AWS services for IT infrastructure and software development

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1. Amazon Elastic Compute Cloud (Amazon EC2):

Description:

- Amazon EC2 provides resizable compute capacity in the cloud, allowing users to scale computing resources as needed.

Use cases:

- Hosting web applications, running backend servers, batch processing, scientific computing.

Benefits:

- Flexibility to choose instance types, scalability, pay-as-you-go pricing model, integration with other AWS services.

Challenges:

- Managing instances, optimizing costs, ensuring security configurations.

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2. Amazon Simple Storage Service (Amazon S3):

Description:

- Amazon S3 offers scalable object storage with high availability and durability, allowing users to store and retrieve any amount of data at any time.

Use cases:

- Backup and restore, data archiving, big data analytics, content storage and distribution.

Benefits:

- Scalability, durability (99.999999999% durability), security features, cost-effective storage tiers.

Challenges:

- Managing storage costs, data migration, ensuring data privacy and compliance.

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3. Amazon Relational Database Service (Amazon RDS):

Description:

- Amazon RDS makes it easy to set up, operate, and scale a relational database in the cloud, supporting several database engines including MySQL, PostgreSQL, MariaDB, Oracle, and SQL Server.

Use Cases:

- Web and mobile applications, e-commerce platforms, data warehousing, ERP systems.

Benefits:

- Automated backups, patching, scaling, high availability, and read replicas.

Challenges:

- Configuring and optimizing database performance, managing costs, ensuring data security.

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4. AWS Lambda:

Description:

- AWS Lambda allows users to run code without provisioning or managing servers, executing code in response to triggers such as changes in data, system events, or user actions.

Use Cases:

- Real-time file processing, data validation, event-driven applications, backends for mobile applications.

Benefits:

- No server management, automatic scaling, pay only for compute time used, integration with other AWS services.

Challenges:

- Cold start latency, debugging and monitoring, managing function versions and dependencies.

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3. Amazon DynamoDB:

Description:

- Amazon DynamoDB is a fully managed NoSQL database service that provides fast and predictable performance with seamless scalability.

Use cases:

- Real-time bidding, gaming applications, IoT data storage, session management.

Benefits:

- Low latency, high throughput, fully managed, built-in security and backup.

Challenges:

- Data modeling complexities, cost management, managing partitions and throughput capacity.

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4. Amazon Virtual Private Cloud (Amazon VPC):

Description:

- Amazon VPC allows users to provision logically isolated sections of the AWS cloud, enabling them to launch AWS resources in a virtual network they define.

Use cases:

- Hosting secure web applications, creating hybrid cloud environments, running multi-tier applications.

Benefits:

- Network isolation, control over IP address range, customizable network configurations, security groups, and network ACLs.

Challenges:

- Designing and managing network architecture, configuring security settings, ensuring network performance.

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7. Amazon CloudFront:

Description:

- Amazon CloudFront is a fast content delivery network (CDN) service that securely delivers data, videos, applications, and APIs to users globally with low latency and high transfer speeds.

Use cases:

- Streaming video, delivering web content, distributing software updates, optimizing dynamic content delivery.

Benefits:

- Global reach, low latency, high transfer speeds, integration with other AWS services, DDOS protection.

Challenges:

- Configuring and managing distributions, monitoring and optimizing performance, handling large traffic spikes.

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8. Amazon Simple Queue Service (Amazon SQS):

Description:

- Amazon SQS is a fully managed message queuing service that enables decoupling and scaling of microservices, distributed systems, and serverless applications.

Use Cases:

- Decoupling application components, asynchronous task processing, distributed workloads.

Benefits:

- Scalability, reliability, secure communication between distributed applications, cost-effective.

Challenges:

- Ensuring message ordering, handling duplicate messages, managing queue depth and visibility timeout.

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9. Amazon Elastic Kubernetes Service (Amazon EKS):

Description:

- Amazon EKS makes it easy to run Kubernetes on AWS without needing to install and operate your own Kubernetes control plane or nodes.

Use Cases:

- Running containerized applications, microservices architecture, CI/CD pipelines, hybrid deployments.

Benefits:

- Managed Kubernetes service, high availability, scalability, security integrations.

Challenges:

- Managing Kubernetes configurations, optimizing resource usage, ensuring cluster security.

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10. AWS Identity and Access Management (IAM):

Description:

- AWS IAM enables users to manage access to AWS services and resources securely, allowing the creation and management of AWS users and groups and use of permissions to allow and deny access to resources.

Use Cases:

- Securing AWS environments, managing user access, implementing least privilege policies.

Benefits:

- Granular access control, enhanced security, integration with other AWS services, compliance support.

Challenges:

- Managing complex permissions, ensuring proper policy configurations, auditing and monitoring access.

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