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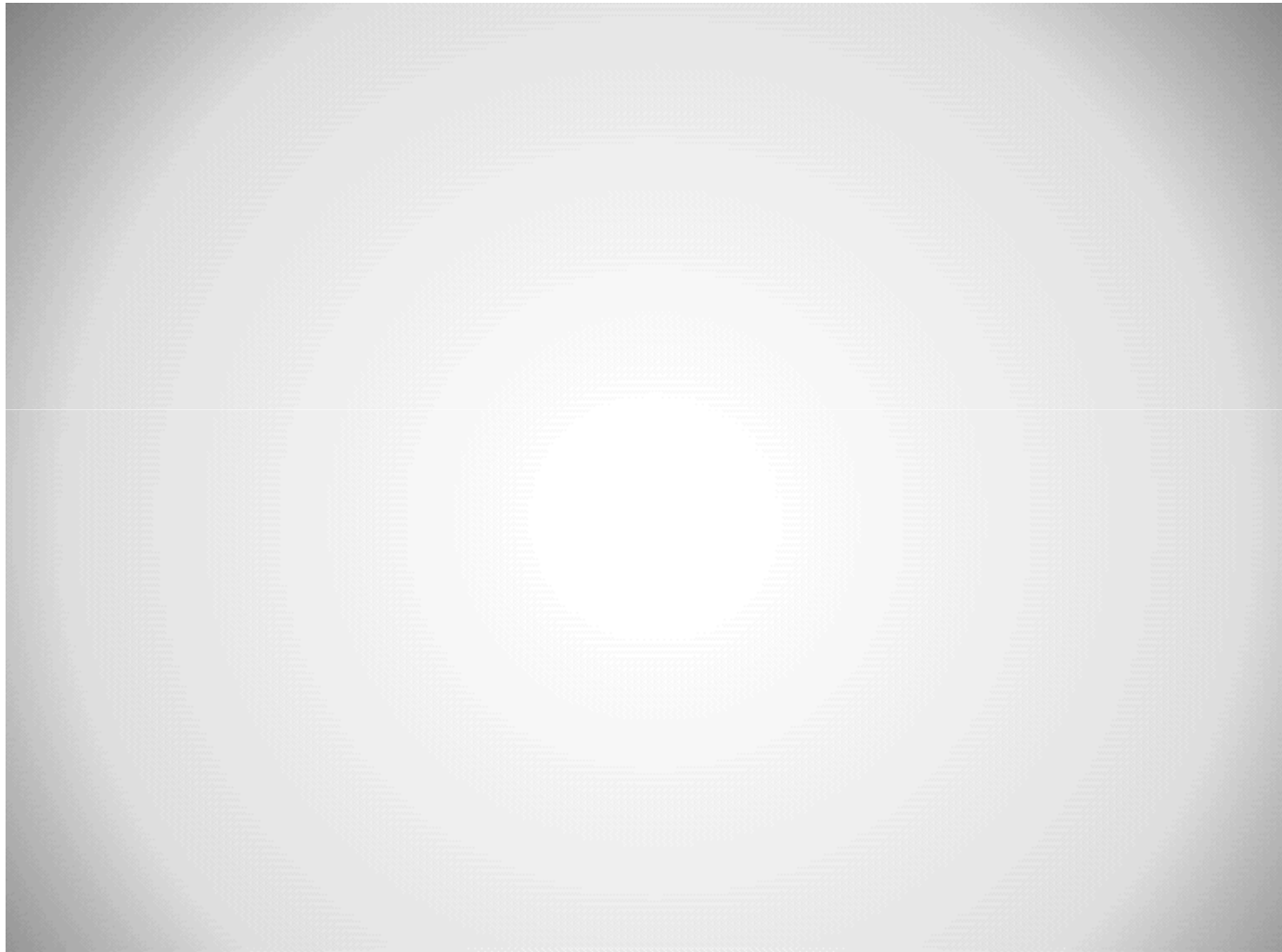
Case study: **THE CZECH ELECTRONIC TOLL SYSTEM**

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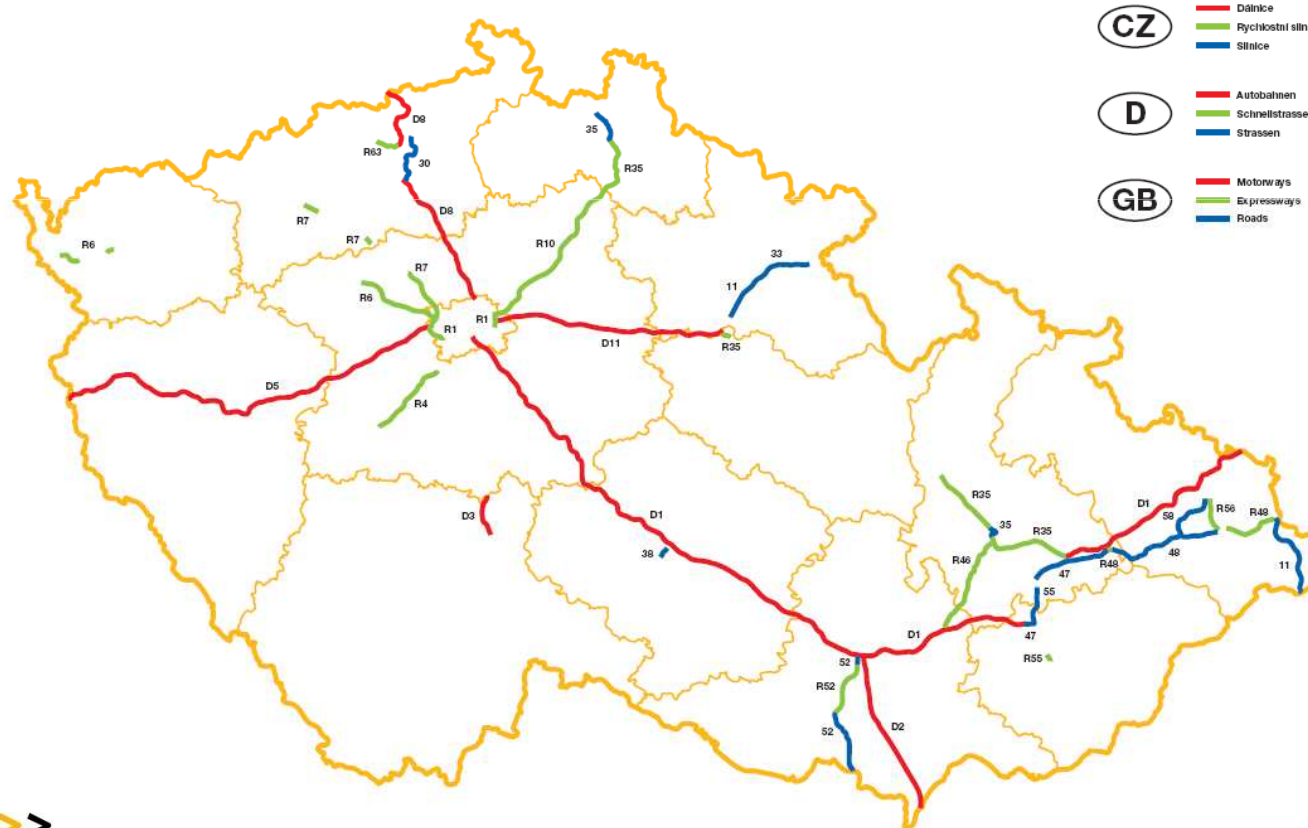
The Czech electronic toll collection system (ETC) in short view



Sharing the road
16th
World Meeting
International Road Federation



CZECH TOLLED ROAD NETWORK BY JANUARY 1, 2010



FIRST STEPS OF THE CZECH ETC INTRODUCTION

- Czech Government discussed the introduction of the road toll shortly after the country joined EU in 2004. The primary reasons for that were:
 - Change of time-based taxation to a more just performance-based one where a user pays for the number of kilometres actually taken;
 - Increase of the volume of funds flowing into road management;
 - Attempt at evening out the conditions for road and railroad transport and the related possible reduction of the increase of truck traffic in the Czech Republic;
 - Possibility of the introduction of telematic services.
- Consotrium Kapsch won the tender (2005) with microwave (DSRC) technology, with open system architecture within and Multi Lane Free Flow System, with mandatory OBU.
- Signature of the contracts with Czech Ministry of Transport on March 31st 2006, due to legal obstructions of unsuccessful competitors.
- Operation started on January 1, 2007 for heavy vehicles with a maximum permissible lade weight of 12 tons and above.
- By the January 1, 2008 the length of the Czech tolled motorway network reached approximately 1.160 km (highways, motorways and selected 1st class roads mainly used by international transit traffic).

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
 - System implemented only within 9 (!) months which is international recognized world record!
 - The total performance of the Czech e-toll system is **about 99 %**, in February 2010 **even 99,4 %** (independent auditor). The transaction performance reaches over 99,7 %.
 - Kapsch provides the complete operation services for the Czech Republic since January 2007. The total length of contract is **10 years**.

BASIC FACTS ABOUT CZECH ETC

- Toll obliged for vehicles **over 3.5 tons** maximum gross weight.
 - Different vehicle categories (axles and emission class).
 - Operation started on January 1, 2007 for heavy vehicles with a maximum permissible lade weight of 12 tons and above. From 2010 the toll obligation was extended to vehicles above 3.5 tons.
- Actually **more than 1200 km of tolled roads** in the operation.
 - Operation of about 970 km highways and motorways (1st Phase) from the 1st January 2007.
 - Operation of about 180 km 1st class roads (2nd Phase) from the 1st January 2008.
 - Newly completed highways and motorways are added to the system every year
- Open system architecture & **Multi Lane Free Flow** with compulsory OBU (On-Board-Unit).
- Deposit for OBU (prepay or post pay payment) approx. 60 EUR (1.550,- CZK).
- Average toll 0,16 EUR/km for H+M and 0,08 EUR/km for 1st class roads.

FACTS & FIGURES OF THE FIRST 3 YEARS OF OPERATION

- During 39 months of operation, **EUR 720 mio** in total has been earned!
- In 2007, the first year of operation, the income was **EUR 213 mio**. In 2008, the second year of operation, the collected toll income footed up to **EUR 245 mio**. in total. In 2009, the ETC reached **EUR 213 mio**.
- Actual daily incomes (working day) reaches up to **EUR 870.000**.
- The revenue in 2010 is about 15 % higher in comparison with 2009. The estimation of the total revenue in actual year is **EUR 245 mio**.
- By the May 2010, there are almost **490.000 active OBU**s (for vehicles above 3.5 t), registered in the system - even 4 times more than the highest expectations!

COST-EFFECTIVE INDICATOR OF ETC

- Only after seven months of the operation, the total amount of the toll income reached the total capital expenditure (EUR 107 mio.) = excellent cost-effective indicator!
 - This excellent indicator is in addition amplified by the fact that the system was built using the contractor method, which means that the general contractor bears the initial costs related with the construction and risks - of sorts of PPP project!
- The state will reimburse the general contractor for such costs gradually within a horizon of 30 months after the launch of the system. Thus, in the first year of the system functioning, the state has only paid 25 % of the total acquisition price of the work!
- Quality cooperation between state representatives when implementing and operating of toll stands behind great results of electronic toll collection system!

TOLL COLLECTION FOR VEHICLES ABOVE 3.5 TONNES

- Since January 2010 the Czech Parliament decided to extend existing electronic toll collection systém for all vehicles above 3.5 tonnes.
- Kapsch makes the necessary adaptations to the existing Czech Electronic Toll System and prepares the OBU's (expectation is about 70-100.000 new vehicles).
- Tolling duty for all lorries is common in whole Europe (except Germany).
- The extension of toll to all trucks is acceptable 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 be over EUR 769 mio = profitable project.

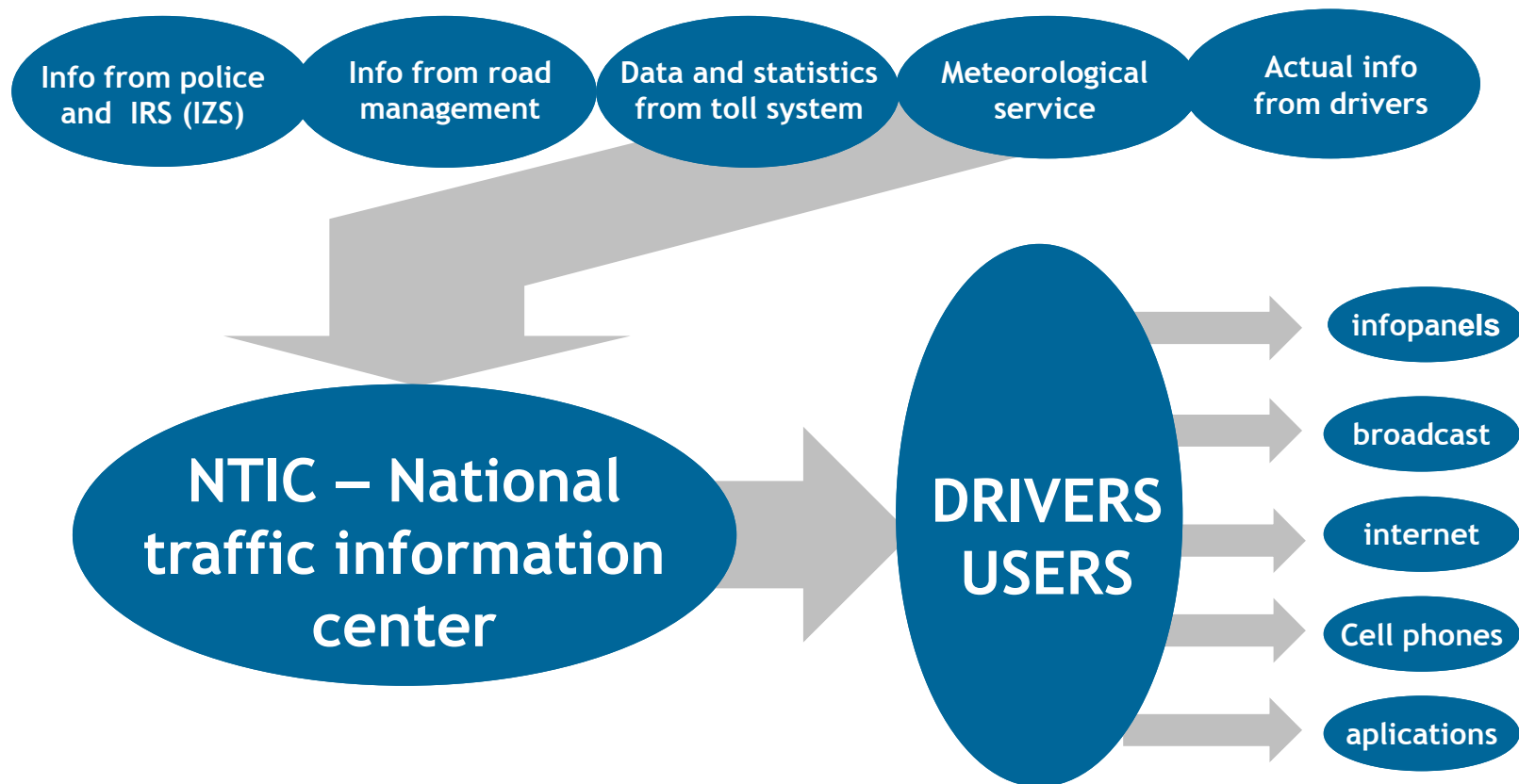
INCREASE OF FRIDAY´S RATES

- The Government has decided to use electronic toll system and the variability of rates (economic motivation, no restrictions) to reduce number of vehicles on roads in the expose time of Friday´s afternoons (movement of population for out of town recreation).
- Since 1st of February, 2010 on all trucks started every Friday to pay time differentiated rates in the interval from 3 p.m. - 9 p.m:
 - For the vehicles with 3 and more axles - toll rate increased by 50%,
 - For the vehicles with 2 axles - toll rate increased by 25%
- In the rest days of week toll rates in average decreased by 1,8% to compensate Friday.
- Actual result is, that the number of vehicles decreased by 15% in given time.
- Due to higher rates on Fridays toll income raises in this day up to 50%

TRANSPORT SAFETY AND TELEMATICS

- The Czech electronic toll system from Kapsch provides an ideal infrastructure to implement a broad spectrum of traffic telematic 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 the 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 (traffic information screens + traffic sensors+travel times system+monitoring cameras) for the Czech most used highway D1 in section 0 - 246,8 km of the D1 highway by means of using existing ETC (phase 1).
 - The second phase of the Traffic Management System is implemented On highways D2 and D5 during 2010 (phase 2).
 - The Traffic Management System is connected to NTIC (National traffic information center) - which collects information from sensors, cameras, meteorologists information, police etc. and operates screens around highways.

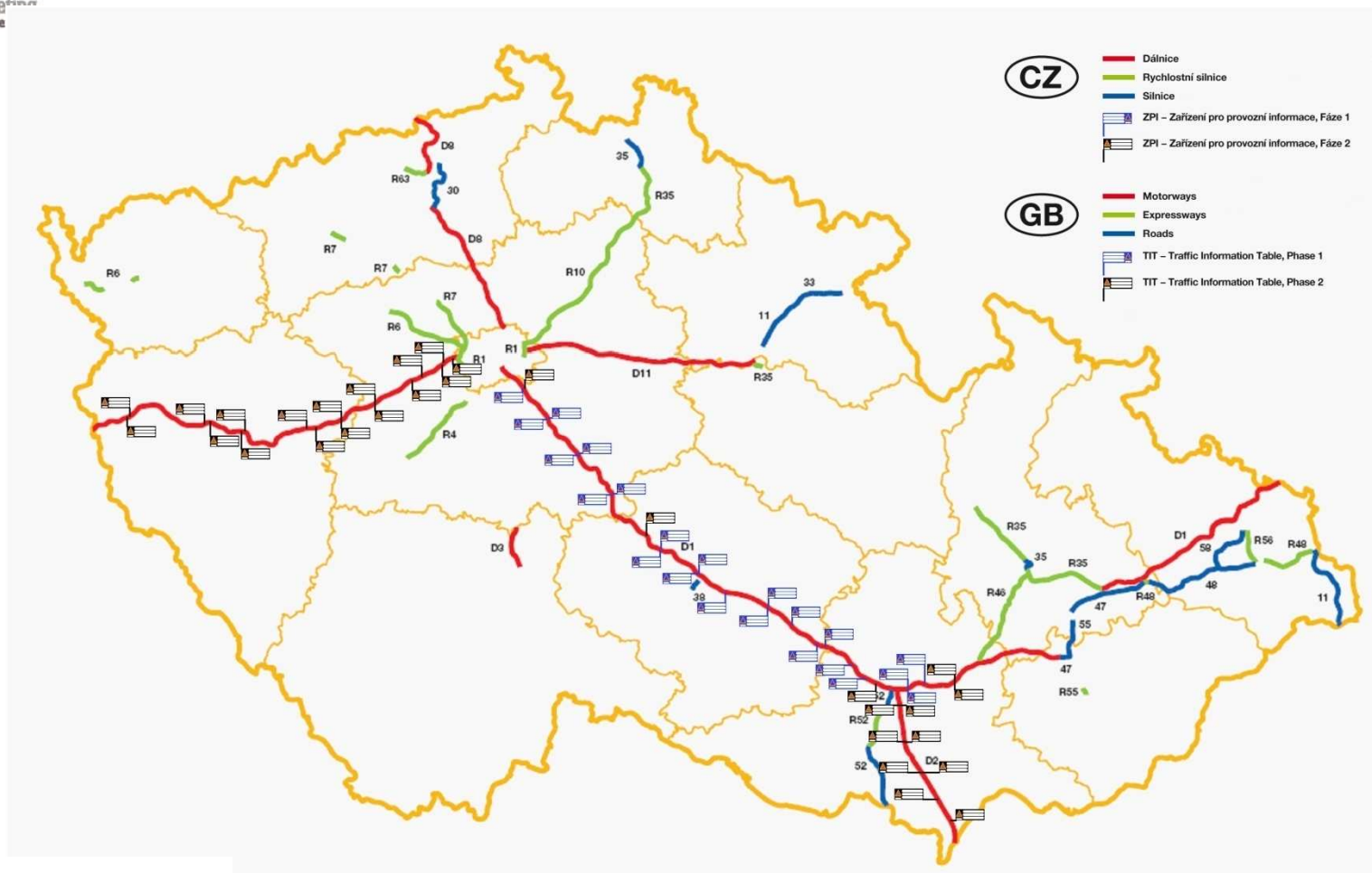
THE CZECH SYSTEM OF TRAFFIC INFORMATION



2008-9: TRAFFIC MANAGEMENT SYSTEM-HIGHWAY D1 (phase 1).



2010: Traffic Management System - phase 1+2



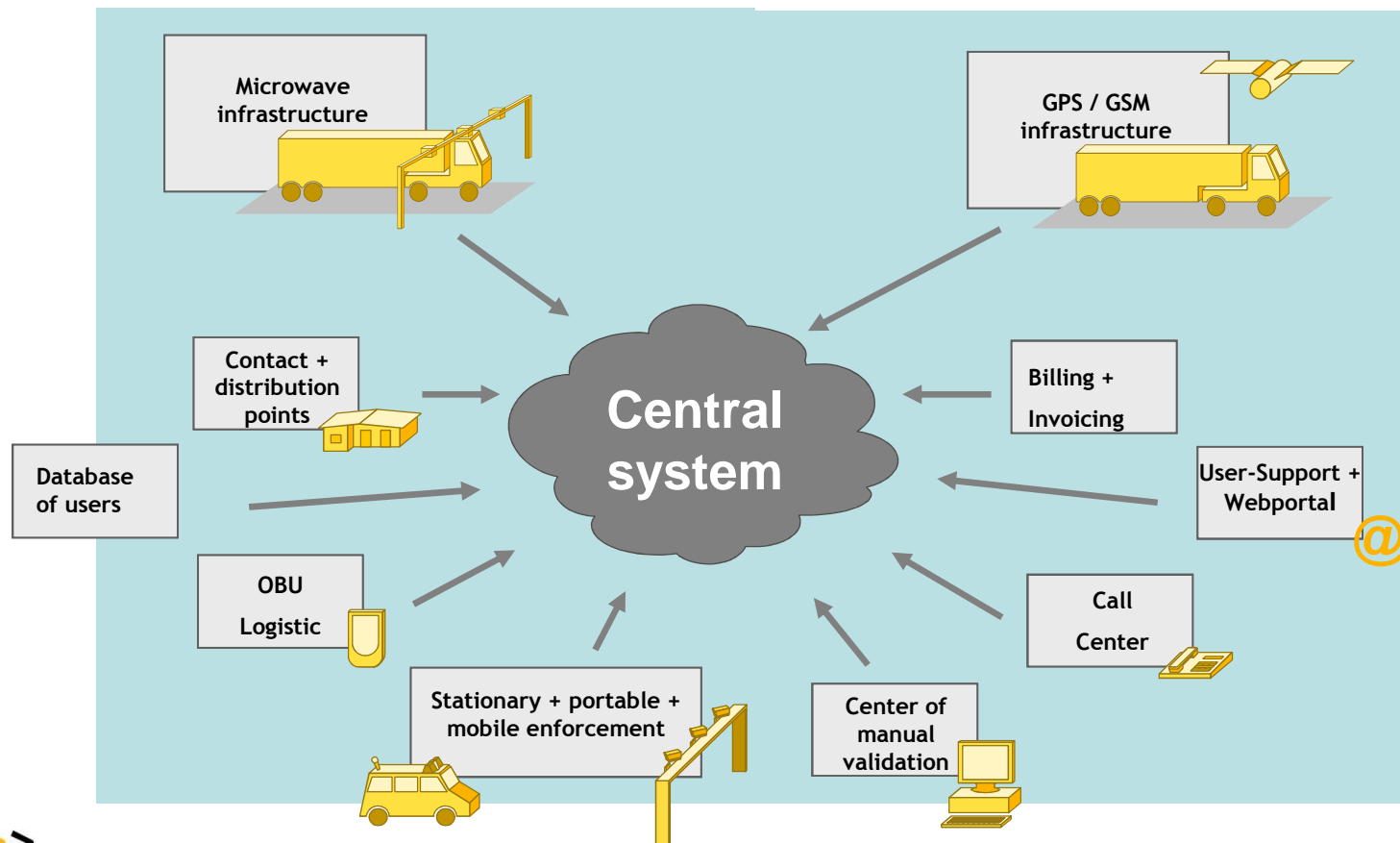
HYBRID SOLUTION=THE WAY TO COLLECT THE RURAL ROADS.

- Microwave technology (DSRC) for the trucks tolling was fully proved as the best one for highways and motorways and will be also used in the future on new ones.
- The governors of the Regions with municipal authorities and local self-governments started to call for the extension of tolling to the rural roads. MoT therefore authorized the supplier and the operator of the tolling system (Kapsch) to prepare the solution.
- The Czech tolling system has been designed as a technologically opened, therefore Kapsch is going to extend it with the satellite subsystem.
- The new unique hybrid system, which is applicable for the trucks tolling in the regions, combines benefits of both DSRC and GPS/GSM technology.
- Hybrid solution is one of the applications of the opened tolling system which was ordered in addition by the customer.
- Kapsch has been testing the hybrid system and hybrid OBU's in the pilot project, which is a part of existing commercial tolling system.
- Hybrid solution in the Czech Republic is compliant to the concepts and architecture of the first draft standard documents from the EU standardization bodies.

PILOT PROJECT OF HYBRID SOLUTION

- The pilot project of Hybrid Electronic Toll System on 1st class, 2nd class and 3rd class roads = Kapsch Area.
- The pilot project started in the half of 2008 to run for 3 years in real traffic, at first with technical improvements and after first year in huge testing.
- The pilot project of the hybrid toll system includes **10.000 testing cars** (5.000 by Kapsch, 5.000 by RSD and MoT with the OBU's of the third parties).
 - Achieved matching result clearly >95%
- The results are meeting technical expectations so far, afterwards it will be necessary to provide the economical calculation of the variation of rural roads under the tolling and the resolution of the legal and legislative problems with ownership of this roads....
- The final decision about the commercial Hybrid tolling system will be in jurisdiction of the Czech MoT and the members of the Parliament (political decision).

CZECH ELECTRONIC TOLL SYSTEM IS OPEN



KAPSCH AREA /OBU

The OBU delivers the basis for toll transactions:

- Receiving & dynamic recording of GPS positions
- Storage, encryption & packing of GPS positions
- Dynamic data transfer (configurable; dependent on application) to the central system over mobile network (VPN tunnel)
- Holding and providing vehicle specific & system specific data
- OBU behaviour is controlled over configurable parameters
- Parameters and software updates via the air interface
- Different operational modes / personalisation
- Mounting at the windscreen (like PREMID)



KAPSCH AREA / THICK CLIENT x THIN CLIENT

Thin client:

- „Stupid“ OBU
- „Smart“ central system
- Flexible functions
- Vehicle position is known
- Tolling segments stored in central system
- DSRC for enforcement

Thick client:

- „Smart“ OBU
- „Stupid“ central system
- Limited functions
- Vehicle position is unknown
- Tolling segments stored in OBU
- DSRC for enforcement

KAPSCH AREA / THICK CLIENT (SK) x THIN CLIENT(CZ)



E-VIGNETTE AS CZECH ETC APPLICATION

- Parliament of the Czech Republic has decided to replace all paper vignettes for personal cars by time electronic vignettes starting January 1st, 2011:
 - economical utilization of infrastructure of existing electronic toll system
 - improvement of security on highways due - gaining online data about car traffic
 - modern way with users advantages for motorists
 - necessary step to switch-over for kilometeric payments for personal cars
- Electronization of highways vignettes will lead to higher control and detection of nonpayers and thereby to 20 % higher collection of time fees.
- For elimination of monitoring people so-called „Big brother“ will be e-Vignettes strictly anonymous and can be used for more cars in the family (portability).
- Time validity of e-Vignette remains the same as paper vignette - 10days, 1month and 1year. New will be so-called „flexible validity“ - from the moment of the charge validity 12 months
- Users will have at their disposal large-scale distribution net, to charge e-Vignette will be also possible through the internet or mobile phone



THANK YOU

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