Eurex System Overview

December 6, 2002
Kolloquiumstag der Universität Gießen

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Agenda

- Eurex Products & Functionality
- Eurex Performance & Volumetric
- Eurex System Overview
Eurex Products & Functionality

Listed Products

Equity Market
- Options on 3M German Shares
- Options on 1M Swiss Shares
- Options on 1M Nordic Shares
- Options on 22 Dutch Shares
- Options on 9 French Shares
- Options on 10 Italian Shares
- Options on 8 NeuerMarkt Shares
- Options on 8 US Shares

Index Market
- DJ Euro STOXX 50 Future
- DJ STOXX 50 Future
- DJ Global Titans 50 Future
- DJ Global Titans 50 Option
- DJ Euro STOXX Sector Index Futures
- DJ STOXX Sector Index Futures
- DJ STOXX Sector Index Futures

Capital Market
- Euro Schatz Future
- Euro Schatz Option
- Euro Bill Future
- Euro Bill Option
- NEMAX Option
- NEMAX Future
- NEMAX Future

Money Market
- 3 M Euribor Option
- 3 M Euribor Future
- 1 M Euribor Option
- 1 M Euribor Future

Options on 8 NeuerMarkt Shares
- Low Exercise Price

Industry Segments:
- Banks
- Healthcare
- Technology
- Telecommunication
- Automobiles
- Energy
- Insurance
GBV-Kolloquium "IT in Banken und Börsen" - WS 02/03

Traded Contracts

*January - June 2002

Traded contracts (millions)

Straight Through Processing

Integrated Trading & Clearing

Core Process  Support Process
Trading Functionality

Order Types

- **Limit Orders**: Executed at the quoted or better price
- **Market Orders**: Have the highest priority for matching
- **Quotes**: Executed at the best available price
- **Stop Orders**: Protected against "unreasonable" price

- For options, two-sided limit orders, bid and ask price must lie within a defined maximum spread
- For futures, single-sided quote also supported, no maximum spread defined
- Mass quotes: several quotes can be entered within a single transaction
- For futures only, stop orders are limit orders which are automatically activated by market price movement
- Executed as market orders
Order Restrictions

- **Good-for-day (GFD)**
  - This is the default for order entry. Unexecuted orders without a time limit are cancelled at the end of the Eurex trading day.

- **Good-till-cancel (GTC)**
  - The order is either valid up to execution or until the trader cancels it.

- **Good-till-date (GTD)**
  - The order is valid until the given date, until execution or until cancelled by the trader.

- **Immediate-or-cancel (IOC)**
  - The order must be filled immediately or as far as possible.
  - The part of the order which has not been filled is cancelled.

- **Fill-or-kill (FOK)**
  - The order is filled immediately and completely or, if this is not possible, it is cancelled.

Trading Periods

- **Pre-Trading Period**
  - Most on-line functions are available.
  - No matching takes place.

- **Opening Period**
  - Determination of the opening price.
  - Opening Auction.
  - For a particular product, Eurex is able to freeze the market in order to check the opening price.

- **Trading Period**
  - Continuous price determination and matching.
  - All on-line functions are available.

- **Post-Trading Period**
  - Calculation of settlement prices.
  - Limited on-line functions are available.
  - No matching takes place.
Matching Principles

- Determination of an auction price corresponding to the highest executable order volume
- Order execution following price/time priority
- Partial matching and matching against several counterparts possible
- Anonymous

- Orders with better limits are executed before the orders with worse limits, orders with the same price are prioritized according to the timestamp assigned at entry time
- Partial matching and matching against several counterparts possible
- Anonymous

- An incoming order is partially matched against a proportion of all orders in the book at the current inside market price regardless of their timestamps
- Currently implemented for futures in short-term interest rates (STIR products) only
- Partial matching and matching against several counterparts possible
- Anonymous

Strategy Trading

- Option Combination Orders:
  - Horizontal & vertical call spread, horizontal & vertical put spread, strangles, straddles and conversions
  - Non-executed combination orders are canceled

- Option Combination Quotes:
  - In separate order book
  - Available for Market Makers only
  - Traders can choose to match against the regular order book or the combination order book

- Calendar Time Spreads: 1st month and 2nd month spread, 2nd month and 3rd month spread, 1st month and 3rd month spread

- Integrated Matching Process, i.e. Time spread combination is matched against the outright order book or the combination order book, depending on which book will yield the better price

- Spread trading for Pro Rata products is available for combination pairs of consecutive expiration months

- Inter-Product Spreads: time spreads between different future products
Price and Quantity Validations

- Traders are requested to confirm the order entry if the price is worse than the market price.
- Prices of limit orders and quotes entered for price/time matched future products is subject to an additional check against the reference price; maximum permitted deviations from the reference prices are defined by the Exchange.
- Maximum order quantity can be defined per product and trader by the Exchange member.
- For market orders and stop orders for price/time matched future products, the maximum order quantity is defined by the Exchange.
- For options, the bid-ask spread must lie within a defined maximum range.

OTC Functions

- Trading of big orders without risk of several partial executions.
- Bilateral and not visible to the market.
- The Buyer enters the trade details and the Seller approves the transaction.
- Simultaneous exchange of cash bonds against futures contracts on such bonds.
- Bilateral and not visible to the market.
- The Buyer of the futures (Seller of the cash bonds) enters the trade details and the Seller (Buyer of the cash bonds) approves the transaction.
- Enabling members to enter volatility trades: Futures trades negotiated outside the system, where the number of futures contracts entered corresponds to the delta hedge required for a specified options trade.
- Bilateral and not visible to the market.
- Either the Buyer or the Seller of a Vola Trade can enter the trade. The counterparty must approve the trade.
Further Trading Features

- Trader can request for a new regular or combination quote for a given options series.
- Market Makers have the obligation to answer quote requests.
- Quote Request can be automatically triggered by the system.
- Trader can use the Cross Request function to indicate his intention to carry out a cross or pre-arranged trade.
- The initiating trader must wait a certain amount of time before entering the matching orders/quotes.
- Clearing attributes can be specified at order entry (e.g., account type, open/close, customer account, give-up).

Clearing Functionality
Account Structure (I)

- Position Accounts hold trades executed on and/or entered to Eurex
- Premium Accounts reflect the premium of all executed options transactions
- Fee Accounts accumulate the fees of all transactions
- Clearing members pay and are liable for their own premiums and fees as well as for those of their Non-Clearing members
- Cash Accounts reflect all cash obligations from the clearing procedure, including premiums, fees, margin requirements and fines (to trigger credit/debit to member's LZB/SNB accounts)
- Securities Accounts mirror the securities pledged as collateral at CBF/SIS

Account Structure (II)

- Principal Accounts only comprise member's proprietary business
- Agent Accounts show transactions executed by a member on behalf of its clients
- Market Maker Accounts reflect transactions executed by a market maker
- The account type A, P, or M can be entered at order entry
Trade Management

- Trade adjustments can be entered for same-day transactions during the Trading Period and the Post-Trading Period.
- Trade adjustments lead to immediate adjustments of the position accounts of the Member.
- Member can carry out four types of trade adjustment:
  - Trade Separation - Member can split one trade into two or more smaller trades on Principal or Agent Account
  - Trade Open/Close Adjustment - Member can adjust an opening trade into a closing trade and vice versa
  - Trade Account Transfer - Member can re-allocate a given trade from one to another own position position account
  - Historical Trade Transfer - An Historical Trade Transfer is the result of an existing trade from the previous business day to the current business day according to specific rules set by the Exchange

Give-Up/Take-Up Trades (I)

- A Give-Up Trade is a transaction that is concluded by one Exchange Participant and is then transferred to another Exchange Participant (with the status of a credit institution), which settles the trade.
- The trade can only be given up in the client account (A1), and can be taken up additionally in the principal accounts (P1/P2). They must be entered and accepted on the same or the next trading day.
- The Give-Up Trade facility gives Exchange Participants who are entitled to trade, the possibility to indicate, when entering the order or after matching, which Clearing Member they would like to clear this trade.
Give-Up/Take-Up Trades (II)

- Exchange Participants can execute trades for their clients and then transfer them to another Exchange Participant.
- This trade transfer includes the transfer of the option premium as well as the fees.
- The settlement is made on the next morning through the accounts of the Clearing Member who accepts the trade.
- The give-up functionality thus creates a separation between trading and clearing: the client can make use of the whole market for execution, but can concentrate his risk with one Clearing Member.
- With the Give-Up/Take-Up functionality, opening trades of the previous day that have been booked in the client position account can be given up on the following day.
- This functional extension especially facilitates day-to-day trading for brokers who trade indirectly through an Exchange Participant.

Position Management (I)

- Corrections can be carried out for positions that already exist.
- Members can perform three types of position adjustment
  - Position Closing Adjustment - Member can close out positions during the Pre-Trading Period, the Trading Period and the Post-Trading Period. Closed positions cannot be reversed into open positions.
  - Position Account Transfer - Member can move position from one to another own account during the Pre-Trading Period and the Post-Trading Period. Exercised or assigned positions cannot be transferred.
  - Position Transfer between Members - Transfers of client positions between various Members if expressly requested by the client and with the consent of all parties involved. The actual adjustment is performed during batch processing.
Position Management (II)

- Positions that are still open in individual option series on the last trading day of an option series are deleted.

- In the case of option contracts, all exercised long positions and assigned short positions are deleted after delivery and payment or after cash settlement, as the case may be. In-the-money positions that are not exercised expire worthless.

- An Automatic Exercise Facility for all option products is available. A Member can individually the minimum in-the-money, so that every open position with the defined range may be exercised automatically on expiration day. This can be defined per product and per account.

- For futures contracts, the corresponding positions of the Exchange Participants are deleted after delivery and payment or after cash settlement, as the case may be.

Daily Profit and Loss Settlement

- For futures and options on futures, a daily profit and loss settlement takes place according to the "mark-to-market" procedure.

- The profits and losses arising in open positions as a result of price changes from the previous day are settled on a daily basis through the Variation Margin.

- The daily profits and losses are calculated as follows:
  - Step 1: Calculation of the daily settlement amount for trades of the current exchange trading day, based on the difference between the price of the trade and the daily settlement price of the relevant exchange trading day.
  - Step 2: Calculation of the daily settlement amount for open positions of the exchange trading day, based on the difference between the daily settlement price of the contract on the relevant exchange trading day and the previous exchange trading day.
  - Step 3: Calculation of the netted daily settlement amounts (Step 1 + Step 2).
  - Step 4: Calculation of the total netted daily settlement amounts for a Clearing Member.

- The resulting profits and losses are credited to/debited from the internal cash account on a daily basis and settled via the corresponding LZB, SNB or CBF account.
Principal Elements of Risk-Based Margining

- It must be deposited by the writer of an option, it covers the potential loss that could ensue if the writer were forced today to liquidate the position.
- It is continuously adjusted, i.e. if prices fluctuate so that the potential loss upon liquidation increases, the writer will be obliged to deposit additional premium margin.
- Long or short positions which have expiration dates that are not identical can be offset against each other (spreading).
- Counterbalanced positions through time-spread orders are subject of Futures Spread Margin.
- Futures Spread Margin has the purpose of covering that risk until the next trading day.
- Additional Margin serves to cover through the next trading any potential additional costs that could arise if the positions had to be liquidated immediately.
- Additional margin is imposed on options (also futures options), as well as on non-spread futures.
- For those products which are handled on a mark-to-market basis, EurexClearing AG books the trading-day profits and losses of all open positions held in an account.

Fee Management

- EurexClearing AG maintains a fee account for every position account in the corresponding product currency.
- Fees are calculated for the following types of transactions:
  - Booking of a concluded transaction
  - Exercises and assignments in options
  - Delivery notice and allocation of the bonds and/or securities to be delivered in the case of capital market futures
  - Cash settlement for products that are cash-settled
  - Position transfers from market-maker position accounts in the case of options
  - Other Costs and amounts not arising from a transaction
- The end-of-month amounts on the fee accounts are debited from the Clearing Member’s internal cash account and settled through the LZB, SNB or CBF account.
Premium Management

- With "traditional-style" options at Eurex, the premium is payable in full in the product currency when the option is purchased.

- It is credited to the Clearing Member’s internal cash account (if the option is sold) or debited (if the option is purchased) during the nighttime batch processing.

- Premiums are netted on the exchange-trading day following the day of the purchase through the LZB account (EUR), the SNB account (CHF) or the CBF account (other currencies).

- With options on futures, the premium is not paid one exchange-trading day after the day on which the option was purchased but instead is payable in full when the option is exercised or expires. During the time the option is held, profits and losses in the option position are settled daily.

Further Clearing Services

- Eurex Clearing AG also acts as the central counterparty and guarantees the fulfillment of the following transactions
  - EurexBonds trades
  - EurexRepo trades
  - Equities traded on Xetra and the FWB floor

- Eurex Clearing AG offers Intra-day Risk Information Services
  - Report on risk during a trading day for existing positions at the member level
  - Risk evaluation based on current market conditions, including underlying prices/volatilities
  - Provision of corresponding intra-day theoretical prices for risk breakdown per End-Customer

- The Eurex Clearing System supports
  - Multiple currencies
  - Multiple Central Security Depositories (CSD)

- The Eurex Clearing System integrates
  - Delivery Management
  - Cash Settlement
  - Security Settlement
  - Collateral Management
Support Services

- Several printable Reports are formatted during batch processing and distributed to members’ installations through the Exchange network.

- A set of raw data is also formatted during batch processing and distributed to members’ installations through the Exchange network. Members can use such raw data to create their own reports.

- Different back-office messages are formatted real-time and sent to the members’ installations, including trade and position data, theoretical and settlement prices for risk evaluation, settlement and delivery instructions, as well as product and series/contract parameters.

- Standard Front End Applications with Graphical User Interface for Trading and Clearing are provided to all members free-of-charge.

- Market Supervision can act on behalf of members: On-behalf trading and/or removing all open orders/quotes from the market.

- Evaluation of members’ position limits, intra-day margin and Market Maker performance.

Eurex Performance & Volumetric
**Significant increase of transaction volume ...**

![Graph showing the number of synchronous daily transactions over time.](image1)

**...and short processing time**

![Graph showing the average processing times of synchronous transactions over time.](image2)
New all time records were set on November 15, 2001!

- Overall Daily Contract Volume: 5,669,752 - 4,557,323 (Mar 14, 2001)
- Futures: 3,281,168
- Options: 2,388,584

⇒ No significant performance problems occurred!

Performance Maintenance at Eurex

- Eurex invests continuously in hardware and software for performance and scalability of its systems.
- Annual development and maintenance effort is about the same as for the initial building of an electronic trading system.
- Hardly any section of the Eurex software is older than 18 month.
- Memory matching processes were introduced to increase the order throughput for a single product.
Observed Volumetric (I)

- Number of products listed\(^1\) 177
- Number of active series/contracts \(^1\) 25,697
- Number of members \(^1\) 456
- Number of members’ front end servers \(^2\) 1,498
- Number of trading sessions concurrently active (average) 10,800

\(^1\) As of July 1, 2002 \(^2\) As of July 1, 2002: MISS only, workstations not included

Observed Volumetric (II)

- Number of traded contracts per day across all products (average) 2,900,000
- Number of traded contracts per day across all products (peak)\(^1\) 5,669,752
- Number of traded contracts per day for the most active product (Euro Bund Future, peak)\(^2\) 1,698,992
- Number of transactions per day (average) 2,800,000
- Number of transactions per day (peak)\(^3\) 4,080,000

\(^1\) November 15, 2001 \(^2\) March 6, 2002 \(^3\) June 21, 2002
Proven Performance

- Number of transactions per second for all products (average) 50
- Number of transactions per second for all products (peak) 160
- Number of transactions per second for a single product (peak) 25
- Host transaction processing time (average) 0.07 sec
- Host transaction processing time (99%) < 0.5 sec
- Network travel time (round trip, average)  < 0.5 sec
- Transaction response time (at member level, average) < 1 sec
- Batch run time (average) 2 h 15 min

1 June 26, 2002 2 DAX Future 3 Premium Connection (Leased line of 64 Kbps)

Reached Availability

- Overall system availability (average) 99.98%

The Eurex availability is calculated based on the stringent requirement that all system components are up and running for the scheduled operation time, including
  - Hardware (e.g. hosts, disks, communication servers).
  - Software (e.g. online-, interface- and batch-application), and
  - Network (e.g. member lines, routers).

Any failure not automatically recovered by the system (transparent fail-over) and therefore requesting operational tasks reduces the system availability, regardless whether it impacts the market and/or the members or not.

1 During 2001
Eurex System Overview

System Design Goal

"Provide a robust platform for high volume distributed transaction processing applications at lowest cost and highest service levels"
System Design Drivers

**Market Characteristics**
- World-wide access & large number of market participants
- Flexible member structure
- Volatile market with high transaction volume
- Comprehensive market supervision & surveillance

**Market Needs**
- Fair and transparent trading environment
- Reliable processing and high system availability
- High throughput and fast response time
- Maximum security
- Scalability and extendibility for future growth potential
- Flexibility for new functional features
- Suitable integration to Members' in-house systems
- Efficient interface with data vendors and with settlement, depository and credit institutions
- Low cost

**Distributed System Architecture**
- Efficient System Environment
- Member-oriented Network Topology
- High Security, Fair, Fast and Reliable Network
- Reliable and Fault-tolerant Back End
- Flexible Member Installation
- Different Member Connection Methods

**Designed Software Architecture**
- Modular Applications
- Extensive Application Programming Interface (VALUES API)
- Custom Middleware
- Efficient Batch Processing
- Separate Database Subsystem
For reasons of Security, Fairness, Performance and Expandability, Eurex does not use the "Traditional" monolithic approach but a distributed system architecture (4 tiers client/server).

4 Layers Client/Server Architecture for all Users
Efficient System Environment

- Financial Data Providers
  - TPF
  - SMF

- Financial Data Disseminators
  - Eurex

- Security Depositories
  - CBF
  - SIS

- Press & Internet

Underlying data

- Index value

Market data

- Members
  - Eurex Market Supervision
  - Eurex Market Surveillance
  - Eurex Accounting / Billing

Delivery instructions

- Market data
- Core System
- Eurex Database Subsystem

Cash instructions

1 Market statistics are published on the Eurex Web-site with one day delay

Member-oriented Network Topology

456 Members in 17 Countries

As of July 1, 2002
High Security, Fair, Fast and Reliable Network

- No direct access to the Back End hosts
- Member configuration under Eurex approval
- Security check at each network level
- Communication Server as Firewall
- Identical number of "hops" for all members to reach the host
- Only leased lines, no satellite, nor ISDN
- 2 x 64 Kbps Member lines
- 2 x 256 Kbps Access Point lines
- Load sharing
- Redundant network lines
- Redundant network routers
- Redundant Communication Servers
- Redundant Access Points
- Transparent fail-over & resubmission of unprocessed transactions
- Uninterruptable power supply (UPS)
Security Concepts

- Functional and technical operation entirely separated
- Flexible security profiles per member respectively trader - stored in secure Back End Host environment
- Different levels of authentication
  - Connection level authentication (authorized Front End?)
  - Session level authentication (authorized Trader?)
  - Transaction level authentication (authorized Action?)
  - Double validation: Front End and Back End Host
- No direct access to the Back End Host
- Encryption of private messages

Reliable and Fault-tolerant Back End

- No direct access by member, nor by data vendor
- Distributed disaster tolerant cluster
- High security computer center (two separate computer rooms)
- Load sharing:
  - all nodes active load being distributed
  - automatic redistribution to surviving nodes after any site or node failure
- Transparent fail-over
- Disk shadowing
- Guaranteed database integrity (all or nothing transactions using RMS recovery unit journaling)
- Re-submission of unprocessed transactions
- Uninterruptible Power Supply (UPS)
- Back End Hosts:
  - 2 times (2 Compaq Alpha Servers GS160 and 1 Compaq Alpha Server ES45) with 4 GB Memory and 4 Processors EV68/1GHz each
  - OpenVMS 7.3
  - 1 GBit-Ethernet LAN

As of July 1, 2002
Member can choose between different connection alternatives ...

Standard Access

- Member
- Network
- Exchange

Alternative Access via Internet

- Combined
- iAccess
- @Eurex

Eurex Back End

Member can choose between different connection alternatives ...

Minimal Configuration
- Eurex Front End
- Eurex

Medium Configuration
- Eurex Front End
- Other server (optional)
- Workstations

Comprehensive Configuration
- Eurex Front End
- Host, e.g. back office, order routing (optional)
- Workstations

“simple” and fault tolerant configurations possible

- Technical prerequisites have to be fulfilled for the link to Eurex.
- Technical guideline is compiled by Eurex to assist members to setup the appropriate configuration.
- The configuration is both checked and classified by Eurex.
... and platforms

- Support of homogeneous client/server combinations on
  - Sun Solaris
  - Microsoft Windows 2000

- Support of heterogeneous client/server combinations on
  - Windows XP Client and Sun Solaris Server
  - Windows XP Client and Windows 2000 Server
  - Windows 2000 Client and Sun Solaris Server

Microsoft Windows NT is currently supported but will be decommissioned with the introduction of Eurex Release 6.0 (October, 2002)

One Front End to access multiple markets

MISS | Member’s LAN | Workstation
--- | --- | ---
VALUES API | @X-ceed | Member / Vendor Application
Generic F/E Technical Services | @X-tract
Eurex BESS | VALUES API
Xetra BESS | Exchange Application
Other BESS...
Eurex Back End | @X-ceed | Eurex Trading Application (GUI)
Xetra Back End | @X-tract | Eurex Clearing Application (GUI)
Other Back End...
VALUES3 | Virtual Access Link Using Exchange Services
One single interface to different markets

Member’s own or vendor application
Application of the exchange, can optionally be replaced by own application
Exchange software, must be installed
Exchange software installation depends on membership
BEES - Back End SubSystem
3 Defined Software Layers

**Application**
- Performs business functions
- Incl. security check (i.e., functional privileges)

**Middleware**
- Performs connection-oriented security check
- Routes transactions; distributes broadcasts
- Ensures load balancing & adds fault-tolerance
- Performs encryption & compression of messages
- Performs database access

**Network**
- Transports transactions and broadcasts
Modular Applications to simplify the integration of new functionality

Online
- Order/quote management
- Matching
- Trade enrichment
- Trade position administration
- Information dissemination
- Settlement price calculation
- Theoretical values calculation
- Audit trailing
- Clearing
- Market supervision
- Diverse support functions.

Interface
- User interface for interactive trading and clearing
- Application Programmable Interface (VALUES API) for all exchange services supporting member's in-house integration
- File-based interface for reports, raw data & theoretical values
- SWIFT & File-based interface for clearing & cash settlement
- Real-time & file-based interface for other subsystems

Batch
- Report generation & distribution
- Series & contracts generation
- Margrining
- Collateral & delivery management
- Cash settlement
- Capital adjustment
- Audit trailing
- Database maintenance
- Preparation for the next business

Extensive open Application Programmable Interface for member's in-house integration

VALUES API
- Members Application(s)
- Application Requests
- Call Interface
- Exchange Applications

Order Routing
Front-Office
Risk Management
Back-Office
User Interface
Reporting
Printer

Eurex
Xetra
VALUES API - The Virtual Access Link Using Exchange Services Application Programmable Interface

- is the single point of access to all exchange trading and clearing services
- provides the connection to multiple exchanges and enables users the opportunity to a fast access into a new market
- is developed and maintained by the exchange
- consists of a technical component (Call Interface) which
  - has proven high reliability since the introduction with Xetra in 1996
  - remains unchanged across exchange application releases
  - shields basic technical services and technologies from member
- and a functional component (Application Requests) which reflects the complete set of Eurex Functionality allowing
  - flexible and easy integration of in-house systems, member-specific applications as well as add-on software of third parties
  - member and third parties development of their own applications based on the interface to replace the exchange standard application completely
  - easy extension for supporting future requirements by adding new Application Requests

VALUES API Framework

- VALUES API is equally available on MISS and Workstation
- VALUES API is equally available on all supported platforms
- VALUES API provides asynchronous processing
- Synchronous processing applications can be built on top of the VALUES API
- C and C++ are supported as programming languages for the VALUES API
- Backwards Compatibility is supported, i.e. parallel supports of Version n and Version n-1
- VALUES API is provided for Eurex and Xetra
To meet stringent service level requirements, Eurex uses its own middleware

- Three principles for transaction routing
  - Function driven transaction routing
  - Data driven transaction routing
  - Single queue - multiple servers

- Two principles for public broadcast
  - Event- and time-triggered netting and compression
  - Equal information simultaneously available to all members & datavendors

- Encryption of private data

- Isolation layer between application and network - The application doesn't have to be aware of the underlying network protocol

- Isolation layer between application and database - Separation of the logical from the physical view of the database and making it transparent to the application

For performance, Eurex uses 4 batch processing principles

- Parallel Processing
  Two or more applications are running in parallel to process different files

- Concurrent Processing
  Multiple instances of one application executed at the same time, driven by a common input control file

- Asynchronous Processing
  Processing is triggered on-line (e.g. event- and time-triggered report extract writer)

- Automated Processing
  Processing is automatically triggered by market close, i.e. no manual operation needed
Separate Database Subsystem

- Relational Database System
- Integrated Risk Management and Collateral Management for
  - EurexDerivative trades
  - EurexBonds trades
  - EurexRepo trades, and
  - Equities traded on Xetra and the FWB floor
- Real-time and periodic data transfer from the Eurex core system
- Supporting Market Supervision & Market Surveillance, i.e.
  - Reference price calculation
  - Market Maker evaluation
  - Real-time price monitor
  - Cross trade evaluation
  - Intra-day margining
  - Position limit check
- Accounting Interface to SAP, including handling of special fee refunds
- Storage of historical data

For more information, please also visit www.eurexchange.com