GyG

Get your Grocery AG

Our Big Data Architecture | Competitive advantage in the 21st century

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Agenda

1. GyG - Our Vision & Mission
2. Our Big Data Ambitions | GAP analysis
3. Core requirements of big data processing systems
4. Stream versus Batch processing of big data
5. GyG - Our big data architecture
6. One step ahead – shaping our future at GyG

GyG - Our Vision & Mission

Save peoples time by delivering the most efficient supply solution for groceries in the needed quality all over the world.

Our Big Data Ambitions:

Real time driven supply chain & sales

- Dynamic pricing
- Demand forecasting & optimization

World leading customer experience

- Product recommendation engines
- Interactive voice/ chat bots
- Personalized offers & advertisement
- Digital Store Assistant

Establishing multi-channel retailing

- Buy & collect
- Home delivery
- Localized product assortments

See Knight (2018)

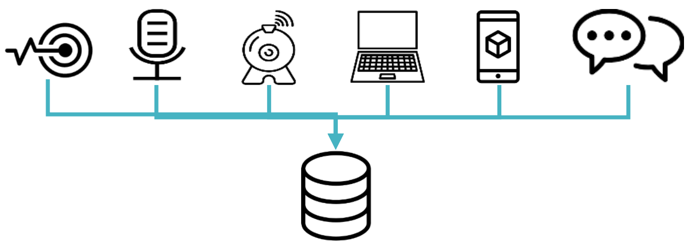
Our Big Data Ambitions | GAP analysis

Our Obsolete IT Infrastructure

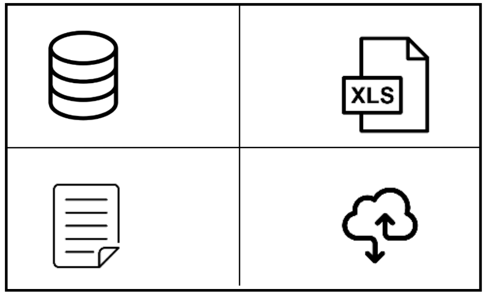
Our New IT Infrastructure

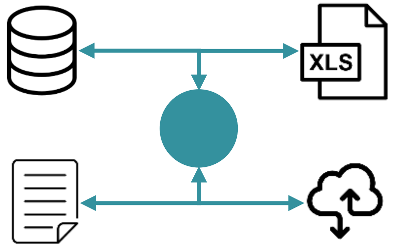
Multidimensional data ingestion

Costumer ID	Name	First Name	Age
50	Humbeck	Niels	29

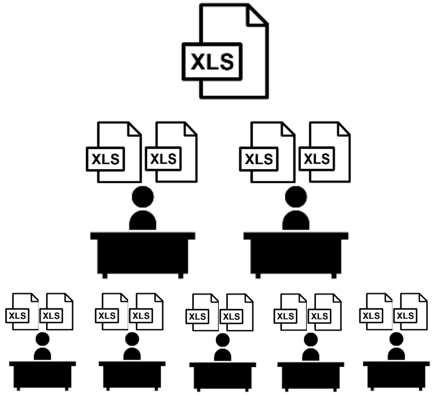


Connectivity & Latency





Increase analytic capabilities

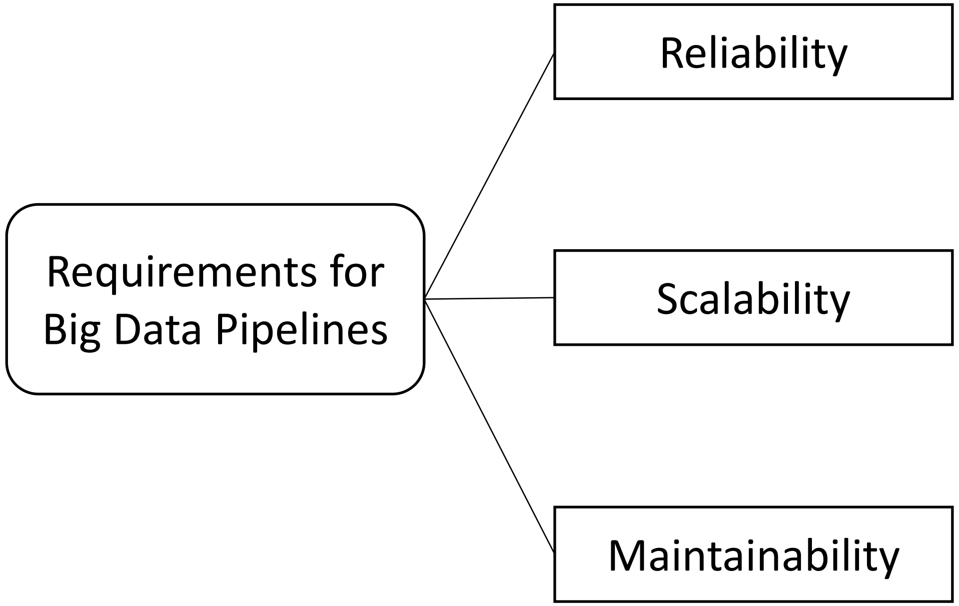


- Real Time analytics and visualization
- Automated reports
- Machine Learning

See Knight (2018)

Core requirements of big data processing systems

Reliability, scalability and maintainability



- The System should perform the correct function at the desired level of performance by preventing faults (hardware, software or human errors) causing failures & downtimes
- How to add resources to cope with increasing, data volume, traffic volume or complexity while keeping the performance?
- Maintain the functionalities in the most efficient way while being prepared for updates (operability, simplicity & evolvability).

Focus on:

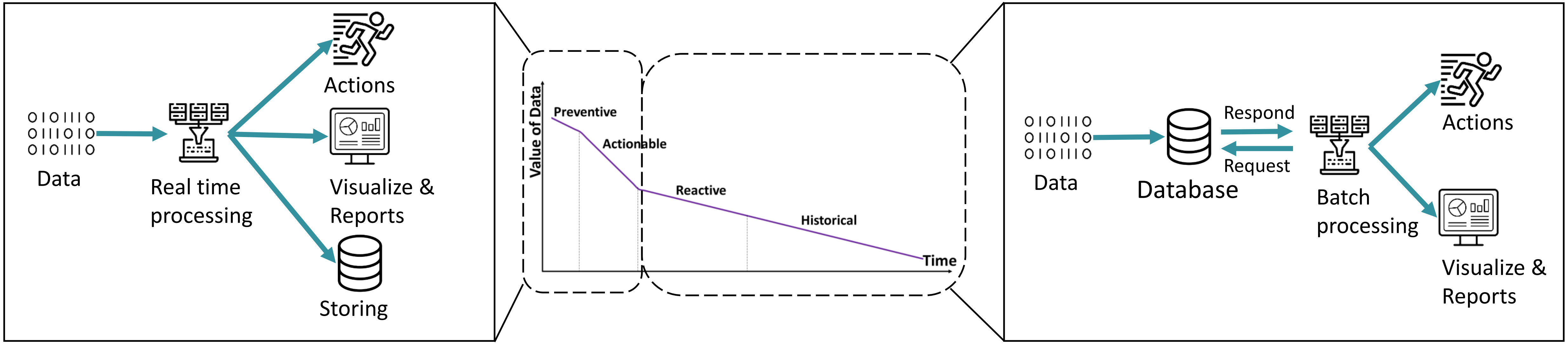
Optimized for availability, high throughput and low latency

See Kleppmann (2017), Marz (2015)

Stream versus Batch processing of big data

Stream processing:

Batch processing:



+
- Low latency
- Up to date data

−
- Expensive
- Higher complexity
- Normally less complex analysis

Use Cases:

- Realtime inventory tracking system
- Recommendation system

+
- Large batches of data
- Complex analytics & independency
- Efficient, cost effective

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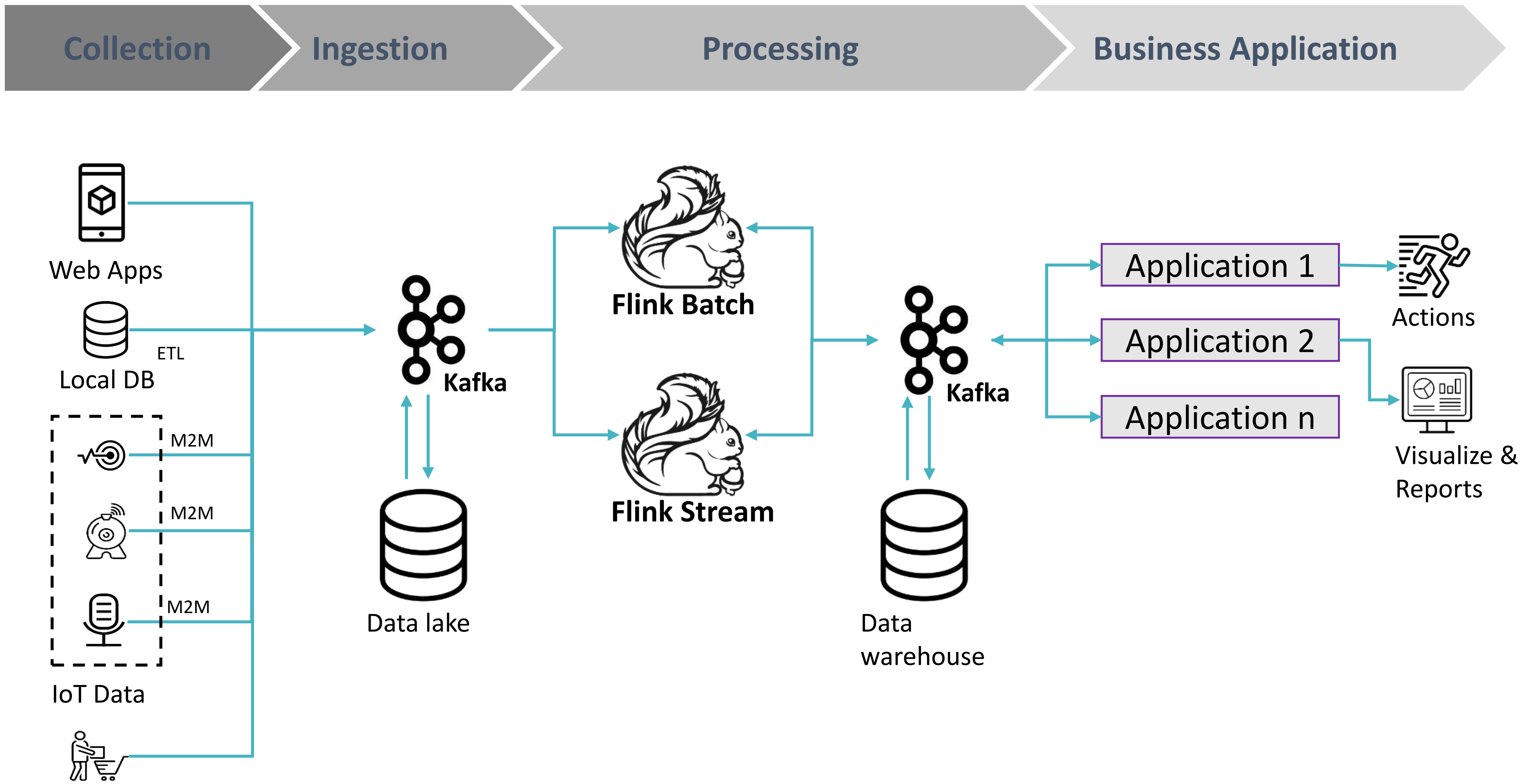
- High latency

Use Cases:

- Demand forecasting

See: Gualtiri (2016)

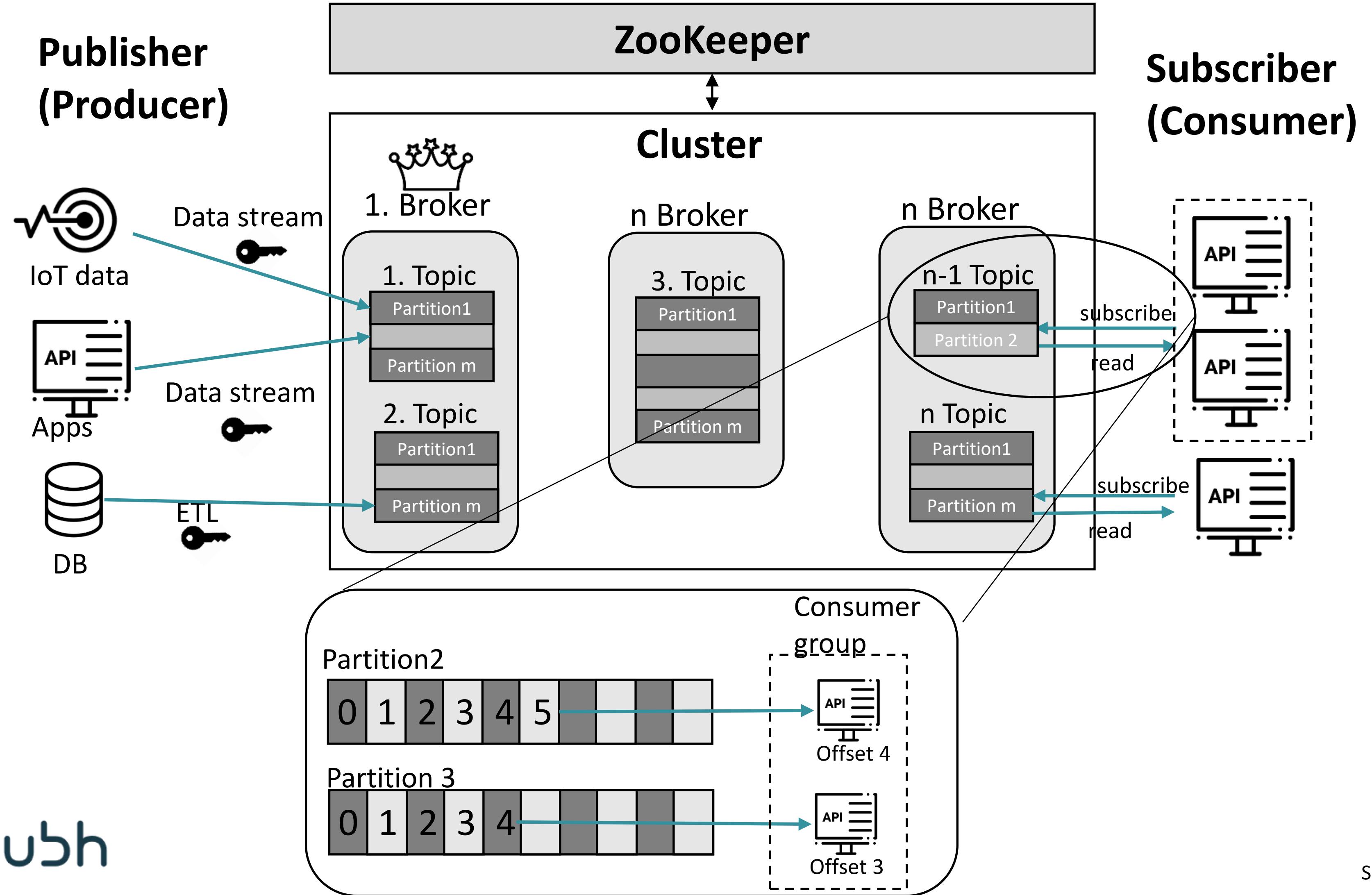
GyG - Our big data architecture



See Gupta (2020), Akanbi (2020), Nasiri (2019), Dendane (2019), Cheng (2018)

GyG - Our big data architecture

Kafka | Pub/Sub messaging system with distributed immutable commit log



Reliability guaranties:

- Guaranties the order in a partition
- At-least once messages guarantee

Scalability:

- Highly scalable (horizontal)

Maintainability:

- Multiple producers/ consumers
- Reduces integration complexity
- Highly configurable +retention
- Fault tolerant

+

- ETL & Big Data ingestion
- High Throughput
- Fairly low latency

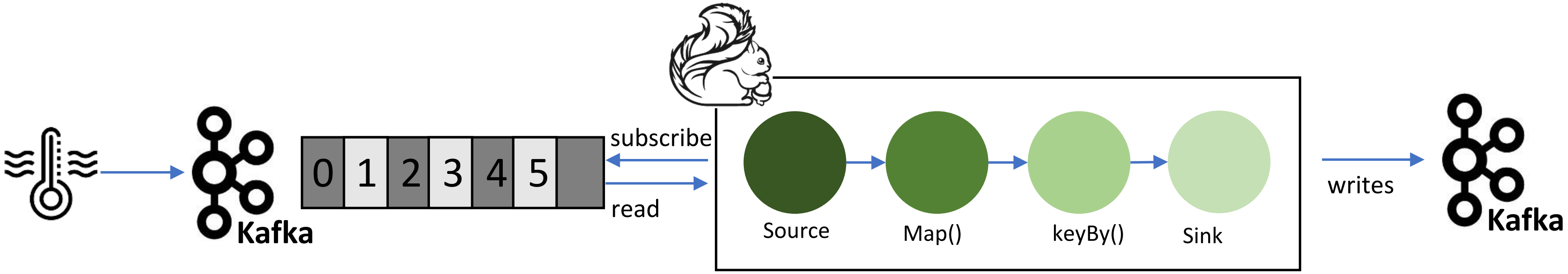
−

- Training
- Not for real low latency

See Müller-Kett (2020); Finematics(2019), Narkhede (2017)

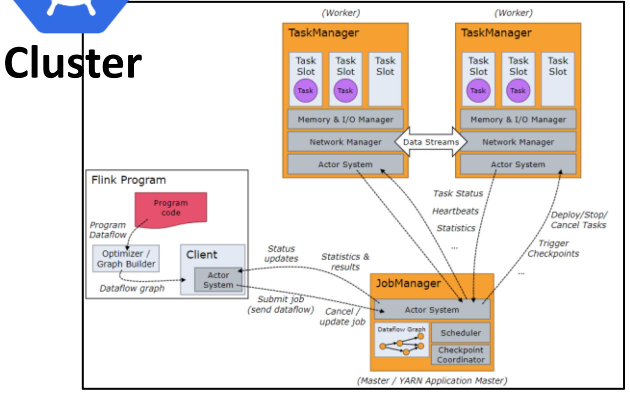
GyG - Our big data architecture

Flink | Distributed processing engine for stateful computations over (un-) & bounded data streams



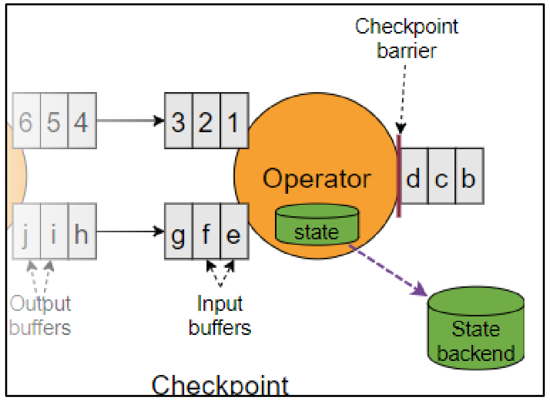
Cluster

Distributed



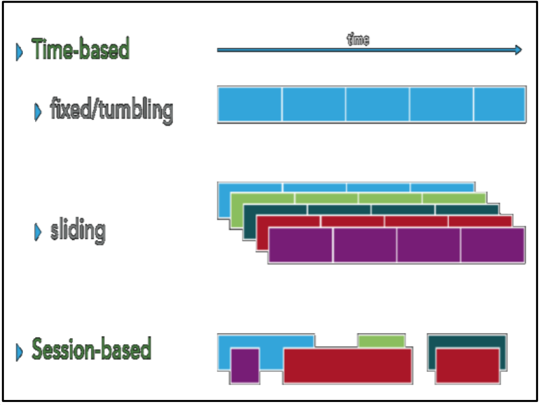
- Horizontal scaling
- High throughput

Stateful Processing



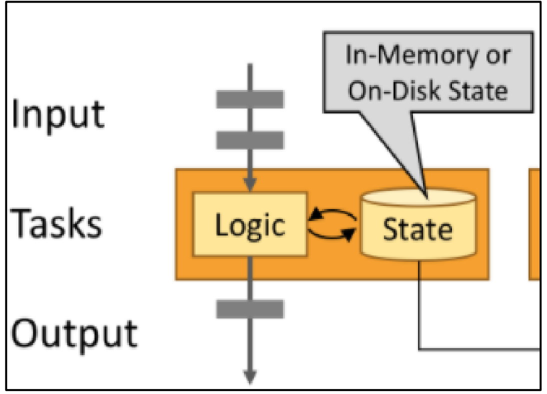
- Exactly once guarantee
- Fault tolerant

Timely Processing



- Enabling stream processing

In-Memory Processing

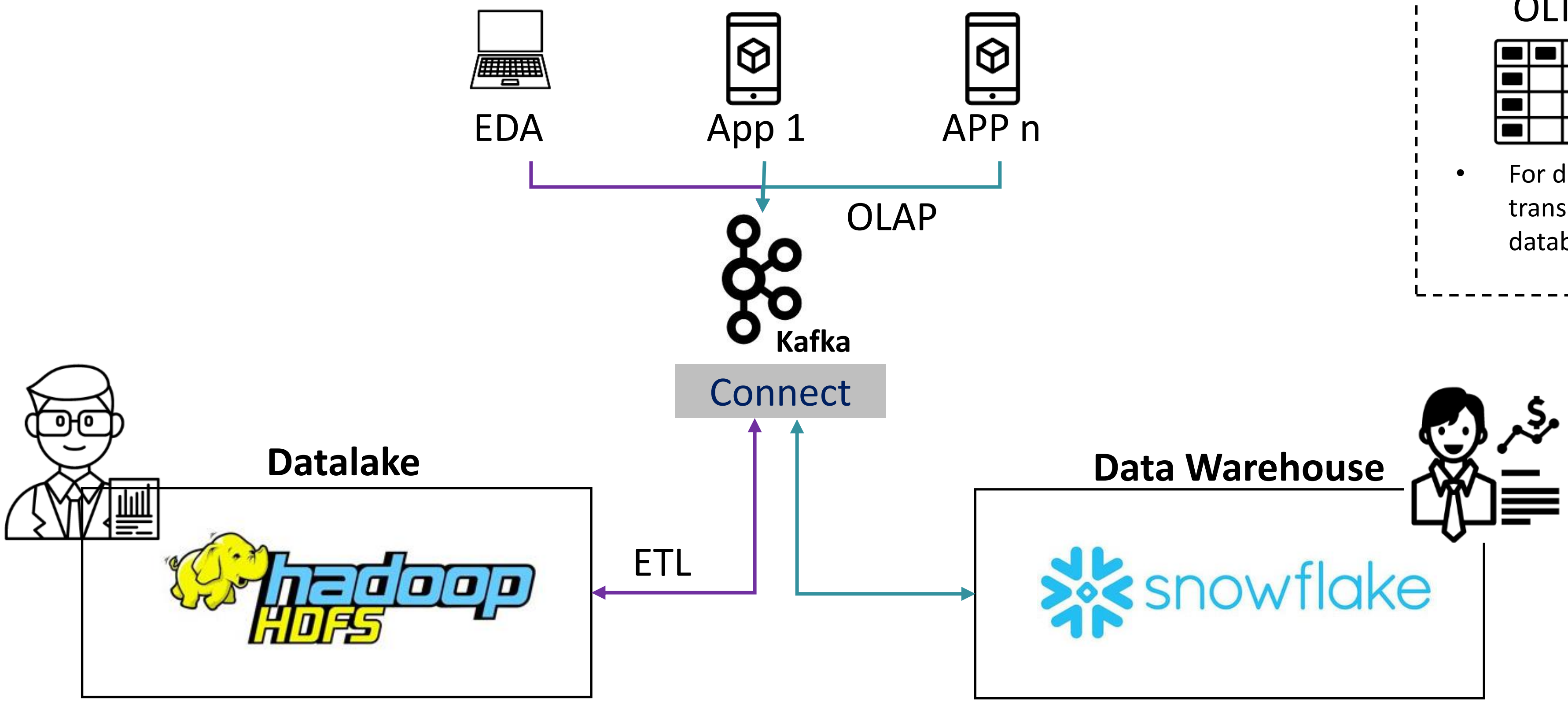


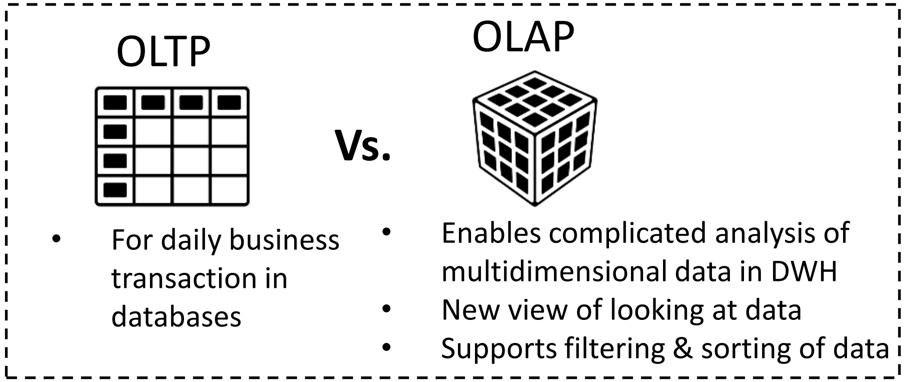
- Low latency

See Flink (1-3), Waski (2016), Sakr (2020)

GyG - Our big data architecture

Data storage & business aplication layer





OLTP
- For daily business transaction in databases

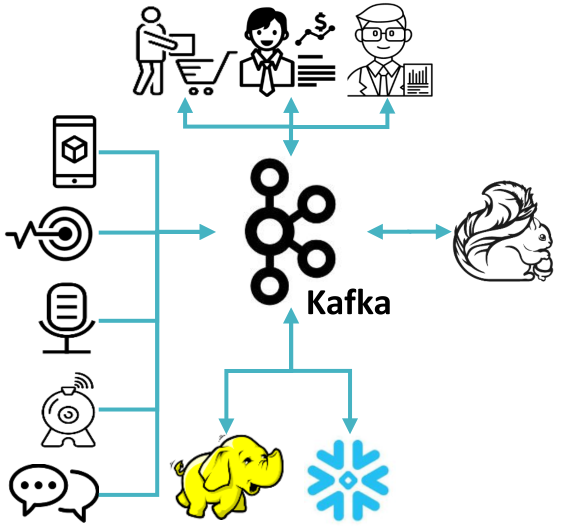
OLAP
- Enables complicated analysis of multidimensional data in DWH
- New view of looking at data
- Supports filtering & sorting of data

See Kidd (2020); Patil (2018), Chaudhuri (n.a.)

One step ahead – shaping our future at GyG

State of the art Big Data infrastructure

- Reliable, maintainable and scalable real time big data system
  - Kafka as our data backbone enabling multi data ingestion & low latency connectivity
  - Real time analysis with Flink
  - Next generation cloud data warehouse



✓

Personalized shopping experience & advertisement

Technology Trends:

- Facial recognition technology
- Social Media integration
  - Sentiment analysis (NLP)
  - Customer segmentation (ML)
- Interactive voice/ chat bots
- Block-Chain integration

Product Developments:

Personal store assistant (App)

- Product recommendation engines
- Virtual try-on functionalities
- Producti information

Personalized outdor advertisement

- Product recommendation engines
- Personalized outdoor advertisement

System Readiness: ✓

- Highy configurable data ingestion of multiple sources
- Processing, analysis & ML of various data in real time
- Store & access multidimensional data fast in the cloud

See Goasduff (2020), Reinhald (2020)

Q&A

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