

**BUSINESS
VALUE
TRANSPORT
AND LOGISTICS
IN MAKING CITY
SMARTER**



City



Transportation



Logistics



Enforcement

Our vision on Digital City



Technology enabled sustainable, competitive, participative, creative, and innovative citizen-centric smart city.

To enable such a city, DXC uses different types of technologies to collect, use and analyze the data to manage assets and resources efficiently.

Digital City - Customer perspective



Governments have to execute strategy through policies and prove the effectiveness

City can only grow within boundaries (Safety, environment, pollution, health)

Stakeholders need to align their demand in a city with strategic goals and limits

Coexistence within boundaries of conflicting interests

Digital transformation with positive impact on business, logistics, health, safety

Client Strategy

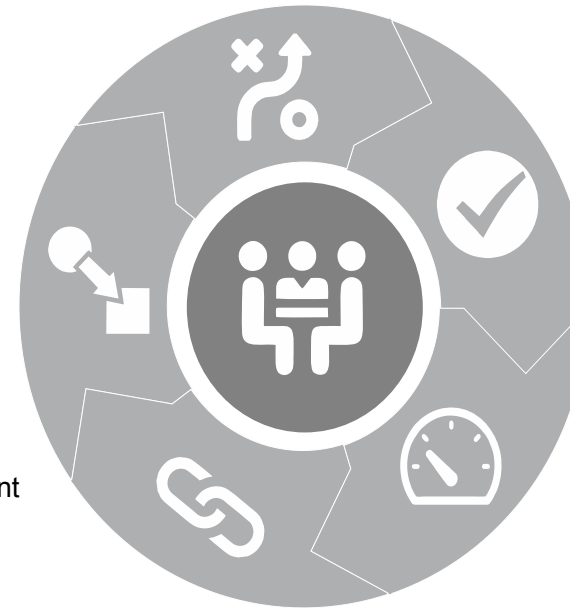
- Challenges
- Desired outcomes
- High level solutions
- Future roadmap

Transform to business value

- Business relevance
- Business value
- Improvement steps

Link & Correlate

- Relate and link different entity measurements
- Relate with traffic and movement patterns
- Predict and forecast



Execution plan

- Desired situation
- Standard building blocks
- Integration into Ecosystem

Actual Measurements

- Real time measurement (vehicles, speed, weight, vibration, IoT, etc.)
- Interface to Central Intelligence
- Storage to support analytics



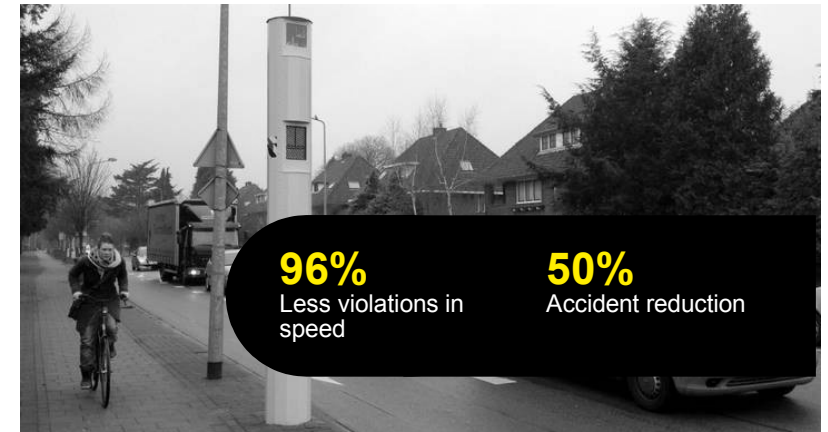
Smart Solutions

Digitally transforming Smart City



Spot Speed and Red Light Enforcement

- ▶ Detection, investigation and prosecution of traffic offences
- ▶ Integration with local/national government and law enforcement
- ▶ Integration with existing systems



⚠ Challenges

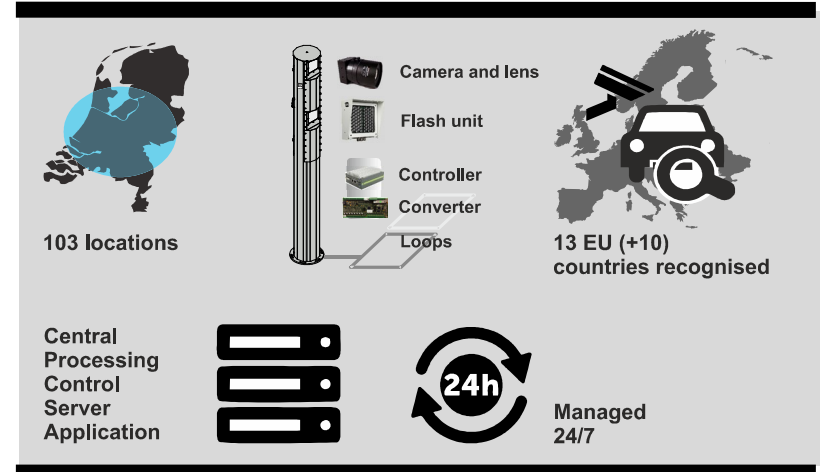
- **Road safety**; in every traffic accident speed plays a role
- **Environment**; the faster a vehicle drives, the higher the fuel consumption, the more CO² emissions and the more noise pollution
- **Flow through**; if road users drive at roughly the same speed, fewer traffic jams will occur. Moreover, the risk of accidents is smaller, and that also saves on traffic jams.

💡 Solution

- Loops in the road that detect the vehicles;
- Infrared flash and a camera for registering the registration number of vehicles;
- Build in electronics for transmitting the data;
- Image AI analytics;
- Processing back office software for handling fines.

✅ Results

- **5% improved traffic flow** (lower speed)
- **20-30% lower emission** (NO₂ and PM₁₀)
- **50% less accidents**
- **96% less violations** in speed (stabilized to 300 per working day on a volume of 150k vehicles; 0,2%)





Average Speed Enforcement

- ▶ Detecting, investigating and prosecuting traffic offences
- ▶ Integration with existing surveillance systems
- ▶ Integration with law enforcement



⚠ Challenges

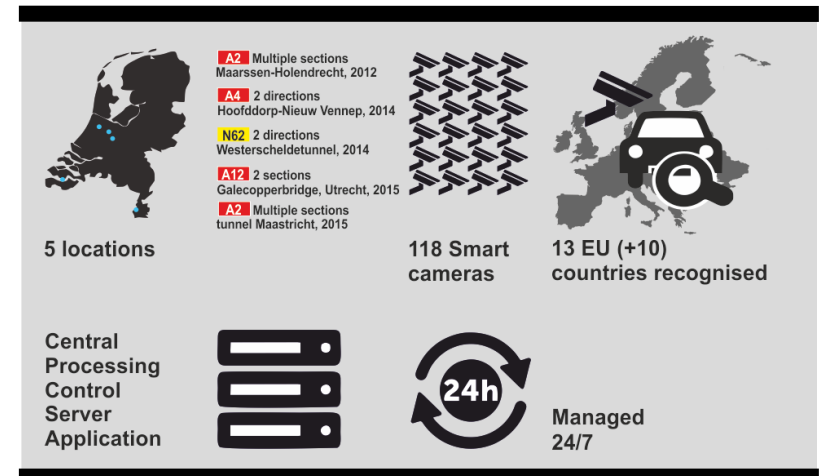
- **Road safety**; in every traffic accident speed plays a role
- **Environment**; the faster a vehicle drives, the higher the fuel consumption, the more CO² emissions and the more noise pollution
- **Flow through**; if road users drive at roughly the same speed, fewer traffic jams will occur. Moreover, the risk of accidents is smaller, and that also saves on traffic jams.

💡 Solution

- Loops in the road (a pair at each start and end of the route) that detect the vehicles; Infrared flash and a camera per lane at the start and end of the route for registering the registration number of vehicles;
- Two porches or bridges on which everything is mounted;
- A cabinet with electronics for transmitting the data;
- Fiber optic network about which the data is sent;
- Processing servers to match photos;
- Processing back office software for handling fines.

✅ Results

- **5% improved traffic flow** (lower speed)
- **20-30% lower emission** (NO₂ and PM₁₀)
- **50% less accidents**
- **96% less violations** in speed (stabilized to 300 per working day on a volume of 150k vehicles; 0,2%)





Free flow Weigh in Motion

- ▶ Safe, smooth and sustainable mobility for all road users



Challenges

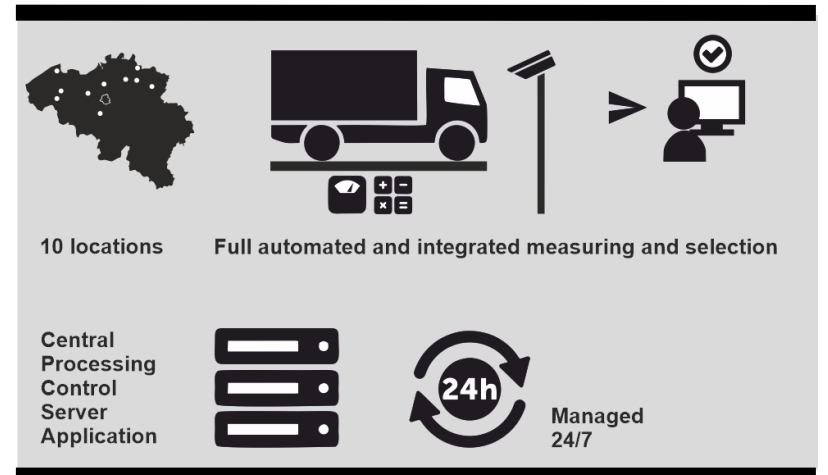
- Low reliability of traditional visual solutions - hit rate of 15-20%
- Detection of overloaded vehicles in an automated way by weighing all vehicles while passing a certain point

Solution

- Overview cameras take an overview of the situation
- License plate recognition cameras automatically register the license plate of every passing vehicle.
- Inductive loops in the road surface detect the vehicle, determine the length of the vehicle and the (indicated) speed of the vehicle
- Weighing sensors in the road surface detect the axles and register the axle loads.

Results

- Free Flow WIM system interception efficiency increased to 83% (instead of 15 to 20% when interceptions were made on visual basis)
- Save time for policemen and drivers





Free Flow Border Control

- ▶ Safe and secure borders;
- ▶ Fast and comfortable border crossing

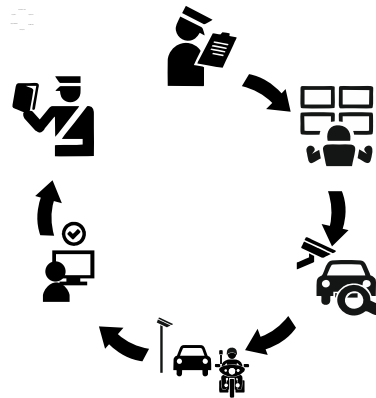


Challenges

No automated systems to:

- Monitor border traffic
- Conduct Information led operations
- Have more insight in Migration crimes (illegal documents, human trafficking, smuggling)
- Have more insight in Organized crime (correlating vehicles, changing vehicles, patterns)
- Resulting into a too high number of violations

Solution



Results

By using DXC's integrated solution, the client was able to:

- Conduct Information led operations at a free flow border
- Gather Statistical information of border traffic
- Conduct Predictive analyses in order to bring down the number of violations

15 fixed locations 100 cameras 6 vehicles 43 EU and neighbouring countries recognised

Central Processing Control Server Application Managed 24/7



Construction Health Monitoring

Road operators

Task to manage roads

- ▶ Incident management
- ▶ Ensuring road is safe
- ▶ Deliver safe travel at all times
- ▶ Perform maintenance on entire infrastructure
- ▶ Ensure compliance with regulations



⚠ Challenges

- **Status** reports
- Problems: continuous 24/7 Alerting and Monitoring
- **Maintenance** forecasting
- **Analytics:** statistics, trends, learning

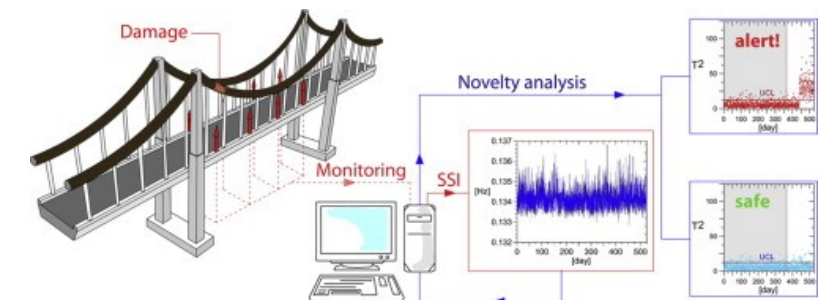
💡 Solution

Solution which answers the following questions:

- Bridge movement within safety limits?
- Traffic passing bridge endangering bridge safety?
- Current mechanical status of bridge?
- What maintenance and when to be scheduled?
- What measures regarding traffic composition and patterns can be made to extend the bridge life span?
- What was original mechanical status of bridge at time X by model-based analytics reconstruction of bridge past?
- What is future mechanical status of bridge at time X by model-based analytics prediction of the bridge future?

✅ Results

- **Safe** bridges
- Real time and historical documentation on **bridge health**
- Effective **maintenance** based on forecasting
- Able to **alarm and act** when bridge perform out of the safe specifications



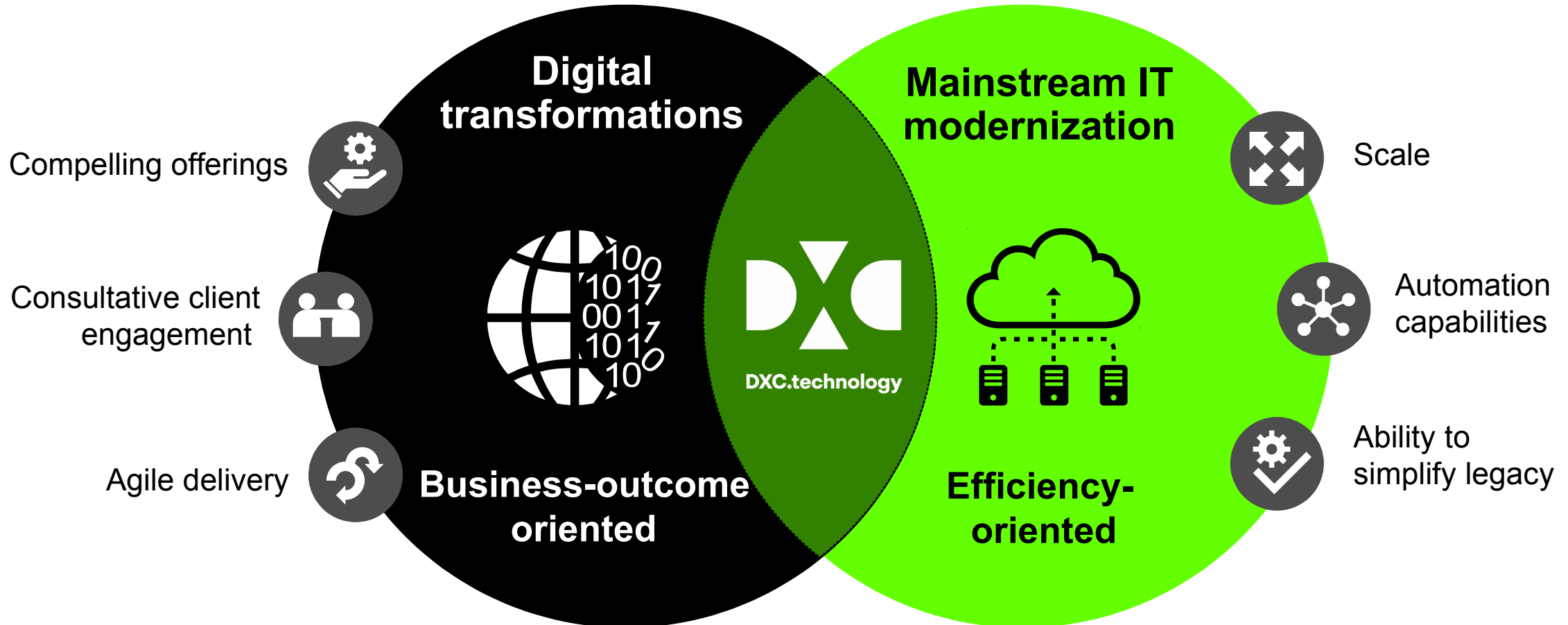
**And the value
comes from
Integration**

Integration of digital innovation with mainstream IT

Client digital transformations...

Results through integration of transformation and traditional IT

...While modernizing mainstream IT





Mobility Incident Management

Road Operator/Salvage companies

Task to manage roads

- ▶ Detect and respond to and manage incidents
- ▶ Road safety monitoring and prediction
- ▶ Maintenance of road infrastructure



Challenges

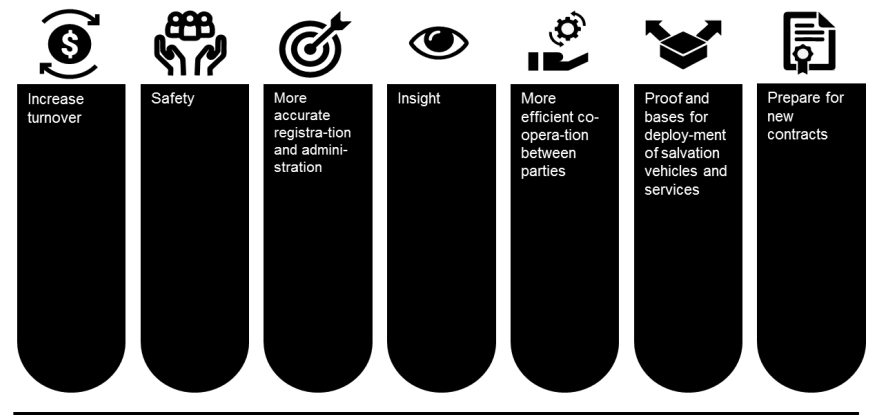
- Continuous 24/7 **Alerting and Monitoring**
- **Status** report
- **Maintenance** forecasting
- Historical **Statistics and prediction**

Solution

- Measurements from
 - Roadside surveillance cameras
 - Call center messages
 - Social media messages
 - Road authority control room
 - Apps
 - IOT Sensors
- Registration and documentation of events and incidents
- Event and Incident orchestration and handling
- Information fusion from social media, weather and public information channels
- Geo special analytics

Results

- Situational **awareness**, common operational picture
- **Reduce costs** caused by events and incidents
- Shorten **resolution** time
- End to end process management
- Insight to recover **better, safer, quicker and more**
- Faster and cheaper pass through





Journey Planner

Public Transport Operators

Provide passengers efficient travel itinerary, with minimal stopovers and focus on climate, as modern travelers demand a:

- ▶ completely connected
- ▶ end-to-end, multi-modal journey (plan & actual travel) with
- ▶ personalized experience recognizing traveler behaviors and preferences

This requires connecting multiple operators to share key data while keeping the traveler informed.



Challenges

- Go and stand where you want with maximum comfort
- Travel time as time gained and time to spend freely
- Sustainable and focus on climate

Solution

- High performance software package providing public transport travel advices for timetable oriented services and additional timetable information:
- validity of the timetable
 - departing and arriving services on a stop
 - companies
 - transport modes
 - attributes on services
 - stop name matching
 - personal timetable.

Results

- Door to door itinerary
- World class mobility;
- Nearby,
- Affordable
- Heart for the environment.

Actuele spoorkaart

Utrecht Centraal - 22:38 Terug naar de kaart

Tijd	Naar	Spoor	Via	Reisdetails
22:38	Maastricht	15	s-Hertogenbosch, Eindhoven, Weert	Intercity
22:40	+4 min. Den Helder	5a	Amstel, Amsterdam C., A'dam Sloterdijk	Intercity
22:41	Breda	19b	Geldermalsen, s-Hertogenbosch, Tilburg	Sprinter
22:43	Rhemen	14b	Maarn, Veenendaal C.	Sprinter
22:43	Schiphol	7a	Bijmer ArenA, A'dam Zuid	Intercity
22:47	+2 min. Breukelen	5a		Sprinter
22:47	Rotterdam Centraal	8	Gouda, Alexander	Intercity
22:50	Groningen	--	Amersfoort, Zwolle, Assen	Intercity
22:50	Zwolle	1	Overvecht, Den Dolder, Amersfoort	Sprinter
22:53	Nijmegen	14b	Driebergen-Zeist, De Klomp, Ede-Wageningen	Intercity
22:54	Amsterdam Centraal	7	Bijmer ArenA, Amstel	Intercity
22:55	Leiden Centraal	18a	Woerden, Alphen a/d Rijn, Lammenschans	Intercity
22:55	Weesp	3	Overvecht, Hilversum	Sprinter
22:59	Den Haag Centraal	8a	Gouda	Intercity
23:03	Den Haag Centraal	12a	Woerden, Gouda, Zoetermeer	Sprinter
23:05	Amersfoort Schelker	11a	Amersfoort	Intercity

Andere stationsoorten



Enforcement Backoffice

Private Services/Government Services/Police

- ▶ Safe, environmentally friendly and efficient transport system in a good, professional manner in cooperation with politicians, law, users and other stakeholders



⚠ Challenges

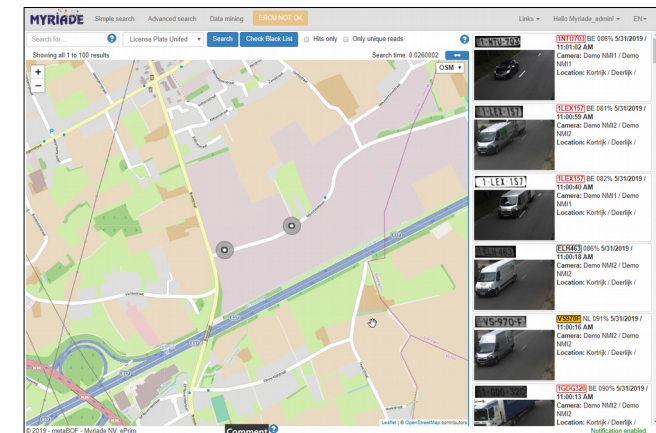
- Visibility: targeted **surveillance** activities
- **Stop crime** in traffic and detecting criminality, such as stolen property
- **Prevent crime**, traffic safety on and along roads
- Vehicles not fulfilling requirements for using the roads are taken off
- The **utilization of resources** to control teams far better

💡 Solution

- The back office system has been designed to allow different services to search through Reads from different types of traffic cameras in order to use it for various purposes.
- Searches can be done based on a particular license plate, but also on time, place, time period, brand of vehicle, country etc., or combinations thereof.

✅ Results

- **Central and integrated processing** solution with associated interfaces
- **Integration** of existing cameras/sensors to the central processing solution
- **Reliable identification** of individual vehicles
- Further **information** about vehicle and its attributes



Making City Smarter

Our vision on Digital City



DXC enables:

- Better use of roads, less travel time
- Reduce accidents
- Utilize infrastructure efficiently, relieving pressure on city centers
- Decrease pollution, better city environment
- Prevent unnecessary delay and millions of lost economy cost and save the environment

Efficiency.



Thank you.