dots.

Everyone deserves to feel safe on the road

Fits.

Future Intelligent
Transportation Solutions

«Roads are the arteries through which the economy pulses. By linking producers to markets, workers to jobs, students to school, and the sick to hospitals, roads are vital to any development agenda.»

The World Bank

Who is it designed for?

- Law Enforcement
- City Administrations
- Road Sensor Service Companies
- Road Administrations
- Public Safety Organizations
- Traffic Management Centers

About the system

FITS vision is to enable safe and efficient transportation.

At its core, FITS is AI-based Intelligent Transportation Platform. Most customers have road and transportation sensors from across a spectrum of vendors and suppliers. FITS automatically collects data from all and any such sensors into a unified data store, fuses it with AI engines and enables business process specific processing for any data-driven use case - from speed enforcement to traffic optimization. It also monitors the fleet of sensors to ensure maximum data collection uptime and includes 24/7 monitoring centre services.

What use cases are supported?

In addition to serving as a unified data store for various planning and forecasting tasks, FITS can be easily expanded into any use case that relies on road and transportation data collected from the fleet of sensors, for instance:

- Spot Speed Enforcement (both fixed and mobile units)
- Traffic Flow Optimization (VMS, traffic lights, free flow)
- Road Toll Enforcement
- Congestion Charge/ Low Emissions Zone Control
- Road and Highway Surveillance
- Interval Speed Enforcement
- Traffic Flow Control at the Border Crossings/ Customs
- Public Transportation Lane Enforcement

Benefits

Privacy

Single tenant in isolated EUROPEAN data centre
Compliance with ISO/IEC 27001/27002:2013
Compliance with GDPR

Optimized Operations

24/7 monitoring and call centre (in English, Latvian, Russian)
Automatic incident tracking system

Customized Integration

Case data offload for legal post-processing
Cross-checking object registration
Whitelist/blacklist and advanced workflows
Other capabilities on-demand

Complete Management

Quick deployment
Scalability
OpEx over CapEx
Risk reduction

Unique capabilities

Micro-targeting for vehicle type and other attributes. Adaptable AI engine can be trained to recognize country and city specific vehicle types with high accuracy (e.g. to recognize public transport vehicles in a specific city).

Maximum precision for license plate and issuing country recognition, highly resistant to weather conditions, view angle etc.

Sensor monitoring service option – we will keep an eye on your fleet of sensors to ensure their operational status.

Data collected into a unified store from all sensors.

Automatic data collection from sensors.

ITS sensors in Latvia, 2019

- Speed cameras
- Road weather stations
- Road weather stations cameras
- Tolling sensors
- Mobile speed cameras
- Variable message signs

About us

Today, dots. is a technology company with a 20-year experience, a proud Microsoft Gold Partner and Partner of the Year in Latvia in 2017 and 2018.

We strive to take a different approach in a traditional Intelligent Transportation Systems industry, by using the latest advancements in Cloud and Machine Learning to solve challenges related to road transportation management.

Back in 1997, we started out under the roof of SQUALIO, growing into one of the most significant partners of Microsoft in the Baltic region.

As time went by, on 1st of June 2015, spin-off of the company was announced, paving path to a separate business, operating today under the name of 'dots.'. dots. provides easy to use software solutions by leveraging capabilities of complex technologies.

Company always strives to ensure high-quality services in all aspects of processes and operations through employing high level educated and certified IT professionals and provides SLA depending on customers' needs and requirements. dots. project experience demonstrates capability of providing software solutions, that enable high efficiency and automation level through integration of various traffic sensors and making them work as a unified system.

Core expertise has been developed around:

Software solutions that enable efficient traffic management, safety enforcement and essential ITS sensor monitoring

Use cases such as speed enforcement, ANPR-based vignette enforcement, road-side sensor management and monitoring

Vehicle classification leveraging computer vision technologies and our research and development into the latest in deep neural network methods

dots. holds an ISO 9001 certification and employs specialists of high qualification, holding various certifications in software development, business analysis, information security and project management, with hands-on complex project implementation experience.

Why choose us?

Solving, not coding

You describe the challenge. We suggest and build the solution.

Practical innovation

Artificial Intelligence, Cloud, Big Data, Cyber Security, you name it. We cherry pick and validate technologies so that solutions for your challenges are the most efficient as possible.

Team and practice

We are the team of experienced professionals driven by the urge to push the limits of what is possible with software and cloud.

Fits.vision

Fits for Computer Vision Tasks

Taking road safety to the next level

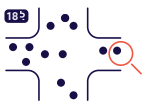
Computer vision technology enables to collect a lot of useful information that can be used to improve traffic monitoring and road safety without the need to install variety of other sensors that can often be either limited in the information output or costly to install and maintain.

About the technology

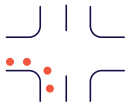
Leveraging deep neural networks allows to collect and extract information such as vehicle count and type, path taken, flow-rate and queue length, travel times, lane changes, incidents in specific locations.

Automation of these tasks significantly improves ability of responsible authorities to proactively deal with unplanned situations and react faster to incidents that happen on the road.

For example



Traffic flow analysis, real-time counting and vehicle type classification with ANPR detection

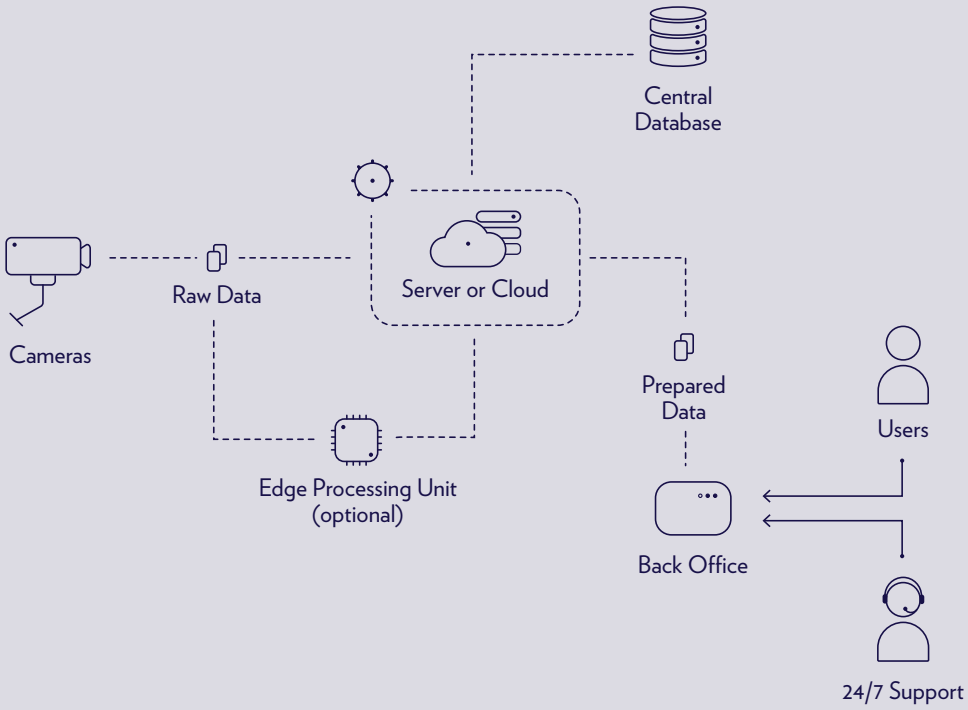


Intersection monitoring with origin – destination detection and left-turn compliance monitoring

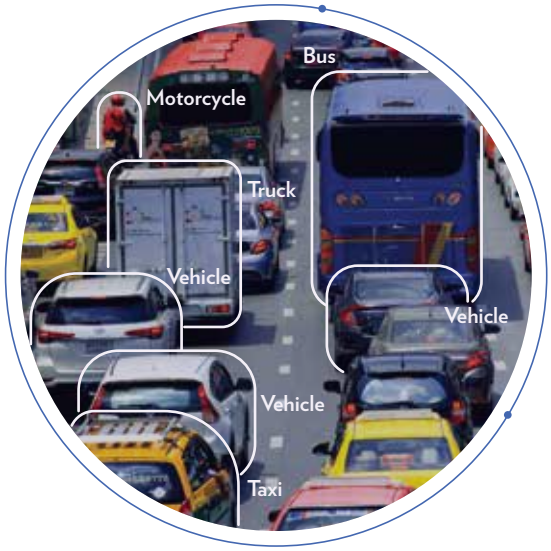
Bus-lane monitoring with ANPR detection

Pedestrian and cyclist counting and monitoring

How does the system work?



Computer vision examples



Traffic flow analysis, real-time counting and vehicle type classification with ANPR detection

Bus-lane monitoring with ANPR detection

Intersection monitoring with origin – destination detection and left-turn compliance monitoring

Pedestrian and cyclist counting and monitoring

Fits.speed

Fits for Speed Enforcement

Contributing to saving lives and making road transportation safety enforcement smarter.

Fits.speed extends FITS core platform with speed enforcement specific capabilities, enabling automated speed enforcement by connecting all traffic violation sensors, raw data processing and preparation of violation cases.

What problem does it solve?

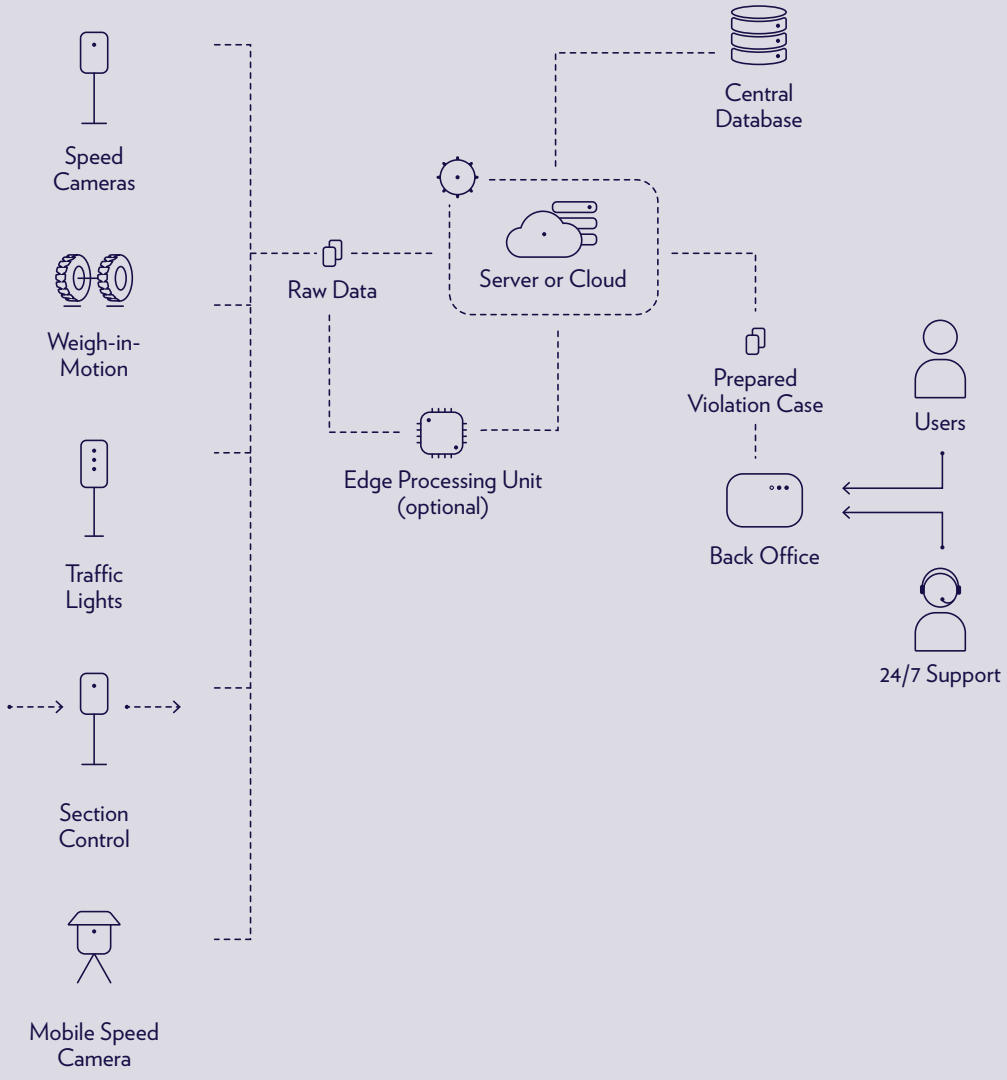
Most countries over the years have procured mobile or stationary speed cameras, however these cameras might come from various manufacturers and with their own standard back-office solutions.

Fits.speed is a vendor-independent software platform thus enabling centralization of speed cameras, no matter what camera vendor is or might be deployed in the future.

Legacy back-office installations have difficulties to meet scalability and availability demands in modern speed enforcement processes, cloud-based system allows quick deployment of speed cameras and enables high availability of the system.

Existing back-office solutions often require high human intervention, especially on occasions when vehicles without visible number plates are captured by cameras (e.g. motorcycles). Fits.speed image/video analytics allows automating such situations without necessity to manually intervene and process individual violation errors.

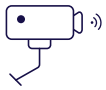
How does the system work?



Key features

Image or video-based automatic violation inspection and processing, through the use of advanced number plate recognition (ANPR) and determination of vehicle types.

Easy to use user interface with a dashboard view of sensors and recent violations.



Support of multiple offence types processing and comprehensive violation search list.

Upload and management of all evidence data mages, video clips, date, time, number plate, location).

Support of spot speed cameras, mobile speed cameras, point-to-point section control cameras, including over low-quality network conditions.

Who would benefit?

Road and Traffic Safety Agencies

Law Enforcement Agencies

National and/ or road police

Key benefits

Maximum precision for license plate and issuing country recognition, highly resistant to weather conditions, view angle etc.

Sensor monitoring enables efficiency in sensor maintenance tasks.

Data collected into a unified store from all speed cameras allows to avoid manual violation process and decrease operational costs.

Micro-targeting for vehicle type and other attributes. Adaptable AI engine can be trained to recognize country and city specific vehicle types with high accuracy (e.g. to recognize public transport vehicles in a specific city, motorcycles, and other).

Automatic, near real-time data collection from speed cameras allows to quickly and efficiently process violations.

Fits.hub

Fits for Road
Sensor Monitoring

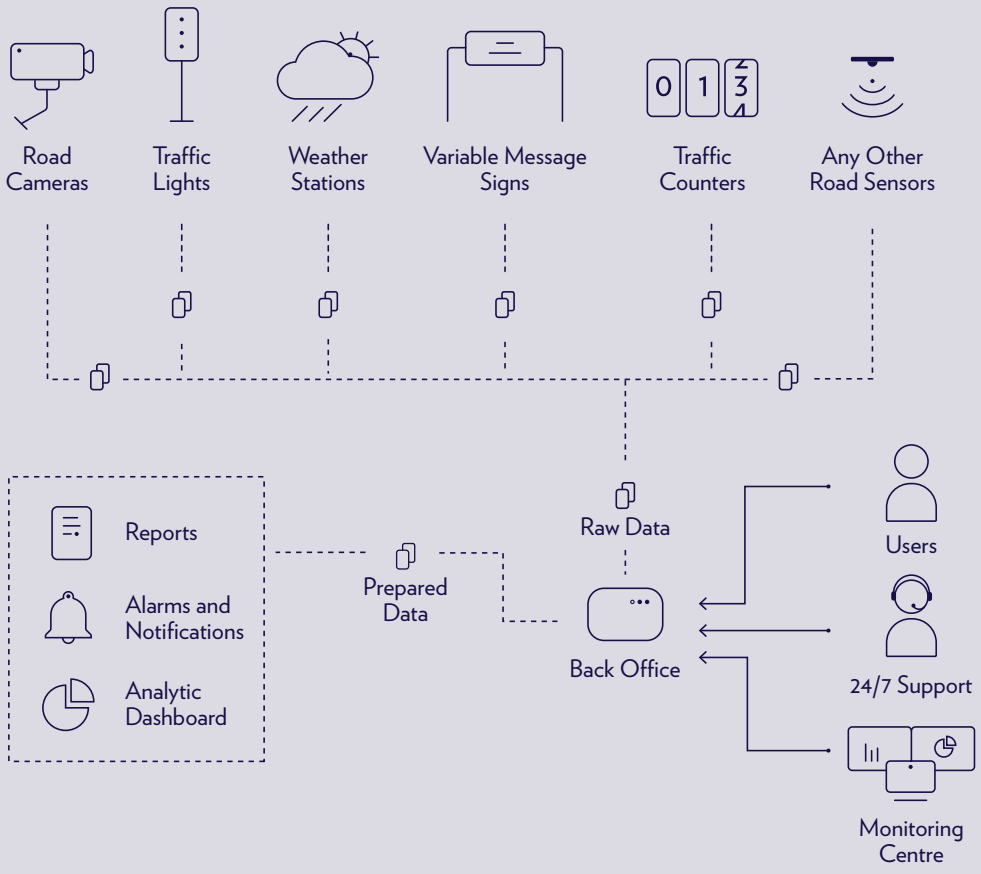
If an organization plans to deploy or already has hundreds of various road-side sensors, but it must use different solutions to manage them, centralized monitoring platform can help achieve superior service operation.

By connecting different road-side sensors through a single platform, organizations are able to maintain sensor operational status, quickly detect sensor faults or anomalies. That leads to a more efficient maintenance processes, and decreased costs and a better overall service to road network participants.

What problem does it solve?

Road-side sensors usually come with their own management and monitoring software. That causes inefficient maintenance processes, due to necessity to use multiple monitoring solutions. Hence, the ability to react fast, if any sensor goes out of operation, is impacted. Centralized sensor monitoring provides a consolidated view of all of the sensor infrastructure and enables efficient service operation.

How does the system work?



Key features

Centralized monitoring of CCTVs, Speed Cameras, Traffic Lights, Weather Stations, Environmental Sensors, Variable Message Signs, Traffic Counters, Weight in Motion sensors.

Dashboard-view of the sensor map.

Integrated notification workflows with real-time alarm transmission.

Vendor-independency and existing support of market leading sensor vendors with a possibility to integrate new ones.

Who would benefit?

Urban, regional and national Road Administrations

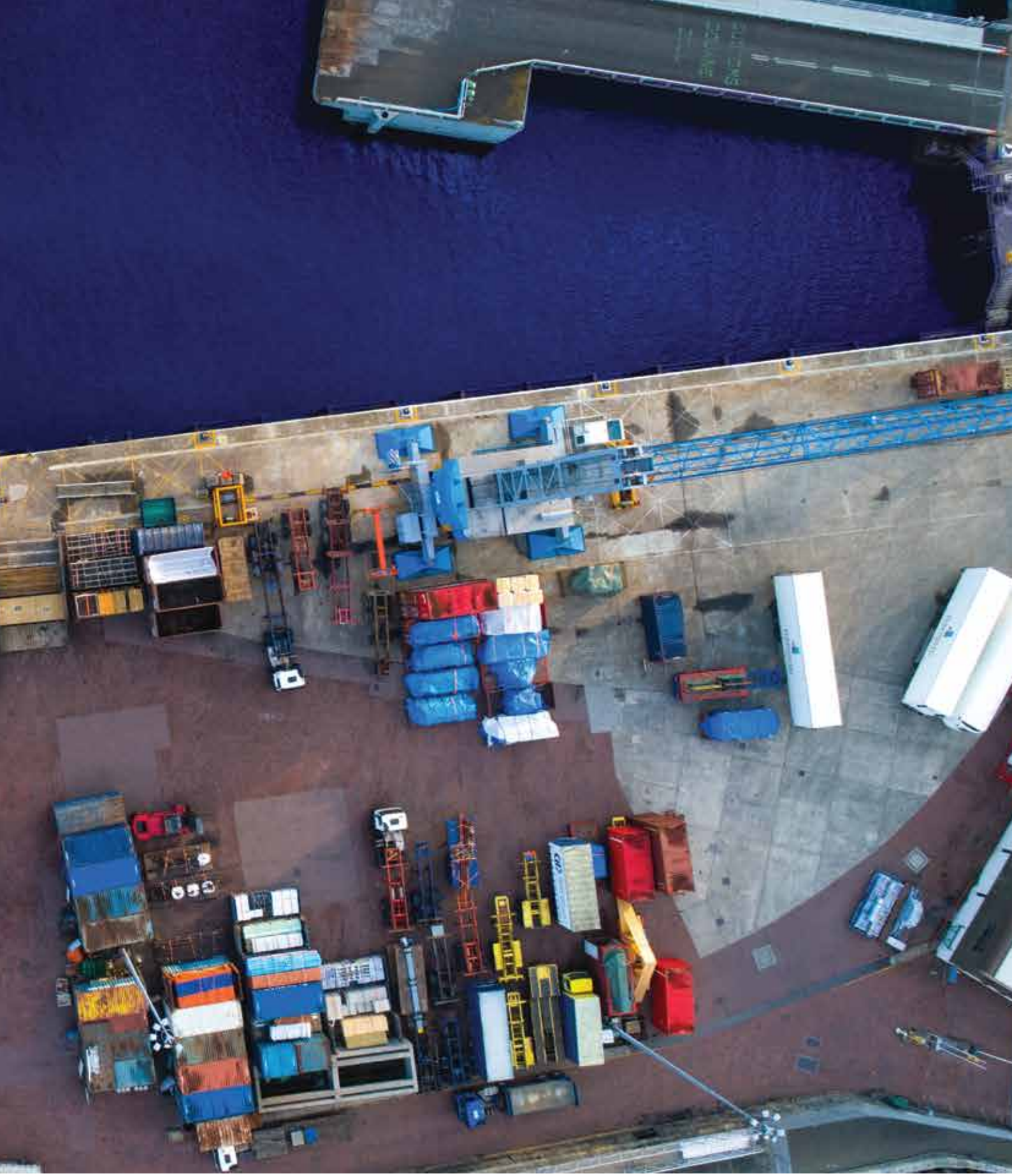
Traffic Management Centers

Key benefits

Increased road-safety due to faster reaction times to fix faulty sensors.

Improved service operation, decreased complexity and overall operational costs.

More efficient hardware sensor maintenance process.



Fits.toll

Fits for Tolling Enforcement

Roads are an important asset and require proper maintenance. We believe road user charge and tolling should be easy to use and efficiently managed to support social equity and provide funds for infrastructure maintenance and development.

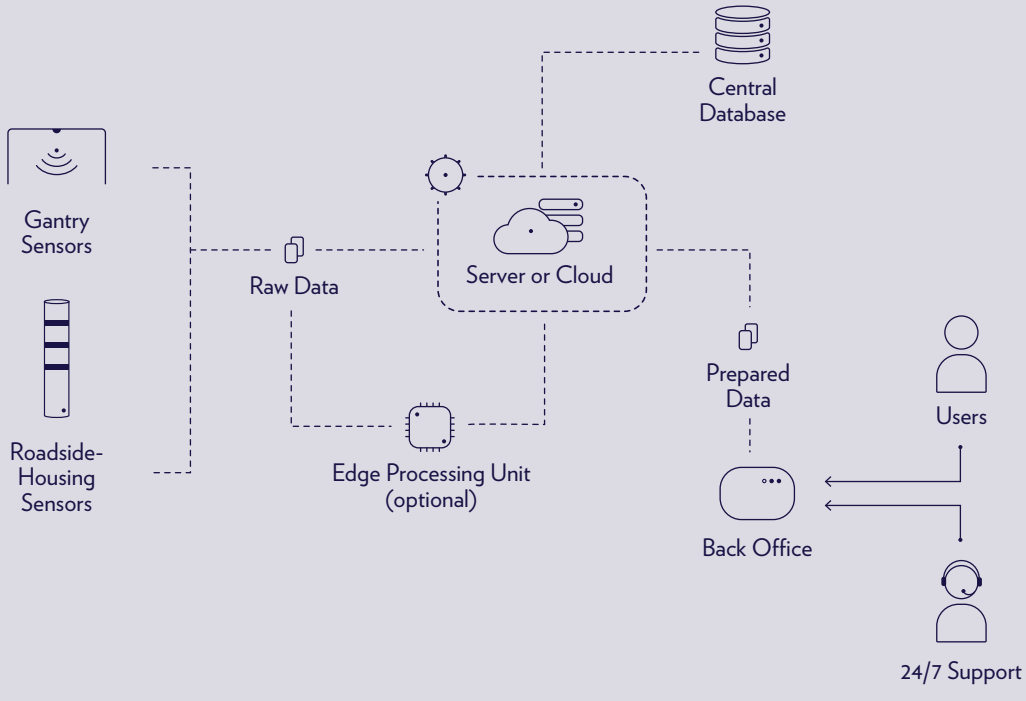
Video-based tolling enforcement based on ANPR technology allows to avoid deployment of additional devices or tags in vehicles thus making the experience for road users more pleasant, at the same time avoiding costs associated with distribution, deployment and maintenance of on-board equipment.

What problem does it solve?

Road user charge methods still quite often require purchase and distribution of on-board equipment, which is quite an inconvenience for road users, especially for tourists or other foreign vehicles. ANPR-based tolling enables a more convenient and cost-effective method of toll control and enforcement.

There are solutions that require deployment of various costly in-pavement and other road-side sensors (lasers) to identify different vehicle classes, and still these solutions may struggle to distinguish important specifics to properly classify vehicles for the use of correct vignette. Fits.toll is able to classify vehicle types just based on the image/video feed from the cameras, thus allowing to achieve the same goal with less investment required into other sensor types.

How does the system work?



Key features

Automatic vehicle status control (road user charge, insurance, safety certificate, surveillance lists) with no interruption to road traffic.

Free-flow automatic vehicle type, time, location, country of origin detection.

Sensor vendor-independency, solution can be adjusted to leverage existing road-side sensor infrastructure.

Various statistics and reports available regarding the traffic flow.

Who would benefit?

Urban, regional and national Road Administrations

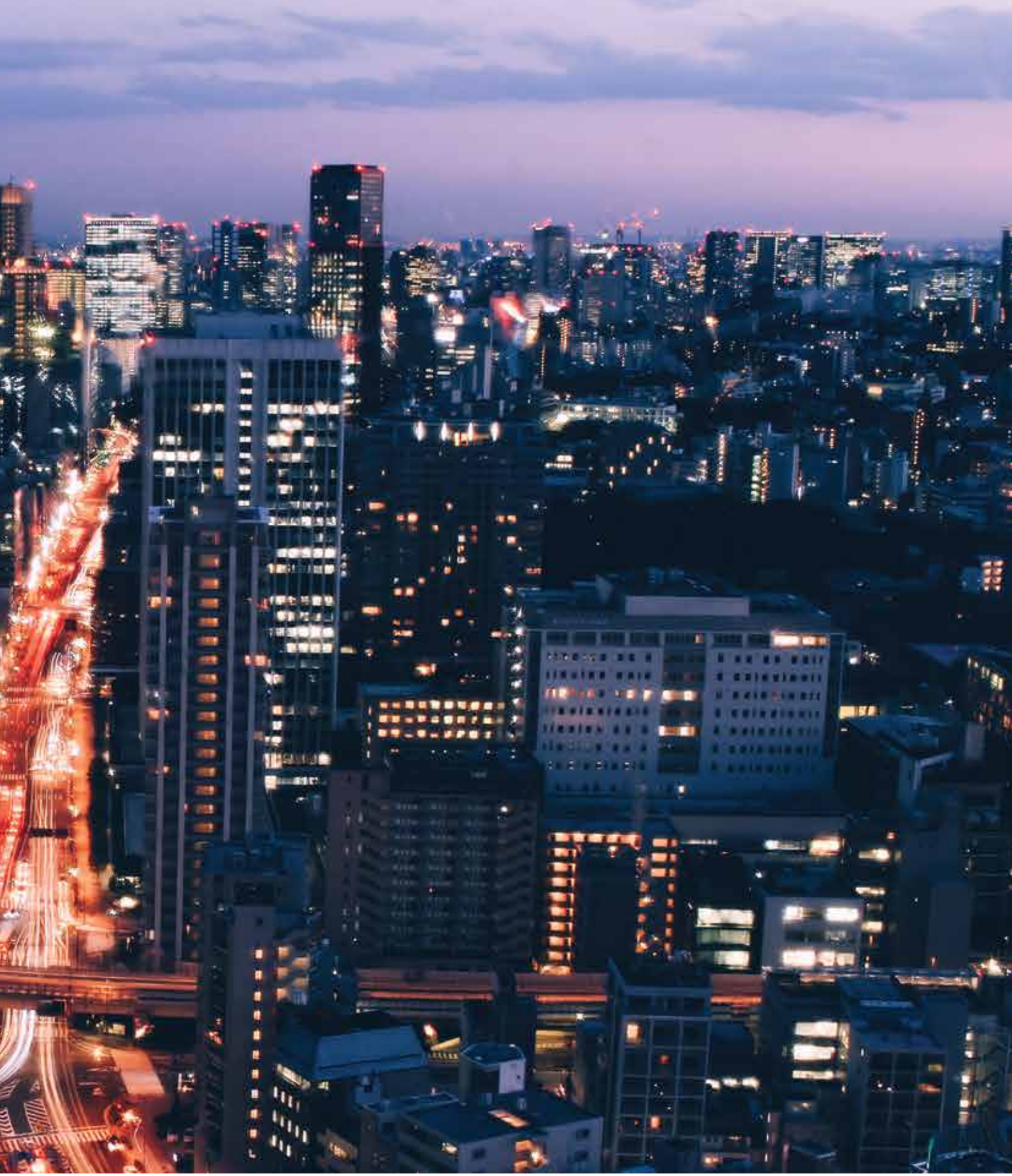
Ministry of Transportation

Key benefits

Video-based vehicle classification enables additional flexibility in road user charge pricing schemes, that take into consideration different vehicle classes (passenger car, motorcycles, inivans, buses).

Data collected into a unified store from all video sensors allows to avoid manual violation process thus decreasing operational costs.

A more convenient & cost-effective road user charge control method.



Case Studies

Implementing Speed Enforcement | Fits.speed

Client

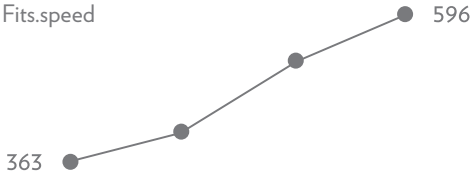
The Road Traffic Safety Directorate (CSDD) is a public limited company that deals with vehicle registration, drivers' qualification exams, issuing driving licenses, technical insurance, road safety audits and general monitoring, maintaining the public register as well as educating and informing road users.

«Every year 1M people worldwide die due to car accidents. That makes half of the population of Latvia. And if we can change this atrocious statistic by improving the road environment, it's our number one priority! Last year, 3 790 car accidents were recorded in Latvia, but by implementing new technology speed cameras, we were able to significantly decrease these numbers, allowing us to believe that the cameras are doing their job properly.»

The Challenge

Due to the limited number of outdated speed detection devices and the increased number of car accidents caused by speeding, the Latvian demography and economy were suffering considerably. The challenge was to create a cost-effective and fast roll-out solution to improve road safety.

2012-2015
Speeding accidents
before Fits.speed



The Solution

The solution was to deploy 100 speed cameras - powerful and precise, difficult to damage, equipped with 24/7 monitoring and a re-trained deep neural network for ANPR/MMR (Automatic Number Plate Recognition and Make and Model Recognition), allowing to detect upcoming issues, pre-process speeding violations, enable rapid response, ensure statistical analysis and educate drivers about being safe on the road

The Outcome

In 2014-2018, the number of traffic accidents in locations where speed cameras have been placed has dropped by **33%** and serious traffic accidents - by **36%.**

Moreover, in average speed cameras process close to **400k** protocols yearly, accounting to **one protocol every other minute.**

36% decrease in serious traffic accidents

33% decrease in traffic accidents

Satiksmes ministrija

Implementing Tolling Enforcement | Fits.toll

Client

Ministry of Transport, the leading institution of state administration of transport and communications, whose mission it is to improve and implement the state policy of Latvia in the fields of transport and communications, to maintain and develop an effective, safe, competitive, environmentally friendly and flexible transport system and create a liberalized and harmonious legal and economic environment of the communications sector.

> Thanks to advanced technologies, we have accessed valuable data and gained information transparency regarding vehicles on our roads. Today, as the system is fully automated, we have diminished human involvement in the administrative tolling process and are now able to focus on strategically more important tasks - how to further improve the road environment and maintenance so that every road user feels safe while driving.

The Challenge

Roads and means of transport make a crucial contribution to the economic development and growth, bringing important social benefits with it. Poorly maintained roads constrain mobility, significantly add to vehicle operating costs, increase accident rates and the costs associated with them. Seeking for an automated go-to solution, the Ministry of Transport decided to introduce the Road User Charge - a payment for using the main state and regional Latvian roads to facilitate their maintenance and development, as well as to promote the use of environmentally friendly vehicles. However, after an in-depth examination, they noticed that the toll is often not paid according to the vehicle's gross weight. Moreover, if the Latvian border could be crossed within 3 hours of driving, both domestic and international drivers predominantly chose not to purchase the toll at all. Thus, in 2016, around 30% of the planned (> 4M EUR) revenue from the Road User Charge wasn't collected and couldn't be applied to improve the road environment.

in 2016
30%
of planned revenue from the Road User Charge wasn't collected at all

The Solution

With that in mind, The Ministry of Transport decided to deploy a long-term, cost-effective smart toll enforcement system, combining high quality transportation sensors and a customized Fits.toll system connected to various registers in order to automatically scan the traffic flow (collecting data regarding the vehicle's type, time, location, country) and verify if the owner of the passing vehicle has purchased the Road User Charge and Insurance and has passed the Vehicle Safety Inspection, or performed other transportation-related check-ups that the client has indicated in advance.

The Outcome

Within the set time frame of 4 months and owing to a close collaboration of all stakeholders, a fully automated and integrated toll enforcement system has been installed. Today, the Ministry of Transport is able to gather valuable traffic flow information and facilitate the vehicle verification process. It has been established that within 2 months the total sum of violation protocols drawn up regarding the Road User Charge has surpassed the investments allocated to the implementation of Fits.toll. Everything being fully automated means less human intervention in administrative processes and lesser overall costs, but most importantly – the Ministry of Transport can claim full transparency and instant information regarding the overall traffic flow situation so that calculated and adjusted road improvements can be made.

Traffic flow transparency

Facilitated verification of passing vehicles

Within 2 months the calculated violation protocols regarding the Road User Charge have exceeded the investments

Implementing Road Sensor Monitoring | Fits.hub

Client

The Latvian State Roads performs the management of the state road network, administration of the State Road Fund and organisation of public procurement in order to provide the public with profitable, durable, safe and environmentally friendly state road network. Maintenance and development of parish, company and household roads are supervised, as well.

> By developing a mobile, safe and environmentally friendly transport system, cities not only rejuvenate the road infrastructure but also lessen the time spent staring out the windshield and prolong the time spent with the family, friends or doing something more content.

The Challenge

The Latvian State Roads focuses on three fundamental principles: sustainability, mobility and technological advancement.

In order to boost the road users' safety and effectively advance the road environment state authorities sought the ways how to achieve these goals as efficient and cost-effective as possible. Unfortunately, problems originated due to outdated systems that are too expensive to replace, difficult to improve and arduous to replicate and because of a large amount of unsorted (raw) data, gathered manually from mutually independent systems, what lead to uncertainty and errors in decision making.

Outdated systems that are too expensive to replace, difficult to improve and arduous to replicate

The Solution

The Latvian State Roads managed to design a solution, in which all road-related sensors (road cameras, traffic lights, weather stations, variable message signs, traffic counters, weight-in-motion etc.) are monitored and managed from one complete system for 24/7 and in real time. Within the scope of the project, 30 different road signs and 13 new weather observation stations were set up along with 11 cameras that were replaced and 10 traffic lights - modernized, allowing lights to switch over according to traffic intensity. Moreover, the real-time traffic surveillance and accident prevention solution was also created and implemented.

The Outcome

As a result, the Latvian traffic system has become broadly updated, modernized and automated according to today's standards. For road authorities, it means a unified system for data transparency, reduction in manual work, agile sensor maintenance and rapid and quick replacement of the outdated sensor. For road users, it means a safer environment with fewer hazards, congestions and overloaded vehicles that cause damages in the road surface.

Modernized, unified and automated 24/7 traffic sensor monitoring system

Traffic data transparency

Rapid and quick replacement of the outdated sensor

dots.

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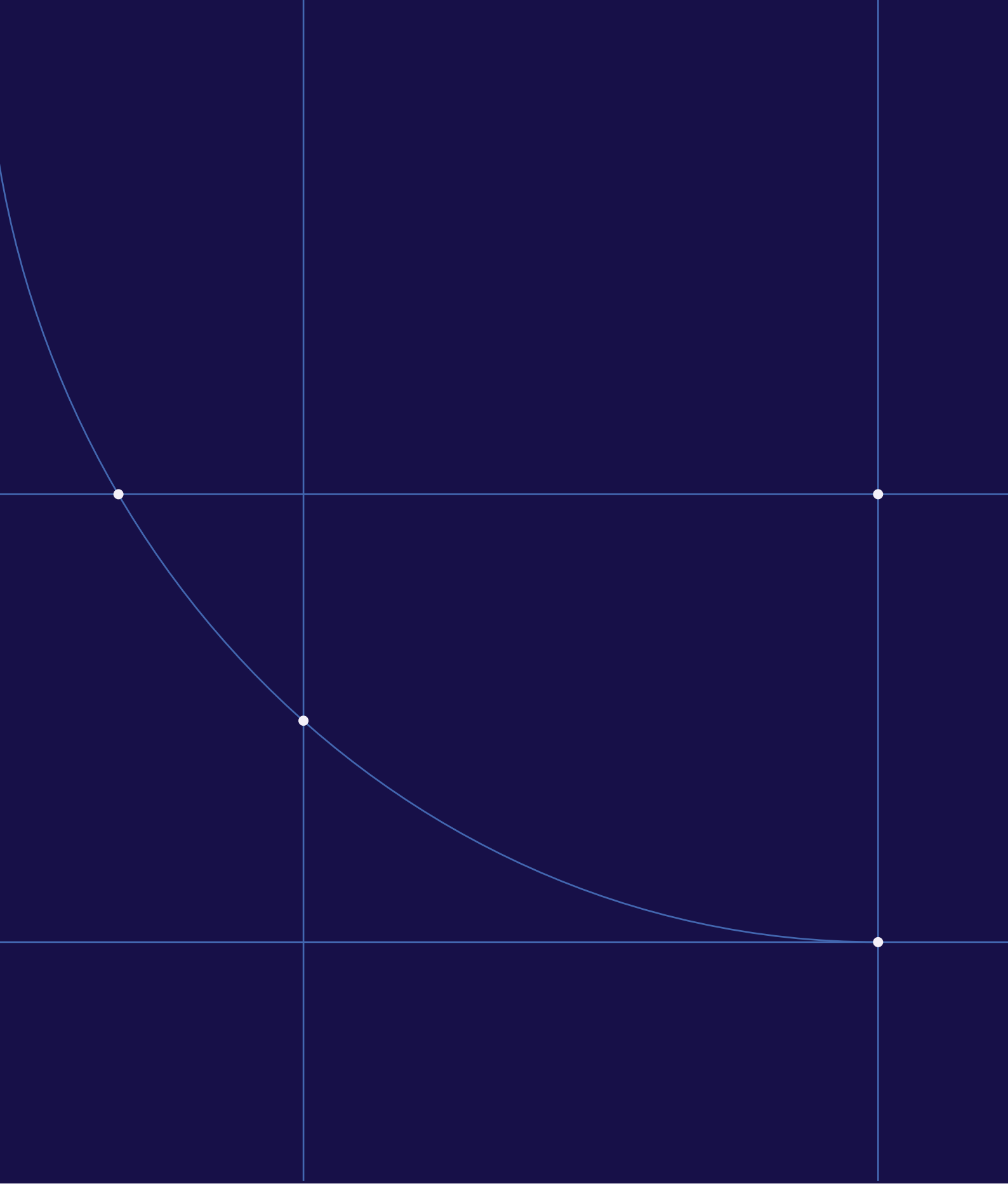

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