FLINK IN ZALANDO'S WORLD OF MICROSERVICES

JAVIER LOPEZ

MIHAIL VIERU

12-09-2016

AGENDA

- Zalando’s Microservices Architecture
- Saiki - Data Integration and Distribution at Scale
- Flink in a Microservices World
- Stream Processing Use Cases:
  - Business Process Monitoring
  - Continuous ETL
- Future Work

ABOUT US

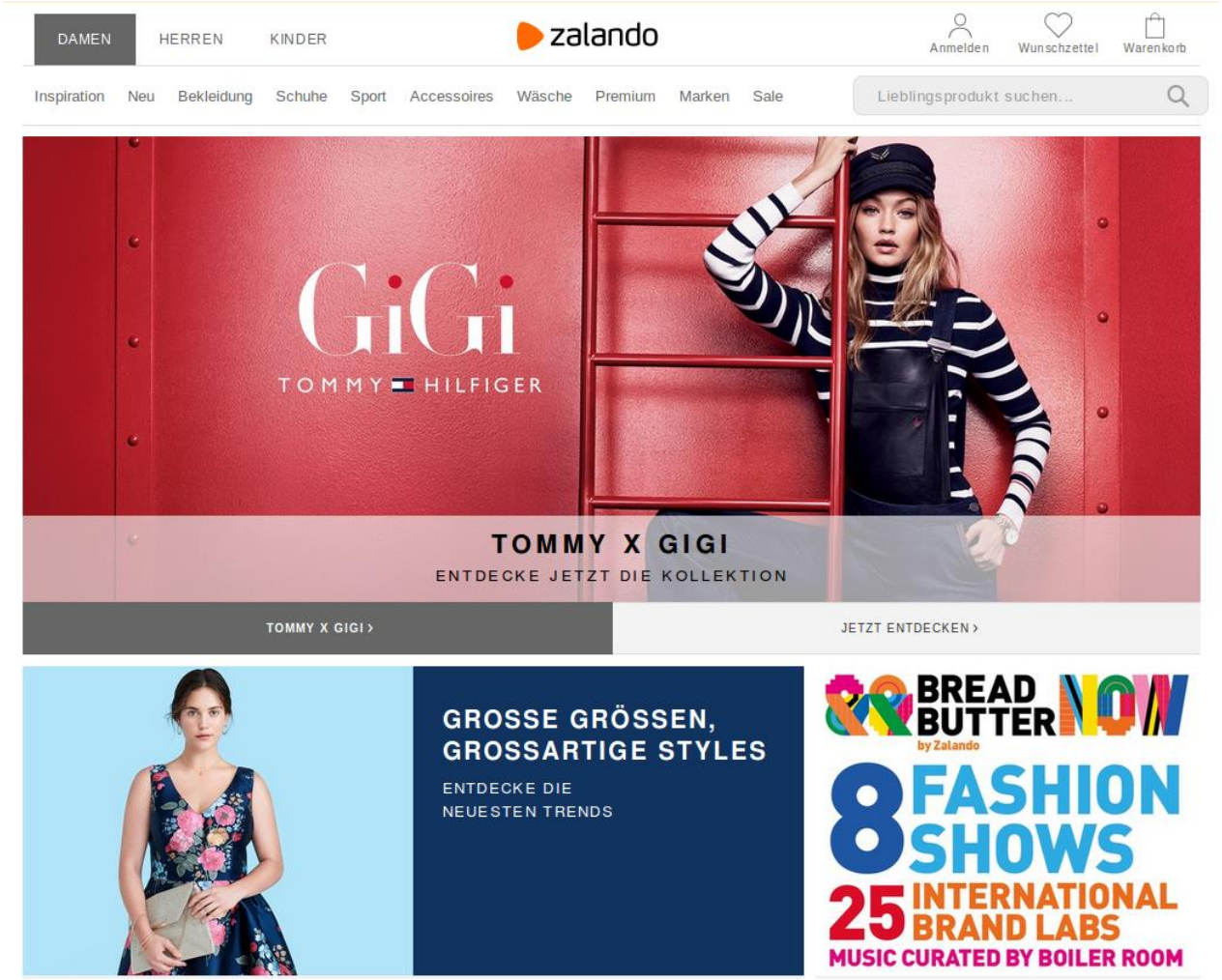
Mihail Vieru

Big Data Engineer,
Business Intelligence

Javier López

Big Data Engineer,
Business Intelligence

zalando


DAMEN
HERREN
KINDER
zalando
Anmelden
Wunschzettel
Warenkorb
Inspiration
Neu
Bekleidung
Schuhe
Sport
Accessoires
Wäsche
Premium
Marken
Sale
Lieblingsprodukt suchen...
GiGi
TOMMY HILFIGER
TOMMY X GIGI
ENTDECKE JETZT DIE KOLLEKTION
TOMMY X GIGI ›
JETZT ENTDECKEN ›
GROSSE GRÖSSEN,
GROSSARTIGE STYLES
ENTDECKE DIE
NEUESTEN TRENDS
BREAD BUTTER NOW
by Zalando
8 FASHION SHOWS
25 INTERNATIONAL BRAND LABS
MUSIC CURATED BY BOILER ROOM

One of Europe's largest online fashion retailers

15 countries

~19 million active customers

~3 billion € revenue 2015

1,500 brands

150,000+ products

11,000+ employees in Europe

zalando

ZALANDO TECHNOLOGY

1300+ TECHNOLOGISTS

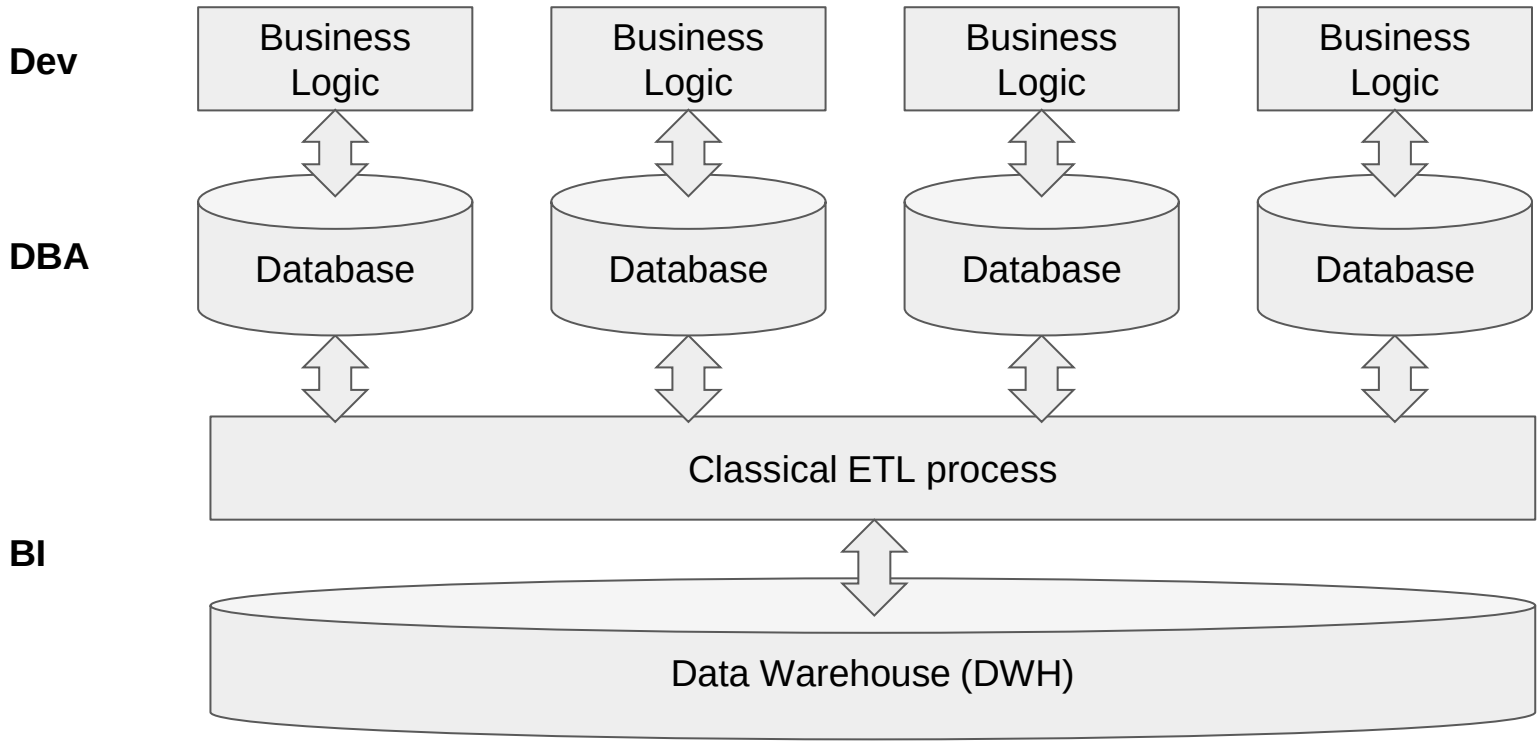
Rapidly growing international team

http://**tech.zalando.com**

zalando

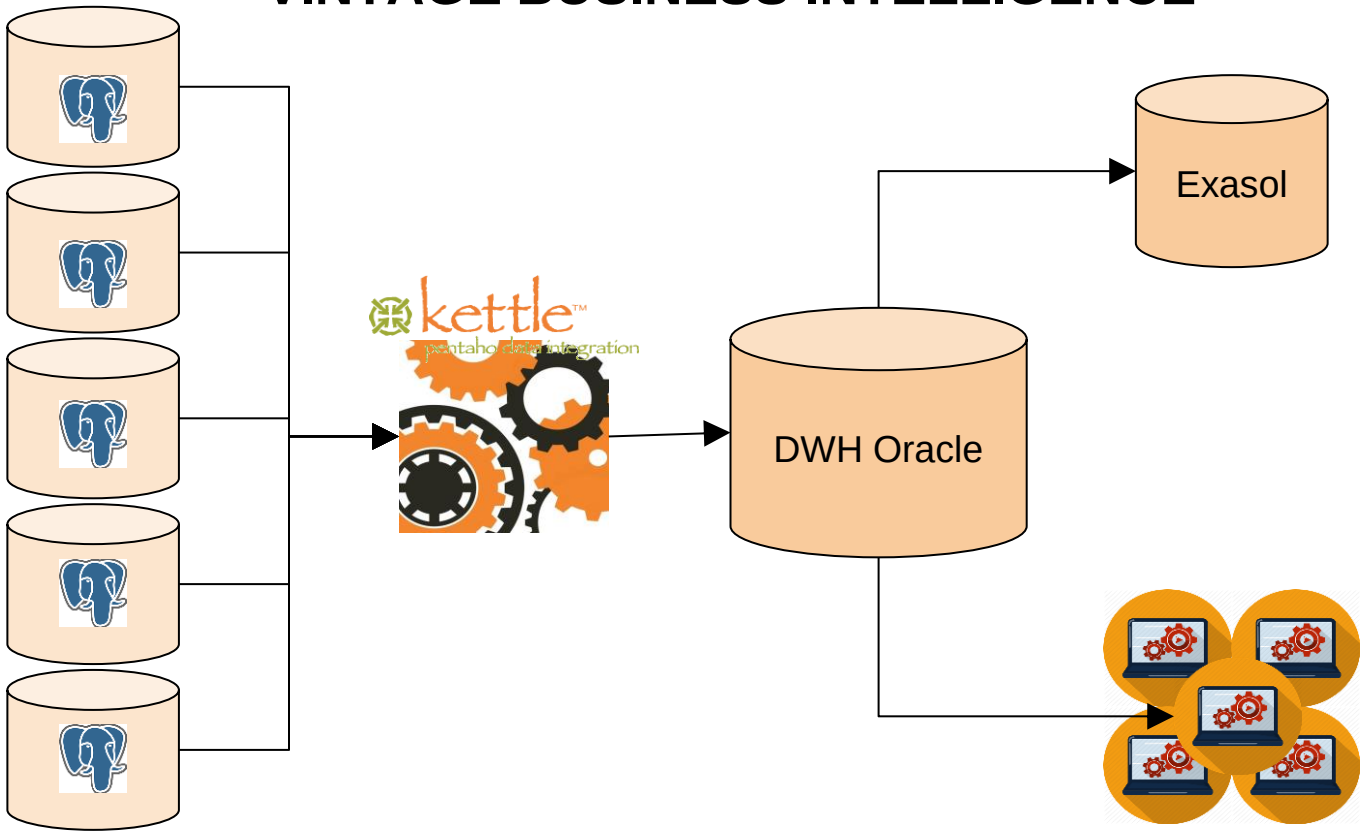
VINTAGE ARCHITECTURE

VINTAGE BUSINESS INTELLIGENCE



zalando

VINTAGE BUSINESS INTELLIGENCE



zalando

RADICAL AGILITY

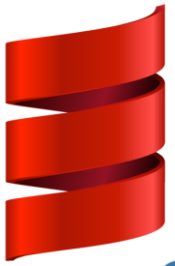
RADICAL AGILITY

AUTONOMY

MASTERY

PURPOSE

RADICAL AGILITY - AUTONOMY



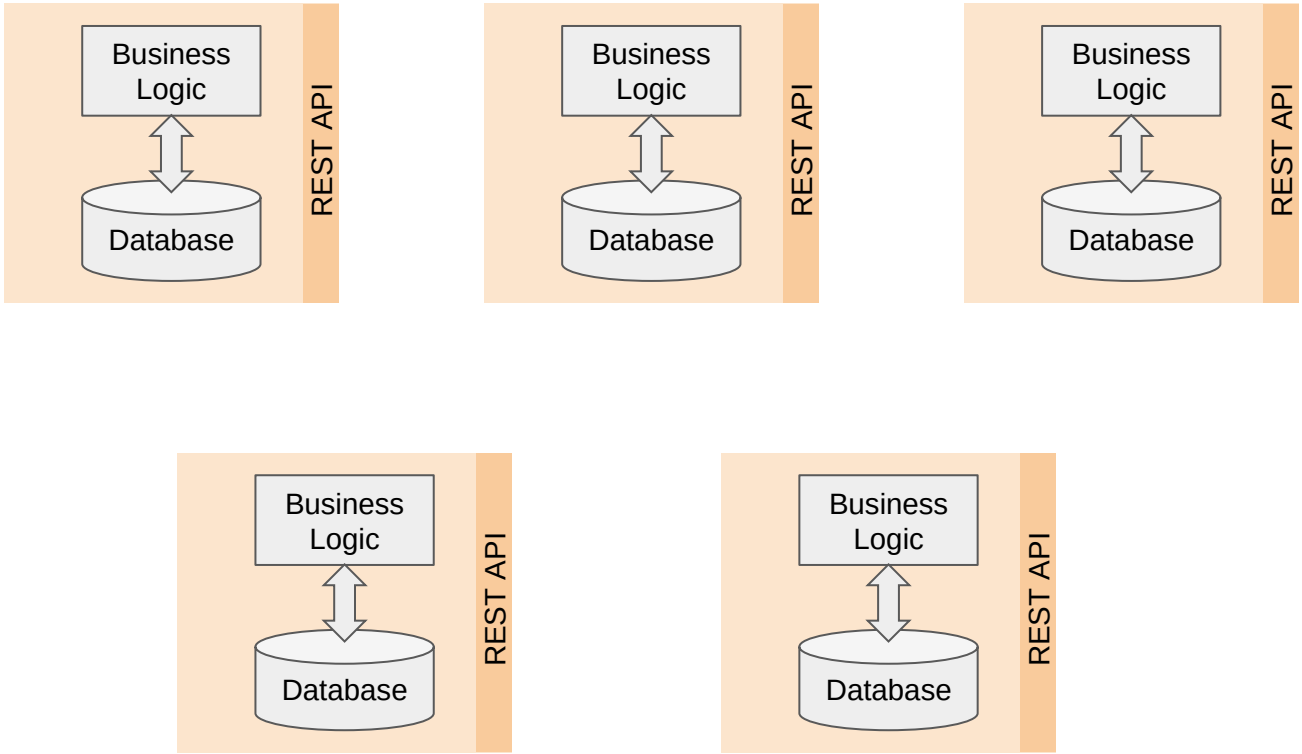
Technologies

Operations

Teams

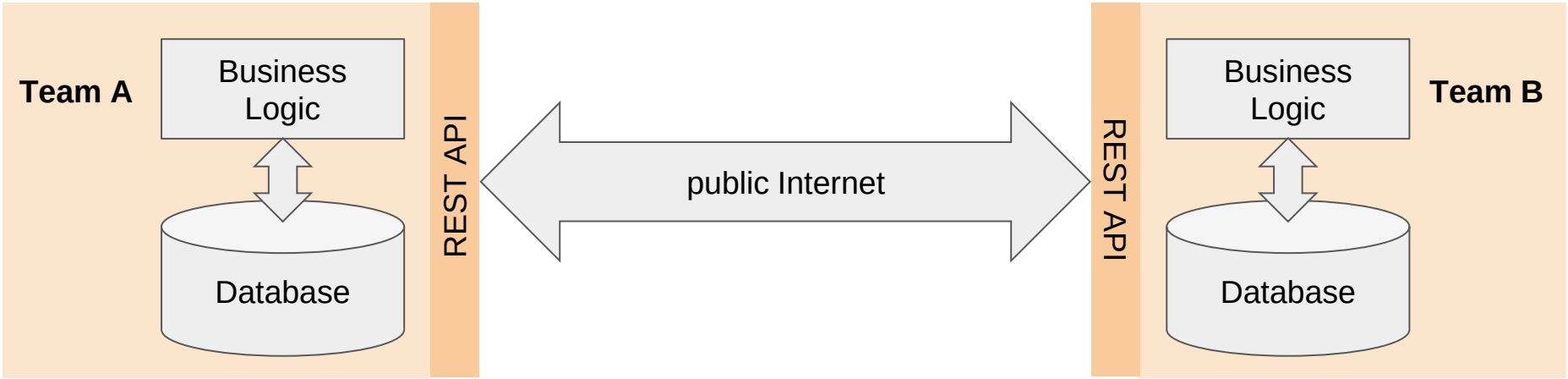
zalando

SUPPORTING AUTONOMY: MICROSERVICES



zalando

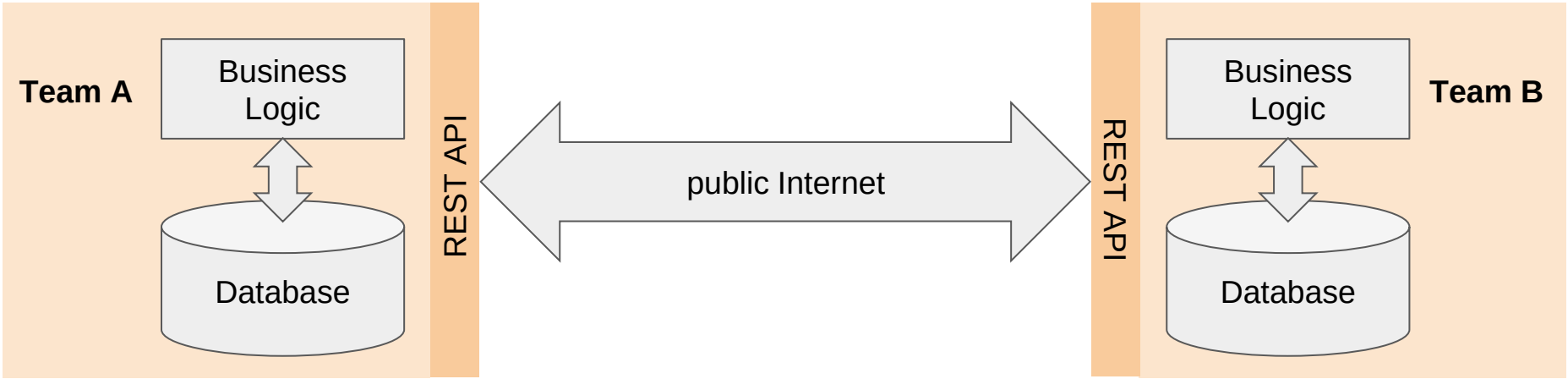
SUPPORTING AUTONOMY: MICROSERVICES

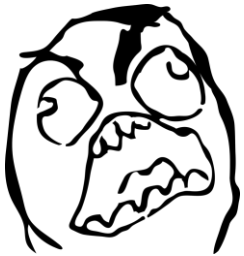


Applications communicate using REST APIs

Databases hidden behind the walls of AWS VPC

SUPPORTING AUTONOMY: MICROSERVICES

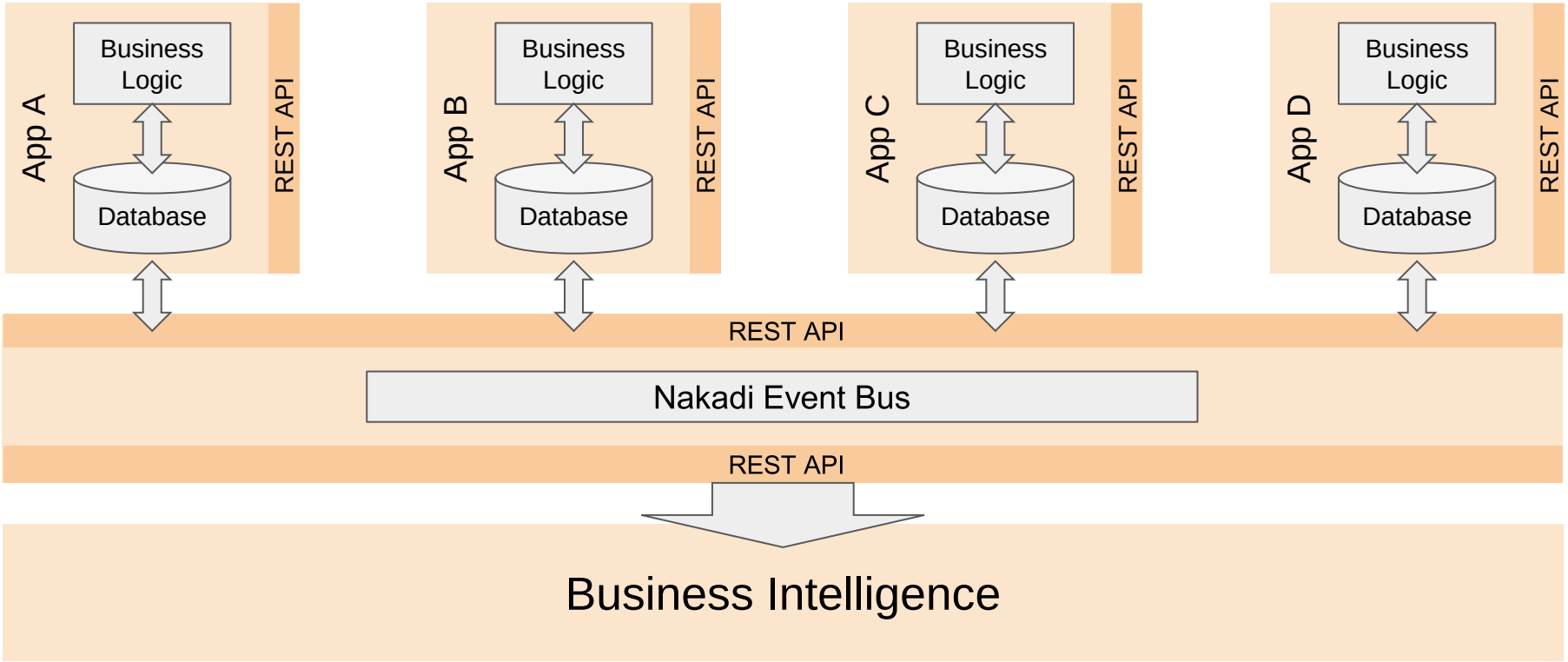




Classical ETL process is impossible!

zalando

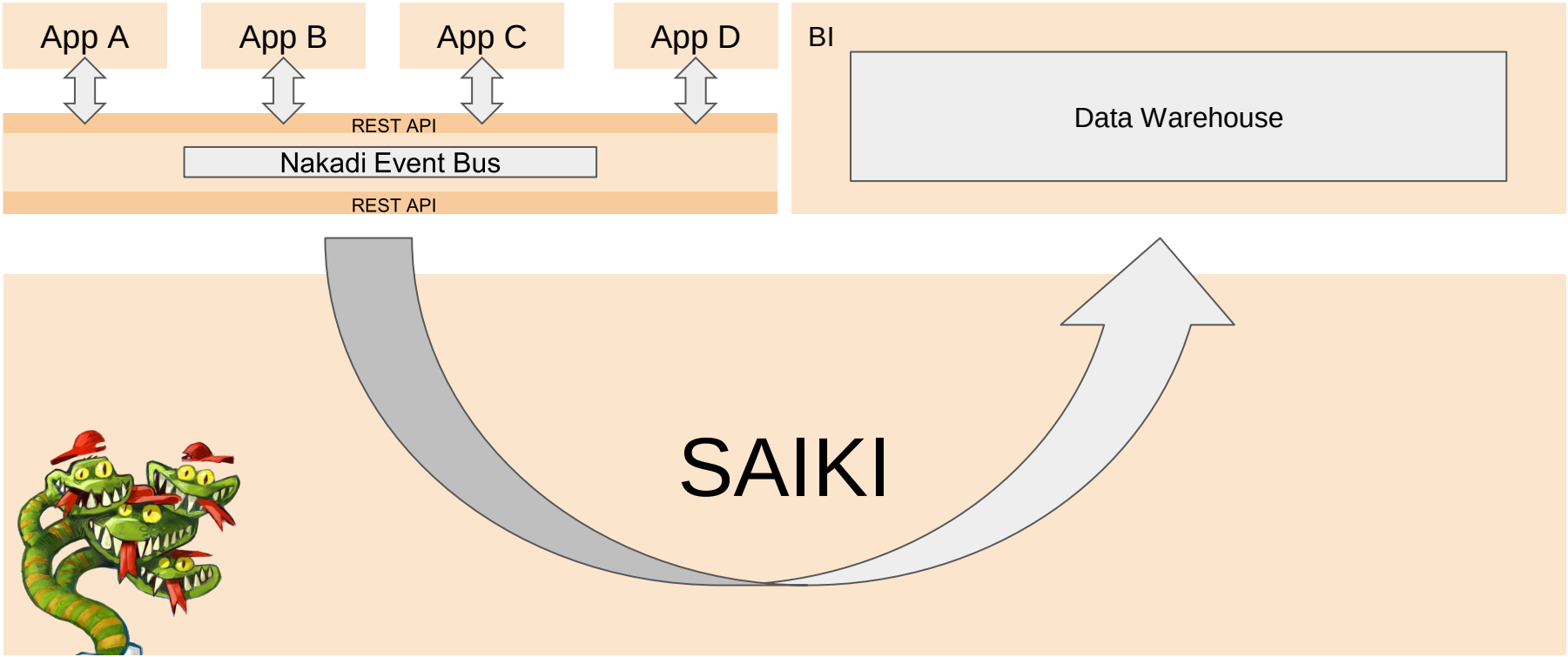
SUPPORTING AUTONOMY: MICROSERVICES



zalando

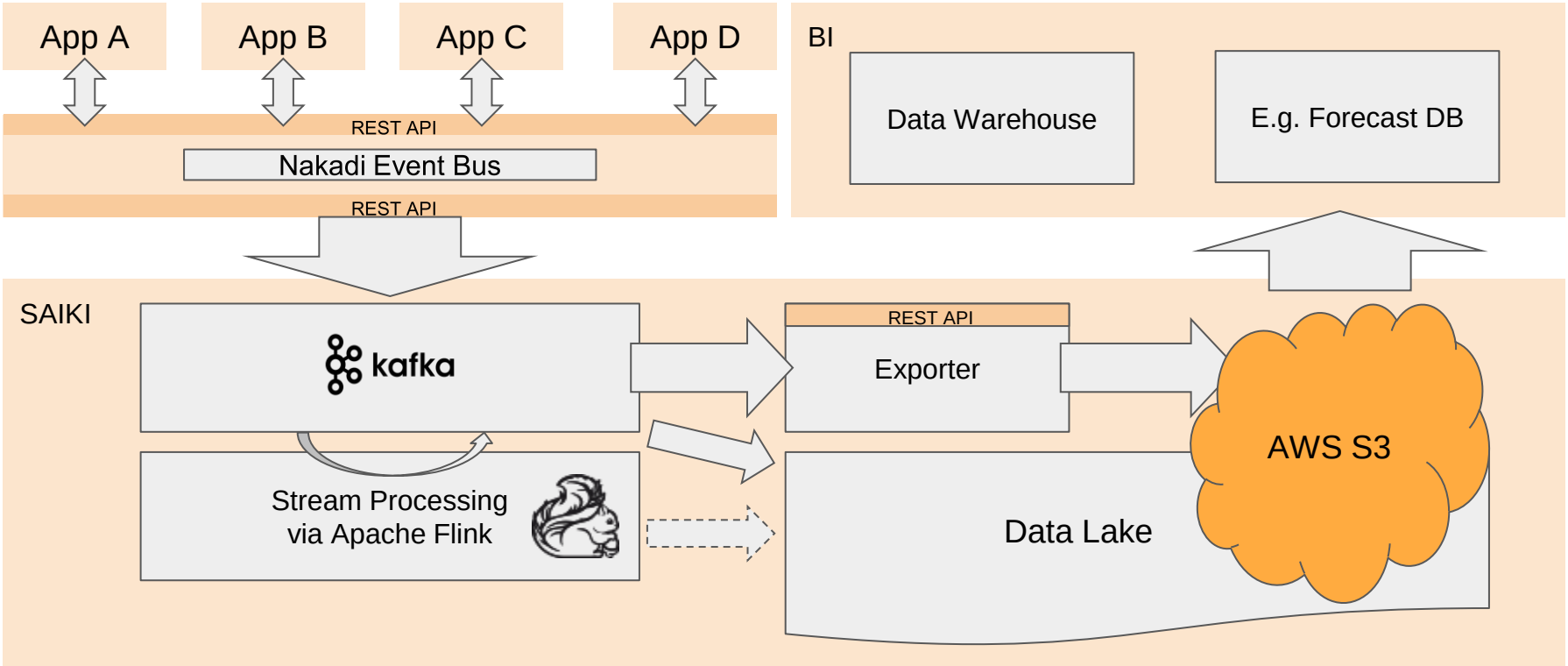
SAIKI

SAIKI DATA PLATFORM



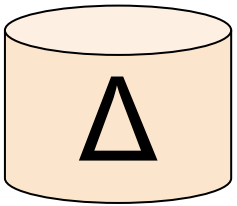
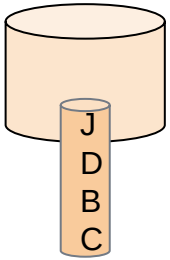
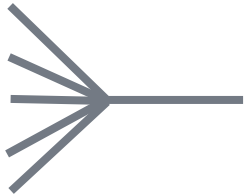
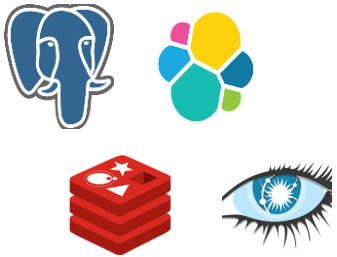
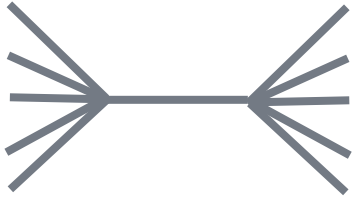
zalando

SAIKI — DATA INTEGRATION & DISTRIBUTION



zalando

SAIKI — SUMMARY

	Data sources Extraction	Data sources Connections	Data sources Technologies	Data Delivery
BEFORE				
AFTER				

FLINK IN A MICROSERVICES WORLD

OPPORTUNITIES FOR NEXT GEN BI

Cloud Computing

- Distributed ETL
- Scale

Access to Real Time Data

- All teams publish data to central event bus

Hub for Data Teams

- Data Lake provides distributed access and fine grained security
- Data can be transformed (aggregated, joined, etc.) before delivering it to data teams

Semi-Structured Data

“General-purpose data processing engines like Flink or Spark let you define own data types and functions.”

- Fabian Hueske, dataArtisans

THE RIGHT FIT

STREAM PROCESSING

THE RIGHT FIT — STREAM PROCESSING ENGINE

Candidates:

Storm & Samza ruled out because of batch processing requirement


Spark
samza
1419
SAIKI STREAM RACE

SPARK VS. FLINK DIFFERENCES

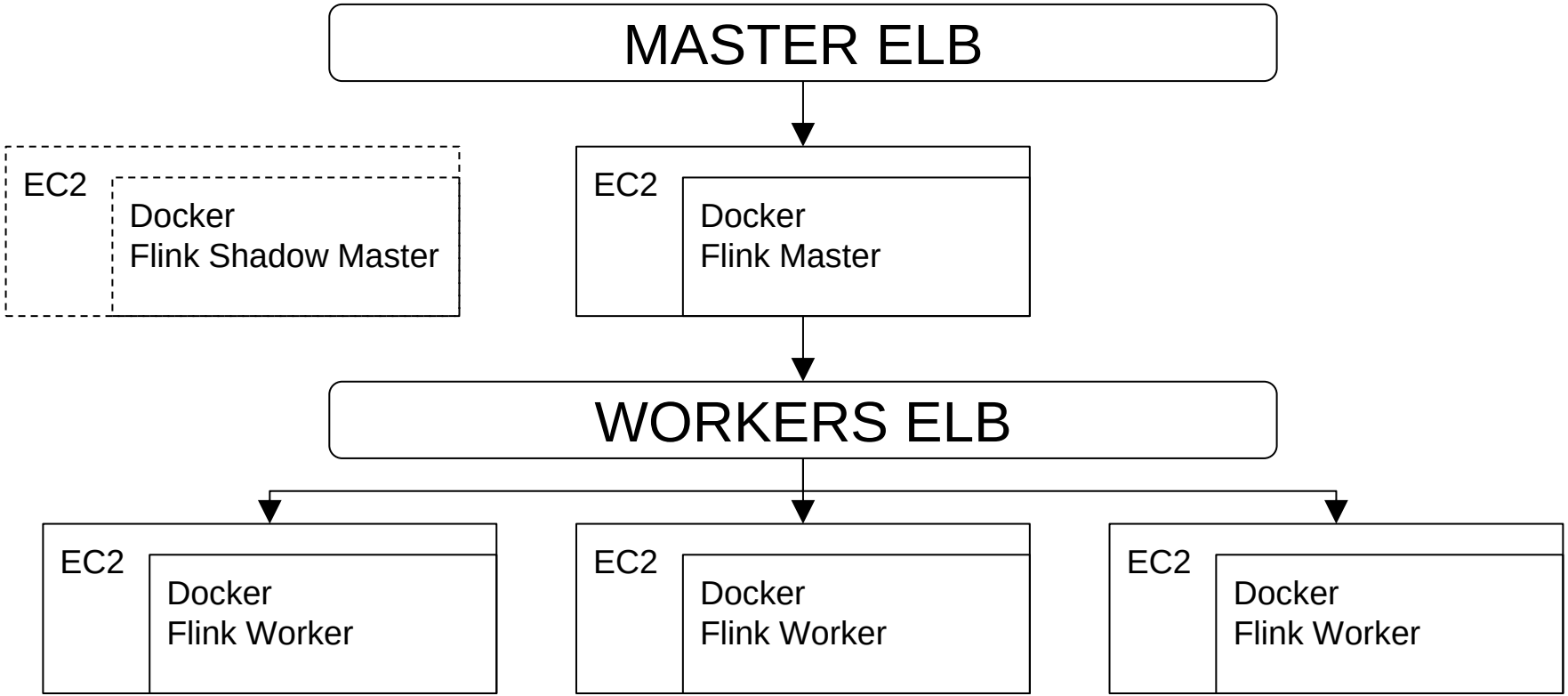
Feature	Apache Spark 1.5.2	Apache Flink 0.10.1
Processing mode	micro-batching	tuple at a time
Temporal processing support	processing time	event time, ingestion time, processing time
Latency	seconds	sub-second
Back pressure handling	manual configuration	implicit, through system architecture
State access	full state scan for each microbatch	value lookup by key
Operator library	neutral	++ (split, windowByCount..)
Support	neutral	++ (mailing list, direct contact & support from data Artisans)

APACHE FLINK

- true stream processing framework
- process events at a consistently high rate with low latency
- scalable
- great community and on-site support from Berlin/ Europe
- university graduates with Flink skills

https://tech.zalando.com/blog/apache-showdown-flink-vs.-spark/

FLINK ON AWS - OUR APPLIANCE



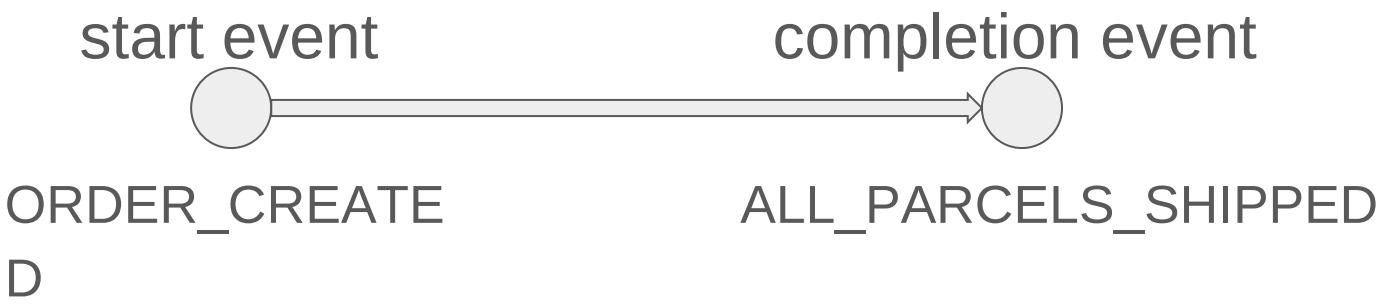
zalando

USE CASES

BUSINESS PROCESS MONITORING

BUSINESS PROCESS

A *business process* is in its simplest form a chain of correlated events:

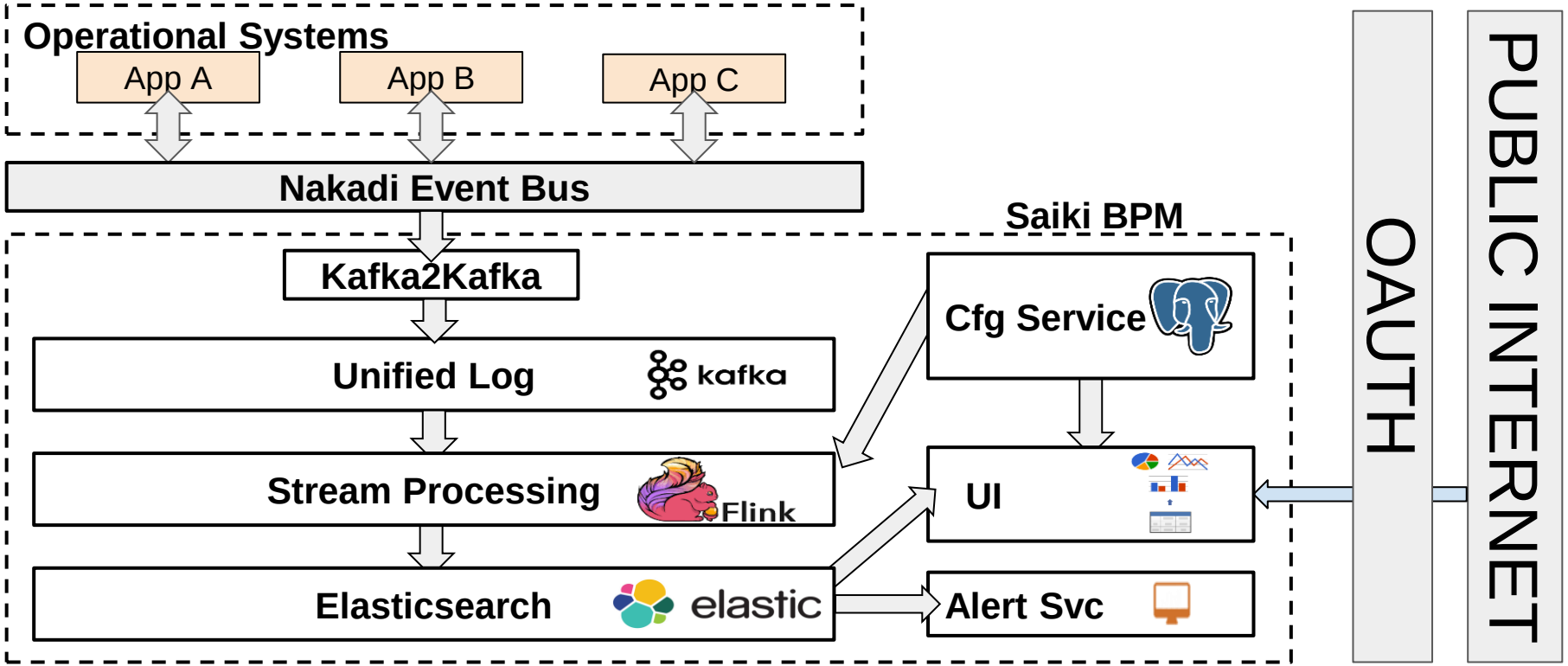


Business Events from the whole Zalando platform flow through Saiki => opportunity to process those streams in near real time

REAL-TIME BUSINESS PROCESS MONITORING

- Check if business processes in the Zalando platform work
- Analyze data on the fly:
  - Order velocities
  - Delivery velocities
  - Control SLAs of correlated events, e.g. parcel sent out after order

ARCHITECTURE BPM



zalando

HOW WE USE FLINK IN BPM

- 1000+ Event Types; 1 Event Type -> 1 Kafka topic
- Analyze processes with correlated event types (Join & Union)
- Enrich data based on business rules
- Sliding Windows (1min to 48hrs) for Platform Snapshots
- State for alert metadata
- *Generation and processing of Complex Events (CEP lib)*

STREAMING ETL

Extract Transform Load (ETL)

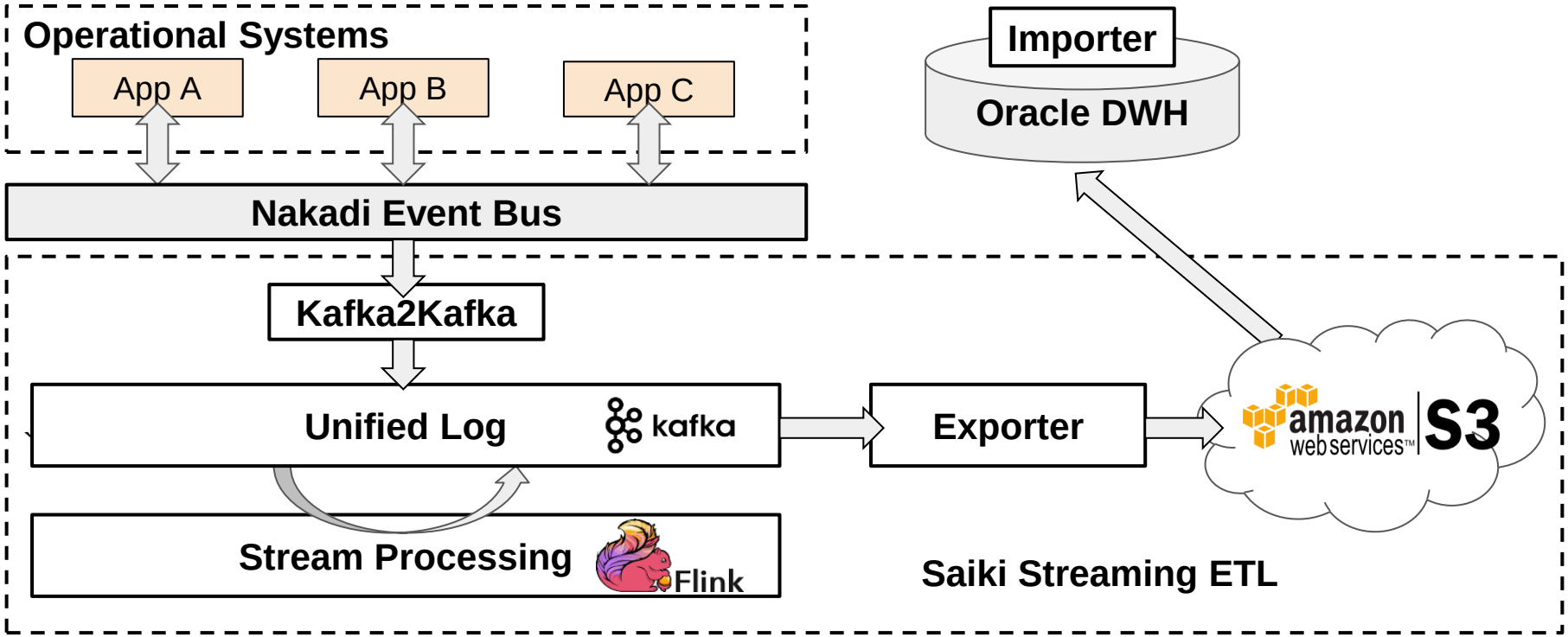
Traditional ETL process:

- Batch processing
- No real time
- ETL tools
- Heavy processing on the storage side

WHAT CHANGED WITH RADICAL AGILITY?

- Data comes in a semi-structured format (JSON payload)
- Data is distributed in separate Kafka topics
- There would be peak times, meaning that the data flow will increase by several factors
- Data sources number increased by several factors

ARCHITECTURE STREAMING ETL



zalando

HOW WE (*WOULD*) USE FLINK IN STREAMING ETL

- Transformation of complex payloads into simple ones for easier consumption in Oracle DWH
- *Combine several topics based on Business Rules (Union, Join)*
- *Pre-Aggregate data to improve performance in the generation of reports (Windows, State)*
- *Data cleansing*
- *Data validation*

FUTURE USE CASES

COMPLEX EVENT PROCESSING FOR BPM

Cont. example business process:

- Multiple PARCEL_SHIPPED events per order
- Generate complex event ALL_PARCELS_SHIPPED, when all PARCEL_SHIPPED events received

(CEP lib, State)

DEPLOYMENTS FROM OTHER BI TEAMS

Flink Jobs from other BI Teams

Requirements:

- manage and control deployments
- isolation of data flows
  - prevent different jobs from writing to the same sink
- resource management in Flink
  - share cluster resources among concurrently running jobs

StreamSQL would significantly lower the entry barrier

REPLACE KAFKA2KAFKA COMPONENT

- Python app
- extracts events from REST API Nakadi Event Bus
- writes them to our Kafka cluster

Idea: Create Nakadi consumer/producer to enable stream processing with Flink to other internal users

(first POC done)

OTHER FUTURE TOPICS

- New use cases for Real Time Analytics/ BI
  - Sales monitoring
  - Price monitoring
- Fraud detection for payments (evaluation)
- Contact customer according to variable event pattern (evaluation)

CONCLUSION

Flink proved to be the right fit for our current stream processing use cases. It enables us to build Zalando's Next Gen BI platform.

https://tech.zalando.de/blog/?tags=Saiki

THANK YOU