Module 10 – The Cloud Journey

Contents

Learning objectives

In this module, you will learn how to:

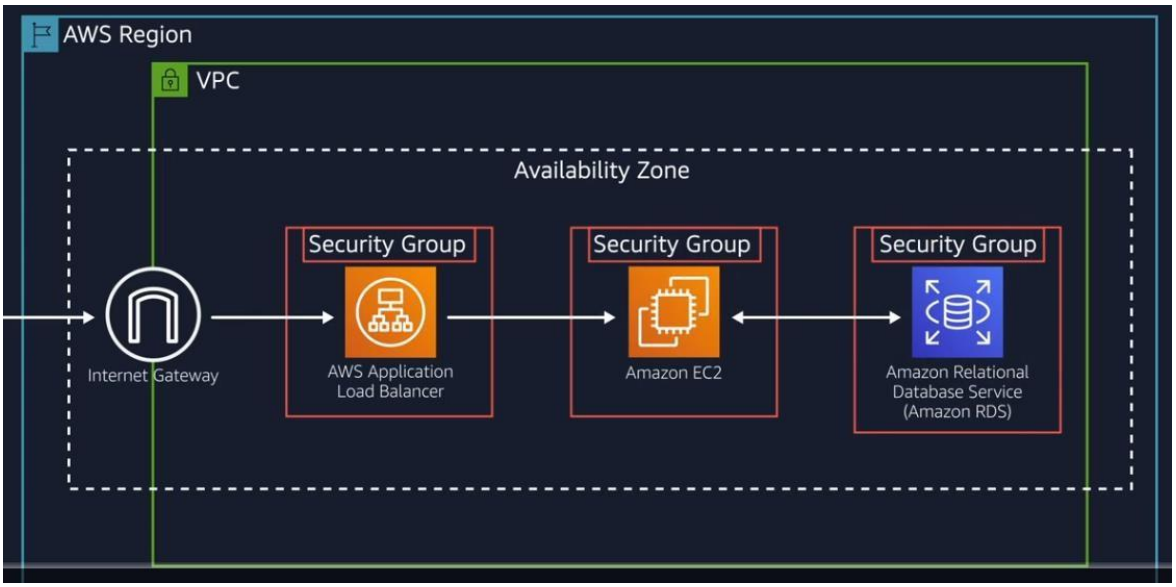
- Summarize the five pillars of the Well-Architected Framework.
- Explain the six benefits of cloud computing.

Introduction

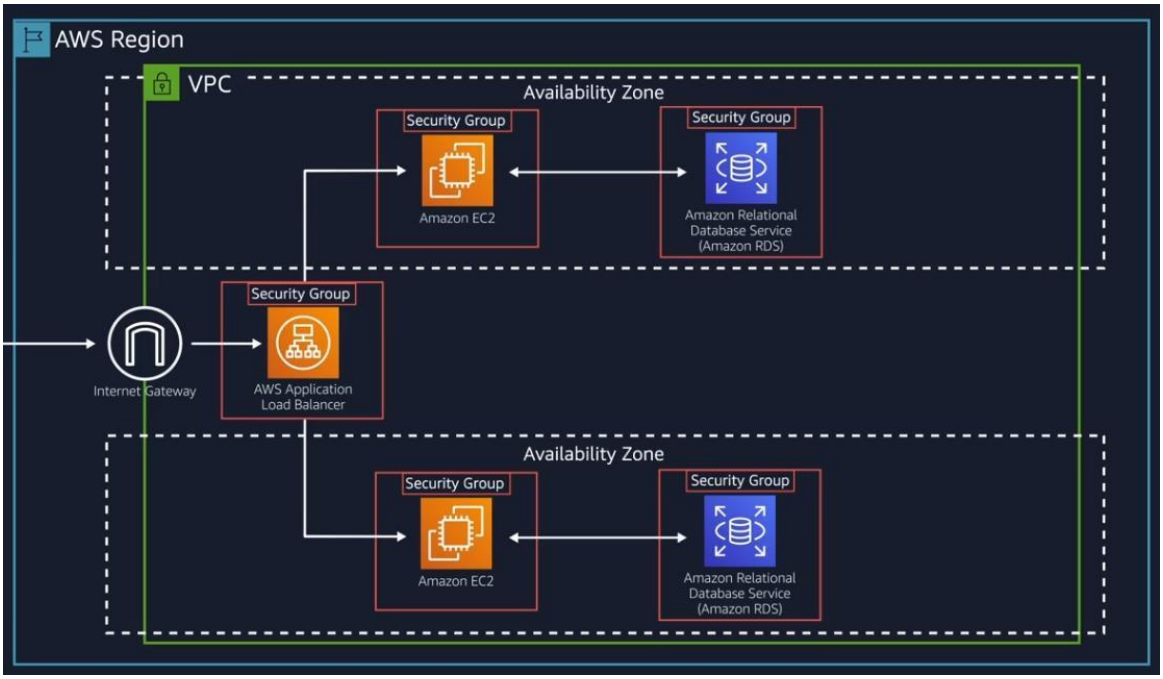
We've covered a lot of different AWS services in this course. And as you know, you use each individual service as building blocks for your solutions. There are endless architectures you can create to solve whatever problem you are trying to solve on AWS.

You can string together services in a simple or complicated manner. Having a lot of options is great, but how do you know if the architecture you've created is, well, good?

Let's look at this basic three-tier architecture. Does this look good? Well, we have a load balancer, some instances, and a backend database. Seems all right to me.



What about this alternate architecture?

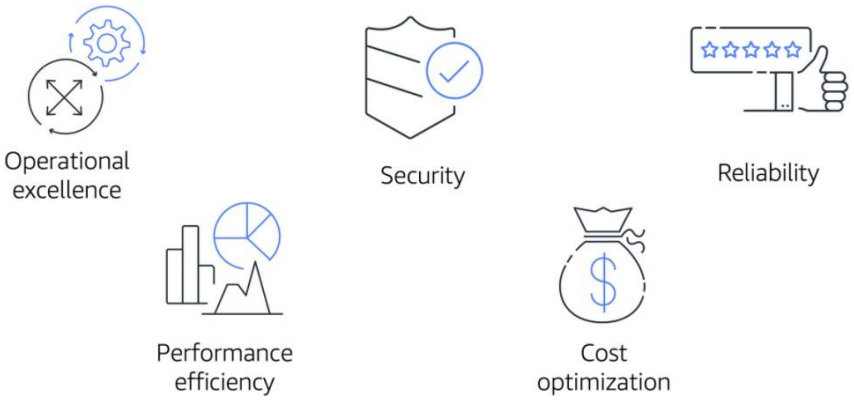


This architecture has now been replicated across Availability Zones or AZs. This is **important for reliability**. If one AZ is having issues, your application will still be up and running in the second AZ. It's important that you are able to spot deficiencies in architectures like in this simple example.

Though not all examples are quite as simple. Luckily, there are tools that can help you get there. We're going to cover something called the **Well-Architected Framework**. This is a tool you can use to **evaluate the architectures you build for excellence** in a few different categories.

The AWS Well-Architected Framework

The **AWS Well-Architected Framework** helps you understand how to design and operate reliable, secure, efficient, and cost-effective systems in the AWS Cloud. It provides a way for you to consistently measure your architecture against best practices and design principles and identify areas for improvement.



The Well-Architected Framework is designed to enable architects, developers, and users of AWS to build secure, high-performing, resilient, and efficient infrastructure for their applications. It is based on **five** pillars:

- Operational excellence
- Security
- Reliability
- Performance efficiency
- Cost optimization

Operational excellence is the **ability to run and monitor systems** to deliver business value and to continually improve **supporting processes and procedures**.

Design principles for operational excellence in the cloud include performing operations as **code, annotating documentation, anticipating failure, and frequently making small, reversible changes.**

The **Security** pillar is the ability to **protect** information, systems, and assets while delivering business value through risk assessments and mitigation strategies.

When considering the security of your architecture, apply these best practices:

- Automate security best practices when possible.
- Apply security at all layers.
- Protect data in transit and at rest.

Reliability is the ability of a system to do the following:

- Recover from infrastructure or service disruptions (e.g. Amazon DynamoDB disruption, or EC2 node failure)
- Dynamically acquire computing resources to meet demand
- Mitigate disruptions such as misconfigurations or transient network issues

Reliability includes testing **recovery procedures**, **scaling horizontally** to increase aggregate system availability, and **automatically recovering** from failure.

Performance efficiency is the ability to **use computing resources efficiently to meet system requirements** and to maintain that efficiency as demand changes and technologies evolve.

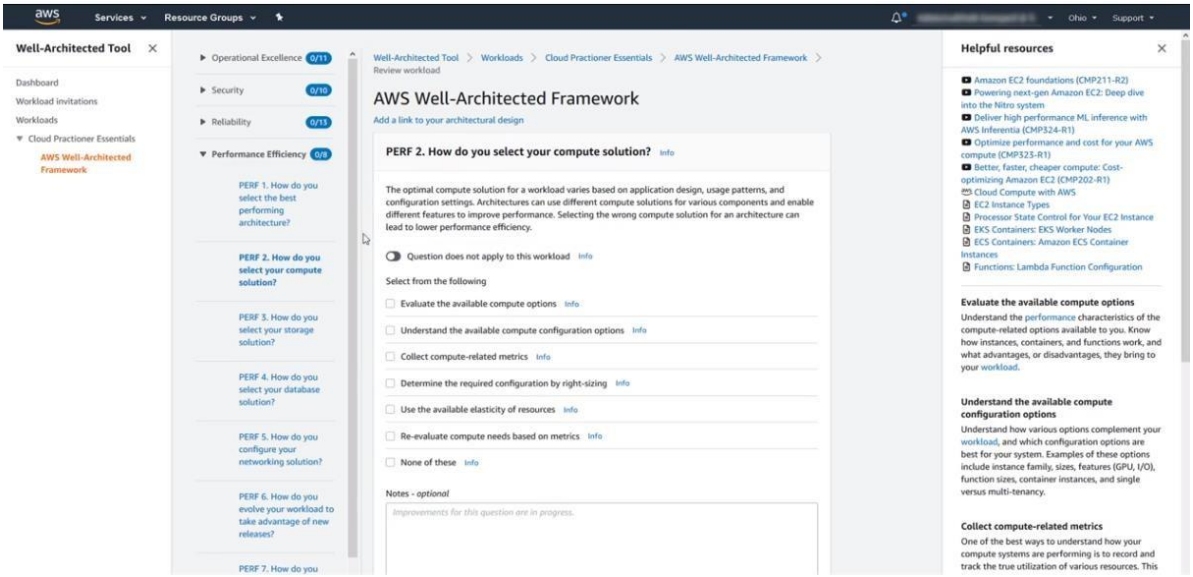
Evaluating the performance efficiency of your architecture includes **experimenting** more often, using **serverless** architectures, and designing systems to be able to go **global** in minutes.

Cost optimization is the ability to run systems to deliver business value at the **lowest price point.**

Cost optimization includes adopting a consumption model**, analysing and attributing expenditure**, and using **managed services to reduce the cost of ownership**.

In the past, you'd need to evaluate these against your AWS infrastructure with the help of a Solutions Architect. Not that you can't, and aren't still encouraged to do that, but we listened to customer feedback, and decided to release the **Framework as a self-service tool**, the **AWS Well-Architected Tool**.

You can access it by the AWS **Management Console**. Create a workload and run it against your AWS account.



Advantages of cloud computing

Operating in the AWS Cloud offers many benefits over computing in on-premises or hybrid environments.

In this section, you will learn about **six advantages of cloud computing**:

- Trade upfront expense for variable expense.
- Benefit from massive economies of scale.
- Stop guessing capacity.
- Increase speed and agility.
- Stop spending money running and maintaining data centres.
- Go global in minutes.

Trade upfront expense for variable expense.
Upfront expenses include data centres, physical servers, and other resources that you would need to invest in before using computing resources. These on-premises data centre costs include things like physical space, hardware, staff for racking and stacking, and overhead for running the data centre.

Instead of investing heavily in data centres and servers before you know how you're going to use them, you can pay only when you consume computing resources.

Benefit from massive economies of scale.
By using cloud computing, you can achieve a lower variable cost than you can get on your own.

Because usage from hundreds of thousands of customers aggregates in the cloud, providers such as AWS can achieve **higher economies of scale**. Economies of scale translate into lower pay-as-you-go prices.

AWS is also an expert at building efficient data centres. We can buy the hardware at a lower price because of the massive volume, and then we install it and run it efficiently. Because of these factors, you can achieve a lower variable cost than you could running a data centre on your own.

Stop guessing capacity.
With cloud computing, you don't have to predict how much infrastructure capacity you will need before deploying an application. You provision the resources you need **for the now**, and you **scale up and down accordingly**.

For example, you can launch Amazon Elastic Compute Cloud (Amazon EC2) instances when needed and pay only for the compute time you use. Instead of paying for resources that are unused or dealing with limited capacity, you can access only the capacity that you need, and scale in or out in response to demand.

Increase speed and agility.
The flexibility of cloud computing makes it easier for you to develop and deploy applications. This flexibility also provides your development teams with more time to experiment and innovate.

With AWS, it's easy to try new things. You can spin up test environments and run experiments on new ways to approach solving a problem. And then if that approach didn't work, you can just delete those resources and stop incurring cost. Traditional data centres don't offer the same flexibility.

Stop spending money running and maintaining data centres.
Cloud computing in data centres often requires you to spend more money and time managing infrastructure and servers. A benefit of cloud computing is the ability to focus less on these tasks and more on your applications and customers.

If you aren't a data centre company, why spend so much money and time running data centres? Let AWS take the undifferentiated heavy lifting off your hands and instead focus on what makes your business valuable.

Go global in minutes.
The AWS Cloud global footprint enables you to quickly deploy applications to customers around the world, while providing them with low latency. Traditionally, you would need to have staff overseas running and operating a data centre for you. With AWS, you can just replicate your architecture to a region in that foreign country.

Summary

In Module 10, you learned about the following concepts:

- The **five pillars** of the AWS Well-Architected Framework:
    - Operational excellence
    - Security
    - Reliability
    - Performance efficiency
    - Cost optimization

- **Six advantages** of cloud computing:
    - Trade upfront expense for variable expense.
    - Benefit from massive economies of scale.
    - Stop guessing capacity.
    - Increase speed and agility.
    - Stop spending money running and maintaining data centres.
    - Go global in minutes.

Quiz

Which pillar of the AWS Well-Architected Framework includes the ability to run workloads effectively and gain insights into their operations?

- Operational excellence

What are the benefits of cloud computing? (Select TWO.)

- Increase speed and agility
- Stop spending money running and maintaining data centres