

# AWS Architecting & Ecosystem

## Well Architected Framework General Guiding Principles

- Stop guessing your capacity needs
- Test systems at production scale
- Automate to make architectural experimentation easier
- Allow for evolutionary architectures
  - Design based on changing requirements
- Drive architectures using data
- Improve through game days
  - Simulate applications for flash sale days

## AWS Cloud Best Practices – Design Principles

- Scalability: vertical & horizontal
- Disposable Resources: servers should be disposable & easily configured
- Automation: Serverless, Infrastructure as a Service, Auto Scaling...
- Loose Coupling: **Not easy or manage so config architect**
  - *Monolith* are applications that do more and more over time, become bigger
  - Break it down into smaller, loosely coupled components
  - A change or a failure in one component should not cascade to other components
- Services, not Servers:
  - Don't use just EC2
  - Use managed services, databases, serverless, etc !

[github.com/pvnakum7](https://github.com/pvnakum7)

# Well Architected Framework

## 5 Pillars

- 1) Operational Excellence
- 2) Security
- 3) Reliability
- 4) Performance Efficiency
- 5) Cost Optimization

### 1. Operational Excellence

Operational Excellence  
AWS Services

- Prepare



AWS CloudFormation



AWS Config

- Operate



AWS CloudFormation



AWS Config



AWS CloudTrail



Amazon CloudWatch



AWS X-Ray

- Evolve



AWS CloudFormation



AWS CodeBuild



AWS CodeCommit



AWS CodeDeploy



AWS CodePipeline

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## 2. Security

### 2) Security

- Includes the ability to protect information, systems, and assets while delivering business value through risk assessments and mitigation strategies
- Design Principles
  - **Implement a strong identity foundation** - Centralize privilege management and reduce (or even eliminate) reliance on long-term credentials - Principle of least privilege - IAM
  - **Enable traceability** - Integrate logs and metrics with systems to automatically respond and take action
  - **Apply security at all layers** - Like edge network, VPC, subnet, load balancer, every instance, operating system, and application
  - **Automate security best practices**
  - **Protect data in transit and at rest** - Encryption, tokenization, and access control
  - **Keep people away from data** - Reduce or eliminate the need for direct access or manual processing of data
  - **Prepare for security events** - Run incident response simulations and use tools with automation to increase your speed for detection, investigation, and recovery

### Security (AWS Services)

- Identity and Access Management



IAM



AWS-STS



MFA token



AWS Organizations

- Detective Controls



AWS Config



AWS CloudTrail



Amazon CloudWatch

- Infrastructure Protection



Amazon CloudFront



Amazon VPC



AWS Shield



AWS WAF



Amazon Inspector

- Data Protection:



KMS



S3



Elastic Load Balancing (ELB)



Amazon EBS



Amazon RDS

- Incident Response



IAM



AWS CloudFormation



Amazon CloudWatch Events

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# 3. Reliability

## 3) Reliability

- Ability of a system to recover from infrastructure or service disruptions, dynamically acquire computing resources to meet demand, and mitigate disruptions such as misconfigurations or transient network issues
- Design Principles
  - Test recovery procedures - Use automation to simulate different failures or to recreate scenarios that led to failures before
  - Automatically recover from failure - Anticipate and remediate failures before they occur
  - Scale horizontally to increase aggregate system availability - Distribute requests across multiple, smaller resources to ensure that they don't share a common point of failure
  - Stop guessing capacity - Maintain the optimal level to satisfy demand without over or under provisioning - Use Auto Scaling
  - Manage change in automation - Use automation to make changes to infrastructure

## Reliability (AWS Services)

### • Foundations



IAM



Amazon VPC



Service Limits



AWS Trusted Advisor

### • Change Management



AWS Auto Scaling



Amazon CloudWatch



AWS CloudTrail



AWS Config

### • Failure Management



Backups



AWS CloudFormation



Amazon S3



Amazon S3 Glacier



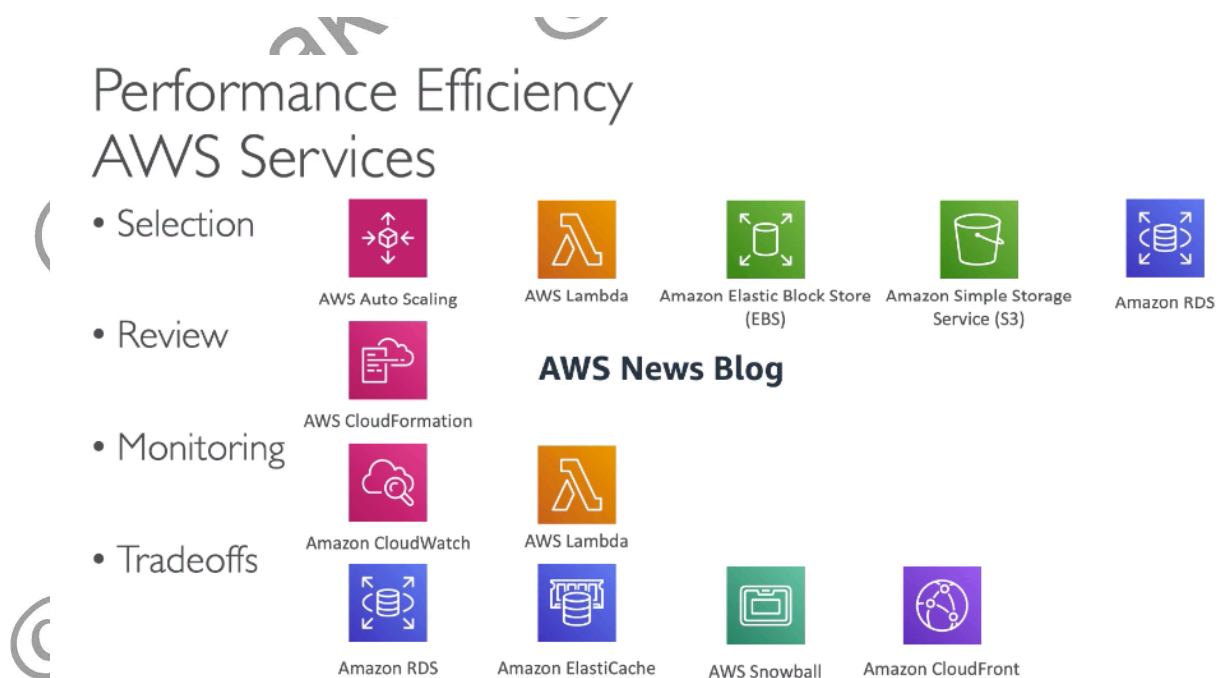
Amazon Route 53

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# 4. Efficiency

## 4) Performance Efficiency

- 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 - Advance technologies become services and hence you can focus more on product development
  - Go global in minutes - Easy deployment in multiple regions
  - Use serverless architectures - Avoid burden of managing servers
  - Experiment more often - Easy to carry out comparative testing
  - Mechanical sympathy - Be aware of all AWS services



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# 5. Cost Optimization

## 5) Cost Optimization

- Includes the ability to run systems to deliver business value at the lowest price point
- Design Principles
  - Adopt a consumption mode - Pay only for what you use
  - Measure overall efficiency - Use CloudWatch
  - Stop spending money on data center operations - AWS does the infrastructure part and enables customer to focus on organization projects
  - Analyze and attribute expenditure - Accurate identification of system usage and costs, helps measure return on investment (ROI) - Make sure to use tags
  - Use managed and application level services to reduce cost of ownership - As managed services operate at cloud scale, they can offer a lower cost per transaction or service

### Cost Optimization AWS Services

- Expenditure Awareness



- Cost-Effective Resources



- Matching supply and demand



- Optimizing Over Time



**AWS News Blog**

**Eco System**

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# AWS Ecosystem – Free resources

- AWS Blogs: <https://aws.amazon.com/blogs/aws/>
- AWS Forums (community): <https://forums.aws.amazon.com/index.jspa>
- AWS Whitepapers & Guides: <https://aws.amazon.com/whitepapers>
- AWS Quick Starts: <https://aws.amazon.com/quickstart/>
  - Automated, gold-standard deployments in the AWS Cloud
  - Example: WordPress on AWS [https://fwd.aws/P3yyv?did=qs\\_card&trk=qs\\_card](https://fwd.aws/P3yyv?did=qs_card&trk=qs_card)
  - Leverages CloudFormation
- AWS Solutions: <https://aws.amazon.com/solutions/>
  - Vetted Technology Solutions for the AWS Cloud
  - Ex - AWS Landing Zone: secure, multi-account AWS environment
  - <https://aws.amazon.com/solutions/implementations/aws-landing-zone/>

## AWS Ecosystem - AWS Support

<b>DEVELOPER</b>	<ul style="list-style-type: none"><li>• Business hours email access to Cloud Support Associates</li><li>• General guidance: &lt; 24 business hours</li><li>• System impaired: &lt; 12 business hours</li></ul>
<b>BUSINESS</b>	<ul style="list-style-type: none"><li>• 24x7 phone, email, and chat access to Cloud Support Engineers</li><li>• Production system impaired: &lt; 4 hours</li><li>• Production system down: &lt; 1 hour</li></ul>
<b>ENTERPRISE</b>	<ul style="list-style-type: none"><li>• Access to a Technical Account Manager (TAM)</li><li>• Concierge Support Team (for billing and account best practices)</li><li>• Business-critical system down: &lt; 15 minutes</li></ul>

## AWS Marketplace



- Digital catalog with thousands of software listings from independent software vendors (3<sup>rd</sup> party)
- Example:
  - Custom AMI (custom OS, firewalls, technical solutions...)
  - CloudFormation templates
  - Software as a Service
  - Containers
- If you buy through the AWS Marketplace, it goes into your AWS bill
- You can sell your own solutions on the AWS Marketplace

# AWS Training

- AWS Digital (online) and Classroom Training (in-person or virtual)
- AWS Private Training (for your organization)
- Training and Certification for the U.S Government
- Training and Certification for the Enterprise
  
- AWS Academy: helps universities teach AWS
  
- And your favorite online teacher...  
teaching you all about AWS Certifications and more!



## AWS Professional Services & Partner Network

- The AWS Professional Services organization is a global team of experts
- They work alongside your team and a chosen member of the APN
- APN = AWS Partner Network
- APN Technology Partners: providing hardware, connectivity, and software
- APN Consulting Partners: professional services firm to help build on AWS
- APN Training Partners: find who can help you learn AWS
- AWS Competency Program: AWS Competencies are granted to APN Partners who have demonstrated technical proficiency and proven customer success in specialized solution areas.
- AWS Navigate Program: help Partners become better Partners

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