
RFID
JOURNAL
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Asset monitoring using RFID & IoT

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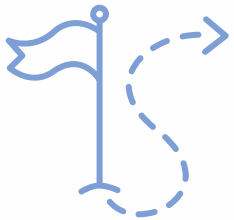
Who is Volkswagen?

Maintains facilities in **14 countries**



Founded in 1937

195.878 **employees**

Volkswagen Brands

Volkswagen Brazil

1959

São Bernardo do Campo/SP

Taubaté/SP

1976

1996

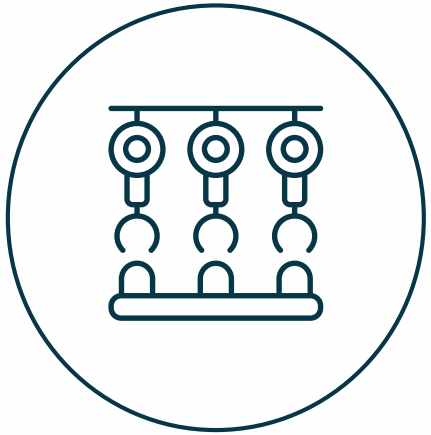
São Carlos/SP

São José dos Pinhais/PR

1999

Volkswagen Brazil ...

~486.000 vehicles produced in 2019



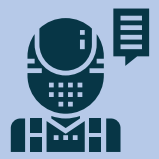
~400 suppliers

+60.000 assets outsourced production

Volkswagen Digital Transformation Program

Volkswagen Brazil is moving forward with a digital transformation plan to transform client and staff experience.

INVESTMENTS
Important investments in digitalization projects through 2023

KEY PILLARS	
 ARTIFICIAL INTELLIGENCE	 DATA ANALTYTICS

IoT and Analytics bring the digital transformation to life, including the right data, at the right time.

Initial context

- Problem Identification

Absense of physical inventory;	Lack of tracebility and asset location	Divergent book balance

Benefits

- Execution of the **physical inventory using technologies**;
- **Control and tracebility** of assets held by third parties;
- **Accounting registration of the property** of the asset according to the physical and period of acquisition;
- **Security in the accounting balance** of assets held by third parties;
- Effective calculation of **the vehicle margin** (depreciation).

- Incident

Unplanned Spending - End of contractual relationship with a supplier.

Project Delta I and II: Tooling Duplication

Initial context

1991

Last physical inventory of VWB assets held by third parties.

2015

End of contract with an Important Supplier

2016

Injunction issued by the judge to rescue the VWB tools

2017/18

Project for resolution of pending advance and diagnosis of the Tooling Management process

2018

Start of the PoC project for traceability technology in BR and AR suppliers and presentation of the results.

2019

Planning to start VWB Inventory of Goods held by Third Parties and Pilot Serie

Then IoT and RFID came up!

SCAN → PoC → Pilot → Roll-Out

Assessed Technologies

	Real Time Location	Tracebility	Business Limitation
Infrared:	✓	✓	Inside box reading
Ultrasound:	✓	✓	High costs
Wi-Fi and ZigBee:	✓	✓	Activies Tags
2D Barcode Visual ID:	✗	✓	Location
Device LoraWAN/SigFox:	✓	✓	Partial Network coverage
RFID:	✓	✓	-

Device	IoT	RFID
Hardware		
Traceability	Online	Job criation to send the inventory information
Communication	Physical localization (GPS)	Radio- frequency
Range	50% Brazil	100% Brasil
Register/ control	Online monitoring- Dashboard	Activities Dashboard
Goal	Asset monitoring and production cycle time control	Asset traceability
Alarm	Anti-trusted alarm	No alarm avaliable

Then IoT and RFID came up!

RFID

- Technology that has existed for more than 60 years and uses tags applied to products that communicate by radio frequency with devices called readers.
- An RFID tag maintains stored data that uniquely identifies each item and its information (eg product, characteristics, batch, expiration date, asset number, etc.)
- The range of RFID signals depends on the type of chip, the frequency and the shape of the antenna - usual distances vary between centimeters and meters. Reading can be done in hundreds of tags in seconds in a simple, fast and efficient way.

IoT

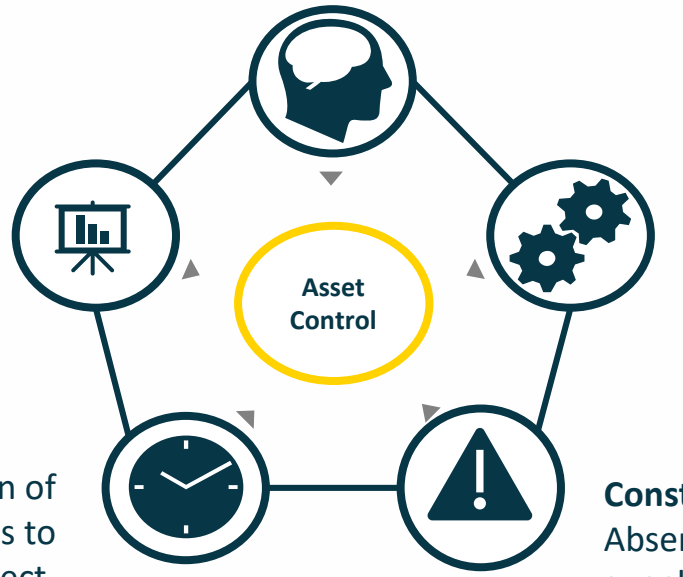
- Technology with a global communication network, capable of transmitting object data, without the need to establish and maintain network connections.
- Device with wireless connectivity approach and that consequently does not cause signaling overhead, since the objects are not connected to the network.
- The device has a software-based communication solution in which all complexity is managed in the cloud and not on the device itself.

PoC Scope

SCAN → PoC → Pilot → Roll-Out

Planning: Install IoT and RFID devices in 3 national and 1 international suppliers.

Consolidation of results: Creation of dashboards to present the results.



Application: Installation of 4 IoT devices and 15 RFID tags at 6 suppliers.

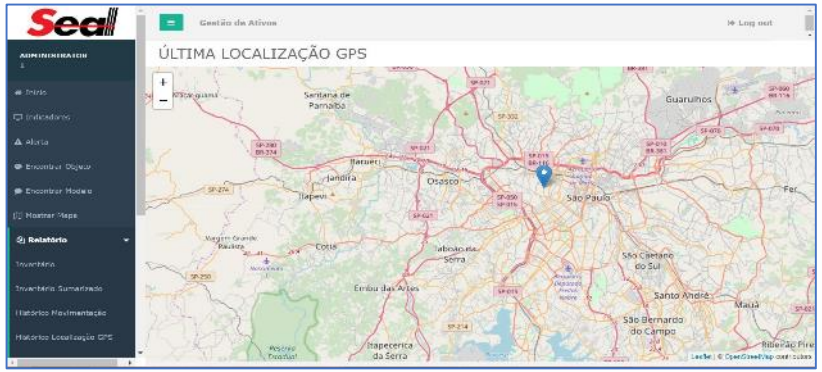
Extra actions: Installation of 2 signal coverage bases to service the project.

Constrain: Absence of signal coverage at 2 suppliers.

Fornecedor	IoT	RFID	Rede IoT
Supplier A	1	3	-
Supplier A	1	6	-
Supplier B	-	3	-
Supplier C	-	3	-
Supplier D	1	-	1
Supplier E	1	-	1

PoC Scope

PoC validated the use cases and evidenced the positive performance of the technology.



Pilot Scope

SCAN → PoC → Pilot → Roll-Out

Proposed:

- Plan the physical Inventory using the traceability technology (RFID / IoT) in 2 national and 2 international suppliers.

Expected Activities::

- Presentation of the execution plan in the committee;
- Definition and approval of the budget and VWB team;
- Communication to suppliers about the inventory;

Identified issues:

- Assets without DTs issued;
- BTs with generic codes;
- BTs registered with two different suppliers;
- Assets transferred to sub-suppliers;
- Assets without BT identification;
- AEKOs with the creation of a new BT for an existing asset.

Supplier definition:

- Risk Management;
- Production of parts with risk of sale in Parallel Mechanism;
- Supplier with a plant;
- Easy location;

Main activities

- Approval of the Inventory premises;
- Extraction of the Third Party Goods Assets report;
- Survey of DTs for asset composition / installation of devices;
- Identification of asset NFs with Generic Code.

Pilot project to confirm RFID and IoT assessment outcomes

Design solution

Hardware, software, tags and infrastructure

Execute pilot Project

Validation of technology

Set up roll out strategy

Implementation plan for 400 suppliers

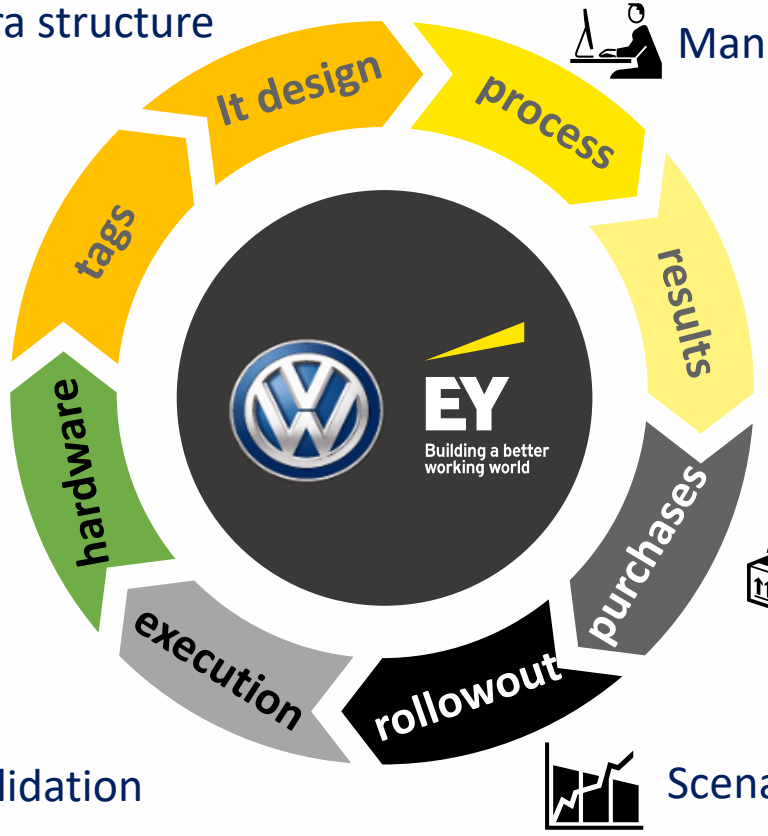
Pilot project to confirm RFID and IoT assessment outcomes

System & Infra structure

Marketing and R&D
Application strategy
Rollowout with suppliers

Specification for pilot
Installation and support

User cases test for validation



Managing model with RFID

Business case validation
Productivity impact

Supply model for pilot
Brazil market assessment
RFID vendors engagement

Scenarios for full implementation

Pilot Implementation 2019

Feb

Kick-off

- TI VW: Survey of Infrastructure, Cloud, Integration Needs;
- Executive agendas for checking project progress;
- Survey of needs with VW suppliers
- Start listing hardware needs, devices, tags, etc.

Pilot Implementation 2019

Feb

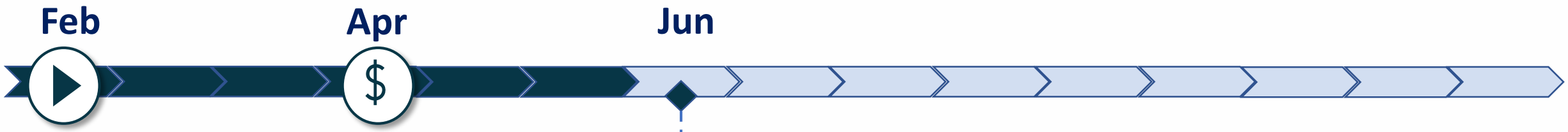
Apr

Kick off

Tags and Equipaments acquisition

- 1216 Iron Tags;
- 300 IoT device;
- 8 equipment suppliers – colector, smartphone, softwares

Pilot Implementation 2019



Kick off

Physical Inventory

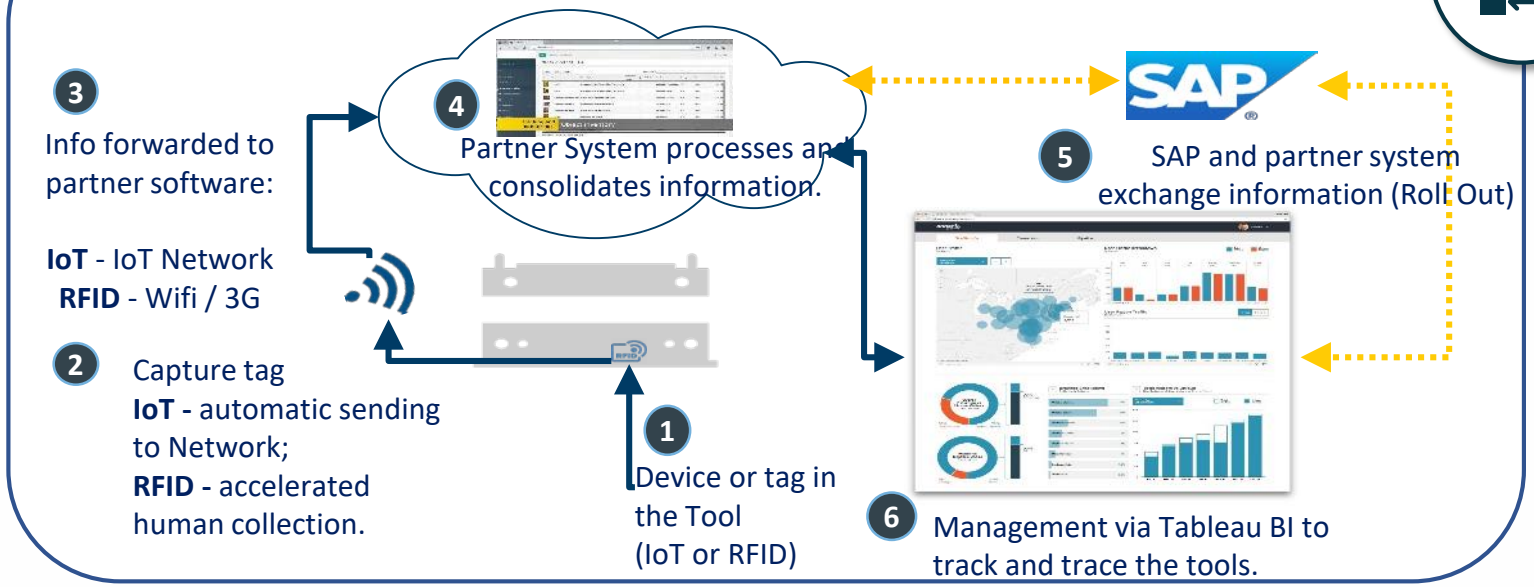
- Physical inventory on 2 suppliers in Brazil and 2 in Argentina.
- Consolidating the list to implement the technologies.

Pilot Implementation 2019

Feb — Apr — Jun — Ago

Kick off

IT Architecture and infraestructure



Pilot Implementation 2019

Feb — Apr — Jun — Ago — Sep

Kick off

Tools tags and devices application in +1500 assets (Brazil and Argentina)





Pilot Implementation 2019

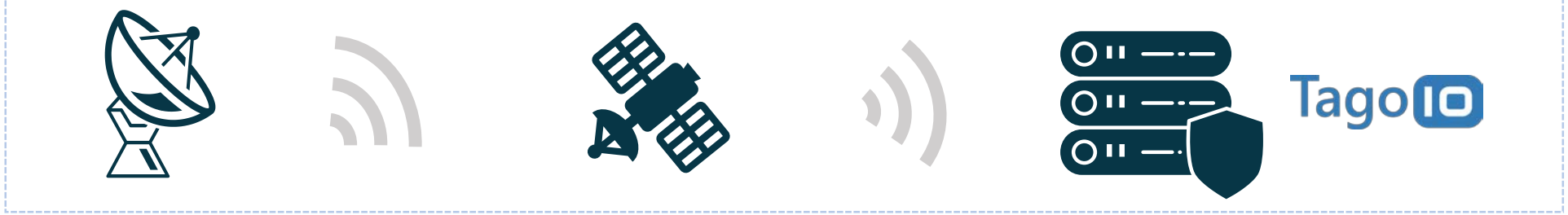
Kick off

RFID e IoT operations execution

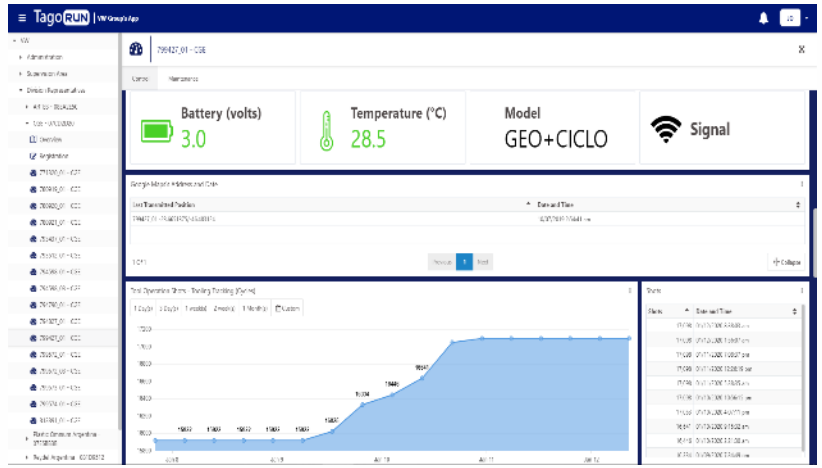
Physical inventory

Tools monitoring

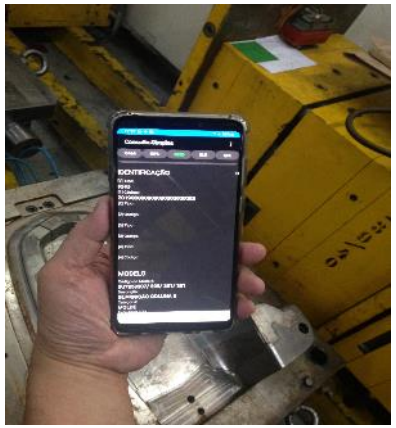
Production cycles

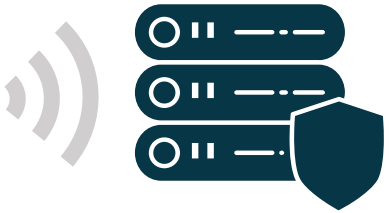


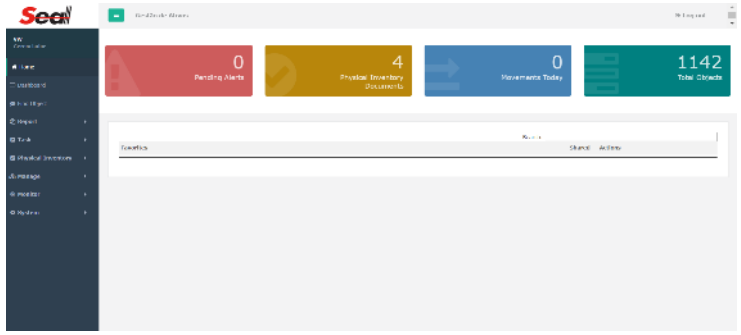
Cycle and time counting information is accumulated and sent every 4 hours via the Sigfox network to a database.

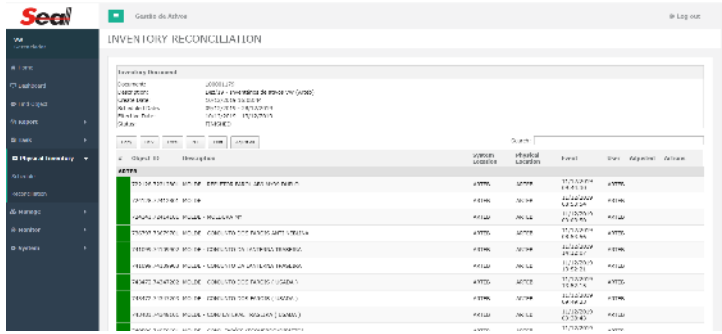


IoT | RFID | Analytcs



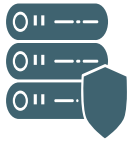


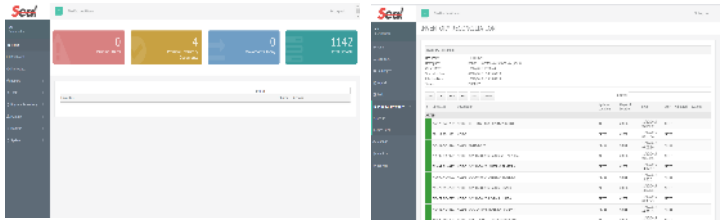


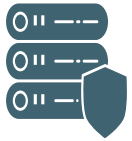


The Volkswagen team creates an inventory document that sends a notification to the supplier to make a physical inventory of tools in their possession. With a mobile collector, the supplier reads the assets and automatically sends the information to a database.

IoT | RFID | Analytcs

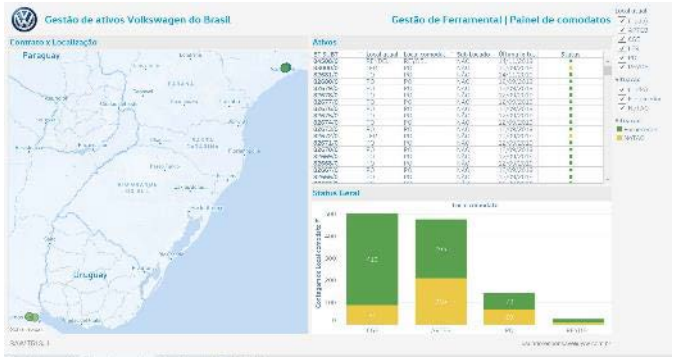






TagoIO

DASHBOARDS TABLEAU



Project conclusion

- ✓ The technology can be applied to monitor asset;
- ✓ The distance to the asset is not a restriction;
- ✓ VW can save money to asset monitory periodically;
- ✓ The information is updated easily;
- ✓ The roll-out is planned to start in 2020 (~ 60.000 assets)

Critical Success Factors

Sponsorship from the top management

Partner with the right players for the Journey. EY was key on this process

Capture results fast and dig deep to validate them

Using Technology not as an end, but as a means to drive better results for the business

Identify where technology can be most valuable to value chain

Choose partners with deep business transformation knowledge

Relentlessly test tags and be agnostic

Senior and diversified integrated team from main areas

Thank you

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Q.A.?

THANK YOU

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