Hello and welcome to the introduction to cloud migration module.

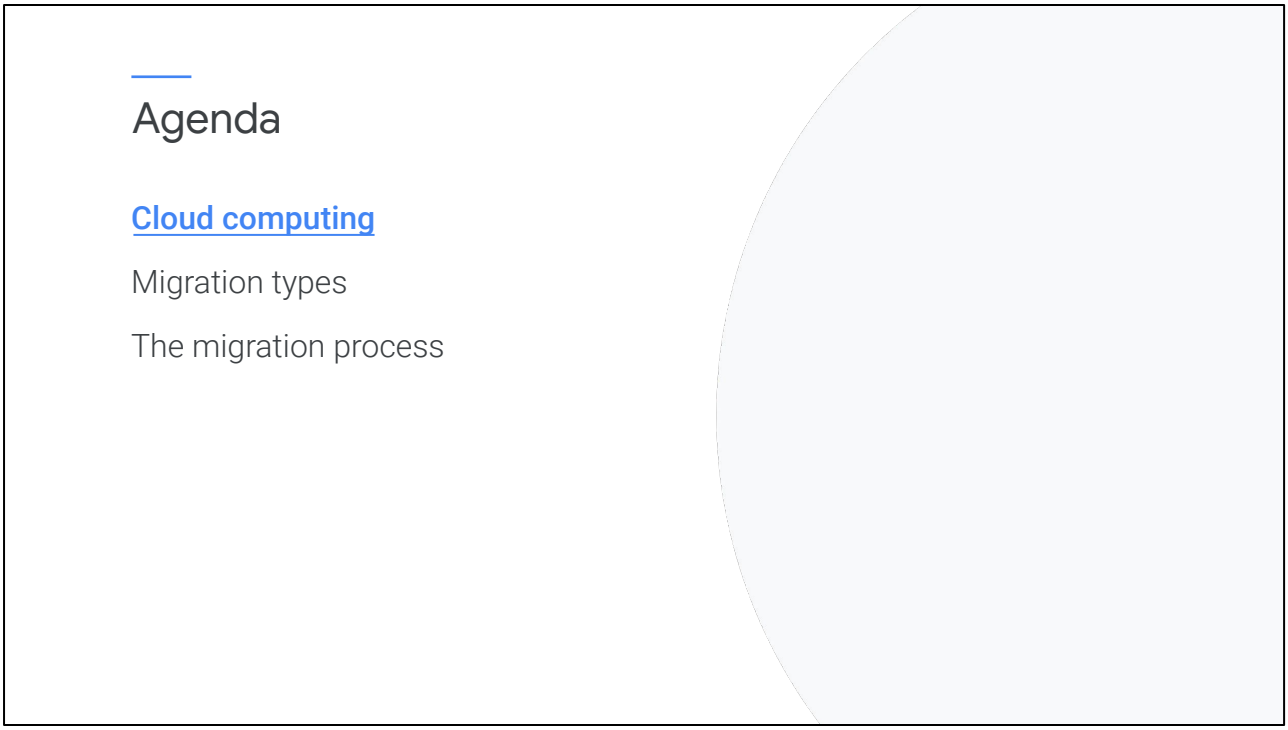
Learn about

Cloud computing characteristics

Reasons to move to the cloud

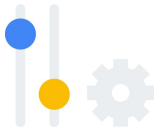
Strategies for migrating to the cloud

In this module, you will learn about cloud computing characteristics, the difference between running your workloads on-premises vs running them in the cloud, reasons to move the cloud, and the common migration strategies to the Cloud.



In this video, you will learn what defines Cloud Computing, the difference in financial expenditure and common reasons to move to the cloud.

What is cloud computing?

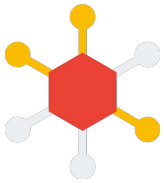


On-demand self-service

No human intervention
needed to get resources

First, computing resources are on-demand and self-service. Cloud-computing customers use an automated interface and get the processing power, storage, and network they need, with no human intervention.

What is cloud computing?



Broad network access

Access from anywhere

Second, resources are accessible over a network from any location, benefiting from an extensive and broad reaching infrastructure.

What is cloud computing?

Resource pooling

Provider shares resources to customers

Providers allocate resources to customers from a large pool, which allows customers to benefit from economies of scale. Customers don’t have to know, or care, about the exact physical location of those resources.

What is cloud computing?

Rapid elasticity

Get more resources quickly as needed

Resources are elastic. Customers who need more resources can get them rapidly. And when they need less, they can scale back.

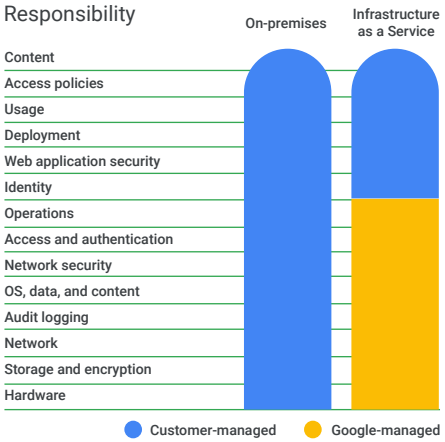
What is cloud computing?

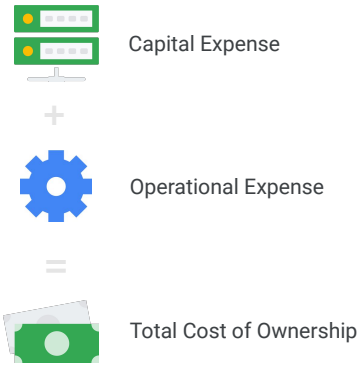
Measured service

Pay only for what
you consume

And finally, customers pay only for what they use or reserve, as they go. If they stop using resources, they simply stop paying for them.

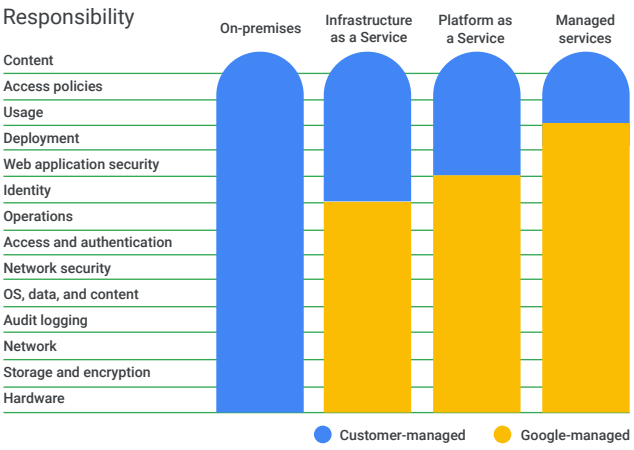
On-premises total cost of ownership





In an on-premises environment, you have full ownership of and responsibility for your hardware. You have to purchase your hardware, which generally involves large asset purchases, paid in a lump sum, that depreciate over time. That is capital expense. In addition, you have to pay for its day-to-day operation, like electricity, and invest in maintaining and securing the hardware throughout its lifecycle, from the physical security of the hardware and the premises in which they are housed, through the encryption of the data on disk, the integrity of your network, maintaining failover, etc. These are called operational expenses. These expenses combine are your total cost of ownership: how much it costs you to run your infrastructure.

Cloud total cost of ownership



Operational Expense

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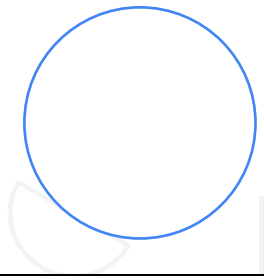
Total Cost of Ownership



When you move an application to Google Cloud, you pay as you go for the resources that you use, without any upfront commitment or obligations. In addition, Google handles many of the lower layers of infrastructure and its security. Because of its scale, Google can deliver a higher level of security at these layers than most of its customers could afford to do on their own.

Common reasons for Moving to the cloud

Refresh Cycle

There are many reasons to move to the cloud. Here are a few examples:

Many enterprises have contracts with private data centers that need to be periodically renewed, or their hardware is approaching end of life. In these times, considerations like cost adjustments or other limiting factors often come up. Consequently, companies tend to reevaluate their cost benefit analysis for running their workloads on-premises and consider the benefits of migrating to the cloud.

Common reasons for Moving to the cloud

Flexibility

Sometimes capacity is needed only at specific times of year, for instance during seasonal peak during the holidays or special events. Companies can benefit from on-demand capacity during these times without paying for it during the rest of the year, thus optimizing their spend and operational efficiency.

Common reasons for Moving to the cloud

Elasticity

Some workloads aren't predictable and non-linear, which can leave you with a choice between over-provisioning resources that tend to be underutilized during quieter times, or under-provisioning and compromising user experience and system stability. Thanks to the elasticity of the cloud, you can increase your capacity or resources based on demand, and dispose of resources when demand decreases. Instead of having to pay the maximum for on-prem capacity, you can adjust your capacity on-demand in the cloud and pay as you go.

Common reasons for Moving to the cloud

Security

With security threats increasing in scale and severity, companies are migrating to the cloud to mitigate risk. Public cloud providers offer vast resources for protecting against threats, more than nearly any single company could invest in.

Agenda

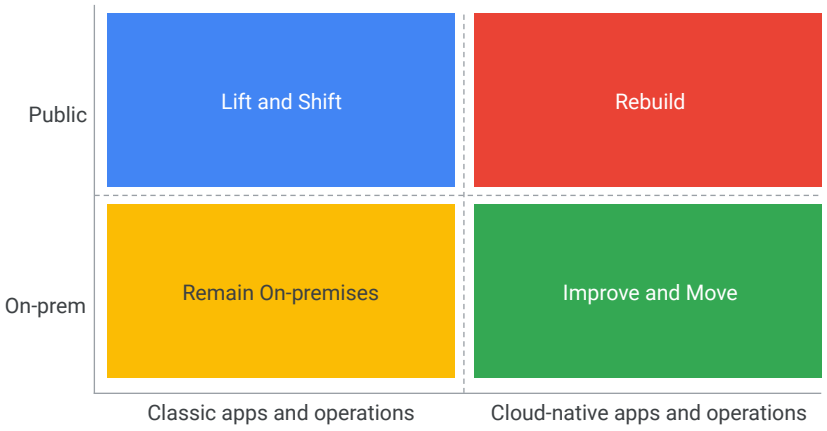
Cloud computing

Migration types

The migration process

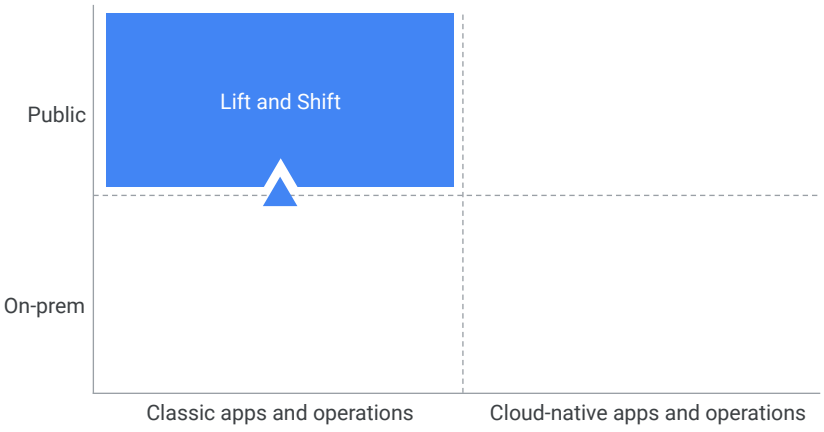
In this video, you will learn the 4 common strategies to migrate your virtual machines to the cloud.

Migration strategies at a glance



When a company considers to migrate to the cloud, they have 4 options: Lift and Shift, which is the main topic of this course, Improve and Move, and Rebuild. In some edge cases, workloads might need to remain on-premises due to technical limitations.

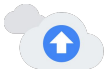
Migration strategies at a glance



Lift and Shift to the cloud provides access to elastic resource allocation, world-leading security, a pay-per-use model, and many other cloud native features, without having to rewrite the application.

Lift and Shift overview

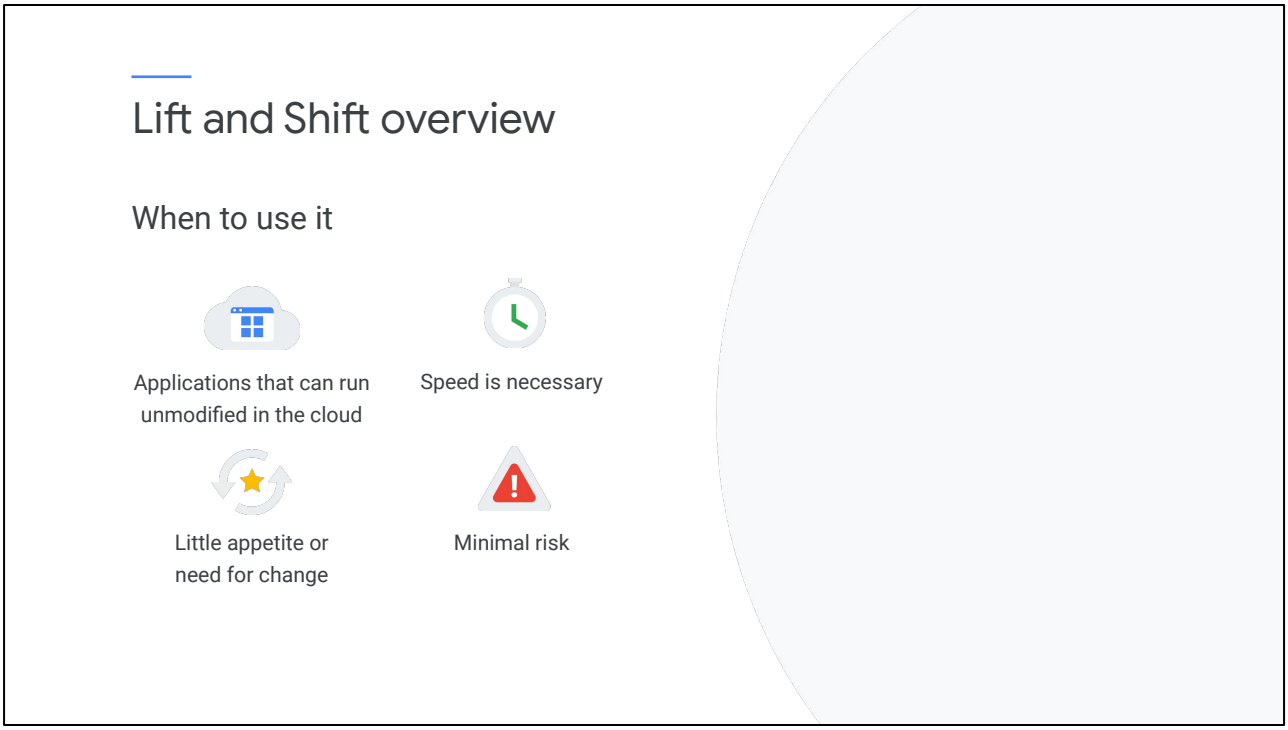
What it is



Moving applications as they exist to the cloud

In a lift and shift migration, you move workloads from a source environment to a target environment with minor or no modifications or refactoring. The modifications you apply to the workloads in order to migrate are only the minimum changes needed in order for the workloads to operate in the target environment.

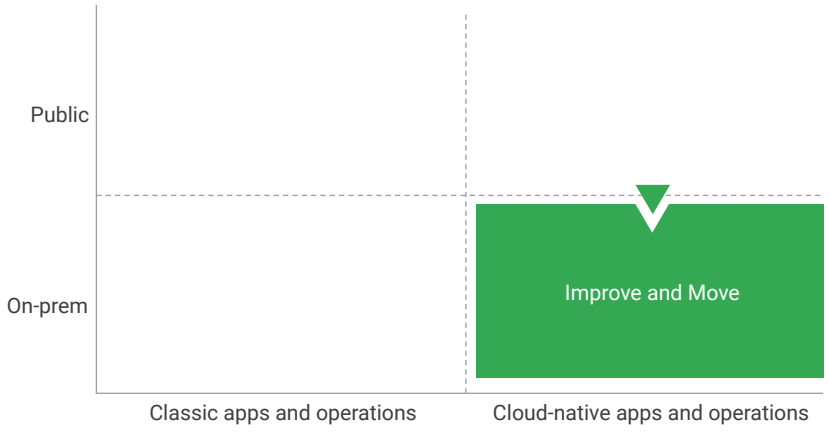
Lift and shift can help companies get into the cloud relatively quickly and with a relatively low-risk way.



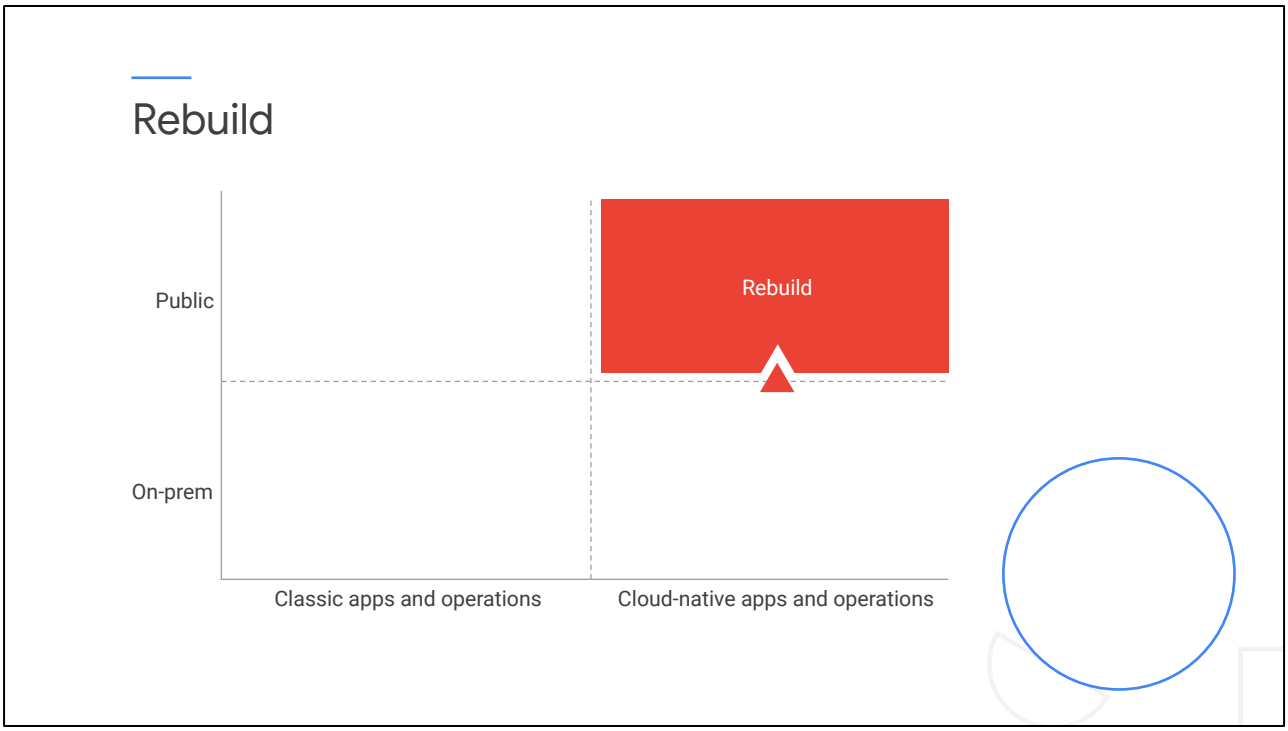
A lift and shift migration is ideal when a workload can operate as-is in the target environment or when there is little or no business need for change. Because you migrate existing workloads with minimal refactoring, lift and shift migrations tend to be the quickest and safest compared to other options.

Lift and shift can also extend the life of applications that have already proven their value. Perhaps they are on aging servers that would need to be replaced or just can't handle the new load—and moving to the cloud might offer solutions to some of the scaling problems, with relatively little in the way of code changes.

Improve and Move



Another migration strategy is an improve and move migration, where you modernize the workload while migrating it. In this type of migration, you modify the workloads to take advantage of cloud-native capabilities, and not just to make them work in the new environment.

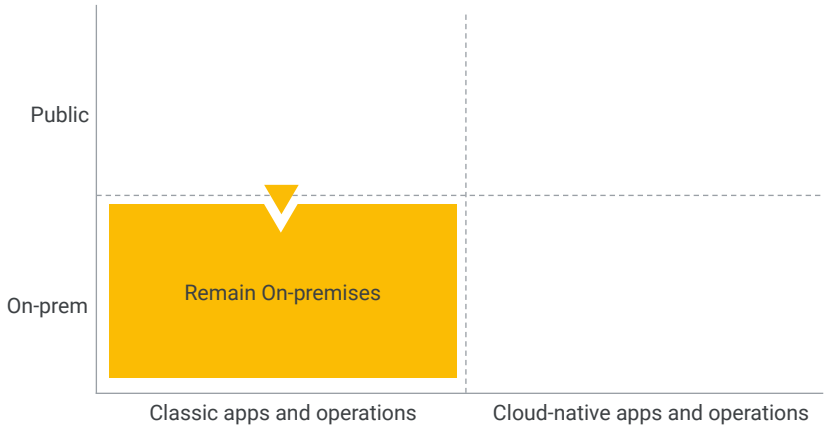


In a Rebuild migration, you decommission an existing app and completely redesign and rewrite it as a cloud-native app.

If the current app isn't meeting your goals—for example, you don't want to maintain it, it's too costly to migrate using one of the previously mentioned approaches, or it's not supported on Google Cloud—you can do a rip and replace migration.

Because both Rebuild and Move and Improve strategies involve code refactoring, they are outside the scope of this course.

Remain On-premises



Finally, sometimes keeping a specific workload on-premises is the only option. It's usually because of technological limitations, for instance:

- Dependency on mainframe machines
- Incompatible licensing and with a Cloud environment
- Compliance constraints like data locality in a specific country that doesn't have a cloud data centers
- Unsupported OS like Windows Desktop images, T servers and Virtual Appliances

Agenda

Cloud computing

Migration types

The migration process

Migrating workloads can be complex. We broke it down to 4 main stages, introduced in this video.

The VM migration process

Assess

Evaluate Your Environment

The first step is Assess, which helps you discover your source environment. Comprehensive lists of servers, storage, usage statistics, applications, operating systems, and licenses are among the key data points to evaluate when identifying which virtual machines are suitable for cloud migration. One of the many environment discovery automation solutions on the market can help build a catalog of your source environment and even make migration recommendations and predict costs in the cloud. We will explore one of these solutions in the next module.

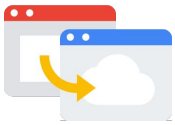
The VM migration process

Prepare

Understand the platform

In the Prepare phase, you learn the foundational knowledge to architect and implement an infrastructure environment on Google Cloud.

The VM migration process



Migrate

Move virtual machines

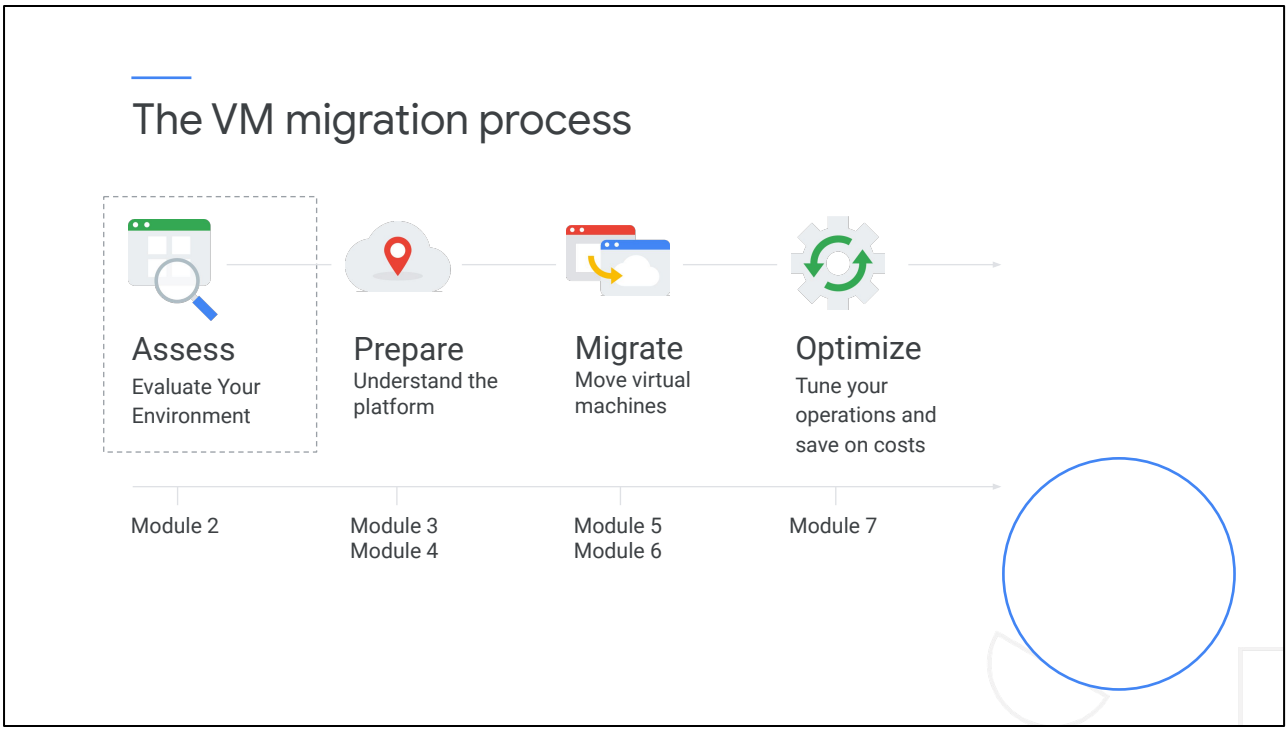
During the Migration Phase, you will configure the migration process, optionally test a solution, and start the migration to the cloud while trying to minimize disruption to your service.

The VM migration process

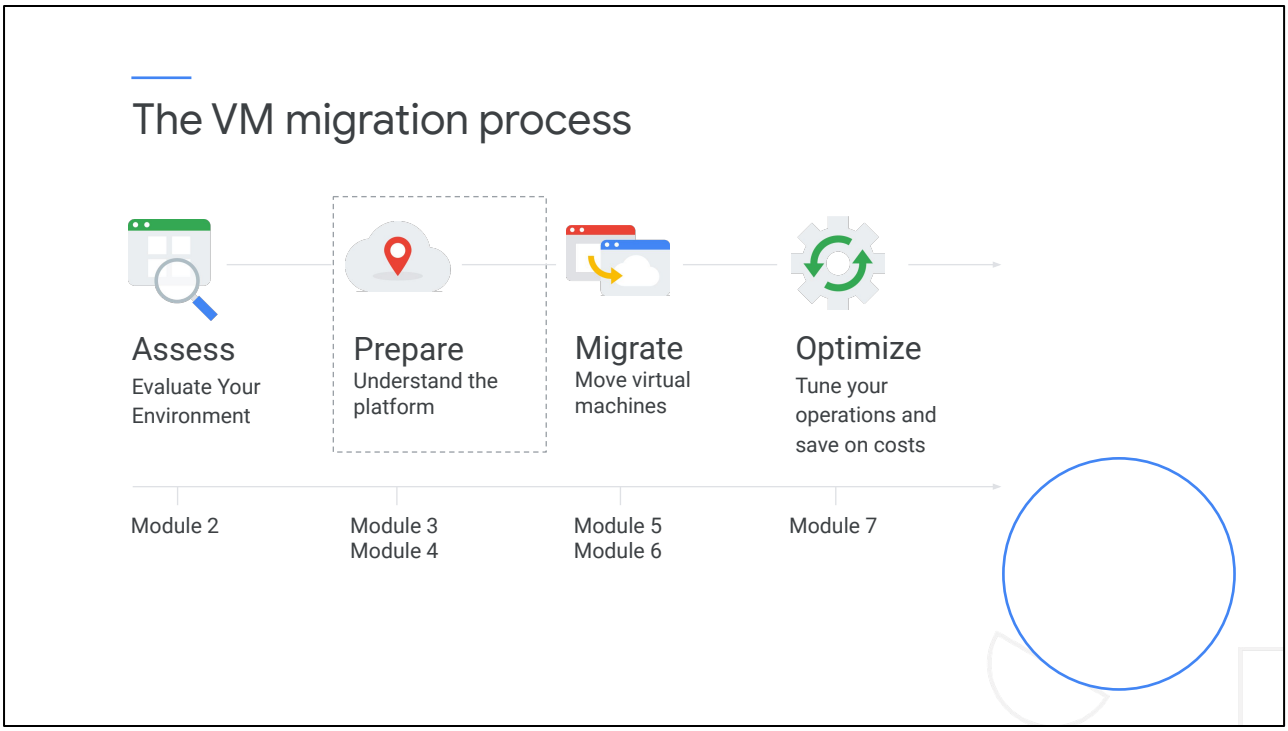
Optimize

Tune your operations and save on costs

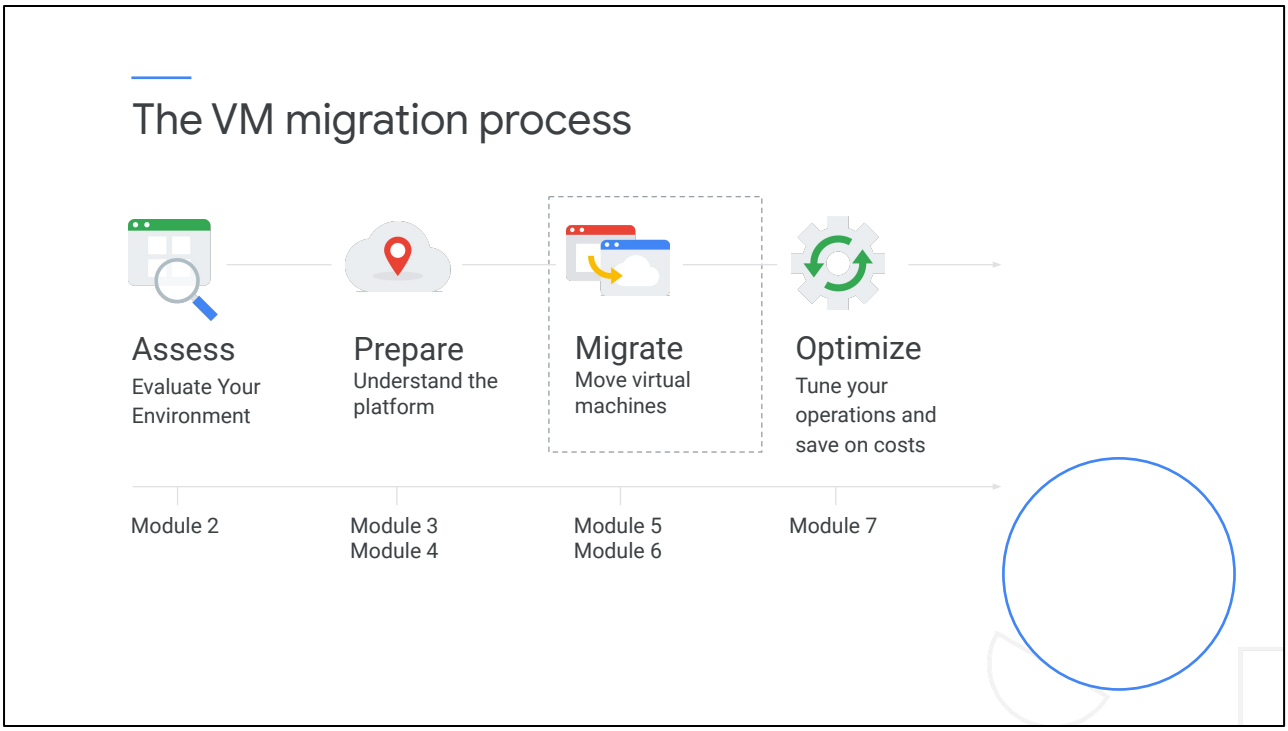
Lastly, during the Optimize phase, after your virtual machines are running successfully in the cloud, you can focus on how to make billing, performance, and process optimization.



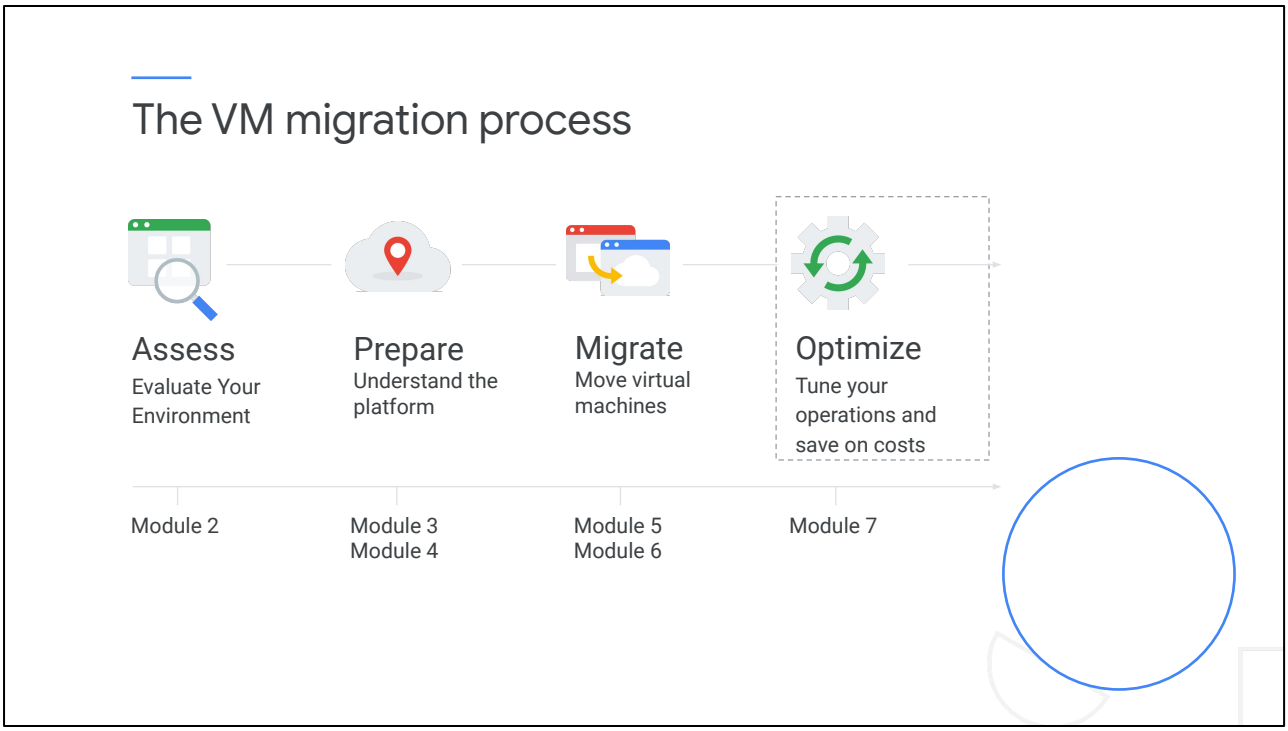
In this course, we start at the Assess phase in Module 2 - Assessing the Source Environment, where you discover the on-premises environment with an easy-to-use automation tool. That will help determine which machines to migrate, make a cost analysis and virtual machine rightsizing recommendation.



We then progress to a Google Cloud specific modules, Module 3 - Google Cloud Fundamentals, and Module 4 - Virtual Machines and Networks in the Cloud. They will cover all you need to know in order to create a solid foundation in the Cloud. If you are already familiar with Google Cloud, you can skip these modules; however, if you are migrating from on-premises or another cloud provider, we recommend going through these modules.



Module 5 focuses on migrating a VM from vSphere on-premises and EC2 VMs on AWS using Migrate for Compute Engine, Google's own workload migration tool. We then discuss governance topics in module 6 like identity, resource hierarchy and network sharing.



After the VMs are migrated, it's time to optimize. In Module 7, you learn how to leverage the elasticity, automation, and globalization of the cloud infrastructure. We will also introduce monitoring and logging using Stackdriver and how to interact with Cloud Support.

In this module, you learned about cloud computing characteristics, the difference between running your workloads on-premises versus running them in the cloud, the reasons why you would want to move your workload to the cloud, and the common migration strategies to achieve this.

One of the first steps in your cloud migration journey is to discover and analyze your source environment. In the next module, we'll introduce you to an assessment automation tool that will assist you to identify which machines you can migrate to the cloud, and predict the total cost of ownership of running those machines in the cloud.

Move on to the next module to learn more.