# RFAD JOURNAL LIVE

## **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)





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# Your Presenter

#### Samad Rostampour

- Professor @ Computer Science Department, Vanier College, Montreal
- IT Director, IoT lab., UQAM University, Montreal(<u>https://labiot.uqam.ca/</u>)
- Judge @RFID Journal Award





# Today's Program

#### > 09:45 AM - 10:30 AM: RFID/IoT in Warehouse & Inventory Management Basics

- > 10:40 AM 11:20 AM: Linking RFID to Inventory-Management Best Practices
- > 11:30 PM 12:15 PM: Targeting the Correct RFID Technology for the Right Project
- ➤ 12:15 -13h00 PM : Lunchtime
- 1:00 PM 1:40 PM: Key Steps in Building an Inventory-Management RFID Solution: Build Your Own RFID Portal
- ➤ 1:50 PM 2:30 PM: Designing Your RFID Solution
- > 2:30 -2:50 PM: Break time
- ➤ 2:50 PM 3:30 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 <u>ElisaRiva</u> de <u>Pixabay</u>



## The Vision – back to early 2010+



#### http://www.internet-of-things-research.eu/about\_iot.htm



# Today

## The Internet of Things

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



**Opening new business models** 



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# How IoT Helps Providing Visibility

- Capture data (events)
- Translate data into information
- Access this information, accurate, precise, updated
- Analyze this information (actual and predictive)
- Take event-based decisions based on this information (actionable insights)
- Improve supply chain business process
   performance





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## How IoT Helps (Cont.)

- Providing a visibility
- To solve an existing problem
- To find a new opportunity





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## The main Idea



Photo by Dan LeFebvre on Unsplash-ligh



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## 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)

**Identification of** Procurement After Production Production/ Engineering needs/project & Inventory Design Sales Distribution sales/Return planning Assembling planning Mgt mgt. (CAD - Cdmputer Aided Design)(TMS – Transportation Management) ► (Computer Aided Engineering) System or LMS – Logistics Management System) >(PDM – Product Data Management System, PLM – Product Life Cycle Management)



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(CRM – Customer Relationship)

Management)



#### 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.

#### AIT- Automated Identification Technologies

Data managemen

(information

Data

capture &

location

based technologie

- 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



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## **RFID Infrastructure**

A Very simple architecture of the data capture layer



https://www.clearstreamrfid.com/software/rfid/



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# 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 Active/ passive/ semi-passive

**Sensors** Movement, Light, Temperature, Etc.

**Mobile devices** Phones, Tablets, Mobile computers, lifi tracker, Etc.

#### Wearables Smart watch, Health& fitness tracker, BLE badge, etc

**None** The object as the identifier



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(IA)

Intelligence

Artificial

Deep learning, reinforcement learning.

### LABO Internet des Objets ESG UQÀM

## lave Ð Multi σ

Capture identification & Data



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Layer 1

The identification (the case for RFID)





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"We have things. We have the internet. That's a start."





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# **THANK YOU**

