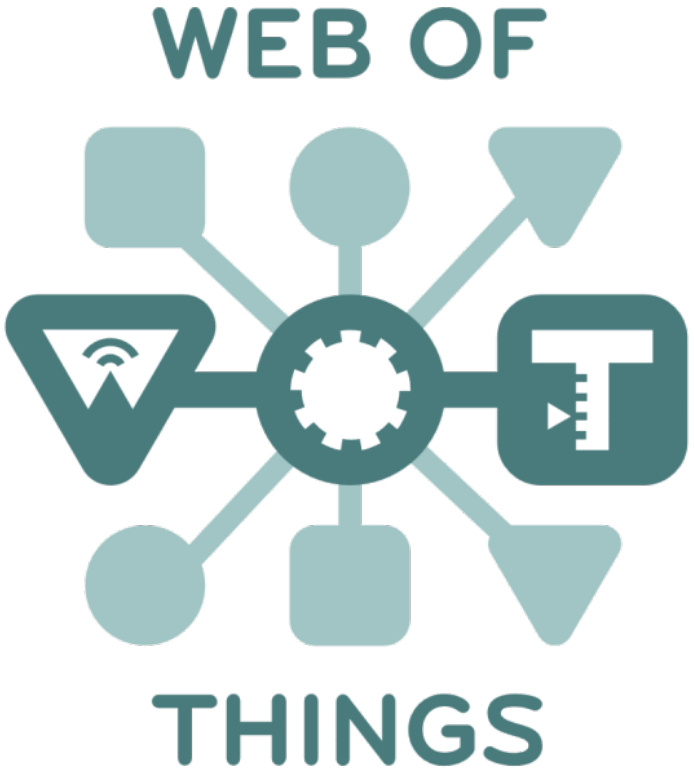


EdgeX/Conexxus Retail PoC

18 March 2020

Outline

- Goals: Retail Modernization
- EdgeX Foundry
- Intel’s Open Retail Initiative (ORI)
- WoT/EdgeX/ORI/Conexxus PoC

Retail Modernization via AI/IoT

What is EdgeX Foundry?

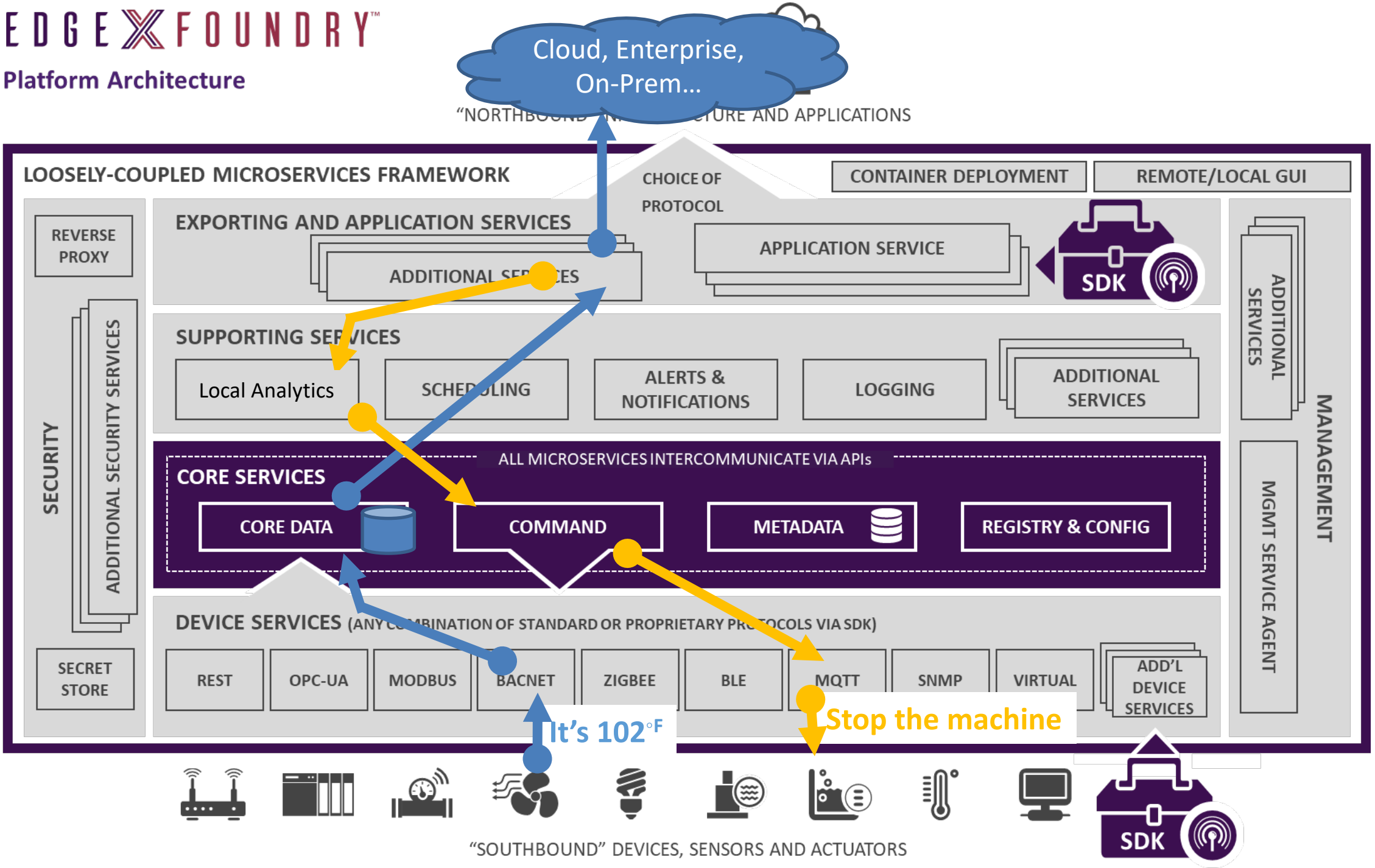
- An open source, vendor neutral project (and ecosystem)
- A micro service, loosely coupled software framework for IoT edge computing
- Hardware and OS agnostic
- Linux Foundation, Apache 2 project
  - Started April 2017

EdgeX Primer

- A collection of a dozen+ micro services
  - Written in multiple languages (Go, C, Java, … we are polyglot believers!!)
- EdgeX data flow:
  - Sensor data is collected by a **Device Service** from a thing
  - Data is passed to the **Core Services** for local persistence
  - Data is then passed to **Application Services** for transformation, formatting, filtering and can then be sent “north” to enterprise/cloud systems
  - Data is then available for edge analysis and can trigger device actuation through Command service
  - Many others services provide the supporting capability that drives this flow
- REST communications between the service
  - Some services exchange data via message bus (core data to export services and rules engine)
- Micro services are deployed via Docker and Docker Compose

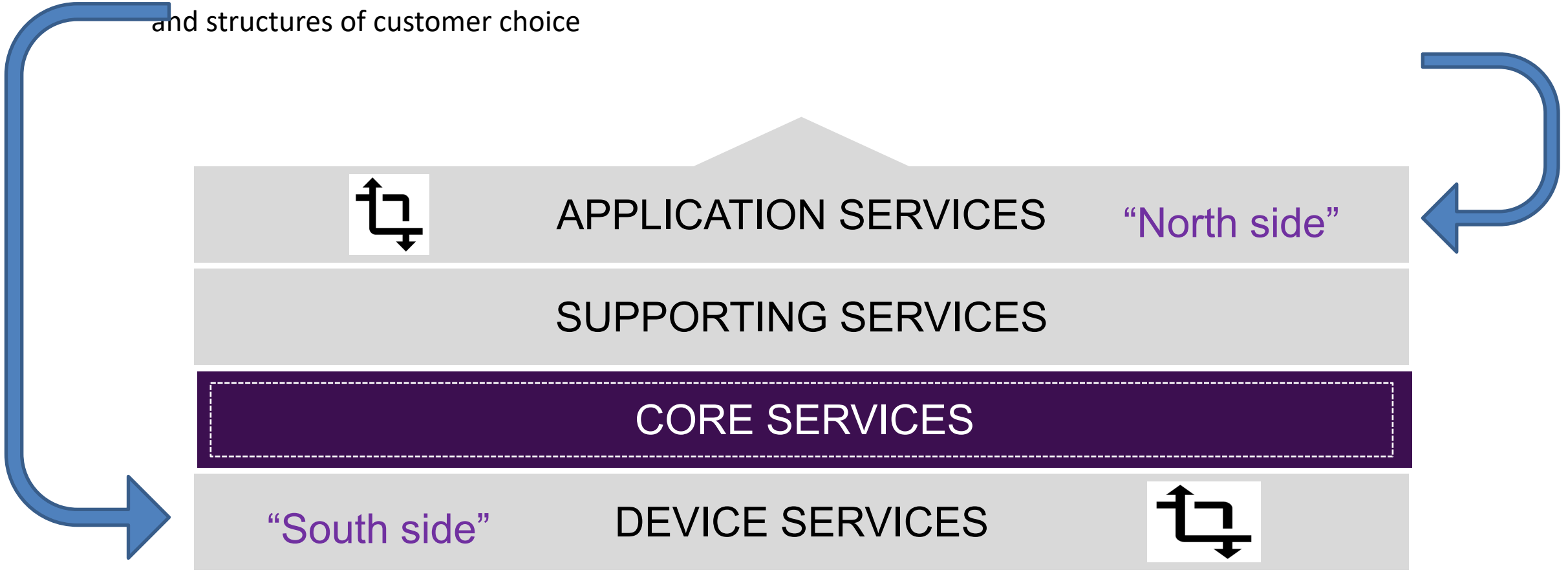
EDGE X FOUNDRY™

Platform Architecture



Dual Transformation Engine

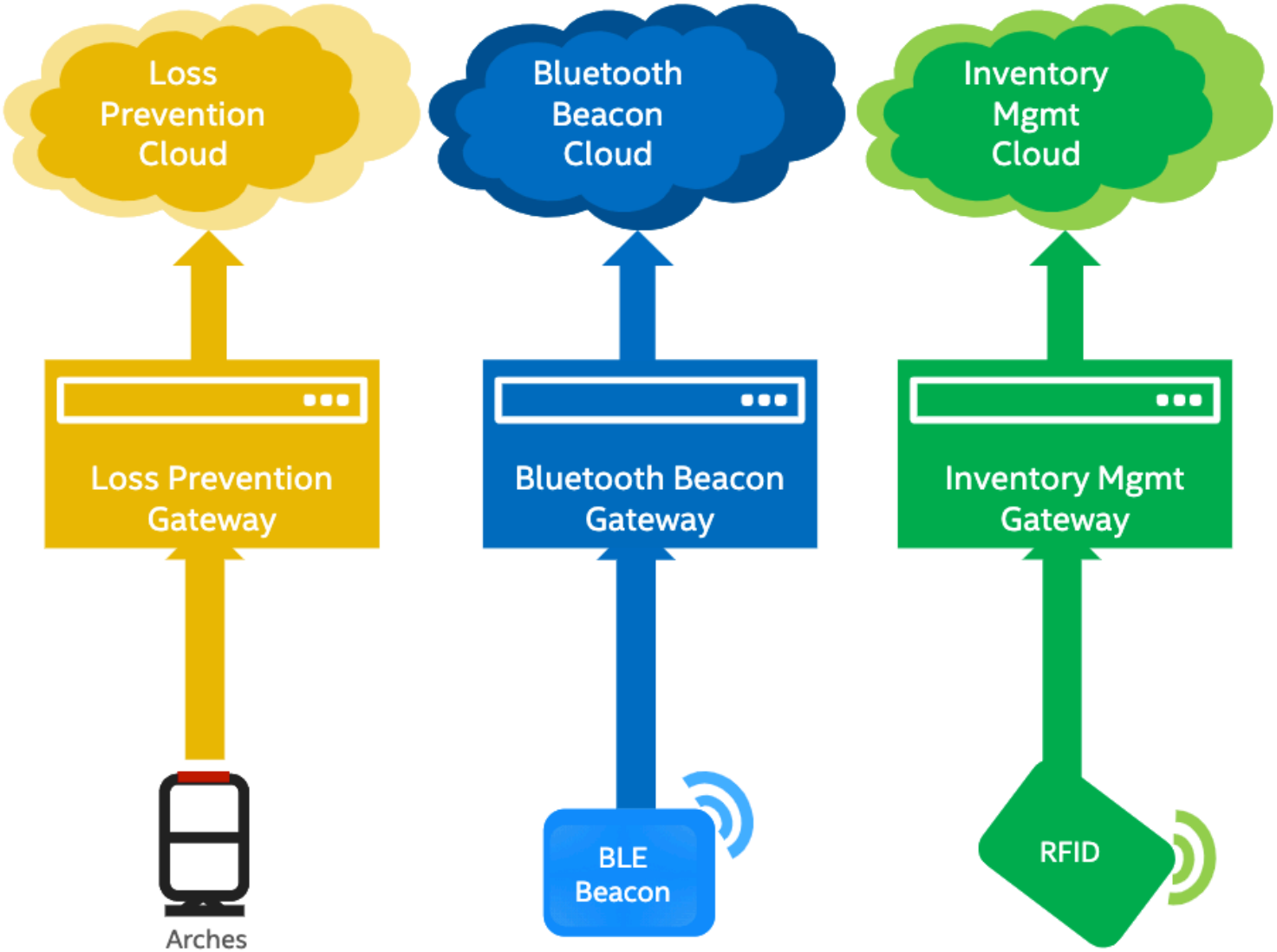
- The layers (and services) of EdgeX constitute **a dual transformation engine**
  - 1x - Translating information coming from sensors and devices via hundreds of protocols and thousands of formats into EdgeX
  - 2x - Delivering data to applications, enterprises and cloud systems over TCP/IP based protocols in formats and structures of customer choice



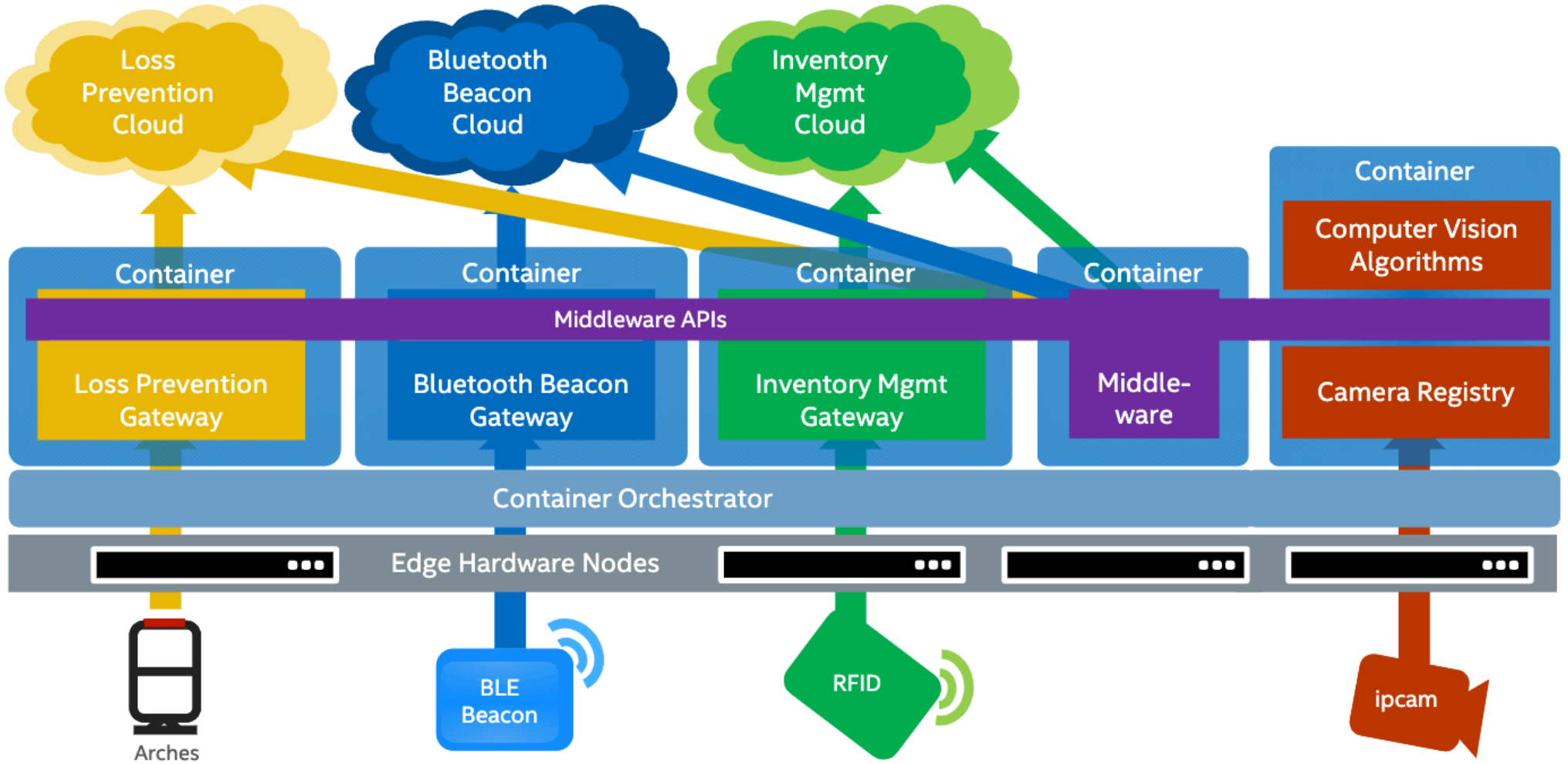
Open Retail Initiative

- A marketing initiative to
  - Promote open source collaboration at the edge
  - Encourage participation in the EdgeX Vertical Solutions WG “Commerce Project”
- Supports retail applications
- Sponsors a number of recipes and reference frameworks
- For retail edge computing applications built around EdgeX
- Sponsored by Intel

Current Situation: Multiple Silos

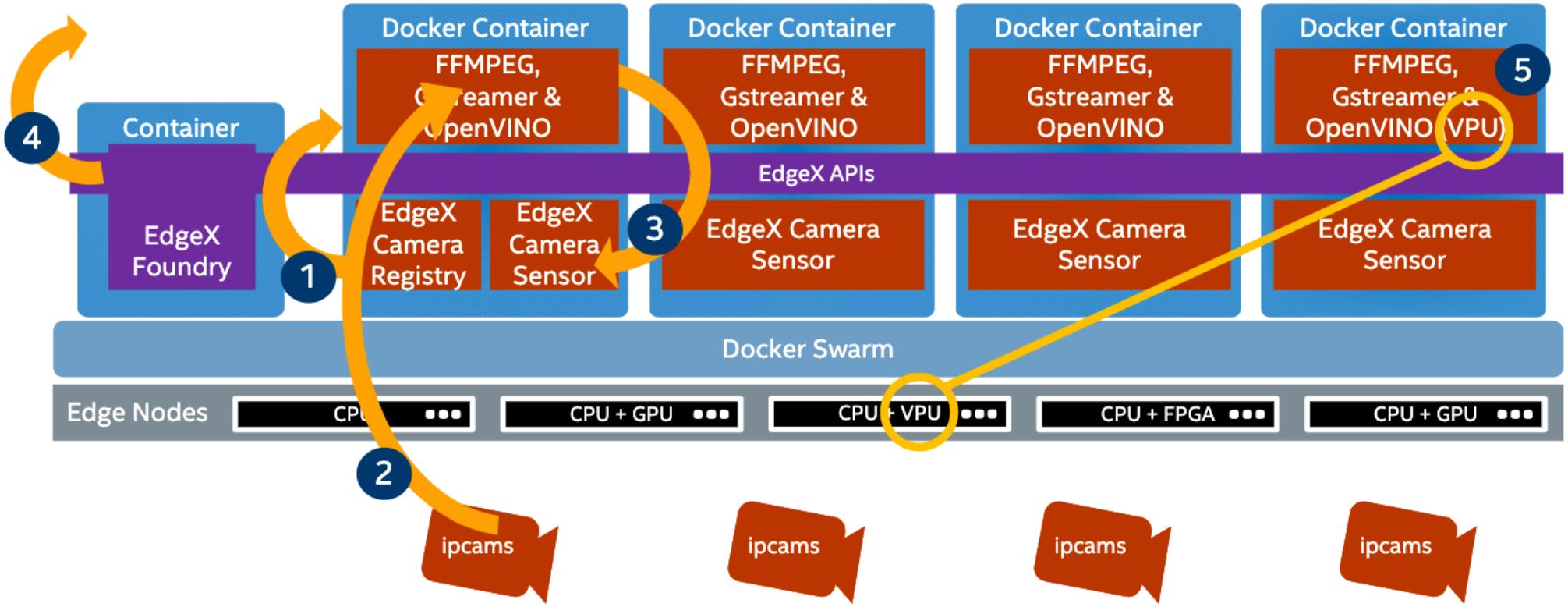


ORI Goals: Consolidation and Integration

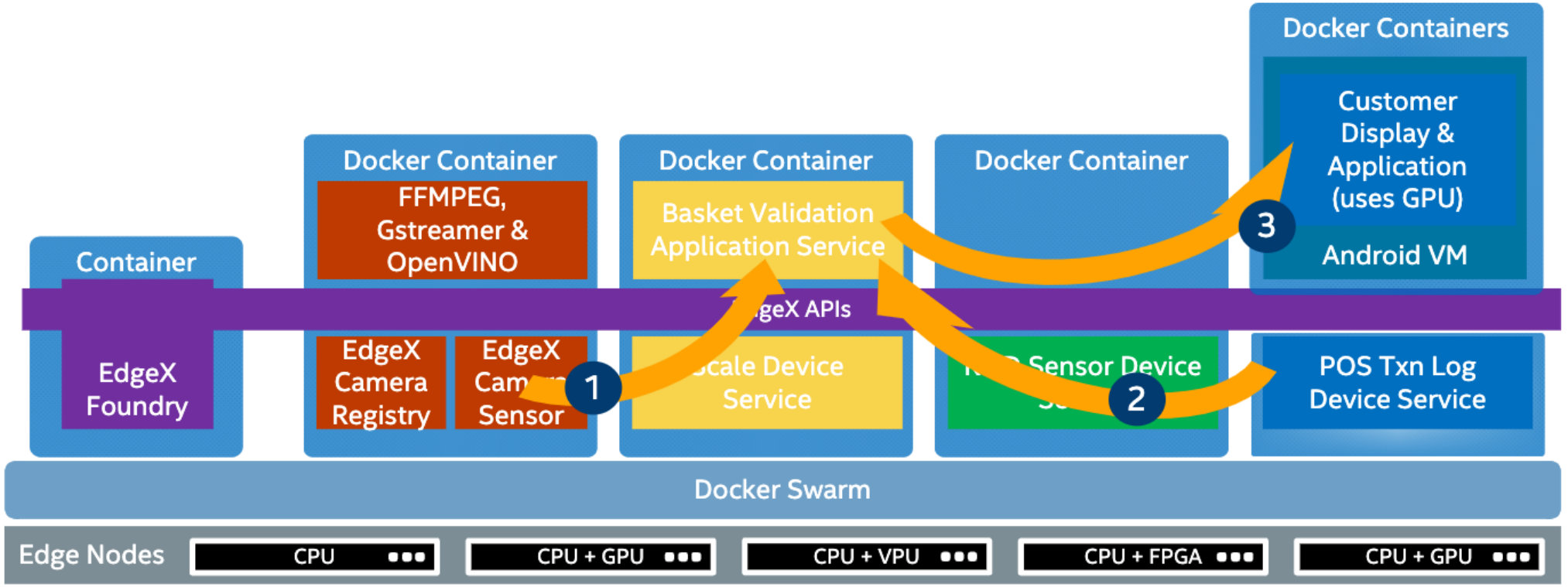


ORI: Computer Vision Example

1. Gstreamer pipelines are spun up based on camera tags
2. IP cameras stream data to Gstreamer pipelines
3. Inference events are published to EdgeX
4. EdgeX makes inference available for apps and export
5. Containers utilize accelerators when available



ORI: Data Fusion Example



1. Cameras are used as virtual sensors in the experience
2. Sensors such as scales and scanners feed the basket validation algorithms
3. Data from separate sources, separate vendors, are utilized to guide the customer experience

EdgeX APIs and Metadata

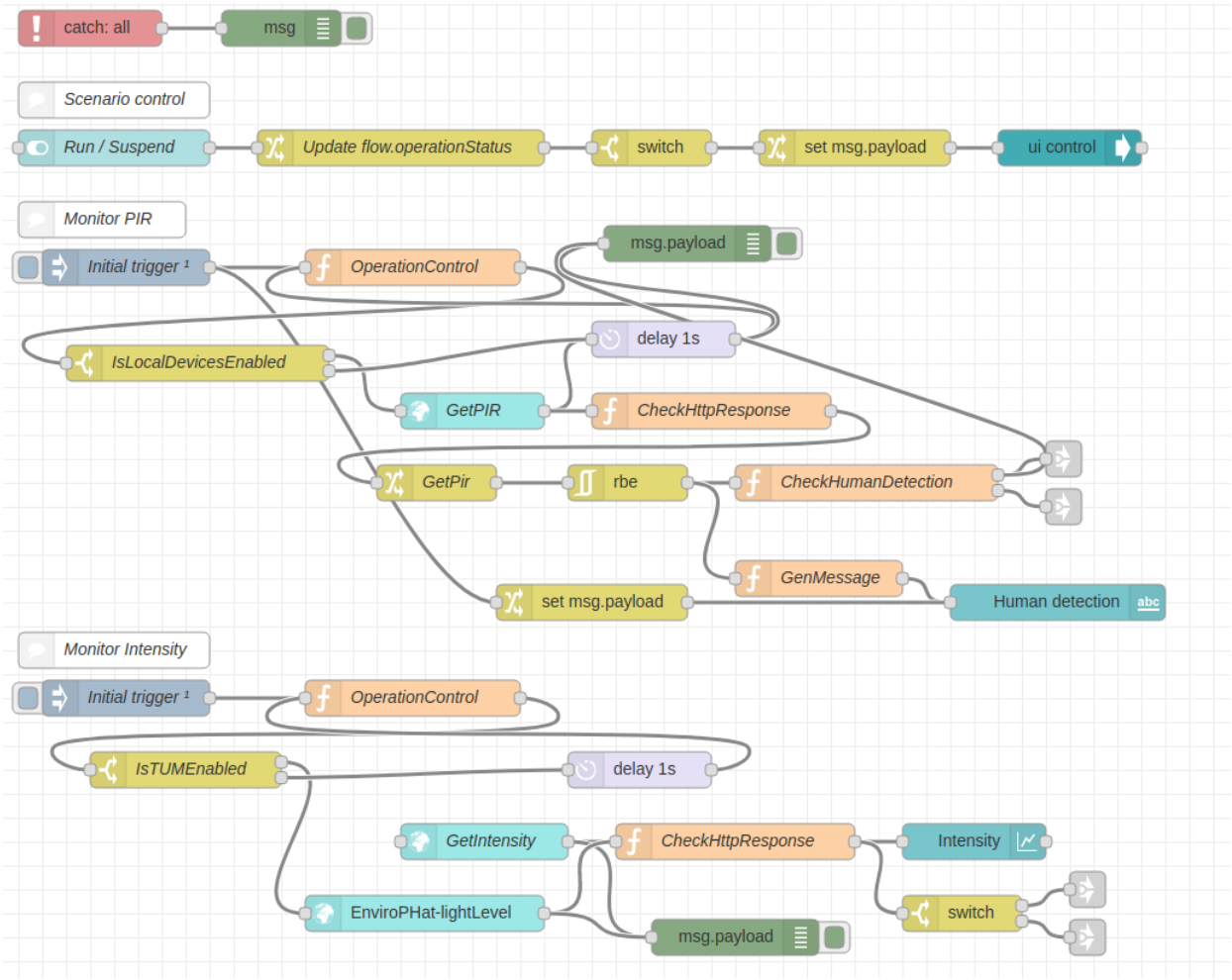
- EdgeX includes a “metadata service”
- APIs for device access translate protocols into a common protocol
  - Based on HTTP
  - Payloads use JSON or CBOR
  - Events use ZeroMQ
- Service APIs have OpenAPI descriptions

Proposed WoT/EdgeX Integration

1. Generate WoT Thing Description metadata for all Device services
   - Including semantic tagging using ODM
2. Generate WoT Thing Description metadata for select Analytics services
   - Computer vision services
3. Prototype a Thing Directory service supporting semantic search
   - To run in parallel with existing EdgeX metadata service
   - Existing EdgeX discovery process would act as “Introduction” layer
4. Generate a template for a “Orchestration Service”
   - Using WoT Scripting API and node-wot
5. Stand up retail use case examples that integrates IoT and Analytics, ex:
   - Loss detection video analytics triggered by an IoT door sensor
   - Digital shelf signage/RFID and weight-based inventory control/item identification
   - Customized marketing content based on video analytics

PoC Definition

- Want to showcase WoT, not really a specific application
  - Have a set of devices from different manufacturers
  - Show how easy they are to orchestrate with WoT support
- Audience is “store owners”, so should be as easy as possible…
  - Suggest using Node-RED
  - Using nodes autogenerated from TDs
  - Do want some “pre-baking”…
- Show attendees how to write rules for specific scenarios
  - Script in advance, but point is fast development of orchestration rules



WoT/EdgeX/ORI/Conexxus PoC Timeline

March: Definition and planning

May: Development

April: First prototype

June: Refinement

July: Release candidate

August: Testing and integration

September: Demo Finalization

October: Show

- NACS 2020 show (in Conexxus booth): 11-14 October, Las Vegas
- TPAC 2020 meeting (+ Edge Workers…): 26-30 October, Vancouver

References

- EdgeX Foundry:
  - https://www.edgexfoundry.org/
  - https://wiki.edgexfoundry.org/
  - https://wiki.edgexfoundry.org/display/FA/Commerce+Project
- Intel Open Retail Initiative
  - https://www.intel.com/content/www/us/en/retail/open-retail-initiative.html
- Conexxus
  - https://www.conexxus.org/

Additional EdgeX Foundry Project Links

Access the code:

https://github.com/edgexfoundry

Access the technical documentation:

https://docs.edgexfoundry.org/

Access technical video tutorials:

https://wiki.edgexfoundry.org/display/FA/EdgeX+Tech+Talks

EdgeX Blog:

https://www.edgexfoundry.org/news/blog/

Join an email distribution:

https://lists.edgexfoundry.org/mailman/listinfo

Join the Slack Channels:

https://slack.edgexfoundry.org/

Become a project member:

https://www.edgexfoundry.org/about/members/join/

LinkedIn:

https://www.linkedin.com/company/edgexfoundry/

Twitter:

https://twitter.com/EdgeXFoundry

Youtube:

https://www.youtube.com/edgexfoundry