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# A Tale of Eight Countries or the EU Council Presidency Translator in Retrospect

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## Abstract

In this paper, we describe the development of the EU Council Presidency Translator, a machine translation solution first introduced during the EU Council Presidency of Latvia. We further analyze how the EU Council Presidency Translator has been used across seven presiding member states starting from H2'2017 onwards. Our findings show that usage of different translation tools has depended on the technological readiness level of the presiding member state. Nevertheless, Presidency Translator usage statistics indicated an upwards trend in the volume of words translated monthly, suggesting increasing popularity of the machine translation based solution. Our analysis further indicates that the machine translation services are used continuously after the periods of presidencies they were developed for conclude. These findings suggest the usefulness of the Presidency Translator above and beyond the needs of the period of the presidency.

## 1 Introduction

Large international organizations face the challenge of language barriers in their everyday work; thus, it is not surprising that they show a strong interest in machine translation (MT). The Pan American Health Organization (PAHO) has developed their MT system already in 1980, starting with English and Spanish and later extending to Portuguese (Aymerich, 2005). The World Intellectual Property Organization (WIPO) has developed its MT tool, WIPO Translate, for ten languages (Pouliquen, 2017) and primary use it for patent translation but also offer it to other UN bodies (Pouliquen et al., 2013) and international organizations, such as the International Monetary Fund (IMF), Food and Agriculture Organization (FAO), International Telecommunication Union (ITU), and World Trade Organization (WTO) (Pouliquen, 2016). The European Patent Office has cooperated with Google by providing its data and using Google Translate technologies for patent search.

European Commission (EC) started to use a customized version of the MT system Systran in 1976, becoming one of the first large-scale adopters of MT (Petrits, 2001). In 2010, the European Commission began to develop its MT system based on the Moses toolkit and released it as the MT@EC tool in 2013 with support for all 24 official languages of the European Union (EU) (Eisele et al., 2011). In 2017, EC migrated its MT platform to neural MT (NMT) technologies and renamed the service to eTranslation. MT@EC and its successor eTranslation are

used by thousands of translators employed by EC, European Parliament, European Committee of the Regions, European Court of Justice, European Central Bank, and other European institutions and bodies. It is also available for any public administration of EU member states and has recently been opened for European small and medium-sized businesses.

As the key European Union decision-maker, the Council of the European Union negotiates and adopts EU laws, coordinates member states' policies, develops the EU's common foreign and security policy, concludes international agreements, and adopts the EU budget. The functioning of the Council is organized by EU member states in 6 months long rotating order. As a result, new presiding member state-specific MT solutions are also developed and deployed bi-annually. In this paper, we describe the development of the EU Council Presidency Translator and its inception during the EU Council Presidency of Latvia as well as analyze its usage statistics and patterns across seven presiding member states starting H2'2017 onwards. Our analysis shows that while the reliance on different translation tools depends on each member state's technological readiness, there is a strong upwards trend in the volume of words translated monthly. Furthermore, the MT systems developed for the EU Council Presidency Translator are used continuously after presidencies of member states conclude, suggesting their usefulness above and beyond the needs of the period of the presidency.

## 2 Solution Genesis

The member state holding the presidency organizes and chairs hundreds of formal and informal meetings in the country of the rotating presidency. Planning these meetings and disseminating their outcomes involves extensive communication and requires the preparation of many thousands of documents, communiqués, press releases, and social media entries. These meetings, communications, documents, and information materials are inherently multilingual because the EU has 27 member states (28 before Brexit) and 24 official languages. Language equality is cemented in the EU founding documents ensuring equal rights to use any of the EU's official languages. Still, the translation demand for the EU Council Presidency is so high that it is challenging to reach this language equality in practice. As a result, not all information is available in all the languages, or non-critical translations are provided with a significant delay.

Machine translation as a solution for the EU Council presidency's translation needs was initially proposed for the Latvian presidency, which took place during the first half of 2015. This was the first time Latvia was assuming the presiding role at the EU Council with its accompanying complex challenges for this relatively small country. The proposal of language technology company Tilde to try leveraging the multilingual challenges with an MT solution was met positively, opening an opportunity to develop and trial custom MT systems and tools. The solution's primary focus was to support delegates, visitors, and journalists attending presidency events in Latvia to access local information and help country residents follow up presidency information. The Latvian national language technology platform hugo.lv was used as the provider of MT systems for translation between Latvian and English (Vasiljevs et al., 2014). A specialized desktop interface was developed for the translation of text snippets, documents, and websites. Translation applications for iOS, Android, and Windows Phone platforms were provided for mobile users. Two translation kiosks were set up at the central venue of the presidency in the newly opened National Library of Latvia, drawing the attention of presidency event participants. Although no formal assessment was carried out, the feedback from visitors, presidency staff, and journalists was overwhelmingly positive, particularly about the possibility of receiving an instant translation of full documents preserving their formatting, and getting a translation of local websites.

The success at Latvia's EU Council Presidency encouraged to apply to the European Commission with a project proposal to develop a full-fledged solution for the succeeding presiden-

cies. Two projects were co-funded by the Connecting Europe Facility program supporting six presidencies - Estonia (H2'2017), Bulgaria (H1'2018), Austria (H2'2018), Romania (H1'2019), Finland (H2'2019), and Croatia (H1'2020). The German Federal Foreign Office funds the current solution for the German EU Council Presidency (H2'2020). For every presidency, Tilde cooperated with strong national partners – Institute for Bulgarian Language, University of Vienna, Research Institute for Artificial Intelligence of the Romanian Academy, Finland's Prime Minister's Office, and the University of Zagreb. The EU Council Presidency Translator was initially launched at the Tallinn Digital Summit of EU heads of state or government on September 29, 2017.

### 3 EU Council Presidency Translator

The EU Council Presidency Translator includes tools and features to target several user groups:

- professional translators to speed up their work by using MT post-editing;
- presidency staff and delegates to translate documents preserving their formatting;
- journalists to support the preparation of multilingual materials and access local websites;
- citizens of EU countries to access the presidency website and other materials in their mother tongue.

It is an online tool in which functionality, interface, and design are customized for every presidency's specific requirements. It includes specifically developed MT systems for the primary translation directions of each EU Council Presidency and supports all official EU languages by integrating European Commission eTranslation systems. The Presidency Translator's essential advantages are synchronous translation in real-time (as opposed to the asynchronous service of the public eTranslation) in a secure environment.

We further describe the EU Council Presidency Translator by looking at its functionality (see Section 3.1), technical architecture (see Section 3.2), and the different types of MT systems it provides (see Section 3.3).

#### 3.1 Functionality

Throughout the years the EU Council Presidency Translator, its functionalities and usage have evolved significantly. The latest, EU Council Presidency in Germany, taking place between July 1<sup>st</sup> and December 31<sup>st</sup>, 2020, is benefiting from the widest range of features allowing users to translate from/to all official languages of the European Union. The functionality includes:

- **An online translation workspace** that provides text snippet, Web page, and formatting-rich document<sup>1</sup> translation functionality<sup>2</sup> that is available to every visitor, delegate, and public administration translator of the current and previous EU Council presidencies. The text snippet translation interface is integrated also with EuroTermBank<sup>3</sup> (Vasiljevs et al., 2008), the largest termbase in Europe. When entering terms in the text snippet translation form, translations are automatically provided from EuroTermBank.
- **A computer-assisted translation (CAT) tool plug-in for SDL Trados Studio**, which is available to public administration translators.

<sup>1</sup>The EU Council Presidency Translator supports translation of \*.doc, \*.docx, \*.xlsx, \*.pptx, \*.odt, \*.odp, \*.ods, and \*.rtf documents.

<sup>2</sup><https://presidencymt.eu>

<sup>3</sup><https://www.eurotermbank.com/>

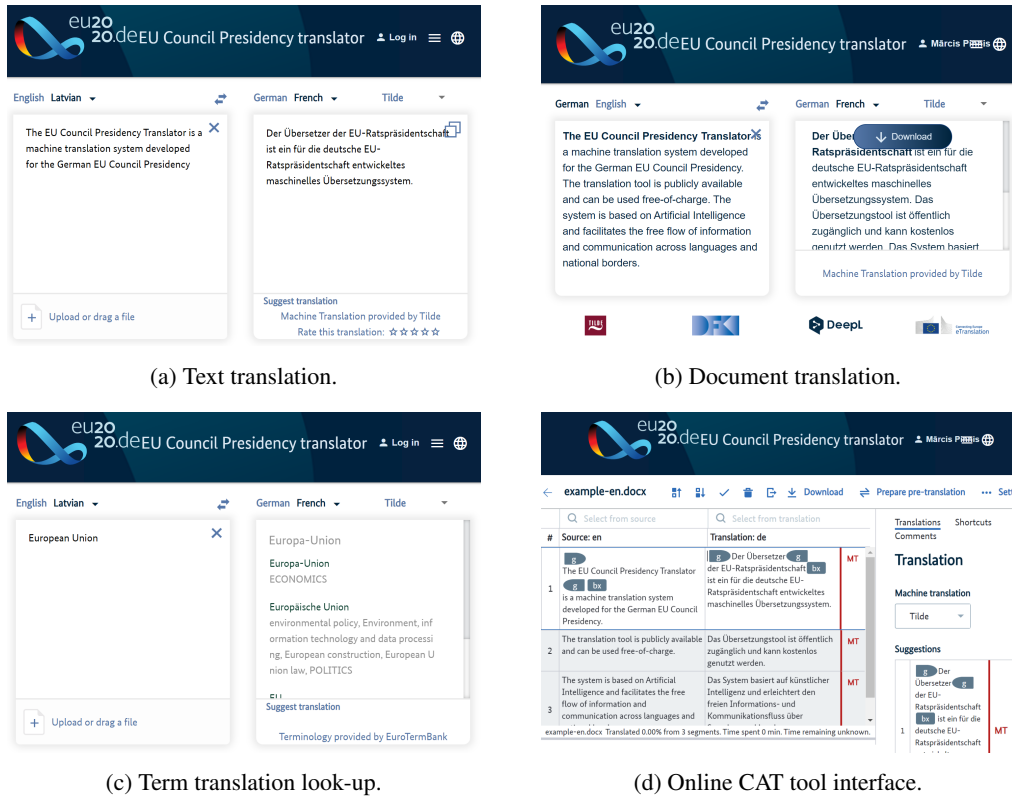


Figure 1: Examples of the graphical user interface of the EU Council Presidency Translator developed for the German EU Council Presidency (source: <https://presidencymt.eu>).

- **A website translation widget**, which can be integrated into the website of each EU Council Presidency, thereby enabling access to the content of the website for all EU citizens in their native languages. In 2020, the website translation widget is integrated into the website of the German EU Council Presidency<sup>4</sup> and provides translations to all official languages of the European Union from either German or English.
- **An online CAT environment for non-professional translators**, which allows translating formatting-rich documents and provides translation memory (TM) functionality. When translating documents, translation suggestions are automatically provided by the EU Council Presidency Translator’s MT systems and user’s private translation memory. Additionally, to MT and TM suggestions, users can search terminology in EuroTermBank. Similarly to professional CAT tools, the online CAT environment also allows pre-translating documents using MT or TM, thereby improving translation productivity even further.

Examples of the graphical user interface from the online translation workspace and the online CAT environment are depicted in Figure 1.

The EU Council Presidency Translator allows deploying and integrating custom and third party MT systems. Before the German EU Council Presidency, the EU Council Presidency Translator provided access to generic MT systems from eTranslation<sup>5</sup> (the MT service devel-

<sup>4</sup><https://www.eu2020.eu>

<sup>5</sup><https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eTranslation>

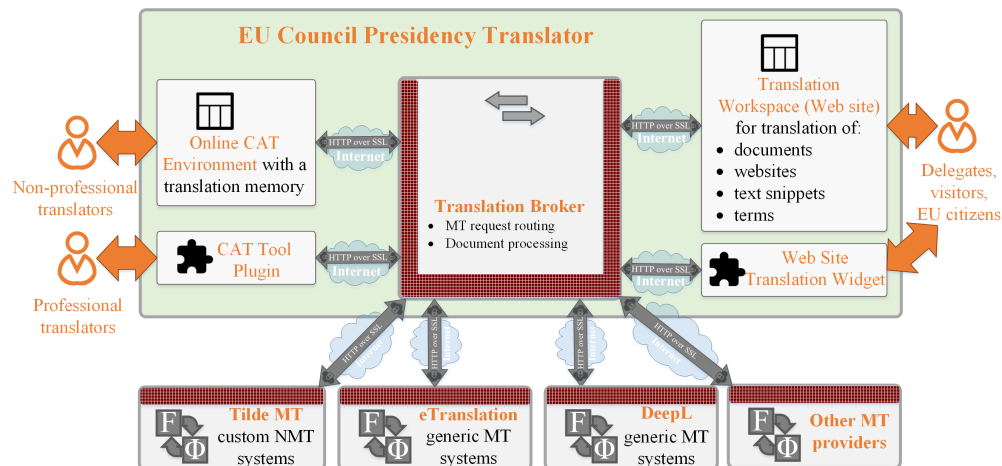


Figure 2: The technical architecture of the EU Council Presidency Translator (an updated diagram from Pinnis and Kalniņš (2018) to reflect the EU Council Presidency Translator for the German EU Council Presidency).

oped and maintained by the European Commission) and custom NMT systems developed by Tilde. For the German EU Council Presidency, The EU Council Presidency Translator has been extended to provide access to generic MT systems developed by DeepL<sup>6</sup> and custom NMT systems developed by the German Research Center for Artificial Intelligence<sup>7</sup> (DFKI).

Users benefit from this user-friendly platform when translating texts, documents, or web content. The EU Council Presidency Translator provides a secure environment for confidential translations as all data transfers are encrypted, and all data are stored within safe data centers within the European Union.

### 3.2 Architecture

The EU Council Presidency Translator has been developed as a cloud-based solution that consists of three types of components:

1. **MT systems** that are deployed on Tilde MT or third party cloud-based infrastructures. The custom NMT systems that are tailored for each EU Council Presidency are deployed on Tilde MT<sup>8</sup> Pinnis et al. (2018b). Generic systems are provided by eTranslation and for the German EU Council Presidency also by DeepL.
2. **An MT system broker** (or proxy) that processes all translation requests and distributes them to the different custom and generic MT system providers, as well as handles formatting-rich document translation. The MT system broker exposes both a translation segment translation API and a document translation API.
3. **Various translation interfaces** that provide access to MT systems. For instance, the CAT tool plugin for SDL Trados Studio, the online translation workspace for text snippet, document, website translation, and term translation look-up, the website translation widget, and the online CAT environment that provides CAT tool functionality for non-professional translators.

<sup>6</sup><https://www.deepl.com/>

<sup>7</sup><https://www.dfki.de/>

<sup>8</sup><https://tilde.com/mt>

The technical architecture of the EU Council Presidency Translator was first published by (Pinnis and Kalniņš, 2018). In this paper, we update the architecture (see Figure2) to reflect the latest developments for the German EU Council Presidency. As depicted in Figure2, all data between all components are transferred using secure (SSL-encrypted) connections.

### 3.3 Machine Translation Systems

The EU Council Presidency Translator provides access to custom and generic MT systems. Since the first launch of the EU Council Presidency Translator in 2017, the custom MT systems have been developed using NMT methods. However, NMT technologies have improved during the past three years; therefore, the EU Council Presidency Translator features NMT systems that have been developed using different NMT technologies.

First custom NMT systems for the Estonian EU Council Presidency (back in 2017 and 2018) were trained using Nematus (Sennrich et al., 2017), an NMT toolkit that allowed us to develop recurrent neural network-based NMT models with multiplicative long short-term memory (MLSTM) units (Krause et al., 2016; Pinnis et al., 2017). The models were deployed in Tilde MT using the AmuNMT decoder (Junczys-Dowmunt et al., 2016), which is faster than Nematus and allows using models trained with Nematus. At the end of 2018, we re-trained the models of the Estonian EU Council Presidency using Transformer (Vaswani et al., 2017) models from the Sockeye NMT toolkit (Hieber et al., 2017). We selected Sockeye as it allowed us to train the best-performing NMT systems at the WMT 2018 shared task on news translation for EN↔ET (Bojar et al., 2018; Pinnis et al., 2018a). However, as Sockeye was relatively slow and did not have features necessary for high-quality formatting-rich document translation, all other NMT systems were developed using the Marian NMT toolkit (Junczys-Dowmunt et al., 2018). Marian provides support for guided alignments that are necessary to support formatting-rich document translation. A list that shows which NMT toolkits were used for the different custom NMT systems of the EU Council Presidency Translator is given in Table 1.

Custom NMT systems for all EU Council presidencies were trained using domain-specific MT system training recipes. Baseline models were trained using both in-domain and out-of-domain data, after which NMT models were fine-tuned on in-domain (presidency-specific) datasets. The in-domain datasets depending on each presidency were collected by Tilde, provided by project partners, or EU Council Presidency offices in the different countries.

To provide translations from/to other languages that are not listed in Table 1, the EU Council Presidency Translator integrates generic NMT systems from eTranslation and for the German EU Council Presidency also from DeepL. The generic systems are mostly intended for delegates of events of EU Council Presidencies and EU citizens that do not necessarily speak the languages in which information is provided in the various events and the website of the particular EU Council Presidency. On the other hand, the custom NMT systems are mostly intended to assist translators and public administration employees of each respective EU Council Presidency.

## 4 Usage Analysis

The EU Council Presidency Translator has been in active use for over three years (since July, 2017). During this time, we have accumulated usage statistics from the different translation interfaces. These statistics allow us to assess, which functionality aspects are the most needed, analyze the adoption of the EU Council Presidency Translator within the different EU Council Presidencies, and plan further improvements to the EU Council Presidency Translator. Further, we provide an analysis of the overall usage statistics (see Section 4.1) as well as country-specific statistics (see Section 4.2).

NMT Toolkit	NMT Architecture	Language pairs
Nematus/AmuNMT	MLSTM	EN↔ET (till 2018), EN↔BG, EN↔DE (for Austrian Presidency)
Sockeye	Transformer	EN↔ET (since 2018)
Marian	Transformer	EN↔DE (since 2020), EN↔RO, EN↔FI, FI↔SV, ET↔FI, EN↔HR, DE↔IT, DE↔ES, DE↔PL, DE↔FR

Table 1: NMT toolkits and NMT model architectures used to develop custom NMT systems for the EU Council Presidency Translator.

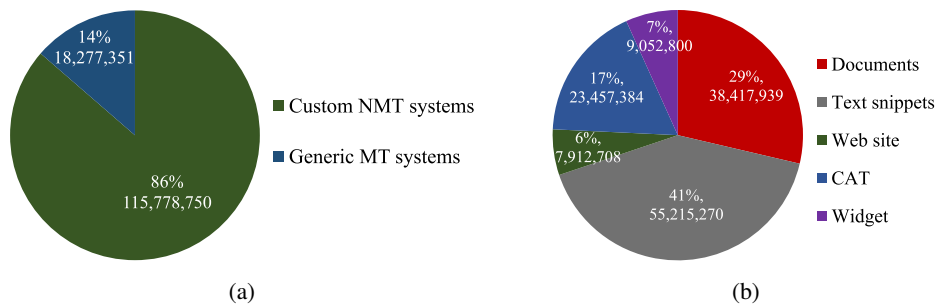


Figure 3: Total number of words translated by the EU Council Presidency Translator grouped by different interface types (left) and MT system types (right).

#### 4.1 Overall Usage Statistics

From the beginning of July, 2017 till August 26, 2020, the EU Council Presidency Translator has processed a total of 4.25 million translation requests from all the different translation interfaces. This amounts to a total of 12.16 million translated sentences or 134.06 million translated words.

As seen in Figure 3a, custom NMT systems that have been developed for each EU Council Presidency have translated 115.8 million words or 86% of the total translation volume. Generic systems that are provided by eTranslation and for the German Presidency also by DeepL have translated 18.3 million words, which amount to 14% of the total translation volume. The proportion of generic systems is slowly increasing since the introduction of the widget for EU Council Presidency websites during the German EU Council Presidency (see Figure 4).

Figure 3b shows that the most used translation interface types are text snippet translation (amounting to 41% of all translated words), formatting-rich document translation (amounting to 29% of all translated words), and CAT tools (amounting to 17% of all translated words). However, note that the widget was introduced only for the German EU Council Presidency. If we look at the overall statistics from July and August of 2020 (See Figure 5 for absolute word counts and Figure 6 for relative proportions), we see that the widget has processed 30% and 34% of all translated words in July and August respectively. We expect it to become the most used translation interface going forward. The website of the German EU Council Presidency<sup>9</sup> provides human-curated content in three languages - German, English, and French. Information in all other official EU languages is provided through the MT widget. The statistics (see Fig-

<sup>9</sup><https://eu2020.eu>

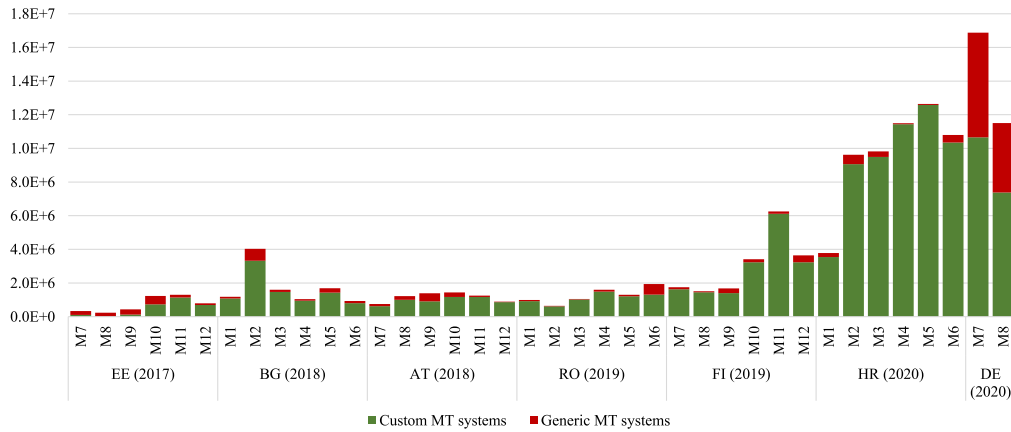


Figure 4: Translated words per month using custom NMT systems and general MT systems (ISO 3166 country codes identify each Presidency)

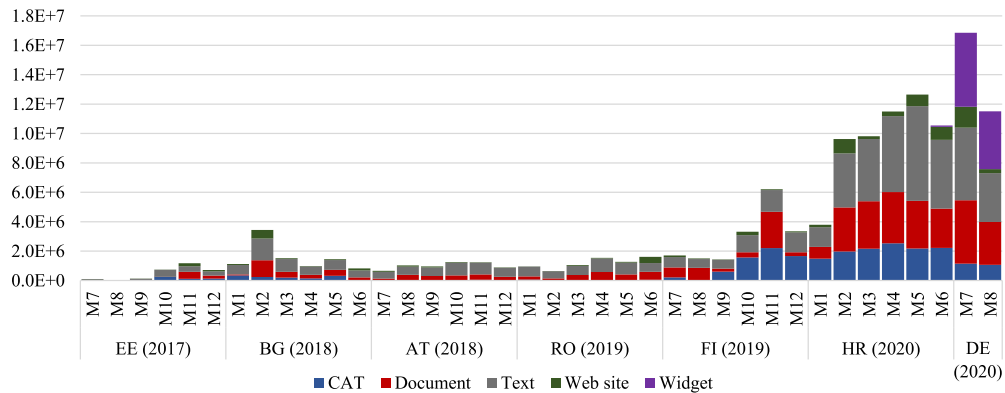


Figure 5: Translated words per month for different interface types for all MT systems of the EU Council Presidency Translator (ISO 3166 country codes identify each Presidency)

ure 7) show that EU citizens use this functionality to acquire content in their native languages, which means that there is a crucial need for EU Council Presidencies to provide content in all official languages of the European Union.

Figure 5 also shows that the EU Council Presidency Translator’s usage has increased significantly over the last three presidencies (Finnish, Croatian, and German). When the EU Council Presidency Translator was introduced during the Estonian Presidency, it translated an average of 0.7 million words in a month. During the Bulgarian Presidency, the usage increased to 1.7 million words per month. Then, during the Austrian and Romanian presidencies, the usage dropped to 1.2 to 1.3 million words per month respectively. During the Finnish and Croatian presidencies, the usage increased to an average of 3.0 and 9.7 million words per month. Finally, the German EU Council Presidency during the first two months averages at 14.2 million words translated per month.

For the Romanian presidency, the explanation of a lower translation volume is that there was a funding gap between the first and second projects. This meant that the custom systems for the Romanian EU Council Presidency were available with a three-month delay and dissemination activities were carried out only in the second half of the Presidency. This consequently



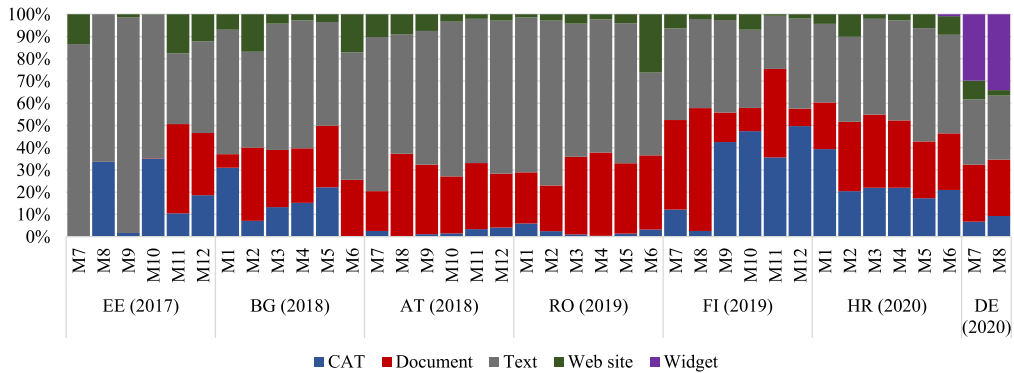


Figure 6: Proportion of translated words per month for different interface types for all MT systems of the EU Council Presidency Translator (ISO 3166 country codes identify each Presidency).

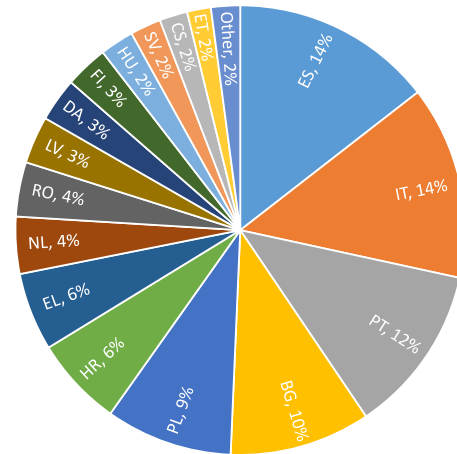


Figure 7: Target languages used through the translation widget that is integrated in the website of the German EU Council Presidency.

resulted in a lower activity by public administration translators from Romania. However, as country-specific statistics (see Section 4.2) show, activity increased at the end of Romania’s Presidency.

#### 4.2 Country-Specific Usage Statistics

An aspect of the EU Council Presidency Translator that we are particularly interested in analyzing is how the EU Council Presidency Translator has been adopted in the different EU Council presidencies. For this, we analyze the statistics of the custom MT systems that have been developed for each individual Presidency. The lists of language pairs for each particular Presidency are listed in Table 2.

Figure 8 depicts the statistics (in terms of the proportion of translated words per month) of the custom MT systems. It is evident that during the Estonian, Bulgarian, Finnish, and Croatian presidencies the most used MT systems were the custom MT systems of those presidencies. However, during the Austrian and Romanian presidencies Bulgarian and Estonian Presidency

Presidency	Translation directions
Estonian	ET↔EN
Bulgarian	BG↔EN
Austrian	DE↔EN
Romanian	RO↔EN
Finnish	FI↔EN, FI↔SV, and FI↔ET
Croatian	HR↔EN
German	DE↔EN, DE↔ES, DE↔FR, DE↔IT, and DE↔PL

Table 2: Translation directions for which custom NMT systems were developed for each EU Council Presidency.

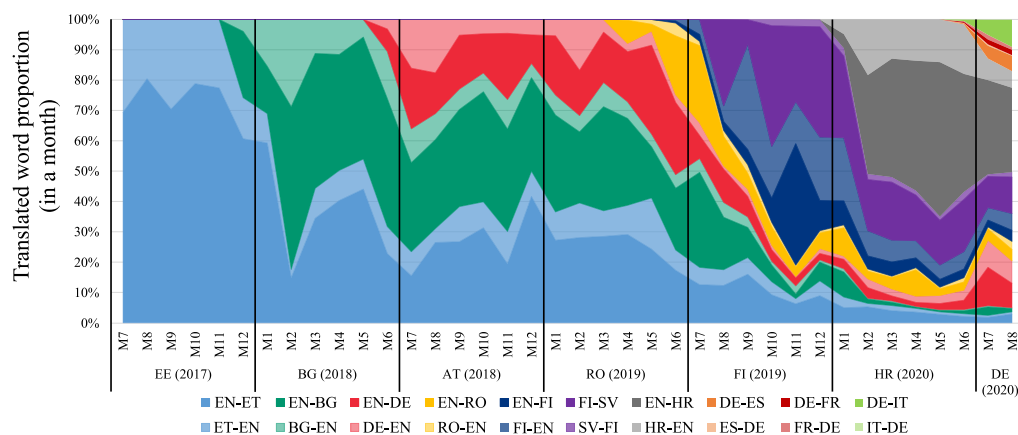


Figure 8: Proportion of translated words per month for different custom NMT systems (ISO 3166 country codes identify each Presidency)

translators continued to use the systems more intensively. For the German EU Council Presidency, it is yet too early to tell, which will be the most used MT systems. It is also interesting to note that since Finland has two official languages, the most used MT system during the Finnish EU Council Presidency was the one translating from Finnish into Swedish.

To better understand the levels of adoption of the EU Council Presidency Translator during each Presidency, we further analyze language pairs of each Presidency individually and for the time frame of each Presidency. We do this because the public administration translators of each particular Presidency continue using the EU Council Presidency Translator also after the presidencies conclude.

Figures 9 and 10 depict the usage of custom NMT systems of each individual Presidency within the Presidency’s time frame in absolute and relative numbers respectively. The statistics show that the EU Council Presidency Translator’s CAT tool plugin was used by public administration translators of Estonian, Austrian, Romanian, And German EU Council presidencies. However, the small absolute numbers show that the public administration translators from Austria did not use the EU Council Presidency Translator effectively and the Romanian translators (as explained above) started using the system only close to the conclusion of their presidency. That being said, we see that public administration translators from Romania have started using the EU Council Presidency Translator closer to the conclusion of the Presidency and our statistics show that translators continue benefiting from the EU Council Presidency Translator also

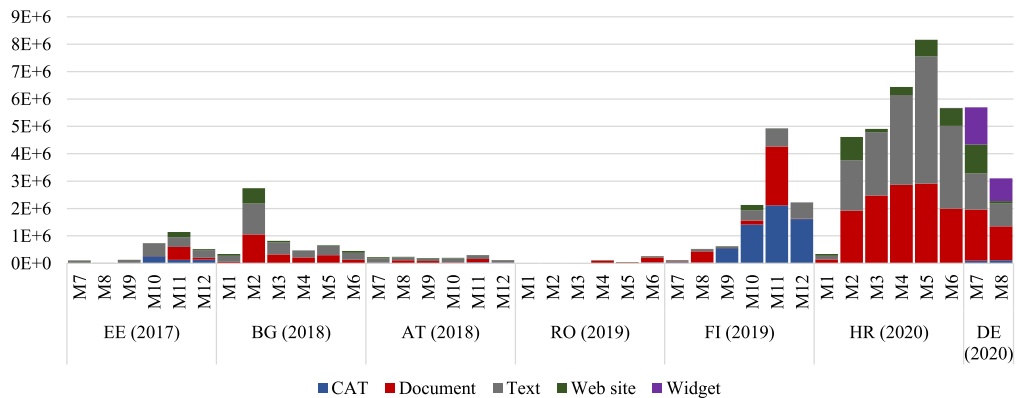


Figure 9: Translated words per month for different interface types for only the custom MT systems of each EU Council Presidency (ISO 3166 country codes identify each Presidency)

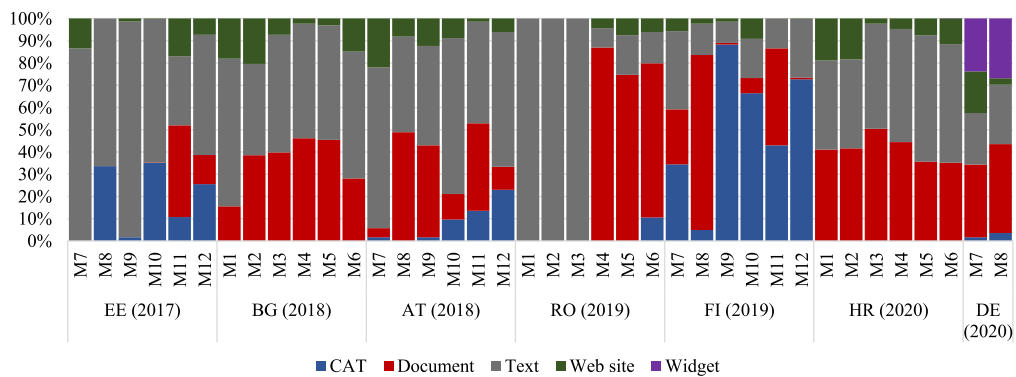


Figure 10: Proportion of translated words per month for different interface types for only the custom MT systems of each EU Council Presidency (ISO 3166 country codes identify each Presidency)

long after the Romanian EU Council Presidency.

Our statistics show that public administration translators in Finland are benefiting from the EU Council Presidency Translator the most. During the Finnish EU Council Presidency, CAT tool requests amount to a total of 55% of all translated words (10.5 million words in total) using the custom NMT systems of the Finnish EU Council Presidency.

Although public administration translators from Bulgaria and Croatia did not utilize CAT tool interfaces, absolute statistics show that the custom systems have been used intensively using other interface types (text snippet translation and document translation particularly). Even more, the custom NMT systems of the Croatian EU Council Presidency are the most used NMT systems to date accounting for a total of 31% of all translated words. This shows that although there are different translation practices established in different countries, the EU Council Presidency Translator's functionality can cater to every Presidency.

## 5 Conclusions

In the paper, we presented the EU Council Presidency Translator, a secure cloud-based solution that integrates MT systems from different MT providers and implements a wide spectrum of

interfaces for end-users (i.e., a web-based translation workspace for text, document, and website translation, an online CAT tool for non-professional translators, an SDL Trados Studio plugin for professional translators, and a website translation widget that enables access to the official website of the German EU Council Presidency in all official languages of the European Union). We discussed its mission to assist EU Council Presidencies by allowing delegates and visitors of events of EU Council Presidencies as well as EU citizens to access information that is shared through the official websites of the EU Council Presidencies as well as by assisting translators (both professional and non-professional) of public administrations in their translation tasks.

Based on aggregated statistics of the usage of the EU Council Presidency Translator, we showed that our solution (having translated a total of 134.06 million words) has been a valuable asset to its users and is heavily utilized on daily bases (with well over 10 million words translated monthly for the last five months) through all types of interfaces. The statistics also allowed us to analyze how the EU Council Presidency Translator has been adopted in different countries. The results showed that Estonia utilized all available translation interfaces. In contrast, Bulgaria did not use CAT tool interfaces, nonetheless, it increased the monthly translated word count. Austria did not fully utilize the benefits of the EU Council Presidency Translator. Due to a funding gap, Romania did not have all the features available during the most active phase of its presidency, however, we see that its translators continue benefiting from the EU Council Presidency Translator even long after the conclusion of the Presidency. Finland showed to have the highest technological readiness level for translation automation. Yet, Croatia utilized the platform most heavily (by mostly translating documents and text snippets and not using the CAT tool plugin), and Germany, although at the beginning of its Presidency, shows to utilize all translation interfaces and reaches usage levels on par or better than Croatia.

We have shown that the EU Council Presidency Translator has been successful in pursuing its mission, and we believe that it will serve many EU Council Presidencies in the future.

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