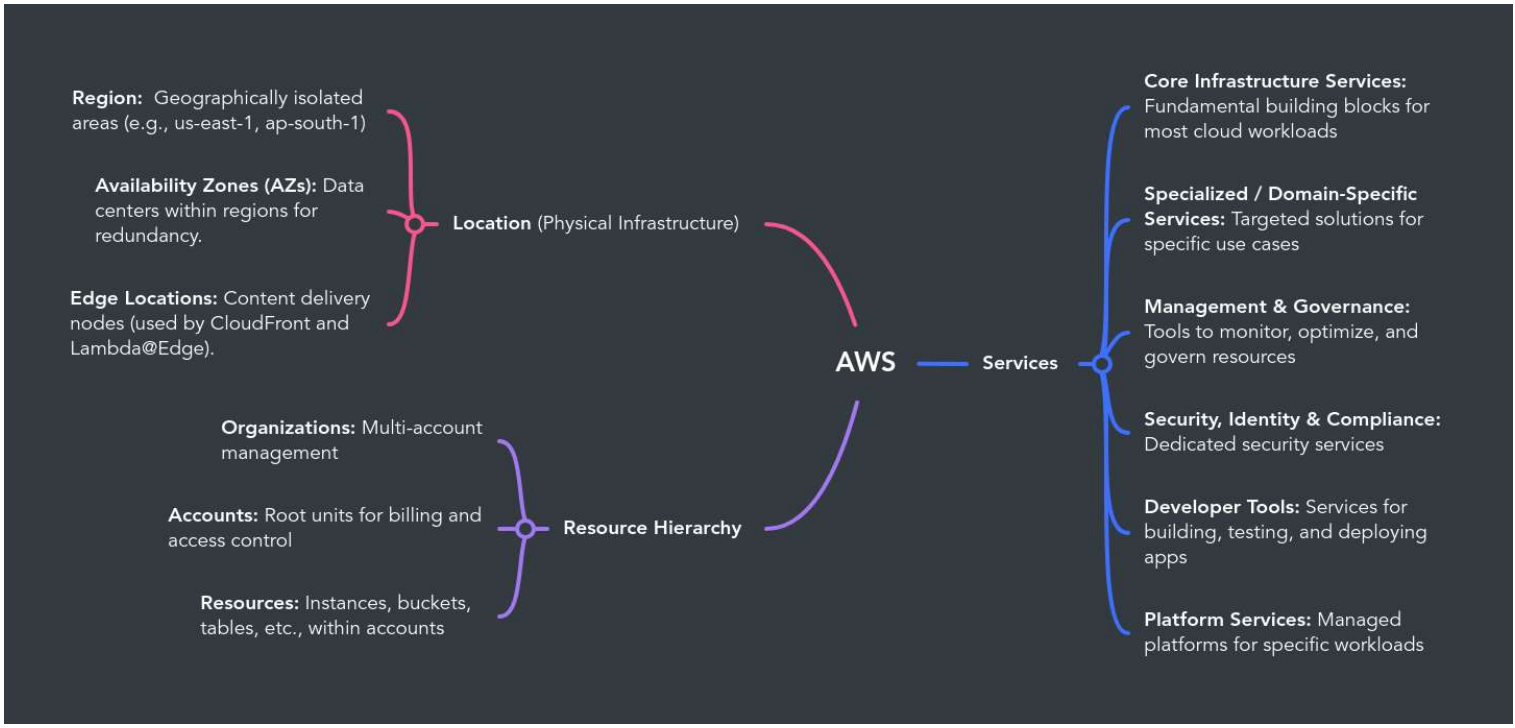
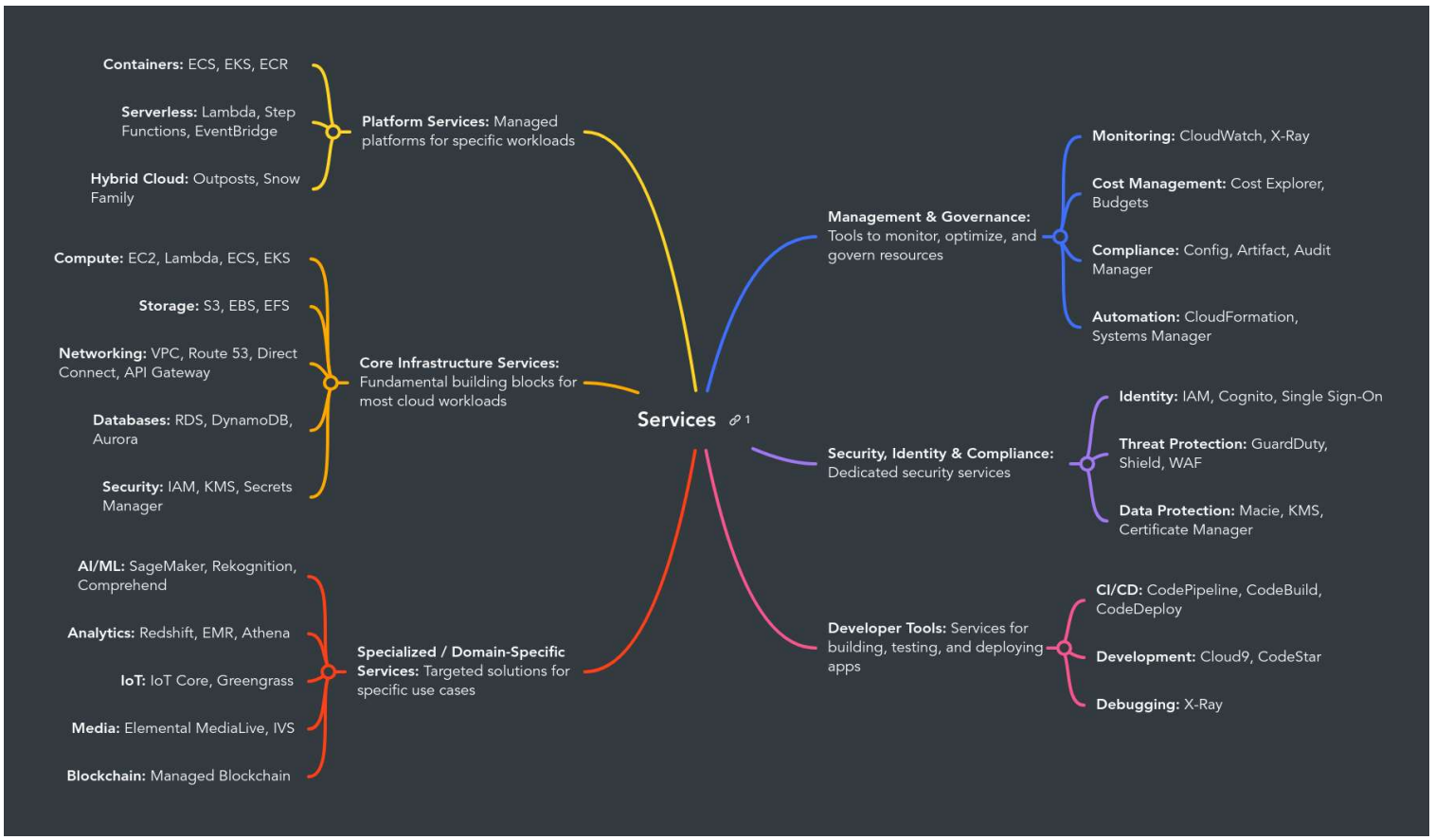
AWS

31 March 2025 18:24





How to Remember: LSR

1. Location: RAE
2. Services: CSMSDP
3. Resource Hierarchy: OAR

Location

1. **Regions**: Large geographical areas where AWS operates its infrastructure. Each region is isolated and contains multiple Availability Zones. Examples include us-east-1, eu-west-1, and ap-south-1.
2. **Availability Zones (AZs)**: Isolated data centers within a region designed to provide high availability and fault tolerance for core AWS services. AZs are connected by low-latency links and are used for hosting infrastructure like EC2 instances and RDS databases. For example, a region like us-east-1 might have AZs named us-east-1a, us-east-1b, and us-east-1c.
3. **Edge Locations**: Data centers located in major cities and highly populated areas globally. They are primarily used for content delivery and caching via services like CloudFront and Route 53, as well as for edge computing with Lambda@Edge. Examples include locations in New York City, London, and Tokyo.

This categorization highlights how AWS infrastructure is organized geographically to support various use cases:

- Regions provide a broad geographical context for deploying applications.
- AZs ensure high availability and redundancy within regions.
- Edge Locations optimize content delivery and latency globally.

Services

1. Compute
    a. Amazon EC2 (Elastic Compute Cloud): Provides resizable virtual servers in the cloud, allowing you to run applications on virtual machines.
    b. AWS Lambda: Serverless compute service that lets you run code without provisioning or managing servers.
    c. Amazon ECS (Elastic Container Service): Fully managed container orchestration service that supports Docker containers.
    d. Amazon EKS (Elastic Kubernetes Service): Managed Kubernetes service for running containerized applications.
    e. AWS Fargate: Serverless compute engine for containers that works with both ECS and EKS.
    f. Amazon Lightsail: Simplified virtual private server (VPS) provider for small-scale projects and applications.
    g. AWS Batch: Fully managed batch processing service for efficiently running batch computing workloads.
    h. AWS Elastic Beanstalk: Platform as a Service (PaaS) for deploying and scaling web applications and services.
    i. Amazon EC2 Auto Scaling: Automatically adjusts the number of EC2 instances based on defined conditions.
    j. AWS Outposts: Extends AWS infrastructure and services to on-premises environments.

Feature	EC2	Containers (ECS/EKS/Fargate)	Serverless (Lambda)
Management	User-managed	Partially managed	Fully managed
Scalability	Manual or Auto Scaling	Auto Scaling	Automatic
Pricing	Pay per instance	Pay per container task/pod	Pay per execution
Use Cases	General-purpose workloads	Microservices	Event-driven apps

2. Storage
    a. Amazon S3 (Object Storage): Scalable, durable, and secure storage for any amount of data. Storage classes include Standard, Intelligent-Tiering, and Glacier for archival use.
    b. Amazon EBS (Block Storage): Low-latency block storage for EC2 instances. Supports SSD and magnetic volumes, snapshots for backups, and encryption for security.
    c. Amazon EFS (File Storage): Elastic file system with shared access across EC2 instances using the NFS protocol. Ideal for web serving and content management.
    d. Amazon FSx (Specialized File Systems): Managed file systems for specific workloads:
        i. FSx for Windows File Server: Native Windows file system.
        ii. FSx for Lustre: High-performance file system for HPC.
    e. AWS Storage Gateway (Hybrid Storage): Bridges on-premises environments with cloud storage via File, Volume, and Tape Gateways.
    f. Amazon S3 Glacier (Archival Storage): Cost-effective long-term storage with options for expedited, standard, or bulk retrieval.
    g. AWS Backup: Centralized backup management across AWS services like EBS, RDS, DynamoDB, and more.

Service	Type	Key Features	Use Cases
Amazon S3	Object	Durable, scalable; multiple storage classes	Data lakes, backups, static websites
Amazon EBS	Block	Low-latency block storage	Databases, transactional

			systems
Amazon EFS	File	Shared access; NFS protocol support	Web serving, content management
Amazon FSx	File	Specialized file systems (Windows/Lustre)	HPC workloads, Windows applications
AWS Storage Gateway	Hybrid	On-premises access to cloud-backed storage	Backup, hybrid workflows
S3 Glacier	Archival	Cost-effective long-term archival	Compliance archives

3. Networking
   a. Amazon VPC (Virtual Private Cloud): Creates isolated virtual networks with customizable IP ranges, subnets, security groups, and network ACLs. Use cases: Secure communication between cloud resources and hybrid setups.
   b. Amazon Route 53: Scalable DNS service for domain registration, routing, and health checks. Supports geo-DNS, weighted round-robin, and latency-based routing.
   c. Amazon CloudFront: Content Delivery Network (CDN) for fast delivery of static and dynamic content via edge locations. Use cases: Accelerating websites and video streaming.
   d. AWS Direct Connect: Provides private connections between on-premises data centers and AWS without using the public internet. Offers speeds from 50 Mbps to 100 Gbps.
   e. AWS VPN: Securely connects on-premises networks to AWS via Site-to-Site VPN or enables remote access with Client VPN.
   f. AWS Transit Gateway: Central hub for connecting multiple VPCs and on-premises networks across accounts with dynamic/static routing.
   g. AWS Global Accelerator: Improves application performance by routing traffic through AWS's global network using static IPs as entry points.
   h. AWS PrivateLink: Establishes private connections between VPCs and services without exposing data to the public internet.
   i. Elastic Load Balancing (ELB): Distributes traffic across multiple targets (e.g., EC2 instances). Types: Application Load Balancer (ALB), Network Load Balancer (NLB), Gateway Load Balancer (GLB).
   j. AWS App Mesh: Service mesh for managing microservices communication with traffic routing, monitoring, and debugging capabilities[1].

Service	Type	Key Features	Use Cases
Amazon VPC	Virtual Network	Isolated networks with customizable configurations	Secure cloud communication
Amazon Route 53	DNS	Domain registration, geo-DNS, latency-based routing	Global traffic management
Amazon CloudFront	CDN	Low-latency content delivery via edge locations	Website acceleration, video streaming
AWS Direct Connect	Hybrid	Private connections to AWS with high speeds	Governance-compliant private connectivity
AWS VPN	Hybrid	Encrypted connections for on-prem/cloud networks	Hybrid setups, remote workforce access
AWS Transit Gateway	Hybrid	Centralized routing for VPCs and on-prem networks	Simplifying hybrid architectures
AWS Global Accelerator	Edge Networking	Static IPs for global traffic routing	Improving app performance globally
AWS PrivateLink	Security	Private connections without public exposure	Securing sensitive applications
Elastic Load Balancing	Traffic Routing	Distributes traffic across multiple targets	High availability and fault tolerance
AWS App Mesh	Service Mesh	Microservices communication management	Standardizing service-to-service traffic

4. Databases

Service	Type	Key Features	Use Cases
Amazon RDS	Relational	High availability, automated backups	Traditional relational databases
Amazon Aurora	Relational	High performance, MySQL/PostgreSQL compatible	High-traffic relational databases
Amazon DynamoDB	NoSQL	Fast, scalable, document/key-value data models	Real-time web applications, IoT data
Amazon DocumentDB	Document-Oriented	MongoDB compatible, high performance	MongoDB workloads, document-based data
Amazon Neptune	Graph	Stores complex relationships, Gremlin/SPARQL	Social networks, recommendation engines
Amazon Timestream	Time-Series	Optimized for time-stamped data, IoT sensor data	IoT analytics, monitoring systems
Amazon QLDB	Ledger	Immutable, tamper-evident transaction records	Financial transactions, supply chain
Amazon Keyspaces	NoSQL (Cassandra)	Serverless, flexible pricing based on usage	Cassandra-compatible workloads, real-time apps

5. Security

Service	Purpose	Key Features	Use Cases
AWS IAM	Identity and Access Management	Authentication, Authorization, User Management	Access control for AWS resources

AWS KMS	Key Management for Encryption	Key creation, rotation, encryption	Encrypting data in AWS services
AWS Secrets Manager	Secure Secret Storage and Rotation	Secret storage, rotation, integration with AWS services	Managing sensitive data like passwords
AWS STS	Temporary Security Credentials	Federation, temporary credentials	Secure access without long-term credentials
AWS Cognito	User Identity and Access Management	User pools, identity pools, authentication	User authentication for web and mobile apps
AWS Inspector	Vulnerability and Compliance Analysis	Vulnerability scanning, compliance checks	Regular security audits and compliance