**AWS Core Services Cheat Sheet**

# Amazon Cloud Computing

* **Definition**: On-demand delivery of IT resources via the internet, with pay-as-you-go pricing.

# Amazon EC2 (Elastic Compute Cloud)

* **Purpose**: Provides secure, resizable virtual servers.
* **Instance Types**:
  1. **General Purpose**: Balanced for most applications.
  2. **Compute Optimized**: High CPU for compute-intensive tasks.
  3. **Memory Optimized**: Extra memory for data-intensive apps.
  4. **Storage Optimized**: Fast local storage for big data.
  5. **Accelerated Computing**: GPUs for ML, graphics, and scientific computations.
* **Pricing Options**:
  1. **On-Demand**: Pay per hour/second without commitment.
  2. **Savings Plans**: 1 or 3-year commitment for discounts.
  3. **Reserved Instances**: 1 or 3-year term with significant savings.
  4. **Spot Instances**: Low-cost spare capacity, can be interrupted.
  5. **Dedicated Hosts**: Physical servers for compliance needs.

# Networking and Content Delivery

* **Elastic Load Balancer (ELB)**: Distributes traffic across multiple EC2 instances. Types: ALB, NLB, GLB.
* **Amazon CloudFront**: CDN for low-latency, secure content delivery globally.
* **Amazon VPC (Virtual Private Cloud)**: Private network in AWS for resource isolation and control.
* **Route 53**: Scalable DNS and domain registration.
* **Direct Connect**: Secure, private link between AWS and on-premises data centers.

# Storage Solutions

* **Amazon S3**: Object storage for files, backups, etc.
  + **Storage Classes**:
    - **Standard**: For frequently accessed data.
    - **Standard-IA**: Infrequently accessed, lower cost.
    - **One Zone-IA**: Single AZ, lower cost, for reproducible data.
    - **Intelligent-Tiering**: Auto-optimizes storage costs.
    - **Glacier**: For long-term archiving.
* **Amazon EBS**: Persistent block storage for EC2, with incremental backups via EBS Snapshots.
* **Amazon EFS**: Scalable, shared file storage with automatic scaling.

# Databases

* **Amazon RDS**: Managed SQL databases (e.g., MySQL, PostgreSQL).
  + **Engines**: Aurora, MySQL, PostgreSQL, MariaDB, Oracle, SQL Server.
* **Amazon DynamoDB**: Fully managed NoSQL database for scalable, low-latency data storage.
* **Amazon Redshift**: Data warehousing service for big data analytics.

# Security and Compliance

* **Shared Responsibility Model**:
  + **AWS**: Infrastructure security.
  + **Customer**: Data, applications, and network security.
* **IAM (Identity and Access Management)**: Control access with users, groups, roles, and MFA.
* **AWS Shield**: DDoS protection (Standard is free; Advanced is paid).
* **AWS WAF**: Web Application Firewall for common threats.
* **AWS Key Management Service (KMS)**: Encryption management for data at rest and in transit.

# Infrastructure Management

* **AWS Elastic Beanstalk**: PaaS for application deployment without infrastructure management.
* **AWS CloudFormation**: Infrastructure as Code (IaC) for resource management and automation.

# Compliance Tools

* **AWS Artifact**: Access to AWS compliance reports and agreements for regulatory needs.

# Monitoring and Auditing Tools

**Amazon CloudWatch**

* **Purpose**: Monitors AWS resources for performance and cost efficiency.
* **Key Features**:
  1. **Metrics**: Tracks key performance data for AWS resources; displays trends.
  2. **Alarms**: Automates actions (e.g., stopping instances) and triggers notifications based on thresholds.
  3. **Dashboards**: Unified, customizable view of all metrics; track resource usage like CPU or request counts.

**AWS CloudTrail**

* **Purpose**: Audits API calls, providing activity history for security and compliance.
* **Details Tracked**:
  + API caller identity, call time, source IP, and event specifics.
* **Insights**: Detects unusual activity (e.g., sudden increase in launched instances) for proactive security.

# Optimization and Budgeting Tools

**AWS Trusted Advisor**

* **Purpose**: Recommends ways to improve cost, security, performance, fault tolerance, and usage limits.
* **Dashboard Symbols**:
  + **Green**: No issues.
  + **Orange**: Suggestions to review.
  + **Red**: High-priority action needed.

**AWS Free Tier**

* **Categories**:
  1. **Always Free**: Services like AWS Lambda and DynamoDB.
  2. **12 Months Free**: Services like S3 and EC2.
  3. **Trials**: Short-term trials (e.g., 90-day Inspector trial).

**AWS Pricing Concepts**

* **Pay for What You Use**: Charges only for used resources.
* **Reserved Savings**: Savings Plans and Reserved Instances offer discounts.
* **Volume-Based Discounts**: Lower per-unit costs for higher usage (e.g., Amazon S3).

**AWS Pricing Calculator**

* **Purpose**: Estimates costs based on expected usage.

**Consolidated Billing (AWS Organizations)**

* **Features**:
  + Centralized billing for linked accounts.
  + Shared discounts for accounts based on combined usage.
  + Transparency via itemized costs per account.

**AWS Budgets**

* **Purpose**: Sets spending and usage limits across services.
* **Features**:
  + Custom alerts for usage thresholds.
  + Real-time tracking and projections.

**AWS Cost Explorer**

* **Purpose**: Visualizes and analyzes AWS cost trends.
* **Capabilities**:
  + Customizable reports by service or time.
  + Identify high-cost services and usage patterns.

**AWS Support Plans**

1. **Basic**: Free, limited to documentation and billing support.
2. **Developer**: Technical guidance for testing; low-cost.
3. **Business**: Production support, use-case guidance, and third-party software support.
4. **Enterprise On-Ramp**: Mid-sized businesses; adds Technical Account Manager (TAM) access.
5. **Enterprise**: 24/7 support, dedicated TAM, architecture guidance, and training.

**Technical Account Manager (TAM)**: Available for Enterprise plans, offering personalized support and architecture guidance.

# AWS Marketplace and Cloud Adoption

**AWS Marketplace**

* **Purpose**: A catalog of software from independent vendors, optimized for AWS.
* **Key Features**:
  + **Diverse Offerings**: Thousands of tools across categories like DevOps, Machine Learning, IoT, and Business Applications.
  + **Detailed Listings**: Info on pricing, support, and reviews for informed purchasing.
  + **Industry-Specific Solutions**: Healthcare, finance, manufacturing, etc.
* **Categories**:
  + **Infrastructure Software**: AWS environment management tools.
  + **DevOps**: CI/CD and monitoring solutions.
  + **Data Products**: Analytics, data warehousing.
  + **Professional Services**: Consulting and expert support.
  + **Business Applications**: CRM, ERP systems.
  + **Machine Learning**: AI tools and frameworks.
  + **IoT**: Connect and manage IoT devices.

# AWS Cloud Adoption Framework (AWS CAF)

* **Purpose**: Guides organizations in adopting cloud successfully.
* **Six Perspectives**:
  1. **Business**: Aligns IT with business needs (Roles: managers, strategy stakeholders).
  2. **People**: Change management for cloud adoption (Roles: HR, staffing).
  3. **Governance**: Balances IT strategy with business value (Roles: CIO, program managers).
  4. **Platform**: Migrates on-premises workloads to cloud (Roles: CTO, solutions architects).
  5. **Security**: Ensures security objectives are met (Roles: CISO, security analysts).
  6. **Operations**: Manages and recovers workloads (Roles: IT operations).

# AWS Migration Strategies (6 Rs)

1. **Rehosting**: "Lift-and-shift" apps with minimal changes.
2. **Replatforming**: "Lift, tinker, and shift" with minor optimizations.
3. **Refactoring**: Rearchitect for cloud-native features.
4. **Repurchasing**: Move to a SaaS model (e.g., CRM to Salesforce).
5. **Retaining**: Keep critical apps on-premises temporarily.
6. **Retiring**: Decommission unused applications.

# AWS Snow Family

* **Purpose**: Transfers large data volumes to/from AWS.
* **Members**:
  1. **AWS Snowcone**: Portable, 8 TB storage for edge computing and data transfer.
  2. **AWS Snowball**: Storage-optimized (80 TB) or compute-optimized for data migration.
  3. **AWS Snowmobile**: Massive 100 PB data transfer via shipping container.

# AWS Well-Architected Framework

* **Purpose**: Provides best practices for building reliable, secure, and cost-efficient cloud applications.
* **Six Pillars**:
  1. **Operational Excellence**: Design for recovery, document for transparency.
  2. **Security**: Encrypt data, automate security practices.
  3. **Reliability**: Scale dynamically, enable automatic recovery.
  4. **Performance Efficiency**: Optimize for adaptability and serverless.
  5. **Cost Optimization**: Pay-as-you-go, attribute costs accurately.
  6. **Sustainability**: Minimize energy use, optimize for efficiency.