

Reference Architecture

Importance of Enterprise Reference Architecture for Insurance



Kishore Ramchandani

Chief Architect Insurance Industry, IBM Cloud for Financial Services



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Current Insurance Company IT Landscape

Many insurance companies have grown organically by adding new products to attract a different demographic, adding distribution channels, expanding geographical reach, regionally and internationally, etc. Often, due to the design inflexibility of systems implemented in the 1970's, 1980's and 1990's, adding an innovative new product has required implementing new core insurance processing systems (e.g., Underwriting, Policy Administration, Claims), as happened when variable life and variable annuity products were introduced. International expansion has frequently required implementing solutions from local vendors, due to the need to operate within a different insurance business ecosystem (e.g., division of motor vehicles, local auto repair shops, hospitals, labs) – and local vendor solutions generally have pre-built data exchange interfaces. Also, local vendor solutions are built taking into consideration country specific regulations, which could be a significant impediment when implementing solutions developed for a different geography.

In addition, several companies have grown through acquisition, either by purchasing a book of business from another insurer, or by purchasing the entire company. Typical management intent when making an acquisition is to add to the company's customer base and gain efficiencies by eliminating duplication of systems and processes through consolidation of business operations (e.g., Claims, Customer Contact Centers) and systems. In practice, we find some progress in organizational consolidation, but very slow progress in systems consolidation. Depending on the degree of complexity of insurance product features, the guarantees of the insurance contract and the age of the supporting systems, the effort involved in discovery of the business rules and the migration effort to a different core insurance platform frequently cannot be economically justified. As a result, it is common to find that application portfolio of the major insurance companies comprise of 1,000 to over 5,000 systems – and understanding the total IT environment and preparing a roadmap to achieving the envisioned target state is a mind boggling effort!

The need for an Enterprise Architecture

Periodic operational and IT cost reduction exercises, and investments in growing the business, without a well thought out, well defined architecture is akin to adding rooms to an old house, one room every few years, without an architectural blueprint that can present a holistic view of what the home would look like, and what the traffic patterns within the home will be every time a room is constructed. This is akin to the convoluted data flows from system to system that we see within several companies.

An Enterprise Architecture (EA) establishes the roadmap that can direct a company to best achieve its goals according to its vision and business priorities. Jaap Schekkerman, founder of the Institute for Enterprise Architecture Developments (IFEAD), justifies the need for Enterprise Architecture, "a rigorously defined framework is necessary to be able to capture a vision of the entire organization in all its dimensions and complexity". To be able to accomplish this, an Enterprise Architecture is buttressed by frameworks which allow the disparate elements of an enterprise to become synergized. An Enterprise Architecture is important because it allows an organization to have a "holistic view" of the enterprise of which it is a part of.

An Enterprise Architecture framework ensures than an organization derives maximum value from IT systems while keeping their costs low.

What comprises an Enterprise Architecture?

In the classic view (e.g., TOGAF, Zachman), an Architecture is comprised of four layers:

1. Business Architecture
2. Data Architecture
3. Applications Architecture
4. Technology Architecture

Business Architecture is an approach to formalize the way an organization operates based on the convergence among strategy management, business process management and information technology. The technique is used to design a modular business structure that enables a defined business strategy within a given business environment.

A business capability model, such as IBM's Insurance Component Business Model (CBM), is part of the IBM Insurance Reference Architecture.

Business Architecture separates strategic decision-making from tactical implementation decisions. Detailed organizational, process and IT designs created from the Business Architecture are assured of being aligned with the business strategy and with each other.

As part of the Business Architecture creation effort, design principles required to leverage the capabilities necessary to execute the organization's strategy are developed and executive agreement obtained.

Data Architecture – includes Data Quality, Efficiency and Effectiveness. There are two aspects of the Enterprise Data Architecture:

1. Operational - Capture the data needed to support core business operations, preferably in real-time, re-use data services, and centrally manage Master and Reference Data.

2. Analytical - Present data that enables Business Intelligence reporting and data analysis for business decision making, integrate data from multiple sources across the enterprise using a Corporate Data Model and present quality data to the end-users on a timely basis.

Availability of and accessibility to the right data and Actionability, i.e., creating business value, enabling decisions that measurably affect business and enabling robust Business Processes, are key.

Application Architecture - describes the logical structure of software supporting and aligned to business operations. The applications run on top of the infrastructure and depend on the data architecture for accessing persistent business data. Application Architectures include *Processes* that coordinate sequences of business functions, *Services* that define simple or complex business functions designed for reuse, *Components* which are collections of business functionality in a single business area, *Data stores* that maintain persistent business data, and *Rules* that describe externalized criteria for making business decisions.

Technical Architecture describes the run time environments for components and other elements of the application architecture. It also provides IT services that support the application architecture. Business and IT teams jointly specify the qualities of service expected of the infrastructure. Many of the Financial Services and Insurance Security Regulations and Frameworks (such as specified by NAIC, NYDFS, CCPA and NIST) need to be addressed within the Application and Technical Architecture layers and compliance monitored and reported.

Roadmap to Cloud

Most major insurance companies have initiated efforts to migrate a substantial part of their application portfolio to Cloud. Many are selecting more than one of the Cloud providers (e.g., AWS, Azure, IBM, Google) as their target environment, even before they have analyzed their application portfolio in detail to:

- a) determine whether the design and technology used for each application would make migration to Cloud feasible at a reasonable cost (Legacy Core New Business, Policy Administration and Claims systems tend to be monolithic in design, contain very complex logic and often were designed to run on the mainframe),

- b) determine which Cloud would offer the best operating price/performance environment as transaction volumes grow, and code modifications need to be made on a regular basis due to regulation changes, new product introductions and other factors.

With management desire to simplify the technology environment and "get rid of the spaghetti" of duplicate systems, multiple data base management systems, analytics and other software from multiple vendors, IT executives are struggling to define what the target environment should be. As a result, decisions are being made that may appear optimal to a business unit, but many decisions do not fit within an overall vision of what the Target Operating Model, and supporting IT should look like.

There has been tremendous change in the technology landscape over the last 10+ years, including evolution of automation tools, increased use of AI capabilities and wider acceptance of Hybrid Cloud as the target environment. Significant increases in bandwidth availability with dropping prices that enable "work from home" for office workers at a reasonable cost, with security built into the network and the layers of the computing architecture and the impact of Covid-19 necessitating the need to work remotely, have caused most organizations to change their operating model. This gives us the opportunity to rethink business processes and leverage the technology to promote automated processing for the majority of insurance transactions, and use AI and Analytics assisted decisioning by Underwriters, Claims Adjusters, medical professionals, for the more complex transactions.

The IBM Insurance Reference Architecture

In early 2020, a few lead IBM Distinguished Engineers and I reviewed the Reference Architecture for Insurance that IBM had developed a few years ago and decided that it needed a major overhaul. We reviewed architectures that several of our insurance clients had developed and came to the same conclusion – there is a great need in the industry for a modern Insurance Reference Architecture, developed taking into consideration new ways of working that take advantage of current technologies. What I have observed at our Insurance clients are numerous efforts to consolidate applications, "modernize" and "containerize" some of them, and migrate to one or more of the leading Cloud vendor environments, without an holistic view of what the target environment should be as more and more of the workloads migrate to a hybrid multivendor Cloud environment. There is a serious danger that the "spaghetti" on-premises IT environment is being recreated with modern technologies!

Our Insurance Reference Architecture development team followed a few basic ground rules:

1. We reviewed and discussed the most frequent issues that our insurance clients told us about, placing particular emphasis on Customer Experience, and the ability to respond in near real time to customer and distribution partner requests. We selected several Use Cases that were associated with the most resources (business and IT) consumed.
2. We decided that technologies we would specify in the Solution Architectures had to be "tried and true", so technologies such as Quantum that are in early stages of commercialization were considered but not included in the solutions. We have included Cognitive capabilities used in business processes where we have experience working with clients in implementing these capabilities for production use.
3. Security considerations have been "baked in" to every layer of the architecture, taking into consideration Financial Services and Insurance company regulations.
4. Insurance Data Architecture has been explicitly defined.

How will use of the Enterprise Reference Architecture for Insurance help?

It will help address the questions:

Do we have a starter set of Insurance Use Cases and Journey Maps to conduct Business Scenario Workshops?

What should the re-imagined Insurance business process (and associated flow of information) look like?

What technologies should be deployed at each step of the process?

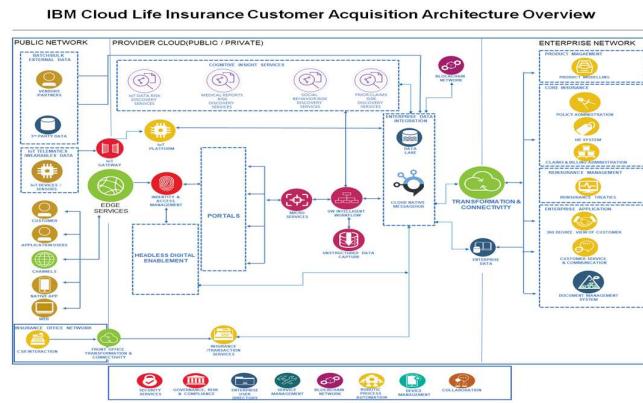
What are the typical sources of data (including those from external sources), and what should the target data architecture look like?

Is it an Open Architecture that can easily evolve as newer technologies become available?

How do we address Financial Services and Insurance Compliance considerations?

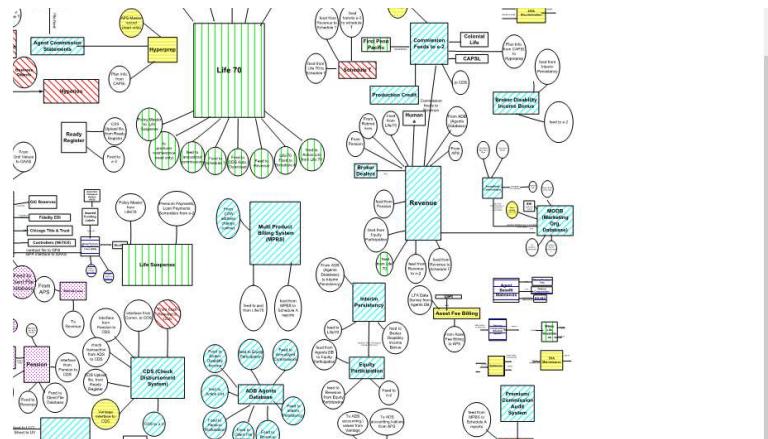
Can we jump start the design and implementation of solutions for the more important insurance business processes?

A sample representation of the Architecture components associated with an application for Life Insurance is given below:

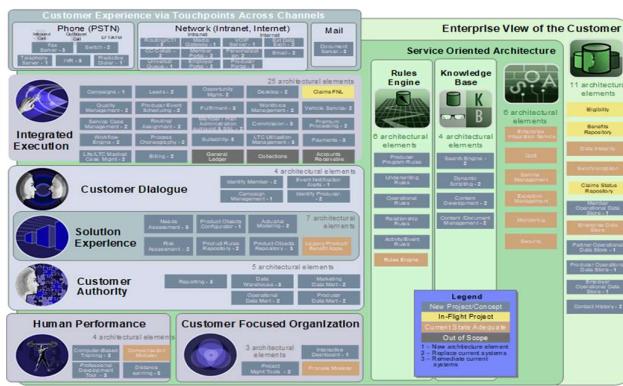


Which IT environment would you rather have?

Continue to evolve without a Reference Architecture:



Build using a Target Reference Architecture:



A more detailed view of the Insurance Reference Architecture, and several other architectures, can be found in the Industry Architectures menu at:

<https://www.ibm.com/cloud/architecture/architectures>

These architectures are continuing to evolve as we add solution architectures for more Use Cases, and can be a useful reference for Insurance companies on their Journey to Cloud.

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Ralph Wiest • 3rd+
Retired IBM Distinguished Engineer

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Kishore - glad to see that you and a number of our Insurance / FS colleagues are progressing the Insurance Reference Architecture and assets into the current world of modern digital transformation, cloud, and cognitive!!

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Kishore Ramchandani Author

Chief Architect Insurance Industry, IBM Cloud for Financial Services

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Thanks Ralph. Our thinking and Reference Architectures have to keep pace with rapid advances in technology and an evolving partner ecosystem!

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Adam Dymitruk • 2nd
Author of Event Modeling, Event Sourcing Expert

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I like the idea of the separation of the concerns. But the converse is true as well, which is why we overlay them on to Event Modeling. That breaks down the delays in hand-offs from different roles in the organization.

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Sridhar Iyengar • 3rd+
IBM Distinguished Engineer, Account Technical Leader, Bank of America

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Kishore - Good work summarizing the importance of EA, Reference architectures and then mapping it modern cloud native hybrid cloud architectures. IBM and our key clients are on this journey and can benefit from formalizing and implementing these architectures. One addition to the thinking around Business Architecture is the importance of Valu ...more

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Kishore Ramchandani Author
Chief Architect Insurance Industry, IBM Cloud for Financial Services

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I agree. Good topics to tackle and write about!

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Ken Kelly • 3rd+
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Impressive work, [Kishore Ramchandani](#) !

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Kishore Ramchandani Author
Chief Architect Insurance Industry, IBM Cloud for Financial Services

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Thanks!

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v well written, Kishore. Thx for sharing.

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Excellent value

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Kishore Ramchandani

Chief Architect Insurance Industry, IBM Cloud for Financial Services

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