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A special mention in this respect goes to Mr. Anders Lundström (Directorate General for Energy and Transport, DG-TREN), his staff and colleagues who have been a source of information and inspiration throughout the project.

The content of this report expresses the findings, conclusion and recommendations of the Strateco study team and does not, whatsoever express nor imply any official point of view or position of the European Commission.

Study related to the Exchange of Operational Data of Border-Crossing Freight Trains

Final Report – Executive Summary

Content

1. OBJECTIVES OF THE STUDY

The objectives of the study were:

- To gain an overview of existing data and exchange systems in connection with freight trains crossing, as now, intra – EU borders and borders from the EU to Czech Republic, Hungary, Norway, Poland, Slovenia and Switzerland.
- To explore the problems regarding the use of current IT systems for data exchange in rail freight, and their impact on efficiency for national, international and Intermodal transport.
- To make proposals for improvement where existing arrangements are inadequate, both now and in the foreseen environment. Particular emphasis has been given to improvements achievable in a short-term horizon.
- To make proposals for action, using the opportunity created by the future TSI instrument, to enhance the quality of application of IT in the areas studied.

Beyond the conditions for a harmonised data exchange system, the study also investigated those data requirements beyond purely operational purposes, which could feature in rail operators' IT applications. This topic is however left deliberately open-ended, since many aspects are competitive tools of private companies.

The underlying study was conducted by a Consortium, consisting of:

- Strateco Eeig in Antwerp, Belgium (leading consultant)
- CANAC consulting division of Canadian National Railway in Montreal, Canada and
- TCI Transport Consultants International in Baltimore, USA

The Consortium brought together rail and intermodal freight experience, North American and European practice, telematics and systems design.

2. CONTEXT OF THE STUDY

Rail freight data are collected and used in various forms, but its concrete availability, and use is at present insufficient and inefficient for cross-border rail freight information exchange between operators. This situation is recognized by all stakeholders and several initiatives have been / are taken to improve the exchange of data.

Two European initiatives are of importance and set the framework for possible solutions, namely COM(1999) 616 *(proposal for a European Parliament and Council Directive amending Directive 91/440/EEC on the development of the Community's railways*) and COM(1999) 617 final draft *Communication of the Commission on integrating Conventional Rail Systems* and Proposal for a Directive on the *"Interoperability of the trans-European Conventional Rail Syste*m".

The first initiative will directly affect all rail freight operations via the implementation of the Rail Package of Liberalisation Measures. This Rail Package is at present in discussion between the European Parliament and the Council of Ministers. The separation between the rail operator and the infrastructure manager, foreseen in COM(1999) 616 is part of the Rail Package and will undoubtedly contribute to increase competition and user choice. Although the detailed arrangements await the published agreement, the existing rail information systems are not adapted to deal with the role of infrastructure managers in the rail freight transport market, in spite of the fact that infrastructure managers already operate in different countries.

The second important initiative is the Directive from the European Parliament and the Council concerning the interoperability of the conventional rail, complementing the Directive 96/48 on high speed interoperability, that will form the legal basis of the Technical specifications for Interoperability (TSI) that the Commission considers essential for the efficient functioning of the European Rail Network. The Directive on conventional rail will become a legal instrument in 2001. When published in the European Official Journal, the TSIs will become mandatory under European Law.

The present study will assist the Commission to identify the requirements for the TSI for rail freight data exchange. The study investigates the present situation in relation to cross-border rail freight information exchange, identifies it major (efficiency) problems and examines possible solutions, using lessons learned in North America where similar problems have been addressed.

Change is inevitable, but requires answers to the following questions:

- What are the objectives of change?
- Should change be imposed externally, in a uniform way?
- Can all or parts of the existing systems and carrier networks be used?
- Can data collection and exchange be made the basis of a new approach to border crossing service provision?
- What will be the needs of infrastructure owners, and how should they be integrated?
- Can data management and Information Technology (IT) services become part of the competitive assets of successful operators?
- Can rail operators and infrastructure managers become more effective and more successful through better data exchange ?

3. INFORMATION SYSTEMS IN EUROPEAN RAILWAYS

3.1 National Systems

Given the increasing demand for on-line accurate information by customers, communicating with the customer for bookings, status reports, estimated time of arrival (ETA) and tracking information, or announcing arrival and availability, is becoming a necessary ingredient of any modern transport system. European national railways have extensive and in some cases advanced information systems applications.

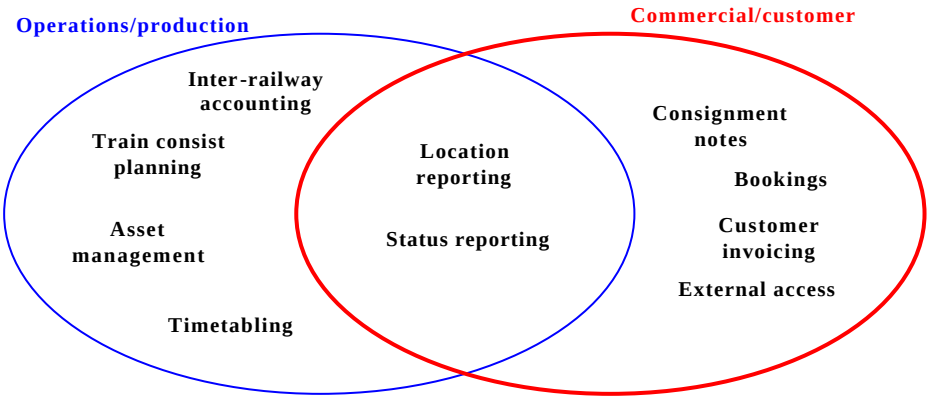
Although national systems (i.e. those developed by the traditional state railways) are very different, they often serve common functions. For example, most national information systems cover such areas as:

- Train operations,
- Wagon operation (including tracking and tracing),
- Unit information (for combined transport),
- Commodity information - for example for hazardous cargo,
- Commercial documentation.

However, the level of detail and emphasis is different for each system, depending on the original system concept. As with international systems, all the applications areas can be categorised as either operational (train/wagon/unit) or commercial (mainly transmitting consignment note data and handling bookings). Few applications cover both areas. Whereas traditional railway systems have been exclusively operationally based, the newer systems have been more customer-focussed, with the emphasis on commercial and status information.

The one area where the operational and commercial needs overlap is in status and location information, as shown below in the figure.

National information systems



Note that in most national systems, there is no relationship with the infrastructure manager foreseen. This is a general reality of present 'national' systems. Only EWS and SBB Cargo seem to reflect any awareness of this need. Although within one country a railway may operate on a “paperless” basis (for example UK), this does not necessarily mean that the same railway can operate internationally on the same basis.

There are very few direct links between national systems. Linkages are all via a separate network – e. g HERMES – or, for third parties, via their own system - e.g. the UIRR's CESAR. Basic information exists in each system, which in every case has to be fed via interfaces with the outside world. The available details for each system are very variable.

Information systems, use within European railways have been designed at different times, by different railways and railway operators, and for different purposes. In general, they were designed for national use as a first priority and therefore it is not surprising that national railway systems do not have common interfaces. Where necessary, these railways had evolved international working methods on a bilateral or multilateral basis to expedite the flows of international traffic. For example, the international railway consignment note is absolutely standard across all railways. But its use - whether carried with driver or attached to wagons - is not.

The table below provides a summary of the functions of various national and third party systems. More detailed descriptions and additional systems (including systems applied in the Central European countries) are discussed in the final report.

Overview of some national information systems

Operator	EWS	DB	Kombiverkehr	Hupac	SNCF	NS/Railion
Country	UK	Germany	Germany	Switzerland	France	Neths
Type**	NRO	NRO	TPO	TPO	NRO	NRO
System name	TOPS	PVG	Ali-baba	onLine	Various	BRAVO
Network/protocols	Proprietary	Proprietary	Proprietary*	Proprietary*	Proprietary	Proprietary
Asset management	Yes	Yes	No	No	Yes	Yes
Train consist planning	Yes	Yes	No	No	Yes	Yes
Location reporting	Yes	Yes	Yes	Yes	Yes	Yes
Status reporting	Yes	Yes	Yes	Yes	Yes	Yes
Timetabling	Yes	Yes	No	No	Yes	Yes
Consignment notes	No	No	Yes	Yes	No	Yes
Bookings	No	No	Yes	Yes	No	Yes
Invoicing	No	No	Yes	Yes	No	Yes
External access	No	No	Yes	Yes	Yes***	No

* Some internet access

** NRO = national rail operator. TPO = third party operator

*** Via EDIFRET

3.2 International systems

Several interesting evolutions are ongoing at the international level, many of them stimulated and / or initiated by the UIC. However, the national railway companies in Europe do not all participate in these initiatives and therewith reduce the potential for the creation of a pan-European network system.

The relevant UIC-Leaflets and the existing cross-border transmission networks (e,g., Hermes Plus, HOSA) could theoretically, provide a framework to achieve data interoperability for cross-border rail freight.

But lack of compliance with agreed standards, limited use of these networks for freight messages, and preference of many railways to set up bilateral arrangements mean that in practice the system as a whole is incomplete and discontinuous.

Private operators and third party service providers have no access to these networks and have now built their own systems. As more open access private operators enter the market, a further proliferation of such information systems is likely.

An overview of the most important international systems is provided in the table hereafter.

Overview of some international information systems

Application name	HIPPS **	ORFEUS **	UIRR	CESAR	TOPAS/TIPNET ~	RAILCOM+
Network/protocols	Hermes Plus	Hermes Plus	Proprietary EDI	Internet	Proprietary***	Proprietary***
Owned by	12 railways	5 railways	UIRR	UIRR	ICF	VR/UZ
Asset management	Yes	No	Yes	No	Yes	No
Train consist planning	Yes	No	Yes	No	Yes	No
Location reporting	Yes	Yes	No	No*	Yes	Yes
Status reporting	Yes	No	Yes	Yes	Yes	Yes
Timetabling	Yes	No	Yes	No	Yes	No
Consignment notes	No	Yes	Yes	No	Yes	Yes
Bookings	No	No	No	Yes	Yes	No
Invoicing	No	No	No	No	Yes	No
External access	No	No	No	Yes	Yes	Yes
User group	Members	Members	UIRR only	UIRR + clients	ICF + clients	VR/UZ+clients

* But CESAR II will include GPS

** When fully developed

*** But also has internet access

~ Under development

4. THE UIC LEAFLETS

UIC-Leaflets, or Fiches, are published to ensure technical and procedural interoperability. Primarily operational or technical, they provide a co-operation framework for railways.

Contrary to most other leaflets of the Union Internationale des Chemins de Fer (UIC), the UIC 404 Leaflet Series covering data exchange are not mandatory. Implementation has therefore been partial, with more or less reliability, enthusiasm and priority.

Therefore

- Messages often exist (especially pre-announcements), but are not produced in time (also in domestic traffic because there is no real-time collection and processing of information).
- Railways receiving trains check them, sometimes using and re-entering commercial data of the consignment note, but there is no quality control and there is no reporting back.

The main conclusion is that UIC has set a basis for an international platform for rail freight information exchange, both with a network (HERMES / HOSA) already available, and with proposed standards.

But without the mandate to enforce these rules or the existence of another mandatory system, potential results remain limited and data use and management is weakened.

5. THE NORTH AMERICAN EXPERIENCE

The North American railways data exchange system has evolved over many years from a paper-based to a fully electronic data exchange process, which effectively meets the needs of the stakeholders (railway owners and operators, customers, customs, regulators, fleet owners/managers, etc.) Although the systems utilised by individual North American railways are quite different, the key to success has been the use of standard message formats; a data exchange with central data sorting and edits; and a central data repository, which processes, forwards and stores data related to local and interline (exchanged) shipments of wagon-load and intermodal traffic.

Both real-time and historic shipment information are available from the central database via Electronic Data Exchange (EDI) and the Internet. RAILINC, a stand-alone, non-profit corporation (wholly owned subsidiary of the Association of American Railroads) manages this process.

Information is provided free to railway customers, though some charges are made to private car leasers. RAILINC provides electronic commerce support to process more than 4,000,000 transactions per day, including settlements, bills of lading, shipment notices, equipment tracing, rates, and other business transactions between 500 member railroad companies of the Association of American Railroads (AAR).

The North American railway industry evolved in a setting different to Europe. The railways are private joint-stock corporations and are vertically integrated, owning real estate as well as fixed and moving assets. This model was retained by Canada when privatising Canadian National in 1995 and by Mexico when splitting and privatising its national system in 1998-1999.

Despite these differences, the needs for data and improved fleet productivity are similar in Europe and North America. Although railways in Europe and North America have different systems, standards for the exchange of data exist. What is missing in Europe is the discipline to collect and / or exchange data for national and international shipments in a complete, timely and accurate manner and to make the results easily accessible to appropriate stakeholders. This discipline was not easily obtained in North America, but is accepted now as the price of obtaining data on which to base business efficiency.

The study has shown that valuable lessons and analogies can be drawn from the RAILINC model and the reasoning behind it. There is no identical transferable solution, because infrastructure ownership with open access remains a major feature in Europe. However, the report includes data system models similar to RAILINC, modified for additional stakeholders, which could be implemented in the European context.

The most important conclusion from the North American practice is a confirmation, that data exchange alone is only a means to achieve efficiency and not the real objective. This objective is to provide reliable, timely and harmonised data for all stakeholders to generate serious process improvements and higher competitiveness. This has been a driving feature of North American experience.

6. CONCLUSIONS

On the basis of the study results, it is possible to draw conclusions concerning railway information systems, as follows:

1. The messages defined in UIC leaflets are very comprehensive, but complex.
2. The Hermes applications cover most important aspects of railway operations but their use are very uneven across Europe.
3. The Hermes (Plus) network is under-utilised for freight, with rail operators often preferring to make alternative arrangements.
4. HOSA should improve both interoperability and customer service between operating railways but its future is uncertain.
5. The HIPPS and ORFEUS projects do not yet appear to have wide acceptance or use.
6. Independent operators of all types will continue to develop their own systems (the optional level) but also tend to subvert what could be a standard mandatory level, unless they are offered something better.
7. The Hermes network, applications and UIC messages are unlikely to be used voluntarily any more in a liberalised environment than they are today.
8. The technical problems of railway systems integration are not difficult to solve, especially in view of the improved functionality of modern software and operating environments. They have been solved in North American practice. However, the isolationist and uncooperative attitude of traditional national railways at an operational level remains a major obstacle to overcome in developing new, open systems.
9. There is functional duplication between traditional railway operators' systems and those of other operators – e.g. private companies and third-party operators, although the latter, without large specialised IT departments, will look for minimal obligations for data provision under a TSI.
10. The need for data exchange between stakeholders in a liberalised environment will, as North American development has shown, eventually be more focused on customer needs and less on railway requirements. But the immediate requirement is in ensuring that railway operations can be correctly performed.
11. Although there is clearly a need for a single international data exchange system, accessible to railways and customers alike, action which is seen as another externally imposed system requiring reshaping of their own IT systems will not, even if legally imposed, win support of the operating national railways.
12. The existing systems could in general generate simple basic data, given sufficient goodwill, to feed a mandatory exchange, although they have to be re-orientated as described above to give a structured and assured flow of data at each level of need.

It is clear that, with many different national and international systems already operating, the creation of a completely new European data based IT system would be immensely costly, unacceptable to all parties and very time-consuming.

The establishment of a new information system is basically not necessary. What is required is a virtual central data exchange structure, which draws extensively on existing resources.

But the use of available and consistent data has to be aligned to the needs of all users – infrastructure operators, railway operators, third-party users and customers – and these needs are becoming increasingly more stratified.

A mechanism to create a European-wide system is absent at present, although there is now undoubtedly a need for mechanisms to make cross-border rail freight information exchange effective.

The authority to implement a European – wide system must come from the legislator as a task within the program of rail interoperability. Legislative authority would come through the Directive on Interoperability for conventional rail, and detailed implementation authority through the definition of TSI. TSI's are the appropriate instruments to define the data to be provided, the formats and the degrees of access to be ensured.

With the TSI established, it is possible to envisage how the exchange might work. The choices are between retaining today's existing organisational forms such as HIT-Rail, which maintain today's networks for users, or, alternatively, moving into a new form which reflects the European interest.

Creating a new platform means creating a functional, accountable centre (albeit perhaps virtual and with decentralised elements) where:

- There is an incentive for all stakeholders to participate as data suppliers and users.
- The system guarantees confidentiality where necessary (uniform acceptance).
- Stakeholders' own existing systems can connect to the pan-European system and generate the required data form the platform to develop own data for their customers.
- Access is granted to all stakeholders as appropriate, with clearly defined limitations of use to guarantee confidentiality and protect individual commercial interests.
- Operations/production data are integrated with operationally necessary and statutory consignment note data, as some key requirements – for example handling hazardous or other specially controlled cargo – need information from both sources.
- The most logical approach would be to re-use / re-model an existing system or platform to take on the co-ordinating and integration role. The experience of the different existing applications can undoubtedly be utilised.
- It is imperative that limited initial targets are set, which can be expanded in the longer-term. Today, an Internet solution is likely to be more effective than classical EDI, and will adapt more readily to new functional and integration opportunities.

The work of UIC in developing standards and definitions in the UIC leaflets, for use in HERMES network applications, could provide a basis for further developments. The analogy with North American practice with standard harmonised databases (descriptions of locations, rail and Intermodal equipment, cargo descriptions etc.) is that the detailed work of listing and coding in accordance with agreed principals seems to have been done.

Based upon the study results, the basic principle for a pan-European information system is that data from the static and moving processes are fed through the individual rail operators' information systems.

As a general rule, information for the customers is provided by the *local* platforms of a railway operator. This reflects also the commercial relationship where the contract with the customer is located. In those platforms, proprietary information on the static processes is combined with information from the moving processes (the transportation process, which should permit tracing and tracking) that is stored in the *international* system. The question whether customers need to access the international system remains open and is directly related to the problem of confidentiality of commercial sensitive information.

The minimum information requirements for cross-border rail freight transport are:

Transport elements

- Cargo (Freight) description, weight, owner, special features
- Load units (Containers, Swap bodies etc.)
- Rail wagons
- Train sections and trainload compositions
- A train or train section consists of elements, which need differentiated supervision according to the needs of rail undertakings or their customers. With monitoring of each of these elements, management of the entire transport operation can be assured.

Information elements

- Identification of rail wagons and/or train compositions.
- Location report of rail wagons and/or train composition.
- Date and time of the capture of data.
- Monitoring of individual cargo during transport is unnecessary, and would only increase the amount of data to be transmitted. It is however important that these can be attributed to a rail wagon or load unit. This means that before transport occurs, there should be systematic linking of cargo data to the rail wagon or load unit. Once done, it suffices to monitor the transportation operation, since at any time a systematic data link with the cargo can then be made. This linking should occur at local level by individual railway companies.

System elements

- Assuring the required monitoring system needs much more than use of specific software platforms for train planning and transport supervision. For rail transport to be effective at international levels, global system conditions are to be provided. The quality of transport monitoring depends upon the weakest link of the overall system.
- The network and central data exchange will take messages with data generated by the mobile processes. The reassuring item is that these messages may be generated in a variety of forms. AVI, GSM or other satellite data are all capable of being assimilated, as also are data generated manually or input in yards and stations.
- The data has only the different characteristics of its source and access features. Satellite systems identify the wagon where it is, on demand or at regular intervals. AVI systems report the journal of observations of the reader station.

The need for data exchange between stakeholders in a liberalised environment will develop increasingly towards customer needs and on rail operational efficiency. But the infrastructure provider is central to the operational processes. Stakeholders have increasingly different needs for data exchange.

A practical system will therefore be one where:

- There is a central European Data Exchange.
- There is an incentive for all stakeholders to participate as data suppliers and users.
- The system can protect confidentiality where necessary.
- Stakeholders' own existing systems can generate the required data and supply this separately.
- Existing systems can be re-aligned fairly easily.
- The experience and investments of existing systems can be selectively utilised.

- Limited initial targets are set, which can be expanded in the longer-term. This would involve starting at Level 1 (rail operators/infrastructure managers, described above) and moving, perhaps in parallel to levels 2 and 3.
- Access is granted to all stakeholders equally, with the only limitations of use concerning confidentiality. This may rule out classical EDI and points to an Internet solution.

It is impossible to analyse all details and requirements of a real-time AVI or satellite reporting system. The issue is that it forms a natural adjunct to a data exchange and is necessary to assure integrity and functionality of data exchange for border crossing trains. ***This confirms the Commission's view that telematics tracking and tracing systems are in fact a necessity.***

Existing systems could generate the data required in accordance with a clear TSI. This means that, in theory, a solution seems possible. The practical implementation is however much more difficult and is not primarily a technical issue. If the stakeholders can be convinced that efficient data exchange is good for business, then the process will be much easier to implement.

7. RECOMMENDATIONS

7.1 Procedures and structures

It is recommended that the Commission more actively participates in the development of the pan-European cross-border rail freight information system, as a means to increase the competitive position of this mode.

The research team recommends that the present mandate of the European Association for Railway Interoperability (AEIF) is expanded and that the organisation be charged with developing proposals leading to a mandatory European Rail Data Exchange System for cross-border rail freight, which will be described in a Directive on Interoperability of conventional rail.

In particular, the AEIF should be given the mandate to co-ordinate efforts of all relevant parties to agree on a formal report to the Commission regarding the Technical Specifications for Interoperability (TSI), which describes the mandatory procedures, messages and data content of the system.

In the preparation phase, the AEIF should co-ordinate in integrating earlier listed inputs to plan / design the levels of mandatory exchanges:

- UIC (for rail operational and technical skills)
- European Infrastructure Managers' Association (EIM)
- HIT Rail (as existing network manager)
- Private/new (non-traditional) rail operators
- Private wagon owners (UIP)

Widening the concept to commercial user needs, there will be value in consulting bodies, which can express an experienced opinion upon the performance of rail operations and the associated data requirements.

These user groups might include:

- Third party intermodal operators (e.g. UIRR, ICF, Transfesa, Ambrogio).
- Major shippers with a high degree of integrated rail operations (e.g. BASF, Oil companies).

From a structural perspective, the discussions to formulate the TSI should start from the principle that there exist three levels of data exchange described. The fine detail of the data content of each level will be proposed by the AEIF but the general scope is described below.

Level 1 – Basic Interoperability

Railways should exchange a minimum level of train data in a timely and accurate electronic form to facilitate train path (capacity) planning for interchange (cross-border) freight traffic. This basic level of information will be *mandatory and will be exchanged between infrastructure managers, the data exchange, and train operators*.

Level 2 – Regular Railway Operations

This level of data exchange is also mandatory and consists of basic operating information concerning locomotives and crews, and train and wagon running, to be co-ordinated and optimised. Trains, wagons, loads and journey details should be identified and exchanged when rail undertakings exchange trains at handover points, not always at frontiers. Infrastructure managers will not be involved in these transactions.

Wagon search possibilities would also be available at this level. For example:

- Fleet managers should be able to determine (via Internet, email, etc.) the current status and location of a fleet of wagons or I.M. units across all E.U. Railways
- Fleet inquiry capability should be by equipment type or by pool (1) identifier and should be available by fleet quantities and/or individual wagon / IM unit number.
- Fleet managers should have access to "pipeline" reports showing location and status of quantities of wagons/I.M. units by type or pool, moving toward specified destination(s).

It should be foreseen that also this level of information becomes in time mandatory in the pan-European system.

Level 3 – Commercial and real-time location Functions

This third level is optional but from a commercial and customer-oriented perspective highly desirable. For international and national shipments, Railways, individually and collectively, should provide the capability to:

- Capture shipment transit time commitments made to customers on a door-to-door or dock-to-dock basis.
- Manage specific shipments against commitments on a real time basis and provide current estimated door/dock time of arrival and (ETA) information to customers as part of the track and trace process.
- Provide timely and accurate ETI (estimated time of interchange), data (in electronic form) for shipments en route to another railway.
- Periodically, measure actual shipment performance versus commitments and provide the information to customers and other appropriate stakeholders.
- Perform root cause failure analysis to facilitate problem resolution and improved shipment transit time reliability.

Stakeholders (2) with appropriate security access should be able to track and trace international and national shipments from a single source on a timely basis.

Shipment status (3) and location (by station) information should be available as well as a history file with date and time of a determined number of events. Response to scheduled inquiries should be via Internet, email.

In addition to current track and trace information, historic shipment trip data for international and national traffic should be available to appropriate stakeholders in summary and detailed form. Electronic booking and transmission of consignment information should be available at least at main locations.

1 Pool: group of wagons or I.M. units identified by individual numbers.

2 Stakeholders: shippers, consignees, railways, customs, fleet owners/managers, and other partner modes.

3 Shipment Status: load, empty, bad order, hold, stored and, delay reason codes

In order to ensure quality, the infrastructure managers and rail operating companies should be made responsible for a defined data accuracy and timeliness of reporting, (depending on the data level). Results of these measures should be made available to the appropriate stakeholders on a regular basis.

The concrete development of the TSI should include, for the broad levels of data requirements, already defined and emerging from EU legislation, functional descriptions, business processes, data exchange formats, new systems design, interfaces to existing systems, timeliness and estimated costs. The development plan should preferably follow the guidelines set out in this report, with three levels of data exchange, the first two being mandatory and the last being optional.

The data plan should be completed as soon as possible so that it is compatible with the ratification in national parliaments of the draft 'Railway Package' at present being proposed. Simultaneously, selected rail undertakings should be encouraged to develop and implement pilot projects, which would deliver level 3 functions – for example tracking and tracing and shipment management capability for international traffic on major traffic routes.

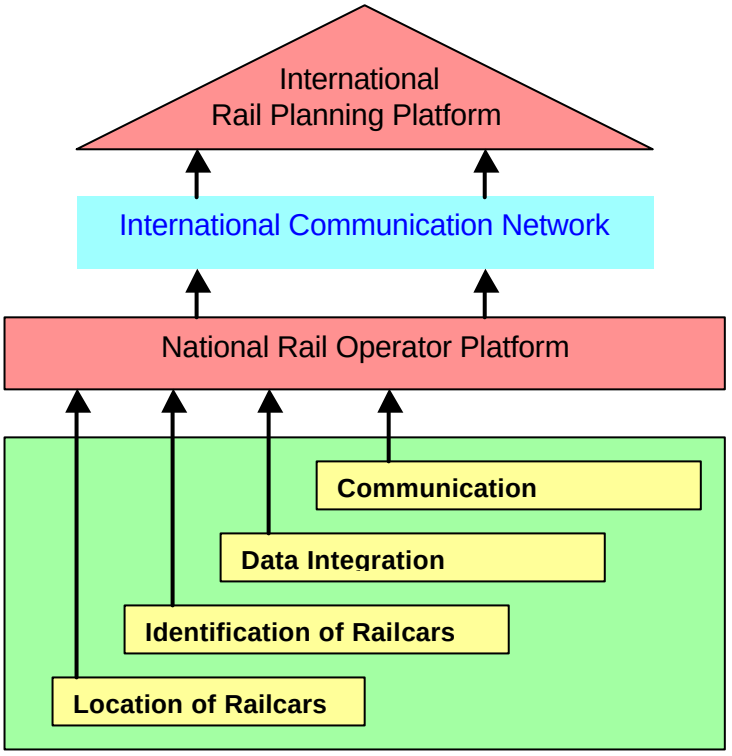
7.2 Basic lay-out of a pan-European information exchange system

The pan-European information exchange system should not take the form of another new information system threatening to replace existing systems at local and national level.

On the contrary, the system should focus on the transmission of only a minimum of information (level 1 and 2) that can be provided by and used by rail operators, transformed into propriety data within their own information systems.

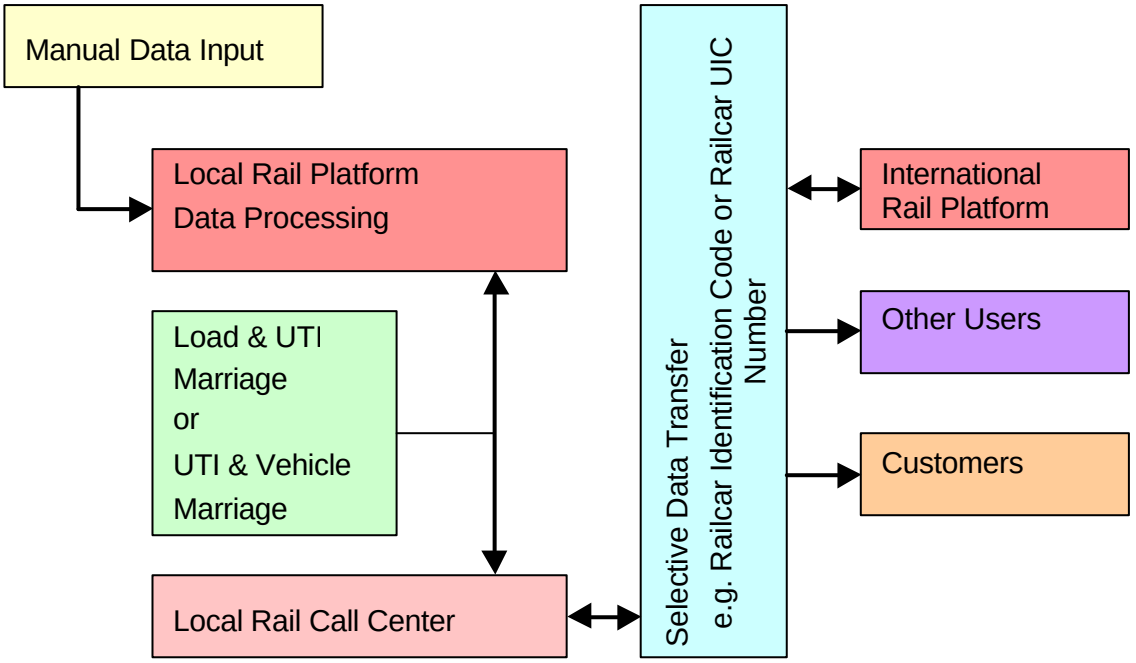
It is the function of railway operators and of all on-rail competitors, to use and structure this information in such a way that they can satisfy their customers in terms of information needs. Hence the data requirements for the two mandatory levels (1 and 2) are relatively simple and already exist in most railway information systems. The next figure provides a simplified concept of the international information exchange system.

A simplified concept for international information exchange system



The international information platform should be seen as a technical information carrying system where local (propriety) information is available in the form of specific standardised coded data. The transformation of propriety information into the international identification codes can and should be done at the local level (individual companies). In a standardised environment, individual operators will be able to “translate” these codes into information that can be used for their own (commercial) purposes. Different stakeholders including customers should be able to access the information at the international level the general approach is visualised in following figure.

Simplified layout of information exchange system



The content of the information to be provided by rail operators should be reduced to a minimum. However, it is essential that the "call centre" database (e.g. Internet site) have sufficient coded information that enables users on the rail operator local platforms to link the payload or UTI and the rail vehicle during data processing.

There are many analogies between the situation being described here, to optimise data capture, concentration, access and use by authorised bodies at the three levels, infrastructure and slot management, rail operations, and customer services. The North American railroads, with substantial organisational and legal differences, have already implemented similar systems of which RAILINC is the most evident. But also Kleinschmidt as one of the private data management companies also serves a similar function for some stakeholders, including major clients.

While it would be superficial to recommend a RAILINC or third party private model for direct European application, the lessons are clear. Mechanisms, including agreement on basic standard data supply and the rules for access, already exist and function. A TSI could draw upon substantial existing agreement, in UIC Leaflets, and in data exchange concepts of which the operational efficiency has already been demonstrated in North America. Railways in North America are in a most competitive environment among themselves but also co-operate wherever there is inter-dependence to provide a service to a customer. Moreover, data are not the end objective. Rather have they served to supply each rail operator's own much more developed information system with timely and accurate data flows for operating, scheduling, tracking and tracing, which improves the level of customer service of the individual operators.

Management and data exchange meet at all levels to improve performance, quality control, and accountability and cost control. This could be a prospect in Europe, but today the approach is still in its infancy.

In Europe, the difference between the static, fragmented infrastructure, and increasingly dynamic rail operators makes changes in the existing market model and structure inevitable.

The concept of a joint or even private central data clearing house would permit agreed data exchange processes to become truly pan-European, on line, in real-time and predictable.

It is in particular a cultural change of the "traditional" rail operators towards open access and confidentiality that will enable the introduction of the system, which will then be seen as a valuable support to increased efficiency.

A possible basic structure of minimum pan-European information flows is demonstrated in next figure.

Simplified view of information flow