DevOps Guide

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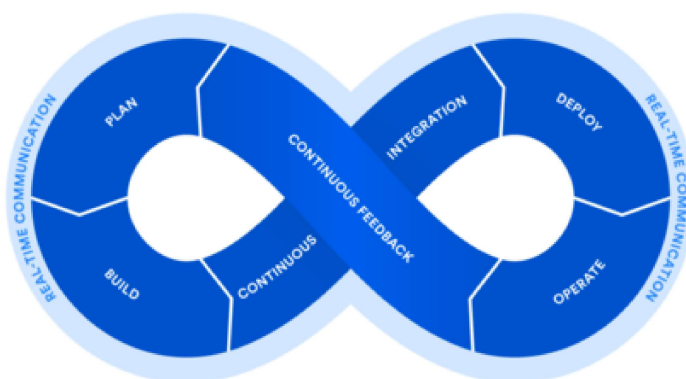
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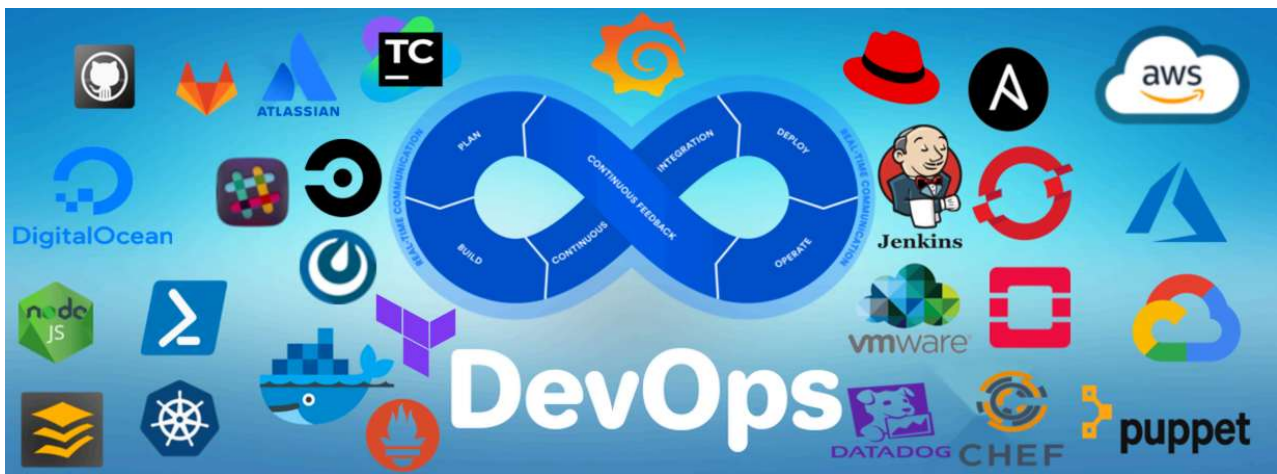
README.md   Updated guide.   5 years ago

DevOps Guide

A guide covering DevOps including the applications and tools that will make you a better and more efficient DevOps Engineer.

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DevOps Learning Resources

[DevOps Engineering on AWS from AWS Training](#)

[AWS Certified DevOps Engineer - Professional from A Cloud Guru](#)

[Microsoft Certified: DevOps Engineer Expert Cert.](#)

[Introduction to Azure DevOps from A Cloud Guru](#)

[Architecting with Google Compute Engine](#)

[Architecting with Google Kubernetes Engine in Google Cloud](#)

[VMware Training and Certification Program](#)

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DevOps Tools

[GitHub](#) provides hosting for software development version control using Git. It offers all of the distributed version control and source code management functionality of Git as well as adding its own features. It provides access control and several collaboration features such as bug tracking, feature requests, task management, and wikis for every project.

[GitHub Codespaces](#) is an integrated development environment(IDE) on GitHub. That allows developers to develop entirely in the cloud using Visual Studio and Visual Studio Code.

GitHub Actions will automate, customize, and execute your software development workflows right in your repository with GitHub Actions. You can discover, create, and share actions to perform any job you'd like, including CI/CD, and combine actions in a completely customized workflow.GitHub Actions for Azure you can create workflows that you can set up in your repository to build, test, package, release and deploy to Azure.Learn more about all other integrations with Azure.

GitHub Packages is a service that helps you safely publish and consume packages, store your packages alongside your code, and share your packages privately with your team or publicly with the open source community. You can also automate your packages with GitHub Actions.

GitHub Copilot is an AI pair programmer that helps you write code faster and with less work. Copilot draws context from comments and code, and suggests individual lines and whole functions instantly. It is powered by OpenAI Codex, a new AI system created by OpenAI.

GitLab is a web-based DevOps lifecycle tool that provides a Git-repository manager providing wiki, issue-tracking and CI/CD pipeline features, using an open-source license, developed by GitLab Inc.

Jenkins is a free and open source automation server. Jenkins helps to automate the non-human part of the software development process, with continuous integration and facilitating technical aspects of continuous delivery.

Bitbucket is a web-based version control repository hosting service owned by Atlassian, for source code and development projects that use either Mercurial or Git revision control systems. Bitbucket offers both commercial plans and free accounts. It offers free accounts with an unlimited number of private repositories. Bitbucket integrates with other Atlassian software like Jira, HipChat, Confluence and Bamboo.

Bamboo is a continuous integration (CI) server that can be used to automate the release management for a software application, creating a continuous delivery pipeline.

Codecov is the leading, dedicated code coverage solution. It provides highly integrated tools to group, merge, archive and compare coverage reports. Whether your team is comparing changes in a pull request or reviewing a single commit, Codecov will improve the code review workflow and quality.

Netdata is high-fidelity infrastructure monitoring and troubleshooting, real-time monitoring Agent collects thousands of metrics from systems, hardware, containers, and applications with zero configuration. It runs permanently on all your physical/virtual servers, containers, cloud deployments, and edge/IoT devices, and is perfectly safe to install on your systems mid-incident without any preparation.

Drone is a Continuous Delivery system built on container technology. Drone uses a simple YAML configuration file, a superset of docker-compose, to define and execute Pipelines inside Docker containers.

Travis CI is a hosted continuous integration service used to build and test software projects hosted at GitHub.

Circle CI is a continuous integration and continuous delivery platform that helps software teams work smarter, faster.

Zuul-CI is a program that drives continuous integration, delivery, and deployment systems with a focus on project gating and interrelated projects. Using the same Ansible playbooks to deploy your system and run your tests.

Artifactory is a Universal Artifact Repository Manager developed by JFrog. It supports all major packages, enterprise ready security, clustered, HA, Docker registry, multi-site replication and scalable.

[Azure DevOps](#) is a set of services for teams to share code, track work, and ship software; CLIs Build, deploy, diagnose, and manage multi-platform, scalable apps and services; Azure Pipelines Continuously build, test, and deploy to any platform and cloud; Azure Lab Services Set up labs for classrooms, trials, development and testing, and other scenarios.

[Team City](#) is a build management and continuous integration server from JetBrains.

[Shippable](#) simplifies DevOps and makes it systematic with an Assembly Line platform that is heterogeneous, flexible, and provides complete visibility across your DevOps workflows.

Spinnaker is an open source, multi-cloud continuous delivery platform for releasing software changes

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[AWS CodeBuild](#) is a fully managed continuous integration service that compiles source code, runs tests, and produces software packages that are ready to deploy. With CodeBuild, you don't need to provision, manage, and scale your own build servers.

[Selenium](#) is a free (open source) automated testing suite for web applications across different browsers and platforms.

[Cucumber](#) is a tool based on Behavior Driven Development (BDD) framework which is used to write acceptance tests for the web application. It allows automation of functional validation in easily readable and understandable format (like plain English) to Business Analysts, Developers, and Testers.

[JUnit](#) is a unit testing framework for the Java programming language.

[Mocha](#) is a JavaScript test framework for Node.js programs, featuring browser support, asynchronous testing, test coverage reports, and use of any assertion library.

[Karma](#) is a simple tool that allows you to execute JavaScript code in multiple real browsers.

[Jasmine](#) is an open source testing framework for JavaScript. It aims to run on any JavaScript-enabled platform, to not intrude on the application nor the IDE, and to have easy-to-read syntax.

[Maven](#) is a build automation tool used primarily for Java projects. Maven can also be used to build and manage projects written in C#, Ruby, Scala, and other languages. The Maven project is hosted by the Apache Software Foundation.

[Gradle](#) is an open-source build-automation system that builds upon the concepts of Apache Ant and Apache Maven and introduces a Groovy-based domain-specific language instead of the XML form used by Apache Maven for declaring the project configuration.

[Chef](#) is an effortless Infrastructure Suite offers visibility into security and compliance status across all infrastructure and makes it easy to detect and correct issues long before they reach production.

[Puppet](#) is an open source tool that makes continuous integration and delivery of your software on traditional or containerized infrastructure easy by pulling together all your existing tools and giving you flexibility to deploy your way.

[Ansible](#) is an open-source software provisioning, configuration management, and application-deployment tool. It runs on many Unix-like systems, and can configure both Unix-like systems as well as Microsoft Windows.

[KubeInit](#) provides Ansible playbooks and roles for the deployment and configuration of multiple Kubernetes distributions.

Salt is Python-based, open-source software for event-driven IT automation, remote task execution, and configuration management. Supporting the "Infrastructure as Code" approach to data center system and network deployment and management, configuration automation, SecOps orchestration, vulnerability remediation, and hybrid cloud control.

Terraform is an open-source infrastructure as code software tool created by HashiCorp.It enables users to define and provision a datacenter infrastructure using a high-level configuration language known as Hashicorp Configuration Language (HCL), or optionally JSON.

Consul is a service networking solution to connect and secure services across any runtime platform and public or private cloud.

Packer is lightweight, runs on every major operating system, and is highly performant, creating machine images for multiple platforms in parallel. Packer does not replace configuration management like Chef or Puppet. In fact, when building images, Packer is able to use tools like Chef or Puppet to install software onto the image.

Nomad is a highly available, distributed, data-center aware cluster and application scheduler designed to support the modern datacenter with support for long-running services, batch jobs, and much more.

Vagrant is a tool for building and managing virtual machine environments in a single workflow. With an easy-to-use workflow and focus on automation, Vagrant lowers development environment setup time and increases production parity.

Vault is a tool for securely accessing secrets. A secret is anything that you want to tightly control access to, such as API keys, passwords, certificates, and more. Vault provides a unified interface to any secret, while providing tight access control and recording a detailed audit log.

CFEngine is an open-source configuration management system, written by Mark Burgess.Its primary function is to provide automated configuration and maintenance of large-scale computer systems, including the unified management of servers, desktops, consumer and industrial devices, embedded networked devices, mobile smartphones, and tablet computers.

Octpus Deploy is the deployment automation server for your entire team, designed to make it easy to orchestrate releases and deploy applications, whether on-premises or in the cloud.

AWS CodeDeploy is a fully managed deployment service that automates software deployments to a variety of compute services such as Amazon EC2, AWS Fargate, AWS Lambda, and your on-premises servers. AWS CodeDeploy makes it easier for you to rapidly release new features, helps you avoid downtime during application deployment, and handles the complexity of updating your applications.

Kubernetes is an open-source container-orchestration system for automating application deployment, scaling, and management. It was originally designed by Google, and is now maintained by the Cloud Native Computing Foundation.

Docker is a set of platform as a service products that use OS-level virtualization to deliver software in packages called containers. Containers are isolated from one another and bundle their own software, libraries and configuration files; they can communicate with each other through well-defined channels. All containers are run by a single operating-system kernel and are thus more lightweight than virtual machines.

Dockle is a Container Image Linter for Security, Helping build the Best-Practice Docker Image.

TwistLock is a Cloud Native Cybersecurity Platform that provides full lifecycle security for containerized environments. From pipeline to perimeter, Twistlock helps customers scale securely and deploy containers with confidence. The Twistlock Platform goes beyond just containers to secure the entire cloud native stack, from the host OS to serverless functions.

PowerShell/PowerShell Core is a cross-platform (Windows, Linux, and macOS) automation and configuration tool/framework that works well with your existing tools and is optimized for dealing with structured data (e.g. JSON, CSV, XML, etc.), REST APIs, and object models. It includes a command-line shell, an associated scripting language and a framework for processing cmdlets.

Hyper-V creates virtual machines on Windows 10. Hyper-V can be enabled in many ways including using the Windows 10 control panel, PowerShell or using the Deployment Imaging Servicing and Management tool (DISM).

HyperKit is a toolkit for embedding hypervisor capabilities in your application. It includes a complete hypervisor, based on xhyve/bhyve, which is optimized for lightweight virtual machines and container deployment. It is designed to be interfaced with higher-level components such as the VPNKit and DataKit. HyperKit currently only supports macOS using the Hypervisor.framework making it a core component of Docker Desktop for Mac.

Intel® Graphics Virtualization Technology (Intel® GVT) is a full GPU virtualization solution with mediated pass-through, starting from 4th generation Intel Core (TM) processors with Intel processor graphics(Broadwell and newer). It can be used to virtualize the GPU for multiple guest virtual machines, effectively providing near-native graphics performance in the virtual machine and still letting your host use the virtualized GPU normally.

Apple Hypervisor is a frameowrk that builds virtualization solutions on top of a lightweight hypervisor, without third-party kernel extensions. Hypervisor provides C APIs so you can interact with virtualization technologies in user space, without writing kernel extensions (KEXTs). As a result, the apps you create using this framework are suitable for distribution on the Mac App Store.

Apple Virtualization Framework is a framework that provides high-level APIs for creating and managing virtual machines on Apple silicon and Intel-based Mac computers. This framework is used to boot and run a Linux-based operating system in a custom environment that you define. It also supports the Virtio specification, which defines standard interfaces for many device types, including network, socket, serial port, storage, entropy, and memory-balloon devices.

Apple Paravirtualized Graphics Framework is a framework that implements hardware-accelerated graphics for macOS running in a virtual machine, hereafter known as the guest. The operating system provides a graphics driver that runs inside the guest, communicating with the framework in the host operating system to take advantage of Metal-accelerated graphics.

Cloud Hypervisor is an open source Virtual Machine Monitor (VMM) that runs on top of KVM. The project focuses on exclusively running modern, cloud workloads, on top of a limited set of hardware architectures and platforms. Cloud workloads refers to those that are usually run by customers inside a cloud provider. Cloud Hypervisor is implemented in Rust and is based on the rust-vmm crates.

InsightVM is a data-rich resource that can amplify the other solutions in your tech stack, from SIEMs and firewalls to ticketing systems. Only InsightVM integrates with 40+ other leading technologies, and with an open RESTful API, your vulnerability data makes your other tools more valuable.

VMware vSphere Hypervisor is a bare-metal hypervisor that virtualizes servers; allowing you to consolidate your applications while saving time and money managing your IT infrastructure.

VMware vSphere is the industry-leading compute virtualization platform, and your first step to application modernization. It has been rearchitected with native Kubernetes to allow customers to modernize the 70 million+ workloads now running on vSphere.

VMware Tanzu is a centralized management platform for consistently operating and securing your Kubernetes infrastructure and modern applications across multiple teams and private/public clouds.

Rancher is a complete software stack for teams adopting containers. It addresses the operational and security challenges of managing multiple Kubernetes clusters, while providing DevOps teams with integrated tools for running containerized workloads.

K3s is a highly available, certified Kubernetes distribution designed for production workloads in unattended, resource-constrained, remote locations or inside IoT appliances.

Rook is an open source cloud-native storage orchestrator for Kubernetes that turns distributed storage systems into self-managing, self-scaling, self-healing storage services. It automates the tasks of a storage administrator: deployment, bootstrapping, configuration, provisioning, scaling, upgrading, migration, disaster recovery, monitoring, and resource management.

Google Kubernetes Engine (GKE) is a managed, production-ready environment for deploying containerized applications.

Anthos is a modern application management platform that provides a consistent development and operations experience for cloud and on-premises environments.

AWS ECS is a highly scalable, high-performance container orchestration service that supports Docker containers and allows you to easily run and scale containerized applications on AWS. Amazon ECS eliminates the need for you to install and operate your own container orchestration software, manage and scale a cluster of virtual machines, or schedule containers on those virtual machines.

Apache Mesos is a cluster manager that provides efficient resource isolation and sharing across distributed applications, or frameworks. It can run Hadoop, Jenkins, Spark, Aurora, and other frameworks on a dynamically shared pool of nodes.

Apache Spark is a unified analytics engine for big data processing, with built-in modules for streaming, SQL, machine learning and graph processing.

Apache Hadoop is a framework that allows for the distributed processing of large data sets across clusters of computers using simple programming models. It is designed to scale up from single servers to thousands of machines, each offering local computation and storage. Rather than rely on hardware to deliver high-availability, the library itself is designed to detect and handle failures at the application layer, so delivering a highly-available service on top of a cluster of computers, each of which may be prone to failures.

Hadoop Distributed File System (HDFS) is a distributed file system that handles large data sets running on commodity hardware. It is used to scale a single Apache Hadoop cluster to hundreds (and even thousands) of nodes. HDFS is one of the major components of Apache Hadoop, the others being MapReduce and YARN.

Microsoft Azure is a cloud computing service created by Microsoft for building, testing, deploying, and managing applications and services through Microsoft-managed data centers.

Azure Functions is a solution for easily running small pieces of code, or "functions," in the cloud. You can write just the code you need for the problem at hand, without worrying about a whole application or the infrastructure to run it.

Rkt is a pod-native container engine for Linux. It is composable, secure, and built on standards.

AWS Lambda is an event-driven, serverless computing platform provided by Amazon as a part of the Amazon Web Services. It is a computing service that runs code in response to events and automatically manages the computing resources required by that code.

Helm is the Kubernetes Package Manager.

Kubespray is a tool that combines Kubernetes and Ansible to easily install Kubernetes clusters that can be deployed on AWS, GCE, Azure, OpenStack, vSphere, Packet (bare metal), Oracle Cloud Infrastructure (Experimental), or Baremetal

Red Hat OpenShift is focused on security at every level of the container stack and throughout the application lifecycle. It includes long-term, enterprise support from one of the leading Kubernetes contributors and open source software companies.

OpenShift Hive is an operator which runs as a service on top of Kubernetes/OpenShift. The Hive service can be used to provision and perform initial configuration of OpenShift 4 clusters.

OKD is a community distribution of Kubernetes optimized for continuous application development and multi-tenant deployment. OKD adds developer and operations-centric tools on top of Kubernetes to enable rapid application development, easy deployment and scaling, and long-term lifecycle maintenance for small and large teams.

Odo is a fast, iterative, and straightforward CLI tool for developers who write, build, and deploy applications on Kubernetes and OpenShift.

Kata Operator is an operator to perform lifecycle management (install/upgrade/uninstall) of Kata Runtime on Openshift as well as Kubernetes cluster.

Knative is a Kubernetes-based platform to build, deploy, and manage modern serverless workloads. Knative takes care of the operational overhead details of networking, autoscaling (even to zero), and revision tracking.

Etcd is a distributed key-value store that provides a reliable way to store data that needs to be accessed by a distributed system or cluster of machines. Etcd is used as the backend for service discovery and stores cluster state and configuration for Kubernetes.

OpenStack is a free and open-source software platform for cloud computing, mostly deployed as infrastructure-as-a-service that controls large pools of compute, storage, and networking resources throughout a datacenter, managed through a dashboard or via the OpenStack API. OpenStack works with popular enterprise and open source technologies making it ideal for heterogeneous infrastructure.

Cloud Foundry is an open source, multi cloud application platform as a service that makes it faster and easier to build, test, deploy and scale applications, providing a choice of clouds, developer frameworks, and application services. It is an open source project and is available through a variety of private cloud distributions and public cloud instances.

Splunk software is used for searching, monitoring, and analyzing machine-generated big data, via a Web-style interface.

Prometheus is a free software application used for event monitoring and alerting. It records real-time metrics in a time series database (allowing for high dimensionality) built using a HTTP pull model, with flexible queries and real-time alerting.

Loki is a horizontally-scalable, highly-available, multi-tenant log aggregation system inspired by Prometheus. It is designed to be very cost effective and easy to operate. It does not index the contents of the logs, but rather a set of labels for each log stream.

Thanos is a set of components that can be composed into a highly available metric system with unlimited storage capacity, which can be added seamlessly on top of existing Prometheus deployments.

Container Storage Interface (CSI) is an API that lets container orchestration platforms like Kubernetes seamlessly communicate with stored data via a plug-in.

OpenEBS is a Kubernetes-based tool to create stateful applications using Container Attached Storage.

ElasticSearch is a search engine based on the Lucene library. It provides a distributed, multitenant-capable full-text search engine with an HTTP web interface and schema-free JSON documents. Elasticsearch is developed in Java.

Logstash is a tool for managing events and logs. When used generically, the term encompasses a larger system of log collection, processing, storage and searching activities.

Kibana is an open source data visualization plugin for Elasticsearch. It provides visualization capabilities on top of the content indexed on an Elasticsearch cluster. Users can create bar, line and scatter plots, or pie charts and maps on top of large volumes of data.

New Relic is a SaaS-based monitoring tool that fully supports the way DevOps teams work in the modern enterprise by streamlining your workflows with today's collaboration software and orchestration tools like Puppet, Chef, and Ansible.

Graylog is a leading centralized log management solution for capturing, storing, and enabling real-time analysis of terabytes of machine data.

Nagios is a free and open source computer-software application that monitors systems, networks and infrastructure. Nagios offers monitoring and alerting services for servers, switches, applications and services. It alerts users when things go wrong and alerts them a second time when the problem has been resolved.

SonarQube is an open-source platform developed by SonarSource for continuous inspection of code quality to perform automatic reviews with static analysis of code to detect bugs, code smells, and security vulnerabilities on 20+ programming languages.

Genie is a federated job orchestration engine developed by Netflix. Genie provides REST APIs to run a variety of big data jobs like Hadoop, Pig, Hive, Spark, Presto, Sqoop and more. It also provides APIs for managing the metadata of many distributed processing clusters and the commands and applications which run on them.

Inviso is a lightweight tool that provides the ability to search for Hadoop jobs, visualize the performance, and view cluster utilization.

Fenzo is a scheduler Java library for Apache Mesos frameworks that supports plugins for scheduling optimizations and facilitates cluster autoscaling.

Dynomite is a thin, distributed dynamo layer for different storage engines and protocols, which includes Redis and Memcached. Dynomite supports multi-datacenter replication and is designed for High Availability(HA).

Dyno is a tool that is used to scale a Java client application utilizing Dynomite.

Raigad is a process/tool that runs alongside Elasticsearch to automate backup/recovery, Deployments and Centralized Configuration management.

Priam is a process/tool that runs alongside Apache Cassandra to automate backup/recovery, Deployments and Centralized Configuration management.

Chaos Monkey is a resiliency tool used to randomly terminates virtual machine instances and containers that run inside of your production environment. Chaos Monkey should work with any backend that Spinnaker supports (AWS, Google Compute Engine, Microsoft Azure, Kubernetes, and Cloud Foundry).

Falcor is a JavaScript library for efficient data fetching. Falcor lets you represent all your remote data sources as a single domain model via a virtual JSON graph, whether in memory on the client or over the network on the server.

Restify is a framework, utilizing connect style middleware for building REST APIs.

Traefik is an open source Edge Router that makes publishing your services a fun and easy experience. It receives requests on behalf of your system and finds out which components are responsible for handling them. What sets Traefik apart, besides its many features, is that it automatically discovers the right configuration for your services.

Jira is a proprietary issue tracking product developed by Atlassian that allows bug tracking and agile project management.

Pivotal Tracker is the agile project management tool of choice for developers around the world for real-time collaboration around a shared, prioritized backlog.

Trello is a web-based Kanban-style list-making application that gives you perspective over all your projects, at work and at home.

Microsoft Teams is the hub for team collaboration in Office 365 that integrates the people, content, and tools your team needs to be more engaged and effective.

Slack is a cloud-based proprietary instant messaging platform developed by Slack Technologies.

OpsGenie is a cloud-based service for dev & ops teams, providing reliable alerts, on-call schedule management and escalations. OpsGenie integrates with monitoring tools & services, ensures the right people are notified.

Releases

No releases published

Packages

No packages published