



Laboratório de Sistemas Computacionais Complexos

2020/04/16 - AULA 11

<https://uclab.xyz/sistemas-complexos-aula11>

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Agenda

Tema da aula:

DevOps

1. Definição DevOps
2. Cultura DevOps
3. Entrega contínua
4. Runtime and reliability
5. DevOps e microserviços
6. Ferramentas

Definição de DevOps

DevOps is a collaborative and multidisciplinary effort within an organization to automate continuous delivery of new software versions, while guaranteeing their correctness and reliability

(LEITE *et al.*, 2019)

Definição de DevOps - CAMS

- **Culture**
- **Automation**
- **Measurement**
- **Sharing**

(HUMBLE and MOLESKY, 2011)

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Entre Devs e Ops

Antes o ágil ficava só nos devs

DevOps

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Cultura de colaboração!

Cultura (Westrum, 2014)

- **Pathological** (power-oriented)

Fear and threat

- **Bureaucratic** (rule-oriented)

Protect the department

- **Generative** (performance-oriented)

Focus on the mission (alinhamento)

Cultura (Westrum, 2014)

Pathological	Bureaucratic	Generative
Low cooperation	Modest cooperation	High cooperation
Messengers “shot”	Messengers neglected	Messengers trained
Responsibilities shirked	Narrow responsibilities	Risks are shared
Bridging discouraged	Bridging tolerated	Bridging encouraged
Failure leads to scapegoating	Failure leads to justice	Failure leads to inquiry
Novelty crushed	Novelty leads to problems	Novelty implemented

Cultura e desempenho de entrega



(FORSGREN *et al.*, 2018)

The three ways of DevOps

- Mapping the value stream for global optimization, not local optimization
- Amplifying continuous feedback loops to support necessary corrections
- Improving daily work through a culture promoting frequent experimentation, risk-taking, learning from mistakes, and knowing that practice and repetition are prerequisites to mastery

(KIM *et al.*, 2016)

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Muito mais sobre cultura, né?

CAMS

(KIM *et al.*, 2016)

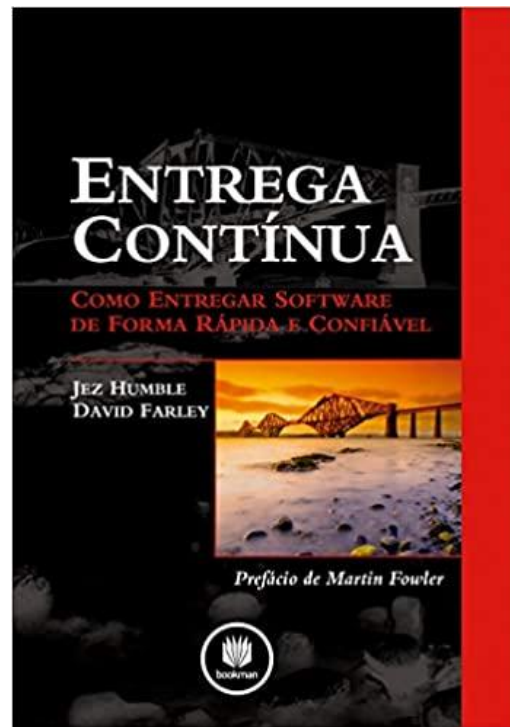
DevOps

DevOps is a collaborative and multidisciplinary effort within an organization **to automate continuous delivery of new software versions**, while guaranteeing their correctness and reliability

Entrega contínua

- Any software version committed to the repository must be a production-candidate version
- After passing through stages, such as compilation and automated tests, the software is sent to production by the press of a button

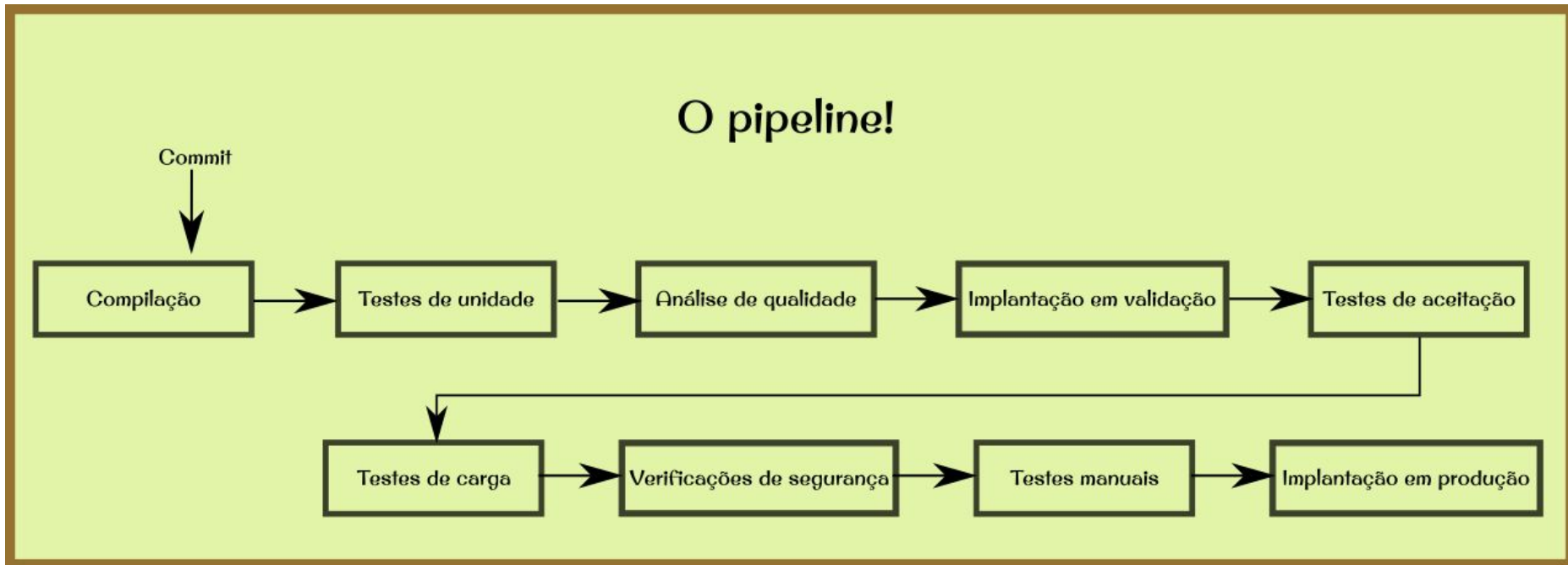
CAMS



Entrega contínua

O deploy se torna chato!

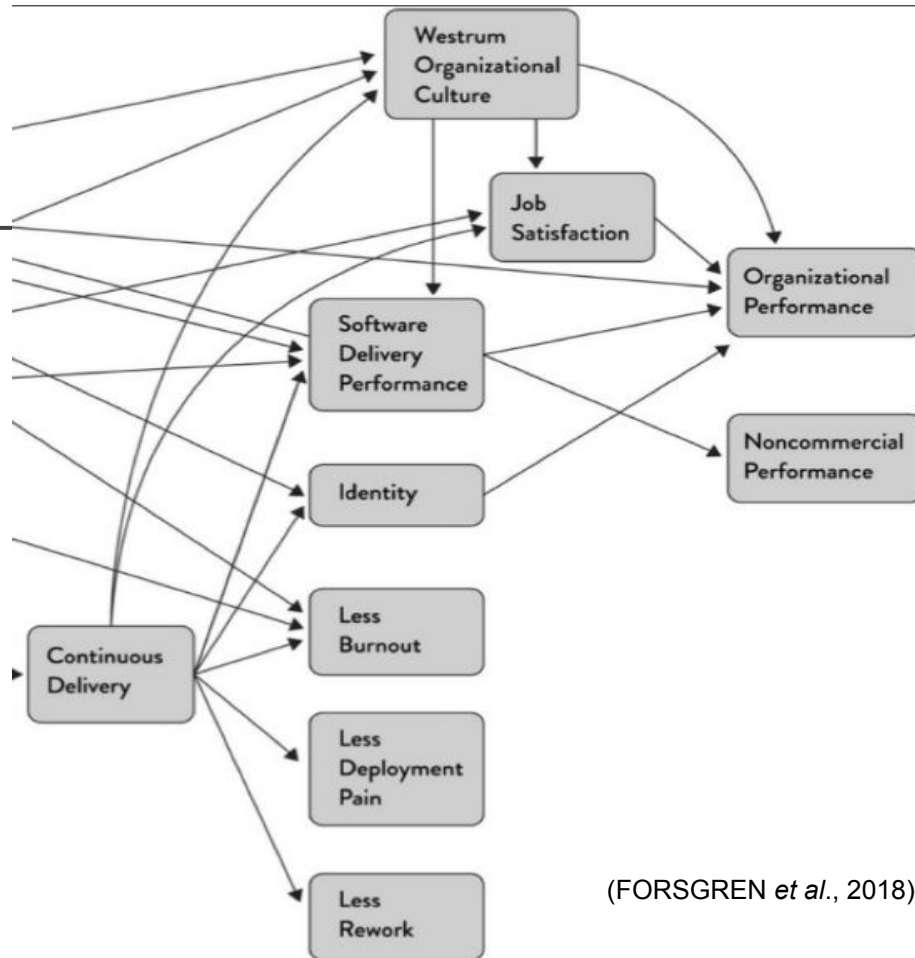
Entrega contínua



Entrega contínua

	#46529 by  latest	 master  16df3408  1641872 Melhorias para ...		 00:09:14  3 days ago
	#46522 by 	 master  246bb7ac  1641872 Melhorias para ...		 00:06:19  5 days ago
	#46517 by 	 master  5ec9a878  1641872 Melhorias para ...		 00:06:41  5 days ago

Entrega contínua



(FORSGREN *et al.*, 2018)

Delivery performance

- Frequência de implantação
- Tempo de entrega
- Tempo de recuperação
- Frequência de falhas

(FORSGREN *et al.*, 2018)

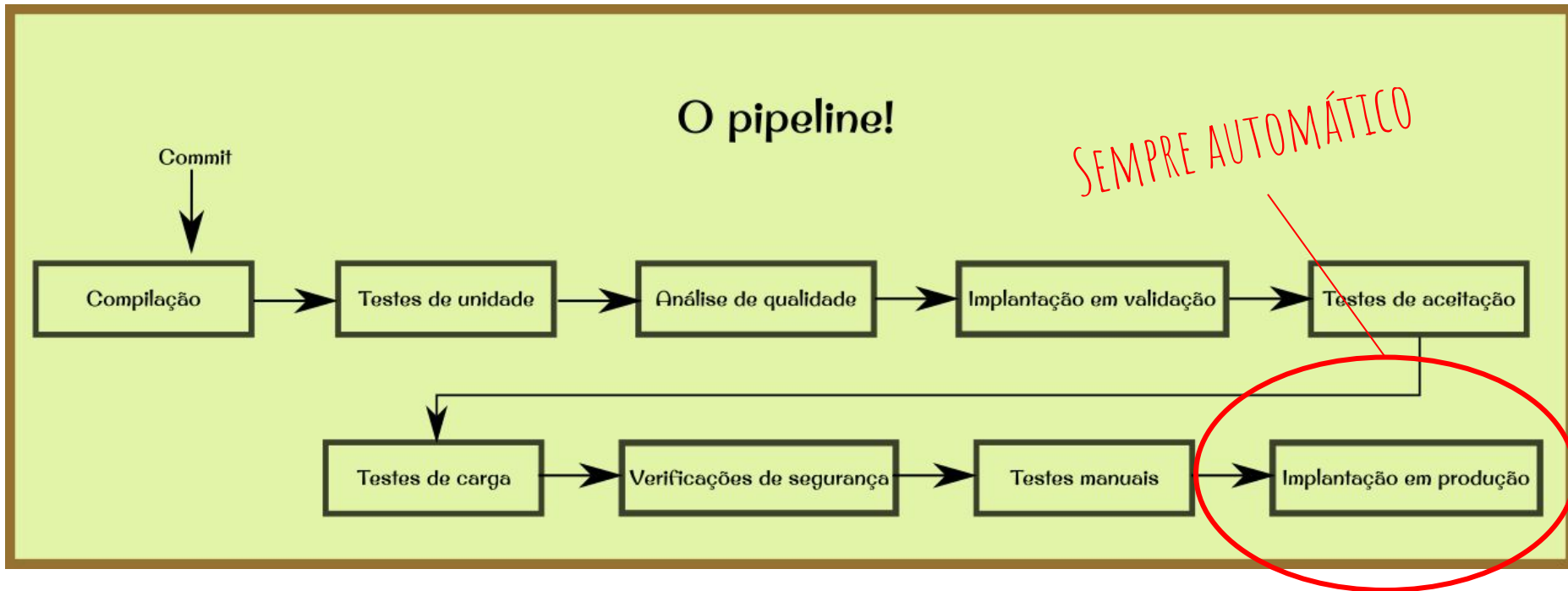
Delivery performance

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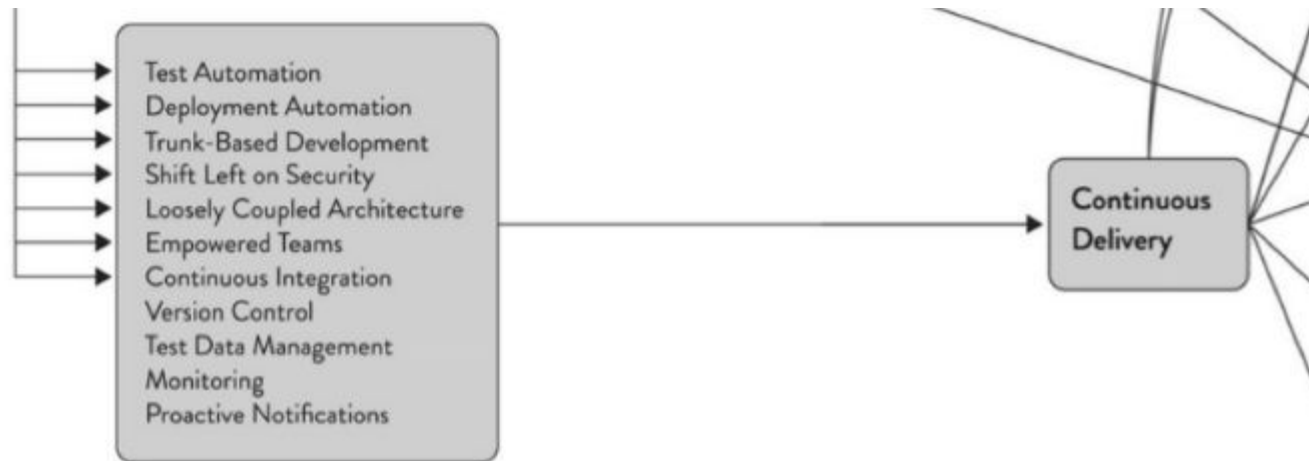
(FORSGREN *et al.*, 2018)

I.e.: o quão bem você consegue fazer entrega contínua

Implantação contínua



Práticas - Entrega Contínua



(FORSGREN *et al.*, 2018)

Integração contínua

- Integrate and test changes after no more than a couple of hours
- Team programming isn't a divide and conquer problem
- It's a divide, conquer, and integrate problem
- The integration step is unpredictable
- The longer you wait to integrate, the more it costs

(BECK and ANDRES, 2004)

O que seria não fazer integração contínua?



Integração contínua vs entrega contínua?



DevOps

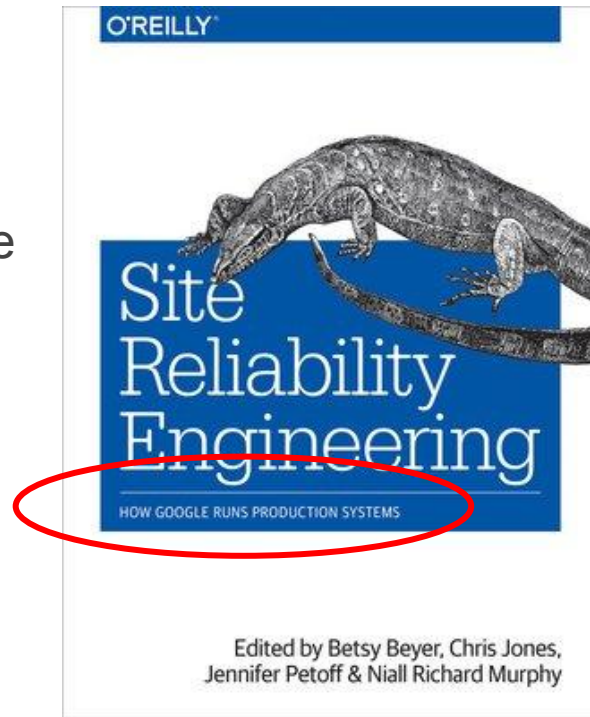
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Como garantir correctness?



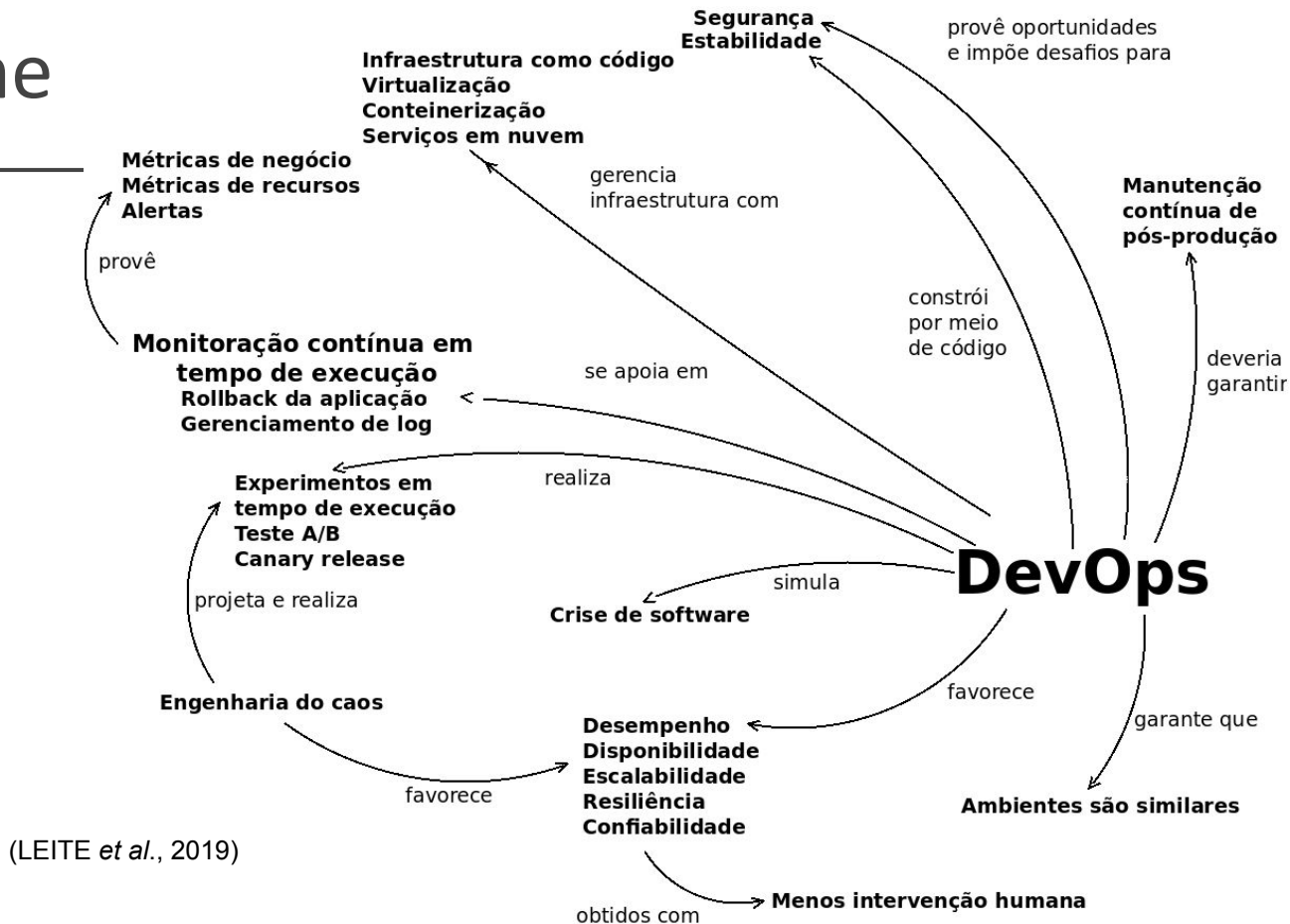
Reliability

- Reduce toil
- Infrastructure staff code to improve NFR
- Limit of 50% of operational work to the infrastructure staff
- Developers sustain the product for a period

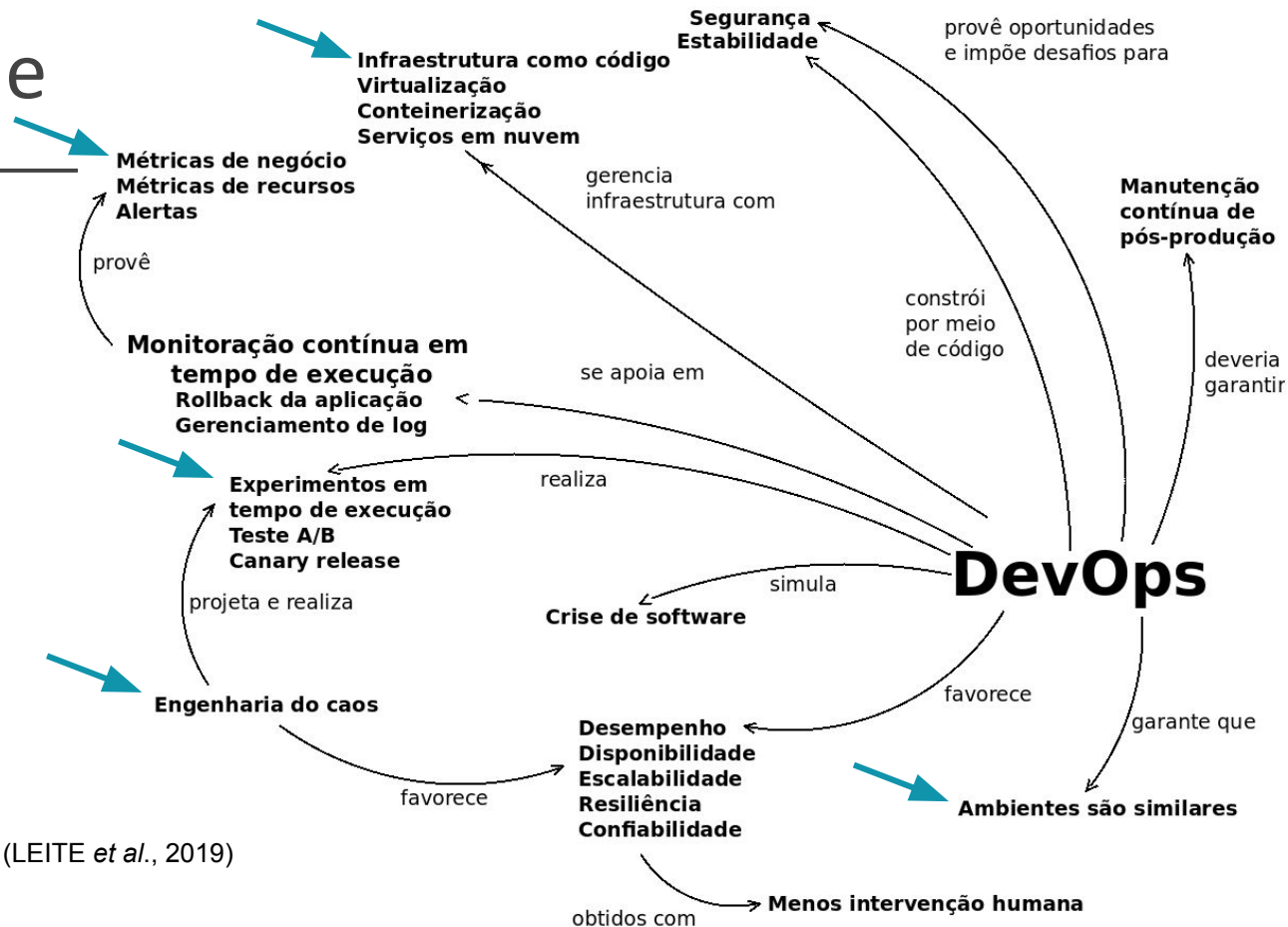


Práticas Runtime

CAMS



Práticas Runtime



(LEITE *et al.*, 2019)



<https://kahoot.it/>



Microserviços

- The microservice architectural style is an approach to developing a single application as a suite of small services, each running in its own process and communicating with lightweight mechanisms, often an HTTP resource API
- These services are built around business capabilities and independently deployable by fully automated deployment machinery

(LEWIS and FOWLER, 2014)



Por que microsserviços precisam de DevOps?



Por que DevOps precisa de microsserviços?



Microserviços e DevOps

- Automação de deploy
- Entrega contínua com monolito é mais difícil
- Build de 10 minutos
- Log aggregator
- Correlation ID's
- Monitoração
- Extra: automação da automação!

Ferramentas

PERIODIC TABLE OF DEVOPS TOOLS (v3) EMBED

1 Os Gl GitLab	2 En Sp Splunk
3 Fm Gh GitHub	4 En Dt Datadog
11 Os Sv Subversion	12 En Db DBMaestro
19 En Cw ISPW	20 En Dp Delphix
37 Os At Artifactory	38 En Rg Redgate
55 Os Nx Nexus	56 Os Fw Flyway
73 Fm Bb BitBucket	74 En Pf Perforce
81 En Xli Xebialabs XL Impact	82 Os Ki Kibana
106 En Sw ServiceNow	107 Pd Jr Jira
110 Fm St Stride	111 En Cn CollabNet VersionOne
112 En Ry Remedy	113 En Ac Agle Central
114 Pd Og OpsGenie	115 Pd Pd Pagerduty
116 Os Sn Snort	117 Os Tw Tripwire
118 En Ck CyberArk Conjur	119 En Vc Veracode
120 Os Ff Fortify SCA	

Legend:

- Os: Open Source
- En: Enterprise
- Free: Free
- Fm: Freemium
- Pd: Paid
- Source Control Mgmt.
- Database Automation
- Continuous Integration
- Testing
- Configuration
- Deployment
- Containers
- Release Orchestration
- Cloud
- AI/Ops
- Analytics
- Monitoring
- Security
- Collaboration



Follow @xebialabs

Publication Guidelines

91 En Xli Xebialabs XL Impact	92 Os Ki Kibana	93 Fm Nr New Relic	94 En Dt Dynatrace	95 En Dd Datadog	96 Fm Ad AppDynamics	97 Os El ElasticSearch	98 Os Ni Nagios	99 Os Zb Zabbix	100 En Zn Zenoss	101 En Cx Checkmarx SAST	102 Os Sg Signal Sciences	103 En Bd BlackDuck	104 Os Sr SonarQube	105 Os Hv HashiCorp Vault
106 En Sw ServiceNow	107 Pd Jr Jira	108 Fm Ti Trello	109 Fm Sl Slack	110 Fm St Stride	111 En Cn CollabNet VersionOne	112 En Ry Remedy	113 En Ac Agle Central	114 Pd Og OpsGenie	115 Pd Pd Pagerduty	116 Os Sn Snort	117 Os Tw Tripwire	118 En Ck CyberArk Conjur	119 En Vc Veracode	120 Os Ff Fortify SCA

Tem que saber tudo isso para ser um DevOps?



 **XebiaLabs**
Enterprise CloudOps

 Follow @xebialabs

Publication Guidelines

Ferramentas

Table 4. Major DevOps tools related to actors and DevOps concepts

<i>Category</i>	<i>Examples</i>	<i>Actors</i>	<i>Goals</i>	<i>Concepts</i>
Knowledge sharing	Rocket Chat GitLab wiki Redmine Trello	Everyone	Human collaboration	Culture of collaboration Sharing knowledge Breaking down silos Collaborate across departments
Source code management	Git SVN CVS ClearCase	Dev / Ops	Human collaboration Continuous delivery	Versioning Culture of collaboration Sharing knowledge Breaking down silos Collaborate across departments
Build process	Maven Gradle Rake JUnit Sonar	Dev	Continuous delivery	Release engineering Continuous delivery Automation Testing automation, Correctness Static analysis

(LEITE *et al.*, 2019)

Ferramentas

Continuous Integration	Jenkins GitLab CI Travis Nexus	Dev / Ops	Continuous delivery	Frequent and reliable release process Release engineering Continuous integration Deployment pipeline Continuous delivery, Automation Artifact management
Deployment automation	Chef, Puppet Docker Heroku Open Stack AWS Cloud Formation Rancher Flyway	Dev / Ops	Continuous delivery Reliability	Frequent and reliable release process Release engineering Configuration management Continuous delivery Infrastructure as code Virtualization, Containerization Cloud services, Automation
Monitoring & Logging	Nagios Zabbix Prometheus Logstash Graylog	Ops / Dev	Reliability	You built it, you run it After-hours support for Devs Continuous runtime monitoring Performance, Availability, Scalability Resilience, Reliability, Automation Metrics, Alerting, Experiments Log management, Security

(LEITE *et al.*, 2019)

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Leonardo Leite, Carla Rocha, Fabio Kon, Dejan Milojicic, and Paulo Meirelles. **A Survey of DevOps Concepts and Challenges**. ACM Computing Surveys, 52, 1-35, 2019.

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