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AWS Advance Topics

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Introduction

With the on-going digitization in the global space, the competition among the striving companies is going up by leaps and bounds. To cope up with this, there must be some path-breaking element that can bring a huge difference in the approach and give an edge to your business. Well, this can certainly happen by leveraging AWS practices into companies. The whole idea is to help companies streamline their business models using proven methods to take them a step forward and to add more value to the companies.
This eBook covers a gist of the AWS best practices for implementing Microservices; Web applications, DevOps and Cost optimization. It also urges to guide the technical teams to pipeline the whole process.

For Technical Teams:

Using AWS resources and tools to prepare your technical team is an invaluable process that strives to augment the business and technical plans to nurture your organization. With AWS, you can ramp up your technical team with deeper knowledge and skills to serve your customers most efficiently and see success coming your way.
All you need is a strong template to follow, which caters to the complete lifecycle of AWS enablement right from the entry point to the expertise level. Augmenting approach at the team level involves sailing through 3 important stages which help one grow with the innate capacities and at the same time adding more value to it.

Early Stage:

The early stage is meant for the people who are completely novice to the AWS cloud and are ready to commence the AWS enablement process. This stage forms the foundation with the basic knowledge of AWS to ensure a solid understanding of the AWS Cloud and its value proposition.

Middle stage:

The middle stage is designed for your bulk workforce. It is designed for the people who are now aware of the AWS cloud and have a strong understanding of this subject. This stage aims to certify these people with specializations and focuses on expanding knowledge about AWS into fringe cases, learning from real-world experiences, and taking a step forward in developing a professional relationship with AWS Solution Architects, Partner Development Managers, and Account Managers of your company. Once your team is through with middle stage, it will be capable of using AWS services to handle new or complex cloud projects.

Advanced stage:

The advanced stage is the summit where your team should strive to be. Now that the team is already an expert in the subject and has a good hold on AWS platform by now, this stage focuses on supporting leadership and specialization at local, regional and global levels. Though learning will always continue with experience, by now with the grip on AWS Cloud, they have become capable of developing solutions using AWS Cloud-native architectures. After completing the advanced stage, a striking difference can be seen within individuals, the team as a whole and the company.

It is very important to develop a training and growth path for your team who are willing to work on AWS. Building a solid AWS-focuses foundation for your technical team is the key to deal with thousands of AWS projects.

Quick takeaways to get you started right away:

1. Leverage a trusted APN Partner to stimulate your cloud efforts with your team along with the requirement for knowledge transfer.

2. Plan different training opportunities and styles to engage your team relevantly.

3. Dedicate yourself completely into the transformation initiative to drive your goal.

4. Train your team to welcome and support newcomers if every possible way. This will also add the integrity element amongst them.

5. If you have teams in multiple countries, then you can create internal apprenticeship model to accelerate the work and achieve the common goal.

Best practices for implementing Microservices:

The basic architecture of microservices, which splits the functionalities of a typical monolithic architecture (comprising of a UI layer, a business layer and a persistence layer) into cohesive verticals by implementing a specific domain.

User Interface

While the contemporary
web applications are dynamic and often use JS framework to implement a single-page app which communicates with a REST (Representational State Transfer) or RESTful API, the static web content can be carried out using Amazon CloudFront and Amazon S3.

Microservices

Application Programming Interfaces are the entry points for applications logic behind a set of programmatic interfaces. This API accepts & operates on calls from clients, which can also include extensive functionalities like traffic management, routing, request filtering, caching, authentication & authorization.

- Microservices Implementations:

  AWS has consolidated building blocks which support the microservices development. There are two popular approaches: AWS Lambda & AWS Fargate (docker containers).

  o While with AWS Lambda, you can just upload the code and Lambda will rapidly run & scale the execution to match with the actual demand curve with its high availability.

  o Container-based– it is a widely used approach to reduce the operational efforts deployments. Container technologies like Amazon ECS (Elastic Container Service) eliminate the need to install, operate and scale your cluster management infrastructure. It supports container placement strategies and constraints to customize the functioning of Amazon ECS. AWS Fargate container management allows to run containers but serverless without any botherations about provisioning, configuring and scaling clusters of virtual machines.

- Private Links

This is a highly scalable and widely available technology that lets you connect your VPC privately to supported AWS services. AWS services are hosted by VPC endpoint services and supported AWS Marketplace partner services. Private links help to augment the isolation of microservices architecture and help business models with better solutions.

Data Store

The Data Store is hold data needed by the microservices. In-memory caches like Memcached or Redis are some popular stores for session data.

- The advantage of AWS is that it offers both the technologies as part of the manages Amazon ElastiCache service.
- Keeping a cache between the application servers and database is the regular apparatus to reduce read load on the database and it also improves latency. This is important because it further may allow resources to be used for writing.
- AWS comes with 6 database engines as part of the manages services through Amazon Relational Database Service (Amazon RDS)
  - Microsoft SQL Server
  - Oracle
  - MySQL
  - MariaDB
  - PostgreSQL
  - Amazon Aurora

Best practices for implementing Web Applications:

AWS provides a highly reliable, scalable, robust, secure, fault-tolerating, cost-efficient and competently performing infrastructure for web applications. It has been built in a way to it addresses to various infrastructural and architectural issues that might come using traditional methods. AWS provides the following benefits:

- A seamless and cost-effective approach to oversized Fleets required to manage Peaks
- Scalability aid to handle unpredicted traffic peaks
- Need-based solution for test, beta, load & pre-production environments

Following are the key components of an AWS web hosting architecture positioned in the AWS Cloud:

- Network Management
- Content Delivery
- Managing Public DNS
- Host Security along with additional Security Features
- Load Balancing Across Clusters
- Finding Other Hosts & Services
- Caching within the Web Application
- Database Configuration, Backup, and Failover
- Storage and Backup of Data and Assets
- Scaling the Fleet Automatically
- Failover with AWS

Below are some of the commonly used AWS services that can be used to build a website.

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Amazon LightSail
AWS offers the simplest way to launch & manage a virtual private server. It offers you a virtual machine SSD-based storage, DNS Management, data transfer and a static IP to start your project.

Amazon EC2
AWS offers the simplest way to launch & manage a virtual private server. It offers you a virtual machine SSD-based storage, DNS Management, data transfer and a static IP to start your project.

AWS Elastic Beanstalk
It handles details of your hosting environment including equipping AWS resources like EC2 app servers and configuring load balancing, scaling & monitoring.

Amazon RDS
It provides instances or the managed relational databases in the AWS cloud. It also provides 6 familiar database engines to choose from, which includes Amazon Aurora, PostgreSQL, Microsoft SQL Server, Oracle, MariaDB and MySQL.

Auto Scaling
This service makes sure that your application is optimized for availability.

AWS Amplify Console
This service provides hosting for full-stack single web applications with uninterrupted deployment.

Amazon S3
It provides secure, durable and highly scalable cloud storage for the objects like HTML pages, CSS files, images, videos, JS, etc., that contribute to your website.

Amazon Route 53
It is a Domain Name Service (DNS) which is highly available and scalable.

Elastic Load Balancing
This service distributes requests to the EC2 instances, which are running in your application, to achieve greater levels of fault tolerance

Thus, the cost-effectiveness, scalability and fault-tolerance capabilities that AWS offers for Web development outweigh the efforts of migrating from the traditional method to AWS cloud.

Best practices for implementing DevOps:

DevOps has been one of the most powerful innovations in the IT ecosystem around the globe. Enterprises are adopting agile methodologies and migrating to cloud. AWS cloud offers automatic provisioning and scaling to shelter applications. The pliant nature of AWS cloud enables better scalability. DevOps pipelines and speeds-up the process of application releasing, as the nature of development is rapid & reusable.

Though the concept sounds quite simple, people often commit mistakes in understanding different deployment technologies and the real notion behind. To help understand better, here are some of the best practices for implementing DevOps in the cloud:

Start with a team of experts

Since DevOps is now a vital component in the IT industry, a requirement of a potential team of developers is mandatory, who have experience have fine operational, interpersonal and communication skills and can take up agile methods in application development and deployment.

Automate processing testing

You must never fail to miss performance testing in your DevOps stream. Automating the testing will help you separate the good and poor performing applications so that the efficiency level does not degrade.

Shift selected applications to the cloud

If you plan to relocate every single application to the cloud, you will end up in carrying a hefty price tag struggling with this impractical job. To do this task wisely, you must analyze and prioritize applications that can bring more value to your business. This will also help you figure out the time and resources required to carry out the migration process.

Security – the Utmost priority

A 24x7 monitoring of security is required within the DevOps in the cloud to ensure there are no breaches anywhere across and your data is secure.

Integrate containers in your cloud strategy

Since DevOps are portable, easily manageable and orchestrated, it is always better to integrate containers in your DevOps and cloud strategy.

Execute cloud-friendly applications

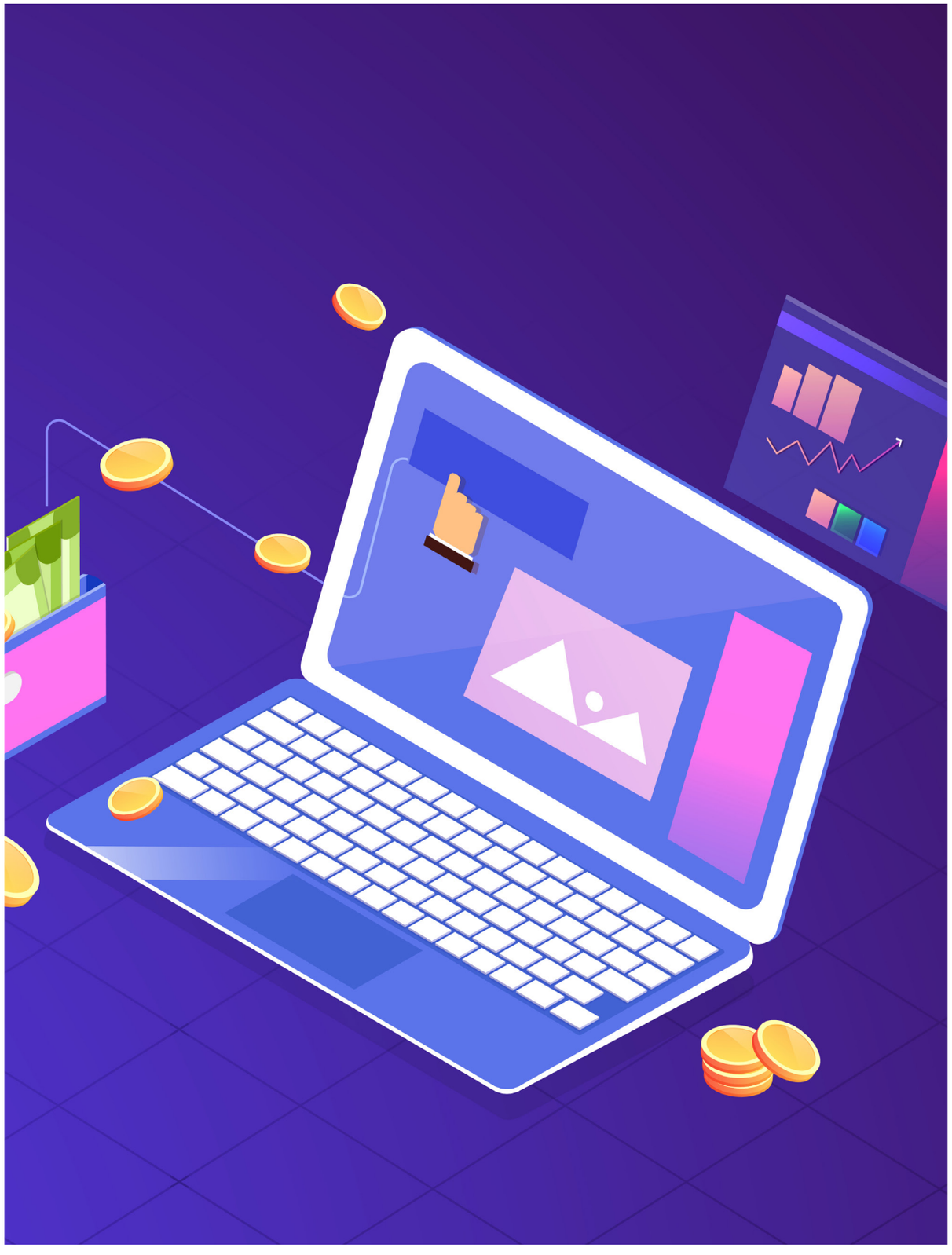
Developers must ensure that the applications are cloud-friendly and decoupled from the physical resources. This will help increase the over efficiency by up to 70 percent, which means you majorly have to pay for the resources that you use and nothing else.

Best practices for implementing Cost Optimization:

The cost optimization vertical includes the potential to run systems to achieve business value at the lowest price point. Users of Amazon Web Services are likely familiar with some AWS cost optimization best practices, but probably not all of them. The most common way out to the cost issues that usually come forward are rightsizing, scheduling, and purchasing Reserved Instances for foreseeable workloads. These three solutions are probably the AWS cost optimization best practices that most of the AWS users are familiar with. But the list does not end here. Here are the other four important best practice areas for cost optimization in the cloud.

Expenditure awareness

The agile nature of cloud encourages innovation and rapid development as well as deployment. This process eliminates the manual working and reduces the time which was associated with provisioning in-house infrastructure. Since Cloud computing in an innovative way of dealing with applications, there is a requirement for a new way of thinking about expenditures. While reviewing the system to understand the expenditures, you must be able to attribute accurate costs associated with individual teams or products to drive efficient usage behavior and to reduce scrap. This accurate attribution will help you experience a profitable business where the decisions are made within the allocated budget boundaries.



Cost-effective resources

Appropriate and efficient usage of workload instances and resources is the what cost-effectiveness all about. This can give you a positive and significant economic impact. AWS comes with a huge variety of cost-effective and flexible pricing options to obtain instances from EC2 and other services that best suit your needs. On-demand Instances enables to pay for compute capacity by the hour without any commitments. Reserved Instances let you reserve capacity & allow you to save up to 75 percent on-demand pricing. With Spot Instances, you can leverage unutilized Amazon EC2 capacity and save up to 90 percent on-demand pricing. Choosing an appropriate server helps a lot to reduce costs drastically.

Matching supply and demand

Balancing the demand-supply cycle can also help optimize the cost though you must keep a provision for extra supply to avoid failures. AWS helps by automatically provisioning resources to match anticipating changes in demand. Features like auto-scaling & demand, buffer and time-based approaches let you add or remove resources as per requirement.

Optimizing over time

Regular reviewing existing practices of deployment will help you assess how newer services can help you cut down costs. This analysis will also help you understand where you are spending more. Though requirements keep changing with time but understanding the cost parameters will help you in the long run.

These techniques and guidance on strategies will help you optimize the initial and the ongoing cost of your deployment.

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