The Shape of Revolutions: How Things Change

Ellen Friedman, PhD
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Berlin Buzzwords #bbuzz

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Today: #bbuzz

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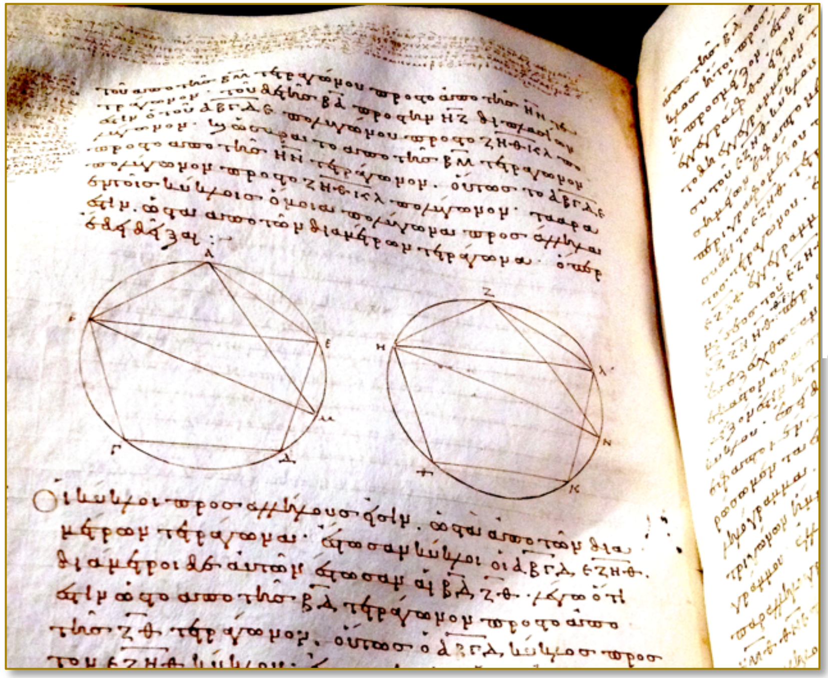
What makes innovation have real impact?

Discovery of new ideas & technology is just part of the picture



Euclid's Geometry, Bodleian Library, Oxford

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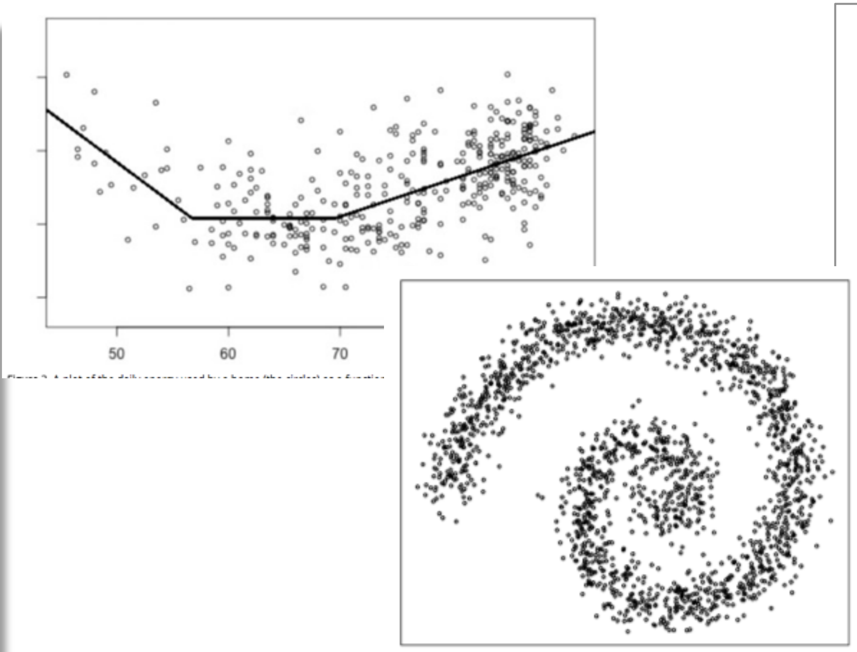

Tensors; k-means clustering

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Medical imaging

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Great Discovery in Genetics: Gregor Mendel

Is blended inheritance correct?

I could test it.

Peas, please….

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Great Discovery in Genetics: Gregor Mendel

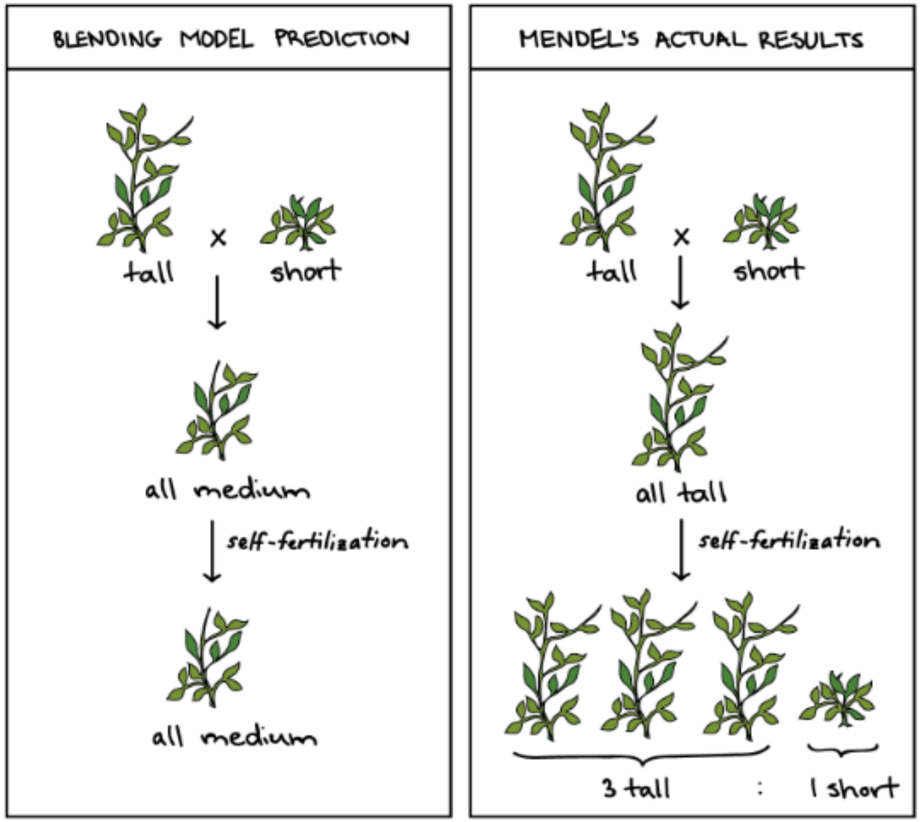
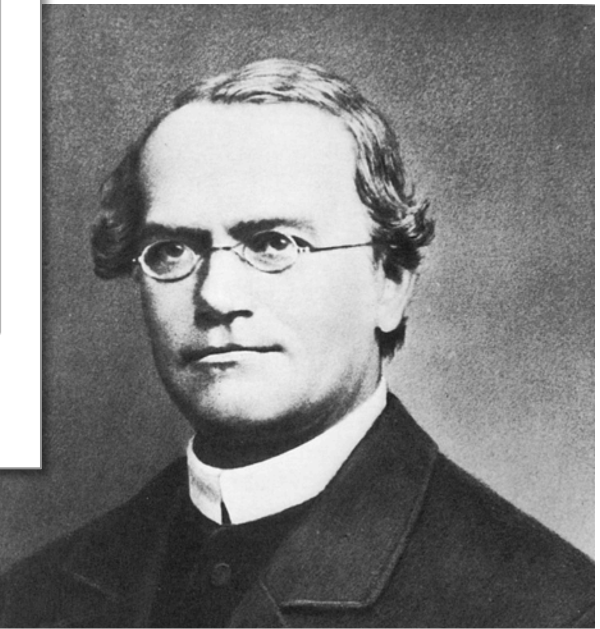


Image modified from "Mendel seven characters," by Mariana Ruiz Villareal (public domain).



Mendel’s Discovery

- Experimental data did not support blended inheritance;
  Supported *discontinuous inheritance*

- Defined terms “dominant” and “recessive” for inheritance

- Basis for modern genetics!!

- Presented results in1865 talks & 1866 paper
  “Experiments on Plant Hybridization”

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Huge discovery, with strong evidence to support it

Initial impact:
none

Re-Discovery of Mendel’s Work

- 40 scientists had failed to see the significance of Mendel’s work…

Until…

- William Bateson (Cambridge University botanic garden) work on discontinuous inheritance 1894 – 1900 credited Mendel + “rediscovery” of Mendel paper by DeVries & Correns

- Huge amount of work followed → modern genetics

For innovation to have impact, the *users* must have vision

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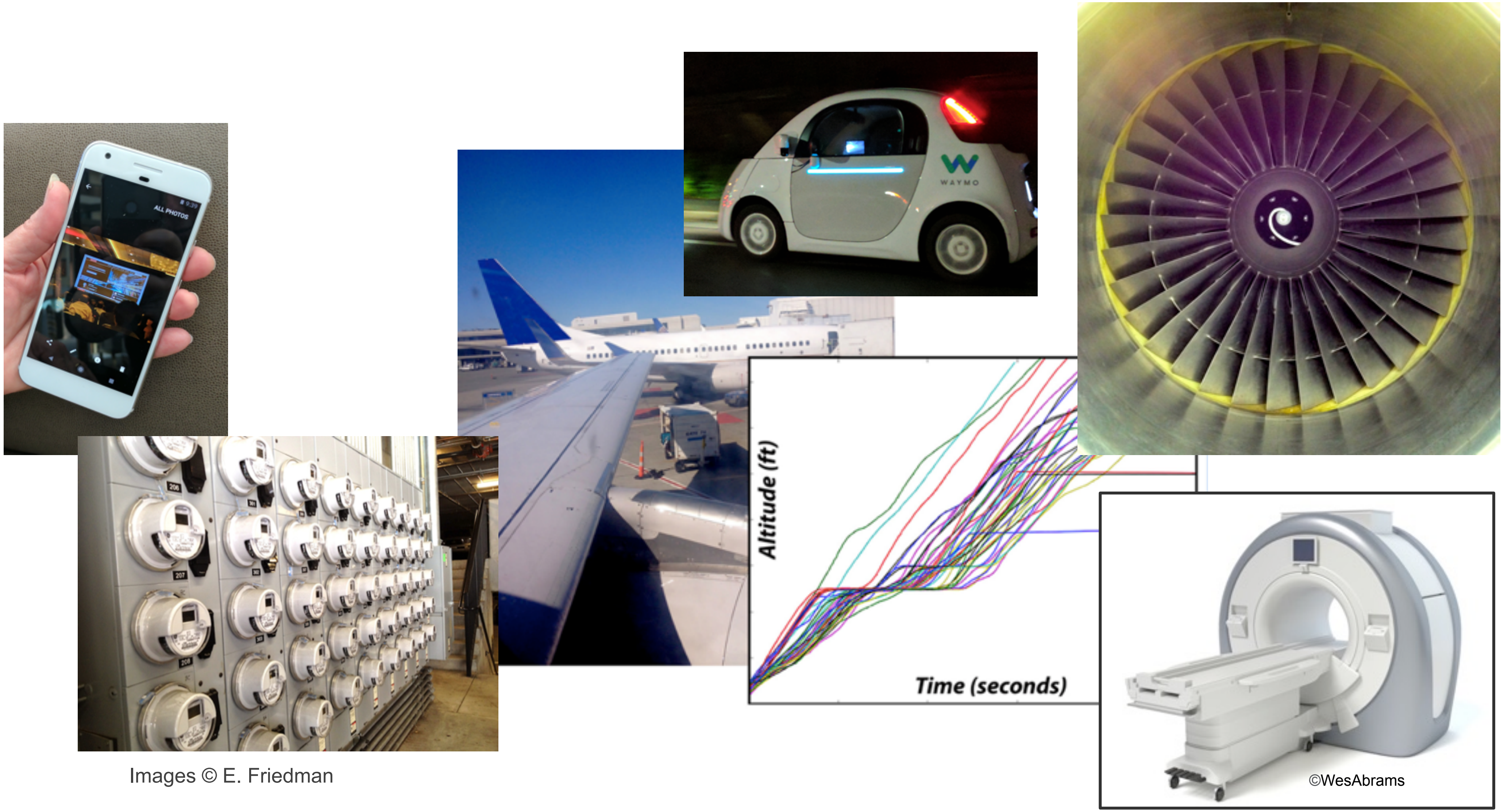
Why stream?

IoT Data: Sensors & Smart Parts



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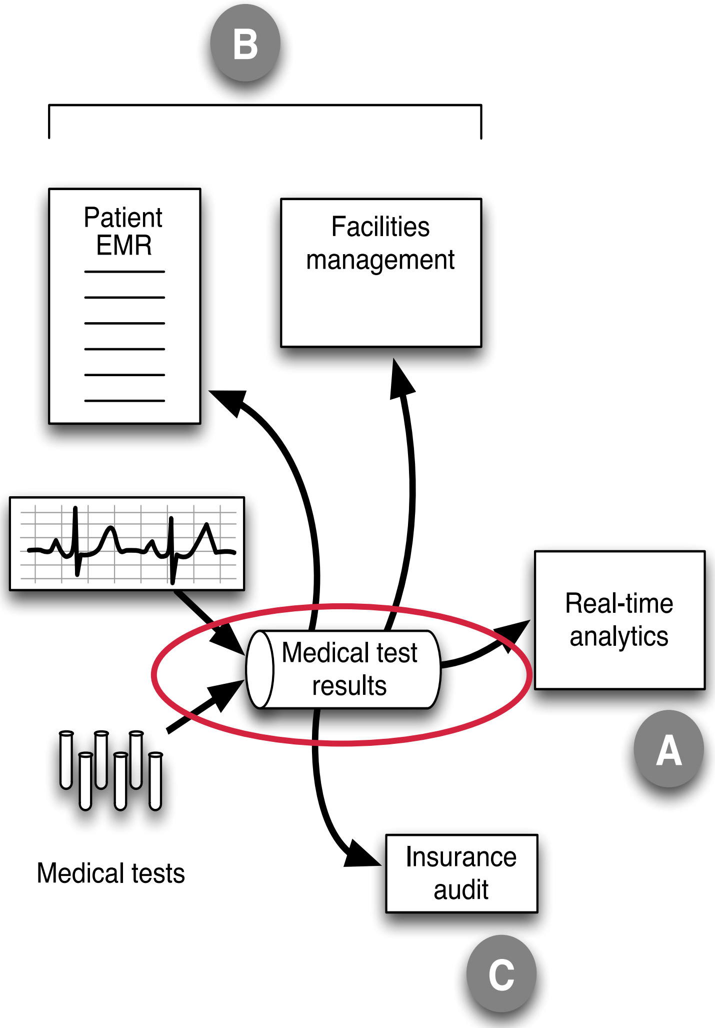
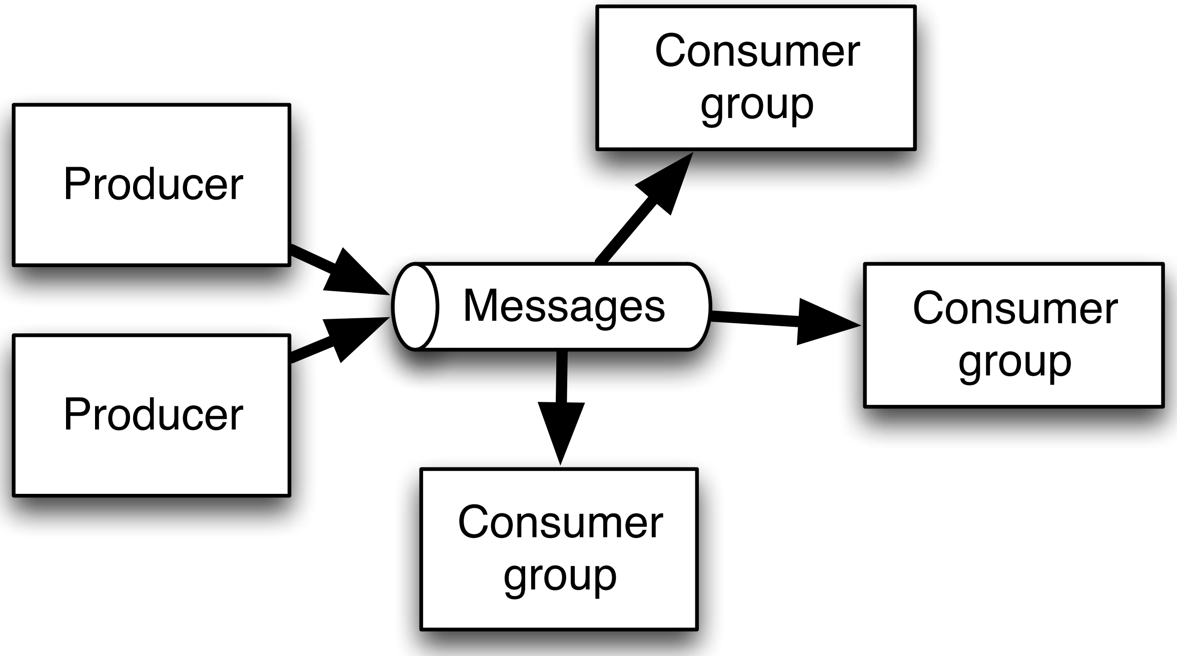
At the Heart: Message Transport

With the right messaging tool at the heart of stream-1st architecture you support other classes of use cases (B & C)



Message Transport Technology: Apache Kafka & MapR Streams



Key capabilities

- Highly scalable
- High throughput, low latency
- Multiple producers & consumers: decoupled
- Durable messages
- Geo-distributed replication preserves offsets, high topic cardinality (unique to MapR Streams)

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Stream transport gives you the flexibility of micro services

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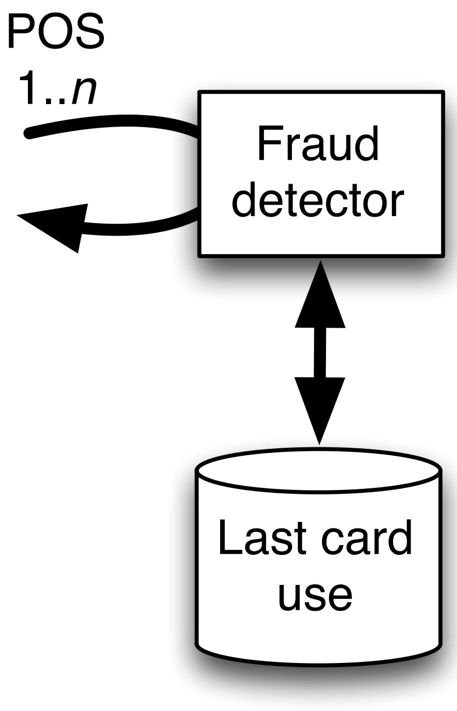
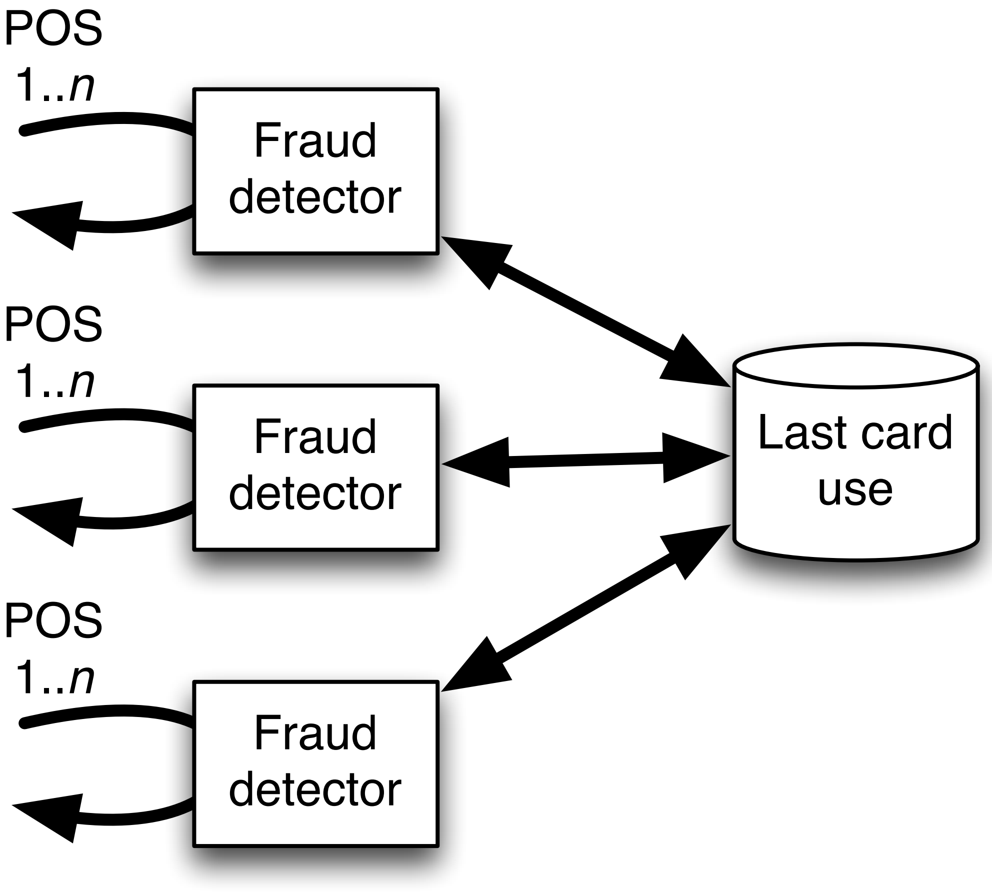
Traditional Solution – Use a Profile Database



What Happens Next?



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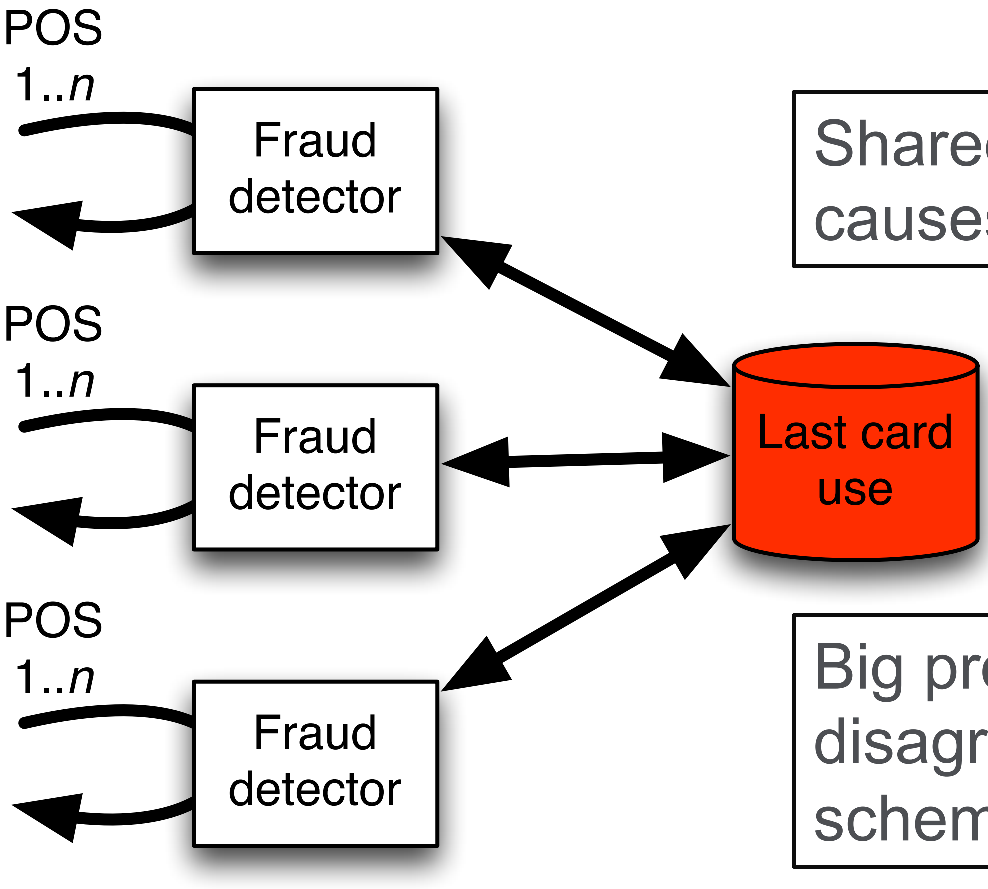
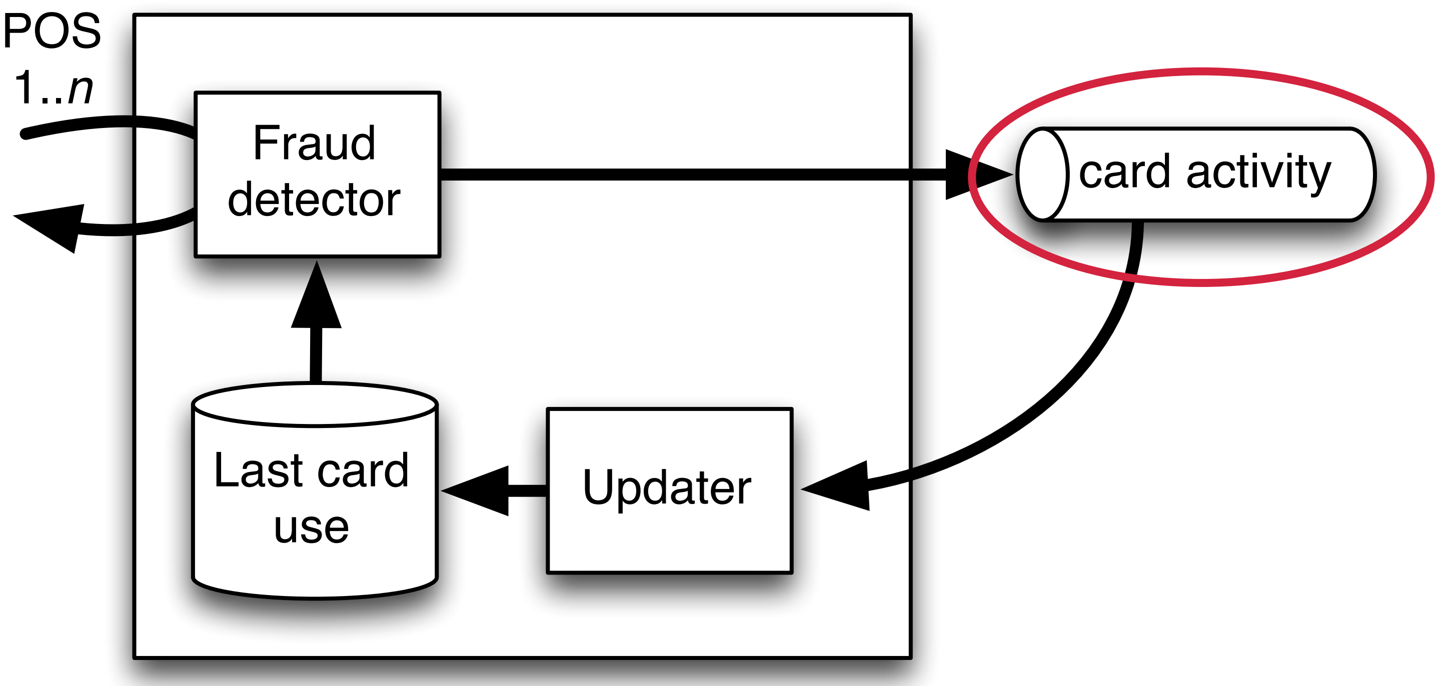
What Happens Next?



Shared database causes problems

Big problem is disagreement about schema and indexing

Use a Stream Isolate Services



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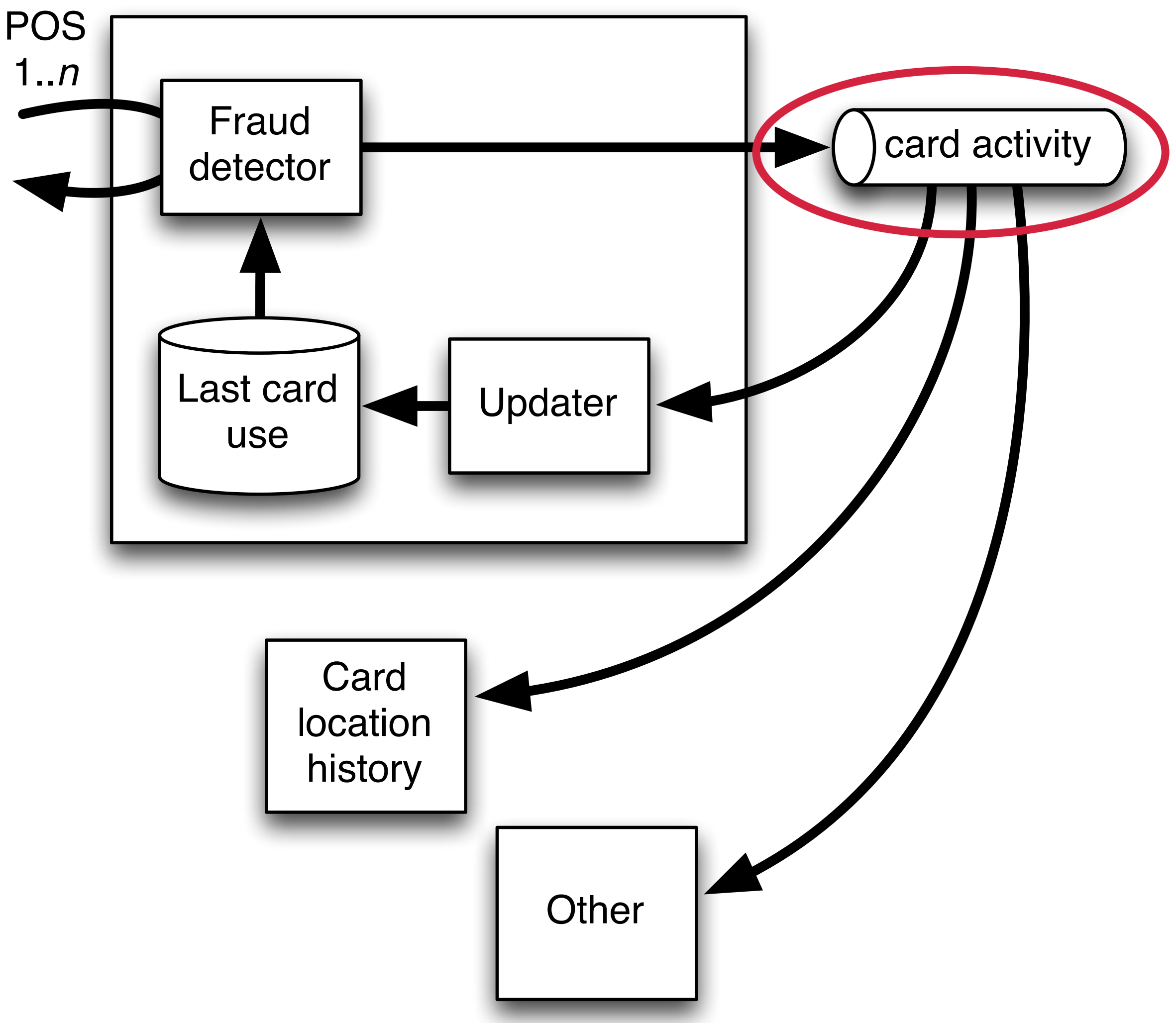
Add New Services via the Stream



Act locally, learn globally

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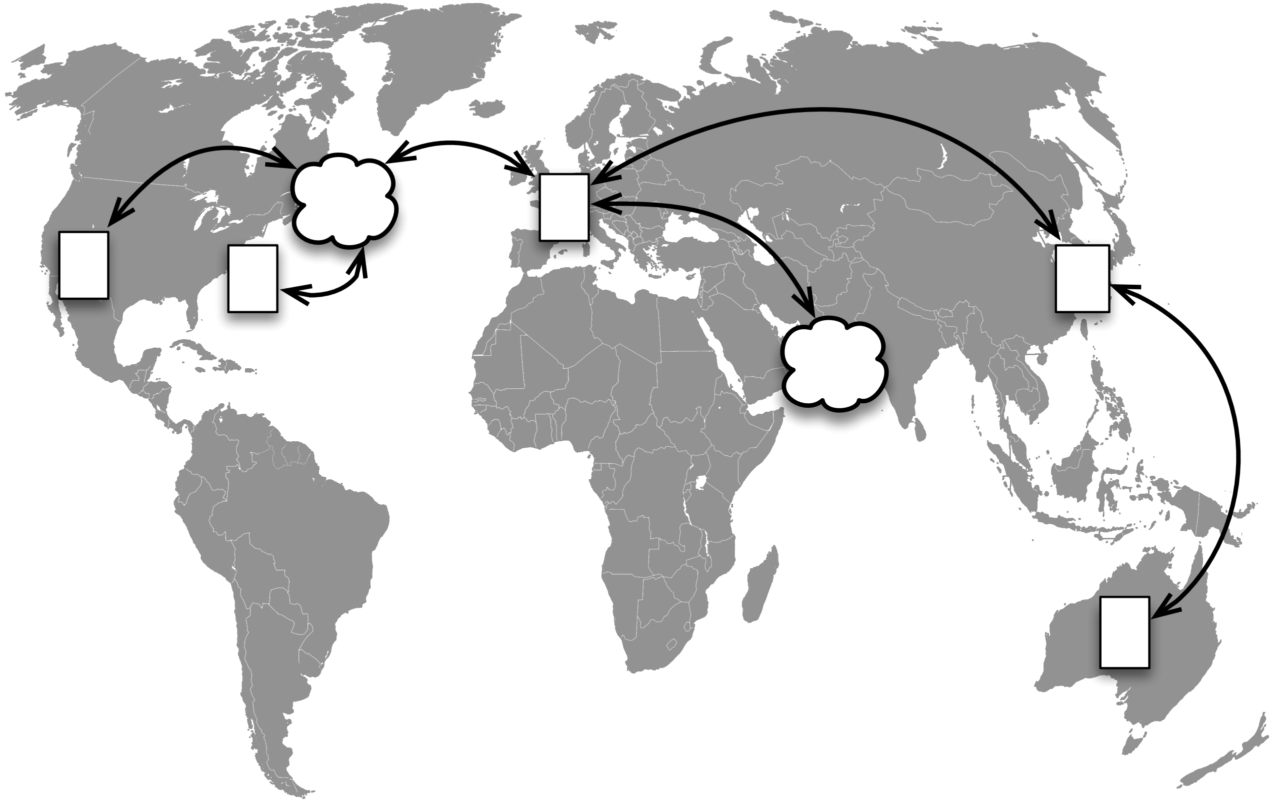
Global Data Fabric



Collect, access & analyze big data where ever you need it, in a seamless system under the same security & administration.

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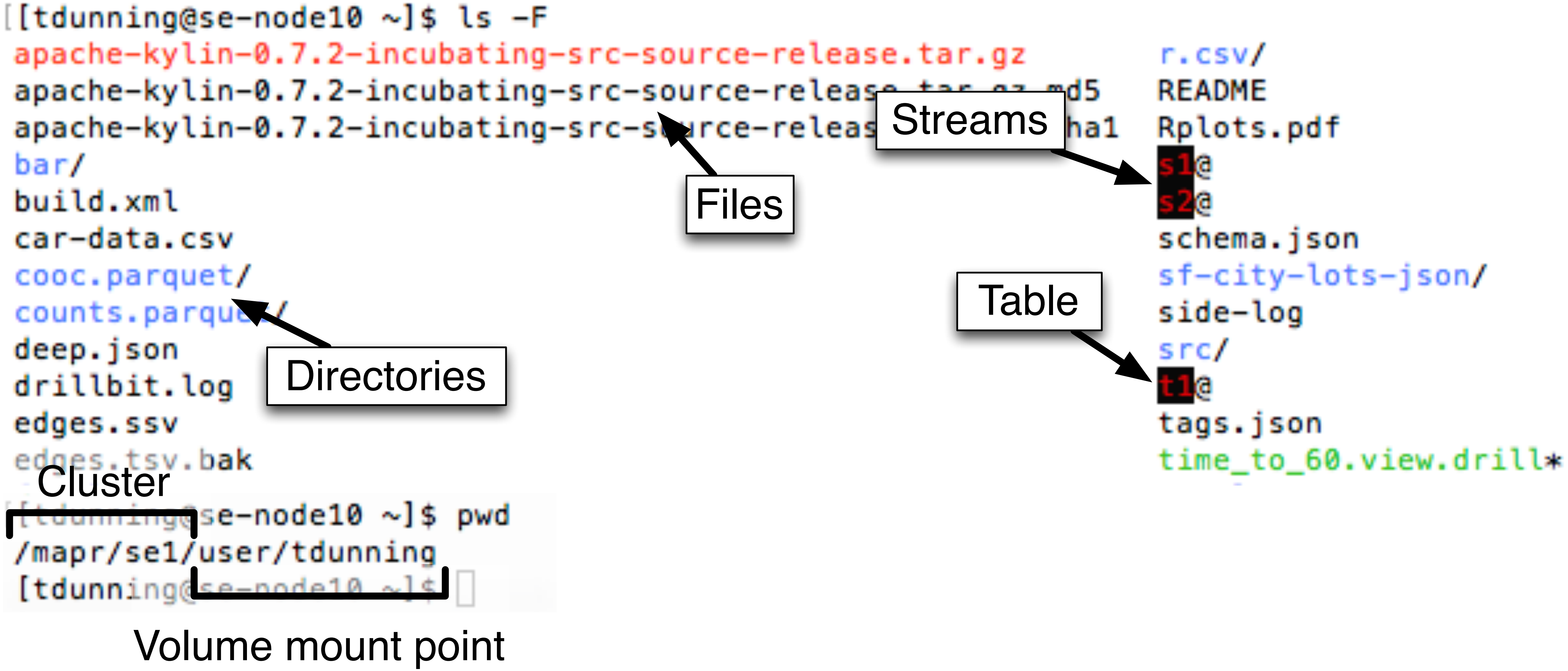
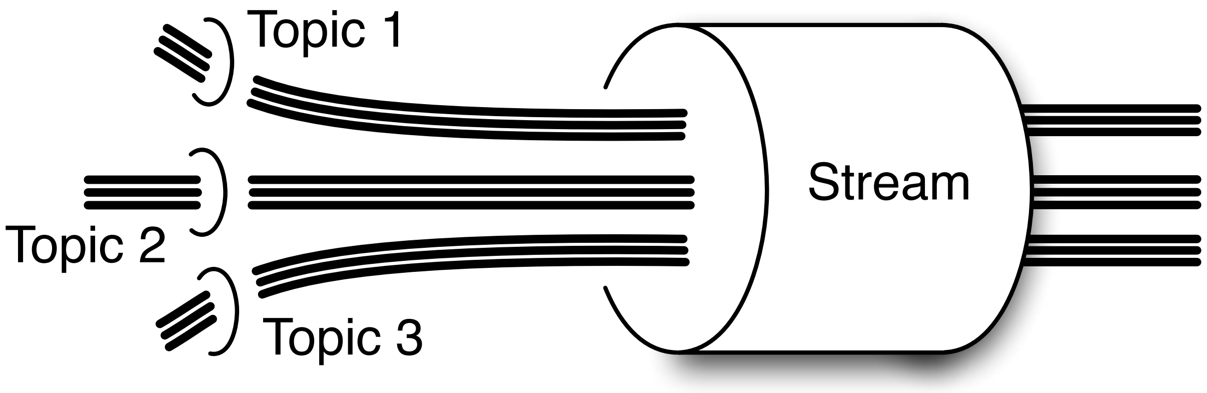
Example: MapR Converged Data Platform



```
[[tdunning@se-node10 ~]$ ls -F
apache-kylin-0.7.2-incubating-src-source-release.tar.gz       r.csv/
apache-kylin-0.7.2-incubating-src-source-release.tar.gz.md5   README
apache-kylin-0.7.2-incubating-src-source-release.tar.gz.sha1  Rplots.pdf
bar/                                                          s1@
build.xml                                                     s2@
car-data.csv                                                  schema.json
cooc.parquet/                                                 sf-city-lots-json/
counts.parquet/                                               side-log
deep.json                                                     src/
drillbit.log                                                  t1@
edges.ssv                                                     tags.json
edges.tsv.bak                                                 time_to_60.view.drill*
[tdunning@se-node10 ~]$ pwd
/mapr/se1/user/tdunning
[tdunning@se-node10 ~]$
```

Unique to MapR: Manage Topics at Stream Level

- *Many* more topics on MapR cluster
- Topics are grouped together in Stream (different from Kafka)



- Policies set at Stream level: time-to-live, ACEs, geo-distributed stream replication (different from Kafka)

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MapR has multi-master, bi-directional table & stream replication

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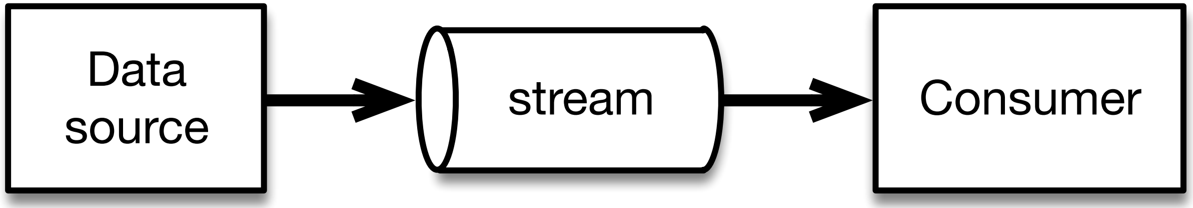
With MapR, Geo-distributed Data Appears Local



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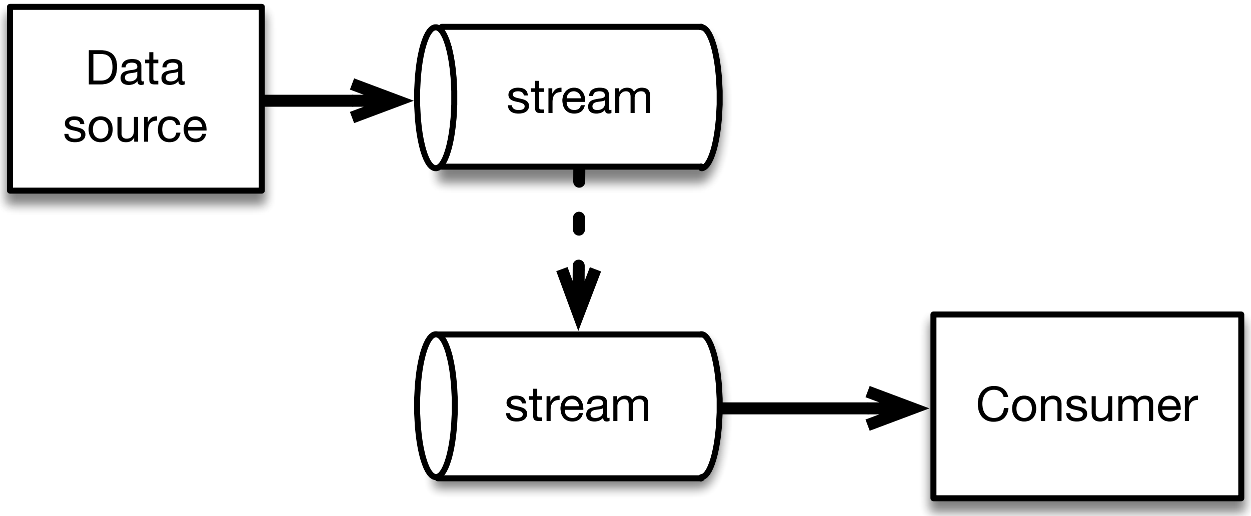

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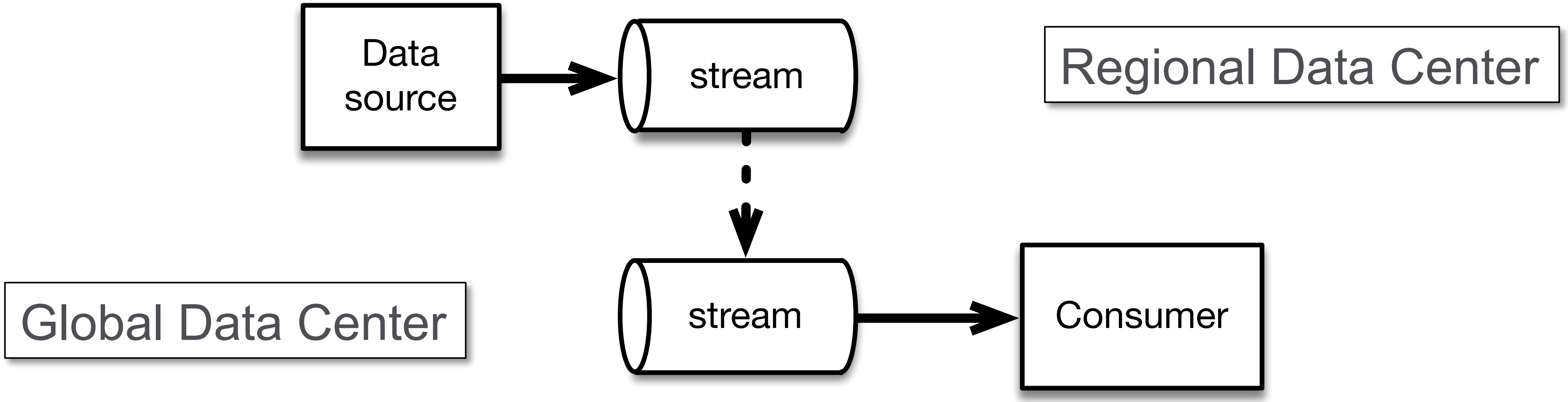

Separation of concerns

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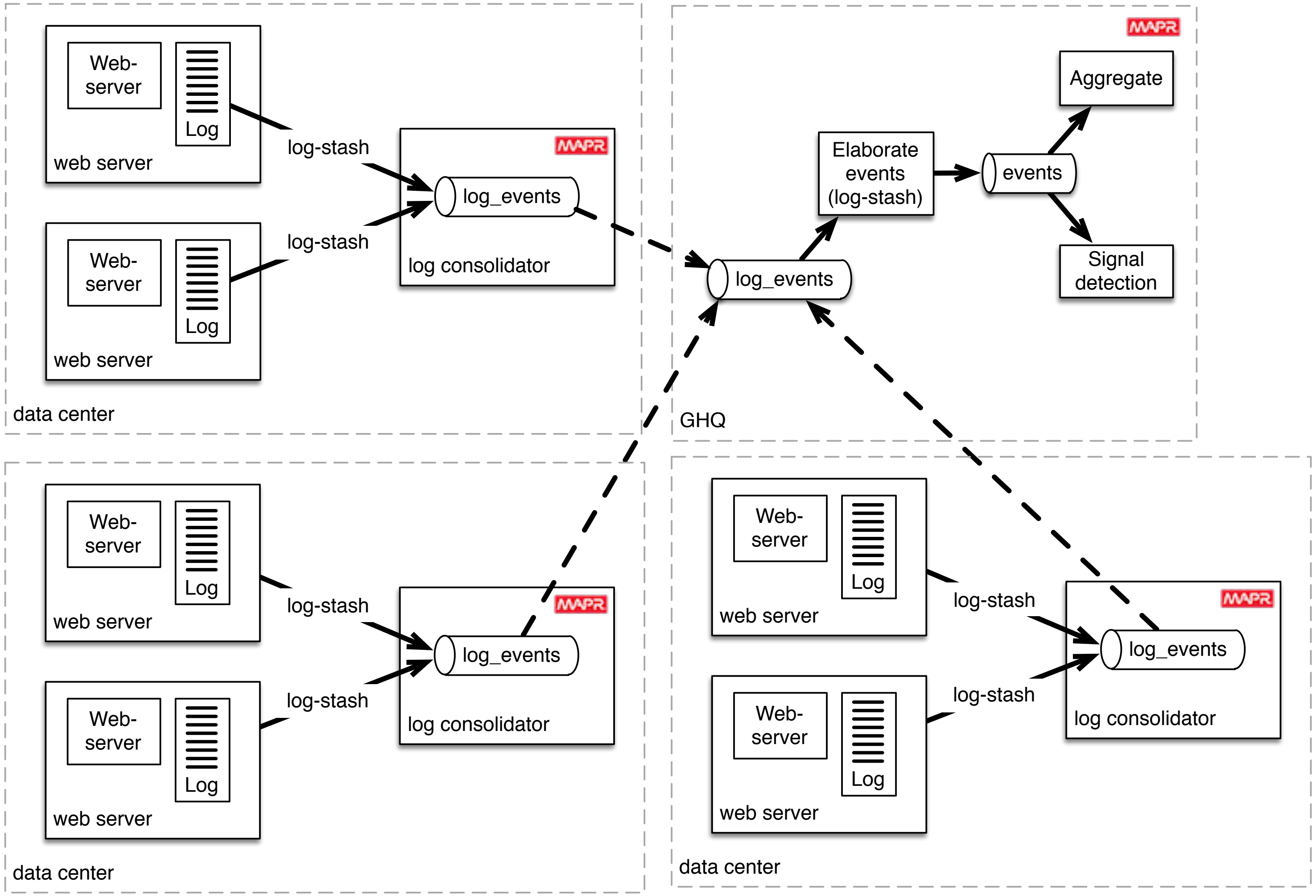
Metrics: Collect Data & Transport to Global Analytics



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“A year of dev time in the bank”

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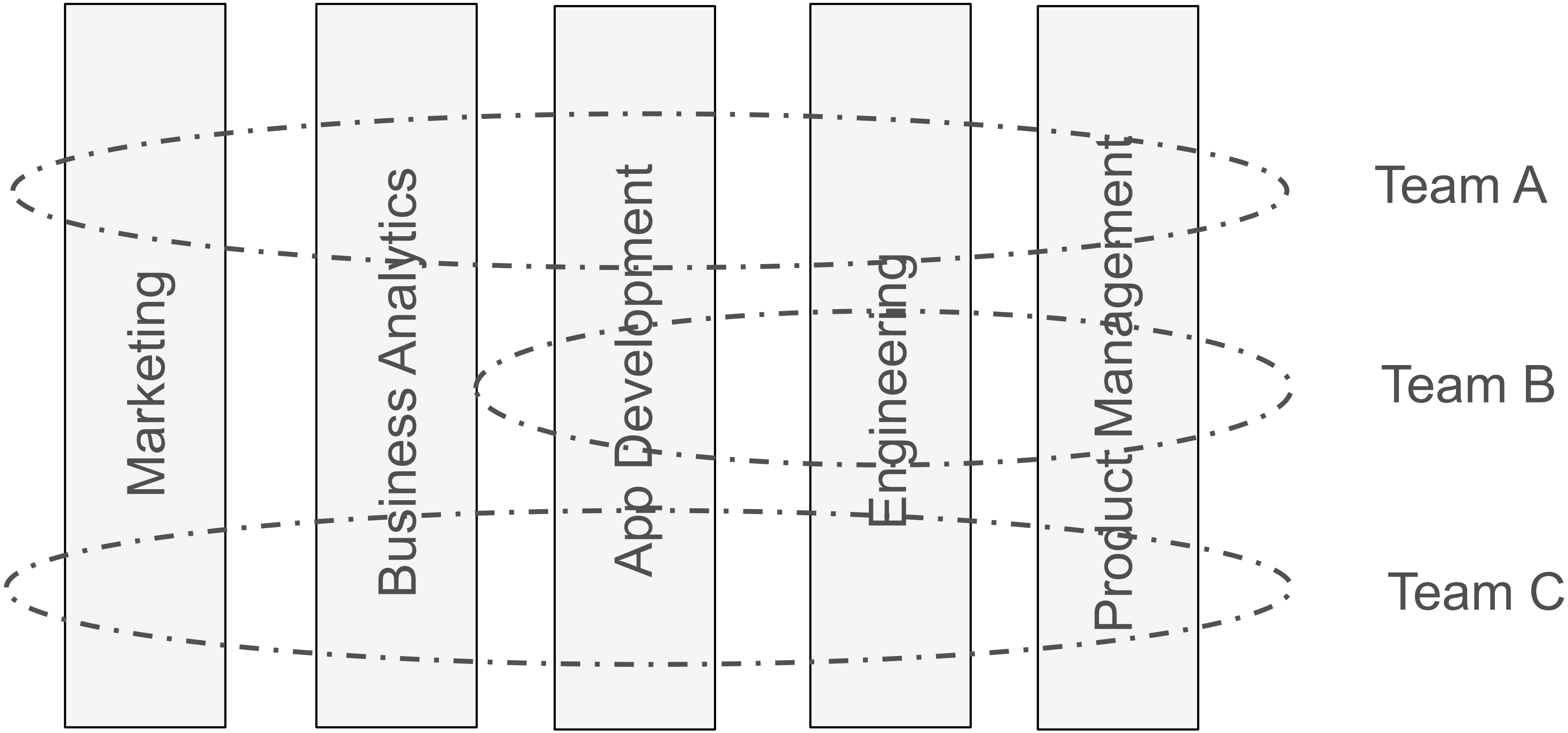
Cross-functional teams each with common goal



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Data is Changing a Society

1.2 B

PEOPLE

Aadhaar Project: Largest Biometric DB in the World

- Unique 12 – digit number for each person in India
- Proof of identity, authenticated anytime, anywhere
- Authentication runs on NoSQL database MapR-DB

AADHAAR

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Data + Inspiration = Great Things

sarah everts @saraheverts · Apr 22

Thousands here at the Brandenburg Gate for Berlin's #sciencemarch #sciencemarchBER #chemistsmarch pic.twitter.com/XXrzCtB4V8

What will you build?

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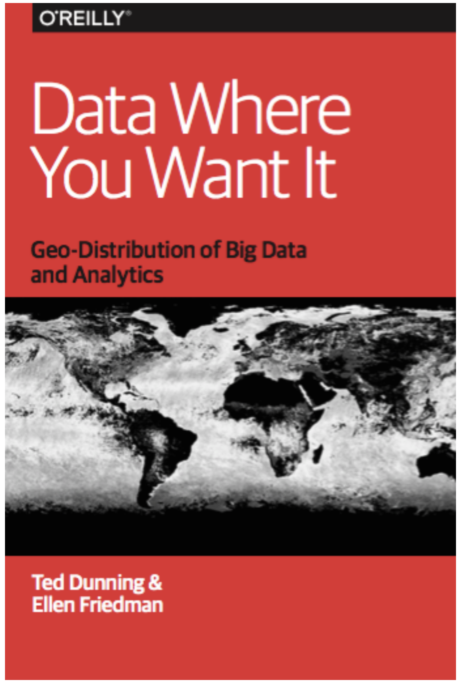
Geo-Distribution of Big Data and Analytics

New O’Reilly data report by Ted Dunning & Ellen Friedman © March 2017



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Data Where You Want It

Geo-Distribution of Big Data and Analytics

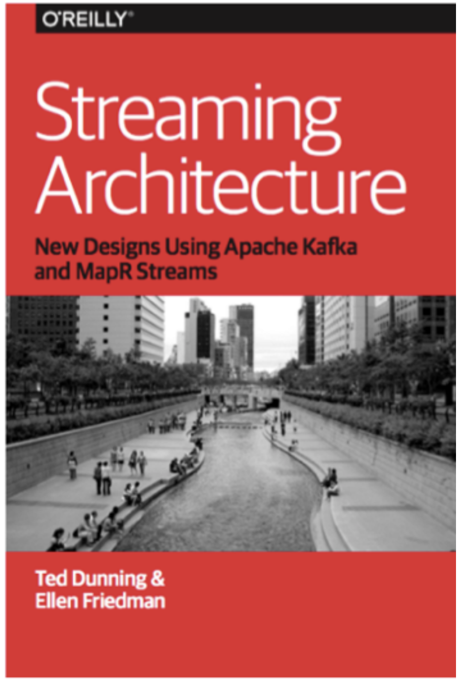
Ted Dunning & Ellen Friedman

Download free pdf courtesy of MapR: http://bit.ly/mapr-geo-distribution-ebook-pdf

Streaming Architecture:

New Designs Using Apache Kafka & MapR Streams

Book by Ted Dunning & Ellen Friedman © March 2017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New Designs Using Apache Kafka and MapR Streams
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Introduction to Apache Flink

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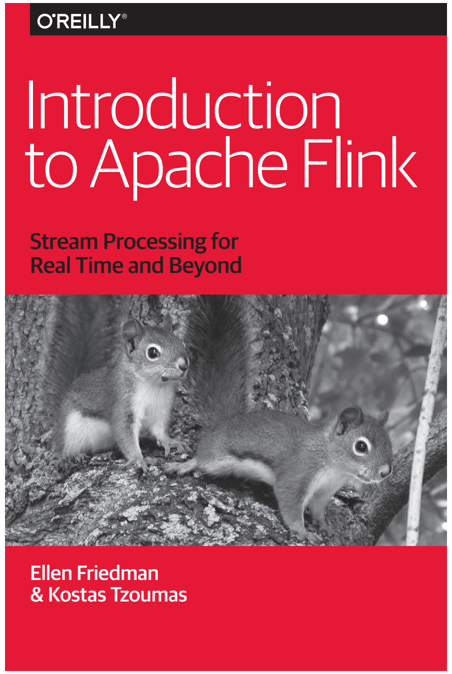
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Introduction to Apache Flink
Stream Processing for Real Time and Beyond
Ellen Friedman & Kostas Tzoumas

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Thank you !

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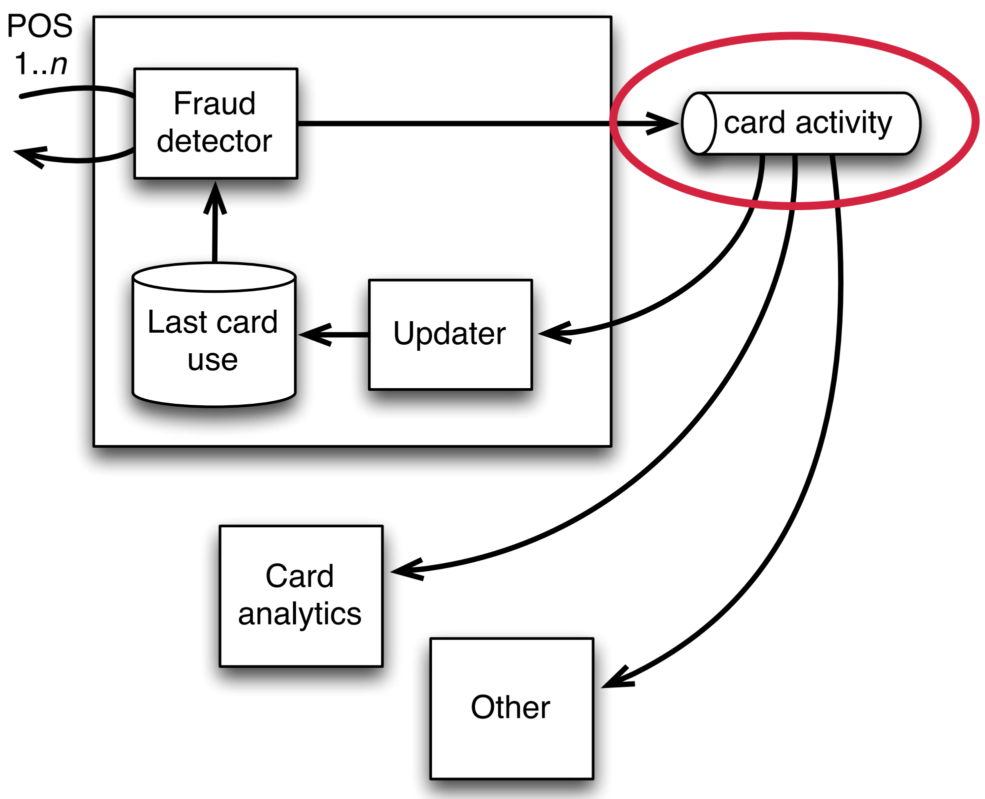
Stream-1st Architecture: Basis for Micro-Services



Stream instead of database as the shared "truth"

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