

A Case Study by: Henk Jonkers, Iver Band, Dick Quartel

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ArchiSurance Case Study

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Boundaryless Information Flow[™] achieved through global interoperability in a secure, reliable, and timely manner

Executive Summary

The ArchiSurance Case Study is a fictitious example developed to illustrate the use of the ArchiMate[®] modeling language in the context of the TOGAF[®] framework. The Case Study concerns the insurance company ArchiSurance, which has been formed as the result of a merger of three previously independent companies. The Case Study describes the baseline architecture of the company and then a number of change scenarios.

This Case Study is required to be used as an example throughout accredited ArchiMate training courses. However, it is not part of the definition of TOGAF. This work supports The Open Group vision of Boundaryless Information Flow by illustrating the combined use of the TOGAF and ArchiMate standards for consistent representation of architectural information across diverse organizations, systems, and initiatives.

Introduction

This fictitious Case Study illustrates the realistic use of the ArchiMate enterprise modeling language in the context of the TOGAF framework. The Case Study concerns the insurance company ArchiSurance, the result of a merger of three previously independent companies based in different metropolitan areas.

This Case Study is used as an example throughout ArchiMate training courses, and as the context for ArchiMate certification examinations. It begins with baseline business, application, data, and technology architectures, making use of the appropriate ArchiMate or TOGAF viewpoints. The study continues with two change scenarios. The first scenario provides examples of views illustrating the TOGAF architecture development and implementation cycle. It shows the architecture vision, business goals, principles and requirements, the target business, application, data, and technology architecture, the results of a gap analysis between baseline and target, and views to support implementation and migration planning. In the second scenario, which adopts the target state of the first scenario as the new baseline, customers gain direct access to their insurance portfolios through the web. For this scenario, there are no models available yet.

The Open Group expects the Case Study to evolve over time, and encourages its members to add new aspects and views or create new change scenarios, as long as they are consistent with the original case description and models.

TOGAF[®] and ArchiMate[®]

Frameworks for enterprise architecture cover different aspects to support the enterprise architect. They may have, among others, any combination of the following ingredients:

- A process ("way of working") for creating architectures
- A set or classification of viewpoints
- A language for describing architectures (defining concepts and relationships, but also a notation)

The Open Group maintains two open standards for enterprise architecture: TOGAF [1] and ArchiMate [2]. The core of TOGAF is a process for enterprise architecture development and implementation – the Architecture Development Method (ADM). TOGAF also describes viewpoints, techniques, and reference models, as well as a content framework that identifies the types of building blocks that make up an architecture. However, TOGAF does not prescribe the use of a specific modeling language to create architectural views.

ArchiMate is a graphical language that provides a uniform representation for models to support the complete architecture development cycle. Version 2.0 of the standard consists of a core language, aimed at the description of the actual architectures (business, information systems, and technology architectures, as well as their inter-relationships), and extensions to model the motivations for the architecture, as well as its implementation and migration planning. Figure 1 sketches how the core language and extensions are linked to the TOGAF ADM. In addition to modeling concepts and relationships, ArchiMate, like TOGAF, defines a set of architecture viewpoints.

TOGAF and ArchiMate have a firm common foundation in their philosophy and use of viewpoints to capture and communicate different aspects of a single underlying architecture model. The standards complement each other in that TOGAF focuses on the process to develop and implement architectures, while ArchiMate focuses on a uniform language to model architectural artifacts.

The ArchiMate language, as described in the Technical Standard [2], complements TOGAF [1] in that it provides a vendor-independent set of concepts and relationships, including a graphical representation, that helps to create a consistent, integrated model, which can be depicted in the form of views.

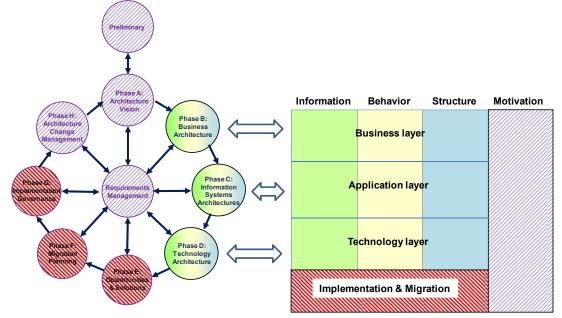


Figure 1: Correspondence between ArchiMate and TOGAF

Background

ArchiSurance [3,4] is the result of a recent merger of three previously independent insurance companies:

- · Home & Away, specializing in homeowners' insurance and travel insurance
- PRO-FIT, specializing in auto insurance
- Legally Yours, specializing in legal expense insurance

The company now consists of three divisions with the same names and headquarters as their independent predecessors.

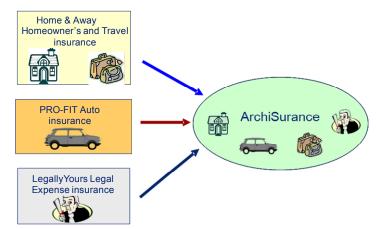


Figure 2: ArchiSurance: The Result of a Merger of Three Insurance Companies

ArchiSurance was formed to take advantage of numerous synergies between the three organizations. While the three pre-merger companies sold different types of insurance, they had similar business models. All three sold direct to consumers and small businesses through the web, email, telephone, and postal mail channels. Although based in different cities, each was completely housed in a modern office complex in a major metropolitan area. Each had loyal customer bases and strong reputations for integrity, value, service, and financial stability. All three companies were privately held by interlocking groups of institutional and individual investors.

The lead investors of the three companies began merger talks after they noticed that lower-cost competitors were entering their markets, that there were new opportunities in high-growth regions, and that each company required significant new IT investments to remain competitive. They realized that only a larger, combined company could simultaneously control its costs, maintain its customer satisfaction, invest in new technology, and take advantage of emerging markets with high growth potential. The merger negotiations and regulatory approvals took 18 months, but two years ago the papers were signed and the merger was complete.

The new company offers all the insurance products of the three pre-merger companies, and intends to frequently adjust its offerings in response to changing market conditions. Like its three predecessors, ArchiSurance sells directly to customers via print, web, and direct marketing.

The merger has resulted in a number of integration and alignment challenges for the new company's business processes and information systems. These challenges are apparent in the ArchiSurance baseline business, application, data, and technology architecture. But first, the TOGAF ADM Preliminary Phase establishes a motivational context for these challenges.

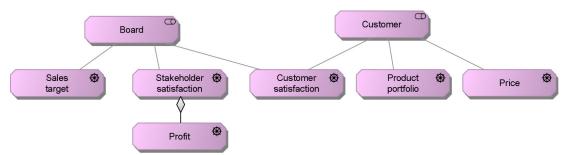
Preliminary Phase

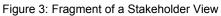
To guide future changes in their business and information technology, ArchiSurance has decided to develop an enterprise architecture based on TOGAF 9.1 and ArchiMate 2.0 with minimal tailoring.

As part of the Preliminary Phase, the main stakeholders in the architecture engagement and their concerns (modeled as internal drivers in ArchiMate) are identified. TOGAF defines a Stakeholder Map matrix to represent this. In ArchiMate, this can be expressed using the Stakeholder viewpoint:

The stakeholder viewpoint allows the analyst to model the stakeholders, their concerns, and the assessments (in terms of strengths, weaknesses, opportunities, and threats) of these concerns. Also, the links to the initial (high-level) goals that address these concerns and assessments may be described.

Figure 3 shows a part of such a diagram, identifying two stakeholders (the ArchiSurance board of directors and its current and potential customers) and their concerns, modeled as drivers. Customer satisfaction is a shared concern of both stakeholders. Stakeholder satisfaction can be refined into more detailed concerns; e.g., profit.





Drivers motivate the development of specific business goals, as shown below for profit. Goals such as cost reduction can be partitioned into the reduction of maintenance costs and the reduction of personnel costs.

ArchiMate defines a principle as either a normative property of all systems in a given context, or a normative property of the way in which they are realized. Note that "systems" here include, for example, organizations and organization units, not only IT systems. Principles, therefore, help realize business goals. TOGAF defines a principle as a qualitative statement of intent that should be met by an architecture. A principle must have a supporting rationale and a measure of importance.

The ArchiMate Principles viewpoint, an example of which is shown in Figure 5, depicts principles, their dependencies, and the goals they realize in a graphical way:

The Principles viewpoint allows the analyst or designer to model the principles that are relevant to the design problem at hand, including the goals that motivate these principles. In addition, relationships between principles, and their goals, can be modeled. For example, principles may influence each other positively or negatively.

TOGAF defines a Principles catalog to provide an overview of principles.

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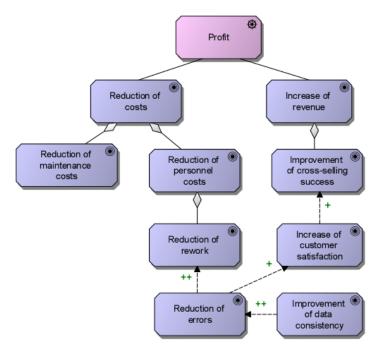


Figure 4: Business Goals Associated with the Driver Profit

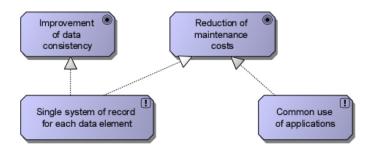


Figure 5: Principles View

Phase B: Baseline Business Architecture

After the merger, ArchiSurance set up a shared front-office as a multi-channel contact center for sales and customer service, with a primary contact center at the pre-merger headquarters of Home & Away. There are still three separate back-offices that handle the insurance products of the three original companies. A Shared Service Center (SSC) has been established for document processing at the pre-merger headquarters of PRO-FIT. The center administers the central document repository as well as all automated document workflows. In addition, it performs all scanning, printing, and archiving for legally binding documents as they enter or leave ArchiSurance. To ensure business continuity and handle periods of peak activity, the SSC also hosts trained personnel and equipment to perform the functions of the front-office, which is similarly prepared to reciprocate.

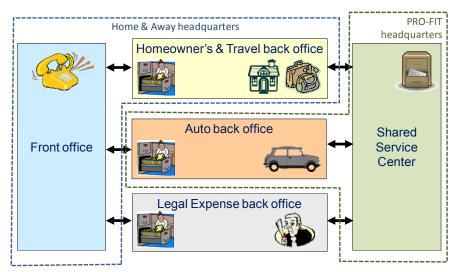


Figure 6: Global Organizational Structure of ArchiSurance

In Phase B (Business Architecture) of the TOGAF ADM, ArchiMate can express and relate ArchiSurance organizational structure, products, services, functions, processes, and information. The business architecture provides context for the data, application, and technology architectures.

Organization Structure

For describing the organization structure, ArchiMate defines the Organization viewpoint:

The Organization viewpoint focuses on the (internal) organization of a company, a department, a network of companies, or of another organizational entity. It is possible to present models in this viewpoint as nested block diagrams, but also in a more traditional way, such as organizational charts. The Organization viewpoint is very useful in identifying competencies, authority, and responsibilities in an organization.

The TOGAF counterpart of this viewpoint is the Organization Decomposition diagram.

The organization structure is often represented as a tree, as shown in Figure 7, although the organizational decomposition approach used by both ArchiMate and TOGAF has far more options than a simple tree-style organizational chart. This view shows the high-level organization structure of ArchiSurance, with its main

locations and departments. Alternatively, a nested diagram can depict the subdivision of the organization into locations and departments.

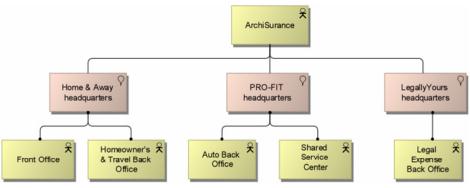


Figure 7: Organization View

Business Functions

An ArchiMate business function groups behavior based on a chosen set of criteria, typically required business resources and/or competences.

The main business functions that ArchiSurance distinguishes are:

- Marketing, which studies, plans, promotes, and manages products and market segments, and works with Actuarial to design products
- Actuarial, which determines product prices and reserve levels, works with marketing to design new products, and analyzes enterprise risk
- Customer Relations, which includes the interactions between ArchiSurance and its customers; it handles customer questions, captures incoming claims, and conducts direct marketing campaigns
- · Underwriting, which sets prices for individual policies and generates insurance proposals and policies
- · Claims, which formulates and executes ArchiSurance's response to each claim against one of its policies
- Finance, which includes regular premium collection, according to the insurance policies with customers as produced by Contracting, and handles the payment of insurance claims
- Document Processing, which supports other functions through document scanning, printing, and archiving
- Investment Management, which manages financial and real estate assets for maximum returns within corporate and regulatory liquidity and risk constraints

Some of these business functions are replicated in the three divisional back-offices of ArchiSurance.

To model business functions and their relationships, ArchiMate defines the Business Function viewpoint:

The Business Function viewpoint shows the main business functions of an organization and their relationships in terms of the flows of information, value, or goods between them.

The TOGAF counterpart of this viewpoint is the Functional Decomposition diagram.

Figure 8 shows the main business functions of ArchiSurance, as well as the most important information flows between the functions and external roles. It also shows the replication of business functions in the back-offices of the different divisions.

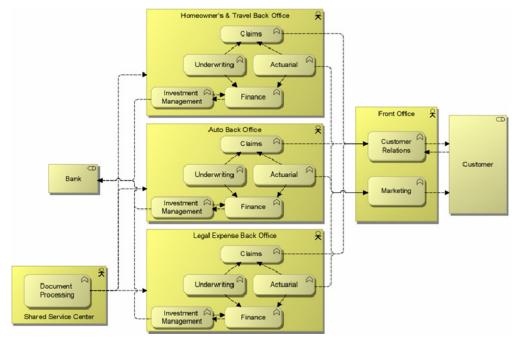


Figure 8: Business Function View

Business Processes

An ArchiMate business process groups behavior based on an ordering of activities. It produces a defined set of products or services. A process architecture shows the most important business processes and their relationships, and possibly the main steps within each of the processes. It usually does not show all the details of a process flow, which is the purpose of business process design languages. ArchiMate defines a Business Process viewpoint:

The Business Process viewpoint is used to show the high-level structure and composition of one or more business processes.

The TOGAF counterpart of this viewpoint is the Process Flow diagram.

Figure 9 shows the two central business processes of ArchiSurance, with their high-level sub-processes: Close contract, which is performed when selling a new insurance product, and Handle claim, which is performed when a damage claim has been received. While the details of these processes may differ for the different types of insurance product, the main steps are the same.

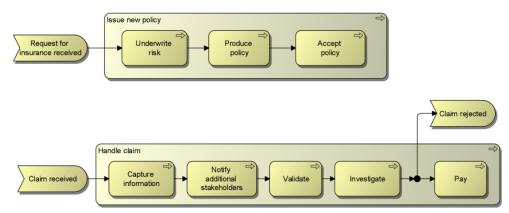


Figure 9: Business Process View

Phase C: Baseline Information Systems Architectures (Applications)

Since the merger, the three divisions have adopted a common web portal, contact center software suite, and document management system. Also, the company has selected a strategic CRM solution and implemented it for both Home & Away and PRO-FIT. However, due to management's focus on minimizing post-merger risks while continually improving the day-to-day performance of each division, core business application rationalization has not begun. Now that ArchiSurance has met post-merger performance expectations, investors expect substantial IT cost savings through the adoption of a common set of product and customerfocused applications. Therefore, a number of challenges remain. Home & Away still uses its pre-merger policy administration and financial application packages, while PRO-FIT and Legally Yours still use their own pre-merger custom monolithic applications.

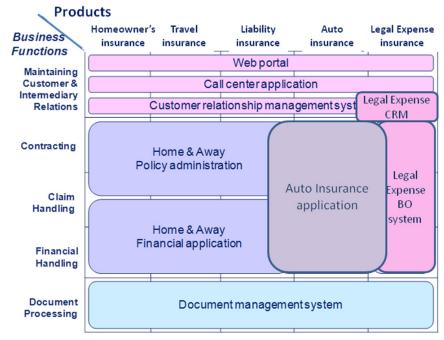


Figure 10: Application Landscape

Application Co-Operation

ArchiMate defines an Application Co-operation viewpoint to show an overview of the application landscape and the dependencies between the applications:

The Application Co-operation viewpoint describes the relationships between applications components in terms of the information flows between them, or in terms of the services they offer and use. This viewpoint is typically used to create an overview of the application landscape of an organization. This viewpoint is also used to express the (internal) co-operation or orchestration of services that together support the execution of a business process.

The TOGAF counterpart of this viewpoint is the Application Communication diagram.

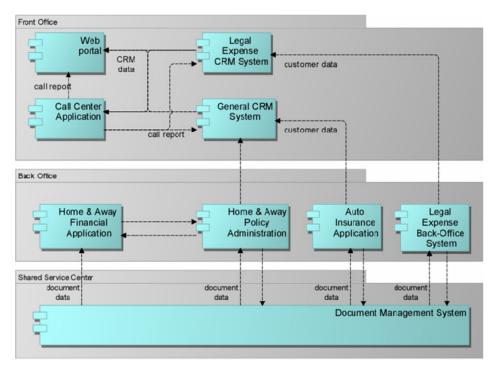


Figure 11 shows the main applications of ArchiSurance, as well as the main data flows between the applications.

Figure 11: Application Co-Operation View

Business-Application Alignment

TOGAF does not define diagrams for business-application alignment. However, it does specify matrix-based viewpoints to show the links between the business and the application architecture; e.g., an Application/Organization matrix and an Application/Function matrix.

The relationships between application components can also be modeled graphically. ArchiMate defines the Application Usage viewpoint:

The Application Usage viewpoint describes how applications are used to support one or more business processes, and how they are used by other applications. It can be used in designing an application by identifying the services needed by business processes and other applications, or in designing business processes by describing the services that are available. Furthermore, since it identifies the dependencies of business processes upon applications, it may be useful to operational managers responsible for these processes.

The Application Service concept plays a central role in this viewpoint. Figure 12 shows a subset of the services offered by the applications used by the Home & Away division of ArchiSurance, and which of the sub-processes of the claim handling process make use of which of these services.

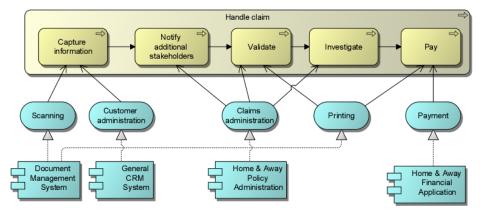


Figure 12: Application Usage View

Phase C: Baseline Information Systems Architectures (Data)

The ArchiSurance data architecture describes the major relationships between its conceptual business objects and its logical data objects. ArchiMate defines the Information Structure viewpoint for this purpose:

The Information Structure viewpoint is comparable to the traditional information models created in the development of almost any information system. It shows the structure of the information used in the enterprise or in a specific business process or application, in terms of data types or (object-oriented) class structures.

One of the data viewpoints that TOGAF defines is the Logical Data diagram.

Figure 13 shows a subset of the business objects that ArchiSurance defines. Part of the customer information is an insurance file, which is composed of insurance requests, insurance policies, and damage claims. A number of specializations of the insurance policy object are defined, one for each type of insurance that ArchiSurance sells.

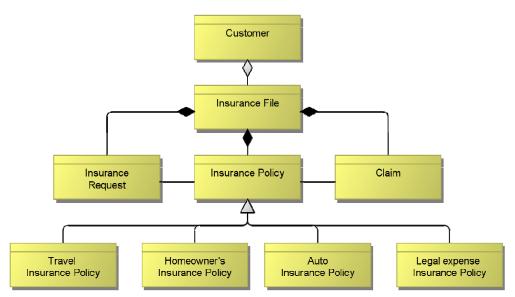


Figure 13: Information Structure View

Another data viewpoint that TOGAF defines is the Data Dissemination diagram:

The purpose of the Data Dissemination diagram is to show the relationship between data entity, business service, and application components. The diagram shows how the logical entities are to be physically realized by application components. This allows effective sizing to be carried out and the IT footprint to be refined. Moreover, by assigning business value to data, an indication of the business criticality of application components can be gained.

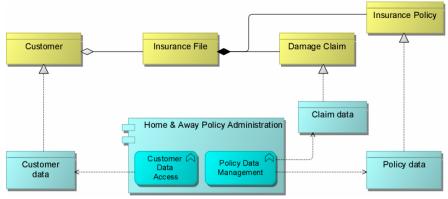


Figure 14 shows a Data Dissemination diagram for one ArchiSurance application.

Figure 14: Data Dissemination Diagram

Phase D: Baseline Technology Architecture

Figure 15 sketches the technical infrastructure landscape of ArchiSurance. In the front-office, located at the Home & Away headquarters, there is a general-purpose server and one dedicated to web hosting. The Shared Service Center (SSC), located at the PRO-FIT headquarters, has its own server for the document management system. Each of the three back-offices has a server for its applications.

A Local Area Network (LAN) connects servers and personal computers at each of the three ArchiSurance locations, which are in turn connected by a corporate Wide Area Network (WAN).

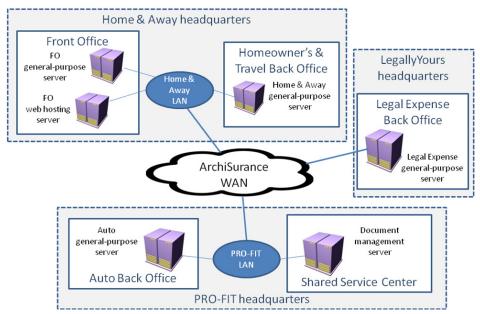


Figure 15: Infrastructure Landscape

For an overview of the infrastructure landscape, ArchiMate defines the Infrastructure viewpoint:

The Infrastructure viewpoint contains the software and hardware infrastructure elements supporting the Application Layer, such as physical devices, networks, or system software (e.g., operating systems, databases, and middleware).

The TOGAF counterpart of this viewpoint is the Environments and Locations diagram.

Figure 16 shows the main infrastructure components of ArchiSurance, grouped by location and department. Also the networks that connect the different devices, and the (application) artifacts deployed on the devices, are shown in this view.

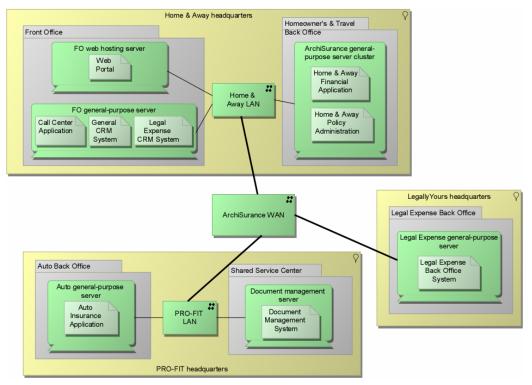


Figure 16: Infrastructure View

Change Scenarios

Scenario 1: Application Portfolio Rationalization

The inflexibility of the ArchiSurance application architecture makes it difficult to adapt to changes in business conditions. Partly as a result of the merger, the application landscape has become scattered, resulting in data redundancy and functional overlap, as well as point-to-point application integration using a variety of data formats and methods. These problems cause internal instabilities, increased application maintenance costs, and obstacles to sharing information across the company and with partners. Consequently, the IT department has a sizable backlog of work requests. ArchiSurance top management is very concerned about the backlog, particularly an unmet need to share information automatically with high-volume contracted sales partners and influential insurance consultants.

This scenario rationalizes the ArchiSurance application portfolio by:

- Migrating to an integrated back-office suite for functions such as policy administration and financial transactions. The suite will consist of:
 - AUTO-U, an automated underwriting system that generates proposals and policies
 - *P-ADMIN*, a packaged policy administration system that integrates with the automated underwriting system to issue, modify, and renew policies; this system also handles customer accounting and billing
 - *VERSA-CLAIM*, a packaged claims system with screens and workflow that can be configured to support ArchiSurance's three lines of business
 - *P-CONFIG*, a product configurator management used to define all insurance products, and expose these definitions to AUTO-U, P-ADMIN, and VERSA-CLAIM through web services
 - BRIMS, a business rule management system (BRMS) consisting of a rules repository, a processing engine, a rule development environment, and an authoring tool for rule management user interfaces. The business rule engine exposes rule execution capabilities to AUTO-U, P-ADMIN, VERSA-CLAIM, and P-CONFIG through web services.
- Completing the migration to the strategic CRM system

The ArchiSurance lead investors and CEO support these initiatives on the condition that all changes are invisible to ArchiSurance customers and partners. The insurer's products and services must not be affected, and all customer and partner interactions must proceed uninterrupted and unchanged.

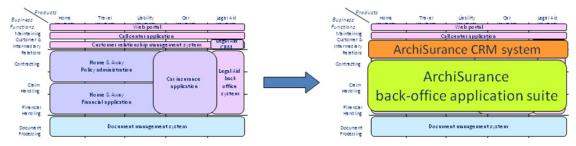


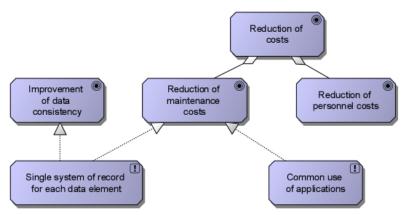
Figure 17: Application Portfolio Rationalization

As part of this effort, the technical infrastructure will also be simplified. The separate back-office servers will be replaced by a shared server cluster located in the data center at Home & Away headquarters. However, to ensure business continuity, there will also be a back-up server cluster located in the data center at PRO-FIT headquarters.

Phase A: Architecture Vision

Phase A of the TOGAF ADM establishes an architecture effort and initiates an iteration of the architecture development cycle by setting its scope, constraints, and goals. This phase also validates the business context and develops a Statement of Architecture Work.

The business context consists of the key business requirements based upon the main business goals and architecture principles. Some relevant business goals and principles for the current scenario are shown in Figure 18.





Goals and principles are the basis for concrete requirements, as shown in an ArchiMate Goal Refinement viewpoint:

The Goal Refinement viewpoint allows a designer to model the refinement of (high-level) goals into more concrete goals, and the refinement of concrete goals into requirements or constraints that describe the properties that are needed to realize the goals. The refinement of goals into sub-goals is modeled using the aggregation relationship. The refinement of goals into requirements is modeled using the realization relationship.

Figure 19 shows an example of such a view for the current change scenario.

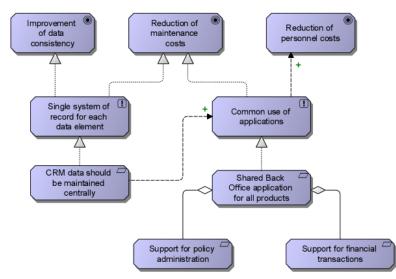


Figure 19: Goal Refinement View

An important element of the architecture vision is a high-level representation of the baseline and target architectures, to explain the added value of the architecture effort to stakeholders. For this purpose, ArchiMate defines the Introductory viewpoint:

The Introductory viewpoint forms a subset of the full ArchiMate language using a simplified notation. It is typically used at the start of a design trajectory, when not everything needs to be detailed yet, or to explain the essence of an architecture model to non-architects that require a simpler, more intuitive notation. Another use of this basic, less formal viewpoint is that it tries to avoid the impression that the architectural design is already fixed, an idea that may easily arise when using a more formal, highly structured, or detailed visualization.

The TOGAF counterpart of this viewpoint is the Solution Concept diagram.

The example below highlights the most important changes that are needed in the current change scenario:

- In the Front-Office, the separate CRM system for Legal Expense will disappear.
- In the Back-Office, the separate back-office applications will be replaced with a single back-office suite. The three separate general-purpose back-office servers will be replaced by a shared server cluster and a back-up server cluster.

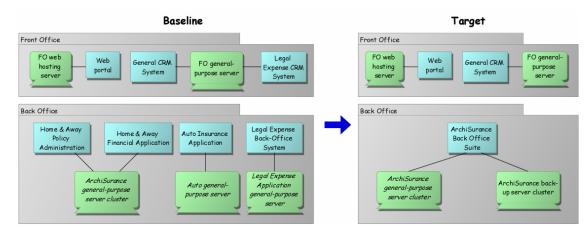


Figure 20: Introductory View

Phase B: Target Business Architecture and Gap Analysis

In this scenario, the business architecture remains unchanged. However, in the business architecture, we also show how the target architecture realizes the key business requirements. For this purpose, TOGAF specifies a Business Footprint diagram. In ArchiMate, this can be expressed using the Requirements Realization viewpoint, defined as follows:

The Requirements Realization viewpoint allows the designer to model the realization of requirements by the core elements, such as business actors, business services, business processes, application services, application components, etc. Typically, the requirements result from the goal refinement viewpoint.

The example below shows how the business requirements established in the architecture vision phase are realized by elements in the architecture.

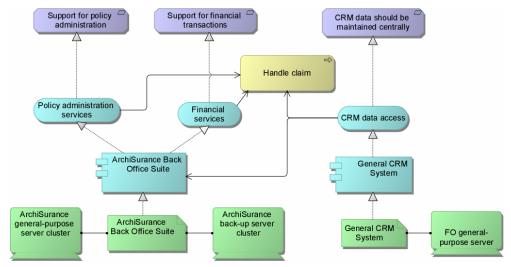


Figure 21: Requirements Realization View

Phase C: Target Application Architecture and Gap Analysis

The Application Communication diagram below shows the proposed target situation for the application landscape.

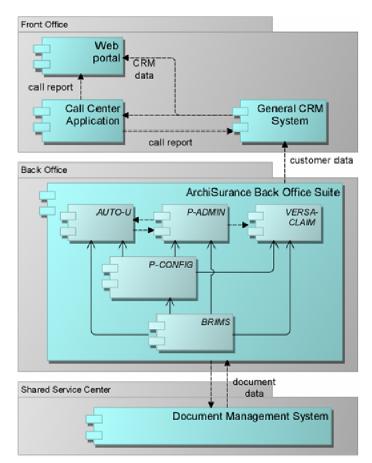


Figure 22: Target Application Architecture: Application Co-Operation View

The results of a global gap analysis for the application architecture are visualized below. Several application components that exist in the baseline architecture are no longer present in the target architecture: the separate back-office applications and the separate Legal Expense insurance CRM system. The CRM functionality for Legal Expense insurance customers is taken over by the general CRM system; therefore, this does not require new components (although it may be necessary to adapt or reconfigure the existing general CRM system, this is not shown in the gap analysis). In addition, a completely new back-office application suite is introduced.

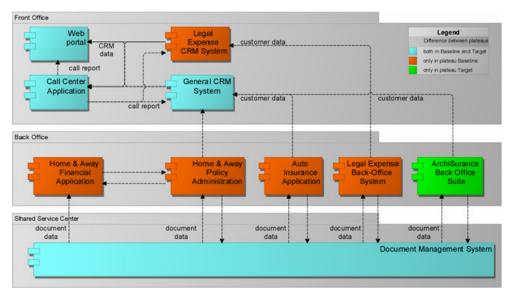
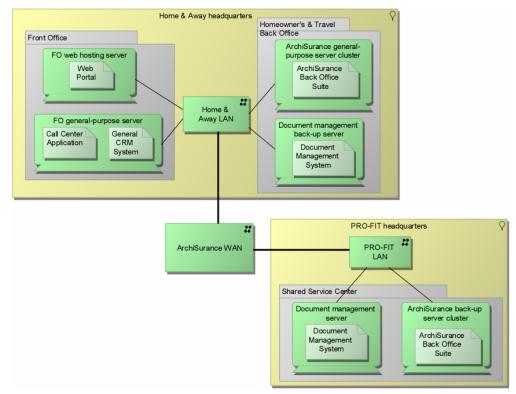


Figure 23: Application Architecture: Gap Analysis

Phase D: Target Technology Architecture and Gap Analysis

The Infrastructure view below shows the proposed target situation for the technical infrastructure landscape.



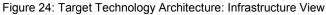


Figure 25 visualizes the results of a global gap analysis for the technology architecture. The separate generalpurpose back-office servers are slated for removal. The original server cluster of Home & Away is to become the central ArchiSurance back-office service cluster, and an additional back-up server cluster is to be placed in the SSC at PRO-FIT headquarters. There is also a back-up document management server to be placed in the Home & Away back-office. The new back-office suite and the document management system are to be replicated on their respective main servers and back-up servers.

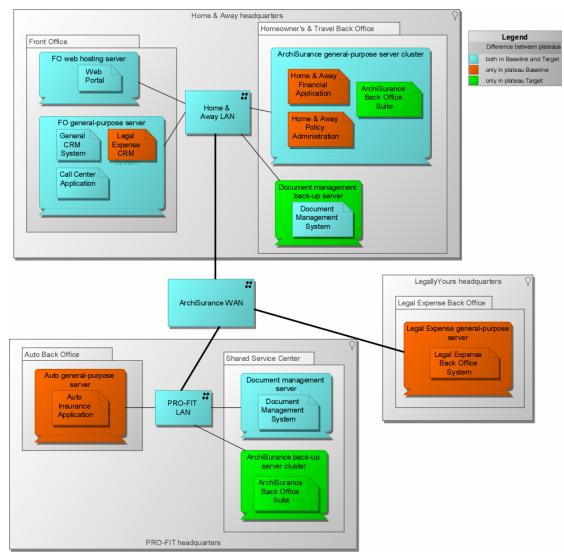


Figure 25: Technology Architecture: Gap Analysis

Implementation and Migration Planning

TOGAF 9 introduces for Phases E and F the *transition architecture*, representing a possible intermediate situation ("plateau") between the baseline architecture and the target architecture.

In ArchiMate, the baseline, target, and transition architectures, as well as their relationships, are shown using the Migration viewpoint:

The Migration viewpoint entails models and concepts that can be used for specifying the transition from an existing architecture to a desired architecture.

Figure 26 shows an example for the current scenario. The IT department of ArchiSurance does not have sufficient resources to carry out the integration of the back-office systems and the integration of the CRM systems in parallel. One transition architecture therefore replaces two CRM systems with one, but has separate back-office systems. Another has a single back-office suite but two CRM applications.

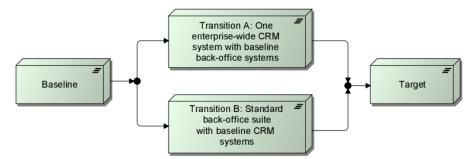


Figure 26: Migration View

Transition architectures enable the planning of implementation projects such as CRM integration and backoffice application integration. The sequence of these projects depends on which of the transition architectures is selected. This can be is shown in a TOGAF Project Context diagram (Figure 27):

A Project Context diagram shows the scope of a work package to be implemented as part of a broader transformation roadmap. The Project Context diagram links a work package to the organizations, functions, services, processes, applications, data, and technology that will be added, removed, or impacted by the project.

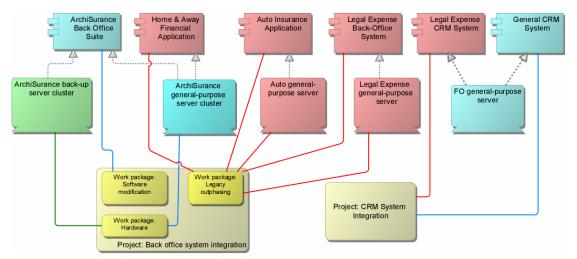


Figure 27: TOGAF Project Context Diagram, expressed in ArchiMate

Scenario 2: Online Portfolio Management

In this scenario, that assumes the target state of Scenario 1 as the new baseline, customers gain direct access to their insurance portfolios through the web. This reduces the number of customer interactions with the front-office by enabling customers to:

- Securely purchase, renew, or modify their homeowner's, travel, auto, or legal expense insurance online consistent with the rules that ArchiSurance uses to conduct its business
- Receive help with their online transactions by:
 - Searching a knowledge base for answers
 - Initiating a chat session with a Customer Service Representative (CSR)
 - Using a web form to compose and submit an email that will be answered by a CSR
 - Using a web form to request a phone call from a CSR
- Access information and special offers from ArchiSurance partners that are tailored to their needs, such as banking and financial planning services, investments, credit cards, and other types of insurance

For this scenario, there are no models available yet. The Open Group encourages its members to contribute to future versions of this Case Study. Contributors may extend or add detail to the two scenarios presented here, or they may create new scenarios. In order to foster a coherent body of work, however, the baseline architectures for new change scenarios should be either the baselines or targets of the change scenarios presented here.

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