Empowering Autonomous Driving Through High-Definition Location Data

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HERE Technologies

200
Countries mapped

8,000+
Employees in 56 countries focused on delivering the world’s best map and location technologies

30+
Years of experience transforming location technology

3D data points per second per car
700,000

4 of 5
In-car navigation systems in Europe and North America use HERE maps

100M
vehicles and counting

28
TB map data

400
HERE cars collecting data for our maps
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
Building the foundation with our fleet
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 km² 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

1. Data collection & ingestion
2. Aggregation in the cloud
3. Creation of a new feature
4. Update map & publish

Observations
- SENSORIS HD Live Map
  - Points (signs, signals, pavement markings…)
  - Polylines (lane markings, road edges…)

Internal HD map

HD map tiles

OEM sensor observations

3rd Party Sources

HERE True Pipeline

Data collection & ingestion

Aggregation in the cloud

Creation of a new feature

Update map & publish
HERE’s self-healing map process

3rd Party Sources
HERE True Pipeline

Observations
- Drive paths
- Polylines (lane markings, road edges...)
- Points (signs, signals, pavement markings...)

Localization
Change detection
Aggregation

Many to one

Features
Map update
Internal HD map

Publish
HD Live Map

SENSORIS

OEM Cloud

OEM sensor observations
HD map tiles
HERE’s self-healing map process

- **3rd Party Sources**
  - SENSORIS
  - HD Live Map

- **HERE True Pipeline**
  - Observations
    - Polyline:
      - Drive paths
      - (lane markings, road edges...)
    - Points:
      - (signs, signals, pavement markings...)

- **Localization**
  - Change detection
  - Aggregation

- **Features**

- **Map update**

- **Internal HD map**

- **Publish**

- **HD Live Map**

- **OEM Cloud**
  - OEM sensor observations

- **HD map tiles**
HERE’s self-healing map process

3rd Party Sources
HERE True Pipeline

Observations

Points (signs, signals, pavement markings…)
Polylines (lane markings, road edges…)
Drive paths

Localization
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Publish

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SENSORIS

OEM Cloud

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Drive paths

Drive paths

Drive paths
HERE’s self-healing map process

- **3rd Party Sources**
  - Observations
    - Polylines (lane markings, road edges...)
    - Points (signs, signals, pavement markings...)
  - Localization
  - Change detection
  - Aggregation

- **HERE True Pipeline**
  - Drive paths

- **Many to one**
  - Features
  - Map update
  - Internal HD map

- **Publish**
- **HD Live Map**

- **SENSORIS**
- **OEM Cloud**
  - OEM sensor observations
  - HD map tiles
From the cloud to the car

3rd Party Sources

HERE True Pipeline

Drive paths
Polylines (lane markings, road edges...)
Points (signs, signals, pavement markings...)

Observations

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HD Live Map

OEM Cloud

OEM sensor observations
HD map tiles

SENSORIS

OEM Cloud

HD Live Map

Points
Polylines

Change detection
Localization

Map update
Internal HD map

3rd Party Sources

HERE True Pipeline

Drive paths
Polylines (lane markings, road edges...)
Points (signs, signals, pavement markings...)

Observations

Localization
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Many to one

Features

Publish

HD Live Map

OEM Cloud

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SENSORIS
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