

ENGENHARIA DE SOFTWARE

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2023



Module 1: Cloud Concepts Overview

AWS Academy Cloud Foundations

Module overview

Topics

- Introduction to cloud computing
- Advantages of cloud computing
- Introduction to Amazon Web Services (AWS)
- AWS Cloud Adoption Framework (AWS CAF)



Knowledge check

Module objectives

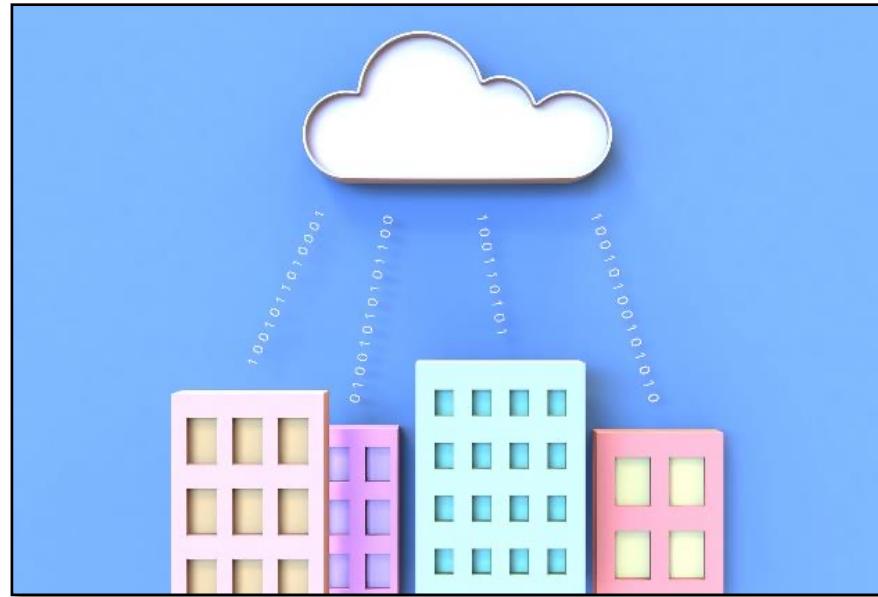
After completing this module, you should be able to:

- Define different types of cloud computing models
- Describe six advantages of cloud computing
- Recognize the main AWS service categories and core services
- Review the AWS Cloud Adoption Framework (AWS CAF)

Section 1: Introduction to cloud computing

Module 1: Cloud Concepts Overview

What is cloud computing?



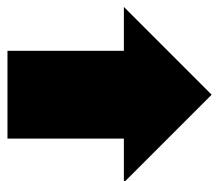
Cloud computing defined

Cloud computing is the **on-demand** delivery of compute power, database, storage, applications, and other IT resources **via the internet** with **pay-as-you-go** pricing.



Infrastructure as software

Cloud computing enables you to **stop thinking of your infrastructure as hardware**, and instead **think of (and use) it as software**.



Traditional computing model



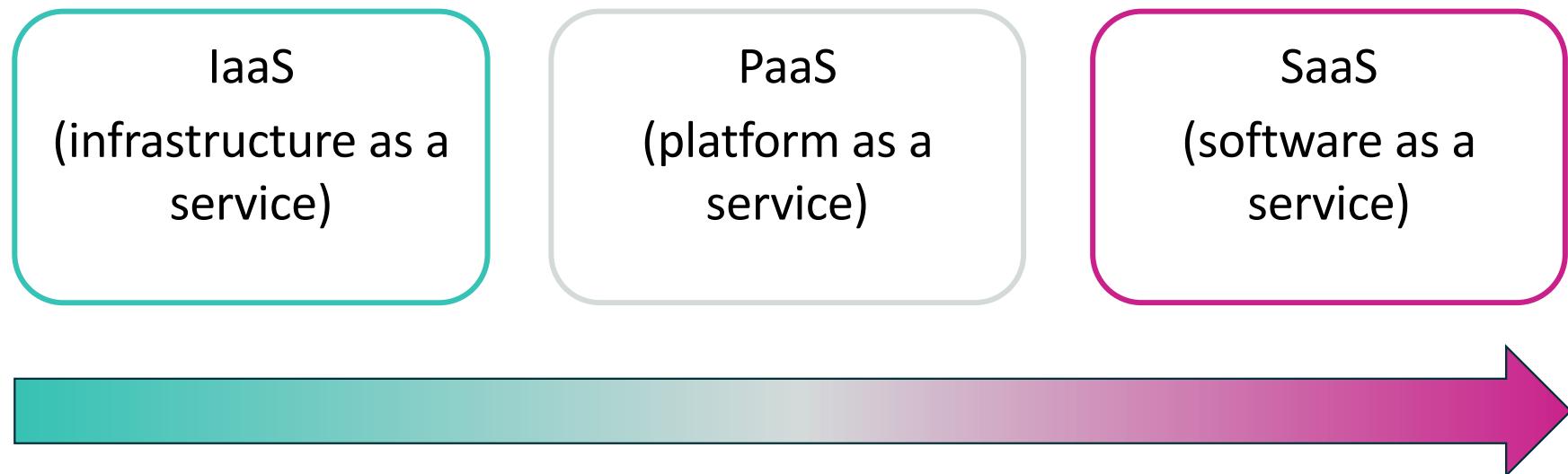
- Infrastructure as hardware
- Hardware solutions:
 - Require space, staff, physical security, planning, capital expenditure
 - Have a long hardware procurement cycle
 - Require you to provision capacity by guessing theoretical maximum peaks

Cloud computing model



- Infrastructure as software
- Software solutions:
 - Are flexible
 - Can change more quickly, easily, and cost-effectively than hardware solutions
 - Eliminate the undifferentiated heavy-lifting tasks

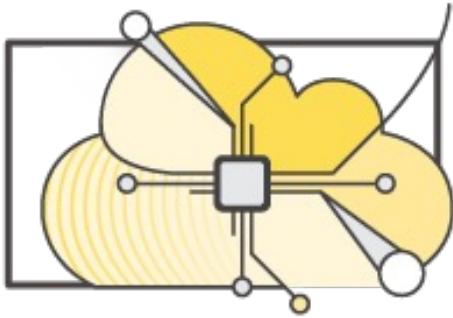
Cloud service models



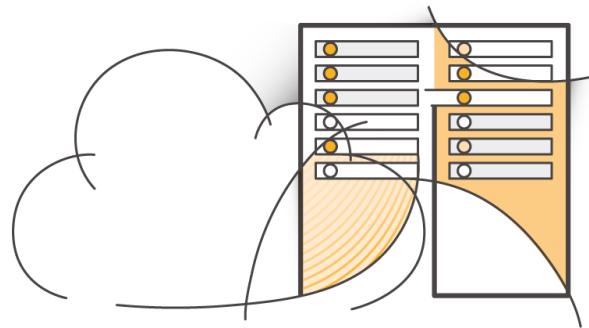
More control
over IT resources

Less control
over IT resources

Cloud computing deployment models



Cloud

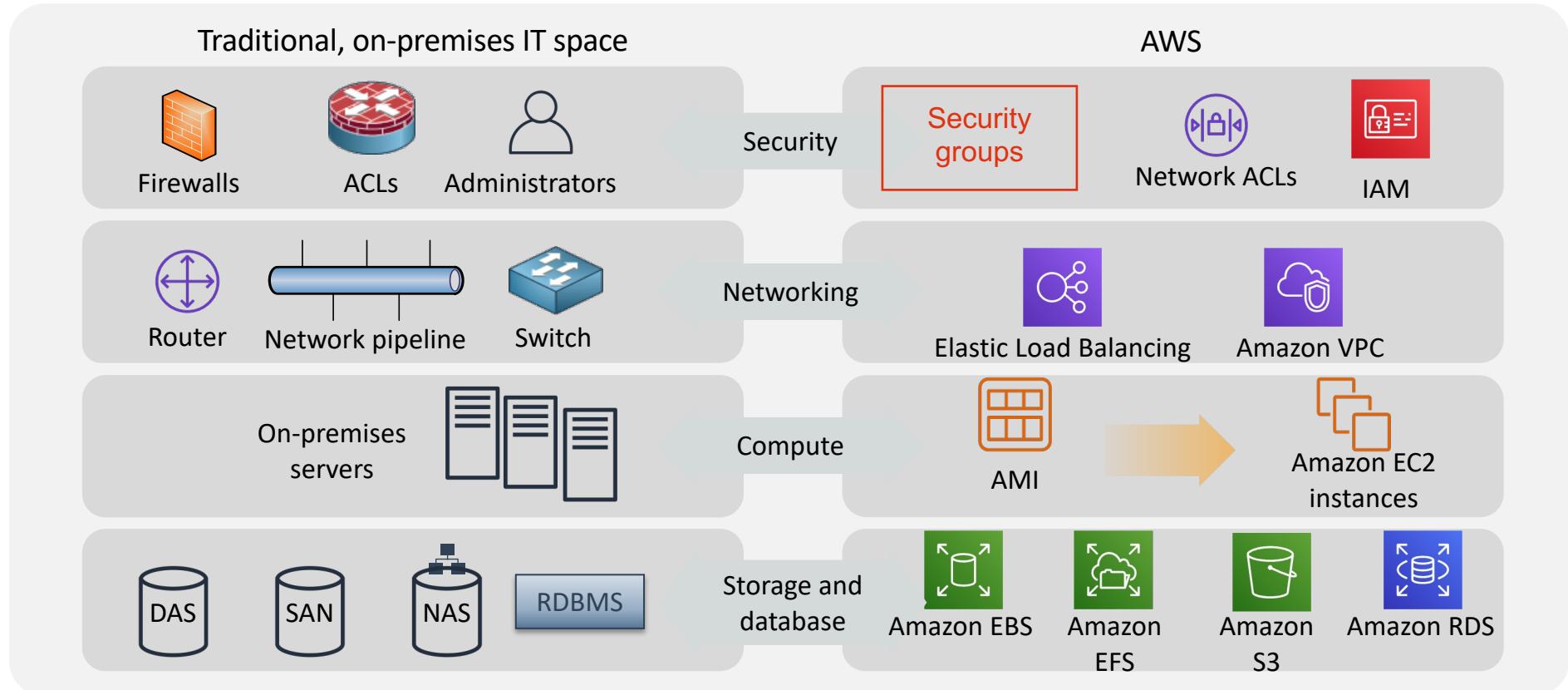


Hybrid



On-premises
(private cloud)

Similarities between AWS and traditional IT



Section 1 key takeaways



- Cloud computing is the on-demand delivery of IT resources via the internet with pay-as-you-go pricing.
- Cloud computing enables you to think of (and use) your infrastructure as software.
- There are three cloud service models: IaaS, PaaS, and SaaS.
- There are three cloud deployment models: cloud, hybrid, and on-premises or private cloud.
- Almost anything you can implement with traditional IT can also be implemented as an AWS cloud computing service.

Section 2: Advantages of cloud computing

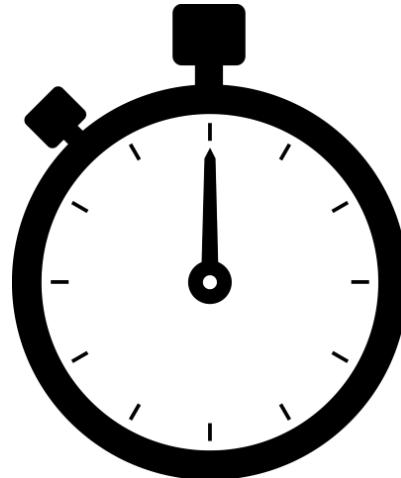
Module 1: Cloud Concepts Overview



Trade capital expense for variable expense



Data center investment
based on forecast



Pay only for the amount
you consume

Massive economies of scale

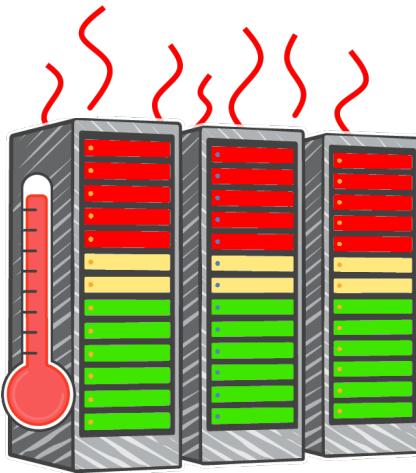
Because of aggregate usage from all customers, AWS can achieve higher economies of scale and pass savings on to customers.



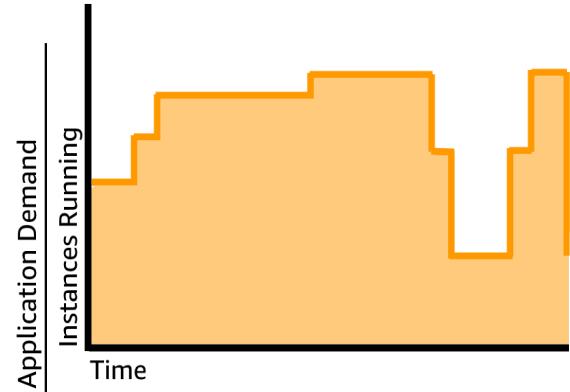
Stop guessing capacity



Overestimated
server capacity



Underestimated
server capacity



Scaling on demand

Increase speed and agility

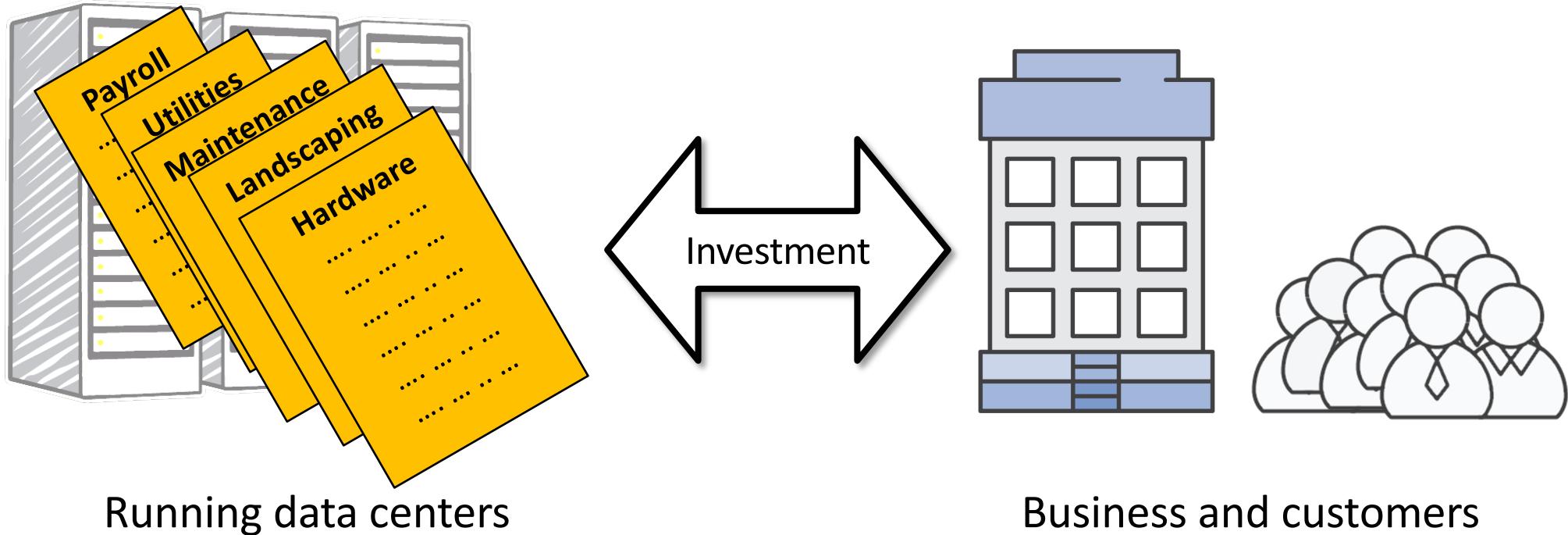


Weeks between wanting resources
and having resources

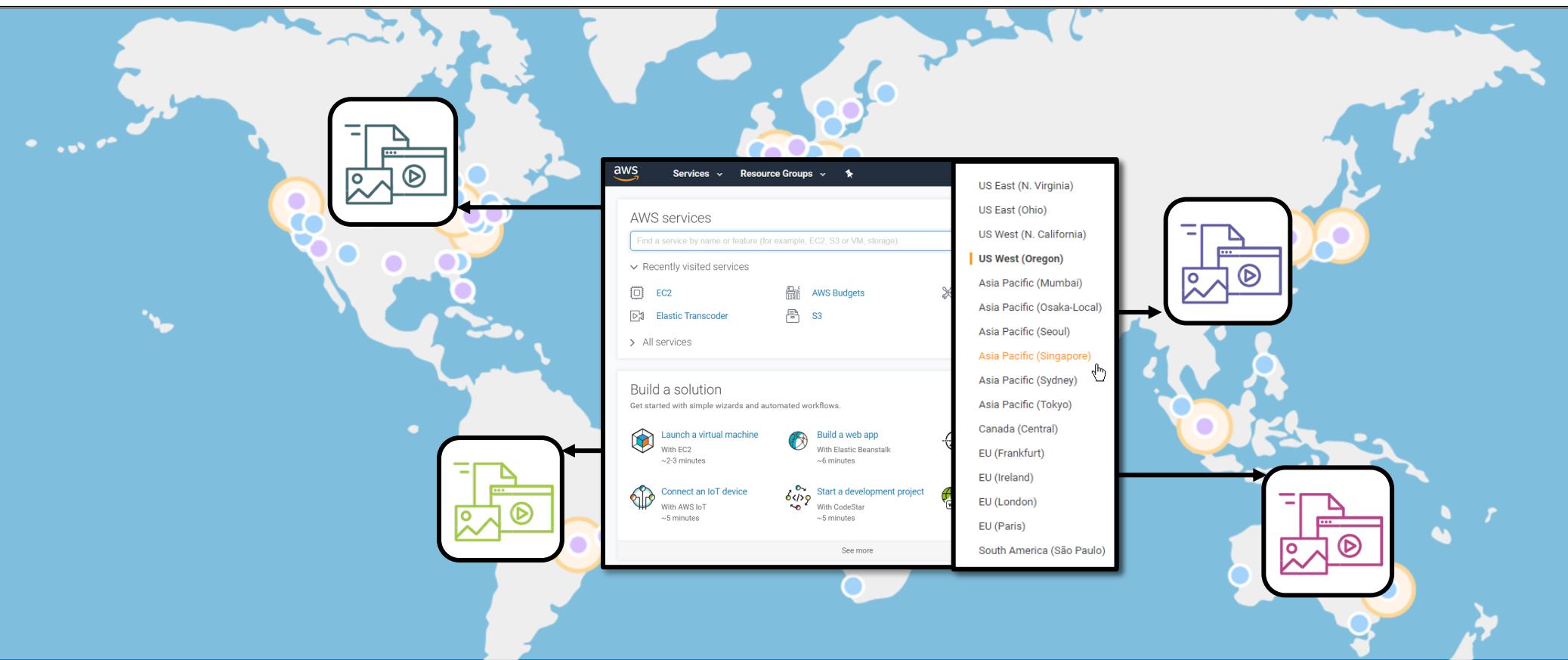


Minutes between wanting
resources and having resources

Stop spending money on running and maintaining data centers



Go global in minutes



Section 2 key takeaways



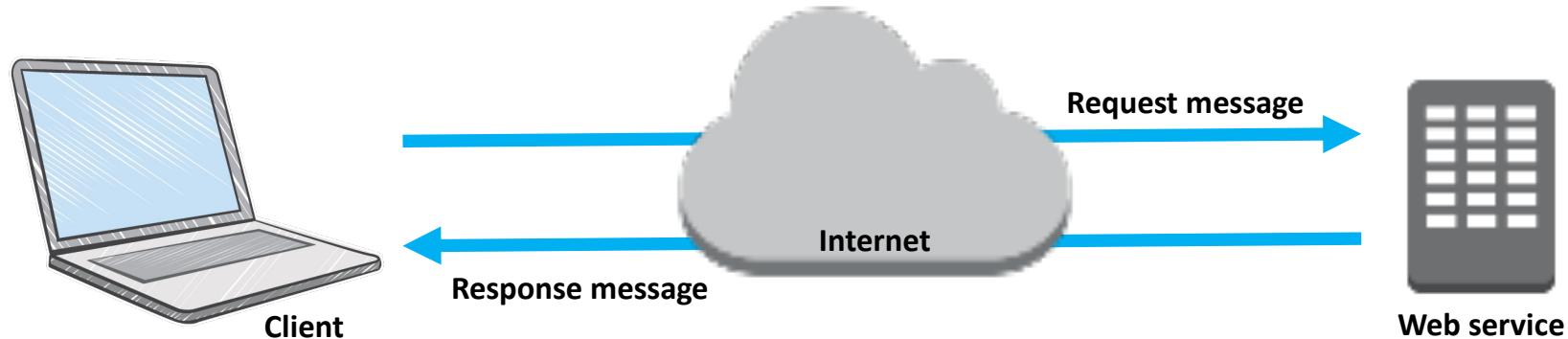
- Trade capital expense for variable expense
- Benefit from massive economies of scale
- Stop guessing capacity
- Increase speed and agility
- Stop spending money on running and maintaining data centers
- Go global in minutes

Section 3: Introduction to Amazon Web Services (AWS)

Module 1: Cloud Concepts Overview

What are web services?

A **web service** is any piece of software that makes itself available over the internet and uses a **standardized format**—such as Extensible Markup Language (XML) or JavaScript Object Notation (JSON)—for the request and the response of an **application programming interface (API) interaction**.



What is AWS?

- AWS is a **secure cloud platform** that offers a **broad set of global cloud-based products**.
- AWS provides you with **on-demand access** to compute, storage, network, database, and other IT resources and management tools.
- AWS offers **flexibility**.
- You **pay only for the individual services you need**, for as long as you use them.
- AWS services **work together** like building blocks.

Categories of AWS services



Analytics



Application Integration



AR and VR



Blockchain



Business Applications



Compute



Cost Management



Customer Engagement



Database



Developer Tools



End User Computing



Game Tech



Internet of Things



Machine Learning



Management and Governance



Media Services



Migration and Transfer



Mobile



Networking and Content Delivery



Robotics



Satellite

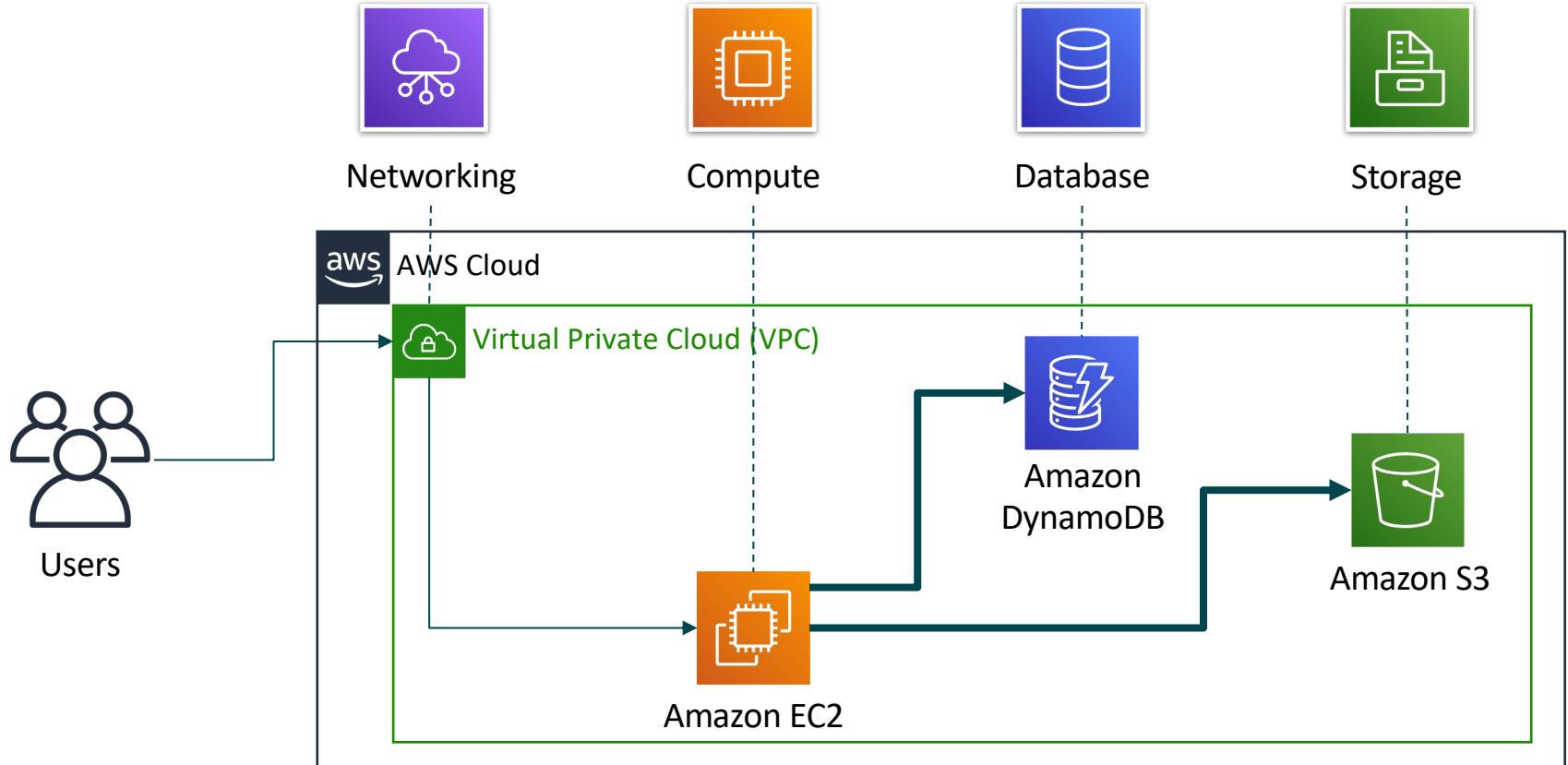


Security, Identity, and Compliance



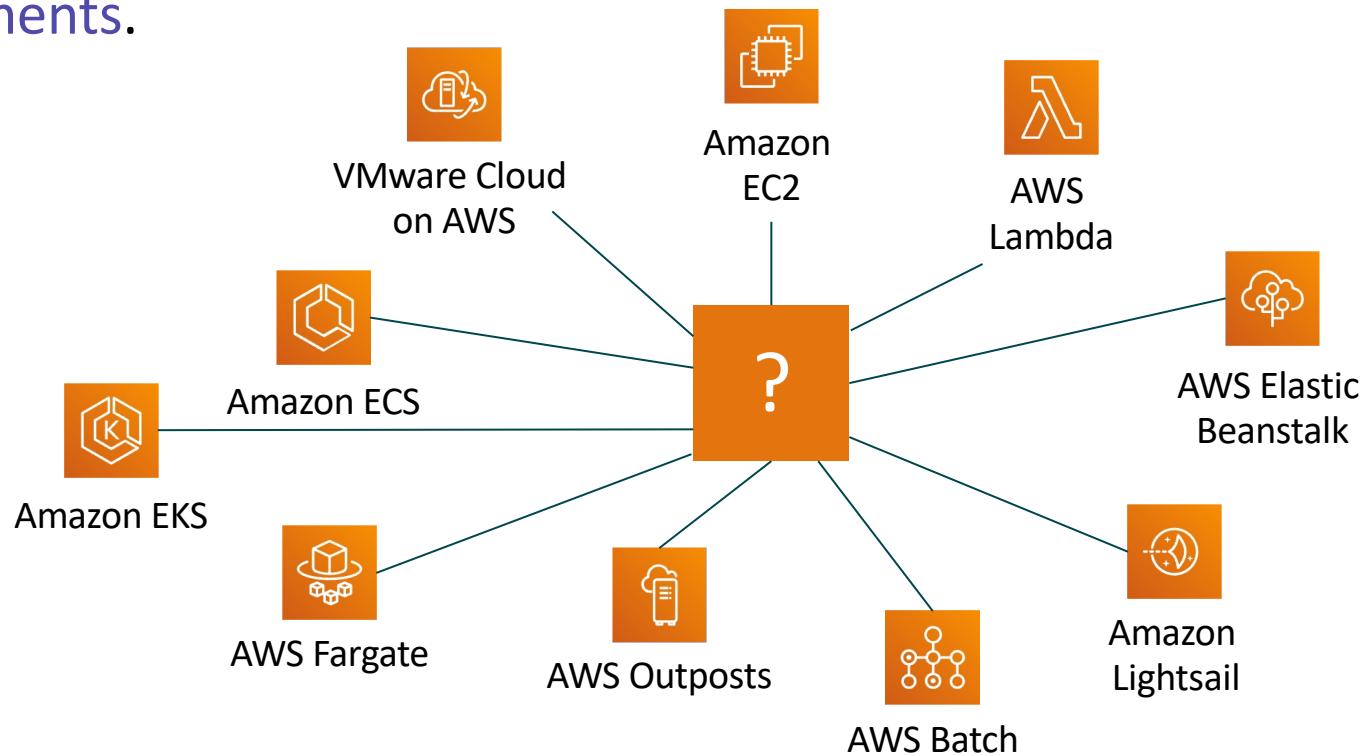
Storage

Simple solution example



Choosing a service

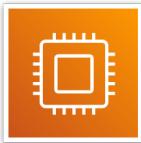
The service you select **depends on your business goals and technology requirements.**



Services covered in this course

Compute services –

- Amazon EC2
- AWS Lambda
- AWS Elastic Beanstalk
- Amazon EC2 Auto Scaling
- Amazon ECS
- Amazon EKS
- Amazon ECR
- AWS Fargate



Storage services –

- Amazon S3
- Amazon S3 Glacier
- Amazon EFS
- Amazon EBS



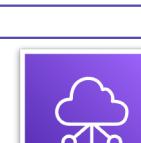
Security, Identity, and Compliance services –

- AWS IAM
- Amazon Cognito
- AWS Shield
- AWS Artifact
- AWS KMS



Networking and Content Delivery services –

- Amazon VPC
- Amazon Route 53
- Amazon CloudFront
- Elastic Load Balancing



Management and Governance services –

- AWS Trusted Advisor
- AWS CloudWatch
- AWS CloudTrail
- AWS Well-Architected Tool
- AWS Auto Scaling
- AWS Command Line Interface
- AWS Config
- AWS Management Console
- AWS Organizations



AWS Cost Management services –

- AWS Cost & Usage Report
- AWS Budgets
- AWS Cost Explorer



Three ways to interact with AWS



AWS Management Console

Easy-to-use graphical interface

```
AWS Storage Gateway Network Configuration
1: Describe Adapter
2: Create Adapter
3: Configure Static IP
4: Set Adapter IP
5: Set Default Adapter
6: View DNS Configuration
7: View Routes
Press "x" to exit
Enter command: 2
Available adapters: eth0
Selected Network Adapter: eth0
Reset to DHCP (ipconfig)
Adapter eth0 set to use DHCP
You must exit Network Configuration to complete this configuration.
Press Return to Continue...
```

Command Line Interface (AWS CLI)

Access to services by discrete commands or scripts



Software Development Kits (SDKs)

Access services directly from your code (such as Java, Python, and others)

Section 3 key takeaways



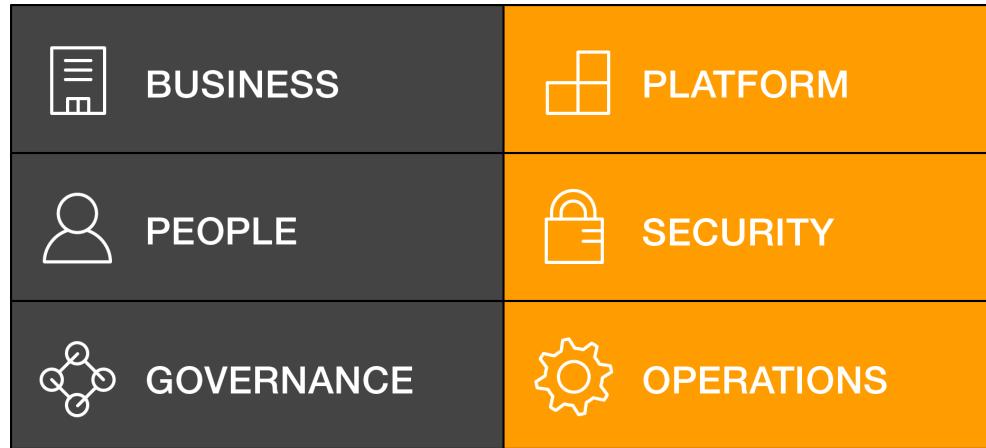
- AWS is a secure cloud platform that offers a broad set of global cloud-based products called services that are designed to work together.
- There are many categories of AWS services, and each category has many services to choose from.
- Choose a service based on your business goals and technology requirements.
- There are three ways to interact with AWS services.

Section 4: Moving to the AWS Cloud – The AWS Cloud Adoption Framework (AWS CAF)

Module 1: Cloud Concepts Overview



AWS Cloud Adoption Framework (AWS CAF)



AWS CAF perspectives

- AWS CAF provides guidance and best practices to help organizations build a comprehensive approach to cloud computing across the organization and throughout the IT lifecycle to accelerate successful cloud adoption.
- AWS CAF is organized into six perspectives.
- Perspectives consist of sets of capabilities.

Six core perspectives

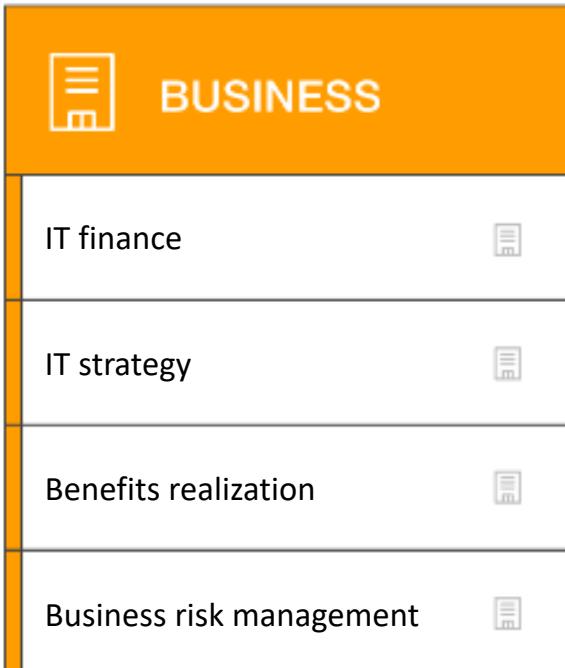


Focus on **business**
capabilities



Focus on **technical**
capabilities

Business perspective

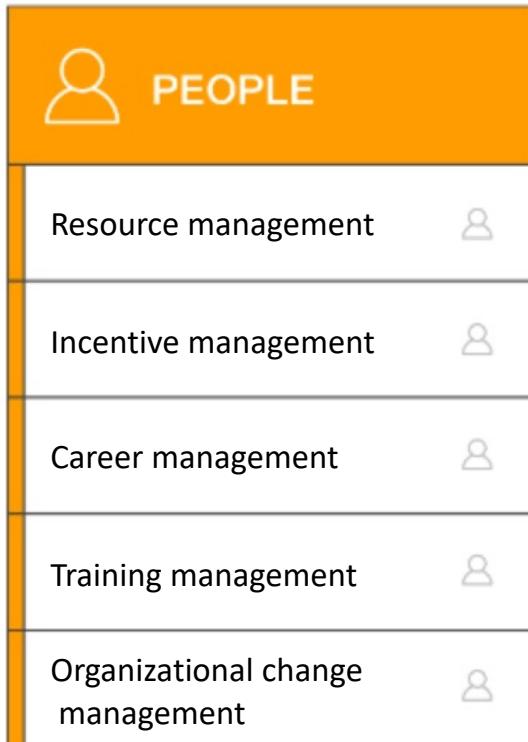


We must ensure that **IT is aligned with business needs**, and that IT investments can be traced to demonstrable business results.



Business managers, finance managers, budget owners, and strategy stakeholders

People perspective



People perspective capabilities

We must prioritize **training, staffing, and organizational changes** to build an agile organization.



Human resources, staffing,
and people managers

Governance perspective

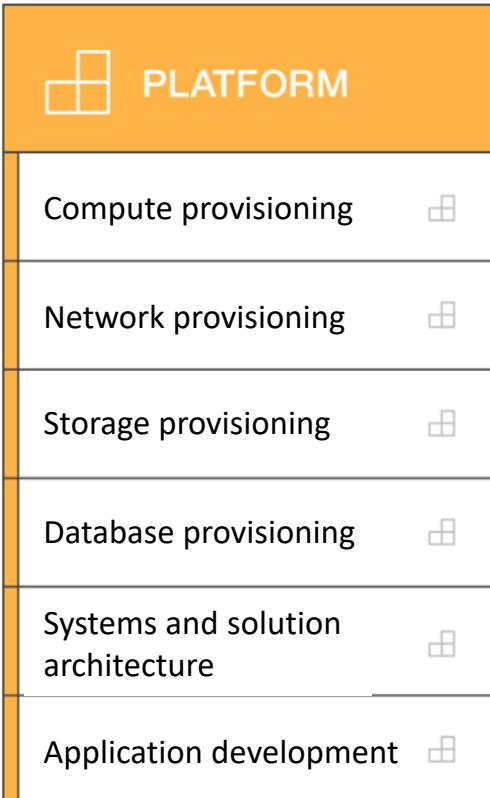


We must ensure that **skills and processes align IT strategy and goals with business strategy and goals** so the organization can maximize the business value of its IT investment and minimize business risks.



CIO, program managers, enterprise architects, business analysts, and portfolio managers

Platform perspective



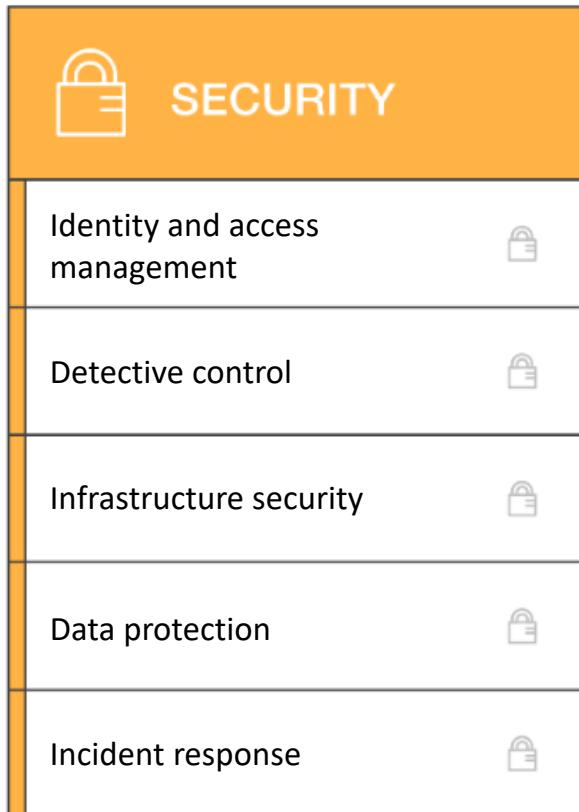
We must understand and communicate the nature of IT systems and their relationships. We must be able to describe the architecture of the target state environment in detail.



CTO, IT managers, and solutions architects

Platform perspective capabilities

Security perspective



Security perspective capabilities

We must ensure that the organization **meets its security objectives**.



CISO, IT security managers,
and IT security analysts

Operations perspective



Operations perspective capabilities

We align with and support the operations of the business, and **define how day-to-day, quarter-to-quarter, and year-to-year business will be conducted.**



IT operations managers and
IT support managers

Section 4 key takeaways



- Cloud adoption is not instantaneous for most organizations and requires a thoughtful, deliberate strategy and alignment across the whole organization.
- The AWS CAF was created to help organizations develop efficient and effective plans for their cloud adoption journey.
- The AWS CAF organizes guidance into six areas of focus, called perspectives.
- Perspectives consist of sets of business or technology capabilities that are the responsibility of key stakeholders.

Module wrap-up

Module 1: Cloud Concepts Overview

Module summary

In summary, in this module you learned how to:

- Define different types of cloud computing models
- Describe six advantages of cloud computing
- Recognize the main AWS service categories and core services
- Review the AWS Cloud Adoption Framework

Complete the knowledge check



Sample exam question

Why is AWS more economical than traditional data centers for applications with varying compute workloads?

Choice	Response
A	Amazon Elastic Compute Cloud (Amazon EC2) costs are billed on a monthly basis.
B	Customers retain full administrative access to their Amazon EC2 instances.
C	Amazon EC2 instances can be launched on-demand when needed.
D	Customers can permanently run enough instances to handle peak workloads.

- A Amazon Elastic Compute Cloud (Amazon EC2) costs are billed on a monthly basis.
- B Customers retain full administrative access to their Amazon EC2 instances.
- C Amazon EC2 instances can be launched on-demand when needed.
- D Customers can permanently run enough instances to handle peak workloads.

Sample exam question answer

Why is AWS more economical than traditional data centers for applications with varying compute workloads?

The correct answer is C.

The keywords in the question are AWS is more economical than traditional data centers for applications with varying.

Additional resources

- What is AWS? YouTube video:
https://www.youtube.com/watch?v=mZ5H8sn_2ZI&feature=youtu.be
- Cloud computing with AWS website: <https://aws.amazon.com/what-is-aws/>
- Overview of Amazon Web Services whitepaper:
<https://d1.awsstatic.com/whitepapers/aws-overview.pdf>
- An Overview of the AWS Cloud Adoption Framework whitepaper:
https://d1.awsstatic.com/whitepapers/aws_cloud_adoption_framework.pdf
- 6 Strategies for Migrating Applications to the Cloud AWS Cloud Enterprise Strategy blog post: <https://aws.amazon.com/blogs/enterprise-strategy/6-strategies-for-migrating-applications-to-the-cloud/>



Module 2: Cloud Economics and Billing

AWS Academy Cloud Foundations

Module overview

Topics

- Fundamentals of pricing
- Total Cost of Ownership
- AWS Organizations
- AWS Billing and Cost Management
- Technical Support

Activities

- AWS Pricing Calculator
- Support plans scavenger hunt

Demo

- Overview of the Billing Dashboard



Knowledge check

Module objectives

After completing this module, you should be able to:

- Explain the AWS pricing philosophy
- Recognize fundamental pricing characteristics
- Indicate the elements of total cost of ownership
- Discuss the results of the AWS Pricing Calculator
- Identify how to set up an organizational structure that simplifies billing and account visibility to review cost data.
- Identify the functionality in the AWS Billing Dashboard
- Describe how to use AWS Bills, AWS Cost Explorer, AWS Budgets, and AWS Cost and Usage Reports
- Identify the various AWS technical support plans and features

Section 1: Fundamentals of pricing

Module 2: Cloud Economics and Billing

AWS pricing model

Three fundamental drivers of cost with AWS

Compute

- Charged per hour/second*
- Varies by instance type

*Linux only

Storage

- Charged typically per GB

Data transfer

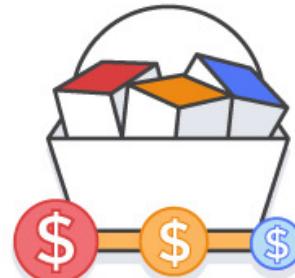
- Outbound is aggregated and charged
- Inbound has no charge (with some exceptions)
- Charged typically per GB

How do you pay for AWS?

Pay for what you use



Pay less when you reserve



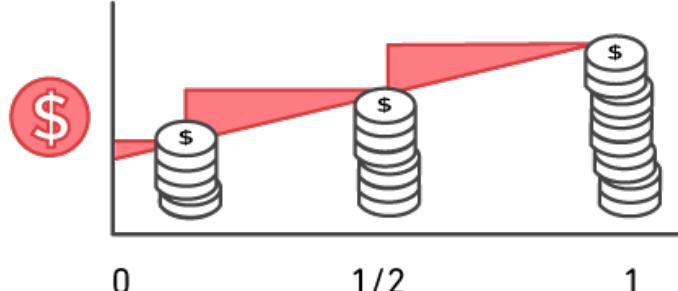
Pay less when you use
more and as AWS
grows



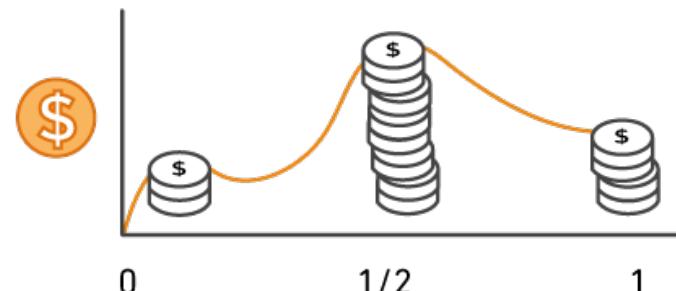
Pay for what you use

Pay only for the services that you consume, with no large upfront expenses.

On premises



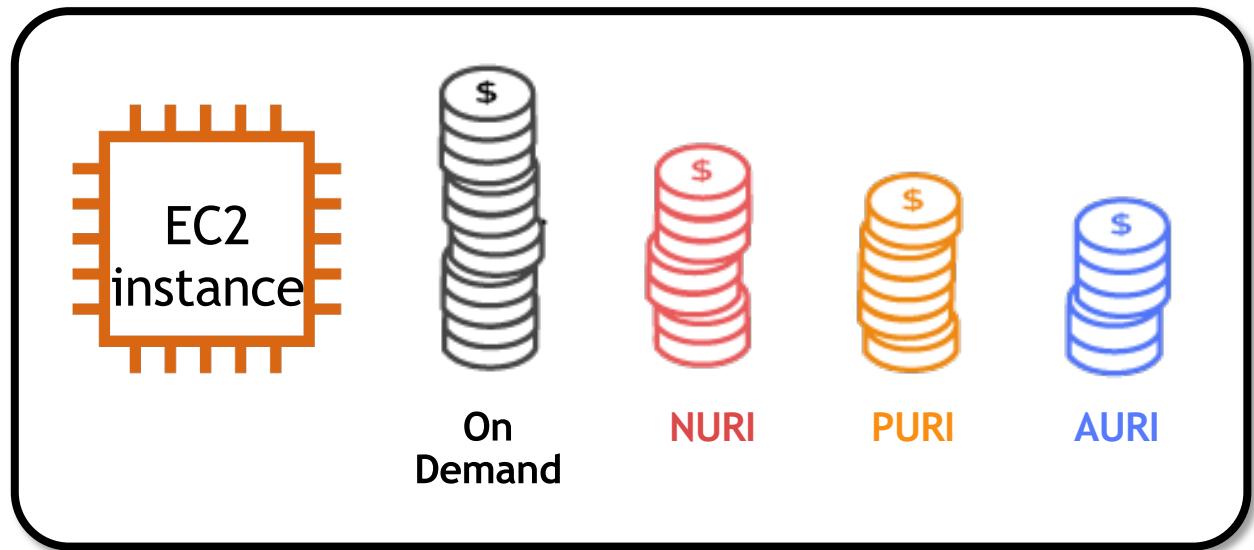
AWS



Pay less when you reserve

Invest in Reserved Instances (RIs):

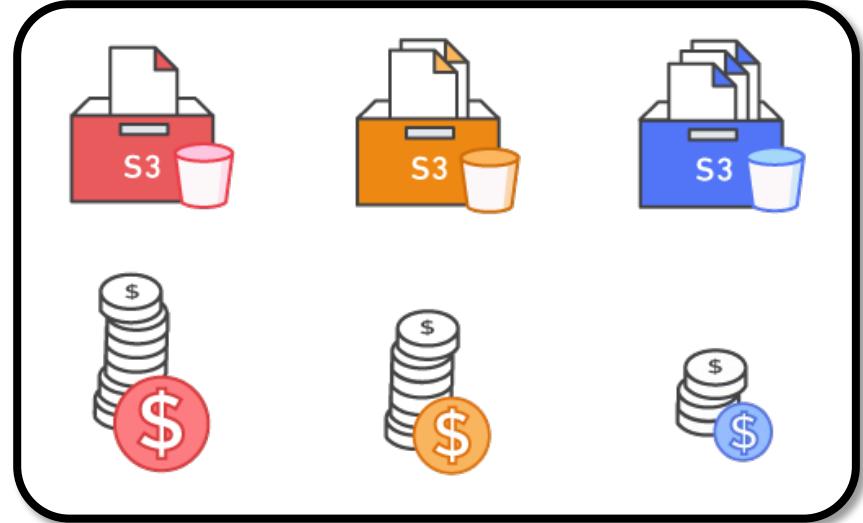
- Save up to 75 percent
- Options:
 - All Upfront Reserved Instance (**AURI**) → largest discount
 - Partial Upfront Reserved Instance (**PURI**) → lower discounts
 - No Upfront Payments Reserved Instance (**NURI**) → smaller discount



Pay less by using more

Realize volume-based discounts:

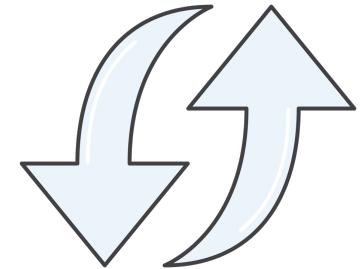
- **Savings** as usage increases.
- **Tiered pricing** for services like Amazon Simple Storage Service (Amazon S3), Amazon Elastic Block Store (Amazon EBS), or Amazon Elastic File System (Amazon EFS) → the more you use, the less you pay per GB.
- Multiple storage services deliver **lower** storage costs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



Pay even less as AWS grows

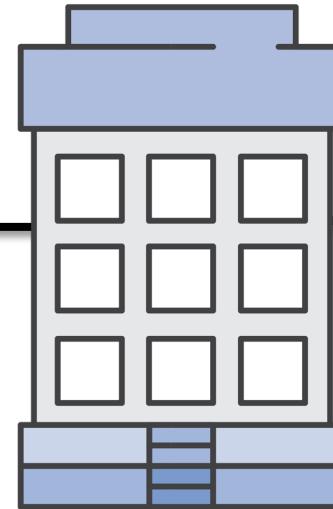
As AWS grows:

- 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 75 times** (as of September 2019).
- Future higher-performing resources replace current resources for no extra charge.



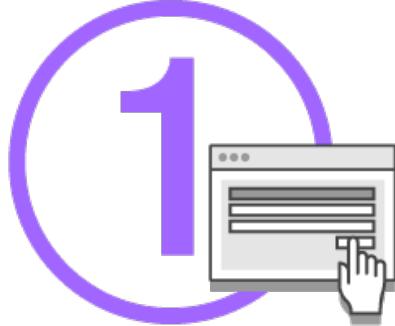
Custom pricing

- Meet varying needs through custom pricing.
- Available for high-volume projects with unique requirements.



AWS Free Tier

Enables you to gain free hands-on experience with the AWS platform, products, and services. Free for 1 year for new customers.



Sign up for an AWS account



Learn with 10-minute tutorials



Start building with AWS

Services with no charge



Amazon VPC



Elastic Beanstalk**



Auto Scaling**



AWS CloudFormation**



AWS Identity and Access Management (IAM)

****Note:** There might be charges associated with other AWS services that are used with these services.

Key takeaways

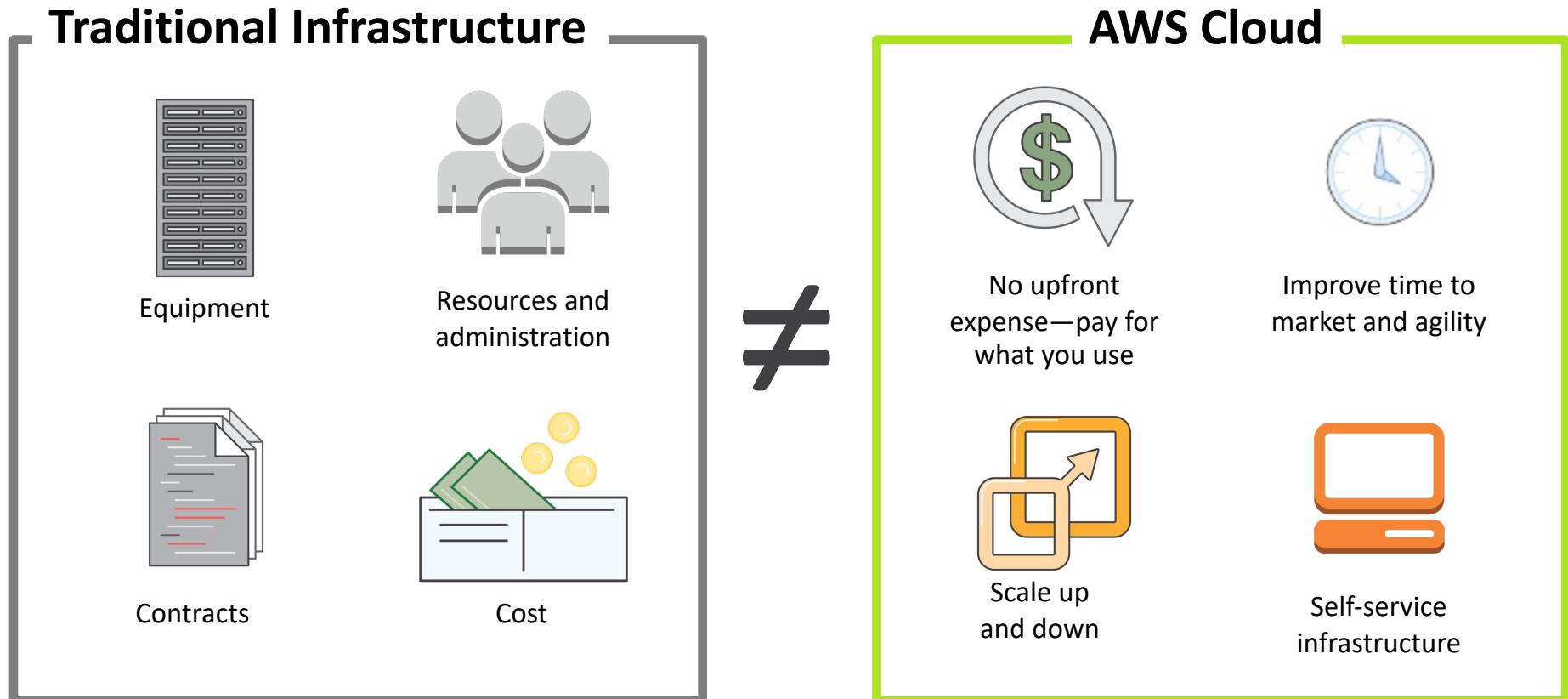


- There is no charge (with some exceptions) for:
 - Inbound data transfer.
 - Data transfer between services within the same AWS Region.
- Pay for what you use.
- Start and stop anytime.
- No long-term contracts are required.
- Some services are free, but the other AWS services that they provision might not be free.

Section 2: Total Cost of Ownership

Module 2: Cloud Economics and Billing

On-premises versus cloud

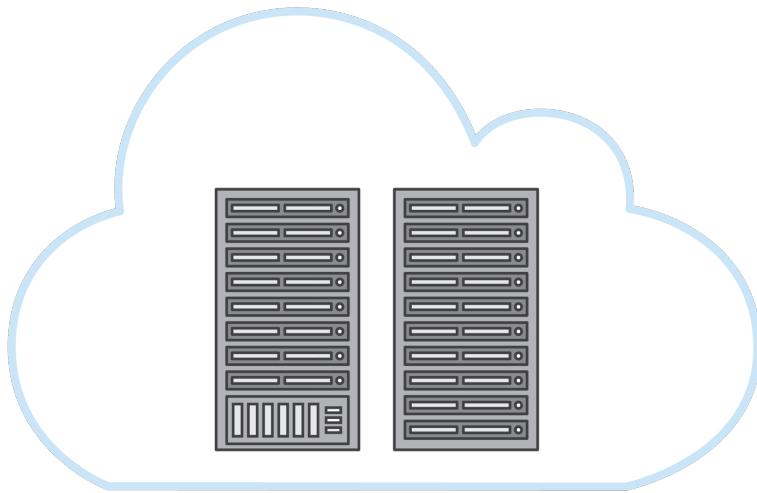


What is Total cost of Ownership (TCO)?

Total Cost of Ownership (TCO) is the financial estimate to help identify direct and indirect costs of a system.

Why use TCO?

- To compare the costs of running an **entire infrastructure environment or specific workload** on-premises versus on AWS
- To budget and **build the business case** for moving to the cloud



TCO considerations

1 Server Costs	Hardware: Server, rack chassis power distribution units (PDUs), top-of-rack (TOR) switches (and maintenance)	Software: Operating system (OS), virtualization licenses (and maintenance)	Facilities cost
			Space Power Cooling
2 Storage Costs	Hardware: Storage disks, storage area network (SAN) or Fibre Channel (FC) switches	Storage administration costs	Facilities cost
			Space Power Cooling
3 Network Costs	Network hardware: Local area network (LAN) switches, load balancer bandwidth costs	Network administration costs	Facilities cost
			Space Power Cooling
4 IT Labor Costs		Server administration costs	

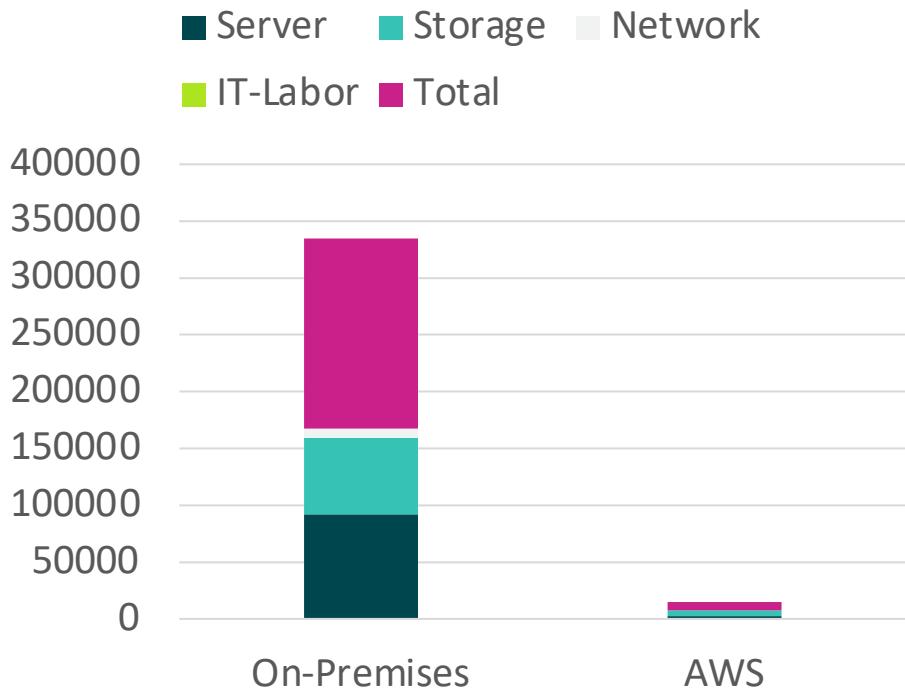
On-premises versus all-in-cloud

You could save up to **96 percent** a year by moving your infrastructure to AWS.

Your 3-year total savings would be **\$159,913**.

3-Year Total Cost of Ownership		
	On-Premises	AWS
Server	\$91,922	\$2,547
Storage	\$67,840	\$4,963
Network	\$7,660	\$-----
IT – Labor	\$ ----- --	\$-----
Total	\$167,422	\$7,509

AWS cost includes business-level support and
a 3-year PURI EC2 instance



AWS Pricing Calculator

Use the [AWS Pricing Calculator](#) to:

- Estimate monthly costs
- Identify opportunities to reduce monthly costs
- Model your solutions before building them
- Explore price points and calculations behind your estimate
- Find the available instance types and contract terms that meet your needs
- Name your estimate and create and name **groups** of services

The screenshot shows the AWS Pricing Calculator interface. At the top, there's a dark header with the title "AWS Pricing Calculator" and a sub-header "Estimate the cost for your architecture solution." Below the header, a sub-sub-header says "Configure a cost estimate that fits your unique business or personal needs with AWS products and services." To the right, there's a sidebar with sections like "Create an estimate" (with a "Create estimate" button), "Getting started" (with links to "What is the AWS Pricing Calculator?", "Getting started", and "Generating estimates"), and "More resources" (with links to "User guide", "FAQs", and "Pricing assumptions and variations"). The main content area is titled "How it works" and shows a four-step process: 1. AWS Pricing Calculator (Estimate the cost of AWS products and services). 2. Add services (Search and add AWS services that you need). 3. Configure service (Enter the details of your usage to see service costs). 4. View estimate totals (See estimated costs per service, service group, and totals). Arrows indicate the flow from step 1 through step 4.

Access the [AWS Pricing Calculator](#)

Reading an estimate

Your estimate is broken into: first 12 months total, total upfront, and total monthly.

AWS Pricing Calculator > My Estimate

My Estimate Info Add service Add support Add group Clear estimate Action ▾ Save and share

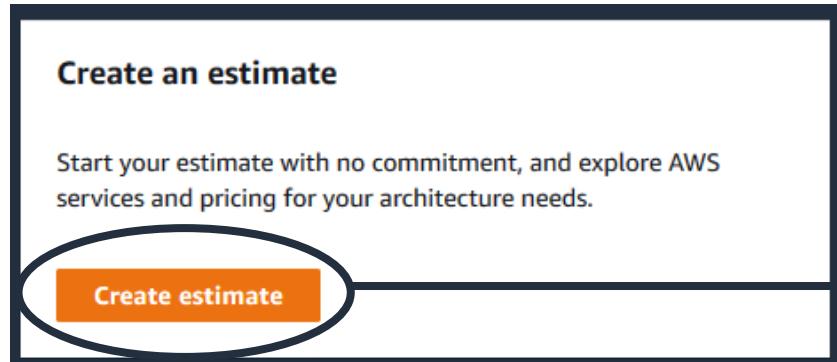
First 12 months total	Total upfront	Total monthly
886.92 USD	0.00 USD	73.91 USD

Services (2)

Amazon Simple Storage Service (S3) Region: US East (Ohio) S3 Standard storage (100 GB per month)	Monthly: 2.37 USD	Edit Action ▾
Amazon EC2 Region: US East (Ohio) Quick estimate Operating system (Linux), Quantity (1), Pricing strategy (EC2 Instance Savings Plans 1 Year No Upfront), Storage for each EC2 instance (General Purpose SSD (gp2)), Storage amount (100 GB), Instance type (t4g.xlarge)	Monthly: 71.54 USD	Edit Action ▾

Activity: AWS Pricing Calculator activity

- Break up into groups of four or five and use the [AWS Pricing Calculator](#) and specifications provided to develop a cost estimate.
- Be prepared to report your findings back to the class.



[AWS Pricing calculator website](#)

The screenshot shows the "aws pricing calculator" interface. At the top, it says "Step 1 Select service". Below this, there is a search bar with the placeholder "AWS services (63)". To the right of the search bar, there are several service cards. The first card is for "Amazon API Gateway", which is described as a fully managed service for creating, publishing, maintaining, monitoring, and securing APIs. It includes "Product page" and "Configure" buttons. The second card is for "Amazon Aurora PostgreSQL-Compatible DB", described as a MySQL and PostgreSQL-compatible relational database built for the cloud. It also includes "Product page" and "Configure" buttons. The third card is for "Amazon Athena", described as an interactive query service for analyzing data in Amazon S3, with a note that there is no infrastructure required. It includes "Product page" and "Configure" buttons. The bottom right corner of the screenshot has some very small, partially cut-off text.

Additional benefit considerations

Hard benefits

- Reduced spending on compute, storage, networking, security
- Reductions in hardware and software purchases (capex)
- Reductions in operational costs, backup, and disaster recovery
- Reduction in operations personnel



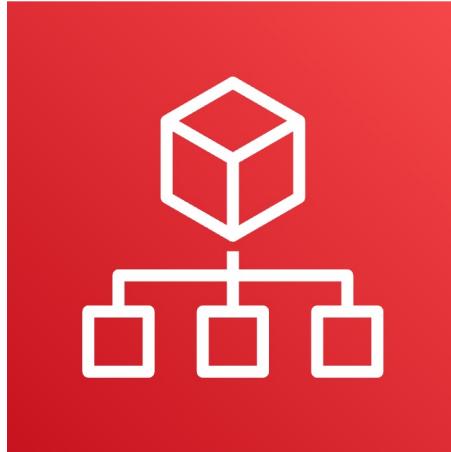
Soft Benefits

- Reuse of service and applications that enable you to define (and redefine solutions) by using the same cloud service
- Increased developer productivity
- Improved customer satisfaction
- Agile business processes that can quickly respond to new and emerging opportunities
- Increase in global reach

Section 3: AWS Organizations

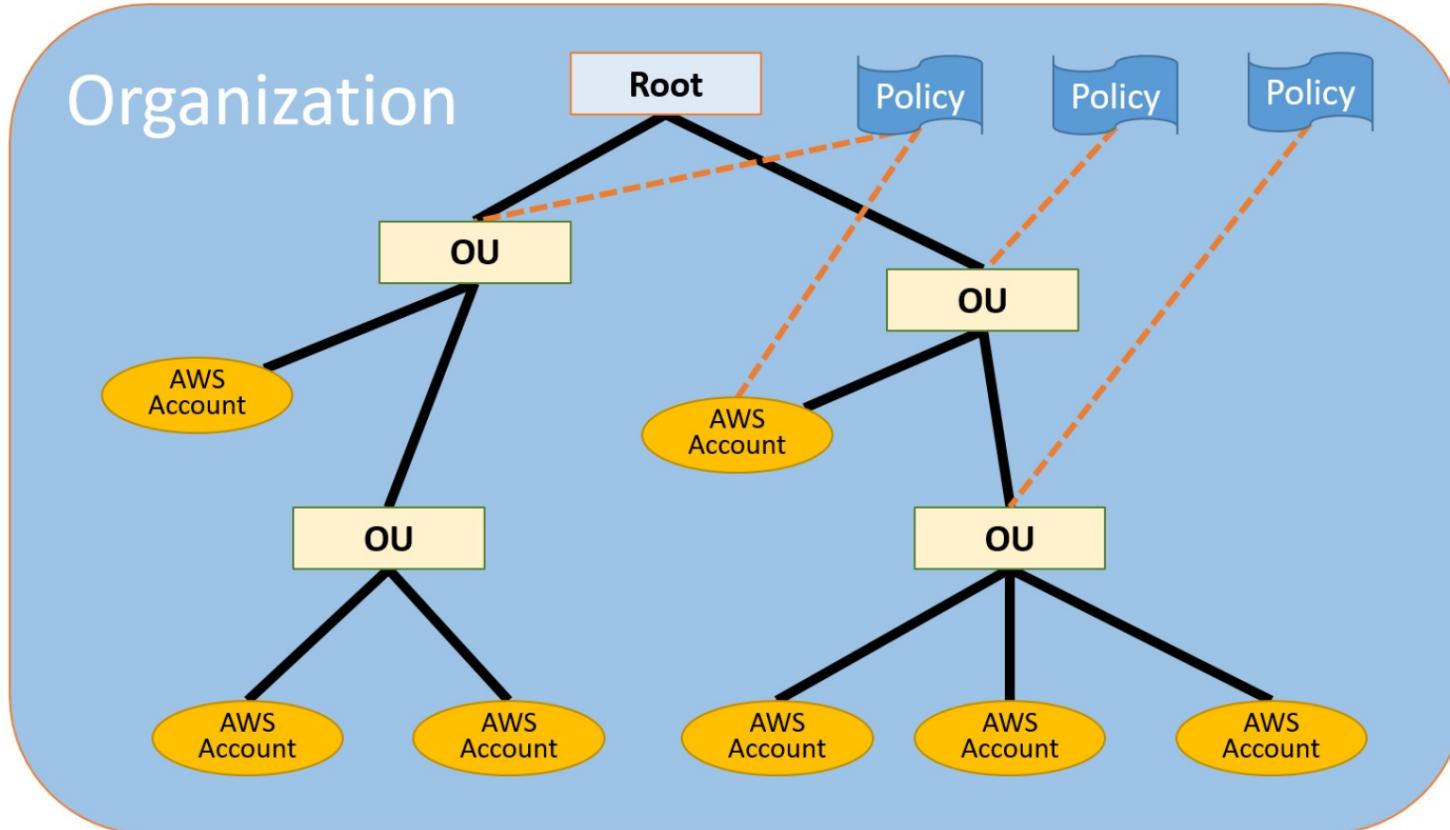
Module 2: Cloud Economics and Billing

Introduction to AWS Organizations



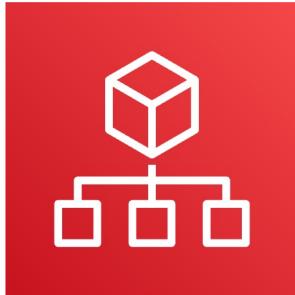
AWS Organizations

AWS Organizations terminology

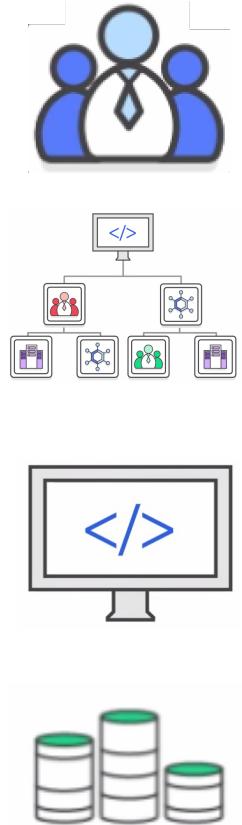


*Organizational Units (OUs)

Key features and benefits



AWS
Organizations



Policy-based account management

Group based account management

Application programming interfaces (APIs)
that automate account management

Consolidated billing

Security with AWS Organizations



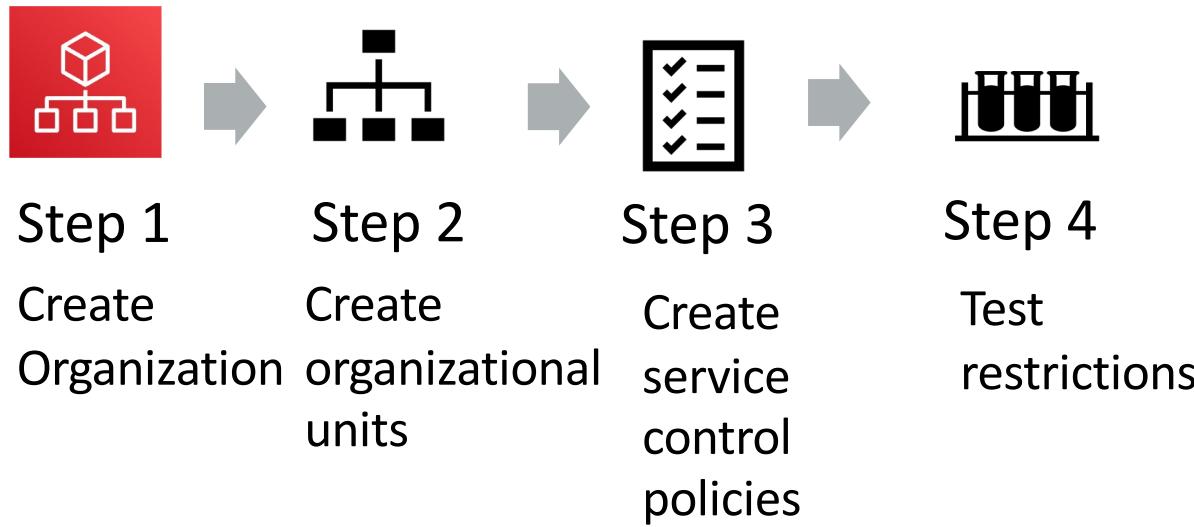
Control access with AWS Identity and Access Management (IAM).

IAM policies enable you to allow or deny access to AWS services for users, groups, and roles.



Service control policies (SCPs) enable you to allow or deny access to AWS services for individuals or group accounts in an organizational unit (OU).

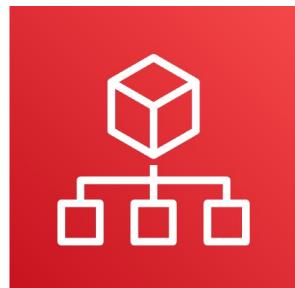
Organizations setup



Limits of AWS Organizations

Limits	
Limits on Names	Names must be composed of Unicode characters. Names must not exceed 250 characters in length.
Maximum and Minimum Values	Number of AWS accounts
	Number of roots
	Number of OUs
	Number of policies
	Maximum size of a service control policy document
	Maximum nesting of OUs in a root
	Invitations sent per day
	Number of member accounts you can create concurrently
	Number of entities to which you can attach a policy

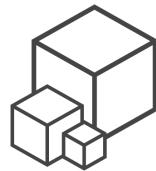
Accessing AWS Organizations



AWS
Organizations



AWS Management Console



AWS Command Line
Interface (AWS CLI) tools



Software development kits
(SDKs)



HTTPS Query application
programming interfaces (API)

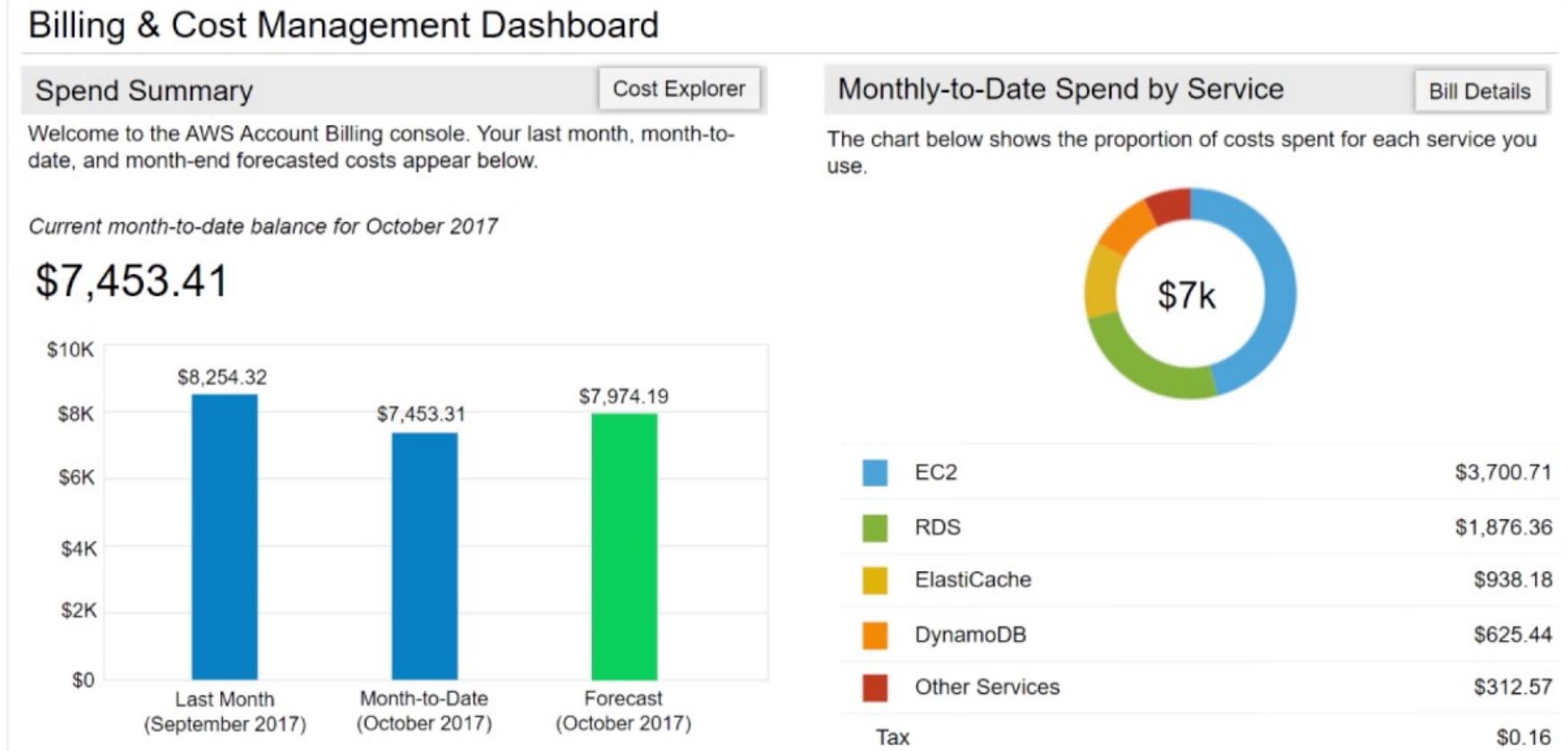
Section 4: AWS Billing and Cost Management

Module 2: Cloud Economics and Billing

Introducing AWS Billing and Cost Management



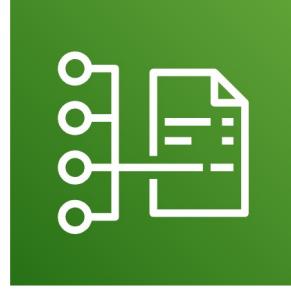
AWS Billing Dashboard



Tools



AWS Budgets



AWS Cost and Usage Report



AWS Cost Explorer

Monthly bills

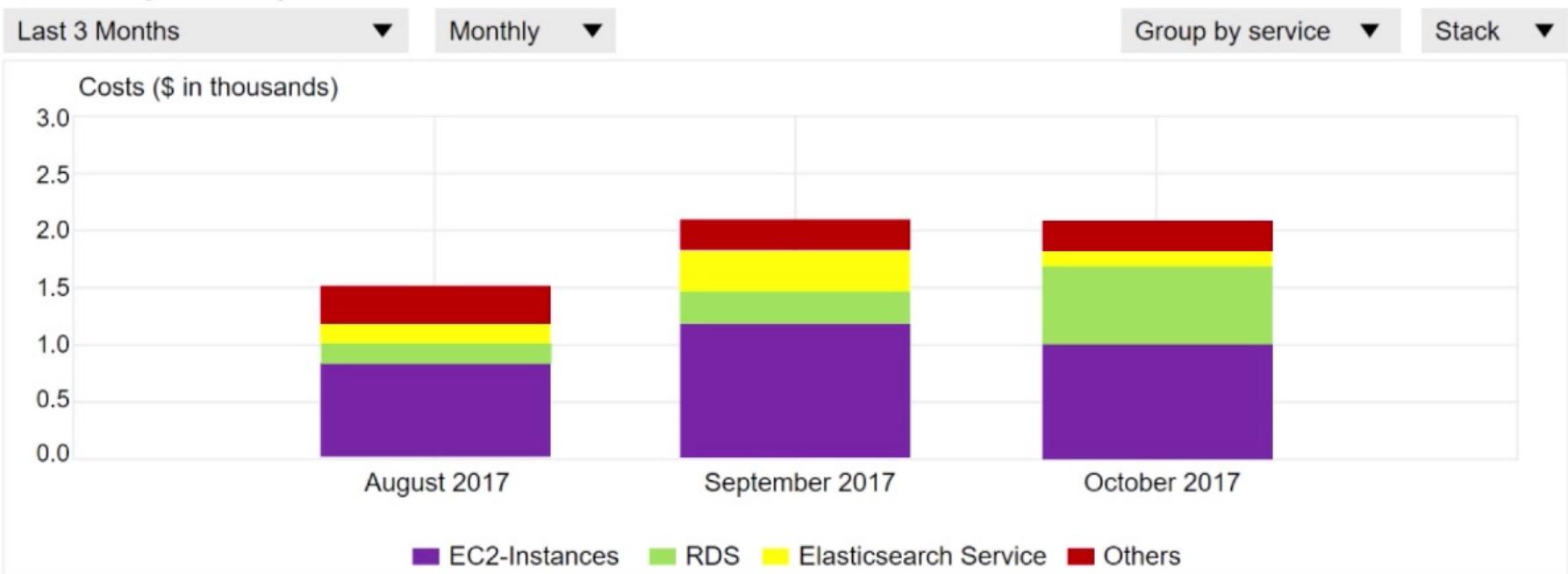
BILLS | COST EXPLORER | BUDGETS | REPORTS

Total	\$7,453.41	USD
AWS Marketplace Charges		\$15.00
▼ Usage Charges and Recurring Fees		\$15.00
Invoice 32342548 – AWS Service Charges: Usage charge for this statement period	2017-10-10	\$15.00
AWS Service Charges		\$7,438.41
▼ Usage Charges and Recurring Fees		\$7,414.41
Invoice 32342513 – AWS Service Charges: Usage charge for this statement period	2017-10-10	\$7,414.41
▼ Usage Charges and Recurring Fees		\$24.00
Invoice 32342507 – AWS Service Charges: Subscription charge	2017-10-10	\$24.00

Cost Explorer

BILLS | COST EXPLORER | BUDGETS | REPORTS

Monthly costs by service



Forecast and track costs

BILLS | COST EXPLORER | **BUDGETS** | REPORTS

Create budget Copy Edit Delete Download CSV

Filter by budget name

	Budget name	Current	Forecasted	Budgeted	Current vs. budgeted	Forecasted vs. budgeted
<input type="checkbox"/>	▶ Total Monthly Cost	\$760.27	\$787.44	\$1,000.00		
<input type="checkbox"/>	▼ S3 Usage Bucket	2978.00 Req	3650.16 Req	3000.00 Req		

Budget details

Start date 10/01/17

End date -

Budget Period Monthly

Variance analysis

Cost and usage reporting

BILLS | COST EXPLORER | BUDGETS | REPORTS

Product Code	Usage Type	Operation	Availability Zone	Usage Amount	Currency Code	Line Item Description
Amazon S3	Requests – Tier 1	ListAllMyBuckets		2	USD	\$0.00 per request – PUT, COPY, POST, LIST under the global free tier
Amazon EC2	USW2-Boxusage:t2.micro	Runinstnaces:0002	us-west-2a	1	USD	\$0.00 per Windows t2.micro instance-hour under monthly free tier
Amazon S3	Requests – Tier 1	ListAllMyBuckets		2	USD	\$0.00 per request – PUT, COPY, POST, LIST under the global free tier
Amazon EC2	USW2-Boxusage:t2.micro	Runinstnaces:0002	us-west-2a	1	USD	\$0.00 per Windows t2.micro instance-hour under monthly free tier
Amazon S3	Requests – Tier 1	ListAllMyBuckets		2	USD	\$0.00 per request – PUT, COPY, POST, LIST under the global free tier
Amazon S3	Requests – Tier 1	ListAllMyBuckets		2	USD	\$0.00 per request – PUT, COPY, POST, LIST under the global free tier

Recorded demo: Amazon Billing dashboard



Billing dashboard demonstration

Getting Started with AWS Billing & Cost Management

- Manage your costs and usage using [AWS Budgets](#)
- Visualize your cost drivers and usage trends via [Cost Explorer](#)
- Dive deeper into your costs using the [Cost and Usage Reports with Athena integration](#)
- Learn more:** Check out the [AWS What's New webpage](#)

Do you have Reserved Instances (RIs)?

- Access the RI Utilization & Coverage reports—and RI purchase recommendations—via [Cost Explorer](#).

Spend Summary

Welcome to the AWS Billing & Cost Management console. Your last month, month-to-date, and month-end forecasted costs appear below.

Current month-to-date balance for September 2019

\$168.20

Category	Value
Last Month	\$304.69
Month-to-Date	\$168.20
Forecast	\$284.01

Month-to-Date Spend by Service

The chart below shows the proportion of costs spent for each service you use.

Bill Details

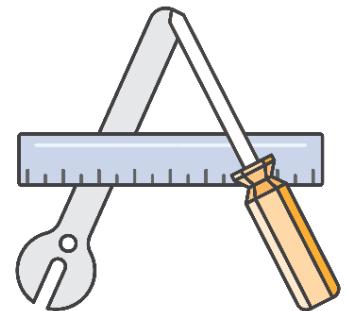
Service	Cost
ES	\$74.52
DatabaseMigrationSvc	\$32.12
SageMaker	\$29.99
EC2	\$16.59
Other Services	\$14.98
Tax	\$0.00
Total	\$168.20

Section 5: Technical support

Module 2: Cloud Economics and Billing

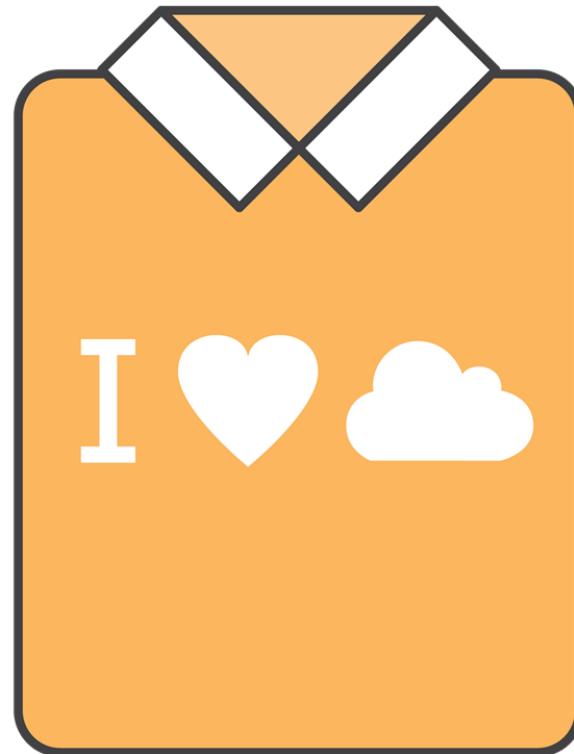
AWS support (1 of 2)

- Provide unique combination of tools and expertise:
 - AWS Support
 - AWS Support Plans
- Support is provided for:
 - Experimenting with AWS
 - Production use of AWS
 - Business-critical use of AWS



AWS support (2 of 2)

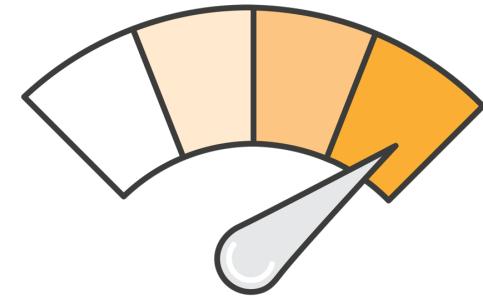
- Proactive guidance :
 - Technical Account Manager (TAM)
- Best practices :
 - AWS Trusted Advisor
- Account assistance :
 - AWS Support Concierge



Support plans

AWS Support offers four support plans:

- **Basic Support** – Resource Center access, Service Health Dashboard, product FAQs, discussion forums, and support for health checks
- **Developer Support**: Support for early development on AWS
- **Business Support**: Customers that run production workloads
- **Enterprise Support**: Customers that run business and mission-critical workloads



Case severity and response times

	Critical	Urgent	High	Normal	Low
Basic			No Case Support		
Developer Plan (Business hours)				12 hours or less	24 hours or less
Business Plan (24/7)		1 hour or less	4 hours or less	12 hours or less	24 hours or less
Enterprise Plan (24/7)	15 minutes or less	1 hour or less	4 hours or less	12 hours or less	24 hours or less

Module wrap-up

Module 2: Cloud Economics and Billing

Module summary

- Explored the fundamental of AWS pricing
- Reviewed TCO concepts
- Reviewed an AWS Pricing Calculator estimate
- Reviewed the Billing dashboard
- Reviewed Technical Support options and costs

Complete the knowledge check



Sample exam question

Which AWS service provides infrastructure security optimization recommendations?

Choice Response

- | | |
|---|--|
| A | AWS Price List Application Programming Interface (API) |
| B | Reserved Instances |
| C | AWS Trusted Advisor |
| D | Amazon Elastic Compute Cloud (Amazon EC2) Spot Fleet |

Sample exam question answer

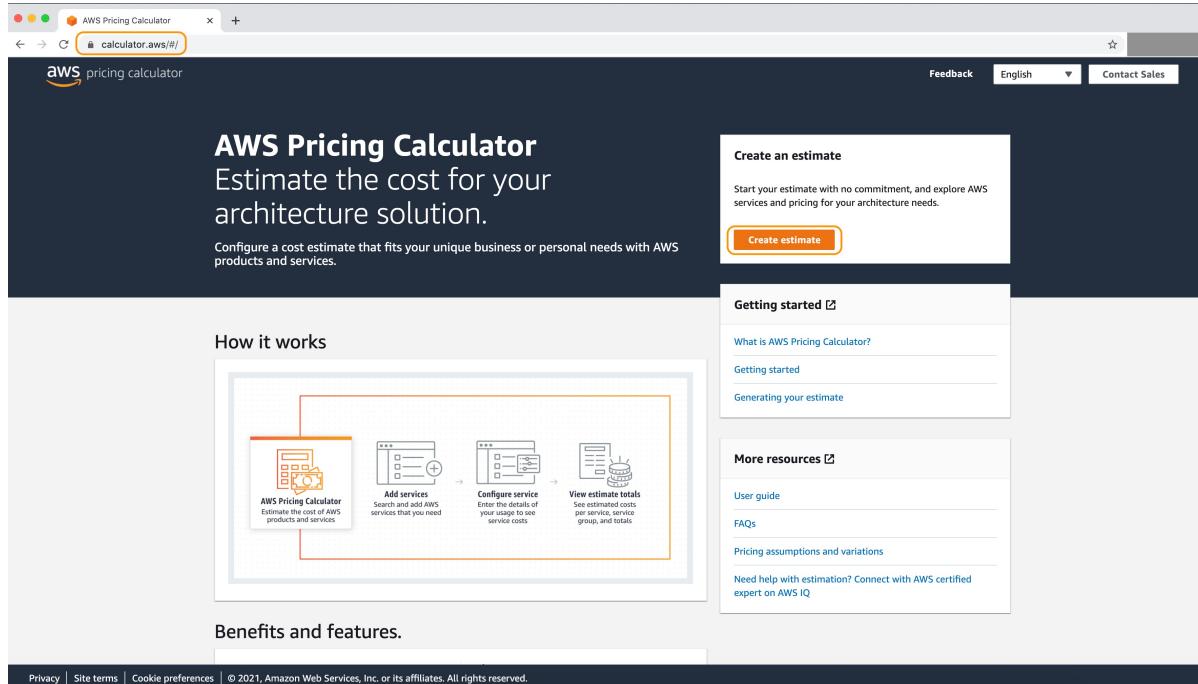
Which AWS service provides infrastructure security optimization recommendations?

The correct answer is C.

The keyword in the question is “recommendations”.

AWS CALCULATOR EXERCISE

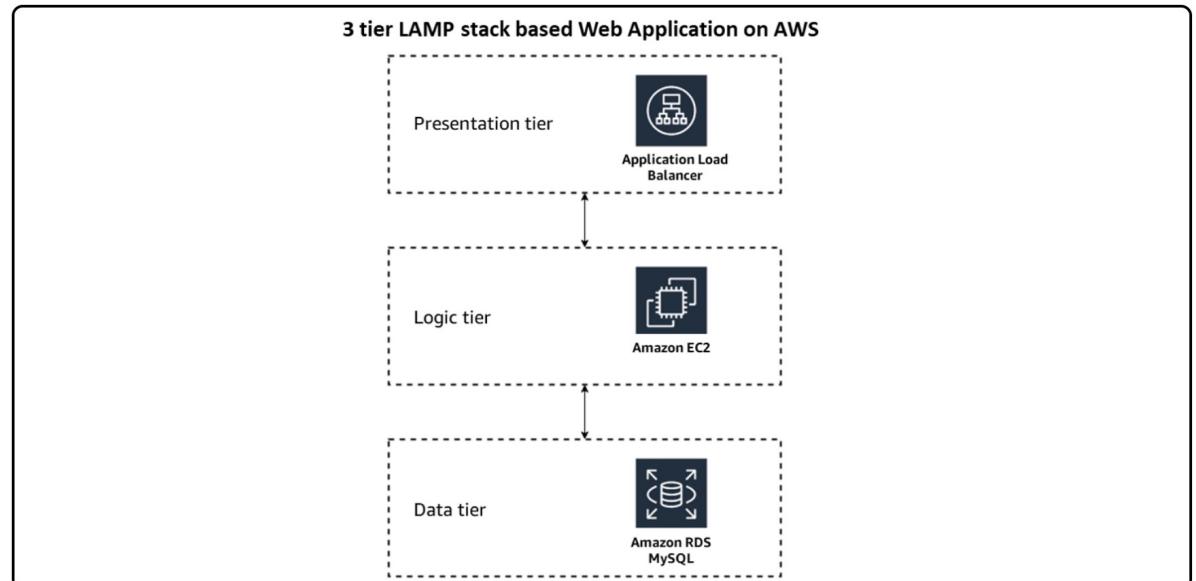
- <https://calculator.aws/#/>
- Click on “Create Estimate”



AWS CALCULATOR EXERCISE

- **WORLOAD DESCRIPTION**

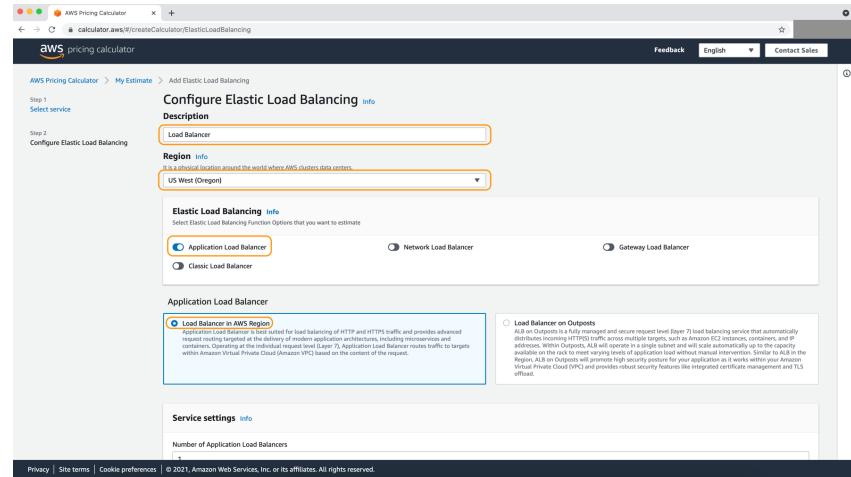
- Lets take the case of a customer facing Web Application. This general purpose workload takes input data from users (over the internet), processes it and returns the results. It is a **spiky** workload which receives **100 new connections per second**, each lasting approximately **3 min**. Per connection, the workload processes **1000 bytes of data across 4 requests per sec**. The workload requires **2 instances at peak**, with **2 GB RAM, 2 vCPU** each and **30 GB of storage** per instance. The workload needs a **100 GB database** which can support transactional traffic.



AWS CALCULATOR EXERCISE

• LOAD BALANCER

- On the Add Service page, choose Elastic Load Balancing by clicking Configure on that tile. You can also use the search bar by typing Load Balancer to narrow down the results.
- For the Description , enter “Load Balancer”
- Choose US West (Oregon) for the Region
- In the Elastic Load Balancing section, choose Application Load Balancer. Also choose Load Balancer in AWS Region
- In the Load Balancer Capacity Units (LCUs) section:
 - Skip Processed bytes (Lambda functions as targets) since we are using EC2 instances
 - For Processed bytes (EC2 Instances and IP addresses as targets) enter “0.36” GB per hour . We get this number since 1,000 bytes of data is processed connection.
 - For Average number of new connections per ALB enter “100” connections per second
 - For Average connection duration enter “3” minute
 - For Average number of requests per second per ALB enter “400”
 - Rules determine how the load balancer routes requests. For example, the default rule only routes HTTP traffic on port 80 to the EC2 instances (targets). Enter “20” for Average number of rule evaluations per request



AWS CALCULATOR EXERCISE

- EC2

- On the My Estimate page, click on Add Service.
- Choose EC2 by clicking Configure on that tile. You can also use the search bar by typing EC2 to narrow down the results. For the Description , enter “EC2”. Leave the default value for Region to be US West (Oregon)
- In the EC2 instance specifications section, choose Linux for the Operating system
- In the Workload section, you can select the pattern that best describes the workload.
 - Select Daily spike traffic
 - Expand the section Daily spike pattern by clicking on the arrow
 - Leave the workloads days to the default option - Monday to Friday
 - Enter 1 for the Baseline and 2 for the Peak, indicating that this workload requires 1 instance at normal times and 2 instances during peak.
 - Leave the default value - 8 hrs and 30 min for Duration of peak

- In the EC2 Instances section, Choose t4g.small. Pricing strategy = “On-Demand”
- In the Amazon Elastic Block Storage (EBS) section, configure the storage required for this workload
 - Choose gp3 for the storage type
 - Leave the default values for IOPS and Throughput - which is sufficient for this workload.
 - Enter 30 for Storage amount
 - Lets chose a daily backup schedule. Choose Daily for Snapshot Frequency and enter “1” GB for Amount changed per snapshot
- In the Data Transfer section, you can specify the networking requirements for this workload
 - Enter 50 and GB per month for Inbound Data Transfer
 - Enter 200 and GB per month for Outbound Data Transfer

AWS CALCULATOR EXERCISE

- RDS

- On the My Estimate page, click on Add Service.
- Choose RDS for MySQL by clicking Configure on that tile. You can also use the search bar by typing RDS to narrow down the results.
- Choose US West (Oregon) for the Region
- In the section MySQL instance specifications:
 - Enter 1 for Quantity
 - For this workload, a m6g.large database instance would be sufficient. Choose db.m6g.large
 - Choose Multi-AZ for Deployment Model
 - Leave the default options for Pricing model, Term and Purchase option

- In the section Storage:
 - Choose General Purpose SSD (gp2) for Storage for each RDS instance
 - Enter 100 GB for Storage amount
- For this workload, the default RDS backups are sufficient. You can skip the Backup section.

AWS CALCULATOR EXERCISE

The screenshot shows the AWS Pricing Calculator interface. At the top, there's a green banner indicating "Successfully added Amazon RDS for MySQL estimate." Below this, the main title is "My Estimate". The total cost for the first 12 months is listed as **3,968.07 USD**. The breakdown includes **Total upfront: 0.00 USD** and **Total monthly: 330.67 USD**.

Services (3)

- Amazon RDS for MySQL**
Description: Database
Region: US West (Oregon)
Monthly: 244.92 USD
Storage for each RDS instance (General Purpose SSD (gp2)), Storage amount (100 GB), Quantity (1), Instance type (db.m6g.large), Deployment option (Multi-AZ), Pricing strategy (OnDemand)
- RDS for MySQL**
Monthly: 244.92 USD
Storage for each RDS instance (General Purpose SSD (gp2)), Storage amount (100 GB), Quantity (1), Instance type (db.m6g.large), Deployment option (Multi-AZ), Pricing strategy (OnDemand)
- Amazon EC2**
Description: EC2
Region: US West (Oregon)
Monthly: 34.28 USD
Upfront: 0.00 USD
Operating system (Linux), Storage amount (30 GB), DT Inbound: Internet (50 GB per month), DT Outbound: Internet (200 GB per month), DT Intra-Region: (0 TB per month), Workload (Daily, Workload days: Monday, Tuesday, Wednesday, Thursday, Friday, Baseline: 1, Peak: 2, Duration of peak: 8 Hr 30 Min), Snapshot Frequency (Daily), Amount changed per snapshot (1 GB), Advance EC2 instance (t4g.small), Pricing strategy (On-Demand), General Purpose SSD (gp3) - IOPS (3000), General Purpose SSD (gp3) - Throughput (125 MBps)

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Additional resources

- AWS Economics Center: <http://aws.amazon.com/economics/>
- AWS Pricing Calculator: <https://calculator.aws/#/>
- Case studies and research: <http://aws.amazon.com/economics/>
- Additional pricing exercises: <https://dx1572sre29wk.cloudfront.net/cost/>



Module 3: AWS Global Infrastructure Overview

AWS Academy Cloud Foundations

Module overview

Topics

- AWS Global Infrastructure
- AWS service and service category overview

Demo

- AWS Global Infrastructure

Activities

- AWS Management Console clickthrough



Knowledge check

Module objectives

After completing this module, you should be able to:

- Identify the difference between AWS Regions, Availability Zones, and edge locations
- Identify AWS service and service categories

Section 1: AWS Global Infrastructure

Module 3: AWS Global Infrastructure Overview

AWS Global Infrastructure

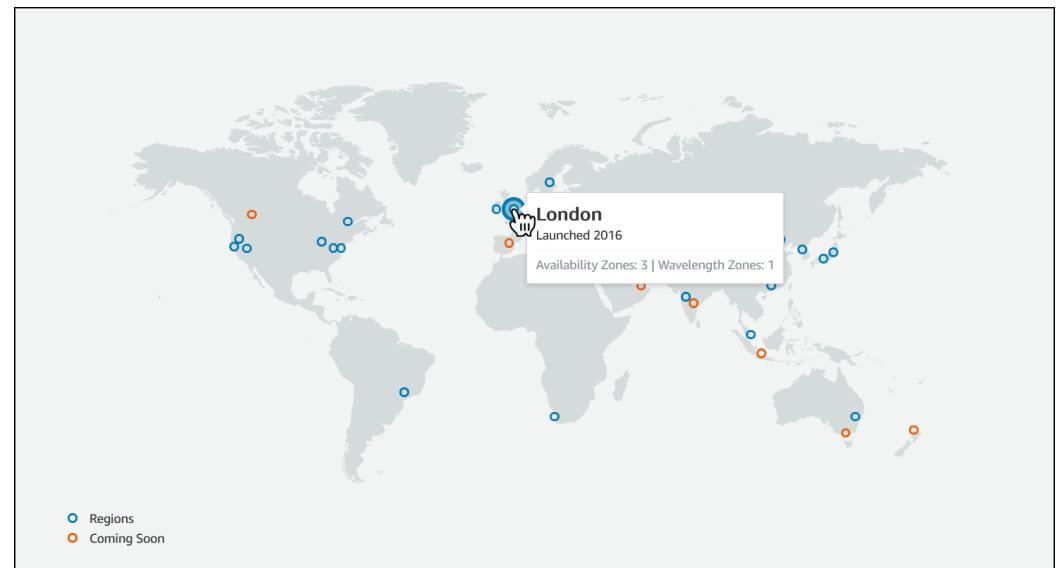
- The **AWS Global Infrastructure** is designed and built to deliver a **flexible, reliable, scalable**, and **secure** cloud computing environment with high-quality **global network performance**.
- AWS continually updates its global infrastructure footprint. Visit one of the following web pages for current infrastructure information:

- AWS Global Infrastructure Map:
https://aws.amazon.com/about-aws/global-infrastructure/#AWS_Global_Infrastructure_Map

Choose a circle on the map to view summary information about the Region represented by the circle.

- Regions and Availability Zones:
https://aws.amazon.com/about-aws/global-infrastructure/regions_az/

Choose a tab to view a map of the selected geography and a list of Regions, Edge locations, Local zones, and Regional Caches.

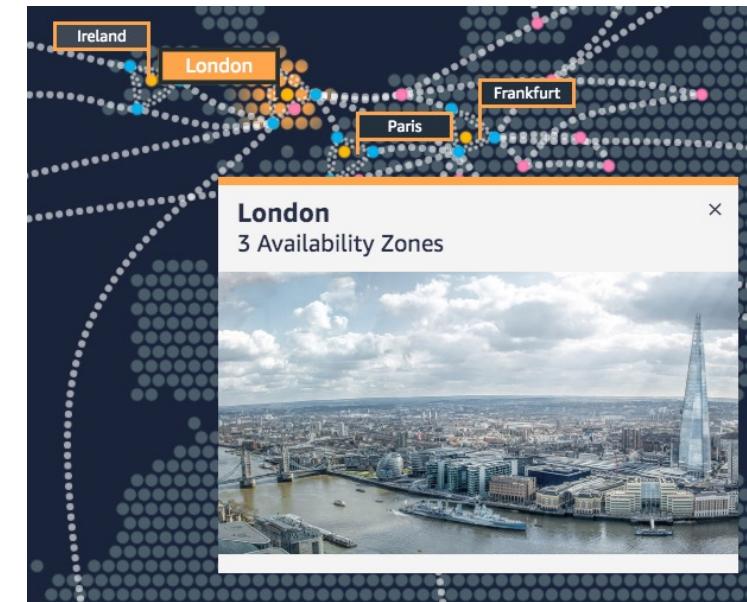


Educator-Led Demo: AWS Global Infrastructure Details



AWS Regions

- An **AWS Region** is a geographical area.
 - Data replication across Regions is controlled by you.
 - Communication between Regions uses AWS backbone network infrastructure.
- Each Region provides full redundancy and connectivity to the network.
- A Region typically consists of two or more **Availability Zones**.



Example: London Region

Selecting a Region

Determine the right Region for your services, applications, and data based on these factors



Data governance, legal requirements



Proximity to customers (latency)



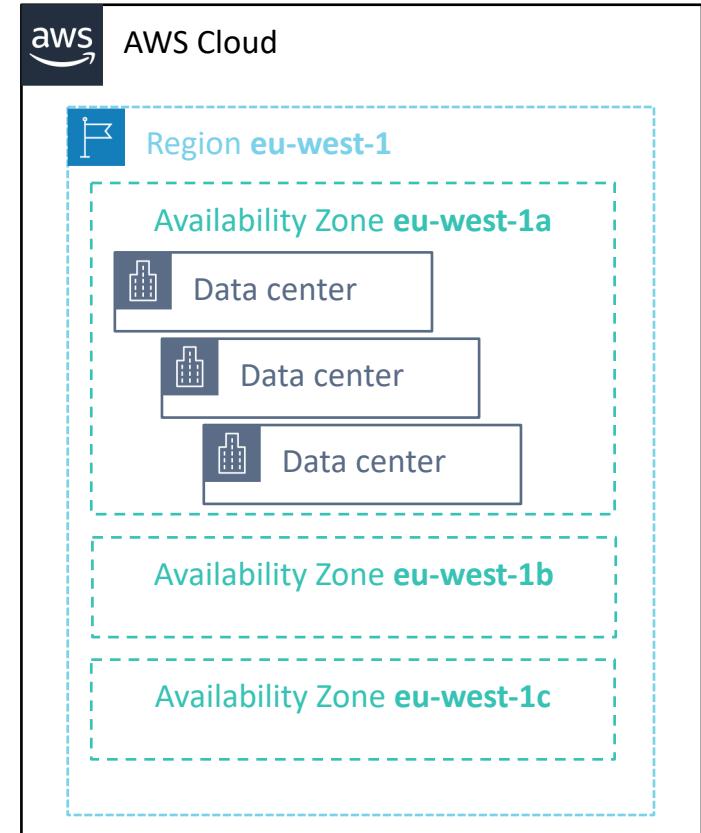
Services available within the Region



Costs (vary by Region)

Availability Zones

- Each **Region** has multiple Availability Zones.
- Each **Availability Zone** is a fully isolated partition of the AWS infrastructure.
 - Availability Zones consist of discrete **data centers**
 - They are designed for fault isolation
 - They are interconnected with other Availability Zones by using high-speed private networking
 - You choose your Availability Zones.
 - **AWS recommends replicating data and resources across Availability Zones** for resiliency.



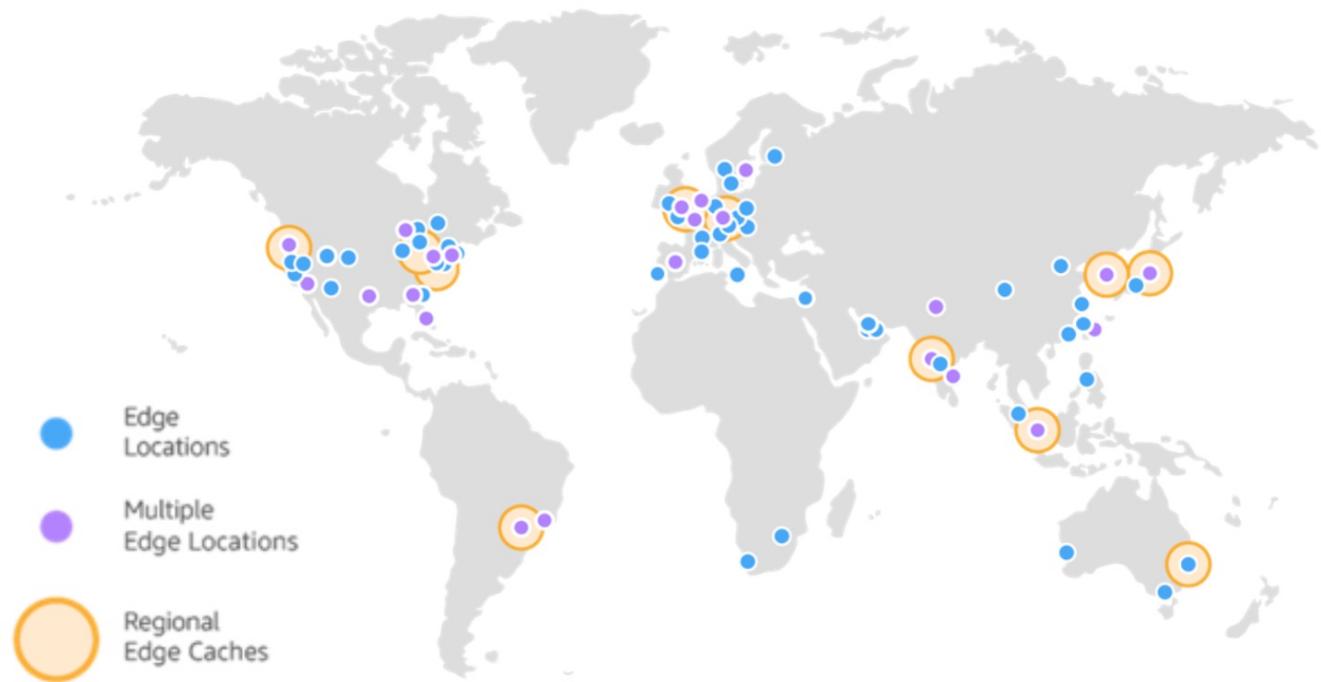
AWS data centers

- AWS data centers are **designed for security**.
- Data centers are where the data resides and data processing occurs.
- Each data center has redundant power, networking, and connectivity, and is housed in a separate facility.
- A data center typically has 50,000 to 80,000 physical servers.



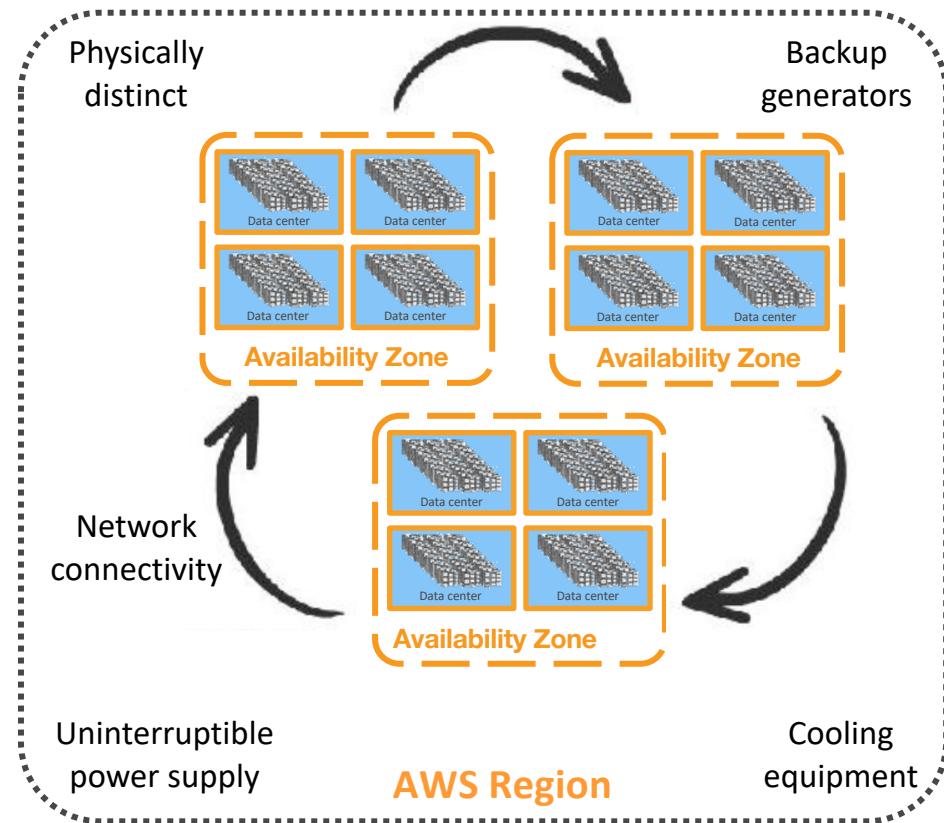
Points of Presence

- AWS provides a global network of **Points of Presence** locations
- Consists of **edge locations** and a much smaller number of **Regional edge caches**
- Used with Amazon CloudFront
 - A global Content Delivery Network (CDN), that delivers content to end users with **reduced latency**
- Regional edge caches used for content with infrequent access.



AWS infrastructure features

- Elasticity and scalability
 - Elastic infrastructure; dynamic adaption of capacity
 - Scalable infrastructure; adapts to accommodate growth
- Fault-tolerance
 - Continues operating properly in the presence of a failure
 - Built-in redundancy of components
- High availability
 - High level of operational performance
 - Minimized downtime
 - No human intervention



Key takeaways

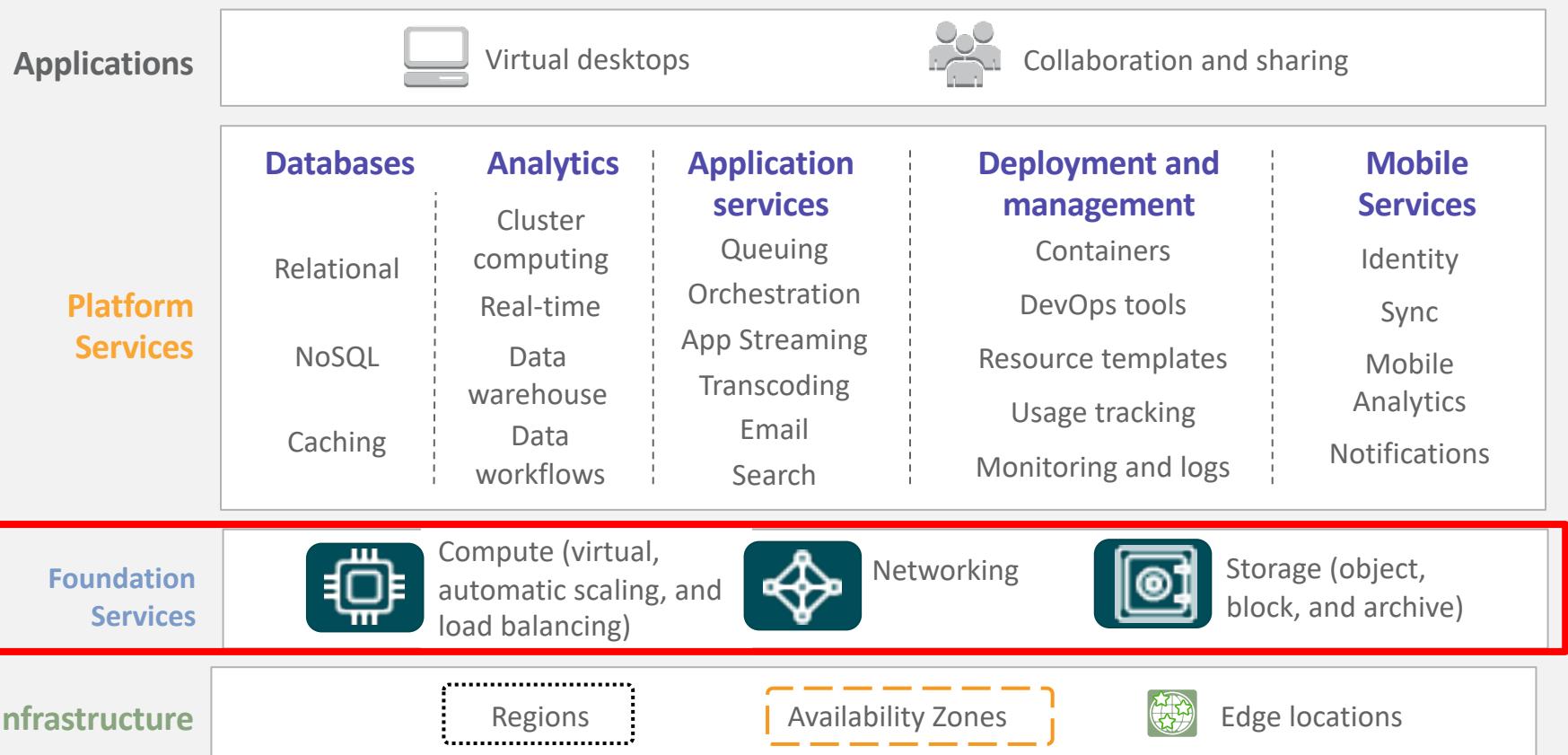


- The **AWS Global Infrastructure** consists of **Regions** and **Availability Zones**.
- Your choice of a **Region** is typically based on **compliance requirements** or to **reduce latency**.
- Each **Availability Zone** is physically separate from other Availability Zones and has redundant power, networking, and connectivity.
- **Edge locations**, and **Regional edge caches** improve performance by **caching content closer to users**.

Section 2: AWS services and service category overview

Module 3: AWS Global Infrastructure Overview

AWS foundational services



AWS categories of services



Analytics



Application Integration



AR and VR



Blockchain



Business Applications



Compute



Cost Management



Customer Engagement



Database



Developer Tools



End User Computing



Game Tech



Internet of Things



Machine Learning



Management and Governance



Media Services



Migration and Transfer



Mobile



Networking and Content Delivery



Robotics



Satellite



Security, Identity, and Compliance



Storage

Storage service category



Photo from <https://www.pexels.com/photo/black-and-grey-device-159282/>



AWS storage services



Amazon Simple Storage
Service (Amazon S3)



Amazon Elastic Block
Store (Amazon EBS)



Amazon Elastic
File System
(Amazon EFS)



Amazon Simple Storage
Service
Glacier

Compute service category

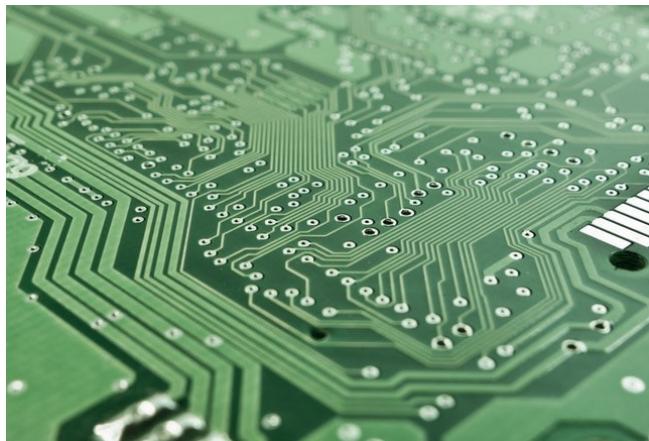
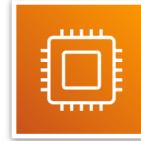


Photo from <https://www.pexels.com/photo/technology-computer-lines-board-50711/>



AWS Compute services



Amazon EC2



Amazon EC2
Auto Scaling



Amazon Elastic
Container Service
(Amazon ECS)



Amazon EC2
Container Registry



AWS Elastic
Beanstalk



AWS Lambda



Amazon Elastic
Kubernetes Service
(Amazon EKS)



AWS Fargate

Database service category

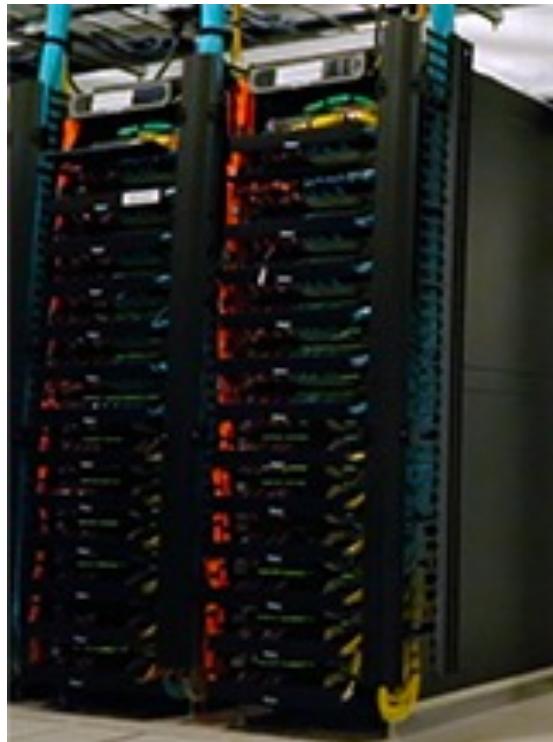


Photo from <https://aws.amazon.com/compliance/data-center/data-centers/>



AWS Database services



Amazon Relational
Database Service



Amazon Aurora



Amazon Redshift



Amazon
DynamoDB

Networking and content delivery service category



Photo by Umberto on Unsplash



**AWS networking
and content delivery** services



Amazon VPC



Elastic Load
Balancing



Amazon
CloudFront



AWS Transit
Gateway



Amazon
Route 53



AWS Direct
Connect



AWS VPN

Security, identity, and compliance service category



Photo by Paweł Czerwiński on Unsplash



**AWS security, identity,
and compliance** services



AWS Identity and Access
Management (IAM)



AWS
Organizations



Amazon Cognito



AWS Artifact



AWS Key
Management
Service



AWS Shield

AWS cost management service category



Photo by Alexander Mils on Unsplash



AWS cost management
services



AWS Cost and
Usage Report



AWS Budgets



AWS Cost
Explorer

Management and governance service category

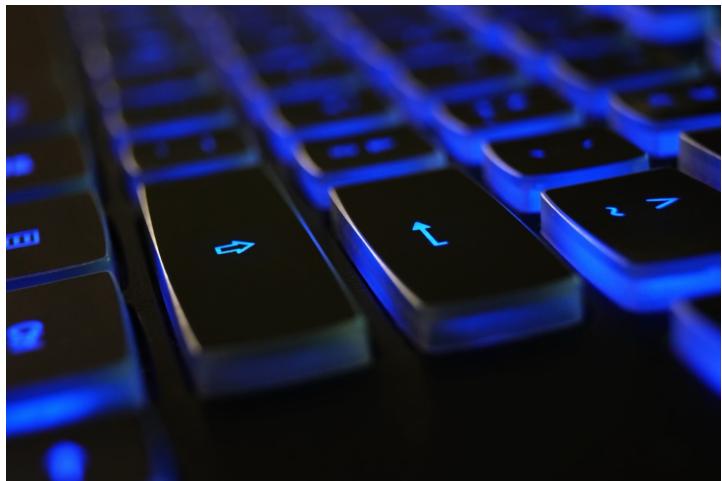


Photo by Marta Branco from Pexels



**AWS management and
governance** services



AWS Management
Console



AWS Config



Amazon
CloudWatch



AWS Auto
Scaling



AWS Command
Line Interface



AWS Trusted
Advisor



AWS Well-
Architected Tool



AWS
CloudTrail

Activity: AWS Management Console clickthrough



Photo by Pixabay from Pexels.

Hands-on activity: AWS Management Console clickthrough

1. Launch the [Sandbox](#) hands-on environment and connect to the [AWS Management Console](#).
2. Explore the AWS Management Console.
 - A. Click the **Services** menu.
 - B. Notice how services are grouped into service categories. For example, the **EC2** service appears in the **Compute** service category.
 - [Question #1:](#) Under which service category does the **IAM** service appear?
 - [Question #2:](#) Under which service category does the **Amazon VPC** service appear?
 - C. Click the **Amazon VPC** service. Notice that the dropdown menu in the top-right corner displays an AWS Region (for example, it might display *N. Virginia*).
 - D. Click the Region menu and switch to a different Region. For example, choose **EU (London)**.
 - E. Click **Subnets** (on the left side of the screen). The Region has three subnets in it. Click the box next to one of the subnets. Notice that the bottom half of the screen now displays details about this subnet.
 - [Question #3:](#) Does the subnet you selected exist at the level of the Region or at the level of the Availability Zone?
 - F. Click **Your VPCs**. An existing VPC is already selected.
 - [Question #4:](#) Does the VPC exist at the level of the Region or the level of the Availability Zone?
 - [Question #5:](#) Which services are global instead of Regional? Check Amazon EC2, IAM, Lambda, and Route 53.

Activity answer key

- Question #1: Under which service category does the **IAM** service appear?
 - Answer: **Security, Identity, & Compliance.**
- Question #2: Under which service category does the **Amazon VPC** service appear?
 - Answer: **Networking & Content Delivery**
- Question #3: Does the subnet that you selected exist at the level of the Region or the level of the Availability Zone?
 - Answer: Subnets exist at the **level of the Availability Zone.**
- Question #4: Does the VPC exist at the level of the Region or the level of the Availability Zone?
 - Answer: VPCs exist at the **Region level.**
- Question #5: Which of the following services are global instead of Regional? Check Amazon EC2, IAM, Lambda, and Route 53.
 - Answer: **IAM and Route 53 are global.** Amazon EC2 and Lambda are Regional.

Module wrap-up

Module 3: AWS Global Infrastructure Overview

Module summary

In summary, in this module you learned how to:

- Identify the difference between AWS Regions, Availability Zones, and edge locations
- Identify AWS service and service categories

Complete the knowledge check



Sample exam question

Which component of AWS global infrastructure does Amazon CloudFront use to ensure low-latency delivery?

Choice	Response
A	AWS Regions
B	AWS edge locations
C	AWS Availability Zones
D	Amazon Virtual Private Cloud (Amazon VPC)

Sample exam question answer

Which component of AWS global infrastructure does Amazon CloudFront use to ensure low-latency delivery?

The correct answer is B.

The keywords in the question are component of AWS global infrastructure, CloudFront, low-latency.

Additional resources

- AWS Global Infrastructure: <https://aws.amazon.com/about-aws/global-infrastructure/>
- AWS Regional Services List: <https://aws.amazon.com/about-aws/global-infrastructure/regional-product-services/>
- AWS Cloud Products: <https://aws.amazon.com/products/>

Thank you

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