

Multi-Language Support

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HL7 FHIR DevDays 2021, Virtual Edition, June 7–10, 2021 | @HL7 | @FirelyTeam | #fhirdevdays | www.devdays.com

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Scope and Agenda

- What if one implements FHIR in a multi-lingual environment?
 - A country could have multiple official languages, or one may be involved in some cross border exchange of FHIR resources.
 - This presentation provides an overview of the various features offered by FHIR (and HTTP) for dealing with multiple languages, as well as some examples and best practices. The audience is assumed to be familiar with the basics of FHIR.
- Language declaration, Language HTTP Tag, Terminologies, Translations, Questionnaires

FHIR & Human Language

- The language used by a resource
 - may be one single unknown/implicit or specified language
 - may contain multiple representations of the same content
- See <http://build.fhir.org/languages.html> for details. This is the go-to place in the FHIR spec for all language related aspects.

Language Declaration, adding Multiple Representations



Language Tag on Resources

- Not all the content has to be in the base language.
- Resource.language should not be assumed to apply to the narrative automatically.

2.27.3 Resource Content

Name	Flags	Card.	Type	Description & Constraints
Resource	«I» N		Base	Base Resource Elements defined in Ancestors: Logical id of this artifact
id	Σ	0..1	id	Logical id of this artifact
meta	Σ	0..1	Meta	Metadata about the resource
implicitRules	?! Σ	0..1	uri	A set of rules under which this content was created
language		0..1	code	Language of the resource content Common Languages (Preferred but limited to AllLanguages)

```

<Patient xmlns="http://hl7.org/fhir">
  <meta>
    <profile value="https://..fgov.be/..be-patient" />
  </meta>
  <language value="nl-BE"/>
  < .. Other content ../>
</Patient>
  
```

HTTP Header: Content-Language

- Content-Language (e.g. in HTTP responses) should match the value of the language tag of a resource (if present)
 - Content-Language: en-US

Language & Narrative Text

- Use a xml:lang attribute on a top-level 'div' within the Narrative section
- Display: all languages by default
- Language aware systems can filter

```
<Patient xmlns="http://hl7.org/fhir">
  <language value="nl-BE"/>
  <text>
    <status value="generated"/>
    <div xml:lang="nl" xmlns="http://www.w3.org/1999/xhtml">
      <div xml:lang="nl" >
        <p> Mevrouw Katja M. Vercouteren, V,
          geboortedatum 11 December 1989</p>
        <p> SSIN: 89121137740.</p>
      </div>
      <div xml:lang="fr">
        <p> Mme Katja M. VERCOUTEREN, F,
          Née le 11 Decembre 1989</p>
        <p> SSIN: 89121137740.</p>
      </div>
    </div>
  </text>
```

Narrative – English/Swedish example

```
"text": {  
  "status": "generated",  
  
  "div": "<div xmlns=http://www.w3.org/1999/xhtml>  
<p><b>Encounter</b></p>  
<p><b>Patient</b>: SMART, NANCY</p>  
<p><b>Location</b>: Model Hospital, MX Hospital, NU05, 102, A</p>  
</div>"  
  
  "div": "<div lang='sv' xmlns=http://www.w3.org/1999/xhtml>  
<p><b>Vårdkontakt</b></p>  
<p><b>Patient</b>: SMART, NANCY</p>  
<p><b>Plats</b>: Model Hospital, MX Hospital, NU05, 102, A</p>  
</div>"  
  
},
```


Language Extension

- Extension used to specify the language of each repeat, in case of repeating items (e.g. name, address)

Extension: Human Language

<http://hl7.org/fhir/StructureDefinition/language>

The Human Language of the item.

Comment:

This is used where an item may repeat to indicate the language of each repeat.

Context of Use: Use on Element ID HumanName, Element ID Address or Element ID Annotation

Extension Content

Summary
Full Structure
XML
JSON
All

Summary

Name	Flags	Card.	Type	Description & Constraints ?
★ Human Language		1..1	code	URL = http://hl7.org/fhir/StructureDefinition/language Human Language: The Human Language of the item.

Binding: [Common Languages \(preferred\)](#)
Use on Element ID HumanName, Element ID Address or Element ID Annotation

Language Extension: Belgian Address example

```
<address>
  <extension url="http://hl7.org/fhir/StructureDefinition/language">
    <valueCode value="fr" />
  </extension>
  <use value="home" />
  <text value="2, Avenue Gustave Latinis, 1030 Schaerbeek" />
  <line value="2, Avenue Gustave Latinis"/>
  <city value="Schaerbeek" />
  <postalCode value="1030" />
  <country value="BE" />
</address>
<address>
  <extension url="http://hl7.org/fhir/StructureDefinition/language">
    <valueCode value="nl" />
  </extension>
  <use value="home" />
  <text value="Gustave Latinislaan 2, 1030 Schaarbeek" />
  <line value="Gustave Latinislaan 2"/>
  <city value="Schaarbeek" />
  <postalCode value="1030" />
  <country value="BE" />
</address>
```

Translation Extension

<Observation>

...

```

<valueString value="Patient loves to sing">
  <extension url="http://hl7.org/fhir/StructureDefinition/translation">
    <extension url="lang">
      <valueCode value="de"/>
    </extension>
    <extension url="content">
      <valueString value="Patient singt gerne"/>
    </extension>
  </extension>
</valueString>

```

....

</Observation>

Extension: Translation

<http://hl7.org/fhir/StructureDefinition/translation>

Language translation from base language of resource to another language.

Context of Use: Use on Element ID string, Element ID code or Element ID markdown

Extension Content

Summary

Full Structure

XML

JSON

All

Summary

Name	Flags	Card.	Type	Description & Constraints
Translation	*	0..*	Extension	URL = http://hl7.org/fhir/StructureDefinition/translation Translation: Language translation from base language of resource to another language.
lang	*	1..1	code	Use on Element ID string, Element ID code or Element ID markdown Code for Language.
content	*	1..1	string, markdown	Content in other Language.

Requested Language, HTTP Tag



Accept-Language HTTP Header

- Requester can indicate requested language, which servers could use to return the correct language
 - Accept-Language: de-DE
- FHIR server SHOULD respond using the requested language (by filtering the correct language representation if there are multiple, by means of auto translation, by using terminology servers, etc.)
- E.g. when searching on text / textual values

Code Systems and Value Sets



Designations

- CodeSystem.concept.designation and ValueSet.compose.include.concept.designation can be used to provide alternative designations of a concept

```

{
  "code": "de",
  "display": "German",
  "designation": [{
    "language": "ru",
    "value": "Немецкий"
  },
  {
    "language": "zh",
    "use": {
      "system": "http://terminology.hl7.org/CodeSystem/designation-usage",
      "code": "display"
    },
    "value": "德语"
  }
]
}

```

Resource.language = en,
 where 'de' has Display 'German',
 And alternate designations in ru
 and zh.

Value Set expansion for a specific Language

- \$expand operation has a displayLanguage parameter
 - Returns a language specific value set
 - Note: not just 'language', but also patient-friendly-terms, or basic-english-for-non-native-speakers as 'languages'
- Persist (expanded) value sets on a per language basis

Automatic Translation



Translation Recommendations

- At run time (patient safety risk)
 - Less so for administrative resources
- Coding systems, questionnaires and other ‘reference material / registries’: translate once and persist.
- Trade off:
 - Resources that are likely to be frequently updated: use run time translation
 - Resources that are unlikely to be updated: perform a once off translation, persist translated version

Questionnaires



Questionnaires

- Option 1: add multiple languages to 1 Q
 - Lots and lots of extensions, unmanagable
- Option 2: language specific Qs
 - Master template (non-FHIR) which holds translations of the questions
 - Use (persisted) language specific value sets

StructureDefinitions



Structure Definition

- If a vendor were to be active in an x number of countries, how would they support x languages in their Structure Definitions (and IGs) ?

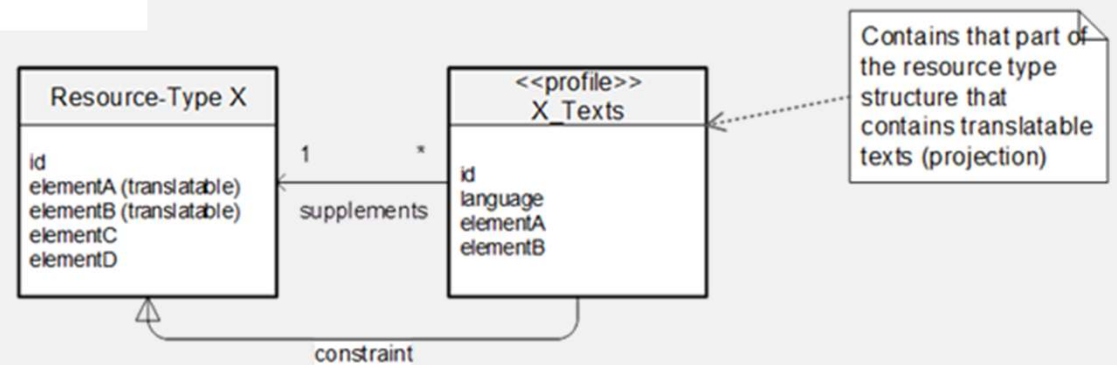
Extension Content

Summary Full Structure XML JSON All

Summary

Name	Flags	Card.	Type	Description & Constraints
translatable		0..1	boolean	URL = http://hl7.org/fhir/StructureDefinition/elementdefinition-translatable translatable: Whether translations might be expected for this element in resource instances.

Use on Element ID ElementDefinition



Summary



Summary

- Use language declarations in resources
- Add a list of translations
- Persist language specific versions of (expanded) value sets
- Persist language specific versions of questionnaires
- Support Accept-Language HTTP header to request a specific language

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