Hexaware
TECHNOLOGIES
YOUR SUCCESS IS OUR FOCUS

Response to Section 3 (ICG)

Presented To: Citi

Version: 1.3 | Date: April 15, 2010

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1. Institutional Client Group (ICG)

1.1.1 DS-1. Provide a brief description (including your knowledge of interface systems/functional areas, upstream and downstream).

Response:

Hexaware is industry leader in asset management and capital market IT service space. Our core expertise is development, implementation, integration, re-engineering and upgrades, production support and maintenance of financials products catering to asset management products. We strongly believe that with our experience with various global customers we can repeat the same success with Citi Group. The below diagram highlights our understanding of key business areas which supports the Institutional Client Group (ICG`s).
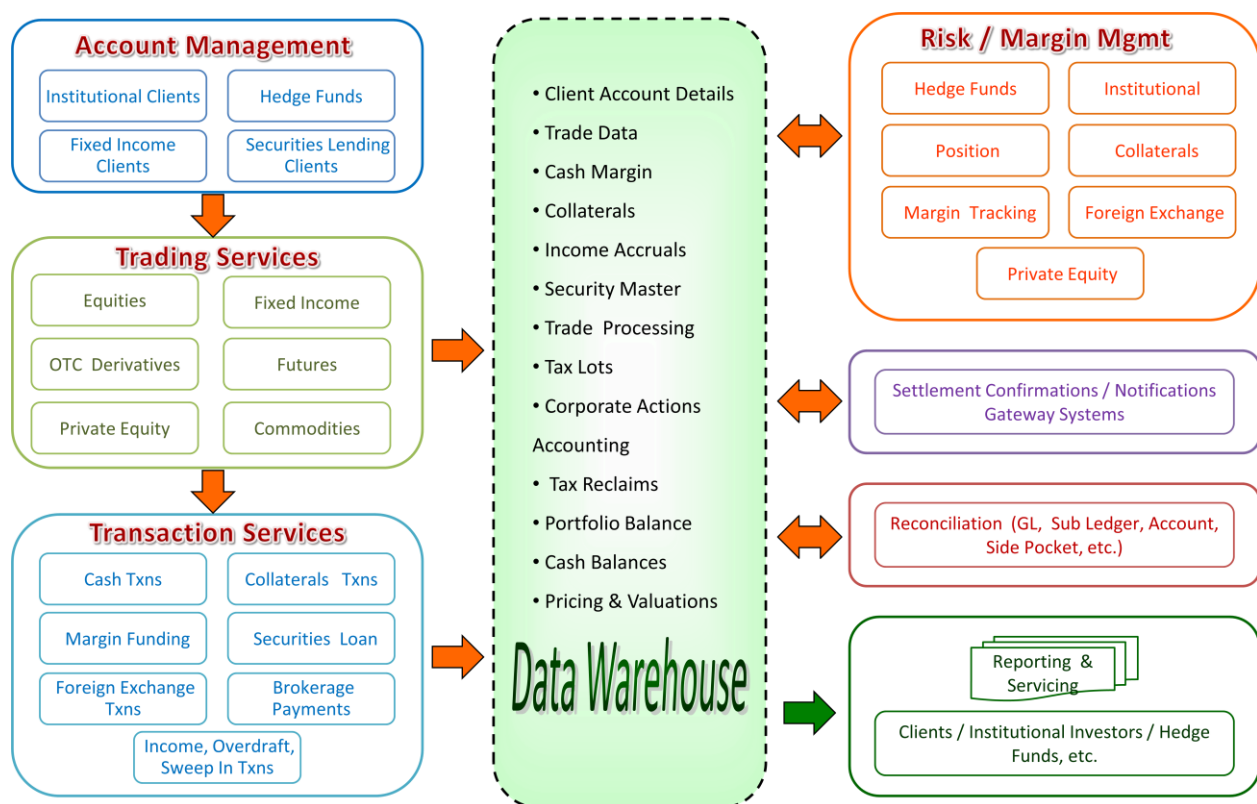
The following sections highlight how Hexaware is placed to service these business processes and the key differentiators in terms of specific domain knowledge relevant to the business units, expertise in related products, tools and technologies.

Domain Experience

Our experience in the business domain areas is described below.

Front Office

❑ **Domain Areas**
- o Order Initiation
- o Order Execution
- o Order Confirmation
- o Order Matching
- o Order allocation
- o Trade Capture
- o Trade Affirmation and Trade Matching

❑ **Messaging Protocols**
- o SWIFT
- o FIX
- o XML

- Experience in Handling different Asset Classes including equities, Fixed Income, ABS, CMBS, CMO, OTC Derivatives etc

- Expertise with market data feeds (Security Master, Corporate Actions, Prices, FX rates, Variable Rates, Ratings, Yield/Duration/Analytics, Benchmark etc) from different vendors across the globe

Corporate Action Processing areas like
- Events Update / Entitlements creations
- Notifications for Voluntary Corporate Actions
- Corporate Action Accounting & Interest Accruals / Tax Reclaims
- Reconciliation and Valuation of
- Cash / Stock Reconciliation
- Accounting Vs Custody System
- Investment Manager Vs Custodians
- Ledger / Sub Ledger Reconciliation
- Pricing & Valuation, PnL &   NAV Calculation

Clearing & Settlements

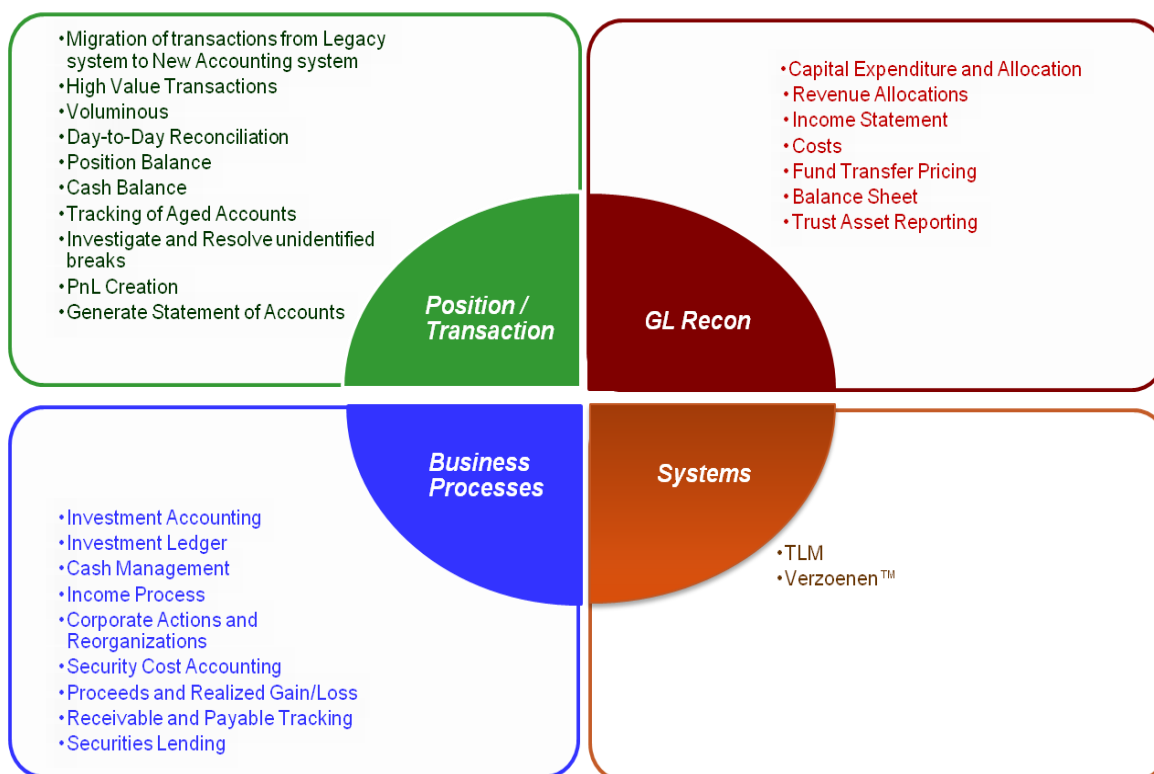Hexaware has expertise in providing comprehensive investment back-office services to global investment managers. The service scope covers all back-office operations and accounting from trade reconciliation, Trade settlements, Holding maintenance, Income and Corporate actions Accruals, Fees Accruals, Valuations to Performance Measurements. The services also include custodian and bank reconciliation.

Our area of expertise in the Settlement & Clearing includes:

Domain Areas	Process	Reconciliation Tools
• Trade Capture • Trade Validation between Investment Manager Vs Broker • Trade Posting • Trade Confirmations • Failed Trade Analysis • Partially Settled Trades • Update Trade Status • Failed Trade exception processing • Claim Processing	• DTC • Crest • Euroclear • SWIFT • FED	• TLM • Verzoenen

Reconciliation Capabilities

Position / Transaction
- Migration of transactions from Legacy system to New Accounting system
- High Value Transactions
- Voluminous
- Day-to-Day Reconciliation
- Position Balance
- Cash Balance
- Tracking of Aged Accounts
- Investigate and Resolve unidentified breaks
- PnL Creation
- Generate Statement of Accounts

GL Recon
- Capital Expenditure and Allocation
- Revenue Allocations
- Income Statement
- Costs
- Fund Transfer Pricing
- Balance Sheet
- Trust Asset Reporting

Business Processes
- Investment Accounting
- Investment Ledger
- Cash Management
- Income Process
- Corporate Actions and Reorganizations
- Security Cost Accounting
- Proceeds and Realized Gain/Loss
- Receivable and Payable Tracking
- Securities Lending

Systems
- TLM
- Verzoenen™

Product Expertise

Front Office

Front Office Components	Business Coverage	Products	Asset Classes
Trade Analytics	Trade Order Management	Charles River IMS	Equities
Compliance / Regulation	Order Routing	Calypso	Fixed Income
Market Data	Pre Trade Risk & Compliance	Murex	FX
Blotter	Trade Execution	Bloomberg POMS	Derivatives
Logging & Auditing	Trade Matching	Blackrock	Cash Instruments
Message Routing	Trade Enrichment		Structured Products
Static Data	Exception Processing		
Electronic Trading	Data Management		

Important Service Offerings

Pre-Trade
Market Connectivity, Real-time Limit Monitoring, Pre Trade Compliance, FIX, Reporting

Front Office
Order Management Systems Monitoring, Real-time Trade Capture, Trade Allocations & Confirmation and Storage of volatile data for trade analytics, Data Management, Reporting, FIX, Exchange Connectivity, DMA

Back Office

Projects

Leading global multi-manager investment advisory
• Macro Level Study to analyze business & systems
• Recommended accounting function outsourcing
• Suggested reliable central repository of clean reference data

Largest Mutual Fund Company
• Functional/Technical evaluation and Gap Analysis Document
• POC and customization of interfaces, schedulers, reports, GUI and valuation configurations
• Execution of Business Test Cases and Preparation of BRDs
• Designed Data Mart to store converted fund data and legacy fund data

Investment Management Banking Firm
• Customization of environment parameters and processes to enable Multitasking capabilities of Accounting Engine
• Configuration:
    •Automating the Corporate Action Processing
    •Best Data setup for Assets, Prices and Corporate actions.
    •Configuration of Asset Setup Process
• Integration of both Inbound and Outbound SWIFT messages.
• Third party reporting tool

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EAGLE
Investment Systems

Back Office - Expertise

Product Implementation

▪ Fit Gap analysis

▪ Functional Validation

▪ POC and Technology Evaluation

▪ Build Interfaces

▪ Scaling Strategy

▪ Workflow

▪ Release Management

▪ Integration with Enterprise Tools

▪ Infrastructure Setup

Security Types Handled

▪ Equity, Fixed Income (Bonds, TBA, Mortgage, Government Bonds, Municipals Bonds, TIPS), Currency (Spots and Forwards), Derivatives (Futures, Swaps, Options), Cash, Indexes (Benchmark Security Index)

Our Experience

▪ Functional/Technical evaluation and Gap Analysis for an enterprise wide investment accounting system for a large Mutual Fund company
▪ POC and customization of interfaces, schedulers, reports, GUI and valuation configurations

▪ Integration of investment accounting solution with satellite systems for an Investment Management Firm
▪ Implemented and integrated the reference data management solution for the investment accounting solution
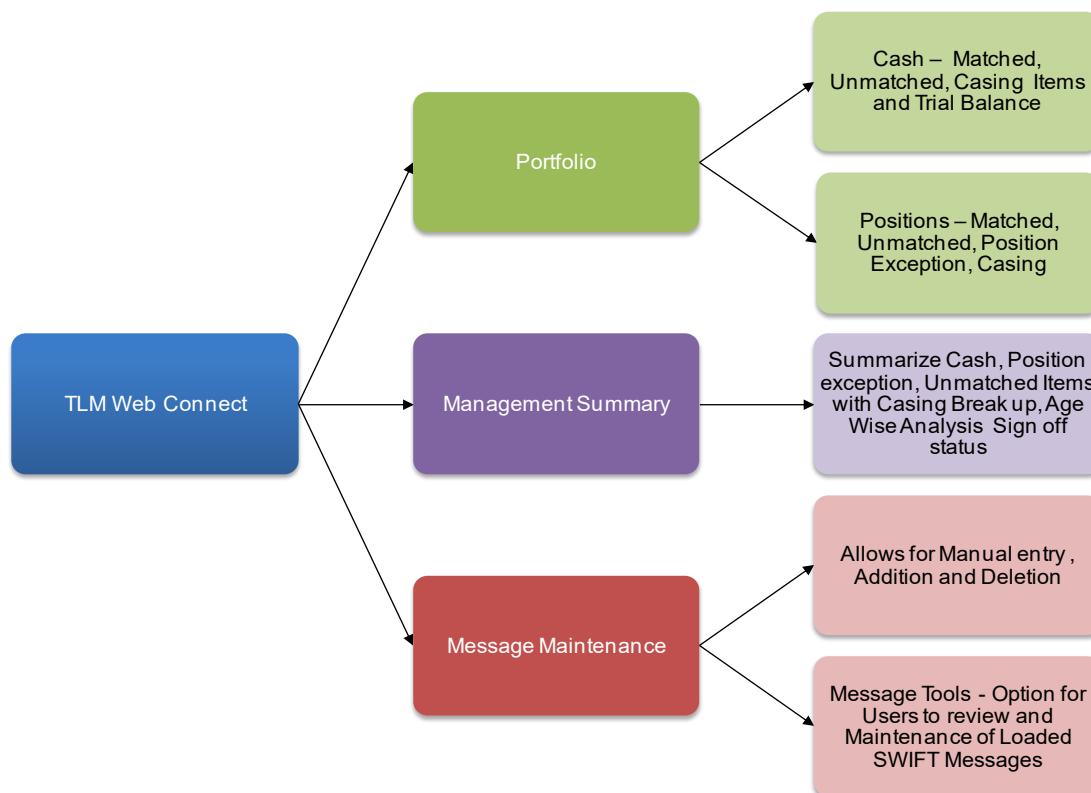
TLM

Hexaware has worked with Leading Reconciliation application for one of our leading Investment Management Firm for supporting the migration of Data from Smart stream SSR to Smart stream TLM. It was deployed in US and supported from across the geographies. It replaced Smart stream's older reconciliation system – SSR (Smart stream Reconciliation). It achieves better match rates as compared to erstwhile SSR by empowering greater flexibility and match quality.

The client to reconcile internal accounts with custodian accounts and automatically pair off matching items uses TLM. For unmatched items, a case is automatically raised and assigned to the respective reconciler for investigation.

Hexaware participated and worked in liaison with client's migration team by deputing its resources at the client location. With our Domain and Technical Capabilities in the Recon Space Hexaware could co-venture with the clients Team to complete the migration.

Hexaware Resources has experience in working with the following modules in TLM web connect.

TLM Web Connect

- **Portfolio**
  - Cash – Matched, Unmatched, Casing Items and Trial Balance
  - Positions – Matched, Unmatched, Position Exception, Casing

- **Management Summary**
  - Summarize Cash, Position exception, Unmatched Items with Casing Break up, Age Wise Analysis Sign off status

- **Message Maintenance**
  - Allows for Manual entry, Addition and Deletion
  - Message Tools - Option for Users to review and Maintenance of Loaded SWIFT Messages

Execution Expertise

The following table highlights the niche domain areas relevant to the Citi ICG business and key information about the reference projects executed in this space. Out of these projects, 3 major projects are expanded in detail in subsequent paragraphs.

Client	Project Scope	Value Additions / Benefits
Account Reference Management/ Security Reference Management/ Pricing Centre		
Large Advisory & Investment Management Firm & Largest German Investment Bank	Hexaware Implemented and provided support for Reference Manager viz. Account Reference Management/Security Reference Management/Pricing Centre	
Leading Asset Management Company in North America	Hexaware provides production support and maintenance for Reference Manager modules of Eagle	
Front Office System		
Largest Financial Institution	Hexaware Team supported the Client Team in Murex Implementation as Front-Office System. The task Includes, Deals migration and Position Transfers from Kondor+ to Murex, Static Data and Market Data Setup and configuration, Functional Testing and Reconciliation of deals between Kondor+ and Murex, PnL Attribution Analysis as well as VaR during migration and Reporting	• Implementation of Murex as Front-Office System Deals migration from Kondor+ • PnL reconciliation for Product Control Unit and VaR MRM department • Generation of PnL & VaR Reports in single platform
Under Derivatives (Futures, Swaps, Options)		
Leading Investment Bank in Germany	The client had 5 different applications for managing their current business requirements and with the implementation of Listed derivatives project, the number is reduced to 1 application. Hexaware implemented the testing of Listed Derivatives moving from 'Waterfall Development Mythology*' to 'Agile Mythology*'. To ensure that store and maintain information related to	• Reusable test data is collected which can be used across all the environments • Used 'Jira' tool to manage MIS / Defect & Issue tracking • Used 'Alfresco and Wiki' tool to manage Documentation Repository / Content

	securities in SimCorp Dimension 4.3	Management
Under Spread Trading		
Financial Spread Betting Company	A highly competitive market in Online Trading Platform 24 Hours support required for the trading Platform Non existence of QA process. The customer base for the organization consisted of retail customers served through a web client and mobile client. Hexaware provided its comprehensive Testing services to help the client attain growth. The scope of work included: • Establishing QA set-up comprising of QA team, methodologies, processes and testing tools in place for the organization's spread betting system • Developing Functional Specifications and Test Pack comprising of test cases, lookups and checklist • Developing a Testing strategy • Conducting Test Management and Execution activities	• Improve market value and revenue by providing Testing services and strengthening the QA process • Ensure accurate documentation of all business requirements and current application functionalities • Capture and document functional requirements for the entire application in scope
FIX / ECN Connectivity		
Europe's Largest Asset Manager	Hexaware to provide end-to-end FIX / ECN Connectivity Automation Testing for their Order Management System for the following asset classes: Fixed Income/ Equity & FX	Hexaware Identified the Gaps in FIX Trading & ECN Connectivity workflows – which were unique and created the test suite for the same
Trade Management		
Leading Asset Management Company in North America	Hexaware has provide ASM support to the In-House Applications • Involved in the full life cycle from Requirement gathering to	• Cost effective Onsite Offshore model • Certified Technical and Functional

	Implementation	resources
Order Management (Equities, Fixed Income, Derivatives, FX)		
Large Custodian Bank	Hexaware provided the production support for Asia Pacific users of Charles River. It included analyzing application issues, user access issues and analysis of business issues reported by the business users. It also included connecting and disconnecting brokers using FIX connectivity before and after the trading hours.	• Hexaware provided the support starting early morning to the traders and application users. This helped client resolve any issues before the start of the trading hours. • All the production issues were resolved in quick time adhering to client specified SLAs. • Access to outside brokers was restricted to trading hours.
Large Custodian Bank	Hexaware carried out the analysis of entire trade work flow of equities, fixed income and derivatives performed in Charles River. Hexaware also worked on the feeds imported and exported out of Charles River.	• Hexaware gained the end to end understanding of various features offered by Charles River while trading; that helped in faster resolution of business issues. • Various interfaces were built to move data in and out of Charles River after removing data redundancy and applying business rules and validations.
Leading Money Manager of an Insurance Company Large Advisory &	A typical implementation to define the dataflow between Aladdin (A Trade Order Management & Compliance System, which is a part	• Defining an overall picture about the dataflow between multiple systems -

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Investment Management Firm Largest German Investment Bank	of Blackrock suite), Accounting systems and Data warehouse to help the performance management group to identify how the assets are performing when compared to it's benchmarks Key Activities were: • The extract the output file from Aladdin in XML format and use Microsoft SSIS ETL to process and transform the file to SQL data and staged. • Convert SQL Data to flat files (which will be the source for Eagle PACE Uploaders). • Data to be Cleansed, Standardized and Stored in the warehouse based on the Business user's requirements	Aladdin, Accounting System and Eagle Data warehouse • Macro level study of CRD implementation & testing services for Buy Side
A Large Institutional and Sub-Advisory	Client has upgraded both the applications – Proprietary PMS & Charles River IMS and wanted to ensure that both the applications have been integrated seamlessly and also the functionality of the applications is in line with Business Requirements	Hexaware has executed end to end testing of Charles River IMS (OMS) which involves great interaction its in-house PMS application and other SWAP WRAP applications of brokers
Leading Canadian-based Financial Services Group	Hexaware was instrumental in handling Bloomberg inbound feeds which involves Consolidated Message Feeds, Positions upload, Counterparties, Cash, Price, Corporate Actions and Custom Sectors uploads Along with developing interfaces for inbound files, Hexaware has also worked with Bloomberg outbound feeds with respect to Bloomberg feed generation and delivery process as well as to identify the data elements requirements and to customize feeds for client use	Hexaware's team coordinated the upgrade of Bloomberg Gateway application, which is a middleware application that takes Bloomberg feeds and populates downstream application with Bloomberg data. Hexaware has provided assistance with Gateway issues including updating brokers, accounts and general troubleshooting, has designed workflow for

	Hexaware has also worked on the core application w.r.t. the following activities: Granting User Permissions, Setting up accounts, Setting up Brokers, Compliance and Backend Processing. Hexaware now also understand the ticketing process and could handle the process of entering a ticket and other scenarios of cancels and corrections i.e., trade date and post trade date	license issue and stored procedure and has done analysis for Maximis security feed additions as well as Trade Feed upgrade. Hexaware has also assisted in installing, testing and training users on Gateway 3.0
Market Data Integration and Management		
Global Financial Data Provider	Client providing investment data such as: pricing, reference data, portfolio valuations and trade processing was looking to enhance their operational efficiency with a long term objective to be cost effective to their end customers. The process scope includes, Scrubbing of data points from 424B5 reports filed on SEC, Viz. Home Equity deals ,Alt A deals ,CMBS deals, CDO	Hexaware Improved efficiency by utilizing the differences in time zones and also leveraged on cost arbitrage, Hexaware's global delivery model and resultant savings by off shoring
State Oil Fund	Development of Interface with Bloomberg, Custodian etc	• Automation of critical market data such as price, Libor, FX rate, credit rating etc. Back up of daily market data to reconcile with custodian database and confirm trade. Interface with Bloomberg for automation of Securities Pricing and FX rates Interfacing with Bloomberg for LIBOR rates and Credit Ratings
Risk Analytics		
Largest Financial Institution	Hexaware Team Supported the Client	• One single

	Team in Murex Implementation for VaR by replacing KVaR+. The Task includes Mapping between Kondor+ and Murex, Static Data and Market Data Setup and configuration, Functional Testing and Reconciliation of deals between Kondor+ and Murex. Trend Analysis during parallel run for VaR and Reporting	consolidated number for VaR • Report delivery before the trading hours • VaR Analysis • Single view reporting of VaR and VaR Analysis
Large Custodian Bank	Hexaware Team Supported the Client Team in Risk Data Warehouse (with Basel II implementation) Hexaware developed 314 ETL components for Release 1 and development is in progress for 165 Release Hexaware performed development and unit Testing. Also assisted client in Installation /Troubleshooting/ Maintenance of DataStage Warehouse in multiple environment i.e. DEV, SIT, UAT and PROD	• Customized adhoc reporting module which allows end users to generate reports.
Data Warehousing		
Leading Financial Institution	Development of Uploaders, Exporters, Web Panels in Eagle PACE. Data received from Multiple Sources like CAMRA, D&D, Strategy, BlackRock, Barclays Point etc. Scope includes Functional Spec, Analysis, Development, SIT and Data Validation.	• Client will rely upon single source for Data instead of receiving Multiple Sources. This data is used by the Client by Portfolio Management Team and Risk Management Group for Report Generation
Large Custodian Bank	Hexaware provided support in development of Financial Data Warehouse and ETL Enhancements Hexaware implemented nFORM Multidimensional Security. Also performed ETL development of Client Profitability reporting	• Also Proactively helped the nFORM Data team in data correction. Hexaware helped client Reduced Firecall resolution time by equipping resources with techno functional skills. Also Hexaware cross trained team

		members to achieve higher % of Multi skilled resources within the team.
Large Advisory & Investment Management Firm Leading Asset Management Company in North America Eagle Systems, Largest German Investment Bank Leading Financial Institution	Implementation of Eagle Pace (Data Warehouse)	• Implementation of Eagle Pace 8.0 • Multiple upgrades of PACE • Product development and support of Portfolio Management products – Eagle PACE • Data upload from In-house apps & External sources to Eagle Pace

Accounting

Eagle Systems, Largest Custodian Bank Largest Partnership Custodial Bank Largest Mutual Fund Company	Hexaware Implemented Portfolio Accounting solution - Eagle Star for the clients mentioned Hexaware has worked in liaison with the product company - Eagle Systems on Eagle STAR	Product development and support of Portfolio Management products – Eagle PACE and Eagle STAR Eagle STAR upgrade
Leading Asset Management Company in North America	Data Migration of Reference, Security, Account, Position, Lots, Trades and Cash Activity from multiple portfolio accounting /management systems such as PACE (US Securities), PMS (International securities) and CAMRA (Insurance accounting)	Hexaware migrated investment data from multiple applications

Portfolio Accounting

Large Custodian Bank	Hexaware provided the production support and maintenance for Dataload Domestic and Dataload Global System that records and stores Transaction and Valuation based data for Domestic and Global Clients in and outside U.S. Upstream	• AS/400 requests for Dataload Global now being successfully executed from offshore as well. • Critical jobs identified that were missing

		shouts and incorporated shouts accordingly.
	Application provides information for various securities and Transactions that take place daily. Using this information it maintains valuation and Account information, which is used by various downstream applications for Reporting, analysis and future investments.	• Mentoring of resources undertaken to ensure that communication is always clear and precise. • Client defined SLAs for System Availability, On Time Delivery, First Time Right, Response Time and Resolution Time were met throughout the project. • Received appreciation from client for the excellent work done by the Dataload Global team.
Large Custodian Bank	Hexaware handled the maintenance work for Fundmaster which is the multi-currency information system the client utilizes to maintain the investment and banking activity associated with its global clients' portfolios. Fundmaster is middle office application and is the heart of business process.	• Client defined SLAs for System Availability, On Time Delivery, First Time Right, Response Time and Resolution Time were met throughout the project. • Successfully able to provide support on Boxing Day. Successfully implemented a generic solution for migration of FundMaster report to XACT
Large Custodian Bank	Hexaware was responsible for Production support, maintenance of existing programs, enhancements and new development, Cycle support for Capitol projects for Fee &	• UAT environment set-up and cycle running, has reduced overheads on the SMEs.

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	Profitability system that deals with the calculation of various fees to be charged to the clients	• Documentation of jobs & programs on major systems like FEP, FEM, FAC. • Received appreciation from client for providing value adds due to enormous reduction in batch run time. Entire team has been appreciated by Application managers during weekly conference calls for their dedication and responsibility in day-to-day work.
Portfolio Management		
Leading Asset Management Company in North America	Hexaware has provide ASM support to the In-House Applications • Involved in the full life cycle from Requirement gathering to Implementation • Involved in providing 24*7 Production support • Sun setting of Legacy applications	• Cost effective Onsite Offshore model • 24*7 Production Support • Certified Technical and Functional resources • Improved Batch cycle and CPU optimization • Fixing existing Production Bugs
Corporate Actions Reporting		
Largest Partnership Custodial Bank	Report Development (Reporting Tool : Hyperion). No. of Reports Developed : 25, Sample Reports like Projected Payments, Past Due Report, Reversal Report	
World's Leading Financial Management and Advisory	Hexaware carried out the task of validating Corporate Action processing on Eagle STAR and CRD	• Independent validation of a large scale product implementation
Reconciliation		
Leading Asset Management Company in North America	Hexaware supported the Business Team in Implementation of TLM application. Client chose to migrate	• Improved Productivity from work flow and Exception Handling

	from Smart Stream SSR into TLM. The Scope includes • Preparation of Test Cases and Test Scenarios • Preparation of User Guides and Job Guides • Performed Regression Testing and Performance Testing • Performed test scenarios listed in Functional Test Tracker by login as different users into TLM Web connect	• Improved Risk Management through Daily Sign off Process for Cash and Asset Aging
Investment Management Firm & Lead Advisor	Hexaware supported Business Users from Migrating Data the Legacy Trading System (DATS) into a more sophisticated system (MUREX). The migration would ensure a complete integration of front office, middle office and back office systems. Scope includes • Data validation – comparing DATS and Murex data for consistency, • Guiding client to identify critical fields that cause mismatches in the portfolios • Provide suggestions on mapping issues in Murex such as strike or fixed rate, notional amount, foreign notional amount, receive notional amount and pay notional amount.	
Large Custodian Bank	Hexaware implemented their Proprietary Reconciliation tool. This tool helps to provide an automated solution for Corporate Transitions, Conversions, TBA and Valuation Reporting of Fund Accounting Team for the reconciliation of data for various events	• Replaced all prior recon macros with Verzoenen tool. • Results in a substantial time savings for the coordinators. • Improves data quality • Improves reconciliation turnaround time • Provides additional time to Valuation

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		Reporting team to focus on client reporting need • Standardization of the reconciliation process across partner areas
Hexaware Technologies	Hexaware Technologies with our Domain Experience Developed proprietary Tool called "Verzonen"	

Auditing

Large Custodian Bank	Hexaware has provided production support and maintenance for Web Focus SLA which is an auditing application. Its one of the core & critical systems. This system authenticates the data available for its clients	

MIS and Reporting

Largest Custodian Bank	Hexaware provided support in Maintenance and support for Enterprise Information Management system (on Business Objects and Oracle).Hexaware provided Physical data model / data mart / OSA support also helped in carrying out maintenance of Business Object Reporting Universe	• Extended support for report migration - DEV/ UAT/ Production. Cost effective Onsite Offshore model.
Large Custodian Bank	Hexaware carried out the Production Support and Maintenance of three reporting applications: CST - Corporate Statement / PSM - Personal Statement /Probate - reports for Probate court that generate performance report statements that will be provided to Personal and Corporate clients. These systems provides complete information regarding client trust accounts in the form of trust statements which contain detailed listings of both activity and assets in the client accounts	• Successfully provided to the most critical stream during the PSM Year end. • No availability missed. All the installs were with 0 defect • Hexaware initiated the process to discontinue INSTALL 1 architecture from CST/PSM progressively • Relocation of Divert Process in the stream to

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		make it more effective. • Appreciation mail received from client on the work done on installing first module in the process of discontinuation of Install 1 and on resolving critical request for CST stream.
Leading Financial Group	Hexaware delivered several Client reports on Eagle PACE	• Hexaware helped in demand based ramp up of MIS reporting team
Leading Asset Management Company in North America	Hexaware has provide ASM support to the In-House Applications v Involved in the full life cycle from Requirement gathering to Implementation Involved in providing 24*7 Production support v Migration of Legacy applications to Newer Technologies	• Cost effective Onsite Offshore model • 24*7 Production Support • Certified Technical and Functional resources • Improved Batch cycle and CPU optimization • Fixing existing Production Bugs
Large Custodian Bank	Hexaware carried out the Maintenance work for Performance optimization for Legacy Trust and Dataload applications	
Trust System		
Large Custodian Bank	Hexaware has provided support and maintenance for Legacy Trust System which is used for - Setup Customer and Account profiles Process "Operator Initiated Transactions" such as payment of dividends, stock merger, stock splits etc.. The key "validation system" that has	• PL1 upgrade from Version 2.3 to 3.4 underway at offshore. • Prepared "PL1 Upgrade Handbook" and delivered to the client.

	the ability to process each Trust/Bank Transaction "Trust Information and Accounting System" that maintains assets and holdings The "Final Repository System" that posts all trust/bank transaction. "Automated Cash Management" that maintains client invested cash balances, loans and overdrafts "Scheduled Income Receipt", that captures positions of each paying security and its holder on a record date. This system makes advices and pays advices PROXY Voting System Pre-Loaded and Free Receipts and Delivery, that is used to preprocess securities for transfers Limited Partnership System – A system that manages assets and securities for Limited Partnership firms	
Billing Management		
Hexaware Technologies	Hexaware Technologies with our Domain Experience Developed proprietary Tool called Billing Management System.	
Compliance		
Largest Custodian Bank	Provide Application Maintenance Services for Compliance in Charles River. Also, assist to implement Compliance Module in new business units	Interact with Business Users to draft new Compliance Rules or update existing ones
Hedge Funds		
Leading Asset Management Company in North America	Hexaware has provide ASM support to the In-House Applications Involved in the full life cycle from Requirement gathering to Implementation Involved in providing 24*7 Production support	• Cost effective Onsite Offshore model • 24*7 Production Support • Certified Technical and Functional resources
PORTIA (Module	Hexaware has developed "Hedge	• Complete Business

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Development)	Module in Portia. As part of this assignment, Exclusive hedge feature were introduced in Portia as separate Module	Spec and Technical Spec Delivered Documents with Highest Quality Reuse test cases and test artifacts
Wealth Management		
Hexaware Technologies	Hexaware Technologies with our Domain Experience Developed proprietary Tool called WealthDirector.	
Large Custodian Bank	Hexaware Technologies worked on the development work for Wealth Passport (WP) which is a part of the Passport suite of web-based applications for Personal Financial Services. It is designed as a financial management portal for managing and calculating the net worth of wealthy individuals and families. It caters to the financial management needs of wealthy individuals and their families. Overall a tool that will facilitate the management of our client's wealth, by our client's	
Transfer Agency Reporting		
Large Advisory & Investment Management Firm	Report Analysis and Bug Fixing for the Data received from MultiFonds (Reporting Tool : Hyperion) No.of Reports Developed : 12	
Cash Management		
Largest Custodian Bank	Hexaware provided the UAT test environment and Production Support for Polaris Intellect which is a liquidity management application and uses data of various application interfaces like GCM and FM systems, processes input, and passes information to systems like GCM, FM, eGATE and TLM. It uses OBLIX as the user authentication software and ARMOR as the user authorization/entitlement software.	• PIN Production migration from version- 1.4.02.4 to version-1.4.06.7 to fix issues. • PIN Production Support for Phase I was carried out smoothly while progressing notably to implement Phase II in UAT.

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		• Hexaware received highest available rating (5) for overall working experience, product/service quality and delivery commitment.
Commercial and Retail Loans		
EDM Implementation for Large Custodian Bank	Hexaware carried out development work for BSS-Loans (after completion of its analysis phase) and all other EDM projects during 2009. This also included testing activities. Hexaware also worked on implementation of FileNet based content management system. It also consist of migrating of some application from legacy application into FileNet based solution. Following application are already being migrated from SIT to UAT and are scheduled to be migrated to PROD by DEC end:- • ACH Reclamations • Derivative Operations Following are two other application for which high level discussion are under process: • Commercial Loan • Retail Loan	• Implemented the pilot solutions for 2 Business Units in an aggressive time of 3 months with development time of just 2 months. • Hexaware recommended many technical designs to enable Northern meet their deadline. Standardized project plans and business requirements gathering process. • Appreciation received from Client for delivering the Account Ownership tool through Lotus Notes to spec and to deadline in spite of late changes requested by them.

Case Study 1: Onsite-Offshore Engagement with Leading Global Custodian

Customer Profile

A leading global custodian bank which known for providing world-class investment management products and services to personal and institutional clients. It provides a full array of investment management products, including active, quantitative and Manager of Managers (MoM) programs including comprehensive portfolio services.

Business Need

- Production support of 74 client applications
    - 32 are highly critical applications
    - 19 are less critical applications
    - 23 are non-critical applications
- A Predictable, Reliable and Stable environment to cater to global IM operations
- An operational model with high level cost efficiencies
- Implement a single point of ownership for Development, Maintenance and Support needs for the Eagle application platform

Background

Hexaware has been working with this client since 2005. During this period Hexaware has gained knowledge of client's standards, guidelines and processes and also built lasting relationships with customer stakeholders by managing individual and organizational expectations. Hexaware has capitalized on this knowledge & experience to develop a successful engagement model to support the client leveraging on its offshore delivery capabilities.

Hexaware – Client Relationship

In addition to normal operations Hexaware has delivered value additions in each area, some of which are mentioned below:

Legacy Trust

- Identified & presented Batch Cycle pain areas.
- Suggested phased approach for batch optimization.
- Estimated CPU gain was 35 % & around 50 CPU hours' savings.

Eagle

- Various exporter performance improvements, say SNC for example
- Various trade rebalance activities, say MSCI Rebalance for example
- Suggested & implemented automatic tag population in PVCS
- Converting jobs, which were based on system date, to process center
- Optimization of Control-M schedules
- Performance improvement of various OLAP reports

Value Proposition

- Unique Global Delivery Model executed from locations in North America, UK and India
- End to end support for the Eagle Product suite (STAR & PACE)
- A dedicated 24 x 5.5 production support with standby "Fire-call" support on weekends

- Provide level 1/2/3 support that includes monitoring of Scheduled Jobs, Business User Request support, Enhancements and Development assignment
- Also supporting a part of the downstream applications, for example CRD's jobs schedule, FIX server support (for broker connectivity)
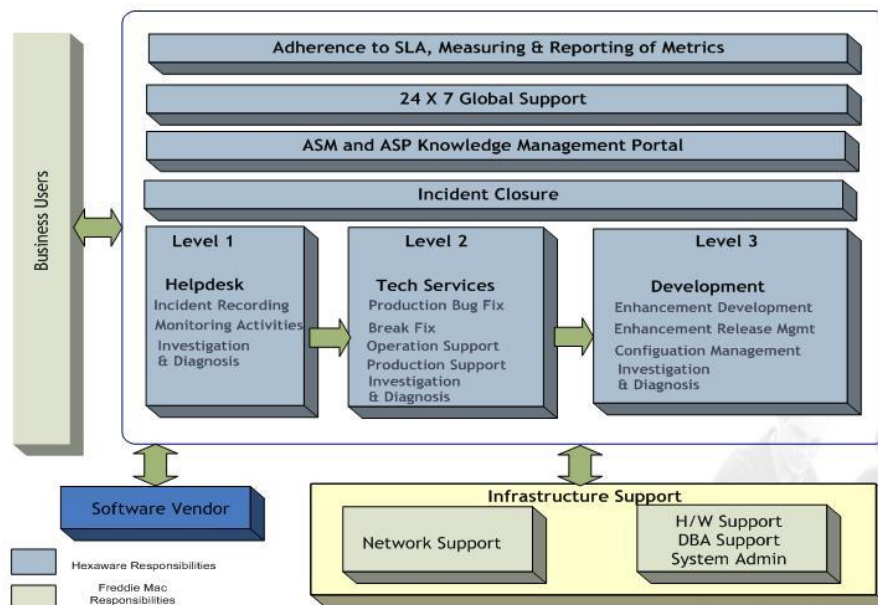
Hexaware's Responsibilities:

- Development and Maintenance of Interfaces for uploading and exporting of data to upstream (Bloomberg, Citigroup, Extel Telekurs, Factset, BarCap, etc) and downstream systems (Charles River, Proprietary PMS and IAM, BarCap, etc.)
- Development and Production Support
- Bullet Proofing / Prototype
- Modernization of existing applications

Domain Supported- CRM, Trading, Custody, Trade settlement, Tax reclamation, Income collection, Client Services, Cash Management, Regulatory Reporting, etc.

Technologies Covered- PL1, IMS, DB/DC, COBOL, DB2, JCL, ADF, DATAVAN, EAGLE 8.x, FOCUS, WEBFOCUS, SCLM, AS/400, RPG, COBOL, XML, PB, Sybase, Unix, C++, PL/SQL, PVCS, .NET, Crystal Report, PeopleSoft, Business Object, Oracle SPs, J2EE, Shell Scripting, Ascential Data Stage7.5, Oracle 10g, etc.

Onsite – Off Shore Engagement

Hexaware supports the global operations in US, Europe and Asia Pacific; and operates on follow the sun approach.

Support Operating Model

Following are the timelines for weekly coverage in all three (3) shifts including the location and resource loading

	CST	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	1:00	2:00
Timeline	Shifts	Shift II - India (offshore)									Shift III - Chicago (onsite)							Shift I - India (offshore)							
RESOURCE	Chicago																								
	- Analyst										3	3	3	3	3	3	3	3	3						
	- PM/Onsite Coordinator							1	1	1	1	1	1	1	1	1									
	UK																								
	- Analyst	2	2	2	2	2	2	2	2	2															
	India																								
	- Analyst	2 2	2	2	2	2	2	2	2	2								2	2	2	2	2	2	2	2
	- PL	1 1	1	1	1	1																1	1	1	1
	AM																								
	PM																								

Value Additions:

- Merging of Control-M Schedules: Helped in reducing number of Schedules
- Changing jobs to run from Process Centre date instead of system date: 13 jobs changed
- S&P, Russell and MSCI rebalance handled smoothly
- Addition of more Debug messages to frequently failing Unix Job shells

CASE STUDY 2: Engagement with an Oldest & Largest Partnership Bank

Customer Profile

One of the oldest and largest partnership banks in America, it develops and manages a family of alternative investment funds that enable high net worth individuals and smaller institutional clients to participate along with it and its large institutional clients in a series of unique investment opportunities.

Background

The initial engagement with the client was commenced in year 2004 and project scope included customization services

Eagle Pace Implementation & Client Reporting — Year 2004 — Kick Off: Onsite 4*, Offshore 4* — Peak: Onsite 2*, Offshore 12*

Internet Strategies — Year 2006 — Onsite 4*, Offshore 4* — Peak: Onsite 4*, Offshore 8*

Eagle Star Customization — Year 2007 — Onsite 1*, Offshore 3* — Onsite 2*, Offshore 7*

Peak: Onsite 2*, Offshore 6* — Onsite 4*, Offshore 4*

Kick Off: Onsite 2*, Offshore 6* — Onsite 3*, Offshore 5*

Year 2005 — Mainframe Projects

Year 2006 — Web Projects in J2EE

Strategic Relationship

Note: * indicates the number of resources.
Years mentioned above are the project commencement year and all engagements are currently ongoing.

(development and/or maintenance services) for its investment portfolio management application (Eagle PACE). Each customization request was treated as an independent RFS (Request for Service). Subsequently, the scope extended to other technologies and verticals like JAVA & Mainframe. Hexaware has accepted this engagement to be executed based on an Onsite-Offshore Model with Time & Material as costing basis. The assignment started with strength of 4 onsite resources to understand the business needs and technological environment at client location and gradually it was expanded to offshore with a peak team size of 12 resources for Eagle PACE Customization and Client Reporting assignment. Based on the quality of deliverables by Hexaware, the client started sending in more request in areas of Reporting, JAVA and Mainframe technologies.

Activities include:

Hexaware provided solutions addressing client's need in multiple engagements as mentioned below:

- Implement and enhance the centralized Data Hub solution for all the investment portfolio accounting and mgmt. data
- Developing of various interfaces in Eagle PACE with Downstream (DTC, TCS (Custody Positions), Bloomberg, S&P, FactSet, etc.) and upstream systems (Security APL, Charles River, Portia, SS&C (Transactions and Positions), etc.) to cater to data requirements.
- Development of client reporting using OLAP and Advance reporting to cater to reporting requirements
- Process optimization to accommodate more events in 'intraday', 'start of day' and 'end of day' batches
- Product Engineering and Implementation (Sun-setting of Eagle Investment Management Systems and Implementation of SunGard)
- Enhance Fund Accounting and Administration
- Development of New Pricing Structure
- Application Development and Support
- Independent Testing – Transfer Agency / Corporate Actions
- HR – IT Services
- Enterprise Packages
- Business Analytics and BI / DW

Domain Supported- CRM, Trading, Custody Services, Trade settlement, Transfer Agency, Wealth Management, Reconciliation, etc.

Technologies Covered- Eagle PACE / STAR, MS 2000 Server, VSS & Client 6.0, CISCO VPN Client 3.6, Oracle 9i, PERL 5, Hyperion / Brio, Java / J2EE / JHTML, Mainframe (Cobol / CICS / DB2), PeopleSoft, etc.

CASE STUDY 3: Eagle Suite Implementation – ARM / SRM / Pricing / PACE

Customer Profile

A Large Investment firm located in the US having multi-manager strategies with approx. US$ 171 billion worth of assets under its management for over 2900 clients.

Background

Hexaware has implemented all the modules of Eagle (ARM, SRM, Pricing and PACE) and further provides Maintenance Services of the same. This implementation would bring improvement by allowing the organization to validate and store data in a more consistent way. The implementation was done for the following asset classes FI (Bonds, TBA, Mortgage, Government Bonds, T-Bills, Municipals Bonds, TIPS), Commodities, Equities, Preferred, Index, Derivatives – SWAPS / Options.

Business Challenge

The customer has a number of homegrown applications for different business lines with their own individual disjoint reference and transaction data. Some of the challenges due to multiple disparate applications were:

- Lack of data transparency
- Duplication of work
- Data integrity issues
- Inadequate reporting

Solution

The Eagle application receives reference data from different vendors like Bloomberg, IDC, WM, Vestek and Upstream, then processes and stores it, before publishing it to downstream Portfolio Management, CRD and Finance Applications.

Transaction and position data is received from Fund Accountants, the outsourced Investment Accounting vendor, CRD & through manual certified positions. This is stored and published to downstream Portfolio Management Sys. & CRD.

Scope

Scope of Hexaware's services is to customize, develop and implement Eagle Pace, ARM, SRM and Pricing Center products to meet the business specific needs of the customer. This being a green field project, Hexaware has been involved in and is fully responsible for Planning, Requirements Gathering, Envisioning, Design, Construction, System Integration Testing, User Acceptance Testing Support, Go Live Support and Warranty Support.

Activities include:

- Implementation of Eagle PACE / ARM / SRM and Pricing
- Uploaders for accepting the feeds from data sources such as: Bloomberg, IDC, WM & Vestek
- Publishing the processed data it to downstream systems such as: in-house Portfolio Management Systems, CRD and other Finance Applications
- Application Support and Maintenance
- Assessment Study of Front Office applications

Domain Supported- The implementation was done for the following asset classes FI (Bonds, TBA, Mortgage, Government Bonds, T-Bills, Municipals Bonds, TIPS), Commodities, Equities, Preferred, Index, Derivatives – SWAPS / Options, etc.

Technologies Covered- Eagle PACE / STAR, MS 2000 Server, CISCO VPN Client 4.8, PERL 5, TFS (Team Foundation Server)

ARM Implementation

- Building custom panels to support the account opening process, including workflow processes.
- End-to-end solution including data scrubbing, translation and validation for uploading.
- Various exporters to downstream systems processing as End of the Day (Batch) process.
- ARM establishes and maintains the below generic structure or Fund structure for funds across all business lines and product offerings.

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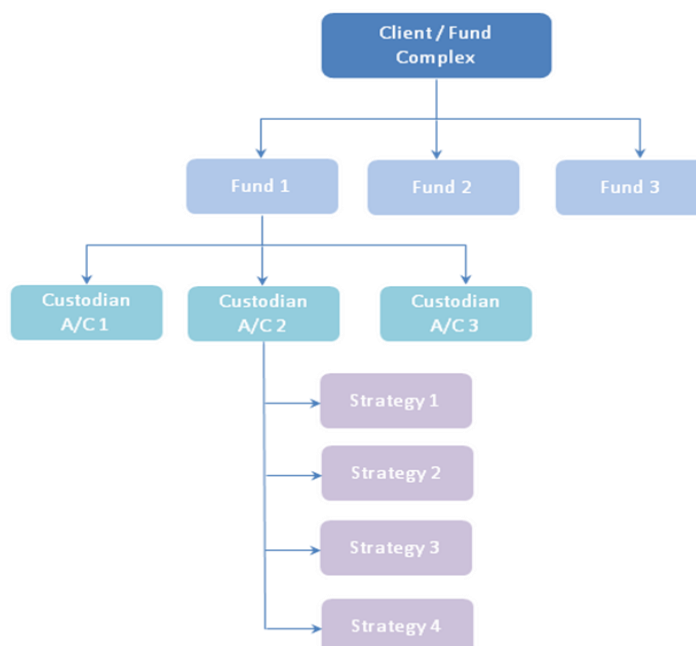
SRM Implementation

- Accept and process security feeds from multiple Security Data Vendors
- Processing of securities of all asset types (Fixed Income, Equities, Derivatives – SWAPS, Index, Currency, Preferred, etc.).
- SRM implementation w.r.t. Uploaders, Composite Security Engine, Validation Engine, Panels (for maintenance of asset classes), Exporters, Message Centre and Data Exchanger.
- Composite Security Engine is triggered after each upload of Bloomberg Back Office files for a region.
- Composite Security Engine is triggered every 15 minutes for Bloomberg front office security request and securities created manually using Message Centre.
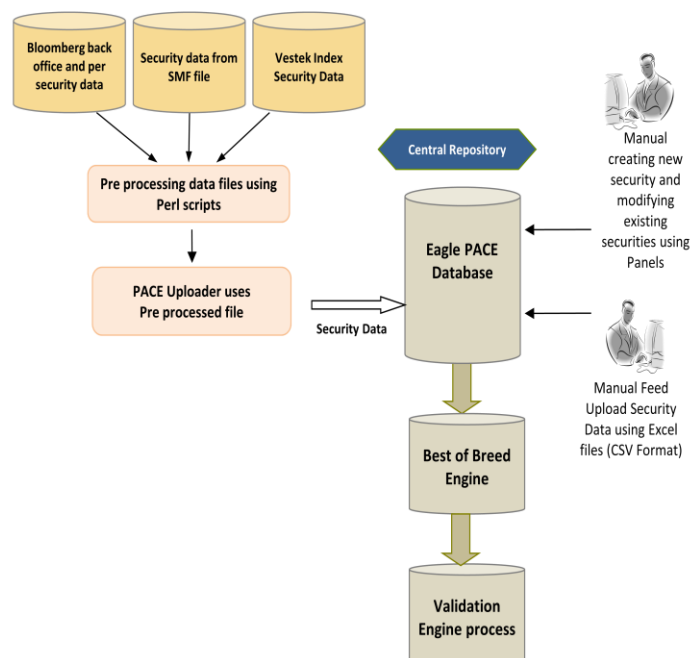
Pricing Implementation

- Region based data from Bloomberg back office
- Historical data through per security request
- NAV data from Fund site
- Manual Data
- Uploaders for Bloomberg data
- Message Center/Panels for Manual Data
- Create Security List
- Validations of price data
- Best Price record generated for downstream systems
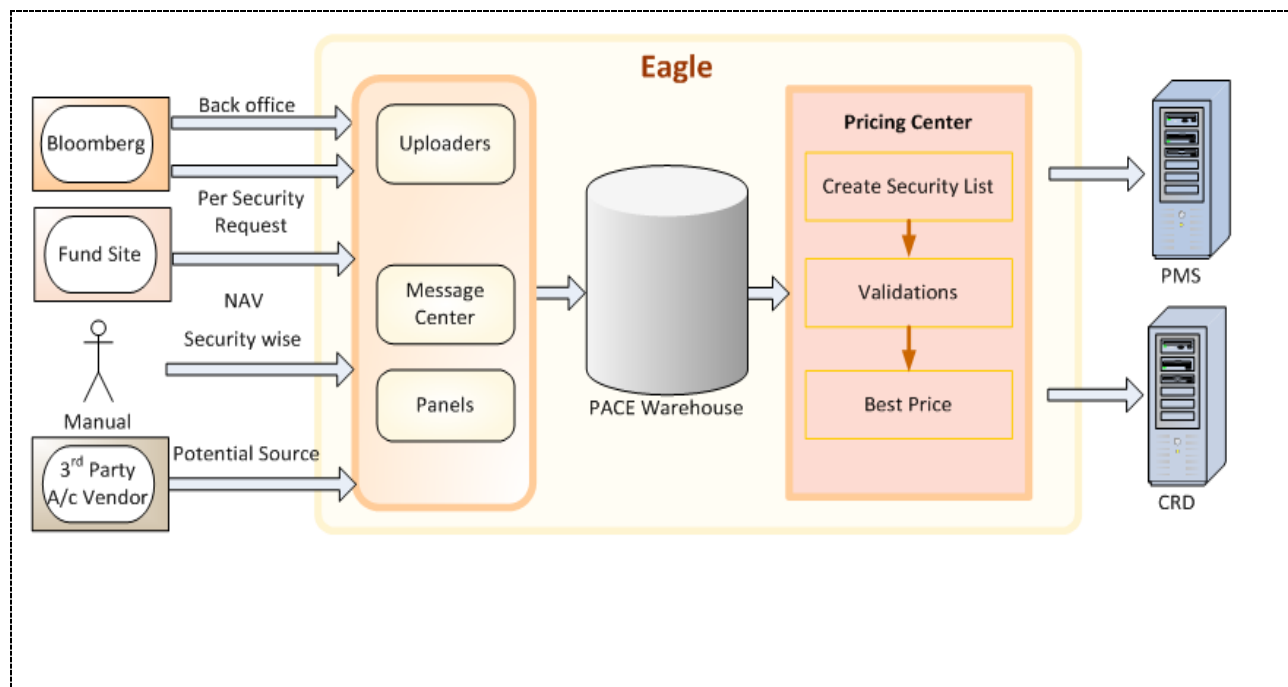
1.1.2 DS-3. Who owns the Intellectual Property to the end product of the engagement, you or your client?

Response:

Hexaware has been working with Global Investment management firms and Intellectual Property (IP) Developed in this area can be categorized as follows.

Custom Development IP

Development of IP during the implementation of the product for the customized solution and these Intellectual Property rights will be with Clients.

Joint Development IP (Nitor, Verzoenen)

Hexaware also jointly worked with Investment Management Firms by bringing their Domain Experience and jointly with Hexaware Technology experience.

Through this we developed Intellectual property which helps for joint marketing and the source code will be with client and the framework and IP will be with Hexaware

 Propreitary IP (Wealth Director, Profra, BMS, Belva)

Hexaware also developed Framework based on the experience in working with Multiple engagements and developed Intellectual Property and the source code and IP will be with Hexaware

When Hexaware use this IP, Hexaware will share the source code with client on the base framework and customize this product to specific client.

1.1.3 DS-4. Please provide duration and total actual size in person months and date (mm/yyyy) when the engagement was completed.

Response:

Hexaware has been working with Global Investment management firms and below 3 are Key clients in this are as follows.

Duration	Start Date	Person Months	Current Status
Engagement with Leading Global Custodian	May, 2005	7500 Person Months	Active Client and multiple projects are in progress.
Oldest & Largest Partnership Bank	May, 2004	335 Person Months	Active Client and multiple projects are in progress.
A Large Investment firm located in the US	October, 2006	300 Person Months	Active Client and multiple projects are in progress.

2. Client Reference

2.1.1	DS -5. Provide up to THREE (3) Client or Industry References whom Citi may call, at its discretion.

Response:

#	Client	Contact	Designation	Email
1	Alliance Bernstein Investments	O'Suilleabhain, Cian J	VP – Operations MIS	cian.osuilleabhain@alliancebernstein.com
2	Northern Trust	Jay Desai	VP - Global Sourcing	jsd4@ntrs.com
3	ING Investment Management	Suresh Krishnamoorthy	Chief Risk Officer – Fixed Income	Suresh.Krishnamoorthy@inginvestment.com

3. Resource Count based on Domain Skills

3.1.1	DS-6. How many people within your organization currently possess such domain skills? List number of people by:
	i. Management – project managers and team leads or
	ii. ii. Staff – programmers and analysts, and average years of experience for said people.

Response:

#	Role	Avg. Years of Experience	Resource Count
1	Manager	10	50
2	Team Lead	7	85
3	Business Analyst	5	62
4	Programmers / Test Analyst	4	248

#	Certification Details	Resource Count	Avg. Years of Domain Experience
1	NSE (National Stock Exchange of India) Certification on various financial modules	85	4
2	Hexaware internal Asset Management Certification	63	4

4. Sample Resumes

4.1.1 DS-7. Include up to THREE (3) resumes that represent skills and expertise in this area from current employees – (you need not give us the name and contact details, but resumes must allow you to identify such resource should we have a need to interview them individually prior to work assignments due to subsequent engagements).

Response:

#	Role	File Name
1	Business Analyst	Hexaware_Resume_Business Analyst_1.docx
2	Business Analyst	Hexaware_Resume_Business Analyst_2.docx
3	Business Analyst	Hexaware_Resume_Business Analyst_3.docx

5. Third Party Product Capabilities

5.1.1   DS-8. Have you worked with any third party tools in this area? If so, please list tools and providers.

Response:

Hexaware offers a complete range of Asset Management Solutions for global financial institutions, Fund Managers, Investment Managers, Institutional Asset Managers, Mutual fund Managers and Trade Associations. We deliver end-to-end solutions combining technology and a deep understanding of the business and our expertise in Portfolio Accounting, Wealth Management, Mutual Fund Accounting, Securities Reference Data and Hedge Fund Accounting. Our solutions are precisely aligned to our clients' specific context and requirements to ensure an integrated experience presented from a common front that addresses the business need.

The Asset Management Focus Areas are

Key Domain Areas
- ❑ Asset Management
- ❑ Securities Reference Data
- ❑ Portfolio Accounting
- ❑ Wealth Management
- ❑ Mutual Fund Accounting

Product Development
- ❑ Billing Management System™
- ❑ ProFra™
- ❑ Wealth Director™
- ❑ Belva™
- ❑ Verzoenen™
- ❑ Nitor™

IT – BPO Service Offerings
- ❑ Security Reference
- ❑ Trade Processing
- ❑ Clearing & Settlement
- ❑ Reconciliation
- ❑ Pricing and Valuation

Product Implementation
- ❑ PORTIA
- ❑ Eagle
- ❑ Charles River IMS
- ❑ Murex
- ❑ Calypso

End-to-End Solution in Capital Markets

Hexaware offers a complete range of Asset Management Solutions for Global Financial Institutions, Fund Managers, Investment Managers, Institutional Asset Managers, Mutual Fund Managers and Trade Associations. Hexaware has deep and extensive understanding of various Business Lines in Front Office / Middle Office and Back Office in Financial space We deliver end-to-end solutions combining technology and a deep understanding of the business and our expertise in Portfolio Accounting, Wealth Management, Mutual Fund Accounting, Securities Reference Data and Hedge Fund Accounting. Our solutions are precisely aligned to our clients' specific context and requirements to ensure an integrated experience presented from a common front that addresses the business need.
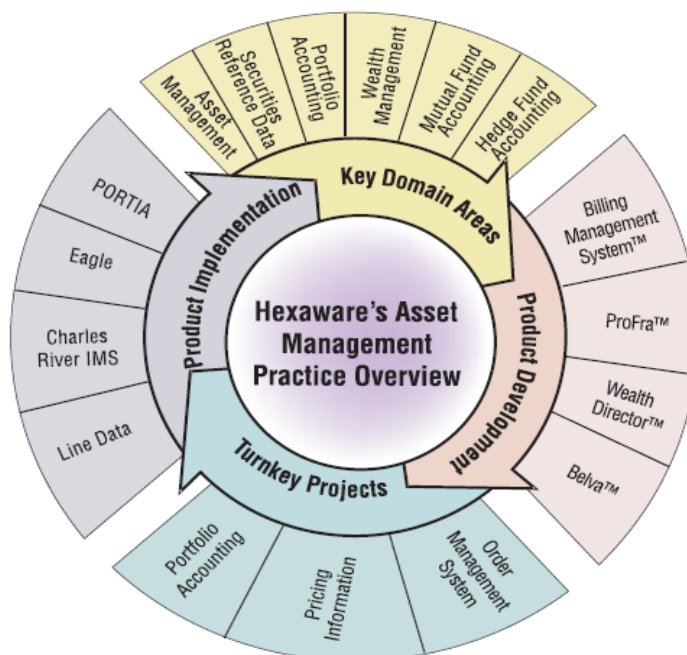
Hexaware has expertise across all security types including Equity, Fixed Income, Derivatives, Mutual Funds and Cash Instruments in supporting the front-office, middle office and back office operations.

Hexaware provide solutions in the following areas:

- Reference Data Management
- Market Data Solutions
- Portfolio accounting
- Settlement confirmation
- Wealth Management
- Client Reporting
- Performance Measurement Attribution
- Compliance
- Fund Accounting
- Billing Management
- Risk Management

The business areas covered under the various domains are as follows:

- **Pre-Trade:** Pre-Trade mainly covers the business areas related to Pricing and Analytics, Static Data and Limit Monitoring.
- **Front Office:** Front-Office concentrates on Trade Capture, Day count issues, User Access Permissions, Product definition, Trade Details Amendment.
- **Middle Office:** Middle-Office covers the areas of Risk Management, Position Management and Portfolio Analytics.
- **Back-Office:** Back-Office focuses on Reconciliation, Settlement Issues, Reconciliation Issues, Payment Generations, Confirmation Generations and other related areas.
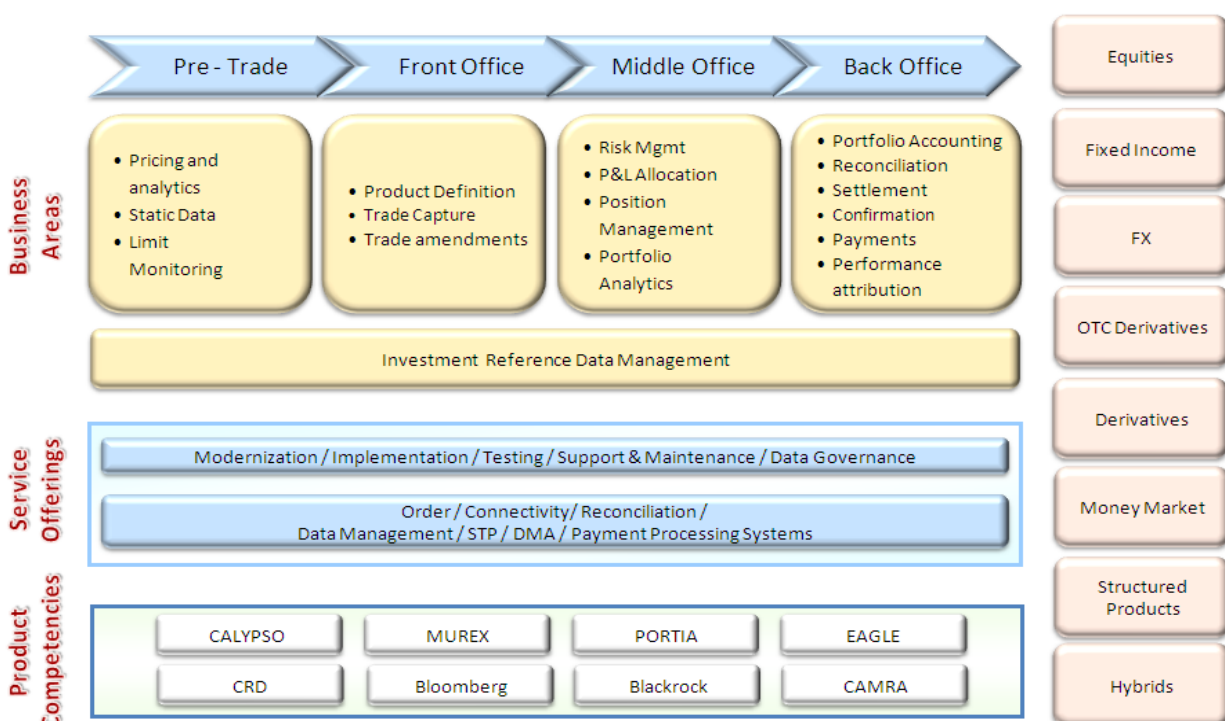
Charles River – Investment Management System (IMS)

Hexaware's capabilities in Trading Applications are as follows:

Trade / Compliance workflow

- Reference Data Setup
- Trade workflow for Equity, FI, Derivatives, FX, Money Market Instruments
- Compliance Rule Setup (Pre/Post)

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- Alerts/Warnings/Data Exceptions
- Trouble Shooting on Compliance Breach

Blotter / Manager Work Bench

- Blotter creation / Configuration
- Manager Workbench Configuration
- Modeling / Rebalancing / Targeting / Swap for Order Generation
- What-if Analysis / Charting

Configuration / Parameterization

- System Parameters Configuration
- User / Engines / Import Configuration
- Trade / Compliance Engine Setup / Maintenance
- Job Creation / Scheduling / Import Feed Generation
- Engine / Job Monitoring

Queries / Reports / FIX

- Creation/Customization of Stored Queries / Web Reports
- FIX Framework, FIX Messaging, Broker Configuration
- Server / Connections Monitoring
- Trade/Compliance database structure, data dependencies
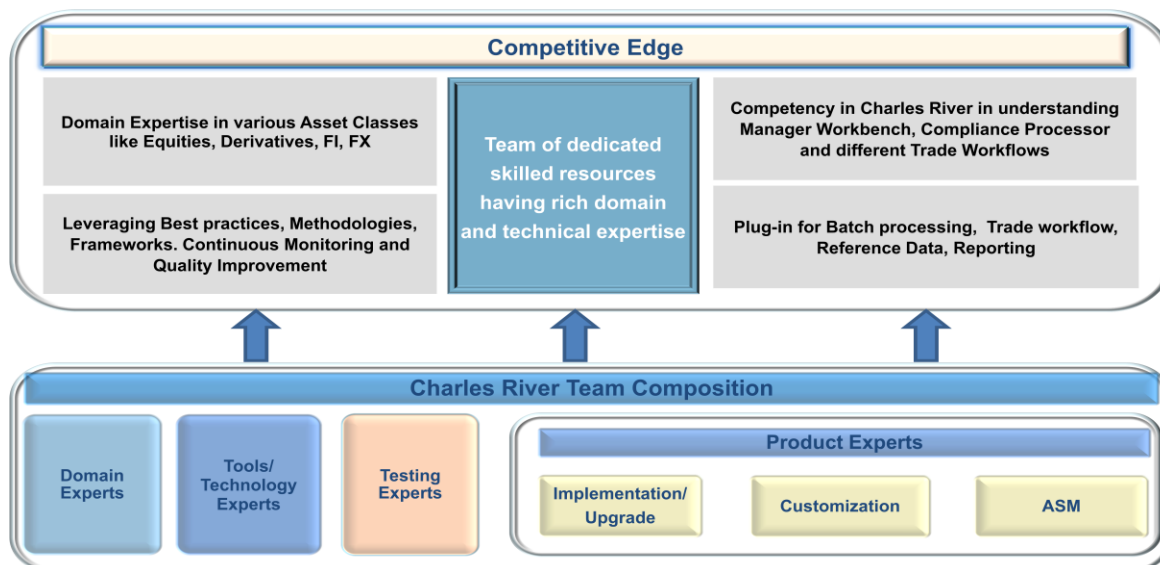
Murex Capabilities

- Our resources are trained in Murex implemented / supported the Application for Global Clients.

Application Knowledge

- Trading
- Confirmation
- Accounting
- Payments
- Pricing
- MxML
- VaR analysis
- Reporting (M-Report/Actuate/Webfocus)

Domain Knowledge on the Product

- Static data setup
- Deal capture
- User administration
- VaR setup and investigation
- Rate Fixing
- Trade/Payment Netting
- Workflow configuration
- Trade life cycle events (Exercise, Termination, Market Operations)
- STP
- P&L

Murex Functional Landscape

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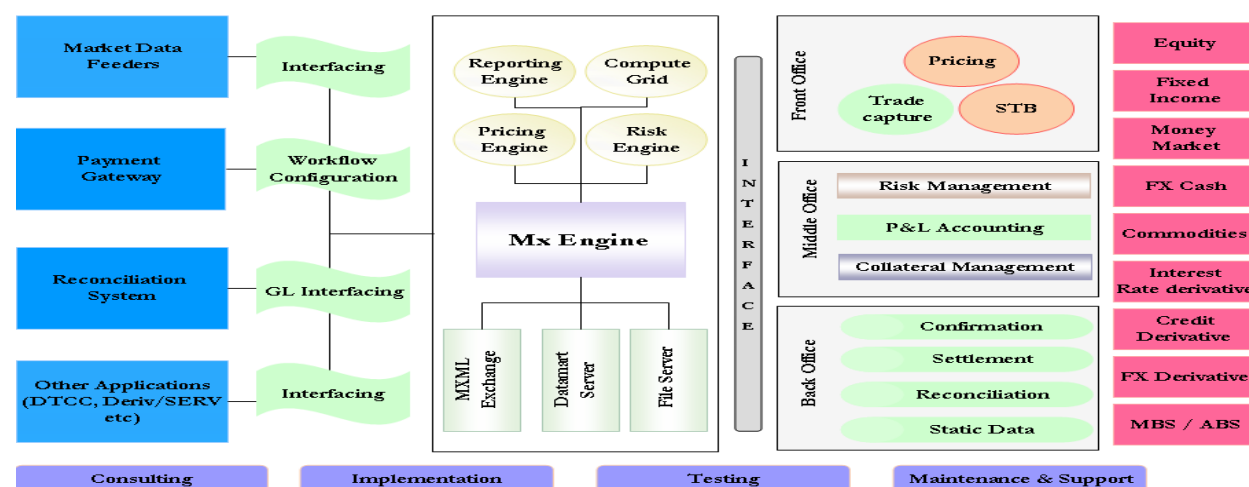
Calypso Capabilities

Calypso COE unit in Hexaware has the dedicated pool of Resources Trained in Functional and Technical areas of Calypso.
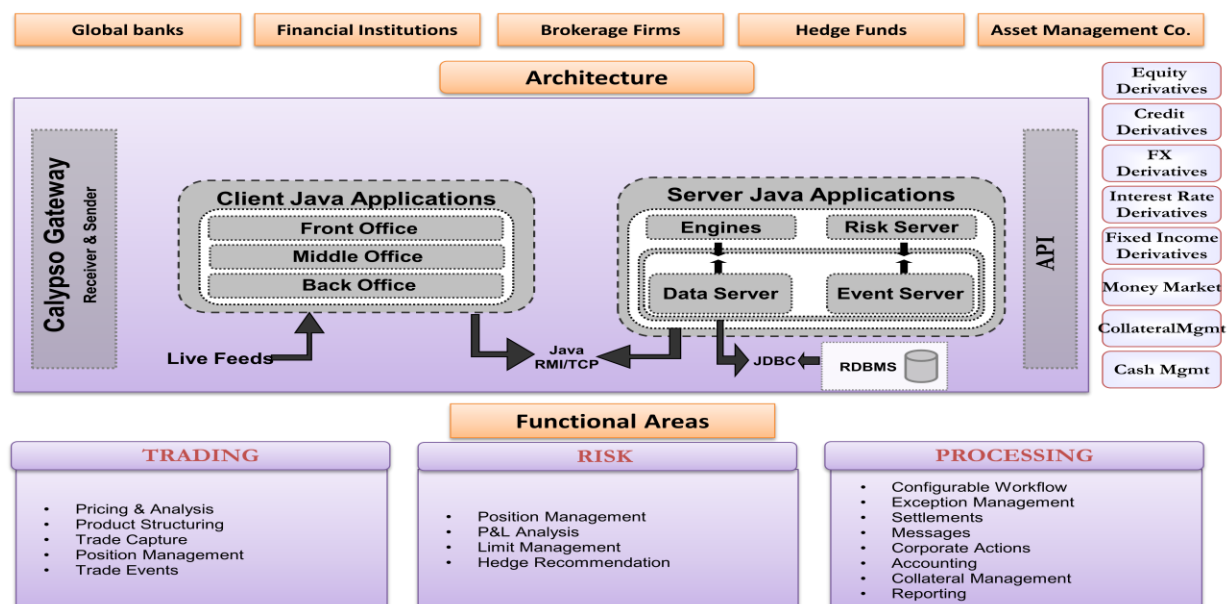
Domain Knowledge

- Derivative Operations (IRD & CRD)
- Reconciliations & BO Processing
- Front, Middle and Back Office Operations
- Technology
- Java
- Java Swing
- J2EE
- JAXB
- XML
- Database(Sybase/Oracle)

Calypso Competency

		Technical	Functional
Introductory			
Training Introduction		✓	✓
Technical & Functional Over view		✓	✓
Reference Data		✓	✓
Functional	**Asset Class FO**		
	IRD Front Office		✓
	CRD Front Office		✓
	FX Front Office		✓
	Commodities Front Office		✓
	Asset Class BO		✓
	IRD Back Office		✓
	CRD Back Office		✓
	FX Back Office		✓
Technical	Introduction to Calypso API	✓	
	Quotes, Curves and Surfaces API	✓	
	Pricing API	✓	
	Product API	✓	
Others	Collateral management		✓
	Cash Management		✓

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Calypso Functional Landscape

Global banks	Financial Institutions	Brokerage Firms	Hedge Funds	Asset Management Co.

Architecture

Calypso Gateway — Receiver & Sender

Client Java Applications
- Front Office
- Middle Office
- Back Office

Server Java Applications
- Engines
- Risk Server
- Data Server
- Event Server

API

- Equity Derivatives
- Credit Derivatives
- FX Derivatives
- Interest Rate Derivatives
- Fixed Income Derivatives
- Money Market
- CollateralMgmt
- Cash Mgmt

Live Feeds — Java RMI/TCP — JDBC — RDBMS

Functional Areas

TRADING	RISK	PROCESSING
• Pricing & Analysis • Product Structuring • Trade Capture • Position Management • Trade Events	• Position Management • P&L Analysis • Limit Management • Hedge Recommendation	• Configurable Workflow • Exception Management • Settlements • Messages • Corporate Actions • Accounting • Collateral Management • Reporting

Eagle STAR / PACE

Implementation Services

- Data Migration: Mapping legacy data, ETL processes using tools such as Data Junction and Informatica, and writing up-loaders.
- Integration with Enterprise tools for scheduling, monitoring, administration and application distribution.
- Interfacing to satellite applications such as client reporting systems, AUM systems, etc, via exporters.

Customization Services

- Account Reference Master (ARM): Building custom panels to support the account opening process, including workflow processes.
- Security Reference Master (SRM): Loading global security master information from market data feeds, including Security cross-reference and indicative data, factors, ratings, prices, corporate actions, security compositing and best pricing
- Customization of STAR-To-PACE procedures.
- Customization of STAR panels

Reporting Services - STAR

- Standard Reports, Grid Reports, and Advanced Reports

- Developing panels to support user selection and entry
- Developing Active reports Designer code for basic and advanced reporting functions

Reporting Services - PACE

- Building Inventory of fields
- Building Field Attributes - Database, rollup, derived, advanced etc
- Developing component rules – Source rule, Field rule, Grouping rule & Date rule
- Developing PACE Report rules and Profiles
- Visual Basic DLL designer for report presentation

Support and QA Services

- Migration of components through development, QA & production environments.
- QA & Release Management: Testing new releases of the product, as per the following methodology
- Upgrading existing version of Eagle to latest versions (both application and data)

Product Support

- 24 x 7 production support to Eagle STAR & PACE

PORTIA Capabilities

PORTIA Expertise

- Pool of Dot Net Development Resources
- Understand PORTIA Architecture
- Capability to support the Product both in New and Old Version
- Expertise in development of various interfaces with PORTIA
- Resource pool who has expertise in
- PORTIA Functional Understanding
- Implementation
- Report Development
- QA
- Resources trained in eReports

PORTIA Services

Implementation Services
- Static Data Creation
- Interfacing with external systems / Data vendors
- Migration of data from external source through AIM

Functional Support

- Setting up of Chart of Accounts
- Security Master setup

Customization Services

- User Defined Data creation
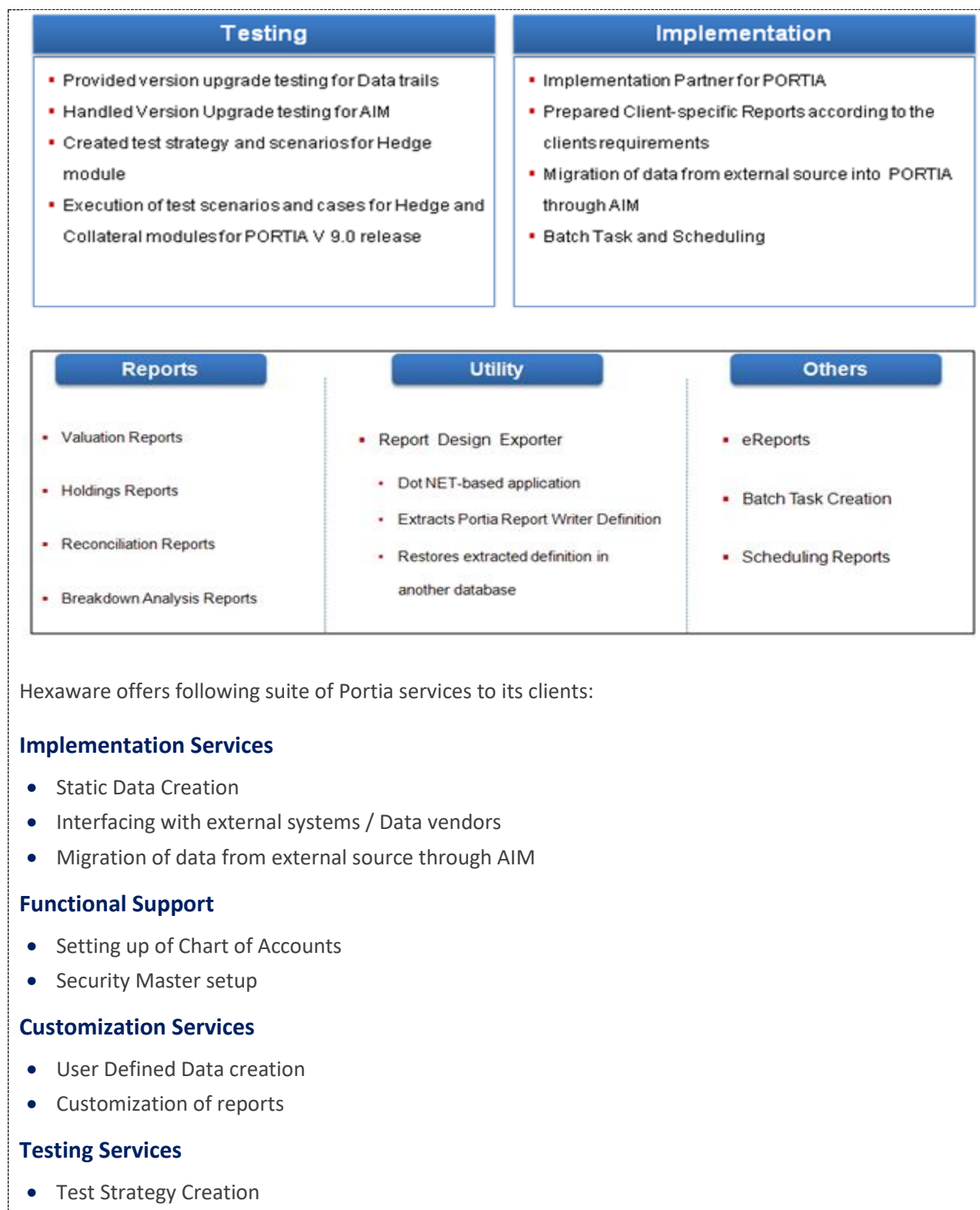- Customization of reports

Testing Services

- Test Strategy Creation
- Scenario Building
- Data Migration testing Using proprietary tools
- SIT / UAT testing
- Parallel run data compare using RECON tools

PORTIA – Perform Expertise

- Functional and Technical understanding of the Product
- Perform operations
- Product Support and Implementation
- QA

Hexaware has got rich experience in Portia in the areas of Development, Functional Understanding, Testing, Implementation and Reporting. Hexaware's expertise can be summed up as follows:

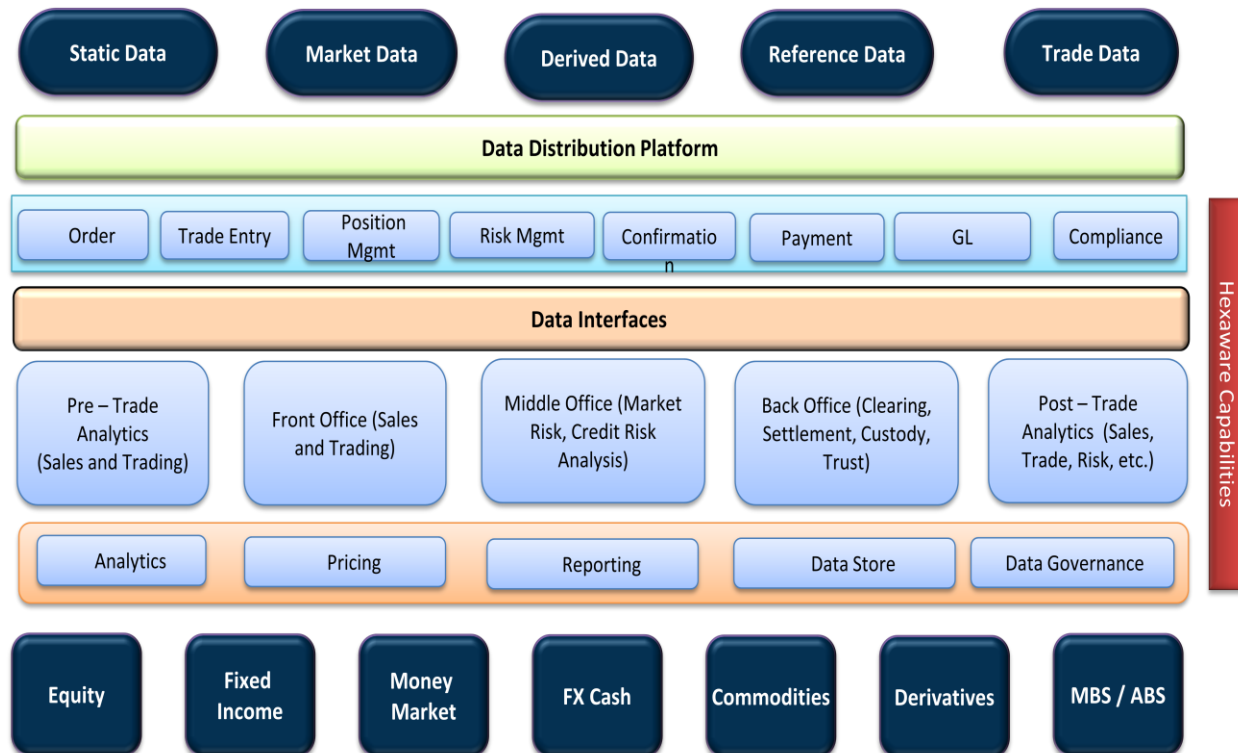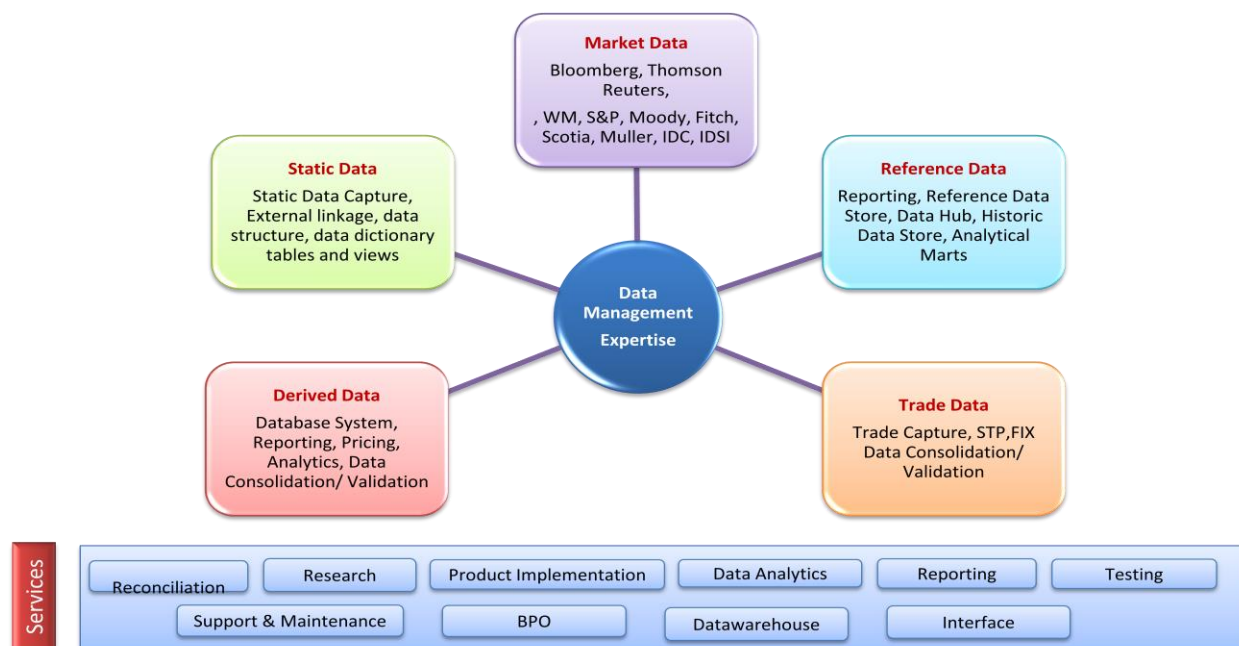| Development	Functional
• Development Partner for PORTIA • Involved in development of new modules for the PORTIA v 9.0 release • Development of new reports for PORTIA clients • Interface development using Dot Net • Involved in development of new interfaces with data vendors	• Involved in the Functional Requirements phase and interacted with PORTIA clients to understand the client requirements • Interacted with the Technical team to understand the current architecture and fit the new requirements

Testing	Implementation
• Provided version upgrade testing for Data trails • Handled Version Upgrade testing for AIM • Created test strategy and scenarios for Hedge module • Execution of test scenarios and cases for Hedge and Collateral modules for PORTIA V 9.0 release	• Implementation Partner for PORTIA • Prepared Client-specific Reports according to the clients requirements • Migration of data from external source into PORTIA through AIM • Batch Task and Scheduling

Reports	Utility	Others

• Valuation Reports
 	
• Holdings Reports
 	
• Reconciliation Reports
 	
• Breakdown Analysis Reports
	• Report Design Exporter
	  • Dot NET-based application
	  • Extracts Portia Report Writer Definition
	  • Restores extracted definition in another database
		• eReports
		
		• Batch Task Creation
		
		• Scheduling Reports

Hexaware offers following suite of Portia services to its clients:

Implementation Services

- Static Data Creation
- Interfacing with external systems / Data vendors
- Migration of data from external source through AIM

Functional Support

- Setting up of Chart of Accounts
- Security Master setup

Customization Services

- User Defined Data creation
- Customization of reports

Testing Services

- Test Strategy Creation

- Scenario Building
- Data Migration testing Using proprietary tools
- SIT / UAT testing
- Parallel run data compare using RECON tools

Data Management Capabilities

We have implemented solutions for consolidation, enrichment and creation of gold copy for security and price data, and managing account and client reference data. Our solution involves implementing validations and hierarchical rules that helps client for portfolio valuations and trade processing.

Security Data Management Landscape:

Data Management Expertise

Market Data
Bloomberg, Thomson Reuters,
, WM, S&P, Moody, Fitch, Scotia, Muller, IDC, IDSI

Static Data
Static Data Capture, External linkage, data structure, data dictionary tables and views

Reference Data
Reporting, Reference Data Store, Data Hub, Historic Data Store, Analytical Marts

Data Management Expertise

Derived Data
Database System, Reporting, Pricing, Analytics, Data Consolidation/ Validation

Trade Data
Trade Capture, STP,FIX Data Consolidation/ Validation

Services

| Reconciliation | Research | Product Implementation | Data Analytics | Reporting | Testing |
| Support & Maintenance | | BPO | Datawarehouse | Interface | |

Investment Data Management Capabilities

Data Types	Services			Subject Matter Expertise
Market Data	**Architecture**	**Technology**	**BPO**	**Security Master**
Reference Data	• Data Integration • Hub and Warehousing • Data Mining • Data Marts • Reporting	• Informatica • Data stage • Business object • Crystal Report Hyperion • Web Focus	• Data Validation • Data Cleansing/ Scrubbing • Reconciliation • Research	**Pricing**
Trade Data	**Proprietary Tools / Framework**			**Ratings**
Static Data	**Belva** — Meta data summit for Investment Business Information, Data Dictionary		**Xmen** — XML-based query engine for Data Integration environment. It ensures ETL coding standards and locate coding errors.	**Corporate Actions**
Performance Data	**VERZOENEN** — Transactional recon process for identifying matches, mismatches, and discrepant data		**BIMA** — Metadata based analysis tool within any BI environment for determining duplicate reports , Dead variables, sub set related reports.	**Factors**
Derived Data	**SLA** — BI environment metadata foundation tool that creates semantic layers such as universes and models.			**Variable Rates**

ARM (Account Reference Management) Capabilities:

- Building customized solution to support the account opening process, including workflow processes.
- Provide End-to-end solution including data scrubbing, translation and validation for uploading/feeds.
- Managing workflow and account approval process
- Integrating with downstream systems for accounts data

SRM (Security Reference Management) Capabilities:

- Accept and process security feeds from multiple Security Data Vendors like Bloomberg, Vestek, Reuters etc.
- Processing of securities of all asset types (Fixed Income, Equities, Derivatives – SWAPS, Index, Currency, Preferred, etc.).
- Handling of Intraday and EOD security feeds.
- Security Validation and Hierarchical decisions.
- Creation of Gold Copy for different Target Systems.

Pricing Capabilities:

- Expertise with pricing data feeds from different vendors including Bloomberg, IDC, WM/Reuters, IDL, IDSI, Muller, Scotia, Lehman and MarkIT.
- Handling pricing information for different Asset Classes including equities, Fixed Income, ABS, CMBS,

CMO, OTC Derivatives etc

- Creation of securities of interest list based on multiple scenarios holdings, watch-lists, new securities, manual price list etc
- Creation of demand for pricing feeds from vendors full set , delta / incremental / individual
- Price Rule validation and Hierarchical decisions
- Creation of Best Price /Gold Copy for different Target Systems

Data Quality

Why Data Quality?

Irrelevant or unneeded information decreases operational efficiency and leads to dire drills, rework and bad business decisions. A data warehouse may fail if users do not trust the quality of the information it contains. The integrity of the information in most data warehouse projects today is often unclear, ill-defined and suspicious.

7 Underlying Technology factors that result in DQ pains

Incorrect Data, Insufficient Data, Invalid Data, Duplicate customer data, Lack of validation routines, Mismatch of Syntax and Formats, Source system changes

The Hexaware Advantage

- Proven methodology for Data Quality Improvement using Six Sigma Techniques
- More than 30 person years of Hexaware experience on data quality products
- Business level partnership with SAS; Data Flux (A SAS DQ tool) used extensively in many client projects
- More than 25 Six Sigma projects executed across diverse functional areas
- Use of proprietary tools such as **Data Certifier and Data Profiler**
- **Data Certifier:** Certifies the data in tables and can validate the Business Rules specified by the users
  Data Profiler: A tool that profiles all the three aspects of data viz. Content, Structure and Relationship

Hexaware's Methodology

Hexaware's Six Sigma Data Quality (SSDQ) methodology is a comprehensive approach based upon the Six Sigma framework, which ensures that client requirements / processes are fully understood, defined, mapped and implemented as per the requirements. The framework is a collaborative one with BI landscape and Six Sigma Methodology. This SSDQ Methodology developed based on both Six Sigma's Define Measure Analyze Improve Control (DMAIC) and Define Measure Analyze Design & Validate (DMADV) frameworks to accommodate new and existing BI systems and will be implemented based on client's requirements. At every stage of the framework, structured tollgate reviews with clients/ business users are conducted to ensure that the existing process is understood clearly and the deliverables / output of each phase are targeted towards the final objective. This approach ensures that

the project moves forward at the intended pace, while avoiding any 'surprises' or unexpected obstacles, and keeps the management team of apprised of the progress.

4 Ds of Hexaware Data Quality

- **Data Certifier (Hexaware's Proprietary tool)** - for certifying incoming data
- **Data Profiler (Hexaware's Proprietary tool)** - for profiling incoming data
- **DART (Hexaware's Proprietary tool)** - For code review and sanitizing Data Integration
- **Data Flux** - Experience in executing projects on SAS Data Flux

5 ways Hexaware helps improve data

Data Profiling, Data Quality improvement, Data Integration, Data Enrichment (Cleansing, Parsing, Clustering, Merging, Deduplication, Householding, Data Monitoring)

6 Hexaware Success stories on Data Quality

1. **A Microfinance organization** (on SAS Data Flux)– negative duplicate customer, non performing assets, integration of existing systems
2. **A Global Telecom major** (on SAS Data Flux)–identify fraud, blacklist default customers and integration of billing and POS systems
3. **A Global Insurance major** (on Informatica custom built)– identify data perspective on risk and customer aspects
4. **A Banking product company**– Structural (column & Table profiling)/ Data Discovery (standardization/Frequency/ & DQ rules) and Relational Discovery(Relation between disparate data)
5. **World's largest mining company** – Extensive usage of Tools for sanitizing ETL and Data Integration using XMen
6. **An eminent security custodian** - Credit Risk data quality project

Wealth Management Capabilities

The Wealth Management practice offers accelerated, end-to-end solutions to support the key transformation imperatives at today's wealth advisory firm. Hexaware has experts rich in industry experience and expertise who work with wealth management firms to address these challenges. Ability to offer a range of investment products including Deposits, Funds, Fixed Income, Equity & Equity linked products, Forex, Derivatives and Structured Products.

Our solution domain ranges from Pre-trade to Post-Trade covering front office, middle office and back office operations. We aim at effectively improve Order Routing Systems, providing high-speed connectivity and managing operational risks.

Hexaware has over a decade of experience in providing re-engineering services thereby transforming the legacy systems into high-performance based solutions. Our solutions are developed in latest architecture and build with modern and proven tools and technologies.

Hexaware has experienced Domain Specialists, Consultants and Project Managers in Asset Management Practice and worked with Leading Global Wealth Managers. Hexaware overall Strong domain focus on the wealth management competency is as follows:

Wealth Management Services	Domain Expertise	Operational Experience
Client Relationship Management	🟩	🟩
Financial Planning	🟩	🟧
Asset Allocation Models	🟩	🟨
Account Aggregation	🟩	🟩
Portfolio Management	🟩	🟩
Portfolio Performance Measurement & Reporting	🟩	🟩
Risk & Attribution Analytics	🟩	🟩
Client Statements	🟩	🟩

🟩	Expert
🟨	Beginner
🟧	Average

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[Proprietary and Confidential]

Hexaware's comprehensive Wealth Management product "Wealth Director" helps financial advisor to manage lifetime assets of High Net worth clients. The details are provided in the next section 6.1.1.

Wealth Management Experience

Multi Bank Holding Company Based in North America

The Multi Bank Holding Company provides services in the following areas: 'Investment Management', 'Asset & Fund Administration' and 'Fiduciary & Banking Solutions'. Their clients include corporations, institutions and affluent individuals worldwide. It has 85 offices in 18 US states and12 locations in North America, Europe and the Asia-Pacific region.

Business Need

Provide one stop solution for the Wealth Management clients. The main purpose of this application is to calculate the individual`s Net worth and provide access to both Internal and External Users.

Service Offerings

Developed and Customized Wealth Management Portal for the Client to address the Business Need

Portal Key Statistics

- No. of Clients / Families using WP – 5000 +
- No. of Portfolios / Accounts – 30,000+
- Average Hits per day – 7000+
- Data sourced thru 12 systems; nightly batch process
- Highly optimized loaders / interfaces to complete a short batch window in time for start of Business day

Portal Details

- Online Data Access
  - Designed as a financial management application for meeting the unique custody, reporting, investment, and financing needs of wealthy individuals and families
  - Core purpose of the this application is to calculate an individual's net worth
  - WP collects data through Aggregation and Transaction
  - Can be accessed by both internal and external users
- Key Features
  - Consolidated Accounting and Tax Reporting

- Net Worth Summary
- Downloading Capabilities
- Data Aggregation

6. Proprietary Products

6.1.1 DS-9. Do you have any packaged product or service offerings in this domain area?

Response:

Proprietary Tools

Hexaware has leveraged its AM capabilities and experience to build tools for helping asset managers to address technological challenges.
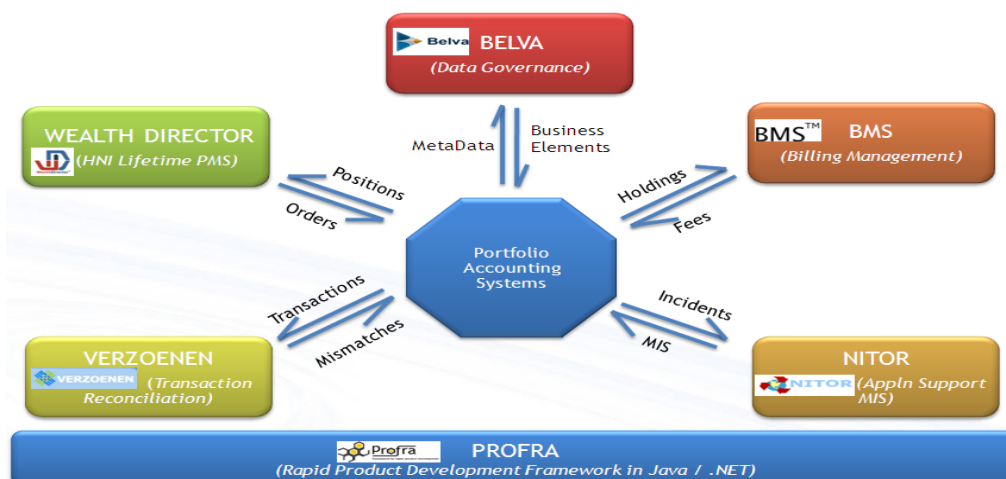
VERZOENEN– (Reconciliation Tool for pre-defined business rules): "Verzoenen" is a reconciliation tool. It reconciles two given files on pre-defined business rules.

BELVA – (Data Governance Tool): Is a Meta Data summit for Investment Business Information & comes with precise definition of Business Elements spanning across Investment Management domain space & across enterprise wide systems.

BMS – (Billing Management Tool): The key features are Hierarchic Model, Flexible Fee Definition & Presentment, Account Aggregation, Billing Segments and Cash Flow Upload from Portfolio Accounting System, Custodian Balances, and Audit & Security.

Wealth Director – (Solution for Wealth Management): "Wealth Director" comprehensive wealth management product helps Financial Advisors manage lifetime assets of High Net worth Clients in the proprietary or ASP model. The features include contact management, profile capture, proposal submission, financial planning encompassing Investments, Insurance, Education, Retirement, Estate and Tax Planning.

NITOR – (PSM Tracking Tool): Is a tracking tool for Support & Maintenance projects.

ProFra (Proprietary Framework for Rapid Product Development): ProFra is developed by Hexaware has a workable framework towards creating an instant base for building any product.

Verzoenen

Reconciliation plays a major role in the areas of Pre and Post Trade Validations, Position Management, Confirmations, Cash Management, Payment Processing, GL Accounting, and Back Office Settlements.

As the businesses grow, organizations frequently migrate to newer systems or integrate multiple legacy systems into newer applications. This initiates a complex scheme of data validation and certification of complete business data transformation into the new system.

Added to this complexity are industry process changes and regulatory compliance changes that end up in product upgrades of existing implemented systems.

Verzoenen – Key Features

Source Data Management

- Multiple input file format definition with options for manual entry or bulk upload.
- Pre-process such as data cleaning and sub-totaling can be done prior to upload.

Data Pairing Definition

- Ability to do manual entry / upload metadata definitions for new file formats for comparison.
- Intuitive UI for pairing fields of the data set to a common recon format through
  - Ready to use transformation rules with options for custom rules.
  - X Ref tables for cross validation.

Recon Definition

- Define flexible parameters for recon key formation and field level matching.
- Capable of defining sequence of recursive recon.
- Options for matching tolerances by amount, %, or range.

Reconciliation Process

- Online / offline scheduled recon process for identifying matches, mismatches, and discrepant data.
- Multiple level of recursive reconciliations based on earlier level mismatch data.
- Ability to refine the results by changing recon parameters and rerun reconciliations.

Reporting

- Flexible Report Builder with predefined set of Mismatch Analysis, Recon Performance & MIS.
- Options for the user to customize standard reports or create custom reports.
- Ability to save report filter data profile for rerun of report at later time.

Verzoenen - Case Study

About Client

Client is a leading provider of investment management, asset and fund administration, fiduciary and banking solutions for corporations, institutions and affluent individuals worldwide.

A financial holding company based in North America, has a network of 85 offices in 18 U.S. states, and has international offices in North America, Europe, the Middle East and the Asia-Pacific region.

Execution Model: Onsite and Offshore.

Project Objectives

The objective of this project is to provide an automated solution for Corporate Transitions, Conversions, TBA and Valuation Reporting of Fund Accounting Team for the reconciliation of data based upon defined business rules for various events. Reconciliation tool must eliminates dependencies on excel macros and standardizes the reconciliation process across both partner groups.

Key Project Requirements

The client specific project requirements for Verzoenen implementation are as below:

- The reconciliation tool should reconcile data between prior custodian and internal system data using a pair and compare methodology.
- The tool must have the capability to remove special characters from asset identifiers fields such as SEDOL/ISIN/CUSIP prior to running Reconciliation.
- The tool should have the capability to do calculations for missing data using a unit price, a market price, or an FX rate.
- When there is more than one entry posted into Internal system that adds up to one entry from the prior custodian, there needs to be ability to subtotal the same assets for each account.
- The tool should perform at least a two level (but not limited to two) matching process between prior custodian and Internal System data based on identifier.
- The unmatched data should appear on a screen where they can be matched from the prior custodian to internal system data manually.
- The tool should have the ability to customize the output as reported.

Existing Systems and Processes

Prior Custodian Data

Prior custodian data are custodial system data for Transitions, Conversions, TBA and Valuation Reporting modules.

Internal System Data

These are data for Transitions, Conversions, TBA and Valuation Reporting coming from Client's Internal System.

Currently, client performs reconciliation between prior custodian data and internal system data using the following methods:

- An Excel pivot table with a True/False methodology, or
- Manually auditing client records using a tic and tie methodology or
- Excel Macros.

Challenges in the Current Process

The challenges faced by the client during current reconciliation process are given below:

- Manual reconciliation leads to huge human errors and consumes more time.
- There is no uniformity of reconciliation process followed between different business partners.
- Excel pivot table or Excel Macros are not flexible to handle changes in reconciliation parameters.
- Due to varying settlement time zones across location throughout the calendar month, the coordinator needs to continually reformat the pivot table to include new settlements.
- Excel macros are not completely reliable, and it is not technically supported by bank.
- Excel macros can be easily tampered which results in its functional failure.
- The business user performs repeated reconciliation to ensure the accuracy of data which is also time-consuming.

Hexaware's Contribution

With Technical and Business expertise in the Reconciliation space, Hexaware had been part of implementing the Tool in several ways such as,

- Requirement gathering from various Business Users.
- Evaluation and identification of available options to meet Clients business need.
- Recommendation of suitable reconciliation solution.
- Customization of Verzoenen tool as per client business requirements.

Project Work Flow

The reconciliation process consists of the following levels:

Uploading Data

Prior custodian Data and Internal system data are uploaded into Verzoenen through excel.

Data Cleaning & Validation

Prior custodian and internal system data are uploaded into Verzoenen

Verzoenen performs data cleaning and validation activities such as

- Special Characters removal
- Missing data calculations
- Subtotalling of multiple records of same account

Sometimes Prior custodian and internal system data come with special characters/junk characters in key fields, such as SEDOL/ISIN/CUSIP, while extracting from their respective systems.
The Verzoenen tool removes such special characters while uploading into the system and keeps clean data ready for actual reconciliation.

Conversions, Transitions and TBA team's prior custodian/internal system data also contain missing data in columns such as

- Total Market Value
- Local Net Income
- Local Gross Income

Verzoenen perform calculations if this column data are missing using formulas such as MARKET VALUE + ACCRUALS = TOTAL MARKET VALUE and calculated values are entered. That is, the MARKET VALUE column data will be added to ACCRUALS column data and will be filled in TOTAL MARKET VALUE column.

The internal system data will also contain more than one record for the same account that can add up to single record. The Verzoenen tool will identify the records based on defined subtotaling keys and add all similar records of same account into one record which is then used for reconciliation with prior custodian data.

All the above data cleaning and validation process are done as part of uploading process and cleaned and validated records are kept ready for reconciliation.

Multi-Level Matching (Auto Recon)

Once the user initiates the reconciliation process, the system automatically tries to match records. First, recon keys are generated based keys defined in the system. This is called level 1 recon key. If recon keys of prior custodian data are matching with internal system data, then it is treated as Matched Records. If recon keys are not matching, the system creates level 2 recon keys which are defined. If this recon key matches for prior custodian data & internal system data, then it is treated as Matched Records. Similarly, this reconciliation process is repeated by the system based on number of level of recon keys defined.

At every level of reconciliation process, the records for which recon keys are matching but other column data are not matching based on parameters such as tolerance check, compare check, round off check, etc., then it is treated as Unmatched Records. The user correct these data and upload once again and run the reconciliation process to move this records from unmatched to matched status.

Those records for which recon keys are not matching, they are treated as Orphan Records.

The records which are having similar recon keys are treated as Duplicate Records.

Generation of Matched, Unmatched, Orphans and Duplicate Records

Once reconciliation process is completed, the system creates Matched, Unmatched, Orphans and Duplicate Records.

Orphan Matching (Manual Recon)

The Orphan and Duplicate records of prior custodian and internal system data are manually matched using ad hoc recon keys which are specified by the users. During this process, the system creates the recon keys based on keys defined for internal system record and overwrite the recon keys of prior custodian record.

Now, on rerunning the reconciliation process, the recon keys of prior custodian and internal system data matches and all this orphan records move to Matched status.

Reports Generation (Standard and Custom Reports)

Once the reconciliation process is over, the user generates reports for Matched, Unmatched and Orphan Records. These are Standard Reports that are available to the users instantly. The users also have the option to generate reports based on various column parameters of prior custodian and internal system records that are used for their analysis purpose using expression builder, Filter and Sort configuration. These are called Custom Reports.

All reports can be exported to excel files and can be; directed to any client's local printers.

Belva

As an Investment Management enterprise grows rapidly or expands across multiple business lines or companies, the number of disparate systems, sub-units & interfaces multiply. This leads to the same business data existing in different state/ format/ consistency across systems.

This needs a central repository to track and trace business data across multiple systems and identify the transformations and links. Such a system forces the organization to specify and delineate the data flow between various systems thru a centralized data store.
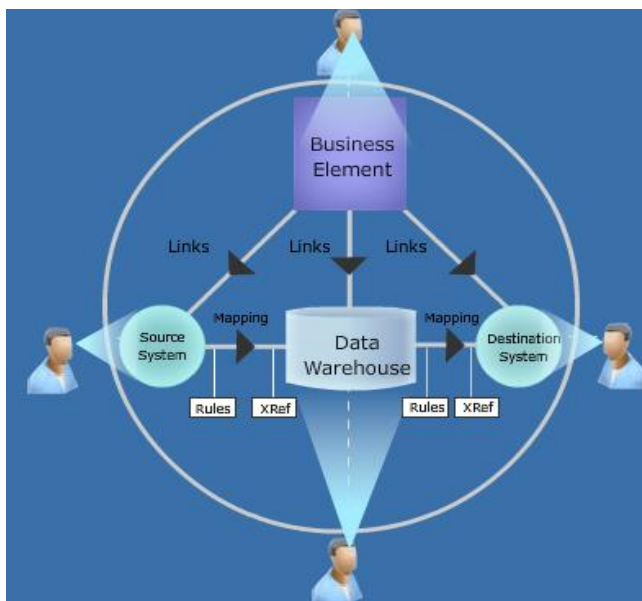
Overview

- Belva is a Meta data summit for investment business.
- Belva captures how the business elements are represented in multiple systems across the enterprise.
- Belva also visualizes the end-to-end flow of an investment data during the lifecycle of the transaction across system.

Belva Highlights

Data Dictionary
- Mapping of Data Elements across multiple systems
- Data Elements linked by a common Business Element

Preloaded Repository of
- Business Element Definitions applicable to Investment Management Industry
- Data Elements of standard products

Repository for
- Specification for Data Migration
- Specification for Data Uploading

Features
- Upload/Download capabilities – For data definitions of products, spreadsheets, etc.
- Comprehensive Cross-referencing against multiple systems.

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- Detailed Reporting Capabilities & Ad-hoc Querying.

Key Features

- Individual/block level data upload.
- Ability to link system elements based on their business definitions.
- A view on end-to-end mapping of business data across systems.
- Ability to define Extract, transformation load rules.
- Ability to add transformation tables for mapping.
- Handling of multiple versions / upgrades of a system and its mappings.
- Definition of central repository and its inflows and outflows can be setup inherently.

Framework Features

- Flexible user access definition.
- Framework on data and GUI screens.
- Structured report generation.
- Generic search/lookup/print.
- User access allows creation of roles/ groups for a business user.
- Provides an 'Export data' high speed utility that enables the user to quickly extract the data from the tables in the system either for processing or for future usage of the data.

Reporting Features

Analysis Reports

- Detailed view of Business Elements and its mapped report elements
- Detailed view of used and unused system data for reporting
- Detailed view of critical Business Elements in terms of report usage
- Matrix view of end-to-end mapping a report generation from multiple systems
- Detailed and Graphical representation of BE mapping status

Mapping Transformation

Detailed view of ETL and XReference tables used in Report Elements mapping

Mapping Tree View

Tree view of BE and end-to-end mapping between source and target

Report Catalog

- Displays the total number of available reports in systems
- Tree view of the reports and the categorization

- Detailed view of the report and the field mappings

Benefits

Business Managers

- Unified view of business data across multiple systems.
- Clear definition of possible values and transitions for an element.
- Load of educating technical users reduced

Technology Managers

- Single repository for all the migration and import specifications.
- Dependency on Persons with in-depth knowledge reduced due to creation of repository of transitions.
- Handling of version updates made very easy and transparent.

Billing Management System (BMS)

Environment

BMS is designed to obtain basic account and balances information from one or more underlying portfolio accounting systems. BMS will provide for maintenance of additional billing related information, and for doing all the processing required to perform accruals, calculate invoices, review and release invoices, and to create extracts to accounting and AUM type of systems.

Operating Cycle
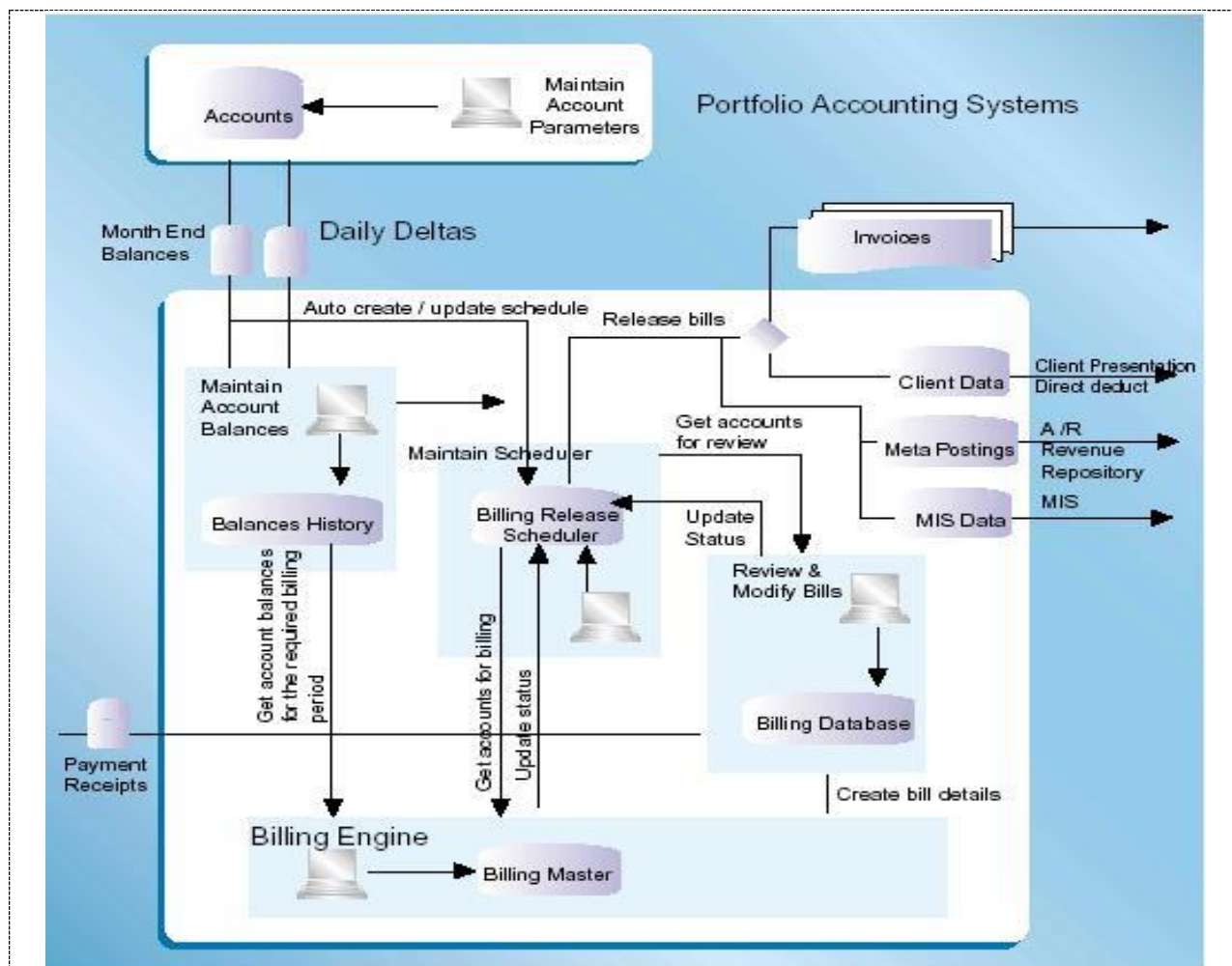
BMS uploads new account information on a daily basis. All account balances are month-end balances. Account balances for any given month can be uploaded many times – initially at the month-end itself, and subsequently if there are any changes to the balance. BMS also provides for uploading balances as "provisional" balances, and then subsequently uploading a "final" balance that has been reviewed and approved.

Once the basic account information has been uploaded to BMS, additional billing parameters can be entered directly into BMS in the form of billing rules. These rules define the calculation and billing frequency, in-advance or in-arrears billing, the asset bases (e.g. billing based on period starting assets, ending assets, or different flavors of average asset balance), minimum and maximum billing limits, discounts, and various other parameters that define the billing requirements.

BMS then provides functionalities to manage both the monthly accruals process as well as the billing process. It provides for auto generation and release of invoices at scheduled periods, selectively

"holding" accounts for review prior to releasing the bills, as well as adding adjustments to the bill. Numerous work-flow notifications are also included to facilitate operations.

Functional Architecture

The following schematic provides a high-level overview of the BMS design:
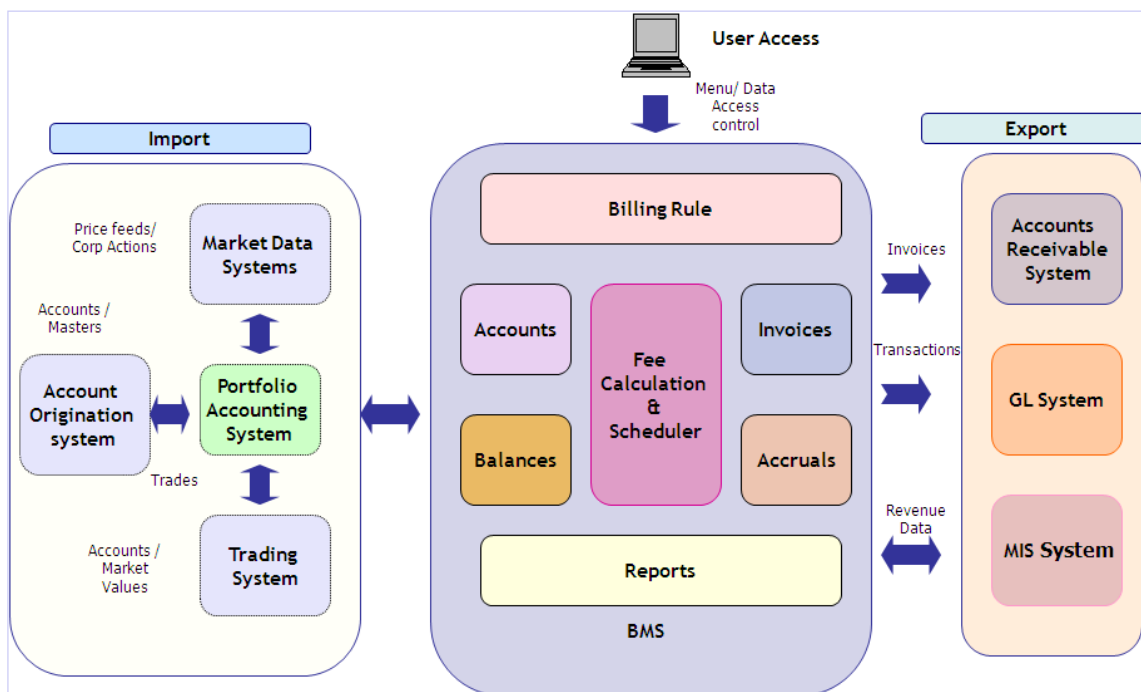
Key Features

BMS has the following key features:

Hierarchic Model

BMS supports definition of an ACCOUNT, PORTFOLIO, PORTFOLIO-SEGMENT, CUSIP, and TAX-LOT. All balances are stored at the portfolio-segment level, and lower level balances at the cusip or tax-lot level are only uploaded if they are needed for the billing calculations.

(Common cases are where certain cusips must be excluded because they are not actively managed, or where mutual funds sponsored by the investment manager have to be backed out to avoid double-billing the clients).

Billing rules can be defined at the client, account, or the portfolio level. The rule applies to all entities

that roll up to that level.

Flexible Fee Definition and Presentment

BMS allows definition of any number of rules for an account, and therefore, any number of fee types for an account. Each rule can specify its own calculation and billing frequency, asset basis, minimum/maximums, discounts, and so on. Each fee can be charged to the clients in multiple ways such as direct deduct, hard-copy invoice, etc. In addition, each fee can be presented in a separate invoice, or multiple fees may be combined into one invoice for presentment to the customer.

Any number of formats can be defined for an invoice, and BMS can be configured to automatically send additional copies of invoices to other addresses.

Account Aggregation

BMS provides supports definition of a RELATIONSHIP that links multiple accounts. Billing rules can be defined at the relationship level also, and BMS will aggregate assets across accounts for the purposes of determining the appropriate billing rate. This allows customers, whether institutional or private client, to pool their assets to obtain a more beneficial billing rate.

Billing Segments

BMS allows upload of portfolio balances by segment. Therefore, BMS provides flexibilities such as excluding CASH from the billable assets, or in applying certain functions only to the EQUITIES portion of the portfolio, and so on.

Cash Flows

BMS allows upload of cash flow information (contributions and withdrawals) from the underlying portfolio accounting system. Portfolios can be marked to reflect the impact of these cash flows on the invoice in multiple ways. An account can be marked to always adjust for cash flows, to never adjust for cash flows, or to selectively adjust only if the cash flows exceed a defined threshold. All system adjustments are notified via work-flow to the concerned account owner for review and approval prior to release of the invoice.

Custodial Balances

BMS allows data entry of account balances as reported by the custodian. The account can be set up to calculate bills based on these balances rather than on the balances uploaded from the portfolio accounting system.

Audit and Security

BMS provides for a flexible setup of users and groups, and allows different access levels to each group

for all functions provided. In addition, an audit trail is maintained of all maintenance activity as well as any adjustments done to billing parameters or invoices, for audit control purposes.

Technology Architecture
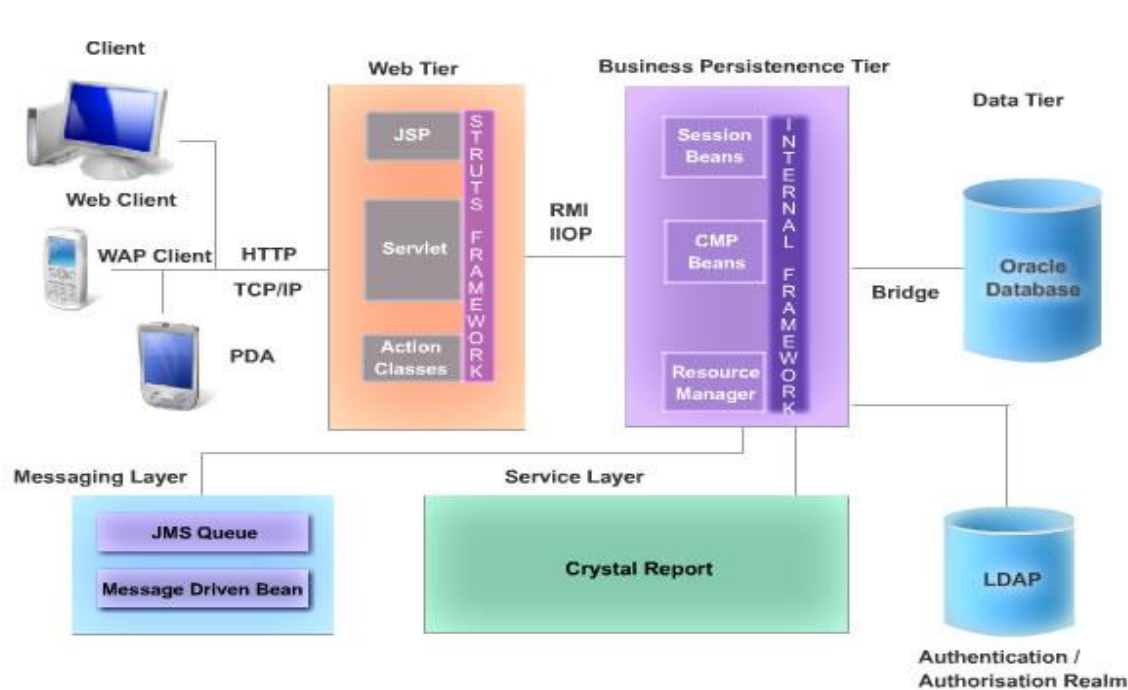
Wealth Director

Overview

Wealth DirectorTM helps Financial Advisors manage lifetime assets of high net worth Clients with ease. WD provides accessibility to both Financial Advisors and Individual Investors across offices worldwide. Wealth DirectorTM gathers information of all assets, liabilities and products of the client and applies this information to the customer's lifestyle and events to create positive and profitable experiences for the clients. In addition to the above, with the aim of better serving high net worth clients, it enables definitions of sophisticated asset allocation models and risk management technologies used by the big financial houses.
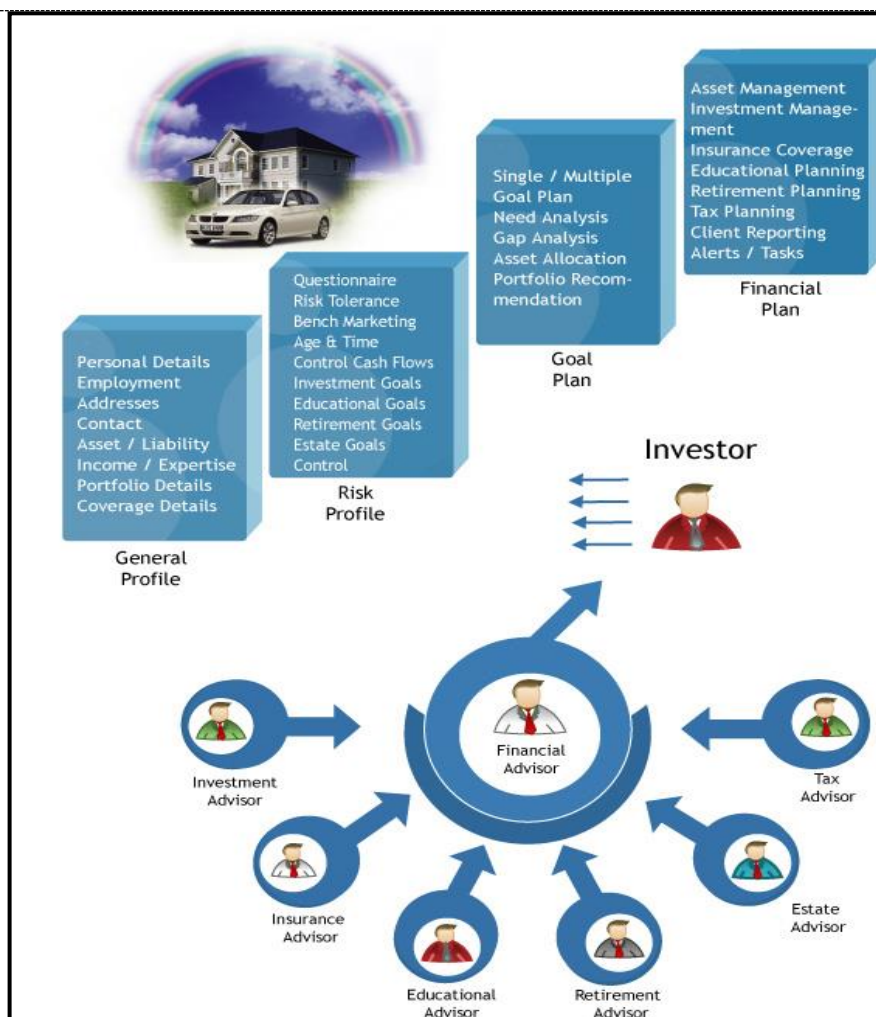
WealthDirector was developed in association with HnetWorth Inc,New Jersey, US based financial solutions company. Hexaware is the technical development partner and owns the right for implementing the software and doing client customizations.

Key Features

- Captures prospective client details, portfolio and risk profile
- Recommends market segment specific and risk specific asset allocation
- Recommends relevant Equity, Mutual Funds, Bonds etc. based on the predefined algorithms
- Executes financial plan on approval by client
- Gateways with banks, portfolio management systems, pricing vendors and other agencies.

- Tracks holdings against model portfolios for deviations and returns
- Allows client to review risk profile and re-align financial plan at frequent intervals
- Has CRM capabilities - tasks, reminders, meetings etc for better planned customer interactions
- Dynamic User Access Controls
- Generic Risk Questionnaire
- Document Management
- Enables single point contact for client
- Supports client with specialists for each sector
- Supports in-house/external Financial Advisors/Specialists

Asset Classes Covered

Wealth DirectorTM proposes to capture of information and advisory agencies for the following segments.

- Stocks
- Bonds
- Funds
- Other Assets & Liabilities
- Cash Flows (income & expenses)
- Insurance

Benefits

Wealth DirectorTM offers numerous benefits for global deployment of a centralized asset management solution. Some of the salient benefits include:

For Clients

- Multiple revisions of risk profile is possible
- Consolidated view of all their assets/cash flows
- Umbrella services covering major products addition to tradable portfolio planning available.
- Online access to returns, risks and recommendations for the entire spectrum of assets.
- Safe, Reliable and Scalable

For Business Users

- Online proposal generation
- Multiple investment scenario analysis
- Availability of advisory services and advisors to provide recommendations

- Asset allocation and manager selection tailoring
- Strategic investment planning as client needs evolve
- Monitoring significant changes in client's portfolio

Functional Architecture

Wealth Director is powered by ProFra (Hexaware's proprietary framework for rapid product development), which makes it more robust and open for structured upgrades.

ProFra supports dynamic menu formation, user access control, and generic tablets in home pages, flexible sort and filter conditions, specific lookup searches etc. ProFra provides print, email, document management, error handling and cache management services in an integrated manner.
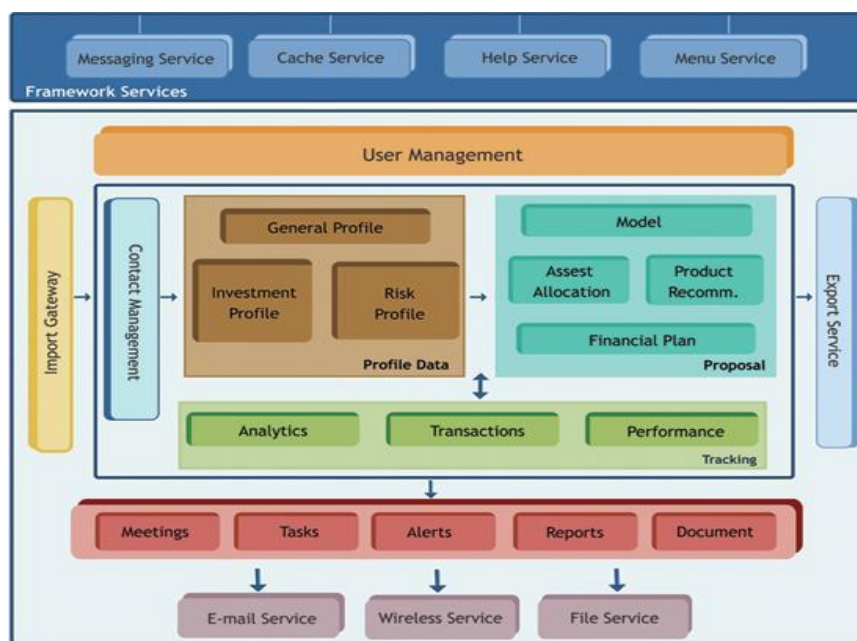
The product has the following major components:

Core Engine

Core engine contains customizable modules which can work independently or work together to suit needs.

Contact Tracker:

- This module handles the capture of contact info either manually or uploads from host systems and assigning, tracking and conversion of contact into a prospect by the FA. The system automatically generates a new user ID and password for the prospects.

Profile Collator:

- This module enables either the prospect or FA to enter the investments, goals and personal information of client / dependants. It also has a dynamic risk profile questionnaire. This will build

the client profile which is the base for asset allocation.

Proposal Generator:

- This module generated the asset allocation proposal based on the profile of the client and on approval generates the individual product recommendation for the asset classes. It enables the individual specialists for each asset class to make / refine the recommendations. It enables the FA to co-ordinates the proposal and send the final plan to client for approval.

Performance Tracker:

- This module tracks the assets of the client as per the approved asset allocation / product recommendation Benchmark. It tracks the deviation in terms of allocation or risk or return on the investment on a periodic basis. This gives a web based holistic view of the investment to the client at all times.

Import / Export Gateways

Wealth Director™ uses its own default gateways for interactions with external system.

This insulates the system from changes influenced by external systems and impacts on multiple customizations. The defined Gateways for imports and exports are listed below.

Import Gateways

- Banking Systems – Day end balances of Savings / Money market accounts
- Mutual funds – Net Asset Values
- Pricing Vendors – Forex Rates, Equity / Bond Pricing
- Portfolio Trading Systems – Trade Confirmations
- Portfolio Accounting Systems – New accounts, Client Holdings , client transactions

Export Gateways

- Banking Systems – Funds Transfer between accounts
- Portfolio Trading Systems – Orders arising out of portfolio tracking / mismatch
- Portfolio Accounting System – Client Cash flows

When interacting with Clients systems, WD expects the local system to deliver the data to the gateway in the CSV format for the specific gateway. If the Local system delivers the data in other format, the same need to be customized at additional cost.

CRM Support Services

Interactions between clients, prospects and advisors are managed by sending

- Alerts / Meeting requests / Reminders

Task creation

- To track and complete activities including profile submission

Information Delivery Channels

- File services
- Uploading documents in a secured location in the company servers
- Uploading documents types such as
  - .xls – MS Excel files,
  - .doc – MS Word files,
  - .pdf – Adobe Portable Document format,
  - .jpg – Images,
  - .txt – Generic text files
- Storing the uploaded files under a directory specific to the prospect / client
- Restricting unauthorized users to access / open the documents
- Dynamic linking of documents to a related transaction for ease of reference

Email Services

- The mails follow specified email patterns stored as templates.
- Generation Options - Online or Batch
- Option to specify
  - Importance – High / Normal / Low
  - Sensitivity – Personal / Private / Confidential
  - Bcc to a specified email –id
  - Reply to for the FA for system generated mails

Nitor

Nitor framework developed by Hexaware captures and maintains production support data, so that SLAs can be calculated, analysis done and reports can be derived out of the data captured. Nitor is web-based and intuitive. Customized reports/ graphs are useful for support analysis and system enhancements.

Key Features of Nitor

- Ability to define multiple entities of same enterprise and track the performance / support separately.
- Ability to handle multiple projects under different environment maintained by different support groups spread across global locations working in different shifts / time zones – In short Global Batch Support Monitor.
- Ability to display online across the globe the current batch job status and projected Up-time for business start.
- Ability to collate data for day-to-day batch execution and support analysis of jobs based on threshold limits and job history over a period.
- This is achieved by the slickly designed modules, which are covered in detail in the following sections.

User Access

- User Maintenance
- User Application

Capture Master Data

- Company details, like name, location, contacts.
- Projects details, like project name, billing type and company.
- System details, like environment, version, project
- Location details, like name and type of location i.e. maintenance/ development
- Shifts details of all the locations
- Feeds details to the System
- Environment details like software and versions
- common Issue of the project
- SLA Maintenance details
- The list value details for the system. Like List Value Master Code, List Value Details Code, List Value Details Description.

Job Setup

In Job Setup, the details captured are job name, description, Start time, End time, dependency details and also the criticality of the Job. Job Run Time will always be the difference between the Start Time and the End time of the job.

Upload Production Data

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[Proprietary and Confidential]

The upload feature of Nitor handles upload of production batch log, system up time and user feedback. This module does not allow the entry of invalid data/ faulty through the upload excel file / Job Setup

Reports

Product Log Data

User can view the Failed Job Status details for the given company, Project, Start date, End Date. User can view the report of failure jobs count in monthly wise, Monthly user requests, Severity Based open and closed requests for a given company, project, application and the date range.

Critical Reports

The Critical job Reports is used to identify all the Completed, In Process and In Queue Jobs which are Critical in a particular Process Center.

System Availability

User can track and view the details of missed systems like Stream, Start Time, End Time, Cut off Time, Delayed, Delay reason, etc.

SLA Maintenance

User can view the SLA details for the failed jobs in an Application like Availability, Response time and Resolution Time.

Feedback

The feedback for the resources can be uploaded through data upload option. The feedback details can be viewed through a report.

Job Runtime History

The job status details monitoring can be done on daily basis can add and view through this report.

Batch Job Status Monitor

The batch job status populates a Tree View report, used to identify all the Completed, In Process and In Queue Jobs, irrespective of their Criticality, for a particular Process Center. This Tree View also represents the Dependencies (if any) of the Jobs.

Benefits

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Nitor framework is primarily used for application support, where status tracking of jobs running in the scheduler needs to be done. Analysis of the current batch jobs can be done to generate reports on job status for a specific period. The graphical representation of the reports helps in understanding which category of jobs fail or do not meet tolerance limits. Tracking of job dependencies and reasons for delay can be done through the rich reports of Nitor. Job failures based on feeds can also be tracked. One of the advantages of Nitor is the ability to store historical job status details.

Nitor's Value-add

- All job details can be fetched from the database, and every job has a unique identification, which enables tracking.
- Failure job details can be tracked which can provide an insight into the reason of job failure
- With Nitor the critical users can be given access to Job status, which can facilitate corrective action without time delay
- Jobs that have crossed the threshold/tolerance limits are reported separately
- Jobs that have been successful according to the status will be checked for validity based on size/no. of records
- Analysis of the frequently failing critical and non critical jobs for a specified duration, pro-actively, giving the users the advantage
- Reports on failed critical and non critical jobs
- Graphical reports ensure quick analysis
- Reports can be exported to excel or as pdf files

ProFra

About ProFra

ProFra (Proprietary Framework for Rapid Product Development) - is developed by Hexaware has a workable framework towards creating an instant base for building any product. ProFra supports dynamic menu formation, user access control, flexible sort and filter conditions, generic lookup searches and hosts print, email, document management, error handling and cache management services.

With ProFra, any product development can save more than 25% of their effort while the team needs to focus only on the business components development. Using ProFra definitely adds economic value of the product and enables to ramp up for quick deliverables.

Framework Services

The basic services that are common across the major products are depicted in the schematic diagram.

ProFra is flexible to handle future enhancements too. Most services can be configured by changes to the table data instead of changing the code or configuration files. In case of Projects, specific components such as questionnaire, email services can also be plugged in. The functionality of ProFra includes:

- Framework Services
- Information Delivery Channels
- Import/Export Gateways
- User Management Services

## Services Available in ProFra

- Private Branding to customize the screens.
- User Access Control.
- Menu Creation and formation according to user/roles.
- Predefined Home pages with multiple Tables.
- User Interface – Overview/Details Pane.
- Reports/Graph Definition, Generation & View.
- Document Upload/View/Linking Screens.
- Hierarchical Questionnaire Definition & Scoring Screens.
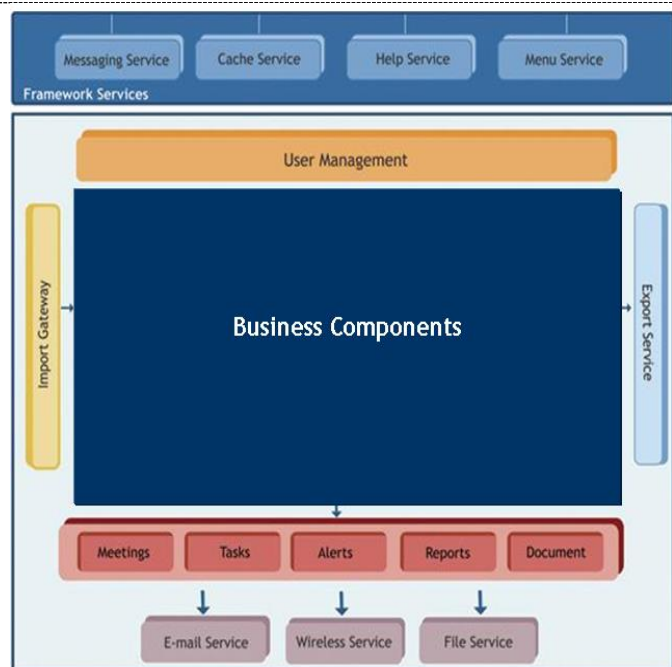
- Email Templates and Generation process.
- Error Message Definitions and Display screens.
- Context Sensitive Help for each Screen/Field.

Technical Architecture

- Thin Client
- Internet Explorer 5.5+
- Mozilla Fire Fox 1.0+
- Web Layer/Application Layer
- JBOSS 4.0.2
- Data Store
- MySql 4.1
- Support Applications
- Jasper 1.1
- JFree Charts 1.0
- Struts Framework 1.1
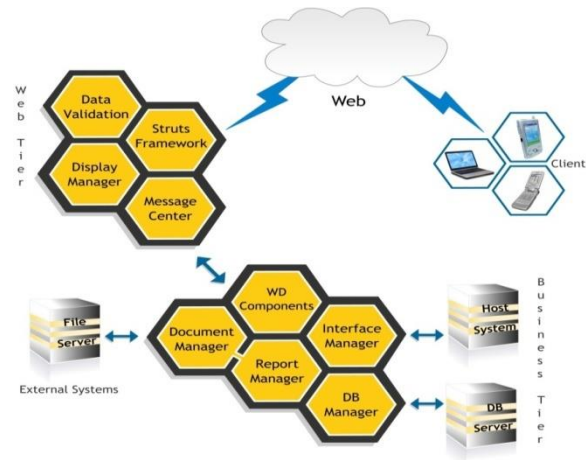
Key Technical Features

- The base web–frame work is implemented using struts/tiles and custom tags.
- Validation and error handing has been customized to take care of functional requirements.
- All business logic is hosted in applications server making it Database-independent.
- Most of the code is generic so that it can be ported to other Application servers with manageable effort.
- MBean services are created through JBoss Mbean services.
- Services like Caching are implemented using MBeans. This enables online refreshing of the cache incase of changed without shut down of the server.
- Messaging is implemented using "Java Message Service" API and Message Driven Enterprise Beans.
- Process intensive jobs like report generation, sending emails is implemented using Messaging.
- The job once done is communicated to application users by task/messages in the application.
- Reports Framework is implemented using Jasper reports.
- General reports use Jasper 1.1 reports for creating the reports in various formats.
- List printing used i-Text to generate reports in PDF format.
- Graph Framework.
- Graph framework is based on JFreecharts 1.0. This framework allows drill down images, display of 3D graphs, save options in JPG and PNG formats.
- Custom Framework.

- Single point data access and manipulation.
- Custom Error handling mechanism, screen validation mechanism.
- Screen rendering mechanisms.
- Context Sensitive Help.

Benefits
- Generic application to be used as Regular or ASP model.
- Implementation of product features using open source technologies and free ware tools for cost-effective deployment.
- Online updation of cache without restarting the server.
- Ability to customize the screen content with minimal change in code.
- Ability to implement in multiple databases and application servers.

Accomplishments

Creation of proprietary products using ProFra

Using this base framework Hexaware has already built two of its key products, catering to Wealth Management (Wealth Director) and Client Fee Billing (BMS)

Wealth Director

The WealthDirector (WD) product serves needs of banking, brokerage and financial planning companies. The platform is a turnkey asset management program, to provide technology and business-process outsourcing for sponsors who wish to offer managed accounts to retail investors. It provides a wide range of services to wealth managers, financial advisors, financial planners, retirement planners, asset & fund managers, trust managers and most importantly individual investors directly.

WD provides a user friendly web interface encompassing client's lifetime investments. It helps financial planners and managers analyze their investor-clients' need and keep track of their goals and investments.

BMS BMS™

The Billing Management System (BMS) addresses common problems faced by asset managers in the area of billing. It is designed keeping in mind the needs of asset managers whose clients are institutional (e.g. separately managed accounts such as pension funds, corporations, etc.) as well as private clients (e.g. high net worth individuals, families, trust and endowment funds, etc.).

BMS is designed to obtain basic account and balances information from one or more underlying portfolio accounting systems. BMS provides for maintenance of additional billing-related information, and for performing all the processing required to perform accruals, calculate invoices, review and release invoices, and to create extracts to accounting and UM type of systems.