



here

# The vehicle of tomorrow, guided by HERE Technologies

Xin Chen, Ph.D.  
HERE Technologies

October 16 2019

# HERE Technologies



Countries mapped



4 of 5

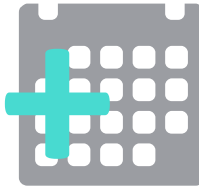
In-car navigation systems in Europe and North America use HERE maps

8,000+



Employees in 56 countries focused on delivering the world's best map and location technologies

30+



Years of experience transforming location technology

700,000

3D data points per second per car

HERE Maps on board of

100M

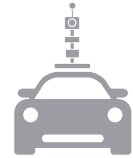
vehicles and counting

28

TB map data



400



HERE cars collecting data for our maps

An aerial view of a city skyline, likely New York City, with a prominent teal rectangular overlay in the center. The text is white and centered within the overlay. The background shows a dense urban landscape with various skyscrapers and buildings under a cloudy sky.

**ENABLING AN AUTONOMOUS  
WORLD  
FOR EVERYONE**

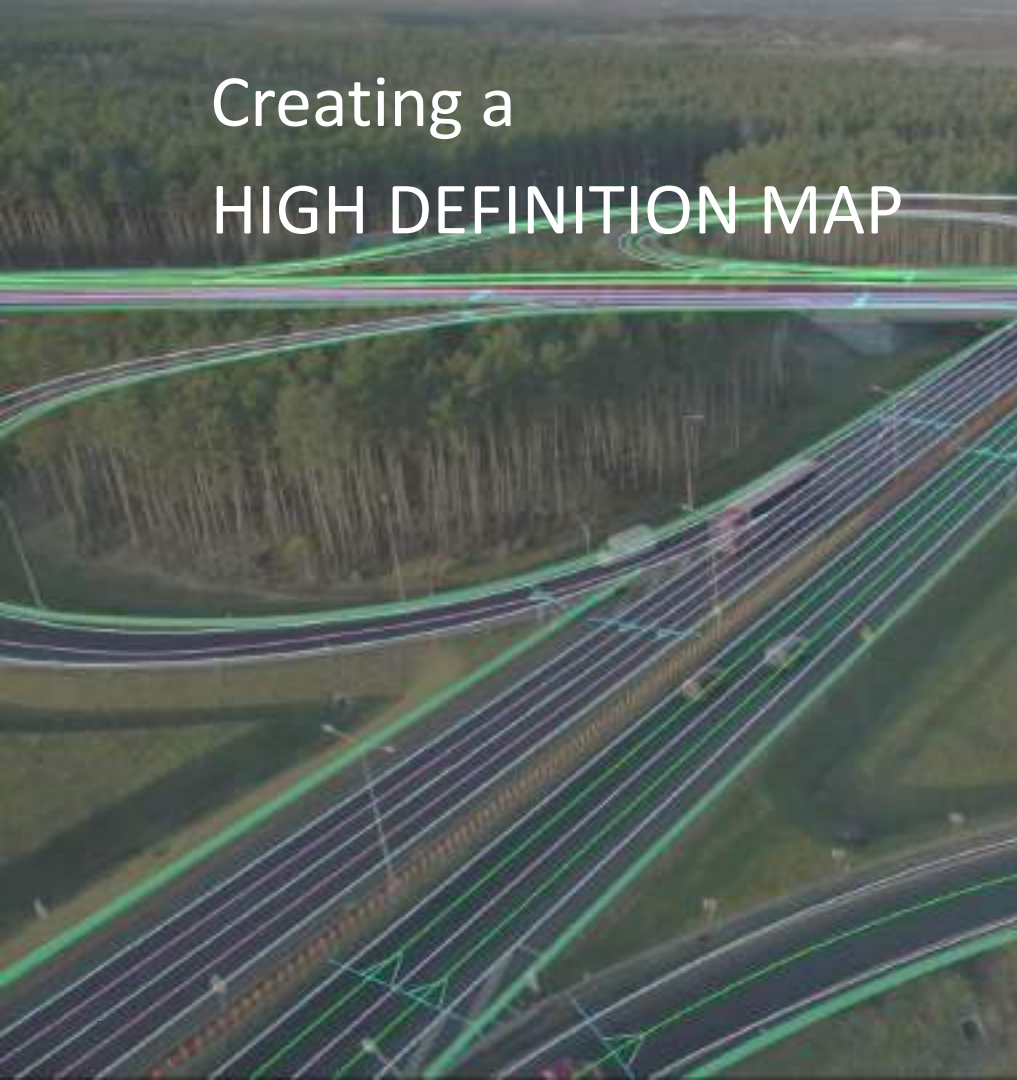
# Creating a DIGITAL REPRESENTATION



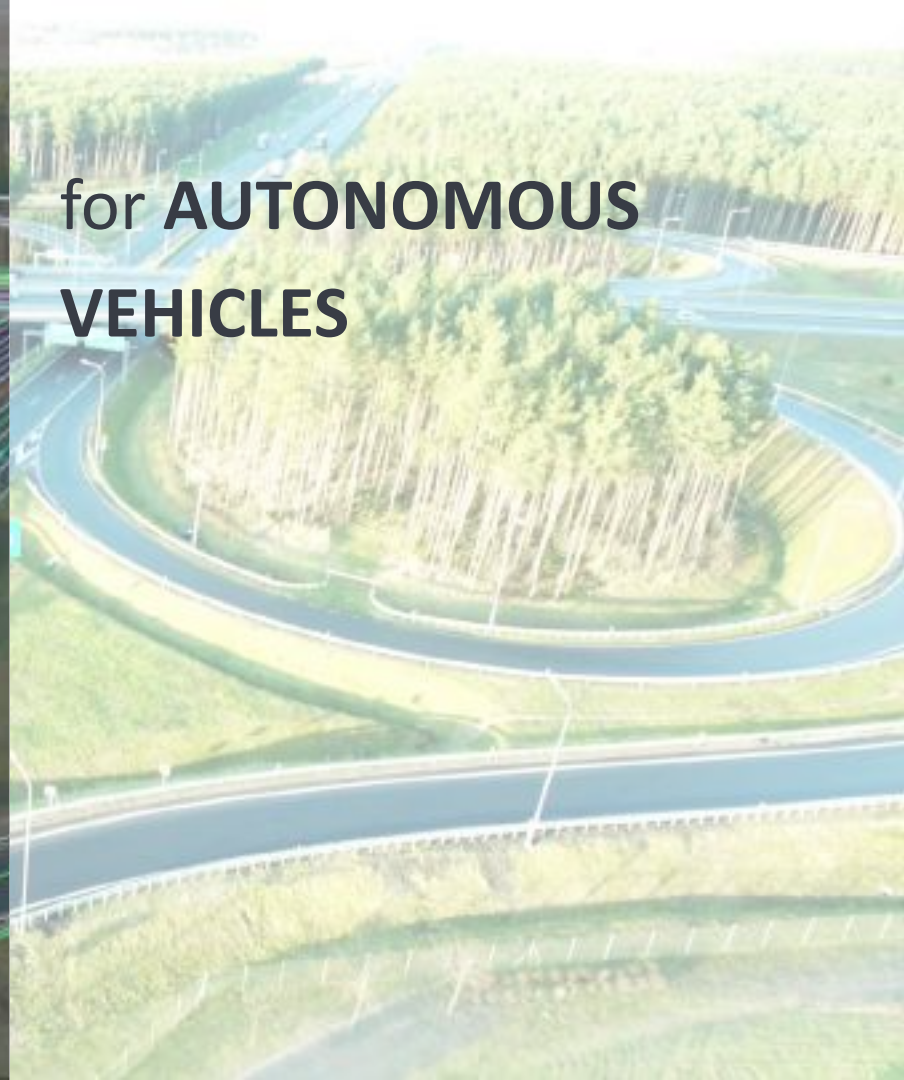
of the **PHYSICAL WORLD**



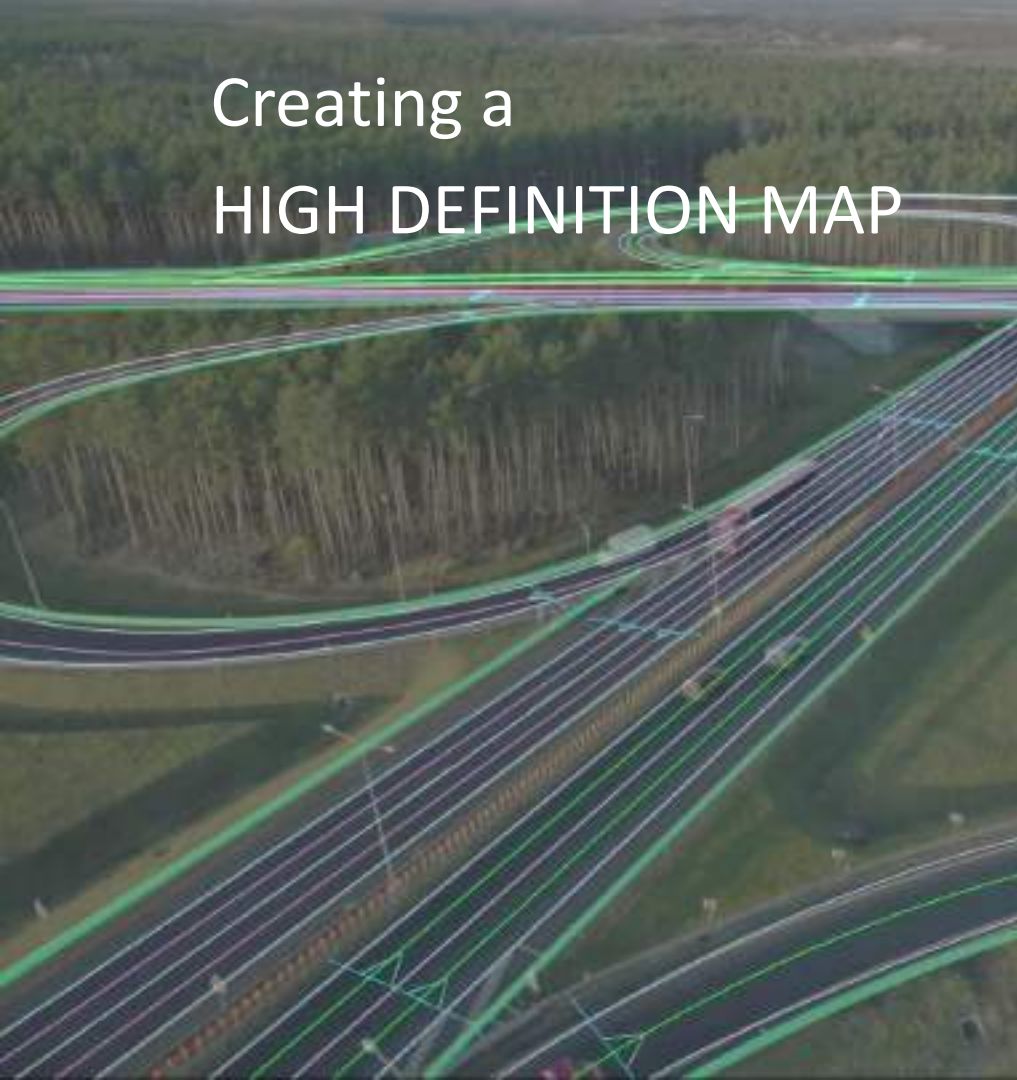
Creating a  
**HIGH DEFINITION MAP**



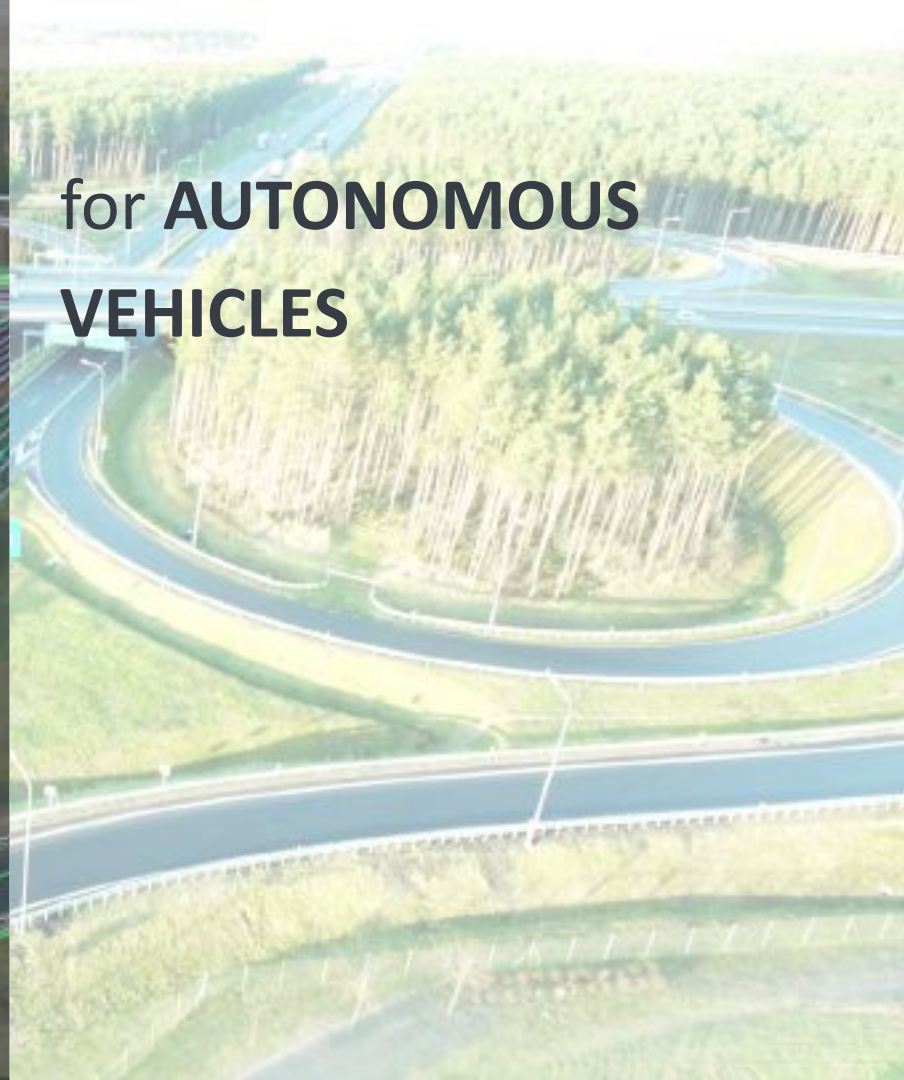
for **AUTONOMOUS  
VEHICLES**



Creating a  
**HIGH DEFINITION MAP**



for **AUTONOMOUS  
VEHICLES**





LANE  
CLOSED

6B93279

GRAND TUNAJ - COSTA MÉRICA



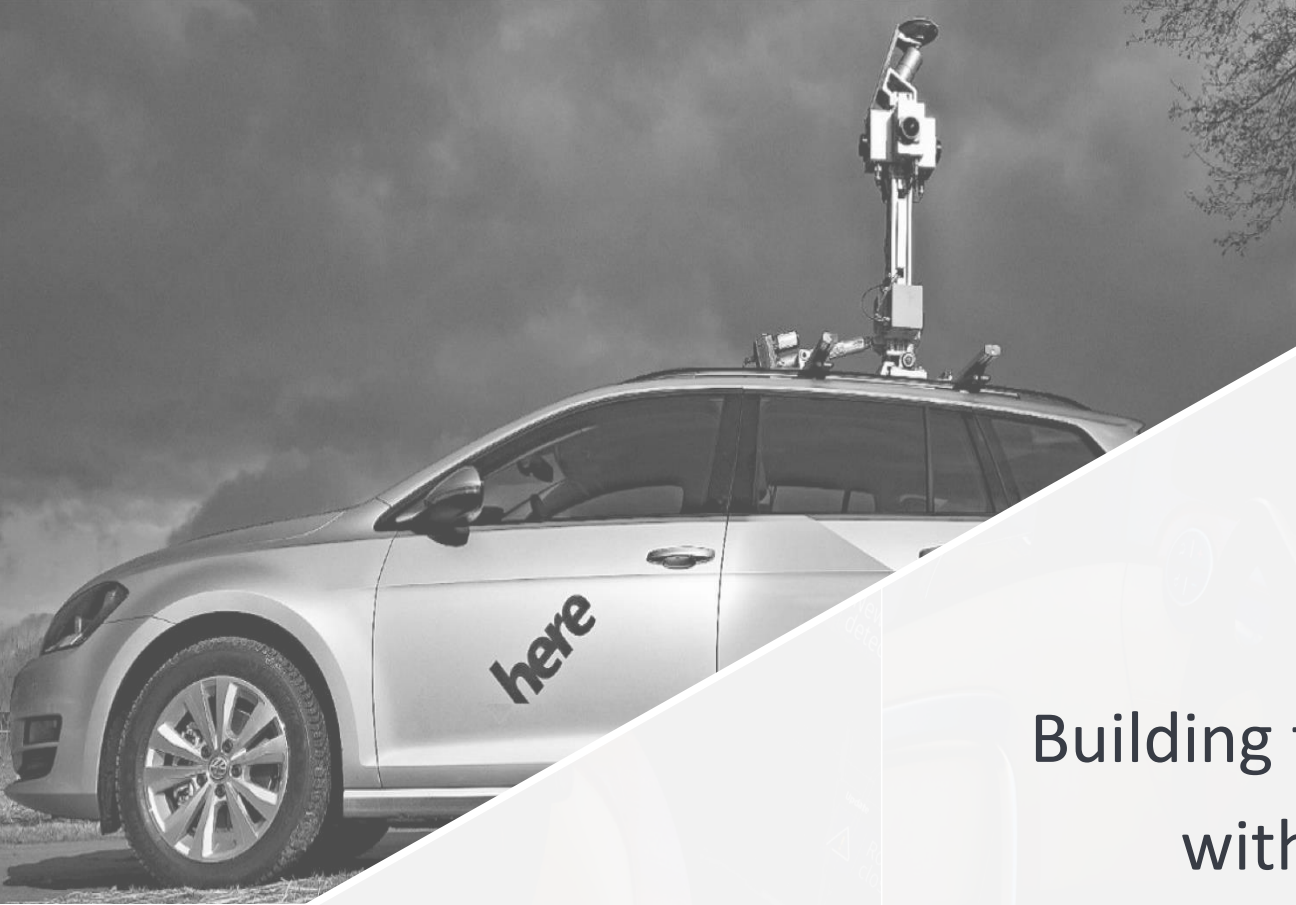




here

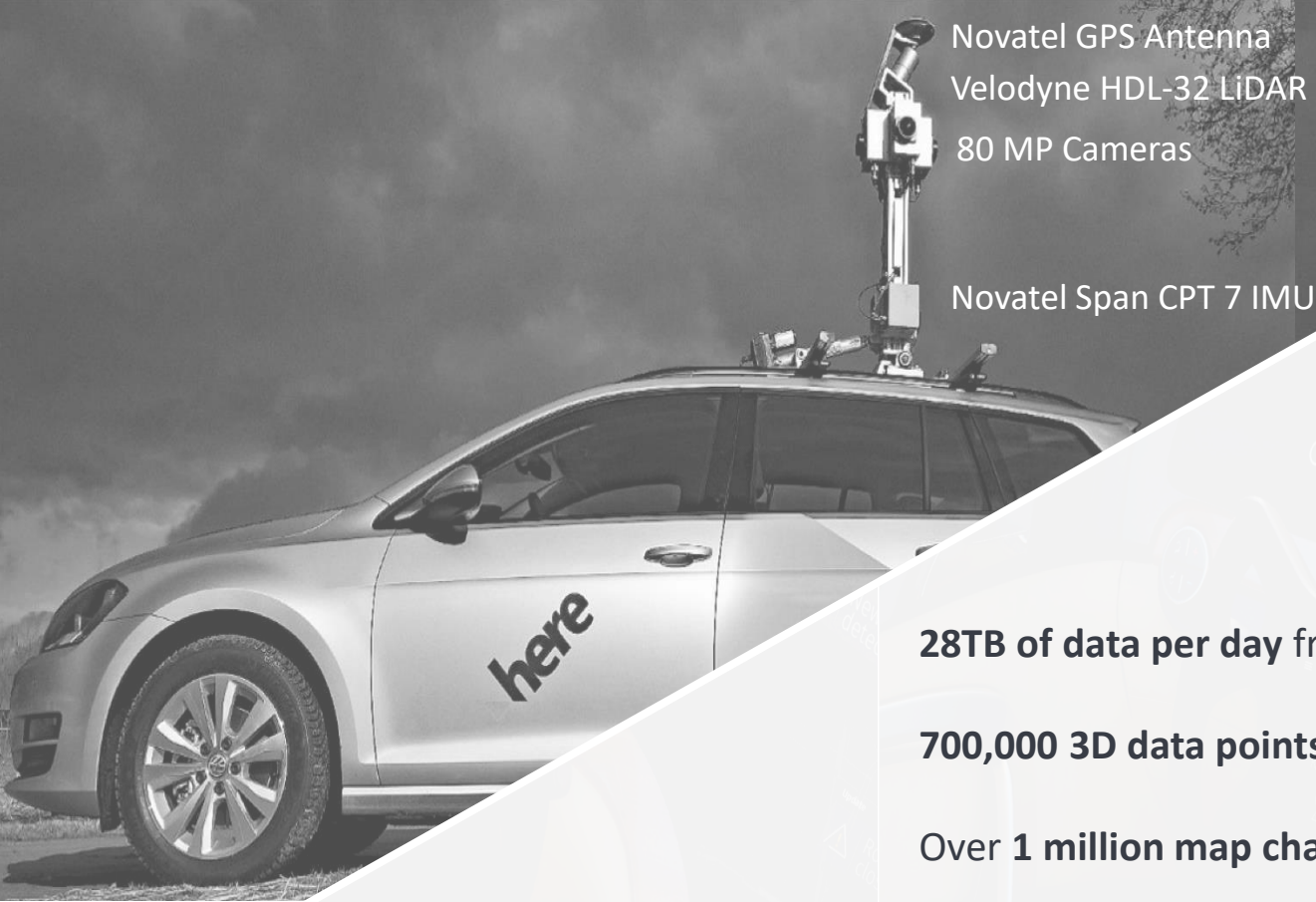
Updating map  
verifying...  
Analysing conditions  
Road closed  
rerouting...

km/h  
55  
40.75414  
73.97612



## Building the foundation with our fleet





Novatel GPS Antenna  
Velodyne HDL-32 LiDAR  
80 MP Cameras

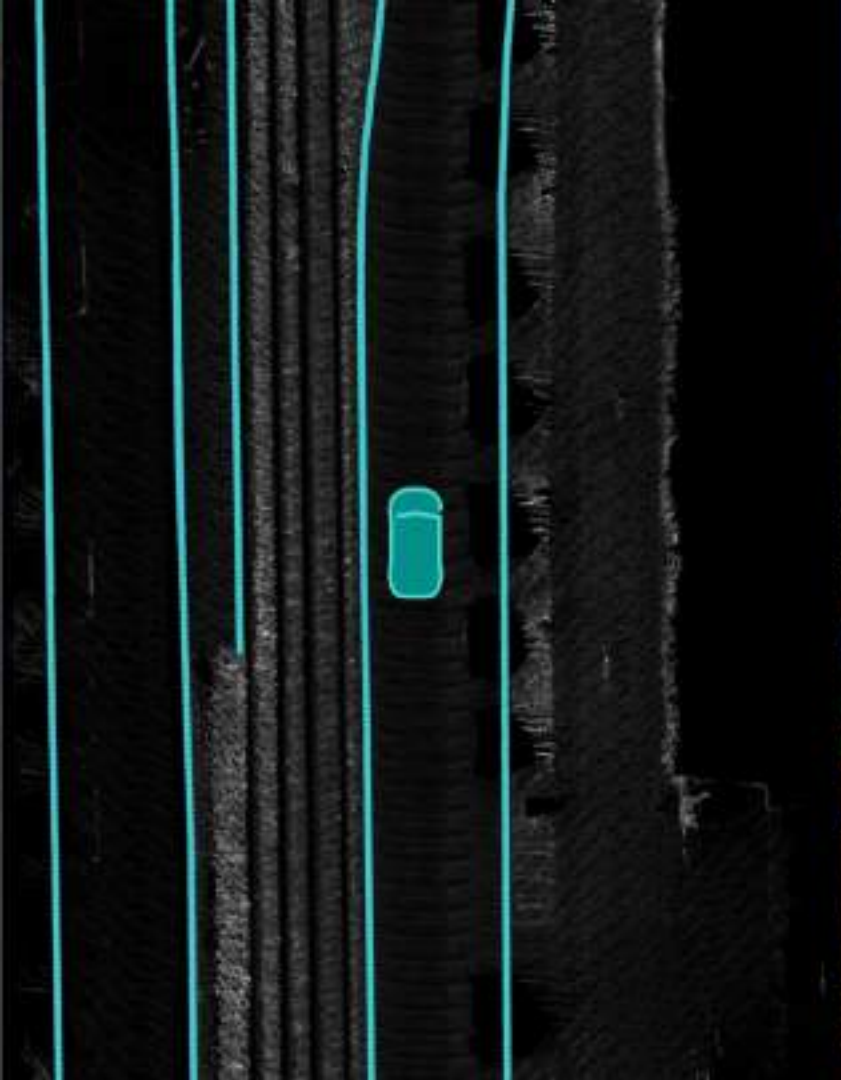
Novatel Span CPT 7 IMU

**28TB of data per day** from our fleet

**700,000 3D data points per second** from our cars

Over **1 million map changes per day**

**14.8 million km<sup>2</sup>** of satellite imagery







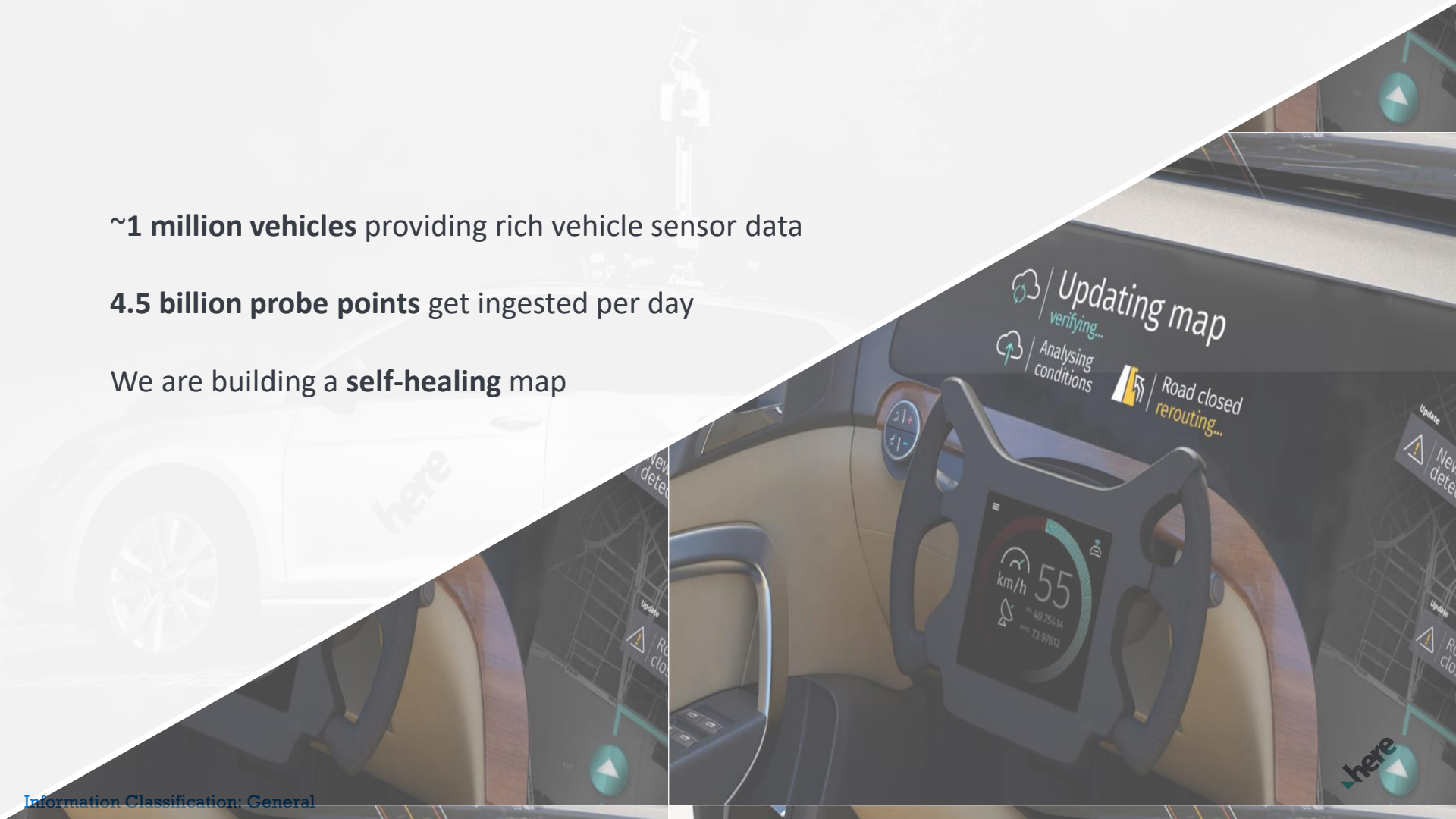
# Maintaining the map with the crowd



~1 million vehicles providing rich vehicle sensor data

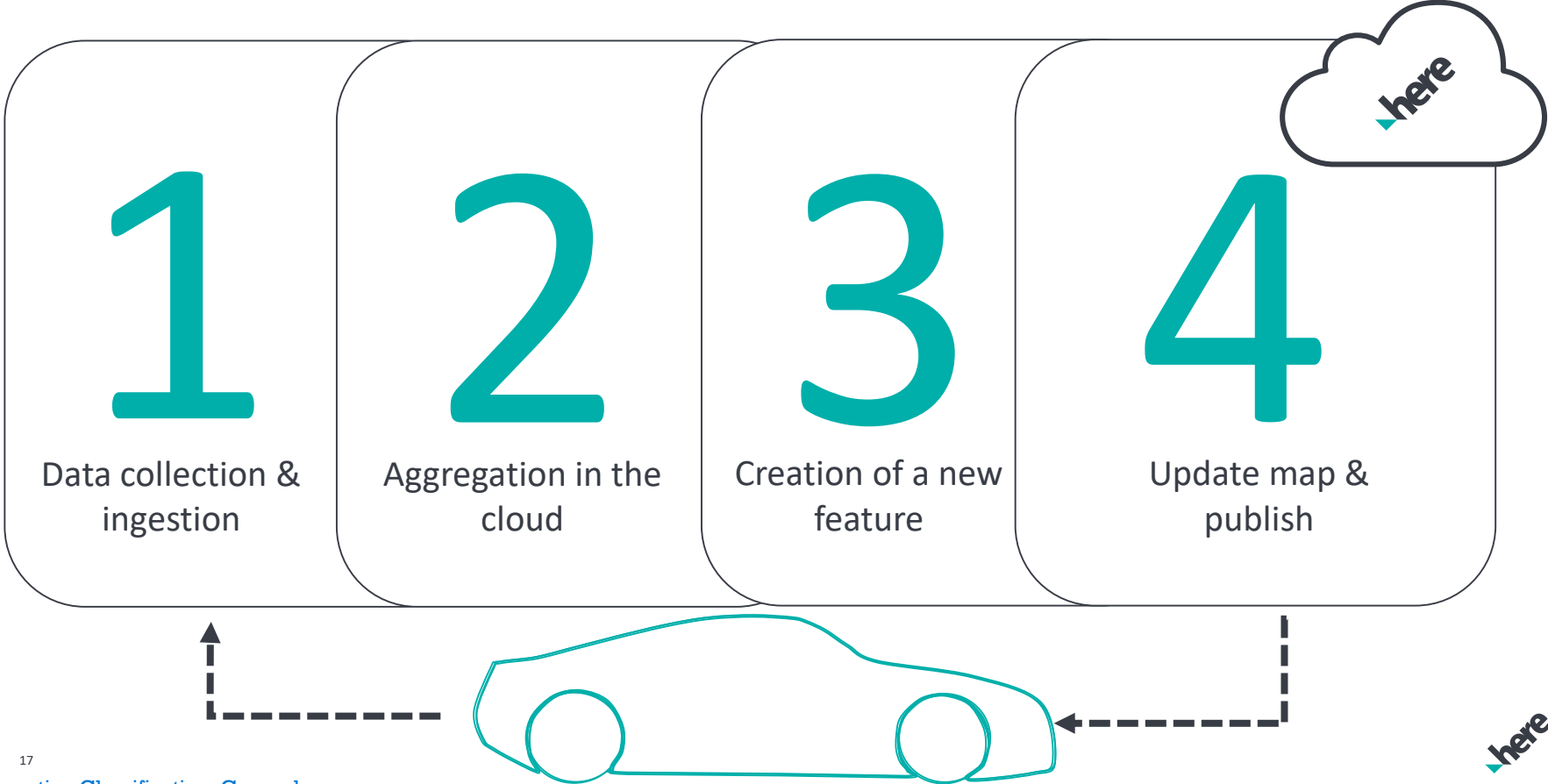
4.5 billion probe points get ingested per day

We are building a **self-healing** map

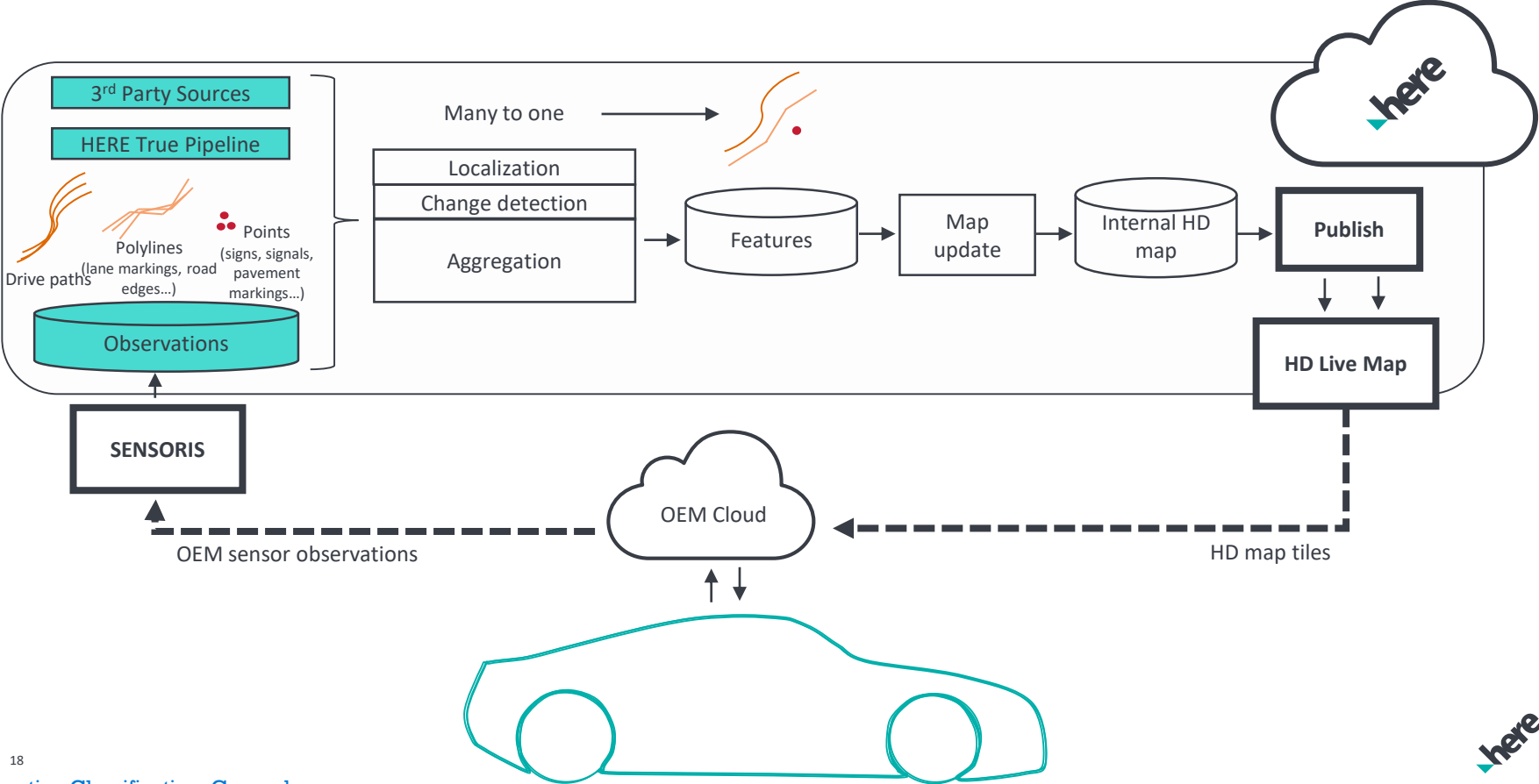




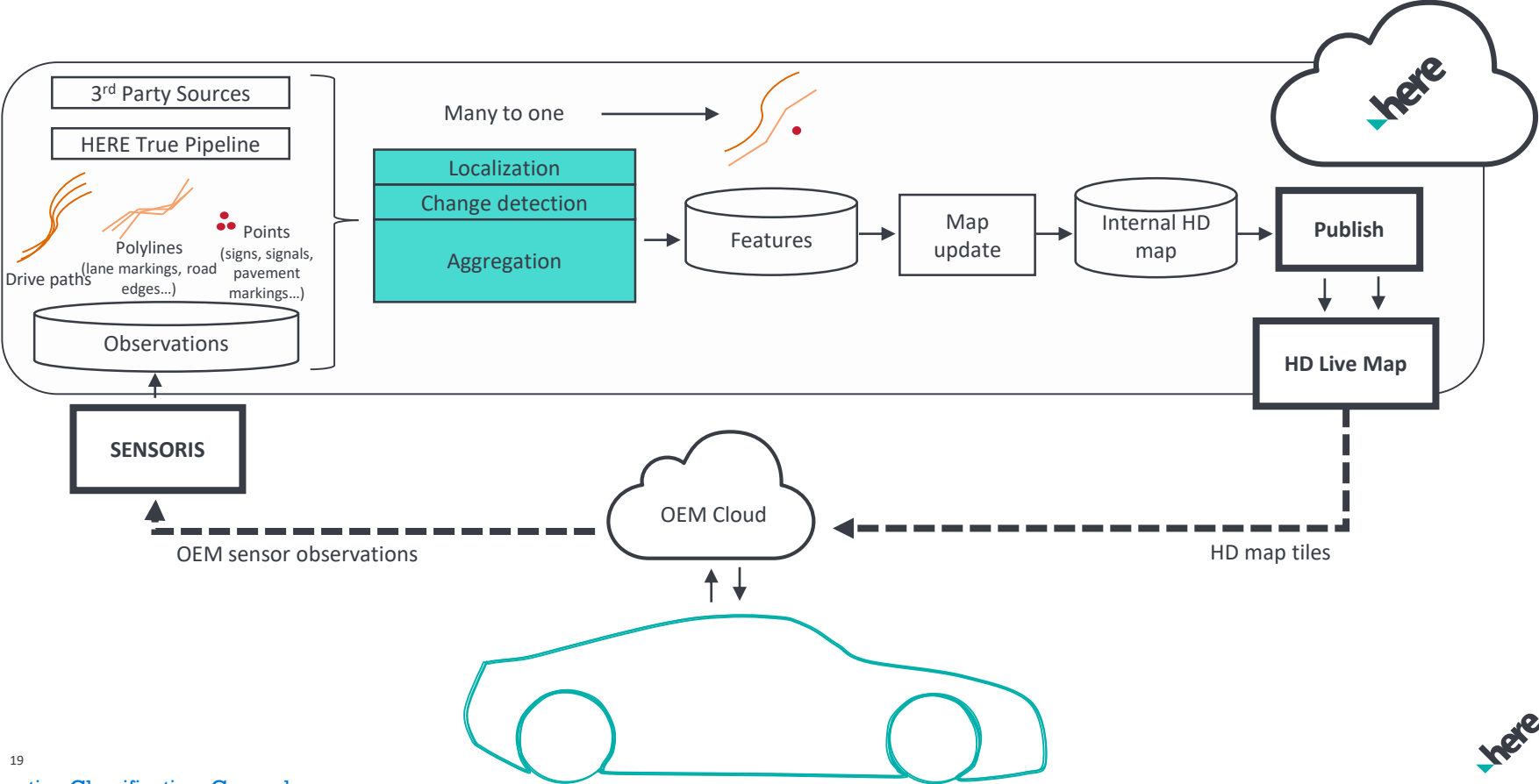
# HERE's self-healing map process



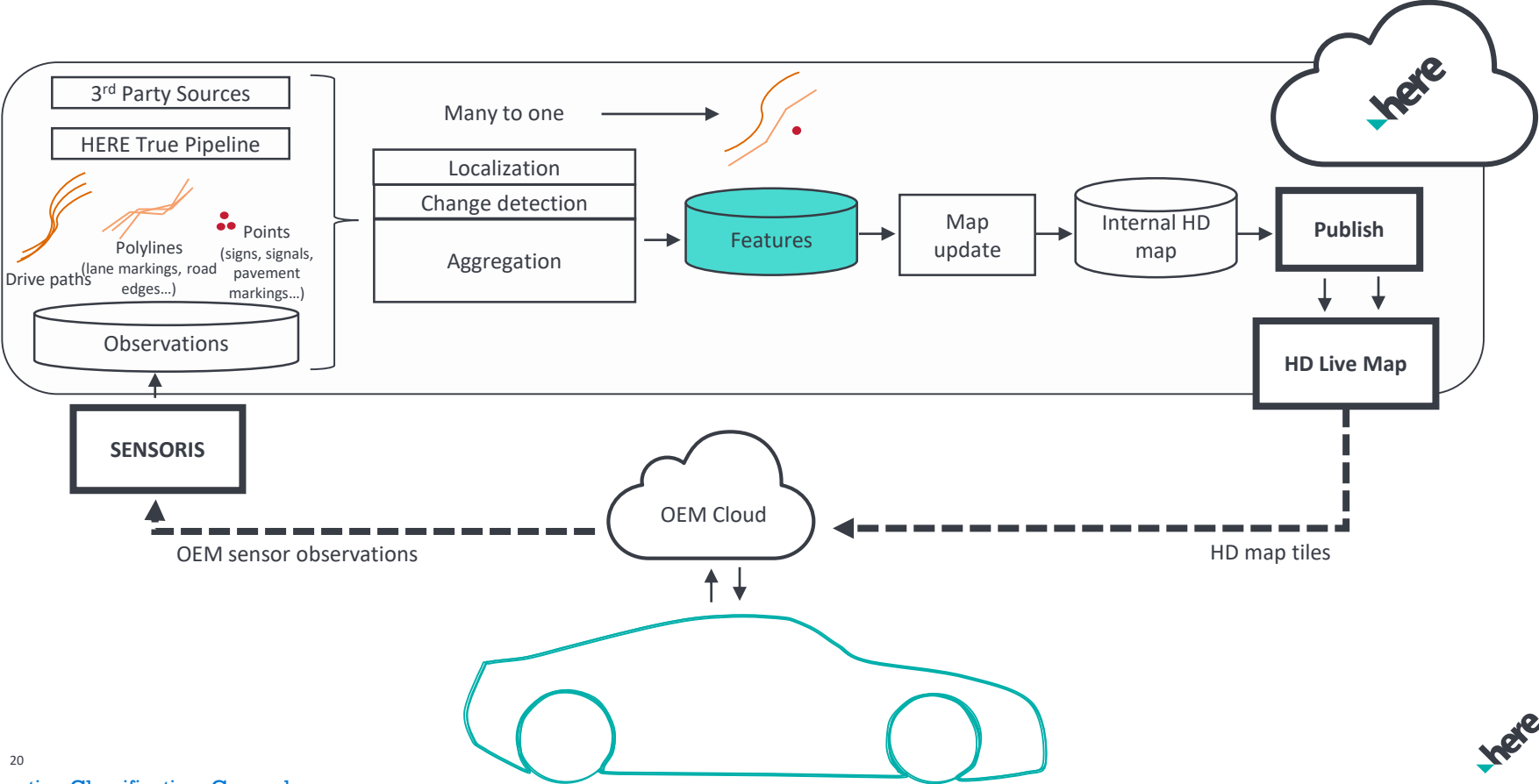
# HERE's self-healing map process



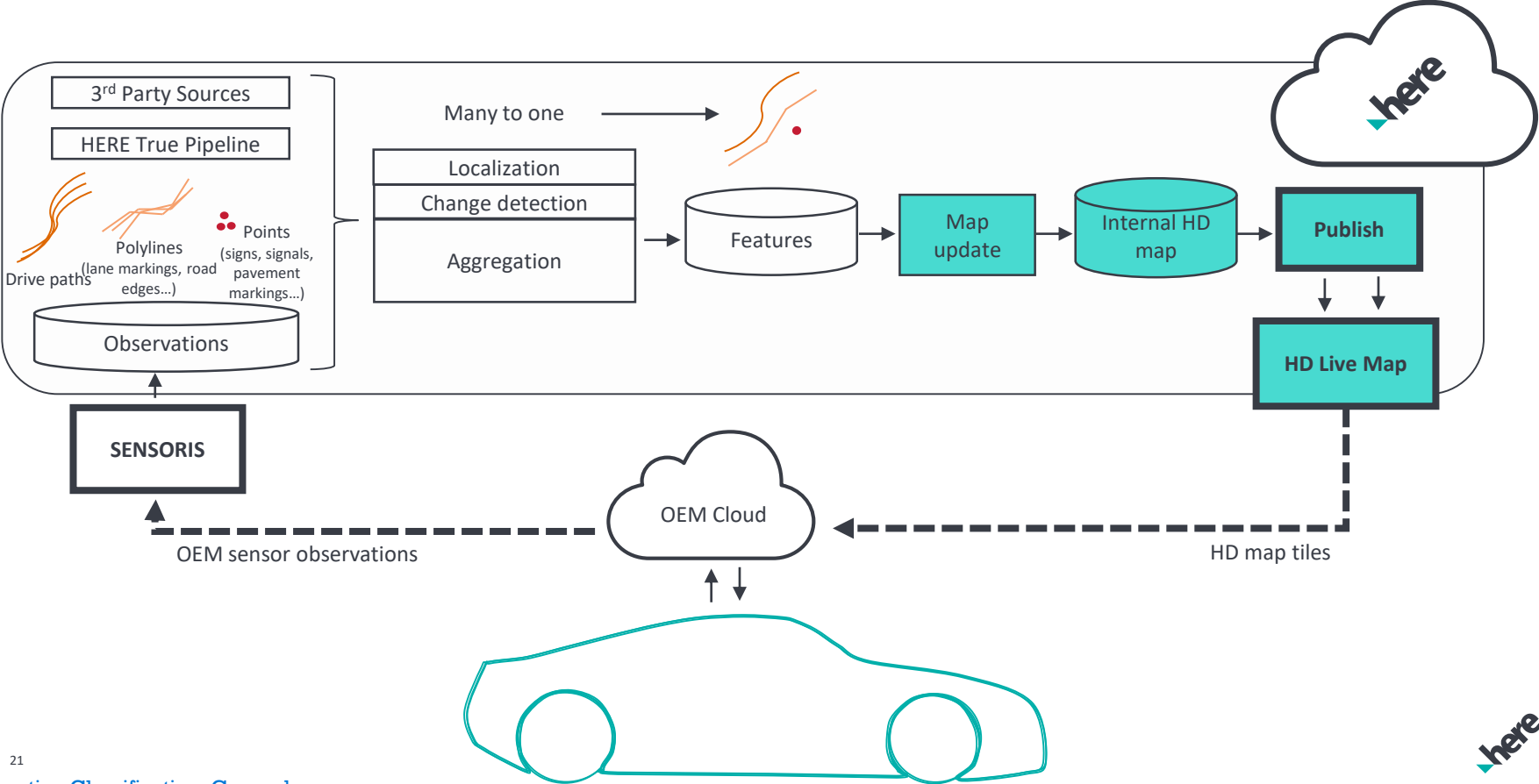
# HERE's self-healing map process



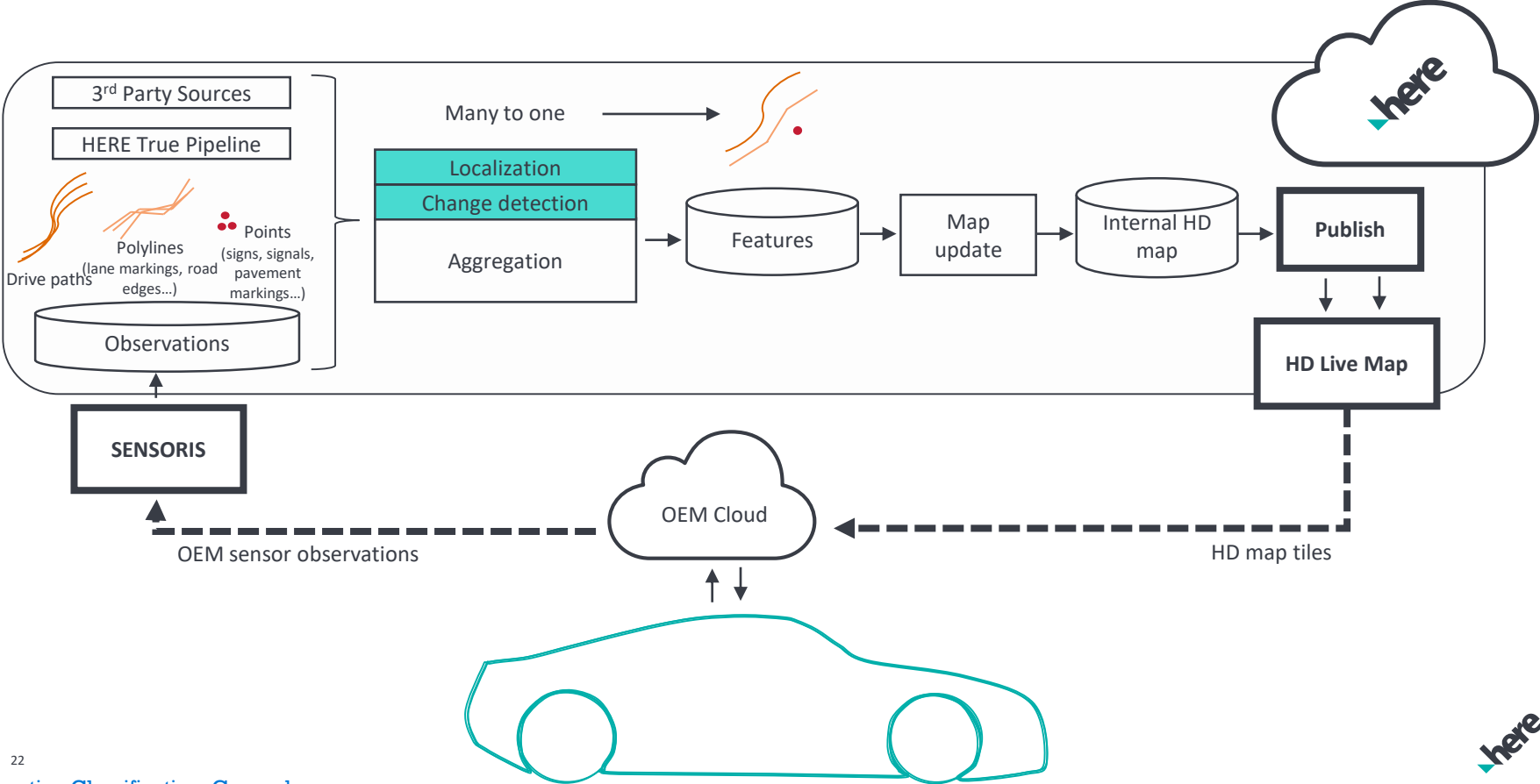
# HERE's self-healing map process



# HERE's self-healing map process

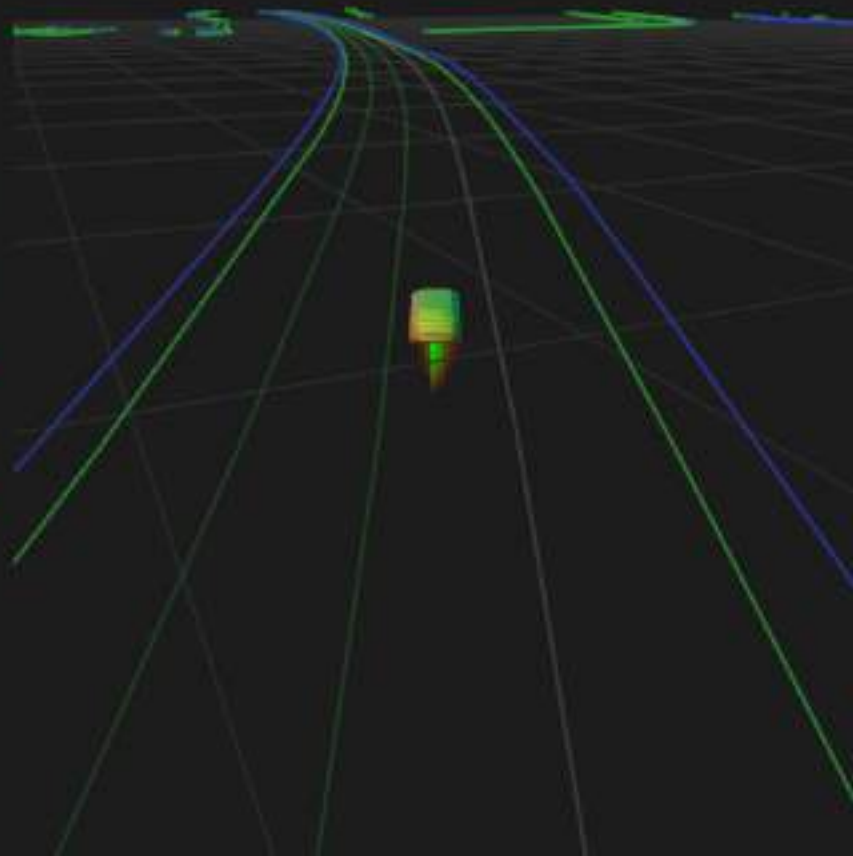


# From the cloud to the car



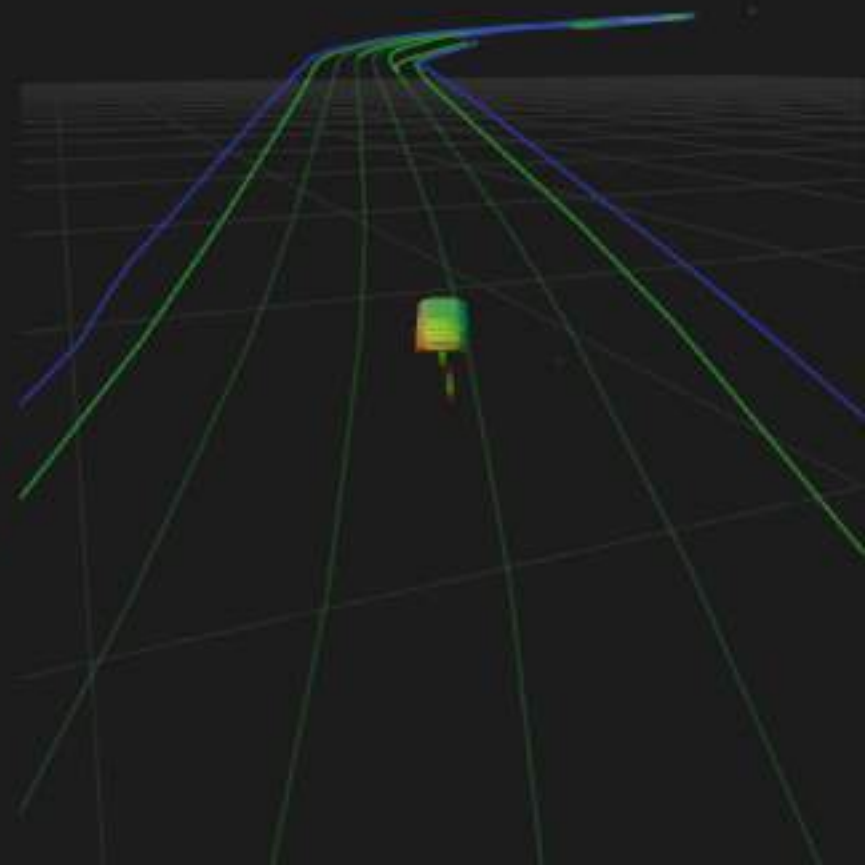
# Lyon, Foggy

NVIDIA Drive Xavier



# Oakland, Tunnel, Night

NVIDIA Drive Xavier







here

Learn more  
at [here.com](https://here.com)

Contact: Dr. Xin Chen  
[xin.5.chen@here.com](mailto:xin.5.chen@here.com)