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Fun with Sensors

Yogi Rampuria
Principal Solution Engineer
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Fun with Sensors' Data

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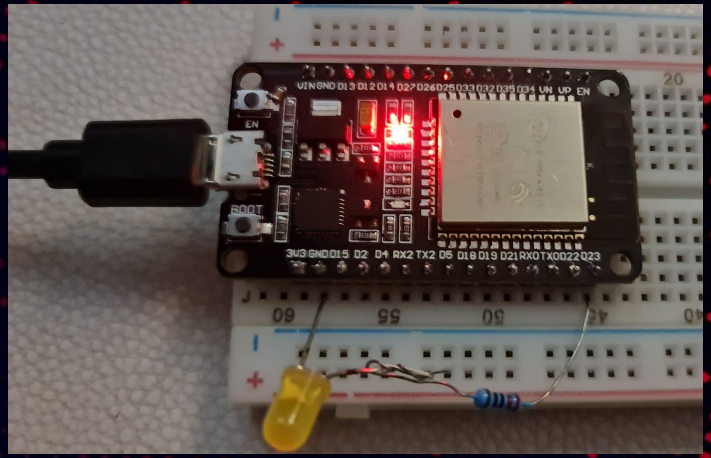
Who am I?

- Solution Engineer @ Yugabyte
- Living in Singapore
- Working with Customers and Partners across South Asia
- Software Engineer from Late 90s
- Active in Cloud Native Community Space (YB,Spring, Cloud, Java, Kubernetes)
- Blog: yogendra.me

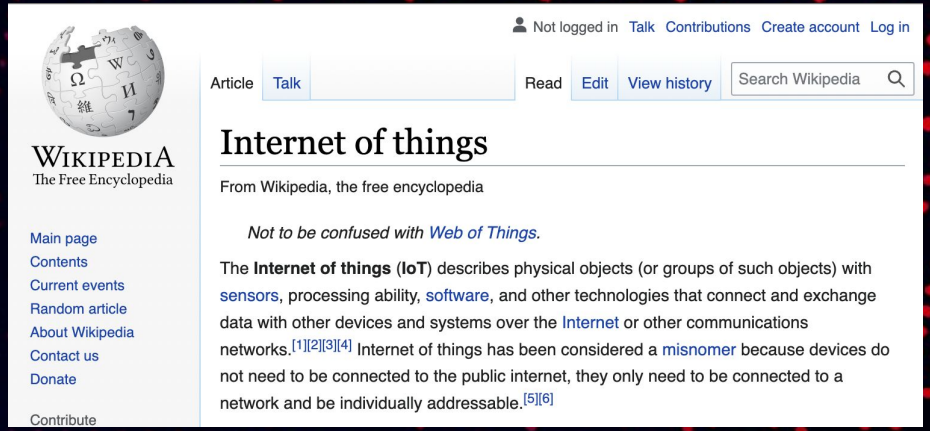
Why the topic?

- I am IoT Hobbyist - RPi, Arduino, ESP32, etc.
- IoT is everywhere
  - Home Automation, Smart Cities, etc.
- Suitability for Distributed SQL
  - Consistency
  - Velocity
  - Volume



IoT: Definition and My Interpretation

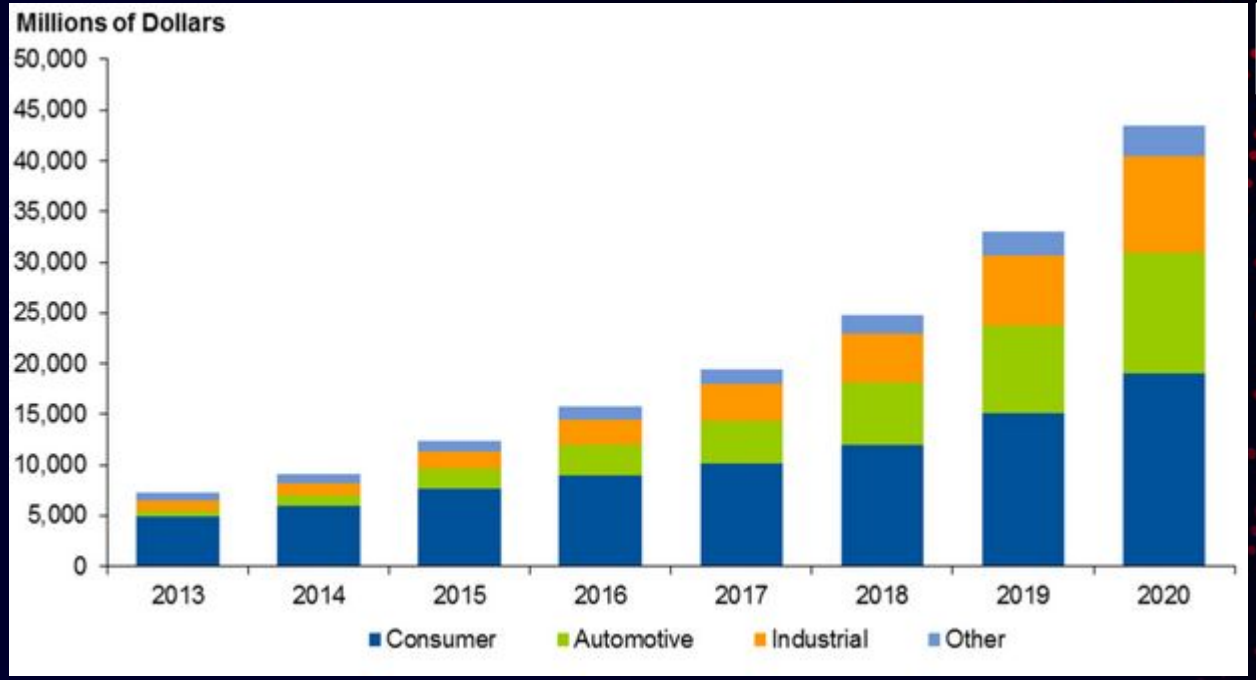
- Small and Low Powered Devices
- Produce Structured Data
- Edge Devices and Processing
- Variety of Acquisition: Analog, Digital, Visual (Camera), Audio (Mic), Sensors (Weather, Bio, Touch)
- Usage: Automotive, Industrial and Home Automation
- MQTT used for Communication
  - Messaging Oriented
  - Publish/Subscribe Model
  - TCP based
  - Brokers handle publishing and subscription (Mosquitto/RabbitMQ)
  - Messaging system for scalable handle data ingestion (Kafka/RabbitMQ)



MQTT: The Standard for IoT Messaging

MQTT is an OASIS standard messaging protocol for the Internet of Things (IoT). It is designed as an extremely lightweight publish/subscribe messaging transport that is ideal for connecting remote devices with a small code footprint and minimal network bandwidth. MQTT today is used in a wide variety of industries, such as automotive, manufacturing, telecommunications, oil and gas, etc.

Market Size



COVID-19 has driven the IoT investment

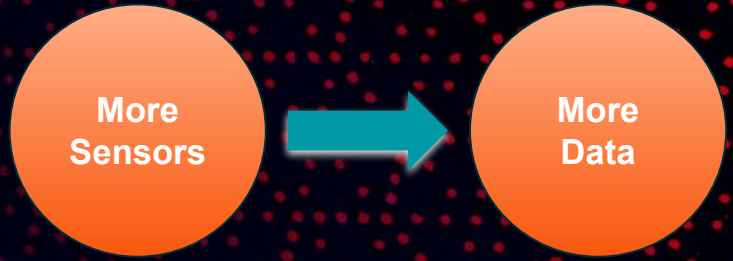
IoT Endpoint by Segment, 2018 - 2020 Worldwide (Installed Base, Billions of Units)

Segment	2018	2019	2020
Utilities	0.98	1.17	1.37
Government	0.40	0.53	0.70
Building Automation	0.23	0.31	0.44
Physical Security	0.83	0.95	1.09
Manufacturing & Natural Resources	0.33	0.40	0.49
Automotive	0.27	0.36	0.47
Healthcare Providers	0.21	0.28	0.36
Retail & Wholesale Trade	0.29	0.36	0.44
Information	0.37	0.37	0.37
Transportation	0.06	0.07	0.08
Total	**3.96**	**4.81**	**5.81**

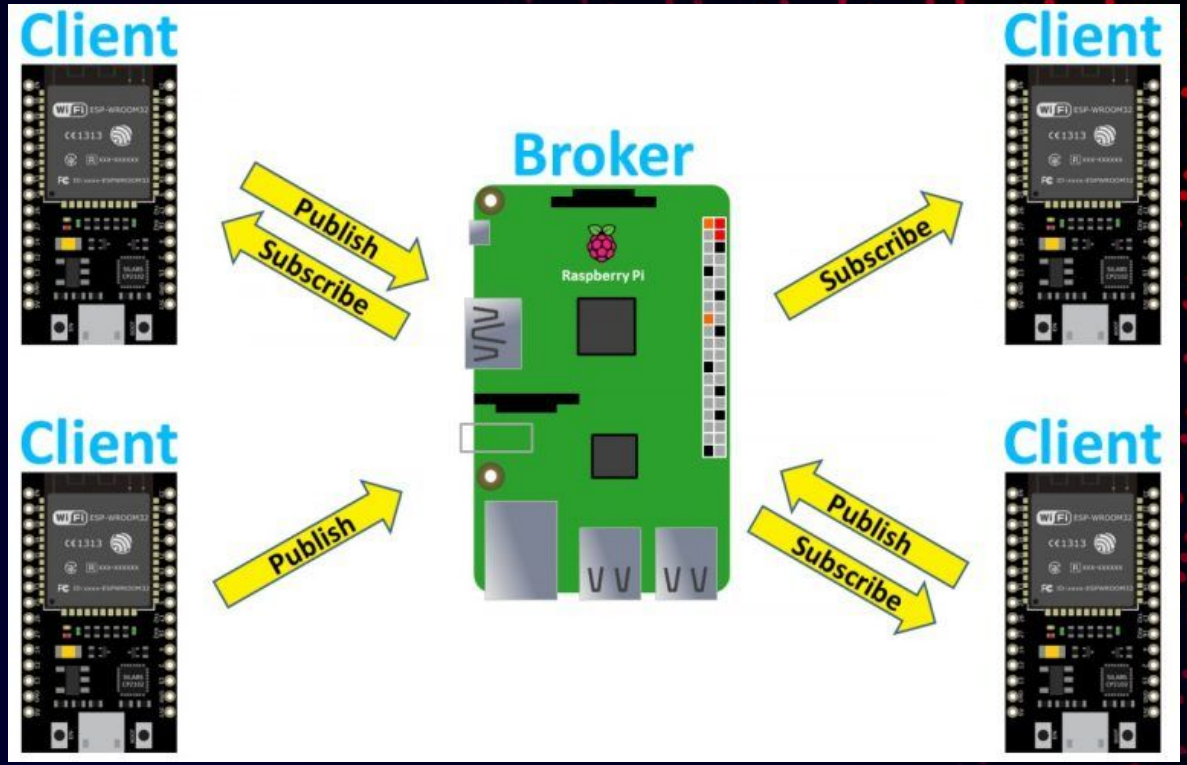
Source: Gartner (August 2019)

What does that mean?

- More sensors -> More data
- More Data -> More Challenges
  - Scaling
  - Resiliency
  - Automation
  - Lifecycle Management
- IoT Application/Solution Data Lifecycle
  - Geo-distributed Acquisition
  - Data Residency
  - Data Purging

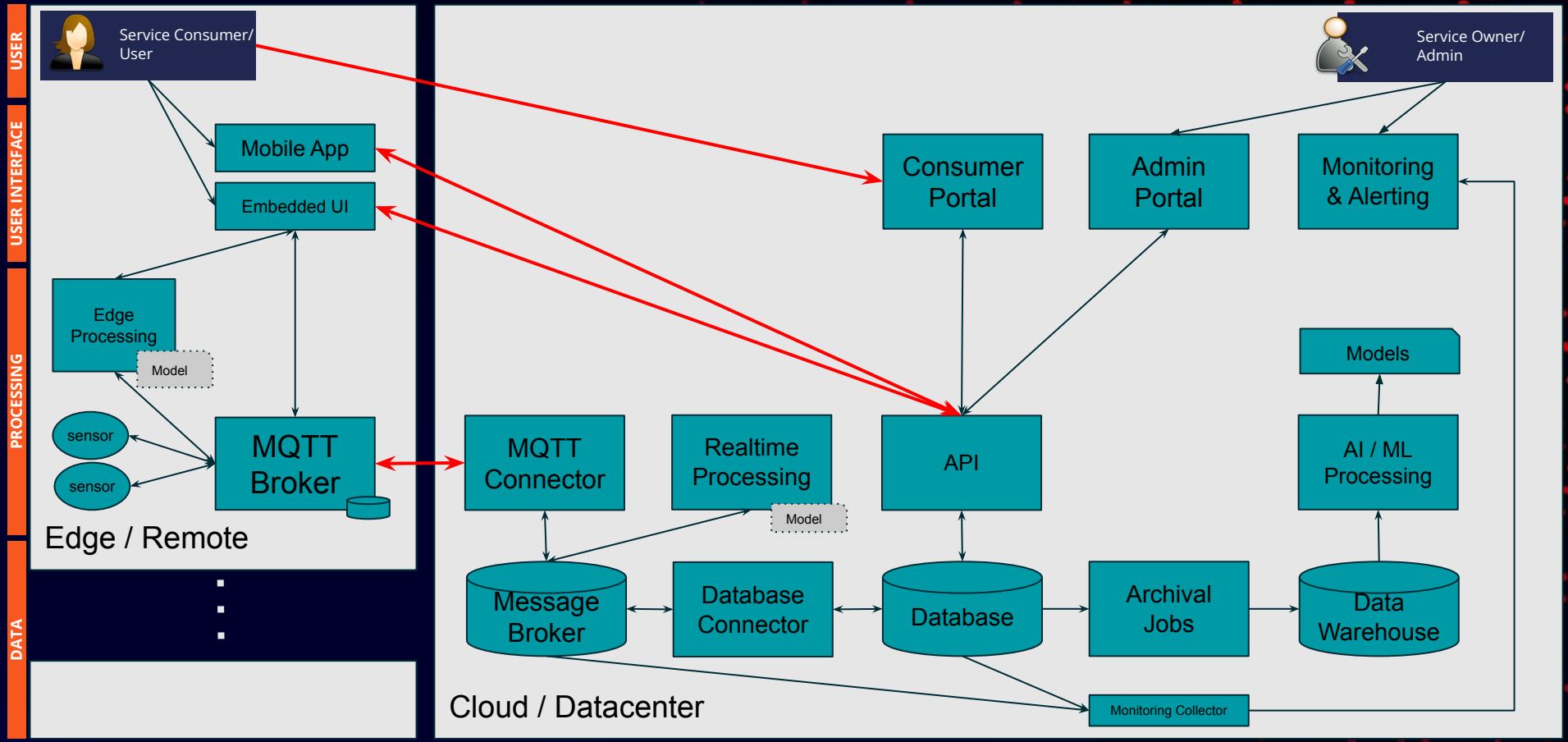


Enthusiast Architecture



Source: https://www.rototron.info/raspberry-pi-esp32-micropython-mqtt-dht22-tutorial/

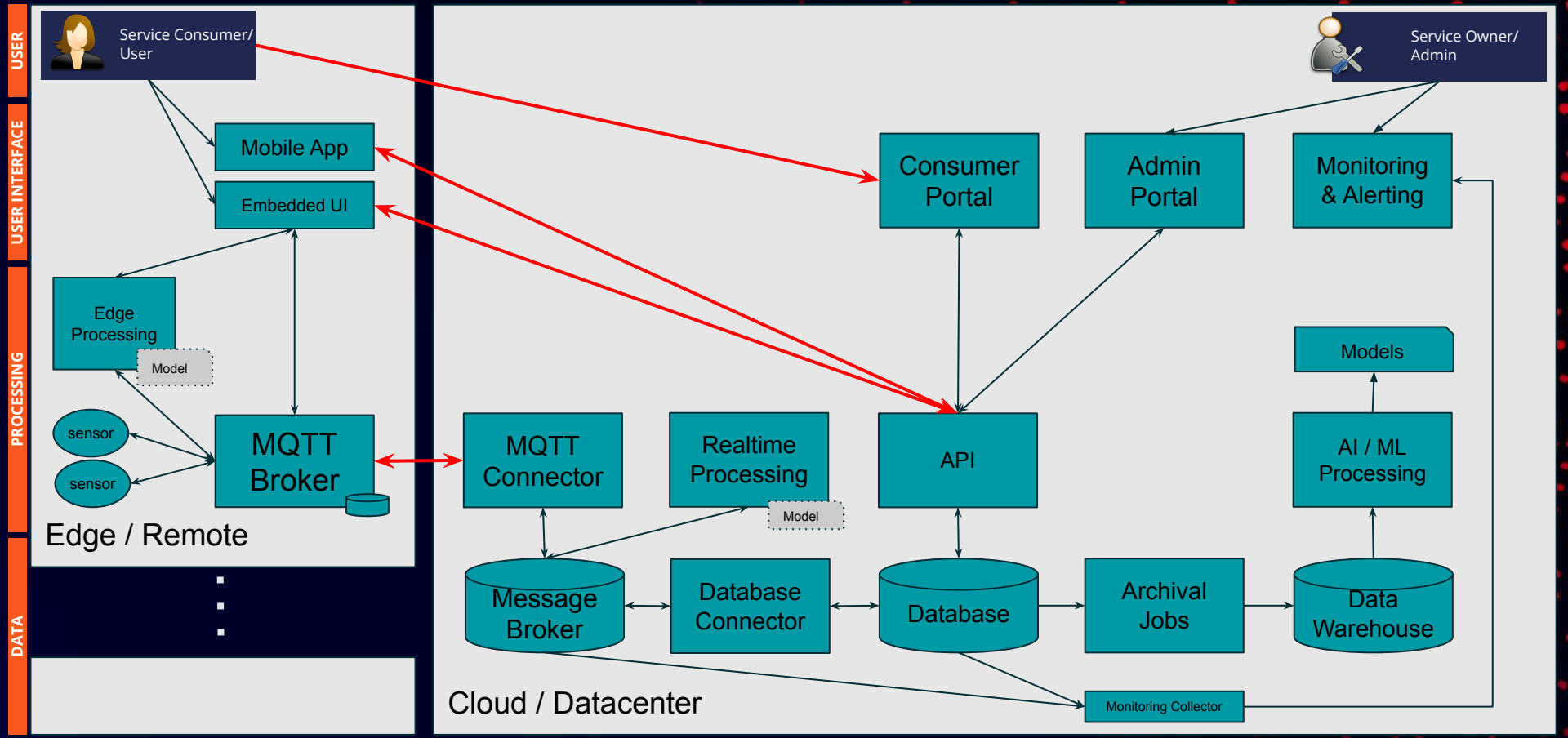
Reference Architecture for Enterprise



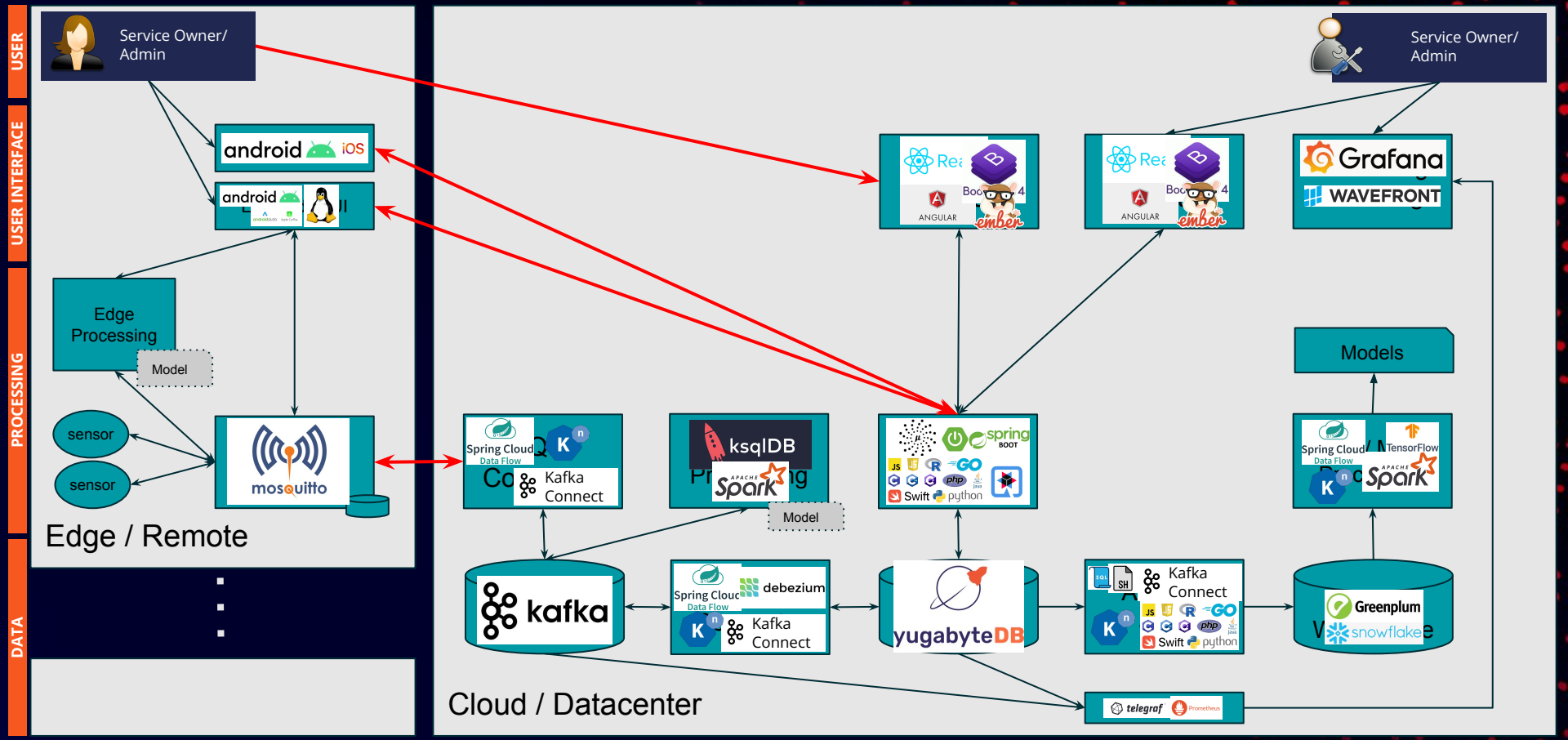
Reference Architecture for Enterprise

- Processing Components are Microservices Based
- Resiliency at All Layers
  - HA, or even better - Distributed
- Scalable
  - Scale up and/or out
- Geo-distribution
  - Especially for PII data
    - User Profile
    - Contacts
    - Identification Details
  - Lower Latency

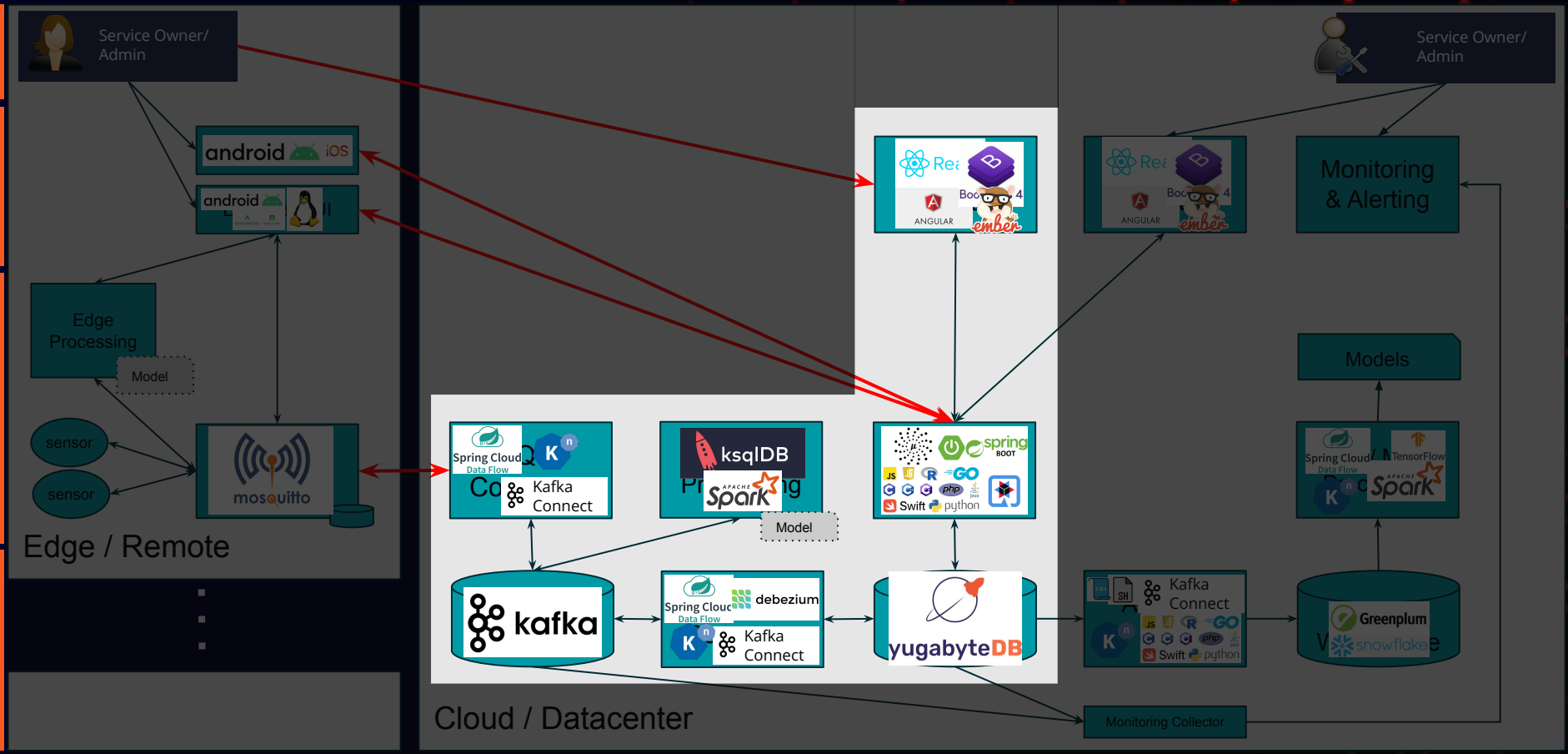
Reference Architecture for Enterprise



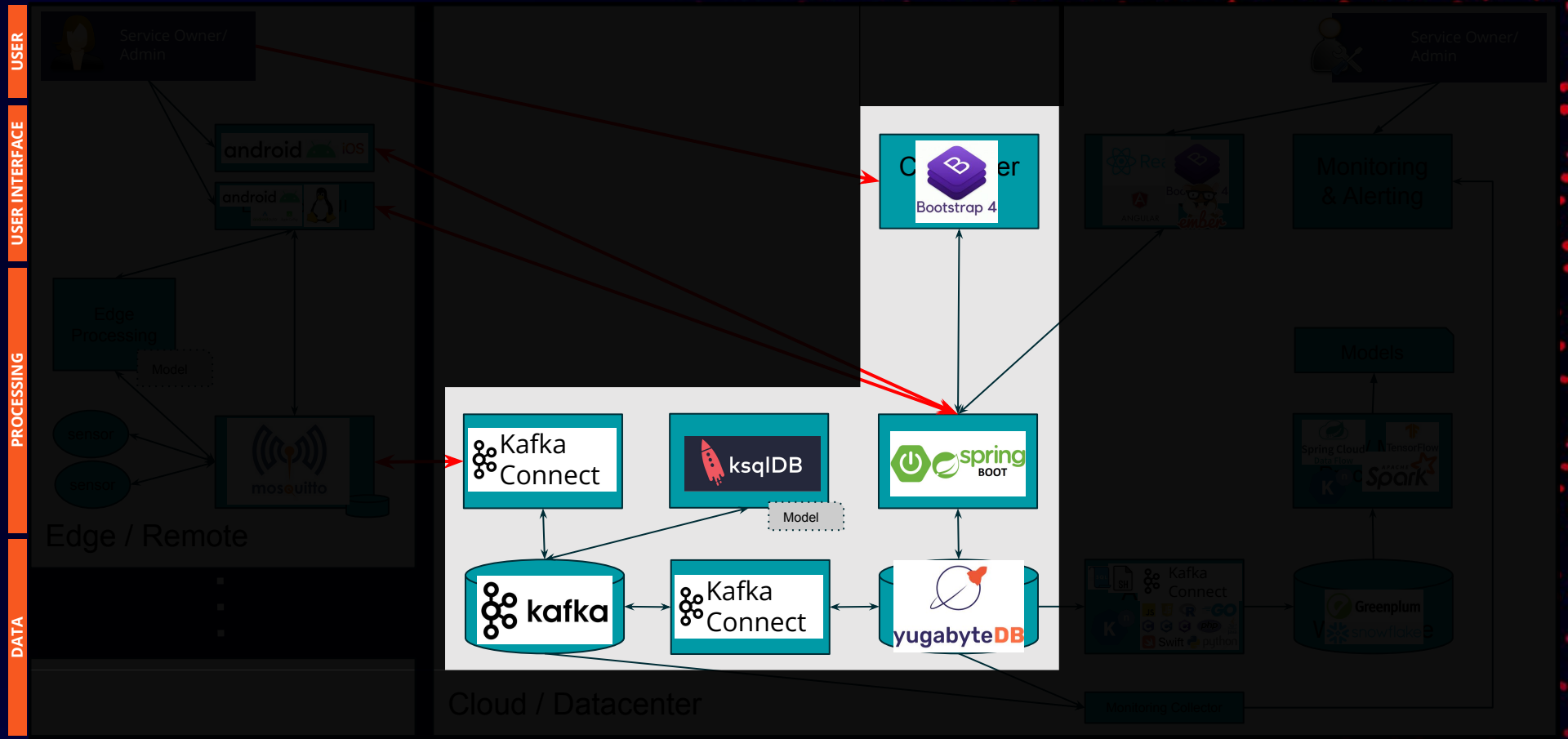
Reference Architecture for Enterprise



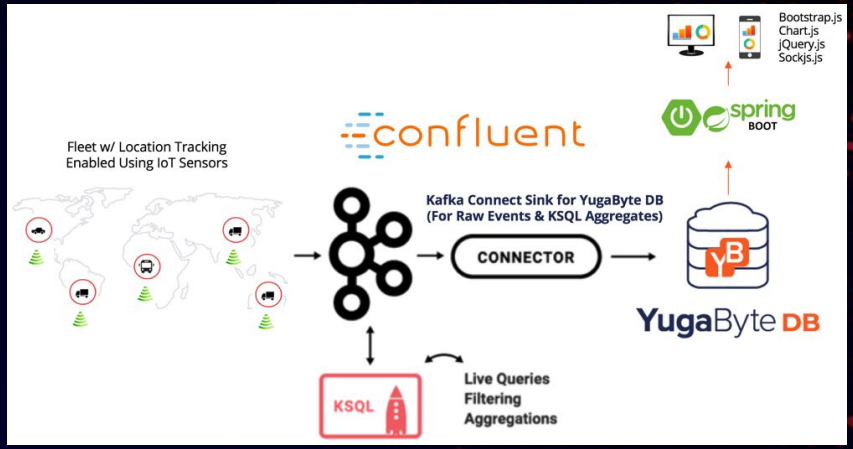
Lets Focus on ...

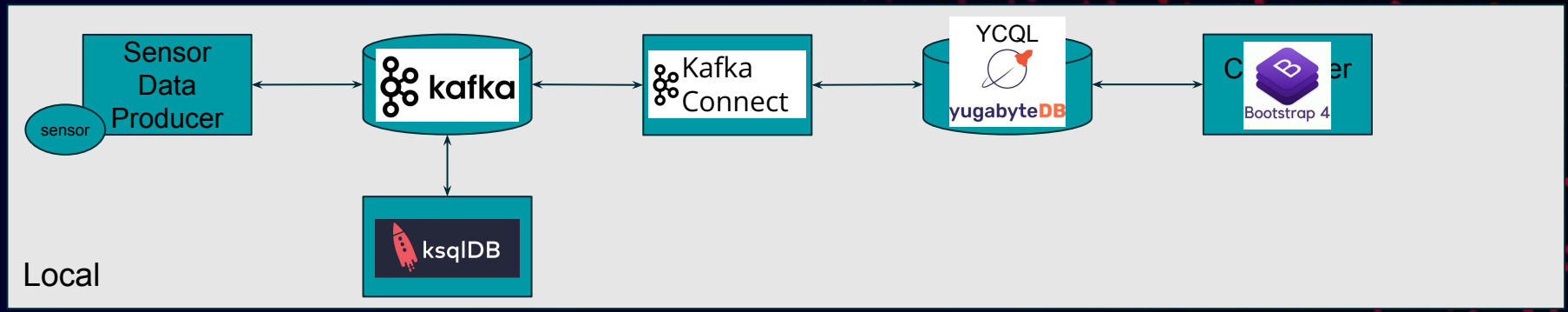


A Bit More Focus ...



Demo : IoT Fleet Management



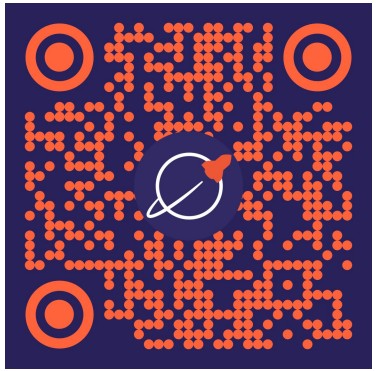


Try yourself with instructions at **https://github.com/yogendra/fun-with-sensors-data**

Summary

- IoT ecosystem is changing rapidly
- YugabyteDB complements Event oriented architecture (Kafka) perfectly
- Data segregation is simplified by YugabyteDB
- Starting small and ability to expand is made possible with YugabyteDB

Thank You



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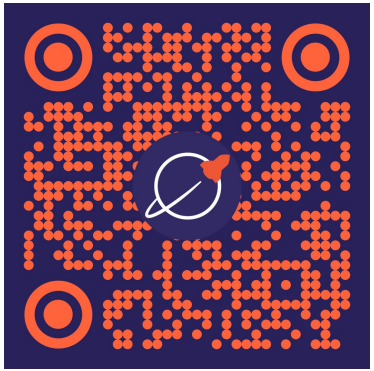
university.yugabyte.com



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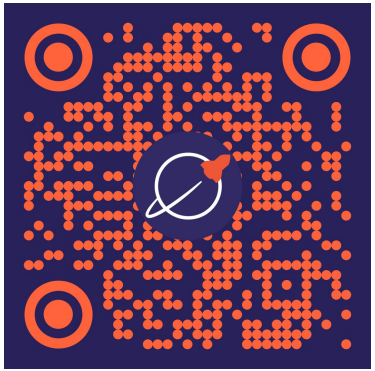

Try it yourself

download.yugabyte.com