EDGE X FOUNDRY™

Vertical Solutions Working Group

March 17, 2020

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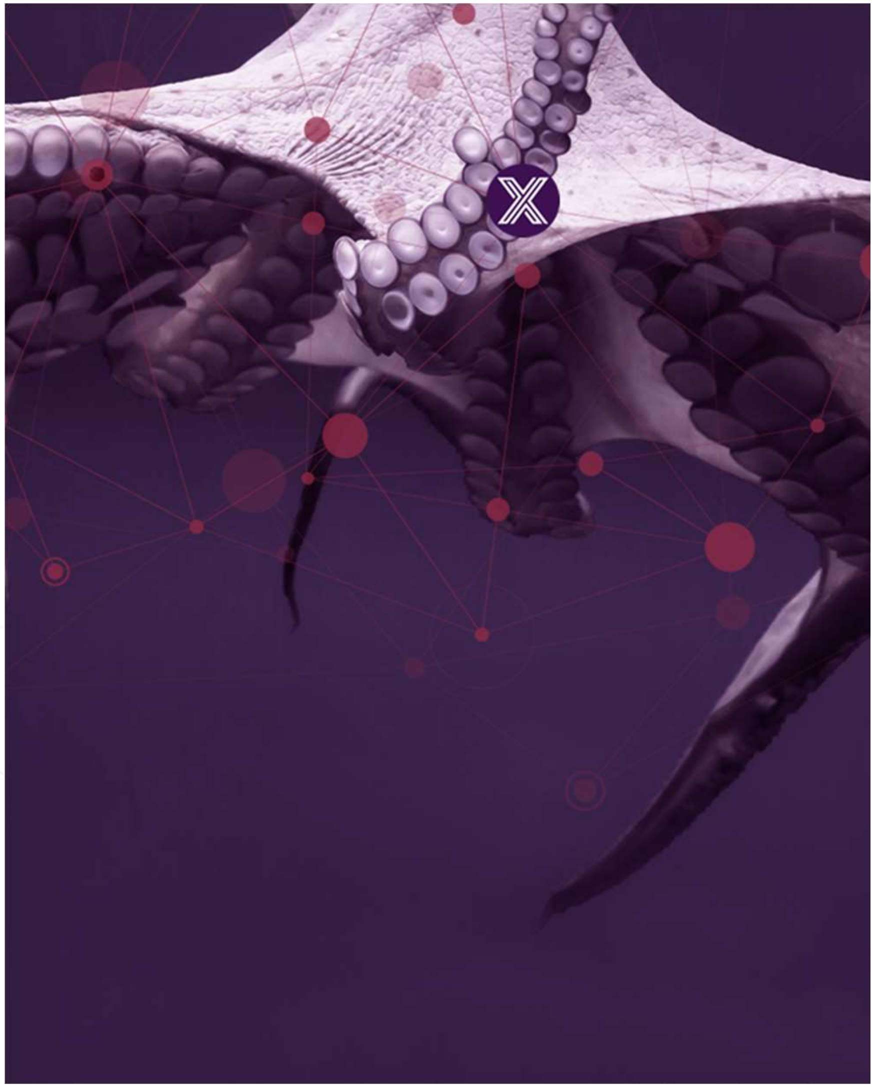

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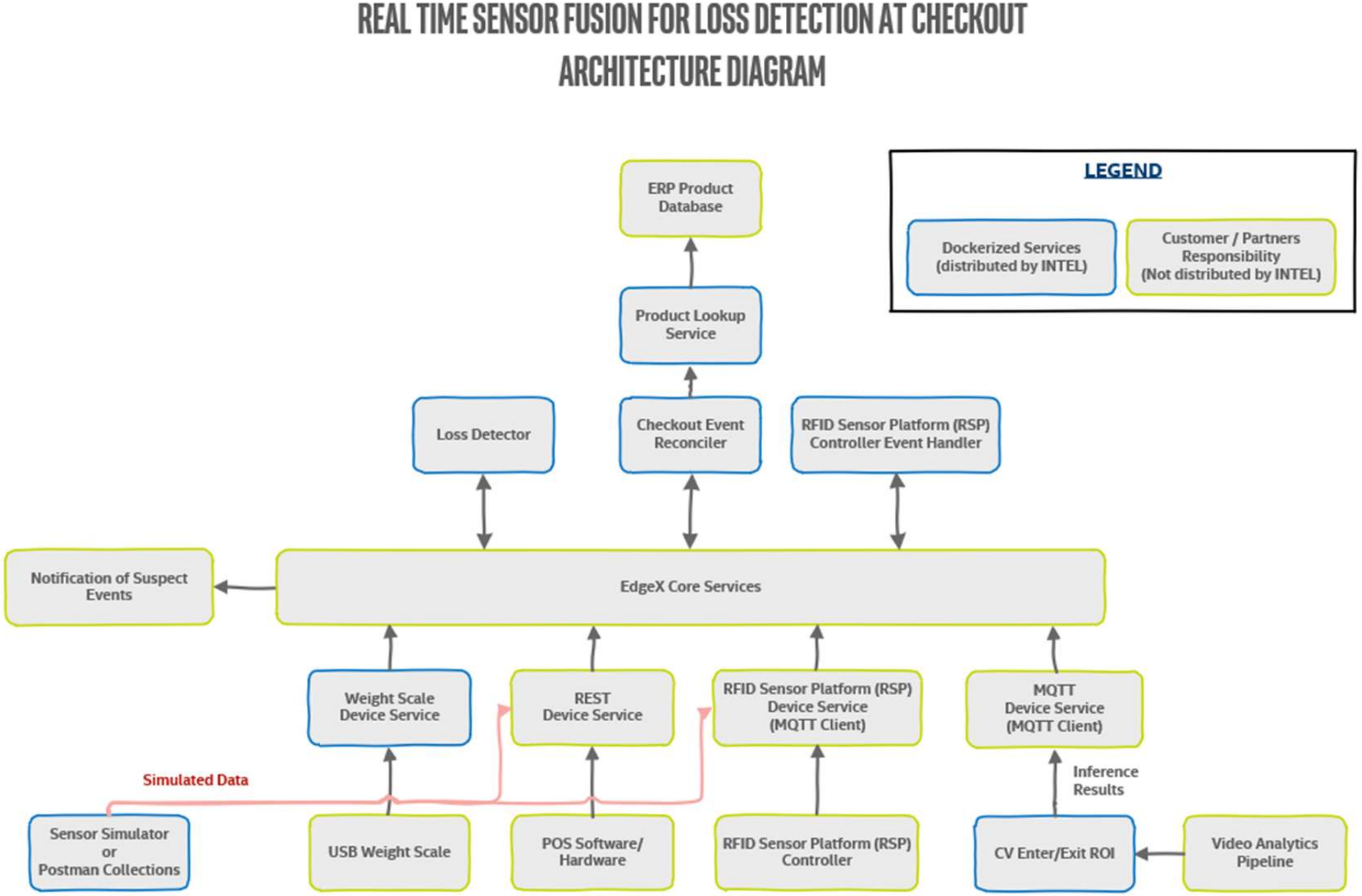
Agenda

- Update to ideation challenge
- Real time sensor fusion for loss detection at checkout reference solution - event flow

Overview of LOSS PREVENTION Services

High Level Architecture


REAL TIME SENSOR FUSION FOR LOSS DETECTION AT CHECKOUT
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CV Enter/Exit ROI
Video Analytics Pipeline

POS Device Service

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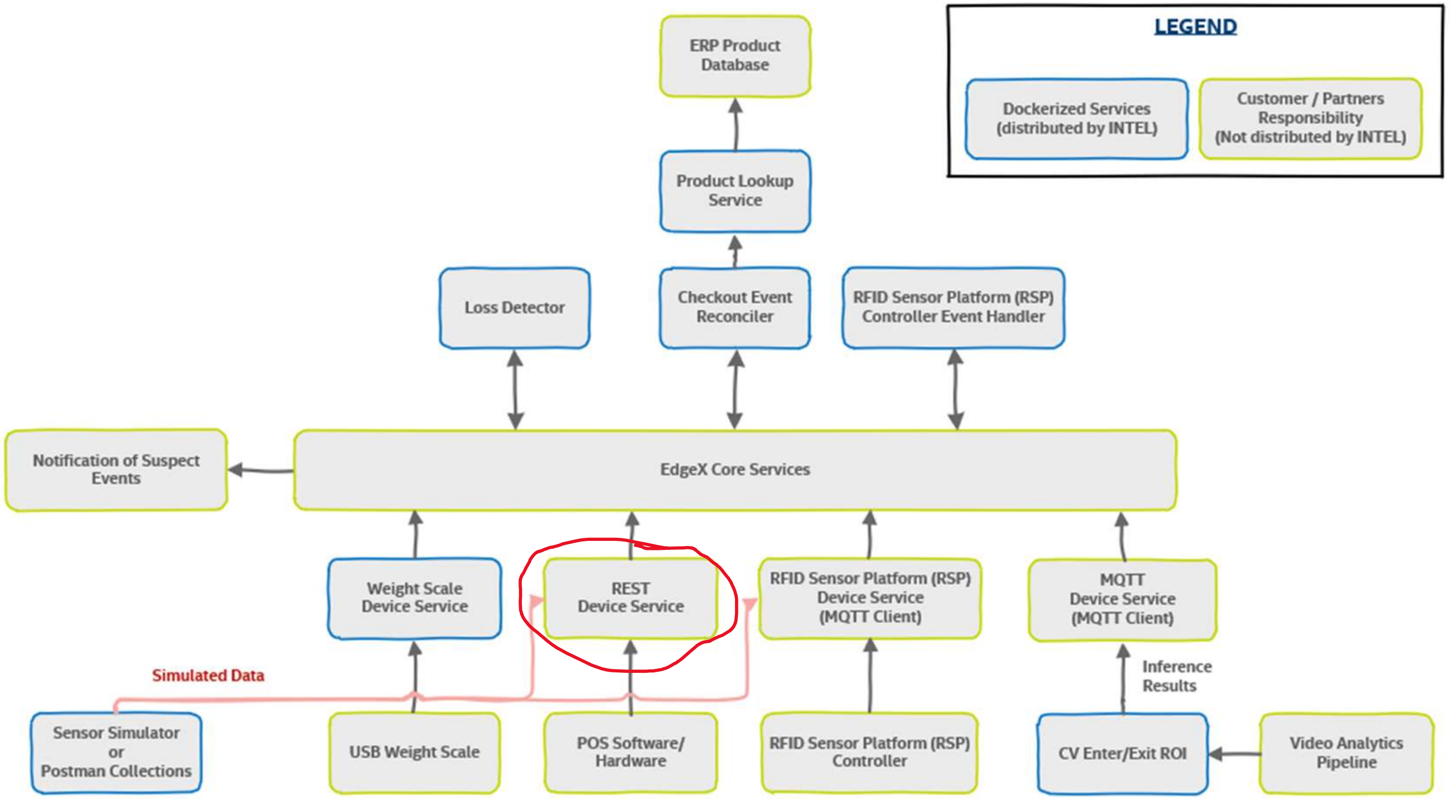
ARCHITECTURE DIAGRAM



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MQTT/REST POS device service is also a micro service based on EdgeX’s device service SDK

- Receives POS events
- Pushes POS event data into EdgeX core data
- Reads data either from Unicenta –or- 3rd Party POS Software
- Image of docker-compose service: device-pos-rtt-log and device-mqtt (optional- configured for POS)
- Requires running docker services:
  - EdgeX Docker services
  - Checkout-lane-reconciler Docker service

Weight Scale Device Service

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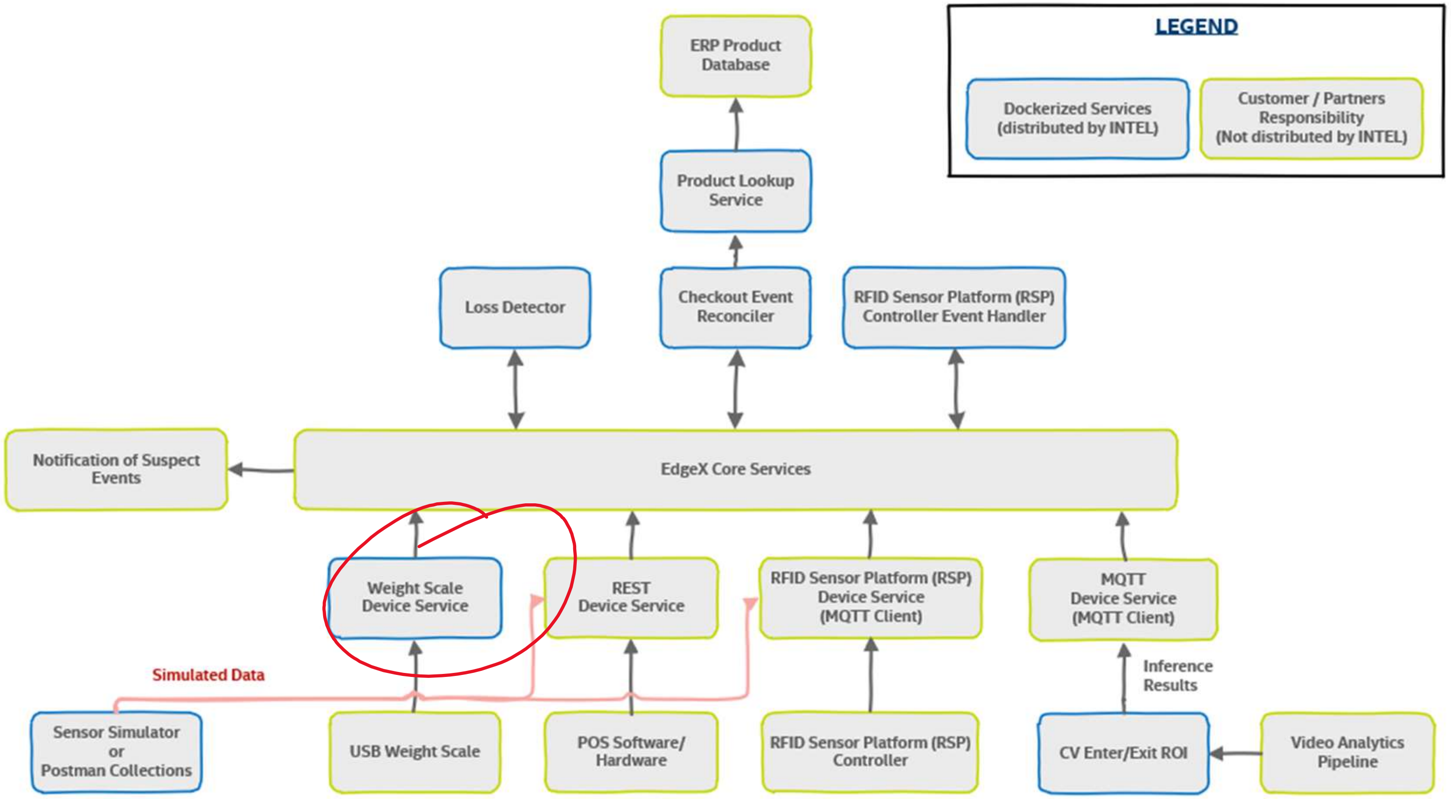
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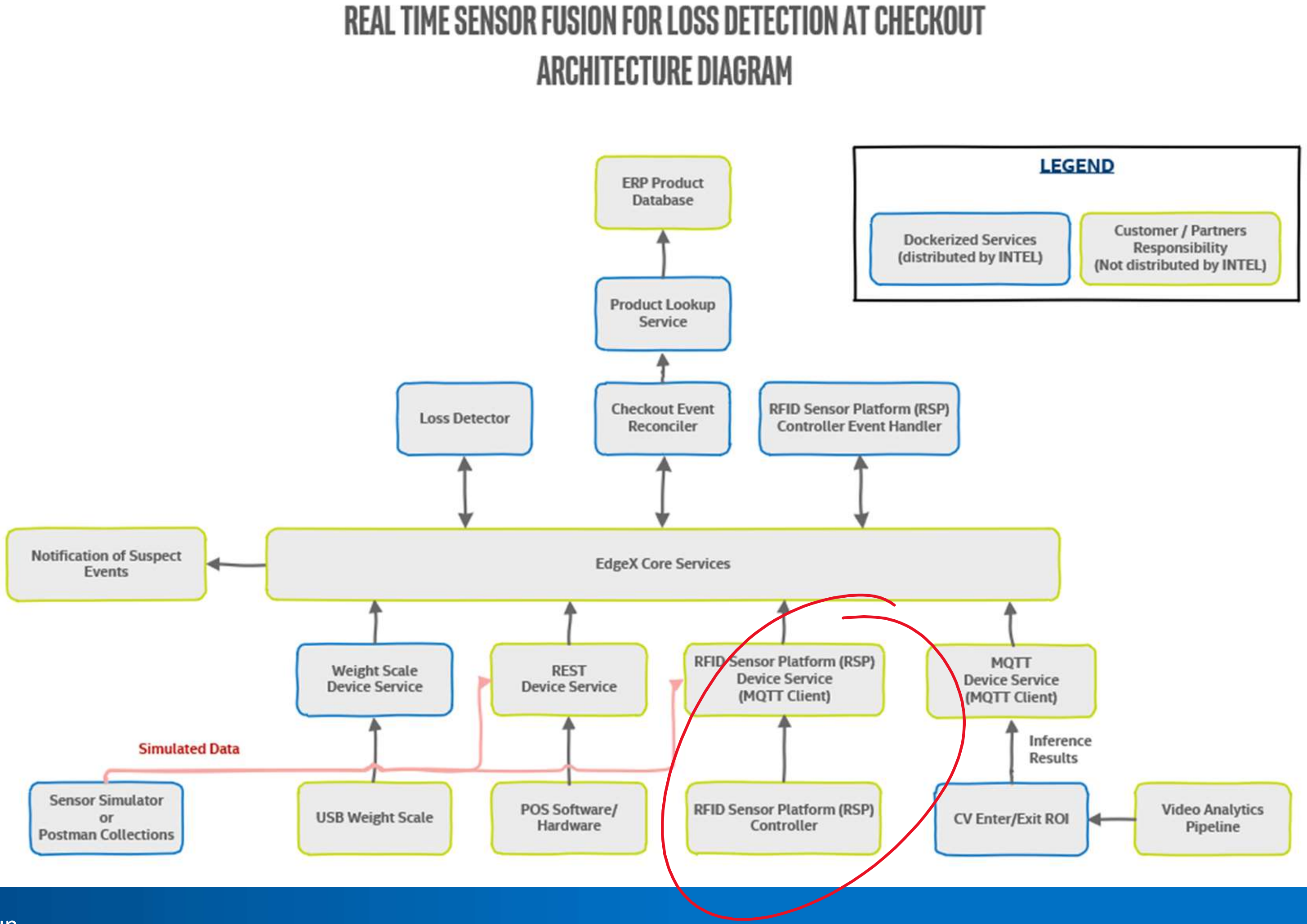
Weight scale device service

- Microservice based on EdgeX’s device service SDK
- connect to checkout lane point of sale (POS) system’s security weighing scale [the scale in the bagging area]
- Pushes scale weight reading data into EdgeX core data
- Image of docker-compose service: device-scale
- Requires running docker services:
  - the edgex-go docker services
  - Checkout-lane-reconciler docker service
- Hardware uses serial scale that communicates over the ECR Interface protocol #5

RFID Device Service



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RFID/RSP Solution and device service

- Two Services
  - Microservice based on EdgeX's device service SDK – Already integrated
  - RSP Gateway software manages RFID Sensors
- Intel RFID Solution typically used to monitor store inventory
- Available here: https://software.intel.com/en-us/retail/rfid-sensor-platform

CV/ROI Services

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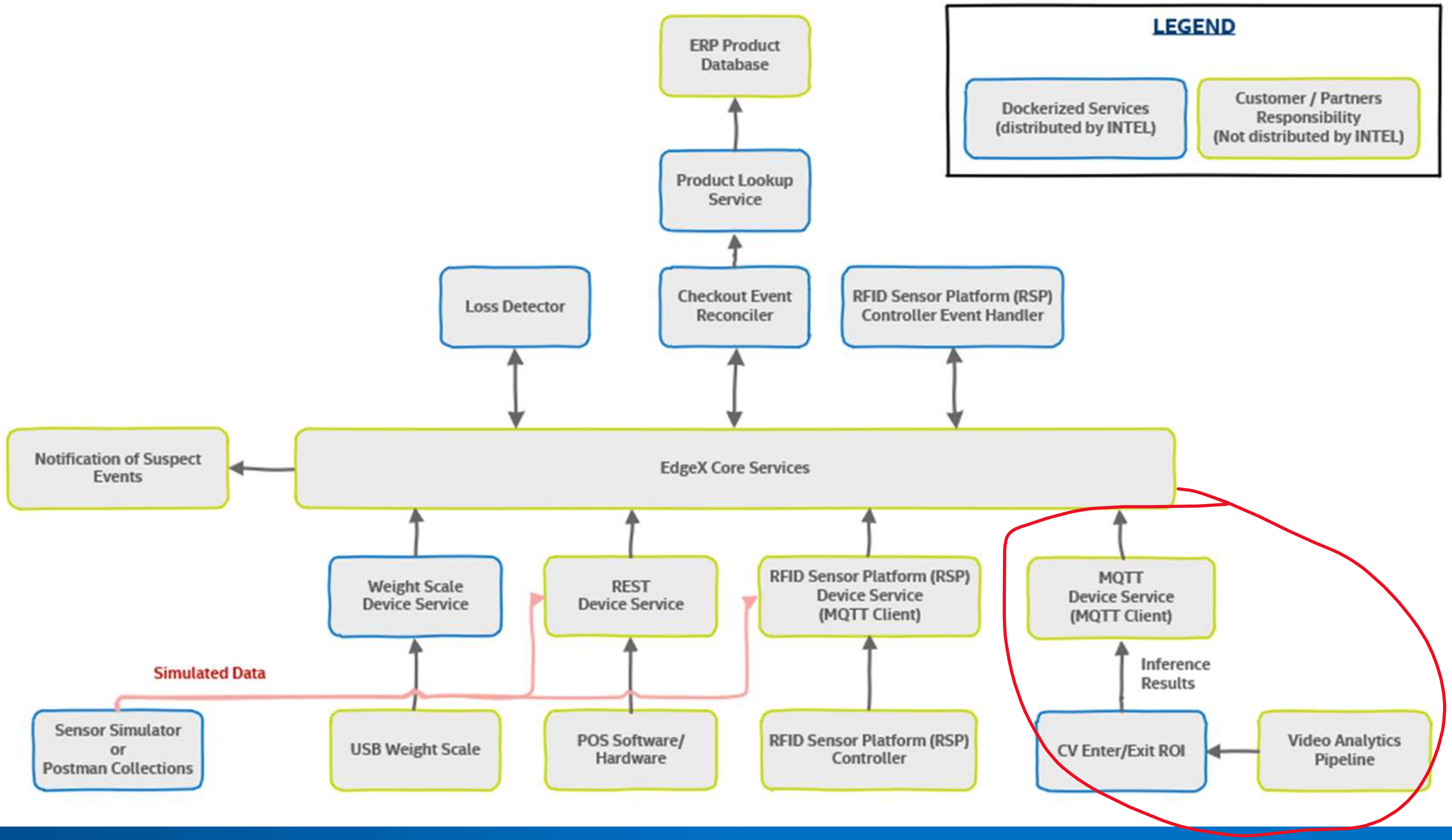
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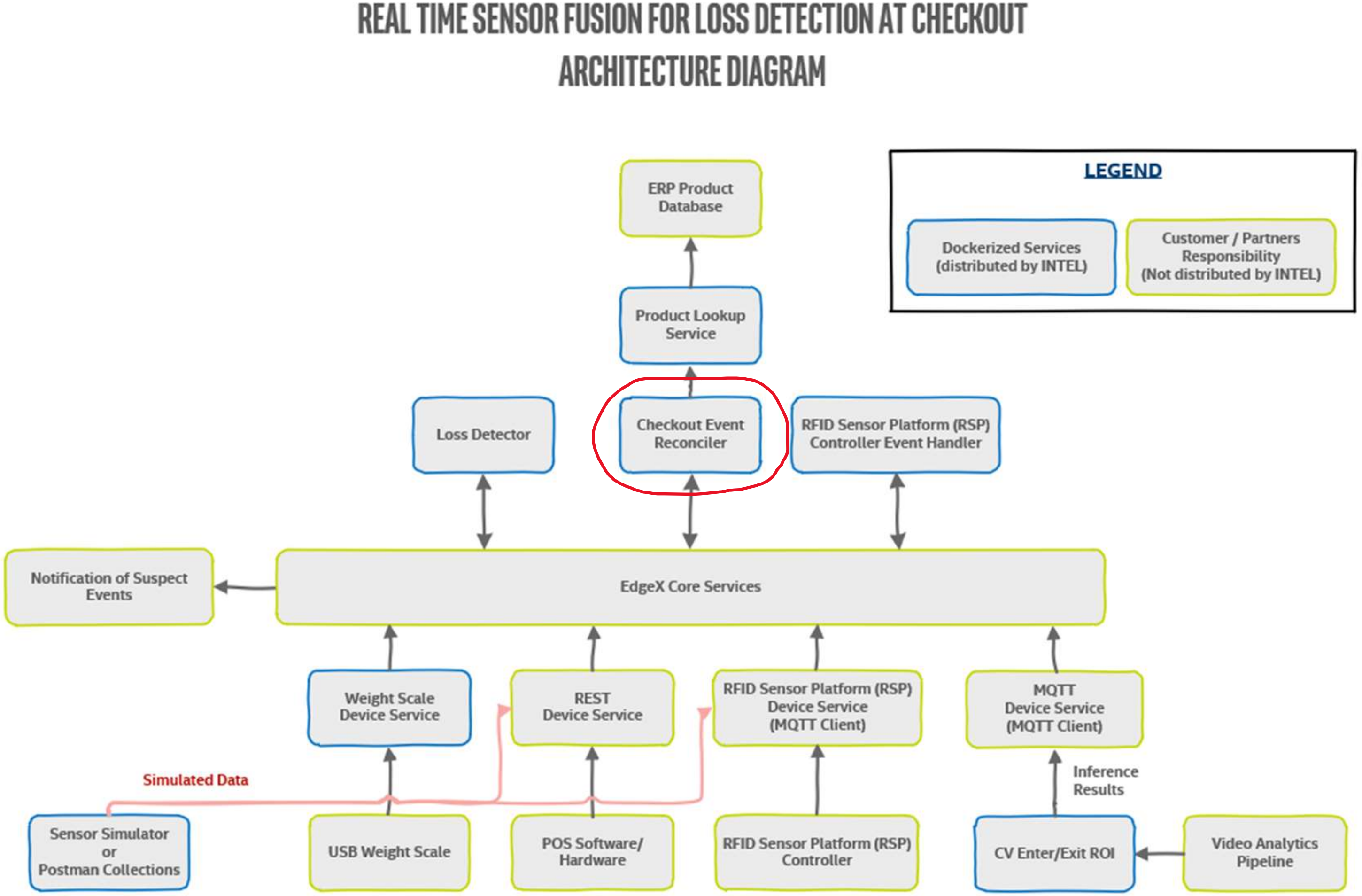
CV/ROI Services

- Three Services
  - VAS – RESTful front end to managing a video ingestion pipeline
  - CV/ROI Service – interprets inference data from VAS to determine Region of Interest(ROI)
  - MQTT Device Service ingests data
- Available here: https://github.com/intel/video-analytics-serving

Basket / Checkout-lane Reconciler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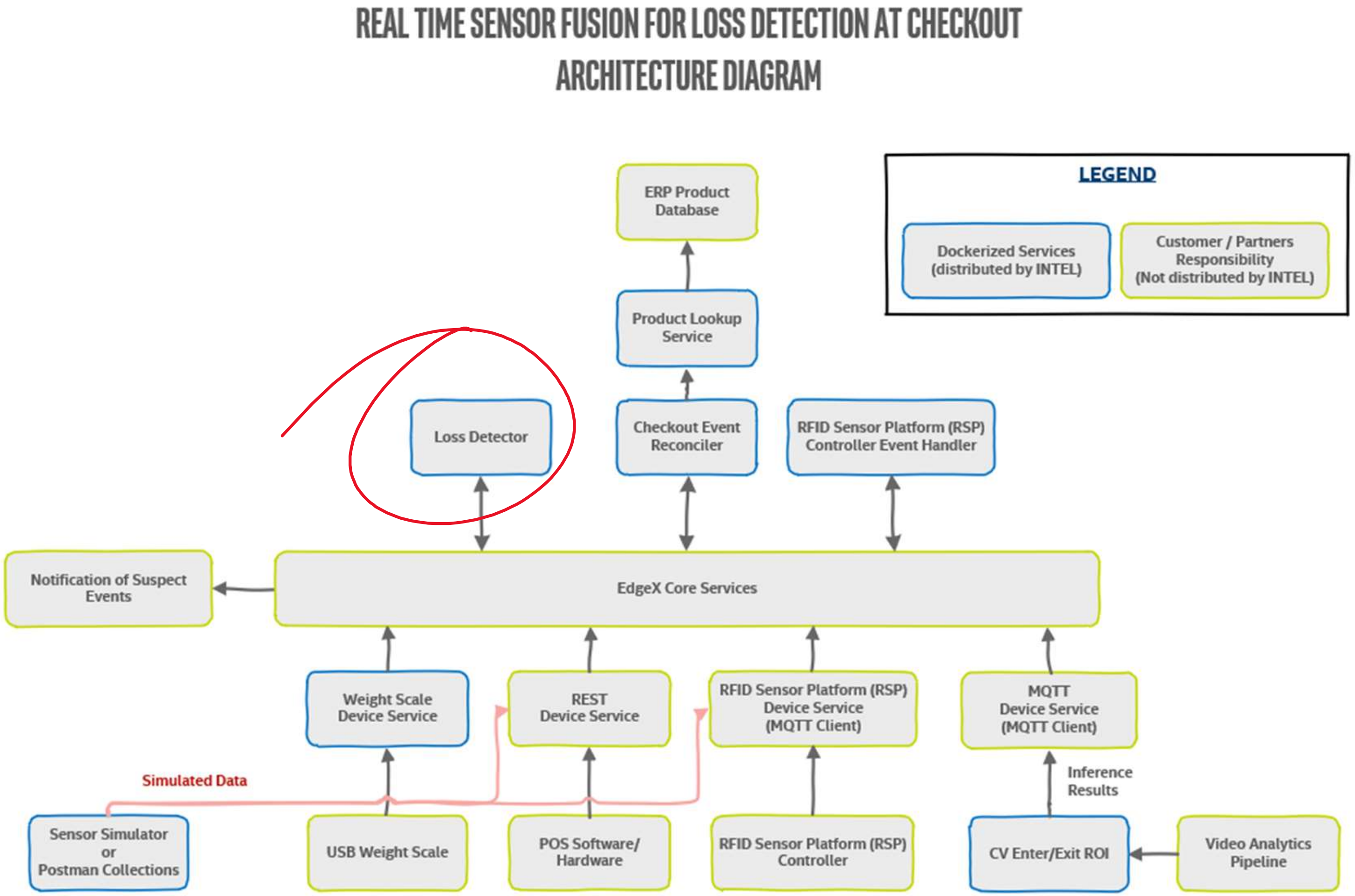
Checkout-lane or basket reconciler service is a micro service based on EdgeX's App Function SDK

- Keeps track of POS + Scale events to reconcile them in the case of theft detection
- Gets POS event data from EdgeX core data
- Push suspect items to Loss Detector
- Image of docker-compose service: checkout-lane-reconciler
- Requires running services:
  - EdgeX Docker services
  - PIM (Product Item Menu) lookup Docker service
  - Loss detector Docker service

Loss Detector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Loss detector service

- Microservice based on EdgeX's App Function SDK
- Receives events from the EdgeX bus (from Reconciler)
- Processes loss detection modality for suspect scale items and sends notifications
- Image of docker-compose service: loss-detector
- Requires running services:
  - EdgeX Docker services
  - SMTP server available

PIM-Lookup Service

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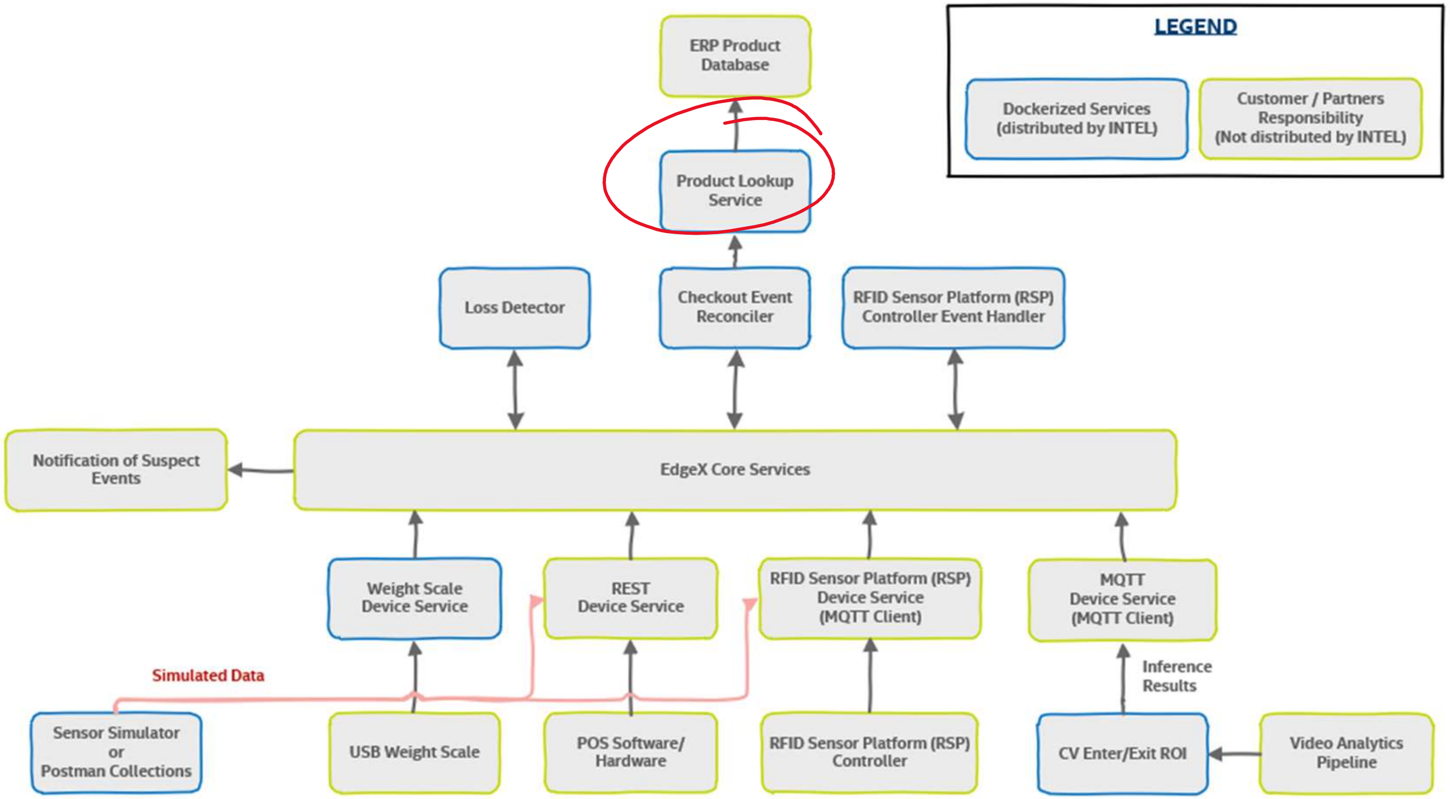
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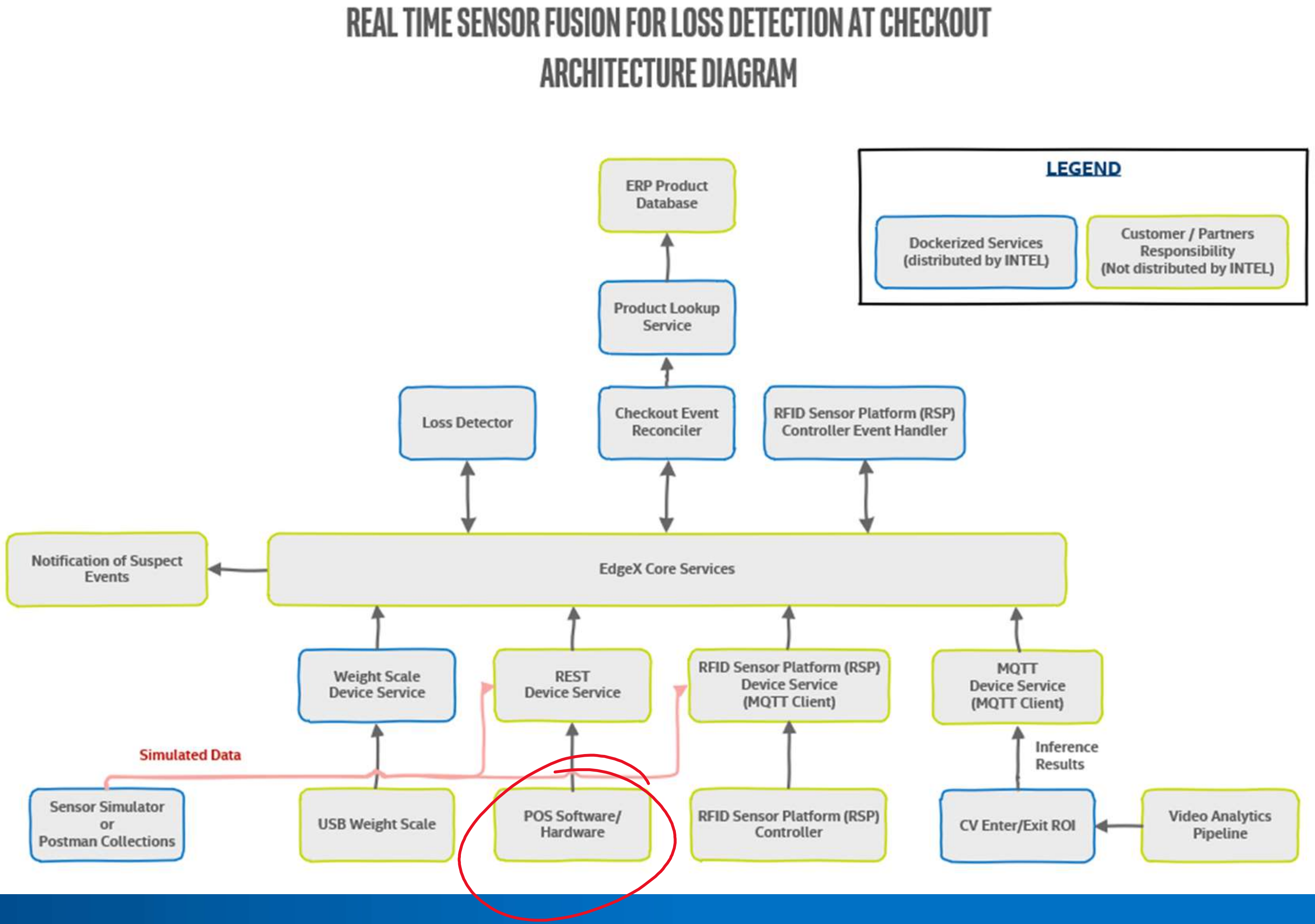
PIM-Lookup service

- Microservice to get the product weight min/max values
- For Unicenta POS SW: PIM values are stored in MySQL database
- Database initialization is required to preload demo PIM values
- Image of docker-compose service: pim-lookup
- The service also can fill the PIM fields of products of Unicenta MySQL via command line flag **–file="path to JSON file".** This is useful when the 3rd party POS database is not available and one can use the local file.

POS Software- Unicenta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Unicenta is 3rd party POS (point of sales) software application uses to create POS events

- POS events examples: basket open, payment start, payment close, basket close
- Requires Oracle Java SE DK to be installed first
- Requires MySQL database instance as the backend storage of Unicenta
- Provides some Java plugin scripts to interacts with product data and send the POS event data as JSON output
- Those pre-requisites can be provided through built MySQL docker image that has DB initialized with products and plugin scripts

Setup process

Run **docker-compose up** to have all components up and running. But if Unicenta is not available in docker, one can do the steps as follows:

1. Download and install Oracle Java SE DK: https://www.oracle.com/technetwork/java/jdk8-downloads-2133151.html
2. Download and install Unicenta: https://unicenta.com/download-files/installers/
3. If not yet, configure mysql database (included in docker-compose) for Unicenta to run
4. All backend server ingredients are in docker-compose YAML to bring up all necessary services: docker-compose up
5. If running Unicenta as standalone, one can use installed shell script to start in command line: /opt/unicentaopos-4.6/start.sh

Meeting Dial-in

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Thank you