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Finnish Transport and Communications Agency

C-ITS Day 1 services V2N deployment pilots – NordicWay pilots lessons and results in Finland

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What problems the Nordic ecosystems (and those who similar) are trying to solve?

- Long road network
- Low volumes of traffic (relative)
- Old vehicles (avg. of over 10 years)
- Extreme weather conditions

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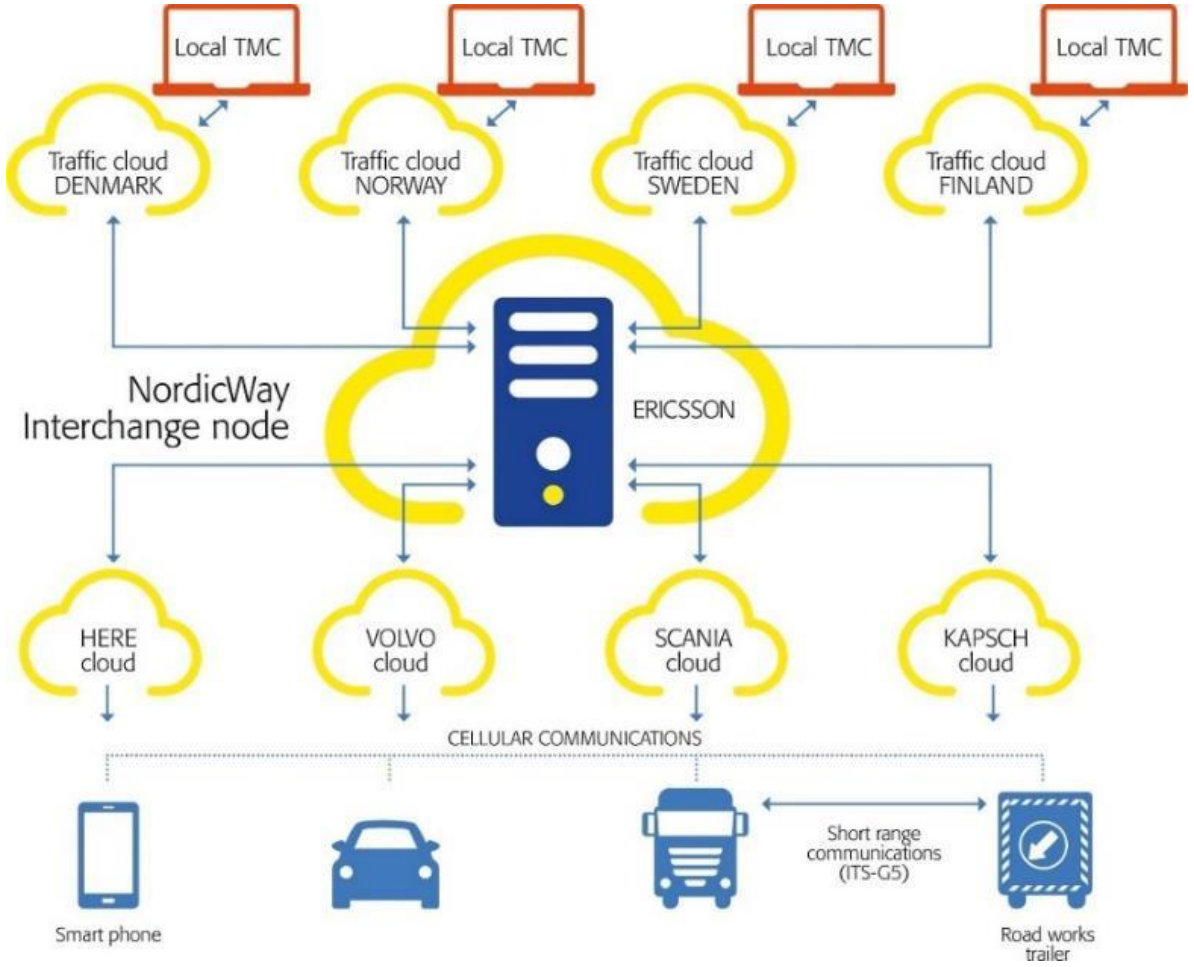
Pictures: Norwegian Public Road Administration and Risto Kulmala

NordicWay (2015-2017) – C-ITS Day 1 services in hybrid communication mainly using cellular

Country	Denmark	Finland	Norway	Sweden
Beneficiary/ Implementing body	Danish Road Directorate	Ministry/ FTA Trafi	Norwegian Public Road Administration	Swedish Transport Administration
Service providers		HERE Infotripla	Volvo Cars	Ericsson Kapsch TrafficCom Scania Volvo Cars
Project Office, Evaluation	Genua	VTT	SINTEF	SWECO

NordicWay Key results – www.nordicway.net

1. **The Architecture** – border and relation agnostic
2. **The standards** – existing standards (DATEX2, etc.)
3. **Ecosystem enabler** – different organizations, new competition and services (innovations)
4. **Maturity** – of digitalization, existing standards, technologies and users
5. **Scalability** – of the architecture, services, users, open results
6. **Demonstrations** – live demos succesfully completed
7. **Latencies** – Low latencies in the order of 0.3-2 seconds obtained
8. **FI pilot: Usefullness** – first source of information
9. **FI pilot: User uptake** – willingness to continue
10. **FI pilot: Safety impact** – Decrease in injury and non-injury accidents and in fatal accidents
11. **FI pilot: Benefit-cost ratio,** period 2019-2030, smallest impact and highest price: 2.3



NordicWay2 project (2017-2020) CEF Transport Sector 2016

Pilot deployment of interoperable Day 1/1.5 C-ITS and support infrastructure readiness for Connected and Automated Driving

- Contribute to harmonisation and interoperability of C-ITS in Europe
- Support deployment of Day 1 and 1.5 C-ITS services on corridor and rural roads
- Support infrastructure readiness for connected and automated driving
- Assess impacts of Day 1/1.5 C-ITS services including mobility, behaviour, acceptance

NordicWay3 project (2019-2023) CEF Transport Sector 2018

Pilot deployment of interoperable Day 1/1.5 C-ITS services and selected Cooperative, Connceted and Automated Mobility services

- Contribute to harmonisation and interoperability of C-ITS in Europe
- Urban connection – Day 1/1.5 services in the Nordic cities
- CCAM in urban and interurban areas and motorway sections
- Impact assessment

NordicWay2 C-ITS Services

(Denmark providing relevant data)

			C-ITS services	FI	NO	SE
Day 1 services	Hazardous location notifications	1	Slow or stationary vehicle(s) & traffic ahead warning	FI.1	NO.1	
		2	Roadworks Warning	FI.2	NO.2	SE.2
		3	Weather and road condition	FI.3	NO.3	
		4	Emergency brake light	-	NO.4	
		5	Emergency vehicle approaching	FI.5		SE.5a &b
		6	Other hazards	FI.6	NO.6	
	Signage applications	7	In-vehicle signage	FI.7	NO.7	
		8	In-vehicle speed limits	FI.8	NO.8	
		9	Signal violation / intersection safety	FI.9	NO.9	
		10	Traffic signal priority request by designated vehicles	-		SE.10
		11	Green light optimal speed advisory (GLOSA)	FI.11		SE.11
Day 1.5		12	Information on alternative fuel vehicle fuelling & charging stations	-	NO.12	
		13	On street parking information and management	-	NO.13	
		14	Traffic information & smart routing	FI.14	NO.14	SE.14
		15	Cooperative collision risk warning	-	NO.15	

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NordicWay2 ecosystem partners

- Over 60 public and private partners working with C-ITS and automation pilots and studies in European collaboration.

Vejdirektoratet
Danish Road Directorate
TRAFIKVERKET
SWEDISH TRANSPORT ADMINISTRATION
Statens vegvesen
Norwegian Public Roads Administration
Trafi
Liikennevirasto
Finnish Transport Agency
Genua Consult
carmenta
superior situational awareness
SWECO
RI.SE
swarco
ZENUITY
kapsch
vti
VOLVO
SCANIA
ERICSSON
Technolution
CLOSER
Uppsala Kommun
City of Gothenburg
norut
NORTHERN RESEARCH INSTITUTE
ITS Perception
WAY 2
Aventi
TRIONA
PSI
Q-FREE
EUROSKILT
bouvet
NORCE
LAPIN AMK
Lapland University of Applied Sciences
Metropolia
SHARPEYE
ROADSCANNERS
ILMATIETEEN LAITOS
dynniq
sensible 4
MH Roine CONSULTING
F-Secure
NODEON
SOLID POTATO
VTT
infoTripla
INDAGON
UKKOVERKOT

Organisation
Infotripla
Arctic Machine
Ficonic Solutions
Finnish Meteorology Institution
RoadCloud
Sitowise

Picture: Wikimedia Common, S. Solberg J.

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NordicWay2 infrastructure readiness and coverage in Finland

- Existing 3G and 4G/LTE cellular network as a backbone for the hybrid communication C-ITS
  - Long range: cellular network with complete coverage of the main road network and major parts of the total road network. Exceptions in the rural roads up north.
  - Short range: ITS-G5 no plans for implementation, but testing on hybrid communication. Case specific installations, such as RWW TMA or hotspot, testing for example of RSUs in arctic snowy and icy conditions with the industry
- NordicWay Interchange Nodes federation in Sweden, Norway and Finland (3) up and running. Co-development available in open source via GitHub, anyone can use and test (https://github.com/NordicWayInterchange/interchange)

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NordicWay2 C-ITS evaluation results in 2020

Quality of services

•Common KPIs to be utilised at all sites
•Joint summary of results per C-ITS service type across all implementations

User acceptance

Jointly made survey to study the user acceptance among general public
Local translations, local data collection
Joint summary of results across all the countries

Ecosystems

Jointly made script for the workshops
Local workshops
Joint summary of results across all the countries

Socio-economic impacts

Jointly made assessment of the socio-economic impacts for the whole region

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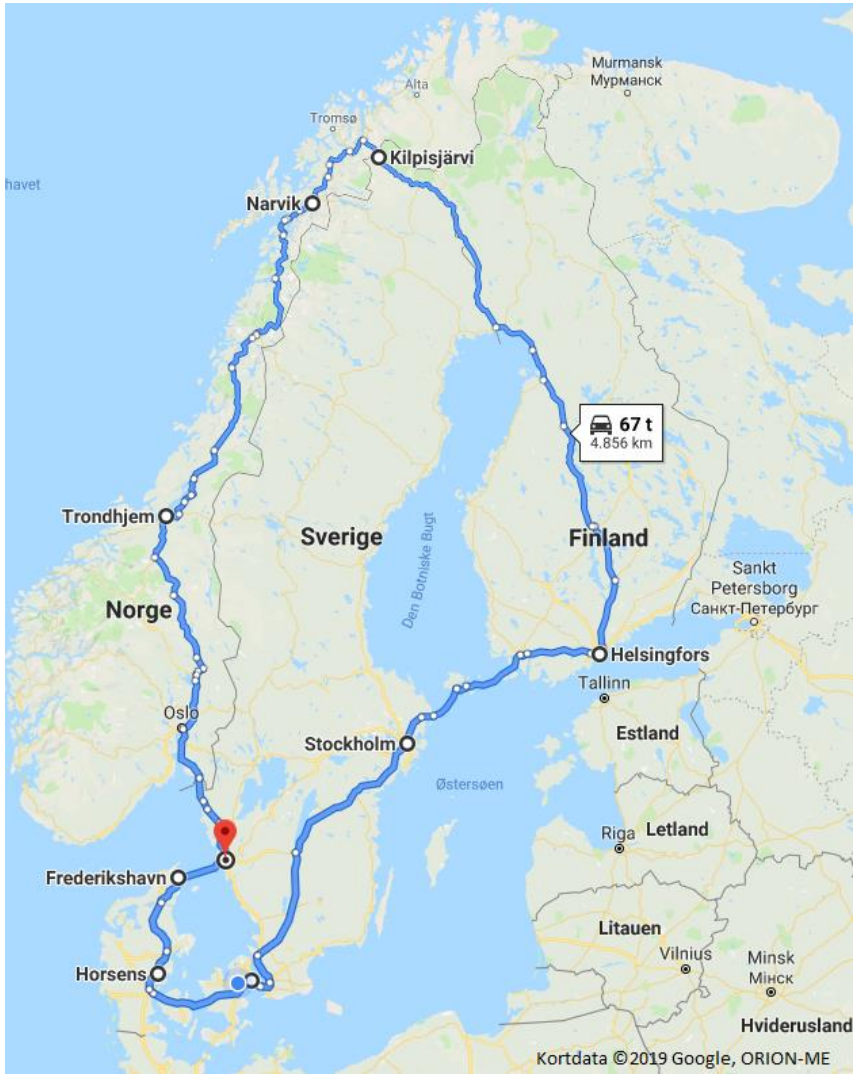
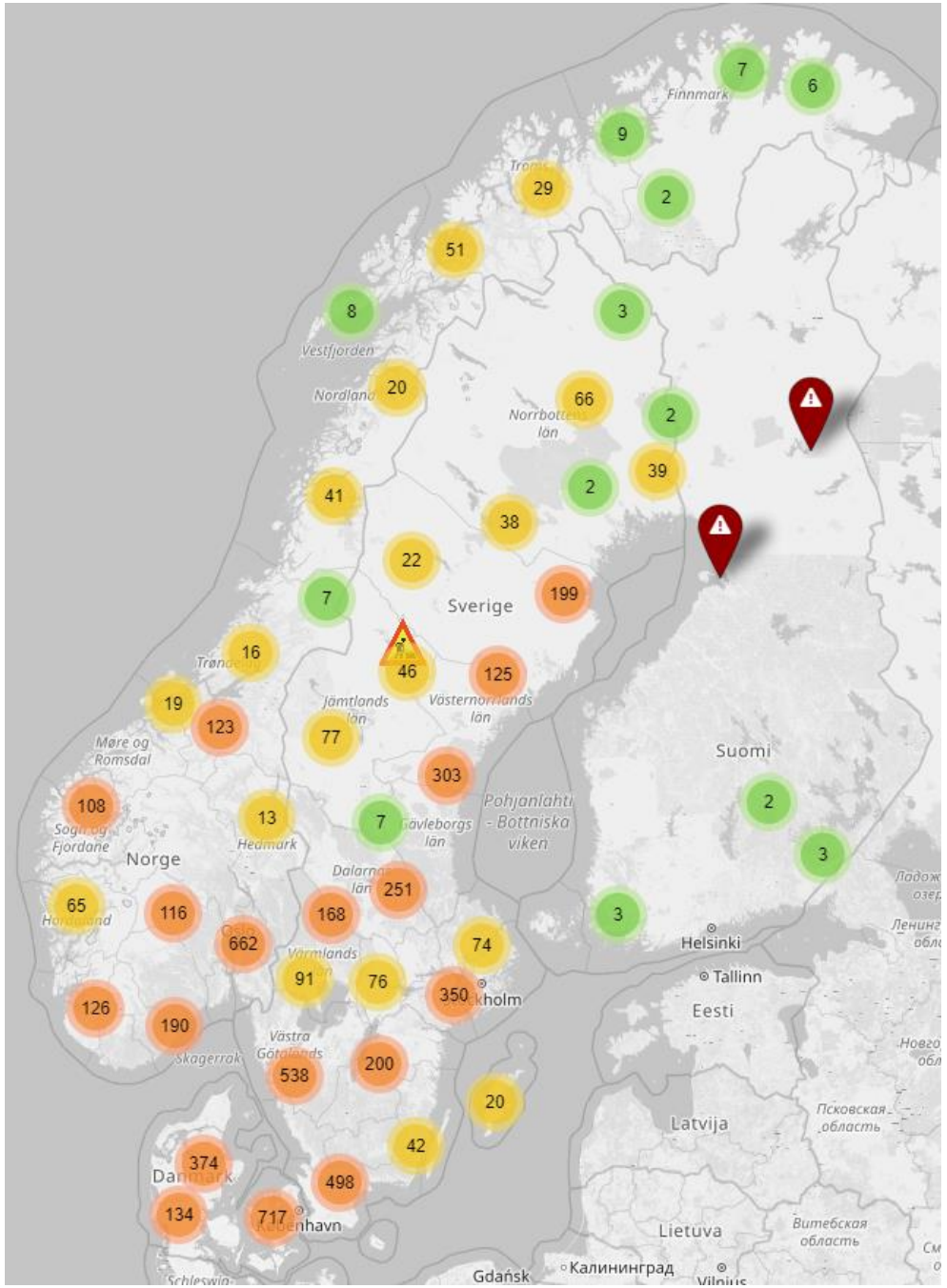
”ITS live”





Nordic WAY

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31.05.2018

Picture: Google and Norwegian Public Road Administration

Finnish public authorities lessons in "Nordic conditions"

- **Market driven competition** and business models with agreements of data licenses. Service providers working with the **end users**.
- **New kind of collaboration in ecosystem**
- **Technology neutrality**
- **Solutions need to have potential to scale up**, fast, wide area and for many
- **"Commonly used" technologies** benefit all business ecosystems in society; traffic and transport solutions are not the single societal issue – vast amount of business opportunities and complex issues with possible common benefits

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What is the role of public authorities in ”Nordic conditions”?

- For the public authorities to consider in V2N ecosystems: if socio-economical costs are positive with traffic safety benefits, quality of data increased or high and costs reasonable, data driven ecosystems should be supported
- On the other hand, authorities should not select ecosystem winners, risk of vendor locks and market disturbance (short term solutions). Considerations:
  - Small (limit size) PPP trials that aim cross-border interoperability in European collaboration
  - Enable local autonomy and small ecosystems, e.g. cities have major potential
- Be open and transparent: evaluate & publish results, open source (with proprietary solutions on top)

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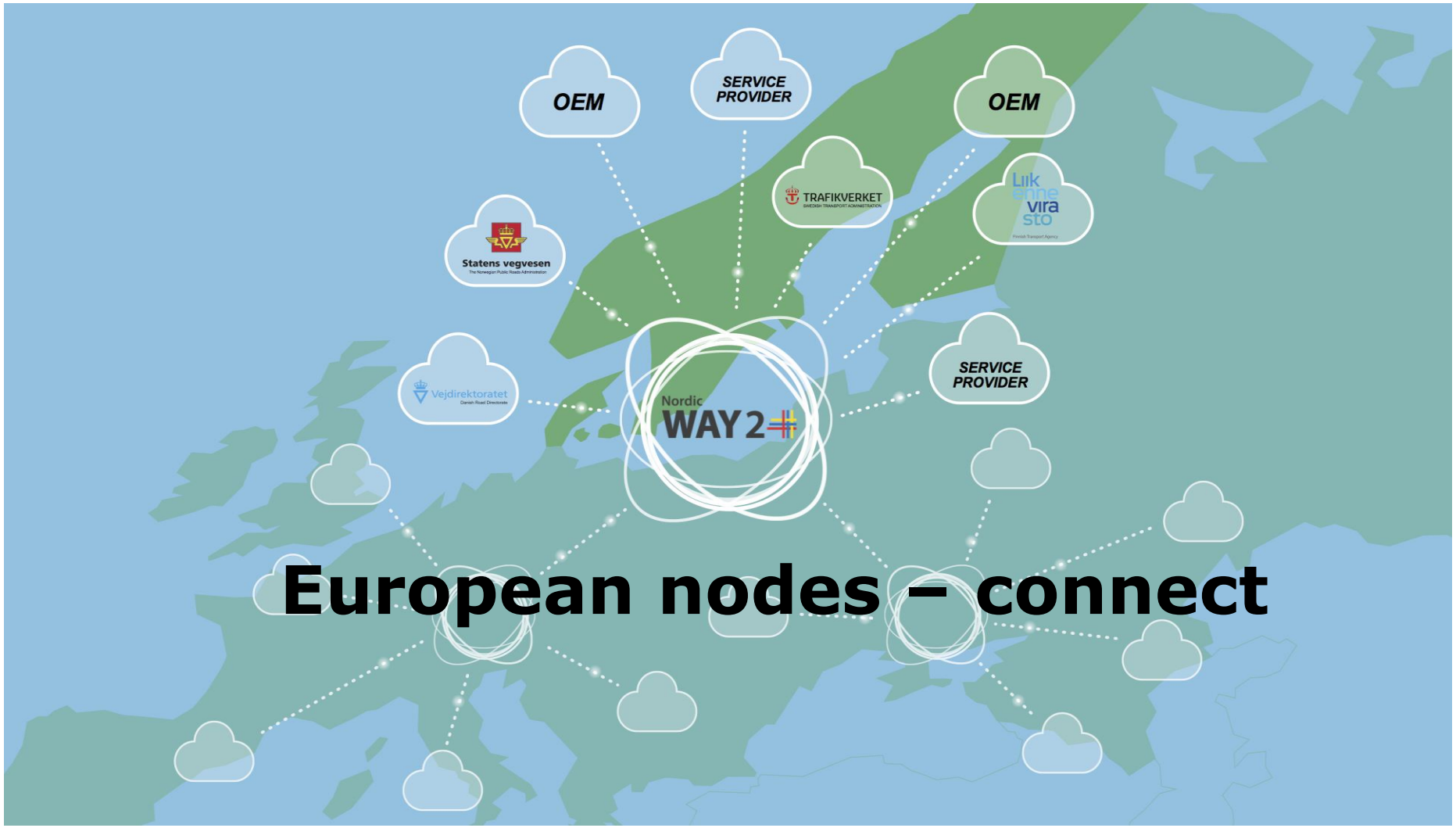
Public-Private-Partnership (PPP) – C-ITS ecosystem of OEMs, service providers, data aggregators, etc.

For example…

data for road safety

Pictures: https://www.dataforroadsafety.eu/

What next: NordicWay3 (2019-2023)



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Pictures: www.nordicway.net (Youtube video)

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Thank you

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