The 6 Pillars of the AWS Well-Architected Framework

AWS Well Architected Framework

It helps cloud architect build secure, high performing, resilient, and efficient infrastructure for their application and workload.

It describes the key concept, design principles and architectural best practice for design and ruining workload in the cloud.

It helps you to understand the pros and cons of decisions you make while building systems on AWS.

Operational Excellence Pillar

- Support development and run workloads effectively

- Gain insight into workload operations
- Continuously improve processes and procedures to deliver business value.

Design Principles

- Perform operation as a code- don’t perform manually use AWS tool cloudformation.

- Make frequent, small, reversible changes - Big changes that are difficult to roll back. This helps you if something goes wrong you can quickly roll back and try again.

- Refine operations procedures frequently.

- Anticipate failure – Make sure you always anticipate what could go wrong, that’s how you can prevent it from happening and also make sure that you are able to recover from failure when it does happen.

- Learn from all operational failures.

Operational excellence AWS Services:

Prepare:

1. AWS CloudFormation
2. AWS Config

Operate:

1. AWS CloudFormation
2. AWS Config
3. AWS CloudTrail
4. Amazon CloudWatch
5. AWs X-Ray

Evolve:

1. AWS CloudFormation
2. AWS CodeBuild
3. AWS CodeCommit
4. AWS CodeDeploy
5. AWS CodePipeline

Security Pillar

Protect data, systems, and assets to take advantage of cloud technologies to improve your security

Design Principles

- Implement a strong identity foundation – make sure your identity management systems like IAM like your identity federation like your mobile and web applications authentication systems you have got to get right so your identities are properly secure.

- Enable traceability- You can trace what's happening where did things went wrong.

- Apply security at all layers- make sure that every layer of your application and infrastructure has security applied.

- Automate security best practices- More you automates the less human error you are likely to have.

- Protect data in transit and at rest- Encrypt your data during transit

- Keep people away from data- The right access controls are in place to secure your data access.

- Prepare for security events- make sure that you are prepared in case anything happens like malicious attacks like distributed denial of service attacks and use tools with automation to increase your speed of detection, investigation and recovery.

Security AWS Services:

1. Identity and Access Management

- IAM
- AWs-STS
- MFA Token
- AWS Organizations

2. Detective controls

- AWS Config
- AWS CloudTrail
- Amazon CloudWatch

3. Infrastructure protection

- Amazon CloudFront
- Amazon VPC
- AWS Sheild
- AWS WAF
- Amazon Inspector

4. Data Protection

- S3
- KMS
- Elastic Load Balancing
- Amazon EBS
- Amazon RDS

5. Incidence Response

- IAM
- AWS CloudTrail
- Amazon CloudWatch Events

Reliability Pillar

Ensuring a workload to perform its intended function correctly and consistently when it’s expected to.

his includes the ability to operate and test the workload through its total lifecycle.

Design Principles

- Automatically recover from failure – Make sure when something goes wrong like a system fails you can automatically recover, you don’t need manual involvement, for example EC2 autoscaling, if a system fails and instance fails then it will be automatically replaced by autoscaling and your load balancer will start distributing traffic to it. That's automatic recovery.

- Test recovery procedures- You always have to test in the cloud

- Scale horizontally to increase aggregate workload availability- Distributes requests across multiple, smaller resources to ensure they don't share a common point of failure.

- Stop guessing capacity

- Manage change in automation- Implement change management procedure and automates as much as possible.

Reliability AWS Services:

1. Foundation

- IAM
- Amazon VPC
- Service limits
- AWS Trusted Adviser

2. Change Management

- AWS Auto Scaling
- Amazon CloudWatch
- AWS CloudTrail
- AWS Config

3. Failure Management

- Backups
- AWS CloudTrail
- Amazon S3
- Amazon S3 Glacier
- Amazon Route 53

Performance Efficiency Pillar

The Performance Efficiency pillar includes the ability to use computing resources efficiently to meet system requirements, and to maintain that efficiency as demand changes and technologies evolve.

Design Principles

- Democratize advanced technologies – AWS wants you to leverage the technologies and services that they provide, they provide lots of amazing tools, manage service event driven architectures, serverless services, all of these kinds of things can be built on aws and utilize on aws so use as much as possible because it delivers values to your business.

- Go global in minutes – The ability to deploy your applications all over the world very easily.

- Use serverless architectures – Wherever possible use serverless it means you are not managing the underlying layer of infrastructure. Managing patches, managing systems and you are leveraging a higher level of service and you are able to scale more easily as well.

- Experiment more often- This is all about experimenting and seeing what we can do. We can learn a lot by testing out different things and it's easy to do in the cloud.

- Consider mechanical sympathy – It means that you need to understand the systems and the purpose of those systems that are available to you so that you can utilize them to their best effect.

Performance Efficiency AWS Services:

1. Selection

- AWS Auto Scaling
- AWS Lamda

- Amazon Elastic Block Store
- Amazon Simple Storage
- Amazon RDS

2. Review

- AWS CloudFormation

3. Monitoring

- Amazon CloudWatch
- AWS Lamda

4. Tradeoffs

- Amazon RDS
- Amazon ElasticCache
- AWS Snowball
- Amazon CloudFront

Cost Optimization

The Cost Optimization pillar includes the ability to run systems to deliver business value at the lowest price point.

Design Principles

- Implement cloud financial management -
- Adopt a consumption model – Pay for what you have used
- Measure overall efficiency – Use CloudWatch for measuring efficiency
- Stop spending money on undifferentiated heavy lifting
- Analyze and attribute expenditure

Cost Optimization AWS Services:

1. Expenditure Awareness

- AWS Budgets
- AWS Cost usage Reports
- AWS cost explorer
- Reserve instance

2. Cost Effective Resource

- Spot Instance
- Reserved Instance
- Amazon S3 Glacier

3. Matching Supply and Demand

- AWS Auto Scaling
- AWS Lamda

4. Optimizing Over Time

- AWS Trusted Adviser
- AWS Cost usage Reports

Sustainability

The discipline of sustainability addresses the long-term environmental, economic, and societal impact of your business activities. Sustainability Pillar is to help organizations learn, measure, and improve their workloads using environmental best practices for cloud computing.

The Sustainability Pillar contains questions aimed at evaluating the design, architecture, and implementation of your workloads to reduce their energy consumption and improve their efficiency. The pillar is designed as a tool to track your progress toward policies and best practices that support a more sustainable future, not just a simple checklist.

Three Pillars of Sustainability

1. Environmental
2. Economics
3. Social

Design Principles

- Understand your impact - Measure business outcomes and the related sustainability impact to establish performance indicators, evaluate improvements, and estimate the impact of proposed changes over time

- Establish sustainability goals - Set long-term goals for each workload, model return on investment (ROI) and give owners the resources to invest in sustainability goals. Plan for growth and design your architecture to reduce the impact per unit of work such as per user or per operation.

- Maximize utilization - Right size each workload to maximize the energy efficiency of the underlying hardware, and minimize idle resources.

- Anticipate and adopt new, more efficient hardware and software offerings - Support upstream improvements by your partners, continually evaluate hardware and software choices for efficiencies, and design for flexibility to adopt new technologies over time.

- Use managed services - Shared services reduce the amount of infrastructure needed to support a broad range of workloads. Leverage managed services to help minimize your impact and automate sustainability best practices such as moving infrequently accessed data to cold storage and adjusting compute capacity.

- Reduce the downstream impact of your cloud workloads - Reduce the amount of energy or resources required to use your services and reduce the need for your customers to upgrade their devices; test using device farms to measure impact and test directly with customers to understand the actual impact on them.