



## The Path to Highly Automated Driving An Evolutionary Development

Brian Droessler, Vice President, Software and Connected Solutions  
Continental Automotive, North America

# Continental Corporation

## Overview 2013

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- › Since 1871 with headquarters in Hanover, Germany

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  - › Sales of €33.3 billion

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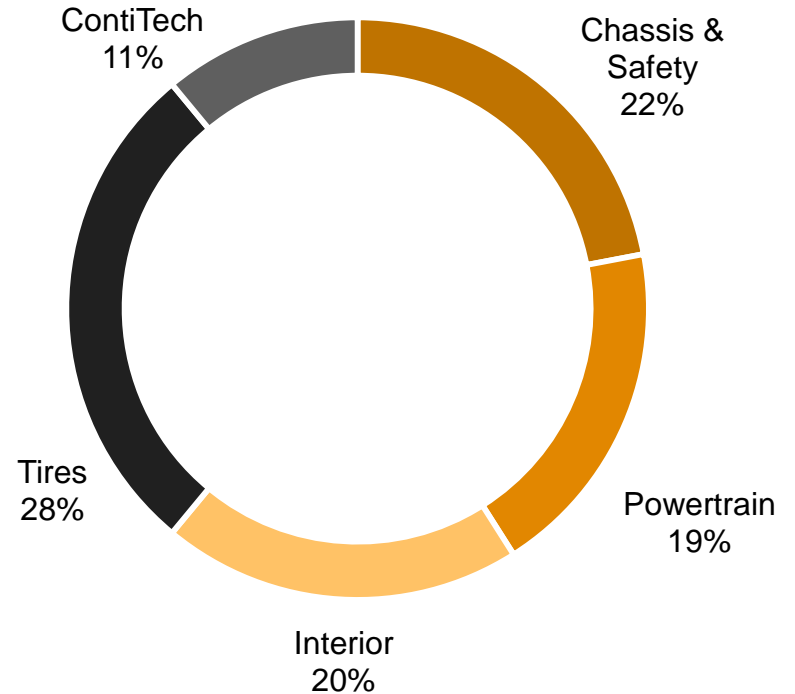
  - › 177,762 employees worldwide

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  - › 300 locations in 49 countries

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Sales by division in %



Status: December 31, 2013

# Continental Corporation

## Five Strong Divisions

### Chassis & Safety

Vehicle Dynamics

Hydraulic  
Brake Systems

Passive Safety &  
Sensorics

Advanced Driver  
Assistance Systems  
(ADAS)

### Powertrain

Engine Systems

Transmission

Hybrid Electric  
Vehicle

Sensors &  
Actuators

Fuel Supply

### Interior

Instrumentation &  
Driver HMI

Infotainment &  
Connectivity

Body & Security

Commercial Vehicles  
& Aftermarket

### Tires

PLT,  
Original Equipment

PLT, Repl. Business,  
EMEA

PLT, Repl. Business,  
The Americas

PLT, Repl. Business,  
Asia Pacific

Commercial  
Vehicle Tires

Two Wheel Tires

### ContiTech

Air Spring Systems

Benecke-Kaliko  
Group

Compounding  
Technology

Conveyor Belt  
Group

Elastomer Coatings

Fluid Technology

Power Transmission  
Group

Vibration Control

PLT – Passenger and Light Truck Tires

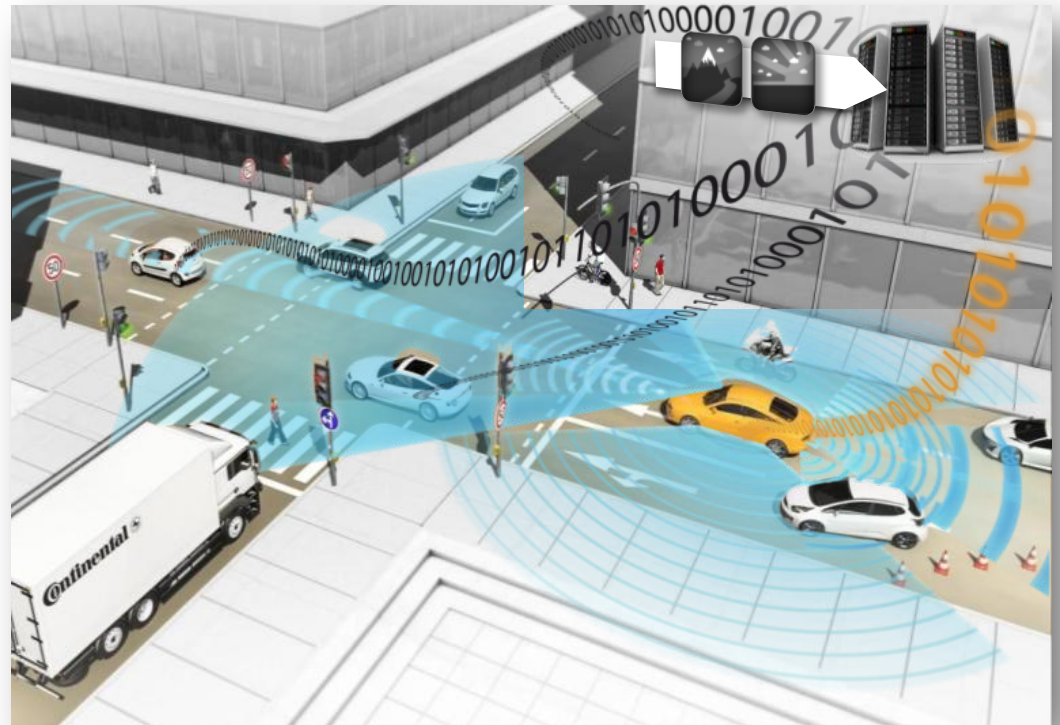
# Reshaping Automotive



**VIDEO**

# The Cloud Enables Automated Driving

- Driver Assistance Systems are a good start
- The cloud is the missing element for automated driving
- Cars need to send, receive and act on real-time data insights
- Cars need to communicate with each other



# The World of Connectivity

## Internet of Things (IoT)



Optimization in closed loop:

Waste



Efficiency

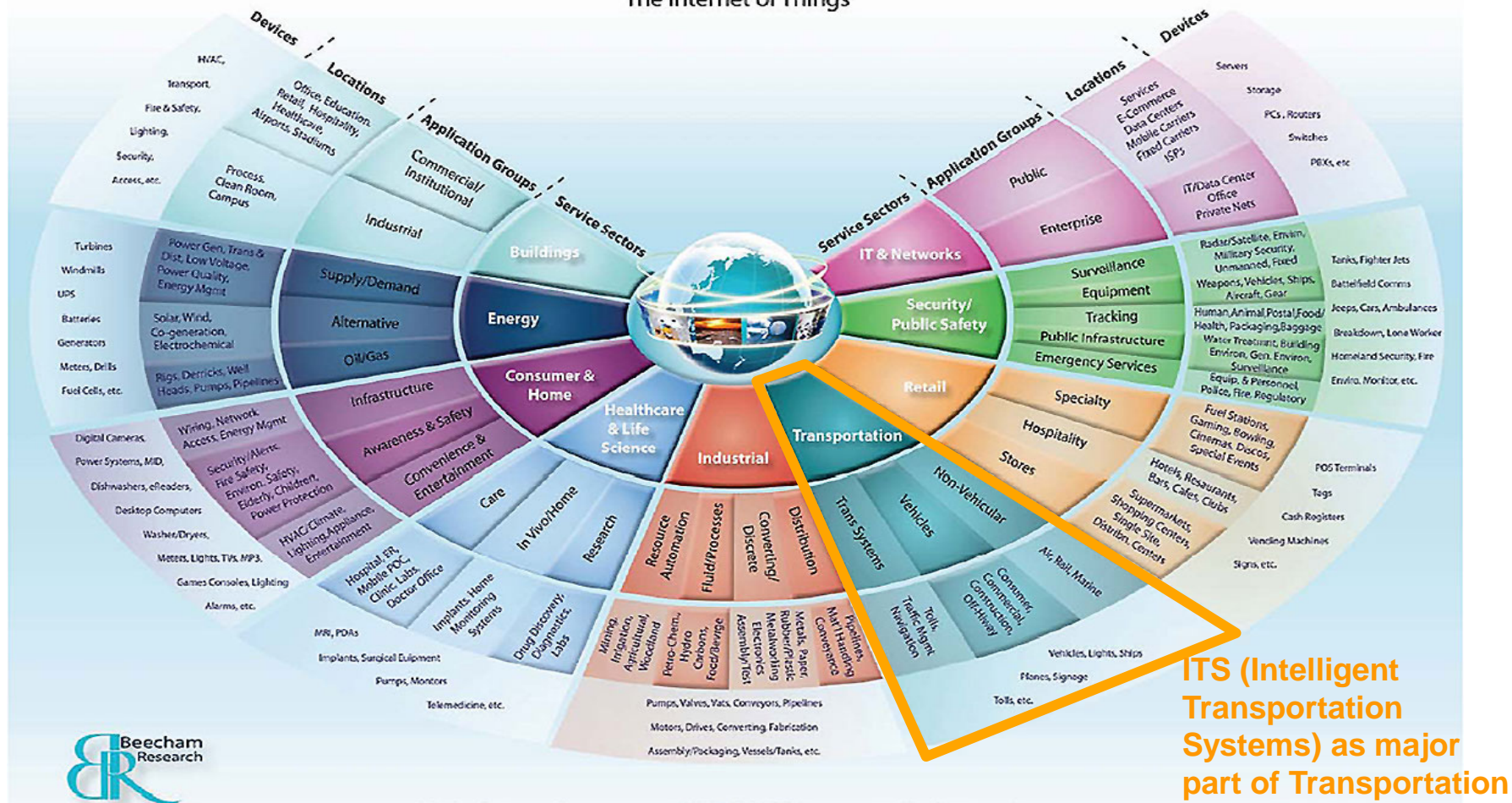


2013: 15 billion connected objects  
2020: > 50 billion connected objects

# Internet of Things: Business Opportunities

## \$14.4 Trillion Value At Stake in the upcoming 9 years\*

The Internet of Things



\*According to a Cisco White Paper; Value at Stake is the combination of increased revenues and lower costs that is created or will migrate among companies and industries.



# Traveling Gradually Becomes Automated

> 2025

## PARTIALLY AUTOMATED

- System monitoring required
- Drivers must be able to take over the task of driving at any time

Example: Stop & go up to 30 km/h



# The Legal Framework Has Yet to be Created

International

**Vienna Convention**  
Every driver sha



National

**Road Traffic Act**  
Participation in r

**Lawmakers have a decisive role to play  
in determining when and how  
market introduction will take place.**



**Partial automation**

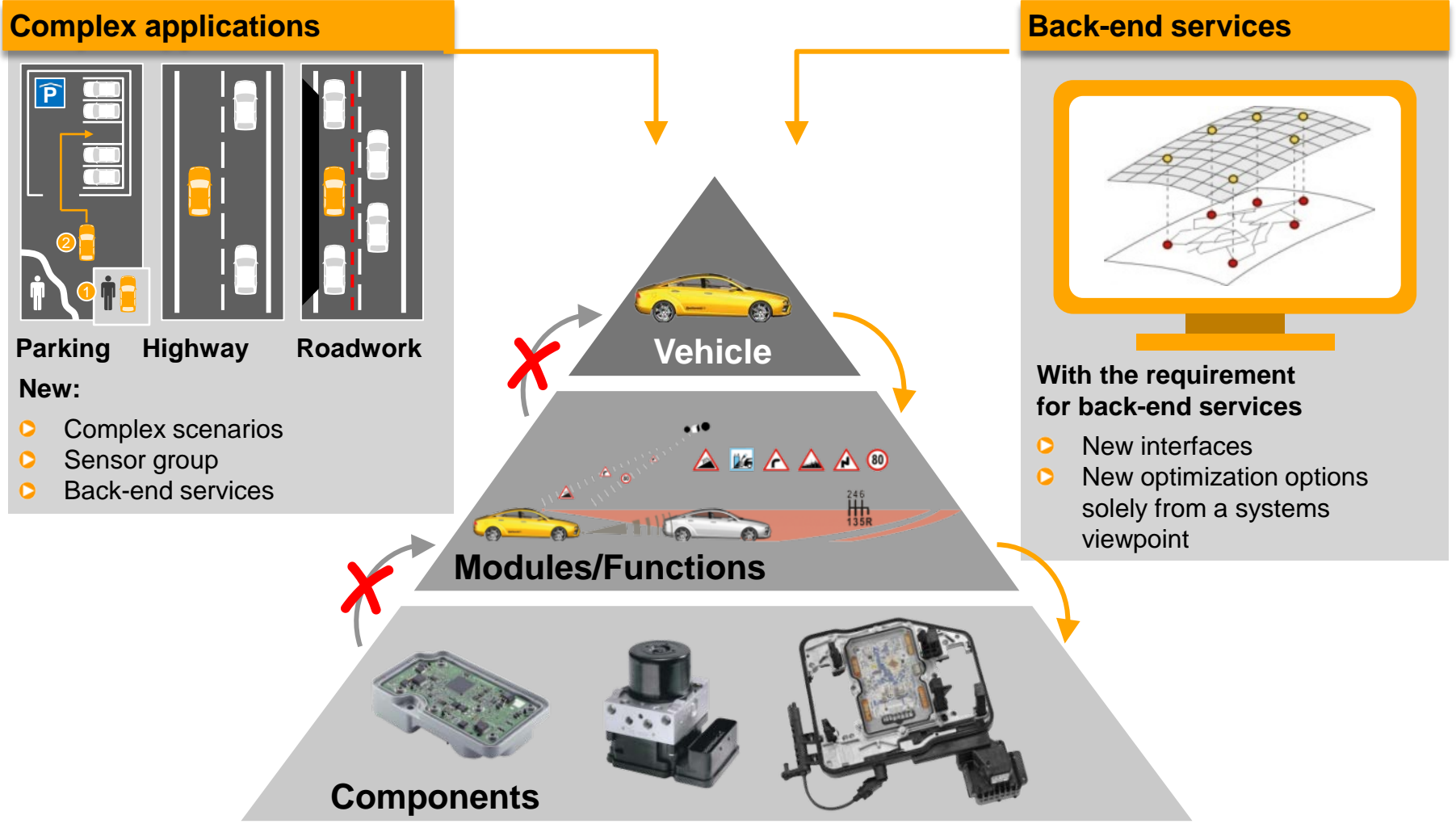


**High automation**

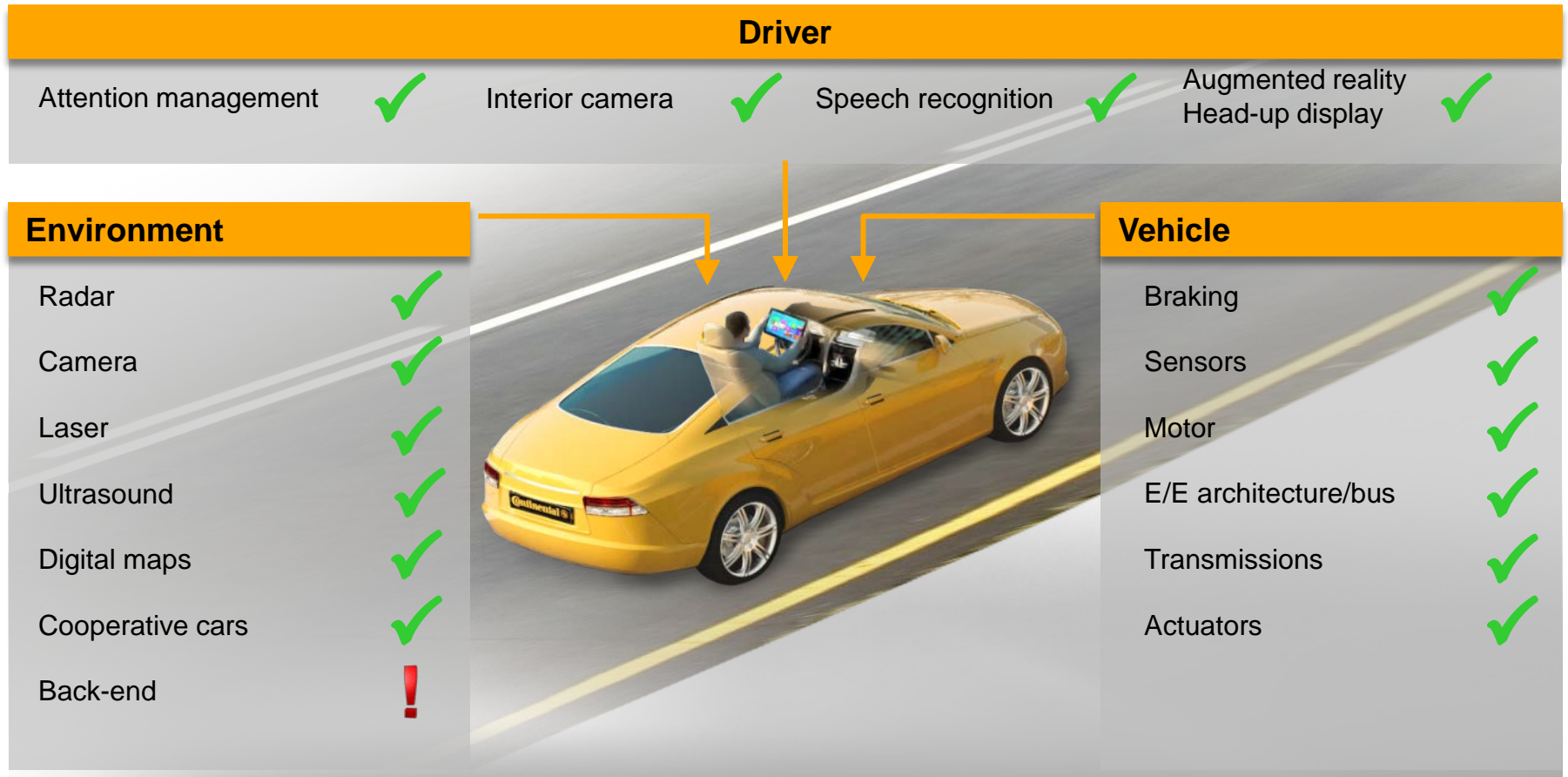


**Full automation**

# Optimal Solutions Require a Systems Approach



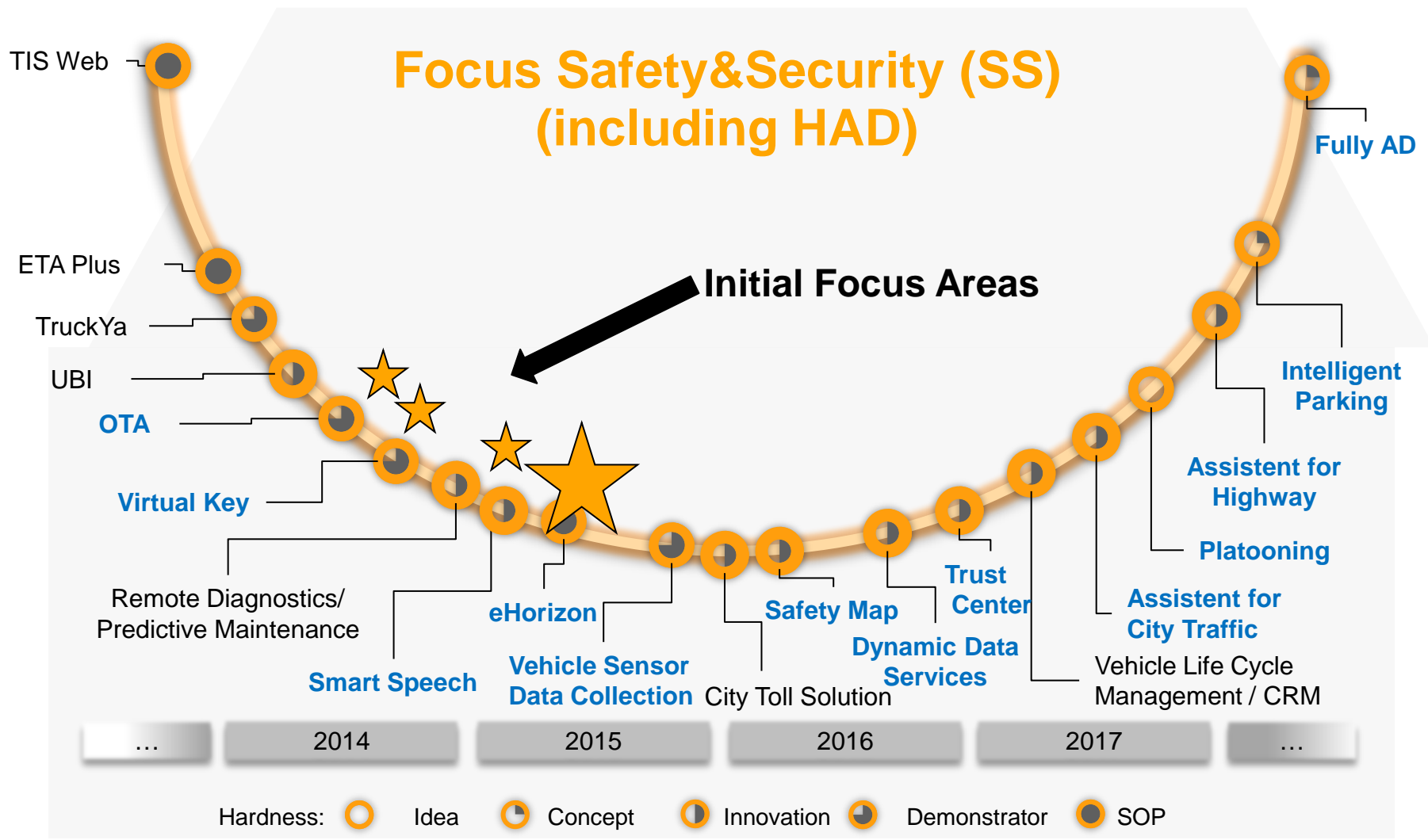
# Suppliers Must Prove Their Systems Expertise



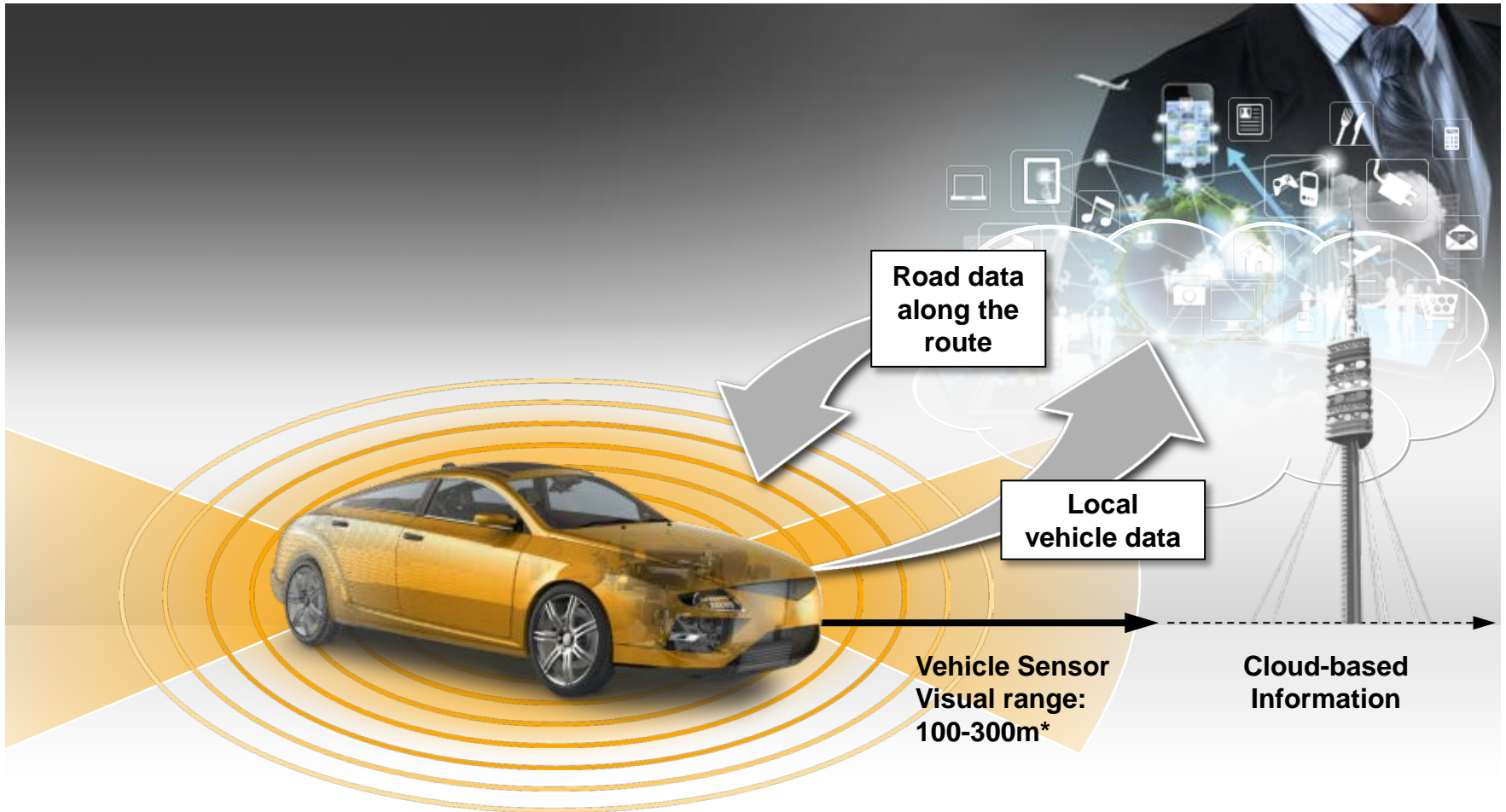
**!** In 2013, Continental is investing over €100 million in R&D for driver assistance systems and automated driving. 1,300 employees are working intensively on this topic.

# Intelligent Transportation Systems - String of Pearls

## Consideration of End-to-End Solutions



# The Benefit for the Driver: Connectivity Increases the “Visual Range”



# Example Use Case

## Why you need an eHorizon system

More Safety –  
Always Informed

### Your Challenge

Imagine you are driving to O'hare airport. Shortly before arrival you pass an area that is usually is very foggy.

Wouldn't it be great to be warned ahead to be able to adapt your driving style and optimize the ADAS functions of your car?

### Our Solution

If one driver is using the fog lights it might be an user error. If 20 cars use fog lights at the same position and drive slower afterwards, it is very likely that there is heavy fog in this area.

With Connected eHorizon, drivers entering the area can be warned to adapt their speed accordingly. Less accidents happen.



# Vehicle Networking and Partnerships

## Strong Partners in the IT Industry



- › Network Connectivity
- › Data compression and data security



- › Big Data processing
- › Stream computing
- › Analytics
- › Infrastructure
- › Platform as a service



- › Highly precise digital map data
- › Map based cloud services



- › System Integrator
- › ITS Applications and ITS services
- › In-car systems
- › In-car components



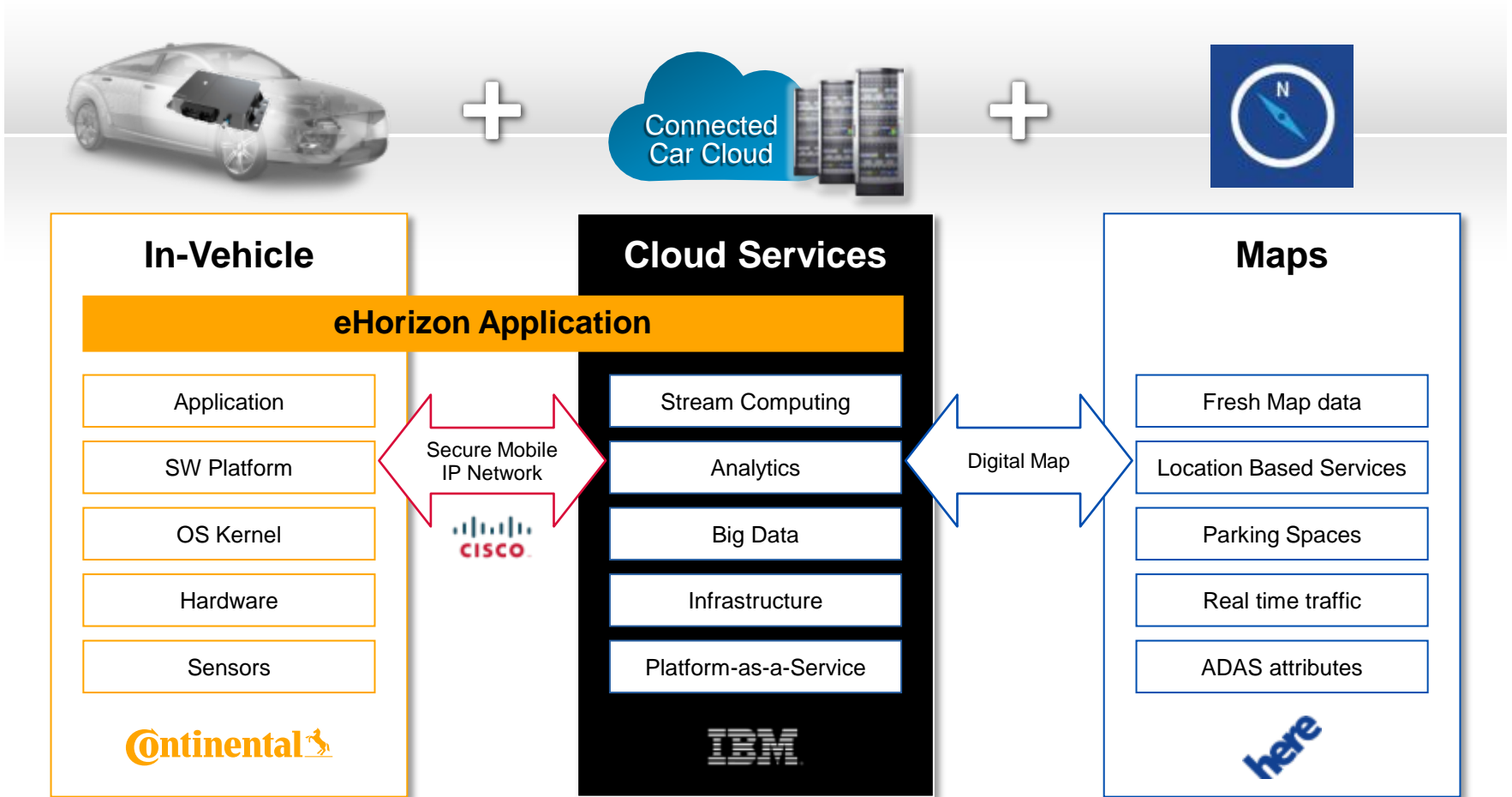
Connected Vehicle





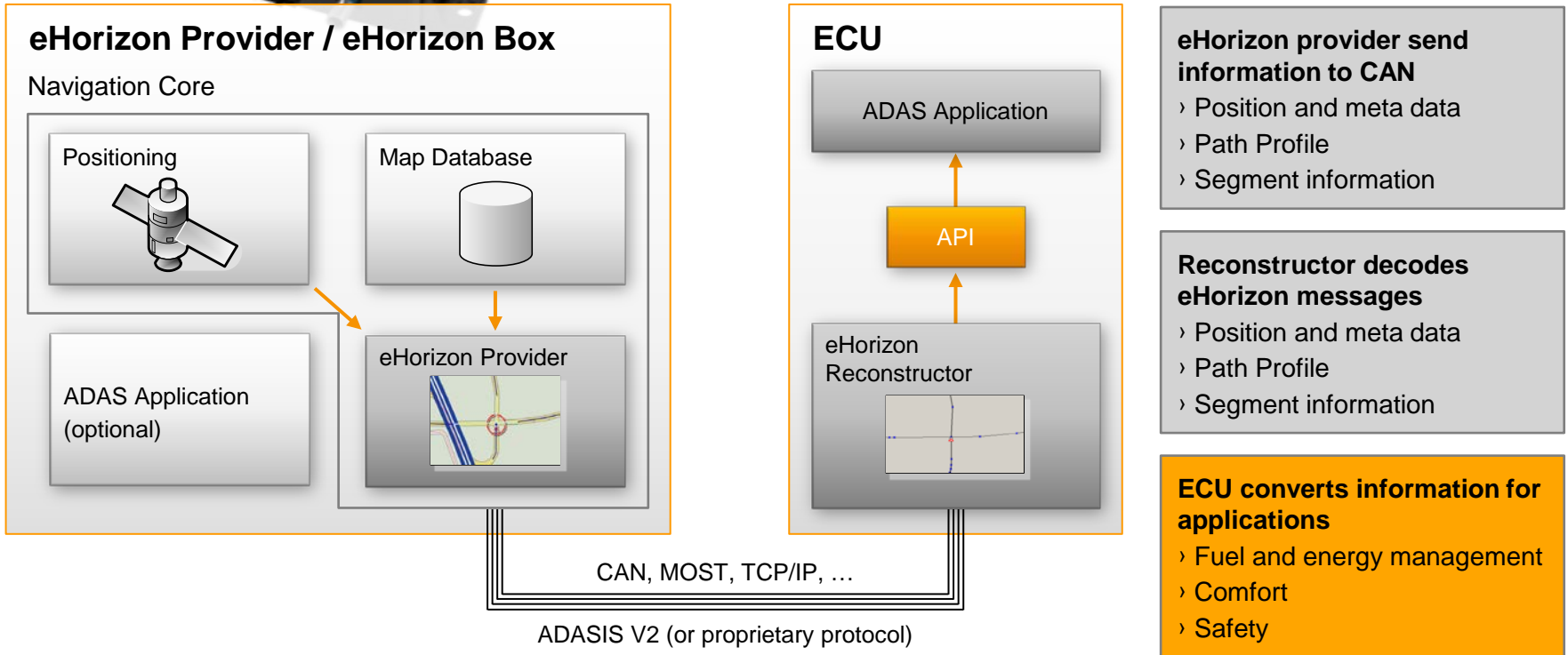
# Technical Solution

## Connected eHorizon System Concept



# eHorizon at a Glance

## System Architecture



# eHorizon at a Glance

## How your vehicle knows what you are up to

Typical path prediction by eHorizon provider

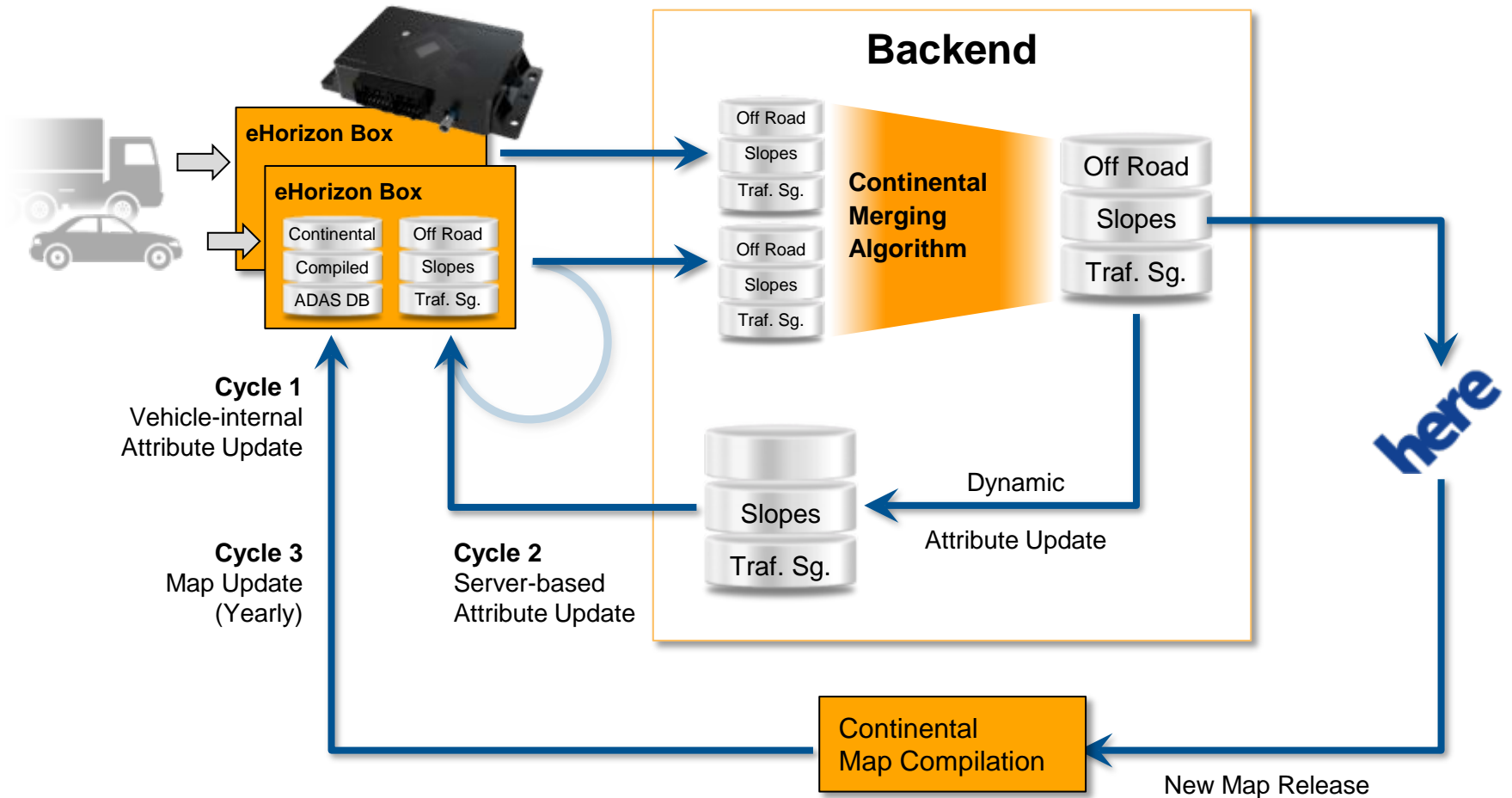


Road segments sent to eHorizon client (blue)

- › Current most probable path (MPP) implementation has a look ahead length of up to 8 km (configurable)
- › Along this stretch (i.e. for all road segments), required ADAS data are put onto the CAN
- › Those ADAS data are provided also for connected road segments (e.g. at intersections) to ensure that the ADAS data are available in case the vehicle leaves the MPP
- › In future, a self-learning MPP will be supported (locally in the vehicle)

# Connected eHorizon

Three Update Cycles ensure Data Availability and Reliability



**We fit your needs...**

and increase Comfort, Safety and Efficiency!

### Comfort



**Maximized comfort**  
by adjusted routes  
based on real time traffic



### Safety



**Increased safety**  
by providing latest road  
and weather conditions



### Efficiency



**Improved cost efficiency**  
by reduction of fuel  
consumption up to 4%



**Continental**   
The Future in Motion



**The Future Starts Earlier With Continental**