Distributed Data Interoperability & Management (DDIM) Task Group
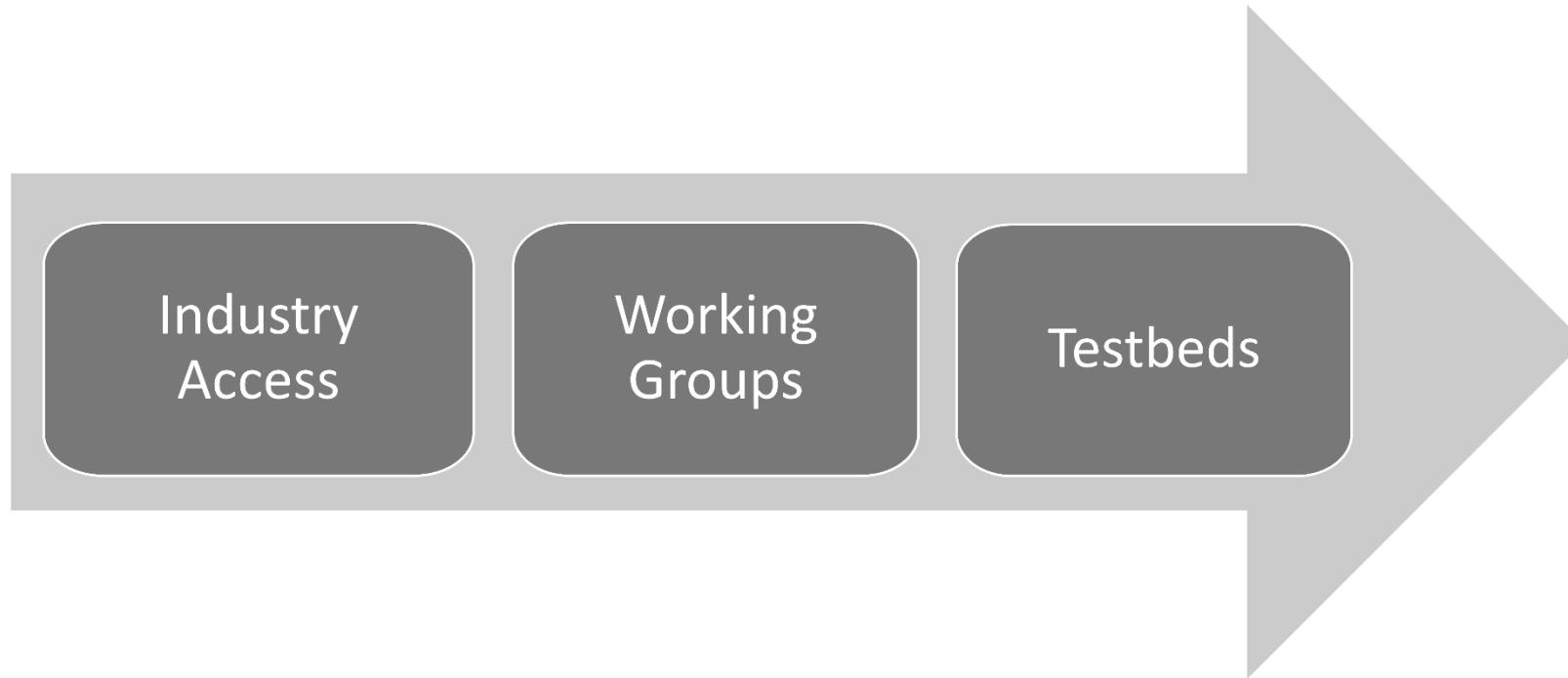
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www.iiconsortium.org

The IIC has three primary areas of activity: Industry Access, Working Groups, and Testbeds

Industry Access

Working Groups

Testbeds

DDIM TG Missioin

- The Distributed Data Interoperability and Management Task Group defines the properties of a data service framework for the industrial internet. Its purpose is to provide a ubiquitous data-sharing integration framework for all architecture elements defined by the Technology Working Group.

- Deliverables
  - Beyond Syntactic Interoperability White Paper (working draft)
 - Industrial Internet Data Management Framework

DDIM Focus

- Interoperability
  - Information Interoperability
  - Requirements for communication behavior Interoperability

- Modeling
  - Information
  - Requirements for communication behaviors

- Data Presentation (to higher level applications)
  - Data transformations
  - Data access services

Interoperability - Industrial Internet Connectivity Stack
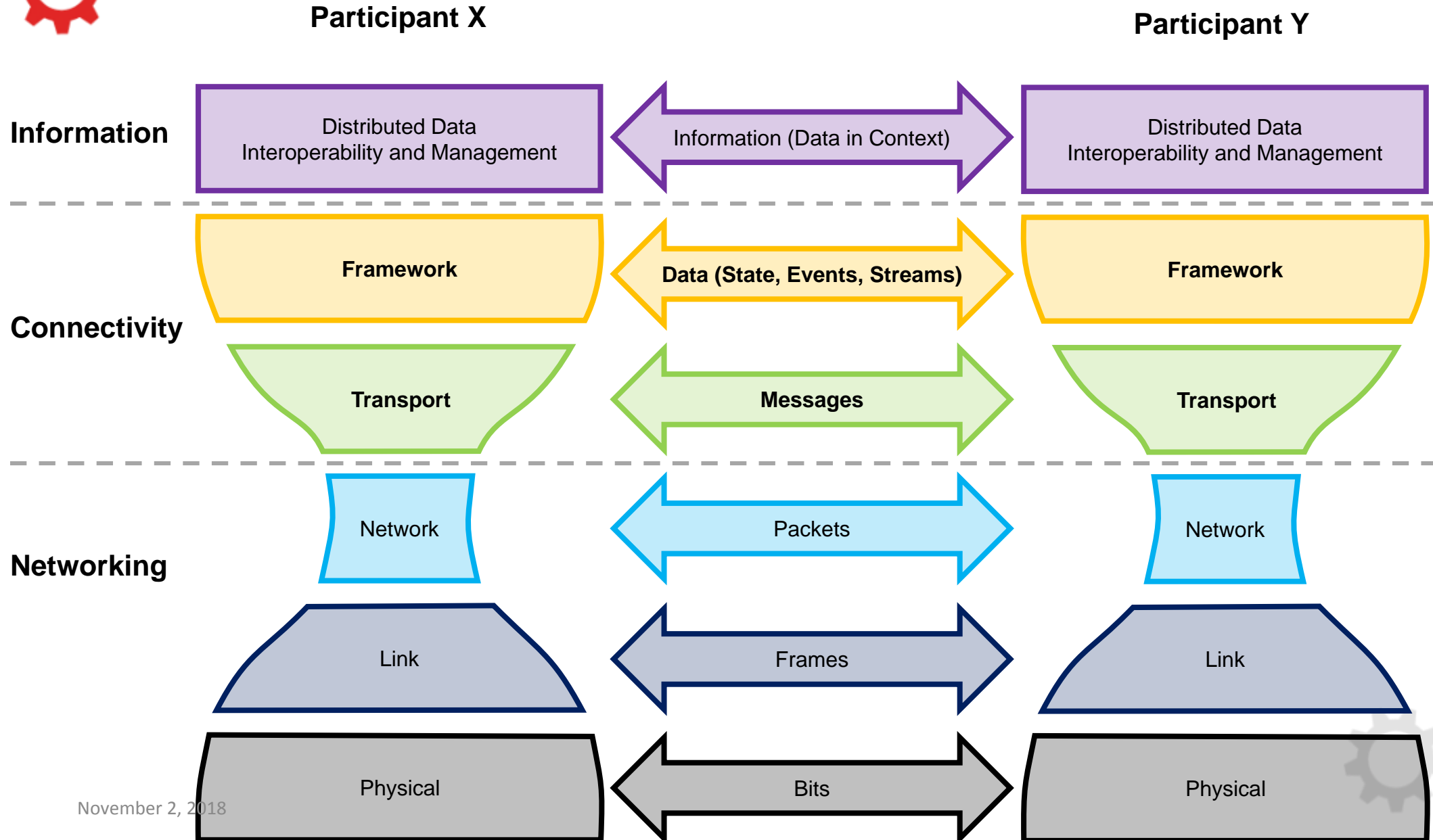
Technical Paper #1: Beyond Syntactic Interoperability

Background:

- Connected Systems
    - Wide variety of connected devices and nodes
    - Multiple manufacturers
- How is system connectivity achieved?
    - Agreement on protocols
        - Low level, for example Ethernet
        - Higher level, for example, DDS
    - Agreement on data
        - Data syntax, semantics
    - Agreement on data streams
        - Behavior of communications: Reliable? Durable? Authentication? Encryption?

Technical Paper #1: Beyond Syntactic Interoperability

Paper Focus:

- What does Information Interoperability mean?

- Why is it important for growth within an industrial vertical?

- Using 2-3 example industries (Energy, Medical, Manufacturing)
  - Explore the benefits and challenges in achieving the next level of Interoperability
  - Investigate the process used in these industries to bring together the manufacturers, integrators, and OEMs involved in IIoT systems.

Information Model Standards

There are requirements, concepts and approaches for information models and digital twins in various verticals. This raises some questions:
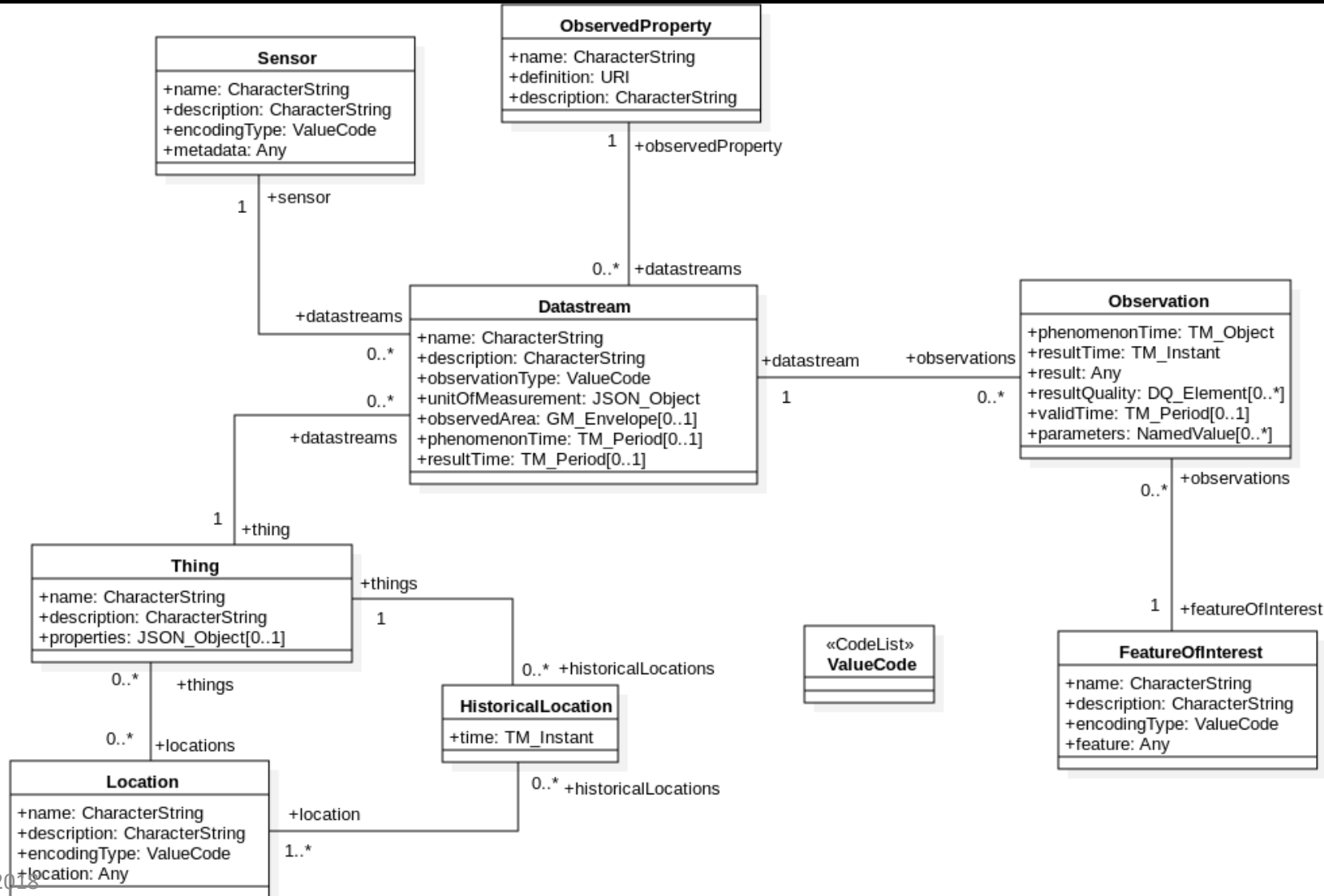
Is a solution for one vertical transferable to a second vertical?

Is there an abstraction that would fit "all" verticals?

SensorThings API Information Model

WoT (Web of Things) and OGC SensorThingsAPI

	WoT + iot.schema.org	OGC SensorThingsAPI
Interaction Abstraction	• Three interaction patterns common in IoT systems (properties, actions, events)	• RESTful; Create, Read, Update, Delete • notifications of updates of entities via MQTT Extension
Contextual Data	• Through semantic annotation with metadata including FoI (Feature of Interest)	• Contextual events refer to classes and objects
Ontology	• WoT core ontology + iotschema.org + schema.org + domain ontologies	• SensorThingsAPI Information model
Data Format	• Can be defined using abstract data schema with binding to JSON, XML, etc.	• JSON
Protocols	• Protocol-binding mechanisms (HTTP, CoAP, MQTT, etc.) with protocol-specific vocabularies	• Create, Read, Update, Delete for all entities • HTTP GET / POST; RESTful; MQTT • Spatio-temporal and filter queries, pagination
Security	• Can annotate interaction patterns with security requirements	• Not in scope
Legacy integration	• Thing Description can describe legacy systems, turning them into semantically interoperable services.	• Easy to map; Open Source implementations available. E.g. https://github.com/FraunhoferIOSB

Cross-industry semantic interoperability

http://www.embedded-computing.com/semantic-interop/cross-industry-semantic-interoperability-part-one