

Asistent

A Machine Translation System for Slovene, Serbian and Croatian

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Add text to be translated and specify the translation direction:

[English Example](#)[Slovene Example](#)[Croatian Example](#)[Serbian Example](#)[Translate](#)

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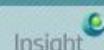
ASISTENT (or `assistant@en`) was developed to translate text between English and the morphological complex south Slavic languages: Slovene, Serbian and Croatian.

Select translation table option/approach:

- phrase based factored hierarchical
 direct translation pivot translation

Please choose the translation direction:

- English → Slovene Slovene → English
 English → Croatian Croatian → English
 English → Serbian Serbian → English
 Slovene → Croatian Croatian → Slovene
 Serbian → Slovene Slovene → Serbian
 Croatian → Serbian Serbian → Croatian



This resource has been funded by Grant No. SFI/12/RC/2289 - INSIGHT - National University of Ireland, Galway

<http://server1.nlp.insight-centre.org/asistent/>

META-NET Language White Paper Series (2012)

Machine Translation

Excellent support	Good support	Moderate support	Fragmentary support	Weak/no support
	<ul style="list-style-type: none">▪ English	<ul style="list-style-type: none">▪ French▪ Spanish	<ul style="list-style-type: none">▪ Catalan▪ Dutch▪ German▪ Hungarian▪ Italian▪ Polish▪ Romanian	<ul style="list-style-type: none">▪ Basque▪ Bulgarian▪ Croatian▪ Czech▪ Danish▪ Estonian▪ Finnish▪ Galician▪ Greek▪ Icelandic▪ Irish▪ Latvian▪ Lithuanian▪ Maltese▪ Norwegian (Bokmål, Nynorsk)▪ Portuguese▪ Serbian▪ Slovak▪ Slovene▪ Swedish▪ Welsh

What Do We Need?

Translation Toolkit:

Moses (text tokenisation, lower-casing)
Giza++ (word alignment)
KenLM (language model)

Parallel data

Europarl

DGT

OpenSubTitles

....

The screenshot shows the ASISTENT English-Slavic Translation System homepage. At the top, there's a navigation bar with links for Home, About, Team, API, and Other Projects. Below the navigation, a main heading reads "ASISTENT English-Slavic Translation System". A sub-section titled "Add text to be translated and specify the translation direction:" contains four buttons: English Example, Slovene Example, Croatian Example, and Serbian Example. To the right of this section is a text area for inputting text, with a "Translate" button at the bottom. Further down, there's a note: "This service is brought to you by <http://nlp.insight-centre.org/>". On the far right, there's a sidebar with information about the system's development and supported language pairs. At the very bottom, there are logos for Insight, NUI Galway, and SFI, along with a grant funding notice.

<http://server1.nlp.insight-centre.org/asistent/>

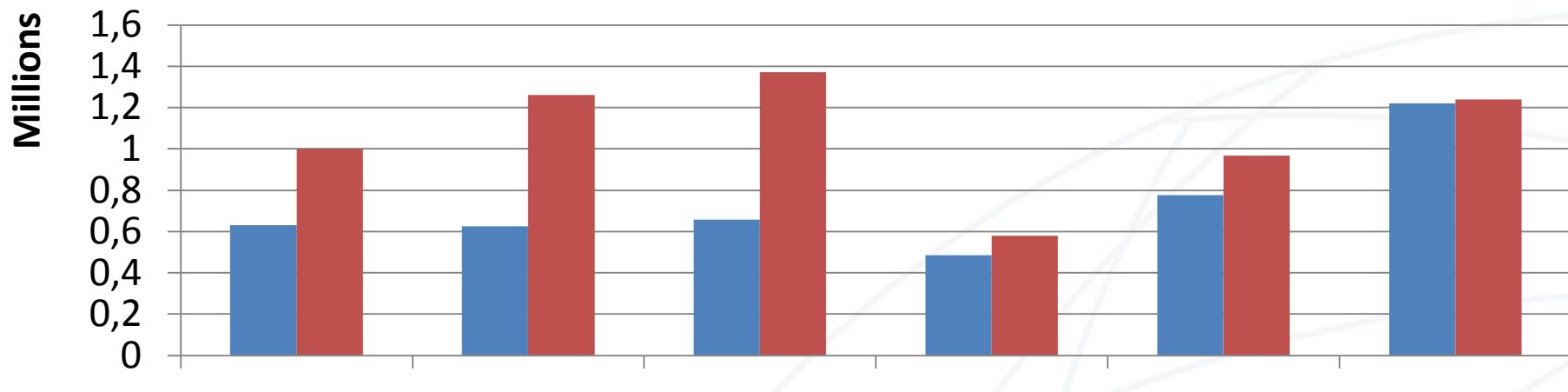
Parallel Corpora Used for Asistent



Name	Domain	En-SI	En-Hr	En-Sr	SI-Hr	SI-Sr	Hr-Sr
DGT	legal	1.8M	196K				
ECB	finance	79K					
EMEA	medical	253K					
Europarl	EP proceedings	599K					
Gnome	IT	998	5K	126	4K	600K	300K
hrenWaC	Web Corpus		86K				
JRC-Acquis	legal	29K	38K				
KDE	IT	58K		32K	85K	49k	33.2k
LangCourse	education			3K			
PHP	IT	1K					
OpenSubtitles	subtitles	10.1M	16.3M	20.5M	6.1M	13.3M	22.3M
SETimes	Web Corpus		198K	209K			
Tatoeba	education		777	633			200K
TED	education	13K	76K	1K			
Ubuntu	IT		8K		557	86K	51K

*<http://opus.lingfil.uu.se/index.php>

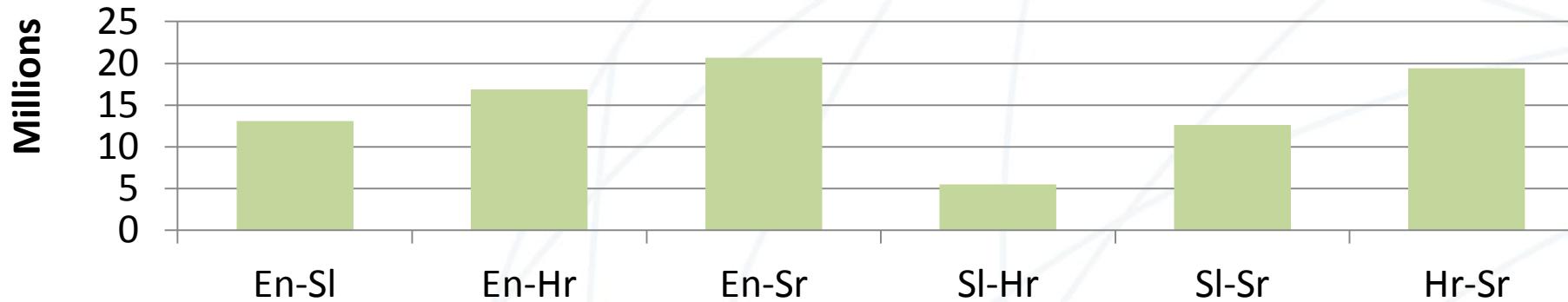
Concatenated Data for Asistent Training



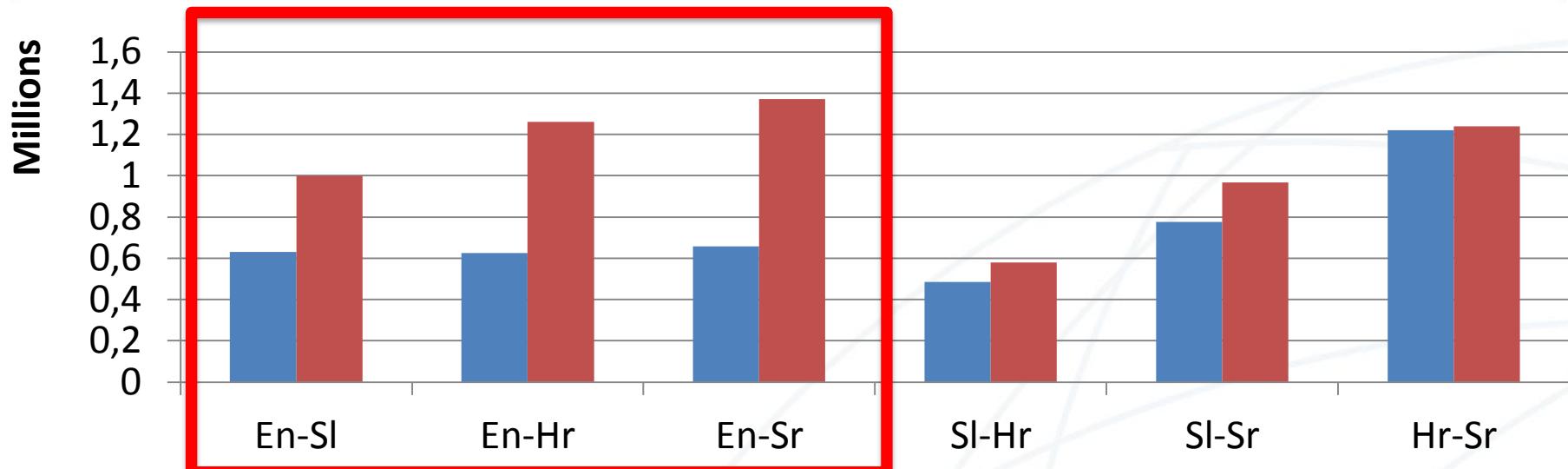
■ vocabulary L1

■ vocabulary L2

■ parallel sentences



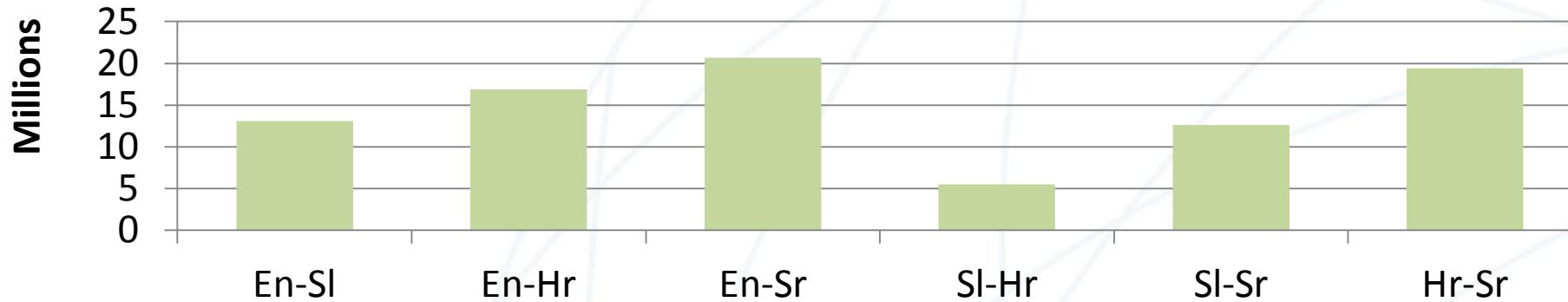
Concatenated Data for Asistent Training



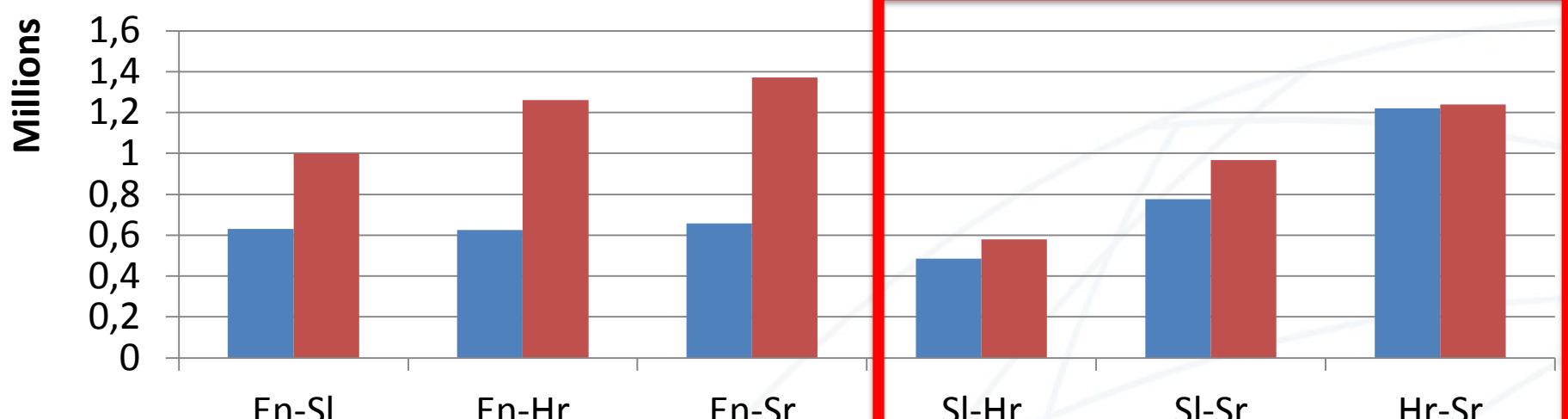
■ vocabulary L1

■ vocabulary L2

■ parallel sentences



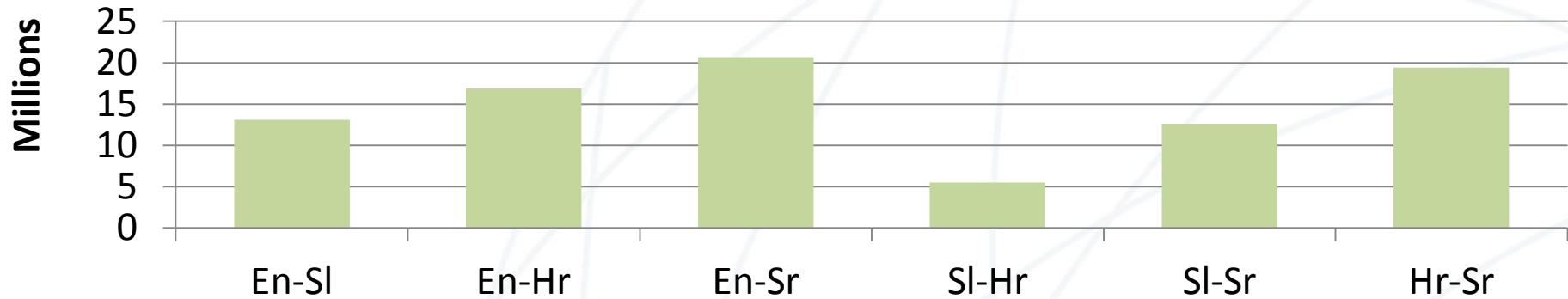
Concatenated Data for Asistent Training



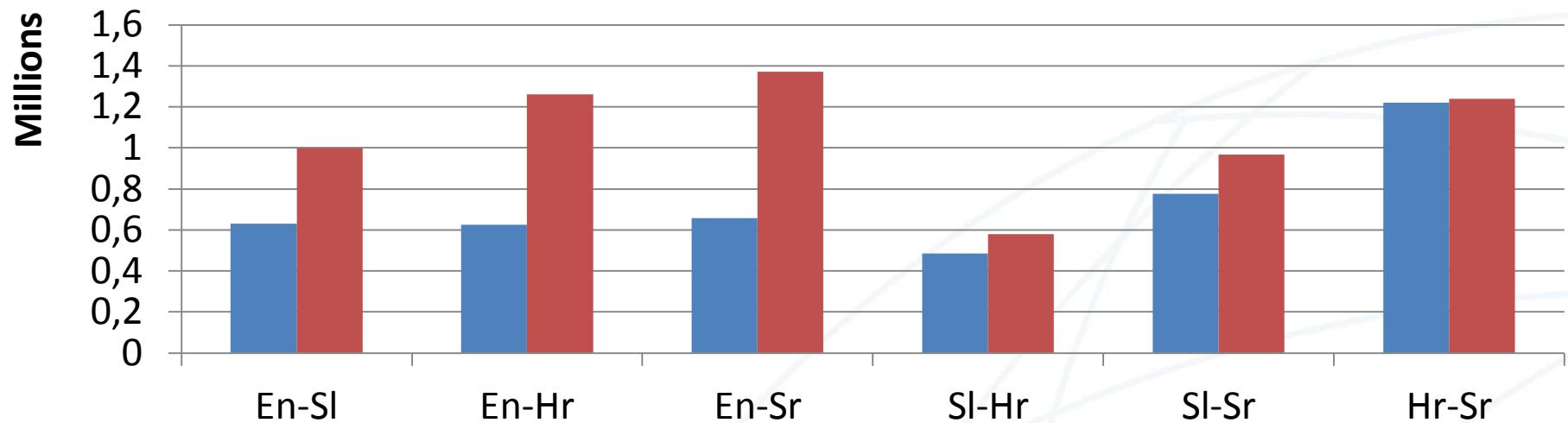
■ vocabulary L1

■ vocabulary L2

■ parallel sentences



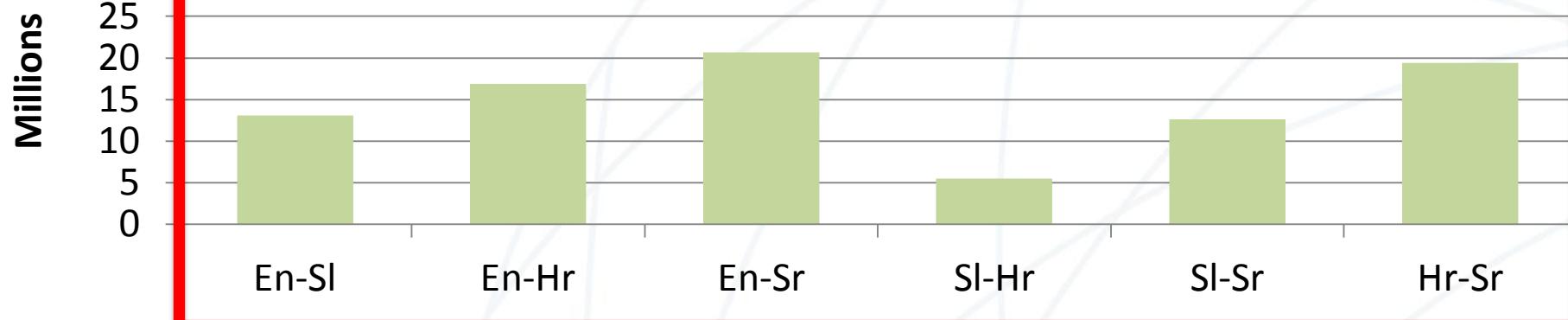
Concatenated Data for Asistent Training



■ vocabulary L1

■ vocabulary L2

■ parallel sentences



Data cleanup

- Falsely encoded special characters removed/fixed
- Cyrillic → Latin (Serbian)
- removing special symbols, as "#", "%" and "@"
- Slovak bi-text was removed from the Tatoeba corpus

Corpora filtering based on the sentence length proportions

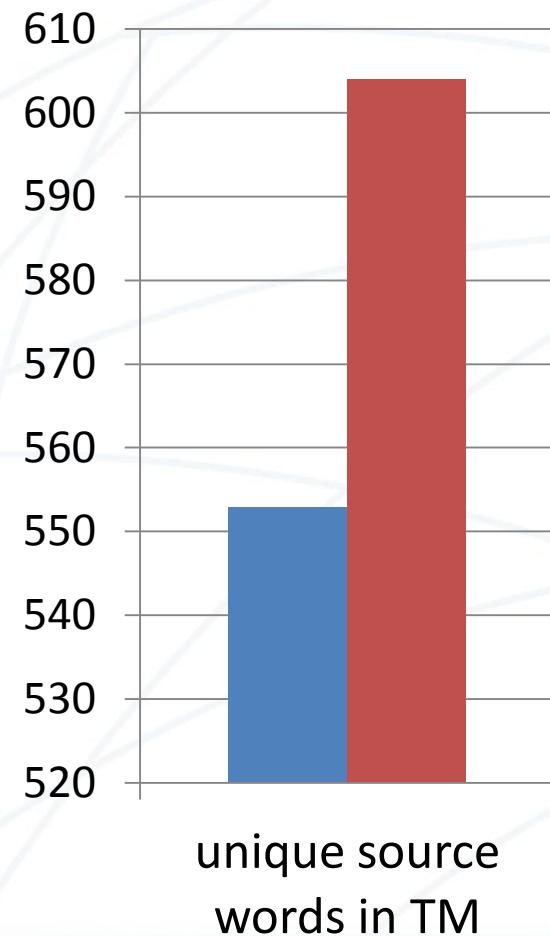
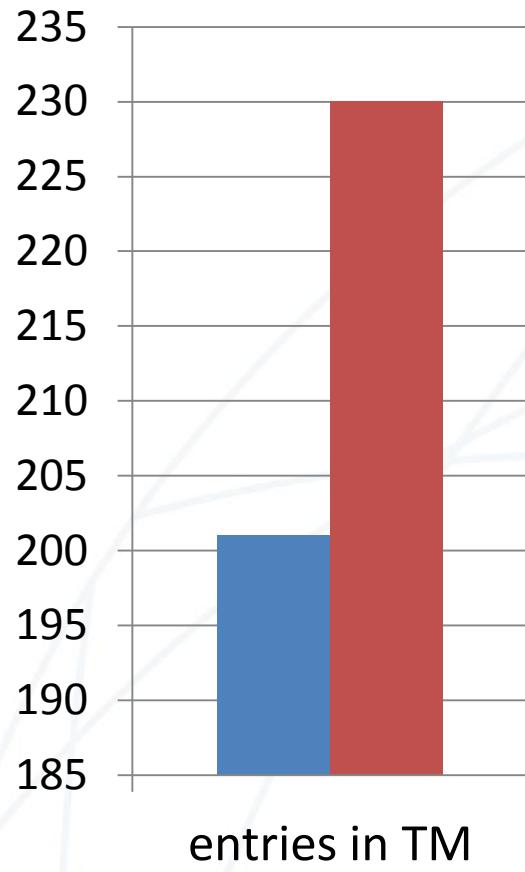
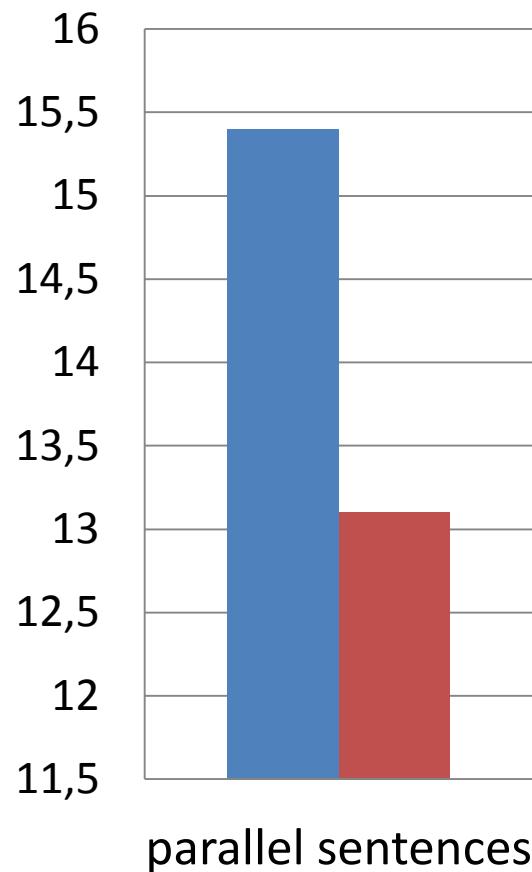
- too short and too long sentences were not included into the training set (average length +/- standard deviation)

Evaluation / Development set creation

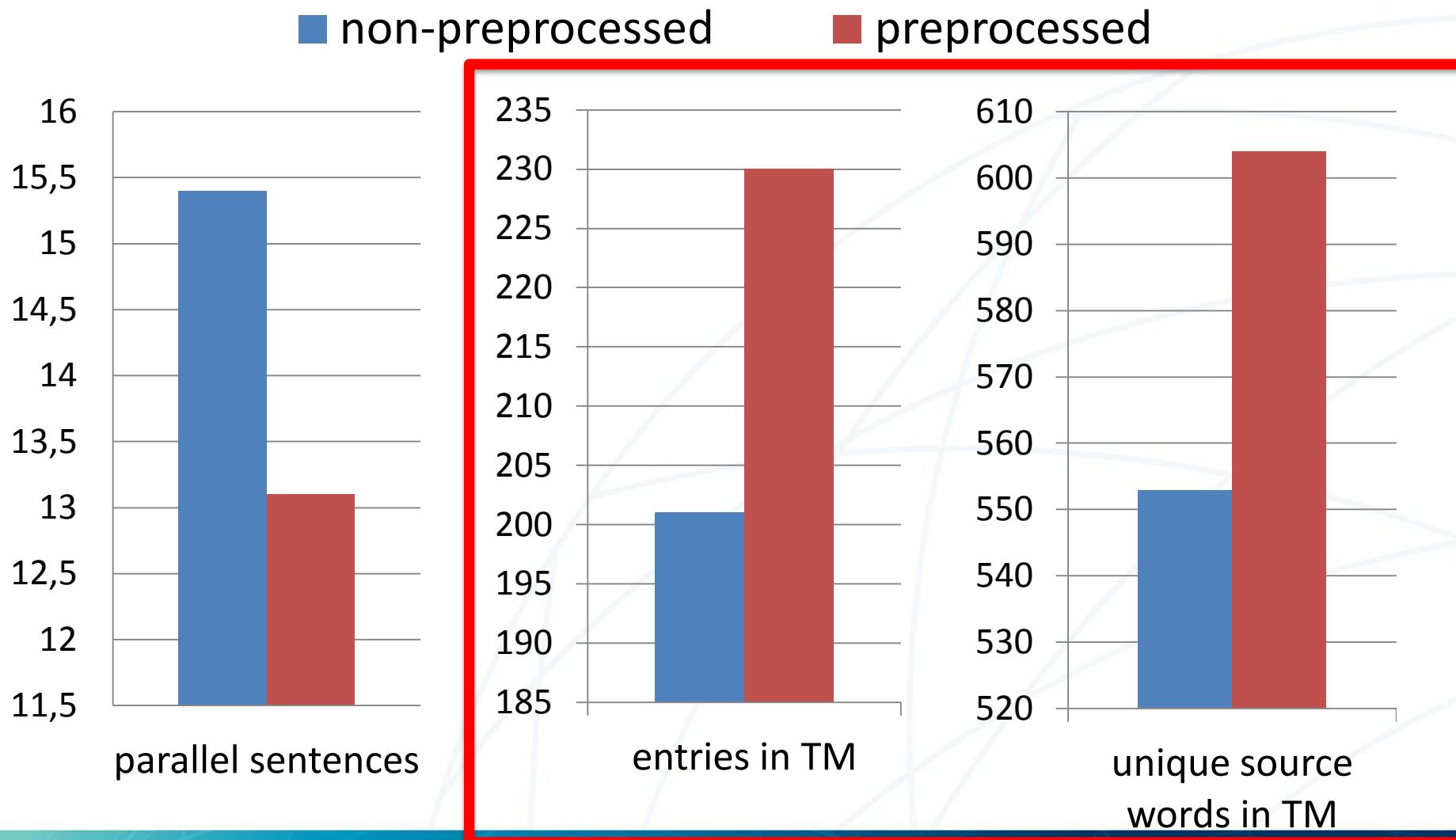
- avoiding too short/long sentences (10 and 40 words / 5 to 15 words)

Data Preparation (example English-Slovene)

■ non-preprocessed ■ preprocessed



Data Preparation (example English-Slovene)



Data Preparation

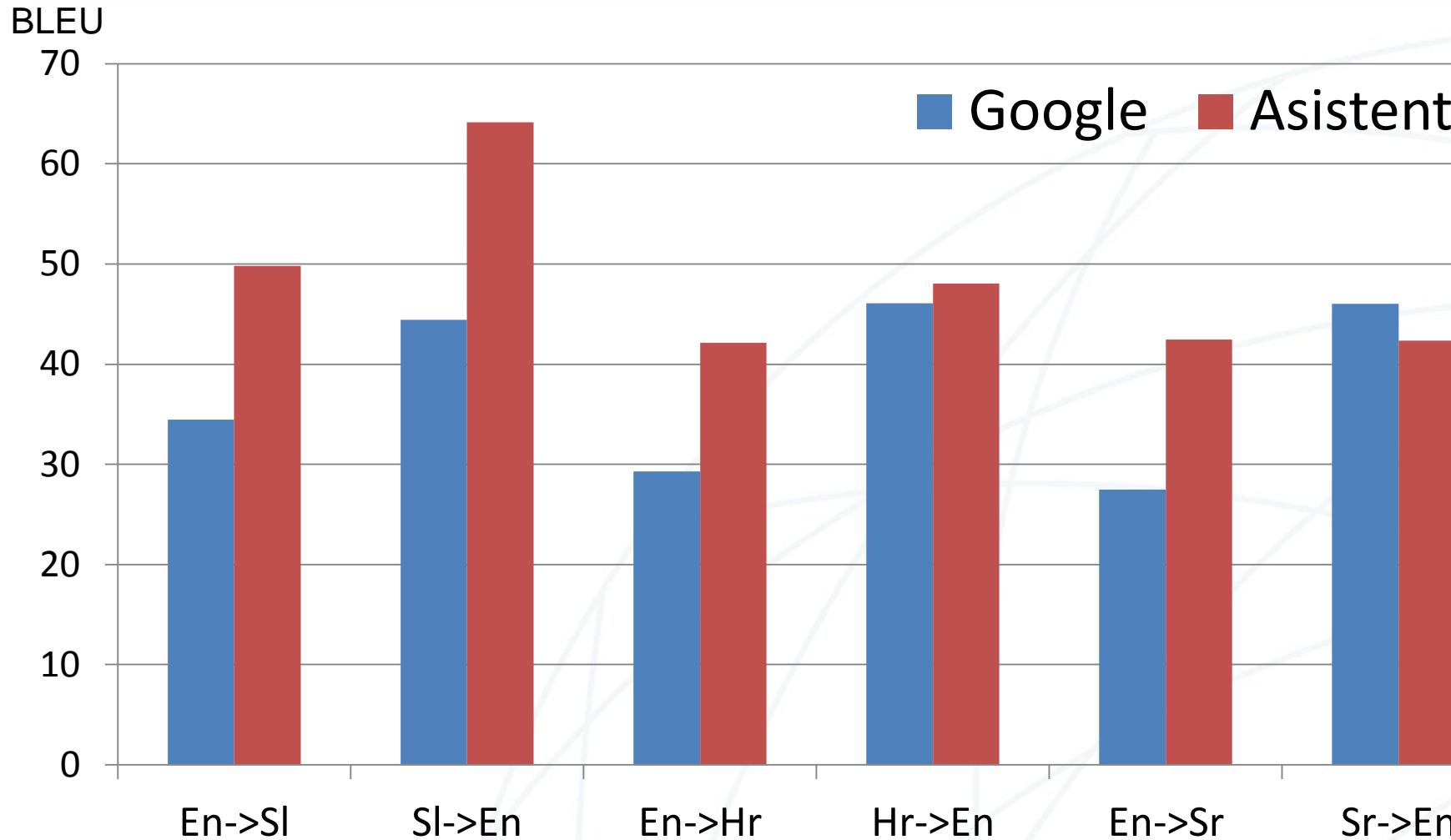
BLEU





Automatic Evaluation, In-Domain (English-Slavic)

Insight

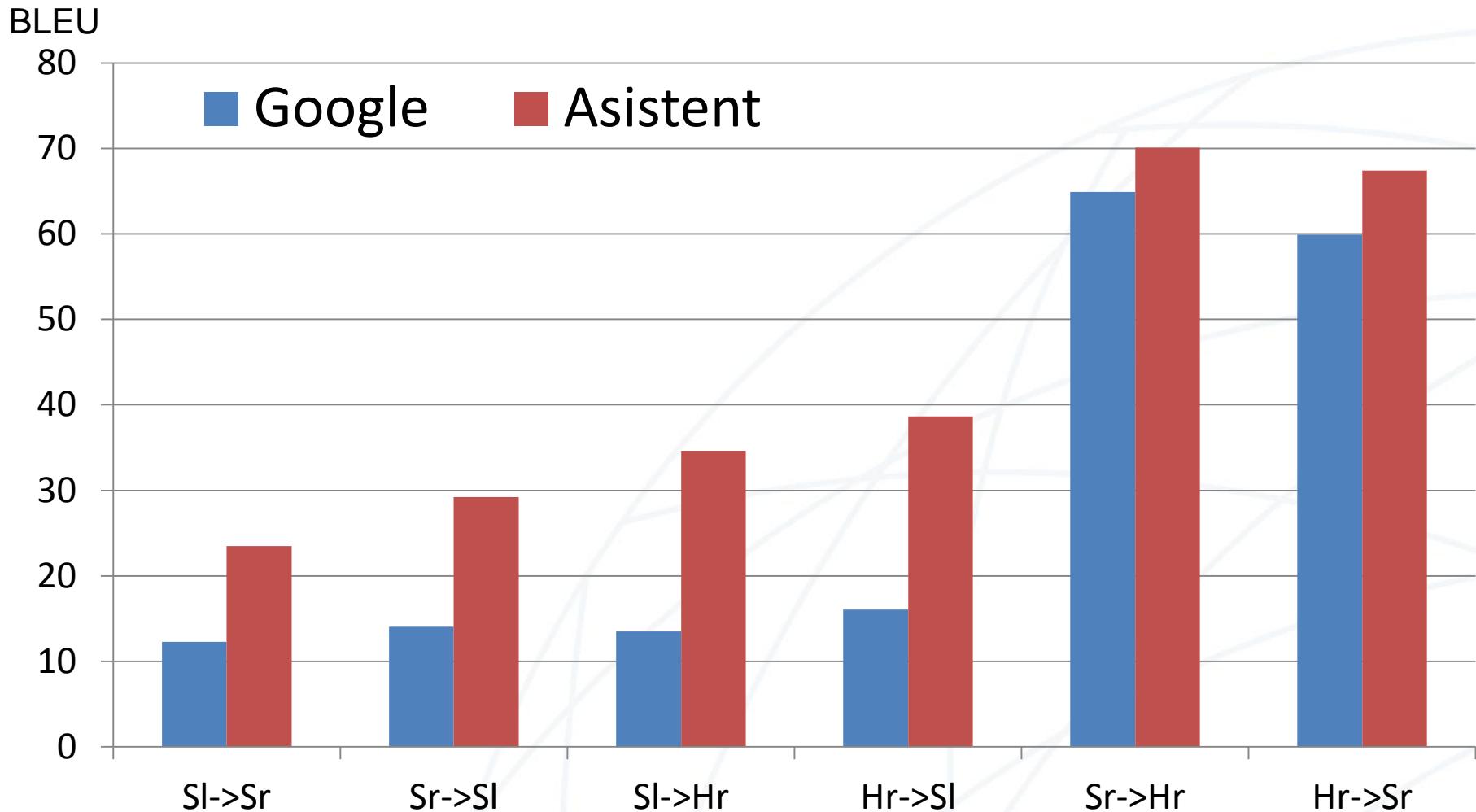


http://server1.nlp.insight-centre.org/asistent/data/asisten_evaluation_set.tar.gz



Automatic Evaluation, In-Domain (Slavic-Slavic)

Insight



http://server1.nlp.insight-centre.org/asistent/data/asisten_evaluation_set.tar.gz

Pivot Translation

... can enable a bridge between languages, when existing parallel corpora are under-resourced ...

Direct Translation:

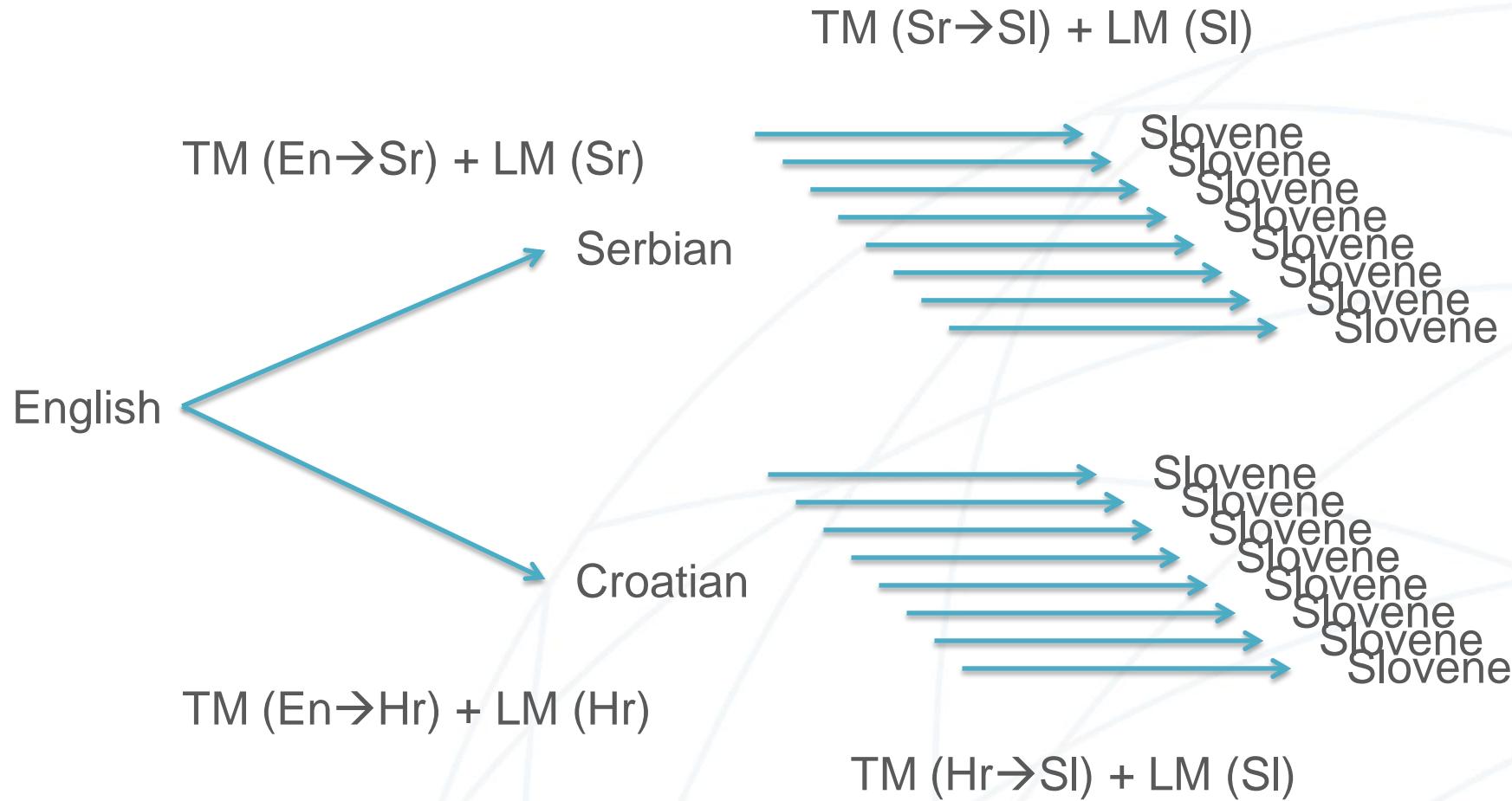
source language → target language

Pivot Translation:

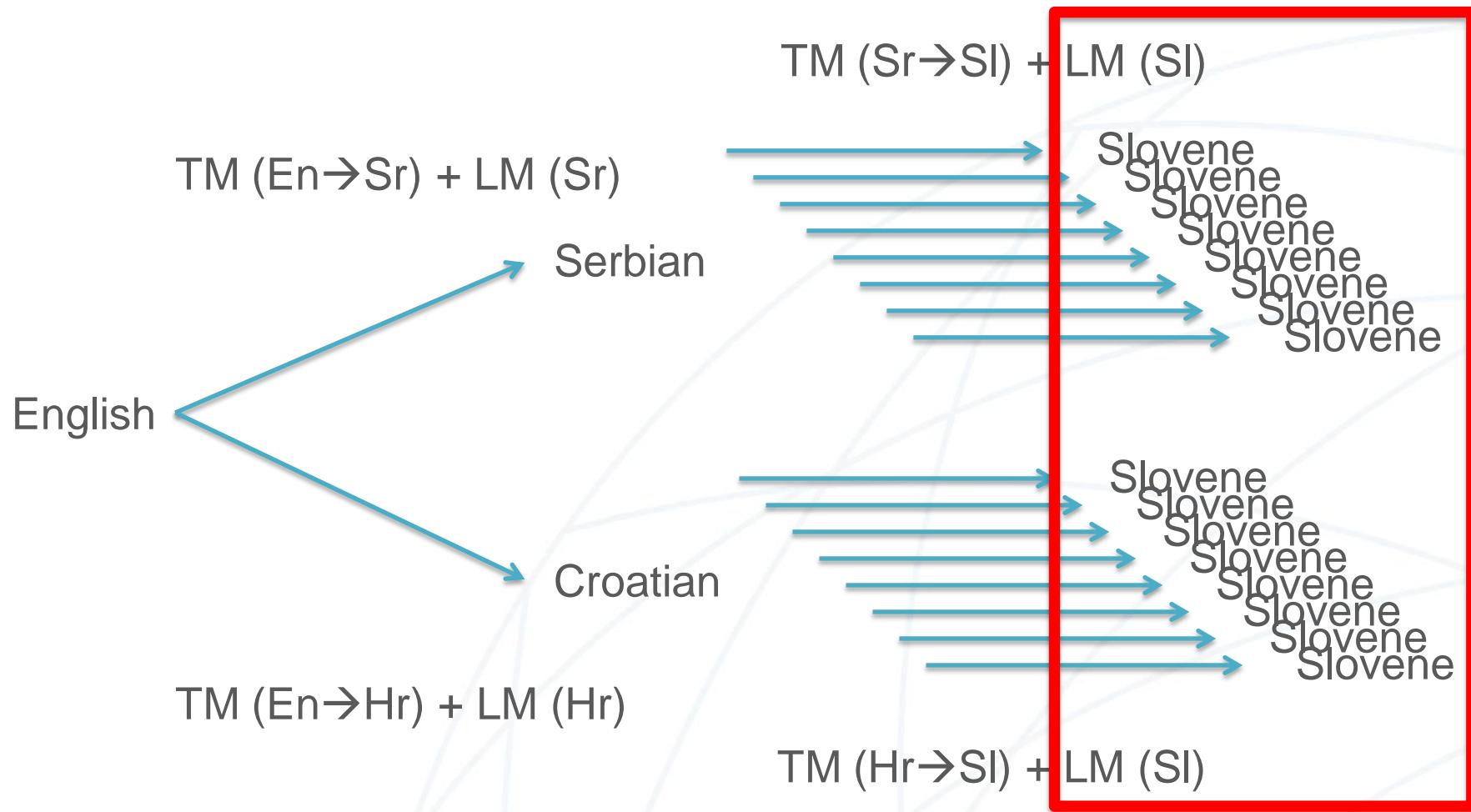
source language → pivot language → target language



Pivot Translation

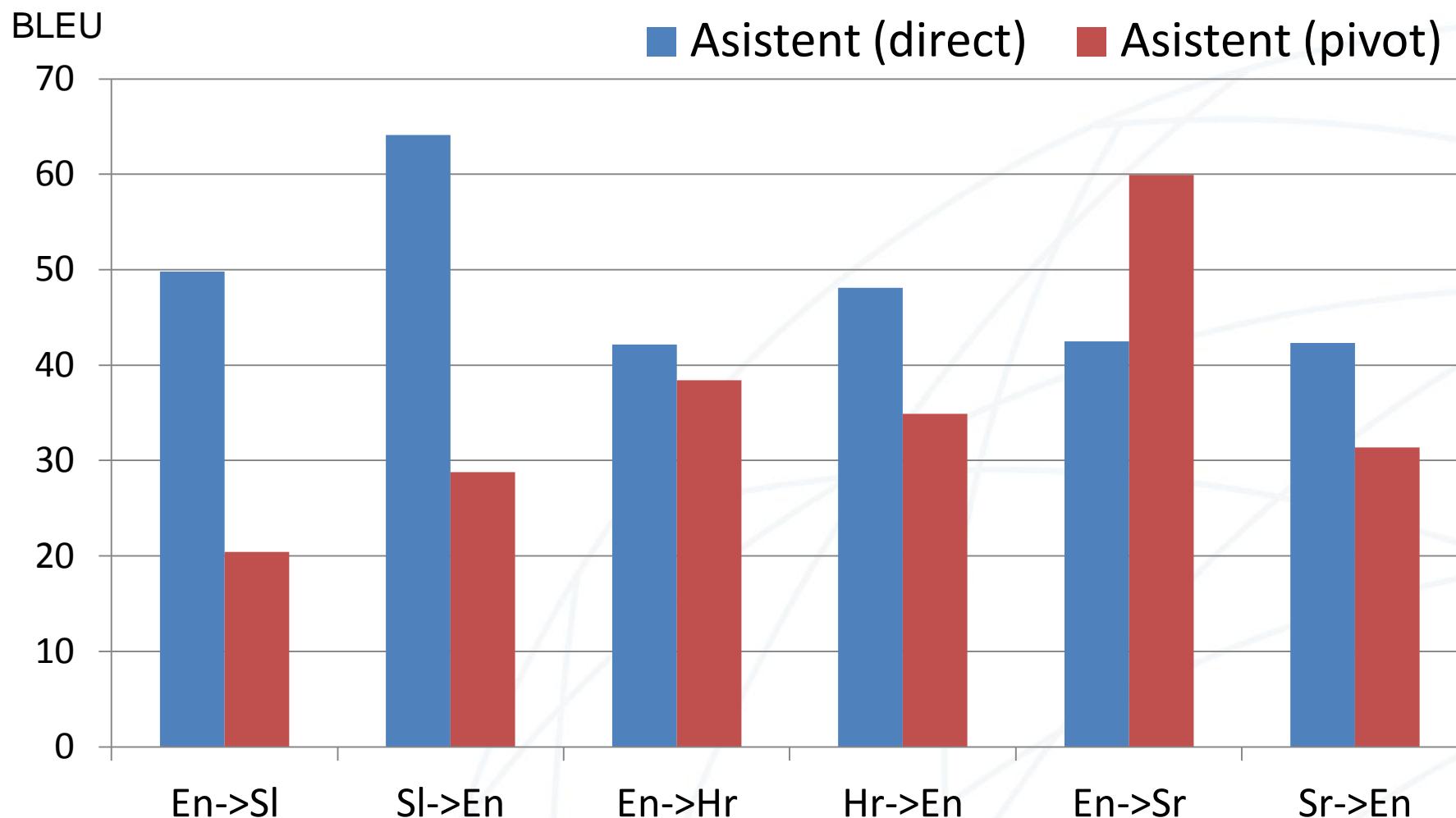


Pivot Translation





Evaluation for Pivot Translation, In-Domain (English-Slavic)





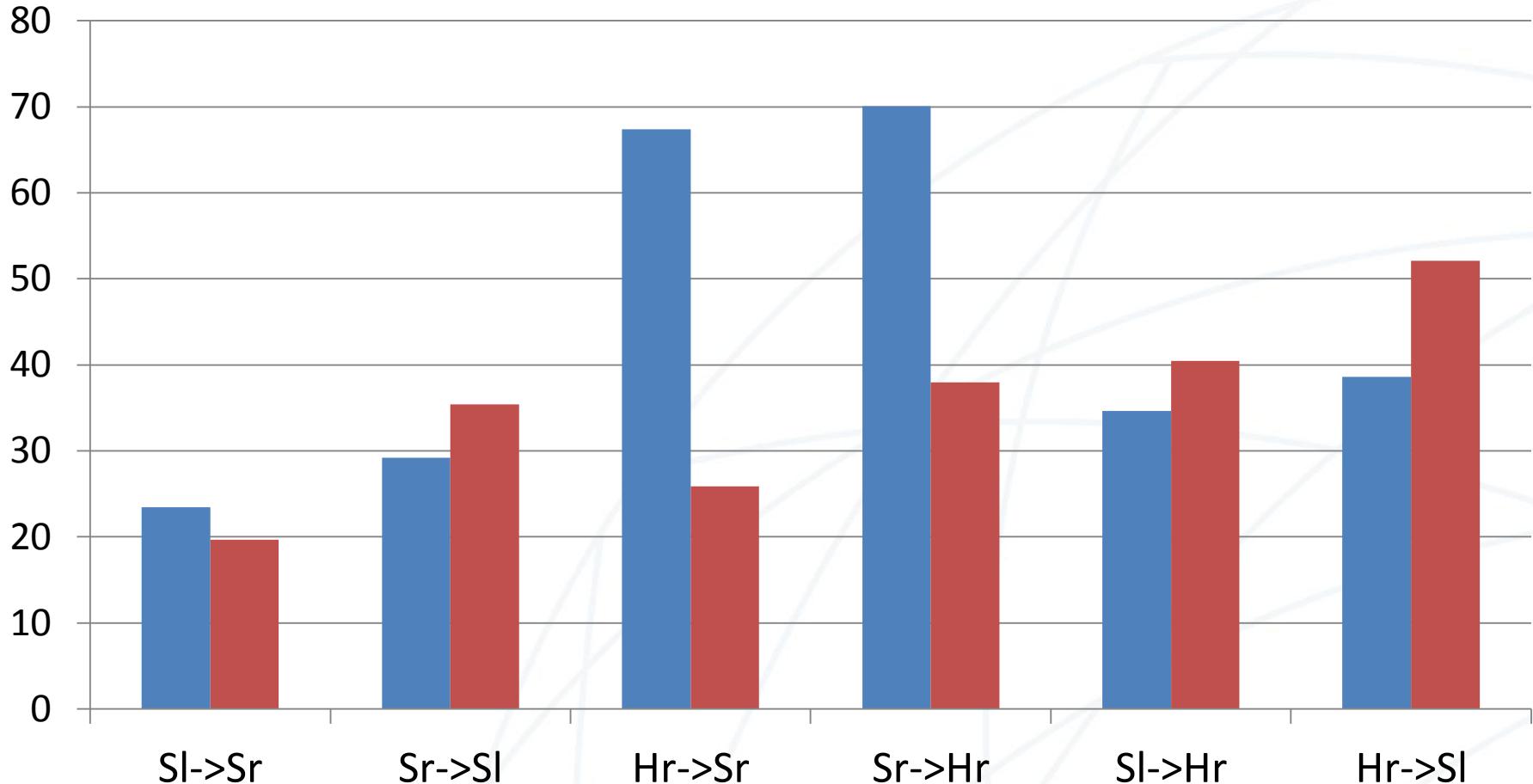
Evaluation for Pivot Translation, In-Domain (Slavic-Slavic)

Insight

BLEU

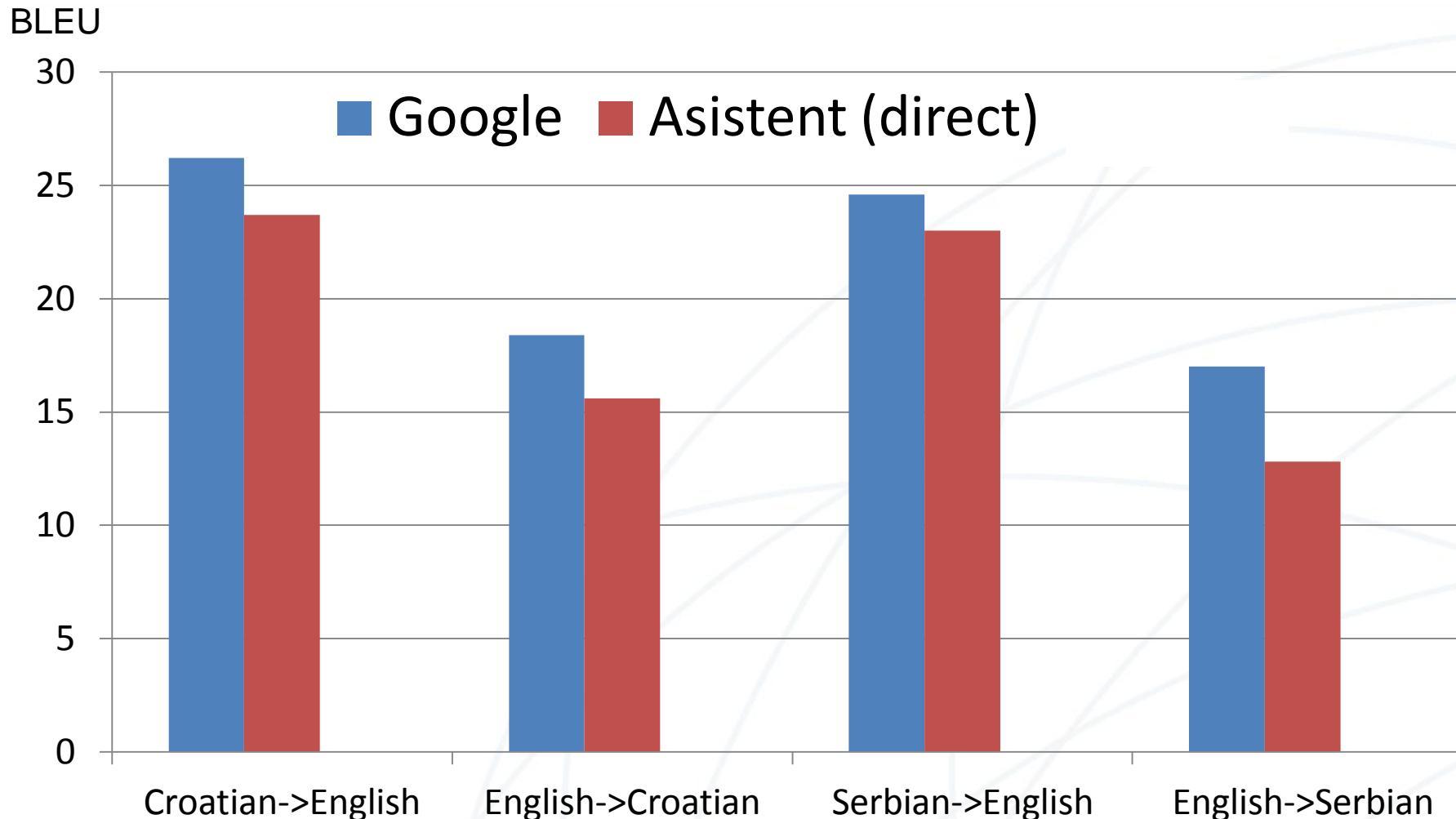
■ Asistent (direct)

■ Asistent (pivot)



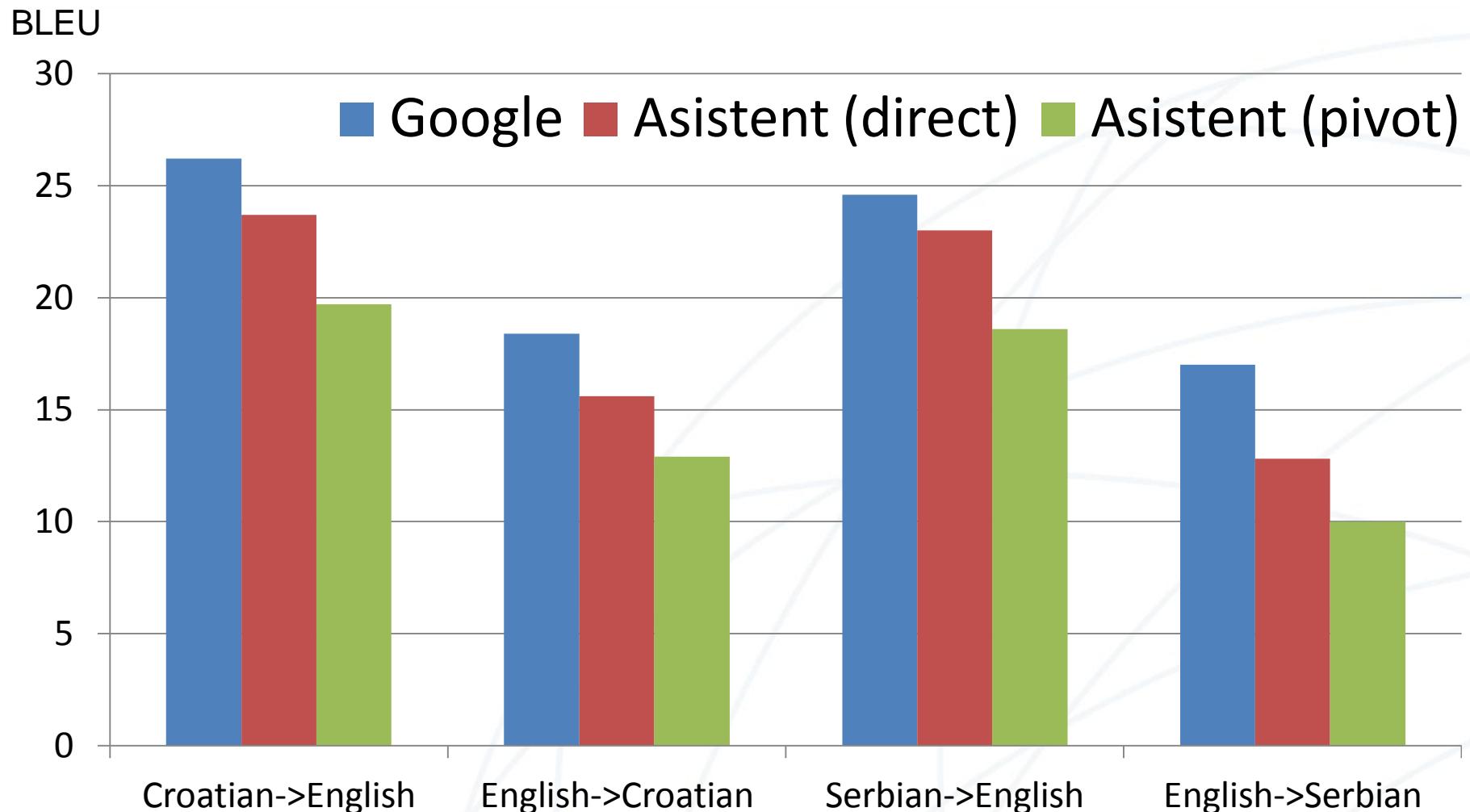


Automatic Evaluation, Out-Domain (Massive Open Online Courses MOOCs)





Automatic Evaluation, Out-Domain (Massive Open Online Courses MOOCs)



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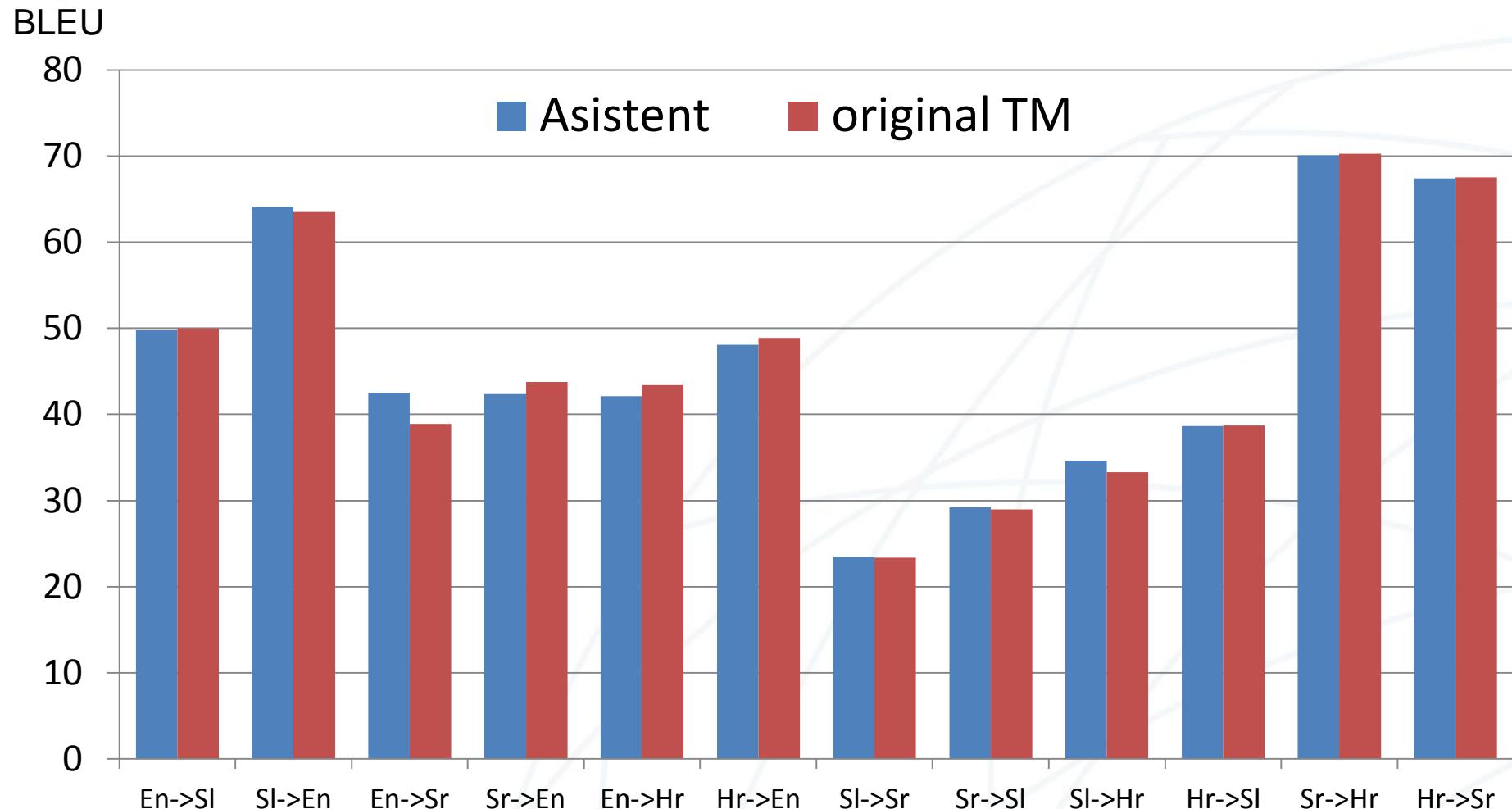
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Filtered vs Original Translation Models



Asistent's API request



Translation request (json)



Provided translation by Asistent



```
{  
  "nbest": "5",  
  "translation_direction": "en_sl",  
  "method": "phrase_based",  
  "approach": "direct",  
  "text2translate": [  
    {"source": "Accusations of witchcraft are also common in other African  
      countries."}  
  ]  
}
```

http://server1.nlp.insight-centre.org/asistent/rest_service.html

Asistent's API request



```
{
```

```
  "time": "6 wallclock secs ( 0.02 usr 0.01 sys + 5.16 cusr 0.42 csys = 5.61 CPU)",  
  "translation_direction": "en_sl",  
  "nbest": "3",  
  "method": "phrase_based",  
  "approach": "direct",  
  "text2translate": [  
    {  
      "source": "Accusations of witchcraft are also common in other African countries.",  
      "possible_translations": {  
        "obtožbe so pogosti tudi v čarovništva , druge afriške države . ":"-9.741",  
        "obtožbe čarovništva so pogosti tudi v drugih afriških državah . ":"-9.644",  
        "obtožbe o čarovništvu so pogosti tudi v drugih afriških državah . ":"-9.706"  
      },  
      "best": "obtožbe čarovništva so pogosti tudi v drugih afriških državah . "  
    }  
  ],  
}
```

Comparison between different SMT methods

- hierarchical models
- factored models (added linguistic information)
- neural machine translation

Manual Evaluation

- pivot translations
- phrase-based vs hierarchical models

Making Asistent/TM (more) accessible

Asistent - A Machine Translation System for Slovene, Serbian and Croatian

Mihael Arcan

mihael.arcan@insight-centre.org

Thank You

Hierarchical Models Evaluation (BLEU)



BLEU

80

■ PB-SMT ■ Hierarchical

70

60

50

40

30

20

10

0

En-SI SI-En En-Hr Hr-En En-Sr Sr-En SI-Sr Sr-SI Hr-Sr Sr-Hr SI-Hr Hr-SI