



# IBM Industry Models for Insurance The Insurance Information Warehouse (IIW)

## General Information Manual



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# Executive Summary

## The Insurance Marketplace

Over the past decade, all insurance industry sectors have experienced profound transformations in their business environments. Deregulation, competition, technology advances and globalization combine to exert enormous pressure on insurers, brokers, asset managers and re-insurers and on their ability to respond to these changes. Some of these key forces shaping the insurance industry include:

### Shifting customer needs and expectations

- Erosion of traditional value propositions, including the emphasis on value delivered through personal relationships
- Willingness to assume more risk, and an increasing preference for self insurance and unbundled services
- Desire for self-direction, supported by rich sets of product and price information
- Requirements for new standards of convenience and service
- Demand for improved capabilities including mass customized products and services
- Increasing willingness to deal with multiple insurers, and change insurers more frequently

### Changing competitive dynamics

- Increasing focus on both revenue generation and cost reduction among existing insurers and emerging competitors
- Potential for dramatically lower acquisition costs for new entrants
- Ability of institutions to capitalize on existing trust-based or transaction-based relationships
- Increasing product and service commoditization through competitive actions and informational transparency
- Emerging lower cost distribution options, potentially favoring new competitors

### Emerging technology levers

- Rapid emergence of valuable but potentially disruptive new technologies
- Development of technologies enabling better collaboration and information sharing across insurers
- Technology-driven delivery efficiencies and economies
- Sustainable competitive advantages of insurers skilled at identifying and deploying key technologies

### Changing economic and business environment

- Continuing global deregulation fueling competition, threatening revenue streams, and eroding market shares
- Growing customer turnover in increasingly saturated markets, requiring higher customer acquisition rates merely to maintain market share
- Significant decline in long term investment returns, severely impacting revenues
- Unsustainably high combined and loss ratios
- Growing medical inflation, increasing numbers of class action suits, asbestos claims, and risk-covered catastrophes all impacting costs

In response to these forces, many insurance companies are determined to obtain and maintain market leadership by:

- Increasing emphasis on growth in core businesses
- Shifting focus from market share and acquisition to customer penetration, profitability, and retention
- Lowering costs relating to claims and claims management through streamlined processes and improved fraud detection
- Developing, bundling, and selling more innovative products more rapidly
- Improving customer relationships to build brand loyalty
- Using technology to improve product offerings and levels of service
- Restructuring the organization so it is more responsive to support market needs and customer requirements

In order to successfully address these issues the insurer must:

Acquire more customers with high value (or value potential)

Increase profitable product/service uptake

Reduce costs associated with claims management, policy administration, and distribution channel management

Broaden penetration – cross sell and up sell its own, and partner, products and services

Ration and target promotions to customers with value improvement potential

Reduce customer turnover – retaining valuable customers longer

Increasingly, insurers turn to the features and capacity of data warehouses to support them in making the best business decisions to face these challenges. Simply put, a data warehouse is a corporate level store of high quality and integrated data from a company's own operational systems (often supplemented with purchased data) that is structured for analytical use. The warehouses provide data for even more refined data in downstream data marts which are data subsets that are usually departmental, line of business, or business function oriented. Without a data warehouse and without the right analytical tools, making the right decisions in today's business environment is more than challenging - it may be impossible. Yet making better decisions faster can be the difference between surviving and thriving in an increasingly competitive insurance marketplace.

Well implemented data warehousing solutions provide information quickly and in a format that greatly improves the decision making process. The data warehouse allows insurance companies to exploit the potential of detailed information previously locked in legacy systems or summarized in distributed and often fragmented data marts, and hence inaccessible to the business user. The effective use of such consolidated information by an organization is commonly called "Business Intelligence".

### Typical Uses of Business Intelligence and Data Warehousing

Business Intelligence (BI) is no longer a luxury, but has become fundamental to the success and growth of business worldwide. Some of the initiatives undertaken through use of BI by insurers include:

- Customer prospecting and acquisition
- Improving agent productivity and associated costs
- Underwriting performance analysis
- Campaign performance management
- Revenue, cost, and profitability analysis

### Critical Success Factors in Business Improvement Facilitated by BI

<b>Customer Intelligence</b>		
<b>Critical Success Factors</b>	<b>Key Business Questions</b>	<b>Pain/Inhibitors</b>
Identify, acquire, grow and retain the most profitable customers.  Develop the 360 degree view across products, channels and life-cycles (life cycles of customers? Products? Channel? All?) that is necessary to understand:  - Customer usage behavior and spending patterns - Realized and unrealized margin contribution - Drivers of product bundle and channel profitability	Who are your most valuable customers?  What are their geo-demographic and usage profiles?  What is their product mix?  What is their turnover rate?  What is their growth potential?  How much can you expect to earn from them?  How do you identify similar prospects?	Most insurers lack a common customer key across lines of businesses

## Customer Relationship Management

Critical Success Factors	Key Business Questions	Pain/Inhibitors
Use Customer Value measures: <ul style="list-style-type: none"> <li>- Ration and target marketing and servicing resources</li> <li>- Increase the velocity of relationship marketing activities</li> <li>- Service and communicate through the most efficient and effective channels</li> <li>- Understand customer behavior, including changing risk and investment requirements</li> <li>- Improve credit risk management</li> </ul>	What percentage of your marketing budget is focused on acquisition?  What is your retention marketing ROI?  Which events have you identified as effective cross-sell triggers?  Which channels have the best response rates for "switch" promotions?	Most insurers lack the ability to measure marketing performance across campaigns and channels against stable baselines.  Effective CRM requires near real-time access to Customer Intelligence. Distributed data marts typically have poor end-to-end data latency (e.g. difficult real time access.)

### What is a Data Warehouse?

A data warehouse is a central repository of detailed and summarized data from disparate internal operational systems often supplemented with data from external sources. Operational and external source data is extracted, integrated, summarized, and stored into a data warehouse, and can then be accessed by users in a consistent and subject oriented format. Data that is organized around a business entity such as customer, product, or service area is more useful for analysis than operational applications which tend to be designed to support a vertical function of the business such as policy administration, accounts receivables, or general ledger.

A data warehouse has a very different structure from an OLTP system. Data in a warehouse vs. operational data may be:

- Archived and summarized as opposed to current or near current
- Organized by subject as opposed to application
- Static until refreshed as opposed to dynamic
- Simplified for analysis as opposed to complex for computation
- Accessed and manipulated as opposed to updated
- Unstructured for analysis as opposed to structured for repetitive processing

A data warehouse provides an on-line analytical processing (OLAP) data structure, as opposed to the operationally tuned OLTP data structure. A user wishing to perform OLAP may access many records per transaction, while OLTP users may only access one record one at a time. Analytical users rarely update data and require response times ranging from minutes to hours, while OLTP users constantly update individual records and expect sub-second response times.

An OLAP environment supports analytical queries against the data that represent an organization's state at a specific point in time. An OLAP data structure describes the organization of the data prepared for use with analytical (multidimensional) tools and allows for accessing, storing and manipulating the forms of information required by DSS, EIS and MIS applications. For example:

- Complex ad-hoc queries are submitted and executed rapidly because the data is stored in a consistent format
- Queries don't interfere with ongoing operations because the system is dedicated to serving as a data warehouse
- Data can be organized by useful categories such as customers or products because the data is consolidated from multiple sources.

## Business Advantages of Data Warehousing

There are several business benefits that can be delivered by the construction and use of a data warehouse:

Competitive Advantage	Gained from focused marketing campaigns, product structuring and bundling, promotional pricing, cross-selling, etc..
Customer Intelligence	Gained from understanding a customer's value across all products and services, evaluating responses to total customer needs, performing predictive analysis to define pre-emptive approaches that focus on building and retaining a valuable customer base, etc.
Risk Mitigation	Gained from understanding past experience and be able to predict future outcomes, minimization of credit risk, better fraud detection.
Profit Improvement	Gained from income planning, revenue optimization, accurate pricing / costing rules, understanding actual charges and discounts, analyzing historical activity, price performance monitoring, etc.
Organizational Efficiencies	Gained from the creation of profitable alliances, maintenance of optimal organization structure, quantifying measures and scores, rewarding on desired results, etc.

Business advantage is gained from using information in the data warehouse to develop a coherent business strategy, which enables the insurer to respond to the pressures of increased competition, to the need to increase the speed of marketing activities, and to expanding market globalization and product innovations. The data warehouse can be used here as a single source of consolidated data about:

Historical business trends	Product gaps and opportunities
Activity and performance targets	Cross-selling opportunities
Customer market segmentation	Sales and distribution channel performance
Premiums, commissions and investments	

Organization of information in this manner enables business advantage by identifying opportunities for:

Focused marketing campaigns	Product customization
Product bundling	Behavioral scores and rewards
Performance tracking	Cross-selling
Exposure management	Sales channel incentives
Promotional pricing	Competitor alliances
Wallet share and market share estimation	Forecasting and Planning

## Cost Versus Value Justification

There are two points to consider when justifying the cost of constructing the data warehouse. The first point is that while operational cost reductions can be realized by analytical use of the information in the data warehouse, incremental operational value can also be driven by it. For example, using the data warehouse to omit non-responding or non-profitable customers has been estimated to save 10% of direct marketing operational costs.

The second point is the most important: that the data warehouse is really about facilitating the acquisition of future revenue. The business drivers for this include the identification of new sources of revenue through more flexible market response capabilities and shorter product time to market. Resulting new insurance and investment products can generate faster growing or completely new revenue streams. The data warehouse supplies information about customer behavior with regard to their profitability, wallet share, and spending patterns. From this, opportunities may be identified for improving customer

relationships, leading to increased customer satisfaction, product uptake and usage (penetration), and retention.

The effect is significant: In a recent IDC report on the “Financial Impact of Business Analytics” found that data warehouse and business analytics implementation can generate a median five-year return on investment (ROI) of 112% with a mean payback of 1.6 years on average costs of \$4.5 million. Of the organizations included in this study, 54% have an ROI of 101% or more.

This study also shows that although a business analytics implementation is a substantial investment for an organization, it can deliver considerable benefits. For the study participants, value accrued through quantitative and qualitative benefits that ranged from increased business performance to reduced operations costs and improved customer relations. These organizations consider their particular business analytics implementation either a necessary cost of business or a critical factor in their plan for success and survival in a highly competitive market.

IBM helps organizations to accelerate achievement of similar results by providing a low risk data warehouse solution, which forms the foundation for the entire data warehouse development.

## **Building a Data Warehouse**

As data warehouses are typically run as stand-alone projects, building a data warehouse gives an organization a unique development opportunity. The results of implementing a data warehouse are immediate and quantifiable and the implementation need not interfere with business operations. Because the operational data of internal systems and external feeds potentially comes from many different sources, the first step must be to produce a logical model of an insurance company’s organizational (enterprise level) data requirements, fully independent of any particular application.

To achieve the organization-wide benefits of this modern information management , a comprehensive specification of the organization’s existing data must also be defined. Because designing and implementing this solution is a complex process – often much more complex than expected or planned for - many organizations may not have all the appropriate skills and resources available in-house to complete the project.

The most cost-effective solution with the shortest deployment time frame is to purchase a data warehouse architecture and blueprint and to tailor it to the insurance company’s specific requirements rather than to attempt to build from scratch.



# Insurance Information Warehouse Overview

## What is the IBM Insurance Information Warehouse?

IBM's Insurance Information Warehouse (IIW) is a fully realized development blueprint that enables insurance companies to build data warehouse solutions to suit their specific needs. IIW includes all of the key components required for the core of a data warehousing solution.

IIW comprises a flexible and scalable data warehouse infrastructure, enabling organizations to build a comprehensive data warehouse solution through phased development. This allows for rapid delivery of high business value deliverables by initially focusing on the business areas offering the greatest returns and feasibility, while building within a proven technical warehousing architecture.

IIW includes content to cover analysis in critical insurance business areas such as Profitability, Analytical CRM, Financial Reporting, and Risk Management. Selected analysis areas are described in further detail at the end of this chapter.

IIW has the flexibility to make possible the creation of a range of data warehouse solutions, from departmental data marts to enterprise-wide data warehouses.

IIW is a proven flexible and scalable data warehouse technical infrastructure which is required for successfully building a comprehensive data warehouse solution that provides the rapid delivery of business value without compromising on a sound and scalable structure.

IIW supplies that infrastructure blueprint. Consisting of analytical requirements satisfied by thousands of common business definitions and logical data structures, IIW is used by insurance companies to integrate data from multiple operational platforms and to design this data warehouse infrastructure.

## IIW Analytical Requirements

The IIW solution offers a set of Analytical Requirements that describe how information can be effectively structured and presented to business users. Examples include:

- Analytical CRM
- Claims Efficiency
- Intermediary Performance
- Business Performance
- Solvency II
- Sarbanes Oxley Act
- IAS

## IIW Business Model

The IIW Business Model is a flexible conceptual business model providing an implementation independent view of the data of the insurance business. It presents a common communication link between the specific warehouse implementation and the core operational data. A customizable business level data model, it enables agreement on common definitions for the data warehouse, and of information likely to be coming from multiple systems. This is described in further detail in Chapter 5.

## IIW Enterprise Model

The IIW Enterprise Model is an enterprise-wide entity-relationship model with pre-defined data warehouse structures for the insurance business. When used with any commercially available modeling CASE tool, IIW allows you to automatically generate the physical data warehouse database from the model. This is described in further detail in Chapter 6.



## Summary of Benefits and Advantages of IIW

- Delivers the means to competitive advantage by providing consolidated, consistent, and usable data structures
- Supports rapid implementation of warehousing solutions by identifying meaningful analytical data.
- Provides a combination of sound infrastructure techniques, a proven method for using data management product sets, and rich functional content.
- Eases the subsequent customization and extension of the data warehouse.
- Enables business users to more effectively control the definition and scoping of the data warehouse solution.
- Offers a lower total cost of ownership (TCO) by being easy to change leading to a high degree of re-usability and the ability to leverage existing company assets.
- Helps substantially reduce normal data warehouse development costs.
- Reduces project risks by providing a proven implementation roadmap.
- Offers straightforward integration with best-of-breed applications needed in data warehousing phases such as ETL, Insurance Analytics, Data Mining, OLAP and CRM tools.
- Enables the development of high-performance and scalable very large data warehouses (VLDW)

## Business Scope of the IIW - The Analytical Requirements

In practical terms, IIW Analytical Requirements offer:

- A comprehensive set of data mart templates.
- Coverage of major business intelligence issues faced by insurers.
- Mapping of each measure and dimension to the IIW Enterprise Data Warehouse (EDW) for rapid and accurate scoping of the data warehouse for a specific business issue while ensuring complete requirements-to-data traceability
- Conformity of dimensions and measures across the enterprise.
- Pre-defined views that let insurers quickly scope a particular business requirement across multiple reporting and data repository structures. These views can be easily customized and expanded to address other business areas.

The Analytical Requirements dramatically reduce the time and effort required in the analysis phase of the data warehouse implementation. Producing high-quality information at this early analysis stage provides the correct scoping and definition that reduces associated development risks and helps ensure a more successful implementation. This chart illustrates the structure and content of a sample Analytical Requirement for Financial Reporting, detailing a subset of the solvency analysis reporting requirements of P&C insurers.

The screenshot displays the 'Data - InfoSphere Data Architect' application. The left pane shows a tree view of the 'Analytical Requirements Model' with 'Solvency' selected. The main pane shows the details for the selected requirement: '<Analytical Requirement> Solvency analysis for p and c (non-life) insurance'. The interface includes a table with columns for 'Name' and 'Documentation'.

Name	Documentation
Above threshold factor for health insurance claims p...	The constant factor that is used to assign the propo...
Above threshold factor for health insurance premi...	The constant factor that is used to assign the propo...
Above threshold factor for non-health insurance dai...	The constant factor that is used to assign the propo...
Above threshold factor for non-health insurance pre...	The constant factor that is used to assign the propo...
Below threshold factor for health insurance claims p...	The constant factor that is used to assign the propo...
Below threshold factor for health insurance premi...	The constant factor that is used to assign the propo...
Below threshold factor for non-health insurance dai...	The constant factor that is used to assign the propo...
Below threshold factor for non-health insurance pre...	The constant factor that is used to assign the propo...
Claims outstanding brought forward at the beginni...	Claims outstanding brought forward at the beginni...
Claims outstanding carried forward at the end of the...	The total claims outstanding and carried forward at t...
Claims paid in reference period	The total amount of claims paid in this reference peri...
Gross claims attributable to reference period (annual...	Gross Claims attributable to Reference Period, cover...
Gross claims attributable to the reference period	The claims paid + the claims outstanding carried for...
Gross claims in health insurance attributable to the r...	The proportion of gross claims for health insurance a...
Gross claims in non-health insurance attributable to t...	The proportion of gross claims for non-health insuranc...
Gross claims net of reinsurance for the reference pe...	Gross Claims, less amounts recoverable from reinsur...
Gross premiums receivable or earned	The gross premium charged for the risk represented...
Minimum guarantee fund for p & c	An explicit monetary figure, defined by national regu...
Number of months in reference period	Used in the Claims Basis of Solvency calculation, whe...
P&C solvency result (claims basis)	Solvency calculation using the Second Method of Cal...
P&C solvency result (premium basis)	Solvency calculation using the First Method of Calcul...
Premiums receivable	(Gross Premiums Receivable) - (Premium Taxes and L...
Premiums receivable (annual basis)	Premiums receivable in the reference period, cover...
Premiums receivable for health insurance	Premiums receivable in the reference period for heal...
Premiums receivable for non-health insurance	Premiums receivable in the reference period for non-
Premium taxes and levies	The deductions due on the Gross Premiums receivab...
Proportion of claims not recoverable from reinsurers	The ratio of claim amounts that were not recoverabl...
Reinsurance recoverable from gross claims in refere...	The amount of reinsurance which is potentially able t...
Required margin of solvency for p & c	The higher of the P&C Solvency Result (Premium Bas...

### Analytical Customer Relationship Management

Advance Analysis	Campaign Analysis by Customer
Campaign Answer Analysis	Campaign Communication Analysis
Campaign contact analysis	Campaign cost analysis
Campaign installment analysis	Campaign profitability analysis
Campaign sales analysis	CrM event analysis
Cross-sell strategy analysis	Cross-selling forecasting analysis
Customer persistency analysis	Customer profitability analysis
Customer prospect optimization analysis	Customer retention analysis
Customer risk analysis	Customer satisfaction analysis
Customer service kpi for growth analysis	Customer service kpi for improvement analysis
Customer service kpi for optimisation analysis	Household policy volume analysis
Household value analysis	Person citation analysis
Policy event analysis	Policyholder behavior analysis
Surrender analysis	Switching analysis

### Profitability - Claims Efficiency and Analysis

Auto claim handling analysis	Auto loss event analysis
Claim handling performance analysis	Claim incoming recovery payments analysis
Claims audit analysis	Claims for It insurance analysis
Claims statistical analysis	Claims value variation analysis
Financial analysis of claims	Health claims analysis
Late claims analysis	Life, savings and investments claim analysis
Loss adjustment expenses analysis	Loss event analysis
P and c claims and premiums by risk group - accident year basis analysis	P and c claims and premiums by risk group - underwriting year basis analysis
P and c claims, expenses and technical provisions - accident year basis analysis	P and c net claims and premiums - accident year basis analysis
Claims monthly close off analysis	Claims value variation analysis
Year-to-date claims comparison analysis	Claim incoming recovery payments analysis

### Profitability - Intermediary Performance

Agency continuous professional development analysis	Agency manpower profile analysis
Agent achievements against internal performance benchmark analysis	Agent performance based on competency analysis
Agent training analysis	Customer feedback on intermediaries analysis
Intermediary compensation analysis	Intermediary persistency analysis
Intermediary production analysis	Intermediary sales performance analysis
New business volume analysis	Non-life insurance distribution channel value creation analysis

### Profitability - Business Performance

Asset management kpi for growth analysis	Asset management kpi for improvement analysis
Asset management kpi for optimisation analysis	Auto policy volume analysis
Average premium size analysis	Billing and collection analysis
Billing and collection kpi for growth analysis	Billing and collection kpi for improvement analysis
Billing and collection kpi for optimisation analysis	Business activity performance analysis
Business volume analysis	Contract management kpi for growth analysis

Contract management kpi for improvement analysis	Contract management kpi for optimisation analysis
Cost analysis	Debt flow analysis
Economic data analysis	Health business volume analysis
Health products profitability analysis	Health sales performance analysis
Insurance products cash flow analysis	Internal linked funds unit price analysis for It insurance
Investment performance analysis	Lt benefit payment kpi for growth analysis
Lt benefit payment kpi for improvement analysis	Lt benefit payment kpi for optimisation analysis
Management initiatives analysis	Marine policy volume analysis
Marketing kpi for growth analysis	Marketing kpi for improvement analysis
Marketing kpi for optimisation analysis	New business for It insurance analysis
Non-life (p and c) sales performance analysis	Overall performance analysis
Overall profitability analysis for p and c (ratio basis)	P and c claim kpi for growth analysis
P and c claim kpi for improvement analysis	P and c claim kpi for optimisation analysis
P and c premiums - accident year basis analysis	P and c premiums, claims and expenses - underwriting year basis analysis
P and C technical provisions - underwriting year basis analysis	Policy delivery analysis
Policy persistency analysis	Premiums for It insurance analysis
Product development kpi for growth analysis	Product development kpi for improvement analysis
Product development kpi for optimisation analysis	Regulatory information analysis
Sales and distribution kpi for growth analysis	Sales and distribution kpi for improvement analysis
Sales and distribution kpi for optimisation analysis	Sales forecast analysis

### Risk & Compliance - Solvency I

Capital adequacy analysis for with-profits business	Equalisation provisions analysis
Equalisation provisions technical account - Accident year basis analysis	Equalisation provisions technical account - Underwriting year basis analysis
Expenses for It insurance analysis	Fixed and variable interest assets analysis for It insurance
Index-linked assets analysis for It insurance	Linked funds balance sheet analysis - Lt insurance
Mathematical reserves analysis for It insurance	Non-linked assets analysis for It insurance
Profit and loss analysis for p and c insurance - technical account	Revenue account for internal linked funds - Lt insurance
Revenue account for It insurance	Solvency analysis for It insurance
Solvency analysis for supplementary accident and sickness insurance	Statement of solvency for all lines of business
Summary of new business for It insurance	Summary of premiums and claims - P and c insurance
Valuation analysis by contract and business for It insurance	Valuation interest rate analysis for It insurance
With-profits funds - payouts on maturity analysis	With-profits funds - payouts on surrender analysis
With-profits funds - realistic balance sheet analysis	Solvency analysis for p and c (non-life) insurance

### Risk & Compliance - Solvency II

Solvency II CoC Risk Margin - Life and Health reserve risk by run-off year and risk driver	Solvency II CoC Risk Margin - Interest rate term structure-dependent calculations
Solvency II CoC Risk Margin - Non-Life reserve risk by run-off year and risk driver	Solvency II CoC Risk Margin - Life and Health summary premium and reserve risk calculations by risk driver

Solvency II CoC Risk Margin - Summary CoC Risk Margin calculations	Solvency II CoC Risk Margin - Non-Life summary premium and reserve risk calculations by risk driver
Solvency II MCR - Reduction for Profit Sharing analysis by with-profits fund	Solvency II Eligible Capital
Solvency II SCR - Counterparty Default Risk	Solvency II MCR - Standard Formula
Solvency II SCR - Counterparty Default Risk analysis by derivative contract	Solvency II SCR - Counterparty Default Risk analysis by counterparty
Solvency II SCR - Health Underwriting Risk	Solvency II SCR - Counterparty Default Risk analysis by reinsurance contract
Solvency II SCR - Life Underwriting Risk	Solvency II SCR - Life Underwriting CAT Sub-Risk analysis by insurance policy
Solvency II SCR - Market Risk Concentration analysis by counterparty	Solvency II SCR - Market Risk
Solvency II SCR - Non-Life Underwriting CAT Sub-Risk analysis by catastrophic risk	Solvency II SCR - Market Risk Spread analysis by exposure
Solvency II SCR - Non-Life Underwriting Risk analysis by LOB and historic year	Solvency II SCR - Non-Life Underwriting Risk
Solvency II SCR - Standard Formula	Solvency II SCR - Non-Life Underwriting Risk analysis by LOB
Solvency II SCR - Operational Risk	Solvency II Balance Sheet Solo
Solvency II Balance Sheet Solo - Assets and Liabilities Valuation Analysis	Solvency II Balance Sheet Solo - Dated subordinated liabilities and hybrid capital
Solvency II Balance Sheet Solo - Own Funds Liabilities	Solvency II Balance Sheet Solo - Participation Investment Assets
Solvency II Balance Sheet Solo - Undated subordinated liabilities and hybrid capital	

### Risk & Compliance - Sarbanes Oxley Act

Sarbanes oxley act analysis (soa)	Sarbanes oxley act balance sheet analysis
Sarbanes oxley act cash flow analysis	Sarbanes oxley act statement of income analysis
Sarbanes Oxley Act Statement Of Change In Shareholders' Equity Analysis	

### Risk & Compliance - IAS

Admissible assets analysis	Balance sheet classified approach analysis
Balance sheet net assets approach analysis	Balance sheet order of liquidity approach analysis
Balance sheet portfolio basis approach analysis	Cash flow direct analysis
Cash flow direct fi analysis	Cash flow indirect analysis
Cash flow indirect fi analysis	Claims monthly close off analysis
IAS39 hedge measurement analysis	Impairment analysis
Income statement by function analysis	Income statement by nature analysis
Income statement fi approach analysis	Liabilities analysis for p and c (non-life) insurance
Liabilities and margins analysis for It insurance	Net assets analysis
Profit and loss (non-technical account) analysis	Statement of changes in equity analysis
Valuation analysis for financial instruments	

### Risk Management

Auto coverage risk period analysis	Auto premium payment analysis
------------------------------------	-------------------------------

Credit contract analysis	Credit withdrawal analysis
Effect of financial engineering on solvency analysis	Financial risk analysis
Insurance risk analysis	Interest rate risk analysis
Investment contract analysis	Liquidity risk analysis
Marine claim handling analysis	Maritime coverage risk period analysis
Maritime loss event analysis	Market analysis
Market risk analysis	Operational risk analysis
Reinvestment analysis	Risk pricing analysis
Underwriting analysis	Underwriting kpi for growth analysis
Underwriting kpi for improvement analysis	Underwriting kpi for optimisation analysis
Coverage component valuation analysis	Policy valuation analysis



# The Analytical Requirements

## Analytical CRM

**Advance Analysis** - Analysis of advances on investment contracts, as a function of policyholder profile, contact method and type of contract. Dimensions: - Time - Event - Communication - Product - Party profile - Policy - Charge - Investment vehicle - Advance - Fiscal regime - Financial objective

**Campaign Answer Analysis** - The campaign answer analysis records measures related to answers to questionnaires sent out by a campaign. Dimensions: - Time - Segment - Questionnaire - Campaign step - Communication medium - Geographic area - Party profile - Contact strategy

**Campaign Contact Analysis** - The campaign contact analysis records measures related to outbound and inbound contacts executed in a campaign. Dimensions: - Time - Segment - Questionnaire - Campaign step - Communication medium - Geographic area - Party profile - Contact strategy

**Campaign Installment Analysis** - Analysis of installments in all contracts and of additional installments resulting from marketing campaigns, as a function of policyholder profile and financial product. Dimensions: - Time - Product - Policyholder - Policy - Premium - Charge - Financial objective - Payment method - Payment origin

**Campaign Sales Analysis** - The campaign sales analysis records measures related to sales generated by a campaign, in terms of number of sold policies, generated revenue, total sum insured, and total commission paid out to agents. Dimensions: - Time - Product - Segment - Campaign step - Communication medium - Distribution channel - Geographic area - Party profile - Contact strategy

**Cross-sell Strategy Analysis** - The cross-selling analysis records measures related to written premium for active policy components. This analysis identifies the best cross-sell marketing strategy according to estimated potential revenues. Dimensions: - Time - Geographic area - Party profile - Cross-sell strategy

**Customer Risk Analysis** - Analysis of measurements related to risk factors. Dimensions: - Time - Policy – Product

**Customer Service KPI for Growth Analysis** - Analysis of the key performance indicators of the modelled organisation's customer service activities, to grow revenue. Dimensions: - Time - Line of business - Product - Distribution channel - Intermediary - Service provider - Party profile – Competitor

**Customer Service KPI for Growth Analysis** - Analysis of the key performance indicators of the modelled organisation's customer service activities, to optimise capital efficiency and manage enterprise risk. Dimensions: - Time - Line of business - Product - Distribution channel - Intermediary - Service provider - Service request - Party profile - Task: business activity, sub-process, process - Task performer: organisational unit, employee

**Household Value Analysis** - The household policy analysis records measures related to the number of policies held by a household, number of people in the household, number of adults, number of children, number of cars. Dimensions: - Time - Customer value - Intermediary – Organisation

**Policy Event Analysis** - Analysis of events affecting the policy, as a function of policyholder profile, contact method and type of contract. Dimensions: - Time - Event - Communication - Product - Coverage - Policy - Role player

**Surrender Analysis** - Analysis of surrender events on investment contracts, as a function of policyholder profile and underlying investment vehicle. Dimensions: - Time - Event - Product - Party profile - Policy - Charge - Investment vehicle - Fiscal regime - Financial objective

**Campaign Analysis by Customer** - A measure of campaign success from the customer perspective : e.g. new customers gained, existing customers cross-sold to, customers contacted but not bought again, and the premiums earned from each category. Dimensions: - Time - Communication medium - Distribution channel - Geographic area - Intermediary - Party profile - Product – Segment

**Campaign Communication Analysis** - Campaign communication analysis records measures related to communications generated by a marketing campaign. Dimensions: - Time (grain: day) - Campaign (grain: campaign) - Customer (grain: customer profile) - Communication (grain: communication purpose) - Intermediary For example, the measure Number of communications corresponds to the number of communications received per day, per campaign, per market segment, per communication purpose (for example, complaint), per communication channel role. This may be used to analyse the number of complaints generated by a marketing campaign.

**Campaign Cost Analysis** - The campaign cost analysis records measures related to the variable cost of the outbound and inbound contacts executed in a campaign. Dimensions: - Time - Segment - Campaign step - Communication medium - Geographic area - Party profile - Contact strategy

**Campaign Profitability Analysis** - The campaign profitability analysis records measures related to the revenues generated by a campaign as well as the costs associated with it. Dimensions: - Time (grain: month) - Campaign - Communication medium - Distribution channel (campaign initiator) - Geographic area ((territory target of campaign) - Contact strategy

**CRM Event Analysis** - The CRM event analysis records measures related to a number of CRM events in the lifecycle of customers/prospects (e.g. marriage, new child, new customer). Dimensions: - Time - Geographic area - Party profile - CRM event

**Cross-Selling Forecasting Analysis** - Records measures related to the probability of success for a targeted customer, as well as the written premium, acquisition cost and discounted profit associated to a cross-sold policy. That is, the measures related to the forecasted performance of targeted marketing campaigns, using the customer segments identified by the data mining algorithm and the propensity scores to cross-buy for each targeted customer. Dimensions: - Time - Product - Geographic area - Party profile - Forecast scenario - Cross-sell strategy

**Customer Profitability Analysis** - Analysis of profitability measurements at customer level (e.g. individual, household). Dimensions: - Time - Intermediary - Policy – Product

**Customer Retention Analysis** - Analysis of measurements related to the loyalty of the customer. Dimensions: - Time - Policy – Product

**Customer Satisfaction Analysis** - Analysis of measurements related to the customer satisfaction. Dimensions: - Time - Policy – Product

**Customer Service KPI for Improvement Analysis** - Analysis of the key performance indicators of the modelled organisation's customer service activities, to improve profit margin. Dimensions: - Time - Line of business - Product - Distribution channel - Intermediary - Service provider - Party profile - Task: business activity, sub-process, process

**Household Policy Volume Analysis** - The household policy analysis records measures related to the number of policies held by a household, total written premium and monthly written premium. Dimensions: - Time - Policy - Premium – Household

**Person Citation Analysis** - The person citation analysis records measures related to the person's citations. Dimensions: - Time (grain: month) – Person

**Policyholder Behavior Analysis** - Analysis of contracts held by the policyholder as well as movements made by the policyholder in each contract. Dimensions: - Time - Product - Geographic area - Party profile

**Switching Analysis** - Analysis of fund-switching on investment contracts, as a function of policyholder profile, type of product and underlying investment vehicle. Dimensions: - Time - Event - Product - Party profile - Policy - Charge - Investment vehicle - Fiscal regime - Financial objective

## **Profitability - Claims Efficiency**

**Auto Claim Handling Analysis** - Records measures related to number of auto claims, total claim amount, reinsurance and third-party recovery. Dimensions: - Time (grain: Day) - Vehicle (grain: Vehicle model) - Driver (grain: Person) - Policyholder (grain: Person) - Intermediary (grain: Intermediary) - Policy (grain: Policy) - Product component (grain: Product component) - Claim (grain: Claim)

**Claim Handling Performance Analysis** - This analytical subject area allows the monitoring and the identification of inefficiencies in the claims handling process. Resulting reports help to optimize suppliers networks and to improve operational efficiency and customer satisfaction. Dimensions: - Time (grain: Daily snapshot on a monthly, quarterly or yearly reference period) - Product component (grain: Product component) - Policy (grain: Policy) - Claim (grain: Claim) - Loss event (grain: Loss event) - Policyholder (grain: Person) - Organisation (grain: Branch) - Intermediary (grain: Intermediary) - Claim adjuster (grain: Person)

**Claims Audit Analysis** - The claims audit analysis allows a detailed follow-up of new claims raised, compliance to business rules (e.g. Reinsurance excess requirements), distribution of claims amongst intermediaries, loading of claim handlers, and so on. Dimensions: - Time (grain: Daily snapshot) - Product component (grain: Product component) - Intermediary (grain: Intermediary) - Policyholder (grain: Person) - Policy (grain: Policy) - Claim (grain: Claim) - Claim adjuster (grain: Person)

**Claims Statistical Analysis** - This analytical subject area allows a statistical analysis of claims per claim profile and product or class of business. Typically, the average claim amount and the claim frequency may influence decisions being made in product development. Dimensions: - Time (grain: Yearly snapshot) - Product component (grain: Product component) - Claim (grain: Claim)

**Financial Analysis of Claims** - Financial performance of the claims area as a whole, including paid/not paid, incurred, litigated, reopened and reported. Used in business areas such as financial planning, fraud detection, profitability, and the overall effectiveness of the Claims department. Dimensions: - Time - Product - Geographic area

**Late Claims Analysis** - This analytical subject area records measures about claims that are submitted late. Typically, lately submitted claims may help identify specific intermediary behavioural patterns, or may influence the calculation of renewal premiums. Dimensions: - Time (grain: Quarterly snapshot) - Product component (grain: Product component) - Intermediary (grain: Intermediary) - Policy (grain: Policy) - Claim (grain: Claim)

**Loss Adjustment Expenses Analysis** - Analysis of the costs associated with handling losses. Used to measure the performance of the underwriting activity, and as a key part of the calculation of risk premium. Dimensions: - Time - Product

**P and C Claims and Premiums by Risk Group - Accident Year Basis Analysis** - Low-level reporting of claims and premiums on an accident year basis. Dimensions : - Time (accident year) - Class of business  
Accident year must be understood as follows,  
- Gross premiums earned in respect of an accident year must be such proportion of gross premiums written as is attributable to risks borne by the insurer during that accident year;  
- Where an amount or number is required to be shown for claims in respect of an accident year, that amount or number must be determined on the basis of claims arising from incidents occurring during that accident year.

**P and C Claims, Expenses and Technical Provisions - Accident Year Basis Analysis** - Aggregate-level analysis of the claims activity. Reported on an 'accident year basis', i.e. showing claims activity in the current financial year arising from (1) incidents in the current financial year and (2) incidents from previous financial years but where claims were handled in the current financial year (i.e. the year being analysed).

**Year-to-Date Claims Comparison Analysis** - This analytical subject area allows the comparison of number of claims, claim payments and estimates between different periods. Dimensions: - Time (grain: Monthly snapshot) - Product component (grain: Product component)

**Auto Loss Event Analysis** - Analysis of auto loss events, with the main purpose to perform trend analysis in motor vehicle faults. Dimensions: - Time (grain: Day) - Car (grain: Car) - Policyholder (grain: Person) - Product component (grain: Product component) - Policy (grain: Policy)  
For example, the Number of accidents represents the number of accidents that happened to a person driving a vehicle at a certain day.

**Claim Incoming Recovery Payments Analysis** - This analytical subject area allows the monitoring of incoming recovery payments from third parties, reinsurers, and so on, in order to track the recovery of debts. Dimensions: - Time (grain: Monthly) - Policyholder (grain: Person) - Claim (grain: Claim) - Claim recovery (grain: Claim recovery)

**Claims for IT Insurance Analysis** - Claims Details for the financial year, compared with the previous year. One form for the whole business, and one for each fund category. Dimensions: - Time: total financial year, and previous year - Fund - Product

**Claims Value Variation Analysis** - This analytical subject area allows a comparison of claims estimates period after period, in order to identify open claims for which there is an important variation in the claim's estimate. Dimensions: - Time (grain: monthly snapshot) - Product component - Policyholder (grain: Person) - Policy (grain: Policy) - Claim (grain: Claim)

**Health Claims Analysis** - The health claims analysis allows the analysis of numbers and amounts of claims, but also the linkage of these figures to the trends of health expenditures by type of treatment, health care provider, and profile of the insured (age and gender). Dimensions: - Time - Health care provider - Insured - Medically necessary treatment



**Life, Savings and Investments Claim Analysis** - Analysis of claims associated with protection insurance, as a function of the insured and policyholder profile. Dimensions: - Time - Event - Product - Policyholder - Coverage - Policy - Benefit - Financial objective

**Loss Event Analysis** - The loss events analytical subject area records measures related to the distribution of claims across all types of loss events. It allows detailed analysis of claims and loss events from different angles. For example, these measures allow the reporting of claims relevant to major disaster or weather events to official insurance bodies and reinsurers

**P and C Claims and Premiums by Risk Group - Underwriting Year Basis Analysis** - Low-level reporting of claims and premiums on an underwriting year basis. Dimensions : - Time (underwriting year) - Class of business Underwriting year must be understood as follows, - Gross premiums written in an underwriting year must be the amount of such premiums arising in respect of contracts of insurance incepting during that underwriting year, whether or not they are received during that underwriting year; - Where an amount is required to be shown for claims in respect of an underwriting year, that amount must be determined on the basis of claims arising under contracts of insurance incepting during that underwriting year.

**P and C Net Claims and Premiums - Accident Year Basis Analysis** - Premiums and Claims detailed on a year-by-year basis of the occurrence of the accident upon which each claim is based. Dimensions : - Time (accident year) - Class of Business Accident year must be understood as follows, - Gross premiums earned in respect of an accident year must be such proportion of gross premiums written as is attributable to risks borne by the insurer during that accident year; - Where an amount or number is required to be shown for claims in respect of an accident year, that amount or number must be determined on the basis of claims arising from incidents occurring during that accident year.

## **Profitability - Intermediary Performance**

**Agency Continuous Professional Development Analysis** - Monitoring of continuous professional development (CPD) of agents through training. This also allows to identify training gaps. Dimensions: - Time (grain : week) - Agent - Training (grains : CPD category / status, source of training)

**Agent Achievements Against Internal Performance Benchmark Analysis** - Analysis of an agent's performance in terms of production, business quality, timeliness in processing applications and level of service. The results per agent are compared against internal agent performance benchmarks defined by the insurance company. These are the typical requirements for an agent to be awarded entry to the higher levels of internal recognition within the sales force. Dimensions: - Time (grain: month) - Agent - Product (grain: product) - Geographic Area (grain: work place)

**Agent Training Analysis** - This analysis tracks the professional development of agents via their performance in examinations, number of training hours and types of courses taken. It also analyses the profitability of the courses conducted, and assesses the training needs and preferences of agents through their response to courses. Dimensions: - Time (grain : month) - Agent - Training

**Intermediary Compensation Analysis** - Analysis of intermediaries' compensation in terms of the source of income. Dimensions: - Time (grain : month) - Intermediary - Geographic area (grain: work place) - Product - Commission (grain : commission type) - Premium (grain: premium frequency)

**Intermediary Production Analysis** - Analysis of an intermediary's business volume in terms of commission, premium and case count. Dimensions: - Time (grain : month) - Intermediary - Product (grain : group) - Geographical area (grain: work place)

**New Business Volume Analysis** - Analysis of profitability of Life, Pensions and Investment business by performing trend sales analysis. Dimensions: - Time - Intermediary - Product - Geographic area - Premium

**Agency Manpower Profile Analysis** - Analysis of the insurer's agency force according to their personal profile and professional competency levels achieved. Dimensions: - Time (grain : month) - Agent

**Agent Performance Based on Competency Analysis** - Analysis of agents' performance and competencies based on a range of key performance indicators. This analysis is performed to identify training gaps. Dimensions: - Time (grain : month) - Agent - Product (grain : product) - Geographical Area (grain: work place)

**Customer Feedback on Intermediaries Analysis** - Analysis of information received from customers about the performance of intermediaries, whether positive or negative. Dimensions: - Time (grain : month) - Intermediary - Customer feedback

**Intermediary Persistency Analysis** - Analysis of the efficiency of intermediaries in terms of quality and conservation of business. Dimensions: - Time (grain : month) - Intermediary - Geographic area (grain: work place) - Product (grain: product)

**Intermediary Sales Performance Analysis** - Analysis of sales performance in terms of commission, premium and case count. Dimensions: - Time (grain : month) - Intermediary - Geographic area (grain: work place) - Product (grain: product) - Premium (grain : premium frequency) - Commission (grain : calculation basis)

**Non-Life Insurance Distribution Channel Value Creation Analysis** - This analytical subject area allows an in-depth analysis of business value generated by different types of distribution channels (e.g. agents, brokers, direct) in Non-life insurance. The tree structure of its measures, combined with its Time dimension (reference year), allows an easier identification of the amounts that trigger the difference of business value from year to year. Dimensions: - Distribution channel - Time

## **Profitability - Business Performance**

**Asset Management KPI for Growth Analysis** - Analysis of the key performance indicators of the modelled organisation's asset management activities, to grow revenue. Dimensions: - Time - Line of business - Product - Category of assets - Party profile

**Asset Management KPI for Optimisation Analysis** - Analysis of the key performance indicators of the modelled organisation's asset management activities, to optimise capital efficiency and manage enterprise risk. Dimensions: - Time - Line of business - Product - Category of assets - Task: business activity, sub-process, process - Task performer: organisational unit, employee

**Average Premium Size Analysis** - Analysis of average premium by policy and policyholder. Dimensions: - Time - Intermediary - Product - Geographic area - Organisation - Premium

**Billing and Collection KPI for Growth Analysis** - Analysis of the key performance indicators for the modelled organisation's billing and collection activities, to grow revenue. Dimensions: - Time - Line of business - Product - Distribution channel - Party profile

**Billing and Collection KPI for Optimisation Analysis** - Analysis of the key performance indicators for the modelled organisation's billing and collection activities, to optimise capital efficiency and manage enterprise risk. Dimensions: - Time - Line of business - Product - Distribution channel - Intermediary - Party profile - Task: business activity, sub-process, process - Task performer: organisational unit, employee

**Business Volume Analysis** - The business volume analysis records measures related to written premium, sum insured and investment value. This analysis can be used to look at the business volume across a company's portfolio. Dimensions: - Time - Campaign - Intermediary - Policy - Product - Geographic area - Party profile

**Contract management KPI for Improvement Analysis** - Analysis of the key performance indicators for the modelled organisation's contract management activities, to improve profit margin. Dimensions: - Time - Line of business - Product - Task: business activity, sub-process, process

**Cost Analysis** - Analysis of total costs of the company per line of business. Dimensions: - Time (grain: monthly) - Line of Business

**Economic Data Analysis** - The analysis of management input and sales plans to achieve the insurance company's objectives.

**Health Products Profitability Analysis** - The profitability of healthcare insurance products is based on the gross profit obtained by comparing the premium and claim amounts. Dimensions: - Time - Product - Type of insurance Profitability is measure that identifies the difference between revenue earned (Income) and costs incurred (Expenses). Also known as Net Income. International Financial Reporting Standard IAS 1 92.

**Insurance Products Cash Flow Analysis** - Analysis of inflows and outflows of cash for all contracts, as a function of the type of financial movement. Dimensions: - Time - Product - Party profile - Policy - Financial objective - Financial movement

**Investment Performance Analysis** - Analysis of the effectiveness and efficiency that the modelled organisation achieves in performing the asset management processes and activities, in particular for managing investments. Dimensions: - Time - Line of business - Category of assets

**Lt Benefit Payment KPI for Improvement Analysis** - Analysis of the key performance indicators of the modelled organisation's benefit payment activities for Long-Term (Life and pensions) Insurance, to improve profit margin. Dimensions: - Time - Line of business - Product - Product component - Distribution channel - Party profile - Category of assets - Claim (type of claim) - Task: business activity, sub-process, process

**Management Initiatives Analysis** - The analysis of management input and sales plans to achieve the insurance company's objectives

**Marketing KPI for Growth Analysis** - Analysis of the key performance indicators for the marketing processes, to grow revenue. Dimensions: - Time - Line of business - Product - Distribution channel - Campaign – Competitor

**Marketing KPI for Optimisation Analysis** - Analysis of the key performance indicators for the marketing processes, to optimise capital efficiency and manage enterprise risk. Dimensions: - Time - Line of business - Product - Distribution channel - Campaign - Task: business activity, sub-process, process - Task performer: organisational unit, employee

**Non-Life (P and C) Sales Performance Analysis** - The analysis of policy sales, in terms of new business, renewals and endorsements.

**Overall Profitability Analysis for P and C (Ratio Basis)** - The overall profitability analysis of the company from a ratio perspective. Dimensions: - Time – Product

**P and C Claim KPI for Improvement Analysis** - Analysis of the key performance indicators for the claims management activities for P&C insurance, to improve profit margin. Dimensions: - Time - Line of business - Product - Coverage - Claim (type of claim) - Task: business activity, sub-process, process

**P and C Premiums - Accident Year Basis Analysis** - Annual reporting of gross premiums, subdividing earned, unearned and reinsurers' shares. Dimensions: - Time (accident year and month) - Class of business This analysis covers all premiums received during the financial year, distinguishing risks incepted during the current or previous financial years. Accident year must be understood as follows, - Gross premiums earned in respect of an accident year must be such proportion of gross premiums written as is attributable to risks borne by the insurer during that accident year;

**P and C Technical Provisions - Underwriting Year Basis Analysis** - Detailed analysis of claims and provisions, based upon the year in which the policy giving rise to the claim was underwritten. Dimensions : - Time (underwriting year and month) - Class of Business Underwriting year must be understood as follows, - Where an amount is required to be shown for claims in respect of an underwriting year, that amount must be determined on the basis of claims arising under contracts of insurance incepting during that underwriting year.

**Policy Persistency Analysis** - Persistency trend analysis to improve the way the company runs the business on a daily basis. Dimensions: - Time - Intermediary - Product - Party profile - Organisation - Policy

**Product Development KPI for Growth Analysis** - Analysis of the key performance indicators for the product development processes, to grow revenue. Dimensions: - Time - Line of business - Product - Competitor

**Product Development KPI for Optimisation Analysis** - Analysis of the key performance indicators for the product development processes, to optimise capital efficiency and manage enterprise risk. Dimensions: - Time - Line of business - Product - Task: business activity, sub-process, process - Task performer: organisational unit, employee

**Sales and Distribution KPI for Growth Analysis** - Analysis of the key performance indicators for the sales and distribution processes, to grow revenue. Dimensions: - Time - Line of business - Product - Distribution channel - Intermediary - Party profile - Competitor

**Sales and Distribution KPI for Optimisation Analysis** - Analysis of the key performance indicators for the sales and distribution processes, to optimise capital efficiency and manage enterprise risk. Dimensions: - Time - Line of business - Product - Distribution channel - Intermediary - Party profile - Task: business activity, sub-process, process - Task performer: organisational unit, employee

**Asset Management KPI for Improvement Analysis** - Analysis of the key performance indicators of the modelled organisation's asset management activities, to improve profit margin. Dimensions: - Time - Line of business - Product - Category of assets - Task: business activity, sub-process, process

**Auto Policy Volume Analysis** - Analysis of auto policy volume in terms of earned premium, written premium and so on. Dimensions: - Policy (grain: coverage) - Geographic area of the Policyholder's home (grain: Postcode) - Vehicle (grain: vehicle profile) - Product component - Intermediary For example, Earned premium measure represents the earned premium for a given reference date, per coverage, per geographic area of the Policyholder's home, per Insured vehicle profile, per product component and per intermediary.

**Billing and Collection Analysis** - Analysis of billing and collection. Dimensions: - Time - Line of business - Product - Distribution channel - Party profile

**Billing and Collection KPI for Improvement Analysis** - Analysis of the key performance indicators for the modelled organisation's billing and collection activities, to improve profit margin. Dimensions: - Time - Line of business - Product - Distribution channel - Party profile - Task: business activity, sub-process, process

**Business Activity Performance Analysis** - Analysis of the effectiveness and efficiency that the modelled organisation achieves in performing its business activities. Dimensions: - Time - Task: business activity, sub-process, process - Task performer, organisational unit - Product, line of business

**Contract Management KPI for Growth Analysis** - Analysis of the key performance indicators for the modelled organisation's contract management activities, to grow revenue. Dimensions: - Time - Line of business - Product - Party profile

**Contract Management KPI for Optimisation Analysis** - Analysis of the key performance indicators for the modelled organisation's contract management activities, to optimise capital efficiency and manage enterprise risk. Dimensions: - Time - Line of business - Product - Distribution channel - Task: business activity, sub-process, process - Task performer: organisational unit, employee

**Debt Flow Analysis** - The analysis of debt related ratios. The use of debt can improve returns to stockholders in good years and increase their losses in bad years. Debt generally represents a fixed cost of financing. Dimensions: - Time (snapshot).

**Health Business Volume Analysis** - The health business volume analysis focuses on new and in-force business in the specific domain of the health insurance portfolio. Dimensions: - Time - Insured - Product - Type of insurance - Intermediary – Policy

**Health Sales Performance Analysis** - The sales performance of the healthcare insurance line-of-business is analysed by comparing the planned numbers and amounts of premiums and claims to their corresponding actual numbers and amounts. Dimensions: - Time - Product – Intermediary

**Internal Linked Funds Unit Price Analysis for IT Insurance** - A statement, for each internal unit-linked fund, of the assets, charges, and change in value between the present valuation and the last. Dimensions: - Time (snapshot at end of current, and previous, valuation period) - Fund (one row in the analysis for each unit-linked fund)

**LT Benefit Payment KPI for Growth Analysis** - Analysis of the key performance indicators of the modelled organisation's benefit payment activities for Long-Term (Life and pensions) Insurance, to grow revenue. Dimensions: - Time - Line of business - Product - Product component - Distribution channel - Party profile

**LT Benefit Payment KPI for Optimisation Analysis** - Analysis of the key performance indicators of the modelled organisation's benefit payment activities for Long-Term (Life and pensions) Insurance, to optimise capital efficiency and manage enterprise risk. Dimensions: - Time - Line of business - Product - Product component - Distribution channel - Intermediary - Claim (type of claim) - Party profile - Task: business activity, sub-process, process - Task performer: organisational unit, employee

**Marine Policy Volume Analysis** - Analysis of maritime policy volumes in terms of earned premium, written premium and so on. Dimensions: - Time (Daily snapshot) - Coverage - Geographic area of the Policyholder's home (grain: country) - Ship - Product component - Intermediary

**Marketing KPI for Improvement Analysis** - Analysis of the key performance indicators for the marketing processes, to improve profit margin. Dimensions: - Time - Line of business - Product - Distribution channel - Campaign - Task: business activity, sub-process, process

**New Business for IT Insurance Analysis** - Detailed breakdown of new business by a range of dimensions: - Time : current financial year - Source of business : e.g. Direct, Reinsurance accepted external, Reinsurance accepted intra-group - Product (grain: product code) with aggregation on Class of business

**Overall Performance Analysis** - Trend analysis of key performance indicators of the insurance company. Dimensions: - Time - Line of business

**P and C Claim KPI for Growth Analysis** - Analysis of the key performance indicators for the claims management activities for P&C insurance, to grow revenue. Dimensions: - Time - Line of business - Product - Coverage - Claim (type of claim) - Party profile

**P and C Claim KPI for Optimisation Analysis** - Analysis of the key performance indicators for the claims management activities for P&C insurance, to optimise capital efficiency and manage enterprise risk. Dimensions: - Time - Line of business - Product - Coverage - Claim (type of claim) - Distribution channel - Intermediary - Task: business activity, sub-process, process - Task performer: organisational unit, employee

**P and C Premiums, Claims and Expenses - Underwriting Year Basis Analysis** - (underwriting year and month) - Class of Business Underwriting year must be understood as follows, - Gross premiums written in an underwriting year must be the amount of such premiums arising in respect of contracts of insurance incepting during that underwriting year, whether or not they are received during that underwriting year; - Where an amount is required to be shown for claims in respect of an underwriting year, that amount must be determined on the basis of claims arising under contracts of insurance incepting during that underwriting year.

**Policy Delivery Analysis** - This analysis applies to new policies that are delivered to customers by the intermediary. It analyses the speed of delivery of policy documents, and when they are not delivered at all. Dimensions: - Time (grain : month) - Intermediary - Geographic area (grain: work place) - Product (grain: product)

**Premiums for IT Insurance Analysis** - Premium Income for the financial year, compared with the previous year. One form for the whole business, and one for each fund category. Dimensions: - Time (total financial year, and previous year) - Fund

**Product Development KPI for Improvement Analysis** - Analysis of the key performance indicators for the product development processes, to improve profit margin. Dimensions: - Time - Line of business - Product - Task: business activity, sub-process, process

**Regulatory Information Analysis** - The analysis of regulatory information and restrictions from a regulatory body. It may lead to increase/decrease of total premium income of the insurance company. Dimensions: - Time - Geographic area - Line of business

**Sales and Distribution KPI for Improvement Analysis** - Analysis of the key performance indicators for the sales and distribution processes, to improve profit margin. Dimensions: - Time - Line of business - Product - Distribution channel - Intermediary - Party profile - Task: business activity, sub-process, process

**Sales Forecast Analysis** - The analysis and comparison of market and company forecasted measures, in terms of policy volumes, premium income, market share and growth rate. Dimensions: - Time - Geographic area - Line of business

## **Risk & Compliance - Solvency I**

**Capital Adequacy Analysis for With-Profits Business** - Calculates a 'regulatory surplus' for with-profits business, which is compared with the newly-introduced 'realistic surplus'. This is known as the 'Twin Peaks' approach to capital adequacy. The amount by which the regulatory surplus exceeds the realistic surplus is called the 'With-Profits Insurance Capital Component' (WPICC). The WPICC is then used to calculate the 'Enhanced Capital Requirement' (ECR) which is compared with the traditional Minimum Capital Requirement (MCR). The higher of the MCR and ECR is the 'Pillar 1' Capital Resources Requirement (CRR). Dimensions: - Time dimension shows snapshots at the end of the period in question and the previous period. - Fund The WPICC is calculated for each with-profits fund, then summed to give a total WPICC for the insurer.

**Equalisation Provisions Technical Account - Accident Year Basis Analysis** - Technical account information for the equalisation provision, using the accident year accounting approach. Dimensions: - Time (accident year) - Line of Business Accident year must be understood as follows, - Gross premiums earned in respect of an accident year must be such proportion of gross premiums written as is attributable to risks borne by the insurer during that accident year; - Where an amount or number is

required to be shown for claims in respect of an accident year, that amount or number must be determined on the basis of claims arising from incidents occurring during that accident year.

**Expenses for IT Insurance Analysis** - Detailed breakdown of business expenses by a range of dimensions: - Time (current year and previous year) - Fund - Product

**Index-linked Assets Analysis for IT Insurance** - A statement, for each index-linked fund, of the assets, liabilities and gross derivative value of the fund. Dimensions: - Time (snapshot at end of current valuation period only) - Fund Index-linked usually refer to the coupling of salaries and pensions etc. to the retail price index in order to make sure that the income from them keeps pace with inflation, and assets are valued and analysed accordingly.

**Mathematical Reserves Analysis for IT Insurance** - A summary of the mathematical reserves, calculated from four sub-groups : direct business (meaning all retail insurance conducted through whatever channel), Reinsurance accepted (external), Reinsurance accepted (Intra-Group), Reinsurance ceded, and net of reinsurance. The figures are all produced under individual analysis subject areas and summarised in this subject area. One form has to be completed for each category of assets (e.g. With-profits, Unit-linked), and one summary form for the whole company. Dimensions: - Time (one snapshot figure for the end of the financial year) - Category of asset

**Profit and Loss Analysis for P and C Insurance - Technical Account** - Financial returns showing the key business measures (premiums, claims and expenses) and a final figure for transfer to the Profit and Loss account. Figures are reported on an accident year basis : first for activity based on the current year's underwriting, then adjustments for previous years (i.e. activity this year based on underwriting done in previous years), followed by any adjustment from underwriting year accounting as opposed to accident year accounting.

**Revenue Account for IT Insurance** - Income and Expenditure for the financial year, compared with the previous year. One form for the whole business, and one for each fund category. Dimensions: - Time (total financial year, and previous year) - Fund

**Solvency Analysis for Supplementary Accident and Sickness Insurance** - Within the Solvency Calculations for Long Term insurance, there is a calculation for supplementary Accident and Sickness insurance offered by Life Companies. The calculation mirrors, in a simpler form, the solvency calculations for General Insurance.

**Summary of New Business for IT Insurance** - Detailed analysis of linked funds and unit liability. Summarises the 'Analysis of New Business' by fund type. Dimensions: - Time (current year and previous year)

**Valuation Analysis by Contract and Business for IT Insurance** - Summarises the valuation and reserve position for each asset category for all contracts within the long-term insurance fund, subdivided into twenty lower-level analyses in a four-by-five two-dimensional structure as follows Dimensions: - Time (snapshot at end of the financial year) - Category of Assets - Product

**With-Profits Funds - Payouts on Maturity Analysis** - Tabulates the insurer's standard payouts and benefits for with-profits policies that continue to maturity (or, in the event of Pensions, to normal retirement) against a specified set of criteria. Dimensions : - Time - Class of business - Policy term

**With-Profits Funds - Realistic Balance Sheet Analysis** - The calculation of the Realistic Surplus, the second of the 'twin peaks' of capital adequacy for with-profits insurance funds, along with the Regulatory Surplus. The Realistic Surplus seeks to allow for future payments to policyholders which are in effect inevitable but which have historically not been included in capital adequacy calculations. Dimensions: - Time (end of current period and end of previous period) - Fund

**Equalisation Provisions Analysis** - Calculation of equalisation provisions for the current financial year. Dimensions: - Time (current financial year) - Line of business

**Equalisation Provisions Technical Account - Underwriting Year Basis Analysis** - Technical account information for the equalisation provision, using the underwriting year accounting approach. Dimensions: - Time (underwriting year) - Line of Business Underwriting year must be understood as follows, - Gross premiums written in an underwriting year must be the amount of such premiums arising in respect of contracts of insurance incepting during that underwriting year, whether or not they are received during that underwriting year; - Where an amount is required to be shown for claims in respect of an underwriting year, that amount must be determined on the basis of claims arising under contracts of insurance incepting during that underwriting year.

**Fixed and Variable Interest Assets Analysis for IT Insurance** - Analysis of that part of the insurer's assets which are represented by fixed and variable interest assets. One form has to be completed for each category of assets (e.g. With-profits, Unit-linked, P

and C), and one summary form for the whole company. Dimensions: - Time, one snapshot figure for the end of the financial year. - Category of assets

**Linked Funds Balance Sheet Analysis - LT Insurance** - Detailed analysis of linked funds and unit liability. Dimensions: - Time (current year and previous year) - Fund Unit-linked: Some investment policies, such as endowment policies, are used to invest in other unit trust linked funds. These are called unit-linked life assurance policies. Traditional participating (with profits) and variable (unit-linked) contracts are examples of performance-linked contracts.

**Non-Linked Assets Analysis for IT Insurance** - An analysis of the insurer's assets which are not used to back 'linked' or 'unit-linked' funds, i.e. assets which back the 'with-profit' and 'non-profit' funds. Dimensions: - Time (one snapshot figure for the end of the financial year) – Fund

**Revenue Account for Internal Linked Funds - LT Insurance** - Detailed analysis of income and expenditure for internal linked funds and unit liability. Dimensions: - Time (current year and previous year) – Fund

**Solvency Analysis for IT Insurance** - The calculation of the Required Minimum Margin of solvency for insurers conducting long term insurance business (i.e. Life and Pensions), including any supplementary Accident and Sickness Insurance carried by them. The calculation involves breaking down the business into the different 'classes' of business which carry different solvency margins.

**Statement of Solvency for All Lines of Business** - Statutory calculations required to demonstrate the solvency of the business. Is based on the assets of the business, the premiums received, and the claims paid - all subject to various adjustments as defined by the regulators. This analytical subject area covers both the general insurance business and the long term insurance business and serves as the overall statement of Solvency. Dimensions: - Time (snapshots at the end of the period in question and the previous period)

**Summary of Premiums and Claims - P and C Insurance** - A high-level report of premiums, claims and provisions by class of business according to statutory reporting requirements. Dimensions: - Time (full financial year) - Class of business (where 'class' is by statutory reporting category)

**Valuation Interest Rate Analysis for IT Insurance** - Analyses the valuation interest rate for each long-term insurance fund which contains non-linked business, though smaller funds may be excluded as appropriate. Dimensions: - Time (snapshot as at end of valuation year) - Class of business - Fund

**With-Profits Funds - Payouts on Surrender Analysis** - Tabulates the insurer's standard payouts and benefits for with-profits policies that are surrendered before maturity against a specified set of criteria. Dimensions : - Time - Class of business - Policy duration at surrender

## **Risk & Compliance - Solvency II**

**Solvency Analysis for P and C (Non-Life) Insurance** - Statutory calculations required to demonstrate the solvency of the business. It is based on the assets of the business, the premiums received, and the claims paid - all subject to various adjustments as defined by the regulators.

**Solvency II CoC Risk Margin - Life and Health Reserve Risk by Run-Off Year and Risk Driver** - The estimates for reserves run-off for year 2 and onwards, as required in the calculation of the Cost-of-Capital Risk Margin, for life insurance and health portfolios.

**Solvency II CoC Risk Margin - Non-Life Reserve Risk by Run-Off Year and Risk Driver** - The estimates for reserves run-off for year 2 and onwards, as required in the calculation of the Cost-of-Capital Risk Margin, for non-life insurance portfolio

**Solvency II CoC Risk Margin - Summary CoC Risk Margin Calculations** - Calculations of the solvency risk margin for non-hedgeable risks, determined according to a Cost-of-Capital approach. Data and calculations are specified according to the methodology tested in the third Quantitative Impact Study (QIS3, 2007) performed by the Committee of European Insurance and Occupational Pension Supervisors (CEIOPS). All through this Solvency model references are made to the QIS3 Technical Specification Part 1 document, as 'QIS3 TS1', and to the QIS3 spreadsheet. Dimensions:

**Solvency II MCR - Reduction for Profit Sharing Analysis by With-Profits Fund** - 'solo' insurance undertaking (not a group/parent), by with-profits fund A with-profits fund is a group of with-profits insurance contracts with uniform characteristics, for which their share in the profit (surpluses) of the insurance undertaking are calculated in the same way (i.e constitute a profit-sharing group), including underlying liabilities and a ring-fenced set of assets backing these liabilities. The backing assets are not normally available to cover other liabilities. Dimensions: - Time (snapshots at the end of the period in question and the previous period) - Company (entity for which the statement of solvency is calculated and stored) - Profit Sharing Group

**Solvency II SCR - Counterparty Default Risk** - This subject area contains summarised measures for the risk driven by the possibility of default of all counterparties to risk mitigation contracts, such as reinsurance and financial derivatives contracts. This subject area is optional from the perspective of the Solvency II calculation methodology; it just offers an additional way of summarising capital charges for counterparty risk. The top-level measure data element is summarised via the analytical subject area ( in the Enterprise Model analytical layer).

**Solvency II SCR - Counterparty Default Risk Analysis by Derivative Contract** - This subject area contains measures for the risk driven by the possibility of default of counterparties in financial derivative contracts. Dimensions: - Time (snapshots for current period and previous period) - Company, in the role of reporting entity - Derivative contract

**Solvency II SCR - Health Underwriting Risk** - This subject area contains measures for the specific risks driven by underwriting of health insurance contracts. This area is concerned with health insurance that is practised on a technical basis similar to life assurance.

**Solvency II SCR - Life Underwriting Risk** - This subject area contains measures for the specific risks driven by underwriting of life insurance contracts. The life underwriting subrisks covered in this subject area are: mortality, longevity, disability/morbidity, lapse, expense, revision and catastrophe.

**Solvency II SCR - Market Risk Concentration Analysis by Counterparty** - This subject area contains detailed measures for solvency capital charges related to extra market risks due to concentrated asset portfolio, by counterparty. Dimensions: - Time (snapshots at the end of the period in question and the previous period; solvency reporting periods are normally calendar years) - Company - playing role of the solvency reporting entity (entity for which the statement of solvency is calculated and stored) - Company - playing role of Counterparty

**Solvency II SCR - Non-Life Underwriting CAT Sub-Risk Analysis by Catastrophic risk** - This subject area contains detailed measures for solvency capital related to specific non-life underwriting catastrophe risk, by catastrophe scenario.

**Solvency II SCR - Non-Life Underwriting Risk** - This subject area contains measures for the specific risks driven by underwriting of non-life insurance contracts. Refers to uncertainties as to: - the eventual position on claim settlements (timing and final amounts) - the future volume of business and future premium rates which the future business will be written at - whether the premium rates are sufficient to cover liabilities deriving from business written

**Solvency II SCR - Non-Life Underwriting Risk Analysis by LOB and Historic Year** - This subject area contains basic measures for solvency capital related to specific risks arising out of the underwriting of non-life insurance contracts, by line of business (prescribed risk drivers) and historic year.

**Solvency II SCR - Standard Formula** - Statutory calculations required to demonstrate the solvency of the business to regulators, for an insurance undertaking (either a solo entity or a group). This analytical subject area covers the standard formula prescribed for the calculation of the Solvency Capital Requirement, for a 'solo' insurance undertaking (not a group/parent). Data and calculations are specified according to the methodology tested in the third Quantitative Impact Study (QIS3, 2007) performed by the Committee of European Insurance and Occupational Pension Supervisors (CEIOPS).

**Solvency II CoC Risk Margin - Interest Rate Term Structure-Dependent Calculations** - The parameters for and calculations directly dependent on interest rates term structure, as prescribed by the EU Solvency II CoC Risk Margin methodology, for run-off years 1 to last

**Solvency II CoC Risk Margin - Life and Health Summary Premium and Reserve Risk Calculations by Risk Driver** - Risk Margin summary calculations for premium and reserve risk charges and factors, by life and health risk driver, according to the Cost-of-Capital methodology.

**Solvency II CoC Risk Margin - Non-Life summary Premium and Reserve Risk Calculations by Risk Driver** - Risk Margin summary calculations for premium and reserve risk charges and factors, by life and health risk driver, according to the Cost-of-Capital methodology.



**Solvency II Eligible Capital** - This subject area defines the measures for the insurance undertaking's capital eligible to cover the Solvency II SCR and MCR, including its split by capital tiers. The capital elements are determined in accordance to the valuation principles for assets and liabilities under Solvency II and to applicable accountancy standards. Dimensions: - Time (snapshots at the end of the period in question and the previous period; solvency reporting periods are normally calendar years) - Company - playing role of the solvency reporting entity (entity for which the statement of solvency is calculated and stored)

**Solvency II MCR - Standard Formula** - Statutory calculations required to determine the minimum level of capital that an insurance undertaking must hold in order to avoid the ultimate regulatory action of close to new business and portfolio run-off or transfer.

**Solvency II SCR - Counterparty Default Risk Analysis by Counterparty** - This subject area contains measures for the risk driven by the possibility of default of a given counterparty to risk mitigation contracts, such as reinsurance and financial derivatives contracts

**Solvency II SCR - Counterparty Default Risk Analysis by Reinsurance Contract** - This subject area contains measures for the risk driven by the possibility of default of counterparties in reinsurance contracts. Dimensions: - Time (snapshots for current period and previous period) - Company, in the role of reporting entity - Reinsurance contract

**Solvency II SCR - Life Underwriting CAT Sub-Risk Analysis by Insurance Policy** - This subject area contains detailed measures for solvency capital charges related to life underwriting catastrophe sub-risk, by insurance policy. Catastrophe risk (related to extreme events e.g pandemics) is related to biometric (mortality/disability) and lapse risks. Used in the calculation of the Solvency Capital Requirement for Life risk.

**Solvency II SCR - Market Risk** - This subject area contains measures of risk driven by the volatility of market prices for financial instruments (exchange rates, equities prices, interest rates etc.). Dimensions: - Time (snapshots at the end of the period in question and the previous period; solvency reporting periods are normally calendar years) - Company (entity for which the statement of solvency is calculated and stored)

**Solvency II SCR - Market Risk Spread Analysis by Exposure** - This subject area contains detailed measures for solvency capital related to the credit spread sub-risk module of the SCR market risk module, at the level of an individual exposure (financial asset).

**Solvency II SCR - Non-Life Underwriting Risk** - This subject area contains measures for the specific risks driven by underwriting of non-life insurance contracts. Refers to uncertainties as to: - the eventual position on claim settlements (timing and final amounts) - the future volume of business and future premium rates which the future business will be written at - whether the premium rates are sufficient to cover liabilities deriving from business written

**Solvency II SCR - Non-Life Underwriting Risk Analysis by LOB** - This subject area contains detailed measures for solvency capital related to specific risks arising out of the underwriting of non-life insurance contracts, by line of business (prescribed risk drivers). The classes of business must be as prescribed by regulatory authority for the purpose of calculating solvency capital requirements. Non-proportional reinsurance written is included, by specific sub-lines.

**Solvency II SCR - Operational Risk** - This subject area deals with the calculation of the specific solvency capital requirement amount driven by operational risks. Dimensions: - Time (snapshots at the end of the period in question and the previous period; solvency reporting periods are normally calendar years) - Company (entity for which the statement of solvency is calculated and stored)

## **Risk & Compliance - Sarbanes Oxley Act**

**Sarbanes Oxley Act Analysis (SOA)** - This analytical subject area allows the generation and analysis of the Security And Exchange Commissions (SEC) 10Q and 10K reports, which support the Financial Institution with regard to compliance with Sections 302 and 404 of the Sarbanes Oxley Act.

**Sarbanes Oxley Act Cash Flow Analysis** - To analyze a Financial Institution's Cash Flow which is the amount of cash a Financial Institution generates and uses during a period, calculated by adding non-cash charges (such as depreciation) to the net income after taxes. The Sarbanes Oxley Act Cash Flow Analysis template assists Financial Institutions in optimizing

report generation with regard to the Securities And Exchange Commissions (SEC) Forms 10Q and 10K regulatory filing requirements.

**Sarbanes Oxley Act stmt chg shrhldr eqty Analysis** - Sarbanes Oxley Act Statement Of Change In Shareholders' Equity Analysis: To analyze a Financial Institution's Statement Of Changes In Shareholders' Equity which includes net profit / loss for period, other gains and losses recognized directly in shareholders equity and the impact of changes in accounting policy and fundamental errors when these are presented as a prior period adjustment.

**Sarbanes Oxley Act Balance Sheet Analysis** - To analyze the Financial Institution's 10Q and 10K financial statement reports which report the Financial Institution's total assets, total liabilities, and total shareholders equity at a specific time. The Sarbanes Oxley Act Balance Sheet Analysis template assists Financial Institutions in optimizing report generation with regard to the Securities And Exchange Commissions (SEC) Forms 10Q and 10K regulatory filing requirements.

**Sarbanes Oxley Act Statement of Income Analysis** - The Sarbanes Oxley Act Statement Of Income Analysis template assists Financial Institutions in optimizing report generation with regard to the Securities And Exchange Commissions (SEC) Forms 10Q and 10K regulatory filing requirements.

## **Risk & Compliance – IAS**

**Admissible Assets Analysis** - An analysis of the insurer's assets. In Financial reporting, one form has to be completed for each category of assets. Dimensions: - Time dimension shows snapshots at the end of the period in question and the previous period. - Category of assets.

**Balance Sheet Net Assets Approach Analysis** - To analyze a Financial Institution Balance Sheet which reports the Financial Institution's assets, liabilities, and net worth at a specific time. The Net Assets approach is utilized for the associated measures and dimensions.

**Balance Sheet Portfolio Basis Approach Analysis** - To analyze a Financial Institution Balance Sheet which reports the Financial Institution's assets, liabilities, and net worth at a specific time. The Portfolio Basis approach is utilized for the associated measures and dimensions

**Cash Flow Direct FI Analysis** - To analyze a Financial Institution's Cash Flow which is the amount of cash a Financial Institution generates and uses during a period, calculated by adding noncash charges (such as depreciation) to the net income after taxes. The Direct Financial Institution approach is utilized for the associated measures and dimensions. International Financial Reporting Standard IAS 1 102 International Financial Reporting Standard IAS 1 8 d

**Cash Flow Indirect FI Analysis** - To analyze a Financial Institution's Cash Flow which is the amount of cash a Financial Institution generates and uses during a period, calculated by adding noncash charges (such as depreciation) to the net income after taxes. The Indirect Financial Institution approach is utilized for the associated measures and dimensions. International Financial Reporting Standard IAS 1 102 International Financial Reporting Standard IAS 1 8 d

**IAS39 Hedge Measurement Analysis** - This analytical subject area contains the base measures required for the calculation of Hedge Measurement according to the requirements of the International Financial Reporting Standards (IFRS) and more precisely International Accounting Standard (IAS) 39.

**Income Statement by Function Analysis** - To analyze a Financial Institution Income Statement which is a financial report that by summarizing revenues and expenses, and showing the net profit or loss in a specified accounting period it depicts a Financial Institution's financial performance due to operations as well as other activities rendering gains or losses. Also known as the profit and loss statement. The Function approach is utilized for the associated measures and dimensions.

**Income Statement FI Approach Analysis** - To analyze a Financial Institution Income Statement which is a financial report that by summarizing revenues and expenses, and showing the net profit or loss in a specified accounting period it depicts a Financial Institution's financial performance due to operations as well as other activities rendering gains or losses. Also known as the profit and loss statement. The Financial Institution approach is utilized for the associated measures and dimensions. International Financial Reporting Standard IAS 1 8

**Liabilities and Margins Analysis for IT Insurance** - This is a calculation/aggregation of all the liabilities and margins which relate to long term insurance. It is used as part of the Profitability and Solvency returns. One analysis per category of assets (including with profit, unit linked, non profit, stakeholder).

**Profit and Loss (Non-Technical Account) Analysis** - The Profit and Loss account as derived within the Financial Reporting function. Dimensions: - Time (shows values for the whole of the period in question and the previous period)

**Valuation Analysis for Financial Instruments** - The actuarial valuation process, typically conducted once per year, which governs the distribution of surplus, declaration of profits, and measurability against the statutory solvency requirements. The valuation is conducted once per 'fund or part of fund for which a surplus is determined', which may be an individually-marketed fund or an asset category (with-profit, non-profit etc.) , and aggregated for these other analyses.

**Balance Sheet Classified Approach Analysis** - To analyze a Financial Institution Balance Sheet which reports the Financial Institution's assets, liabilities, and net worth at a specific time. The Classified approach is utilized for the associated measures and dimensions.

**Balance Sheet Order of Liquidity Approach Analysis** - To analyze a Financial Institution Balance Sheet which reports the Financial Institution's assets, liabilities, and net worth at a specific time. The Order Of Liquidity approach is utilized for the associated measures and dimensions.

**Cash Flow Direct Analysis** - To analyze a Financial Institution's Cash Flow which is the amount of cash a Financial Institution generates and uses during a period, calculated by adding noncash charges (such as depreciation) to the net income after taxes. The Direct approach is utilized for the associated measures and dimensions. International Financial Reporting Standard IAS 1 102 International Financial Reporting Standard IAS 1 8 d

**Cash Flow Indirect Analysis** - To analyze a Financial Institution's Cash Flow which is the amount of cash a Financial Institution generates and uses during a period, calculated by adding noncash charges (such as depreciation) to the net income after taxes. The Indirect approach is utilized for the associated measures and dimensions. International Financial Reporting Standard IAS 1 102 International Financial Reporting Standard IAS 1 8 d

**Claims Monthly Close Off Analysis** - The claims monthly close off analysis records measures used to reconcile claims outstanding versus claims estimates. This analytical area provides executives with the ability to state claim liabilities on a monthly basis. Dimensions: - Time (grain: Monthly snapshot) - Product component (grain: Product component)

**Impairment Analysis** - Analysis of financial assets of which the carrying amount is greater than the recoverable amount. At each reporting date an enterprise should assess whether there is objective evidence that a financial asset or portfolio of assets is impaired. Dimensions: - Time - Fund

**Income Statement by Nature Analysis** - To analyze a Financial Institution Income Statement which is a financial report that by summarizing revenues and expenses, and showing the net profit or loss in a specified accounting period it depicts a Financial Institution's financial performance due to operations as well as other activities rendering gains or losses. Also known as the profit and loss statement. The Nature approach is utilized for the associated measures and dimensions.

**Liabilities Analysis for P and C (Non-Life) Insurance** - Analysis of all the liabilities of the business, comparing the current financial year with the previous year, and linking through to the Profit and Loss, and Solvency statements.

**Net Assets Analysis** - Models the Statement of Net Assets for an insurer's financial reporting returns. This brings together the two 'Admissible Assets Analysis' forms, one for Long term business and one for the rest. Dimensions: - Time (snapshots at the end of the period in question and the previous period) Net Assets comprise excess of the value of securities owned, cash, receivables, and other assets over the liabilities of the organization, included on the Balance Sheet, which is a financial statement that shows the financial position of the organization at a particular date. It consists of a list of assets, liabilities, and fund balances.

**Statement of Changes in Equity Analysis** - To analyze a Financial Institution's Statement Of Changes In Equity which includes net profit / loss for period, other gains and losses recognized directly in equity and the impact of changes in accounting policy and fundamental errors when these are presented as a prior period adjustment.

## Risk Management

**Auto Coverage Risk Period Analysis** - An analysis period of exposure-to-risk for a specific policy, coverage and vehicle. Risk periods are constrained by the criteria such as maximum time period, maximum of one accident, premium per unit time constant. Dimensions: - Time - Person - Vehicle - Intermediary - Policy - Household - Coverage

**Credit Contract Analysis** - Analysis of credit contracts and use of credit as a function of policyholder profile and financial product. Dimensions: - Time - Product - Policyholder - Policy - Financial objective

**Effect of Financial Engineering on Solvency Analysis** - This analytical subject area covers the potential impact of financial engineering on a long-term (such as life/health) insurer. Dimensions: - Time dimension shows snapshots at the end of the period in question and the previous period. Financial engineering is the process of employing mathematical finance and computer modeling skills to make pricing, hedging, trading and portfolio management decisions. Utilizing various derivative securities and other methods, financial engineering aims to precisely control the financial risk that an entity takes on. Methods can be employed to take on unlimited risks under certain events, or completely eliminate other risks by utilizing combinations of derivative and other securities.

**Insurance Risk Analysis** - Insurance risk relates to the uncertainty on the frequency, severity and time to payment of future claims and associated expenses. Also called underwriting or liability risk, its definition strongly depends on the specific character of the insurance product. The different sources of insurance risk are: - Model and parameter uncertainty (including the risk of parameters that change in time, such as uncertainty due to mortality trends or changes in legislation) - Volatility risk - Extreme event risk (catastrophes). Insurance risk also includes risks/uncertainty due to policyholder behavior once the insurance contract has come into force.

**Investment Contract Analysis** - Analysis of investment contracts in monetary funds and unit-linked funds. Analysis of correlation between allocation of savings at a given point in time as a function of policyholder profile and type of underlying investment vehicle. Dimensions: - Time - Product - Policyholder - Policy - Investment vehicle - Fiscal regime - Financial objective

**Marine Claim Handling Analysis** - Records measures related to number of ship claims, total claim amount, reinsurance and third-party recovery. Dimensions: - Time - Ship - Geographic area - Skipper - Intermediary - Policy - Product - Claim - Policyholder

**Maritime Loss Event Analysis** - Analysis of maritime loss events. Dimensions: - Time (grain: daily) - Ship - Skipper - Product (grain: product component) - Geographic area (grain: loss event location)

**Market Risk Analysis** - To evaluate the risk that the economic position of the company is affected by the performance of the financial markets. It includes the potential effects on the actual values of the assets and the liabilities (and therefore on the volatility of the surplus) as well as the potential effects on the level of the insurance liability cash flows through profit-sharing arrangements. Market risk includes inflation risk as far as inflation can affect future insurance liabilities (indexation) and expenses. Specific issues such as guarantees and embedded financial options, potential effects on policyholder behavior and management discretion applied in performance-linked profit sharing should also be addressed. IFRS 4.39(d), IAS 32.76

**Reinvestment Analysis** - Analysis of reinvestments in investment contracts, which may or may not result from marketing campaigns, as a function of policyholder profile. Dimensions: - Time - Event - Product - Policyholder - Policy - Fiscal regime - Financial objective

**Underwriting Analysis** - Analysis of contracts and coverages underwritten, as a function of customer profile, marketing campaigns, product and coverage profile, intermediary profile, and commission profile. Dimensions: - Time - Intermediary - Product component - Party profile - Organisation - Coverage - Policy - Commission - Charge - Investment vehicle - Fiscal regime - Financial objective - Underwriter

**Underwriting KPI for Improvement Analysis** - Analysis of the key performance indicators for the underwriting processes, to improve profit margin. Dimensions: - Time - Line of business - Product - Coverage - Task: business activity, sub-process, process

**Auto Premium Payment Analysis** - The premium payment analysis records measures related to policy component payments - premium income - and interest income gained from investment of premium in money markets. Dimensions: - Time - Vehicle - Place - Intermediary - Policy - Product

**Credit Withdrawal Analysis** - Analysis of credit withdrawals and use of credit as a function of policyholder profile and financial product. Dimensions: - Time - Product - Party profile - Policy - Financial objective

**Financial Risk Analysis** - Financial risks include the risk of a possible change in one or more of a specified interest rate, financial instrument price, commodity price, foreign exchange rate, index of prices or rates, credit rating or credit index. The most important components of this financial risk are interest rate risk, equity price risk, currency risk and credit risk. IFRS 4.IG2, Examples 1.15 and 1.19; IAS 39.AG12A. Financial risk is defined in terms of changes in the same variables used in the definition of a derivative in IAS 39.

**Interest Rate Risk Analysis** - To analyze the exposure of an asset or liability to market fluctuations in the level of interest rates. Particularly important is the impact of changes in the level of interest rates in long term insurance and investment contracts with guaranteed and fixed terms and long term insurance and contracts with discretionary participatory features (DPF); long term insurance and investment contracts without fixed terms (unit-linked); and borrowings and other financial assets (e.g.; interest rate swaps).

**Liquidity Risk Analysis** - To analyse the potential that the Financial services company may be unable to meet its obligations as a consequence of a timing mismatch between asset and liability cash flow patterns. The insurer is exposed to daily calls on its available resources mainly from claims arising from short term insurance contracts.

**Maritime Coverage Risk Period Analysis** - An analysis period of exposure-to-risk for a specific , and . Risk periods are constrained by the criteria such as maximum time period, maximum of one accident, premium per unit time constant. Dimensions: - Time - Ship - Intermediary - Policy - Coverage

**Market Analysis** - The analysis of markets' trend. Dimensions: - Time - Line of business - Competitor / Partner - Geographic area - Distribution channel

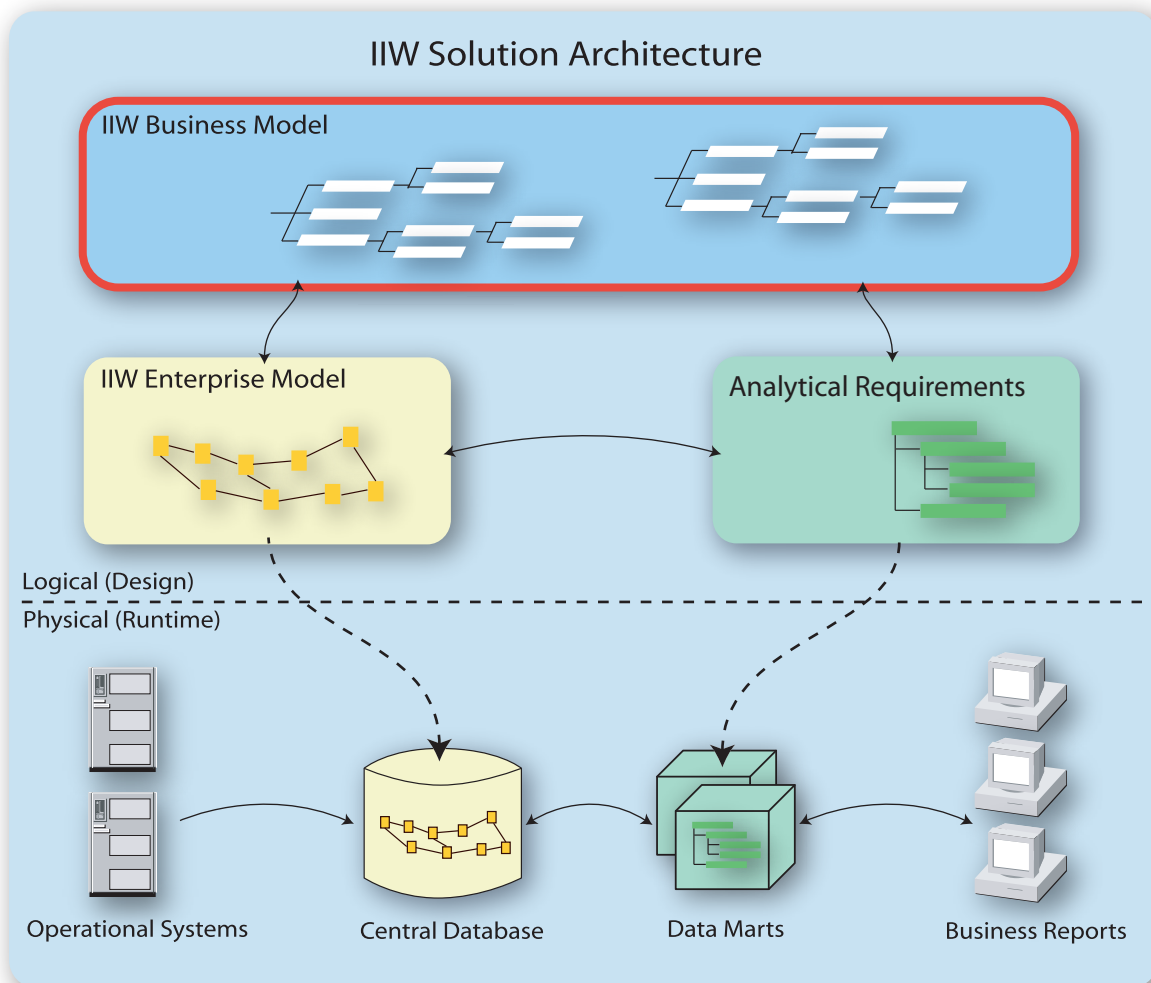
**Operational Risk Analysis** - To analyze the financial institution's operational risk loss events, the total exposure, loss insurance amounts, write-offs and other adjustments, in order to determine the actual impact on the financial institution's capital. The risk of loss results from inadequate or failed internal processes, people and systems or from external events

**Risk Pricing Analysis** - The risk pricing analysis records measures related to claims (e.g., claim frequency, claim severity, etc) and policies (e.g., earned premium) and the estimates generated as part of the Generalised Linear Model. Dimensions: - Time - Intermediary - Organisation - Policy - Product

**Underwriting KPI for Growth Analysis** - Analysis of the key performance indicators for the underwriting processes, to grow revenue. Dimensions: - Time - Line of business - Product - Coverage - Intermediary  
Underwriting KPI for Optimisation Analysis



# The Business Model



## What is the IIW Business Model?

The IIW Business Model is a data model designed specifically for the insurance industry, containing thousands of carefully constructed business definitions reflecting the result of many person-years of analysis. It provides an enterprise-wide view of data common to all insurers.

The Business Model has been developed to provide the insurer with a "jump start" in its model development process and to assist in maximizing the value of its information. It is a generic model, defining data that is widely applicable to any insurer. The information reflected in the data model is independent of organizational structure and has been validated by multiple sources within the industry.

The Business Model provides a vehicle for merging requirements of existing models and is designed for stability, flexibility and reusability. By using this model, the information management team can proactively support the business response to the dramatic changes that drive today's insurance industry.

The IIW Business Model represents upwards of 80% of the data required by an insurer in carrying out its core business. Rather than a simplistic listing of data types and definitions, it is a fully defined set of fulfilled business requirements, delivered in a model structure that is designed to address key issues that face insurers in the current environment of deregulation, changing social welfare parameters, product innovation, and accelerating technological change and to reflect the industry's key business values.

The Business Model covers data to support analysis such as:

<p><b>Improved customer care</b></p>	<p>It reflects the complex inter-relationships between customers and between customers and the insurer. It distinguishes between the natures of the customers themselves and the relationship the customer has with the insurer and becomes a pivotal component in the insurer's response to changing market dynamics. The model exposes the data that enables the business to refine its approach to the management of customer relationships while providing information systems staff with a blueprint for integrated customer care systems.</p>
<p><b>Rapid development of new products</b></p>	<p>It recognizes that products can be rapidly assembled from fundamental components and readily packaged together. It understands the distinction between marketable products and the components that make up those products. Further, it recognizes the complex ways in which a product may be acquired by a customer and then be serviced by direct or indirect channels. By clarifying the distinction between a marketed product and the policy, pension, or investment policies themselves, the model enables the insurer to plan and manage the increasingly complex relationships between the products and services offered and the means of selling, servicing and fulfilling those products and services.</p>
<p><b>Complex relationships with competitors</b></p>	<p>It recognizes that competitors can also be customers and, on occasion, strategic partners. It allows for these changing roles and the corporate policies, regulations, and agreements that impact these roles.</p>
<p><b>Integration of business</b></p>	<p>The Business Model does not differentiate fundamental data according to lines of business or organizational structures. The model reflects a fully integrated view of data that can be used by all segments of the business. The model focuses on providing the insurer with a means of understanding the different facets of each business challenge, and how those facets can then be combined into a solution. It cuts through the confusion of legacy systems and provides the path to coordination among business applications.</p>

### Features of the Business Model

The Business Model is an enterprise-wide model of the business requirements of a global, generic player in the Insurance Industry. Expressed in data that satisfies those requirements, the Business Model covers the many business areas in the insurance industry. Its key features are:

- A layered model structure with sufficient detail to represent the data requirements of a multi-line insurer operating in an international environment
- Use of advanced modeling techniques to encourage reusability of system assets
- Composite data model for defining system requirements
- Designed for flexibility in extension and expansion
- Customizable to provide a platform for improved data management and systems development
- Structured to provide direct benefit in all phases of the systems development life cycle
- Defined with full integration to the Enterprise Model
- Structured starting point to integrate data and process

### Benefits of Using the Business Model

- Rigorous specification of data requirements to reduce redundancy of information across the enterprise
- Common definitions for improved accuracy and consistency of data

- Facilitates the application development life cycle thereby reducing system and lost opportunity cost
- Consistent data architecture for modeling new or changed requirements
- Customizable model and that can incorporate the organization's unique data requirements and business rules
- Focuses the development effort on validating, enhancing, and extending data requirements rather than devoting time to the labor-intensive process of developing a data model for the enterprise from the ground up.

IIW has been developed with the assistance of insurance companies, other insurance professionals, and data warehousing experts. The structure, especially that of the business model, is designed to be readily understood and navigated by those who may have had minimal exposure to data modeling. At the same time, the structure and rigor of IIW satisfies the needs of the experienced modeler and analyst. Consequently, IIW provides a communication bridge between the business and the technical professionals within the organization.

## The Packages

The Business Model is organized into key 'packages', each focused on a specific business concept:

Account and Fund	Customer accounts, monetary accounts (liabilities, reserves, revenues), financial asset holding and funds need to be considered in the insurer's accounting process.
Activity	Various activities are of interest to an insurer, especially those in the underwriting and claims management areas. During the underwriting process, the insurer needs to understand its exposed risk, based on the activities performed by the insured, either professionally or privately. For example, an insurance company may decide not to cover certain occupations or hobbies or may request an additional premium for the added risk. During the claims management process, the insurer needs to understand the circumstances that surround the loss event resulting in a claim. Activities describe what the different parties were doing at the time of the loss event. The activities are validated against the conditions defined in the insurance agreement, with the result that the claim may not be paid if the conditions are not met.
Actuarial Statistics and Index	Actuarial statistics may be managed either internally or externally to the insurance company, and typically represent a table or algorithm to supply a particular value based on a set of parameters associated with the insurance agreement. Indexes are usually defined by an external body, but are used within the product structure to define how monetary amounts will be incremented or decremented over time.
Assessment and Condition	Assessments are used by the insurer to represent the results of an evaluation based on a subjective opinion or a scientific approach. Condition is the state of a place, a physical object, or an activity occurrence existing at a given point in time.
Claim	Claim enables the insurer to represent requests for insurance benefits (money, services or goods), and to show how these requests for benefits are related to the different aspects of the insurance business. The definition of a claim in the context of the model involves the structure of a claim (the splitting of a claim into smaller claims parts), the responsibilities of a claim (what the operations to be performed by a claim are, and what information is to be included in a claim), and the relationships claims have with other areas in the organization.
Contact Point and Preferences	Contact Point and Preferences represent addresses in a general sense (postal addresses, also include telephone numbers, e-mail addresses, and so on) as well as preferences of how customers want to be contacted (timing preferences, preferred name to use in communication, person by whom you prefer to be contacted and so on).
Event	Many events (life events, business events, loss events, etc..) are of interest to the insurer. A special case of event is a loss event that represents an event that caused a loss to an insured as covered by an insurance contract.

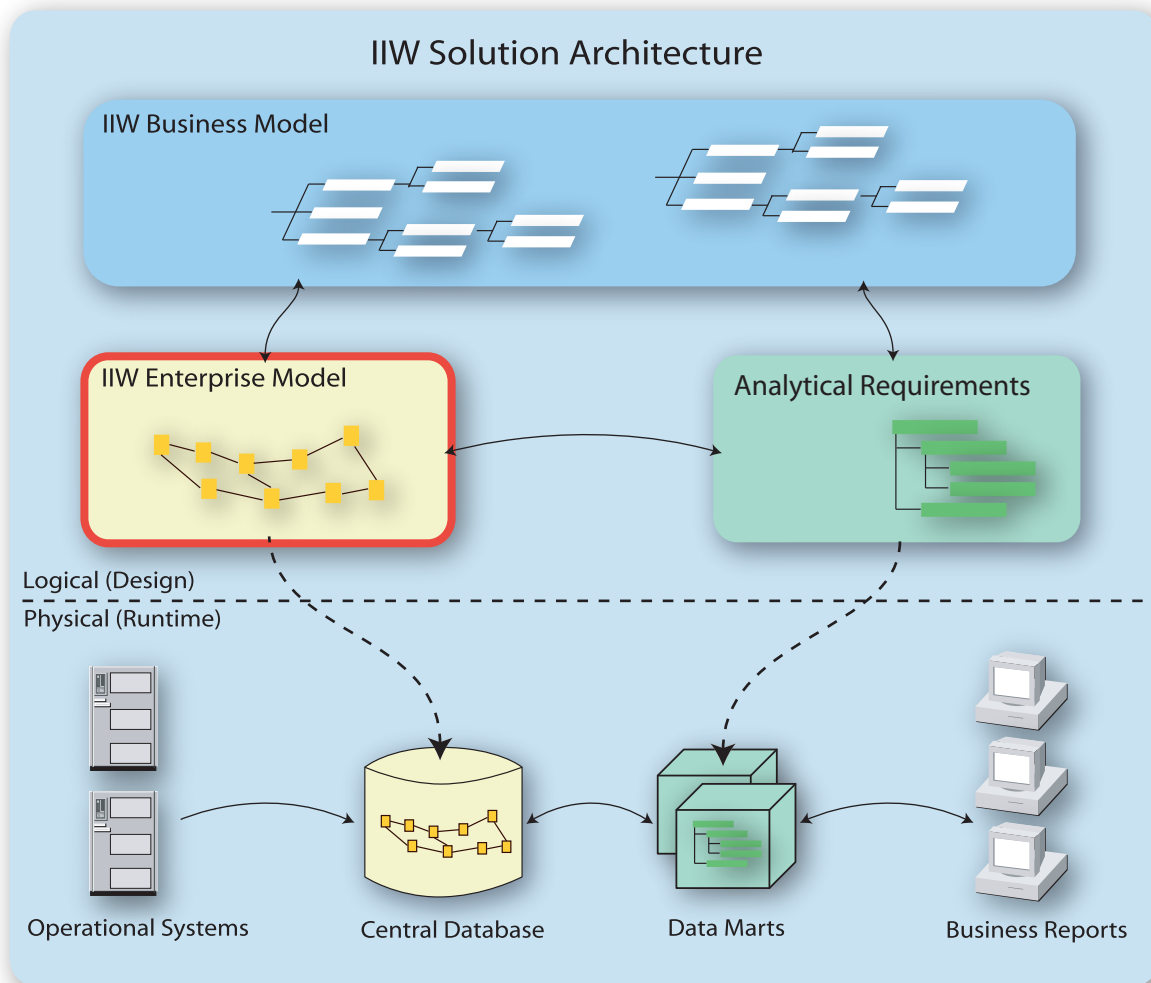


Financial Transaction	<p>Financial transaction allows an insurer to define accounts receivable (inbound payments due), accounts payable (outbound payments due), payments in, and payments out, and to capture the relationships between these transactions. Outbound payments (for example, the payment of a claim to a customer) result from the accounts payable, whereas inbound payments (for example, a customer paying his premium) are created by recording of the physical money transaction as registered by a bank.</p> <p>Naturally, the concept of Financial Transaction is closely related to the Account, as all financial transactions must be posted to accounts via account entries.</p>
Goal and Need	<p>Goal and Need represents the financial objectives or requirements of a customer or a market segment. It includes natural phenomenon protection, liability protection as well as financial planning. Financial planning covers the areas of retirement funding, education funding, dependent protection, purchase of durable goods, tax reduction, risk minimization, and so on.</p>
Legal Action	<p>A legal action represents a process of having a court of law (or any recognized arbitration body) render judgment on a dispute between two parties or groups of parties. This includes criminal and civil cases. This may be caused by non-fulfillment of a delivery of financial liability, service, or goods or by the breaking of an agreement between two or more parties. Disputes may be resolved by an independent arbitrator appointed by the insurance companies involved, or by a court care. Disputes may arise for different reasons, but very often are related to claims; for example, when the liability of a claim is disputed, when a subrogation is issued, when financial obligations are not met, or when the cost of a service is disputed.</p>
Money Provision	<p>Money Provision identifies monetary amounts outside the context of billing and accounting that are likely to become payable to or by the insurer. Money Provision makes it possible to define how much money can be payable, by whom and to whom, and how the payments will be scheduled over time when the money becomes payable. It is therefore strongly related with other concepts in the model, such as Product and Agreement, Activity, and Claim, and to the financial related areas, such as Financial Transaction and Account.</p>
Party	<p>Party represents all participants in the Organization's environment that are of interest to the Organization. It covers information about people, organizations, divisions of organizations, government agencies, clubs, businesses and many other parties. Party also covers the involvement that parties can have in different business contexts, such as administering a contract and processing a claim.</p>
Physical Object	<p>The objective of the Physical Object concept is to define physical objects such as cars, houses, human bodies, or any grouping of these from a risk and claims management perspective. All physical objects that can be covered by an insurance policy, excluded from insurance, or involved in a claim, are represented in the model. Physical objects can also be used as collateral in financial services agreement (like a house in a mortgage for example).</p>
Place	<p>Place allows an insurer to represent places from a risk management perspective as well as from a territory management point of view. Place is a bounded area defined by nature, by an external authority (such as a government) or for an internal business purpose. Used to identify a location in space that is not a structured address; for example, country, city, continent, postal area or risk area. A place may also be used to define a logical place in a computer or telephone network.</p>
Registration	<p>Registration defines the existence of different types of official registrations and the role of each of these types of registration in the insurance business. Registration represents the formal recording by an authorized body of the granting of rights, privileges, favors, or statuses.</p>

<p>Specification, Product &amp; Agreement</p>	<p>Allows an insurer to model financial services products and to define how financial services agreements are created and maintained based on the definition of a product. An agreement specification indicates the type of product or product component on which the policy or policy component is based. It maintains an inventory of products, coverages, and so on. An agreement represents a mutual understanding between two or more parties, each committing themselves to fulfill one or more obligations. An agreement can also represent an intermediary agreement, as in an agency contract or a brokerage contract or an employment agreement between the insurer and an employee.</p>
<p>Standard Text and Communication</p>	<p>Standard Text and Communication is used to define templates that can be used for mass-generating documents, as well as to look up important documents the insurer wants to keep track of in its operations. It is also used to keep track of communications: the receiving or sending (or of the intention to send) of a communication between two parties, for example a telephone call, a letter, a fax, an e-mail or a meeting.</p>



# The Enterprise Model



## What is the Enterprise Model?

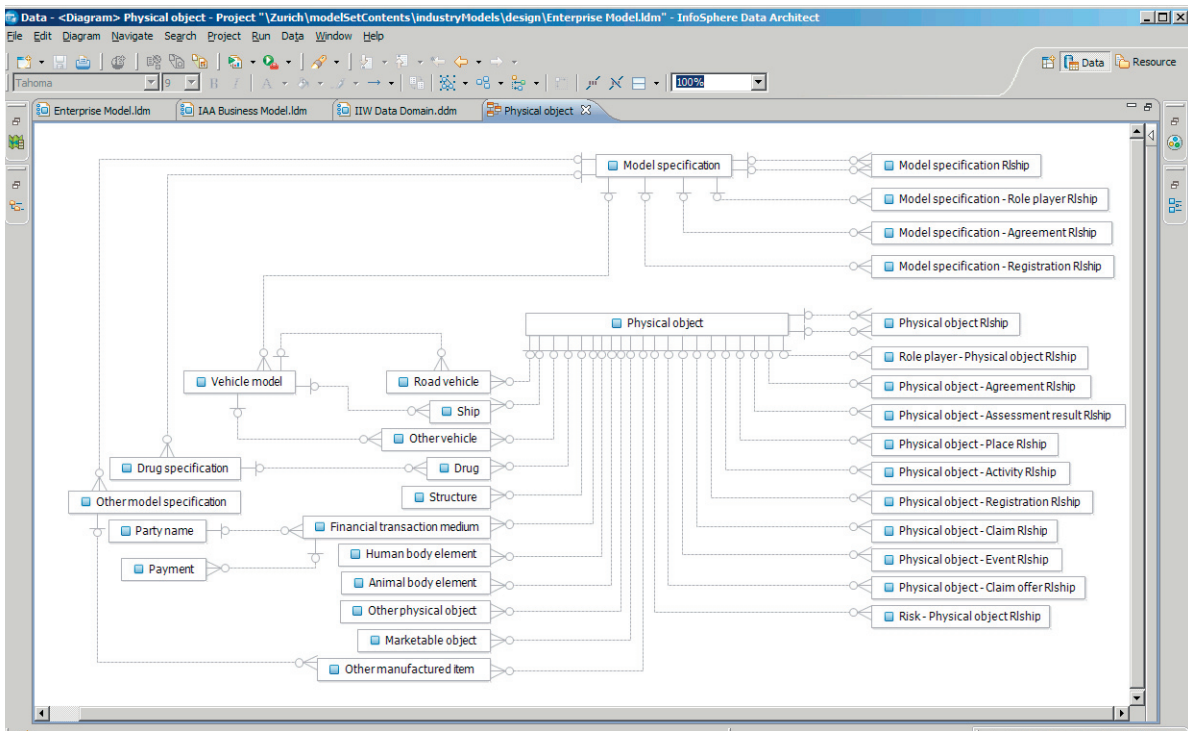
Once the data requirements are accounted for and validated in the Business Model, that data must be put into a structure that is specifically appropriate for the data warehouse and data marts. In essence, this data is carefully organized in accordance with its intended informational use for easier consumption by the end user.

The Insurance Information Warehouse Enterprise Model provides both the content and the structure to support the provision of this clean, rationalized, and easily accessible data from a central information repository.

The Enterprise Model is a logical model consisting of the data structures typically needed by an insurer for a data warehouse. Once the logical model has been customized to meet the exact requirements of the insurer, the physical data warehouse database definition can be automatically generated through the use of a modeling CASE tool.

A logical model is a representation of an insurer's data or information requirements and is usually represented in an Entity Relationship Diagram (ERD) using business definitions. The data needs are represented without consideration for technology constraints associated with platforms, tools, and software or how the application will be finally implemented. It is generic and flexible in design and facilitates an insurer's understanding of the true meaning of its data.

An example of an ERD from IIW is shown:



The Enterprise Model features a flexible “Atomic Data” area (primary data storage area) as well as the typical summaries needed by most insurers to roll-up the detail data for analysis purposes. The Enterprise Model has been designed to be one step from a physical data base generation. Normally, only a portion of the Enterprise Model is generated in the initial project phase. Other areas can be generated as the insurer tackles more business areas over time.

This comprehensive data model is derived from IBM’s highly successful Insurance Application Architecture (IAA) Business Model, from customer development partnerships, and from leading data warehousing design practices. The Enterprise Model can be used as the basis for supporting a detailed analysis of the areas of most concern to insurers today:

- Relationship management
- Profitability and performance of customers, products and channels
- Maximization of wallet share
- Customer loyalty and retention
- Enterprise-wide risk management
- Improvement of cross-selling ratios
- Marketing campaign management
- House holding
- Consistent definition of customer and products across the organization
- Identification of purchasing and product usage patterns

### Uses of the Enterprise Model

The Enterprise Model can be used as:

- The blueprint for a design of a central business data warehouse database structure. In this case the Enterprise Model assists in the creation of a flexible and extensible data warehouse-specific physical database.
- A logical reference point for the consolidation of data definitions and structures across a number of data marts.
- A starter set for the design of a data mart. In this case the structure can be optimized for the performance of end-user delivery functions or specific application (e.g., CRM).

- A logical reference point for the consolidation of data definitions and structures across lines of business and in cases of mergers and acquisitions, customer loyalty and retention.

### Major Groupings within the Enterprise Model

The Enterprise Model contains current and historical, atomic and summarized, de-normalized corporate data. Its purpose is to deliver a unique, consolidated, consistent, aggregated at the most detailed level, corporate source of information for distribution to users with specific needs. The Enterprise Model contains:

- A de-normalized representation of the atomic information of interest for the data warehouse. This part is derived from the normalized atomic information represented in the Business Model and is used as the basis to derive the dimensional structures.
- A dimensional representation of the analysis areas, which includes conformed dimensions and conformed facts (where conformed means “defined consistently”). The Enterprise Model represents summarized and aggregated information. It uses dimensional modeling techniques to present data in a standard, predictable, intuitive framework that sustains high-performance physical access.
- Historical information.

### Atomic Data

This is the component of the data warehouse that acts as the primary storage area for the data in the data warehouse. Typically this component is populated by data coming from the operational systems. The data structures in the Atomic Data are usually generalized and the bulk of the Enterprise Model would fit into this component.

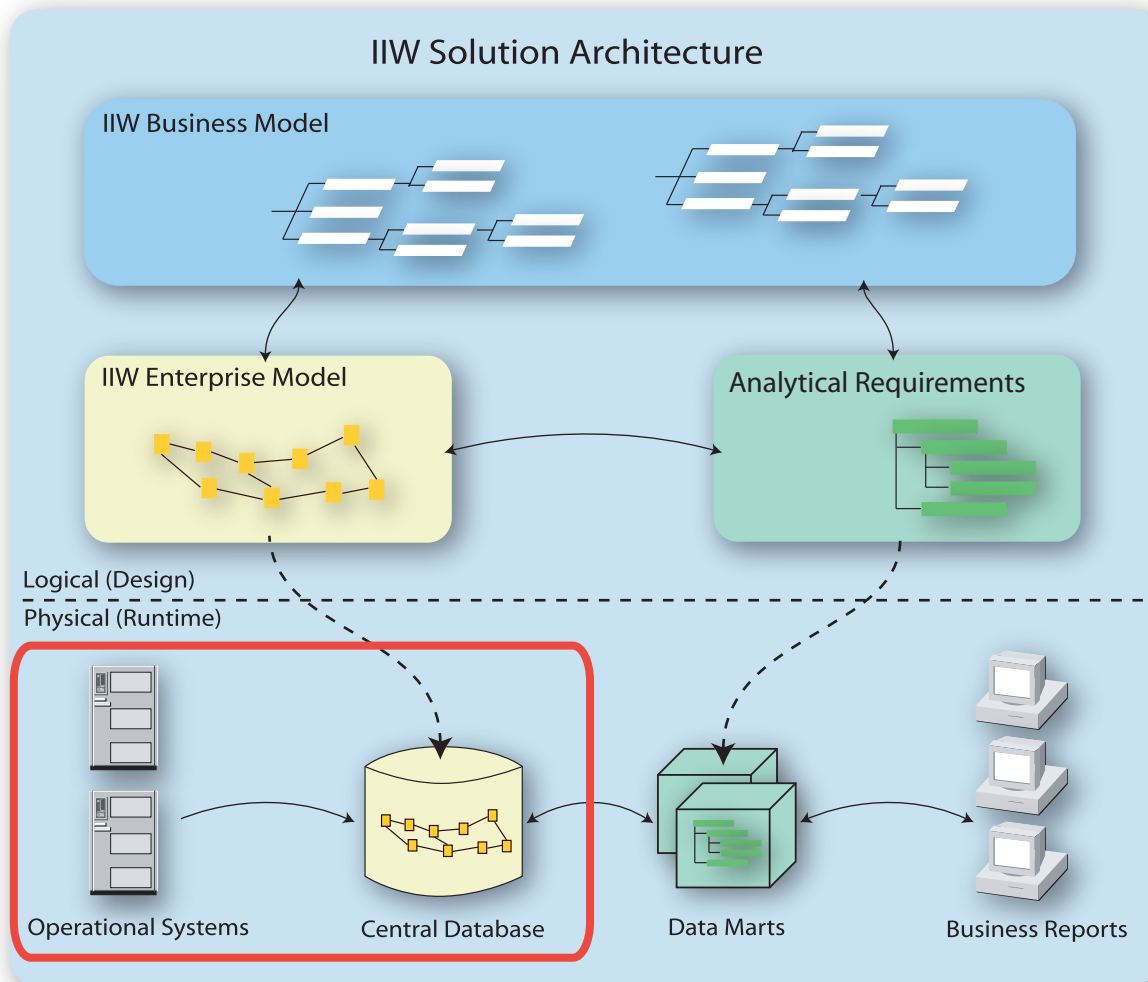
### Analysis Area

This is the component of the data warehouse that prepares the data initially stored in the Systems of Record (source systems or operational data store) for subsequent distribution to the data marts. The entities in the Analysis Area contain the specific aggregations or summaries of data needed to be a specific data mart or part of a data mart.

Representative Analysis Areas include:

Advances analysis	Investment contracts analysis
Agent commission analysis	Market share analysis
Auto claim analysis	Loss events analysis
Auto claim payments analysis	New business volume analysis
Campaign communications analysis	Person citations analysis
Campaign contacts analysis	Person value analysis
Campaign installments analysis	Policyholder behavior analysis
Campaign profit analysis	Policy event tracking analysis
Campaign responses analysis	Policy lifecycle analysis
Campaign sales analysis	Policy payments analysis
Cash flow analysis	Policy persistency analysis
Claim and benefit analysis	Policy volume for vehicles analysis
Credit contracts analysis	Portfolio analysis
Credit withdrawals analysis	Reinvestment analysis
Cross selling analysis	Surrender analysis
Customer event analysis	Switching analysis
Customer persistency analysis	Underwriting analysis
Forecast analysis	Life, savings and investments claim analysis

# The Physical Environment



## Open Architecture

The Insurance Information Warehouse physical environment provides a physical data warehouse infrastructure. This infrastructure is tightly integrated with the logical environment incorporating both the IIW Business Model and IIW Enterprise Models.

IIW promotes an open architecture with each component adhering to industry standards. This allows the insurer to implement its data warehouse using existing or preferred commercially available tools for data cleansing, data movement, model management, and end user access.

It is possible to automatically generate the required data structures for a full data warehouse physical environment using the IIW Enterprise Model.

The main components of the physical environment are:

- IIW Database
- Data Marts
- Business Reports
- Operational System Data

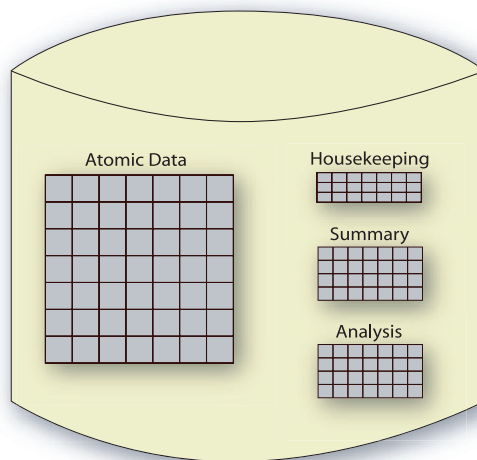
## IIW Database

The IIW Database is forward engineered from the IIW Enterprise Model (described in the previous chapter) and is designed as a starter kit for insurers who wish to create an overall data warehouse solution. The IIW Database provides a blueprint for a data warehouse, which first consolidates data from operational systems and then supplies data to a range of downstream data marts. It has been designed to support the needs of a central data warehouse and supplies the data needed by specific marts.

Transformation rules are used for identifying the adjustments made to a logical data model (Enterprise Model) to transform the structure into a more physical design. For example, these rules might define when two or more entities should be collapsed into one table, when attributes might be replicated in multiple tables, or when a subtype entity might be collapsed into its parent table.

The IIW Database is designed to provide a compromise between the need to provide a structure that is flexible and one that is relatively easily populated. The need for flexibility is driven by the requirement to support a range of different types of analytical and other future applications, without knowing the exact requirements of these applications. The ease of population is an objective driven by the need to ensure that the data warehouse is as easy to maintain as possible.

The IIW Database is divided up into a number of areas:



### Atomic Data Tables

The Atomic Data (or System of Record) is the area of the physical database where the data is stored in a flexible generalized format. Typically, all data supplied to the IIW Database as part of the normal updates from the operational systems would be stored here.

### Analysis and Summary Tables

The analysis tables are designed to aggregate the data for use by specific analytical applications. While the summary tables are designed to store commonly used aggregations, the analysis table are effectively a staging area for a specific business applications.

The analysis tables may be necessary to collect the data into a format which is usable by an analytical tool. The analysis tables are typically of use where the application needs highly summarized data, such as with end user OLAP products.

An example of an analysis tables is the Customer Persistency Analysis table. This table is designed to gather the data from within the data warehouse for a specific set of OLAP reports and charts dealing with analyzing customer persistency. This table needs to pull data from other Data warehouse tables such as Product, Measurement Period, Customer, Policy, and Organization Unit.

### Data Marts

On-Line Analytical Processing lets users gain insight into data through fast, consistent and interactive access to a wide variety of data. OLAP transforms raw data into actionable information. With IIW, it is possible to develop multi-dimensional data marts that source the data from the central warehouse and transform it into this useful information. These data marts can be stored in an OLAP server and can be accessed by a range of spreadsheet and data warehouse reporting tools.

## Business Reports

IIW supports the development of a range of business reports. Such solutions range from spreadsheets and data warehouse reporting tools to specific applications such as customer profiling, data mining, campaign analysis, customer prospecting, and profitability and risk analysis applications.

In the case of spreadsheets or data warehousing reporting tools, once the equivalent data mart structures have been created it is then possible to rapidly create extensive and sophisticated reports and charts that are customized to the exact needs of the business users.

Using summary reporting, the insurers can 'slice and dice' the information to quickly identify trends and patterns. Summary reports typically query data marts.

This is an example of a summary report:

**SCR Standard formula facts by Line of business**

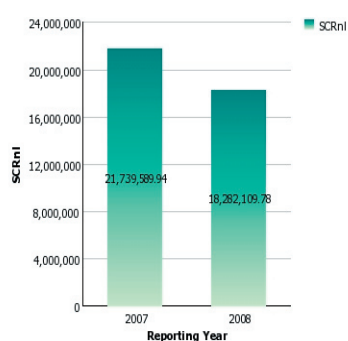
	Premium and reserve nonlife underwriting risk standard deviation of overall nonlife portfolio risk	NIcat Solvency capital component for catastrophe risk	Premium and reserve nonlife underwriting risk overall reserve Volume measure	Basic Solvency Capital component for nonlife underwriting risk SCRnl	NIpr Solvency capital component for premium and reserve underwriting risk	Premium and reserve nonlife underwriting risk overall premium Volume measure
Motor - Other Classes	0.18612	0	19,723,559.96	17,062,570.5	17,062,570.5	45,104,162
Motor - Third Party Liability	0.22231	0	47,668,268.68	34,346,519.23	34,346,519.23	58,674,119

Mar 4, 2009

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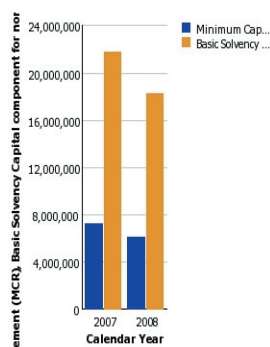
**SCR Standard Formula - SCRnl**



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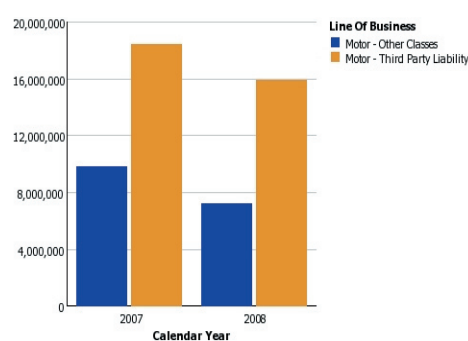


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**SCRnl by Line of Business**



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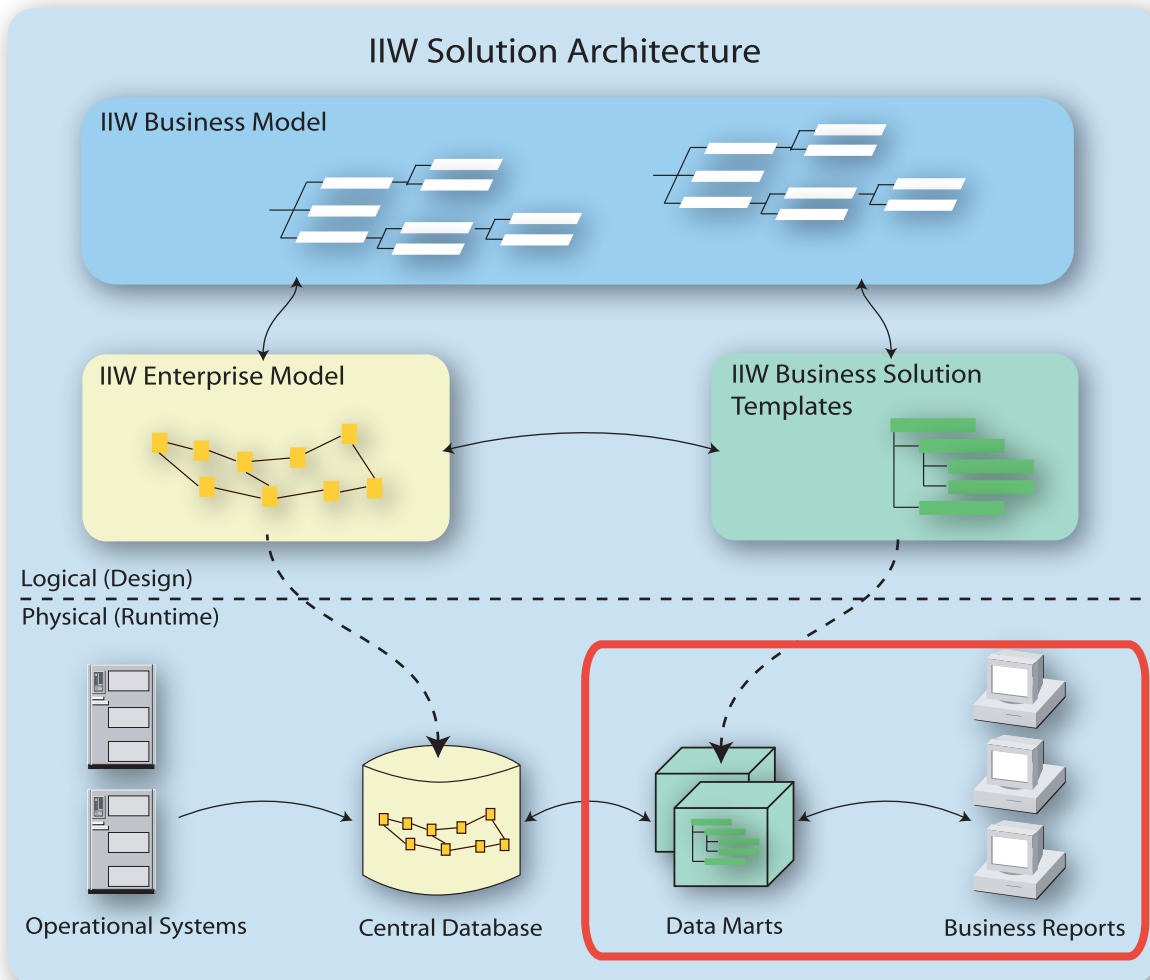
## Data from Operational Systems

Existing operational systems are the primary input to the data warehouse. The state and amount of this data varies widely from one insurer to another. However, in designing and building the IIW Database, a number of assumptions have been made:

- The data is supplied to the data warehouse on a periodic basis (daily, weekly, monthly)
- The data is primarily detailed
- The data has been through a cleaning process
- The data represents the "delta", or change captured since the last extraction



## Sample Business Applications & Data Marts



To help insurers pursue BI-related customer relationship marketing and underwriting goals, IIW includes business applications and data marts.

Each data mart is designed to support a specific purpose, to focus on a particular problem, or on a departmental information requirement. This is in contrast to the Enterprise Model which is designed to be as open and as flexible as possible.

The following data marts are provided with the IIW solution, included for prototyping purposes and/or illustrating the types of business applications that the data warehousing infrastructure can facilitate:

### Segmentation Discovery and Management (SDM)

The SDM Application was developed taking into account the following principles:

- Starter Set - The SDM Application provides an insurance company with the key building blocks of a segmentation management facility: business requirements, data models, data analysis examples, and business reporting templates.
- Open solution - Independent of any business intelligence tool (OLAP, data mining). Although the SDM application uses IBM Intelligent Miner as data mining support tool, it can be easily customized and adapted to any other data mining tool. Likewise, Business Objects OLAP tool is used as an illustration of the multi-dimensional analysis capabilities of the SDM application but other tools could be used.
- Compliance with IIW architecture - The SDM application complies with IIW architectural principles. The building blocks are positioned in the relevant layers: Source layer, Business Data Warehouse layer (BDW), Business Information Warehouse layer (BIW) and Client layer.
- Modeling approach - Bearing in mind the usual characteristics of a data mart, such as user accessibility and performance, the SDM data mart is de-normalized and its entities are specialized. Also, the granularity of the fact entities has been adapted to the most appropriate level of aggregation on each of its dimensions.

The SDM data mart model and business application contains:

- A subset of the Enterprise data warehouse: a limited number of tables with only the relevant attributes for the data mining exercises
- A set of tables that represent the flat files used as input for the data mining tool
- A set of fact tables surrounded by their dimension tables for the OLAP tool (Business Objects)

The chart below shows a typical business report that may be used to identify the most promising cross-selling strategies. The business opportunity for each cross-selling strategy is quantified by examining the number of policyholders who hold one base product but who are not policyholders of the target product the insurance company wants to cross-sell. These policyholders are candidates for cross-selling. The average target product premium for holders of both products is calculated and multiplied by the number of cross-selling candidates to arrive at the premium opportunity for each cross-selling strategy.

Cross-Selling Strategy	Base Number Of Policyholders	Target Number Of Policyholders	Cross-Selling Penetration	Opportunity Number Of Policyholders	Total Target Standardised Premium	Average Target Standardised Premium	Opportunity Standardised Premium
FWL to Motor	62	15	24.19 %	47	IR£9,000.00	IR£600.00	IR£28,200.00
Motor to FWL	33	15	45.45 %	18	IR£10,000.00	IR£666.67	IR£12,000.00
			<b>Sum:</b>	<b>65</b>		<b>Sum:</b>	<b>IR£40,200.00</b>

## Campaign Management - Quick Start (CMQS)

The CMQS was developed taking into account the following principles:

- Starter Set - The CMQS Application provides an insurance company with the key building blocks of a campaign management facility: business requirements, data models, data analysis examples, and business reporting templates.
- Open solution - Independent of any campaign management tool or business intelligence tool (OLAP). Although the CMQS uses a campaign management support tool, it can be customized and adapted to another campaign management tool. Likewise, an OLAP tool is used as an illustration of the multi-dimensional analysis capabilities of the CMQS but other tools could be used..
- Compliance with IIW architecture - The CMQS complies with IIW architectural principles. The building blocks are positioned in the relevant layers: Source layer, Business Data Warehouse layer (BDW), Business Information Warehouse layer (BIW) and Client layer.
- Modeling approach - Bearing in mind the usual characteristics of a data mart, such as user accessibility and performance, the CMQS data mart is de-normalized and its entities are specialized. Also, the granularity of the fact entities has been adapted to the most appropriate level of aggregation on each of its dimensions.

The CMQS data mart model and business application contains:

- Campaign contacts fact with dimensions Time, Campaign, Communication Medium and Market Segment
- Campaign responses fact with dimensions Time, Campaign, Market Segment, Communication Medium and Response Code
- Campaign sales and profits fact with dimensions Time, Campaign, Market Segment, Geographic Area, Channel Role, Payment Method dimensions, product and Communication Medium.
- Campaign communications fact with dimensions Time, Campaign, Channel role, Market Segment and Communication Purpose

The following chart shows an interactive OLAP report that facilitates the analysis of the premium volumes written as the result of a campaign by campaign/campaign cell/campaign step, sales geography, distribution channel, and household income.

**Campaign Results**

Acquisition 99 (FWL)

Sales Area 1

Campaign Cell Name	Sales District Name	Channel Type	Household Income	Total standardised premium	Percentage
Elite	Sales Region 1	Sales Rep	50K or more	IR£600.00	6.67 %
Elite	Sales Region 2	Broker	50K or more	IR£1,200.00	13.33 %
Elite	Sales Region 3	Broker	50K or more	IR£600.00	6.67 %
Elite	Sales Region 3	Sales Rep	50K or more	IR£1,200.00	13.33 %
Standard	Sales Region 1	Broker	Up to 50K	IR£1,200.00	13.33 %
Standard	Sales Region 1	Sales Rep	Up to 50K	IR£1,200.00	13.33 %
Standard	Sales Region 2	Broker	Up to 50K	IR£600.00	6.67 %
Standard	Sales Region 2	Sales Rep	Up to 50K	IR£1,200.00	13.33 %
Standard	Sales Region 3	Broker	Up to 50K	IR£600.00	6.67 %
Standard	Sales Region 3	Sales Rep	Up to 50K	IR£600.00	6.67 %
<b>Sum:</b>				<b>IR£9,000.00</b>	
<b>Percent:</b>					<b>100.00 %</b>

[Campaign Summary](#)
[Campaign Cell Summary](#)
[Campaign Structure](#)
[Campaign Contacts](#)
[Campaign Responses](#)
[Campaign Results](#)

Last Exec: 3/6/99 17:03

## Underwriting Profitability Analysis (UPA)

The core of the UPA business application is a client-server application environment that facilitates the development of risk models based on the characteristics and risk experience of an auto insurance business portfolio. It identifies the rating factors and rules which predict the customer segments by calculating virtual 'pure premium' for each segment based on claims frequency and severity.

The UPA application consists of the following components:

- The UPA client provides a graphical user interface from which analysts can manage the data mining process.
- The Probabilistic Estimator (ProbE) data mining engine performs the data mining computations.
- The UPA server manages communication between the ProbE engine and one or more UPA Clients and handles queuing of data mining runs.
- A meta file generation utility automates the creation of a UPA meta file from an Erwin data model.

- The UPA data models (CASE tool format) provide a starter set to rapidly scope, design and implement data stores that are suitable for analysis via UPA and the ProbE data mining engine.
- Several sample data sets, provided to support installation, testing and education activities in advance of real data sets being available.

The UPA data mart models and business application contains:

- Claims fact with dimensions Time, Policy, Person, Geographic area, Vehicle, Specification, Channel role, Claim.
- Claim payments fact with dimensions Time, Policy, Person, Geographic area, Vehicle, Specification, Channel role, Claim.
- Policy payments fact to record measures related to policies component payment. The measures are fully identified by dimensions Time, Policy, Geographic area, Vehicle, Specification and Channel role.

The chart below illustrates the UPA generation of IF-THEN rules, that predict pure premium according to the claim frequency and severity experience of a given customer risk segment.

The screenshot shows the 'Underwriting Profitability Analysis' interface. At the top, there are menu options (File, Edit, View, Help) and tabs for Databases, Data Mining, Rule Sets, Viewer, Editing, and Scenarios. Below this, there are dropdown menus for Rule set (UPA\_rule\_set1 0), Training DB, Calibration DB, and Evaluation DB, all set to '(40K Records) Training Sample'.

The main table displays the following data:

Matching Data	Pred. Claim Rate	Actual Claim Rate	Pred. Sev.	Actual Sev.	Pred. PP	Actual PP	Pred. Avg. Prem.	Actual Avg. Prem.	Pred./Pred. Loss Ratio	Ac
Rule 1	0	0	0	0	0	0	0	0	0	0
Rule 2	0	0	0	0	0	0	0	0	0	0
Rule 3	0.0204	0.0836	0.0836	1736	1736	145	47	47	3.07	
Rule 4	12549	0.0404	0.0404	1500	1500	73	27	27	2.62	
Rule 5	2198	0.1278	0.3005	2487	2796	318	93	101	3.38	
Rule 6	6939	0.1347	0.1347	2617	2617	352	98	98	3.57	
Rule 7	12030	0.0974	0.0974	2240	2240	218	89	89	2.43	
Summary	40000	0.0871	0.0948	2148	2218	187	65	65	2.86	

Below the table, a window titled 'Rule 3' is open, showing the following details:

```

If Vehicle Year <= 86
and Type of Vehicle = Family Car
or Luxury Car
or Sportscar
or Van

Then RCMCLD / RACCN
Claim rate: 0.0836
Severity: 1736
Standard deviation of severity: 1474
Pure premium: 145
Loss ratio: 3.07

Number of points: 6204
Predicted claim rate: 0.0836
Actual claim rate: 0.0836
Predicted severity: 1736
Actual severity: 1736
Predicted pure premium: 145
Actual pure premium: 145
Predicted average premium: 47
Actual average premium: 47
Predicted/Predicted loss ratio: 3.07
Actual/Predicted loss ratio: 3.07
Predicted/Actual loss ratio: 3.07
Actual/Actual loss ratio: 3.07

```

## Demonstrators

Additionally, the IIW solution includes a set of demonstrators:

**Customer and Prospect Optimizer (CPO)** - CPO is a web-enabled customer prospect management and delivery system showing how an insurance company's sales force (agents, brokers and internal sales personnel) could deliver leads and capture feedback on the success of those leads.

**Profitability Analysis for Motorcycle (PAM)** - PAM uses MicroStrategy's Decision Support System (DSS) suite, specifically the DSS Architect and DSS Agent™ (trademark of MicroStrategy, Inc.), to provide sample reports related to profitability analysis, claims analysis and cost analysis for motorcycles.

**Risk Pricing Analysis (RPA)** - RPA is a data mart which can be used to illustrate analysis of past claims experience for different types of risk in relation to rating variables, for motor and household insurance.

## Sample Reporting Environments

### Health Profitability Management

The Health Profitability Management (HPM) data mart enables the analysis of key performance indicators for individual and corporate health insurance clients. Examples include:

Profitability by policy type (e.g., Private Medical Insurance (PMI), critical illness, income replacement, total individual incapacity, long-term care insurance)

- Gross earned premiums by policy type (individual and group)
- Gross earned premiums compared to gross claims (or gross earned premiums minus gross claims)
- Mean annual premium for individual and group policies
- Mean annual claim per policy

New Business and Business in-force by policy type and distribution channel (e.g., Broker or Independent Financial Advisor, sales force and tied agents)

- New individual and group policies
- New individual critical illness policies by type (e.g., heart attack, coronary bypass, kidney failure, major organ transplant, cancer, stroke)
- New individual premiums (increments/decrements)
- Mean premium
- Regular pre-funded long term care policies in force by age and gender
- Single pre-funded and point of need long term care policies in force by age and gender
- Single long term care in force by age and gender

Sales Performance by policy type and distribution channel

- Actual and planned numbers of policyholders
- Actual and planned mean premiums
- Actual and planned gross earned premium, gross claims and gross claims ratio
- Actual and planned mean premiums

Health expenditures by type of service and treatment incurred (e.g., hospital care, physician/clinical services, prescription drugs, nursing home care, home health care, other personal healthcare).

### Intermediary Performance Analysis (IPA)

Intermediary Performance Analysis (IPA) data mart focuses on the management of various sales channels in terms of production, productivity, training, and competencies. It enables management reporting on the following business areas:

- Agency continuous professional development analysis
- Agency learning achievement analysis
- Agency resource profile analysis
- Agency resource qualification analysis
- Agent performance and competency development analysis
- Agent training analysis
- Analysis of agent achievements against competition criteria
- Analysis of customer feedback on intermediaries
- Analysis of policy delivery
- Intermediary compensation analysis
- Intermediary persistency analysis

- Intermediary production analysis
- Intermediary productivity analysis

The chart below shows a range of key performance indicators associated with the Agent performance and competency development analysis used to identify training gaps. Business reporting can be performed along the following dimensions: Type of Agent, Class of Business, Insurance Product, Geographic Area, Premium Stream (Regular, Single), Type of Policy, and Type of Training.

### Financial Reporting

The Financial Reporting data mart enables the development of an effective insurance management information system (e.g., Executive Dashboard). Additionally, it addresses the regulatory compliance issues such as those imposed by the Solvency II initiative in the European Union (EU). It comprehensively covers the following financial reporting areas:

Admissible Assets Analysis	Analysis of Claims for Long-Term Insurance
Analysis of New Business for Long Term Insurance	Analysis of P&C Claims & Premiums by Risk Group - Accident Year Basis
Analysis of P&C Claims & Premiums by Risk Group - Underwriting Year Basis	Analysis of P&C Claims, Expenses & Technical Provisions - Accident Year Basis
Analysis of P&C Net Claims and Premiums - Accident Year Basis	Analysis of P&C Premiums - Accident Year Basis
Analysis of P&C Premiums, Claims & Expenses - Underwriting Year Basis	Analysis of P&C Technical Provisions - Underwriting Year Basis
Analysis of Premiums for Long Term Insurance	Analysis of the effect of financial engineering on solvency
Capital adequacy analysis for With-Profits business	Equalization Provisions Analysis
Equalization Provisions Technical Account - Accident Year Basis	Equalization Provisions Technical Account - Underwriting Year Basis
Expenses Analysis for Long Term Insurance	Financial analysis of claims
Fixed and Variable Interest Assets analysis for Long Term Insurance	Index-Linked Assets Analysis for Long Term Insurance
Internal Linked Funds Unit Price Analysis for Long Term Insurance	Liabilities Analysis for P&C (Non-Life) Insurance
Liabilities and Margins Analysis for Long Term Insurance	Linked funds balance sheet - Long Term Insurance
Loss Adjustment Expenses analysis	Mathematical Reserves analysis for Long Term Insurance
Net Assets Analysis	Non-Linked Assets Analysis for Long Term Insurance
Profit & Loss Analysis for P&C Insurance - Technical Account	Profit And Loss (non-technical account) analysis
Revenue Account for Internal Linked Funds - Long Term Insurance	Revenue Account for Long Term Insurance
Solvency Analysis for Long Term Insurance	Solvency Analysis for P&C (Non-Life) Insurance
Solvency Analysis for Supplementary Accident & Sickness Insurance	Solvency Analysis for Supplementary Accident & Sickness Insurance
Summary of New Business for Long Term Insurance	Summary of Premiums and Claims - P&C Insurance
Valuation Analysis by Contract and Business for Long Term Insurance	Valuation Analysis for Long Term Insurance
Valuation Interest Rate Analysis for Long Term Insurance	With-Profits Funds - Analysis of Payouts on Maturity
With-Profits Funds - Analysis of Payouts on Surrender	With-Profits Funds - Realistic Balance Sheet Analysis

**Overall Profitability Analysis (OPA)** is a simple decomposition of the main profitability ratios for non-life insurance: combined ratio, loss ratio, operating ratio and so on.

**Sales Forecast Analysis (SFA)** addresses the factors determining the forecast of sales by: Determining the market size to assess details of product sales and premium volume, determining the market share by product, considering competitors and target market share, forecasting product sales volume and premium income based upon previous sales history and market analysis , planning the growth rates based upon market analysis.

**Claim Efficiency Analysis (CEA)** addresses the factors impacting the efficiency of the claims handling process by: monitoring incoming recovery payments from third parties and re-insurers, assessing the distribution of claims amongst intermediaries and the loading of claim handlers, reconciling claims outstanding versus claims estimates, performing claims statistical analysis, which may influence product development, analyzing the distribution of claims across all types of loss events.





## **IBM Industry Models**

### **Software Group**

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