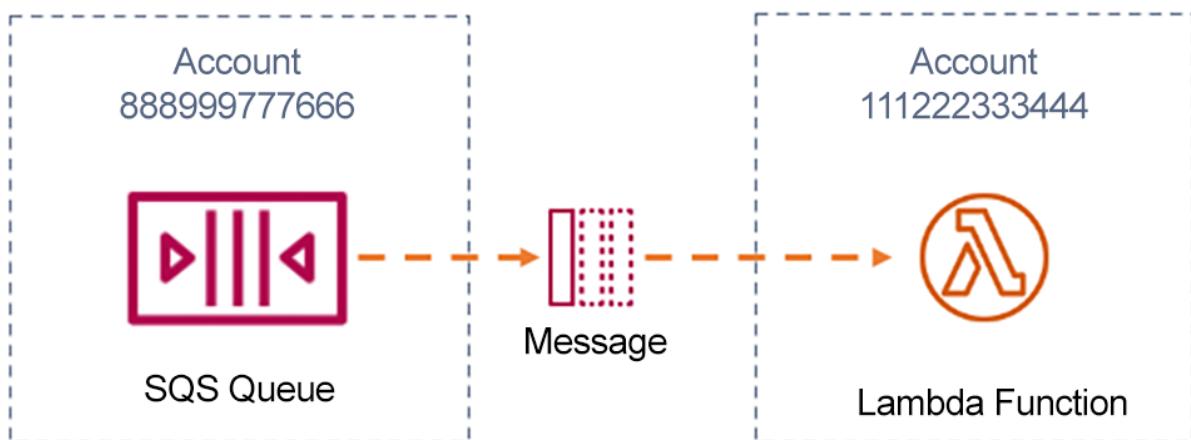
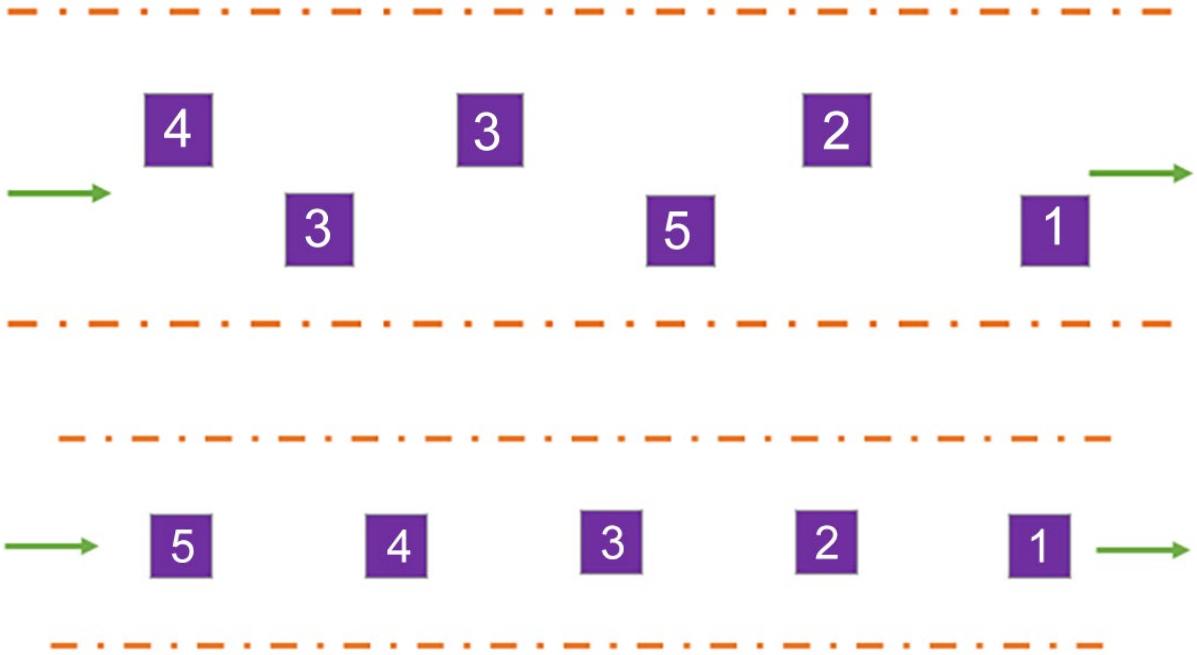
Quiz 1

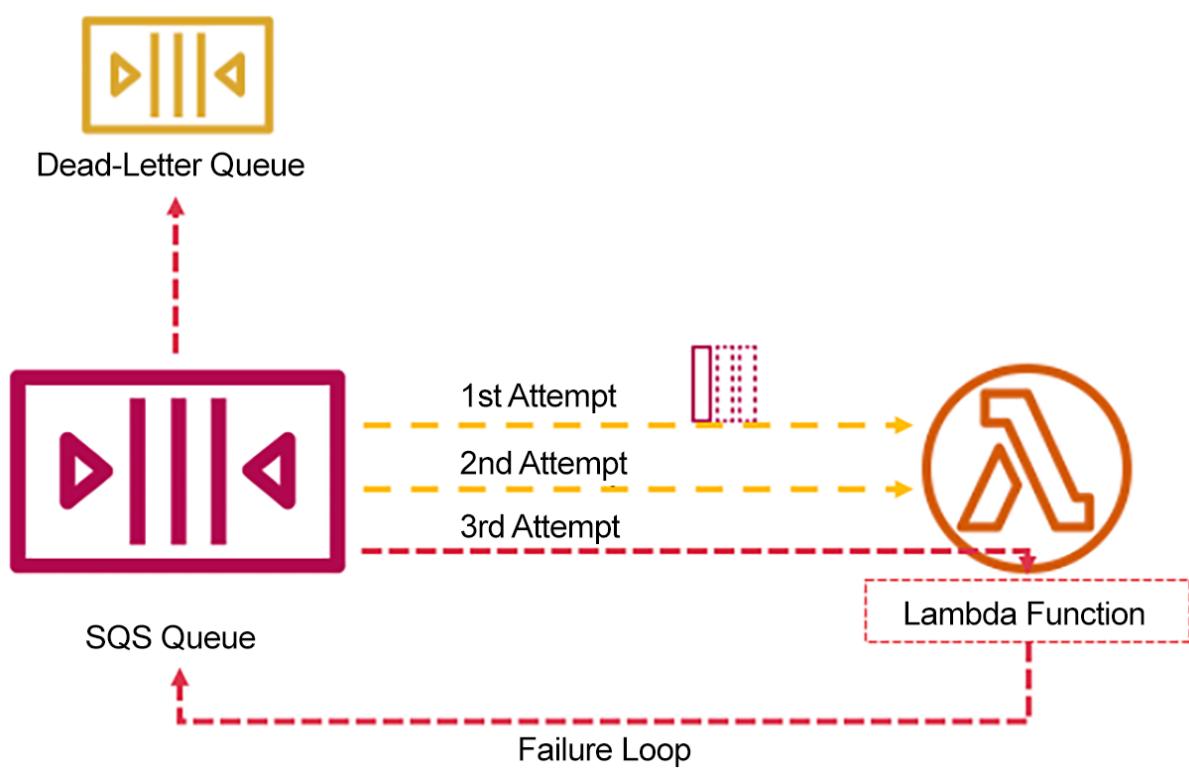
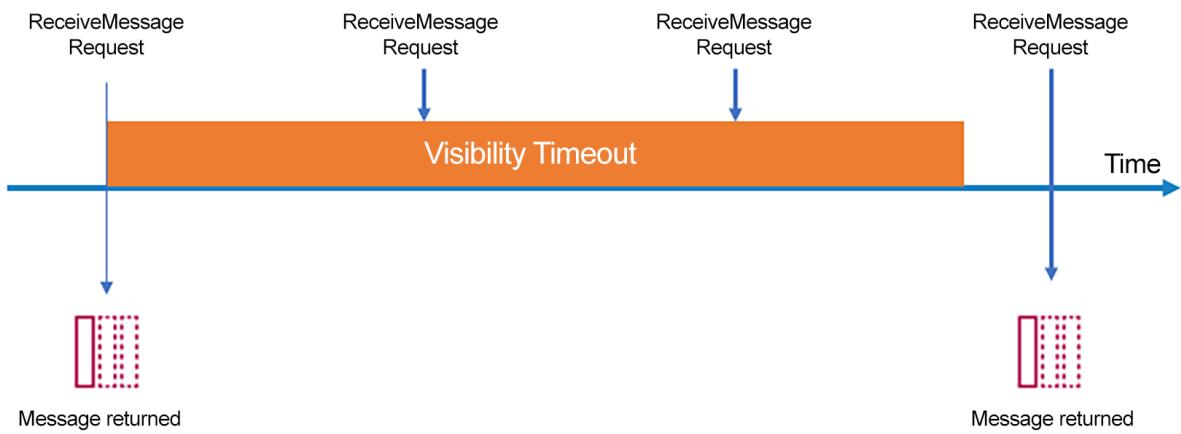
[SHOW QUIZ DETAILS ▾](#)

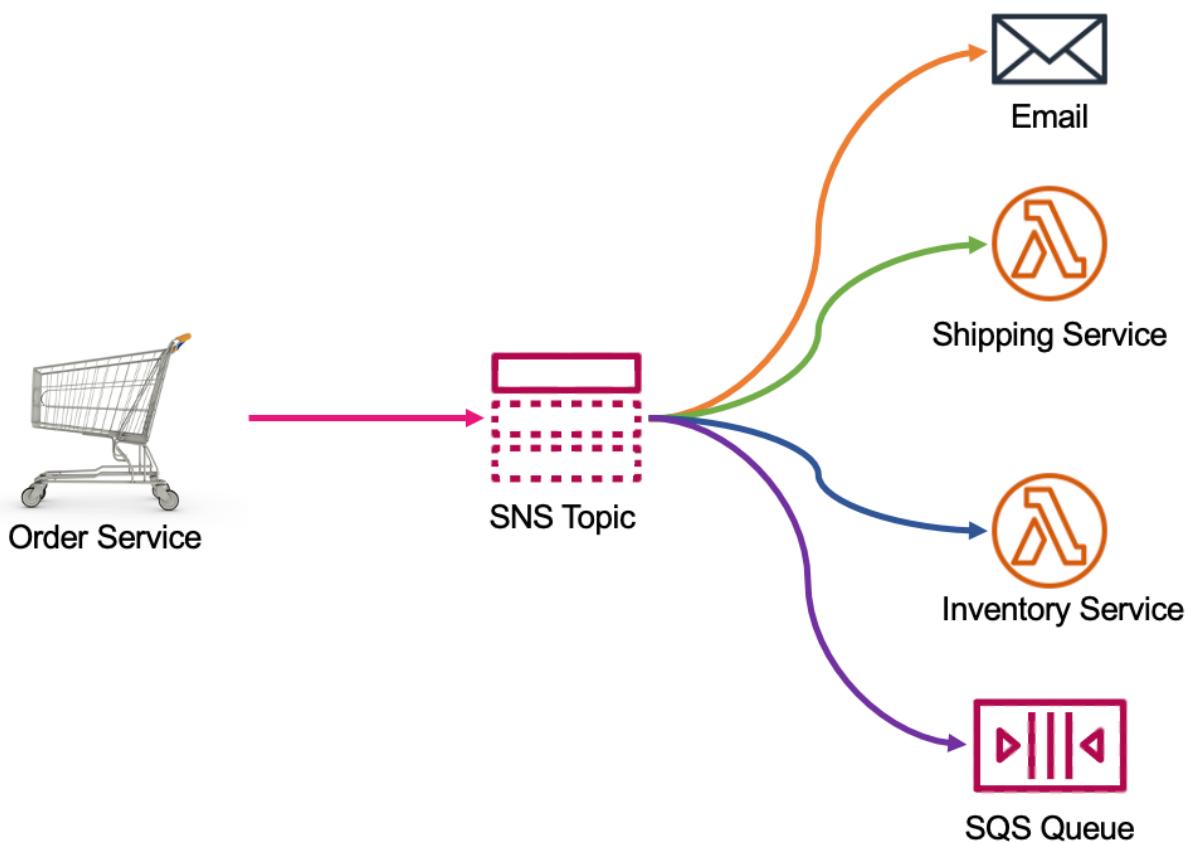
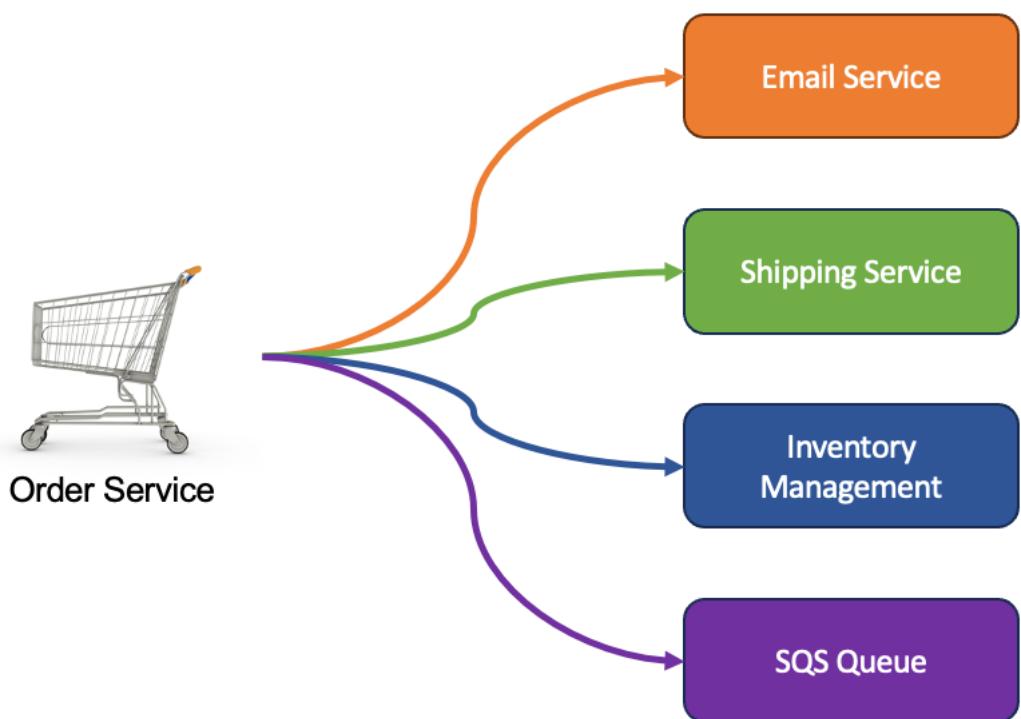
START

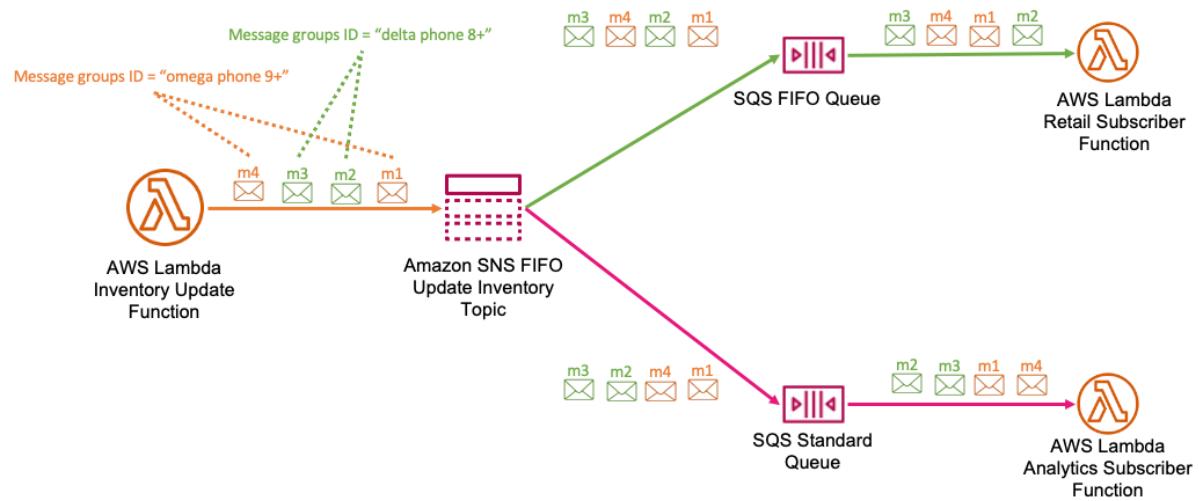
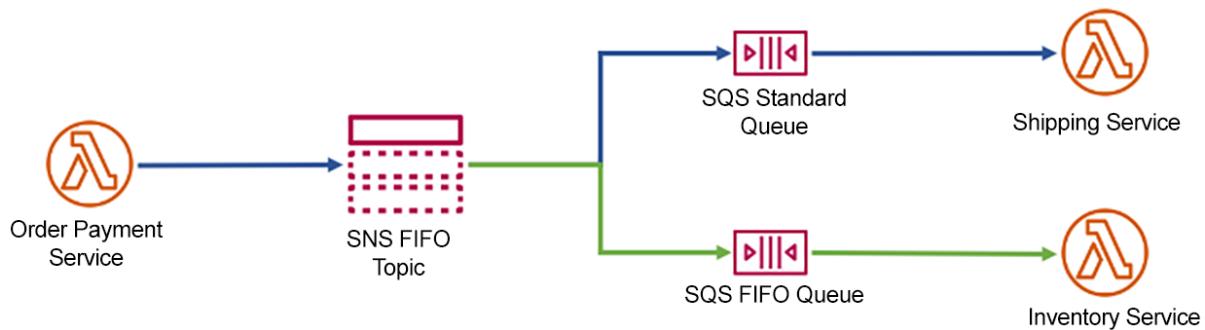
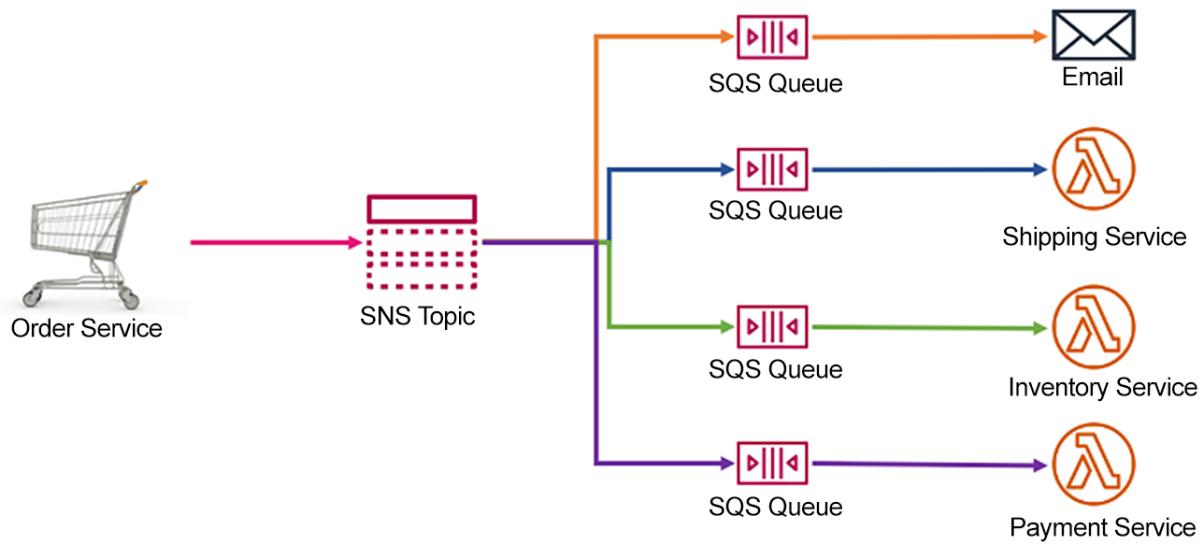
Chapter 15: Decoupling the Application Stack and Managing Data Ingestion

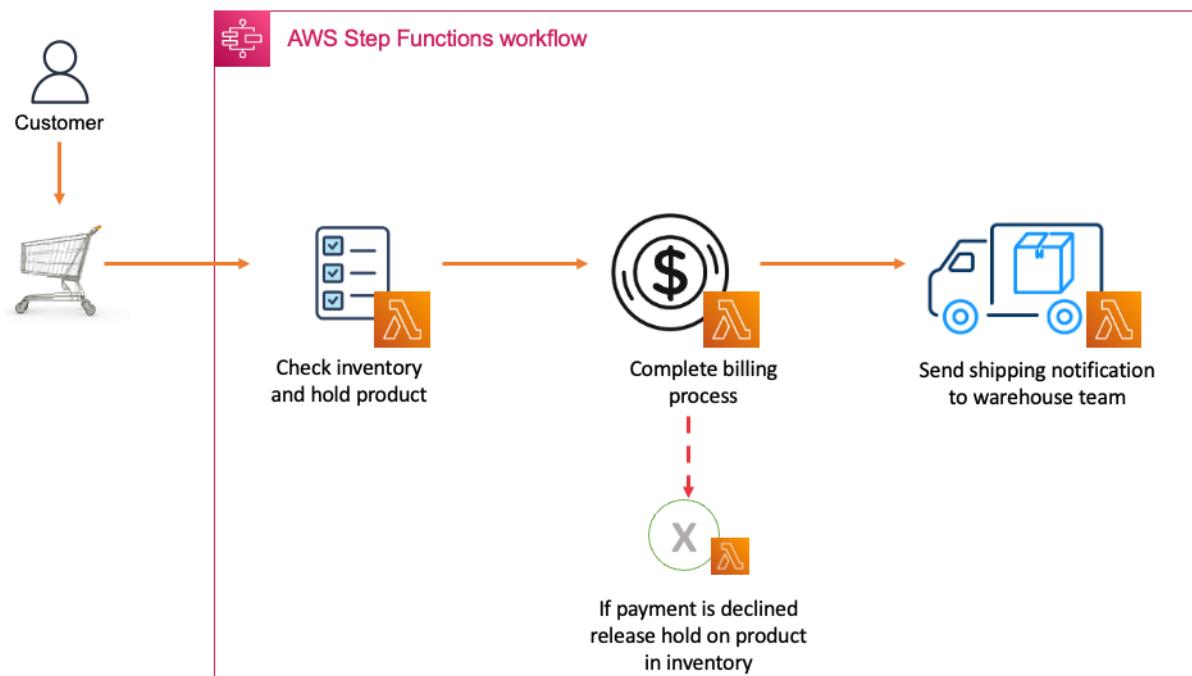
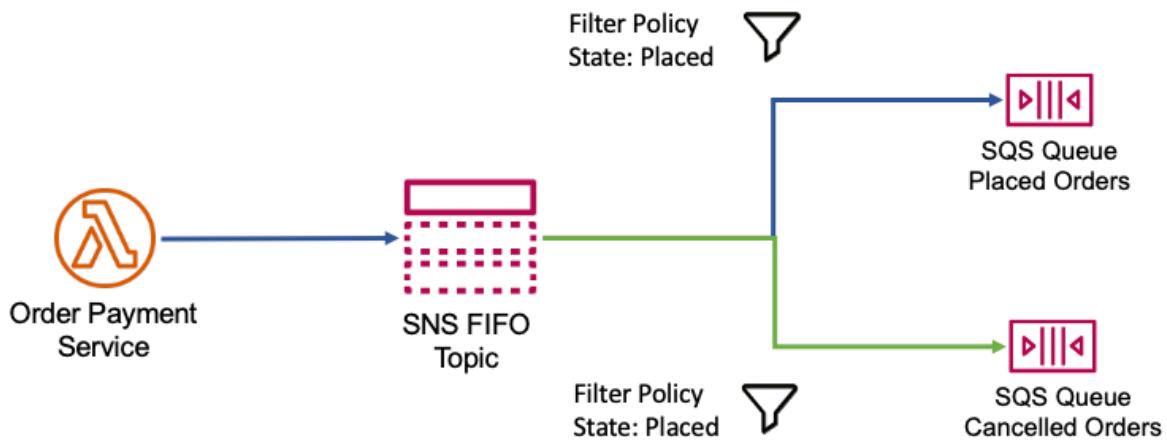












```

"Retry": [ {
    "ErrorEquals": [ "States.Timeout" ],
    "IntervalSeconds": 3,
    "MaxAttempts": 2,
    "BackoffRate": 1
} ]
  
```

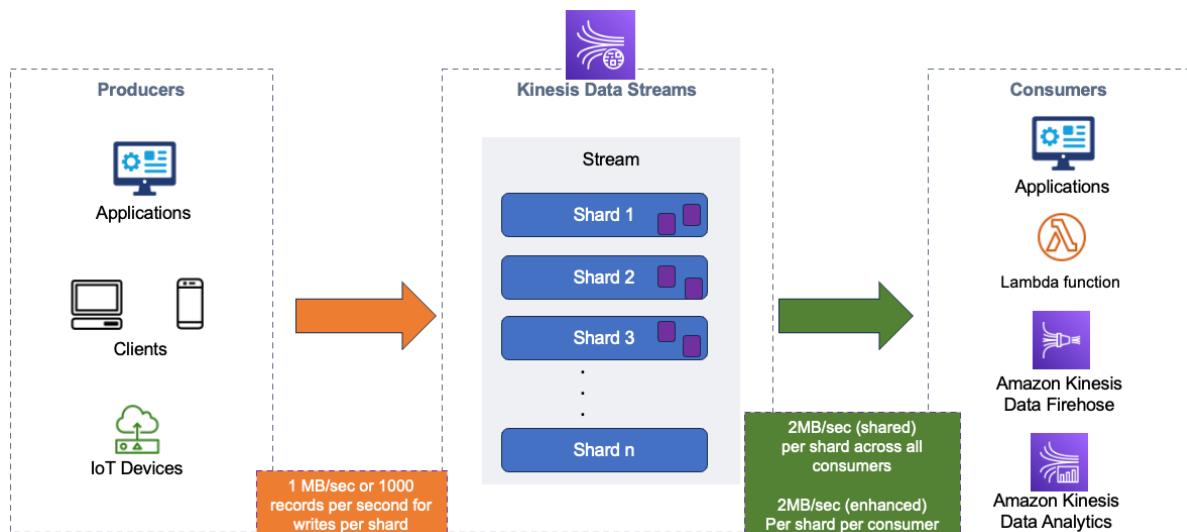
```
"Retry": [
  {
    "ErrorEquals": [ "States.Timeout" ],
    "IntervalSeconds": 3,
    "MaxAttempts": 2,
    "BackoffRate": 1
  },
  {
    "ErrorEquals": [ "States.All" ],
    "IntervalSeconds": 5,
    "MaxAttempts": 5,
    "BackoffRate": 2
  }
]

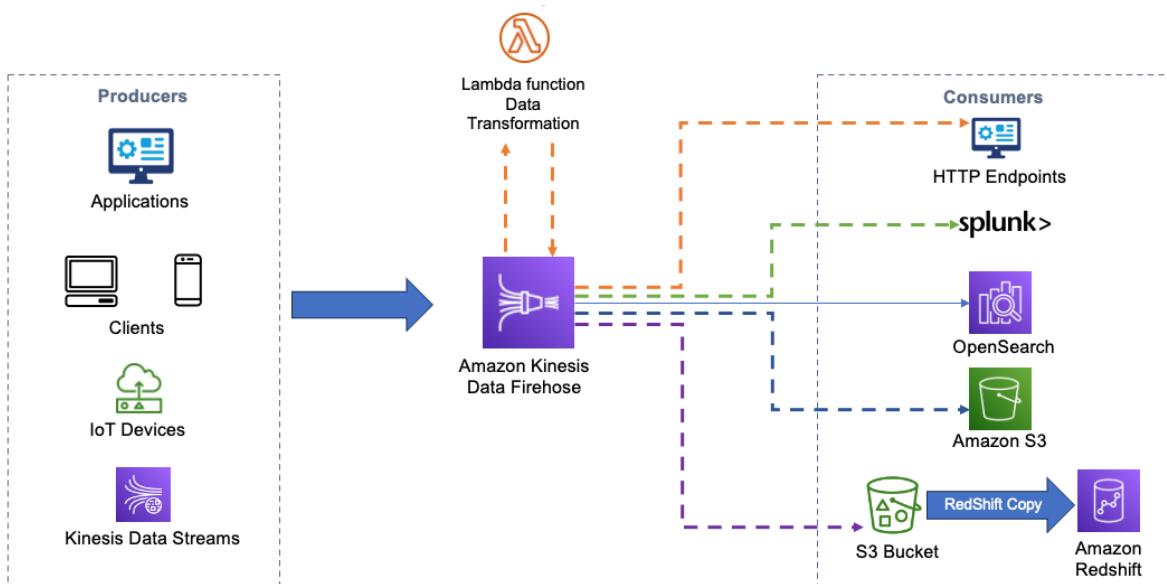
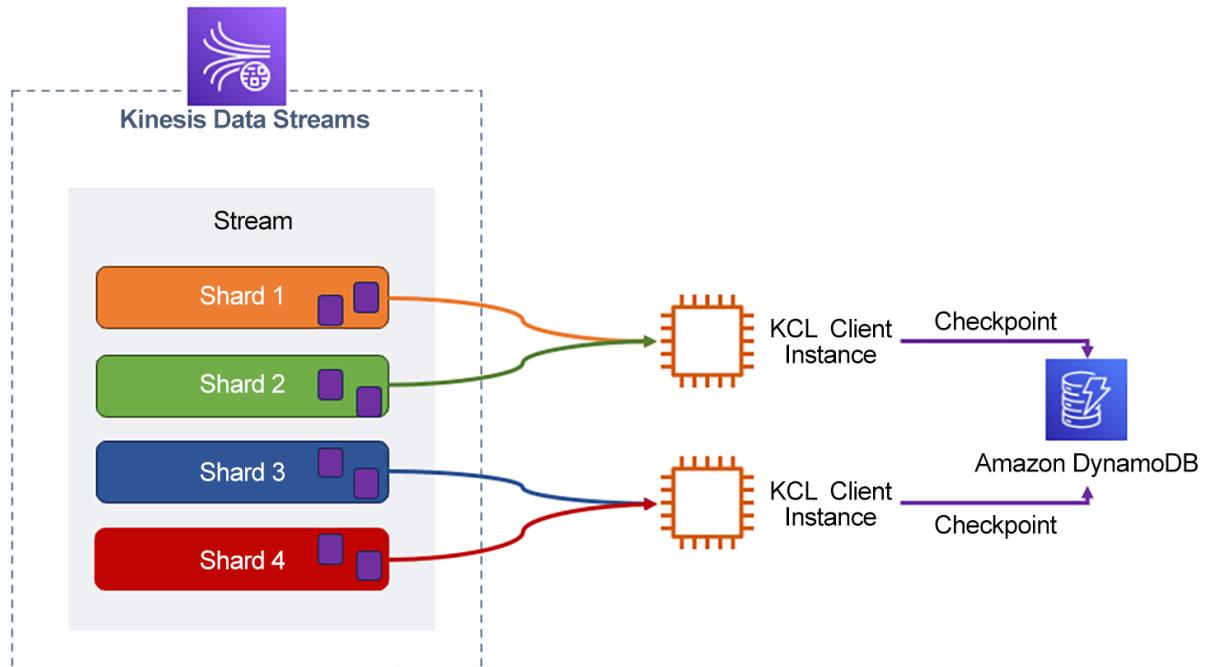
"HelloWorld": {
  "Type": "Task",
  "Resource": "arn:aws:lambda:REGION:ACCOUNT_ID:function:FUNCTION_NAME",
  "Catch": [
    {
      "ErrorEquals": ["States.Timeout"],
      "Next": "fallback"
    }
  ],
  "End": true
},
"fallback": {
  "Type": "Pass",
  "Result": "`This is the fallback from the catch`",
  "End": true
},
```

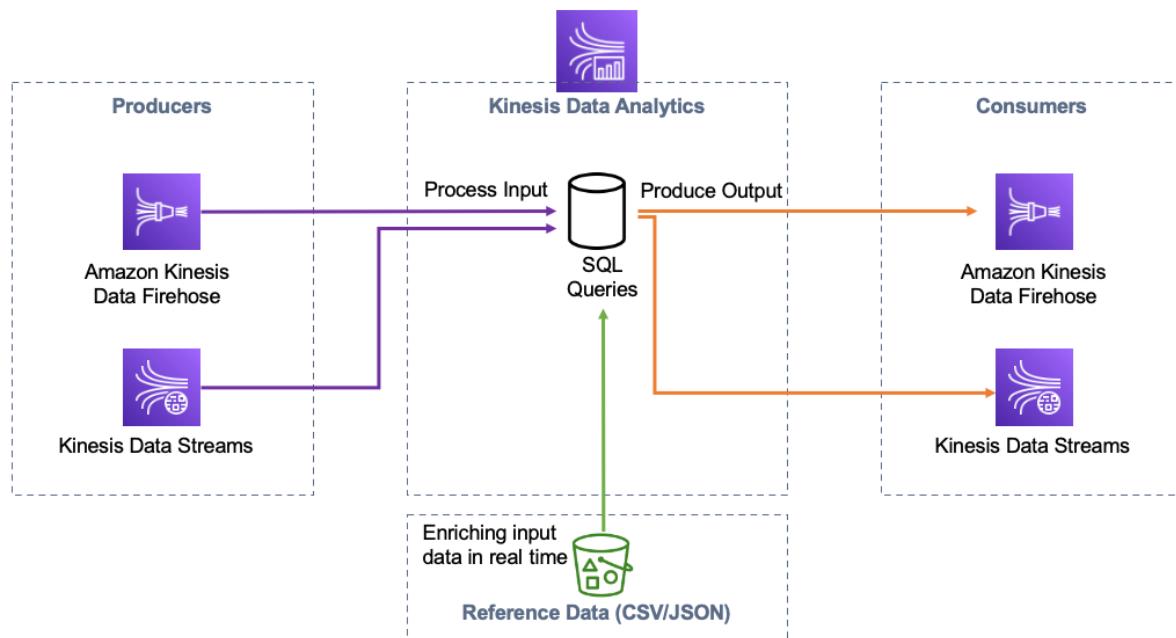
```

"HelloWorld": {
  "Type": "Task",
  "Resource": "arn:aws:lambda:REGION:ACCOUNT_ID:function:FUNCTION_NAME",
  "Catch": [
    {
      "ErrorEquals": ["States.Timeout"],
      "Next": "fallback",
      "ResultsPath": "$.error" ←
    }
  ],
  "End": true
},
"fallback": {
  "Type": "Pass",
  "Result": "This is the fallback from the catch",
  "End": true
},

```







Practice Resources

DASHBOARD > CHAPTER 15

Decoupling the Application Stack and Managing Data Ingestion

Summary

This chapter examined the importance of decoupling application components and effectively managing data ingestion within cloud architectures, particularly using AWS services. Using AWS solutions such as Amazon SQS, SNS, Kinesis, and Step Functions, we explored methodologies to enhance application scalability, reliability, and maintainability.

This chapter discussed how these services allow for robust, real-time data handling and asynchronous communication between decoupled components, enabling businesses to build flexible and resilient systems.

The chapter provided strategic insights into deploying these technologies to streamline workflows, reduce dependencies, and improve cloud-based applications' overall efficiency and performance. Through detailed discussions and practical examples, this chapter equipped you with the knowledge to architect more dynamic, responsive, and independently scalable cloud solutions.

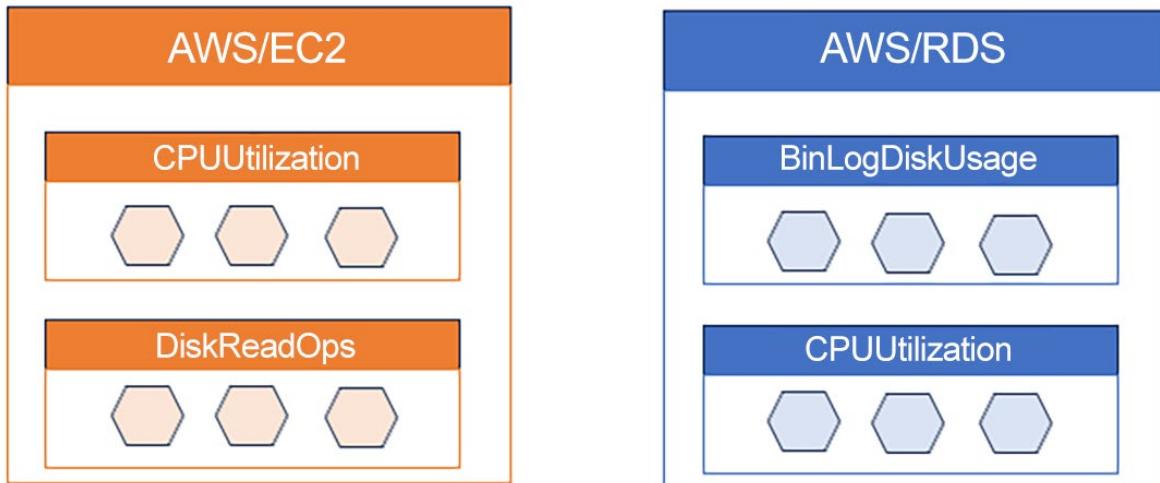
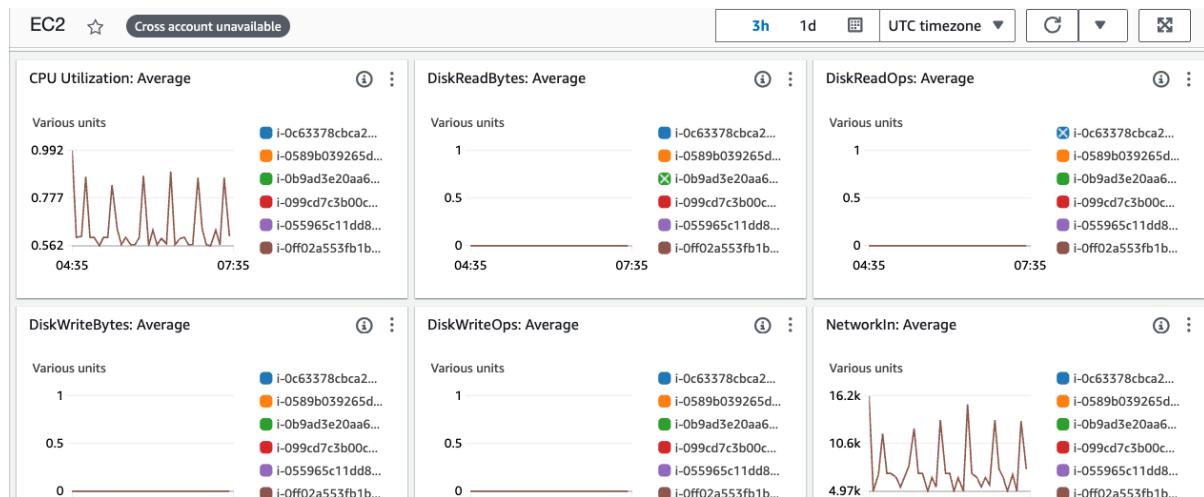
Chapter Review Questions

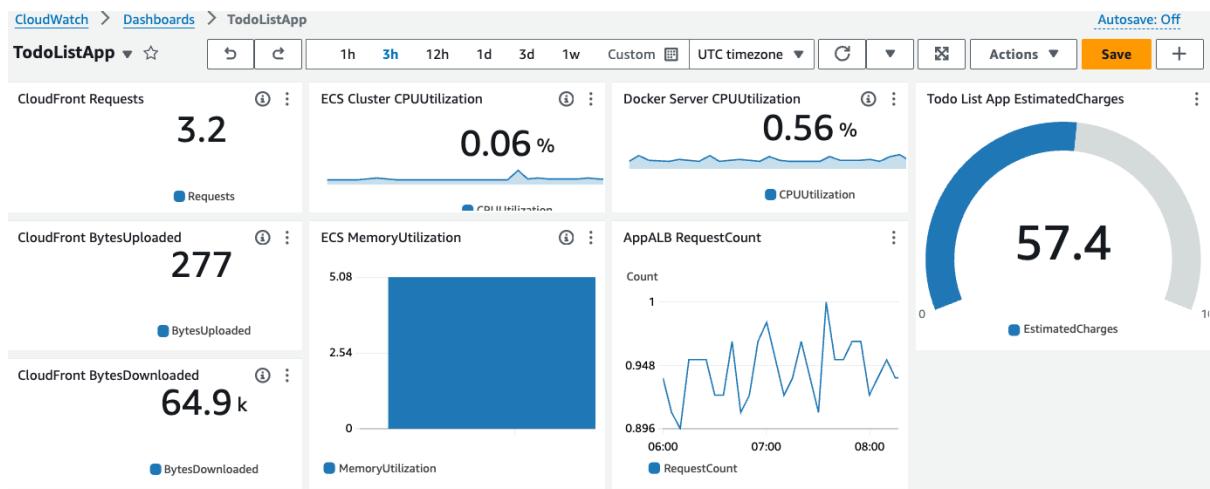
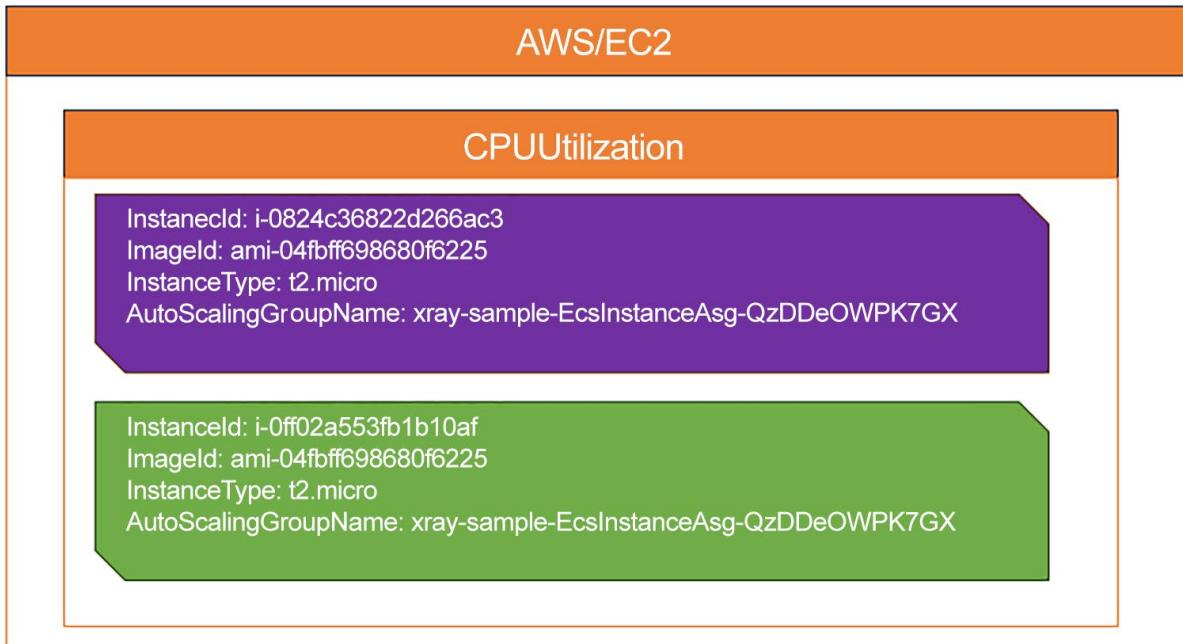
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Select Quiz

Quiz 1 [SHOW QUIZ DETAILS](#) [START](#)

Chapter 16: Monitoring with Amazon CloudWatch and AWS CloudTrail





Lambda action

Alarm state trigger

Define the alarm state that will trigger this action.

[Remove](#)

In alarm

The metric or expression is outside of the defined threshold.

OK

The metric or expression is within the defined threshold.

Insufficient data

The alarm has just started or not enough data is available.

Function Type

Select the type of Lambda Function

Select Lambda Function from the signed in account

Enter Function ARN for cross account function

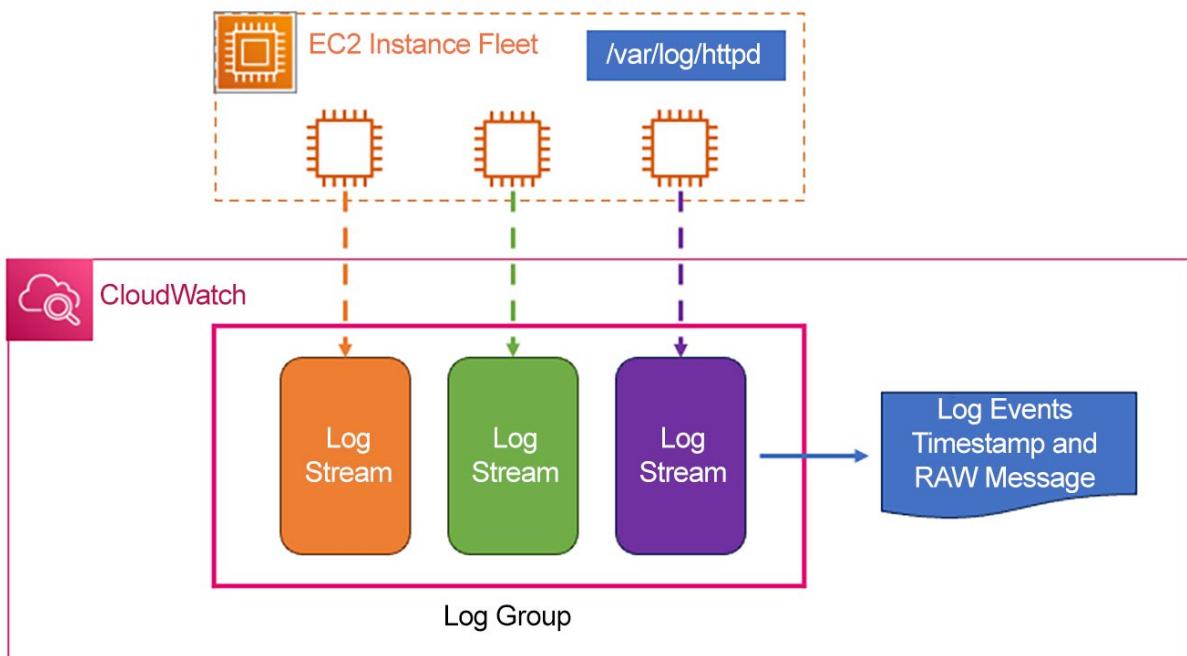
Choose a function

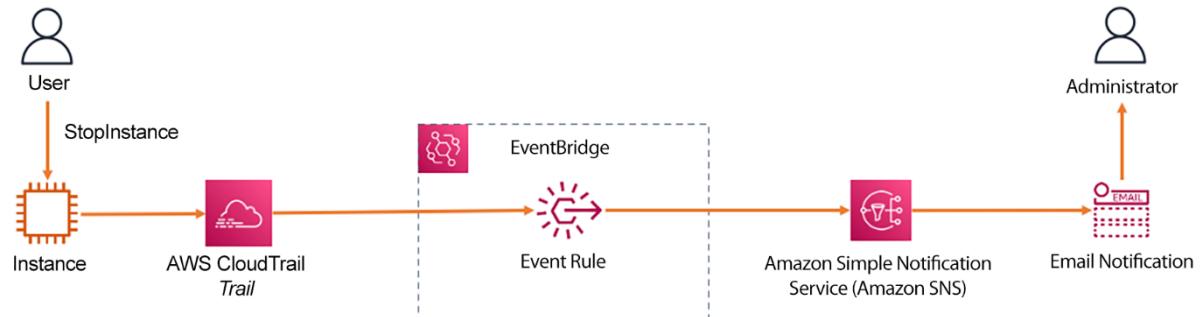
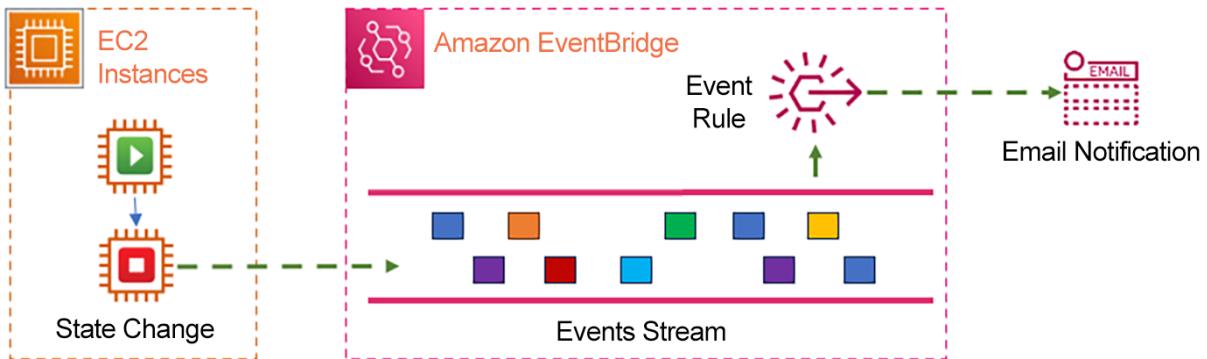
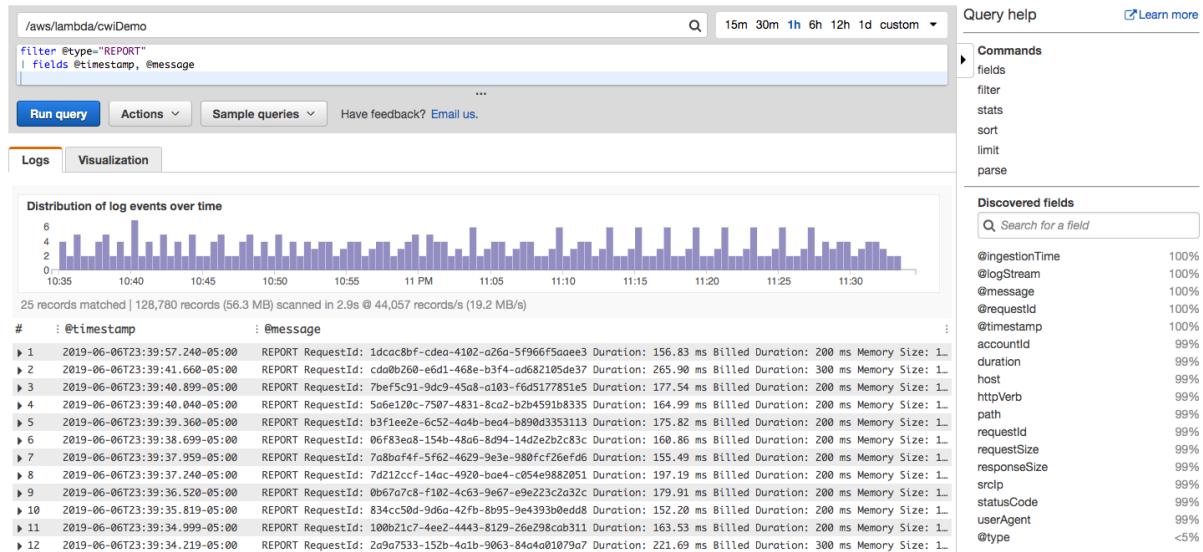
Select Lambda Function

Existing Lambda Functions on the signed-in account, enter the function ARN for cross account functions

► **Configure version/alias**

[Add Lambda action](#)





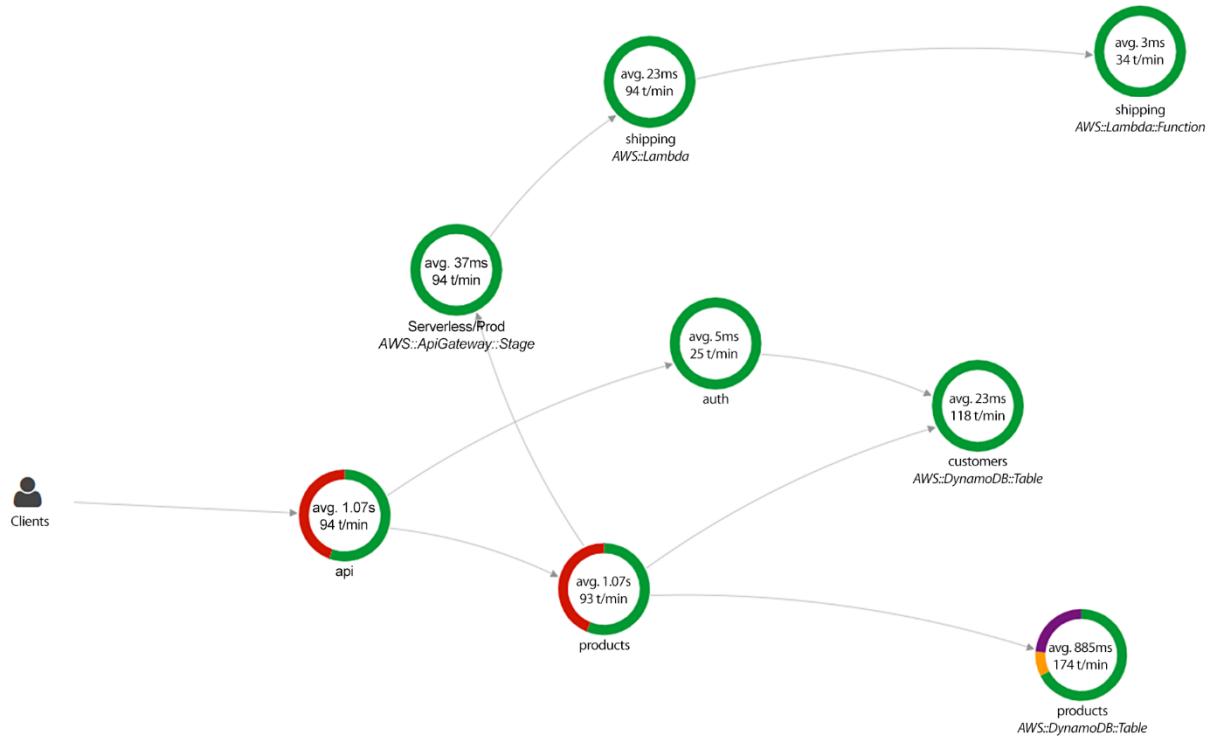
General details			
			Edit
Trail logging	Trail log location	Log file validation	SNS notification delivery
Logging	devinstancetrail/AWSLogs/905418297138	Enabled	Disabled
Trail name	Last log file delivered	Last file validation delivered	Last SNS notification
WindowsServerMonitor	-	-	-
Multi-region trail	Log file SSE-KMS encryption		
Yes	Enabled		
Apply trail to my organization	AWS KMS key		
Not enabled	arn:aws:kms:us-east-1:905418297138:key/c8d1fd7c-3838-4111-8f7f-8a180c4cc9aa		
	AWS KMS key alias		
	devmonitorkey		

[Event pattern](#) [Targets](#) [Monitoring](#) [Tags](#)

Event pattern [Info](#)

```

1 {
2   "source": ["aws.ec2"],
3   "detail-type": ["AWS API Call via CloudTrail"],
4   "detail": {
5     "eventSource": ["ec2.amazonaws.com"],
6     "eventName": ["StopInstances"]
7   }
8 }
```

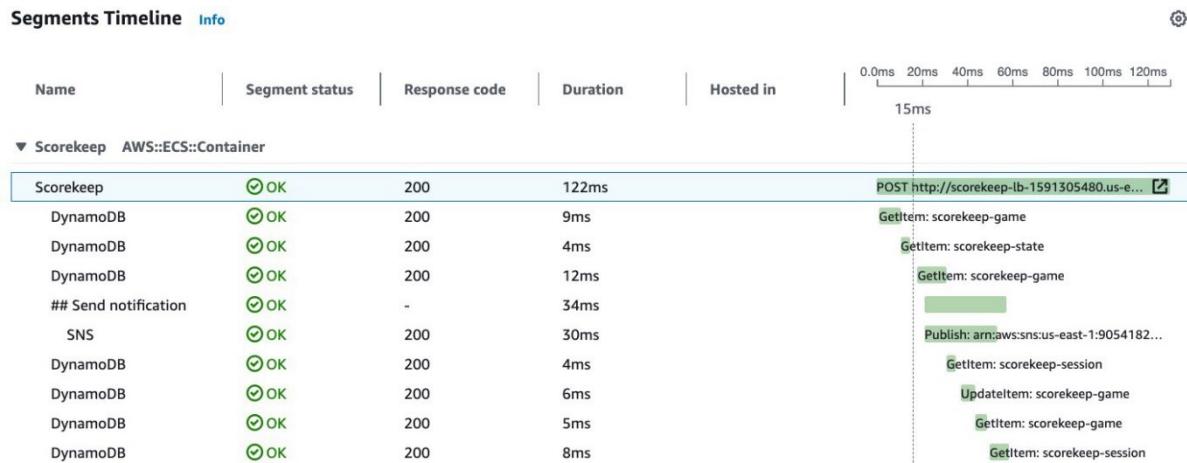


Segment details: Scorekeep



[Overview](#) [Resources](#) [Annotations](#) [Metadata](#) [Exceptions](#) [SQL](#)

Overview	Time	Errors and faults	Requests & Response
Subsegment ID 1-66a36511-64896036072efd590e0a c130-6e6be6ec7bbd0af1	Start Time 2024-07-26 08:57:53.965 (UTC)	Error false	Request url http://scorekeep-lb-1591305480.us-east-1.elb.amazonaws.com/api/move/CV6CV00C/RBCF46B/IFF2BJ5H
Name Scorekeep	End Time 2024-07-26 08:57:54.087 (UTC)	Fault false	
Origin AWS::ECS::Container	Duration 122ms		Request method POST
			Response code 200



Traces (23)

This table shows traces with updates within the last 5 minutes, with an average response time of 0.19s. It shows as many as 1000 traces.

Start typing to filter trace list

ID	Trace status	Timestamp	Response code	Response Time
..64896036072efd590e0ac130	OK	3.5min (2024-07-26 09:57:53)	200	0.122s
..41e0e4036df07c7577aef4d3	OK	3.5min (2024-07-26 09:57:52)	200	0.088s
..1f2738e33456974c1eb06aea	OK	3.5min (2024-07-26 09:57:51)	200	0.085s
..04e3c46e0371389100411122	OK	3.5min (2024-07-26 09:57:50)	200	0.079s
..41be4fc52a1573bf59315a20	OK	3.5min (2024-07-26 09:57:50)	200	0.018s

Specify permissions [Info](#)

Add permissions by selecting services, actions, resources, and conditions. Build permission statements using the JSON editor.

Policy editor

```

1 ▼ {
2   "Version": "2012-10-17",
3   "Statement": [
4     {
5       "Effect": "Allow",
6       "Action": [
7         "logs:CreateLogGroup",
8         "logs:CreateLogStream",
9         "logs:PutLogEvents",
10        "logs:DescribeLogGroups",
11        "logs:DescribeLogStreams"
12      ],
13      "Resource": "*"
14    }
15  ]
16 }
```

Policy editor

```
1▼ {
2    "Version": "2012-10-17",
3▼   "Statement": [
4▼     {
5       "Effect": "Allow",
6▼       "Action": [
7         "logs>CreateLogGroup",
8         "logs>CreateLogStream",
9         "logs>PutLogEvents",
10        "logs>DescribeLogGroups",
11        "logs>DescribeLogStreams"
12      ],
13      "Resource": "*"
14    }
15  ]
16 }
```

Services	Tasks	Infrastructure	Metrics	Scheduled tasks	Tags
Tasks (1)					
Filter desired					
<input type="text"/> Filter tasks by property or value					
<input type="checkbox"/>	Task		Last status	Desired st...	
<input type="checkbox"/>	5a07d603c39047e89d8d14b19ff9abcd		Running	Running	

Configuration

Operating system/Architecture Linux/X86_64	Capacity provider -	ENI ID eni-0bfcbddf4ce804e46	Public IP -
CPU Memory .5 vCPU 1 GB	Launch type FARGATE	Network mode awsvpc	Private IP 10.0.11.4
Platform version	Container instance IDs:	Subnet ID	MAC address

Timestamp	Message	Source IP	Destination IP	Port	ECS logs
There are older events to load. Load more.					
2024-07-26T10:57:42.000+01:00	7 441639934710 eni-0bfccbbdf4ce804e46 10.0.20.10 10.0.11.4 3306 56470 6 1 52 1721987862 1721987890	10.0.11.4			
7 441639934710 eni-0bfccbbdf4ce804e46 10.0.20.10 10.0.11.4 3306 56470 6 1 52 1721987862 1721987890 ACCEPT OK todo-plus-cluster arn:aws:ecs:us-east-1:441639934710:cluster/todo-plus-cluster -- todo-plus-ecs-service arn:aws:ecs:us-east-1:441639934710:task-definition/todo-plus-task-definition:4 5a07d603c39047e89d8d14b19ff9abcd arn:aws:ecs:us-east-1:441639934710:task/todo-plus-cluster/5a07d603c39047e89d8d14b19ff9abcd 5a07d603c39047e89d8d14b19ff9abcd-1788962618 -					
2024-07-26T10:57:42.000+01:00	7 441639934710 eni-0bfccbbdf4ce804e46 10.0.11.4 10.0.11.80 80 42900 6 5 617 1721987862 1721987890	10.0.11.4	10.0.11.80	80	42900 6 5 617 1721987862 1721987890
7 441639934710 eni-0bfccbbdf4ce804e46 10.0.11.4 10.0.11.80 80 42900 6 5 617 1721987862 1721987890 ACCEPT OK todo-plus-cluster arn:aws:ecs:us-east-1:441639934710:cluster/todo-plus-cluster -- todo-plus-ecs-service arn:aws:ecs:us-east-1:441639934710:task-definition/todo-plus-task-definition:4 5a07d603c39047e89d8d14b19ff9abcd arn:aws:ecs:us-east-1:441639934710:task/todo-plus-cluster/5a07d603c39047e89d8d14b19ff9abcd 5a07d603c39047e89d8d14b19ff9abcd-1788962618 -					

Practice Resources

DASHBOARD > CHAPTER 16

Monitoring with Amazon CloudWatch and AWS CloudTrail

Summary

This chapter examined two of AWS's most powerful monitoring tools for your AWS infrastructure and resources: Amazon CloudWatch and AWS CloudTrail. These services are crucial in maintaining operational efficiency, ensuring security, and achieving compliance across AWS environments.

Amazon CloudWatch is a robust monitoring platform that offers comprehensive visibility into AWS resources and applications. It collects and tracks metrics, logs, and event data in real time, enabling administrators to oversee the operational health of AWS deployments efficiently. CloudWatch supports a range of functionalities, from basic metric collection and custom metrics to advanced log analysis and dashboard visualizations. These capabilities facilitate performance optimization, real-time incident response, and proactive system availability management.

AWS CloudTrail complements CloudWatch by providing a detailed audit trail of all actions taken within an AWS account. This service is essential for compliance with regulatory requirements, as it logs every API call, including the API caller's identity, the call's time, and the source IP address. CloudTrail enhances security monitoring by identifying unusual activities that could indicate security threats and ensures that all user actions are accountable, aiding forensic investigations and compliance audits.

This chapter also covered AWS X-Ray, designed to help you analyze and debug distributed applications and microservices architecture. While moving away from a monolithic design is highly recommended, distributed applications come with their own challenges. Using X-Ray, you can quickly and visually identify performance issues and bottlenecks, enabling developers to get to the root cause of issues quickly.

Chapter Review Questions

The AWS Certified Developer Associate Certification and Beyond by Rajesh Daswani, Dorian Richard

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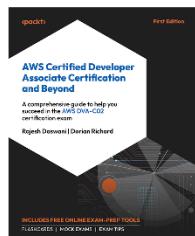
Chapter 17: Accessing the Online Practice Resources

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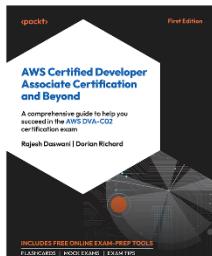
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