

# MT post-editing: How to shed light on the "unknown task" Experiences made at SAP

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## Abstract

This paper describes a project currently under way at SAP dealing with the task of post-editing MT output. As a concrete result of the project, a standard post-editing guide to be used by translator end users is currently being created. The purpose of this post-editing guide is not only to train and support translators in the daily work with MT but also to make the post-editing task more accessible to them, thus encouraging an open-minded attitude towards translation technology. Furthermore the systematic error typology underlying the guide serves not only as a methodological framework for the research on post-editing but also as a diagnosis for necessary corrections and enhancements to be carried out in the corresponding MT systems used.

In the context of the project description, the related research in the field of automated translation processes as well as the experiences made with MT at SAP are illustrated.

## 1 Introduction

### 1.1 Machine Translation at SAP

In order to cope with its large and constantly growing translation volumes faster and at lower costs, SAP is one of the few big industrial groups to have

invested in an increasing number of MT systems over the past years. Currently there are four MT systems that are deployed in the translation of SAP offline texts, i.e. texts extracted from SAP systems, converted into an "MT-suitable" format before machine translation, and re-imported into the systems after the translation has been completed. These systems are:

- ❑ LOGOS (used for *English–French* and *English–Spanish*)
- ❑ PROMT (used for *English–Russian* and *English–Portuguese*)
- ❑ METAL (used for *German–English*)
- ❑ LOGOVISTA (used for *English–Japanese*)

Translation is done by external vendors and translation projects are coordinated by the department SAP Language Services (SLS) in cooperation with Multilingual Technology (MLT, in the case of LOGOS and METAL). However, the translation workflow varies from system to system, the LOGOS and the PROMT processes being very similar to each other and differing greatly from the METAL process. LOGOS and PROMT are used to translate SAP documentation material and training courses, whereas METAL and LOGOVISTA are used exclusively for the translation of "SAP notes" (standardized documents for troubleshooting and customer support). For the purposes of this study, only the major differences between the workflows connected with the four MT systems are described, and two system-specific processes are illustrated (PROMT and METAL).

PROMT has been productively deployed in the translation of SAP documentation and training courses since August 2000. The MT software is installed locally at SAP, and MT output is sent to external translation agencies for post-editing, one of them being the PROMT translation department itself. The following slide provides an overview of the PROMT translation workflow.

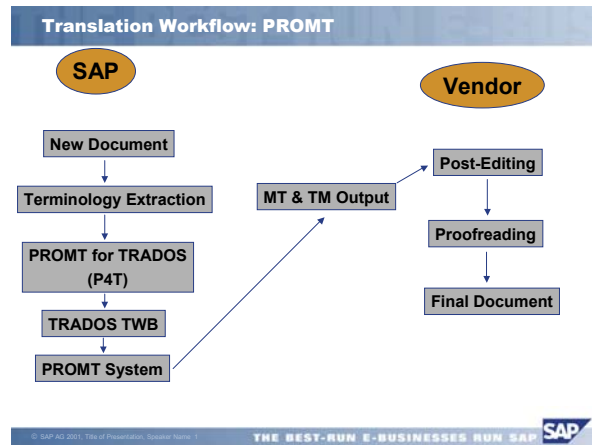


Figure 1 - Translation Workflow: PROMT

The METAL technology has been used in the translation of SAP notes since 1993/94. Initially Machine Translation and post-editing were done internally at SAP. In 1996, the translation of notes was outsourced to an external translation agency, which also meant a change in the translation workflow itself. The reasons for this are among other things the high and constantly growing translation volumes as well as the special requirements this text type implies. Since notes deal with very specific problems related to the use of SAP software and aim at enabling customers worldwide to access support on their own with the goal of reducing the number of incoming phone calls and customer messages at SAP's support departments, these need to be available in German, English and Japanese within very tight deadlines.

The biggest difference between the notes translation process and the PROMT / LOGOS workflow is that the MT software is installed at translation partners' sites rather than at SAP, and external translators generate their worklists themselves. Therefore, unlike the PROMT / LOGOS workflow, the whole translation workflow takes place externally. The following slide gives an overview of the METAL translation process.

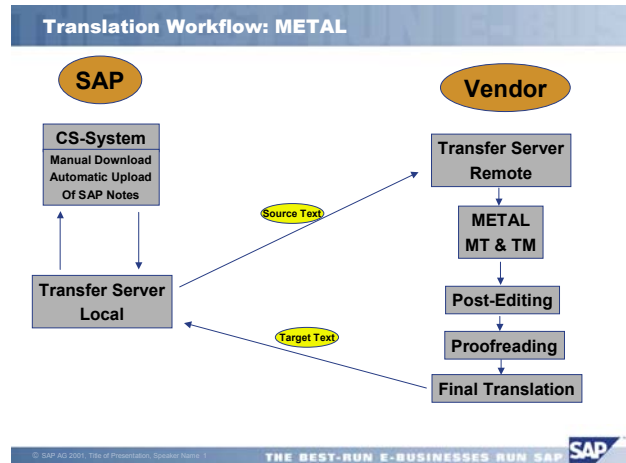


Figure 2 - Translation Workflow: METAL

In every translation project, post-editing the raw MT output is perhaps the most important stage in the process, since the quality expected from the final translations (after post-editing) must in principle meet the same high requirements as that of any human translation.

However, despite the various experiences gained in this field at SAP, approaches to examine post-editing as a linguistic task and to provide common guidelines for post-editors have remained rather insular. This is the motivation behind SLS's increasing efforts.

## 1.2 Post-editing: Defining the “Unknown Task”

Translation is not only a creative process but also implies some routine and tedious work. And that is where MT systems come in. Machine Translation cannot replace human translation, at least not in the foreseeable future. Nevertheless, it can make a translator's work easier and more efficient by facilitating many tedious tasks such as lexical queries and ensuring terminological consistency. Secondly, MT can make drafting a lot easier for a translator since the MT system already provides a textual framework to "polish up," provided that the relevant terminology is sufficiently coded in the system dictionaries.

This "polishing" of machine-translated texts, generally referred to as "post-editing," is required in almost every instance where MT is used. And yet, post-editing is still a largely unknown task, largely neglected by research in linguistics and MT studies, so that the borderlines between post-

editing and proofreading often appear rather blurry.

### 1.3 Objective of the Study

The objective of this study is twofold. Firstly, it sets out to define post-editing as a linguistic task in its own right, similar to translating, yet not quite the same and not identical to proofreading either. Furthermore, the different steps into which the post-editing task can be broken down are described in the light of the experiences gained in the daily translation business at SAP.

Secondly, a general typology of MT errors is presented. This classification can be used as a standard benchmark for post-editing MT output, regardless, in principle, of language pair, MT system, or text type. This common typology was made possible by the observations that not only the requirements relevant for post-editing are largely language and system-independent, and that the errors detected in raw MT output often bear great resemblance to each other, even between language pairs as different as English-Portuguese and English-Japanese.

## 2 Translation v. Post-editing v. Proofreading

As mentioned above, the task of “polishing up” the raw MT output to an acceptable, end-user friendly text quality is commonly referred to as *post-editing*, and this terminological convention should be maintained in MT research. The scope of the post-editing task depends on the quality of the output, the text type and the purpose of the target text with regard to its recipient.

In most cases, the post-editor is also a translator. In many cases, this can lead to a situation in which the translator will expect the same quality from a machine-translated text as from a text translated by him/herself. This expectation, however, can barely be fulfilled and only adds to the widespread misperceptions about machine translation. Since MT systems have not been designed for translating Shakespeare just as industrial robots have not been designed for dancing Swan Lake, (Arnold et al., 1994), the post-editor's task clearly goes beyond merely “checking” the MT output. This is what every post-editor has to keep in mind before ap-

proaching the job, and this is why post-editing implies a positive and open-minded attitude on the part of the translator towards MT technology.

Since machine-translated texts are linguistically different from texts translated by a human translator, post-editing also requires certain experience and skills in recognizing typical “machine” errors. These skills can usually be applied only after some analysis of output texts. Nevertheless, mistakes produced by a machine translation system are normally typological and recurring. Once the post-editor is able to identify these mistakes, his work will be facilitated. Still, many MT mistakes do not immediately catch the post-editor's eye since the sentence appears “comprehensible” at first glance. Therefore it is absolutely crucial for post-editing that every machine-translated sentence be thoroughly checked against the source text in order to identify “tricky” MT mistakes, especially those resulting from wrongly analyzed syntactic structures or from defects in the input text.

*Post-editing* must also be distinguished from the task of *proofreading*, which can be defined as the last step in the post-editing process upon completion of the target text. The aim of proofreading is to make sure that the target text renders the content of the source text, preserves coherence, and is idiomatic in the target language. The text reviser does not necessarily have to be the translator or post-editor of the text him/herself. In many cases, it is even recommended to give post-editing tasks to one person and proofreading tasks to another.

As a result, post-editing must be seen as a linguistic task in its own right and the cognitive processes involved in this task are neither identical to translation per se nor to proofreading. One of the reasons for this is related to the nature of the post-editing process itself, as this process includes three different texts, the source text, the machine translation and the translator's own target text, as Krings points out (Krings, 2001).

Another task of any translator using MT, closely related to post-editing, is to collect recurring MT errors and to report these to project coordinators or (ideally) to MT system developers directly, with a suggestion on how to correct the system's dictionaries and linguistic components. This task is crucial because of the necessity to ensure the higher quality of MT output.

### **3 Creating a Common Post-editing Guide for SAP Translation Projects Involving MT**

#### **3.1 Background of the Project**

Through the exchange of experiences among MT users at SLS, the need for joint research efforts in the field of post-editing and for a resulting common post-editing guide that all translators could use became clear very fast. The purpose of this guide is not only to give translators instructions about the "unknown" task of post-editing but also to make them familiar with its linguistic implications and hence further an open-minded attitude towards the work with MT systems. Furthermore the use of a post-editing guide is also intended to increase translators' efficiency since "familiarity with the pattern of errors produced by a particular MT system is an important factor in reducing post-editing time" (Arnold et al., 1994). At the same time, the post-editing guide is designed to train post-editors in this task.

After analyzing samples of raw MT output for texts which were translated using different MT systems, the SLS MT user group discovered that the errors found had a lot in common. Some errors occurred in all language pairs, irrespective of the system used.

#### **3.2 Definition and Structure of Post-editing as a Linguistic Process**

After gathering post-editing experiences and "real life" examples from all translation projects at SAP in which MT is used, one of the first project steps was to define post-editing as a linguistic task and to break the process down into various stages. In this context, the following steps were pinned down:

1. General output check
2. Editing the MT output
3. Proofreading

The first stage of the post-editing process consists of very general output checks to identify the most important defects in the target language such

as incompleteness or words not translated by the MT system for whichever reason (terminology not coded in MT system, defects in the linguistic components of the system, etc.). As a result of this step, a list of unknown words can be compiled to ensure regular dictionary and system maintenance.

The editing stage is the main task in the process and focuses on "repairing" the machine-translated text on a sentence-by-sentence basis. Various categories of translation errors can arise at this stage, and the task itself requires a lot of attention to semantic errors as well as a great deal of understanding for typical "machine errors".

As mentioned above, a final proofreading step follows after the target text as such has been completed. The main objective of this step in the process is to make sure the translation does not contain any semantic errors and is idiomatic and stylistically adequate in the target language.

### **4 A Typology of MT Errors as a Result of Joint Research:**

After gathering examples of errors typically corrected by post-editors in the various MT projects, the need to establish a special error typology for post-editing quickly became apparent.

This typology has three purposes: Firstly, it is designed to make post-editors aware of the main types of errors that can occur when using MT and is aimed to help train them in this kind of task more efficiently. The second objective of the typology is to provide a systematic framework for continued research in the field of post-editing. This framework is filled with "real life" examples of errors post-editors came across in the various projects.

Finally, the distribution of errors in the typology provides an overview of the necessary corrections and enhancements to be carried out in the corresponding MT system, especially its MT dictionaries.

The error typology is presented in summarized form in the following paragraph and will be illustrated with examples from the different MT projects run at SAP.

## Error classification

### 1. *Lexical errors*

- 1.1 General vocabulary
- 1.1.1 Function words
- 1.1.2 Other categories
- 1.2 Terminology
- 1.3 Homographs / polysemic words
- 1.4 Idioms

### 2. *Syntactic errors*

- 2.1 Sentence / clause analysis
- 2.2 Syntagmatic structures
- 2.3 Word order

### 3. *Grammatical mistakes*

- 3.1 Tense
- 3.2 Number
- 3.3 Active / passive voice

### 4. *Errors due to defective input text*

## Illustrations and Examples

### *Lexical errors:*

On the lexical level, there is a basic distinction between general vocabulary and special terminology. In the field of general vocabulary itself, errors are classified according to the lexical categories they affect (function words such as articles, pronouns, conjunctions, etc. v. "main" categories such as verbs, nouns, adjectives, etc.).

### *General vocabulary:*

Within general vocabulary, these errors are often due to insufficient dictionary coding. An example of these is the following typical error reported from the LOGOS English-French system:

In the examples given in the following paragraphs, the source text is indicated in the first line; ☒ stands for the erroneous and ☑ for the correct translation.

"So-called" is often used in English to introduce new or technical terms.

the so-called reporting functions  
☒ soi-disant  
☑ xxx les "fonctions de reporting"

In this instance, the appropriate remedy for the MT error would consist of suppressing any translation of "so-called" and rendering the corresponding term between inverted commas.

However, other lexical errors are not quite as easy to eliminate as these can be due to insufficiencies in the translation rules of the MT system. An example of this type of translation error is the wrong translation of the word "following" whenever it is not followed by a noun.

### *Terminology:*

Quite obviously, errors regarding special terminology are particularly important for translation projects at SAP. Again, an illustrative example in this context is delivered by LOGOS (English-French):

In SAP terminology there is usually a 1-to-1 correspondence between source language and target language term. In some applications, however, two different possible target translations have to be suggested for one source term. The appropriate translation must therefore be derived from the context.

name  
☒ nom (of employee)  
☑ libellé (posting text)  
  
transaction  
☒ transaction (system transaction)  
☑ opération (financial transaction)

### *Homographs / polysemic words:*

Another important problem complex is the resolution of ambiguities; for example, between verb and noun forms, as with the words "uses," "report," and "starts", which are incorrectly analyzed in the following sentences. Interestingly enough, this phenomenon occurs with both the LOGOS (English-

French) and the PROMT (English-Portuguese) systems:

#### LOGOS (EN-FR)

The system **uses** the data xxx  
 Les utilisations du système les données xxx  
 Le système utilise les données xxx

Report XXX is used to run the statistics.  
 Signalez XXX est utilisé effectuer la statistique.  
 Le programme XXX est utilisé pour effectuer les statistiques.

Sichern Sie die gemachte Hinweisänderung als übersetzungsrelevant.

- Save the made change of note as translation-relevant.
- Save the change made to the note as translation-relevant.

Übersetzen Sie den Hinweis in die entsprechend mögliche Zielsprache.

- Translate the note into the correspondingly possible target language.
- Translate the note into the respective target language.

#### PROMT (EN-PT):

When you click on this button the program **starts** automatically  
 Quando se clica neste botão os inícios de programa automaticamente.  
 Quando se clica neste botão, o programa começa automaticamente.

#### Idioms:

As MT systems generally tend to translate "too literally" by simply mapping structures from source language to target language, the pretranslation is often unidiomatic and sometimes requires thorough revision, as in the following examples from METAL (DE-EN):

beigefügte Programmkorrektur bewirkt, daß vorab geprüft wird...  
 the attached correction causes that the system checks...  
 the attached correction causes the system to check...

Bei der Erfassung des Hinweises wird die falsche Sprache gewählt.  
 With the note entry the incorrect language is selected.  
 When creating a note the incorrect language is selected.

#### Syntactic errors:

##### Sentence / clause analysis:

A syntactic error that could be observed with all MT systems deployed at SAP is, quite obviously, the wrong analysis of embedded sentences, often combined with multiple relative pronouns.

Likewise the correct use of commas has great influence on the resolution of syntactic structures, especially in temporal and conditional clauses.

An interesting example of this type of MT error is the following sentence. Due to the missing comma between the adverbial and the main clause, the whole sentence is interpreted as a temporal clause and therefore mistranslated into Japanese:

After a pause of approximately 10 minutes press the OK button.

☒ およそ 10 分の延音記号が問題がないボタンを押した後

#### Syntagmatic structures:

Another error that occurs quite frequently on the syntactic level is the mistranslation of participial clauses, as in the following example observed with the English-Portuguese version of PROMT:

The system calls up the relevant data using the corresponding reports.

- O sistema chama os dados relevantes que usam os relatórios correspondentes.
- O sistema chama os dados relevantes usando os relatórios correspondentes.

In this instance, the past participle of "use", "using", was rendered as a relative clause rather than a participial clause with adverbial meaning.

An important MT problem concerning the source language German is the wrong analysis of the subject and object of a sentence since German syntax does not have to (and often does not) follow the SPO schema. The ambiguities resulting from such phenomena constitute major pitfalls for the automated sentence analysis, as in the following illustrative example from METAL (DE-EN):

- Statistiken nach dem neuen Verfahren bekommen nur Tabellen, die in der Check-Phase zur Aktualisierung bestimmt wurden.
- Statistics after the new procedure only receive tables that were determined the check phase for the update.
  - Only tables that were determined in the check phase for the update receive statistics after the new procedure.

This type of MT problem can be prevented, or at least reduced, by avoiding the use of ambiguous German constructions with objects in the initial position of the sentence. Ideally, this could be implemented through the use of Controlled Language.

#### *Grammatical errors:*

One stereotypical MT mistake that can be observed in all of the MT systems used at SAP is the incorrect use of articles in the target language, especially between English and Romance languages due to functional differences in article usage. Similarly the treatment of pronouns constitutes a source of frequent errors, particularly between English (or Germanic languages in general) and Romance languages. The reason for this is the general non-existence of neutral pronouns in the latter, as in the following example from the language pair EN-PT:

- It is a special characteristic of the SAP R/3 System.
- Ele é uma característica especial do Sistema R/3 da SAP.
  - Esta é uma característica especial do Sistema R/3 da SAP.

Another interesting mistake common to the various language pairs is the incorrect rendition of English phrasal verbs, as illustrated in the following example observed with LOGOS (English-French).

- to carry out
- porter dehors
  - exécuter

## 5. Conclusion

We hope to have shown with this paper that SAP has recognized the importance of examining and defining post-editing as a linguistic task and of creating a dedicated post-editing guide in the light of three objectives.

Firstly translators are to be made familiar with the work on MT output with a view to encouraging an open-minded and self-assured attitude towards the MT system. This becomes particularly important given the widespread reservations about the technology among translators as these often fear MT as a dehumanizing monster threatening their jobs. However, we are convinced that in fact the opposite is true and that MT is there to support translators and hence make their work easier, more efficient and, in the end, more rewarding.

The second objective pursued by the post-editing project is to train translators on this special task by providing them with special guidelines to follow in their daily work.

Thirdly, the error typology closely related to the post-editing guide can be seen as a “living document” designed to be constantly updated and supplemented with an increasing number of examples. The main purpose of this typology is then to provide a framework for necessary corrections and improvements to be carried out in the MT system.

## 6. Outlook for the Future

While the post-editing project currently under way at SAP is an attempt to optimize the back end of the machine translation process, great significance

is attached to the opposite approach at the moment. This approach focuses on making the input at the front end of the translation process more suitable for MT using Controlled Language. The fact that improvements in machine-translation quality by simplifying the linguistic input into the MT system has a direct influence on the post-editing processes is confirmed by Krings (Krings, 2001). The use of “MT friendlier” input texts would mean an improvement in the quality of the output that needs post-editing, thus reducing the scope of the work at the other end of the process.

Increasing efforts are currently being made at SAP to introduce Controlled Language for the various types of product-related documentation, which have to be translated into more than 20 languages within relatively tight deadlines.

## References

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