



D3.1.2: XLIFF ROUNDTRIPPING PLUS XSLT FOR HIDDEN WEB FORMATS

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1. EXECUTIVE SUMMARY

Internationalization Tag Set (ITS) 2.0 metadata targets the whole multilingual content life cycle. This deliverable demonstrates how ITS 2.0 metadata can be used to inform localisation transformation workflows, how ITS 2.0 metadata can be modified and introduced during the localisation roundtrip and fed back into monolingual content in the original format but in the target language.

This deliverable is twofold. Moravia and UL have been working on XLIFF roundtripping of ITS 2.0 categories based on output of XLIFF generators such as OKAPI Framework Tikal and Trinity College Dublin CMS-L10n.

To ensure proper seeding and extraction of ITS 2.0 categories from deep web formats UEP has developed ITS aware stylesheets for Docbook, a widely used deep web format.

UL's roundtrip is based on the publicly accessible and to be open sourced platform SOLAS (Service Oriented Localisation Architecture Solution). SOLAS is an Enterprise Service Bus (ESB) type architecture where each of the components is loosely coupled and works with the others based on 1) RESTful interfaces and 2) a common message format (XLIFF).

Previously disclosed components (SOLAS LocConnect, SOLAS MT Broker, SOLAS Workflow Recommender, SOLAS LKR) were enhanced with ITS2 capabilities and new components with ITS2 capabilities were developed (SOLAS TA Broker, SOLAS Target Populator, MT Training Exporter, XLIFF Extractor/Merger). Unit tests for all components have been developed to demonstrate implementability on W3C test suite for the ITS2 standard, these unit test were used to demonstrate ITS2 compliance of both SOLAS and Moravia MT Services.

2. INTRODUCTION

This public deliverable describes the service oriented infrastructure of an ITS2.0 aware ecosystem of tools. Each of the participating components is described in its own subsection within the section 3. SOLAS related components are all addressing the localisation roundtrip. Docbook and DITA support is about enabling the ITS 2.0 metadata in source (and target) monolingual popular authoring formats. Extraction of localisable content can make use of ITS 2.0 metadata only to a very limited extent if the metadata has not been first seeded in popular authoring formats such as Docbook or DITA. There are obviously many other source content formats, Content Management systems etc. that can be used as source formats in ITS->XLIFF based localisation roundtrips, DocBook and DITA are used as suitable XML vocabularies examples.

3. THE TECHNOLOGY

3.1. SOLAS

SOLAS (Service Oriented Localisation Architecture Solution) is a component-based localisation platform that seeks to address the emerging challenges of user driven localisation. This innovative platform empowers the content owner and the community that seeks the content in a specific language, in particular the small-to-medium sized enterprises and NGOs (not-for-profits and charities).

The distributed nature of SOLAS (ESB type of architecture) allows for cross-organizational localisation. Tasks can be automated by components on behalf of the user, while also allowing them to integrate fully featured applications as components using a set of RESTfull interfaces.

Data is shared between the components using XLIFF (the XML Localization Interchange File Format) that acts

as the single uniform message format throughout any SOLAS orchestrated roundtrip.

SOLAS is a research prototype, some of the components or even parts of components are developed robustly as a final production ready solution, such as the BaseX data stores, Rabbit MQ based messaging etc. Other parts of the architecture have been rapidly developed in lightweight and often browser based technologies (DART, js, PHP scripts etc.) and are pending further development under the umbrella of the TRF Open Source project (trommons.org) to become production ready. The purpose of the whole system is to demonstrate the implementability of the whole roundtrip based on a componentized and standards driven architecture. For instance the pull based PHP based orchestration is now being re-implemented using a JBoss workflow engine. This is important for real life usability of the platform for social localisation projects by TRF and its partner pro bono organization, has nevertheless no impact on the solution and usefulness of the ITS 2.0 metadata demonstrated by this deliverable.

SOLAS LOCCONNECT

This component is orchestrating the progression of the XLIFF roundtrip. In a sense it supports all ITS2.0 categories as far as they can be encoded in a valid XLIFF 1.2 or XLIFF 2.0 file.

This component was first developed by UL as part of the SFI funded CNGL. Within the LT-Web project this component has been made ITS2 aware, ITS2 <-> XLIFF 1.2 (stable) and XLIFF 2.0 (tentative) Mapping was added.

This component supports entry of the following ITS2 metadata categories via its PMUI:

- Domain

It displays the following ITS 2.0 categories in its Project Management Viewer:

- Translate
- Term
- Text Analytics

LocConnect was developed using the PHP programming language. It runs on an apache web server on Windows or Linux with a MySQL database for storing data. It has a RESTful API that can be used to access or modify data stored in the database.

LocConnect serves as the business orchestration unit in the overall SOLAS architecture (ESB). Files are uploaded though a PMUI site where the user provides some meta-data that can be used to produce a workflow for the file. LocConnect then makes the file available to the other tools that need to process it through its API.

Below is a screenshot of the PMUI form on the LocConnect web site. It allows the uploader to select the most appropriate workflow for their task by selecting tools.

Create a New Project

Project Name	<input type="text" value="TestProject - Monday the 18th"/>
Project Description	<input type="text" value="Mon, 18 Nov 13 13:32:47 +0000"/>
Start Date	<input type="text" value="18/11/2013"/>
Deadline	<input type="text" value="28/11/2013"/>
Budget(€)	<input type="text" value="1000"/>
Quality Requirements	<input type="text" value="High"/>
Client	<input type="text" value="Symantec"/>
Use MT	<input checked="" type="radio"/> Yes <input type="radio"/> No
Use Source Validation	<input checked="" type="radio"/> Yes <input type="radio"/> No
Use TA	<input checked="" type="radio"/> Yes <input type="radio"/> No
Use TP	<input checked="" type="radio"/> Yes <input type="radio"/> No
LMC file	<input type="button" value="Browse..."/> No file selected.
Source XLIFF file	<input type="button" value="Browse..."/> No file selected.
	<input type="button" value="Submit Query"/> <input type="button" value="Reset"/>

LocConnect PMUI data input form.

The PMUI data is stored in the XLIFF file using the metadata module. It is stored in a meta group called “pmui-data” with single meta elements for each tool. Below is a sample of the PMUI data stored in an XLIFF file.

```

<mda:metadata>
  <mda:metagroup category="pmui-data">
    <mda:meta type="pname">
      Test Project - Thursday the 19th
    </mda:meta>
    <mda:meta type="pdescription">
      Thu, 19 Sep 13 14:21:24 +0100
    </mda:meta>
    <mda:meta type="startdate">19/09/2013</mda:meta>
    <mda:meta type="deadline">29/09/2013</mda:meta>
    <mda:meta type="budget">1000</mda:meta>
    <mda:meta type="qrequirement">LOW</mda:meta>
    <mda:meta type="use-mt">NO</mda:meta>
    <mda:meta type="client">OTHER</mda:meta>
    <mda:meta type="lkr">YES</mda:meta>
    <mda:meta type="ta">NO</mda:meta>
    <mda:meta type="tp">NO</mda:meta>
    <mda:meta type="lmc">NO</mda:meta>
  </mda:metagroup>
</mda:metadata>

```

Through the LocConnect UI it is possible to track the progress of the files. Feedback from each of the tools can be reviewed and the output from each tool can be downloaded or viewed. The XLIFF viewer displays the file on the site and highlights several XLIFF and ITS meta data elements.

LocConnect can be accessed at <http://demo.solas.uni.me/locconnect/>

SOLAS MT BROKER

This component was first developed by UL as part of the SFI funded CNGL. Within the LT-Web project this component has been made ITS2 aware, ITS2 <-> XLIFF 1.2 (stable) and XLIFF 2.0 (tentative) Mapping was added.

The MT Broker is written in PHP and runs on an apache web server. Calls to the MT service providers are made using PEAR's HTTP Request2 library. It wraps calls to a number of language service providers including Bing and Moses which provide machine translations for the given file. The MT Broker then populates the XLIFF file with the alternative translations from the language provider. It supports the alt-trans element of XLIFF 1.2 and the matches module of XLIFF 2.0. It pulls its tasks from LocConnect using the LocConnect API.

Below is a segment that has a corresponding match in the matches module. The mrk is placed inside the source to reference the match in the matches module.

```
<segment id="seg-4" its:domain="ITS">
  <source>
    <mrk id="m_1" type="match" ref="#match_4">
      From the canyons of Arizona, to the Khmer temples
      deep in the jungle; from the tropical beaches of
      Queensland to the glaciers of Antarctica; or from
      the wild savanna of Africa to mysterious castles in
      the forests of Bohemia, our offer takes you in some
      of the most amazing places on our planet.
    </mrk>
  </source>
</segment>
```

Below is the corresponding match from the matches module. It contains the source text that was matched as well as the translated text it was matched to. The id of the match is referenced from the mrk of the source segment.

```
<mtc:match id="match_4">
  <source xml:lang="en-us">
    From the canyons of Arizona, to the Khmer temples deep in
    the jungle; from the tropical beaches of Queensland to
    the glaciers of Antarctica; or from the wild savanna of
    Africa to mysterious castles in the forests of Bohemia,
    our offer takes you in some of the most amazing places on
    our planet.
  </source>
  <target xml:lang="fr-fr">
    Des canyons de l'Arizona, aux temples Khmers enfouis dans
    la jungle; des plages tropicales du Queensland aux
    glaciers d'Antarctique; ou de la savane africaine aux
    mystérieux château au cœur des forets de Bohême, notre
    offre vous amène aux endroits les plus incroyables de
    notre planète.
  </target>
</mtc:match>
```

The services are registered with metadata about their level of support for XLIFF and ITS, so that the MT Broker can decide in what way the MT services will be tasked and consumed. Based on the capabilities of the registered systems, the MT Broker or Mapper supports the ITS2.0 metadata categories in one of two ways:

USING SERVICES THAT SUPPORT THE ITS2.0 <-> XLIFF MAPPING

In that case the incoming XLIFF file is routed as is to the MT service and accepted back as delivered by the MT service. In this case the burden of supporting the ITS metadata categories is on the service provider rather than on the broker.

USING SERVICES THAT ARE NOT GENERALLY ITS AWARE

The XLIFF file is parsed for ITS 2.0 categories and these are interpreted and only suitable portions of the source content are sent to the MT service. The incoming XLIFF file is later populated with alternative translations based on the suggestions coming from the MT service, ITS metadata are added and modified as required.

In this scenario the broker interprets the

- Translate
- Domain

metadata categories

And is able to add

- Provenance
- MT confidence

metadata.

The MT Broker can be accessed at <http://demo.solas.uni.me/mapper/>

SOLAS LKR

This component was first developed by UL as part of the SFI funded CNGL. Within the LT-Web project this component has been made ITS2 aware, ITS2 <-> XLIFF 1.2 (stable) and XLIFF 2.0 (tentative) Mapping was added.

The Localisation Knowledge Repository is a source authoring tool that aims to increase the quality of the source language file. XLIFF 1.2 and 2.0 files can be uploaded by a project manager to the LKR for processing. The project manager can define a set of QA tests that will be used when analysing the file. When an author views a file the text that failed the conformance tests are highlighted. The highlighted text will provide a hint when hovered over which identifies the test that failed as well as a possible solution. The author makes all the changes necessary and passes the file to the project manager. If the project manager is not satisfied with the changes made by the author they can leave comments on the file and pass it back to the author.

Below is a screenshot of the XLIFF file viewer from the LKR. It shows annotators references and a number of segments. The segments with a red background have QA warnings that appear when the user hovers over them.

Job 469

Scroll down to view the warnings and to edit your text, then re-analyse the document.

You have 5 warnings, in segments 1, 2, 3, 4 and 5.

[Pass on to PM with warnings](#)

Original	Editable	Comments
	<input type="button" value="Re-analyse"/>	
	File #1	
Annotator References:		
text-analysis	http://enrycher.ijs.si	
1 HTML Demo Example	HTML Demo Example <input type="button" value="Re-analyse"/>	
2 Have you ever dreamed of stepping on each of the six continents around the planet during a single amazing trip?	Have you ever dreamed of stepping on each of the six continents around the planet during a single amazing trip? <input type="button" value="Re-analyse"/>	
3 Our Around the World in 80 Daystravel package is specifically designed for this.	Our Around the World in 80 Daystravel package is specifically designed for this. <input type="button" value="Re-analyse"/>	

Sample XLIFF file view, LKR

The image below shows the legend for LKR's XLIFF viewer. The viewer marks text that has been marked as a term, a comment or as do not translate.

Legend

Format	Meaning
Sample	Text marked as "Do not translate"
Comment	Hover of this text for a comment
Term	This text has been marked as a term

LKR XLIFF viewer legend.

This process continues until the project manager is satisfied with the file. Then, the file can be exported and sent back to LocConnect. Several XLIFF attributes can be specified when exporting the file.

The LKR is written in PHP and runs on an apache web server. It uses a MySQL database to store data. It can be run as a standalone web service or as part of the SOLAS productivity suite. It can pull jobs from LocConnect using the LocConnect API.

LKR can read and modify the following ITS 2.0 metadata categories as mapped into XLIFF 1.2 and XLIFF 2.0 and back:

- Translate
- Term
- Text Analytics

- Domain

The LKR can be accessed at <http://demo.solas.uni.me/lkr/author/>

WORKFLOW RECOMMENDER

This component is basically a plugin providing the orchestration component LocConnect with the prescribed workflow information. It analyses the data specified in the XLIFF file and generates an appropriate workflow. The data is added to the XLIFF when it is uploaded to LocConnect.

This component was first developed by UL as part of the SFI funded CNGL. Within the LT-Web project this component has been made ITS2 aware, in the sense that it now takes into account ITS2 based PMUI metadata that are passed by LocConnect. It can now also take ITS2 informed workflow suggestions from CMS systems that are kicking off their own SOLAS workflow instances.

The Workflow Recommender is written in PHP running on an Apache web server. It uses PEAR's HTTP Request2 package to request resources from LocConnect. It generates a workflow based on the criteria provided by LocConnect and then sends an XLIFF file, enriched with the workflow information, back.

Below is a sample workflow that was generated by the WFR and encoded in an XLIFF file using the metadata module. It contains the list of tools that need to process the file and the order they need to be processed in.

```
<mda:metadata>
  <mda:metagroup category="workflow_entry">
    <mda:meta type="tool_id">MT</mda:meta>
    <mda:meta type="order">1</mda:meta>
  </mda:metagroup>
  <mda:metagroup category="workflow_entry">
    <mda:meta type="tool_id">TA</mda:meta>
    <mda:meta type="order">2</mda:meta>
  </mda:metagroup>
  <mda:metagroup category="workflow_entry">
    <mda:meta type="tool_id">TP</mda:meta>
    <mda:meta type="order">3</mda:meta>
  </mda:metagroup>
  <mda:metagroup category="workflow_entry">
    <mda:meta type="tool_id">CMP</mda:meta>
    <mda:meta type="order">4</mda:meta>
  </mda:metagroup>
</mda:metadata>
```

The workflow recommender can be accessed at <http://demo.solas.uni.me/wfr/>

TARGET POPULATOR

This component was developed from scratch under the LT-Web funding. It is ITS 2 aware by design via the XLIFF 1.2. and XLIFF 2.0 Mapping.

The target populator takes an XLIFF file with alternative translations and selects the most appropriate one to automatically populate the target. The selection is made using the match quality attributes and the provenance records. It is written in Dart compiled to Javascript and as such can run in any modern web browser (however, Google Chrome or Firefox are recommended).

Complex decision making plugins can be designed and connected.

Below is a sample segment with multiple matches before the target populator processes the file.

```
<segment id="seg-2" its:domain="ITS">
  <source>
    <mrk id="m-1" type="match" ref="#match_1">
      <mrk id="m-2" type="match" ref="#match_2">
        Have you ever dreamed of stepping on each of
        the six continents around the planet during a
        single, amazing trip?
      </mrk>
    </mrk>
  </source>
  <target></target>
</segment>
```

Once the target populator has processed the file the target element will be populated. The Target Populator will select the most appropriate target from the matches referenced in the segment source.

```
<segment id="seg-2" its:domain="ITS">
  <source>
    <mrk id="m-1" type="match" ref="#match_1">
      <mrk id="m-2" type="match" ref="#match_2">
        Have you ever dreamed of stepping on each of
        the six continents around the planet during a
        single, amazing trip?
      </mrk>
    </mrk>
  </source>
  <target>
    N'avez-vous jamais rêvé de marcher sur les six
    continents, en un seul voyage magnifique autour de la
    planète?
  </target>
</segment>
```

The target populator can be accessed at <http://demo.solas.uni.me/wfr/>

TEXT ANALYTICS AND TERMINOLOGY BROKER

This component was developed from scratch under the LT-Web funding. It is ITS 2 aware by design via the XLIFF 1.2. and XLIFF 2.0 Mapping.

The text analytics and terminology broker is used to wrap text analytics web services. The only service currently invoked by this broker is Tilde's terminology enricher. The broker is written using Dart and compiled into Javascript so it can be run on any modern web browser with Javascript support (however, Google Chrome or Firefox are recommended).

This is analogical to the MT Broker, the TAT broker sends and receives XLIFF files to and from services that are aware of the ITS<->XLIFF mapping of the following ITS2 metadata categories:

- Term

- Text Analytics

Otherwise, the XLIFF encoding and injection of metadata can be done on behalf of the services that are not aware of the mapping.

The Text Analytics Broker can be accessed at <http://demo.solas.uni.me/TA/web/>

SOLAS EXTRACTOR AND MERGER

This component was developed from scratch under the LT-Web funding. It is ITS 2 aware by design via the XLIFF 1.2.

This component can be used for extraction of translatable content into valid XLIFF 1.2 files in cases the workflow initiator does not produce the XLIFF files on its own. This component can also work with the XLIFF 2.0 open source toolkit (a Google code project affiliated to OKAPI), which is however under development and does not support the XLIFF2.0 ITS2 Mapping yet (mainly because XLIFF 2.0 is still under development).

Based on the XLIFF version parameter, this tool can use either the Tikal extractor

XLIFF Extractor using <http://www.opentag.com/okapi/wiki/index.php?title=Tikal>

XLIFF Merger using <http://www.opentag.com/okapi/wiki/index.php?title=Tikal>

Or the XLIFF 2.0 Toolkit

<https://code.google.com/p/okapi-xliff-toolkit/>

However the development of the XLIFF 2.0 Toolkit has not yet been finalized, so this functionality is experimental and currently not capable of merging back.

3.2. Moravia MT Services

THE SERVICE

Because generally accessible MT services are not yet ITS2.0 aware, Moravia has provided an MT service component that processes valid XLIFF 1.2 and files with mapped ITS 2.0 information. Moravia also developed experimental support for XLIFF 2.0 files with mapped ITS 2.0 metadata.

Moravia's service is based on Moses, and M4Loc, which in turn uses the OKAPI Framework Tikal functionality.

Moravia exposed a RESTful service that receives valid XLIFF 1.2 files and returns them with translation candidates encoded as <alt-trans> elements, eventually valid XLIFF 2.0 files that are returned with translation candidates within the XLIFF 2.0 Translation Candidates module. This service is registered with SOLAS MT Broker but can be used standalone with any valid XLIFF 1.2 or XLIFF 2.0 file though direct upload and download. The RESTful interface allows for easy integration.

All changes that Moravia developed have been committed under LGPL to the M4Loc project.

For details of this solution see deliverable **D4.3: XLIFF Roundtripping Prototype based on M4Loc Work and Okapi Tools**

SUPPORTED ITS 2.0 METADATA

- Domain
- Term
- Text Analytics
- Translate
- MT Confidence

3.3. ITS 2.0 Roundtripping Support in DocBook and DITA

DocBook is very popular format for producing structured documents that are later published on the Web. Support for all ITS 2.0 attributes and elements was added into DocBook schema by UEP and will be distributed as a part of a next official DocBook schema release.

Sources of DocBook+ITS 2.0 schema are available at <https://github.com/docbook/docbook/tree/master/relaxng/schemas/dbits>.

UEP also modified DocBook XSL stylesheets to pass-through ITS 2.0 metadata into resulting HTML code when HTML output is generated from the DocBook sources. This means that once ITS 2.0 metadata are entered into the content they are available also to tools operating directly on the web content.

Similar effort had been done for DITA as well. However current version of DITA XML standard does not allow using namespaces for attribute extensibility. UEP is working closely with OASIS DITA TC to enable this functionality in the future versions of the DITA XML standard. Meanwhile, guidelines for using ITS markup inside current version of DITA XML are being developed.

4. WEBPAGES

4.1. Using ITS 2.0 in DocBook

<http://xmlguru.cz/2013/05/docbook-and-its2>

4.2. Using ITS 2.0 in DITA

<http://xmlguru.cz/2013/11/dita-and-its2>

4.3. MLW-LT, XLIFF/MT Round-Tripping

<http://mlwt.moravia.com/mlwt-web-test/Presentation.aspx>

4.4. Other webpages

TCD CMS-L10N

CMS-L10N is not part of this deliverable, it is used as a complementary element triggering the roundtrips that are developed and delivered via this deliverable.

<http://phaedrus.cs.tcd.ie/DocumentTracking/>

TROMMONS

Trommons is a contraction of Translation Commons, it is an umbrella brand for the (The Rosetta Foundation) TRF open source project that was launched to enable social and pro bono localisation projects with state of the art yet freely and transparently available technology.

Currently only the SOLAS-Match component of the SOLAS platform is open sourced, the productivity components used as ITS2.0 and ITS2.0 <-> XLIFF Mapping reference implementations will be open sourced by the end of 2013. All above described SOLAS components will be distributed through TRF github repository under the LGPL.

<http://www.therosettafoundation.org/trommons/technology-resources/>

<http://trommons.org/>

<https://github.com/TheRosettaFoundation/SOLAS-Match>

5. APPENDIX

22-NOV-2013 11:24 FROM paul dillon

TO conor

P.001/001



UNIVERSITY of LIMERICK

O L L S C O I L L U I M N I G H

Technology Transfer Office

Date: 22nd November 2013

Subject: Licensing of Intellectual Property to The Rosetta Foundation

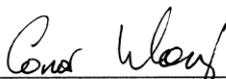
To whom it concerns,

I can confirm that the University of Limerick is in the process of licensing the following intellectual property to The Rosetta Foundation:

- *Workflow Recommender*
The workflow recommender responds to the need of higher automation in localisation projects.
- *LocConnect*
Localisation Orchestration Framework LocConnect uses XLIFF as a vehicle to exchange localisation data and metadata among different tools and services. It supports the ad-hoc connection of distributed localisation components, and facilitates the automation of execution of workflows. It can not only provide web service integration, but it can also act as a localisation data repository.
- *Localisation Knowledge Repository (LKR)*
Enables users to check text against user-defined guidelines (rather than a set list of controlled languages or style rules), check text regardless of what application was used to develop it and store localisation-relevant metadata in an XLIFF project file (which can be reused throughout the rest of the localisation process)
- *XLIFF Phoenix*
Natively use XLIFF files as translation memories and recover from them localisation data and metadata with the XLIFF Phoenix tool that has been developed.
- *MT-Mapper*
Automated Optimal Machine Translation System (MT) Selection supporting XML Localization Interchange File Format (XLIFF)

The University of Limerick has previously licensed technology to The Rosetta Foundation and thus is confident that the intellectual property listed above can be licensed in the near future.

Regards,



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TOTAL P.001