OPTIRAILS: Optimisation of traffic through the European rail traffic management systems

Anne Curchod, TSM/ITEP, EPFL
Maurice Genête, SYSTRA

Conference paper STRC 2002
Session 6

STRC | 2nd Swiss Transport Research Conference
Monte Verità / Ascona, March 20-22, 2002

OPTIRAILS: Optimisation of traffic through the European rail traffic management systems

Anne Curchod
LITEP
EPFL
Lausanne

Maurice Genête

SYSTRA
Paris

Phone: 021-693 24 78
Fax: 021-693 50 60
e-Mail: anne.curchod@epfl.ch

Abstract

International trains, in particular freight trains, spend much time stopped at particular points in the network, waiting for resources or for administrative tasks (custom). Comprehensive management of international traffic, from origin to destination, is likely to reduce delays and to improve both performance and reliability.

The OPTIRAILS research project aims to develop a trans-European supervisory management facility, based on existing national traffic management systems, to help to control international traffic.

This new European supervisory layer will be corridor-oriented. Its main tasks will be

- to collect and distribute information on the running of international trains on the corridor and on the network status
- to help train rescheduling in case of perturbation
- to help train rerouting
- to help negotiation between infrastructure managers (and possibly train operators) in order to optimise a corridor-wide traffic management.

After a short review of the state of the art of the research in rail traffic management systems, the paper describes the OPTIRAILS system, its expected benefit on the international rail traffic improvement and the current state of the project.

Keywords

Railway – Traffic Management – 2nd Swiss Transport Research Conference – STRC 2002 – Monte Verità

1. Introduction

International trains, in particular freight trains, spend too much time waiting for resources or for administrative tasks (customs,). To improve international rail traffic performance and reliability, train traffic should be managed comprehensively, from origin to destination.

The main aim of the OPTIRAILS project (OPTImisation of traffic through the European RAIL traffic management Systems) is to specify a prospective rail traffic management system, within the ERTMS (European Rail Traffic Management System) framework, which will be applicable to international railway corridors, mainly intending to improve real-time train dispatching and route planning, as well as information for both the customers and the operating staff.

2. The OPTIRAILS project

The existing ERTMS project (ETCS, GSM-R, etc.) focuses mainly on safety and technology issues. The "traffic management" layer is missing at the present time, and that almost prevents ERTMS from being a complete European rail traffic management system. Within this perspective there was need to identify functional and technical facilities for a pan-European rail traffic management system.

The OPTIRAILS projects (financed by the EU under the 4th and 5th EU/Framework programs, and by the project partners themselves, and supported also by the UIC) were intended to design European-wide supervisory management, **to control international traffic in coordination with existing national traffic management**.

Two successive European projects aimed at this purpose.

2.1 OPTIRAILS I

The OPTIRAILS I (OPTImisation of traffic through the European RAIL traffic management Systems) research project has been assigned to the OPTIRAILS I Consortium by EC-DG VII under the 4th RTD programme. OPTIRAILS I Consortium partners were: SYSTRA (F), AEATR (GB), ITALFERR (I). TRADEMCO (GR), TIFSA (E), HB (D), SNCF (F), FS (I), RENFE (E), ITEP-EPFL (CH), CSEE (F), INRETS (F), SOFREAVIA (F), SCANRAIL (DK)

OPTIRAILS I focuses particularly on the definition of traffic management tools based on the existing and foreseeable ERTMS design. Co-operation with other European R&D projects sponsored by the EU such as: LIBERAIL, EUFRANET, MORANE, EUROPE-TRIS, EUROPE-TRIP has been undertaken so as to establish a collaborative European framework. Co-operation with projects sponsored by UIC such as the EIRENE project has also been established.

The principal results of OPTIRAILS I are:

- A review of the existing status of ERTMS, ETCS, GSM-R projects in Europe, mainly as regards the particular experience already gained in France, Germany, Italy, Spain, and on some other countries

- An in-depth analysis of methods and tools available in the field of rail traffic dispatching, a comparison with the air and road transport management systems, and a survey of potential implementation cases in Europe
- Specification of functional requirements (FRS) for traffic management and a pre- feasibility study of the project
- A project design of traffic management tools leading to their Functional Requirements Specification (FRS) completed with a cost-benefit analysis of the project
- The dissemination of the project's results and its recommendations, by means of circulation of documents, organisation of seminars and creation of an OPTIRAILS web site.

2.2 OPTIRAILS II

The OPTIRAILS II research project is the continuation of the OPTIRAILS I. It has been assigned to the OPTIRAILS II Consortium by EU-DG VII under the 5^{th} RTD programme. The OPTIRAILS II Consortium partners are: SYSTRA (F), TRADEMCO (GR), TIFSA (E), SNCF (F), FS (I), RENFE (E), EPFL (CH), CSEE-Transport (F), NEI (N), VTT (FI), TRANSURB (B), SWEDERAIL (SW), STERIA (F), HALCROW (GB), ATKINS (DK), SBB (CH).

The OPTIRAILS II project main aim is to go further into the specification of the system. In particular, the following issues are addressed:

- Completion and consolidation of the Functional Requirement Specifications for the core traffic management system
- Completion and consolidation of the Functional Requirement Specifications for the sub-systems and interfaces
- Drafting of System Requirement Specifications for the core traffic management system
- Drafting of System Requirement Specifications for sub-systems and interfaces
- Dissemination of relevant information related to non-confidential results and project issues
- Working out of a functional demonstrator illustrating the OPTIRAILS concepts.

3. Review of research on traffic management systems

The first phase of the OPTIRAILS I project was to make a review of the current state of research and development in the field of traffic management systems. The review study was completed by a comparison with traffic management system for air and road.

3.1 Research on railway traffic management systems

No theoretical – strictly speaking - approaches of real-time management have been found during the review. Various research works are under way and practical approaches (concepts and design of tools) are also under development. The efforts are generally done by the railway companies themselves, by consulting offices (often closely related to railway companies), or by the academia, in collaboration with or on the demand of railway companies.

Two main subjects were addressed:

- very-short-time planning, focussing on train rescheduling or re-routing
- real-time traffic management systems, with three levels: visualisation (train monitoring), prediction (running time forecasts) and conflict detection/resolution.

3.1.1 Very short term planning

Some research effort is made in this topic, but it focuses on local level: lines, stations and regional networks. Ongoing projects aim to develop and to optimise arithmetic algorithms (change the order of trains to reduce delays), or to define a concept for computer-aided traffic management systems.

3.1.2 Traffic management

Visualisation

For computer aided traffic management systems, visualisation of the current operation situation and comparison between planned timetable and current operation are fundamental.

One may assume that optimal train traffic management can only be achieved if the managers have full access to complete information, not only within the sector to manage, but also on neighbouring sectors. Forecasts of the immediate future evolution of the operation are also vital.

Prediction

Commonly, traffic prediction is obtained with simulators. Data and calculation accuracy depends on models. Simulation may be based on the pre-determined running times that are included in the timetable. Alternatively, it may require computation of running time, which is done during simulation process.

The two main problems of prediction are speed and reliability. A rapid evaluation of the future operation is essential for decisions making. A simulation that would need hours (or even ten minutes) to produce its results would be useless to the operator who must take a decision in a few minutes. The reliability of prediction is also vital to choose a relevant strategy. Making prediction for the next few hours in railway operation is a very difficult task, due to the numerous constraints and interactions in the network.

Conflict detection/resolution

It seems fairly impossible to fully substitute dispatchers or path controllers with a machine, at least not nowadays. Instead, current systems include computer-aided conflict detection/resolution modules, which suggest solution(s). Operators may accept (choose) one solution, modify it, or try to design a new of their own. In this last case, the system anticipates the consequences of the new solution.

Conflict resolution modules are based on different types of computer science methods, depending on the system. These techniques are generally a blend of procedures that include elements of operational research, heuristics, knowledge-based systems and fuzzy logic.

3.2 Rail / Road / Air Traffic Management Comparison

Table 1 summarises similarities and differences between Rail, Road and Air traffic operation management.

3.2.1 Road traffic management

Road traffic management concerns mostly local and regional geographical fields (urban networks, ring roads).

Aims of road traffic management are:

- to reduce congestion
- to increase safety
- to minimise travel times
- to optimise the use of network capacity.

Involved means are:

- to control access to parts of the network (using traffic signals or lights, ramp-metering, etc.)
- to provide drivers with information on traffic conditions (congestion, incidents, weather conditions,)
- to suggest alternative routes

Road traffic differs from rail traffic in the sense that the first one is a stochastic process and is commonly modelled by using approaches based on flow theory (hydrodynamics). Moreover, drivers are free to choose their route and their choices are generally based on their own experience. Forecasting future traffic density is therefore more challenging, compared to rail traffic where the timetable is planned in advance.

Finally, connections are very important in railway operation, at least for passenger trains, while this problem does not occur in road traffic.

Consequently, many approaches used in road traffic management as well as their results are not easy to apply to rail traffic management in general and to OPTIRAILS framework in particular.

3.2.2 Air traffic management

Due to the international nature of air traffic, the issue of pan-European authority for regulation has been solved many years ago. The problem is different in rail traffic, where the network is shared between regional, inter-regional and international traffic, as well as between freight and passenger trains. Many countries wish to maintain a good regional and inter-regional supply. As train passengers hardly accept delays, national or local infrastructure managers are inclined to give the highest priority to passenger trains. It seems very difficult nowadays to transfer rail traffic management authority from national level to pan-European level.

Another difference between air and rail lies in technical incompatibilities for the later from one country to another. Recent European projects open the way to interoperability by creating specification of common standards able to promote free access to the rail infrastructure. This is to compare with the air traffic where, due to the international nature of air navigation, air safety is supported by international standards.

Changes to air traffic flow and capacity management in the next few years will focus on moving from flow management, mainly based on control mechanisms, to the collaborative management of capacity. Enhancements up to year 2005 will concentrate on improving tools and procedures: re-routing to provide alternative routes that avoid congestion, algorithms for slot allocation, collaborative flight planning, and optimised capacity management.

One keyword that may also apply to rail traffic management is collaborative decision making. That means, for all actors, to increase their mutual knowledge of the situation and of each other’s constraints, preferences and capabilities, and to anticipate problems. Three specific factors define the collaborative concept: all parties must know the constraints, all parties must be able to react to the constraints, and experience of the past must be used to improve the system. This lesson could be learnt from

EUROCONTROL, as the international organisation for air traffic management mainly dedicated to European air space.

3.3 Summing up the comparison

One conclusion of this review is that there are no real common and universal theoretical approaches for rail traffic management, although at regional and national levels several practical methods are implemented and some tools are developed. These systems need large amount of very accurate data, and it seems difficult to apply them at European level.

A multi-layer structure as in the European project MARCO, with a central system heading regional or local centres seemed an interesting one. With this approach, the responsibility of train traffic management in a zone (region, state,) would be left to national centres, and OPTIRAILS would be there to co-ordinate the train path allocation between states, and to deal with train priorities. Such an approach has also similarities with the air traffic management in EUROCONTROL.

Table 1: Rail / Road / Air Comparison

	Rail	Road	Air
Geographical field	Regional National International	Mostly local and regional	National International
Process type	Discrete	Stochastic	Discrete
Treatment	Following of individual trains	Flow processing (apart from microscopic level)	Following of individual planes
Route choice	Routes fixed by traffic management	Routes chosen by the individuals, the drivers	Routes fixed by traffic management In future, greater freedom of crew to choose or adapt their individual route between O/D (departure and arrival airports)
Freedom degree for routes	1D (guided traffic)	2D (freedom in the road network)	3D (possibility to avoid conflicts with other plane by horizontal or vertical diversion)
Timetable	Respect of a planned timetable	No timetable	Planned timetable, introduction of new planes at short time before departure
Connections	Connections between trains in stations Short connection times	No connection	Connections between flights Longer connection times
Management strategies	National (regional) strategies	Mostly local strategies	European strategies
Management aims	Safety Optimal use of the network capacity Respect the planned timetable Minimise delays	Safety Optimal use of the network capacity Avoid network congestion Minimise travel times Environmental concerns	Safety Optimal use of the airport, air-corridor and network capacity Avoid airspace congestion Minimise delays and costs
Means	Early conflict detection Optimal conflict resolution	Entrance control Indication of congestion and unfavourable traffic conditions Advise on alternative routes	Smoothing demand in order to avoid congestion (slot allocation) Ground-holding policy Fit routes to adapt flight arrival time to traffic conditions

4. OPTIRAILS concepts

4.1 Underlying principles

OPTIRAILS is a real-time management system with the aim to manage in almost real-time every-day incidents during the running of the international trains.

Most railway networks have already developed their own traffic management systems and manage the traffic operation in their own part of international corridors with high efficiency. The difficulty occurs with international trains and is greatly linked to the lack of information between Infrastructure Managers. IMs do not know in advance how the international trains are running in the upstream networks (are they on time, late or in advance) and when to expect them to arrive at the border. Moreover, international trains are processed by each IM with the objective to optimise local traffic operation, without taking into account the needs or constraints in downstream networks.

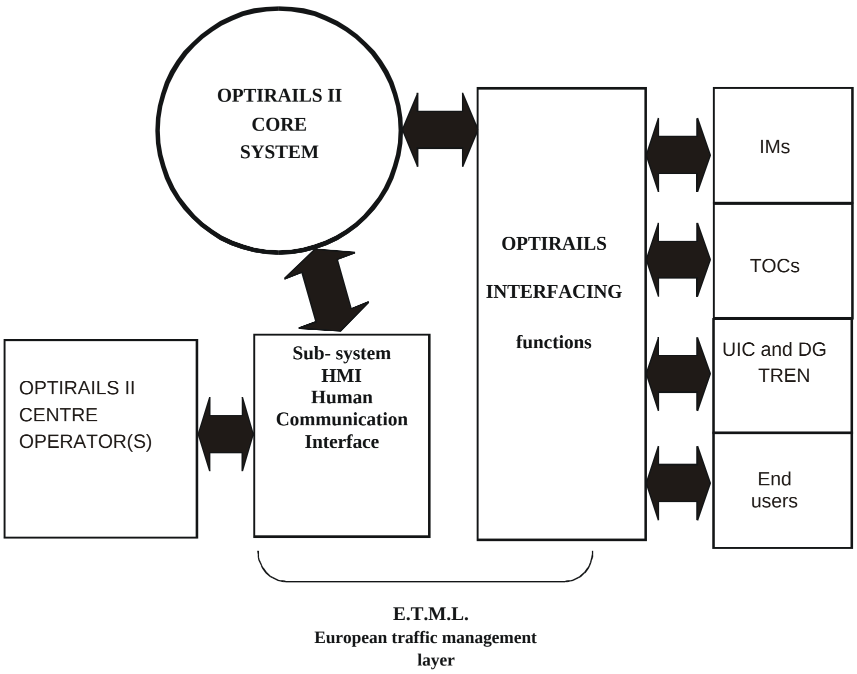
Another issue is the acceptability of OPTIRAILS system. In fact, railway networks are in the best position to deal with problems occurring in their own network. They not only have information on all the local and international trains as well as on the network, but also the every day experience of the network operation. Furthermore, they will accept with difficulty orders or advice from an international higher system. On the other hand, it would be unacceptable to replace local systems, whose development had been very expensive. Therefore, whenever a perturbation rises in one network, OPTIRAILS only deals with problems induced in subsequent networks, letting national systems resolve internal problems. OPTIRAILS copes with short- to medium-term decisions (taken between the train departure from its origin and its arrival at destination). In this way, the OPTIRAILS system does not interfere with the national systems, only picking up the necessary information by means of an interface, adapted to each local system.

The different management systems today are not at the same development level in the different countries, and their capabilities vary. These systems also change according to the technological development and the needs of the different IMs. A high level management system like OPTIRAILS must be able to evolve along with the development of the national systems.

4.2 General concepts

Considering those constraints, the new corridor-oriented European supervisory layer is designed as a high-level traffic management system, concerned by international trains, from their origin to their destination. This traffic management system does not interfere with the existing national or regional dispatching centres and does not impact the safety.

Figure 1 OPTIRAILS general structure



It is evolutionary in

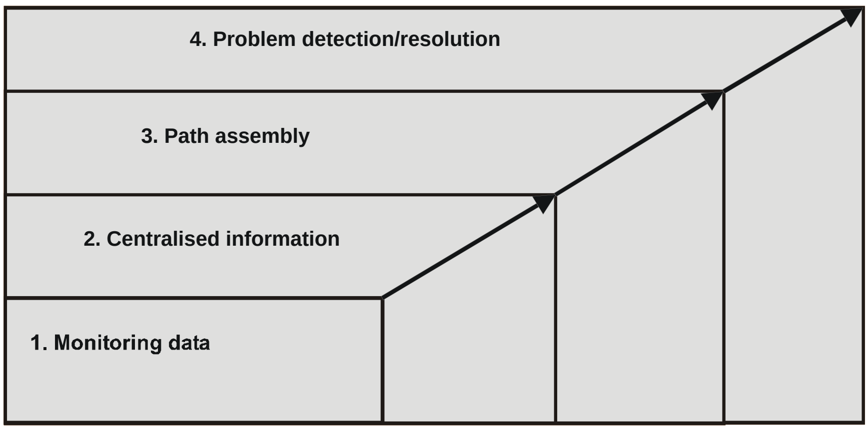
- collecting and distributing information on international trains and on the network status
- helping train rescheduling or rerouting, in case of perturbation
- sustaining negotiation between infrastructure managers (and possibly train operators) in order to optimise corridor-wide traffic management.

Timetable and train locations are the basic information OPTIRAILS has to collect. Train delays can be inferred from these pieces of information, but causes of delays are complementary information that OPTIRAILS should also be able to collect. Train composition, corridor status are also important as they contribute to better understand and forecast the running of the trains. When trains are late, it is crucial to plan actions, in order to prevent increase and/or propagation of delays. Accurate and reliable predictions of arrival time at the border or in important locations are essential to make good decisions. OPTIRAILS dealing only with international trains on the corridor, it has not the full set of information needed to provide consistent forecasts. IMs are in a better position to provide trustworthy predictions, because they have complete knowledge of their network operation.

Four different strategic options have been considered to implement a supervisory management centre, going from the most elementary to the most complex and comprehensive solution:

- Option 1: Data monitoring to provide offline reporting
- Option 2: Online centralised information collection and supply
- Option 3/4: Negotiated train-path assembly
- Option 5/6: Problem detection / problem solution

Figure 2 OPTIRAILS options



The options are structured so that each option is included in the later one, and therefore the functionality of one option is contained in the later ones. Each option brings new functionality as compared to the previous one, and may also need refinement of the data of the preceding option. For example, options up to 3/4 only deal with international trains' data. However, problem detection and resolution provided in option 5/6 require information for all the corridor trains, international and domestic. Data acquisition functions implemented in options 3/4 should thus be enhanced to implement option 5/6.

The next sections describe more in detail the different OPTIRAILS options.

4.3 Option 1: Collecting data and monitoring performances

OPTIRAILS Option 1 is the lowest and the simplest level of the system, which only delivers off-line reports.

OPTIRAILS, at option 1, collects all the basic information, which is also necessary for the upper options. This information includes all data directly regarding the running of international trains: long-term planned timetable, updated timetable till train departure, real running of the trains, with delays and their causes, and IMs forecasts during train journey. It also includes information on the real train composition and on the corridor status.

The collected information is then analysed off-line, in order to produce periodic reports. The aim of this analysis is to detect the parts of the corridor where problems occur the most frequently and the causes of perturbation: capacity bottleneck, lack of resources (engines, drivers, crew, etc.), timetable problems (clients unable to provide goods in time,). On the basis of these results, it would be possible to give advice to improve future quality of service.

4.4 Option 2: Centralised information

At option 2, OPTIRAILS provides users with real-time information on the running of the trains.

The aim of this option is to improve the effectiveness and efficiency of the running of the international trains on the corridor, through information sharing. In particular, it will provide users with up to date information concerning the real-time running of the international trains along the corridor and the status of the corridor.

Timetable data are collected before train departure. Information on the running of the trains and, in case of delay, on the forecasts made by the IMs (Infrastructure Managers) is collected in real-time; the causes of train delays are collected whenever possible, so as the status of the corridor (capacity restriction, possession, incidents, etc.).

At any moment, OPTIRAILS users may ask for information on the traffic operation (train locations, delays, forecasts, train composition, etc.). If OPTIRAILS does not have the required information, it will attempt to obtain it from the corresponding IM. The main improvement compared to option 1 is the real-time capture and dispatching of information.

Due to centralised information, OPTIRAILS users are informed earlier and in a more accurate way about the real operation along the corridor. This information allows them to make better decisions in order to improve the operation on their own network. Accurate forecasts of arrival time at the border also let reduce waiting time for international trains by preparing the necessary resources just in time, which also makes it possible to optimise the use of resources.

Accurate and continuous information do not only contribute to limit delays, but also to inform the final client (passengers, Freight Forwarders,) on the expected arrival time, improving thus the service quality.

4.5 Option 3/4: Path assembly and solutions from negotiations

When a problem occurs, the main task of OPTIRAILS Option 3/4 is to contribute in finding a negotiated solution between the IMs involved along the corridor.

If the planned path of a train becomes unavailable or is not suitable anymore, for example if resources are not available, it is necessary to find a new path for the train. A consensus between OPTIRAILS partners on a new path must be found. It is essential to agree on an optimum path from a corridor point of view, even if this optimum path is not the best solution for each individual IM, hence the need of negotiation and trade-offs.

In option 3/4, OPTIRAILS plays the role of a facilitator during the negotiation. It has neither the full set of information and nor the necessary tools to calculate and propose a solution by itself. Its role is to collect new paths proposed by the different IMs, to assemble them together into a corridor-wide path and to verify its feasibility and its suitability. If the new assembled path is not feasible (because, for instance, buffer times at borders are not sufficient, or not suitable, or the new arrival time at destination is later than the contracted delivery time), OPTIRAILS conducts the negotiation between partners to find a more appropriate solution.

With information on planned path along the corridor and on the real-time running of international trains, OPTIRAILS can check, at every moment, if the planned path is still suitable or feasible. In fact, when a train is late, OPTIRAILS can verify, on the basis of the forecasts sent by IMs, if the buffer times at borders or in important points (stations) are sufficient to allow the running of the train. If it is not the case, OPTIRAILS can point at the problem at an earlier stage and warn consequently its users.

When the delay becomes too large or if there is need to search for new paths for some trains, OPTIRAILS can initiate the path assembly process, that is the search of a new path and, if necessary, a negotiation process. An early path assembly helps finding a good solution and minimises the delay resulting from border crossings. The earlier the problem is detected, the more time is available to find a solution and the better the solution would be.

Such a path assembly process lets limit the delay and communicate a more reliable expected arrival time to the clients, so that they may better plan the use of their resources or prepare mitigation measures if necessary.

4.6 Option 5/6: Problem detection and resolution

In this option, which is the most complete and the most sophisticated one, OPTIRAILS is able by itself to detect operational problems and to propose solutions.

Information limited to international trains is not sufficient to enable problem detection and resolution. To make it possible, it is necessary to have a full picture of the network, i.e. to have data on both international and domestic trains. That means to enhance the data acquisition functions to be able to collect data for all the trains. The consequences are that we need to collect and deal with a much larger amount of real-time data.

New functions have to be implemented, giving to OPTIRAILS the capacity to predict potential problems in routing and to identify solutions in terms of high-level potential paths. Those proposals will be sent to the involved IMs, who have to consider the detail requirements and to implement the advice from OPTIRAILS. These new functionalities also require new data models, like the corridor model in order to verify the capacity of the corridor. The purpose of the corridor capacity model is to predict the likely available capacity along the corridor for the analysed train. The initial assumption is that where there is enough spare capacity, there is a high likelihood for IM to find a path. If spare capacity is scarce, there is a high probability that the train will be delayed.

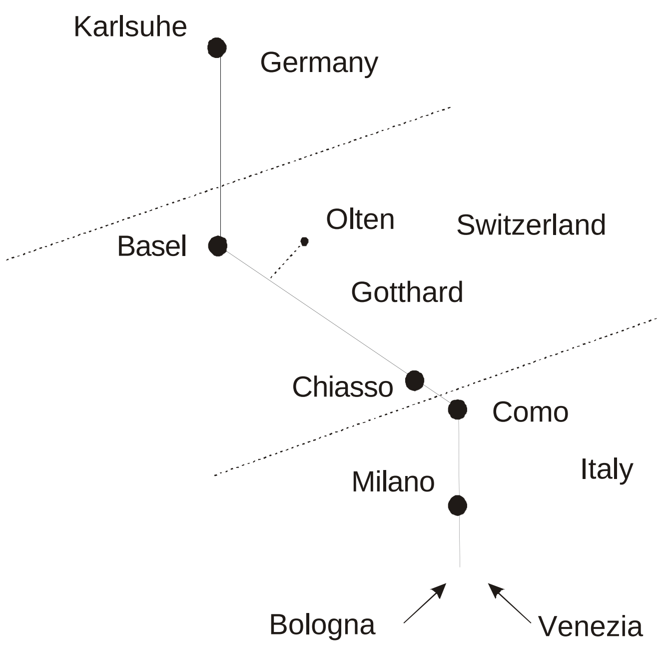
Automation of problem detection and resolution will help to reduce reaction time. This will not only help finding better new paths for international trains when necessary, but it will also enhance the capacity of the corridor thanks to a better anticipation of the real need of resources.

5. OPTIRAILS demonstrator

5.1 Objectives

A demonstration has been developed to check the validity of the OPTIRAILS concepts, to illustrate the technical options, to show the feasibility of the concept, and to prepare the acceptance of the OPTIRAILS system by its future users.

Figure 3 OPTIRAILS Demonstrator: geographical zone



The geographical area covered by the demonstrator was part of a North-South corridor, from Karlsruhe in Germany to Milano in Italy, via the Gotthard tunnel in Switzerland. The presentation of the demonstrator has been conducted partly on-line, in order to prove the technical feasibility. On the other hand, different operation scenarios have been processed, pointing out the benefits of OPTIRAILS, both for option 2 (centralised information) and for option 3/4 (path assembly system). Those scenarios have in particular highlighted the importance of early problem detection, which allows for example to find a good new path for a delayed train and to limit delay increase, and improves the use of resources thanks to a better allocation (one better conforming to the real operation on the corridor).

5.2 Scenarios

The main aim of the demonstrator was to prove that the functions defined in the project were technically feasible and economically affordable. However it was also important to demonstrate the advantages OPTIRAILS provides to Infrastructure Managers (IMs) and Train Operator Companies (TOCs).

The set of scenarios elaborated in the project did not claim to be exhaustive. They only demonstrated a subset of advantages that can be expected thanks to OPTIRAILS.

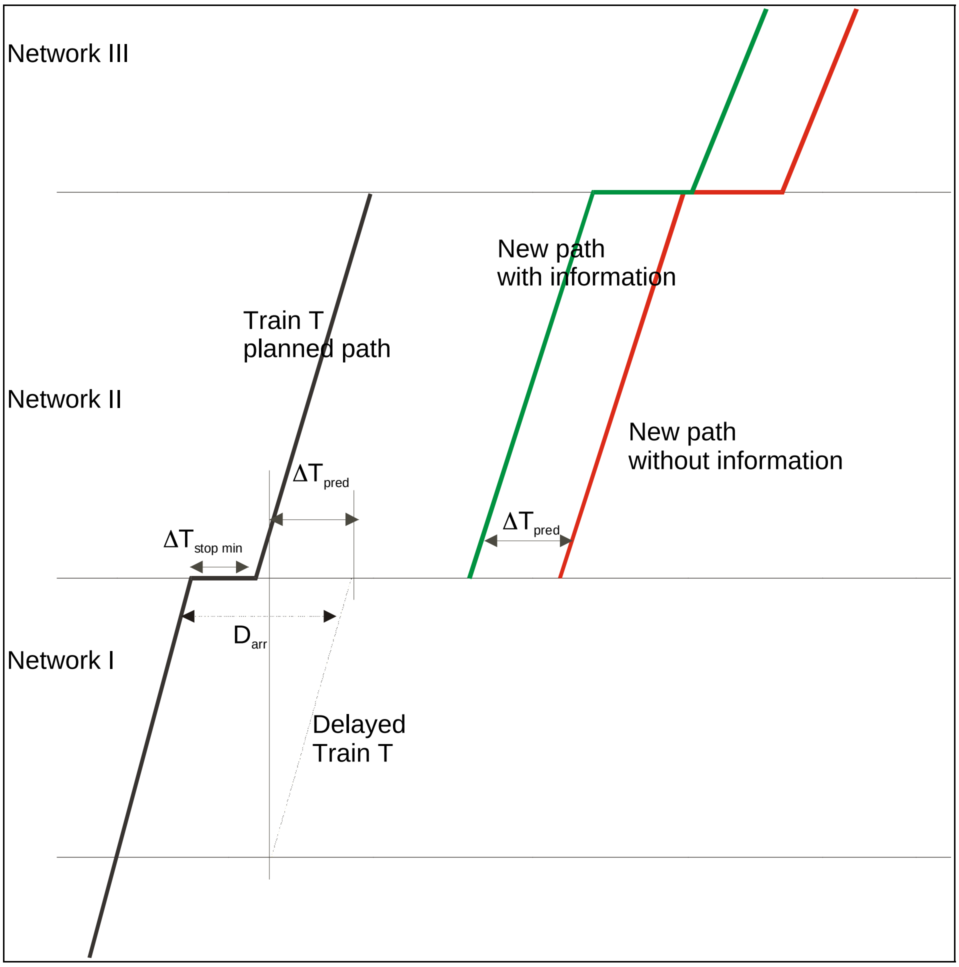
Ideally, to develop the soundest scenarios one needs to analyse the operation over the last months, in order to establish a set of typical actual cases, to treat those with OPTIRAILS, and to compare how they have actually been managed and how they could have been managed with OPTIRAILS. Due to lack of time and information, it has not been possible to proceed with this way. As a consequence scenarios represent mostly academic situations that are as close to reality as our knowledge allowed it.

The next paragraph roughly describes one scenario and its advantages.

Scenario 1: Freight train rescheduling

When trains have large delays, they cannot use the planned path any more and it is necessary to search for a new path, which is a long process. This rescheduling process can only begin when suitable and reliable information on the arrival time at the border is available. It means that, without information on the running of the train, the rescheduling only begins when at the train arrives at the border. In these circumstances, the train has to wait at the border till a new path has been allocated to it, and the delay increases. With better information transmission, the new path search process might start in advance, saving time and reducing train delays.

Figure 4 Train rescheduling



A rescheduling process takes place when the train delay is larger than a determined threshold D_{resch}. Today, the train arrival time at the border is often known only when the train physically arrives at the border. Part of the delay can sometimes be recovered by using buffer time[1] ΔT_{rec}

[1] Interval between planned stopping time and minimal necessary stopping time

at the border. If the resulting delay $D = D_{arr} - \Delta T_{rec}$ (delay at arrival minus buffer time) is still greater than the threshold D_{resch}, it is necessary to search a new path. If the minimal stopping time $\Delta T_{stop\ min}$ is less than ΔT_{search}, the minimal departure time is:

$T_{dep\ min} = T_{T\ arr} + D_{arr} + \Delta T_{search},$ with T_{Tarr} = arrival time according to timetable.

If it is possible to calculate in advance the arrival time and the delay ΔT_{pred} at the border with a good confidence level, the new path search can start earlier. The minimal departure time becomes

$$T_{dep\ min} = \max (T_{Tarr} + D_{arr} + \Delta T_{search} - \Delta T_{pred} ; T_{Tarr} + D_{arr} + \Delta T_{stop\ min})$$

The maximal delay reduction is

ΔT_{pred} if $\Delta T_{pred} < \Delta T_{search} - \Delta T_{stop\ min}$ and

$\Delta T_{search} - \Delta T_{stop\ min}$ if ΔT_{pred} is greater than $\Delta T_{search} - \Delta T_{stop\ min}$

However, in the second case, Network II has more time to find a good path and to prepare resources.

In the same way, as soon as Network II has found a new path and informed OPTIRAILS, Network III can start the process of finding a new path, on the basis of the new planned arrival time at border between Networks II and III.

6. Conclusion and further developments

The OPTIRAILS project aims to develop a European-wide supervisory management system, to control international traffic in coordination with existing national traffic management.

This new corridor-oriented European supervisory layer will concentrate and disseminate all information regarding the "life" of trains along international corridors, with permanent checks of factors entailing risks for the quality of service. Such an information management would be of a great help for all actors of the transport chain, from the consignor (especially if the wagons to be used are coming from abroad) to the consignee.

OPTIRAILS is expected to reduce the consequences of incidents through:

- better real-time path allocation (more time for decision making results on a better quality of the solution found);
- the reduction of the number of trains impacted by the initial incidents;
- better use of resources thanks to anticipation in the study of operational modifications to the plan;
- better and earlier information to other actors, especially to the final customers (if a delay occurs, the negative opinion of the final customers is attenuated if, properly advised, they are able to reorganise their production accordingly).

The follow-up of OPTIRAILS will be the development of the EUROPTIRAILS project. Main issues for this project will be the implementation of a real time traffic management prototype connected to four existing centres (Germany, France, Switzerland and Italy), the operation of the prototype over several months, the assessment of the results in order to check the added value of the OPTIRAILS concepts, and the definition of possible institutional frame scenario structures in order to prepare the implementation of OPTIRAILS on European corridors.