

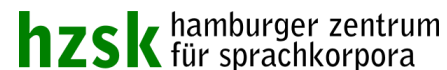
# Conversion and Annotation Web Services for Spoken Language Data in CLARIN

The logo for the Archive for Spoken German (AGD), featuring the letters 'AGD' followed by three curved lines representing sound waves.

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The logo for the Institute for German Language (IDS), consisting of the letters 'IDS' inside a circle.

INSTITUT FÜR  
DEUTSCHE SPRACHE

The logo for the Hamburg Centre for Language Corpora (hzsk), with 'hzsk' in green and 'hamburger zentrum für sprachkorpora' in black.

**hzsk** hamburger zentrum  
für sprachkorpora

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The logo for the University of Hamburg (U+H), featuring the letters 'U+H' in white on a red square background.

Universität Hamburg  
DER FORSCHUNG | DER LEHRE | DER BILDUNG

# Web Services in CLARIN(-D)

- Lemmatizing, POS Tagging, Named Entity Recognition, Parsing, ...
- Annotation chains in WebLicht
- Built with, meant to operate on „canonical“ written language
- Text Corpus Format (TCF) as the underlying data model

**→ Use with (transcriptions of) spoken language?**

# Spoken language data

- A few widely used formats – CHAT, EAF, EXMARaLDA, Transcriber, Praat, ... (see *CLARIN - Interoperability and Standards*, D5.C-3)
  - More than / different from a “stream of tokens”
    - Non-Speech “tokens” (pauses, non-verbal descriptions, breathing)
    - Parallel structures (overlaps, alternative transcriptions)
    - Time alignment
    - No sentences, no document hierarchy
    - Defect tokens (incomprehensible speech, incomplete words, disfluencies)
- ➔ TCF not sufficient to accommodate all information

# General approach

(1) A common format to represent transcriptions

- ISO/ TC 37/SC 4/WG 6: “Language resource management - Transcription of Spoken Language”, based on TEI guidelines
- Conversion web services from tool formats to ISO/TEI

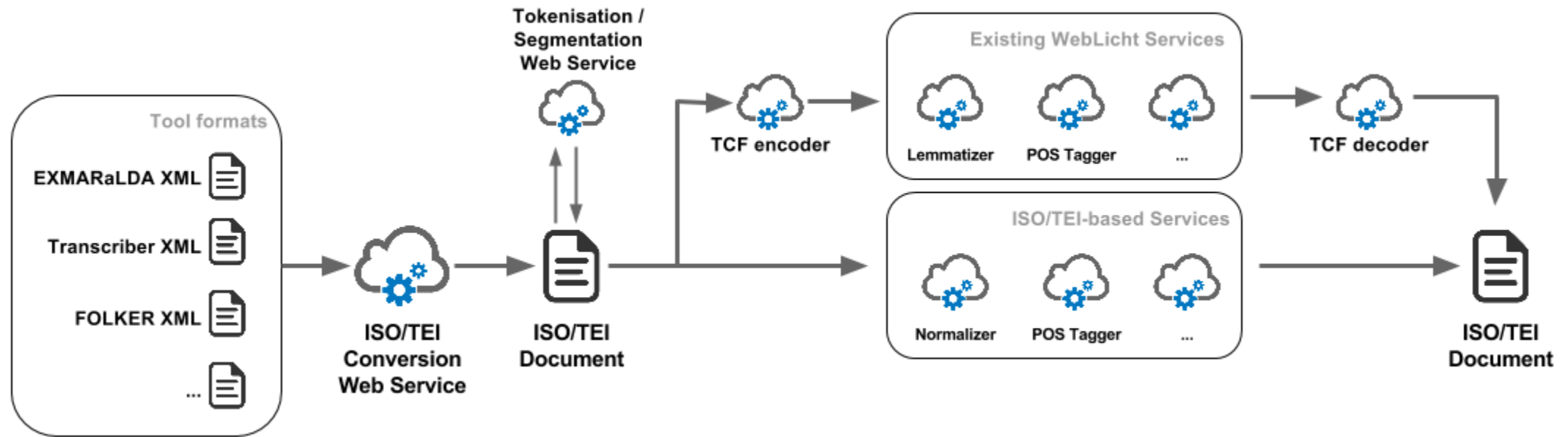
(2a) Encode to TCF – use existing services – decode from TCF

- „Hide“ spoken language specifics
- (Tokenisation web service), Codec web service

(2b) Spoken language specific services

- Orthographic normalisation, forced word alignment, prosodic annotation, ...
- „pause-aware“ POS tagging

# Architecture



# ISO „Transcription of Spoken Language“

- Schmidt (2005), Schmidt et al. (2008), CLARIN guide on interoperability, Schmidt (2011): TEI for spoken language, tool interoperability
- ISO project 2012 to 2016, published in August 2016
- Scope: Orthographic transcription, verbal behaviour
- Ready to use
  - Compatible with data at HZSK and AGD
  - Existing converters for EXMARaLDA, FOLKER, Transcriber, CHAT
  - EAF conversion on corpus-for-corpus basis
  - Praat conversion with intermediate step

# ISO „Transcription of Spoken Language“

## Macro structure

- Speakers - <particDesc>
- Timeline - <timeline>, <when>
- Sequence of <u> with @start and @end
- <anchor> for arbitrary alignment

## Micro structure

- Optional (→ CDATA only)
- „Tokenisation“ - <w>, <pause>, <vocal>, ...
- Segmentation - <seg>

```
(1) <u who="MJ" start="#T0" end="#T2">
    I ((cough)) see a door. I (0.3) want to paint it (black/blue).</u>

(2) <u who="MJ" start="#T0" end="#T2">
    I ((cough)) see a door.
    <anchor synch="#T1"/>
    I (0.3) want to paint it (black/blue).</u>

(3) <u who="MJ" start="#T0" end="#T2">
    <w>I</w><vocal><desc>cough</desc></vocal><w>see</w><w>a</w><w>door</w><p>.</p>
    <anchor synch="#T1"/>
    <w>I</w><pause dur="PT0.3S"/><w>want</w><w>to</w><w>paint</w><w>it</w>
    <unclear><choice><w>black</w><w>blue</w></choice></unclear><p>.</p></u>

(4) <u who="MJ" start="#T0" end="#T2">
    <seg type="intonation-phrase" subtype="falling">
        <w>I</w><vocal><desc>cough</desc></vocal><w>see</w><w>a</w><w>door</w>
    </seg>
    <anchor synch="#T1"/>
    <seg type="intonation-phrase" subtype="falling">
        <w>I</w><pause dur="PT0.3S"/><w>want</w><w>to</w><w>paint</w><w>it</w>
        <unclear><choice><w>black</w><w>blue</w></choice></unclear>
    </seg></u>
```

# ISO „Transcription of Spoken Language“

## Standoff annotation

- Generic mechanism: <spanGrp>, <span> + ID/IDREFS
- <annotationBlock> to group utterances with their annotations
- Borrowed from TEI standoff proposal (L. Romary, Banski et al. 2016)

```
<annotationBlock who="MJ" start="#T0" end="#T2" xml:id="ab1">
  <u xml:id="u1">
    <seg type="intonation-phrase" subtype="falling" xml:id="seg1">
      <w xml:id="w1">I</w>
      <vocal xml:id="voc1"><desc>cough</desc></vocal>
      <w xml:id="w2">see</w>
      <w xml:id="w3">a</w>
      <w xml:id="w4">door</w>
    </seg>
  </u>
  <spanGrp type="lemma">
    <span from="w1" to="#w1">I</span>
    <span from="w2" to="#w2">see</span>
    <span from="w3" to="#w3">a</span>
    <span from="w4" to="#w4">door</span>
  </spanGrp>
  <spanGrp type="pos">
    <span from="w1" to="#w1">PPER</span>
    <span from="w2" to="#w2">V</span>
    <span from="w3" to="#w3">DET</span>
    <span from="w4" to="#w4">NN</span>
  </spanGrp>
</annotationBlock>
```



## Step 1: Tool format to ISO/TEI

- XSL stylesheets for EXMARaLDA, Transcriber, FOLKER
- Conversion „by proxy“ (through EXMARaLDA) for CHAT, Praat
- Import/Export filters in the tools
- TEI Drop as a desktop application („Droplet“)
- CLARIN Web services at HZSK (e.g. PID 11022/0000-0000-9ABA-1 )
- N.B.: No explicit markup of micro structure in tool formats (except for FOLKER), but: Tokenisation obligatory for use with TCF → „Segmentation“ algorithms for GAT, HIAT, CHAT conventions

### EXMARaLDA Partitur-Editor

The EXMARaLDA Partitur-Editor is a tool for transcribing and annotating digital audio and video. With the Partitur-Editor, you can enter, edit and output transcriptions in partitur (“musical score”) notation. Transcription and digital audio or video recordings can be linked and aligned in this p...

### Format Converter

Converter for several transcription and annotation formats; Transcription and annotation format conversion

### EXB2ISO-TEI Converter

Converter for EXMARaLDA Basic Transcriptions (EXB) to the ISO-TEI format for transcription of spoken language; Conversion to ISO-TEI from EXB

TEI Drop

Settings

Parse method: HIAT

Write output to...  ...the same...  ...a separate directory:

Suffix for output: \_TEI.xml

Messages

```
ESLO2_LIVRENF_1326_B.trg add
ESLO2_LIVRENF_1326_B.trg read
[ESLO2_LIVRENF_1326_B.trg] T
_B_TEI.xml
***** DONE *****
```

Converted files

C:\Users\Thomas\Dropbox\IDS\Segmentierung\SegCor\Pilot\ESLO\ReadingChild\ORIGINALS\ESLO2\_LIVRENF\_1326\_B\_TEI.xml

Operations

Help Done.

```

<u who="MJ" start="#T0" end="#T2">
  <seg type="intonation-phrase" subtype="level">
    <w xml:id="w1">I</w>
    <vocal xml:id="voc1"><desc>cough</desc></vocal>
    <w xml:id="w2">see/w>
    <w xml:id="w3">a/w>
    <w xml:id="w4">door/w>
  </seg>
</u>

```

```

<TextCorpus>
  <text>I see a door I want to paint it black</text>
  <tokens>
    <token ID="w1">I</token>
    <token ID="w2">see</token>
    <token ID="w3">a</token>
    <token ID="w4">door</token>
  </tokens>
  <sentences>
    <sentence ID="s_1" tokenIDs="w1 w2 w3 w4"/>
  </sentences>
  <textSource type="application/tei+xml;
    format-variant=tei-iso-spoken;tokenized=1">
    <![CDATA[<TEI xmlns="http://www.tei-c.org/ns/1.0">
      [...]<u who="MJ" start="#T0" end="#T2">[...]</TEI>]]>
  </textSource>
</TextCorpus>

```

## Step 2: ISO/TEI to TCF input (encoding)

- Map what can be mapped
  - basically <w> → <token>
  - <u> or <seg> as sentence equivalents
- Keep original document in <textSource> (for stateless decoding)
- Keep original IDs (for inserting new annotations)

# Step 3: WebLicht Chain...

The image shows a horizontal chain of six processing modules in a web interface. Each module has a title bar, a main content area, and a status bar at the bottom. The status bars all contain a blue 'i' icon and a red 'X' icon, indicating that each module in the chain is currently inactive or has an error.

Module	Content	Status
IMS: Tokenizer	Sentences Tokens	i X
IMS: TreeTagger	Part of Speech: STTS Tagset Lemmas	i X
Sfs: German Named Entity	Model: <input type="text" value="conll2003"/>	i X
IMS: Constituent Parser	Parsing: Tiger Treebank Tagset	i X
IMS: Morphology	morphology	i X
Sfs: Geolocation	Geo - Capitals: Name Geo - Continents: Name Geo - Coordinates: Decimal	i X

```

<TextCorpus>
  <!-- [...] -->
  <POSTags tagset="stts">
    <tag ID="pt_0" tokenIDs="w1">PPER</tag>
    <tag ID="pt_1" tokenIDs="w2">V</tag>
    <tag ID="pt_2" tokenIDs="w3">DET</tag>
    <tag ID="pt_3" tokenIDs="w4">NN</tag>
    <!-- [...] -->
    <tag ID="pt_10" tokenIDs="w10">ADJ</tag>
  </POSTags>
  <!-- [...] -->
</TextCorpus>

```

```

<annotationBlock who="MJ" start="#T0" end="#T2" xml:id="ab1">
  <u>
    <seg type="intonation-phrase" subtype="level">
      <w xml:id="w1">I</w>
      <vocal xml:id="voc1"><desc>cough</desc></vocal>
      <w xml:id="w2">see/w>
      <w xml:id="w3">a/w>
      <w xml:id="w4">door/w>
    </seg>
  </u>
  <spanGrp type="pos">
    <span from="#w1" to="#w1">PPER</span>
    <span from="#w2" to="#w2">V</span>
    <span from="#w3" to="#w3">DET</span>
    <span from="#w4" to="#w4">NN</span>
  </spanGrp>
</annotationBlock>

```

## Step 4: TCF output to TEI/ISO (decoding)

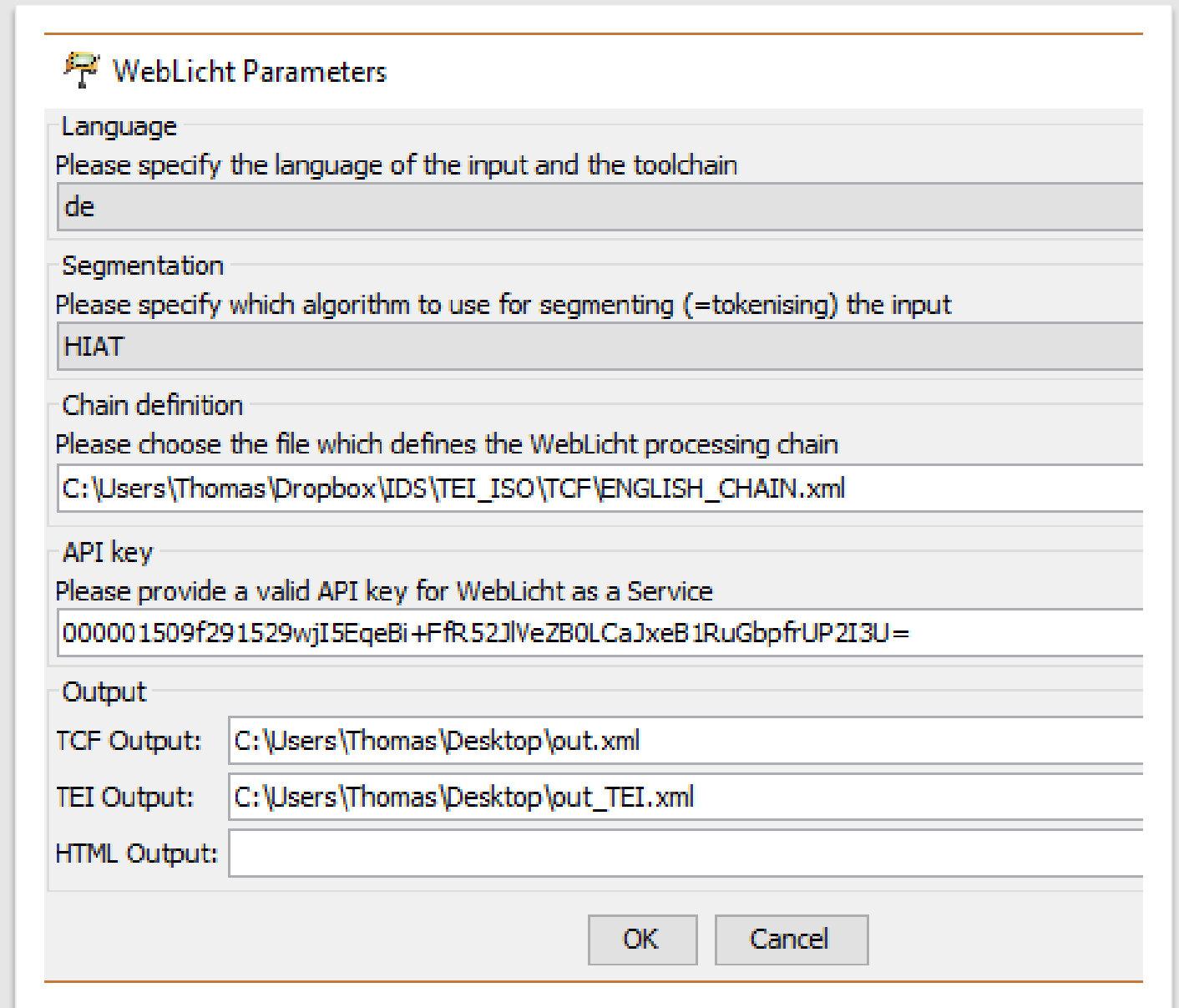
- Map TCF annotation layers to <spanGrp> / <span>

# Or: Cut out the middleman!

- No detour via TCF, no information loss
- Web services operating directly on TEI/ISO format
  - e.g. normalisation layer (modified orthography → standard orthography, FOLK project)
  - e.g. POS tagging for interaction data (STTS 2.0 with TreeTagger, Westpfahl/Schmidt 2016)
  - also: services operating on the audio signal, e.g. forced word alignment through WebMAUS
- Currently no appropriate chaining tool (but Switchboard?)

# Implementation status

- Proof of concept in EXMARaLDA (through WaaS)
- Converters ready
- WebLicht integration coordinated (MIME-types for format information!)
- Web services under construction



The image shows a Windows-style dialog box titled "WebLicht Parameters". It contains several sections with labels and input fields:

- Language:** "Please specify the language of the input and the toolchain". Input field contains "de".
- Segmentation:** "Please specify which algorithm to use for segmenting (=tokenising) the input". Input field contains "HIAT".
- Chain definition:** "Please choose the file which defines the WebLicht processing chain". Input field contains "C:\Users\Thomas\Dropbox\IDS\TEI\_ISO\TCF\ENGLISH\_CHAIN.xml".
- API key:** "Please provide a valid API key for WebLicht as a Service". Input field contains "000001509f291529wjI5EqeBi+FfR.52JlVeZB0LCaJxeB1RuGbpfrUP2I3U=".
- Output:** Three rows of input fields:
  - TCF Output: C:\Users\Thomas\Desktop\out.xml
  - TEI Output: C:\Users\Thomas\Desktop\out\_TEI.xml
  - HTML Output: (empty field)

At the bottom right, there are "OK" and "Cancel" buttons.

# References

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