Metropolitan State University
ICS 432 - 01: Distributed and Cloud Computing
Fall 2021

Week 15 Module: Cloud Economics and Billing
Total points: 35
Due: 12:20 PM on Saturday, December 11, 2021
Late submissions will NOT be accepted.

The purpose of this module is to introduce the business advantages for moving to the cloud. The module begins by explaining the pricing philosophy of AWS and the overall concept of Total Cost of Ownership (TCO). These concepts are important to understand because you might need to rely on them in cloud practitioner careers.

The module describes the following tools that are available for understanding and explaining the costs for running AWS services:

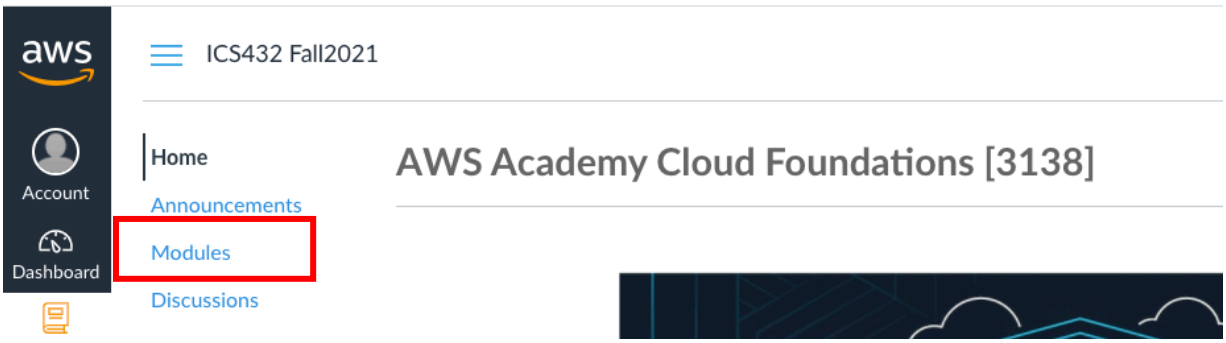
- AWS TCO Calculator
- AWS Simple Monthly Calculator
- AWS Organizations
- AWS Billing Dashboard

You will complete this module in three steps:

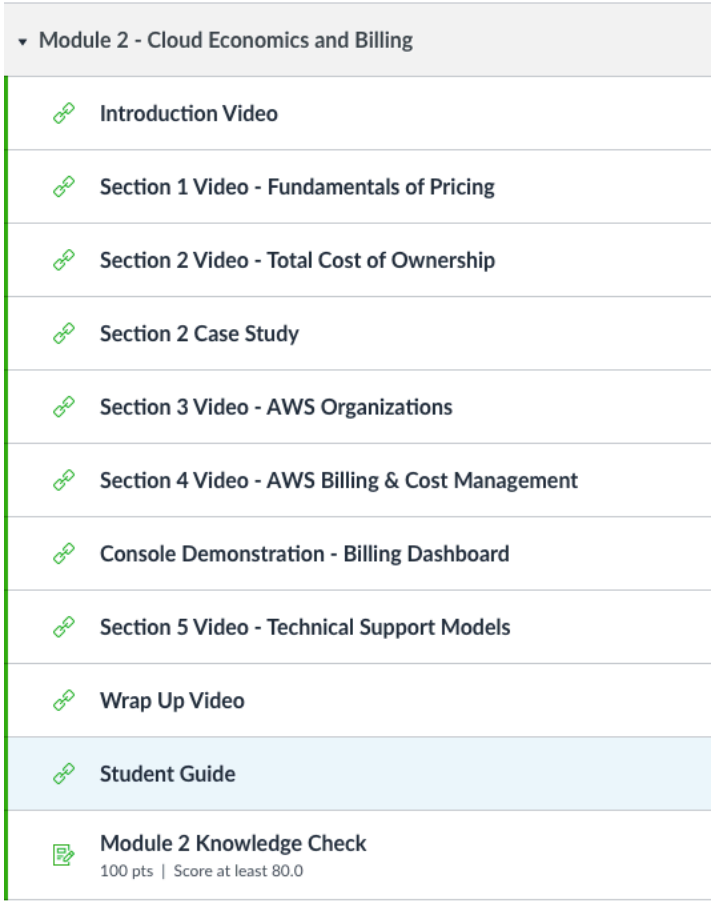
1- Watch videos and read the slides to learn the concepts.
2- Complete module Knowledge check → 10 points
3- Complete cost estimation activity → 25 points

Step 1: Learn about AWS Billing and Cost Estimation

1- Log in to AWS Academy and go to the ICS 432: AWS Academy Cloud Foundations course site.
2- From the left menu, click on Modules.



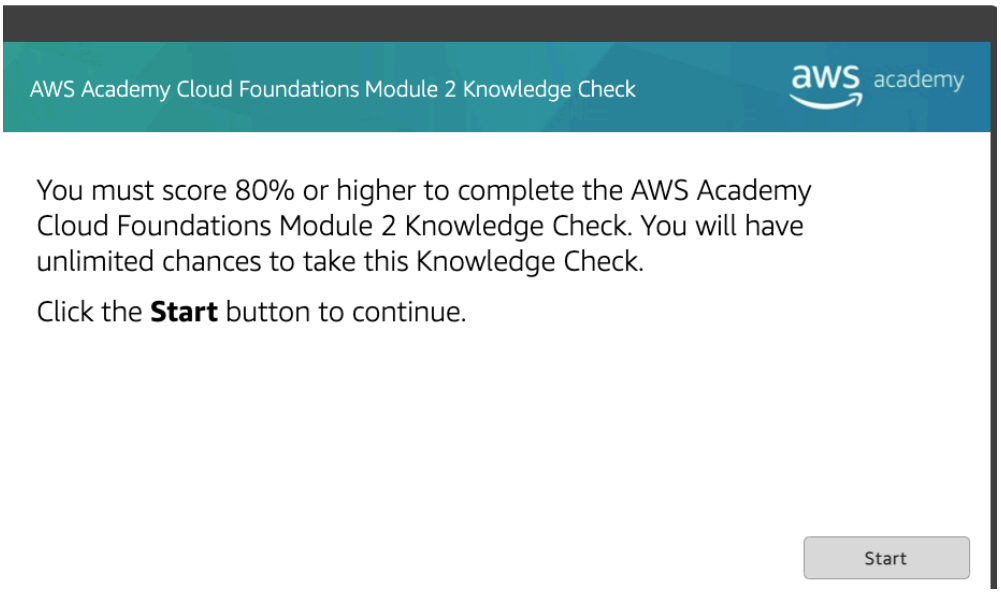
3- Watch all videos (total ~ 45 mins) in Module 2: Cloud Economics and Billing.
   - Introduction video: 1:29 mins
   - Fundamentals of Pricing: 4:29 mins
   - Total cost of ownership: 9:59 mins
   - Case Study: 2:53 mins
   - AWS Organizations: 5:19 mins
   - AWS Billing & Cost Management: 3:42 mins
   - Console Demonstration - Billing dashboard: 7:31 mins
   - Technical Support: 4:42 mins
   - Wrap up video: 2:30 mins



4- Read Student Guide slides (69 slides).

Step 2: Complete knowledge check quiz (10 points)

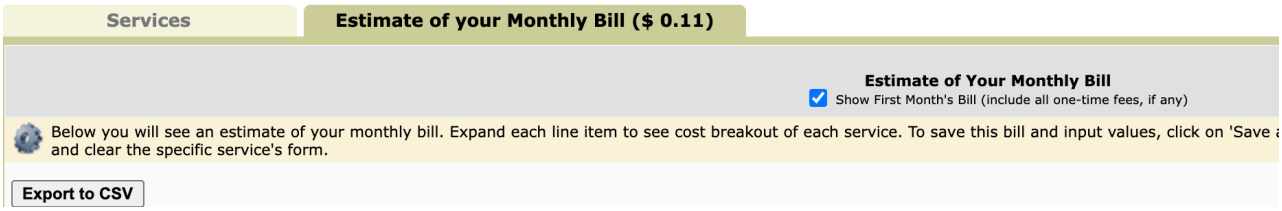
The Module 2 knowledge check is the last item in the list of topics in module 2. To complete the knowledge check, click on Start. The knowledge check consists of 10 multiple choice questions that are based only on the materials covered in this module. Note that you can attempt to take the knowledge check more than once.



Submission #1 (10 Points): At 12:30 PM on Saturday, December 11, I will log in to the AWS Academy course portal and I will copy your knowledge check score to the corresponding D2L entry.

Step 3: Week 15 Activity - Cost Estimation (25 points)

For this activity, you will use the Simple Monthly Calculator (https://calculator.s3.amazonaws.com/index.html) to estimate the costs for the following two scenarios. After you add all the services, go to Estimate your Monthly Bill tab and click on Export to CSV.



Take a screenshot of your CSV file or copy and paste the table to a word document. Upload the documents with the estimation for the two scenarios to the designated D2L folder by 12:20 PM on December 11, 2021.

Submission #2 (25 points): submit a word document that includes your cost estimation for the following two scenarios.

Scenario 1: Web Application with an Amazon RDS hosted database in the US West (Oregon) Region

Service	Data Required
Amazon Elastic Compute Cloud (Amazon EC2)	• Two Linux t3.2xlarge instances • 20 hours per day usage • 1-Year Reserved billing with no upfront costs
Amazon Simple Storage Service (Amazon S3)	• 100 GB Standard storage • 10,000 PUT, COPY, POST, or LIST requests • 5,000 GET, SELECT, and other requests. • 1 GB data returned by S3 Select • 10 GB data scanned by S3 Select • Amazon S3 data is replicated to US East (Ohio) to S3 Standard storage.
Elastic Load Balancing	• Three Application Load Balancers • Average of 50 connections/second per Application Load Balancer. • Average connection time is 60 seconds • Average of 100 requests per second for each Application Load Balancer • Data processed per Application Load Balancer for EC2 instances with IP address as targets is 100 GB/month • Average number of rule evaluations per request is 10
Amazon Route 53	• Five hosted zones, not using traffic flow • 10 million standard queries per month • 10,000 basic Domain Name System (DNS) health checks per month within AWS • 20,000 basic DNS health checks per month outside of AWS
	• 10 elastic network interfaces • Average of 2 million resolver queries per month
Amazon Relational Database Service (Amazon RDS)	• Two RDS db.r3.8xlage standard instances that run MySQL • 100 GB of General Purpose storage and no Provisioned IOPS • 30 GB of data transferred out per month and 5 GB of data transferred in
AWS Support	• Business Support

Scenario 2: Application using Amazon Simple Queue Service (Amazon SQS) and Amazon Athena in the Europe (Ireland) Region

Service	Data Required
Amazon Virtual Private Cloud (Amazon VPC)	• 100 virtual private network (VPN) connections with 50 percent utilization per month • 1 network address translation (NAT) Gateway with 50 percent utilization per month processing 100 GB per month • 100 GB transferred out per month • 10 GB transferred in per month
Amazon SQS	• 100,000 requests per month in a standard queue • 10,000 requests per month in a FIFP queue • 50,000 GB per month data transferred out • 20,000 GB per month data transferred in
Amazon DynamoDB	• 1 TB dataset On-demand capacity • 5-KB item size • Eventually consistent reads • 4 million items read per month • 2 million transactional items read per month • 2 million items written per month • 1 million transactional items written per month • 1 million replicated writer per month using on-demand global tables • 100 GB of on-demand data backup
Amazon Elastic File System (Amazon EFS)	• 100 GB of data stored in standard storage • 50 GB stored in infrequently accessed storage • 10 MBps of provisioned throughput
AWS Support	• Enterprise Support