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Multi-National and Multi-Entity capable Securities Order Management System for Electronic Brokerages

Contents

Abstract

The current bear market has forced electronic brokerages to compensate the transaction-driven fixed cost degression effect of bull markets by cost containment programs, while maintaining their position in the expanded markets. Orderflow consolidation will be the key principle to obtain the critical mass for this business. Options for the consolidation of the order flow can be the consolidation across internal entities / countries of the group and the acquisition of external order volumes e.g. via brokerage franchises.
The current system landscape is not designed to support multi-national and multi-entity order flow consolidation. Fragmented, redundant, legacy-based and proprietary securities order management systems have been utilized to ensure market readiness in the former bull market. This article outlines the requirements and architecture for securities order management systems which enable the efficient orderflow consolidation across entities and countries in the brokerage industry.

1. Business Context

There are various reasons why an increasing number of retail brokerages are facing severe problems. Even former stars of the brokerage market are generating significant loss figures and are reducing headcount. The general market decrease is creating a high cost pressure on the transaction-driven brokerage business. Customer expectations have expanded while at the same time they expect to pay less fees and commissions. In addition there is still kind of a technical evolution ongoing. ”Order Management Systems (OMS) have grown to become a central component of most brokerage operations. For brokers / dealers, these systems have expanded to cover not only traditional trade creation and management workflow, but also have begun to include some aspects of other functions such as: execution, smart order routing, confirmation […].” [1]

In the last bull market various new players established the electronic retail brokerage market. As long as an increasing number of new customers opened securities accounts and started trading, each participant on the market was able to be profitable just by offering services but without having a competitive platform and operations. In the current bear market consolidation of electronic brokerages is ongoing in which competitive cost structures and therefore systems are mandatory to keep the position. Another effect of the former bull market was the rapid regional expansion of electronic brokerages. Expansion has been driven by acquisitions and rapid system implementation without cost effective application integration/consolidation strategies.

Also the increasing relevance of cross-border equity trading is not adequately reflected in the curent system landscape and transaction costs: ”With the introduction of the Euro, there has been increased emphasis on creating a more centralized financial market in Europe. To date, cross-

border equities trading in Europe costs five times as much as a typical cost of trade in a domestic market." [2]

In principal current electronic brokerages systems are characterized by proprietary, self-developed and legacy-based mid-tier and back-end application which have been adapted for the online distribution channel. The technical evolution is mainly based on customized traditional brokerage systems and new developments for front-end systems. Multiple front-end, mid-tier and backend systems in different countries are common practice which are justified by different market and regulatory requirements.
Another threat for electronic brokerages has been revealed especially by some initial public offerings like Deutsche Telekom AG and Infineon AG in 2000 : timely order execution in peak load situations. The volume of customer orders is hardly predictable. Therefore electronic brokerages have to be prepared to handle extremely high volumes, especially when being present in more than one European country. In addition new regulatory requirements, e.g. resulting from 'Basel II' have to be considered. Legal institutions like the 'Bundesaufsichtsamt für das Kreditwesen (BAKred)' in Germany are monitoring especially online brokers which requires them to offer highly available systems and back-up solutions like Call Centers etc.

Basically there are three major opportunities to cope with the current market situation:

1. Internal orderflow consolidation across group entities and countries
2. External orderflow acquisition e.g. by Electronic Brokerage Franchises
3. IT cost reduction e.g. by Electronic Brokerage platform consolidation

Ad 1 – Orderflow Consolidation
Orderflow consolidation requires relatively high volumes of customers and orders and basically means to bundle customer orders and to apply trade and settlement netting in order to reduce the market-side costs for execution, clearing, settlement and custodial services significantly. The opportunity for the consolidating broker is to reduce third party commissions and fees related to a single order. The broker can pass savings to the customers and/or increase the profit margins.

Ad 2 – Online Brokerage Franchising
Franchising is an emerging business in the brokerage segment. The franchising opportunity is based on the fact that more and more small- and mid-size banks cannot afford to keep own order management systems productive because they will hardly reach the critical mass of customers and orders.
Therefore brokers with existing systems can act as application and business service provider for the brokerage value chain . A franchise model assumes a clear separation of functions between franchiser and franchisee as well as on the corresponding interfacing. The opportunity for the franchisee is to turn fixed cost into variable cost and therefore to reduce the dependency of volatile markets. The opportunity for the franchiser is to increase the customer basis and order volume and therefore to reach a better fixed cost reduction.

Ad 3 – Platform Consolidation
Another cost saving opportunity is the consolidation of multiple brokerage platforms in a single multi-national and multi-entity capable platform. The challenge will be the avoidance of multiple maintenance effort for different systems and to reduce duplicated implementation effort when introducing new product offerings.

2. *Order Management Systems in the Securities Process Chain*

When looking at the securities process chain order management systems play a key role for the life cycle of an order. As shown in Figure 1 order management systems can be divided into buy-side and sell-side systems. This article focuses on the buy-side order management systems.

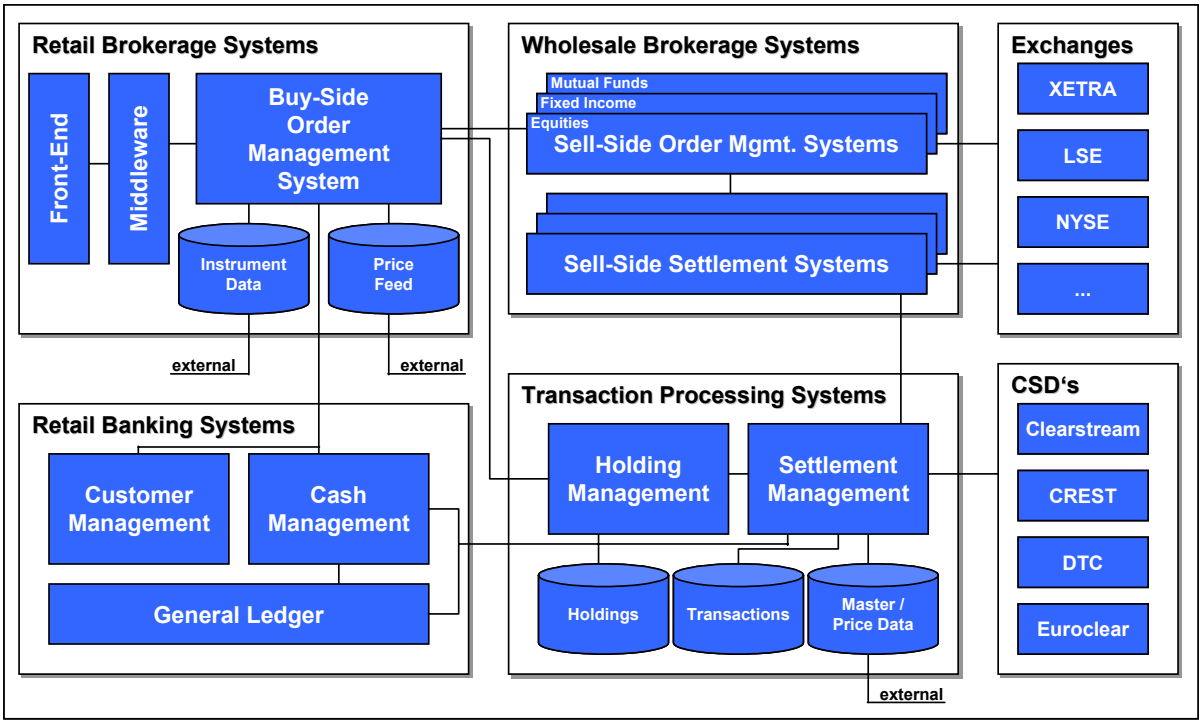

Figure 1 – Order Management Systems in the Securities Process Chain

National and multi-national brokerage offerings have to cover different requirements regarding functions, products and country specifics. Current order management solutions are based on one of the following models:

a. *Functionality / Process driven OMS Structure:*
   Mainly oriented on the different brokerage process steps
   (e.g. processing of order-routing by one component and order reconciliation by another one)
b. *Product driven OMS Structure:*
   Mainly oriented on the different products to be handled by the system
   (e.g. different applications for equities and for mutual funds processing)
c. *Country driven OMS Structure:*
   Mainly oriented on country requirements
   (e.g. different applications for multiple countries)

Within the order life cycle an order management system typically covers the following functions:

- Order Management
  - Orderbook maintenance including order status update
  - Orderbook reconciliation

- Order Validation
  - Order specific validations
  - Customer specific validations
  - Market / country specific validations
- Order Routing
  - Order routing to respective markets
  - Receive incoming messages related to orders

Order management systems which are currently used by Banks and Brokerage Companies in Europe can be very often characterized as custom built mainframe systems. Typically these order management systems are highly integrated with the legacy systems for settlement, holding management or customer data management.

Table 1 provides a few examples of current order management systems. Please note that this list is by far not complete regarding the European market but shows the tendency.

Bank / Broker	OMS Name	Custom built / Package	Architecture	Programming Language
Commerzbank / Comdirect	Cowias	Custom built	Embedded / Host	Cobol
Deutsche Bank / maxblue	Direct Ordering	Custom built	Standalone / Host	Cobol
Dresdner Bank	WPO	Custom built	Embedded	Cobol
Advance Bank	EWS-Plus (HLB)	Custom built	Embedded	Cobol
HypoVereinsbank / Direkt Anlage Bank	BSP-Trade (FMSB)	Custom built	Embedded	Cobol
BNP Paribas / Consors	OMS	Custom built	Embedded / Client-Server	Java

Table 1 – Order Management Systems in Europe[1]

3. Requirements for a Multi-National and Multi-Entity Securities Order Management System

Please check wording and rephrase.
The orderflow consolidation opportunity assumes that orders are aggregated before they reach the market. Due to different legal and regulatory requirements which are driven by different countries and products it is not possible to concentrate all types of orders. While the buy side OMS focuses on single customer orders, it is the responsibility of the sell side OMS to consolidate the orders where possible. There has to be a clear interface between both to avoid changes to the buy side OMS if the orderflow is consolidated in a different way.

The online brokerage franchising opportunity assumes that involved OMS are enabled to handle multiple clients. Additionally, a well-structured interface is required between the OMS and all applications which are typically provided by the franchisee. All non-brokerage applications fall into this category, since a franchising partner is usually reluctant to give up ownership on the

[1] Source: Deutsche Bank AG and Accenture Ltd.

customers banking and customer data. To allow flexible interfacing to various franchising partner, it is recommended to have a designated interfacing component at this interface which insulates both sides from changes on the other side: the entity adapter.

The platform consolidation opportunity assumes to reduce redundancies between applications and to streamline the overall process. Redundancies can only be avoided if the OMS structure model is chosen which is best in line with the changes the company faces. Typically the amount of countries and products remains stable, while changes to functionality and processes are more frequent. Therefore it is advisable to choose the functionality/process driven OMS Structure, while applying modularization and standardization of interfaces. (Comment: architectural requirement)

Process oriented requirements

The two high-level processes of the order life cycle which affect order management systems are:

1. 'From order entry to order routing (to market)' and
2. 'From order execution to trade processing'.

Product oriented requirements

Even if most offered products have some common process steps (e.g. order entry for equities and structured products) there are still important differences which have to be considered in the system design. These product oriented requirements can be implemented as separate system components or could lead to duplicated applications depending on the chosen OMS structure (e.g. one for equities processing and one for funds processing). Clearly the OMS has to be able to handle at least all those products which are in scope for the corresponding brokerage company. The OMS has to handleall currencies corresponding to the product offering of the electronic brokerage.

Trading-type oriented requirements

Similar to the product oriented requirements there are some aspects to be considered because of different trading-types. The different trading-types require specific processing in Order Management, Order Validation and Order Routing. Depending on the trading-type the order router decides to route the order to the market / exchange or to a wholesale broker. Another typical difference is the processing of the orderbook reconciliation by the Order Management against the exchange or against the wholesale broker.

Architecture oriented requirements

First of all a model with different layers is necessary, especially to enable a clear separation between workflow components and business logic components. There must be a front-end layer which is connected to the (functional) mid-tier. This mid-tier is the core of the order management system and is interfacing with all other internal and external parties like data providers, execution and transaction service providers and all legacy / back-end systems. Especially when interfacing with external parties it is essential to use interfaces with standardized protocols like FIX. Furthermore the underlying technical architecture must support the 24x7 availability of the applications which, among others, has deep impact on the design of online and batch processing. Hand in hand with the availability goes the system performance which is especially important to meet customer expectations.

4. Architecture for Multi-National and Multi-Entity capable Order Management System

The consolidation of the orderflow, the enablement of a franchise offering and the consolidation of different OMS platforms requires an application architecture which supports requirements of multiple entities in a multi-national environment.

How can an OMS application architecture look like?

For external flexibility, the OMS should be set up as layer model where the OMS is encapsulated from the surrounding systems using different adapters. A front-end adapter has to be implemented to guarantee channel independence and as message layer between the front-end and the OMS. An entity adapter has to be set up to enable independence from the legacy systems and therefore to enable a franchise offering. An interface layer has to be implemented to interface with external parties like execution providers and data providers. This interface has to be standardized to allow easy replacement of execution and data providers without impact on the core OMS.

For internal flexibility, workflow and business logic in the OMS have to be separated. Small business modules contain the business logic and offer small-grained services. A workflow engine aggregates these small-grained services and offers them as large-grained services to the outside, mainly to the channels. Any changes to workflow or functionality will then have only localized impact, which greatly reduces maintenance and testing effort. During modularization it is important to streamline and re-distribute functionality within the existing applications. For example the different order validations which have to be processed are very often executed multiple times. Especially when a retail broker is routing the orders to an execution service provider it is quite likely that (market) validations are processed twice. See Figure 2 on how a multi-national order management system can be structured.

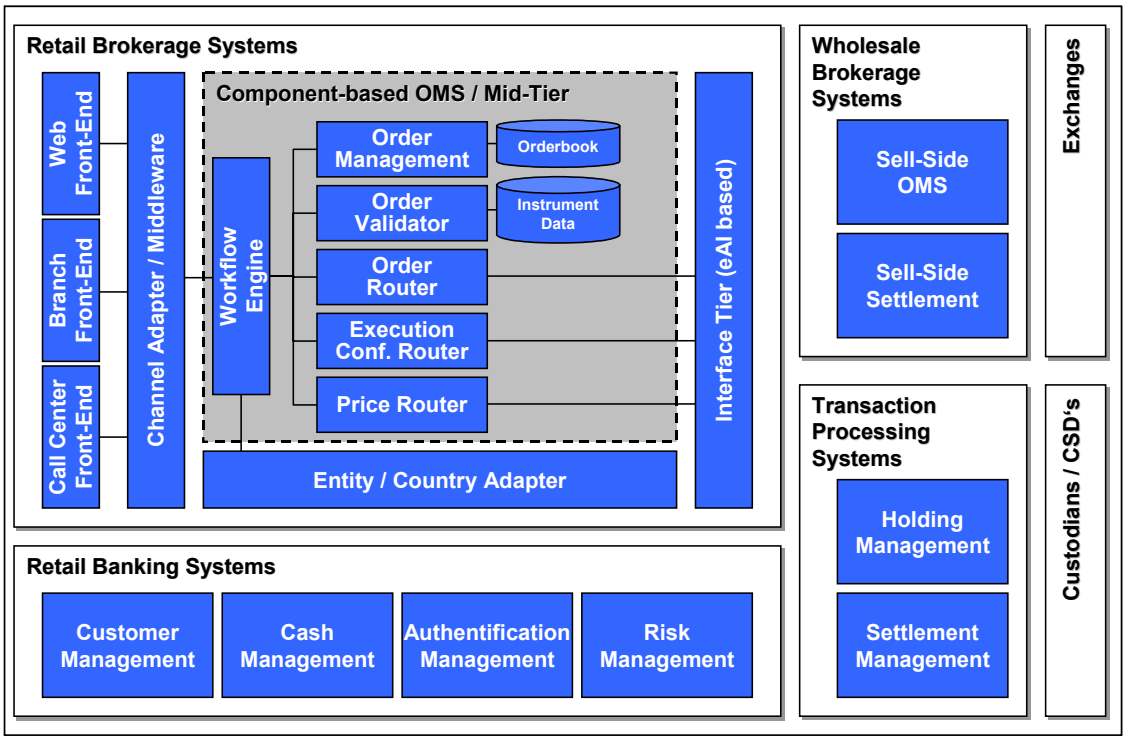

Figure 2 – Architecture for a Multi-National Order Management System

The most important building blocks in the mid-tier as shown in Figure 2 will provide the following services:

- Workflow Engine:
  - Handles all service requests (e.g. order request or order execution) by calling the relevant service providers
  - Supports transactional integrity (rollback if transaction fails)

- Order Management:
  - Stores orderbook / quotebook
  - Maintains order, order request, quote, and quote request state
  - Orderbook reconciliation

- Order Validator:
  - Basic order checks (only order specific checks), e.g.
    - Instrument & order type tradable on selected exchange?
    - Limit reasonable?
    - Enrich order data with instrument data
    - Calculates amount for cash blocking (w/o fees)

- Order Router:
  - Knows which execution service provider / market should be used for which product / order type / customer
  - Exchange-specific order validation (if delegation to execution provider not possible)
  - Interfacing & interface monitoring

- Execution Confirmation Router:
  - Knows which transaction service provider should be used for which product / order type / customer
  - Sends customer specific data (settlement accounts)

- Price Router:
  - Requests current prices from a central price provider

- Instrument Data:
  - Maintains current instrument data which is identical for all countries and all partner entities. Instrument data is synchronized with execution provider and contains attributes like ISIN, name, exchanges, reference-exchange

The building block structure is connected by a suitable execution architecture which fulfills all architecture requirements (high availability, small response time, high throughput) and provides frequently used services (e.g. messaging/notification, persistence, logging, audit trailing) for all existing applications.

The scope of an execution architecture has to be defined very carefully. The implementation of a standardized service is more expensive than a customized implementation. If too many services are standardized, their implementation effort will exceed the standardization effort. Only features which are used frequently should be standardized.

Implementation of the execution architecture can be reduced by making use of widely used standards in this area, like J2EE and EAI. These standards are designed for interoperability, and have evolved in a wide variety of contexts. Usage of these standards also allows outsourcing large parts of the execution architecture implementation to a vendor tool, without compromising vendor independence.

The most critical service with regard to the requirements of the execution architecture is efficient connectivity. It is highly recommended to implement a message bus. A message bus is a concept for efficient communication between all applications. Since a substantial amount of development work is required to adapt point-to-point connections between applications, an improved approach is to connect these applications via standard adapters to a message bus. The message bus is specialized to handle all types of communication (synchronous, asynchronous, point-to-point, publish & subscribe) very efficiently. All applications connected to the message bus can communicate with each other. A standard adapter allows connectivity from one technical platform to the message bus, therefore can be reused for other applications with the same technology. Currently, a variety of technical platforms exists. All of them have different advantages and disadvantages. The execution architecture has to support all of them, including platforms planned to be used in the future. Once all applications are connected via the message bus instead of via point-to-point interfaces, setup and maintenance costs can be reduced substantially.

5. Build or Buy: Criteria for Proprietary and Standard Packaged Systems

Reengineering projects for order management systems should evaluate carefully the build or buy decision. Table 2 provides some decision criteria as guidance. The build or buy decision is mainly driven by the capabilities and effort to integrate with the existing brokerage and banking back-end systems landscape.

Criteria	Build		Buy	
	Pro	Contra	Pro	Contra
Development Cost	- fit with requirements - differentiation from competitors	- no scale effects - implementation effort multiplied for different countries (if not customizable)	- reuse in other countries with limited effort	- customization effort and ongoing license fees
Maintenance Cost	- maintenance skills in-house; independence from vendors	- no scale effects - maintenance effort multiplied for different countries	- reduced maintenance cost for shared system	- dependency from vendors
Data Sources and Interfacing Capabilities	- built to offer all relevant interfaces (internally and externally) - flexible adjustment of interfaces	- high integration cost for first implementation	- normally offer standardized interfaces	- adjustment of interfaces not flexible - not all relevant interfaces will be part of product offering
Regional Expansion Capabilities	- all country specific requirements are implemented in an embedded solution	- built to fulfill requirements of first country - transfer to other countries difficult	- better transferability for European product offerings	- not all relevant countries might be part of product offering
Franchising Capabilities	- all Broker / Bank specific requirements are implemented in an embedded solution	- built to fulfill only requirements of Broker / Bank itself - implementation of multi-client capability might be complicated	- product offering should support multi-client capability (to be evaluated from case to case)	- definition and implementation of multi-client capability is pre-defined by product offering; adjustment might be complicated (e.g. different levels of clients)
Workflow	- workflow can be separated out of the embedded system	- for existing application: usually mix of workflow and business logic; adjustments are complicated and expensive	- ideally workflow separation is already provided	- some vendors explicitly offer “integrated systems” with no separation between workflow and business logic

Table 2 – Criteria for Build vs. Buy Decision

6. Conclusion

The current mid-tier system landscape in electronic brokerage is characterized by multiple fixed cost intensive securities order management systems. The operational risks like system availability and correct processing as well as the implementation complexity like back-end integration and proprietary product requirements are critical factors for reengineering projects. Reduction of transaction costs by orderflow consolidation and IT costs by platform consolidation are valid arguments for a redesign of current system landscape. The implementation of cost efficient electronic brokerages and corresponding systems could be leveraged by an standardization of international securities businesses and processing.

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