Socrates$^{2.0}$ – Vialis gebruikersdag

Tiffany Vlemmings | May 2019

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SYSTEM OF COORDINATED ROADSIDE AND AUTOMOTIVE SERVICES FOR TRAFFIC EFFICIENCY AND SAFETY

SOCRATES$^{2.0}$ is a horizontal project, paving the way for the future traffic management in Europe: a traffic management that allows for the best use (fast-safe-clean) of existing infrastructure.

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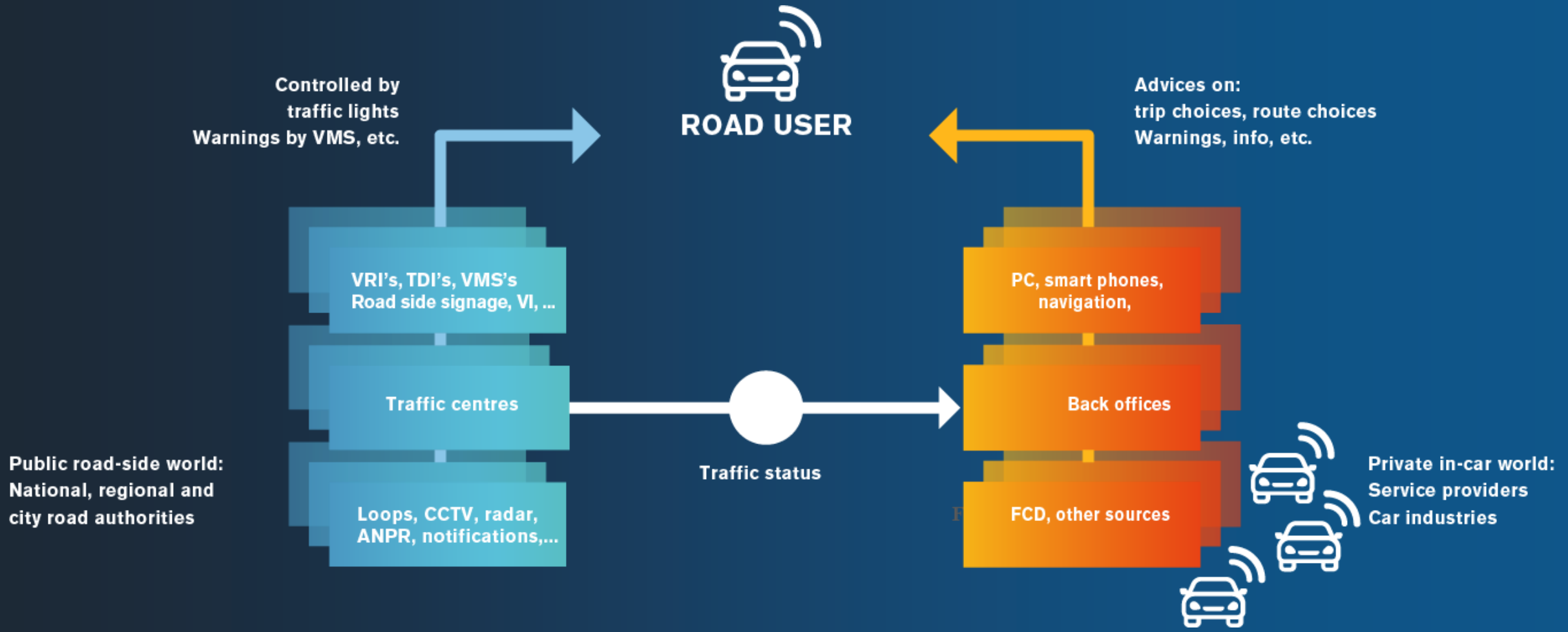
Traffic management: current status



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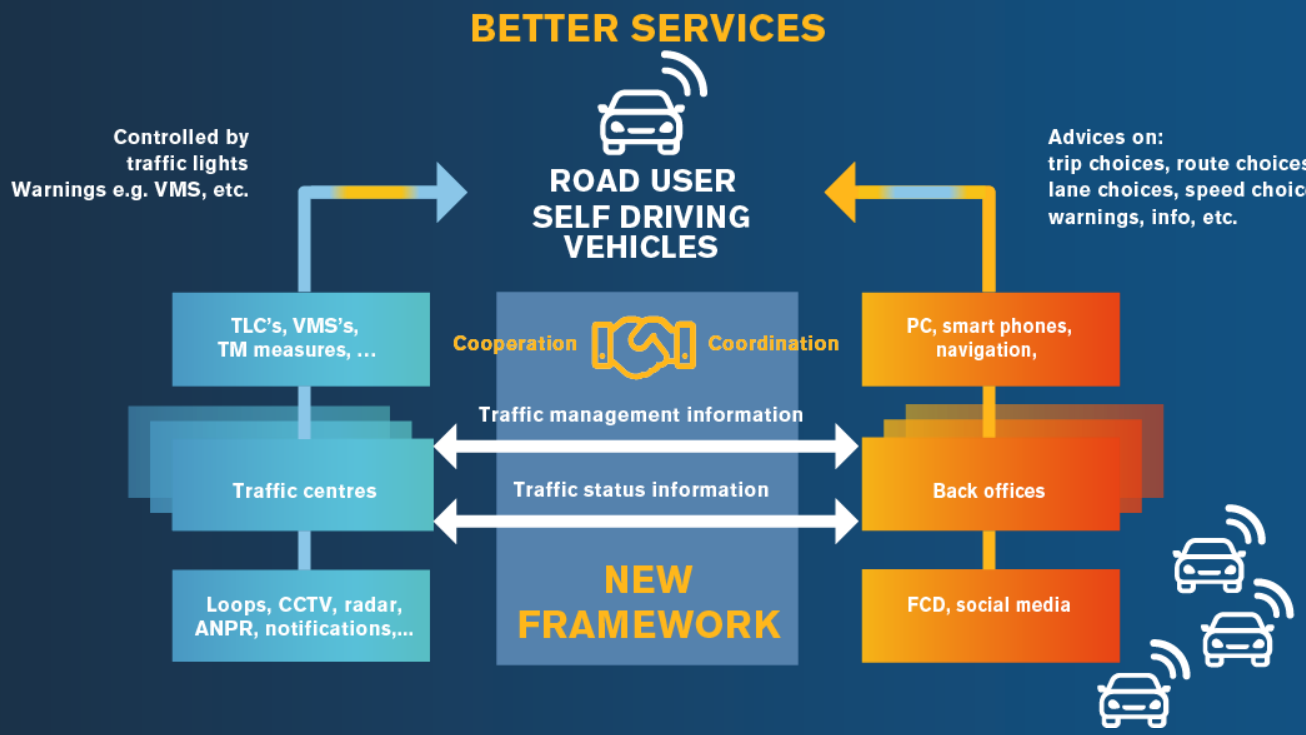
Vision



SOCRATES$^{2.0}$ - Establishes an eco-system for trusted collaboration between public and private parties to improve road safety and traffic efficiency.

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Objective 1

To design, operate and evaluate new and extended traffic management measures and mobile/in-car services for road users; based on a close cooperation of road authorities, service providers and car industries.

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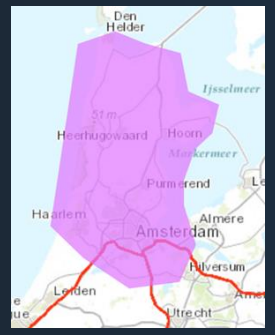
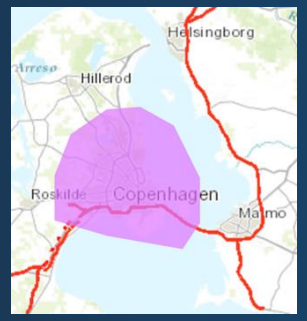
Objective 2

To design, operate and evaluate a cooperation framework (at strategic, tactical and operational level) for interactive traffic management by road authorities, service providers and car industries.

Pilot



Amsterdam
6000 drivers
3 VC's
6 SP's



Copenhagen
1000 drivers
1 VC's
6 SP's

Munich
1000 drivers
1 VC's
5 SP's

Antwerp
1000 drivers
1 VC's
6 SP's

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SOCRATES$^{2.0}$ Consortium

TOMTOM · BEMOBILE smart mobility · here · BrandMKRS CREATIVE AGENCY

Technolution · MAP TRAFFIC MANAGEMENT

BMW

Vlaamse overheid · Gemeente Amsterdam · Autobahndirektion Südbayern · CITY OF COPENHAGEN The Technical and Environmental Administration · Vervoerregio Amsterdam

bast · Rijkswaterstaat Ministerie van Infrastructuur en Milieu · Provincie Noord-Holland · ndw National Data Warehouse for Traffic Information

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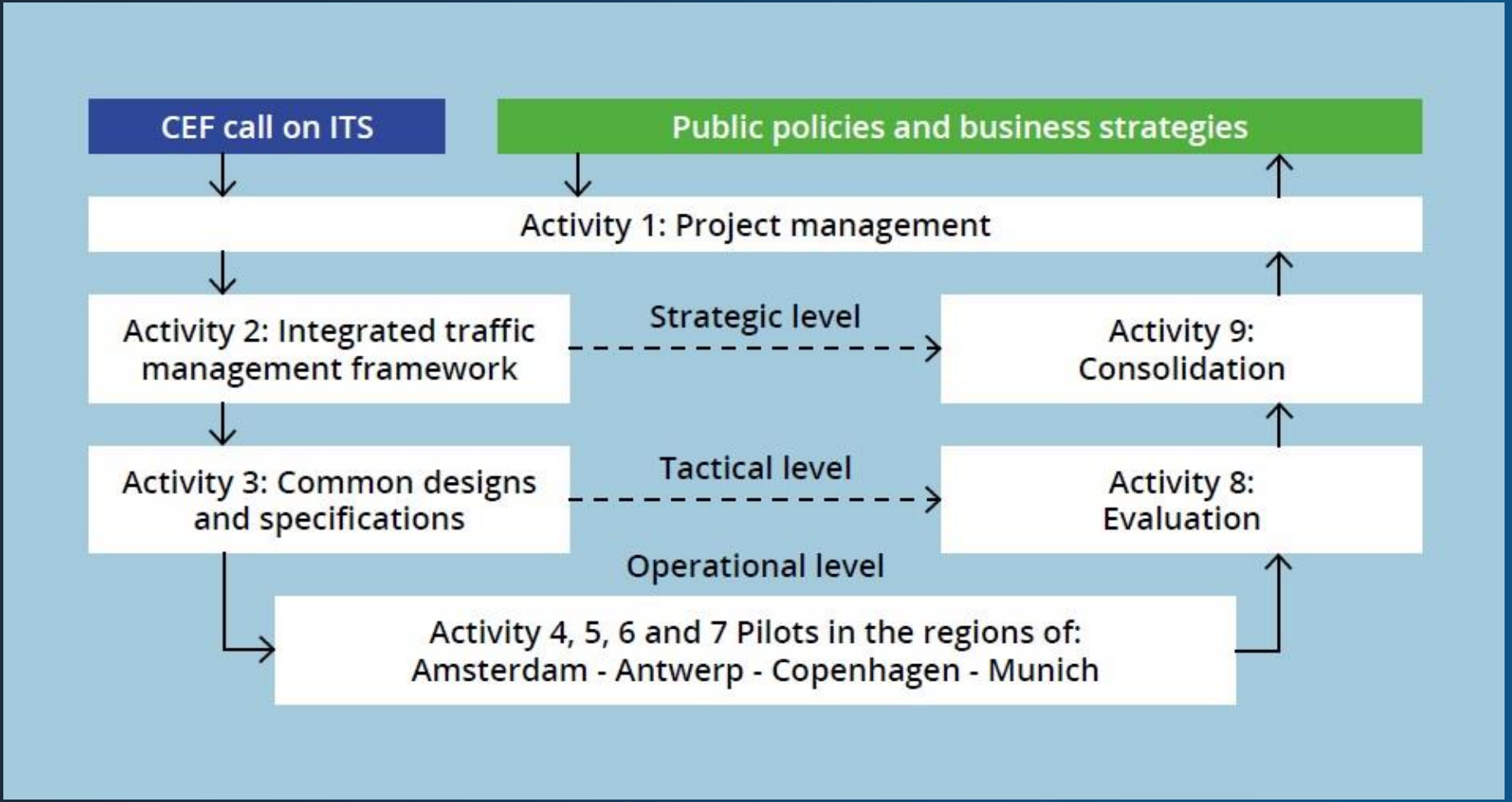
Structure: V-Model Activities



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Activity 2 - Objectives

Interactive traffic management cooperation framework

to commonly define a FRAMEWORK for interactive traffic management

to achieve a SHARED VISION about interactive traffic management

to identify and analyse potential BOTTLENECKS

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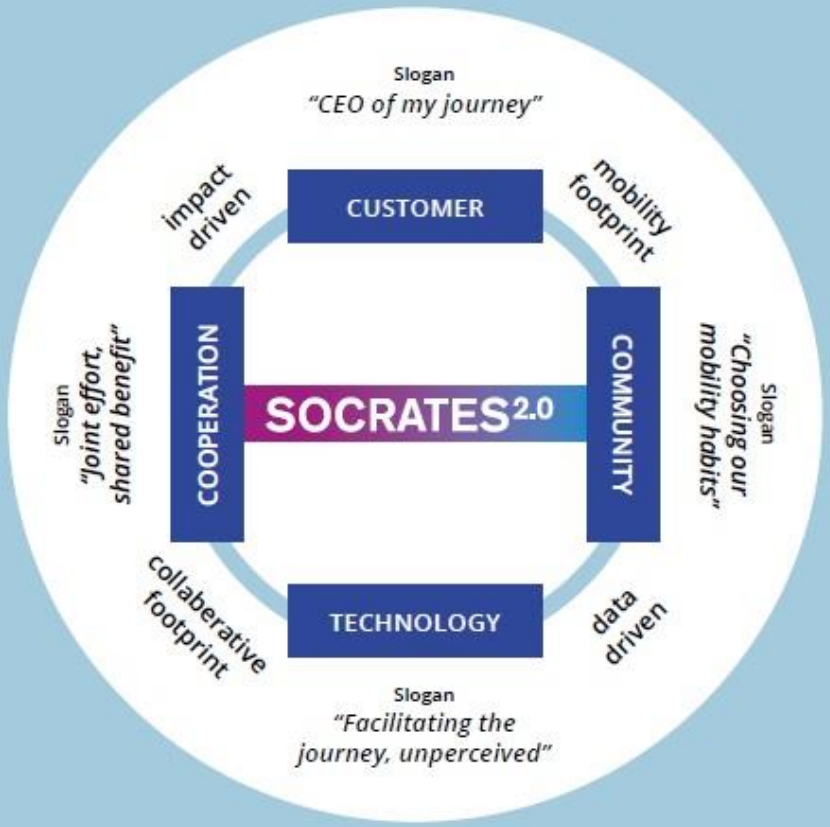
Socrates Vision

2 goals:

- **Enhanced services**
- **Cooperation Framework**

4 dimensions:

- **CEO of my journey**
- **Choosing my mobility habits**
- **Facilitating journey, unperceived**
- **Joint effort, shared benefit**



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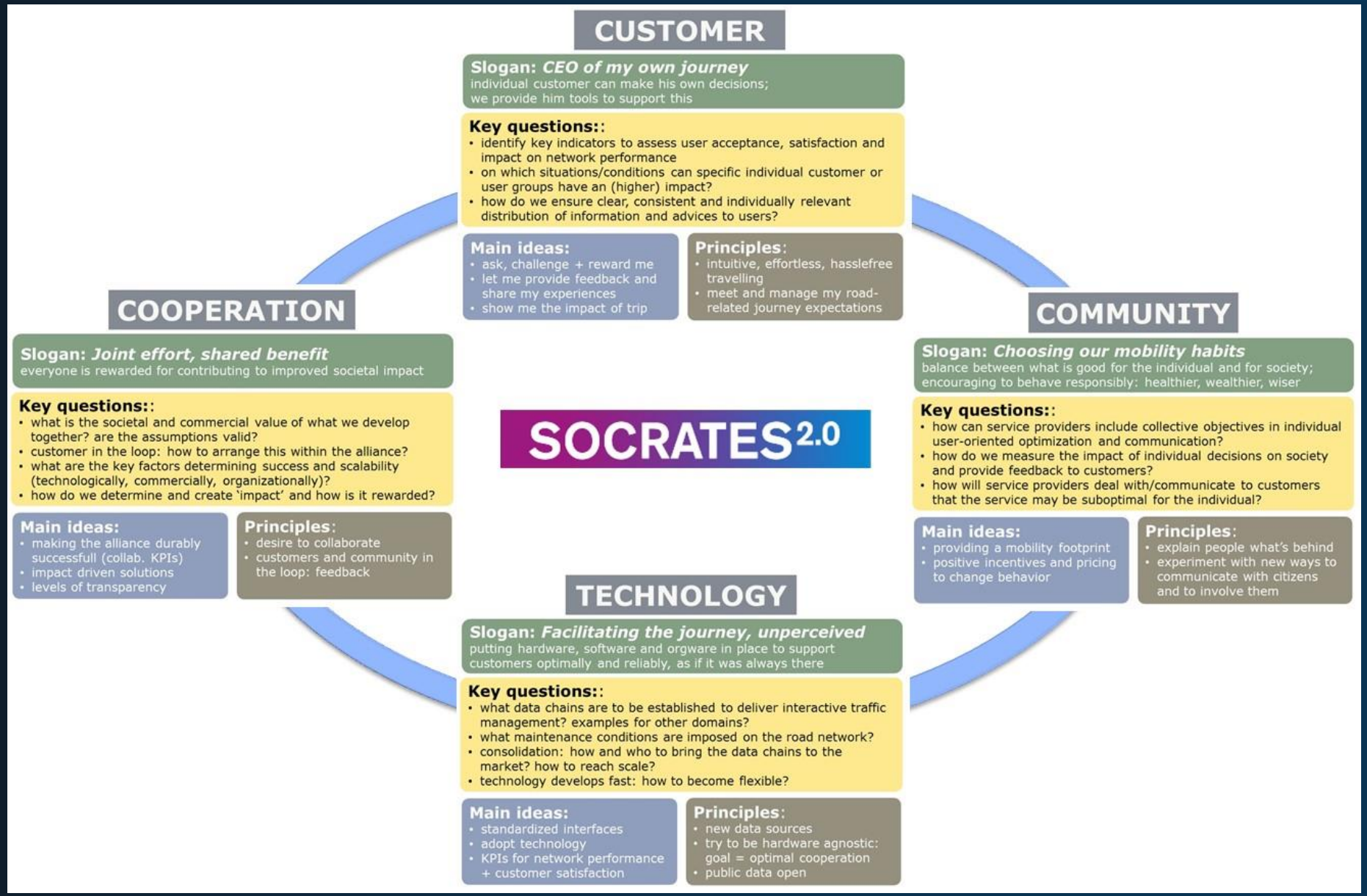
Per dimension

- **Slogan/ joint aims**
- **Key questions**
  → ***why***
- **Main ideas**
  → ***what***
- **Leading principles**
  → ***how***



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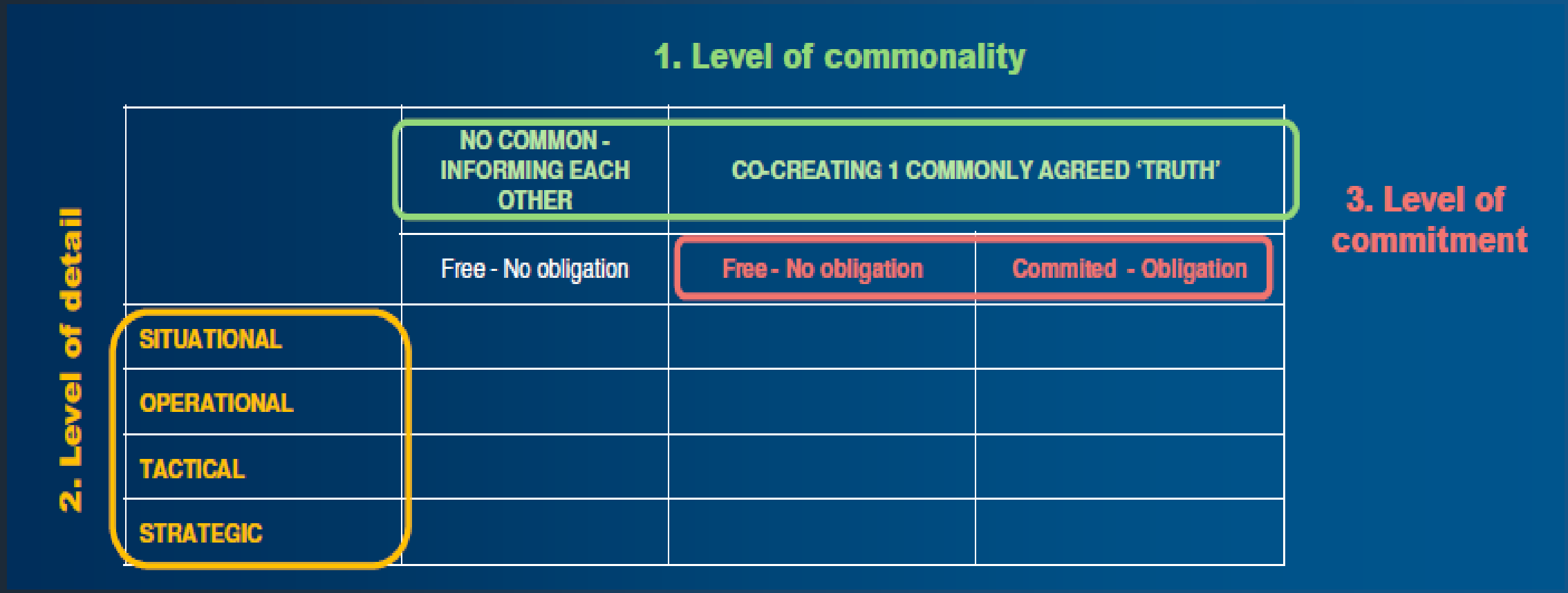
Cooperation Model



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Visual of cooperation Models

NO COMMON -
INFORMING EACH OTHER

Free - No obligation

CO-CREATING 1 COMMONLY AGREED 'TRUTH'

Free - No obligation

Commited - Obligation

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Cooperation Model Matrix

	No joint approach – exchange info	Exchange info - common insights	Joint approach – common insights – coordinated approach
Situational – status sensors, actuators	Monitoring with own instruments	Share data, jointly set up CSP and optional improve own monitoring	Joint development CSP and all agree to use it
Operational – actions, measures	Independent choice and deployment of measures	Share actions and measures and optional improve own measures and actions	Joint development, choose and deploy coordinated measures and actions
Tactical – approach, TM services, motivation	Independent development and choice of tactical approach	Share approach and motivation and possibly improve own approach and motivation	Joint development, choice and deployment of coordinated approach
Strategical – policy, priorities, objectives	Independent development and deploy of policy framework	Share policies and prios and possibly improve own policy and prios	Joint development and deployment of policies

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Cooperation Models Canvas

	No joint approach – exchange info	Exchange info - common insights	Joint approach – common insights – coordinated services
Situational	CM 1	CM 3	CM 5
Operational			
Tactical	CM 2	CM 4	CM 6
Strategical			

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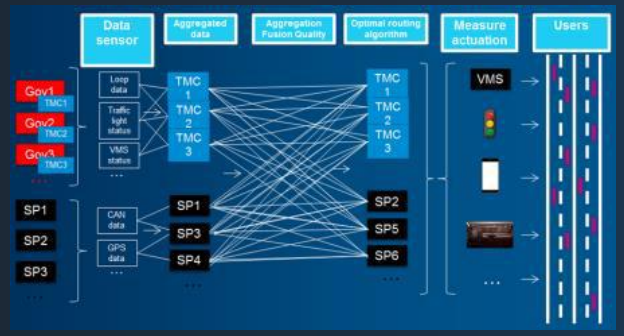
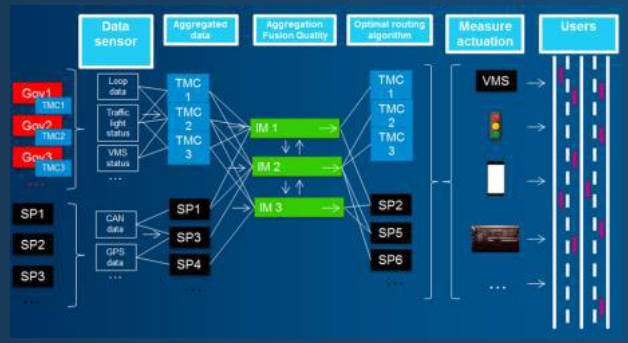
Cooperation Model

- The higher the number the more the complexity of the cooperation
- no “one size fits all” Cooperation Model. Depends on:
  - specific use case
  - legacy systems, exisiting organisation and governance
  - ambition
- different models require different data, intermediary services, agreements, business models etcetera.

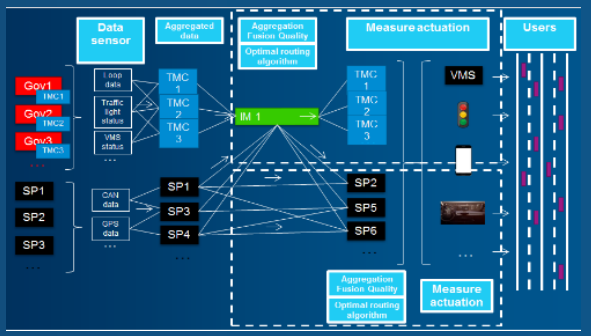
Intermediary Archetypes



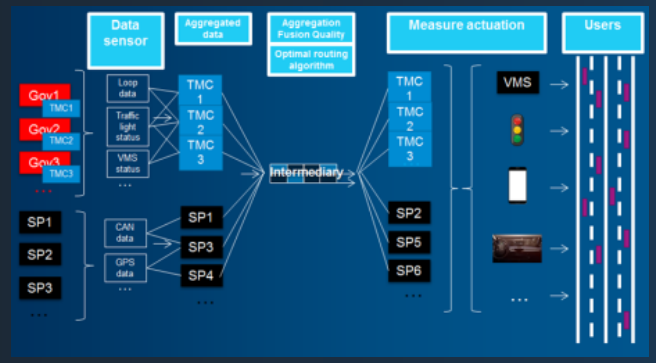
No intermediary



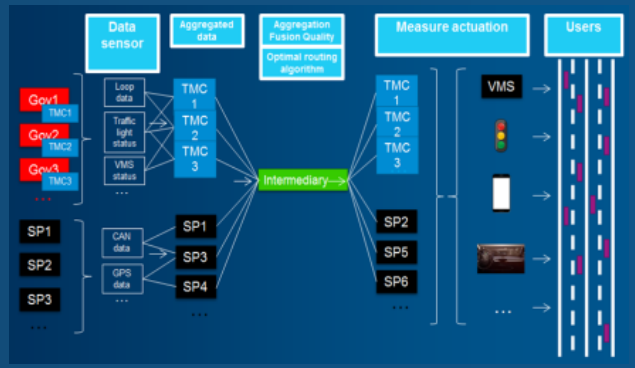
Multiple intermediaries P&P



1 intermediary for governments



1 Intermediary 'Trusted 3rd Party'



1 Intermediary Public

Roles, tasks/functions, actors

Per use case/coordination model

Data Strategy Activation Assessment

Who?

	Data								Strategy							Activation				End users	Evaluation / Assessment impact		
Non-operational function -->									common goals and mission. Desired state of the network	setup KPI for SR			tactical too box										
Operational functions -->	Socrates data archiving	historic data providing	actual data collection	data aggregation	data fusion	data completion	common current state of the network	common prediction state of the network			operationalization of strategic goals to measurable values, thresholds, boundaries, ..	common problem state of the network	Strategy identification	Strategy orchestrate / tactical tool box	distribution to all SP	implement SR in back office SP	implement SR in TMC (info to VMS)	add other actuators to assist SR	activate individual routes (and other measures)	individual road users and communities	feed back loop to improve current measure	impact measured	evaluation of effects
ROLE names -->	data archiver	data provider	data provider	data aggregator	network monitorer	network monitor	network monitor	network monitor	strategy table	strategy table	strategy configurator	network monitor	network manager	network manager	network manager	service provider	service provider	service provider	service provider		network monitor	kpi assessor	evaluator
Dutch Public Authority		yes	actual data, event data, road works, top 8 data		NDW for public data		available for A'dam south east						regional network vision Amsterdam		send out SR on tactical level (avoid route or stimulate route)		yes in all 3 TMCs	could include traffic light to influence traffic					
BMW			FCD (PVD?)	FCD?												yes	x		yes		quality check on data		
HERE	yes	yes	Yes		yes data integration and aggregation										yes	yes	x		yes in here we go				
TomTom		yes	yes volumes on the road, more than regular info														x		yes, incl parking				
Be-Mobile			OD data, FCD, Follow up data, parking	tbd	tbd	tbd	tbd	tbd		tbd	tbd	tbd	tbd	tbd	tbd		x		filtsmeister				
Technolution		technical enabler	technical enabler	technical enabler	technical enabler	technical enabler	technical enabler	technical enabler		technical enabler	technical enabler	technical enabler	technical enabler	technical enabler	technical enabler	x	technical enabler	technical enabler			technical enabler		
MAPtm					yes					TTP framework?							x				yes, performance impact		yes
Brand MKRS			social media data														x		pretrip, ontrip, posttrip, last mile service				yes

Public + Private

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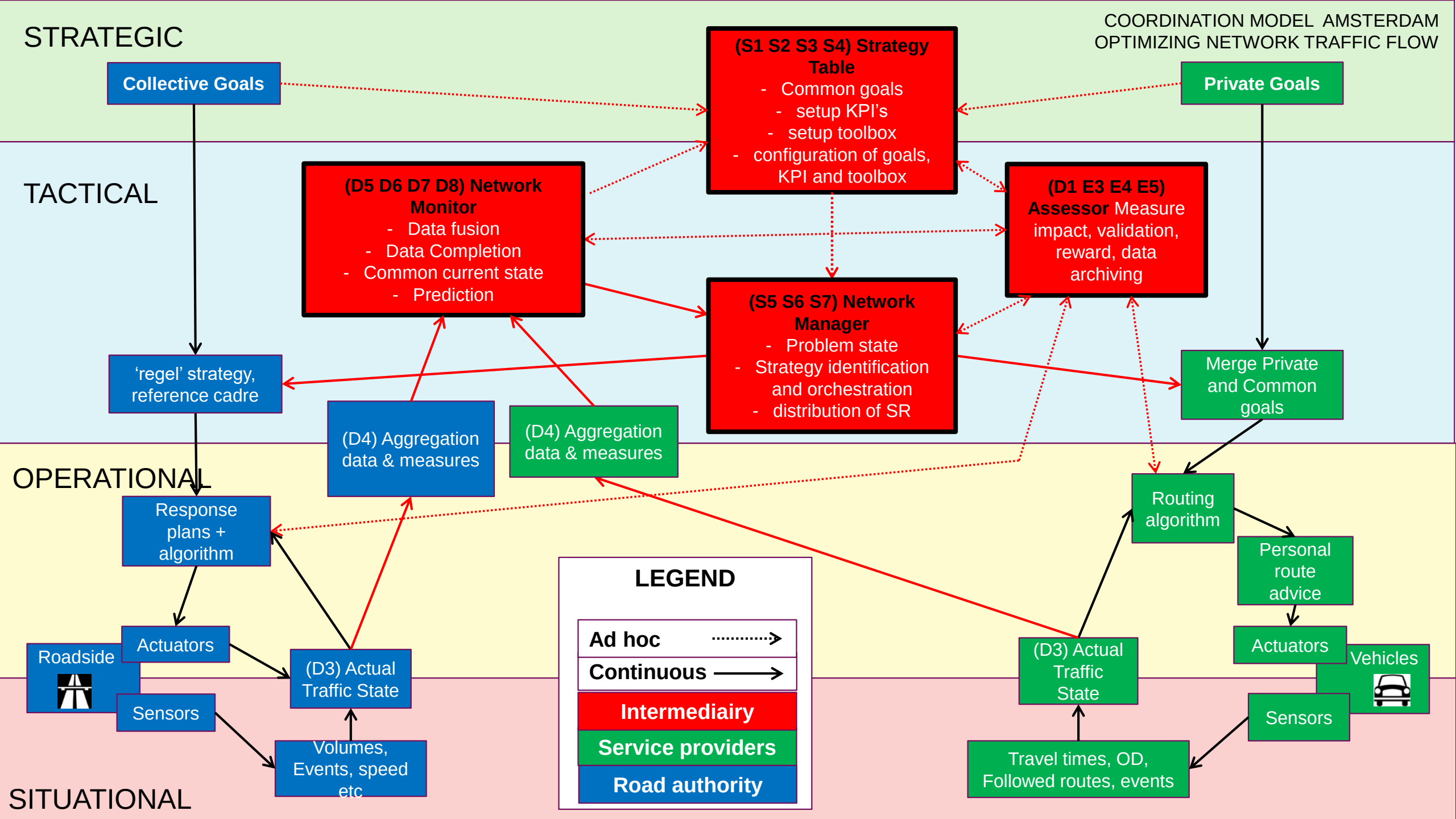
COORDINATION MODEL AMSTERDAM
OPTIMIZING NETWORK TRAFFIC FLOW
STRATEGIC
TACTICAL
OPERATIONAL
SITUATIONAL
Collective Goals
(S1 S2 S3 S4) Strategy Table
- Common goals
- setup KPI's
- setup toolbox
- configuration of goals, KPI and toolbox
Private Goals
(D5 D6 D7 D8) Network Monitor
- Data fusion
- Data Completion
- Common current state
- Prediction
(D1 E3 E4 E5) Assessor Measure impact, validation, reward, data archiving
(S5 S6 S7) Network Manager
- Problem state
- Strategy identification and orchestration
- distribution of SR
'regel' strategy, reference cadre
Merge Private and Common goals
(D4) Aggregation data & measures
(D4) Aggregation data & measures
Response plans + algorithm
Routing algorithm
Personal route advice
Actuators
Roadside
Sensors
(D3) Actual Traffic State
Volumes, Events, speed etc
(D3) Actual Traffic State
Actuators
Vehicles
Sensors
Travel times, OD, Followed routes, events
LEGEND
Ad hoc
Continuous
Intermediairy
Service providers
Road authority

Role – Strategy table

Functions / tasks

1. Identification of the problem / UC mission
2. Translate mission to pilot site
3. Identification of public and private goals
4. Alignment of public and private goals
5. Setup of KPI’s
6. Create/monitor reward system if applicaple
7. Setup toolbox with available services from all partners
8. Operationalisation of strategic goals in measurable KPI’s

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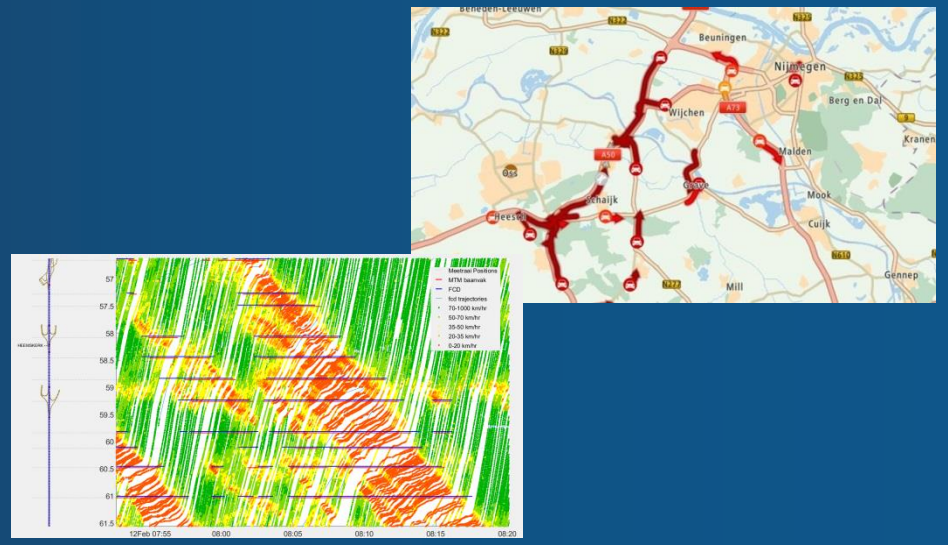
Role – Network monitor

Functions / tasks

1. Collection of (aggregated) data from partners (only data that we need)
2. Data fusion of specific data types
3. Respect partner limitations (legal issues, security etc)
4. Quality assessment
5. Data completion
6. Delivery of common current state
7. Delivery of prediction



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Role – Network manager

Functions / tasks

1. Configuration of network manager system
2. Create a current predicted problem state
3. Service identification based on available services (toolbox)
4. Harmonisation of services
5. Distribution of services requests to TMCs and SP
6. Improve service identification and harmonisation

Role – Assessor

Functions / tasks

1. Measure added value
2. Validation of impact using received data from partners
3. Added value and reward reports
4. Data archiving for assessment
5. (Data archiving for evaluation and for Assesment)

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Use Cases

Smart Routing	SR_01: Optimizing network traffic flow
	SR_02: Individual routing towards public event locations
Speed and Lane Advice	SLA_01: Maximum allowed speed
	SLA_02: Speed advice “Congestion ahead”
	SLA_03: Speed advice “Head of Congestion”
	SLA_04: Speed advice at Traffic Lights
	SLA_05: Speed advice at shockwaves
	SLA_06: Lane information
	SLA_07: Lane advice at short on- and off-ramps
	SLA_08: Lane advice at Traffic Lights
Local information and hazardous warning	LIHW_01: Road Works Warning
	LIHW_02: Road condition warning
	LIHW_03: Emergency Service protection
	LIHW_04: Enviromental/Areal information and constraints

- From many ideas towards 14 elaborated use cases
- Selection down to 5 based on preferences per partner + pilot site

Overview UC – PS – CM

		PS Amsterdam	PS Copenhagen	PS Munich	PS Antwerp
SR_01	Optimising network traffic flow	CM6	CM3		CM1 + CM4
SR_02	Smart Destination	CM3 / CM6	CM3	CM2	
SLA_06	Lane information				
LIHW_01	Road works	CM3		CM3	CM3
LIHW_04	Environmental / areal info	CM1	CM3		

Functional design

1. **Context & Mission of PS-UC**
2. **Existing services for PS-UC**
3. **Socrates services for PS-UC**

1.1 Local context

- Geographical scope: Munich region, but not the city
- Relevant network: Major road network
- Specifics:
  - Allianz Arena (Soccer Stadium)
  - Trade Fair Area
  - massive construction works on the A99 ring for the next years

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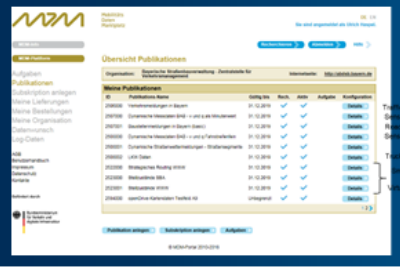
1.3 Available data via MDM



- Smart Destinations and „Virtual Traffic Control"
- Truck Parking Information
- Traffic Information (congestion, accidents etc.)
- Road Works Information
- Sensor data

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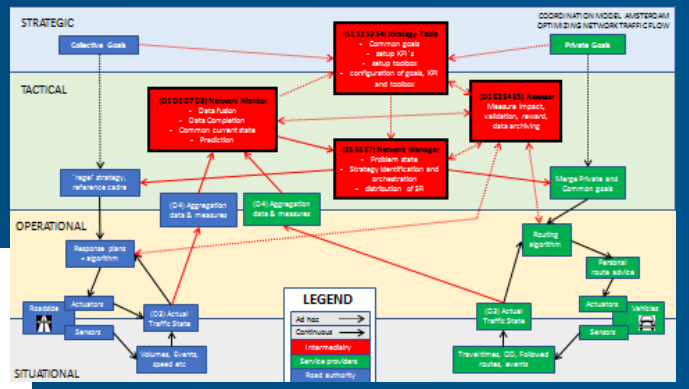
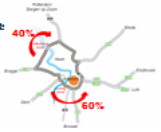


Problem statement

Main problem: Sub-optimal distribution of traffic over 2 river crossings (caused by tolling costs).
[Users/services do not (enough) follow advices from RA; routing services do not consider dynamic tolling costs]



How should it look like after implementation? → Better distribution of traffic over 2 river crossings.
How to evaluate successful implementation? → Measure traffic intensities before and after implementation.
What measures will improve the situation? → Advice travellers to switch routes, ...

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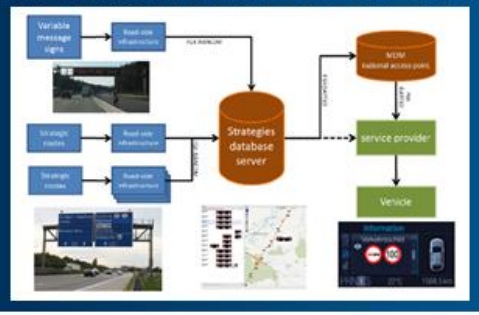
System architecture of the SDBS



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Cooperation Model – CM1

Cooperation Model:

	No joint approach – exchange info	Exchange info – common insights	Coordinated approach
Situational	x		
Operational	x		
Tactical			
Strategic			

- Situational level: some SP's take into account open data from RA (mainly incidents, accidents, events, ...)
- Operational level: RA informs SP on suspension of toll, ...
- Strategic & tactical level: RA's have collective goals (optimize network traffic flow), SP's have private & individual goals (best routes for individuals)

What's in it for
- RA: better distribution of traffic (optimized network traffic flow) in case of toll suspension.
- SP: More informative service.
- Users: Improved information → improved travel choices.

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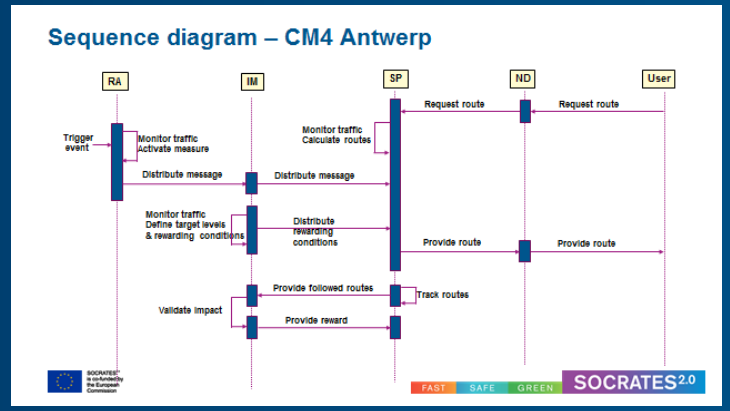
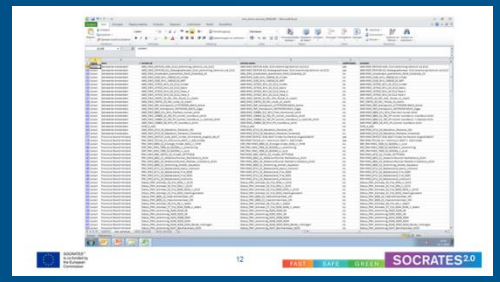
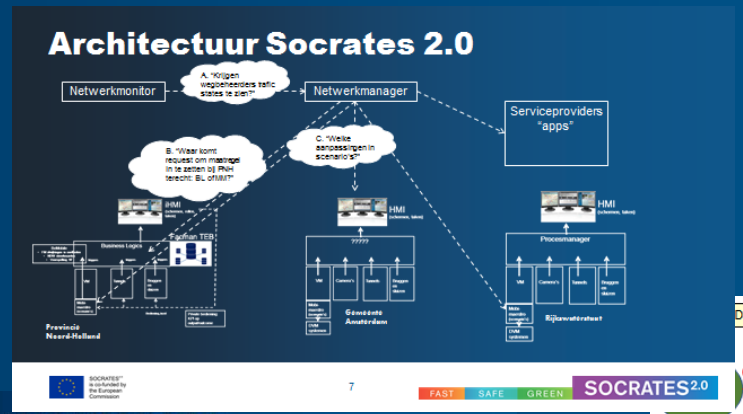
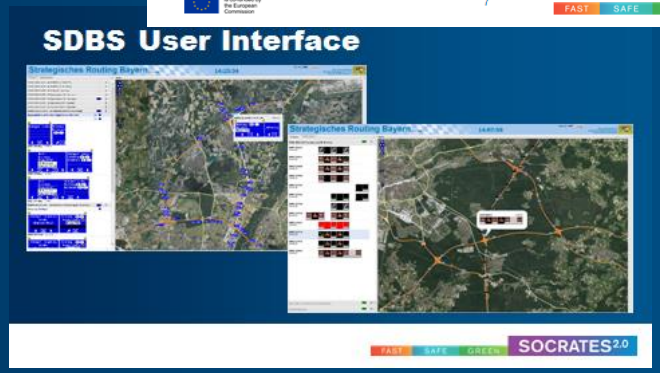
Technical design

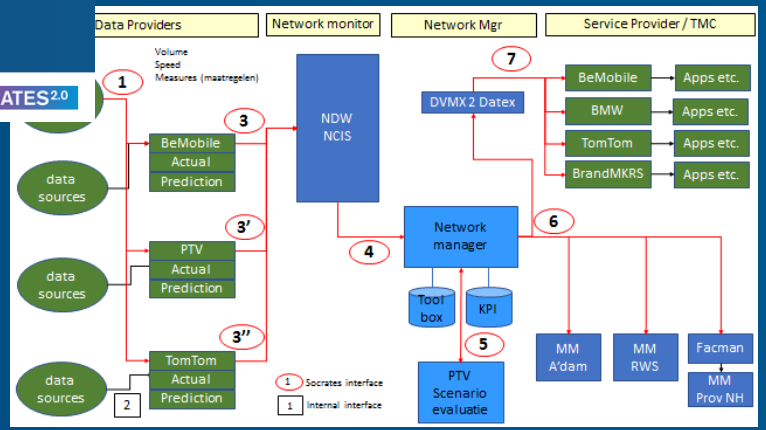
- Users stories
- Sequence diagrams
- Interface descriptions
- Information architechture
- Application architecture
- Technical architecture
- Transition plan

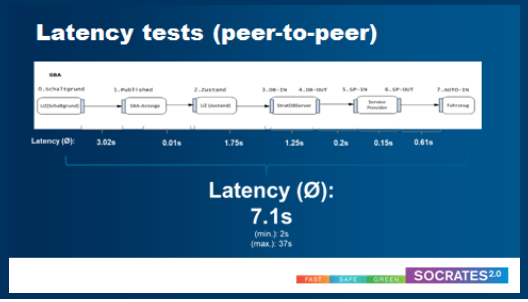












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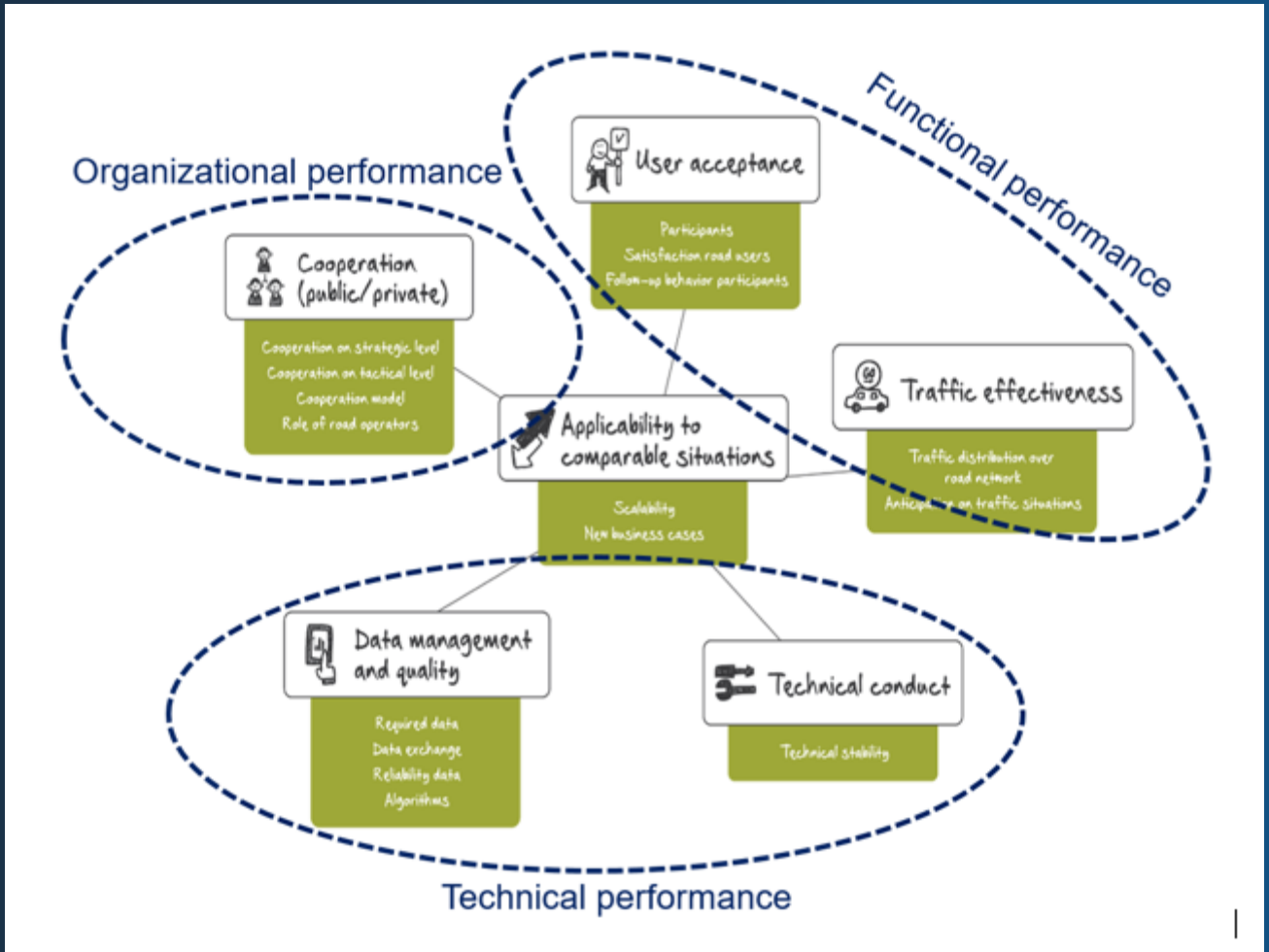
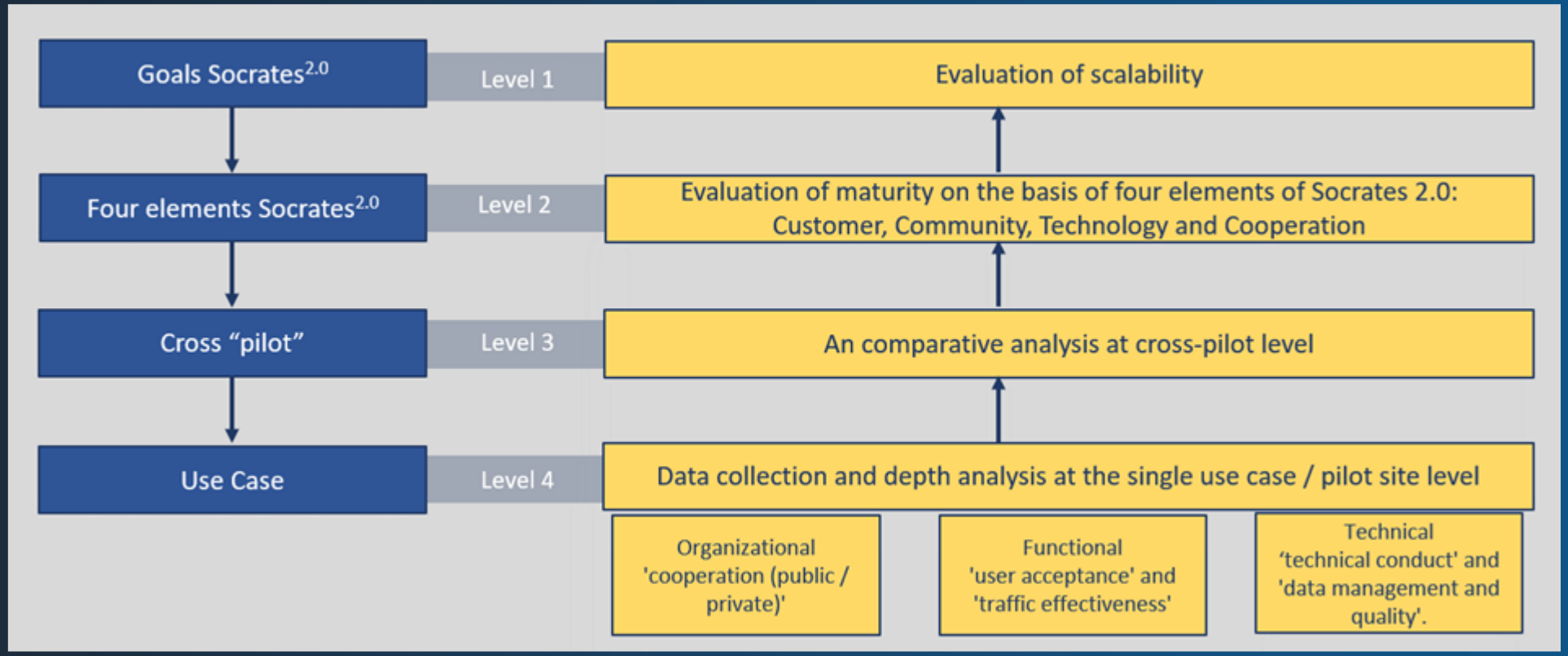
Timeline Amsterdam:

UC	End Stage 2	End Integration	Pilot
ONTF	01-07-2019	15-09-2019	16-09-2019 – 28-06-2020 (2 plateau's)
SD	30-09-2019	31-10-2019	01-11-2019 – 31-07-2020
RW	01-08-2019	01-09-2019	02-09-2019 – 28-06-2020
EZ	01-08-2020	01-09-2019	02-09-2019 – 28-06-2020

Evaluation topics



Levels of Evaluation



To conclude

Development of common cooperation framework based on:

- **Shared vision (customer, community, technology, cooperation)**
- **6 cooperation models (simple to complex)**
- **4 intermediary roles**

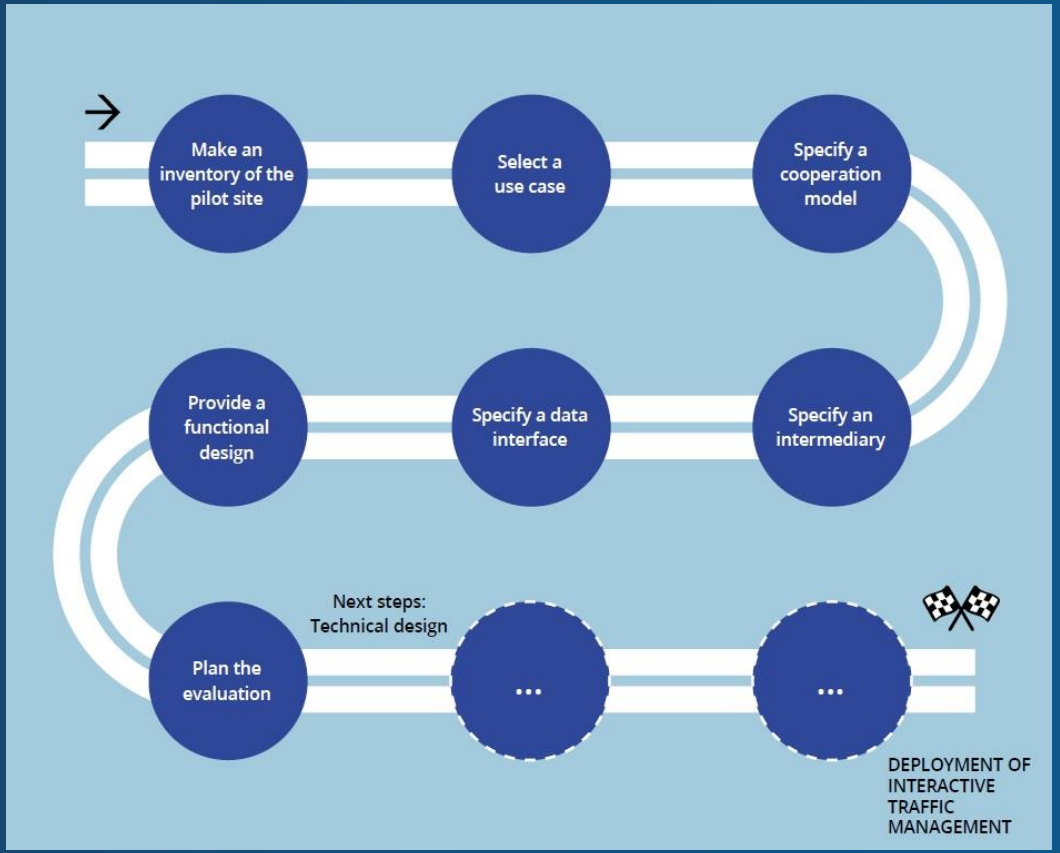
To conclude

Socrates cooperation framework testing:

- **Deployability**
- **Applicability (different use cases)**
- **Benificiality / cost effectiveness**
- **Scalability**

Setting the stage for interactive traffic management

- Replication (other cities, use cases)
- Consolidation (C-roads, TM2.0 a.o.)
- Development of a guideline



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Vragen?

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