

From Silos to DevOps to Platform Engineering

Embracing GitOps and
going behind the hype

Horacio Gonzalez

2024-05-23



@LostInBrittany

Horacio Gonzalez

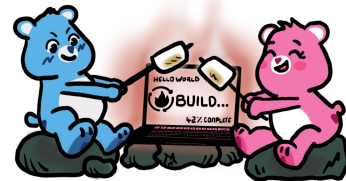
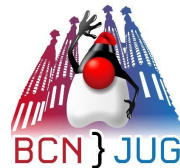
@LostInBrittany

Spaniard Lost in Brittany

Head of DevRel



clever cloud



clever cloud

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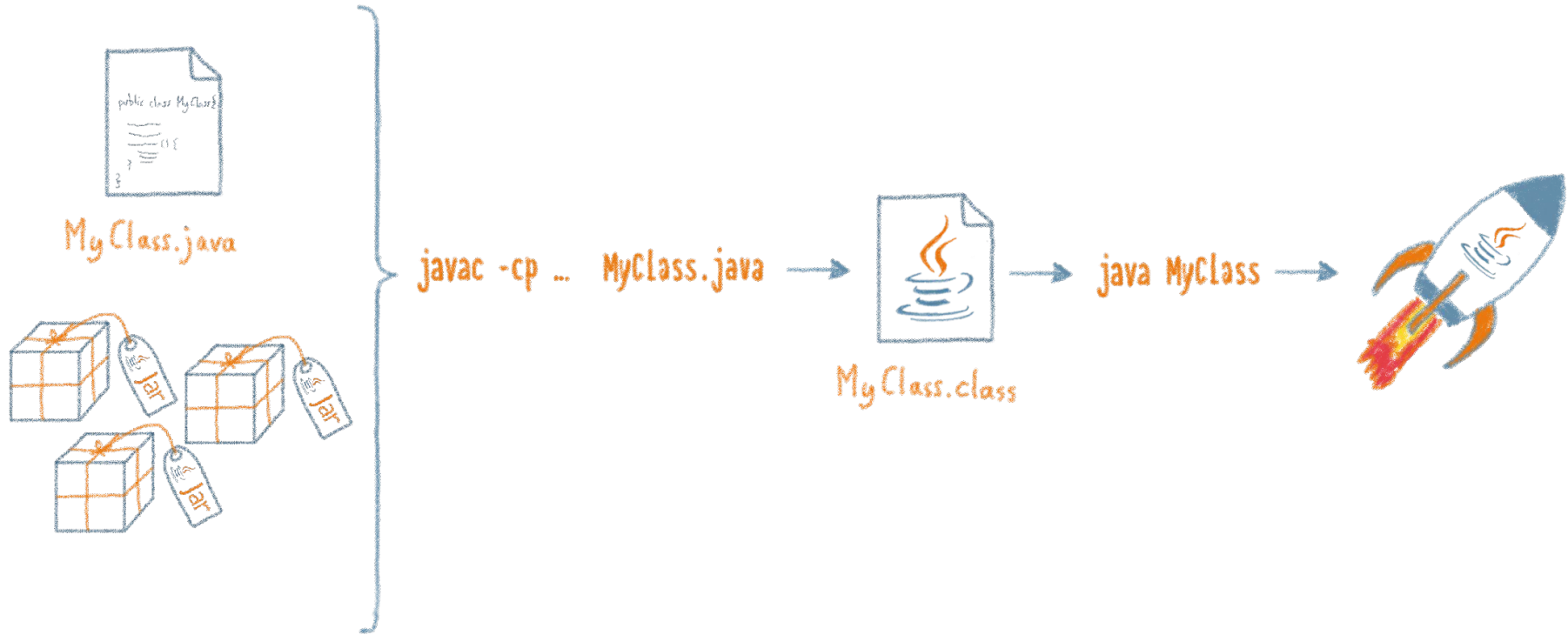


Adding layers of shiny complexity

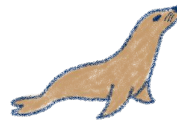
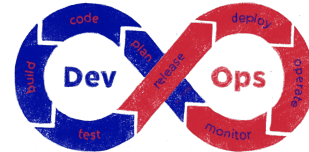
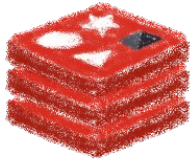
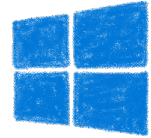
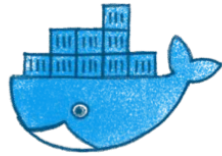
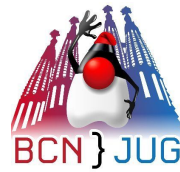
Last 30 years in software development



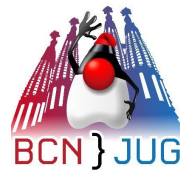
From write-compile-exec to Kubernetes



From write-compile-exec to Kubernetes



If I were a student now, I would feel scared



Overwhelmed? Please see the CNCF Trail Map. That and the interactive landscape are at l.cncf.io

Database Streaming & Messaging Application Definition & Image Build Continuous Integration & Delivery Platform Serverless

Scheduling & Orchestration Configuration & Service Discovery Remote Procedure Call Service Proxy API Gateway Service Mesh

Cloud Native Storage Container Runtime Cloud Native Network

Automation & Configuration Container Registry Security & Compliance Key Management

Observability and Analysis Monitoring Logging Tracing Check Engineering Continuous Optimization

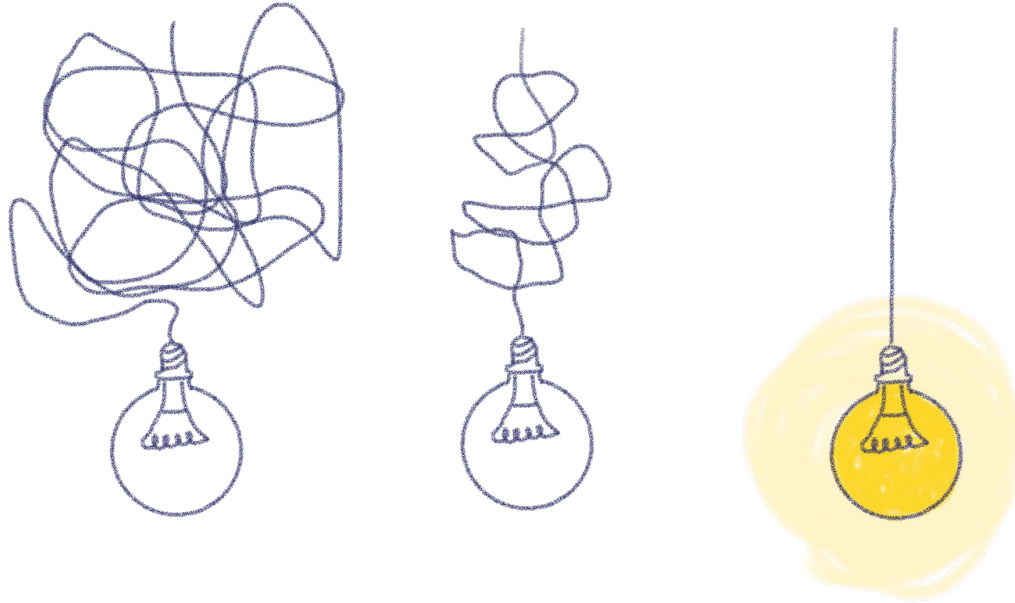
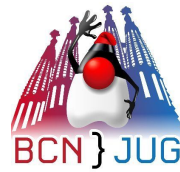
Cloud Native Landscape 1.0

This landscape is intended as a map through the previously articulated terrain of cloud native technologies. There are many routes to discovery a cloud native application with CNCF projects representing a particularly well-trodden path.

l.cncf.io



Platform Engineering to the rescue



Empowering developers while reducing complexity



clever cloud

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IT in the 90s

Once upon a time...

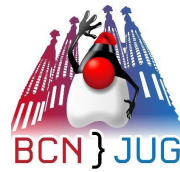


In a time almost forgotten



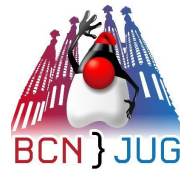
When even internet was young...

When Windows 95 was the cutting edge



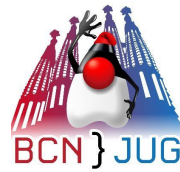
And a 100 Mb disk was huge...

Big companies still used mainframes



Bigger, fancier, but still the same old IBM

Bare-metal based IT reigned



Control, reliability, security...
But cost, rigidity, logistics...



Applying the industrial model



Trying to shoehorn IT into a model where it doesn't fit

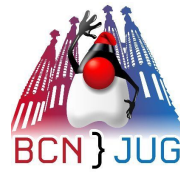


Walls & Silos



And procedures, and hierarchy, and corporate politics

Why are we managing IT like factories?



Because we didn't know otherwise?



Rémi Verchère ❄️

@rverchere

bash will still be used

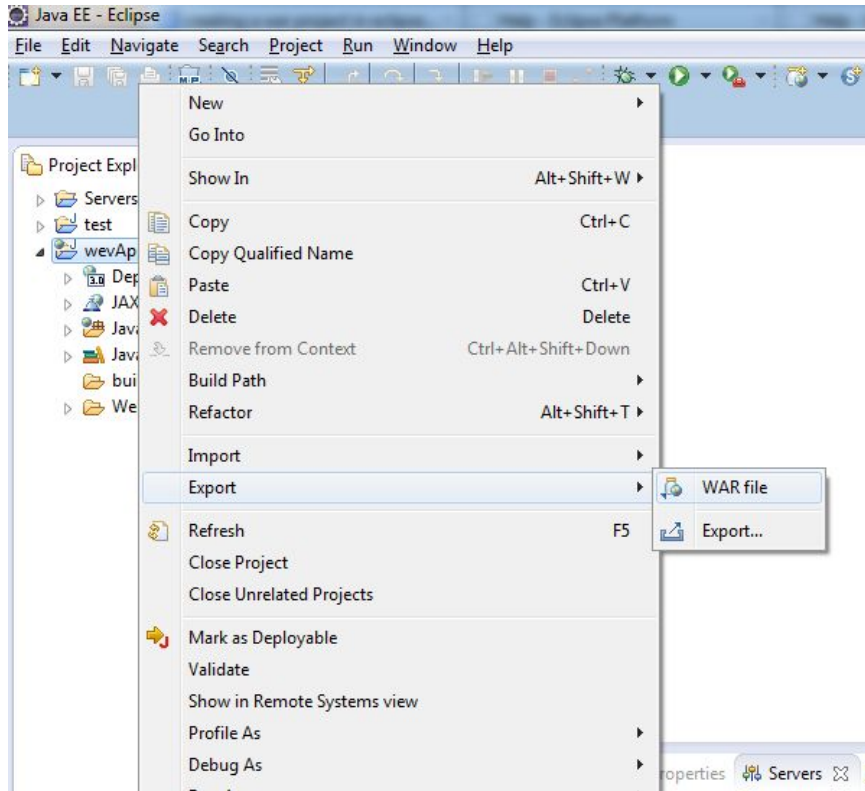
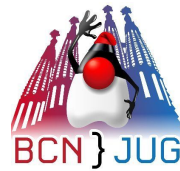
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Tooling evolves

CVS, Ant and (Leeeroy) Jenkins



Old school procedures



commons
IO™

Apache Commons IO™

Last Published: 09 June 2023 | Version: 2.13.0

ApacheCon Apache Commons

Download Apache Commons IO

Using a Mirror

We recommend you use a mirror to download our release builds, but you **must verify the integrity** of the downloaded files using signatures downloaded from our main distribution directories. Recent releases (48 hours) may not yet be available from all the mirrors.

You are currently using <https://dtdn.apache.org/>. If you encounter a problem with this mirror, please select another mirror. If all mirrors are failing, there are backup mirrors (at the end of the mirrors list) that should be available.

Other mirrors:

It is essential that you **verify the integrity** of downloaded files, preferably using the **PGP** signature (`*.asc` files); falling that using the **SHA512** hash (`*.sha512` checksum files).

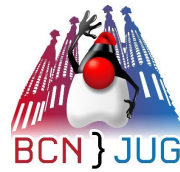
The **KEYS** file contains the public PGP keys used by Apache Commons developers to sign releases.

Apache Commons IO 2.13.0 (requires Java 8)

Binaries

commons-io-2.13.0-bin.tar.gz	sha512	pgp
commons-io-2.13.0-bin.zip	sha512	pgp

Tooling empowering changes



Theory existed since 1999
But without the right tooling...

Source control tools



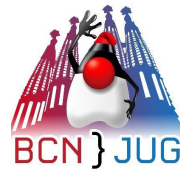
ClearCase



Better than copying and renaming folders...



Dependency management & build



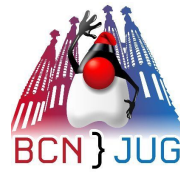
The agile dependency manager



Better than grabbing each dependency in their website
and running `javac` by hand...



Unit testing and continuous integration



Hudson CI

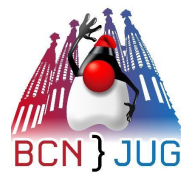


Jenkins

If *Testing is Doubting*, let's doubt automatically

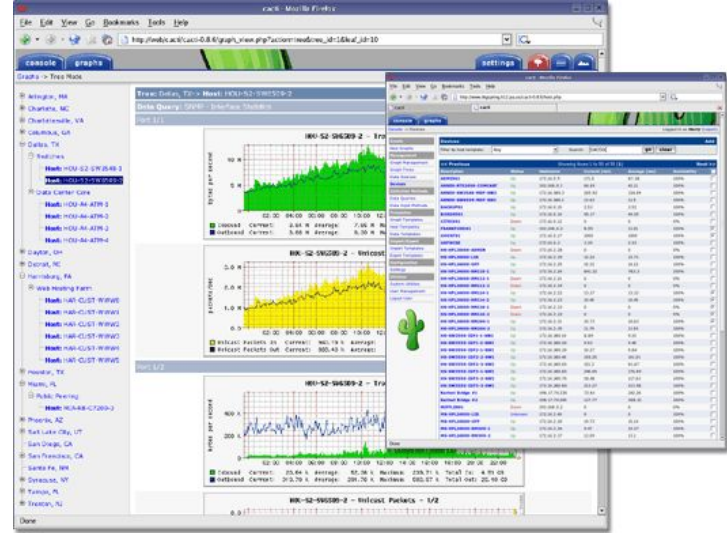


Monitoring tools



Nagios

ZABBIX



No more spending nights looking at a status screen



So many more possibilities...



So much more complexity!





Rémi Verchère ❄️

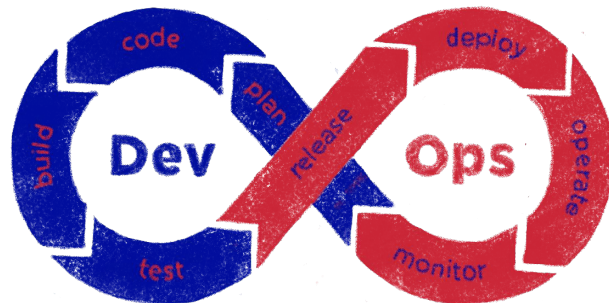
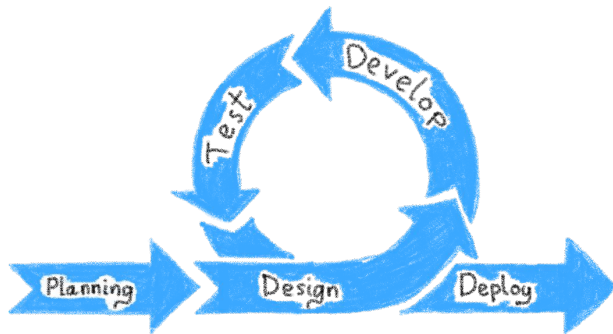
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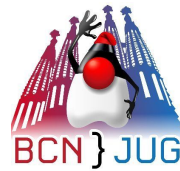
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XP, agility and DevOps

Buzzwords that changed the IT



Extreme Programming



The Values of Extreme Programming

Extreme Programming (XP) is based on values. The rules we just examined are the natural extension and consequence of maximizing our values. XP isn't really a set of rules but rather a way to work in harmony with your personal and corporate values. Start with XP's values listed here then add your own by reflecting them in the changes you make to the rules.

Simplicity: We will do what is needed and asked for, but no more. This will maximize the value created for the investment made to date. We will take small simple steps to our goal and mitigate failures as they happen. We will create something we are proud of and maintain it long term for reasonable costs.

Communication: Everyone is part of the team and we communicate face to face daily. We will work together on everything from requirements to code. We will create the best solution to our problem that we can together.

Feedback: We will take every iteration commitment seriously by delivering working software. We demonstrate our software early and often then listen carefully and make any changes needed. We will talk about the project and adapt our process to it, not the other way around.

Respect: Everyone gives and feels the respect they deserve as a valued team member. Everyone contributes value even if it's simply enthusiasm. Developers respect the expertise of the customers and vice versa. Management respects our right to accept responsibility and receive authority over our own work.

Courage: We will tell the truth about progress and estimates. We don't document excuses for failure because we plan to succeed. We don't fear anything because no one ever works alone. We will adapt to changes when ever they happen.

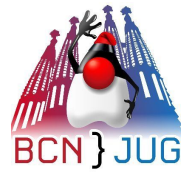
What lessons have we learned about implementing XP so far. 🗨️ 📝

ExtremeProgramming.org/home | [XP Rules](#) | [XP Map](#) | [Lessons Learned](#) | [About the Author](#)

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Manifesto for Agile Software Development



Manifesto for Agile Software Development

We are uncovering better ways of developing software by doing it and helping others do it.
Through this work we have come to value:

Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan

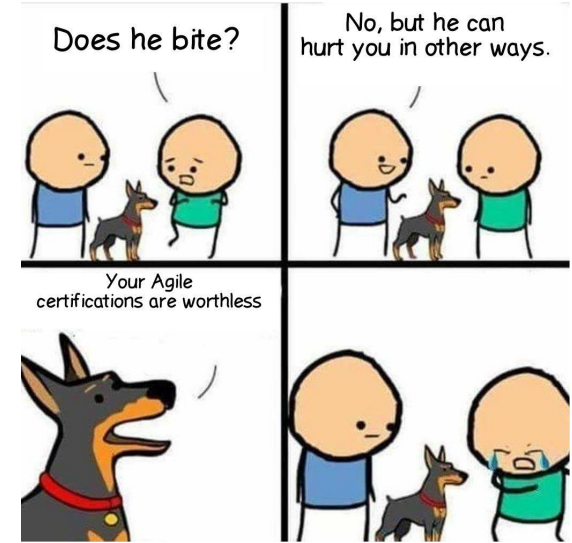
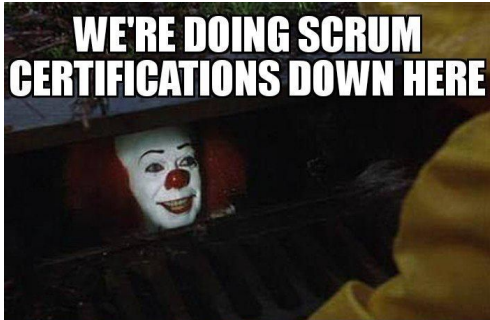
That is, while there is value in the items on the right, we value the items on the left more.



Breaching walks, breaking down silos

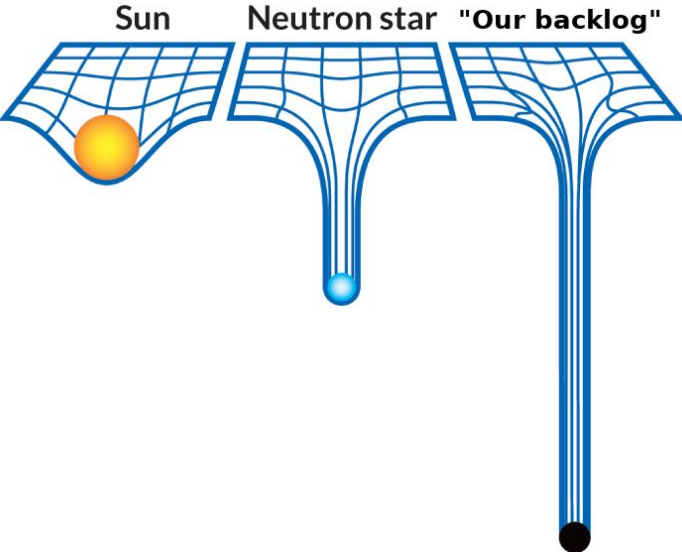


The business of Agility

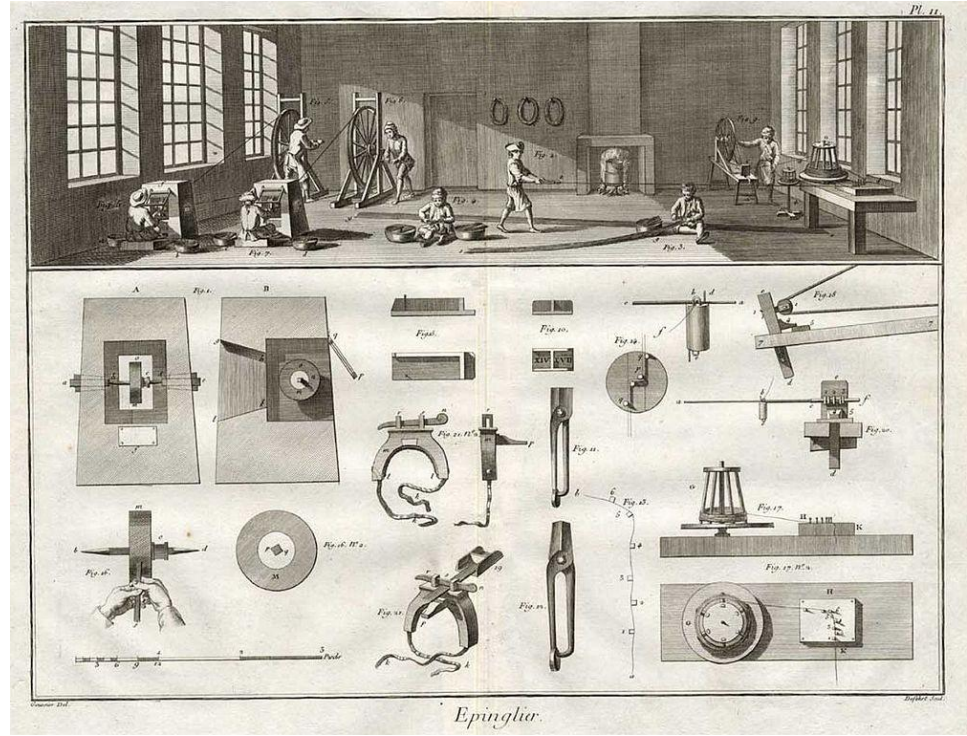


The Dark Side rises

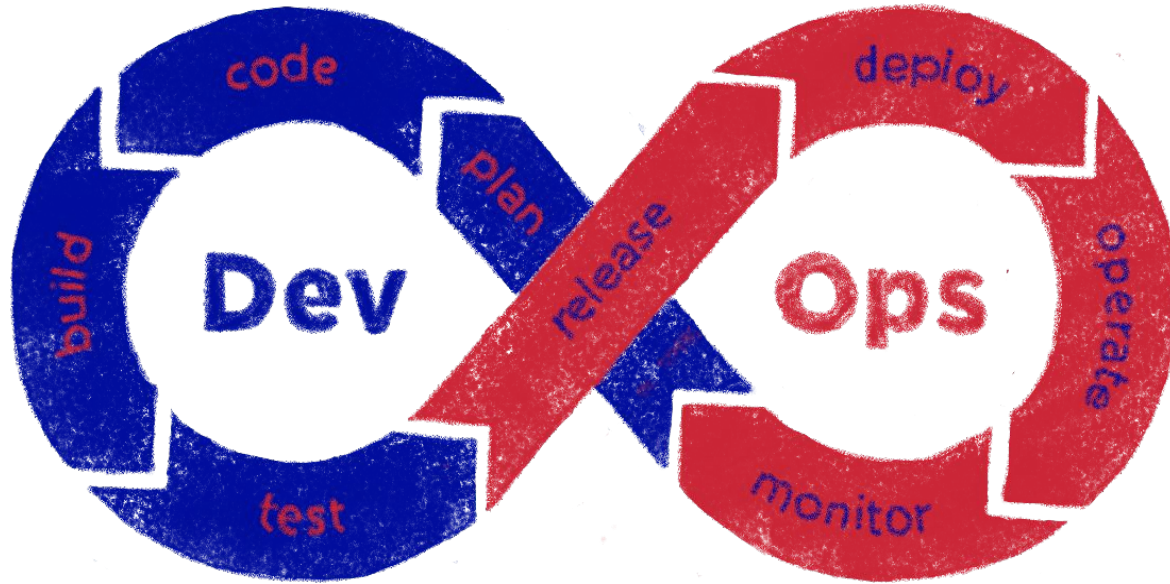
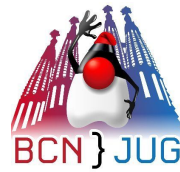
Agile Tooling



Back to industrial practices ?



DevOps: breaking Dev and Ops Silos

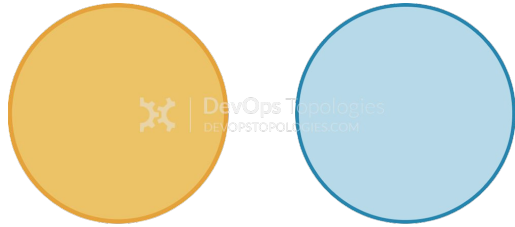


DevOps is a reaction to the wall of confusion



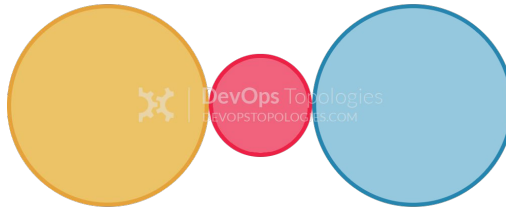
Making the different stakeholders
to work together in sync

DevOps anti patterns



• Dev

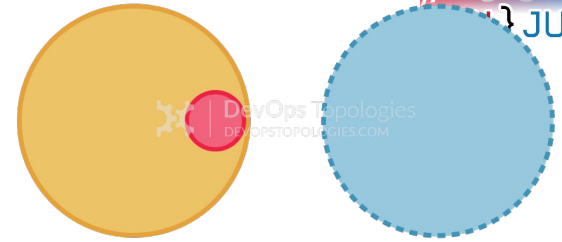
• Ops



• Dev

• DevOps

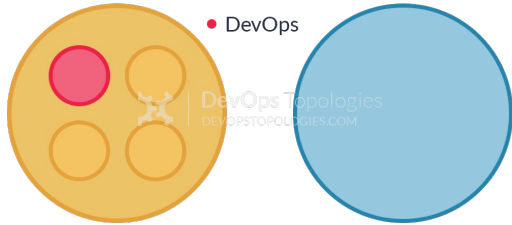
• Ops



• Dev

• DevOps

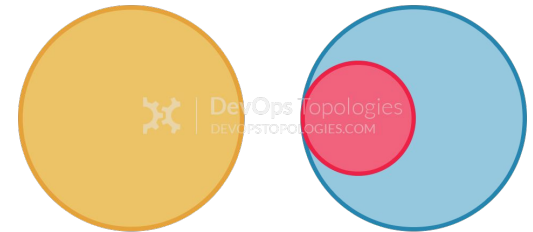
• Ops



• DevOps

• Dev

• Ops



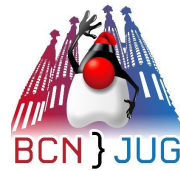
• Dev

• DevOps

• Ops

More in [DevOps Topologies](https://www.devopstopologies.com) site

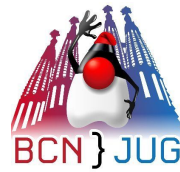
DevOps also has another Dark Side



A DevOps engineer is an IT generalist who should have a wide-ranging knowledge of both development and operations, including coding, infrastructure management, system administration, and DevOps toolchains.

WTF is a DevOps Engineer? And a DevSecOps?
A DevMIOps? A DevAiDataSecOps? A Dev*Ops?

So we have Cults of Agility and Dev*Ops



And so much more complexity!



Rémi Verchère ❄️

@rverchere

bash will still be used

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Enter the Cloud

Renting server time in other's people infra

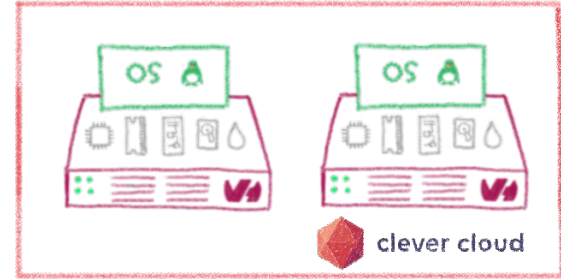
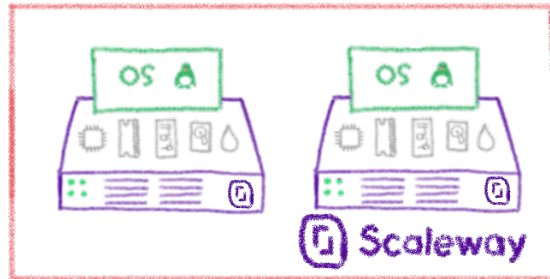
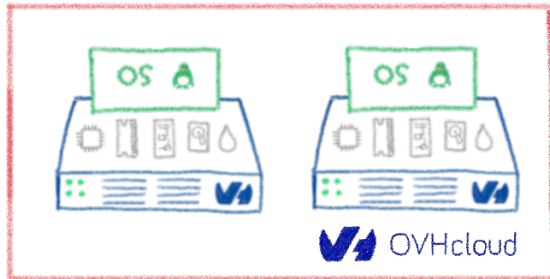
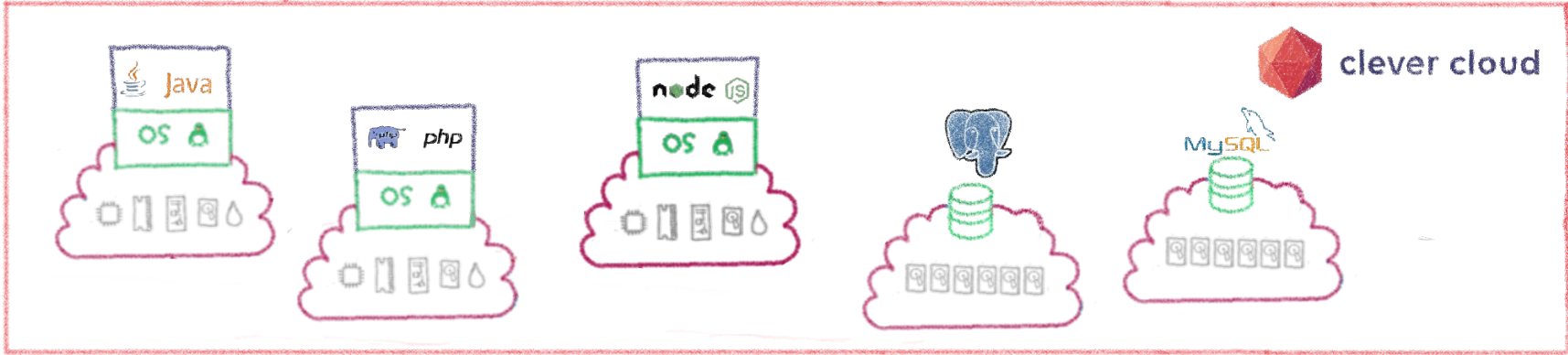


From virtualisation to the cloud



How to use the infrastructure at its full capacity

Cloud demands automation

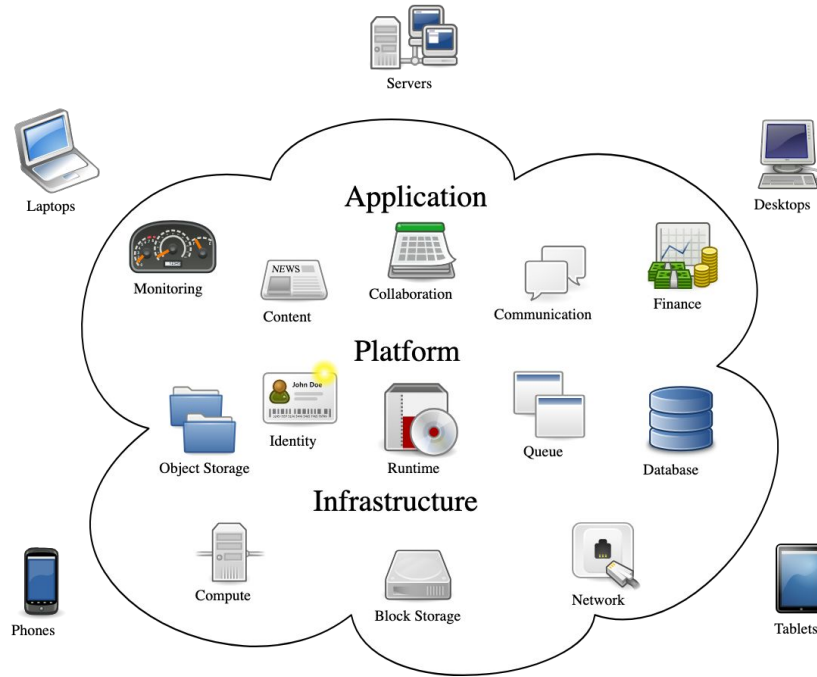


Empowering developers



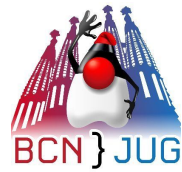
Infrastructure is only a click away

Distributed is the new black



Cloud Native architectures and services

Sysadmins who code



Creating tools: automation, monitoring, observability...



New roles appear: SRE



WTF is a System Reliability Engineer?

250 cloud products only in this provider...



And so much more complexity!





Rémi Verchère ❄️

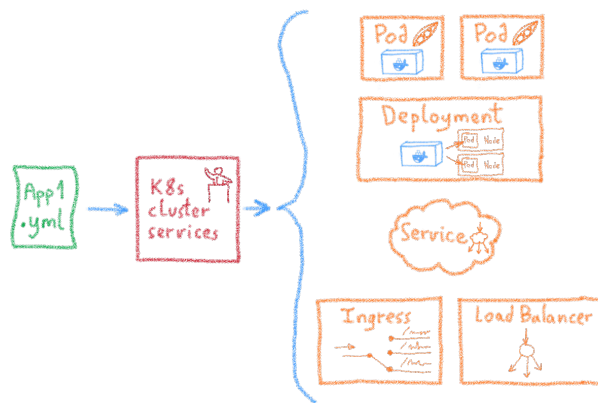
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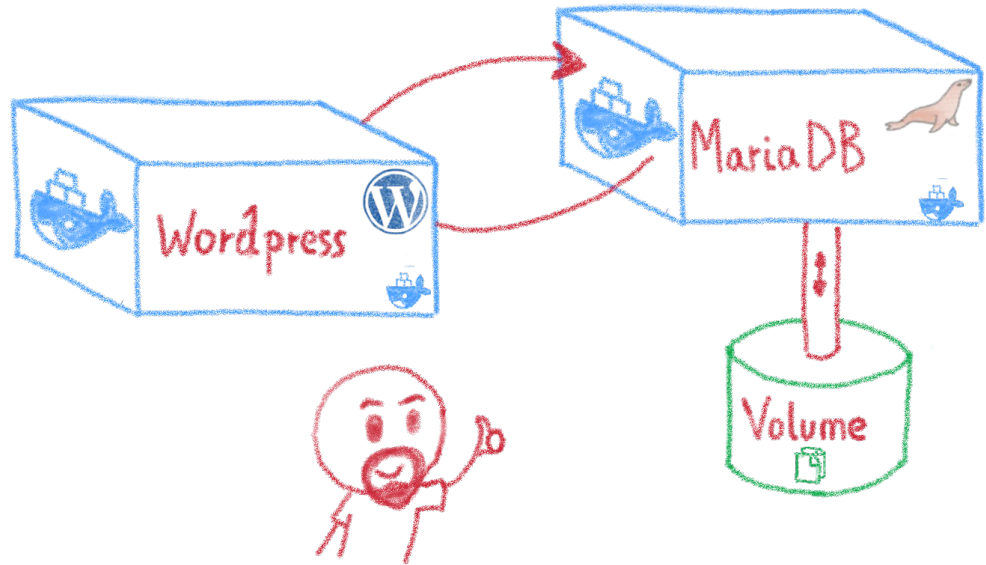
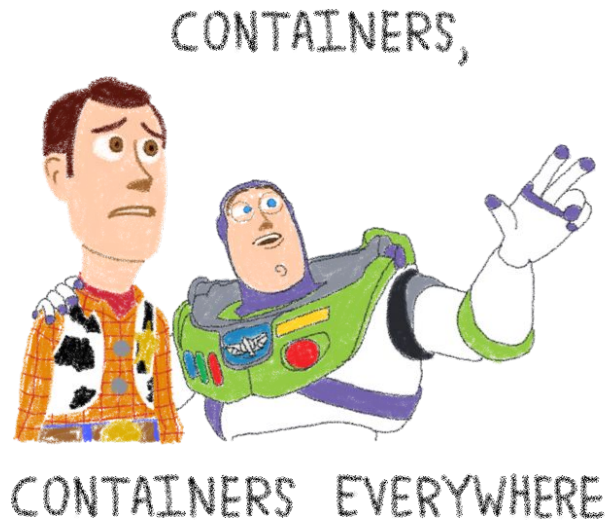
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Declarative Infrastructure

The intern metaphor

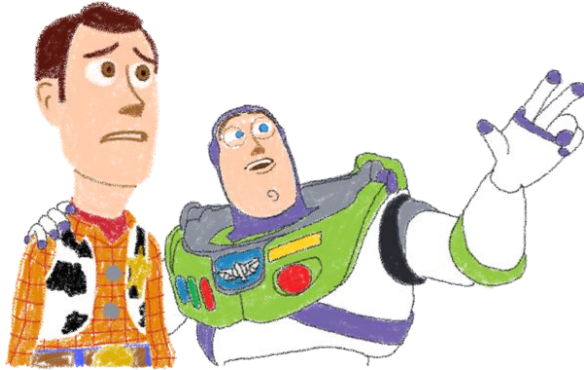


Containers make dev life easier

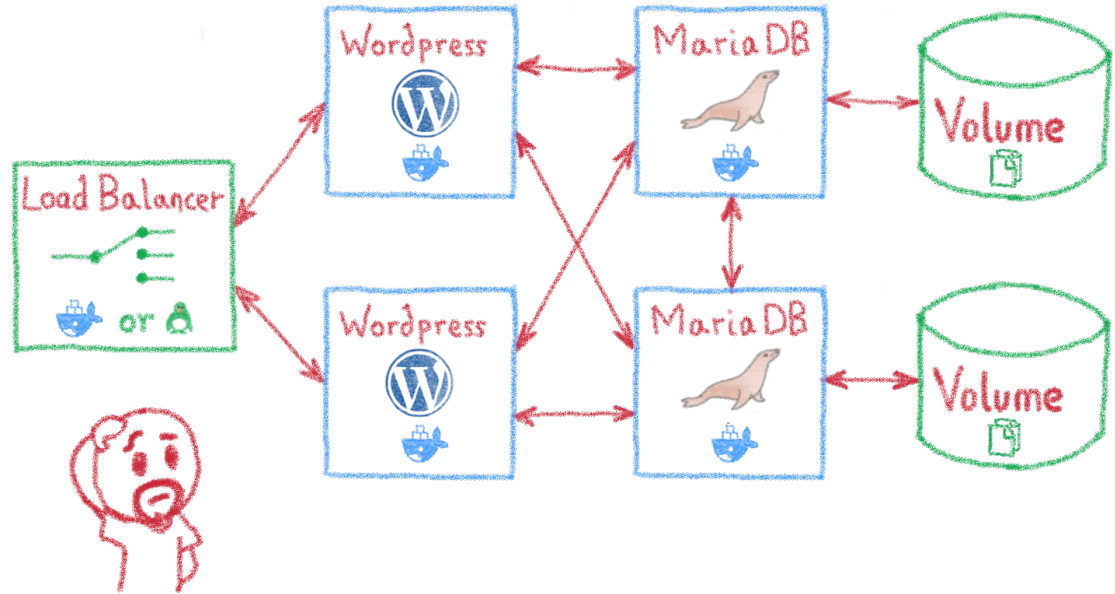


Less simple if you must operate them

CONTAINERS,

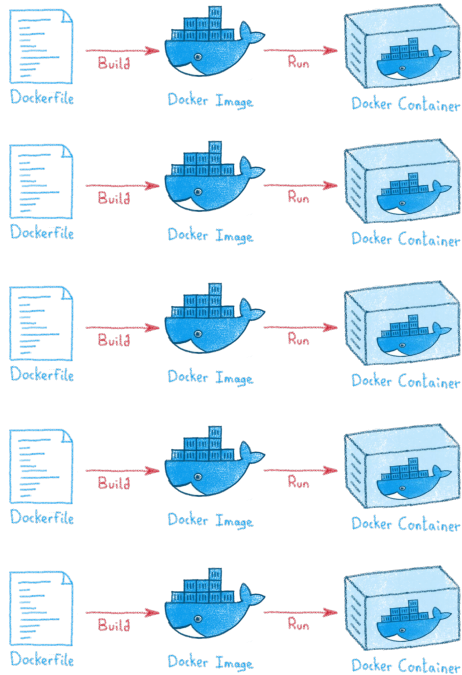


CONTAINERS EVERYWHERE



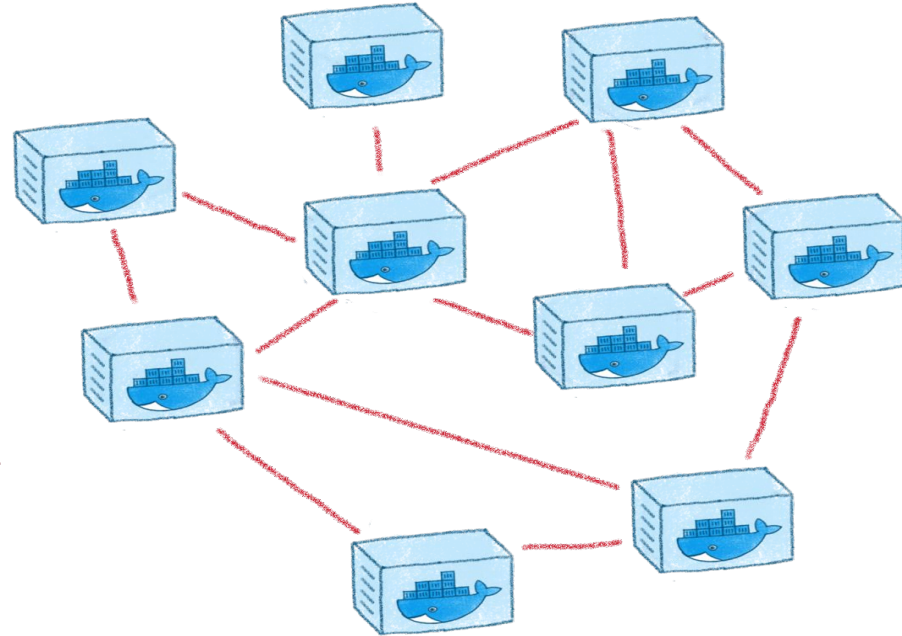
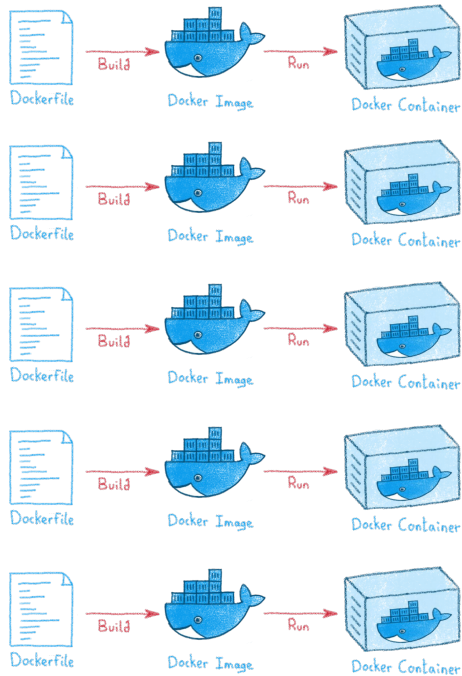
Like in a production context

And what about microservices?



Are you sure you want to operate them by hand?

And what about microservices?

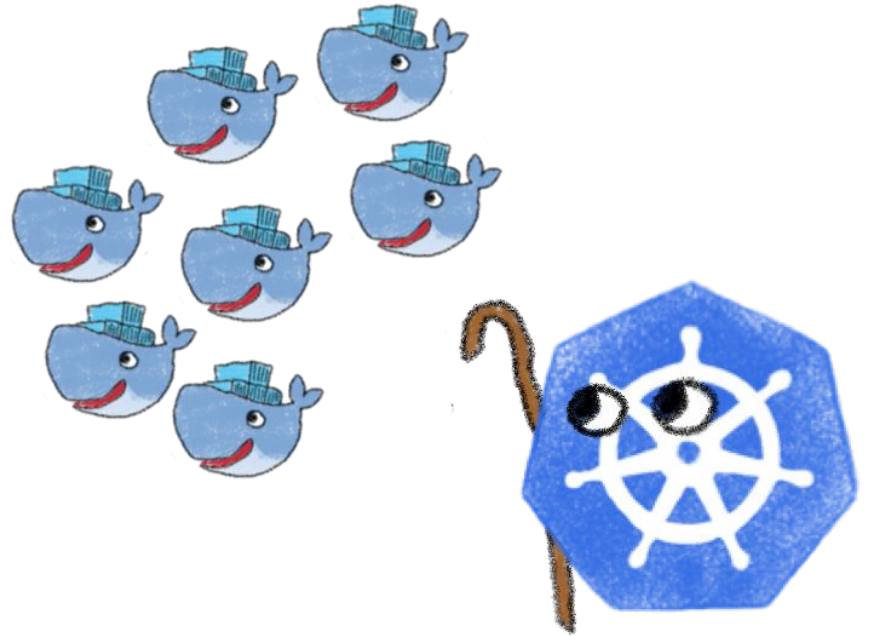


Are you sure you want to operate them by hand?

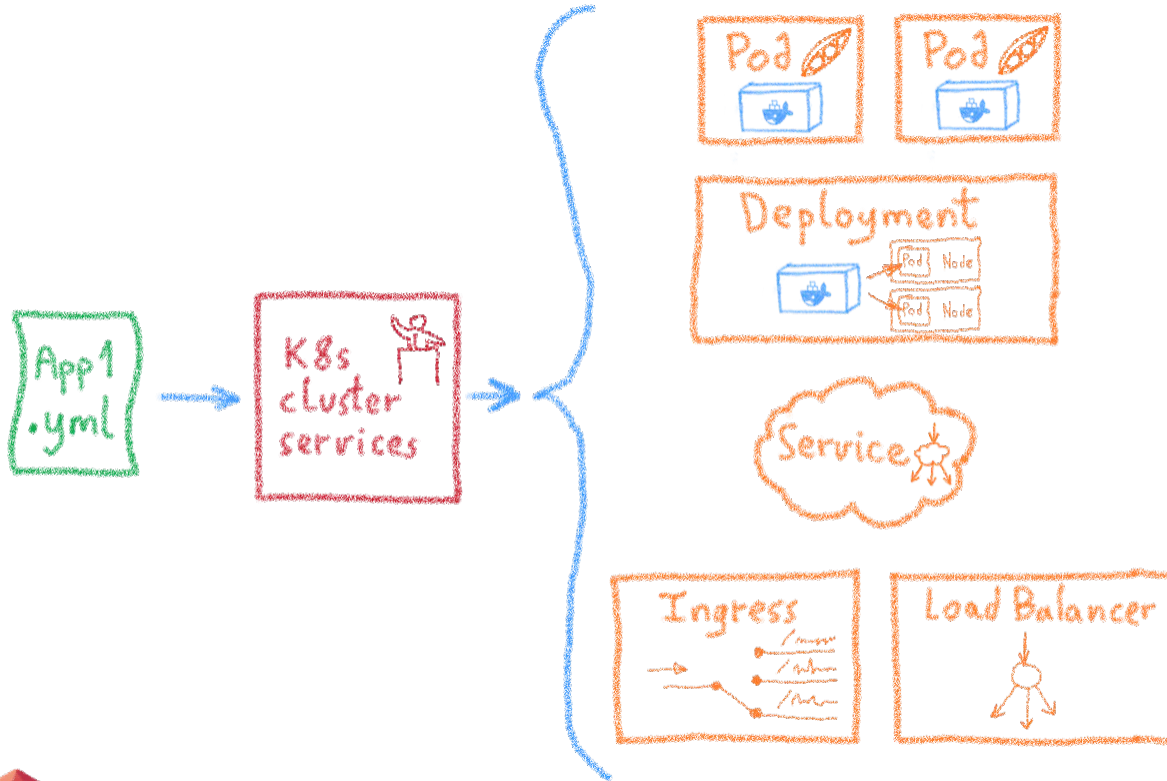
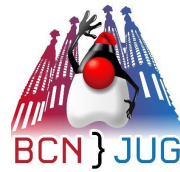
Kubernetes: a full orchestrator

Takes care of:

- Deployment
- Scaling
- Monitoring
- Repairing
- Securing
- ...



Kubernetes - Desired State Management



Ingress

Services

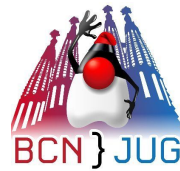
Deployments




Pods

Sidecars

Replica Sets

Infrastructure as Code

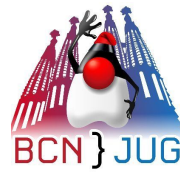


- Build 
- Modify 
- Version 

your infrastructure



Containers? Pods? Ansible? Terraform?



So much more complexity!



Rémi Verchère ❄️

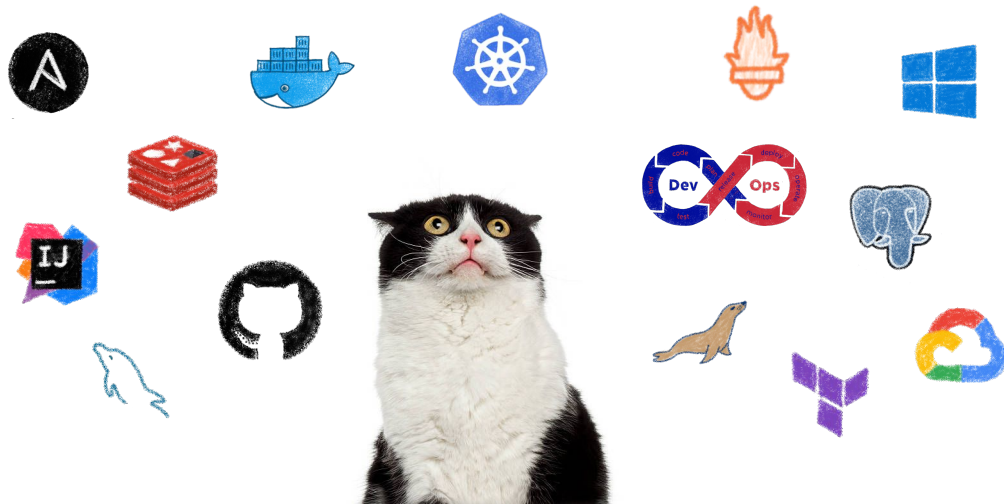
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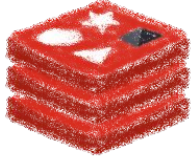
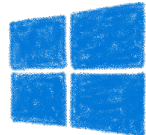
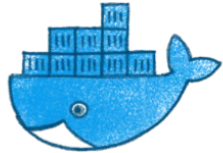
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Becoming a developer in 2024

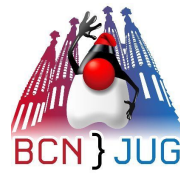
Do I need to know all that?



So many things to learn...



So many options ...



Overwhelmed? Please see the CNCF Trail Map. That and the interactive landscape are at [Lcnf.io](#)

Cloud native are not open source

App Definition and Development

- Database: KV, V, etc.
- Streaming & Messaging: cloudevents, etc.
- Application Definition & Image Build: WFLX, etc.
- Continuous Integration & Delivery: etc.

Infrastructure & Management

- Scheduling & Orchestration: Kubernetes, etc.
- Configuration & Service Discovery: etc.
- Remote Procedure Call: gRPC, etc.
- Service Proxy: etc.
- API Gateway: etc.
- Service Mesh: etc.

Runtime

- Cloud Native Storage: etc.
- Container Runtime: etc.
- Cloud Native Network: etc.

Programming

- Automation & Configuration: etc.
- Container Registry: etc.
- Security & Compliance: etc.
- Key Management: etc.

Servers

- Platform: Certified Kubernetes - Distribution, etc.
- Serverless: etc.
- Members: etc.
- CD Foundation Landscape: etc.
- Monitoring: etc.
- Observability and Analysis: etc.
- Logging: etc.
- Check Engineering: etc.
- Continuous Optimization: etc.

Other sections: Kubernetes Certified Service Provider, Kubernetes Training Partner, Certified CNCF.



@LostInBrittany



Managing the self-service commodity



Shift left and Cognitive Load

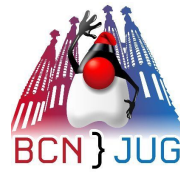


Platform Engineering to the rescue

Without adding more complexity?



What's Platform Engineering?



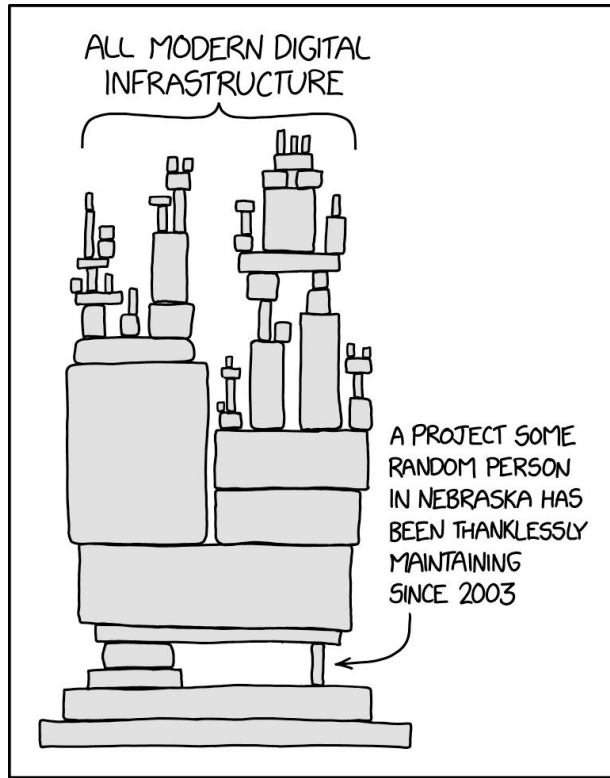
Platform engineering is the discipline of designing and building toolchains and workflows that enable self-service capabilities for software engineering organizations in the cloud-native era.

Platform engineers provide an integrated product most often referred to as an “Internal Developer Platform” covering the operational necessities of the entire lifecycle of an application.

Lucca Galante

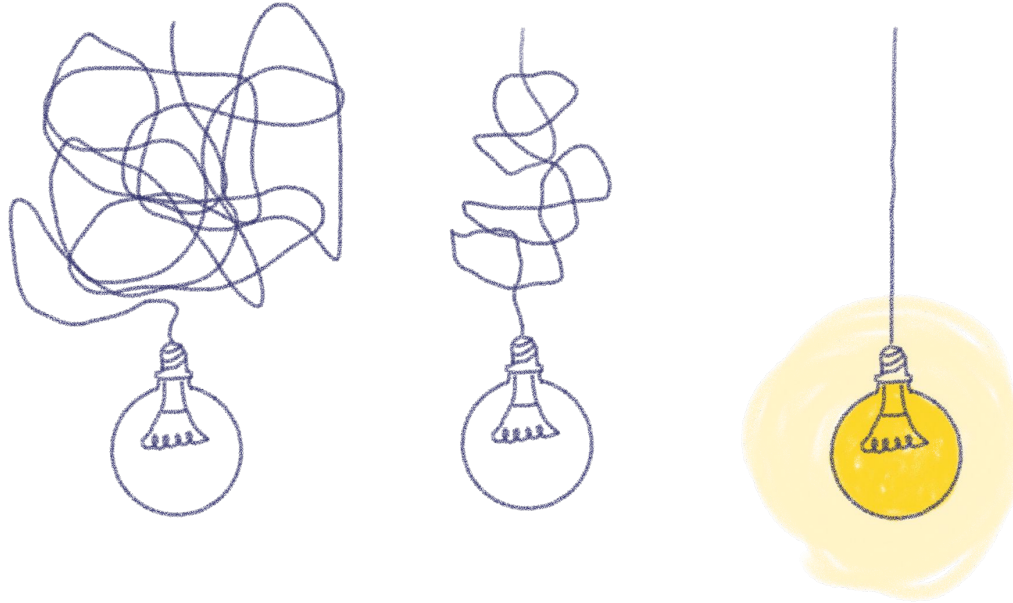
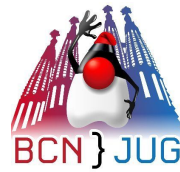


A fancy name for something already there



Most companies already have
some kind of platform
Often homemade...

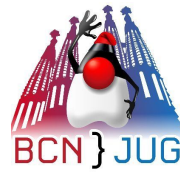
The purpose of Platform Engineering



Empowering developers while reducing complexity



But how can we create them?



GitOps



What is GitOps?



Git is the
single source
of truth



Treat
everything as
code



Operations
through Git
workflows

Benefits of GitOps



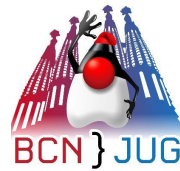
- Collaboration
- Visibility & auditing
- Security & reliability
- Provisioning & deployment

Team Topologies





It's not only a tool, but an organisation



Team Topologies



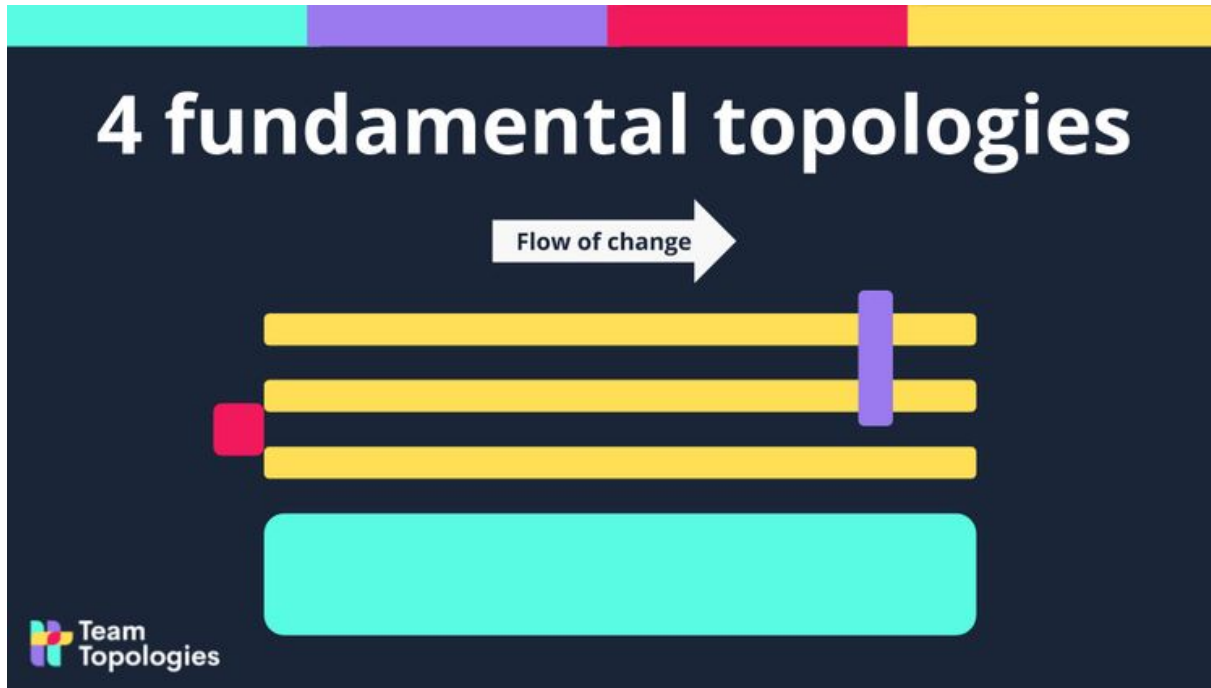
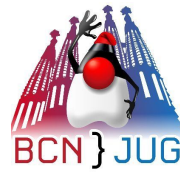
4 fundamental topologies

-  Stream-aligned team
-  Enabling team
-  Complicated Subsystem team
-  Platform team



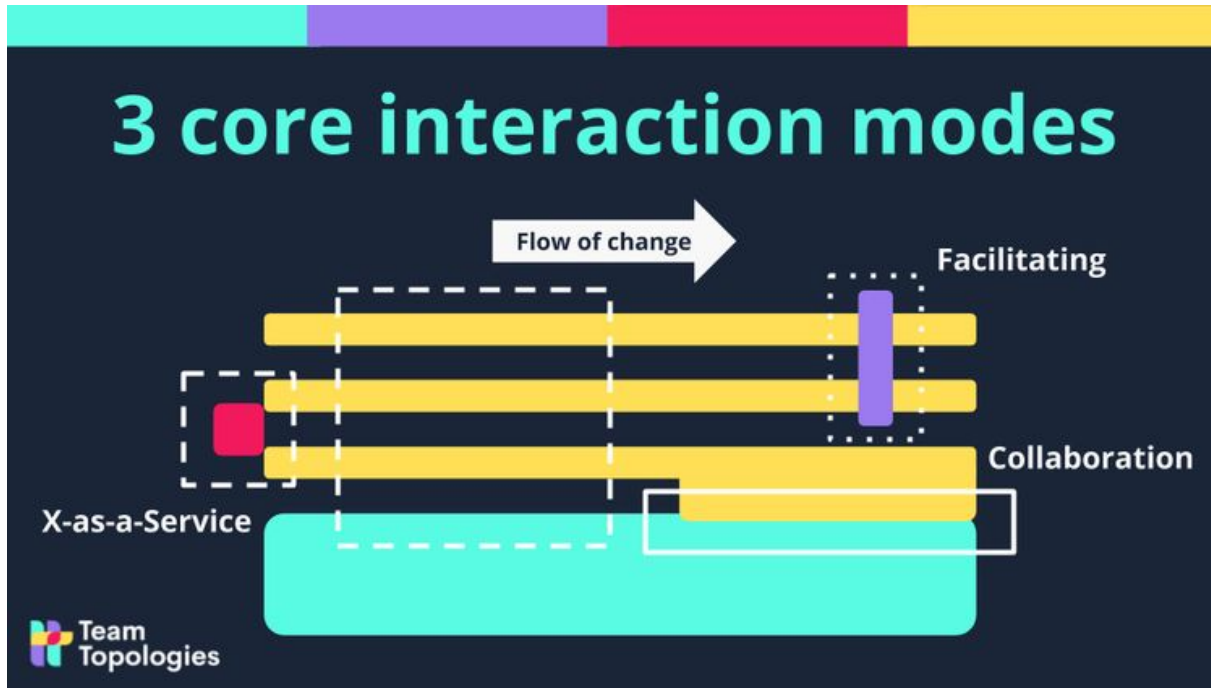
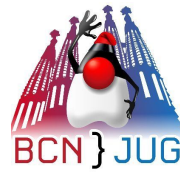
<https://teampologies.com/>

Team Topologies



<https://teamentopologies.com/>

Team Topologies



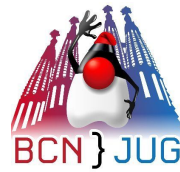
<https://teampologies.com/>

Principles of Platform Engineering

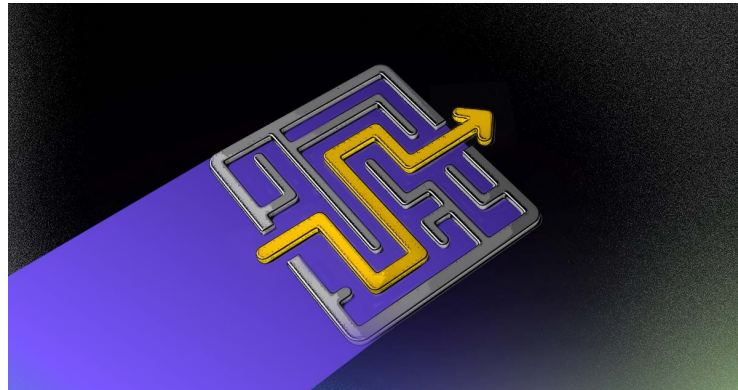
To make it work



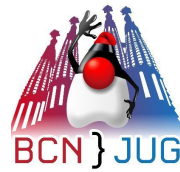
Paving golden paths



Platform engineering is about binding process and tools into a paved road. Rather than letting everybody operate everything and having to understand the entire toolchain to do so, platform engineers provide the glue to bind everything into a consistent self-service experience.



Clear mission and role

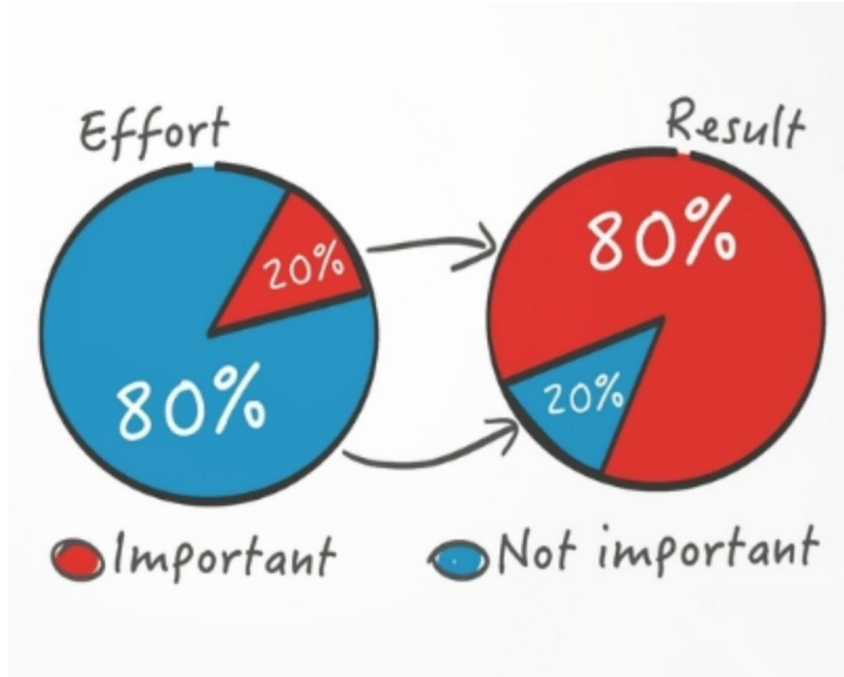


Platform as a Product

Work Types

Type	Output	Planning	Goal	Approach
Manufacturing			<ul style="list-style-type: none">• Maximise efficiency• Commodification	<ul style="list-style-type: none">• Mass production• Precise Specifications• Control Variation
Construction			<ul style="list-style-type: none">• Compromise between cost, time, scope and quality.	<ul style="list-style-type: none">• Plan & Execute• Comprehensive Specifications• Control Change
Product Development			<ul style="list-style-type: none">• Maximise quality and features• Discard low value work	<ul style="list-style-type: none">• Iterative experimentation• Respond to feedback

Focus on common problems



Glue is valuable



Don't reinvent the wheel





Rémi Verchère ❄️

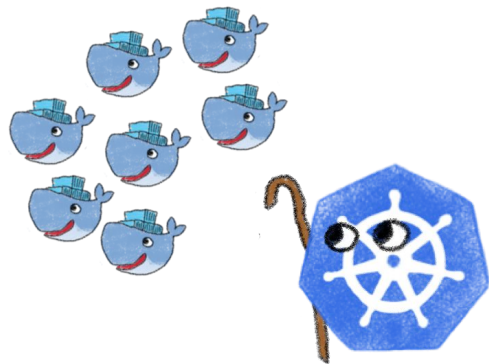
@rverchere

bash will still be used

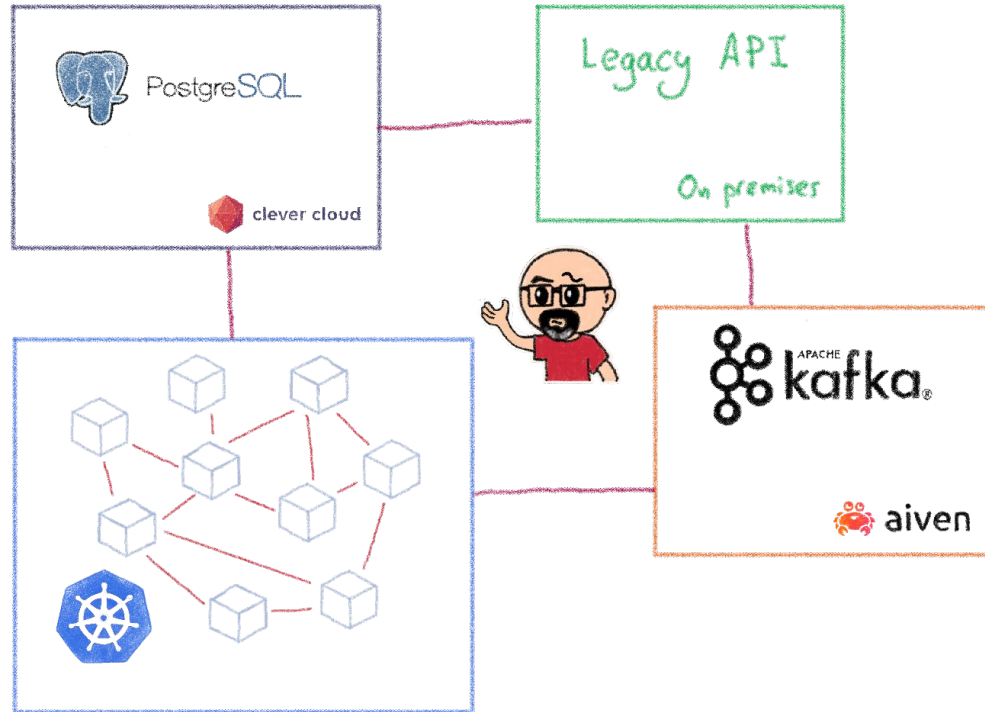
7:46 PM · Aug 8, 2023 · **290** Views

An IDP over Kubernetes

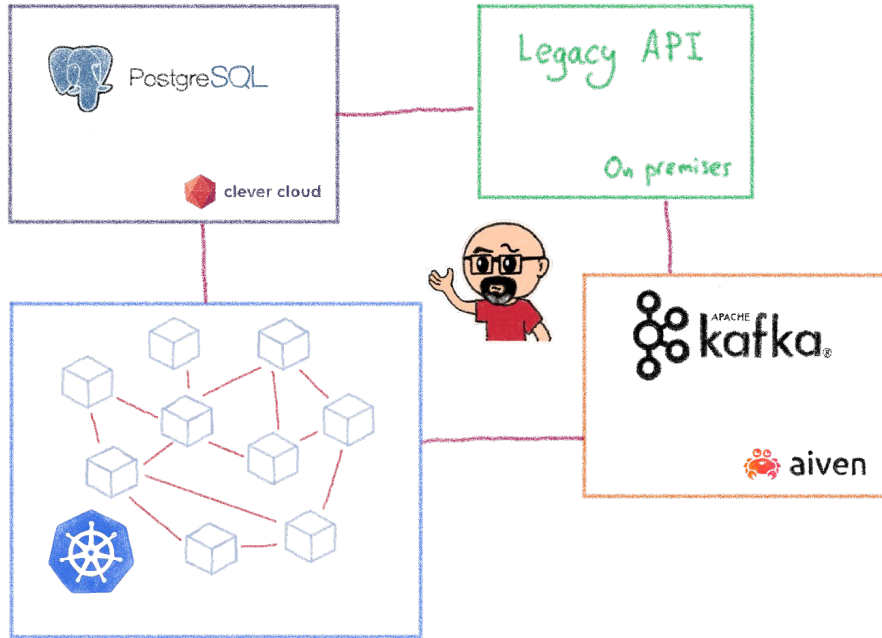
What could I use?




Don't put everything into Kubernetes



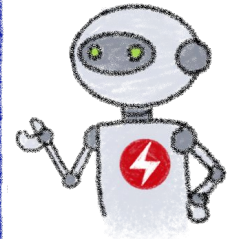
Operators simplify Kubernetes integration



 OPERATOR



Human Operator



Kubernetes Operator

Lots of available operators



OperatorHub.io









Search OperatorHub... Contribute ▾

Welcome to OperatorHub.io

OperatorHub.io is a new home for the Kubernetes community to share Operators. Find an existing Operator or list your own today.

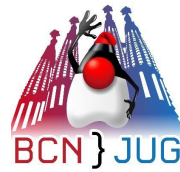
CATEGORIES 359 ITEMS VIEW ▢ ▾ SORT A-Z ▾

- AI/Machine Learning
- Application Runtime
- Big Data
- Cloud Provider
- Database
- Developer Tools
- Drivers and plugins
- Integration & Delivery
- Logging & Tracing
- Modernization & Migration
- Monitoring
- Networking
- OpenShift Optional
- Security

 <p>Aerospike Kubernetes Operator provided by Aerospike</p> <p>The Aerospike Kubernetes Operator automates the</p>	 <p>Airflow Helm Operator provided by opdev</p> <p>An experimental operator that installs Apache Airflow.</p>	 <p>Aiven Operator provided by aiven</p> <p>Manage your https://aiven.io resources with Kubernetes.</p>	 <p>Akka Cluster Operator provided by Lightbend, Inc.</p> <p>Run Akka Cluster applications on Kubernetes.</p>
 <p>Altinity Operator for</p>	 <p>Alvearie Imaging Ingestion</p>	 <p>Anchore Engine Operator provided by Anchore Inc.</p>	 <p>Ansible Galaxy provided by Galaxy</p>



Hey JUG, operators ❤️ Java

A screenshot of the Java Operator SDK website. The page has an orange header with a navigation menu: HOME, DOCS, CODE OF CONDUCT, RELEASES, a Discord icon, and a GitHub icon. Below the header is a large orange section with the Java logo, the text "[JAVA OPERATOR SDK]", and three buttons: "GET STARTED", "CONTRIBUTE", and "DISCORD CHANNEL". Below this is a white section with the text "Sponsored by:" followed by the logos for "Container Solutions" and "Red Hat".

[JAVA OPERATOR SDK]

HOME DOCS CODE OF CONDUCT RELEASES

[JAVA OPERATOR SDK]

GET STARTED CONTRIBUTE DISCORD CHANNEL

Sponsored by:

Container Solutions & Red Hat



So you have a bunch of operators...

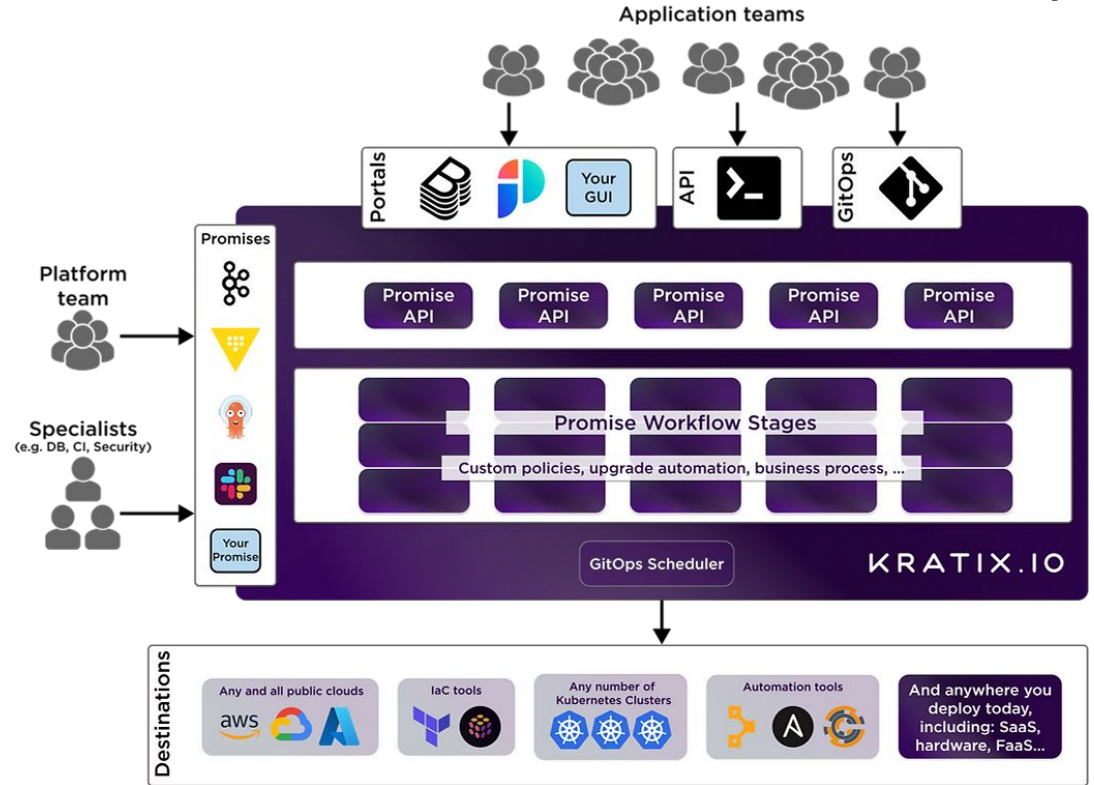
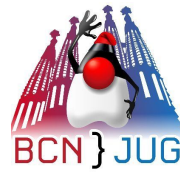


 Aerospike Kubernetes Operator provided by Aerospike The Aerospike Kubernetes Operator automates the...	 Airflow Helm Operator provided by opflow An experimental operator that installs Apache Airflow.	 Aiven Operator provided by aiven Manage your https://aiven.io resources with Kubernetes.	 Akkia Cluster Operator provided by Lightbend, Inc. Run Akkia Cluster applications on Kubernetes.	 Atlassian Operator for ClickHouse provided by Atlassian ClickHouse Operator manages full lifecycle of ClickHouse...	 Dapr Control Plane Operator provided by dapr.io Dapr Control Plane Operator	 DataDog Operator provided by DataDog DataDog provides a modern monitoring and analytics platform. Gather metrics...	 DataStax Kubernetes Operator for Apache Cassandra provided by DataStax Simple provisioning, flexible...	 DataTrucker IO provided by DataTrucker IO	 Debezium Operator provided by Debezium Authors An Operator for installing and managing Debezium
 Alibaba Imaging Ingestion Operator provided by Alibaba The Alibaba Imaging Ingestion provides a collection of...	 Anchore Engine Operator provided by Anchore Inc. Anchore Engine - container image scanning service for policy-based security.	 Anolis Galaxy provided by Galaxy Community Anolis Galaxy is Anolis's official hub for sharing...	 Apache Spark Operator provided by ramanathan An operator for managing the Apache Spark clusters and intelligent applications...	 API Operator for Kubernetes provided by WSO2 API Operator provides a fully automated experience for...	 Dell Container Storage Modules provided by Dell Technologies Easily install and manage Dell's CSI Drivers and CSM.	 Dell CSI Operator provided by Dell Technologies	 Devfile Registry Operator provided by Red Hat Deploy and manage Devfile Registries on Kubernetes and OpenShift with the Devfile...	 dnext-operator provided by Merit Bridge dnext-operator	
 API Testing provided by Insomnium API Testing Operator provides a fully automated experience for API Testing applications...	 APiCaaS provided by Red Hat APiCaaS is an API gateway built on top of NGINX. It is part of the Red Hat SSO4 API...	 Apicurio Registry Operator provided by Apicurio Deploy and manage Apicurio Registry on Kubernetes.	 APM4Matics Operator Generate client SDKs and Interactive Documentation for your APIs in minutes.	 App Director provided by Randoil Enable Developer Self-Service to Setup and Manage Applications on Multiple...	 DNS Operator provided by Red Hat A Kubernetes Operator to manage the lifecycle of DNS resources	 druid-operator provided by Apache Druid Community druid-operator allows creating Apache Druid cluster...	 DynaTrace OneAgent provided by Dynatrace LLC	 DynaTrace Operator provided by Dynatrace LLC	 Eclipse Ditto provided by Jens Remann Eclipse Ditto provides a Digital Twin platform. A digital twin is a virtual, cloud-based...
 AppDynamics Operator for Kubernetes provided by AppDynamics LLC AppDynamics Operator to install AppDynamics Clou...	 Application Services Metering Operator provided by Red Hat Collect the usage of products from the Applic...	 Appraxis CPS Operator provided by Appraxis, Inc The Appraxis CPS operator enables you to back up and restore your...	 Aqua Security Operator provided by Aqua Security, Inc. The Aqua Security Operator runs within a OpenShift cluster and provides a means to...	 ArangoDB provided by ArangoDB GmbH ArangoDB Kubernetes Operator	 Eclipse Hawkbit provided by Jens Reinmann Eclipse Hawkbit is a firmware update platform.	 ECR Secret Operator provided by MOBB ECR Secret Operator	 EDB Postgres for Kubernetes provided by EnterpriseDB Corporation Operator to manage Post...	 EDP Keycloak Operator provided by EPM Delivery Platform An Operator for managing Keycloak.	 EDP Nexus Operator provided by EPM Delivery Platform An Operator for managing Nexus entities.
 Argo CD provided by Argo CD Community Argo CD is a declarative, GitOps continuous delivery...	 Argo CD Operator (Helm) provided by OpenShift SRE Declarative Continuous Delivery following GitOps.	 Astra Trident provided by NetApp, Inc. Trident Operator, to manage Astra Trident installations	 AtlasMap Operator provided by AtlasMap AtlasMap is a data mapping solution with an interactive web-based user interface...	 AuthInfo Operator provided by Red Hat	 EDP Sensor Operator provided by EPM Delivery Platform An Operator for managing Sensor entities.	 eG Innovations Universal Agent Operator provided by eG Innovations	 Elasticsearch (ECK) Operator provided by Elastic Run Elasticsearch, Kibana, APM Server, Beats, Emb...	 Elasticsearch Index Operator provided by IBM An operator for managing index installations...	 Elasticsearch Phenix Operator provided by Corefour Manage Elasticsearch indices, templates lifecycle...

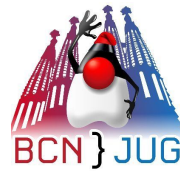


Too many options again...

Use a Platform Engineering framework



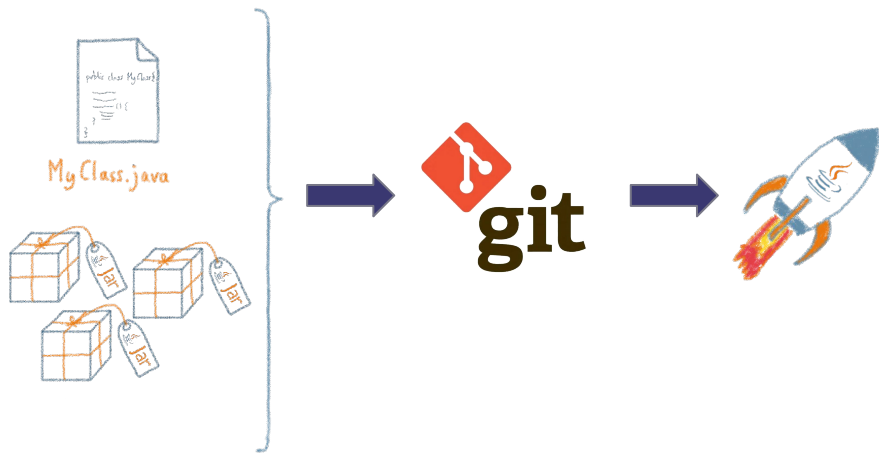
Set-up a robust CI/CD/GitOps pipeline



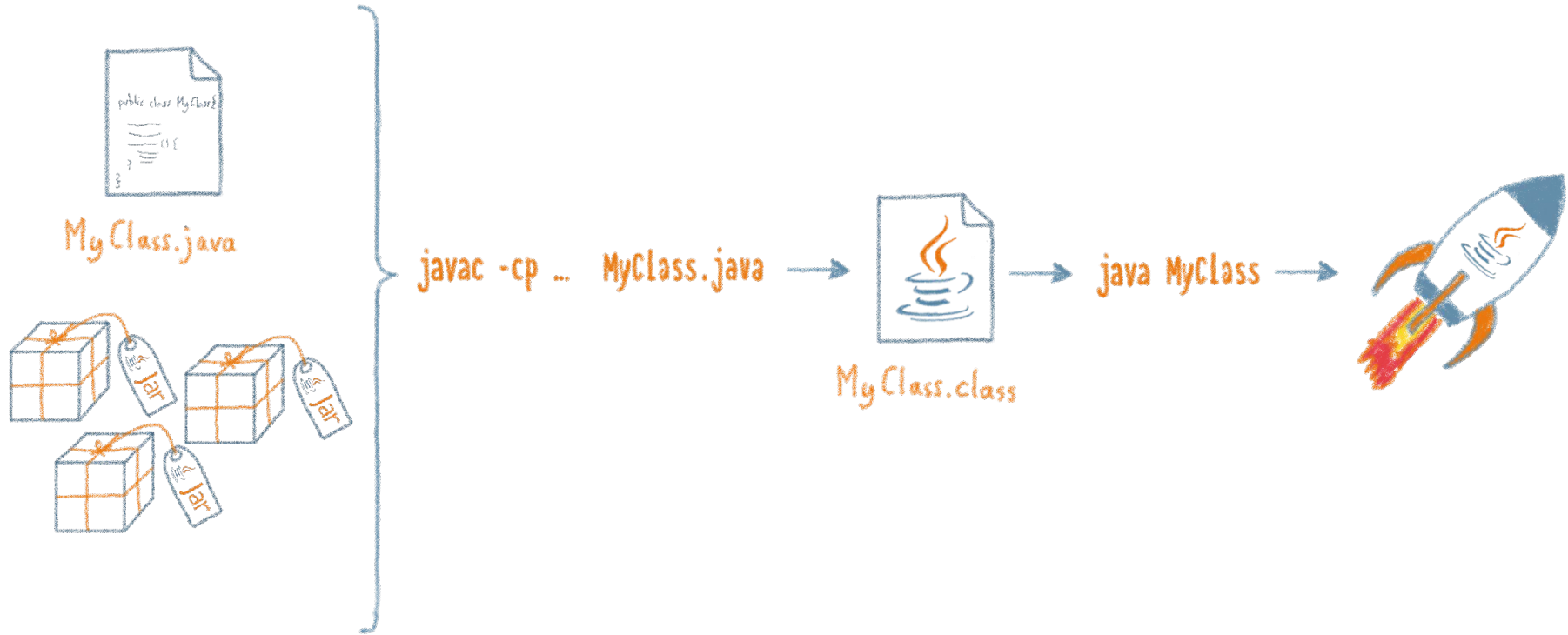
The screenshot shows the Argo CD web interface for the 'argocd-dev' application. The top navigation bar includes buttons for 'APP DETAILS', 'APP DIFF', 'SYNC', 'SYNC STATUS', 'HISTORY AND ROLLBACK', 'DELETE', and 'REFRESH'. The 'APP HEALTH' section shows 'Missing' status. The 'CURRENT SYNC STATUS' is 'OutOfSync From 3.33.2 (3.33.2)'. The 'LAST SYNC RESULT' is 'Sync OK' with a green checkmark, dated 'Thu Feb 03 2022 11:47:24 GMT-0500'. The main area displays a dependency graph for the application, starting with 'argocd-dev' (9 minutes) and branching into several components: 'argocd-dex-server', 'argocd-server', 'argocd-dev-application-controller', 'argocd-dev-repo-server', and 'argocd-dev-server'. Each component is further detailed with its type (e.g., 'sa', 'secret', 'rs', 'pod') and status (e.g., '8 minutes', 'a minute', 'rev:1'). A search bar at the top left of the graph shows '90%'.

An IDP without Kubernetes

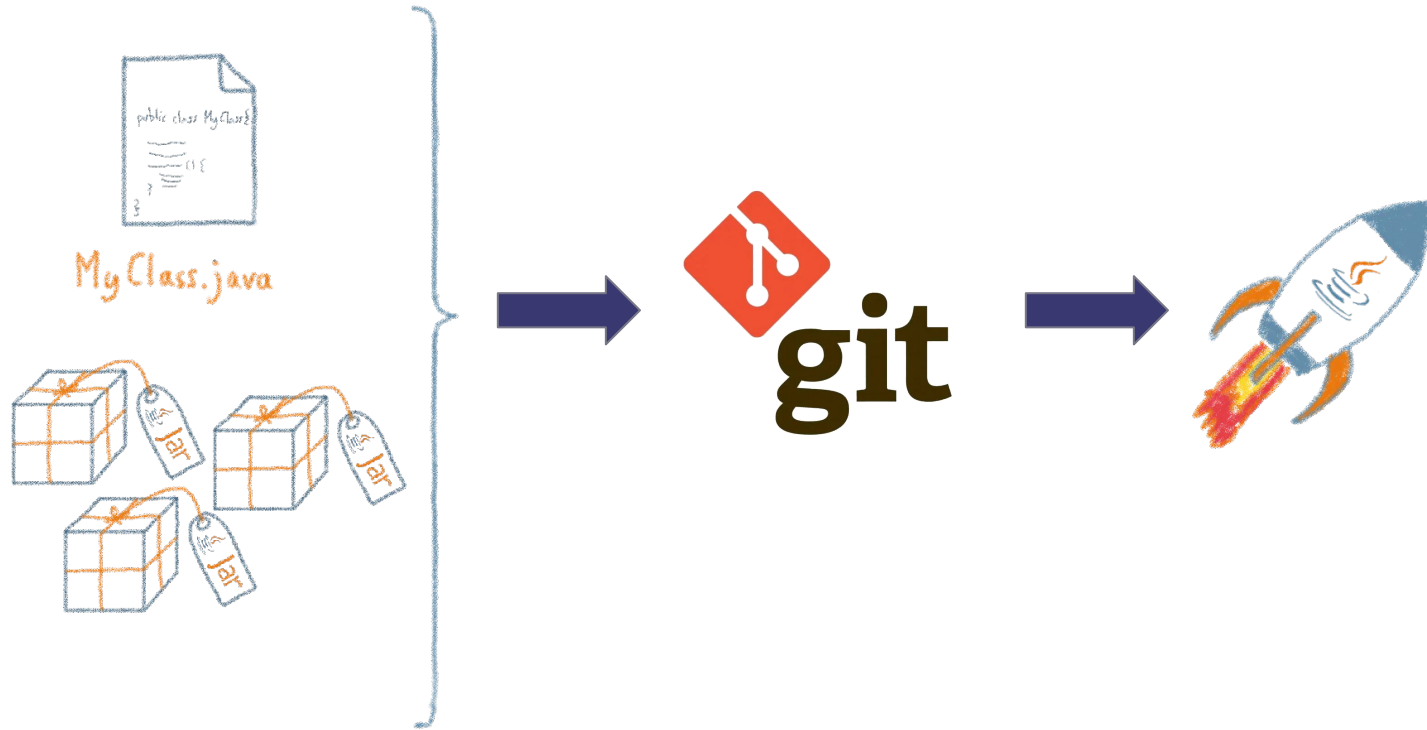
There is a life outside K8s...



What if developers only developed?



PaaS as cornerstone of a dev-centered IDP



Some Links to go further

- [There Is No Such Thing as a DevOps Engineer](#)
- [DevOps Topologies](#)
- [What is Platform Engineering](#)
- [Team Topologies](#)
- [Kratix](#)
- [Aiven](#)
- [Clever Cloud](#)

