

DigitalHouse >

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# DATA SCIENCE

Machine Learning – Modelos em Produção



Evidentemente – os **Modelos Preditivos** desenvolvidos e treinados por **Cientistas de Dados** precisam chegar até o “mundo real” – o chamado ambiente produtivo. Também conhecido como o ambiente de **Produção**.

## Why do 87% of data science projects never make it into production?

VB STAFF JULY 19, 2019 4:10 AM



"If your competitors are applying AI, and they're finding insight that allow them to accelerate, they're going to peel away really, really quickly," Deborah Leff, CTO for data science and AI at IBM, said on stage at Transform 2019.

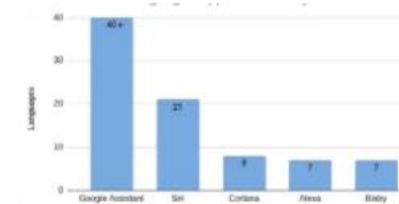
On their panel, "What the heck does it even mean to 'Do AI'?" Leff and Chris Chapo, SVP of data and analytics at Gap, dug deep into the reason so many companies are still either kicking their heels or simply failing to get AI strategies off the ground, despite the fact that the inherent advantage large companies had over small companies is gone now, and the paradigm has changed completely. With AI, the fast companies are outperforming the slow companies.

<https://venturebeat.com/2019/07/19/why-do-87-of-data-science-projects-never-make-it-into-production/>

Most Read



Microsoft reports \$36.9 billion in Q2 2020 revenue: Azure up 62%, Surface up 6%, and LinkedIn up 24%




Why Google Assistant supports so many more languages than Siri, Alexa, Bixby, and Cortana



Meena is Google's attempt at making true conversational AI





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[Home](#) » [Topics](#) » [Data Science](#) » Help! My Data Scientists Can't Write (Production) Code!

## Help! My Data Scientists Can't Write (Production) Code!

 August 13, 2019 by [Editorial Team](#) [Leave a Comment](#) 

 tweet  share  share  email

Businesses across the world are hiring data scientists to beef up their efficiency and competitiveness via artificial intelligence (AI). Startup companies (dubbed AI-First companies) are disrupting traditional industries like banking, insurance, real estate and healthcare using AI technologies.

The demand for data scientists far exceeds supply. And, the problem is exacerbated by the fact that the data scientist profession is itself splitting into multiple sub-disciplines. Some examples of this divide include:

- Decision scientists have domain expertise and specialize in linking the domain knowledge and the algorithm to solve a problem.
- Data scientists have expertise with machine learning (ML) and related algorithmic fields at the application level, i.e., they know how to apply algorithms to data sets to generate successful experimental insights.
- ML research scientists can create new algorithms to solve more custom problems or adapt/exploit recent research advances.

Regardless of which of these skill-sets are needed, businesses face a common problem when trying to monetize successful AI experiments. None of the above skill-sets are required to include a strong competency in production software development. This is not the key value the data scientist brings to the problem. It is, however, a critical aspect of getting an ML application (which itself is a program, frequently in Python, R or Java) running for a business purpose. Not only that – the level of programming interest and capability varies widely from role to role and individual to individual.

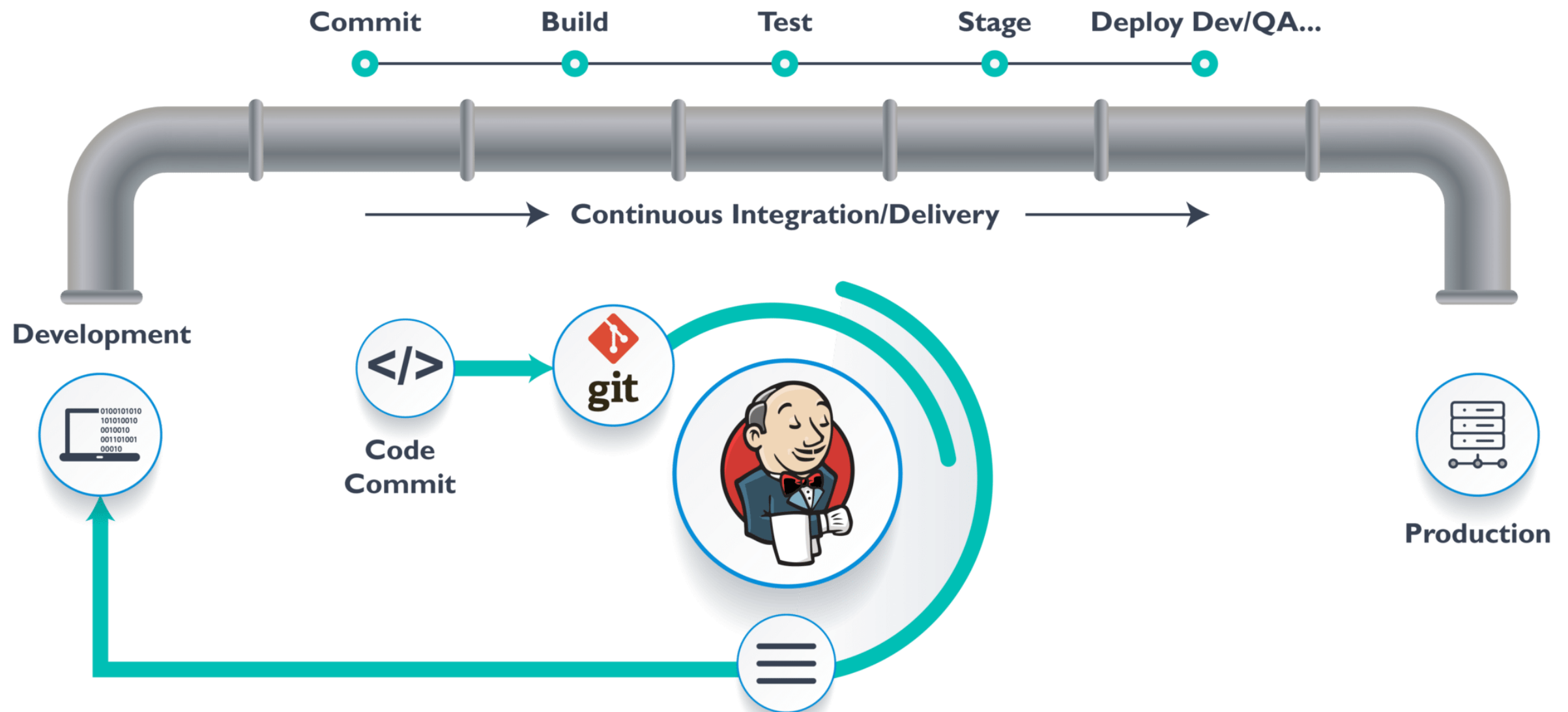
### INDUSTRY PERSPECTIVES

#### The Bots Have Arrived (What's New?)

In this special guest feature, Karl Chan, President and Chief Technology Officer at Laserfiche, believes that as the sheer amount of data continues to rise, humans alone will not be able to meet the challenge of managing and processing it. Bots, already widely deployed for everything from customer service requests to medical operations, are the solution for today's organizations that need to collect data from multiple, disparate sources, manage and process it, and put it to use.

[\[READ MORE...\]](#)

<https://insidebigdata.com/2019/08/13/help-my-data-scientists-cant-write-production-code/>



<https://dzone.com/articles/learn-how-to-setup-a-cicd-pipeline-from-scratch>

Neste contexto é fundamental que Cientistas de Dados tenham o conhecimento do fluxo de atividades e operações que leva o software até o ambiente produtivo – o **PIPELINE** de desenvolvimento. Permitindo então desta maneira que o software desenvolvido seja feito, desde sua concepção, com todos os requisitos necessários para a entrega no ambiente produtivo, o mundo real.

**VAMOS COLOCAR UM  
WEB APP EM PRODUÇÃO  
(NA INTERNET)**



# Streamlit.

## The fastest way to build data apps

Streamlit's open-source app framework is the easiest way for data scientists and machine learning engineers to create beautiful, performant apps in only a few hours! All in pure Python. All for free.

<https://www.streamlit.io/>

```
pip install streamlit
```



Observação – poderá ser necessário colocar o caminho do streamlit.exe no PATH (Windows)

C:\Users\[**USUÁRIO**]\AppData\Roaming\Python\Python37\Scripts

```
(base) C:\streamlit>streamlit hello

Welcome to Streamlit. Check out our demo in your browser.

Local URL: http://localhost:8501
Network URL: http://192.168.0.10:8501

Ready to create your own Python apps super quickly?
Just head over to https://docs.streamlit.io

May you create awesome apps!
```

Vamos rodar o “Hello World” do Streamlit no prompt e ver o resultado no Browser:

- > streamlit hello

Depois iremos rodar também:

- > streamlit run tutorial.py

- > streamlit run bandrec-streamlit.py





## Recomendação de Bandas

Escolha o país

- ☒ Estados Unidos
- ☐ Reino Unido
- ☐ Brasil

Digite o nome da Banda / Artista

megadeth

Submeter

Recommendations for megadeth:

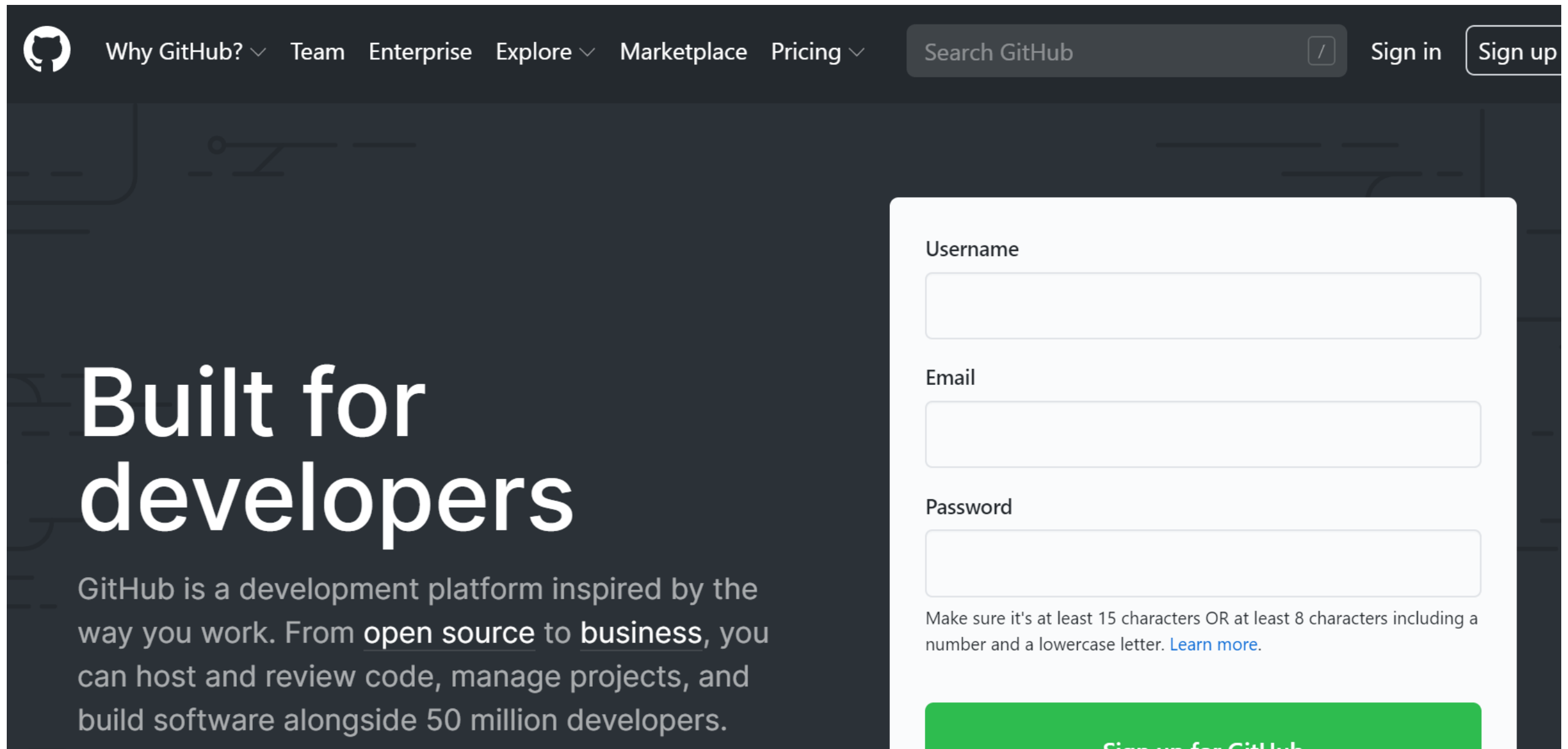
1: black sabbath, with distance of 0.3221987029536757:

2: koЯn, with distance of 0.3742111519629977:

3: slipknot, with distance of 0.37701311363710077:



Descompactar arquivos recebidos do pacote webapp.zip



The screenshot shows the GitHub homepage. The top navigation bar includes the GitHub logo, links for 'Why GitHub?', 'Team', 'Enterprise', 'Explore', 'Marketplace', and 'Pricing', a search bar, and 'Sign in' and 'Sign up' buttons. The main content area features the text 'Built for developers' and a description of GitHub as a development platform. A white sign-up form is overlaid on the right side of the page, containing fields for 'Username', 'Email', and 'Password', along with a 'Sign up for GitHub' button.

Why GitHub? ▾ Team Enterprise Explore ▾ Marketplace Pricing ▾ Search GitHub / Sign in Sign up

# Built for developers

GitHub is a development platform inspired by the way you work. From open source to business, you can host and review code, manage projects, and build software alongside 50 million developers.

Username

Email

Password

Make sure it's at least 15 characters OR at least 8 characters including a number and a lowercase letter. [Learn more.](#)

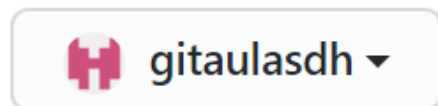
Sign up for GitHub

<https://github.com/>

## Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

Owner



Repository name \*

/

Great repository names are short and memorable. Need inspiration? How about **ubiquitous-pancake**?

Description (optional)



**Public**

Anyone on the internet can see this repository. You choose who can commit.



**Private**

You choose who can see and commit to this repository.

Create repository

gitaulasdh / webapp

Unwatch

1

★ Star

0

🍴 Fork

0

&lt;&gt; Code

! Issues

🔗 Pull requests

🎮 Actions

📁 Projects

📖 Wiki

🛡 Security

📈 Insights

⚙ Settings

## Quick setup — if you've done this kind of thing before



Set up in Desktop

or

HTTPS

SSH

<https://github.com/gitaulasdh/webapp.git>

Get started by [creating a new file](#) or [uploading an existing file](#). We recommend every repository include a [README](#), [LICENSE](#), and [.gitignore](#).

## ...or create a new repository on the command line

```
echo "# webapp" >> README.md
git init
git add README.md
git commit -m "first commit"
git remote add origin https://github.com/gitaulasdh/webapp.git
```











webapp /



Drag files here to add them to your repository

Or [choose your files](#)

Subir todos arquivos que estavam no webapp.zip, descompactados previamente

 bandrec-streamlit.py	×
 Procfile	×
 requirements.txt	×
 setup.sh	×
 usersha1-artmbid-artname-plays_1.tsv	×
 usersha1-profile.tsv	×



### Commit changes

Carga inicial dos arquivos

Add an optional extended description...

Commit changes

Cancel

E nesta mesma tela dar “commit changes”.

gitaulasdh / webapp

Unwatch1

Star0

Fork0

<> Code

! Issues

🔗 Pull requests

🎬 Actions

📁 Projects

📖 Wiki

🛡 Security

📈 Insights

⚙ Settings

🔗 Branch: master ▾

Go to file

Add file ▾

📄 Clone ▾

gitaulasdh committed b25299e now ...

🕒 1 commits 🔗 1 branch 🏷 0 tags

📄 Procfile	Carga inicial dos arquivos	now
📄 bandrec-streamlit.py	Carga inicial dos arquivos	now
📄 requirements.txt	Carga inicial dos arquivos	now
📄 setup.sh	Carga inicial dos arquivos	now
📄 usersha1-artmbid-artname-pla...	Carga inicial dos arquivos	now
📄 usersha1-profile.tsv	Carga inicial dos arquivos	now

About

No description, website, or topics provided.

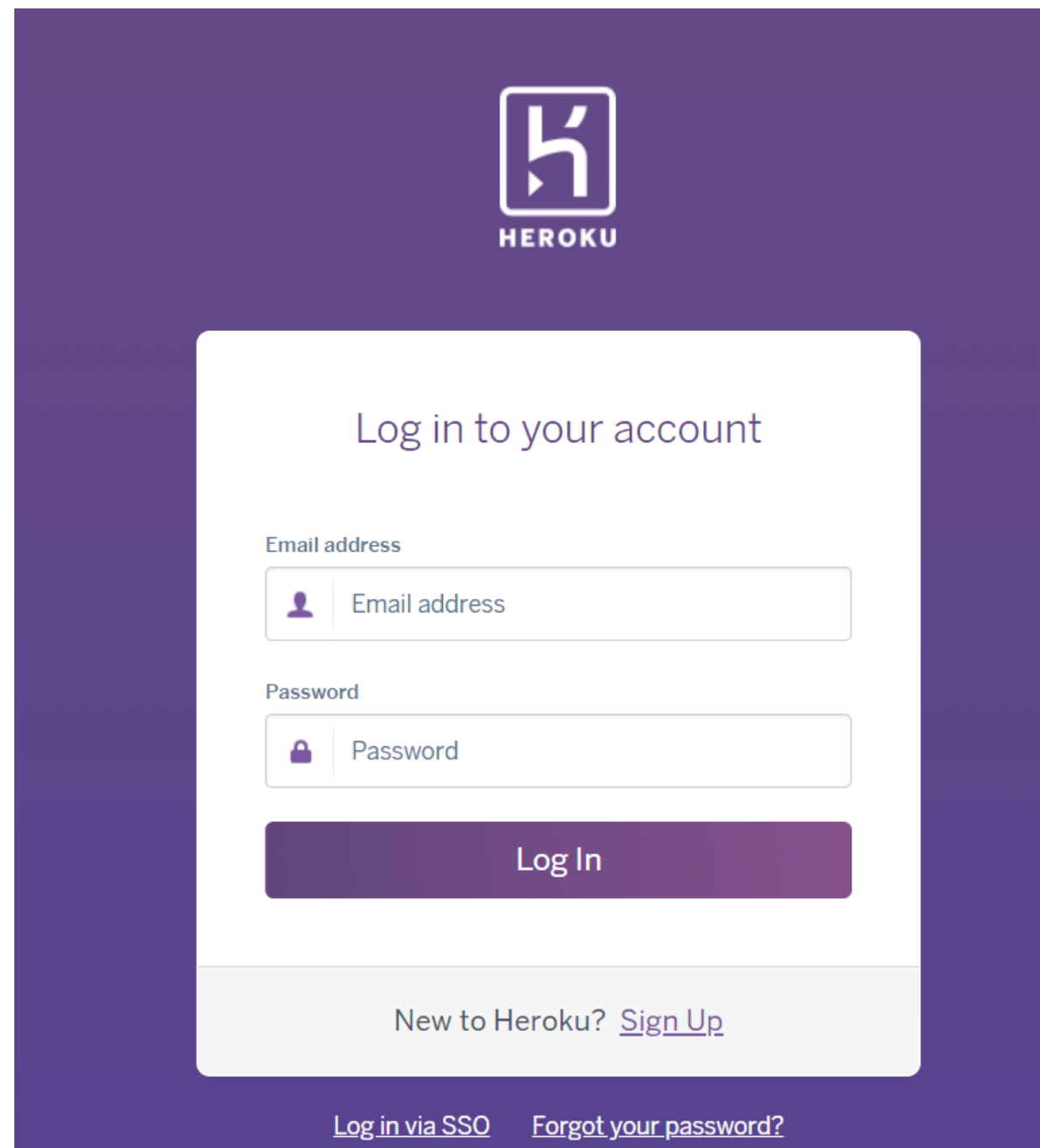
Releases

No releases published

Create a new release

Packages

No packages published

The image shows the Heroku login page. At the top center is the Heroku logo, which consists of a stylized 'H' inside a square, with the word 'HEROKU' underneath. Below the logo, the text 'Log in to your account' is centered. There are two input fields: 'Email address' and 'Password'. Each field has a small icon on the left (a person for email and a lock for password) and a placeholder text. Below the password field is a purple 'Log In' button. At the bottom of the form, there is a link 'New to Heroku? Sign Up'. At the very bottom of the page, there are two links: 'Log in via SSO' and 'Forgot your password?'.

<https://www.heroku.com/>

Selecionar “Sign Up”, preencher todos os dados e confirmar a inscrição no e-mail enviado



Personal ▾

New ▾



## Welcome to Heroku

Now that your account has been set up, here's how to get started.

-  Create new app
-  Create new pipeline

Dismiss



### Create a new app

Create your first app and deploy your code to a running dyno.

[Create new app](#)

### Create a team

Create teams to collaborate on your apps and pipelines.

[Create a team](#)

### Looking for help getting started with your language?

Get started by reading one of our language guides in the Dev Center

[Node.js](#)[Ruby](#)[Java](#)[PHP](#)[Python](#)[Go](#)[Scala](#)[Clojure](#)



Create New App

App name

webappauladh



**webappauladh** is available

Choose a region



United States



Add to pipeline...

Create app

Personal &gt; webappauladh



Open app

More &gt;

Overview

Resources

Deploy

Metrics

Activity

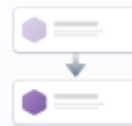
Access

Settings

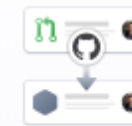
## Add this app to a pipeline

Create a new pipeline or choose an existing one and add this app to a stage in it.

Add this app to a stage in a pipeline to enable additional features



Pipelines let you connect multiple apps together and **promote code** between them. [Learn more.](#)



Pipelines connected to GitHub can enable **review apps**, and create apps for new pull requests. [Learn more.](#)

Choose a pipeline

## Deployment method



Heroku Git  
Use Heroku CLI



GitHub  
Connect to GitHub



Container Registry  
Use Heroku CLI

## Connect to GitHub

Connect this app to GitHub to enable code diffs and deploys.

## View your code diffs on GitHub

Connect your app to a GitHub repository to see commit diffs in the activity log.

## Deploy changes with GitHub

Connecting to a repository will allow you to deploy a branch to your app.

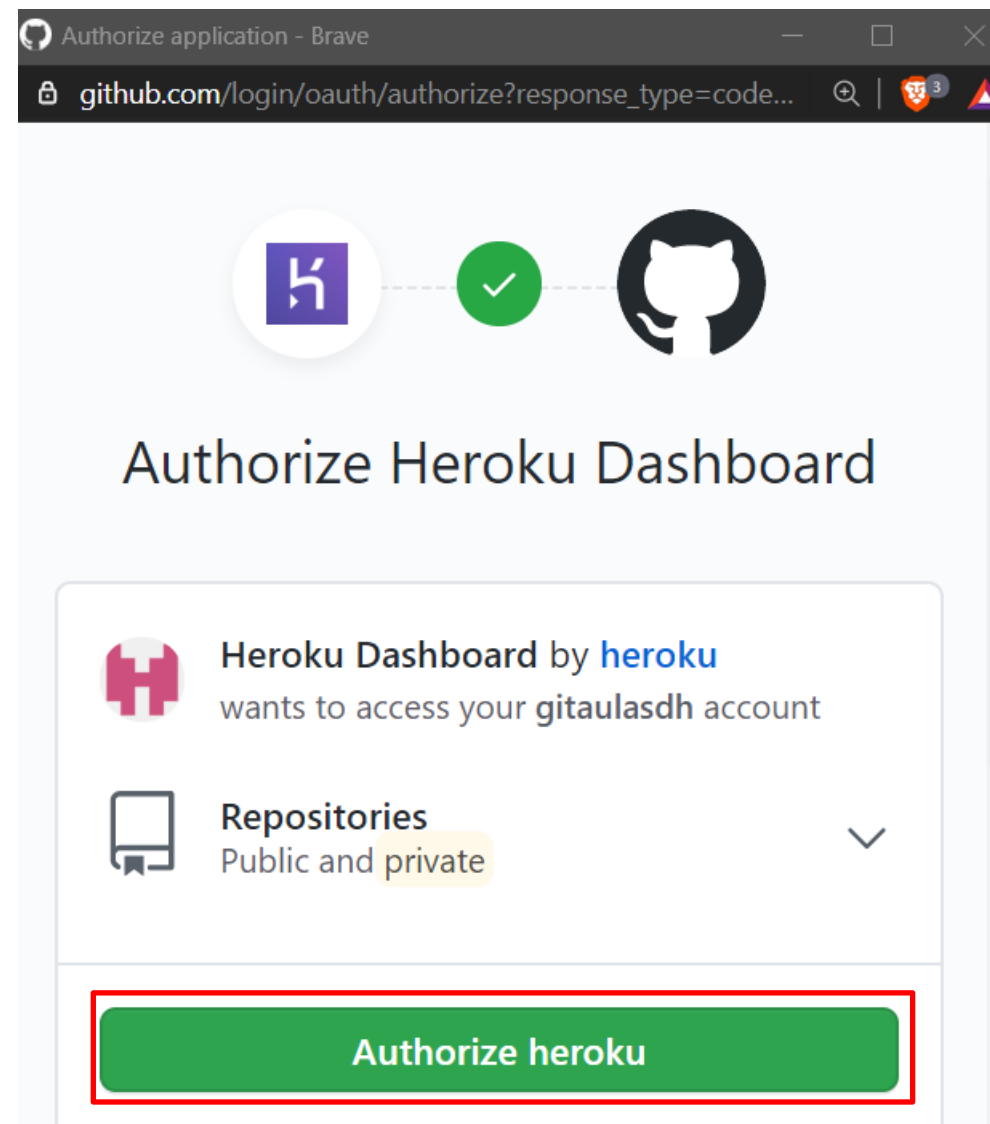
## Automatic deploys from GitHub

Select a branch to deploy automatically whenever it is pushed to.

## Create review apps in pipelines

Pipelines connected to GitHub can enable **review apps**, and create apps for new pull requests. [Learn more.](#)

Connect to GitHub



Personal > webappauladh

☆ Open app More

Overview Resources Deploy Metrics Activity Access Settings

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Add this app to a stage in a pipeline to enable additional features

Pipelines let you connect multiple apps together and **promote code** between them.

[Learn more.](#)

Pipelines connected to GitHub can enable **review apps**, and create apps for new pull requests.

[Learn more.](#)

Choose a pipeline

Deployment method

Heroku Git

Use Heroku CLI

GitHub

Connect to GitHub

Container Registry

Use Heroku CLI

Connect to GitHub

Connect this app to GitHub to enable code diffs and deploys.

Search for a repository to connect to

gitaulasdh

webapp

Search

Missing a GitHub organization? [Ensure Heroku Dashboard has team access.](#)

gitaulasdh/webapp

Connect

Aguardar alguns segundos para que  
seja feita a conexão / download do repo  
ou dê reload na página

Personal > webappauladh

GitHub gitaualsdh/webapp

Open app More

Overview Resources Deploy Metrics Activity Access Settings

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Choose a pipeline

Deployment method

Heroku Git  
Use Heroku CLI

GitHub  
Connected

Container Registry  
Use Heroku CLI

App connected to GitHub

Code diffs, manual and auto deploys are available for this app.

Connected to gitaualsdh/webapp by gitaualsdh

Disconnect...

Releases in the [activity feed](#) link to GitHub to view commit diffs

Automatic deploys

Enables a chosen branch to be automatically deployed to this app.

Enable automatic deploys from GitHub

Every push to the branch you specify here will deploy a new version of this app. **Deploys happen automatically:** be sure that this branch is always in a deployable state and any tests have passed before you push. [Learn more.](#)

Choose a branch to deploy

master

☐ Wait for CI to pass before deploy

Only enable this option if you have a Continuous Integration service configured on your repo.

Enable Automatic Deploys

Manual deploy

Deploy the current state of a branch to this app.

Deploy a GitHub branch

This will deploy the current state of the branch you specify below. [Learn more.](#)

Choose a branch to deploy

master

Deploy Branch

Acompanhar para ver se o deploy dos arquivos foi feito com sucesso



Receive code from GitHub



Build **master** `b25299e3`



Release phase






Deploy to Heroku



Your app was successfully deployed.

 [View](#)

 Personal >  webappauladh

GitHub  gitaulasdh/webapp

☆

Open app

More >

Overview

Resources

Deploy

Metrics

Activity

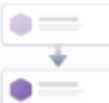
Access

Settings

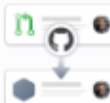
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Use Heroku CLI

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Connected to  [gitaulasdh/webapp](#) by  [gitaulasdh](#)

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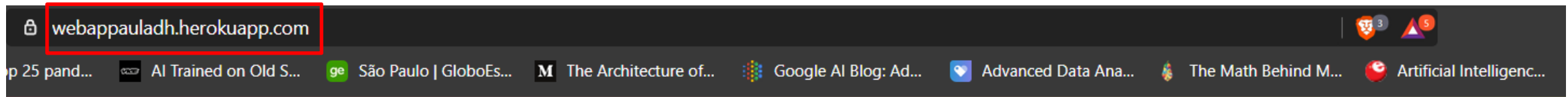
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 master

☐ Wait for CI to pass before deolv



## Recomendação de Bandas

Escolha o país

- ☒ Estados Unidos  
☐ Reino Unido  
☐ Brasil

Digite o nome da Banda / Artista

megadeth

Submeter

### Recommendations for megadeth:

1: black sabbath, with distance of 0.3221987029536757:

2: koЯn, with distance of 0.3742111519629977:

3: slipknot, with distance of 0.37701311363710077:

```
Procfile x
1 web: sh setup.sh && streamlit run --server.port $PORT bandrec-streamlit.py
2
```

**Procfile** – indica os comandos que vão ser executados

```
requirements.txt x
1 numpy==1.17.3
2 pandas==1.0.5
3 streamlit==0.62.0
4 scipy==1.4.1
5 fuzzywuzzy==0.18.0
6 sklearn
7
```

**requirements.txt** – libs a serem instaladas

```
setup.sh x
1 mkdir -p ~/.streamlit/
2
3 echo "\
4 [server]\n\
5 headless = true\n\
6 port = $PORT\n\
7 enableCORS = false\n\
8 \n\
9 " > ~/.streamlit/config.toml
```

**setup.sh** – preparação e configuração do ambiente

**VAMOS COLOCAR UM  
WEB SERVICE EM PRODUÇÃO  
(NA INTERNET)**





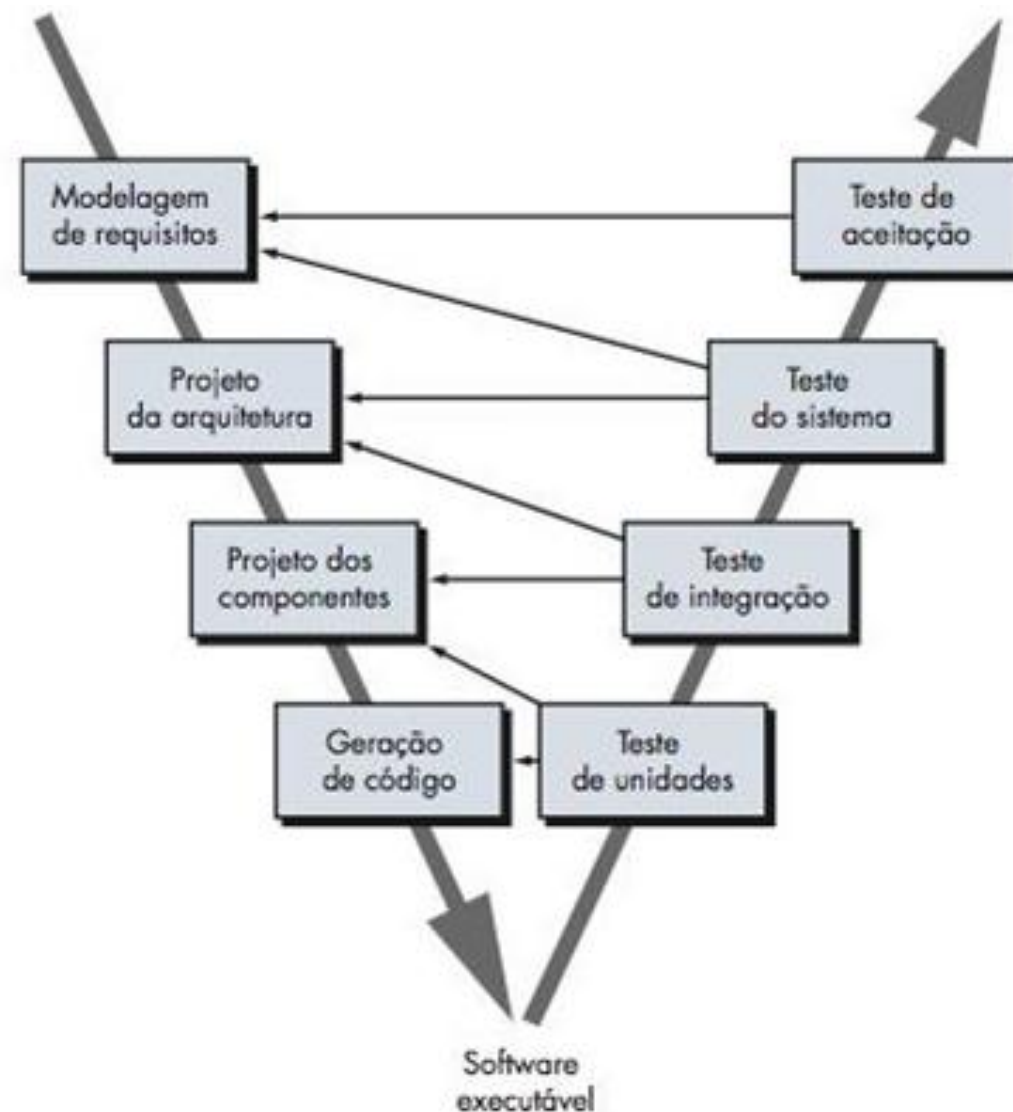
Agora vamos criar um webservice com o Flask e fazer o deploy do mesmo no Heroku.



Descompactar arquivos em webservice.zip e abrir o notebook **deploy\_api\_heroku\_v1.ipynb** no Jupyter.



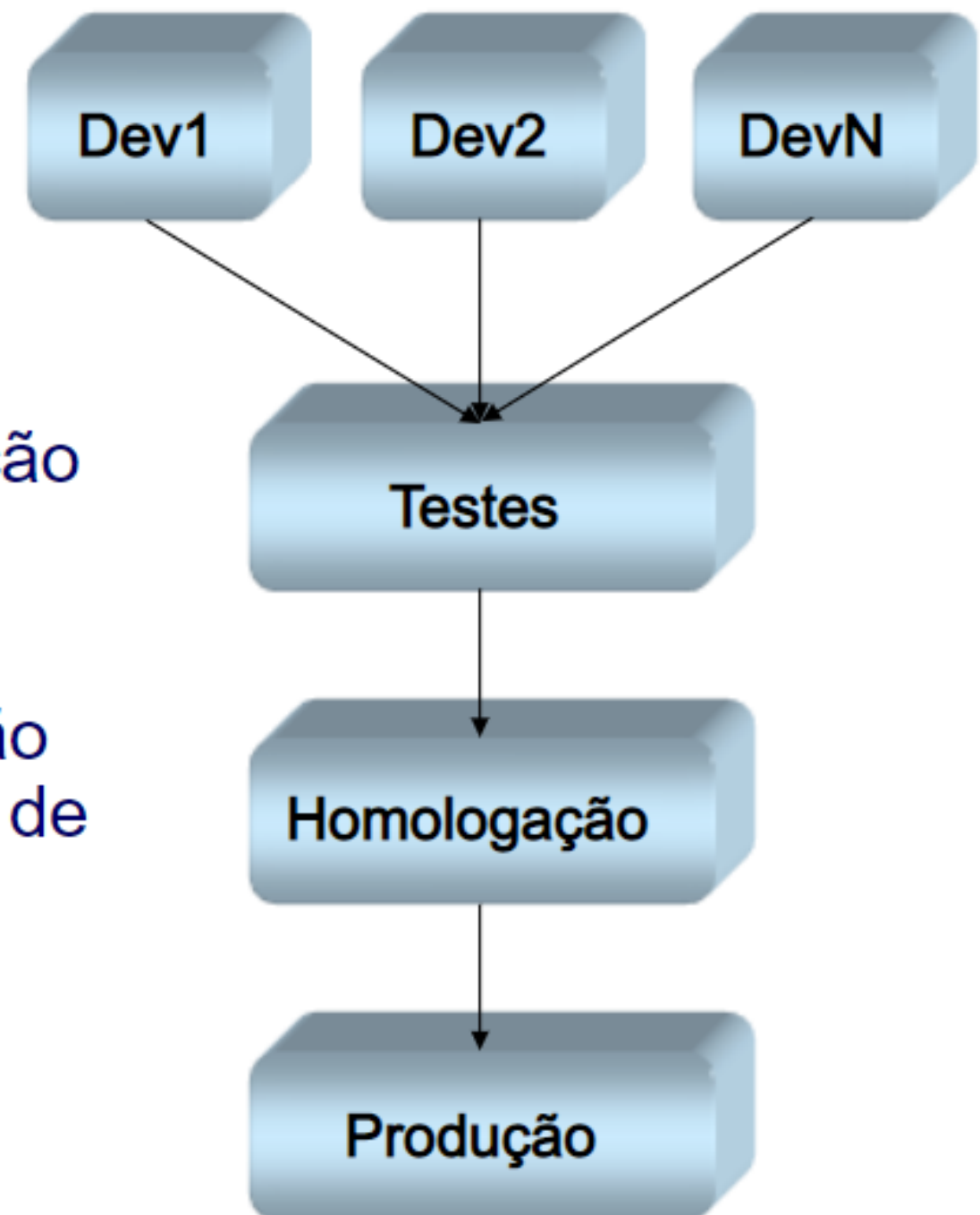
**COMO O SOFTWARE  
CHEGA AO AMBIENTE  
PRODUTIVO?**

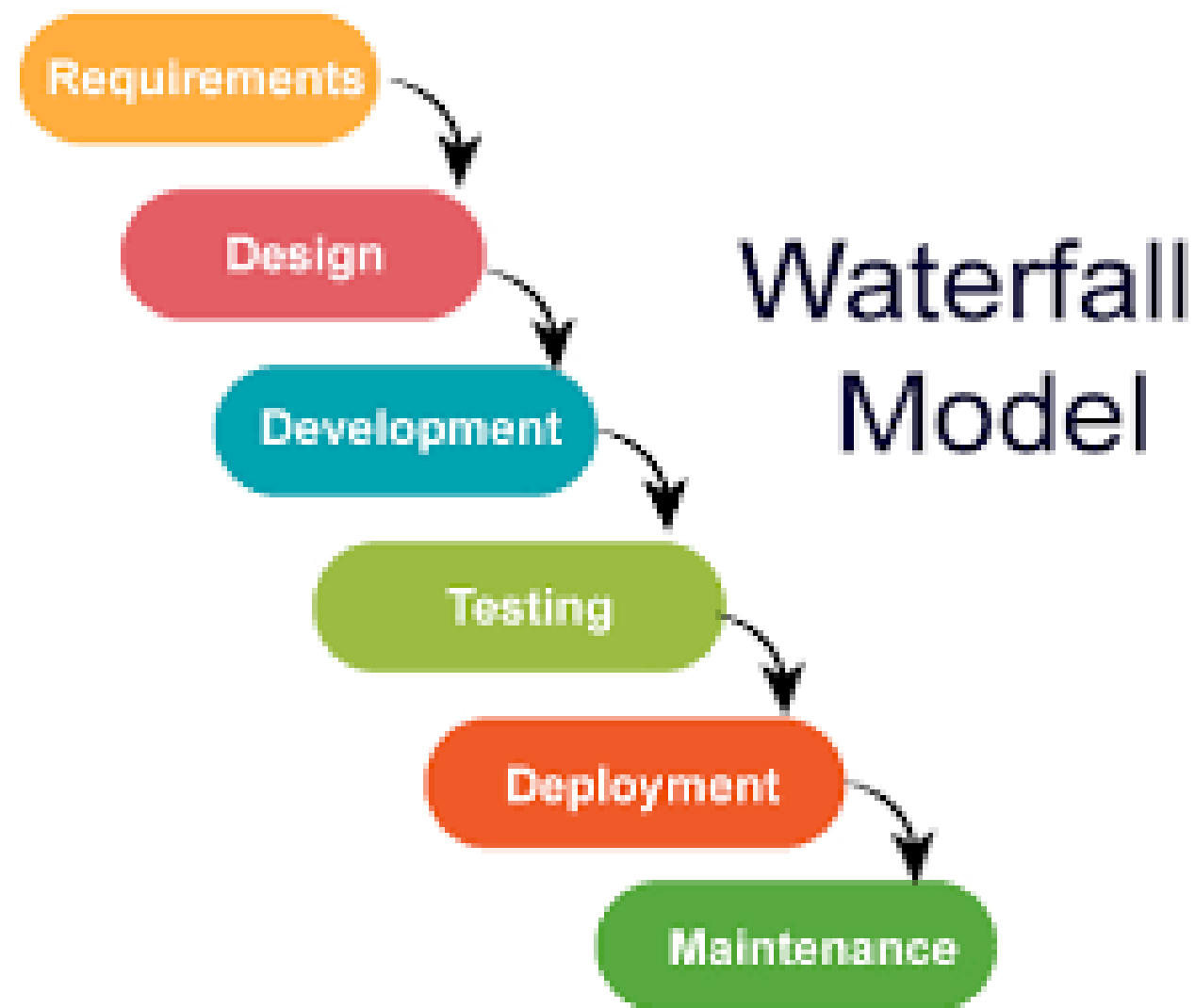


<https://www.devmedia.com.br/introducao-ao-modelo-cascata/29843>

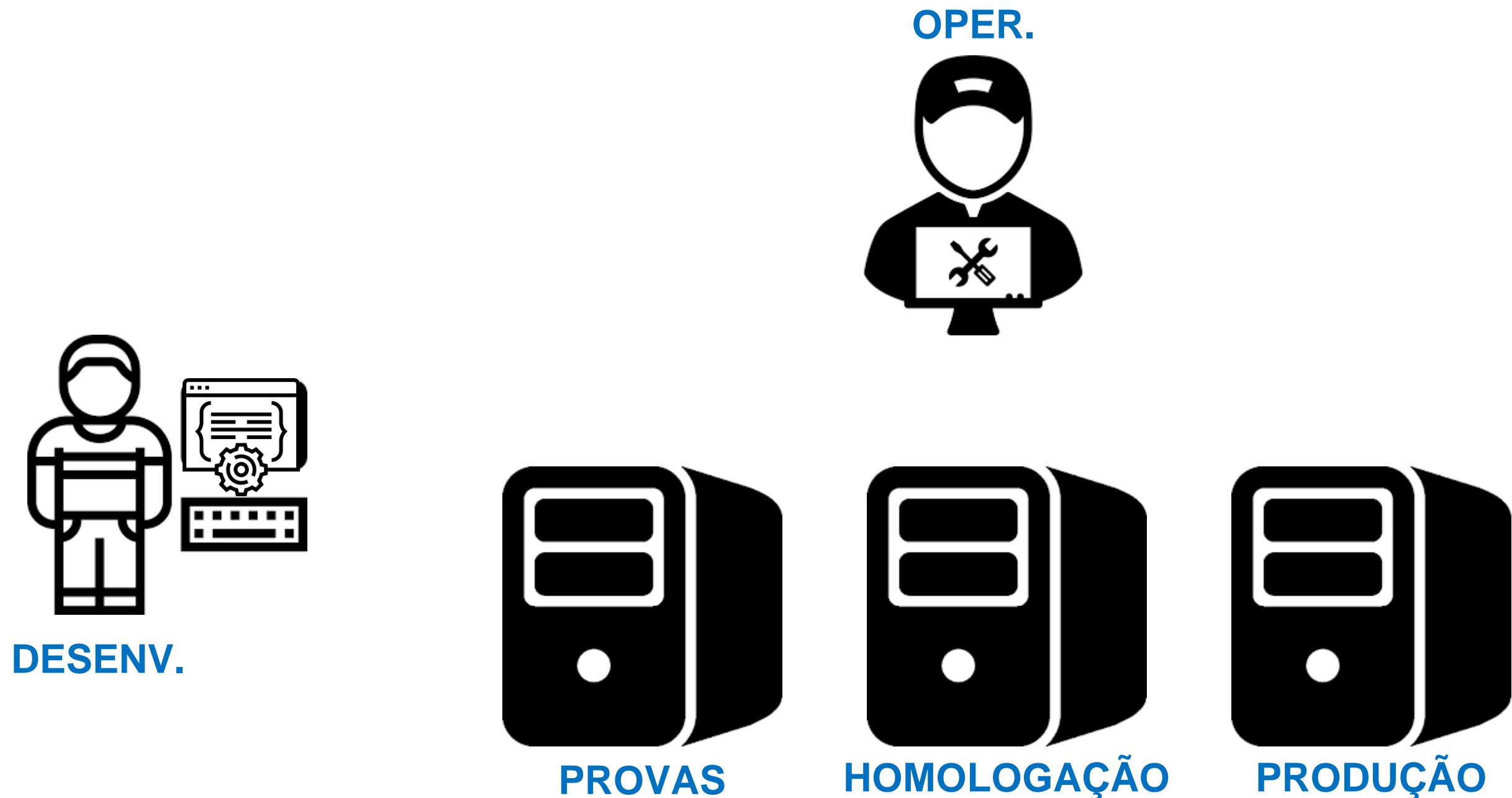
Importante lembrarmos do modelo mais tradicional de desenvolvimento de software – o “**V Model**” para entendermos sua evolução e o estágio atual dos conceitos de entrega e desenvolvimento de software.

- **Desenvolvimento**
  - Estação de trabalho dos desenvolvedores
- **Testes**
  - Ambiente para testar a integração das unidades desenvolvidas
- **Homologação**
  - Ambiente similar ao de produção utilizado para realizar os testes de aceitação
- **Produção**
  - Ambiente real de produção da aplicação

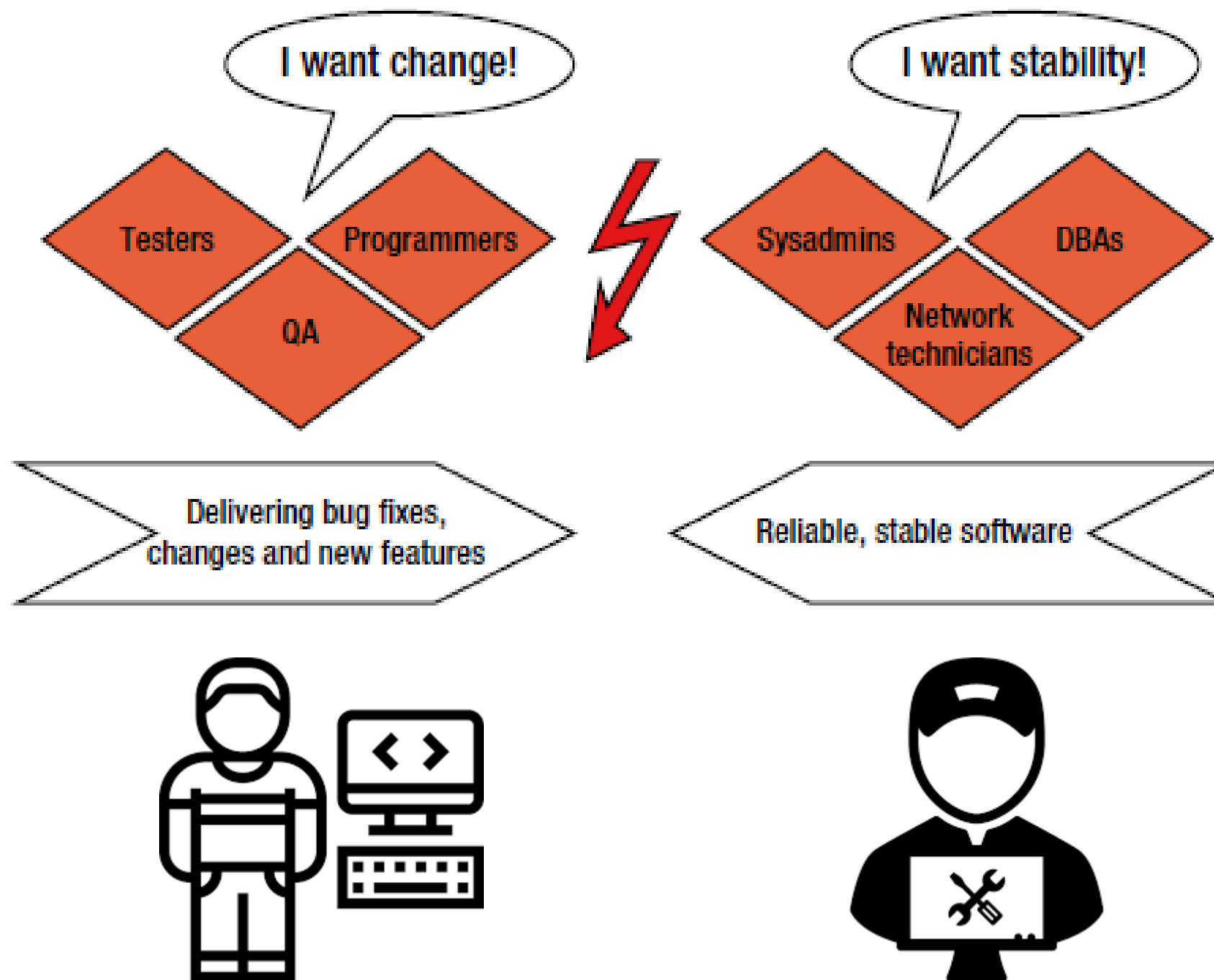




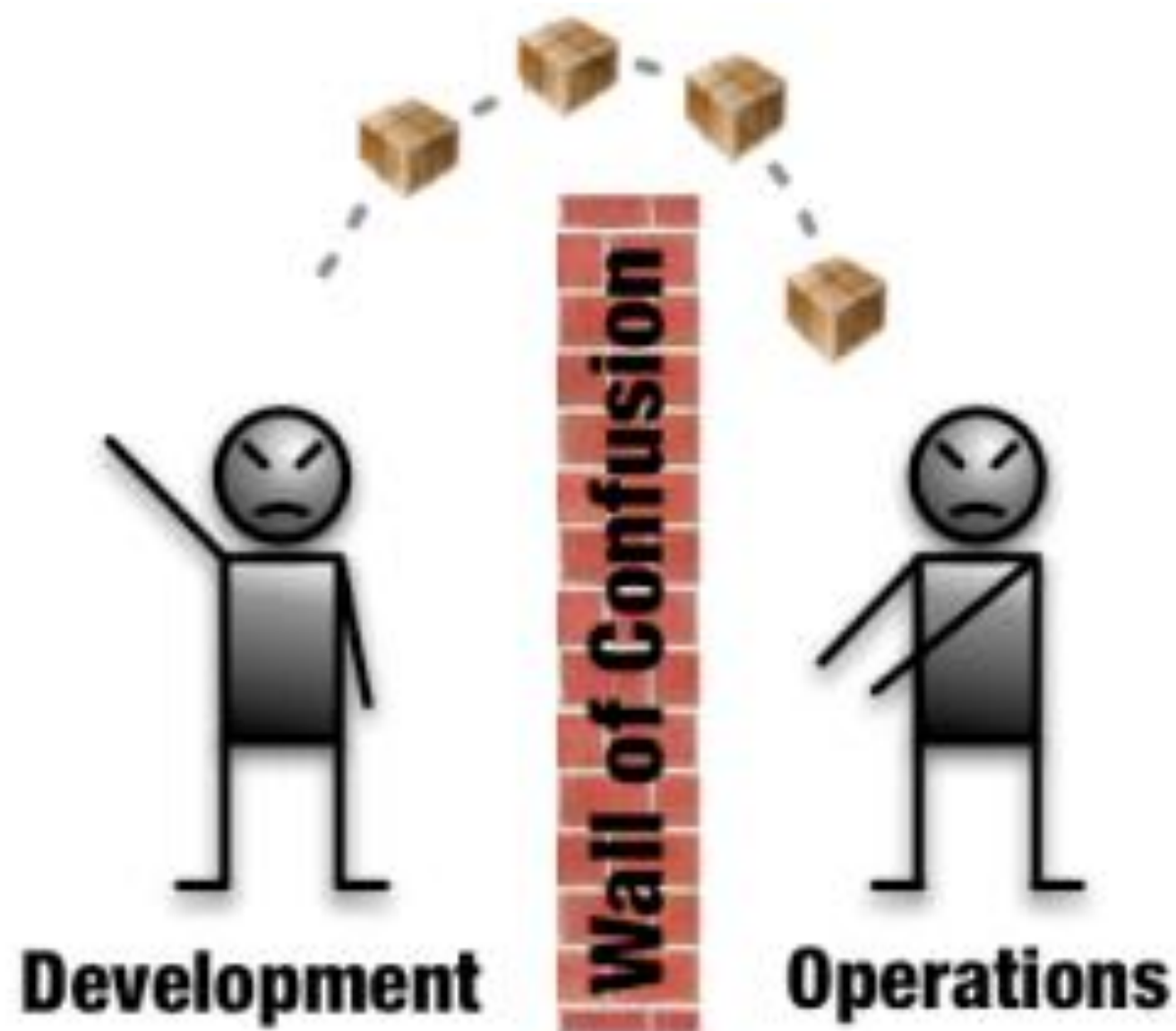
Outra denominação muito comum para o modelo tradicional de desenvolvimento de software é **Waterfall** ou Cascata em português.



No modelo tradicional de desenvolvimento o programador faz o **Build** de seu programa e entrega o executável produzido para a equipe de Operações. Esta equipe faz a **Movimentação** do programa entre os ambientes.







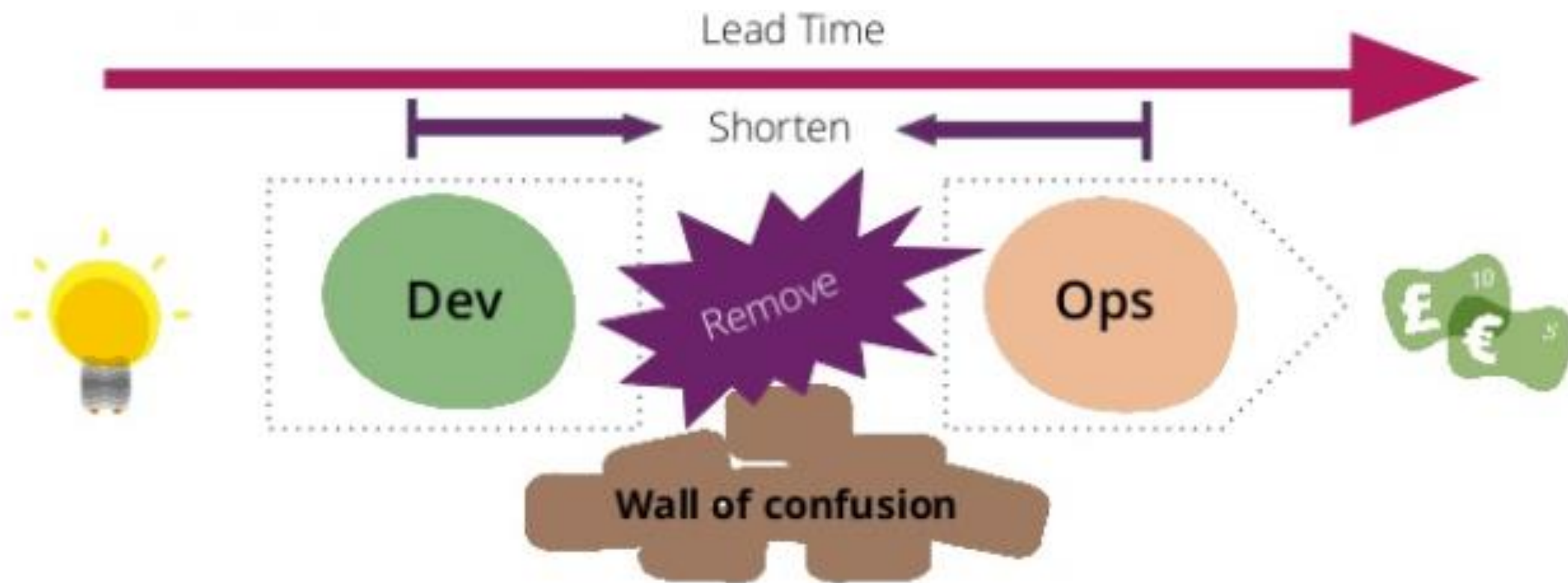
No modelo tradicional de desenvolvimento tínhamos uma divisão clara e distinta entre as equipes de **Desenvolvimento** e **Operações**. Hoje é consenso que havia entre os dois um “**Muro de Confusão**” causando uma série de problemas.

10 deploys per day  
Dev & ops cooperation at Flickr

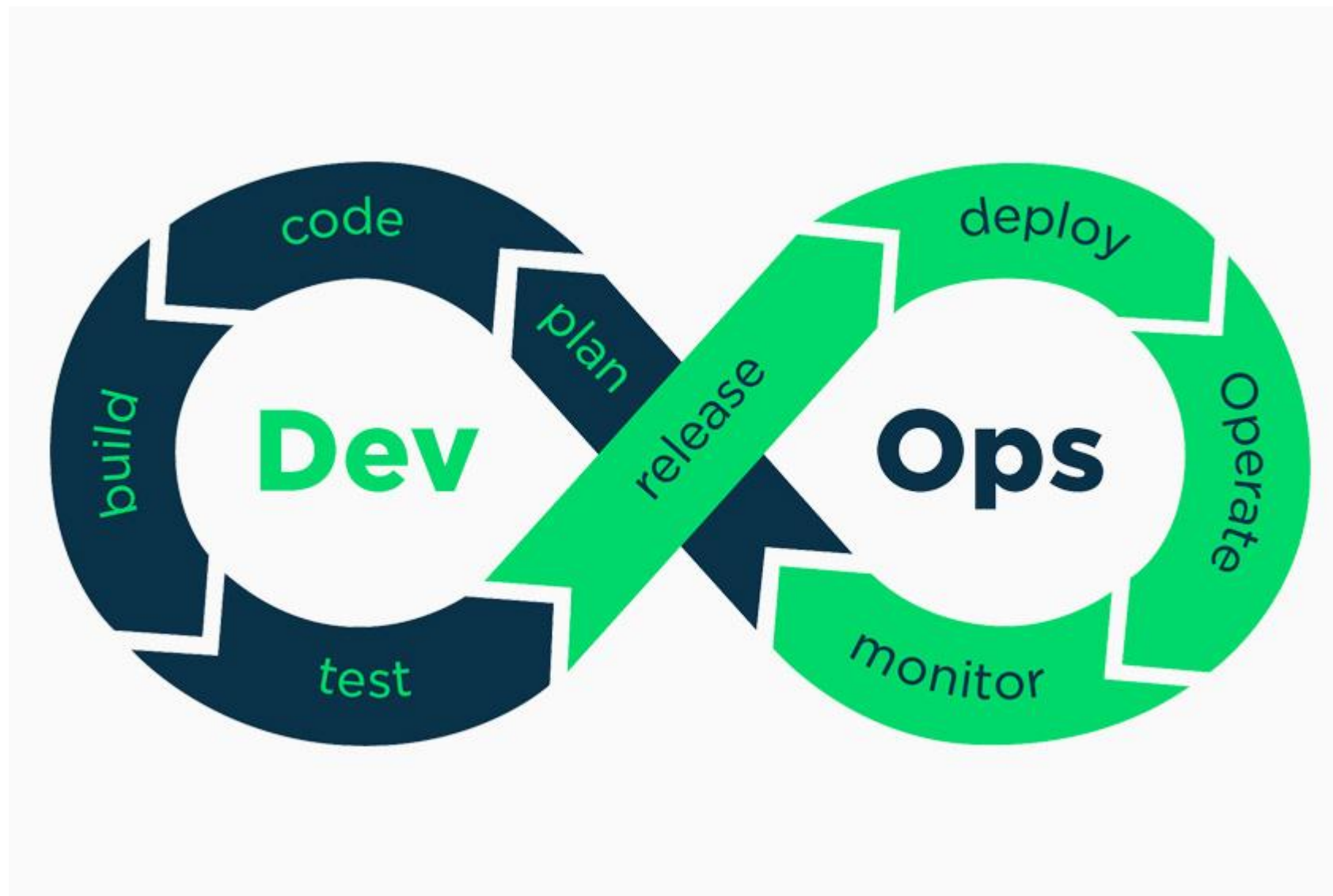
John Allspaw & Paul Hammond  
Velocity 2009

<https://pt.slideshare.net/jallspaw/10-deploys-per-day-dev-and-ops-cooperation-at-flickr>

Porém em 2009 John Allspaw e Paul Hammond fizeram a apresentação “*10 deploys per day – Dev & Ops cooperation at Flickr*” – introduzindo o conceito de **DevOps**.

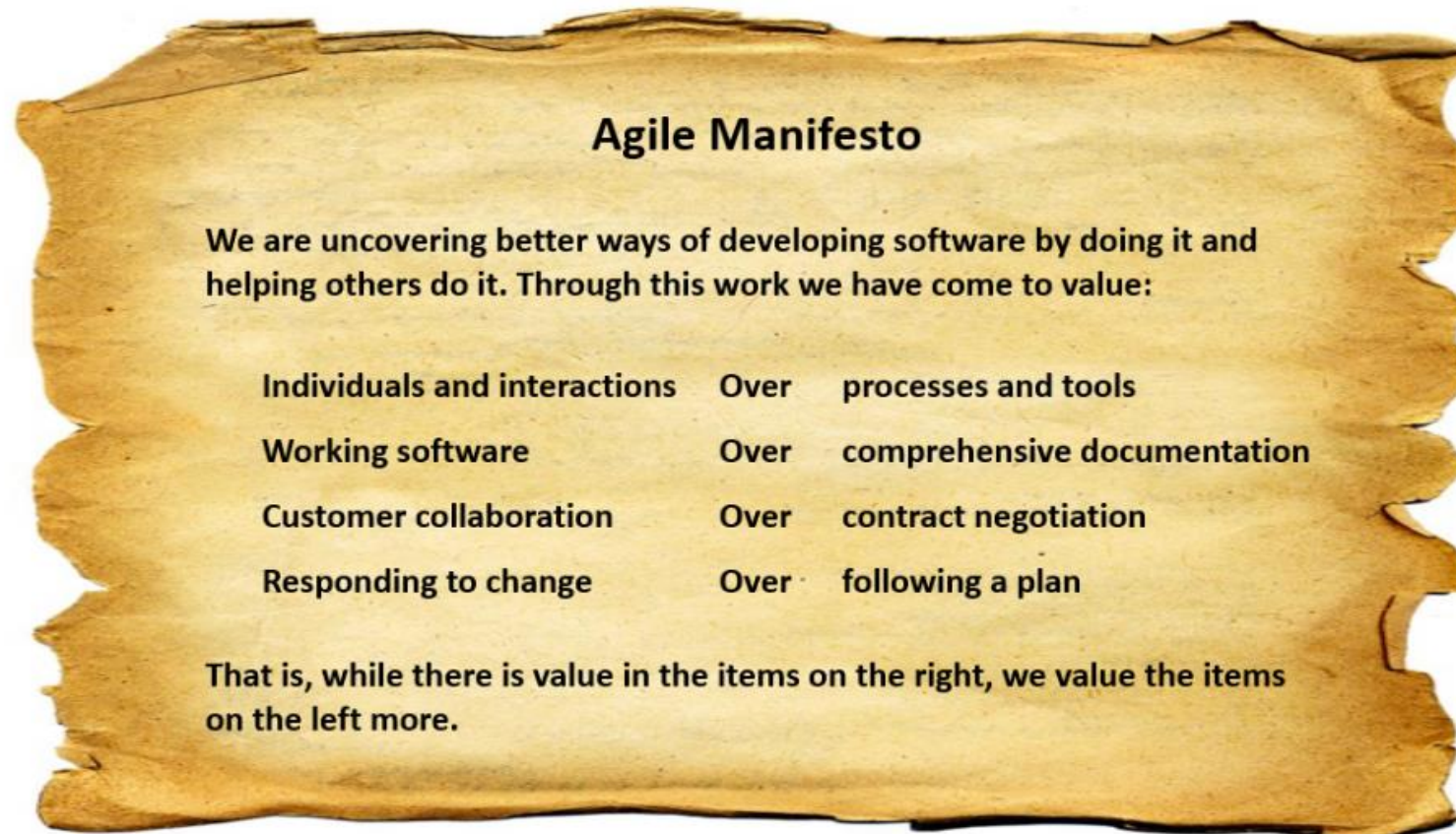


O conceito de DevOps propõe então eliminar esta barreira entre as duas equipes – principalmente através da **Automatização** dos processos de entrega de software ao ambiente produtivo.



E junto com a automação, além da maior integração entre as equipes, a ideia é que o processo de entrega de software com valor ao cliente possa ocorrer com uma frequência bem maior – baseada em um processo iterativo.





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1.5 18

Essa nova maneira de entregar software foi impulsionada também pelo advento das metodologias ágeis (**Agile**) de desenvolvimento de software – que também propôs a entrega de software com valor em intervalos menores – num processo iterativo.

### Agile Methodology



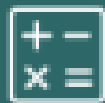
## Data Scientist

also known as Data Managers, statisticians.



A data scientist will be able to take data science projects from end to end. They can help store large amounts of data, create predictive modelling processes and present the findings.

**Skills:** Mathematics, Programming, Communication



Will use programmes such as:  
SQL, Python, R

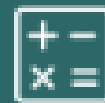
## Data Engineers

also known as database administrators and data architects.



They are versatile generalists who use computer science to help process large datasets. They typically focus on coding, cleaning up data sets, and implementing requests that come from data scientists.

**Skills:** Programming, Mathematics, Big data



Will use programmes such as:  
Hadoop, NoSQL, and Python

## Data Analysts

also known as business Analysts.



They typically help people from across the company understand specific queries with charts.

**Skills:** Statistics, Communication, Business knowledge



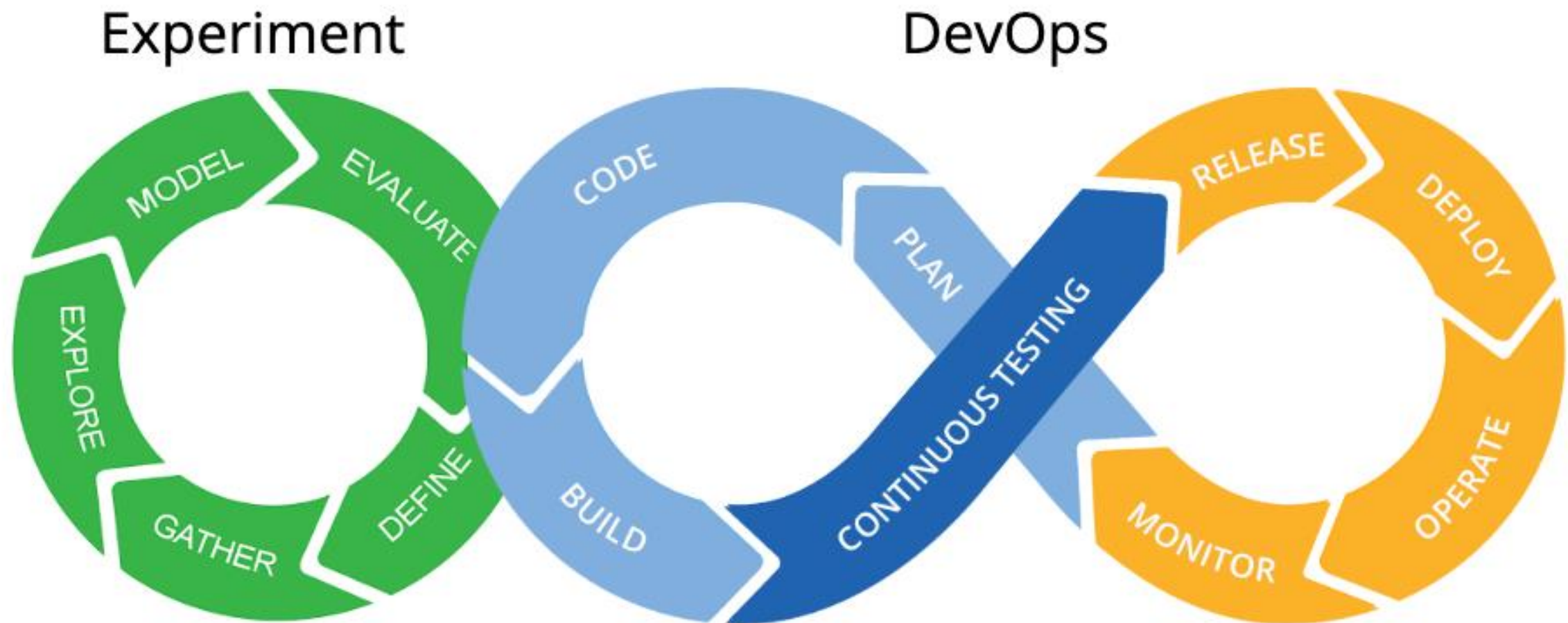
Will use programmes such as:  
Excel, Tableau, SQL

DEV

OPS

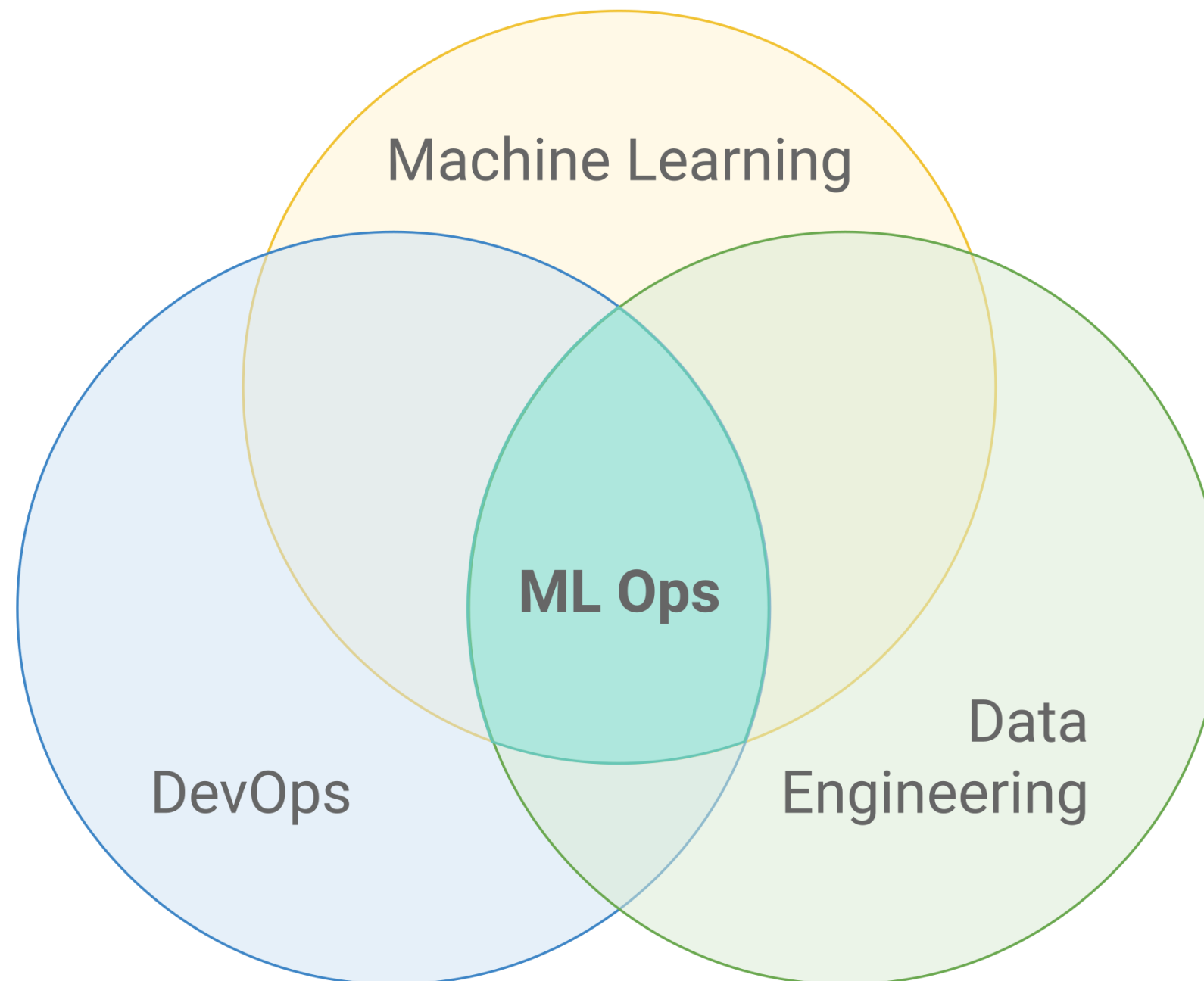
*"It has been said that a data scientist is someone who is better at statistics than any software engineer, and better at software engineering than any statistician"*

***MACHINE LEARNING  
OPERATIONS  
ML - OPS***



<https://blog.jdriven.com/2019/10/machine-learning-systems-require-paradigm-shift-in-software-engineering/>





<https://medium.com/@cbreuel/ml-ops-machine-learning-como-disciplina-de-engenharia-a058770b93dc>

*O ML Ops é um conjunto de práticas que combina Machine Learning, DevOps e Engenharia de Dados, que visa implantar e manter sistemas de ML em produção de maneira confiável e eficiente.*

Prática	DevOps	Engenharia de Dados	ML Ops
Controle de versões	Versionamento de código	Versionamento de código Linhagem de dados	<b>Versionamento de código + dados + modelos (conectados)</b>
Pipeline	n/a	Pipeline de dados/ETL	<b>Pipeline ML de treinamento, Pipeline ML de predição</b>
Validação de comportamento	Testes unitários	Testes unitários	<b>Validação de modelo</b>
CI/CD	Implanta código em produção	Implanta código do pipeline de dados	<b>Implanta código dos pipelines de ML</b>
Validação de dados	n/a	Validação de negócio e formato	<b>Validação estatística</b>
Monitoramento	Baseado em SLOs	Baseado em SLOs	<b>SLOs + monitoramento diferencial e estatístico, em fatias</b>

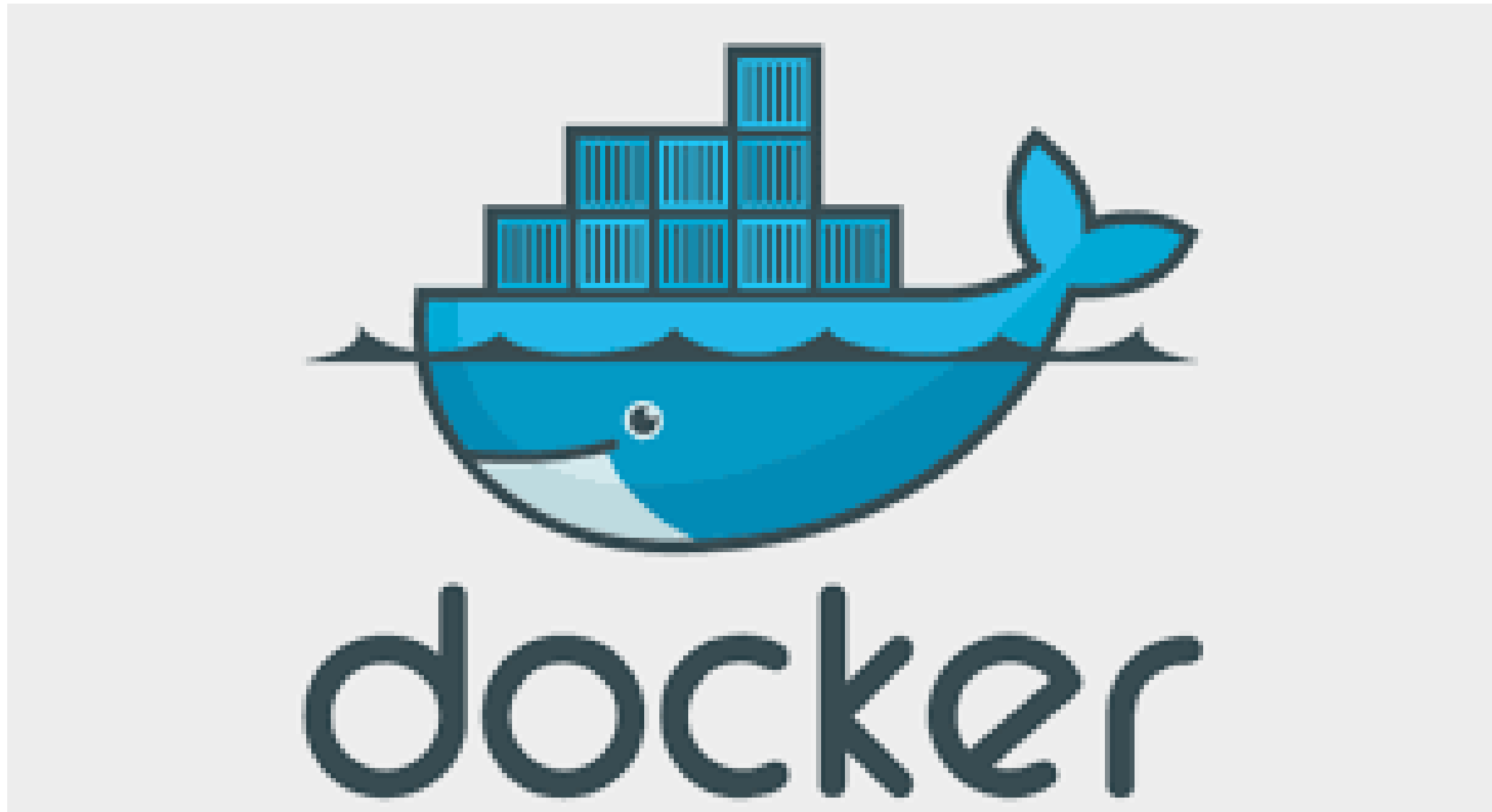
<https://medium.com/@cbreuel/ml-ops-machine-learning-como-disciplina-de-engenharia-a058770b93dc>

Como uma diferença fundamental em relação ao modelo de DevOps observamos que em ML também precisamos fazer o deploy adicional de **Dados** e **Modelos** para funcionamento e Validação da solução preditiva.

# **FERRAMENTAS ENVOLVIDAS**

## ***ML - OPS***

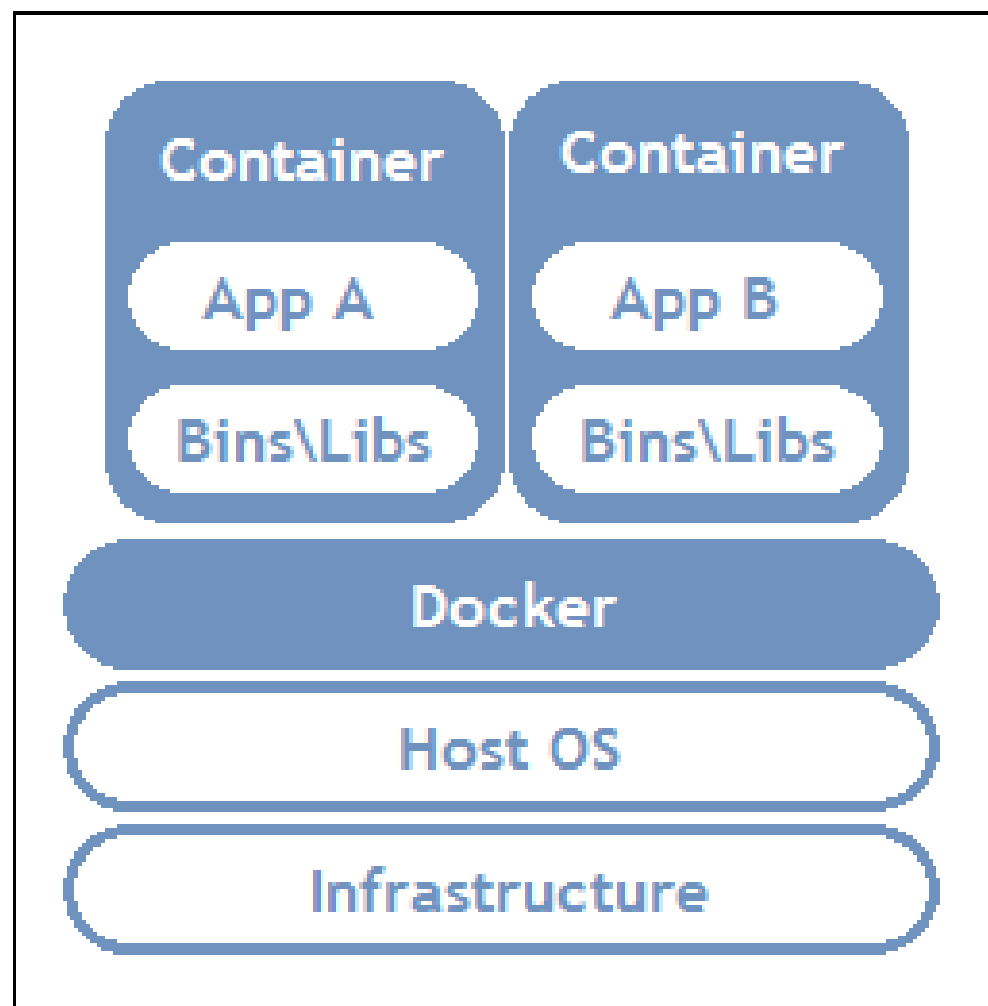
**DOCKER**



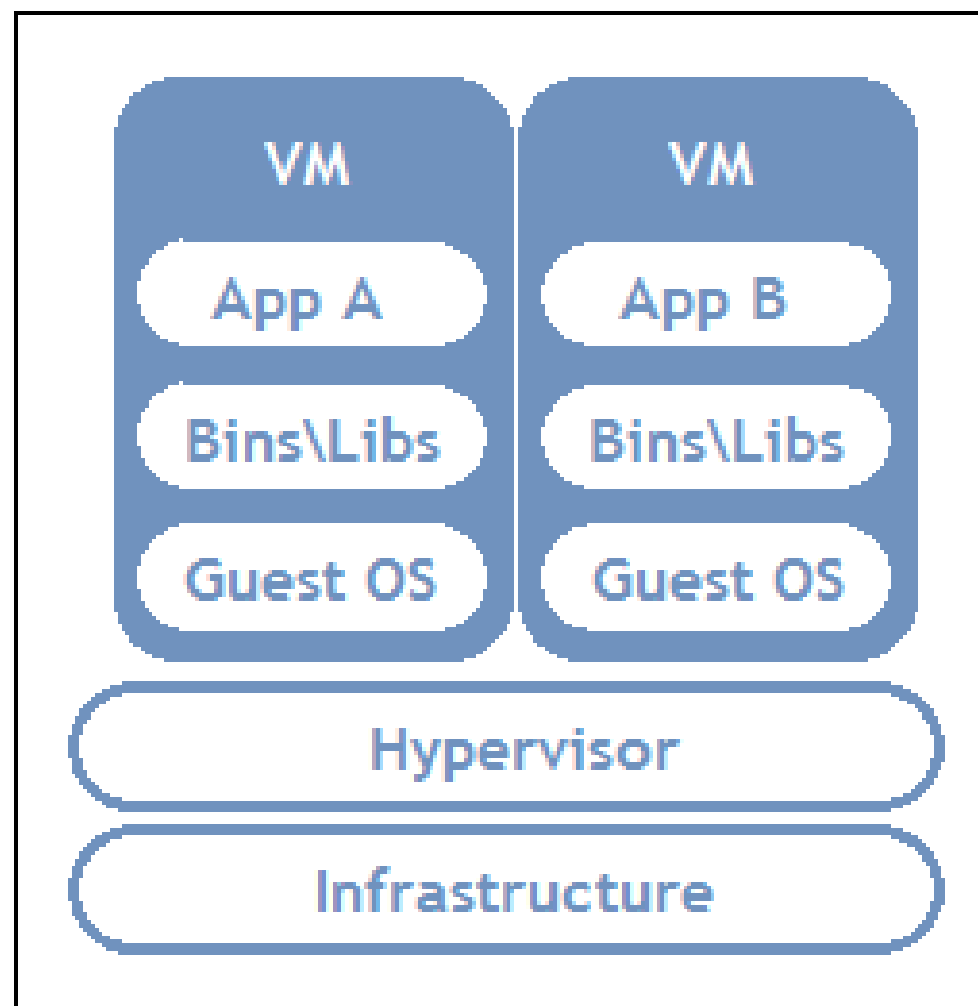
<https://stack.desenvolvedor.expert/appendix/docker/oqueue.html>

Docker é uma plataforma aberta, criada com o objetivo de facilitar o desenvolvimento, a implantação e a execução de aplicações em ambientes isolados. Foi desenhada especialmente para disponibilizar uma aplicação da forma mais rápida possível – com a possibilidade de escalonamento horizontal quase que imediato.


## Container Based Implementation



## Virtual Machine Implementation




O Docker se diferencia por trabalhar com **CONTAINERS** que podem ser entendidos como mini-máquinas virtuais - muito leves e simples que podem ser instanciadas com diferentes imagens (bases de dados, sistemas operacionais, etc). Por serem leves e diretamente conectadas ao kernel do sistema operacional elas podem rapidamente ser criadas e destruídas, otimizando a utilização do hardware.

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DOCKER EE DOCKER CE CONTAINERS PLUGINS


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Redis is an open source key-value store that functions as a data structure server.

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[https://hub.docker.com/search?image\\_filter=official&type=image](https://hub.docker.com/search?image_filter=official&type=image)

**KUBERNETES**





<https://www.concrete.com.br/2018/02/22/tudo-o-que-voce-precisa-saber-sobre-kubernetes/>

O Kubernetes é uma ferramenta que faz o **Gerenciamento de Containers** gerados por aplicações com o Docker.

Docker + Kubernetes  
Orquestrando containers e escalando  
rapidamente suas aplicações

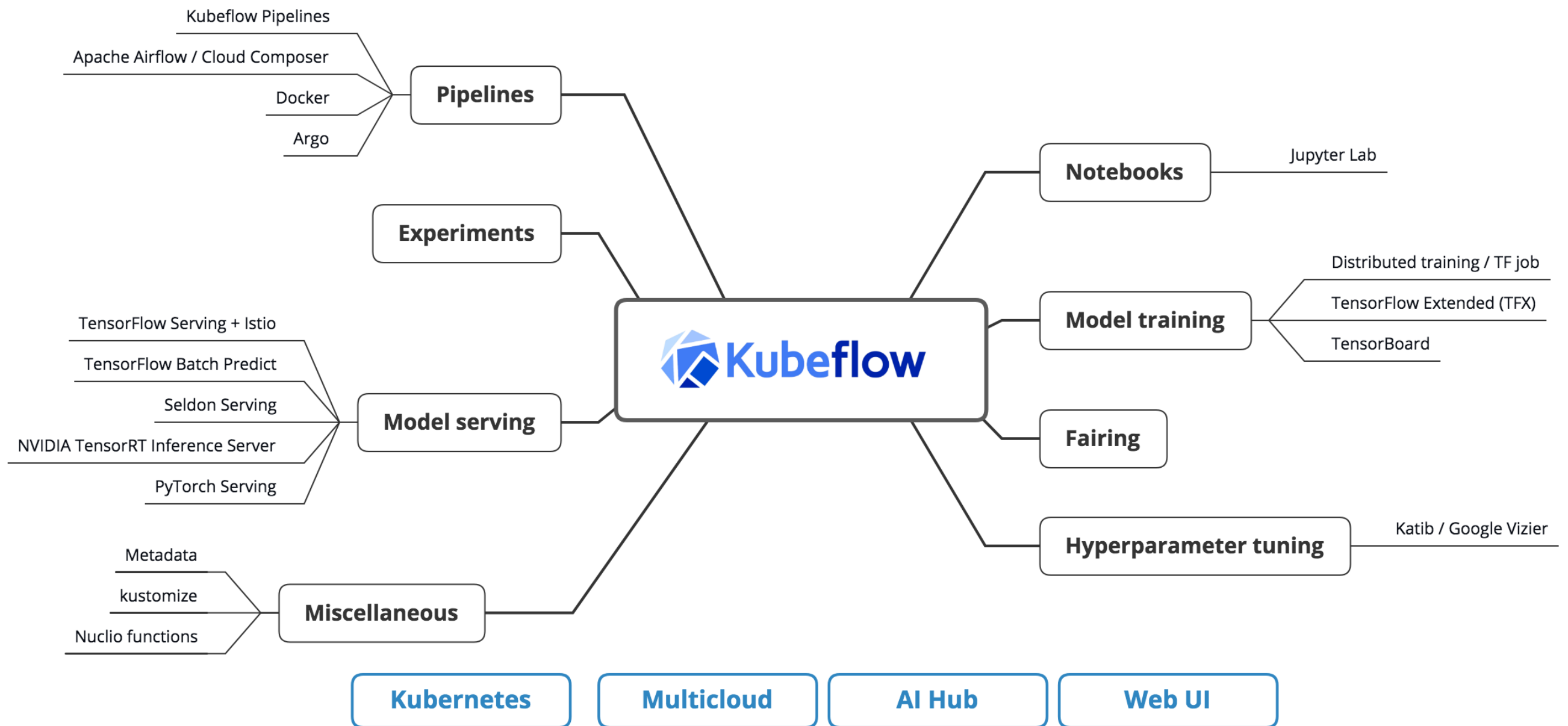


Renato Groffe  
Microsoft MVP, MTAC  
[facebook.com/renatogroffe](https://www.facebook.com/renatogroffe)  
[medium.com/@renato.groffe/](https://medium.com/@renato.groffe/)

<https://www.slideshare.net/renatogroff1/docker-kubernetes-orquestrando-containers-e-escalando-rapidamente-suas-aplicaes-devops-professionals-setembro2018>

Docker + Kubernetes: Orquestrando containers e escalando rapidamente suas  
aplicações - DevOps Professionals - Setembro-2018

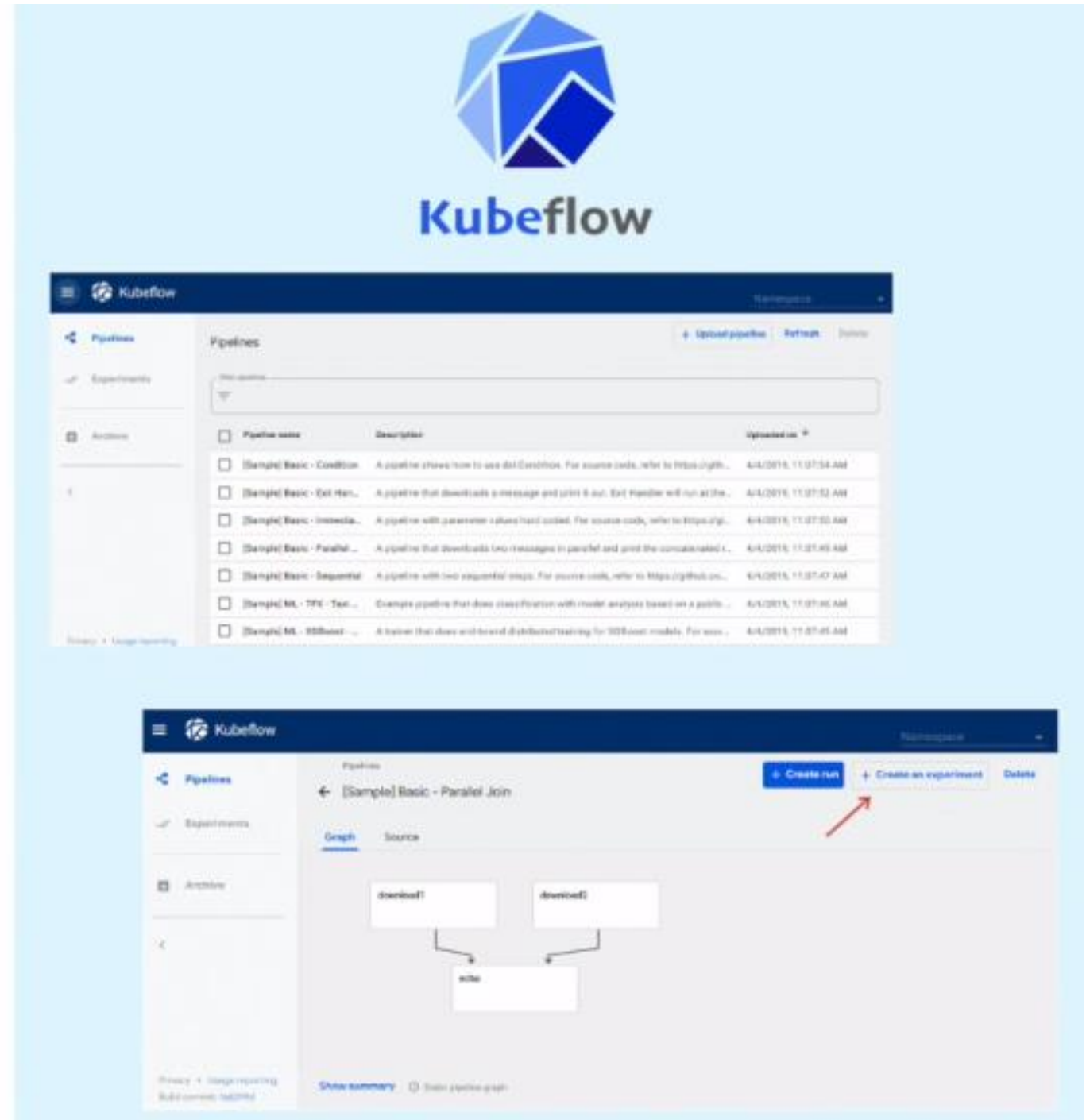
**KUBEFLOW**



## Kubeflow Pipelines

Kubeflow Pipelines is a platform for building and deploying portable, scalable machine learning (ML) workflows based on Docker containers.

- End-to-end orchestration: enabling and simplifying the orchestration of machine learning pipelines.
- Easy experimentation: making it easy for you to try numerous ideas and techniques and manage your various trials/experiments.
- Easy re-use: enabling you to re-use components and pipelines to quickly create end-to-end solutions without having to rebuild each time.





# Kubeflow Pipelines

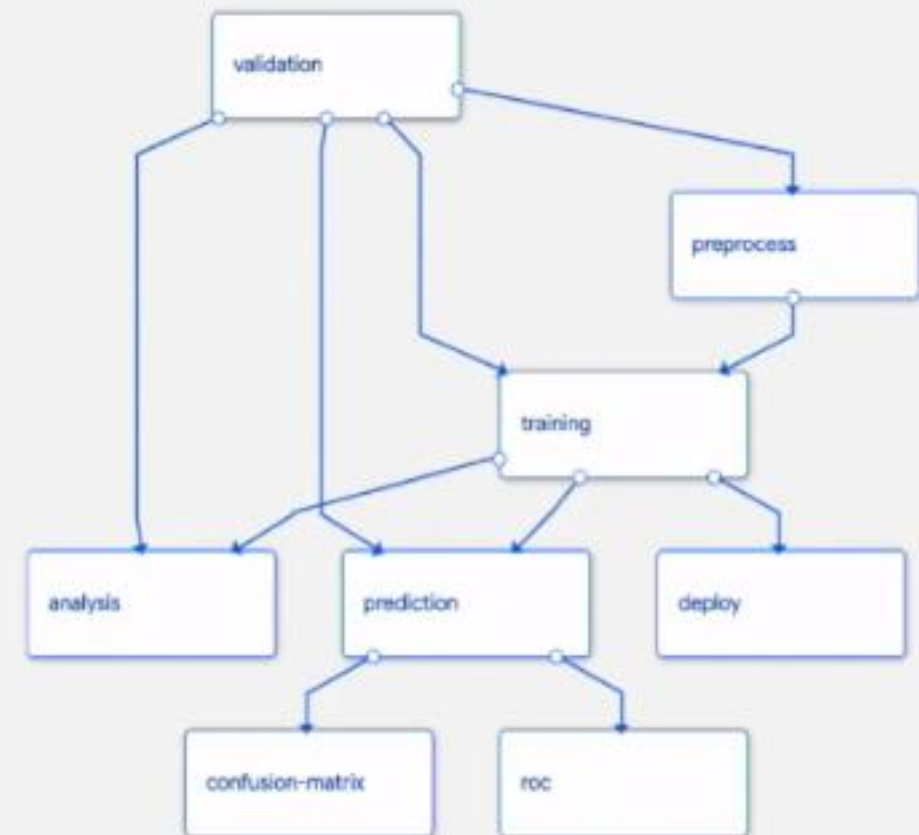
Two key takeaways : A Pipeline and a Pipeline Component

A *pipeline* is a description of a machine learning (ML) workflow, including all of the components of the workflow and how they work together.

← [Sample] ML - TFX - Taxi Tip Prediction Model Trainer

Graph

Source



## Kubeflow Pipelines

Each pipeline *component* is a container that contains a program to perform the task required for that particular step of your workflow.



# MODELOS NA *CLOUD*



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## Entenda os modelos de serviço IaaS, PaaS e SaaS do IBM Cloud

**Qual a diferença entre IaaS, PaaS e SaaS?**  
A diferença principal está no tipo de serviço que está sendo oferecido. Veja:



**Infraestrutura como serviço (IaaS)**

Um fornecedor oferece aos clientes o acesso pago por utilização ao armazenamento, à rede, aos servidores e a outros recursos computacionais em cloud.



**Plataforma como serviço (PaaS)**

Um provedor de serviços oferece acesso a um ambiente baseado em cloud no qual os usuários podem construir e fornecer aplicativos. O provedor fornece infraestrutura subjacente.

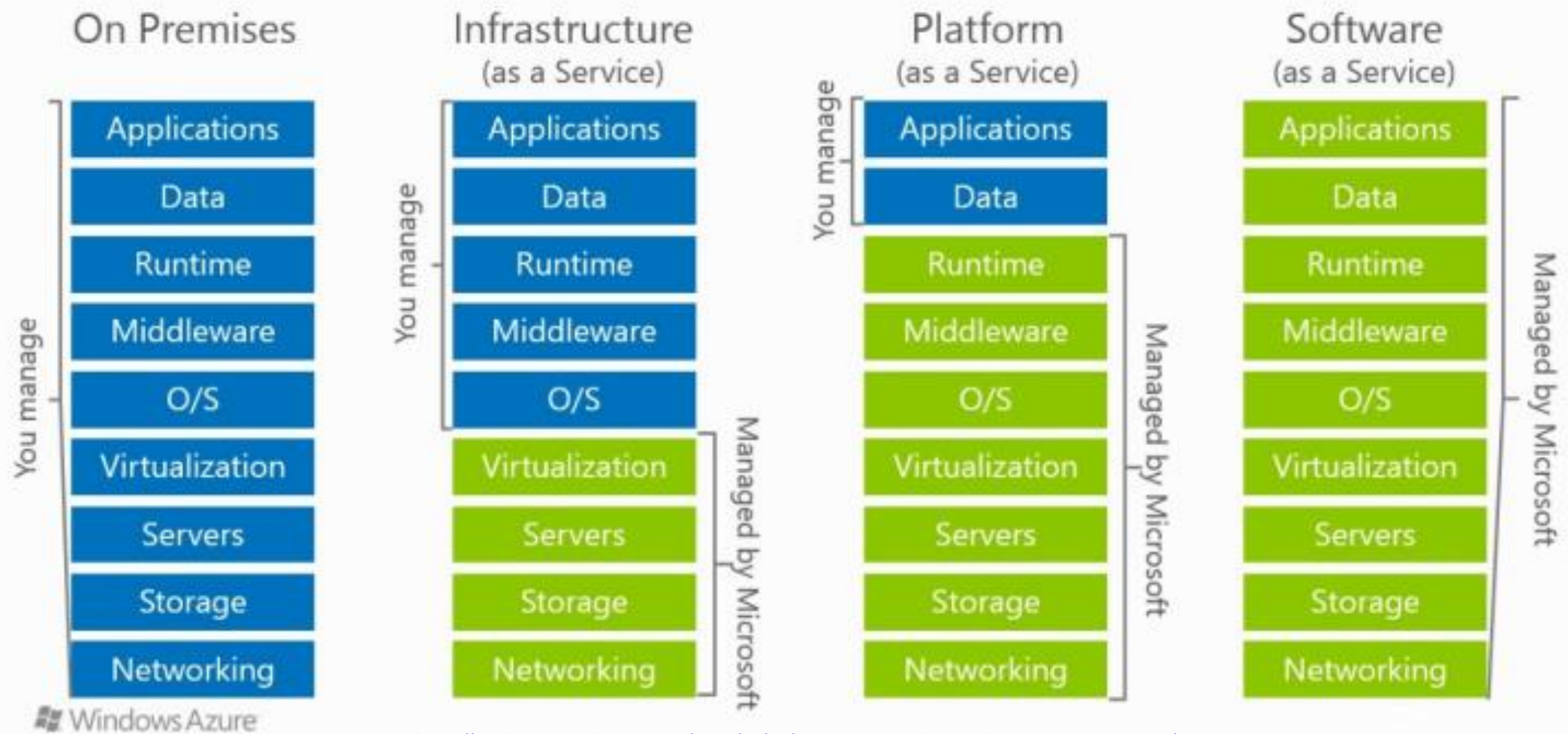


**Software como serviço (SaaS)**

Um provedor de serviços oferece software e aplicativos por meio da Internet. Os usuários subscrevem ao software e o acessam por meio da web ou de APIs do fabricante.

<https://www.ibm.com/br-pt/cloud/learn/iaas-paas-saas>

# Cloud Models



<https://stack247.wordpress.com/2015/05/21/azure-on-premises-vs-iaas-vs-paas-vs-saas/>



IBM Watson



Google Cloud  
AutoML Vision



IBM Cloud



HEROKU



Google Cloud



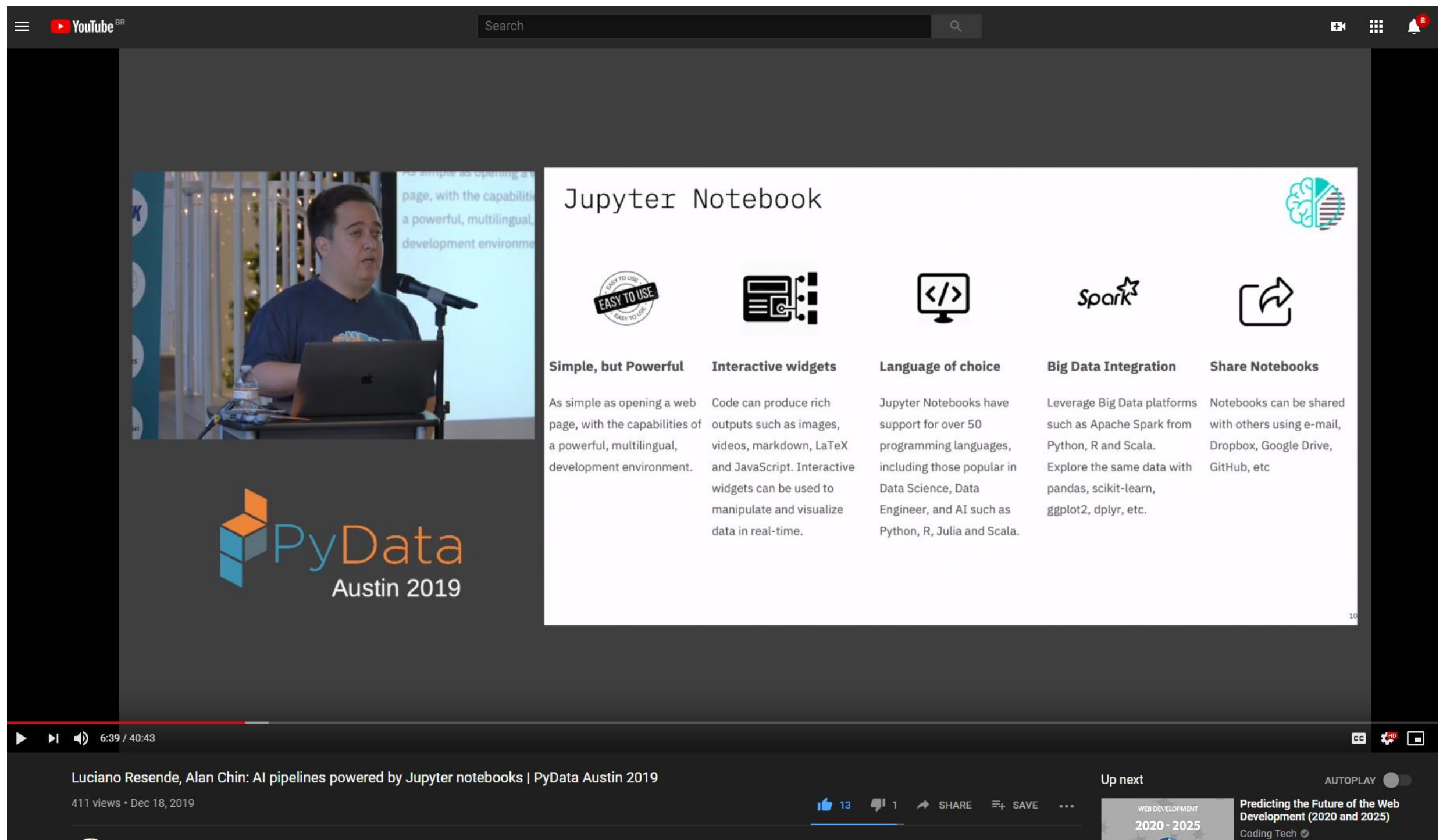
Amazon SageMaker



Azure Machine Learning








***JUPYTER NOTEBOOKS***  
**EM PRODUÇÃO**



The video player shows a presentation slide titled "Jupyter Notebook". On the left, a man is speaking at a podium with a laptop. The slide content is as follows:

## Jupyter Notebook

				
<b>Simple, but Powerful</b> As simple as opening a web page, with the capabilities of a powerful, multilingual, development environment.	<b>Interactive widgets</b> Code can produce rich outputs such as images, videos, markdown, LaTeX and JavaScript. Interactive widgets can be used to manipulate and visualize data in real-time.	<b>Language of choice</b> Jupyter Notebooks have support for over 50 programming languages, including those popular in Data Science, Data Engineer, and AI such as Python, R, Julia and Scala.	<b>Big Data Integration</b> Leverage Big Data platforms such as Apache Spark from Python, R and Scala. Explore the same data with pandas, scikit-learn, ggplot2, dplyr, etc.	<b>Share Notebooks</b> Notebooks can be shared with others using e-mail, Dropbox, Google Drive, GitHub, etc

PyData Austin 2019

Video title: Luciano Resende, Alan Chin: AI pipelines powered by Jupyter notebooks | PyData Austin 2019  
Views: 411 views • Dec 18, 2019  
Up next: Predicting the Future of the Web Development (2020 and 2025) by Coding Tech

<https://youtu.be/XJAx9dS0k7I>



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# nbconvert 5.6.1

`pip install nbconvert`[Latest version](#)

Released: Oct 24, 2019

Converting Jupyter Notebooks

## Navigation

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## Project links

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## Project description

### nbconvert

#### Jupyter Notebook Conversion

[Google Group](#) [build failing](#) [docs passing](#) [docs passing](#) [codecov 92%](#) [PASSED](#)

The **nbconvert** tool, `jupyter nbconvert`, converts notebooks to various other formats via [Jinja](#) templates. The nbconvert tool allows you to convert an `.ipynb` notebook file into various static formats including:

- HTML
- LaTeX
- PDF
- Reveal JS
- Markdown (md)
- ReStructured Text (rst)
- executable script

<https://pypi.org/project/nbconvert/>

## Notebook Pipelines using NBConvert

Jupyter NBConvert enables executing and converting notebooks to different file formats.

### Advantages

- Support notebook chaining
- Convert results to immutable formats

### Limitations

- No support for parameters

### Jupyter NBConvert

<https://nbconvert.readthedocs.io/en/latest/>



```
$ pip install nbconvert
```

```
$ jupyter nbconvert --to html --execute overview_with_run.ipynb
```

```
[NbConvertApp] Converting notebook overview_with_run.ipynb to html
```

```
[NbConvertApp] Executing notebook with kernel: python3
```

```
[NbConvertApp] Writing 300558 bytes to overview_with_run.html
```

```
$ open overview_with_run.html
```

## Papermill

Papermill is an open source tool contributed by Netflix which enables parameterizing, executing, and analyzing Jupyter Notebooks.

Papermill lets you:

- Parameterize notebooks
- Execute notebooks





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# DATA SCIENCE

Machine Learning – Modelos em Produção