Amazon EC2

Amazon Elastic Compute Cloud (Amazon EC2) is a web service with which you can run virtual server "instances" in the cloud.

Amazon EC2 instances can run the Windows, Linux, or MacOS operating systems.

The EC2 simple web service interface allows you to obtain and configure capacity with minimal friction.

EC2 is designed to make web-scale cloud computing easier for developers.

Amazon EC2 changes the economics of computing by allowing you to pay only for capacity that you actually use.

Amazon EC2 provides developers the tools to build failure resilient applications and isolate them from common failure scenarios.

Benefits of EC2 include:

- **Elastic Web-Scale computing** – you can increase or decrease capacity within minutes not hours and commission one to thousands of instances simultaneously.
- **Completely controlled** – You have complete control include root access to each instance and can stop and start instances without losing data and using web service APIs.
- **Flexible Cloud Hosting Services** – you can choose from multiple instance types, operating systems, and software packages as well as instances with varying memory, CPU and storage configurations.
- **Integrated** – EC2 is integrated with most AWS services such as S3, RDS, and VPC to provide a complete, secure solution.
- **Reliable** – EC2 offers a highly reliable environment where replacement instances can be rapidly and predictably commissioned with SLAs of 99.99% for each region.
- **Secure** – EC2 works in conjunction with VPC to provide a secure location with an IP address range you specify and offers Security Groups, Network ACLs, and IPSec VPN features.
- **Inexpensive** – Amazon passes on the financial benefits of scale by charging very low rates and on a capacity consumed basis.

An Amazon Machine Image (AMI) is a special type of virtual appliance that is used to create a virtual machine within the Amazon Elastic Compute Cloud ("EC2").

An AMI includes the following:

- One or more [EBS](#) snapshots, or, for instance-store-backed AMIs, a template for the root volume of the instance (for example, an operating system, an application server, and applications).
- Launch permissions that control which AWS accounts can use the AMI to launch instances.
- A block device mapping that specifies the volumes to attach to the instance when it's launched.

AMIs come in three main categories:

- **Community AMIs** – free to use, generally you just select the operating system you want.
- **AWS Marketplace AMIs** – pay to use, generally come packaged with additional, licensed software.
- **My AMIs** – AMIs that you create yourself.
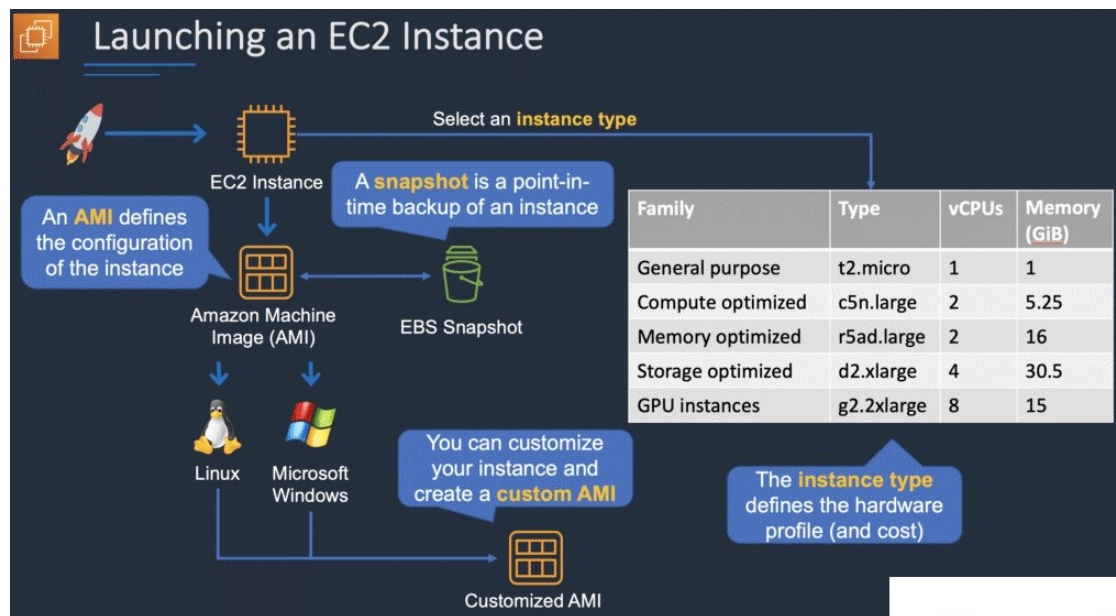
Metadata and User Data:

- User data is data that is supplied by the user at instance launch in the form of a script.
- Instance metadata is data about your instance that you can use to configure or manage the running instance.
- User data is limited to 16KB.
- User data and metadata are not encrypted.
- Instance metadata is available at http://169.254.169.254/latest/meta-data.

The Instance Metadata Query tool allows you to query the instance metadata without having to type out the full URI or category names.

Pricing

On-demand:

- Good for users that want the low cost and flexibility of EC2 without any up-front payment or long-term commitment.
- Applications with short term, spiky, or unpredictable workloads that cannot be interrupted.
- Applications being developed or tested on EC2 for the first time.

Reserved:

- Applications with steady state or predictable usage.
- Applications that require reserved capacity.
- Users can make up-front payments to reduce their total computing costs even further.
- Standard Reserved Instances (RIs) provide up to 75% off on-demand price.
- Convertible RIs provide up to 54% off on-demand price – provides the capability to change the attributes of the RI as long as the exchange results in the creation of RIs of equal or greater value.
- Scheduled RIs are available to launch within the time window you reserve. This option allows you to match your capacity reservation to a predictable recurring schedule that only requires a fraction of a day, a week, or a month.

Spot:

- Applications that have flexible start and end times.
- Applications that are only feasible at very low compute prices.
- Users with an urgent need for a large amount of additional compute capacity.
- If Amazon terminate your instances you do not pay, if you terminate you pay for the hour.

Dedicated hosts:

- Physical servers dedicated just for your use.
- You then have control over which instances are deployed on that host.
- Available as On-Demand or with Dedicated Host Reservation.
- Useful if you have server-bound software licences that use metrics like per-core, per-socket, or per-VM.
- Each dedicated host can only run one EC2 instance size and type.
- Good for regulatory compliance or licensing requirements.
- Predictable performance.
- Complete isolation.
- Most expensive option.
- Billing is per host.

Dedicated instances:

- Virtualized instances on hardware just for you.
- Also uses physically dedicated EC2 servers.
- Does not provide the additional visibility and controls of dedicated hosts (e.g. how instance are placed on a server).
- Billing is per instance.
- May share hardware with other non-dedicated instances in the same account.
- Available as On-Demand, Reserved Instances, and Spot Instances.
- Cost additional $2 per hour per region.

Savings Plans:

- Savings Plans is a flexible pricing model that provides savings of up to 72% on your AWS compute usage.
- This pricing model offers lower prices on Amazon EC2 instances usage, regardless of instance family, size, OS, tenancy or AWS Region.
- Also applies to AWS Fargate and AWS Lambda usage.

Instance Types

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases.

Instance types comprise varying combinations of CPU, memory, storage, and networking capacity and give you the flexibility to choose the appropriate mix of resources for your applications.

Each instance type includes one or more instance sizes, allowing you to scale your resources to the requirements of your target workload.

The table below provides an overview of the different EC2 instance types:

Category	Families	Purpose/Design
General Purpose	A1, T3, T3a, T2, M5, M5a, M4	General purpose instances provide a balance of compute, memory and networking resources, and can be used for a variety of diverse workloads
Compute Optimized	C5, C5n, C4	Compute Optimized instances are ideal for compute bound applications that benefit from high performance processors
Memory Optimized	R5, R5a, R4, X1e, X1, High Memory, z1d	Memory optimized instances are designed to deliver fast performance for workloads that process large data sets in memory
Accelerated Computing	P3, P2, G4, G3, F1	Accelerated computing instances use hardware accelerators, or co-processors, to perform functions, such as floating-point number calculations, graphics processing, or data pattern matching
Storage Optimized	I3, I3en, D2, H1	This instance family provides Non-Volatile Memory Express (NVMe) SSD-backed instance storage optimized for low latency, very high random I/O performance, high sequential read throughput and provide high IOPS at a low cost

Amazon Elastic Container Service (ECS)

Amazon Elastic Container Service (ECS) is another product in the AWS Compute category. It provides a highly scalable, high performance container management service that supports Docker containers and allows you to easily run applications on a managed cluster of Amazon EC2 instances.

Amazon ECS eliminates the need for you to install, operate, and scale your own cluster management infrastructure.

Using API calls you can launch and stop container-enabled applications, query the complete state of clusters, and access many familiar features like security groups, Elastic Load Balancing, EBS volumes and IAM roles.

Amazon ECS can be used to schedule the placement of containers across clusters based on resource needs and availability requirements.

An Amazon ECS launch type determines the type of infrastructure on which your tasks and services are hosted.

There are two launch types and the table below describes some of the differences between the two launch types:

Amazon EC2	Amazon Fargate
You explicitly provision EC2 instances	The control plane asks for resources and Fargate automatically provisions
You're responsible for upgrading, patching, care of EC2 pool	Fargate provisions compute as needed
You must handle cluster optimization	Fargate handles cluster optimization
More granular control over infrastructure	Limited control, as infrastructure is automated

The Elastic container registry (ECR) is a managed AWS Docker registry service for storing, managing and deploying Docker images.

There is no additional charge for Amazon ECS. You pay for AWS resources (e.g. EC2 instances or EBS volumes) you create to store and run your application.

Amazon ECR is integrated with Amazon EC2 Container Service (ECS).

With Amazon ECR, there are no upfront fees or commitments. You pay only for the amount of data you store in your repositories and data transferred to the Internet.

AWS Lambda

AWS Lambda is a serverless computing technology that allows you to run code without provisioning or managing servers.

AWS Lambda executes code only when needed and scales automatically.

You pay only for the compute time you consume (you pay nothing when your code is not running).

Benefits of AWS Lambda:

- No servers to manage.
- Continuous scaling.
- Subsecond metering.
- Integrates with almost all other AWS services.

Primary use cases for AWS Lambda:

- Data processing.
- Real-time file processing.
- Real-time stream processing.
- Build serverless backends for web, mobile, IOT, and 3rd party API requests.

Amazon Lightsail

Amazon LightSail Instances

Amazon Lightsail is one of the newest services in the AWS Compute suite of products. Amazon Lightsail is great for users who do not have deep AWS technical expertise as it make it very easy to provision compute services.

Amazon Lightsail provides developers compute, storage, and networking capacity and capabilities to deploy and manage websites, web applications, and databases in the cloud.

Amazon Lightsail includes everything you need to launch your project quickly – a virtual machine, SSD-based storage, data transfer, DNS management, and a static IP.

Amazon Lightsail provides preconfigured virtual private servers (instances) that include everything required to deploy and application or create a database.

The underlying infrastructure and operating system is managed by Amazon Lightsail.

Best suited to projects that require a few dozen instances or fewer.

Provides a simple management interface.

Good for blogs, websites, web applications, e-commerce etc.

Can deploy load balancers and attach block storage.

Public API.

Limited to 20 Amazon Lightsail instances, 5 static IPs, 3 DNS zones, 20 TB block storage, 40 databases, and 5 load balancers per account.

Up to 20 certificates per calendar year.

Can connect to each other and other AWS resources through public Internet and private (VPC peering) networking.

Application templates include WordPress, WordPress Multisite, Drupal, Joomla!, Magento, Redmine, LAMP, Nginx (LEMP), MEAN, Node.js, and more.

Amazon Lightsail currently supports 6 Linux or Unix-like distributions: Amazon Linux, CentOS, Debian, FreeBSD, OpenSUSE, and Ubuntu, as well as 2 Windows Server versions: 2012 R2 and 2016.

Amazon LightSail Databases

Amazon Lightsail databases are instances that are dedicated to running databases.

An Amazon Lightsail database can contain multiple user-created databases, and you can access it by using the same tools and applications that you use with a stand-alone database.

Amazon Lightsail managed databases provide an easy, low maintenance way to store your data in the cloud.

Amazon Lightsail manages a range of maintenance activities and security for your database and its underlying infrastructure.

Amazon Lightsail automatically backs up your database and allows point in time restore from the past 7 days using the database restore tool.

Amazon Lightsail databases support the latest major versions of MySQL. Currently, these versions are 5.6, 5.7, and 8.0 for MySQL.

Amazon Lightsail databases are available in Standard and High Availability plans.

High Availability plans add redundancy and durability to your database, by automatically creating standby database in a separate Availability Zone.

Amazon Lightsail is very affordable.

Amazon Lightsail plans are billed on an on-demand hourly rate, so you pay only for what you use.

For every Amazon Lightsail plan you use, we charge you the fixed hourly price, up to the maximum monthly plan cost.

AWS Elastic Beanstalk

AWS Elastic Beanstalk is the fastest and simplest way to get web applications up and running on AWS.

Developers simply upload their application code and the service automatically handles all the 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 EC2, Amazon Elastic Container Service (Amazon ECS), Auto Scaling, and Elastic Load Balancing to easily support applications that need to scale to serve millions of users.
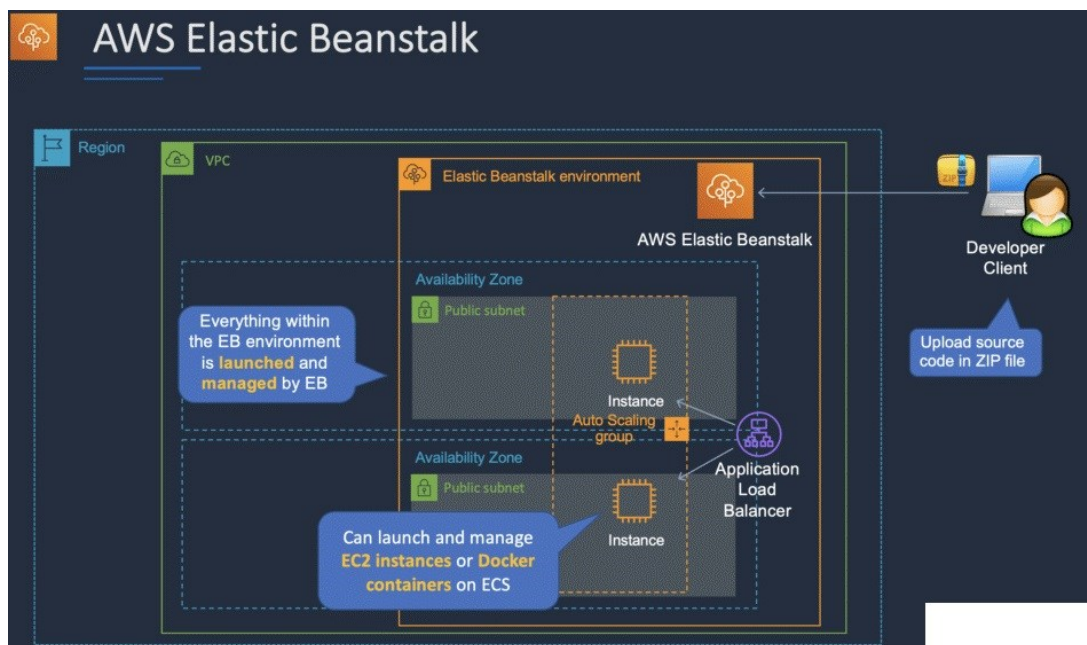
AWS Batch

AWS Batch enables developers, scientists, and engineers to easily and efficiently run hundreds of thousands of batch computing jobs on AWS.

AWS Batch dynamically provisions the optimal quantity and type of compute resources (e.g., CPU or memory optimized instances) based on the volume and specific resource requirements of the batch jobs submitted.

AWS Cloud Management

AWS Organizations

AWS organizations allow you to consolidate multiple AWS accounts into an organization that you create and centrally manage.

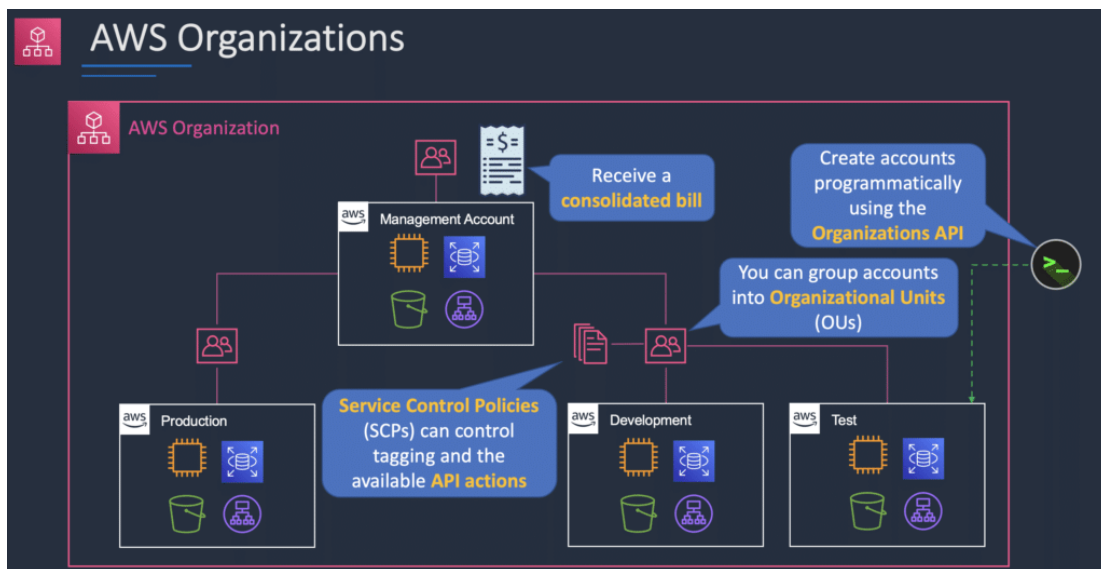Available in two feature sets:

- Consolidated Billing.
- All features.

Includes root accounts and organizational units.

Policies are applied to root accounts or OUs.

Consolidated billing includes:

- Paying Account – independent and cannot access resources of other accounts.
- Linked Accounts – all linked accounts are independent.

AWS Control Tower

Simplifies the process of creating multi-account environments.

Sets up governance, compliance, and security guardrails for you.

Integrates with other services and features to setup the environment for you including:

- AWS Organizations, SCPs, OUs, AWS Config, AWS CloudTrail, Amazon S3, Amazon SNS, AWS CloudFormation, AWS Service Catalog, AWS Single Sign-On (SSO).

Examples of guardrails AWS Control Tower can configure for you include:

- Disallowing public write access to Amazon Simple Storage Service (Amazon S3) buckets.
- Disallowing access as a root user without multi-factor authentication.
- Enabling encryption for Amazon EBS volumes attached to Amazon EC2 instances.

AWS Config

AWS Config is a fully-managed service that provides you with an AWS resource inventory, configuration history, and configuration change notifications to enable security and regulatory compliance.

With AWS Config, you can discover existing and deleted AWS resources, determine your overall compliance against rules, and dive into configuration details of a resource at any point in time. AWS Config enables compliance auditing, security analysis, resource change tracking, and troubleshooting.
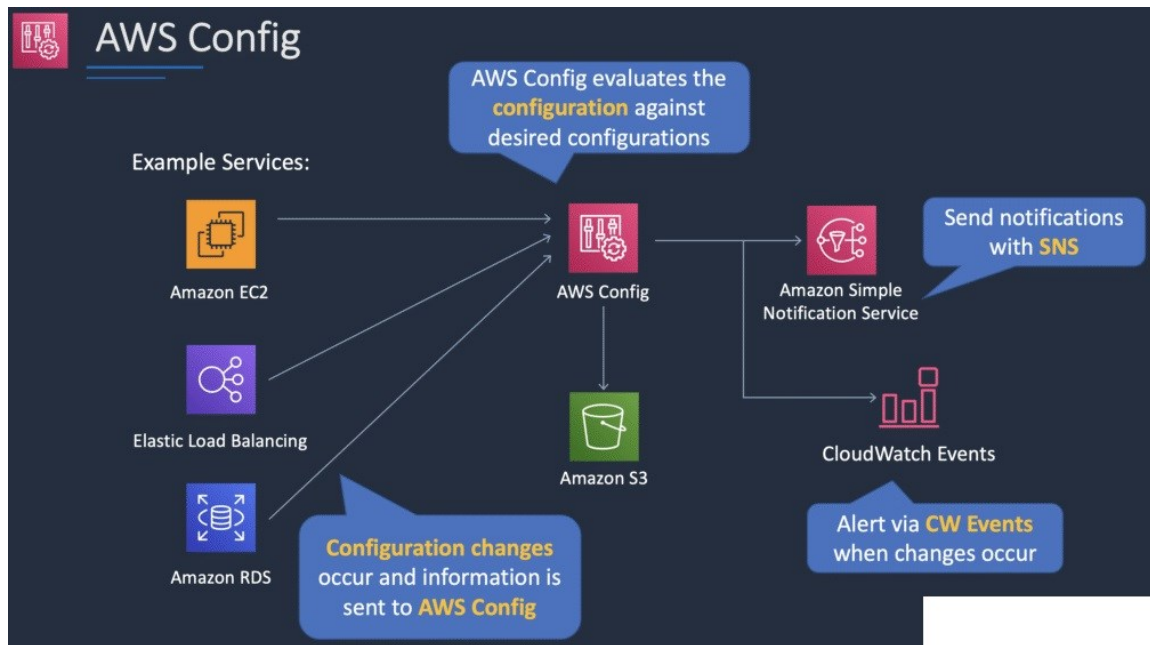
AWS Service Catalog

AWS Service Catalog allows organizations to create and manage catalogs of IT services that are approved for use on AWS.

AWS Service Catalog allows you to centrally manage commonly deployed IT services.

IT services can include virtual machine images, servers, software, and databases and multi-tier application architectures.

Enables users to quickly deploy only the approved IT services they need.

AWS Systems Manager

Manages many AWS resources including Amazon EC2, Amazon S3, Amazon RDS etc.

Systems Manager Components:

- Automation.
- Run Command.
- Inventory.
- Patch Manager.
- Session Manager.
- Parameter Store.

AWS Personal Health Dashboard

AWS Personal Health Dashboard provides alerts and remediation guidance when AWS is experiencing events that may impact you.

Personal Health Dashboard gives you a personalized view into the performance and availability of the AWS services underlying your AWS resources.

The dashboard displays relevant and timely information to help you manage events in progress.

Also provides proactive notification to help you plan for scheduled activities.

Alerts are triggered by changes in the health of AWS resources, giving you event visibility, and guidance to help quickly diagnose and resolve issues.

You get a personalized view of the status of the AWS services that power your applications, enabling you to quickly see when AWS is experiencing issues that may impact you.

Also provides forward looking notifications, and you can set up alerts across multiple channels, including email and mobile notifications, so you receive timely and relevant information to help plan for scheduled changes that may affect you.

Alerts include remediation details and specific guidance to enable you to take immediate action to address AWS events impacting your resources.

Can integrate with Amazon CloudWatch Events, enabling you to build custom rules and select targets such as AWS Lambda functions to define automated remediation actions.

The AWS Health API allows you to integrate health data and notifications with your existing in-house or third-party IT Management tools.

Service Health Dashboard

AWS publishes up-to-the-minute information on service availability.

This information is not personalized to you (unlike Personal Health Dashboard).

AWS OpsWorks

AWS OpsWorks is a configuration management service that provides managed instances of Chef and Puppet.

Updates include patching, updating, backup, configuration and compliance management.

AWS Trusted Advisor

AWS Trusted Advisor is an online tool that provides you real time guidance to help you provision your resources following AWS best practices.

Trusted Advisor checks help optimize your AWS infrastructure, improve security and performance, reduce your overall costs, and monitor service limits.

AWS Basic Support and AWS Developer Support customers get access to 6 security checks (S3 Bucket Permissions, Security Groups – Specific Ports Unrestricted, IAM Use, MFA on Root Account, EBS Public Snapshots, RDS Public Snapshots) and 50 service limit checks.

AWS Business Support and AWS Enterprise Support customers get access to all 115 Trusted Advisor checks (14 cost optimization, 17 security, 24 fault tolerance, 10 performance, and 50 service limits) and recommendations.

Additional AWS Services & Tools

There are Additional AWS Services & Tools that may feature on the exam. Often you do not need to know these at a deep level but do need to understand what they are and what they are used for.

On this page, you'll find some high-level details and links for more information on some of these services and tools.

Exam tip: Before sitting the exam it would be wise to go through the AWS console and pick out any services you're not familiar with and do a bit of reading up on them using the AWS documentation.

Compute

Amazon Elastic Container Service for Kubernetes (EKS):

- Amazon Elastic Container Service for Kubernetes (EKS) is a managed Kubernetes service that makes it easy for you to run Kubernetes on AWS without needing to install, operate, and maintain your own Kubernetes control plane.
- EKS is certified Kubernetes conformant, so existing applications running on upstream Kubernetes are compatible with Amazon EKS.
- EKS automatically manages the availability and scalability of the Kubernetes control plane nodes that are responsible for starting and stopping containers, scheduling containers on virtual machines, storing cluster data, and other tasks.
- EKS automatically detects and replaces unhealthy control plane nodes for each cluster.
- Generally available but only in limited regions currently.
- https://aws.amazon.com/eks/features/

AWS Batch:

- With AWS Batch, you simply package the code for your batch jobs, specify their dependencies, and submit your batch job using the AWS Management Console, CLIs, or SDKs.
- AWS Batch allows you to specify execution parameters and job dependencies, and facilitates integration with a broad range of popular batch computing workflow engines and languages (e.g., Pegasus WMS, Luigi, and AWS Step Functions).
- AWS Batch efficiently and dynamically provisions and scales Amazon EC2 and Spot Instances based on the requirements of your jobs. AWS Batch provides default job queues and compute environment definitions that enable you to get started quickly.
- https://aws.amazon.com/batch/features/

AWS Elastic Beanstalk:

- AWS Elastic Beanstalk is the fastest and simplest way to get web applications up and running on AWS.
- Developers simply upload their application code and the service automatically handles all the 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 EC2, Amazon Elastic Container Service (Amazon ECS), Auto Scaling, and Elastic Load Balancing to easily support applications that need to scale to serve millions of users.
- https://aws.amazon.com/elasticbeanstalk/details/

Storage

AWS Storage Gateway:

- AWS Storage Gateway is a hybrid cloud storage service that connects your existing on-premises environments with the AWS Cloud.
- Its features make it easy for you to run hybrid cloud workloads at any stage of your cloud adoption, whether it's getting started with cloud backups, running cloud processing workflows for data generated by on-premises machines, or performing a one-time migration of block volume data or databases.
- Storage Gateway seamlessly connects to your local production or backup applications with NFS, SMB, iSCSI, or iSCSI-VTL, so you can adopt AWS Cloud storage without needing to modify your applications.
- Its protocol conversion and device emulation enables you to access block data on volumes managed by Storage Gateway on top of Amazon S3, store files as native Amazon S3 objects, and keep virtual tape backups online in a Virtual Tape Library backed by S3 or move the backups to a tape archive tier on Amazon Glacier.
- https://aws.amazon.com/storagegateway/features/

Database

Amazon Elasticache:

- Amazon ElastiCache offers fully managed [Redis](#) and [Memcached](#).
- Seamlessly deploy, run, and scale popular open source compatible in-memory data stores.
- Amazon ElastiCache can be used to significantly improve latency and throughput for many read-heavy application workloads (such as social networking, gaming, media sharing and Q&A portals) or compute-intensive workloads (such as a recommendation engine) by allowing you to store the objects that are often read in cache.
- Amazon ElastiCache simplifies and offloads the management, monitoring, and operation of in-memory cache environments, enabling you to focus on the differentiating parts of your applications.
- Pay only for the resources you consume based on node hours used.
- https://digitalcloud.training/certification-training/aws-certified-cloud-practitioner/aws-databases/
- https://aws.amazon.com/elasticache/features/

Amazon Neptune:

- Amazon Neptune is a fast, reliable, fully-managed graph database service that makes it easy to build and run applications that work with highly connected datasets.
- With Amazon Neptune, you can create sophisticated, interactive graph applications that can query billions of relationships in milliseconds.
- SQL queries for highly connected data are complex and hard to tune for performance. Instead, Amazon Neptune allows you to use the popular graph query languages Apache TinkerPop Gremlin and W3C's SPARQL to execute powerful queries that are easy to write and perform well on connected data.
- https://aws.amazon.com/neptune/features/

Migration

AWS Migration Hub:

- AWS Migration Hub provides a single location to track the progress of application migrations across multiple AWS and partner solutions.
- Using Migration Hub allows you to choose the AWS and partner migration tools that best fit your needs, while providing visibility into the status of migrations across your portfolio of applications.
- For example, you might use AWS Database Migration Service, AWS Server Migration Service, and partner migration tools such as ATADATA ATAmotion, CloudEndure Live Migration, or RiverMeadow Server Migration SaaS to migrate an application comprised of a database, virtualized web servers, and a bare metal server.
- Using Migration Hub, you can view the migration progress of all the resources in the application.
- https://aws.amazon.com/migration-hub/features/

AWS Database Migration Service:

- AWS Database Migration Service helps you migrate databases to AWS quickly and securely.
- The source database remains fully operational during the migration, minimizing downtime to applications that rely on the database.
- The AWS Database Migration Service can migrate your data to and from most widely used commercial and open-source databases.
- AWS Database Migration Service supports homogenous migrations such as Oracle to Oracle, as well as heterogeneous migrations between different database platforms, such as Oracle or Microsoft SQL Server to Amazon Aurora.
- With AWS Database Migration Service, you can continuously replicate your data with high availability and consolidate databases into a petabyte-scale data warehouse by streaming data to Amazon Redshift and Amazon S3.
- https://aws.amazon.com/dms/

AWS Server Migration Service:

- AWS Server Migration Service (SMS) is an agentless service which makes it easier and faster for you to migrate thousands of on-premises workloads to AWS
- AWS SMS allows you to automate, schedule, and track incremental replications of live server volumes, making it easier for you to coordinate large-scale server migrations
- https://aws.amazon.com/server-migration-service/

Networking & Content Delivery

Amazon API Gateway:

- Amazon API Gateway is a fully managed service that makes it easy for developers to create, publish, maintain, monitor, and secure APIs at any scale.
- With a few clicks in the AWS Management Console, you can create an API that acts as a "front door" for applications to access data, business logic, or functionality from your back-end services.
- Back-end services may include [Amazon Elastic Compute Cloud (Amazon EC2)](#), code running on [AWS Lambda](#), or any web application.
- https://aws.amazon.com/api-gateway/features/

AWS Direct Connect:

- AWS Direct Connect is a cloud service solution that makes it easy to establish a dedicated network connection from your premises to AWS.
- Using AWS Direct Connect, you can establish private connectivity between AWS and your datacenter, office, or colocation environment, which in many cases can reduce your network costs, increase bandwidth throughput, and provide a more consistent network experience than Internet-based connections.
- AWS Direct Connect lets you establish a dedicated network connection between your network and one of the AWS Direct Connect locations.
- Using industry standard 802.1q VLANs, this dedicated connection can be partitioned into multiple virtual interfaces.
- This allows you to use the same connection to access public resources such as objects stored in Amazon S3 using public IP address space, and private resources such as Amazon EC2 instances running within an [Amazon Virtual Private Cloud (VPC)](#) using private IP space, while maintaining network separation between the public and private environments.
- https://digitalcloud.training/certification-training/aws-certified-cloud-practitioner/aws-networking/
- https://aws.amazon.com/directconnect/features/

Developer Tools

AWS CodeStar:

- AWS CodeStar enables you to quickly develop, build, and deploy applications on AWS. AWS CodeStar provides a unified user interface, enabling you to easily manage your software development activities in one place.
- With AWS CodeStar, you can set up your entire continuous delivery toolchain in minutes, allowing you to start releasing code faster. AWS CodeStar makes it easy for your whole team to work together securely, allowing you to easily manage access and add owners, contributors, and viewers to your projects.
- With AWS CodeStar, you can use a variety of project templates to start developing applications on Amazon EC2, AWS Lambda, and AWS Elastic Beanstalk.
- AWS CodeStar projects support many popular programming languages including Java, JavaScript, PHP, Ruby, and Python.
- https://aws.amazon.com/codestar/features/

AWS CodeCommit:

- AWS CodeCommit is a fully-managed source control service that hosts secure Git-based repositiories.
- It makes it easy for teams to collaborate on code in a secure and highly scalable ecosystem.
- CodeCommit eliminates the need to operate your own source control system or worry about scaling its infrastructure.
- You can use CodeCommit to securely store anything from source code to binaries, and it works seamlessly with your existing Git tools.
- https://aws.amazon.com/codecommit/features/

AWS CodeBuild:

- AWS CodeBuild is a fully managed continuous integration service that compiles source code, runs tests, and produces software packages that are ready to deploy.
- With CodeBuild, you don't need to provision, manage, and scale your own build servers. CodeBuild scales continuously and processes multiple builds concurrently, so your builds are not left waiting in a queue.
- You can get started quickly by using prepackaged build environments, or you can create custom build environments that use your own build tools.
- With CodeBuild, you are charged by the minute for the compute resources you use.
- https://aws.amazon.com/codebuild/features/

AWS CodeDeploy:

- AWS CodeDeploy is a fully managed deployment service that automates software deployments to a variety of compute services such as Amazon EC2, AWS Lambda, and your on-premises servers.
- AWS CodeDeploy makes it easier for you to rapidly release new features, helps you avoid downtime during application deployment, and handles the complexity of updating your applications.
- You can use AWS CodeDeploy to automate software deployments, eliminating the need for error-prone manual operations. The service scales to match your deployment needs, from a single Lambda function to thousands of EC2 instances.
- https://aws.amazon.com/codedeploy/features/

AWS CodePipeline:

- AWS CodePipeline is a fully managed continuous delivery service that helps you automate your release pipelines for fast and reliable application and infrastructure updates.
- CodePipeline automates the build, test, and deploy phases of your release process every time there is a code change, based on the release model you define.
- This enables you to rapidly and reliably deliver features and updates.
- You can easily integrate AWS CodePipeline with third-party services such as GitHub or with your own custom plugin.
- https://aws.amazon.com/codepipeline/features/

AWS X-Ray:

- AWS X-Ray helps developers analyze and debug production, distributed applications, such as those built using a microservices architecture.
- With X-Ray, you can understand how your application and its underlying services are performing to identify and troubleshoot the root cause of performance issues and errors.
- X-Ray provides an end-to-end view of requests as they travel through your application, and shows a map of your application's underlying components.
- You can use X-Ray to analyze both applications in development and in production, from simple three-tier applications to complex microservices applications consisting of thousands of service.
- https://aws.amazon.com/xray/features/

Management Tools

https://digitalcloud.training/certification-training/aws-certified-cloud-practitioner/aws-cloud-management/

AWS CloudFormation:

- AWS CloudFormation provides a common language for you to describe and provision all the infrastructure resources in your cloud environment.
- CloudFormation allows you to use a simple text file to model and provision, in an automated and secure manner, all the resources needed for your applications across all regions and accounts.
- This file serves as the single source of truth for your cloud environment.
- You can use JSON or YAML to describe what AWS resources you want to create and configure.
- https://aws.amazon.com/cloudformation/features/
- https://digitalcloud.training/certification-training/aws-solutions-architect-associate/management-tools/aws-cloudformation/

AWS Config:

- AWS Config is a service that enables you to assess, audit, and evaluate the configurations of your AWS resources.
- Config continuously monitors and records your AWS resource configurations and allows you to automate the evaluation of recorded configurations against desired configurations.
- With Config, you can review changes in configurations and relationships between AWS resources, dive into detailed resource configuration histories, and determine your overall compliance against the configurations specified in your internal guidelines.
- This enables you to simplify compliance auditing, security analysis, change management, and operational troubleshooting.
- https://aws.amazon.com/config/features/

AWS OpsWorks:

- AWS OpsWorks is a configuration management service that provides managed instances of Chef and Puppet.
- Chef and Puppet are automation platforms that allow you to use code to automate the configurations of your servers.
- OpsWorks lets you use Chef and Puppet to automate how servers are configured, deployed, and managed across your Amazon EC2 instances or on-premises compute environments.
- OpsWorks has three offerings, AWS Opsworks for Chef Automate, AWS OpsWorks for Puppet Enterprise, and AWS OpsWorks Stacks

AWS Service Catalog:

- AWS Service Catalog allows organizations to create and manage catalogs of IT services that are approved for use on AWS.
- These IT services can include everything from virtual machine images, servers, software, and databases to complete multi-tier application architectures.
- AWS Service Catalog allows you to centrally manage commonly deployed IT services, and helps you achieve consistent governance and meet your compliance requirements, while enabling users to quickly deploy only the approved IT services they need
- Uses CloudFormation templates.
- https://aws.amazon.com/servicecatalog/features/

AWS Systems Manager:

- AWS Systems Manager gives you visibility and control of your infrastructure on AWS
- Systems Manager provides a unified user interface so you can view operational data from multiple AWS services and allows you to automate operational tasks across your AWS resources.
- With Systems Manager, you can group resources, like Amazon EC2 instances, Amazon S3 buckets, or Amazon RDS instances, by application, view operational data for monitoring and troubleshooting, and take action on your groups of resources.
- Systems Manager simplifies resource and application management, shortens the time to detect and resolve operational problems, and makes it easy to operate and manage your infrastructure securely at scale.
- https://aws.amazon.com/systems-manager/features/

AWS Managed Services:

- AWS Managed Services provides ongoing management of your AWS infrastructure so you can focus on your applications.
- By implementing best practices to maintain your infrastructure, AWS Managed Services helps to reduce your operational overhead and risk.
- AWS Managed Services automates common activities such as change requests, monitoring, patch management, security, and backup services, and provides full-lifecycle services to provision, run, and support your infrastructure.
- AWS Managed Services delivers consistent operations management and predictable results by following ITIL® best practices, and provides tooling and automation to increase efficiency, and reduce your operational overhead and risk.
- https://aws.amazon.com/managed-services/#

Analytics

Amazon Athena:

- Amazon Athena is an interactive query service that makes it easy to analyze data in Amazon S3 using standard SQL.
- Athena is serverless, so there is no infrastructure to manage, and you pay only for the queries that you run.
- With a few clicks in the AWS Management Console, customers can point Athena at their data stored in S3 and begin using standard SQL to run ad-hoc queries and get results in seconds.
- You can use Athena to process logs, perform ad-hoc analysis, and run interactive queries
- Athena scales automatically – executing queries in parallel – so results are fast, even with large datasets and complex queries.
- https://aws.amazon.com/athena/features/

Amazon EMR:

- Amazon Elastic Map Reduce (EMR) provides a managed Hadoop framework that makes it easy, fast, and cost-effective to process vast amounts of data across dynamically scalable Amazon EC2 instances.
- You can also run other popular distributed frameworks such as Apache Spark, HBase, Presto, and Flink in Amazon EMR, and interact with data in other AWS data stores such as Amazon S3 and Amazon DynamoDB.
- Amazon EMR securely and reliably handles a broad set of big data use cases, including log analysis, web indexing, data transformations (ETL), machine learning, financial analysis, scientific simulation, and bioinformatic.
- https://aws.amazon.com/emr/features/

Amazon CloudSearch:

- Amazon CloudSearch is a managed service in the AWS Cloud that makes it simple and cost-effective to set up, manage, and scale a search solution for your website or application.
- Amazon CloudSearch supports 34 languages and popular search features such as highlighting, autocomplete, and geospatial search.
- https://aws.amazon.com/cloudsearch/

Amazon Elasticsearch:

- Amazon Elasticsearch Service, is a fully managed service that makes it easy for you to deploy, secure, operate, and scale Elasticsearch to search, analyze, and visualize data in real-time.
- With Amazon Elasticsearch Service you get easy-to-use APIs and real-time analytics capabilities to power use-cases such as log analytics, full-text search, application monitoring, and clickstream analytics, with enterprise-grade availability, scalability, and security.
- https://aws.amazon.com/elasticsearch-service/features/

Amazon Kinesis:

- Amazon Kinesis makes it easy to collect, process, and analyze real-time, streaming data so you can get timely insights and react quickly to new information.
- There are four types of Kinesis service:
  - Kinesis Video Streams makes it easy to securely stream video from connected .devices to AWS for analytics, machine learning (ML), and other processing.
  - Kinesis Data Streams enables you to build custom applications that process or analyze streaming data for specialized needs.
  - Kinesis Data Firehose is the easiest way to load streaming data into data stores and analytics tools.
  - Amazon Kinesis Data Analytics is the easiest way to process and analyze real-time, streaming data.
- https://aws.amazon.com/kinesis/

AWS Data Pipeline:

- AWS Data Pipeline is a web service that helps you reliably process and move data between different AWS compute and storage services, as well as on-premises data sources, at specified intervals.
- With AWS Data Pipeline, you can regularly access your data where it's stored, transform and process it at scale, and efficiently transfer the results to AWS services such as Amazon S3, Amazon RDS, Amazon DynamoDB, and Amazon EMR.
- AWS Data Pipeline helps you easily create complex data processing workloads that are fault tolerant, repeatable, and highly available.
- https://aws.amazon.com/datapipeline/

AWS Glue:

- AWS Glue is a fully managed extract, transform, and load (ETL) service that makes it easy for customers to prepare and load their data for analytics.
- You can create and run an ETL job with a few clicks in the AWS Management Console.
- You simply point AWS Glue to your data stored on AWS, and AWS Glue discovers your data and stores the associated metadata (e.g. table definition and schema) in the AWS Glue Data Catalog.
- Once cataloged, your data is immediately searchable, queryable, and available for ETL.
- AWS Glue generates the code to execute your data transformations and data loading processes.
- https://aws.amazon.com/glue/features/

Media Services

Amazon Elastic Transcoder:

- Amazon Elastic Transcoder is media transcoding in the cloud.
- It is designed to be a highly scalable, easy to use and a cost-effective way for developers and businesses to convert (or "transcode") media files from their source format into versions that will playback on devices like smartphones, tablets and PCs.
- https://aws.amazon.com/elastictranscoder/

Security, Identity and Compliance

Amazon Cognito:

- Amazon Cognito lets you add user sign-up, sign-in, and access control to your web and mobile apps quickly and easily.
- Amazon Cognito scales to millions of users and supports sign-in with social identity providers, such as Facebook, Google, and Amazon, and enterprise identity providers via SAML 2.0.
- https://aws.amazon.com/cognito/details/

AWS Certificate Manager:

- AWS Certificate Manager is a service that lets you easily provision, manage, and deploy public and private Secure Sockets Layer/Transport Layer Security (SSL/TLS) certificates for use with AWS services and your internal connected resources.
- SSL/TLS certificates are used to secure network communications and establish the identity of websites over the Internet as well as resources on private networks.
- AWS Certificate Manager removes the time-consuming manual process of purchasing, uploading, and renewing SSL/TLS certificates.
- https://aws.amazon.com/certificate-manager/features/

AWS CloudHSM:

- AWS CloudHSM is a cloud-based hardware security module (HSM) that enables you to easily generate and use your own encryption keys on the AWS Cloud.
- With CloudHSM, you can manage your own encryption keys using FIPS 140-2 Level 3 validated HSMs.
- CloudHSM offers you the flexibility to integrate with your applications using industry-standard APIs, such as PKCS#11, Java Cryptography Extensions (JCE), and Microsoft CryptoNG (CNG) libraries.
- https://aws.amazon.com/cloudhsm/features/

AWS Directory Service:

- AWS Directory Service for Microsoft Active Directory, also known as AWS Managed Microsoft AD, enables your directory-aware workloads and AWS resources to use managed Active Directory in the AWS Cloud.
- AWS Managed Microsoft AD is built on actual Microsoft Active Directory and does not require you to synchronize or replicate data from your existing Active Directory to the cloud.
- You can use standard Active Directory administration tools and take advantage of built-in Active Directory features, such as Group Policy and single sign-on (SSO).
- With AWS Managed Microsoft AD, you can easily join Amazon EC2 and Amazon RDS for SQL Server instances to your domain, and use AWS Enterprise IT applications such as Amazon WorkSpaces with Active Directory users and groups.

- https://aws.amazon.com/directoryservice/features/

AWS Artifact:

- AWS Artifact is your go-to, central resource for compliance-related information that matters to you.
- It provides on-demand access to AWS' security and compliance reports and select online agreements.
- Reports available in AWS Artifact include our Service Organization Control (SOC) reports, Payment Card Industry (PCI) reports, and certifications from accreditation bodies across geographies and compliance verticals that validate the implementation and operating effectiveness of AWS security controls.
- Agreements available in AWS Artifact include the Business Associate Addendum (BAA) and the Nondisclosure Agreement (NDA).
- https://aws.amazon.com/artifact/

Machine Learning

Amazon Rekognition:

- Amazon Rekognition makes it easy to add image and video analysis to your applications.
- You just provide an image or video to the Rekognition API, and the service can identify the objects, people, text, scenes, and activities, as well as detect any inappropriate content.
- Amazon Rekognition also provides highly accurate facial analysis and facial recognition on images and video that you provide.
- You can detect, analyze, and compare faces for a wide variety of user verification, people counting, and public safety use cases.
- https://aws.amazon.com/rekognition/

Amazon SageMaker:

- Amazon SageMaker is a fully-managed platform that enables developers and data scientists to quickly and easily build, train, and deploy machine learning models at any scale.
- Amazon SageMaker removes all the barriers that typically slow down developers who want to use machine learning.
- https://aws.amazon.com/sagemaker/features/

Amazon Comprehend:

- Amazon Comprehend is a natural language processing (NLP) service that uses machine learning to find insights and relationships in text.
- The service identifies the language of the text; extracts key phrases, places, people, brands, or events; understands how positive or negative the text is; analyzes text using tokenization and parts of speech; and automatically organizes a collection of text files by topic.
- Using these APIs, you can analyze text and apply the results in a wide range of applications including voice of customer analysis, intelligent document search, and content personalization for web applications.
- https://aws.amazon.com/comprehend/features/

Amazon Transcribe:

- Amazon Transcribe is an automatic speech recognition (ASR) service that makes it easy for developers to add speech-to-text capability to their applications.
- Using the Amazon Transcribe API, you can analyze audio files stored in Amazon S3 and have the service return a text file of the transcribed speech.
- Amazon Transcribe can be used for lots of common applications, including the transcription of customer service calls and generating subtitles on audio and video content.
- The service can transcribe audio files stored in common formats, like WAV and MP3, with time stamps for every word so that you can easily locate the audio in the original source by searching for the text.
- https://aws.amazon.com/transcribe/

Mobile Services

AWS AppSync:

- AWS AppSync makes it easy to build data-driven mobile and browser-based apps that deliver responsive, collaborative experiences by keeping the data updated when devices are connected, enabling the app to use local data when offline, and synchronizing the data when the devices reconnect.
- AWS AppSync uses the open standard GraphQL query language so you can request, change, and subscribe to the exact data you need with just a few lines of code.
- https://aws.amazon.com/appsync/product-details/

AWS Device Farm:

- AWS Device Farm is an app testing service that lets you test and interact with your Android, iOS, and web apps on many devices at once, or reproduce issues on a device in real time.
- View video, screenshots, logs, and performance data to pinpoint and fix issues and increase quality before shipping your app.
- https://aws.amazon.com/device-farm/

Application Integration

AWS Step Functions:

- AWS Step Functions lets you coordinate multiple AWS services into serverless workflows so you can build and update apps quickly.
- Using Step Functions, you can design and run workflows that stitch together services such as AWS Lambda and Amazon ECS into feature-rich applications.
- Workflows are made up of a series of steps, with the output of one step acting as input into the next.
- https://aws.amazon.com/step-functions/features/

Amazon MQ:

- Amazon MQ is a managed message broker service for Apache ActiveMQ that makes it easy to set up and operate message brokers in the cloud.
- Message brokers allow different software systems–often using different programming languages, and on different platforms–to communicate and exchange information.
- Messaging is the communications backbone that connects and integrates the components of distributed applications, such as order processing, inventory management, and order fulfillment for e-commerce.
- https://aws.amazon.com/amazon-mq/features/

Amazon SQS:

- Amazon Simple Queue Service (SQS) is a fully managed message queuing service that enables you to decouple and scale microservices, distributed systems, and serverless applications.
- SQS eliminates the complexity and overhead associated with managing and operating message oriented middleware, and empowers developers to focus on differentiating work.
- Using SQS, you can send, store, and receive messages between software components at any volume, without losing messages or requiring other services to be available.
- https://aws.amazon.com/sqs/features/

Amazon SWF:

- Amazon SWF helps developers build, run, and scale background jobs that have parallel or sequential steps.
- You can think of Amazon SWF as a fully-managed state tracker and task coordinator in the Cloud.
- https://aws.amazon.com/swf/

Internet of Things

AWS IoT Core:

- AWS IoT Core is a managed cloud service that lets connected devices easily and securely interact with cloud applications and other devices.
- AWS IoT Core can support billions of devices and trillions of messages, and can process and route those messages to AWS endpoints and to other devices reliably and securely.
- With AWS IoT Core, your applications can keep track of and communicate with all your devices, all the time, even when they aren't connected.
- https://aws.amazon.com/iot-core/features/

Desktop & App Streaming

Amazon Workspaces:

- Amazon WorkSpaces is a managed, secure cloud desktop service. You can use Amazon WorkSpaces to provision either Windows or Linux desktops in just a few minutes and quickly scale to provide thousands of desktops to workers across the globe.
- Amazon WorkSpaces offers you an easy way to provide a secure, managed, cloud-based virtual desktop experience to your end-users.
- Unlike traditional on-premises Virtual Desktop Infrastructure (VDI) solutions, you don't have to worry about procuring, deploying, and managing a complex environment – Amazon WorkSpaces takes care of the heavy lifting and provides a fully managed service.
- https://aws.amazon.com/workspaces/features/