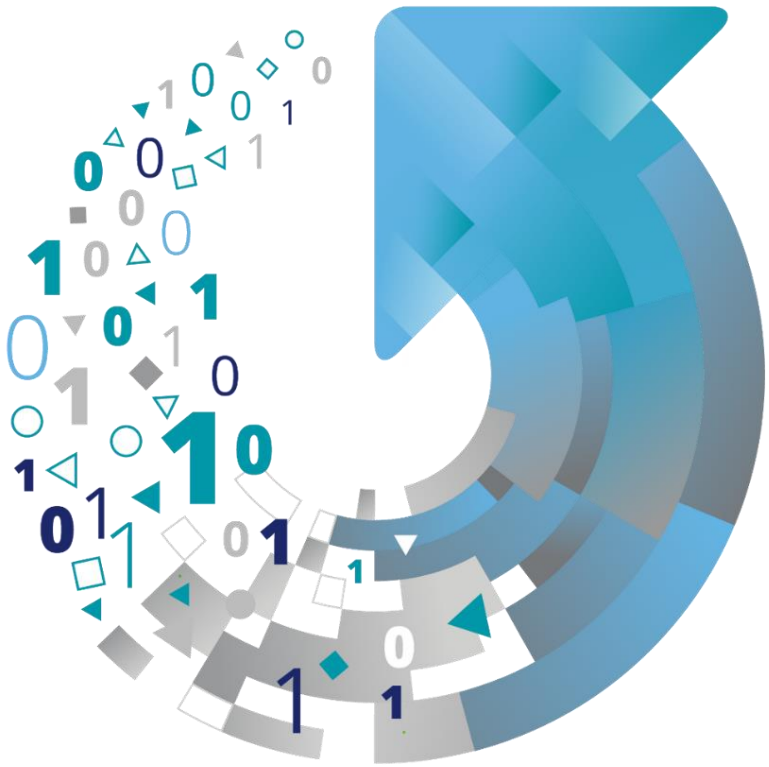
Deloitte.

Publication Office of the European Union

A.2: Infrastructure description & technology selection



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1. Introduction

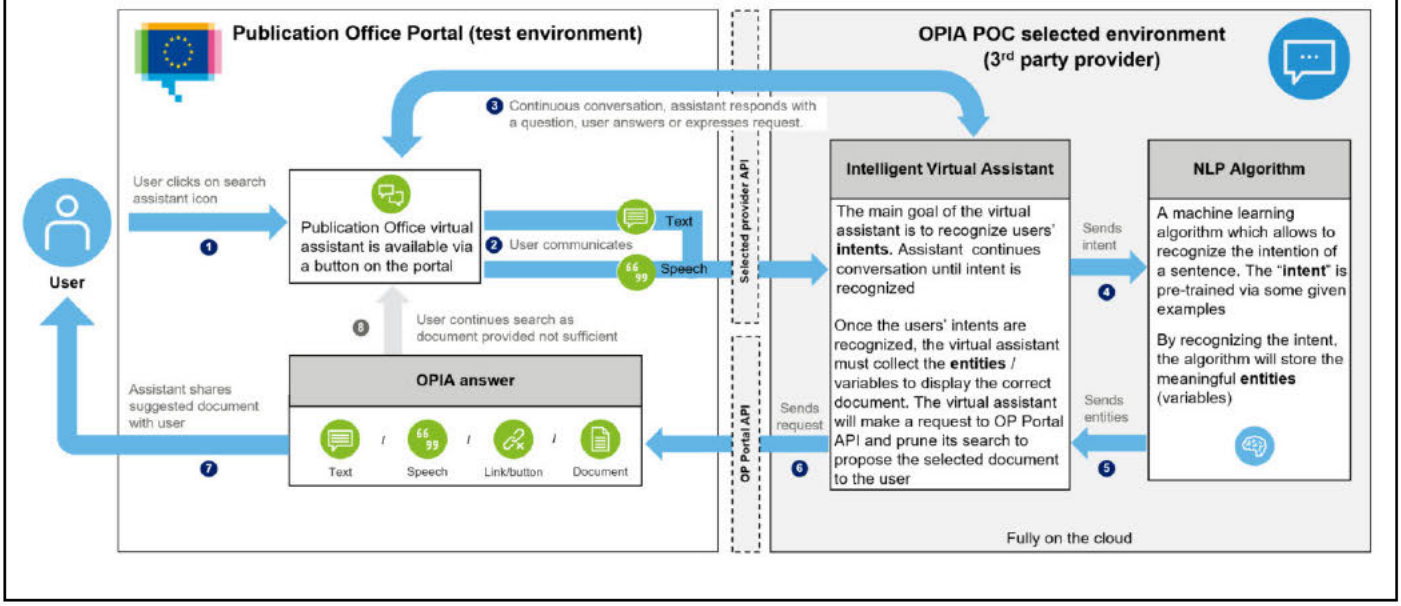
Within the larger context of the "Reading Disability and Document Access" (RDDA) study that has been mandated by the EU parliament, the Publication Office (OP) decided to create an intelligent virtual assistant to increase usability of the search portal and guide users, including vulnerable users, to access the relevant documentation and information.

This document will include a description of the selected technologies and the selection process followed after the initial filtering that was completed prior to the project. The focus will be on the three vendors: Microsoft Azure Bot Service, IBM Watson &Chatlayer. The document will also include a description of the OP portal infrastructure as well as the data query modelling/ flow to realize the OPIA. We also include a description of data sources, user intents (English and French) and the foreseen training and testing strategy.

2. OP Portal general infrastructure

The infrastructure for the OPIA will be on a separate public cloud infrastructure, with data stores in the EU. The OPIA will query the OP Portal Search API (test environment) and interacting with the end user through a user-friendly interface. The OP Intelligent Assistant will retrieve information transmitted by the user to the OP portal with an API, interpret it in the selected cloud infrastructure and answer the requests by suggesting the relevant searched document.

FIGURE 1: INTELLIGENT VIRTUAL ASSISTANT GENERAL ARCHITECTURE

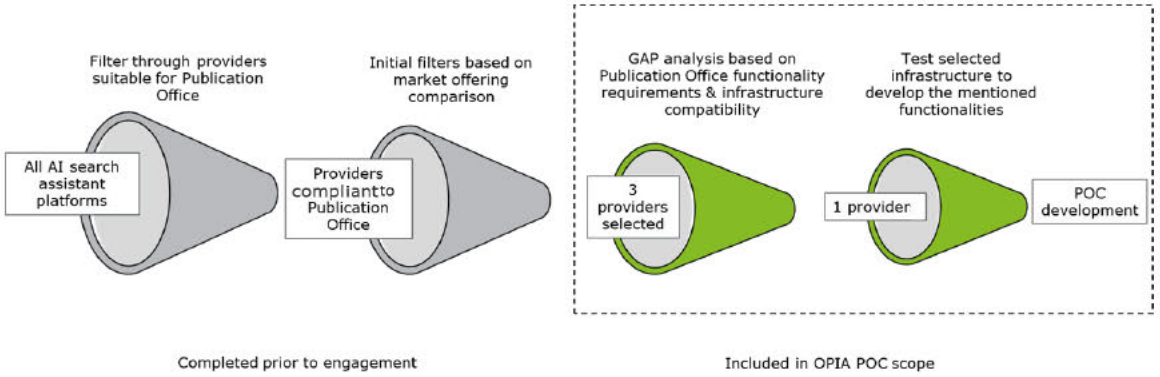


Once the user enters a request with the OP Intelligent Assistant, the API of the provider will retrieve the information, send it through the cloud environment where the OPIA will interpret the user's intent and extract the key information or entities needed to complete the search. This will allow the OPIA to answer the user's request in text, action buttons, picture, audio, video or actions (e.g. open a web page). After the OPIA dialogue with the user is complete, the result will be called from the publication portal. The OP Portal user will interact with the OPIA through the OP portal from the beginning to the end of the dialog.

3. Technology selection

Deloitte's approach to technology selection consist of a classical step-by-step selection process, starting from an overall market analysis of the AI solutions acting in the area of conversational AI. A solution list of three solutions that will undergo a GAP analysis to select one that fits the Publications Office business specifications, functionality requirements and infrastructure compatibility.

FIGURE 2: TECHNOLOGY SELECTION PROCESS



Prior to the project, a total of 99 conversational AI platforms have been taken into account. We excluded solutions that doesn't at least cover the features included in the project scope and that are not suitable for the Publications Office due to the general policy. A short list of top 10 providers was further evaluated: Liferay, IBM Watson, Amazon Lex, Google dialogflow, Microsoft Azure Bot Services, SAP, kORE.ai, BOOST.ai, Chatlayer and Chatterbot. For the next filter, we studied the following features to compare the providers:

- Notable functionalities of the virtual intelligent assistant
- Integration channels (API)
- Platform design and overall user friendliness
- High-level costing
- Voice recognition support
- Supported languages (at least French and English)
- Possibilities of deployment (on premise, public cloud, private cloud deployment)

From this comparison, we were able to select the three vendors included in the OPIA POC scope. All three vendors cover the OPIA POC scope and offer interesting features to be further analysed:

- Microsoft Azure
- IBM
- Chatlayer

We will list and detail the selection criteria. Thereafter, we will describe the general architecture and functionalities of each of the three platforms and include an evaluation of all three platforms based on the given selection criteria. Finally, we will recommend a selected provider.

3.1 Selection criteria

The three vendors have been selected from other conversational AI platforms in the pre-selection phase. The following **key features** have been defined and all three platforms comply with these.

- **K.1 Geography**: Data centres on European soil
- **K.2 Language:** English and French as a minimum requirement
- **K.3 Text-to-Speech:** Functionality to include speech-to-text available
- **K.4 End-to-end conversation:** Smart assistant can lead user from introduction to propose a search
- **K.5 Hosting:** Availability and compatibility to host Intelligent Assistant of the OP Portal

To distinguish between the providers, a list of selection criteria has been set up in order to create a benchmark for distinguishing between the three providers and facilitate selection. The selection criteria is detailed below.

TABLE 1: SELECTION CRITERIA AND DESCRIPTION

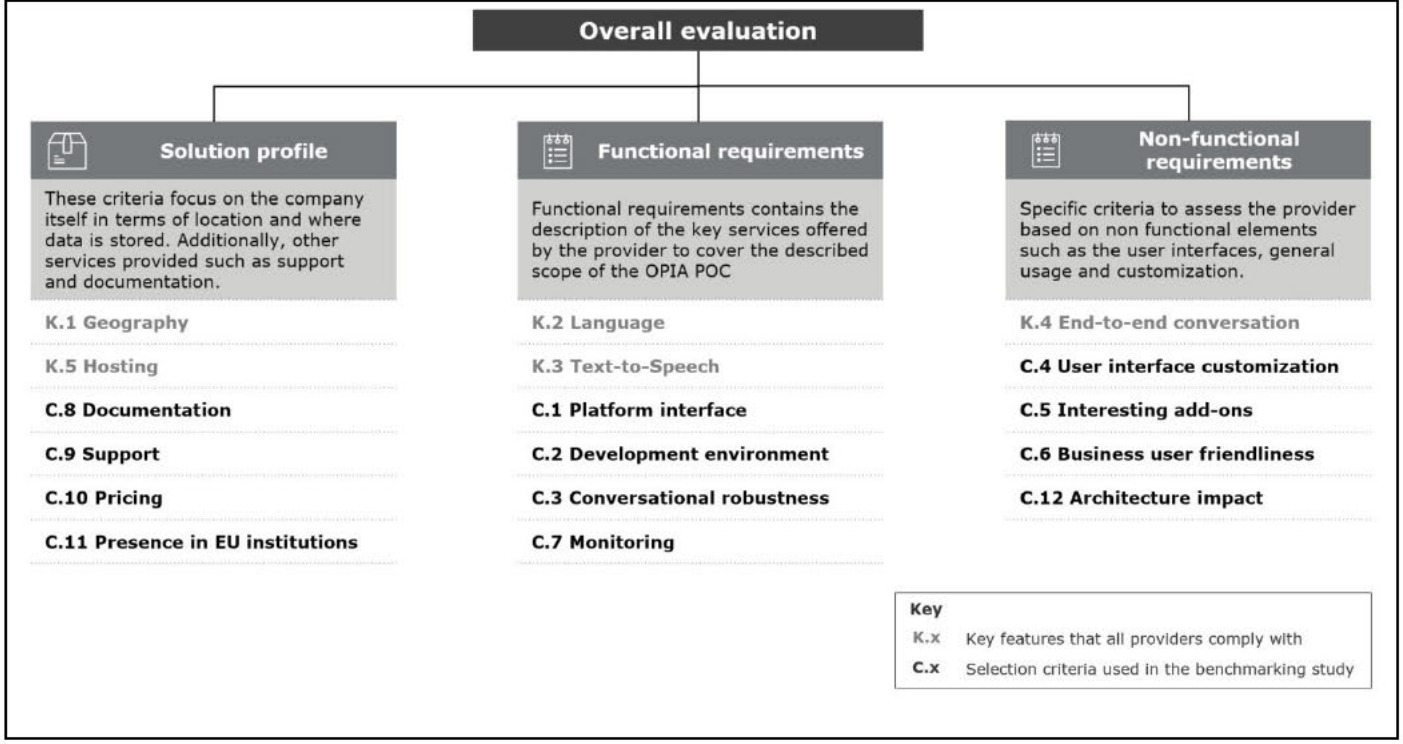
Code	Criteria	Description
C.1	Platform interface	What does the initial environment look like? Is it user-friendly? Does the platform facilitate quick learning?
C.2	Development environment	Does the platform have a code editor? To what degree does this allow customization?
C.3	Conversational robustness	Does the platform support unexpected questions? How does the platform deal with spelling mistakes?
C.4	User interface customization	Is it possible to customize the look of the Assistant to fit the customer environment? How many options of customization exists?
C.5	Interesting add-ons	Are there note-worthy add-ons offered? Does any additional feature facilitate accessibility towards sensitive users?
C.6	Business user friendliness	Is the environment suitable for a business person to maintain? Can a user without conversational AI knowledge understand the underlying architecture?
C.7	Monitoring	Does the platform provide analytic tools to monitor the health of the Intelligent Assistant? Does it provide remediation recommendations when users are experiencing issues?
C.8	Documentation	Is there suitable documentation available online? Is their community Q&A for the platform? Does the documentation assist with general questions?
C.9	Support	Does the provider assist with support services? What are the assistance availabilities and response time?
C.10	Pricing	What is the pricing offer? Does the pricing allow scalability? Are there suitable packages for the OP portal requirements?
C.11	Presence in EU institutions	Does the vendor have a presence in offering conversational AI to an EU institution?
C.12	Architecture impact	Given full integration of the OPIA into the OP Portal, how complex it is to implement the provider solution into the Publication Office website architecture? Is the provider an official provider for EU institutions?

The 10 Selection criteria covers the set up and training of the assistant, the maintenance and analytics to ensure the assistant remains relevant, how advanced the assistant is regarding RDDA sensitive user groups, as well as the general user experience. Each of the three providers will be assessed based on these criteria and a score between 1 and 4 will be assigned.

Evaluation scale

The benchmarking criteria can be divided into the following categories:

FIGURE 3: BENCHMARK CRITERIA



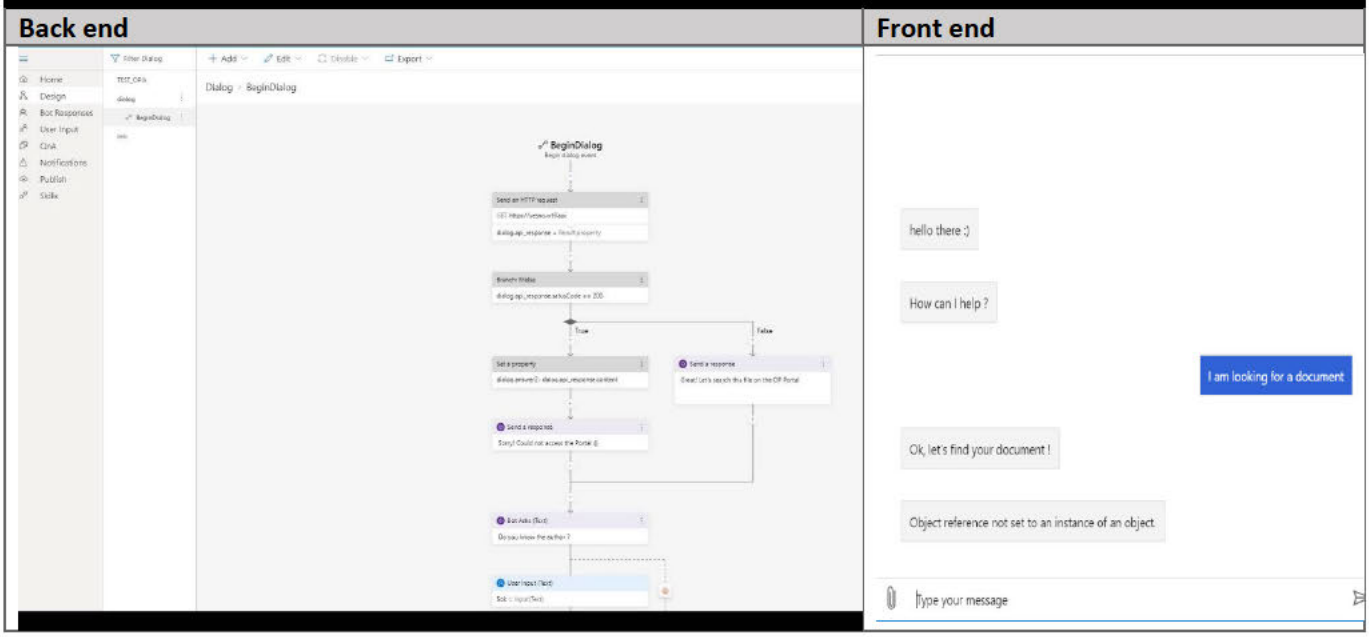
3.2 Vendor overview

Microsoft Azure

Microsoft Azure offers a wide variety of services within conversational AI. Language Understanding (LUIS) is a cloud-based conversational AI service that applies custom machine-learning intelligence on which we can integrate cognitive services such as the QnA maker and the Speech service that converts spoken language requests into text. Azure bot services provides tools to build conversational AI assistants.

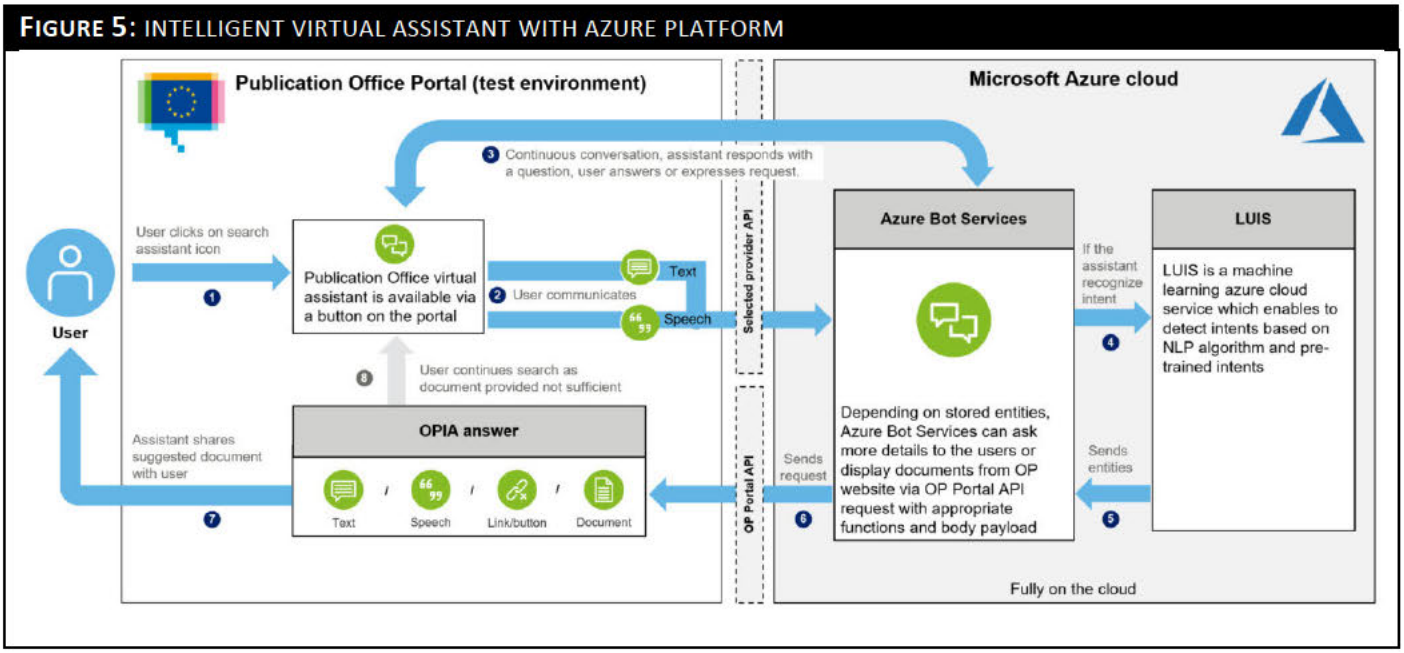
The figure below shows the GUI interface and front end view of the intelligent assistant. On the left, Bot Framework Composer is the main graphical application to develop a Microsoft Azure Bot, while the right hand side provides a view on what the intelligent virtual assistant could look like to the user.

FIGURE 4: MICROSOFT AZURE BOT SERVICES BACK END AND FRONT END SCREENSHOT



For the scope of the OPIA POC, Azure Bot Services and LUIS covers the needed functionalities. Azure Bot Services provides the framework to build, deploy and manage the Intelligent Assistant, whereas LUIS adds prebuilt domain models or custom model to determine the intent of the user. The diagram below shows how the Azure features would conform to the OP portal POC environment.

FIGURE 5: INTELLIGENT VIRTUAL ASSISTANT WITH AZURE PLATFORM



Deloitte tested the above features and completed an evaluation based on the predefined selection criteria.

TABLE 2: MICROSOFT AZURE EVALUATION BASED ON SELECTION CRITERIA

Code	Criteria	Azure evaluation	Score
C.1	Platform interface	**Pros:** The bot framework offers you full customization and both waterfall and adaptive dialogs and various channels of integration. **Cons:** It can be difficult to understand the architecture of a complex dialog between the virtual assistant and the end-user.	3

C.2	Development environment	**Pros:** Large possibilities to customize the virtual assistant, the bot framework SDK is available for .NET, JavaScript / Node.js, Python and Java. The Bot Framework Emulator is an open source application that allows to host the virtual assistant locally which enable tests before deploying the virtual assistant on the Azure cloud. **Cons:** No cons.	4
C.3	Conversational robustness	**Pros:** If the intent is not recognized, the platform allows to build a dialog in order to guide the user. The bot attempts to deal with spelling mistakes through the autocorrect feature. **Cons:** No cons.	3
C.4	User interface customization	**Pros:** Multiple user interface customization options with css and JavaScript. **Cons:** An interface facilitating easy customization would be valuable.	3
C.5	Interesting add-ons	**Pros:** A personalisation feature exists that can add personality to the assistant. It can be set to be personal, friendly, and can pick up language nuances. Microsoft Azure covers 17 languages including seven languages which is at least the official language of one country in the European Union. **Cons:** Having pre-trained intent for general conversation could significantly accelerate the process of developing of the virtual assistant. For Azure this feature is less advanced than other evaluated solutions.	3
C.6	Business user friendliness	**Pros:** It is possible to set up and maintain the environment without strong technical knowledge **Cons:** It can be difficult to understand the full architecture of the virtual assistant, for specific adjustments and errors the support services or a technical business profile with understanding of conversational AI will be required.	2
C.7	Monitoring	**Pros:** Within Ms Azure conversational tools, there is the bot analytics for statistics on the virtual assistance usage and performance. Azure Application Insights allows to monitor events, performances and errors of the virtual assistant. **Cons:** No cons.	4
C.8	Documentation	**Pros:** Ms Azure conversational tools are well documented, with multiple online tutorials on how to use the different functionalities. Furthermore, the documentation is really specific and exhaustive, all tools, features and options are explained. **Cons:** As tool versions are updated regularly, tutorials might be suitable for older versions.	3
C.9	Support	**Pros:** A workload specialist can assist on the technology of the virtual assistant. There also are other support services, and a helpline available 24/7, seven days a week. **Cons:** No cons.	3
C.10	Pricing	**Pros:** Azure prices is flexible between the different services you use. It is a pay-per-use based pricing. There are ways to customize your pricing to fit your needs and to modify it to enlarge the scope.	4

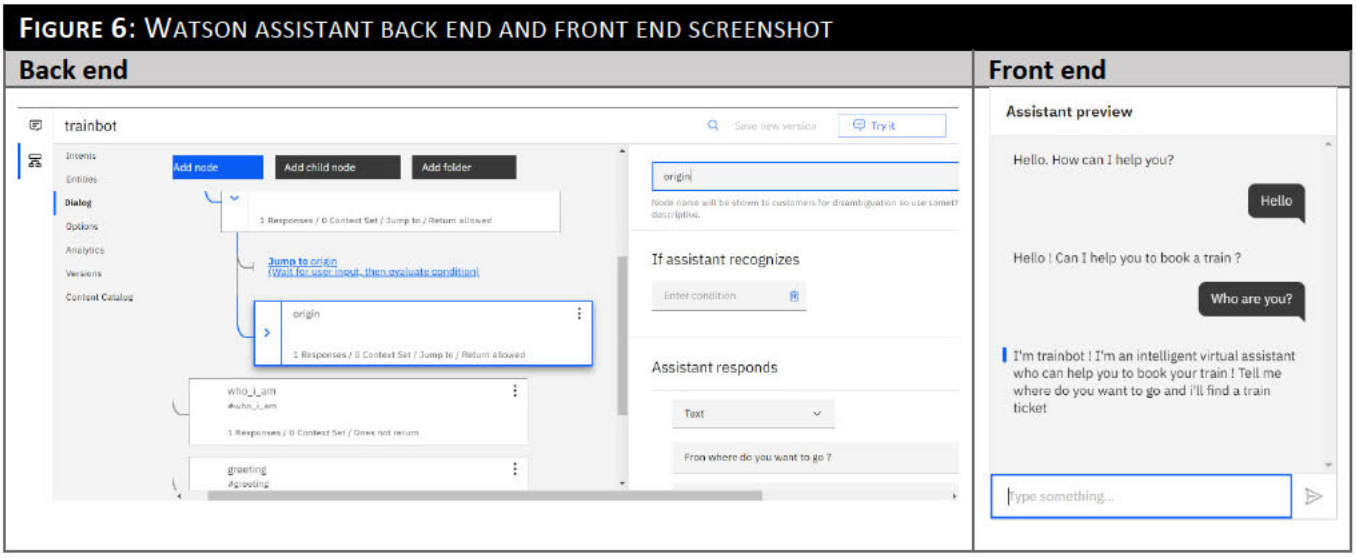
		Cons: No cons.	
C.11	Presence in EU institutions	**Pros:** Ms Azure has a proven footprint in the market. There is a relationship through providing a wide range of services to various clients. Azure has recently embarked in conversational AI for the EU education and government sector during the Covid-19 crisis. Ms Azure is an official cloud provider to EU institutions. **Cons:** Conversational AI topics are ongoing with EU governments, but no public references available for EU institutions.	3
C.12	Architecture impact	**Pros:** From an architectural perspective, full industrialization of the OPIA will benefit from using Microsoft Azure, as the portal is currently hosted on this platform. Integration between the services and features will be simplified. Ms Azure is an officially certified provider to EU institutions. **Cons:** No cons	4

IBM

IBM Watson offers a wide variety of services within conversational AI. In addition to a reliable platform and cloud service provider, IBM offers a variety of conversational AI solutions. A virtual assistant can be created with Watson Assistant. Watson Discovery adds cognitive search functionalities and content analytics to the offering. In addition, IBM Watson also provides a speech-to-text and text-to-speech API, which allows the user to talk to the assistant and the assistant to respond vocally. It is also to re-train the speech-to-text feature via acoustic modelling to help impaired speech people and people with pronounced accent to be understood.

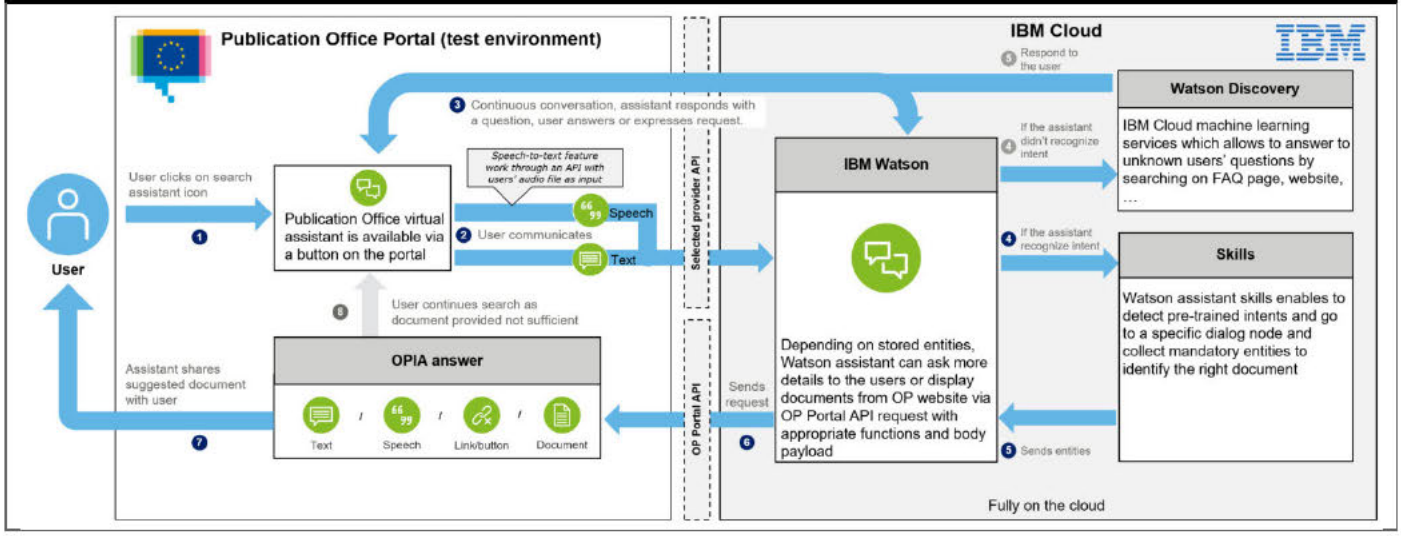
The development interface and front end view of the intelligent assistant can be seen in the figure below. On the left, Watson Assistant is the main graphical website to develop a virtual assistant and on the right, a view of what the intelligent virtual assistant could look like is provided.

FIGURE 6: WATSON ASSISTANT BACK END AND FRONT END SCREENSHOT



Watson Assistant is composed of one or several skills covering subjects. These skills enable the virtual assistant to discuss with users and offer assistance. IBM provides another useful tool Watson Discovery that allows further search and alternative resources for the assistant to provide an answer. The diagram below indicates the integration of the IBM cloud features to the OP portal to cover the POC scope.

FIGURE 7: INTELLIGENT VIRTUAL ASSISTANT WITH IBM PLATFORM



The IBM Watson features has been evaluated against the predefined selection criteria with the results summarised in the table below.

TABLE 3: IBM WATSON EVALUATION BASED ON SELECTION CRITERIA

Code	Criteria	Azure evaluation	Score
C.1	Platform interface	**Pros**: The platform is well-built and user-friendly. Each window is clear and their functionalities too. **Cons**: The size of the different platform windows are not optimized. Specific options are located in several sub-divided windows. Understanding the general architecture of the virtual assistant platform can be overwhelming.	3
C.2	Development environment	**Pros**: The GUI platform has a basic code editor option which allows Json and JavaScript. It is possible to have a powerful customization via the SDK tools in many language (Java, Python, NodeJS, .NET, Ruby). **Cons**: The code editor in the GUI interface is not simple to access. Furthermore, there are no spell check, compiling or debugging features in the code editor.	3
C.3	Conversational robustness	**Pros**: Autocorrect provides grammatical error tolerance. The feature called irrelevance detection filters out noise in user's messages to focus on relevant intents. The disambiguation with auto-learning option avoids misclassifications by displaying multi-detected intents. Watson Discovery tool provides additional cognitive search functionalities. **Cons**: No cons.	4
C.4	User interface customization	**Pros**: IBM Watson offers many possibilities and options to deploy and customize the assistant by advanced code development. **Cons**: Features with interesting tools to customize the platform without programming would make customisation more accessible.	3
C.5	Interesting add-ons	**Pros**: It is also feasible to re-train the speech-to-text feature through an acoustic model to include different accents. This feature can be relevant for speech impaired and other vulnerable users that form part of the project scope. IBM Watson covers 13	4

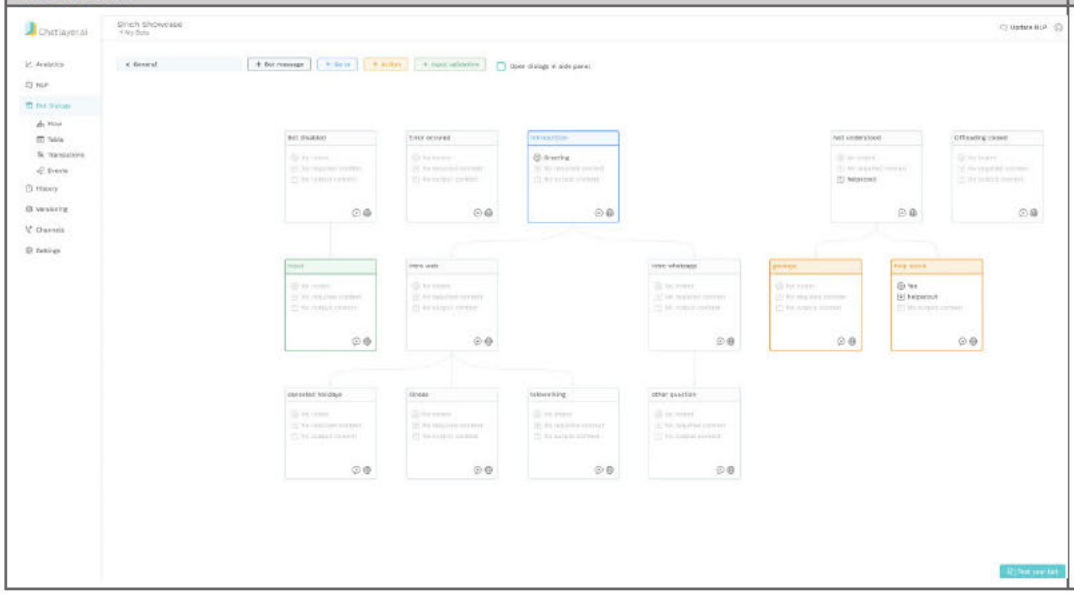
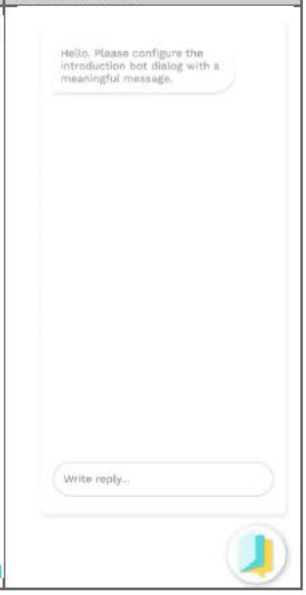
		languages including eight language which is at least the official language of one country in the European Union. **Cons**: Training the acoustic model would require training data for the specific accents, user types foreseen that might be difficult to obtain.	
C.6	Business user friendliness	**Pros**: A business person with no knowledge about programming language or developing can easily understand the basic feature of the Watson Assistant and look at the analytic tools to get n good overview. **Cons**: The architecture of the virtual assistant can be difficult to understand and process. For specific adjustments and errors the support services or a technical business profile with understanding of conversational AI will be required.	2
C.7	Monitoring	**Pros**: Watson Assistant provides an analytics window to monitor virtual assistant's answer and possible errors. The platform provides analytics to guide model maintenance. **Cons**: No cons.	4
C.8	Documentation	**Pros:** The documentation on IBM cloud is complete. It ranges from basic solution and simple virtual assistant architecture to specific and complex architecture. Furthermore, there is a community around Watson, with several questions about it on forums. **Cons**: As tool versions are updated regularly, available tutorials and documentation might refer to older versions.	3
C.9	Support	**Pros**: IBM can provide assistance through online consultation booking. Large community around Watson exists online. Dedicated IBM support teams to assist client. **Cons**: No 24/7 helpline available for immediate support.	3
C.10	Pricing	**Pros**: IBM pricing is pay-per-use for the services selected. The speech-to-text is based on minutes per month and text-to-speech is based on numbers of characters. Finally, the Watson Discovery service is based on number of document per month. This offers flexibility and scalability to build a package suitable for the scope. **Cons**: No cons.	4
C.11	Presence in EU institutions	**Pros**: IBM has a relationship with many EU institutions providing cloud and other services. IBM is part of the EU Expert group on AI since 2018. IBM is working with several EU institutions at inspirational level around Watson technologies. References of conversational AI deployed at EU governmental level has been provided. **Cons**: No formal reference for conversational AI at EU institutions could be provided.	3
C.12	Architecture impact	**Pros:** From an architectural perspective (considering the OP portal's current cloud provider), IBM Watson can be hosted, but with a higher complexity of integration in comparison to other evaluated vendors. **Cons:** IBM is not a current cloud provider to EU institutions. Keeping in mind the full industrialization of the OPIA in the future, it means that the architecture complexity will increase from an integration point of view.	2

Chatlayer

Chatlayer is an intuitive platform that focusses solely to provide conversational AI. They cover text to speech and have an intuitive platform to build an Intelligent Assistant. They host their services making use of Ms Azure Cloud services on servers based in the EU.

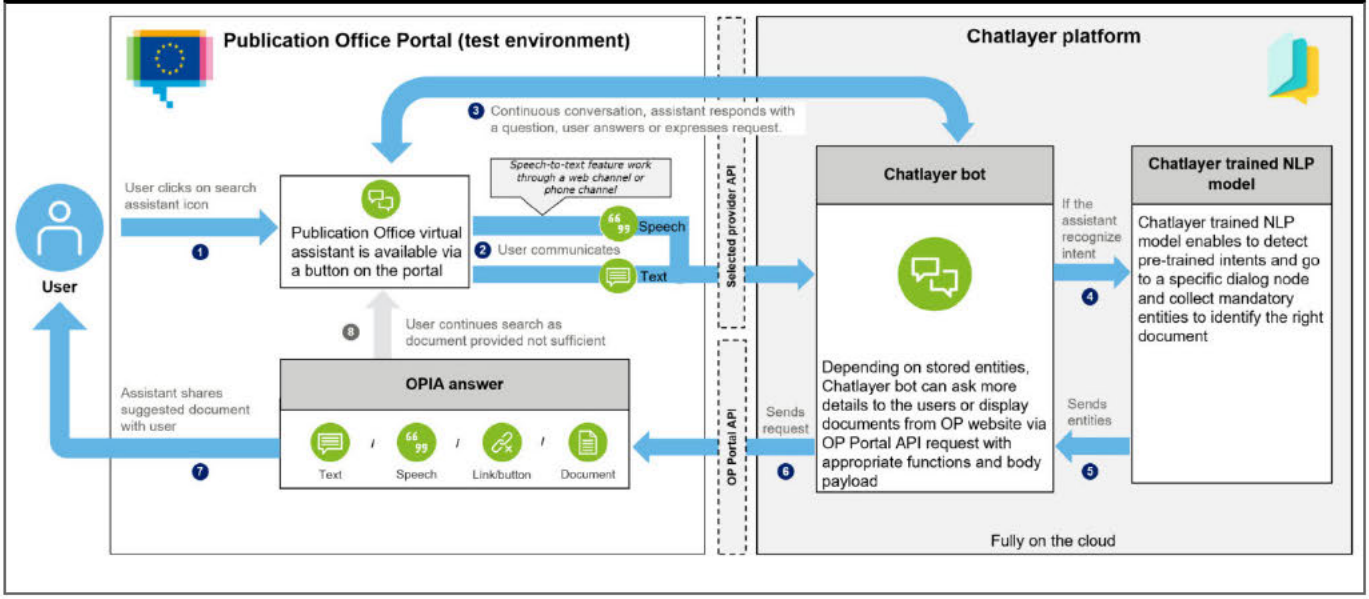
On the left, Chatlayer.ai is the main graphical website to develop a Chatlayer Bot; and on the right, you can actually foresee what the intelligent virtual assistant looks like to the user. The interface and front end view of the intelligent virtual assistant can be seen in the figure below.

FIGURE 8: CHATLAYER BACK END AND FRONT END SCREENSHOT

Back end	Front end
	

Chatlayer's strength lies in simple and intuitive platform with easy-to-understand documentation. Complex features are simplified to become easy to create and maintain. The speech-to-text feature can be implemented via a phone channel and web channel. Simplifications implies less possibilities for customization & control over development. The diagram below shows how Chatlayer's architecture can integrate to the OP portal POC environment.

FIGURE 9: INTELLIGENT VIRTUAL ASSISTANT WITH CHATLAYER PLATFORM



Chatlayer features has been evaluated against the predefined selection criteria with the results summarised in the table below.

TABLE 4: CHATLAYER EVALUATION BASED ON SELECTION CRITERIA

Code	Criteria	Chatlayer evaluation	Score
C.1	Platform interface	**Pros**: The platform is designed to make conversational AI available to all levels of user and has a user-friendly graphical interface. It facilitates basic virtual assistant creation. Chatlayer dialog node is a great graphical representation of the flow, it provides an efficient view on complex dialog architecture **Cons**: Certain advanced functionalities difficult to find.	3
C.2	Development environment	**Pros**: A code editor is available and supports several languages like Json and JavaScript **Cons**: No full programming development solution and small code editor without spell checking, auto correct, compiling or preview in it	2
C.3	Conversational robustness	**Pros**: Tool exists to detect typical misclassification with overlapping intents and next give suggestions on how to avoid it. The platform uses set context to guide the bot to consider only specific intents within the flow. **Cons**: There are no features or options to handle grammar errors or autocorrect.	3
C.4	User interface customization	**Pros**: There are options to customize the front end of the virtual assistant with css files. Chatlayer support services can build a custom widget to fit specific design requests. **Cons**: The lack of an SDK reduces the possibilities of customization.	2
C.5	Interesting add-ons	**Pros**: The platform covers 25 main languages and can handle 100 languages by translation. **Cons**: No cons.	3

C.6	Business user friendliness	**Pros**: The platforms usability is a main feature, it is a powerful virtual assistant to business people with different skills and knowledge. The simplicity facilitates easy learning with no advanced knowledge about conversational AI needed as a prerequisite. **Cons**: No cons.	4
C.7	Monitoring	**Pros**: Chatlayer provides a dashboard and an error board to control the efficiency of your virtual assistant and re-train it if it shows a source of error. **Cons**: Even though the tools cover monitoring, other providers evaluated go beyond expectation offering a dedicated service for monitoring.	3
C.8	Documentation	**Pros**: Chatlayer's documentation is clear and complete, everything is available on their website. **Cons**: The documentation is focused on basics aspects of the platform, with complexity to guide users through advanced customisation and newly added features. There is not a large online community for QnA and assistance tutorials available.	2
C.9	Support	**Pros**: Chatlayer provides support from 8:30 till 17:30 for the 4 packages. With the enterprise and corporate package, Chatlayer provides premium support with priority ticketing. Chatlayer usually responds within 24h of request. **Cons**: No 24/7 helpline available for immediate support. For packages lower than the corporate level, no priority services are granted.	3
C.10	Pricing	**Pros**: Chatlayer provides four packages. The professional is a starting point with possible upgrade to the enterprise package in case high usage of assistant availability occurs. **Cons**: Pay per use is not a pricing option, The fixed price package allows less flexibility and limits the amount of messages to the assistant.	2
C.11	Presence in EU institutions	**Pros**: Chatlayer has already been used for bot development by EU institutions such as the European Parliament and the European Commission. **Cons**: The platform relies on other providers for cloud services and does not offer a wider range of services.	4
C.12	Architecture impact	**Pros:** As Chatlayer is hosted on Microsoft Azure full industrialization of the OPIA will have no additional integration complexities. Ms Azure is an official cloud provider to EU institutions. **Cons:** No cons.	4

3.3 Evaluation

The table below represents the final evaluation of the three providers based on the eleven criteria we defined previously. Each criteria has its own weight to communicate the importance of the criteria to the OPIA scope. Criteria directly related to the development and functionalities of the Intelligent Assistant and the included features have been weighted on a higher basis than other criteria.

The criteria is weighted into three groups of importance with C.2 Development Environment & C.3 Conversational robustness gaining the highest importance (0,15) due to the direct alignment with the development of the OPIA POC features to cover the project scope. Other functional requirements such as interesting add-ons and the platform interface gain 0,10 weighting, with the non-functional and solution profile criteria scored on the basis weight of 0,05. The criteria C.12 Architecture impact is allocated a higher weight of 0,15 as this feature is of importance to the Publication Office, keeping full integration of the assistant into the portal as well as alignment to EU official cloud providers in mind. The highest possible score that can be obtained by a vendor is a four.

TABLE 5: PROVIDERS FINAL EVALUATION

Criteria		Weight	Microsoft Azure Bot Services	IBM Watson	Chatlayer
C.1	Platform interface	0,10			
C.2	Development environment	0,15			
C.3	Conversational robustness	0,15			
C.4	User interface customization	0,05			
C.5	Interesting add-ons	0,10			
C.6	Business user friendliness	0,05			
C.7	Monitoring	0,05			
C.8	Documentation	0,05			
C.9	Support	0,05			
C.10	Pricing	0,05			
C.11	Presence in EU institutions	0,05			
C.12	Architecture impact	0,15			
Total score		**1,00**	**3,35**	**3,15**	**2,95**

3.4 Proposed selection

The main goal of the technology selection is to ensure that the best conversational AI platform is selected to deliver the OPIA POC scope. Even though all three providers in the final comparison could cover the OPIA scope, Deloitte's evaluation would be that Microsoft Azure is the most suitable platform for developing the Intelligent Assistant.

Azure's offering is comprehensive and developer friendly. Microsoft Azure Bot Services offers developer-friendly tools, powerful deployment solutions and cloud architecture, and includes multiple interesting add on features as part of the broader Azure portfolio. The Bot Framework Composer tool is user friendly and offers powerful analytics to enable developers to continuously react to the changing state of conversations. These tools include Azure Application Insights to monitor events, performances and errors of the virtual assistant. This, along with Microsoft's enterprise and industry expertise will allow the development of complex solutions.

All the Publication Office features for the OPIA can be addressed using this tool. Features such as LUIS, and Bot Framework Composer facilitate a smooth conversation and search. These skills will assist in adapting the OPIA to suit the sensitive user audience as defined as part of the RDDA study.

4. Conclusion

The proposed solution for the OPIA is recommended as Microsoft Azure. The offering covers all the requirements set out for the OPIA POC. The platform is comprehensive, with a strong development environment that includes interesting add on features such as adding a personality to the assistant that can be suitable for the Publication Office beyond the POC scope.

The next steps include the following:

- **Integration with the OP Portal:** Integration of Microsoft Azure Bot Services should be without complication as the OP Portal is hosted with this provider. The OP portal API will be used to retrieve documents for the OPIA project scope.
- **OPIA development:** The two key functionalities, text-to-speech and intelligent search assistant will be developed.

The following attention points are going to be addressed:

- **Maintenance of the assistant:** Azure Application Insights allows to monitor events, performances and errors of the virtual assistant. These powerful analytic tools enable continuous monitoring. Business user-friendliness is an attention point raised in our evaluation as the architecture of the Azure bot services virtual assistant is complex. Due to the learning curve, we suggest on boarding a more technical business profile to monitor the OPIA.
- **Support services:** Microsoft Azure offers support services to assist with any queries, integration and development questions regarding their products and features. The extent of the support is to be evaluated to ensure that this is suitable for implementation that goes beyond the POC scope.
- **Pricing arrangements**: Pricing should be further analysed to include possible partnerships between Ms Azure and EU institutions. The scope of usage of an intelligent assistant for full deployment should be taken into consideration with statistics of portal usage and estimates of usage of the OPIA to give a full overview of the most suitable package from the price offerings.

5. Appendix

5.1 Glossary

TABLE 6: GLOSSARY	
Technical terms	**Description**
SDK - Software Development Kit	A set of tools that can be used to create, develop and customize applications
CSS - Cascading Style Sheet	A style sheet language used for describing HTML element, we can customise the layouts of the web pages
PoC – Proof of Concept	A realization of a certain method or idea in order to demonstrate its feasibility
API - Application Programming Interface	A software intermediary that allows applications to retrieve information from one another
AI – Artificial Intelligence	Computer technology that allows machines work in an intelligent way
NodeJS	back-end JavaScript runtime environment that executes JavaScript code outside a web browser
GUI - graphical user interface	Allows a user to interact with a computer program using a pointing device that manipulates small pictures on a computer screen
LUIS - Language Understanding	A cloud-based conversational AI service that applies custom machine-learning intelligence to a user's conversational, natural language text to predict overall meaning, and pull out relevant, detailed information
JavaScript/Java	An object-oriented computer programming language commonly used to create interactive effects within web browsers
Python	A scripting language often used for creating Web applications and dynamic Web content
Ruby	Object-oriented programming language
.NET	The name given to a collection of computer products and technologies of the Microsoft Company to make applications easily portable on the Internet.
GitBook	Modern documentation platform where teams can document everything from products to internal knowledge-bases and APIs

5.2 Pricing

TABLE 7: PRICING FOR MICROSOFT AZURE'S FEATURES	
Features	**Microsoft Azure**
Virtual Assistant	**Bot Services** : (S1) Standard channels : Unlimited Messages Premium channels : 0.422€ per 1,000 messages (Free / S0) Standard channels : Unlimited channels Premium channels : 10000 messages per month https://azure.microsoft.com/en-in/pricing/details/bot-service/ **LUIS :** Text requests : 1,265€ per 1000 transactions https://azure.microsoft.com/en-in/pricing/details/cognitive-services/language-understanding-intelligent-services/
Speech-to-text	**LUIS** : Speech requests : 4,639€ per 1000 transactions https://azure.microsoft.com/en-in/pricing/details/cognitive-services/language-understanding-intelligent-services/ **or** **Cognitive Services :** 0,844€ per audio hour https://azure.microsoft.com/en-in/pricing/details/cognitive-services/speech-services/
Text-to-speech	**Cognitive Services :** 3,374€ per 1M characters https://azure.microsoft.com/en-in/pricing/details/cognitive-services/speech-services/
Other features	**Azure App Service** : 46,171€ per month https://azure.microsoft.com/en-us/pricing/details/app-service/windows/ **Azure Application** : • 100GB per day => 206.61€ per day • 200GB per day => 387.92€ per day • 300GB per day => 569.23€ per day • 400GB per day => 742.11€ per day • 500GB per day => 911.82€ per day • 500GB+ per day => 911.82€ per day + 182.37€ for each additional 100GB

TABLE 8: PRICING FOR IBM WATSON'S FEATURES	
Features	**IBM Watson**
Virtual Assistant	**Watson Assistant** : 101€ for 1000 users per month https://www.ibm.com/cloud/watson-assistant/pricing/
Speech-to-text	**Watson Speech-to-text** : • 1 - 250,000 : 0.02€ /MINUTE • 250,001 - 500,000 : 0.015€ /MINUTE • 500,001 - 1,000,000 : 0.0125€ /MINUTE • 1000000+ : 0.01€ / MINUTE https://www.ibm.com/fr-fr/cloud/watson-speech-to-text/pricing
Text-to-speech	**Watson Text-to-Speech** : 0.02€ per 1000 char https://www.ibm.com/fr-fr/cloud/watson-text-to-speech/pricing
Other features	**Discovery** : document tiers pricing (Assumption: 1$ = 0,85€) • XS (50k documents per month) : 424€ • S (1M documents per month) : 1272€ • MS (2M documents per month) : 2544€ • M (4M documents per month) : 4239€ https://www.ibm.com/cloud/watson-discovery/pricing

TABLE 9: PRICING FOR CHATLAYER'S PACKAGE	
Packages	**Chatlayer**
Starter Package **499€**	• 1 live bot (Up to 3 test bots) • Up to 3 users (for configuration & administration) • Up to 1 languages • 5000 text messages per month maximum • No voice • 1 API connection (no code editor)
Professional package **1598€**	• 1 live bot (Up to 3 test bots) • Up to 5 users (for configuration & administration) • Up to 3 languages • 15.000 text messages per month (EUR 999 per month for 15.000 text messages) • 1.500 voice minutes per month (EUR 199 per month for 1.500 voice minutes) • 10 API connections (code editor possible)
Enterprise package **4399€**	• Up to 2 live bots (Up to 10 test bots) • Up to 20 users (for configuration & administration) • Up to 5 languages • 100.000 text messages per month (EUR 999 per month for 100.000 text messages) • 10.000 voice minutes per month (EUR 999 per month for 10.000 voice minutes) • Unlimited API connections
Corporate package	"A la carte" package **Pricing set up for client specifically**

The pricing calculation was made with the following assumptions:

- 30 000 queries per day (30 day month)
- 30% of 30 000 queries use the virtual assistant per day (270 000 messages per month)
- 15% of the queries used the speech-to-text and text-to-speech features
- Each speech-to-text message last 5 seconds on average
- Maximum 1000 unique users per month

These assumptions does not include any possible discount that the Publication Office might receive from the vendors. The pricing is based on the above assumptions that simulate the OPIA POC environment and reflects the Publication Office criteria, and is completed based on the best understanding of the information made available by the vendors.

TABLE 10: FINAL PROVIDERS PRICING TABLE (PER MONTH)

Features	Microsoft Azure		IBM Watson		Chatlayer	
Services	• Bot Services (Premium) • LUIS (Standard) Azure App Service (Basic)		• Watson (Plus plan) • Watson Discovery (Advanced plan)		Enterprise package	**4399€**
Virtual Assistant	**Bot Services**: Premium channels 10,000 messages/month 0.422€ per 1,000 messages **LUIS**: Text requests: 1,265€ / 1000 transactions	**113.94€ + 341.55€ = 455.49€**	**Watson Assistant** users based pricing 101€ for 1000 unique users/month	**101€**	100.000 text messages per month included in the package, thus an additional 170.000 will be needed (EUR 999 per month for 100.000 additional text messages)	**999€ x2 = 1998€**
Speech-to-text	**LUIS**: Speech requests: 4,639€ / 1000 transactions	**187.88€**	**Watson Speech-to-text**: 1 – 250K: 0.02€ /min 250K – 500K: 0.01€ /min	**57.04€**	10 000 voice minutes per month (include in enterprise package), 3375 voice minutes required.	**0€**
Other features	**Azure App Service**: 46,171€ per month **Azure Application**: 100GB per day => 206.61€ per day	**46.€ + 206.61€ = 252.78€**	**Watson Discovery** (10% of queries): tiers pricing -XS (50k documents per month): 425€ (Assumption: 1$ = 0,85€)	**425€**	None	**0€**
Total	**896.15€**		**546.53€**		**6397€**	