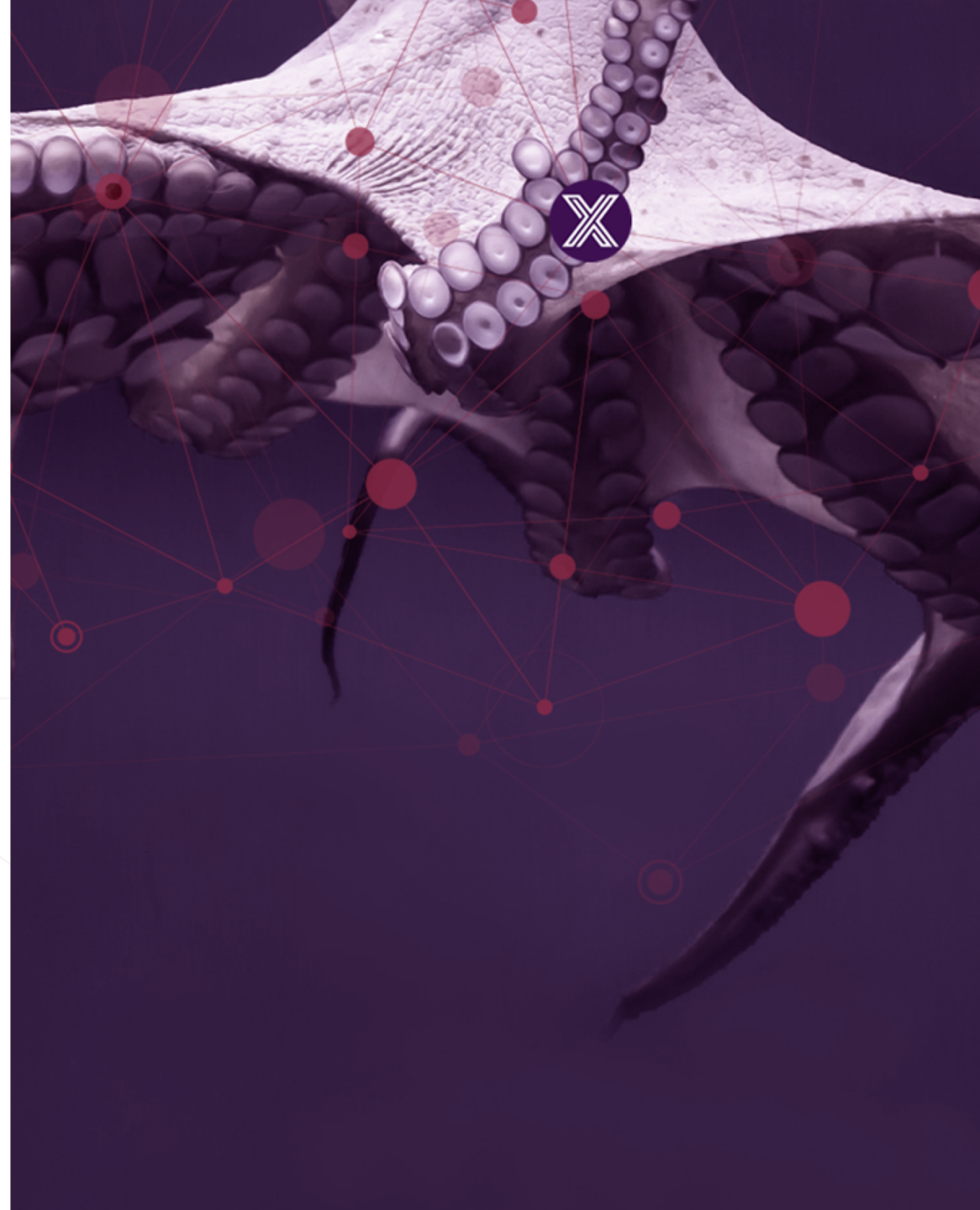




Commerce Project Business Update

Seoul F2F

April 30th, 2019



Agenda

1. Status of the Commerce Project
2. Review London ORI Materials for context on positioning
3. Enumerate Use Cases underway
4. Introduce technical topics

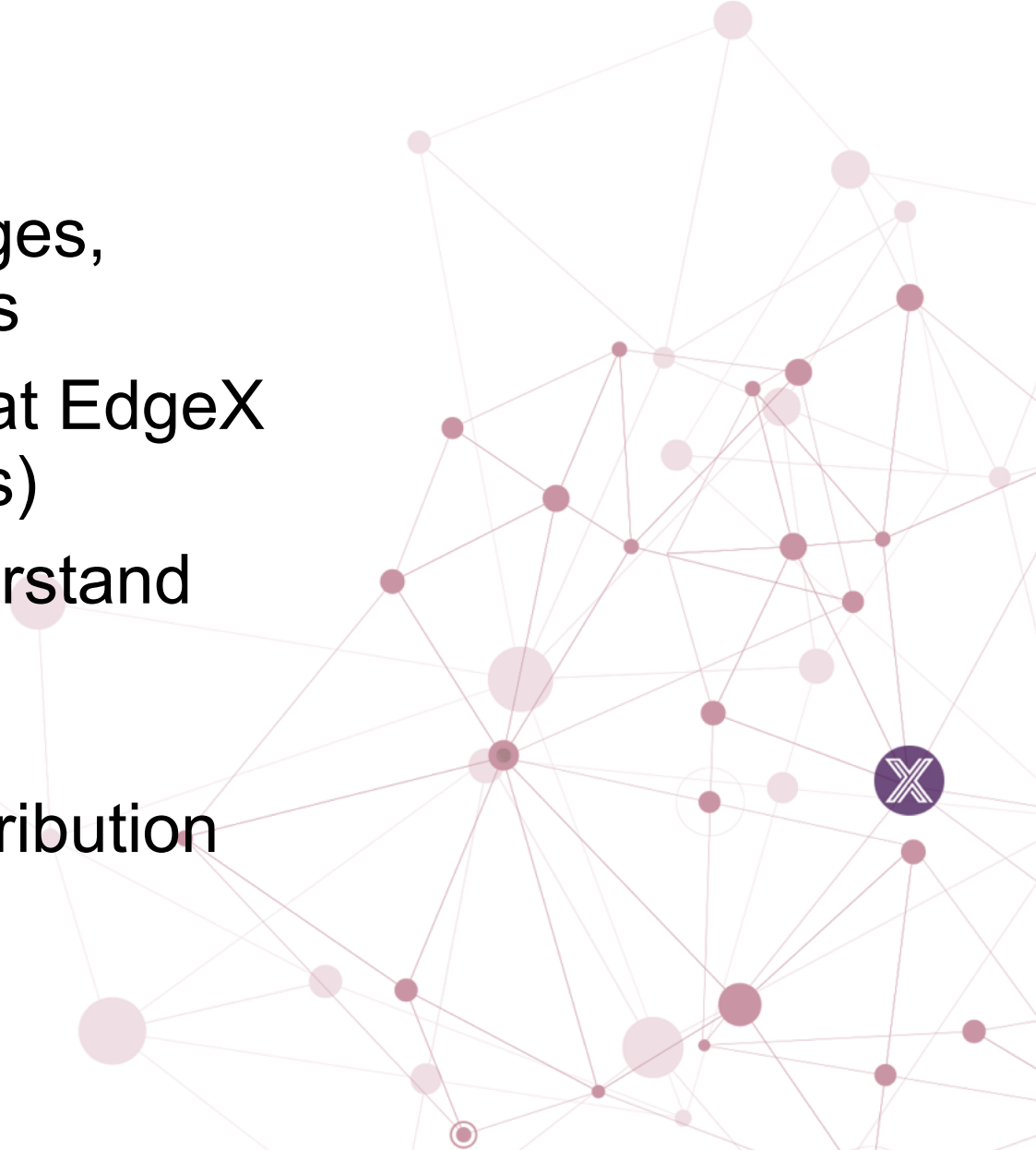
Commerce Project Charter

- Increase utilization of EdgeX Foundry and related OSS efforts in retail and commerce environments
- Reduce cost and complexity of solution deployments
- Decrease time required to evaluate and deploy new IOT use cases



Typical Activities

- Retailer presentations on IOT challenges, opportunities and vendor requirements
- Review retail use cases and needs that EdgeX Foundry can address (example: T-logs)
- Mapping of retail value chains to understand parties required for OSS enablement, distribution and support
- Prioritization of development and contribution for EdgeX Foundry roadmap/backlog



Commerce Project Status

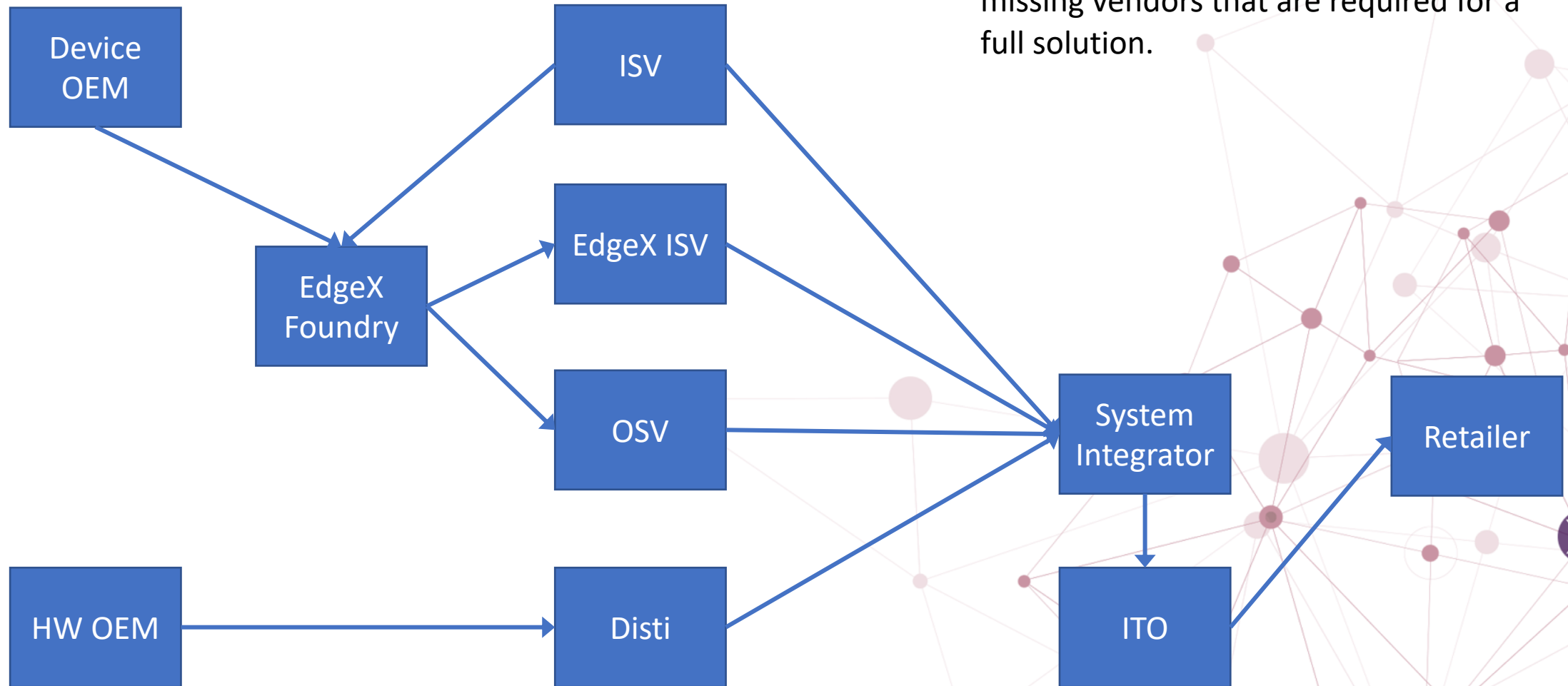
- Have been recruiting to our ORI since before NRF in January
- First partner recruiting effort in London (March)
 - 50 attendees from 30 companies
 - Broad swath of the ecosystem
- Had some calendaring snafus (mine) and then during the groups.io organization
- CTO of Vitamin Shoppe has agreed to speak soon on IOT and in-store innovation challenges – open to use case consideration
- While starting small, already creating some important connections

Commerce Project Challenges

- Still trying to figure out how to corral our recruits effectively for regular meeting awareness
- Walking the fine line between promoting use cases that are too simple, vs too complex
- Clear ask around roles of participation
 - Chicken and Egg: participate when there is demand vs need participation to enable demand

Retail EdgeX Value Chain

Notes: create version with EdgeX stack diagram, indicating missing pieces and missing vendors that are required for a full solution.





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London ORI materials

Posted at <https://wiki.edgexfoundry.org/display/FA/Commerce+Project>

Use Cases Underway

- Loss Prevention at Checkout (Intel)
- Computer Vision based Vending (Intel)
- New: Inventory Management (From CP)
- New: Airport multi-vendor integrations (From CP)



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Technical Topics

Technical Topics

- InfluxDB Ingestion Device Service

- Take advantage of all the TIG stacks and mindshare
- Proposed: Line Protocol device service
- Simultaneously: I need to put some positioning together on EdgeX vs InfluxDB
 - For example: when do we coach to pass data first through EdgeX, or first through InfluxDB for performance reasons?

Technical Topics (part 2)

- Data Sharing / Message Bus enhancements:
 - Application vs Device, or Subscriber vs Publisher?
 - Permissioned Data Sharing
 - Tiered / Federated EdgeX instances



Technical Topics (part 3)

- Industry Standards Alignment
 - Ontology alignments
 - OMG / Retail
 - ACRIS
 - CNCF CloudEvents



OMG Retail

- Reached out in April to OMG Retail Team
 - OMG's ethos is on semantics and ontologies
 - Former NRF ARTS standards are stagnating
 - But there is enthusiasm to co-work with EdgeX for standards work moving forward
- Coincidentally Doug Migliori reached Commerce Project from OMG Retail, among other
- Doug's observations:
 - Many orgs, many schemas, need a framework to help scale speed using existing standards
 - Biggest problem are conflicting ontologies
- Led us to consider his proposal for cross-industry meta data and communications

Ontology vs Connectivity

- Basic premise:
 - We are growing the CP to encourage more device and app connectivity with EdgeX
 - (Certification will be an important attribute for co-marketing purposes)
 - Ontology and semantic definitions will be more critical than the basic connectivity
 - Data sharing without writing glue logic and translators for every conflicting definition of “temperature”
 - Need to deep dive on Core Metadata for scale onboarding of broader markets and application interactions



**OBEDA™ in EdgeX Services for
Cross-Industry Semantic Interoperability**

Source: ControlBEAM

Consortia Object Class Comparison

Information Model

Top-Level

Subclass

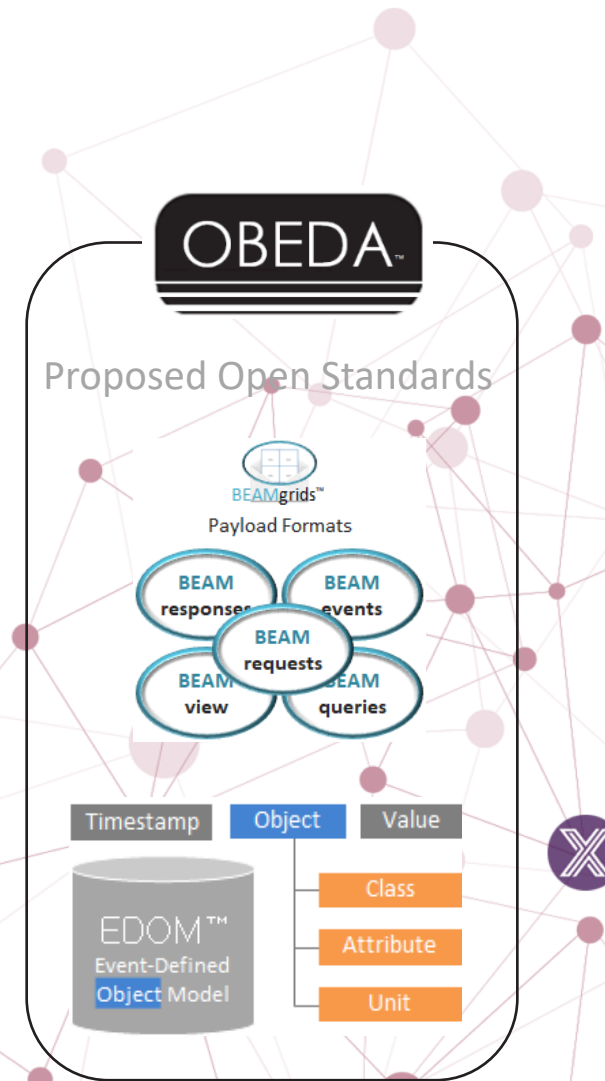
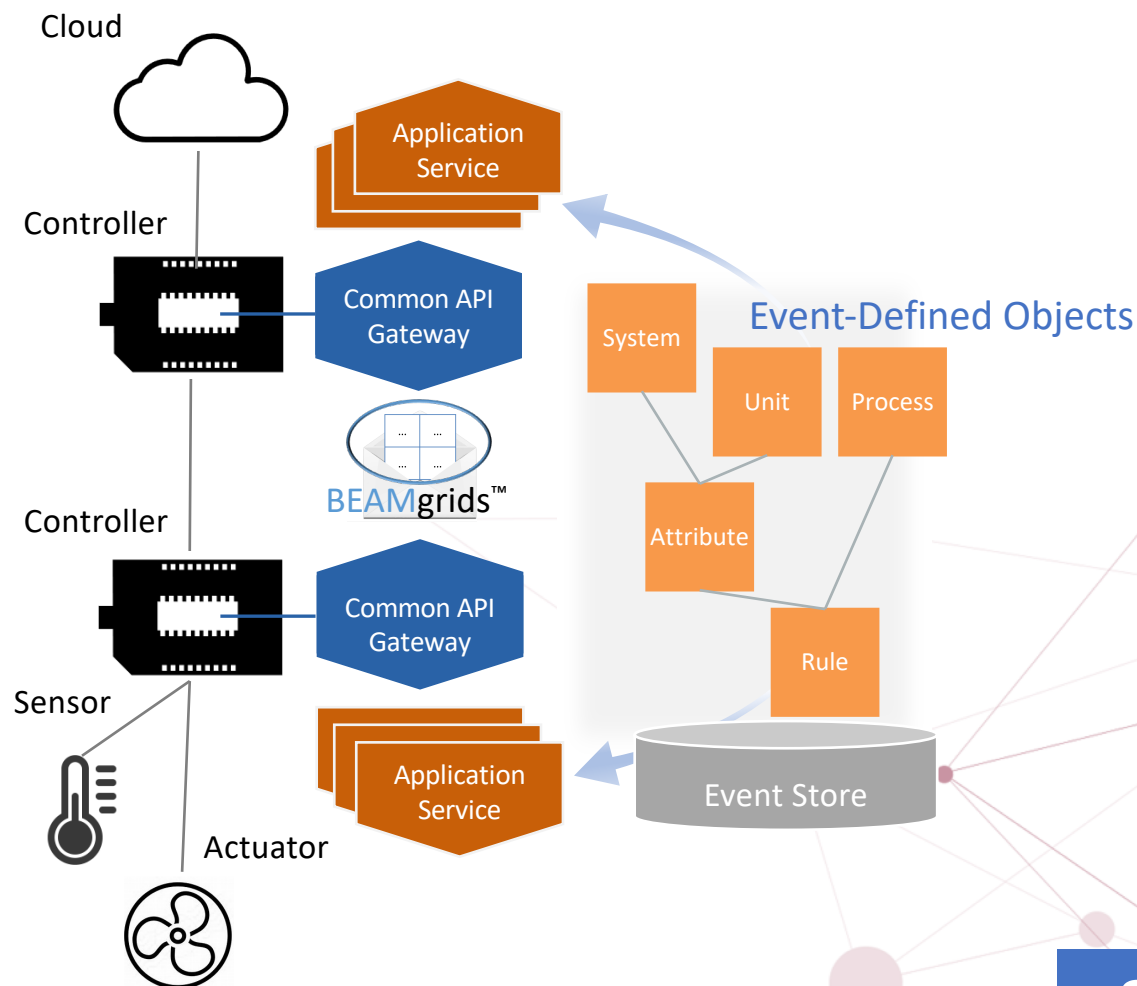
Vocabulary Term (English)	GS1 <i>EDI</i>	OMG <i>Retail Ontology</i>	Open Group <i>O-DEF</i>	Schema .org <i>Ontology</i>	ACRIS <i>Ontology</i>
Object	Object		Object	Thing /Item	
Class	Class		Object Class	Type	
Attribute				Property	
Asset	Asset	Asset	Resource		
Offering				Offer	Offering
Product	Product	Item	Product	Product	Product
Service				Service	Service
Location	Place	Place		Place	Location
Party	Party	Party			Party
Person		Person	Person	Person	Person
Organization		Organization	Enterprise	Organization	Organization
Agreement		Transaction			Agreement
System			Environment		
Process			Process	Action	
Rule			Law-Rule		
Connection	Permissioned Data				



Source: ControlBEAM

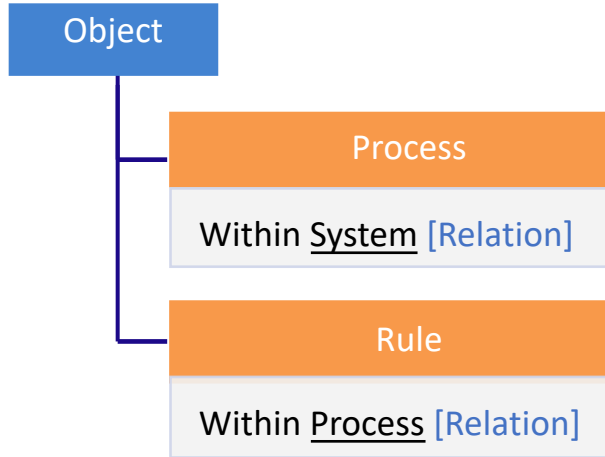
OBEDA in Infrastructure as a Service (IaaS)

Distributed Edge-to-Cloud Computing (M2M2B2B2C)



Source: ControlBEAM

Consuming and Producing Events through System Processes



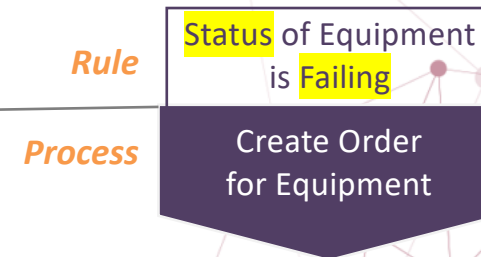
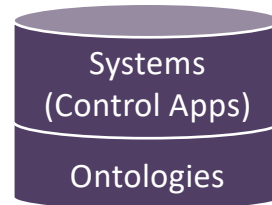
Ontology-Based Business Process Modeling (BPM)

Ontology-Based System Modeling

At 10:59 on 10/25/17
 the Status of Motor # fan6 is Failing



Timestamp	Class	Object	Attribute	Value	Unit
2017-10-25...	5787...	fan6	602A...	2	

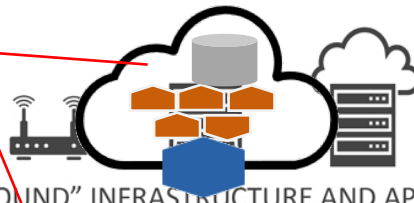


Order				
[Retailer]		Number: 1032		
3100 Main Street		Date: 10/25/2017		
Suite 401				
Irvine, CA 92660				
Item	Quantity	Price	Total Price	
28301-42, Fan	1	129.95	129.95	

Timestamp	Class	Object	Attribute	Value	Unit
2017-10-25...	B426...	G831...	5584...	02G2...	
"	"	"	E5E4...	Y238...	
"	"	"	EC7E...	277F...	
"	059Z...	0283...	5584...	02G2...	
"	"	"	9BC5...	G831...	
"	"	"	562D...	I8G0...	
"	"	"	C40E...	1	
"					

Source: ControlBEAM

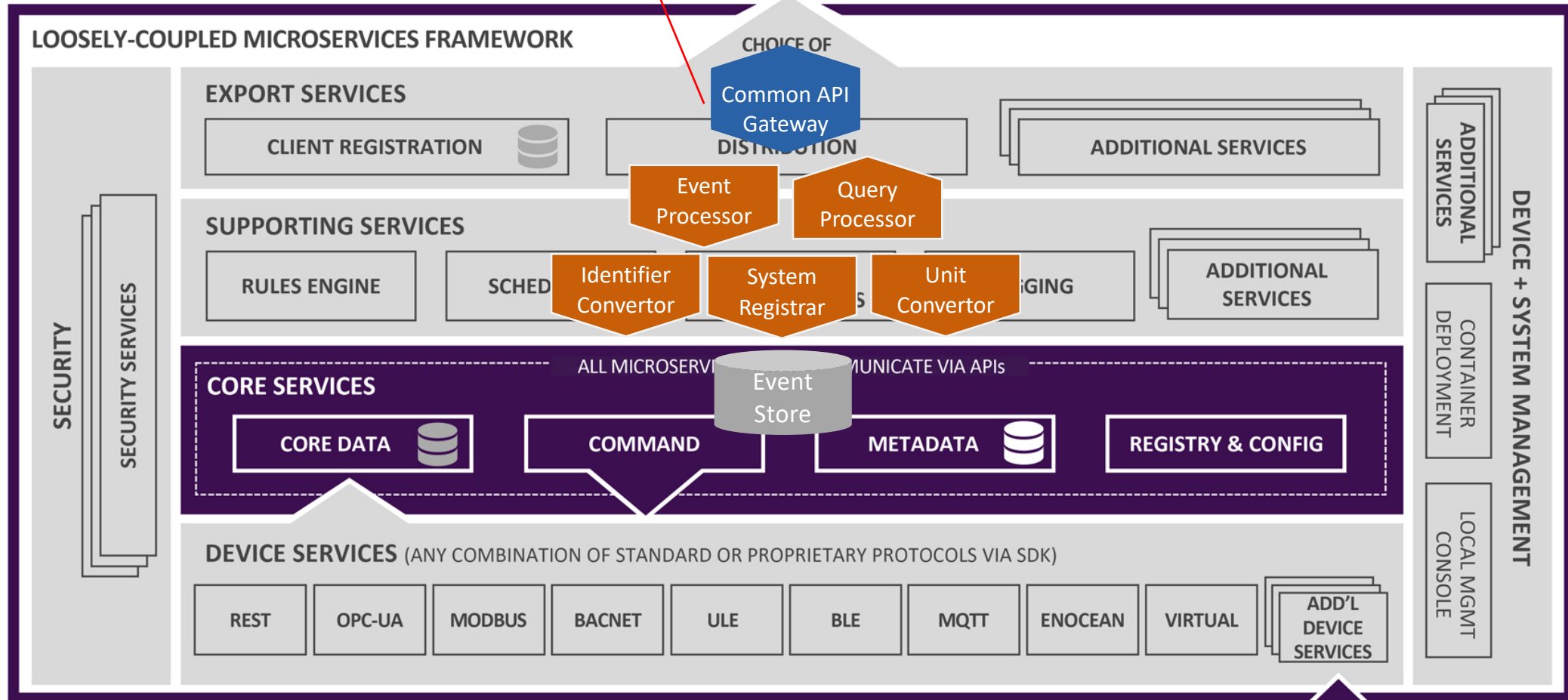
Integrate
Common
Application
Services in all
nodes



“NORTHBOUND” INFRASTRUCTURE AND APPLICATIONS

REQUIRED INTEROPERABILITY FOUNDATION

REPLACEABLE REFERENCE SERVICES



“SOUTHBOUND” DEVICES, SENSORS AND ACTUATORS

Source: ControlBEAM

Utilizing Common Payload Formats within EdgeX Services



Simple queries that use same common format supporting complex queries

Integration provided:

- Messaging
 - Message Bus
 - HTTP
 - JSON/CBOR messages
- Configuration Events
 - Local
 - Remote Registry
- Logging Events
 - Correlation ID tracing
 - Access to logging client
- System Management Telemetry Events
 - CPU Usage
 - Memory Usage
 - etc.
- Events marked as exported

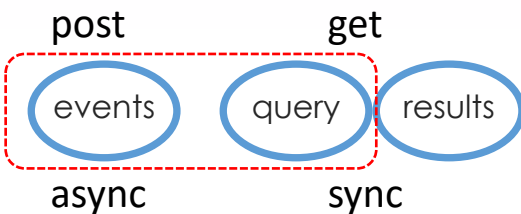
...10:30:38
 "the Status of **Process** ID 4920... is Invoked"

...11:12:33
 "the CPU Usage of **Device** ID 2948... is 32"

...11:15:49
 "the Memory Usage of **Device** ID 8620... is 64"

ontology-based semantic identifiers
 (replaces overloaded single element "topic"/"key")

Common formats used by Core & Supporting Services (Logging, Messaging, Telemetry)



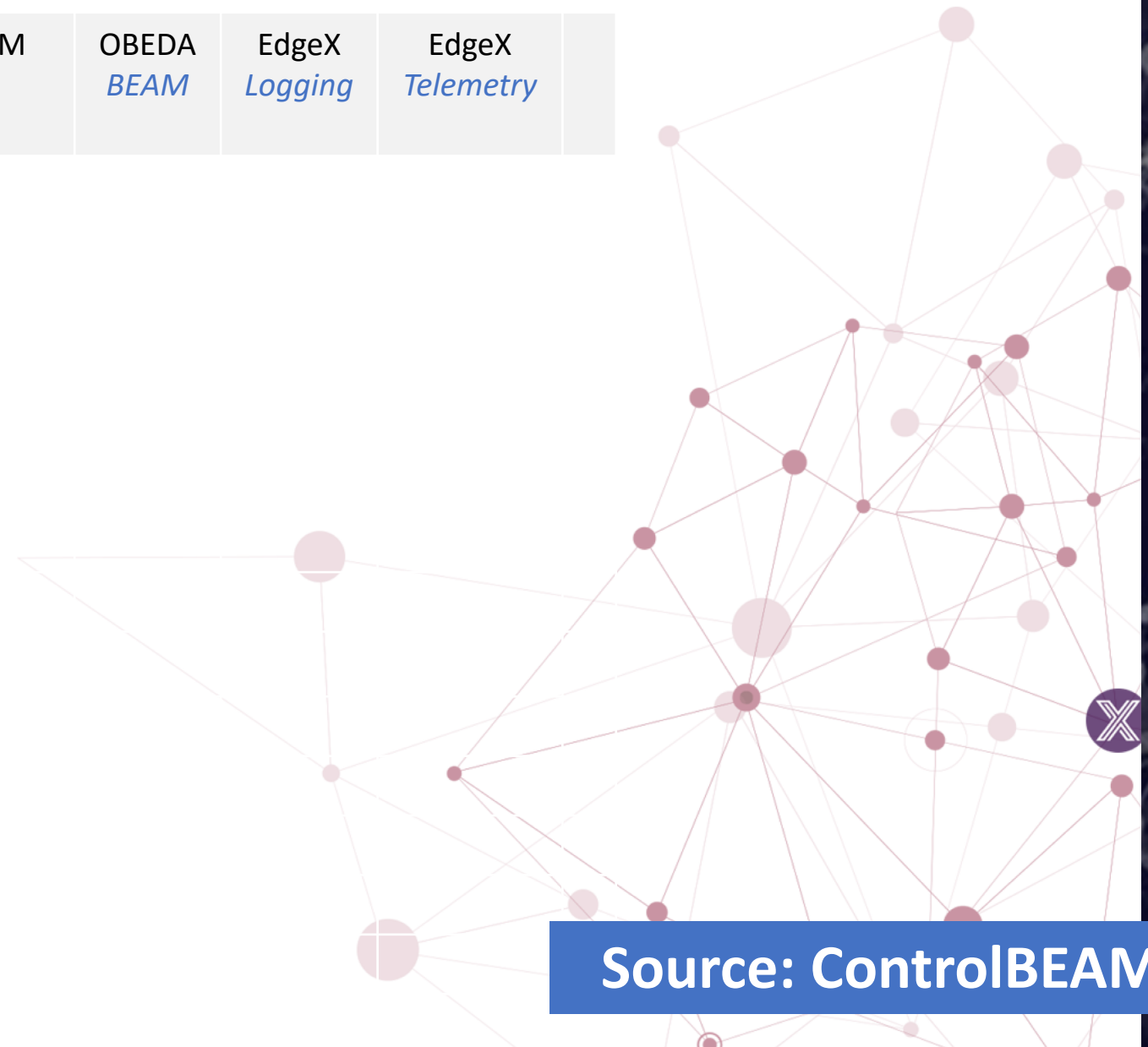
Timestamp	Class	Object	Attribute	Value	Unit
...10:30:38	5787...	4920...	602A...	2	
...11:12:33	1283...	2948...	72B3...	32	
...11:15:49	1283...	8620...	4C38...	64	

Source: ControlBEAM

Consortia Event Format Comparison

CNCF <i>CloudEvents</i>	GS1 <i>EPCIS</i>	OCF	LWM2M	OBEDA <i>BEAM</i>	EdgeX <i>Logging</i>	EdgeX <i>Telemetry</i>	
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Table In Process...

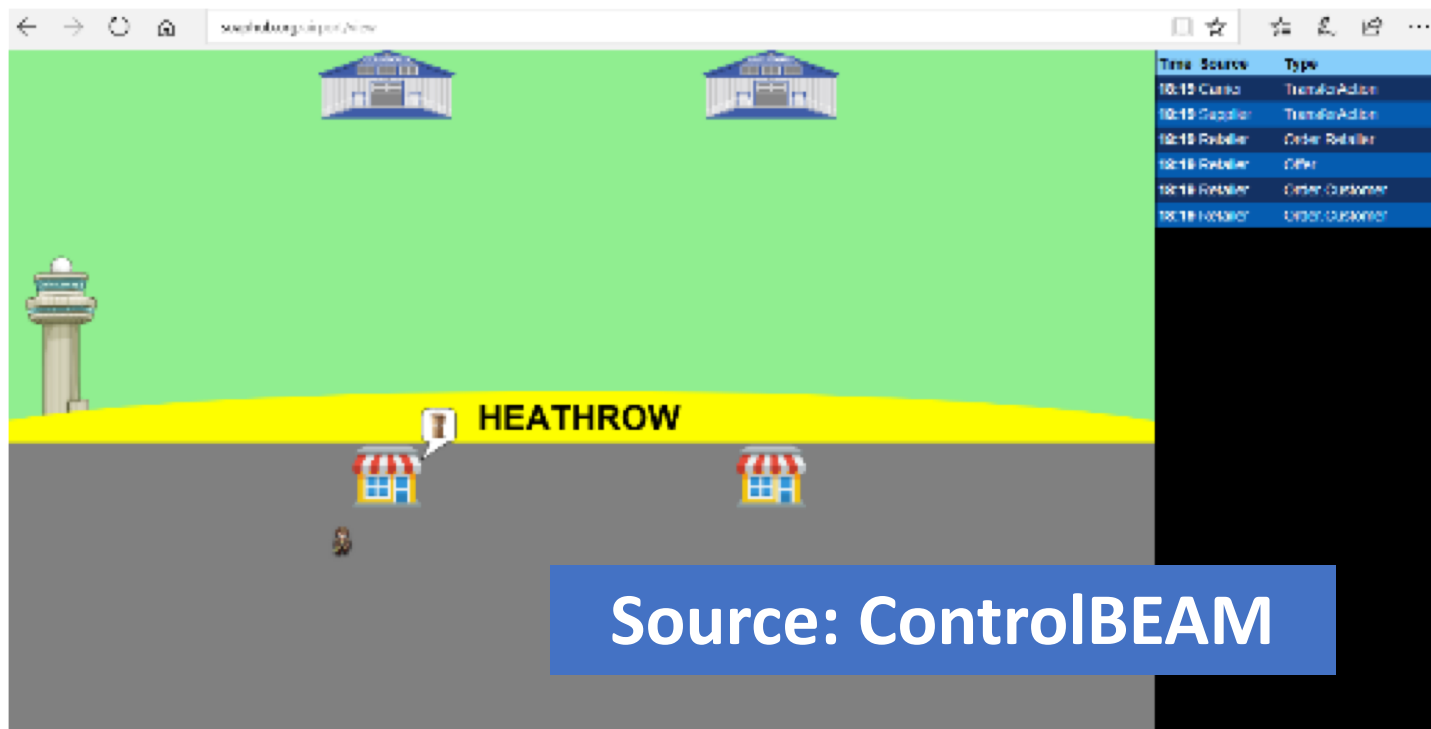


Source: ControlBEAM

CNCF CloudEvents

- CNCF led project to ease data sharing among cloud service providers, and others
- Abstracts to a logical pub/sub + data structure
- Implementations and support available for HTTP, JSON, Webhooks, MQTT, NATS, AMQP
- Standard focuses on self-describing data structures for sharing events between domains
- Maps well to application services, device services
- Could flow deeper into architecture for simplification and consistency of data sharing within EdgeX

KubeCon Demo Oppty



- Each cloud service participant will connect to the service hub as either a Retailer, Supplier or Carrier. All attendees will connect as Passengers.
- The listed shops on the attendee UI will be derived from connected Retailer nodes. Each Retailer offers small, medium, and large drinks. As a Passenger places an order for a drink, the originating order is represented by events are consumed by microservices distributed across the connected clouds.
- All produced events are displayed on the right panel - click on a row in the event panel will display the complete JSON-formatted CloudEvent content, which includes Schema.org semantic identifiers with concepts that align fairly well with the ACRIS semantic model. The "type" element comprises the "class", the "subject" element comprises the "object" (class instance), and the "data" element comprises attribute/value pairs.



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Thank You – Q&A