



Wider applicability of SOCRATES2.0 results

TM2.0 Task Force report

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*This is the final report from the TM2.0 Task Force 25 “Wider applicability of SOCRATES2.0 results”, launched in April 2021. **Familiarity with TM2.0 concepts is assumed. For detailed understanding, familiarity with SOCRATES2.0 concepts is recommended (socrates2.org – see especially the “Consolidation Report”).***

Purpose of the Task Force

SOCRATES^{2.0} (2017-2021) was a significant European research & development project with the aim of putting TM2.0 ideas into practice. It had public and private sector partners and conducted pilots in 4 countries, and its overall budget was several million Euros. As the most significant TM2.0-based project to date, SOCRATES^{2.0} must have generated significant knowledge on realising the TM2.0 concept. The TM2.0 Steering Body agreed a need for a Task Force (TF) to assess wider applicability of the SOCRATES^{2.0} approach: **whether elements from SOCRATES^{2.0} could be applied in other places to support improved traffic management through public/private cooperation.**

Method

The Task Force began by considering how the defined “vision” of the SOCRATES^{2.0} project compared to known visions in the countries of the TF participants. In just one country it was considered that the current vision of traffic management authorities was too distant from the SOCRATES^{2.0} vision to find applicability at this time, but for others there was thought to be possibility of sufficient alignment of vision for applicability of SOCRATES^{2.0} elements to be further explored. For England as an example, the defined SOCRATES^{2.0} vision was compared with Highways England’s customer strategy. Similarity was found, for example:

Highways England customer strategy	SOCRATES ^{2.0} vision
“Help our customers to have control of their journeys”	“CEO of my journey”
“supporting journeys”	“supporting individuals”
“sharing information [with service providers]”	“Cooperation” [public/private]

With sufficient alignment of vision to justify further exploration, the Task Force considered how to do that. The TF membership was intentionally composed both of participants from SOCRATES^{2.0} and also participants who had no part in that project, to ensure we had sufficient knowledge and understanding of the project but also the possibility to apply fresh viewpoints without bias.

However, counting the members actively contributing, there were only 4 SOCRATES^{2.0} members and 4 non-SOCRATES^{2.0} members: not enough to sufficiently judge wider applicability without further input. The TF therefore decided to conduct a set of interviews with external stakeholders.

When considering the private sector service providers active in the wider set of countries, those are typically the same companies who had participated in SOCRATES^{2.0}, so we assumed that conducting further interviews with those service providers would not give significant value to add to their project contributions. The TF therefore focussed on interviews with public authorities.

Interview design

The TF agreed that the focus of each interview should be the SOCRATES^{2.0} “cooperation models”: patterns of cooperative interaction between public and private sector actors. These are general models which could be used for a wider set of use cases than those trialled in the project pilots. Some of the cooperation models involve what the project called “intermediary” roles, so assessing the applicability of these models included assessing the applicability of the intermediary roles.

The interviews were designed to take around 90 minutes, with completion possible in 60 minutes if necessary. The TF agreed that each conversation should be tailored according to the context, potentially selecting the most relevant and useful questions from the set, rather than being obliged to answer every question. The interview included initial topics to prepare for the main discussion on cooperation models.

The set of topics for selection and tailoring was as follows:

1. Starting level of awareness and knowledge of the SOCRATES^{2.0} approach.
2. Goals, progress and plans on public/private cooperation for traffic management
3. Alignment with the SOCRATES^{2.0} vision – in the areas Customer, Community, Technology, Cooperation.
4. Cooperation models – Exchanged Data, Shared View, Coordinated Approach – including exploration of how each intermediary role could work.
5. Interest in potential follow-up, such as a half-day workshop with interested peers.

The time-limited interviews could not fully reflect the full SOCRATES^{2.0} approach which first understands the traffic management use cases to be solved and then chooses the appropriate cooperation model, but the potential use cases could be briefly mentioned and envisaged by the participants to enable discussion on the cooperation models.

Interview findings

Levels of interest

The TF members had contrasting experiences in seeking interviews. In UK 5 interviews were held, after 6 direct requests. In other countries combined, a total of 4 interviews were held, even after extending the TF beyond its original planned duration to attempt to gain further results.

Most of those interviewed had some prior awareness of SOCRATES^{2.0} but little knowledge of the cooperation models.

All interviewees, even the most critical of some of the advanced cooperation patterns, were interested in the prospect of further future discussion on the topics. Despite high proportion of interest in a follow-up workshop amongst those interviewed, the TF chose not to hold this workshop due primarily to the relative lack of non-UK participants.

Vision

All interviewees saw some alignment with the SOCRATES^{2.0} vision, at least with some aspects.

Cooperation models

The nine interviewees made many fascinating observations, which can be seen in the appendix to this report. The following three sections contain the points raised in 2 or more of the interviews.

“Data exchange” cooperation model

This is about public/private data exchange, supported by agreed data standards.

All reported that some public/private data exchange is happening already or has happened already.

- Many want to increase their amount of public/private data exchange.
- Some are not yet using private sector data operationally due to lack of information on the meaning and derivation of the data.
- Private sector data is wanted for new use cases.
- Google is important as a source of data but may not engage in Socrates-like cooperation.
- Reduction in measurement & control infrastructure is a desired trend but may not happen for some time.

“Shared view” cooperation model

The shared view model includes the “Network Monitor” intermediary role, which provides the single shared view of the network from data supplied by public and private sector organisations.

- The idea of a Network Monitor intermediary seems more accepted in the Netherlands and Germany, where NDW and even MDM may already be a natural fit, than in countries where there is no similar national service.
- The majority believe that any Network Monitor should be national to make it practical for service providers to participate.
 - There was a difference of views between national and local authorities. The central government authority interviewed considers their role is only to set standards, for regions to adopt at their own pace.
 - There are some doubts on funding/commercial viability.
 - Socrates2.0 showed that the Network Monitor could not be any existing private sector data provider because that could prevent participation of other private sector providers. The Network Monitor should be neutral and trusted, with no interests in commercial data provision – which implies it must be public-funded.
- Some would like service provider feedback on the public authority’s data.
- Some trust issues remain – (UK) public authorities are not yet fully convinced.

“Coordinated approach” cooperation model

The coordinated approach model also includes the “Strategy Table” which provides the strategy definitions agreed by public and private organisations, the “Network Manager” which requests network management actions when it detects that strategies should be triggered, and the “Assessor” which evaluates performance and assigns reward.

- Most public authorities would be interested in pursuing a joint strategy table with service providers
 - However, some say this is conditional on their seeing a chance of uptake of actions by service providers, which is doubted.

- There was a range of opinions on the idea of incentives & commercial rewards: from being optimistic that these could work, or at least that some types of incentives could work, to being sure that this approach will not work.
- On an intermediary network manager: some cannot envisage or find it difficult to envisage this, or can envisage it only for limited aspects such as social media dissemination.
- Some see a challenge in funding the coordinated approach, maybe even an impossible one.
- On an independent assessor: doubts were expressed, though potential value was also expressed. Some say the intermediary roles should be precisely defined services, mostly IT services, then independence is not important.

Conclusion

In the population of road authorities interviewed, there is no single common view about the wider applicability of the SOCRATES^{2.0} approaches.

SOCRATES2.0 has helped stimulate interest in public/private cooperation for traffic management. Whether or not a particular country, region or locality could successfully apply all the new constructs designed by SOCRATES2.0, the project has at the least provided a useful structure, terminology and conceptual designs to use in continuing dialogue on public/private cooperation for traffic management.

To enable and maximise future uptake of public/private cooperation for traffic management, the results of this TF suggest that:

- Private sector data providers should consider whether they can do more to mitigate the stated concerns of road authorities to increase trust in their data.
- Stakeholders should analyse, improve, and promote technical specifications for traffic management IT services. SOCRATES2.0 practical experience is now feeding into improvement of DATEX II specifications in the NAPCORE project in 2022, which should help many cooperation cases.

Appendix – Anonymised interview records

The following are summary transcripts by the interviewers.

Interview 1 on behalf of a regional cooperation of authorities

1a. What is your level of awareness and knowledge of the approach of SOCRATES2.0 project to interactive traffic management?

Limited awareness and knowledge of project. Familiar with basic principles.

2a. Goals, progress and plans on public/private cooperation for traffic management

Current political goals for traffic management are shifting from a solely car focus towards a more multimodal focus.

Multiple public and private partners are involved in [a proof of concept project]. Main questions are: how can we improve maintenance and how can effects be monitored? Must lead to a higher cost-effectiveness. National upscaling is needed to include service providers.

2b. How far do you think you can go in this area?

More cooperation with service providers and reach out to costumers would be our next step.

3. Vision: Pick one or more of the 4 pillars and/or their connections with adjacent pillars. How does that align with your own strategy (present and/or future) for traffic management?

Cooperation is most aligned with our current strategy. Previously technology was our focus and now it works, now we focus on cooperation with private partners as a bridge to reach out the community and customers.

4. Cooperation models

Exchanged Data cooperation model

4a. Further benefits experienced

An important process is the 'digitalisation of governments'. This is about digitalisation and publication of public data. We have active data teams working in this. Examples of data types are: volumes, speeds, travel times, bicycle flows, sharing response plans, road works, ...

4b. Further key findings or challenges, experienced or envisaged

Data exchange protocols must be the same on at least national level.

Shared View cooperation model

4c. At what level of scope (e.g. aligned to your organisation's scope or more specific or more general than that? National?) do you think a common Network Monitor service could support effective public/private cooperation on traffic management data?

A Network Monitor would benefit us, mainly because we would like to incorporate and fuse other data sources. The Network Monitor must be trusted to keep the market open for new data providers. NDW is a natural partner for this.

4d. Can you envisage using an intermediary's shared view of the network, in place of your own private internal view, in your traffic management operations? Please elaborate. What benefits can you envisage?

Yes

4e. Further opinions on the potential challenges

Cost-effectiveness ratio

Coordinated Approach cooperation model

4f. Can you envisage participating in a joint Strategy Table with service providers? What benefits can you envisage?

I like this idea and we want to gain more experiences on this. A pilot project could be interesting to explore the added value. Possible use case is to prevent cut-through traffic.

4g. Can you envisage integrating with a Network Manager intermediary role and potentially implement (or consider implementing) its service requests that are based on the shared network view and agreements of the Strategy Table? What benefits can you envisage?

I see potential benefits for our regional cooperation on traffic management. We should expand this with the service providers. I believe that the Network Manager technology developed in Socrates (e.g. digitalisation of response plans) can help us reach the next level regarding the executing of response plans, services and measures.

4h. Due to historic roles, a road network authority may naturally envisage performing the Network Manager and Strategy Table roles, but can you also envisage another party leading these services? Please elaborate on the consequences.

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4i. Have you any thoughts on how an Assessor role could retain at least some independence from the other public and private participants? Please elaborate.

Monitoring and evaluation are important aspects.

4j Please share any further opinions on the potential challenges of this ambitious "coordinated approach".

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5. Would you be interested in participating in a European online workshop of perhaps half a day, in which these topics are further explored?

Yes

Interview 2 on behalf of a large conurbation

1a. What is your level of awareness and knowledge of the approach of SOCRATES2.0 project to interactive traffic management?

Was not aware of SOCRATES2.0 until this interview was arranged, then used the website to gain a basic familiarity in advance of the interview.

2a. Goals, progress and plans on public/private cooperation for traffic management

Have explored using private sector data in operations, through studies of consultants. The main issues preventing use are the lack of information on the meaning and derivation of the data – especially for network status, speed and journey time data.

Currently provide authority data as open data, with thousands of subscriptions, which includes at least some service providers. There may be more consuming indirectly through open republications that exist.

2b. How far do you think you can go in this area?

Not yet clear. Progress seems inevitable but some aspects would need a national approach.

Would like to remove need for infrastructure such as ANPR systems, but there is a concern on ongoing revenue costs of private sector provision. Would be keen to find a way to influence in-vehicle service provision.

3. Vision: Pick one or more of the 4 pillars and/or their connections with adjacent pillars. How does that align with your own strategy (present and/or future) for traffic management?

“Data-driven” is appropriate.

The ability to *influence* mobility habits to meet public policy goals is important.

4. Cooperation models

Exchanged Data cooperation model

4a. Further benefits experienced

4b. Further key findings or challenges, experienced or envisaged

Described at #2.

The authority does not consume private sector data operationally yet due to the issues mentioned.

Would want better information on confidence and quality of the data, which could be through having explicit data on derivation. For example service providers publish speed, travel time and status on very low flow roads at night time – how do they know these roads are open?

Shared View cooperation model

4c. At what level of scope (e.g. aligned to your organisation’s scope or more specific or more general than that? National?) do you think a common Network Monitor service could support effective public/private cooperation on traffic management data?

It would need a national approach due to scaling issues. It is assumed that service providers will not want to adapt to dozens of different network monitors.

(This authority originally waited for national guidance on how to publish open data on traffic, but when none was forthcoming it developed its own and has published since 2014. With no national guidance, there are different approaches across the country.)

4d. Can you envisage using an intermediary's shared view of the network, in place of your own private internal view, in your traffic management operations? Please elaborate. What benefits can you envisage?

The idea has some merit for some kinds of data – being able to establish a shared and agreed source of the truth rather than slightly different data from different sources. It could work well for the use cases trialled in SOCRATES2.0 - roadworks, safety and alerts – but it will be harder for network performance, journey time and congestion due to lack of certainty on the derivation of data and therefore its confidence and quality.

This authority doesn't envisage it totally replacing their network view, due for example to a need to monitor and report on specific policy, but can envisage it becoming the established source of the truth for certain defined aspects.

4e. Further opinions on the potential challenges

Consistency across locations and participants – which will need funding.

Coordinated Approach cooperation model

4f. Can you envisage participating in a joint Strategy Table with service providers? What benefits can you envisage?

Yes, happy to participate as long as service providers are willing to participate in adopting win/win/win strategies. An example is when the local major league football team plays at home: a few minutes before the end of the match, the road looks clear and the alternative may look worse. But the authority knows that it is about to go congested and needs the in-vehicle services to recommend the alternative road. This does not appear to happen to the extent the authority wants, so there would be scope to agree defined approaches for the Strategy Table. (This is similar to the tunnel scenario of SOCRATES2.0.)

4g. Can you envisage integrating with a Network Manager intermediary role and potentially implement (or consider implementing) its service requests that are based on the shared network view and agreements of the Strategy Table? What benefits can you envisage?

4h. Due to historic roles, a road network authority may naturally envisage performing the Network Manager and Strategy Table roles, but can you also envisage another party leading these services? Please elaborate on the consequences.

The authority cannot relinquish its responsibilities for aspects such as traffic signal control, but could imagine an intermediary taking control of limited defined aspects such as social media dissemination.

It could be that this independent intermediary becomes better trusted as a source of truth by the travellers than any individual actor is at present, leading to better uptake and better response to guidance.

4i. Have you any thoughts on how an Assessor role could retain at least some independence from the other public and private participants? Please elaborate.

An independent assessment of what really happened could be valuable. This authority would be happy to relinquish the responsibility for evaluation of impact of actions because it's time consuming. If the assessment approach could be well-defined and scrutinised up-front, then it could be trusted to run. However, if the assessment still required significant ad-hoc labour effort then it would be better value to keep in-house in the authority where there are already skills, rather than procuring a consultant's service.

4j Please share any further opinions on the potential challenges of this ambitious "coordinated approach".

Funding is a challenge of course.

Scaling will be challenge – unlike the Network Monitor which could be national, the strategy agreement needs to be on a local level. So while this authority would participate, it is doubted whether the service providers would participate except for the largest networks.

5. Would you be interested in participating in a European online workshop of perhaps half a day, in which these topics are further explored?

Possibly, and it is more likely if the national central government authority was also to participate.

Interview 3 on behalf of a major city and metropolitan region

1a. What is your level of awareness and knowledge of the approach of SOCRATES2.0 project to interactive traffic management?

Have watched youtube videos to gain a basic familiarity in advance of the interview.

2a. Goals, progress and plans on public/private cooperation for traffic management

Private sector has valuable data that is of interest. Have explored directly or indirectly using Google, Waze, TrafficMaster, Inrix, O2, Ford, Here, at least.

Fees for this data is an issue – and in particular the lack of certainty on ongoing revenue costs over a significant time period. Most of the suppliers are still feeling their way on what they can charge for this data.

Most of these explorations have not led to ongoing usage. Some data is used at least for analysis.

Next it is planned to consider making better use of Waze data.

Another aspiration is to use mobility data to better understand reasons for travel and how sustainable and active travel can be promoted.

Better air quality data is desired.

In the other direction, an open data portal is available but is not known to be used by in-vehicle service providers.

[As can be seen from discussions under Q4, there is also interest in collaboration beyond data exchange.]

2b. How far do you think you can go in this area?

Some measurement infrastructure can be replaced by 3rd party data, and that trend would continue if the challenges on data can be resolved – ongoing costs and also the ability to get data that is as raw as possible rather than processed/analysed/aggregated data which may not be trusted.

3. Vision: Pick one or more of the 4 pillars and/or their connections with adjacent pillars. How does that align with your own strategy (present and/or future) for traffic management?

Thoughts at the vision level:

What people really want is important – we shouldn't just be led by what's available.

We should be inclusive to all travellers regardless of their technology capability.

4. Cooperation models

Exchanged Data cooperation model

4a. Further benefits experienced

4b. Further key findings or challenges, experienced or envisaged

Described at #2.

Roadworks is an instructive example: the authority has data on permits, but that is not the same as the real on-street situation – yet it is sometimes interpreted as representing the real situation by

uninformed data users. This shows the importance of establishing the meaning, and understanding whether the data has the required quality for the selected use case.

Clearly explaining the meaning is important in both directions. The authority has to explain a lot to avoid misuse of their data for the wrong use cases.

Shared View cooperation model

4c. At what level of scope (e.g. aligned to your organisation's scope or more specific or more general than that? National?) do you think a common Network Monitor service could support effective public/private cooperation on traffic management data?

Should be national.

4d. Can you envisage using an intermediary's shared view of the network, in place of your own private internal view, in your traffic management operations? Please elaborate. What benefits can you envisage?

Depends on trust.

It's a good concept but getting the details right is expected to be difficult.

4e. Further opinions on the potential challenges

It will be a challenge to keep it cost-effective.

For ongoing operational services over time, as opposed to short limited pilots, effort is needed to maintain an accurate road network definition - it can't just be assumed to be a fixed structure – so the approach to a changing network needs to be defined.

Coordinated Approach cooperation model

4f. Can you envisage participating in a joint Strategy Table with service providers? What benefits can you envisage?

It's a good idea. Each participant can influence the network in different ways.

It could be very useful to consider the use cases and agree the specific strategies to meet them to provide benefits.

It should give a well understood open environment for traffic management.

It needs a lot of work in detail!

There could be conflicting objectives e.g. authority aiming to reduce private car travel and some private sector wishing to increase it.

4g. Can you envisage integrating with a Network Manager intermediary role and potentially implement (or consider implementing) its service requests that are based on the shared network view and agreements of the Strategy Table? What benefits can you envisage?

4h. Due to historic roles, a road network authority may naturally envisage performing the Network Manager and Strategy Table roles, but can you also envisage another party leading these services? Please elaborate on the consequences.

Having enough trust in an intermediary Network manager will be a challenge.

It might turn out almost impossible, but the authority is not unwilling to try.

4i. Have you any thoughts on how an Assessor role could retain at least some independence from the other public and private participants? Please elaborate.

The interview discussed related arrangements such as having a national independent arbiter or watchdog which is done to regulate other sectors. For traffic management the path is not obvious. It should be easier for a restricted scope.

Wider interconnected impacts of interventions on the transport network (e.g. secondary effects, effects on the specific day, the lack of isolation of actions) make benefit assessment harder.

4j Please share any further opinions on the potential challenges of this ambitious “coordinated approach”.

Aspects of the coordinated approach may also be useful in public/public cooperation e.g. between highway and city traffic managers.

We might not move to the “coordinated approach” straight away, but rather by building up through the other collaboration models, and adopting parts of coordinated approach at a time.

5. Would you be interested in participating in a European online workshop of perhaps half a day, in which these topics are further explored?

Yes.

Interview 4 on behalf of a national highway operator

1a. What is your level of awareness and knowledge of the approach of SOCRATES2.0 project to interactive traffic management?

Was not familiar.

2a. Goals, progress and plans on public/private cooperation for traffic management

Has just published a major work of digital strategy. Sees the organisation as a provider of information which will be used by private sector to provide services. Public/private cooperation is intrinsic in the digital vision. A 4-month study is about to start to further explore how best to support this. A need that is yet to be fully answered is how to formalise relationships with private sector – it is recognised that a clearer plan is needed for that.

It will be difficult because there is no obligation on 3rd parties to cooperate.

Google is important but may not want to engage.

The public sector information needs to be sufficiently high quality that the private sector, even Google, will want to cooperate.

Measuring success of such initiatives will be difficult. The organisation is considering how to measure success for each service it plans. (This brings in secondary issues like communications network coverage to reach enough motorists.)

2b. How far do you think you can go in this area?

We don't know how successful the public/private collaboration will be, so we're not certain how far we will get, but certainly reduction of measurement and control infrastructure is the expected trend. It will a long time before the whole vehicle fleet is sufficiently equipped so the traditional infrastructure will be used for a long time.

3. Vision: Pick one or more of the 4 pillars and/or their connections with adjacent pillars. How does that align with your own strategy (present and/or future) for traffic management?

At a high level the vision seems well aligned to this organisation's vision.

Customer – customers don't care about national/local boundaries, so the services need to scale and operate smoothly across these.

Community – this area is more uncertain due to the pandemic.

4. Cooperation models

Exchanged Data cooperation model

4a. Further benefits experienced

4b. Further key findings or challenges, experienced or envisaged

The organisation publishes data for private sector parties to freely consume, and as part of that service it consumes at least one source of private sector data.

The interviewee wonders whether his organisation has paid enough attention to success of this publication – whether it has looked enough at the uptake of its publications by service providers and

the impact this has on information reaching vehicles, and whether it has looked enough at guaranteeing the service levels that would support all worthwhile private sector services. There was recent experience of concern about the organisation's data services not being of high enough quality to support a specific 3rd party service that relied on the data.

The organisation's consumption of private sector data seemed to be as a commodity within a larger service contract, for a contractor to organise, so there is little specific experience about consumption of private sector data.

[Not discussed in this interview, but the organisation also participates in the Data for Road Safety Task Force.]

Shared View cooperation model

4c. At what level of scope (e.g. aligned to your organisation's scope or more specific or more general than that? National?) do you think a common Network Monitor service could support effective public/private cooperation on traffic management data?

Should be national, because consumers would need local + highway data from one source.

Google may want to be a single source.

"OneNetwork" has had some success in establishing themselves as a single source for roadworks.

The current information service for this organisation has some similarity with "Shared view" because a private sector company fuses data from the public organisation with its own commercial private data and the result is provided as a service of the public organisation. *[This is funded directly by the public organisation.]*

4d. Can you envisage using an intermediary's shared view of the network, in place of your own private internal view, in your traffic management operations? Please elaborate. What benefits can you envisage?

Probably not!

i.e. It doesn't seem likely that an intermediary's shared view of the network will be established with enough trust for that to become the main view used operationally by this organisation.

4e. Further opinions on the potential challenges

The challenges mentioned so far are the main ones.

Coordinated Approach cooperation model

4f. Can you envisage participating in a joint Strategy Table with service providers? What benefits can you envisage?

It would make sense *if* there was a chance of uptake of strategies by service providers.

But that is something doubtful.

There may be a need for legislation?

Can incentives & commercial rewards really work? It is foreseen to be very difficult for this organisation to get involved with that.

It might have been easier to adopt this structured approach to cooperation 20 years ago – it will be harder now that service providers are mature and established.

At least there would value in a conversation about how the Shared View could be used and what impact it could have on operations.

4g. Can you envisage integrating with a Network Manager intermediary role and potentially implement (or consider implementing) its service requests that are based on the shared network view and agreements of the Strategy Table? What benefits can you envisage?

4h. Due to historic roles, a road network authority may naturally envisage performing the Network Manager and Strategy Table roles, but can you also envisage another party leading these services? Please elaborate on the consequences.

Cannot envisage an intermediary Network Manager – network management for this organisation's network has to be by this organisation. *[Post-meeting note – NM is only a name though; the SOCRATES NM only requests what the public sector has already defined should be done].*

We do need just 1 place for data though.

4i. Have you any thoughts on how an Assessor role could retain at least some independence from the other public and private participants? Please elaborate.

It is hard to envisage independence – a public sector body might be seen as on the side of the public sector traffic manager, whereas a private sector company may have commercial bias on one hand or bias towards a public sector funder on the other hand.

4j Please share any further opinions on the potential challenges of this ambitious “coordinated approach”.

It feels like we are still decades away from this happening on a large scale.

There could be first steps made.

Service providers want to distinguish their offerings and it is doubted whether they want to participate – without funding that would have to come from the public sector – and that will be a major challenge to achieve.

5. Would you be interested in participating in a European online workshop of perhaps half a day, in which these topics are further explored?

Yes.

Interview 5 on behalf of a notably innovative local authority

1a. What is your level of awareness and knowledge of the approach of SOCRATES2.0 project to interactive traffic management?

Was aware and had been following in the early part of the project, so was aware of the ambitions, but hadn't had time to look at results.

2a. Goals, progress and plans on public/private cooperation for traffic management

Want to use more data that has been derived from vehicles, for traffic management, and even to influence road layouts.

Need to understand more about the vehicles on the network e.g. freight movements.

Interest in multiple modes including newer mobility modes.

Have been involved with several research projects on these topics, working with a vehicle manufacturer for example, and researching in-vehicle signage.

Currently obtain real-time traffic data directly from one in-vehicle services provider, and indirectly from another via a consolidated service.

2b. How far do you think you can go in this area?

Not on a trend towards complete replacement – or at least not for 10 years. Things may change as CAV proportions increase. For the time being our own sensors (camera-based for example) remain essential. For the next 5 years there is work to be done on calibration and validation of data to ensure it is fit for purpose.

3. Vision: Pick one or more of the 4 pillars and/or their connections with adjacent pillars. How does that align with your own strategy (present and/or future) for traffic management?

Customer – agree it is good for traveller to see the potential impact of their travel, and to see options e.g. quick-but-high-carbon vs slow-but-low-carbon.

Across modes things are still quite disjointed, this authority wants to improve that.

Authority needs to think ahead in planning e.g. when authorising new physical facilities like car parks, include data sharing requirements.

Community – yes, increase green awareness.

Technology – yes open & standardised (this authority involved in some good examples e.g. cross-region parking data services using APDS [soon to be ISO] data model).

Cooperation – feedback loop is mentioned – this should allow stakeholders including private sector to influence policy.

4. Cooperation models

Exchanged Data cooperation model

4a. Further benefits experienced

4b. Further key findings or challenges, experienced or envisaged

Can be a challenge to get data from Google.

Issues of lack of trust in both directions; private sector doesn't always trust local highways authority data. An example is roadworks timings – local authority can provide times from permits but they shouldn't be interpreted as confirmed on-road timings. These can be improved from vehicle data.

Shared View cooperation model

4c. At what level of scope (e.g. aligned to your organisation's scope or more specific or more general than that? National?) do you think a common Network Monitor service could support effective public/private cooperation on traffic management data?

Regional or higher.

4d. Can you envisage using an intermediary's shared view of the network, in place of your own private internal view, in your traffic management operations? Please elaborate. What benefits can you envisage?

Yes. A common understanding will help develop common policies and encourage equity.

Note that fleet management and potentially even insurers will potentially be users too.

The Network Monitor will give an opportunity to fuse other data e.g. weather and use that operationally.

4e. Further opinions on the potential challenges

Money.

For ongoing commitments by an authority, a challenge is persuading the council members to keep the commitment going – since the council can change significantly after elections.

Legislation may be needed in order to guarantee a continuing service.

Coordinated Approach cooperation model

4f. Can you envisage participating in a joint Strategy Table with service providers? What benefits can you envisage?

Yes.

A coordinated approach is desirable. If we have increased understanding of vehicles on the network, we can perform more sophisticated coordinated traffic management e.g. send electric vehicles to a jam at a school, while sending diesel vehicles another way.

The authority already does similar to strategy table with the national highway authority and can imagine similar including private sector. The authority already influences autonomous vehicle trials to comply with specific traffic management actions when needed.

Can imagine offering incentives e.g. parking discount for traveller time choice. The town/city-centre managers should also be involved for details.

There is already some coordinated cooperation e.g. car park agrees to close when it reaches 90% capacity due to the negative network impact from traffic waiting, both authority and parking provider have taken action. (Done without an intermediary role)

4g. Can you envisage integrating with a Network Manager intermediary role and potentially implement (or consider implementing) its service requests that are based on the shared network view and agreements of the Strategy Table? What benefits can you envisage?

4h. Due to historic roles, a road network authority may naturally envisage performing the Network Manager and Strategy Table roles, but can you also envisage another party leading these services? Please elaborate on the consequences.

[Ran out of time to discuss these aspects.]

4i. Have you any thoughts on how an Assessor role could retain at least some independence from the other public and private participants? Please elaborate.

Can understand why an Assessor concept is considered needed, and have no problem with the principle, but funding in practice will be difficult.

Town centre stakeholders might be part of the bigger solution e.g. traveller time choice could encourage use of shops or restaurants, with a financial case for them.

4j Please share any further opinions on the potential challenges of this ambitious “coordinated approach”.

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5. Would you be interested in participating in a European online workshop of perhaps half a day, in which these topics are further explored?

Yes.

Interview 6 on behalf of a national transport authority

1a. What is your level of awareness and knowledge of the approach of SOCRATES2.0 project to interactive traffic management?

Was aware and had listened to past congress presentations, so aware of the scope and ambitions, but have not looked at final publications.

2a. Goals, progress and plans on public/private cooperation for traffic management

The department does not itself manage traffic and doesn't limit how it is done by national and local roads managers.

Priorities of the department include: more availability of data, more connectivity, more automation, better predictive modelling, and to unlock the potential of connected vehicles and their data.

Also want to support industry to provide new services.

Current activity is often in business cases for supporting work.

There is also some legislation in specific areas (for example roadworks and bus-related), but further legislation for traffic management is not currently planned and seems unlikely.

Desires to be highly aligned with Europe e.g. the ITS regulations.

2b. How far do you think you can go in this area?

All the way to high levels of connectivity, automation, predictive modelling, and simplified unified payments for all transport-related services.

3. Vision: Pick one or more of the 4 pillars and/or their connections with adjacent pillars. How does that align with your own strategy (present and/or future) for traffic management?

Community: Wants to increase ease of access to transport services. Not enough open data is available and discoverable – we need standards that are easy to use by organisations making products and services to make transport easier to access and use.

4. Cooperation models

Exchanged Data cooperation model

4a. Further benefits experienced

4b. Further key findings or challenges, experienced or envisaged

Uncontrolled data exchange [without any national guidance or support] means less opportunity for ensuring it supports public policy.

We need to ensure data exchange supports public good, public policy.

Shared View cooperation model

4c. At what level of scope (e.g. aligned to your organisation's scope or more specific or more general than that? National?) do you think a common Network Monitor service could support effective public/private cooperation on traffic management data?

The same question has been considered in recent years. The department considered the Netherlands model for sharing data as represented by NDW, but decided that this wouldn't be the most appropriate model for this country. The department doesn't envisage a national Network Monitor but they may emerge at the level of regions and combined authorities which move at their own pace. The central government role is to help these regional schemes to interoperate and have standardised interfaces so that they are practical for consuming organisations to interface with. Companies don't need just one socket as long as there is one standard. Responsibility for transport is devolved to multiple authorities, but it is hoped that there will be agreement on standards.

4d. Can you envisage using an intermediary's shared view of the network, in place of your own private internal view, in your traffic management operations? Please elaborate. What benefits can you envisage?

(n/a, this organisation does not manage traffic)

4e. Further opinions on the potential challenges

The Shared View will need legal and enforceable agreements, which is tricky.

It is not yet clear how national government should help this issue, so this remains a challenge.

(The rail sector provides a model that may be relevant in some respects, but the sectors are different.)

As the initiative should support policy, it should be possible to gain funding. But business cases need work, and it is difficult to quantify and measure the benefit. [but see also later remarks on funding in the Coordinated approach]

Coordinated Approach cooperation model

All 3 cooperation models seem appropriate for different things – they can all exist at once across the country. Coordinated is very resource-heavy so would only be used in the highest priority traffic management scenarios, running side-by-side with a Shared View used for a wider set of functions, and with some separate data exchanges where the Shared View is not yet established.

A role of central government may be to help local authorities choose which of the three cooperation models to choose for different purposes.

Road users shouldn't see the differences though.

4f. Can you envisage participating in a joint Strategy Table with service providers? What benefits can you envisage?

The role of the central government department may be to help to shape how strategies are defined & shared amongst stakeholders, by standards.

4g. Can you envisage integrating with a Network Manager intermediary role and potentially implement (or consider implementing) its service requests that are based on the shared network view and agreements of the Strategy Table? What benefits can you envisage?

4h. Due to historic roles, a road network authority may naturally envisage performing the Network Manager and Strategy Table roles, but can you also envisage another party leading these services? Please elaborate on the consequences.

Network Manager should be considered as a service rather than an organisational role, and it shouldn't be crucial who provides that service as long as it is clearly understandable.

4i. Have you any thoughts on how an Assessor role could retain at least some independence from the other public and private participants? Please elaborate.

The detailed dynamic financial rewards for participation foreseen by SOCRATES2.0 seem like science fiction. Where there is a need for new funding to be generated and then allocated, there seems very little scope for that. Perhaps in emission zone schemes that generate fees, and similar, otherwise generating the necessary funding seems unlikely. [i.e. central government is not going to provide it]

The role of the assessor in working out what happened and feeding back to improve the strategy table is useful though.

Public sector can mandate services and service providers can choose to participate within that framework.

The non-financial assessor doesn't need to be independent and could be public sector.

Private sector should trust public sector to look out for the interests of citizens.

4j Please share any further opinions on the potential challenges of this ambitious "coordinated approach".

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5. Would you be interested in participating in a European online workshop of perhaps half a day, in which these topics are further explored?

Yes. With the caveat that he may not be able to say as much as local government might ideally wish.

Interview 7 on behalf of large regional state authority

1a. What is your level of awareness and knowledge of the approach of SOCRATES2.0 project to interactive traffic management?

Was a participant. [Interview still relevant to consider further use cases, wider geographic use, and ongoing use beyond the project].

2a. Goals, progress and plans on public/private cooperation for traffic management

Our main focus is connection infrastructure with the automotive industry systems. We have a lot of intelligence on the road (message displays, road sensors). But for the majority those systems work stand alone. Current developments are connecting roadworks equipment (location and warning). We're measuring free truck parking spaces and make that information available. In the TMC we have setup a display with variable signs, environmental sensors, traffic sensors, overhead signalling. Our data is distributed via the national service. Furthermore we connect traffic lights for distribution and maintenance benefits. There is a healthy cooperation going on between different road operators here. But we also cooperate with multiple automotive partners.

Overall goals for road operators are safety, reliable journey times and green. These are described in law and landed in a state program. Targets are set for 2025.

2b. How far do you think you can go in this area?

Our first goal is to share information and discuss this with automotive partners. Together we consider routing strategies, how it looks like, what do they need to adapt to use it. We also provide the reason why a routing strategy is given. The main focus is to support currently activated TMC measures. And a small amount is about requesting an action without own measure. We have a taskforce for rolling out the Socrates concept in the state, in cooperation with an automotive partner.

3. Vision: Pick one or more of the 4 pillars and/or their connections with adjacent pillars. How does that align with your own strategy (present and/or future) for traffic management?

Cooperation is most aligned with our current strategy. We used to work on our own. The customer we approach via the OEMs.

4. Cooperation models

Exchanged Data cooperation model

4a. Further benefits experienced

Enable our infrastructure to connect to the outside world. This benefits operation and maintenance of traffic lights. This makes it possible to connect from a distance. Same for the connected roadwork trailers, the location is now known in the TMC. Another benefit is that we can propose a routing strategy where we have no roadside equipment.

4b. Further key findings or challenges, experienced or envisaged

We hope that the 'driver follow up rate' will go up. One of challenges was to give the reason as part of the routing strategy. We made a list of 15 possible reasons. Also risk of congestion. Current discussing on 2 competing channels for communication (wifi / cellular V2X).

Shared View cooperation model

4c. At what level of scope (e.g. aligned to your organisation's scope or more specific or more general than that? National?) do you think a common Network Monitor service could support effective public/private cooperation on traffic management data?

We are pretty happy with the current national service. On state level we have a kind of network monitor in place supporting multiple road operations (slippery service, roadworks, incident management, tunnels, TMC, ...)

4d. Can you envisage using an intermediary's shared view of the network, in place of your own private internal view, in your traffic management operations? Please elaborate. What benefits can you envisage?

Yes. We would like to receive service providers feedback on our closed roads information. By using this we could improve the service.

4e. Further opinions on the potential challenges

It goes pretty smoothly. The national service was a big benefit for us.

Coordinated Approach cooperation model

4f. Can you envisage participating in a joint Strategy Table with service providers? What benefits can you envisage?

Yes, I like this idea and we want to gain more experiences on this.

4g. Can you envisage integrating with a Network Manager intermediary role and potentially implement (or consider implementing) its service requests that are based on the shared network view and agreements of the Strategy Table? What benefits can you envisage?

A good idea for the major city area. For big events we establish a common TMC.

4h. Due to historic roles, a road network authority may naturally envisage performing the Network Manager and Strategy Table roles, but can you also envisage another party leading these services? Please elaborate on the consequences.

No outspoken view on this.

4i. Have you any thoughts on how an Assessor role could retain at least some independence from the other public and private participants? Please elaborate.

Open for any proposal :)

4j Please share any further opinions on the potential challenges of this ambitious "coordinated approach".

Collective interest vs individual interest.

5. Would you be interested in participating in a European online workshop of perhaps half a day, in which these topics are further explored?

Yes.

Interview 8 on behalf of a notably innovative small city

1a. What is your level of awareness and knowledge of the approach of SOCRATES2.0 project to interactive traffic management?

Member of the TM2.0 platform, acquainted with the objectives, the Cooperation Framework and public-private cooperation. Not in detail aware of the content or results

2a. Goals, progress and plans on public/private cooperation for traffic management

Key elements of the mobility vision are: sustainability, economy, health, innovation, accessibility. Car traffic: robust daily urban system. For the main city transit roads, the policy is to “ensure smooth traffic flow by deploying advanced traffic controllers”. Furthermore, it is a wide accepted statement that a further increase of traffic demand can no longer be accommodated by advancement of controllers. New research is necessary. The city starts updating this policy in 2022.

2b. How far do you think you can go in this area?

Though the city often participates in H2020 RTD projects, the TM2.0 ideas are completely new to them.

3. Vision: Pick one or more of the 4 pillars and/or their connections with adjacent pillars. How does that align with your own strategy (present and/or future) for traffic management?

The city’s mobility innovation policy is mostly based on technological advancement. More particularly: advanced traffic controlling and CCAM.

The city can never only have a road user centric approach. This because residents and businesses also have their say in policy objectives. In a city, all conflicting interests come together. Serving one community, might discriminate against other communities. So key elements are more based on non-discriminating factors like health and sustainability. Technology is more of a vehicle to reach these goals.

4. Cooperation models

The city has some general statements on the cooperation framework:

- A public road authority actually taking care of traffic management is absent in large parts of the world. Even in the first world. Socrates expects the existence of a (public) road authority being responsible and taking care of smart, safe and green mobility. This is very often not exactly the case. Even in this highly developed country lots of small and medium sized cities have just enough resources (personnel and money) available, to do the minimum for safety (place traffic controllers, deploy bike lanes). Smart and green or digitalisation are often not on the agenda.
- The city often participates in H2020 RTD pilot projects. So, testing of new technology and its applicability is a well-known concept. However, actual deployment of a new technology (like for instance the Socrates services) is very difficult. The following issues arise:
 - First seeing then believing: actual sustainable impact needs substantial evidence and a sound business case
 - Habits are hard to change: traffic is managed via traffic controllers and signs. Not by services of third parties we can’t control
 - What are the socio-economic effects? Are some colleagues (managing the controllers since ages) running out of a job? Even when having innovation in the strategic vision, this is bad for commitment.

- The city expects the regional or, even better, the national road authority to represent the interest of local road authorities and take the initiative. The city does not have enough resources to allocate personnel to develop an effective public-private cooperation that is beneficial for them. There is simply too much to work to be done when deploying for instance a smart routing service to avoid the school zones in the city. A generic, national solution would make more sense (so the city does not envision their selves in participating in a strategy table), and would be endorsed.
- If not the national road authority, then the SP should take the initiative and present a “of the shelf” service, with proven impact and fair costs (we will make you demonstrate the service first for free!). The local authority is not capable of funding the SP’s initial costs, but may be willing to pay for a service that is actually helping them (the impact driven business model is very appealing).

TM2.0 and the Socrates models are a real game changer. However, because of the relative maturity of the traffic management systems, expectations are that it is going to be very difficult and for sure time consuming to convince decision makers to shift from self-controlled, for residents visible, job-providing roadside systems to paid third party organised digital services.

And especially these socio-economic aspects need more elaboration in order to advance with the theme.

5. Would you be interested in participating in a European online workshop of perhaps half a day, in which these topics are further explored?

Not discussed.

Interview 9 on behalf of a national transport authority

1a. What is your level of awareness and knowledge of the approach of SOCRATES2.0 project to interactive traffic management?

Very familiar with the concept and approach of SOCRATES2.

2a. Goals, progress and plans on public/private cooperation for traffic management

The overall objectives are accessibility of the road network with regard to traffic safety and reduced environmental impact.

Important strategic positions include:

- Cooperate with market players, but not compete with them.
- Via traffic regulations and incentives, has the opportunity to control/manage groups of vehicles in order to increase traffic safety, promote accessibility and reduce environmental impact. Control of or advice for individual vehicles is outside our area of responsibility.
- Provide the market with the best possible conditions for implementing solutions that support society's goals.
- Priority is to provide quality-assured data on road infrastructure, traffic regulations and measures in the road network, where the source of data is public actors. These data usually need to be supplemented with data from private actors in order to be comprehensive and directly useful in services to end users. => Cooperation with Service Providers is crucial.
- What is visually visible in the road network must also be digitally accessible.
- In our role as road operator information about traffic in the road network is required. To a limited extent, such data is collected by our own detectors, but primarily such data is generated by external actors. => Agreements with them on access to the necessary data is necessary.

2b. How far do you think you can go in this area?

Our main goal is to provide our data in a quality assured way and to establish a structured and continuous dialogue with major service providers in order to understand their needs.

Agreements should be reached with service providers at a strategic level, ie on rerouting. Agreements on KPIs are foreseen. Exchange of data for primarily bilateral common operational pictures.

We foresee that we don't need that much of detectors in the road network as we can get vehicle generated data quite soon, but we will still need VMSs, traffic signs, etc. for a very long time to reach travellers in older vehicles.

3. Vision: Pick one or more of the 4 pillars and/or their connections with adjacent pillars. How does that align with your own strategy (present and/or future) for traffic management?

We have a large focus on developing structured Cooperation with Service Providers and the Automotive Industry as these are the channels to the travellers and the vehicles. Traditionally that kind of cooperation hasn't been on the agenda at all.

4. Cooperation models

Exchanged Data cooperation model

4a. Further benefits experienced

We think we can reach quite far by developing the exchange of data. We need to focus a lot on our processes to source and quality assure our data. We have an idea that what is visible in the road network, should also be provided as digital information on our channels to the external world. Our experience is that only by talking with the Service Providers we get a better understanding on how to provide our data.

When it comes to our usage of data generated by vehicles and mobile phones in the road network, we already have agreements for travel times and for road friction.

4b. Further key findings or challenges, experienced or envisaged

As for now, we don't have any plans to provide data via short-range communication directly to the vehicles. We rely on service providers to establish the end-user services and we can provide our data in any format that makes it easier for the service providers to use the data in their services.

We foresee a number of agreements with commercial actors in the coming years, in order to get much more vehicle generated data for our own operations.

Shared View cooperation model

4c. At what level of scope (e.g. aligned to your organisation's scope or more specific or more general than that? National?) do you think a common Network Monitor service could support effective public/private cooperation on traffic management data?

We think a common Network Monitor might be difficult to establish because of commercial stakeholders reluctance to share data with each other. On the other hand, if a sustainable business models for a public/private Network Monitor services can be established it might be possible for the future. We already have commercial actors aggregating all kind of data in order to establish a real-time picture of the traffic situation.

4d. Can you envisage using an intermediary's shared view of the network, in place of your own private internal view, in your traffic management operations? Please elaborate. What benefits can you envisage?

We would like to receive service providers feedback on our data and we foresee bilateral operational pictures with service providers. We will use that kind of operational pictures for our own traffic management, but commercial stakeholders need to establish their own operational pictures based on our data and data they can get from other sources.

4e. Further opinions on the potential challenges

The largest challenges are probably data quality and sustainable business models.

Hard to know how exactly how the funding will work, but at least we foresee re-allocation of funding from roadside equipment to processing (and buying) of data.

Coordinated Approach cooperation model

4f. Can you envisage participating in a joint Strategy Table with service providers? What benefits can you envisage?

Yes, we think agreed KPIs on a strategic level will be very valuable.

4g. Can you envisage integrating with a Network Manager intermediary role and potentially implement (or consider implementing) its service requests that are based on the shared network view and agreements of the Strategy Table? What benefits can you envisage?

Hard to tell, how to implement a strategy table role, but we think that it can be implemented also without any intermediary.

4h. Due to historic roles, a road network authority may naturally envisage performing the Network Manager and Strategy Table roles, but can you also envisage another party leading these services? Please elaborate on the consequences.

-

4i. Have you any thoughts on how an Assessor role could retain at least some independence from the other public and private participants? Please elaborate.

Kind of hard to see what kind of independent stakeholder it could be.

4j Please share any further opinions on the potential challenges of this ambitious “coordinated approach”.

How to establish incentives for road users in order to promote advice that are best for the society but not necessarily for the individual.

We first need to re-allocate funding to improve the quality of our own data.

5. Would you be interested in participating in a European online workshop of perhaps half a day, in which these topics are further explored?

Yes!