



Future of DevOps!

This document includes notes and Case studies on all important DevOps trends in 2024.

YouTube Video:

Trending DevOps Tools and Technologies in 2024

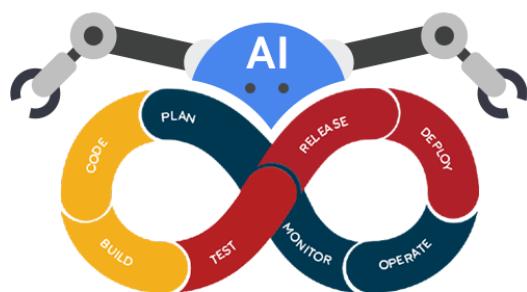
Trending DevOps tools and technologies in 2024 - In this devops video we discuss popular top devops trends happening in 2024 along with case studies and examples on how different

➡ <https://youtu.be/x1PXAY4kQ2K?si=oliSOdcW9kSHs7TL>



AIOps (artificial intelligence for IT operations)

AIOps stands for 'artificial intelligence for IT operations'.



AIOps meaning integrating AI in DevOps to automate various DevOps tasks like:

- **Anomaly Detection:**
 - Excel at detecting anomalies in system behavior.
 - Alert teams to potential issues before escalation.
- **Predictive Maintenance:**
 - Analyze historical data to predict maintenance needs.
 - Prevent system failures through timely tasks.
- **Failure Prediction:**
 - Anticipate failures before occurrence.
 - Enable proactive measures to mitigate risks.
- **Performance Optimization:**
 - Optimize system performance.
 - Identify bottlenecks and suggest improvements.
- **Capacity Planning:**
 - Help teams plan for future resource needs.
 - Based on historical usage data and predicted trends.
- **Root Cause Analysis:**
 - Quickly identify the root causes of issues.
 - Speed up problem resolution and minimize downtime.

PepsiCo MLOPS Case study:



- PepsiCo partnered with Microsoft Azure to leverage AIOps capabilities for analyzing consumer data.
- By using machine learning, PepsiCo analyzed 20 years of data and gained insights into consumer shopping trends, enabling better preparation for future demands.

Learning resources:

AI tools in DevOps: https://youtu.be/HU3g1x_ohIY

CHATGPT hacks for DevOps : <https://youtu.be/OrpTRmQU6UA>

Serverless

Serverless computing enables building and running applications without managing servers.



Over the last few years, serverless has become one of the most innovative and exciting approaches to deploying software.

- Serverless market expected to reach \$30 billion by 2030.
- Over 50% of cloud-based enterprises have adopted serverless.

Top Companies using Serverless

Autodesk Serverless Transition

Reduced Cost & Account creation time by 99% 😎



- **Challenge:**
 - Manual AWS account creation took two weeks, impacting scalability.
- **Solution:**
 - Adopted AWS Lambda and DynamoDB for serverless transition.
 - Automated account creation process.
- **Results:**
 - Reduced account creation time by 99% from 2 weeks to 10 minutes.
 - Improved scalability and performance.

Blog: <https://aws.amazon.com/solutions/case-studies/autodesk-serverless/>

Learning resources:

What is Serverless: <https://youtu.be/-aZvZLri-yY?si=IJ7Fm1XWE16Qnd2u>

Serverless Framework: <https://medium.com/kodeyoga/serverless-framework-a73f63ab603b>

Low Code/No Code Platforms

Low-code/no-code development is the practice of using a visual interface and drag-and-drop elements to build applications for business processes without coding.



According to [Gartner](#), 65% of application development will be low code by 2024.

- **Usage:**

- Low-code/no-code platforms empower both developers and non-developers to create applications with minimal manual coding.
- They streamline the DevOps pipeline by providing visual interfaces and pre-built components, accelerating the development and deployment process.

Benefits

- **Rapid Development:**
 - Accelerates development cycles, reducing time to market.
- **Improved Efficiency:**
 - Automates tasks, freeing developers for strategic initiatives.
- **Scalability:**
 - Easily scales to accommodate evolving business needs.
- **Agility:**
 - Enables quick prototyping and iteration for effective responses.
- **Cost Savings:**
 - Lowers development costs by reducing coding expertise needs.

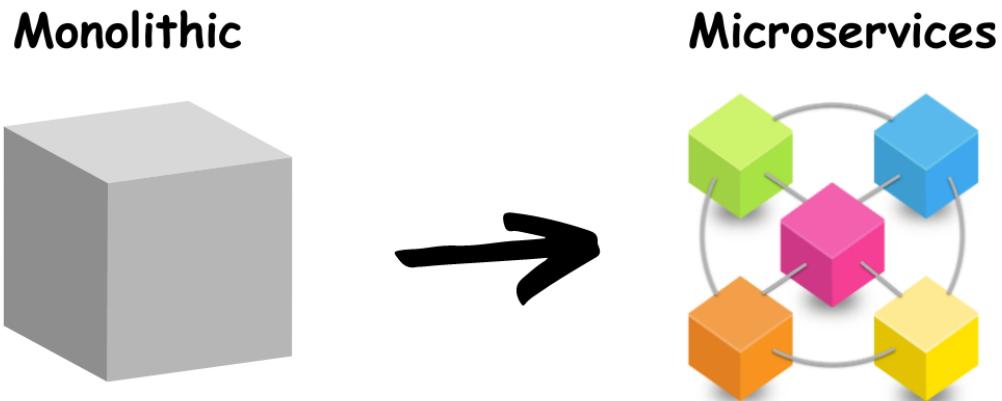
Learning resources:

Low Code Platform: <https://thehtoclub.com/tools/best-low-code-platform/>

Microservices

Small, independent parts of software that work together for a bigger job. Each part does a specific task, making it easier to

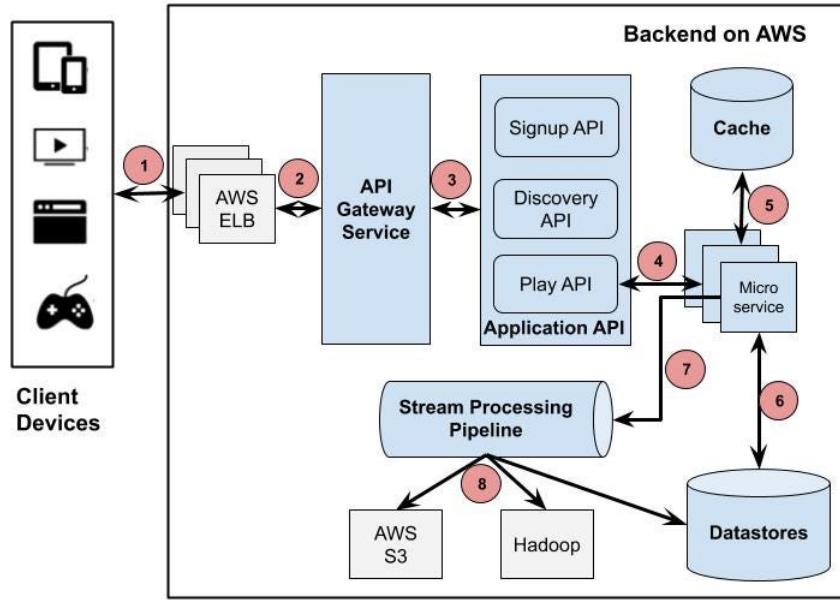
| manage and grow.



- **Benefits:**

- **Scalability:** Each microservice can be scaled independently, allowing for more efficient resource allocation.
- **Flexibility:** Enables teams to choose the best technology stack for each service, promoting innovation and flexibility.
- **Resilience:** Failure in one microservice does not necessarily affect the entire system, leading to improved fault isolation and resilience.
- **Speed:** Facilitates faster development and deployment cycles as smaller, focused teams can work on individual services concurrently.

Netflix Microservices Journey



Netflix's Microservices Migration on AWS

- **Decision:** Moved from RDBMS to distributed data systems on AWS.
- **Timeline:** Started in 2009, completed by 2012.
- **Approach:** Migrated non-customer-facing programs first, then customer-facing ones.
- **Result:** Overcame scaling challenges, eliminated outages.
- **Scale:** By 2015, handled 2 billion API requests daily with 500+ microservices.
- **Current State:** Manages 139 million customers across 190 nations with over 700 microservices.

Learning resources:

What is Microservices Architecture: <https://youtube.com/shorts/5JzKWXLIT8M>

Microservices Project Deployed on EKS: https://youtu.be/jHIRqQzqB_Y

Top Companies using microservices Architecture:

<https://www.sayonetech.com/blog/5-microservices-examples-amazon-netflix-uber-spotify-and-etsy/>

Cloud Native Tools (Containers, K8s, Service meshes)

Cloud-native tools are software solutions tailored for efficient deployment and management of applications in cloud environments



Popular Cloud-Native Tools:

- **Containerization:**
 - Docker
 - Podman
- **Container Orchestration:**
 - Kubernetes (K8s)
 - Amazon EKS, Google GKE, Azure AKS
- **Service Mesh:**
 - Istio
 - Linkerd
 - Consul
 - Cilium
- **Monitoring & Observability:**
 - Prometheus
 - Grafana
- **CI/CD:**
 - Jenkins
 - GitLab CI/CD
 - GitOps Tools (e.g., ArgoCD, Flux)
- **Configuration Management:**
 - Ansible
 - Terraform
- **Secrets Management:**
 - HashiCorp Vault
 - AWS Secrets Manager

- Google Cloud Secret Manager
- **WebAssembly (Wasm):**
 - Wasmtime
 - Wasmer
 - AssemblyScript

Cloud Native Tools Case Studies by CNCF:

Case Studies

CNCF end users are telling their stories to help elevate technical conversations to business objectives and challenges. Read how our end users have leveraged cloud native

 <https://www.cncf.io/case-studies/>



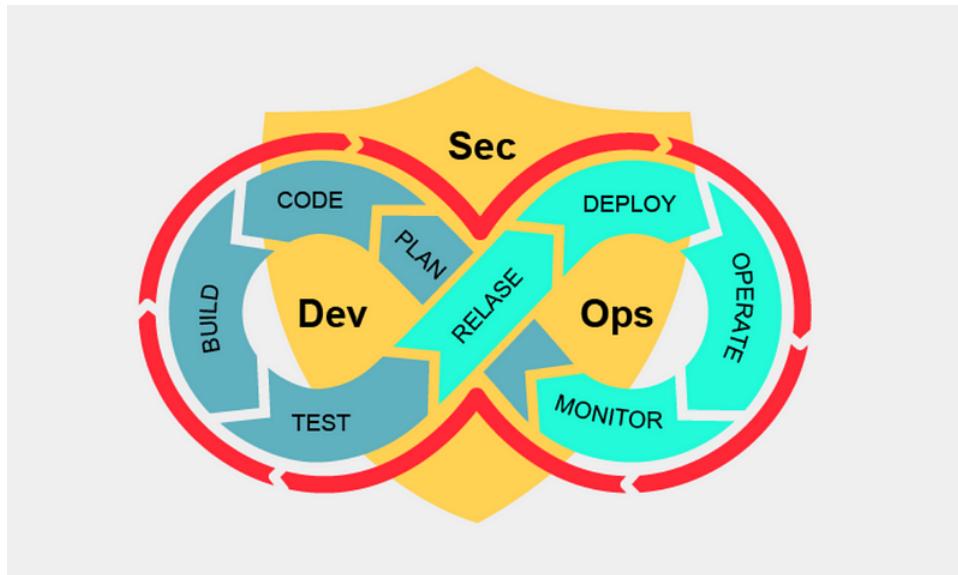
Learning resources:

What is Cloud Native Applications: <https://youtu.be/UZFDs4CNhh0>

CNCF Landscape: <https://landscape.cncf.io/>

DevSecOps

Integrating security in DevOps Processes



Current approach in DevOps Market :

- 50% of enterprises conduct Static Application Security Testing (SAST).
- 40% conduct Dynamic Application Security Testing (DAST).
- 50% scan containers and dependencies for vulnerabilities.

2023 Global DevSecOps Report by GitLab: <https://about.gitlab.com/developer-survey/>

Pokemon Go's DevOpSecOps Implementation:



Pokemon Go's Privacy Protection:

- **Concerns & Liability:**
 - With 800 million downloads, mainly from children, GDPR liability arose.
- **Partnership with Niantic:**
 - Shared responsibilities with Niantic for backend operations and compliance.
- **Adopted DevSecOps:**
 - Implemented automated security checks from the start.
- **Successful Privacy Protection:**
 - DevSecOps adoption ensured effective privacy measures.

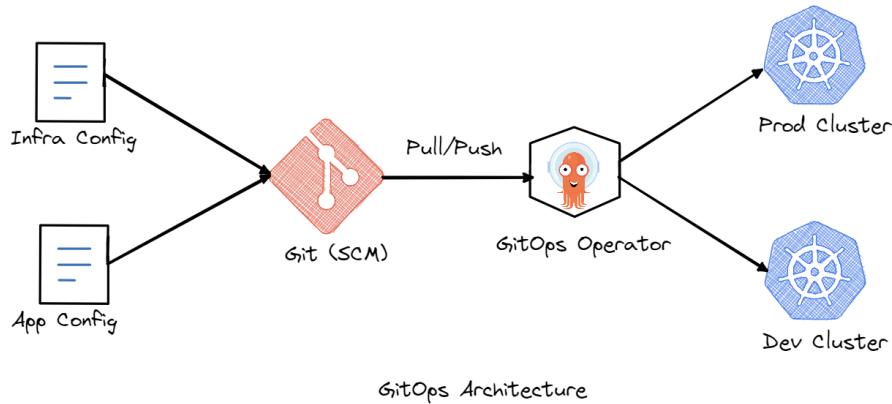
Learning resources:

DevSecOps Project to deploy Netflix on Kubernetes:

<https://youtu.be/g8X5AoqCJHc>

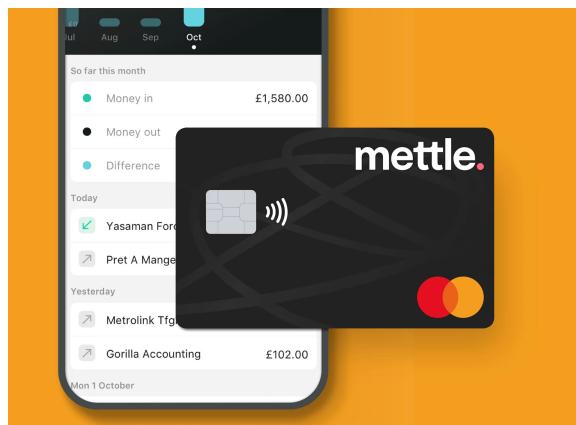
GitOps

Automating infrastructure and application deployment using **Git repositories** as the single source of truth.



- Automates and controls infrastructure, based on Kubernetes principles.
- Utilizes **Git** for merging and deploying applications, integrating DevOps practices like version control and CI/CD.
- Focuses on **incremental** releases and continuous delivery to streamline software deployment.

Case Study: Mettle



- **Objective:**

- Provide small businesses with a finance application for faster payments and better financial management.

- **Challenges:**

- Needed quick deployment of new features without compromising reliability or security.

- **Adopting GitOps:**

- Used FluxCD to implement GitOps approach.
 - Created self-service platform for engineers, reducing dependency on Platform Team assistance.

- **Results:**

- Increased production speed by 75% and deployment by **25%**.
 - Reduced Mean Time to Recovery (MTTR) to **20** minutes.
 - Decreased developer involvement in operational tasks by **75%**.

Learning resources:

GitOps Explained with a Project: <https://youtu.be/1hF-HRq5Mww>

More Ops

1. FinOps: Financial operations (FinOps) is a framework for managing cloud costs efficiently by aligning financial, technical, and operational practices.
2. DataOps: DataOps is a collaborative data management practice focused on improving the communication, integration, and automation of data flows across an organization.
3. ChatOps: ChatOps is a collaboration model that connects people, tools, and processes within a chat environment, enabling teams to automate tasks and make data-driven decisions directly in chat channels.
4. NoOps: NoOps is a concept where operations are entirely automated and abstracted away from developers, allowing them to focus solely on writing code without worrying about deployment, scaling, or infrastructure management.