# Arquitectura e Implementación de Microservicios

## Monitoreo de microservicios

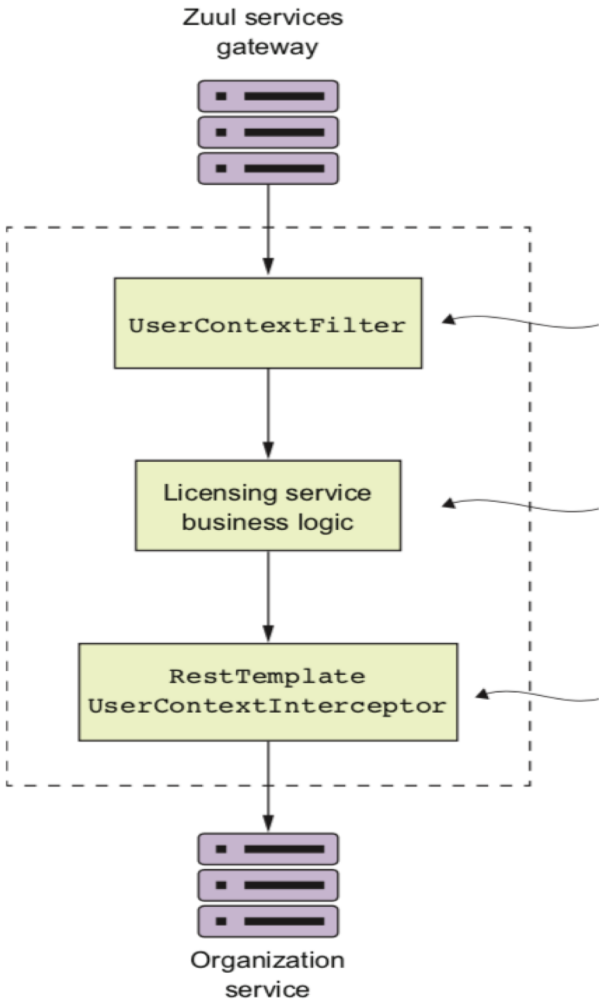
OS ENTERPRISE CONSULTING

# Tracing distribuido

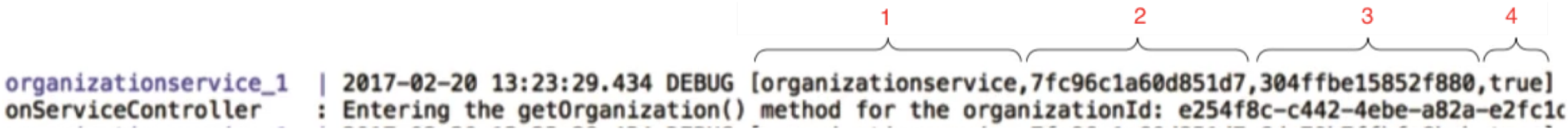
- Microservicios
  - Descomponer aplicaciones en partes pequeñas y manejables
  - Tiene un precio:
    - Complejidad en debug cuando hay problemas
- Necesitas hacer tracing servers, servicios y fuentes de datos
- Técnicas
  - Correlation-id: enlazar transacciones
  - Log-aggregation: agregar multiples logs en único data-source
  - Visualizar gráficamente : flujo y performance de transacciones
- Herramientas
  - Spring cloud sleuth
  - Papertrail,
  - Zipkin

# Spring sleuth

- Solución actual
  - Correlation-id
  - Propagado con spring interceptors
  - Leer y almacenar  usando Filters
- Spring Sleuth
  - Crea, inyecta correlation-id
  - Propagación entre servicios
  - Agrega correlation a spring MDC , Mapped Diagnostic Context
  - Publica traces a open-zipkin.

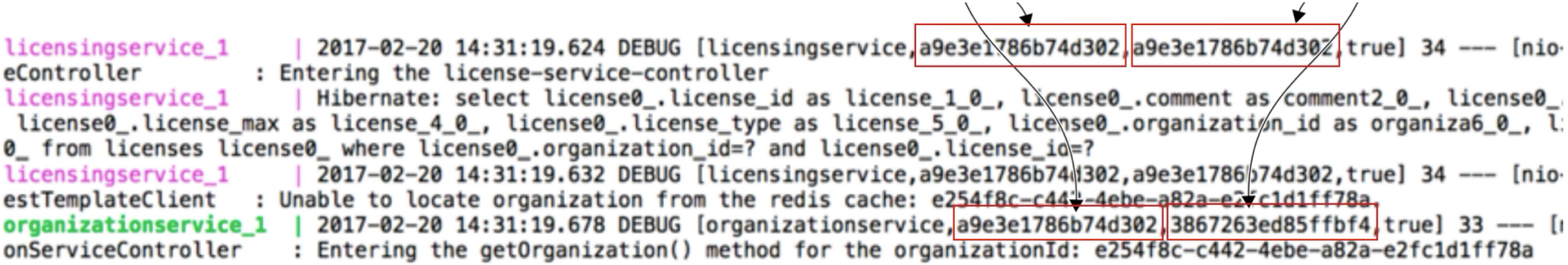


- Crea trace data
- Todo log incluye trace data



# Trace data

- Application-name: spring.application.name
- Trace-id: identificador en todos los servicios
- Span-id: identificador en 1 servicio
- Send to zipkin: flag de envio a zipkin




- Sleuth reemplaza zuulfilter, userfilter, hystrix config, interceptor, etc

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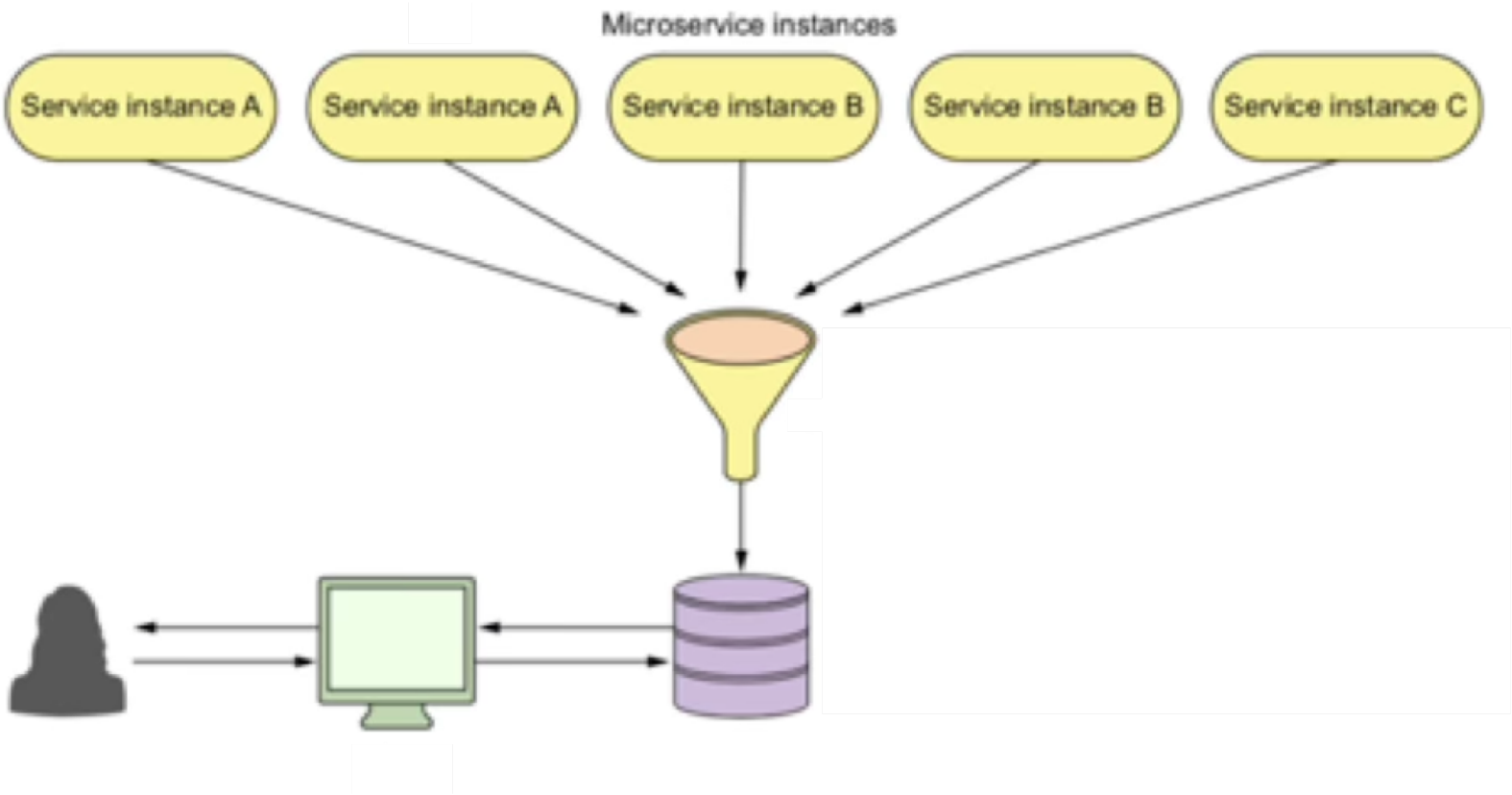
# Trace data

- Span id
  - Unidad básica de trabajo
  - Trace – Span: de 1 a muchos
- Send to zipkin
  - Tamaño de Trace data puede ser problema
  - Elegir si enviar

# Log aggregation

- Unir logs de varios servicios es difícil
  - Recuperar logs servers
  - Programar scripts para consultar logs
  - Generar Backups de logs
- Demasiado tiempo
- Mejor : Stream en tiempo real de logs a punto centralizado, data indexada y searchable

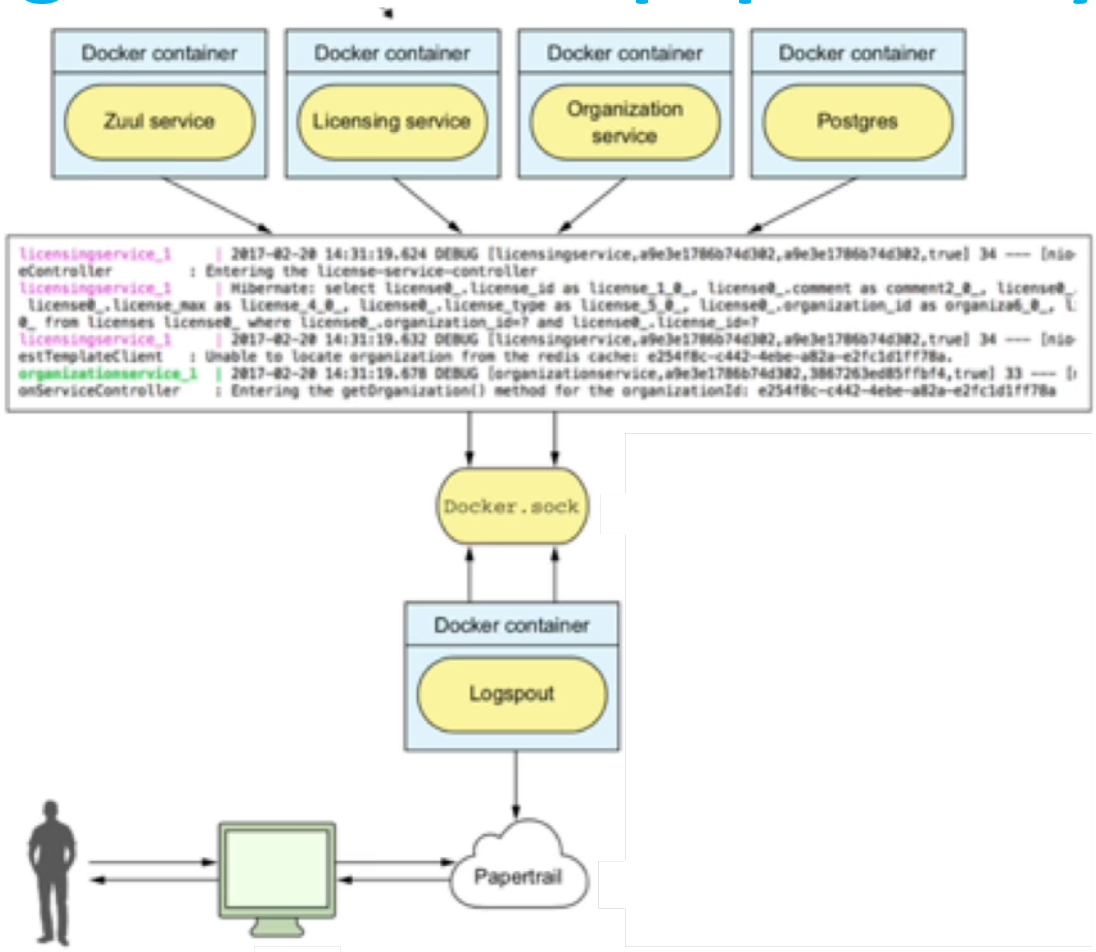
# Log aggregation



# Herramientas

| Product Name | Implementation Models | Notes |
|---|---|---|
| Elasticsearch, Logstash, Kibana (ELK) | Open source<br>Commercial<br>Typically implemented on premise | http://elastic.co<br>General purpose search engine<br>Can do log-aggregation through the (ELK-stack)<br>Requires the most hands-on support |
| Graylog | Open source<br>Commercial<br>On-premise | http://graylog.org<br>Open-source platform that's designed to be installed on premise |
| Splunk | Commercial only<br>On-premise and cloud-based | http://splunk.com<br>Oldest and most comprehensive of the log management and aggregation tools<br>Originally an on-premise solution, but have since offered a cloud offering |
| Sumo Logic | Freemium<br>Commercial<br>Cloud-based | http://sumologic.com<br>Freemium/tiered pricing model<br>Runs only as a cloud service<br>Requires a corporate work account to signup (no Gmail or Yahoo accounts) |
| Papertrail | Freemium<br>Commercial<br>Cloud-based | http://papertrailapp.com<br>Freemium/tiered pricing model<br>Runs only as a cloud service |

# log aggregation usando papertrail y docker

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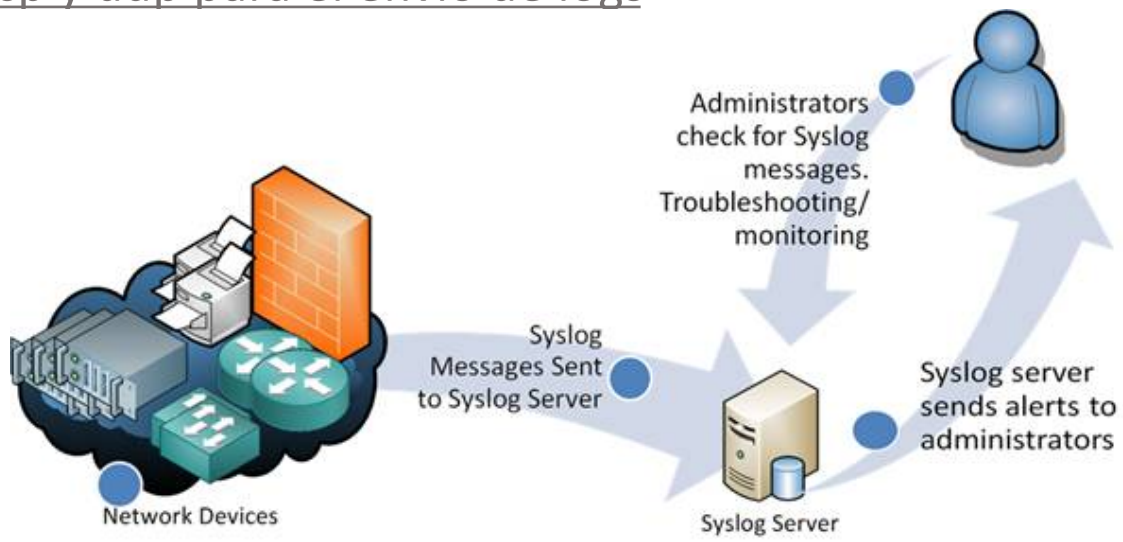
- https://papertrailapp.com
  - Start logging
  - Registrarse

# papertrail y syslog

- papertrail usa syslog para enviar logs
  - Standar para compartir mensajes de notificacion
  - syslog es un formato de mensajeria .
  - soporta tcp y udp para el envio de logs

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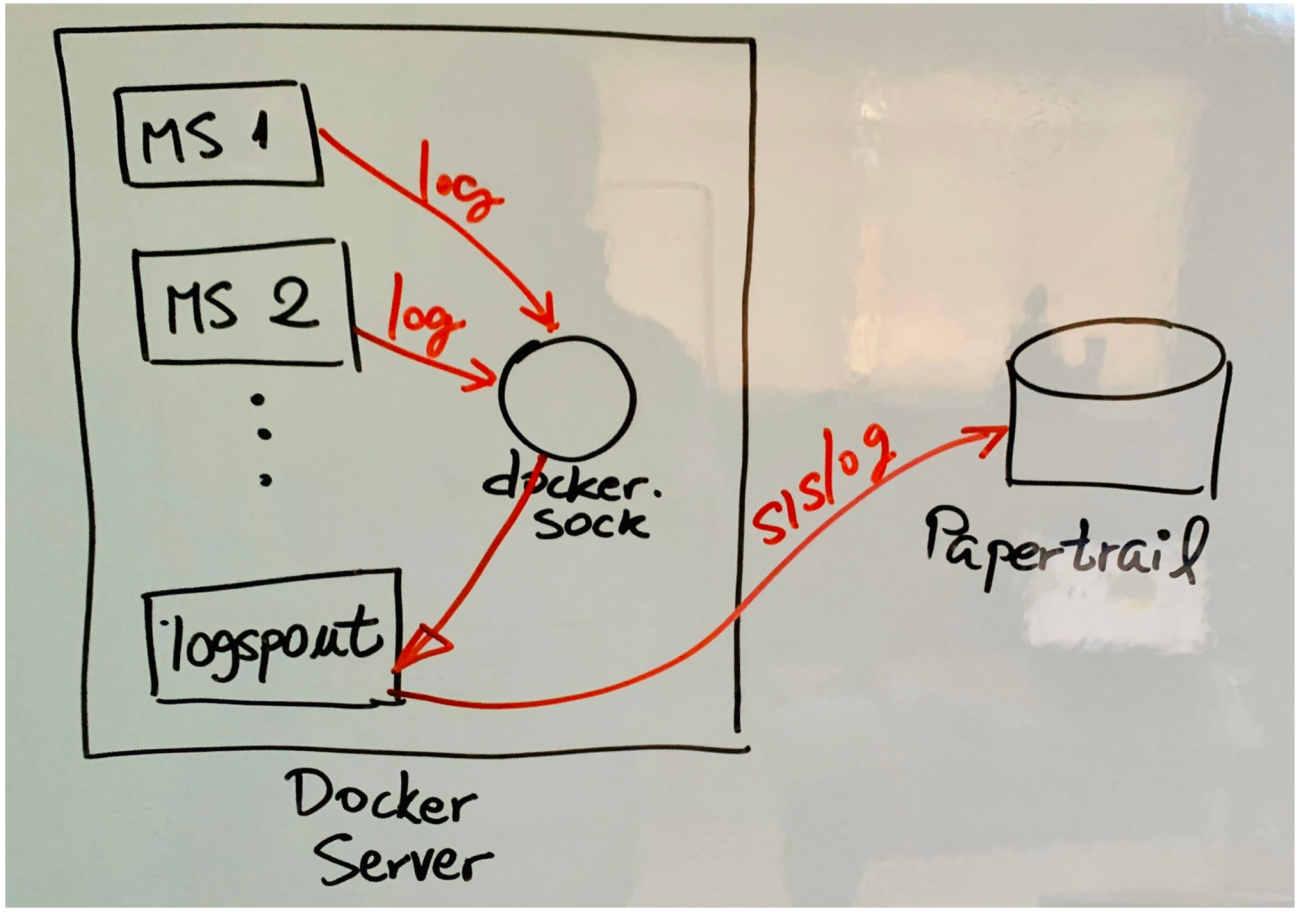
# Papertrail setup


Soporta multiples S.O. y herramientas
Cadena de conexión syslog
Unico por cuenta

# Laboratorio

Demo-tracing

# Logspout

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# Logspout vs Docker Driver

## Supported logging drivers

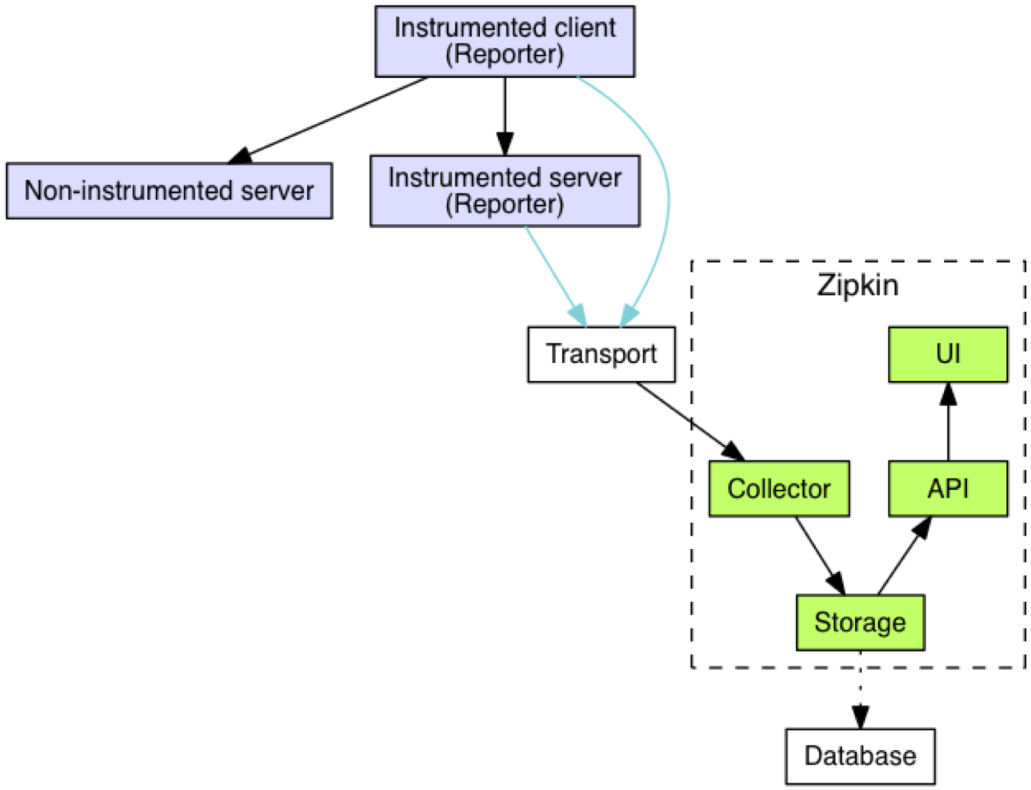
The following logging drivers are supported. See the link to each driver's documentation for its configurable options, if applicable. If you are using logging driver plugins, you may see more options.

| Driver | Description |
|---|---|
| `none` | No logs are available for the container and `docker logs` does not return any output. |
| `local` | Logs are stored in a custom format designed for minimal overhead. |
| `json-file` | The logs are formatted as JSON. The default logging driver for Docker. |
| `syslog` | Writes logging messages to the `syslog` facility. The `syslog` daemon must be running on the host machine. |
| `journald` | Writes log messages to `journald`. The `journald` daemon must be running on the host machine. |
| `gelf` | Writes log messages to a Graylog Extended Log Format (GELF) endpoint such as Graylog or Logstash. |
| `fluentd` | Writes log messages to `fluentd` (forward input). The `fluentd` daemon must be running on the host machine. |
| `awslogs` | Writes log messages to Amazon CloudWatch Logs. |
| `splunk` | Writes log messages to `splunk` using the HTTP Event Collector. |

# Analizar trace data con Zipkin

- Una imagen vale mas que un millón de líneas de log
- Provee una imagen de flujo de transacciones y tiempo de respuesta.
  - Posible con Sleuth y Zipkin
- Importante para Identificar problemas de performance.

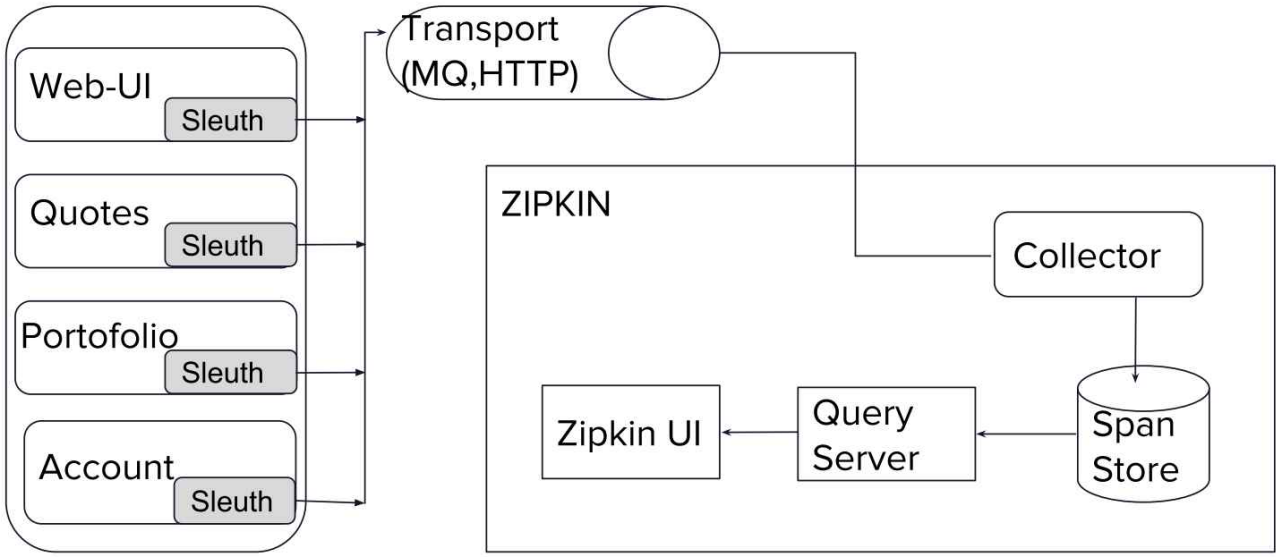
# Arquitectura



# Zipkin

- **storage**
- almacena la trace data en 4 stores:
  - memoria. por defecto
  - mysql
  - cassandra
  - elasticsearch
- **transport**
- varias formas de transporte de traces. Incluyen:
  - http
    - usa thread asincrono para enviar traces
  - kafka/rabbitmq
    - Encola traces hasta zipkin disponible

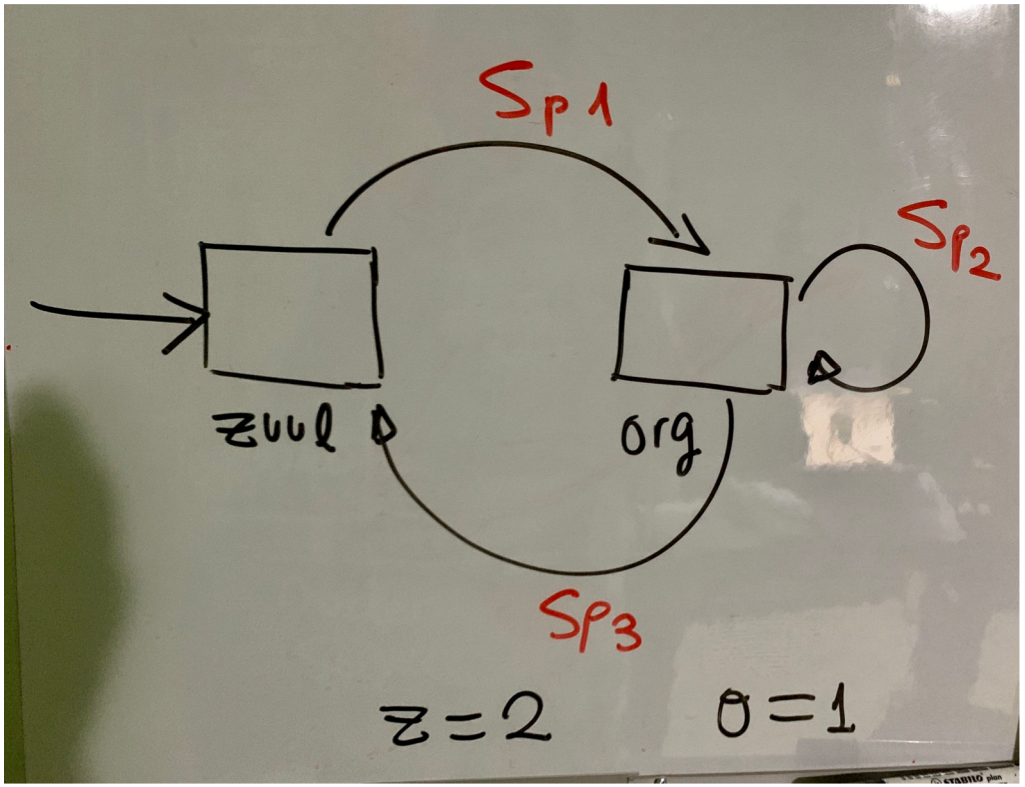
# Integrating Sleuth Stream and Zipkin



# Laboratorio

Demo-zipkin

# Spans de la transaccion

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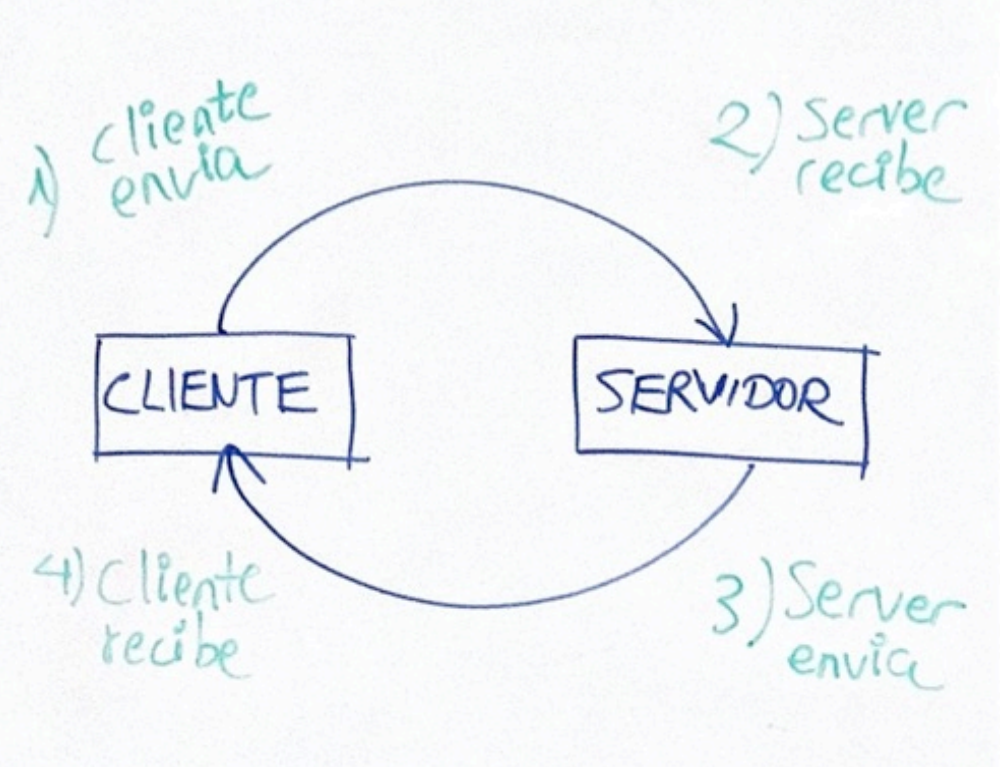
# Integrar Postgres con Zipkin

- Servicios no integrados con Sleuth
- Hay que manejar explícitamente eventos del request

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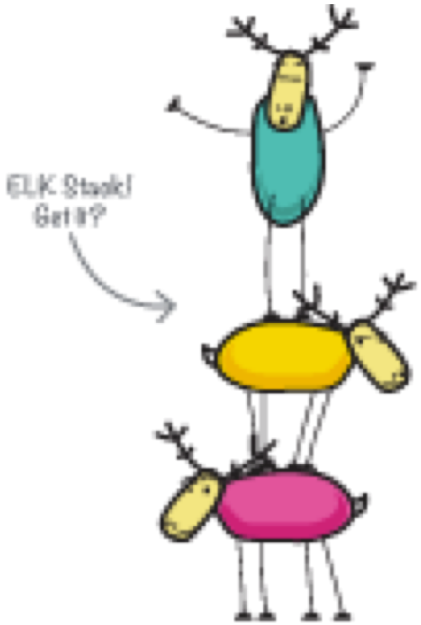
# ELK Stack

- elasticsearch, es un motor de busquedas basado en json
- logstash, colecciona data de multiples fuentes para enviarlo a elasticsearch
- kibana, permite visualizar data con graficos.




**E** Elasticsearch

**L** Logstash

**K** Kibana

# Partes de elk


Data Aggregation & Processing

Indexing & storage

Analysis & visualization

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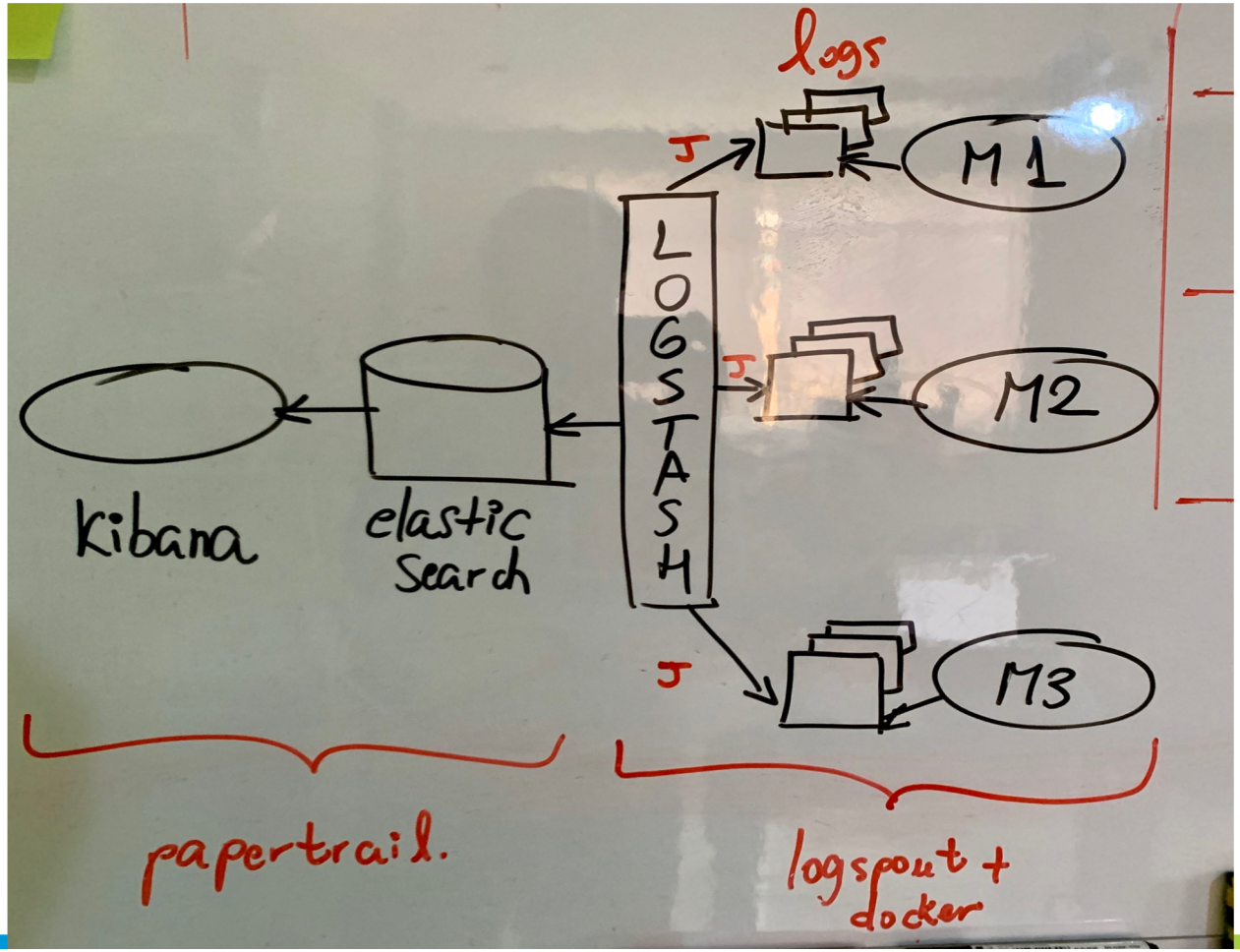
# Log aggregation con elk stack

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# Laboratorio

Demo-elk

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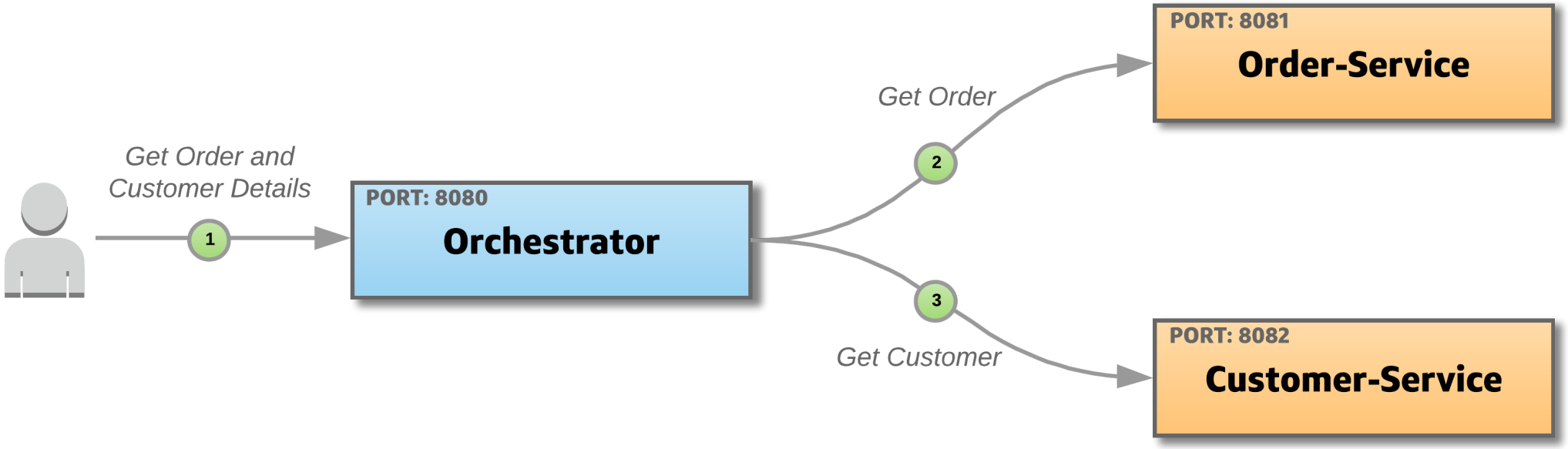
# ELK Stack

- **instalacion**
  - docker image de elk con elasticsearch, logstash y kibana empaquetados
  - https://hub.docker.com/r/sebp/elk

# Ejemplo

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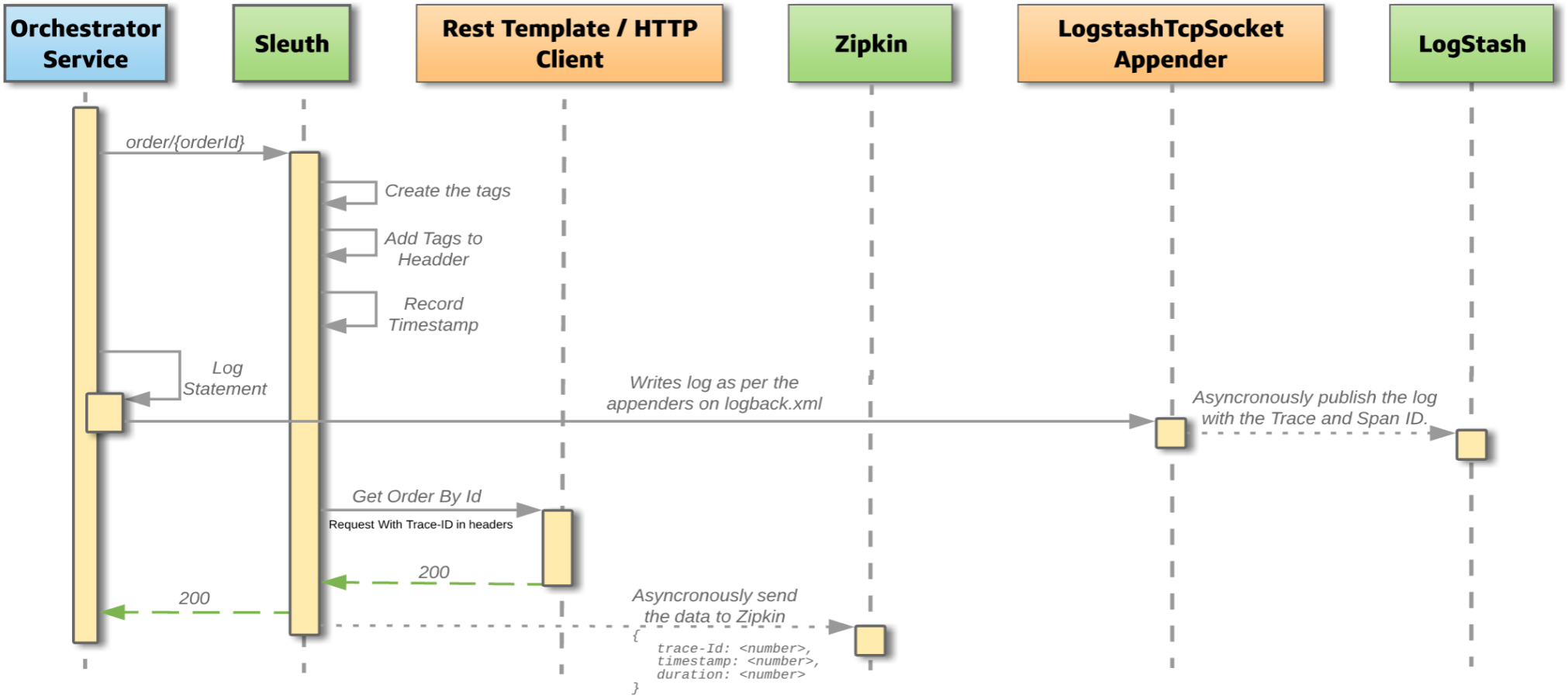
# Secuencia: Sleuth , Zipkin y Logstash



# Kibana

Buscar traces

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# Ejercicio

- Buscar traces de dia de hoy, que contengan valor para traceid, pertenezcan a los servicios customer-service u order-service y el log level sea INFO