aws

User Guide

AWS Compute Optimizer

AWS Compute Optimizer: User Guide

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Table of Contents

What is AWS Compute Optimizer?

AWS Compute Optimizer is a service that analyzes your AWS resources' configuration and utilization metrics to provide you with rightsizing recommendations and identify idle resources. It reports whether your resources are optimal, and generates optimization recommendations to reduce the cost and improve the performance of your workloads. Compute Optimizer also provides graphs showing recent utilization metric history data, as well as projected utilization for recommendations, which you can use to evaluate which recommendation provides the best price-performance trade-off. The analysis and visualization of your usage patterns can help you decide when to move or resize your running resources, stop or delete idle resources, and still meet your performance and capacity requirements.

Compute Optimizer provides a console experience, and a set of APIs that allows you to view the findings of the analysis and recommendations for your resources across multiple AWS Regions. You can also view findings and recommendations across multiple accounts, if you opt in the management account of an organization. The findings from the service are also reported in the consoles of the supported services, such as the Amazon EC2 console.

Supported resources

Compute Optimizer generates recommendations for the following resources:

- Amazon Elastic Compute Cloud (Amazon EC2) instances
- Amazon EC2 Auto Scaling groups
- Amazon Elastic Block Store (Amazon EBS) volumes
- AWS Lambda functions
- Amazon Elastic Container Service (Amazon ECS) services on AWS Fargate
- Commercial software licenses

For Compute Optimizer to generate recommendations for these resources, they must meet a specific set of requirements, and must have accumulated sufficient metric data. For more information, see Resource requirements.

Opting in

You must opt in to have Compute Optimizer analyze your AWS resources. The service supports standalone AWS accounts, member accounts of an organization, and the management account of an organization. For more information, see Opting in to AWS Compute Optimizer.

Analyzing metrics

After you opt in, Compute Optimizer begins analyzing the specifications and the utilization metrics of your resources from Amazon CloudWatch for the last 14 days. For example, for Amazon EC2 instances, Compute Optimizer analyzes the vCPUs, memory, storage, and other specifications. It also analyzes the CPU utilization, network in and out, disk read and write, and other utilization metrics of currently running instances. For more information, see Metrics analyzed by AWS Compute Optimizer.

Enhancing recommendations

After you opt in, you can enhance your recommendations by activating recommendation preferences, such as the enhanced infrastructure metrics (paid feature). This feature extends the metrics analysis lookback period for selected resources to 93 days (compared to the 14-day default). For more information, see Enhanced infrastructure metrics.

You can also customize your recommendations using rightsizing recommendation preferences, which allow you to adjust CPU and memory utilization headroom and thresholds, configure specific lookback periods, and set instance family preferences at the organization, account, or regional level. For more information, see ???.

Additionally, Compute Optimizer can ingest and analyze external EC2 memory utilization metrics from observability products like Datadog and Dynatrace to generate more accurate EC2 rightsizing recommendations. For more information, see ???.

Viewing findings and recommendations

Optimization findings for your resources are displayed on the Compute Optimizer dashboard. For more information, see Using the AWS Compute Optimizer dashboard.

The top optimization recommendations for each of your resources are listed on the recommendations page. The top 3 optimization recommendations and utilization graphs for

a specific resource are listed on the resource details page. For more information, see Viewing resource recommendations.

Export your optimization recommendations to record them over time, and share the data with others. For more information, see Exporting AWS Compute Optimizer recommendations.

Availability

To view the currently supported AWS Regions and endpoints for Compute Optimizer, see Compute Optimizer Endpoints and Quotas in the *AWS General Reference*.

AWS resources supported by Compute Optimizer

This chapter outlines the AWS resources that Compute Optimizer generates recommendations for. It also provides you with the specific resource types supported by Compute Optimizer.

AWS Compute Optimizer generates recommendations for the following AWS resources:

- **Amazon Elastic Compute Cloud (Amazon EC2) instances**

  Compute Optimizer generates recommendations for many Amazon EC2 instance types. For more information about the specific instance types that Compute Optimizer supports, see Supported Amazon EC2 instance types.

- **Amazon EC2 Auto Scaling groups**

  Compute Optimizer generates recommendations for EC2 Auto Scaling groups. For more information, see Supported Amazon EC2 Auto Scaling groups.

- **Amazon Elastic Block Store (Amazon EBS) volumes**

  Compute Optimizer generates recommendations for various EBS volume types. For more information about the specific EBS volume types that Compute Optimizer supports, see Supported Amazon EBS volume types.

- **AWS Lambda functions**

  Compute Optimizer generates memory size recommendations for Lambda functions that meet specific requirements. For more information, see Lambda function requirements.

- **Amazon Elastic Container Service (Amazon ECS) services on AWS Fargate**

  Compute Optimizer generates recommendations for Amazon ECS services on Fargate that meet specific requirements. For more information, see Requirements for Amazon ECS services on Fargate.

- **Commercial software licenses**

  Compute Optimizer generates license recommendations for Microsoft SQL Servers on Amazon EC2 that meet specific requirements. For more information, see Commercial software license requirements.

> **Note**
>
> In order to generate recommendations for each resource, the resources must meet Compute Optimizer's metric and resource-specific requirements. For a list of the requiremtents for each resource, see Resource requirements.

Topics

Supported Amazon EC2 instance types

Compute Optimizer generates recommendations for the instance types listed in this section. The following table lists the EC2 instance types that are supported by Compute Optimizer.

Instance series	Instance family
C – Compute optimized	C1 | C3 | C4 | C5 | C5a | C5ad | C5d | C5n | C6a | C6g | C6gd | C6gn | C6i | C6in | C6id | C7a | C7g | C7gd | C7gn | C7i | C7i-flex | C8g | C8gd | C8gn
D – Dense storage	D2 | D3 | D3en
G – Graphics intensive	G4dn | G5g | G5 | G6 | Gr6 | G6e
Hpc – High performance computing	H1 | Hpc6a | Hpc6id | Hpc7a | Hpc7g
I – Storage optimized	I2 | I3 | I3en | I4g | I4i | I7ie | I8g | Im4gn | Is4gen | I8ge
M – General purpose	M1 | M2 | M3 | M4 | M5 | M5a | M5ad | M5d | M5dn | M5n | M5zn | M6a | M6g | M6gd | M6i | M6id | M6idn | M6in | M7a | M7g | M7gd | M7i | M7i-flex | M8g | M8gd | M8i | M8i-flex

Instance series	Instance family
P – GPU accelerated	P3 | P4 | P4d | P4de | P5 | P5e | P5en
R – Memory optimized	R3 | R4 | R5 | R5a | R5ad | R5b | R5d | R5dn | R5n | R6a | R6g | R6gd | R6i | R6id | R6idn | R6in | R7a | R7g | R7gd | R7i | R7iz | R8g | R8gd | R8i | R8i-flex
T – Burstable performance	T1 | T2 | T3 | T3a | T4g
U – High memory	U-3tb1 | U-6tb1 | U-9tb1 | U-12tb1 | U-18tb1 | U-24tb1 | U7i-6tb | U7i-8tb | U7i-12tb | U7in-16tb | U7in-24tb | U7in-32tb
X – Memory intensive	X1 | X1e | X2gd | X2idn | X2iedn | X2iezn | X8g
Z – High memory	z1d

Note

- If an EC2 instance isn't listed, then it isn't supported by Compute Optimizer.
- Compute Optimizer doesn't generate EC2 rightsizing recommendations for Spot Instances.

Supported Amazon EC2 Auto Scaling groups

Compute Optimizer generates rightsizing and idle recommendations for Amazon EC2 Auto Scaling groups. This section outlines what Compute Optimizer supports for both types of recommendations.

Rightsizing recommendations

Compute Optimizer supports rightsizing recommendations for EC2 Auto Scaling groups that have the following:

- Single EC2 instance types

- Mixed EC2 instance types
- One or multiple scaling policies based on CPU utilization:
  - Target tracking
  - Predictive scaling
  - Simple scaling
  - Step scaling
- Scheduled scaling policies
- No scaling policy

> **Note**
>
> Compute Optimizer doesn't support rightsizing recommendations for EC2 Auto Scaling groups that have the following:
>
> - EC2 instance types that aren't supported by Compute Optimizer
> - Spot Instances
> - Mixed instance types that contain any instances outside of the C, M, or R instance families
> - Amazon ECS or Amazon EKS workloads
> - Mixed instance types containing both AMD and Intel instances
> - Mixed instance types using instance weights
> - Mixed instance types containing both x86 and Graviton instances
> - Mixed instance types containing instances on different platforms, such as Windows, SQL Server, and Linux

Idle recommendations

Compute Optimizer supports idle recommendations for EC2 Auto Scaling groups that use most of the Supported Amazon EC2 instance types. This includes EC2 Auto Scaling groups that have the following:

- EC2 Spot Instances
- Mixed instance types containing any of the instance families that Compute Optimizer supports (including G and P instance families)

- Amazon ECS or Amazon EKS workloads

Supported Amazon EBS volume types

Compute Optimizer generates recommendations for the following EBS volume types that are attached to an instance:

- HDD `st1` and `sc1`
- General Purpose SSD `gp2` and `gp3`
- Provisioned IOPS SSD `io1`, `io2`, and `io2 Block Express`

Compute Optimizer also generates recommendations to move your data out from previous generation HDD Magnetic volumes. For more information, see Amazon EBS previous generation volumes.

Additional resources

- Resource requirements
- Metrics analyzed by AWS Compute Optimizer
- Getting started with AWS Compute Optimizer

Resource requirements

This page provides you with an overview of the resource requirements needed for AWS Compute Optimizer to generate optimization recommendations. For Compute Optimizer to generate recommendations, your AWS resources must meet Amazon CloudWatch metric and resource-specific requirements. Compute Optimizer has different CloudWatch metric data requirements for each resource type.

If your resources don't have enough metric data, allow for more time before the recommendations start appearing in the Compute Optimizer console. For example, if your resources have enough metric data but the recommendations aren't showing up, this probably means that Compute Optimizer is still analyzing your resources. It can take up to 24 hours to complete the analysis. After the analysis is complete, resource recommendations appear in the Compute Optimizer console.

Topics

Amazon EC2 instance and EC2 Auto Scaling group requirements

Amazon EC2 instances and EC2 Auto Scaling groups both require at least 30 hours of CloudWatch metric data in the past 14 days.

If you enabled the enhanced infrastructure metrics feature, both EC2 instances and EC2 Auto Scaling require at least 30 hours of CloudWatch metric data over the past 93 days. For more information, see Enhanced infrastructure metrics.

For a list of the instance types supported by Compute Optimizer, see Supported Amazon EC2 instance types. For information about the EC2 Auto Scaling groups that Compute Optimizer supports, see Supported Amazon EC2 Auto Scaling groups.

Important

You must enable Cost Explorer to allow Compute Optimizer to use Cost Explorer's billing data to calculate savings and populate pricing information for your recommendations. We recommend that you also opt in to Cost Optimization Hub to receive rightsizing recommendations that consider any Reserved Instances or Savings Plans pricing models that are active in your accounts. For more information, see Enabling Cost Explorer and Getting started with Cost Optimization Hub in the *AWS Cost Management User Guide*.

Amazon EBS volume requirements

Compute Optimizer generates recommendations for EBS volume types that are attached to a running instance for at least 30 consecutive hours. Data is only reported to CloudWatch when the volume is attached to a running instance. If you detach an EBS volume from an EC2 instance, the recommendations for that volume will no longer be available.

For a list of Amazon EBS volume types supported by Compute Optimizer, see Supported Amazon EBS volume types.

Lambda function requirements

Compute Optimizer generates memory size recommendations only for Lambda functions that meet the following requirements:

- The configured memory is less than or equal to 1,792 MB.
- The functions were invoked at least 50 times in the last 14 days.

Functions that don't meet these requirements are given a finding of **Unavailable**. The reason code of **Inconclusive** applies to functions that have configured memory greater than 1,792 MB. **Insufficient data** applies to functions that have been invoked fewer than 50 times in the last 14 days.

Functions with a finding of **Unavailable** don't appear in the Compute Optimizer console and don't receive recommendations.

> **Note**
>
> Lambda functions don't require CloudWatch metric data.

Requirements for Amazon ECS services on Fargate

To generate recommendations for Amazon ECS services on Fargate, Compute Optimizer requires the following:

- Your services have at least 24 hours of CloudWatch and Amazon ECS utilization metrics in the past 14 days.
- No step scaling policy is attached.
- No target scaling policy is attached to CPU and memory.

> **Note**
>
> If a target tracking policy is attached to the service's CPU only, Compute Optimizer only generates memory size recommendations. Or, if a target tracking policy is attached to the service's memory only, Compute Optimizer only generates CPU size recommendations.

- The service run status is **SteadyState** or **MoreWork**.

For more information about the metrics analyzed, see Metrics for Amazon ECS services on Fargate.

Commercial software license requirements

Compute Optimizer only generates license recommendations for Microsoft SQL Server on Amazon EC2.

To generate recommendations for commercial software licenses, Compute Optimizer requires the following:

- At least 30 *consecutive* hours of CloudWatch metric data.
- Enable CloudWatch Application Insights using your Microsoft SQL Server database credentials.

For more information about how to enable CloudWatch Application Insights, see Set up Amazon CloudWatch Application Insights for monitoring in the *Amazon CloudWatch User Guide*.

- Attach the required instance role and policy for CloudWatch Application Insights. For more information, see Policies to enable commercial software license recommendations.

For more information about the metrics analyzed, see Metrics for commercial software licenses.

Additional resources

- AWS resources supported by Compute Optimizer
- Metrics analyzed by AWS Compute Optimizer
- Getting started with AWS Compute Optimizer

Getting started with AWS Compute Optimizer

When you access the AWS Compute Optimizer console for the first time, you're asked to opt in using the account that you're signed in with. Before you can use the service, you must opt in or out. In addition, you can also opt in or opt out using the Compute Optimizer API, AWS Command Line Interface (AWS CLI), or SDKs.

By opting in, you're authorizing Compute Optimizer to analyze the specifications and utilization metrics of your AWS resources. Examples include EC2 instances and EC2 Auto Scaling groups.

> **Note**
>
> To improve the recommendation quality of Compute Optimizer, Amazon Web Services might use your CloudWatch metrics and configuration data. This includes up to three months (93 days) of metrics analysis when you activate the enhanced infrastructure metrics feature. Contact AWS Support to request that AWS stop using your CloudWatch metrics and configuration data to improve the recommendation quality of Compute Optimizer.

Required permissions

You must have the appropriate permissions to opt in to Compute Optimizer, to view its recommendations, and to opt out. For more information, see Identity and Access Management for AWS Compute Optimizer.

When you opt in, Compute Optimizer automatically creates a Service-Linked Role in your account to access its data. For more information, see Using service-linked roles for AWS Compute Optimizer.

Accounts supported by Compute Optimizer

The following AWS account types can opt in to Compute Optimizer:

- **Standalone AWS account**

  A standalone AWS account that doesn't have AWS Organizations enabled. If you opt in to Compute Optimizer while signed in to a standalone account, Compute Optimizer analyzes the resources in the account and generates optimization recommendations for those resources.

- **Member account of an organization**

  An AWS account that's a member of an organization. If you opt in to Compute Optimizer while signed in to a member account of an organization, Compute Optimizer only analyzes the resources in the member account and generates optimization recommendations for those resources.

- **Management account of an organization**

  An AWS account that administers an organization. If you opt in to Compute Optimizer while signed in to a management account of an organization, Compute Optimizer gives you the option to opt in the management account only, or the management account and all member accounts of the organization.

  > **Important**
  >
  > To opt in all member accounts for an organization, make sure that the organization has all features enabled. For more information, see Enabling All Features in Your Organization in the *AWS Organizations User Guide*.
  > When you opt in using your organization's management account and include all member accounts within the organization, trusted access for Compute Optimizer is enabled in your organization account. For more information, see Trusted access for AWS Organizations.

Next steps

For instructions on how to opt in your account, or the accounts within your organization, to AWS Compute Optimizer, see Opting in to AWS Compute Optimizer.

Additional resources

- Identity and Access Management for AWS Compute Optimizer
- AWS managed policies for AWS Compute Optimizer
- Using service-linked roles for AWS Compute Optimizer

Opting in to AWS Compute Optimizer

Use the following procedure to opt in your account, or the accounts within your organization, to AWS Compute Optimizer. You can opt in using the Compute Optimizer console or the AWS Command Line Interface (AWS CLI).

> **Note**
>
> If your account is already opted in, but you want to opt in again to re-enable trusted access for Compute Optimizer in your organization. You can opt in again, but this must be done using the AWS CLI. When you opt in using the AWS CLI, run the `update-enrollment-status` command and specify the `--include-member-accounts` parameter. Alternatively, you can enable trusted access directly in the AWS Organizations console or by using AWS CLI or API. For more information, see Using AWS Organizations with other AWS services in the *AWS Organizations User Guide*.

Prerequisites

Make sure your IAM identity has appropriate permissions to opt in to AWS Compute Optimizer. The suggested policy that grants this permission is Policy to opt in to Compute Optimizer.

Procedure

Console

To opt in to Compute Optimizer

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.

   If this is your first time using the Compute Optimizer console, the **Compute Optimizer landing page** is displayed.
2. Choose **Get started**.
3. On the **Account setup** page, review the **Getting started** and **Setting up your account** sections.
4. The following options are displayed if the account that you're signed in to is the management account of your organization. Choose one before continuing to the next step.

- **Only this account** - Choose this option to opt in only the account that you're currently signed in to. If you choose this option, Compute Optimizer analyzes resources that are in the individual account, and generates optimization recommendations for those resources.
- **All accounts within this organization** - Choose this option to opt in the account you're currently signed in to, and all of its member accounts. If you choose this option, Compute Optimizer analyzes resources that are in all accounts in the organization, and generates optimization recommendations for those resources.

> **Note**
>
> If you add any new member accounts to your organization after you opt in, Compute Optimizer automatically opts in those accounts.

5. Choose **Opt in**. By opting in, you indicate that you agree to and understand the requirements to opt in to Compute Optimizer.

After you opt in, you're redirected to the dashboard in the Compute Optimizer console. At the same time, the service immediately starts analyzing the configuration and utilization metrics of your AWS resources. For more information, see Metrics analyzed by AWS Compute Optimizer.

> **Note**
>
> When you complete the opt in process, it can up to 24 hours for the opted-in accounts to appear in the Compute Optimizer console.

CLI

To opt in to Compute Optimizer

1. Open a terminal or command prompt window.

   If you didn't already install the AWS CLI already, install and configure it to work with Compute Optimizer. For more information, see Installing the AWS CLI and Quickly Configuring the AWS CLI in the *AWS Command Line Interface User Guide*.

2. Enter one of the following commands. Choose if you want to opt in your individual account or the management account of your organization and all its member accounts.

   - To opt in your individual account:

     ```
     aws compute-optimizer update-enrollment-status --status Active
     ```

   - To opt in the management account of an organization and include all member accounts within the organization:

     ```
     aws compute-optimizer update-enrollment-status --status Active --include-member-accounts
     ```

   After you opt in to Compute Optimizer using the previous command, the service begins analyzing the configuration and utilization metrics of your AWS resources. For more information, see Metrics analyzed by AWS Compute Optimizer.

Next steps

- Make sure that your AWS resources meet the necessary requirements for Compute Optimizer to generate your receommendations. And allow for at least 24 hours for your optimization recommendations to be generated. be generated. For more information, see Resource requirements.
- View the findings and recommendations in the dashboard and recommendation pages of the Compute Optimizer console. For more information, see Using the AWS Compute Optimizer dashboard and Viewing resource recommendations.
- Consider extending the lookback period from the 14-day default period to 93 days by activating the enhanced infrastructure metrics feature. For more information, see Enhanced infrastructure metrics.

Additional resources

- Identity and Access Management for AWS Compute Optimizer
- AWS managed policies for AWS Compute Optimizer
- Using service-linked roles for AWS Compute Optimizer

- Troubleshooting — Troubleshooting in Compute Optimizer

Opting out of Compute Optimizer

Use the following procedure to opt your account out of Compute Optimizer using the AWS CLI. This procedure also deletes your account's recommendations and related metrics data from Compute Optimizer. For more information, see update-enrollment-status in the *AWS CLI Command Reference*.

> **Note**
>
> You can't opt out using the Compute Optimizer console.

Procedure

To opt an account out of Compute Optimizer

1. Open a terminal or command prompt window.

   If you haven't already, install the AWS CLI and configure it to work with Compute Optimizer. For more information, see Installing the AWS CLI and Quickly Configuring the AWS CLI in the *AWS Command Line Interface User Guide*.
2. Enter the following command.

   ```
   aws compute-optimizer update-enrollment-status --status Inactive
   ```

   > **Note**
   >
   > You can't specify the `--include-member-accounts` parameter when opting out with the `update-enrollment-status` command. If you specify this parameter when opting out with this command, an error occurs.

Your account is opted out of Compute Optimizer after running the previous command. At the same time, your account's recommendations and related metrics data are deleted from Compute Optimizer. If you access the Compute Optimizer console, the option to opt in again should be displayed.

Identity and Access Management for AWS Compute Optimizer

You can use AWS Identity and Access Management (IAM) to create identities (users, groups, or roles), and give those identities permissions to access the AWS Compute Optimizer console and APIs.

By default, IAM users don't have access to the Compute Optimizer console and APIs. You give users access by attaching IAM policies to a single user, a group of users, or a role. For more information, see Identities (Users, Groups, and Roles) and Overview of IAM Policies in the IAM User Guide.

After you create IAM users, you can give those users individual passwords. Then, they can sign in to your account and view Compute Optimizer information by using an account-specific sign-in page. For more information, see How Users Sign In to Your Account.

Important

- To view recommendations for EC2 instances, an IAM user requires the `ec2:DescribeInstances` permission.
- To view recommendations for EBS volumes, an IAM user requires the `ec2:DescribeVolumes` permission.
- To view recommendations for EC2 Auto Scaling groups, an IAM user requires the `autoscaling:DescribeAutoScalingGroups` and `autoscaling:DescribeAutoScalingInstances` permissions.
- To view recommendations for Lambda functions, an IAM user requires the `lambda:ListFunctions` and `lambda:ListProvisionedConcurrencyConfigs` permissions.
- To view recommendations for Amazon ECS services on Fargate, an IAM user requires the `ecs:ListServices` and `ecs:ListClusters` permissions.
- To view current CloudWatch metrics data in the Compute Optimizer console, an IAM user requires the `cloudwatch:GetMetricData` permission.
- To view recommendations commercial software licenses, certain Amazon EC2 instance roles and IAM user permissions are required. For more information see, Policies to enable commercial software license recommendations.
- To view recommendations for Amazon RDS, an IAM user requires the `rds:DescribeDBInstances` and `rds:DescribeDBClusters` permissions.

If the user or group that you want to give permissions to already has a policy, you can add one of the Compute Optimizer specific policy statements illustrated here to that policy.

Topics

Trusted access for AWS Organizations

When you opt in using your organization's management account and include all member accounts within the organization, trusted access for Compute Optimizer is automatically enabled in your organization account. This allows Compute Optimizer to analyze compute resources in those member accounts, and generate recommendations for them.

Every time that you access recommendations for member accounts, Compute Optimizer verifies that trusted access is enabled in your organization account. If you disable Compute Optimizer trusted access after you opt in, Compute Optimizer denies access to recommendations for your organization's member accounts. Moreover, the member accounts within the organization aren't opted in to Compute Optimizer. To re-enable trusted access, opt in to Compute Optimizer again using your organization's management account and include all the member accounts within the organization. For more information, see Opting in to AWS Compute Optimizer. For more information about AWS Organizations trusted access, see Using AWS Organizations with other AWS services in the *AWS Organizations User Guide*.

Policy examples for Compute Optimizer

Topics

Policy to opt in to Compute Optimizer

This policy statement grants the following:

- Access to opt in to Compute Optimizer.
- Access to create a service-linked role for Compute Optimizer. For more information, see Using service-linked roles for AWS Compute Optimizer.
- Access to update the enrollment status to the Compute Optimizer service.

> **Important**
>
> This IAM role is required to opt in to AWS Compute Optimizer.

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "iam:CreateServiceLinkedRole",
            "Resource": "arn:aws:iam::*:role/aws-service-role/compute-
optimizer.amazonaws.com/AWSServiceRoleForComputeOptimizer*",
            "Condition": {"StringLike": {"iam:AWSServiceName": "compute-
optimizer.amazonaws.com"}}
        },
        {
            "Effect": "Allow",
            "Action": "iam:PutRolePolicy",
            "Resource": "arn:aws:iam::*:role/aws-service-role/compute-
optimizer.amazonaws.com/AWSServiceRoleForComputeOptimizer"
        },
        {
            "Effect": "Allow",
            "Action": "compute-optimizer:UpdateEnrollmentStatus",
            "Resource": "*"
        }
    ]
```

```
}
```

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "iam:CreateServiceLinkedRole",
            "Resource": "arn:aws-cn:iam::*:role/aws-service-role/compute-
optimizer.amazonaws.com/AWSServiceRoleForComputeOptimizer*",
            "Condition": {"StringLike": {"iam:AWSServiceName": "compute-
optimizer.amazonaws.com"}}
        },
        {
            "Effect": "Allow",
            "Action": "iam:PutRolePolicy",
            "Resource": "arn:aws-cn:iam::*:role/aws-service-role/compute-
optimizer.amazonaws.com/AWSServiceRoleForComputeOptimizer"
        },
        {
            "Effect": "Allow",
            "Action": "compute-optimizer:UpdateEnrollmentStatus",
            "Resource": "*"
        },
        {
            "Effect": "Allow",
            "Action": "organizations:DescribeOrganization",
            "Resource": "*"
        }
    ]
}
```

Policies to grant access to Compute Optimizer for standalone AWS accounts

The following policy statement grants full access to Compute Optimizer for standalone AWS accounts.

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "compute-optimizer:*",
                "ec2:DescribeInstances",
                "ec2:DescribeVolumes",
                "ecs:ListServices",
                "ecs:ListClusters",
                "autoscaling:DescribeAutoScalingGroups",
                "autoscaling:DescribeAutoScalingInstances",
                "lambda:ListFunctions",
                "lambda:ListProvisionedConcurrencyConfigs",
                "cloudwatch:GetMetricData"
            ],
            "Resource": "*"
        }
    ]
}
```

The following policy statement grants read-only access to Compute Optimizer for standalone AWS accounts.

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "compute-optimizer:GetEnrollmentStatus",
                "compute-optimizer:GetEffectiveRecommendationPreferences",
                "compute-optimizer:GetRecommendationPreferences",
                "compute-optimizer:GetRecommendationSummaries",
                "compute-optimizer:GetEC2InstanceRecommendations",
```

```
                "compute-optimizer:GetEC2RecommendationProjectedMetrics",
                "compute-optimizer:GetAutoScalingGroupRecommendations",
                "compute-optimizer:GetEBSVolumeRecommendations",
                "compute-optimizer:GetLambdaFunctionRecommendations",
                "compute-optimizer:DescribeRecommendationExportJobs",
                "compute-optimizer:GetEffectiveRecommendationPreferences",
                "compute-optimizer:GetRecommendationPreferences",
                "compute-optimizer:GetECSServiceRecommendations",
                "compute-optimizer:GetECSServiceRecommendationProjectedMetrics",
                "compute-optimizer:GetRDSDatabaseRecommendations",
                "compute-optimizer:GetRDSDatabaseRecommendationProjectedMetrics",
                "compute-optimizer:GetIdleRecommendations",
                "ec2:DescribeInstances",
                "ec2:DescribeVolumes",
                "ecs:ListServices",
                "ecs:ListClusters",
                "autoscaling:DescribeAutoScalingGroups",
                "autoscaling:DescribeAutoScalingInstances",
                "lambda:ListFunctions",
                "lambda:ListProvisionedConcurrencyConfigs",
                "cloudwatch:GetMetricData",
                "rds:DescribeDBInstances",
                "rds:DescribeDBClusters"
            ],
            "Resource": "*"
        }
    ]
}
```

Policies to grant access to Compute Optimizer for a management account of an organization

The following policy statement grants full access to Compute Optimizer for a management account of your organization.

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
```

```
            "Effect": "Allow",
            "Action": [
                "compute-optimizer:*",
                "ec2:DescribeInstances",
                "ec2:DescribeVolumes",
                "ecs:ListServices",
                "ecs:ListClusters",
                "autoscaling:DescribeAutoScalingGroups",
                "autoscaling:DescribeAutoScalingInstances",
                "lambda:ListFunctions",
                "lambda:ListProvisionedConcurrencyConfigs",
                "cloudwatch:GetMetricData",
                "organizations:ListAccounts",
                "organizations:DescribeOrganization",
                "organizations:DescribeAccount",
                "organizations:EnableAWSServiceAccess",
                "organizations:ListDelegatedAdministrators",
                "organizations:RegisterDelegatedAdministrator",
                "organizations:DeregisterDelegatedAdministrator"
            ],
            "Resource": "*"
        }
    ]
}
```

The following policy statement grants read-only access to Compute Optimizer for a management account of an organization.

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "compute-optimizer:GetEnrollmentStatus",
                "compute-optimizer:GetEnrollmentStatusesForOrganization",
                "compute-optimizer:GetRecommendationSummaries",
                "compute-optimizer:GetEC2InstanceRecommendations",
                "compute-optimizer:GetEC2RecommendationProjectedMetrics",
```

```
                "compute-optimizer:GetAutoScalingGroupRecommendations",
                "compute-optimizer:GetEBSVolumeRecommendations",
                "compute-optimizer:GetLambdaFunctionRecommendations",
                "compute-optimizer:GetEffectiveRecommendationPreferences",
                "compute-optimizer:GetRecommendationPreferences",
                "compute-optimizer:GetECSServiceRecommendations",
                "compute-optimizer:GetECSServiceRecommendationProjectedMetrics",
                "compute-optimizer:GetRDSDatabaseRecommendations",
                "compute-optimizer:GetRDSDatabaseRecommendationProjectedMetrics",
                "compute-optimizer:GetIdleRecommendations",
                "ec2:DescribeInstances",
                "ec2:DescribeVolumes",
                "ecs:ListServices",
                "ecs:ListClusters",
                "autoscaling:DescribeAutoScalingGroups",
                "autoscaling:DescribeAutoScalingInstances",
                "lambda:ListFunctions",
                "lambda:ListProvisionedConcurrencyConfigs",
                "cloudwatch:GetMetricData",
                "organizations:ListAccounts",
                "organizations:DescribeOrganization",
                "organizations:DescribeAccount",
                "organizations:ListDelegatedAdministrators",
                "rds:DescribeDBInstances",
                "rds:DescribeDBClusters"
            ],
            "Resource": "*"
        }
    ]
}
```

Policies to grant access to manage Compute Optimizer recommendation preferences

The following policy statements grant access to view and edit recommendation preferences.

Grant access to manage recommendation preferences for EC2 instances only

JSON

```
{
```

```
 "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "compute-optimizer:DeleteRecommendationPreferences",
                "compute-optimizer:GetEffectiveRecommendationPreferences",
                "compute-optimizer:GetRecommendationPreferences",
                "compute-optimizer:PutRecommendationPreferences"
            ],
            "Resource": "*",
            "Condition" :  {
                "StringEquals" : {
                    "compute-optimizer:ResourceType" : "Ec2Instance"
                }
            }
        }
    ]
}
```

Grant access to manage recommendation preferences for EC2 Auto Scaling groups only

JSON

```
{
 "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "compute-optimizer:DeleteRecommendationPreferences",
                "compute-optimizer:GetEffectiveRecommendationPreferences",
                "compute-optimizer:GetRecommendationPreferences",
                "compute-optimizer:PutRecommendationPreferences"
            ],
            "Resource": "*",
            "Condition" :  {
                "StringEquals" : {
                    "compute-optimizer:ResourceType" : "AutoScalingGroup"
                }
            }
        }
```

```
    ]
}
```

Grant access to manage recommendation preferences for RDS instances only

JSON

```
{
 "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "compute-optimizer:DeleteRecommendationPreferences",
                "compute-optimizer:GetEffectiveRecommendationPreferences",
                "compute-optimizer:GetRecommendationPreferences",
                "compute-optimizer:PutRecommendationPreferences"
            ],
            "Resource": "*",
            "Condition" :  {
                "StringEquals" : {
                    "compute-optimizer:ResourceType" : "RdsDBInstance"
                }
            }
        }
    ]
}
```

Policies to enable commercial software license recommendations

For Compute Optimizer to generate license recommendations, attach the following Amazon EC2 instance roles and policies.

- The `AmazonSSMManagedInstanceCore` role to enable Systems Manager. For more information, see AWS Systems Manager identity-based policy examples in the *AWS Systems Manager User Guide*.
- The `CloudWatchAgentServerPolicy` policy to enable the release of instance metrics and logs to CloudWatch. For more information, see Create IAM roles and users for use with the CloudWatch agent in the *Amazon CloudWatch User Guide*.

- The following IAM inline policy statement to read the secret Microsoft SQL Server connection string stored in AWS Systems Manager. For more information about inline policies, see Managed policies and inline policies in the *AWS Identity and Access Management User Guide*.

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "secretsmanager:GetSecretValue*"
            ],
            "Resource": "arn:aws:secretsmanager:*:*:secret:ApplicationInsights-*"
        }
    ]
}
```

Additionally, to enable and receive license recommendations, attach the following IAM policy to your user, group or role. For more information, IAM policy in the *Amazon CloudWatch User Guide*.

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
            "Action": [
                "applicationinsights:*",
                "iam:CreateServiceLinkedRole",
                "iam:ListRoles",
                "resource-groups:ListGroups"
            ],
            "Effect": "Allow",
            "Resource": "*"
        }
    ]
}
```

Policy to deny access to Compute Optimizer

The following policy statement denies access to Compute Optimizer.

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Deny",
            "Action": "compute-optimizer:*",
            "Resource": "*"
        }
    ]
}
```

Policy examples for Automation

Topics

- Policy to enable Automation for your account
- Policy to enable Automation across your organization
- Policy to grant full access to Compute Optimizer Automation for standalone AWS accounts
- Policy to grant read-only access to Compute Optimizer Automation for standalone AWS accounts
- Policy to grant full access to Compute Optimizer Automation for a management account of an organization
- Policy to grant read-only access to Compute Optimizer Automation for a management account of an organization

Policy to enable Automation for your account

The following policy statement enables Automation for your account.

```
{
    "Version": "2012-10-17",
    "Statement": [
```

```
        {
            "Effect": "Allow",
            "Action": "iam:CreateServiceLinkedRole",
            "Resource": "arn:aws:iam::*:role/aws-service-role/aco-
automation.amazonaws.com/AWSServiceRoleForComputeOptimizerAutomation",
            "Condition": {"StringLike": {"iam:AWSServiceName": "aco-
automation.amazonaws.com"}}
        },
        {
            "Effect": "Allow",
            "Action": [
                "iam:PutRolePolicy",
                "iam:AttachRolePolicy"
            ],
            "Resource": "arn:aws:iam::*:role/aws-service-role/aco-
automation.amazonaws.com/AWSServiceRoleForComputeOptimizerAutomation"
        },
        {
            "Effect": "Allow",
            "Action": "aco-automation:UpdateEnrollmentConfiguration",
            "Resource": "*"
        }
    ]
}
```

Policy to enable Automation across your organization

The following policy statement enables Automation across your organization.

```
                {
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "iam:CreateServiceLinkedRole",
            "Resource": "arn:aws:iam::*:role/aws-service-role/aco-
automation.amazonaws.com/AWSServiceRoleForComputeOptimizerAutomation",
            "Condition": {"StringLike": {"iam:AWSServiceName": "aco-
automation.amazonaws.com"}}
        },
```

```
        {
            "Effect": "Allow",
            "Action": [
                "iam:PutRolePolicy",
                "iam:AttachRolePolicy"
            ],
            "Resource": "arn:aws:iam::*:role/aws-service-role/aco-
automation.amazonaws.com/AWSServiceRoleForComputeOptimizerAutomation"
        },
        {
            "Effect": "Allow",
            "Action": "aco-automation:UpdateEnrollmentConfiguration",
            "Resource": "*"
        },
        {
            "Effect": "Allow",
            "Action": "aco-automation:AssociateAccounts",
            "Resource": "*"
        },
        {
            "Effect": "Allow",
            "Action": "aco-automation:DisassociateAccounts",
            "Resource": "*"
        },
        {
            "Effect": "Allow",
            "Action": "aco-automation:ListAccounts",
            "Resource": "*"
        }
    ]
}
```

Policy to grant full access to Compute Optimizer Automation for standalone AWS accounts

The following policy grants full access to Compute Optimizer Automation for standalone AWS accounts.

```
                {
    "Version": "2012-10-17",
    "Statement": [
```

```
        {
            "Effect": "Allow",
            "Action": [
               "aco-automation:*",
            "ec2:DescribeVolumes"
            ],
            "Resource": "*"
        }
    ]
}
```

Policy to grant read-only access to Compute Optimizer Automation for standalone AWS accounts

The following policy grants read-only access to Compute Optimizer Automation for standalone AWS accounts.

```
                {
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
               "aco-automation:GetEnrollmentConfiguration",
               "aco-automation:GetAutomationEvent",
               "aco-automation:GetAutomationRule",
               "aco-automation:ListAutomationEvents",
               "aco-automation:ListAutomationEventSteps",
               "aco-automation:ListAutomationEventSummaries",
               "aco-automation:ListAutomationRules",
               "aco-automation:ListAutomationRulePreview",
               "aco-automation:ListAutomationRulePreviewSummaries",
               "aco-automation:ListRecommendedActions",
               "aco-automation:ListRecommendedActionSummaries",
               "aco-automation:ListTagsForResource",
               "ec2:DescribeVolumes"
            ],
            "Resource": "*"
        }
    ]
}
```

Policy to grant full access to Compute Optimizer Automation for a management account of an organization

The following policy grants full access to Compute Optimizer Automation for a management account of an organization.

```
            {
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
               "aco-automation:*",
               "ec2:DescribeVolumes",
               "organizations:ListAccounts",
               "organizations:DescribeOrganization",
               "organizations:DescribeAccount",
               "organizations:EnableAWSServiceAccess",
               "organizations:ListDelegatedAdministrators",
               "organizations:RegisterDelegatedAdministrator",
               "organizations:DeregisterDelegatedAdministrator"
            ],
            "Resource": "*"
        }
    ]
}
```

Policy to grant read-only access to Compute Optimizer Automation for a management account of an organization

The following policy grants read-only access to Compute Optimizer Automation for a management account of an organization.

```
            {
    "Version": "2012-10-17",
    "Statement": [
        {
```

```
            "Effect": "Allow",
            "Action": [
               "aco-automation:GetEnrollmentConfiguration",
               "aco-automation:GetAutomationEvent",
               "aco-automation:GetAutomationRule",
               "aco-automation:ListAccounts",
               "aco-automation:ListAutomationEvents",
               "aco-automation:ListAutomationEventSteps",
               "aco-automation:ListAutomationEventSummaries",
               "aco-automation:ListAutomationRules",
               "aco-automation:ListAutomationRulePreview",
               "aco-automation:ListAutomationRulePreviewSummaries",
               "aco-automation:ListRecommendedActions",
               "aco-automation:ListRecommendedActionSummaries",
               "aco-automation:ListTagsForResource",
               "ec2:DescribeVolumes"
            ],
            "Resource": "*"
        }
    ]
}
```

Additional resources

- Troubleshooting — Troubleshooting in Compute Optimizer
- Opting in to AWS Compute Optimizer
- AWS managed policies for AWS Compute Optimizer
- Using service-linked roles for AWS Compute Optimizer
- Using service-linked roles for Automation

AWS managed policies for AWS Compute Optimizer

To add permissions to users, groups, and roles, consider using AWS managed policies rather than to writing your own policies. It takes time and expertise to create IAM customer managed policies that provide your team with only the permissions they need. To get started quickly, you can use AWS managed policies. These policies cover common use cases and are available in your AWS account. For more information about AWS managed policies, see AWS managed policies in the *IAM User Guide*.

AWS services maintain and update AWS managed policies. You can't change the permissions in AWS managed policies. Services occasionally add additional permissions to an AWS managed policy to support new features. This type of update affects all identities (users, groups, and roles) where the policy is attached. Services are most likely to update an AWS managed policy when a new feature is launched or when new operations become available. Services don't remove permissions from an AWS managed policy, so policy updates won't break your existing permissions.

Additionally, Amazon Web Services supports managed policies for job functions that span multiple services. For example, the **ReadOnlyAccess** AWS managed policy provides read-only access to all and resources. When a service launches a new feature, AWS adds read-only permissions for new operations and resources. For a list and descriptions of job function policies, see AWS managed policies for job functions in the *IAM User Guide*.

Topics

AWS managed policy: ComputeOptimizerServiceRolePolicy

The `ComputeOptimizerServiceRolePolicy` managed policy is attached to a service-linked role that allows Compute Optimizer to perform actions on your behalf. For more information, see Using service-linked roles for AWS Compute Optimizer.

> **Note**
>
> You can't attach `ComputeOptimizerServiceRolePolicy` to your IAM entities.

Permissions details

This policy includes the following permissions.

- `compute-optimizer` – Grants full administrative permissions to all resources in Compute Optimizer.

- `organizations` – Allows the management account of an AWS organization to opt in member accounts of the organization to Compute Optimizer.
- `cloudwatch` – Grants access to CloudWatch resource metrics for the purpose of analyzing them and generating Compute Optimizer resource recommendations.

JSON

```
{
 "Version":"2012-10-17",
 "Statement": [
  {
   "Sid": "ComputeOptimizerFullAccess",
   "Effect": "Allow",
   "Action": [
    "compute-optimizer:*"
   ],
   "Resource": "*"
  },
  {
   "Sid": "AwsOrgsAccess",
   "Effect": "Allow",
   "Action": [
    "organizations:DescribeOrganization",
    "organizations:ListAccounts",
    "organizations:ListAWSServiceAccessForOrganization",
                                "organizations:ListDelegatedAdministrators"
   ],
   "Resource": [
    "*"
   ]
  },
  {
   "Sid": "CloudWatchAccess",
   "Effect": "Allow",
   "Action": [
    "cloudwatch:GetMetricData",
    "cloudwatch:DescribeAlarms"
   ],
   "Resource": "*"
  },
  {
```

```
   "Sid": "AutoScalingAccess",
   "Effect": "Allow",
   "Action": [
    "autoscaling:DescribeAutoScalingInstances",
    "autoscaling:DescribeAutoScalingGroups",
    "autoscaling:DescribePolicies",
                               "autoscaling:DescribeScheduledActions"
   ],
   "Resource": "*"
  },
  {
                        "Sid": "Ec2Access",
                        "Effect": "Allow",
                        "Action": [
                               "ec2:DescribeInstances",
                               "ec2:DescribeVolumes"
                        ],
                        "Resource": "*"
                }
 ]
}
```

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
            "Sid": "ComputeOptimizerFullAccess",
            "Effect": "Allow",
            "Action": [
                "compute-optimizer:*"
            ],
            "Resource": "*"
        },
        {
            "Sid": "AwsOrgsAccess",
            "Effect": "Allow",
            "Action": [
                "organizations:DescribeOrganization",
                "organizations:ListAccounts",
                "organizations:ListAWSServiceAccessForOrganization"
```

```
            ],
            "Resource": [
                "*"
            ]
        },
        {
            "Sid": "CloudWatchAccess",
            "Effect": "Allow",
            "Action": [
                "cloudwatch:GetMetricData"
            ],
            "Resource": "*"
        }
    ]
}
```

AWS managed policy: ComputeOptimizerReadOnlyAccess

You can attach the `ComputeOptimizerReadOnlyAccess` policy to your IAM identities.

This policy grants read-only permissions that allow IAM users to view Compute Optimizer resource recommendations.

Permissions details

This policy includes the following:

- `compute-optimizer` – Grants read-only access to Compute Optimizer resource recommendations.
- `ec2` – Grants read-only access to Amazon EC2 instances and Amazon EBS volumes.
- `autoscaling` – Grants read-only access to EC2 Auto Scaling groups.
- `lambda` – Grants read-only access to AWS Lambda functions and their configurations.
- `cloudwatch` – Grants read-only access to Amazon CloudWatch metric data for resource types that are supported by Compute Optimizer.
- `organizations` – Grants read-only access to member accounts of an AWS organization.
- `ecs` – Grants access to Amazon ECS services on Fargate.

JSON

```
{
 "Version":"2012-10-17",
 "Statement": [
  {
   "Effect": "Allow",
   "Action": [
    "compute-optimizer:DescribeRecommendationExportJobs",
    "compute-optimizer:GetEnrollmentStatus",
    "compute-optimizer:GetEnrollmentStatusesForOrganization",
    "compute-optimizer:GetRecommendationSummaries",
    "compute-optimizer:GetEC2InstanceRecommendations",
    "compute-optimizer:GetEC2RecommendationProjectedMetrics",
    "compute-optimizer:GetAutoScalingGroupRecommendations",
    "compute-optimizer:GetEBSVolumeRecommendations",
    "compute-optimizer:GetLambdaFunctionRecommendations",
    "compute-optimizer:GetRecommendationPreferences",
    "compute-optimizer:GetEffectiveRecommendationPreferences",
    "compute-optimizer:GetECSServiceRecommendations",
    "compute-optimizer:GetECSServiceRecommendationProjectedMetrics",
    "compute-optimizer:GetLicenseRecommendations",
    "compute-optimizer:GetRDSDatabaseRecommendations",
                                "compute-
optimizer:GetRDSDatabaseRecommendationProjectedMetrics",
                                "compute-optimizer:GetIdleRecommendations",
    "ec2:DescribeInstances",
    "ec2:DescribeVolumes",
    "ecs:ListServices",
    "ecs:ListClusters",
    "autoscaling:DescribeAutoScalingGroups",
    "autoscaling:DescribeAutoScalingInstances",
    "lambda:ListFunctions",
    "lambda:ListProvisionedConcurrencyConfigs",
    "cloudwatch:GetMetricData",
    "organizations:ListAccounts",
    "organizations:DescribeOrganization",
    "organizations:DescribeAccount",
    "rds:DescribeDBInstances",
                                "rds:DescribeDBClusters"
   ],
   "Resource": "*"
  }
```

```
 ]
}
```

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "compute-optimizer:DescribeRecommendationExportJobs",
                "compute-optimizer:GetEnrollmentStatus",
                "compute-optimizer:GetEnrollmentStatusesForOrganization",
                "compute-optimizer:GetRecommendationSummaries",
                "compute-optimizer:GetEC2InstanceRecommendations",
                "compute-optimizer:GetEC2RecommendationProjectedMetrics",
                "compute-optimizer:GetAutoScalingGroupRecommendations",
                "compute-optimizer:GetEBSVolumeRecommendations",
                "compute-optimizer:GetLambdaFunctionRecommendations",
                "compute-optimizer:GetECSServiceRecommendations",
  "compute-optimizer:GetECSServiceRecommendationProjectedMetrics",
    "compute-optimizer:GetLicenseRecommendations",
                "ec2:DescribeInstances",
                "ec2:DescribeVolumes",
                "ecs:ListServices",
  "ecs:ListClusters",
                "autoscaling:DescribeAutoScalingGroups",
                "lambda:ListFunctions",
                "lambda:ListProvisionedConcurrencyConfigs",
                "cloudwatch:GetMetricData",
                "organizations:ListAccounts",
                "organizations:DescribeOrganization",
                "organizations:DescribeAccount"
            ],
            "Resource": "*"
        }
    ]
}
```

AWS managed policy: ComputeOptimizerAutomationServiceRolePolicy

The `ComputeOptimizerAutomationServiceRolePolicy` managed policy is attached to a service-linked role that allows Compute Optimizer to to implement optimization recommendations by managing AWS resources in your account. . For more information, see Using service-linked roles for AWS Compute Optimizer.

> **Note**
>
> You can't attach `ComputeOptimizerAutomationServiceRolePolicy` to your IAM entities.

Permissions details

This policy includes the following permissions:

- `ec2:DescribeVolumes`, `ec2:DescribeSnapshots`, `ec2:DescribeVolumesModifications` – Grants read-only access to view Amazon EBS volumes, snapshots, and volume modification status for monitoring and validation purposes.
- `ec2:ModifyVolume`, `ec2:DeleteVolume` – Allows modification and deletion of Amazon EBS volumes, but only for resources that do not have the `exclude-from-compute-optimizer-automation`tag. This allows you to exclude resources from automated optimization actions.
- `ec2:CreateSnapshot` – Grants permission to create snapshots of Amazon EBS volumes for backup purposes before performing optimization actions.
- `ec2:CreateVolume` – Allows creation of Amazon EBS volumes from snapshots to support rollback operations in case optimization actions need to be reverted.
- `ec2:CreateTags` – Grants permission to add tags to Amazon EBS resources for tracking automation events and maintaining resource metadata.

To view the permissions for this policy, see ComputeOptimizerAutomationServiceRolePolicy in the in the *AWS Managed Policy Reference*.

Compute Optimizer updates to AWS managed policies

View details about updates to AWS managed policies for Compute Optimizer since this service began tracking these changes. For automatic alerts about changes to this page, subscribe to the RSS feed for this guide.

Change	Description	Date
Edit to the `ComputeOptimizerReadOnlyAccess` managed policy	Added the `compute-optimizer:GetLicenseRecommendations` actions to the `ComputeOptimizerReadOnlyAccess` managed policy.	July 26, 2023
Edit to the `ComputeOptimizerReadOnlyAccess` managed policy	Added the `GetEnrollmentStatusesForOrganization` action to the `ComputeOptimizerReadOnlyAccess` managed policy.	August 26, 2021
Compute Optimizer started tracking changes	Compute Optimizer started tracking changes for its AWS managed policies.	May 18, 2021

Using service-linked roles for AWS Compute Optimizer

AWS Compute Optimizer uses AWS Identity and Access Management (IAM) service-linked roles. A service-linked role is a unique type of IAM role that's linked directly to Compute Optimizer. Service-linked roles are predefined by Compute Optimizer and include all of the permissions that the service requires to call other on your behalf.

With a service-linked role,setting up Compute Optimizer doesn't require manually adding the necessary permissions. Compute Optimizer defines the permissions of its service-linked roles, and unless defined otherwise, only Compute Optimizer can assume its roles. The defined permissions

include the trust policy and the permissions policy, and that permissions policy cannot be attached to any other IAM entity.

For information about other services that support service-linked roles, see AWS Services That Work with IAM and look for the services that have **Yes** in the **Role** column. Choose a **Yes** with a link to view the service-linked role documentation for that service.

Topics

Service-linked role permissions for Compute Optimizer

Compute Optimizer uses the service-linked role that's named **AWSServiceRoleForComputeOptimizer** to access Amazon CloudWatch metrics for AWS resources in the account.

The AWSServiceRoleForComputeOptimizer service-linked role trusts the following services to assume the role:

- `compute-optimizer.amazonaws.com`

The role permissions policy allows Compute Optimizer to complete the following actions on the specified resources:

- Action: `cloudwatch:GetMetricData` on all AWS resources.
- Action: `cloudwatch:DescribeAlarms` on all AWS resources.
- Action: `organizations:DescribeOrganization` on all AWS resources.
- Action: `organizations:ListAccounts` on all AWS resources.
- Action: `organizations:ListAWSServiceAccessForOrganization` on all AWS resources.

- Action: `autoscaling:DescribeAutoScalingInstances` on all AWS resources.
- Action: `autoscaling:DescribeAutoScalingGroups` on all AWS resources.
- Action: `autoscaling:DescribePolicies` on all AWS resources.
- Action: `autoscaling:DescribeScheduledActions` on all AWS resources.
- Action: `ec2:DescribeInstances` on all AWS resources.
- Action: `ec2:DescribeSnapshots` on all AWS resources.
- Action: `ec2:DescribeVolumesModifications` on all AWS resources.
- Action: `ec2:CreateVolume` on all AWS resources.
- Action: `ec2:ModifyVolume` on all AWS resources.
- Action: `ec2:DeleteVolume` on all AWS resources.
- Action: `ec2:CreateSnapshot` on all AWS resources.
- Action: `ec2:createTags` on all AWS resources.

Service-linked role permissions

To create a service-linked role for Compute Optimizer, configure permissions to allow an IAM entity (such as a user, group, or role) to create the service-linked role. For more information, see Service-Linked Role Permissions in the *IAM User Guide*.

To allow an IAM entity to create a specific service-linked role for Compute Optimizer

Add the following policy to the IAM entity that needs to create the service-linked role.

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "iam:CreateServiceLinkedRole",
            "Resource": "arn:aws:iam::*:role/aws-service-role/compute-
optimizer.amazonaws.com/AWSServiceRoleForComputeOptimizer*",
            "Condition": {"StringLike": {"iam:AWSServiceName": "compute-
optimizer.amazonaws.com"}}
        },
```

```
        {
            "Effect": "Allow",
            "Action": "iam:PutRolePolicy",
            "Resource": "arn:aws:iam::*:role/aws-service-role/compute-
optimizer.amazonaws.com/AWSServiceRoleForComputeOptimizer"
        },
        {
            "Effect": "Allow",
            "Action": "compute-optimizer:UpdateEnrollmentStatus",
            "Resource": "*"
        }
    ]
}
```

JSON

```
{
    "Version":"2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "iam:CreateServiceLinkedRole",
            "Resource": "arn:aws-cn:iam::*:role/aws-service-role/compute-
optimizer.amazonaws.com/AWSServiceRoleForComputeOptimizer*",
            "Condition": {"StringLike": {"iam:AWSServiceName": "compute-
optimizer.amazonaws.com"}}
        },
        {
            "Effect": "Allow",
            "Action": "iam:PutRolePolicy",
            "Resource": "arn:aws-cn:iam::*:role/aws-service-role/compute-
optimizer.amazonaws.com/AWSServiceRoleForComputeOptimizer"
        },
        {
            "Effect": "Allow",
            "Action": "compute-optimizer:UpdateEnrollmentStatus",
            "Resource": "*"
        },
        {
            "Effect": "Allow",
            "Action": "organizations:DescribeOrganization",
            "Resource": "*"
```

```
        }
    ]
}
```

To allow an IAM entity to create any service-linked role

Add the following statement to the permissions policy for the IAM entity that needs to create a service-linked role, or any service role that includes the needed policies. This policy attaches a policy to the role.

```
{
    "Effect": "Allow",
    "Action": "iam:CreateServiceLinkedRole",
    "Resource": "arn:aws:iam::*:role/aws-service-role/*"
}
```

To allow Compute Optimizer to perform recommended actions on behalf of customers

Add a statement to the permissions policy for the IAM entity that needs to create a service-linked role, or any service role that includes the needed policies. This policy attaches a policy to the role. For more information, see AWS managed policy: ComputeOptimizerAutomationServiceRolePolicy on the managed policy page.

Creating a Service-Linked Role for Compute Optimizer

You don't need to manually create a service-linked role. When you opt in to the Compute Optimizer service in the AWS Management Console, the AWS CLI, or the AWS API, Compute Optimizer creates the service-linked role for you.

> **Important**
>
> If you completed an action in another service that uses the features supported by the service-linked role, the role can appear in your account. For more information, see A New Role Appeared in My IAM Account.

If you delete this service-linked role, and then need to create it again, you can use the same process to recreate the role in your account. When you opt in to the Compute Optimizer service, Compute Optimizer creates the service-linked role for you again.

Editing a Service-Linked Role for Compute Optimizer

Compute Optimizer doesn't allow you to edit the AWSServiceRoleForComputeOptimizer service-linked role. After you create a service-linked role, you can't change the name of the role because various entities might reference the role. However, you can edit the description of the role using IAM. For more information, see Editing a Service-Linked Role in the *IAM User Guide*.

Deleting a Service-Linked Role for Compute Optimizer

We recommend that, if you no longer need to use Compute Optimizer, you delete the AWSServiceRoleForComputeOptimizer service-linked role. That way you don’t have an unused entity that's not actively monitored or maintained. However, before you can manually delete the service-linked role, you must opt out of Compute Optimizer.

To opt out of Compute Optimizer

For information about opting out of Compute Optimizer, see Opting out of Compute Optimizer.

To manually delete the service-linked role using IAM

Use the IAM console, the AWS CLI, or the AWS API to delete the AWSServiceRoleForComputeOptimizer service-linked role. For more information, see Deleting a Service-Linked Role in the *IAM User Guide*.

Supported Regions for Compute Optimizer service-linked Roles

Compute Optimizer supports using service-linked roles in all of the Regions where the service is available. To view the currently supported AWS Regions and endpoints for Compute Optimizer, see Compute Optimizer Endpoints and Quotas in the *AWS General Reference*.

Additional resources

- Troubleshooting — Troubleshooting in Compute Optimizer
- AWS managed policies for AWS Compute Optimizer
- Opting in to AWS Compute Optimizer
- Identity and Access Management for AWS Compute Optimizer

Using service-linked roles for Automation

AWS Compute Optimizer uses AWS Identity and Access Management (IAM) service-linked roles named AWSServiceRoleForComputeOptimizerAutomation. A service-linked role is a unique type of IAM role that's linked directly to Compute Optimizer Automation. Service-linked roles are predefined by Compute Optimizer Automation and include all of the permissions that the service requires to call other on your behalf.

With a service-linked role, setting up Compute Optimizer Automation doesn't require manually adding the necessary permissions. Compute Optimizer Automation defines the permissions of its service-linked roles, and unless defined otherwise, only Compute Optimizer Automation can assume its roles. The defined permissions include the trust policy and the permissions policy, and that permissions policy cannot be attached to any other IAM entity.

For information about other services that support service-linked roles, see AWS Services That Work with IAM and look for the services that have **Yes** in the **Role** column. Choose a **Yes** with a link to view the service-linked role documentation for that service.

Topics

Service-linked role permissions for Compute Optimizer Automation

Compute Optimizer Automation uses the service-linked role that's named **AWSServiceRoleForComputeOptimizerAutomation** which enables access to AWS services and resources used or managed by Compute Optimizer Automation. This service-linked role allows Compute Optimizer Automation to implement optimization recommendations by performing tasks such as creating, modifying, and deleting resources through other AWS services.

The AWSServiceRoleForComputeOptimizerAutomation service-linked role trusts the `aco-automation.amazonaws.com` services to assume the role.

The AWSServiceRoleForComputeOptimizerAutomation service-linked role uses the managed policy AWSComputeOptimizerAutomationRolePolicy.

Service-linked role permissions

To create a service-linked role for Compute Optimizer Automation, configure permissions to allow an IAM entity (such as a user, group, or role) to create the service-linked role. For more information, see Service-Linked Role Permissions in the *IAM User Guide*.

Add the following policy to the IAM entity that needs to create the service-linked role.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "iam:CreateServiceLinkedRole",
            "Resource": "arn:aws:iam::*:role/aws-service-role/aco-
automation.amazonaws.com/AWSServiceRoleForComputeOptimizerAutomation",
            "Condition": {"StringLike": {"iam:AWSServiceName": "aco-
automation.amazonaws.com"}}
        },
        {
            "Effect": "Allow",
            "Action": "iam:PutRolePolicy",
            "Resource": "arn:aws:iam::*:role/aws-service-role/aco-
automation.amazonaws.com/AWSServiceRoleForComputeOptimizerAutomation"
        }
    ]
}
```

Creating a Service-Linked Role for Compute Optimizer Automation

The AWSServiceRoleForComputeOptimizerAutomation service-linked role is created automatically when you enable Compute Optimizer Automation. You can enable the AWSServiceRoleForComputeOptimizerAutomation manually in the AWS CLI or the IAM API.

The service-linked role created for a Compute Optimizer Automation management account does not apply to member accounts. Compute Optimizer Automation creates a separate service-linked role for each account when the feature is enabled. When a management account enables

Automation for a member account, Compute Optimizer Automation creates the service-linked role on-demand the first time it implements a recommended action for that account. This occurs either when the management account or member account initiates the action directly or when an automation rule executes an action for that member account.

Editing a Service-Linked Role for Compute Optimizer Automation

Compute Optimizer Automation doesn't allow you to edit the AWSServiceRoleForComputeOptimizerAutomation service-linked role. After you create a service-linked role, you can't change the name of the role because various entities might reference the role. However, you can edit the description of the role using IAM. For more information, see Editing a Service-Linked Role in the *IAM User Guide*.

Deleting a Service-Linked Role for Compute Optimizer Automation

If you no longer need to use a feature or service that requires a service-linked role, we recommend that you delete the role. That way, you don't have an unused entity that isn't actively monitored or maintained.

When you disable Compute Optimizer Automation, Compute Optimizer Automation doesn't automatically delete the AWSServiceRoleForComputeOptimizerAutomation service-linked role for you. If you enable Compute Optimizer Automation again, the service can then start using the existing service-linked role again. If you no longer need to use Compute Optimizer Automation, you can manually delete the service-linked role.

> **Important**
>
> Before you delete the AWSServiceRoleForComputeOptimizerAutomation service-linked role, you must first disable Compute Optimizer Automation. If Compute Optimizer Automation isn't disabled when you try to delete the service-linked role, the deletion fails.

Use the IAM console, the AWS CLI, or the AWS API to delete the AWSServiceRoleForComputeOptimizerAutomation service-linked role. For more information, see Deleting a Service-Linked Role in the *IAM User Guide*.

Supported Regions for Compute Optimizer Automation service-linked Roles

Compute Optimizer Automation supports using service-linked roles in all of the Regions where the service is available. To view the currently supported AWS Regions and endpoints for Compute Optimizer, see Compute Optimizer Endpoints and Quotas in the *AWS General Reference*.

Metrics analyzed by AWS Compute Optimizer

After you opt in, AWS Compute Optimizer analyzes the specifications, such as vCPUs, memory, or storage, and the Amazon CloudWatch metrics of your running resources from a period over the last 14 days. If you activate the enhanced infrastructure metrics recommendation preference, AWS Compute Optimizer analyzes your resources for up to 93 days.

The analysis can take up to 24 hours to complete. When the analysis is complete, the findings are displayed on the dashboard page of the Compute Optimizer console. For more information, see Using the AWS Compute Optimizer dashboard.

Note

- To generate recommendations for Amazon EC2 instances, EC2 Auto Scaling groups, Amazon EBS volumes, Lambda functions, and commercial software licenses, Compute Optimizer uses the maximum utilization point within each five-minute time interval over the lookback period. For ECS services on Fargate recommendations, Compute Optimizer uses the maximum utilization point within each one-minute time interval.
- AWS might use your utilization data to help improve the overall quality of Compute Optimizer's recommendations. To stop AWS using your utilization data, contact AWS Support.

Contents

EC2 instance metrics

Topics

- Enabling memory utilization with the CloudWatch agent

Metrics analyzed for EC2 instances

Compute Optimizer analyzes the following CloudWatch metrics of your EC2 instances, including instances that are part of EC2 Auto Scaling groups.

Metric	Description
`CPUUtilization`	The percentage of allocated EC2 compute units that are in use on the instance. This metric identifies the processing power that's required to run an application on an instance.
`GPUEncoderStatsSessionCount`	The number of active encoding sessions on an NVIDIA GPU.
`NetworkIn`	The number of bytes that's received on all network interfaces by the instance. This metric identifies the volume of incoming network traffic to an instance.
`NetworkOut`	The number of bytes that are sent out on all network interfaces by the instance. This metric identifies the volume of outgoing network traffic from an instance.
`NetworkPacketsIn`	The number of packets that are received by the instance.
`NetworkPacketsOut`	The number of packets that are sent out by the instance.
`DiskReadOps`	The read operations per second of the instance store volume of the instance.
`DiskWriteOps`	The write operations per second of the instance store volume of the instance.
`DiskReadBytes`	The read bytes per second of the instance store volume of the instance.
`DiskWriteBytes`	The write bytes per second of the instance store volume of the instance.

Metric	Description
VolumeReadBytes	The read bytes per second of EBS volumes attached to the instance. Displayed as KiBs in the console.
VolumeWriteBytes	The write bytes per second of EBS volumes attached to the instance. Displayed as KiBs in the console.
VolumeReadOps	The read operations per second of EBS volumes attached to the instance.
VolumeWriteOps	The write operations per second of EBS volumes attached to the instance.

For more information about instance metrics, see List the available CloudWatch metrics for your instances in the *Amazon Elastic Compute Cloud User Guide*. For more information about EBS volume metrics, see Amazon CloudWatch metrics for Amazon EBS in the *Amazon Elastic Compute Cloud User Guide*.

Enabling memory utilization with the CloudWatch agent

To have Compute Optimizer analyze the memory utilization metric of your instances, install the CloudWatch agent on your instances. Enabling Compute Optimizer to analyze memory utilization data for your instances provides an additional measurement of data that further improves Compute Optimizer's recommendations. For more information about installing the CloudWatch agent, see Collecting Metrics and Logs from Amazon EC2 Instances and On-Premises Servers with the CloudWatch agent in the *Amazon CloudWatch User Guide*.

On Linux instances, Compute Optimizer analyses the `mem_used_percent` metric in the `CWAgent` namespace, or the legacy `MemoryUtilization` metric in the `System/Linux` namespace. On Windows instances, Compute Optimizer analyses the `Available MBytes` metric in the `CWAgent` namespace. If both the `Available MBytes` and `Memory % Committed Bytes In Use` metrics are configured in the `CWAgent` namespace, Compute Optimizer chooses `Available MBytes` as the primary memory metric to generate recommendations.

Note

- We recommend that you configure the `CWAgent` namespace to use `Available MBytes` as your memory metric for Windows instances.
- Compute Optimizer also supports the `Available KBytes` and `Available Bytes` metrics, and prioritizes both over the `Memory % Committed Bytes In Use` metric when generating recommendations for Windows instances.

Additionally, the namespace must contain the `InstanceId` dimension. If the `InstanceId` dimension is missing or you overwrite it with a custom dimension name, Compute Optimizer can't collect memory utilization data for your instance. Namespaces and dimensions are defined in the CloudWatch agent configuration file. For more information, see Create the CloudWatch agent Configuration File in the *Amazon CloudWatch User Guide*.

Important

All of the CloudWatch namespaces and metric names are case sensitive.

Example: CloudWatch agent configuration for memory collection

```
{
    "agent": {
        "metrics_collection_interval": 60,
        "run_as_user": "root"
    },
    "metrics": {
        "namespace": "CWAgent",
        "append_dimensions": {
            "InstanceId": "${aws:InstanceId}"
        },
        "metrics_collected": {
            "mem": {
                "measurement": [
                    "mem_used_percent"
                ],
                "metrics_collection_interval": 60
```

```
            }
        }
    }
}
```

EBS volume metrics

Compute Optimizer analyzes the following CloudWatch metrics of your EBS volumes.

Metric	Description
`VolumeReadBytes`	The read bytes per second of the EBS volume.
`VolumeWriteBytes`	The write bytes per second of the EBS volume.
`VolumeReadOps`	The read operations per second of the EBS volume.
`VolumeWriteOps`	The write operations per second of the EBS volume.

For more information about these metrics, see Amazon CloudWatch metrics for Amazon EBS in the *Amazon Elastic Compute Cloud User Guide*.

Lambda function metrics

Compute Optimizer analyzes the following CloudWatch metrics of your Lambda functions.

Metric	Description
`Invocations`	The number of times your function code is executed, including successful executions and executions that result in a function error.
`Duration`	The amount of time that your function code spends processing an event.
`Errors`	The number of invocations that result in a function error. Function errors include exceptions thrown by your code and

Metric	Description
	exceptions thrown by the Lambda runtime. The runtime returns errors for issues such as timeouts and configuration errors.
`Throttles`	The number of invocation requests that are throttled.

For more information about these metrics, see Working with AWS Lambda function metrics in the *AWS Lambda Developer Guide*.

Metrics for Amazon ECS services on Fargate

Compute Optimizer analyzes the following CloudWatch and Amazon ECS utilization metrics of your Amazon ECS services on Fargate.

Metric	Description
`CPUUtilization`	The percentage of CPU capacity that's used in the service.
`MemoryUtilization`	The percentage of memory that's used in the service.

For more information about these metrics, see Amazon ECS CloudWatch metrics in the *Amazon ECS User Guide for AWS Fargate*.

Metrics for commercial software licenses

Compute Optimizer analyzes the following metric to generate recommendations for commercial software licenses.

`mssql_enterprise_features_used` — the number of Microsoft SQL Server Enterprise edition features in use. The features are as follows:

- More than 128GB of memory for the buffer pool extension
- More than 48 vCPUs
- Always On availability groups with more than 1 database

- Asynchronous commit replicas
- Read-only replicas
- Asynchronous database mirroring
- `tempdb` memory-optimized metadata is enabled
- R or Python extensions
- Peer-to-peer replication
- Resource Governor

Using the AWS Compute Optimizer dashboard

Use the dashboard in the Compute Optimizer console to evaluate and prioritize the optimization opportunities for the supported resource types in your account. The dashboard displays the following information, which is refreshed daily and generated by analyzing the specifications and utilization metrics of your resources.

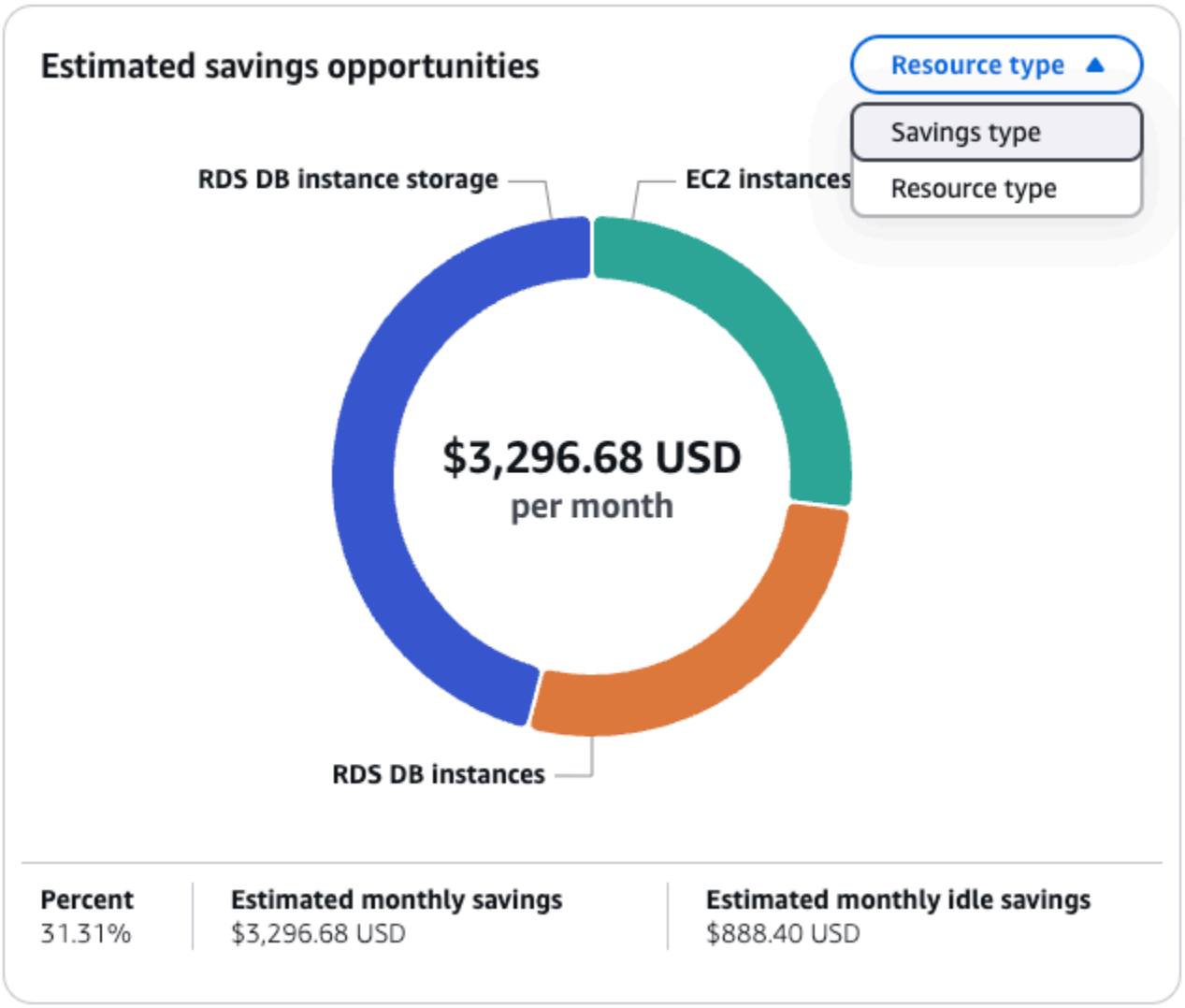
Topics

Savings opportunity

The savings opportunity section displays the total estimated monthly USD amount and percentage that you could save if you implement the Compute Optimizer recommendations for resources in your account. You can choose to display the estimated monthly savings by resource type or savings type. If you prefer to evaluate your resources for cost savings, then prioritize the resource type that has the greatest savings opportunity.

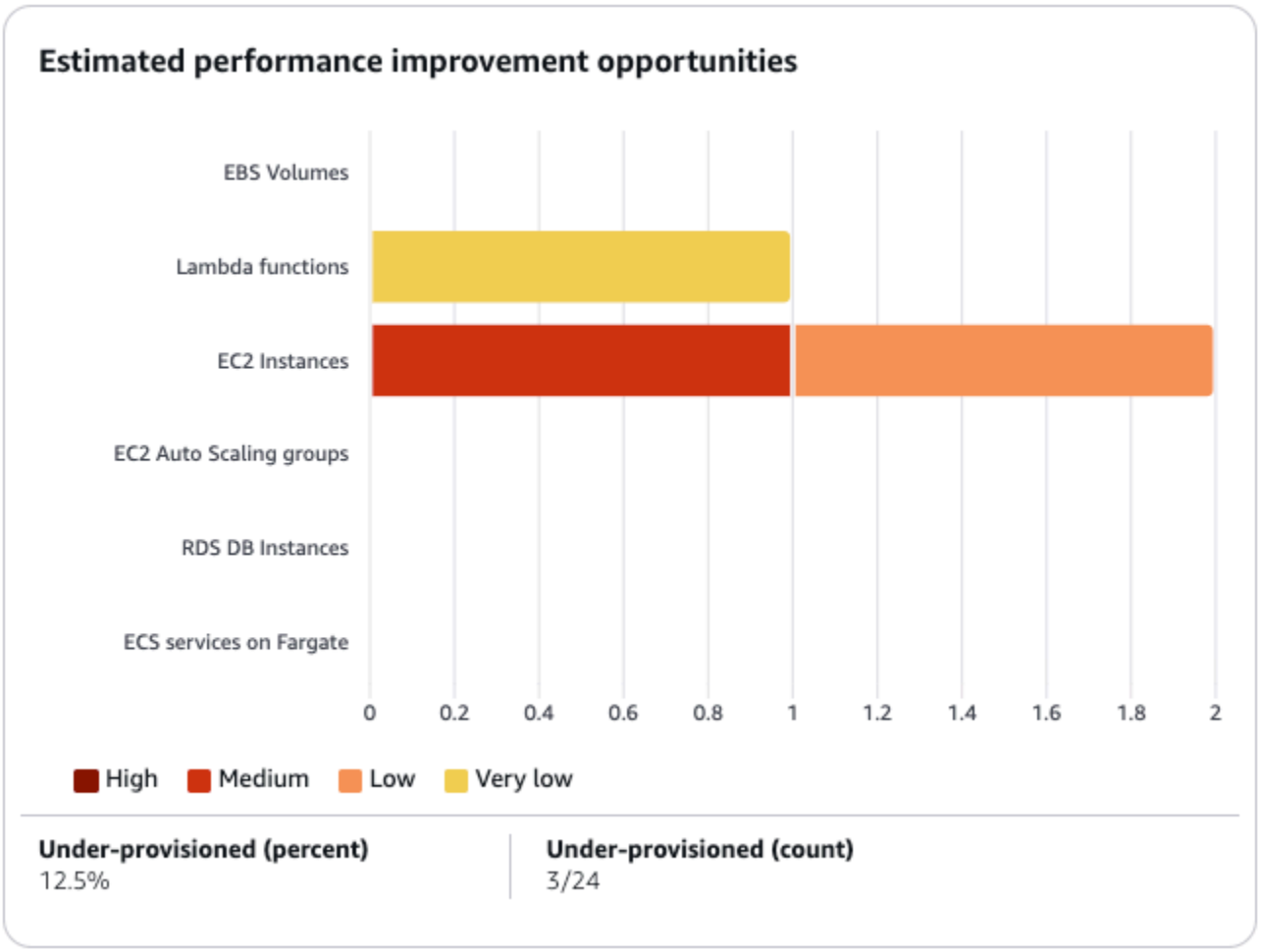
Using EC2 as an example, the estimated monthly savings and savings opportunity for individual EC2 instances are listed in the EC2 instances recommendations page under the **Estimated monthly savings (after discounts)**, **Estimated monthly savings (On-Demand)**, and **Savings opportunity (%)** columns. For more information, including how estimated monthly savings is calculated, see Estimated monthly savings and savings opportunity.

> **Important**
>
> If you enable Cost Optimization Hub in AWS Cost Explorer, Compute Optimizer uses Cost Optimization Hub data, which includes your specific pricing discounts, to generate your recommendations. If Cost Optimization Hub isn't enabled, Compute Optimizer uses Cost Explorer data and On-Demand pricing information to generate your recommendations. For more information, see Enabling Cost Explorer and Cost Optimization Hub in the in the *AWS Cost Management User Guide*.



Performance improvement opportunity

The performance improvement opportunity section displays a count and percentage of the resources in your account that Compute Optimizer found to be at risk of not meeting your workload performance needs. It also displays the performance risk classifications per resource type. Resources can have a performance risk of high, medium, and very low. If you prefer to evaluate your resources for performance improvements, then prioritize the resource types that have a high performance risk.



Optimization options per resource

This table in the dashboard provides a breakdown of optimization opportunities across your different resource types. It outlines the potential savings that you can achieve by identifying and addressing resources that are not optimized, idle, or inefficiently sized.

- The **Savings opportunity** column displays the potential cost savings that you can achieve through optimization. Note that the saving opportunity might not be equal to the sum of the idle, rightsize, and license savings figures.
- The **Optimized**, **Not optimized**, and **Idle** columns indicate the current state of your resources utilization, helping to identify areas for improvement.
- The **Idle savings**, **Rightsizing savings**, and **License savings** columns quantify the potential cost savings that you can achieve by addressing your idle clean-up opportunities, rightsizing your resources, and using our recommended license configurations.

You can use this table as a comprehensive guide to identify optimization opportunities, prioritize areas for improvement, and estimate the financial impact of various optimization strategies for your AWS resources.

Viewing the dashboard

Use the following procedure to view the dashboard and the optimization findings for your resources.

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **Dashboard** in the navigation pane.

   By default, the dashboard displays an overview of optimization findings for AWS resources across all AWS Regions in the account that you're currently signed in to.
3. You can perform the following actions on the dashboard:

   - To view the optimization findings for resources in another account, choose **Account**, and then select a different account ID.

     > **Note**
     >
     > The ability to view optimization findings for resources in other accounts is available only if you're signed in to a management account of an organization, you opted in all member accounts of the organization, and trusted access with Compute Optimizer is enabled. For more information, see Accounts supported by Compute Optimizer and Trusted access for AWS Organizations.

   - To show or hide the savings opportunity and performance improvement opportunity sections of the dashboard, choose the gear icon, choose the sections that you want to show or hide, and choose **Apply**.
   - To filter findings on the dashboard to one or more AWS Regions, enter the name of the Region in the **Filter by one or more Regions** text box, or choose one or more Regions in the drop-down list that appears.
   - To clear the selected filters, choose **Clear filters** next to the filter.
   - To view optimization recommendations, choose the **View recommendations** link for one of the resource types displayed, or choose the number of resources listed next to a findings

classification to view the resources for that classification. For more information, see Viewing resource recommendations.

Viewing resource recommendations

Recommendations for your AWS resources are displayed in the following pages of the AWS Compute Optimizer console.

- The **resources recommendations** page lists each of your running resources, along with their top recommendation generated by Compute Optimizer.
- The **resource details** page lists the top recommendation options for a specific resource, along with utilization metric graphs for the resource. You can access this page from the recommendations page.

The recommendations and resource details pages are available for each of the following AWS resources that are supported by Compute Optimizer:

- Amazon EC2 instances
- EC2 Auto Scaling groups
- Amazon EBS volumes
- AWS Lambda functions
- Amazon ECS services on Fargate
- Commercial software licenses

Viewing EC2 instance recommendations

AWS Compute Optimizer generates instance type recommendations for Amazon Elastic Compute Cloud (Amazon EC2) instances. Recommendations for your Amazon EC2 instances are displayed on the following pages of the Compute Optimizer console:

- The **EC2 instances recommendations** page lists each of your current instances, their finding classifications, finding reasons, platform differences, current instance type, and current hourly price for the selected purchasing option. The top recommendation from Compute Optimizer is listed next to each of your instances. This recommendation includes the recommended instance type, the hourly price for the selected purchasing option, and the price difference between your current instance. Use the recommendations page to compare your current instances with their top recommendation. Doing this can help you to decide if you want to up-size or down-size your instances.

- The **EC2 instance details** page lists up to three optimization recommendations for a specific instance. You can access this page from the EC2 instances recommendations page. The page specifically lists the specifications for each recommendation, their performance risk, and their hourly prices for the selected purchasing option. The details page also displays utilization metric graphs for the current instance, overlaid with the projected utilization metrics for the recommendation options.

The recommendations are refreshed daily. These recommendations are generated by analyzing the specifications and utilization metrics of the current instance over a period of the last 14 days. Or, if you activate the enhanced infrastructure metrics paid feature, the recommendations are generated by analyzing a longer period of time. For more information, see Metrics analyzed by AWS Compute Optimizer.

Keep in mind that Compute Optimizer generates recommendations for EC2 instances that meet a specific set of requirements. Recommendations can take up to 24 hours to be generated. Moreover, sufficient metric data must be accumulated for recommendations to be generated. For more information, see Resource requirements.

Contents

Finding classifications

The **Finding** column on the **EC2 instances recommendations** page provides a summary of how each of your instances performed during the analyzed period.

The following findings classifications apply to EC2 instances.

Classification	Description
Under-provisioned	An EC2 instance is considered under-provisioned when at least one specification of your instance, such as CPU, memory, or network, does not meet the performance requirements of your workload. Under-provisioned EC2 instances might lead to poor application performance.
Over-provisioned	An EC2 instance is considered over-provisioned when at least one specification of your instance, such as CPU, memory, or network, can be sized down while still meeting the performan ce requirements of your workload, and when no specification is under-provisioned. Over-provisioned EC2 instances might lead to unnecessary infrastructure cost.
Optimized	An EC2 instance is considered optimized when all specifications of your instance, such as CPU, memory, and network, meet the performance requirements of your workload, and the instance is not over-provisioned. For optimized instances, Compute Optimizer might sometimes recommend a new generation instance type.

Finding reasons

The **Finding reasons** column on the **EC2 instances recommendations** and **EC2 instance details** pages shows which specification of an instance is under-provisioned or over-provisioned.

The following finding reasons apply to instances:

Finding reason	Description
CPU over-provisioned	The instance's CPU configuration can be sized down and also meet the performance requirements of your workload. This is identified by analyzing the `CPUUtilization` metric of the current instance during the look-back period.

Finding reason	Description
CPU under-provisioned	The instance's CPU configuration doesn't meet the performance requirements of your workload and there's an alternative instance type that provides better CPU performance. This is identified by analyzing the `CPUUtilization` metric of the current instance during the look-back period.
Memory over-provisioned	The instance's memory configuration can be sized down while still meeting the performance requirements of your workload. This is identified by analyzing the memory utilization metric of the current instance during the look-back period. **Note** Memory utilization is analyzed only for resources with the unified CloudWatch agent installed. For more information, see Enabling memory utilization with the Amazon CloudWatch Agent.
Memory under-provisioned	The instance's memory configuration doesn't meet the performance requirements of your workload and there's an alternative instance type that provides better memory performance. This is identified by analyzing the memory utilization metric of the current instance during the look-back period.

Finding reason	Description
GPU over-provisioned	The instance's GPU and GPU memory configurations can be sized down while still meeting the performance requirements of your workload. This is identified by analyzing the `GPUUtilization` and `GPUMemoryUtilization` metrics of the current instance during the look-back period. **Note** The GPU utilization and GPU memory utilization metrics are analyzed only for resources with the unified CloudWatch agent installed. For more information, see ???.
GPU under-provisioned	The instance's GPU and GPU memory configurations don't meet the performance requirements of your workload and there's an alternative instance type that provides better memory performance. This is identified by analyzing the `GPUUtilization` and `GPUMemoryUtilization` metrics of the current instance during the look-back period.
EBS throughput over-provisioned	The instance's EBS throughput configuration can be sized down and also meet the performance requirements of your workload. This is identified by analyzing the `VolumeReadBytes` and `VolumeWriteBytes` metric of EBS volumes attached to the current instance during the look-back period.
EBS throughput under-provisioned	The instance's EBS throughput configuration doesn't meet the performance requirements of your workload. And, there's an alternative instance type that provides better EBS throughput performance. This is identified by analyzing the `VolumeReadBytes` and `VolumeWriteBytes` metric of EBS volumes that are attached to the current instance during the look-back period.

Finding reason	Description
EBS IOPS over-provisioned	The instance's EBS IOPS configuration can be sized down and also meet the performance requirements of your workload. This is identified by analyzing the `VolumeReadOps` and `VolumeWriteOps` metrics of EBS volumes attached to the current instance during the look-back period.
EBS IOPS under-provisioned	The instance's EBS IOPS configuration doesn't meet the performance requirements of your workload. And, there's an alternative instance type that provides better EBS IOPS performance. This is identified by analyzing the `VolumeReadOps` and `VolumeWriteOps` metrics of EBS volumes attached to the current instance during the look-back period.
Network bandwidth over-provisioned	The instance's network bandwidth configuration can be sized down while still meeting the performance requirements of your workload. This is identified by analyzing the `NetworkIn` and `NetworkOut` metrics of the current instance during the look-back period.
Network bandwidth under-provisioned	The instance's network bandwidth configuration doesn't meet the performance requirements of your workload. And, there's an alternative instance type that provides better network bandwidth performance. This is identified by analyzing the `NetworkIn` and `NetworkOut` metrics of the current instance during the look-back period. This finding reason happens when the `NetworkIn` or `NetworkOut` performance of an instance is impacted.
Network PPS over-provisioned	The instance's network PPS (packets per second) configuration can be sized down and also meet the performance requirements of your workload. This is identified by analyzing the `NetworkPacketsIn` and `NetworkPacketsOut` metrics of the current instance during the look-back period.

Finding reason	Description
Network PPS under-provisioned	The instance's network PPS (packets per second) configuration doesn't meet the performance requirements of your workload. And, there's an alternative instance type that provides better network PPS performance. This is identified by analyzing the `NetworkPacketsIn` and `NetworkPacketsOut` metrics of the current instance during the look-back period.
Disk IOPS over-provisioned	The instance's disk IOPS configuration can be sized down and also meet the performance requirements of your workload. This is identified by analyzing the `DiskReadOps` and `DiskWriteOps` metrics of the current instance during the look-back period.
Disk IOPS under-provisioned	The instance's disk IOPS configuration doesn't meet the performance requirements of your workload. And, there's an alternative instance type that provides better disk IOPS performance. This is identified by analyzing the `DiskReadOps` and `DiskWriteOps` metrics of the current instance during the look-back period.
Disk throughput over-provisioned	The instance's disk throughput configuration can be sized down while still meeting the performance requirements of your workload. This is identified by analyzing the `DiskReadBytes` and `DiskWriteBytes` metrics of the current instance during the look-back period.
Disk throughput under-provisioned	The instance's disk throughput configuration doesn't meet the performance requirements of your workload. And, there's an alternative instance type that provides better disk throughput performance. This is identified by analyzing the `DiskReadBytes` and `DiskWriteBytes` metrics of the current instance during the look-back period.

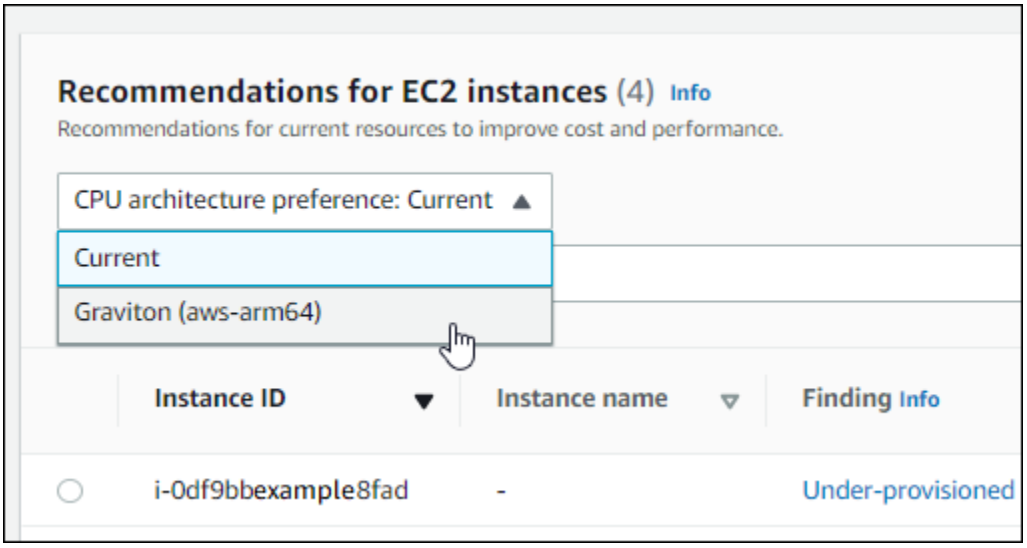
> **Note**
>
> For more information about instance metrics, see List the available CloudWatch metrics for your instances in the *Amazon Elastic Compute Cloud User Guide*. For more information about EBS volume metrics, see Amazon CloudWatch metrics for Amazon EBS in the *Amazon Elastic Compute Cloud User Guide*.

You can change an instance's CPU, local disk, memory, or network specifications by changing the type of the instance. For example, you can change the instance type from C5 to C5n to help improve network performance. For more information, see Change the instance type guide for Linux and Change the instance type guide for Windows in the *EC2 User Guides*.

You can change an EBS volume's IOPS or throughput specifications by using Amazon EBS Elastic Volumes. For more information, see Amazon EBS Elastic Volumes in the *Amazon Elastic Compute Cloud User Guide*.

AWS Graviton-based instance recommendations

When viewing Amazon EC2 instance recommendations, you can view the price and performance impact of running your workload on AWS Graviton-based instances. To do so, choose **Graviton (aws-arm64)** in the **CPU architecture preference** dropdown. Otherwise, choose **Current** to view recommendations that are based on the same CPU vendor and architecture as the current instance.



> **Note**
>
> The **Current price**, **Recommended price**, **Price difference**, **Price difference (%)**, and **Estimated monthly savings** columns are updated to provide a price comparison between the current instance type and the instance type of the selected CPU architecture preference. For example, if you choose **Graviton (aws-arm64)**, prices are compared between the current instance type and the recommended Graviton-based instance type.

Inferred workload types

Migration effort

The **Migration effort** column on the **EC2 Auto Scaling groups recommendations** and **EC2 Auto Scaling groups details** pages lists the level of effort that might be required to migrate from the current instance type to the recommended instance type. The following shows examples of the different levels of migration effort.

- **Very low** — The recommended instance type has the same CPU architecture as the current instance type.
- **Low** — Amazon EMR is the inferred workload type and an AWS Graviton instance type is recommended
- **Medium** — A workload type can't be inferred but an AWS Graviton instance type is recommended.
- **High** — The recommended instance type has different CPU architecture from the current instance type, and the workload has no known compatible version on the recommended CPU architecture.

For more information about migrating from x86-based instance types to Arm-based AWS Graviton instances type, see Considerations when transitioning workloads to AWS Graviton2 based Amazon EC2 instances in the *AWS Graviton Getting Starged GitHub*.

Platform differences

The **Platform differences** column on the **EC2 instance details** page describes the differences between the current instance and the recommended instance type. Consider the configuration

differences before migrating your workloads from the current instance to the recommended instance type.

The following platform differences apply to EC2 instances:

Platform difference	Description
Architecture	The CPU architecture of the recommended instance type is different than that of the current instance type. For example, the recommended instance type might use an Arm CPU architecture and the current instance type might use a different one, such as x86. Before migrating, consider recompiling the software on your instance for the new architecture. Alternatively, you might switch to an Amazon Machine Image (AMI) that supports the new architecture. For more information about the CPU architecture for each instance type, see Amazon EC2 Instance Types.
Hypervisor	The hypervisor of the recommended instance type is different than that of the current instance. For example, the recommended instance type might use a Nitro hypervisor and the current instance might use a Xen hypervisor. For information about the differences that you can consider between these hypervisors, see Nitro Hypervisor section of the Amazon EC2 FAQs. For more information, see Instances built on the Nitro System in the *Amazon EC2 User Guide for Linux*, or Instances built on the Nitro System in the *Amazon EC2 User Guide for Windows*.
Instance store availability	The recommended instance type doesn't support instance store volumes, but the current instance does. Before migrating, you might need to back up the data on your instance store volumes if you want to preserve them. For more information, see How do I back up an instance store volume on my Amazon EC2 instance to Amazon EBS? in the *AWS Premium Support Knowledge Base*. For more information, see Networking and storage features and Amazon EC2 instance store in the *Amazon EC2 User Guide for Linux*, or see Networking and

Platform difference	Description
	storage features and Amazon EC2 instance store in the *Amazon EC2 User Guide for Windows*.
Network interface	The network interface of the recommended instance type is different than that of the current instance. For example, the recommended instance type might use enhanced networkin g and the current instance might not. To enable enhanced networking for the recommended instance type, install the Elastic Network Adapter (ENA) driver or the Intel 82599 Virtual Function driver. For more information, see Networking and storage features and Enhanced networking on Linux in the *Amazon EC2 User Guide for Linux*, or Networking and storage features and Enhanced networking on Windows in the *Amazon EC2 User Guide for Windows*.
Storage interface	The storage interface of the recommended instance type is different than that of the current instance. For example, the recommended instance type uses an NVMe storage interface and the current instance doesn't such this interface. To access NVMe volumes for the recommended instance type, install or upgrade the NVMe driver. For more information, see Networking and storage features and Amazon EBS and NVMe on Linux instances in the *Amazon EC2 User Guide for Linux*, or Networking and storage features and Amazon EBS and NVMe on Windows instances in the *Amazon EC2 User Guide for Windows*.
Virtualization type	The recommended instance type uses the hardware virtual machine (HVM) virtualization type and the current instance uses the paravirtual (PV) virtualization type. For more information about the differences between these virtualization types, see Linux AMI virtualization types in the *Amazon EC2 User Guide for Linux*, or Windows AMI virtualization types in the *Amazon EC2 User Guide for Windows*.

Estimated monthly savings and savings opportunity

Estimated monthly savings (after discounts)

This column lists the approximate monthly cost savings that you experience by migrating your workloads from the current instance type to the recommended instance type under the Savings Plans and Reserved Instances pricing models. To receive recommendations with Savings Plans and Reserved Instances discounts, the savings estimation mode preference needs to be activated. For more information, see Savings estimation mode.

> **Note**
>
> If you don't activate the savings estimation mode preference, this column displays the default On-Demand pricing discount information.

Estimated monthly savings (On-Demand)

This column lists the approximate monthly cost savings that you experience by migrating your workloads from the current instance type to the recommended instance type under the On-Demand pricing model.

Savings opportunity (%)

This column lists the percentage difference between the price of the current instance and the price of the recommended instance type. If savings estimation mode is activated, Compute Optimizer analyzes the Savings Plans and Reserved Instances pricing discounts to generate the savings opportunity percentage. If savings estimation mode isn't activated, Compute Optimizer only uses On-Demand pricing information. For more information, see Savings estimation mode.

> **Important**
>
> If you enable Cost Optimization Hub in AWS Cost Explorer, Compute Optimizer uses Cost Optimization Hub data, which includes your specific pricing discounts, to generate your recommendations. If Cost Optimization Hub isn't enabled, Compute Optimizer uses Cost Explorer data and On-Demand pricing information to generate your recommendations. For more information, see Enabling Cost Explorer and Cost Optimization Hub in the in the *AWS Cost Management User Guide*.

Estimated monthly savings calculation

For each recommendation, the cost to operate a new instance using the recommended instance type is calculated. Estimated monthly savings are calculated based on the number of running hours for the current instance and the difference in rates between the current instance type and the recommended instance type. The estimated monthly savings for instances that are displayed on the Compute Optimizer dashboard is a sum of the estimated monthly savings for all over-provisioned instances in the account.

Performance risk

The performance risk columns on the **EC2 instance details** page and the **EC2 instance recommendations** page define the likelihood of the current and recommended instance type not meeting your workload requirements. Compute Optimizer calculates an individual performance risk score for each specification of the current and recommended instance. This includes specifications such as CPU, memory, EBS throughput, EBS IOPS, disk throughput, disk IOPS, network throughput, and network PPS. The performance risk of the current and recommended instance is calculated as the maximum performance risk score across the analyzed resource specifications.

The values range from very low, low, medium, high, and very high. A very low performance risk means that the instance type is predicted to always provide enough capability. The higher the performance risk means that you should validate whether the instance type meets the performance requirements of your workload before migrating your resource. Decide whether to optimize for performance improvement, for cost reduction, or for a combination of these two. For more information, see Changing the Instance Type in the *Amazon Elastic Compute Cloud User Guide*.

> **Note**
>
> In the Compute Optimizer API, the AWS Command Line Interface (AWS CLI), and the AWS SDKs, performance risk is measured on a scale of `0` (very low) to `4` (very high).

Utilization graphs

The **EC2 instance details** page displays utilization metric graphs for your current instance. The graphs display data for the analyzed period. Compute Optimizer uses the maximum utilization point within each 5 minute time interval to generate EC2 instance recommendations.

You can change the graphs to display data for the last 24 hours, 3 days, 1 week, or 2 weeks. If you activate the enhanced infrastructure metrics paidfeature, you can view 3 months. You can also change the statistic of the graphs between average and maximum.

> **Note**
>
> For periods of time when your instances are in a stopped state, the utilization graphs show a value of 0.

The following utilization graphs are displayed on the details page:

Graph name	Description
CPU utilization (percent)	The percentage of allocated EC2 compute units used by the instance. The CPU utilization graph includes a comparison of the CPU utilization data of your current instance type against that of the selected recommended instance type. The comparison shows you what the CPU utilizati on is if you use the selected recommended instance type during the analyzed period. This comparison can help you to identify if the recommended instance type is within your workload's performance threshold. **Note** The **Burstable baseline** only displays for T-instances. You can use this baseline performance to learn how your CPU utilization relates to the baseline utilization of the specific T-instance. For more information, see Key concepts and definitions for burstable performance instances in

Graph name	Description
	the *Amazon EC2 User Guide for Linux Instances*.
Memory utilization (percent)	The percentage of memory allocated by applications and the operating system as used. The memory utilization graph includes a comparison of the memory utilization data of your current instance type against that of the selected recommended instance type. The comparison shows you what the memory utilization is if you use the selected recommended instance type during the analyzed period. This comparison can help you to identify if the recommended instance type is within your workload's performance threshold. **Note** The memory utilization graph is populated only for instances that have the unified CloudWatch agent installed on them. For more informati on, see Collecting Metrics and Logs from Amazon EC2 Instances and On-Premises Servers with the CloudWatch Agent in the *Amazon CloudWatch User Guide*.
Network in (MiB/second)	The number of mebibytes (MiB) per second received on all network interfaces by the instance.

Graph name	Description
Network out (MiB/second)	The number of mebibytes (MiB) per second sent out on all network interfaces by the instance.
Network packets in (per second)	The number of packets received by the instance on all network interfaces.
Network packets out (per second)	The number of packets sent out by the instance on all network interfaces.
Disk read operations (per second)	The completed read operations per second from the instance store volumes of the instance.
Disk write operations (per second)	The completed write operations per second from the instance store volumes of the instance.
Disk read bandwidth (MiB/second)	The read mebibytes (MiB) per second from the instance store volumes of the instance.
Disk write bandwidth (MiB/second)	The write mebibytes (MiB) per second from the instance store volumes of the instance.
EBS read operations (per second)	The completed read operations per second from all EBS volumes attached to the instance. For Xen instances, data is reported only when there is read activity on the volume.
EBS write operations (per second)	The completed write operations per second to all EBS volumes attached to the instance. For Xen instances, data is reported only when there is write activity on the volume.

Graph name	Description
EBS read bandwidth (MiB/second)	The read mebibytes (MiB) per second from all EBS volumes attached to the instance.
EBS write bandwidth (MiB/second)	The written mebibytes (MiB) per second to all EBS volumes attached to the instance.

Accessing EC2 instance recommendations and details

You can use one of the following procedures to access either the **EC2 instances recommendations** or the **EC2 instance details** pages in the AWS Console.

On the **EC2 instances recommendations** page you can view the recommendations for your current instances. On the **EC2 instance details** page you can view the details of a specific instance and its recommendations.

Procedures

Accessing EC2 instance recommendations page

To access the EC2 instances recommendations page

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **EC2 instances** in the navigation pane.

   The recommendations page lists the specifications and finding classifications of your current instances and the specifications of the recommended instances. The current instances listed are from the AWS Region that is currently selected, in the selected account.
3. You can perform the following actions on the recommendations page:

   - View the price and performance impact of running your workload on AWS Graviton-based instances. To do this, choose **Graviton (aws-arm64)** in the **CPU architecture preference** dropdown list. Otherwise, the **Current** (default) option displays recommendations that are based on the same CPU vendor and architecture as the current instance.

- Filter recommendations by AWS Regions, Findings, Finding reasons, or Inferred Workload Type. To do this, first select the **Filter by one or more properties** text box. Then, choose the property and a value in the dropdown list that appears.
- Filter your recommendations by tags. To do this, first select the **Tag key** or **Tag value** text box. Then, enter the key or value that you want to filter your EC2 instance recommendations by.

  For example, to find all the recommendations that have a tag with the key of `Owner` and the value of `TeamA`, specify `tag:Owner` for the filter name and `TeamA` for the filter value.
- View recommendations for instances in another account. To do this, choose **Account**, and then select a different account ID.

  > **Note**
  >
  > If you're signed in to a management account of an organization and trusted access with Compute Optimizer is enabled, you can view recommendations for resources in other accounts. For more information, see Accounts supported by Compute Optimizer and Trusted access for AWS Organizations.

- Clear the selected filters. To do this, choose **Clear filters** next to the filter.
- Access the **EC2 instance details** page for a specific instance. To do this, choose the finding classification listed next to the instance that you want to access.

Accessing EC2 instance details page

To access the EC2 instance details page

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **EC2 instances** in the navigation pane.
3. Choose the finding classification listed next to the instance that you want to view detailed information for.

   The details page lists up to three optimization recommendations for the instance that you chose. The page lists the specifications of your current instance, the specifications and performance risks of the recommended instances, and utilization metric graphs.
4. You can perform the following actions on the details page:

- To view the price and performance impact of running your workload on AWS Graviton-based instances, choose **Graviton (aws-arm64)** in the **CPU architecture preference** dropdown. Otherwise, the **Current** (default) option displays recommendations that are based on the same CPU vendor and architecture as the current instance.
- Activate the enhanced infrastructure metrics paid feature to extend the metrics analysis look-back period for the EC2 instance you're viewing up to three months (compared to the 14-day default). For more information, see Enhanced infrastructure metrics.
- Choose a recommendation option to view the utilization comparison between your current instance and a recommended instance.

  The utilization metric graphs for your current instance are displayed at the bottom of the page. The solid blue line is the utilization of your current instance. The dotted orange line is the projected utilization of the selected recommended instance if you use that instance during the analyzed period. The dotted orange line is displayed in the CPU utilization and memory utilization graphs.
- To change the time range of the graphs, choose **Time Range**, and then choose **Last 24 hours**, **Last 3 days**, **Last week**, or **Last 2 weeks**. If you activate the enhanced infrastructure metrics recommendation preference, you can also choose **Last 3 months**.

  Choosing a shorter time range displays the data points at a higher granularity, which provides a higher level of detail.
- To change the statistic value of the graphs, choose **Statistics**, and then choose **Average** or **Maximum**.

  You can use this option to determine the typical instance utilization of your workload over time. To view the highest value observed during the specified period, change the selection to **Maximum**. This way, you can determine the peak instance usage of your workload over time.

Viewing EC2 Auto Scaling group recommendations

AWS Compute Optimizer generates instance type recommendations for Amazon EC2 Auto Scaling groups. Recommendations for your EC2 Auto Scaling groups are displayed on the following pages of the AWS Compute Optimizer console.

- **EC2 Auto Scaling group recommendations**

This page lists each of your current EC2 Auto Scaling groups, their finding classifications, current instance type(s), current hourly price for the selected purchasing option, and current configuration. The top recommendation from Compute Optimizer is listed next to each of your EC2 Auto Scaling groups, and it includes the recommended instance type, the hourly price for the selected purchasing option, and the price difference between your current instance type(s) and the recommendation. Use the recommendations page to compare the current instance type(s) of your EC2 Auto Scaling groups with our top recommendation, which can help you to decide if you should upsize or downsize your instances.

- **EC2 Auto Scaling group details**

  Depending on the specific EC2 Auto Scaling group, this page provides you with rightsizing recommendations and/or recommendations to scale in an idle group. It lists the specifications for each rightsizing recommendation such as the performance risk and hourly prices for the selected purchasing option. The details page also displays utilization metric graphs that can be used to compare the current EC2 Auto Scaling group with the projected utilization metrics for the recommendation option(s).

The recommendations are refreshed daily. They're generated by analyzing the specifications and utilization metrics of the current EC2 Auto Scaling group over the default lookback period of 14 days or a 32-day lookback period. You can extend the lookback period to 93 days if you enable enhanced infrastructure metrics. For more information, see Enhanced infrastructure metrics, ???, and Metrics analyzed by AWS Compute Optimizer.

Keep in mind that Compute Optimizer generates recommendations for EC2 Auto Scaling groups that meet a specific set of requirements, recommendations could take up to 24 hours to be generated, and sufficient metric data must be accumulated. For more information, see Resource requirements.

Important

If you enable Cost Optimization Hub in AWS Cost Explorer, Compute Optimizer uses Cost Optimization Hub data, which includes your specific pricing discounts, to generate your recommendations. If Cost Optimization Hub isn't enabled, Compute Optimizer uses Cost Explorer data and On-Demand pricing information to generate your recommendations. For more information, see Enabling Cost Explorer and Cost Optimization Hub in the in the *AWS Cost Management User Guide*.

Contents

Finding classifications

The **Finding** column on the **EC2 Auto Scaling groups recommendations** page provides a summary of how each of your EC2 Auto Scaling groups performed during the lookback period.

The following findings classifications apply to EC2 Auto Scaling groups.

Classification	Description
Not optimized	EC2 Auto Scaling groups that maintain a fixed pool of instances are considered not optimized when the group is either oversized or running workloads that might cause performance issues. EC2 Auto Scaling groups that scale dynamically or follow a fixed schedule of scaling events are considered not optimized when there are other instance types that can meet the demand at a lower cost.
Optimized	An EC2 Auto Scaling group is considered optimized when all specifications of your group, such as CPU, memory, and network, meet the performance requirements of your workload. For optimized groups, Compute Optimizer might recommend a new generation instance type.

Estimated monthly savings and savings opportunity

Estimated monthly savings (after discounts)

This column lists the estimated monthly savings for the EC2 Auto Scaling group if you had used the recommended instance type(s) during the lookback period. After discount savings consider any Reserved Instances or Savings Plans pricing models that are active in your accounts. To receive recommendations with Savings Plans and Reserved Instances discounts, the savings estimation mode preference needs to be activated. For more information, see Savings estimation mode.

> **Note**
>
> If you don't activate the savings estimation mode preference, this column displays the default On-Demand pricing information.

Estimated monthly savings (On-Demand)

This column lists the approximate monthly cost savings for the EC2 Auto Scaling group if you had used Compute Optimizer's recommendation during the lookback period, and purchased under the On-Demand instance pricing.

Savings opportunity (%)

This column lists the estimated monthly savings percentage of the current monthly cost that you can save by adopting the recommended instance type(s) for your EC2 Auto Scaling group. If savings estimation mode is activated, Compute Optimizer analyzes any Reserved Instances or Savings Plans pricing models that are active in your accounts to generate the savings opportunity percentage. If savings estimation mode isn't activated, Compute Optimizer only uses On-Demand pricing information. For more information, see Savings estimation mode.

Estimated monthly savings calculation

For each recommendation, we calculate the cost to operate a new instance using the recommended instance type. Estimated monthly savings are calculated based on the number of running hours for current instances in the EC2 Auto Scaling group and the difference in rates between the current instance type and the recommended instance type. The estimated monthly savings for EC2 Auto Scaling groups displayed on the Compute Optimizer dashboard is a sum of the estimated monthly savings for all over-provisioned instances in EC2 Auto Scaling groups, in the account.

AWS Graviton-based instance recommendations

When viewing EC2 Auto Scaling group recommendations, you can view the price and performance impact of running your workload on AWS Graviton-based instances. To do so, choose **Graviton (aws-arm64)** in the **CPU architecture preference** dropdown. Otherwise, choose **Current** to view recommendations that are based on the same CPU vendor and architecture as the current instance.

> **Note**
>
> The **Current price**, **Recommended price**, **Price difference**, **Price difference (%)**, and **Estimated monthly savings** columns are updated to provide a price comparison between the current instance type and the instance type of the selected CPU architecture preference. For example, if you choose **Graviton (aws-arm64)**, prices are compared between the current instance type and the recommended Graviton-based instance type.

Inferred workload types

Migration effort

The **Migration effort** column on the **EC2 Auto Scaling groups recommendations** and **EC2 Auto Scaling groups details** pages lists the level of effort that might be required to migrate from the current instance type to the recommended instance type. The following shows examples of the different levels of migration effort.

- **Very low** — The recommended instance type has the same CPU architecture as the current instance type.
- **Low** — Amazon EMR is the inferred workload type and an AWS Graviton instance type is recommended
- **Medium** — A workload type can't be inferred but an AWS Graviton instance type is recommended.
- **High** — The recommended instance type has different CPU architecture from the current instance type, and the workload has no known compatible version on the recommended CPU architecture.

For more information about migrating from x86-based instance types to Arm-based AWS Graviton instances type, see Considerations when transitioning workloads to AWS Graviton2 based Amazon EC2 instances in the *AWS Graviton Getting Started GitHub*.

Performance risk

The performance risk columns on the **EC2 Auto Scaling groups details** page and the **EC2 Auto Scaling groups recommendations** page define the likelihood of the current and recommended instance type(s) running in your EC2 Auto Scaling group not meeting your workload requirements. Compute Optimizer calculates an individual performance risk score for each specification of the EC2 Auto Scaling group, including CPU, memory, EBS throughput, EBS IOPS, disk throughput, disk IOPS, network throughput, and network PPS. The performance risk of the current and recommended EC2 Auto Scaling group is calculated as the maximum performance risk score across the analyzed resource specifications.

The values range from very low, low, medium, high, and very high. A very low performance risk means that the instance type(s) is predicted to always provide enough capability. A higher the performance risk means that you should validate whether the instance type(s) running in your EC2 Auto Scaling group will meet the performance requirements of your workload before migrating your resource. Decide whether to optimize for performance improvement, for cost reduction, or for a combination of these two. For more information, see Changing the Instance Type in the *Amazon Elastic Compute Cloud User Guide*.

> **Note**
>
> In the Compute Optimizer API, the AWS Command Line Interface (AWS CLI), and AWS SDKs, performance risk is measured on a scale of `0` (very low) to `4` (very high).

Utilization graphs

The **EC2 Auto Scaling group details** page displays utilization metric graphs for current instances in the group. The graphs display data for the analysis period. Compute Optimizer uses the maximum utilization point within each five-minute time interval to generate EC2 Auto Scaling group recommendations.

You can change the graphs to display data for the last 24 hours, three days, one week, or two weeks. If you activate the enhanced infrastructure metrics paid feature, you can view data from the last three months.

The following utilization graphs are displayed on the details page:

Graph name	Description
Average CPU utilization (percent)	The average percentage of allocated EC2 compute units used by instances in the EC2 Auto Scaling group.
Average network in (MiB/second)	The number of mebibytes (MiB) per second received on all network interfaces by instances in the EC2 Auto Scaling group.
Average network out (MiB/second)	The number of mebibytes (MiB) per second sent out on all network interfaces by instances in the EC2 Auto Scaling group.
Instance capacity	This is the number of running instances with an EC2 Auto Scaling group at any given time.

Accessing EC2 Auto Scaling group recommendations and details

You can use one of the following procedures to access either the **EC2 Auto Scaling groups recommendations** or the **EC2 Auto Scaling group details** pages in the AWS Console.

On the **EC2 Auto Scaling groups recommendations** page you can view the recommendations for your current EC2 Auto Scaling groups. On the **EC2 Auto Scaling group details** page you can view the details of a specific group and its recommendations.

Procedures

Accessing EC2 Auto Scaling group recommendations page

To access the EC2 Auto Scaling group recommendations page

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **EC2 Auto Scaling groups** in the navigation pane.

The recommendations page lists the specifications and finding classifications of your EC2 Auto Scaling groups, along with the specifications of the recommended groups. The current EC2 Auto Scaling groups listed are from the AWS Region that is currently selected, in the selected account.

3. You can perform the following actions on the recommendations page:

   - View the price and performance impact of running your workload on AWS Graviton-based instances. To do this, choose **Graviton (aws-arm64)** in the **CPU architecture preference** dropdown list. Otherwise, the **Current** (default) option displays recommendations that are based on the same CPU vendor and architecture as the current instance.
   - Filter recommendations by AWS Regions, Findings, or Finding reasons. To do this, first select the **Filter by one or more properties** text box. Then, choose the property and a value in the dropdown list that appears.
   - View recommendations for instances in another account. To do this, choose **Account**, and then select a different account ID.

     > **Note**
     >
     > If you're signed in to a management account of an organization and trusted access with Compute Optimizer is enabled, you can view recommendations for resources in other accounts. For more information, see Accounts supported by Compute Optimizer and Trusted access for AWS Organizations.

   - Clear the selected filters. To do this, choose **Clear filters** next to the filter.
   - Access the **EC2 Auto Scaling group details** page for a specific EC2 Auto Scaling group. To do this, choose the finding classification listed next to the desired group.

Accessing EC2 Auto Scaling group details page

To access the EC2 Auto Scaling group details page

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **EC2 Auto Scaling groups** in the navigation pane.
3. To view the details of a recommendation, select an EC2 Auto Scaling group and choose **View details**. Or, choose the EC2 Auto Scaling group link.

The details page lists up to three optimization recommendations for the EC2 Auto Scaling group that you chose. It lists the specifications of current instances in the EC2 Auto Scaling group, the specifications and performance risks of the recommended instances, and utilization metric graphs.

4. You can perform the following actions on the details page:

   - To view the price and performance impact of running your workload on AWS Graviton-based instances, choose **Graviton (aws-arm64)** in the **CPU architecture preference** dropdown. Otherwise, the **Current** (default) option displays recommendations that are based on the same CPU vendor and architecture as the current instance.
   - Activate the enhanced infrastructure metrics paid feature to extend the metrics analysis look-back period for the Auto Scaling group you're viewing up to three months (compared to the 14-day default). For more information, see Enhanced infrastructure metrics.
   - The utilization metric graphs for your current instance are displayed at the bottom of the page. The solid blue line is the utilization of current instances in the Auto Scaling group.
   - To change the time range of the graphs, choose **Time Range**, and then choose **Last 24 hours**, **Last 3 days**, **Last week**, or **Last 2 weeks**. If you activate the enhanced infrastructure metrics recommendation preference, you can also choose **Last 3 months**. Choosing a shorter time range displays the data points at a higher granularity, which provides a higher level of detail.

Viewing Amazon EBS volume recommendations

AWS Compute Optimizer generates volume type, volume size, IOPS, and throughput recommendations for Amazon Elastic Block Store (Amazon EBS) volumes. Recommendations for your EBS volumes are displayed in the following pages of the AWS Compute Optimizer console:

- The **EBS volumes recommendations** page lists each of your current volumes, their finding classifications, their current volume type, and their current hourly price. The top recommendation from Compute Optimizer is listed next to each of your volumes, and it includes the recommended volume type, recommended volume size, recommended IOPS, the monthly price of the recommendation, and the price difference between your current volume and the recommendation. Use the recommendations page to compare your current volumes with their top recommendation, which can help you to decide if you should up-size or down-size your volume.

- The **EBS volume details** page, which you can access from the EBS volume recommendations page, lists up to three optimization recommendations for a specific volume. It lists the specifications for each recommendation, their performance risk, and their monthly prices. The details page also displays utilization metric graphs for the current volume.

The recommendations are refreshed daily. They're generated by analyzing the specifications and utilization metrics of the current volume over a period of the last 14 days. For more information, see Metrics analyzed by AWS Compute Optimizer.

Keep in mind that Compute Optimizer generates recommendations for EBS volumes that meet a specific set of requirements, recommendations could take up to 24 hours to be generated, and sufficient metric data must be accumulated. For more information, see Resource requirements.

Contents

Finding classifications

The **Finding** column on the **EBS volumes recommendations** page provides a summary of how each of your volumes performed during the analyzed period.

The following findings classifications apply to EBS volumes.

Classification	Description
Not optimized	An EBS volume is considered not optimized when Compute Optimizer has identified a volume type, volume size, or IOPS specification that can provide better performance or cost for your workload.
Optimized	An EBS volume is considered optimized when Compute Optimizer determines that the volume is correctly provision

Classification	Description
	ed to run your workload, based on the chosen volume type, volume size, and IOPS specification. For optimized resources , Compute Optimizer might sometimes recommend a new generation volume type.

Estimated monthly savings and savings opportunity

Estimated monthly savings (after discounts)

This column lists the approximate monthly cost savings that you experience by migrating your EBS volumes from the current specifications to the recommended specifications under specific discounts. To receive recommendations with specific discounts, the savings estimation mode preference needs to be activated. For more information, see Savings estimation mode.

> **Note**
>
> If you don't activate the savings estimation mode preference, this column displays the default On-Demand pricing discount information.

Estimated monthly savings (On-Demand)

This column lists the approximate monthly cost savings that you will experience by migrating your EBS volumes from the current specifications to the recommended specifications.

Savings opportunity (%)

This column lists the percentage difference between the price of the current EBS volume specification and the price of the recommended volume specification. If savings estimation mode is activated, Compute Optimizer analyzes specific discounts to generate the savings opportunity percentage. If savings estimation mode isn't activated, Compute Optimizer only uses On-Demand pricing information. For more information, see Savings estimation mode.

> **Important**
>
> If you enable Cost Optimization Hub in AWS Cost Explorer, Compute Optimizer uses Cost Optimization Hub data, which includes your specific pricing discounts, to generate your

recommendations. If Cost Optimization Hub isn't enabled, Compute Optimizer uses Cost Explorer data and On-Demand pricing information to generate your recommendations. For more information, see Enabling Cost Explorer and Cost Optimization Hub in the in the *AWS Cost Management User Guide*.

Estimated monthly savings calculation

For each recommendation, we calculate the cost to operate a new EBS volume using the recommended volume specifications. Estimated monthly savings are calculated based on the number of running hours for the current volume and the difference in rates between the current volume specifications and the recommended volume specifications. The estimated monthly savings for EBS volumes displayed on the Compute Optimizer dashboard is a sum of the estimated monthly savings for all EBS volumes in the account with a finding classification of *Not optimized*.

Performance risk

The performance risk columns on the **EBS volume details** page the **EBS volume recommendations** page define the likelihood of the current and recommended EBS volume not meeting your workload requirements. Compute Optimizer calculates an individual performance risk score for each specification of the EBS volume, including volume type, volume size, baseline IOPS, burst IOPS, baseline throughput, and burst throughput. The performance risk of the current and recommended EBS volume is calculated as the maximum performance risk score across the analyzed resource specifications.

The values range from very low, low, medium, high, and very high. A performance risk of very low means that the EBS volume is predicted to always provide enough capability. The higher the performance risk means that you should validate whether the volume meets the performance requirements of your workload before migrating your resource. Decide whether to optimize for performance improvement, for cost reduction, or for a combination of these two. For more information, see Requesting modifications to your EBS Volumes in the *Amazon Elastic Compute Cloud User Guide*.

Note

If Compute Optimizer doesn't display a risk value for your current Amazon EBS volume, this means that the volume is predicted to provide enough performance capability and is considered to have a very low performance risk.

Utilization graphs

The **EBS volume details** page displays utilization metric graphs for your current volume. The graphs display data for the analysis period. Compute Optimizer uses the maximum utilization point within each five-minute time interval to generate EBS volume recommendations.

You can change the graphs to display data for the last 24 hours, three days, one week, or two weeks. You can also change the statistic of the graphs between average and maximum.

The following utilization graphs are displayed on the details page:

Graph name	Description
Read operations (per second)	The completed read operations per second for the current EBS volume. For Xen instances, data is reported only when there is read activity on the volume.
Write operations (per second)	The completed write operations per second to the current EBS volume. For Xen instances, data is reported only when there is write activity on the volume.
Read bandwidth (KiB/second)	The read kibibytes (KiB) per second from the current EBS volume.
Write bandwidth (KiB/second)	The written kibibytes (KiB) per second to the current EBS volume.
Burst balance (percent)	The percentage of I/O credits remaining in the burst bucket for the current EBS volume. This metric is displayed only for General Purpose SSD (gp2) volumes in the Compute Optimizer console.

Accessing EBS volumes recommendations and details

You can use one of the following procedures to access either the **EBS volumes recommendations** or the **EBS volume details** pages in the AWS Console.

On the **EBS volumes recommendations** page you can view the recommendations for your current EBS volumes. On the **EBS volume details** page you can view the details of a specific volume and its recommendations.

Procedures

Accessing EBS volumes recommendations page

To access the EBS volume recommendations page

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **EBS volumes** in the navigation pane.

   The recommendations page lists the specifications and finding classifications of your volumes, along with the specifications of the recommended volumes. The current volumes listed are from the AWS Region that is currently selected, in the selected account.
3. You can perform the following actions on the recommendations page:

   - Filter recommendations by AWS Regions, Findings, or Finding reasons. To do this, first select the **Filter by one or more properties** text box. Then, choose the property and a value in the drop-down list that appears.
   - Filter your recommendations by tags. To do this, select the **Tag key** or **Tag value** text box. Then, enter the key or value you want to filter your EBS volume recommendations by.

     For example, to find all recommendations that have a tag with the key of `Owner` and the value of `TeamA`, specify `tag:Owner` for the filter name and `TeamA` for the filter value.
   - View recommendations for volumes in another account. To do this, choose **Account**, and then select a different account ID.

     > **Note**
     >
     > If you're signed in to a management account of an organization and trusted access with Compute Optimizer is enabled, you can view recommendations for resources

in other accounts. For more information, see Accounts supported by Compute Optimizer and Trusted access for AWS Organizations.

- Clear the selected filters. To do this, choose **Clear filters** next to the filter.
- Access the **EBS volume details** page for a specific volume. To do this, choose the finding classification listed next to the desired volume.

When you're ready, use Amazon EBS Elastic Volumes to modify the configuration of your volumes. For more information, see Amazon EBS Elastic Volumes in the *Amazon Elastic Compute Cloud User Guide*.

Accessing EBS volume details page

To access the EBS volume details page

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **EBS volumes** in the navigation pane.
3. Choose the finding classification listed next to the volume for which you wish to view detailed information.

   The details page lists up to three optimization recommendations for the volume that you chose. It lists the specifications of your current volume, the specifications and performance risks of the recommended volumes, and utilization metric graphs.
4. You can perform the following actions on the details page:

   - Choose a recommendation option to view the utilization comparison between your current volume and a recommended volume.

     The utilization metric graphs for your current volume are displayed at the bottom of the page.
   - To change the time range of the graphs, choose **Time Range**, and then choose **Last 24 hours**, **Last 3 days**, **Last week**, or **Last 2 weeks**.

     Choosing a shorter time range displays the data points at a higher granularity, which provides a higher level of detail.

- To change the statistic value of the graphs, choose **Statistics**, and then choose **Average** or **Maximum**.

  You can use this option to determine the typical volume utilization of your workload over time. To view the highest value observed during the specified period, change the selection to **Maximum**. This allows you to determine the peak volume usage of your workload over time.

When you're ready, use Amazon EBS Elastic Volumes to modify the configuration of your volumes. For more information, see Amazon EBS Elastic Volumes in the *Amazon Elastic Compute Cloud User Guide*.

Viewing Lambda function recommendations

AWS Compute Optimizer generates memory size recommendations for AWS Lambda functions. Recommendations for your functions are displayed in the following pages of the Compute Optimizer console:

- The **Lambda functions recommendations** page lists each of your current functions, their finding classifications, finding reasons, current configured memory, current usage, and current cost. The top recommendation from Compute Optimizer is listed next to each of your functions, and it includes the recommended configured memory, recommended cost, and the price difference between your current function and the recommendation. Note that the recommended cost is a range that is displayed under the **Recommended cost (high)** and **Recommended cost (low)** columns in the console. Use the recommendations page to compare your current functions with their top recommendation, which can help you to decide if you should up-size or down-size the configured memory of your function.
- The **Lambda function details** page, which you can access from the Lambda function recommendations page, lists the top optimization recommendation for a function. It lists the configuration for your current function and the recommendation option. The details page also displays utilization metric graphs for the current function.

The recommendations are refreshed daily. They're generated by analyzing the specifications and utilization metrics of the current function over a period of the last 14 days. For more information, see Metrics analyzed by AWS Compute Optimizer.

Keep in mind that Compute Optimizer generates recommendations for Lambda functions that meet a specific set of requirements, recommendations could take up to 24 hours to be generated, and sufficient metric data must be accumulated. For more information, see Resource requirements.

Contents

Finding classifications

The **Finding** column on the **Lambda functions recommendations** page provides a summary of how each of your functions performed during the analyzed period.

The following findings classifications apply to Lambda functions.

Classification	Description
Not optimized	A Lambda function is considered not optimized when Compute Optimizer has identified that its configured memory or CPU power (which is proportional to the configured memory) is under-provisioned or over-provisioned. In this case, Compute Optimizer generates a recommendation that can provide better performance or cost for your workload. When a function is not optimized, Compute Optimizer displays a finding reason of either **Memory under-provisioned** or **Memory over-provisioned**.
Optimized	A Lambda function is considered optimized when Compute Optimizer determines that its configured memory or CPU power (which is proportional to the configured memory) is correctly provisioned to run your workload.

Classification	Description
Unavailable	Compute Optimizer was unable to generate a recommend ation for the function. This could be because the function has not met the requirements of Compute Optimizer for Lambda functions, or the function does not qualify for a recommend ation. For this finding classification, Compute Optimizer displays one of the following finding reasons: • **Insufficient data** when the function does not have sufficien t metric data for Compute Optimizer to generate a recommendation. • **Inconclusive** when the function does not qualify for a recommendation because the function has configured memory greater than 1,792 MB, or Compute Optimizer cannot generate a recommendation with a high degree of confidence. **Note** Functions with a finding of **Unavailable** are not listed in the Compute Optimizer console.

Estimated monthly savings and savings opportunity

Estimated monthly savings (after discounts)

This column lists the approximate monthly cost savings that you experience by migrating your workloads from the current Lambda function memory specification to the recommended memory specification under the Savings Plans pricing model. To receive recommendations with Savings Plans discounts, the savings estimation mode preference needs to be activated. For more information, see Savings estimation mode.

> **Note**
>
> If you don't activate the savings estimation mode preference, this column displays the default On-Demand pricing discount information.

Estimated monthly savings (On-Demand)

This column lists the approximate monthly cost savings that you experience by migrating your workloads from the current Lambda function memory specification to the recommended memory specification under the On-Demand pricing model.

Savings opportunity (%)

This column lists the percentage difference between the price of the current Lambda function memory specification and the price of the recommended specification. If savings estimation mode is activated, Compute Optimizer analyzes the Savings Plans pricing discounts to generate the savings opportunity percentage. If savings estimation mode isn't activated, Compute Optimizer only uses On-Demand pricing information. For more information, see Savings estimation mode.

> **Important**
>
> If you enable Cost Optimization Hub in AWS Cost Explorer, Compute Optimizer uses Cost Optimization Hub data, which includes your specific pricing discounts, to generate your recommendations. If Cost Optimization Hub isn't enabled, Compute Optimizer uses Cost Explorer data and On-Demand pricing information to generate your recommendations. For more information, see Enabling Cost Explorer and Cost Optimization Hub in the in the *AWS Cost Management User Guide*.

Estimated monthly savings calculation

For each recommendation, we calculate the cost to operate a new Lambda function using the recommended memory specification. Estimated monthly savings are calculated based on the number of running hours for the current Lambda function and the difference in rates between the current memory specification and the recommended memory specification. The estimated monthly savings for Lambda functions displayed on the Compute Optimizer dashboard is a sum of the estimated monthly savings for all Lambda functions in the account with a finding classification of *Not optimized*.

Current performance risk

The **Current performance risk** column on the **Lambda functions recommendations** page defines the likelihood of each current Lambda function not meeting the resource needs of its workload. The current performance risk values range from very low, low, medium, and high. A very low performance risk means that the current Lambda function is predicted to always provide enough capability. The higher the performance risk is, the more likely you should consider the recommendation generated by Compute Optimizer.

Utilization graphs

The **Lambda function details** page displays utilization metric graphs for your current function. The graphs display data for the analysis period. Compute Optimizer uses the maximum utilization point within each five-minute time interval to generate Lambda function recommendations.

You can change the graphs to display data for the last 24 hours, three days, one week, or two weeks.

The following utilization graphs are displayed on the details page:

Graph name	Description
Duration (milliseconds)	The amount of time that your function code spends processing an event.
Errors (count)	The number of invocations that result in a function error. Function errors include exceptions thrown by your code and exception s thrown by the Lambda runtime. The runtime returns errors for issues such as timeouts and configuration errors.
Invocations (count)	The number of times your function code is executed, including successful executions and executions that result in a function error.

Accessing Lambda function recommendations and details

You can use one of the following procedures to access either the **Lambda function recommendations** or the **Lambda function details** pages in the AWS Console.

On the **Lambda function recommendations** page you can view the recommendations for your current functions. On the **Lambda function details** page you can view the details of a specific function and its recommendations.

Procedures

Accessing Lambda function recommendations page

To access the Lambda function recommendations page

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **Lambda functions** in the navigation pane.

   The recommendations page lists the specifications and finding classifications of your functions, along with the specifications of the recommended functions. The current functions listed are from the AWS Region that is currently selected, in the selected account.
3. You can perform the following actions on the recommendations page:

   - Filter recommendations by AWS Regions, Findings, or Finding reasons. To do this, first select the **Filter by one or more properties** text box. Then, choose the property and a value in the dropdown list that appears.
   - Filter your recommendations by tags. To do this, select the **Tag key** or **Tag value** text box. Then, enter the key or value you want to filter your Lambda function recommendations by.

     For example, to find all recommendations that have a tag with the key of `Owner` and the value of `TeamA`, specify `tag:Owner` for the filter name and `TeamA` for the filter value.
   - View recommendations for functions in another account. To do this, choose **Account**, and then select a different account ID.

     > **Note**
     >
     > If you're signed in to a management account of an organization and trusted access with Compute Optimizer is enabled, you can view recommendations for resources

in other accounts. For more information, see Accounts supported by Compute Optimizer and Trusted access for AWS Organizations.

- Clear the selected filters. To do this, choose **Clear filters** next to the filter.
- Access the **Lambda function details** page for a specific function. To do this, choose the finding classification listed next to the function that you want to access.

Modify the configured memory of your Lambda function when you're ready. For more information, see Configuring Lambda function memory in the *AWS Lambda Developer Guide*.

Accessing Lambda function details page

To access the Lambda function details page

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **Lambda functions** in the navigation pane.
3. Choose the finding classification listed next to the function for which you wish to view detailed information.

   The details page lists the top optimization recommendation for the function that you chose. It lists the specifications of your current function, the recommended function configuration, and utilization metric graphs.
4. You can perform the following actions on the details page:

   - Choose a recommendation option to view the utilization comparison between your current function and a recommended function.

     The utilization metric graphs for your current function are displayed at the bottom of the page.
   - To change the time range of the graphs, choose **Time Range**, and then choose **Last 24 hours**, **Last 3 days**, **Last week**, or **Last 2 weeks**.

     Choosing a shorter time range displays the data points at a higher granularity, which provides a higher level of detail.

Modify the configured memory of your Lambda function when you're ready. For more information, see Configuring Lambda function memory in the *AWS Lambda Developer Guide*.

Viewing Amazon ECS services on Fargate recommendations

AWS Compute Optimizer generates recommendations for Amazon ECS services on Fargate. These recommendations are displayed on the following pages of the Compute Optimizer console.

The **Recommendations for Amazon ECS services on Fargate** page lists the following information for each of your ECS services:

- Finding classifications
- Finding reasons
- Estimated monthly savings
- Savings opportunity
- Current performance risk

The recommendations from Compute Optimizer are listed next to each of your Amazon ECS services. The information that's provided includes the recommended CPU and memory size within an Amazon ECS service, the hourly price for the selected purchasing option, and the price difference between your current Amazon ECS service and the service with Compute Optimizer's recommended configurations. This information can help you decide if you up-size or down-size your Amazon ECS services on Fargate. For more information about how to view your recommendations for Amazon ECS services on Fargate, see Accessing ECS service recommendations and details.

Note

The recommendations are refreshed daily and they can take up to 24 hours to generate. Keep in mind that Compute Optimizer requires 24 hours of metrics in the past 14 days to generate recommendations for Amazon ECS service on Fargate. For more information, see Requirements for Amazon ECS services on Fargate.

The **Amazon ECS service details** page provides the following information for your Amazon ECS service:

- Your current Amazon ECS service task size settings and Compute Optimizer's recommended task size settings. Use the table to compare your current task settings, such as CPU size, memory size, and pricing details, with Compute Optimizer recommendations.
- Your current container size settings and Compute Optimizer's recommended container size settings. Use the table to compare your current container settings, such as CPU size, memory size, and memory reserved, with Compute Optimizer recommendations.
- Use the utilization graphs to compare your current Amazon ECS service CPU and memory utilization metrics with Compute Optimizer's recommendation. The graphs show visually the impact of these recommendations.

For more information about how to view the details for your Amazon ECS service on Fargate, see Accessing ECS service details page.

Contents

Finding classifications

The **Findings** column on the **Recommendations for Amazon ECS services on Fargate** page provides a summary of how each of your services performed during the analysis period.

The following findings classifications apply to Amazon ECS services on Fargate.

Classification	Description
Under-provisioned	When Compute Optimizer detects that there's not enough memory or CPU, an Amazon ECS service is considered under-provisioned. Compute Optimizer displays a finding reason of **CPU under-provisioned** or **Memory under-provisioned**. An under-provisioned Amazon ECS service might result in poor application performance.
Over-provisioned	When Compute Optimizer detects that there's excessive memory or CPU, an Amazon ECS service is considered over-provisioned. Compute Optimizer displays a finding reason of **CPU over-provisioned** or **Memory over-provisioned**. An over-provisioned Amazon ECS service might result in additional infrastructure costs.
Optimized	When both the CPU and memory of your Amazon ECS service meet the performance requirements of your workload, the service is considered optimized.

For more information about under-provisioned and over-provisioned Amazon ECS services on Fargate, see Finding reasons in the Viewing Amazon ECS services on Fargate recommendations topic.

Finding reasons

The **Finding reasons** column on the **Recommendations for Amazon ECS services on Fargate** page shows which specification of an Amazon ECS service on Fargate is under-provisioned or over-provisioned.

The following finding reasons apply to Amazon ECS services on Fargate.

Finding reason	Description
CPU over-provisioned	The ECS service CPU configuration can be sized down while still meeting the performance requirements of your workload. This

Finding reason	Description
	is identified by analyzing the `CPUUtilization` metric of the current service during the look-back period.
CPU under-provisioned	The ECS service CPU configuration can be sized up to enhance the performance of your workload. This is identified by analyzing the `CPUUtilization` metric of the current service during the look-back period.
Memory over-provisioned	The ECS service memory configuration can be sized down while still meeting the performance requirements of your workload. This is identified by analyzing the `MemoryUtilization` metric of the current service during the look-back period.
Memory under-provisioned	The ECS service memory configuration can be sized up to enhance the performance of your workload. This is identified by analyzing the `MemoryUtilization` metric of the current service during the look-back period.

For more information about these metrics, see Amazon ECS CloudWatch metrics in the *Amazon ECS User Guide for AWS Fargate*.

Estimated monthly savings and savings opportunity

Estimated monthly savings (after discounts)

This column lists the approximate monthly cost savings that you experience after you adjust the configurations of your Amazon ECS service on Fargate to the recommended configurations under the Savings Plans pricing model. To receive recommendations with Savings Plans discounts, the savings estimation mode preference needs to be activated. For more information, see Savings estimation mode.

> **Note**
>
> If you don't activate the savings estimation mode preference, this column displays the default On-Demand pricing discount information.

Estimated monthly savings (On-Demand)

This column lists the approximate monthly cost savings that you experience after you adjust the configurations of your Amazon ECS service on Fargate to the recommended configurations under the On-Demand pricing model.

Savings opportunity (%)

This column lists the percentage difference between the price of the current ECS service on Fargate and the price of the service with the recommended configurations. If savings estimation mode is activated, Compute Optimizer analyzes the Savings Plans pricing discounts to generate the savings opportunity percentage. If savings estimation mode isn't activated, Compute Optimizer only uses On-Demand pricing information. For more information, see Savings estimation mode.

Important

If you enable Cost Optimization Hub in AWS Cost Explorer, Compute Optimizer uses Cost Optimization Hub data, which includes your specific pricing discounts, to generate your recommendations. If Cost Optimization Hub isn't enabled, Compute Optimizer uses Cost Explorer data and On-Demand pricing information to generate your recommendations. For more information, see Enabling Cost Explorer and Cost Optimization Hub in the in the *AWS Cost Management User Guide*.

Estimated monthly savings calculation

For each recommendation, Compute Optimizer calculates the cost to operate a new Amazon ECS service on Fargate by using the recommended service specifications. Estimated monthly savings are calculated based on the estimated monthly running time of the current Amazon ECS service. The savings are also based on the difference in rates between the current Amazon ECS service and the service with the recommended configurations.

Note

To calculate the estimated monthly running time of your Amazon ECS services on Fargate, Compute Optimizer analyzes your utilization data over the past 14 days. Then, Compute Optimizer uses the analysis results to estimate your monthly usage.

The estimated monthly savings for Amazon ECS services that are displayed on the Compute Optimizer dashboard is a sum of the estimated monthly savings for all over-provisioned services in the account.

Current performance risk

The **Current performance risk** column on the **Recommendations for Amazon ECS services on Fargate** page defines how likely each current Amazon ECS service doesn't meet workload resource needs. The values for current performance risk are Very low, Low, Medium, and High.

A very low performance risk means that the current Amazon ECS service is predicted to consistently provide enough capability. A high performance risk is likely due to high CPU or memory utilization. If your Amazon ECS service is always running at capacity, it increases the chances of your service suffering from higher latency or lower performance. Compute Optimizer's recommendations provides you with enough capacity to run your workloads efficiently.

Compare current settings with recommended task size

On the **Amazon ECS service details** page, compare the current Amazon ECS service task size with Compute Optimizer's recommended task size for your resources. Savings and performance risk information for your Amazon ECS service is also provided in the table. The following table provides a description for each column section in the console.

Column	Description
CPU size	The CPU size of the current Amazon ECS service tasks and Compute Optimizer's recommended CPU size configurations.
Memory size	The memory size of the current Amazon ECS service tasks and Compute Optimizer's recommended memory size configurations.
Pricing details	The On-Demand price of the current Amazon ECS service on Fargate and Compute Optimizer's recommended configurations. For more information, see AWS Fargate Pricing.

Column	Description
Estimated monthly savings	The approximate monthly cost savings after you adjust the configurations of your Amazon ECS service to Compute Optimizer 's recommended configurations. For more information, see Estimated monthly savings and savings opportunity.
Savings opportunity (%)	The percentage difference between the price of your current Amazon ECS service and the price of the service with Compute Optimizer 's recommended configurations. For more information, see Estimated monthly savings and savings opportunity.
Price difference	The difference between the public pricing of the current Amazon ECS service on Fargate and the service with Compute Optimizer 's recommended configurations. For more information, see AWS Fargate Pricing.
Performance risk	This defines how likely your current Amazon ECS service and Compute Optimizer's recommendation doesn't meet workload resource needs. The values for performance risk are Very low, Low, Medium, and High. For more information, see Current performance risk.

Column	Description
Auto Scaling configuration	The Auto Scaling configuration of your current Amazon ECS service and Compute Optimizer 's recommended task size. If your service has a step scaling policy or a target tracking policy on both CPU and memory, Compute Optimizer can't generate any Auto Scaling recommend ations. If a target tracking policy is on the service's CPU only, Compute Optimizer only generates memory size recommendations. Or, if a target tracking policy is on the service's memory only, Compute Optimizer only generates CPU size recommendations. For more information about step scaling and target scaling policies, see Step scaling policies for Application Auto Scaling and Target tracking scaling policies for Applicati on Auto Scaling in the *Application Auto Scaling User Guide*.

Compare current settings with recommended container size

On the **Amazon ECS service details** page, compare the current Amazon ECS service container size with the recommended container size options. The table provides your current and Compute Optimizer's recommended CPU size, memory size, and memory reserved configurations. Compute Optimizer generates container-level recommendations that are compatible with the recommended task size.

> **Note**
>
> Compute Optimizer only provides container size setting recommendations for when container size settings need to adjust to fit within an Amazon ECS service task. For example, suppose that Compute Optimizer recommends downsizing a task size. Then,

Compute Optimizer provides container-level setting recommendations to make sure that the task size and container size settings are compatible with each other.

Utilization graphs

The **Amazon ECS service details** page displays utilization metric graphs for your Amazon ECS services on Fargate and Compute Optimizer recommendations. The graphs display the current and recommended CPU and memory data for the analysis period. Compute Optimizer uses the maximum utilization point within each one-minute time interval to generate recommendations ECS services on Fargate.

The solid blue line is the utilization of your current service. If you used the recommendations during the analysis period, the green line is the projected upper bound value and the grey line is the projected lower bound value.

Note

The utilization values of an Amazon ECS service can vary based on the infrastructure Fargate uses. Compute Optimizer provides a utilization range to help you consider all possible operating conditions.

You can change the graphs to display data for the last 24 hours, 3 days, 1 week, or 2 weeks. You can also change the statistic of the graphs between average and maximum.

The following utilization graphs are displayed on the details page.

Graph name	Description
CPU utilization (percent)	The percentage of CPU capacity that's used in the service. The graph compares the CPU utilization data of your current Amazon ECS service with the service when the recommended configura tions are applied. The comparison shows you what the CPU utilization is if you configured your CPU to the recommended settings during

Graph name	Description
	the analysis period. This comparison shows if the recommended Amazon ECS service settings are within your workload's performan ce threshold.
Memory utilization (percent)	The percentage of memory that's used in the service. The graph compares the memory utilization data of your current Amazon ECS service with the service when the recommended configura tions are applied. The comparison shows you what the memory utilization is if you configured your memory to the recommend ed settings during the analysis period. This comparison shows if the recommended Amazon ECS service settings are within your workload's performance threshold.

Accessing ECS service recommendations and details

You can use one of the following procedures to access either the **Recommendations for Amazon ECS services on Fargate** or the **Amazon ECS service details** pages in the AWS Console.

On the **Recommendations for Amazon ECS services on Fargate** page you can view the recommendations for your current services. On the **Amazon ECS service details** page you can view the details of a specific service and its recommendations.

Procedures

Accessing ECS service recommendations page

To access the ECS service recommendations page

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **ECS services on Fargate**.

> **Note**
>
> The current services listed are from the AWS Region that's currently selected in the selected account.

3. You can perform the following actions on the recommendations page:

   - Filter recommendations by AWS Regions, Findings, or Finding reasons. To do this, first select the **Filter by one or more properties** text box. Then, choose the property and a value in the dropdown list that appears.
   - Filter your recommendations by tags. To do this, select the **Tag key** or **Tag value** text box. Then, enter the key or value you want to filter your ECS service recommendations by.

     For example, to find all recommendations that have a tag with the key of `Owner` and the value of `TeamA`, specify `tag:Owner` for the filter name and `TeamA` for the filter value.
   - View recommendations for services in another account. To do this, choose **Account**, and then select a different account ID.

     > **Note**
     >
     > If you're signed in to a management account of an organization and trusted access with Compute Optimizer is enabled, you can view recommendations for resources in other accounts. For more information, see Accounts supported by Compute Optimizer and Trusted access for AWS Organizations.
   - Clear the selected filters. To do this, choose **Clear filters** next to the filter.

Accessing ECS service details page

To access the ECS service details page

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **ECS services on Fargate**.
3. Select the service name you want to view detailed information for. Then, choose **View details**.
4. You can perform the following actions on the details page:

- On the utilization graphs, you can hover over the graph to see exact values on specific dates over the analysis period.
- To change the time range of the graphs, choose **Time Range**, and then choose **Last 24 hours**, **Last 3 days**, **Last week**, or **Last 2 weeks**.

  Choosing a shorter time range displays the data points at a higher granularity, which provides a higher level of detail.
- To change the statistic value of the graphs, choose **Statistics**, and then choose **Average** or **Maximum**.

  You can use this option to determine the typical Amazon ECS service utilization of your workload over time. To view the highest value observed during the specified period, change the selection to **Maximum**. This way, you can determine the peak service usage of your workload over time.

Viewing commercial software license recommendations

AWS Compute Optimizer generates license recommendations for commercial software that run on Amazon EC2. These recommendations are displayed on the following pages of the Compute Optimizer console.

The **Recommendations for commercial software licenses** page lists the following information for each of your EC2 instances with licenses.

- Finding classifications
- Finding reasons
- Estimated monthly savings
- Savings opportunity
- On-Demand prices
- BYOL hourly license prices

The recommendations from Compute Optimizer are listed next to each of your EC2 instances with commercial software licenses. The information that's provided includes recommended saving opportunities, EC2 instance On-Demand prices, and hourly bring your own license (BYOL) prices. This information can help you decide if you should down-size your license edition. For

more information about how to view your license recommendations for commercial software, see Accessing commercial software license recommendations and details.

> **Note**
>
> The recommendations are refreshed daily and they can take up to 24 hours to generate. Keep in mind that Compute Optimizer requires 24 hours of metrics in the past 14 days to generate license recommendations. For more information, see Commercial software license requirements.

The **License details** page provides the following information for your license recommendation:

- Your current license settings and Compute Optimizer's recommended licence configurations. Use the table to compare your current license configurations, such as edition, model, and number of instance cores, with Compute Optimizer recommendations.
- Use the utilization graphs to access the utilization of the current license during the analysis period.

For more information about how to view the details for your license recommendation, see Accessing commercial software license details page.

Contents

Finding classifications

The **Findings** column on the **Commercial software license recommendations** page provides a summary of how each of your licenses performed during the analyzed period.

The following findings classifications apply to Microsoft SQL Server licenses.

Classification	Description
Insufficient metrics	When Compute Optimizer detects that your CloudWatch Application Insights isn't enabled or is enabled with insufficient permissions. Compute Optimizer displays a finding reason of `InvalidCloudwatchApplicationInsights` or `CloudwatchApplicationInsightsError`.
Not optimized	When Compute Optimizer detects that your EC2 infrastructure isn't using any of the Microsoft SQL server license features you're paying for, a license is considered not optimized. Compute Optimizer displays a finding reason of `LicenseOverprovisioned`. A license that isn't optimized might result in unnecessary additional costs.
Optimized	When the license for your SQL server database meets your performance requirements, the license is considered optimized.

For more information about these finding classifications, see Finding reasons.

Finding reasons

The **Finding reasons** column on the **EC2 instances recommendations** and **EC2 instance details** pages shows which specification of an instance is under-provisioned or over-provisioned.

The following finding reasons apply to Microsoft SQL server license recommendations.

Finding reason	Description
`LicenseOverprovisioned`	A license is considered over-provisioned when any of the current license features aren't in use. CloudWatch Application Insights analyzes the `mssql_enterprise_features_used` metric to identify this. If your license is over-provisioned, you can consider downgrading your Microsoft SQL Server license. If you meet certain

Finding reason	Description
	eligibility requirements you can downgrade from SQL Server Enterprise edition to SQL Server Standard edition, or Developer edition if it is a non-production workload. For more information, see Downgrade your Microsoft SQL Server edition in the *Microsoft SQL Server on Amazon EC2 User Guide*.
`InvalidCloudwatchApplicationInsights`	The backend exporter of your CloudWatch Application Insights isn't configured properly. For more information about how to configure CloudWatch Application Insights, see Set up Amazon CloudWatch Application Insights for monitoring in the *Amazon CloudWatch User Guide*.
`CloudwatchApplicationInsightsError`	You have configured CloudWatch Application Insights but it hasn't identified the number of Enterprise edition features in use. It can take a few hours to identify the features. If the features aren't identified after a few hours, contact Support.

Estimated monthly savings and savings opportunity

The **Estimated monthly savings (On-Demand)** column lists the approximate monthly cost savings after you downgrade your license edition based on Compute Optimizer's recommendations. To calculate this, Compute Optimizer multiplies the savings per hour by the estimated monthly running hours.

The **Savings opportunity (%)** column lists the percentage difference between your current Microsoft SQL server license and Compute Optimizer's recommended license. The Bring Your Own License (BYOL) savings calculation is based on the license price. The License Included savings calculation is based on the On-Demand pricing.

> **Important**
>
> Savings opportunity data requires that you opt in to Cost Explorer, as well as activate **Receive Amazon EC2 resource recommendations** in the Cost Explorer preferences page. That creates a connection between Cost Explorer and Compute Optimizer. With this connection, Cost Explorer generates savings estimates considering the price of existing resources, the price of recommended resources, and historical usage data.

Estimated monthly savings reflects the projected dollar savings associated with each of the recommendations generated. For more information, see Enabling Cost Explorer and Optimizing your cost with Rightsizing Recommendations in the *Cost Management User Guide*.

Inferred workload types

Compare current license edition with recommended license edition

On the **License details** page, compare the configurations of your current license edition with Compute Optimizer's recommended license edition. The following table provides a description for each column section in the console.

Column	Description
License edition	The current license edtion and the recommend ed license edition. For example, Enterprise, Standard, and Free.
Instance On-Demand price	The current and recommended On-Demand instance prices.
BYOL price (hourly)	The current and recommended Bring your own license (BYOL) hourly price.
Estimated monthly savings	The approximate monthly cost savings after you downgrade your license edition based on Compute Optimizer's recommendations. For more information, see Estimated monthly savings and savings opportunity.
Savings opportunity (%)	The percentage difference between your current Microsoft SQL server license and Compute Optimizer's recommended license. For more information, see Estimated monthly savings and savings opportunity.

Column	Description
Instance cores	The current and recommended number of physical cores for an instance. Number of instance cores are used in licensing calculati ons.

Utilization graphs

The **License details** page displays current resource utilization of the current commercial software license. The graph only displays the number of Enterprise editon features that were used data over the analysis period.

You can change the graphs to display data for the last 24 hours, three days, one week, or two weeks.

Accessing commercial software license recommendations and details

You can use one of the following procedures to access either the **Recommendations for commercial software licenses** or the **License details** pages in the AWS Console.

On the **Recommendations for commercial software licenses** page you can view the recommendations for your current licenses. On the **License details** page you can view the details of a specific license recommendation.

Procedures

Accessing commercial software license recommendations page

To access the commercial software license recommendations page

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **Licenses** in the navigation pane.
3. (Optional) You can also access the license recommendations from the EC2 instances page. To do this, first select the Filter by one or more properties. From the dropdown list that appears, choose the **Inferred workload type** property and then choose the **Inferred workload type = SQL Server value**.

> **Note**
>
> The current licenses listed are from the AWS Region that is currently selected, in the selected account.

4. You can perform the following actions on the recommendations for commercial software licenses page:

   - Filter recommendations by AWS Regions, Findings, or Finding reasons. To do this, first select the **Filter by one or more properties** text box. Then, choose the property and a value in the dropdown list that appears.
   - Filter your recommendations by tags. To do this, select the **Tag key** or **Tag value** text box. Then, enter the key or value you want to filter your licesne recommendations by.

     For example, to find all recommendations that have a tag with the key of `Owner` and the value of `TeamA`, specify `tag:Owner` for the filter name and `TeamA` for the filter value.
   - View recommendations for functions in another account. To do this, choose **Account**, and then select a different account ID.

     > **Note**
     >
     > If you're signed in to a management account of an organization and trusted access with Compute Optimizer is enabled, you can view recommendations for resources in other accounts. For more information, see Accounts supported by Compute Optimizer and Trusted access for AWS Organizations.

   - Clear the selected filters. To do this, choose **Clear filters** next to the filter.

Accessing commercial software license details page

To access the commercial software license details page

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **Licenses** in the navigation pane.
3. Choose the **Instance ID** you want to view detailed information.

4. You can perform the following actions on the details page:

   - On the utilization graphs, you can hover over the graph to see exact values on specific dates over the analysis period.
   - To change the time range of the graphs, choose **Time Range**, and then choose **Last 24 hours**, **Last 3 days**, **Last week**, or **Last 2 weeks**.

     Choosing a shorter time range displays the data points at a higher granularity, which provides a higher level of detail.
   - To change the statistic value of the graphs, choose **Statistics**, and then choose **Average** or **Maximum**.

Apply optimization recommendations using Automation

Automation is a feature within AWS Compute Optimizer that enables you to apply optimization recommendations to your AWS resources, which can help you reduce cost and improve performance. You can apply recommended actions directly or create automation rules that implement recommendations on a recurring schedule when they match your specified criteria. With automation rules, set criteria such as AWS Region and Resource Tags to target specific geographies and workloads. Configure rules to run daily, weekly, or monthly, and Compute Optimizer continuously evaluates new recommendations against your criteria. Track automation events over time, examine detailed step history, estimate savings achieved, and reverse actions directly from Compute Optimizer when needed.

Enabling Automation

When you access the Automation section of the Compute Optimizer console for the first time, you're asked to enable the feature using the account that you're signed in with. You can also opt in using the Compute Optimizer Automation API, AWS Command Line Interface (AWSCLI), or SDKs.

By enabling this feature, you authorize Compute Optimizer to implement optimization recommendations by managing AWS resources in your account. This includes creating Amazon EBS snapshots, deleting EBS volumes, and modifying EBS volumes. In the future, AWS may expand the types of optimization recommendations that AWS Compute Optimizer can implement and the AWS resources it can manage.

To enable Automation, you need specific permissions to update the Automation enrollment configuration and create the necessary service-linked role. For more information on service-linked roles, see Using service-linked roles for AWS Compute Optimizer.

To enable Automation

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose any page under the **Automation** section.
3. On the feature landing page, choose **Enable Automation**.
4. When prompted, review the note on service-linked role permissions and choose **Enable Automation**.

To enable Automation using IAM policies, see Enabling Automation.

If you're enabling Automation for member accounts in your organization, the management account also needs permissions to associate and disassociate accounts. These permissions allow the management account to enable Automation for member accounts and configure whether the management account can implement optimizations on behalf of the member account. For more information, see Enabling Automation for your organization.

Policy to enable Automation for your account

The following policy statement enables Automation for your account.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "iam:CreateServiceLinkedRole",
            "Resource": "arn:aws:iam::*:role/aws-service-role/aco-
automation.amazonaws.com/AWSServiceRoleForComputeOptimizerAutomation",
            "Condition": {"StringLike": {"iam:AWSServiceName": "aco-
automation.amazonaws.com"}}
        },
        {
            "Effect": "Allow",
            "Action": [
                "iam:PutRolePolicy",
                "iam:AttachRolePolicy"
            ],
            "Resource": "arn:aws:iam::*:role/aws-service-role/aco-
automation.amazonaws.com/AWSServiceRoleForComputeOptimizerAutomation"
        },
        {
            "Effect": "Allow",
            "Action": "aco-automation:UpdateEnrollmentConfiguration",
            "Resource": "*"
        }
    ]
}
```

Enabling Automation for your organization

When you enable Automation for your organization's management account, you can also configure Automation for your organization's member accounts, enabling centralized implementation of optimization actions across your organization. This centralized approach can help you optimize for cost and performance at scale.

Policy to enable Automation across your organization

The following policy statement enables Automation across your organization.

```
                {
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "iam:CreateServiceLinkedRole",
            "Resource": "arn:aws:iam::*:role/aws-service-role/aco-
automation.amazonaws.com/AWSServiceRoleForComputeOptimizerAutomation",
            "Condition": {"StringLike": {"iam:AWSServiceName": "aco-
automation.amazonaws.com"}}
        },
        {
            "Effect": "Allow",
            "Action": [
                "iam:PutRolePolicy",
                "iam:AttachRolePolicy"
            ],
            "Resource": "arn:aws:iam::*:role/aws-service-role/aco-
automation.amazonaws.com/AWSServiceRoleForComputeOptimizerAutomation"
        },
        {
            "Effect": "Allow",
            "Action": "aco-automation:UpdateEnrollmentConfiguration",
            "Resource": "*"
        },
        {
            "Effect": "Allow",
            "Action": "aco-automation:AssociateAccounts",
            "Resource": "*"
        },
```

```
        {
            "Effect": "Allow",
            "Action": "aco-automation:DisassociateAccounts",
            "Resource": "*"
        },
        {
            "Effect": "Allow",
            "Action": "aco-automation:ListAccounts",
            "Resource": "*"
        }
    ]
}
```

Trusted access for AWS Organizations

You must have trusted access enabled to manage automation for your member accounts. When you opt in to Compute Optimizer using your organization's management account and include all member accounts, trusted access is automatically enabled. This allows Compute Optimizer to analyze resources and generate recommendations for member accounts. Trusted access also allows Compute Optimizer to implement recommendations for member accounts that have also enabled the Automation feature.

Compute Optimizer verifies that trusted access is enabled each time you access recommendations or apply recommendations for member accounts. If you disable trusted access, the management account loses access to recommendations and automation for your organization's member accounts. To re-enable trusted access, opt in to Compute Optimizer again using your organization's management account and include all the member accounts. For more information, see Opting in to AWS Compute Optimizer. For more information about AWS Organizations trusted access, see Using AWS Organizations with other AWS services in the AWS Organizations User Guide.

Configure automation for member accounts

To enable Automation for member accounts, the management account needs permissions to associate and disassociate accounts. These permissions allow the management account to enable Automation for member accounts and configure whether the management account can implement optimizations on behalf of member accounts. For more information , see Policy to enable Automation across your organization.

Once a member account is associated, the management account or delegated administrator can view and apply recommended actions to the member account. When you associate a member account, its organization rule mode is automatically set to Any Allowed, which permits the management account to create Automation rules that automatically apply actions to that account. If the member account has not previously enabled the Automation feature, the association process automatically enables it.

To enable Automation for member accounts

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Account management** under the **Preferences** section.
3. Choose the **Automation** tab.
4. Search for the account using its account Id.
5. Select the account and choose Add. You can enable Automation for up to 50 accounts at a time.

Organization rule mode

This setting controls whether the management account can implement automated optimization actions for the member account. When set to Any Allowed, the management account can directly implement recommended actions or create Automation rules that apply to the member account. When set to None Allowed, only the member account can act on its own recommendations, and management account rules will not apply. When you enable Automation for a member account, its organization rule mode is automatically set to Any Allowed.

Organization rules targeting a member account automatically start or stop applying based on the organization rule mode setting. Rules apply when the mode is set to Any Allowed and stop applying when set to None Allowed. If you change the mode to None allowed, any in-progress automation steps initiated by organization rules will continue to completion, but no new automation steps will be triggered by organization rules for that account.

To configure organization rule mode for member accounts

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Account management** under the **Preferences** section.

3. Choose the **Automation** tab.
4. Select the accounts that you want to configure.
5. Choose **Actions** and select `Allow organization rules` or `Disallow organization rules`. You can select and update the configuration for up to 50 accounts at a time.

Recommended actions

Recommended actions are optimization opportunities that you can implement through Compute Optimizer. They are a subset of Compute Optimizer's recommendations. You can view and apply each recommended action directly or create automation rules to implement them on a recurring schedule when they match your specified criteria.

Viewing recommended actions

The Recommended actions page displays a summary of your recommended actions and a table with details for individual actions. Recommended actions help you optimize your resources for performance and cost savings.

> **Note**
>
> Your organization's management account and delegated administrator can view recommended actions for member accounts with Automation enabled and configured to allow centralized optimization. For more information, see Enabling Automation for your organization.

To access recommended actions

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Recommended actions** under the **Automation** section.
3. You can perform the following actions on the **Recommended actions** page:

   - View recommended actions.

   - Filter recommended actions by one or more properties such as AWS Region or Resource Tag key-values.

- Select the recommended actions that you want to apply.

- View a summary of the estimated monthly savings for your selected recommended actions and the total opportunity available based on your filters.

- Create automation rule from your selected filters. This pre-fills the rule creation form with your selected filters in the recommended actions table.

Recommended actions summary

This section of the Recommended actions page summarizes the estimated monthly savings for your selected recommended actions and the total opportunity available based on your filters. You can select and apply up to 10 actions at a time.

Recommended action types

In the recommended actions table, you will find a list of optimization opportunities. The following recommended action types are supported:

- Snapshot and delete unattached EBS volumes: This action is recommended for volumes unattached from EC2 instances for 32 or more days. Compute Optimizer creates a snapshot to back up your data before deleting the volume. For more information about this recommendation criteria, see Idle criteria per resource.
- Upgrade EBS volume type: This action is recommended for volumes using previous generation volume types. Upgrading to newer generation volume types, such as gp3 and io2, provides better performance and cost efficiency with improved IOPS and throughput capabilities at lower prices.

There are several considerations when applying recommended actions:

- The estimated monthly savings considers the snapshot cost based on the volume's provisioned size. Actual snapshot cost depends on the incremental EBS snapshot size.
- After Compute Optimizer modifies an Amazon EBS volume, you must wait at least six hours and ensure that the volume is in the 'in-use' or 'available' state before you can modify the same volume. For more information, see the Amazon EBS User Guide.

Estimated monthly savings

Estimated monthly savings (after discounts)

This column in the recommended actions table displays the estimated monthly savings from implementing the recommended action. If you have savings estimation mode enabled, the estimated monthly savings include your specific discounts. To receive recommended actions that include your specific discounts, enable the savings estimation mode preference. For more information, see Savings estimation mode.

> **Note**
>
> If you don't enable the savings estimation mode preference, this column displays estimated monthly savings based on On-Demand pricing.

Estimated monthly savings (On-Demand)

This column in the recommended actions table displays the estimated monthly savings from implementing the recommended action. The estimated monthly savings calculation is based on On-Demand pricing.

Apply recommended actions

You can select up to 10 recommended actions at a time to apply. Once you apply the recommended action, it will be removed from the Recommended action page and an automation event will be created. You can view and monitor the status of the action in the Automation events page. Automation events awaiting execution will be in Ready status. You can have up to 100 automation events in Ready status per account per region.

To apply recommended actions

1. On the **Recommended actions** page, select up to 10 recommended actions that you want to apply.
2. Choose **Review and apply**. You will be able to review and confirm your selection on the next page before implementing actions.
3. Review your selection. You can remove selected recommended by clicking on the in-line remove icon.
4. Choose **Confirm and apply**.

5. When prompted to confirm, type "`confirm`" and choose **Apply changes**.

Automation rules

Automation rules automatically implement recommended actions based on your defined criteria and schedule. Automation rules are global resources that manage automated actions across all AWS Regions where Compute Optimizer Automation is available. You can create, update, and delete automation rules from any AWS Region where Compute Optimizer Automation is available.

Rule type

There are two types of rules:

- Account rules: Rules that apply recommended actions only to your account.
- Organization rules: Rules that centrally apply recommended actions across member accounts.

> **Note**
>
> Only the management account or delegated administrator can create organization rules. You can only select member accounts with Automation enabled and organization rules allowed can be selected for the rule to apply. Member accounts can view the details of organization rules that apply to their account but cannot edit them. Organization rules can be configured to apply before or after member account rules.

Rule criteria

When configuring a rule, choose the recommended action types you want your rule to implement, such as snapshot and delete unattached Amazon EBS volumes and upgrade Amazon EBS volume type. Refine your selection using criteria such as AWS Region and Resource Tags. Then preview the current matching recommended actions to validate your criteria.

> **Important**
>
> If you don't specify rule criteria, Compute Optimizer applies all the selected recommended actions types in the accounts you select in your rule scope, including recommended actions in all AWS Regions where Compute Optimizer Automation is available.

The following recommended action attributes are currently supported as criteria for automation rules:

Attribute	Operator	Field type
Current volume size (GiB)	`NumericEquals | NumericNotEquals | NumericLessThan | NumericLessThanEquals | NumericGreaterThan | NumericGreaterThanEquals`	Integer
Current volume type	`StringEquals | StringNotEquals | StringEqualsIgnoreCase | StringNotEqualsIgnoreCase | StringLike | StringNotLike`	String
Estimated savings ($)	`NumericEquals | NumericNotEquals | NumericLessThan | NumericLessThanEquals | NumericGreaterThan | NumericGreaterThanEquals`	Double
Lookback period (days)	`NumericEquals | NumericNotEquals | NumericLessThan | NumericLessThanEquals | NumericGreaterThan | NumericGreaterThanEquals`	Integer
AWS Region	`StringEquals | StringNotEquals | StringEqualsIgnoreCase | StringNotEqualsIgnoreCase | StringLike | StringNotLike`	String
Resource ARN	`StringEquals | StringNotEquals | StringEqualsIgnoreCase | StringNotEqualsIgnoreCase | StringLike | StringNotLike`	String

Attribute	Operator	Field type
Resource tags	`StringEquals | StringNotEquals | StringEqualsIgnoreCase | StringNotEqualsIgnoreCase | StringLike | StringNotLike`	Resource Tag
Restart needed	`StringEquals | StringNotEquals | StringEqualsIgnoreCase | StringNotEqualsIgnoreCase | StringLike | StringNotLike`	String

You can specify up to 20 conditions per attribute and 20 values per condition. For more information, see Criteria in the AWS Compute Optimizer Automation API Reference.

Schedule

Set a schedule for when your rule runs by specifying the frequency (daily, weekly, or monthly), start time, end time, and timezone. During this window, Compute Optimizer will start implementing recommended actions that match your specified criteria. The number of actions that get initiated depends on the duration of your scheduled time window, Compute Optimizer Automation's concurrency limit, and the time required to complete each action. Automated actions will show as "In-Progress" until all steps in the automation workflow are fully completed. Up to 100 actions can be in-progress concurrently per account per AWS Region.

Rule order

By default, rules are created with rule order 1 (highest priority) within their rule group. For example, when a management account creates an organization rule configured to apply after member account rules, it receives a rule order of 1, the highest priority among all rules in that group. Rule group and rule order determine which rule applies when a recommended action in an account matches multiple rules. Compute Optimizer assigns the action to the active rule with the lowest rule order value (highest priority), regardless of when that rule is scheduled to run.

For example, if a recommended action matches all of the rules in the following table, Compute Optimizer assigns it to Rule-C and implements it according to Rule-C's schedule.

Rule group	Rule order	Rule name	Status	Schedule
Organization rules evaluated before member account rules	1	Rule-A	Inactive	Weekly on Mondays from 12:00 to 13:00 UTC
2	Rule-B	Inactive	Daily from 12:00 to 13:00 UTC	
Member account rules	1	Rule-C	Active	Monthly on 15th from 12:00 to 13:00 UTC
2	Rule-D	Inactive	Monthly on 15th from 12:00 to 13:00 UTC	
Organization rules after before member account rules	1	Rule-E	Inactive	Weekly on Mondays from 12:00 to 13:00 UTC
2	Rule-F	Active	Daily from 12:00 to 13:00 UTC	

Creating automation rules

You can use an automation rule to manage automated implementation of recommended actions in Compute Optimizer. For background information about how automation rules work, see Automation rules.

Automation rules are global resources that manage automated actions across all AWS Regions where Compute Optimizer Automation is available.

You can only create one automation rule at a time. To create multiple automation rules, follow the console procedures multiple times, or call the API or command multiple times with your desired parameters.

When you create an automation rule in the Compute Optimizer console, you can preview the current recommended actions that match your rule criteria. This can help you validate and iterate on your rule criteria.

> **Important**
>
> When you create an organization rule in the management account and apply it to member accounts, those member accounts will be able to see the details of the rule from their account. AWS recommends that you don't include personally identifying, confidential, or sensitive information in your rule name, description, or other fields.

To create an automation rule

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Automation rules** under the **Automation** section.
3. Choose **Create Automation rule**.
4. If you are creating a rule in the management account or delegated administrator, you can choose the **rule type**, the **member accounts** you want to apply the rule, and whether to apply the rule **before** or **after member account rules**. You can only select member accounts with Automation enabled and organization rules allowed can be selected for the rule to apply.
5. Choose the **action types** you want this rule to implement.
6. (Optional) You can specify **rule criteria** to refine which recommended actions will be automatically implemented. For each criteria, use the `Attribute`, `Operator`, and `Value` drop down menus and input fields to specify your rule criteria

   > **Important**
   >
   > If you don't specify rule criteria, Compute Optimizer applies all recommended action types across the accounts in your rule scope, including recommended actions in all AWS Regions where Compute Optimizer Automation is available.

7. (Optional) Choose **Refresh matching actions** to get a preview of the recommended actions that match your rule criteria.
8. Set a recurring **Schedule** for your rule to automatically implement matching actions. This includes the frequency (daily, weekly, or monthly), start time, end time, and time zone.
9. (Optional) You can add **Tags** as key-value pairs to your rule to help you easily identify the rule.
10. Provide a rule **name** and a **description** (optional) for your rule.
11. For **Rule status**, choose whether you want the rule to be `Active` or `Inactive` after it's created.
12. Choose **Create Automation rule**.

> **Note**
>
> By default, rules are created with the rule order 1 (highest priority) in their rule group. You can update the rule order from the Automation rules page. To learn more more, see Editing automation rule order.

Viewing automation rule

The Automation rules page displays your automation rules and allows you to create and manage them. You can click on each rule to get more details, including the specific rule criteria used to match recommended actions.

To view automation rules

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Automation rules** under the **Automation** section.
3. Choose the **rule name** of the rule you want to view details for.
4. You can perform the following actions on the **rule details** page:

   - View rule details and criteria.

   - Enable and disable the rule.

   - Edit the rule.

- Delete the rule.

- Manage tags for the rule.

Updating automation rules

You can update rules at any time. You can only update the configuration of one rule at a time. Before you enable a rule by changing the rule status from `Inactive` to `Active`, review and confirm your rule criteria. You can preview the matching recommended actions before saving your updated rule criteria. If you change the mode to `Inactive`, any in-progress automation steps initiated by the rule will continue to completion, but no new automation steps will be triggered by the rule.

To update automation rules

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Automation rules** under the **Automation** section.
3. Select the rule that you want to update.
4. Choose **Actions** and select **Edit**.
5. Update your rule configuration as needed.
6. Choose **Save changes**.

Editing automation rule order

Rule order determines which rule applies when a recommended action in an account matches multiple rules. Compute Optimizer assigns the action to the active rule with the lowest rule order value (highest priority), regardless of when that rule is scheduled to run. You can edit the rule order at any time. You can only edit one rule at a time. For organization rules, you can also edit the rule group to specify whether the rule applies before or after member account rules.

To reorder automation rules

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Automation rules** under the **Automation** section.

3. Find the rule that you want to reorder.
4. Choose the **Rule order** cell for the rule you want to reorder, then use the menu to select the new rule order and choose the check mark icon.
5. When prompted choose Save changes.

To edit the rule group (organization rules only)

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Automation rules** under the **Automation** section.
3. Select the rule that you want to edit.
4. In the **Apply rule** section, choose **Before member account rules** or **After member account rules**.
5. Choose **Save changes**.
6. Review the rule order on the **Automation rules** page to ensure that it matches your intended priority.

Deleting or disabling automation rules

When you delete an automation rule, Compute Optimizer permanently removes it from your account, and it no longer implements recommended actions. Previously implemented actions remain unchanged. To restore the automation rule, you must create a new rule. As an alternative to deletion, you can disable a rule. This retains the rule for future use, but Compute Optimizer won't apply the rule to any matching recommendations until you enable it.

To delete or disable automation rules

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Automation rules** under the **Automation** section.
3. Select the rules that you want to delete. You can select up to 10 at a time.
4. Choose Actions and select Delete (to retain a rule and disable it, choose Disable).
5. When prompted, choose Delete (or Disable).

Automation events

The Automation events page is centralized dashboard that displays information about the automated actions initiated through Compute Optimizer. You can review summary information and get details for individual automation events. By default, the dashboard shows information automation events from the last 6 months. You can view events from the past year using the date filter.

The Events summary section summarizes the estimated monthly savings and count for your automation events by status.

You can track events completed over time by viewing the Monthly events summary chart, which summarizes the estimated monthly savings and count for your automation events, grouped by status and the month in which the automation event was created. The chart displays estimated monthly savings (not cumulative savings) for events executed in each month. These savings estimates represent the potential monthly savings calculated at the time of modification and do not reflect actual realized savings in that month or any subsequent months. The Monthly events summary chart shows the sum of all events shown in the Automation events table based on your selected filters. Estimated monthly savings are only displayed for events with Complete and Rollback Complete status.

This Automation events table displays automation events implemented by Compute Optimizer. Review details such as event type, description, status, and estimated monthly savings. These savings estimates represent the potential monthly savings calculated at the time of modification and do not reflect actual realized savings in that month or any subsequent months.

Select an automation event ID to view Event details and step history. The step history table provides a chronological record of operations performed during the automation event. Each step shows the specific action taken to modify your resource, along with its own step status, start time, and completion time.

Rollback

Rollback capabilities that allow you to reverse automated optimization actions if needed. You can initiate rollback from the Automation events page, where you can select and roll back up to 10 automation events at a time. You can only initiate rollback for events with Complete status.

The specific rollback steps depend on the event type:

- Snapshot and delete unattached EBS volume: Rolling back volume deletion creates a new EBS volume from the snapshot of the deleted volume. The new volume will have a different volume ID, and all user-created tags on the original volume will be restored to the new volume.
- Upgrade EBS volume type: Rolling back volume type upgrades will modify the volume to the previous volume type configuration.

There are several considerations for rollback:

- Compute Optimizer requires the original EBS snapshot created by Compute Optimizer to perform rollback operations for volume deletions. If you delete this snapshot and attempt to roll back the automation event, the rollback operation will fail.
- Amazon EBS requires waiting at least six hours between volume modifications. After Compute Optimizer completes a volume modification event, you must wait at least six hours before initiating a rollback. Similarly, after a rollback completes, you must wait six hours and ensure the volume is in the in-use or available state before making any additional modifications to the volume. For more information, see the Amazon EBS User Guide.
- Compute Optimizer validates that the current Amazon EBS volume configuration matches the configuration at the time the automation event completed. If you modify the volume configuration after Compute Optimizer completes the automation event and then attempt to roll back the automation event, the rollback operation will fail.

Automation event statuses

Automation events reports the following status details:

Event status	Event status reason
Ready	The automation has not started running.
In-Progress	The automation is running.
Complete	The automation completed successfully.
Failed	The automation did not complete successfully.
Rollback Ready	The rollback has not started running.

Event status	Event status reason
Rollback In-Progress	The rollback is running.
Rollback Complete	The rollback has completed successfully.
Rollback Failed	The rollback did not complete successfully.

View automation events

This **Automation events** page displays automation events initiated by Compute Optimizer. Review details such as event type, description, status, and estimated savings.

To view automation event details

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Automation rules** under the **Automation** section.
3. You can perform the following actions on the **Automation events** page:

   View total estimated monthly savings and count summary by event status.

   - View monthly summary of automation events by status.

   - (Optional) Filter by date range, account ID (management account only), event status, event type, AWS Region, or Resource type.

   - Review history of automation events, including details on event status, estimated savings, created time, and completed time.

View automation events details

Select an automation event ID to view more details and step history on **Event details** page.

To view automation event details

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Automation rules** under the **Automation** section.

3. Choose the event ID of the automation event you want to get details for.
4. You can perform the following actions on the **Event details** page:

   - View details such as event status, estimated savings, created time, and completed time

   - View step history of operations performed during the automation event. Each step shows the specific action taken to modify your resource, along with its own step status, start time, and completion time.

   - Initiate a roll back for the automation event.

Roll back automation events

You can also initiate rollback for automation events if necessary. You can select and roll back up to 10 automation events at a time. You can only initiate rollback for events with Complete status.

To roll back an automation event

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Automation rules** under the **Automation** section.
3. Select the automation events that you want to roll back. You can select up to 10 events at a time to roll back.
4. Choose **Rollback events**.
5. Review your selected automation events to roll back.
6. Choose **Confirm all rollbacks**.

Disabling Automation

You can disable the Automation feature at any time. However, the management account can't disable Automation for all member accounts in the organization. Each member must disable the feature at the account level.

> **Note**
>
> Disabling Automation stops all of the automation rules in your account. If you opt in again later, all rules will be inactive, and you must enable the rules you want to run. You must wait at least 24 hours after opting out to opt in again.

When the management account disables the Automation feature, Compute Optimizer retains the associations between the management account and its member accounts. If the management account opts back in later, Compute Optimizer automatically restores these associations. However, if a member account opted out independently during the period when the management account had the feature disabled, that member account will not be re-associated when the management account opts back in.

To disable the Automation feature

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the navigation pane, choose **Automation rules** under the **Automation** section.
3. Choose the **Automation** tab.
4. Choose **Disable Automation for account**
5. When prompted for confirmation, choose **Disable Automation**

Recommendation preferences

Recommendation preferences are features that you can activate so that Compute Optimizer generates resources recommendations that align more with your workload requirements. Following are the features that are currently available as recommendation preferences in Compute Optimizer.

- Enhanced infrastructure metrics
- Inferred workload type
- AWS Graviton-based instance recommendations

Enhanced infrastructure metrics

Required permissions

You must have the appropriate permissions to activate and deactivate enhanced infrastructure metrics. For more information, see Policies to grant access to manage Compute Optimizer recommendation preferences.

Organization, account, and resource level

You can activate enhanced infrastructure metrics using the Compute Optimizer console, AWS Command Line Interface (AWS CLI), and AWS SDKs. In the console, you can activate the feature in the following three areas, with each providing a different level of activation.

- At the resource level, you can activate enhanced infrastructure metrics for the individual resource that you're viewing. For example, the **Instance details** page for an individual EC2 instance provides the option to activate the enhanced infrastructure metrics feature only for that EC2 instance. For more information, see Activating enhanced infrastructure metrics at the resource level later in this guide.

  > **Note**
  >
  > Resource-level preferences override account-level preferences, and account-level preferences override organization-level preferences. For an EC2 instance that is part of an EC2 Auto Scaling group, the EC2 Auto Scaling group recommendation preference overrides that of the individual instance.

- For an individual AWS account holder, you can activate the enhanced infrastructure metrics feature for all EC2 instances in the account that meet your resource type and AWS Region criteria. EC2 instance preferences at the account level apply to standalone instances and instances that are part of EC2 Auto Scaling groups. For more information, see Activating enhanced infrastructure metrics at the organization or account level later in this guide.
- The account manager or the delegated administrator of an AWS Organization can activate the enhanced infrastructure metrics feature for all resources in all member accounts of the organization that meet your resource type and AWS Region criteria. EC2 instance preferences at the organization level apply to standalone instances and instances that are part of EC2 Auto Scaling groups in all member accounts. For more information, see Activating enhanced infrastructure metrics at the organization or account level later in this guide.

After you activate the enhanced infrastructure metrics feature, Compute Optimizer applies the preference the next time recommendations are refreshed. This can take up to 24 hours. To confirm that your resource recommendations have enhanced infrastructure metrics enabled, see Confirming the status of enhanced infrastructure metrics.

Compute Optimizer considers updated preferences the next time that it generates recommendations. Until then, a **pending** status is affixed to your update preference (for example, **Active-pending** or **Inactive-pending**). To confirm if your resource recommendations are taking enhanced infrastructure metrics into consideration, see Confirming the status of enhanced infrastructure metrics.

Confirming the status of enhanced infrastructure metrics

After you activate the enhanced infrastructure metrics recommendation preference, Compute Optimizer applies the preference the next time that recommendations are refreshed. This can take up to 24 hours. The **Effective enhanced infrastructure metrics** column in the Resource Recommendations page confirms that the recommendations listed are taking the three-month look-back period into consideration. An **Active** status confirms the recommendation listed is considering the longer look-back period. An **Inactive** status confirms that the recommendation isn't yet considering the longer look-back period.

Next steps

For instructions on how activate or deactivate enhanced infrastructure metrics at the resource level, see Activating enhanced infrastructure metrics at the resource level.

For instructions on how activate or deactivate enhanced infrastructure metrics at the organization or account level, see Activating enhanced infrastructure metrics at the organization or account level.

Activating enhanced infrastructure metrics at the resource level

This section provides you with instructions on how to activate or deactivate enhanced infrastructure metrics at the resource level. Recommendation preferences activated at the resource level apply only to the individual resource.

Prerequisites

Make sure that you have the appropriate permissions to activate and deactivate enhanced infrastructure metrics. For more information, see Policies to grant access to manage Compute Optimizer recommendation preferences.

Procedure

To activate or deactivate enhanced infrastructure metrics at the resource level

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. In the left navigation pane under **Recommendations** and **Rightsizing**, choose the resource type that you want to activate or deactivate enhanced infrastructure metrics.

   > **Note**
   >
   > For an EC2 instance that's part of an EC2 Auto Scaling group, the EC2 Auto Scaling group recommendation preference overrides the preference of the individual instance.

3. In the resource recommendations page, select the resource for which you want to activate or deactivate enhanced infrastructure metrics. Then, choose **View details**.
4. In the **Recommendation preferences** section of the **Resource details** page, choose **Enhanced infrastructure metrics**.
5. In the prompt that appears, select the **Enhanced infrastructure metrics - paid feature** checkbox. Then, choose **Save** to activate enhanced infrastructure metrics for the resource.
6. (Optional) If you want to deactivate the the enhanced infrastructure metrics, unselect the **Enhanced infrastructure metrics - paid feature** checkbox. Then, choose **Save**.

> **Note**
>
> Saving the preference initiates metering for enhanced infrastructure metrics for the individual resource. For more information about pricing for this feature, see Compute Optimizer pricing.

Compute Optimizer considers updated preferences the next time that it generates recommendations. Until then, a **pending** status is affixed to your updated preference (for example, **Active-pending** or **Inactive-pending**). To confirm if your resource recommendations are taking enhanced infrastructure metrics into consideration, see Confirming the status of enhanced infrastructure metrics.

Additional resources

- Troubleshooting — Failed to get or update enhanced infrastructure metrics recommendation preferences
- Activating enhanced infrastructure metrics at the organization or account level

Activating enhanced infrastructure metrics at the organization or account level

This section provides you with instructions on how to activate or deactivate enhanced infrastructure metrics for member accounts of an AWS Organization or an individual AWS account holder.

Prerequisites

Make sure that you have the appropriate permissions to activate and deactivate enhanced infrastructure metrics. For more information, see Policies to grant access to manage Compute Optimizer recommendation preferences.

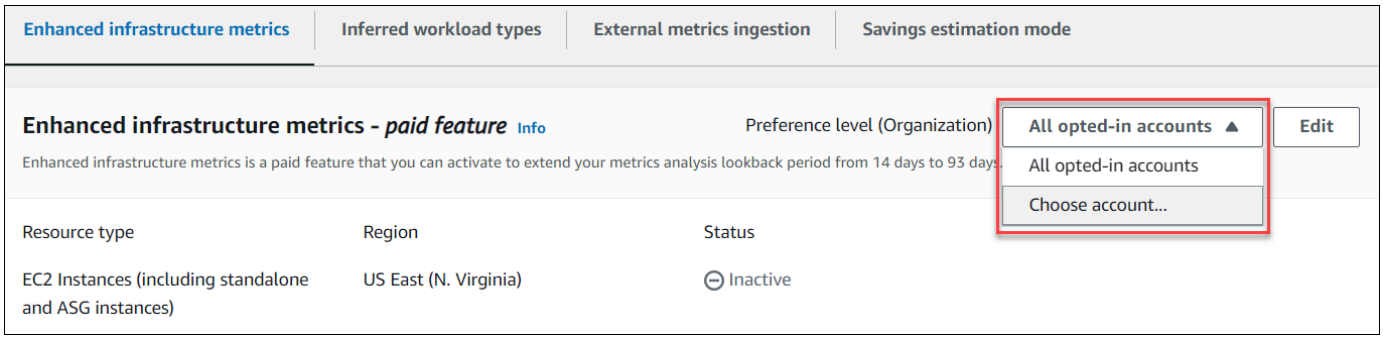
Procedure

To activate or deactivate enhanced infrastructure metrics at the organization or account level

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **General** in the navigation pane. Then, choose the **Enhanced infrastructure metrics** tab.
3. If you're an individual AWS account holder, skip to step 4.

   If you're the account manager or delegated administrator of your organization, you can manage all member accounts or an individual member account for enhanced infrastructure metrics.

   - To opt in all member accounts, choose **All opted-in accounts** from the Preference level dropdown.
   - To opt in an individual member account, choose **Choose account** from the Preference level dropdown. In the prompt that appears, select the account you want to opt in for rightsizing preferences. Then, choose **Set account level**.



4. Choose **Edit**.
5. In the prompt that appears, choose **Add a preference**.
6. Select a **Resource type**, **Region**, and the **Activate** checkbox. Then, choose **Save**.
7. (Optional) If you want to deactivate enhanced infrastructure metrics, unselect the **Activate** checkbox. Then, choose **Save**.

Compute Optimizer considers updated preferences the next time that it generates recommendations. Until then, a **pending** status is affixed to your update preference (for example,

Active-pending or **Inactive-pending**). To confirm that your resource recommendations are taking enhanced infrastructure metrics into consideration, see Confirming the status of enhanced infrastructure metrics.

Additional resources

- Troubleshooting — Failed to get or update enhanced infrastructure metrics recommendation preferences
- Activating enhanced infrastructure metrics at the resource level

Inferred workload type

The inferred workload types and migration effort are listed in the **Inferred workload types** and **Migration effort** columns of the EC2 instances and EC2 Auto Scaling groups recommendations pages. For more information, see Viewing EC2 instance recommendations and Viewing EC2 Auto Scaling group recommendations.

Required permissions

You must have the appropriate permissions to activate the inferred workload type feature. For more information, see Policies to grant access to manage Compute Optimizer recommendation preferences.

Organization and account level

By default, inferred workload type is activated. However, you can create a recommendation preference to deactivate the feature. You can deactivate inferred workload type using the Compute Optimizer console, AWS Command Line Interface (AWS CLI), or AWS SDKs. In the console, you can deactivate the feature in the following areas. Deactivating in each area provides a different level of deactivation.

- For an individual AWS account holder, you can deactivate the inferred workload type feature for all AWS resources in the account that meet your AWS Region criteria. For more information, see Activating inferred workload type
- The account manager or the delegated administrator of an AWS Organization can deactivate the inferred workload type feature for all resources in all member accounts of the organization that meet your AWS Region criteria. For more information, see Activating inferred workload type.

After you deactivate the inferred workload type feature, Compute Optimizer stops inferring workload types the next time that recommendations are refreshed. This can take up to 24 hours to take effect.

Next steps

For instructions on how to activate inferred workload type, see Activating inferred workload type.

Activating inferred workload type

This section provides you with instructions on how to activate the inferred workload type feature for member accounts of an AWS Organization or an individual AWS account holder.

Prerequisites

Make sure that you have the appropriate permissions to activate the inferred workload type feature. For more information, see Policies to grant access to manage Compute Optimizer recommendation preferences.

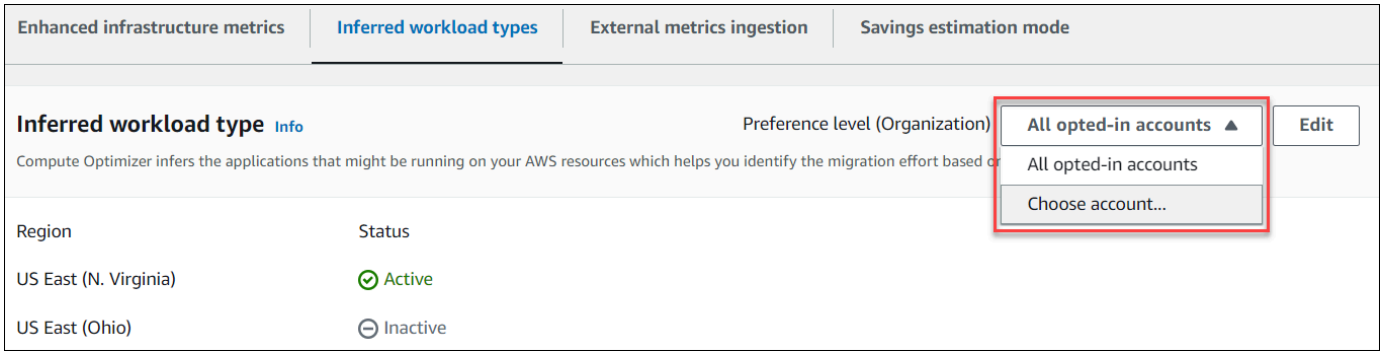
Procedure

To activate the inferred workload type feature for member accounts of an AWS Organization or an individual AWS account holder

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **General** in the navigation pane. Then, choose the **Inferred workload type** tab.
3. If you're an individual AWS account holder, skip to step 4.

   If you're the account manager or delegated administrator of your organization, you can manage all member accounts or an individual member account for inferred workload type.

   - To opt in all member accounts, choose **All opted-in accounts** from the Preference level dropdown.
   - To opt in an individual member account, choose **Choose account** from the Preference level dropdown. In the prompt that appears, select the account you want to opt in for rightsizing preferences. Then, choose **Set account level**.



4. Choose **Edit**.
5. To deactivate the inferred workload type preference in an AWS Region, unselect the **Activate** checkbox. Then, choose **Save**.
6. (Optional) If you want to activate the inferred workload type preference in an AWS Region select the **Activate** checkbox. Then, choose **Save**..
7. (Optional) To add a new inferred workload type preference in an AWS Region, choose **Add a preference**. Then, select a **Region** and the **Activate** checkbox. Finally, choose **Save**.

Additional resources

- ???
- ???

AWS Graviton-based instance recommendations

To view recommendations for AWS Graviton-based instances

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **EC2 instances**, **EC2 Auto Scaling groups**, or **RDS databases** in the navigation pane.
3. On the recommendation page of the resource that you selected, choose **Graviton (aws-arm64)** in the **CPU architecture preference** dropdown.
4. (Optional) Otherwise, choose **Current** to view recommendations that are based on the same CPU vendor and architecture as the current instance.

> **Note**
>
> The **Current price**, **Recommended price**, **Price difference**, **Price difference (%)**, and **Estimated monthly savings** columns are updated to provide a price comparison between the current instance type and the instance type of the selected CPU architecture preference. For example, if you choose **Graviton (aws-arm64)**, prices are compared between the current instance type and the recommended Graviton-based instance type.

Additional resources

- Viewing EC2 instance recommendations
- Viewing EC2 Auto Scaling group recommendations

Managing accounts and preferences

The Accounts page of the Compute Optimizer console lists the recommendation preferences that are activated for the account or organization, such as enhanced infrastructure metrics.

For the management account of an organization, the Accounts page also lists your organization's member accounts and their opt-in status to Compute Optimizer. Management accounts can opt in member accounts of the organization to AWS Compute Optimizer. When a member account is opted in, Compute Optimizer analyzes the member account's supported resources for potential optimization.

Topics

Viewing the status of an organization's member accounts

This section provides you with instructions on how to view member accounts of an organization that are opted in to Compute Optimizer.

> **Note**
>
> This option is only available to the account manager or delegated administrator of an organization who opted in member accounts to Compute Optimizer.

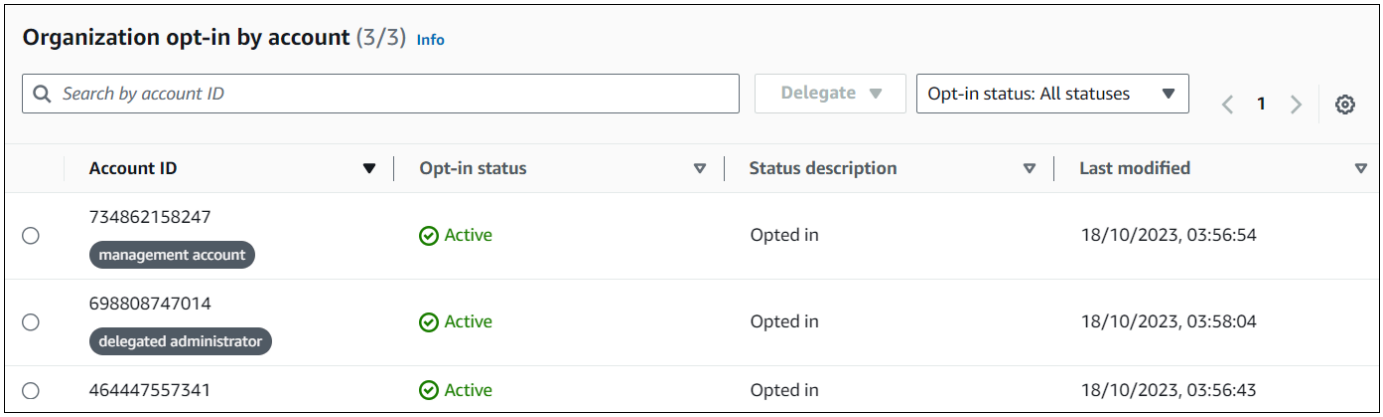
Prerequisites

The following procedure assumes that you have already completed the Opting in to AWS Compute Optimizer procedure.

Procedure

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **Account management** in the navigation pane.

The **Account management** page lists the member accounts of the organization and their current Compute Optimizer opt-in status. The **Opt-in status** and **Status description** columns describe the status of each account ID that are listed. To delegate an administrator account, see ???.



Additional resources

- ???
- Opting in to AWS Compute Optimizer

Exporting AWS Compute Optimizer recommendations

You can export your recommendations to record them over time, and share the data with others. Recommendations are exported in a CSV file, and its metadata in a JSON file, to an existing Amazon Simple Storage Service (Amazon S3) bucket that you specify.

Topics

Specifying an existing S3 bucket for your recommendations export

You can export your Compute Optimizer recommendations to an Amazon Simple Storage Service (Amazon S3) bucket. Your recommendations are exported as CSV file and the metadata is exported as a JSON file. This section provides you with instructions on how to specify an Amazon S3 bucket for your recommendation export by adding a policy to the bucket. The policy that you add allows Compute Optimizer to write recommendations export files to your Amazon S3 bucket.

Prerequisites

Make sure that you create a destination S3 bucket for your recommendations export. The S3 bucket that you specify for your recommendations export files must not be publicly accessible, and can't be configured as a Requester Pays bucket. As a security best practice, create a dedicated S3 bucket for Compute Optimizer export files. For more information, see How Do I Create an S3 Bucket? in the *Amazon S3 Console User Guide*.

Procedure

After you create your S3 bucket, follow these steps to add a policy to the S3 bucket that allows Compute Optimizer to write recommendations export files to your bucket.

1. Open the Amazon S3 console at https://eusc-de-east-1.console.amazonaws-eusc.eu/s3/.
2. Choose the bucket where you want Compute Optimizer to deliver your export files.

3. Choose **Permissions**.
4. Choose **Bucket Policy**.
5. Copy one of the following policies, and paste it into the **Bucket Policy Editor** text box.
6. Replace the following placeholder text in the policy:

   - Replace *amzn-s3-demo-bucket* with the name of your bucket.
   - Replace *optionalPrefix* with the optional object prefix.
   - Replace *myRegion* with the source AWS Region.
   - Replace *myAccountID* with the account number of the requester of the export job.

7. Include all three of the following statements in the policy:

   1. The first statement (for the `GetBucketAcl` action) allows Compute Optimizer to get the access control list (ACL) of your bucket.
   2. The second statement (for the `GetBucketPolicyStatus` action) allows Compute Optimizer to get the policy status of your bucket, indicating whether the bucket is public.
   3. The third statement (for the `PutObject` action) gives Compute Optimizer full control to put the export file in your bucket.

   Your export request fails if any of these statements are missing or if the bucket name and optional object prefix in the policy don't match what you specify in your export request. Your export also fails if the account number in the policy doesn't match the account number of the requester of the export job.

   > **Note**
   >
   > If the existing bucket already has one or more policies attached, add the statements for Compute Optimizer access to that policy or policies. Evaluate the resulting set of permissions to ensure that they're appropriate for the users who access the bucket.

Policy option 1: Using an optional prefix

The object prefix is an optional addition to the S3 object key that organizes your export files in your S3 bucket. If you want to specify an object prefix when you create your recommendations export, use the following policy.

JSON

```
{
            "Version":"2012-10-17",
            "Statement": [
                {
                    "Effect": "Allow",
                    "Principal": {"Service": "compute-optimizer.amazonaws.com"},
                    "Action": "s3:GetBucketAcl",
                    "Resource": "arn:aws:s3:::amzn-s3-demo-bucket"
                },
                {
                    "Effect": "Allow",
                    "Principal": {"Service": "compute-optimizer.amazonaws.com"},
                    "Action": "s3:GetBucketPolicyStatus",
                    "Resource": "arn:aws:s3:::amzn-s3-demo-bucket"
                },
                {
                    "Effect": "Allow",
                    "Principal": {"Service": "compute-optimizer.amazonaws.com"},
                    "Action": "s3:PutObject",
                    "Resource": "arn:aws:s3:::amzn-s3-demo-bucket/optionalPrefix/
compute-optimizer/myAccountID/*",
                    "Condition": {"StringEquals": {
                            "s3:x-amz-acl": "bucket-owner-full-control",
                            "aws:SourceAccount": "myAccountID"
                        },
                        "ArnLike": {
                              "aws:SourceArn": "arn:aws:compute-
optimizer:myRegion:myAccountID:*"
                         }
                    }
                 }
            ]
        }
```

> **Note**
>
> The *compute-optimizer/myAccountID/* component isn't part of the optional prefix. Compute Optimizer creates the *optimizer/myAccountID/* part of the bucket path for you that's added to the prefix that you specify.

Policy option 2: No object prefix

If you don't want to specify an object prefix, use the following policy.

JSON

```
{
            "Version":"2012-10-17",
            "Statement": [
                {
                    "Effect": "Allow",
                    "Principal": {"Service": "compute-optimizer.amazonaws.com"},
                    "Action": "s3:GetBucketAcl",
                    "Resource": "arn:aws:s3:::amzn-s3-demo-bucket"
                },
                {
                    "Effect": "Allow",
                    "Principal": {"Service": "compute-optimizer.amazonaws.com"},
                    "Action": "s3:GetBucketPolicyStatus",
                    "Resource": "arn:aws:s3:::amzn-s3-demo-bucket"
                },
                {
                    "Effect": "Allow",
                    "Principal": {"Service": "compute-optimizer.amazonaws.com"},
                    "Action": "s3:PutObject",
                    "Resource": "arn:aws:s3:::amzn-s3-demo-bucket/compute-
optimizer/myAccountID/*",
                    "Condition": {"StringEquals": {
                            "s3:x-amz-acl": "bucket-owner-full-control",
                            "aws:SourceAccount": "myAccountID"
                        },
                        "ArnLike": {
                             "aws:SourceArn": "arn:aws:compute-
optimizer:myRegion:myAccountID:*"
                         }
```

```
                }
            }
        ]
    }
```

Next steps

For instructions on how to export your AWS Compute Optimizer recommendations, see Exporting your recommendations.

Additionally, you can specify S3 buckets that are encrypted with either Amazon S3 customer managed keys or AWS Key Management Service (KMS) keys. For instructions on how to do this, see Using encrypted S3 buckets for your recommendations export.

Additional resources

- Troubleshooting — Troubleshooting failed export jobs
- Exported files
- Amazon Simple Storage Service User Guide.

Using encrypted S3 buckets for your recommendations export

For the destination of your Compute Optimizer recommendations exports, you can specify S3 buckets that are encrypted with either Amazon S3 customer managed keys or AWS Key Management Service (KMS) keys.

Prerequisites

To use an S3 bucket with AWS KMS encryption enabled, you must create a symmetric KMS key. Symmetric KMS keys are the only KMS keys that Amazon S3 supports. For instructions, see Creating keys in the *AWS KMS Developer Guide*.

After you create the KMS key, apply it to the S3 bucket that you plan to use for your recommendations export. For more information, see Enabling Amazon S3 default bucket encryption in the *Amazon Simple Storage Service User Guide*.

Procedure

Use the following procedure to grant Compute Optimizer the required permission to use your KMS key. This permission is specific for encrypting your recommendations export file when saving it to your encrypted S3 bucket.

1. Open the AWS KMS console at https://eusc-de-east-1.console.amazonaws-eusc.eu/kms.
2. To change the AWS Region, use the Region selector in the upper-right corner of the page.
3. In the left navigation menu, choose **Customer-managed keys**.

> **Note**
>
> Compute Optimizer recommendation exports aren't permitted for S3 buckets encrypted with **AWS managed keys**.

4. Choose the name of the KMS key that you used to encrypt the export S3 bucket.
5. Choose the **Key policy** tab, then choose **Switch to policy view**.
6. Choose **Edit** to edit the key policy.
7. Copy one of the following policies, and paste it into the statements section of the key policy.
8. Replace the following placeholder text in the policy:

   - Replace *myRegion* with the source AWS Region.
   - Replace *myAccountID* with the account number of the export requester.

   The `GenerateDataKey` statement allows Compute Optimizer to call the AWS KMS API to obtain the data key for encrypting the recommendation files. This way, the uploaded data format can accommodate the bucket encryption setting. Otherwise, Amazon S3 rejects the export request.

> **Note**
>
> If the existing KMS key already has one or more policies attached, add the statements for Compute Optimizer access to those policies. Evaluate the resulting set of permissions to ensure that they're appropriate for the users who access the KMS key.

Use the following policy to allow Amazon S3 bucket keys. This policy must be used regardless of whether S3 bucket keys are enabled or disabled. For more information, see Reducing the cost of SSE-KMS with Amazon S3 Bucket Keys in the *Amazon Simple Storage Service User Guide*.

```
{
                "Sid": "Allow use of the key to Compute Optimizer",
                "Effect": "Allow",
                "Principal": {
                    "Service": "compute-optimizer.amazonaws.com"
                },
                "Action": [
                    "kms:GenerateDataKey",
                    "kms:Decrypt"
                ],
                "Resource": "*",
                "Condition": {"StringEquals": {
                        "aws:SourceAccount": "myAccountID"
                    },
                    "StringLike": {
                         "aws:SourceArn": "arn:aws:compute-
optimizer:myRegion:myAccountID:*"
                     }
                }
            }
```

Next steps

For instructions on how to export your AWS Compute Optimizer recommendations, see Exporting your recommendations.

Additional resources

- Troubleshooting — Troubleshooting failed export jobs
- Exported files
- Amazon Simple Storage Service User Guide.

Exporting your recommendations

This section provides you with instructions on how to export your AWS Compute Optimizer recommendations. Recommendations are exported in a CSV file, and its metadata in a JSON file.

Prerequisites

- The following procedures assumes that you have already completed the Specifying an existing S3 bucket for your recommendations export procedure.
- Make sure that you understand the following restrictions that apply to exporting Compute Optimizer recommendations.
  - You can't export recommendations from multiple AWS Regions into a single Amazon S3 bucket. To export recommendations from multiple AWS Regions, you must create separate Amazon S3 buckets for your recommendations in each AWS Region.
  - You can have only one recommendations export job in progress for each resource type, and for each AWS Region. Before creating a new export job, confirm that all previous export jobs are complete. For more information about viewing your export jobs, including those that are in progress, see Viewing your export jobs.
  - Recommendations for each resource type and in each are exported in separate CSV files. You can't export recommendations from multiple resource types and Regions into a single file.
  - Large export jobs can take up to a few hours to complete. To lower your wait time, consider limiting the recommendation columns that you include in your export job. Additionally, if your account is the management account of an organization, consider limiting the number of member accounts to include in your export job.

Procedure

To export your recommendations

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose a resource type in the navigation pane. For example, choose **EC2 instances**, **Auto Scaling groups**, **EBS volume**, **Lambda function**, or **ECS services on Fargate**.
3. On the **Recommendations** page, choose the **Action** dropdown menu, and choose **Export Recommendations**.
4. On the **Export Recommendations** page, under **Export destination settings**, specify the following:

   a. For **Region**, specify an AWS Region for your export.

b. For **Destination S3 bucket name**, specify the name of an existing S3 bucket in the specific Region.

c. (Optional) Choose **Add Region** to export the recommendations for another AWS Region.

d. (Optional) Choose **Remove** next to a specific Region and S3 bucket name to remove the destination from the export job.

e. (Optional) For **Object prefix**, specify a prefix to use in the destination S3 bucket for all of the export files. The prefix is an optional addition to the S3 object key that organizes your export files in your S3 bucket. You can specify a date prefix (for example, `2020/april`), a resource type prefix (for example, `ec2-instances`), or a combination of both (for example, `2020/april/ec2-instances`).

5. Under **Export filters**, specify the following:

a. For **Resource type**, choose the resource type to include in your recommendations export.

b. For **Accounts**, choose if you want to include recommendations for all member accounts of the organization. This option is available only if your account is the management account of an organization.

c. For **CPU architecture preference**, choose **Graviton (`aws-arm64`)** to export recommendations that are based on the 64-bit ARM architecture (AWS Graviton). Otherwise, choose **Current** to export recommendations that are based on the CPU architecture of your current instances.

6. Under **Columns to include**, choose the recommendations data to include in your recommendations export. For more information about the columns to include, see Exported files.

7. After confirming that the export job is configured correctly, choose **Export**. Or, to return to the **Recommendations** page without creating the export job, choose **Cancel**. If you cancel the export job configuration, the configuration is deleted.

> **Note**
>
> If you export recommendations for multiple AWS Regions at one time, they're treated as separate export jobs. Compute Optimizer tries to start all of them at once. If an export job fails to start, the **Export Recommendations** page displays an error. Export jobs that successfully start continue to process. But, before trying to start them again, you must resolve the errors for the failed jobs.

Your recommendations export job might take up to a few hours to complete. Check the status of your export jobs by viewing the **Exports** page. For more information, see Viewing your export jobs. Your recommendations export file and its associated metadata file are saved to the specified S3 bucket when the export job is complete. The following are examples of the full Amazon S3 object key for the export file and its associated metadata file. The account ID in the object keys is the account of the requester of the export job. For more information, see Exported files.

```
s3://amzn-s3-demo-bucket/OptionalPrefix/compute-
optimizer/AccountId/AWSRegion-CreatedTimestamp-UniqueJobID.csv
```

```
s3://amzn-s3-demo-bucket/OptionalPrefix/compute-
optimizer/AccountId/AWSRegion-CreatedTimestamp-UniqueJobID-metadata.json
```

Example:

```
s3://compute-optimizer-exports/ec2-instance-recommendations/compute-
optimizer/111122223333/us-west-2-2020-03-03T133027-3e496c549301c8a4dfcsdX.csv
```

```
s3://compute-optimizer-exports/ec2-instance-recommendations/compute-
optimizer/111122223333/us-west-2-2020-03-03T133027-3e496c549301c8a4dfcsdX-metadata.json
```

Next steps

For instructions on how to view the export jobs that you created, see Viewing your export jobs.

Additional resources

- Troubleshooting — Troubleshooting failed export jobs
- Exported files
- Amazon Simple Storage Service User Guide.

Viewing your export jobs

This section provides you with instructions on how to view the export jobs that you created in the last seven days.

Prerequisites

The following procedures assumes that you have already completed the Exporting your recommendations procedure.

Procedure

To view your export jobs

1. Open the Compute Optimizer console at https://eusc-de-east-1.console.amazonaws-eusc.eu/compute-optimizer/.
2. Choose **Exports** in the navigation pane.

   The **Exports** page displays the recommendation export jobs that were created in the last seven days.

   Export jobs can have one of the following statuses.

   - **Queued** - The export job didn't start yet. You can have only one recommendations export job in progress for each resource type, and for each AWS Region.
   - **In progress** - The export job started but isn't complete. Export jobs can take anywhere from a few minutes to a few hours to complete. This depends on the number of recommendations and fields that the export job includes.
   - **Complete** - The export job is complete. A link to the export CSV file in the destination Amazon S3 bucket is displayed for each complete export job under the export destination column.
   - **Failed** - The export job failed to start or complete. The message that's displayed under the failure reason column for the export job provides additional information about why the export job failed. For example, the export might have failed because the destination Amazon S3 bucket didn't have the required permissions. After resolving the issue, try to export your recommendations again. For more information, see Troubleshooting failed export jobs.
3. You can perform the following actions on the page:

   - Choose the export destination link for a completed job to access the destination S3 bucket. The export destination displays only for successful export jobs. A dash (-) displays for export jobs that are in progress or that failed.
   - Scroll right to view the failure reason for failed export jobs. Use the failure reason to determine why your export job isn't complete.

Additional resources

- Troubleshooting — Troubleshooting failed export jobs
- Exported files

Exported files

Recommendations are exported in a CSV file, and the metadata in a JSON file, to the Amazon S3 bucket that you specified when you created the export job.

Topics

Recommendations file

The recommendations file includes the recommendation data for the recommendation columns that you choose to include when you create the export job. The following tables list all of the recommendation columns that can be included in the export file for each resource type.

In the following tables, *API field name* column represents the fields that you can specify when requesting a recommendations export using the API. The *Description* column describes the data of each field, the name of the column as displayed in the Compute Optimizer console, and the name of the column as listed in the export CSV file. The recommendation data columns in the CSV file are numbered when multiple recommendations are generated for each resource. Ranked recommendation columns, in which *<rank>* is replaced with a ranking, correspond to each other. For example, recommendationOptions_*1*_memory, recommendationOptions_*1*_network, and recommendationOptions_*1*_vcpus correspond to each other, and are for the same recommendation.

> **Note**
>
> By default, all export files include the following columns:
>
> - **recommendations_count** - The number of recommendations included in the export file.
> - **errorCode** - The error code for when a recommendation wasn't generated for a resource.

- **errorMessage** - The error message that corresponds to the error in the errorCode column.

EC2 instance recommendation fields

API field name	Description
AccountId	The account ID that the current instance was created under. This field is displayed as the **Account ID** column in the EC2 instances recommendations and instance details pages of the Compute Optimizer console. This field is labeled **Account ID** on the Export recommendations page of the Compute Optimizer console, and as **accountId** in the export CSV file.
CurrentInstanceType	The instance type of the current instance. This field is displayed as the **Current instance type** column in the EC2 instances recommend ations and instance details pages of the Compute Optimizer console. This field is labeled **Current instance type** on the Export recommendations page of the Compute Optimizer console, and as **currentInstanceTyp e** in the export CSV file.
CurrentMemory	The memory of the current instance. This field is displayed as the **Memory** column in the EC2 instance details page of the Compute Optimizer console. This field is labeled **Current memory** on the Export recommendations page of the Compute

API field name	Description
	Optimizer console, and as **current_memory** in the export CSV file.
CurrentNetwork	The network performance, or rate of data transfer, of the current instance. This field is displayed as the **Network** column in the EC2 instance details page of the Compute Optimizer console. This field is labeled **Current network** on the Export recommendations page of the Compute Optimizer console, and as **current_network** in the export CSV file.
CurrentOnDemandPrice	The On-Demand price of the current instance. The price listed might not reflect the actual price you pay for the instance. This field is displayed as the **Current On-Demand price** column in the EC2 instances recommendations page of the Compute Optimizer console. This field is labeled **Current On-Demand price** on the Export recommendations page of the Compute Optimizer console, and as **current_o nDemandPrice** in the export CSV file.

API field name	Description
CurrentStandardOneYearNoUpfrontReservedPrice	The Reserved Instances, standard 1-year no upfront price of the current instance. The price listed might not reflect the actual price you pay for the instance. This field is displayed as the **Current 1-year RI price** column in the EC2 instances recommendations page of the Compute Optimizer console. This field is labeled **Current 1-year RI price** on the Export recommendations page of the Compute Optimizer console, and as **current_standardOneYearNoUpfrontReservedPrice** in the export CSV file.
CurrentStandardThreeYearNoUpfrontReservedPrice	The Reserved Instances, standard 3-year no upfront price of the current instance. The price listed might not reflect the actual price you pay for the instance. This field is displayed as the **Current 3-year RI price** column in the EC2 instances recommendations page of the Compute Optimizer console. This field is labeled **Current 3-year RI price** on the Export recommendations page of the Compute Optimizer console, and as **current_standardThreeYearNoUpfrontReservedPrice** in the export CSV file.

API field name	Description
CurrentStorage	The local storage volume of the current instance. This field is displayed as the **Storage** column in the EC2 instance details page of the Compute Optimizer console. This field is labeled **Current storage** on the Export recommendations page of the Compute Optimizer console, and as **current_storage** in the export CSV file.
CurrentVCpus	The number of vCPUs of the current instance. This field is displayed as the **vCPUs** column in the EC2 instance details page of the Compute Optimizer console. This field is labeled **Current vCPUs** on the Export recommend ations page of the Compute Optimizer console, and as **current_vcpus** in the export CSV file.
Finding	The finding classification for the current instance. Instances can be classified as under-provisioned, over-provisioned, or optimized . For more information, see Instance finding classifications. This field is displayed as the **Finding** column in the EC2 instances recommendations page of the Compute Optimizer console. This field is labeled **Finding** on the Export recommend ations page of the Compute Optimizer console, and as **finding** in the export CSV file.

API field name	Description
FindingReasonCodes	The finding reasons describe which specifications of the current instance were under-provisioned or over-provisioned. Specifications include CPU, memory, local disk throughput, local disk IOPS, EBS volume throughput, EBS volume IOPS, network bandwidth, or network packets-per-second. This field is displayed as the **Finding reasons** column in the EC2 instances recommendations page of the Compute Optimizer console. This field is labeled **Finding reason codes** on the Export recommendations page of the Compute Optimizer console, and as **findingReasonCodes_*<code>*** in the export CSV file. The *<code>* portion of the label identifies the instance specifications (CPU, memory, network, etc.) that are over-provisioned or under-provisioned.
InstanceArn	The Amazon Resource Name (ARN) of the current instance. This field is not displayed in the Compute Optimizer console. This field is labeled **Instance ARN** on the Export recommendations page of the Compute Optimizer console, and as **instanceArn** in the export CSV file.

API field name	Description
InstanceState	The state of the instance when the recommendation was generated. This field is displayed as the **Recommendation instance state** column in the EC2 instance recommendation and detail pages of the Compute Optimizer console. This field is labeled **Recommendation instance state** on the Export recommendations page of the Compute Optimizer console, and labeled **instanceArn** in the export CSV file.
InstanceName	The name of the current instance. This field is displayed as the **Instance name** column in the EC2 instances recommendations page of the Compute Optimizer console. This field is labeled **Instance name** on the Export recommendations page of the Compute Optimizer console, and as **instanceName** in the export CSV file.
LastRefreshTimestamp	The timestamp of when the instance recommendation was last refreshed. This field isn't displayed in the Compute Optimizer console. This field is labeled **Last refresh timestamp** on the Export recommend ations page of the Compute Optimizer console, and as **lastRefreshTimestamp_UTC** in the export CSV file.

API field name	Description
LookbackPeriodInDays	The number of preceding days for which Compute Optimizer analyzed metric data from the current instance to generate the recommendation. This field isn't displayed in the Compute Optimizer console. This field is labeled **Lookback period in days** on the Export recommendations page of the Compute Optimizer console, and as **lookBackPeriodInDays** in the export CSV file.
RecommendationOptionsInstanceType	The instance type of the instance recommendation. This field is displayed as the **Recommended instance type** column in the EC2 instances recommendations page of the Compute Optimizer console. This field is labeled **Recommendation options Instance type** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_instanceType** in the export CSV file.
RecommendationOptionsMemory	The memory of the instance recommendation. This field is displayed as the **Memory** column in the EC2 instance details page of the Compute Optimizer console. This field is labeled **Recommendation options memory** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_memory** in the export CSV file.

API field name	Description
RecommendationOptionsNetwork	The network performance or rate of data transfer of the instance recommendation. This field is displayed as the **Network** column in the EC2 instance details page of the Compute Optimizer console. This field is labeled **Recommendation options network** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_network** in the export CSV file.
RecommendationOptionsOnDemandPrice	The On-Demand price of the instance recommendation. This field is displayed as the **Recommended On-Demand price** column in the EC2 instance recommendations page of the Compute Optimizer console. This field is labeled **Recommendation options On-Demand price** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_onDemandPrice** in the export CSV file.

API field name	Description
RecommendationOptionsPerformanceRisk	The performance risk of the instance recommendation. This field is displayed as the **Performance risk** column in the EC2 instance details page of the Compute Optimizer console. This field is labeled **Recommendation options performance risk** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_performanceRisk** in the export CSV file.
RecommendationOptionsPlatformDifferences	The platform differences column displays the configuration differences between the current instance and each recommended instance type option. The recommended instance type might use a different CPU architecture, hypervisor, instance store, network interface, storage interface, and virtualization type. This field is displayed as the **Platform differences** column in the EC2 instance details page of the Compute Optimizer console. This field is labeled **Recommendation options platform differences** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_platformDifferences_*<difference>*** in the export CSV file. The *<difference>* portion of the label identifies the configuration that's different between the current instance and recommended instance type.

API field name	Description
RecommendationOptionsProjectedUtilizationMetricsCpuMaximum	The projected maximum CPU utilization metric of the instance recommendation. This value defines the maximum CPU utilization of the recommended instance type if you used the recommended instance type during the look-back period. This field is displayed as an overlay on the **CPU utilization (percent)** metric graph in the EC2 instance details page of the Compute Optimizer console. This field is labeled **Recommendation options projected utilization metrics CPU maximum** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_projectedUtilizationMetrics_CPU_MAXIMUM** in the export CSV file.

API field name	Description
RecommendationOptionsProjectedUtilizationMetricsMemoryMaximum	The projected maximum memory utilization metric of the instance recommendation. This value defines the maximum memory utilization of the recommended instance type if you used the recommended instance type during the look-back period. This field is displayed as an overlay on the **Memory utilization (percent)** metric graph in the EC2 instance details page of the Compute Optimizer console. This field is labeled **Recommendation options projected utilization metrics memory maximum** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_projectedUtilizationMetrics_MEMORY_MAXIMUM** in the export CSV file.
RecommendationOptionsStandardOneYearNoUpfrontReservedPrice	The Reserved Instances, standard 1-year no upfront price for the instance recommendation. This field is displayed as the **Recommended 1-year RI price** column in the EC2 instance recommendations page of the Compute Optimizer console. This field is labeled **Recommended options 1-year RI price** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_standardOneYearNoUpfrontReservedPrice** in the export CSV file.

API field name	Description
RecommendationOptionsStandardThreeYearNoUpfrontReservedPrice	The Reserved Instances, standard 3-year no upfront price for the instance recommendation. This field is displayed as the **Recommended 3-year RI price** column in the EC2 instance recommendations page of the Compute Optimizer console. This field is labeled **Recommended options 3-year RI price** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_standardThreeYearNoUpfrontReservedPrice** in the export CSV file.
RecommendationOptionsStorage	The local storage volume of the instance recommendation. This field is displayed as the **Storage** column in the EC2 instance details page of the Compute Optimizer console. This field is labeled **Recommendation options storage** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_storage** in the export CSV file.

API field name	Description
RecommendationOptionsVcpus	The vCPUs of the instance recommendation. This field is displayed as the **vCPUs** column in the EC2 instance details page of the Compute Optimizer console. This field is labeled **Recommendation options vCPUs** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_vcpus** in the export CSV file.
RecommendationsSourcesRecommendationSourceArn	The Amazon Resource Name (ARN) of the current resource. This field is not displayed in the Compute Optimizer console. This field is labeled **Recommendation source ARN** on the Export recommendations page of the Compute Optimizer console, and as **recommendationsSources_*<rank>*_recommendationSourceArn** in the export CSV file.
RecommendationsSourcesRecommendationSourceType	The resource type of the current resource (for example, instance). This field is not displayed in the Compute Optimizer console. This field is labeled **Recommendation source type** on the Export recommendations page of the Compute Optimizer console, and as **recommendationsSources_*<rank>*_recommendationSourceType** in the export CSV file.

API field name	Description
UtilizationMetricsCpuMaximum	The maximum CPU utilization metric of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **CPU utilization (percent)** graph in the EC2 instance details page. This field is labeled **Utilization metrics CPU maximum** on the Export recommend ations page of the Compute Optimizer console, and as **utilizationMetrics_CPU_MAXI MUM** in the export CSV file.
UtilizationMetricsDiskReadBytesPerSe condMaximum	The maximum disk read bytes per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Disk read (MiB/ second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics disk read bytes per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizati onMetrics_DISK_READ_BYTES_PER_SECOND _MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsDiskReadOpsPerSecondMaximum	The maximum disk read operations per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Disk read (operations/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics disk read operations per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_DISK_READ_OPS_PER_SECOND_MAXIMUM** in the export CSV file.
UtilizationMetricsDiskWriteBytesPerSecondMaximum	The maximum disk write bytes per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Disk write (MiB/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics disk write bytes per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_DISK_WRITE_BYTES_PER_SECOND_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsDiskWriteOpsPerSecondMaximum	The maximum disk write operations per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Disk write (operations/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics disk write operations per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_DISK_WRITE_OPS_PER_SECOND_MAXIMUM** in the export CSV file.
UtilizationMetricsEbsReadBytesPerSecondMaximum	The maximum bytes read per second for volumes attached to an instance observed during the lookback period (up to 14 days). This field is displayed as the **EBS read bandwidth (MiB/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics EBS read bandwidth bytes per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_EBS_READ_BYTES_PER_SECOND_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsEbsReadOpsPerSecondMaximum	The maximum number of read operations per second for volumes attached to an instance observed during the lookback period (up to 14 days). This field is displayed as the **EBS read operations (per second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics EBS read throughput operations per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_EBS_READ_OPS_PER_SECOND_MAXIMUM** in the export CSV file.
UtilizationMetricsEbsWriteBytesPerSecondMaximum	The maximum bytes written per second for volumes attached to an instance observed during the lookback period (up to 14 days). This field is displayed as the **EBS write bandwidth (MiB/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics EBS write bandwidth bytes per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_EBS_WRITE_BYTES_PER_SECOND_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsEbsWriteOpsPerSecondMaximum	The maximum number of write operations per second for volumes attached to an instance observed during the lookback period (up to 14 days). This field is displayed as the **EBS write operations (per second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics EBS write throughput operations per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_EBS_WRITE_OPS_PER_SECOND_MAXIMUM** in the export CSV file.
UtilizationMetricsMemoryMaximum	The maximum memory utilization metric of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Memory utilization (percent)** graph in the EC2 instance details page. This field is labeled **Utilization metrics memory maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_MEMORY_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsNetworkInBytesPerSecondMaximum	The maximum network in bytes per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Network in (MiB/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics network in bytes per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_NETWORK_IN_BYTES_PER_SECOND_MAXIMUM** in the export CSV file.
UtilizationMetricsNetworkOutBytesPerSecondMaximum	The maximum network out bytes per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Network out (MiB/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics network out bytes per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_NETWORK_OUT_BYTES_PER_SECOND_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsNetworkPacketsInPerSecondMaximum	The maximum network packets in per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Network packets in (per second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics network packets in per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_NETWORK_PACKETS_IN_PER_SECOND_MAXIMUM** in the export CSV file.
UtilizationMetricsNetworkPacketsOutPerSecondMaximum	The maximum network packets out per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Network packets out (per second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics network packets out per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_NETWORK_PACKETS_OUT_PER_SECOND_MAXIMUM** in the export CSV file.

API field name	Description
EffectiveRecommendationPreferencesEnhancedInfrastructureMetrics	The status of the enhanced infrastructure metrics recommendation preference for the listed recommendation. An **Active** status confirms the recommendation listed is considering the longer three-month lookback period. An **Inactive** status confirms that the recommendation is not yet considering the longer lookback period. For more information, see Enhanced infrastructure metrics. This field is displayed as the **Effective enhanced infrastructure metrics** column in the EC2 instance recommendations page of the Compute Optimizer console. On the Export recommendations page of the Compute Optimizer console, it's labeled as **Effective recommendation preferences enhanced infrastructure metrics**, and in the export CSV file, it's labeled as **EffectiveRecommendationPreferencesEnhancedInfrastructureMetrics**.
EffectiveRecommendationPreferencesExternalMetricsSource	The status of the external metrics recommendation preference for the listed recommendation. For more information, see External metrics ingestion. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Effective recommendation preferences external metrics source**, and in the export CSV file format it's labeled as **EffectiveRecommendationPreferencesExternalMetricsSource**.

API field name	Description
EffectiveRecommendationPreferencesCpuVendorArchitectures	The CPU vendor and architecture for an EC2 instance recommendation. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Effective recommendation preferences CPU vendor architectures**, and in the export CSV file, it's labeled as **EffectiveRecommendationPreferencesCpuVendorArchitectures**.
CurrentPerformanceRisk	The performance risk rating for a current instance. This field is displayed as the **Current performance risk** column in the EC2 instances recommendations page of the Compute Optimizer console. On the Export recommendations page of the Compute Optimizer console, it's labeled as **Current performance risk**, and in the export CSV file, it's labeled as **CurrentPerformanceRisk**.
RecommendationOptionsSavingsOpportunityPercentage	The estimated monthly savings possible as a percentage of monthly cost by adopting Compute Optimizer recommendations for an instance. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options savings opportunity percentage**, and in the export CSV file, it's labeled as **RecommendationOptionsSavingsOpportunityPercentage**.

API field name	Description
RecommendationOptionsEstimatedMonthlySavingsCurrency	The currency of the estimated monthly savings. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options estimated monthly savings currency**, and in the export CSV file, it's labeled as **RecommendationOptionsEstimatedMonthlySavingsCurrency**.
RecommendationOptionsEstimatedMonthlySavingsValue	The value of the estimated monthly savings. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options estimated monthly savings value**, and in the export CSV file, it's labeled as **RecommendationOptionsEstimatedMonthlySavingsValue**.
EffectiveRecommendationPreferencesInferredWorkloadTypes	The status of the inferred workload type recommendation preference for the listed recommendation. For more information, see Inferred workload type. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Effective recommendation preferences inferred workload types**, and in the export CSV file, it's labeled as **EffectiveRecommendationPreferencesInferredWorkloadTypes**.

API field name	Description
InferredWorkloadTypes	The application that might be running on the instance as detected by Compute Optimizer. For more information, see Inferred workload types. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Inferred workload types**, and in the export CSV file, it's labeled as **InferredWorkloadTypes**.
RecommendationOptionsMigrationEffort	The level of effort that might be required to migrate from the current instance type to the recommended instance type. For more information, see Inferred workload types. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options migration effort**, and in the export CSV file, it's labeled as **RecommendationOptionsMigrationEffort**.

Auto Scaling group recommendation fields

API field name	Description
AccountId	The account ID in which the current Auto Scaling group was created. This field is displayed as the **Account ID** column in the Auto Scaling groups recommendations and group details pages of the Compute Optimizer console. This field is labeled **Account ID** on the Export

API field name	Description
	recommendations page of the Compute Optimizer console, and as **accountId** in the export CSV file.
AutoScalingGroupArn	The Amazon Resource Name (ARN) of the current Auto Scaling group. This field is not displayed in the Compute Optimizer console. This field is labeled **Auto Scaling group ARN** on the Export recommend ations page of the Compute Optimizer console, and as **autoScalingGroupArn** in the export CSV file.
AutoScalingGroupName	The name of the Auto Scaling group. This field is displayed as the **Auto Scaling group name** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Auto Scaling group name** on the Export recommendations page of the Compute Optimizer console, and as **autoScali ngGroupName** in the export CSV file.

API field name	Description
CurrentConfigurationDesiredCapacity	The desired capacity of the current Auto Scaling group. This field is displayed as the **Desired number of instances** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Current desired capacity** on the Export recommendations page of the Compute Optimizer console, and as **currentConfiguration_desiredCapacity** in the export CSV file.
CurrentConfigurationInstanceType	The instance type of instances in the current Auto Scaling group. This field is displayed as the **Current instancce type** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Current instance type** on the Export recommendations page of the Compute Optimizer console, and as **currentConfiguration_instanceType** in the export CSV file.
CurrentConfigurationMaxSize	The maximum size of the current Auto Scaling group. This field is displayed as the **Current maximum size** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Current maximum size** on the Export recommendations page of the Compute Optimizer console, and as **currentConfiguration_maxSize** in the export CSV file.

API field name	Description
CurrentConfigurationMinSize	The minimum size of the current Auto Scaling group. This field is displayed as the **Current minimum size** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Current minimum size** on the Export recommendations page of the Compute Optimizer console, and as **currentConfiguration_minSize** in the export CSV file.
CurrentMemory	The memory of instances in the current Auto Scaling group. This field is displayed as the **Memory** column in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Current memory** on the Export recommendations page of the Compute Optimizer console, and as **current_memory** in the export CSV file.
CurrentNetwork	The network performance, or rate of data transfer, of instances in the current Auto Scaling group. This field is displayed as the **Network** column in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Current network** on the Export recommendations page of the Compute Optimizer console, and as **current_network** in the export CSV file.

API field name	Description
CurrentOnDemandPrice	The On-Demand price of instances in the current Auto Scaling group. The price that's listed might not reflect the actual price that you pay for the instance. This field is displayed as the **Current On-Demand price** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Current On-Demand price** on the Export recommendations page of the Compute Optimizer console, and as **current_onDemandPrice** in the export CSV file.
CurrentStandardOneYearNoUpfrontReservedPrice	The Reserved Instances, standard 1-year no upfront price of instances in the current Auto Scaling group. The price listed might not reflect the actual price you pay for the instance. This field is displayed as the **Current 1-year RI price** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Current 1-year RI price** on the Export recommendations page of the Compute Optimizer console, and as **current_standardOneYearNoUpfrontReservedPrice** in the export CSV file.

API field name	Description
CurrentStandardThreeYearNoUpfrontReservedPrice	The Reserved Instances, standard 3-year no upfront price of instances in the current Auto Scaling group. The price listed might not reflect the actual price you pay for the instance. This field is displayed as the **Current 3-year RI price** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Current 3-year RI price** on the Export recommendations page of the Compute Optimizer console, and as **current_standardThreeYearNoUpfrontReservedPrice** in the export CSV file.
CurrentStorage	The local storage volume of instances in the current Auto Scaling group. This field is displayed as the **Storage** column in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Current storage** on the Export recommendations page of the Compute Optimizer console, and as **current_storage** in the export CSV file.

API field name	Description
CurrentVCpus	The number of vCPUs of instances in the current Auto Scaling group. This field is displayed as the **vCPUs** column in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Current vCPUs** on the Export recommendations page of the Compute Optimizer console, and as **current_vcpus** in the export CSV file.
Finding	The finding classification for the current Auto Scaling group. Auto Scaling groups can be classified as not optimized or optimized. For more information, see Auto Scaling group finding classifications. This field is displayed as the **Finding** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Finding** on the Export recommendations page of the Compute Optimizer console, and as **finding** in the export CSV file.
LastRefreshTimestamp	The timestamp of when the Auto Scaling group recommendation was last refreshed. This field is not displayed in the Compute Optimizer console. This field is labeled **Last refresh timestamp** on the Export recommend ations page of the Compute Optimizer console, and as **lastRefreshTimestamp** in the export CSV file.

API field name	Description
LookbackPeriodInDays	The number of preceding days for which Compute Optimizer analyzed metric data from the current Auto Scaling group to generate the recommendation. This field is not displayed in the Compute Optimizer console. This field is labeled **Lookback period in days** on the Export recommendations page of the Compute Optimizer console, and as **lookBackPeriodInDays** in the export CSV file.
RecommendationOptionsConfigurationDesiredCapacity	The desired capacity of the Auto Scaling group recommendation. This field is displayed as the **Desired number of instances** column in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Recommendation options desired capacity** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_configuration_desiredCapacity** in the export CSV file.

API field name	Description
RecommendationOptionsConfigurationInstanceType	The instance type of the Auto Scaling group recommendation. This field is displayed as the **Recommendation instance type** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Recommendation options Instance type** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_configuration_instanceType** in the export CSV file.
RecommendationOptionsConfigurationMaxSize	The maximum size of the Auto Scaling group recommendation. This field is displayed as the **Maximum number of instances** column in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Recommendation options maximum size** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_configuration_maxSize** in the export CSV file.

API field name	Description
RecommendationOptionsConfigurationMinSize	The minimum size of the Auto Scaling group recommendation. This field is displayed as the **Minimum number of instances** column in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Recommendation options minimum size** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_configuration_minSize** in the export CSV file.
RecommendationOptionsMemory	The memory of the Auto Scaling group recommendation. This field is displayed as the **Memory** column in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Recommendation options memory** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_memory** in the export CSV file.

API field name	Description
RecommendationOptionsNetwork	The network performance, or rate of data transfer, of the Auto Scaling group recommendation. This field is displayed as the **Network** column in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Recommendation options network** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_network** in the export CSV file.
RecommendationOptionsOnDemandPrice	The On-Demand price of the Auto Scaling group recommendation. This field is displayed as the **Recommend ed On-Demand price** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Recommendation options On-Demand price** on the Export recommend ations page of the Compute Optimizer console, and as **recommendationOpti ons_*<rank>*_onDemandPrice** in the export CSV file.

API field name	Description
RecommendationOptionsPerformanceRisk	The performance risk of the Auto Scaling group recommendation. This field is displayed as the **Performance risk** column in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Recommendation options performance risk** on the Export recommend ations page of the Compute Optimizer console, and as **recommendationOpti ons_*<rank>*_performanceRisk** in the export CSV file.
RecommendationOptionsProjectedUtiliz ationMetricsCpuMaximum	The projected maximum CPU utilization metric of the Auto Scaling group recommendation. This value defines the maximum CPU utilizati on of the recommended instance type if you used the recommended instance type during the look-back period. This field is displayed as an overlay on the **CPU utilization (percent)** metric graph in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Recommendation options projected utilizati on metrics CPU maximum** on the Export recommendations page of the Compute Optimizer console, and as **recommend ationOptions_*<rank>*_projectedUtilizat ionMetrics_CPU_MAXIMUM** in the export CSV file.

API field name	Description
RecommendationOptionsProjectedUtilizationMetricsMemoryMaximum	The projected maximum memory utilization metric of the Auto Scaling group recommendation. This value defines the maximum memory utilization of the recommended instance type if you used the recommended instance type during the look-back period. This field is displayed as an overlay on the **Memory utilization (percent)** metric graph in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Recommendation options projected utilization metrics memory maximum** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_projectedUtilizationMetrics_MEMORY_MAXIMUM** in the export CSV file.
RecommendationOptionsStandardOneYearNoUpfrontReservedPrice	The Reserved Instances, standard 1-year no upfront price for the Auto Scaling group recommendation. This field is displayed as the **Recommended 1-year RI price** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Recommended options 1-year RI price** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_standardOneYearNoUpfrontReservedPrice** in the export CSV file.

API field name	Description
RecommendationOptionsStandardThreeYearNoUpfrontReservedPrice	The Reserved Instances, standard 3-year no upfront price for the Auto Scaling group recommendation. This field is displayed as the **Recommended 3-year RI price** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. This field is labeled **Recommended options 3-year RI price** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_standardThreeYearNoUpfrontReservedPrice** in the export CSV file.
RecommendationOptionsStorage	The local storage volume of the Auto Scaling group recommendation. This field is displayed as the **Storage** column in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Recommendation options storage** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_storage** in the export CSV file.

API field name	Description
RecommendationOptionsVcpus	The vCPUs of the Auto Scaling group recommendation. This field is displayed as the **vCPUs** column in the Auto Scaling group details page of the Compute Optimizer console. This field is labeled **Recommendation options vCPUs** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_vcpus** in the export CSV file.
UtilizationMetricsCpuMaximum	The maximum CPU utilization metric of instances in the current Auto Scaling group observed during the lookback period (up to 14 days). This field is displayed as the **CPU utilization (percent)** graph in the Auto Scaling group details page. This field is labeled **Utilizati on metrics CPU maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics _CPU_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsDiskReadBytesPerSecondMaximum	The maximum disk read bytes per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Disk read (MiB/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics disk read bytes per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_DISK_READ_BYTES_PER_SECOND_MAXIMUM** in the export CSV file.
UtilizationMetricsDiskReadOpsPerSecondMaximum	The maximum disk read operations per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Disk read (operations/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics disk read operations per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_DISK_READ_OPS_PER_SECOND_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsDiskWriteBytesPerSecondMaximum	The maximum disk write bytes per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Disk write (MiB/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics disk write bytes per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_DISK_WRITE_BYTES_PER_SECOND_MAXIMUM** in the export CSV file.
UtilizationMetricsDiskWriteOpsPerSecondMaximum	The maximum disk write operations per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Disk write (operations/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics disk write operations per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_DISK_WRITE_OPS_PER_SECOND_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsEbsReadBytesPerSecondMaximum	The maximum bytes read per second for volumes attached to instances in the current Auto Scaling group observed during the lookback period (up to 14 days). This field is displayed as the **EBS read bandwidth (MiB/second)** graph in the Auto Scaling group details page. This field is labeled **Utilization metrics EBS read bandwidth bytes per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_EBS_READ_BYTES_PER_SECOND_MAXIMUM** in the export CSV file.
UtilizationMetricsEbsReadOpsPerSecondMaximum	The maximum number of read operations per second for volumes attached to instances in the current Auto Scaling group observed during the lookback period (up to 14 days). This field is displayed as the **EBS read operations (per second)** graph in the Auto Scaling group details page. This field is labeled **Utilization metrics EBS read throughput operations per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_EBS_READ_OPS_PER_SECOND_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsEbsWriteBytesPerSecondMaximum	The maximum bytes written per second for volumes attached to instances in the current Auto Scaling group observed during the lookback period (up to 14 days). This field is displayed as the **EBS write bandwidth (MiB/second)** graph in the Auto Scaling group details page. This field is labeled **Utilization metrics EBS write bandwidth bytes per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_EBS_WRITE_BYTES_PER_SECOND_MAXIMUM** in the export CSV file.
UtilizationMetricsEbsWriteOpsPerSecondMaximum	The maximum number of write operations per second for volumes attached to instances in the current Auto Scaling group observed during the lookback period (up to 14 days). This field is displayed as the **EBS write operations (per second)** graph in the Auto Scaling group details page. This field is labeled **Utilization metrics EBS write throughput operations per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_EBS_WRITE_OPS_PER_SECOND_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsMemoryMaximum	The maximum memory utilization metric of instances in the current Auto Scaling group observed during the lookback period (up to 14 days). This field is displayed as the **Memory utilization (percent)** graph in the Auto Scaling group details page. This field is labeled **Utilization metrics memory maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_MEMORY_MAXIMUM** in the export CSV file.
UtilizationMetricsNetworkInBytesPerSecondMaximum	The maximum network in bytes per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Network in (MiB/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics network in bytes per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_NETWORK_IN_BYTES_PER_SECOND_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsNetworkOutBytesPerSecondMaximum	The maximum network out bytes per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Network out (MiB/second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics network out bytes per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_NETWORK_OUT_BYTES_PER_SECOND_MAXIMUM** in the export CSV file.
UtilizationMetricsNetworkPacketsInPerSecondMaximum	The maximum network packets in per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Network packets in (per second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics network packets in per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_NETWORK_PACKETS_IN_PER_SECOND_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsNetworkPacketsOutPerSecondMaximum	The maximum network packets out per second of the current instance observed during the lookback period (up to 14 days). This field is displayed as the **Network packets out (per second)** graph in the EC2 instance details page. This field is labeled **Utilization metrics network packets out per second maximum** on the Export recommendations page of the Compute Optimizer console, and as **utilizationMetrics_NETWORK_PACKETS_OUT_PER_SECOND_MAXIMUM** in the export CSV file.
EffectiveRecommendationPreferencesEnhancedInfrastructureMetrics	The status of the enhanced infrastructure metrics recommendation preference for the listed recommendation. An **Active** status confirms the recommendation listed is considering the longer three-month lookback period. An **Inactive** status confirms that the recommendation isn't considering the longer lookback period. For more information, see Enhanced infrastructure metrics. This field is displayed as the **Effective enhanced infrastructure metrics** column in the Auto Scaling group recommendations page of the Compute Optimizer console. On the Export recommendations page of the Compute Optimizer console, it's labeled as **Effective recommendation preferences enhanced infrastructure metrics**, and in the export CSV file, it's labeled as **EffectiveRecommendationPreferencesEnhancedInfrastructureMetrics**.

API field name	Description
EffectiveRecommendationPreferencesCpuVendorArchitectures	The CPU vendor and architecture for an Auto Scaling group recommendation. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Effective recommendation preferences CPU vendor architectures**, and in the export CSV file, it's labeled as **EffectiveRecommendationPreferencesCpuVendorArchitectures**.
CurrentPerformanceRisk	The performance risk rating for a current Auto Scaling group. This field is displayed as the **Current performance risk** column in the Auto Scaling groups recommendations page of the Compute Optimizer console. On the Export recommendations page of the Compute Optimizer console, it's labeled as **Current performance risk**, and in the export CSV file, it's labeled as **CurrentPerformanceRisk**.
RecommendationOptionsSavingsOpportunityPercentage	The estimated monthly savings possible as a percentage of monthly cost by adopting Compute Optimizer recommendations for an Auto Scaling group. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options savings opportunity percentage**, and in the export CSV file, it's labeled as **RecommendationOptionsSavingsOpportunityPercentage**.

API field name	Description
RecommendationOptionsEstimatedMonthlySavingsCurrency	The currency of the estimated monthly savings. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options estimated monthly savings currency**, and in the export CSV file, it's labeled as **RecommendationOptionsEstimatedMonthlySavingsCurrency**.
RecommendationOptionsEstimatedMonthlySavingsValue	The value of the estimated monthly savings. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options estimated monthly savings value**, and in the export CSV file, it's labeled as **RecommendationOptionsEstimatedMonthlySavingsValue**.
EffectiveRecommendationPreferencesInferredWorkloadTypes	The status of the inferred workload type recommendation preference for the listed recommendation. For more information, see Inferred workload type. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Effective recommendation preferences inferred workload types**, and in the export CSV file, it's labeled as **EffectiveRecommendationPreferencesInferredWorkloadTypes**.

API field name	Description
InferredWorkloadTypes	The application that might be running on the instances in the Auto Scaling group as detected by Compute Optimizer. For more information, see Inferred workload types. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Inferred workload types**, and in the export CSV file, it's labeled as **InferredWorkloadTypes**.
RecommendationOptionsMigrationEffort	The level of effort that might be required to migrate from the current instance type to the recommended instance type. For more information, see Inferred workload types. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options migration effort**, and in the export CSV file, it's labeled as **RecommendationOptionsMigrationEffort**.

EBS volume recommendation fields

API field name	Description
AccountId	The AWS account ID that the current EBS volume was created under. This field is displayed as the **Account ID** column in the Amazon EBS volumes recommendations and volume details pages of the Compute Optimizer console. This field is labeled **Account ID** on the Export

API field name	Description
	recommendations page of the Compute Optimizer console, and as **accountId** in the export CSV file.
CurrentConfigurationVolumeBaselineIOPS	The baseline input/output operations per second (IOPS) of the current EBS volume. This field is displayed as the **Current IOPS** column in the Amazon EBS volumes recommendations page of the Compute Optimizer console. This field is labeled **Current baseline IOPS** on the Export recommendations page of the Compute Optimizer console, and as **CurrentConfigurationVolumeBaselineIOPS** in the export CSV file.
CurrentConfigurationVolumeBaselineThroughput	The baseline throughput of the current EBS volume. This field is displayed as the **Current throughput** column in the Amazon EBS volumes recommendations page of the Compute Optimizer console. This field is labeled **Current baseline throughput** on the Export recommendations page of the Compute Optimizer console, and as **CurrentConfigurationVolumeBaselineThroughput** in the export CSV file.

API field name	Description
CurrentConfigurationVolumeBurstIOPS	The burst input/output operations per second (IOPS) of the current EBS volume. This field is displayed as the **Burst IOPS** column in the Amazon EBS volume details page of the Compute Optimizer console. This field is labeled **Current burst IOPS** on the Export recommendations page of the Compute Optimizer console, and as **CurrentConfigurationVolumeBurstIOPS** in the export CSV file.
CurrentConfigurationVolumeBurstThroughput	The volume burst throughput of the current EBS volume. This field is displayed as the **Burst throughput** column in the Amazon EBS volume details page of the Compute Optimizer console. This field is labeled **Current burst throughput** on the Export recommendations page of the Compute Optimizer console, and as **CurrentConfigurationVolumeBurstThroughput** in the export CSV file.
CurrentConfigurationVolumeSize	The current size (in GB) of the current EBS volume. This field is displayed as the **Current size** column in the Amazon EBS volumes recommendations page of the Compute Optimizer console. This field is labeled **Current volume size** on the Export recommendations page of the Compute Optimizer console, and as **CurrentConfigurationVolumeSize** in the export CSV file.

API field name	Description
CurrentConfigurationVolumeType	The volume type of the current EBS volume. This field is displayed as the **Current volume type** column in the Amazon EBS volumes recommendations page of the Compute Optimizer console. This field is labeled **Current volume type** on the Export recommendations page of the Compute Optimizer console, and as **CurrentConfigurationVolumeType** in the export CSV file.
CurrentMonthlyPrice	The current monthly price of the current EBS volume. This field is displayed as the**Current monthly price** column in the Amazon EBS volumes recommendations page of the Compute Optimizer console. This field is labeled **Current monthly price** on the Export recommendations page of the Compute Optimizer console, and as **currentMonthlyPrice** in the export CSV file.
Finding	The finding classification for the current EBS volume. EBS volumes can be classified as optimized, or not optimized. For more information, see EBS volume finding classifications. This field is displayed as the **Finding** column in the Amazon EBS volumes recommendations page of the Compute Optimizer console. This field is labeled **Finding** on the Export recommendations page of the Compute Optimizer console, and as **finding** in the export CSV file.

API field name	Description
LastRefreshTimestamp	The timestamp of when the EBS volume recommendation was last refreshed. This field is not displayed in the Compute Optimizer console. This field is labeled **Last refresh timestamp** on the Export recommend ations page of the Compute Optimizer console, and as **lastRefreshTimestamp** in the export CSV file.
LookbackPeriodInDays	The number of preceding days for which Compute Optimizer analyzed metric data from the current EBS volume to generate the recommendation. This field is not displayed in the Compute Optimizer console. This field is labeled **Look-back period in days** on the Export recommendations page of the Compute Optimizer console, and as **lookBackP eriodInDays** in the export CSV file.
RecommendationOptionsConfigurationVo lumeBaselineIOPS	The baseline input/output operations per second (IOPS) of the EBS volume recommend ation. This field is displayed as the **Recommended IOPS** column in the Amazon EBS volumes recommendations page of the Compute Optimizer console. This field is labeled **Recommended baseline IOPS** on the Export recommendations page of the Compute Optimizer console, and as **Recommend ationOptions_*<rank>*_ConfigurationVolu meBaselineIOPS** in the export CSV file.

API field name	Description
RecommendationOptionsConfigurationVolumeBaselineThroughput	The baseline throughput of the EBS volume recommendation. This field is displayed as the **Recommended throughput** column in the Amazon EBS volumes recommendations page of the Compute Optimizer console. This field is labeled **Recommended baseline throughput** on the Export recommendations page of the Compute Optimizer console, and as **RecommendationOptions_*<rank>*_ConfigurationVolumeBaselineThroughput** in the export CSV file.
RecommendationOptionsConfigurationVolumeBurstIOPS	The burst input/output operations per second (IOPS) of the EBS volume recommendation. This field is displayed as the **Burst IOPS** column in the Amazon EBS volume details page of the Compute Optimizer console. This field is labeled **Recommended burst IOPS** on the Export recommendations page of the Compute Optimizer console, and as **RecommendationOptions_*<rank>*_ConfigurationVolumeBurstIOPS** in the export CSV file.

API field name	Description
RecommendationOptionsConfigurationVolumeBurstThroughput	The volume burst throughput of the EBS volume recommendation. This field is displayed as the **Burst throughput** column in the Amazon EBS volume details page of the Compute Optimizer console. This field is labeled **Recommended burst throughput** on the Export recommendations page of the Compute Optimizer console, and as **RecommendationOptions_*<rank>*_ConfigurationVolumeBurstThroughput** in the export CSV file.
RecommendationOptionsConfigurationVolumeSize	The current size (in GB) of the EBS volume recommendation. This field is displayed as the **Recommended size** column in the Amazon EBS volumes recommendations page of the Compute Optimizer console. This field is labeled **Recommended volume size** on the Export recommendations page of the Compute Optimizer console, and as **RecommendationOptions_*<rank>*_ConfigurationVolumeSize** in the export CSV file.

API field name	Description
RecommendationOptionsConfigurationVolumeType	The volume type of the EBS volume recommendation. This field is displayed as the **Recommended volume type** in the Amazon EBS volumes recommendations page of the Compute Optimizer console. This field is labeled **Recommended volume type** on the Export recommendations page of the Compute Optimizer console, and as **RecommendationOptions_*<rank>*_ConfigurationVolumeType** in the export CSV file.
RecommendationOptionsMonthlyPrice	The monthly price of the EBS volume recommendation. This field is displayed as the **Recommended monthly price** column in the Amazon EBS volumes recommendations page of the Compute Optimizer console. This field is labeled **Recommended monthly price** on the Export recommendations page of the Compute Optimizer console, and as **RecommendationOptions_*<rank>*_MonthlyPrice** in the export CSV file.

API field name	Description
RecommendationOptionsPerformanceRisk	The performance risk of the EBS volume recommendation. This field is displayed as the **Performance risk** column in the Amazon EBS volume details page of the Compute Optimizer console. This field is labeled **Performance risk** on the Export recommendations page of the Compute Optimizer console, and as **recommendationOptions_*<rank>*_performanceRisk** in the export CSV file.
UtilizationMetricsVolumeReadBytesPerSecondMaximum	The maximum read bytes per second metric of the current EBS volume observed during the lookback period (up to 14 days). This field is displayed as the **Read bandwidth (KiB/second)** graph in the Amazon EBS volume details page. This field is labeled **Utilization metrics EBS read bytes per second (maximum)** on the Export recommendations page of the Compute Optimizer console, and as **UtilizationMetricsVolumeReadBytesPerSecondMaximum** in the export CSV file.

API field name	Description
UtilizationMetricsVolumeReadOpsPerSecondMaximum	The maximum read operations per second metric of the current EBS volume observed during the lookback period (up to 14 days). This field is displayed as the **Read operations (per second)** graph in the Amazon EBS volume details page. This field is labeled **Utilization metrics EBS read operations per second (maximum)** on the Export recommendations page of the Compute Optimizer console, and as **UtilizationMetricsVolumeReadOpsPerSecondMaximum** in the export CSV file.
UtilizationMetricsVolumeWriteBytesPerSecondMaximum	The maximum write bytes per second metric of the current EBS volume observed during the lookback period (up to 14 days). This field is displayed as the **Write bandwidth (KiB/second)** graph in the Amazon EBS volume details page. This field is labeled **Utilization metrics EBS write bytes per second (maximum)** on the Export recommendations page of the Compute Optimizer console, and as **UtilizationMetricsVolumeWriteBytesPerSecondMaximum** in the export CSV file.

API field name	Description
UtilizationMetricsVolumeWriteOpsPerSecondMaximum	The maximum write operations per second metric of the current EBS volume observed during the lookback period (up to 14 days). This field is displayed as the **Write operations (per second)** graph in the Amazon EBS volume details page. This field is labeled **Utilization metrics EBS write operations per second (maximum)** on the Export recommendations page of the Compute Optimizer console, and as **UtilizationMetricsVolumeWriteOpsPerSecondMaximum** in the export CSV file.
CurrentConfigurationRootVolume	Contains the image used to boot the current instance during launch. This field is displayed as the **Root volume** column in the Amazon EBS volumes recommendations page of the Compute Optimizer console. This field is labeled **Root volume** on the Export recommendations page of the Compute Optimizer console, and labeled **rootVolume** in the export CSV file.
RootVolume	Contains the image used to boot the instance during launch. This field is displayed as the **Root volume** column in the Amazon EBS volumes recommendations and volume details pages of the Compute Optimizer console. This field is labeled **Root volume** on the Export recommendations page of the Compute Optimizer console, and labeled **rootVolume** in the export CSV file.

API field name	Description
VolumeArn	The Amazon Resource Name (ARN) of the current EBS volume. This field is not displayed in the Compute Optimizer console. This field is labeled **EBS volume ARN** on the Export recommendations page of the Compute Optimizer console, and as **VolumeArn** in the export CSV file.
CurrentPerformanceRisk	The performance risk rating for a current EBS volume. This field is displayed as the **Current performance risk** column in the EBS volumes recommendations page of the Compute Optimizer console. On the Export recommend ations page of the Compute Optimizer console, it's labeled as **Current performance risk**, and in the export CSV file, it's labeled as **CurrentPerformanceRisk**.
RecommendationOptionsSavingsOpportun ityPercentage	The estimated monthly savings possible as a percentage of monthly cost by adopting Compute Optimizer recommendations for an EBS volume. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options savings opportunity percentage**, and in the export CSV file, it's labeled as **RecommendationOpti onsSavingsOpportunityPercentage**.

API field name	Description
RecommendationOptionsEstimatedMonthlySavingsCurrency	The currency of the estimated monthly savings. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options estimated monthly savings currency**, and in the export CSV file, it's labeled as **RecommendationOptionsEstimatedMonthlySavingsCurrency**.
RecommendationOptionsEstimatedMonthlySavingsValue	The value of the estimated monthly savings. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options estimated monthly savings value**, and in the export CSV file, it's labeled as **RecommendationOptionsEstimatedMonthlySavingsValue**.

Lambda function recommendation fields

API field name	Description
AccountId	The AWS account ID in which the current Lambda function was created. This field is displayed as the **Account ID** column in the Lambda functions recommendations and function details pages of the Compute Optimizer console. This field is labeled **Account ID** on the Export recommendations page of the Compute Optimizer

API field name	Description
	console, and as **accountId** in the export CSV file.
CurrentConfigurationMemorySize	The amount of memory (in MB) currently configured on the current Lambda function. This field is displayed as the **Current configured memory** column in the Lambda functions recommendations page of the Compute Optimizer console. This field is labeled **Current configured memory** on the Export recommendations page of the Compute Optimizer console, and as **CurrentConfigurationMemorySize** in the export CSV file.
CurrentConfigurationTimeout	The timeout time currently configured on the current Lambda function. This field is displayed as the **Timeout** column in the Lambda functions recommendations page of the Compute Optimizer console. This field is labeled **Timeout** on the Export recommendations page of the Compute Optimizer console, and as **CurrentConfigurationTimeout** in the export CSV file.

API field name	Description
CurrentCostAverage	The average current cost of the current Lambda function. This field is displayed listed as the **Current cost (average)** column in the Lambda functions recommendations page of the Compute Optimizer console. This field is labeled **Current cost (average)** on the Export recommendations page of the Compute Optimizer console, and as **CurrentCostAverage** in the export CSV file.
CurrentCostTotal	The total current cost of the current Lambda function. This field is listed as the **Current cost** column in the Lambda functions recommendations page of the Compute Optimizer console. This field is labeled **Current cost (total)** on the Export recommendations page of the Compute Optimizer console, and as **CurrentCostTotal** in the export CSV file.
Finding	The finding classification for the current Lambda function. Lambda functions can be classified as under-provisioned, over-provisioned, or optimized. For more information, see Lambda function finding classifications. This field is listed as the **Finding** column in the Lambda functions recommendations page of the Compute Optimizer console. This field is labeled **Finding** on the Export recommendations page of the Compute Optimizer console, and as **finding** in the export CSV file.

API field name	Description
FindingReasonCodes	The finding reason for the current Lambda function. Lambda functions can have a finding reason of memory under-provisioned, memory over-provisioned, insufficient data, or inconclusive. For more information, see Lambda finding classifications. This field is listed as the **Finding reason** column in the Lambda functions recommend ations page of the Compute Optimizer console. This field is labeled **Finding reason** on the Export recommendations page of the Compute Optimizer console, and as **FindingRe asonCodes** in the export CSV file.
FunctionArn	The Amazon Resource Name (ARN) of the current Lambda function. This field is not listed in the Compute Optimizer console. This field is labeled **Function ARN** on the Export recommend ations page of the Compute Optimizer console, and as **FunctionArn** in the export CSV file.
FunctionVersion	The version of the current Lambda function. This field is listed as the **Function version** column in the Lambda functions recommend ations page of the Compute Optimizer console. This field is labeled **Function version** on the Export recommendations page of the Compute Optimizer console, and as **FunctionV ersion** in the export CSV file.

API field name	Description
LastRefreshTimestamp	The timestamp of when the Lambda function recommendation was last refreshed. This field isn't displayed in the Compute Optimizer console. This field is labeled **Last refresh timestamp** on the Export recommend ations page of the Compute Optimizer console, and as **lastRefreshTimestamp** in the export CSV file.
LookbackPeriodInDays	The number of preceding days for which Compute Optimizer analyzed metric data from the current Lambda function to generate the recommendation. This field isn't displayed in the Compute Optimizer console. This field is labeled **Look-back period in days** on the Export recommendations page of the Compute Optimizer console, and as **lookBackP eriodInDays** in the export CSV file.
NumberOfInvocations	The number of invocations for the current Lambda function during the look-back period. This field is displayed as the **Invocatio ns (count)** graph in the Lambda function details page. This field is labeled **Number of invocations** on the Export recommendations page of the Compute Optimizer console, and as **NumberOfInvocations** in the export CSV file.

API field name	Description
RecommendationOptionsConfigurationMemorySize	The amount of memory (in MB) of the Lambda function recommendation. This field is listed as the **Recommended configured memory** in the Lambda functions recommendations page of the Compute Optimizer console. This field is labeled **Recommended configured memory** on the Export recommendations page of the Compute Optimizer console, and as **RecommendationOptions_*<rank>*_ConfigurationMemorySize** in the export CSV file.
RecommendationOptionsCostHigh	The upper range cost of the Lambda function recommendation. This field is displayed as the **Recommended cost (high)** column in the Lambda functions recommendations page of the Compute Optimizer console. This field is labeled **Recommended cost (high)** on the Export recommendations page of the Compute Optimizer console, and as **RecommendationOptions_*<rank>*_CostHigh** in the export CSV file.

API field name	Description
RecommendationOptionsCostLow	The lower range cost of the Lambda function recommendation. This field is displayed as the **Recommended cost (low)** column in the Lambda functions recommendations page of the Compute Optimizer console. This field is labeled **Recommended cost (low)** on the Export recommendations page of the Compute Optimizer console, and as **RecommendationOptions_*<rank>*_CostLow** in the export CSV file.
RecommendationOptionsProjectedUtilizationMetricsDurationExpected	The projected duration of the Lambda function recommendation. This field is listed as the **Projected duration (expected)** column in the Lambda functions details page of the Compute Optimizer console. This field is labeled **Utilization metrics Lambda duration milliseconds expected** on the Export recommendations page of the Compute Optimizer console, and as **RecommendationOptions_*<rank>*_ProjectedUtilizationMetricsDurationExpected** in the export CSV file.

API field name	Description
RecommendationOptionsProjectedUtilizationMetricsDurationLowerBound	The projected minimum amount of time that the recommended Lambda function spends processing events if the recommended Lambda function is used during the look-back period. The lower bound together with the upper bound form a range of time that the Lambda function recommendation option is projected to spend processing an event. This field is listed as the **Projected duration (low)** column in the Lambda functions details page of the Compute Optimizer console. This field is labeled **Utilization metrics Lambda duration milliseconds (lower bound)** on the Export recommendations page of the Compute Optimizer console, and as **RecommendationOptions_*<rank>*_ProjectedUtilizationMetricsDurationLowerBound** in the export CSV file.

API field name	Description
RecommendationOptionsProjectedUtilizationMetricsDurationUpperBound	The projected maximum amount of time that the recommended Lambda function spends processing events if the recommended Lambda function is used during the look-back period. The lower bound together with the upper bound form a range of time that the Lambda function recommendation option is projected to spend processing an event. This field is listed as the **Projected duration (high)** column in the Lambda functions details page of the Compute Optimizer console. This field is labeled **Utilization metrics Lambda duration milliseconds (upper bound)** on the Export recommendations page of the Compute Optimizer console, and as **RecommendationOptions_*<rank>*_ProjectedUtilizationMetricsDurationUpperBound** in the export CSV file.
UtilizationMetricsDurationAverage	The average duration metric of the current Lambda function observed during the lookback period (up to 14 days). This field is displayed as the **Duration (average)** column in the Lambda function details page of the Compute Optimizer console. This field is labeled **Utilization metrics Lambda duration milliseconds (average)** on the Export recommendations page of the Compute Optimizer console, and as **UtilizationMetricsDurationAverage** in the export CSV file.

API field name	Description
UtilizationMetricsDurationMaximum	The maximum duration metric of the current Lambda function observed during the lookback period (up to 14 days). This field is displayed as the **Duration (maximum)** column in the Lambda function details page of the Compute Optimizer console. This field is labeled **Utilization metrics Lambda duration milliseconds (maximum)** on the Export recommendations page of the Compute Optimizer console, and as **UtilizationMetricsDurationMaximum** in the export CSV file.
UtilizationMetricsMemoryAverage	The average memory utilization metric of the current Lambda function observed during the lookback period (up to 14 days). This field is displayed as the **Used memory (average)** column in the Lambda function details page of the Compute Optimizer console. This field is labeled **Utilization metrics Lambda memory used MB (average)** on the Export recommendations page of the Compute Optimizer console, and as **UtilizationMetricsMemoryAverage** in the export CSV file.

API field name	Description
UtilizationMetricsMemoryMaximum	The maximum memory utilization metric of the current Lambda function observed during the lookback period (up to 14 days). This field is displayed as the **Memory (maximum)** column in the Lambda function details page of the Compute Optimizer console. This field is labeled **Utilizati on metrics Lambda memory used MB (maximum)** on the Export recommendations page of the Compute Optimizer console, and as **UtilizationMetricsMemoryMaximum** in the export CSV file.
CurrentPerformanceRisk	The performance risk rating for a current Lambda function. This field is displayed as the **Current performance risk** column in the Lambda functions recommendations page of the Compute Optimizer console. On the Export recommendations page of the Compute Optimizer console, it's labeled as **Current performance risk**, and in the export CSV file, it's labeled as **CurrentPerformanceRisk**.

API field name	Description
RecommendationOptionsSavingsOpportunityPercentage	The estimated monthly savings possible as a percentage of monthly cost by adopting Compute Optimizer recommendations for a Lambda function. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options savings opportunity percentage**, and in the export CSV file, it's labeled as **RecommendationOptionsSavingsOpportunityPercentage**.
RecommendationOptionsEstimatedMonthlySavingsCurrency	The currency of the estimated monthly savings. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options estimated monthly savings currency**, and in the export CSV file, it's labeled as **RecommendationOptionsEstimatedMonthlySavingsCurrency**.
RecommendationOptionsEstimatedMonthlySavingsValue	The value of the estimated monthly savings. On the Export recommendations page of the Compute Optimizer console, this field is labeled as **Recommendation options estimated monthly savings value**, and in the export CSV file, it's labeled as **RecommendationOptionsEstimatedMonthlySavingsValue**.

Recommendation fields for Amazon ECS services on Fargate

API field name	Description
AccountId	The AWS account ID that created the current Amazon ECS service on Fargate. This field is displayed as the **Account ID** column in the Amazon ECS services recommendations and details pages of the Compute Optimizer console. This field is labeled **Account ID** on the Export recommend ations page of the Compute Optimizer console, and labeled **accountId** in the export CSV file.
ServiceArn	The Amazon Resource Name (ARN) of the current Amazon ECS service. This field isn't displayed in the Compute Optimizer console. This field is labeled **Service ARN** on the Export recommendations page of the Compute Optimizer console, and labeled **serviceArn** in the export CSV file.
LookbackPeriodInDays	The number of preceding days Compute Optimizer analyzed metric data from the current service to generate the recommend ation. This field isn't displayed in the Compute Optimizer console. This field is labeled **Lookback period in days** on the Export recommendations page of the Compute Optimizer console, and labeled **lookBackP eriodInDays** in the export CSV file.
LastRefreshTimestamp	The timestamp of when the Amazon ECS service recommendation was last refreshed.

API field name	Description
	This field isn't displayed in the Compute Optimizer console. This field is labeled **Last refresh timestamp** on the Export recommendations page of the Compute Optimizer console, and labeled **lastRefreshTimestamp_UTC** in the export CSV file.
LaunchType	The capacity provider for the current Amazon ECS service. This field is displayed as the **Launch type** column in the Amazon ECS services recommendations page of the Compute Optimizer console. This field is labeled **Launch type** on the Export recommendations page of the Compute Optimizer console, and as **launchType** in the export CSV file.
CurrentPerformanceRisk	The performance risk rating for the current Amazon ECS service. This field is displayed as the **Current performance risk** column in the Amazon ECS services recommendations page of the Compute Optimizer console. This field is labeled **Current performance risk** on the Export recommendations page of the Compute Optimizer console, and labeled **CurrentPerformanceRisk** in the export CSV file.

API field name	Description
CurrentServiceConfigurationMemory	The memory size of the current Amazon ECS service tasks. This field is displayed as the **Current configured memory size** column in the Amazon ECS services recommendations page of the Compute Optimizer console. This field is labeled **Current configured memory** on the Export recommendations page of the Compute Optimizer console, and labeled **currentServiceConfiguration_memory** in the export CSV file.
CurrentServiceConfigurationCpu	The CPU size of the current Amazon ECS service tasks. This field is displayed as the **Current configured CPU size** column in the Amazon ECS services recommendations page of the Compute Optimizer console. This field is labeled **Current configured CPU** on the Export recommendations page of the Compute Optimizer console, and labeled **currentServiceConfiguration_cpu** in the export CSV file.

API field name	Description
CurrentServiceConfigurationTaskDefinitionArn	The task definition ARN of the current Amazon ECS service. This field is displayed as the **Task definitio n name** column in the Amazon ECS services recommendations page of the Compute Optimizer console. This field is labeled **Task definition name** on the Export recommend ations page of the Compute Optimizer console, and labeled **currentServiceConf iguration_taskDefinitionArn** in the export CSV file.
CurrentServiceConfigurationAutoScali ngConfiguration	The Auto Scaling configuration of your current Amazon ECS service. This field is displayed as the **Auto Scaling configuration** column in the Amazon ECS service details page of the Compute Optimizer console. This field is labeled **Auto Scaling configuration** on the Export recommend ations page of the Compute Optimizer console, and labeled **currentServiceConf iguration_autoScalingConfiguration** in the export CSV file.

API field name	Description
CurrentServiceContainerConfigurations	The current container configurations of the current Amazon ECS service task. This field is displayed in the **Compare current settings with recommended container size** table of the Compute Optimizer console's service details page. This field is labeled **Container configurations** on the Export recommendations page of the Compute Optimizer console. In the export CSV file, the following labels are populated: • **currentServiceContainerConfiguration _*container_number*_containerName** • **currentServiceContainerConfiguration _*container_number*_memory** • **currentServiceContainerConfiguration _*container_number*_memoryReservation** • **currentServiceContainerConfiguration _*container_number*_cpu**
UtilizationMetricsCpuMaximum	The maximum percentage of CPU capacity that's used in the Amazon ECS service. This field is displayed as the **CPU utilization (percent)** graph in the Amazon ECS service details page of the Compute Optimizer console. This field is labeled **Projected utilization max CPU metric** on the Export recommendations page of the Compute Optimizer console, and labeled **utilizationMetrics_CPU_MAXIMUM** in the export CSV file.

API field name	Description
UtilizationMetricsMemoryMaximum	The maximum percentage of memory capacity that's used in the Amazon ECS service. This field is displayed as the **Memory utilization (percent)** graph in the Amazon ECS service details page of the Compute Optimizer console. This field is labeled **Projected utilization max memory metric** on the Export recommendations page of the Compute Optimizer console, and labeled **utilizationMetrics_MEMORY_MAXIMUM** in the export CSV file.
Findings	The finding classification for the Amazon ECS service. Amazon ECS services on Fargate can be classified as under-provisioned, over-provisioned, or optimized. For more information, see Finding classifications. This field is displayed as the **Findings** column in the Amazon ECS services recommendations page of the Compute Optimizer console. This field is labeled **Findings** on the Export recommendations page of the Compute Optimizer console, and labeled **findings** in the export CSV file.

API field name	Description
FindingReasonCodes	The finding reasons column describes which specifications of the current Amazon ECS service were under-provisioned, over-prov isioned, or optimized. This field is displayed as the **Finding reasons** column in the Amazon ECS services recommendations page of the Compute Optimizer console. This field is labeled **Finding reason codes** on the Export recommendations page of the Compute Optimizer console, and labeled **findingRe asonCodes_*<code>*** in the export CSV file. The *<code>* portion of the label identifies the service specifications (CPU or memory) that are under-provisioned, over-provisioned, or optimized.
RecommendationOptionsMemory	The memory size of the Amazon ECS service recommendation. This field is displayed as the **Memory size** column in the Amazon ECS service details page of the Compute Optimizer console. This field is labeled **Recommendation options memory** on the Export recommend ations page of the Compute Optimizer console, and labeled **recommendationOpti ons_*<rank>*_memory** in the export CSV file.

API field name	Description
RecommendationOptionsCpu	The CPU size of the Amazon ECS service recommendation. This field is displayed as the **CPU size** column in the Amazon ECS service details page of the Compute Optimizer console. This field is labeled **Recommendation options CPU** on the Export recommendations page of the Compute Optimizer console, and labeled **recommendationOptions_*<rank>*_cpu** in the export CSV file.
RecommendationOptionsSavingsOpportunityPercentage	The approximate monthly cost savings percentage after you adjust the configurations of your Amazon ECS service to Compute Optimizer's recommended configuration. This field is labeled **Recommendation options savings opportunity percentage** on the Export recommendations page of the Compute Optimizer console, and labeled **RecommendationOptionsSavingsOpportunityPercentage** in the export CSV file.
RecommendationOptionsEstimatedMonthlySavingsCurrency	The currency of the estimated monthly savings. This field is labeled **Recommendation options estimated monthly savings currency** on the Export recommendations page of the Compute Optimizer console, and labeled **RecommendationOptionsEstimatedMonthlySavingsCurrency** in the export CSV file.

API field name	Description
RecommendationOptionsEstimatedMonthlySavingsValue	The value of the estimated monthly savings. This field is labeled **Recommendation options estimated monthly savings value** on the Export recommendations page of the Compute Optimizer console, and labeled **RecommendationOptionsEstimatedMonthlySavingsValue** in the export CSV file.
RecommendationOptionsContainerRecommendations	The recommedned memory and CPU size of the containers in the Amazon ECS service. This field is displayed in the **Compare current settings with recommended container size** table of the Compute Optimizer console's service details page. This field is labeled **Container recommendations** on the Export recommendations page of the Compute Optimizer console. In the export CSV file, the following labels are populated: • **recommendationOptions_*<index>*_containerName_*<index>*** • **recommendationOptions_*<index>*_containerMemory_*container_number*** • **recommendationOptions_*<index>*_containerMemoryReservation_*container_number*** • **recommendationOptions_*<index>*_containerCpu_*container_number***

API field name	Description
RecommendationOptionsProjectedUtilizationMetricsCpuMaximum	The projected maximum CPU utilization metric of the Amazon ECS service recommendation. If you used the recommended Amazon ECS service during the look-back period, this value defines the maximum CPU utilization of the recommended Amazon ECS service. This field is displayed as an overlay on the **CPU utilization (percent)** metric graph in the Amazon ECS service details page of the Compute Optimizer console. This field is labeled **Recommendation options projected utilization metrics CPU maximum** on the Export recommendations page of the Compute Optimizer console, and labeled **recommendationOptions_*<rank>*_projectedUtilizationMetrics_CPU_MAXIMUM** in the export CSV file.

API field name	Description
RecommendationOptionsProjectedUtilizationMetricsMemoryMaximum	The projected maximum memory utilization metric of the Amazon ECS service recommendation. If you used the recommended Amazon ECS service during the look-back period, this value defines the maximum memory utilization of the recommended Amazon ECS service. This field is displayed as an overlay on the **Memory utilization (percent)** metric graph in the Amazon ECS service details page of the Compute Optimizer console. This field is labeled **Recommendation options projected utilization metrics memory maximum** on the Export recommendations page of the Compute Optimizer console, and labeled **recommendationOptions_*<rank>*_projectedUtilizationMetrics_MEMORY_MAXIMUM** in the export CSV file.

Recommendation fields for commercial software licenses

- **`AccountId`**
- **`ResourceArn`**
- **`LookbackPeriodInDays`**
- **`LastRefreshTimestamp`**
- **`Findings`**
- **`FindingReasonCodes`**
- **`NumberOfCores`**
- **`CurrentLicenseConfigurationInstanceType`**
- **`CurrentLicenseConfigurationOperatingSystem`**
- **`CurrentLicenseConfigurationLicenseName`**
- **`CurrentLicenseConfigurationLicenseEdition`**

- **CurrentLicenseConfigurationLicenseModel**
- **CurrentLicenseConfigurationLicenseVersion**
- **MetricsSource**
- **RecommendationOptionsOperatingSystem**
- **RecommendationOptionsLicenseEdition**
- **RecommendationOptionsLicenseModel**
- **RecommendationOptionsSavingsOpportunityPercentage**
- **RecommendationOptionsEstimatedMonthlySavingsCurrency**
- **RecommendationOptionsEstimatedMonthlySavingsValue**
- **Tags**

Metadata file

A metadata JSON file is output with every export job. The file includes the schema information for the associated recommendations file, such as the dialect of the data, column definitions, and column descriptions. The file is meant to help parse the export file, and describe its contents. The metadata file is saved in the same S3 bucket and prefix that you specified for the export file.

The metadata file includes the following properties for each exported column or field:

- **Name** - The export field recommendations column name.
- **Titles** - The user-friendly recommendations column name.
- **Datatype** - The type of data for the column.
- **Null** - The string to expect if the column is null.
- **Required** - Indicates if the column data is required.

The following is an example of the information that's included in the metadata file.

```
{
  "@context": [
    "http://www.w3.org/ns/csvw"
  ],
  "url": "us-east-1-2020-05-18T001229Z-f264881a-bfb3-4676-9b14-8d1243599ebb.csv",
  "dc:title": "EC2 Instance Recommendations",
  "dialect": {
```

```
    "encoding": "utf-8",
    "lineTerminators": [
      "\n"
    ],
    "doubleQuote": true,
    "skipRows": 0,
    "header": true,
    "headerRowCount": 1,
    "delimiter": ",",
    "skipColumns": 0,
    "skipBlankRows": false,
    "trim": false
  },
  "dc:modified": {
    "@value": "2020-05-20",
    "@type": "xsd:date"
  },
  "tableSchema": {
    "columns": [
      {
        "name": "accountId",
        "titles": "Account ID",
        "datatype": "string",
        "null": "",
        "required": false
      },
      {
        "name": "instanceArn",
        "titles": "Instance Arn",
        "datatype": "string",
        "null": "",
        "required": false
      },
      {
        "name": "utilizationMetrics_CPU_MAXIMUM",
        "titles": "Cpu Maximum Utilization Metrics",
        "datatype": "double",
        "null": "",
        "required": false
      },
      {
        "name": "recommendations_count",
        "titles": "Number of recommendations",
        "datatype": "integer",
```

```
        "required": true
      },
      {
        "name": "recommendationOptions_1_instanceType",
        "titles": "Recommendation 1 Instance Type",
        "datatype": "integer",
        "null": "",
        "required": false
      },
      {
        "name": "lastRefreshTimestamp_UTC",
        "titles": "Last Resfreshed Timestamp UTC",
        "datatype": "datetime",
        "format": "yyyy-MM-dd HH:mm:ss",
        "null": "",
        "required": false
      },
      {
        "name": "errorCode",
        "titles": "Error Code",
        "datatype": "string",
        "required": true
      },
      {
        "name": "errorMessage",
        "titles": "Error Message",
        "datatype": "string",
        "required": true
      }
    ]
  }
}
```

Troubleshooting in Compute Optimizer

This section covers troubleshooting why fails or errors might occur while using Compute Optimizer. The solutions provided in this section show how you can mitigate these problems.

Topics

Failed to create service-linked role

Description

Accounts show a **Failed** opt-in status, and a description of **Failed to create service-linked role**.

Cause

Compute Optimizer uses AWS Identity and Access Management (IAM) service-linked roles. These roles include all of the permissions that the service requires to call other AWS services on your behalf. You must configure permissions to allow an IAM entity (a user, group, or role) to create a service-linked role for Compute Optimizer. The user who tried to opt in to Compute Optimizer might not have the permissions required to have the service-linked role created.

Solution

Add the required permissions to the user who performs the Compute Optimizer opt-in. For more information, see the section called “Service-linked role permissions”.

Failed to enable trusted access

Description

Accounts show a **Failed** opt-in status, and a description of **Failed to enable trusted access**.

Cause

You can use *trusted access* to enable Compute Optimizer to perform tasks in your organization and its accounts on your behalf. For more information about AWS Organizations trusted access, see Using AWS Organizations with other AWS services in the *AWS Organizations User Guide*.When you opt in using your organization's management account and include all member accounts within the organization, trusted access for Compute Optimizer is automatically enabled in your organization account. The user who tried to opt in to Compute Optimizer might not have the permissions required to have trusted access enabled.

Solution

Add the required permissions to the user who perform the Compute Optimizer opt-in. For more information, see Permissions required to enable trusted access in the *AWS Organizations User Guide*. After you add the required permissions, opt in to Compute Optimizer again using your organization's management account and include all member accounts within the organization. For more information, see the section called “Opting in to Compute Optimizer”.

Failed to get or update enhanced infrastructure metrics recommendation preferences

Description

A banner is displayed that indicates that the Compute Optimizer console could not get or update enhanced infrastructure metrics recommendation preferences.

Cause

You might not have the permissions required to view or update recommendation preferences.

Solution

Add the required permissions to the user who will view or edit recommendation preferences. For more information, see Policies to grant access to manage Compute Optimizer recommendation preferences.

Troubleshooting failed export jobs

When you try to export your resource recommendations, you might experience one of the following error messages or issues. Use the information provided to try to resolve the error before trying to export your recommendations again.

You don't have permissions to the Amazon S3 bucket specified. Confirm the permissions of your S3 bucket and try again.

Confirm that you have configured the required permissions on your Amazon S3 bucket. For more information, see Specifying an existing S3 bucket for your recommendations export.

The Amazon S3 bucket specified is public. Only private S3 buckets are supported.

Your Amazon S3 bucket must be set to block public access. For more information, see Blocking public access to your Amazon S3 storage in the *Amazon Simple Storage Service User Guide*.

You created a scripted or automatic export job but there is recommendation data missing from your Amazon S3 bucket.

Call the `DescribeRecommendationExportJobs` API to verify the final status of the export job. If the export job failed, try to call the `Export`*`Resource`*`Recommendations` API again. For more information, see DescribeRecommendationExportJobs in the *AWS Compute Optimizer API Reference*.

Security in AWS Compute Optimizer

Cloud security at AWS is the highest priority. As an AWS customer, you benefit from a data center and network architecture that is built to meet the requirements of the most security-sensitive organizations.

Security is a shared responsibility between AWS and you. The describes this as security *of* the cloud and security *in* the cloud:

- **Security of the cloud** – AWS is responsible for protecting the infrastructure that runs AWS services in the AWS Cloud. AWS also provides you with services that you can use securely. Third-party auditors regularly test and verify the effectiveness of our security as part of the .
- **Security in the cloud** – Your responsibility is determined by the AWS service that you use. You are also responsible for other factors including the sensitivity of your data, your company's requirements, and applicable laws and regulations.

This documentation helps you understand how to apply the shared responsibility model when using Compute Optimizer. The following topics show you how to configure Compute Optimizer to meet your security and compliance objectives. You also learn how to use other AWS services that help you to monitor and secure your Compute Optimizer resources.

Topics

Data protection in AWS Compute Optimizer

The AWS applies to data protection in AWS Compute Optimizer. As described in this model, AWS is responsible for protecting the global infrastructure that runs all of the AWS Cloud. You are responsible for maintaining control over your content that is hosted on this infrastructure. This content includes the security configuration and management tasks for the AWS services that you use. For more information about data privacy, see the .

For data protection purposes, we recommend that you protect AWS account credentials and set up individual user accounts with AWS Identity and Access Management (IAM). That way each user is

given only the permissions necessary to fulfill their job duties. We also recommend that you secure your data in the following ways:

- Use multi-factor authentication (MFA) with each account.
- Use SSL/TLS to communicate with AWS resources. We recommend TLS 1.2 or later.
- Set up API and user activity logging with AWS CloudTrail.
- Use AWS encryption solutions, along with all default security controls within AWS services.
- Use advanced managed security services such as Amazon Macie, which assists in discovering and securing personal data that is stored in Amazon S3.
- If you require FIPS 140-2 validated cryptographic modules when accessing AWS through a command line interface or an API, use a FIPS endpoint.

We strongly recommend that you never put confidential or sensitive information, such as your customers' email addresses, into tags or free-form fields such as a **Name** field. This includes when you work with Compute Optimizer or other AWS services using the console, API, AWS CLI, or AWS SDKs. Any data that you enter into tags or free-form fields used for names may be used for billing or diagnostic logs. If you provide a URL to an external server, we strongly recommend that you do not include credentials information in the URL to validate your request to that server.

Compliance validation for AWS Compute Optimizer

Third-party auditors assess the security and compliance of AWS Compute Optimizer as part of multiple AWS compliance programs. AWS Compute Optimizer is FedRAMP authorized for GovCloud and is in scope for that compliance program.

For a list of AWS services in scope of specific compliance programs, see . For general information, see .

Your compliance responsibility when using Compute Optimizer is determined by the sensitivity of your data, your company's compliance objectives, and applicable laws and regulations. AWS provides the following resources to help with compliance:

- – This collection of workbooks and guides might apply to your industry and location.
- Evaluating Resources with Rules in the *AWS Config Developer Guide* – The AWS Config service assesses how well your resource configurations comply with internal practices, industry guidelines, and regulations.

Monitoring Compute Optimizer Automation

Monitoring is an important part of maintaining the reliability, availability, and performance of Compute Optimizer Automation and your other AWS solutions. AWS provides the following monitoring tools to watch Compute Optimizer Automation, report when something is wrong, and take automatic actions when appropriate:

- *AWS CloudTrail* captures API calls and related events made by or on behalf of your AWS account and delivers the log files to an Amazon S3 bucket that you specify. You can identify which users and accounts called AWS, the source IP address from which the calls were made, and when the calls occurred. For more information, see the AWS CloudTrail User Guide.

Amazon EventBridge is a serverless event bus service that makes it easy to connect your applications with data from a variety of sources. EventBridge delivers a stream of real-time data from your own applications, Software-as-a-Service (SaaS) applications, and AWS services and routes that data to targets such as Lambda. This enables you to monitor events that happen in services, and build event-driven architectures. For more information, see the Amazon EventBridge User Guide.

Logging AWS Compute Optimizer Automation API calls using AWS CloudTrail

AWS Compute Optimizer Automation is integrated with AWS CloudTrail, a service that provides a record of actions taken by a user, role, or an AWS service. CloudTrail captures all API calls for Compute Optimizer Automation as events. The calls captured include calls from the Compute Optimizer Automation console and code calls to the Compute Optimizer Automation API operations. Using the information collected by CloudTrail, you can determine the request that was made to Compute Optimizer Automation, the IP address from which the request was made, when it was made, and additional details.

Every event or log entry contains information about who generated the request. The identity information helps you determine the following:

- Whether the request was made with root user or user credentials.
- Whether the request was made on behalf of an IAM Identity Center user.
- Whether the request was made with temporary security credentials for a role or federated user.
- Whether the request was made by another AWS service.

CloudTrail is active in your AWS account when you create the account and you automatically have access to the CloudTrail **Event history**. The CloudTrail **Event history** provides a viewable, searchable, downloadable, and immutable record of the past 90 days of recorded management events in an AWS Region. For more information, see Working with CloudTrail Event history in the *AWS CloudTrail User Guide*. There are no CloudTrail charges for viewing the **Event history**.

For an ongoing record of events in your AWS account past 90 days, create a trail or a CloudTrail Lake event data store.

CloudTrail trails

A *trail* enables CloudTrail to deliver log files to an Amazon S3 bucket. All trails created using the AWS Management Console are multi-Region. You can create a single-Region or a multi-Region trail by using the AWS CLI. Creating a multi-Region trail is recommended because you capture activity in all AWS Regions in your account. If you create a single-Region trail, you can view only the events logged in the trail's AWS Region. For more information about trails, see Creating a trail for your AWS account and Creating a trail for an organization in the *AWS CloudTrail User Guide*.

You can deliver one copy of your ongoing management events to your Amazon S3 bucket at no charge from CloudTrail by creating a trail, however, there are Amazon S3 storage charges. For more information about CloudTrail pricing, see AWS CloudTrail Pricing. For information about Amazon S3 pricing, see Amazon S3 Pricing.

CloudTrail Lake event data stores

CloudTrail Lake lets you run SQL-based queries on your events. CloudTrail Lake converts existing events in row-based JSON format to Apache ORC format. ORC is a columnar storage format that is optimized for fast retrieval of data. Events are aggregated into *event data stores*, which are immutable collections of events based on criteria that you select by applying advanced event selectors. The selectors that you apply to an event data store control which events persist and are available for you to query. For more information about CloudTrail Lake, see Working with AWS CloudTrail Lake in the *AWS CloudTrail User Guide*.

CloudTrail Lake event data stores and queries incur costs. When you create an event data store, you choose the pricing option you want to use for the event data store. The pricing option determines the cost for ingesting and storing events, and the default and maximum retention period for the event data store. For more information about CloudTrail pricing, see AWS CloudTrail Pricing.

Compute Optimizer Automation management events in CloudTrail

Management events provide information about management operations that are performed on resources in your AWS account. These are also known as control plane operations. By default, CloudTrail logs management events.

AWS Compute Optimizer Automation logs all Compute Optimizer Automation control plane operations as management events. For a list of the AWS Compute Optimizer Automation control plane operations that Compute Optimizer Automation logs to CloudTrail, see the AWS Compute Optimizer Automation API Reference.

Compute Optimizer Automation event examples

An event represents a single request from any source and includes information about the requested API operation, the date and time of the operation, request parameters, and so on. CloudTrail log files aren't an ordered stack trace of the public API calls, so events don't appear in any specific order.

The following example shows a CloudTrail event that demonstrates the `ThrottlingException` operation.


```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "EXAMPLEAIZ5FYRFP3POCC:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T20:23:42Z",
                "mfaAuthenticated": "false"
            }
```

```
        }
    },
    "eventTime": "2025-11-06T19:50:12Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "GetEnrollmentConfiguration",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "2f3a4012-f005-4d83-9042-1639a80c54ce",
    "eventID": "29ea5225-2dd6-486f-9bfe-caf7a81c3bab",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "errorCode": "ThrottlingException",
    "requestParameters": null,
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `AccessDenied` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "EXAMPLEAIZ5FYRFP3POCC:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/ReadOnly/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
```

```
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/ReadOnly",
                "accountId": "111122223333",
                "userName": "ReadOnly"
            },
            "attributes": {
                "creationDate": "2025-11-06T19:48:45Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T19:50:12Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "GetEnrollmentConfiguration",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "3f4a5013-f106-4e84-9143-1740b91d55df",
    "eventID": "30fb6336-3ee7-597g-0cgf-dbg8b92d4cbc",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "errorCode": "AccessDenied",
    "errorMessage": "User: arn:aws:sts::111122223333:assumed-role/ReadOnly/john-doe
 is not authorized to perform: aco-automation:GetEnrollmentConfiguration because no
 identity-based policy allows the aco-automation:GetEnrollmentConfiguration action",
    "requestParameters": null,
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```


The following example shows a CloudTrail event that demonstrates the `NetworkEvent` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "EXAMPLEAIZ5FYRFP3POCC:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-07T04:23:51Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-05T20:23:48Z",
    "eventSource": "aco-automation.amazonaws.com",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "4g5b6024-g217-5f95-0254-2851c02e66eg",
    "eventID": "41gc7447-4ff8-608h-1dgh-ech9c03e5dcd",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "eventName": "GetEnrollmentConfiguration",
    "requestParameters": null,
    "responseElements": null,
    "sharedEventID": "c50cba87-2fb0-4458-b9fb-3c5e0f077718",
```

```
    "vpcEndpointId": "AWS Internal",
    "vpcEndpointAccountId": "AWS Internal",
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }

}
```

The following example shows a CloudTrail event that demonstrates the `GetEnrollmentConfiguration` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
       "principalId": "EXAMPLEAIZ5FYRFP3POCC:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/
AuthenticatedComputeOptimizerRole/MettleCanary",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "AROASVBPKTAKQR6L32DI4",
                "arn": "arn:aws:iam::111122223333:role/
AuthenticatedComputeOptimizerRole",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-05T20:23:45Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-05T20:23:48Z",
    "eventSource": "aco-automation.amazonaws.com",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
```

```
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "5h6c7135-h328-6ga6-1365-3962d13f77fh",
    "eventID": "52hd8558-5gg9-719i-2ehi-fdi0d14f6ede",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "eventName": "GetEnrollmentConfiguration",
    "requestParameters": null,
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `ListAccounts` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
       "type": "AssumedRole",
       "principalId": "EXAMPLEAIZ5FYRFP3POCC:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/
AuthenticatedComputeOptimizerRole/MettleCanary",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/
AuthenticatedComputeOptimizerRole",
                "accountId": "111122223333",
                "userName": "AuthenticatedComputeOptimizerRole"
            },
```

```
            "attributes": {
                "creationDate": "2025-11-05T20:23:45Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-05T20:23:48Z",
    "eventSource": "aco-automation.amazonaws.com",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "6i7d8246-i439-7hb7-2476-4073e24g88gi",
    "eventID": "63ie9669-6hh0-820j-3fij-gej1e25g7fef",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "eventName": "ListAccounts",
    "requestParameters": {
        "maxResults": 50
    },
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `GetAutomationRule` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
```

```
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "abcdef01234567890;",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
"eventTime": "2025-11-06T04:24:01Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "GetAutomationRule",
    "awsRegion": "us-east-1",
        "eventTime": "2025-11-06T04:24:01Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "GetAutomationRule",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "7j8e9357-j540-8ic8-3587-5184f35h99hj",
    "eventID": "74jf0770-7ii1-931k-4gjk-hfk2f36h8gfg",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "ruleArn": "arn:aws:compute-optimizer::123456789012:automation-
rule/123AbcdEfGHi1jkL"
    },
    "responseElements": null,
    "tlsDetails": {
```

```
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `ListAutomationRules` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:21:59Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "ListAutomationRules",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "8k9f0468-k651-9jd9-4698-6295g46i00ik",
```

```
    "eventID": "85kg1881-8jj2-042l-5hkl-igl3g47i9hgh",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": null,
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `ListTagsForResource` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:33:00Z",
    "eventSource": "aco-automation.amazonaws.com",
```

```
    "eventName": "ListTagsForResource",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "9l0g1579-l762-0ke0-5709-7306h57j11jl",
    "eventID": "96lh2992-9kk3-153m-6ilm-jhm4h58j0ihi",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "resourceArn": "arn:aws:compute-optimizer::111122223333:automation-
rule/035Pcy46SStQHe0A"
    },
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```


The following example shows a CloudTrail event that demonstrates the `ListAutomationRulePreview` operation.


```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
```

```
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T19:31:22Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T19:31:28Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "ListAutomationRulePreview",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "0m1h2680-m873-1lf1-6810-8417i68k22km",
    "eventID": "07mi3003-0ll4-264n-7jmn-kin5i69k1jij",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true, Note: Please be mindful when interacting with displayed
 links.
"recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "ruleType": "OrganizationRule",
        "organizationScope": {
            "accountIds": [
                "535045952558"
            ]
        },
        "recommendedActionTypes": [
            "UpgradeEbsVolumeType",
            "SnapshotAndDeleteUnattachedEbsVolume"
        ],
        "criteria": {
            "region": [{
                "comparison": "StringEquals",
                "values": [
                    "us-east-1",
```

```
                    "us-west-2"
                ]
            }],
            "resourceArn": [{
                "comparison": "StringLike",
                "values": [
                    "vol-"
                ]
            }]
        },
        "maxResults": 100
    },
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `ListAutomationRulePreviewSummaries` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T19:14:49Z",
                "mfaAuthenticated": "false"
```

```
            }
        }
    },
    "eventTime": "2025-11-06T19:21:52Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "ListAutomationRulePreviewSummaries",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "1n2i3791-n984-2mg2-7921-9528j79l33ln",
    "eventID": "18nj4114-1mm5-375o-8kon-ljo6j70l2kjk",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",

    "requestParameters": {
        "ruleType": "AccountRule",
        "recommendedActionTypes": [
            "SnapshotAndDeleteUnattachedEbsVolume"
        ]
    },
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `ListRecommendedActions` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
```

```
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:27:20Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "ListRecommendedActions",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "2o3j4802-o095-3nh3-8032-0639k80m44mo",
    "eventID": "29ok5225-2nn6-486p-9lop-mqp7k81m3lkl",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": null,
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `ListRecommendedActionSummaries` operation.


```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:31:59Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "ListRecommendedActionSummaries",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "3p4k5913-p106-4oi4-9143-1740l91n55np",
    "eventID": "30pl6336-3oo7-597q-0dqp-nrq8l92n4mlm",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
```

```
    "requestParameters": null,
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `GetAutomationEvent` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:25:20Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "GetAutomationEvent",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
```

```
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "4q5l6024-q217-5pj5-0254-2851m02o66oq",
    "eventID": "41qm7447-4pp8-608r-1eqr-srr9m03o5nmn",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "eventId": "a12cb3d4e5f67g0h"
    },
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `ListAutomationEvents` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
```

```
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:24:32Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "ListAutomationEvents",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "5r6m7135-r328-6qk6-1365-3962n13p77pr",
    "eventID": "52rn8558-5qq9-719s-2frs-tss0n14p6ono",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": null,
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `ListAutomationEventSteps` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
```

```
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:28:10Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "ListAutomationEventSteps",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "6s7n8246-s439-7rl7-2476-4073o24q88qs",
    "eventID": "63so9669-6rr0-820t-3gst-utt1o25q7pop",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "eventId": "a12cb3d4e5f67g0h"
    },
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `ListAutomationEventSummaries` operation.


```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:31:03Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "ListAutomationEventSummaries",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "7t8o9357-t540-8sm8-3587-5184p35r99rt",
    "eventID": "74tp0770-7ss1-931u-4htu-vuv2p36r8qpq",
    "readOnly": true,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
```

```
    "requestParameters": null,
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `UpdateEnrollmentConfiguration` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
       "principalId": "EXAMPLEAIZ5FYRFP3POCC:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/
AuthenticatedComputeOptimizerRole/MettleCanary",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/
AuthenticatedComputeOptimizerRole",
                "accountId": "111122223333",
                "userName": "USER NAME"
            },
            "attributes": {
                "creationDate": "2025-11-05T20:23:45Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-05T20:23:46Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "UpdateEnrollmentConfiguration",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
```

```
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "8u9p0468-u651-9tn9-4698-6295q46s00su",
    "eventID": "85uq1881-8tt2-042v-5iuv-wvw3q47s9rqr",
    "readOnly": false,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "status": "Active",
        "clientToken": "12345abc-12ab-1234-123a-EXAMPLEeb16b"
    },
    "responseElements": {
        "status": "Active",
        "lastUpdatedTimestamp": "Nov 5, 2025, 8:23:46 PM"
    },
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```


The following example shows a CloudTrail event that demonstrates the `AssociateAccounts` operation.


```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
       "principalId": "EXAMPLEAIZ5FYRFP3POCC:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/
AuthenticatedComputeOptimizerRole/MettleCanary",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
```

```
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/
AuthenticatedComputeOptimizerRole",
                "accountId": "111122223333",
                "userName": "AuthenticatedComputeOptimizerRole"
            },
            "attributes": {
                "creationDate": "2025-11-05T20:23:45Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-05T20:23:45Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "AssociateAccounts",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "9v0q1579-v762-0uo0-5709-7306r57t11tv",
    "eventID": "96vr2992-9uu3-153w-6jvw-xwx4r58t0srs",
    "readOnly": false,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "errorCode": "InvalidParameterValueException",
    "errorMessage": "The management account or the delegated administrator doesn't have
 access to this member account.",
    "requestParameters": {
        "accountIds": [
            "123456789012"
        ],
        "clientToken": "12345abc-12ab-1234-123a-EXAMPLEeb16b"
    },
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
```

```
}
```

The following example shows a CloudTrail event that demonstrates the `DisassociateAccounts` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
       "principalId": "EXAMPLEAIZ5FYRFP3POCC:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/
AuthenticatedComputeOptimizerRole/MettleCanary",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/
AuthenticatedComputeOptimizerRole",
                "accountId": "111122223333",
                "userName": "AuthenticatedComputeOptimizerRole"
            },
            "attributes": {
                "creationDate": "2025-11-05T20:23:45Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-05T20:23:47Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "DisassociateAccounts",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "0w1r2680-w873-1vp1-6810-8417s68u22uw",
    "eventID": "07ws3003-0vv4-264x-7kwx-yxy5s69u1tst",
    "readOnly": false,
```

```
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "accountIds": [
            "123456789012"
        ],
        "clientToken": "12345abc-12ab-1234-123a-EXAMPLEeb16b"
    },
    "responseElements": {
        "accountIds": [
            "123456789012"
        ]
    },
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `CreateAutomationRule` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/*****************",

        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
```

```
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:20:00Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "CreateAutomationRule",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "1x2s3791-x984-2wq2-7921-9528t79v33vx",
    "eventID": "18xt4114-1ww5-375y-8lxy-zyz6t70v2utu",
    "readOnly": false,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "ruleName": "TestRule",
        "ruleType": "AccountRule",
        "recommendedActionTypes": [
            "SnapshotAndDeleteUnattachedEbsVolume"
        ],
        "schedule": {
            "scheduleExpression": "cron(0 2 * * ? *)",
            "scheduleExpressionTimezone": "UTC",
            "executionWindowInMinutes": 60
        },
        "status": "Active",
        "clientToken": "12345abc-12ab-1234-123a-EXAMPLEeb16b"
    },
    "responseElements": {
        "ruleArn": "arn:aws:compute-optimizer::123456789012:automation-
rule/123AbcdEfGHi1jkL",
        "ruleId": "123AbcdEfGHi1jkL",
        "name": "SourabTestRule",
        "ruleType": "AccountRule",
        "ruleRevision": 1,
```

```
        "priority": "1E-30",
        "recommendedActionTypes": [
            "SnapshotAndDeleteUnattachedEbsVolume"
        ],
         "criteria": {
            "region": [{
                "comparison": "StringEquals",
                "values": [
                    "us-east-1"
                ]
            }]
        },
        "clientToken": "12345abc-12ab-1234-123a-EXAMPLEeb16b"
    },
    "responseElements": {
        "ruleArn": "arn:aws:compute-optimizer:us-east-1:111122223333:automation-
rule/123AbcdEfGHi1jkL"
    },
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `DeleteAutomationRule` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
```

```
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:26:15Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "DeleteAutomationRule",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "3z4u5913-z106-4ys4-9143-1740v91x55xz",
    "eventID": "30zv6336-3yy7-597a-0eza-b1b8v92x4wvw",
    "readOnly": false,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "ruleArn": "arn:aws:compute-optimizer::111122223333:automation-
rule/123AbcdEfGHi1jkL"
    },
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```


The following example shows a CloudTrail event that demonstrates the `UpdateAutomationRule` operation.

```
        {
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:22:30Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "UpdateAutomationRule",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/ComputeOptimizerAutomation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x8664 lang/java#17.0.16 md/OpenJDK64-
BitServerVM#17.0.16+8-LTS md/vendor#Amazon.comInc. md/enUS md/kotlin/1.9.21-release-633
 exec-env/AWSLambdajava17 m/E,N,i",
    "requestID": "2y3t4802-y095-3xr3-8032-0639u80w44wy",
    "eventID": "29yu5225-2xx6-486z-9myz-a0a7u81w3vuv",
    "readOnly": false,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "ruleArn": "arn:aws:compute-optimizer:us-east-1:123456789012:automation-
rule/123AbcdEfGHi1jkL",
        "status": "Active"
    },
```

```
    "responseElements": {
        "ruleArn": "arn:aws:compute-optimizer:us-east-1:123456789012:automation-
rule/123AbcdEfGHi1jkL"
    },
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLSAES128GCMSHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `TagResource` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:22:37Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "TagResource",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/Compute_Optimizer_Automation#2.37.x-SNAPSHOT
```

```
 os/Linux#5.10.244-267.968.amzn2.x86_64 lang/java#17.0.16 md/OpenJDK_64-
Bit_Server_VM#17.0.16+8-LTS md/vendor#Amazon.com_Inc. md/en_US md/kotlin/1.9.21-
release-633 exec-env/AWS_Lambda_java17 m/E,N,i",
    "requestID": "6c7x8246-c439-7bv7-2476-4073y24a99ab",
    "eventID": "63cy9669-6bb0-820d-3hcd-ede2y25a7bab",
    "readOnly": false,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "resourceArn": "arn:aws:compute-optimizer::111122223333:automation-
rule/123AbcdEfGHi1jkL",
        "ruleRevision": 1,
        "tags": [{
            "key": "test",
            "value": "cloudtrail"
        }]
    },
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLS_AES_128_GCM_SHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `UntagResource` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID"
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
```

```
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:33:09Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "UntagResource",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/Compute_Optimizer_Automation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x86_64 lang/java#17.0.16 md/OpenJDK_64-
Bit_Server_VM#17.0.16+8-LTS md/vendor#Amazon.com_Inc. md/en_US md/kotlin/1.9.21-
release-633 exec-env/AWS_Lambda_java17 m/E,N,i",
    "requestID": "7d8y9357-d540-8cw8-3587-5184z35b00bc",
    "eventID": "74dz0770-7cc1-931e-4ide-fef3z36b8cbc",
    "readOnly": false,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "resourceArn": "arn:aws:compute-optimizer::111122223333:automation-
rule/123AbcdEfGHi1jkL",
        "ruleRevision": 2,
        "tagKeys": [
            "test"
        ]
    },
    "responseElements": null,
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLS_AES_128_GCM_SHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `RollbackAutomationEvent` operation.


```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T19:31:22Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T19:35:59Z",
    "eventSource": "aco-automation.amazonaws.com",
    "eventName": "RollbackAutomationEvent",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/Compute_Optimizer_Automation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x86_64 lang/java#17.0.16 md/OpenJDK_64-
Bit_Server_VM#17.0.16+8-LTS md/vendor#Amazon.com_Inc. md/en_US md/kotlin/1.9.21-
release-633 exec-env/AWS_Lambda_java17 m/E,N,i",
    "requestID": "8e9z0468-e651-9dx9-4698-6295a46c11cd",
    "eventID": "85ea1881-8dd2-042f-5jef-gfg4a47c9dcd",
    "readOnly": false,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
```

```
    "requestParameters": {
        "eventId": "a52cb5d6d8f24e0c",
        "clientToken": "a1b2c3d4-5678-90ab-cdef-EXAMPLE11111"
    },
    "responseElements": {
        "eventId": "a52cb5d6d8f24e0c",
        "eventStatus": "ROLLBACK_READY"
    },
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLS_AES_128_GCM_SHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```

The following example shows a CloudTrail event that demonstrates the `StartAutomationEvent` operation.

```
{
    "eventVersion": "1.11",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "abcdef01234567890;:john-doe",
        "arn": "arn:aws:sts::111122223333:assumed-role/Admin/john-doe",
        "accountId": "111122223333",
        "accessKeyId": "ACCESS KEY ID"
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "EXAMPLEAIZ5FYRFP3POCC",
                "arn": "arn:aws:iam::111122223333:role/Admin",
                "accountId": "111122223333",
                "userName": "Admin"
            },
            "attributes": {
                "creationDate": "2025-11-06T04:19:48Z",
                "mfaAuthenticated": "false"
            }
        }
    },
    "eventTime": "2025-11-06T04:27:46Z",
    "eventSource": "aco-automation.amazonaws.com",
```

```
    "eventName": "StartAutomationEvent",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "100.26.200.255",
    "userAgent": "canary-generated aws-sdk-java/2.35.11 md/io#sync md/
http#Apache md/internal ua/2.1 api/Compute_Optimizer_Automation#2.37.x-SNAPSHOT
 os/Linux#5.10.244-267.968.amzn2.x86_64 lang/java#17.0.16 md/OpenJDK_64-
Bit_Server_VM#17.0.16+8-LTS md/vendor#Amazon.com_Inc. md/en_US md/kotlin/1.9.21-
release-633 exec-env/AWS_Lambda_java17 m/E,N,i",
    "requestID": "9f0a1579-f762-0ey0-5709-7306b57d22de",
    "eventID": "96fb2992-9ee3-153g-6kfg-hgh5b58d0ede",
    "readOnly": false,
    "eventType": "AwsApiCall",
    "managementEvent": true,
    "recipientAccountId": "111122223333",
    "eventCategory": "Management",
    "requestParameters": {
        "recommendedActionId": "aa112223333a4444"
    },
    "responseElements": {
            "recommendedActionId": "aa112223333a4444",
            "eventId": "a12cb3d4e5f67g0h",
            "status": "READY"
        }
    },
    "tlsDetails": {
        "tlsVersion": "TLSv1.3",
        "cipherSuite": "TLS_AES_128_GCM_SHA256",
        "clientProvidedHostHeader": "aco-automation-gamma.us-east-1.amazonaws.com"
    }
}
```


For information about CloudTrail record contents, see CloudTrail record contents in the *AWS CloudTrail User Guide*.

Document history for AWS Compute Optimizer

The following table describes the documentation for this release of AWS Compute Optimizer.

- **API version:** 2019-11-30
- **Latest documentation update:** August 15, 2022

The following table describes the documentation for this release of Compute Optimizer.

Change	Description	Date
Compute Optimizer generates commercial software license recommendations	Compute Optimizer now generates license recommendations for commercial software that run on Amazon EC2. Compute Optimizer only provides Microsoft SQL Server license recommendations. For more information, see Viewing commercial software license recommendations.	August 28, 2023
AWS Graviton based instance recommendations	Compute Optimizer now provides the price and performance impact for running your workload on AWS Graviton based instances. For more information, see AWS Graviton-based instance recommendations. If your account is your organization's management account, you can now also view the member accounts of an organization that are opted in to Compute Optimizer.	August 26, 2021

	For more information, see Viewing the accounts opted in to AWS Compute Optimizer.	
Recommendations export for Amazon EBS volumes and Lambda functions	You can now export recommendations for Amazon EBS volumes and Lambda functions to Amazon S3. For more information, see Exporting recommendations.	May 18, 2021
Adding documentation for AWS managed policies	Compute Optimizer now tracks changes for its AWS managed policies. For more information, see AWS managed policies for AWS Compute Optimizer.	May 18, 2021