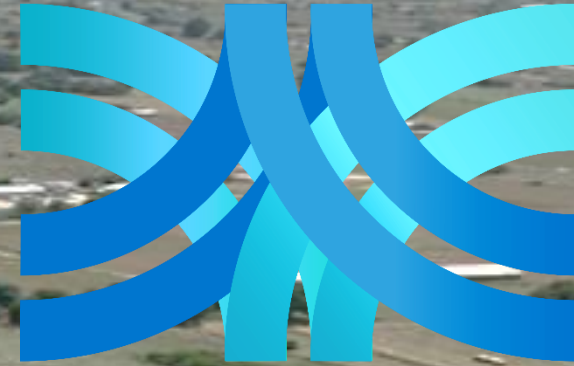


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Bundling of C-ITS services: applications and tools

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Challenges of large-scale C-ITS deployment

Private and public sector stakeholders

- Service providers
- Data aggregators and distributors
- Transport networks' operators



Smart mobility services to assist travellers in making their trips comfortable and efficient

Effects of smart mobility services on travel behaviour and traffic patterns in the road network

- Mode, Route, Lane and Speed choices



Increasing influence

**What is the main challenge for road authorities?
How to incorporate, connect and exploit smart mobility services
into day-to-day dynamic traffic management**

What is C-ITS services Bundling?

Bundling is the coordinated provision of several C-ITS services as one combined service

Form:

- Open, modular and extendable applications
- A complete suite of C-ITS services under one user environment

Logic:

- Intelligence featuring both end-user and policy related parameters
- Ensure to the highest degree possible that C-ITS services cover in an optimal way multi-parametric needs

Bundling objectives

- Exploit the increasing use of C-ITS services
- Develop and implement strategies for the operation and exploitation of C-ITS services in real-time and within varying geographical areas
- Enhance traditional traffic management
- Serve the scopes of operational traffic managers
- Integrate and exploit C-ITS services capable of offering “control variables”

Bundling dimensions

- **End-user bundling dimension**
- **Operator/Manager dimension**



End-user bundling dimension

End-user types

1. Drivers
2. Vulnerable Road Users (VRUs)
3. Public Transportation Fleets' Operators (PT)
4. Commercial Fleets' Operators (CF)
5. Emergency services vehicles (EV)

Objectives

- Provide C-ITS services within an integrated suite
- Applications in end-user devices (Smartphones, Tablets, On-board units/systems)
- Use of Artificial Intelligence technologies (context-aware, location-aware, user preferences related, adaptive)
- Interoperability with Traffic Management

End-user bundling dimension

End-user bundling dimension

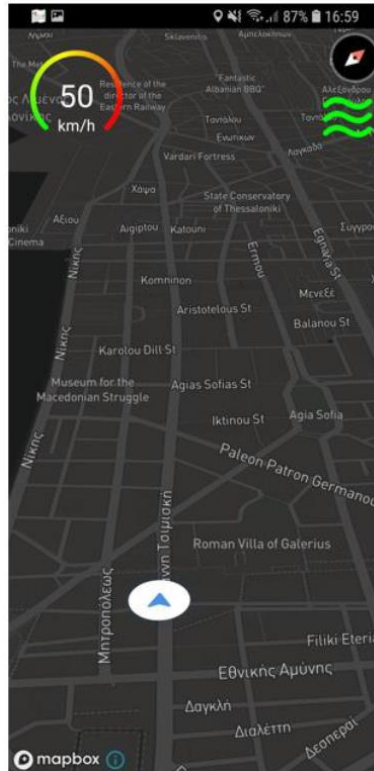
How to implement?

Via one common Application providing multiple C-ITS services



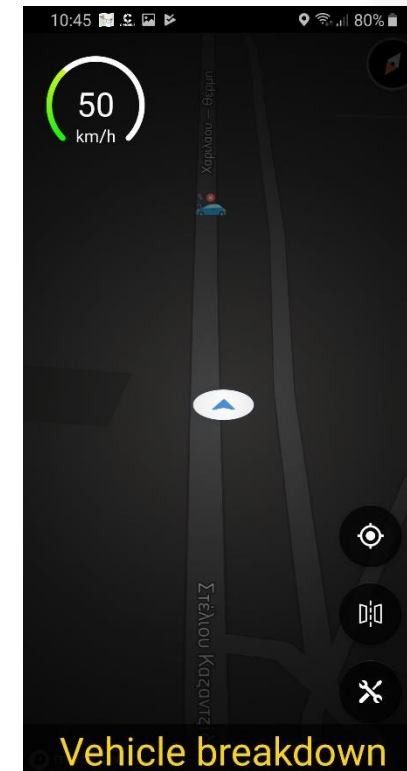
In-Vehicle Signage

- Speed limit
- Travel time



In-Vehicle Signage and GLOSA

- Speed limit
- Green Wave



In-Vehicle Signage and Road Hazard Warning

- Speed limit
- Hazard upstream

Operators – Managers bundling dimension

Stakeholders

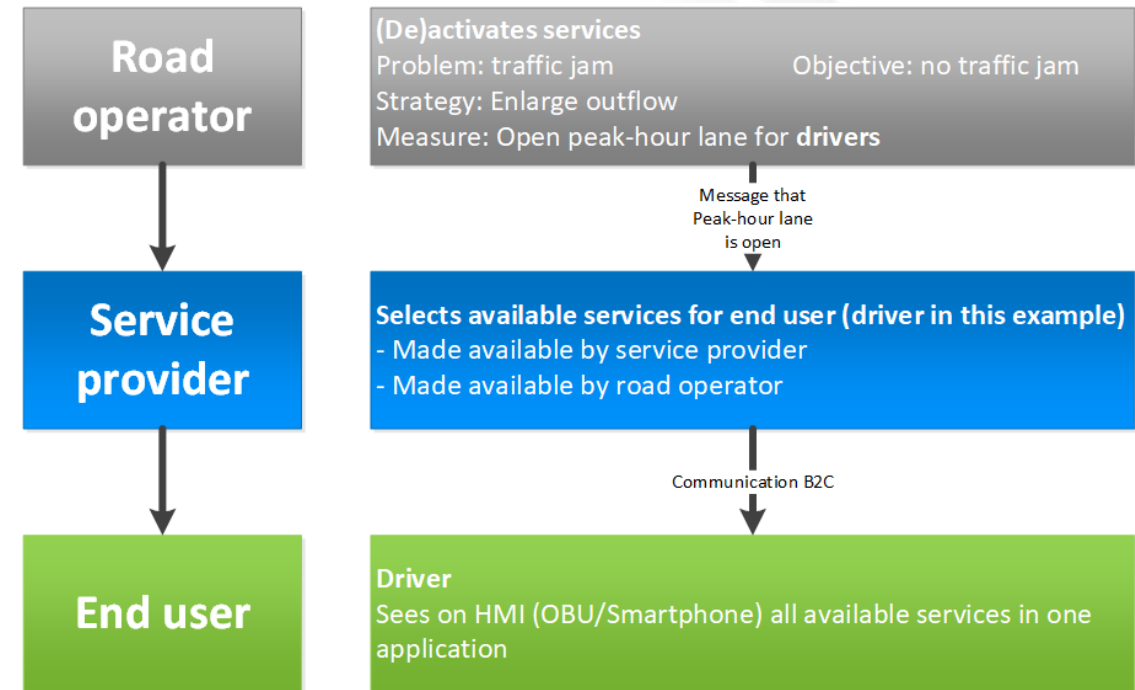
1. Road operators/ Traffic Managers
2. Service providers (including OEMs)
3. End-users

Objective

- Integrate and exploit the use of C-ITS services for operational traffic management

Implementation steps

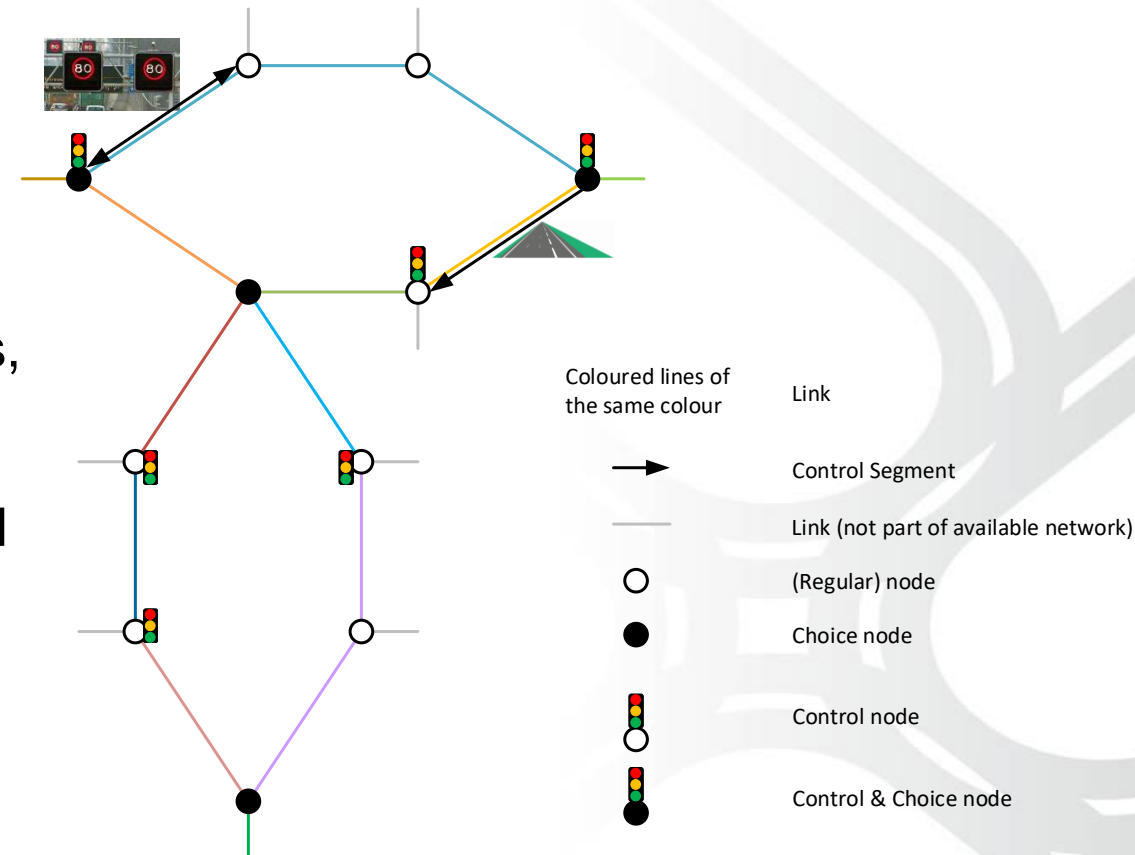
- Assess the contribution of smart mobility services
- Select available smart mobility services in the available network
- Operational process



Operators – Managers bundling dimension

Approach

- Dynamic Traffic Management (DTM) “control strategies”
 1. Policy: defined by road authorities/ includes importance and function of roads, quantitative thresholds for links and route parts
 2. Available road network: choice nodes, control nodes, regular nodes, control segments, links, route parts
 3. Strategies: each strategy contains one or more DTM services
 1. Inform traffic
 2. Enlarge the outflow
 3. Reduce the inflow
 4. Reroute traffic (demand)



Operators – Managers bundling dimension

Implementation

Via the “Operator View” Tool

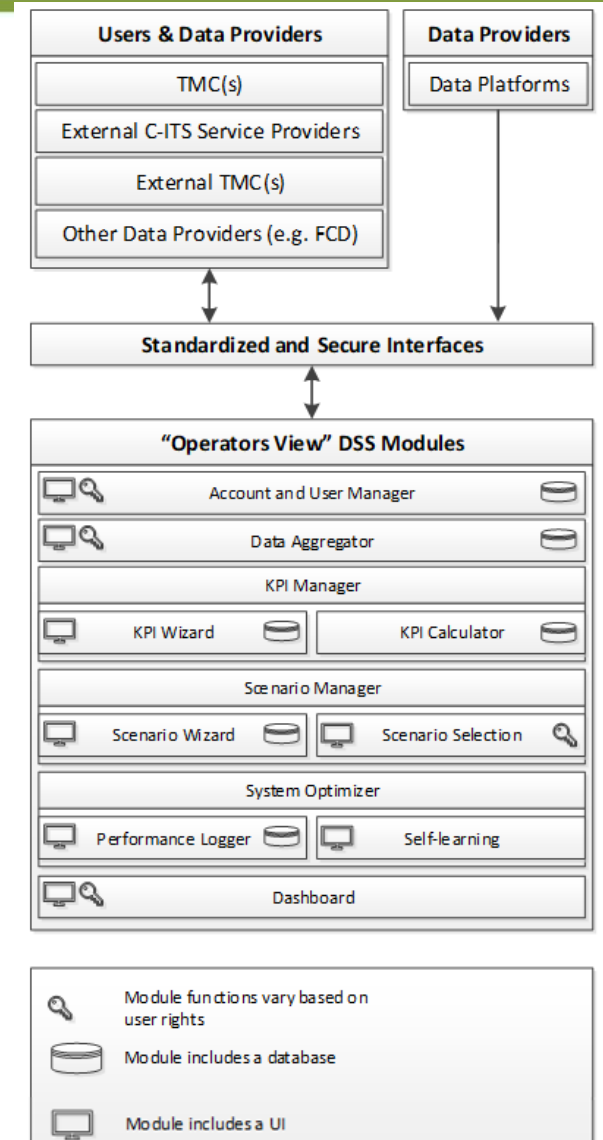
- An intermediary between Service providers and Traffic Management Centers
- A high-reference support system for Traffic Management Centers
 - ✓ Interfacing with one or more Traffic Management Centers
 - ✓ Standardized and widely used communication protocols (e.g. DATEX II)
 - ✓ Holistic traffic coordination
 - ✓ Selection, implementation and assessment of control strategies
 - ✓ Activation and deactivation of C-ITS services
 - ✓ Road network status monitoring

Operators – Managers bundling dimension

“Operator View” Tool main components

1. Visualization component
 - Visualization of data, Network & System KPIs
 - Reporting
 - Data exporting
2. Scenario management component
 - GIS-based interfaces
 - Control strategies/scenarios, and measures creation
 - Control strategies/scenarios, and measures editing
 - Definition of associations between KPIs, control strategies/scenarios, and measures

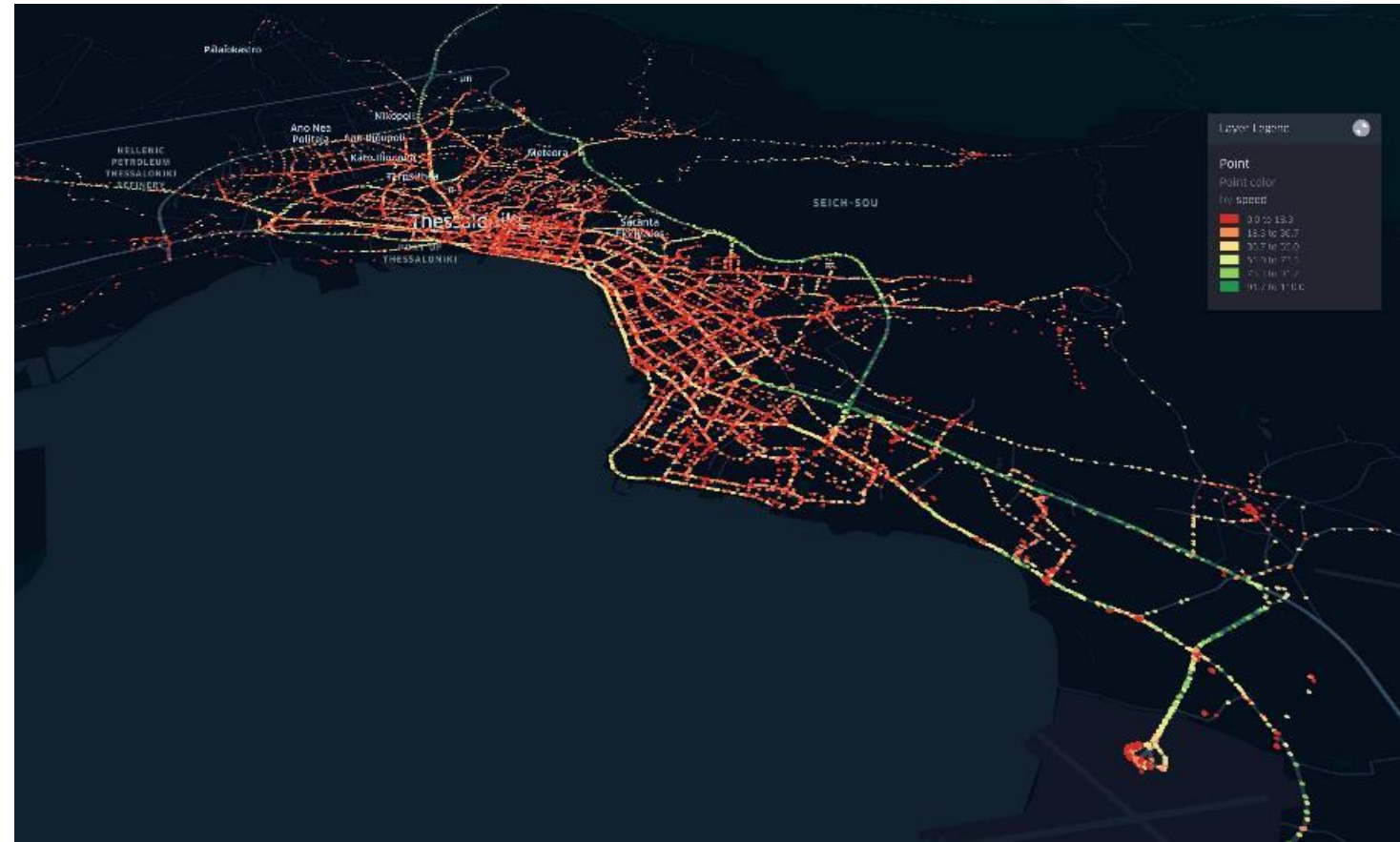
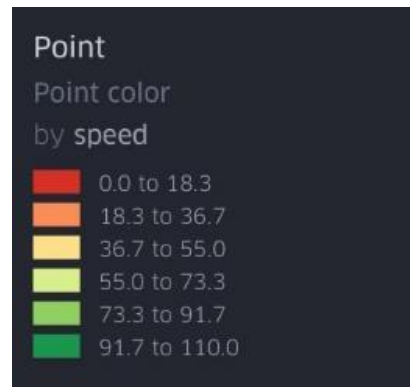
➔ **High-level system layout**



Operators – Managers bundling dimension

“Operator View” Tool Visualization component example

- ✓ Traffic status in the road network
- ✓ Data from real-time FCD



Closing information

- Coordinated provision of C-ITS services
- App for the provision of C-ITS services to end-users
- Platform enabling coordinated traffic management for connected vehicles through activation of C-ITS services
- Can be extended to support features of automated vehicles
- Project information available at: <http://c-mobile-project.eu>
- Thessaloniki deployment information available at: <http://cmobile.imet.gr>





Thank you for your attention!

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