

Industry Models for Insurance

The Insurance Application Architecture (IAA) Overview



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Chapter 1. Insurance Application Architecture - Executive Summary

Insurance for On Demand Business

As the insurance industry continues to deal with a fast pace of change, insurers face stark new challenges. In today's marketplace, survival favors the agile; speed can be a critical differentiator; and the organizational status quo is often a liability. Successful insurers are beginning to adapt to continuous, unpredictable and accelerating change. Many insurers still struggle to manage a complex web of legacy silos, disparate systems, redundant functionality, excess capacity and inconsistent service levels. Enthusiasm for IT spending and decentralization has exacerbated the problem, saddling firms with overlapping – and often unproven – technologies. For many insurers, the results are all too familiar: disjointed operations, redundant capabilities, inefficient cost structures and duplication of work across product, geography and business lines.

Most insurers still operate largely within a vertical business structure, whereby distribution occurs mainly by product silo and operations are biased toward internally manufactured or developed products. Achieving material cost reductions in this structure is difficult, and consumers generally see very little or no differentiation among insurers. Given their financial challenges, insurers can no longer afford to have capabilities duplicated across product silos, with each product operating its own processes, systems and specific channels. This duplication causes significantly greater complexity in insurer operations, impacts costs and speed to market, and often increases operational risk.

In large enterprises, initiatives that attempt to optimize these processes in isolation, without first merging them, fail to fully address their complexity and overlapping functions. Process optimization generally focuses on vertical integration and often within single products or business units. To achieve a step change in performance, today's highly complex insurance operating models must be simplified. Moving from process transformation to enterprise transformation is the key that will unlock significant benefits for insurers.

Technology is a fundamental change enabler, but IT decisions need to remain firmly rooted in the business needs of the organization. To operate on demand, your organization will need to transform the way it operates by re-evaluating its business processes as well as its technology infrastructure.

Business Transformation

Most insurance firms know they need to change, but question if the analytical tools available to them are up to the task. Traditional, linear approaches, such as business process re-engineering, are useful for optimizing workflows and often yield improved sub-processes, but they do little to highlight similar activities that are scattered across separate processes within the enterprise. Successful insurers require a new way to view their business operations, one that will help them adapt and thrive in an environment of continuous change.

An insurance specific Component Business Model (CBM) helps by simplifying the way insurers look at their operations. With CBM, executives can extract themselves from the process "rut" and get at the real sources of value that drive their companies. They can identify the unique, standalone building blocks that comprise the insurer as a whole. Viewing business activities as autonomously managed components that can be optimized individually for greater value to the whole business enables decision makers to cut through historical boundaries that may have built up along organizational, product, channel, customer, geographical and informational lines.

Application Transformation

The use of component-based business modeling, underpinned by industry models, such as the IBM Insurance Application Architecture (IAA), enables insurers to define their target business architecture and transformation goals. This drives application transformation and often the design and implementation of new application solutions. The IAA models, with a rich set of industry application component definitions, are a key accelerator for the logical design and architecture of building new functionality.

A common enterprise-wide description of the business concepts that define the business data entities controlled by the application components is the crucial factor in a successful application solution. Without this common language, any attempt to support an already challenging consistent and flexible architecture is made more difficult. The IAA models provide a complete and unambiguous description of the business concepts, business activities, and business rules that must be supported within the insurer.

The Insurance Application Architecture (IAA)

The Insurance Application Architecture (IAA) is a comprehensive set of insurance specific models that represents best practices in insurance and is a natural extension to the Component Business Model. The IAA models provide the insurance specific business content to accelerate the projects that result from moving to an On Demand Business and pick up the definition of the components that take you there.

IAA describes the business of the insurer and is an efficient communication bridge between business and technology communities. It is designed to be readily accessible to business users and by focusing on industry issues such as Sales and Customer Services, Marketing and Analytics, Customer Relationship Management, Core Systems, Insurance Claims and Risk and Compliance.

IAA comprises:

- Foundation Models: insurance terms and definitions for communication and standardization
- Information Models: insurance data content for an enterprise-wide view of information and data rationalization
- Process Models: insurance business processes content for areas such as business process modeling, simulation and execution
- Integration Models: business services content for component based development and services oriented architectures
- Product Models: a method for accelerating insurance product design

These models are described graphically on page 8.

IAA in practice typically supports over 80% of an insurer's business requirements and is designed to be easily customized and extended to cover any specific requirements. IAA assists an insurer in implementing a flexible, reusable, extensible and easily customizable architecture, to enable the insurer to:

- Be more adaptive and to respond quickly to changing customer needs
- Focus on achieving competitive differentiation
- Identify and leverage best practice behaviors across the organization

The IAA models identify, describe and structure all of the business functions, data, and processes that you would expect to find in any insurer in a way that accelerates IT projects. These models ensure that business requirements for major initiatives are captured and expressed in a manner that can be understood and used by the IT organization and that are reflected in all subsequent levels of the application development process.

By providing a set of pre-defined models, IAA enables the scoping, specification, design and deployment of information solutions, which are:

- Faster, through use of generic model specifications and designs
- Cost effective, through reduced analysis costs and increased re-use of existing assets
- Better, through increased quality and consistency
- Lower risk, by building on good practice and by ensuring a strategic perspective

IAA Value Propositions

Communication & Standardization

IAA provides extensible structures and rich business content for all stages of systems development or integration projects. It can be easily customized to cover every single insurer's needs while the pre-defined content provides an important accelerating factor. IAA provides a strong base for defining corporate data and development standards. Its use enforces consistency in data or services across projects and lines of business. IAA also facilitates the understanding between business and IT by transforming the business content into IT artifacts while maintaining traceability of business requirements to IT systems.

Business Process Analysis

IAA defines best practice business processes for the insurance industry based on a large pool of requirements collected and validated over many projects. The processes link to other business constructs, in particular to the business component services that describe how IT can support the requirements expressed in those processes. With IAA an insurer can compare its own business processes to best practice business processes, and can understand how to better support them from an IT perspective.

Application Rationalization, Component Based Development and Services Oriented Architectures

It is common for an insurer to have a good deal of duplication in services (functionality) across different IT applications. The negative impact on maintenance and extensibility is very clear. When business functionality needs to evolve, multiple systems will be impacted, which results in significant duplication of effort. The ideal situation is to have a componentized solution where all functionality is clearly identified and allocated to one, and only one, component. To evolve from a situation with hundreds of applications that are duplicating functionality to a component-based solution is by no means easy and requires a well structured series of steps. IAA addresses this issue at the diagnostic and design levels. This supports the primary business driver for component-based development which is to increase the flexibility of the systems and to decrease the disparity between the required business functionality and what the existing systems provide.

An SOA enables more rapid and pragmatic response to business transformation, while enabling IT to rationalize, simplify and enable new capabilities within the application portfolio while reducing complexity and cost. Services oriented architectures are to application transformation what the Component Business Model (CBM) is to business transformation. For the insurance industry, the transition between these levels is supported by the traceability features of the IBM Insurance Application Architecture. These features articulate the services required to support a particular business component, thus providing a seamless path from business transformation to application transformation.

Integration

The goal of integration is to make communication possible between systems that have not been designed to communicate. SOA is a technology that can help in integration. SOA as a basis for integration and as a means of structuring large-scale software architectures is rapidly becoming the backbone of the modern insurer. A key factor underpinning a successful SOA is a common enterprise-wide description of the business concepts and processes. Models are required to provide the specification for the structure and content of the services needed for integration. SOA without business content is just an empty shell. IAA provides this business structure.

Product Flexibility

Survival in a highly competitive environment can be achieved through price competition (cost control) or by company differentiation. Customer service supported by a customer-centric view is one differentiating factor; a second factor is product differentiation. To keep pace with the competition, it is essential to innovate and to develop and release new financial products quickly. IAA offers a set of specialized analysis techniques dedicated to the structuring of insurance products that

enable a more rapid release of products to the market. IAA contains a representative set of insurance products structured in accordance with these analysis techniques. These product definitions can be used as templates to accelerate the modeling of insurance products. IAA also includes a design framework for building flexible product engines and administration systems to support both new and existing products.

Data Rationalization

The importance of accurate and readily available data in an insurance company can never be emphasized enough. Unfortunately, the same fundamental information is often captured in various places and formats the company. This has negative and quantifiable implications: a risk of poor data quality and an increased maintenance burden with increasing difficulty in updating the systems to satisfy new business requirements. IAA, with its thousands of industry definitions and its formatting of those definitions into a logical structure, can be used as an overall reference for data. The business drivers for data rationalization are to reduce multiple data entries (saving costs) and to understand a broader view of key concepts, such as a single view of the customer across the whole company. From a management point of view, this effort can be phased and scoped by subject area; for example, a first step could be to understand how to clearly identify all the customer data within the insurer.

Data Warehousing

The effort of implementing a data management infrastructure that allows efficient data extraction, transformation and aggregation, and distributes accurate, complete and timely information to business users and decision makers is a major challenge. The IAA data warehouse solution lets insurers exploit the potential of detailed information previously locked in legacy systems and hence inaccessible to the business user. IAA features a consistent suite of business requirements and enterprise analysis and design models for a data warehouse plus pre-defined data mart models, enabling insurers to effectively develop solutions to:

- Improve business profitability analysis, including underwriting, claims performance, persistency, cross-selling penetration, and fraud detection
- Build Management Information Systems (MIS) to track and analyze key performance indicators
- Develop risk management systems to support extensive risk modeling and data analysis, including asset and liability management.

Customer Centricity

Since the cost of acquiring a new customer is much higher than the cost of retaining an existing customer, creating and maintaining high customer satisfaction is critical to insurers' profitability and competitiveness. This can only be achieved by having a consolidated customer view for an in-depth understanding of those customers' needs. In most companies, customer information is scattered across disconnected systems, making it impossible to obtain a total picture of a customer. While all the IAA models have been built around the idea of a customer-centric view of the business, the IAA warehouse models (the informational side of IAA) best address that entire customer information picture with a number of analytical perspectives that focus on customer segmentation, marketing, campaigns, and more.

Distribution and Partnerships

Developing new distribution channels is core to capturing a bigger market share. Providing a wider set of offerings customized to customers' needs through establishing alliances and partnerships is also essential. Open systems are the critical success factor to reaching these goals and can be achieved through clearly defined system interfaces or integration through messaging as supported by IAA.

Mergers & Acquisitions

The competitive pressures that continue to fuel mergers designed to achieve cost reduction through economies of scale result in financial services groups that are larger and more dis-integrated than ever before. The technical consequence is the need to integrate systems that are invariably built on different platforms in different locations and to provide a single internet

image to consumers. IAA, particularly through its IAA-XML messages, is a perfect fit to provide one single, common, and integrated corporate reference point for those businesses, irrespective of current size and growth strategies.

Deploying the IAA Models

The IAA business models are tool independent, but are optimized for use in conjunction with IBM software products. IAA used with IBM middleware helps move you quickly through requirements gathering, analysis and design, and deployment for accelerated transformation to an effective On Demand Business.

Using **DB2** Information Management Software

IBM DB2 Information Management Software products help banks leverage their existing IT assets so they can maximize the value of their information with advanced Business Intelligence (BI) features for building and working with data warehouses and data marts. IBM's BI solutions enable companies to comb through vast quantities of data quickly, thoroughly and with sharp analytical precision. BI capabilities are built into the DB2 engine, and BI applications have DB2 at their core. The IAA business models provide banking-focussed data content, which can be deployed on IBM DB2 Information Management Software to address areas such as business intelligence.

Using **WebSphere** software

IBM WebSphere delivers application infrastructure and integration software that helps companies address key priorities in an on demand world. IBM WebSphere software delivers the ability to integrate disparate applications and systems in a flexible manner that speeds time to value and helps companies maximize the utilization of existing resources. The IAA models provide standardized business services and models which can be deployed through IBM Rational software to address areas such as model driven development and common services.

Using **Rational** software

Rational software helps organizations create business value by improving their software development capability. Rational software allows you to:

- Adopt iterative development practices that reduce project risk.
- Focus on architecture to develop more resilient systems.
- Effectively manage change and protect critical strategic assets.

The IAA models provide content in Rational software to accelerate and reduce the risk of model-driven development projects.

How this document is structured

Chapter 2: The IAA Foundation Models assist with standardization of terms.

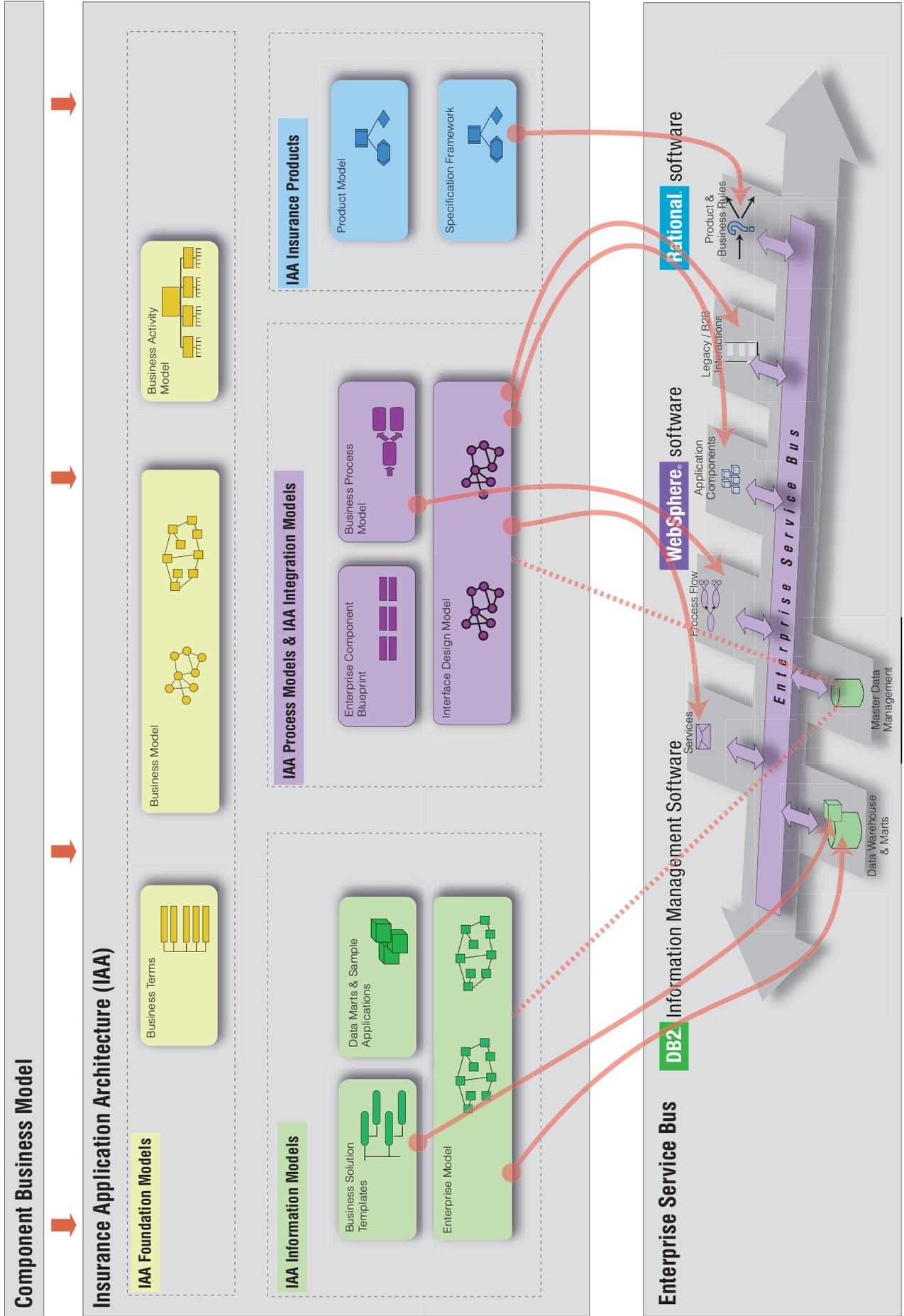
Chapter 3: The IAA Information Models assist with creating a consistent enterprise view of information.

Chapter 4: The IAA Process Models assist with process simplification and business process re-engineering.

Chapter 5: The IAA Integration Models assist in the creation of a services oriented architecture environment.

Chapter 6: The IAA Product Models provide a method for accelerating insurance product design

IAA Business Models Positioning



Chapter 2. IAA Foundation Models

Communication and Standardization

Building systems for the insurance industry requires a wide range of skills: from understanding the fundamentals of the business, to the fine-tuning of databases and component designs, many different people have to be involved. An important success factor is good communication among these different types of resources.

Getting down to a common reference is a challenging goal. The IAA approach to this problem is to define models at different levels, some of them purely business-oriented and some of them very technical from an IT point of view, but all enforcing a semantic consistency and traceability between them

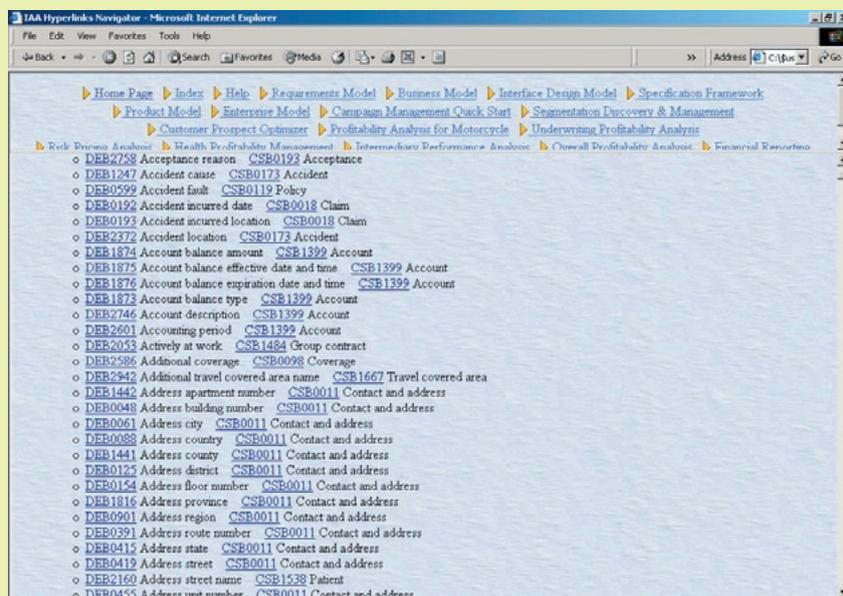
The IAA Foundation Models provide us with the tools to identify the important functions and business concepts that make up a particular business issue. The models are deliberately designed to encourage the business and technical professional to “step back” from the constrained detail of the current environment and to focus on describing the true and full scope of the business issue being discussed. Providing a language that is common to all stakeholders and that describes key aspects of the issue, enables fast and complete scoping of a business issue.

Business Terms

IAA provides a comprehensive list of insurance focused business terms to define its data. This makes communication with the business easier, leading to better business buy-in of proposed technical solutions.

Clearly defined business terms improve the standardization within an insurer. IAA provides a catalogue of over 2500 business terms grouped in domains and mapped to the Business Model. Because they are grouped by logical business domain, the business terms provide an easy entry point to the models. The business terms include aliases so that business people can use the terms they are most comfortable with.

With data requirements defined, the next step is to create a conceptual view of the data within the insurer to satisfy those requirements, free of any technological considerations.



A view of the IAA Business Terms

The IAA Business Model

A fundamental principle of IAA is the unambiguous definition of business concepts to ensure good communication across different IT projects and between the business users and IT. This leads to systems that are adeptly architected and resilient to changes in the business. Such systems have a longer life and lower maintenance costs.

The IAA Business Model provides this conceptual view of the enterprise data. Through its evolution since the early 1990's, the IAA Business Model has been the model of choice in a large number of development projects and has been put to the test and enriched by many insurance companies worldwide. The strength of the IAA Business Model lies in its generic design structures that guarantee its applicability in diverse situations.

The purpose of the Business Model is the clear understanding and communication of business concepts as a means to accelerate project scoping. For example: what could be meant by "Customer" in a particular business context?

"Customer" concepts could include:

- Identifying a specific person or organization
- Knowing all customer addresses
- Knowing all products the customer has bought
- Knowing which market segments the customer belongs to
- Knowing about the customers recent transaction history
- Knowing about the customers complaint history

The meaning of "Customer" can imply some or all of these concepts depending on the business context. For example, in a customer relationship management initiative "Customer" may be quite different to what "Customer" is to current call center operations. The IAA Business Model can be used to define precisely what "Customer" means in either situation and to clarify and reconcile these perspectives.

The IAA Business Model Structure

The IAA Business Model is available under two forms: UML as supported by CASE tools like Rational Rose and an Entity-Relationship form as supported by CASE tools like ERwin. These two representations are equivalent from a data point of view; the UML version adds the representation of the services to the data.

The Business Data Model is a conceptual business model representing the atomic information of the data warehouse, without any design content. It is the Entity-Relationship version of the IAA Business Model.

The Business Object Model is structured as:

- A set of use cases, which describe service candidates
- A model of business concepts, which are used by these use cases

Business Activity Model

The functional requirements of an insurance company are expressed as business activities: elementary units of work that are performed as part of the business operations. The IAA business activities are organized into business activity categories,

according to a functional view. It is possible to organize the activities differently, e.g., based on the line of business, or according to organizational principles such as in the IBM Component Business Modeling approach.

The Activity Model allows rapid and complete scoping and comparison of the functional aspects of business issues and should be used at the start of any project. By identifying which activities are involved in a particular topic or project, you can quickly create a complete list of the business areas to be considered. If other related topics or projects are scoped in the same way, they can be compared and contrasted using a common language to avoid duplication of effort in overlapping initiatives.

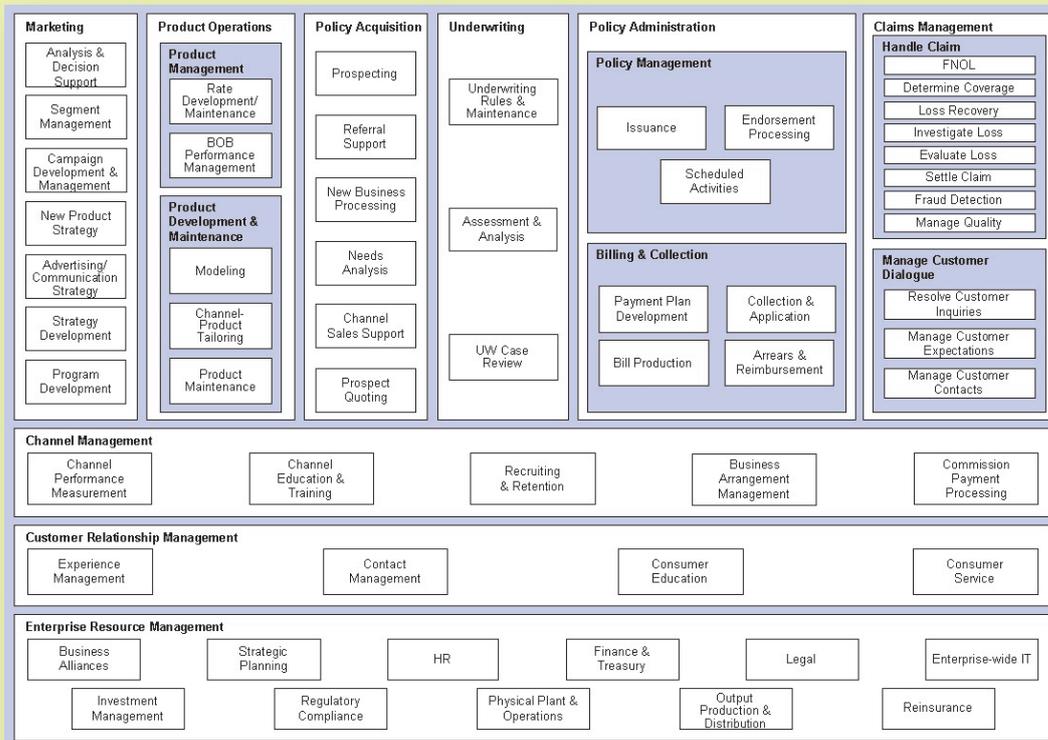
Specific uses include:

- Understanding the responsibilities of business units and the dependencies among them
- Integrating similar functions across business areas, supporting reusability of solutions
- Aligning business processes and organizational structure to strategy and prioritizing business requirements in functional terms
- Defining project scope clearly and avoiding duplication of effort with other projects
- Laying the foundation for the design of business workflows and application services/components

Benefits of the Activity Model

- Provides enterprise-wide definitions of business function, independent of organizational structure or line of business
- Forms part of a common language between business and IT
- Provides a rapid and accurate scoping tool for new initiatives
- Provides a predefined, readily customizable description of insurance functions

The next figure shows activity categories for Property & Casualty insurance.



Chapter 3. IAA Information Models

Data Rationalization and Warehousing

Information is one of the insurer's most powerful assets. Using enterprise data models to define this information enables higher data quality and completeness for both analytical and operational use. Analytically, such models allow insurers to improve their focus on the profitability of different products and lines of business and to achieve targeted and more effective marketing for up-selling and cross-selling products and services.

IAA Insurance Information Warehouse (IIW)

The effort of implementing a data management infrastructure that allows efficient data extraction, transformation and aggregation, and distributes accurate, complete and timely information to business users and decision makers is a major challenge faced by insurers. The IAA data warehouse solution – IIW - lets insurers exploit the potential of detailed information previously locked in legacy systems and hence inaccessible to the business user. IIW features a consistent suite of business requirements and enterprise analysis and design models for a data warehouse, pre-defined data mart models, and templates to create any number of additional data marts. IIW lets insurers effectively develop solutions to:

- Improve business profitability analysis, including underwriting, claims performance, persistency, cross-selling penetration, and fraud detection
- Build Management Information Systems (MIS) to track and analyze key performance indicators
- Develop risk management systems to support extensive risk modeling and data analysis, including asset and liability management

The IIW lets insurers build data warehouse solutions to suit their specific needs. It has the flexibility to enable the creation of a range of data warehouse solutions, from departmental data marts to enterprise-wide data warehouses by including all of the key components required for the core of a data warehousing solution. The IIW provides the blueprint for a single consistent enterprise view of the data. It is a proven solution with the scalability and flexibility needed to address existing and future data consolidation requirements using pre-defined insurance content.

IIW Features

- A data management toolkit designed to assist insurers in building warehousing solutions
- Rich data models for the full spectrum of the insurance businesses
- Encourages insurers to adopt a business-focus when building an information management solution
- Save up to 80% of analysis costs by using predefined data model and templates
- Experience to minimize risks by supporting an iterative development approach to an enterprise wide solution
- Aligned to support industry issues e.g. regulatory compliance and customer insight.
- Delivers the performance and scalability to manage the customer information needs of a large insurers
- Supports consistent access to customer information by all of the enterprise's business applications

The IIW solution has the following components:

Business Requirements

The business requirements of IIW accelerate the development of a state-of-the-art decision support system by deeply covering the domains of customer knowledge (segmentation, profitability and value analysis, wallet share), customer development (cross-selling and up-selling), customer care and loyalty (analysis of customer contacts and service, retention,

persistence), operational performance (claims, underwriting, etc.), campaign management, profitability, and more. For the analysis, gathering, documentation, and structuring of business requirements, IIW uses the IAA Business Data Model. The Business Data Model is a conceptual business model representing the atomic information of the data warehouse, without any physical design content. It is the Entity-Relationship version of the IAA Business Model.

IIW Business Solution Templates (BST)

The Business Solution Templates (BSTs) are a set of templates that allow business managers to quickly and easily define the reporting structures needed to access key information. These BSTs include key performance indicators grouped by functional reporting and provide the basis for rapid customization and prototyping of reporting requirements into a range of reporting environments.

The Business Solution Templates represent an easy to use business-oriented way of structuring the IIW content. By defining consistent focus areas as an entry point to the content, they facilitate the identification, the scoping and the customization of analytical business requirements. These requirements are then designed into the IIW Enterprise Data Warehouse and its subsequent data marts thanks to the IIW traceability.

To accelerate the development of a state-of-the-art decision support system, the business requirements cover in great depth the domains of customer knowledge (segmentation, profitability and value analysis, wallet share), customer development (cross-selling and up-selling), customer care (analysis of customer contacts and service) and customer loyalty (retention, persistence) as well as other analytical considerations such as campaign management or underwriting profitability analysis:

Analytical CRM

Campaign Answer Analysis	Campaign Communication Analysis
Campaign Contact Analysis	Campaign Cost Analysis
Campaign Installment Analysis	Campaign Profitability Analysis
Campaign Sales Analysis	Campaign Analysis by Customer
CRM Event Analysis	Cross Sell Strategy Analysis
Cross Sell Forecasting Analysis	Policyholder Behavior Analysis
Household Value Analysis	Customer Persistence Analysis
Customer Profitability Analysis	Customer Prospect Optimization Analysis
Customer Satisfaction Analysis	Customer Risk Analysis

Profitability - Claims Efficiency

Claim Handling Performance Analysis	Claim Incoming Recovery Payments Analysis
Claims Audit Analysis	Claims Monthly Close Off Analysis
Claims Statistical Analysis	Claims Value Variation Analysis
Late Claims Analysis	Loss Event Analysis
Year-To-Date Claims Comparison Analysis	

Profitability - Intermediary Performance

Agency Continuous Professional Development	Agent Performance Based on Competency
Agent Training Analysis	Customer Feedback on Intermediary Analysis
Intermediary Compensation Analysis	Intermediary Persistence Analysis
Intermediary Production Analysis	Intermediary Sales Performance Analysis
Policy Delivery Analysis	

Profitability - Business Performance

Advance Analysis	Business Volume Analysis
New Business Volume Analysis	Policy Event Analysis
Policy Persistency Analysis	Surrender Analysis
Switching Analysis	Underwriting Analysis

Risk & Compliance - Solvency II

Liabilities Analysis for P&C Insurance	P&C Claims, Expenses and Technical Provisions Analysis
Expenses for Long Term Insurance	Premiums for Long Term Insurance
Liabilities and Margins Analysis for Long Term Insurance	Admissible Asset Analysis
Net Asset Analysis	Profit and Loss Analysis
Summary of Premiums and Claims for P&C	Solvency Analysis for P&C
Solvency Analysis for Long Term Insurance	Statement of Solvency

Risk & Compliance - Sarbanes Oxley Act

Consolidated Financial Statements Analysis	Consolidated Statement of Cash Flows
Consolidated Stmt of Changes in Shareholders' Equity	Consolidated Balance Sheet Analysis
Consolidated Statement of Income Analysis	Management's Discussion and Analysis of Financial Condition and Results of Operations

Risk & Compliance - IAS

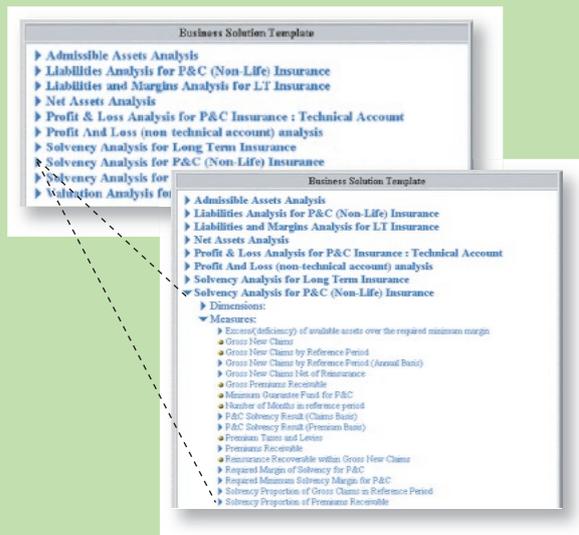
Balance Sheet Classified Approach Analysis	Balance Sheet Net Assets Approach
Balance Sheet Order of Liquidity Approach	Balance Sheet Portfolio Basis Approach
Cash Flow Direct Analysis	Cash Flow Direct Financial Institution Analysis
Cash Flow Indirect Analysis	Cash Flow Indirect Financial Institution Analysis
Income Statement by Function Analysis	Income Statement by Nature Analysis
Income Statement Financial Institution Approach Analysis	Statement of Changes in Equity Analysis

How the BSTs are used

Data mart and Data Warehouse Scoping and Design: The information analysis and management reporting aspects of a particular topic are scoped within the dimensions and measures that make up the Business Solution Templates. The scope defined in the BSTs can then be propagated to the warehouse design (the IAA Enterprise Model) so that you can define what parts need to be implemented for any particular project.

Benefits of the BSTs

- Business users can more rapidly and effectively control the definition and scoping of a data mart solution
- Provides a consistent structure and consistent reporting for data marts generated from scoped portions of the BSTs.
- Enables accurate scoping of the warehousing solution addressing the immediate needs of the insurer



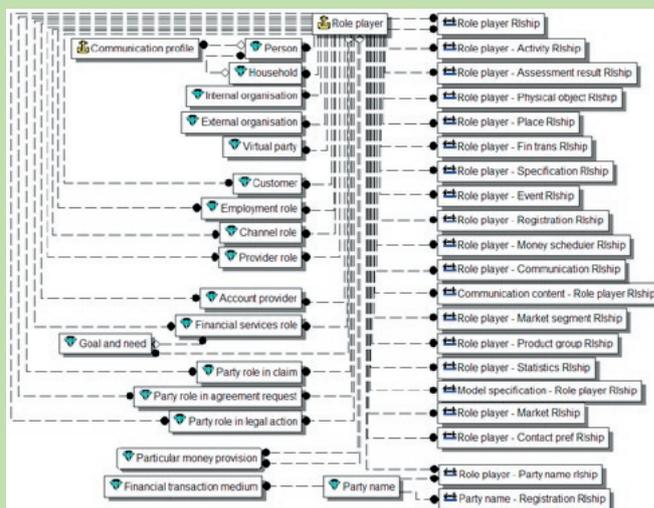
An example of an IAA Business Solution Template

Enterprise Model

The data of the IIW Enterprise Model provides the historical and atomic data needed for a data warehouse and business intelligence infrastructure that can support multiple lines of business and analytical functions. The aim of this shared infrastructure is to provide a reusable single point of data platform and data structure environment that will reduce the development and operational costs in providing business intelligence functionality to the myriad of front and back office organization units.

The Enterprise Model provides insurers with both the content and the infrastructure to support the provision of clean, rationalized and easily accessible data from a central information repository. It allows insurers to exploit the potential of information previously locked in legacy systems and inaccessible to the business user.

The Enterprise Model is a logical model consisting of 80% or more of the data structures typically needed by an insurer for its data warehouse. Once it has been customized to meet the requirements of the insurer, this model can be automatically generated into the physical data warehouse database.



An example of the Enterprise Model

Enterprise Model Features

- A single overall data architecture for enterprise wide storage of consolidated data needed for customer insight, value based and business performance management, and compliance
- Has structures to handle the storage of raw detailed data from many sources

How the Enterprise Model is used

Central Warehouse Scoping and Design: The Enterprise Model provides the blueprint for a design of a central business data warehouse database structure. The model assists in the creation of a flexible and extensible data warehouse specific physical database.

Consistency of Data Mart Architecture: The Enterprise Model provides a logical reference point for the consolidation of data definitions and structures across a number of data marts.

Data Mart Design: The Enterprise Model provides a starter set for the design of prototype data marts. In this case the structure would have to be optimized for the performance of end-user delivery functions.

Benefits of the Enterprise Model

- Provides complete data warehouse database structure for insurers
- Enables insurers to address the infrastructure and storage issues for multiple requirements from a single blueprint
- Promotes the standardization of data across the enterprise
- Enables business users to more effectively control the definition and scoping of the data warehouse solution

Data Marts and Sample Applications

Data Mart models are designed and optimized to support a set of business applications and demonstrators described below. They provide a summary of the details in the Enterprise data warehouse in a way that is requested by users. The Data Mart models are assembled from IIW multi-dimensional Analytical Subject Areas, which are used to create additional insurer specific data marts. Each fact and dimension in these Analytical Subject Areas is also defined separately so that they can be added or taken away from any particular analysis or data mart.

The screenshot shows the 'Underwriting Profitability Analysis' application. The main window displays a table with columns: Matching Data, Pred. Claim Rate, Actual Claim Rate, Profit. Sev., Actual Sev., Profit. PP, Actual PP, Pred. Avg. Prem., Actual Avg. Prem., and Pred./Actual Loss Ratio. A summary row is highlighted in yellow.

Rule	Matching Data	Pred. Claim Rate	Actual Claim Rate	Profit. Sev.	Actual Sev.	Profit. PP	Actual PP	Pred. Avg. Prem.	Actual Avg. Prem.	Pred./Actual Loss Ratio
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	6264	0.0836	0.0836	1736	1736	145	145	47	47	3.07
Rule 4	12549	0.0484	0.0484	1508	1508	73	73	27	27	2.62
Rule 5	2198	0.1278	0.3005	2487	2796	318	840	93	101	3.38
Rule 6	6939	0.1347	0.1347	2617	2617	352	352	98	98	3.57
Rule 7	12030	0.0974	0.0974	2240	2240	218	218	89	89	2.43
Summary	40800	0.0871	0.0948	2148	2218	187	210	85	85	2.86

The 'Rule 3' detail window shows the following information:

```

Rule 3
If Vehicle Year = 95
and Type of Vehicle = Family Car
or Luxury Car
or Sportcar
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: 6264
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
    
```

An example of Underwriting Profitability Analysis

Chapter 4. IAA Process Models

Business Process Modeling

There are many business reasons for which an insurance company might want to model its processes:

- To improve the quality of service to its customers in order to retain them and attract new ones
- To understand which parts of its business are not core differentiators and could be outsourced
- To improve the integration with third parties, in particular distribution channels but also providers
- To meet regulatory compliance requirements in terms of process documentation
- To reduce operating costs and to increase the efficiency of the business

In any organization of significant size many business processes that have essentially the same purpose (and therefore should be essentially the same process) are carried out in very different ways in various organization units of the enterprise. The different process flows come about through a number of circumstances such as:

- Mergers and acquisitions
- Varying levels of automation across the enterprise
- Varying organizational structures and responsibilities across the enterprise
- New products or channels

This results in significant cost to the insurer, including::

- Inconsistent customer experience across channels
- Errors in serving the customer base (e.g. differing process for different products)
- Increased information technology costs in supporting the disparate processes
- Increased management costs due to increased complexity in audit and regulatory governance
- Increased staff training costs and reduced staffing flexibility
- Difficulty in introducing best practice in an enterprise-wide fashion
- Inability to guarantee compliance with policies and regulations

Insurers have found that by streamlining processes across organizational units, products, customers and even geographies, they have achieved very real savings and improved their cost to income ratio measurably.

The IAA Process Models have been developed to address this, as well as to create logical models that capture business requirements for development initiatives and help manage change. They have been created to serve as a business process architecture, which is a vital tool for:

- Enabling cross enterprise business process simplification and rationalization
- Providing a fast-path to an enterprise-wide business process architecture
- Documenting complete business requirements
- Managing process change

Business process architectures provide the enterprise with a clear understanding of its business in the context of its many processes. Clear, well-structured business process architectures have always been vital for ensuring efficiency and effectiveness of business operations. The introduction of new technologies such as business process automation (workflow management tools), centralized rules engines and active data warehouses has made business process architectures even more important than in the past. Initiatives such as straight-through-processing (STP), achieving a zero latency enterprise, and business activity monitoring, are greatly hampered improved with the use of effective enterprise-wide business process architectures.

The IAA Process Models play a critical role in the definition of a services based architecture. Analyzing the processes that support the operations of a financial institution identifies the service candidates that will best support those processes. Process analysis provides essential information about the context of those services, capturing requirements governing the applications that call services within the architecture, and the human roles within the organization that interact with those applications.

With the IAA Process Models, an insurer can both compare its own business processes to best practice business processes, and can also understand how to better support them from an IT perspective.

The IAA Business Process Model

The IAA Business Process Model (BPM) is a set of logical models of that structure of insurance processes, where the processes are defined (as much as possible) to be independent of product, channel, organization structure or technology. By maintaining this independence, the BPM displays the fundamental “core” of business activities that are essential for the continued success of the insurer. The BPM is represented by flow diagrams of activity networks that graphically describe what is required to be achieved by each process.

Like all the other models, the BPM has been built with customization in mind. This means that it’s structure makes it easy to reflect the specificities of every insurer when defining the to be processes across the enterprise.

For process simplification projects (achieving common processes across products and/or channels, harmonization of processes from merged organizations) the steps outlined above are preceded by identifying strategies whereby the differing process flows are selected according to how well they can be brought into synchronization. Understanding the strategies to be achieved by an initiative is an essential pre-requisite to scoping workflows and prioritizing workflow customization.

Actors

An actor represents a stake holder in a process. IAA defines more than 80 actors, such as customer, medical expert or agent. Actors are specified in swim-lanes at each level of detail. Swim-lanes split the process depending on who is responsible for handling each process part. The high-level business processes are decomposed into sub-processes and further decomposed down to an activity level. This decomposition is expressed as a flow of activities and sub-processes in activity decision flow diagrams.

The decomposition can be nested in several levels and only stops at the activity level. The 700 re-usable activities are combined into about 200 business processes in various process flows.

How the BPM is used

Optimizing and re-engineering processes

The BPM provides a generic core of best practice insurance process definitions and diagrams. Thus it offers a fast start for process re-engineering projects by providing an existing structure upon which to map the “as-is” environment, and create the “to-be” solution. The BPM eliminates the need to start with a blank sheet of paper.

Rationalizing and simplifying product (and other) processes

Because the BPM is designed to be independent of product, channel, organization structure, etc.. it is an ideal “target architecture” for process simplification and rationalization projects.

Analyzing Application Impacts and Gaps

Being generic, the BPM is easily mapped to the functionality of application packages. It is a straightforward exercise to compare the functionality of the package to the insurers existing or future process requirements documented by the customized BPM, (in order to identify how well an application supports those requirements). It is also possible to compare the functionality of one application system to another to identify reusable solution alternatives for those process requirements.

Supporting a Services Oriented Architecture

Analysis of the processes that support the operations of an insurer identifies the service candidates that will best support those processes. Process analysis provides essential information about the context of those services, capturing requirements governing the applications that call services within the architecture, and the human roles within the organization that interact with those applications.

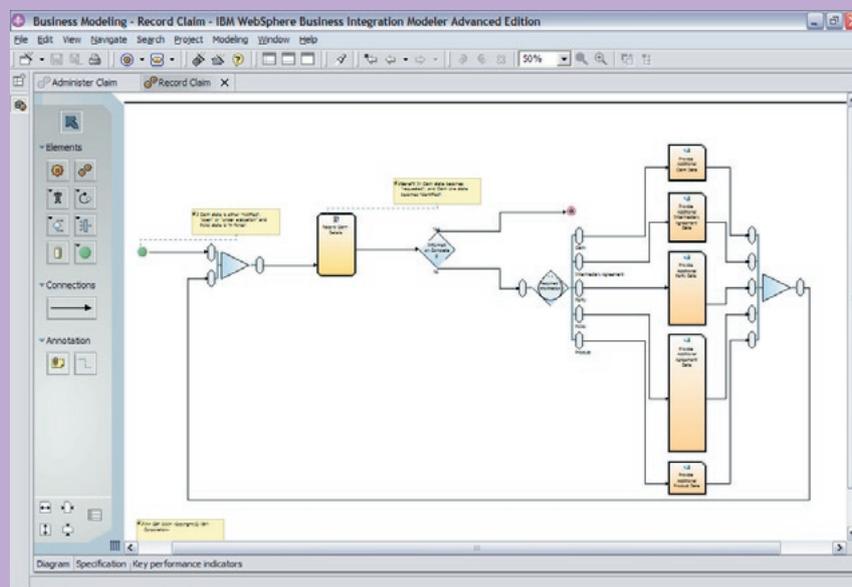
BPM Process Catalog

Channel Management	Intermediary Management
Claims Management	Communication Management
CRM	Customer Acquisition
Enterprise Resource Management	Financial Reporting and Regulatory Compliance
Human Resources Management	Information Technology Management
Financial Transactions	Investment Management
Market Research and Analysis	Marketing and Promotion Management
Product Portfolio Management	Provider Management
Reinsurance Management	Underwriting

Benefits of the BPM

- Jump start analysis with content rich processes
- Provide an enterprise wide view of processes by promoting a common process language and eliminating redundancy in process variations
- Provide a path to automation through linkages to IT services

In addition to the analysis level business processes, IAA provides a path to create design level processes that can be deployed in run-time as process choreography.



An example of the Record Claim process in WBI Modeler

IAA Business Process Design Model

Processes can be specified at different levels of detail depending on the intended usage. The Business Processes that have been described so far are essentially targeted at business analysis and simulation. In order to use processes to drive a run-time environment, using a technology such as BPEL (Business Process Execution Language), some design activities need to be performed.

The result of this design work is the Business Process Design Model. From it, you can use the generation capabilities of a tool like WBI Modeler to generate BPEL that can be consumed in a run-time environment or imported to other tools.

The Design Model is defined in line with the CBM Analysis so that it is possible to understand the business requirements and how they get transformed into executable process flows.

Chapter 6. IAA Integration Models

Services Oriented Architectures, Integration and Component Based Development

Integration issues are a major concern for insurers. Existing infrastructure must be retained, yet in order to meet the demands of today's business issues, a consistent architecture is required that maximizes reuse and supports the development of new initiatives.

Services oriented architecture (SOA), as a basis for integration and as a means of structuring large-scale software architectures, are rapidly becoming the backbone of the modern insurer. SOA can increase the speed of business changes, improve business efficiency and performance, and protect the privacy and security of critical information assets. It enables IT to align more tightly with business strategies in a cost effective manner and in a secure and managed integration environment.

A key factor underpinning a successful SOA is a common enterprise-wide description of the business concepts and processes that are of interest to an insurer. Without this common language any attempt to support a consistent and flexible architecture may fail.

The IAA Integration Models provide this common language. The models support a complete and unambiguous description of the business services required to support the insurer. The IAA Integration Models enable the efficient and accurate gathering of requirement and guarantees the consistency of definitions with a single integration effort or across multiple projects.

The IAA Integration Models are fully consistent with the IAA Process Models, describing the underlying services that support the automation of these processes. Using the IAA Integration Models, business concepts can be traced from analysis level through design level refinements to actual component and message definitions that provide a quick start for the specification of a common services bus within the organization.

The business processes, activities, and use cases defined in IAA represent the functional requirements of the insurance company's systems. The next step in the IAA approach is to take these requirements and describe how they can be covered by a set of services.

The Enterprise Component Blueprint

Portfolio assessment consists in describing the existing applications across the whole enterprise according to a framework of services. Only by going through such an activity can you effectively assess the amount of duplication of functionality across several legacy systems. Here are a few examples of very common duplication: management of customer-related information, execution of business rules, handling of funds, rating, policy management across lines of business, and so on.

To be able to perform such an activity, you need an enterprise-wide list of service definitions. This is typically quite difficult to create on your own but you can use an existing industry reference instead of having to create this yourself. Such an industry reference is the IAA Enterprise Component Blueprint (ECB), which defines a normalized set of functional services to support the insurance business.

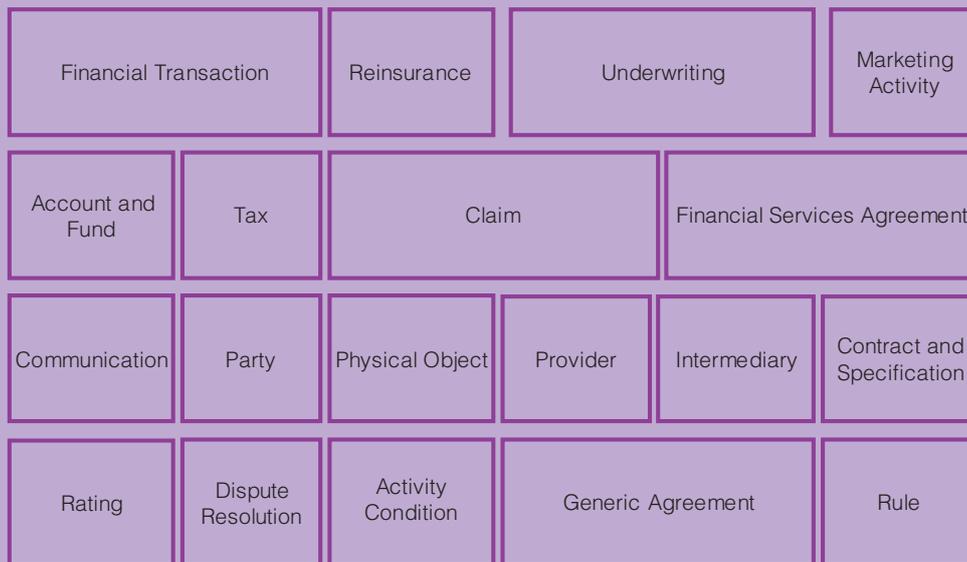
The ECB contains about 300 unique service definitions, such as Request risk assessment. In practice, the functionality described by this service will be implemented in multiple legacy systems, often in conflicting ways. This is a strong inhibitor

to business agility as evolving this capability means that you need to update several systems, which creates additional work and increases the risk of errors and inconsistencies.

Performing such a portfolio assessment is the only way to really understand how to reconcile the business and I.T. priorities. The result is a duplication map that describes all the functional overlaps between the existing legacy applications.

The ECB gives a business view of how the financial services business could be supported by a fully componentized software solution. It describes a set of business components and defines them by the services they provide.

The ECB describes the components at two levels of detail: at the business level and at the design level.



The Enterprise Component Blueprint

The Interface Design Model (IDM)

The Interface Design Model (IDM) (the design level of the ECB) allows the insurer to specify a services oriented architecture that meets the requirements defined in the models described above. This task is normally performed by a technical team within the insurer that make design level decisions based on concerns such as the technology environment.

The IDM was developed to:

- Assist modelers in designing reusable services that meet the insurers stated requirements,
- Define business components that support these services
- Define standard interface definitions that describe the communication between software systems in the insurer

Business Service Groupings

The IDM is structured as a component model, describing units of software that satisfy specific business requirements. The actual requirements that are supported by a component are described as interfaces, which group related services. The internals of a component within IDM are derived from the class models of the BOM, providing the detailed class definitions and relationships, which describe how the component operates.

The components of the IDM designed to meet specific business needs are:

Account agreement	Account and fund
Activity condition place	Claim
Common	Communication
Contract specification	Dispute resolution
Financial transaction	Generic agreement
Insurance agreement	Intermediary
Marketing activity	Party
Physical object	Provider
Rating	Reinsurance
Reporting	Rule Tax
Underwriting	

Business Service Interactions

The IDM describes the collaboration between services to meet a business goal. For example the service retrieve customer information may call other finer-grained services to perform the required task. e.g. get names and contact points.

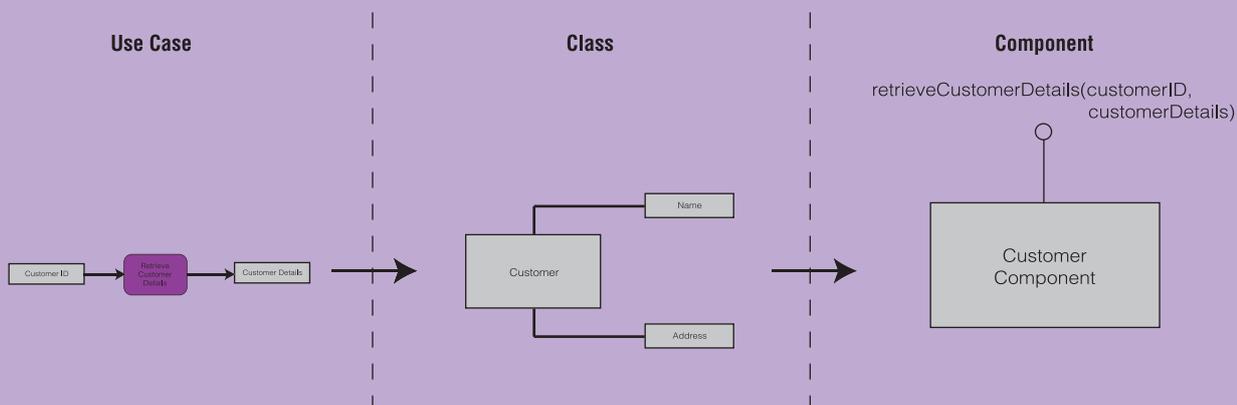
Collaborations between services are essential to a successful SOA as they prevent the definition of monolithic services that would be less reusable across multiple projects.

Uses of the IDM

- Assists in the design for a services oriented architecture
- Provides component definitions for software development
- Provides messages definitions for integration development

Benefits of the IDM

- Allows you to construct services within a formalized model
- Provides traceability back to business requirements
- Structured to maximize reuse of business services
- Enables consistency of definitions
- Provides a ready built model so you can focus on business issues rather than building a model from scratch



Defining IDM services based on Business Model use cases

Deploying the IAA Integration Models

The IDM remains a technology independent view of an SOA and requires transformation into the specifics of a given technology, for example Web Services or XML messaging. However, some of this translation can be done automatically through the use of the IAA Integration Model Generators.

Generators could be developed for other technologies as well since the IDM content is defined to be completely independent from any technology and the technology-specific choices are only made during the generation process.

Why Components?

Monolithic applications or package solutions deliver in general a set of functions to meet a particular purpose that is based on a generic set of requirements. During the implementation of these packaged solutions, companies tailor the functionality by adding extra functions as required and by deleting or modifying functions that do not match the business requirements. Inherent to this approach is the fact that most packages usually set rigid limits on the scope of additions and modifications.

A component-based approach does not generally provide a ready-to-use set of business functions that packages do. Instead, it provides major functional components from which a fully customized solution can be built or with which packaged solutions can be evaluated for fit within an organizations' system architecture. With a consistent set of inter-operable components, it is possible to provide a solution that is better tailored to the needs of the business without having to build from scratch.

Recently developed packaged applications define more and more their interfaces in a component style, which makes them much more suited to component-based and service-based architectures.

Components to implement the services

There are two implementation strategies for the SOA enterprise-wide services: integration (to the legacy systems or package solutions) or components. In almost every case, the solution is a mixture of both approaches.

When opting for implementing components to support the implementation of services, you need to define an enterprise component architecture: how do the components relate to each other, are there dependencies, how do they collaborate, can they be deployed independently?

The Interface Design Model proposes an enterprise-wide set of components for the insurance business. These components are defined to support an enterprise wide set of SOA services. These two layers are kept completely synchronized and traceability is enforced.

In Model-driven terms, the IDM is a Platform-Independent Model (PIM). From there, it is possible to apply some automated transformations to make it target a specific technology.

Java Design Model (JDM)

The Java Design Model (JDM) represents such a Platform-Specific Model that targets the definition of J2EE enterprise-wide components. From the JDM, it is possible to generate J2EE-compliant Enterprise Java® Beans (EJB) interfaces for the components as well a full set of Data Transfer Objects. These assets greatly facilitate the definition of enterprise-wide components for the insurance industry.

The advantages of the approach are a full consistency between the levels (from business and process definitions to services and components), an enterprise-wide approach that reduces duplication of functionality and reduces maintenance costs, and an external validation element that reduces the risk of overseeing some business requirements or to embark on a dubious design.

Chapter 6. IAA Insurance Products

Product Flexibility

Survival in a highly competitive environment can be achieved through price competition (cost control) or by company differentiation. Customer service supported by a customer-centric view is one differentiating factor; a second important factor is product differentiation. Therefore, to keep pace with the competition, it is essential to innovate and to develop and release new financial products quickly.

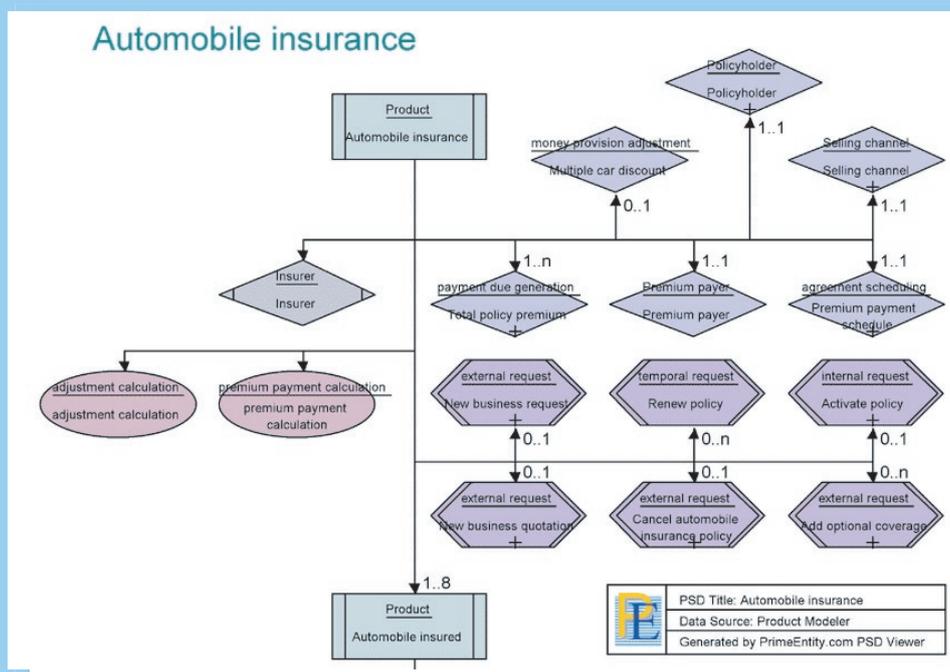
One of the strengths of IAA is the way it analyses financial services products. The IAA Product Modeling Guide provides a set of techniques for analyzing and defining insurance products in a very structured way. It provides a graphical notation (Product Specification Diagrams) semantic as well as hints and tips for modeling insurance products based on accumulated project experience.

IAA Product Model

The IAA Product Models contain a representative set of insurance products structured in accordance with these analysis techniques. These product definitions can be used as templates to accelerate the modeling of insurance products.

- For life insurance: annuities (immediate, deferred, single or joint life), term and whole life, unit linked and all of their components (waiver of premium, accidental death, loans, and so on) as well as all of their life-cycle transactions (total and partial surrender, fund switch, premium holiday/vanishing premiums etc..)
- For property and casualty: auto (including liability, own car damage, break of glass, fire, theft, car replacement etc.), home (with a full set of options and coverages) and travel (with all the options) a fully fledged methodological example of how to customize the product templates.
- For health insurance: family health indemnity plan with all its features and life-cycle events.

The next figure shows a simplified example of a Product Specification Diagram for automobile insurance.



Example of a Product Specification Diagram

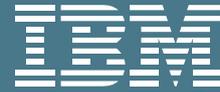
Product modeling can be done in a purely analytical way (to rationalize a product portfolio, for example) but it realizes its full potential when the analysis is coupled to the Specification Framework, which is the generic framework that supports the design and development of systems for product definition and agreement administration.

IAA Specification Framework

The IAA Specification Framework is a design framework for building flexible product engines and administration systems to support those products (as well as existing ones). Its underlying principles of re-use of product definitions and externalization of product rules can dramatically reduce the time to market of new products

The IDM focuses on the definition of the interfaces but does not completely detail how these interfaces are implemented. In that respect, it is an external design model. An internal design level focuses on the implementation of the interfaces and provides a set of class and low level collaborations in order to support the implementation of interfaces. The Specification Framework is a UML model that provides the design of a technical framework allowing a dynamic definition of products and agreements. The Specification Framework should be used as a design model by anyone who wants to develop a flexible product system that can support the creation and the maintenance of related agreements, i.e., policies.

The Specification Framework has been implemented successfully on different platforms and for different lines of business: health insurance, commercial lines, homeowner and even for an agent-compensation system (in that case, the product is the specification of the intermediary contracts and the agreements the intermediary contract themselves).



For more information:

IBM Industry Models & Assets
IBM Belgium
Ave du Bourgetlaan
1130 - Brussels
Belgium

Email: fssc@ie.ibm.com

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