Product Description

Rail Cargo System

Controlling your front- and back office processes using the Ab Ovo Rail Cargo System Solution

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AbOvo

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1. Introduction

1.1 General scope of the Rail Cargo System

Our Rail Cargo System is a comprehensive system for the European Rail Cargo environment. It consists of a group of four integrated modules:
1. Contracts & Tariffs
2. Orders and Consignment notes
3. Operational Planning and Execution
4. Financial matters

The overall design is depicted in the following diagram:
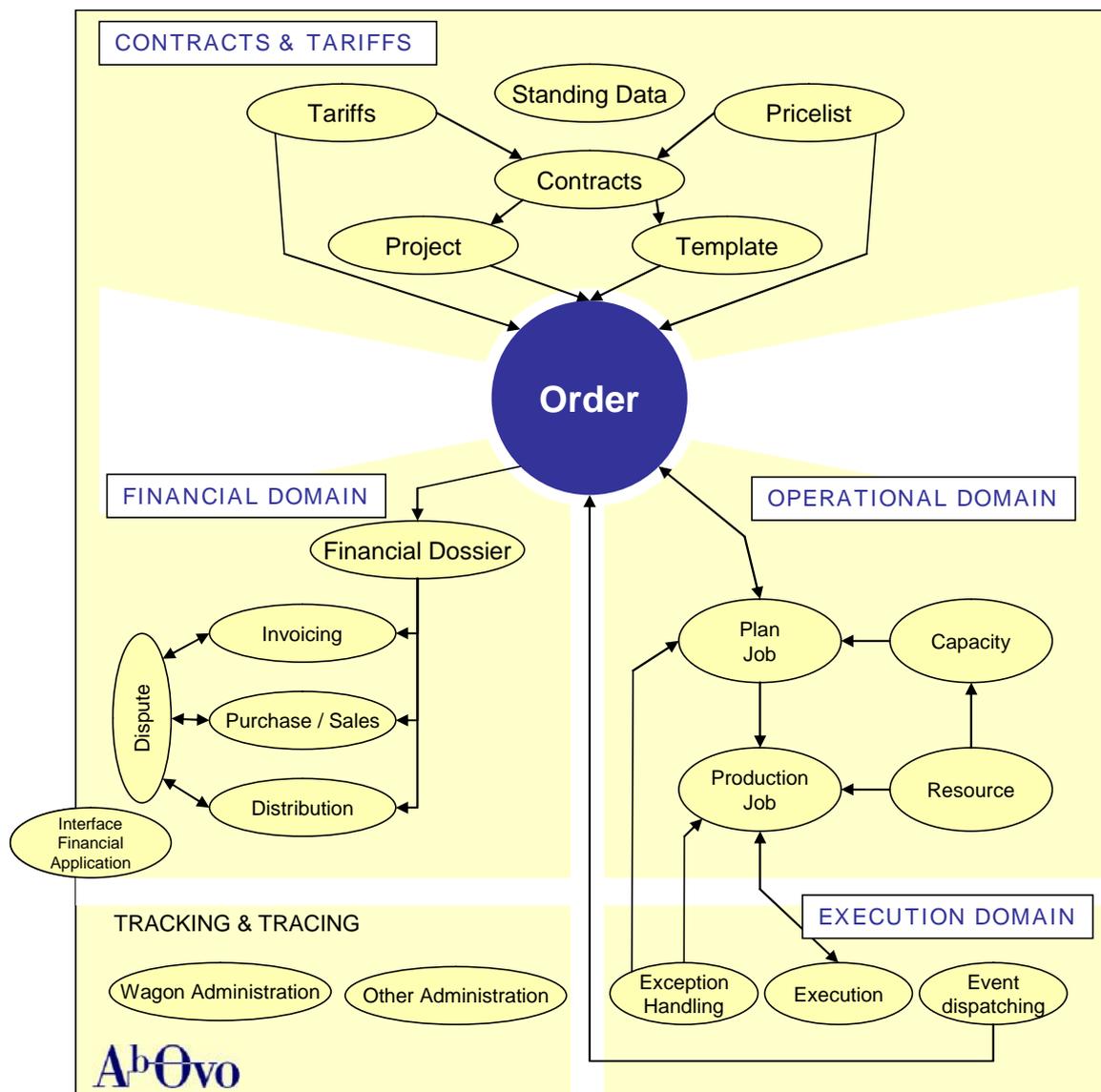
Throughout the system a support module is used consisting of functions like standing data, authorization, reporting and system maintenance.

1.2 A short description of the Rail Cargo System

The railway industry, a rapidly changing sector
The liberalization in the European rail sector and the expansion of the European Union has created a variety of opportunities for both established rail operators as well as for newcomers in this industry. With these new developments rail operators are faced with an increase in competition forcing them to operate in the most cost effective and efficient way. These developments also have their effect on the rail cargo industry. In order to meet today's challenges cargo operators cooperate more with each other and need specific IT-systems to support their business processes. The main IT-challenges reflect on the full order to cash processes, the planning & rescheduling of resources, international tracking & tracing, the optimization of empty equipment use plus improved asset management.

The Rail Cargo System – a flexible IT-solution
The Rail Cargo System is a *complete front-/back office ICT-application* covering the whole workflow from contracts to execution of transport to financial settlement and everything in between. The Rail Cargo System supports both the 'current' business models as well as the 'new' business models and extends even to support the actual "door to door" transports.

The Rail Cargo System is designed with a business focus: *get it right from the start*! The current international financial and administrative processes are complex and labor intensive. The system ensures that the customer order is valid and is booked under the correct contract and conditions preventing that you have to solve problems afterwards (which is much more expensive) when running the financial processes.

The Rail Cargo System is *suitable and usable for all operators*, whether they run complex or simpler processes. Further more the system offers the possibility to scale up the functionality that is to be used to support the processes. The question is what needs to be used? Do you run unit cargo operations? Do you use international revenue distribution, the purchase/selling model or both? Functionality can be customized, parameterized or simply excluded.

The order – core of the system
The system is based on and built around one key corner stone: the order. The order is the actual linking pin in the system, integrating 'contract to invoice' for every transport in only one system.

The so-called order dossier, which is the functional link between all the modules, forms the core of the system. The order dossier contains the customer order information (what needs to be shipped where and when or which services need to be provided) combined with the information on tariffs, contracts, pricing, etc. Every time something changes in the execution of an order as a result of change requests by the customers (e.g. more goods to transport or different services to provide), or as a result of changes in the execution (e.g. alternate route due to closed paths) the order dossier is updated, the related costs are re-calculated and the financial dossier is adjusted to the new situation.

Tariffs

In the world of European rail cargo, there are two predominant ways to define price and revenue: the traditional international revenue distribution and the new purchase/selling model. These models define the price of a customer order and subsequent handling of the revenue with direct tariffs, with contracts or with a pricelist (the company's price catalogue). These are all included in the Rail Cargo System, including the possibility to create project orders (a combination of one or more types of orders, all to be invoiced as a single project) and the use of order templates.

Operational & execution domain

The order directly relates to the operational (planning) and execution domain. When the customer order is available, various tasks are defined, planned and checked against available capacity. If the capacity is available (or made available after purchase), the planned tasks become executable tasks to which resources are assigned. The executable tasks lead to detailed activity lists for the employees. The other way around is also possible: when unexpected events in the execution lead to new tasks (except handling). The execution of production tasks includes movements (retrieve customer wagons, shunting, checks, transport) and services (weighing, repair, customs, etc). Events and triggers such as imported trains received by way of a Hermes message or import orders received by Orpheus can initiate orders or add additional information to the existing order.

Financial domain

The financial domain fully supports both the 'classic' revenue distribution model and the new purchase / selling model as far as internationally defined. It includes functionality regarding invoicing (to customers, suppliers and main contractors), purchase / selling, revenue distribution and dispute handling. The financial module does not include general ledger functionality. The Rail Cargo System is open to any bookkeeping standard and flexible interface functionality is included.

Tracking & Tracing

For registration of the whereabouts and rental of wagons, a tracking and tracing module is included. This module is directly connected to the financial and execution domain.

Workflow

The Rail Cargo System is totally 'status' driven, including guarded and authorized state transitions. All occurrences of objects do always have a status. When in the workflow an order is passed on to another domain ('responsibility shift'), this can be read from the order status. Order statuses are for example: order work version, order not valid, consignment note final, order in planning/production, order in financial domain.

Multi-lingual

The Rail Cargo System is available in Dutch, English, German and French. In this product description Dutch screenshots are used. The Rail Cargo System supports integration with Microsoft Windows and Office.

1.3 Key characteristics

Business processes from start to finish:	All business processes are supported, from contracts, orders to execution and financial settlement.
From Customer Site to Customer site	The system is the <u>first ICT-solution</u> that covers the whole process of <u>door-to-door</u> transports.
Fully integrated modules:	All modules in the Rail Cargo System are fully integrated. When you, for example, make a change in the order dossier the system automatically recalculates tariffs, alters the production planning etc.
Use of templates:	Templates are pre-entered data sheets that can be copied and re-used.
Scenario based:	Scenarios are predefined actions. For example the break-down of a wagon leads to a repair order.
Based on international railway regulations	The Rail Cargo Systems supports all international regulations. For example, consignment notes are created conform the new COTIF standard and the international revenue model is supported.
Supports interfaces:	The system can be interfaced with other IT-applications such as a bookkeeping system or a marketing database. All major EDI formats are supported for interfacing with foreign railways via Hermes, Orpheus and with customers and partners.
Supports Web technology:	Customers can have access to the Rail Cargo System via a Web Portal. The Web Portal is used to, for example, enter orders, create consignment notes or view status reports. A multi-lingual User Interface is possible.
Based on modern proven technology:	The Rail Cargo System is built with TET. TET is a development environment totally driven on the principles of Model Driven Architecture.
Configurable to local situation:	European rail cargo companies operate in the same environment. Nevertheless every individual operator faces specific local-driven processes. The Rail Cargo System supports these local processes in a flexible way.
Standing data:	Fixed data is stored for faster data entry and less mistakes. Examples of fixed data are: all partners (like customers and other railroad operators), the names and distances of all European railway stations (DIUM), the wagon types and all wagon data, commodities (NHM-codes), dangerous goods (RID), etc. Data/descriptions can be entered in several languages.

2. Contracts & Tariffs

2.1 Business Scope
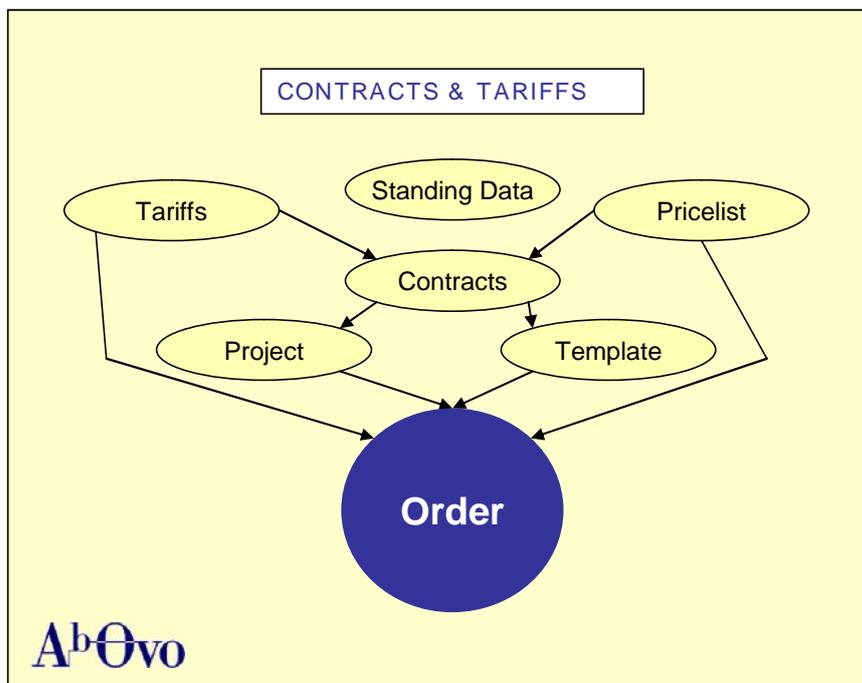
2.2 Contracts

Contracts, tariffs and pricelists are long-term agreements with customers and partners. Contracts and tariffs are a prerequisite for the ordering, planning, execution and financial processes. Agreements with customers and partners are recorded in the contract module. Components of such agreements are price rules with discounts on tariffs and price lists, service level agreements, calculation methods, status reports, permitted wagon types, permitted commodities, permitted routes or transport relations, grouping functionality, etc. Examples of types of contracts are:

- Transport contract (i.e. freight contract, special transport, infra transport; combined with requested services).
- Service only contracts (without transport).
- Purchase contract.

Contracts can be either based on tariffs combined with revenue distribution, or on the pricelist (the company's price catalogue). A customer can have multiple contracts.

The contract price lines offer a wide variety of pricing possibilities. The prices in the price lines can be expressed in various price units; for instance a price per train, per wagon, per ton, per UTI, per wagon group. Additionally, on each price line thresholds and specific conditions can be defined. For example, a specific price can be valid for a train composed of at least 25 wagons, where each wagon must be loaded between 20 and 40 tons. Another price line can be valid between 20 and 24 wagons, et cetera.

2.2.1 Workflow contracts

In this part of the Rail Cargo System you can:
- Search contracts
- Enter new contracts
- Save contracts
- (Re)Open contracts
- Validate and approve (both internal and external)
- Create templates (at this moment bottom up, from the order)

You can search for contracts via various details such as a contract number, the date, the name of the contracting party, etc. It's also possible to create a new contract based on existing contracts.

2.2.2 Key characteristics contracts

- Use of contract versions. A contract can have one or more main versions and per main version one or more subversions. Only a unique combination of (sub) versions can be valid on one specific day e.g. today or on January 31st two years ago. This makes it possible to calculate against the right contract version, valid on the original transportation day. The main version is meant for the 'yearly' contract cycle. The sub-version is meant for fixing possible errors or smaller corrections/changes to prices, etc. Within the subversions the contract price lines have a validity period of there own.
- Several levels of contract information. In contracts the information is stored on a contract level (e.g. shipping conditions, Incoterms or contract information) and price line level (e.g. departing station, arriving station, tariff, route, wagon type, specific conditions). In this way more generic information can be used for different contracts making it easier and faster to enter new contracts in the system.
- Approval of contracts. Before the contract actually can be used, it must be validated and approved, both internally (by other departments) and externally (by customers and / or partners).
- Multilingual. Contracts can be printed in several languages.

The contract serves as the validation 'base' for the order and as a source for data. When entering the order, components are filled in automatically from the contract into the order. The order must comply with the contract stipulations. A combination of business rules and contract data like validity rules, contract status, renewal / administrative extension period, defines whether an order can be accepted and processed. In special cases an order may be accepted but not yet transported, or it can be transported but not yet financially settled.

With the screenshots on the next pages you get a good impression on how new contracts are entered in the Rail Cargo System.

Entry of a new contract
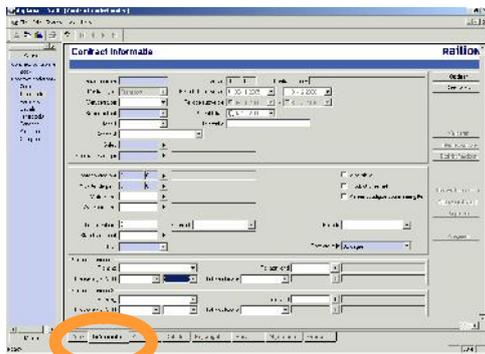
Contract Information

The blue fields are mandatory, the white fields are optional, the grey fields are blocked. In this screen all general information about a contract is entered. Examples of such data are a contract number, contract type, business unit, the account manager, main contractor, validity period for main and subversion, reference, departure and arrival country, language, transport conditions, contract status, etc.
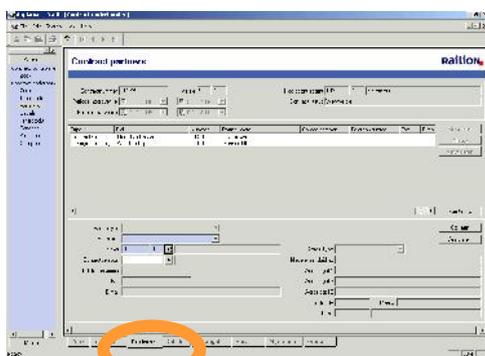
Contract Partners

After the correct data in the screen 'contract information' has been stored the screen 'contract partners' will appear automatically. Data in 'contract information' will be automatically recorded in the screen 'contract partners'. In 'contract partners' all data about partners is entered.
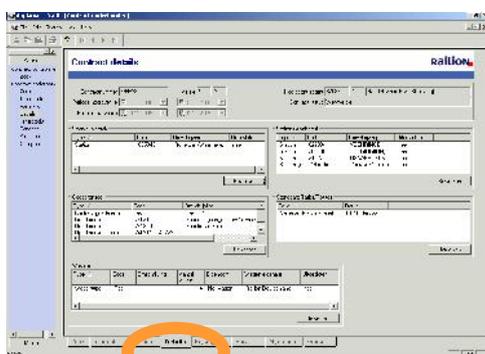
Contract Details

The contract details screen shows the information that is necessary for the layout of the price rules. This screen is used to record detail information in relation to stations, departure and arrival, type of goods, standard tariffs/routes and wagons. It's also possible to select and create groups.
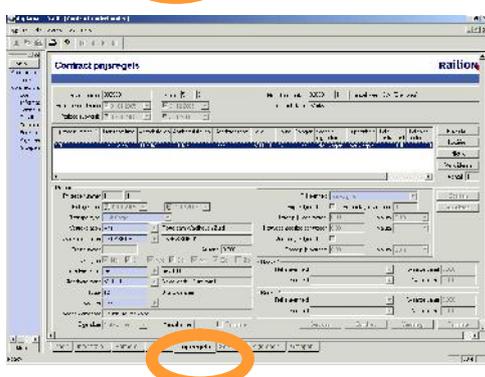
Contract Price Lines

This screen is used to present important price lines and record detail information about price lines. You can add new price lines or edit existing ones when prices or relations change. Revenue distribution data is part of the price line.
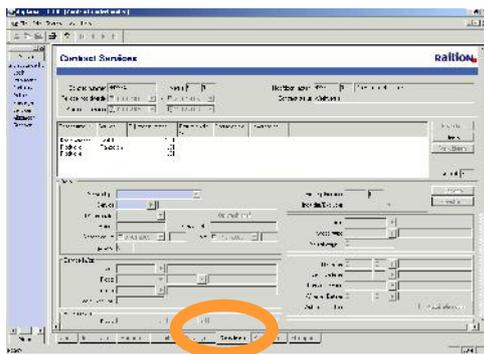
Contract Services

Here you can enter services to an existing contract. These services can be derived from the standing data or entered manually.
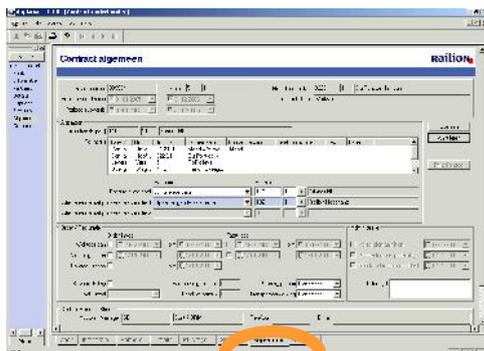
Contract Administrative Information

This screen is primarily used for internal and financial and administrative purposes. Information about the invoicing party, partners and partner roles, billing rules and payment terms, rules for ordering and invoicing, acceptance by customer and partners, names of contact persons, the status of a contract, et cetera are maintained here.
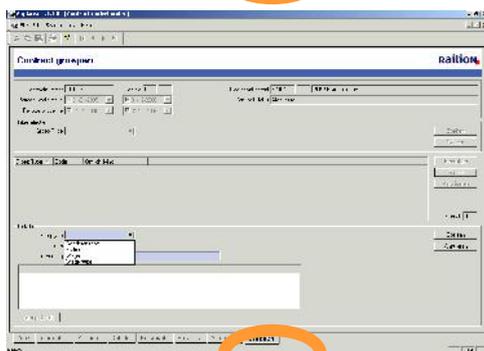
Contract Grouping

The screen 'contract groups' is used to create groups, for example a group of wagons; a unique feature in the Rail Cargo System. Groups can consist of for example allowed types of wagons, list of wagon numbers, commodities, and stations. Standing data groups can be incorporated in the contract groups. Groups can be referred to in the price lines and validated against in orders.

When all data is entered the contract must be validated via the button 'validation'. After pressing this button the Rail Cargo System checks if all data is entered correctly, if not, pop-up screens will appear. The validated contract is sent to the financial department for validation and approval; the contract will be checked against the normal standards and procedures for financial processing. The financial department can give the contract a definitive status.

2.3 Tariffs

The tariff structure is used to record the international railway tariffs, as the core of the classic 'revenue distribution' model. The tariff structures are used to validate transports and to calculate the freight price and the international revenue distribution. All tariff aspects can be modeled in the tariff module.

International tariffs are complex and nearly all tariffs differ from each other. In general, tariffs require specialists to understand and maintain tariffs and to program tariffs in specific programs for each tariff. This makes tariffs labor intensive, costly and giving long lead times for changes. The Rail Cargo System changes all this.

2.3.1 Workflow tariffs

In this part of the Rail Cargo System you can:
* Define and build tariffs (set applicable validity period, currency, weight rounding rules, domestic or international, container tariff)
* Set empty wagon commodities codes (allowed commodity codes for empty wagon transport, this definition is applicable for all tariffs)
* Search, clear and edit tariff routes
* Tariff exclusion / inclusion (like commodities, wagon types, wagons, empty transport, stations, dangerous goods, etc.)
* Set tariff movement restrictions
* Define tariff constants and assign specific values to constants
* Define tariff tables definition (like price tables)
* Set and fill tariff tables
* Define and fill tariff matrixes
* Define tariff calculation script for freight price and revenue distribution
* Validate, check and test tariffs
* Calculate tariffs

2.3.2 Key characteristics tariffs

* Simple tariff calculation. The tariff module has been designed and built as a 'modeling and calculation box'. Common rules, concepts, denominators and aspects from the tariffs have been deducted and extracted and build into common components and tools. Using the tariff module's components and tools, like functions, tables and modeling/script language, the tariffs can be built and maintained by an 'expert user'. The actual tariff calculation rules are not programmed by a software developer, but by an 'end user specialist'. It can be compared with Microsoft's Excel; the actual formulas are entered by the user.
* Highly flexible module. Even within a contract, the tariff module can be used to record contract price line information, like: the price equals to 98% of tariff prices. This including revenue distribution and calculations to divide a fixed price according to tariff rules. All components modeled in a tariff have an independent validity period. This makes it possible to maintain tariffs on component level. For instance, if only a price has been changed in a new version of a tariff, only the specific price table to be changed gets a new version.
* Calculation of 'historic' transports. When an order is calculated against a tariff, the transportation date determines the components of the tariff to be used. On every
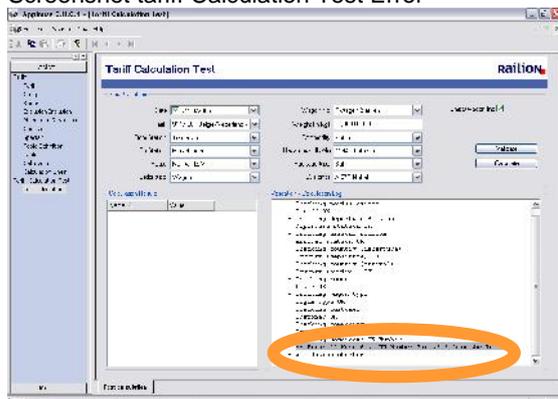
day in time, only one complete set of components is valid. Because transports from the past must be calculated against the rules and tables from the past, this concept makes it possible to calculate 'historic' transports.

- Manual calculation of prices. Manual calculation is used for multiple purposes. When e.g. a customer without a contact asks for a freight price quotation, to test a tariff or to help determine prices and distributions in contracts. Manual calculation is supported for freight price, revenue distribution and distribution of a fixed sum. It is performed with all validation and calculation rules, however the results are free to use and not stored. To make a manual calculation, the actual transport data are entered and the requested type of calculation is chosen. With the validation option the entered data is validated. On detection of errors the script is stopped and the error is displayed. When the calculation button is pressed the results are presented, including a logging with all performed script rules.

- Automatic calculation of transports. Automatic tariff calculation of a transport is done during processing of the order. Within the order processing is determined whether a calculation is needed and when. For an order without a contract, the calculation must be performed before the consignment note is printed because the freight price must be printed on the consignment note.

Manual validation and calculation of a transport

On the left an error message is generated because the hazardous UN number used for the transport is not allowed according to the rules (meaning being excluded in this tariff). One of the big advantages is that with the Rail Cargo System you can see, in one overview, what the specific problem is. The screenshot on the right shows that the transport has complied with all rules and therefore has been validated and calculated. The results are shown in the box 'Calculation result'. In the 'Validate / calculation log' the actual executed lines are shown and the intermediate results.

Screenshot tariff Calculation Test Error   Screenshot tariff Calculation Test Agreed
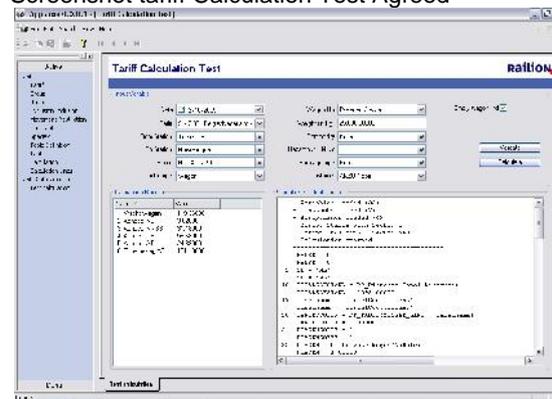
3. Orders and Consignment notes

3.1 Orders

The order is the core of the system in which all information regarding tasks to be executed from the customers' point of view is stored. In the Rail Cargo System these are transport requests and transport related services.
The order can be initiated in different ways:

- Automatically via interfaces from the customer (EDI)
- Automatically via interfaces from the international railway partners (ECN, Orfeus, Hermes)
- Internal by the customer service center
- External by the customer himself via a web application
- Via automatic internal processes (repositioning of empty wagons or parking costs of wagons)
- As a result of exception handling (generated during the execution phase)

3.2 Workflow orders

In this part of the Rail Cargo System you can:

- Find existing orders
- Enter new orders
- Enter extra services
- Create the consignment note
- Preview and print the consignment note
- Save, (re)open and select orders
- Approve or reject orders
- Print the order confirmation to the client
- Plan the order
- Choose the transport plan
- Plan automatically or manually
- Record order fulfillment / completion, manually or automatically

You can search relevant orders via various details. Orders can be of type domestic, export, import or transit. An order can exist without a contract and can be coupled to other orders (empty wagon to customer, charter by customer, return empty wagons to customer). An order can be based on a contract, on international tariffs, on a domestic tariff or on the price catalogue.

3.3 Key characteristics orders

- <u>Status driven.</u> Orders are completely status driven. Order statuses are used for steering the order through the system. While statuses are volatile and keep changing, important statuses and events are kept in internal indicators.
- <u>Order status screen.</u> For an easy access to specific orders there are two parameters available on which you can see (1) only your own orders or all orders and (2) you can set the amount of hours to go back. From the orders also the order status and messages are shown.
- <u>Order templates.</u> Orders can be generated based on order templates. A template is a customer specific predefined and pre-filled order. Templates are uniquely numbered and can be related to the individual customer. Customers can place orders based on template numbers.
- <u>Order validation.</u> Order validation is built in different levels to tune the validation requirements with the order process. In each higher validation level more and more thorough validation checks are performed.
- <u>Detailed information.</u> Detailed information is kept in the order, e.g. on which track the customer is expecting the wagons, local trains and feeding trips.
- <u>Fast order entry.</u> To diminish the amount of work involved in repetitive order handling, various features are offered, like making a copy of an existing order, use of templates, and use of standing orders.
- <u>Rapid entry screens.</u> Rapid entry screens for wagons and containers make it possible to quickly enter orders that consist of a lot of specific data. Via a message screen all extra remarks are shown.
- <u>Automatic determination of price line(s).</u> The price line(s) to be used are automatically determined. The order is evaluated and depending on the price unit in the contract (like price per train, per wagon group, per wagon, per ton) one or, possibly more price lines are selected. The most detailed level is a price line per wagon or per container.
- <u>Specific financial screen.</u> With a specific financial screen you can manually enter the financial settlement of an order in case of specific price agreements.
- <u>Cancellation.</u> Canceling of the order is subject to rules, and is only allowed up to a specific order status or execution status. Canceling can be done by the customer or by the railway operator.
- <u>Versions and statuses.</u> Orders can have different versions and statuses. Examples of these statuses are 'work version' (the order is still being adjusted) or 'not correctly validated' (the order has not yet passed the validation stage).

Order versioning and order changes
To be able to keep track on changes and the order history, full order versioning functionality is built. Related to important order statuses in the order life cycle, it is imperative to keep and safeguard a part of the order or all of the order content. This can be important in relation to customer appointments and customer delivered information or customer requests. For instance, when a consignment note has been made final, the part of the order related to the consignment note may not be changed anymore. Or when the financial settlement has started, the whole order content must be saved and remain unchanged. To be able to make authorized changes to an order in this situation, a 'higher version' of the order can be made in which version the changes are recorded and further processed. When a higher version of an order is made, the status of the preceding order version is set to expired and that version is made unchangeable. Only one (the last) version of the order at the time can be active.

Changes can have impact on order planning and execution, like re-planning an order or printing a CIT document as an appendix to the consignment note to reflect the changes to a consignment note. A specific order version can be transferred to the financial domain only once; per order more versions (one at a time) can be transferred.

Completion of the order
After the order fulfillment / completion, the order is passed back to the order domain again for further processing. Determination and registration of order completion will normally be done automatically, but can also be done manually in the order. In the execution domain all detailed jobs and movements must be registered as completed. Further processing consists of checking if everything is completed and final, if all information is recorded or if information is expected back from other rail operators (by means of a CIT document). The order is checked against the contract status and parameters for financial settlement and if everything is correct, the order is automatically passed on to the financial domain. If not, the order is placed in a waiting or error status.
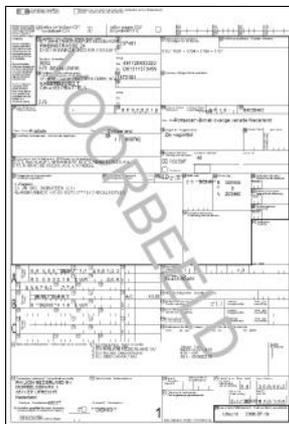
3.4 Consignment note

The consignment note complies with the new COTIF. In the Rail Cargo System consignment notes can be created and printed. Externally created consignment notes can be processed. "Paperless" transport can be supported by the ECN flow.

Most rail operators handle both export and domestic transports as well as import and transit transports. The processing of consignment notes is different for these types of transports. The main difference is that for export and domestic transport the 'own' consignment note is generated and printed and for import and transit the received 'foreign' consignment notes are entered into the system. Both ways of processing are supported by the Rail Cargo System.

The order and consignment note are closely coupled, in a way that the consignment note can be regarded as a 'print of the order'. All data is extracted from the order on generation or re-generation time, and nearly no additional data needs to be entered. A consignment note can simply not exist without an order.

New demands of the COTIF are met

Example of consignment note printed via the Rail Cargo System

Based on the order dossier, the consignment note is created. With the Rail Cargo System the new demands of the COTIF are met. Per order there are various options to generate and print consignment notes: ranging from only one to many consignment notes per order. To create a consignment note two screens have to be filled in: one to create the consignment note and select the wagons and containers and one for entering possible additional data and viewing the more financial related sections (also filled from the order, like all known services and their costs and tariff based freight costs for orders without a contract).

The consignment note can be printed in English, German, French and Dutch. Shown is the first page of the consignment note in the 'view or example mode'.

The consignment note can be printed from to accompany the physical transport (documents on the train). Using the ECN flow, RCS can also support the actual paperless transport, where the consignment notes are handed over to and accepted by the receiving railway undertaking.

Printing the consignment note
With the Rail Cargo System you can create and print as many drafts consignment notes as you want. The original consignment note however can be printed only once. Copies that are printed are marked with 'copy'. Only in very restricted situations and with high authorization, a new original can be printed. For example when the printer failed or did actually 'eat' the original copy. Organizational guidelines and procedures must be in place to guarantee the uniqueness of the consignment note.

For entering the import or transit consignment note data an order must exist. However, normally an order will be present already, fed into the system from interfaces (as ECN, Orfeus or Hermes). A special screen is available to check and enter data from the consignment note. After entering the data, the consignment note is validated and declared final by the user.

Finalizing the consignment note
After making the consignment note final, all directly related order parts become 'frozen' and can not be changed without making a higher version of the order (see also order versions). Changes made in the order after printing the original and final consignment note, can as a consequence, not be (re)printed on the consignment note. The changes can be printed on a special CIT document, which is an official attachment to the consignment note.
Finalizing the consignment note is a prerequisite for the financial domain. Normally the execution has been finished when entering the data.

Note: A consignment note must always be generated and finalized. The order can be planned but not transported without a printed consignment note. Only a domestic consignment note does not always need to be printed.

4. Operational Planning & Execution

4.1 Business Scope
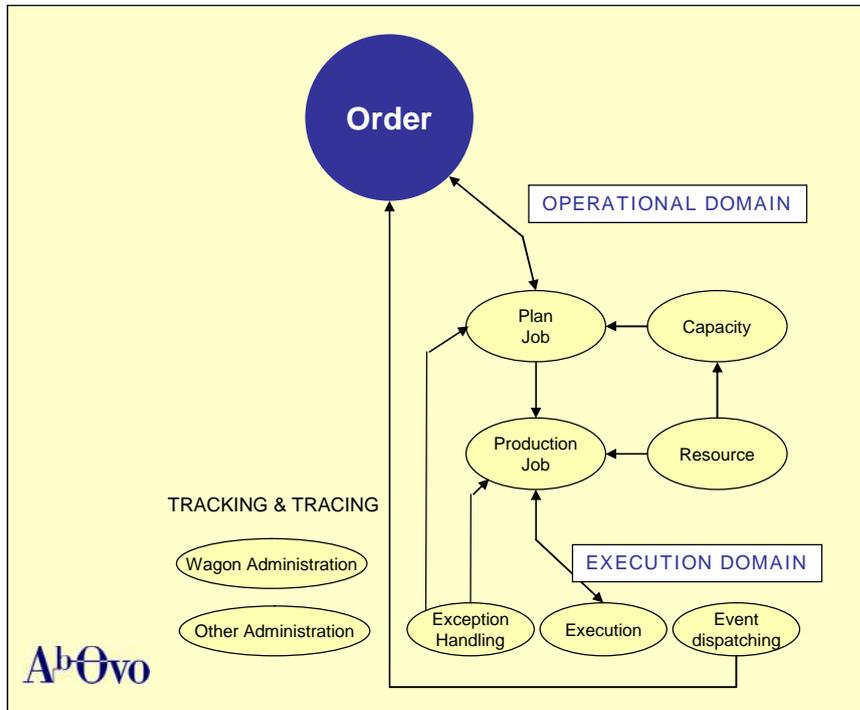
4.2 Operational domain

When the order is ready to be booked or planned, the order is passed on to the planning process and is broken down into a list of linked single plan jobs. To improve the planning and visibility on resource capacity, it is important to be able to plan an order as early as possible. Therefore, before an order to be planned and passed on, a minimum set of data must be available. During completion of the order, order changes are transferred to planning.

4.2.1 Workflow operational domain

In this part of the Rail Cargo System you can:

- Find the arrivals of trains
- Report the arrivals of trains
- Plan and confirm wagons in an arrival track
- Plan and confirm wagons in a local train
- Plan and confirm wagons from local train to customer
- Dock wagons to an order
- Plan and confirm to unload local trains
- Replace wagons

- Appoint departure track
- Plan and confirm wagons on departure track and train
- Alter the order of the wagons
- Process defects to trains and wagons

In the operational planning domain verified orders are planned to possible resources and booked on date specific trains.

4.2.2 Key characteristics operational domain

- Decision support functionality. The operational process is supported by a decision support functionality ensuring an efficient allocation of shipments across the network. Keeping all transport constraints (for example train length, weight restrictions, dangerous goods) and service level agreements in consideration the trip plan is created, either fully automatic or manual by the planner.
- Delivery of a yard-to-yard plan. The trip plan not only consists of long haul trains but delivers a yard-to-yard plan involving 'local trains' or 'shifters' to pick up and deliver wagons from and to customer sidings. Apart from productive moves, empty- or light moves for repositioning wagons are planned and can be allocated to specific commercial transport orders, thus ensuring a complete picture of the executed transport plan and its belonging cost allocation.
- Re-planning. Re-planning after order changes is fully supported by either automatic or manual re-planning. As with initial planning the booked capacity i.e. in length and weight of the trains are taken into account and updated automatically.
- Logical wagon-blocks. At planning level the Rail Cargo System administers logical wagon-blocks in generic and date specific trains. The allocation of wagons and their sequence is ensured in such a way that wagons that travel part of the train's route can be detached from the back of the train at the required location. The Rail Cargo System maintains both orientation of stations and the indication if a Run-Round/Head-Tail logic is needed for specific stations.
- Scenarios. Processes are steered based on scenarios. The result of triggered scenarios in the order process can be that new jobs are activated. For instance, after the 'gather customer wagons' job the 'place wagons in a train' job can be activated.

4.3 Execution domain

When an order is planned and resources have been assigned, the actual execution can start. Service level agreements, reserved capacity, sequence of sub processes, rollback mechanisms, etc. are taken into account. The execution domain contains the actual execution of planned jobs. This execution can be related to one single job, but also to a series of jobs from multiple orders. An occurrence during execution can lead to exception handling. For instance, a broken down wagon in the activity list will lead to a 'repair order'.

4.3.1 Workflow execution domain

Execution can be divided into the following steps:
- Preparation and validation
  - Checking order, status and documentation of wagons.
  - If necessary updating actual sequence of wagons on the track or in the prepared train.
  - Preparing documents for wagons with operational restrictions.
  - Printing of transport documents.
- Handing over and execution
  - After all checks have been processed and documentation is prepared, the train as such is ready for departure and can, on administrative level, be handed over to the next station/process coordinator for further handling.
  - At this time all tasks and jobs needed to be executed at the next station are activated and presented on the 'To-Do' list of the process coordinator of the following station.
  - The last step is receiving the trigger that the train has departed and updating the actual departing time which is stored separately from the planned departure times.
  - The Rail Cargo System keeps track of the sequence number of wagons whether they are located on a track or in a train and takes orientation of stations and Run-Rounds at intermediate stations into account.
- Exception handling
  - Each performed activity can trigger the creation of new activities not only if activities are executed along the planned path but also if they are not executed within their tolerances or are not executed on time.
  - This means that each occurrence of an unexpected event will lead to the generation of new tasks or jobs to be performed to solve the risen situation. The behavior of the Rail Cargo System's event manager is not fixed, but is maintained by the customers application.
- Preparation for financial domain
  - Executed orders are prepared and send to the financial domain for further processing and invoicing. The Rail Cargo System ensures that not only operational information is complete but also that information regarding extra non-transport services are entered. This implies that this information is entered into the system as close as possible to the execution of these activities and reduces the need for the financial department to investigate services that have been delivered in the past.

5. Financial domain

5.1 Business Scope
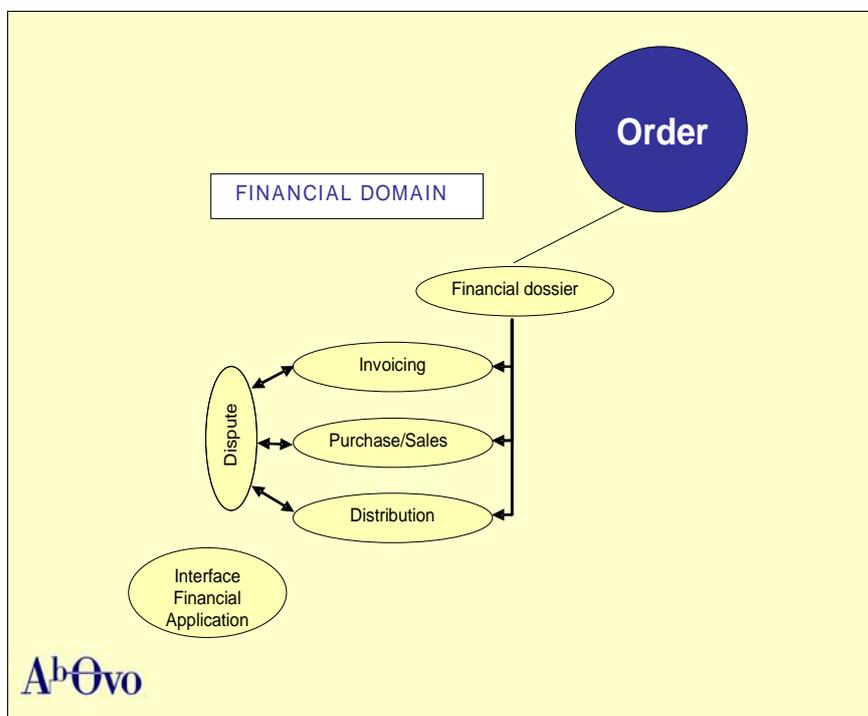
The order feeds the financial domain the moment an order has been executed. The necessary input for the financial domain is derived from, for example, the consignment note(s), delivered services or executed transports. The financial domain fully supports both the 'classic' revenue distribution model as well as the new purchase / selling model.

Account lines
Account lines are the core on which the financial processing is based, guaranteeing reliable, flexible, transparent and independent processing. Account lines are 'role' based and can be related to customers, suppliers or railway revenue distribution. A role defines the activities per party regarding administrative and financial processing of the order. For the derivation and composition several aspects must be taken into account like: all specific and required roles in the processing of the order, international agreements and the order and contract specifications. Example: who is the invoicing and invoiced party, when is freight prepaid or collect, related to the transport relation / route. Another way of looking at account lines is that all actions (internally generated or externally received), positions, and events for that order are registered and stored in their specific account lines. The account lines are always related to only one specific order.

In the flow of the financial domain, first a final calculation is made for all consignment note(s) in the order. After the calculation the account lines are derived. In the financial domain, both expected and actual claims and obligations are registered. Disputes initiated by third parties to your company and vice versa can be processed.

International and customer financial settlement is always per consignment note. When an order contains more than one consignment note, the order is processed as a whole, but always on the consignment note level. To prevent complex, possible incomplete and non-transparent processing of an order, an order is only transferred to the financial domain when everything in the order is finished, validated and approved.

5.2 Functionality financial domain

The financial domain includes functionality regarding:
- Invoicing - with customers and suppliers (both normal and reverse billing).
- Revenue distribution - active distribution to other companies and expected positions with the full reconciliation process (including all required documents and electronic files as described in the UIC Fiche 304).
- Purchase / selling – invoicing between main and sub contractors, active invoicing and the expected positions and reconciliation process.
- Clearing lines for account settling or transfers.
- Dispute handling (internal and external).
- Interfacing to a financial application with general ledger, accounts receivable and accounts payable.
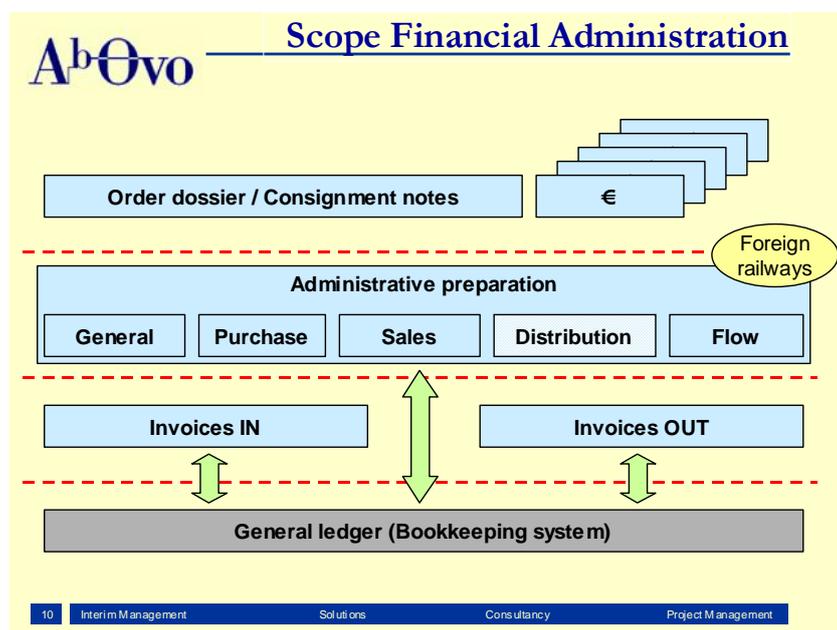
5.3 Key characteristics financial domain

- <u>Multiple versions.</u> Multiple versions are necessary because multiple calculations and subsequent processing can be executed for a single order (i.e. order changes resulting from contracts, tariffs and disputes).
- <u>Ledger connection to bookkeeping system.</u> The financial module does not include ledger functionality. A ledger connection to any bookkeeping system is possible.
- <u>Calculation.</u> The calculation of an order is performed against tariffs, contracts, price lists or the calculation may be overruled from the order by special manual prices or manually determined price line.
- <u>Account line derivation and composition.</u> Account lines are 'role' based and can be either active (take action, for example send an invoice to a customer) or passive (no direct action required, the other party must take action, for example reverse billing where the customer takes the action). A passive account line must (in time) always be matched with an active one. In all situations a position (debit or credit to a party) is registered, accounted and guarded. A passive account line can be regarded as 'to be expected' and the actual received settlement is always compared to the expected amount. Possible differences are registered. All received events (payments, externally revenue distribution lines) are registered as external account lines. One order normally results in more than one account line.
- <u>Credit notes.</u> Credit notes are supported, and are always related to corrections in the order. Normally the 'correction invoice' is built up from the original credited invoice line and the new corrected debit invoice line.
- <u>Recalculation and evaluation of differences.</u> This is used for the recalculation of groups of orders or of individual orders. Reasons for recalculation can be for instance, a change in a contract to resolve an error and where all touched orders must be reprocessed. For selection of orders a selection screen is available. Changes will be evaluated and handled automatically in the financial domain, which could result for instance in a credit note or a additional debit note.
- <u>Automatic and manual approval process.</u> The approval process can be done automatically or manually.
- <u>Flexibility in invoicing.</u> For invoicing a lot of configuration options regarding timing and content are offered.

5.4 Description of key processes financial domain

The approval process
After the calculation and account line composition, all amounts and roles must be 'approved'; the last check on consistency, plausibility, deviations from normal values and possible errors. This approval process can be done automatically or manually; this is set by several parameters. Normally it will be done automatically. However, when a specific contract is known for its complexity and therefore errors are likely to occur, a contract can be set to manual approval.

During the automatic approval process several plausibility checks are made: when any doubt or check falls outside its set limits, the order is passed to manual approval. For the manual approval process a special viewer screen is build with viewing of data up to wagon or container level. When an order is disapproved, corrections must be made in the order domain. In the financial domain no changes can be made to any data.

Flexibility in invoicing

For invoicing a lot of configuration options regarding timing and content are offered. Per partner or customer the invoicing process can be defined / tuned. Every day an invoice run is run. During this run all customers to be invoiced are selected, based on the timing settings. Possible timing options are: daily per order, daily, weekly, two weekly and monthly; if applicable the day of the week must be selected. For the selected customers all orders ready for invoicing are selected. When no additional content options have been set all the customer orders are placed on one invoice only. Otherwise more than one invoice is made (if applicable orders are present in the selection). Content options are for example: per contract or group of contracts, per (group of) transport relation (defined as departing station and/or arrival station), per (group of) commodities or, in special cases, per service number. The transport relation and commodities can be set per contract, over a group of contracts and even without contracts. For transport orders, one invoice line is made per consignment note (with all related information). For 'service only' orders, an invoice line is made for every service. Possible types of invoice lines with different formatting are: train price, wagon price, tons price, %-reduction and service price.

VAT and EU Community legislation, rules and procedures

The Rail Cargo System complies with the VAT and EU Community legislation, rules and procedures. To make it clear and transparent to the customer (freight payer), VAT-codes are used. A VAT-code is determined for each order (i.e. per consignment note), depicting the rules that apply to that specific transport (like liable to VAT, VAT to be paid in the country of origin or destination, are goods from inside or outside the community and destined to leave the community or stay in the community). The VAT-rate is defined per VAT-code. The VAT is calculated per invoice on a consolidated level for each VAT-code present on the invoice. Therefore all orders / invoice lines on the invoice are grouped per VAT-code and the VAT is calculated on the total amount of all orders per VAT-code. The calculated amounts per VAT-code are summed into one total VAT amount. Note: the amount of VAT is not calculated per individual invoice line. On the front page of the invoice a summary is given per VAT-code with the calculated amount of VAT and prescribed text. The VAT-number of the clients must be known and per invoice only one VAT-number can exist.

Possibility of manual invoicing

Manual invoices can be made, although this is not encouraged for several reasons. All transport invoicing is always automatically invoiced from the order. Also corrections must be processed from the order, after correcting the order. While the automatically calculated price on the order is not correct for whatever reason, in the order a manual price can be set. Only in special situations manual invoices can be necessary. Because maintaining the integrity and transparency of the financial settlement and the (audit) trail from order to cash is vital, all invoices must be originated or linked to orders. While manual invoicing can potentially be in conflict with the trail / integrity / check for completeness / full accountability, manual invoicing is not encouraged. Therefore always an order must be made, not being a transport order. For manual invoices a special authorization cycle is in place.

The dispatching and further processing of the different account lines
Within the financial domain, the 'order financial' is subject to full versioning. Every time the order (only allowed in a higher version of the order) is transferred to the financial domain, a new version of the order financial is created. The new version is processed completely independent of the former version up to the point where the calculation and account lines have been made. At this point the versions are compared and a difference analysis is performed. If there is no difference (which is possible because not all changes need to have a financial impact) the new version is not further processed. If there is a difference the processing of the previous version is stopped directly or reversed and, depending on the difference, specific actions are taken by the dispatching process. While the processing of the various account lines is independent of each other after the 'dispatching process', not all processes are finished at the same time. It is even possible that some processes have been finished, while some processes have not been started (like invoicing with a daily invoice and international revenue settlement which is always a monthly process).

About Ab Ovo

Ab Ovo is an IT consultancy company, specialized in the area of Travel & Transport and Logistics. Especially in the Rail segment we have implemented a variety of successful projects and IT solutions. Ab Ovo offers practical solutions for issues in the areas of planning, scheduling and optimization (APS), front/back office applications, supply chain management and (application) integration plus information management. Our solutions are fully tailored to model the business processes exactly and completely, and therefore enable you to maximize both the utilization of the various resources and the effectiveness of the core processes within your organization. ROI's of (less than) one year are quite common. To realize our solutions, we have entered into a number of partnerships with "best of breed" technology providers. Ab Ovo also offers its customers a full range of IT related consultancy and project/interim management services, in order to contribute substantially to their business successes.

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6- Mapping of Rail Cargo System on generic rail processes

RAIL CARGO SYSTEM: THE TOTAL IT-SOLUTION FOR THE EUROPEAN RAIL CARGO INDUSTRY

PROCESS OF A RAIL CARGO COMPANY

THE RAIL CARGO SYSTEM

ORDERS - the core of the system

| CONTRACTS | TARIFFS | PLANNING | EXECUTION | FINANCES |

INTERFACES

INTERFACES

INTERNAL NON-OPERATIONAL PROCESSES	INTERNAL OPERATIONAL PROCESSES
* Financial adminstration (for example SAP) * Marketing & Sales * Human Resource Management	Planning of locomotives and drivers - Paloma: developed by Ab Ovo, used by Railion NL - CTP: developed by Ab Ovo, used by Railion DE - Railopt: developed by Qnamic, used by BLS Asset Management Datastream: implemented by Ab Ovo at National Express/One Railway

EXERNAL PARTIES OF A RAIL CARGO COMPANY

| U.I.C. | CUSTOMERS | NETWORK OPERATOR | OTHER TRAIN OPERATING COMPANIES |