AMRITA VISHWA VIDYAPEETHAM

Unit II

Public Cloud - Using public cloud for infrastructure management (compute and storage services)

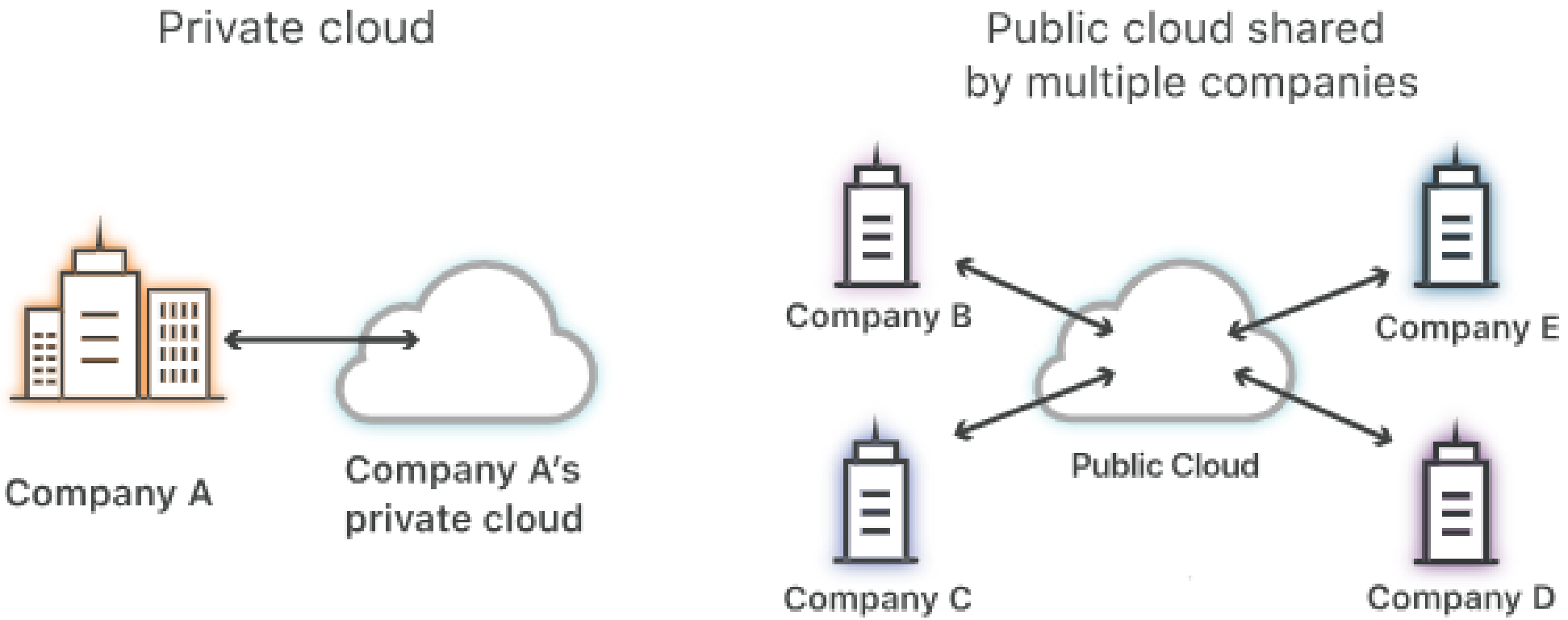
- Public cloud is a type of computing where resources are offered by a third-party provider via the internet and shared by organizations and individuals who want to use or purchase them.

- Some public cloud computing resources are available for free, while customers may pay for other resources through subscription or pay-per-usage pricing models.

Public Cloud Services

- Services can include an array of workloads including databases, firewalls, load balancers, management tools and other platform-as-a-service (PaaS) or software-as-a-service (SaaS) elements.
- Users then assemble resources and services to build an infrastructure capable of deploying and operating enterprise workloads.
- Public cloud services can be free or offered through a variety of subscription or on-demand pricing schemes, including pay-per-usage or pay-as-you-go (PAYG) models.

Public Vs Private Cloud



Advantages

The main benefits of the public cloud are as follows:

- A reduced need for organizations to invest in and maintain their own on-premises IT resources;
- Scalability to quickly meet workload and user demands; and
- Fewer wasted resources, because customers only pay for what they use.

Public Cloud Characteristics

A public cloud consists of the following key characteristics:

- on-demand computing and self-service provisioning;
- resource pooling;
- scalability and rapid elasticity;
- pay-per-use pricing;
- measured service;
- resiliency and availability;
- security; and
- broad network access.

Challenges

- **Runaway costs.** Increasingly complex cloud costs and pricing models make it difficult for organizations to keep track of IT spending.
- **Scarce cloud expertise.** Another challenge is the skills gap among IT professionals in the cloud computing industry. Companies struggle to hire and retain staff with expertise in building and managing modern cloud applications.
- **Limited transparency and controls.** Public cloud users also face the tradeoff of limited control over their IT stack since the provider can decide when and how to manage configurations.
- **Vendor lock-in.** Although each public cloud can offer similar resources and services, the controls and delivery of those assets can vary between providers, making it difficult for one data set or application to migrate easily between providers. This poses the risk of vendor dependency, which can raise costs and limit capabilities for business users.

Public Cloud Services in a Cloud Market

Cloud Infrastructure

- Cloud infrastructure refers to the virtualized resources, networks, and services that enable the delivery of cloud computing services over the internet.
- It includes the hardware, software, and networking components that are necessary for the operation and management of cloud-based applications and services.
- In a cloud infrastructure, computing resources such as servers, storage, and networking devices are provided as a service, allowing users to access and use them on-demand.

Cloud Management Tools

Monitoring and Analytics: Cloud management tools provide real-time insights into the performance and health of applications and infrastructure. They enable proactive identification and resolution of issues, ensuring optimal performance.

Resource Allocation and Optimization: Through resource allocation and optimization, these tools help engineering teams make informed decisions about resource allocation, ensuring efficient utilization and cost optimization.

Automation: Cloud management tools automate various tasks, such as provisioning and deployment, reducing manual efforts and improving operational efficiency. Automation also enables rapid scalability and enhances agility.

Governance and Compliance: Cloud management tools assist in enforcing governance policies and compliance requirements. They help engineering teams track usage, implement access controls, and maintain compliance with regulations.

Managing Cloud Infrastructure

1. Define Your Requirements
2. Evaluate Service Level Agreements (SLAs)
3. Assess Security Measures
4. Evaluate Performance and Scalability
5. Review Pricing and Cost Structure
6. Consider Vendor Lock-In
7. Evaluate Support and Documentation

Managing Cloud Infrastructure

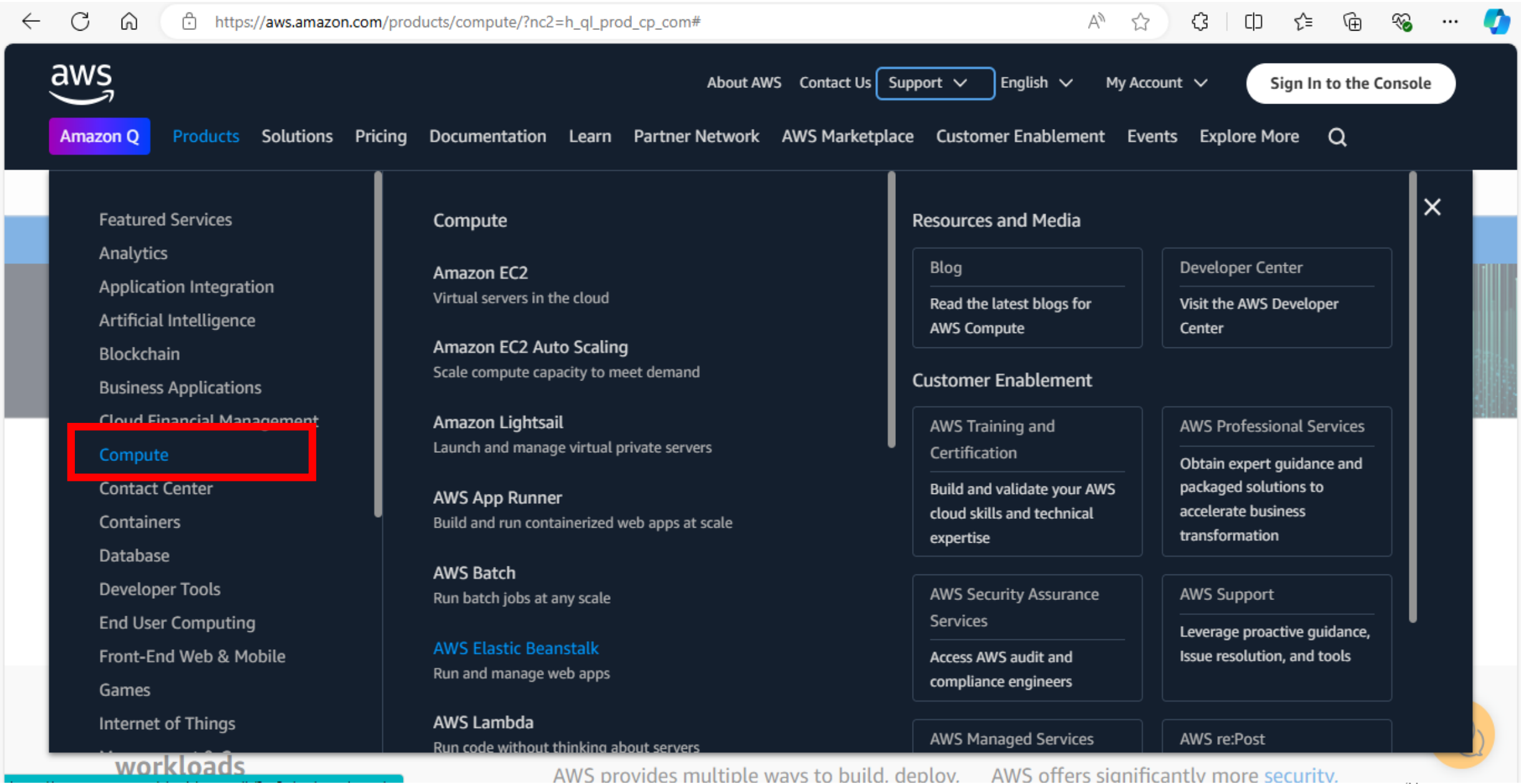
8. Automate Infrastructure Deployment
9. Implement Continuous Integration/Continuous Deployment (CI/CD)
10. Leverage DevOps Practices – Communication between development and operations teams
11. Adopt Microservices Architecture
12. Implement Scalable and Elastic Infrastructure
13. Monitor Resource Utilization
14. Implement Security Best Practices
15. Implement Backup and Disaster Recovery Strategies

Managing Cloud Infrastructure

16. Optimize Data Storage
17. Implement Load Balancing
18. Implement Identity and Access Management (IAM)
19. Use Cloud Monitoring and Logging Tools
20. Implement Automated Scaling
21. Regularly Test Disaster Recovery Procedures
22. Implement Automated Testing

Compute Services

- In cloud computing, the term “compute” describes concepts and objects related to software computation. It is a generic term used to reference processing power, memory, networking, storage, and other resources required for the computational success of any program.
- For example, applications that run machine learning algorithms or 3D graphics rendering functions require many gigs of RAM and multiple CPUs to run successfully.
- In this case, the **CPUs, RAM, and Graphic Processing Units required will be called compute resources**, and the applications would be compute-intensive applications.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Virtual servers in the cloud
Amazon EC2 Auto Scaling
Scale compute capacity to meet demand
Amazon Lightsail
Launch and manage virtual private servers
AWS App Runner
Build and run containerized web apps at scale
AWS Batch
Run batch jobs at any scale
AWS Elastic Beanstalk
Run and manage web apps
AWS Lambda
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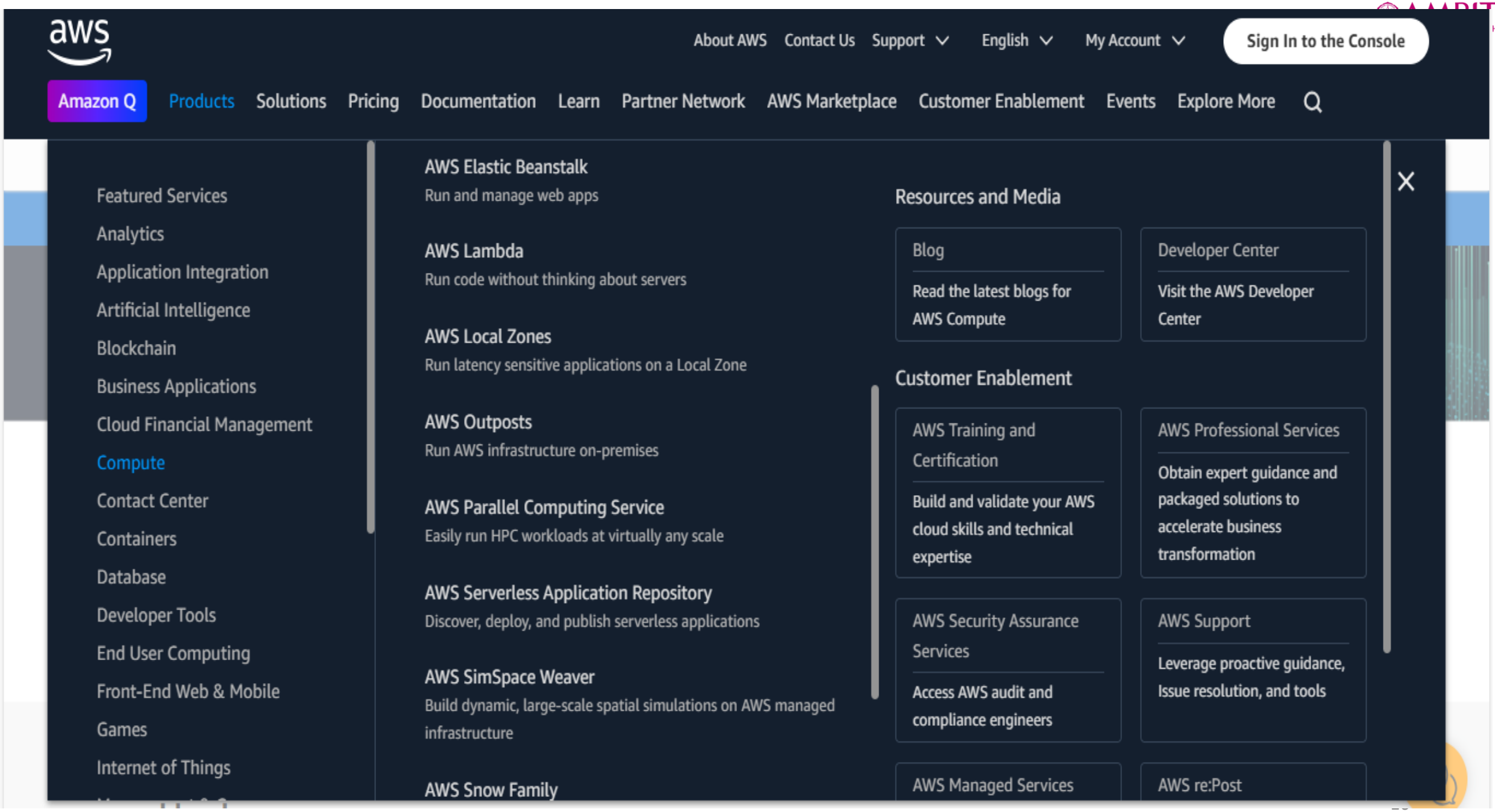
AWS Security Assurance Services
Access AWS audit and compliance engineers
AWS Support
Leverage proactive guidance, Issue resolution, and tools
AWS Managed Services
AWS re:Post
workloads
AWS provides multiple ways to build, deploy
AWS offers significantly more security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Internet of Things
AWS Elastic Beanstalk
Run and manage web apps
AWS Lambda
Run code without thinking about servers
AWS Local Zones
Run latency sensitive applications on a Local Zone
AWS Outposts
Run AWS infrastructure on-premises
AWS Parallel Computing Service
Easily run HPC workloads at virtually any scale
AWS Serverless Application Repository
Discover, deploy, and publish serverless applications
AWS SimSpace Weaver
Build dynamic, large-scale spatial simulations on AWS managed infrastructure
AWS Snow Family
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AWS Professional Services
Obtain expert guidance and packaged solutions to accelerate business transformation
AWS Security Assurance Services
Access AWS audit and compliance engineers
AWS Support
Leverage proactive guidance, Issue resolution, and tools
AWS Managed Services
AWS re:Post

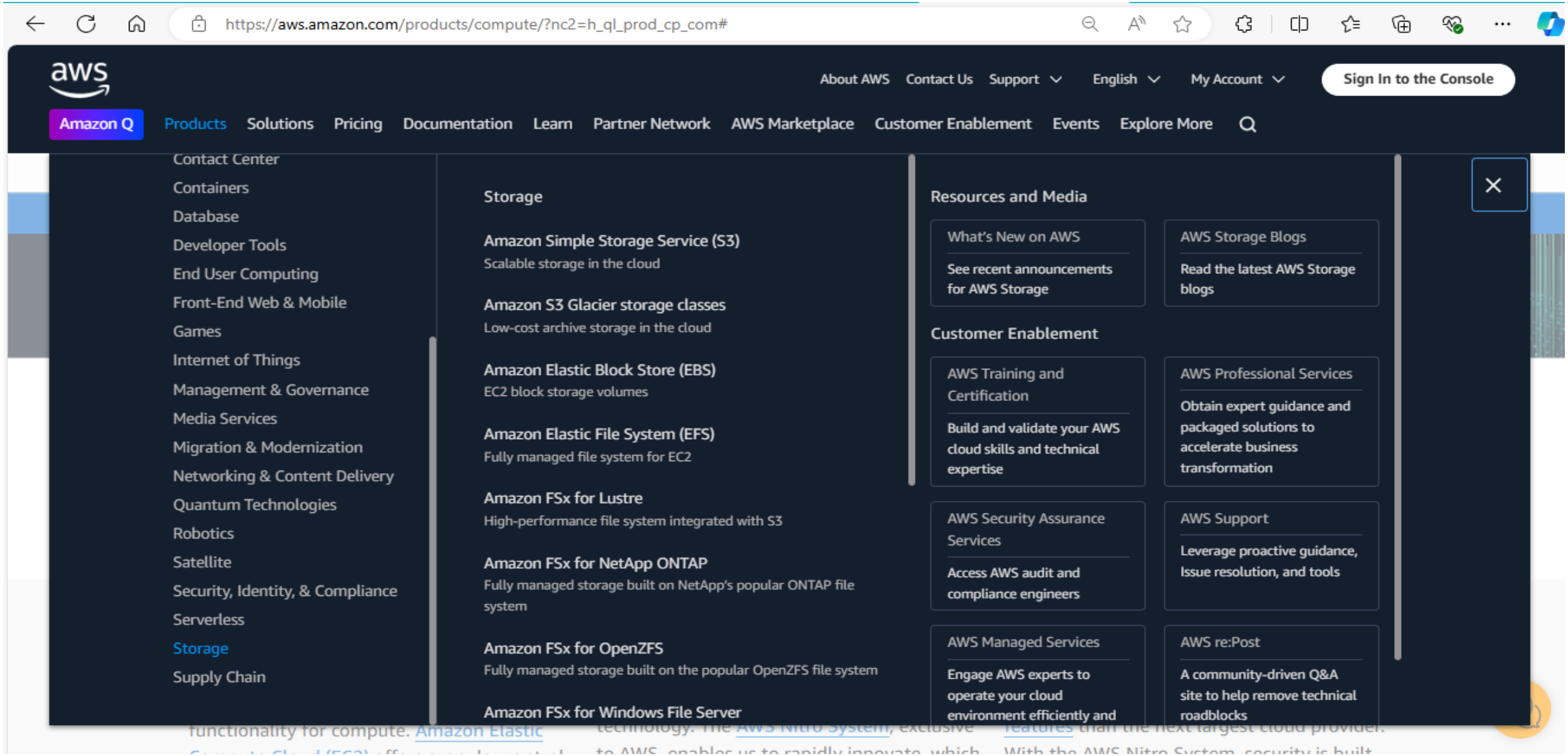
AWS Compute | Overview | Compute Solutions | Compute Services | Compute Partners

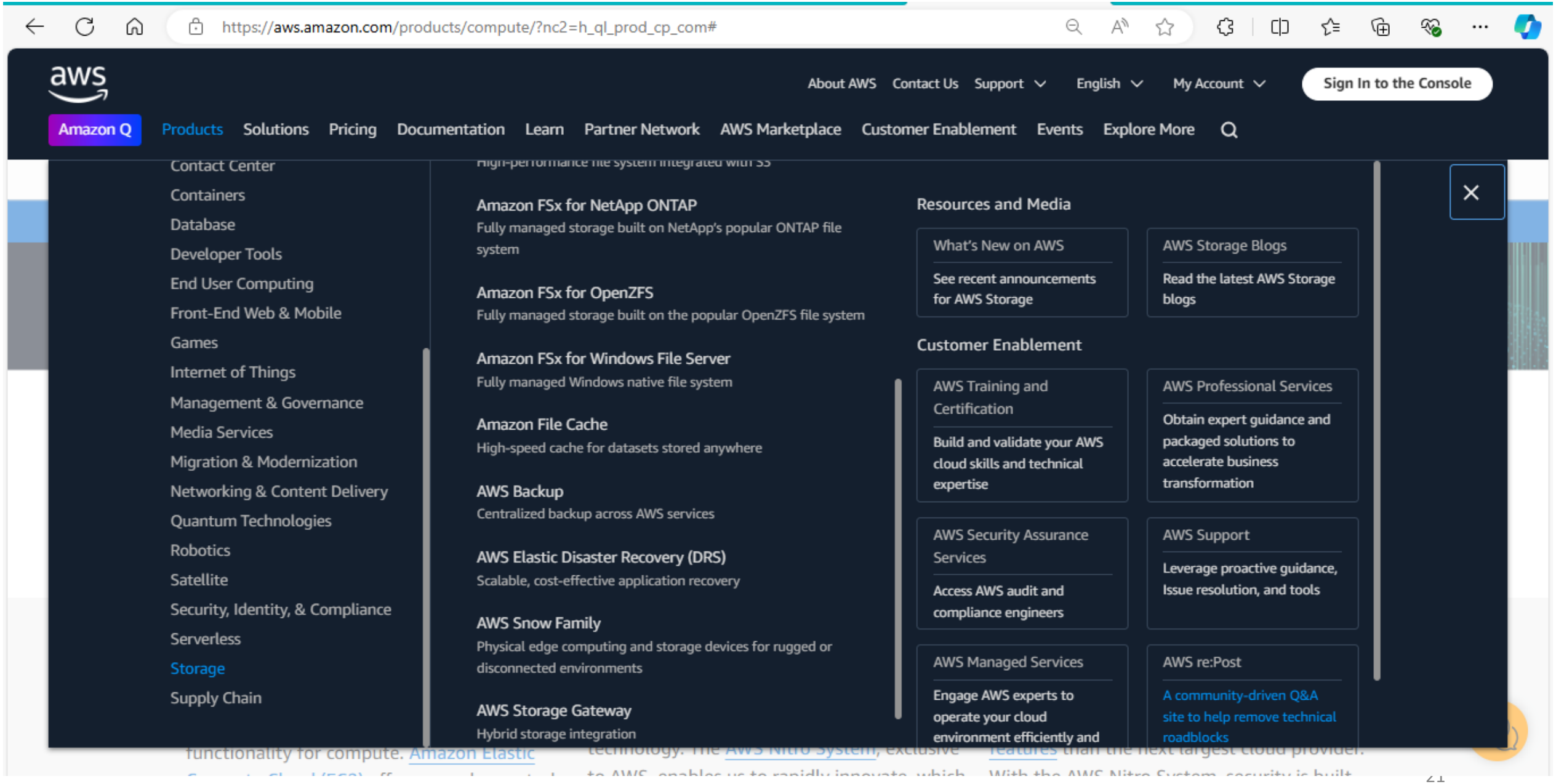
Category	Service description	AWS service
Instances (virtual machines)	Easy-to-use service for deploying and scaling web applications and services	AWS Elastic Beanstalk
	Secure and resizable compute capacity (virtual servers) in the cloud	Amazon Elastic Compute Cloud (EC2)
	Run fault-tolerant workloads for up to 90% off	Amazon EC2 Spot
	Automatically add or remove compute capacity to meet changes in demand	Amazon EC2 Autoscaling
	Easy-to-use cloud platform that offers you everything you need to build an application or website	Amazon Lightsail
	Fully managed batch processing at any scale	AWS Batch

AWS Compute	Overview	Compute Solutions ▾	Compute Services ▾	Compute Partners ▾
Containers	Highly secure, reliable, and scalable way to run containers	**Amazon Elastic Container Service (ECS)**
	Run containers on customer-managed infrastructure	**Amazon ECS Anywhere**
	Easily store, manage, and deploy container images	**Amazon Elastic Container Registry (ECR)**
	Fully managed Kubernetes service	**Amazon Elastic Kubernetes Service (EKS)**
	Create and operate Kubernetes clusters on your own infrastructure	**Amazon EKS Anywhere**
	Serverless compute for containers	**AWS Fargate**
	Build and run containerized applications on a fully managed service	**AWS App Runner**
Serverless	Run code without thinking about servers. Pay only for the compute time you consume	**AWS Lambda**

Edge and hybrid	Run AWS infrastructure and services on premises for a truly consistent hybrid experience	**AWS Outposts**
	Collect and process data in rugged or disconnected edge environments	**AWS Snow Family**
	Deliver ultra-low latency application for 5G devices	**AWS Wavelength**
	Preferred service for all vSphere workloads to rapidly extend and migrate to the cloud	**VMware Cloud on AWS**
	Run latency sensitive applications closer to end-users	**AWS Local Zones**
Cost and capacity management	Flexible pricing model that provides savings of up to 72% on AWS compute usage	**AWS Savings Plan**
	Recommends optimal AWS compute resources for your workloads to reduce costs and improve performance	**AWS Compute Optimizer**
	Build and maintain secure Linux or Windows Server images	**EC2 Image Builder**
	Automatically distribute incoming application traffic across multiple targets	**Elastic Load Balancing (ELB)**

Storage Services

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Internet of Things
Management & Governance
Media Services
Migration & Modernization
Networking & Content Delivery
Quantum Technologies
Robotics
Satellite
Security, Identity, & Compliance
Serverless
Storage
Supply Chain
Amazon FSx for NetApp ONTAP
Fully managed storage built on NetApp's popular ONTAP file system
Amazon FSx for OpenZFS
Fully managed storage built on the popular OpenZFS file system
Amazon FSx for Windows File Server
Fully managed Windows native file system
Amazon File Cache
High-speed cache for datasets stored anywhere
AWS Backup
Centralized backup across AWS services
AWS Elastic Disaster Recovery (DRS)
Scalable, cost-effective application recovery
AWS Snow Family
Physical edge computing and storage devices for rugged or disconnected environments
AWS Storage Gateway
Hybrid storage integration
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AWS Support
Leverage proactive guidance, Issue resolution, and tools
AWS Managed Services
Engage AWS experts to operate your cloud environment efficiently and
AWS re:Post
A community-driven Q&A site to help remove technical roadblocks

AWS storage services

Object, file, and block storage

Amazon Simple Storage Service (S3)

Object storage with industry-leading scalability, availability, and security for you to store and retrieve any amount of data from anywhere.

Amazon Elastic File System (EFS)

A simple, serverless, elastic, set-and-forget file system for you to share file data without managing storage.

FSx

Amazon FSx

Fully managed, cost-effective file storage offering the capabilities and performance of popular commercial and open-source file systems.

Amazon Elastic Block Store (EBS)

Easy to use, high-performance block storage service for both throughput and transaction-intensive workloads at any scale.

Amazon File Cache

High-speed cache for datasets stored anywhere, accelerate cloud bursting workloads.

Data migration

AWS DataSync

Online data transfer service that optimizes network bandwidth and accelerates data movement between on-premises storage and AWS storage.

AWS Snow Family

Offline data transfer devices with built-in security and logistics features for simplified data migration.

Hybrid cloud storage and edge computing

AWS Storage Gateway

Hybrid cloud storage service that gives you on-premises access to virtually unlimited cloud storage.

AWS Snow Family

Edge compute, data collection, and data transfer services with security and end-to-end logistics for mobile and rugged deployments.

Managed file transfer

AWS Transfer Family

Simple and seamless file transfer to Amazon S3 and Amazon EFS using SFTP, FTPS, and FTP protocols.

Disaster recovery and backup

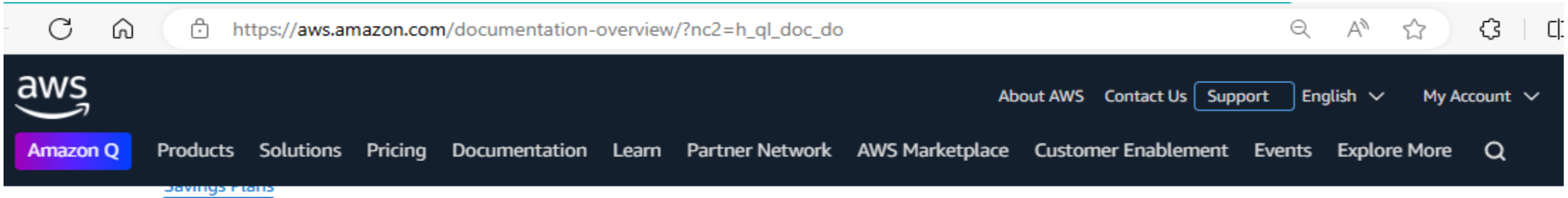
AWS Elastic Disaster Recovery (DRS)

Minimize downtime and data loss with fast, reliable recovery of on-premises and cloud-based applications using affordable storage, minimal compute, and point-in-time recovery.

AWS Backup

Fully managed, policy-based service to centrally manage and automate data protection, compliance, and governance for applications running on AWS.

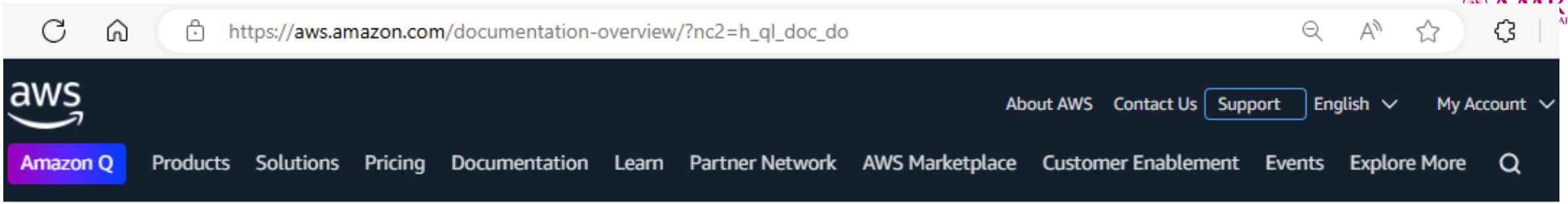
Documentation Support



Savings Plans
AWS Compute Optimizer

Compute

Amazon EC2 Auto Scaling
Amazon EKS Anywhere
Amazon EKS Distro
Amazon Elastic Kubernetes Service (EKS)
Amazon Lightsail
Amazon EC2
AWS App Runner
AWS Batch
AWS Elastic Beanstalk
AWS Fargate
AWS Lambda
AWS Outposts
AWS PrivateLink
AWS Serverless Application Repository
AWS VPN
Elastic Load Balancing
Red Hat Openshift Service on AWS
AWS SimSpace Weaver
AWS Private 5G
AWS Telco Network Builder



Serverless

Amazon EventBridge
AWS Application Composer

Storage

Amazon Elastic Block Store
Amazon Elastic File System
Amazon FSx for Lustre
Amazon FSx for NetApp ONTAP
Amazon FSx for Windows File Server
Amazon FSx for OpenZFS
Amazon S3
AWS Backup
AWS DataSync
AWS Snowball
AWS Snowcone
AWS Snowmobile
AWS Storage Gateway
AWS Transfer Family

Select a category:

Linux Virtual Machines

Provision virtual machines for Ubuntu, Red Hat, and more.

Product Pricing

SQL Server on Azure Virtual Machines

Migrate SQL Server workloads to the cloud at lower total cost of ownership (TCO).

Product Pricing

Static Web Apps

Streamlined full-stack development from source code to global high availability.

Product Pricing

Virtual Machine Scale Sets

Manage and scale up to thousands of Linux and Windows VMs.

Product Pricing

Virtual Machines

Provision Windows and Linux VMs in seconds.

Product Pricing

Azure Virtual Desktop

Enable a secure, remote desktop experience from anywhere.

Product Pricing

Windows Virtual Machines

Provision virtual machines for SQL Server, SharePoint, and more.

Product Pricing

Azure Dedicated Host

A dedicated physical server to host your Azure VMs for Windows and Linux.

Product Pricing

Azure VM Image Builder

Simplify your image building process with easy to use tool.

Product Pricing

Azure Kubernetes Service (AKS)

Deploy and scale containers on managed Kubernetes.

Product Pricing

Chat with sales

If you want to	Use this
Provision Linux and Windows virtual machines in seconds with the configurations of your choice	Virtual Machines
Achieve high availability by autoscaling to create thousands of VMs in minutes	Virtual Machine Scale Sets
Get deep discounts when you provision unused compute capacity to run your workloads	Azure Spot Virtual Machines
Deploy and scale containers on managed Kubernetes	Azure Kubernetes Service (AKS)
Accelerate app development using an event-driven, serverless architecture	Azure Functions
Develop microservices and orchestrate containers on Windows and Linux	Azure Service Fabric
Quickly create cloud apps for web and mobile with fully managed platform	App Service
Containerize apps and easily run containers with a single command	Azure Container Instances
Cloud-scale job scheduling and compute management with the ability to scale to tens, hundreds, or thousands of virtual machines	Batch
Create highly available, scalable cloud applications and APIs that help you focus on apps instead of hardware	Cloud Services

Select a category:

Archive Storage

Industry leading price point for storing rarely accessed data.

Product

Azure Managed Lustre

Azure Managed Lustre is a fully managed, cloud based parallel file system that enables customers to run their high performance computing (HPC) workloads in the cloud.

Product Pricing

Azure Backup

Simplify data protection with built-in backup management at scale.

Product Pricing

Azure Data Lake Storage

Scalable, secure data lake for high-performance analytics.

Product Pricing

Azure Data Share

A simple and safe service for sharing big data with external organizations.

Product Pricing

Azure Files

Simple, secure and serverless enterprise-grade cloud file shares.

Product Pricing

Azure Storage Actions PREVIEW

Simplify storage data management at massive scale.

Product

Azure NetApp Files

Enterprise-grade Azure file shares, powered by NetApp.

Product Pricing

Azure Blob Storage

Massively scalable and secure object storage.

Product Pricing

Azure Data Box

Appliances and solutions for data transfer to Azure and edge compute.

Product Pricing

Chat w

If you want to	Use this
High-performance, durable block storage for business-critical applications	Azure Disk Storage
Massively scalable and secure object storage for cloud-native workloads, archives, data lakes, high-performance computing, and machine learning	Azure Blob Storage
Massively scalable and secure data lake for your high-performance analytics workloads	Azure Data Lake Storage
Simple, secure, and serverless enterprise-grade cloud file shares	Azure Files
Enterprise-grade Azure file shares, powered by NetApp	Azure NetApp Files
Hybrid cloud file shares for caching your on-premises data	Azure File Sync
Cloud storage gateway to transfer data efficiently and easily between the cloud and the edge	Azure Stack Edge
Appliances and solutions for transferring data into and out of Azure quickly and cost-effectively	Azure Data Box
Elastic SAN is a cloud-native Storage Area Network (SAN) service built on Azure. Gain access to an end-to-end experience like your on-premises SAN.	Azure Elastic SAN
Manage persistent storage volumes for stateful container applications	Azure Container Storage PREVIEW

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Compute Engine
Virtual machines running in Google's data center.

App Engine
Serverless application platform for apps and back ends.

Cloud GPUs
GPUs for ML, scientific computing, and 3D visualization.

Migrate to Virtual Machines
Server and virtual machine migration to Compute Engine.

Spot VMs
Compute instances for batch jobs and fault-tolerant workloads.

Batch
Fully managed service for scheduling batch jobs.

Sole-Tenant Nodes
Dedicated hardware for compliance, licensing, and management.

Bare Metal
Infrastructure to run specialized workloads on Google Cloud.

Recommender
Usage recommendations for Google Cloud products and services.

VMware Engine
Fully managed, native VMware Cloud Foundation software stack.

Cloud Run
Fully managed environment for running containerized apps.

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Storage →

Cloud Storage
Object storage that's secure, durable, and scalable.

Block Storage
High-performance storage for AI, analytics, databases, and enterprise applications.

Filestore
File storage that is highly scalable and secure.

Persistent Disk
Block storage for virtual machine instances running on Google Cloud.

Cloud Storage for Firebase
Object storage for storing and serving user-generated content.

Local SSD
Block storage that is locally attached for high-performance needs.

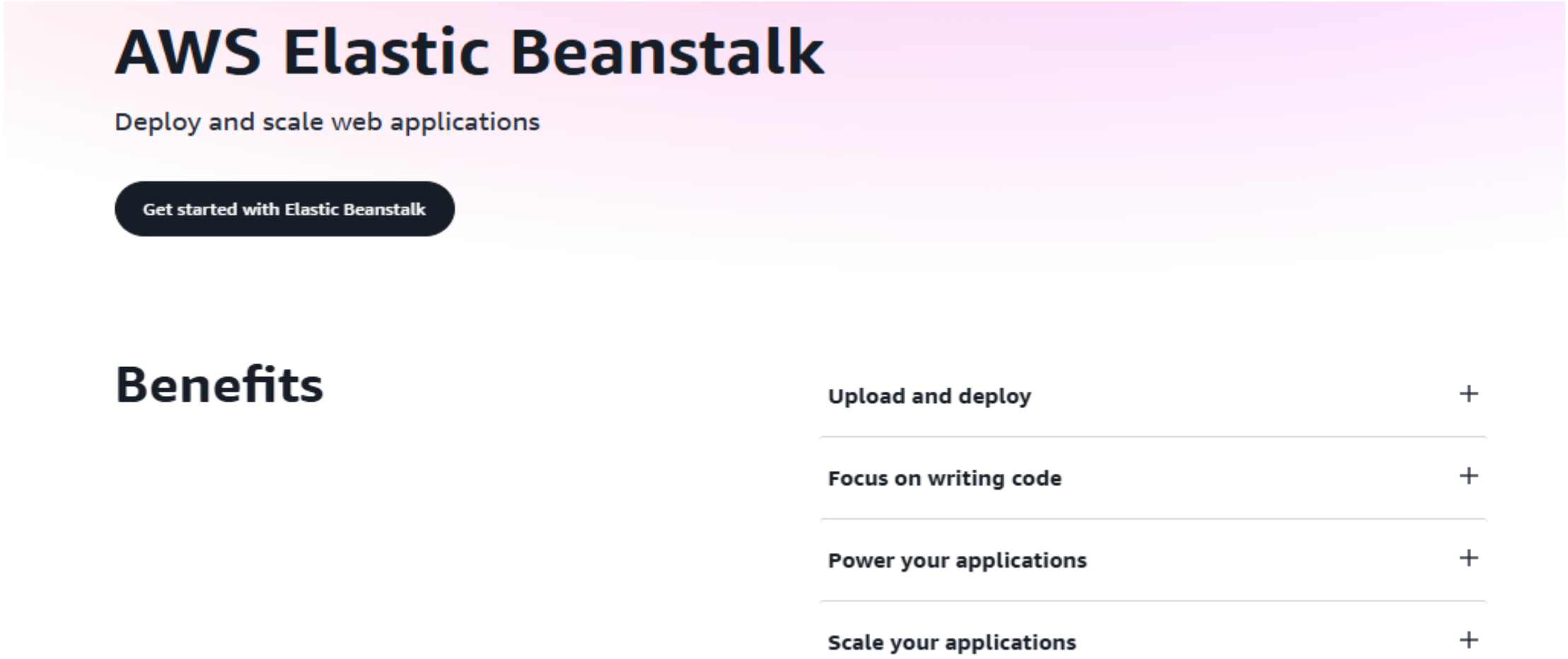
Storage Transfer Service
Data transfers from online and on-premises sources to Cloud Storage.

Parallelstore
High performance, managed parallel file service.

Google Cloud NetApp Volumes
File storage service for NFS, SMB, and multi-protocol environments.

Backup and DR Service
Service for centralized, application-consistent data protection.

Web application deployment using public cloud services



AWS Elastic Beanstalk Documentation

AWS Elastic Beanstalk is designed to get web applications up and running on AWS. You can upload your application code and the service handles details such as resource provisioning, load balancing, auto-scaling, and monitoring. Elastic Beanstalk is ideal if you have a PHP, Java, Python, Ruby, Node.js, .NET, Go, or Docker web application. Elastic Beanstalk uses core AWS services such as Amazon Elastic Compute Cloud (EC2), Amazon Elastic Container Service (ECS), AWS Auto Scaling, and Elastic Load Balancing (ELB) to support applications that need to scale to serve a large number of users.

Selection of application platforms

AWS Elastic Beanstalk supports web applications written in many languages and frameworks. It requires no or minimal code changes to go from development machine to the cloud. Development options for deploying your web applications include Java, .NET, Node.js, PHP, Ruby, Python, Go, and Docker.

Variety of application deployment options

With AWS Elastic Beanstalk you can deploy your code through the AWS Management Console, Elastic Beanstalk Command Line Interface, Visual Studio, and Eclipse. Multiple deployment offer choices for the speed and safety of deploying your applications while helping you to reduce administrative burden.

Monitoring

Elastic Beanstalk provides a unified user interface (UI) to monitor and manage the health of your applications.

Application Health

Elastic Beanstalk collects key metrics and attributes to determine the health of your applications. With the Elastic Beanstalk Health Dashboard you can visualize overall application health and customize application health checks, health permissions, and health reporting in one UI.

Monitoring, Logging, and Tracing

Elastic Beanstalk integration with Amazon CloudWatch and AWS X-Ray means you can use monitoring dashboards to view performance metrics such as latency, CPU utilization, and response codes. You can also set up CloudWatch alarms to get notified when metrics exceed your chosen thresholds.

Public

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