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TAF TSI implementation in ad hoc TT tool for SŽDC – Czech IM

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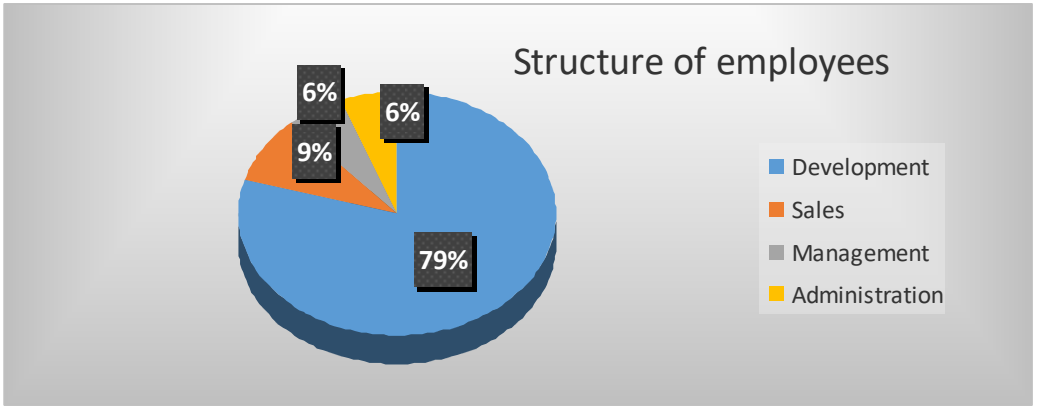
Digitalisation Conference and Fair –
Budapest, 26. 10. 2016

Profile

Specialized software companies

- A Czech private group of specialized software companies
- Close and effective cooperation since 1993
- The main development background is based in the Czech Republic
- Own subsidiaries in Slovakia, Poland and Hungary
- Representations in Ukraine, Belarus, Russia



Profile

IT Systems for Transport and Logistics

- Software solutions for IM, RU and logistic operators
- Complex coverage of transport technology processes
- **Electronic data exchange in accordance with TAF TSI**
- **Telematics applications for planning, controlling, evaluating**
- Progressive technology of transport vehicles monitoring
- Wireless communications with crew of hauling vehicles

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References

- More than 1000 customers in 25 countries
- Railway undertakings, operators and infrastructure managers, freight forwarders, carriers, shippers, universities, international associations and organizations etc.

DB SCHENKER · Rail Cargo Austria Rail Cargo Group · Rail Cargo Hungaria Rail Cargo Group · AWT ADVANCED WORLD TRANSPORT · SNCF GROUPE · PKP cargo GRUPA PKP · cargoSPED GRUPA PKP CARGO · LHS · SŽDC Správa železniční dopravní cesty · CD · T Cargo · AAE · CFL cargo · BUDAMAR LOGISTICS · DHL · ŽSR · ZSSK CARGO · ŽELEZNIČNÁ SPOLOČNOSŤ SLOVENSKO · LOKORAIL, a.s. · GRG GRUP FEROVIAR ROMÂN · CFR MARFĂ · ermefret · trade trans INTERNATIONALE TRANSPORTE · VTG · hitrail · POLZUG INTERMODAL GMBH · CZ LOKO · Express Polska · MAERSK LOGISTICS · GW Train Regio · CKTZ · CIT · VEOLIA TRANSPORT · RND s.r.o. · ORLEN · SKUPINA ČEZ · Dopravní podnik hlavního města Prahy · Unipetrol ORLEN GROUP

In Czech Republic SŽDC – IM uses 2 IT systems for TT Construction:

- **IS KANGO for yearly TT**
- **IS KADR for ad hoc TT**

Why ?

At 2004 year Czech republic entered into EU
- Czech rail sector adopted a lot of new regulations and important are 3 terms:

Capacity allocation
Network statement
Fee of use of Infrastructure

From 2005 we have capacity allocation and capacity allocation fee

Czech IM needed IT system for solving this issue

Conditions:

- Every ad hoc train had to be calculated – capacity allocation fee
- We opened borders for international traffic for private RU‘s
- We didn‘t have extra new staff – only new OSS department 1+5
- We had yearly TT system which we couldn‘t use for it
  - IS works strictly for section by section TT construction
  - It was created for unique Railway company, it wasn‘t open for others RU‘s
  - IT system was in technical adaptation from file system to db client server architecture – The IT team didn‘t have any additional capacity for our needs

Czech IM decided to create a new IT system specially for ad hoc trains capacity allocation – IS KADR

- **RU will do path requests in web page**
- **IM will create ad hoc paths and allocate capacity**
- **IT system will be prepared in accordance with split railway system**
- **IS KADR will take data from KANGO and put additional ad hoc paths**
- **TT construction will be between 1st and final point**

IS KADR was born and It is working from begin TT 2007 - 10. 12. 2006

At 2008 year TT department was moved from ČD to SŽDC

Calculation of fee of use of infrastructure was bigger and bigger problem

- It was used statistic system which methodology was created at 1926
- This system had problem with correct detection particular train performance
- At 2009 was decided to create new IT system for calculation fee of use of infrastructure

Preconditions:

- **System will automatically calculate fee on based data from planning and operation IT systems**
- **System these data collect automatically from defined data interfaces**
- **Users will solve only data conflicts**

How to solve ?

Almost every running freight train had conflict with identity …

SŽDC decided to implemented TAF TSI:

- objects TR ID, PA ID, PR ID
- processes
- messages

The objects start at planning phase
–> we implemented objects into KADR

Objects description

- **Train – TR – object is created by RU**
  - Defined between **2 particular locations at Europe at 1 time for 1 or more days**
  - Based object for communication between RU and IM
- **Path Request PR – object is created by RU**
  - Object is used only in Path Request dialog
  - For **1 object TR you can have 1 – N objects PR**
  - Change of any train parameters means to create new object PR and also obligation to send new path request

Objects description

- **Path – PA – object is created by IM**
  - Object consists all TT data – path (locations and time) and train parameters allocated by 1 IM
  - For **1 object PR is possible to have 1 – N objects PA**
  - Change of any train parameters means to create new object PA – new TT for particular days

- **OTN – operational train number – 5 digits train number – allocated by IM**
  - It is only an attribute – no identifiers
  - It is held for staff and control system communication
  - On the SŽDC network is not allowed to use 2 same OTN – unique for GSM R

Relationships between objects

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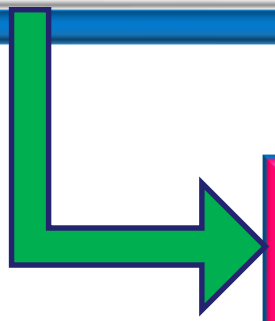
TR1 Hamburg (21:10) – Praha (1:35 +1) 3.3., 4.3.

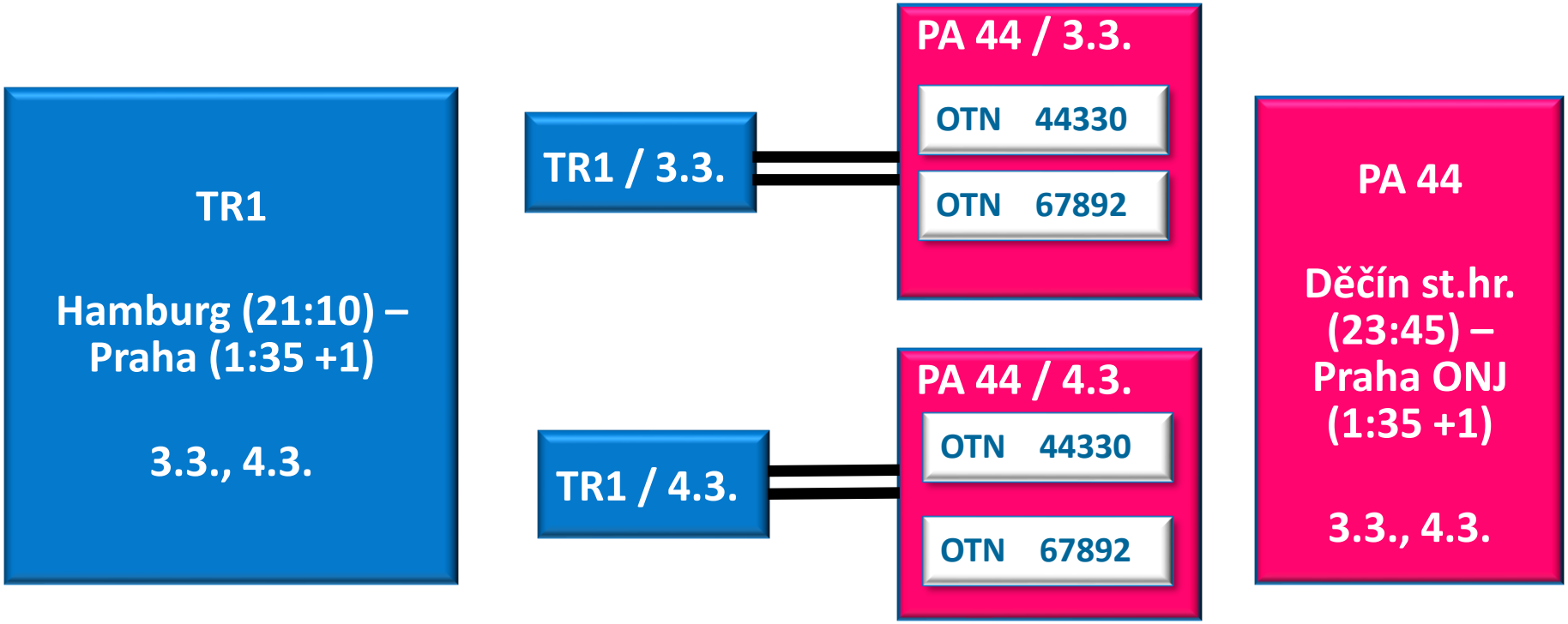
- PR1 Hamburg (21:10) – Schöna Grenze (23:50) 3.3., 4.3.
- PR2 Děčín st.hr. (23:50) – Praha (1:35 +1) 3.3., 4.3.



PA 44 Děčín st.hr. (23:45) – Praha ONJ (1:35 +1) 3.3., 4.3.

- OTN 159 Děčín st. hr. (23:45) – Praha hl.n. (01:30) 3.3., 4.3.
- OTN 27159 Praha hl.n. (01:54 +1) – Praha ONJ (2:20 +1) 3.3., 4.3.

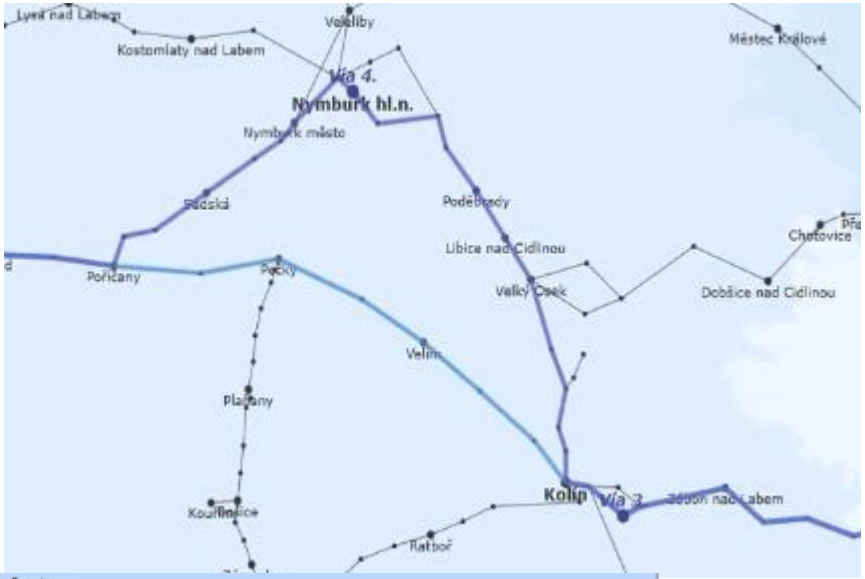
Relationships between objects – planning and daily form of objects

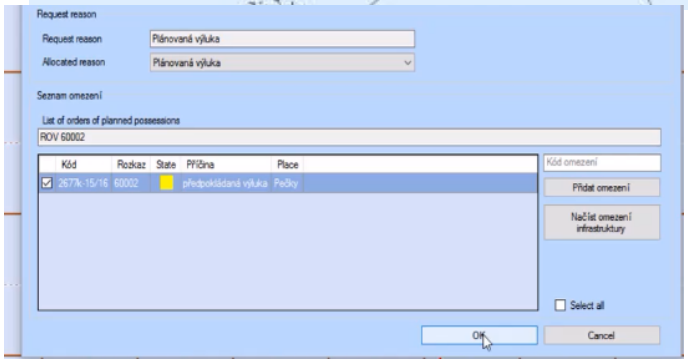


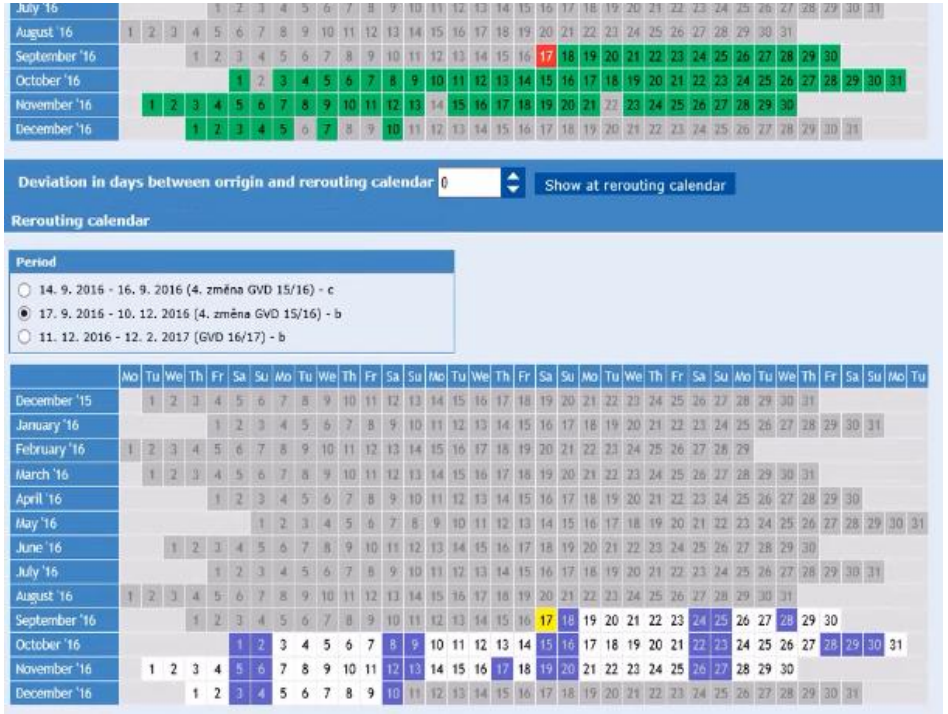
Impacts of objects methodology into KADR:

- System was complete rebuilted, now we can allocate more then 1 paths for 1 PR
  - We can solve problem with new path in case of accidents, planning or operational rerouting path
- System extended number of elements for full compatibility with TAF TSI, adopt code lists from TAF also and implemented data communication via TAF TSI messages version 2.1
- In system was created OTN reservation module – OTN is unique – GSM R reason

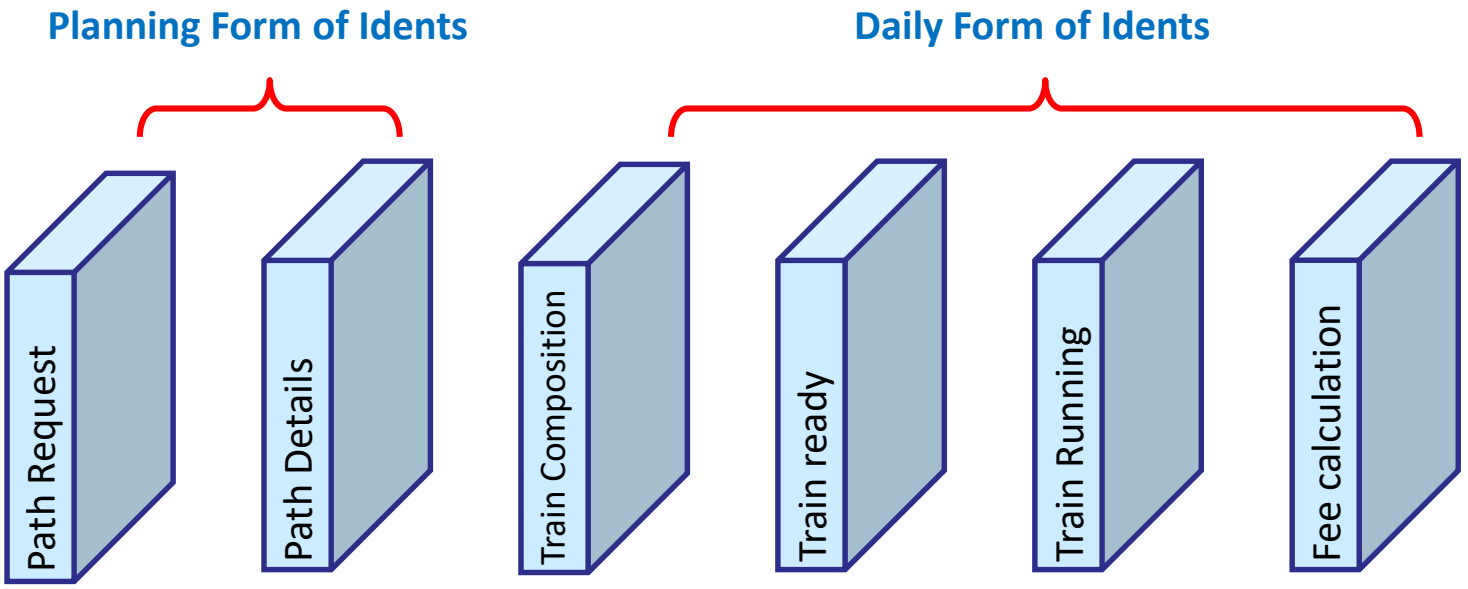
Rerouting path in KADR







Transmission of TR ID and PA ID



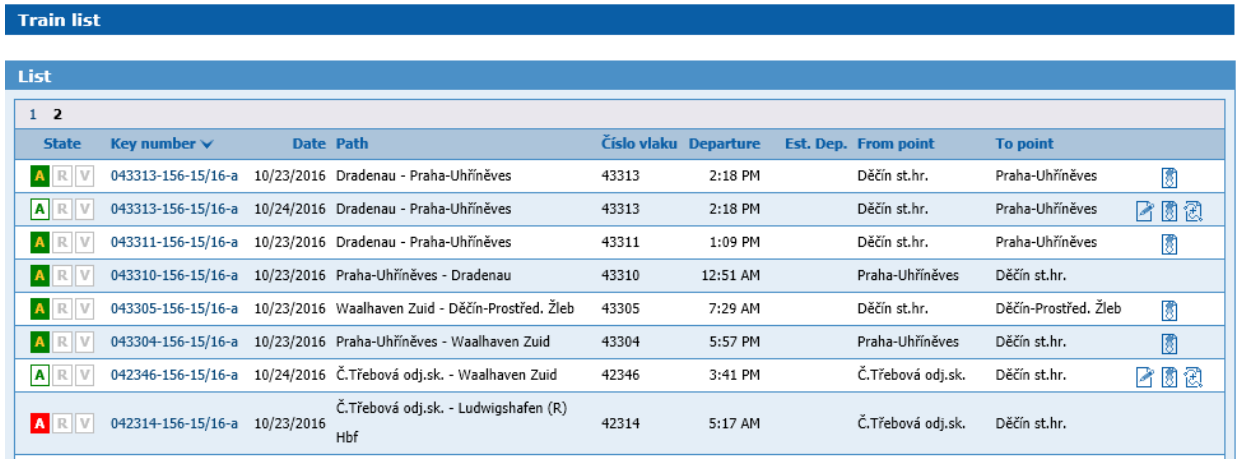
Path Activation

Boundary between planning and daily form of object

- Information from RU – Train will go or not
- This information starts daily Train and path object
- It was pointed – it is crucial process

IS KADR is gate for IS SŽDC for this function

- web services
- web client



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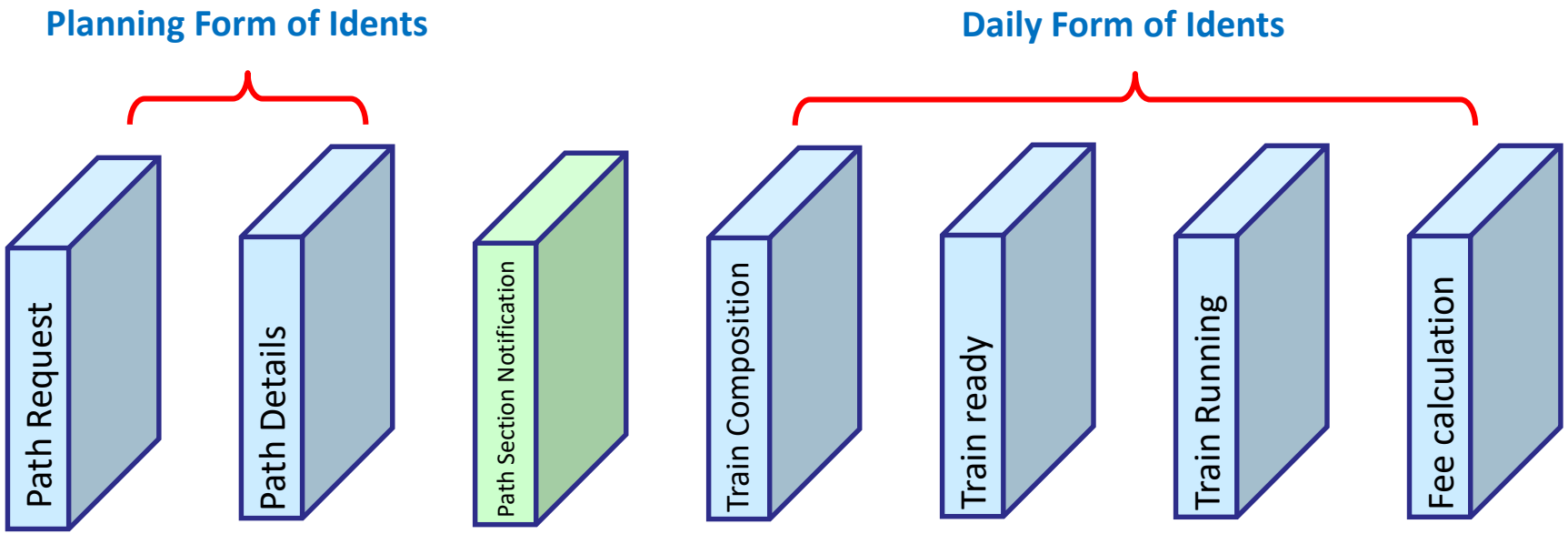


From 2015 it was started in operation new integrated IT system of SŽDC

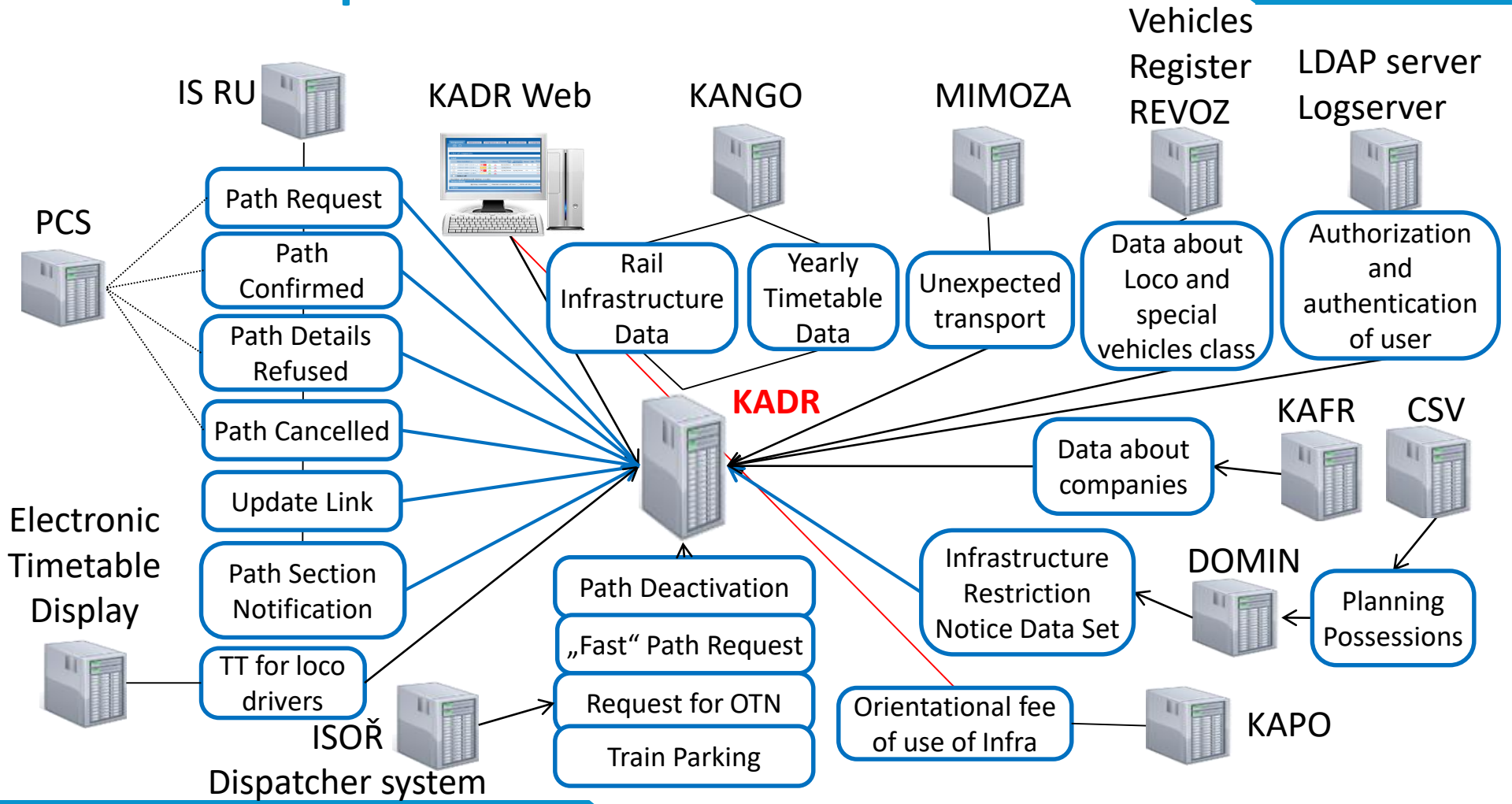
Main features:

- All data from common registers and code lists are used in all IT systems
- Every information is inserted only once
- Full data connection between all IT systems of SŽDC and IS of RU‘s
- Mutual data communication is on based TAF TSI rules

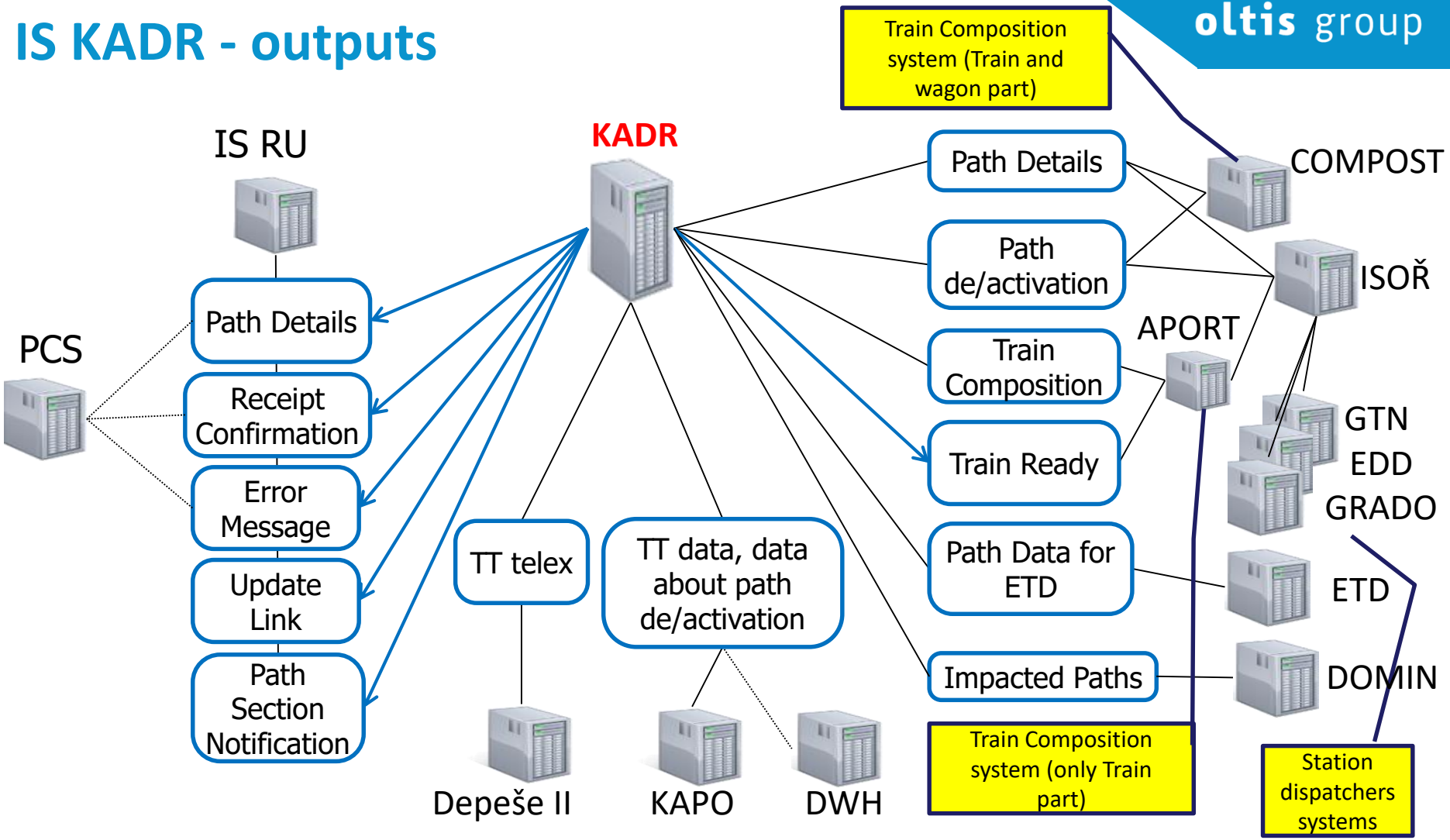
IS KADR:

- Is one from main IT part of IS SŽDC
- Is working in regime 7 x 24
- Number of mutual communications is very high

IS KADR - inputs



IS KADR - outputs



Next development for 2017

- Implementation of international ad hoc paths via PCS – is in preparation
- Full implementation Path Not Available process
- To creation module for planning station tracks occupation
- To rebuilt work with Rail Infrastructure Description – automatically inputs of changes

Thank You for Your Attentions

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