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Chairman RACE network RFID

RFID
Radio Frequency
Identification in Rail



TRAFIKVERKET

Swedish Transport Administration



RFID

Radio transmission of data between tag/transponder and reader

Definitions – RFID

RFID – Radio Frequency IDentification

- Is a technology for wireless communication between a reader and a transponder/tag

RFID can be split into **active** and **passive** systems:

- Active systems have a battery in the transponder/tag
- Passive systems have no battery in the transponder/tag

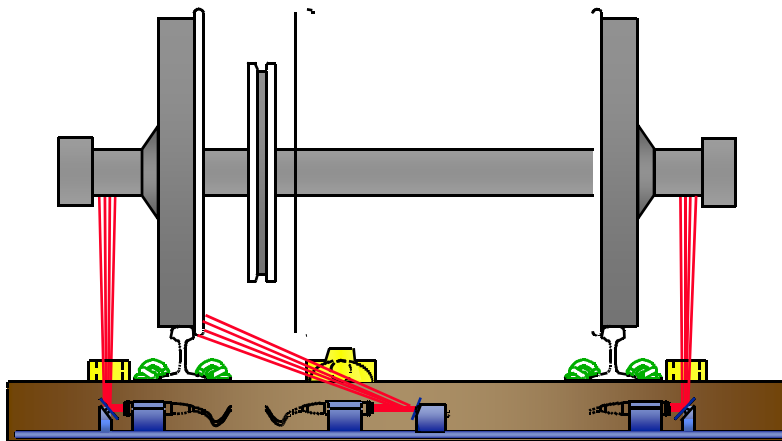
RFID Proof of Concept (period 2005-2008)

- RFID testing for several years with active and semi active solutions
- About 500 wagons has been tagged
- Great results with RFID reading (but no real application developed)

Suppliers has been:

Tagmaster Adage (Amtrac/Transcore)

One area of interest with RFID are detector measurement and wagon ID!



Hot Box/Hot Wheel
detection



Detector

Carbon Stripe Camera

Carbon stripe fault detection

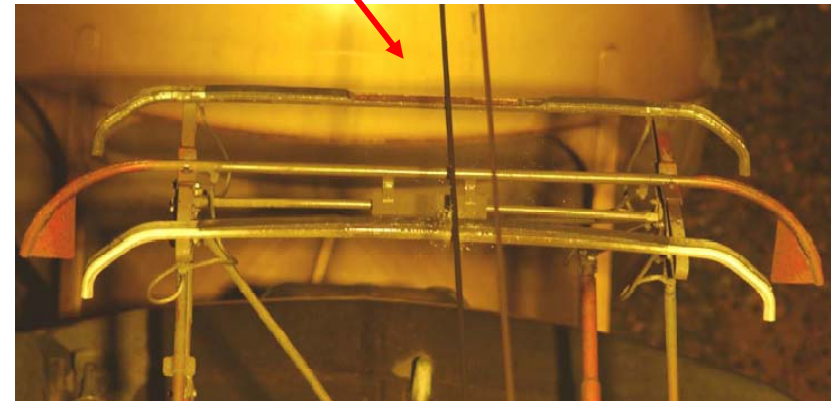
Digital camera

Flashlight

Radar



Picture analyses



TSI rolling stock — freight wagons

EU legislation for rail transport in Europe

- RFID transponders/tags are not mandatory
- Two passive transponders/tags per wagon, mounted on the left side
- ISO 18000-6 type A air interface
- Reads the individual tag ID/wagon ID, date and time
- Speeds up to 30 km/h

Rail traffic in Europe

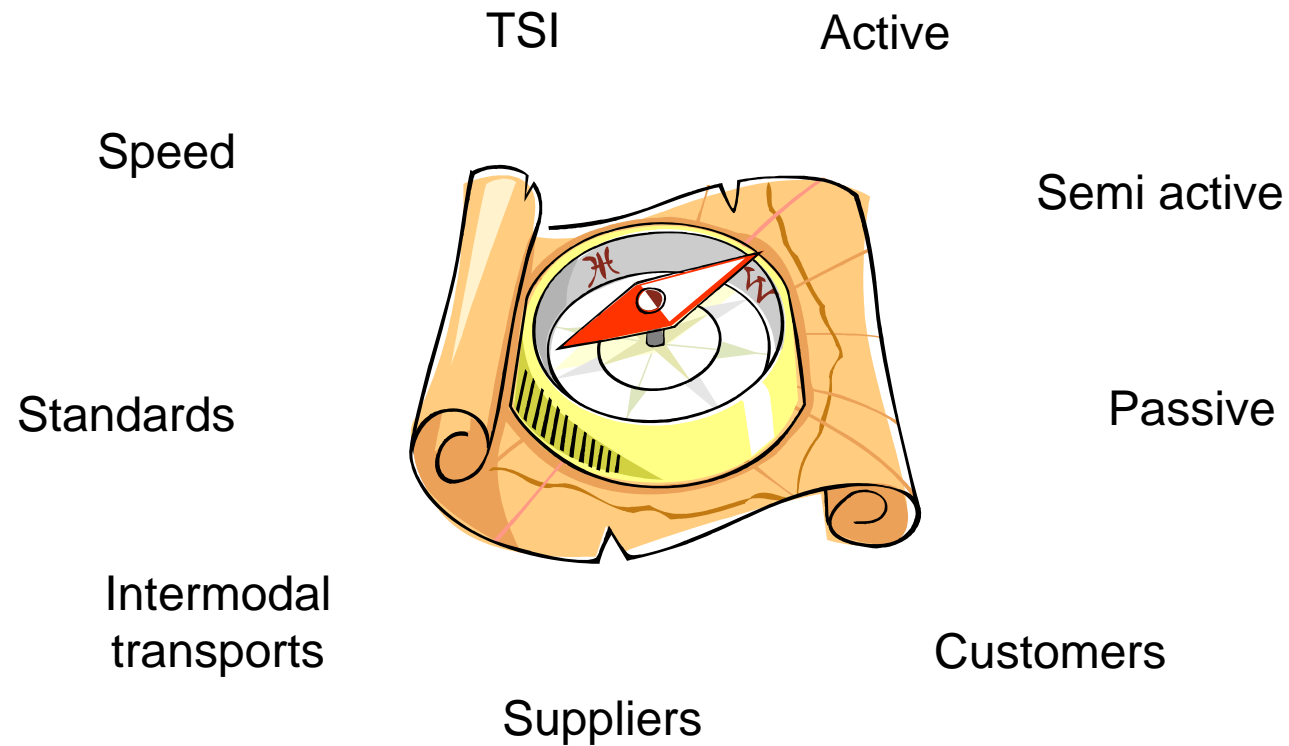
60-70% of wagons in Sweden come from other European countries

Need:

- European standard for RFID system
- Standard for information exchange



Navigation – way to GO?



External support



RFID demands for a pre-study (2009)

- Speed over “160” km/h
- Open standard
- Potential EU-standard
- Easy to maintain
- Competitiveness
- Robust
- Possible to use in other transport systems

Pre-study results:

Upgrade TSI

- Upgrade air interface standard to ISO 18000-6 type C
- Speeds up to max speed of the wagon
- Not just for shunting yards but also trackside detection
- Recommend RFID transponder/tag on rolling stock – freight wagons

Position paper

- Finland (RHK) and Sweden (BV)
- EIM – ERA – Commission

Published on EIM website: www.eimrail.org/techpapers.html

GS1 – a standards body

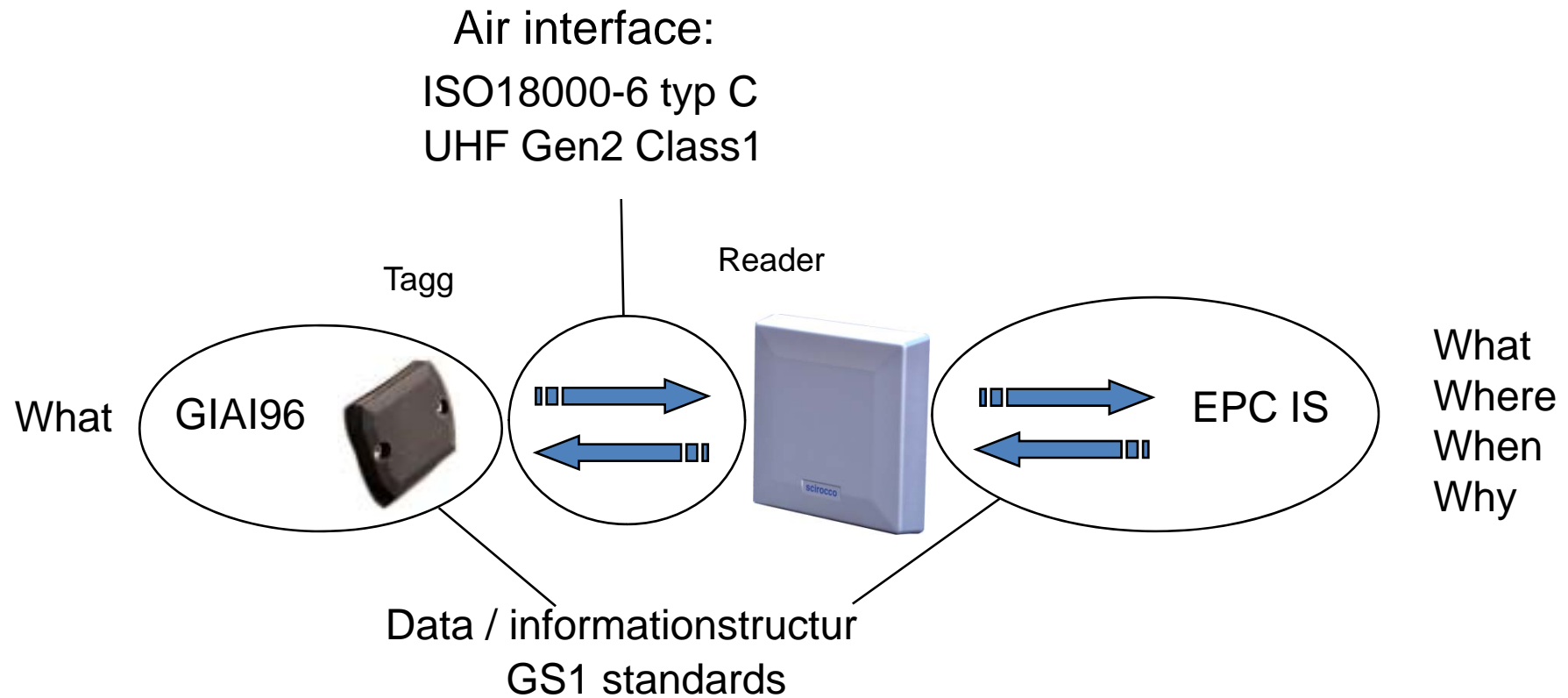
- ✓ Owned by its member organisations
- ✓ 1.3 million customers
- ✓ Offices in 108 countries - operations in 145 countries

GS1 Transport

One of five prioritised GS1 projects
Swedish Rail Project – rail in general

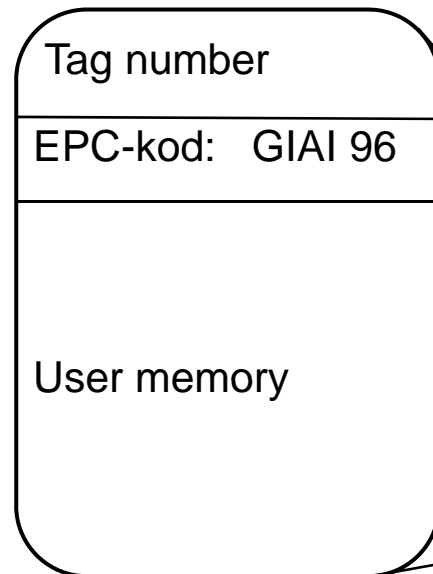


STANDARDS



EPC

Transponder/tag



(Header, FilterValue, Partition, Company Prefix, Individual Asset Reference)

Company prefix, A/B + Wagon number

1/2 + 12 digits



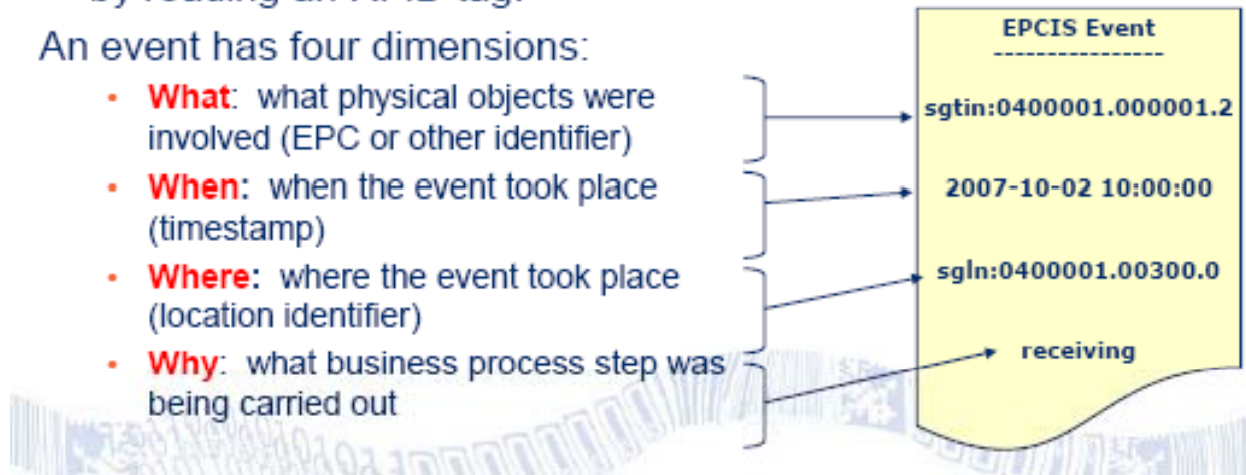
EPCIS

EPCIS Data consists of **events**, each of which records something that happened in the real world.

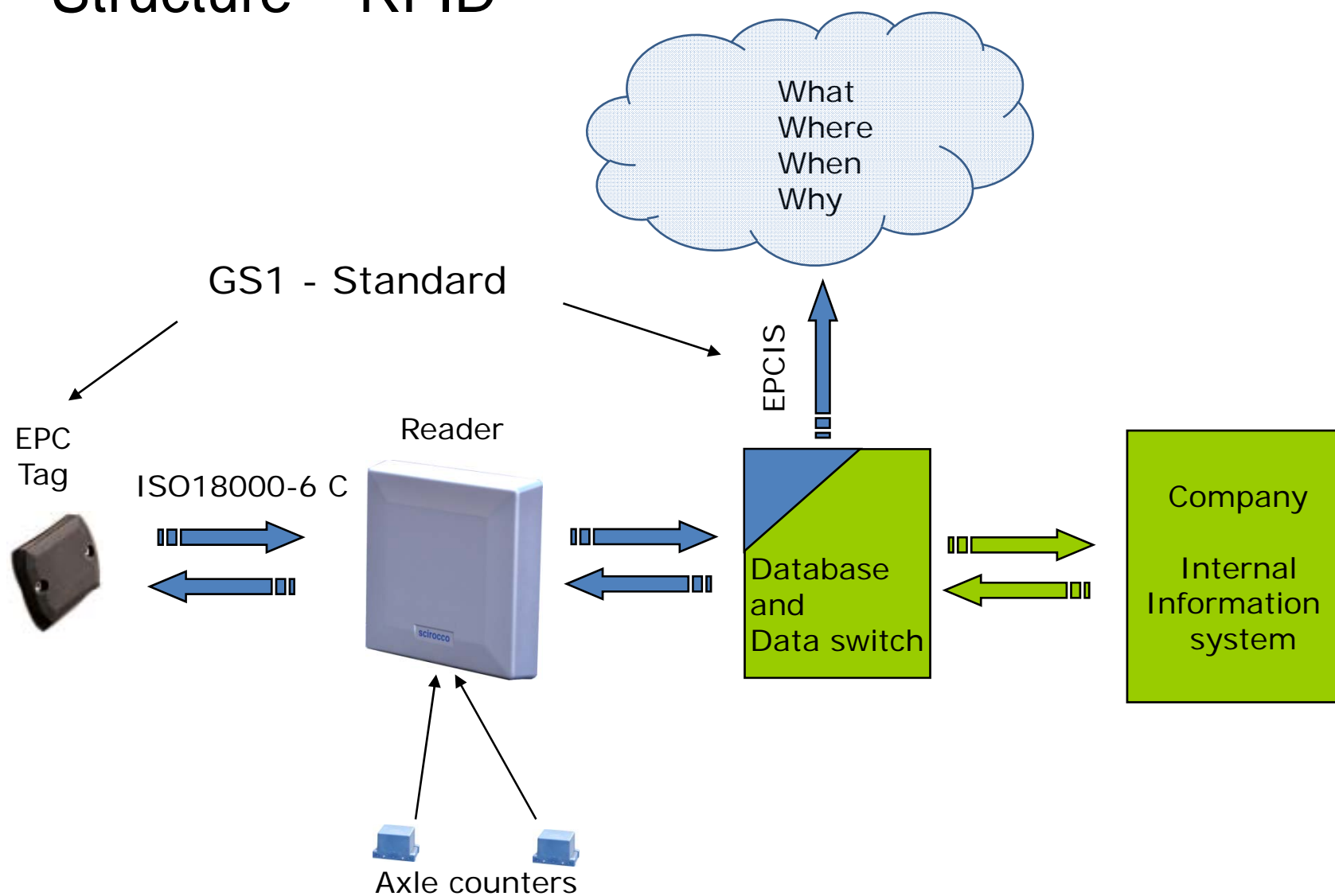
Often, though not necessarily, triggered by reading an RFID tag.

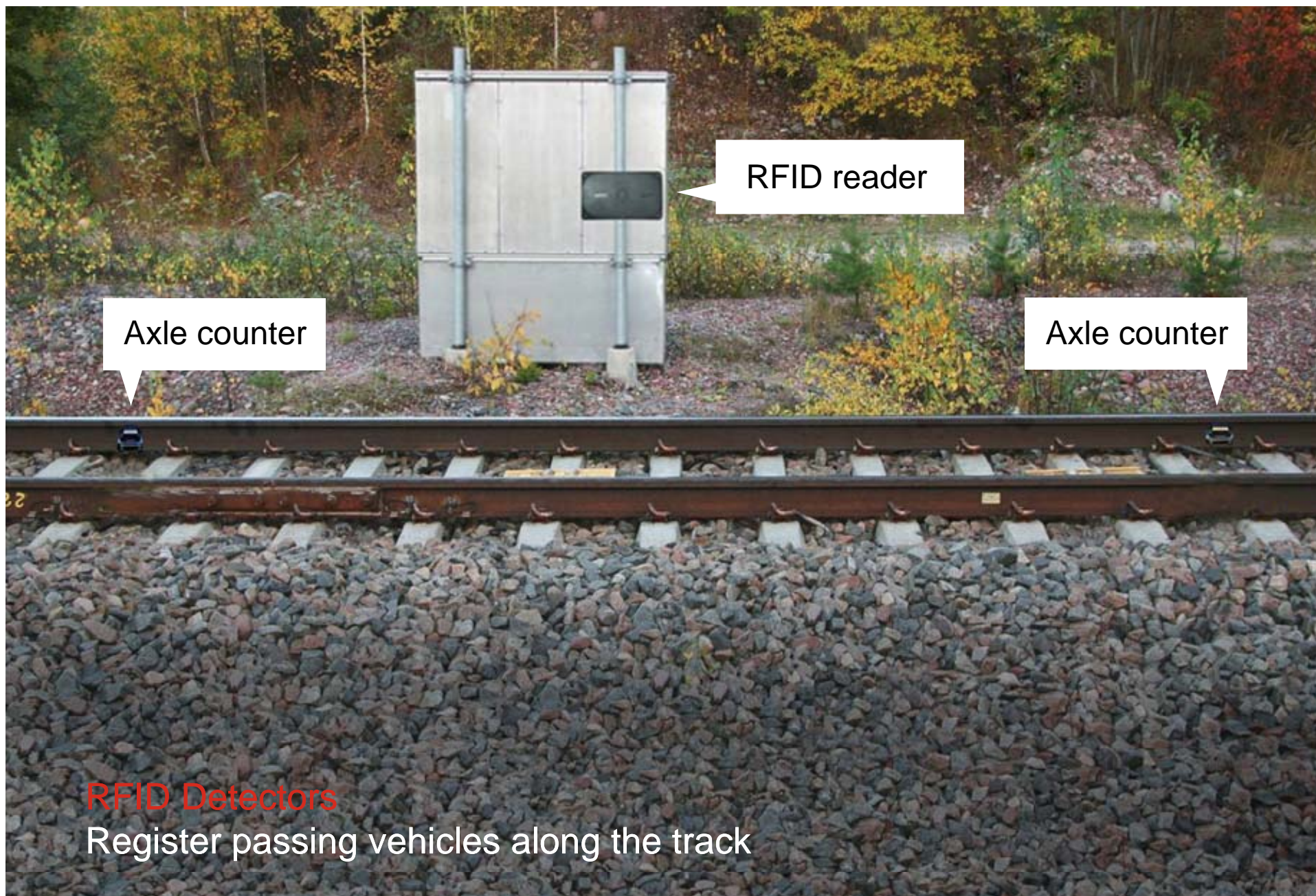
An event has four dimensions:

- **What:** what physical objects were involved (EPC or other identifier)
- **When:** when the event took place (timestamp)
- **Where:** where the event took place (location identifier)
- **Why:** what business process step was being carried out



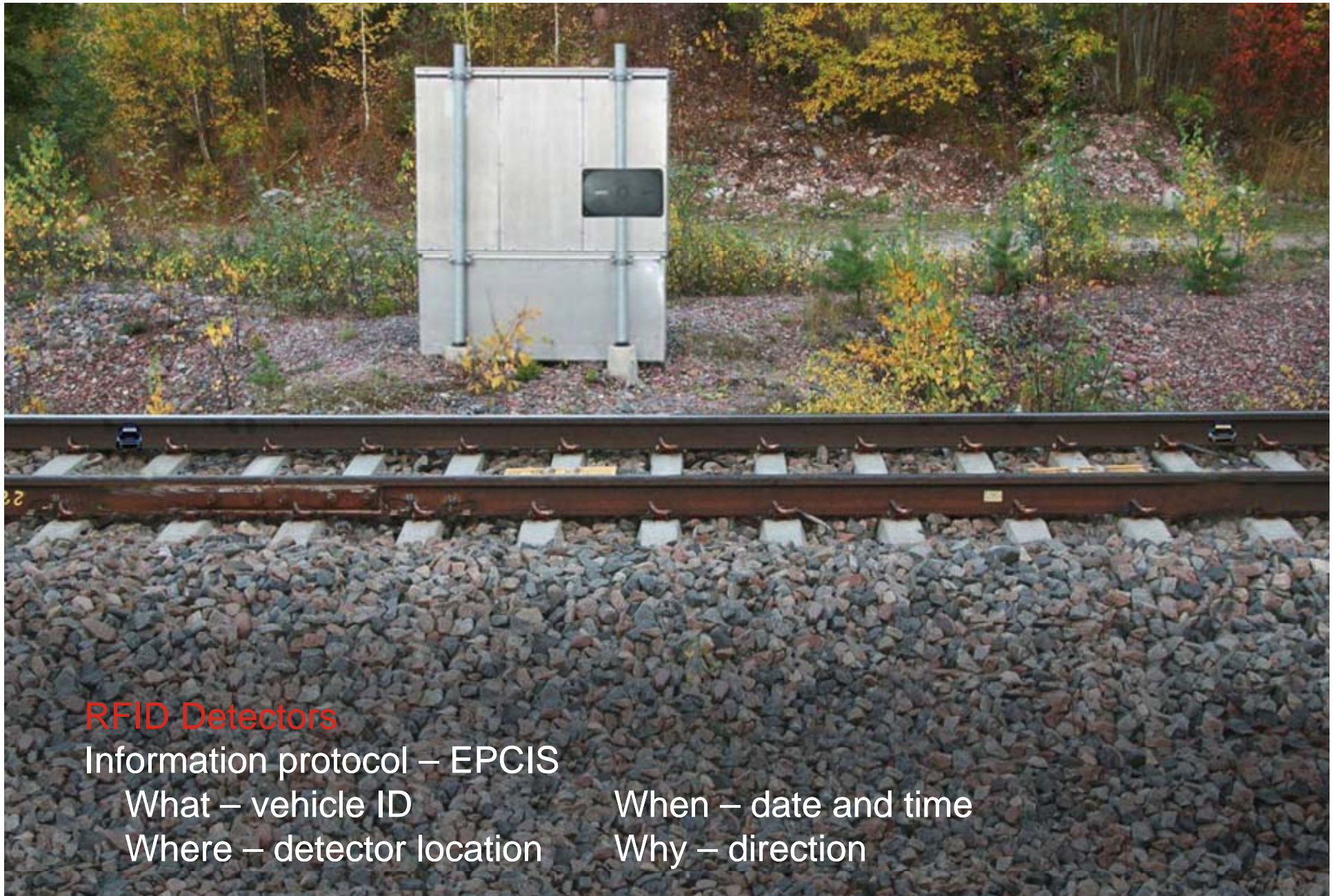
Structure – RFID





RFID Detectors

Register passing vehicles along the track



RFID Detectors

Information protocol – EPCIS

What – vehicle ID

When – date and time

Where – detector location

Why – direction

Ongoing RFID projects:

SSAB: Steel billet train Luleå - Borlänge *Active RFID*

SCA: Paper wagons Munksund - Holmsund – *Semi-active RFID*

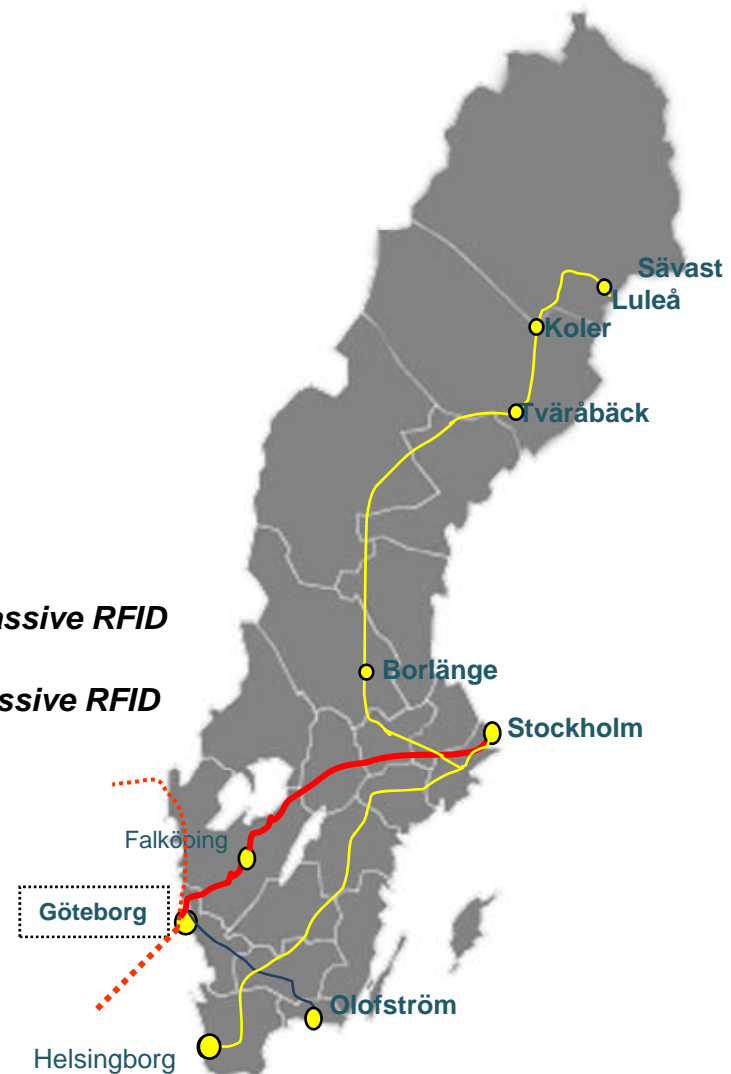
Dry Port: Falköping - Göteborgs hamn - *Passive RFID*

Posten: Post train Stockholm – Göteborg – *Passive RFID*

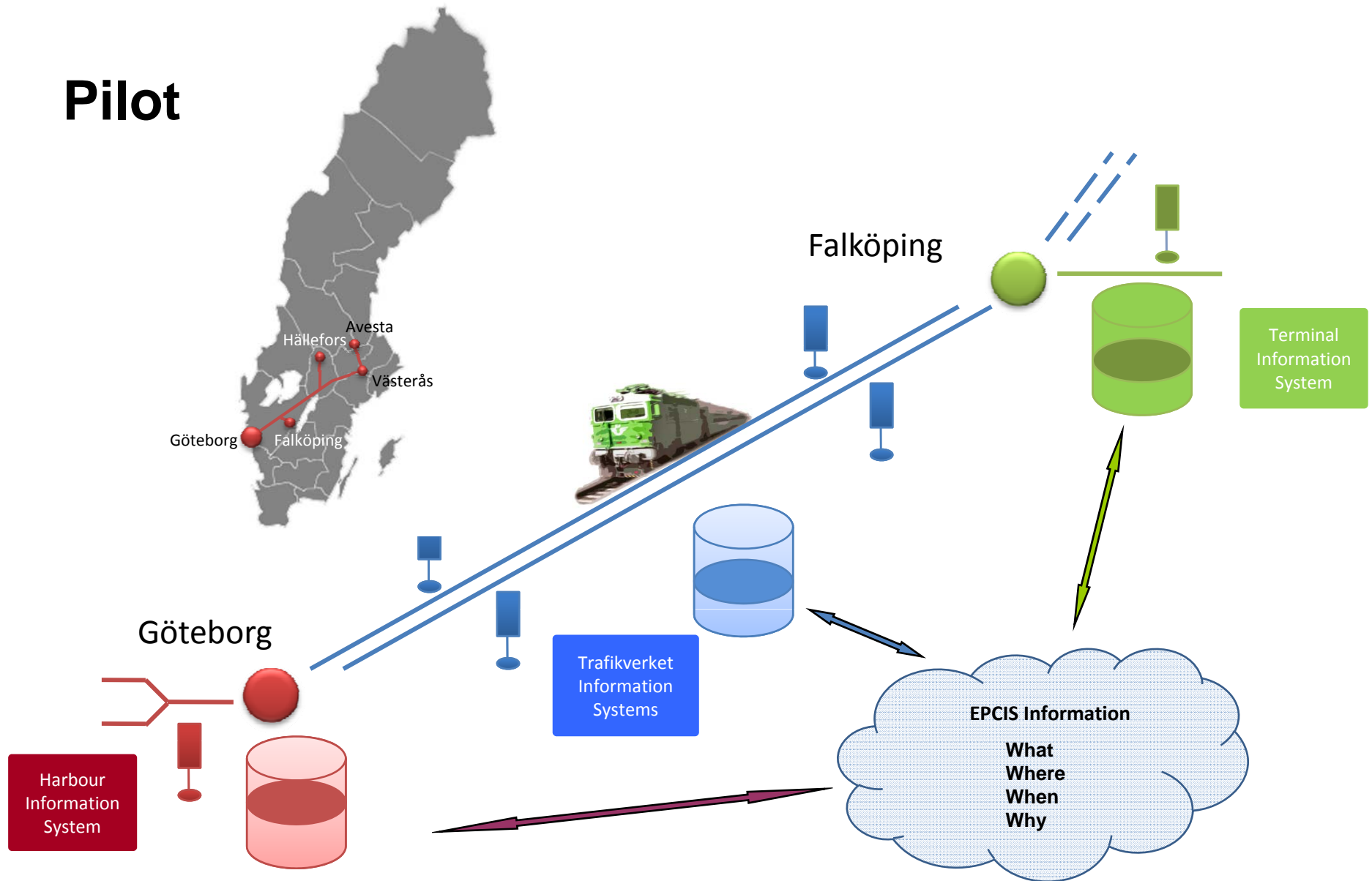
Volvo: Train shuttle Olofström – Göteborg – (Gent) - *Passive RFID*

Green Cargo: Intermodal transports Helsingborg – Stockholm – *Passive RFID*

SJ: X2000 “high speed” train Stockholm – Göteborg 200km/h - *Passive RFID*



Pilot



RFID - GPS (satellite positioning)



RFID:

- Know which reader locations a wagon has passed
- Know in which zone (between reader locations) a wagon is

GPS:

- Know in real-time where a train (locomotive + wagons) is

RFID+GPS:

- Know in real-time the exact position of every individual wagon

Benefits for Trafikverket/ Swedish Transport Administration

- Combine detector measurement and alarms with correct vehicle
- Lower costs for track maintenance,
- Less disruption of traffic
- Correct train assembly
- Correct charging

Benefits for Railway companies

- Track and trace wagons
- Proactive vehicle maintenance based on input from trackside detectors
- Combine detector alarms with correct vehicle
- Lower cost for vehicle maintenance
- Less disruption of traffic
- More effective shunting of freight wagons
- Correct train assembly
- Correct charging

Benefits for the customer of cargo transports

- Enables intermodal transport
- Track and trace wagons and freight across the whole of Europe
- Better use of resources
- Lower freight costs
- Reduced environmental impact
- Correct charging

Deployment in Sweden

- Build an infrastructure of 500-700 RFID readers along Swedish Transport Administration's tracks
 - Major junctions/stations
 - Shunting yards
- Requirements specification for procurement of RFID readers 2010
- Limited installation and deployment 2011
- Full roll-out of RFID readers 2012-2013

Future:

Transport Administration

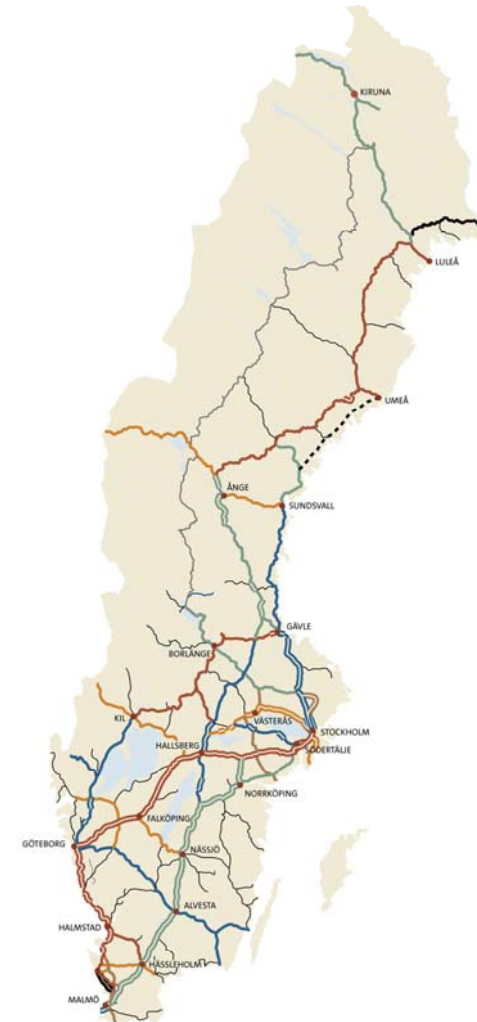
- Will build the infrastructure with 500-700 readers
- Will strive for a European standard

Railway companies / operators

- Wagon owners will tag their own wagons

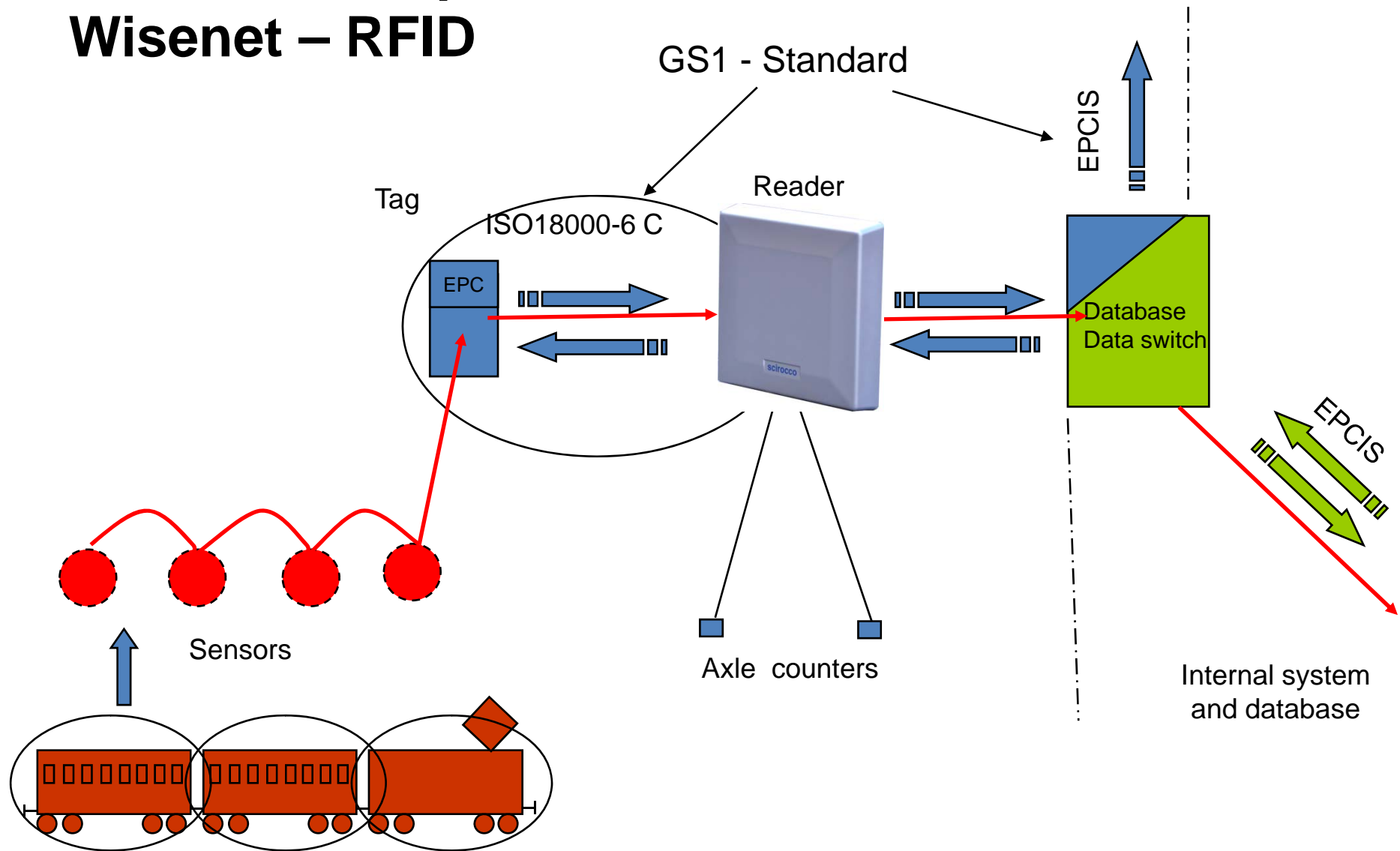
Market

- Than it's up to the market to get use of the information provided to develop new services and business



Future development

Wisenet – RFID



Outside Sweden

- Finland
- Norway
- UK
- France (Spain and Poland)
- Belgium
- Switzerland
- Austria





Thank you!

Any questions?

