



*unity, solidarity, universality*

# L'état des applications du numérique au fret ferroviaire en Europe

Le fret ferroviaire et les OFP: et maintenant, osons  
l'avenir !!

Les apports du numérique au fret ferroviaire

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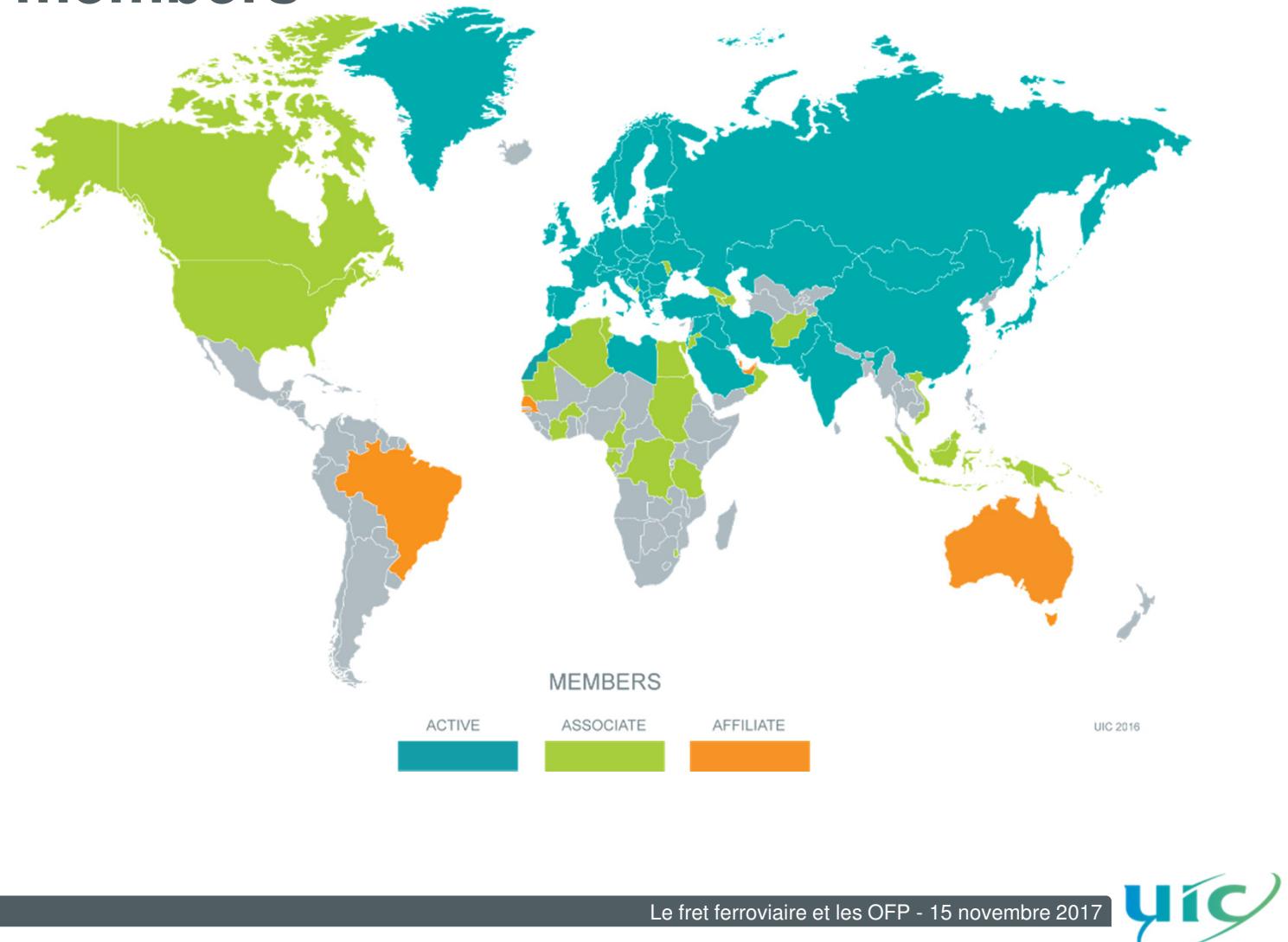
# Agenda

- > UIC – the worldwide railway organization
- > ISR – Wagon Tracking and Tracing
- > Orfeus – Electronic Consignment Note
- > E-Wag – Intelligent Wagon

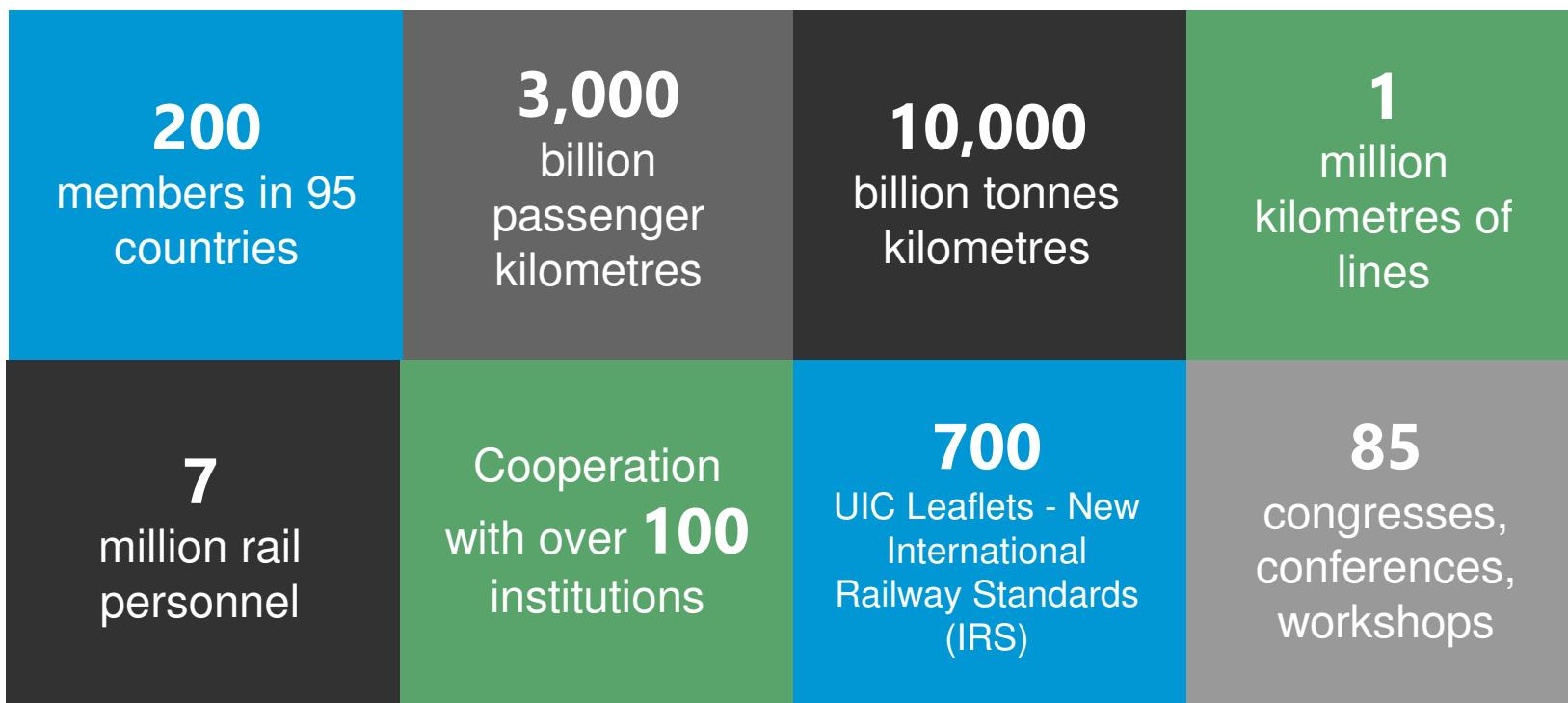
# UIC - A long history at the service of member railways and international railway cooperation



# UIC members



# UIC Today



# European Landscape

- > 28 Member States
- > Liberalised Markets
  - Separation of Infra and Operators
- > Technical Specifications for Interoperability
  - Telematic applications for freight services
- > Large Scale Research and Development (Shift2Rail)



# Innovation

- > Reduce cost of rail
- > Share best practice globally
- > Assess implementation feasibility (pilots)
- > Examples:
  - Automated driving
  - Automatic coupling
  - Electronic Consignment
  - Intelligent Assets (e-Wag)

# **Wagon Tracking and Tracing ISR**

# ISR - Event-driven Track and Trace on wagon level

## > Based on events from the

- RU's operational systems and
- Train Information System from RailNetEurope

## > Distributed via :

- Web Portal
- Realtime webservices
- Messaging

Train - 49829					
Departure at origine					
IM	Date	0087	15.05.2017 19:39		
49829	87 28654	Tourcoing		Event type	Real Time
49829	87 28654	Tourcoing		Departure	15.05.2017 22:41
49829	87 28600	Lille-Flandres		Arrival	15.05.2017 22:33
49829	87 28618	La Madeleine (Nord)		Run-through	15.05.2017 22:05
49829	87 28643	Don Sainghin		Run-through	15.05.2017 21:47
49829	87 28643	Don Sainghin		Run-through	15.05.2017 21:47
49829	87 34502	Lens		Run-through	15.05.2017 21:34
49829	87 24176	Triangle-d'Ostricourt		Run-through	15.05.2017 21:23
49829	87 34520	Pont-de-la-Deûle		Run-through	15.05.2017 21:16
49829	87 34500	Douai		Run-through	15.05.2017 21:13

## > Data also used to calculate

- Wagon Mileage
- Shipment ETA

Wagons Status														
ISR	Wagon and Status	Event timestamp	Event type	Event Info			Consignment Note			Shipping Info				
				CC	Station	Station Name	Train	CC	Station	Number	Transit CC	Type	From CC	To Station
338778092449 1		17.05.2017 07:14	Departure	88	253534	Antwerpen-Noord-Bundel D	47652	87	115881	706275	88	C/P	87	11588
338778092449 1		16.05.2017 01:10	Arrival	88	253534	Antwerpen-Noord-Bundel D	49829	87	115881	706275	88	C/P	87	11588
338778092449 1		15.05.2017 19:39	Departure	87	286442	Ternier	49829	87	115881	706275	88	C/P	87	11588
338778092449 1		15.05.2017 14:25	Arrival	87	286442	Ternier	48966	87	115881	706275	88	C/P	87	11588
338778092449 1		15.05.2017 10:43	LeftOrigin	87	115881	Grandpuits	48966	87	115881	706275	88	C/P	87	11588

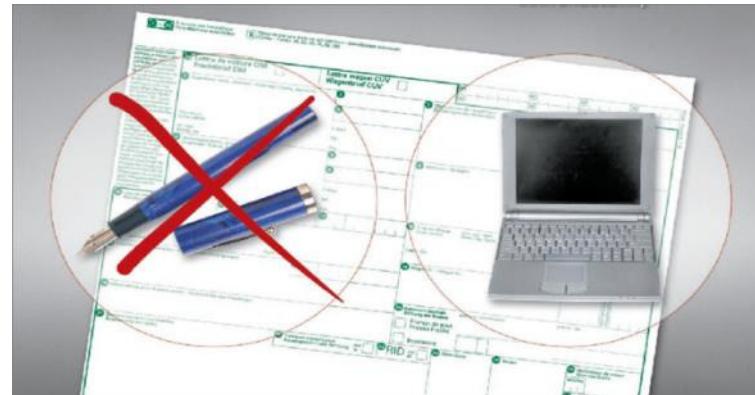


# **Electronic Consignment Note ORFEUS**

# What is Electronic Consignment Note

## > Single data capture

For all involved parties



## > Paperless transport

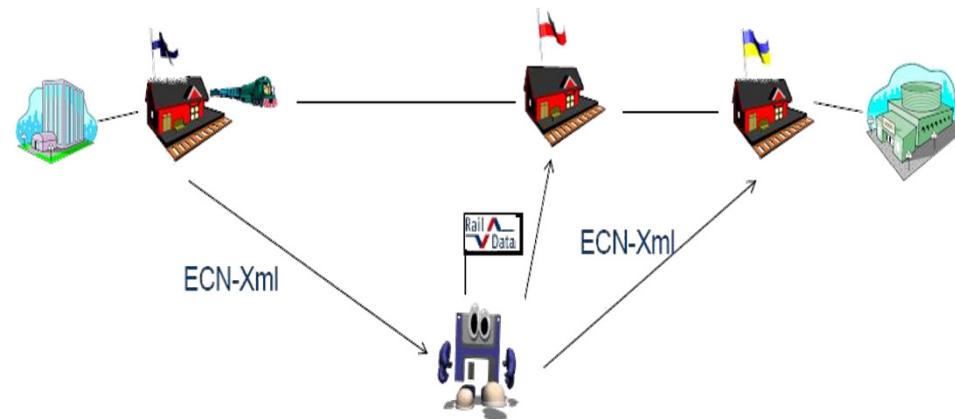
Independent and ahead of train movement

## > Data available

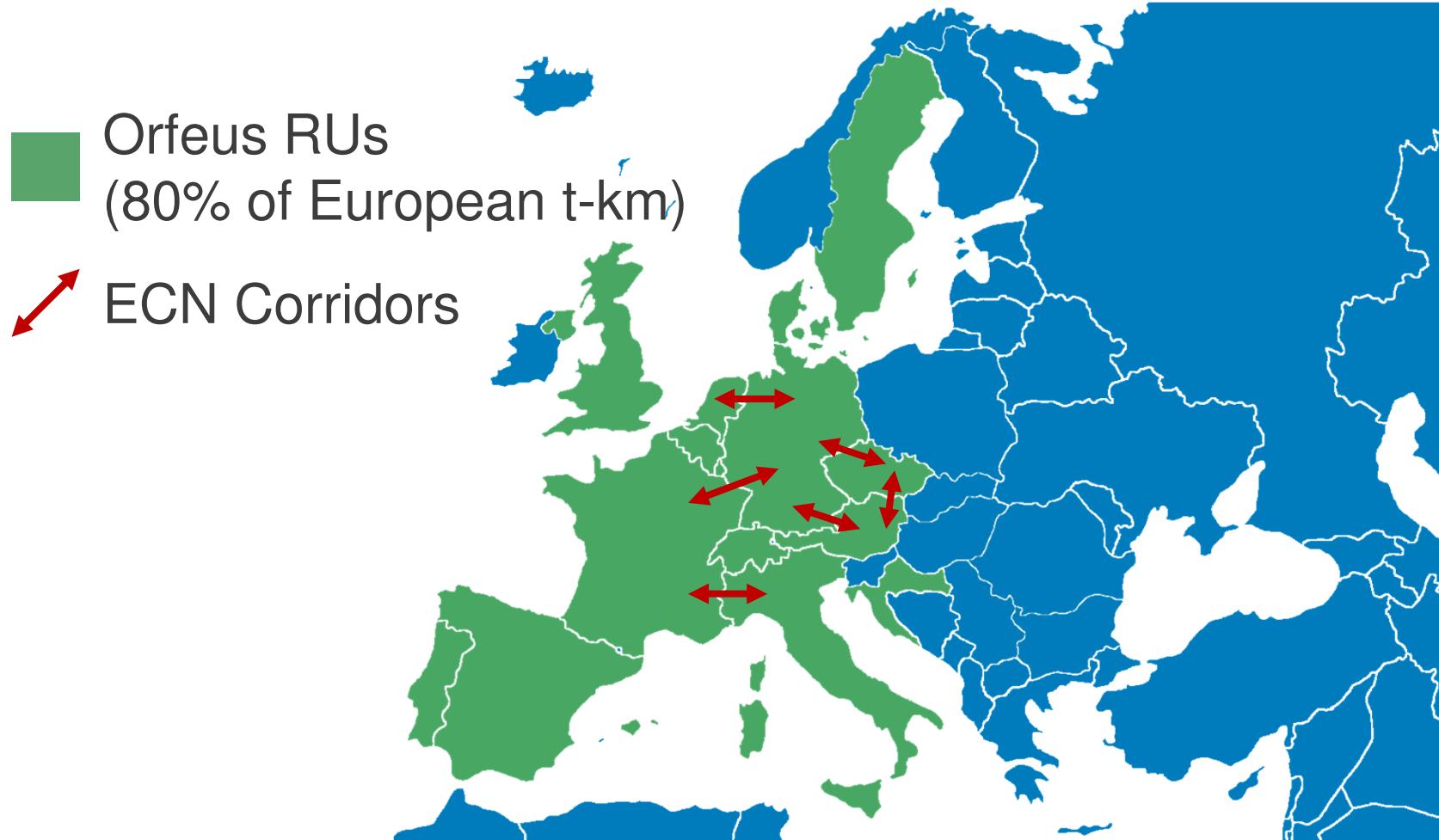
Anytime

Anywhere

Electronic or paper



## Roll-out



# Next steps

## > Substitute carrier

- Simplified message flow

## > Implementations for

- Intermodal transports
- Trilateral transports

## > SMGS : Common CIM-SMGS message format

- With CIT and OSJD
- For Eurasian corridors

# Digital Freight Train **E-WAG**

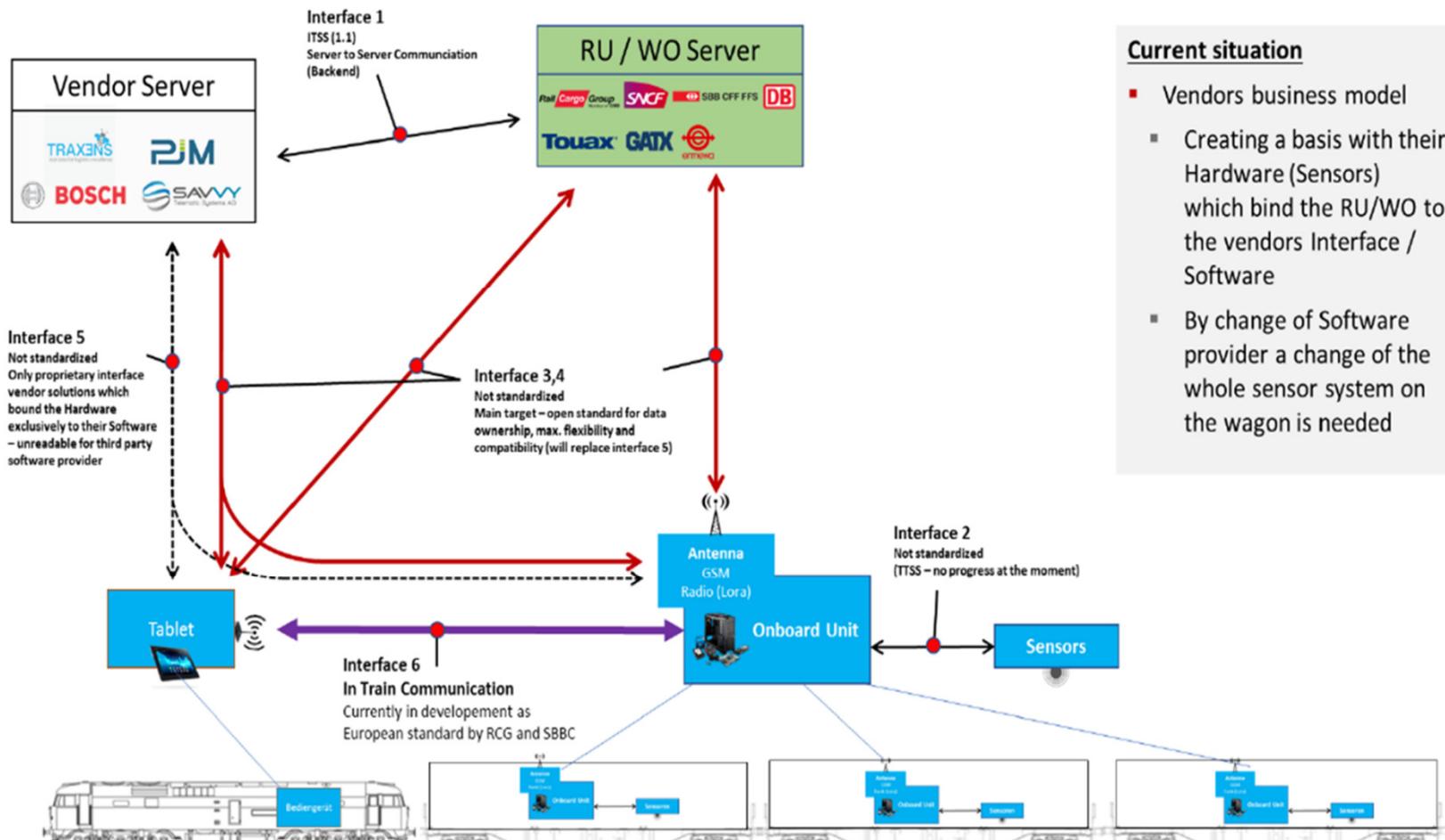
# Intelligent Assets for Freight Wagons

Main Use cases	Short term Sub Use Cases and Data Types: Implementation within current project				
Tracking & Tracing	Last known position* ■ [GNSS position]	Positions in time interval* ■ [GNSS position list]	Mileage* ■ [meters]	Estimated time of arrival ■ [UTC time stamp]	Ident. of delays ■ [UTC format]
Brake Monitoring	Monitoring brake valve ■ [pressure]	Monitoring hand brake ■ [hand brake on / hand brake off]			
Shock detection	Detection of shunting shocks* ■ [shunting shock detection] ■ [UTC time stamp of shock] ■ [GNSS position]		Automatic derailment detection ■ More, repetitive vertical shocks within short time period ■ Time stamp first shock ■ GNSS position		
Weighting / (Over) Load detection	Loading state* ■ [Loaded / unloaded / unknown] ■ [UTC time stamp]	Uneven load detection ■ [uneven load detected] ■ [percentage] ■ [GNSS position]	Overload condition detection* ■ [Overload detected] ■ [UTC time stamp of detection] ■ [GNSS position]	Loading shock detection* ■ [loading shock detected] ■ [UTC time stamp of shock] ■ [GNSS position]	Weighting ■ [kg] ■ [UTC time stamp of detection] ■ [GNSS position]
Load surveillance (inside wagon)	Temperature ■ [°C] ■ [GNSS position] ■ [UTC time stamp]	Humidity ■ [%] ■ [GNSS position] ■ [UTC time stamp]	Door surveillance ■ [door open / door closed] ■ [door number] ■ [GNSS position] ■ [UTC time stamp]		

# Intelligent Assets for Freight Wagons

Main Use cases	<u>Long term Sub Use Cases and Data Types: Implementation out of current scope</u>			
<b>Automatic Brake test</b> 	<b>Capturing of train formation</b> ■ [list of wagon numbers]	<b>Train integrity check</b> ■ [Integrity check passed / integrity check failed]	<b>Automatic brake test</b> ■ [Brake test passed / brake test failed] ■ [GNSS position]	
<b>Shock detection</b> 	Automatic derailment detection ■ More, repetitive vertical shocks within short time period ■ Time stamp first shock ■ GNSS position]			
<b>Condition based maintenance</b> 	Monitoring of wear down ■ Brake blocks ■ Replace by demand	Monitoring of technical condition ■ Distributor valves ■ Slack Adjuster	Identification of components ■ Traceability / LLC control	Flat spot detection ■ Axle ID ■ Time stamp first detection ■ GNSS pos. first detection
<b>Active Control</b> 	Temperature inside/outside the wagon (eg. humidity) ■ Active control of a fan or lid ■ Time stamp ■ GNSS position			

# Interfaces for Sensors in Freight Railways



## Current situation

- Vendors business model
  - Creating a basis with their Hardware (Sensors) which bind the RU/WO to the vendors Interface / Software
  - By change of Software provider a change of the whole sensor system on the wagon is needed

# Objectives

## > Interoperability

Any wagon

Any where

Any sensor vendor

## > In collaboration with Wagon Keepers and Shippers