

ArchiSurance Case Study

Version 3.1

A Case Study by:

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ArchiSurance Case Study, Version 3.1

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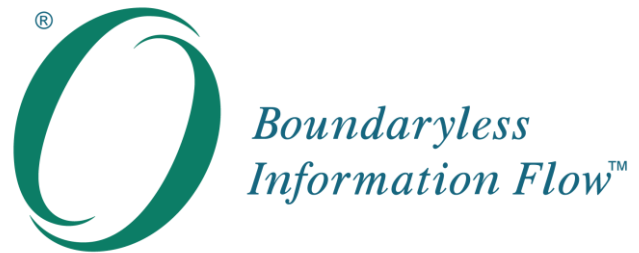
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Executive Summary

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.

Even though the concepts presented in this Case Study could be applied to different situations, the example addresses typical concerns corresponding to the insurance and financial sectors.

This work supports The Open Group vision of Boundaryless Information Flow™ by illustrating the combined use of The Open Group ArchiMate and TOGAF standards for consistent representation of architectural information across diverse organizations, systems, and initiatives.

This document is an update of the pre-existing ArchiSurance Case Study [5], to reflect the changes and additions in the ArchiMate 3.1 Specification.

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 shows Baseline and Target Business, Application, Data, and Technology Architectures, making use of the appropriate ArchiMate or TOGAF viewpoints. The study incorporates two change scenarios: Rationalization and Digital Transformation.

This document is an update of the pre-existing ArchiSurance Case Study [5], to reflect the changes and additions in the ArchiMate 3.1 Specification. 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.

The ArchiMate and TOGAF Standards

Frameworks for Enterprise Architecture cover different aspects of architecture practice. They may have, among others, any combination of the following ingredients:

- A method for creating architectures
- A set or classification of viewpoints
- A language for describing architectures including language element definitions and notations

The Open Group maintains two open standards for Enterprise Architecture: the TOGAF framework [1] and the ArchiMate modeling language [2]. The core of the TOGAF framework is a method for Enterprise Architecture development and implementation: the Architecture Development Method (ADM). The TOGAF framework 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, the TOGAF framework does not prescribe the use of a specific modeling language to create architectural views.

The ArchiMate language is a graphical notation that provides a uniform representation for models that can support the complete architecture development cycle. The ArchiMate Specification [2] consists of a core language, aimed at the description of Business, Information Systems, IT, and physical Technology Architectures, and their inter-relationships. It also contains elements to model business and technology strategy, motivations driving architecture development, and plans for architecture implementation and migration.

Figure 1 sketches how the core language and additional elements support the TOGAF ADM. In addition, the ArchiMate language contains elements for modeling the physical aspects of an enterprise, such as facilities and equipment, which the TOGAF framework does not address. This Case Study considers physical elements part of the ArchiSurance Technology Architecture using viewpoints chosen from both the ArchiMate language and the TOGAF framework.

The ArchiMate and TOGAF standards share a firm foundation in their core ideas and their use of viewpoints to capture and communicate different aspects of a single underlying architecture model. The standards

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complement each other in that the TOGAF standard focuses on a method for developing and implementing architectures, while the ArchiMate language focuses on a uniform notation for modeling architectures.

The ArchiMate language [2] complements the TOGAF framework [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. While the ArchiMate language defines its own example viewpoints that serve as templates for a broad range of views, the language can also be used to construct the diagrams defined in the TOGAF Architecture Content Framework.

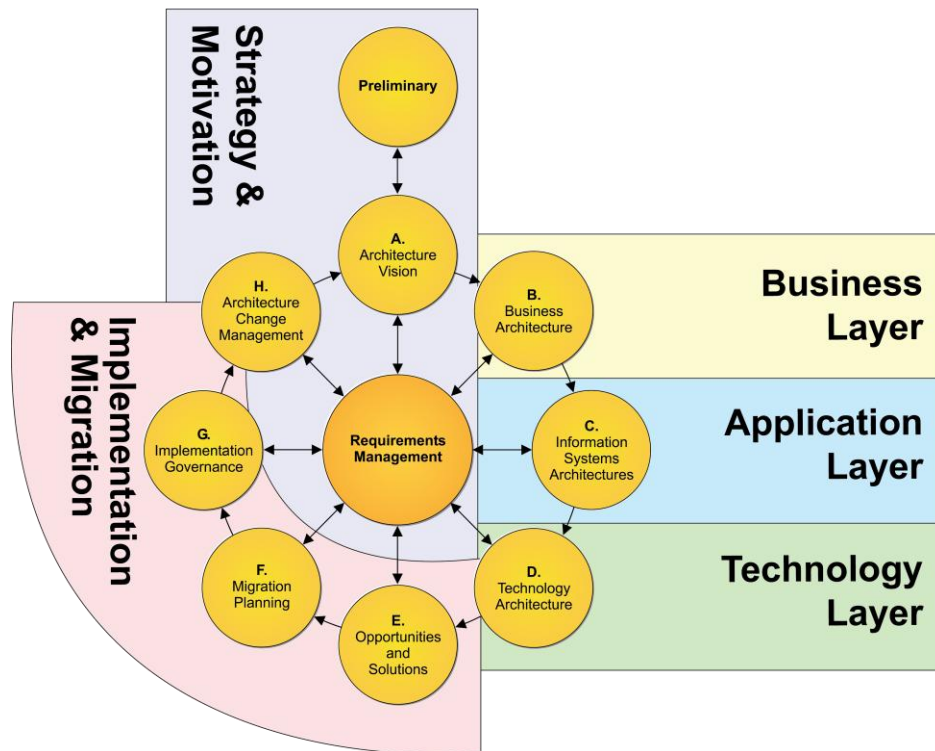


Figure 1: Approximate Correspondence between the ArchiMate Language and the TOGAF ADM

Background

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

- *Home & Away*, specializing in homeowner's 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.

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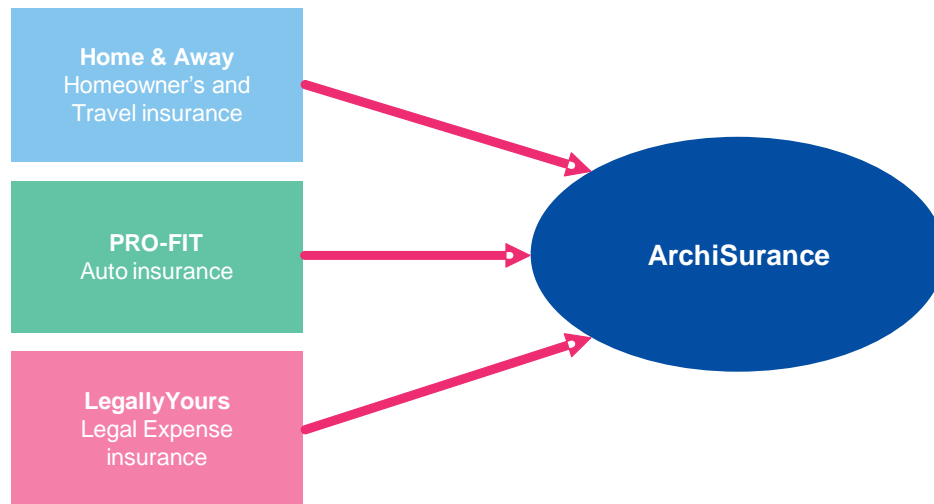


Figure 2: ArchiSurance: The Result of a Merger of Three Insurance Companies

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 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 web, email, telephone, and postal mail channels, and indirectly via intermediaries.

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.

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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.

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.

Digital Transformation

In addition to the more immediate goals related to post-merger integration, ArchiSurance also sees the rapid pace of technology as both a challenge and an opportunity. It wants to embark on a Digital Transformation and has defined a new Digital Customer Intimacy strategy, which employs a combination of Big Data and the Internet of Things (IoT). ArchiSurance intends to acquire more detailed customer data and use it to improve customer interaction and satisfaction, and to adjust insurance premiums based on risk.

To this end, for insurance products sold to consumers, ArchiSurance intends to use data from smart, connected devices such as fitness trackers, vehicle tracking systems, or home automation gateways. In various B2B markets ArchiSurance intends to use data from sources such as fleet management systems, energy networks, in-store RFID¹ devices, or smart building sensors. Ultimately, this may result in real-time insurance products where customers receive direct feedback on the financial consequences of their behavior, and advice on adjusting this behavior to lower their insurance premium.

The next sections describe how ArchiSurance approaches the Rationalization and Digital Transformation change scenarios.

¹ See https://nl.wikipedia.org/wiki/Radio-frequency_identification.

Phase A: Architecture Vision

To guide future changes in their business and information technology, ArchiSurance has decided to develop an Enterprise Architecture based on the ArchiMate 3.1 and TOGAF 9.2 standards.

As part of Phase A, the main stakeholders in the architecture engagement and their concerns (modeled as internal drivers in the ArchiMate language) are identified. The TOGAF standard defines a Stakeholder Map matrix to represent this. In the ArchiMate language, 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., profitability.

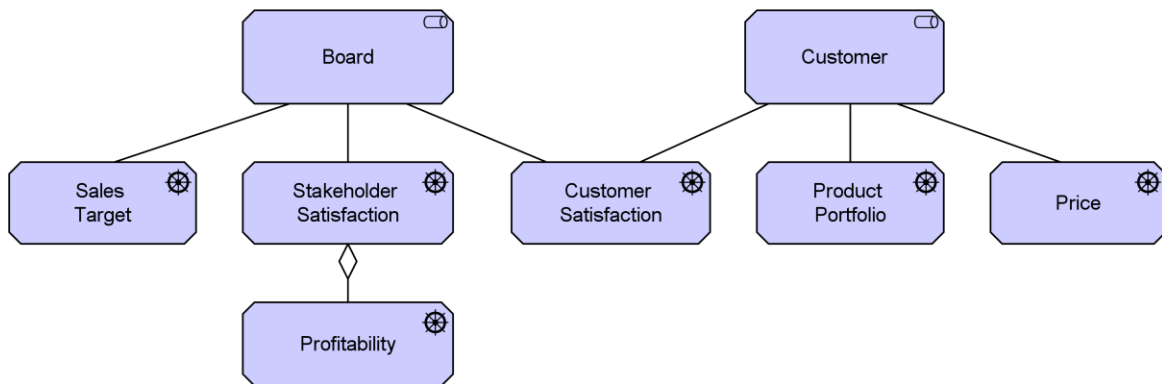


Figure 3: Fragment of a Stakeholder View

Drivers motivate the development of specific business goals, as shown in Figure 4 for profitability. The two assessments show that profitability of ArchiSurance is suffering from customers defecting to competitors with superior digital experiences or lower premium costs. ArchiSurance plans to raise its profit margin by 5% in the next fiscal year. Goals such as reduction of costs have a positive influence on this outcome. This goal of cost reduction can in turn be partitioned into the reduction of maintenance costs and the reduction of personnel costs.

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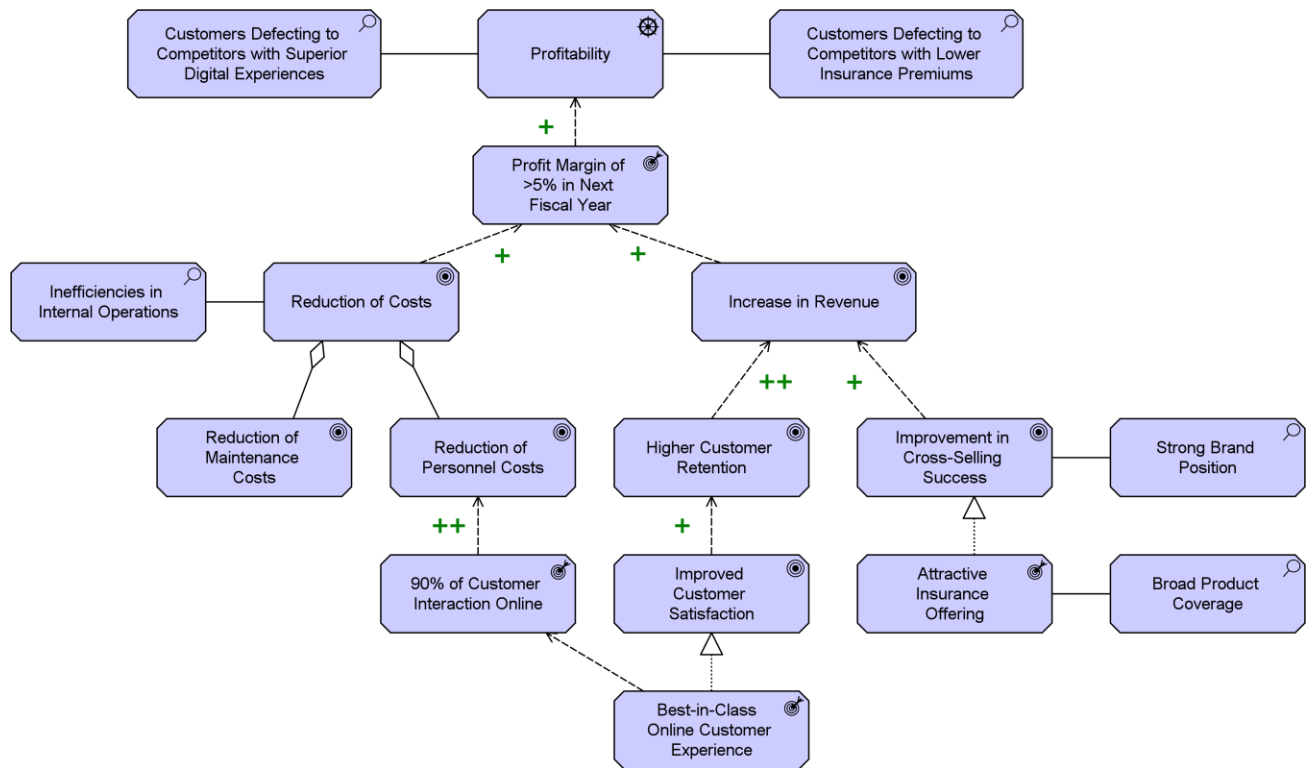


Figure 4: Business Goals, Assessments, and Expected Outcomes Associated with the Driver Profitability

Based on its business goals, ArchiSurance defines a set of principles to guide its architecture development. The ArchiMate language defines a principle as a realized qualitative statement of intent that must be met by the architecture. Note that the systems here include, for example, organizations and organization units, not only IT systems. Principles, therefore, help realize business goals. The TOGAF standard also defines a principle as a qualitative statement of intent that should be met by an architecture. A TOGAF principle must have at least 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:

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.

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

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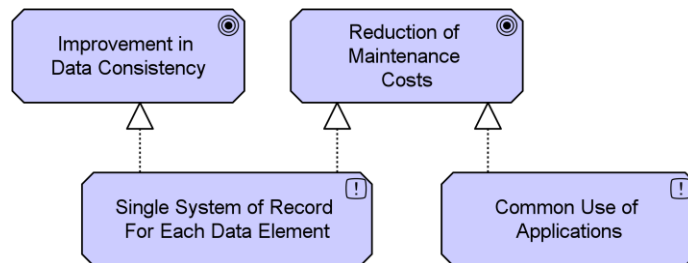


Figure 5: Principles View (Fragment)

Goals and principles are the basis for concrete requirements, as shown in a 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 6 shows an example of such a view for the Rationalization change scenario.

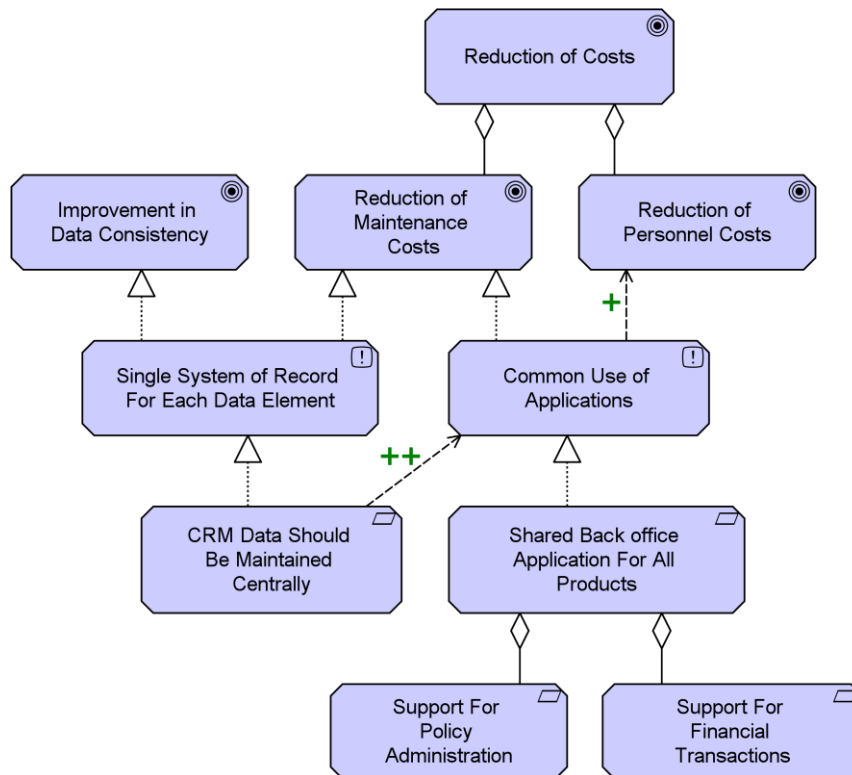


Figure 6: Goal Refinement View for Rationalization Strategy

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Longer-Term Vision

In addition to the short-term need for rationalization, ArchiSurance has defined a longer-term Digital Customer Intimacy strategy that combines Big Data and IoT. ArchiSurance intends to use more detailed customer data to improve customer interaction and satisfaction, and to customize insurance premiums based on insights into the customers' behavior. The company will capture this data with smart, connected devices such as personal fitness trackers, black boxes in vehicles, home automation gateways, fleet management systems, in-store RFID devices, or smart building sensors.

The Strategy viewpoint allows the Business Architect to model an overview of the courses of action chosen or considered by the enterprise, the capabilities and resources supporting them, the envisaged outcomes, and how these contribute to the organization's goals and drivers.

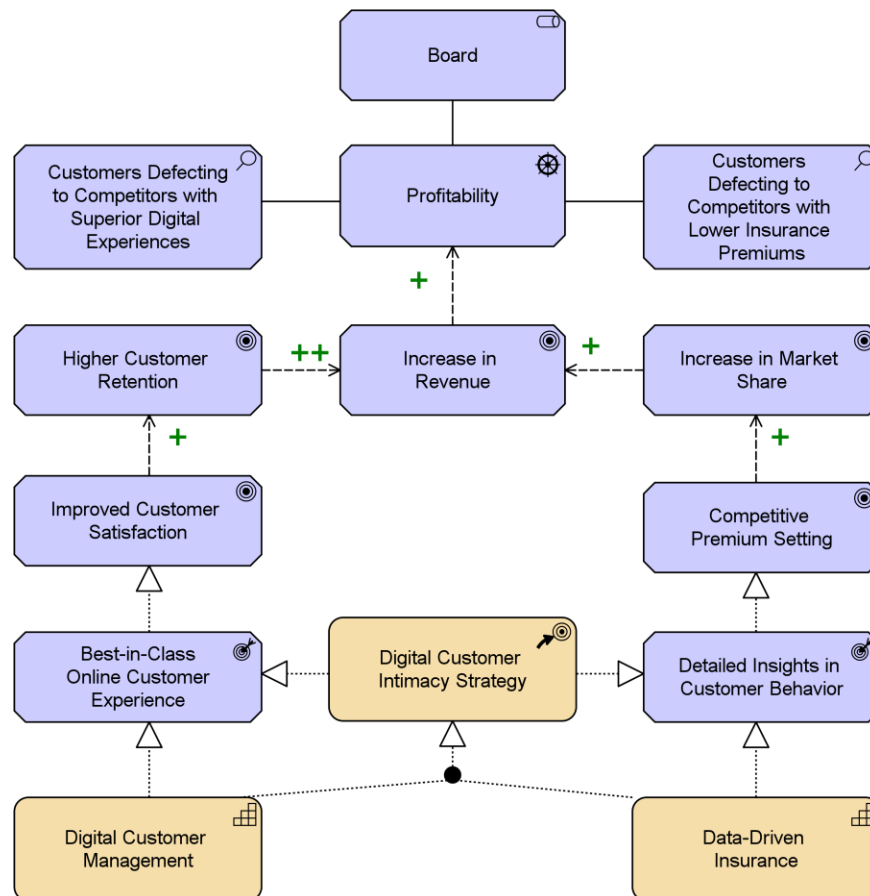


Figure 7: Strategy View for Digital Customer Intimacy Strategy

Ultimately, this new strategy should of course also contribute to the main drivers of the organization, as outlined in part in Figure 3. The relationships between strategy, capabilities, envisaged outcome, and stakeholder drivers is shown in Figure 7. The Digital Customer Intimacy strategy requires ArchiSurance to develop a number of new capabilities and resources, including digital customer management, data acquisition, and data analysis.

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Solution Concept

An important element of the Architecture Vision is a high-level representation of the Target Architecture and how this provides a solution to the needs of the enterprise, to explain the added value of the architecture effort to stakeholders. The TOGAF Solution Concept diagram can be created with the ArchiMate language for this purpose. Figure 8 highlights the most important aspects of the Target Architecture, showing requirements and outcomes derived from both the Rationalization and the Digital Customer Intimacy strategies:

- Enterprise-wide Customer Relationship Management (CRM) automation in the front-office, to replace individual CRM systems
- Integrated back-office automation will replace the separate back-office applications for the different lines of business
- The outcome Detailed Insights in Customer Behavior will be supported by acquiring customer behavior data from external data sources, which will be fed into a solution for automated data analysis, which in turn will deliver customer profiles to the new back-office solution

The business intelligence gained from that will be used in setting insurance premiums for individual customers as part of the claim management capability, and the development of new insurance products. This will also require the development of organizational competencies in data analysis.

- Various social media apps in combination with the requisite social media competencies of the organization will realize the envisaged excellent online customer interaction

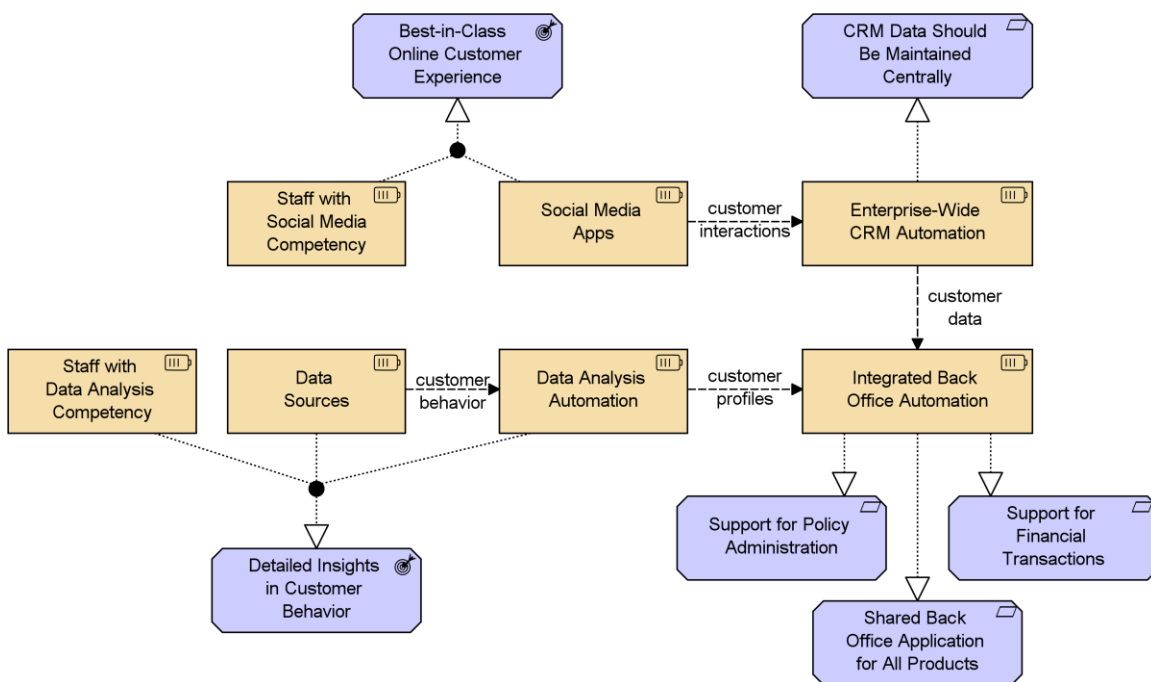


Figure 8: Solution Concept View

Phase B: 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.

In Phase B (Business Architecture) of the TOGAF ADM, the ArchiMate language 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, the ArchiMate language defines the Organization viewpoint:

The Organization viewpoint focuses on the 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 9, although the organizational decomposition approach used by both the ArchiMate and TOGAF standards 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's departments (Figure 10).

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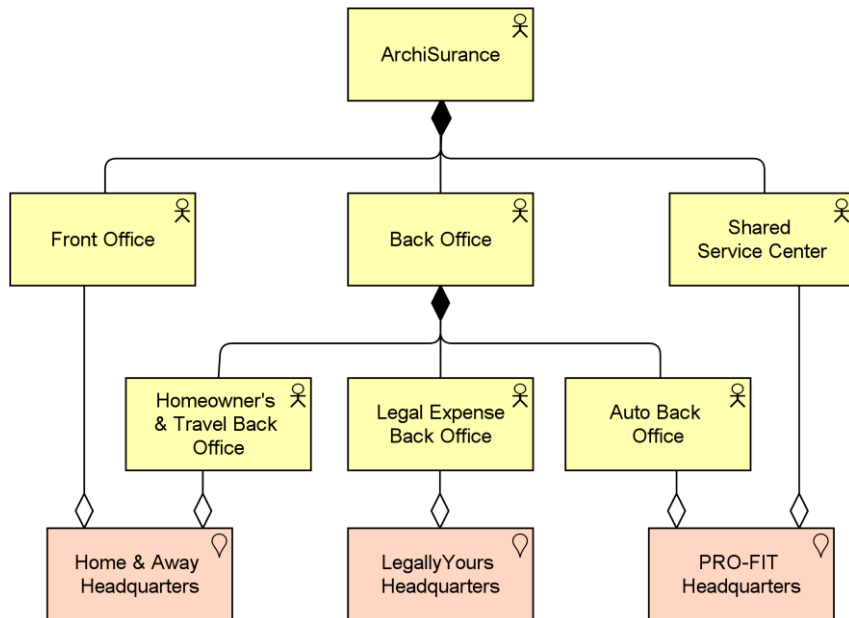


Figure 9: Organization View

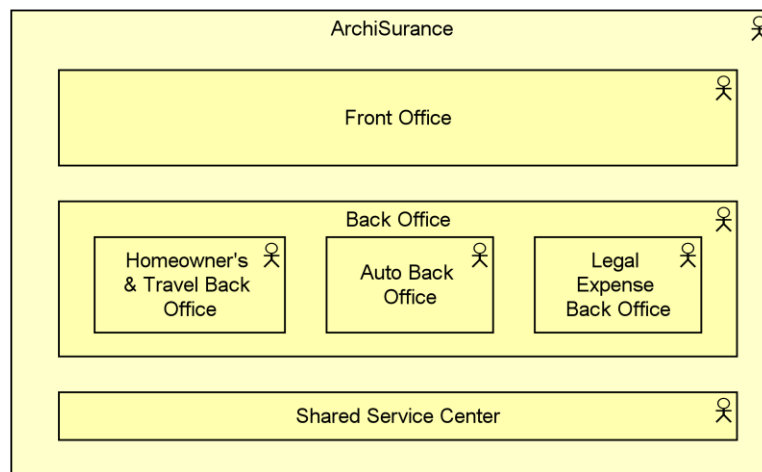


Figure 10: Organization Decomposition (Nested)

Value Stream

To express at a strategic level how ArchiSurance creates value for its customers, it uses value streams. The main, high-level value stream for acquiring insurance products is depicted in Figure 11 (using the icon notation for value stream). This shows the stages in the value production, the value contribution of each stage, and the resulting outcome for the customer.

The Value Stream viewpoint allows the Business Architect to create a structured overview of a value stream, the capabilities supporting the stages in that value stream, the value created, and the stakeholders involved.

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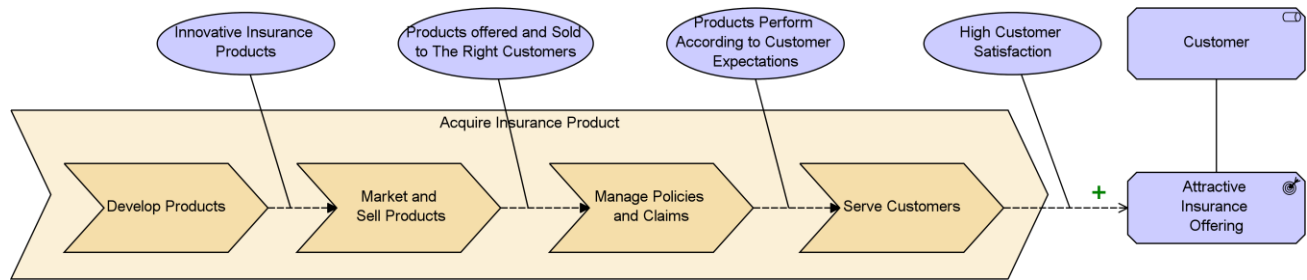


Figure 11: Value Stream

Capabilities

ArchiSurance needs to improve or change several of its capabilities to implement the strategic and operational changes it envisages. To that end, it has created a capability map to get a clear view of its current capabilities, inspired by the Panorama360 reference model for the insurance industry.² This is shown in Figure 12.

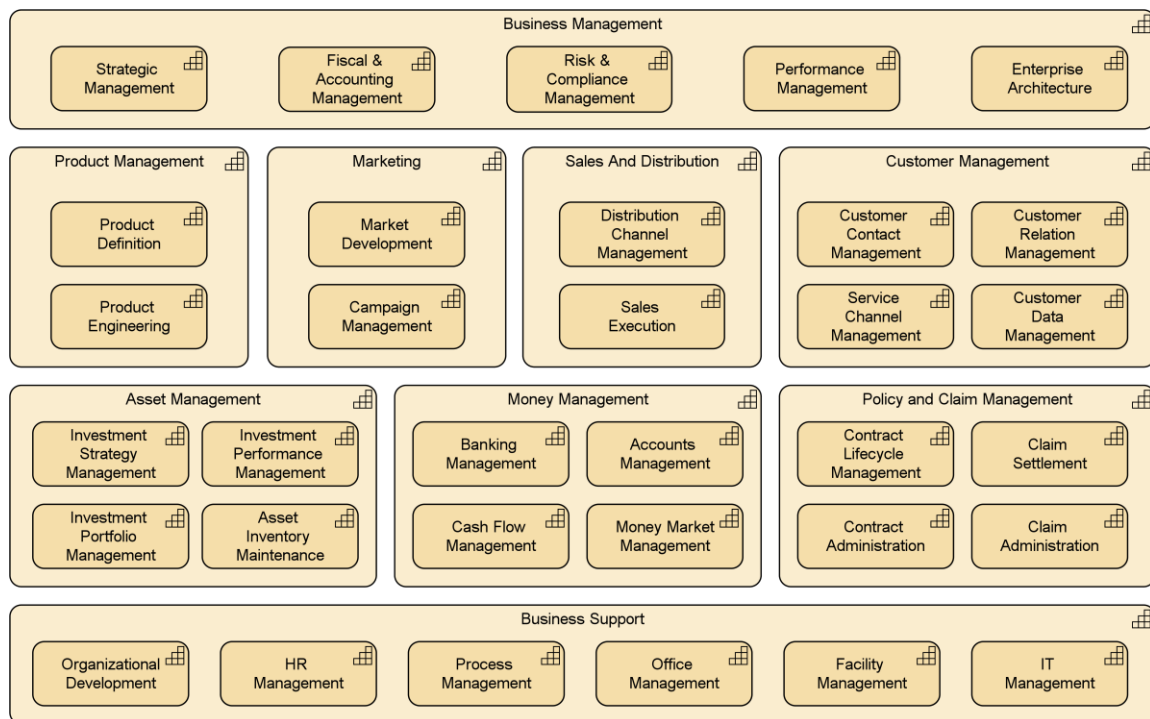


Figure 12: Capability Map View (Baseline)

² See www.insuranceframeworks.com/what_is_panorama360.aspx.

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The Capability Map viewpoint allows the Business Architect to create a structured overview of the capabilities of the enterprise. A capability map typically shows two or three levels of capabilities across the entire enterprise. It can, for example, be shaded to create a heat map that identifies areas requiring investment.

The stages of the value stream shown in Figure 11 are supported by various capabilities. This is shown in the cross-mapping in Figure 13. The capabilities are realized by the behavior of the organization; for example, by the business functions shown in Figure 14. These capabilities also need to be supported by the right resources.

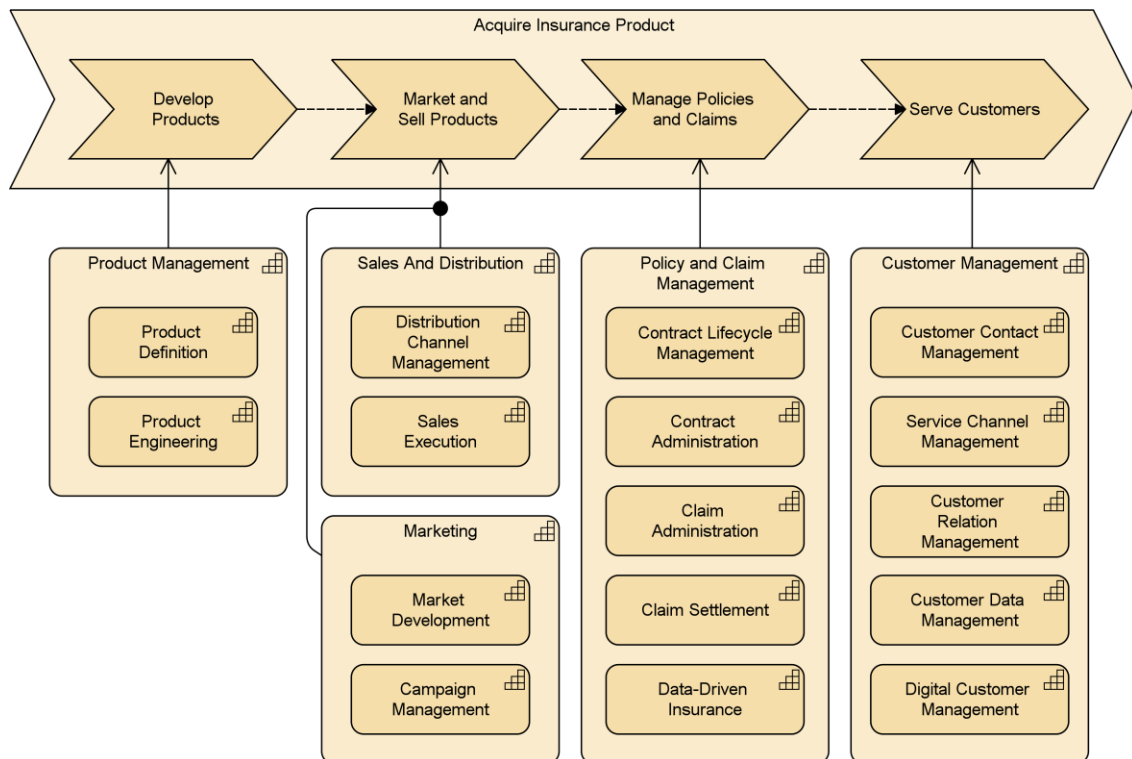


Figure 13: Value Stream – Capability Cross-Mapping

Business Functions

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

The main business functions distinguished by ArchiSurance 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

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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 a response to each claim against an ArchiSurance policy
- Sales, which manages a pipeline of opportunities, and closes contracts with customers
- Finance, which handles regular premium collection and 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, we can define a Business Function viewpoint and specify its contents using the viewpoint mechanism defined in the ArchiMate language:

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 14 shows the main business functions of ArchiSurance, as well as the most important information flows between the functions and external parties.

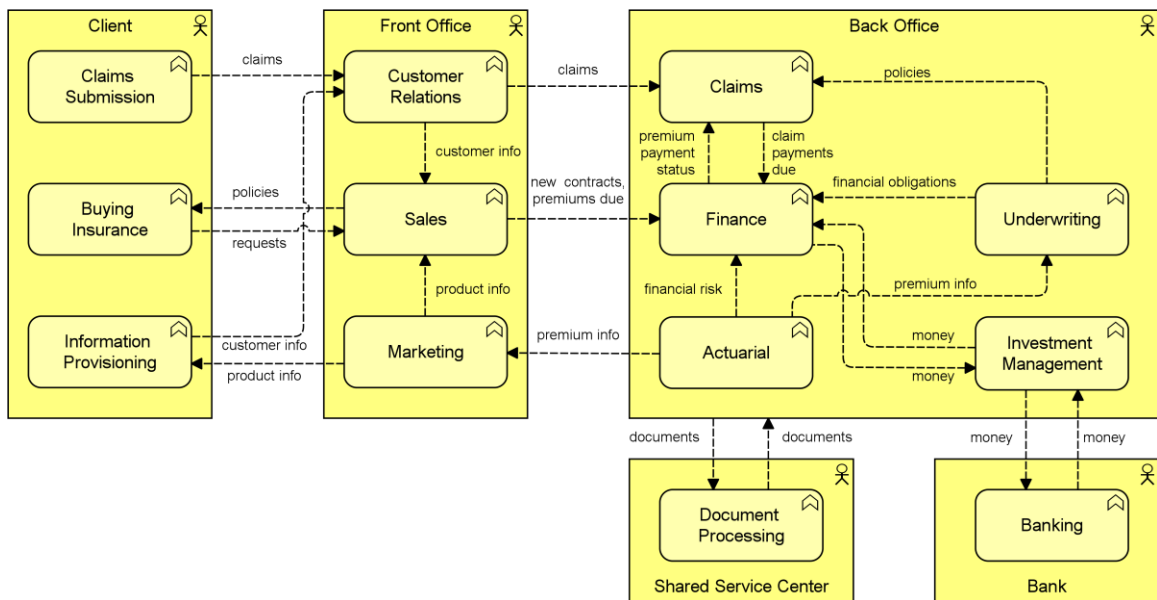


Figure 14: Business Function View (Baseline)

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Capabilities versus Business Functions

Note that business functions are distinct from capabilities. Capabilities represent the current or desired abilities of an organization, realized by its people, processes, information, and technology. They are focused on specific business outcomes, and are used for strategic planning purposes, as described in Phase A: Architecture Vision (on page 10). In contrast, business functions describe what the organization actually does; they are explicitly managed, and are more closely aligned to the organization structure. Multiple business functions may (together with other elements) contribute to the realization of a capability.

An example is the new capability Digital Customer Management that ArchiSurance wants to establish as part of their Digital Customer Intimacy strategy (see Figure 12). This capability will in part be realized by the customer relations business function, but also by a (yet-to-be realized) business function Business Intelligence, and by various resources such as data analysts, risk managers, data acquisition and analysis applications, and customer behavior data.

Of course, when drawing a map of the current capabilities of the organization, its current business functions will often figure prominently, since what an organization does must be something it is able to do. In describing the Baseline Business Architecture, the value of a capability map therefore mostly lies in the analysis of the current *versus* desired levels of capability on the one hand, and in uncovering capabilities that the organization already possesses but does not recognize or manage as business functions on the other. Figure 15 shows some of these relationships between the main capabilities of ArchiSurance as listed in Figure 12 and some of the business functions mentioned in this section. Note that not all capabilities are listed, since the business functions in this section are focused on the primary operations of ArchiSurance and not on, for example, its management. Figure 15 also shows the letter notation that signifies the layer of a concept ('S' for strategy and 'B' for business layer).

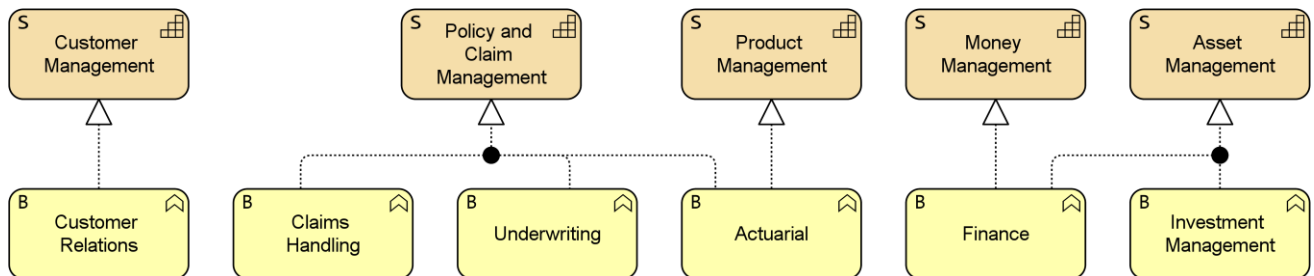


Figure 15: Capability Realization (Baseline, Partial)

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. We can define a Business Process viewpoint and specify its contents using the viewpoint mechanism defined in the ArchiMate language:

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

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

Figure 16 shows the two central business processes of ArchiSurance, with their high-level sub-processes: “issue new policy”, 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.

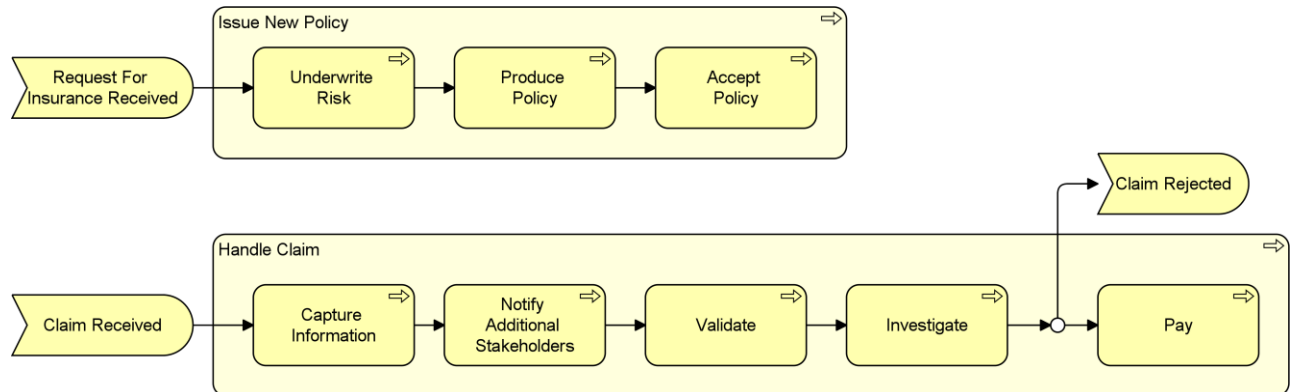


Figure 16: Business Process View (Baseline)

The business processes of ArchiSurance realize the stages of its value stream (Figure 11), an example of which is shown in Figure 17.

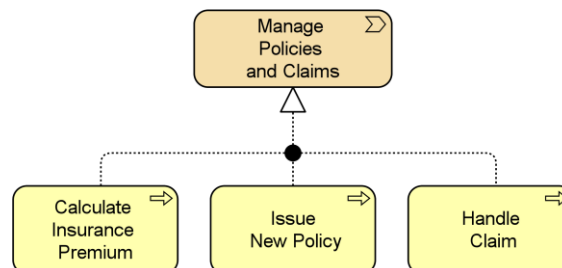


Figure 17: Value Streams are Realized by Business Processes

Requirements Realization

In the Business Architecture, we also show how the Target Architecture realizes the key business requirements. For this purpose, the TOGAF standard specifies a Business Footprint diagram. In the ArchiMate language, 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, these requirements result from the Goal Realization viewpoint.

The example in Figure 18 shows how business requirements established in the Architecture Vision phase are realized by elements in the architecture.

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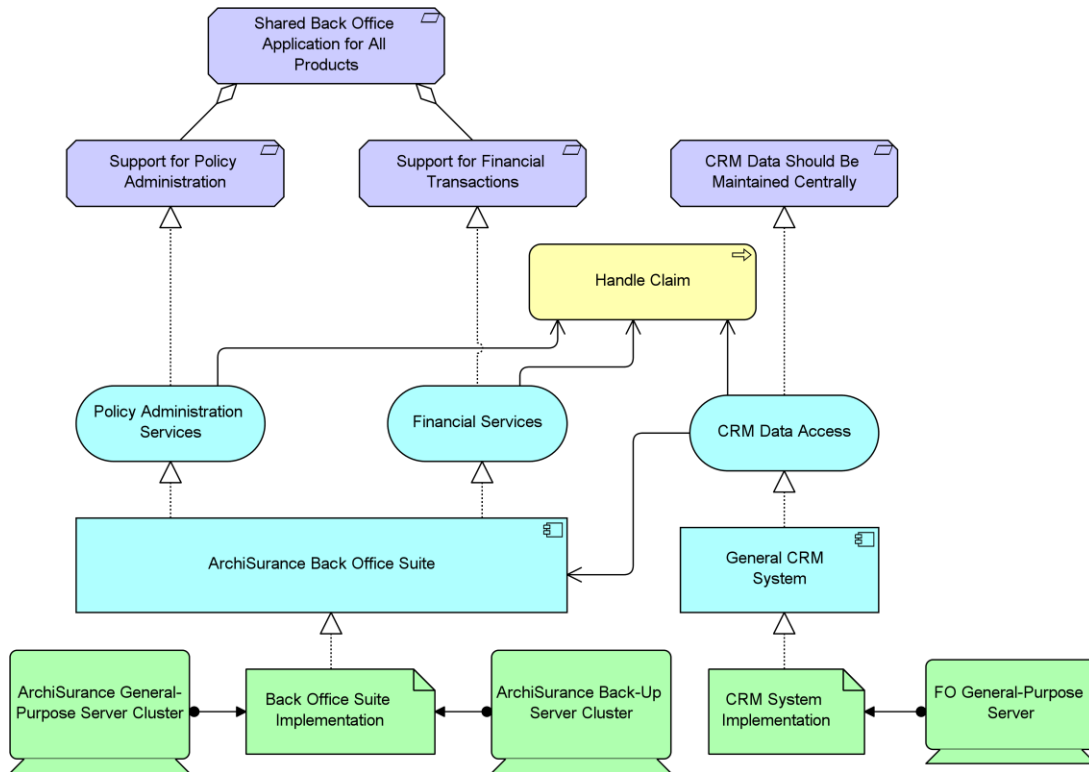


Figure 18: (Partial) Requirements Realization View

Gap Analysis

The Digital Customer Intimacy strategy of ArchiSurance also requires changes to the Business Architecture. First of all, new capabilities are needed, as previously identified. Figure 19 shows these new capabilities in the context of the pre-existing “customer management” and “policy and claim management” capabilities.

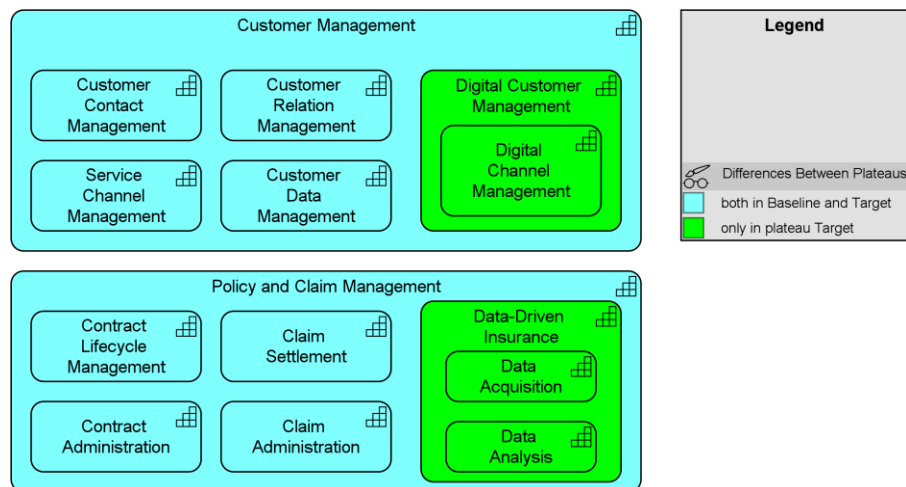


Figure 19: Capabilities Gap Analysis

Capability Realization

These capabilities require personnel with the right knowledge and skills for the digital age, smart devices for data acquisition, and the customer data itself.

The Resource Map viewpoint allows the Business Architect to create a structured overview of the resources of the enterprise. A resource map may also show relationships between resources and the capabilities they support.

On the left-hand side in Figure 20, you see the capabilities and resources related to the Rationalization strategy, and on the right are those linked to the Digital Customer Intimacy strategy.

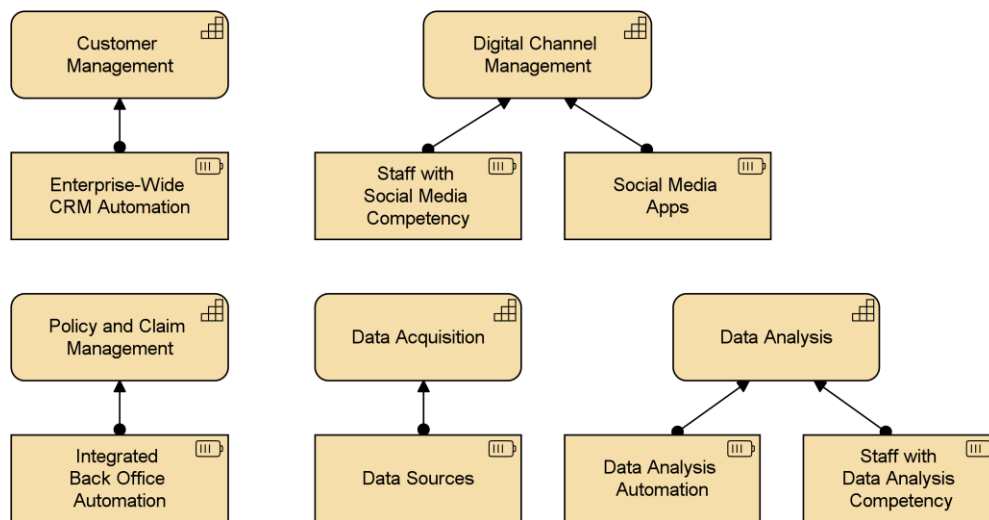


Figure 20: Resource Map View (Target)

These resources themselves are realized by the rest of the Business, Information Systems, and Technology Architectures that are the subject of Phases B, C, and D of the TOGAF ADM. A small part of what this may result in is shown in Figure 21. Note that this does not depict all elements needed to realize these resources, but only a representative sample, again showing the implementation of the Rationalization strategy on the left and the Digital Customer Intimacy strategy on the right. In practice, separate views will often be created to show how individual capabilities and resources are realized.

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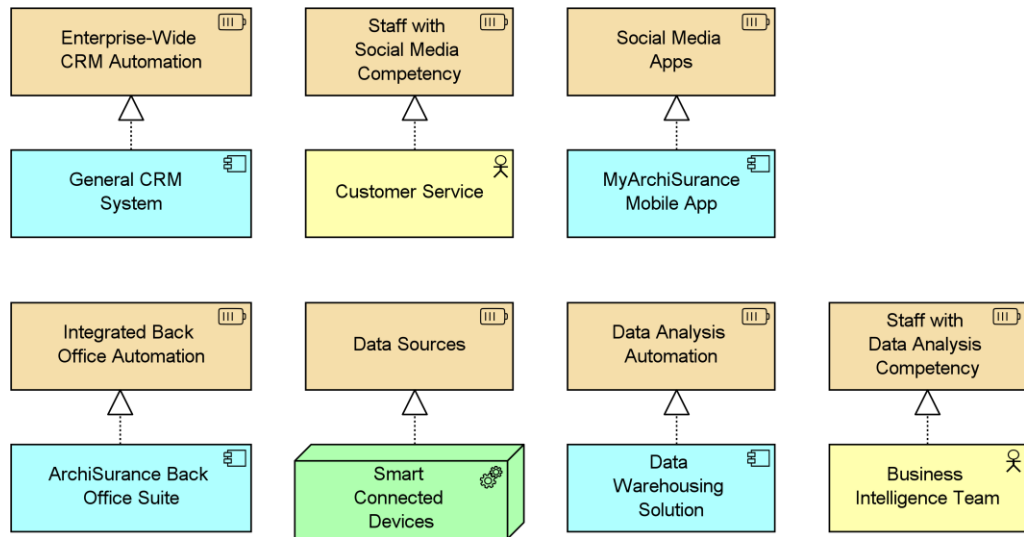


Figure 21: Resource Realization View (Target)

Phase C: Information Systems Architectures (Application)

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 customer-focused 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.

Application Cooperation

The ArchiMate language defines an Application Cooperation viewpoint to show an overview of the application landscape and the dependencies between the applications:

The Application Cooperation viewpoint describes the relationships between application 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 22 shows the main applications of ArchiSurance and the main data flows between them.

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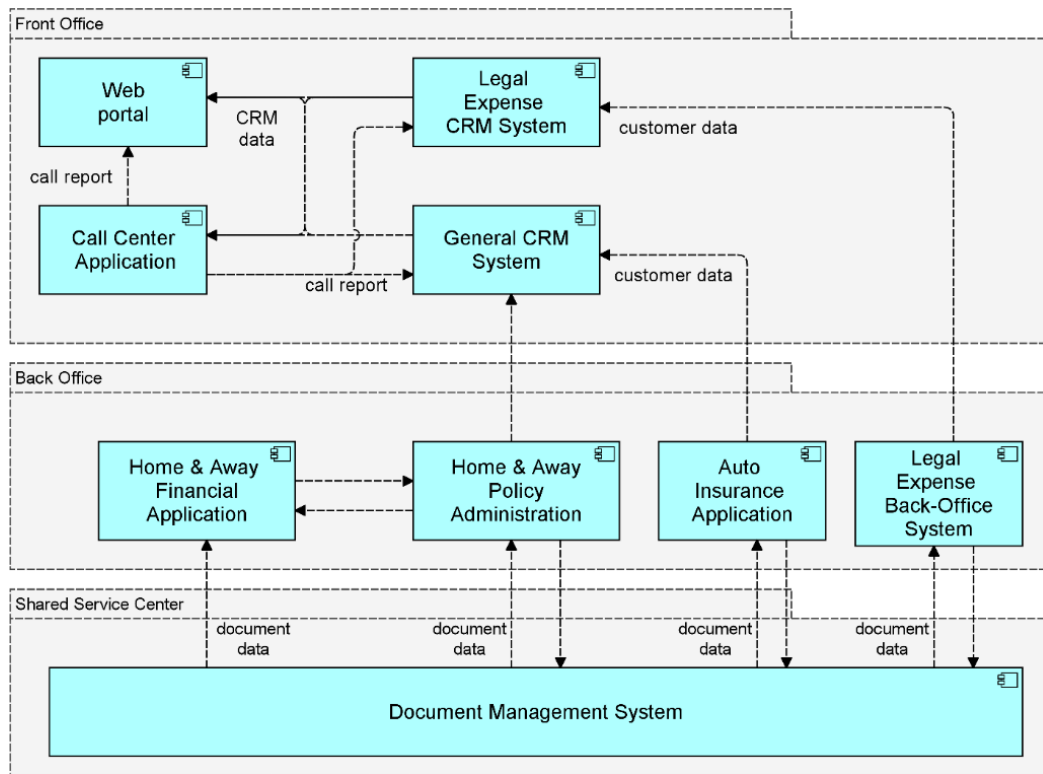


Figure 22: Application Cooperation View (Baseline)

The Application Cooperation view in Figure 23 shows the proposed target situation for the application landscape.

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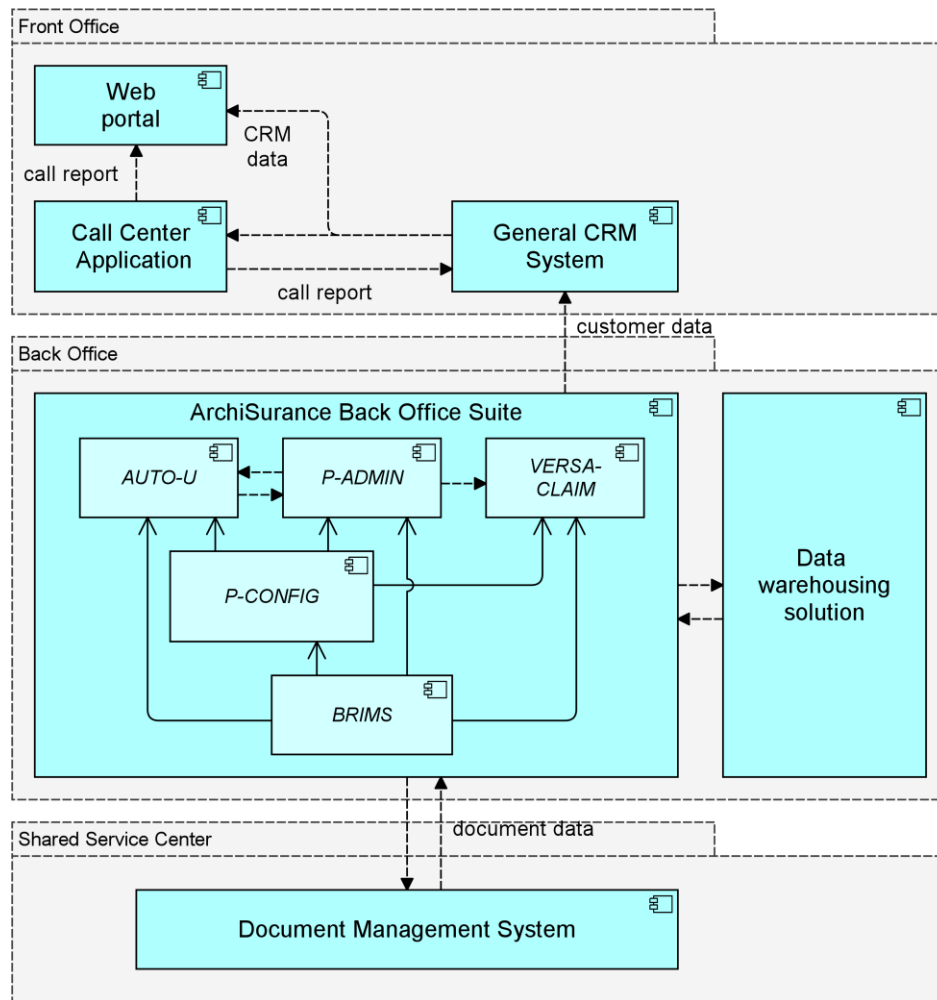


Figure 23: Application Cooperation View (Target)

This comprises the following application components, that together realize the Rationalization scenario:

- An integrated back-office suite for functions such as policy administration and financial transactions; the suite consists 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 for all lines of business, replacing the policy administration functionality of the Home & Away, Auto, and Legal Expense legacy systems
 - *VERSA-CLAIM*, a packaged claims system with screens and workflow that can be configured to support the three lines of business of ArchiSurance, replacing the claims processing functionality of the Home & Away, Auto, and Legal Expense legacy systems

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- *P-CONFIG*, a product configurator management system 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
- A general CRM system, to be used by the entire organization

Business-Application Alignment

The TOGAF standard does not define diagrams for business-application alignment. However, it does specify matrices 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. The ArchiMate language 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 24 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.

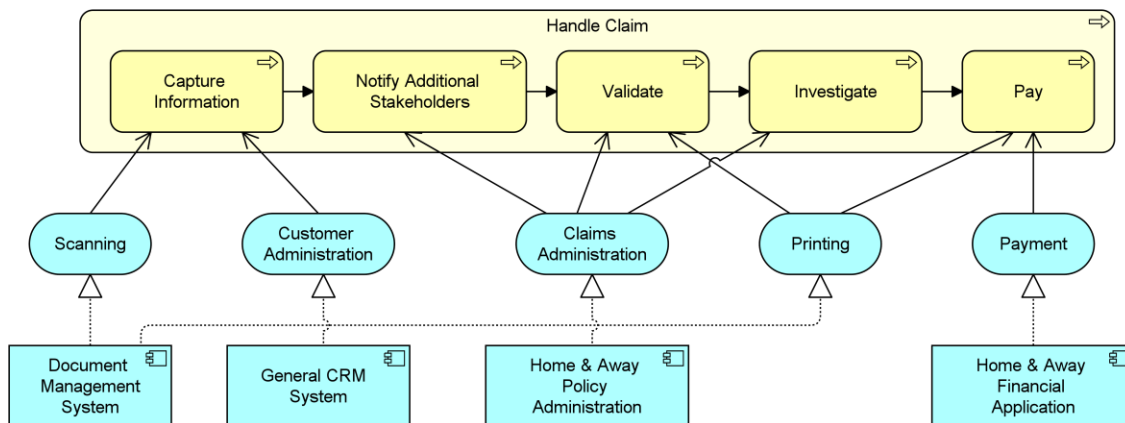


Figure 24: Application Usage View (Baseline)

Application Behavior

The behavior of the data warehousing solution, in the context of data acquisition on the one hand and the business processes and functions on the other, is shown in Figure 25. The insurance premium of individual

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customers is based in part on the data they acquire from different devices. This data is processed to create customer-specific profiles that are input to the calculation of their insurance premiums. At an aggregated level, this data is also used to develop new kinds of insurance products and to assess and adjust the overall risk exposure of the company.

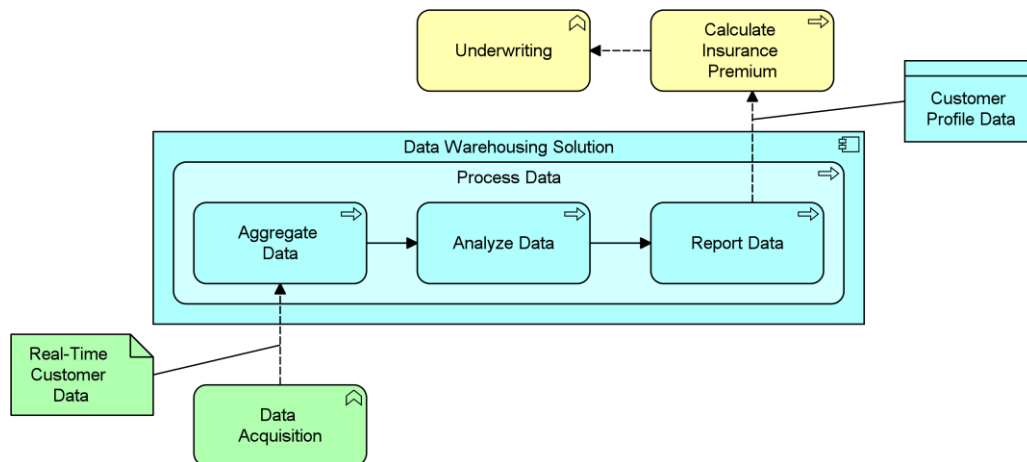


Figure 25: Application Behavior View (Target)

Gap Analysis

The results of a global gap analysis for the Application Architecture are visualized in Figure 26. 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 and new data warehousing solution are introduced.

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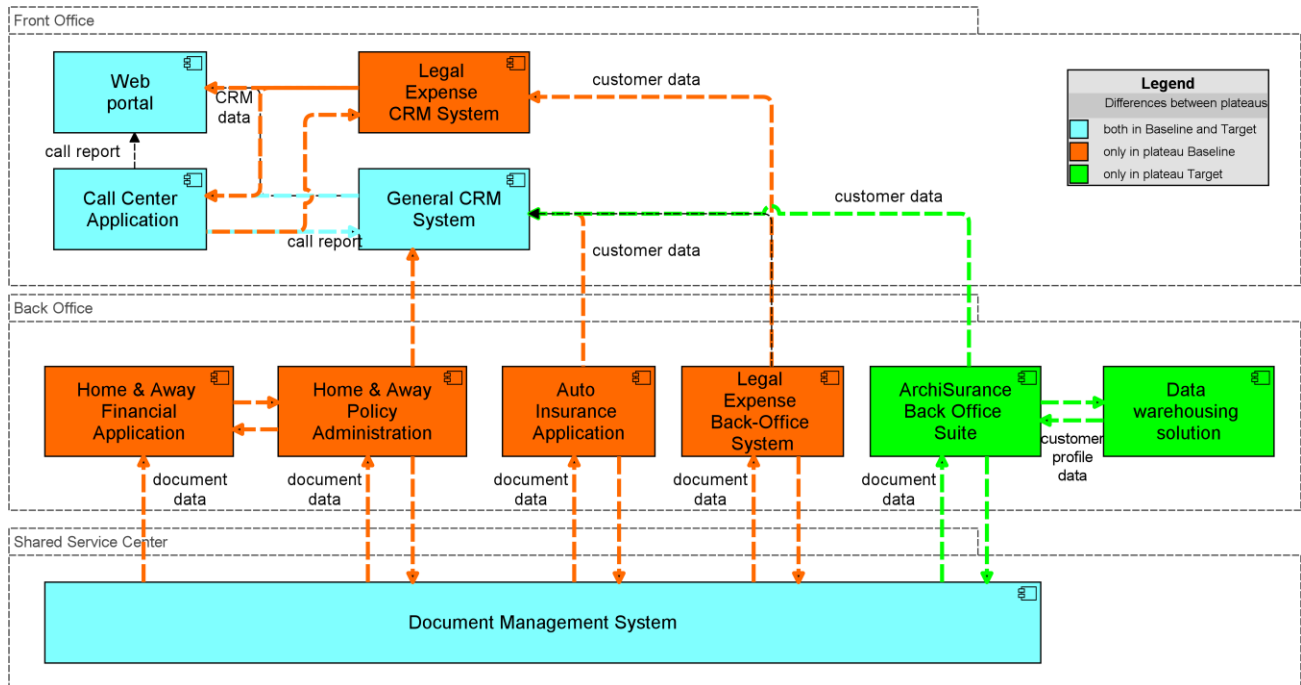


Figure 26: Application Architecture: Gap Analysis

Phase C: Information Systems Architectures (Data)

The ArchiSurance Data Architecture describes the major relationships between its conceptual business objects and its logical data objects. The ArchiMate language 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 the TOGAF standard defines is the Logical Data diagram.

Figure 27 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.

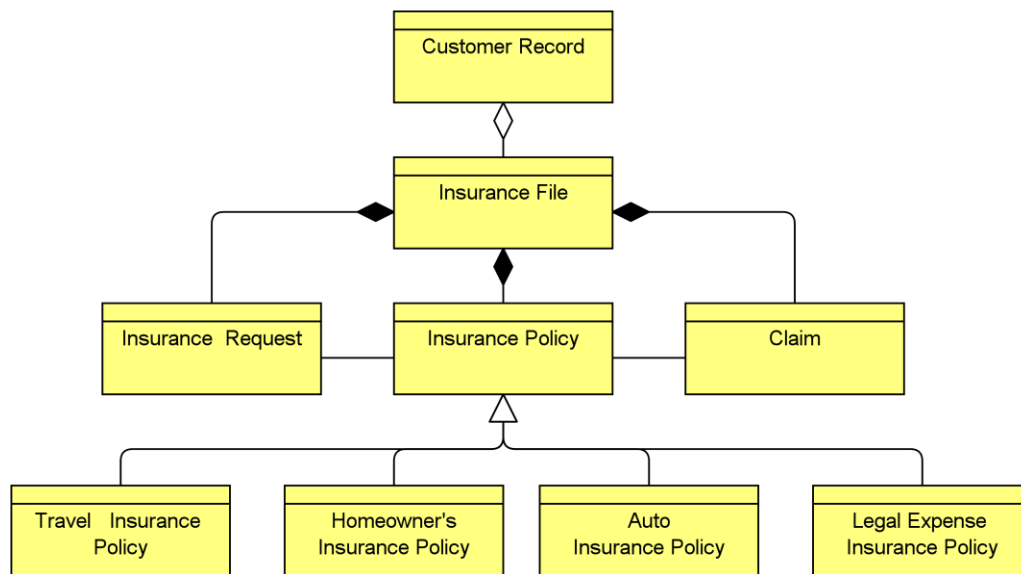


Figure 27: Information Structure View Showing Main Business Objects

Another data viewpoint that the TOGAF standard 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.

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Figure 28 shows a Data Dissemination diagram for one ArchiSurance application.

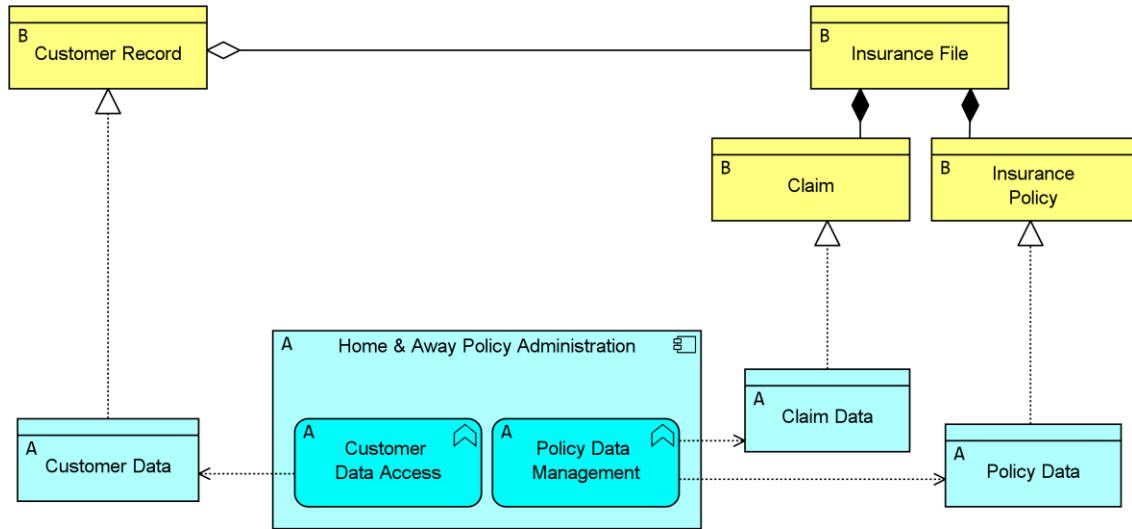


Figure 28: Data Dissemination Diagram

Phase D: Technology Architecture

In the ArchiSurance front-office, located at the Home & Away headquarters, there is a general-purpose server and one dedicated to web hosting. The 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).

For an overview of the infrastructure landscape, the ArchiMate language 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, such as operating systems, databases, and middleware.

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

Infrastructure

Figure 29 shows the main infrastructure components of ArchiSurance, grouped by location and department. Also shown in this view are the networks that connect the different devices, and the (application) artifacts deployed on the devices.

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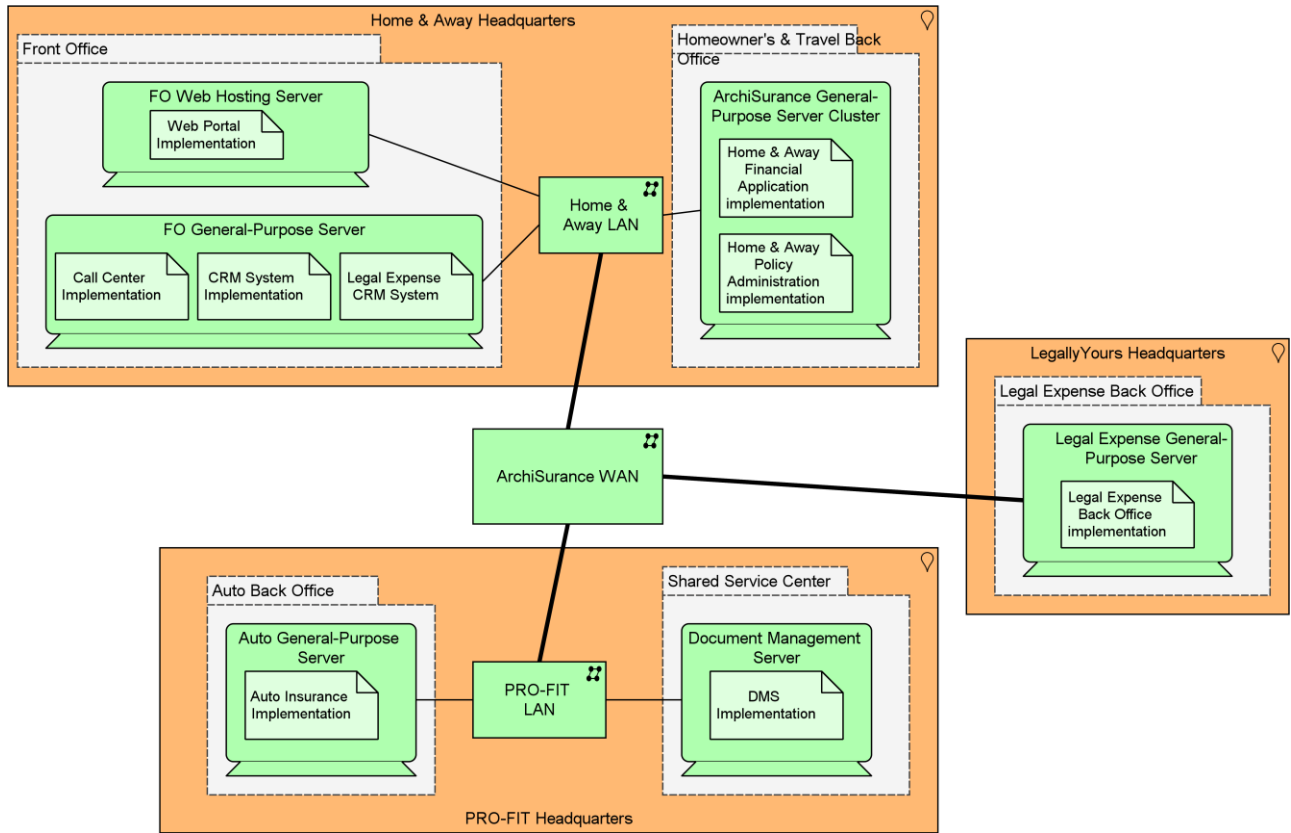


Figure 29: Infrastructure View (Baseline)

The Infrastructure view in Figure 30 shows the proposed target situation for the technical infrastructure landscape.

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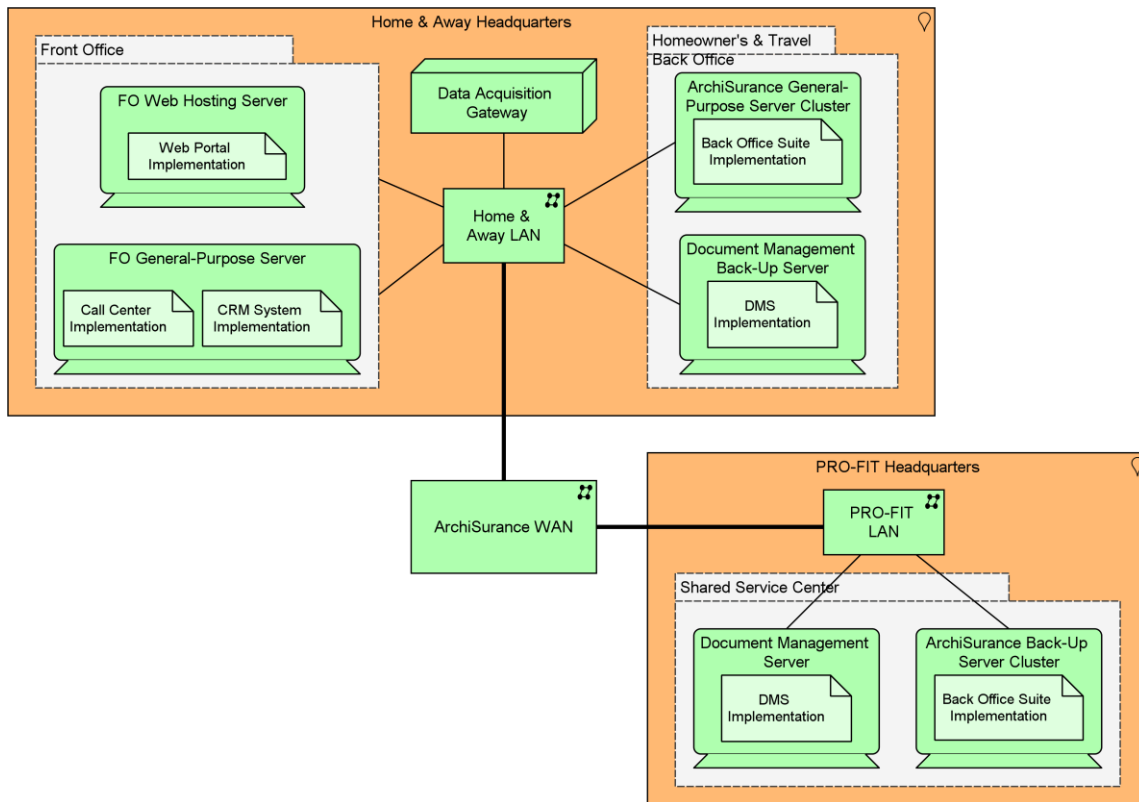


Figure 30: Technology Architecture: Infrastructure View (Target)

In a separate set of views, ArchiSurance has visualized the IoT-based data acquisition in Figure 31, as outlined in its new Digital Customer Intimacy strategy. To support this, ArchiSurance establishes a data acquisition gateway that can connect to all kinds of smart devices that generate relevant data. These devices are modeled as equipment. In turn, equipment can be located at a facility; in Figure 31 we see a “home alarm system” and “smart thermostat” within a “smart home”. Finally, the smart thermostat itself is connected to the “energy network”, modeled as a distribution network in the ArchiMate language.

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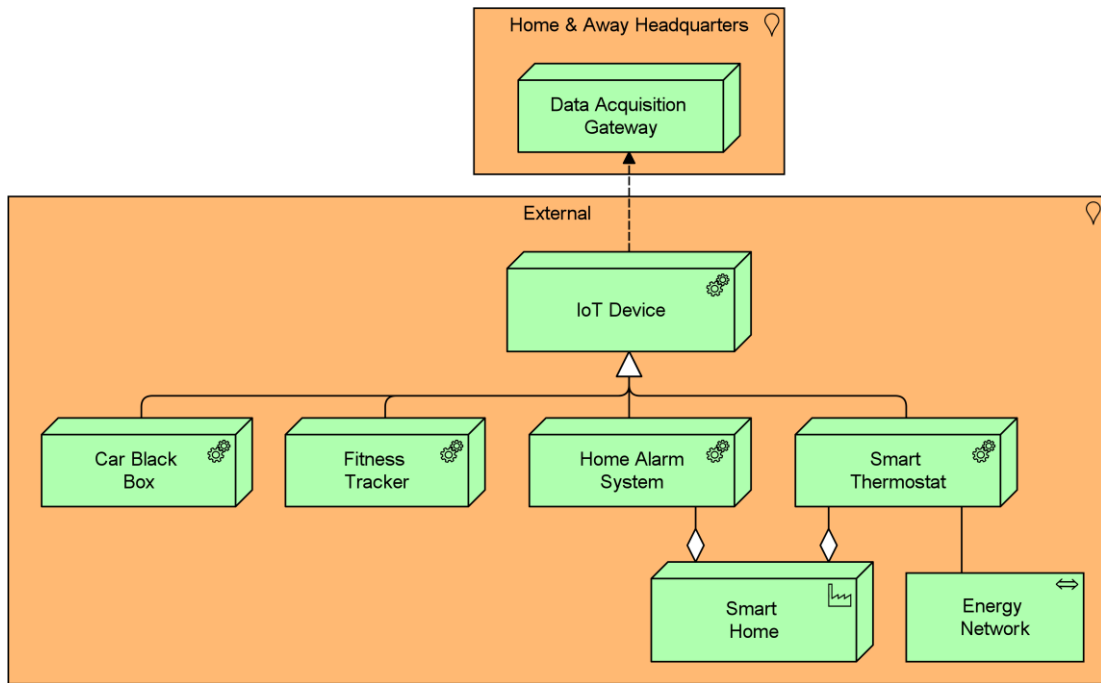


Figure 31: Data Acquisition from IoT Services (Target)

The implementation of ArchiSurance data acquisition is based on a microservices architecture. IoT devices can register themselves with the gateway via a REST³ API. It also uses services on the API to notify the gateway of the data it acquires. For each registered device, an instance of the data acquisition functionality will run in a container. The gateway itself is supported by a Platform-as-a-Service (PaaS), providing services for deployment, integration, service lifecycle management, accounting, security, load balancing, storage, virtualization, and more. This is shown in Figure 32.

³ See https://en.wikipedia.org/wiki/Representational_state_transfer.

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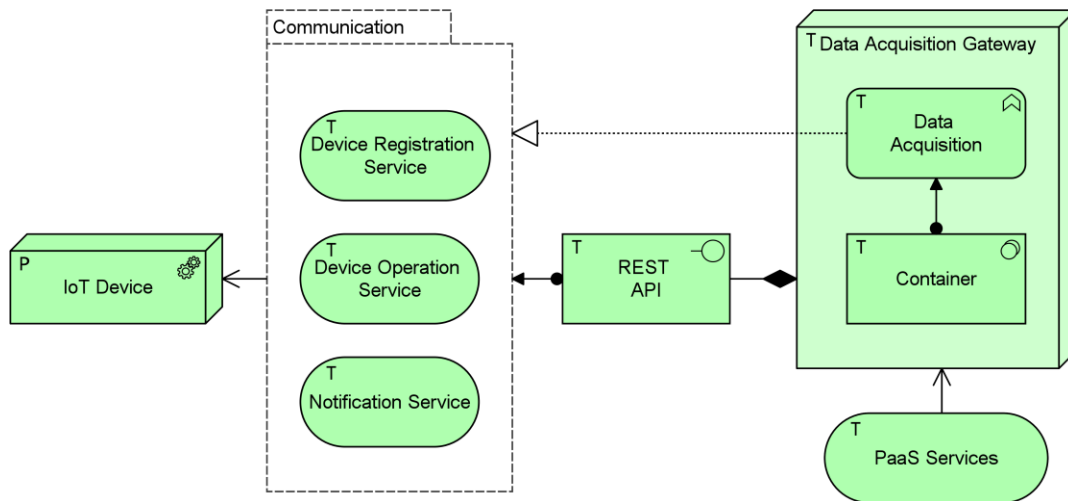


Figure 32: IoT Device Services (Target)

Gap Analysis

Figure 33 visualizes the results of a global gap analysis for the Technology Architecture. The separate general-purpose 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.

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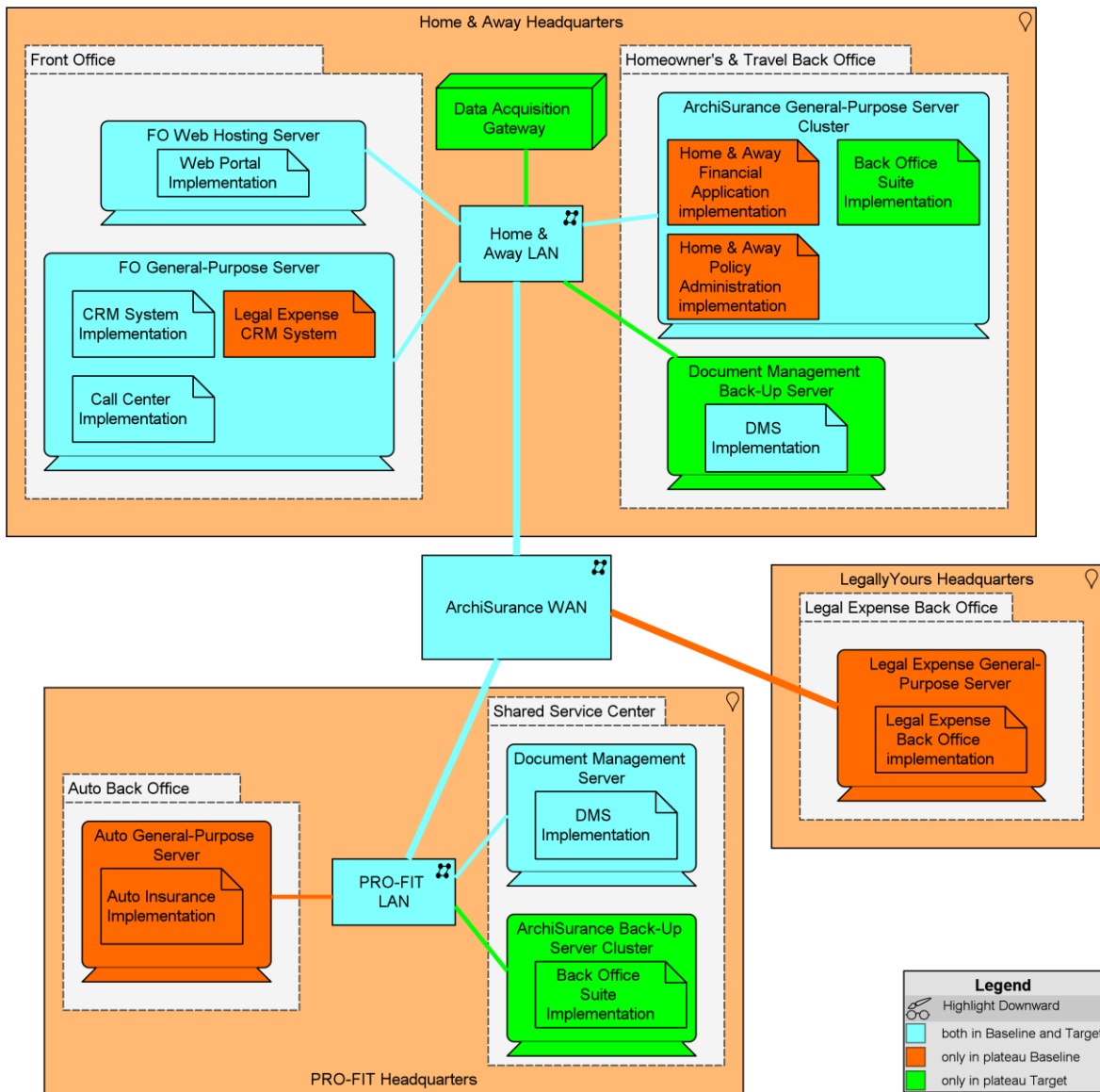


Figure 33: Technology Architecture: Gap Analysis

Phases E & F: Opportunities & Solutions and Migration Planning

For Phases E and F, the TOGAF 9.2 standard introduces the Transition Architecture, representing a possible intermediate situation or plateau between the Baseline Architecture and the Target Architecture.

In the ArchiMate language, the Baseline, Target, and Transition Architectures, as well as their relationships, are shown using the Migration viewpoint:

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

Figure 34 shows an example for the current scenario. The IT department of ArchiSurance does not have sufficient resources to carry out the standardization 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. After that, the data warehousing and IoT solution will be implemented.

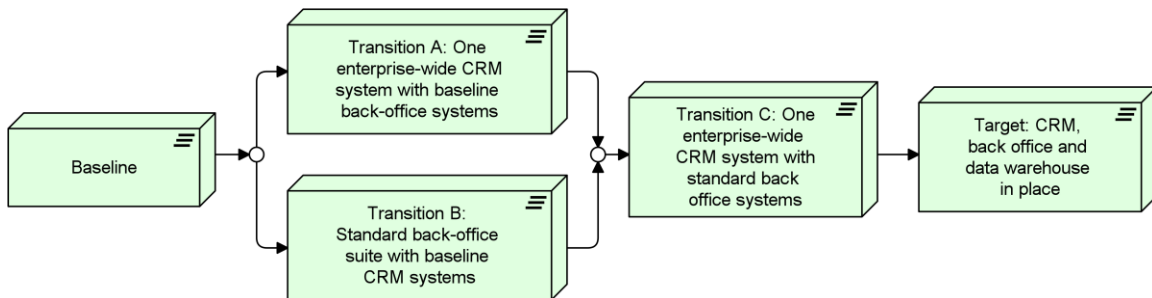


Figure 34: Migration View

Transition Architectures enable the planning of implementation projects such as CRM integration and back-office application integration. The sequence of these projects depends on which of the Transition Architectures is selected. This can be shown in a TOGAF Project Context diagram (Figure 35):

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.

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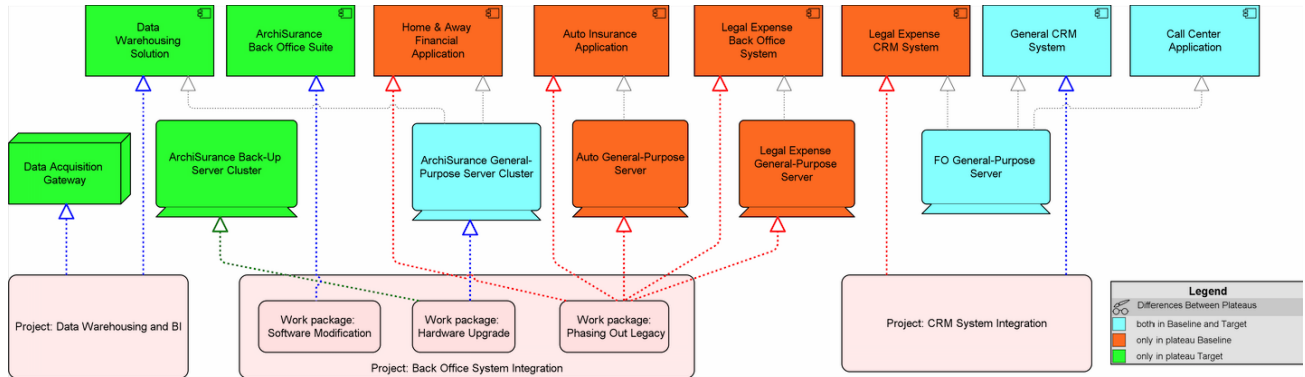


Figure 35: TOGAF Project Context Diagram, expressed in the ArchiMate Language

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References

The following documents are referenced in this Case Study:

(Please note that the links below are good at the time of writing but cannot be guaranteed for the future.)

- [1] The TOGAF® Standard, Version 9.2, a Standard of The Open Group (C182), published by The Open Group, April 2018; refer to: www.opengroup.org/togaf.
- [2] ArchiMate® 3.1 Specification, a Standard of The Open Group (C197), published by The Open Group, November 2019; refer to: www.opengroup.org/library/c197.
- [3] Doest, H., Iacob, M.-E., Lankhorst, M.M. (Ed.) & van Leeuwen, D.: Viewpoints Functionality and Examples, ArchiMate Deliverable D3.4.1a v2, TI/RS/2003/091, Telematica Instituut, Enschede, The Netherlands, 2004.
- [4] van den Berg, H., Moelaert, F.: PRO-FIT Autoschade Open Case Testbed, Testbed Deliverable WP3/N004/V001, TRC, Enschede, The Netherlands, 1997.
- [5] ArchiSurance Case Study (Y121), published by The Open Group, January 2012; refer to: www.opengroup.org/library/y121 and ArchiSurance Case Study, Version 2 (Y163), published by The Open Group, September 2017; refer to: www.opengroup.org/library/y163.

About the Authors



Henk Jonkers is a Senior Research Consultant at BiZZdesign. In this capacity, he is involved in the company's developments in the area of Enterprise Architecture and enterprise engineering. He also participates in multi-party research projects, contributes to training courses, and performs consultancy assignments. Previously, he worked as a Member of Scientific Staff at Telematica Instituut (currently Novay), where he was involved in various applied research projects in the areas of business process modeling and analysis, Enterprise Architecture, service-oriented architecture, and model-driven development. Henk was one of the main developers of the ArchiMate modeling language and an author of the ArchiMate Specification, and is actively involved in the activities of the ArchiMate Forum of The Open Group.



Iver Band is a practicing Enterprise Architect and a developer and communicator of Enterprise Architecture standards and methods. At Cambia Health Solutions, he has guided initiatives focusing on provider systems, web and mobile experiences, and architecture methods and tools. He is currently focused on solutions that provide information about healthcare consumers and groups. Iver is a former Vice-Chair of the ArchiMate Forum. He has led development of several White Papers published by The Open Group and has contributed to the second and third major versions of the ArchiMate Specification. Iver's certifications from The Open Group include TOGAF 9 Certified and ArchiMate 2 Certified. He is a Certified Information Systems Security Professional (CISSP), a Certified Information Professional (CIP), an AHIP Information Technology Professional, and a Prosci Certified Change Consultant.



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Marc Lankhorst is Managing Consultant at BiZZdesign. He is responsible for market development, consulting, and coaching on digital business design and Enterprise Architecture, and spreading the word on the ArchiMate notation for Enterprise Architecture modeling. His expertise and interests range from enterprise and IT architecture and business process management to agile methods, portfolio management, and digital business design. In the past, he has managed the ArchiMate R&D project, a major cooperation between several partners from government, industry, and academia which developed the initial version of the ArchiMate language, and he currently leads the ArchiMate development team within the ArchiMate Forum of The Open Group.

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