WIRELESS — MEETING 2024

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5G Remote Automated Driving

Panel II – Connectivity and Trends

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Challenges faced by industries

Lack of efficiency

Repetitive actions, decrease of productivity because of time wastage activities.

Safety issues

People needing to do hazardous tasks and increased errors associated with manual handling.

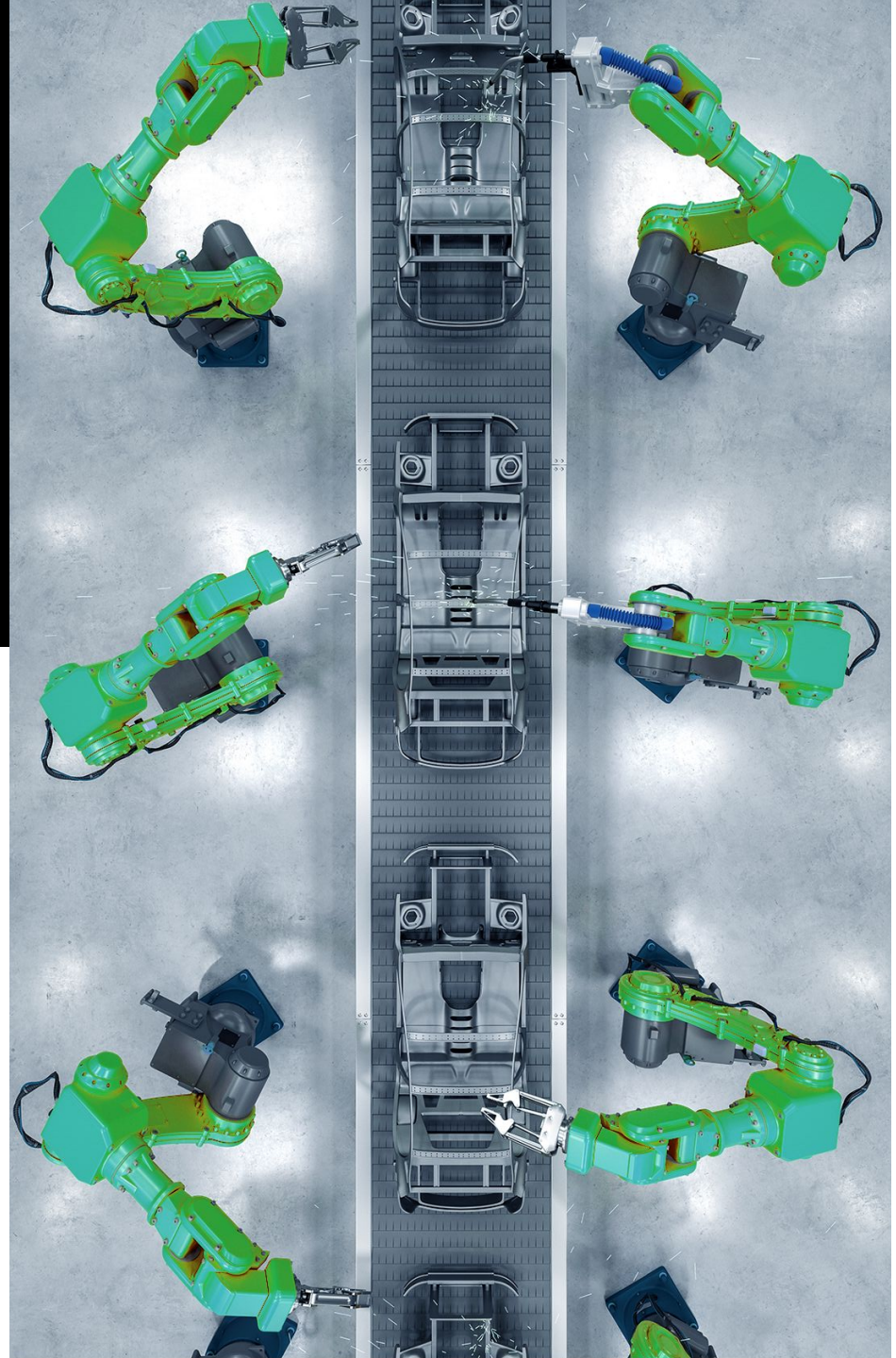
Availability

Limited working hours, production breaks due to workers' availability.

Is our solution ready for elevating all industries and **sectors for Industry 4.0?**

Our Solution

It is a cloud-based solution for automating processes by driving vehicles around in dynamic environments



Adaptable to the customers, fits any layout and setup, and is tailored to any use case requirements

Dynamic environments are no trouble for the solution, that can monitor everything in real time and drive the vehicles efficiently

Automated storage/retrieval system (AS/RS)

- Complex implementation
- High initial cost
- Limited flexibility

Automated Guided Vehicles (AGV)

- Fixed routes
- High infrastructure requirements
- Limited flexibility

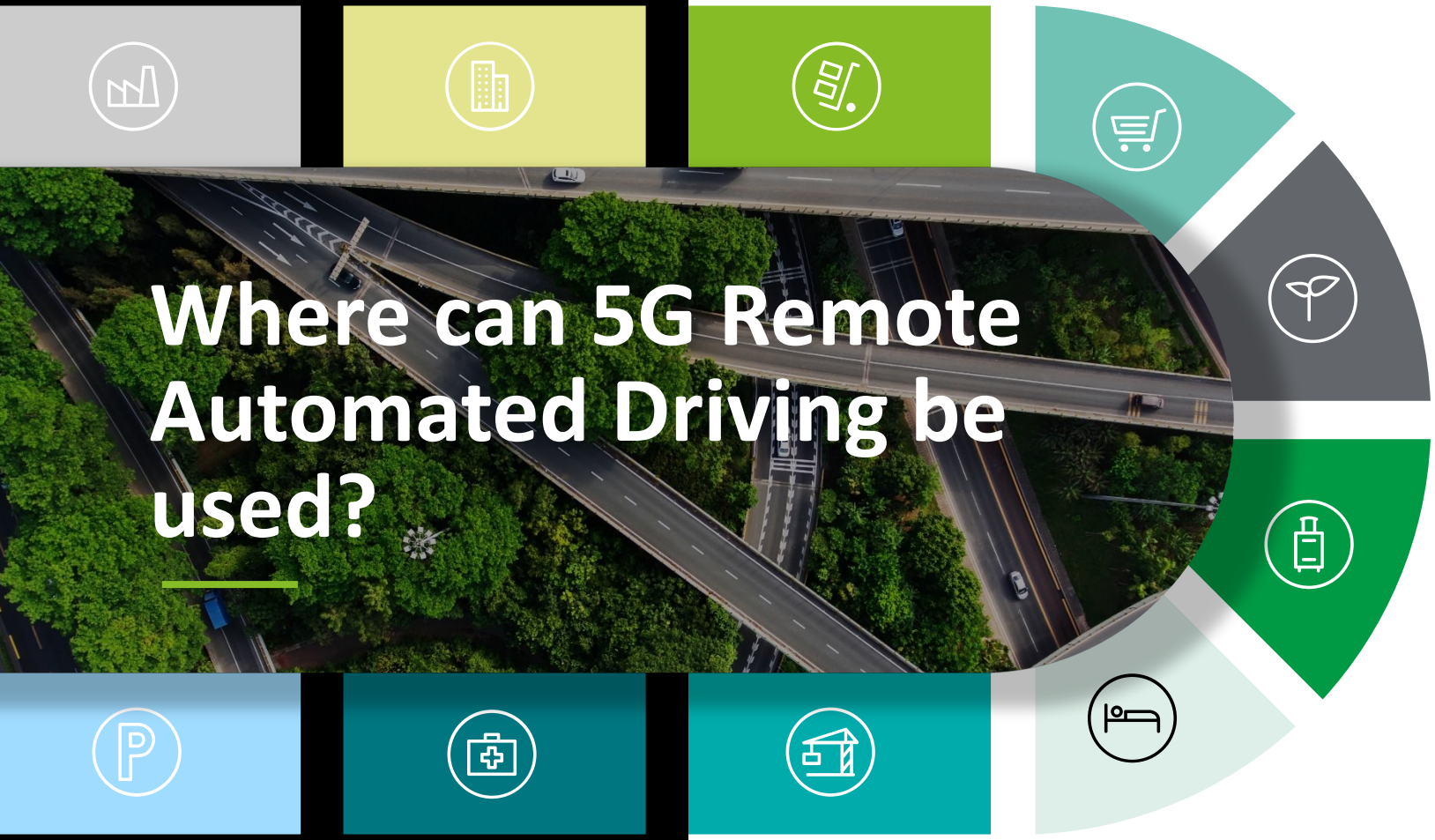
Autonomous Mobile Robots (AMR)

- High initial cost
- Retrofitting challenges
- Navigation issues

We cover the gaps of the current solutions and joint the best of all solutions

5G Remote Automated Driving

- Flexibility
- Scalability
- Adaptability
- Customization
- Efficiency
- Reliability
- Security
- Cost optimization



Where can 5G Remote Automated Driving be used?

Factories
- Transport of materials
- Transport of products

Office spaces
- Transport of materials

Warehouses
- Transport of packages
- Transport of pallet

Retail
- Stock management
- Transport of pallets
- Transport of products
- Automatic shopping

Agriculture fields
- Transport of products
- Treatment application
- Product inspection

Terminals
- Transport of luggage
- Transport of materials

Hotels
- Room services
- Transport of goods

Extraction or construction sites
- Transport of materials
- Difficult access inspections

Hospital units
- Transport of food
- Transport of medicine
- Automated wheelchairs
- Automated stretchers

Parking & Garages
- Automated valet parking

5G Remote Automated Driving solution includes support, 5G and sensoring hardware setup and a core cloud native software solution to manage and monitor all vehicles

Real time environment recognition and tracking of all the objects in the controlled space

Drive tracking of all controlled vehicles and possibility of intervening manually on the drives whenever it is needed;

Vehicles

Hardware with LiDAR sensors, CCTV HD cameras

Sensors & Cameras

5G

01

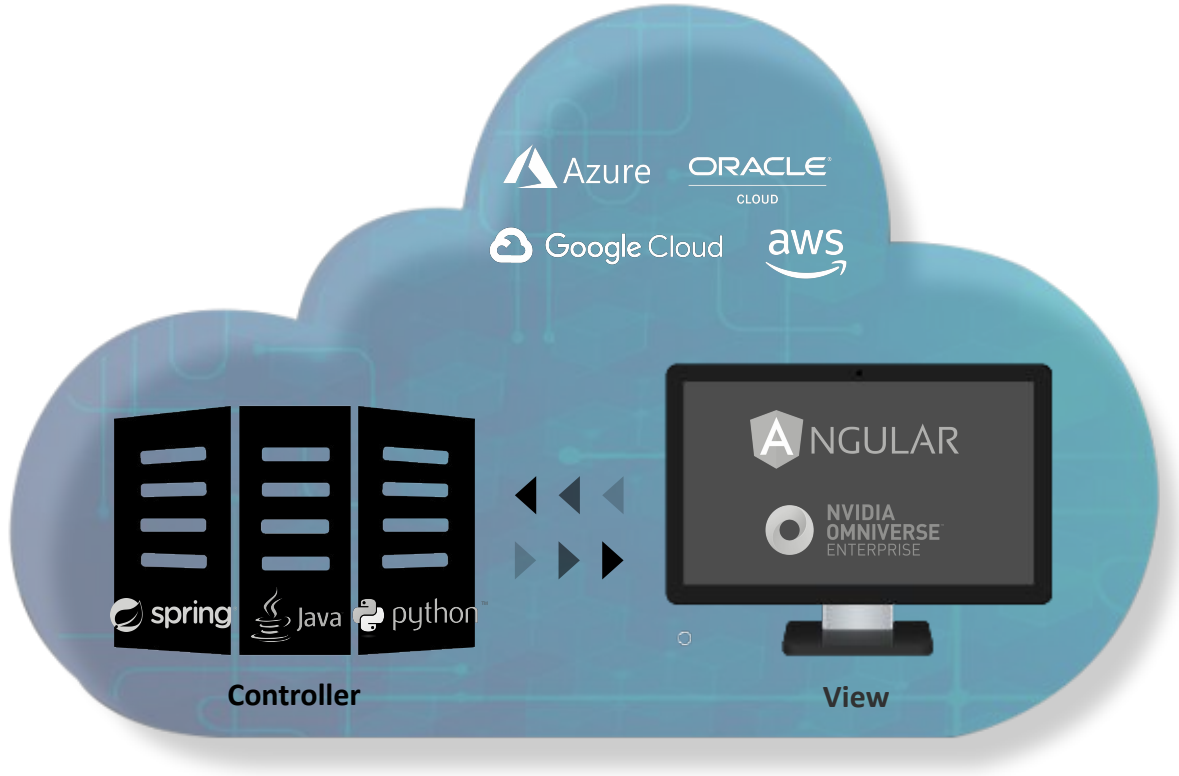
Software with open-source frameworks like Angular, Java + Spring, Python, hosted in any cloud, with IaaC using Terraform.

02

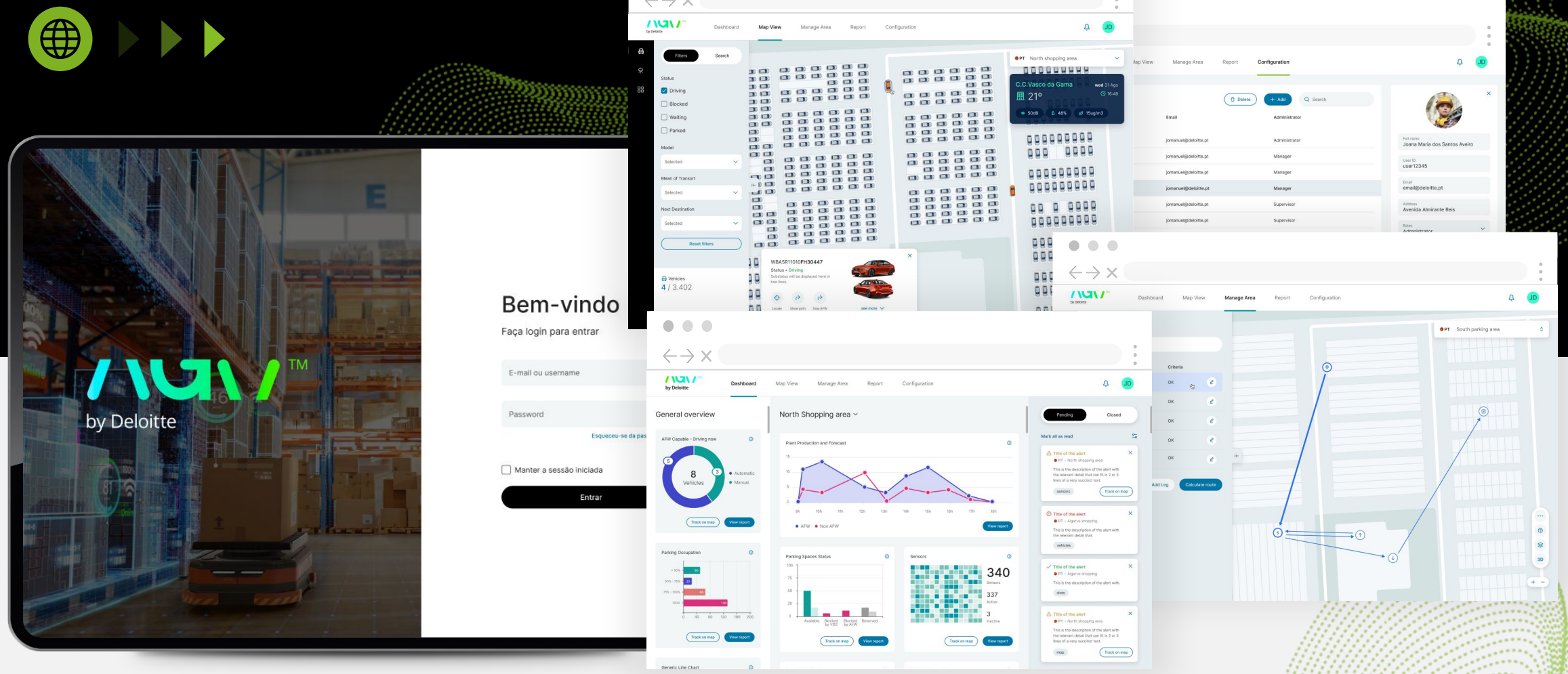
Manage traffic rules and pathing rules like velocity, blocked areas, traffic lights, preferred roads, etc

03

Manage slots, geofences and any parking layouts

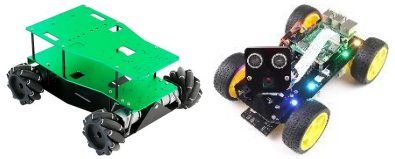


Visualize dashboards and metrics, monitor driving and act on alarmistic, and generate reports



The capabilities of the system can be experienced in a **3D live demo**

Multiple types of vehicles will be in action, showcasing the agnostic driving capabilities of the solution



The entire demo space is tracked by **sensors and cameras**, creating a real time representation of the environment

Spread around the maquette, there will be **3D props** that represent a dynamic environment

01

Vehicle **registration** is initiated when placed on a **geofence**, simulating the end of a production line

02

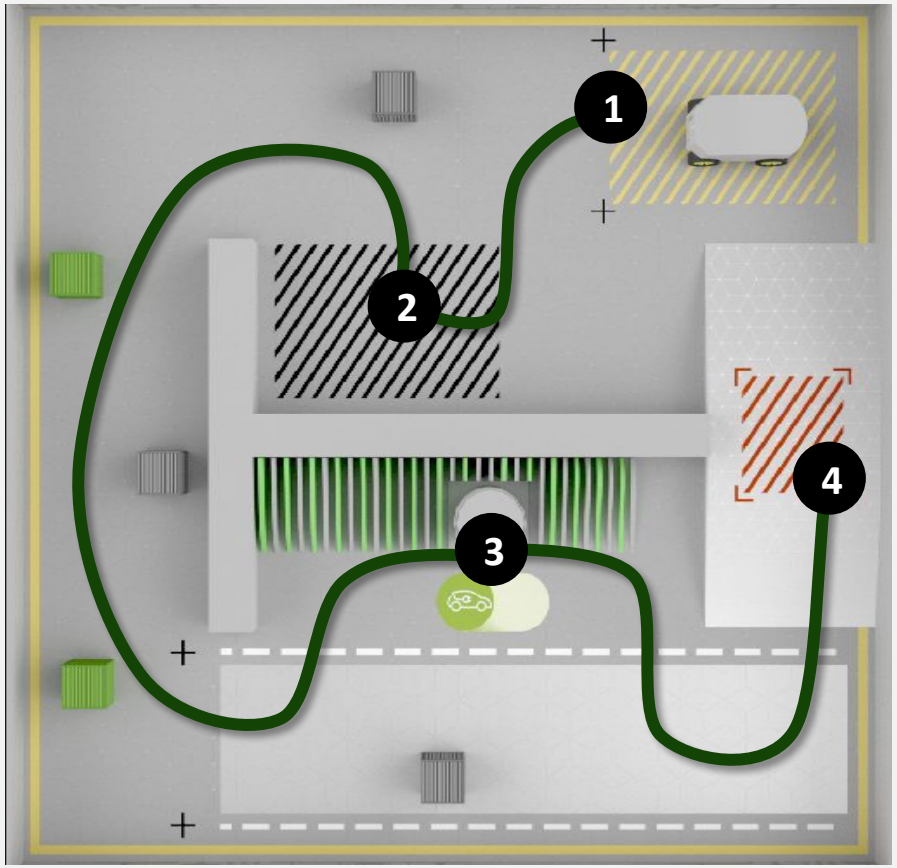
Vehicle **drives** to a first designated **stop and does** a road test

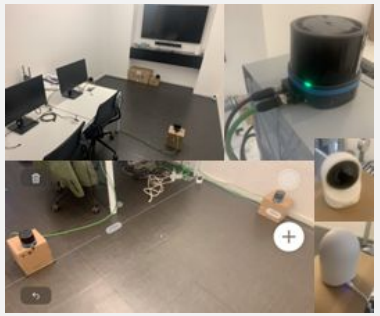
03

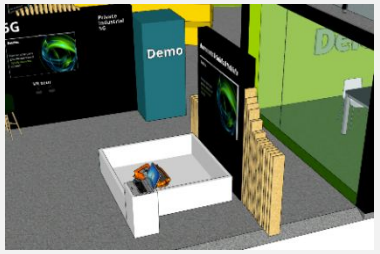
Vehicle **drives** to a second designated stop, **avoiding obstacles** in the way and does an electric checkup

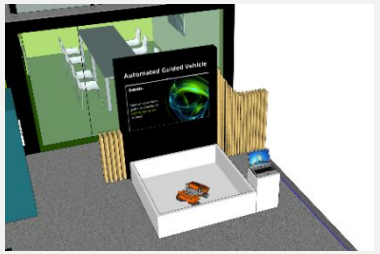
04

Vehicle **drives** to the last stop and is parked, **finalizing** its route









Delivering the 5G enabled digital transformation for Automotive Sector

Advanced connectivity for Automated Driving, vehicle control and maneuver around an automotive OEM production plant without requiring a driver

5G Advanced connectivity powered by CISCO

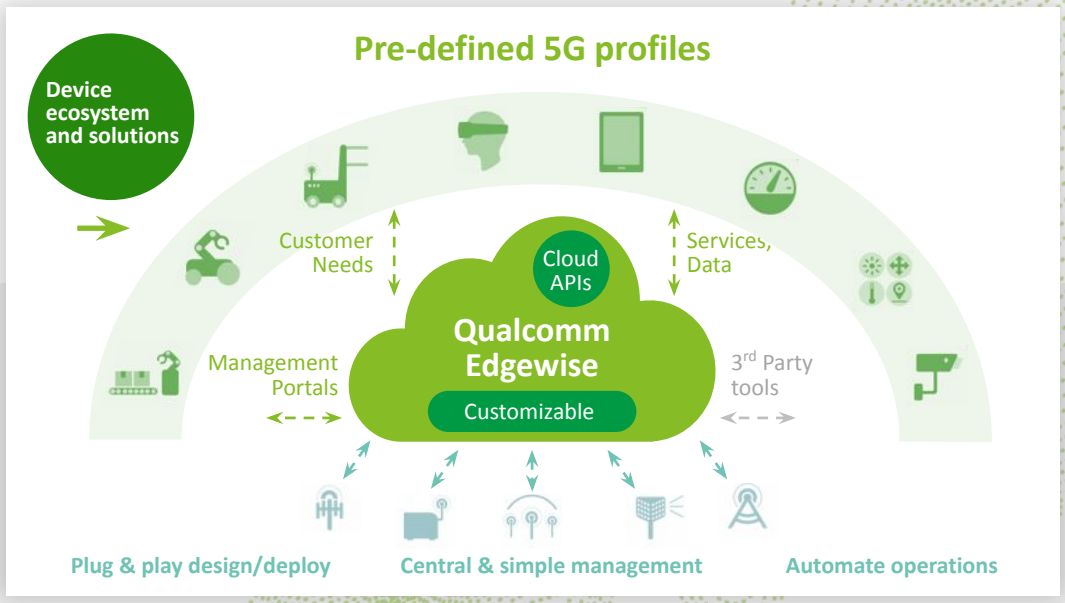
CISCO 5G CORE @ Deloitte - Lisbon

5G RAN @ MWC

Intelligent Sensing powered by Wavecom

Automated networks powered by Qualcomm

Deloitte and Qualcomm are partnering to bring **simplified, centralized and automated network management and operations** solutions to life…



5G Remote Automated Driving at MWC 2024

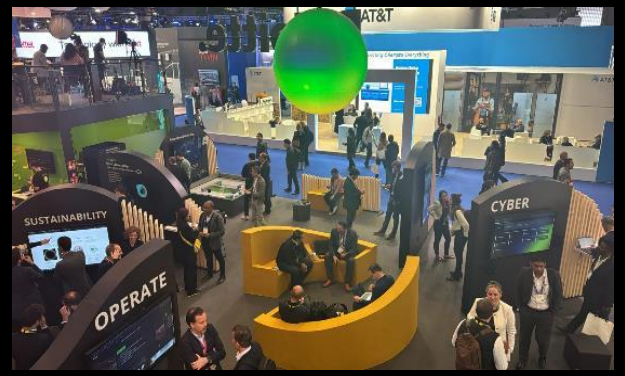
CORE 5G SA
@ Lisboa

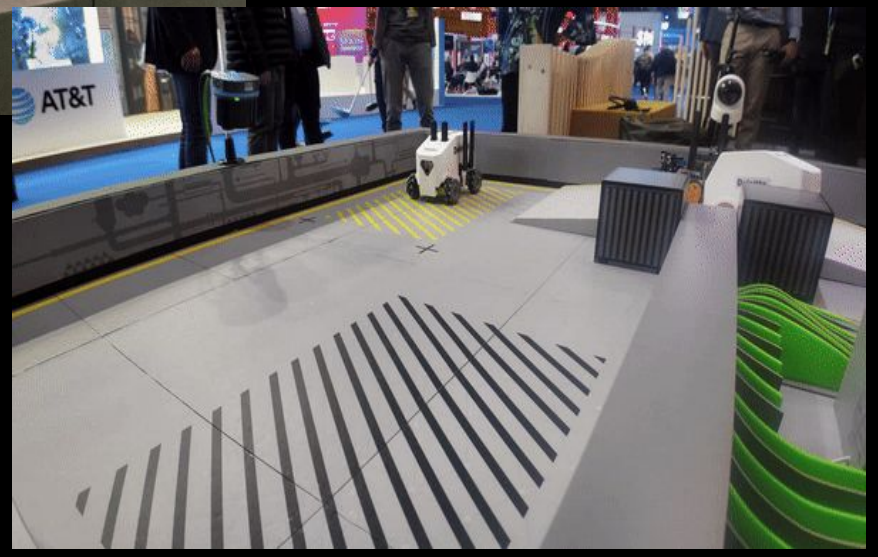
5G Spectrum band
N77 (3,9-4.0GHz)

RAN & Devices
@ Barcelona

Internet
External Access

Deloitte Booth was coverage with a **5G Private Network** to support all real Demos





Remote Automated Drive Vehicle showcasing the agnostic driving capabilities of the solution with **sensors and cameras.**

Where was this already done?

20 factories

3 continents

1 Distribution parking
2 Sensor calibration
3 Charging stations
4 Load parking
5 Distribution parking
6 Test Maneuvering

1 car parked every minute

60% of produced cars can be driven

300 cars driven simultaneous

20 milliseconds signal frequency

50.000 messages every minute per car

3.5 Gb of data per hour per car

movement tracking

Sensors
Sensor data

Vehicle
vehicle signals
trajectories

IT Infrastructure
vehicle & parking information

Monitor & Control
map information
parking & path rules

- Parking Manager
- Vehicle Manager
- Plant Communication Service
- Path Planning
- Vehicle Communication Service
- Databases

Where was this already done?

ROADMAP

DONE

- Private network setup
- Hardware acquisition (vehicles, sensors and cameras)
- Vehicle communication Live tracking of objects
- AI models for vehicle maneuvering

IN PROGRESS

- Middleware for all types of vehicles
- Object identification and movement prediction
- Cloud infrastructure setup

TO DO

- Traffic rules
- Path optimization
- Digital twin simulations

Deloitte.