



END-TO-END IOT OPEN ARCHITECTURE

Filippo Lambiente // Partner Pre-Sales

AGENDA

Broad range of use cases

E2E IoT Architecture

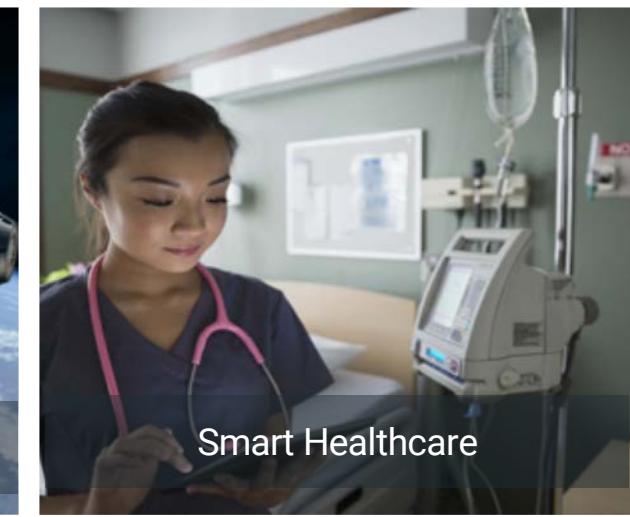
IoT eclipse.org

The role of Cloudera

Extended eco-systems

Intro to the IoT Lab

POWERING A BROAD RANGE OF USE CASES



END2END IOT ARCHITECTURE

KEY FUNCTIONALITY FOR AN END-TO-END IOT ARCHITECTURE



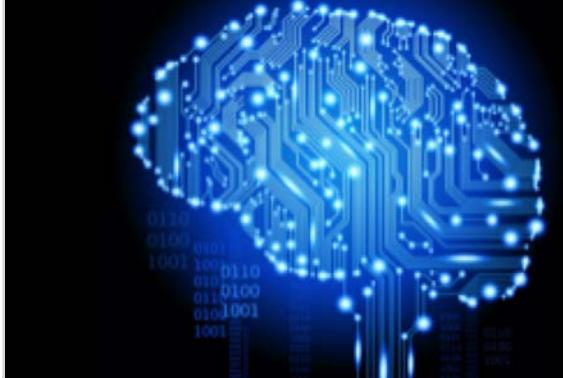
Device Management & Connectivity

Securely connect, authenticate and manage disparate connected devices that speak different protocols



Intelligent Edge Processing & Analytics

Apply analytics at the edge with machine learning and business rules to enable local, low-latency decision making



Advanced Analytics & Machine Learning

Centralize IoT data processing, analytics and machine learning to enable deep business insights and actionable intelligence



Business & Application Integration

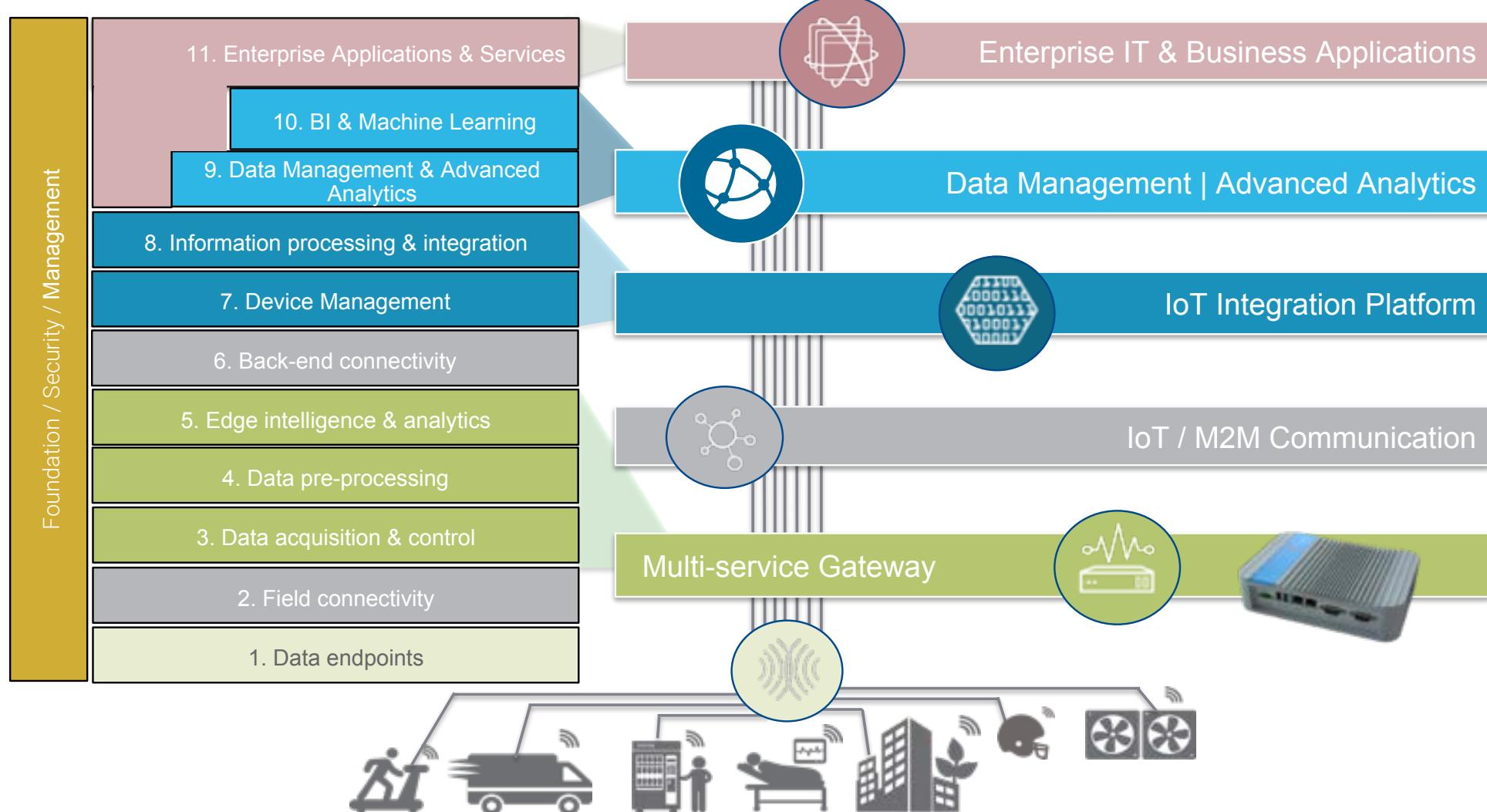
Enable integration with enterprise and business applications to bridge the gap between OT and IT and reduce complexity



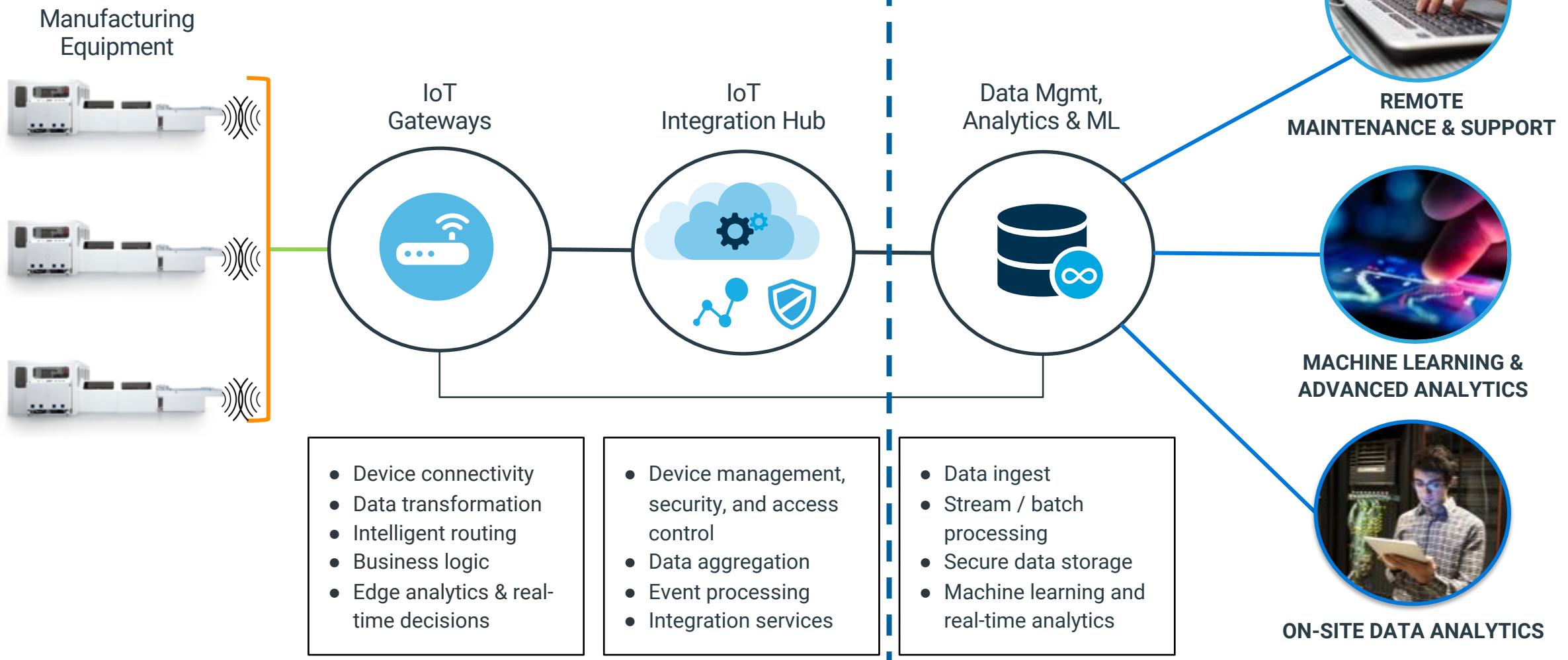
End-to-End Security & Compliance

Tools to enable end-to-end data security, compliance, authorization and authentication

PULLING TOGETHER THE BUILDING BLOCKS FOR IOT

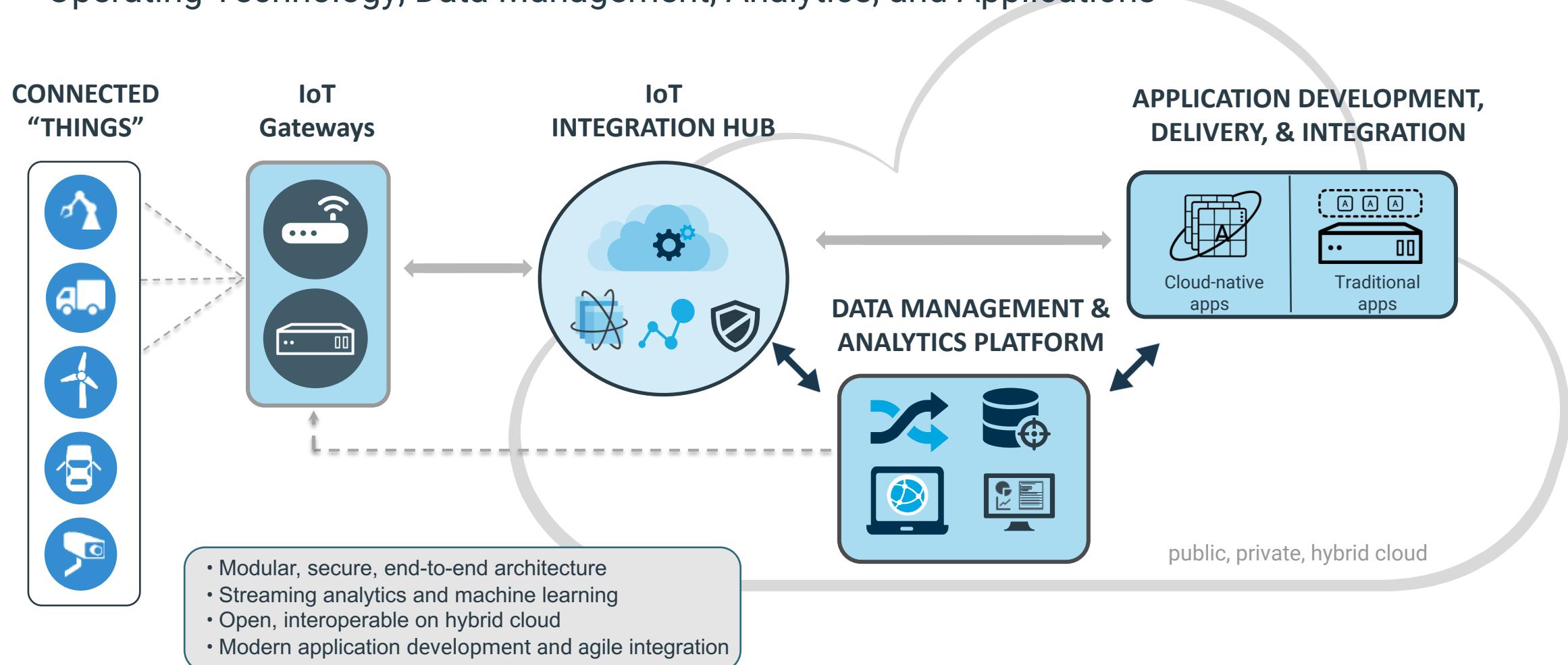


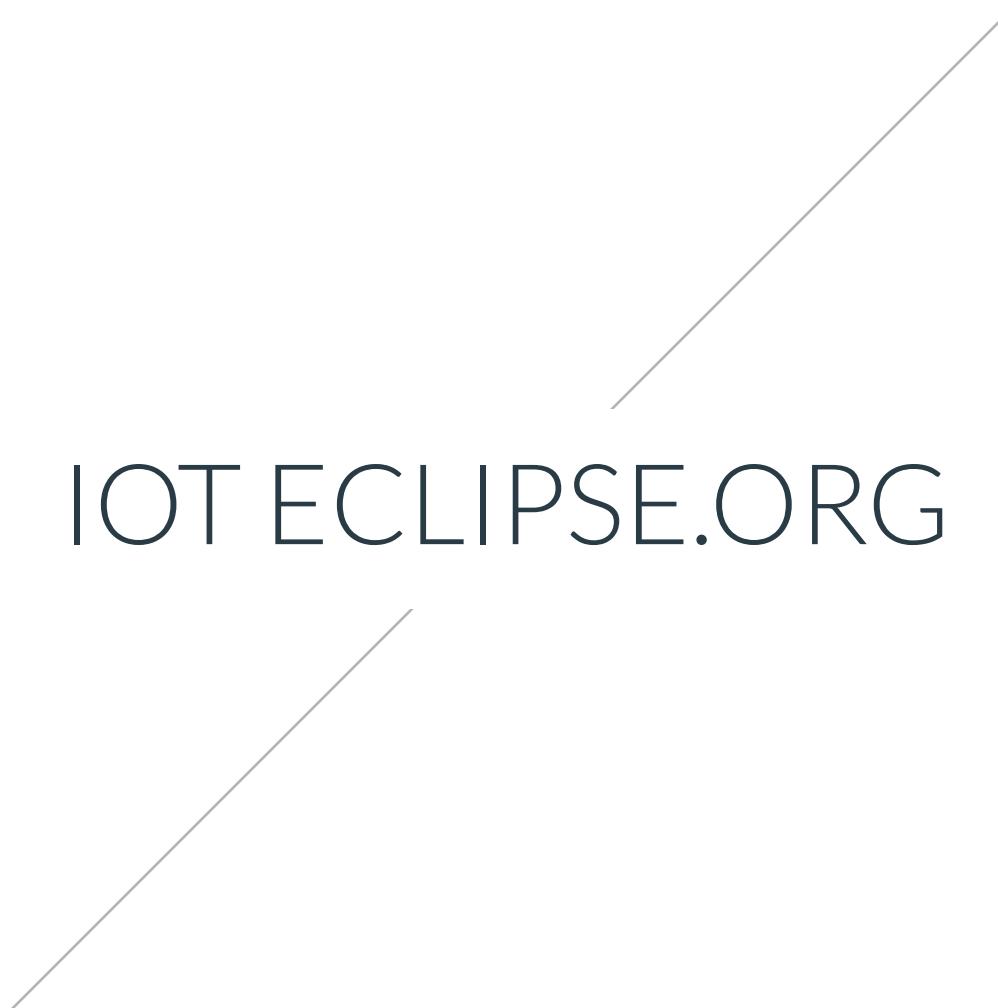
THE IOT ECOSYSTEM & ARCHITECTURE



END-TO-END IOT ARCHITECTURE OVERVIEW

Operating Technology, Data Management, Analytics, and Applications





IOT ECLIPSE.ORG

Addressing End-to-End Enterprise IoT needs

Operational Technology (OT)

Information Technology (IT)

Operational Technology (OT)

- Device Management
- Industrial protocols
- OT Middleware
- Intelligent gateways
- MQTT co-inventors
- OT security



Information Technology (IT)

- Messaging & Integration
- Business Rules & CEP
- Open Hybrid Platform-as-a-Service
- Enterprise Linux Platform
- IT security



Data Management & Analytics

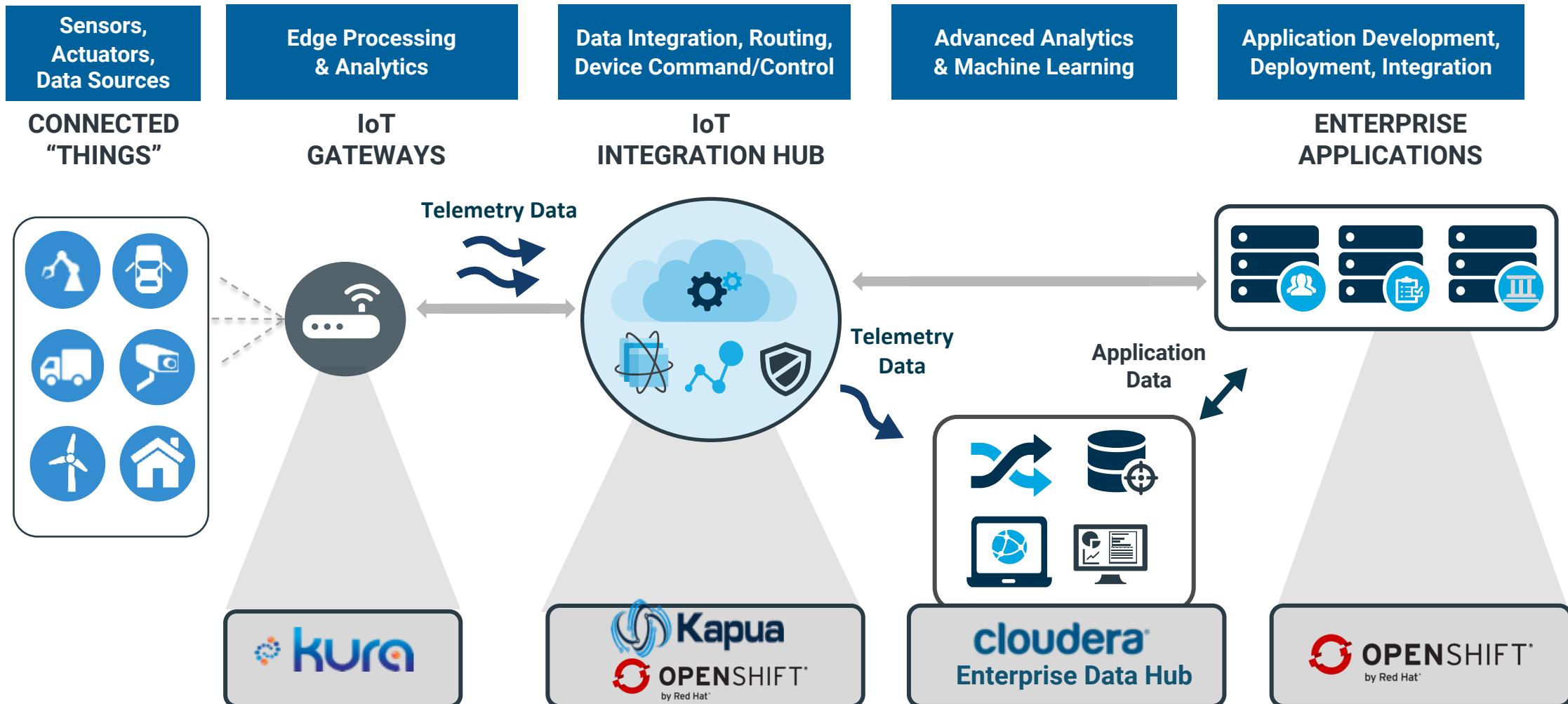
- Enterprise Data Mgmt.
- Persistent Data Storage
- Big Data Processing & Analytics
- Real-Time Analytics
- Machine Learning
- Data Security & Compliance



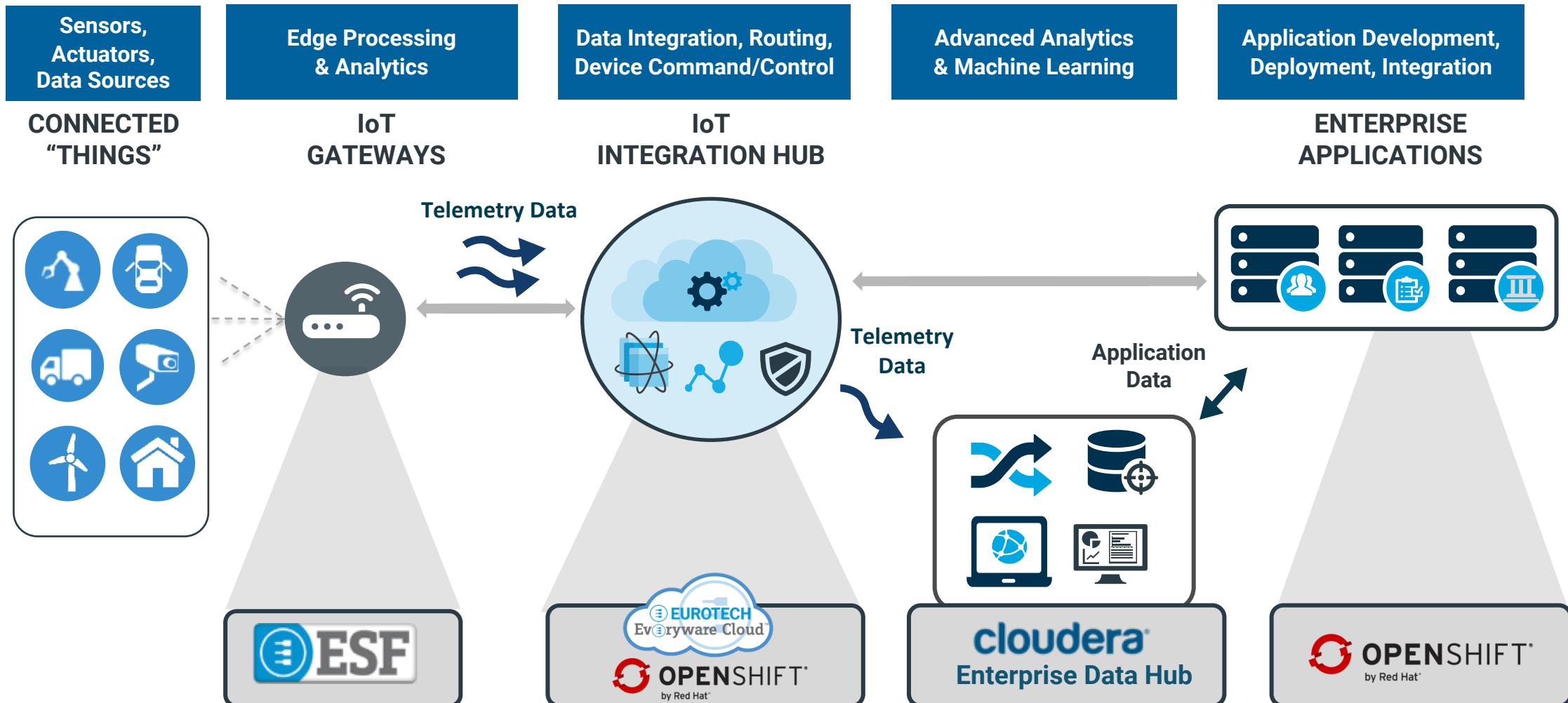
Enterprise IoT open source community



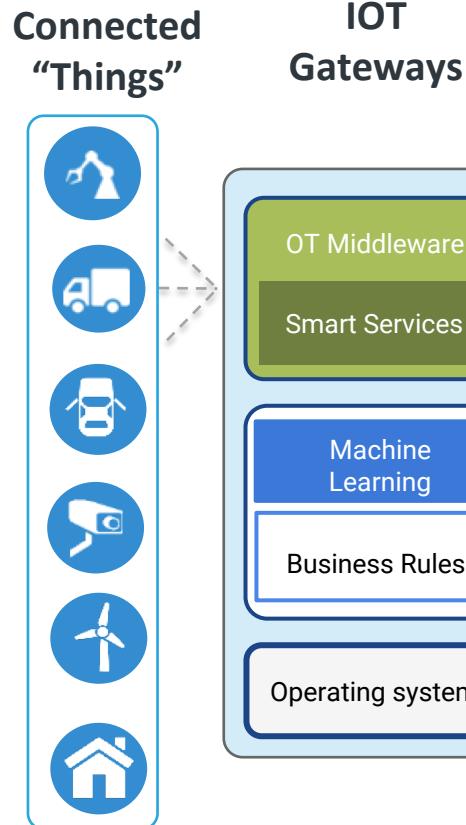
END-TO-END ENTERPRISE GRADE SOLUTIONS FOR IOT



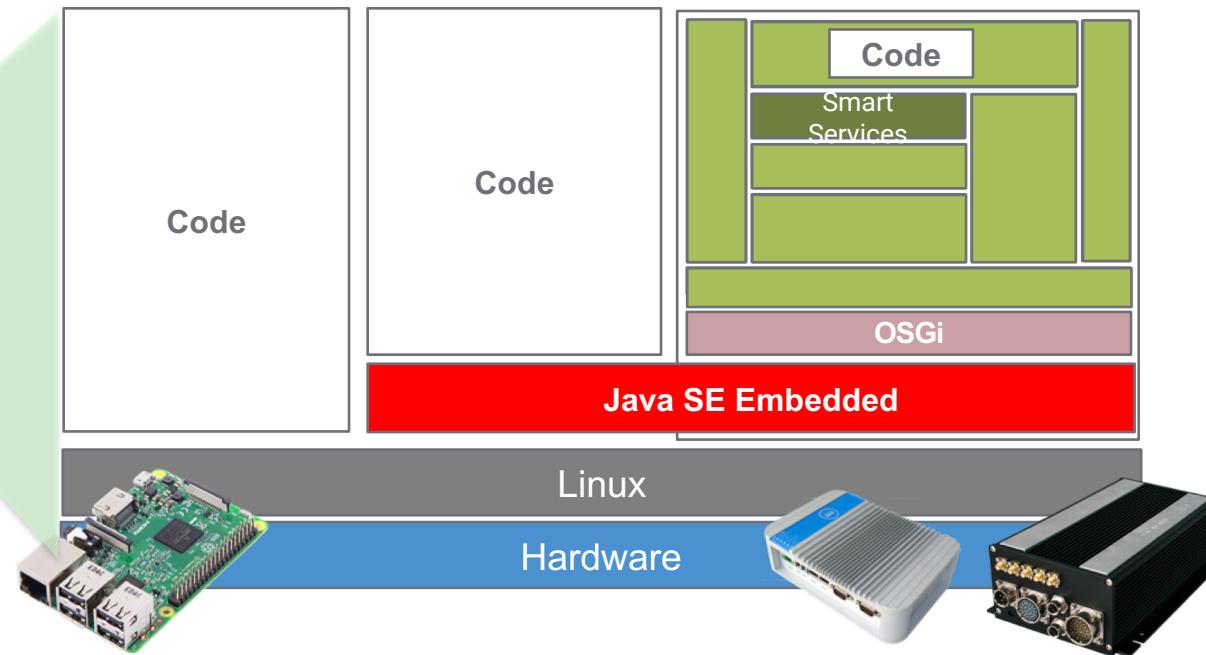
END-TO-END ENTERPRISE GRADE SOLUTIONS FOR IOT



IOT GATEWAYS



Developer's Productivity, Increasing Value, Minimizing TCO



powered by

EUROTECH
kura
ESF
RED HAT® JBOSS® FUSE

OSGi™
Alliance

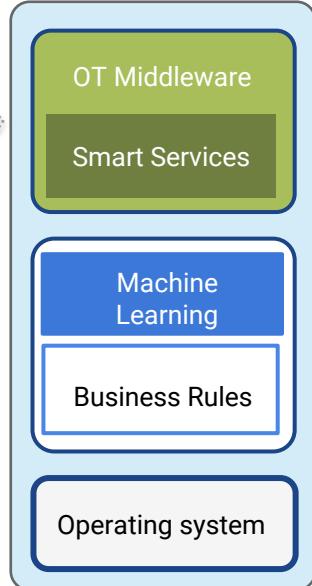
Java

**RED HAT®
ENTERPRISE
LINUX®**

IOT GATEWAYS

Connected
“Things”

IOT
Gateways



Everyware
Cloud

Eclipse
Kapua

AWS IoT

Azure IoT

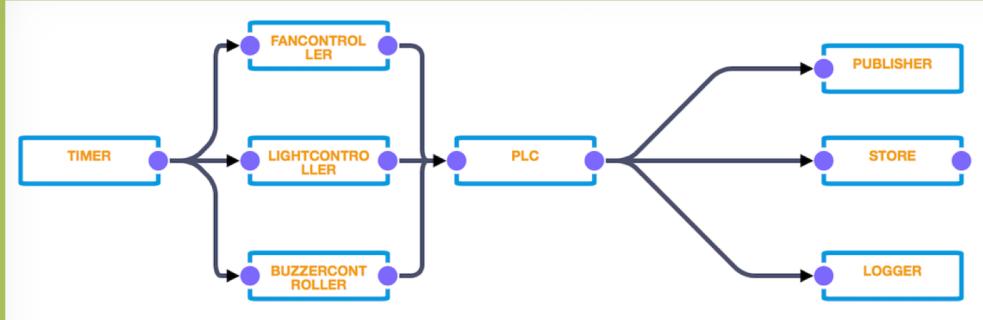
Other

Connect to
IoT Cloud Services

Multiple Connections
Message Routing
Digital Twins

Develop IoT Edge
Computing Apps

Wires Data Flow
SQL Database
Full Java APIs



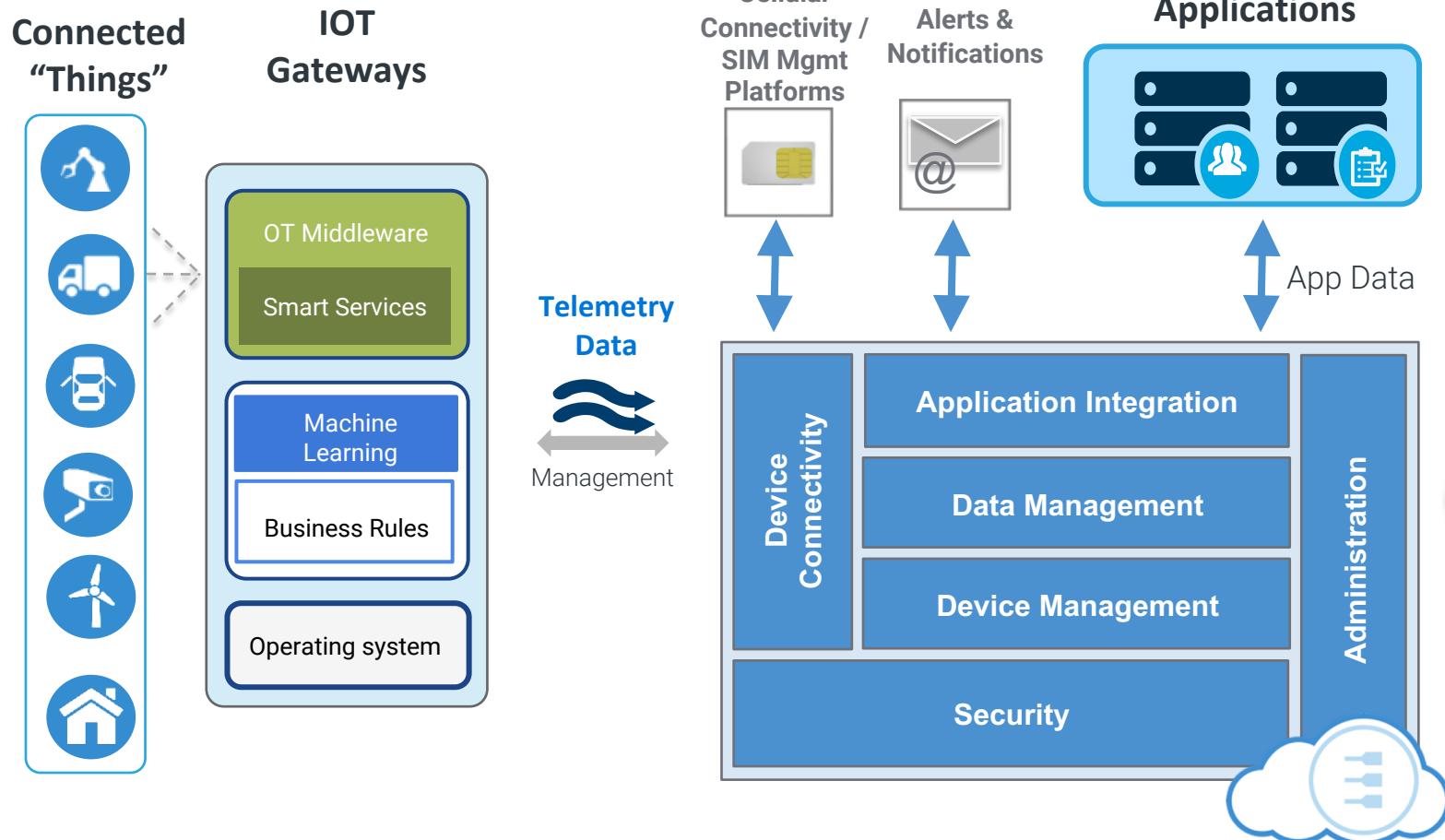
RS 232/485
Bluetooth Low Energy
USB
CAN bus
GPS/GNSS
GPIO/I2C/PWM



Connect to
Field Devices

Industrial Protocols
Modular Drivers

IOT INTEGRATION HUB



Device Management

- Connectivity Management
- Device Registry
- Device Provisioning
- Remote Configuration
- Software Updates
- Remote Access (VPN)



Integration

- SIM Mgmt Platforms

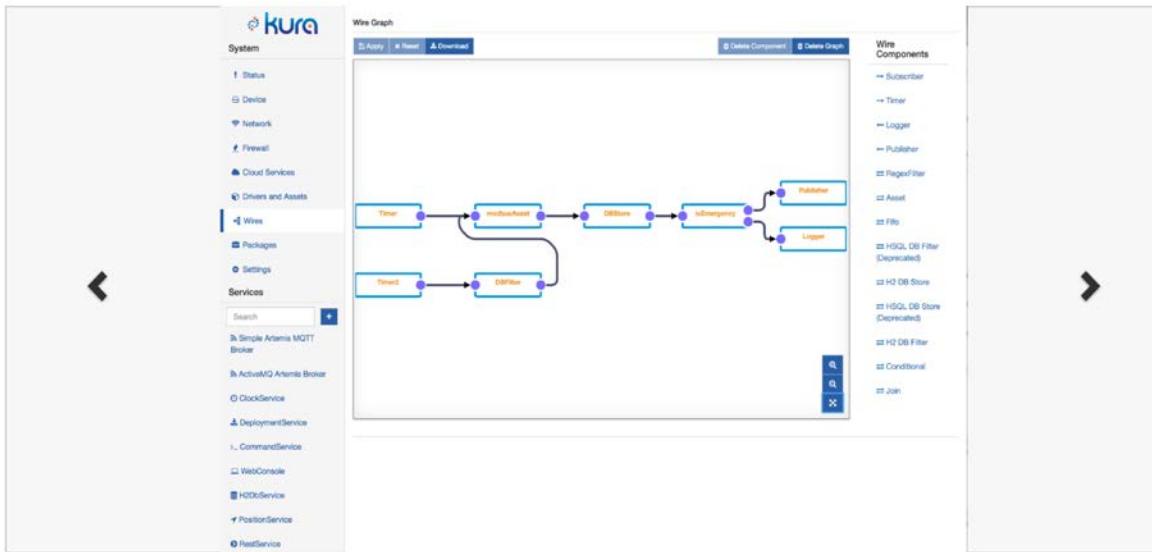
Platform Management

- Web Console
- Full API Access
- Health Check Monitor

KURA AND KAPUA GETTING STARTED



The extensible open source Java/OSGi IoT Edge Framework



Eclipse Kura™ is an extensible open source IoT Edge Framework based on Java/OSGi. Kura offers API access to the hardware interfaces of IoT Gateways (serial ports, GPS, watchdog, GPIOs, I2C, etc.). It features ready-to-use field protocols (including Modbus, OPC-UA, S7), an application container, and a web-based visual data flow programming to acquire data from the field, process it at the edge, and publish it to leading IoT Cloud Platforms through MQTT connectivity.



Project News



Twitter Feed

<https://www.eclipse.org/kura/>

Getting Started

1 - Run Eclipse Kapua

- › Ensure you have the following dependencies satisfied

64 bit architecture
Java VM Version 8
Docker Version 1.2+
Internet Access (needed to download the artifacts)

- › Run the docker containers through Docker Compose

```
$ git clone git@github.com:eclipse/kapua.git kapua
$ cd kapua/deployment/docker
$ ./docker-deploy
```

- › The following services are now available

Web Console

<http://127.0.0.1:8080/>
Username: kapua-sys
Password: kapua-password

Message Broker

<tcp://127.0.0.1:1883/>
Username: kapua-broker
Password: kapua-password

RESTful APIs

<http://127.0.0.1:8081/doc>
Username: kapua-sys
Password: kapua-password

Kura 3.2.0 Release

Eclipse Kura 3.2.0 is now available for download!

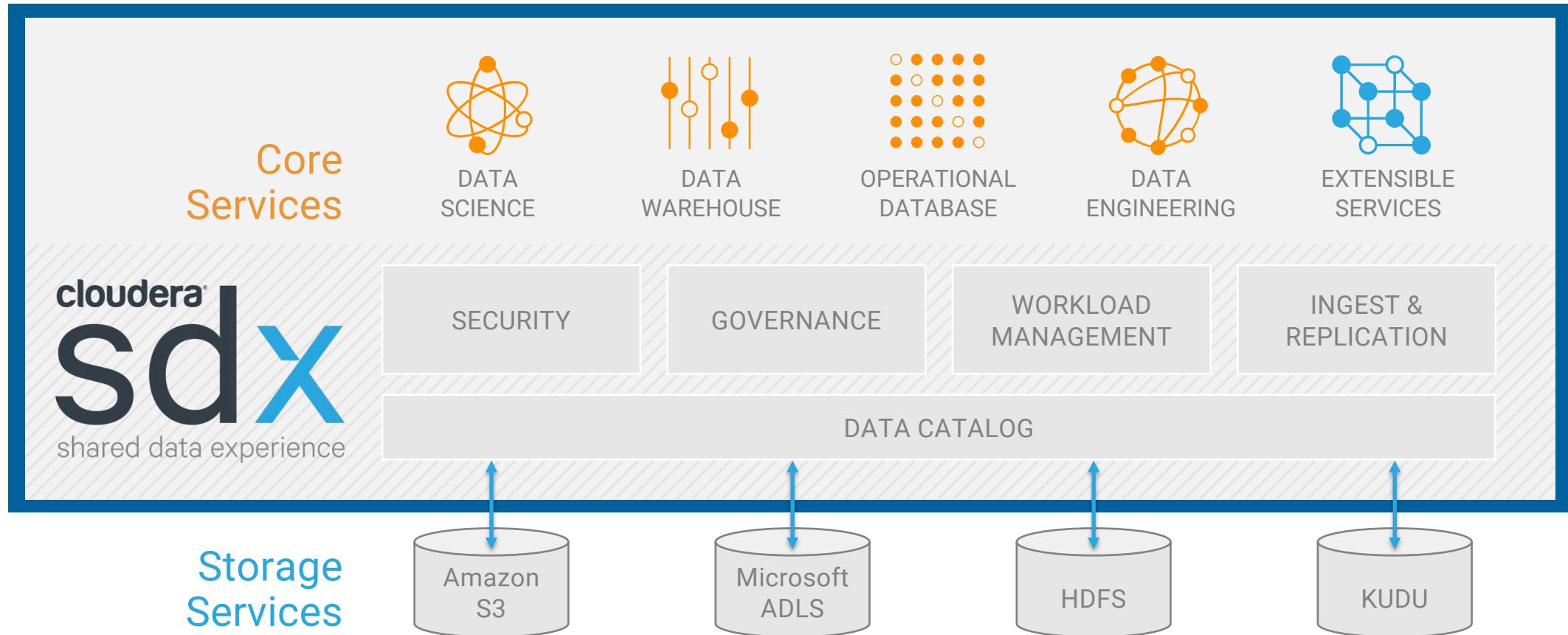
<https://www.eclipse.org/kapua/>



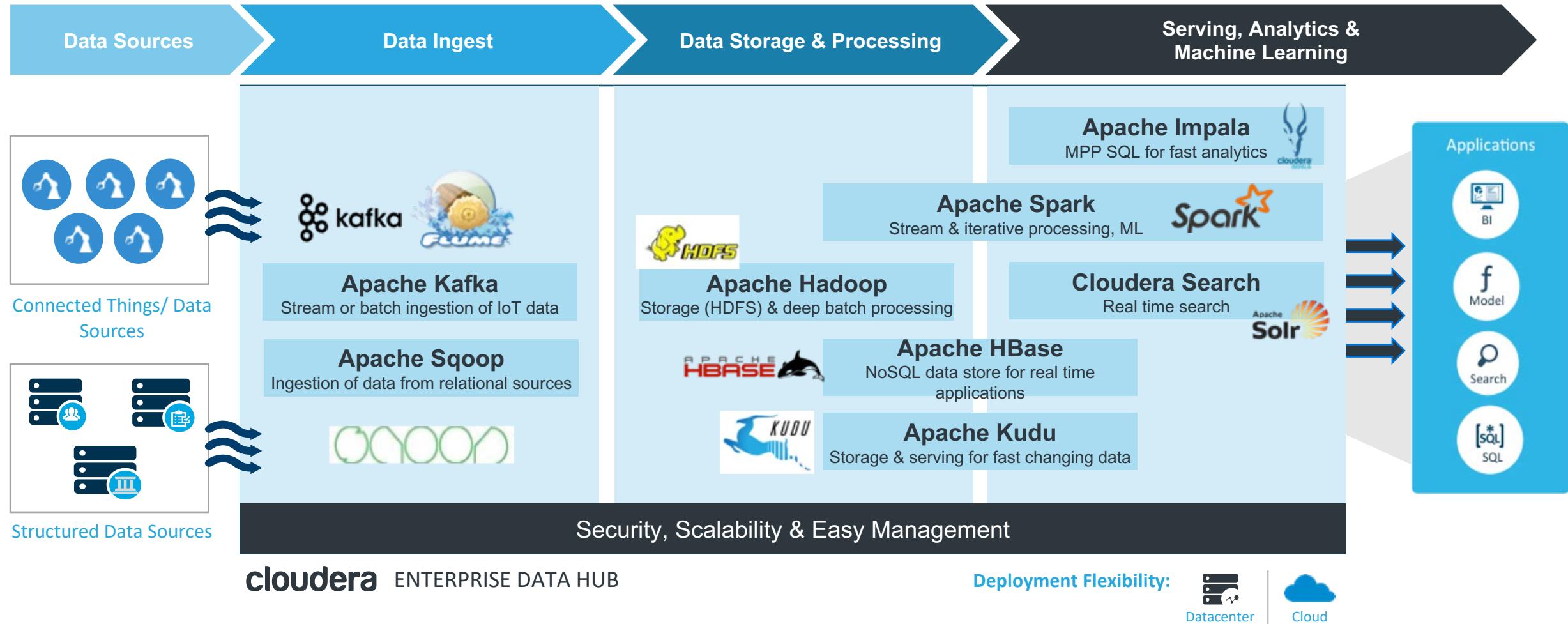
THE ROLE OF CLOUDERA

CLOUDERA ENTERPRISE

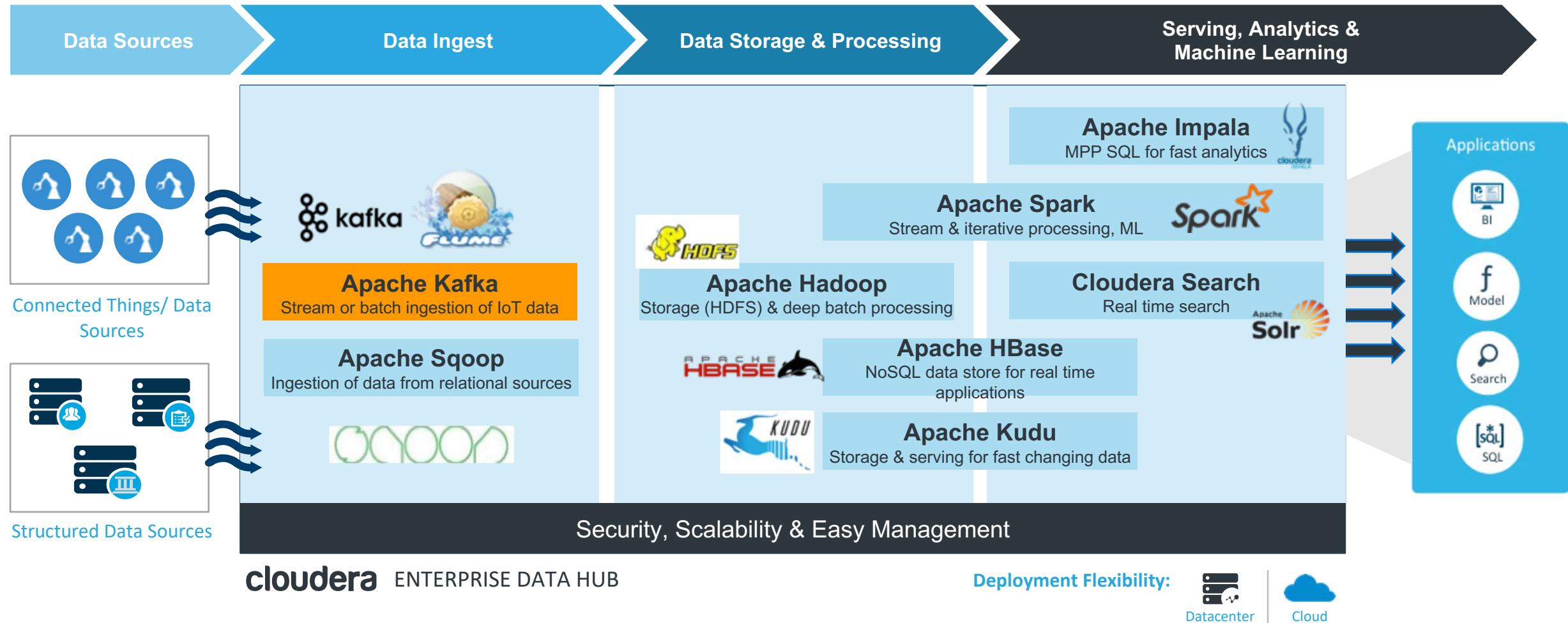
The modern platform for machine learning and analytics optimized for the cloud



CLOUDERA ENTERPRISE

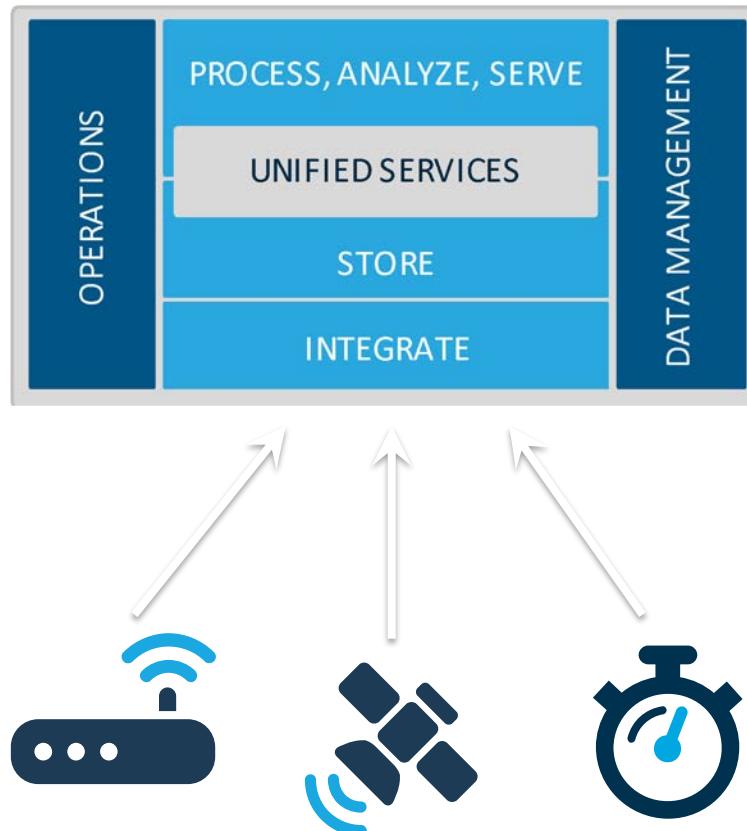


CLOUDERA FOR IOT - APACHE KAFKA



APACHE KAFKA

Pub-Sub Messaging for Hadoop



Backbone for real-time architectures

Fast, flexible messaging for a wide range of use cases

Scale to support more data sources and growing data volumes

Zero data loss **durability** and always-on **fault-tolerance**

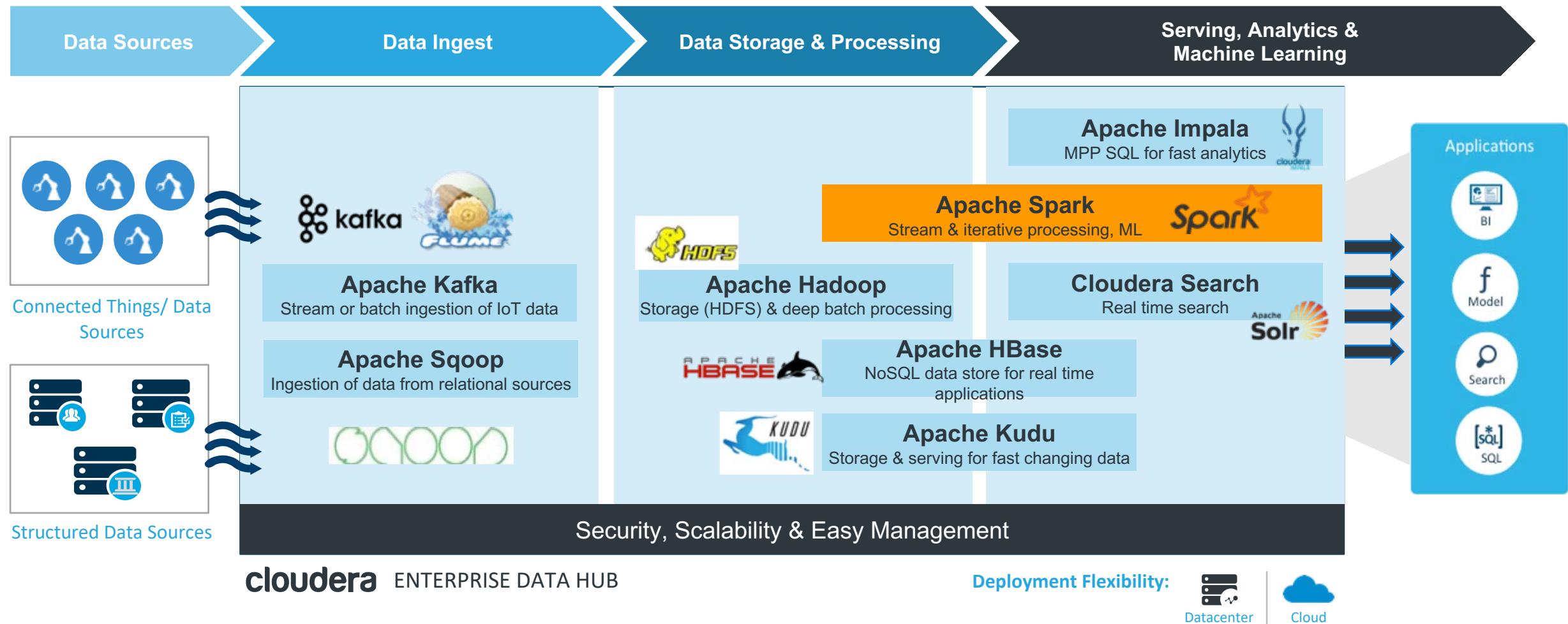
Built-in security and data protection

Seamless integration across the platform

Connect to Flume, Spark Streaming, HBase, & more

Manage and monitor with Cloudera Manager

CLOUDERA FOR IOT - APACHE SPARK



APACHE SPARK

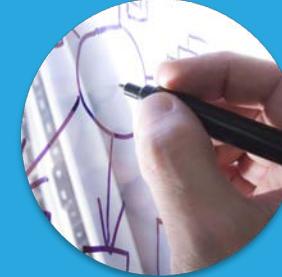
Fast and flexible general purpose data processing for Hadoop



Data Engineering



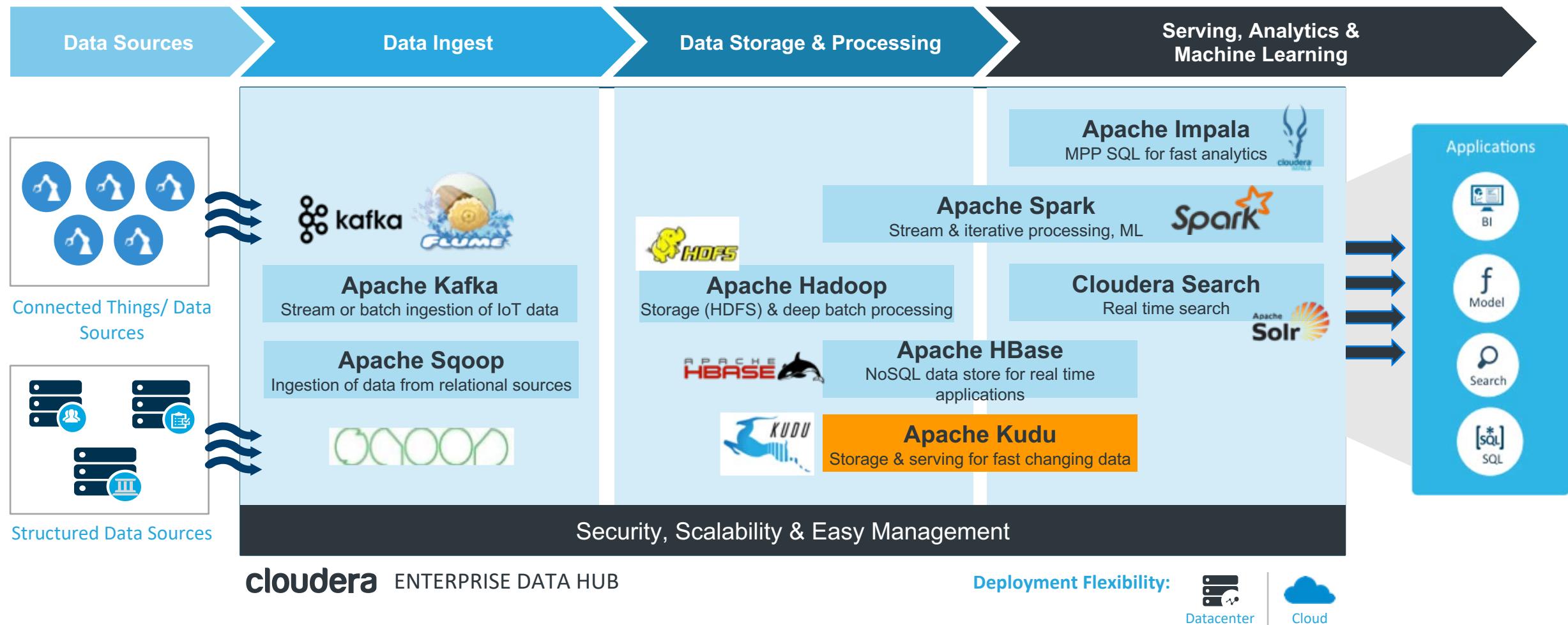
Stream Processing



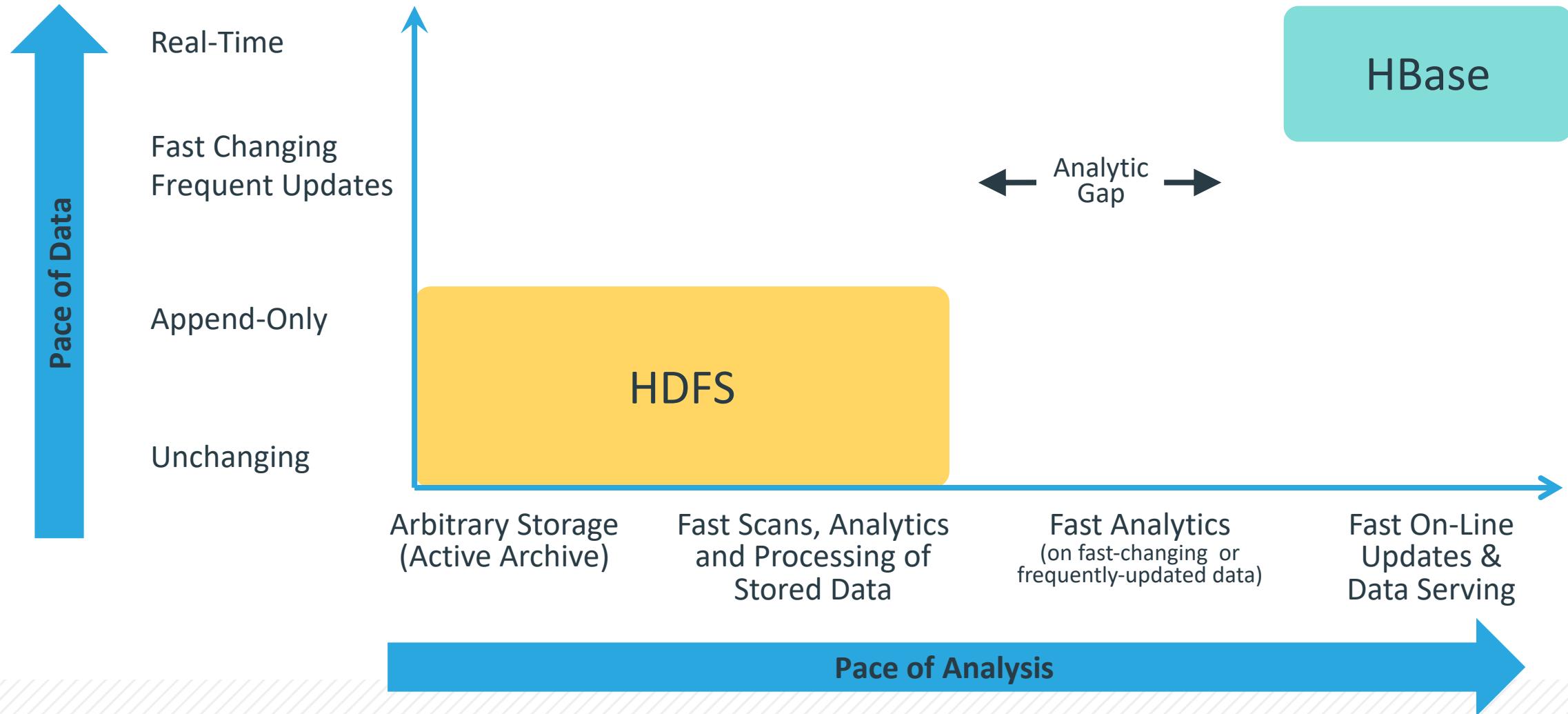
Data Science &
Machine Learning

Unified API and processing Engine for large scale data

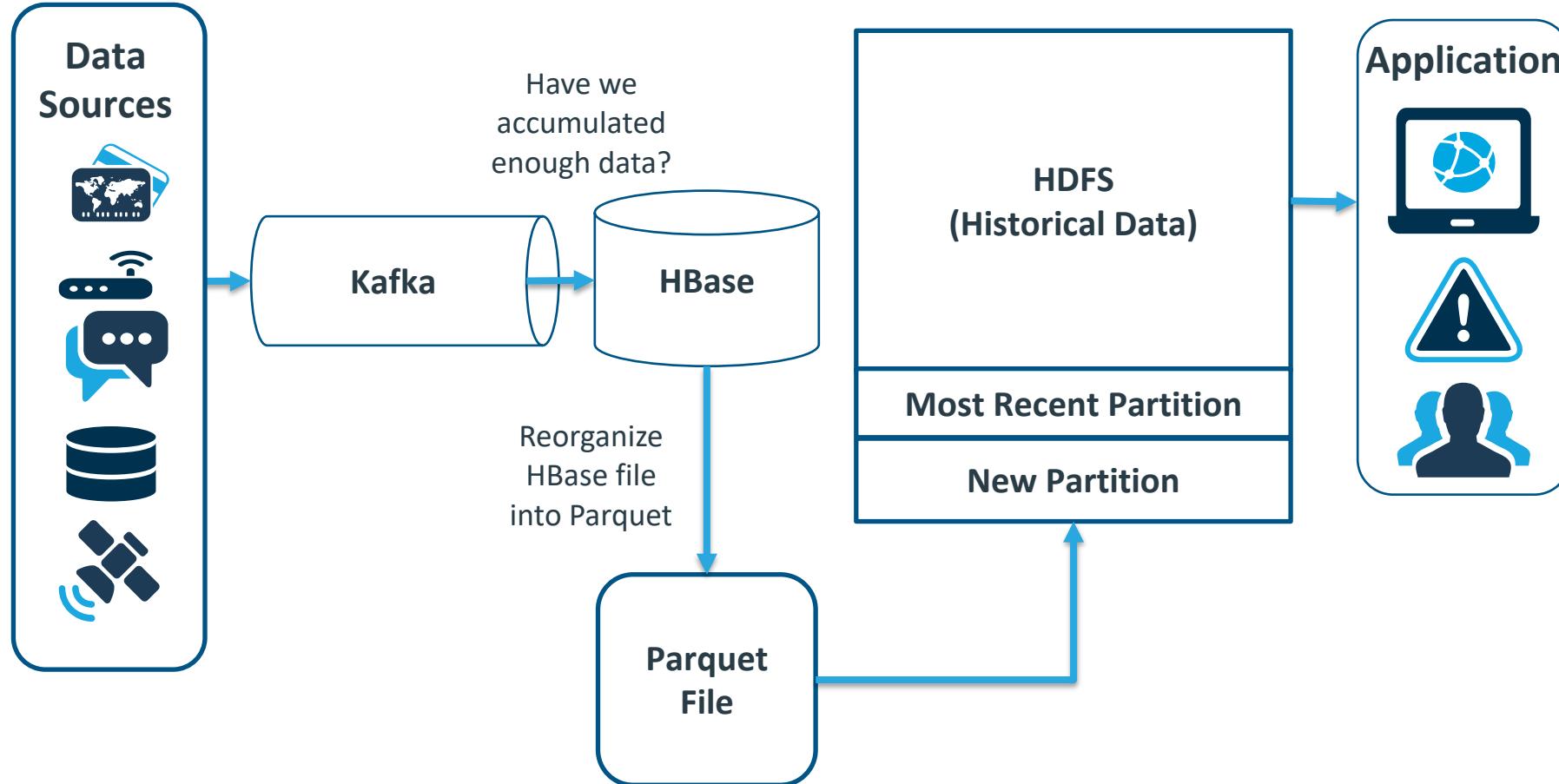
CLOUDERA FOR IOT - APACHE KUDU



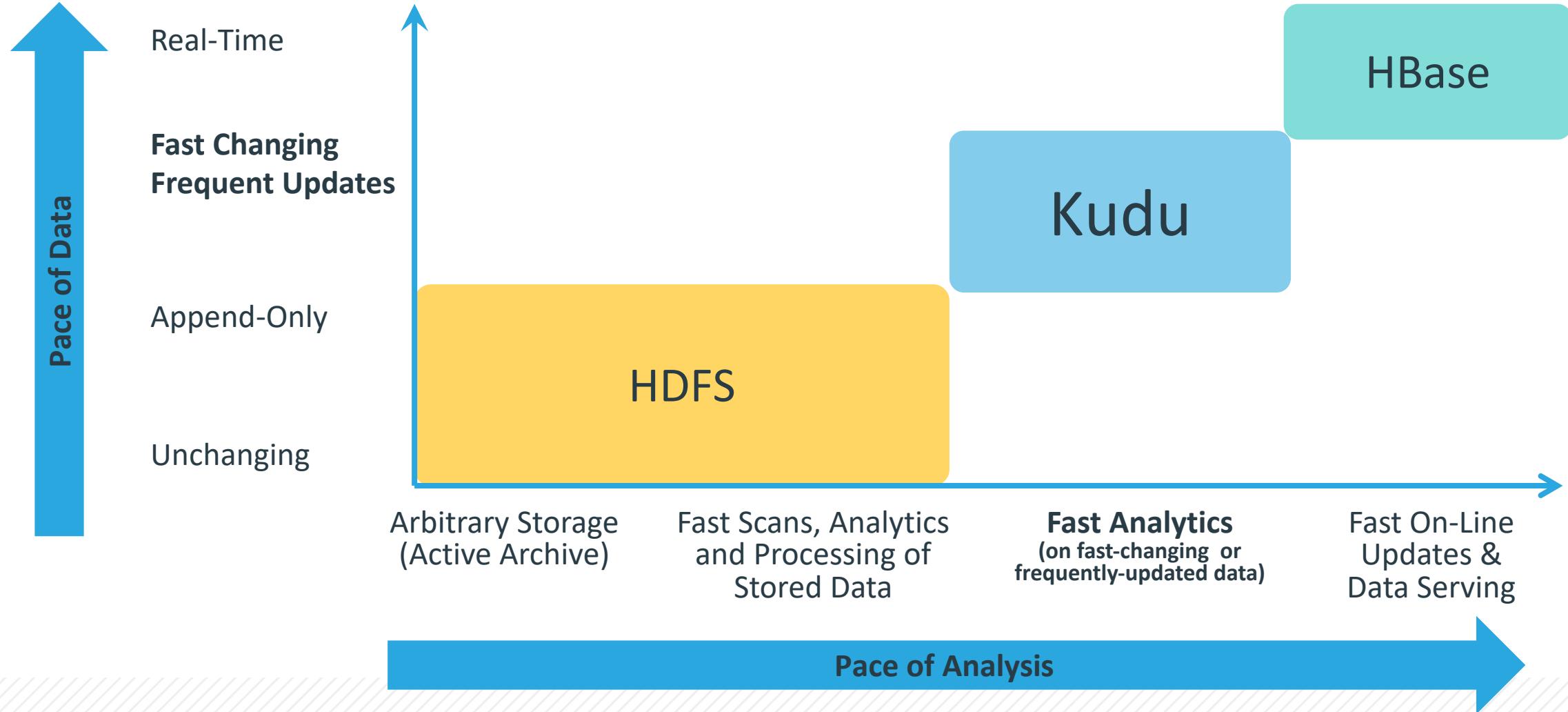
THE ANALYTIC GAP



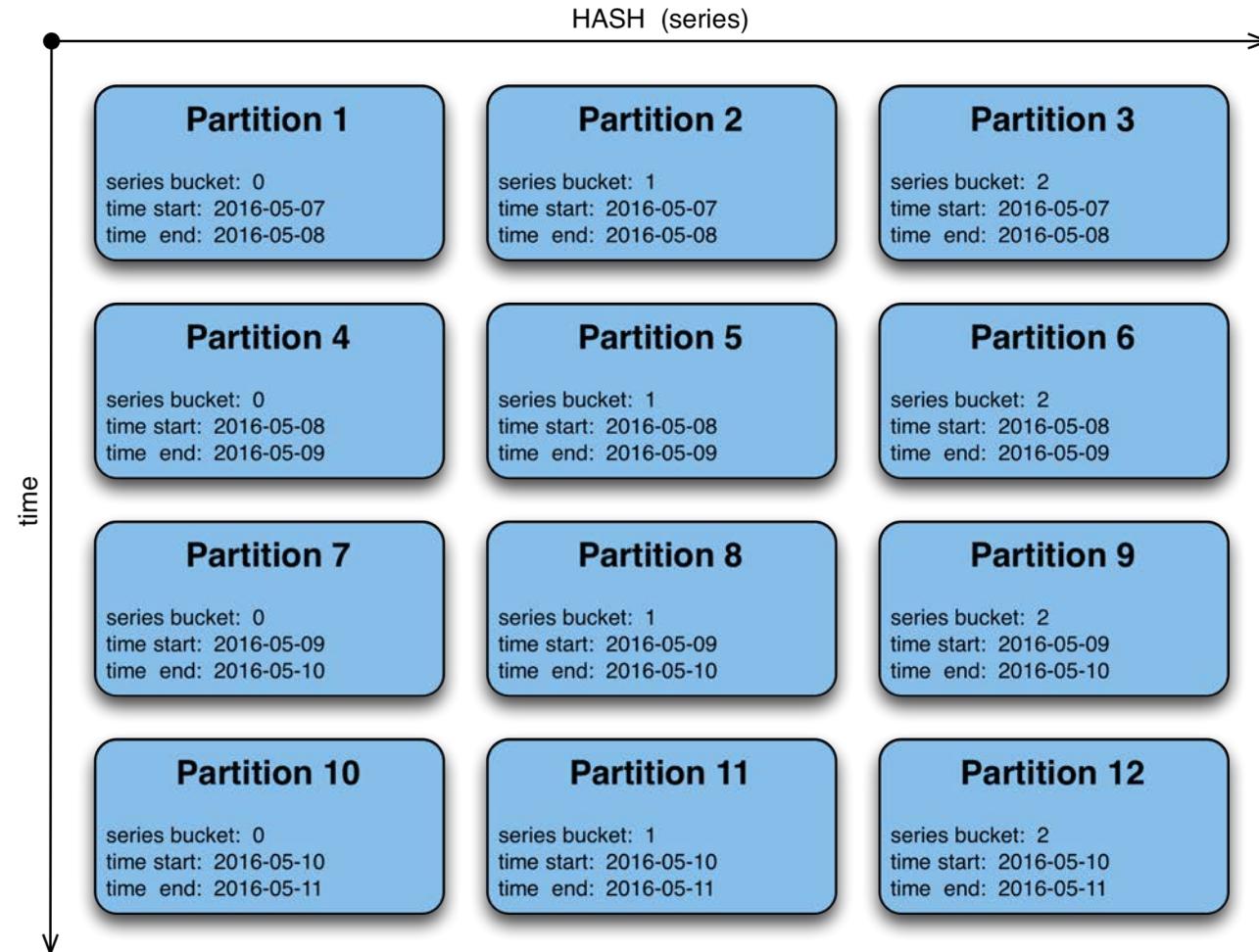
NEAR REAL-TIME ANALYTICS WITH THE ANALYTIC GAP



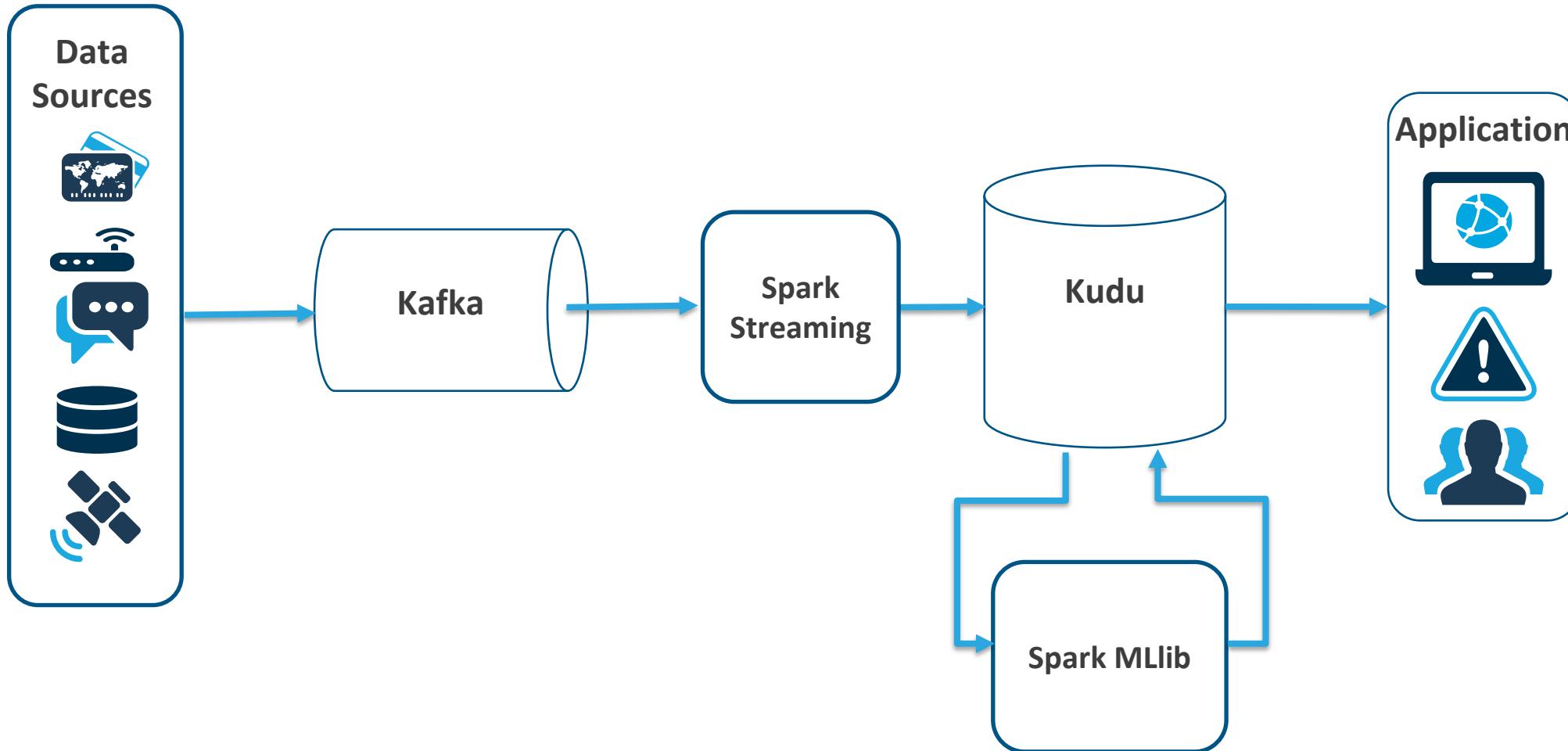
FILLING THE ANALYTIC GAP



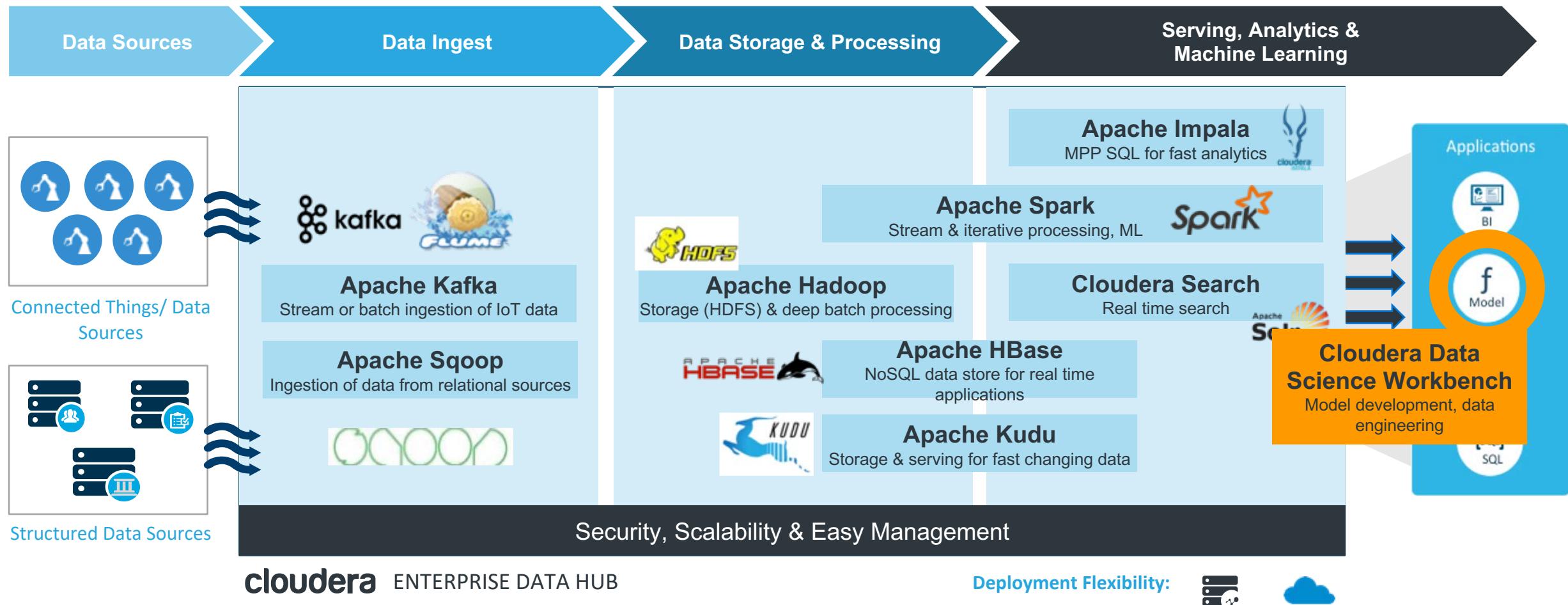
PARTITIONING – BY SERIES HASH + TIME RANGE



REAL-TIME ANALYTICS IN HADOOP WITH KUDU

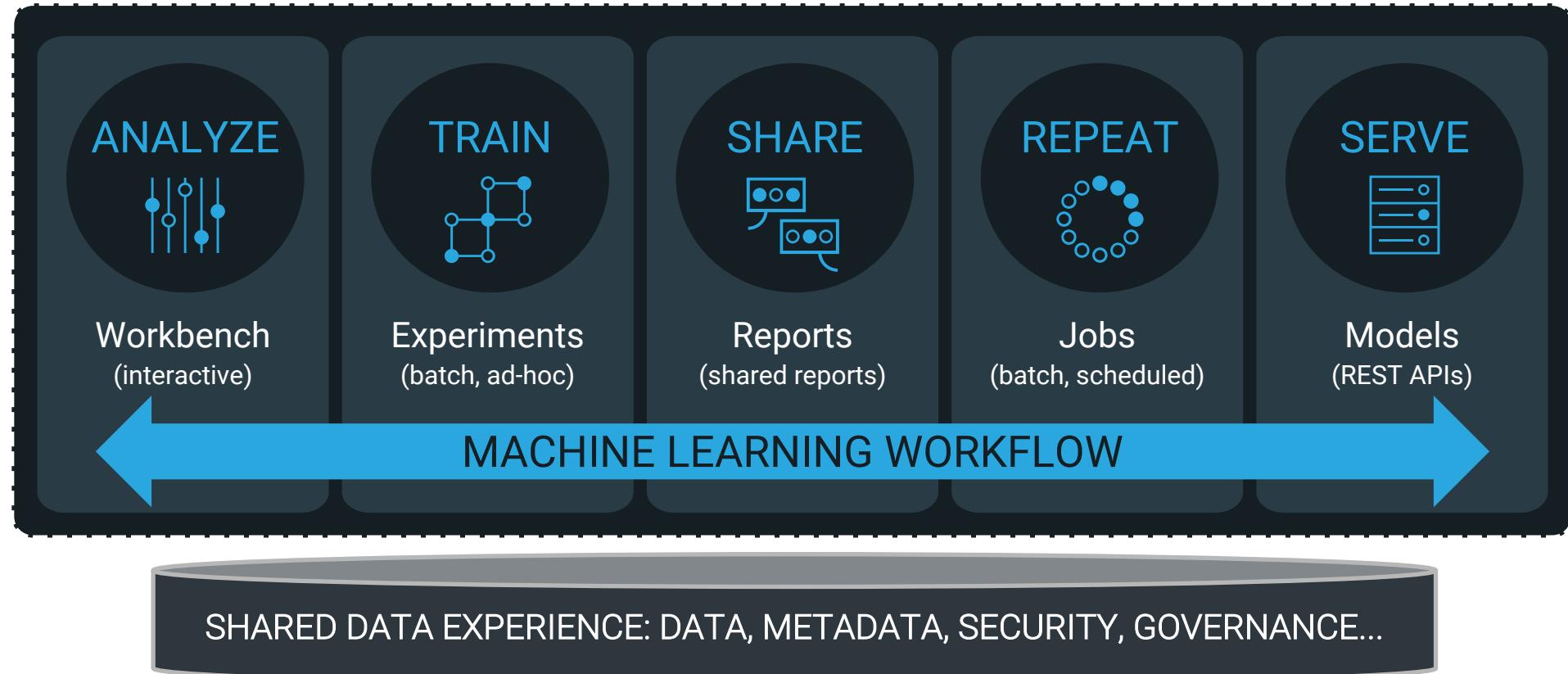


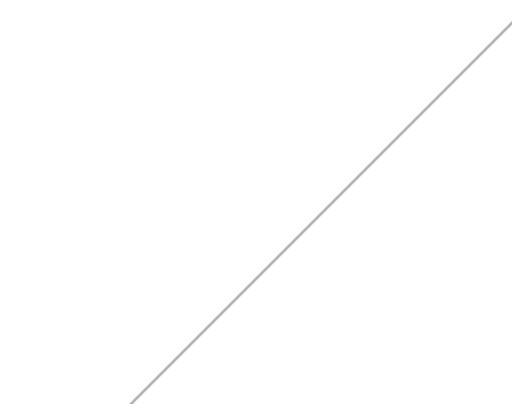
CLOUDERA FOR IOT - DATA SCIENCE WORKBENCH



EXPANDING FROM RESEARCH TO PRODUCTION

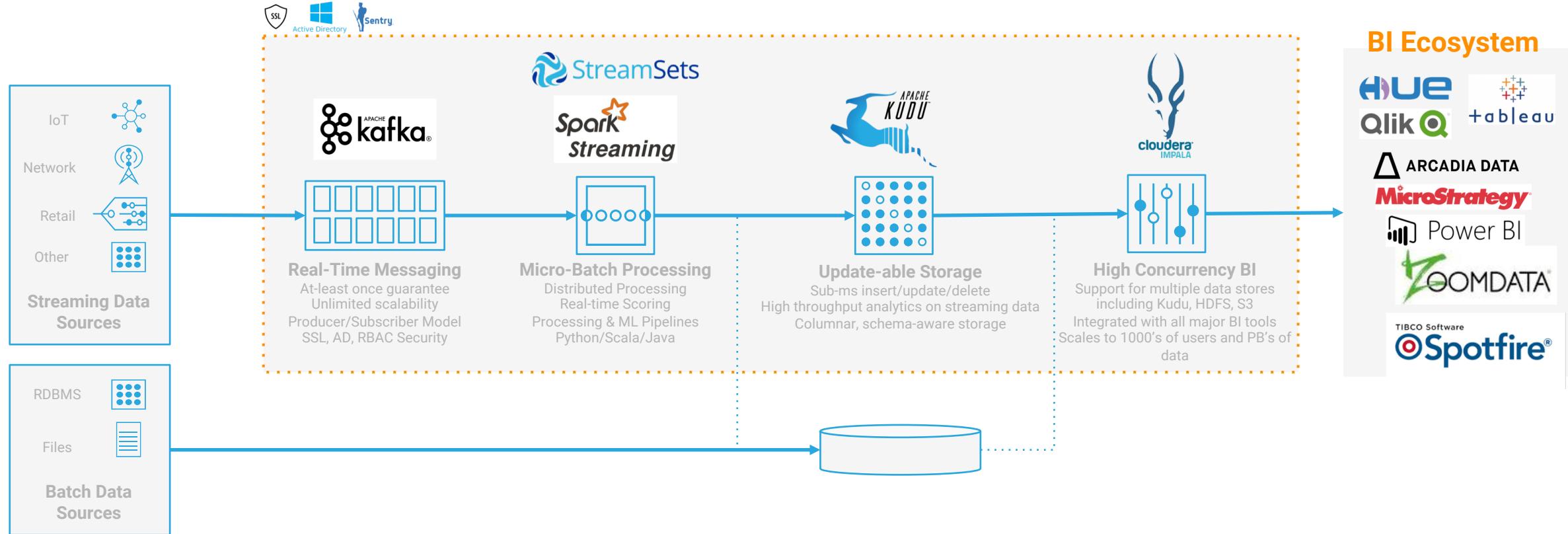
More robust workflows for Data Scientists





EXTENDED ECO-SYSTEMS

REFERENCE ARCHITECTURE



STREAMSETS



StreamSets Data Collector is a 100% open source software for building and deploying individual any-to-any continuous data ingest pipelines

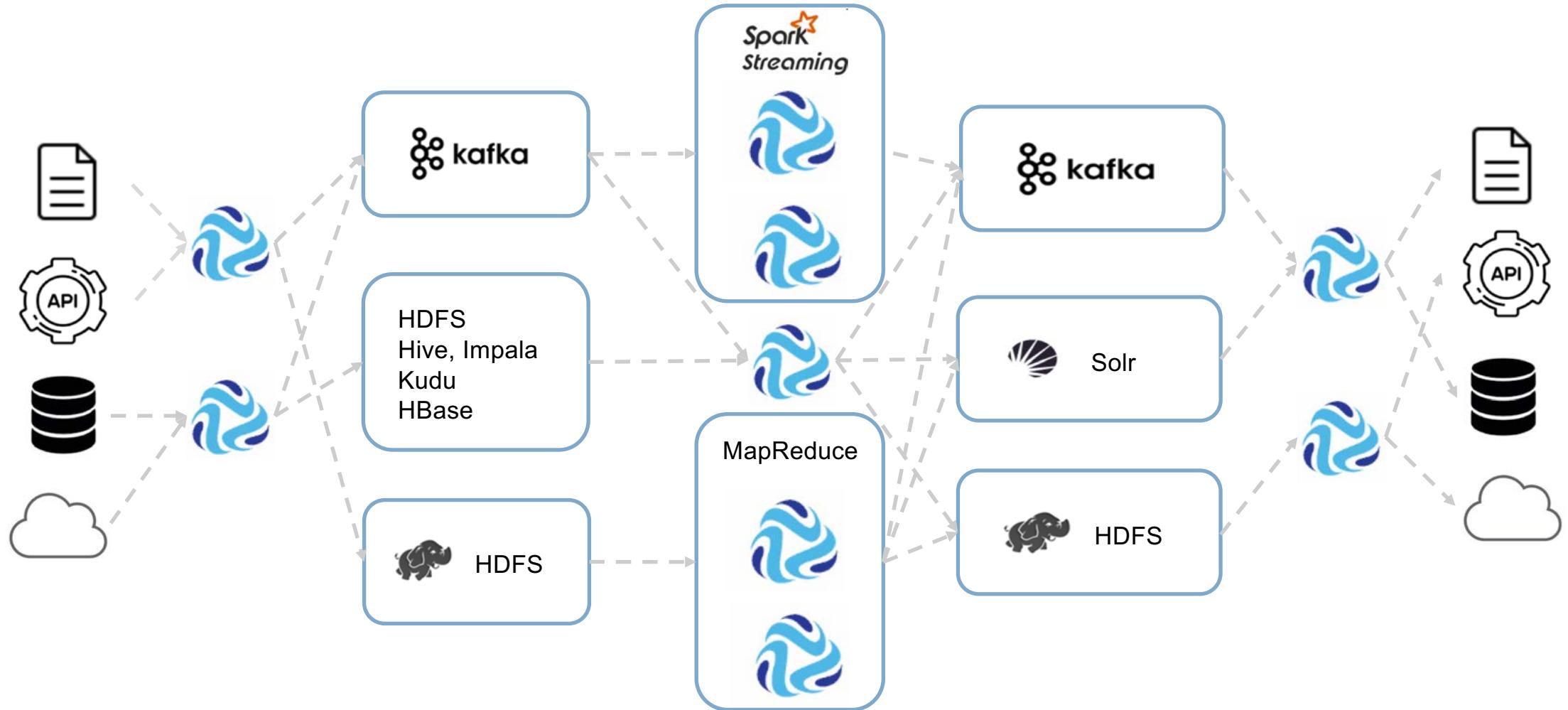
DEVELOPER PRODUCTIVITY
Flexible pipeline creation
Ease of use

IN-STREAM SANITIZATION
Data is ready for consumption upon arrival

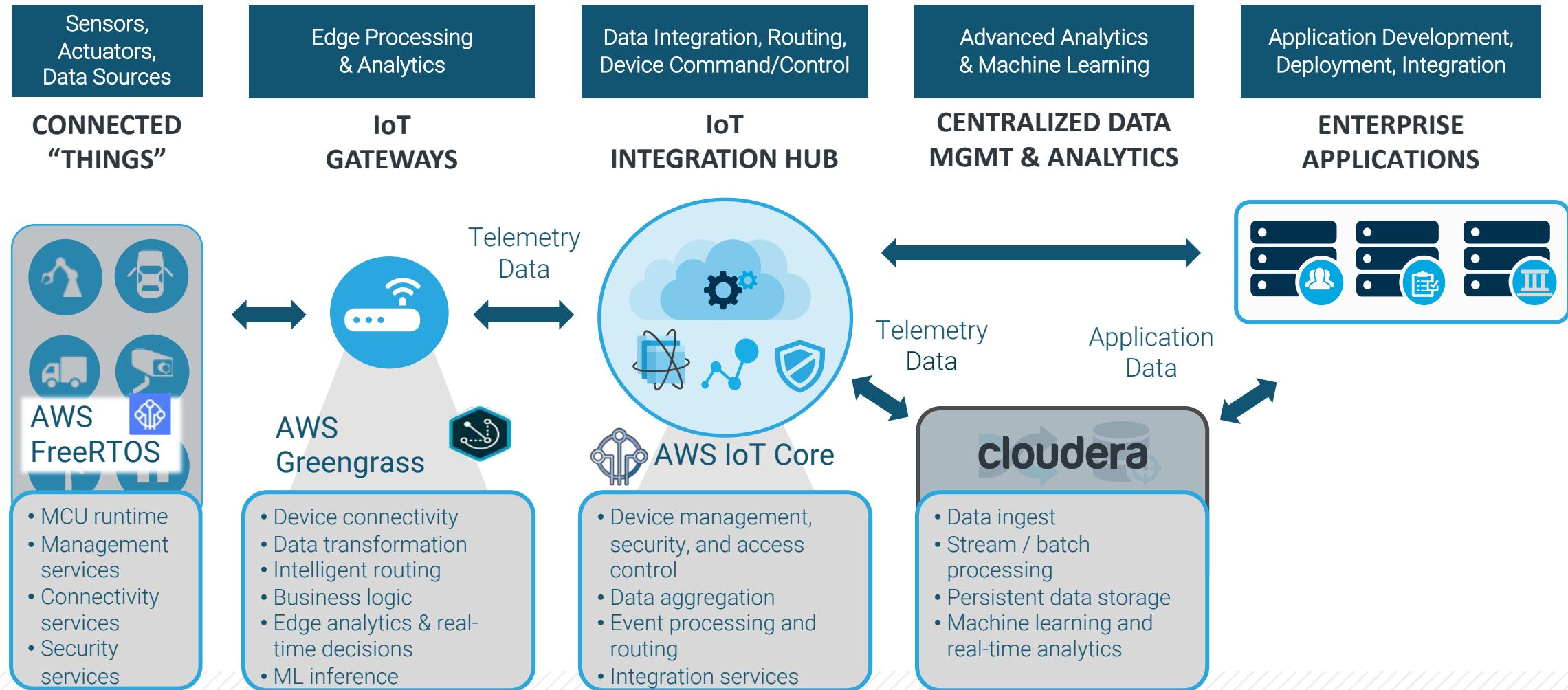
VISIBILITY
Metrics, Monitoring, Alerting

OPERATIONAL EXCELLENCE
Data drift handling
Zero-downtime upgrades

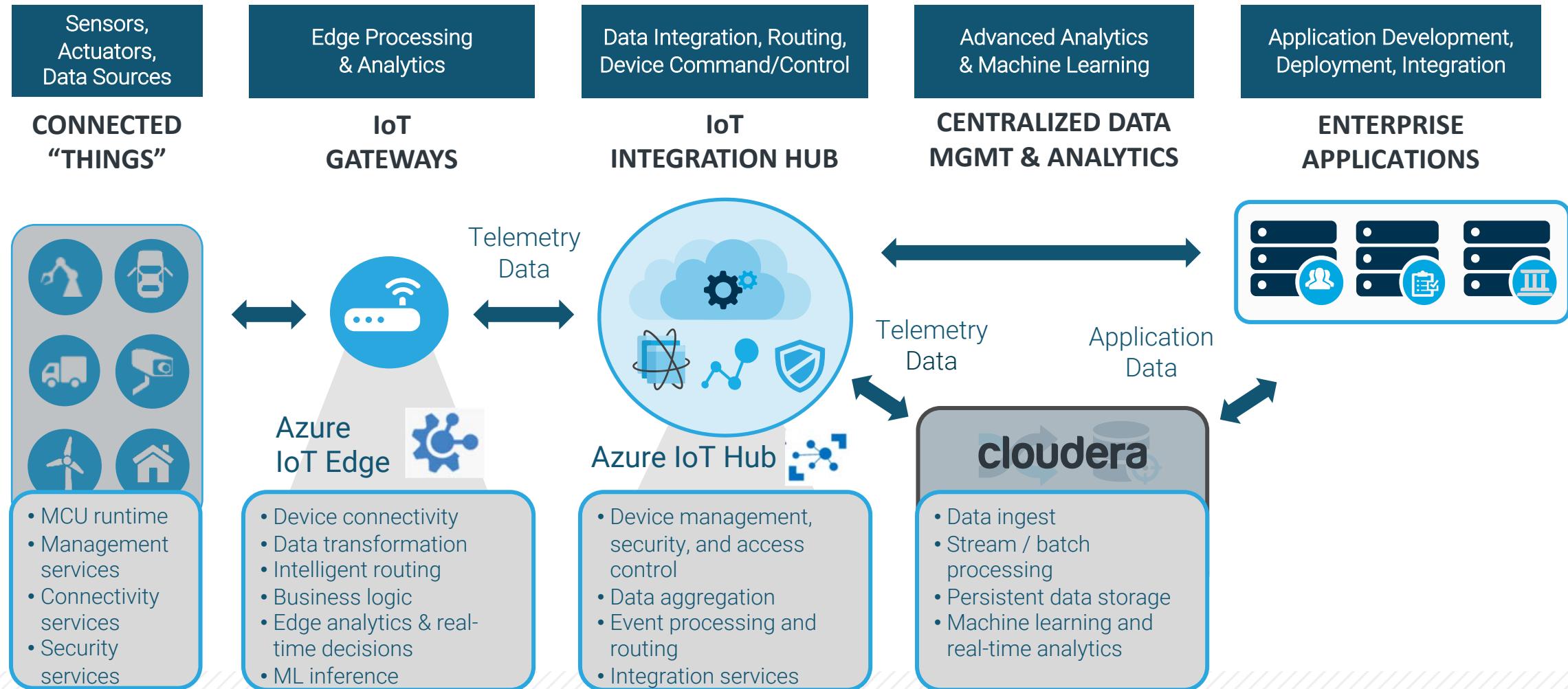
SCALE UP AND OUT



END-TO-END ARCHITECTURE FOR IOT: AWS + CLOUDERA

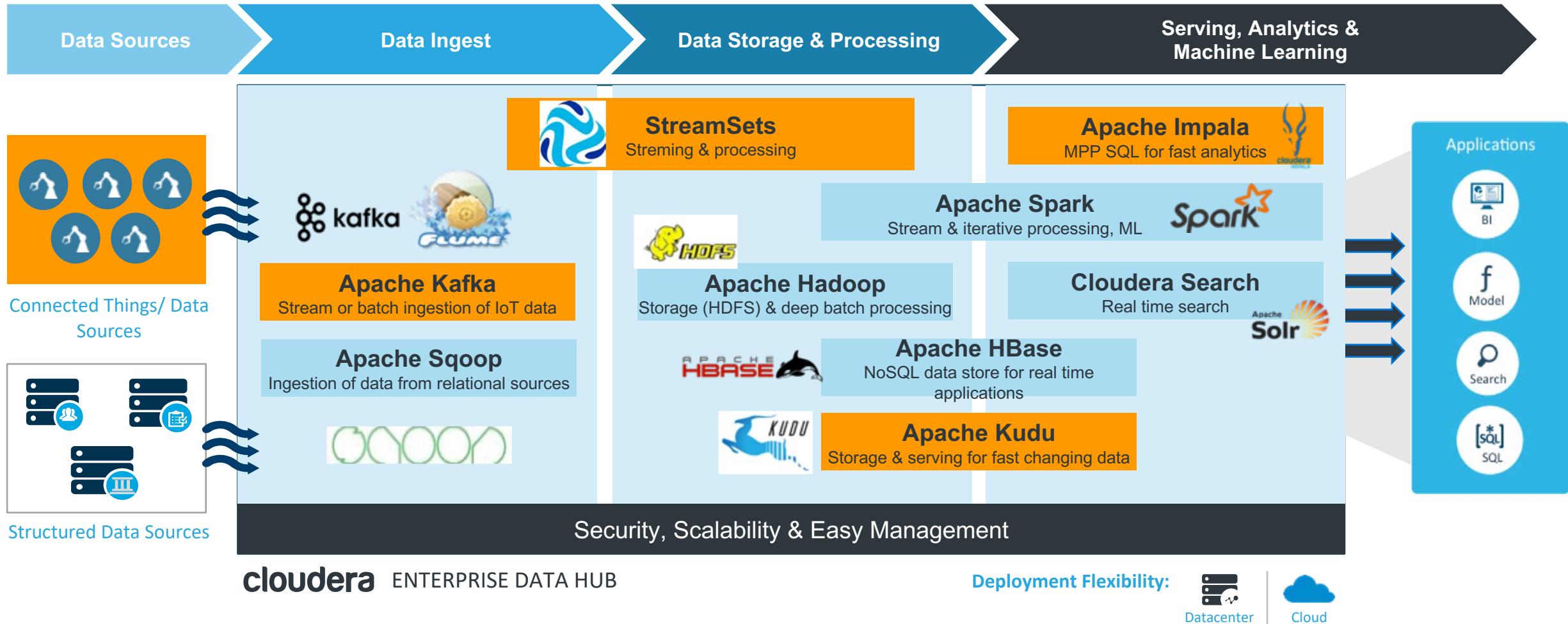


END-TO-END ARCHITECTURE FOR IOT: AZURE + CLOUDERA

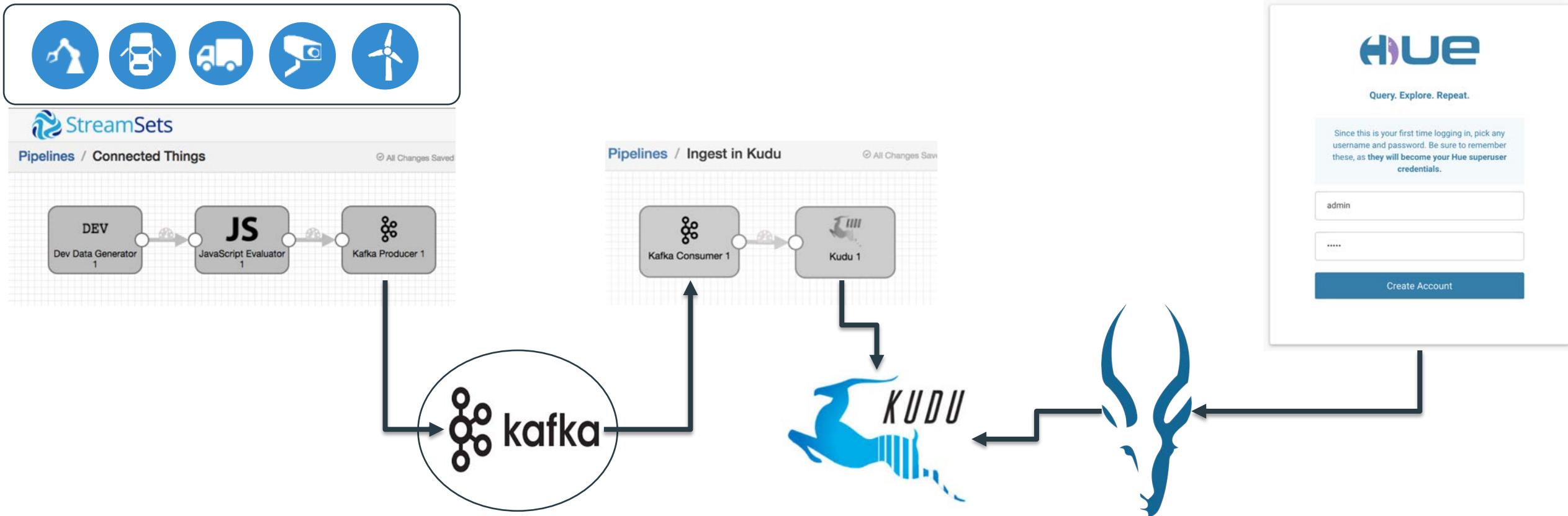


INTRO TO THE IOT LAB

SCENARIO FOR THE LAB



WHAT WE WILL BUILD



THANK YOU