RFiD JOURNAL LIVE!
20 YRS
2003 - 2022

MAY 17 - 19, 2022
MANDALAY BAY | LAS VEGAS, NV

RFID/IoT for Warehouse and Inventory Management

RFID/IoT in Warehouse & Inventory Management Basics

Presenter: Samad Rostampour

Professor, Vanier College and IT director @ IoT Lab, Université du Québec à Montréal (UQAM)

With the **collaboration of Ygal Bendavid**

Director @IoT Lab, Université du Québec à Montréal (UQAM)

Your Presenter

Samad Rostampour

- Professor @ Computer Science Department, Vanier College, Montreal

- IT Director, IoT lab., UQAM University, Montreal(https://labiot.uqam.ca/)

- Judge @RFID Journal Award

Today's Program

➢ **10:45 AM - 11:30 AM: RFID/IoT in Warehouse & Inventory Management Basics**

➢ 11:30 AM - 12:15 PM : Linking RFID to Inventory-Management Best Practices

➢ 12:15 -13h00 PM : Lunch time

➢ 1:00 PM - 1:45 PM: Targeting the Correct RFID Technology for the Right Project

➢ 1:45 PM - 2:30 PM : Key Steps in Building an Inventory-Management RFID Solution: Build Your Own RFID Portal

➢ 2:30 -2h45 PM : Break time

➢ 2:45 PM - 3:30 PM: Designing Your RFID Solution

➢ 3:30 PM - 4:15 PM: Building Your RFID Business Case

Objective of the presentation

- **Position RFID technologies within the IoT portfolio**
- Position RFID within your IS infrastructure
- Understand what the options on the market are and how they compete with or complement other IoT technologies

What is IoT

1. A buzzword

2. A global network of connected objects

3. A technology

4. A concept

5. A new type of communication network

6. Another way of talking about AI

7. Not important
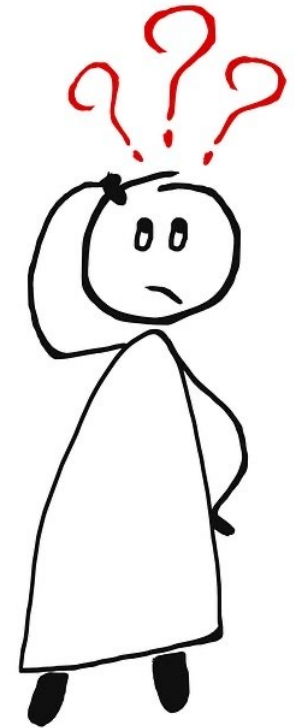
Image par ElisaRiva de Pixabay

The Vision – back to early 2010+

A **dynamic global network infrastructure**

with **self configuring capabilities**

based on **standard and interoperable communication protocols**

where **physical and virtual "things"**
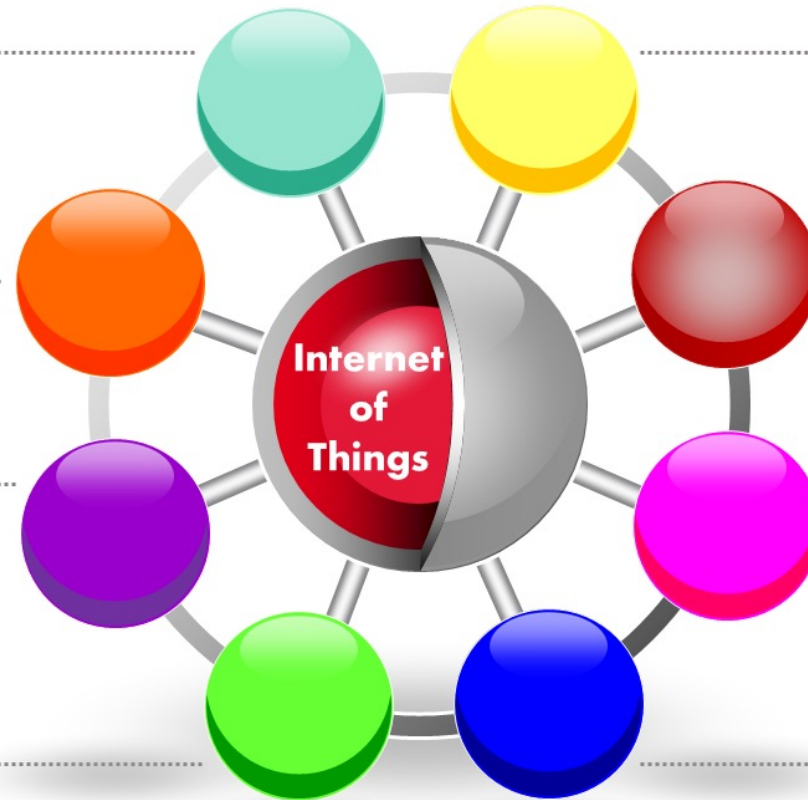
have **identities, physical attributes, and virtual personalities**

use **intelligent interfaces**,

and are **seamlessly integrated**

into **the information network.**

Internet of Things

http://www.internet-of-things-research.eu/about_iot.htm

LABO IoT — Internet des Objets — ESG UQÀM

RFID JOURNAL LIVE! — 20 YRS — 2003 - 2022

MAY 17 - 19, 2022

Today

The Internet of Things

Opening new business models

IT Ecosystem in which each **unique** objects (living or not) is equipped with **a device** enabling it to **communicate** **&** **connect automatically** in **real time** with its environment (physical & virtual) and to manage its owns **transactions**

MAY 17 - 19, 2022

How IoT Helps
Providing Visibility

- **Capture** data (events)

- **Translate** data into information's

- **Access** this information, accurate, precise, updated

- **Analyze** this information (actual and predictive)

- Take **event-based decisions** based on this information (*actionnable insights*)

- **Improve** supply chain business process **performance**

LABO **IoT** Internet des Objets **ESG** UQÀM

RFID JOURNAL LIVE! 20 YRS 2003 - 2022

MAY 17 - 19, 2022

The main Idea

Photo by Dan LeFebvre on Unsplash-light
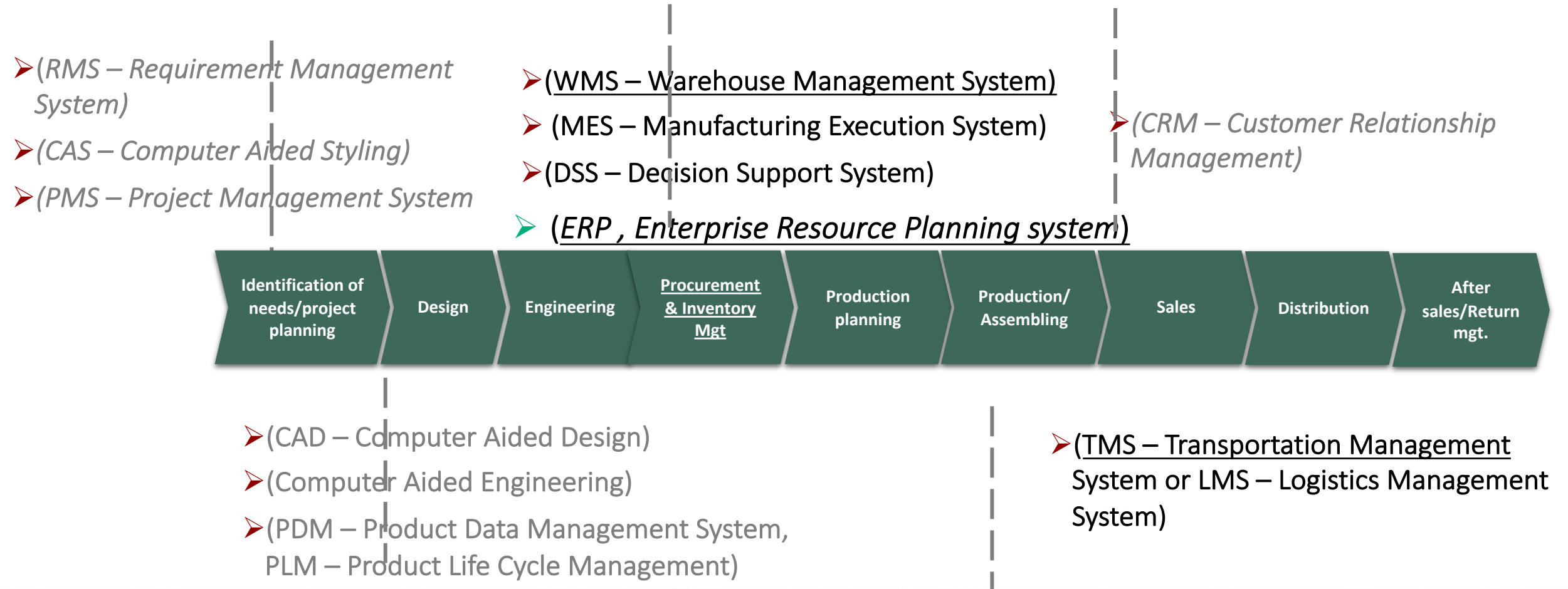
MAY 17 - 19, 2022

Objective of the presentation

- Position RFID technologies within the IoT portfolio
- **Position RFID within your IS infrastructure**
- Understand what are the options on the market and how they compete with or complement other IoT technologies

IS in the value Chain
The foundation on which IoT will deliver its potential

➤ *(RMS – Requirement Management System)*

➤ *(CAS – Computer Aided Styling)*

➤ *(PMS – Project Management System*

➤ (WMS – Warehouse Management System)

➤ (MES – Manufacturing Execution System)

➤ (DSS – Decision Support System)

➤ *(ERP , Enterprise Resource Planning system)*

➤ *(CRM – Customer Relationship Management)*

Identification of needs/project planning	Design	Engineering	Procurement & Inventory Mgt	Production planning	Production/ Assembling	Sales	Distribution	After sales/Return mgt.

➤ (CAD – Computer Aided Design)

➤ (Computer Aided Engineering)

➤ (PDM – Product Data Management System, PLM – Product Life Cycle Management)

➤ (TMS – Transportation Management System or LMS – Logistics Management System)

IOS – Inter organisational systems
- EDI- Electronic Data Interchange
- VPN-Virtual Private Networks
- VAN-Value-Added Networks
- eMP- Electronic Market places
- Etc.

EIS – Enterprise Information systems
- WMS- Warehouse management Systems
- ERP- Enterprise Resource planning Systems
- TMS- Transportation Management Systems
- SCM- Supply Chain Management Solutions
- TOS-Terminal Operating Systems
- Etc.

Information sharing

Data management (information)

Data capture & location based technologies
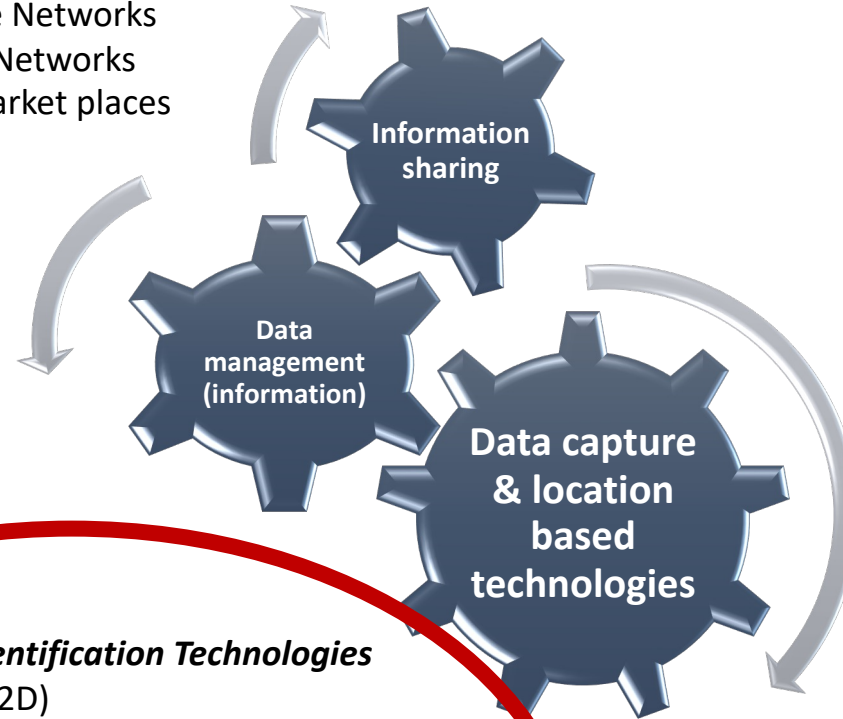
AIT- Automated Identification Technologies
- Bar code (linear, 2D)
- RFID - Radio Frequency Identification
- OCR - Optical Character Recognition
- Etc.

Location Based Technologies
- Active RFID technologies (RFID, UWB, BLE, etc)
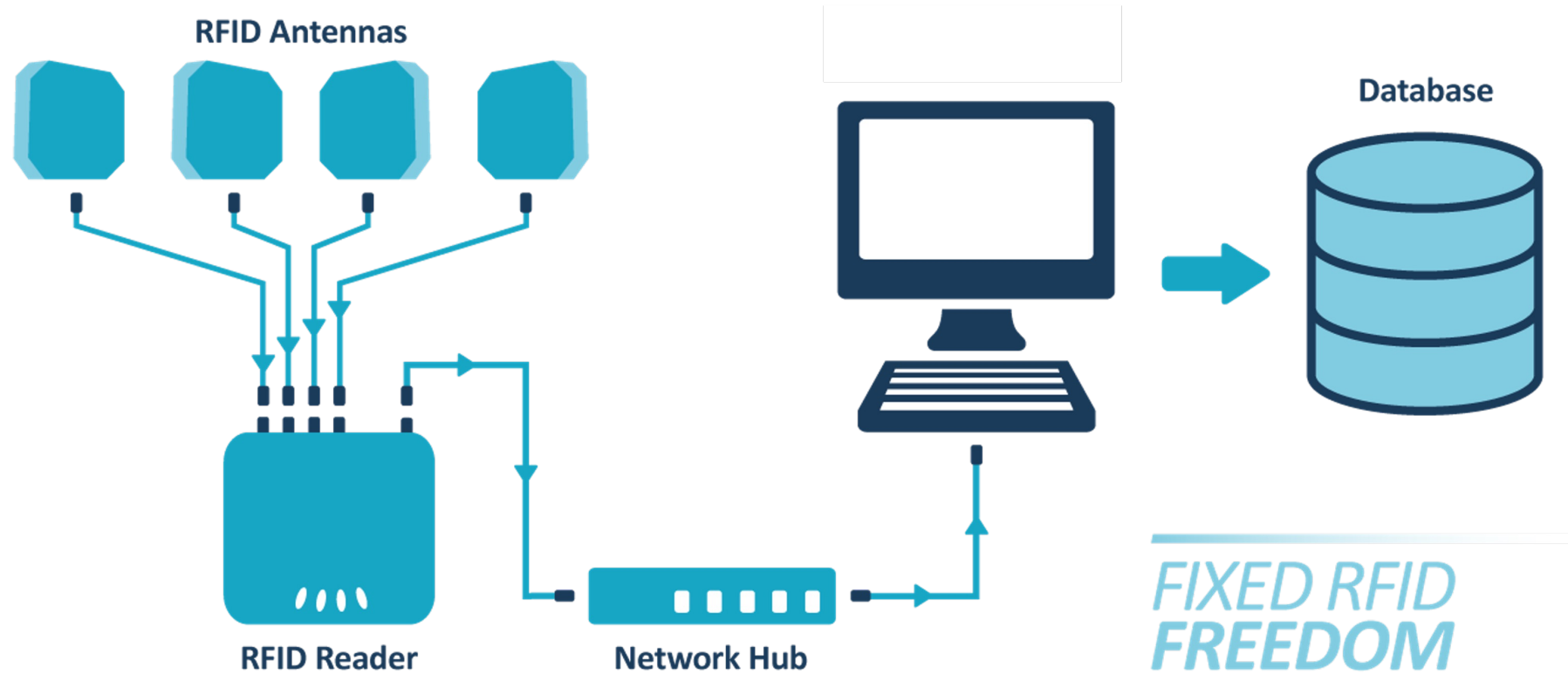- GPS- Global Positioning System
- LBS- Location based system (cellular network)

Source: Cassivi et Bendavid (2014), A study on emerging technological practices in logistics and transportation: a Canadian perspective, Strategic Policy and Innovation Directorate, Transport Canada
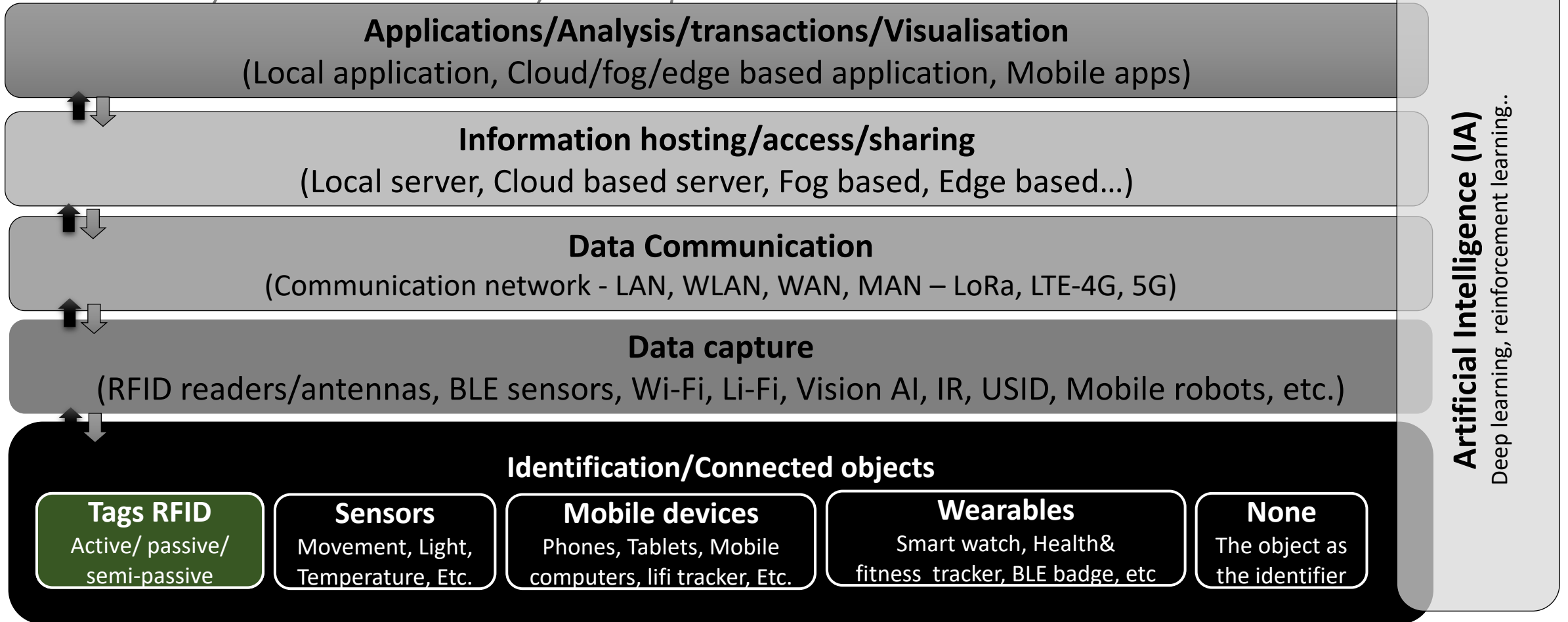
LABO IoT
Internet des Objets
ESG UQÀM

RFID JOURNAL LIVE! 20 YRS 2003 - 2022

MAY 17 - 19, 2022

RFID Infrastructure

A very simple architecture of the data capture layer

IoT Infrastructure
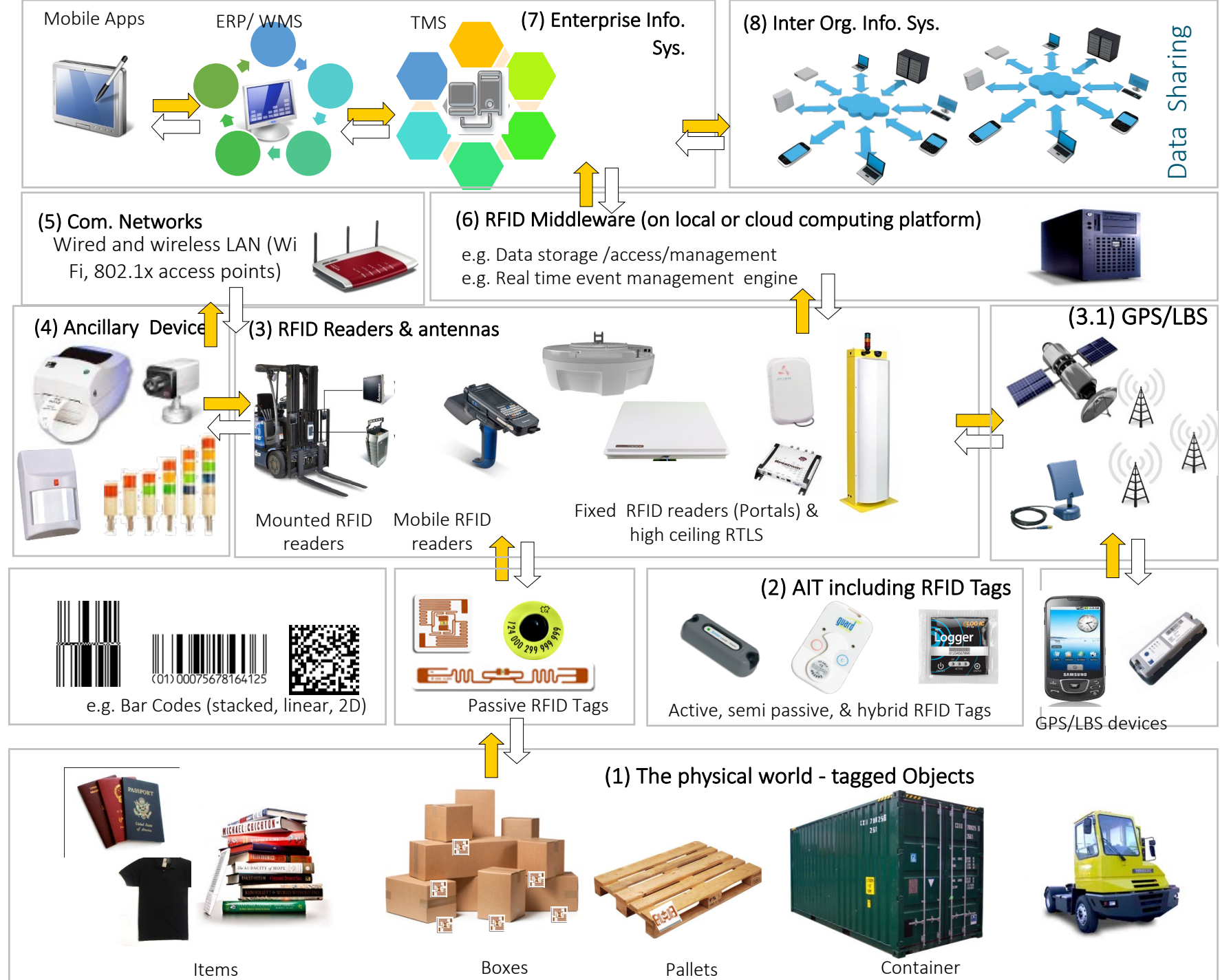
Multi technos/multi standards/multi protocoles

Applications/Analysis/transactions/Visualisation

(Local application, Cloud/fog/edge based application, Mobile apps)

Information hosting/access/sharing

(Local server, Cloud based server, Fog based, Edge based...)

Data Communication

(Communication network - LAN, WLAN, WAN, MAN – LoRa, LTE-4G, 5G)

Data capture

(RFID readers/antennas, BLE sensors, Wi-Fi, Li-Fi, Vision AI, IR, USID, Mobile robots, etc.)

Identification/Connected objects

Tags RFID	**Sensors**	**Mobile devices**	**Wearables**	**None**
Active/ passive/ semi-passive	Movement, Light, Temperature, Etc.	Phones, Tablets, Mobile computers, lifi tracker, Etc.	Smart watch, Health& fitness tracker, BLE badge, etc	The object as the identifier

Artificial Intelligence (IA)
Deep learning, reinforcement learning..

LABO IoT
Internet des Objets
ESG UQÀM

RFID JOURNAL LIVE!
20 YRS
2003 - 2022

MAY 17 - 19, 2022

Multi layer architecture

Data management

Data identification & Capture

Data Sharing

Mobile Apps   ERP/ WMS   TMS   **(7) Enterprise Info. Sys.**

(8) Inter Org. Info. Sys.

(5) Com. Networks
Wired and wireless LAN (Wi Fi, 802.1x access points)

(6) RFID Middleware (on local or cloud computing platform)
e.g. Data storage /access/management
e.g. Real time event management engine

(4) Ancillary Device   **(3) RFID Readers & antennas**   **(3.1) GPS/LBS**

Mounted RFID readers   Mobile RFID readers   Fixed RFID readers (Portals) & high ceiling RTLS

(2) AIT including RFID Tags

e.g. Bar Codes (stacked, linear, 2D)   Passive RFID Tags   Active, semi passive, & hybrid RFID Tags   GPS/LBS devices

(01) 00075678164125

(1) The physical world - tagged Objects

Items   Boxes   Pallets   Container

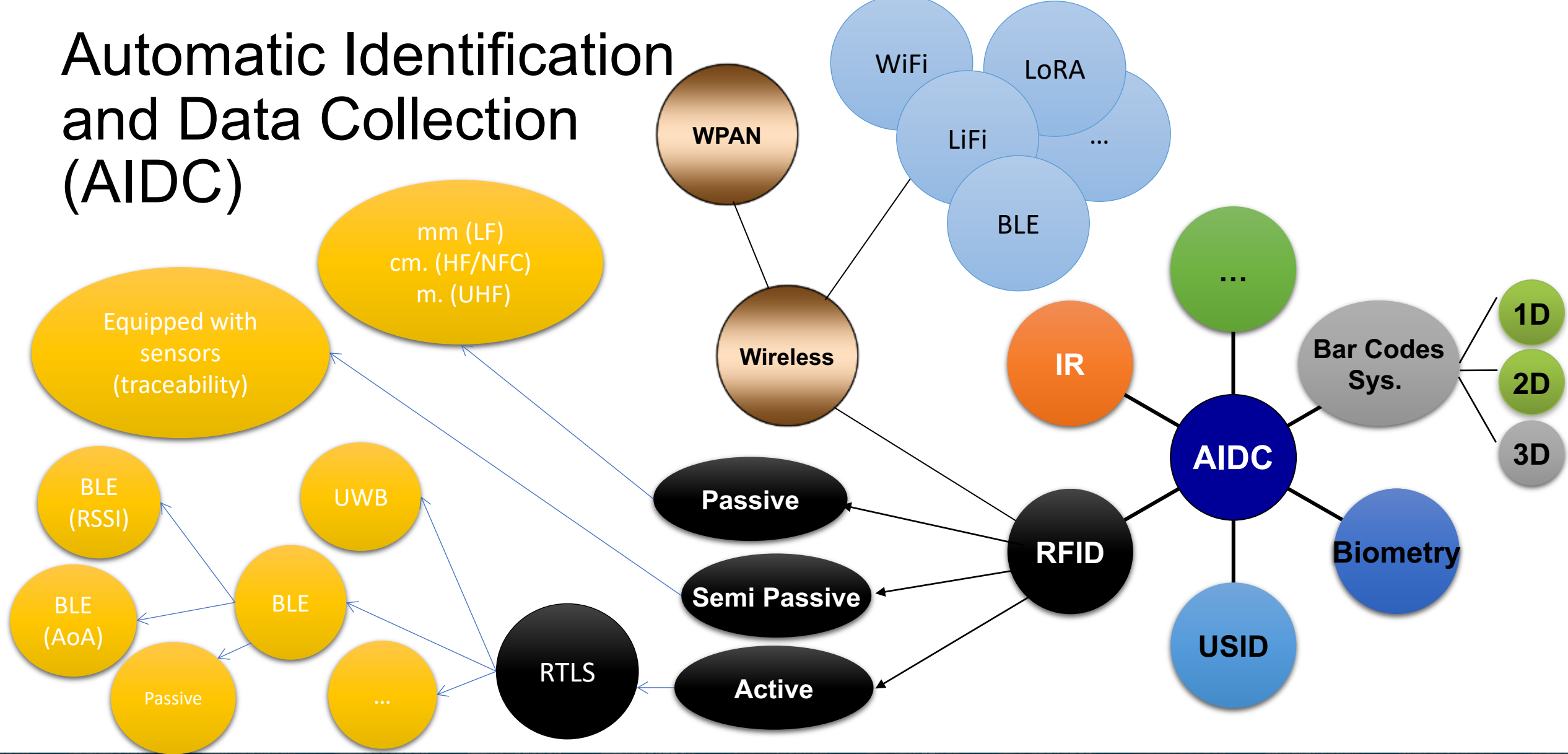LABO IOT Internet des Objets ESG UQÀM

RFID JOURNAL LIVE!

Objective of the presentation

- Position RFID technologies within the IoT portfolio

- Position RFID within your IS infrastructure

- **Understand what the options on the market are and how they compete with or complement other IoT technologies**

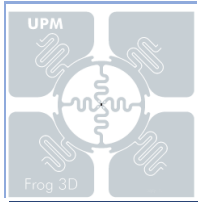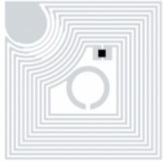Automatic Identification and Data Collection (AIDC)

Layer 1

The identification (the case for RFID)

Layer 1

The identification (the case for RFID)

Passive RFID

Semi Passive

Active tags

- No battery

- LF: mm - identification
- HF: cm – NFC/Access control /payments/ EAS
- UHF: m - Logistics processes (UHF)

- Battery-assisted passive tags (BAP) data loggers

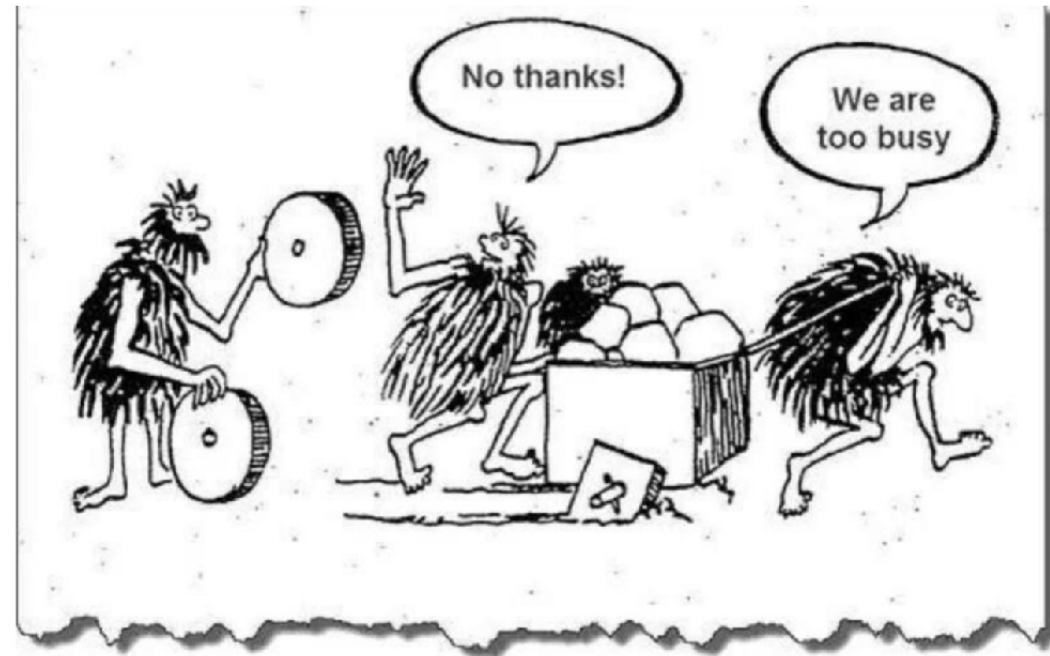- E.g., traceability - Cold chain management/supply chain integrity

- Battery
- Active Transponder
- Beacon

- E.g., mobile-critical Asset management, people tracking, equipment tracking, etc.

Ready for IoT

THANK YOU

RFiD JOURNAL LIVE!

20 YRS

2003 - 2022