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Data Challenges in an acquisition based world

(or how to click a Data Lake together with AWS)

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How do you tackle the challenges of reporting and data quality in a company with a model of local and centralized entities? We will talk about the evolution of Data in Delivery Hero from Data Warehouse to a Data Lake oriented Architecture and will show you how you can click your own Data Lake together with the help of AWS.
We are an Online Food Ordering and Delivery Marketplace

Key Facts about Delivery Hero

- Founded in May 2011
- Operating in +40 markets with +6000 employees plus thousands of employed drivers
- The largest food network in the world with more than 150,000 restaurant partners
- Global leader in the space with 291.5 million orders processed (2017)
- More than $1.5 billion invested into Delivery Hero to date
2008
Niklas started OnlinePizza in Sweden

2010
Lieferheld launched

2011
HungryHouse joins

2012
OnlinePizza Norden joins

2014
PedidosYa, pizza.de and Baedaltong joins

2015
Talabat, Yemeksepti and Foodora joins

2016
foodpanda joins

IPO, M&A, ...
Customer Experience - Data

The Right Food
- Search, Recommendations, Vouchers, Premium Placements

Order Placement
- Time to Order
- Estimated Delivery Time
- Payment Method

After Order
- Reviews, Ratings, Complaints
- Where is my food?
- Reorder Rate

“Understand the whole cycle”
Order delivery - Data

- **Availability**
  - Online, Open, Busy, ...

- **Cooking**
  - Preparation Time
  - Items Unavailable

- **Delivery**
  - Driving Time
  - Driver Shifts
  - Delivered?!

“Tons of Data to collect”
We are an Online Food Ordering and Delivery Marketplace

1. Search
2. Order
3. Receive
4. Cook
5. Deliver
6. Eat
KPIs, Reporting, ...
• **Global Data Warehouse**
  - Airflow, Redshift, S3
  - ETLs everywhere
  - Standard Data Structures

• **Schemas & Definitions**
  - Evolving, Interpretation

• **Scalability & Realtime**
  - 24 - 48 hours
  - Reporting vs Access

• **Data Quality**
Data Lake - Requirements

Requirements

- Near **Realtime** (ideally <5sec)
- Scalable, reliable
- **Long-term** persistence
- Cloud based
- Event based subscription and batch download
- **Consistent** with source of truth
- Column level ACLs
- **GDPR compliant**
- No over-engineering
- Fast access by index or time or entity
- Cost efficient
- Data representation adapted to use-cases

Limitations

- API only access
- No guaranteed order of events
- Should not be used for critical applications (i.e. applications that are required to place & transmit an order)
Use Cases

Potential First Scope

- Billing in SAP
- Increased response rate for Surveys
- Customer Segmentation for Marketing
- Reports for Vendor Portal
- Forecasting for Logistics
- Standardized Monitoring & Alerting
- Fraud Detection for Reviews
- ....
Data Lake - A normalized, consistent, near real-time data platform for global services...

Goals
- Simplify integration
- Make data available for machine learning
- Allow data-exchange between entities and services
- Simplify migrations

Requirements
- Normalized backend data
- Near real-time data
- Consistent with source of truth
- Data access both via event subscription and batch processing
• **Near Real-Time**

• **Cost Efficient***

• **Permanent**

• **Scalable**
Ingestion

- **API Gateway**
  - Swagger
  - Versioning
  - Authentication

- **Lambda**
  - Scales
  - Validation
  - Serverless

- **SDKs**
  - Client-Side validation
  - Direct ingestion into kinesis
- **Kinesis**
  - Stream-based, Simple, Scales, ...

- **Kinesis Firehose**
  - S3, Redshift, Elastic Search

- **Kinesis Analytics**
  - Window-based SQL Queries
  - Merge Streams

- **S3**
  - S3 storage incl. lifecycle, replication and publish/access
● **SNS**
  ○ Filtering!
  ○ Fanout Events

● **DynamoDB**
  ○ Enrich Data

● **Athena & Glue**
  ○ On Demand Queries
  ○ Detect Schemas On-the-fly

● **Further Features**
  ○ APIs for Single & Batch
  ○ Subscriptions
  ○ Replay
  ○ ...
Consumer Blueprints

- **Access**
  - 80% API

- **Store**
  - SNS Consumer
  - REST Service
  - DB

- **Push**
  - SDKs
  - Subscription

“Unleash the Power of Data”
Status

- >250,000 Orders per Day
- 5 - 10 Events per Order
- New Team of 4
- < 3 Month
- < 500 $*
Order Map

- **Visualize new Orders**
- **All Platforms***
- **Stack**
  - SNS to SQS
  - NodeJS, Socket.io

https://ordermap.rps-ops.com/ (internal only)
- Customer feedback
- Sentiment Analysis
- Consumes Data from within another cloud*

https://happymeter.deliveryhero.com/ (internal only)
● Predict upcoming Downtimes
● Based on Historical and (near) Real-Time data
● How real-time do you need?
● How much control do you need?
● What’s your critical path?

< 2 seconds

Amazon API Gateway → AWS Lambda → Amazon Kinesis → Amazon SNS → Internet
Click it together!

- < 1 Day
- No Code*
- No Machines
- No Automation
- No Consistency
Conclusion

- AWS your One-Stop-Shop
- Serverless for faster Go-to-Market
- Use Case driven because “No Value, No Support”
- Duplication, Consistency and Ordering
- Permanent Storage vs GDPR
- Event Bus first, Data Lake later?
- Know your Customers (Consumers)
- Be Aware of the Limits
  - No control over Partitioning with Kinesis Firehose*
  - Kinesis Consumer Count