Apache Flink® Meets Apache Mesos® and DC/OS

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DC/OS

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MapReduce is
crunching Data


We need to turn faster!

Evolution of Data Analytics

Days *Hours* *Minutes* *Seconds* *Microseconds*

Batch → **Micro-Batch** → **Event Processing**

Reports what has happened using descriptive analytics

Solves problems using predictive and prescriptive analytics

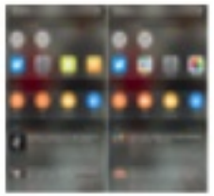
Billing, Chargeback

Product recommendations

Real-time Pricing and Routing

Real-time Advertising

Predictive User Interface



FMACK Stack

EVENTS

Ubiquitous data streams from connected devices

Sensors

Devices

Clients

INGEST

Ingest millions of events per second

ANALYZE

Real-time and batch process data

STORE

Distributed & highly scalable database

ACT

Visualize data & build data driven apps

Apache Kafka

Apache Flink

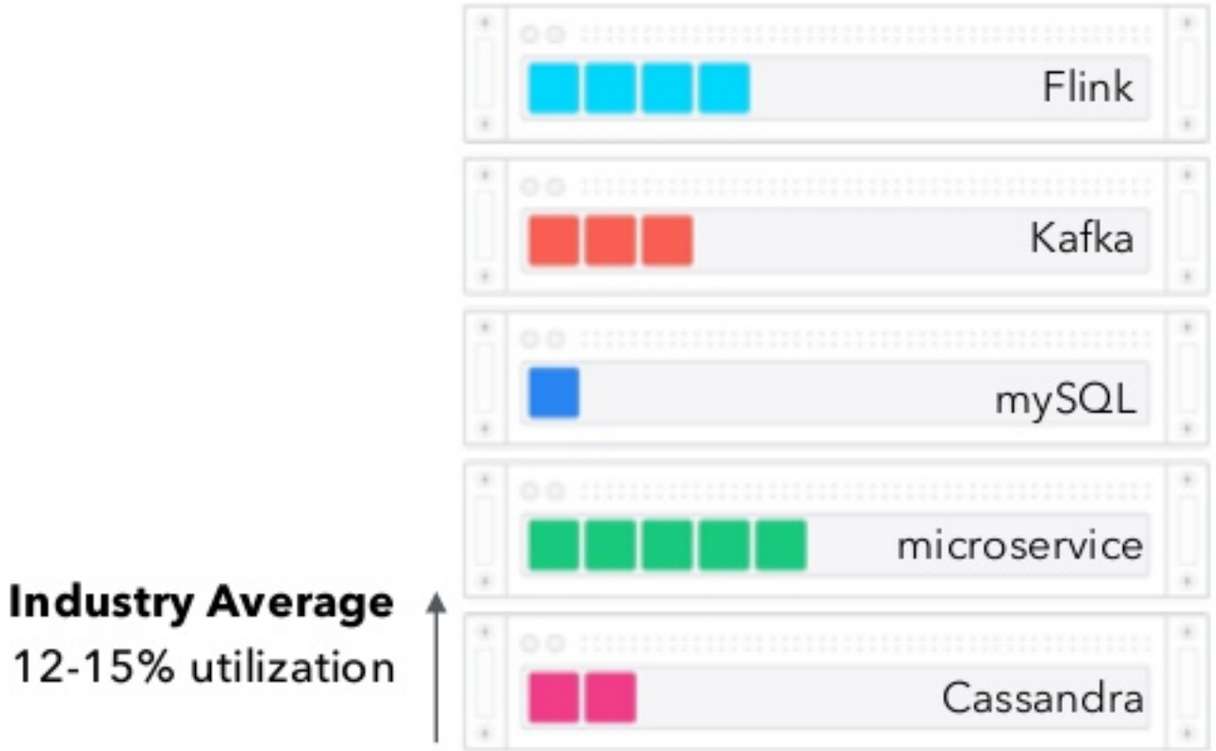
Apache Cassandra

Akka

Mesos/ DC/OS


Datacenter

Naive Approach



Apache Mesos

Industry Average
12-15% utilization

Typical Datacenter
siloed, over-provisioned servers, low utilization

Mesos
automated schedulers, workload multiplexing onto the same machines

Apache Mesos

Why Mesos?

- 2-level scheduling
- Fault-tolerant, battle-tested
- Scalable to 10,000+ nodes
- Created by Mesosphere founder @ UC Berkeley; used in production by 100+ web-scale companies [1]

[1] http://mesos.apache.org/documentation/latest/powered-by-mesos/

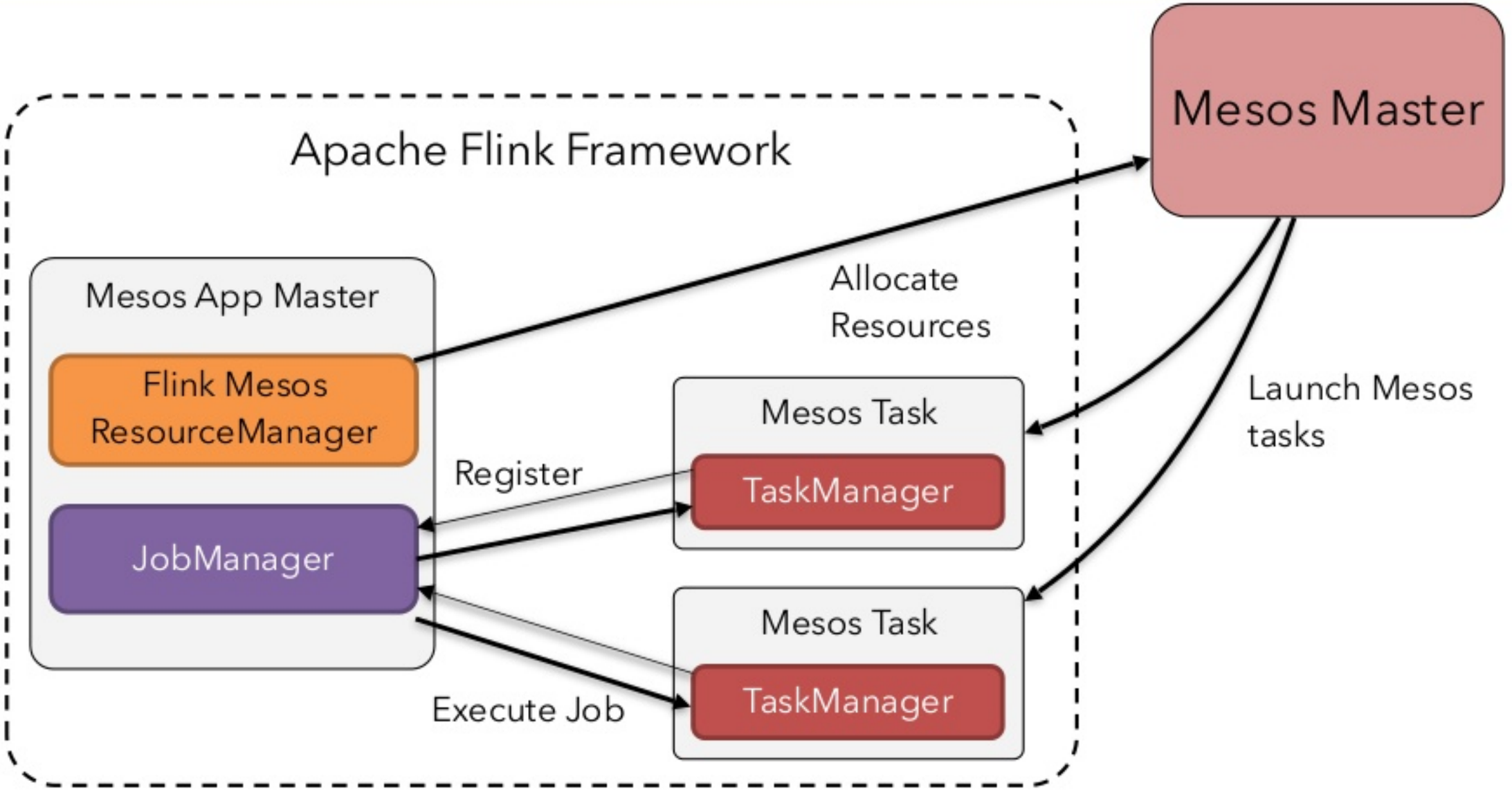
Apache Flink & Apache Mesos

Why Apache Mesos?

- Mesos offers full functionality to implement fault tolerant and elastic distributed applications

- 30% of survey respondents were running Flink on Mesos (prior to proper Mesos support, September 2016)

Flink's Mesos Integration



Resource Manager Components

Connection Monitor

- Monitors connection to Mesos

Launch Coordinator

- Resource offer processing and task scheduling
- Gathers offers and matches them to tasks using Fenzo

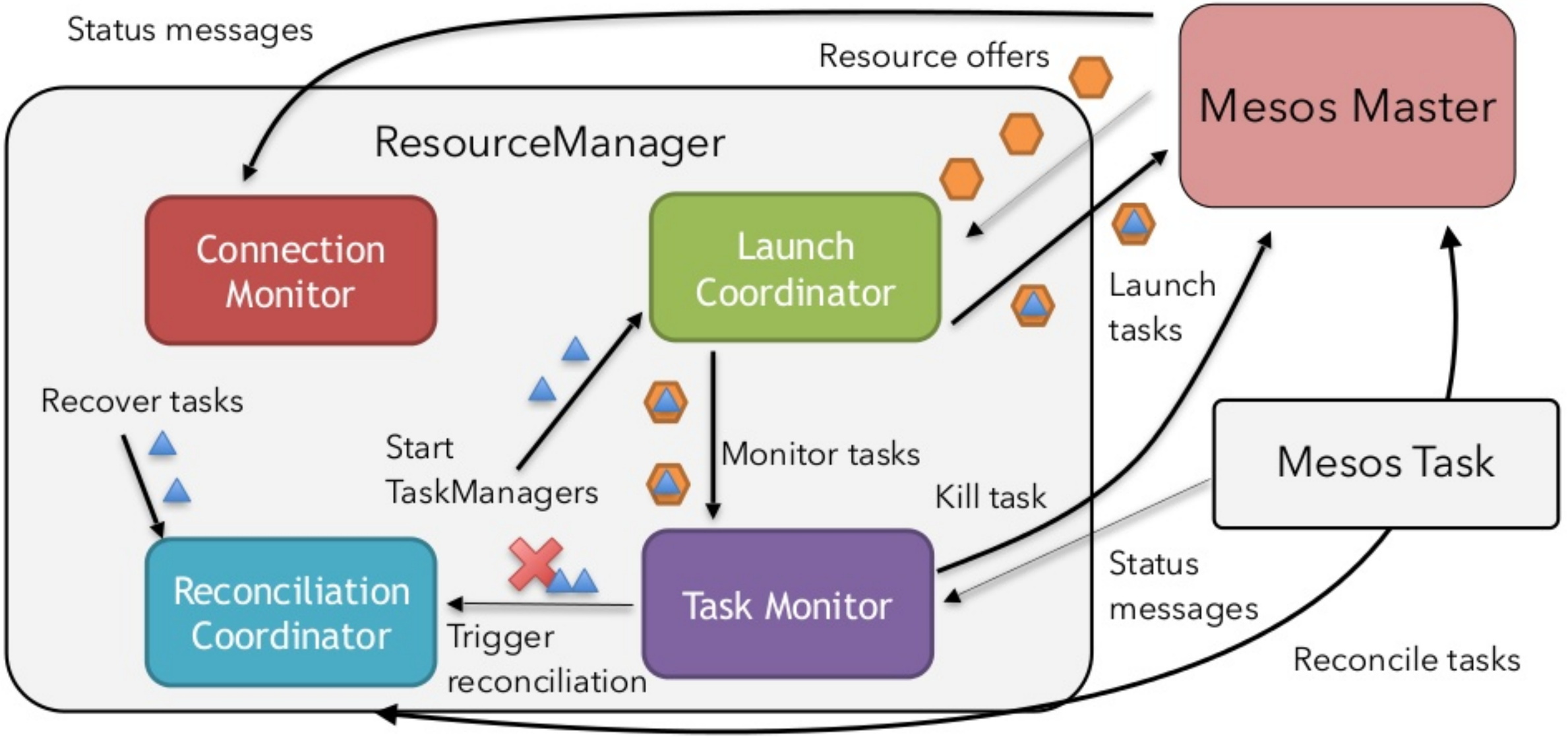
Task Monitor

- Monitors Mesos tasks
- Triggers reconciliation
- Makes sure tasks are properly killed

Reconciliation Coordinator

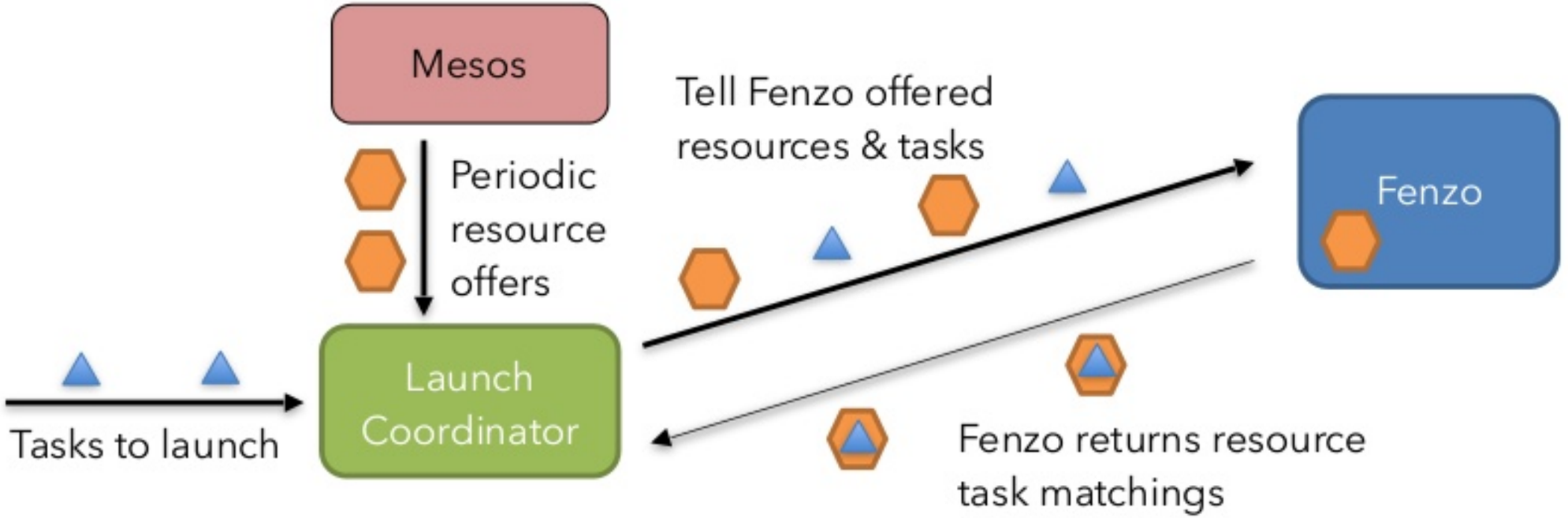
- Reconciles tasks view between ResourceManager and Mesos Master

Component Interplay

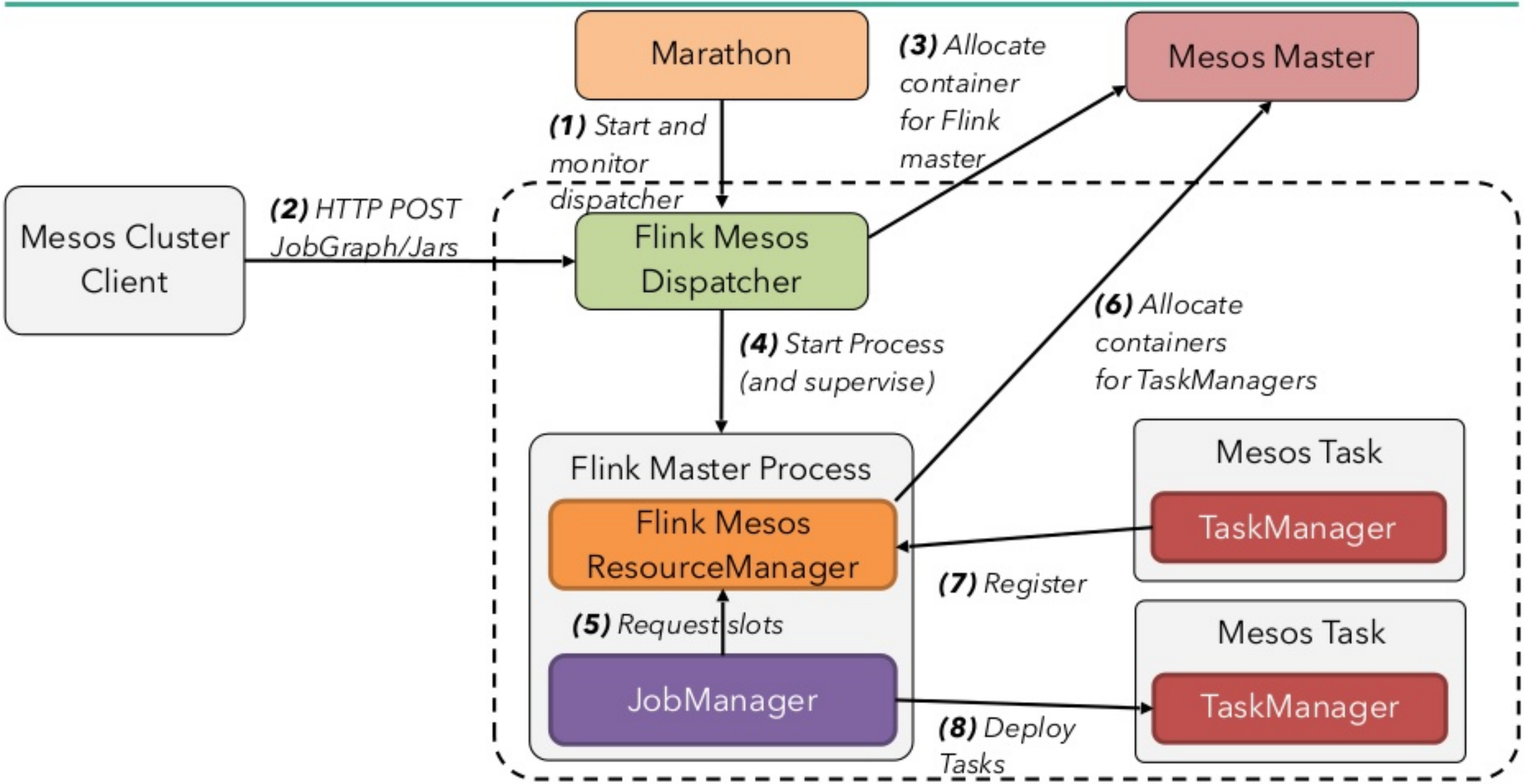


Fenzo

- Generic task scheduler for Mesos frameworks
- Developed by Netflix
- Matching between tasks and resource offers
  - Pluggable fitness evaluator

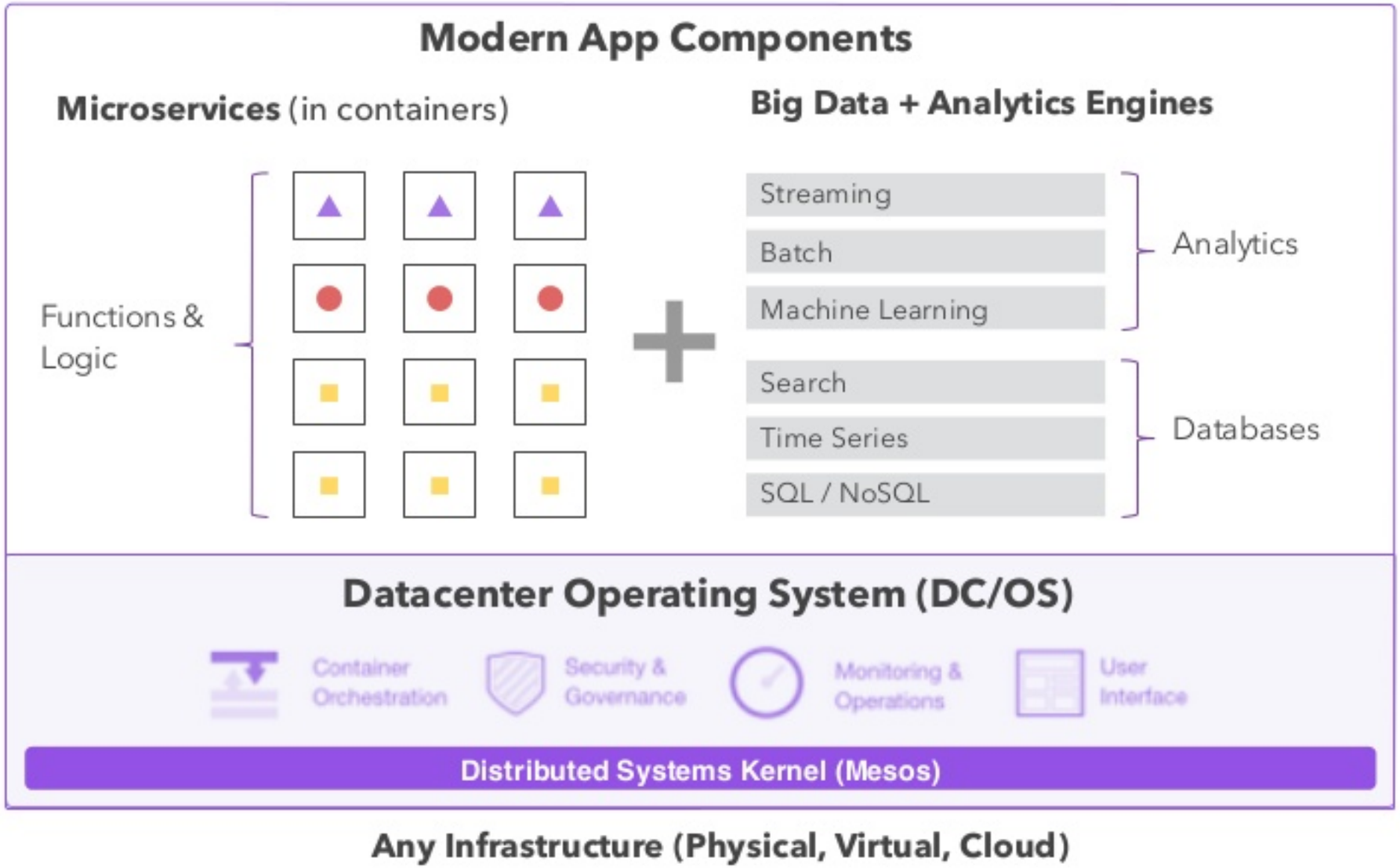


New Distributed Architecture



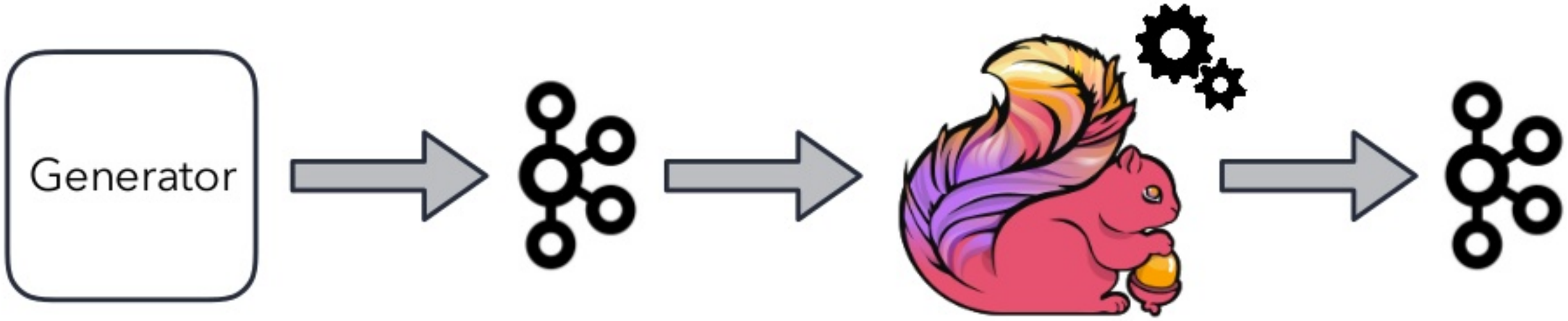
DC/OS

DC/OS


Modern App Components
Microservices (in containers)
Functions & Logic
Big Data + Analytics Engines
Streaming
Batch
Machine Learning
Analytics
Search
Time Series
SQL / NoSQL
Databases
Datacenter Operating System (DC/OS)
Container Orchestration
Security & Governance
Monitoring & Operations
User Interface
Distributed Systems Kernel (Mesos)
Any Infrastructure (Physical, Virtual, Cloud)

Demo Time

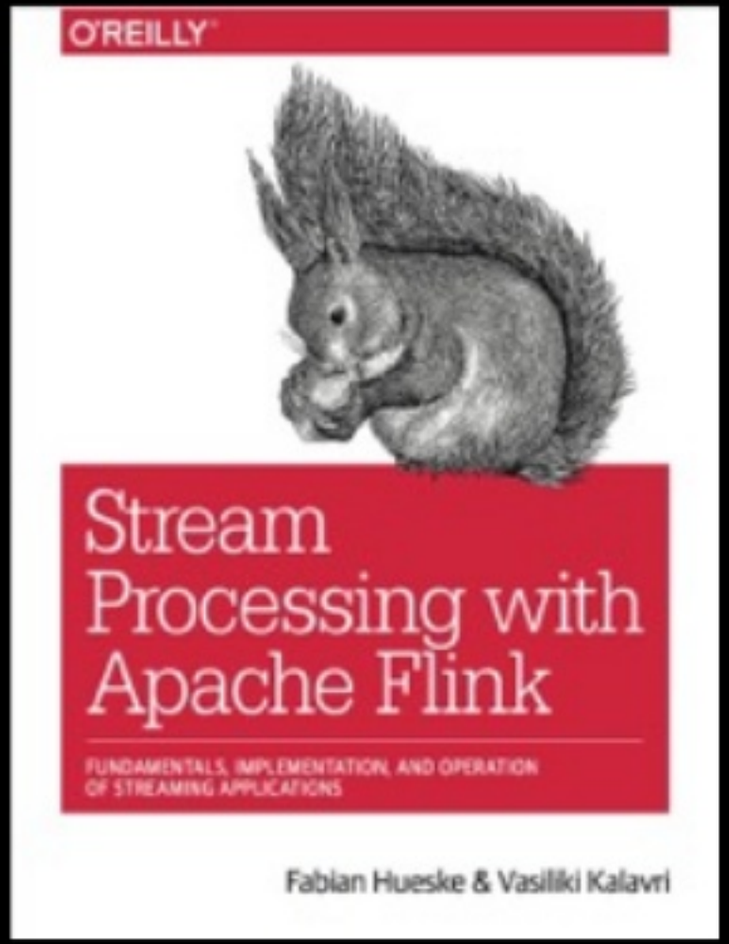
- Financial data generated by generator
- Written to Kafka topics
- Kafka topics consumed by Flink
- Flink pipeline operates on Kafka data
- Results written back into Kafka



Conclusion

TL;DL

- Apache Flink runs on Mesos using Fenzo
- New distributed architecture supports dynamic resource allocation
- DC/OS offers easy to use Flink package



Thank you!

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