

# Software Architecture

## Table of Contents

- [Table of Contents](#table-of-contents) - [Overview](#overview) - [Basic Structure](#basic-structure)

1. [Bot](#bot)
2. [Gateway](#gateway)
3. [Registry](#registry)
4. [Service](#service)

- [API](#api)

## Overview

*BeuthBot* consists of many interwoven *Microservices*. Every *Microservice* uses our basic API to communicate with other *Microservices*. This approach enables us to change parts of the system easily at any time or to introduce new *Microservices*, all they need to do is to implement our API.

## Basic Structure

Our application is basically composed of the following four components.

Bot ↔ Gateway ↔ Registry ↔ Service

Following diagram shows that in more detail.

![[structure](../assets/structure-without-notes.png)]

A user can write the `_Bot_` to request informations, the meaning of the message is extracted and a fitting `_Microservice_` is chosen to retrieve the necessary data. A response is build from that data and distributed back up to the bot which answers the users request.

following sequence diagram further illustrates that.

![[flow](../assets/flow.png)]

## Bot

This is an abstraction for the available chatbots, e.g. a `_Bot_` for `_Telegram_` and another `_Bot_` for `_WhatsApp_`.

The user interacts with this `_Microservice_`, here she can request information and gets answers from `_BeuthBot_`.

## Gateway

The `_Gateway_` is the centerpiece of `_BeuthBot_` one could say.

The `_Bot_` notifies the `_Gateway_` with the message it got from the user.

The `_Gateway_` then uses NLP (Natural Language Processing) `_Microservices_` to get the meaning and intention of the user. Here we try to extract what the user wants from `_BeuthBot_`, to notify the right service and present a fitting answer to our user.

## Registry

After obtaining the intention of our user, the `_Gateway_` notifies the `_Registry_`, to get the information the user requested.

The Registry distributes the request to the correct `_Service_`, that takes care of retrieving the right informations.

## Service

`_Service_` is an abstraction for the implemented `_Microservices_` that retrieve the necessary data we need to answer users requests. E.g. the `_MensaService_` is a `_Microservice_` that can give informations about the current menu, filtered by a number of parameters, e.g. a vegan user.

## API

Because of the complexity of the single `_Microservices_`, every single `_Microservice_` implements its own, distinct, API.

But to answer a users request we use a unified, comprehensive API. Its basic idea is to pass a `_Response_`-Object trough the individual `_Microservices_`, which consists of the initial request, an answer as a response to the users request and informations about the user.

Following class diagram further illustrates that:

![[flow](../assets/response-request-api.png)]

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