

# Czech electronic toll collection - Next steps

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**SDT**

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Czech and Slovak Intelligent  
Transport Systems & Services

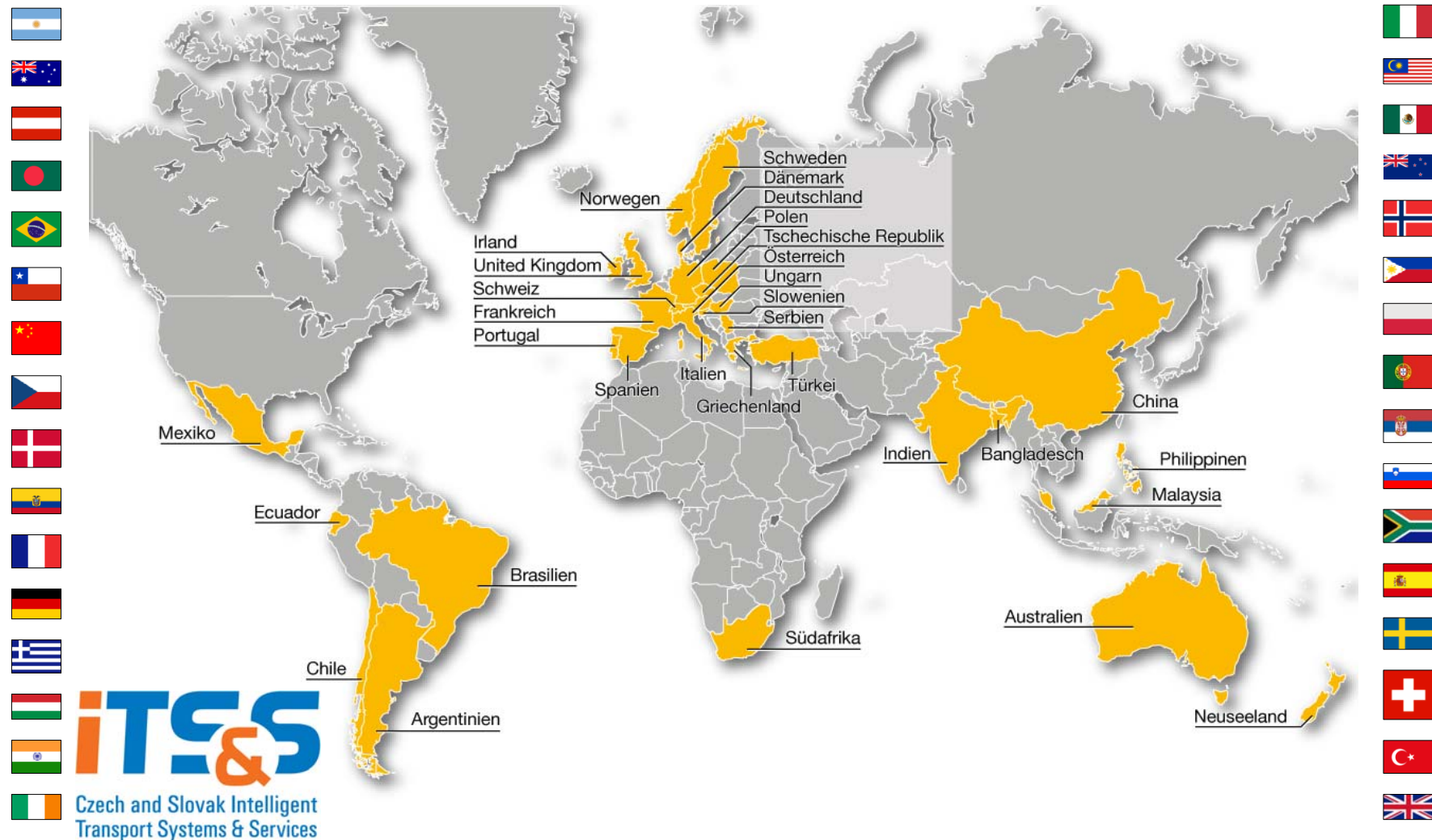


## Kapsch Telematic Services Czech Republic.

- Czech Republic Truck Tolling System and traffic telematics operator
- System Integrator of the Czech Republic Truck Tolling System.
- Established in 2006, headquarter in Prague.
- About 140 employees today.
- Kapsch Telematic Services was listed among the „Czech Top 100 Best“ companies for 2006 and 2007



**Kapsch references: 218 installations in 35 countries.**



## Basic facts about Czech ETC.

- Toll for vehicles **over 12 tons** maximum gross weight.
  - vehicle categories (axles and emission class).
- Actually **about 1200 km of tolled roads** in the operation.
  - Operation of about 970 km highways and motorways (1st Phase) from 1st January 2007.
  - Operation of about 180 km 1st class roads (2nd Phase) from 1st January 2008.
  - Newly completed highways and motorways.
- Open system architecture & **Multi Lane Free Flow** with compulsory OBU (On-Board-Unit).
- Deposit for OBU (prepay or post pay payment) approx. 57 EUR (1.550,- CZK).
- Average toll 0,16 EUR/km for H+M and 0,08 EUR/km for 1st class roads.



The total performance of the Czech e-toll system is **about 99%**

## Who is who in Czech ETC.

**Buyer:** Czech Ministry of Transport (MD ČR)



**Operator:** Czech Road and Motorway Directorate (ŘSD ČR)



**Mobile Enforcement:** Czech Customs Administration (GŘC ČR)



**Project Manager:** Consortium of Deloitte and Bovis



**Independent Auditor:** LogicaCMG



**General Contractor and operator of services of ETC:** Consortium Kapsch



- Consortium Kapsch won the tender (2005) with microwave (DSRC) technology, with open system architecture within and Multi Lane Free Flow System, with mandatory OBU.
- System implemented only within 9 (!) months which is international recognized world record! Operation started on January 1, 2007 for heavy vehicles with a maximum permissible lade weight of 12 tons and above.



Kapsch provides the complete operation services for the Czech Republic



## Facts & Figures of the first 2,5 years of operation.

- In 2007, the first year of operation, was earned **EUR 213 mio.** In 2008, the second year of operation, the collected toll footed up to **EUR 245 mio.** in total.
- By the August 2009, almost 420.000 active OBUs, are registered in the system - even 3 times more the highest expectations!
- The revenue in 2009 is about 10 % lower in comparison with 2008, and is the same like in 2007. The estimation of the total revenue in actual year is **EUR 207 mio.**
- Table of weekly revenue:

Week	2008	2009	Index	Change 2008-2009		2007	2009	Index	Change 2007-2009
25	127 923 358	112 860 552	88,23%	-11,77%		113 645 793	112 860 552	99,30%	-0,70%
26	125 372 215	112 508 752	89,74%	-10,26%		113 770 908	112 508 752	98,90%	-1,10%
27	122 636 927	109 877 299	89,60%	-10,40%		87 851 428	109 877 299	125,07%	25,07%
28	121 768 989	100 516 286	82,55%	-17,45%		112 928 618	100 516 286	89,01%	-10,99%
29	119 789 285	106 598 076	88,99%	-11,01%		110 835 803	106 598 076	96,18%	-3,82%
30	116 450 928	104 292 156	89,56%	-10,44%		107 220 943	104 292 156	97,27%	-2,73%
31	109 326 943	104 546 408	95,63%	-4,37%		99 147 931	104 546 408	105,44%	5,44%
32	103 952 508	103 635 861	99,70%	-0,30%		97 401 416	103 635 861	106,40%	6,40%
33	109 159 141	105 648 126	96,78%	-3,22%		102 829 030	105 648 126	102,74%	2,74%
34	114 169 873	108 780 525	95,28%	-4,72%		106 681 294	108 780 525	101,97%	1,97%
35	118 942 014	114 674 371	96,41%	-3,59%		110 488 401	114 674 371	103,79%	3,79%

Source: Czech toll project MYTO CZ



**Czech electronic toll operation -  
two and half years of experiences.**



## Electronic tool operation experiences.

**Short time implementation**



**Cost-effective indicator and PPP**



**Toll system effectiveness**



**Number of users and OBU's**







## Next steps



## Toll system extension

**DSRC technology extension  
in all new highways**



**Interoperability**

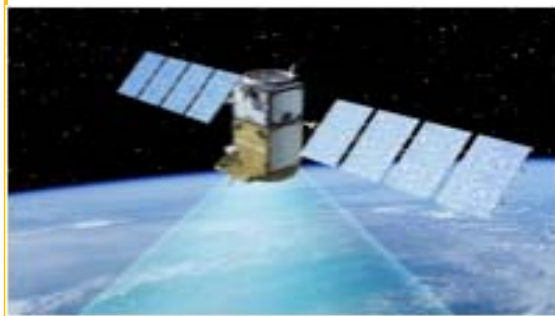
**Toll collection for vehicles  
above 3.5 tonnes**



**Electronic coupons for time-based  
fee for personal cars**



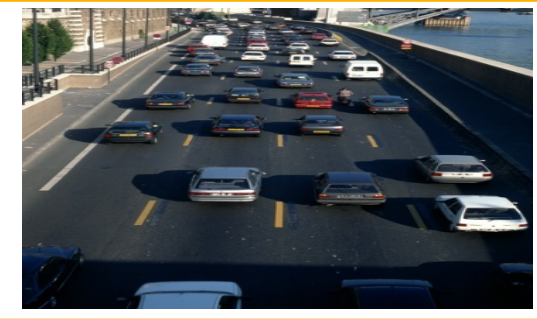
**Hybrid tolling solution for low  
class roads**



**Traffic Management System**



**City charging in Prague**



## Next steps – Extension of the System, Interoperability.



- The electronic tolling system was in 2007 implemented in one part so far – on highways and motorways. After evaluation of technical and economical aspects had Czech Ministry of Transport decided to complete the electronic tolling on highway and motorway network with microwave technology because of undeniable benefit of this technology. That means, from 2008 approximately 180 km of selected **1st class roads**, used for transit, had be tolled with microwave technology.
- The distance-related tolls are to be extended to cover all vehicles of **3.5 tonnes** or more **by January 1, 2010**.
- The on the microwave DSRC technology based system will be in **the future extend** to include another approximately 1,000 km of future motorways, the construction or extension of which is scheduled to begin **by the end of 2017**.
- **Interoperability**

## Toll collection for vehicles above 3.5 tonnes.



- **Czech Parliament decided to extend electronic toll collection for all vehicles above 3.5 tonnes from January 2010.**
- Kapsch makes the necessary adaptations to the existing Czech Electronic Toll System and prepares the OBU's.
- Tolling duty for all lorries is rightful and common in whole Europe (except Germany), e.g. in neighbouring Austria or prepared one in Slovakia.
- The extension of toll to all trucks is agreeable also for the largest domestic association of road transport operators CESMAD BOHEMIA.
- Czech MoT together with experts from CVUT chose an option which is counting with the same tariff conditions like for heavier trucks.
- **With operation until 2017 accrued profit of 3,5 ton's trucks is going to work out EUR 769 mio = profitable project.**



## Transport safety and telematics.

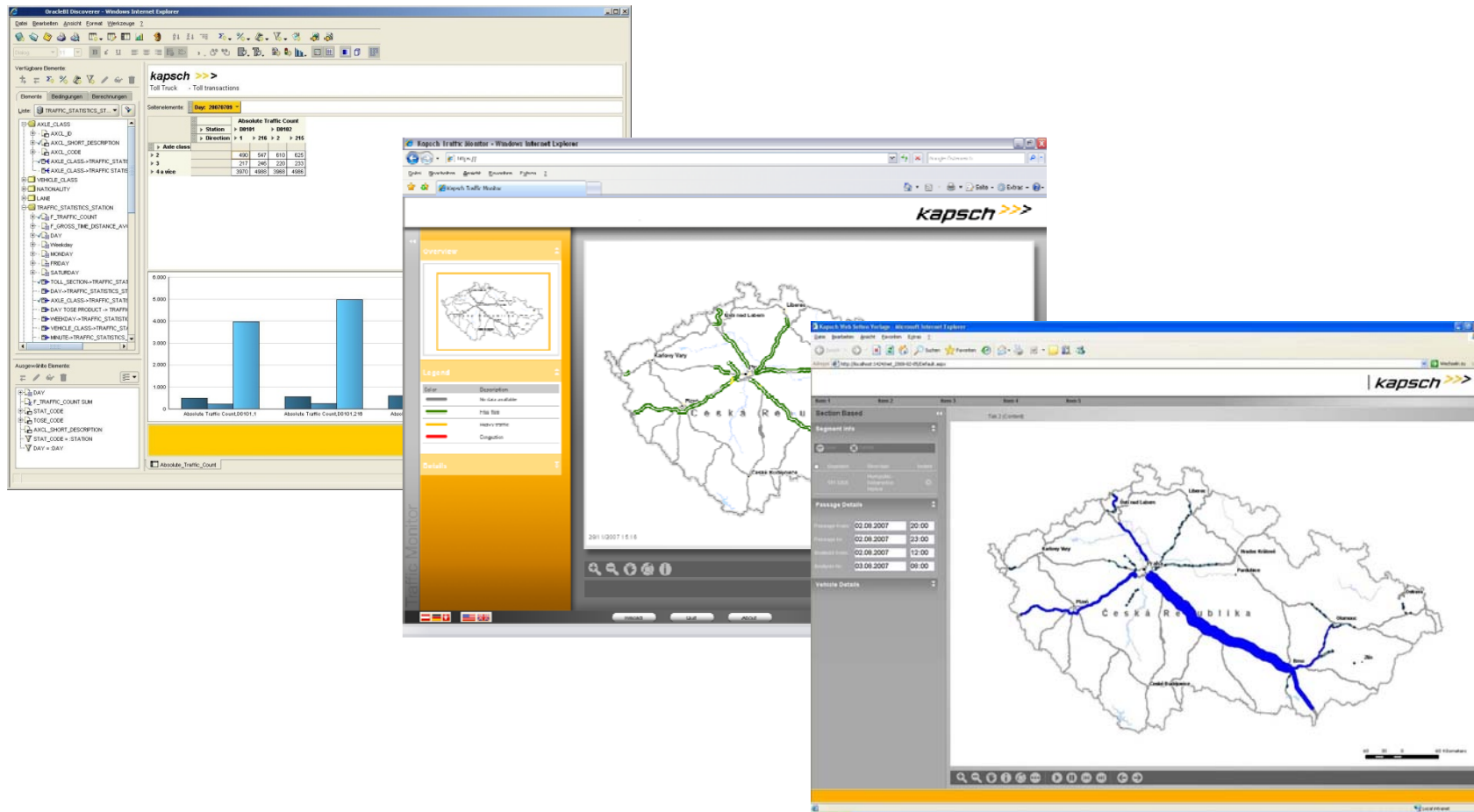


- The Czech electronic toll system from Kapsch provides an ideal infrastructure for implementing a broad spectrum of traffic telematics solutions starting from capturing traffic data for traffic management and planning, applications for improving safety & security, mobility services for improving comfort for the road user, to solutions for various industries like fleet tracking or pay-as-you-drive car insurance.
- Toll system for transport safety:
  - Implementation of the **Traffic Management System** for the Czech highways by means of using existing infrastructure of tolling system.
    - sensor and cameras
    - VMS variable message signs
    - TIT traffic information tables
    - TT travel time

The traffic information system serves for the collection of traffic data in conjunction with the ETS. This traffic data is sent to the NTIC which analyses the data and provides it to drivers either via the variable info signs or via mobile phones, radio and navigation systems“

- **NTIC** (National traffic information center) – electronic toll collection system data are the main source of indications, besides police, IZS, meteorologists information, traffic reports and road infrastructure.

# Traffic monitoring, Statistics, Analysis



## Hybrid tolling solution for low class roads.



Kapsch System Concept shows how a future national road pricing system could be implemented for all roads and all vehicles:

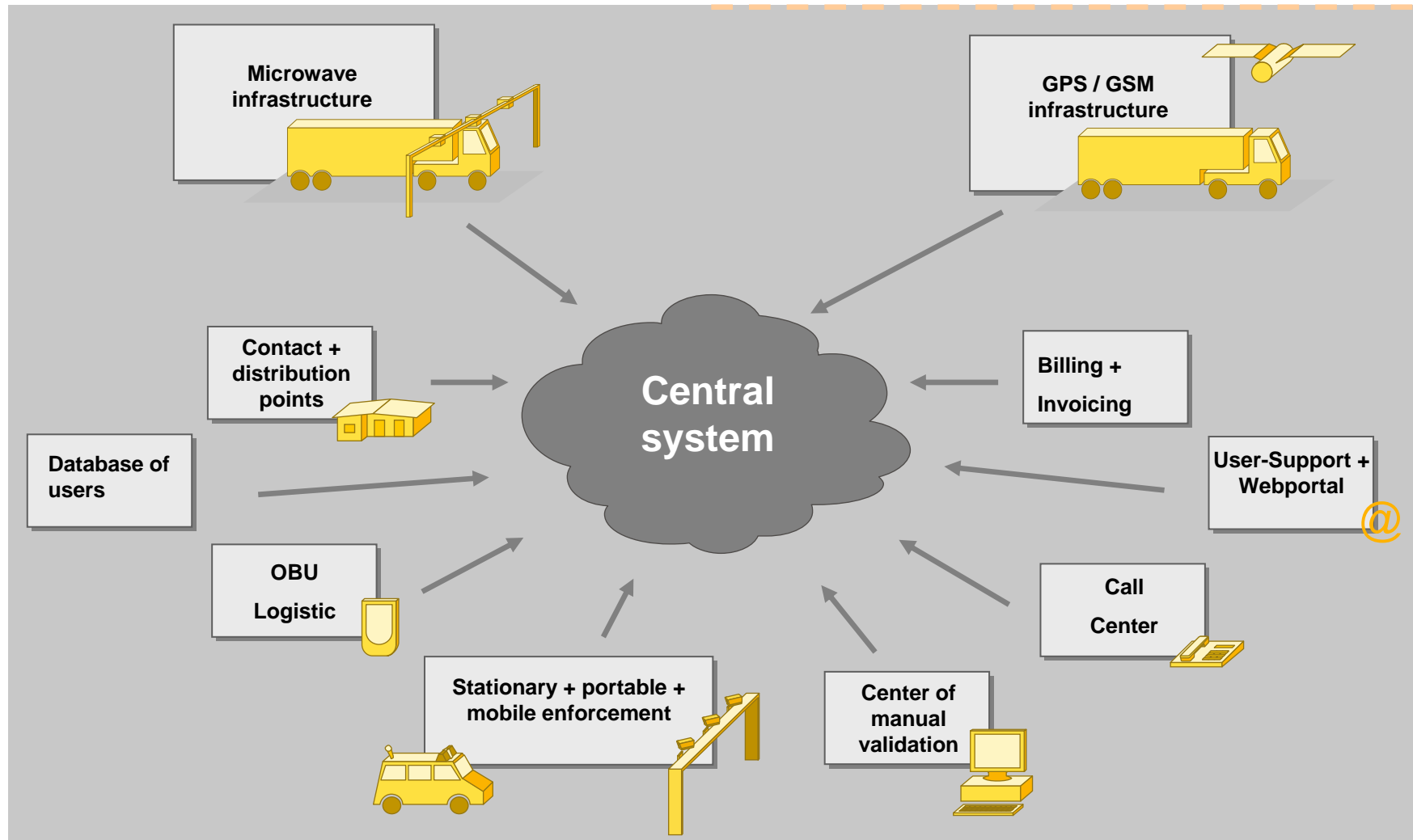
- DSRC for motorways and other main roads (current solution)
- GPS/GPRS for rural roads (Trial)
- DSRC/Video charging for urban areas or specific charging zones (Parking)



GPS/DSRC on-board unit

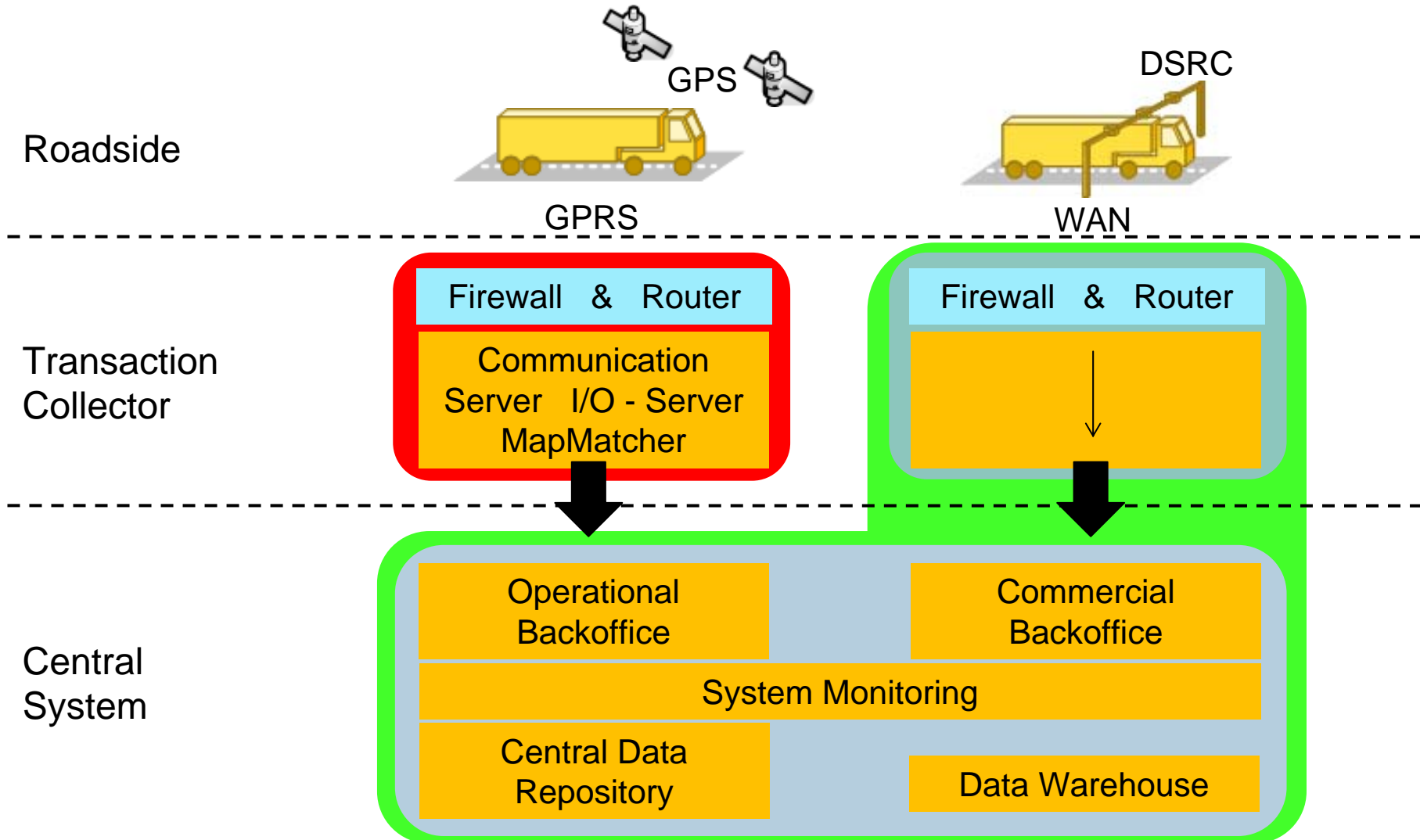
3 system parts fully compatible: enable the system planners to choose the best technology for each specific use case

# Czech Republic Truck Tolling System is open.





## Kapsch Area / System overview



## Benefits of Kapsch Area Hybrid OnBoard Unit.

- Sophisticated device designed for both microwave as well as satellite-based charging.
- Designed for windscreen mounting and self-installable within a few minutes.
- Very easy to use.
- Due to their simplicity the OBUs can be distributed via a broad spectrum of point-of-sales like gas stations, kiosks etc. or send by mail after a user has registered over the web or by phone.
- Basis for additional telematic applications.



## The hybrid toll system

- The pilot project of hybrid toll system for the electronic toll collection on 1st class, 2nd class and 3rd class roads.
  - Kapsch is implementing the interface for a future satellite-based toll collection system to achieve the hybrid toll system, which will combine existing Czech electronic toll system with satellite technology.
  - Pilot project of the Hybrid system will be part of the delivery, which will work as a full area system with the possibility to provide the tolling of even lower class roads, anywhere in the Czech republic.

## Electronic coupons

Electronic coupons for time-based fee for personal cars



- Replacement of existing „paper“ vignette by anonymous **electronic** one to maximal usage of existing toll system by **January 1, 2011**. In Czech republic, time fee for highways usage is paid **by personal cars**.
  - The electronic vignette will communicate with the existing tolling infrastructure (e.g. information about traffic flow density to prevent accidents and congestions, electronic enforcement of non-payers).
  - Only DSRC technology enable to charge personal cars on highways (low operation costs, OBU purchase price).



## Key Benefits



The Electronic Vignette Concept is

- Cost efficient due to sharing infrastructure with Truck Tolling System
- Providing accurate and reliable data output for traffic surveillance and statistical surveys

Value Added - INCREASING TRAFFIC SAFETY

- Road user gets used to cope with electronic devices enabling time based tolling
- ELHC may be authorized also for other applications, e.g. city toll, parking
- High confidence from users due to absolute anonymity
- Even more benefit for road user due to re-use and sharing of units
- Migration to distance based passenger car tolling possible

## Introduction

- Complete replacement of the current windscreen sticker system with an electronic solution provided by Kapsch for vehicles  $\leq 3,5$  t
- High synergies and cost efficiency due to sharing the infrastructure of the existing truck tolling system
- Every car will be equipped with a small electronic device (OBU/ELC), transmitting an anonymous, but unique transaction code for every unit
- Therefore 100% coverage of vehicles with transponders (OBU or ELC) except motorbikes will allow very accurate traffic recording for real time information (NDIC) and high reliability analysis (telematic data)
- More flexible and innovative Road User services using ELC due to ELC sharing, selfcare web portals, and multiple payment means and channels
- Possible bonus for reuse of the transponder (when purchasing one additional year)



## General requirements

- Cheap and easy-to-install ELC (On Board Unit - „OBU“)
- Utilisation of the existing tolling infrastructure of the Czech Truck Tolling System
- Road User anonymity - no link between ELC, License Plate and the Road User
  - Road User receives PIN Code issued separately with the ELC enabling access to ELC status and other operations (blocking)
- 3 Validity periods with system launch:
  - 10 days
  - 1 month
  - 1 year
- Additional Validity periods during operation:
  - Floating from date to date
- Big distribution point network to bring high comfortability to the users
- Additional payment and reload possibilities will increase useability and acceptance



## Distribution Points, Sales channels

All applications (Web/Cash desk) - IP based Interface to the Central System

Functionalities:

Activation/Issuance of ELHCs with PIN and ELHC certificate

Deactivation/Return of ELHCs

Prolonguement of ELHC Validity Periods

Collection/Refund of ELHC Deposits

Blacklisting (stolen/lost ELHC)

Information on last ELHC activity

- Setup of approximately 2.000 Distribution Points
  - 1000 DPs with Ceska Posta
  - 1000 DPs „on the road“ (fuel chains, ABA)
- Web Application (Self care Portal for Road User)
- Payment by SMS
  - elongation of existing contracts by mobile phone payment

## Roadside Equipment and Enforcement



- Utilisation of the existing tolling infrastructure
- No stationary nor portable enforcement
- Blacklist handling is possible for accurate user signalization - double or quadruple beep in case of lost/stolen or Validity Period expiry. Hardware upgrade on roadside equipment necessary
- Enforcement only handled by mobile units operated by the Custom Administration/Police of CR. Road user has to be stopped!
- 200 handheld control devices („OBU mobile readers“) with GSM connection to central system to be given to authorized personnel (Custom Administration, Police of CR) for checking on parking lots and fuel stations.

## Call Centre, Selfcare Portal

- Setup and operation of a Call Centre:
  - Operating in:
    - Czech, German, English - 24\*7\*365
    - Russian, Hungarian, Polish - 06:00 – 22:00 \* 365
    - Application and knowledge base web based
  - Road User Selfcare
    - Public access internet information portal
    - Languages Czech, English, German, Hungarian, Russian, Polish
    - Secure Access for registered users with PIN and username to retrieve account information (Expiration date, account status, last known transaction)
    - Furthermore blacklisting (report lost or stolen units), remote payment elongation via web payment platform





**Thank you.**



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