



# **Rbinder: monitoramento sem modificação de código nem adição de dependências**

matheus@guava.com.br



# Sobre mim

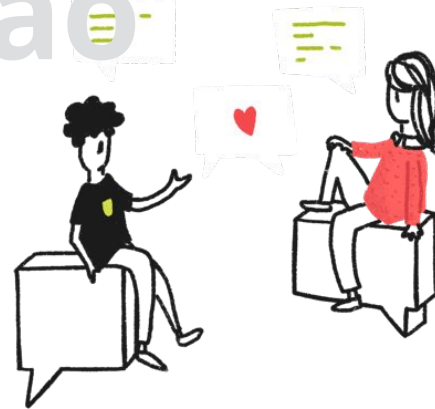
História

Distributed Tracing

Instrumentação

Proxies

Rbinder





# Sobre mim

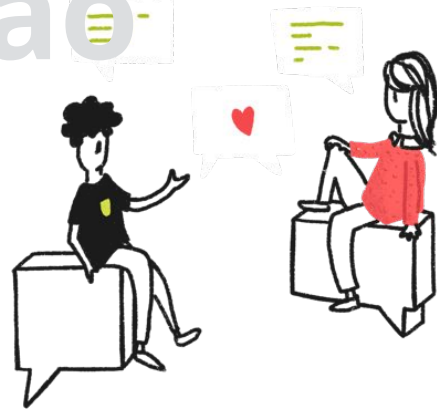
# **História**

# Distributed Tracing

# Instrumentação

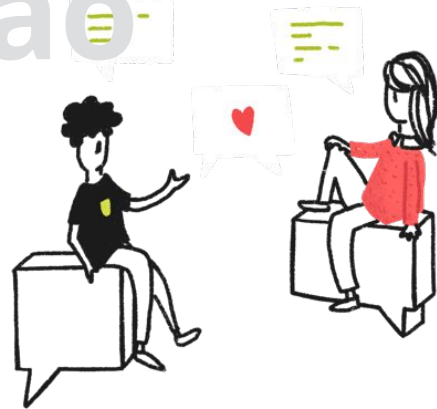
# Proxies

# Rbinder





Sobre mim  
História  
**Distributed Tracing**  
Instrumentação  
Proxies  
Rbinder





# Sobre mim

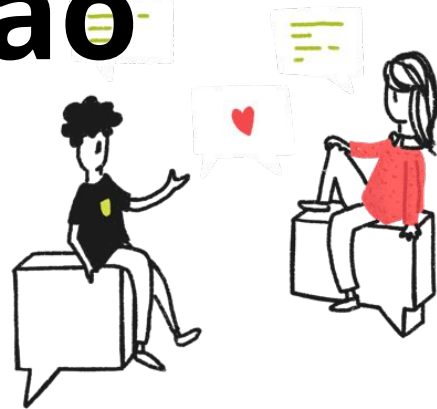
## História

## Distributed Tracing

# **Instrumentação**

## Proxies

## Rbinder





# Sobre mim

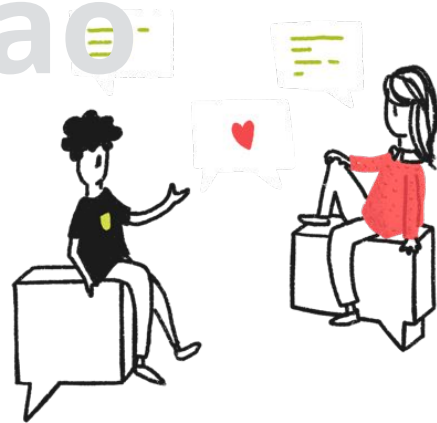
# História

# Distributed Tracing

# Instrumentação

# **Proxies**

# Rbinder





# Sobre mim

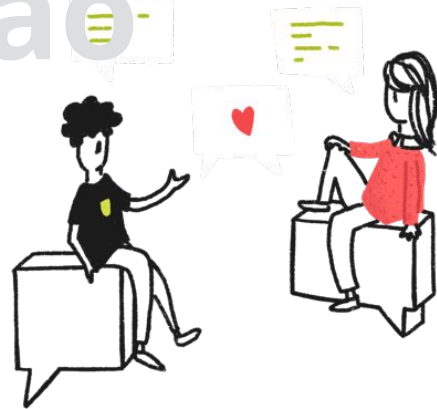
## História

## Distributed Tracing

## Instrumentação

## Proxies

# Rbinder





# Matheus





# 2010



# 2012



# 2016



Google Cloud Platform



**SOFTLAYER<sup>®</sup>**  
an IBM Company



**2016**



Google Cloud Platform



**SOFTLAYER®**  
an IBM Company



**2016**



**rubber.io**



Google Cloud Platform



**SOFTLAYER®**  
an IBM Company



**2016**



**NGINX**





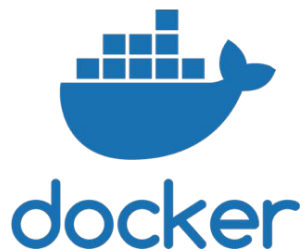
Google Cloud Platform



**SOFTLAYER®**  
an IBM Company



2016



ANSIBLE





Google Cloud Platform



**SOFTLAYER<sup>®</sup>**  
an IBM Company



**2016**



**New Relic<sup>®</sup>**

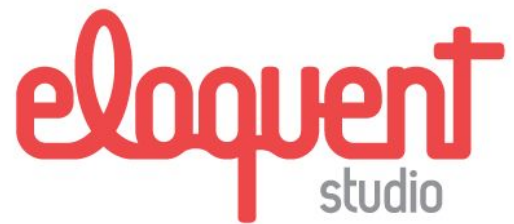




# guava



# 2016









# Supporting Microservice Evolution

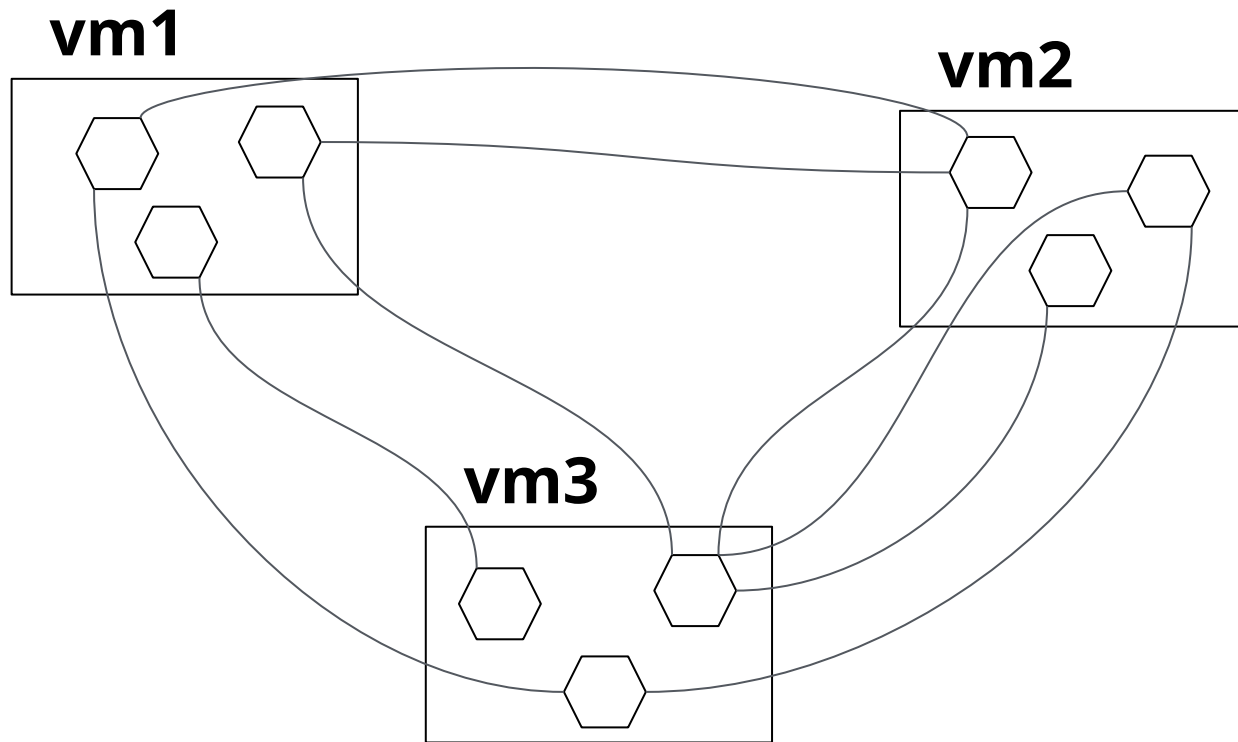
Adalberto R. Sampaio Jr.<sup>\*</sup>, Harshavardhan Kadiyala<sup>§</sup>, Bo Hu<sup>§</sup>,  
John Steinbacher<sup>†</sup>, Tony Erwin<sup>‡</sup>, Nelson Rosa<sup>\*</sup>, Ivan Beschastnikh<sup>§</sup>, Julia Rubin<sup>§</sup>

<sup>\*</sup>Federal University of Pernambuco, Brazil

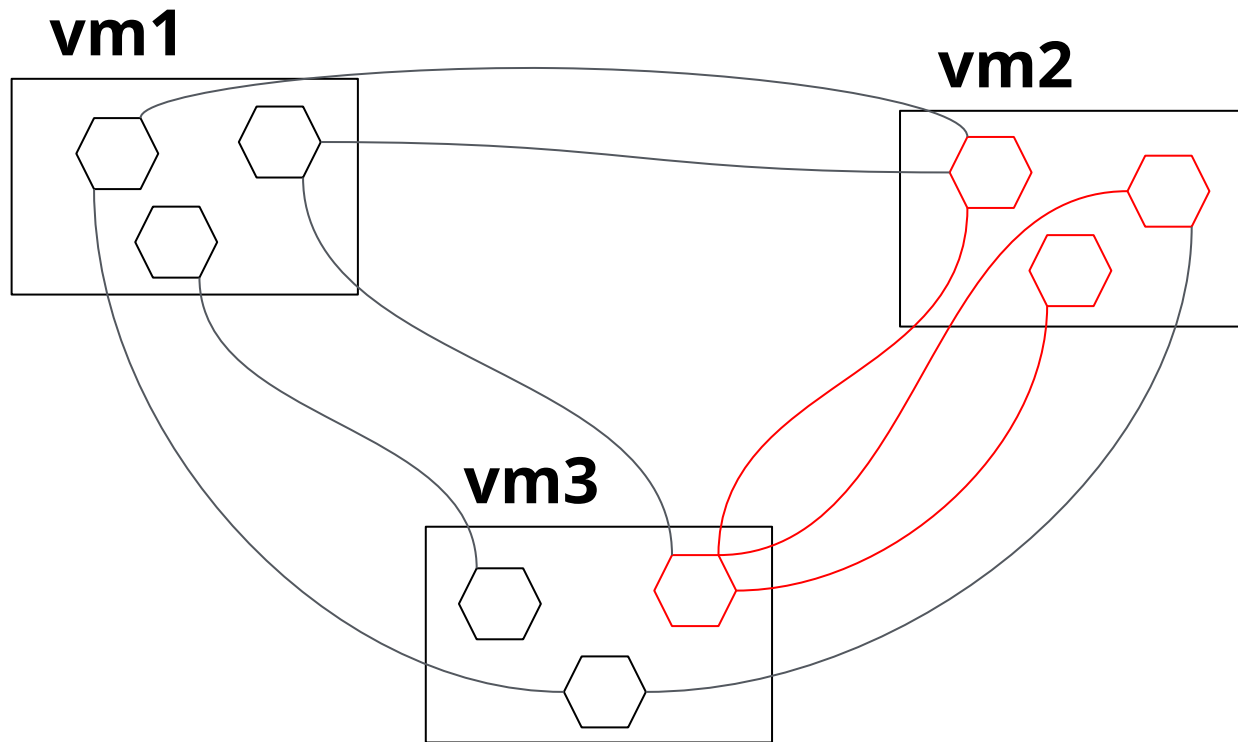
<sup>§</sup>University of British Columbia, Canada

<sup>†</sup>IBM, Canada

<sup>‡</sup>IBM, USA

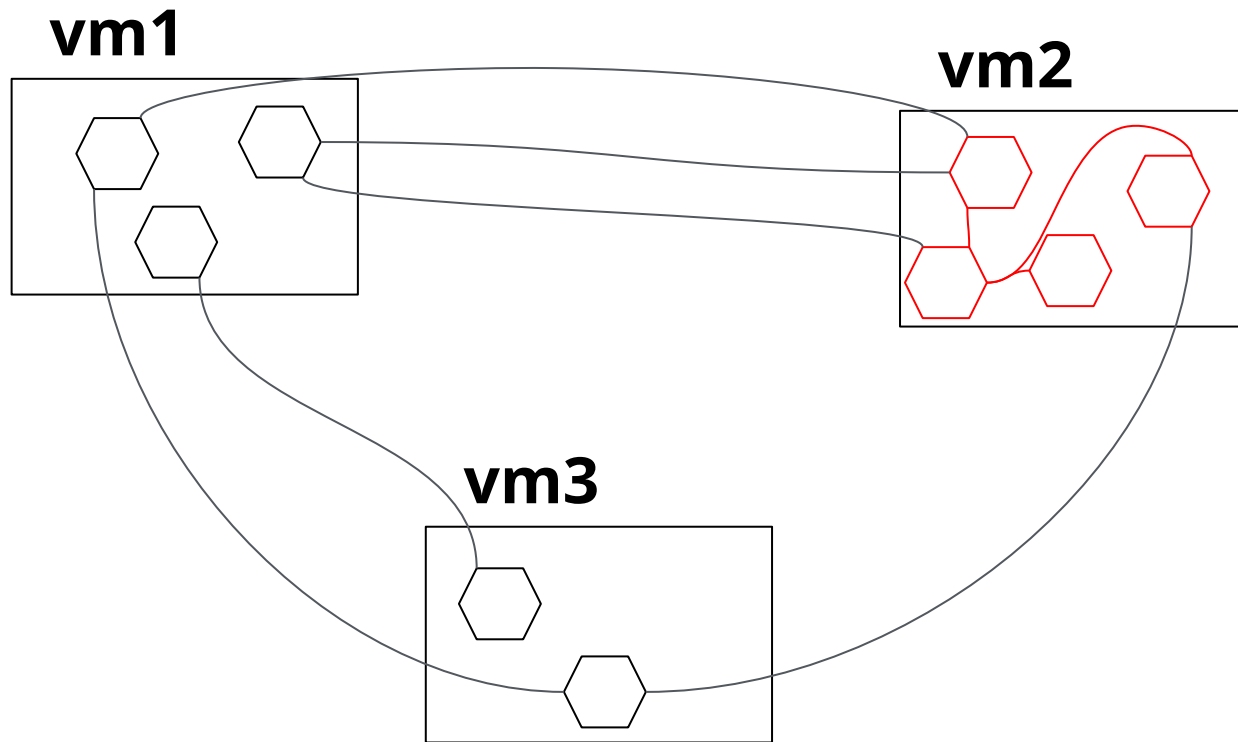


**microserviço**



**microserviço**





**microserviço**



# Métricas, métricas, métricas






# <https://microservices-demo.github.io>


OFFER OF THE DAY Buy 10 socks, get a pet human for free!

Login



HOME CATALOGUE ▾

0 items in cart



### WE LOVE SOCKS!

Fun fact: Socks were invented by woolly

### BEST PRICES

We price check our socks with trained monkeys

### 100% SATISFACTION GUARANTEED





# DISTRIBUTED TRACING

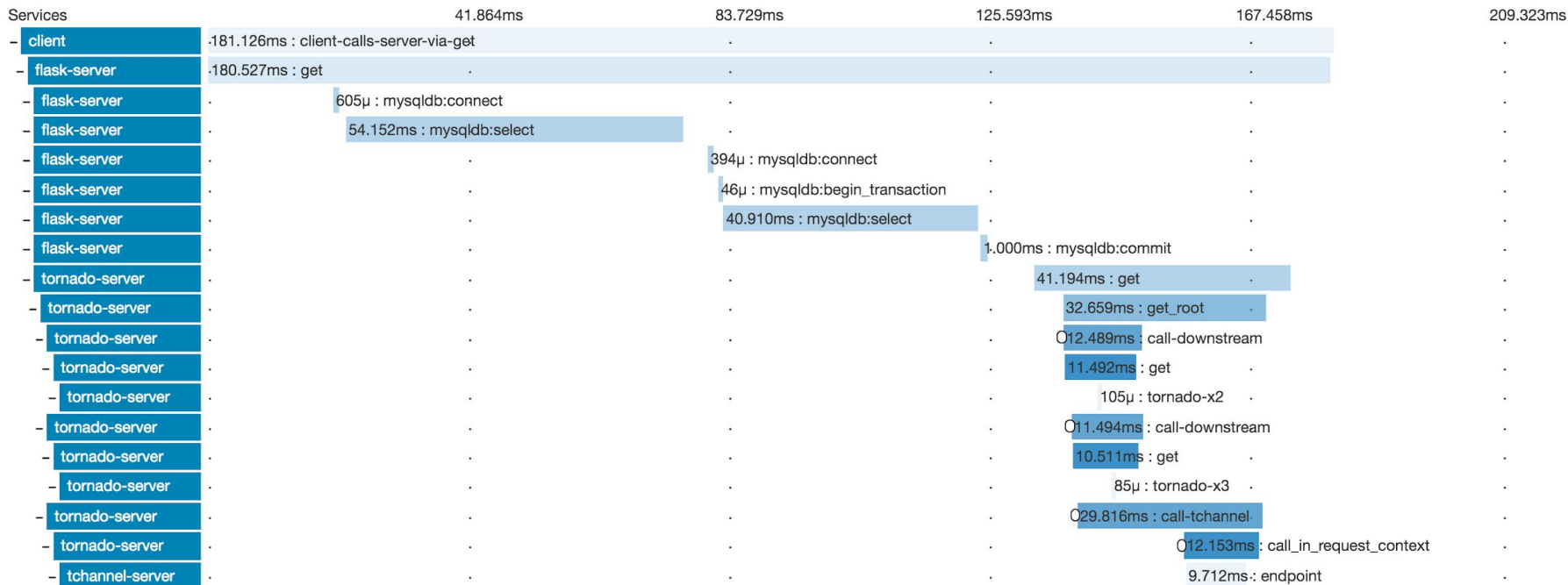
DevOps Recife

Duration: 209.323ms Services: 5 Depth: 7 Total Spans: 24

JSON

Expand All Collapse All Filter Service Se...

client x4 flask-server x10 missing-service-name x2 tchannel-server x2 tornado-server x11



[Explore](#)

# Zipkin API 1.0.0

[ Base URL: localhost:9411/api/v2 ]

<https://zipkin.io/zipkin-api/zipkin2-api.yaml>

Zipkin's v2 api currently includes a POST endpoint that can receive spans.

Schemes

HTTP



default

GET /services

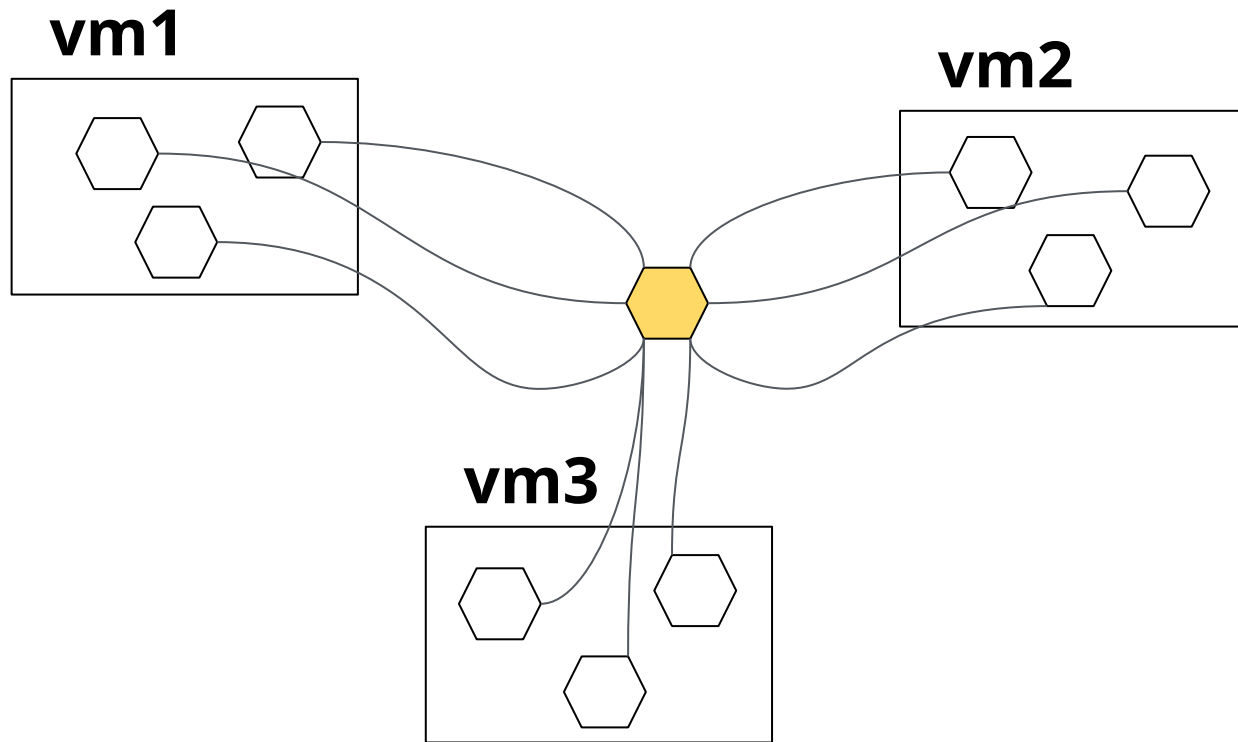
GET /spans

POST /spans

GET /traces

GET /trace/{traceId}

GET /dependencies



**zipkin**



**microsserviço**



# Métricas, métricas, métricas





# Métricas, métricas, métricas

**lacunas**



**tamanho**

# **Métricas, métricas, métricas**

**lacunas**



tamanho                      tipo

**Métricas, métricas,  
métricas**

lacunas



**tamanho**

**tipo**

# Métricas, métricas, métricas

**lacunas**

**banco  
de  
dados**



tipo

tamanho



# Métricas, métricas, métricas

lacunas

banco  
de  
dados



tipo

tamanho



# Métricas, métricas, métricas

GOLANG



lacunas

banco  
de  
dados



tipo

tamanho



GOLANG



# Métricas, métricas, métricas

lacunas

banco  
de  
dados



tamanho

tipo



Spring Cloud Sleuth



GOLANG



# Métricas, métricas, métricas

lacunas

banco  
de  
dados



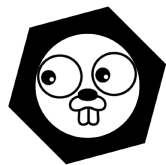


tamanho

tipo



Spring Cloud Sleuth



GOLANG



# Métricas, métricas, métricas

lacunas

banco  
de  
dados



tamanho

tipo



Spring Cloud Sleuth



GOLANG



# Métricas, métricas, métricas



banco  
de  
dados

lacunas






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HOME CATALOGUE ▾

0 Items in cart



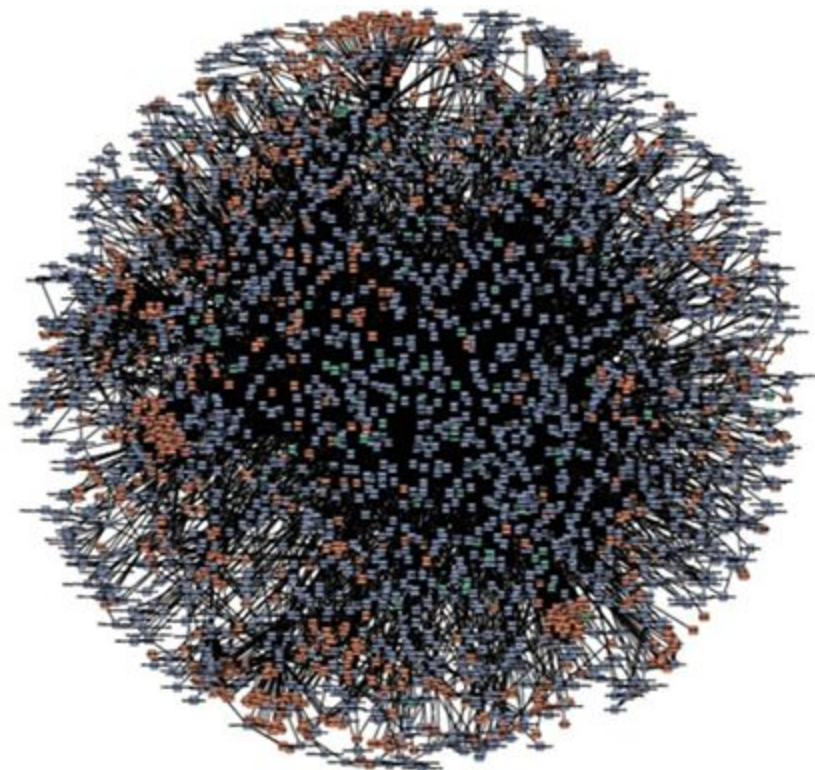
WE LOVE SOCKS!

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BEST PRICES

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100% SATISFACTION  
GUARANTEED



amazon.com<sup>®</sup>





# Como habilitar tracing distribuído?



# Como habilitar tracing distribuído?

**SEM MODIFICAR CÓDIGO**



# Como habilitar tracing distribuído?

**SEM MODIFICAR CÓDIGO**

**SEM ADICIONAR  
DEPENDÊNCIAS**





# Istio

Connect, secure, control, and observe services.



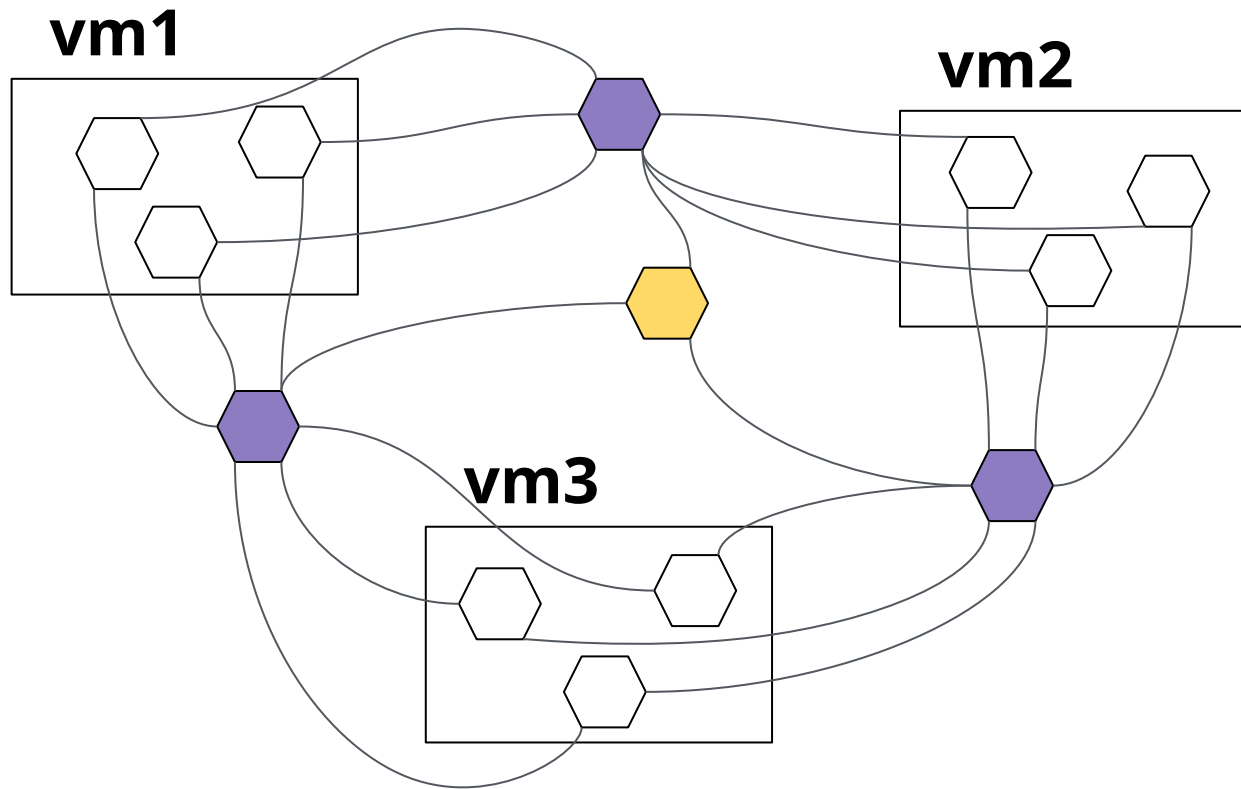
**proxy**



**zipkin**



**microserviço**







# Istio

Connect, secure, control, and observe services.

**Although Istio proxies are able to automatically send spans, they need some hints to tie together the entire trace. Applications need to propagate the appropriate HTTP headers so that when the proxies send span information, the spans can be correlated correctly into a single trace.**

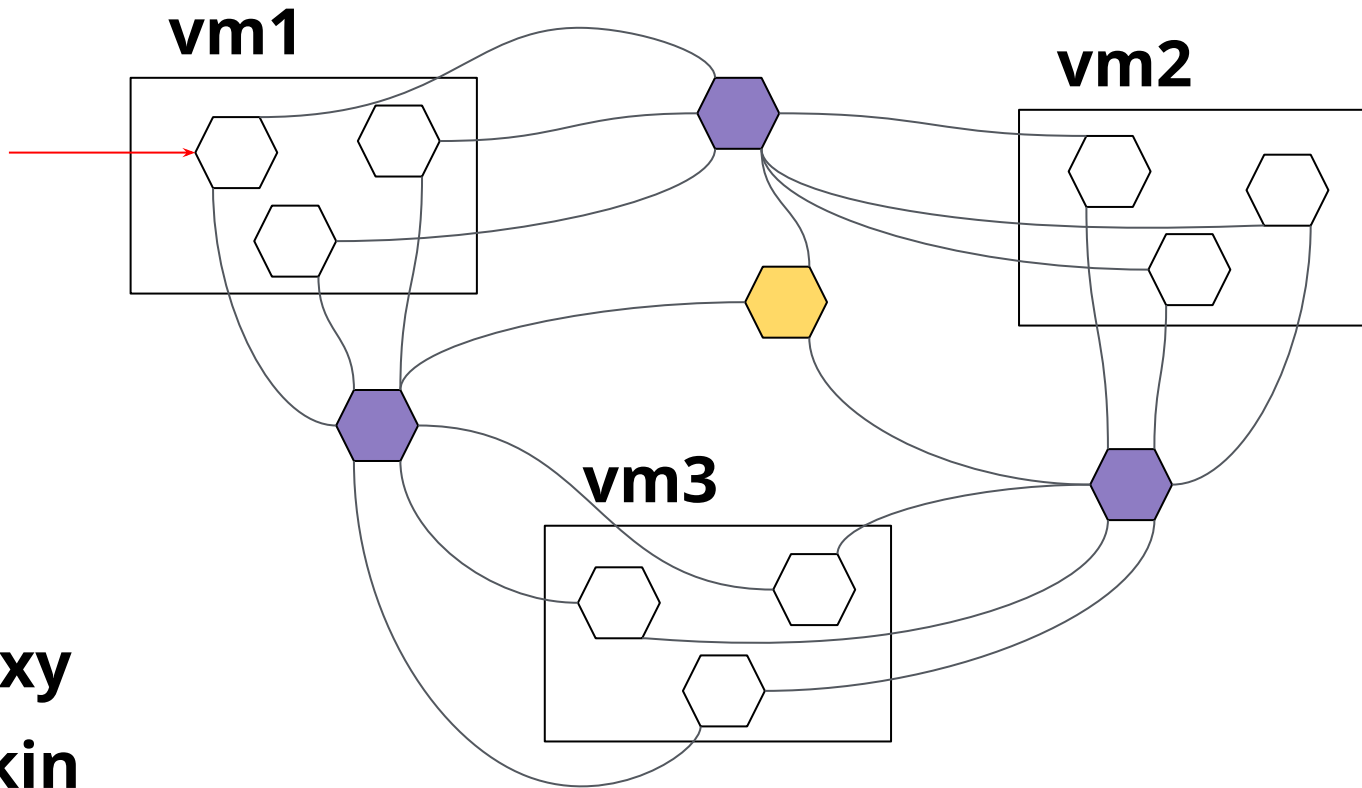


# Istio

Connect, secure, control, and observe services.

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**Applications need to propagate the appropriate HTTP headers** so that when the proxies send span information, the spans can be correlated correctly into a single trace.



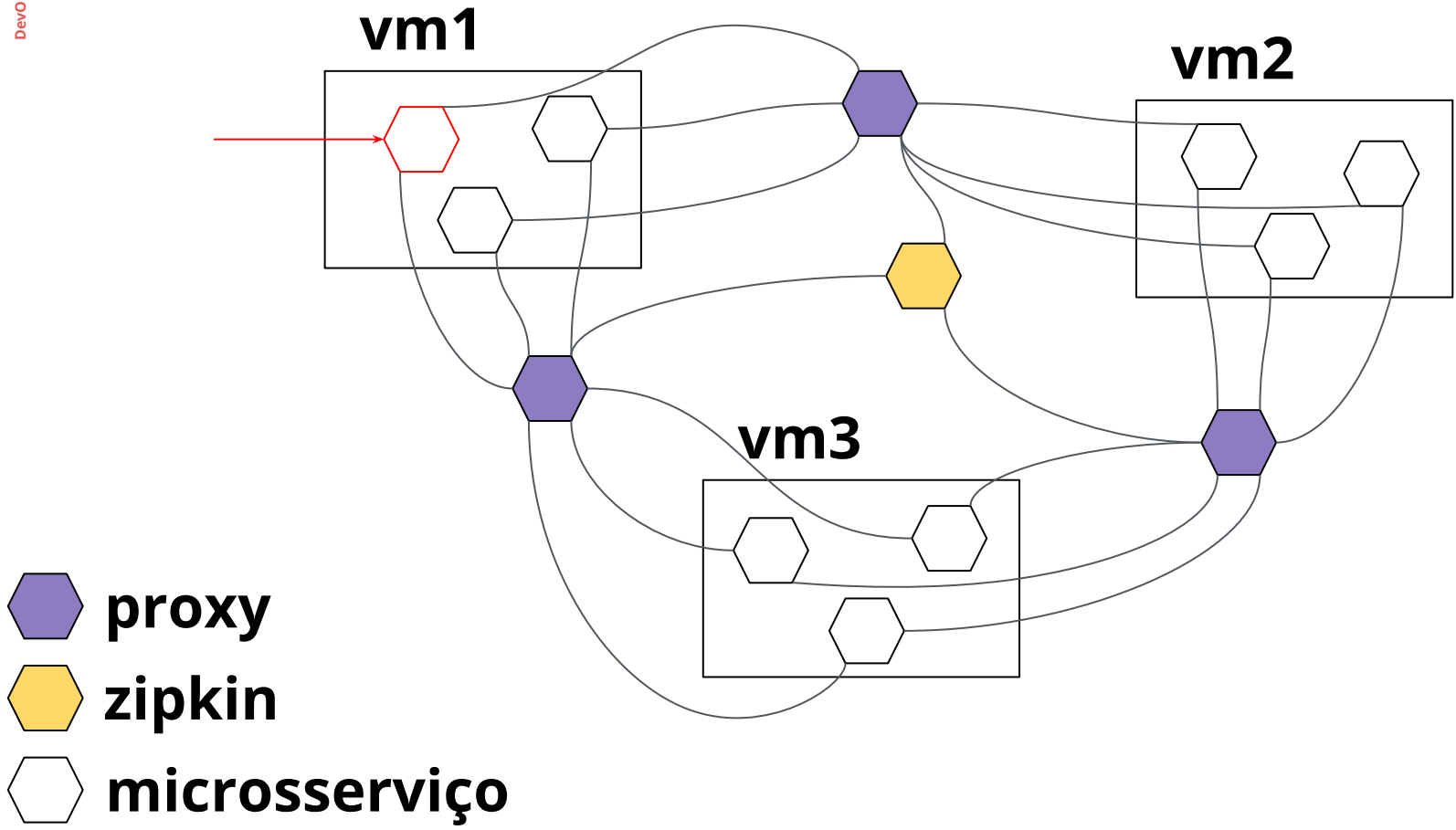
**proxy**

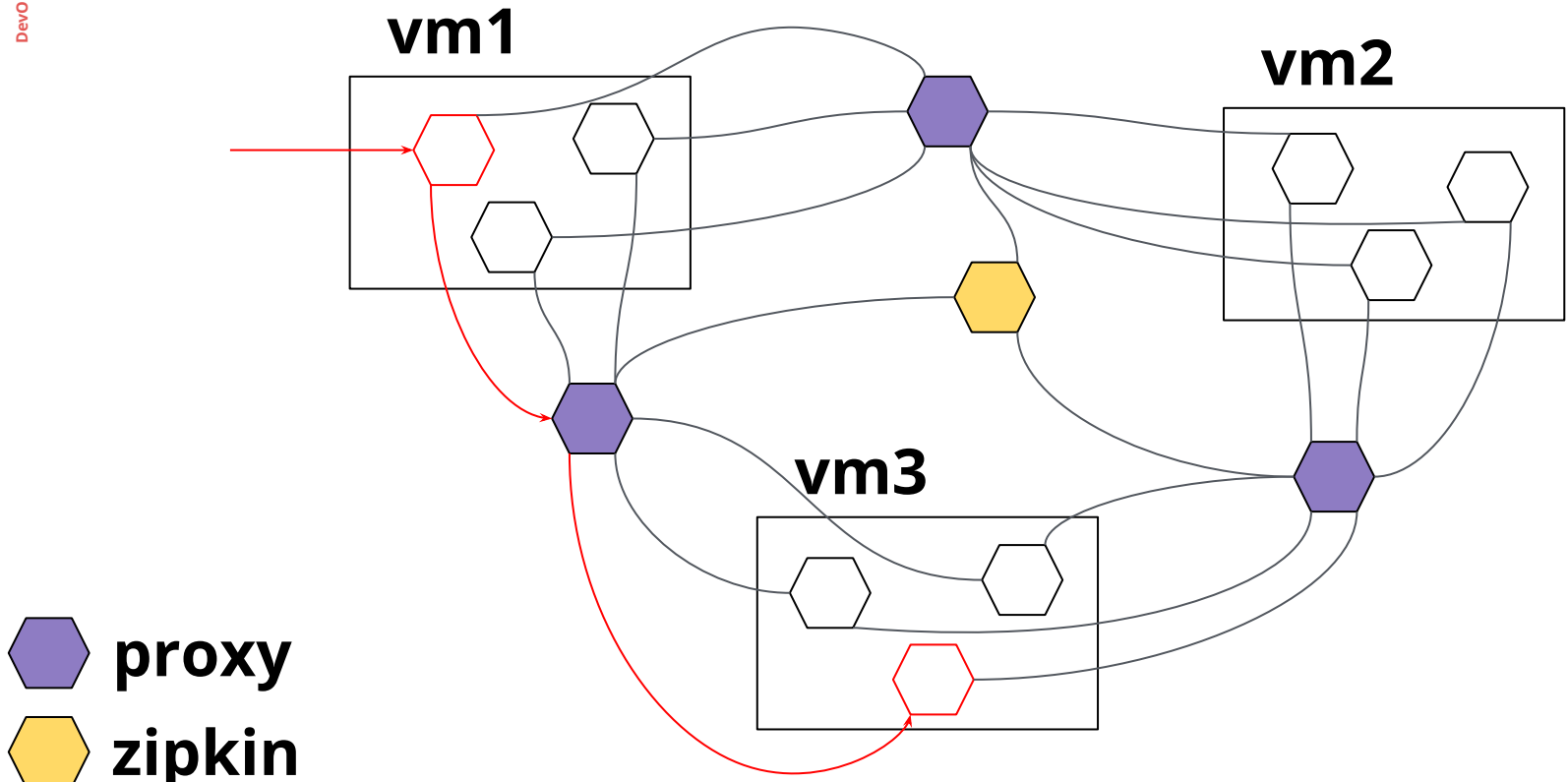


**zipkin**



**microsserviço**






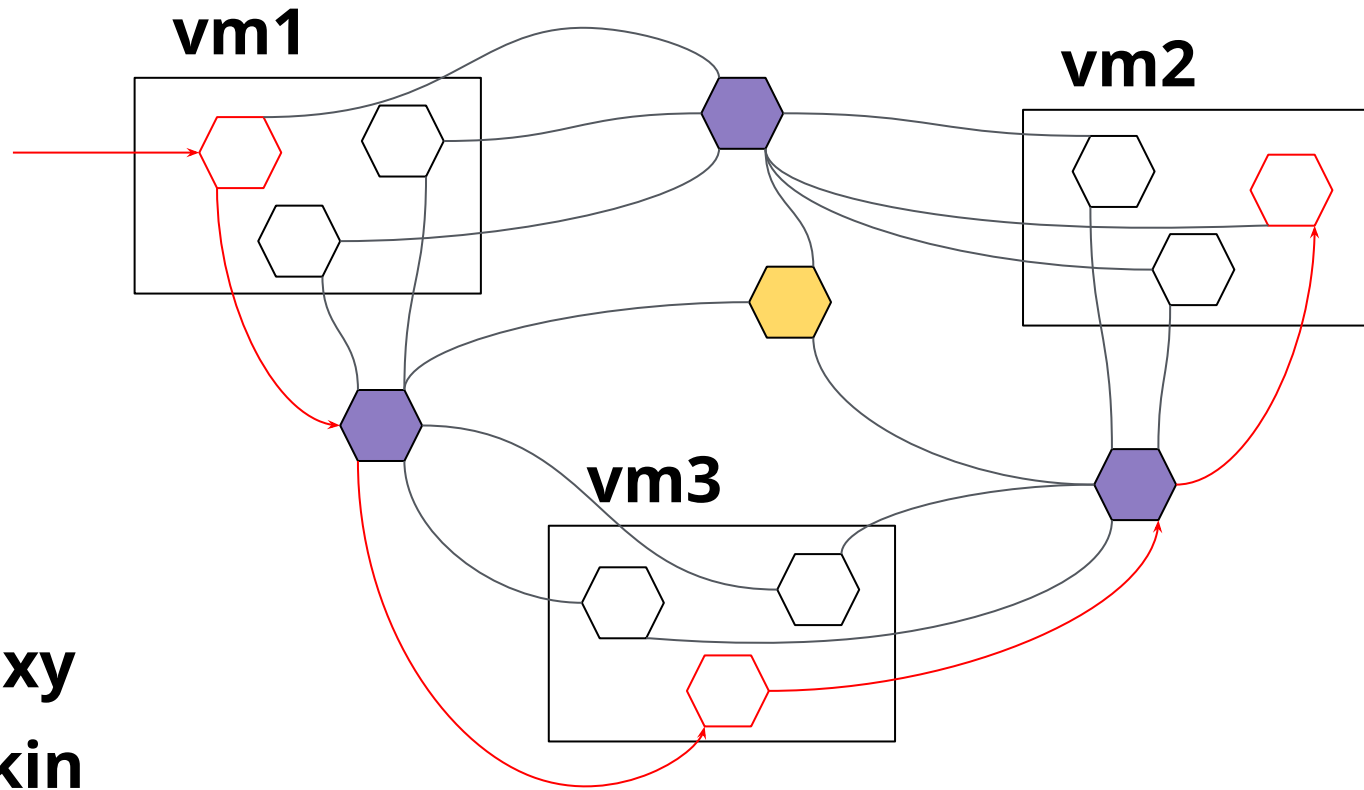


-  **proxy**
-  **zipkin**
-  **microsserviço**






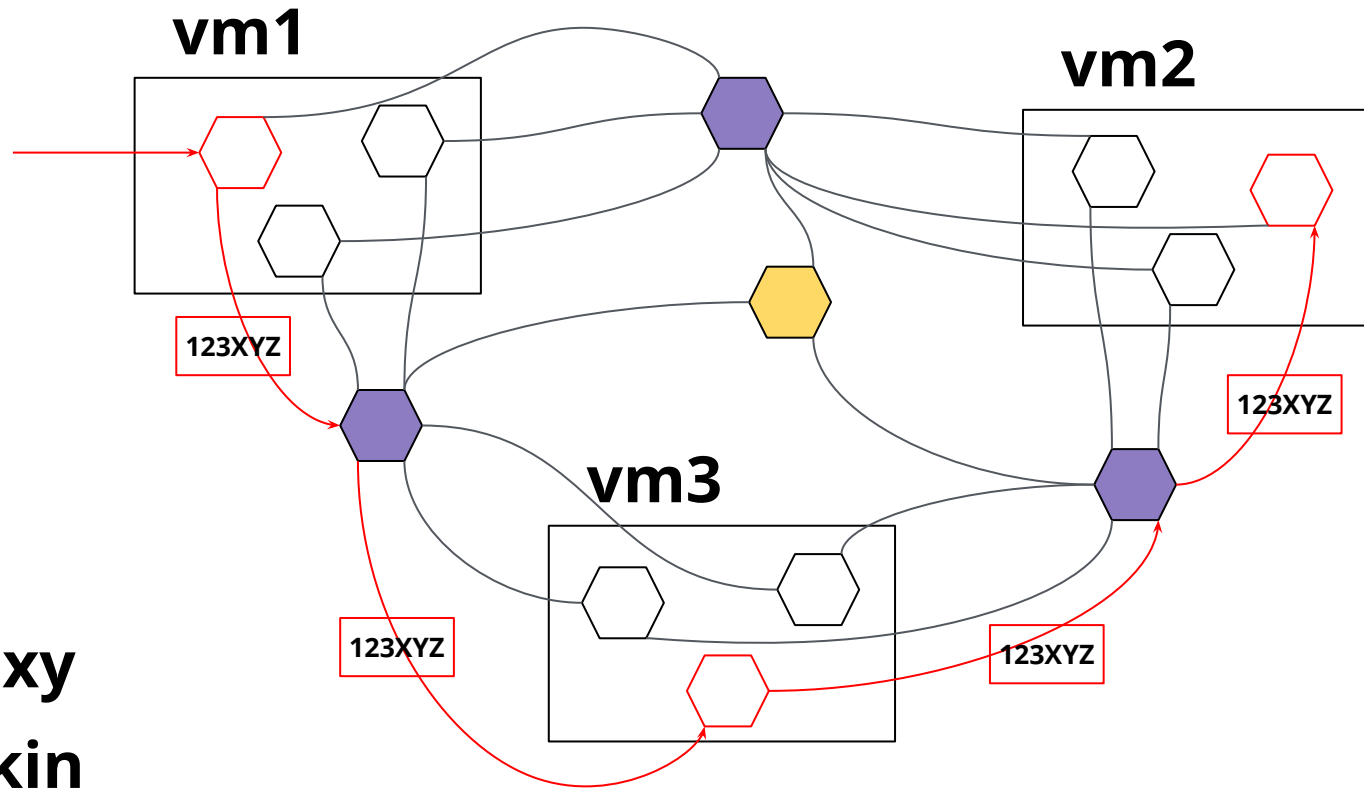


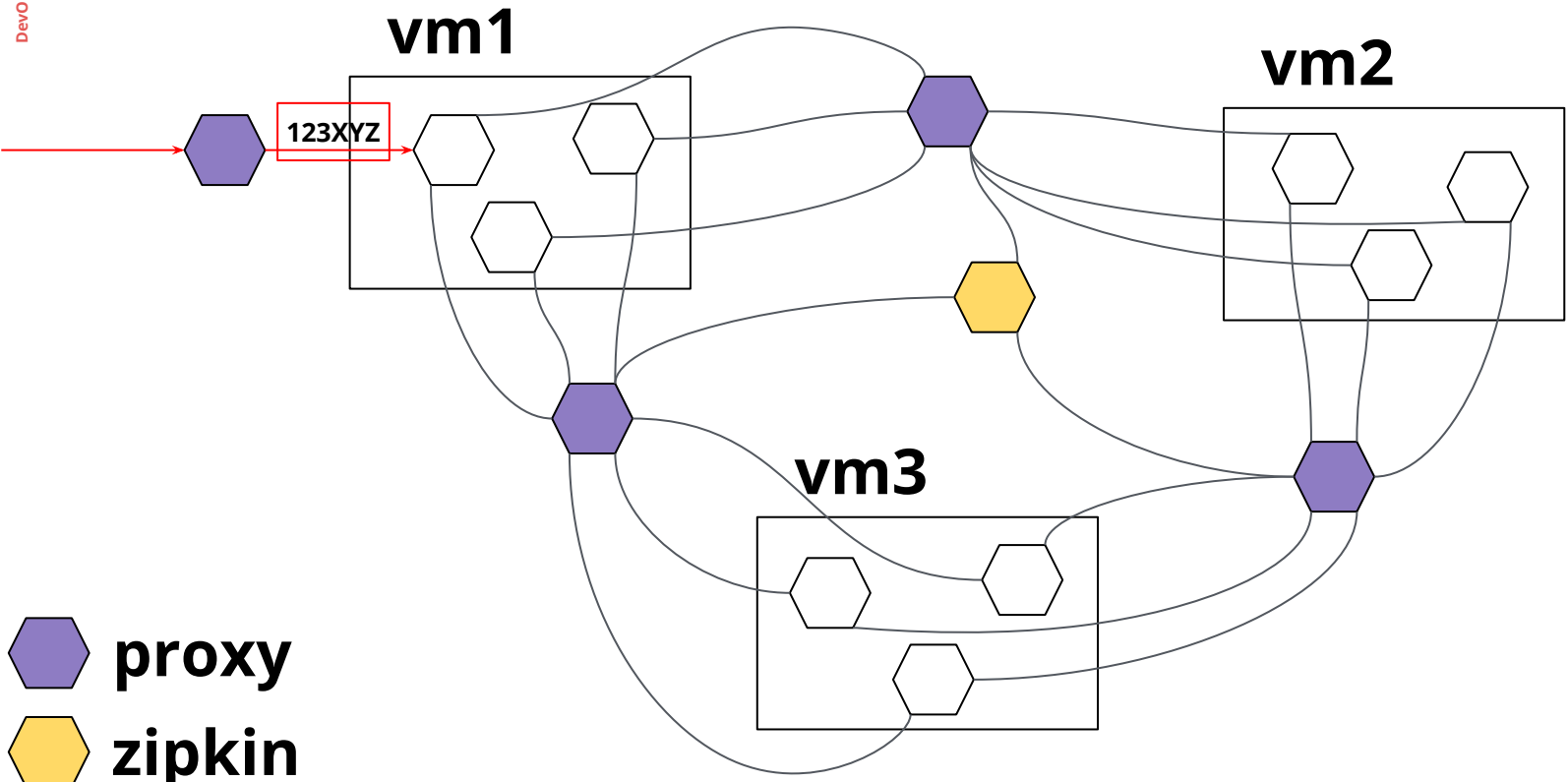
-  **proxy**
-  **zipkin**
-  **microsserviço**



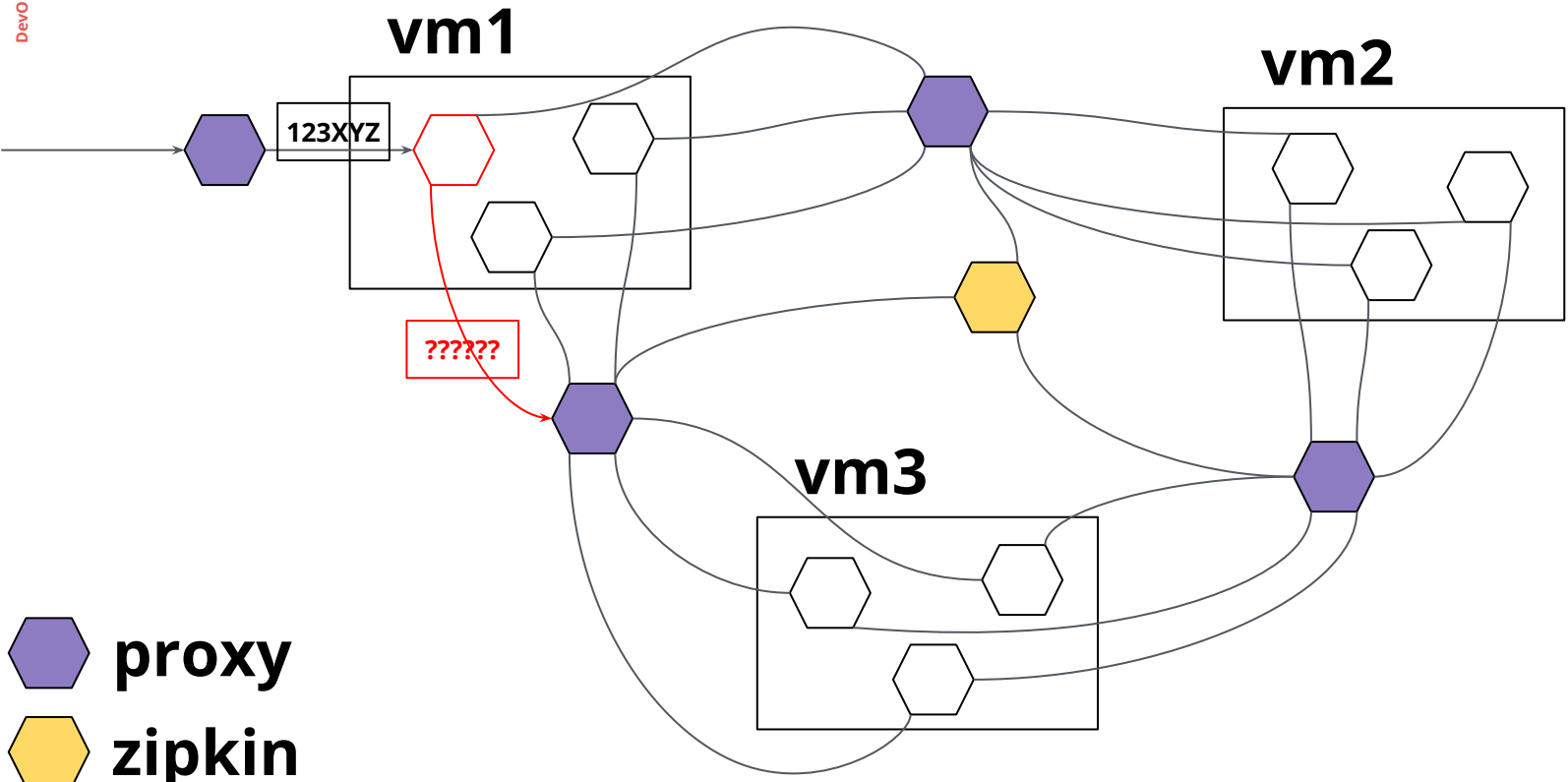


-  proxy
-  zipkin
-  microsserviço



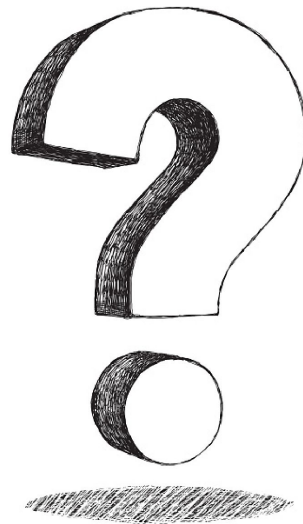


-  **proxy**
-  **zipkin**
-  **microsserviço**



-  **proxy**
-  **zipkin**
-  **microsserviço**





**Por que se satisfazer com isso?**





# Era syscall que nos faltava





WIKIPEDIA  
The Free Encyclopedia

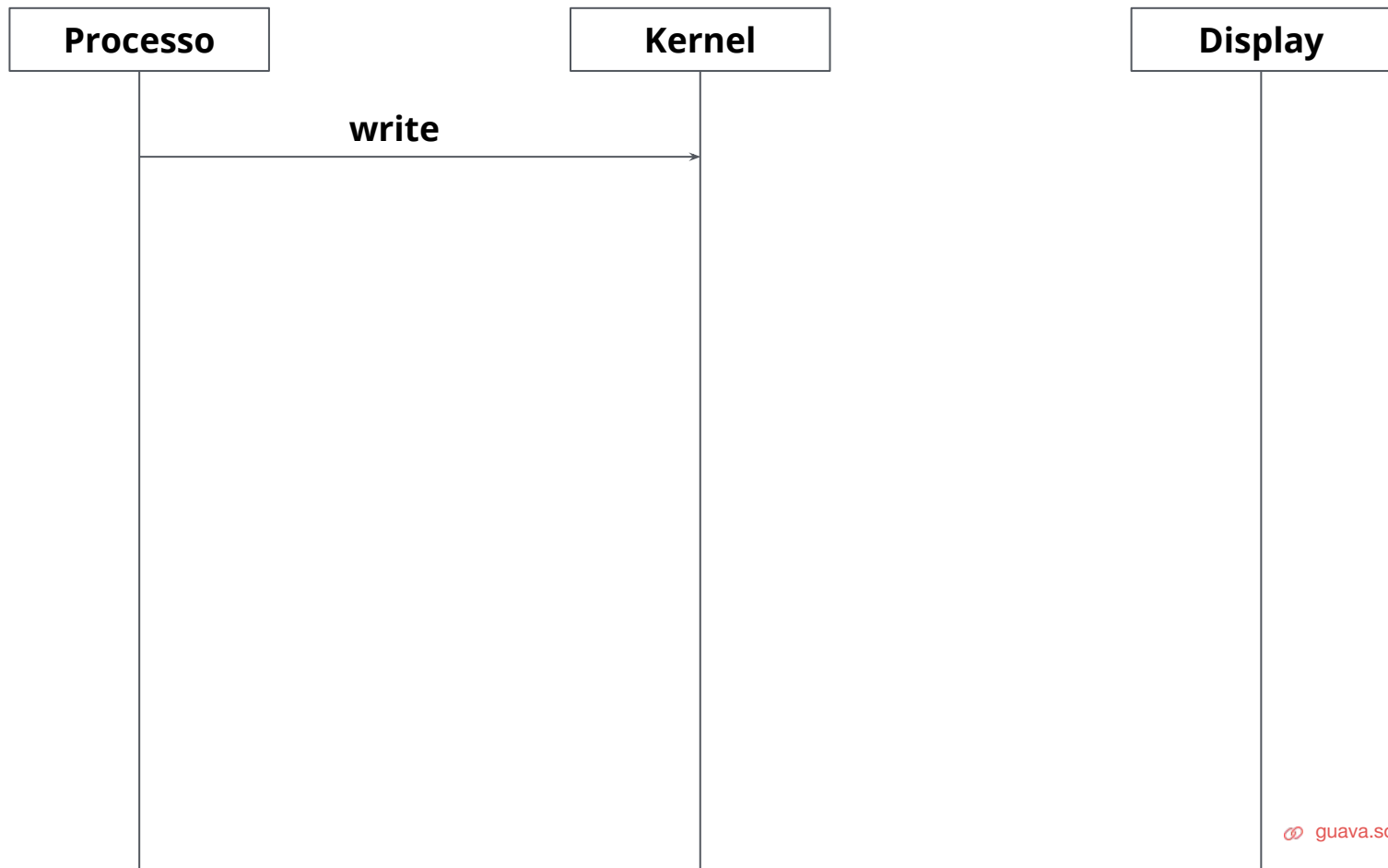
**a system call is the programmatic way in which a computer program requests a service from the kernel of the operating system it is executed on**

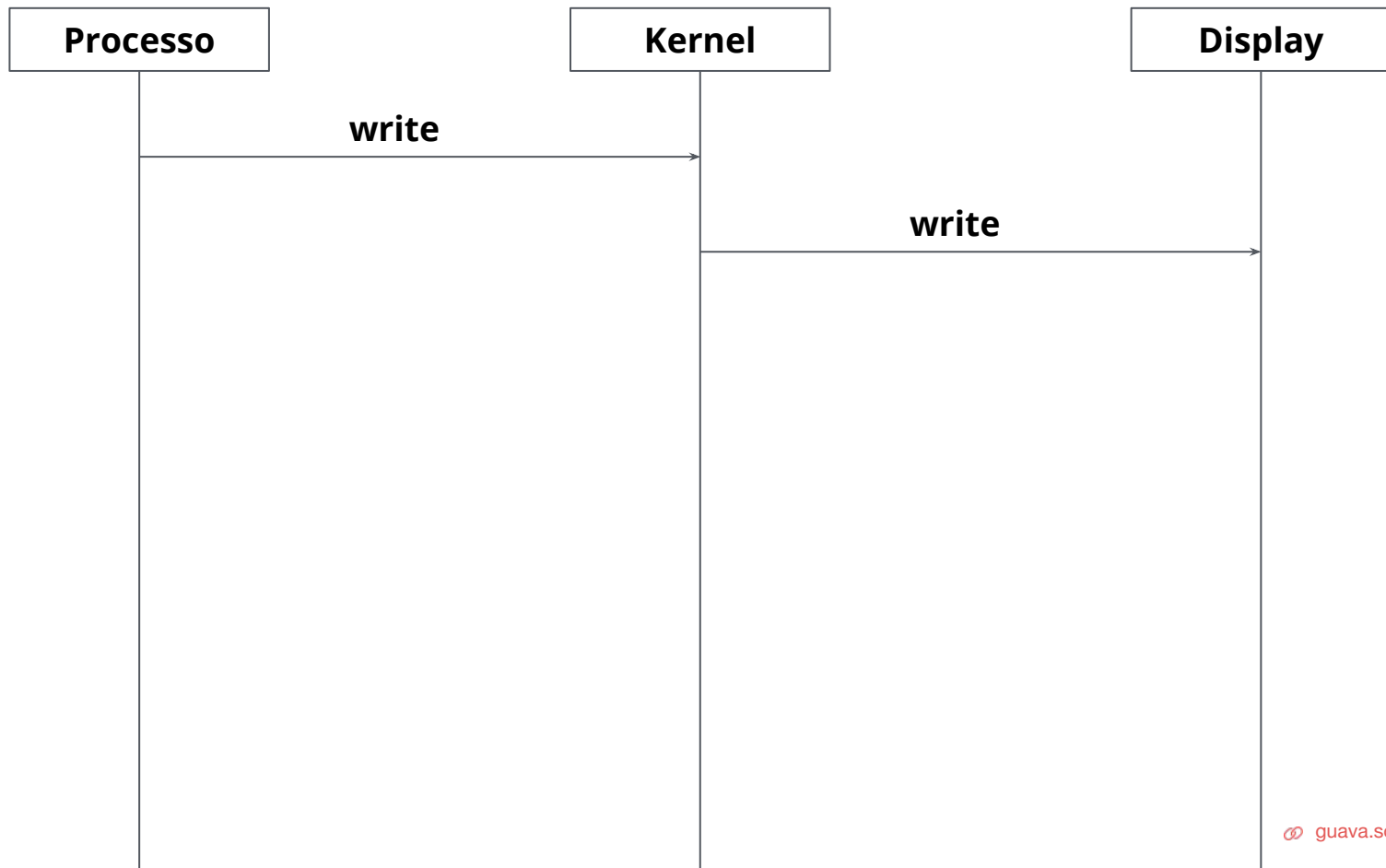


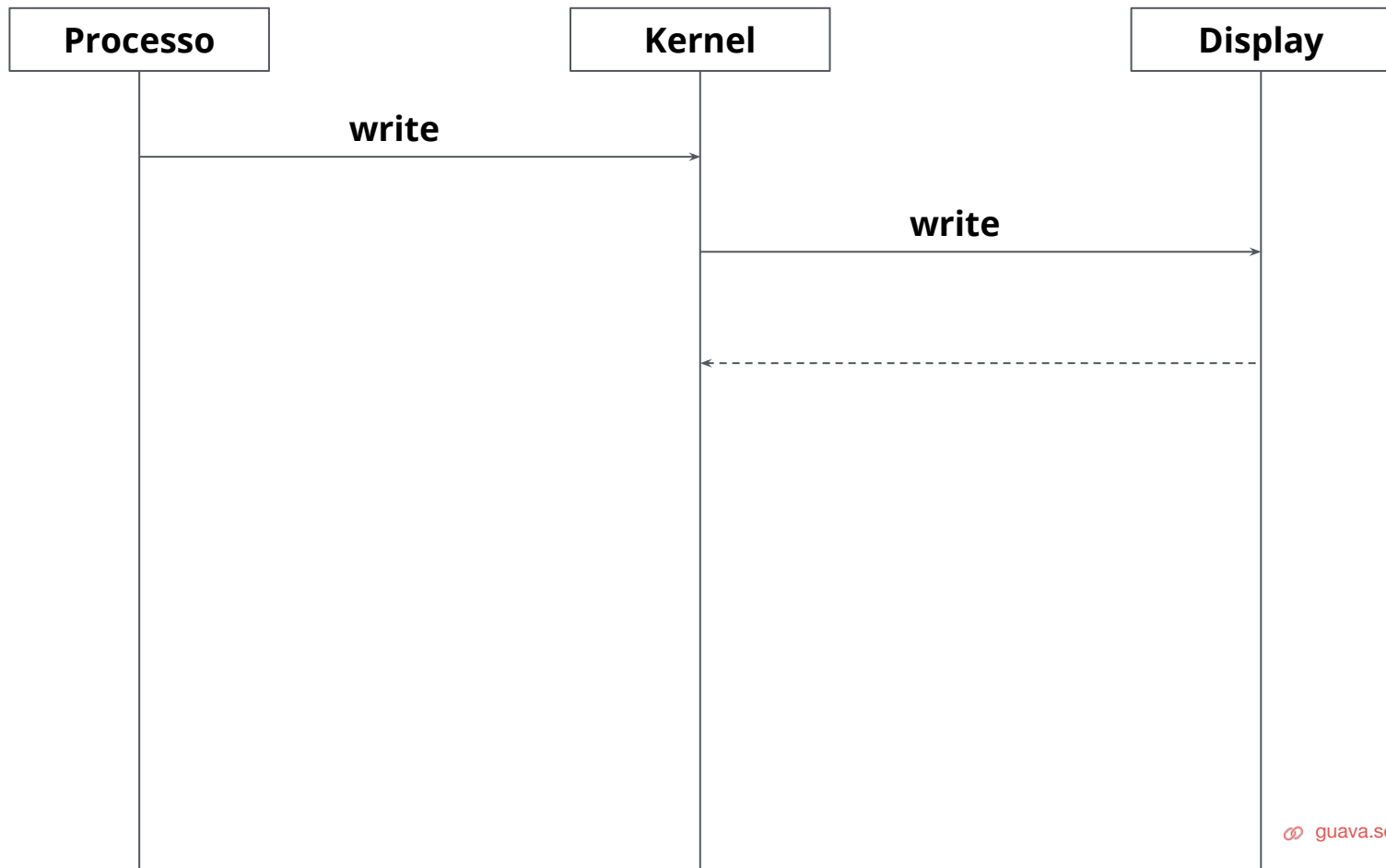
**Processo**

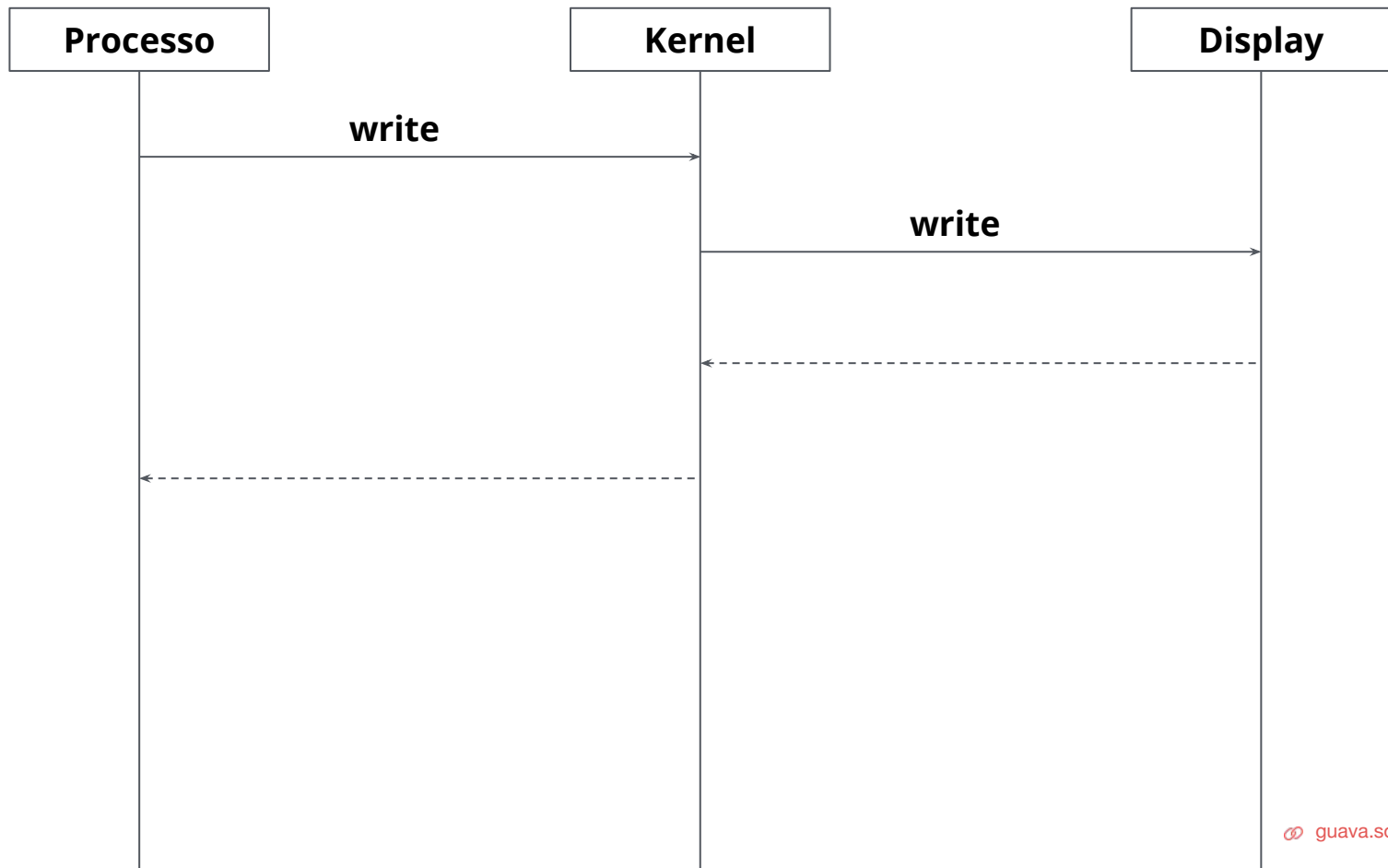
**Kernel**

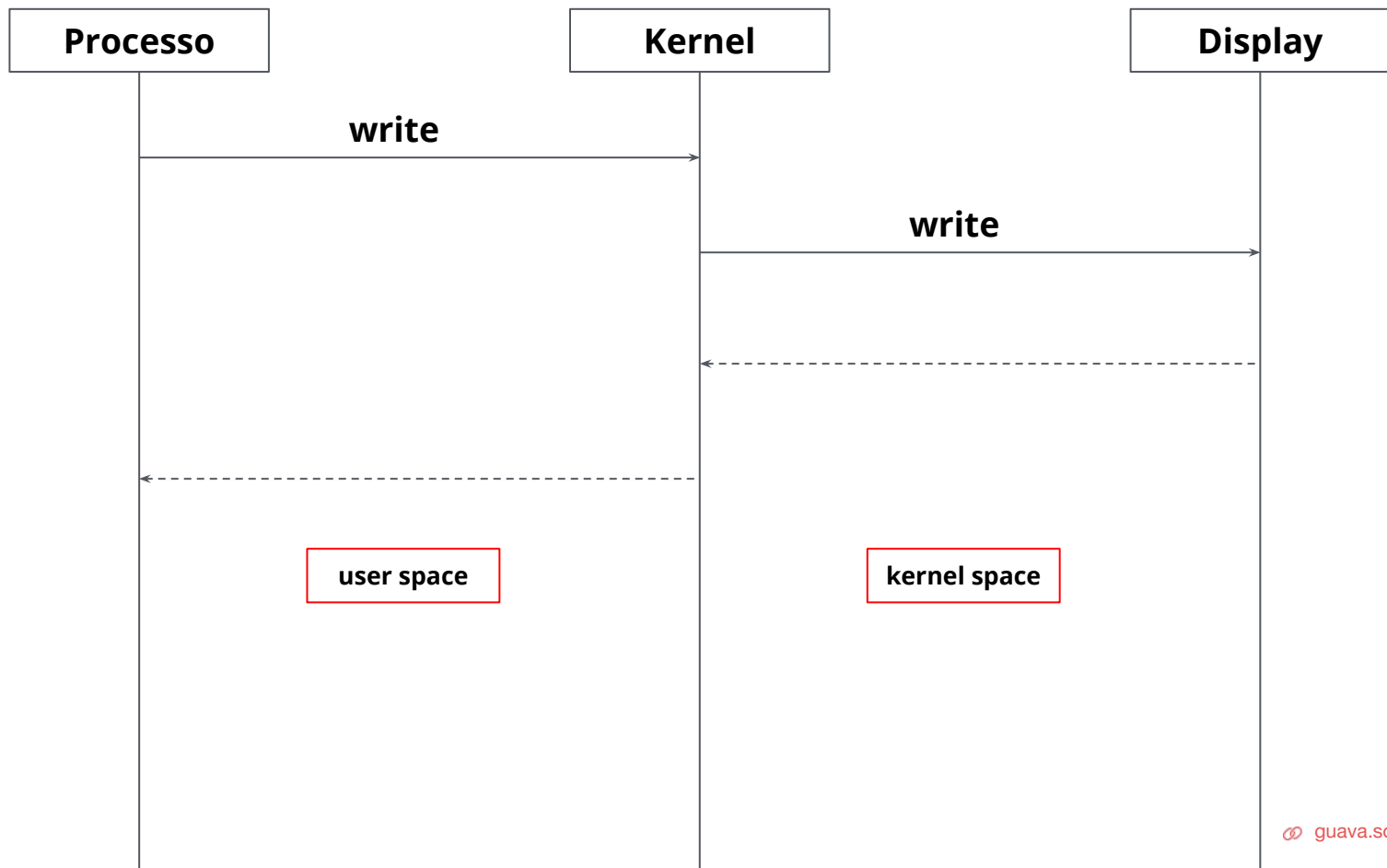
**Display**

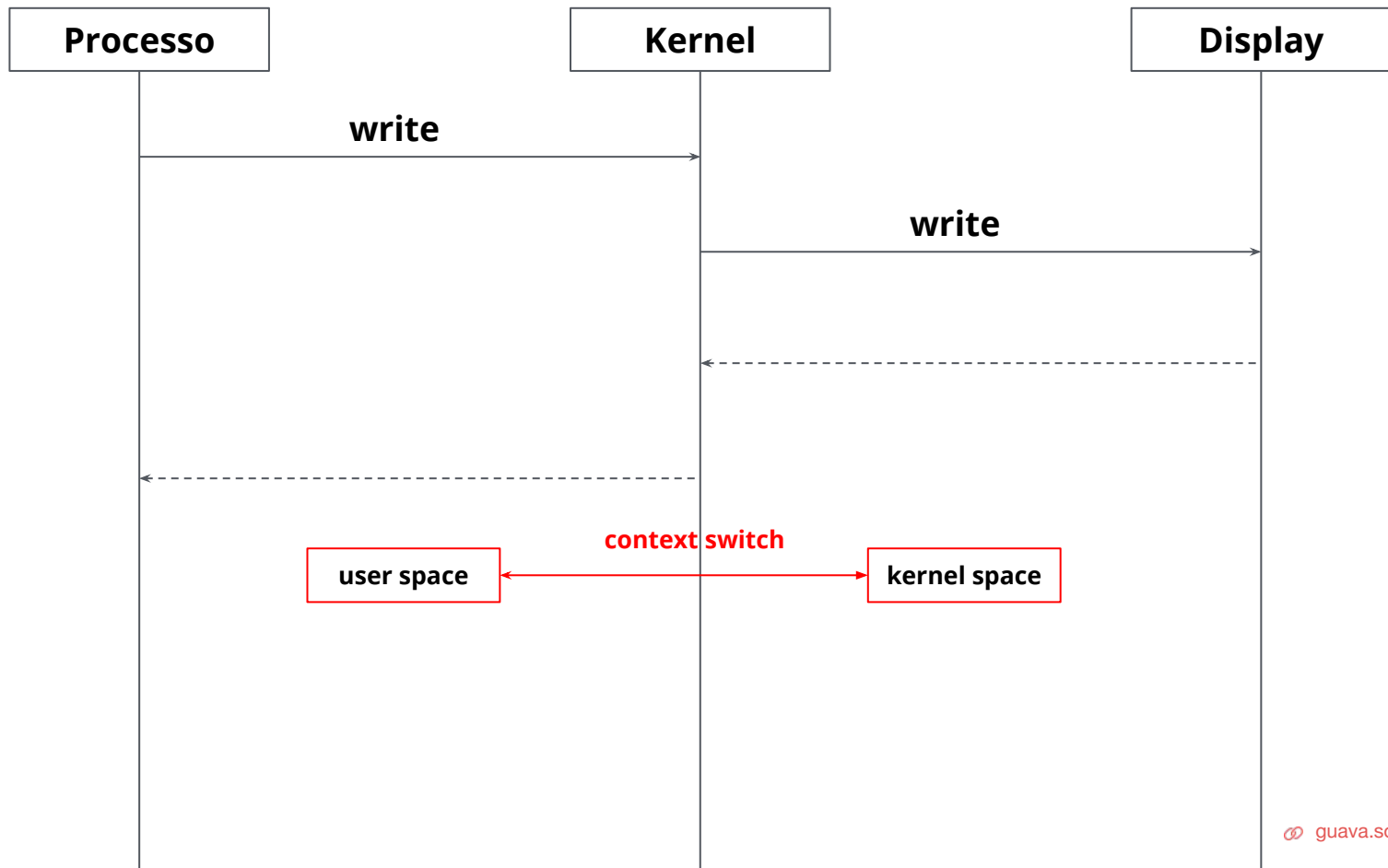
















**\$ strace echo**



**Monitorar a execução de syscalls relacionadas ao envio e recebimento de requisições HTTP para extrair e injetar informações de identificação**



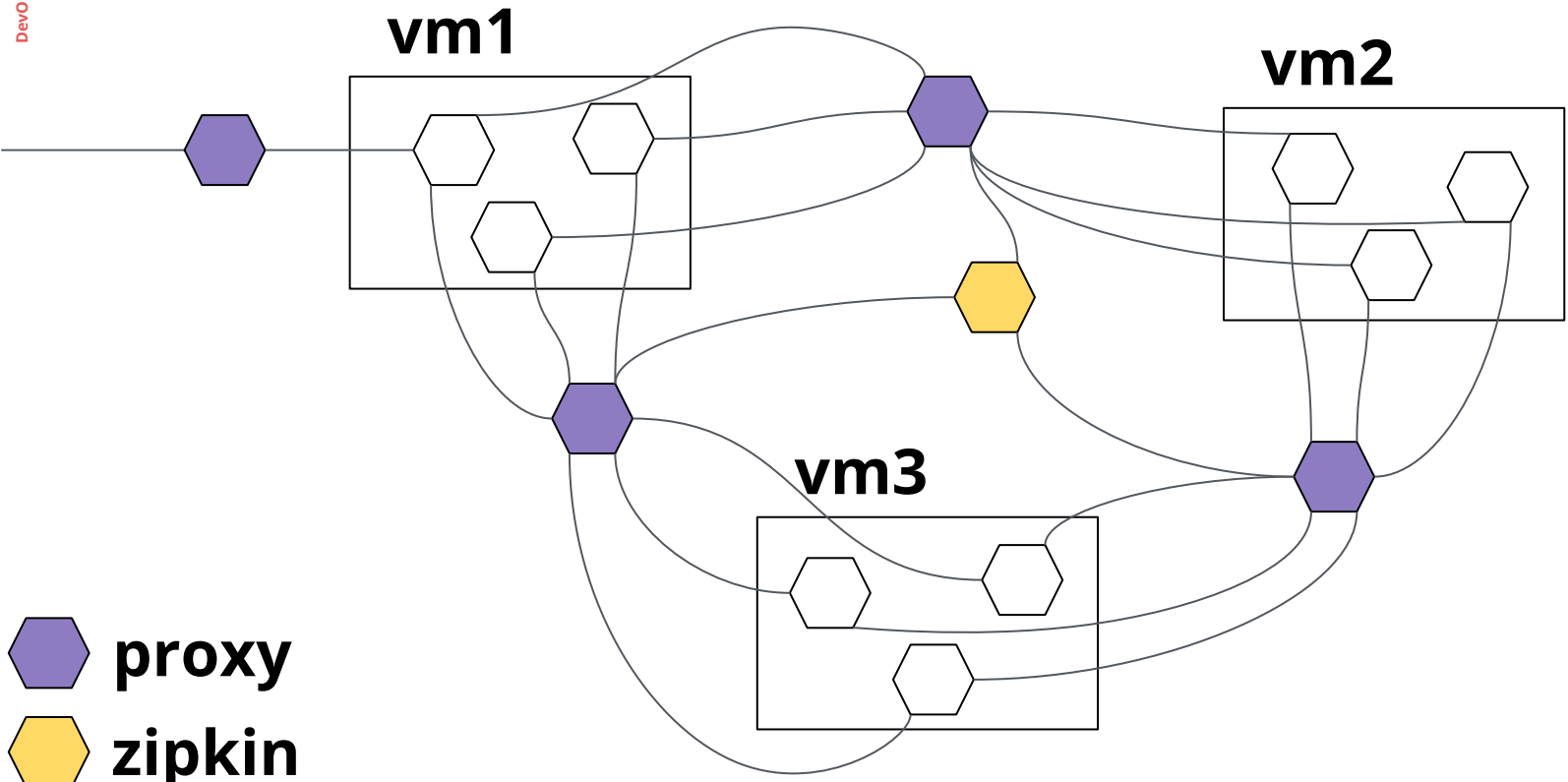
Monitorar a execução de syscalls relacionadas ao envio e recebimento de **requisições HTTP** para extrair e injetar informações de identificação



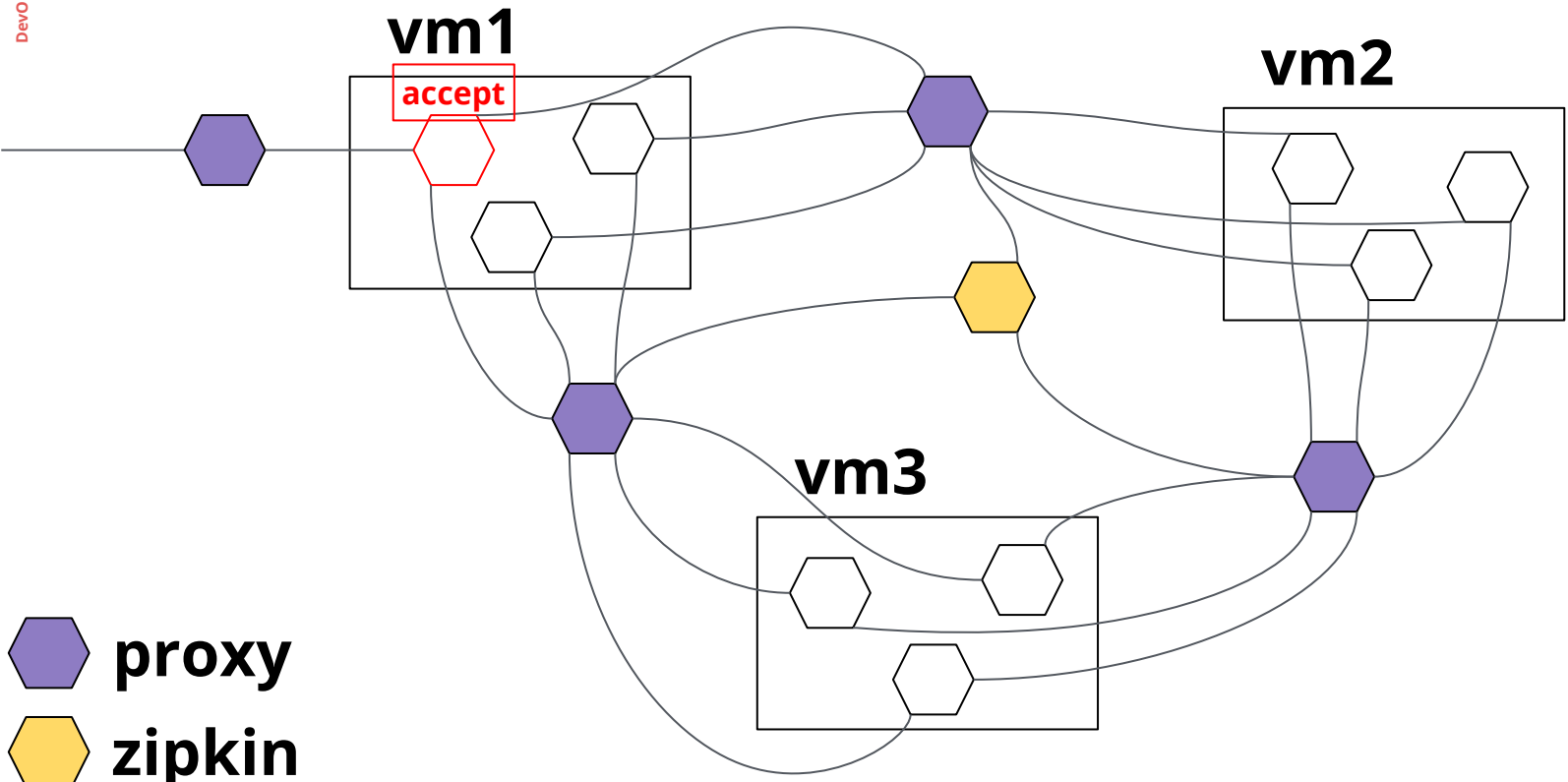
Monitorar a execução de syscalls relacionadas ao envio e recebimento de requisições HTTP para extrair e **injetar** informações de identificação



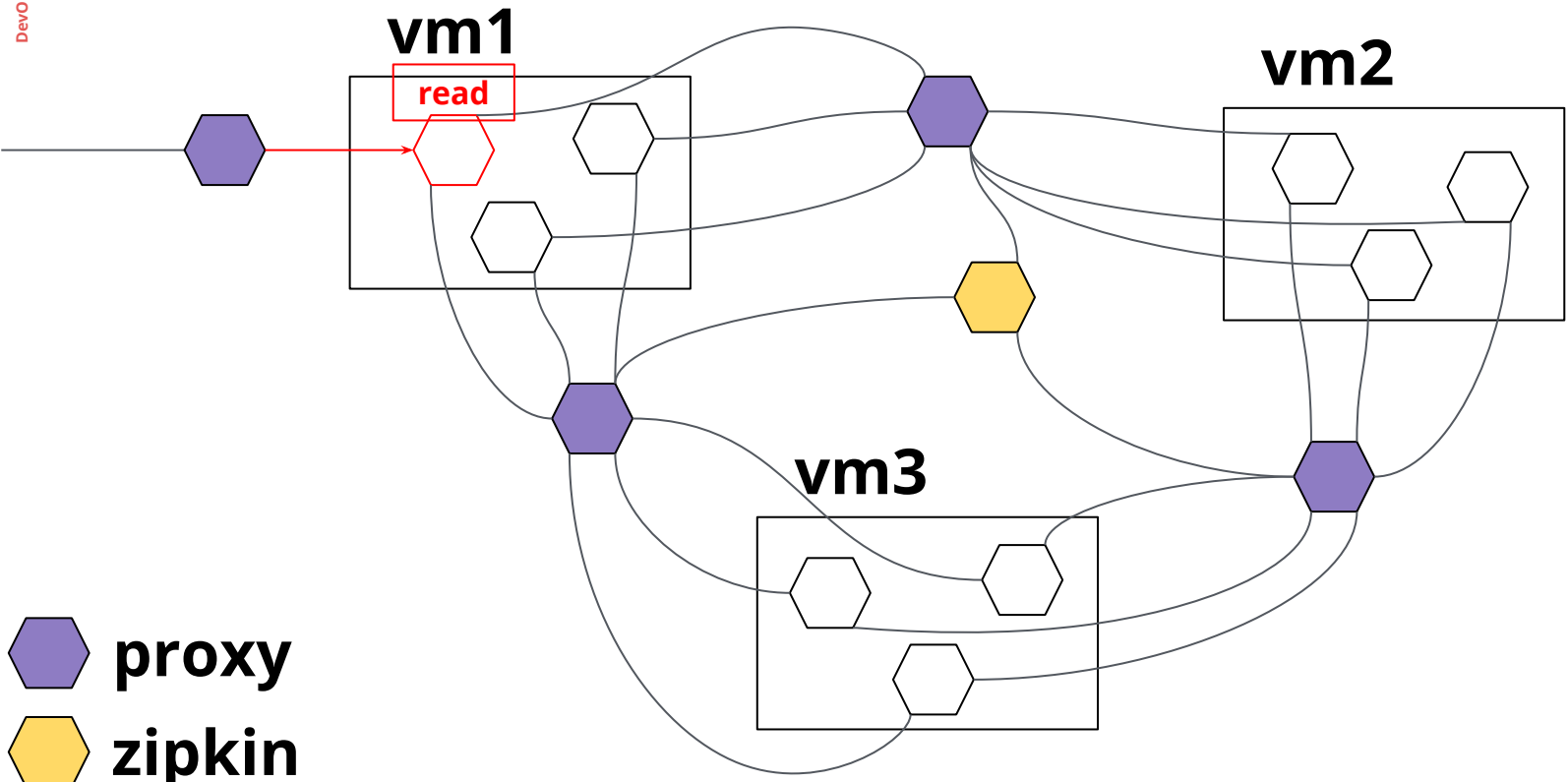
```
$ strace -o strace.out ruby request.rb
```



-  **proxy**
-  **zipkin**
-  **microserviço**

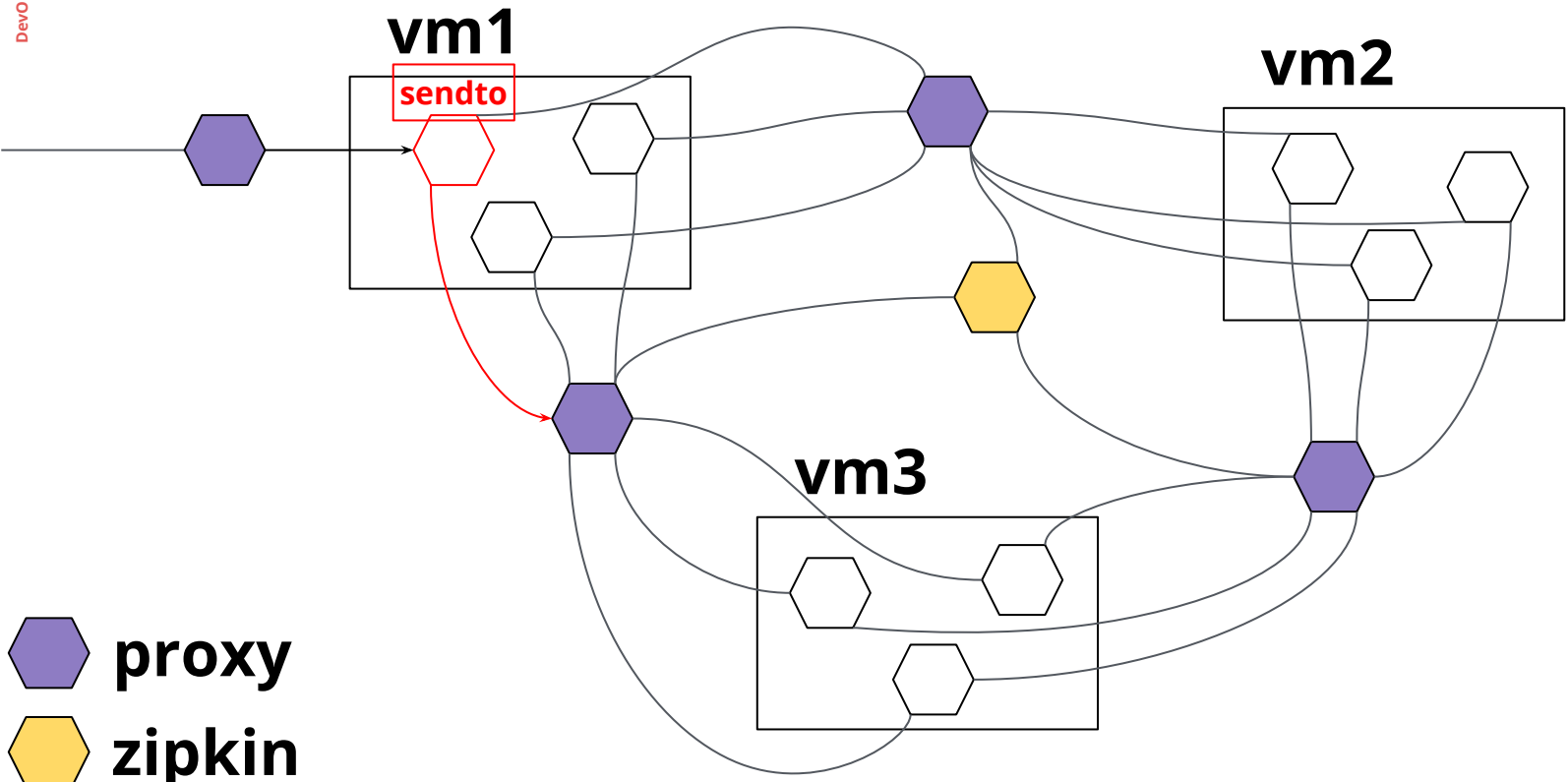


-  **proxy**
-  **zipkin**
-  **microserviço**



-  **proxy**
-  **zipkin**
-  **microserviço**



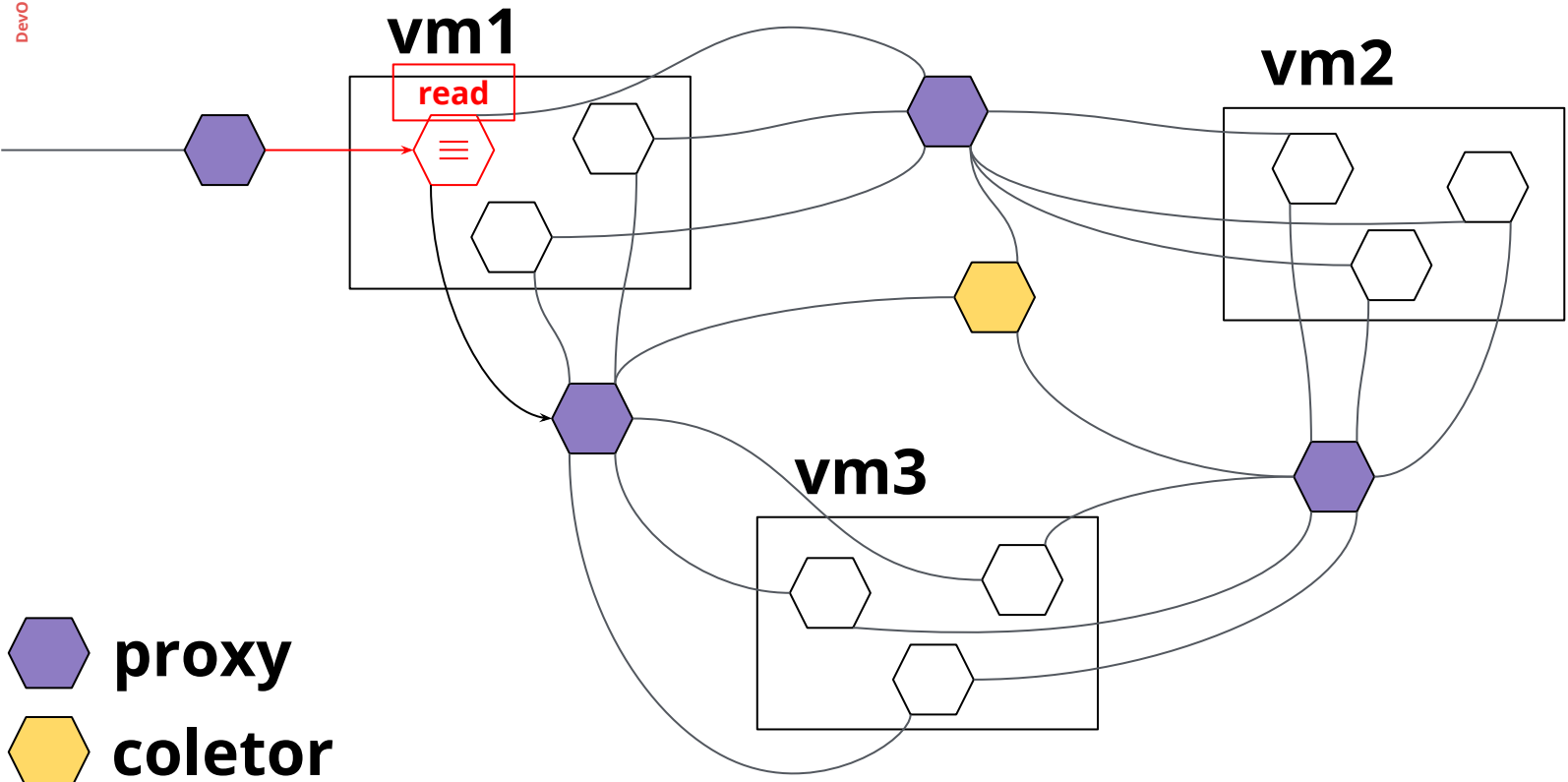





-  **proxy**
-  **zipkin**
-  **microserviço**

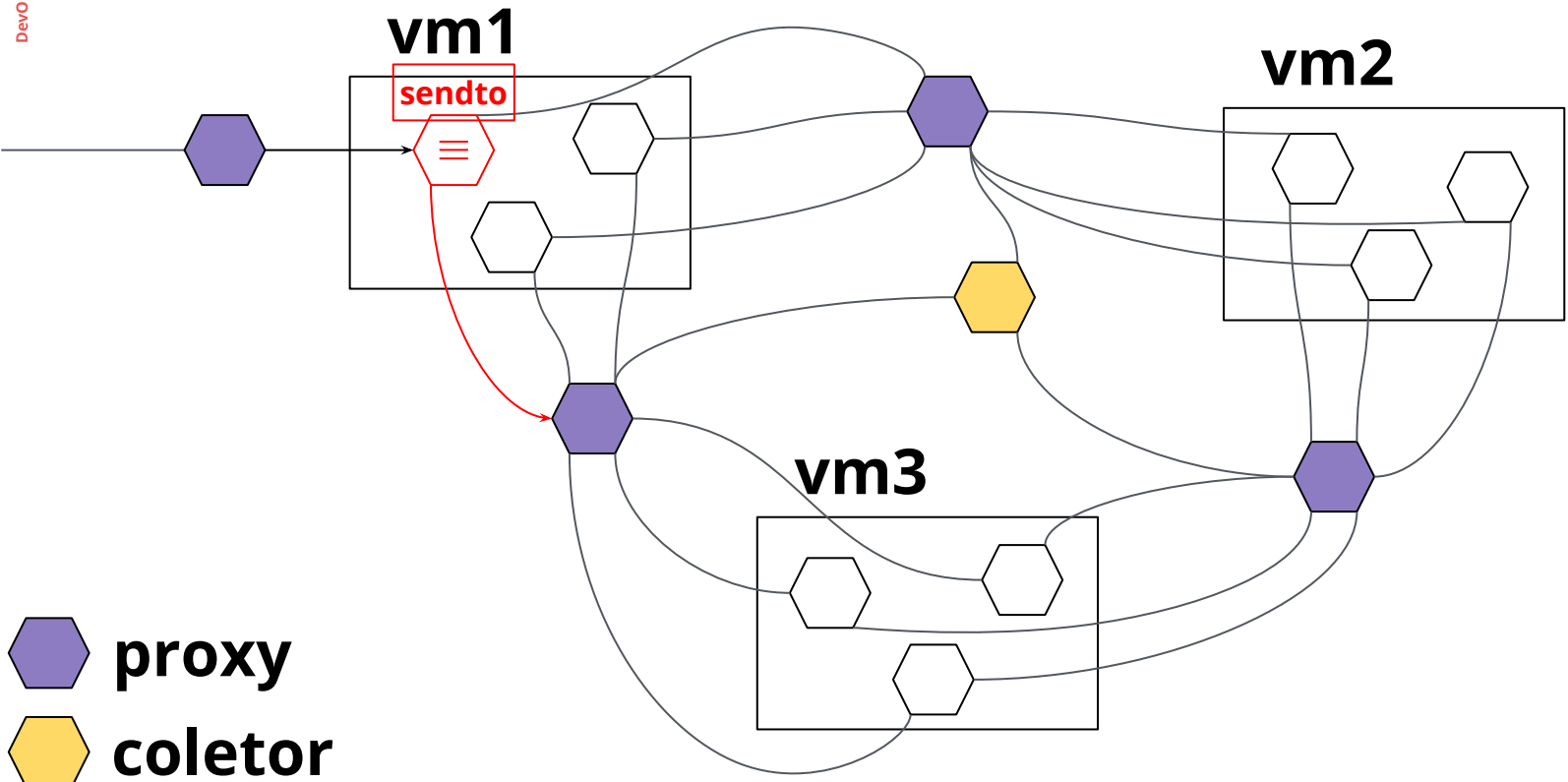





# THREADS





-  proxy
-  coletor
-  microsserviço



-  **proxy**
-  **coletor**
-  **microsserviço**



# Como monitorar (e modificar!) syscalls programaticamente?



**ebpf**

**loadable  
kernel  
modules**

**kprobes**

**ptrace**

**ld\_preload**

**seccomp**

**uprobes**

**strace**

**dynamo  
rio**

**pin**

**frida**

**valgrind**



ebpf

loadable  
kernel  
modules

kprobes

**ptrace** 

ld\_preload

seccomp

uprobes

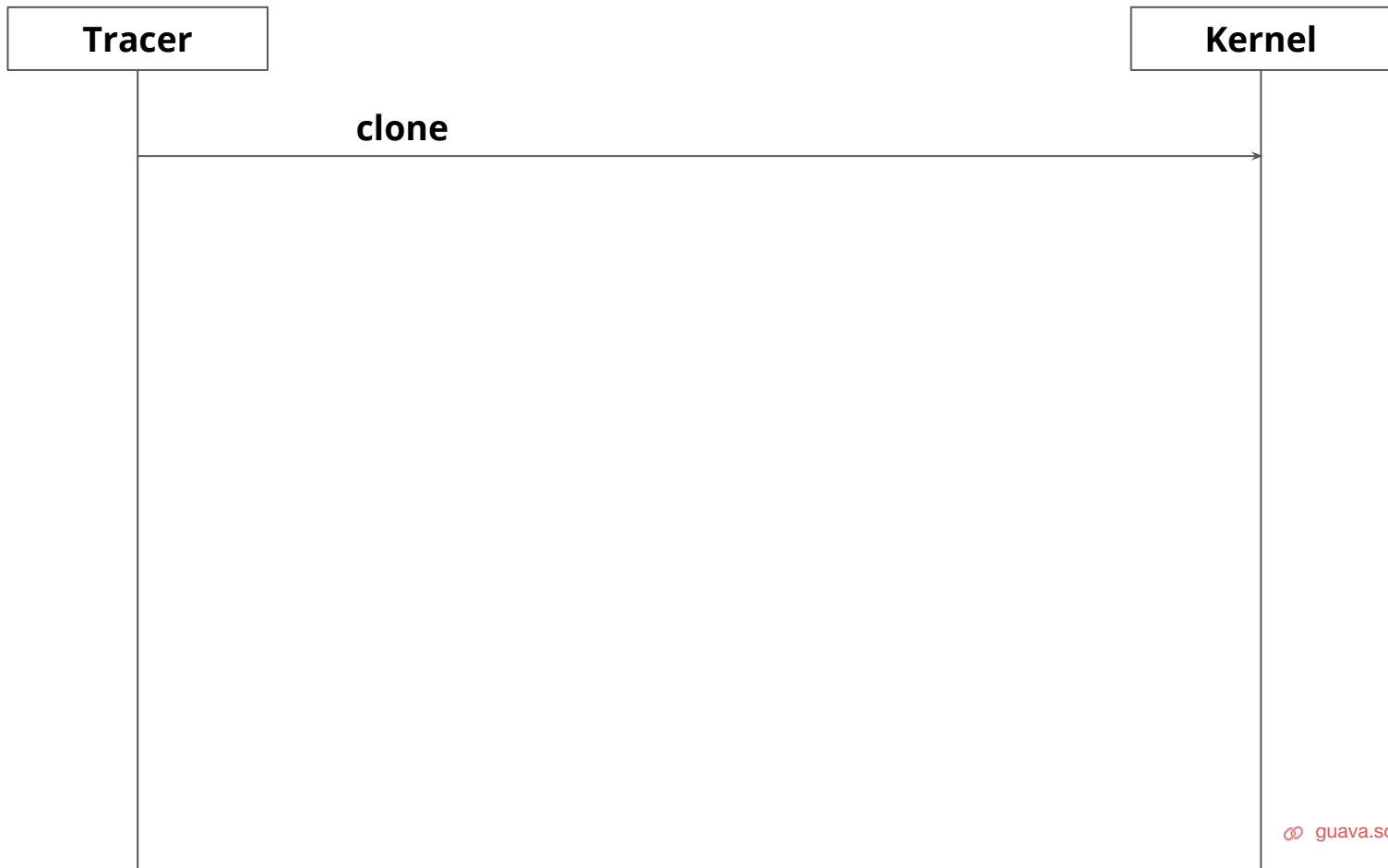
strace

dynamo  
rio

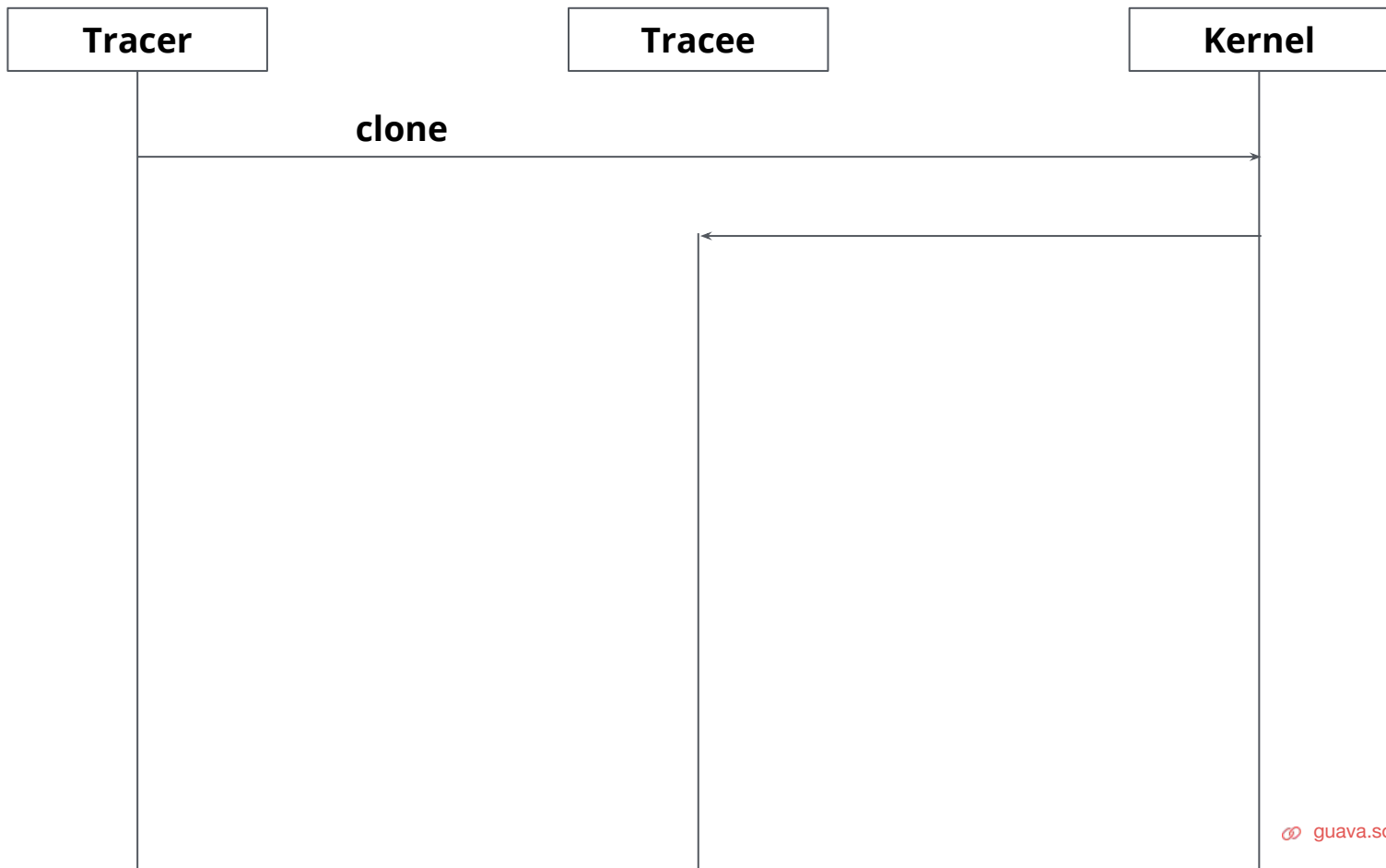
pin

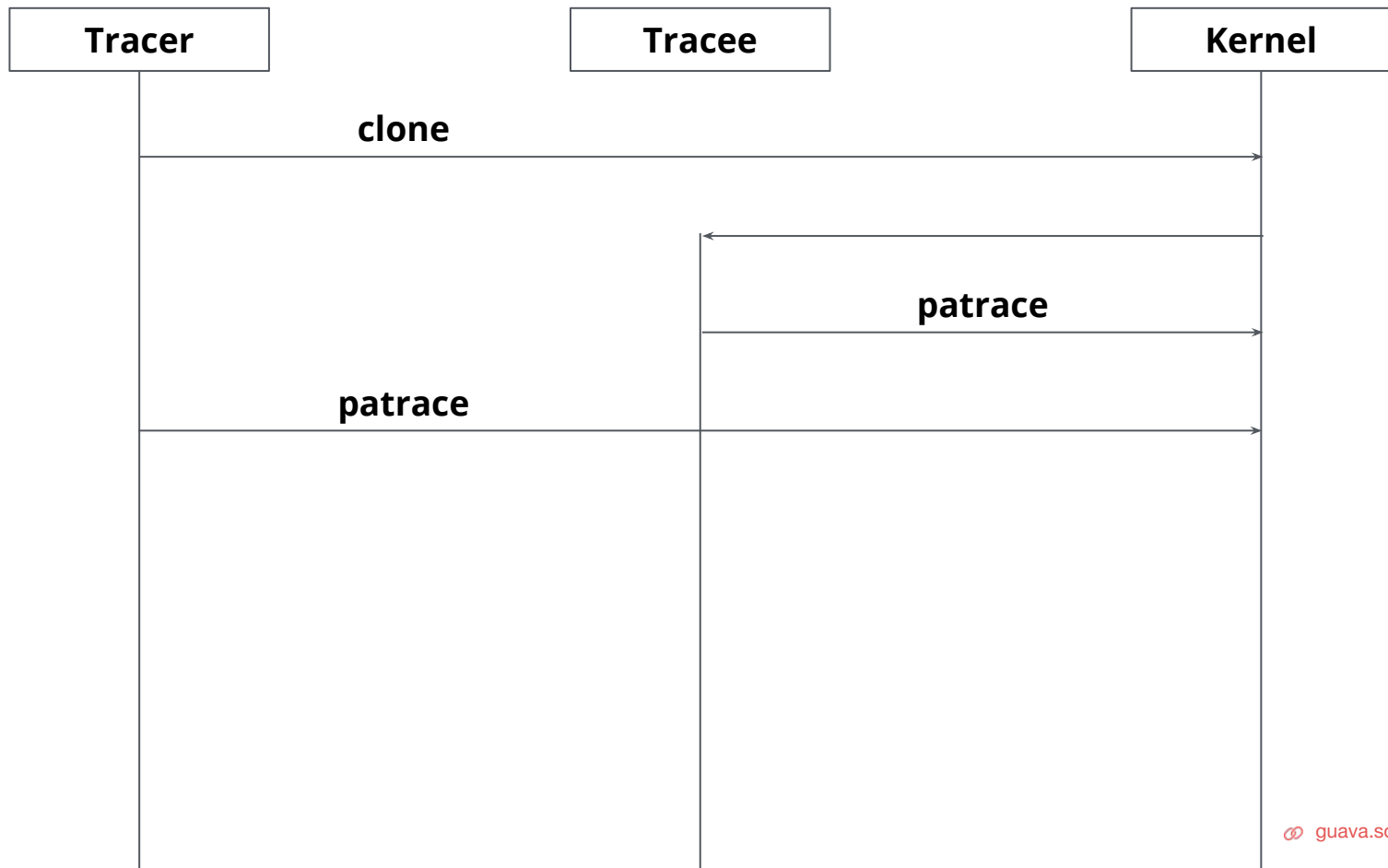
frida

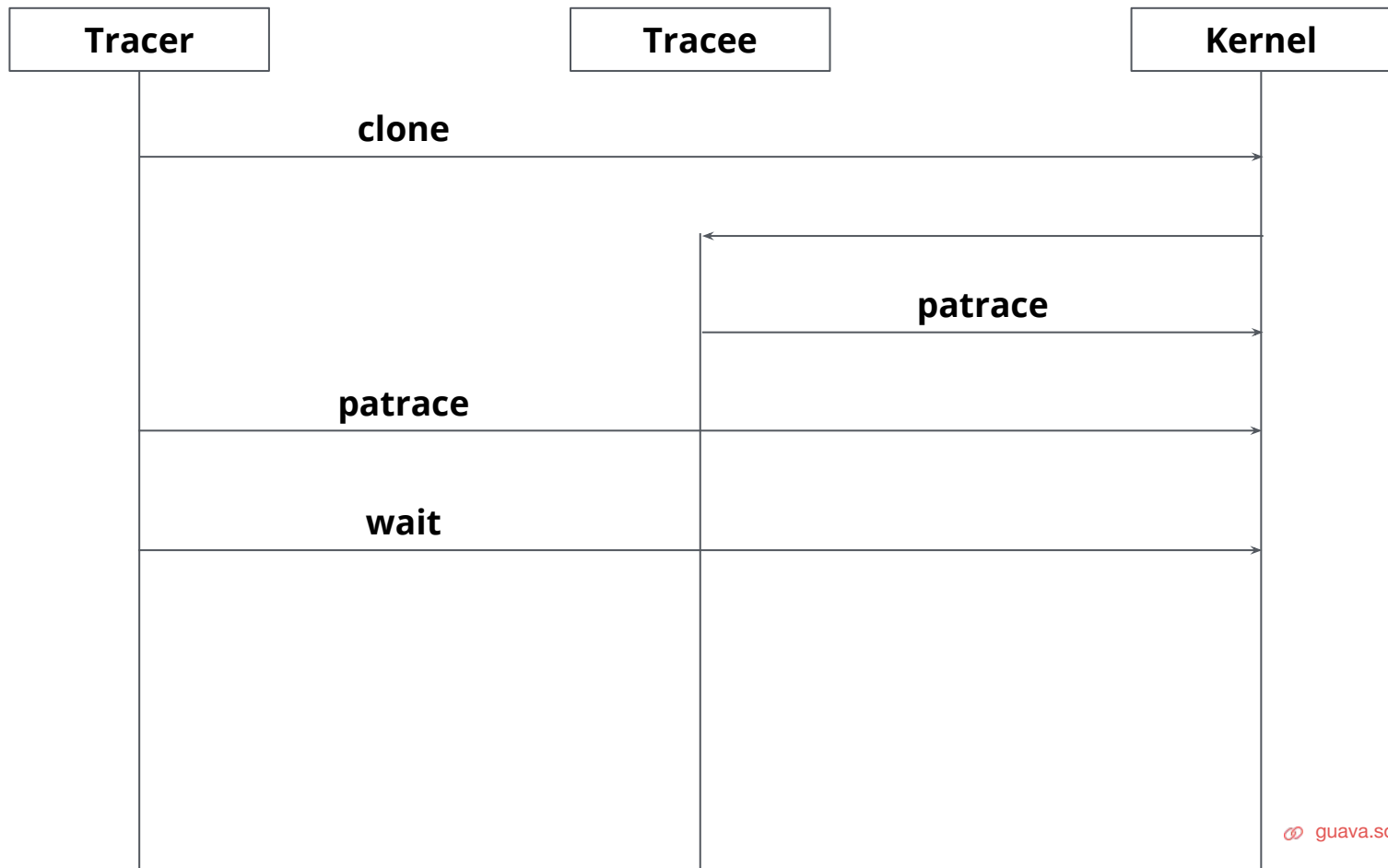
valgrind

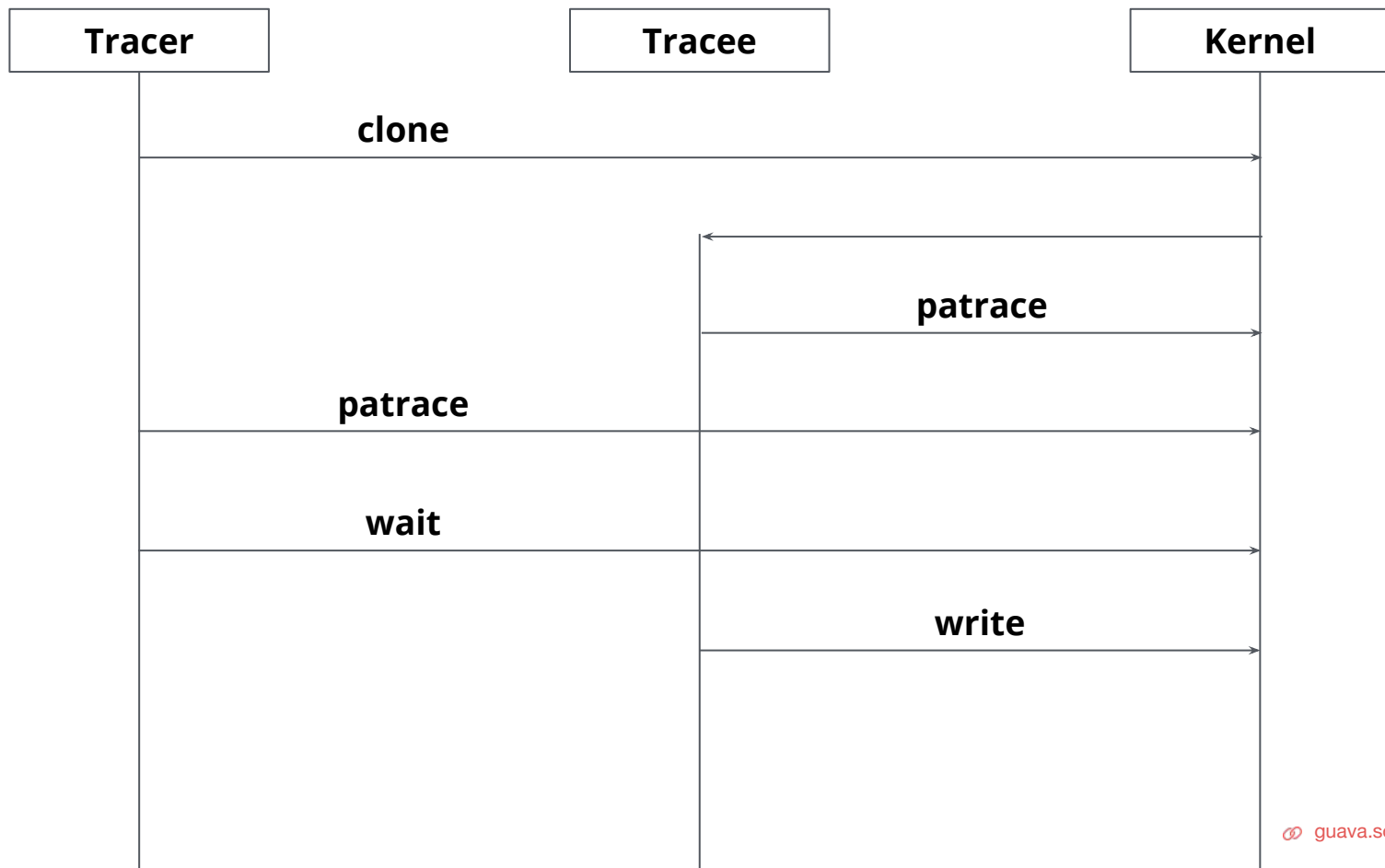


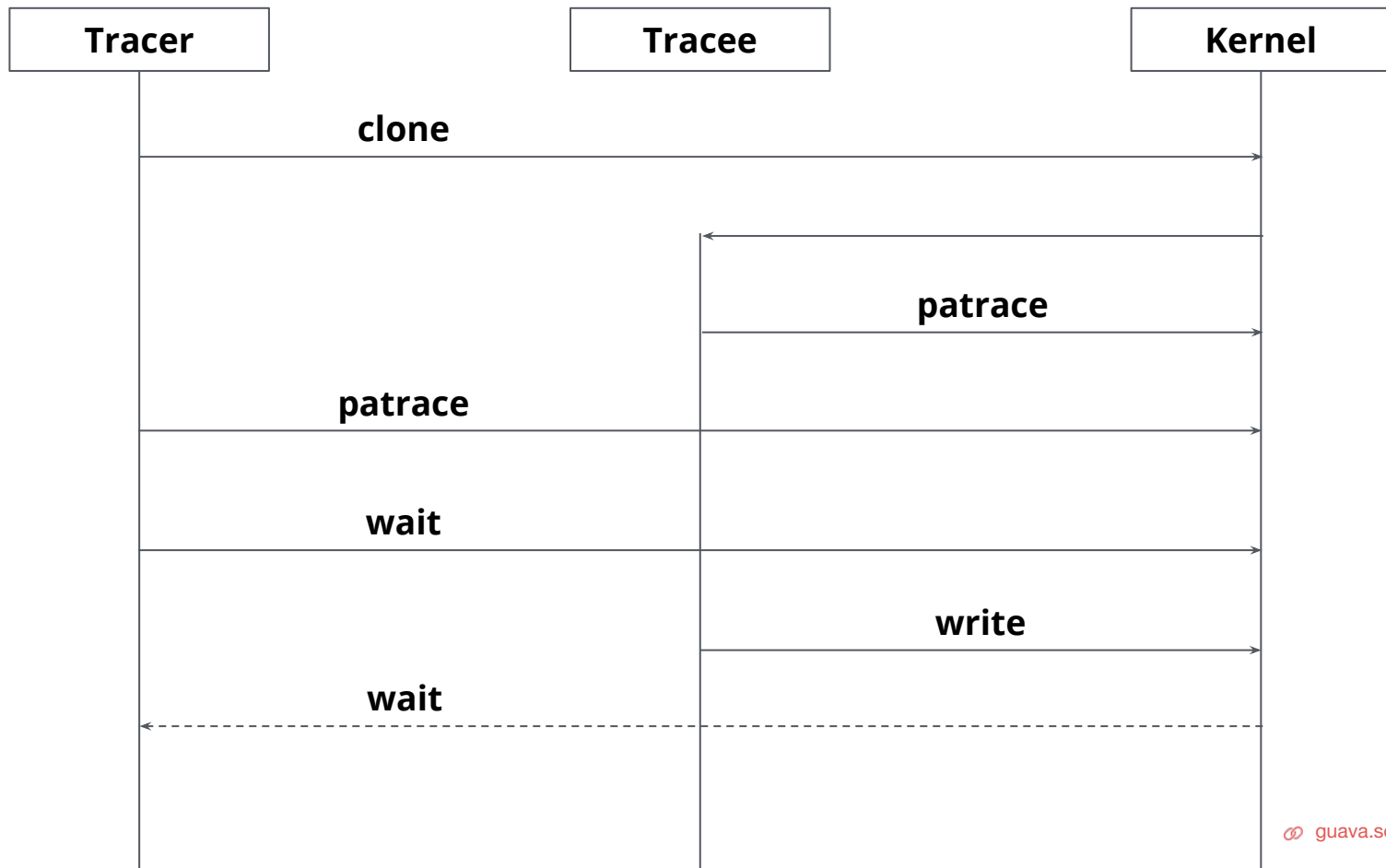


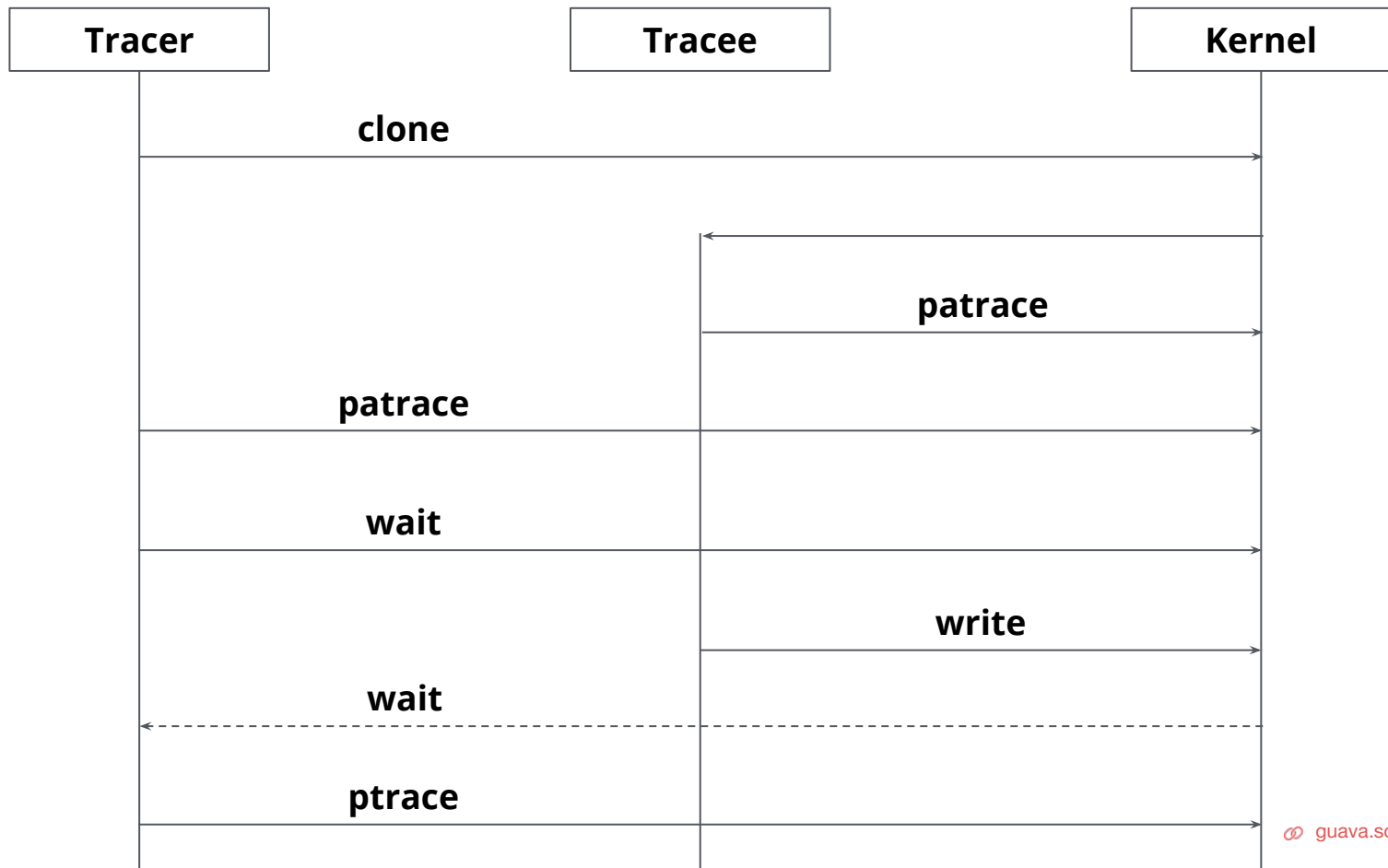














**<https://github.com/embs/rbinder>**



**Ociosa**

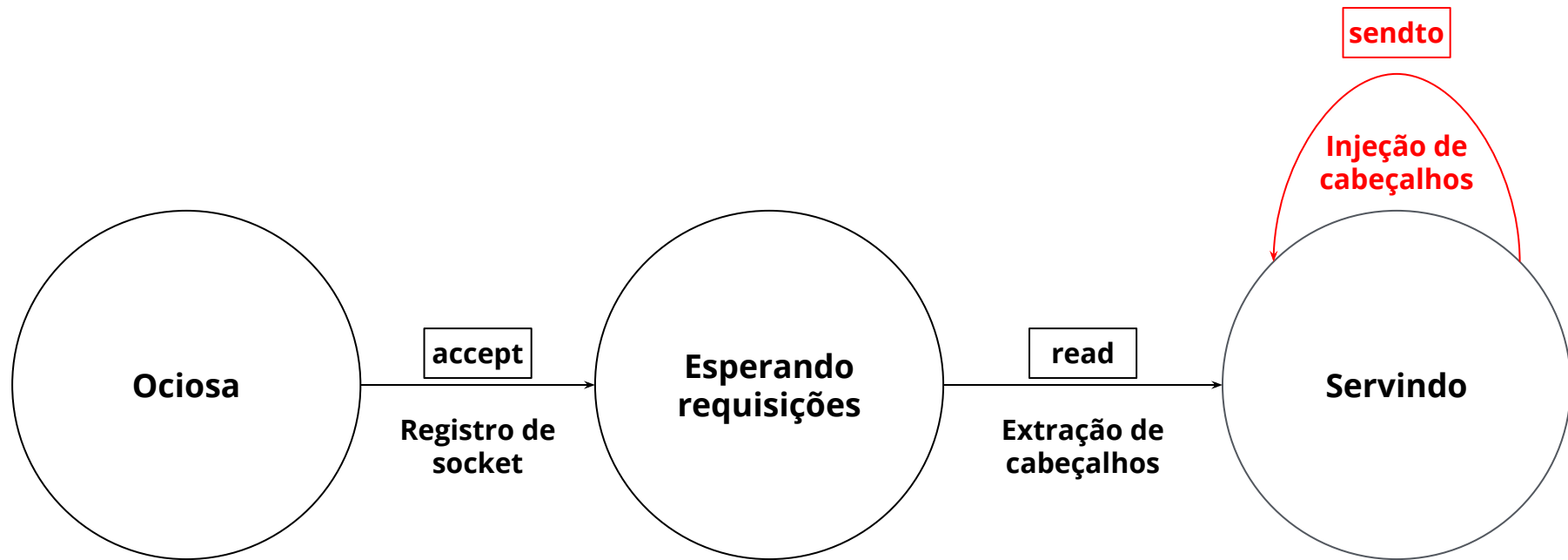
**Esperando  
requisições**

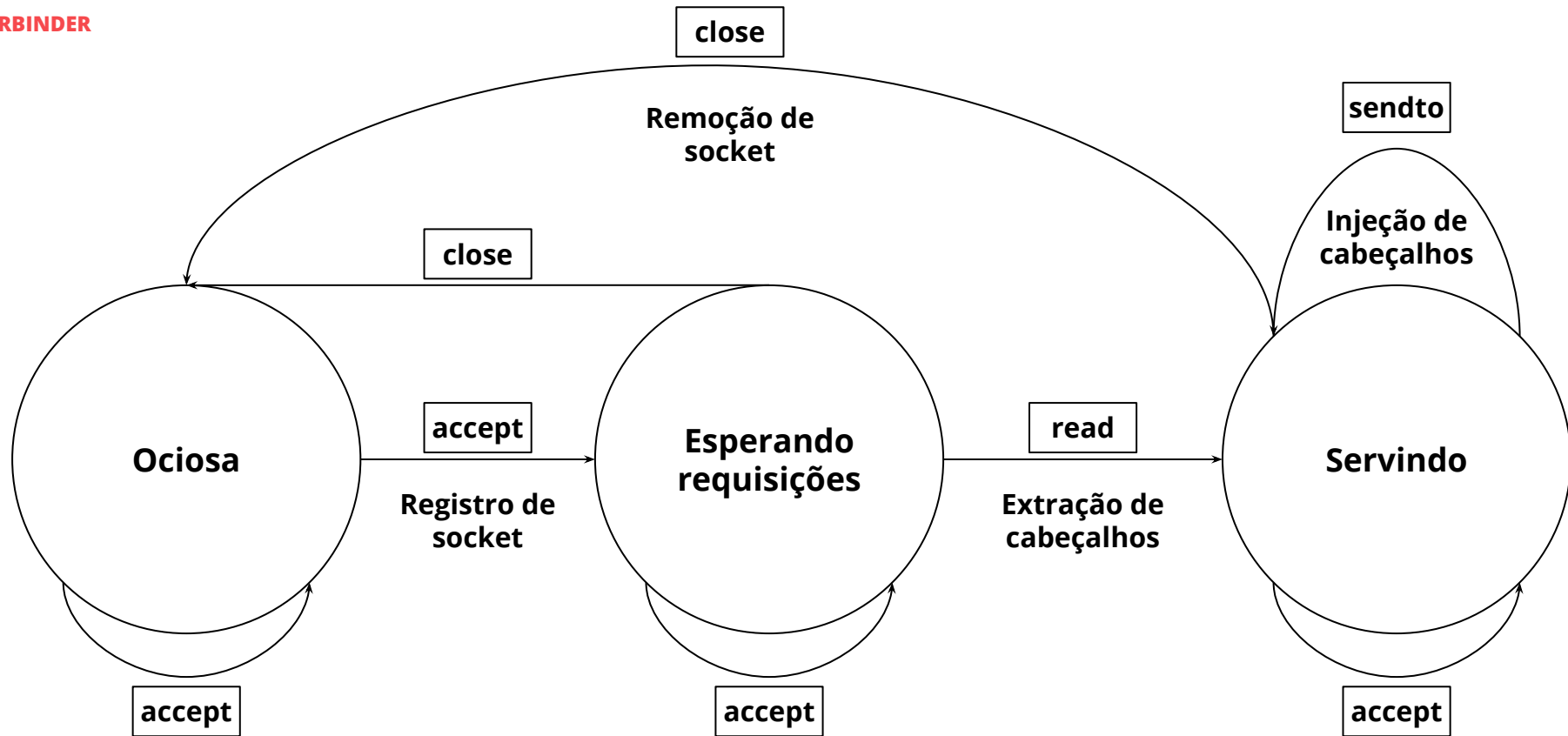
**Servindo**













~~CMD ["java", "-jar", "service.jar"]~~

CMD ["rbinder", "java", "-jar", "service.jar"]



# E isso presta?






# <https://microservices-demo.github.io>


OFFER OF THE DAY Buy 10 socks, get a pet human for free!

Login



HOME CATALOGUE ▾

0 Items in cart



### WE LOVE SOCKS!

Fun fact: Socks were invented by woolly

### BEST PRICES

We price check our socks with trained monkeys

### 100% SATISFACTION GUARANTEED





**10% mais lento que aplicação não monitorada**



**5% mais lento que monitoramento padrão**



# Menor tamanho de binários



# Menor tempo de inicialização



# Nenhuma modificação de código



**Nenhuma dependência adicionada  
(à stack da aplicação)**



# O que vale é o que importa



# Caminho orgânico





Istio

Connect, secure, control, and observe services.



## Interação com comunidades de desenvolvimento

GOLANG





# Aprendizados de Sistemas Operacionais



# Chance de trocar essa ideia



# Distributed Tracing rocks!

Instrumentação sucks!

Proxies fazem *quase* tudo

Rbinder talvez resolva



Distributed Tracing rocks!  
**Instrumentação sucks!**  
Proxies fazem *quase* tudo  
Rbinder talvez resolva



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Instrumentação sucks!  
**Proxies fazem *quase* tudo**  
Rbinder talvez resolva



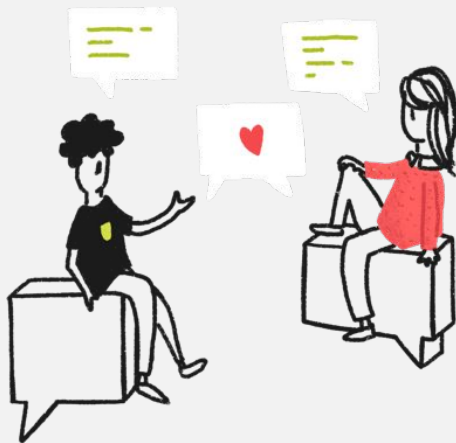
Distributed Tracing rocks!  
Instrumentação sucks!  
Proxies fazem *quase* tudo  
**Rbinder talvez resolva**



# Muito obrigado!







[matheus@guava.com.br](mailto:matheus@guava.com.br)



**<https://github.com/embs/rbinder>**