

How To Use This Course

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Lesson 7 - The Value of Performance

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## Available Tools

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John has been paying close attention to what Arnav said about the value of compute and how performance and costs need to balance out. He really wants to know how he can balance these options. Sofia suggested a list of tools for him to review. These tools should help him rightsize his workloads and try to determine the cost associated with each instance type. Let's review these tools with John and see what he discovers.

### AWS Compute Optimizer

AWS Compute Optimizer is a right-sizing recommendation tool that you can use to improve your AWS infrastructure efficiency. Compute Optimizer analyzes the configuration and utilization metrics of your current resources and then generates recommendations for more optimal configurations by considering both cost and performance. It evaluates your resources using your default Amazon CloudWatch metrics to analyze usage patterns from data acquired over the previous 14 days. The service has no additional charge by default.

To learn how Compute Optimizer works, choose each of the following five numbered markers in order.

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graph LR
    1[1 Get started] --> 2[AWS Compute Optimizer]
    2 --> 3[Resource analysis  
Resource configuration  
Utilization data  
Recommendations]
    3 --> 4[4 Cross-service integration]
    4 --> 5[5 Reconfigure resources]
  
```

By applying knowledge gathered from business experience that Amazon itself has gained in running diverse workloads in the cloud, Compute Optimizer identifies workload patterns and recommends optimal AWS resources. Compute Optimizer analyzes your workload to identify dozens of defining characteristics, such as, if it is CPU intensive, if it exhibits a daily pattern, or if a workload accesses local storage frequently.

The service processes these characteristics and identifies the hardware resource required by the workload. Compute Optimizer then infers how the workload would have performed on various hardware platforms (for example, EC2 instance types) or using different configurations to offer recommendations.

### Findings

Compute Optimizer classifies its findings for EC2 instances into four categories. To learn more, expand each of the following four categories.

**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 performance 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. An optimized EC2 instance runs your workloads with optimal performance and infrastructure cost. For optimized instances, Compute Optimizer might sometimes recommend a new generation instance type.

**None**

There are no recommendations for this instance. This might occur if you've been opted in to Compute Optimizer for less than 12 hours, or when the instance has been running for less than 30 hours, or when the instance type is not supported by Compute Optimizer.

To learn more about Compute Optimizer and how to optimize your workloads, see the re:Invent session, [Optimizing resources efficiency with AWS Compute Optimizer](#).

### Demo: AWS Compute Optimizer

For an introduction and overview of the Compute Optimizer dashboard, choose play.

# Demo: AWS Compute Optimizer

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## Demo transcript

Introduction to AWS Compute Optimizer for Amazon EBS

This demonstration is an introduction to the features and options available in AWS Compute Optimizer for Amazon EC2. In this demonstration, you learn how to interact with the Compute Optimizer dashboard and learn about the recommendations, filters, and currently available features.

To begin, sign in to the AWS Management Console using a login with administrator-level permissions. Navigate to the Services menu. Under Management and Governance, select AWS Compute Optimizer.

If you have not previously used Compute Optimizer, you are directed to this AWS Compute Optimizer page. Select Get Started. Here, the screen tells you about opting into Compute Optimizer and how AWS might use up to 14 days of CloudWatch metrics to build your recommendations. It also tells you that a new service-linked role will be created in your account to provide Compute Optimizer with read-only access to your AWS resources and CloudWatch metrics. To opt-in, choose the Opt in button.

For the purposes of this demo, Amazon EC2 instances were created and allowed to run over a period of three days. When opting into Compute Optimizer it will take 12 hours for the analytics to run on your environment. None of your services will be affected during this time as Compute Optimizer uses historic metrics to make its determination of what can be optimized.

When the Compute Optimizer console opens, you can see the default Dashboard. AWS Compute Optimizer is a global service and shows information for all of your regions. You have the option of filtering for just one specific region and choosing only the analysis of that region to review. If you select the gear icon, you are given the option to filter for cost savings or performance efficiency.

Move down the page, to the Performance improvement opportunity section. This summarizes under-provisioned resources in the account that Compute Optimizer found to be at risk of not meeting the performance needs of your workloads. These resources might require more capacity than they currently have.

In the next section there are four currently available options: Amazon EC2, Auto Scaling groups, EBS volumes, and Lambda functions. This environment doesn't have any Auto Scaling groups or Lambda functions and so a (0) zero is displayed.

Under EC2 Instances, select View recommendations. When the Recommendations for EC2 instances dashboard opens, select the Info link. This link opens a sidebar with information explaining how to use this page and where you can find additional information. Close the information sidebar, and return to the main dashboard.

The dashboard displays a number of default columns. Select the GEAR icon. This option allows you to modify the list of columns visible in the dashboard. You can toggle the individual columns to add or remove them from your dashboard view. You can also view the dashboard by purchasing option, allowing you to view on-demand instances, Reserved instances, or to exclude instances belonging to an Auto Scaling group. Close the preferences window.

In the Recommendations for EC2 instances, locate the Finding column. This column displays the optimization classification that Compute Optimizer has assigned to your instance and will read Optimized, Under-provisioned, or Over-provisioned. You can select the Info link beside each column to learn more about that column. For now, select Under-provisioned.

Under Instance at the top of the dashboard, you can see the findings. Here, Compute Optimizer found that this instance's CPU, EBS throughput and EBS IOPS are under provisioned. Below this description is the Recommendation preferences, where you can turn on Enhanced infrastructure metrics to deeper metrics analysis. There is a fee for using this option.

Locate the Compare current instance type with recommended options heading. Here, Compute Optimizer provides you with three recommended instance types. The first, Option 1, is a t3.micro. It shows the instance price, the Price difference, and the performance risk which is Very low. The Performance risk indicates the likelihood that the recommended instance type will not meet the resource needs of your workload.

If you scroll to the right, you'll notice additional columns such as Migration effort, which estimates how hard it'll be to move to this recommended instance type. Platform differences, which gives you data on the underlying hardware differences of this recommended instance. And then you have the number of vCPUs, Memory, Storage, and Network.

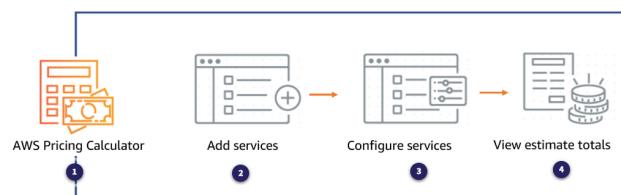
In the Compare section, Compute Optimizer compares the analyzed performance taking both the current and the recommended instance characteristics into consideration. You can see the current values in blue and the recommended Option 1 values in orange.

AWS Compute Optimizer is an easy way to check the provisioned resources to ensure they are not over or underutilized. The free tool can help you optimize and right size your environment and provides actionable feedback and suggestions. It's a great tool to have in your toolbox. This concludes the Introduction to AWS Compute Optimizer for Amazon EC2. Thank you for watching.

## Pricing calculator

AWS Pricing Calculator is a web-based planning tool that you can use to create estimates for your AWS use cases. You can use it to model your solutions before building them, explore the AWS service price points, and review the calculations behind your estimates. You can use it to help you plan how you spend, find cost saving opportunities, and make informed decisions when using AWS.

To learn how AWS Pricing Calculator works, choose each numbered marker in order.



AWS Pricing Calculator is useful for those who have never used AWS. It's also useful for those who want to reorganize or expand their AWS usage. You don't need any experience with the cloud or

AWS to use AWS Pricing Calculator.

With AWS Pricing Calculator, you can do the following tasks:

- **View transparent prices** – View the calculations behind the estimated prices for your service configurations. You can view price estimates by service or by groups of services to analyze your architecture costs.
- **Use groups for hierarchical estimates** – Sort your estimates into groups to align with your architecture for clear service cost analysis.
- **Share your estimates** – Save the link to each estimate to share or revisit at a later time. Estimates are saved to the AWS public servers.
- **Export your estimates** – Export your estimates in comma-separated values (CSV) or portable document format (PDF) files to share locally with your stakeholders.

To start using the tool, see [AWS Pricing Calculator](#).

## Cost Explorer

You can use AWS Cost Explorer to view and analyze your costs and usage. You can view data for up to the last 12 months, forecast how much you're likely to spend for the next 12 months, and get recommendations for what Reserved Instances to purchase. You can use Cost Explorer to identify areas that need further investigation and view trends that you can use to understand your costs.

You can view your costs and usage using the Cost Explorer user interface (UI) at no additional cost. Cost Explorer provides preconfigured views that display at-a-glance information about your cost trends and gives you a head start on customizing views that suit your needs.

The right-sizing recommendations feature in Cost Explorer helps you identify cost-saving opportunities by downsizing or terminating instances in Amazon EC2. Right-sizing recommendations analyze your Amazon EC2 resources and usage to show opportunities for how you can lower your spending. You can see all of your underused EC2 instances across member accounts in a single view to immediately identify how much you can save. After you identify your recommendations, you can take action on the Amazon EC2 console.

## Usage reports and limits

Cost Explorer provides you with a cost and usage reports. You can't modify these reports, but you can use them to create your own custom reports.

- **Daily costs** – This shows how much you've spent in the last 6 months, along with how much you're forecasted to spend over the next month.
- **Monthly costs by linked account** – This shows your costs for the last 6 months, grouped by linked, or member account. The top five member accounts are shown by themselves, and the rest are grouped into one bar.
- **Monthly costs by service** – This shows your costs for the last 6 months, grouped by service. The top five services are shown by themselves, and the rest are grouped into one bar.
- **Monthly EC2 running hours costs and usage** – This shows how much you have spent on active Reserved Instances.

For additional information see [Using the default Cost Explorer reports](#).

Amazon EC2 also provides resources such as images, instances, volumes, and snapshots. When you create your AWS account, a default quota (also referred to a limit) is set on these resources on a per-Region basis. For example, there is a maximum number of instances that you can launch in a single Region. When you launch a new instance in the *US West (Oregon)* Region, the instance will only launch if you are below your limit for the maximum number of instances in that Region.

The Amazon EC2 console provides limit information for the resources managed by the Amazon EC2 and Amazon Virtual Private Cloud (Amazon VPC) consoles. You can request an increase for many of these limits. Use the limit information that we provide to manage your AWS infrastructure.

For additional information on resource limits within AWS and how to locate your limits in the AWS Management Console, see [Amazon EC2 service quotas](#).

## Coffee break

In this lesson, John learned about the different AWS tools available to him to help right-size his instances and compare the costs of different instance types.

In the next lesson, John continues to identify ways to balance price and performance.

