

Acme Manufacturing Cloud Migration Project

This repository documents the architecture, design, and deployment procedures for migrating Acme Manufacturing's on-premises systems to AWS. This project prioritizes a phased approach, emphasizing security, scalability, and cost-efficiency. The focus is on a complete infrastructure and application migration, not on a single application or feature.

Project Goals

The primary objectives of this cloud migration are:

- **Cost Reduction:** Achieve a significant reduction in IT infrastructure costs.
- **Scalability and Agility:** Create a scalable and flexible infrastructure to accommodate future growth and changing business needs.
- **Enhanced Security:** Implement robust security measures to protect sensitive data and comply with relevant regulations.
- **Improved Performance:** Enhance application performance and reduce latency.

Phased Migration Approach

The project will follow a three-phased approach:

1. **Proof of Concept (POC):** A non-critical application will be migrated to AWS to validate the chosen architecture and identify potential challenges. This is a low-risk approach to test and refine the migration process.
2. **Gradual Migration:** Critical applications and services will be migrated incrementally, prioritizing based on dependencies and business impact. This minimizes disruption to ongoing operations.
3. **Optimization and Automation:** Post-migration, the infrastructure will be optimized for cost and performance, and automation will be implemented to streamline operations and maintenance.

Architecture

The AWS architecture is designed using the Well-Architected Framework, focusing on the five pillars: Operational Excellence, Security, Reliability, Performance Efficiency, and Cost Optimization. Key components include:

1. Network Layer:

- VPC (Virtual Private Cloud): A logically isolated network for all resources. This includes public and private subnets.
- Internet Gateway: Provides access to the public internet for public-facing resources.
- NAT Gateway: Enables private instances to access the internet without direct exposure.
- Security Groups: Control inbound and outbound traffic to resources, enforcing least privilege.
- Route Tables: Define routing paths for network traffic within the VPC.
- Direct Connect (Optional): For hybrid cloud setups, maintaining connectivity with on-premises infrastructure.
- VPN (Optional): Secure remote access to the AWS environment.

2. Compute Layer:

- EC2 (Elastic Compute Cloud): Virtual machines for applications requiring more control or complex configurations.
- ECS/EKS (Elastic Container Service/Kubernetes): For containerized applications.
- Auto Scaling Groups: Dynamically scale compute resources based on demand.
- Load Balancing: Distribute traffic across multiple instances.

3. Storage Layer:

- S3 (Simple Storage Service): Object storage for backups, logs, and other unstructured data.
- EFS (Elastic File System): Shared file storage for applications requiring shared file access.
- RDS (Relational Database Service): Managed relational database service (specify engine, e.g., PostgreSQL, MySQL). Includes details on instance types, high availability, and backups.

4. Security Layer:

- IAM (Identity and Access Management): Granular access control with roles and policies, enforcing least privilege.

- KMS (Key Management Service): Encryption key management for securing data at rest and in transit.
- GuardDuty: Continuous threat detection and security monitoring.
- WAF (Web Application Firewall): Protects web applications against attacks.
- CloudTrail: Auditing and logging of API calls and other significant actions.

5. Monitoring and Logging Layer:

- CloudWatch: Centralized monitoring and logging service, providing real-time insights into system health, performance, and security.

Functionality

The core functionality of this project is the complete migration of Acme Manufacturing's on-premises applications and data to a secure and scalable AWS environment. This includes:

- Application Migration: Moving applications from on-premises servers to AWS compute services (EC2, ECS/EKS).
- Data Migration: Transferring data from on-premises databases and storage to appropriate AWS services (RDS, S3).
- Infrastructure Provisioning: Setting up the core network and security infrastructure in AWS.
- Security Configuration: Implementing and testing security measures to protect the migrated systems and data.
- Monitoring and Alerting: Setting up monitoring and alerting to ensure system health and identify potential issues.

Deployment Steps

Detailed deployment steps for each phase will be documented in separate directories within this repository:

- poc-deployment: Instructions for the Proof of Concept phase.
- pilot-migration: Instructions for the Pilot Migration phase.
- full-migration: Instructions for the Full Migration phase.
- automation-scripts: Scripts for automating various tasks.

Each directory will contain detailed instructions, scripts, and configuration files necessary for that phase of the migration.

Suggested Documentation to Include

In addition to the above deployment steps, the following documentation will be included in this repository:

- Architecture Diagram: A visual representation of the overall architecture.
- Network Diagrams: Detailed diagrams of the VPC, subnets, and routing.
- Data Migration Plan: A document outlining the strategy and procedures for migrating data.
- Security Best Practices: Documentation describing the security measures implemented.
- Runbooks: Operational procedures for common tasks and troubleshooting.
- Testing Procedures: Test plans and results.

This repository will be kept up-to-date throughout the project lifecycle.

This README provides a high-level overview of the Acme Manufacturing cloud migration project. Refer to the individual documents within this repository for detailed information. Regular updates will be made to this README to reflect project progress and any changes to the plan.

Contact

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