



FROM WI-FI TECHNOLOGY TO WAREHOUSE MOTION INTELLIGENCE

**AI & COGNITIVE
SYSTEMS FORUM**

CONNECTED TRANSPORT

MANUFACTURING

HEALTHCARE

ENERGY AND UTILITIES

BUILDINGS & INFRASTRUCTURE

OPEN INDUSTRY

ENABLING IoT



Enjoying Warehouse Motion Intelligence and New Operational Insights from Wi-Fi technology Smart Data

How the leading logistics company FM Logistic has optimized their warehouse operations by generating timely insights about the employees and asset movement inside their facilities, leveraging their existing Wi-Fi technology data.



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Warehouses workers spend
50% of their time on motion.
Unncecessary motion is a major
and permanent potential for
savings.

FM > LOGISTIC

- Third-party logistics services provider (3PL)
- Funded in France in 1967.
- €1.4 billion revenue per year.
- Warehouses in 14 countries across Europe, Asia and Latin America.
- 4 million sqm warehousing surface.
- 28.000 employees and 500 clients.

INNOVATION STRATEGY

- Open Innovation structure for startup development support.
- People Empowerment initiatives.
- 5 Corporate programs:
 - Urban Logistics
 - Logistics for Bulk & Circular economy
 - Data for Supply Chain
 - Sustainable Buildings & SC
 - Flexible Automation (inventory by drone, driverless forklifts & AMR deployment, palettisation cobots,...)

THE WAREHOUSE MOBILITY CHALLENGE

FACTS:

- A critical pain point was the limited and non standardized visibility over movements inside the warehouse : spot analysis (spaghetti diagram) exists but no permanent monitoring
- WHs and Process teams were making decisions based on theory based or partial insights about how people and assets move.
- No data available for movements between missions (ghost mission)

PROBLEMS:

- Limited benchmark and comparaisn between warehouses.
- Potential inefficiencies due to sub-optimized paths and ghost missions.

THE TECHNOLOGY LANDSCAPE FOR WH MOBILITY

| Technology | Description | Benefits | Drawbacks |
|--------------------------|--|--|--|
| WMS metrics | Theoretical calculations made by WMS, such as optimal mission distance. | WMS already available. | Depends on WMS. |
| Wi-Fi | Use signal power (access points) and positioning techniques (trilateration, fingerprinting). | Inexpensive, Wi-Fi is a must-have. | Heterogeneous infrastructure inhibits one vendor RTLS solution. Poor positioning accuracy due to changing electromagnetic noise. |
| Ultra Wide Band (UWB) | Very accurate positioning and tracking technology, used in mission-critical environments. | Very accurate. | Requires considerable investment for 100's of warehouses. Requires tags. |
| Bluetooth Beacons (BTLE) | Low consumption technology based on small sensors . Uses tags or Bluetooth-enabled devices. | Battery-powered sensors easy to install (no wiring). | A real WH requires tags. |
| Satellite (GPS) | Positioning using GPS, Galileo or Glonass global satellite networks. | Quite accurate. | Only outdoors. Requires satellite-positioning devices for all operations. |

APPROACH

MAIN GOAL: reliable warehouse motion intelligence solution.

REQUIREMENTS:

- Scalable and flexible solution to deploy in multiple locations and manage at a corporate level.
- Affordable and non-sensor based.
- Easy to implement and quick results.
- Integrated with different WMS and corporate technologies.



Datumize

- Scale-up from Barcelona developing Dark Data integration software.
- Experience in gathering data from complex sources (network traffic, IoT & machine data, distributed locations, and Wi-Fi technologies).
- Proprietary and powerful data collection engine.
- Enterprise technology.

SOLUTION PERSPECTIVE

- Leverage current Wi-Fi infrastructure for all FM Logistic warehouses.
- Use Datumize software to collect data from Wi-Fi access points and connected devices.
- Transform data to generate motion information (positioning and movement of people/assets tracked) → New Datumize algorithms to be created.
- Match motion data with WMS operational data, to correlate observations with missions.
- Sink processed data into corporate systems (storage and analytics).

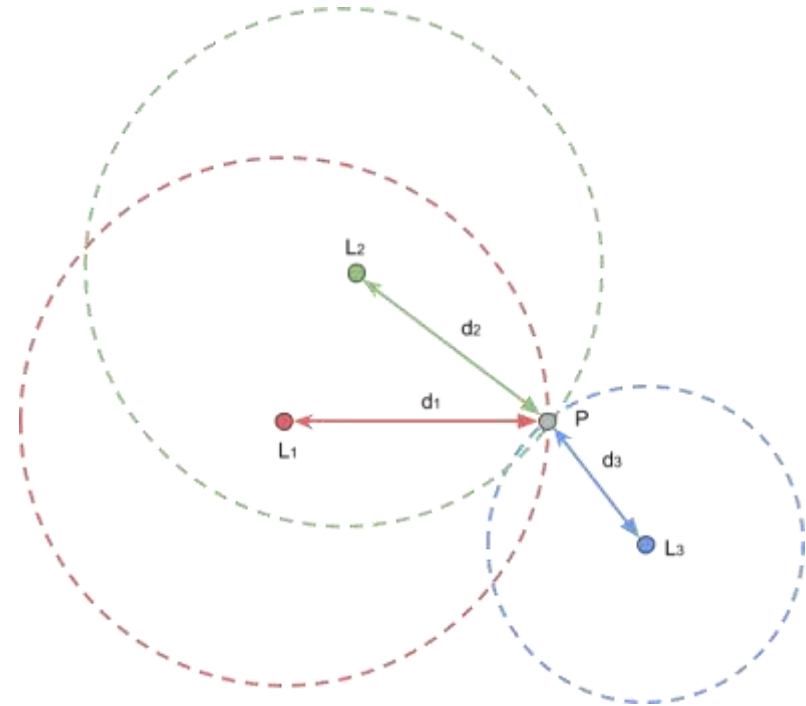


BENEFITS

- No need for new hardware/wiring/installations in warehouses.
- No need to modify operations (WMS, handhelds, vehicles).
- No overhead on network.
- Wi-Fi vendor agnostic, compatible with any warehouse.
- Homogeneous metrics for all warehouses.
- Data consolidated at country and corporate level.

TECHNICAL CHALLENGES

- Traditional trilateration and footprint techniques were offering poor accuracy (~50 meters) for indoor location and movements.
- Poor Wi-Fi conditions (can be fixed).
- Continuous change of electromagnetic map (can't be fixed).



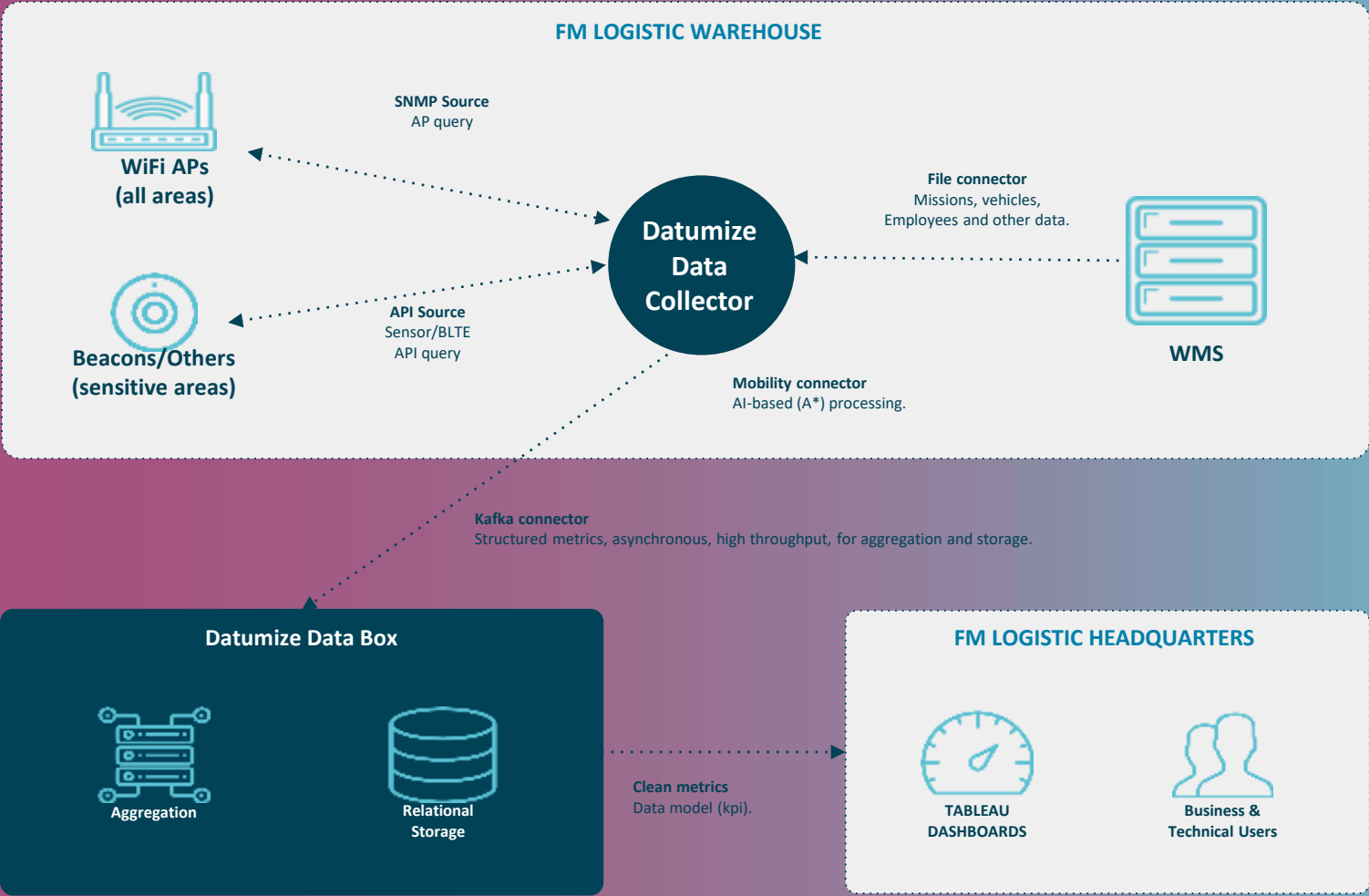
THE INNOVATION

Implementation of strategies to increase the accuracy of out-of-the-box Wi-Fi positioning

- **HEURISTICS:** real-life conditions like walls and interbuildings can not be crossed, the maximum speed for forklifts is 13km/h, people don't walk at speed of light...
- **ARTIFICIAL INTELLIGENCE:** optimized path finding (A*) algorithms considering the possible routes and matching the estimated path with the real path.

OUTCOME: position and movement, >90% accuracy.

THE FINAL SOLUTION Datumize



DAY-TO-DAY

- **Tracking of distance crossed with time spent mission**
 - Multi-criteria analytics : by mission, by group of mission (by order, by purchase order, ...), by group of workers, by group of forklifts, ...)
- **Reliable motion data to supply performance analyze**
 - Short and long term benchmarks
 - Estimated path for each mission and comparison with optimal path.
- **Visualization of hourly heatmap**
 - Bottleneck analysis



SHORT TERM KEY RESULTS

- **Improved Management practices**
 - Reliable metrics about wasted motion in the warehouse (digital lean) to measure performance improvement and identify bad/best practices
 - Improved analytics for resources consumption (forklifts, ...)
- **Improved Warehouse set up**
 - Heatmap as a valuable insights for warehouse distribution optimization
- **Leading to savings in distance per motion, then in time and costs**

FUTURE EXPECTATIONS FOR FM LOGISTIC

- **Expand the solution to all group WHs.**
- **Use the solution for permanent benchmarking of distance** as a performance root cause between similar WHs
 - Best / bad practices monitoring
 - Best / bad warehouse set ups

FUTURE EXPECTATIONS FOR DATUMIZE

- Deploy Datumize Motion Intelligence solution in leading logistic companies in Europe and US.
- More R+D to enhance the Artificial Intelligence and Heuristics components.
- Explore the technical and commercial integration of Datumize technology with third-parties (IoT platforms, Streaming Analytics, etc.).
- Work on new use cases for motion intelligence in new industries (Hospitality, Retail, Healthcare...)
- Innovation project for tracking non-connected devices (randomized MAC addresses, anti-tracking techniques in smartphones).



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Thank you!

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SAVE THE DATE

29 - 31 October 2019



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