TEAM DATA DOCTORS

- Pradeep Vepada
- Jeet Vasavada
- Shaikh Umair Ahmed

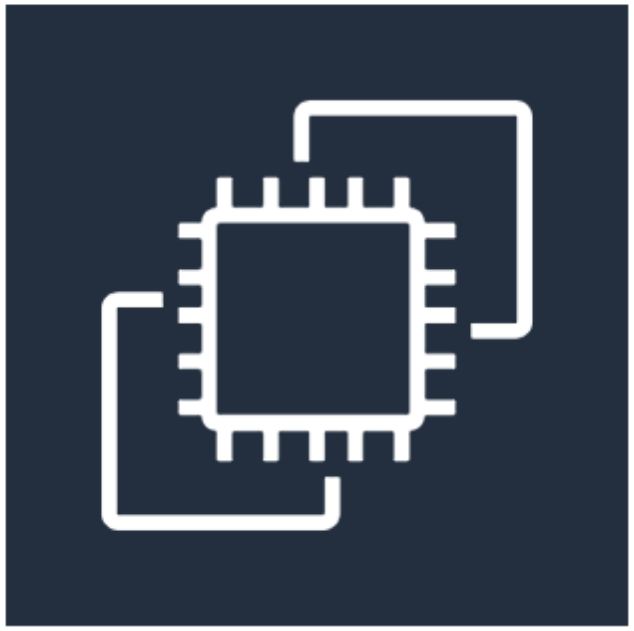
HAPPY HEART HOSPITAL

- Our client, a large healthcare organization, faced significant challenges with their existing system. Their outdated infrastructure made it difficult to process vast amounts of patient, clinical, and operational data efficiently. As a result, real-time decision-making and advanced analytics were nearly impossible, impacting the quality of care and hospital operations.

- To solve this, we implemented a cutting-edge solution leveraging AWS Cloud Services. We migrated their data to the cloud and built a comprehensive data warehouse designed specifically for healthcare data processing. This new system enables seamless integration of patient records, real-time clinical data, and operational metrics while supporting advanced analytical queries.

AWS Benefits

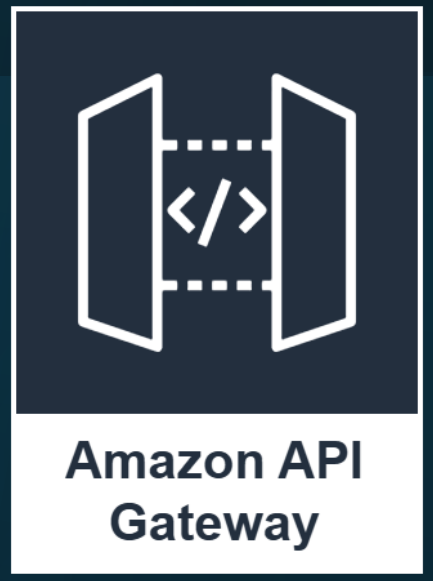
- **Scalability**: Auto-scales with Redshift, RDS, and Lambda.
- **Cost-Efficient**: Pay-as-you-go, no hardware costs.
- **High Availability**: Multi-AZ, automated backups.
- **Secure**: IAM roles, encryption, HIPAA compliance.
- **High Performance**: Fast queries, low latency.
- **Integration**: Seamless with S3, Glue, and Tableau.
- **Real-Time**: Kinesis and Lambda for instant data processing.
- **Global Reach**: Low latency, disaster recovery.



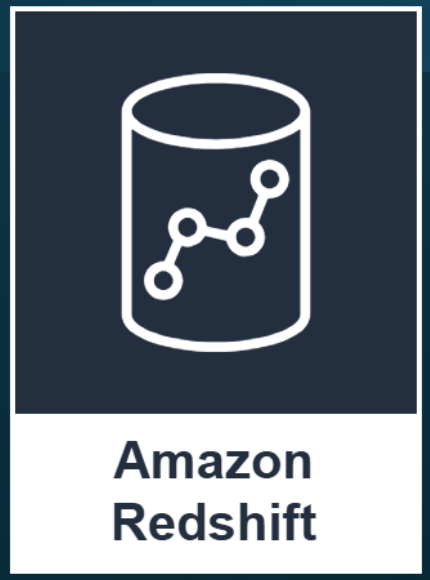
Elastic Compute Cloud

- Use Cases:
- Hosting websites and applications.
- Running backend servers for mobile apps.
- Processing big data and performing analytics.
- Running machine learning models and computations.

Data Ingestion: API Gateway → Lambda → Kinesis (real-time).



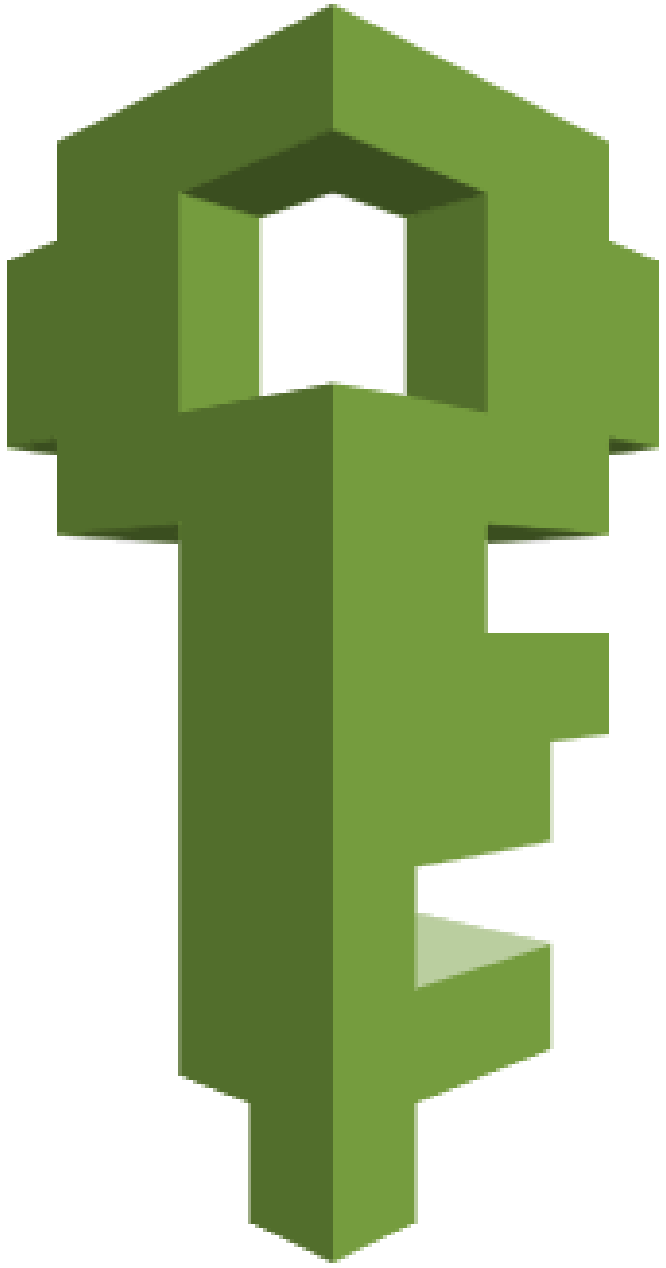
Storage: S3 (staging) → RDS (relational data) → Redshift (data warehouse)



ETL Process: Lambda

Monitoring:
CloudWatch.

Amazon
CloudWatch



Access Control: IAM for permissions.

AWS Components and Their Roles

RDS: Stores relational database data. Highlight its features like multi-AZ deployments, automated backups, and read replicas.

Redshift: Central data warehouse for analytical queries. Mention its scalability and ability to handle complex queries.

S3: Used for staging data and storing raw files.

Lambda: For serverless ETL processing, like data transformation and loading into Redshift.

API Gateway: Provides secure access for applications to interact with the data.

CloudWatch: Used for logging and monitoring the system for anomalies.

IAM: Manages secure access control to ensure only authorized users can interact with the resources.

• Data Loading and Processing

Batch Processing:

- Use **AWS Glue** for ETL jobs to process and move data between S3, RDS, and Redshift.
- Example: Staging data from S3, transforming it, and loading into Redshift.

Real-Time Processing:

- Use **AWS Kinesis** for real-time ingestion.
- Trigger **Lambda** functions to process and move real-time data to RDS or S3.

• Resilience, Performance, and Security

- **Resilience**:
  - Use **multi-AZ deployments** for RDS.
  - Enable **automated backups** for disaster recovery.
- **Performance**:
  - Leverage **read replicas** in RDS for faster reads.
  - Use **ElastiCache** (e.g., Redis) to cache frequently accessed queries.
- **Security**:
  - Implement **VPC** to isolate resources.
  - Use **IAM roles and policies** for secure access.
  - Enable **encryption** (at rest and in transit) using AWS Key Management Service (KMS).

Advantages of Snowflake

- **Separation of Storage and Compute**:
- Scale storage and compute independently, reducing costs.
- **Automatic Scaling**:
- Handles peak workloads seamlessly for large healthcare data.
- **Advanced Security**:
- Data encryption and HIPAA compliance for patient data protection.
- **Data Sharing**:
- Securely share data without duplication.
- **Performance Optimization**:
- Fast query execution with multi-cluster architecture.
- **Support for Semi-Structured Data**:
- Handles JSON, XML, and real-time streaming data.

Thankyou

- Data Doctors