MODULE 9: Cloud Architecture

1. AWS Well Architected Framework

- Secure
- High performing
- Resilient
- Efficient

A consistent approach to evaluate and implement cloud architecture.

Pillars:

- Operational excellence
- Security
- Reliability
- Cost optimisation
- Performance efficiency

Any Company architecture:

- Fly and snap
- Show and sell
- Make and ship

Operational excellence:

- Focuses on running and monitoring system to deliver business value
- Design principles:

1. Perform operations and code
2. Make frequent small and reversible changes
3. Refine operations, procedures frequently
4. Anticipate failure
5. Learn from all operations and failure

Security:

- Focuses on protection of system and assets while delivering business values through risk management and mitigation strategies.
- Security Design principles:

1. Implement a strong Identity foundation
2. Enable traceability
3. Apply security at all layers
4. Automate security best practises
5. Protect data in transit and at rest
6. Keep people away from data
7. Prepare for security events

Reliability:

- Focuses to ensure a workload performs its intended function correctly and consistently when it's expected to.
- Reliability design principles:
    1. Automatic recover from failures
    2. Test recovery procedures
    3. Scale horizontally to increase workload availability
    4. Stop guessing capacity
    5. Manage changing automation

Performance:

- Uses IT and computing resources efficiently to meet system requirements and to maintain that efficiency as demand changes and technologies evolve
- Performance design principles:
    1. Democratise advance technologies
    2. Go global in minutes
    3. Use serverless architecture
    4. Experiment more often
    5. Consider mechanical sympathy

Cost Optimisation:

- Focuses on avoiding unnecessary cost
- Cost Optimisation:
    1. Implement cloud financial management
    2. Adopt consumption model
    3. Major overall efficiency
    4. Stop spending money on undifferentiated heavy lifting
    5. Analyse and attribute expenditures

2. Reliability and Availability

It is a measure of system's ability to provide functionality when desired by the user
System includes all system components : hardware, software, firmware.
Probability that your entire system will function as intended for a specified period.
Meantime between failures = Total time in service / no. of failures.
MTTR: Meantime to repair
MTTF: Meantime to failure

Availability:

- Normal operation time/ total time

High Availability

- System can withstand some degradation while still remaining available

- Downtime is minimised
- Minimal human intervention is required

Availability tier :

- 99%, Max disruption : 3 days 15 h batch processing and data extraction
- 99.9% , 8h 45 min used in project tracking
- 99.95%, 4h 22min used in online commerce
- 99.99%, 52 min used in video delivery nd broadcast system
- 99.999%, 5 min used in ATM transaction and telecommunication system

Factors that influence availability:

- Scalability
- Fault tolerance
- Recoverability

3. AWS Trusted Advisor:

- Online tool that provides real time guidance to help you provision your resources by following AWS best practises.
- Look at your entire AWS environment and give your real time recommendation in 5 categories:
    1. Fault tolerance
    2. Security
    3. Service limits
    4. Cost optimisation
    5. Performance