Telematics Applications for Passengers and freight TAP/TAF TSI

European Railway Agency

(ERA)

Content of this presentation

1. **European Railway Agency (ERA)**

2. **TAP TSI**

3. **TAF TSI**

4. **Links to other specifications**

5. **TAF/TAP TSI and railML®**

The "jargon" used in this PPT

Abbreviation	Title
CEN	European Normalization Committee
CI	Common Interface
EC	European Commission
ERA	European Railway Agency
IM	Infrastructure Manager
LRU	Lead railway undertaking
PRM	Passengers with Reduced Mobility
RISC	Railway Interoperability and Safety Committee
RU	Railway Undertaking
TAF TSI	Telematics Applications for Freight - Technical Specifications for Interoperability
TAP TSI	Telematics Applications for Passengers – Technical Specifications for Interoperability
TD	Technical Document of the European Railway Agency

The European Railway Agency

- Established in 2004 (EC Regulation 881/2004)
- Located in Valenciennes and Lille
- Staff: 154 (2013)
- ERA is a EU institution:

	European Council (summit)	
European Parliament	Council of Ministers (Council of the EU)	European Commission
Court of Justice / Court of Auditors	Economic and Social Committee	Committee of the Regions
European Investment Bank	Agencies	European Central Bank

ERA

The European Railway Agency

Main tasks of ERA:

o   address recommendations for European Rail Legislation (with economic evaluation and justification) to the European Commission concerning Safety, ERTMS, Cross-acceptance and **Interoperability**

o   issue opinions to the European Commission (or to National safety authorities) concerning rail National safety rules, Interoperability of the trans-European rail network and Monitoring the work of notified bodies

o   maintenance of some public rail related databases

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European Rail Legislation for TAP TSI

The TAP TSI is based on the following legal documents:

- Directive 2008/57/EC on the interoperability of trans-European rail system (Annex II)

- European Rail Passengers' Rights Regulation EC/1371/2007 (Art 10 and Annex II).

→ Above documents are publicly available at the EU web site

http://eur-lex.europa.eu/en/index.htm.

Purpose of TAP TSI

The Technical Specification for Interoperability on "Telematics Applications for Passengers" (TAP TSI) prescribes protocols for the data exchange of

- timetables,
- tariffs,
- reservations, fulfillment
- Information to passengers in station and vehicle area
- train running information,
- etc

which must be respected by the European rail sector (railways, infrastructure managers, ticket vendors etc.) according to the European Rail Passengers' Rights Regulation EC/1371/2007 and to the Interoperability Directive EC/2008/57.

Technical Documents of TAP TSI

In Dec 2009 ERA has signed contract with UIC according to which UIC has transferred the underpinning UIC leaflets as ERA Technical Document B.1, B.2, B.3, B.4, B.5, B.6, B.7, B.8, B.9 and B.10.

ERA Technical Document B.30 is derived from the TAF TSI (Telematics Applications for Freight) RU/IM train movement messages.

Above ERA Technical Documents (and underpinning ERA TAP Passenger Codelist) are annexes of the TAP TSI, thus, legally binding message interfaces for timetables, tariffs, reservations, fulfilment, and train running information.
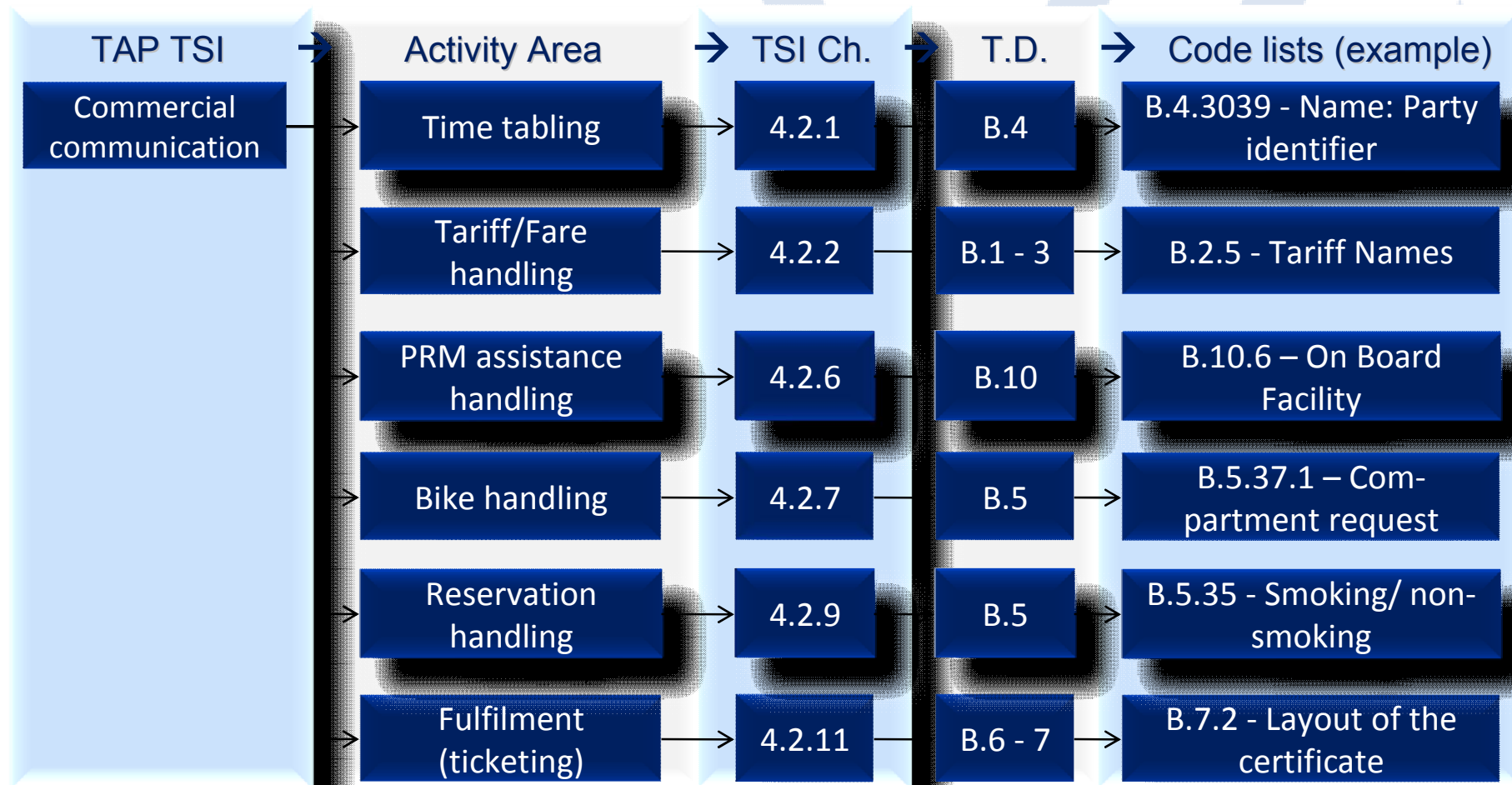
All Technical Documents are available at ERA's website at http://www.era.europa.eu/Document-Register/Pages/TAP-TSI.aspx .

The documents are maintained by ERA though a change control management process.

Structure of TAP TSI
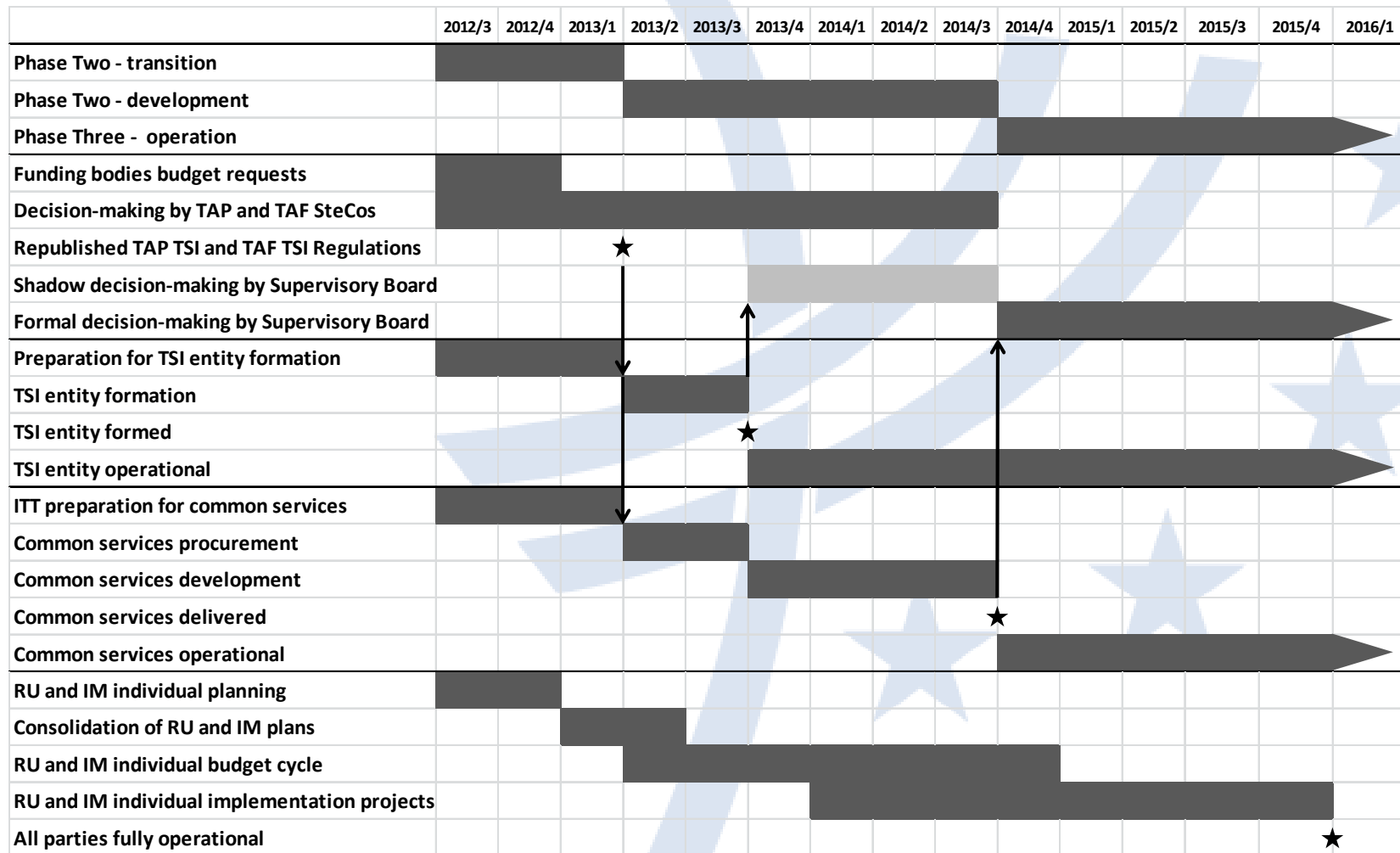
The structure of TAP TSI can be outlined as follows:

TAP TSI	Activity Area	TSI Ch.	T.D.	Code lists (example)
Commercial communication	Time tabling	4.2.1	B.4	B.4.3039 - Name: Party identifier
	Tariff/Fare handling	4.2.2	B.1 - 3	B.2.5 - Tariff Names
	PRM assistance handling	4.2.6	B.10	B.10.6 – On Board Facility
	Bike handling	4.2.7	B.5	B.5.37.1 – Compartment request
	Reservation handling	4.2.9	B.5	B.5.35 - Smoking/ non-smoking
	Fulfilment (ticketing)	4.2.11	B.6 - 7	B.7.2 - Layout of the certificate

No unique data format is used for TAP TSI technical documents. The used data format depends on the technical document:

- **EDIFACT (timetabling)**
- **Fixed length text files (tariff data)**
- **Binary messages (reservation messages)**
- **XML-messages (home printed tickets, PRM reservation)**

Further steps of TAP TSI

	2012/3	2012/4	2013/1	2013/2	2013/3	2013/4	2014/1	2014/2	2014/3	2014/4	2015/1	2015/2	2015/3	2015/4	2016/1
Phase Two - transition	▓	▓													
Phase Two - development			▓	▓	▓	▓	▓	▓	▓						
Phase Three - operation										▓	▓	▓	▓	▓	▓
Funding bodies budget requests	▓														
Decision-making by TAP and TAF SteCos	▓	▓	▓	▓	▓	▓	▓	▓	▓						
Republished TAP TSI and TAF TSI Regulations			★												
Shadow decision-making by Supervisory Board						▓	▓	▓	▓						
Formal decision-making by Supervisory Board										▓	▓	▓	▓	▓	▓
Preparation for TSI entity formation	▓	▓	▓												
TSI entity formation				▓	▓										
TSI entity formed						★									
TSI entity operational						▓	▓	▓	▓	▓	▓	▓	▓	▓	▓
ITT preparation for common services	▓	▓	▓												
Common services procurement				▓	▓										
Common services development						▓	▓	▓	▓						
Common services delivered										★					
Common services operational										▓	▓	▓	▓	▓	▓
RU and IM individual planning	▓	▓													
Consolidation of RU and IM plans			▓	▓											
RU and IM individual budget cycle				▓	▓	▓	▓	▓	▓	▓					
RU and IM individual implementation projects						▓	▓	▓	▓	▓	▓	▓	▓		
All parties fully operational														★	

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Purpose of TAF TSI

Legal background: COMMISSION REGULATION (EC) No 62/2006 of 23 December 2005

The Technical Specification for Interoperability on "Telematics Applications for Freight" (TAF TSI) drafted by ERA prescribes <u>protocols for the data exchange</u> of:

- **Path Request**
- **Train Running Forecast**
- **Service Disruption Information**
- **Shipment Estimated Time of Interchange / Arrival**
- **Etc.**

TAF TSI prescribes furthermore <u>databases</u> which must be implemented by European RUs , IMs or Freight Customers:

- **Reference Files (such as location ID, company ID etc).**
- **Rolling Stock Reference Databases**
- **Wagon and Intermodal Unit Operational Database**
- **Trip plan for wagon / Intermodal unit**

Functionalities:

•**RU/IM:** Long-term planning, Path Request on Short Notice, Train Preparation, Train Running Forecast, Service Disruption Information and Train Location.

•**LRU/Customer:** Consignment note data, exchange of information concerning ETI/ETA calculation, Interchange Reporting and Wagon Movement
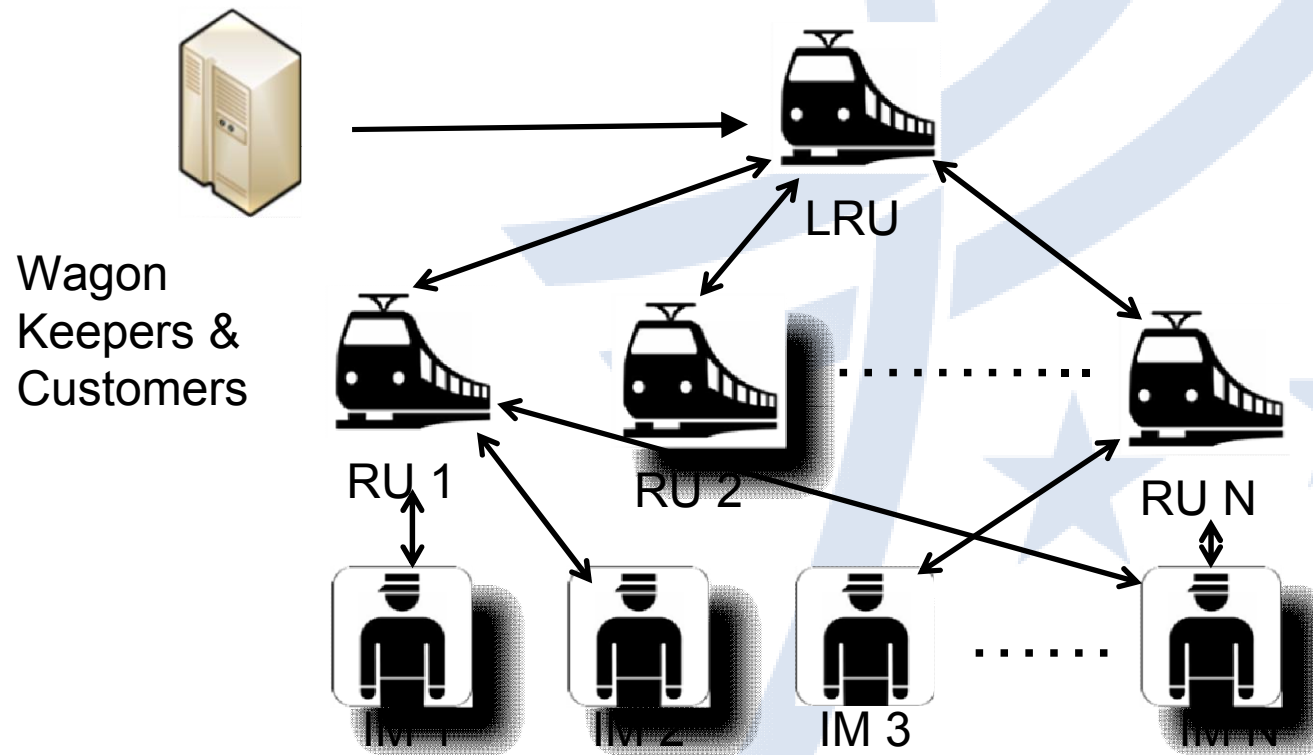
TAF TSI System Architecture:

PCS | TIS

ISR | Orfeus

CI

CI

RU

CI

IP

Network

CI

RU

CI | CI | CI

IM 1 | IM 2 | SM

CI

RU

CI

RU

CI

RU | R U | R U

HMI

Reference files
- Location ID
- Company ID
Common Meta Data

C.A. PKI

CI

CI

CI

IM   = Infrastructure Manager
RU   = Railway Undertaking
HMI = Human Machine Interface
SM   = Station Master
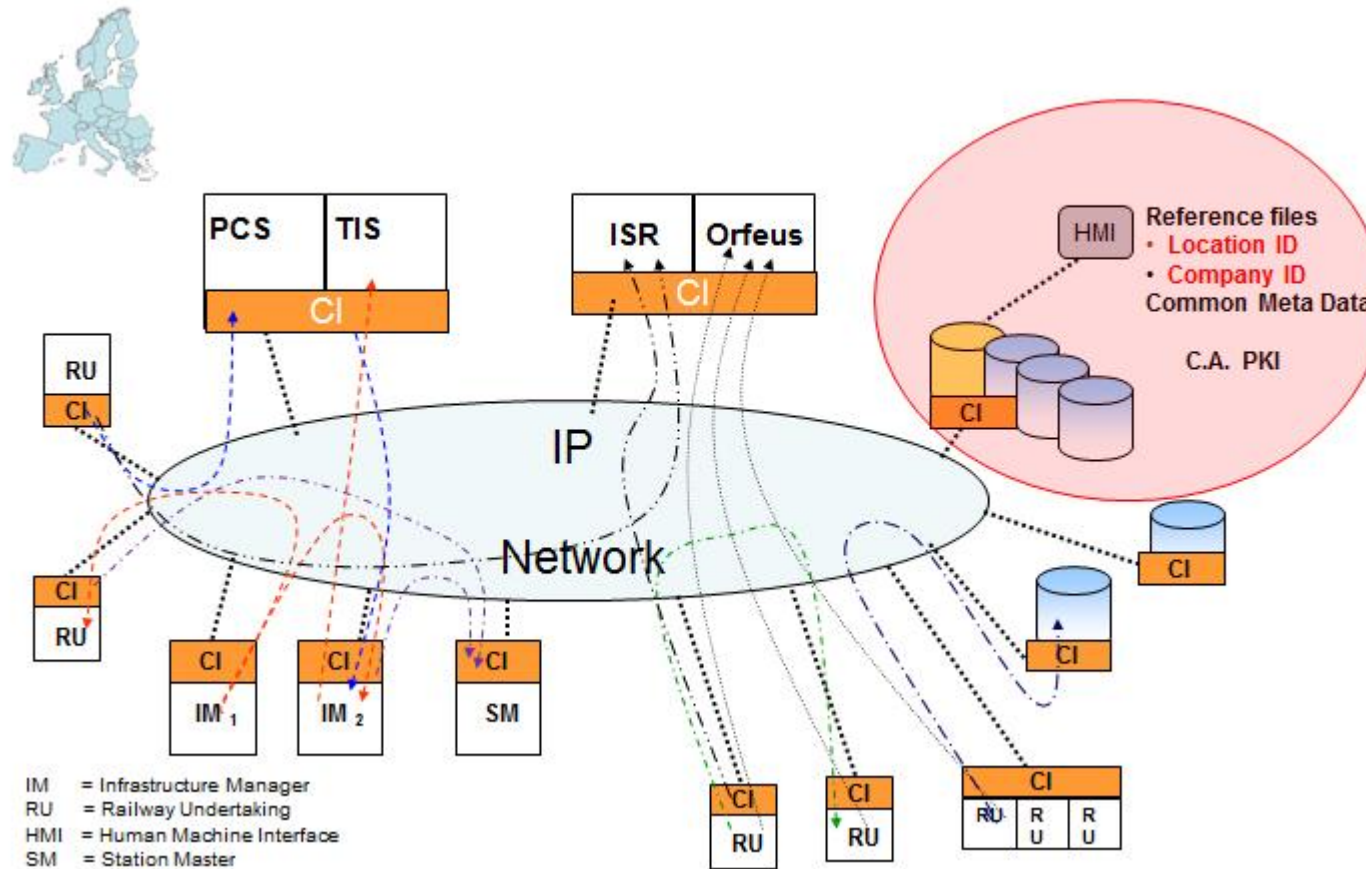
Content of TAF TSI – Common Interface

TAF TSI prescribes the mandatory use of a so called "common interface" which is mandatory for all RUs and IMs:

•the appropriate formatting, conformity checking, encrypting, signing, addressing and decrypting of the exchanged messages
•the appropriate access to all the data required according the TSI within each RU, IM, Customer, etc., whether the relevant Databases are central or individual
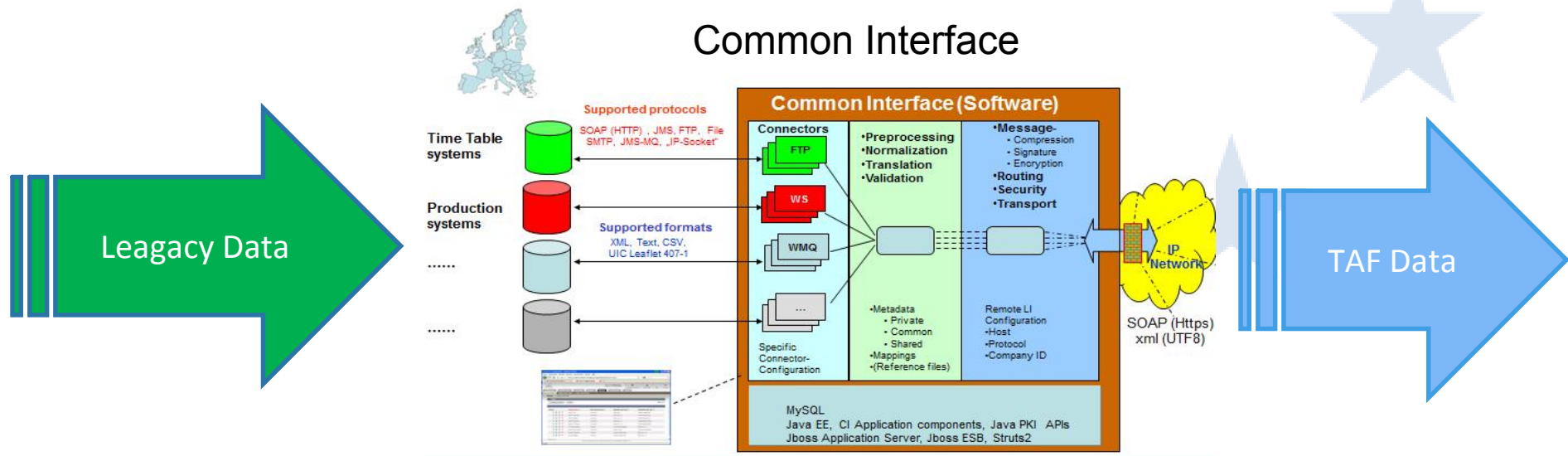
Common Interface

TrainRunningInformationMessage:

```xml
<?xml version="1.0" encoding="ISO-8859-1"?>
<!--Sample XML file generated by XMLSpy v2013 (x64) (http://www.altova.com)--><!--xmlns="http://www.era.europa.eu/schemes/TAFTSI/5.2"-->
<TrainRunningInformationMessage>
  <MessageHeader>
    <MessageReference>
      <MessageType>2002</MessageType>
      <MessageTypeVersion>5.1.9</MessageTypeVersion>
      <MessageIdentifier>dc024a24-1034-49eb-84f2-50bd52d1536c</MessageIdentifier>
      <MessageDateTime>2012-12-21T14:13:36.486+01:00</MessageDateTime>
    </MessageReference>
    <Sender>0014</Sender>
    <Recipient>0080</Recipient>
  </MessageHeader>
  <MessageStatus>1</MessageStatus>
  <OperationalTrainNumberIdentifier>
    <OperationalTrainNumber>4711</OperationalTrainNumber>
  </OperationalTrainNumberIdentifier>
  <TrainLocationReport>
    <Location>
      <CountryCodeISO>FR</CountryCodeISO>
      <LocationPrimaryCode>12345</LocationPrimaryCode>
    </Location>
    <LocationDateTime>2001-12-17T09:30:47Z</LocationDateTime>
    <TrainLocationStatus>12</TrainLocationStatus>
  </TrainLocationReport>
</TrainRunningInformationMessage>
```

Minimum and Maximum Implementation Dates:
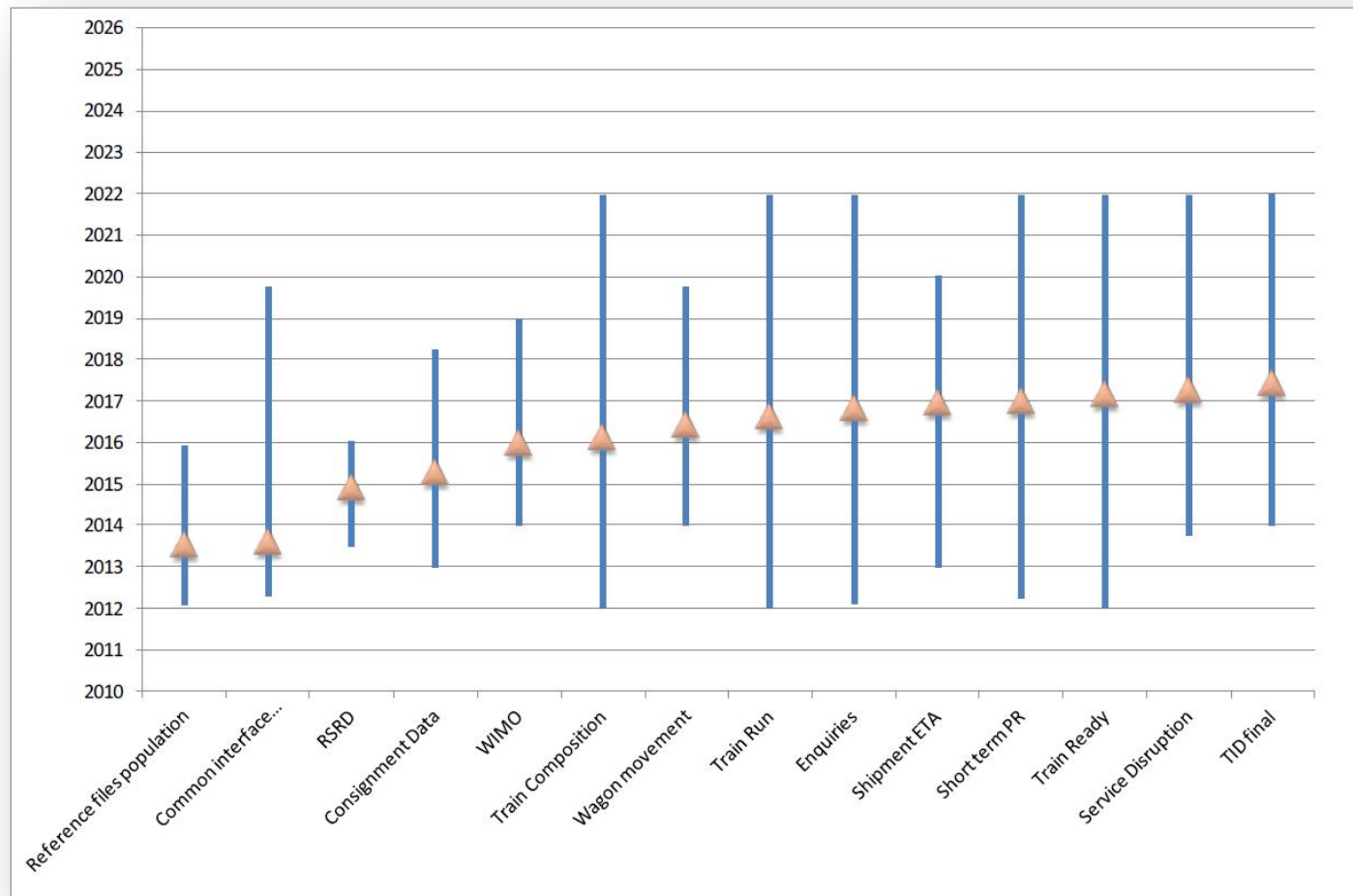
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Relationship TAP TSI - NeTEx

Legal background in TAP TSI: chapter 4.2.22 "Management of connection with other modes of transport"

- EN 12896 ('Transmodel') and EN TC 278 WI 00278207 ('IFOPT -Identification of Fixed Objects in Public transport'
- EN 15531 ('SIRI') for the exchange of real-time timetables and norm EN TC 278 WI 00278207 ('IFOPT') for the exchange of stop/station' data

Development of „NeTEx":

- Standard in development by CEN TC278 WG3 SG7/SG9
- XML-schema based on EN 12896 („Transmodel")
- Define the exchange of timetable-, network- und tariff-data for public transport
- Timetable and network defined as draft (Technical Specification CEN/TS 16614-2)
- In work: tariff data exchange

Relationship with national standards

- National standards (e.g. VDV452, Neptune) and European standards (e.g. TAP TSI) can be expressed in NeTEx

Relationship TAP TSI - NeTEx

TAP TSI timetable data (EDIFACT):

```
UIB+UNOB:4+4186++++++20090224:163202'¶
UIH+TSDUPD:D:04A+1+4186'¶
MSD+AAR:61'¶
ORG+0003+++0003'¶
HDR+81+273:2009-02-24*45:2009-02-24T1632+4186'¶
ALS+29+005454759:OHNIC+503520N+135027E'¶
POP+87:0001'¶
POP+273:1993-08-01/2099-12-31'¶
CNY+CZ'¶
TIZ+CET:1'¶
IFT+X02+OHNIC'¶
ALS+29+005454762:FILIPOVKA+505927N+150132E'¶
POP+87:0001'¶
POP+273:1993-08-01/2099-12-31'¶
CNY+CZ'¶
TIZ+CET:1'¶
IFT+X02+FILIPOVKA'¶
```

Mapping ➡

Transmodel/NeTEx :

```
<ScheduledStopPoint id="tap:ScheduledStopPoint:005454759"
  <Name>OHNIC</Name>¶
  <Location>¶
    <Longitude>13.8408333333</Longitude>¶
    <Latitude>50.5888888889</Latitude>¶
  </Location>¶
  <validityConditions>¶
    <AvailabilityCondition id="tap:AvailabilityCondition:
      <FromDate>1993-08-01T00:00:00</FromDate>¶
      <ToDate>2099-12-31T23:59:59</ToDate>¶
    </AvailabilityCondition>¶
  </validityConditions>¶
  <ShortName>OHNIC</ShortName>¶
  <StopType>railStation</StopType>¶
  <RequestStop>false</RequestStop>¶
  <TopographicPlaceView>¶
    <CountryRef ref="cz"/>¶
  </TopographicPlaceView>¶
</ScheduledStopPoint>¶
```

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Relationships TAP&TAF - railML

TAP TSI timetable data (EDIFACT):

```
ALS+29+008722326:LILLE EUROPE'¶
POP+87:0005'¶
POP+273:1997-08-23/2099-12-31'¶
CNY+FR'¶
TIZ+CET:1'¶
SER+101'¶
IFT+X02+LILLE EUROPE'¶
RFR+AWN:008728600'¶
MES+20:MIN'¶
RLS+13+6'¶
```

```
PRD+9108::2:::::EUROSTAR+0019'¶
POP+273:2011-02-11/2011-07-01::100111110011111001¶
PDT++:::53'¶
ASD+30'¶
SER+21'¶
SER+4:::13'¶
SER+47'¶
SER+5:::13'¶
SER+54:::13'¶
POR+007015400+*0619'¶
POR+007015440+0633*0636'¶
TRF+1'¶
POR+007054660+0655*0658'¶
TRF+1'¶
POR+008728107+0829*0832'¶
POR+008722326+0907*0910'¶
POR+008814002+0942'¶
```

Mapping → **Mapping** →

railML® :

```xml
<railml xmlns:dc="http://purl.org/dc/elements/1.1/" xsi:schemaLoc
  <infrastructure>¶
    <operationControlPoints>    <operationControlPoints>¶
      <ocp id="tap:ScheduledStopPoint:008722326" code="008722326'
        <tsi country="87" location="72232"/>¶
      </ocp>¶
    </operationControlPoints>¶
  </infrastructure>¶
  <timetable>¶
    <trainParts>¶
      <trainPart id="TAPTSI:trainPart:00199108_2011-02-11/2011-07
        <operatingPeriodRef ref="TAPTSI:OperatingPeriod:00199108_
        <ocpsTT>¶
          <ocpTT ocpRef="tap:ScheduledStopPoint:007015400">¶
            <times departure="06:19:00"/>¶
          </ocpTT>¶
          <ocpTT ocpRef="tap:ScheduledStopPoint:007015440">¶
            <times arrival="06:33:00" departure="06:36:00"/>¶
          </ocpTT>¶
          <ocpTT ocpRef="tap:ScheduledStopPoint:007054660">¶
            <times arrival="06:55:00" departure="06:58:00"/>¶
          </ocpTT>¶
          <ocpTT ocpRef="tap:ScheduledStopPoint:008728107">¶
            <times arrival="08:29:00" departure="08:32:00"/>¶
          </ocpTT>¶
          <ocpTT ocpRef="tap:ScheduledStopPoint:008722326">¶
            <times arrival="09:07:00" departure="09:10:00"/>¶
          </ocpTT>¶
          <ocpTT ocpRef="tap:ScheduledStopPoint:008814002">¶
            <times arrival="09:42:00"/>¶
          </ocpTT>¶
        </ocpsTT>¶
      </trainPart>¶
    </trainParts>¶
  <&timetable>¶
</railml>¶
```

possible goals for further developments

1. Harmonization of XML data elements between telematics applications for freight and passengers and railML®
   - Transformation between the different XML-schemes easier
   - no loss of accuracy because of data conversions
2. Harmonization of concepts
   - E.g. Naming for similar purposes
3. Definition of Mappings
   - Definition of a mapping between the different data models/XML-schemes (e.g. Path request and railML timetable schema)
   - Definition of a mapping railML® - NeTEx
4. Clear definition of borders for the different XML-schemes and data models
   - E.g. TAP TSI is dealing with timetable data for passenger information, TAF TSI is dealing with partially with timetable data for operational purposes

TAF TSI:

http://www.era.europa.eu/Document-Register/Pages/CR-TAF-TSI.aspx

TAP TSI:

http://www.era.europa.eu/Document-Register/Pages/TAP-TSI.aspx

Questions ?

Thank you for your kind attention:

Stefan Jugelt

Project officer for Telematic Applications European Railway Agency

E-mail: Stefan.Jugelt@era.europa.eu

Backup

TAP TSI – timetable data

Purpose:

-**Exchange of timetable data**

Conditions:

-**Annual timetables must be published at least two months in advance**

-**Timetable changes must be published at least 7 days in advance**

How:

-**File in EDIFACT-format (technical document B.4)**

RU

RU's official internet site(s)

RU's

Authorities and 3rd parties

TAP TSI - tariff data

Purpose:

- Exchange of tariff data *

Conditions:

- RU's shall provide their tariff data to other RU's, third parties according to distribution agreements between them

- tariffs must be published to authorized public bodies

How:

- distance based fares based (technical document B.1)

- Ticket + reservation (technical document B.2)

- reduction cards, supplements and special offers (technical document B.3)

* For international and foreign sales

RU

Other RU

3rd parties

Authorized public bodies

TAP TSI - availability/reservations

Purpose:

- Exchange of availability/reservation messages data between RU's and ticket vendor

- Reservation of seats, berths, storage place for bicycles and cars

Conditions:

- Based on commercial agreements between RU's and/or ticket vendors

How:

- reservation of seats, berths and storage places for cars and bicycles (technical document B.5)

- Reservation of PRM assistance (technical document B.10)

- On bilateral agreement usage of proprietary standards possible

requesting RU or ticket vendor

Request

replying RU

Reply
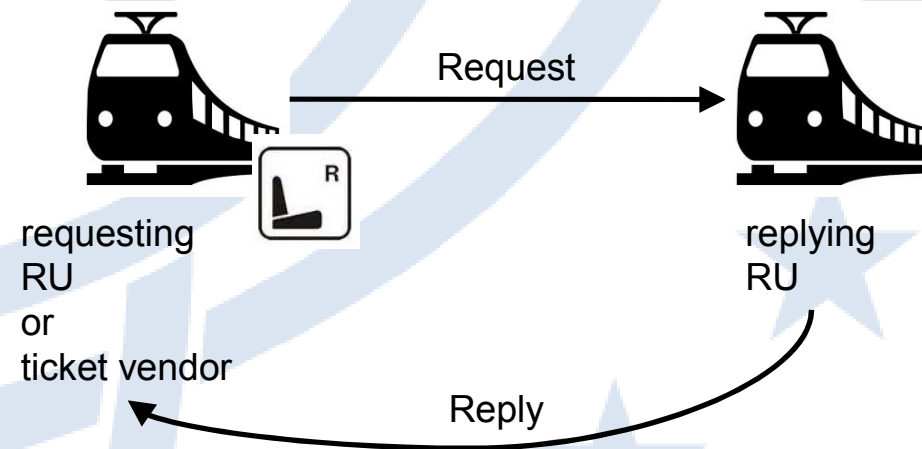
Conditions:

-Based on commercial agreements between issuer (e.g. RU, travel agency) and RU

How:

-RCT2 Ticket format (technical document B.6)

-Home printed ticket (technical document B.7)

Future developments:

- not all fulfilment methods are currently covered by TAP TSI

-ERA requested a CEN standard for e-ticket and manifest on list

-delivery of this standard foreseen for 2012

RCT2-ticket

Issuer

Home printed ticket

Example:

```
PRD+00090:::37:::Vauban+0083**0085'
POP+273:2003-12-15/2003-12-20::111111'
PDT++:::50'
SER+9'

POR+008301700:37:12+*0810'
POR+008507000:37:12+1156*1204'
POR+008721202:37:12+1444*1446'
POR+008200100:37:12+1650'

ODI+008507000*008200100+2*4'
SER+26'
```

EC 90 provides a restaurant (code 9).

The train runs from MILANO (008301700) via BERN (008507000) and STRASBOURG (008721202) to LUXEMBOURG (008200100).

Bicycle transport (code 26) is available only from BERN (stop index 2) to LUXEMBOURG (stop index 4).

Example:

Series N° 02399 from the Austrian Federal Railways (ÖBB – 1181)

RU   Series N°   Origin   Destination

1181023990300123600Feldkirch   00317600Flugh. Graz-Feld.010000

0 0 0<1181>Zell/See*Trieben*Bruck/Mur

via with carrier code

00006160006160101001000000000000000000000011451001637100315810

Km in 2nd class   fare table N°

000000000000000200912100120991231

Validity period

Examples:

B.5:

8385930270781100016590000110100122190483001118500080052207000005
(reservation request for 5 places Milano-Brig)

B.10:

```
<Requestor Company="1180" System="1"/>
 <Dialogue DialogId="12345" Date=« 2010-08-13"/>
 <PrmCustomer DisabilityDegree= "25" PriorityCard="true" WheelChairChange="true">
 <pc:FirstName>Jan</pc:FirstName>
 <pc:LastName>Smith</pc:LastName>
<pc:Title>Mr</pc:Title>
 <pc:DateOfBirth>1967-08-13</pc:DateOfBirth>
 <pc:Phone Preferred="false">+49 5558 458787</pc:Phone>
 <pc:MobilePhone Preferred="false">+49 5458</pc:MobilePhone>
 <pc:E-mail Preferred="false">JS@blah.com</pc:E-mail>
…
```

Practical example: B.6

Generic layout of a RCT2 ticket:

Practical example: B.7

Generic layout of a
home print ticket (A4 format)
- upper and lower part: