

Software DevOps

Software Engineering
Prof. Maged Elaasar

DevOps: The story of a wall



DevOps: The story of a wall



KPI

- Feature Complete
- Bug Free
- Time to market



Communication
Collaboration
Integration
Automation



KPI

- Performance
- Efficiency
- Stability

Non functional requirements of
the application = infrastructure
functional requirements
(security, performance, ...)



User Stories

- As an administrator I want to connect to System X so that I can reboot the system
- As an application I need a database so I can store my data
- As a service manager I need a report of the CPU, Memory and Disk so I can report it on the weekly service meetings

DevOps

“DevOps is development and operations collaboration”

“DevOps is using automation”

“DevOps is small deployments”

It's DevOps!

It's DevOps!

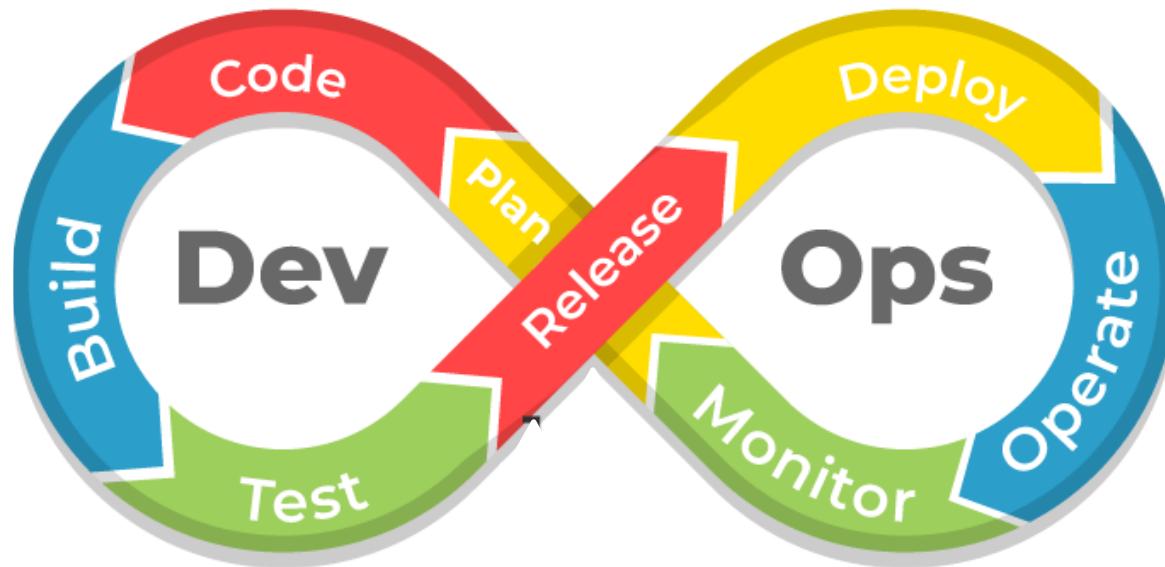
It's DevOps!

“DevOps is treating your infrastructure as code”

“DevOps is feature switches”

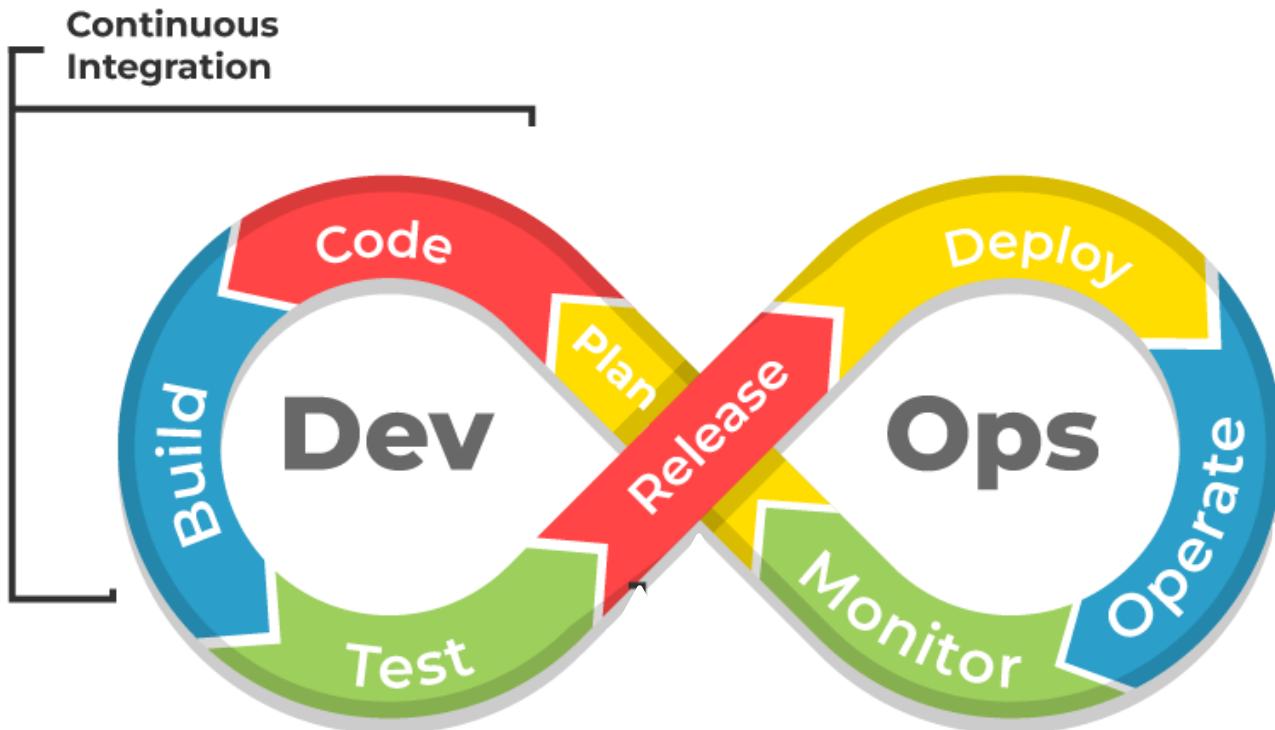
“Kanban for Ops?”

DevOps

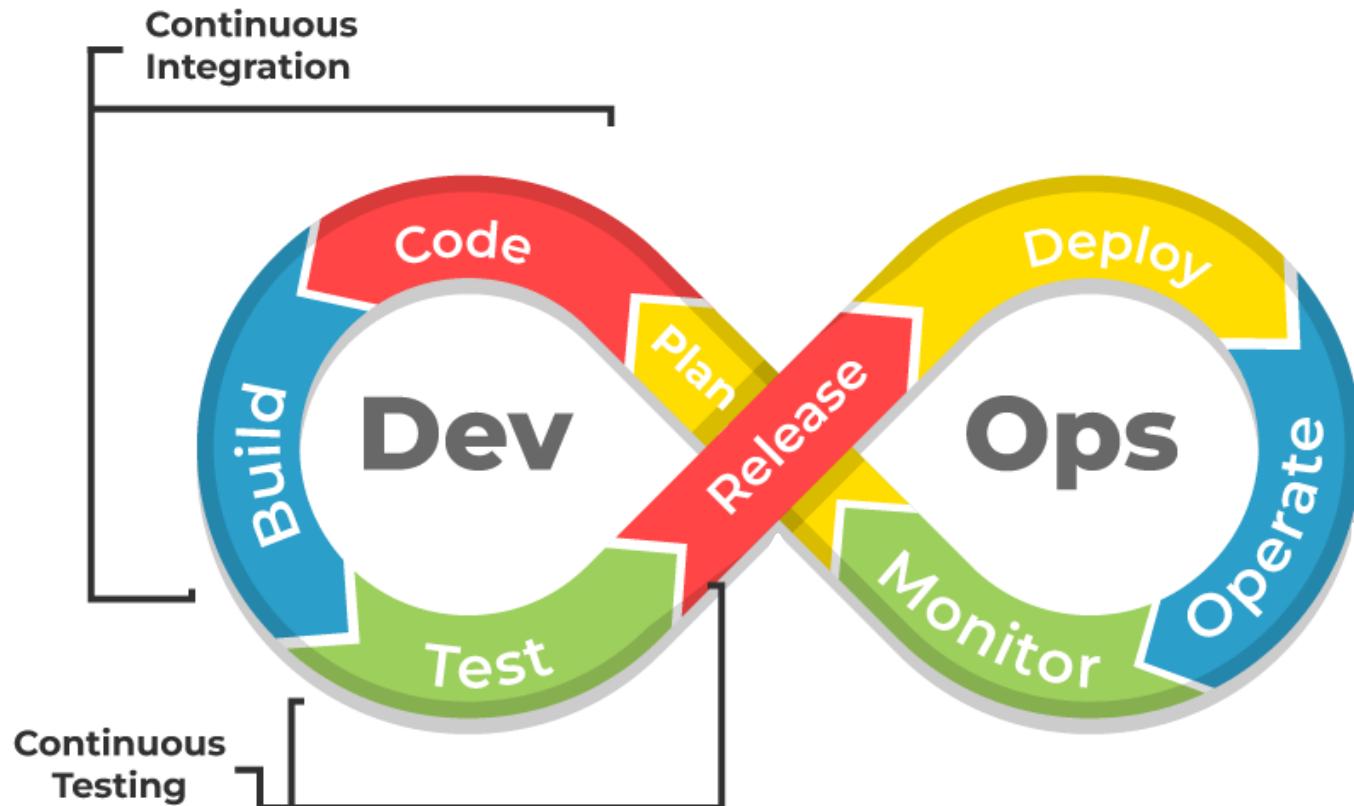


Set of practices, principles, and cultural philosophies that aim to improve collaboration and communication between software development (Dev) and IT operations (Ops) teams.

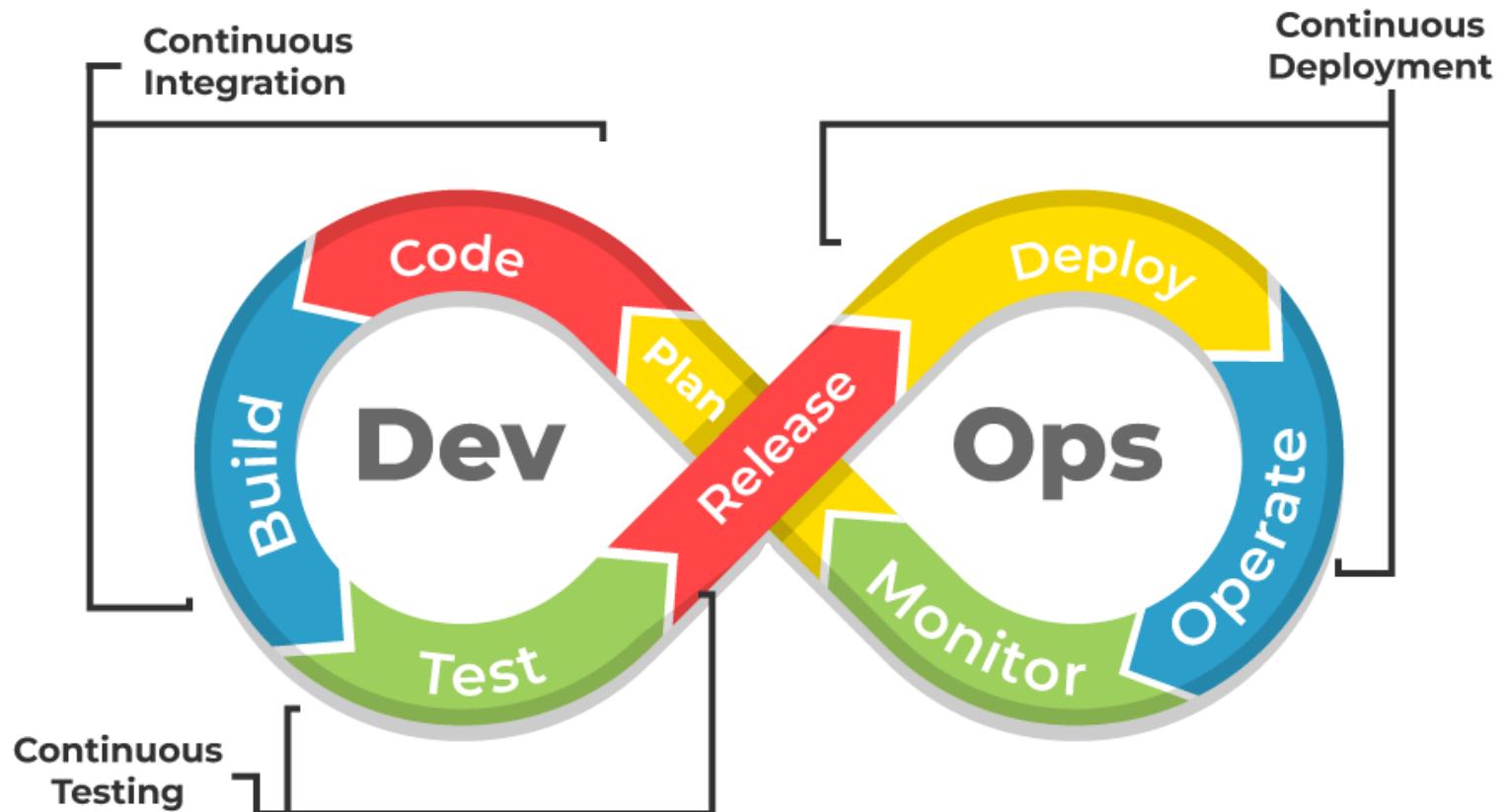
DevOps



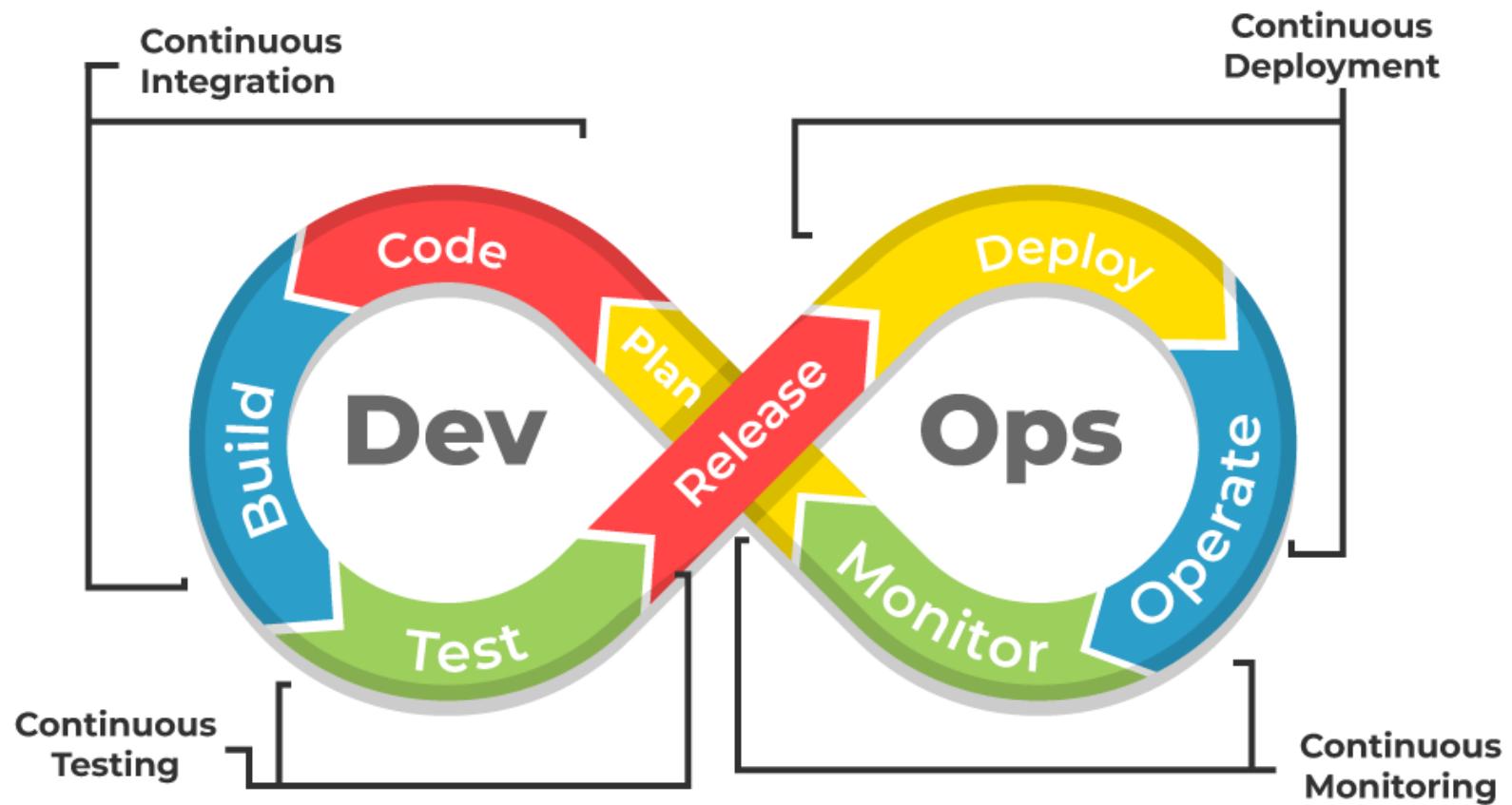
DevOps



DevOps

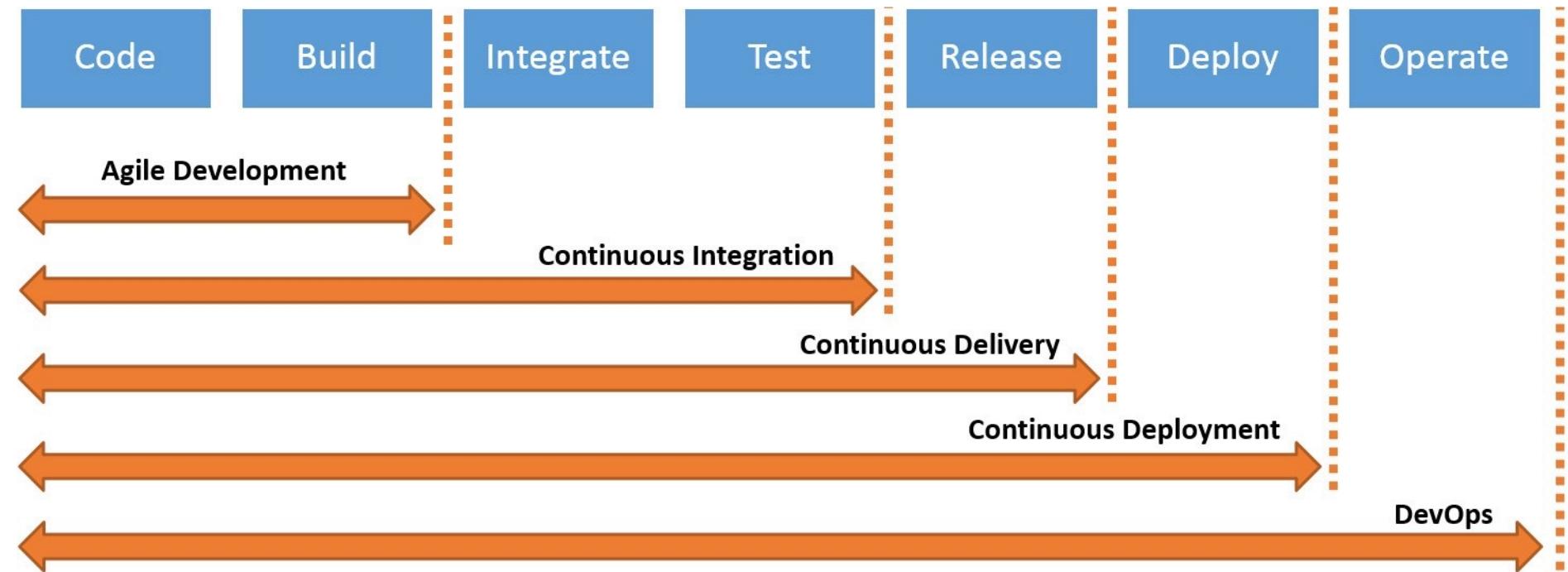


DevOps



DevOps

Continuous Integration / Delivery /Deployment

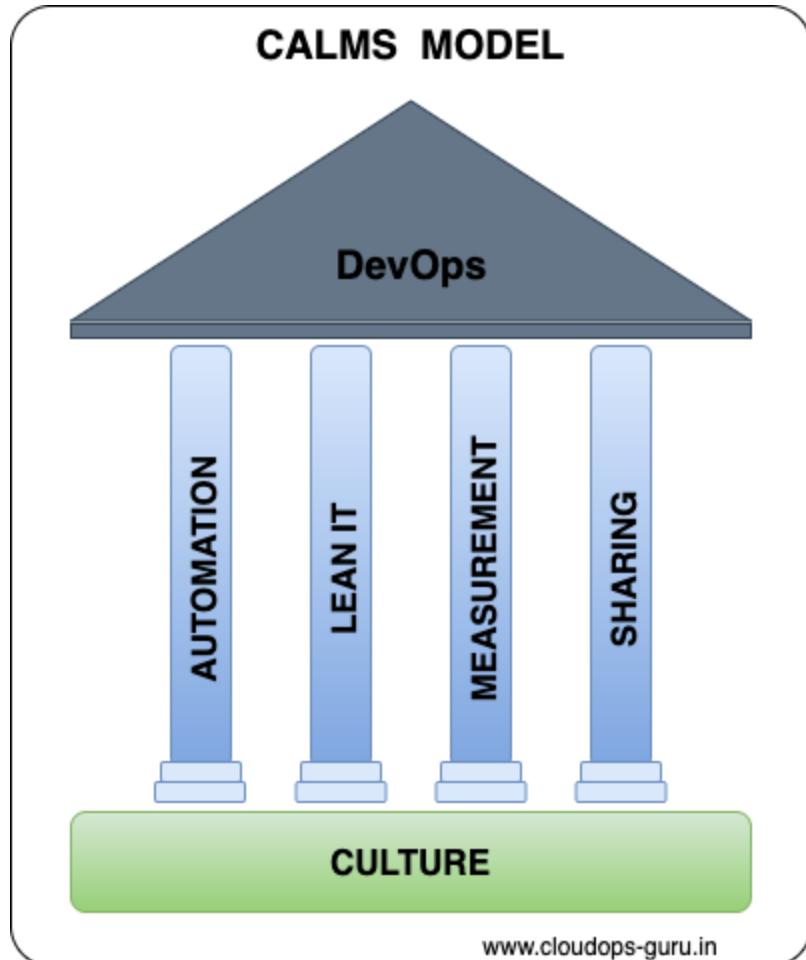


Source: <https://www.bmc.com/blogs/continuous-delivery-continuous-deployment-continuous-integration-whats-difference/>

DevOps Principles

- **Collaboration and communication** to breaking down silos
- **Automation** - streamline various aspects of the software delivery pipeline.
 - **Continuous Integration / Continuous Delivery (CI/ CD)**
 - **Infrastructure as Code (IaC)**: Manage provisioning infrastructure
- **Monitoring and Logging**: Implement robust monitoring and logging solutions to detect issues, and facilitate troubleshooting.
- **Feedback Loops** from operations to development
 - help teams continuously improve their processes and respond quickly to changing requirements or issues.
- **Culture of Continuous Improvement**
 - teams regularly assess their processes, identify areas for enhancement, and implement changes to increase efficiency and quality.

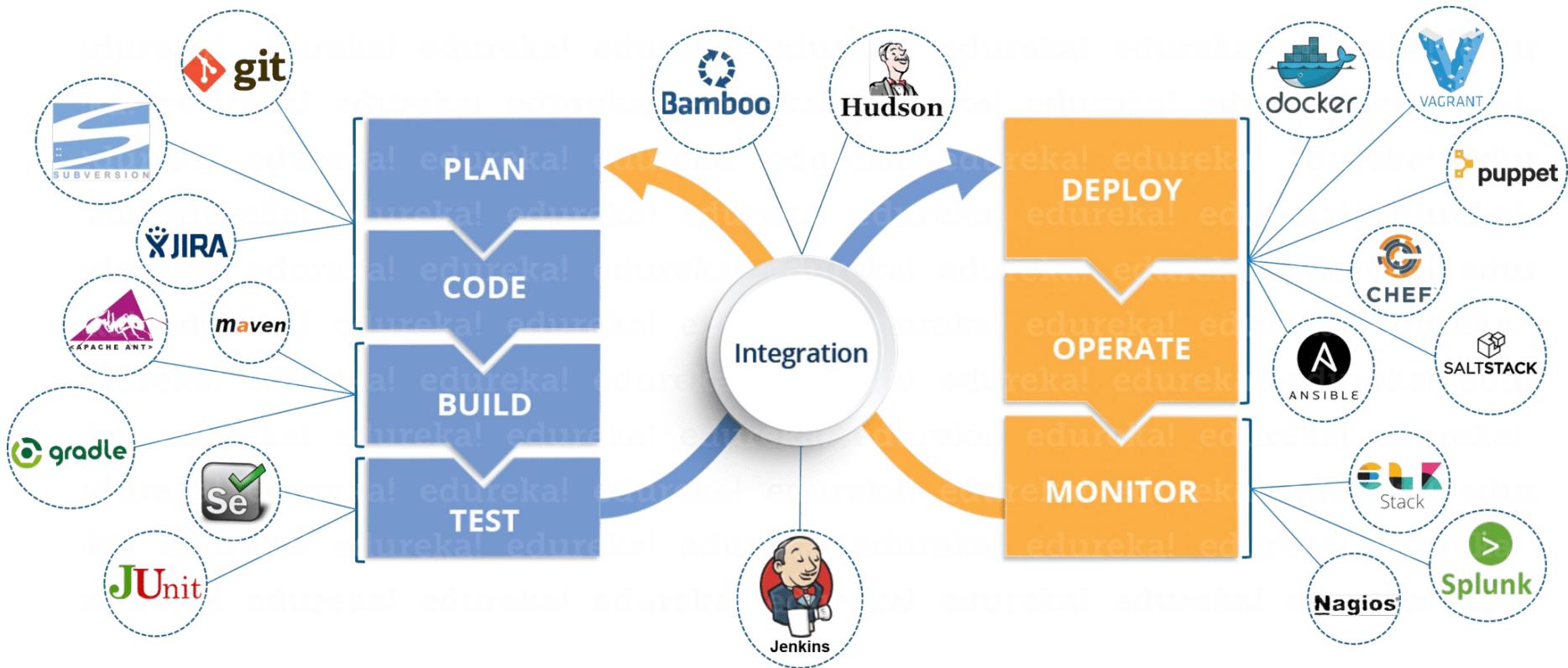
DevOps Principles – Culture



the secret of high-performing teams

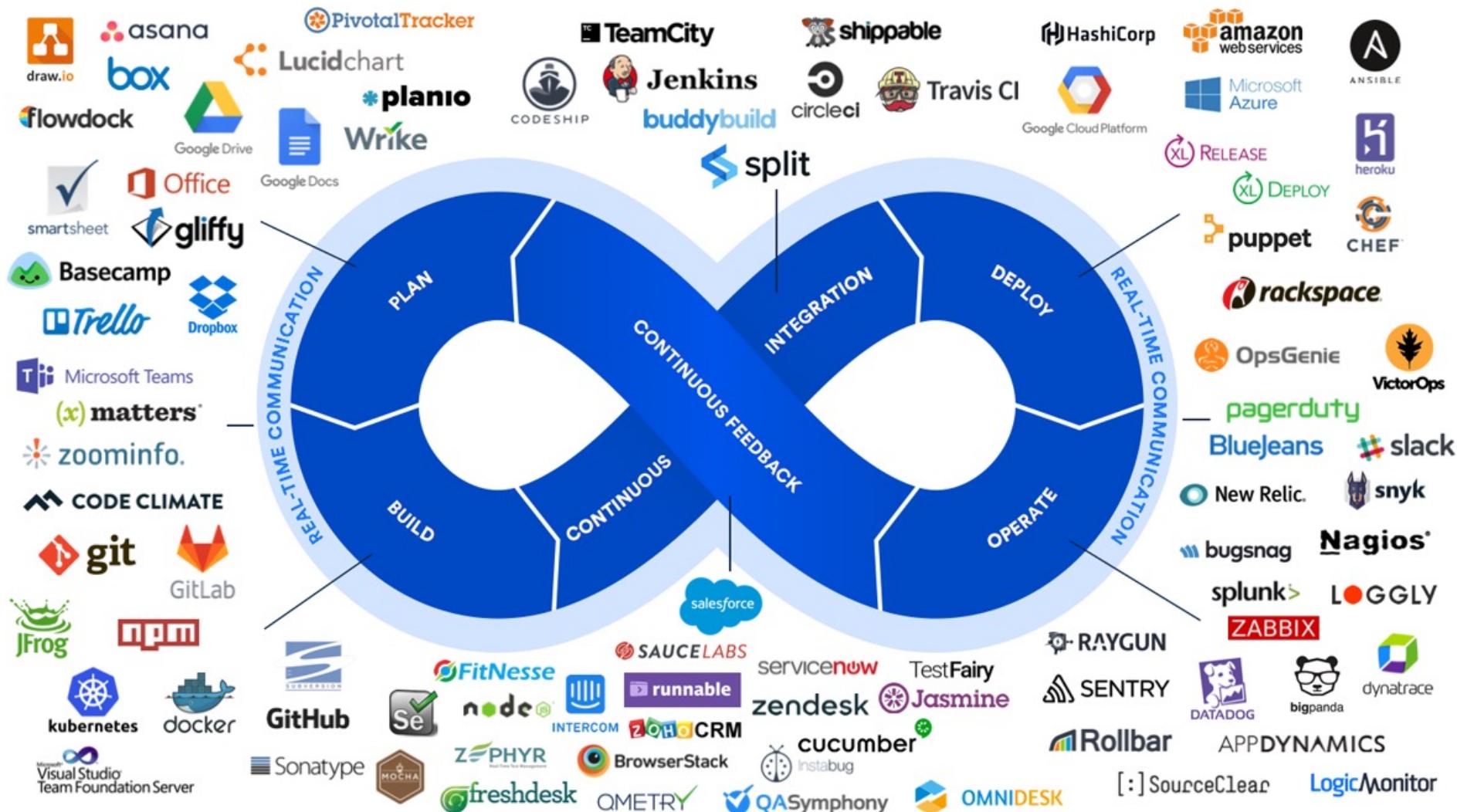


DevOps Tool Chain



Source: DevOps Training | Edureka

DevOps Principles - Automation



DevOps Principles

Monitoring and Continuous Improvement

<https://devops.games>



KPI:

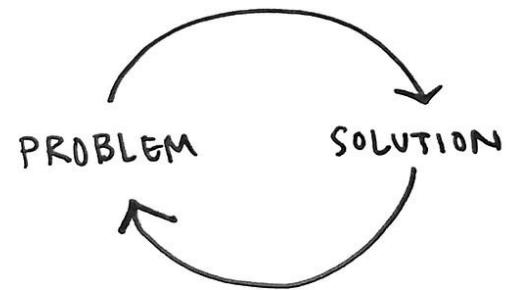
Employee Satisfaction
Customer Satisfaction
Productivity
Stability

DevOpsDream

by Mechanical Rock

DevOps - Challenges

- Cultural Resistance
- Toolchain Complexity
- Skills Gap
- Security Concerns
- Observability through the lifecycle is complex
- Measuring success through KPIs is not easy
- Effective communication



Technical disciplines of DevOps

- Change management strategies
- Environment management strategies
- Deployment, Integration, and Monitoring strategies

Change Management

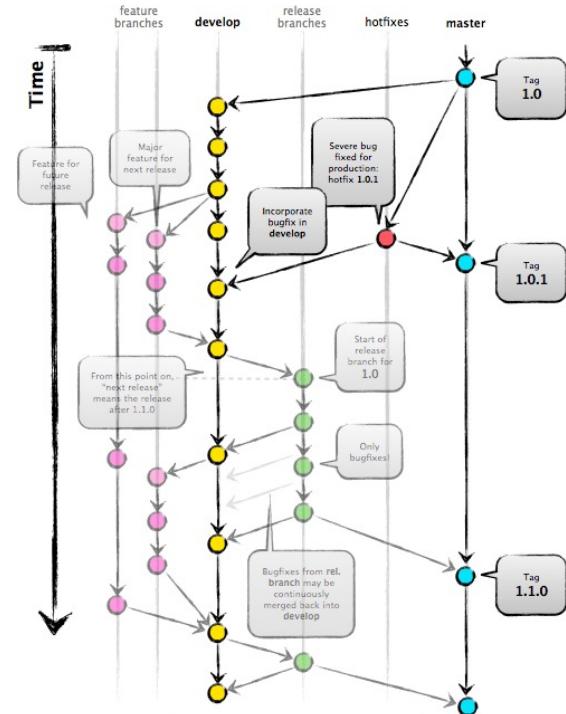
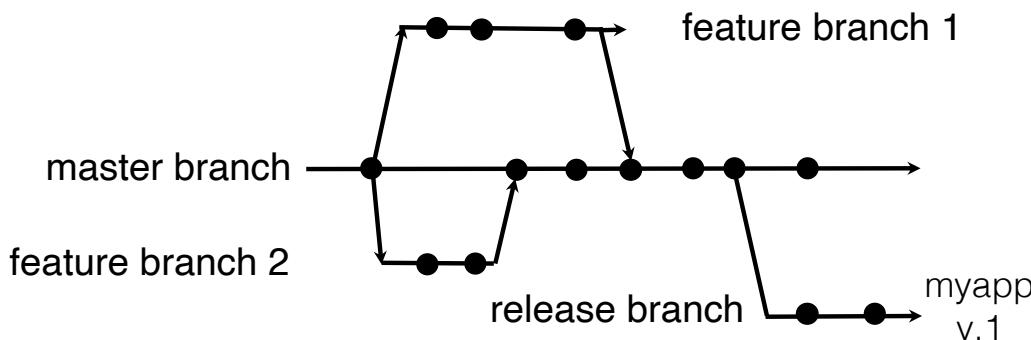
Change Management Strategy

- Identify the artifacts for which you want to keep track.
 - It is not necessary to want to trace all the artifacts, because it requires time, space, maintenance, etc.
 - Establish relationships between artifacts in order to easily find information.
- Define versioning mechanisms.
 - What differentiates a release version from a developer version, a long term support version, etc.?
- Control changes.
 - Manage change requests, evaluate their validity and ensure that a valid request leads to adequate changes.
 - Ensure that the entire team receives the changes made.
- Audit for completeness.
 - Are there any missing artifacts?
 - Are we getting all relevant change requests?
 - Are there any changes that are not compatible with each other?

Continuous Integration

Version Control

- Version control systems (VCS) play a fundamental role in managing and tracking changes to source code and other artifacts throughout the software development lifecycle
 - Track changes: What - Who – When – Where



Change Control

Ex.: Jira; GitHub Issues

Issue Tracking System

Issues Pull requests Labels Milestones Filters ▾ is:open is:issue New issue

104 Open ✓ 9,660 Closed Author ▾ Labels ▾ Milestones ▾ Assignee ▾ Sort ▾

Issue	Description	Labels	Comments
!.form-group-sm .form-group-lg shrink textarea	.confirmed .css		4
#13989 opened 11 hours ago by limitstudios	v3.2.1		
Tooltip unnecessarily breaks into multiple lines when positioned to the right	.confirmed .js		0
#13987 opened 15 hours ago by hnrch02	v3.2.1		
Tooltip Arrows in Modal example facing wrong way	.css		6
#13981 opened a day ago by SDCore			
Table improvement	.css		0
#13978 opened a day ago by Tjoosten			
docs/dist files	.docs		7
#13977 opened 2 days ago by XhmikosR	v3.2.1		
Potential solution to #4647	.js		4
#13976 opened 2 days ago by julioarmando			
Bootstrap site: right-hand navigation text becomes rasterized after scrolling	.css .docs		4
#13974 opened 2 days ago by mg1075	v3.2.1		
Dropdown toggle requires two clicks	.js		1
#13972 opened 2 days ago by Kizmar			

Change Control

Ex.: Jira; GitHub Issues

Issue Tracking System

◀ Open modal is shifting body content to the left #9855

Edit New Issue

Open matOr opened this issue 5 months ago · 88 comments



matOr commented 5 months ago

When launching the modal component will slightly move to the left on mobile devices. The scrollbars seem to disappear, which makes it hard to see what's happening.

You can observe the problem on this issue.



jamescostian commented 5 months ago

I can confirm that I see this also on Chrome for Linux on my phone. It's on the branch

Set milestone

Open Closed

Create and assign to new milestone:
Shipping Next

Assign up to 10 people to this issue

Clear assignees

- jinghui-cheng
- linshuangliu
- jin-guo Jin Guo
- ogelin Olivia

Labels

- confirmed
- css
- js

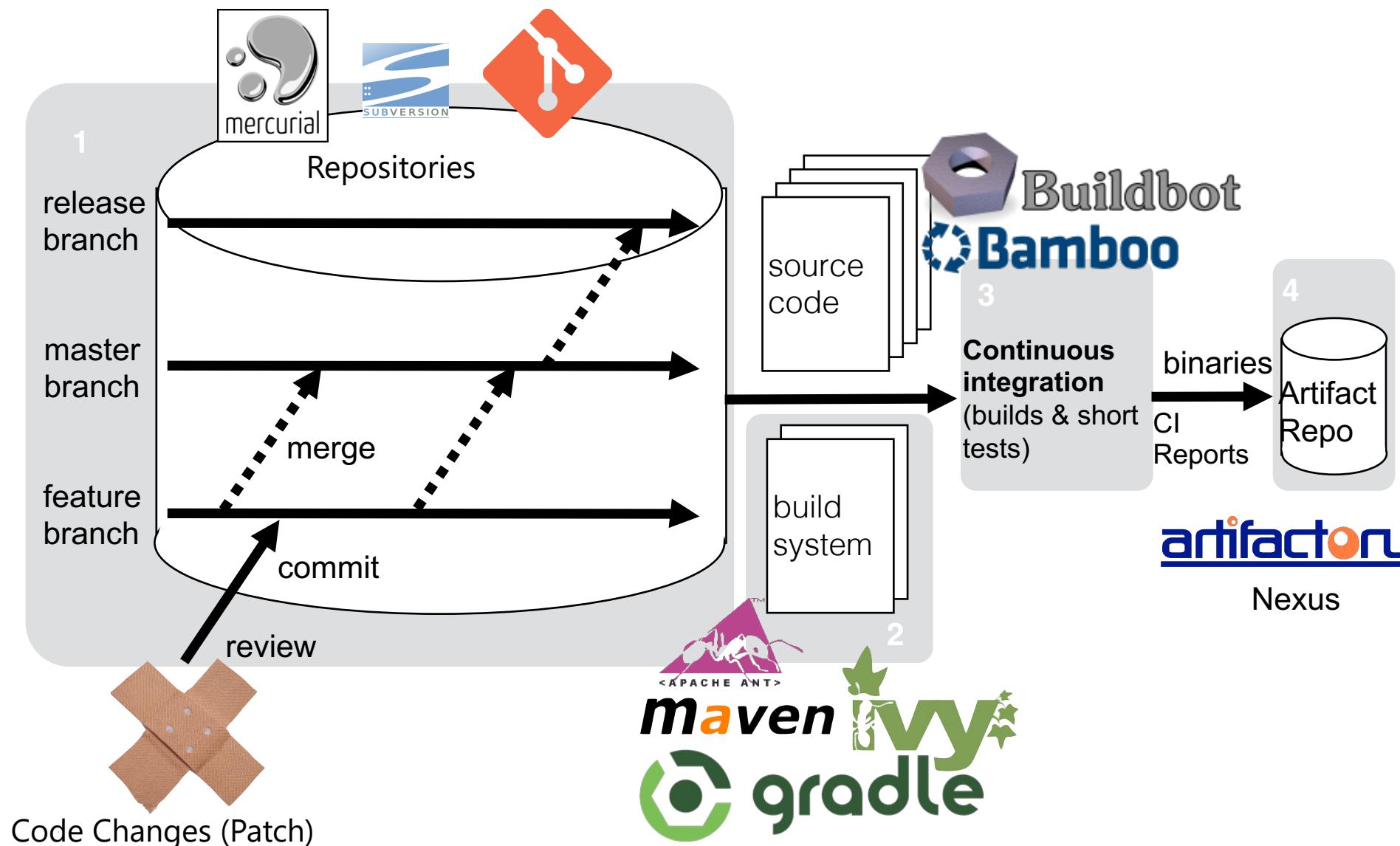
Milestone

v3.1.0

Assignee

No one assigned

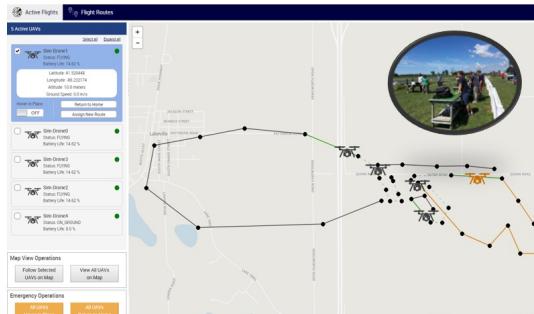
Continuous Integration



Environment Management

What is the environment?

- a) A web application to control drone flight.



- b) A mobile application for health monitoring.



- c) A massively multiplayer online role-playing game ("MMORPG").

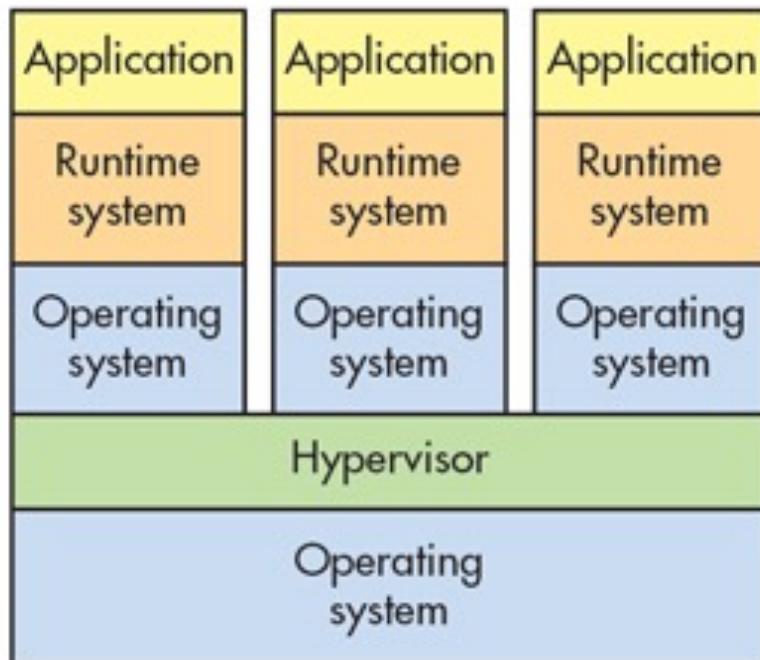


Environment Management Technologies

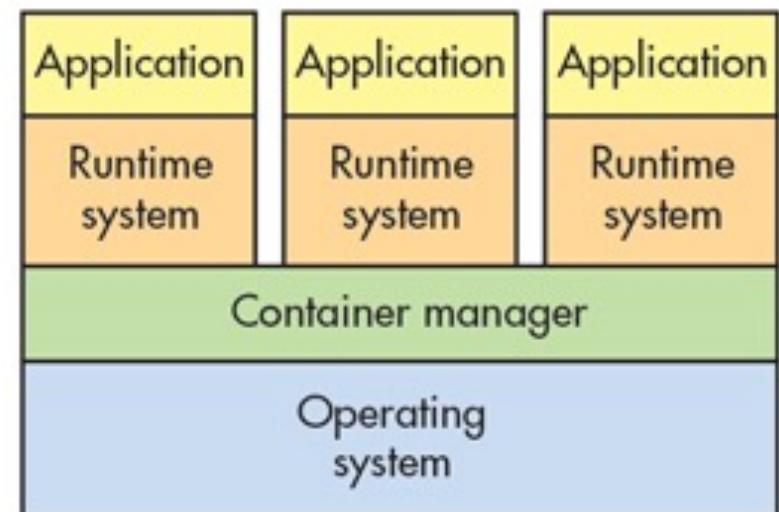
- **Package managers**
 - run-time specific: npm, Maven, ...
- **OS package managers:**
 - apt-get, rpm, ...
- **Containerization Platform**
 - Docker, Kubernetes
- **Configuration Management and Automation**
 - Ansible, Chef, Puppet, Vagrant, ...
- **Infrastructure as Code (IaC):** managing and provisioning computing infrastructure through machine-readable script files rather than physical hardware configuration or interactive configuration tools
 - Terraform
 - CloudFormation:

Exemple: docker

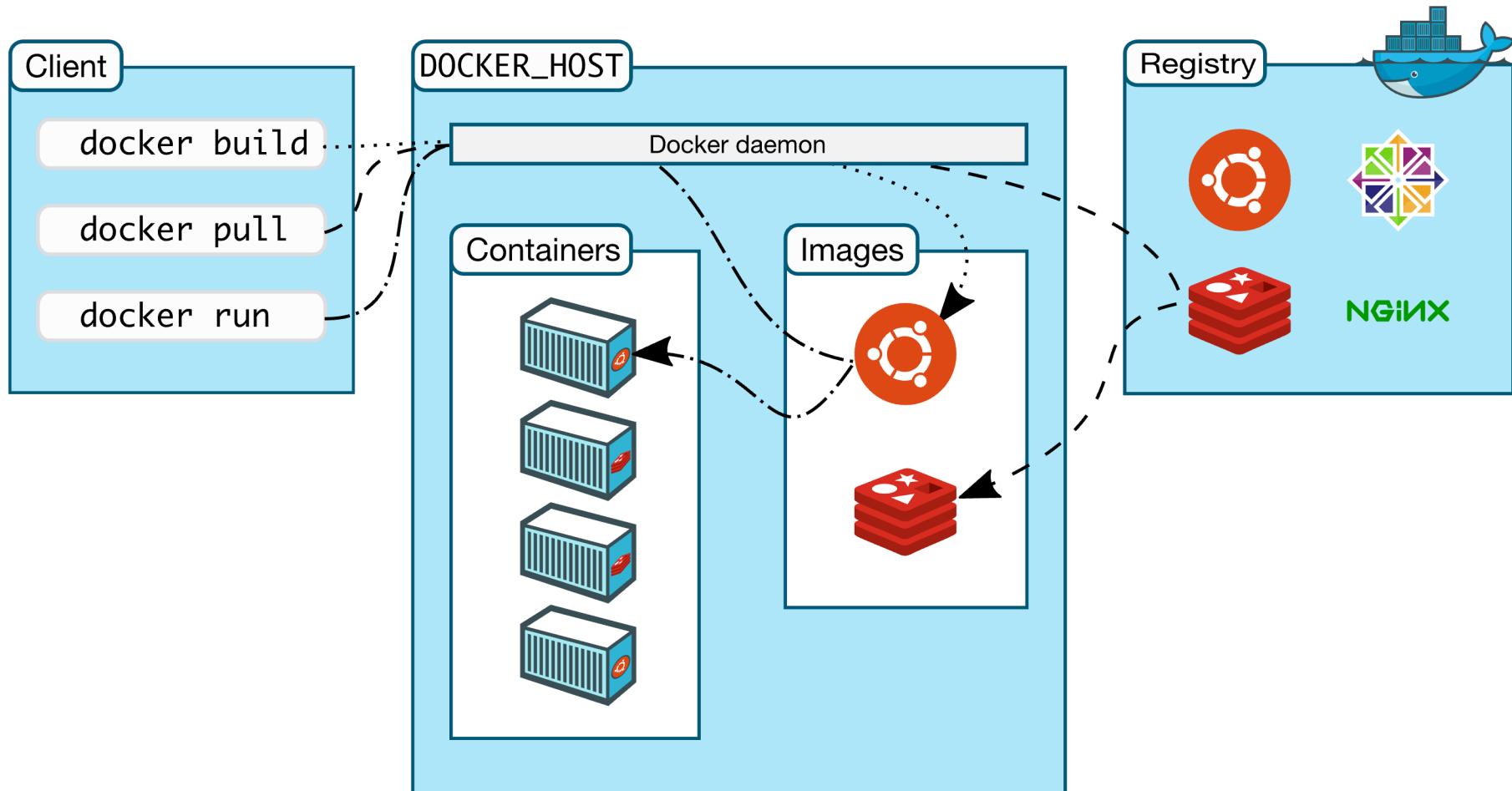
Virtual Machine



Container



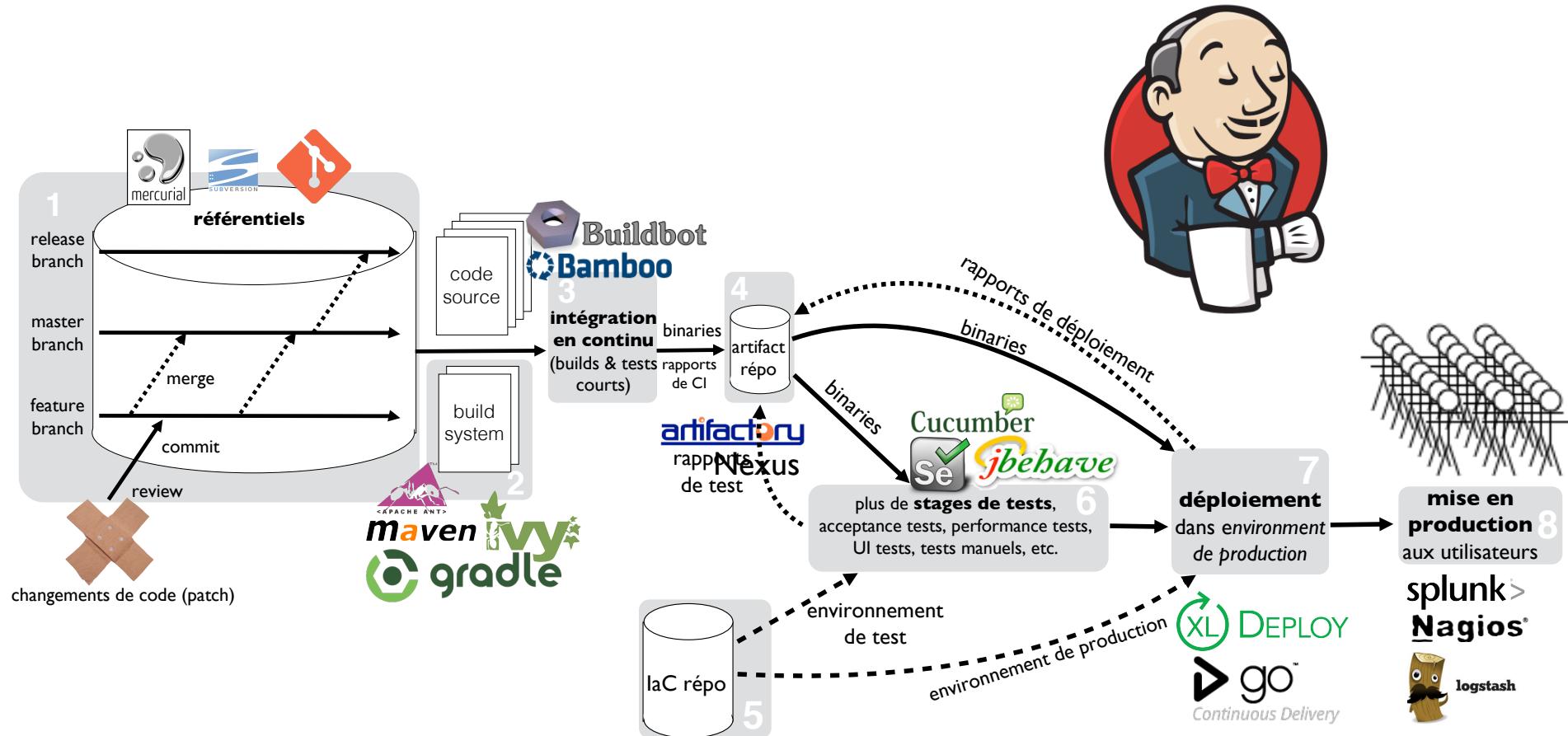
Example docker



Deployment Strategies

- Blue-green
- Canari
- Rolling upgrades
- A/B testing

Release Pipeline



Monitoring



2013-07-15T20:02:48.432-05:00 | Log for VMware Fusion pid=21199 version=5.0.3 build=build-1040386 option=Release

2013-07-15T20:02:48.432-05:00 | The process is 64-bit.

Interpreting raw data
can be complicated

2013-07-15T20:02:48.432-05:00 | Host codepage=UTF-8 encoding=UTF-8

2013-07-15T20:02:48.432-05:00 | Host is Mac OS X 10.7.5 (11G63)

2013-07-15T20:02:48.413-05:00 | VTHREAD initialize main thread 3 "VMware Fusion" pid 21199

2013-07-15T20:02:48.413-05:00 | UTIL: Change file descriptor limit from soft 256,hard 4294967295 to soft 8192,hard 4294967295.

2013-07-15T20:02:48.414-05:00 | Msg_Reset:

2013-07-15T20:02:48.414-05:00 | [msg.dictionary.load.openFailed] Cannot open file "/Library/Preferences/VMware Fusion/config": No such file or directory.

2013-07-15T20:02:48.414-05:00 | -----

2013-07-15T20:02:48.414-05:00 | PREF Optional preferences file not found at /Library/Preferences/VMware Fusion/config. Using default values.

2013-07-15T20:02:48.414-05:00 | Msg_Reset:

2013-07-15T20:02:48.414-05:00 | [msg.dictionary.load.openFailed] Cannot open file "/Volumes/VMware Fusion/VMware Fusion.app/Contents/Library/settings": No such file or directory.

2013-07-15T20:02:48.414-05:00 | -----

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ELK

- **Elasticsearch**
- **Logstash**
- **Kibana**

ELK is an acronym that refers to a set of three open-source tools: Elasticsearch, Logstash, and Kibana. These tools are often used together to collect, store, search, and visualize large volumes of data.



Quick View

Home Dashboard
Tactical Overview
Birdseye
Operations Center
Operations Screen
Open Service Problems
Open Host Problems
All Service Problems
All Host Problems
Network Outages

Details

Service Detail
Host Detail
Hostgroup Summary
Hostgroup Overview
Hostgroup Grid
Servicegroup Summary
Servicegroup Overview
Servicegroup Grid
BPI
Metrics

Graphs

Performance Graphs
Graph Explorer

Maps

BBmap
Google Map
Hypermap
Minemap
Nagvis
Network Status Map
Legacy Network Status Map

Incident Management

Latest Alerts
Acknowledgements
Scheduled Downtime
Mass Acknowledge
Recurring Downtime
Notifications

Monitoring Process

Process Info
Performance
Event Log

Host Status Summary**Host Status Summary**

Up	Down	Unreachable	Pending
53	61	3	0
Unhandled		Problems	All
64		64	117

Last Updated: 2017-10-05 16:06:57

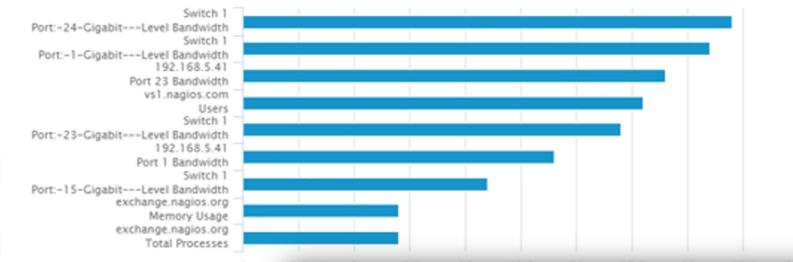
Service Status Summary**Service Status Summary**

Ok	Warning	Unknown	Critical	Pending
226	12	84	271	2
Unhandled		Problems	All	
366		367	595	

Last Updated: 2017-10-05 16:06:57

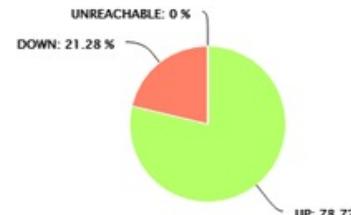
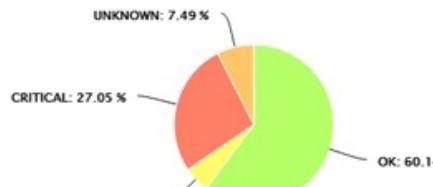
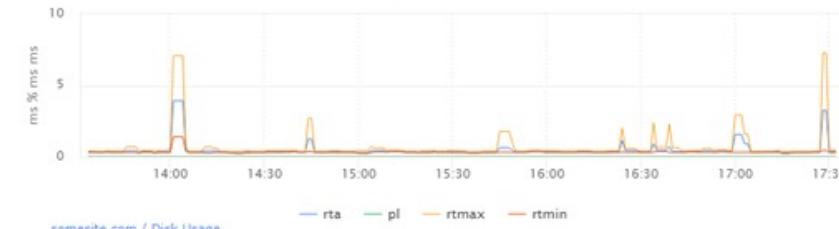
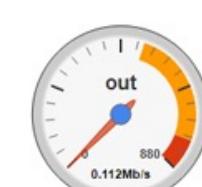
Hostgroup Status Summary**Status Summary For All Host Groups**

Host Group	Hosts	Services
All EMC SAN Hosts (all_emc_hosts)	1 Up	4 Ok 1 Critical
Firewalls (firewalls)	1 Up	1 Ok
Host Deadpool (host-deadpool)	3 Up 1 Down 1 Unreachable	8 Ok 2 Critical
Linux Servers (linux-servers)	5 Up	52 Ok 3 Warning 9 Unknown 6 Critical
new group (new group)	8 Up 1 Down 2 Unreachable	58 Ok 3 Warning 9 Unknown 11 Critical
Printers (printers)	1 Up 2 Unreachable	2 Ok 3 Critical
Websites (websites)	3 Up	20 Ok 2 Warning

My Graph**Top Alert Producers Last 24 Hours****Metrics Overview****Disk Usage**

Host	Service	%
localhost	Root Partition	78
vs1.nagios.com	/ Disk Usage	31
exchange.nagios.org	/ Disk Usage	12

Last Updated: 2017-10-05 16:06:58

Bandwidth - Main Office**Host Health****Service Health****esx2.nagios.local : HOST****192.168.5.43xx / Bandwidth IN****192.168.5.43xx / Bandwidth OUT**

CHAOS ENGINEERING

Chaos Engineering is a discipline of experimenting on a distributed system in order to build confidence in the system's ability to withstand turbulent conditions in production.



Netflix: Every X Week, There's a Day of Chaos on which the Simian Army attacks the production environment



DevOps – What is Next

- AIOPs: Artificial Intelligence for IT Operations
- DevSecOps: integrates security practices into the software development and delivery process (Zero Trust Security)
- ChatOps: Integrating chat platforms with DevOps processes for collaboration and automation
- ModelOPs: Focus on managing the life cycle of models- those can be system models or ML models

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