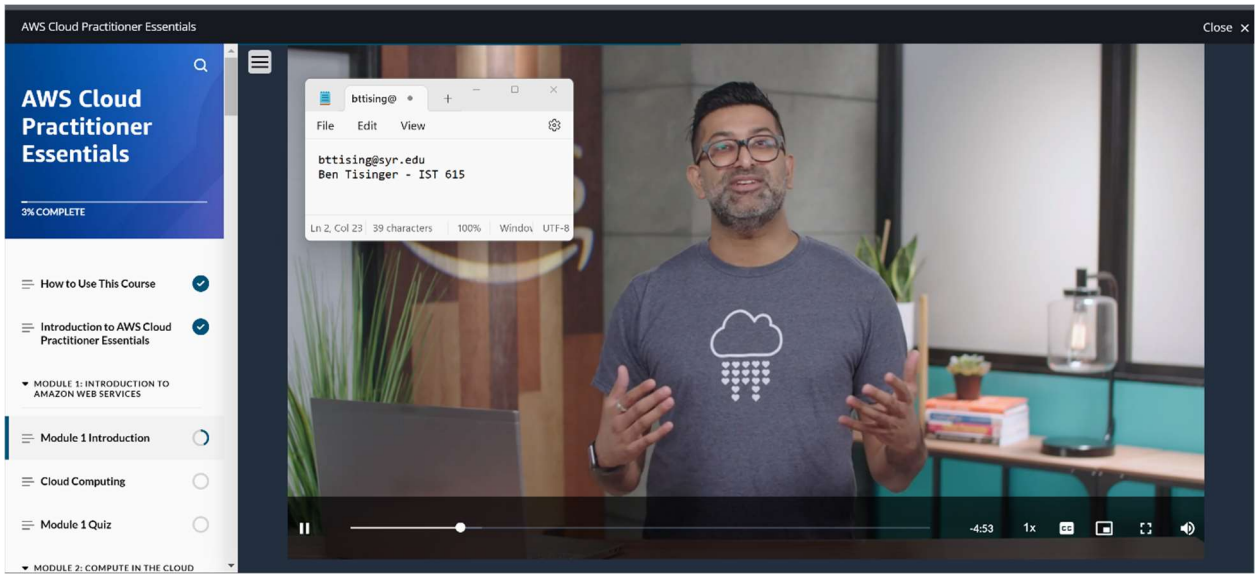
AWS Lab 1 – IST615

Benjamin Tisinger

1/14/2024

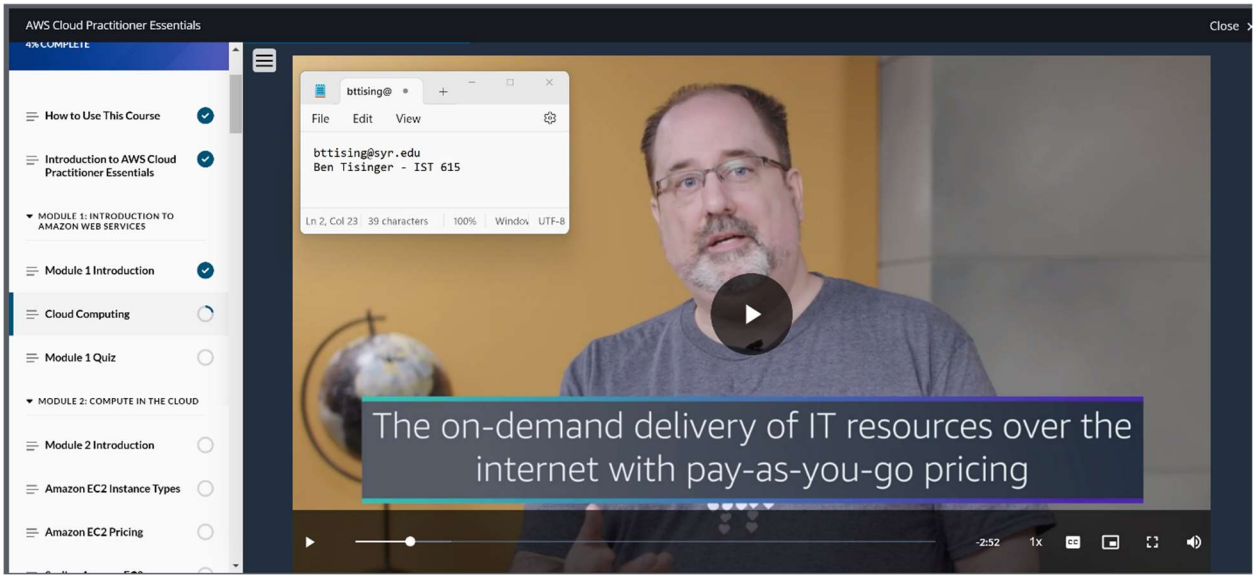
MODULE 1 :



AWS Offers a wide range of services such as:

- Compute
- Storage
- Network Security
- Robot Development
- Blockchain
- Machine Learning / AI
- Video Production
- Satellite Usage

- Cloud Computing Uses a Client-Server Model
- Usage of an EC2 on the Server side (AWS) (Elastic for shrinking or growing based on Usage)
- AWS Primary Model is Pay for what you Use
- On Prem / On Site server usage is a flat one-time sunk cost that you pay for to build servers, it's not elastic so you can't scale up or down based on usage. This makes AWS much more popular cost wise, maintenance wise and usage wise



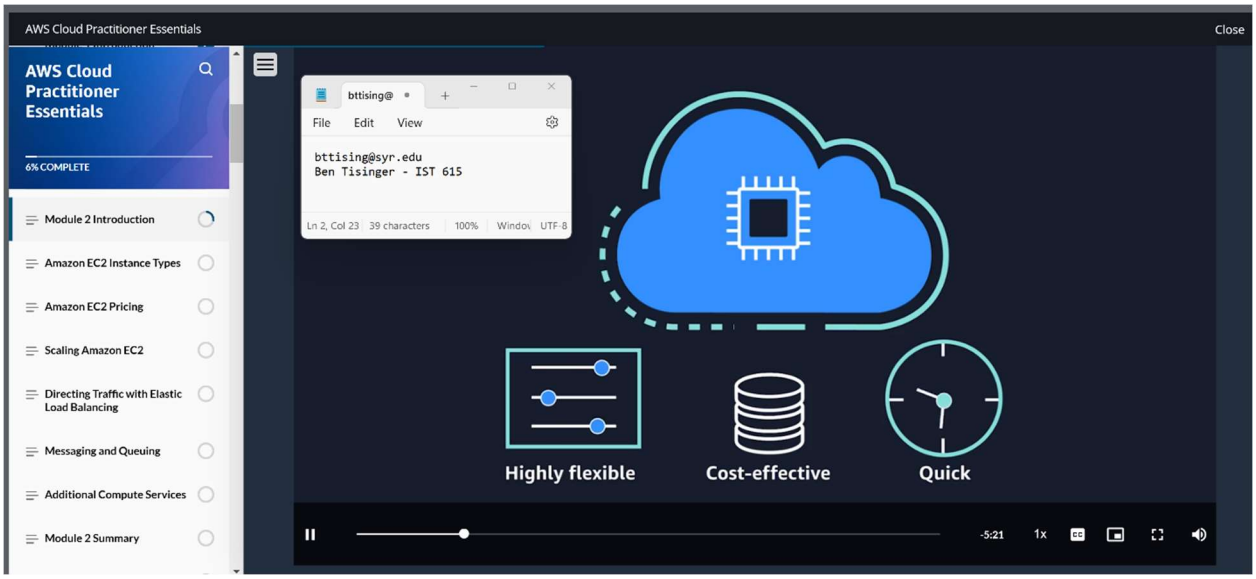
- Cloud Computing is the On-Demand delivery of IT Resources of the internet using a pay as you go pricing structure
- On-Demand Delivery means when you need resources you receive them from AWS. You don't need to schedule or tell the system you need more resources it grows based on usage and requests
- AWS Offers a wide range of Products because of business requests and the ability to farm out your data centers
- AWS wants to develop and produce software that helps with the repetitive and labor-intensive IT use cases
- AWS markets themselves as highly innovative or game changing due to the pricing structure and ability to simply pay for what you need and use.

Module 1 Quiz Taken – Received 4/4

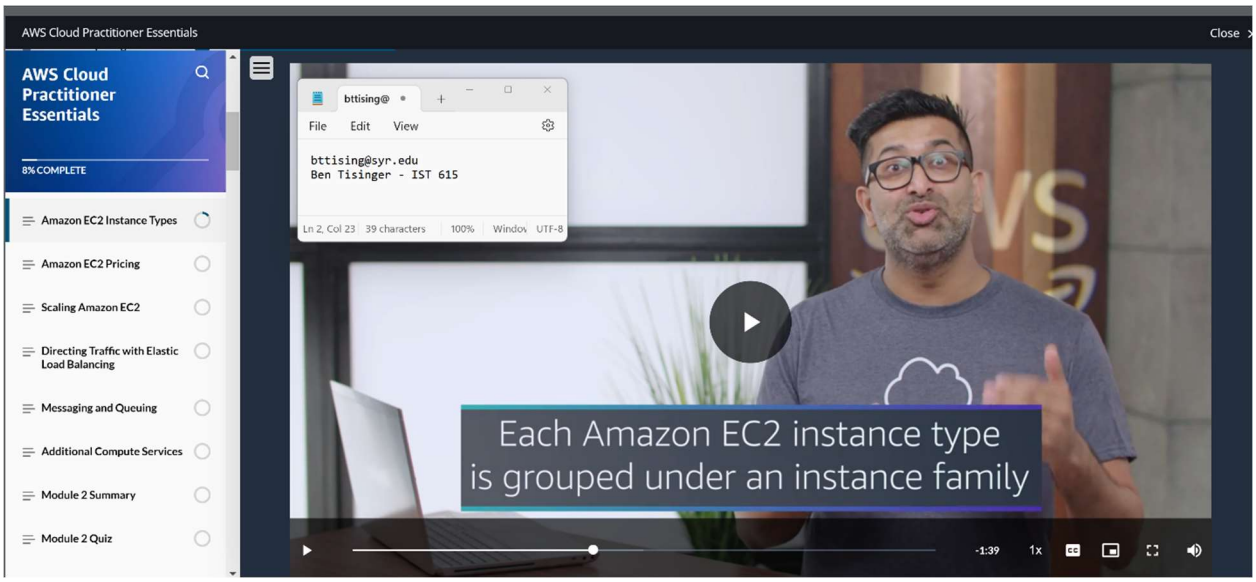
Overview:

AWS offers a wide variety of products due to ever-changing business needs and structure. They primarily use a client server model with EC2 systems on the server side. AWS excels in cloud management because they offer a pay for what you need and use system to save businesses time and money. The end goal for amazon web services is to develop and produce software that takes labor extensive and time extensive tasks and make the quicker and simpler to complete.

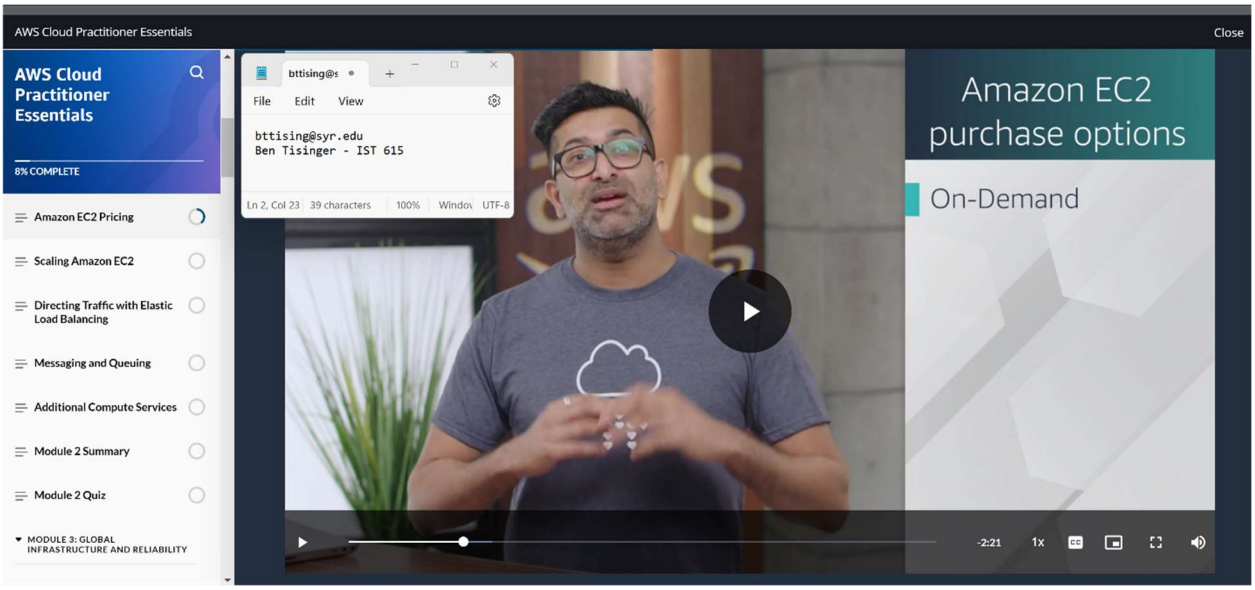
MODULE 2



- Amazon EC2 – Need raw computer capacity with the ability to be highly flexible, cost effective and quick. This is where EC2 excels versus the conventional model of buying and maintaining on-site data centers.
- The process of researching, buying, receiving, installing, and maintaining physical servers is far less superior to AWS cloud servers and the ability to host and use as much as you can pay for.
- AWS Servers are already built, installed, secured and are online for easy usage.
- EC2 is flexible in the sense that you can turn an instance on and pay for what you might be using and when you power the instance off there are no incurred costs.
- EC2 also uses multitenancy which involves sharing underlying hardware between virtual machines
- EC2 instances can consist of Windows or Linux operating systems and have the ability to run your business or web applications of different complexity. Can also run databases or third-party applications with the ability scale the size of your instance.



- Every type of EC2 instance is grouped under an instance family
- Instance types have different combinations of server capacity, memory, storage, and networking capacity
- EC2 instance families consist of General Purpose, Compute Optimized, Memory Optimized , Accelerated Computing and Storage Optimized
- General Purpose is good for balanced resources, Diverse Workload, Web Servers, and Code Repositories
- Compute Optimized – Gaming Serves and HPC, Scientific Modeling
- Memory Optimized – Heavy Memory based tasks
- Accelerated Computing – Floating Point Number calculations , Graphics Processing and Data matching
- Storage Optimized – high performance workloads for locally stored data



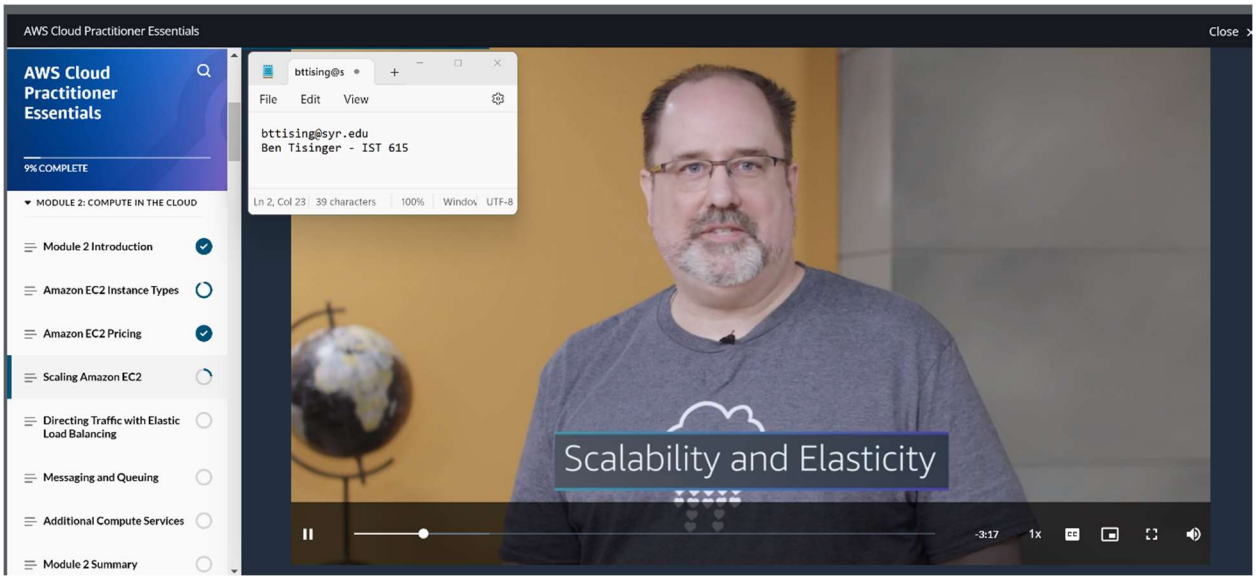
- EC2 Pricing Includes On-Demand which means you simply pay for what you need wile using the instance.

- Savings plan purchase options means the ability to pay a baseline price for consistent amount of usage / Dollar amount is per hour for either a 1- or 3-year term.

- Reserved Instances – City or State usage for mostly consistent data - 3 types of payment plans

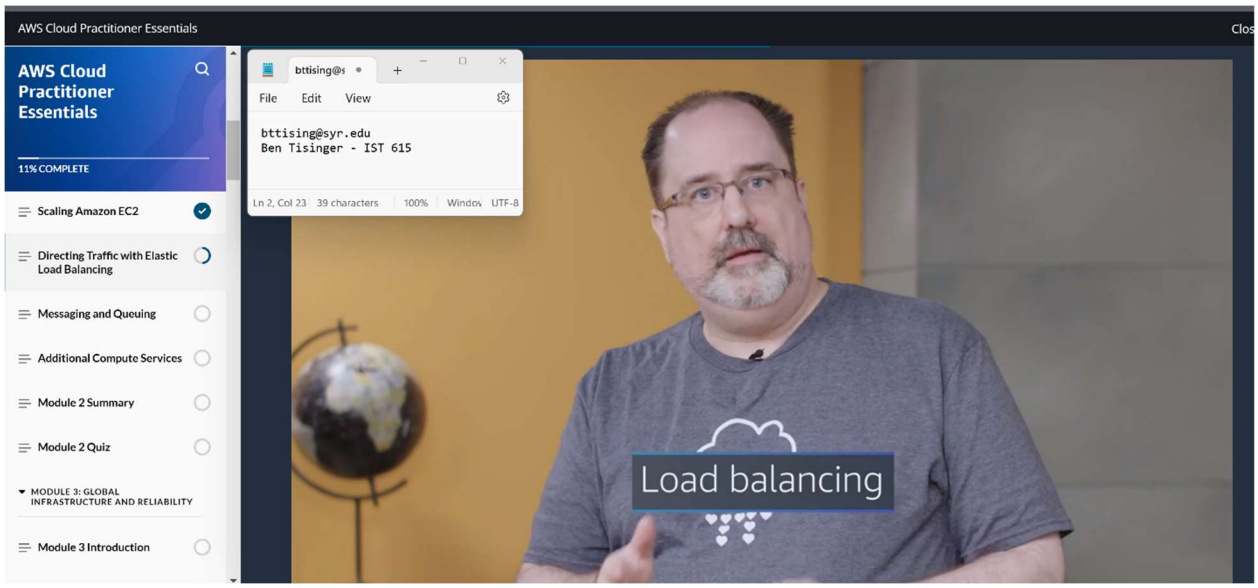
- Spot instances are more quick spin up instances – AWS can reclaim the server at any moment with a 2-minute warning / Batch Workload

- Dedicated Hosts - Yours and Yours only – Will not share (Probably More Expensive)



- Scalability and Elasticity is hard to properly predict and configure with onsite data centers because you would need to figure out the potential maximum amount of usage and then over buy servers to potentially account for that higher usage

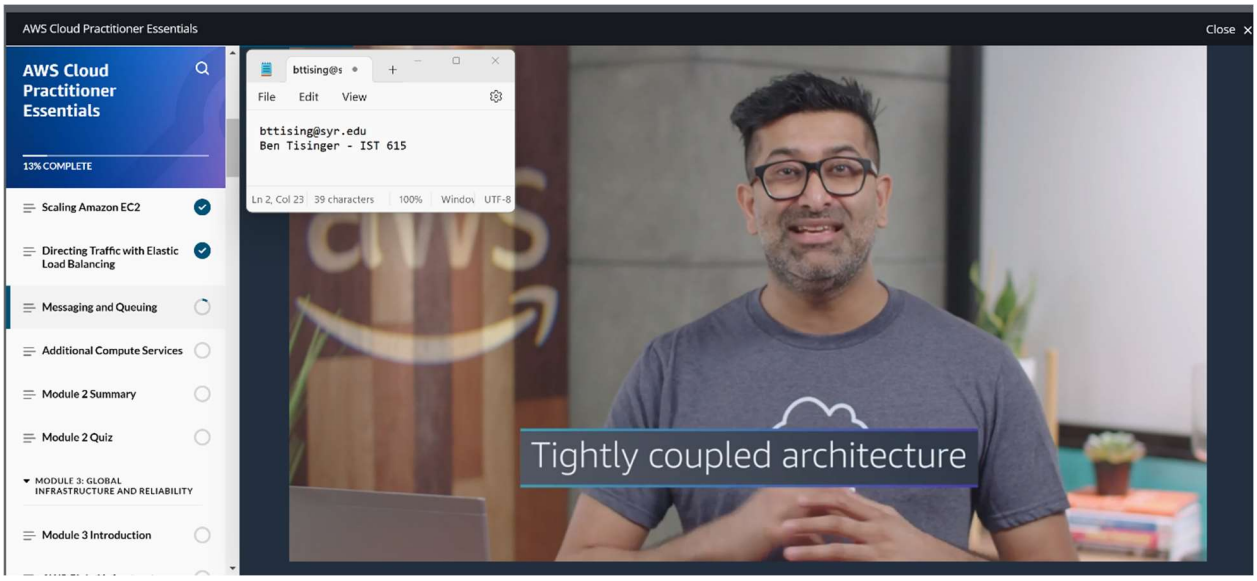
- AWS markets that they are much better solution than On-Prem with their ability to scale up or down/out and pay as you go so that you are never overbuying or underusing your resources. The autoscaling feature is pretty slick with the ability to handle a large amount of requests during high traffic and then can scale itself back down.



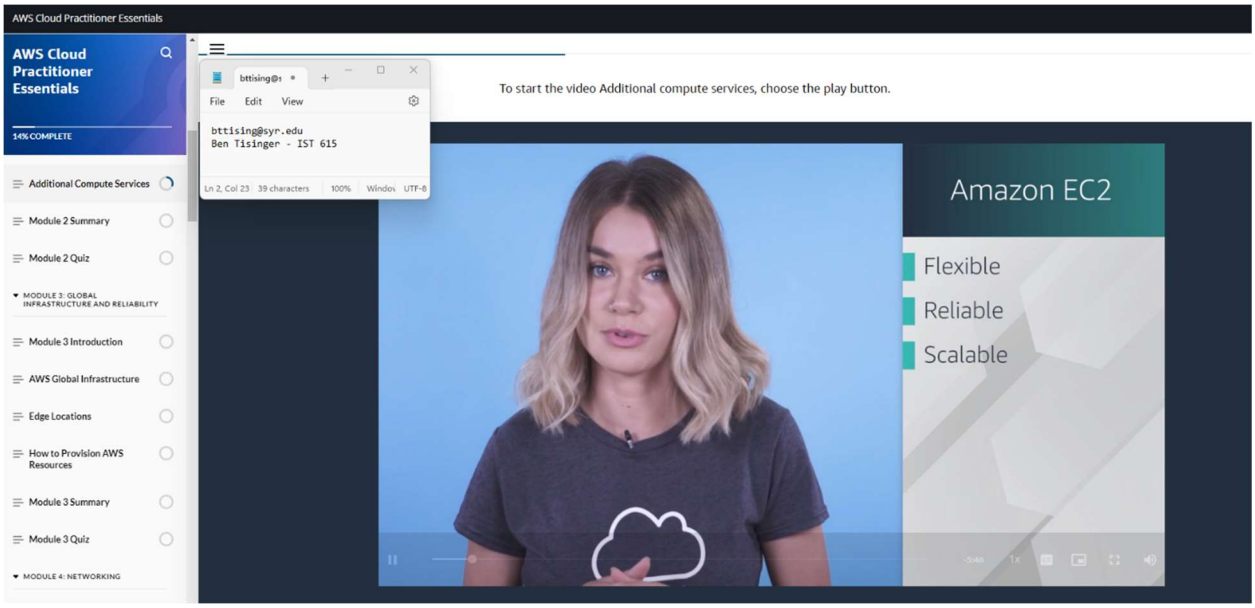
- Load Balancer is an application that takes requests and routes them to specific instances for consumption.

- AWS supports many out of the box load balance programs, but it will be up to the development team to maintain those programs on AWS Servers.

- ELB is a service that AWS provides for load balancing services. It is a regional level service that is highly available with no additional effort and is easily scalable. This service can also run at different levels and handle different EC2 instances to properly balance your workload



- Need some sort of Buffer or queuing stage to help applications communicate to understand load capacity and requests
- Tightly coupled architecture while good in premise is difficult because if one component fails then the entire rest of the system could crash.
- Loosely Coupled means that the architecture is easily able to be modified and single out a failure and it will not cause a cascaded failure. Can add a buffer to the queue so that both applications do not fail.
- Amazon SQS allows you to send, store and receive messages at any volume. Not required for other outside programs. SQS queues are reliable, fast, and easy to maintain. SQS can also send out notifications to outside users. This service seems to be great for getting data between two systems and having it queued in the event of failure.



- EC2 requires scaling, patching and architecture for high availability by the end user. This is still much less work overall than if you decided to host everything on site.

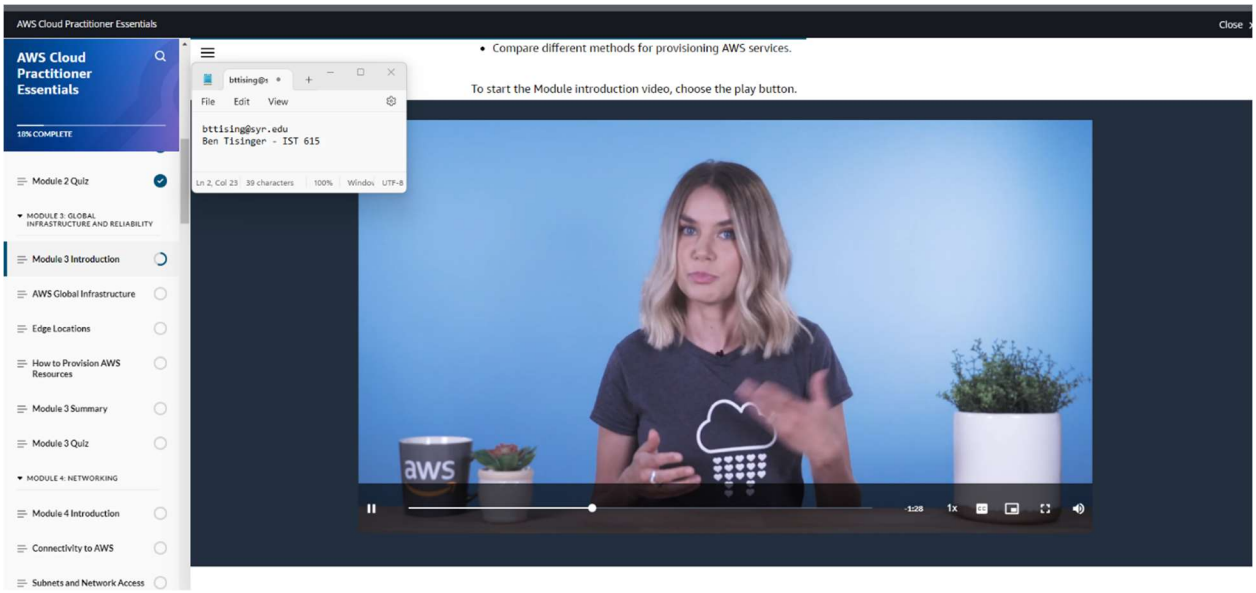
- AWS offers multiple serverless options for businesses. All the server management processes are done by AWS and the user just focuses on the applications. This may include a lambda function with a trigger. Primarily used for fast resources that take under 15 minutes to complete

- You can also use Container Server Elastic or Kubernetes service. Both services are container orchestration tools. This would use a docker container system. You can run these containers on top of EC2 Instances.

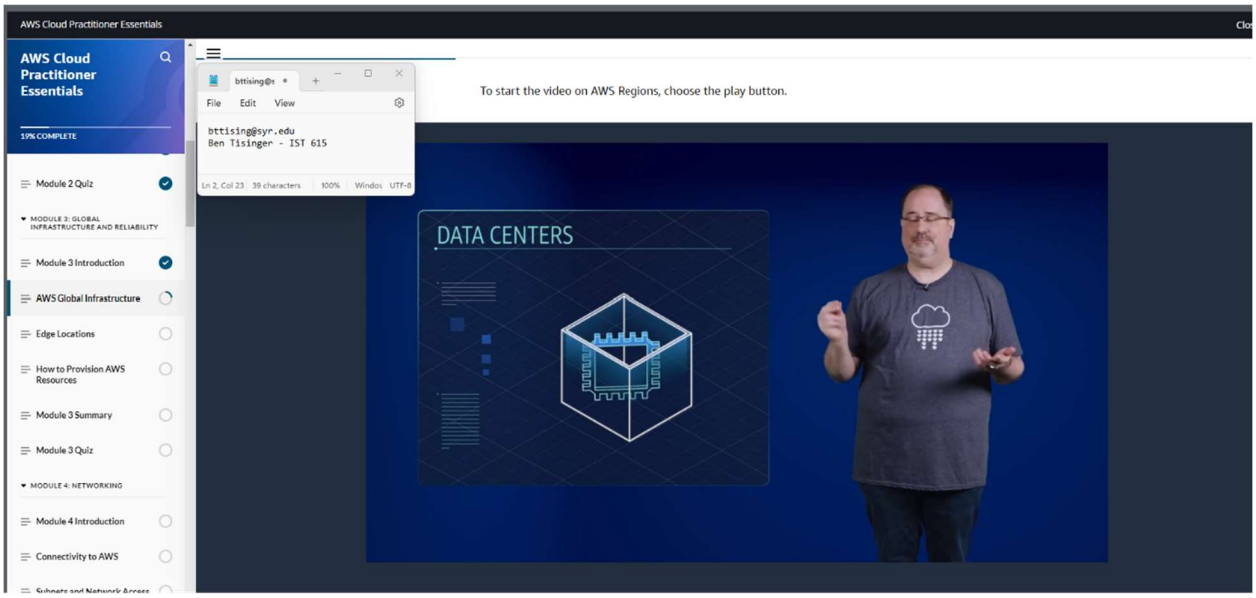
- AWS offers computer services such as Docker Container based workloads, Amazon ECS or EKS and Amazon Fargate which is managed for you by amazon.

Module 2 Quiz Taken – Received 5/5

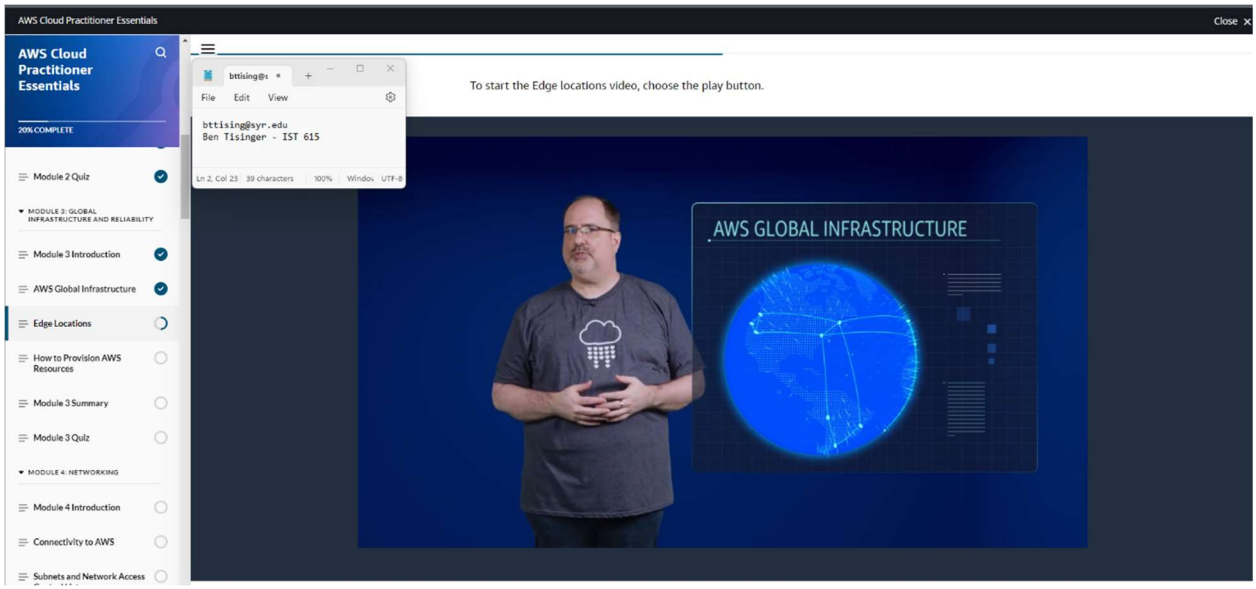
MODULE 3



- AWS needs to be highly available for customer usage. Amazon web services has multiple locations designed for infrastructure that include high availability and fault tolerance. This involves placing different server facilities in different areas to minimize the risk of losing service.
- AWS has multiple regions that offer different services and availability to always provide the user with the data and programs they need.

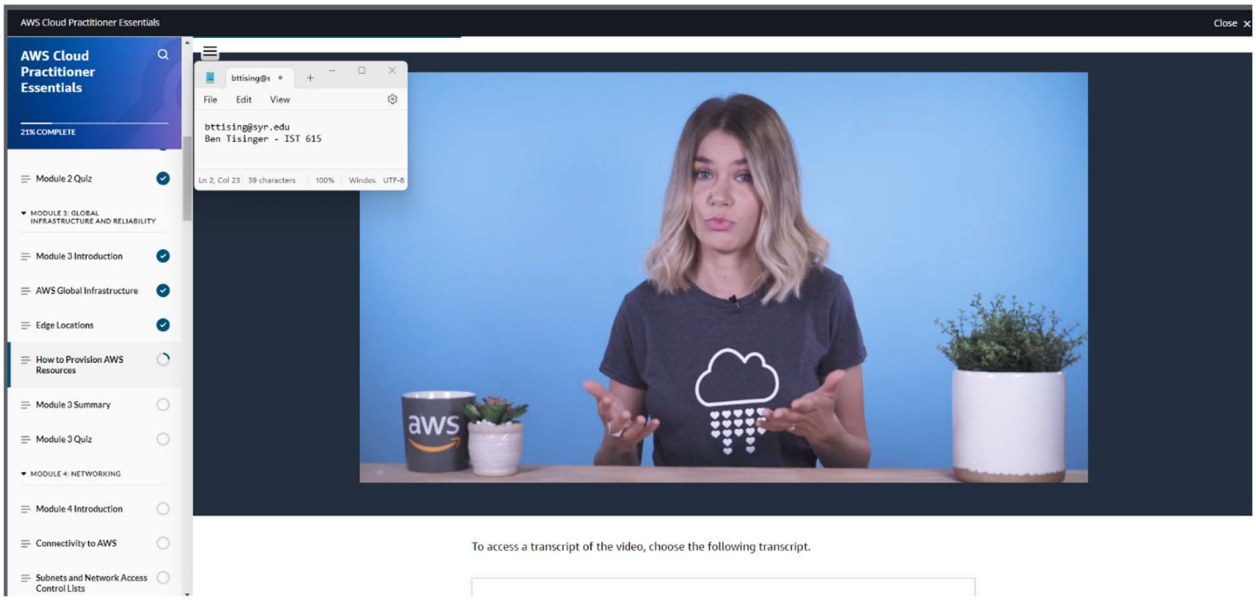


- Companies can now run their programs and systems from data centers that they actually don't own or have any ties to. If you run your own data center you would need to have redundant location in case of disaster for your primary location. Most companies store their data as backups and hope for a disaster not to occur.
- AWS builds infrastructure groups for locations that need the most availability of resources. Each region can connect to each other via high-speed fiber optic cables. Data can only be shared from region to region if the user enables that feature.
- Data can be specific to regions based off government regulations and other conventions.
- Four Factors for Regions – Compliance, Proximity, Feature Ability and Pricing
- Pricing is determined by many factors such as location and region. There are multiple price sheets for different regions.



- AWS – Caching Copies of the Data can improve the performance of the people querying the data. For AWS they offer Amazon CloudFront – CloudFront helps deliver data to customers with low latency and high transfer speeds. They use edge locations to help customers get data faster. Edge locations are smaller hubs that are not directly connected to regions. The edge locations also run more than just CloudFront, they also run a service called Route 53 which helps get customers to the correct web locations very quickly.

- AWS also offers a service called outposts which can be built inside your own datacenter but are owned and controlled by AWS. This offers an almost AWS like datastore inside your company locally. Most customers don't usually choose this option as it is a little overkill.



- Most AWS Services can be accessed via an API. API is an application that has predetermined calls to control the services it is programmed to control. This in particular means via a line of code you can modify or change your service offerings. You can create an EC2 instance or even a lambda function via API calls. You can interact with AWS services via the Management Console or the command line interface. I personally use the command line at my work. There is also the ability to access AWS from certain software development kits.

- The AWS Console is browser based and you can manage your resources visually. The browser console is usually the first place you visit if you are new to AWS. The production environment may not be the best place use the AWS Console as it requires a lot of work.

- The command line interface allows you to make API calls using the CLI. The AWS CLI is better situated for production environments as it is easier to make API calls and less mistakes.

Conclusion

Amazon Web Services is a game-changer in the field of cloud computing, offering a diverse range of services that change how businesses manage their IT infrastructure. At its center, AWS has a pay-as-you-go model, an interesting change from the conventional on-site servers with fixed one-time costs.

One feature is Amazon(EC2), providing nice flexibility, cost-effectiveness, and speed. The ability to power instances on and off has nice cost savings, instead of the traditional model of continuous expenses associated with physical servers.

AWS prioritizes high availability and data security by strategically operating in multiple regions. The selection of regions considers factors like compliance, proximity, and pricing, ensuring businesses have options that align with their specific needs.

Amazon CloudFront enhances data delivery speed, acting as a valuable asset in optimizing performance. API's serve as a critical component by enabling seamless communication with AWS services. Whether operating the user-friendly AWS Console or the slightly complex Command Line Interface, AWS gives users the ability to manage their resources efficiently.