Automation, Efficiency and Scalability in Securities Back Office Processing

An implementer's view

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Presentation Outline

- Perspective on back office automation (STP)
- Modular, Seamlessly Integrated, Scalable and Extensible Back Office System: Implementation considerations
  - System Architecture & Technology
  - The debate: “BUILD” vs. “BUY” ?
  - Total Cost of Ownership
- Case Study

Perspectives on Back Office Automation

Driven by two key aspects :

- Intra-Firm STP
  - reasonably similar across different capital markets and firms with similar business model
- Inter-Firm STP
  - May differ from market to market; governed by the law of the land and market practices/infrastructure

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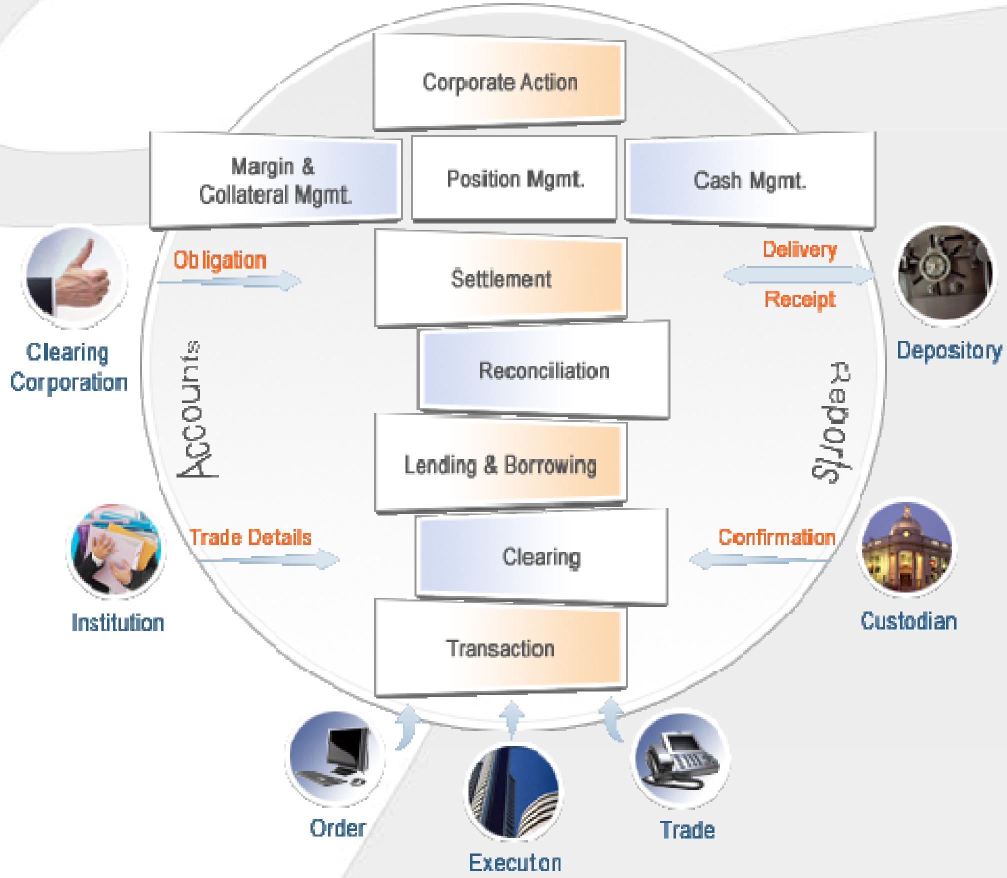
Industry Dynamics : Emerging Markets

- Chinese firms need to invest to improve trade processing infrastructure :
  - 3.8 million new accounts in August, 2007; 25 times more than the 150,000 in August 2006
  - January,2008 there were 112 million accounts, up from 74 million at the beginning of 2007
- Brazil ramps up Securities Processing
  - CSDC is trying to strengthen post-trade processing working with Omgeo, DTCC and Euroclear
- Algo trading takes strides in Asia…. ***is 'back office' ready ?***
  - Improved market infrastructure and buy-side demand is pushing electronic trading in APAC; But back office is still limited by poorly integrated workflow systems, voice broking, asset-specific settlement protocols, leading to processing bottlenecks and significant trading errors
- Credit Derivatives market opens up in Malaysia
- Vietnamese firms To list on London Exchange
- India allows institutional short-selling
  - SEBI is mandating that transactions be settled on T+1, to limit lending/borrowing window
- DMA opens new opportunities in India
  - Trading volumes will start going up by end-2008 as brokerage firms begin offering DMA

Many views on STP

- STP in back-office . . . business view
  - Reducing settlement cycles
  - Elimination of manual intervention
  - Reduction of operational cost & risk
  - The backbone for efficient market mechanism
- STP in back-office . . . implementer's view
  - Real-time software system that automates the entire post-execution trade life-cycle management, providing the right balance between elevating process efficiency, minimizing operational cost and limiting risk exposure

Back Office Process Stack



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An Ideal Back Office Processing Workflow

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Implementation Considerations

- Architecture backbone
- Scalability
- Distribution
- Virtualization
- Functional Extensibility
  - Customizability
  - Adapting to evolving market practices

To make back office system a Future-Proof investment

Architecture Backbones

- Tier based
- Grid based
  - Messaging grid (distributed messaging)
  - Processing grid (parallel processing)
  - Data grid (distributed data caching)
- Service Oriented

Everything towards the common goal …

Architecture : Goal

Having a computing framework that is capable of handling capacity transaction throughput, enabling clustering, high availability, location transparency and consistency of secured services across all the layers of the architectural stack.

Architecture : Scalability

- Scalability is a measure of how cost-effectively you can grow your operating capacity
- Plan ahead for a scalable system based on off-peak and peak trade volume (and future growth plan)
- Linear scalability – scaling OUT through additional resources (hardware, application instances)

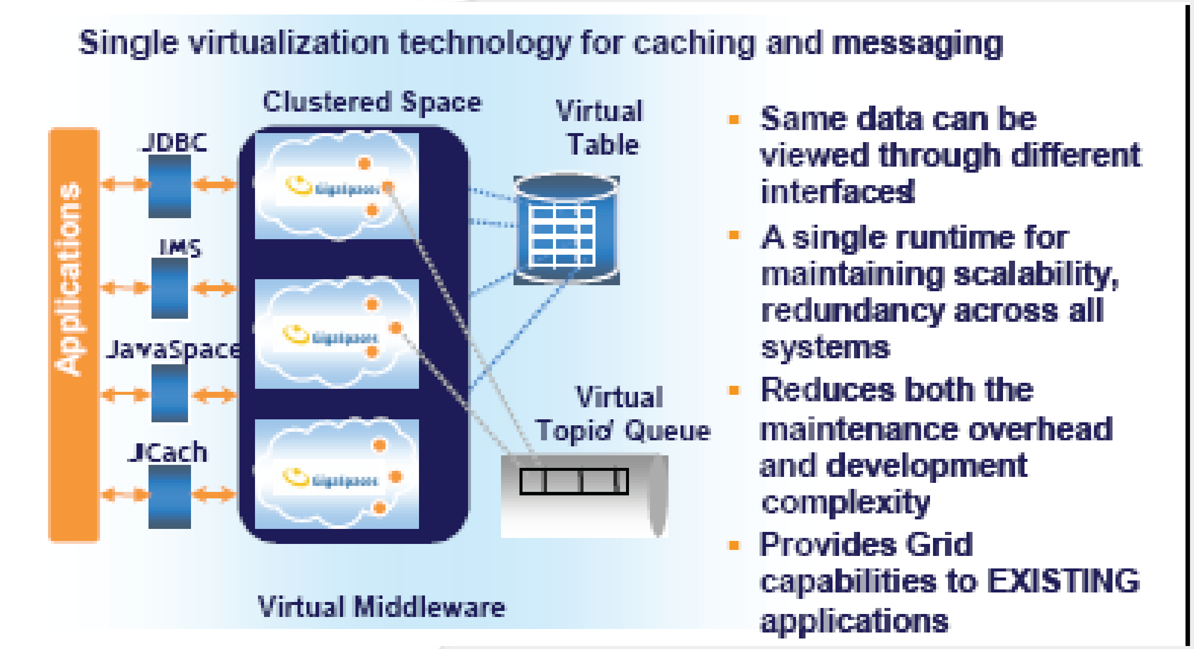
Architecture : Distribution

- Data distribution
  - Data grids (distributed cache, network attached memory)
- Process distribution
  - Cooperative parallel processing (map/reduce paradigm)
- Message distribution
  - Message bus

Goal : Loosely coupled distributed services for implementing high performance and low latency STP system

Architecture : Virtualization

'Write-Once' business logic and scale anywhere



Single virtualization technology for caching and messaging

- Same data can be viewed through different interfaced
- A single runtime for maintaining scalability, redundancy across all systems
- Reduces both the maintenance overhead and development complexity
- Provides Grid capabilities to EXISTING applications

Virtualizing the Middleware using Space based technology

(figure copyright : Gigaspaces)

Architecture : Functional Extensibility

- Rule based processing to accommodate
  - Changing market practices & business rules
  - Localization for different regions
  - Externalizing the customization activities
  - Use of rule engines for dynamic inference (e.g. SSI)

New Computing Platform – Multi-core

- Multi-core CPU is becoming mainstream : back-office system need to take advantage of multi-core platform
  - But old software is not designed to use multiple CPU cores
- Need stateless concurrent application design for allowing low-overhead parallel tasking and result accumulation *(example : trade valuation, billing, batch processes etc.)*
  - Require help of concurrency model, tools, new programming languages (e.g. functional language like Erlang)

Distribute processes across multi-core commodity servers

The Debate : Build vs. Buy ?

No right answer – that is universally acceptable

- **Build**:
  - In-house or by external vendor; both demands active collaboration from internal operations
  - Build-from-scratch takes too much time and feels risky
- **Buy**:
  - Even if functions/features match - operational and technical integration may not be trivial
  - Off-the-shelf package solutions may require significant customization, raising the TCO :*One size does not fit all*

The right & balanced approach depends on many factors

Factors Influencing Build or Buy

- Corporate IT road-map
- Time to deploy (including integration/migration)
- Budget allocation (incremental vs. upfront)
- Firms internal resource profile and IT capabilities
- Handling future changes and enhancements
- Feature differences between a custom built solution and packaged solution and their criticality to the firm
- True Total Cost of Ownership (e.g. over 5 years)

Build vs. Buy : Our View

- Having a right balance between what you can BUY and then what needs to be BUILT on it

- No single solution truly fits all problems – so critically evaluate the application capabilities against requirements (current & expected in future)

- BUY customizable solution framework – as it may be difficult to configure all custom requirements in a tightly packaged solution

Total Cost of Ownership (TCO)

Pay careful attention to the real cost

- TCO is combination of procurement cost **+** cost of customization, support, operations and ongoing maintenance

- TCO depends on the degree of effort required for:
  - Customization, Integration, Migration
  - System Testing & UAT, User Training
  - Supporting future business requirements & enhancements
  - Ongoing system maintenance – hardware and software
  - Managing operational scalability

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Case Study

Broker-cum-Custodian Back Office system

for

Global Financial Services Company

The Background

- **Customer**

  Securities broker-cum-custodian with operations in multiple capital markets (Japan, Asia, USA, UK)

- **Goal**

  Implement and migrate to a new technology system that would eliminate their operational inefficiencies and enable them to meet future business demands -

  Handle higher volume, Be ready for T+1 settlement and have common solution backbone across global operations

Their Operational Issues

- Too many scattered legacy systems
- Scattered reference data for each legacy system
- User operation and training – multiple system knowledge required
- Lack of standards in information exchange protocol
- Old systems unable to handle increasing volumes
- Manual process for data verification/reconciliation

High-level Objectives

- Phase out scattered legacy systems with a single new system built on latest technology platform
- Unified system for handling multiple asset classes
- Common architectural platform across multiple offices
- Seamless integration with the required legacy systems
- Centralize Reference Data repository
- Enable intra-firm STP; be ready for inter-firm STP (T+1)
- Be scalable for handling increasing trade volume
- Provide flexibility for easier incorporation of changes in market regulations and firm’s business practices in future

The Solution

Implementation of a clearing & settlement system with real time interface between market intermediaries and straight-through transaction processing capabilities

- Comprehensive post-execution trade life-cycle management
- Works in both real time and batch mode
- Supports multiple asset classes
- Supports cross border, multi-currency trading
- Integrated reporting solution
- Real time posting and general ledger journalization
- Integrated with FO and MO in real time
- Integrated with market intermediaries (where supported)

The Application (Functional Components)

- Trade capture and management
- Settlement processing
- Corporate action
- Position management (customer, inventory, nostro and stock record)
- General ledger
- Reporting (regulatory, transaction, risk assessment, audit and client reports)
- Exception monitor

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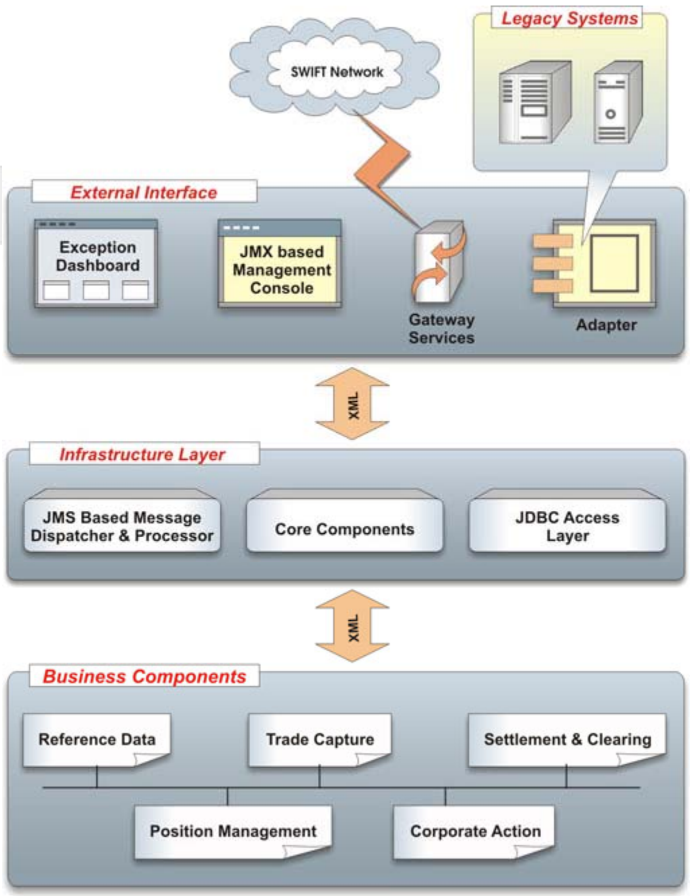
Solution Architecture



Architectural Decisions

- Architected using industry standard Java platform
  - Asynchronous messaging middleware (JMS)
  - Web based for centralized deployment and maintenance
  - Container based (Java EE) management
- Built-in rule engine for configuration/localization
- Built-in Java reporting engine for all reporting needs
- Centralized exception handling and dashboard
- Scalable through stateless service layer & clustering
- Fault Tolerance through Oracle RAC & Fail-safe MoM

High Level Approach

- Custom solution was first implemented in Japan (2003), followed by Hong Kong (2004) and Singapore (2005)
  - These are operational and under active maintenance
- Upgrading the technology platform for more scalability and followed by implementation for US operation
  - The system successfully completed UAT (2007)

The Benefits

- Less number of disparate systems to use/manage/monitor
- Faster processing to handle increasing trade volume
- Real time information availability and decision making
- Less manual intervention, ready for 1 day settlement
- Daily generation of all regulatory and client reports
- Faster exception handling, lowering operational cost & risk
- Modular applications provides easier maintenance
- Quick detection of system/operational errors due to real-time integrated environment
- Automatic reconciliation and discrepancy identification

Challenges

- Varying levels of complexity for similar processes in different markets [complexity increases with market age]
- Unifying different market practices in a single platform
- Eliminating or Integrating with local legacy systems and business processes
- User acceptability and inherent resistance to migrate to new system

Lessons Learnt

- Have a proper reference data strategy. If not defined, insist on getting it defined before starting implementation
- Everything cannot be made configurable – performance and configurability needs to be balanced
  - Drastic differences in market practices may require some rebuild
- Plan for ‘performance’ early – evaluate/estimate current and expected /future performance metrics
- Set scalability expectations early – how much can be scaled and at what cost
- Involve users from initial stages to get to know usability requirements (and get buy-in for new system)
- Have a well-defined migration & implementation path
  - Estimate efforts and ensure resource for parallel run

Thank You

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