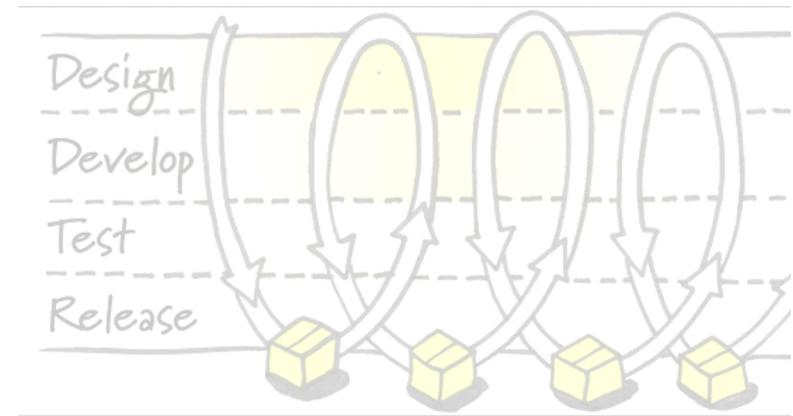


Colégio Politécnico da UFSM
Departamento de Ensino

Aula 2 - Cultura DevOps

Baseado no material distribuído em: <https://uclab.xyz/sistemas-complexos-aula11>

Disciplina: Conceito e Implantação de DevOps (v.1.)
Prof. Dr. Vinícius Maran (vinicius.maran@ufsm.br)





*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)

*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)

Entre Devs e Ops

Antes o ágil ficava só nos Devs

*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)

Cultura de colaboração!

Definição de DevOps

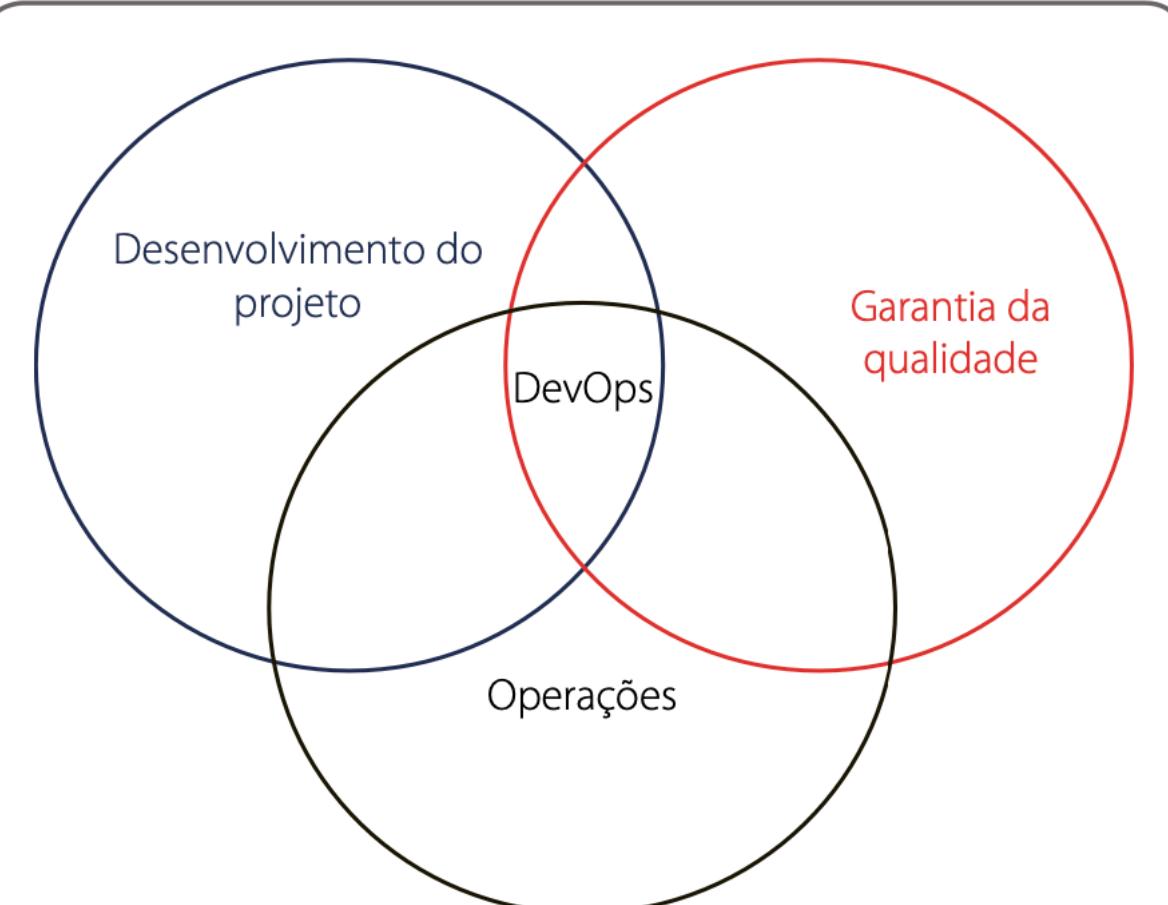


Figura 1. Áreas correlacionadas que formam o DevOps.

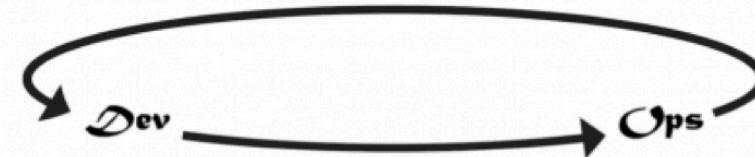
Fonte: Adaptada de Traversin (2017).

Definição de DevOps

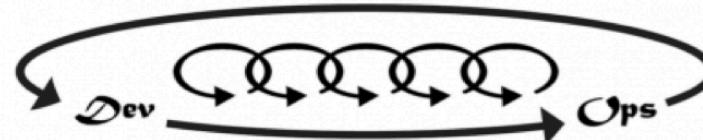
The First Way: Systems Thinking



The Second Way: Amplify Feedback Loops



The Third Way: Culture Of Continual Experimentation And Learning



- O **evento Agile 2008** abriu caminhos para o DevOps, com discussões e debates acerca de infraestrutura ágil.
- O termo DevOps só surgiu em 2009, com o objetivo de **unir administradores de infraestrutura e programadores**, promovendo automação nos processos de integração e entrega.
 - Ao contrário da metodologia ágil, o **DevOps não possui um documento similar ao Manifesto Ágil**. Dessa forma, mesmo sendo conhecido mundialmente, cada empresa adapta o conceito de acordo com as suas necessidades.

(Culture) Cultura

(Automation) Automação

(Measurement) Medição

(Sharing) Compartilhamento

(HUMBLE and MOLESKY, 2011)

Pathological (power-oriented)

Fear and threat

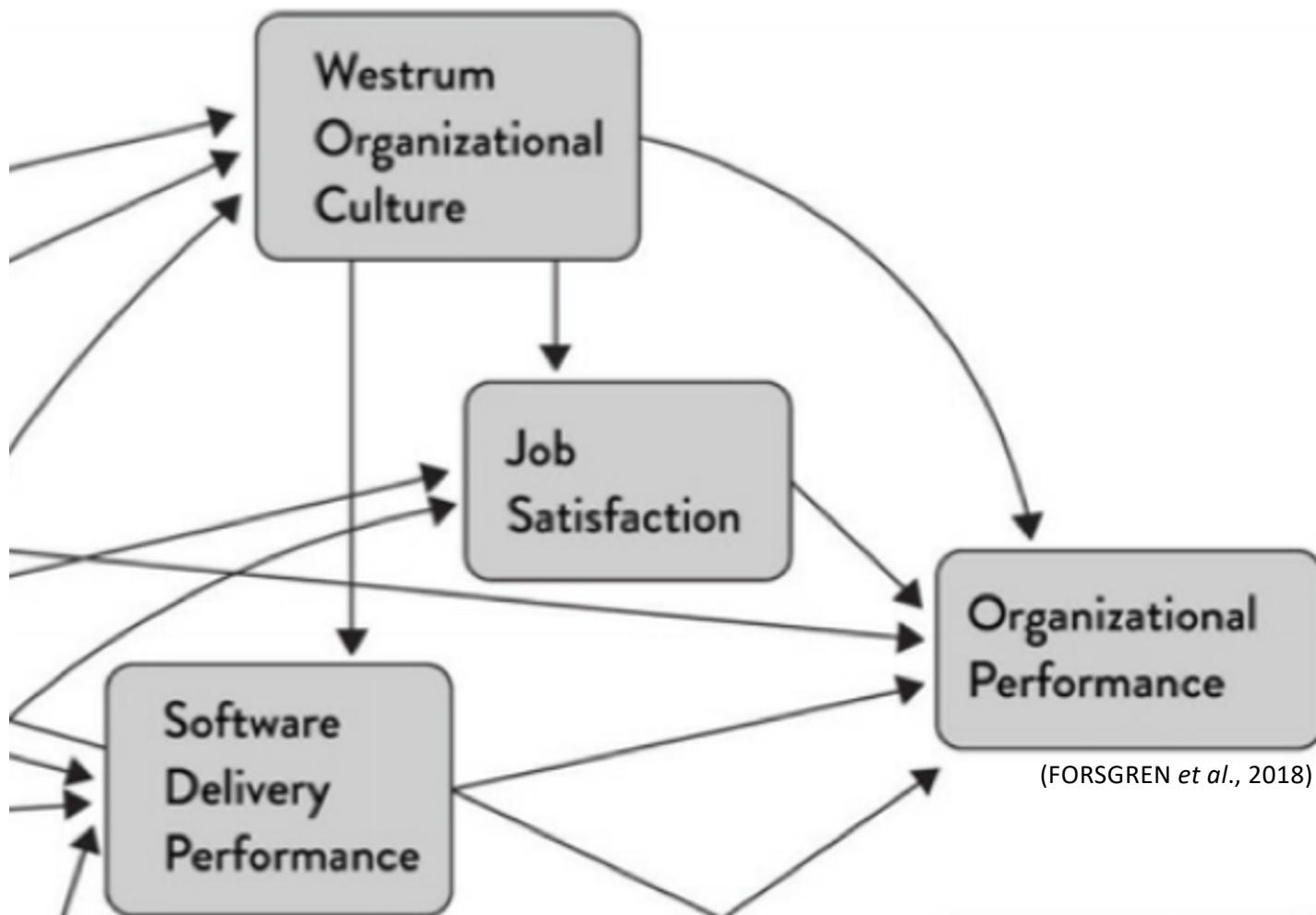
Bureaucratic (rule-oriented)

Protect the department

Generative (performance-oriented)

Focus on the mission (alinhamento)

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



3 caminhos para DevOps – CAMS

Mapear o fluxo de valor para otimização global, não otimização local

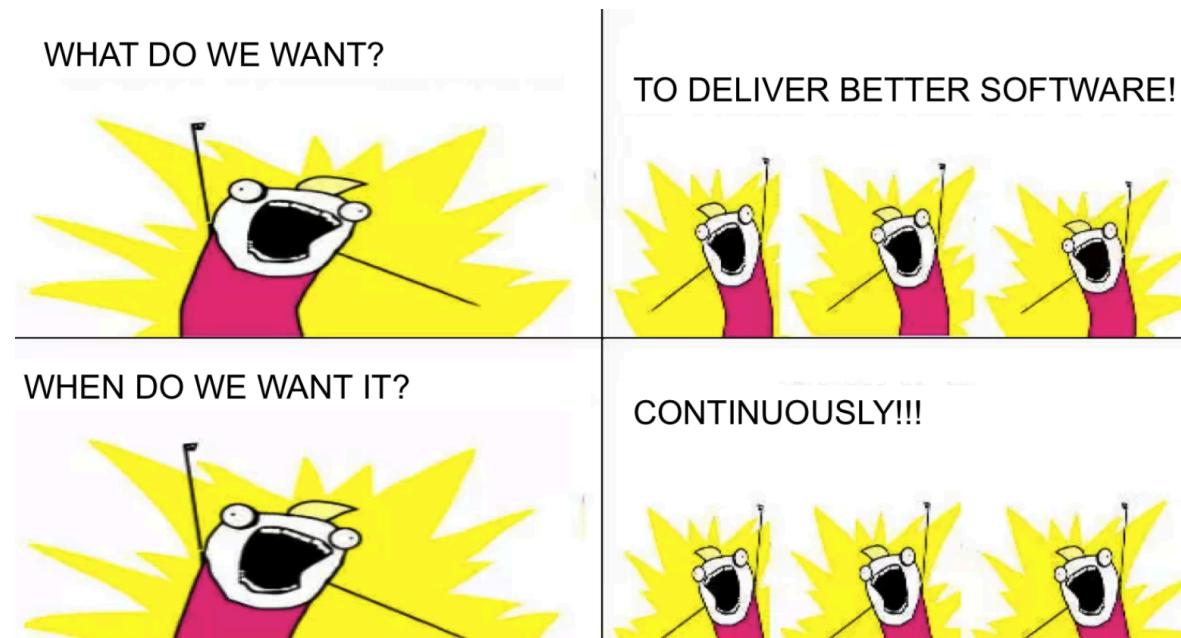
Ampliação de ciclos de feedback contínuos para suportar as correções necessárias

Melhorar o trabalho diário por meio de uma cultura que promova a experimentação frequente, a assunção de riscos, o aprendizado com os erros e o conhecimento de que a prática e a repetição são pré-requisitos para o domínio

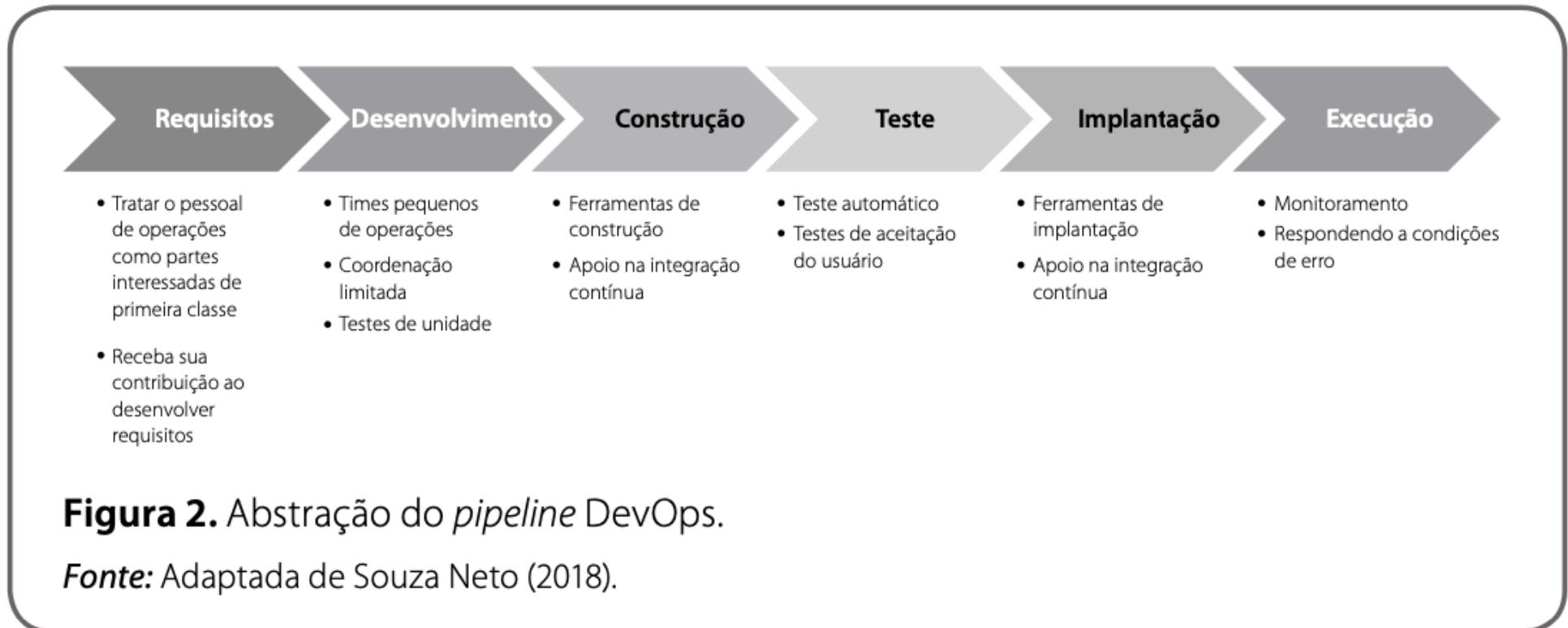
Diretamente relacionados à cultura

(KIM *et al.*, 2016)

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



- A integração contínua (**CI, continuous integration**) e a entrega contínua (**CD, continuous delivery**) são práticas da engenharia de software que visam a testar e disponibilizar o software de forma automatizada, contínua e consistente (DESTRO; FRANÇA, 2019)
- Essas práticas são fixadas em um conjunto, intitulado ***pipeline***
- ***pipeline*** pode variar de acordo com o projeto, considerando-se que cada sistema suporta tecnologias distintas e possui ferramentas específicas para realizar diferentes ações



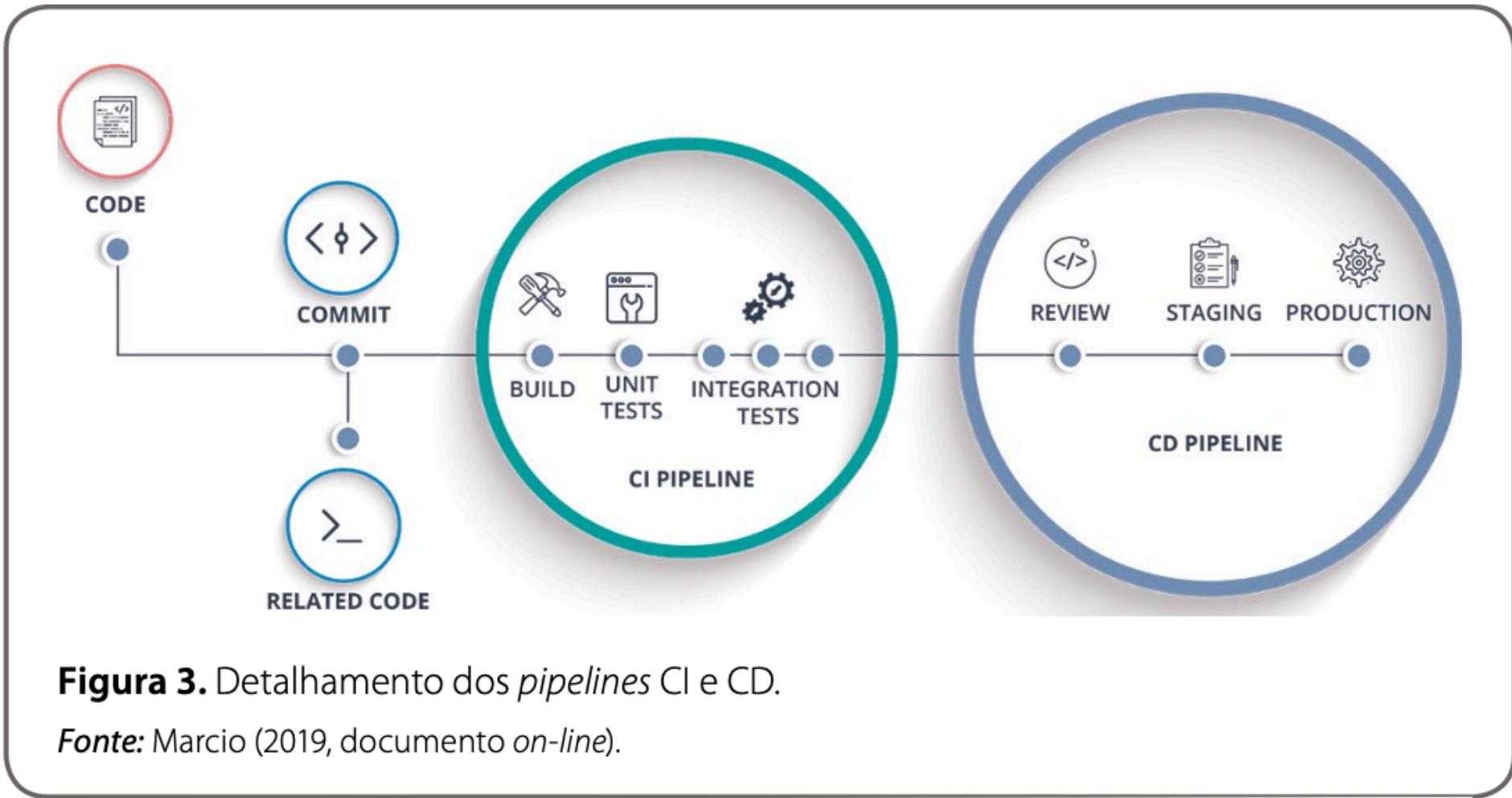


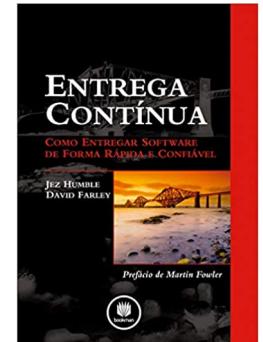
Figura 3. Detalhamento dos *pipelines* CI e CD.

Fonte: Marcio (2019, documento on-line).

Qualquer versão de software com *commit* no repositório deve ser uma versão candidata à produção

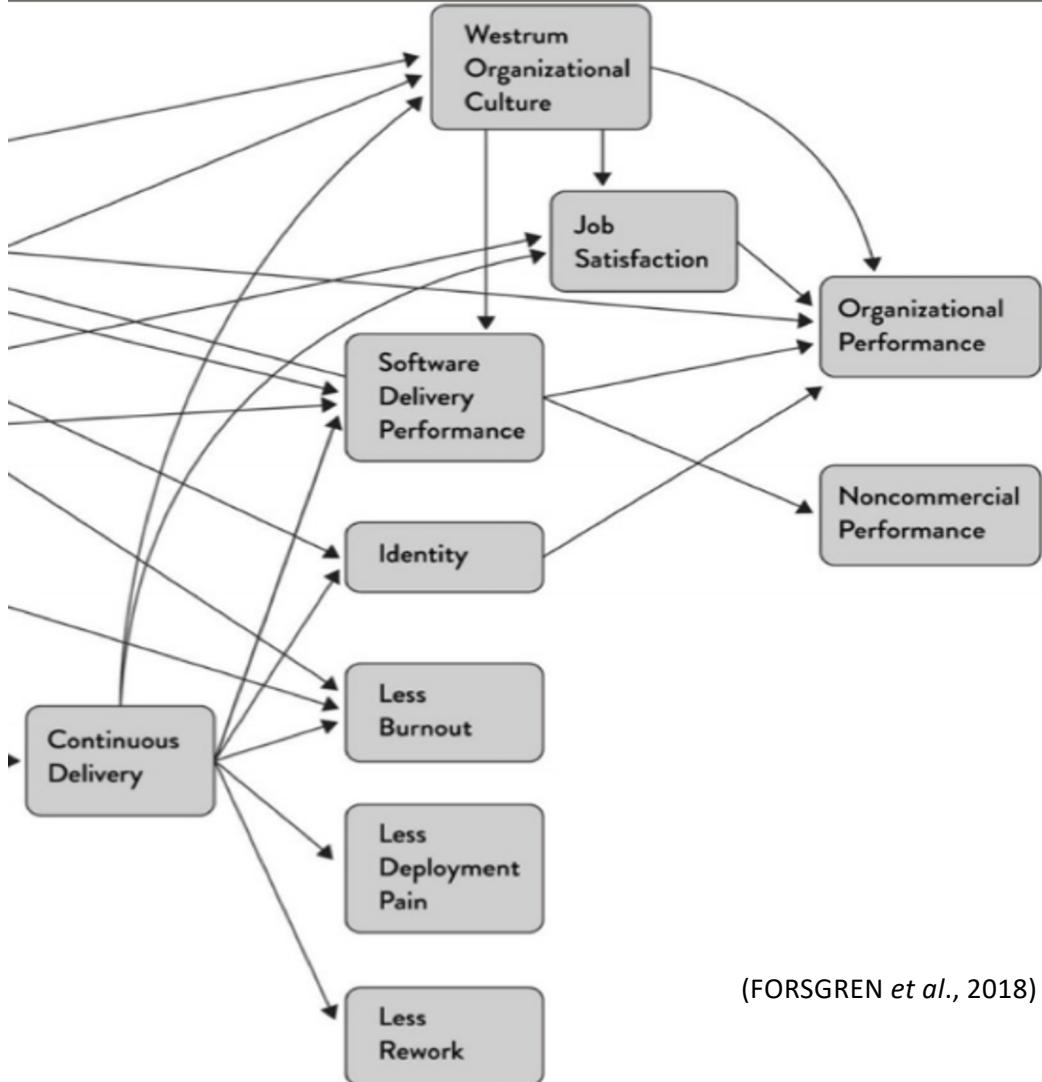
Depois de passar por etapas, como compilação e testes automatizados, o software é enviado para produção ao pressionar um botão

O deploy se torna chato



Entrega Contínua

| Status | Pipeline | Triggerer | Stages | |
|---|---|---|---|---|
|  passed ⌚ 00:05:58 📅 1 day ago | PDSA2-235 Fix data de cadastro ao cadastrar usu... #513062423 ⚒ PDSA2-235 -o- 5e6fa95e 🎨 latest |  |    →  |  |
|  passed ⌚ 00:06:24 📅 1 day ago | PDSA2-235 Fix senha ao cadastrar usuario sem cr... #513055262 ⚒ PDSA2-235 -o- b3c805f5 🎨 |  |    →  |  |
|  passed ⌚ 00:08:01 📅 3 days ago | Merge branch 'PDSA2-229' into 'master' #510826969 ⚒ master -o- a07d0afc 🌐 latest |  Vinicius Maran |    →  |  |
|  passed ⌚ 00:07:44 📅 4 days ago | PDSA2-229 Modulo Doencas de Controle #509795165 ⚒ PDSA2-229 -o- 2292266f 🎨 |  |    →  |  |



- O quanto bem você consegue fazer entrega contínua

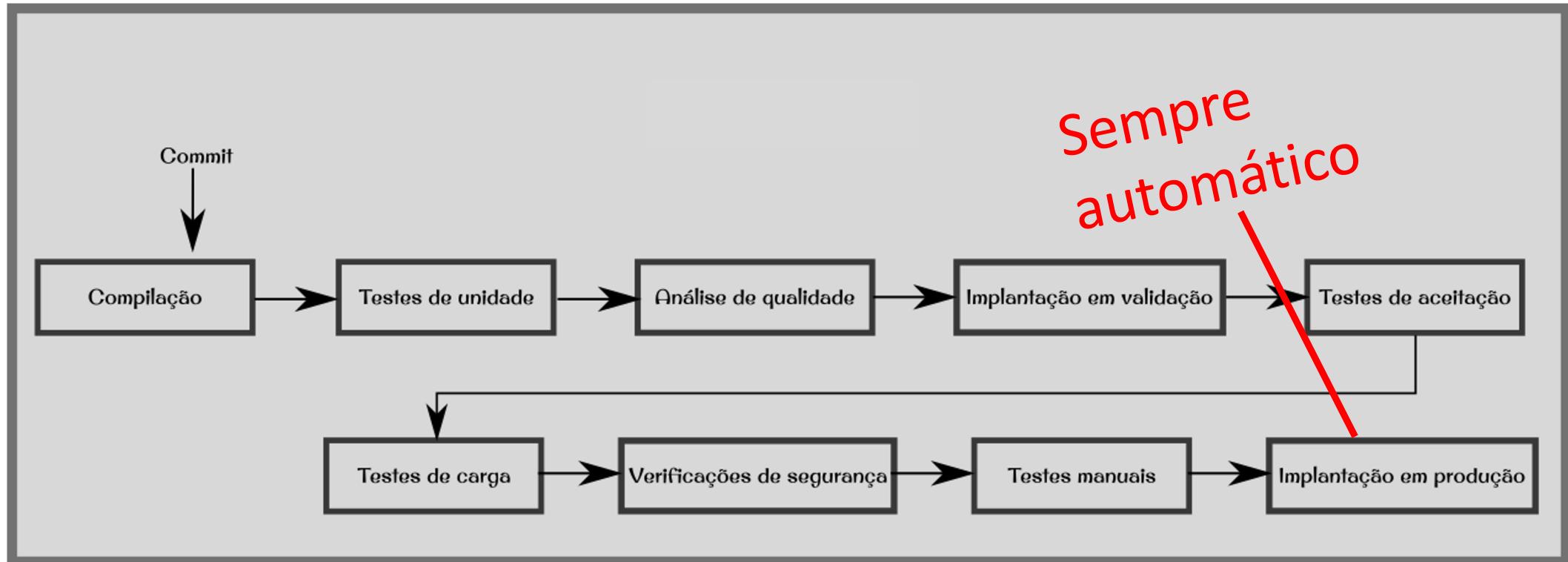
Frequência de implantação

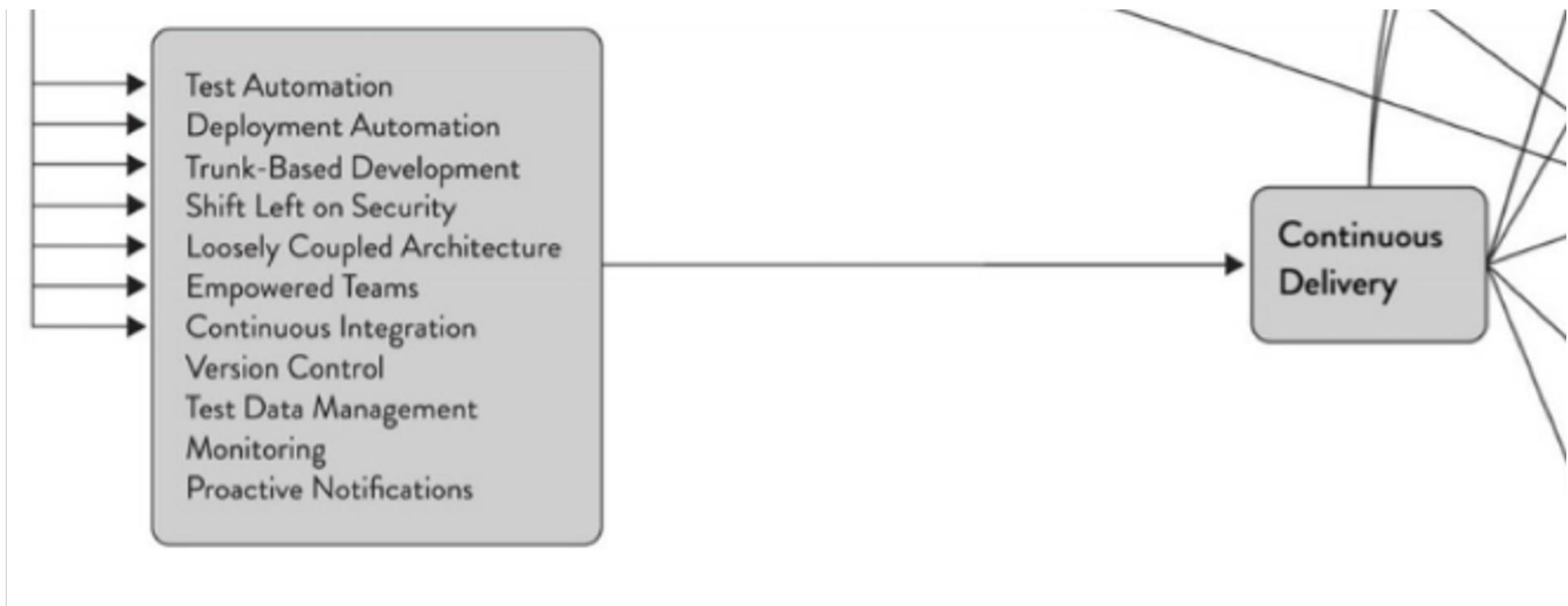
Tempo de entrega

Tempo de recuperação

Frequência de falhas

(FORSGREN *et al.*, 2018)





(FORSGREN *et al.*, 2018)

Integre e teste as alterações após no máximo algumas horas

A programação em equipe não é um problema de dividir e conquistar

É um problema de dividir, conquistar e integrar

A etapa de integração é imprevisível

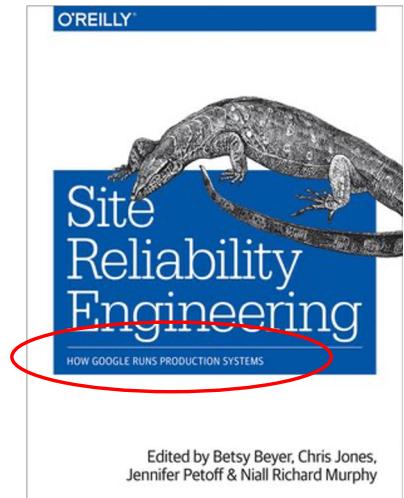
Quanto mais você esperar para integrar, mais custará

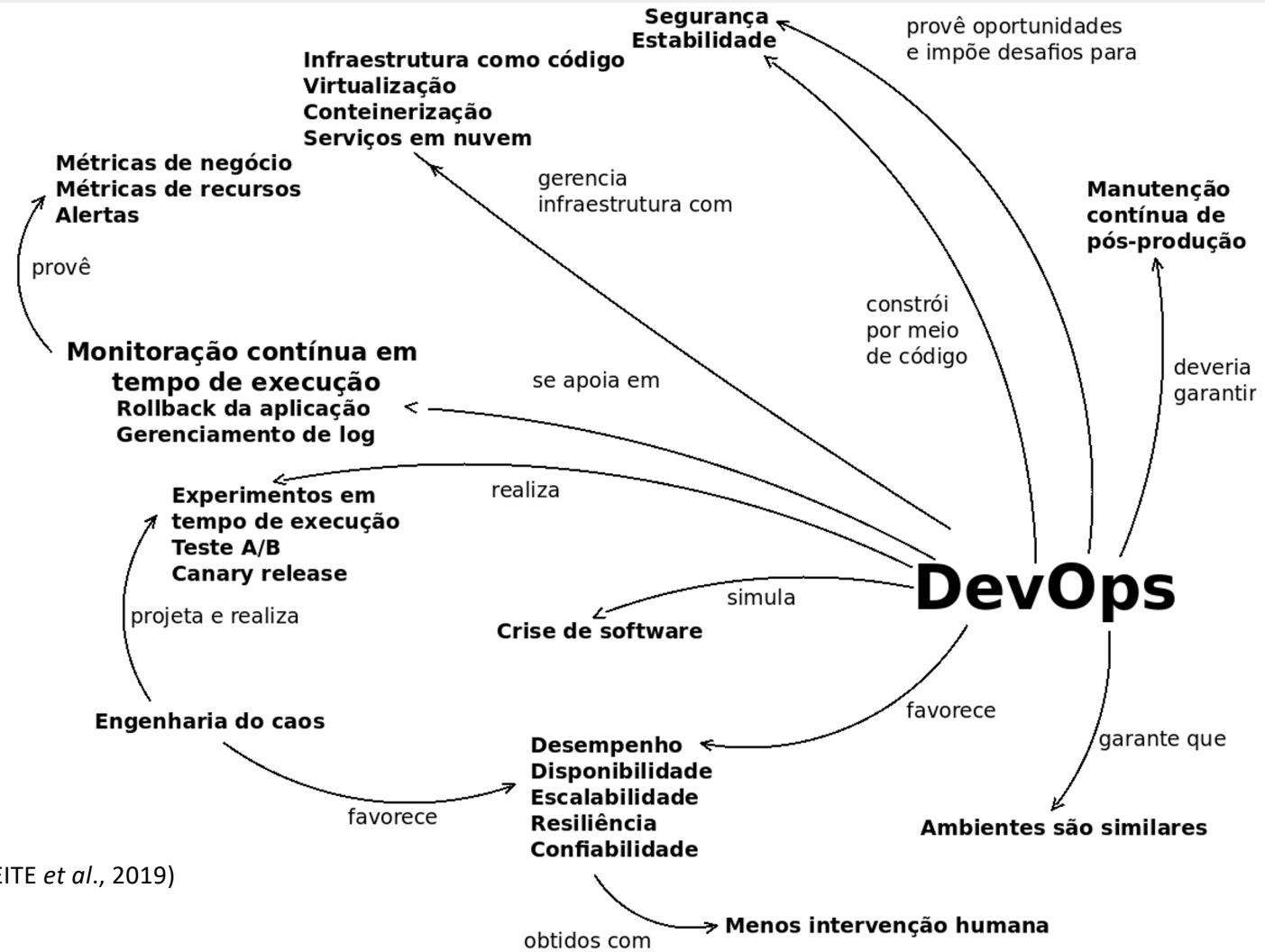
(BECK and ANDRES, 2004)

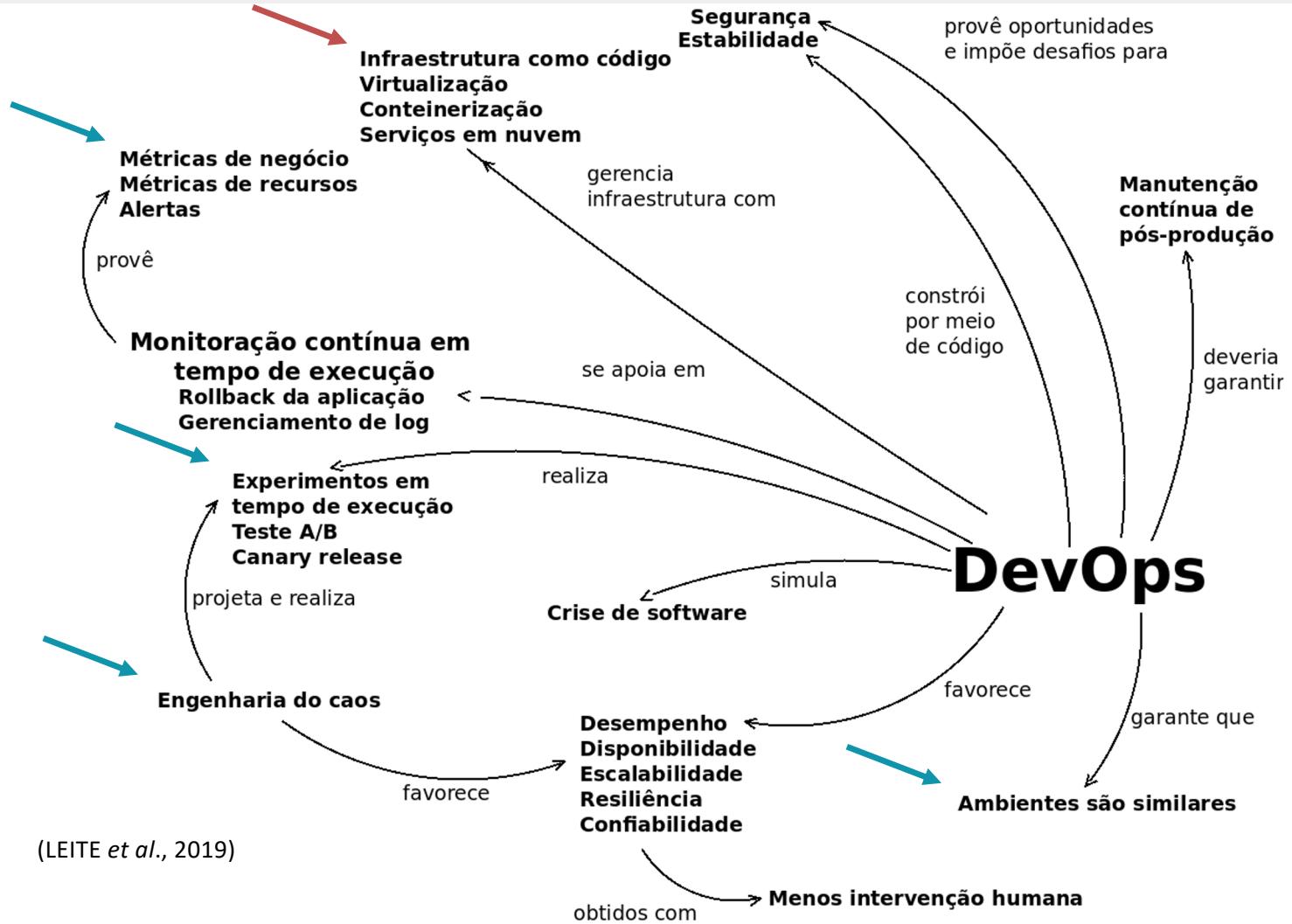
*DevOps is a **collaborative** and **multidisciplinary** effort within an organization **to automate continuous delivery of new software versions**, **while guaranteeing their correctness and reliability***

(LEITE et al., 2019)

- *Correctness*
 - Garantia que o software em produção está na versão correta e com funcionalidades corretas.
- *Reliability (Confiabilidade)*
 - *Reduce toil*
 - *Infrastructure staff code to improve NFR (nonfunctional requirements)*
 - *Limit of 50% of operational work to the infrastructure staff*
 - *Developers sustain the product for a period*







Ferramentas

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------|--|-------------------------|-------------------------|-------------------------|---------------------------|------------------------|-----------------------|-------------------------------|---------------------------|-------------------------------------|---------------------------------|---------------------------|---------------------------------|--------------------------------|-------------------------------------|---------------------------------|---------------------------|----------------------------|---------------------------|---------------------------|-----------------------|--------------------------------|-------------------------|-----------------------|-----------------------|-------------------------------|------------------------------|------------------------|---------------------|--------------------|--------------------------|------------------------|-------------------------|--------------------------|-----------------------------------|--------------------------|------------------------------|-------------------------|----------------------|--------------------------|--------------------------------|---------------------|-------------------------|---------------------------|---------------------------|----------------------------------|------------------------|--------------------------|---------------------|---------------------------------|-------------------------|-------------------------------------|-----------------------|--------------------------|--------------------------|------------------------|----------------------------|------------------------------|-----------------------|-----------------------|------------------------|--------------------------------|---------------------------------|---------------------------|---------------------------|---------------------------------|----------------------------|----------------------|------------------------|-----------------------|------------------------|--------------------------------------|------------------------|-------------------------------|--------------------------|---------------------------|-----------------------|--------------------------|---------------------------------|--------------------------|-----------------------------|
| 1 Os Gl GitLab | PERIODIC TABLE OF DEVOPS TOOLS (v3) | | | | | | | | | | | | | | | | | | 2 En Sp Splunk | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 Fm Gh GitHub | Os Open Source Fr Free Fm Freemium Pd Paid En Enterprise | | | | | | | | | | Source Control Mgmt. | Deployment | Analytics | Embed | 5 En Xlr XebiaLabs XL Release | 6 Fm Aws AWS | 7 Pd Az Azure | 8 En Gc Google Cloud | 9 En Op OpenShift | 10 Fm Sl Sumo Logic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 En Dt Datical | Fr | Database Automation | Dt | Containers | Ad | Monitoring | Af | Ld | Gc | Op | 11 Os Sv Subversion | Continuous Integration | Release Orchestration | Pd | Ur UrbanCode Release | Az Azure Functions | Pd | 17 En Ld Lambda | En Ic IBM Cloud | Os Fd Fluentd | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 En Db DBMaestro | Fm | Testing | Pd | Cloud | Ei | Security | Pr | 32 Fm Cc CA CD Director | 33 En Ku Kubernetes | 34 Pd Al Alibaba Cloud | 13 Os Dk Docker | Ch | Collaboration | En | 31 Os Xld XebiaLabs XL Deploy | 30 En Ud UrbanCode Deploy | 35 Os Os OpenStack | 36 Os Ps Prometheus | 18 Os Sl Sumo Logic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 En Cw ISPW | 20 En Dp Delphix | 21 Os Jn Jenkins | 22 Fm Cs Codeship | 23 Os Fn FitNesse | 24 Fr Ju JUnit | 25 Fr Ka Karma | 26 Fm Su SoapUI | 27 En Ch Chef | 28 Fr Tf Terraform | 29 En Xld XebiaLabs XL Deploy | 30 En Ud UrbanCode Deploy | 31 Os Ku Kubernetes | 32 Fm Cc CA CD Director | 33 En Pr Plutora Release | 34 Pd Al Alibaba Cloud | 35 Os Os OpenStack | 36 Os Ps Prometheus | 37 Os At Artifactory | 38 En Rg Redgate | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39 Pd Ba Bamboo | 40 Fm Vs VSTS | 41 Fr Se Selenium | 42 Fr Jm JMeter | 43 Os Ja Jasmine | 44 Pd Si Sauce Labs | 45 Os An Ansible | 46 Os Ru Rudder | 47 En Oc Octopus Deploy | 48 Os Go GoCD | 49 Os Ms Mesos | 50 Pd Gke GKE | 51 Fm Om OpenMake | 52 Pd Cp AWS CodePipeline | 53 Os Cy Cloud Foundry | 54 En It ITRS | 55 Os Nx Nexus | 56 Os Fw Flyway | 57 Os Tr Travis CI | 58 Fm Tc TeamCity | 59 Os Ga Gatling | 60 Fr Tn TestNG | 61 Fm Tt Tricentis Tosca | 62 Pd Pe Perfecto | 63 En Pu Puppet | 64 Os Pa Packer | 65 Fm Cd AWS CodeDeploy | 66 En Ec ElectricCloud | 67 Os Ra Rancher | 68 Pd Aks AKS | 69 Os Rk Rkt | 70 Os Sp Spinnaker | 71 Pd Ir Iron.io | 72 Pd Mg Moogsoft | 73 Fm Bb BitBucket | 74 En Pf Perforce HelixCore | 75 Fm Cr Circle CI | 76 Pd Cb AWS CodeBuild | 77 Fr Cu Cucumber | 78 Os Mc Mocha | 79 Os Lo Locust.io | 80 En Mf Micro Focus UFT | 81 Os Sl Salt | 82 Os Ce CFEngine | 83 En Eb ElasticBox | 84 En Ca CA Automic | 85 En De Docker Enterprise | 86 Pd Ae AWS ECS | 87 Fm Cf Codefresh | 88 Os Hm Helm | 89 Os Aw Apache OpenWhisk | 90 Os Ls Logstash | 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 Checkmark SAST | 102 En 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 Agile 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 En Ff Fortify SCA |

Ferramentas



- Precisamos conhecer todas ?



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| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|------------|--------|--------|--------|-----------|--------|-----------|--------|-----------|------------|-------------|--------|---------------|---------------|--------|----------|--------|-----------|--------|--------|-----------|----------|-----------------|----------|-----------|-------------|-----------|----------|-----------------|
| 91 | En | 92 | Os | 93 | Fm | 94 | En | 95 | En | 96 | Fm | 97 | Os | 98 | Os | 99 | Os | 100 | En | 101 | En | 102 | Er | 103 | En | 104 | Os | 105 | Os |
| Xli | Kelialabs | Ki | Kibana | Nr | New Relic | Dt | Dynatrace | Dd | Datadog | Ad | AppDynamics | EI | ElasticSearch | Ni | Nagios | Zb | Zabbix | Zn | Zenoss | Cx | Checkmark | Sg | Signal Sciences | Bd | BlackDuck | Sr | SonarQube | Hv | HashiCorp Vault |
| Xlia | LIMPACT | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | Impact | |
| 106 | En | 107 | Pd | 108 | Fm | 109 | Fm | 110 | Fm | 111 | En | 112 | En | 113 | En | 114 | Pd | 115 | Pd | 116 | Os | 117 | Os | 118 | En | 119 | En | 120 | Er |
| Sw | ServiceNow | Jr | Tl | Sl | Slack | St | Stride | Cn | CollabNet | VincentOne | Ry | Remedy | Ac | Agile Central | Og | OpsGenie | Pd | Pagerduty | Sn | Smart | Tw | Triptire | Ck | CyberArk | Ff | Fortify SCA | Veracloud | Veracode | |

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

(LEITE *et al.*, 2019)

+ algumas

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

(LEITE *et al.*, 2019)

- **Fórum de Discussão**

- Dúvidas, sugestões, relatos de casos reais (Cultura DevOps)

- **Leitura**

- Artigo (Survey DevOps, 2019)

- **Para próxima aula:**

- Instalar Virtualbox + imagem Linux (ubuntu)

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