IT-Concept for Equity MCC

Jens Richelsen (DUS-9352)

Revision log

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30.07.2003	J. Richelsen	Changes of trade-status transitions
05.08.2003	J. Richelsen	Changes in Bloomberg connection
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1 Overview

1.1 About this document

This document describes the configuration of the Equity MGB, especially of the source systems Fidessa and Prime.

1.2 Legal Obligation

The German Banking Supervision requires that a Market Conformity Check is executed for each trade (not necessarily immediately after the trade has been done).

1.3 Glossary

Abbreviation	Explanation
RIC	Reuters ID
MCC	Market Conformity Check
MGB	Markt Gerechte Bewertung

2 Architecture

2.1 Data import

2.1.1 General

Source-systems deliver files, which are imported automatically. The common data is stored in a general trade-table and the source-system dependent data is stored each in a different source-system table.
The tables are linked with a trade_id that is unique for the whole database.
The data is stored with a job_id that is different for each trade_date, source-system and import-run.
This enables the rerun of processing a source-system for the same trade-date.
Small mappings will be done during the import, like date conversions.
The main checks/conversions, which are needed for further analysis (e.g. storno, etc.) are included into the trade-status-checks.

2.1.2 Prime

The data is delivered by Connect:Direct file transfer.
All date and time information is assumed to be Düsseldorf local time (MEZ/MESZ).
The following query (TEV_extractMGB) extracts the data:

```
/*Temporäre Tabelle, die Maturity sowie Preis der Combination ausgibt*/
select
   i.insaddr
   , i.insid
```

```
   , add_info(i, 'Expiry Date')    'Exp_Comb'
   , max(i1.exp_day)               'Exp_Opt'
   , p.day
   , p.settle
into Temp_Comb
from instrument i
   , instrument i1
   , CombinationLink cl
   , price p
where i.instype = 'Combination'
and i.insaddr = cl.owner_insaddr
and i1.insaddr = cl.member_insaddr
and i.insaddr = p.insaddr
and p.day = today
and display_id(p, 'ptynbr') = 'SETTLEMENT'
and p.settle ~= ''
group by i.insid

select
   t.trdnbr                                    'Trade ID',
   convert('time', t.time, '%Y.%m.%d %H:%M:%S')       'TradeDateTime',
   convert('time', t.updat_time, '%Y.%m.%d %H:%M:%S')  'AmendedDateTime',
   convert('time', t.creat_time, '%Y.%m.%d %H:%M:%S')  'CreationDateTime',
   t.value_day                                  'SettlementDate',
   i.insaddr                                   'InstrumentID',
   i.insid                                     'InstrumentName',
   i.isin                                      'InstrumentISINCode',
   iu.insaddr                                   'UnderlyingInstrumentID',
   iu.insid                                    'UnderlyingInstrumentName',
   iu.isin                                     'UnderlyingInstrumentISINCode',
   t.category = 'Collateral' ?
      'Collateral' :
      i.instype                                    'TradeType', /*mark Collaterals in FA4*/
   t.quantity < 0                ? 'S' : 'B'        'BuySellFlag',
   i.instype = 'Warrant'          ? 'Y' : 'N'       'WarrantFlag',
   i.otc = 'Yes'                 ? 'Y' : 'N'        'OTCFlag',
   t.optkey1_chlnbr not in ('0')   ? 'Y' : 'N'      'InternalDealFlag',
   t.status = 'Void'              ? 'Y' : 'N'       'StornoFlag',
   (t.creat_usrnbr = 3
   AND t.updat_usrnbr = 3
   AND t.optional_key ~=''
   AND t.creat_time = t.updat_time)? 'Y' : 'N'      'AutomaticTradeFlag',
   i.issuer_ptynbr = '103'        ? 'Y' : 'N'       'InternalInstrumentFlag',
   (add_info(t,'COMMISSION') not in ('',' ')
   OR add_info(t,'COURTAGE') not in ('',' '))
                                 ? 'Y' : 'N'       'NetGrossFlag',
   t.quantity                                   'TradeVolume',
   t.price                                     'TradePrice',
   display_id(t,'curr')                          'TradeCurrency',
   ch.entry                                    'Exchange',
   convert('time', t.creat_time, '%Y.%m.%d %H:%M:%S')  'SystemDateTime',
   p.prfid                                     'BookID',
   ' '                                        'OrderID',
   u.userid                                     'TraderID',
   pty.ptyid                                    'CounterpartyID',
   ' '                                        'ReutersID',
   ' '                                        'BloombergID',
   t.text1                                      'FreeText1',
   t.correction_trdnbr                            'ReferenceTrade',
   pty.ptyid in ('Eurex', 'EUREX', 'XETRA EDE', 'XETRA')
                                 ? 'Y' : 'N'       'AutomaticTradeFlag_old',
   convert('date', tc.exp_comb, '%d/%m/%Y')          'Exp_Comb',
   convert('date', tc.exp_opt, '%d/%m/%Y')           'Exp_Opt',
   tc.settle,
   u.name                                      'TraderName',
```

```
   add_info(i,'IssueDate')                    'IssueDate',
   add_info(i,'SUBTYPE')                      'Subtype'
from
   trade t,
   instrument i,
   instrument iu,
   portfolio p,
   user u,
   party pty,
   choicelist ch,
   Temp_Comb tc
where
   t.updat_time > TODAY
and t.insaddr = i.insaddr
and iu.insaddr =* i.und_insaddr
and t.prfnbr = p.prfnbr
and t.trader_usrnbr *= u.usrnbr
and t.counterparty_ptynbr *= pty.ptynbr
and t.optkey3_chlnbr *= ch.seqnbr
and t.optional_key  not like 'FID%'
and i.insaddr *= tc.insaddr
```

! Remark: Fidessa Trades in PRIME will be filtered out. Background: Fidessa Equity Trades are delivered into PRIME to use its Risk Management and Back Office functionality.

The following table describes the fields of the file:

Name	Comment	Example
Trade ID	Trade ID	11737585
TradeDateTime	Trade date (YYYY.MM.DD HH:MI:SS)	2008.03.26 16:25:00
AmendedDateTime	Amended date (YYYY.MM.DD HH:MI:SS)	2008.05.30 15:20:43
CreationDateTime	Creation date (DD.MM.YYYY HH:MI)	26.03.2008 16:25
SettlementDate	Settlement date (DD.MM.YYYY)	26.03.2008
InstrumentID	Instrument ID	4035114
InstrumentName	Instrument Name	EUR/DEP/EO/080326-080327/#2
InstrumentISINCode	International Security Identifying Number	
UnderlyingInstrumentID	Underlying instrument ID, if an underlying exists	N/A
UnderlyingInstrumentName	Underlying instrument name, if an underlying exists	N/A
UnderlyingInstrumentISINCode	Underlying instrument ISIN, if an underlying exists	N/A
TradeType	TradeType	Deposit
BuySellFlag	BuySellFlag: B – buy S - sell	B
WarrantFlag	Warrant flag: Y – Warrant N – not Warrant	N
OTCFlag	OTC flag: Y – is OTC	Y

	N – not OTC	
InternalDealFlag	Internal deal flag: Y – internal N – not internal	N
StornoFlag	Storno flag: Y - storno N – not storno	N
AutomaticTradeFlag	Automatic trade flag. Indicates if traded via 'EUREX' or 'XETRA EDE': Y – automatic N- not automatic	N
InternalInstrumentFlag	Internal instrument flag Y – internal N – not internal	N
NetGrossFlag	NetGross flag N – net Y – includes comission	N
TradeVolume	Trade volume	31.20
TradePrice	Trade price	100.00
TradeCurrency	Trade currency	EUR
Exchange	Exchange id	XAB
SystemDateTime	System date (DD.MM.YYYY HH:MI)	26.03.2008 16:25
BookID	Book ID	LEM002
OrderID	Order ID	
TraderID	Trader ID	BUTTOND
CounterpartyID	Counterparty ID	SEB AG FFM
ReutersID	Reuters ID	
BloombergID	Bloomberg ID	
FreeText1	Free text	Some text
ReferenceTrade		
AutomaticTradeFlag_old		
Exp_Comb	Expiry date of the combination	
Exp_Opt	Expiry date of the option	
Settle	Settlement price	32,22
TraderName	Trader name	Johnson, John
IssueDate	Date when the instrument was issued	2011-02-15
Subtype	Sub type of the trade	DUMMY
Strike_Price	Strike price of an option	200.5
Put/Call_Flag	Option type P or C	P
Contract size	Number of units per contract	100
FX-Rate	Fx-rate against EUR	0.8211
quote_type	Described the way the instrument is quoted (e.g. per unit, per contract,…)	Per Unit
Multiplicator	Factor to multiply the volume to calculate the real number of units of the trade (the price is related to one unit)	1.5

3 MCC logic

3.1 General classification mechanism

3.1.1 Trade category mapping

The trade is mapped to a category mainly based on the tradeType:
For "Stock" it is checked if the instrument of the trade is part of a set ISIN lists. These lists can be configured in the database in the table T42_MGB_CONFIGURATION. The related keys are shown in the following:

T42_KEY	category
STOCK_EURO_BLUE_CHIP	CAT_STOCK_EURO_BLUE_CHIP
STOCK_M_DAX	CAT_STOCK_M_DAX
STOCK_SPECIAL_CASE	CAT_STOCK_SPECIAL_CASE

For "Warrant" with an ISIN-prefix "DE" the category CAT_WARRENT_GERMAN_UNDERLYING is taken.
Other tradeTypes are mapped to their uppercase name with the prefix CAT.

3.2 Trade status checks

3.2.1 General

To calculate the status of a trade a set of expressions is evaluated. If the expression returns true or if the expression is empty, the evaluation is stopped and the related state is taken as the resulting state. An expression consists of expressions combined with the logical and-operator (&&) or the or-operator (||). An expression can also be negated with the not-operator (!) and finally braces can be used to group expressions. A nuclear expression (a condition) is then evaluated by executing a java-function of the trade.
An example:

status_name	expression
no_check	product_not_mcc_relevant || is_storno
internal_deal	is_internal
high_low_check	is_net_trade
historical_check	

In the example the first expression "product_not_mcc_relevant" is extracted and the corresponding java-method is looked up in a special configuration table and executed on the trade-object. Then the next condition "is_storno" is checked against the trade-object. The result is logically combined with the or-operator. Assuming the result is true, the final state would be "no_check". Again assuming the first three expression return false, the forth state "historical_check" would become the final result.

3.2.2 Prime

3.2.2.1 Definition of trade status rules

The following rules are used to calculate the status of the trade.

status_name	check	expression
Internal bond trade	N	is_bond && is_sedt_book
Technical booking	N	is_combination && is_sedt_book &&

		is_westlb_counterparty
No check (Storno)	N	is_storno
No check (Non risk book)	N	is_non_risk_book
No check (OTC)	N	is_otc
No check (Automatic trade)	N	is_automatic && is_automatic_counterparty
No check (Collateral)	N	is_collateral_instrument
Selo other check	N	is_zero_price && is_selo
MINT Migration Trade	N	is_umbuchung && is_helaba_ffm_counterparty
Traded on issue date	Y	is_traded_on_issue_date
Check high low prices	Y	is_internal_deal && is_umbuchung
Check high low prices	Y	is_foreign_exchange && !is_option
Check historic price	Y	

The following are executed after the Bloomberg data is received. They are explained later.

status_name	**check**	**expression**
Umbuchung	N	!is_out_of_price_range && !is_out_of_time_range && is_umbuchung
O.K.	N	!is_out_of_price_range && !is_out_of_time_range
Bagatelle	N	is_bagatelle
Check high low prices	Y	is_highlow_bloomberg_timeout
Check historic price	Y	is_historic_bloomberg_timeout
Euwax check	Y	is_euwax_timeout
No price found (BLB-Corp-request)	Y	has_no_price && (is_warrant || is_convertible || is_combination)
No price found (foreign exchange)	Y	has_no_price &&is_foreign_exchange
No price found (historic price)	Y	has_no_price
Out of price and time range	Y	is_out_of_price_and_time_range
Out of price range	Y	is_out_of_price_range
Out of time range	Y	is_out_of_time_range
Check historic price	Y	

The following conditions refer to values from fields, which can be found in the Prime file (see "data import").

3.2.2.2 Condition: is_bond_instrument

Returns true, if the field "Trade type" contains the entry "Bond".

3.2.2.3 Condition: is_warrant

Returns true, if the field "Trade type" contains the entry "Warrant".

3.2.2.4 Condition: is_combination

Returns true, if the field "Trade type" contains the entry "Combination".

3.2.2.5 Condition: is_convertible

Returns true, if the field "Trade type" contains the entry "Convertible".

3.2.2.6 Condition: is_collateral_instrument

Returns true, if the field "Trade type" contains the entry "Collateral".

3.2.2.7 Condition: is_sedt_book

Returns true, if the field "BookId" contains one entry of the list configured in the table T42_MGB_CONFIGURATION with the key "SEDT_BOOK".

3.2.2.8 Condition: is_sedt_counterparty
Returns true, if the field "Counterparty id" contains one entry of the list configured in the table T42_MGB_CONFIGURATION with the key "SEDT_COUNTERPARTY".

3.2.2.9 Condition: is_storno
The field "StornoFlag" indicates storno-trades. 'Y' indicates a storno.

3.2.2.10 Condition: is_automatic
The field "AutomaticTradeFlag" indicates automatic trades.
If the value is "Y", it is an automatic trade.

3.2.2.11 Condition: is_automatic_counterparty
Returns true, if the field "CounterpartyId" contains one entry of the list configured in the table T42_MGB_CONFIGURATION with the key "AUTOMATIC_COUNTERPARTY".

3.2.2.12 Condition: is_otc
The field "OTCFlag" indicates otc trades.
If the value is "Y", it is an otc trade.

3.2.2.13 Condition: is_traded_on_issue_date
If the field "IssueDate" is not null and equals the trade date, the condition returns true.

3.2.2.14 Condition: is_non_risk_book
Returns true, if the field "BookId" contains on entry of the list configured in the table T42_MGB_CONFIGURATION with the key "PRIME_NON_RISK_BOOK".

3.2.2.15 Condition: is_internal_instrument
The field "InternalInstrumentFlag" indicates internal instruments.
If the value is "Y", it is an internal instruments.

3.2.2.16 Condition: is_umbuchung
If the field "TraderId" contains the value "UMBUCHUNG", the condition returns true.

3.2.2.17 Condition: is_westlb_counterparty
If the field "Counterparty" contains a value that is configured in the database in the table T42_MGB_CONFIGURATION with the key WESTLB_COUNTERPARTY the condition returns true.

3.2.2.18 Condition: is_helaba_ffm_counterparty
If the field "CounterpartyID" contains a value that is configured in the database in the table T42_MGB_CONFIGURATION with the key HELABA_FFM_COUNTERPARTY the condition returns true.

3.2.2.19 Condition: is_zero_price
Returns true, if the trade price is zero.

3.2.2.20 Condition: is_traded_on_combination_expiry_date
Returns true, if the trade date equals the combination expiry date.

3.2.2.21 Condition: is_traded_on_option_expiry_date
Returns true, if the trade date equals the option expiry date.

3.2.2.22 Condition: is_bond_instrument
Returns true if the instrument name matches the form "<CUR>/BD/*" or the form "<number>%*" where <number> is a decimal number with "." as optional decimal point.

3.2.2.23 Condition: is_deposit_instrument
Returns true if the instrument name matches the form "<CUR>/DEP/*".

3.2.2.24 Condition: is_selo_instrument
Returns true if the instrument name matches the form "<CUR>/SELO/*".

3.2.2.25 Condition: is_selo
Returns true, if the field "Trade type" contains the entry "SecurityLoan".

3.2.2.26 Condition: is_combination
Returns true, if the field "Trade type" contains the entry "Combination".

3.2.2.27 Condition: is_internal_deal
The field "InternalDealFlag" indicates internal deals.
If the value is "Y", it is an internal deal.

3.2.2.28 Condition: has_no_isin
The field "isin" is empty.

3.2.2.29 Condition: is_non_exchange_traded
If the field Exchange" contains the value is "XAB", it is not traded at an exchange ("außerbörslich").

3.2.2.30 Condition: is_net
The field "NetGrossFlag" indicates net trades.
The value "Y" indicates that a commision or courage exists. The trade is a gross trade.
If this condition is fulfilled, an addon is used when checking the price differences.

3.2.2.31 Condition: is_foreign_exchange
If the exchange code from prime is one of the following Non-German codes, the condition returns true. The values are configured in the database in the table T42_MGB_CONFIGURATION and the key PRIME_NON_GERMAN_EXCHANGE_CODES.

3.2.2.32 Condition: is_late_deal
If the difference between trade_date and system_date is greater than 24h, the condition is set false.

3.2.2.33 Condition: is_bagatelle
To calculate the turnover the following formula is used:

$$turnover = (trade\,\mathrm{Price} - bloomberg\,\mathrm{Price}) * volume * fx\_rate * multiplier$$

(The multiplier corrects the volume to get the number of units per trade.)
If the absolute turnover is smaller than a threshold, the condition returns true.
The threshold is configured in the database in the table T42_MGB_CONFIGURATION and the key EQUITY_BAGATELLE_LIMIT. The values are supposed to be in EUR.

3.3 Price request

3.3.1 General

The status derived from the trade types above divides the trades into 5 main distinct groups:

- Check high low prices (to request the high and the low price of a specific day from Bloomberg)
- Check historic price (to request an intra day price for Equities from Bloomberg)
- Check historic corporate prices (to request an intra day price for Corporates from Bloomberg)
- Euwax Check (to request derivative prices from the EUWAX exchange)
- Any other state with or without direct

The type of request depends on a field which is defined by the automatic state (t10_state_code.t10_market_data_request_type).

3.3.2 Building a Bloomberg request

3.3.2.1 Equity

To build the appropriate request string to get equity prices from Bloomberg the following rules are defined.
The blank-separated request-string is build of the isin and the exchange. If any rule returns a Bloomberg exchange-code it is used for the request and the further rules are ignored.

1. First it is checked if an exchange-code for that specific ISIN is configured (”IE0072559994” -> ”GR”).
2. Then the source system exchange code and the currency are translated to a Bloomberg exchange code (e.g. the London exchange code: ”LSE” + "GBP" -> ”LN”).
3. The source system exchange code and the ISIN country code (first 2 characters) are translated to a Bloomberg exchange code (e.g. the EURONEXT Exchange code: ”ENX” + "DE" -> ”GR”).
4. The source system exchange code is translated to a Bloomberg exchange code (e.g. ”HAM” -> ”GR”).
5. If no exchange is available, the first 2 letters of the ISIN and the currency (which is mandatory) are mapped to a default exchange-code (”DE” + ”EUR” -> ”GR”).
6. If still no exchange is available, only the currency (which is mandatory) is mapped to an exchange-code (”EUR” -> ”GR”).
7. If no exchange could be mapped, the request-string just consists of the ISIN.
8. If no ISIN is available and the source system offers a Bloomberg request-string, it is used.
9. No Bloomberg request is performed.

The Bloomberg identifier-type-code (e.g. ISIN, WPK, TICKER, etc) will be added automatically (default is “ISIN”).
The Bloomberg security-type “Equity” will be added automatically.
The following table shows the mapping rules in a compact form:

Rule priority	**source fields**				
	source_system	**source_system exchange_code**	**ISIN**	**ISIN_country_code**	**currency**
1			x		
2	x	x			x
3	x	x		x	
4	x	x			
5				x	x
6					x

The configuration is saved in one table. The source fields are compared to the entries in the configuration table. The fields that are required to perform an exact match are marked with a "x" in the table. If an exact match was found, the Bloomberg target exchange code is taken. If not, the source fields of the next rule are compared.

3.3.2.2 Corporates

The request string starts with the isin. It is followed by the Bloomberg security-type “Corp”. The Bloomberg identifier-type-code (e.g. ISIN, WPK, TICKER, etc) will be added automatically (default is “ISIN”).
To request a corporate price a single Bloomberg price source needs to be specified. A list of consequently used price sources is configured in the database in the table T42_MGB_CONFIGURATION with the key EQUITY_BLOOMBERG_DEFAULT_SOURCES. The initial values were

EURX,EUWX

3.3.2.3 Options

The request string for options need to be build from several fields.
It starts with the underlying instrument ticker, followed by the expiry date with the format "MM/dd/yy". Then P or C, indicating the call or the put type, are combined with the strike price (without fraction). Finally the Bloomberg security-type "Equity" is added.
Example: "PHI1 12/16/11 P22 Equity"

3.3.3 Data retrieval from Bloomberg

The Bloomberg data will be received from the ActiveX interface of the Bloomberg terminal. The license model requires that the Bloomberg data will not leave the terminal-PC. To ensure this, the data is saved in a flat file on the local terminal and an anonymous reference is saved in the server database.
The request-string together with all relevant price-check data (trade price, trade time, check type, check thresholds, etc) is sent to the client application. The request-string is passed to Bloomberg. The process is synchronously waiting for the response data.
The price is saved in a local file (to be configured by the user) together with an unique id, which is also saved in the server database to link the price to the corresponding trade.
The client performs the price-check and saves the result, but not the Bloomberg price, in the server database.
So the price data is only displayed and saved on the client-PC and the data is useless for anyone else, since no trade information is save on that client. Only if you have access to the database and your own profile (local price file) is configured correctly, you can read the prices you received and the connected trades.
Bloomberg time is London time, which is in general GMT+1!

3.3.4 Euwax requests

Prices from Euwax are requested from the EUWAX-archiv at http://www.euwax.de
The MGB-tool requests the EUWAX server with an http request and parses the resulting html page to fetch the prices.

3.4 Pricing checks

3.4.1 Processing

In the following step the received market prices are compared to the trade prices. The rules to calculate the state of the trade follow the same idea like described above. The are defined above but described below.

3.4.1.1 Condition: is_highlow_bloomberg_timeout

True if a "time Out" event occurred while waiting for the Bloomberg response on a "highlow"-request. The request can be reprocessed.

3.4.1.2 Condition: is_historic_bloomberg_timeout

True if a "time Out" event occurred while waiting for the Bloomberg response on a "historic"-request. . The request can be reprocessed.

3.4.1.3 Condition: is_euwax_timeout

True if the EUWAX-website could be reached technically but no archive data was available. The request can be reprocessed.

3.4.1.4 Condition: has_no_price

Bloomberg has not sent any market data for that trade.

3.4.1.5 Condition: is_out_of_price_and_time_range

A combination of the following two conditions..

3.4.1.6 Condition: is_out_of_price_range

If the trade price differs more than a predefined threshold from market price, the trade is out of price range. The thresholds are described below.

3.4.1.7 Condition: is_out_of_time_range

If the trade time differs more than a predefined threshold from the time of the market price, the trade is out of time range. The thresholds are described below.

3.4.2 Historic price/time tolerances

The current tolerance thresholds can be extracted per trade category with the following SQL:

```
SELECT   t05_instrument AS CATEGORY, t11_tolerance_time_minutes,
         t11_tolerance_percent
    FROM t05_instrument, t11_price_check_category
   WHERE t05_instrument_type = 'pricecheck'
     AND t05_instrument LIKE 'CAT_%'
     AND t11_name NOT LIKE '%no longer use)%'
     AND fk_t05_t11_price_check = t11_id
     AND fk_t05_t09_mandant = 'EQU'
ORDER BY t05_id;
```

If the trade has passed special trade-status-conditions, an "add-on" is added to the thresholds.

Condition_name	**Historical check**		**High/low interval check**
	add-on to absolute time deviation in minutes	**add-on to absolute price deviation in percent**	**add-on to absolute price deviation from interval bounds in percent**
is_net	200	0,15	0,25

If a relative and an absolute tolerance are defined for a category, only the absolute tolrance is used while the relative value is ignored.