Welcome to Fundamentals of AWS Pricing.

What you will learn

At the core of the lesson

You will learn how to:

- Describe the AWS pricing model
- Explain the advantages of the AWS pricing model
- Describe the AWS Free Tier offer
- Explain the concept of total cost of ownership (TCO)
- Identify the purpose of the AWS Pricing Calculator

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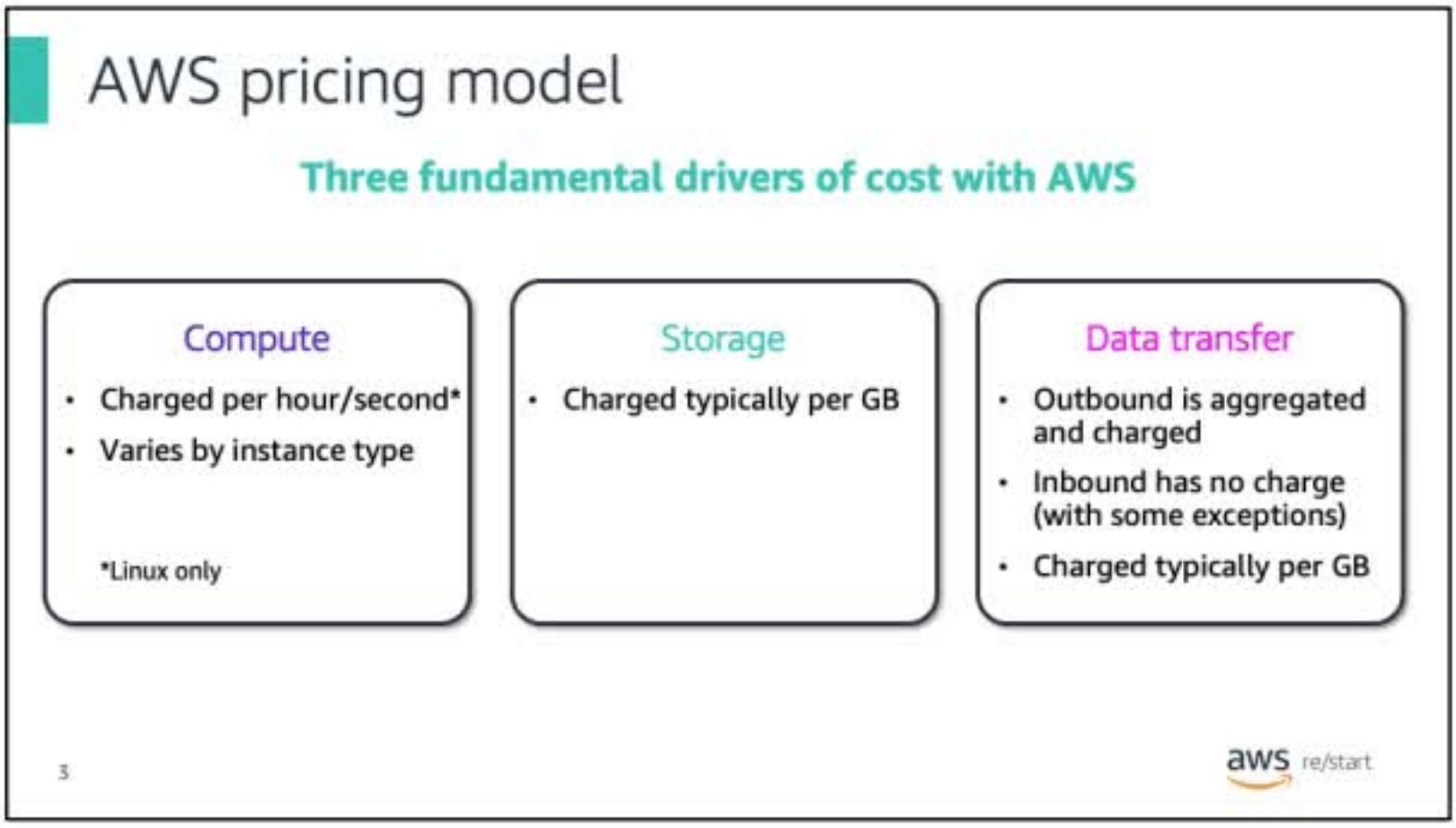
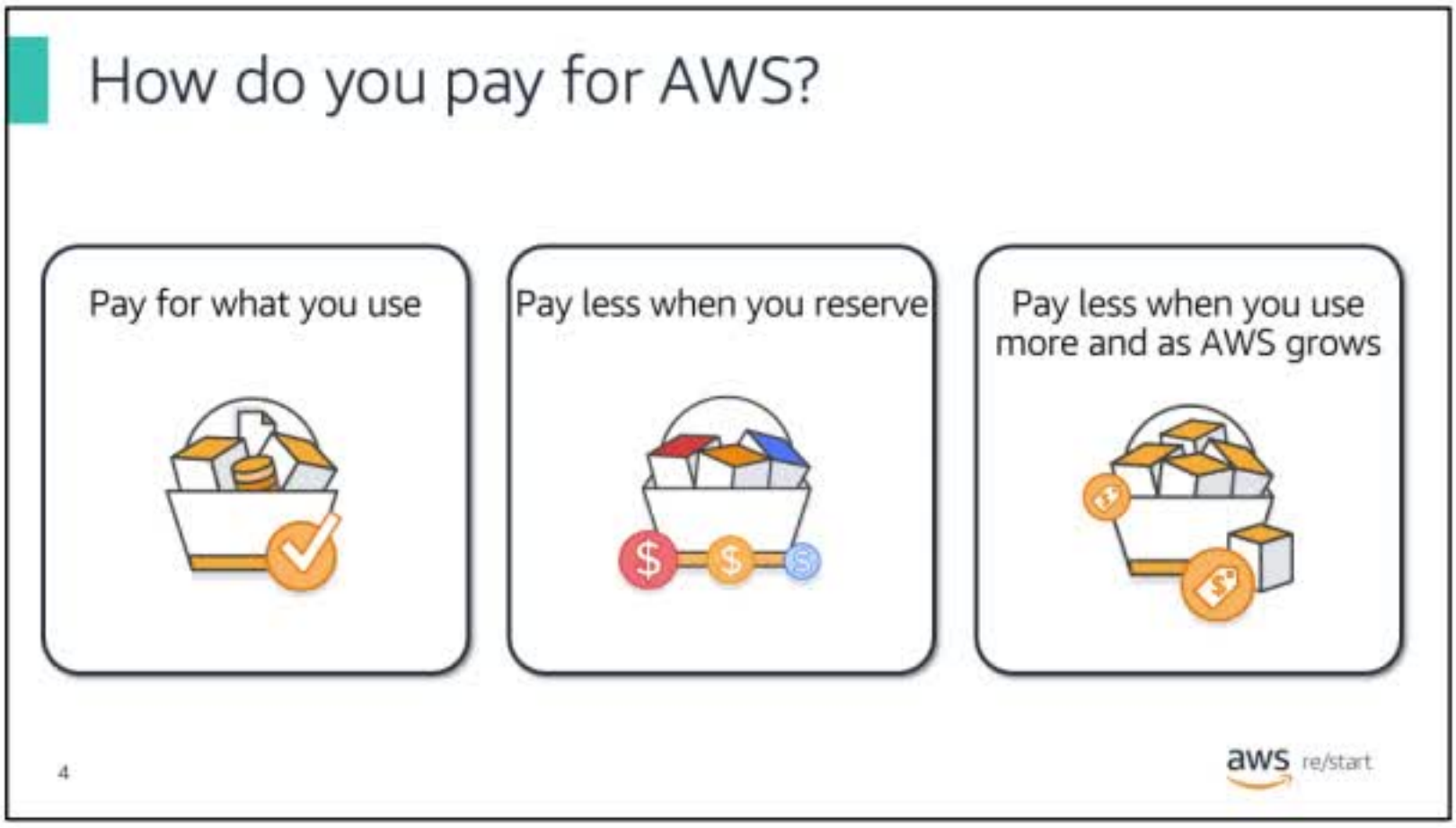
After completing this module, you will understand the pricing philosophy of Amazon Web Services (AWS) and review the fundamental characteristics of pricing. You will also identify tools that you can use to calculate estimates of how much it might cost to use AWS services.



There are three fundamental drivers of cost with AWS: **compute, storage**, and **outbound data transfer**. These characteristics vary somewhat, depending on the AWS offering and pricing model that you choose.

In most cases, you won't be charged for inbound data transfer or for data transfer between other AWS services in the same AWS Region. There are some exceptions, so be sure to verify data transfer rates before you begin to use the AWS service.

Outbound data transfer is aggregated across services and then charged at the outbound data transfer rate. This charge appears on the monthly statement as *AWS Data Transfer Out*.



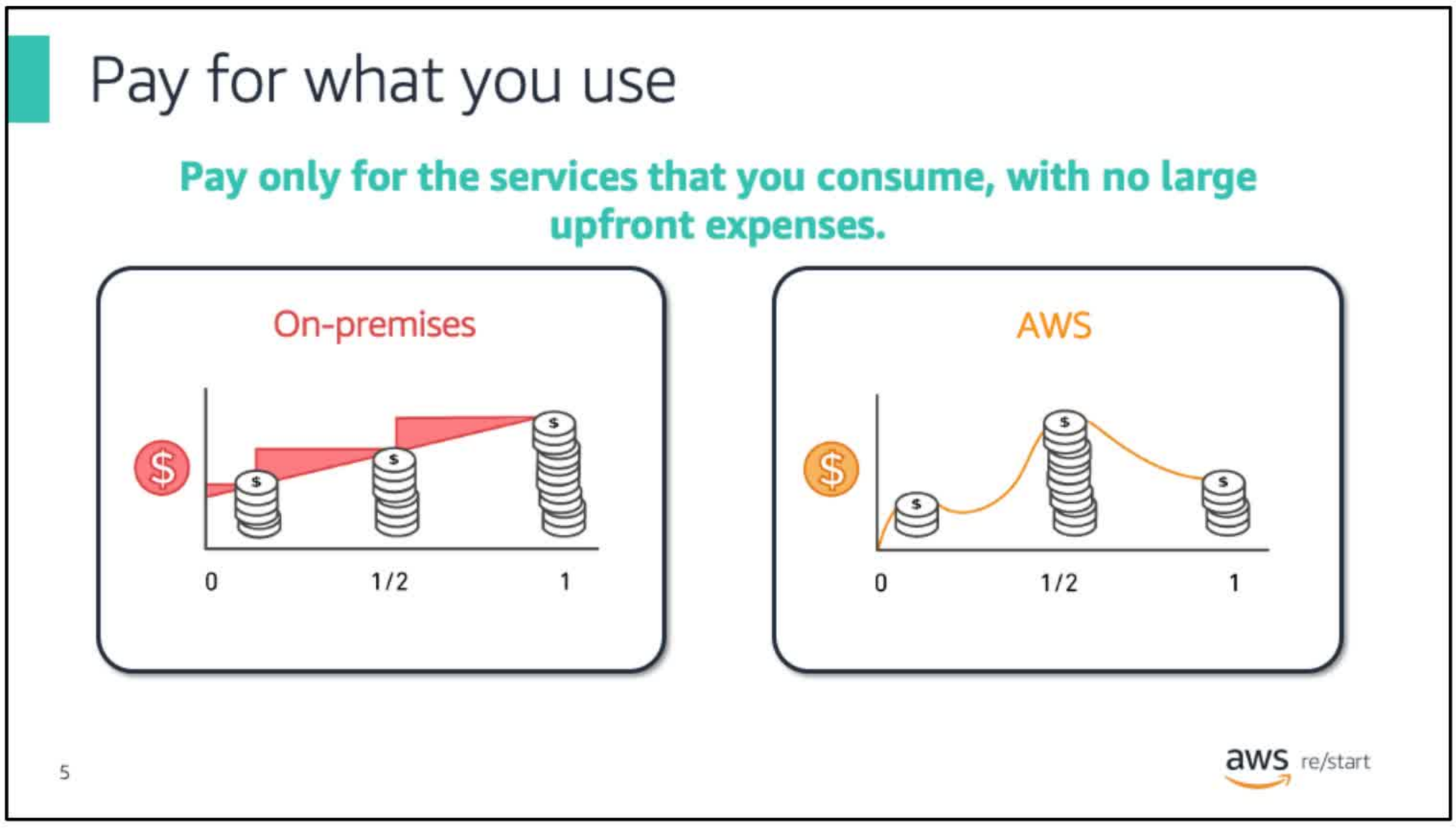
This philosophy is what underlies AWS pricing. While the number and types of services offered by AWS have increased dramatically, our philosophy on pricing has not changed. At the end of each month, you pay for what you use. You can start or stop using a product at any time. No long-term contracts are required.

AWS offers a range of cloud computing services. For each service, you pay for exactly the amount of resources that you actually need. This utility-style pricing model includes:

- Pay for what you use
- Pay less when you reserve
- Pay less when you use more
- Pay even less as AWS grows

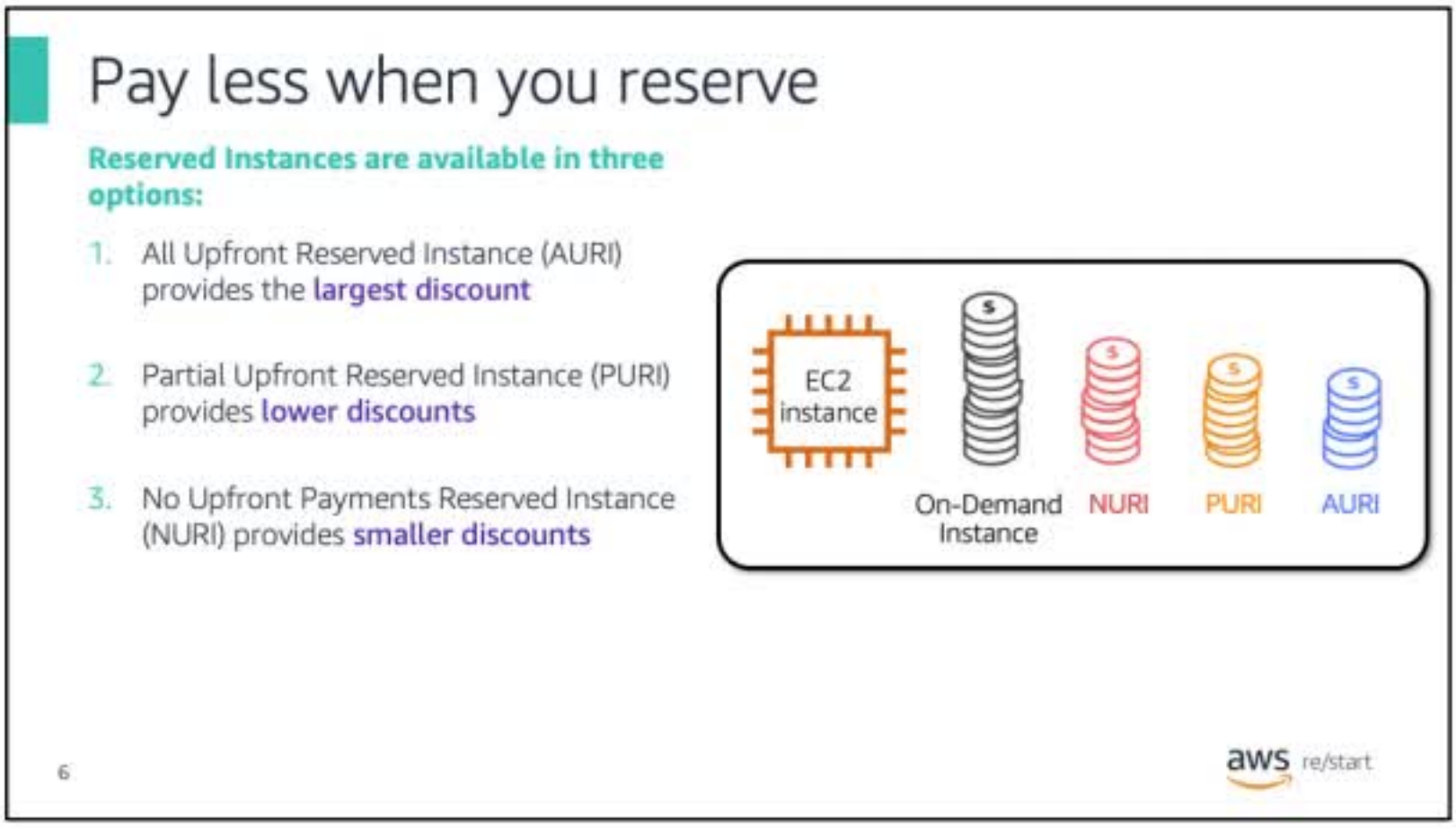
You will now take a closer look at these core concepts of pricing.

To learn more about AWS pricing, see: AWS pricing overview



Unless you build data centers for a living, you might have spent too much time and money building them. With AWS, you pay only for the services that you consume with no large upfront expenses. You can lower variable costs, so you no longer need to dedicate valuable resources to building costly infrastructure, including purchasing servers, software licenses, or leasing facilities.

Quickly adapt to changing business needs and redirect your focus on innovation and invention by paying only for what you use and for as long as you need it. All AWS services are available on demand, require no long-term contracts, and have no complex licensing dependencies.



For certain services like Amazon Elastic Compute Cloud (Amazon EC2) and Amazon Relational Database Service (Amazon RDS), you can invest in reserved capacity. With Reserved Instances, you can save significantly over equivalent on-demand capacity. Reserved Instances are available in three options:

- All Upfront Reserved Instance (or AURI)
- Partial Upfront Reserved Instance (or PURI)
- No Upfront Payments Reserved Instance (or NURI)

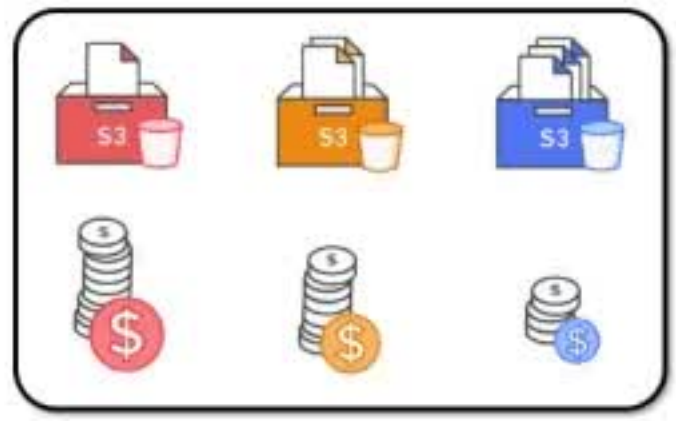
When you buy Reserved Instances, you receive a greater discount when you make a larger upfront payment. To maximize your savings, you can pay all upfront and receive the largest discount. Partial Upfront RIs offer lower discounts, but they give you the option to spend less upfront. Lastly, you can choose to spend nothing upfront and receive a smaller discount, which enables you to have capital to spend on other projects.

By using reserved capacity, your organization can minimize risks, more predictably manage budgets, and comply with policies that require longer-term commitments.

Pay less by using more

Realize volume-based discounts:

- **Savings** as usage increases
- **Tiered pricing** for services like Amazon Simple Storage Service (Amazon S3), Amazon Elastic Block Store (Amazon EBS), or Amazon Elastic File System (Amazon EFS)
  - The more you use, the less you pay per GB
- Multiple storage services deliver **lower** storage costs based on needs



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With AWS, you can get volume-based discounts and realize important savings as your usage increases. For services like Amazon Simple Storage Service (Amazon S3), pricing is tiered, which means that you pay less per GB when you use more. In addition, *data transfer in* doesn't incur charges. Multiple storage services deliver lower storage costs based on your needs. As a result, as your AWS usage needs increase, you benefit from the economies of scale that enable you to increase adoption and keep costs under control.

As your organization evolves, AWS also gives you options to acquire services that help you address your business needs. For example, the AWS storage services portfolio offers options to help you lower pricing based on how frequently you access data and the performance that you need to retrieve it. To optimize your savings, you can choose the right combination of storage solutions that help you reduce costs while preserving performance, security, and durability.

Pay less as AWS grows

As AWS grows:

- AWS focuses on lowering cost of doing business
- This practice results in AWS passing savings from economies of scale to you
- Since 2006, AWS has **lowered pricing 76 times** (as of November 2019)
- Future higher-performing resources replace current resources for no extra charge

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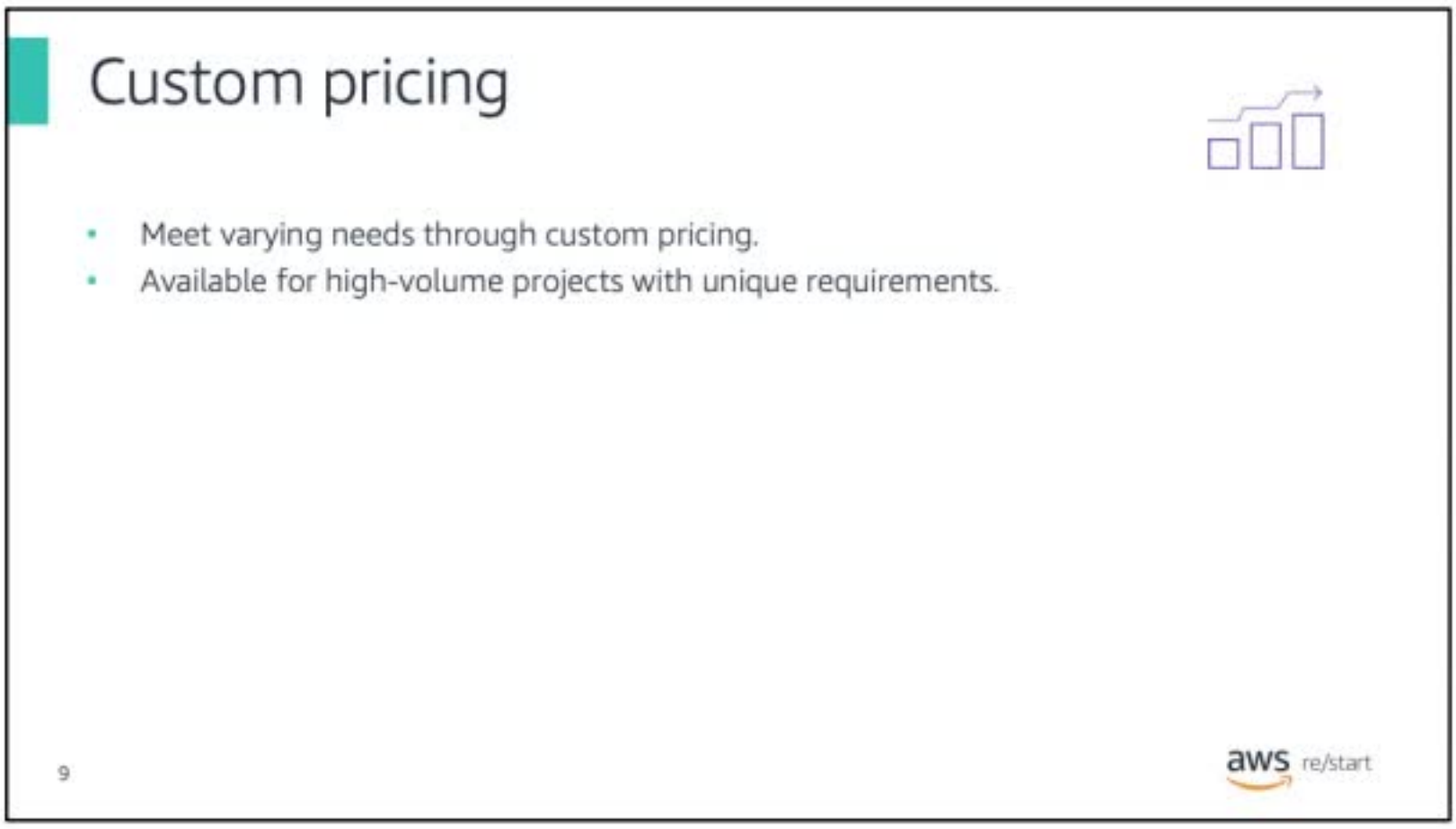
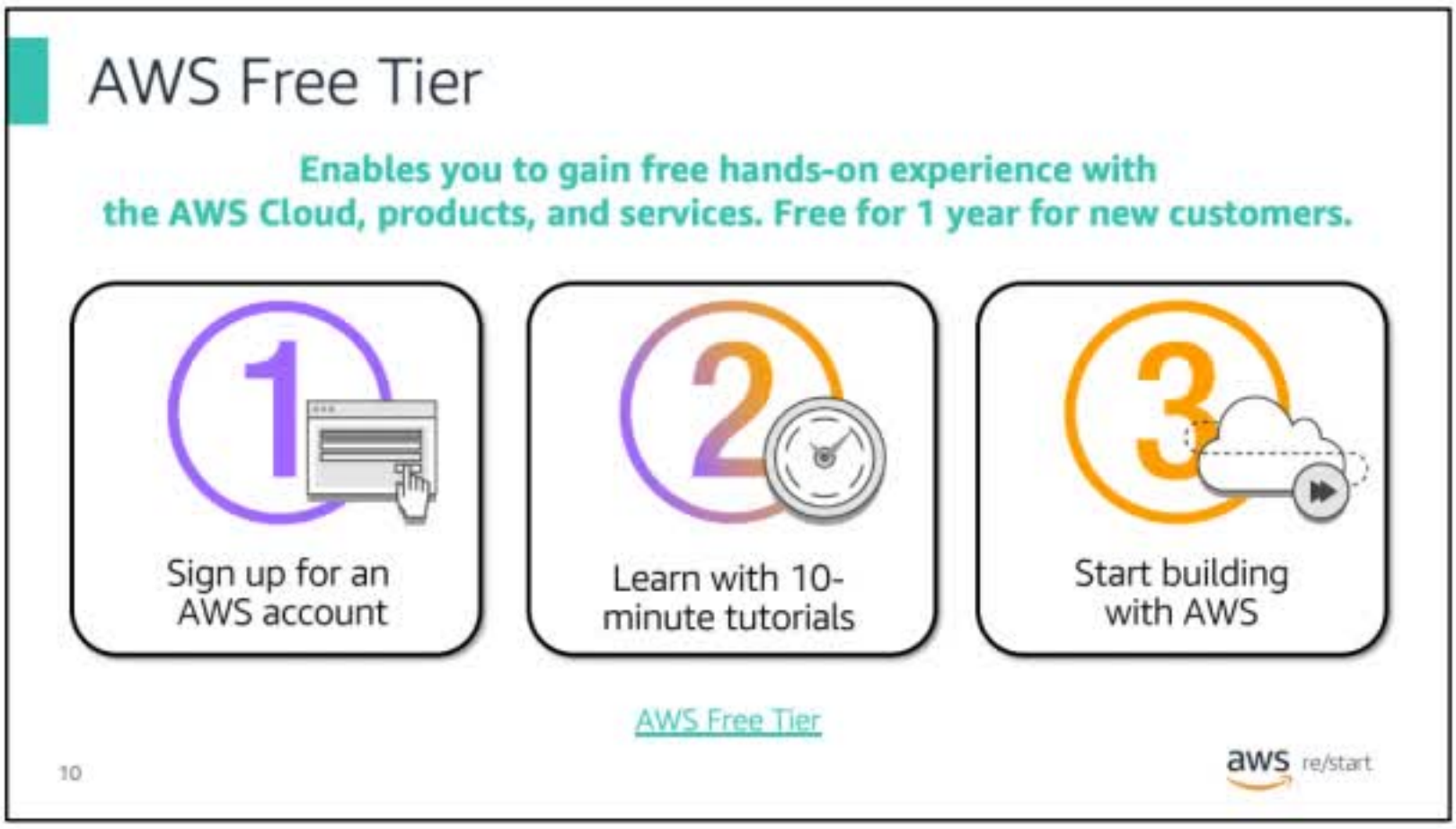
AWS constantly focuses on reducing data center hardware costs, improving operational efficiencies, lowering power consumption, and generally lowering the cost of doing business.

These optimizations and the substantial and growing economies of scale of AWS result in passing savings back to you as lower pricing. Since 2006, AWS has lowered pricing **78** times (as of November 2019).

Another benefit of AWS growth is that future, higher-performing resources replace current ones for no extra charge.



AWS realizes that every customer has different needs. If none of the AWS pricing models work for your project, custom pricing is available for high-volume projects with unique requirements.



To help new AWS customers get started in the cloud, AWS offers a free usage tier (the AWS Free Tier) for new customers for up to 1 year. The AWS Free Tier applies to certain services and options. If you are a new AWS customer, you can run a free Amazon Elastic Compute Cloud (Amazon EC2) T2 micro instance for a year, while also using a free usage tier for Amazon S3, Amazon Elastic Block Store (Amazon EBS), Elastic Load Balancing, AWS data transfer, and other AWS services.

To learn more, refer to the AWS Free Tier website.

AWS also offers a variety of services and features for no additional charge. Some of them are shown in this slide, and they include:

- **Amazon Virtual Private Cloud (Amazon VPC)** enables you to provision a logically isolated section of the AWS Cloud where you can launch AWS resources in a virtual network that you define.
- **AWS Identity and Access Management (IAM)** controls your users' access to AWS services and resources.
- **Consolidated Billing** is a billing feature in the **AWS Organizations** service to consolidate payment for multiple AWS accounts. Consolidated billing provides:
    - **One bill** for multiple accounts.
    - The ability to **easily track** each account's charges.
    - The opportunity to decrease charges because of volume pricing discounts from **combined usage**.
    - And you can consolidate all of your accounts using Consolidated Billing and get tiered benefits.
- **AWS Elastic Beanstalk** is a way for you to quickly deploy and manage applications in the AWS Cloud.
- **AWS CloudFormation** gives developers and systems administrators a way to create a collection of related AWS resources and provision them in an

orderly and predictable fashion.
- **Automatic Scaling** automatically adds or removes resources according to conditions you define. The resources you are using increase seamlessly during demand spikes to maintain performance and decrease automatically during demand lulls to minimize costs.
- **AWS OpsWorks** is an application management service that makes it easy to deploy and operate applications of all shapes and sizes.

Though there is no charge for these services, there might be charges associated with other AWS services used with these services. For example, when you automatically scale additional EC2 instances, there will be charges for those instances.

AWS Pricing Calculator

AWS Pricing Calculator

- Estimate monthly costs
- Identify opportunities to reduce monthly costs
- Use templates to compare services and deployment models

Access the AWS Pricing Calculator

https://calculator.aws/#/

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The AWS Pricing Calculator can help you estimate a monthly AWS bill. Using this tool, you can add, modify, and remove services from your bill. It will recalculate the estimated monthly charges automatically.

The calculator incorporates a wide array of pricing calculations across all services in all Regions. It also shows a breakdown of features for each service in each Region.

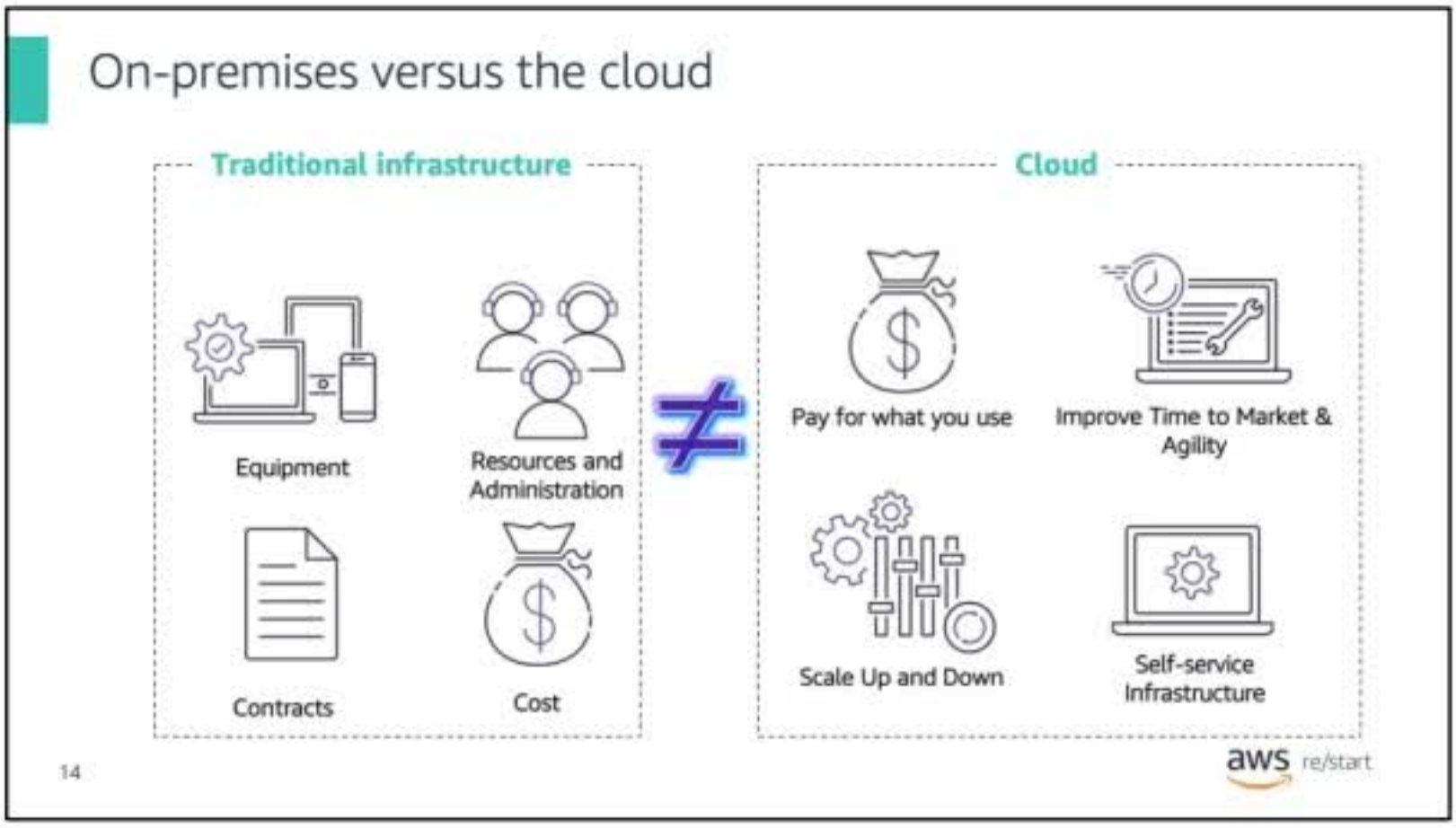
The AWS Pricing Calculator is a tool that helps you:

- Estimate AWS monthly services costs
- Identify opportunities for cost reduction
- Use templates to model solutions to compare services and deployment models

The calculator also shows common customer samples and usage. For example, you can choose **Disaster Recovery and Backup** or **Web Application** to access sample data and uses for each service.

To learn more about the AWS Pricing Calculator and to start using it, refer to AWS Pricing Calculator website.

Total Cost of Ownership



Many businesses are choosing between an on premises and cloud infrastructure. The difference between these two options is how they are deployed.

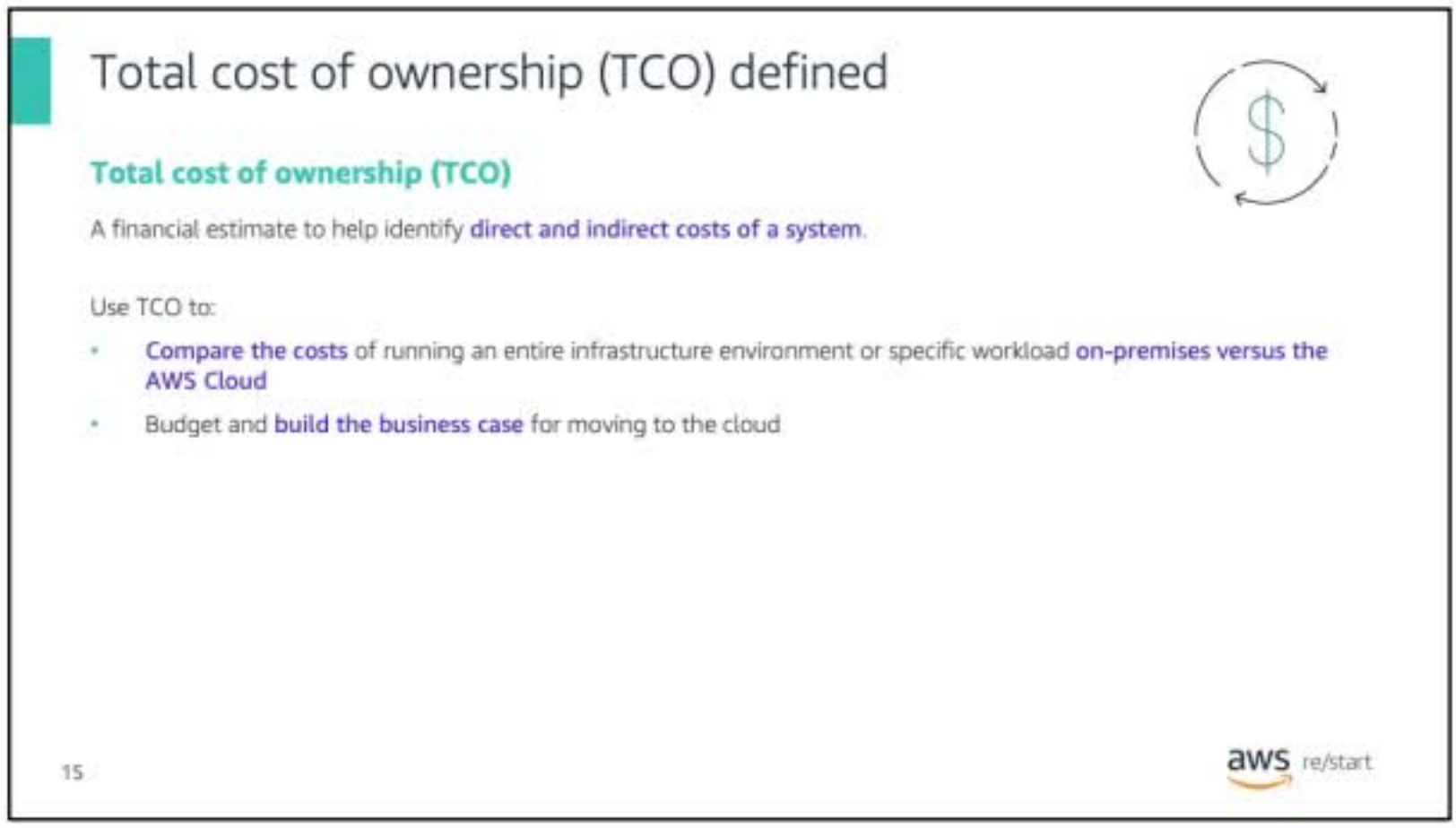
An on-premises infrastructure is installed locally on a company's own computers and servers. There are several fixed costs (capital expenses) associated with the traditional infrastructure, including facilities, hardware, licenses, and maintenance staff. Scaling up can be expensive and time consuming. Scaling down does not reduce fixed costs.

A cloud infrastructure is purchased from a service provider who builds the infrastructure and maintains capital expenses. A customer pays for what they use. Scaling up or down is simple. Costs are easy to estimate because they depend on service usage.

It is difficult to compare an on-premises IT delivery model with the AWS Cloud. The two infrastructures are so different they use different terms.

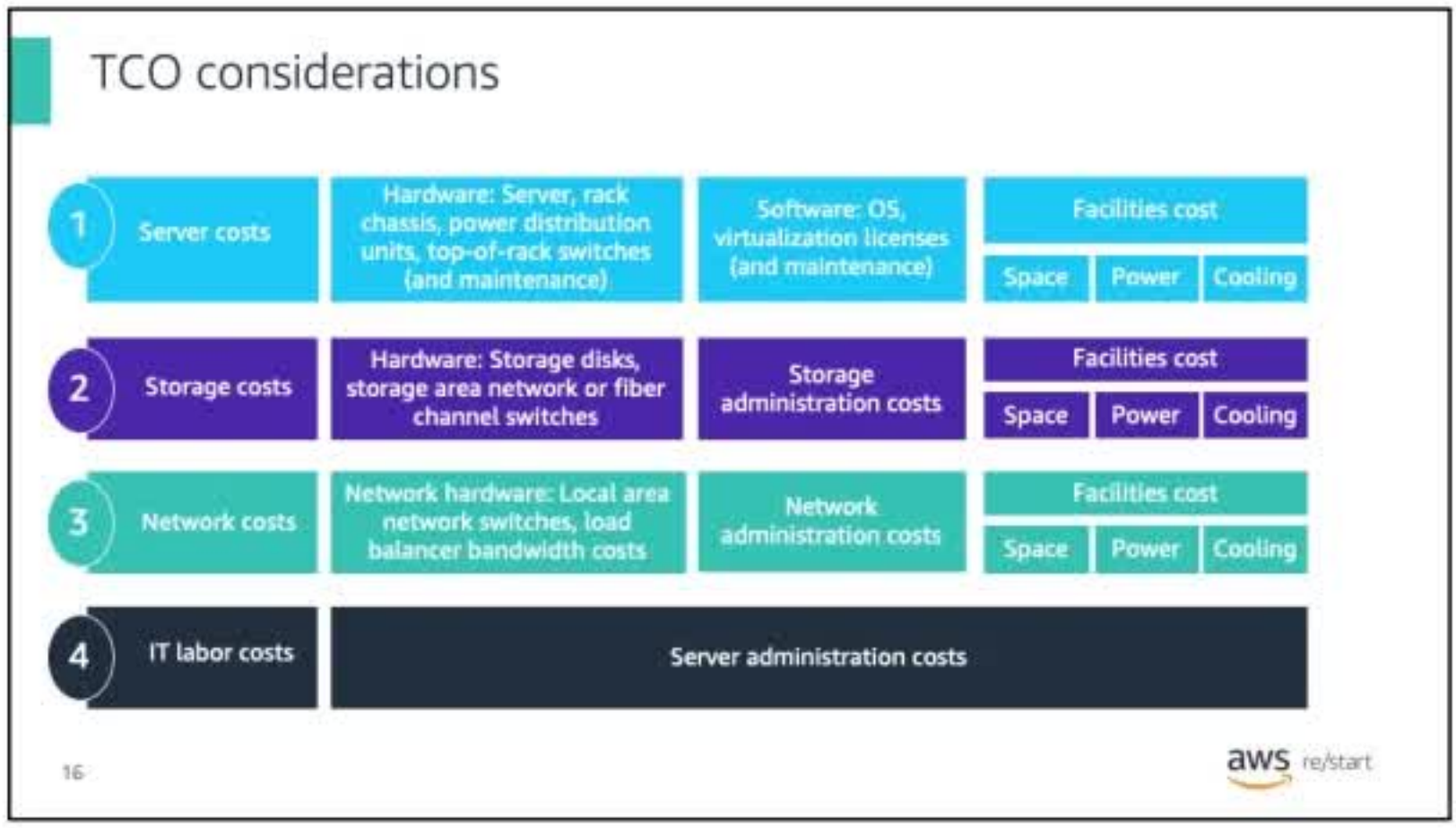
- An on-premises IT discussion is based on capital expenditure, long planning cycles, and multiple components to buy, build, manage, and refresh over time.
- AWS is a discussion about flexibility, agility, and consumption-based costs.

How can you identify the best option?



You can use total cost of ownership (TCO) to compare on premises and cloud solutions and identify the best option. TCO is a financial estimate that helps buyers and owners determine the direct and indirect costs of a product or system. It includes the cost of a service and associated expenses.

For example, say that you run a specific workload in an on-premises or co-location facility, and you wan to run the same workload in the cloud. You can use TCO to compare the costs of running the workload on a cloud infrastructure versus on an on-premises (or colocation) infrastructure. You can then use the comparison for budgeting purposes or to build a business case for the optimal deployment solution.



When you compare an on-premises solution and a cloud solution, it's important to accurately assess the true costs of both options. With the cloud, most costs are upfront and can be easily calculated. For example, cloud providers give transparent pricing based on different usage metrics, such as RAM, storage, and bandwidth, among others. Pricing is frequently fixed per unit of time.

After you gain certainty over pricing, you can calculate costs based on several different usage estimates.

With on-premises technology, in-house costs of running a server include:

- **Direct costs,** such as power, floor space, storage, and IT operations to manage those resources
- **Indirect costs,** such as network and storage infrastructure

The diagram is an abbreviated list that demonstrates the type of costs that are involved in data center maintenance. It doesn't include every cost item. Depending on the solution, software costs can also include database, management, and middle-tier costs. Facilities costs can include upgrades, maintenance, building security, and taxes. IT labor costs can include security and application

administration costs.

Some of the costs that are associated with data center management include:

- Server costs for both hardware and software, and facilities expenses for equipment
- Storage costs for hardware, administration, and facilities
- Network costs, which include costs for hardware, administration, and facilities
- IT labor costs that are required to administer the solution

Key takeaways

AWS pricing

- You are not charged for:
  - Inbound data transfer
  - Data transfer between services in the same AWS Region
- You pay for what you use
- You can start and stop anytime
- No long-term contracts are required
- Some services are free, but other AWS services that are used with these services might not be free
- Total Cost of Ownership (TCO) is a financial estimate to help identify the direct and indirect costs of a system
- AWS provides a Pricing Calculator

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In summary, though the number and types of services offered by AWS have increased, the AWS philosophy on pricing has not changed. At the end of each month, you pay only for what you use, and you can start or stop using a product at any time. No long-term contracts are required.

The best way to estimate costs is to examine the fundamental characteristics for each AWS service, estimate your usage for each characteristic, and then map that usage to the prices that are posted on the website. The service pricing strategy gives you the flexibility to choose the services that you need for each project and to pay only for what you use. You can use the AWS Pricing Calculator to get AWS service cost estimates and evaluate the total of an AWS solution, respectively.

Some AWS services don't incur charges, including:

- Amazon VPC
- AWS Elastic Beanstalk
- AWS CloudFormation
- IAM
- Amazon EC2 Auto Scaling

- AWS OpsWorks
- Consolidated Billing

Though the services themselves don't incur charges, the resources that they provision are not free. Additionally, you are not charged for inbound data or data transfer between services in the same Region. However, outbound data transfer costs are tiered.

To learn more about pricing, refer to:
AWS pricing
AWS pricing overview