

# TomTom Hazard Warnings

## Overview

A jam tail builds right after a turn. Debris falls off a truck, blocking highway lanes. Winter weather creates slippery streets. Every day, drivers must navigate challenging road conditions that can impact their comfort and safety. Identifying and alerting road users of potential hazards ahead of time allows them to anticipate risks and adjust accordingly.

TomTom's Hazards Service uses real-time information to notify both drivers and automated vehicles about potentially dangerous upcoming traffic, road and weather conditions. It combines data from multiple sources, including GPS probe data from over 600 million connected TomTom devices – the largest probe network in the industry.

Using a first-of-its-kind, low-latency push service, TomTom's Hazards Service is able to report detected hazards to a vehicle in under five seconds. This is a breakthrough from the traditional request-response model. Typically, an accident happens, it's loaded onto the server and then waits for the vehicle to request new information on a particular stretch of road. This can take several minutes – at high speeds that delay can translate to long distances. We push alerts out, sending detected hazard alerts to the vehicle within seconds.

With the widest range of hazard features, fastest notifications and highest number of data sources on the market, TomTom's Hazards Service is the complete solution for keeping drivers and self-driving cars on track for safe travel, no matter what lies ahead.

## Features

## Benefits

Extensive feature set

With warnings about nine distinct types of traffic, road and weather hazards drivers are better prepared for dangerous conditions.

Low-latency push service

Hazard notifications are pushed to the vehicle in seconds, not minutes, giving drivers ample time to anticipate and react to adverse events.

Largest probe data network

Over 600 million community inputs and up to 20% of vehicles on the road during rush hour in Europe contribute real-time information on upcoming conditions.

Autonomous ready

Increases safety by enabling automated vehicles to take preventative maneuvers, such as reducing speed for adaptive cruise control or changing lanes.



## End-user benefits

TomTom Hazards benefits both drivers and self-driving cars, allowing them to:

- Enjoy peace of mind by knowing what is coming down the road in real time.
- Change driving behavior ensuring safety based on upcoming hazards; for example, changing lanes knowing there is an object on the road ahead.
- Improve safety of autonomous features based on road conditions; for example, increasing distance of advanced cruise control if there are slippery roads ahead.
- Adjust the route to avoid hazards along the planned path.

## How the Hazards Service works

TomTom's Hazards Service harnesses industry-first push technologies to deliver hazard notifications to vehicles with low latency. It draws on the OpenLR™ location referencing method to pinpoint a hazard's exact position on the road and transmit that location to the vehicle. Hazard warnings appear in driver navigation systems with display and audio alerts. In automated driving and advanced driver assistance systems (ADAS), hazard data can also be used to automatically adjust a vehicle's driving behavior.

## Sample applications

TomTom's Hazards Service supports a wide array of use cases. Examples include:

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