WAY4™ Data Model Overview

Contents

Introduction

This document gives an overview of the WAY4 system concept and describes main system objects and their relations to each other.

Note that for a number of system objects, changes to object attributes in one table do not cause the attributes of the same objects to be changed in other tables. Changes to these objects may lead to violation of system integrity. The properties of these objects should only be changed after consultation with the WAY4 vendor. These objects (and object properties) include:

- Message Types – it is not recommended to change transaction message codes (code field in the MESSAGE_TYPE table), request/notification category (category field in the MESSAGE_TYPE table).
- Transaction Types – it is not recommended to change the "direction" of a transaction (dr_cr field in the TRANS_TYPE table), the chain_type field of the TRANS_TYPE table.
- Products – it is not recommended to change Product codes (code field in the APPL_PRODUCT table).
- Tariff Types – it is not recommended to change tariff type codes (code field of the TARIFF_GROUP table).

Note that the codes of some objects are used as the values of tagged parameters. When the object codes are changed, tag values are not updated automatically. Foe example, account type codes (code field in the ACCOUNT_TYPE table) are used in standing payment orders as values of the tag DN=<Debit Account Type Code><Credit Account Type Code>; client and contract classifier codes and client and contract custom parameter codes used as values of IF_CS, IF_PARM group tags, etc.

Financial Institutions

Technically, WAY4 can process data from an unlimited number of financial institutions. Most system objects are described within a financial institution.

Financial institution

- Internal identifiers
- Global parameters
- Clients
- Contracts
- Products
- Transaction data
- General Ledger
- Currency exchange rates
- Routing rules
- Internal clearing rules
- External identifiers

For each financial institution, users specify its name, bank identification code and global parameters, such as country, national currency, standard algorithm for interest accrual, etc.

Client and contract data is linked to a specific financial institution.

A special set of Products is created for each financial institution. Also, Products may be partially inherited from another financial institution (usually a head one).

Transaction data and General Ledger data stored in WAY4 after transaction processing is also linked to a specific financial institution.

Each financial institution has its own set of currency exchange rates. The system stores rate history for previous billing cycles. Different rate types can be specified for a financial institution (buying/selling rate, average rate, etc.)

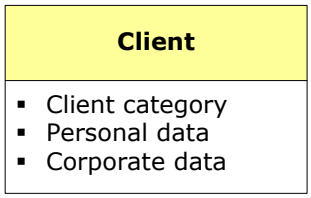
WAY4 allows for using various interbranch routing schemes.

To perform clearing through external payment systems, external identification codes are assigned to financial institutions. Identifiers like ICA, Visa Center BIN and Acquirer BIN, used for online data processing, are determined by routing rules.

A combined Visa/MasterCard/AMEX/Diners/JCB BIN/MBR table is used to determine recipients of financial messages. The table contains unique BIN ranges assigned by financial institutions to their Products. If a message may be routed to several destinations, the one with the highest priority is selected.

Clients

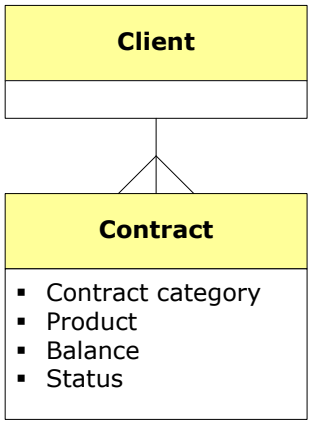
Client objects are used to identify clients and maintain profiles containing their classification and personal data. A set of additional parameters is used for corporate clients.



Clients are grouped by category (natural persons, legal persons and bank branches) and by additional parameters determined by their financial institution.

Contracts

A contract regulates relations between a financial institution (an issuer and/or an acquirer) and a party involved in a card transaction settlement (a cardholder, a merchant or a bank branch).



A contract is registered within a specific financial institution and can correspond to a bank account, a bankcard or a terminal. Accordingly, WAY4 supports three contract categories: account, card and device contracts.

A contract is a set of accounts and rules for working with them.

Account contracts are registered for all parties involved in bank transaction settlements (issuers, acquirers, cardholders, merchants, bank branches), and are used as bank contracts. Account contracts can be used to build contract hierarchies or "trees", both for issuing and acquiring.

Card contracts contain information about the conditions of bankcard processing (bankcard number, embossing data, etc.).

Device contracts contain information about device parameters.

Two contracts participate when registering transactions in the system: the transaction information source contract and target contract (for example, when withdrawing cash from an ATM, the ATM contract is the transaction information source contract and the bankcard contract is the target contract).

A contract's status determines contract behaviour when a transaction is performed. For example, a contract status may allow all transactions to be performed, decline authorisations only or decline all transactions. A contract status can be changed either manually or automatically, when specific conditions arise (falling past due, loan repayment, etc.)

Contracts can be grouped into hierarchies called contract trees. WAY4 supports a technically unlimited number of hierarchy levels and contracts on each level.

Contract Hierarchies

Contract hierarchies are used to regulate financial relations and obligations between contracts. Examples of contract hierarchies are corporate schemes, family schemes, multilevel merchant schemes, or payment system routing contracts.

WAY4 supports the contract hierarchy type "Main/Sub" and four subtypes of the "Liability" hierarchy type. The table below shows the main features of these hierarchy types.

Function	Contract relation types				
	Main/Sub	Liability			
		Full Liability	Affiliated	Only Check Balance	Reporting
MC[1] balance check during SC[2] authorisations	+	+	–	+	–
MC usage limiter check during SC authorisations	+	+	–	–	–
MC balance change after SC transactions	+	–	–	–	–
MC interest accrual after SC transactions	+	–	–	–	–
Balance and transactions of all SCs included in MC statements	+	–	–	–	–
Same Accounting Scheme for MC and all SCs	+	–	–	–	–
Product hierarchy check when creating a contract hierarchy	+	+	+	–	–
Statistics for contracts included in a contract tree	+	+	+	–	+

Example of "Full Liability" relations:

- Each department of a company independently repays its loans and loan interest.
- All departments together may not exceed the total corporate credit limit.
- Common usage limiters set for the entire company regulate transactions performed in any of the departments.
- Product parameters that may be used when a department contract is opened depend on the parameters of the Product used by the company contract.

Example of "Affiliated" relations:

- Each company employee independently repays his/her loans and loan interest and has a separate credit limit.
- Product parameters that may be used when an employee's contract is opened depend on the parameters of the department Product.

[1] Main contract
[2] Subcontract

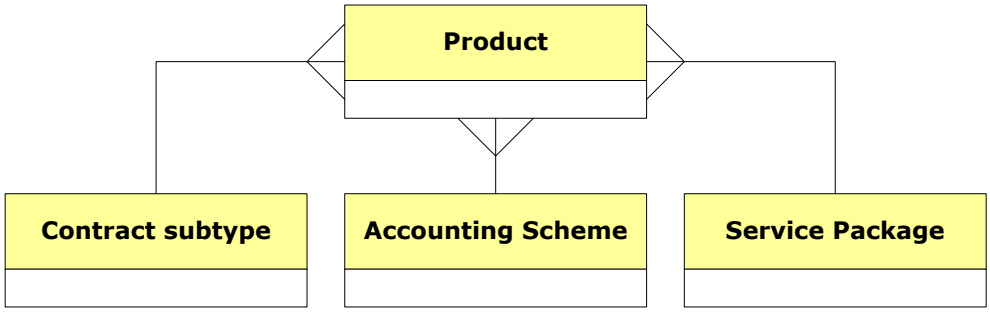
Example of "Only Check Balance" relations:

- Each company department independently repays its loans and loan interest.
- All departments together may not exceed the total corporate credit limit.

A hierarchy of the "Reporting" type is used to collect statistics on transaction activity of contracts included in a contract tree. This data is used to generate "non-financial" reports, for instance, to create statements for all corporate accounts without calculating their consolidated totals.

Products

In WAY4, Products determine the main properties of a contract: the set of contract accounts, list of allowed transactions, interest rates and fees, normalisation rules, standing payment orders, usage limiters, and others.



A Product is made up of a contract subtype, an Accounting Scheme and a Service Package.

Contract types and subtypes determine the channel used to send transaction information (for example, the channel for connection to the payment system, the device network, etc.), contract numbering rules and main bankcard parameters (for card contracts).

Accounting Schemes describe accounting rules for the contract: the number and type of contract accounts, rules for reflecting funds in WAY4 subsidiary GL Accounts and GL accounts, interest calculation and accrual rules, due and amount normalisation rules, standing order parameters, etc.

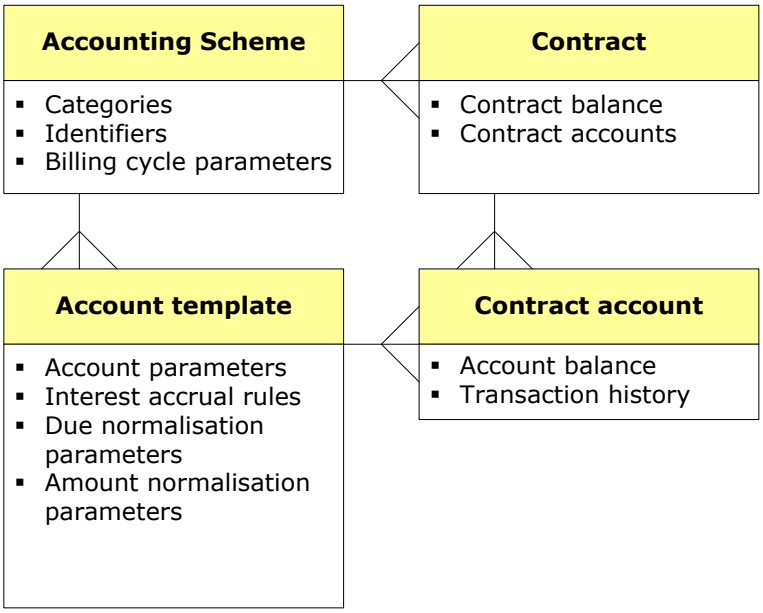
Service Packages determine the set of allowed transactions, fee rates, rules for generating accounting entries and usage limiter parameters.

A separate set of Products and corresponding contract subtypes, Accounting Schemes and Service Packages is created for each financial institution.

Accounting Schemes and Contract Accounts

Each contract has a set of accounts for recording funds in different currencies, keeping separate balances for different transaction types, grouping payments into due and overdue, accruing interest, and others.

A Product's Accounting Scheme determines the set of contract accounts and relations between them. When an Accounting Scheme is modified, the corresponding changes are made to accounts of all contracts that use this Accounting Scheme.

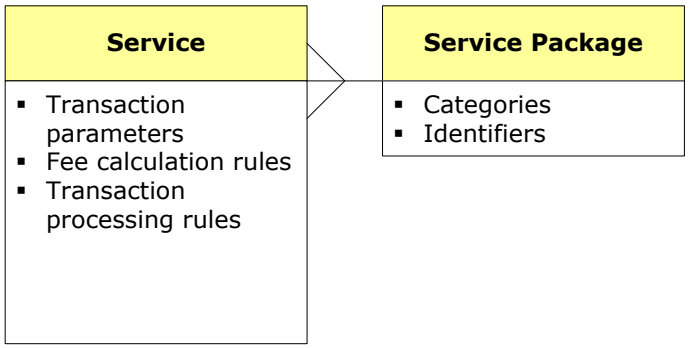


Each contract account contains its current balance value, the balance value at the beginning of each billing cycle, etc. It also stores the complete history of financial transactions. The current balance of an account is updated during financial document processing.

A contract may have contract accounts in different currencies used by the financial institution.

Service Packages and Services

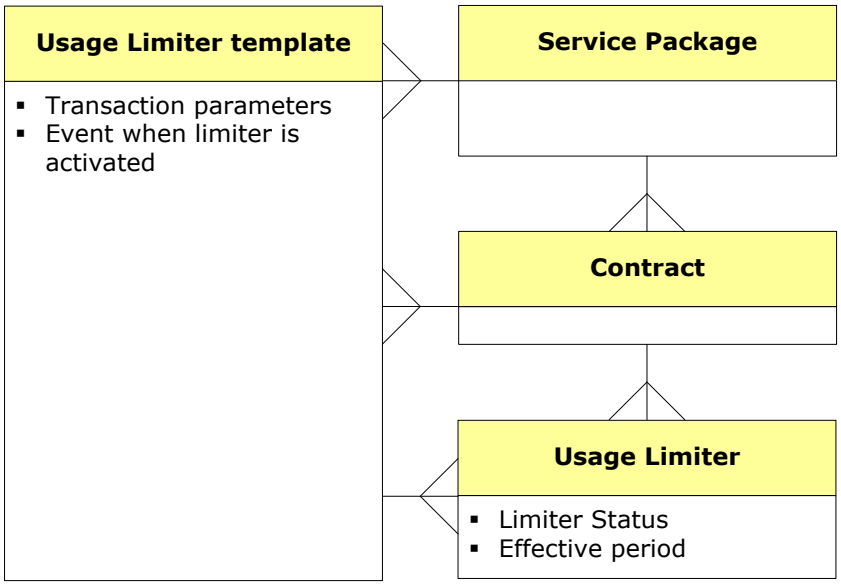
Along with Accounting Schemes, Service Packages are an integral part of Products. A Service Packages determines a set of transactions allowed for a contract, describes the corresponding fees and document processing rules and contains usage limiter parameters.



Within a Service Package, a Service determines the rules for transaction processing (for example, performing a retail transaction with a card at a payment terminal, dispensing cash at an ATM, charging an annual fee for a card, for a mini-statement request, etc.); for each transaction the type of contract account is specified for generating movement of funds, rules for calculating and charging fees. Since two contracts participate in registering transactions in the system, when processing transactions, a search is first made for the contracts of both parties to the transaction, and then for the Services of these contracts.

Contract Usage Limiters

Limits can be applied to contracts; for example, limits can be placed on the total number of transactions on a contract for a period, the amount of transactions for a period, the amount of a separate transaction, the number of free online mini-statements, These limits are set by using contract usage limiters. Usage limiters can be transaction (limits on the amount or number of transactions, etc.) or non-transaction (limits on mini-statements, balances, etc.).



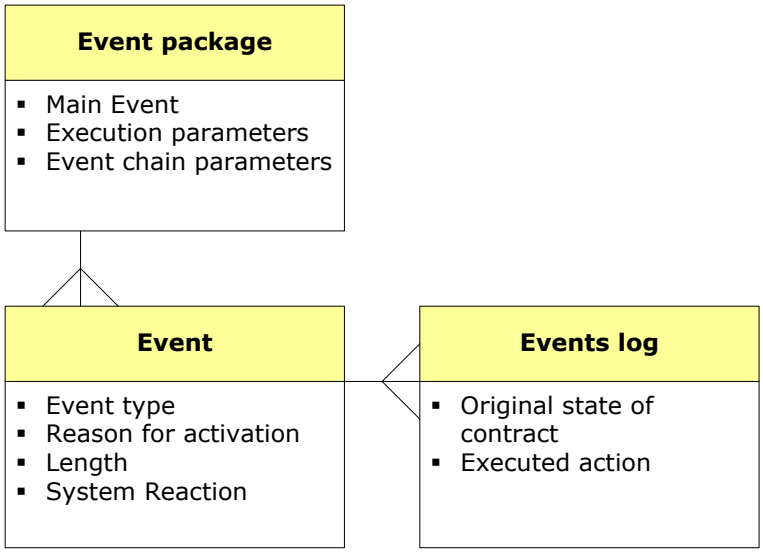
Limiter parameters are set in common templates configured the Service Package (parameters are specified for all contracts using this Service Package) or in individual templates configured for a contract.

Events

Events are used for contracts to automate various actions that must be executed when certain conditions occur in the system. The lifecycle of an Event consists of three stages: opening, processing and closing.

For example, an Event can be configured that is used to automatically inform a client that a loan payment is overdue. In this case, the Event opens when funds enter an overdue account, closes when payment is made and Event processing consists of placing a message about the overdue payment in each client statement.

An Event can be opened and closed automatically or manually. Events can be joined in chains (packages) of Events.

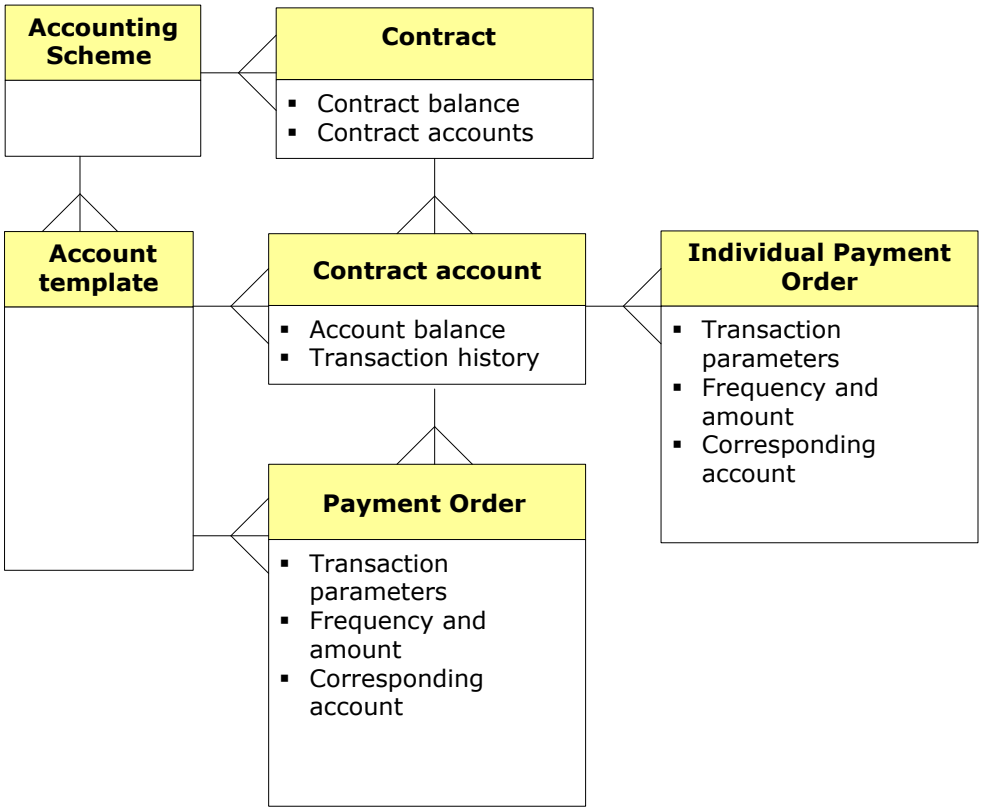


All Events processed by the system are registered in the Events log.

Standing Payment Orders

Standing payment orders are used for automatic generation of documents for transferring funds from one account to another. Standing payment orders make it possible to perform such transactions as automatic reimbursement of merchants, crediting a cardholder's current account, amount normalization including inter-currency normalization, redefinition of the direction of interest accrual and due normalization, etc.

One of the most important functions of a standing payment order is the ability to initiate the creation of a document online, when the amount of the document is specified by the client. For example, a client can pay utilities online at an ATM.

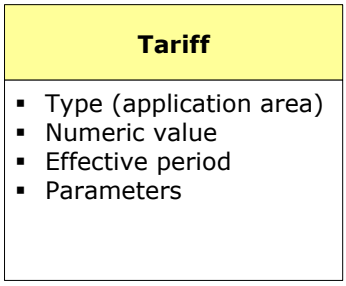


The system allows for the flexible configuration of payment orders:

- Create general payment orders on the Accounting Scheme level and on their basis generate documents for all contracts using this Accounting Scheme.
- Create template payment orders on the Accounting Scheme level and on their basis generate inherited payment orders for contracts using this Accounting Scheme; parameters of inherited payment orders can be changed.
- Create personal payment orders for a specific contract.

Tariffs

The tariff management module is used in WAY4 to simplify Product configuration. This module makes it possible to set contract parameter values (such as interest rates, fees, limits on the number and amount of transactions, etc.) on the Product level, and use tariffs to obtain specific numeric values of parameters.

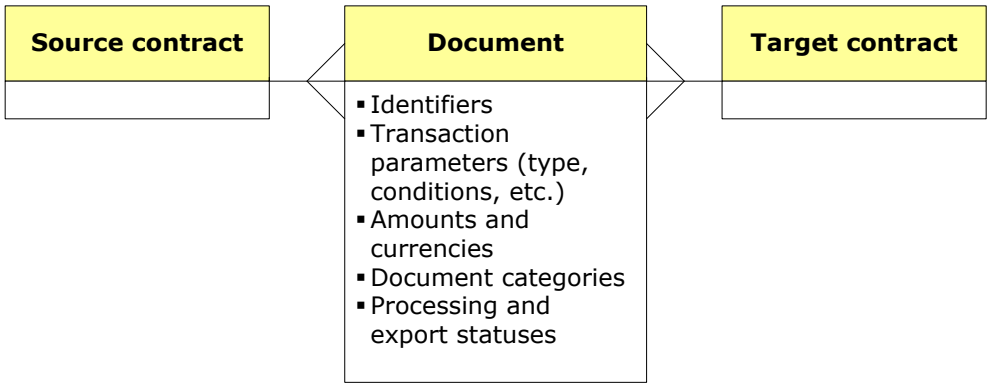


A tariff is a set of Product parameters together with specified numeric values. Tariffs are combined in tariff domains. A tariff domain can be individually configured for a contract, assigned by an Event to a contract, linked to a contract through a Product, Service Package, Accounting Scheme, and also through a financial institution.

Documents

Documents reflect all types of transactions between contracts. Examples of documents are authorisations, financial transactions, transactions setting credit limits and payment system fees, to name but a few.

A transaction is an instance of information exchange between two contracts. This is why a WAY4 document always contains links to a source contract and a target contract.



Each document contains comprehensive transaction data, including transaction type, transaction conditions and a number of classification parameters (categories): authorisation or financial document, request/notification, etc.

Documents generated by the same transaction are combined into chains (for example, authorisation and financial documents, dispute documents, original and reversal documents). During document processing, WAY4 automatically checks document chains for correctness. This helps to easily find unmatched presentments, representments, and others.

Documents are generated as a result of manual entry, after receiving online messages or imported from files. The system can also generate documents automatically when specific conditions arise (falling past due, overdraft, etc.)

When a document from an external system is received, WAY4 saves its original data in the database. This allows the next documents in the chain to inherit necessary transaction data. This also allows original data to be analysed in their initial form.

During document processing, WAY4 checks the document, identifies counterparty contracts by their numbers and financial institution identifiers and determines document processing rules from the corresponding Service Packages.

If the target contract belongs to another financial institution, WAY4 finds routing contracts using routing parameters, such as the BIN table.

The last step of financial document processing is to post the document to contract accounts, creating necessary accounting records (generating WAY4 subsidiary GL account entries and GL entries) and updating account balances.

Each document contains at least two amounts: the transaction amount in the original transaction currency and settlement amount in the settlement currency

used by the processing centre. Transaction processing is based on the settlement amount, which is converted into the currency of the corresponding account.

Data History

WAY4 database tables fall into two categories: manually changed and automatically changed.

When data is changed manually, a new record with the active status is created in the database. The old record is not deleted, its status is set to inactive, and the ID of the new active record is specified. The modification date and the system user who made the changes are specified for the newly created record.

When a record is deleted, WAY4 does not physically delete the data from the database, but assigns a special status to the deleted record.

The entire history of changes to data is stored by WAY4 as described above.