



# THE DEVELOPER'S CONFERENCE

**A experiência de decompor monolitos  
com API management, Kubernetes e Istio Service Mesh**

**Robisson Oliveira**

# Quem sou eu...

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# Objetivo

Compartilhar como decidimos decompor uma aplicação monolítica de 10 anos em micro-serviços para dar mais agilidade ao negócio.

# Agenda

O problema que  
tínhamos para resolver

A nossa abordagem  
para solucionar esse  
problema



kubernetes

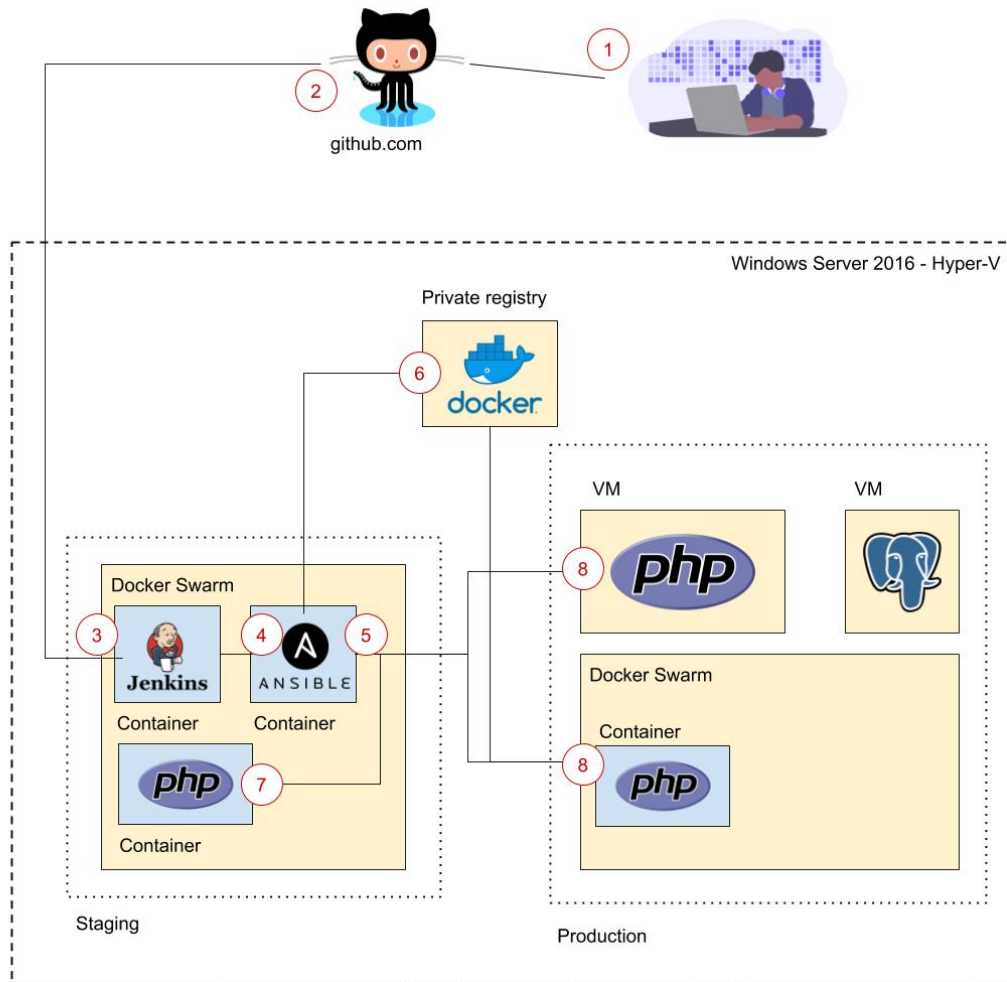


Istio



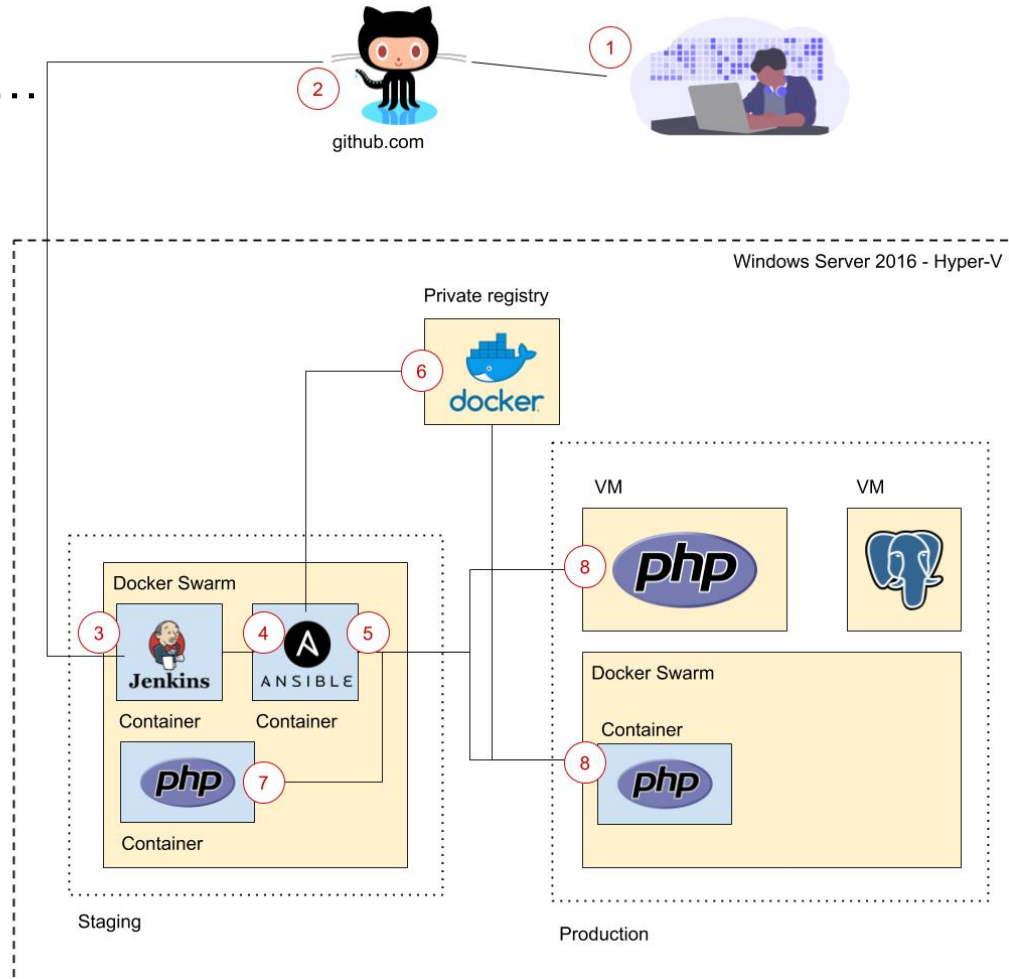
# Até março 2019...

- Uma aplicação de 10 anos monolítica
- Utilizando Domain Driven Design a 2 anos
- Escrevendo testes unitários/Integração
- Containers em dev/teste/produção
- Utilizando CI/CD com múltiplos deploys ao dia



# Começamos a ter alguns problemas...

- Mais conflitos de código em consequência de um time em crescimento
- Com mais e mais testes, os builds passam a levar mais tempo
- Atualizar a plataforma se torna impossível, porque o código mais antigo não é compatível
- Testar novas tecnologias ou implementações

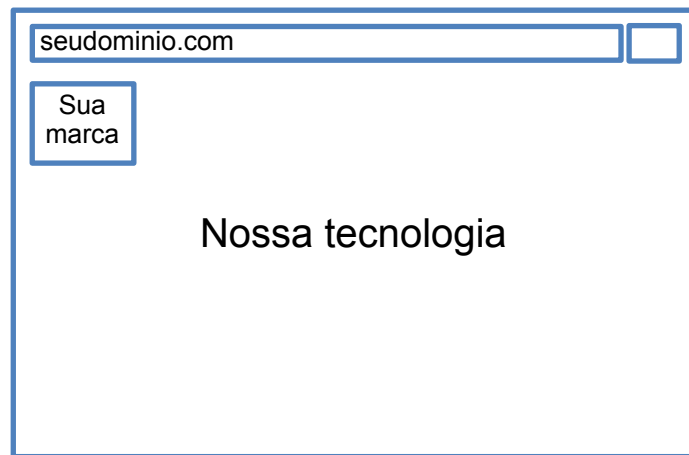


# E dois direcionamentos estratégicos...

Uma estratégia de marketplace



Transformar alguns produtos em white label



# E definimos algumas premissas...

- Estabelecer uma arquitetura que permitisse migrar para a nuvem até 2023.
- Separar o código que realmente estava trancando a arquitetura de evoluir.
- Escolher uma plataforma de Apis para facilitar a publicação, distribuição e documentação a terceiros.

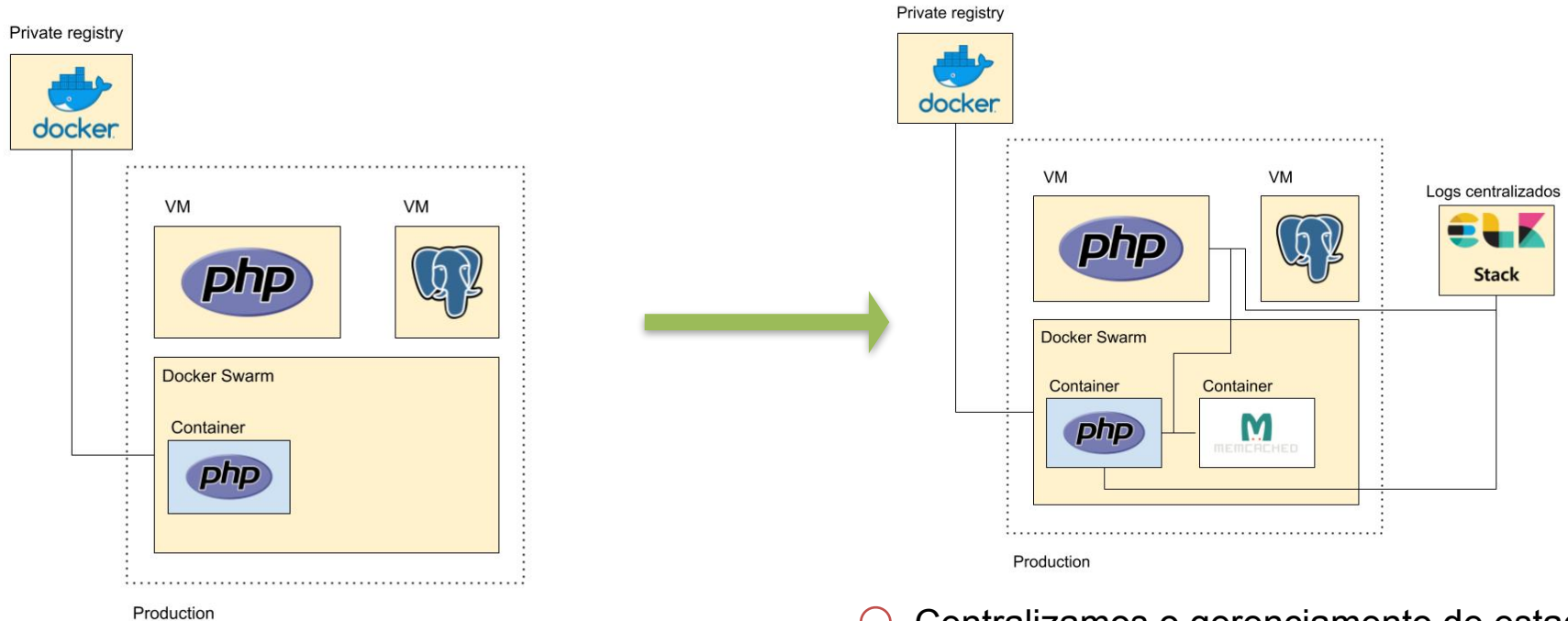




O que fizemos na prática...

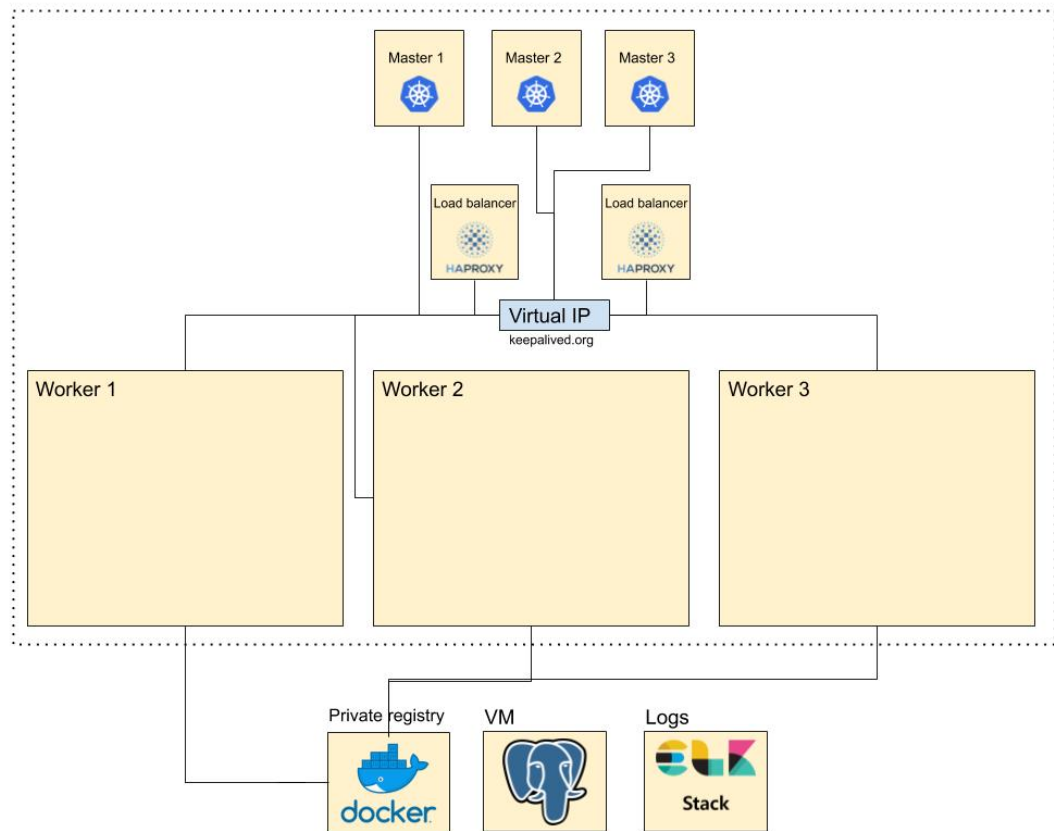
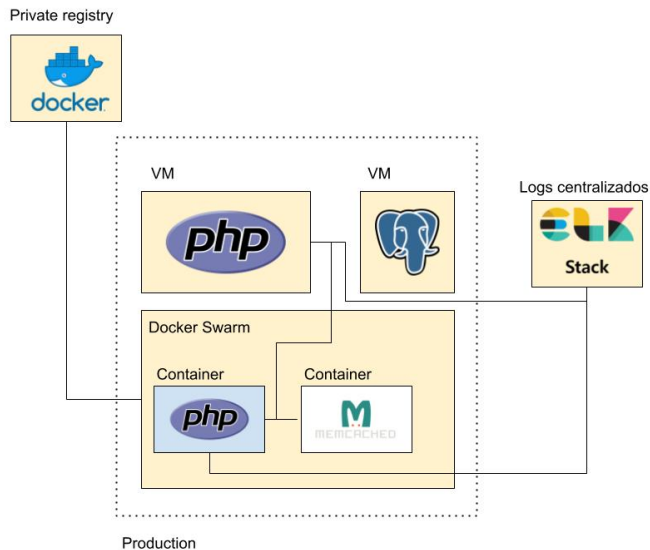


# Garantimos que o aplicação poderia escalar horizontalmente...

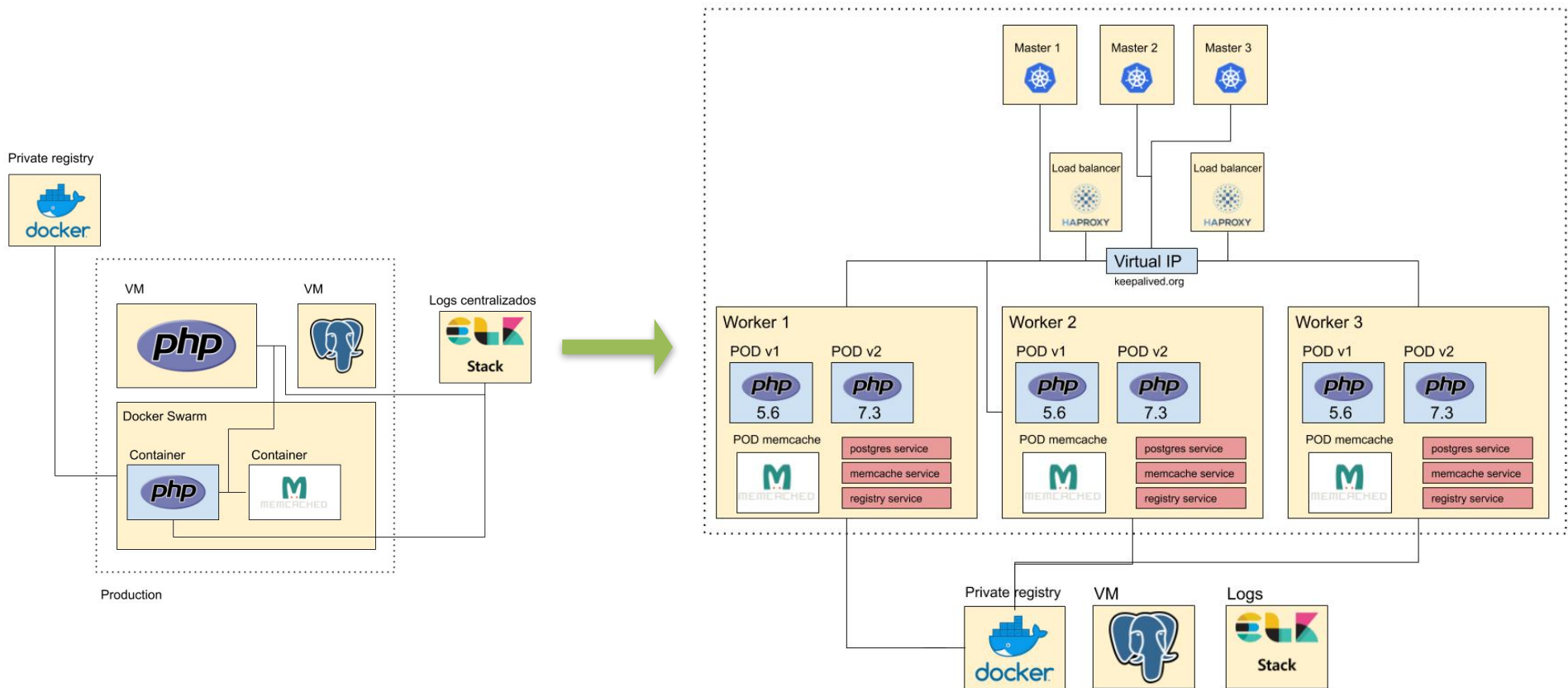


- Centralizamos o gerenciamento de estado
- Centralizamos os logs
- Passamos a utilizar semantic version

# Do Docker Swarm para o Kubernetes...

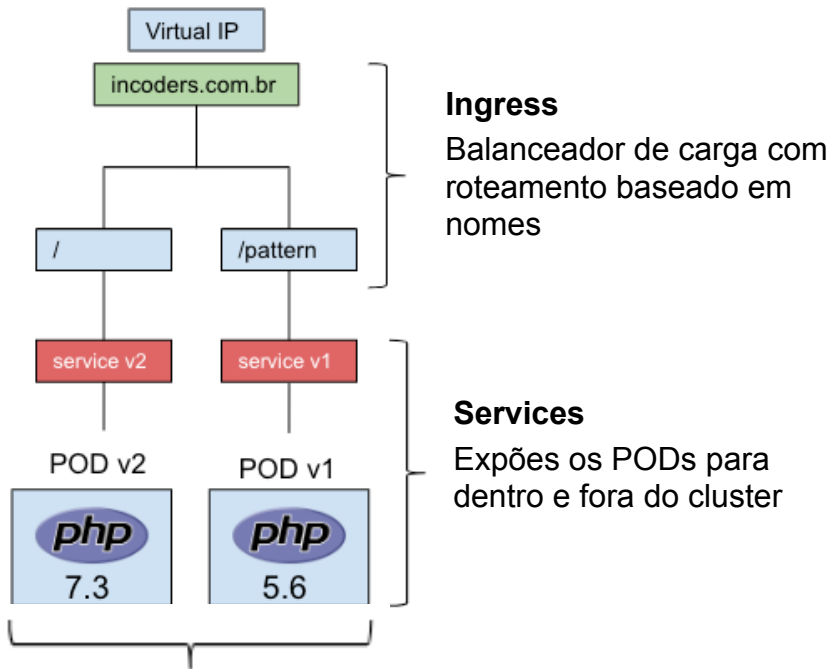


# Do Docker Swarm para o Kubernetes...



# Do Docker Swarm para o Kubernetes...

## Fluxo de requisições



### Ingress

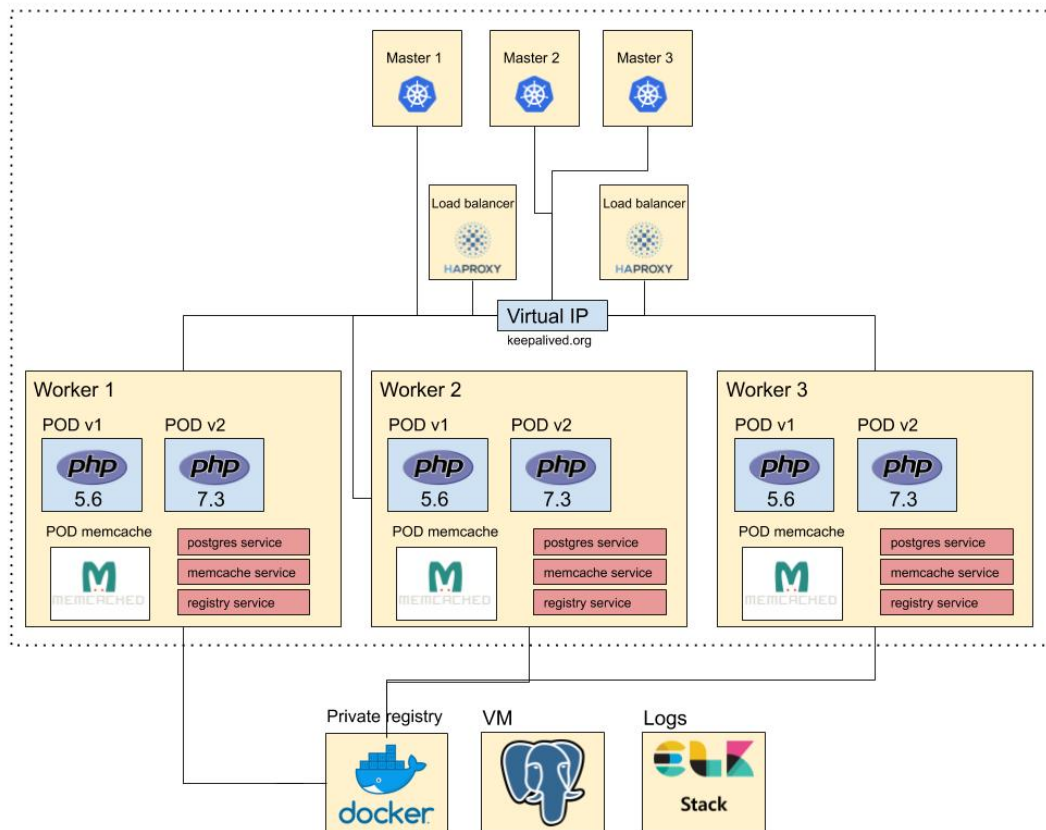
Balanced de carga com roteamento baseado em nomes

### Services

Expõe os PODs para dentro e fora do cluster

### Secrets

Fornecem parâmetros de configuração das aplicações como variáveis de ambiente



# Reforçando o Kubernetes com Istio Service Mesh...



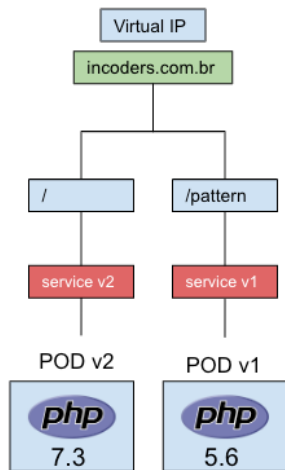
O termo service mesh é usado para descrever uma rede de micro-serviços que compõem uma aplicação e as interações entre eles.

Reduz a complexidade de gerenciar micro-serviços.

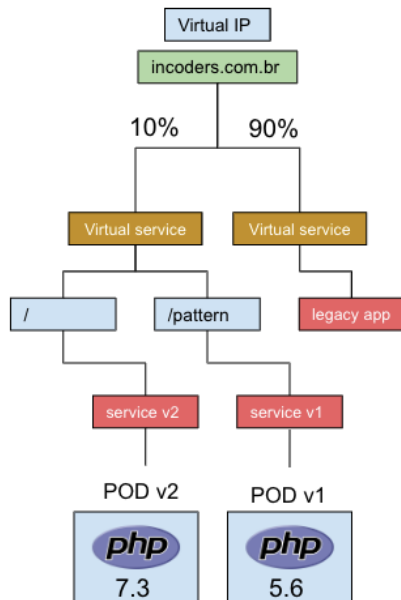
- Controle de tráfego
- Segurança
- Políticas
- Observabilidade

# Reforçando o Kubernetes com Istio Service Mesh...

## Fluxo de requisições



## Fluxo de requisições



Private registry



VM



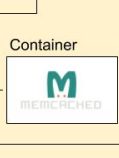
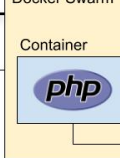
VM



Logs centralizados



Docker Swarm

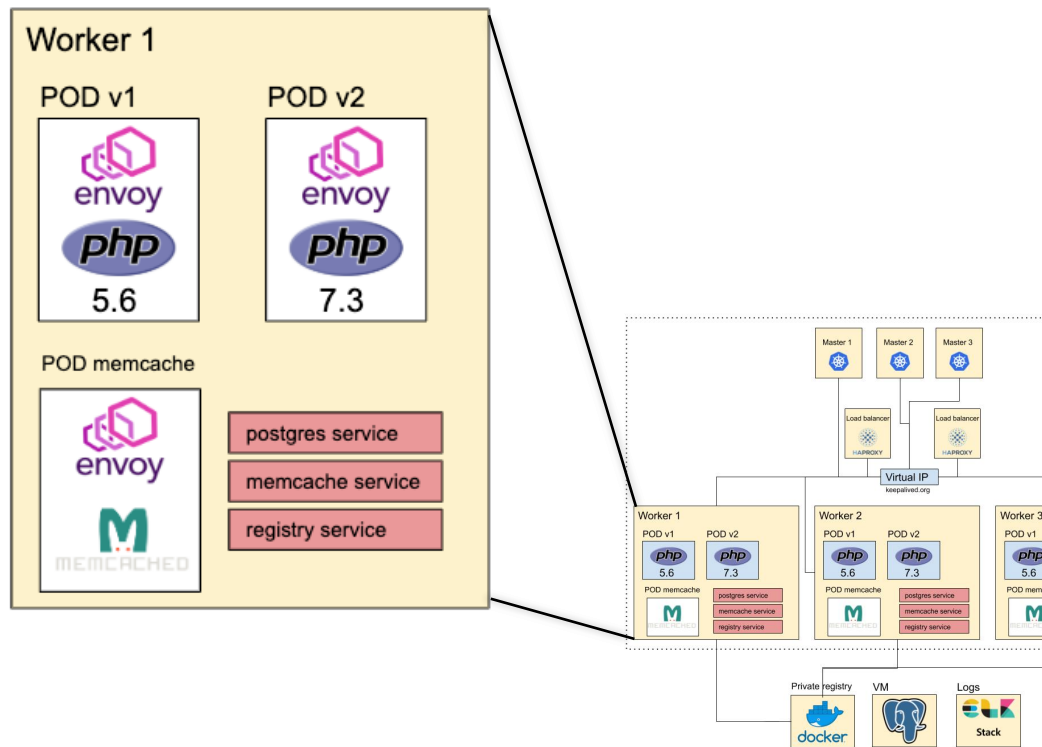


Production

# Reforçando o Kubernetes com Istio Service Mesh...

Como o Istio opera:

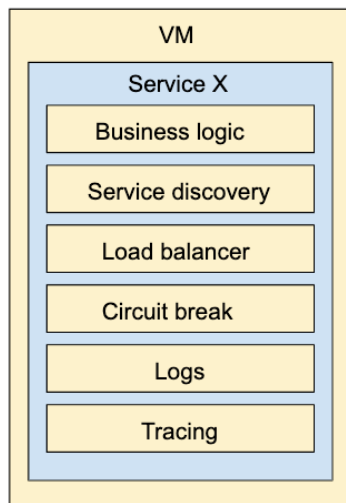
- Trabalha como um service proxy, utilizando um padrão chamado Sidecar container
- Intercepta todo o tráfego de entrada e saída do POD



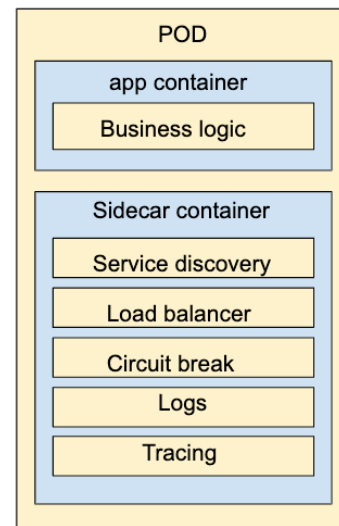


# Reforçando o Kubernetes com Istio Service Mesh...

Antes de Istio + Kubernetes

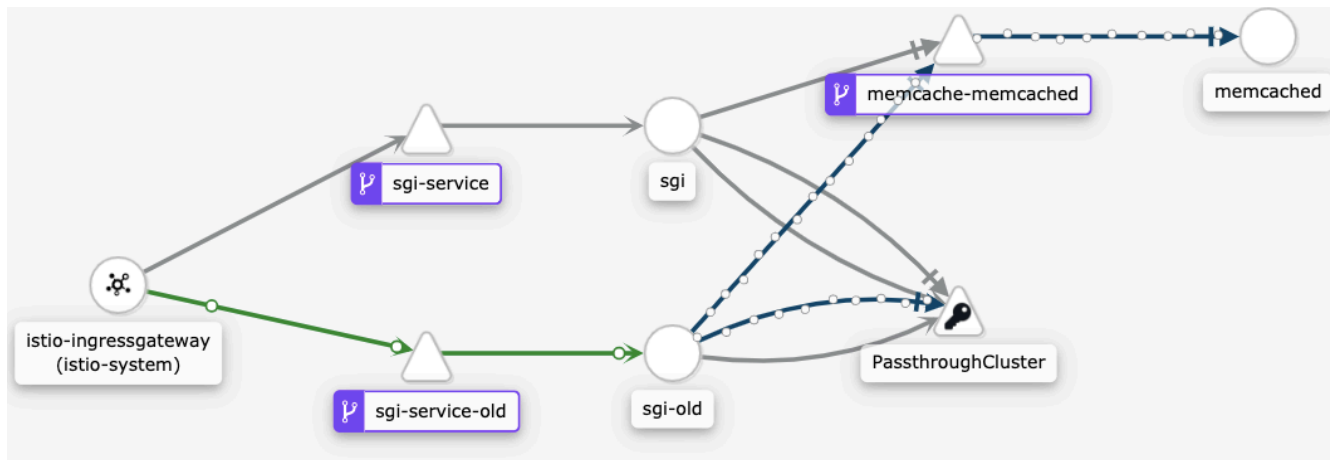
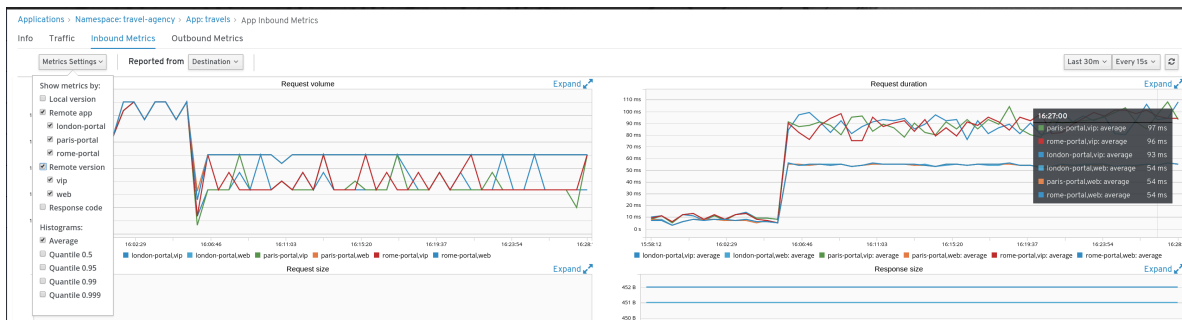


Com Istio + Kubernetes



# Observabilidade no Istio...

# KIALI



App: reviews

namespace: bookinfo version: value=v1  
version: value=v2 version: value=v3

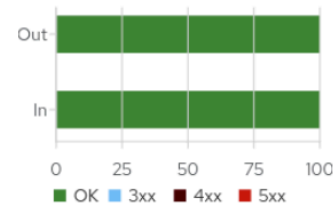
Services: reviews

Workloads: reviews-v1, reviews-v2, reviews-v3

No gRPC traffic logged.

HTTP Traffic (requests per second):

	Total	%Success	%Error
In	0.99	100.00	0.00
Out	0.66	100.00	0.00



HTTP - Inbound Request Traffic min / max:  
RPS: 0.87 / 1.07, %Error 0.00 / 0.00



HTTP - Outbound Request Traffic min / max:

# Observabilidade no Istio...

# JAEGER

Jaeger UI | Lookup by Trace ID... | Search | Compare | Dependencies | About Jaeger ▾

**Find Traces**

Service (6)  
productpage.default

Operation (3)  
all

Tags ⓘ  
http.status\_code=200 error=true

Lookback  
Last Hour

Min Duration  
e.g. 1.2s, 100ms, 500us

Max Duration  
e.g. 1.2s, 100ms, 500us

Limit Results  
20

Find Traces

Duration

Time

10 Traces | Sort: Most Recent ▾

Compare traces by selecting result items

- istio-ingressgateway: productpage.default.svc.cluster.local:9080/productpage fb1b0e2 38.21ms  
8 Spans | details.default (1) | istio-ingressgateway (1) | productpage.default (3) | ratings.default (1) | reviews.default (2) | Today 2:37:33 pm a few seconds ago
- istio-ingressgateway: productpage.default.svc.cluster.local:9080/productpage fb1db0 37.76ms  
8 Spans | details.default (1) | istio-ingressgateway (1) | productpage.default (3) | ratings.default (1) | reviews.default (2) | Today 2:37:32 pm a few seconds ago
- istio-ingressgateway: productpage.default.svc.cluster.local:9080/productpage fce4b3e 28.3ms  
6 Spans | details.default (1) | istio-ingressgateway (1) | productpage.default (3) | ratings.default (1) | Today 2:37:32 pm a few seconds ago
- istio-ingressgateway: productpage.default.svc.cluster.local:9080/productpage 8b60662 46.23ms  
8 Spans | details.default (1) | istio-ingressgateway (1) | productpage.default (3) | ratings.default (1) | reviews.default (2) | Today 2:37:31 pm a few seconds ago

Jaeger UI | Lookup by Trace ID... | Search | Compare | Dependencies

istio-ingressgateway: productpage.default.svc.cluster.local:9080/productpage fb1b0e2

Trace Start June 10, 2019 2:37 PM | Duration 38.21ms | Services 5 | Depth 6 | Total Spans 8

0ms | 9.55ms

Service & Operation

- istio-ingressgateway productpage.default.svc.cluster.local:9080/productpage 38.21ms
- productpage.default productpage.default.svc.cluster.local:9080/productpage 3.17ms
  - details.default details.default.svc.cluster.local:9080/productpage 2.49ms
- productpage.default reviews.default.svc.cluster.local:9080/productpage 3.17ms
  - reviews.default reviews.default.svc.cluster.local:9080/productpage 3.17ms
    - reviews.default ratings.default.svc.cluster.local:9080/productpage 3.17ms

# Observabilidade no Istio...

# ZIPKIN



Investigate system behavior Find a trace View Saved Trace Dependencies

Try Lens UI

Go to trace

Search

Service Name	Span Name	Remote Service Name	Lookback
all	all	all	1 hour

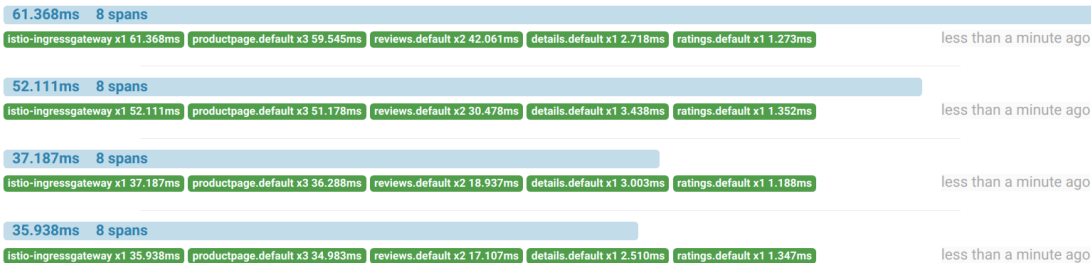
Annotation Query	Duration (µs) >=	Limit	Sort
For example: http.path=/foo/bar/ and cluster=foo and cache.miss	Ex: 100ms or 5s	10	Longest First

Find Traces

Showing: 10 of 10

Services: all

JSON



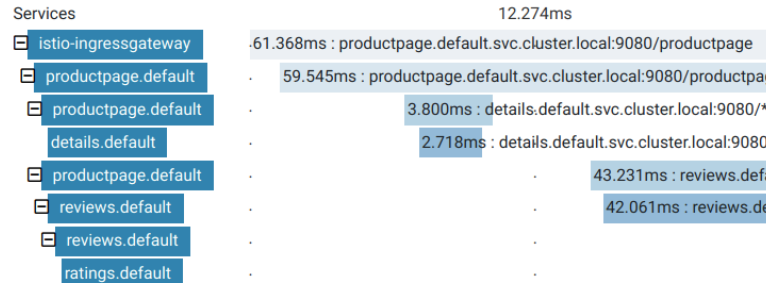
Investigate system behavior Find a trace View Saved Trace

Duration: 61.368ms Services: 5 Depth: 6

Expand All

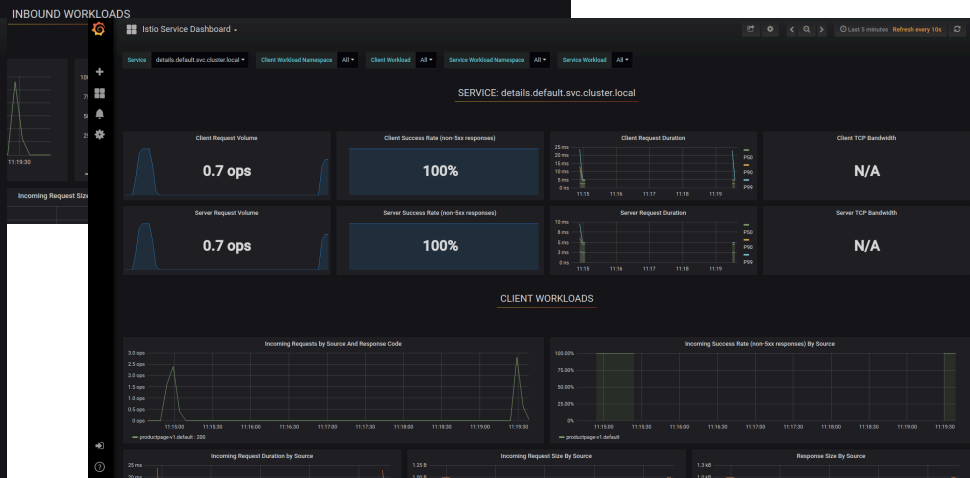
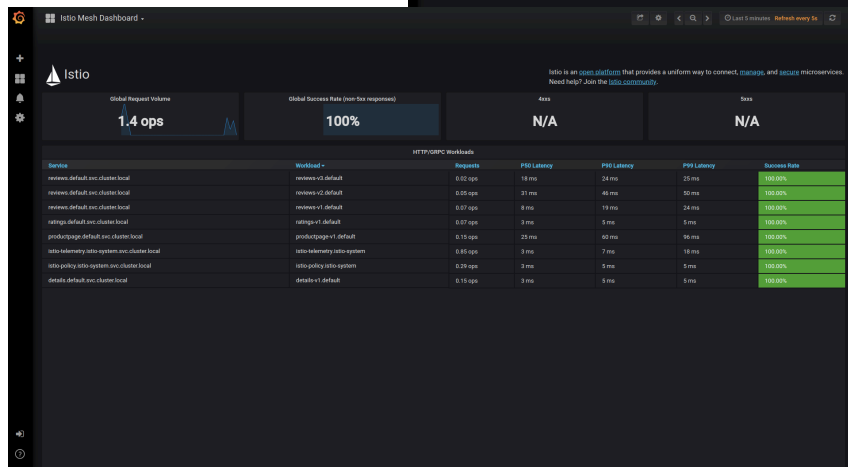
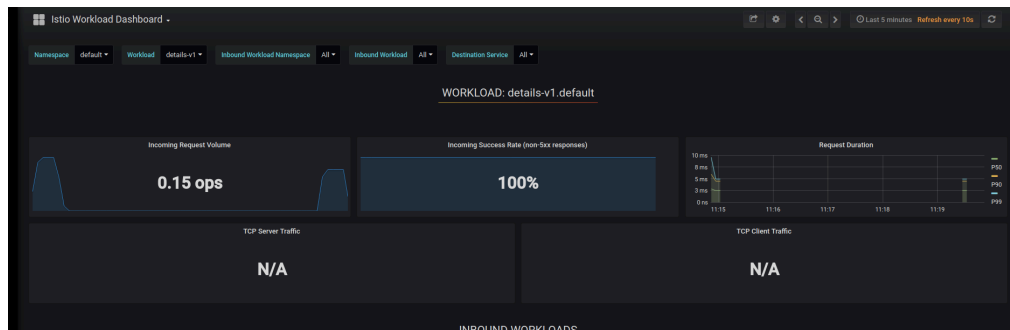
Collapse All

details.default x1 istio-ingressgateway x1 productpage.default x3 ratings.default x1 reviews.default x1



# Observabilidade no Istio...

# Grafana + Prometheus



# Problemas resolvidos até aqui...

- Estabelecer uma arquitetura que permitisse migrar para a nuvem até 2023.
- Separar o código que realmente estava trancando a arquitetura de evoluir.
- Escolher uma plataforma de Apis para facilitar a publicação, distribuição e documentação a terceiros.

# Organizando os serviços em Apis públicas para o marketplace...



Select Service Type ▾

- Database >
- File Storage >
- Email >
- Notification >
- Remote Service >
- Script >
- OAuth >
- LDAP >
- IoT >
- Cache >
- Source Control >
- Log >
- SSO >

AWS DynamoDB	IBM informix
AWS Redshift DB	MongoDB
Azure DocumentDB	MySQL
Azure Table Storage	Oracle
Cassandra	PostgreSQL
Couchbase	Salesforce
CouchDB	SAP SQL Anywhere
Firebird	SQLite
IBM DB2	SQL Server
MemSQL	SAP Hana

[CREATE YOUR API](#)



lean • enterprise • middleware

API  
publisher

Developer  
portal

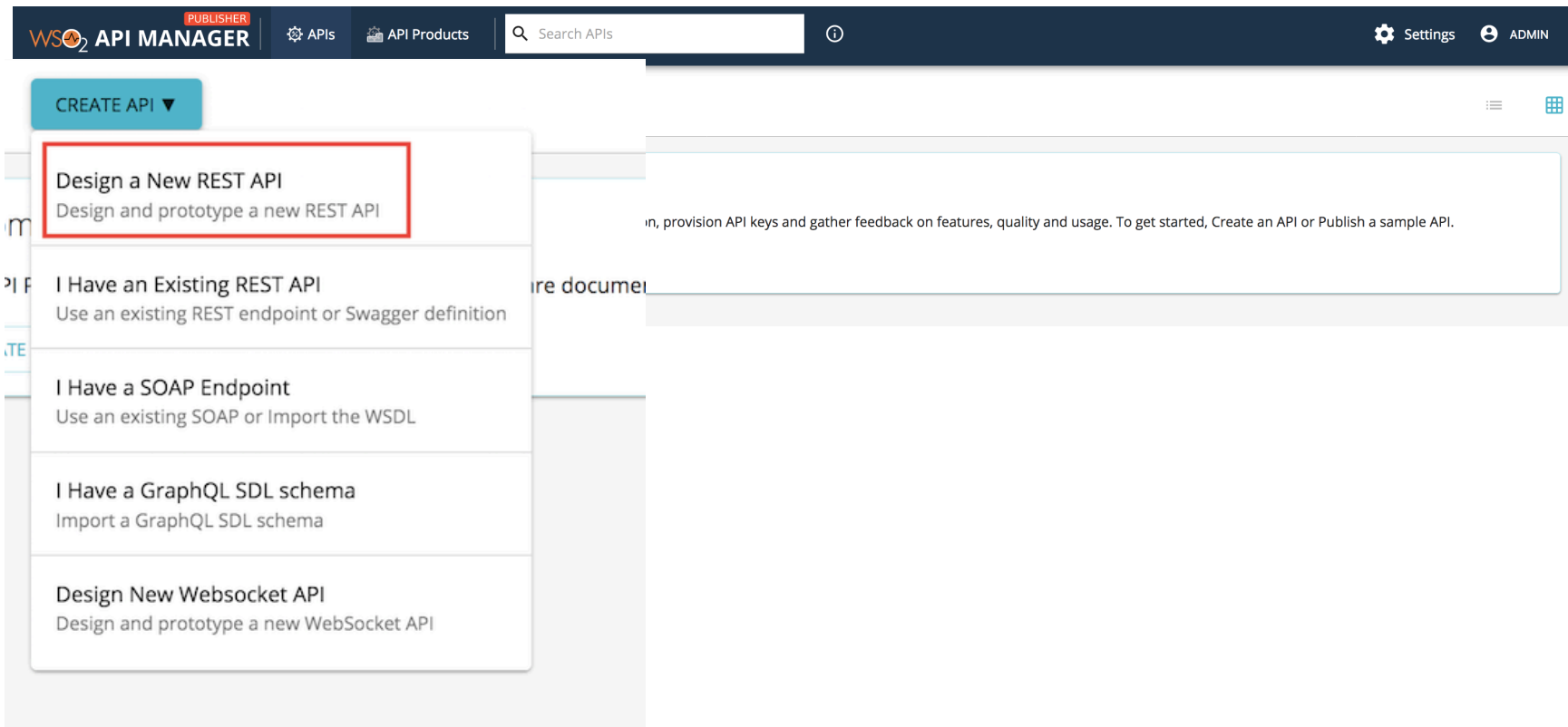
Key  
Manager

API  
Analytics

Traffic  
management

Identity  
Server

# Registrando uma API no API Manager



The screenshot displays the WSO2 API Manager interface. At the top, the navigation bar includes the WSO2 API Manager logo, a 'PUBLISHER' badge, and navigation links for 'APIs' and 'API Products'. A search bar labeled 'Search APIs' is present, along with 'Settings' and 'ADMIN' links. Below the navigation bar, a blue button labeled 'CREATE API' has a dropdown menu open. The dropdown menu lists five options, with the first option, 'Design a New REST API', highlighted with a red border. The other options are 'I Have an Existing REST API', 'I Have a SOAP Endpoint', 'I Have a GraphQL SDL schema', and 'Design New Websocket API'. The main content area of the page is partially visible, showing a large text box with the text: 'in, provision API keys and gather feedback on features, quality and usage. To get started, Create an API or Publish a sample API.'

**PUBLISHER** WSO2 API MANAGER

APIs API Products Search APIs Settings ADMIN

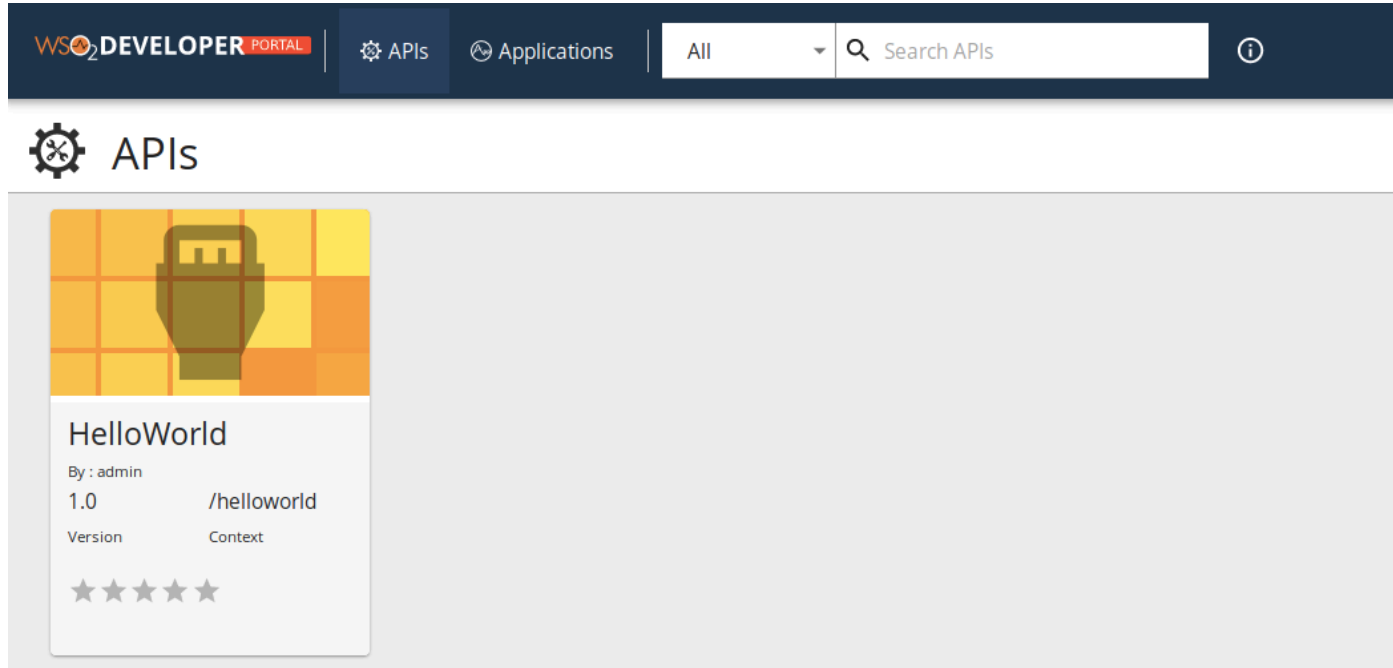
**CREATE API**

- Design a New REST API**  
Design and prototype a new REST API
- I Have an Existing REST API  
Use an existing REST endpoint or Swagger definition
- I Have a SOAP Endpoint  
Use an existing SOAP or Import the WSDL
- I Have a GraphQL SDL schema  
Import a GraphQL SDL schema
- Design New Websocket API  
Design and prototype a new WebSocket API

in, provision API keys and gather feedback on features, quality and usage. To get started, Create an API or Publish a sample API.



# Disponibilizando pubblicamente

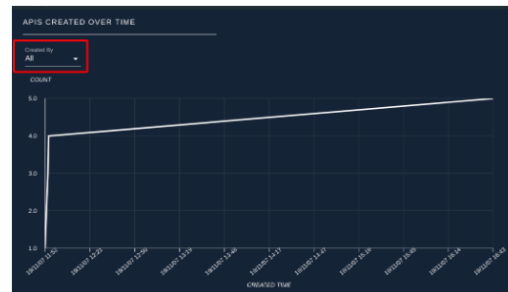
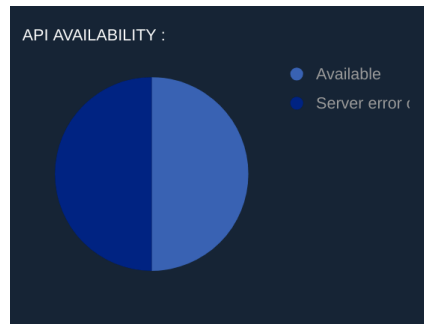
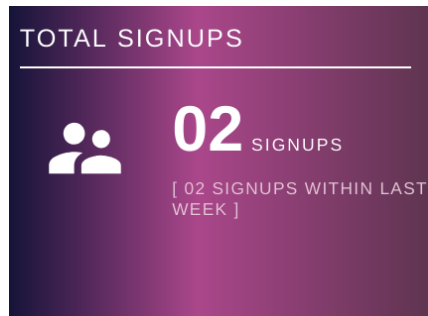
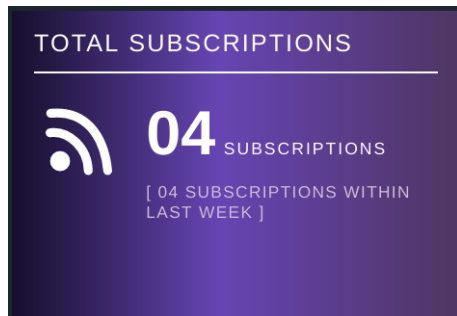
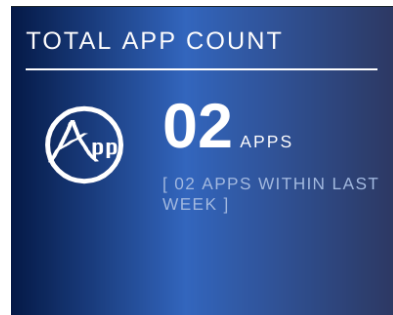
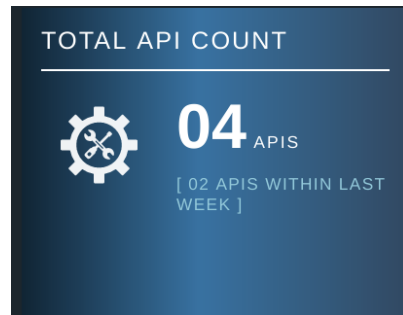
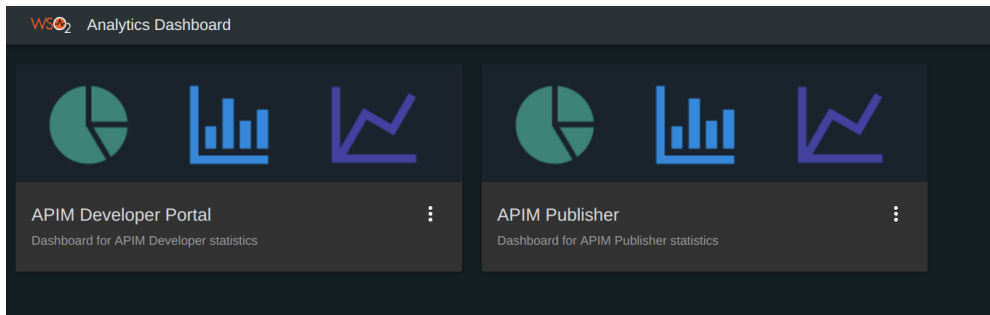


The screenshot displays the WSO2 Developer Portal interface. At the top, there is a dark blue navigation bar with the following elements from left to right: the logo 'WSO2 DEVELOPER PORTAL', a 'APIs' button with a gear icon, an 'Applications' button with a cloud icon, a dropdown menu currently set to 'All', a search bar labeled 'Search APIs', and an information icon. Below the navigation bar, the main content area is titled 'APIs' with a gear icon. A card for the 'HelloWorld' API is visible on the left. The card features a yellow and orange grid background with a USB icon. The text on the card reads: 'HelloWorld', 'By : admin', '1.0' (Version), and '/helloworld' (Context). At the bottom of the card, there are five grey stars representing a rating.

# Disponibilizando pubblicamente

The screenshot displays the WS2 Developer Portal interface for the 'HelloWorld' API. The top navigation bar includes 'WS2 DEVELOPER PORTAL', 'APIs', 'Applications', a search bar, and user settings for 'ADMIN'. The left sidebar lists navigation options: Overview, Credentials, Comments, Try Out, Documentation, and SDKs. The main content area shows the API details for 'HelloWorld' (admin), which is currently 'Not Rated'. Key information includes: Version 1.0, Context /helloworld/1.0, Provider admin, a 5-star rating, and Available Environments set to 'Production and Sandbox'. Below this, there are two main sections: 'API Credentials' and 'Resources'. The 'API Credentials' section provides instructions on how to generate credentials and offers buttons for 'KEY GENERATION WIZARD' and 'SUBSCRIBE TO AN APPLICATION'. It also shows 'View Credentials' with '0 Subscriptions >>'. The 'Resources' section displays the endpoint /\* with method buttons for GET, PUT, POST, DELETE, and PATCH, and a 'TEST >>' button. At the bottom, there are partial views for 'Comments' (0 of 0) and 'SDK Generation'.

# Visualizando métricas das APIs





# THE DEVELOPER'S CONFERENCE