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How to Create a **Cloud-Native Architecture** with **AWS** and DevOps Technologies

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What is a Cloud-Native Architecture?

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- A combination of **methodologies**.
- **Abstracts** all the IT layers; from Networking, DC, OS to Cloud-native Architecture.
- Focus on **building products**, features and **not managing** infrastructure.
- **Enabler** to transform your application.

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Benefits of a Cloud-Native Architecture.

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- Accelerates your **SDLC**.
- Helps develop your MVPs faster.
- Helps to turn your apps into **API based apps**.
- Helps to reduce **downtime**, **and failures**.
- Pinpoints issues more easily through a **Decouple architecture, Microservices, and serverless**.
- Lower **costs**, and less time.

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Cloud-Native Architecture
Principles and Patterns

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1 Amazon Autoscaling. Always use services with high availability, scalability and redundancy. **Main premise of AWS**.

2 Utilize the **12-factor methodology.** Loosely coupled architecture, environment parity, light environments, global environment variables and more.

3 **Automation and Infrastructure as Code**. CI CD, Automated Testing, Automated disaster recovery, Automated dev environments and more.

Tools: Amazon CloudFormation, Amazon Codepipeline and CodeBuild.

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Cloud-Native Architecture
Principles and Patterns

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4 **Immutable** infrastructure and immutable code deployments.

5 Pay as you go. **Pay per use.**

6 **Self-service** architecture. IaaS, PaaS, SaaS or API-based.

7 Use as many **Managed services**. Amazon RDS, Cognito or Fargate

8 Focused on **utilization** vs idle resources

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DevOps Tools on AWS to Adopt a Cloud-Native Architecture

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Containers

- What are containers ?
  - **A light and virtual OS** with minimal resources to run a service or function.
  - It can run anywhere. **dev-to-prod.**
  - **Portable, flexible and isolated.**
  - **85%** of the current apps are based in containers (Gartner).

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Microservices

- What are microservices?
  - A **practice to architect software** through autonomous small & independent services.
  - An **isolated service** to be run within a container. Nginx, Apache, Java app, etc.
  - Easy to **scale** and develop faster.
  - Communicated via **APIs.**

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Docker

- What is Docker?
  - An **open source platform** to create and manage containers & microservices.
  - **Orchestrator** container service.
  - A **revolutionary** tool born in 2014.
  - Allows to **ship packages** and develop apps faster.

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DevOps Tools on AWS to adopt a Cloud-Native Architecture

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Kubernetes

- What is Kubernetes?
  - An **Orchestrator platform** to scale and manage containers.
  - **Another revolutionary** open source tool made by **Google.**
  - Allows to create **microservice architectures.**
  - Helps to manage the **Automated Deployments** (rollbacks, canary), LB, scaling, add hardware resources, and move containers.

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DevOps Tools on AWS to adopt a Cloud-Native Architecture

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Amazon EKS

- What is Amazon EKS?
  - A **pre-configured Kubernetes** service created by AWS.
  - An Elastic Kubernetes Service that allows you to **control, scale and maintain** Kubernetes clusters.
  - **Costs**: 20 cents per hour per EKS cluster.

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DevOps Tools on AWS to adopt a Cloud-Native Architecture

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Amazon ECS

- A high-performance **orchestration** system.
- The **de-facto** solution to manage containers, **owned** by AWS.
- **Easier** vs Kubernetes and EKS.
- **Cheaper** and requires **less expertise** vs EKS (doesn't includes control plane costs).
- ECS service is **free**, and you just pay the **EC2 instances** being used.

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DevOps Tools on AWS to adopt a Cloud-Native Architecture

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Amazon Fargate

- A **serverless container** service.
- **Easier to manage** vs ECS.
- **No need to provision** servers or maintain infrastructure. *For **ECS you still need** to maintain EC2 instances.
- **Task** based.

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The Serverless Ecosystem Within AWS

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Serverless

- What is serverless?
  - **Invented** by AWS. The **latest SUPER** revolutionary service.
  - The **pure cloud-native** architecture ecosystem.
  - Allows you to run functions(**FaaS**), and not servers, networks, OS, VMs, or containers.
  - Focused purely to develop the **business logic** of the application.

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The Serverless Ecosystem Within AWS

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Amazon Lambda

- **Technology** to develop serverless applications
- Allows you to run your code with high scalability, availability and redundancy.
- Service billed by **Milliseconds**. 1M request is free, $.0000016 per Gb-Second.
- **Supports**: Java, Node.js, C#, Python, Go, and Ruby.

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The Serverless Ecosystem Within AWS

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Use Cases for Serverless

- **API** based apps.
- A fintech/banking **reporting** job.
- **Batch** processing task.
- Isolated or **async** job (cron jobs).
- Data transformation - **ETLs**.

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Business case 1: **Beepquest.ai**

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Beepquest is an audit operation software that guarantees the proper execution of business processes, and enables you to take wise decisions.

Beepquest is a SaaS application that wanted to modernize their infrastructure. Being a quick startup and moving into a highly Modern environment using microservices, Kubernetes and Automation of new tenants.

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Business case 1: **Beepquest.ai**

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Solution:

- Moved the **monolithic** application into a container environment with Docker, **Amazon EKS** and microservice architecture.
- Created a **multi tenant architecture**, one single source of trust, one single environment for attending all organizations or tenants.

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Business case 1: **Beepquest.ai**

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Results: Focused on **Innovation** with a faster time to Market.

- Improves **Platform resiliency**
- Reduces web **development costs** at least 20%
- A **fault tolerant** architecture.

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Business case 2:
Reinventaauctions.com

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A SaaS platform to buy and sell vehicles, a C2C platform. This platform is based on Node.js and React. The initial requirement was to modernize their platform from using a monolithic architecture into a serverless ecosystem and Amazon Fargate.

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Business case 2: **Reinventaauctions.com**

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Solution:

- A pure **cloud-native ecosystem** using Amazon Lambda, AWS step functions and leveraging the serverless framework. As well as adding a **CI/CD pipeline** with the **12-factor methodology**, rapid feedback, focused on utilization and reducing AWS costs by adopting a **serverless ecosystem**.
- Everything is **managed services** from Amazon RDS, Cognito and Fargate.

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Business case 2: **Reinventaauctions.com**

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Results: A Cloud-first strategy

- A production ready **cloud-native solution**. Leveraging serverless, containers and
- Managed services.
- A **fully automated environment** using Infrastructure as Code with Amazon

Cloudformation. Dev environment, staging and production.

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Business case 2: **Reinventaauctions.com**

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- An **end- to end** highly scalable, available and redundant infrastructure.

  Fault-tolerant and reliable.

- **Stateless and immutable infrastructure**, allowing it to be highly scalable and

  prune to NO errors.

- Ready to receive **spikes up to 200-300%** since using Fargate and AWS

  autoscaling can help with this contingency event.

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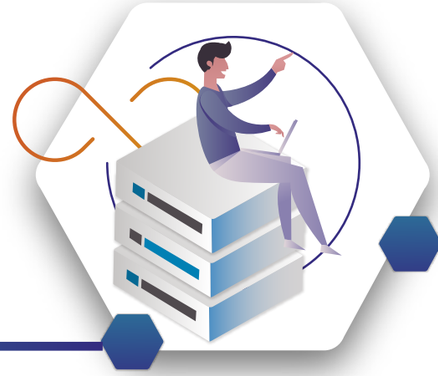
Our Service Offering

DevOps Consultancy



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