# Personalized Daily Travel Assistance Service

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## 1. Model

This section briefly describes the model that was designed as part of this work. In addition, 3 central architectural principles are defined

### 1.1 Strategy Layer

This level outlines the general strategy that the company is following. Based on the description, the most important capabilities of the company are their ability to continuously adapt their services to changing customer needs through an AI-based model, their ability to integrate their service information into popular calendar systems to inform customers about travel routes in a way of their choice, and their ability to provide travel planning services to their customers.

These main capabilities can be seen at the centre level of the model. In order to offer these capabilities, certain resources must be used, which can be found at the lower level. The actions required to derive the given capabilities and resources are listed at the top level of the model.

### 1.2 Architecture principles

#### 1.2.1 Personalisation

**Motivation**: By personalizing the service to each client's specific needs and preferences, the service can provide a more convenient and enjoyable travel experience, which can lead to increased customer satisfaction and loyalty.

**Consequences/Impact**: The personalised daily travel assistance service should prioritize individualized travel recommendations and experiences, considering the client's ownership of vehicles, transportation preferences, and personal and work agendas.

#### 1.2.2 Efficiency

**Motivation**: By optimizing travel routes and transportation options, the service can provide a more efficient and cost-effective travel experience for clients, which can lead to increased customer satisfaction.

**Consequences/Impact**: Implementing efficiency as a guiding principle may require a strong focus on data analytics and machine learning to continuously improve travel recommendations and identify cost-saving opportunities. It may also require the negotiation of flexible contracts with transportation providers to allow for last-minute changes in travel plans.

#### 1.2.3 Accessibility

**Motivation**: Providing multiple channels for accessing the service and the ability to make travel arrangements at any time can make the service more convenient for clients, which can lead to increased customer satisfaction and loyalty.

**Consequences/Impact**: Implementing accessibility as a guiding principle may require a strong focus on building a user-friendly interface and integrating the service with popular calendar systems and devices. It may also require the development of mobile apps and other tools to allow clients to easily book tickets and make travel arrangements on the go.

### 1.3 Business Layer

In the application layer, the general business construct of the planned enterprise is visualized. As previously mentioned in the strategy layer, the focus is on the process of automated travel planning and preparation. This can be seen in the core of this layer, which consists of the process of managing tickets and personal appointments, followed by interaction with the user and notification of planned travel routes.

When purchasing tickets (private and public), the service must first search for available options, then select a suitable ticket, and finally make the purchase. The remaining parts of the business support the main process.

The first supporting process is the process of forecasting, which uses weather and traffic information, as well as forecast models based on past data, to predict external influences on the journey.

The second process that needs to be included in this context is the process of managing contracts with public transport operators. These contracts are necessary for the service to be able to buy tickets for customers or to access real-time data related to public transport.

### 1.4 IT-Architecture: Application and Technology Layer

The purpose of the application and technology layers in this context is to support the business processes and overall strategy of the company. These layers provide support in the form of information and technology components, as represented by the duality of ArchiMate layers.

The application layer represents the information structure required by the company's goals. This layer includes three main systems: the Ticketing Management System, the Forecasting System, and the Agenda Management System. These systems offer services of the same name to the company. On the data side, the main data set is the customer data, which consists of information provided to the system by the user and information about the user collected by the system during their use of the service.

The technology layer represents the hardware and software structure needed to meet the requirements defined by the application layer and other layers. The central object in this layer is the "virtual unified database," which contains a database of critical data that is kept in-house and a database of non-critical data that is stored in external data centers. These two databases are virtualized together to form the central object of this layer, and are necessary for securely and efficiently storing the service's data.

The Forecasting System in the application layer is supported by the Forecast Node in the technology layer. This node includes a database that stores historical data and input devices that acquire new data to be stored in the database via a data transfer connection. This node is then accessed via an interface.

The needs of the Ticketing System and Agenda Management System are met by two APIs that connect the service to various host applications.

The last node in the technology layer is the Artificial Intelligence Assistant, which consists of a server (hardware component) and an AI model (software component). This node is used by the company and its information structure in two ways: as an assistant that the user can interact with via an interface, and by the Prediction System to improve predictions.

## 2. Questions

In this section, the questions given in the assignment about the role of architecture principles and the role of a modelling language to link services via applications to underlying IT infrastructure are addressed.

## 2.1 Role of architecture principles

Architectural principles are guidelines that ensure that the design of a system or solution is consistent with the organisation's goals and values. They provide a set of guiding principles that can be used to form decisions and ensure that the architecture of a system is consistent with the overall strategy and direction of the organisation.

The formulation of architectural principles prior to the creation of the actual architectural models is important as it helps to ensure that the design of the system is consistent with the organisation's goals and values. It also helps to ensure that the architecture is flexible and adaptable and can evolve and change as the needs of the organisation change over time.

In the context of ArchiMate, architectural principles can guide the design of architectural models and ensure that they are consistent with the overall strategy and direction of the organisation. For example, an organisation might have a principle that states that all

systems should be designed for maximum scalability and flexibility to support future growth. This principle could then be used as the basis for designing the architectural models in ArchiMate to ensure that they are designed to support the defined goals. Overall, the role of architectural principles is to provide guidance and direction for the design of systems and solutions and to ensure that they are aligned with the organisation's goals and values. It has to be noted, that the architectural principles can, together with the goals of a company, change over time as the needs of the organisation change.

## 2.2 Role of a modelling language to link services via applications to underlying IT infrastructure

An enterprise architecture modelling language or framework is a set of standardised approaches, methods, and notations that is used for creating and communicating enterprise architecture models. Such a language or framework is important since it helps to connect the different components of an enterprise architecture in a clear, structured, and meaningful way.

One of the main purposes of such a framework is to connect business processes and services to the underlying IT infrastructure. This is required as the IT infrastructure often presents the foundation for the business processes and services. By modelling the relationship between these elements, it is possible to better understand how the IT infrastructure supports the business and identify potential problems or inefficiencies early on.

In addition to linking business processes and services to the IT infrastructure, an enterprise architecture modelling language can also be used to identify and document the various components of the enterprise architecture, including business processes, services, applications, and data. In this way, a comprehensive and accurate picture of the overall architecture of the enterprise is created, which can be used for decision-making to ensure that the enterprise operates efficiently and effectively.

Overall, an enterprise architecture modelling language is a valuable tool for understanding and improving the way an enterprise works. By linking business processes and services to the underlying IT infrastructure, it helps to meet the needs of stakeholders and achieve an enterprise' goals.