

The Convergence of CAVs with Transport Infrastructure



The ERTICO - ITS Europe Partnership

Mobile Network Operators

Research

Service Providers

Suppliers

Traffic & Transport Industry

Users

Vehicle Manufacturers

Public Authorities

* Non-shareholder



ERTICO VISION

Safer
Smarter
Cleaner

Mobility



ERTICO
ITS EUROPE

Connected & Automated Driving

Clean Mobility

Urban Mobility

Transport & Logistics

ITS systems
and services

Develop
Promote
Deploy

ERTICO MISSION

TM 2.0 Platform



Started in 2014



Focus on new solutions for advanced and active traffic management



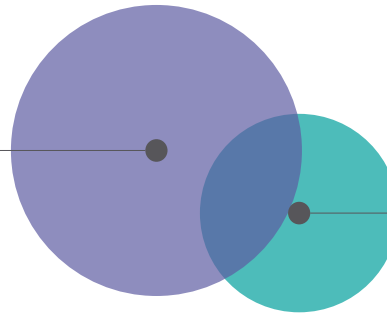
an ERTICO innovation platform



Vision: **“Enable vehicle interaction with traffic management”**

Basic aims

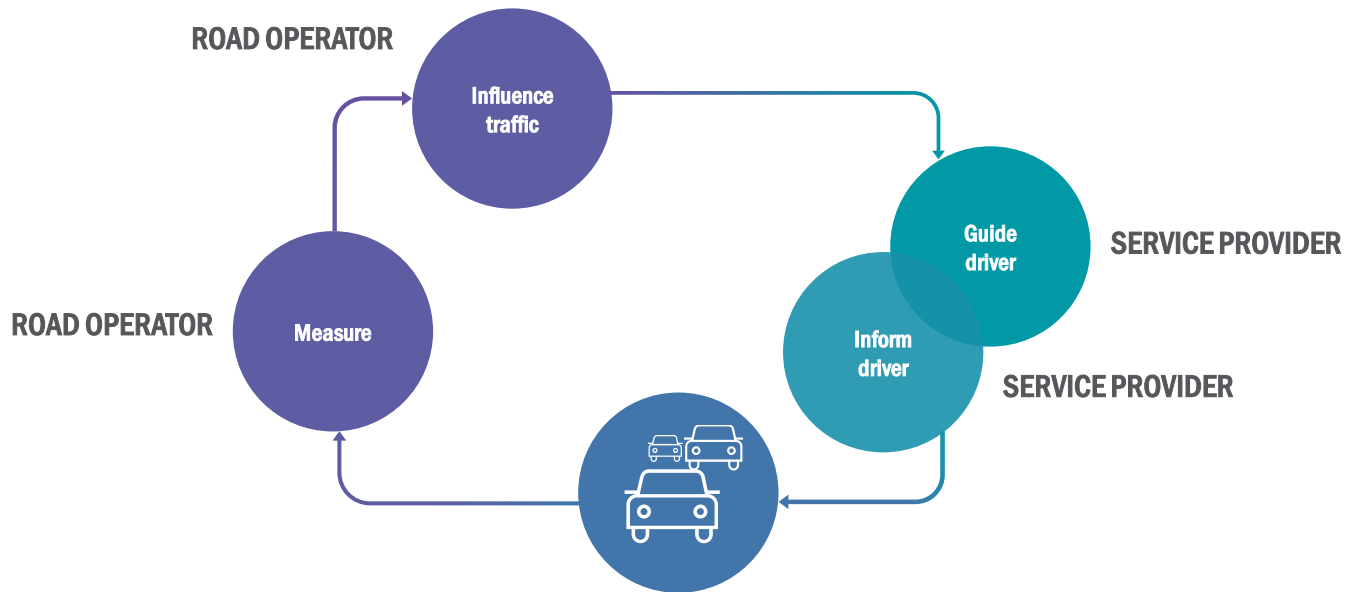
Use a set of **common interfaces, principles and business models** to facilitate the exchange of data between vehicles and TMC.



+ Improve entire value chain for consistent TM and Mobility services.

Traffic Management: Traditional Situation

Road Operators & Service Providers



Convergence is needed (Technology)

- Today traffic control strategy is not able to address individual travellers
- Individual vehicle behaviour (as available from the route guidance system) is not made available to the traffic management system
- Traffic management plans (TMP) are not part of the dynamic traffic information that is delivered to the vehicles today
- Highway operators do incident management based on the tools they have available. Knowing how the secondary road network is performing is crucial data to have in order to decide how to guide drivers

Convergence is needed (Governance)

Public Authorities

- Achieving KPIs on policy objectives
- Better tackling congestion and traffic collapse (and consequently CO2 emissions)

Traffic managers

- avoid congestion and traffic
- Improve TMP complementing or replacing loop detectors and enhancing accuracy
- TMPs measures reach driver directly
- FCD-enabled TM even in roads with no ITS (scalable)

Users

- avoid congestion: more relaxed driving
- Receive relevant regional information in-vehicle
- Improved road safety through smoother traffic flow

Transport Operators

- Reduction of queues at terminals
- Reduction of fuel consumption/cost
- Better decisions based on more accurate and real-time information (ETA)
- Optimisation of network operations

Service providers

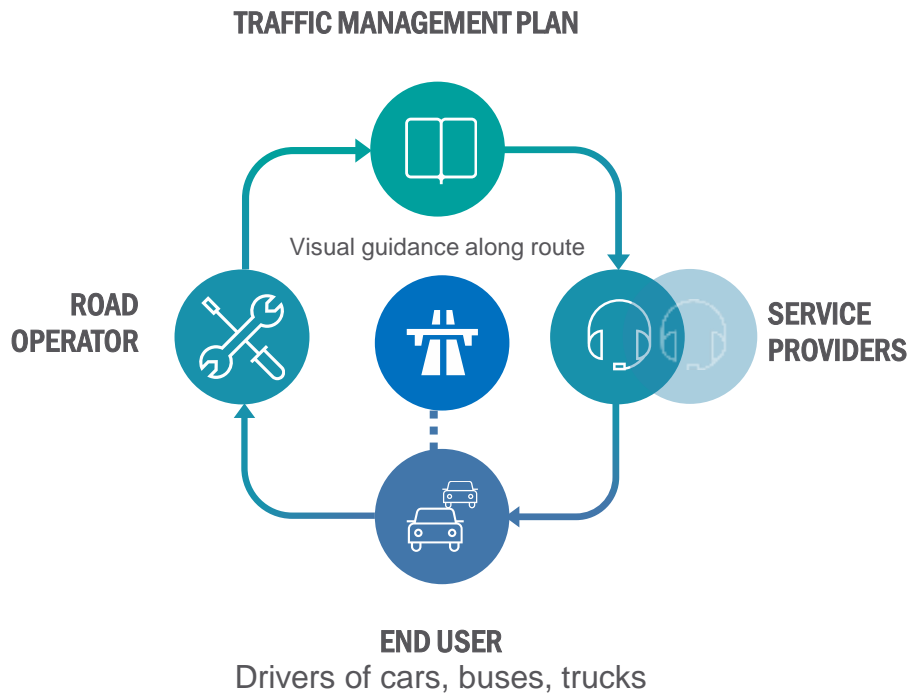
- Provide best route option for the destination (not only fastest)
- Provide information that goes beyond congestion
- Provide solution (best route option) not the problem
- Regional information becomes part of an integrated service

Enable vehicle interaction with traffic management



- The future of Traffic Management is to build upon deployment of connected vehicles and travellers in order to:
 - achieve convergence of mobility services and traffic management.
 - create synergies between actions of the individual travellers with the collective mobility objectives.
 - bridge the innovative developments in the vehicle and in the traffic management while giving value to the legacy and creating new business opportunities.

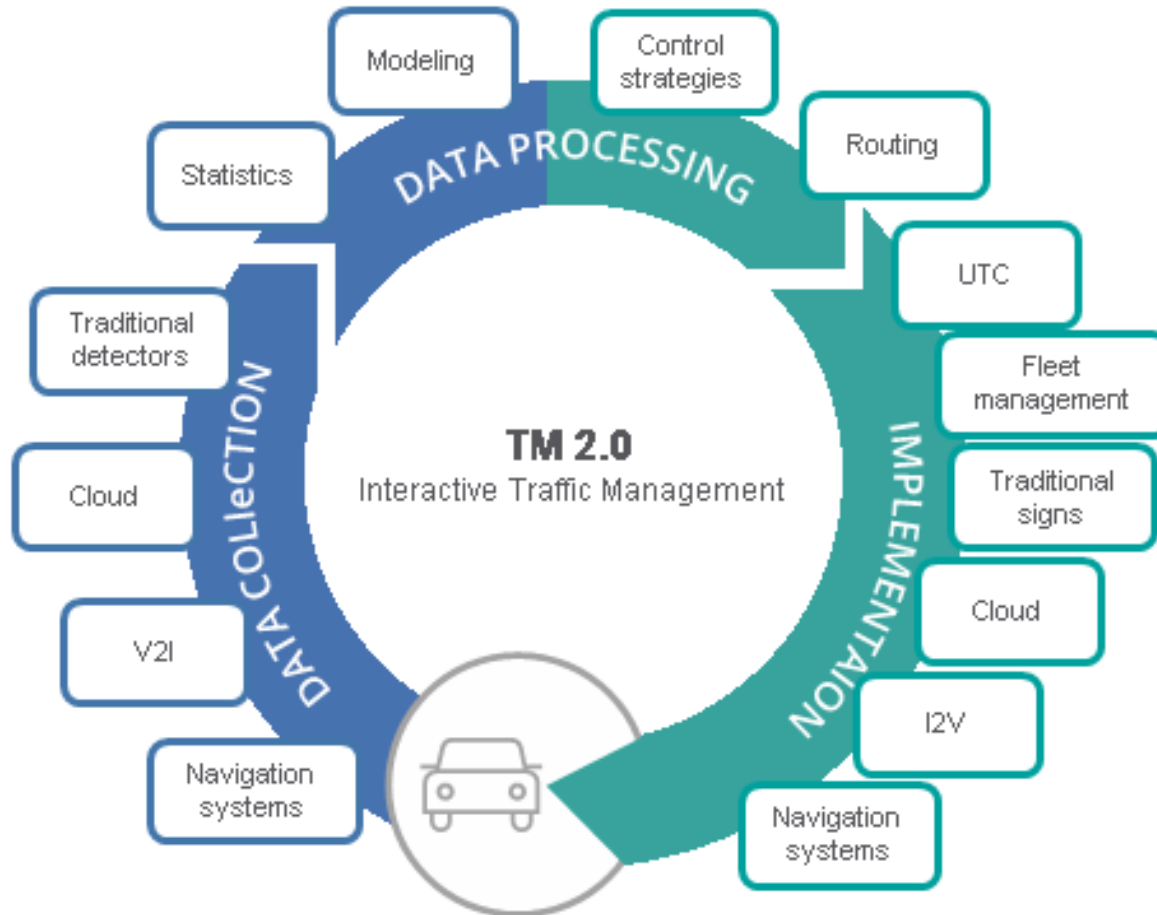
TM2.0 - Towards Active Traffic Management



Coherence of:

- **Traffic management plans** provided by road authorities **with**
- **Dynamic traffic information** provided by traffic service providers **with**
- **Guidance** provided by navigation service providers

TM 2.0 – What is needed



TM 2.0 ecosystem challenges



2020



2025

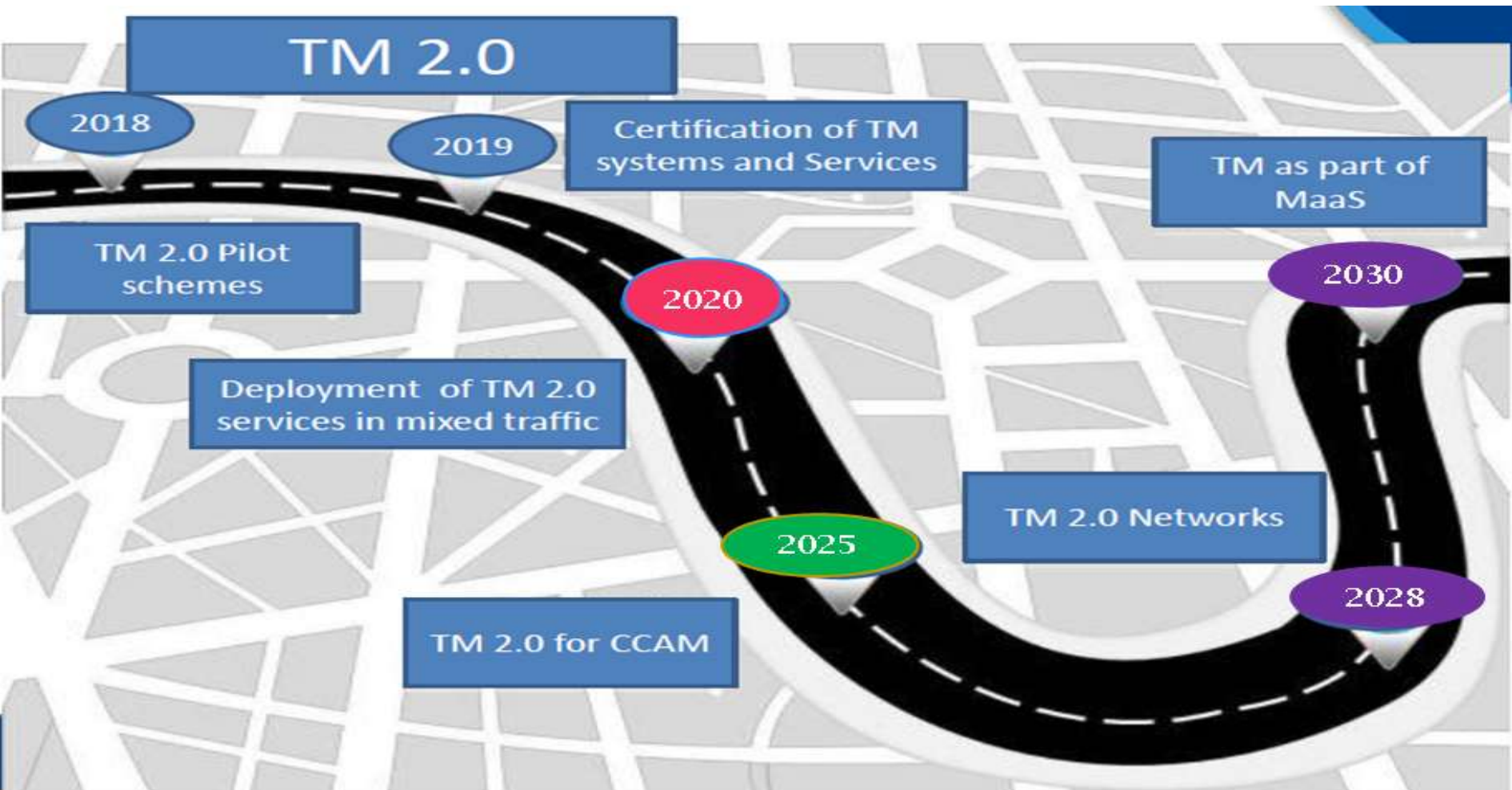


2030



- **Level 3 AVs on the road**
 - Relevant infrastructure and greater connectivity in place to move from scattered TM pilots to broad deployment
- **Level 4 AVs on the road**
 - Need to have dedicated testbeds in cities and corridors on the Highways
 - Need for Certification schemes
- Linkage between TM and multimodal platforms (MaaS operators).

TM2.0 - Towards convergence of CAVs with Transport Infrastructure



Use Cases selected

- Traffic light signal and timing transmission
- Information about Roadworks transmission
- Policeman regulating traffic at intersection
- Priority request
- Dynamically assign lanes to specific vehicles
- Extended Probe Vehicle Data collection and analysis
- Scheduling and prioritisation of flexible automated systems for public transportation
- Unsignalised intersection support by TM
- Shockwave damping

Needs for communication

- Extensions / complementary definitions in standards:
 - Vehicle level of automation (in CAM messages and other protocols)
 - Intended trajectory / path planning (location, speed, acceleration per time point - needs standardisation)
 - Automated vehicles should confirm reception of information by TMC

Needs for infrastructure (1)

- Intelligent local TMC (roadside ITS station, or at traffic light controller, or cloud-based) responsible to dispatch information to automated vehicles and service providers and verify its reception
- Registry of automated vehicles in area of control, possibly integrated in a local dynamic map
- Interface between traffic light controller and local TMC
- Redundancy of communication for high-risk scenarios
- System to transmit policeman's commands

Needs for infrastructure (2)

- New traffic signs and road markings, i.e. for dynamic lanes segregation, bus stops
- Flag in probe vehicle data transmission for prioritisation, i.e. over data exchange for entertainment purposes
- Virtual bus stops, for example via pickup request buttons
- Smart priorities assignment module for unsignalised intersections
- Smart algorithms for shockwave damping (speed suggestion obligatory)

Quality, safety and security concerns

- Layered handling of information: only information of relevance for higher level of TM should pass to the higher level
- Rules and procedures on how to compare data from different sources
- Data from different sources should be related (in time or geographical area)
- Detailed data about intersections topology and lanes
- Dynamic data about roadworks in digital format, including position, length, lane
- Redundant intelligence on the vehicles and on the local TMC (challenge: policeman at intersection)
- Redundant communication technologies
- Local TMCs connected in a network (no boundaries for vehicles)
- Data privacy, encryption, cyber-security

Changing role of Public Authorities/TMC

2020

Deployment of TM 2.0

- sculpt the policy master plan;
- coordination of an integrated transport system
- planning, implementing and linking to hubs;
- open PPP cooperation- defined contractual agreements
- Procurement
- collection of data - linked to KPIs;
- readiness for new technologies;

2025

TM 2.0 for CCAM

- **Policy level:**
- PAs to implement incentive policies and defining the service requirements for privacy, security and safety.
- **Operational level:**
- Digitalisation of infrastructure;
- Managing the transition from normal to AVs;
- demand driven planning; lane control;
- training; ensuring interoperability of services;
- procurement to enable the shift from a system to a service.
- PA will need to measure achievements; optimise and define the most relevant KPI
- TMC to make the move from reactive to proactive traffic policies; taking responsibility for the implementation of actions defined by the PAs

2030

TM as a Service

- PAs to stimulate preferred behaviours through instruments incl. taxation and discounts
- PAs to define success factors and KPIs for 2030- what they want to achieve
- There will be an ecosystem approach with respect to the Architecture, Data and
- Auctioning
- TMC to become integrated, multimodal and putting different algorithms and models to work (incl. drones etc...).
'Orchestration'- to be combined with MaaS.

Changing role of Service Providers

2020

Deployment of TM 2.0

- SPs should be in a better position to be implementing the decisions of the PAs, for example adaptable speed limits based on real time data.
- Need to shift roles of public roadside traffic management measures to private in-car navigation services.
- SPs should develop new kinds of offerings which match offerings with PA KPIs
- interoperable interfaces;
- enhance societally enabled TMC (e.g. to measure CO2 towards a city);

2025

TM 2.0 for CCAM

- SPs to accept to share intentions (That is needed for day 3).
- Deployment of TM 2.0 services in mixed traffic
- SP to get an increased involvement in collective Traffic Management and to become the arm of the PAs, taking responsibility for acting but not exercising decision making power;

2030

TM as a Service

- SP align with MaaS provider
- SP offer “certified” and interoperable services

TM 2.0 concept implementation



Concluding

In TM 2.0 Service Providers do not compete on the information but on its quality and on how to best route customers while taking the priorities of public authorities into account

In exchange, the public authorities open their information on their traffic management plans and measures to all cooperating Service Providers

TM 2.0 provides an informed view of the road network that leads to optimization of Traffic Management

<http://tm20.org/>

Thank you

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