

The European Commission's science and knowledge service

Joint Research Centre

Pilot project on EU Disaster damages and losses database

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Workshop on INSPIRE extension



Outline

- Context
- INSPIRE core schemas extension
- Data harmonisation workflow
- Next steps

Aim of the Pilot

- To harmonize relevant natural hazard/risk data/service requirements contained in INSPIRE legislative and technical framework (e.g. Data specification on Natural Risk Zones) with the Guidance for Recording and Sharing Disaster Damage and Loss Data.
- To show the feasibility of a workflow in which the EU Member States provide one set of spatial data services conformant to the requirements contained in both the legal frameworks.

EU legislative framework

- **EU– INSPIRE Directive** (since 2007)
 - Set of Implementing Rules & Technical Guidelines
- **Decision on a Union Civil Protection Mechanism** (since 2014)
 - Guidance for Recording and Sharing Disaster Damage and Loss Data 2015



International activities/frameworks

- **GEO/GEOS SBA – Disaster Resilience**
- **IUGS – CGI**
- **Sendai, SDGs, COP21, UNISDR, OECD..**



Pilot phases

- Phase 1 (December 2015 – April 2016) – scoping of the data harmonization and identification of the main issues
- Phase 2 (April – December 2016) – creation of the common data model (extended INSPIRE model)
- Phase 3 (January–March 2017) – demonstration phase transforming a few MS data sets to the common data model, and deploying and configuring the remaining INSPIRE components (Metadata, Network services on selected 1-2 MS datasets).

Technological scope of the pilot

- Test data discovery through standardised discovery services & metadata
- Test data (re)use and interoperability by adopting common cross-domain models to exchange data
- Test online data access by means of standardised view and download services

Damage and Loss data model



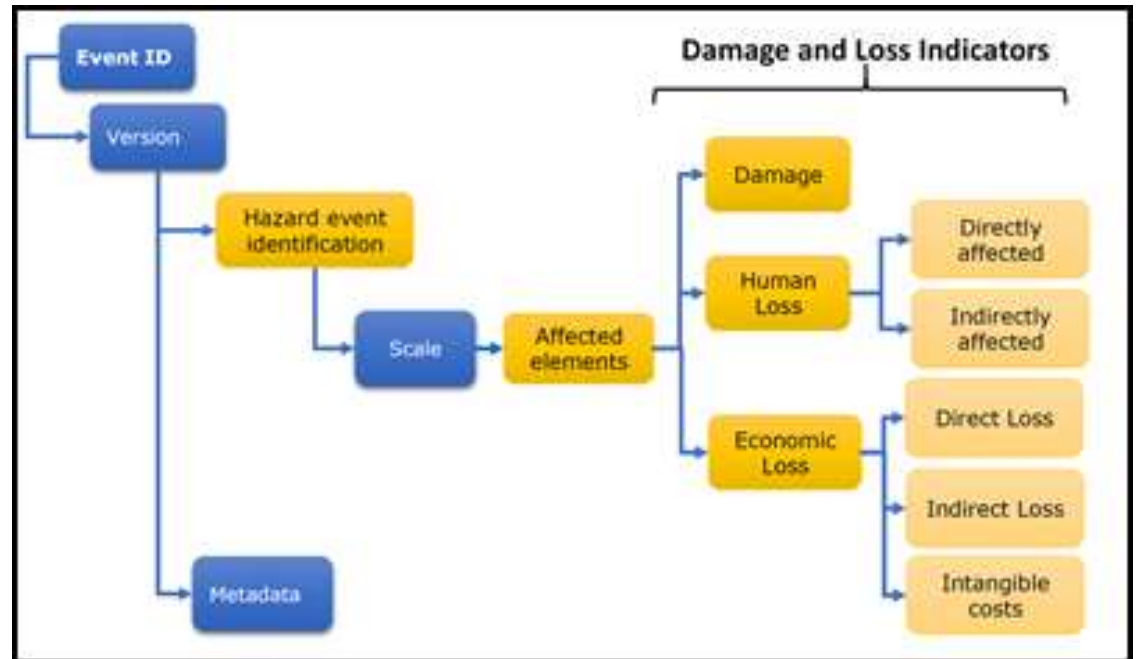
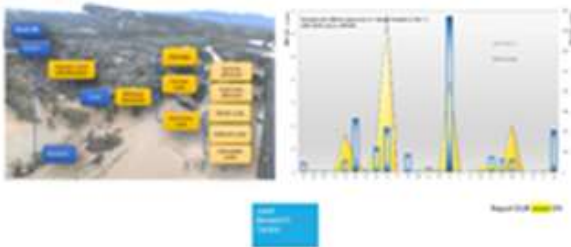
JRC SCIENCE AND POLICY REPORTS

Guidance for Recording and Sharing Disaster Damage and Loss Data

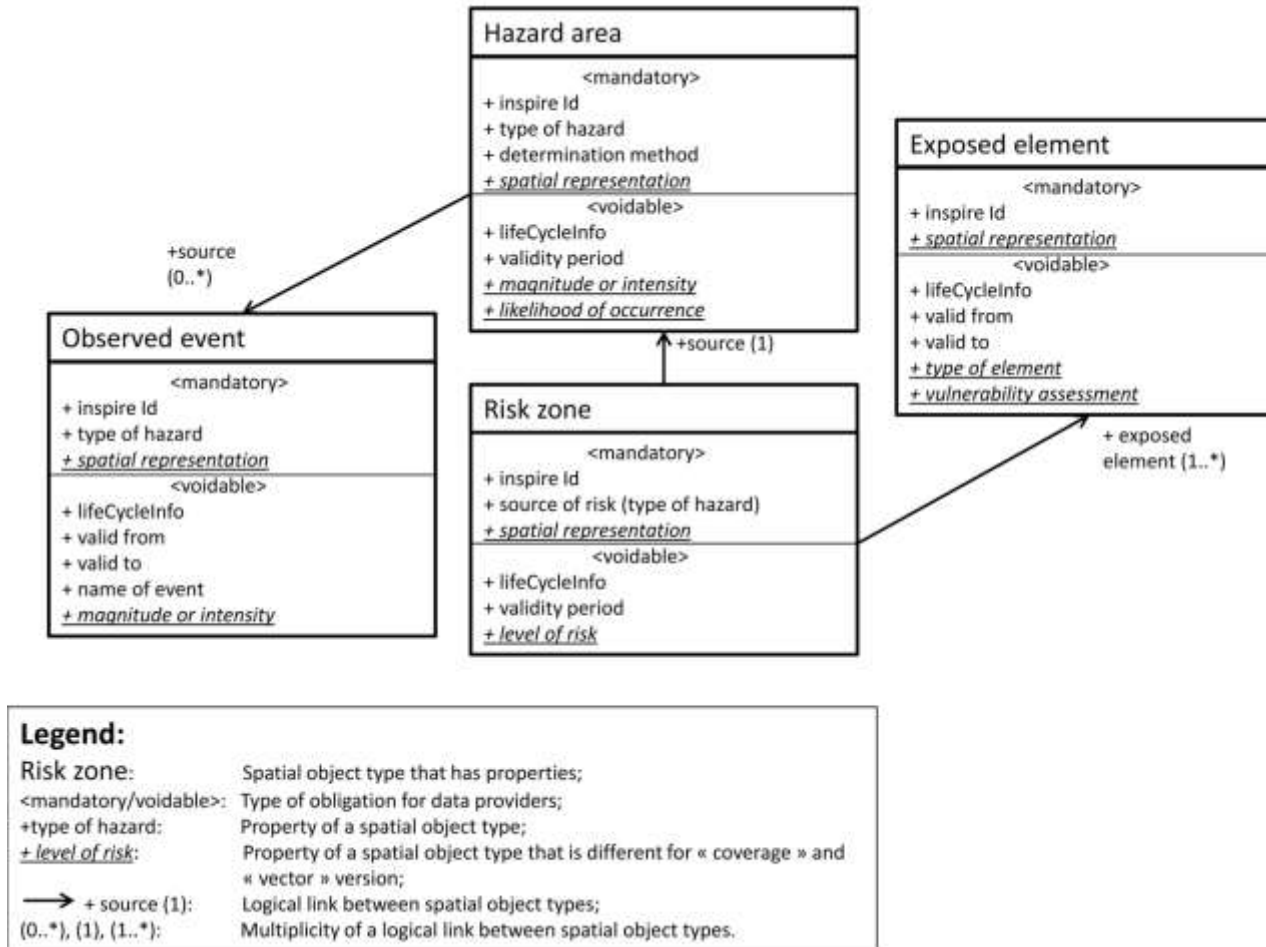
Towards the development of operational indicators to translate the Sendai Framework into action

EU expert working group on disaster damage and loss data

2015



INSPIRE NZ data model



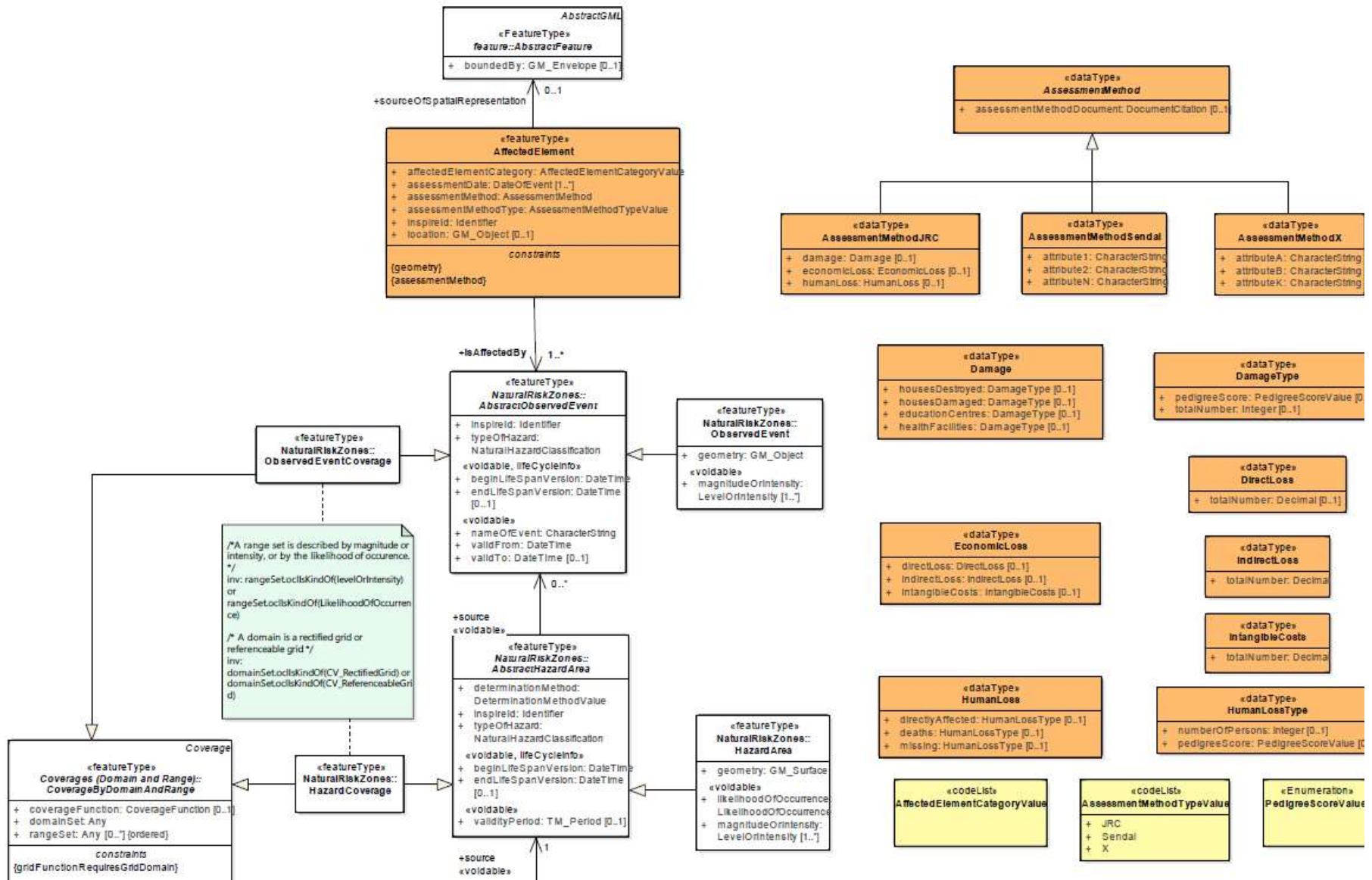
Simplified representation of the main classes of the INSPIRE DS V3.0 UML data model (Tomas R, Barredo J, Harrison M, et al. 2015)

Common data model initial requirements

Two major use cases analysed:

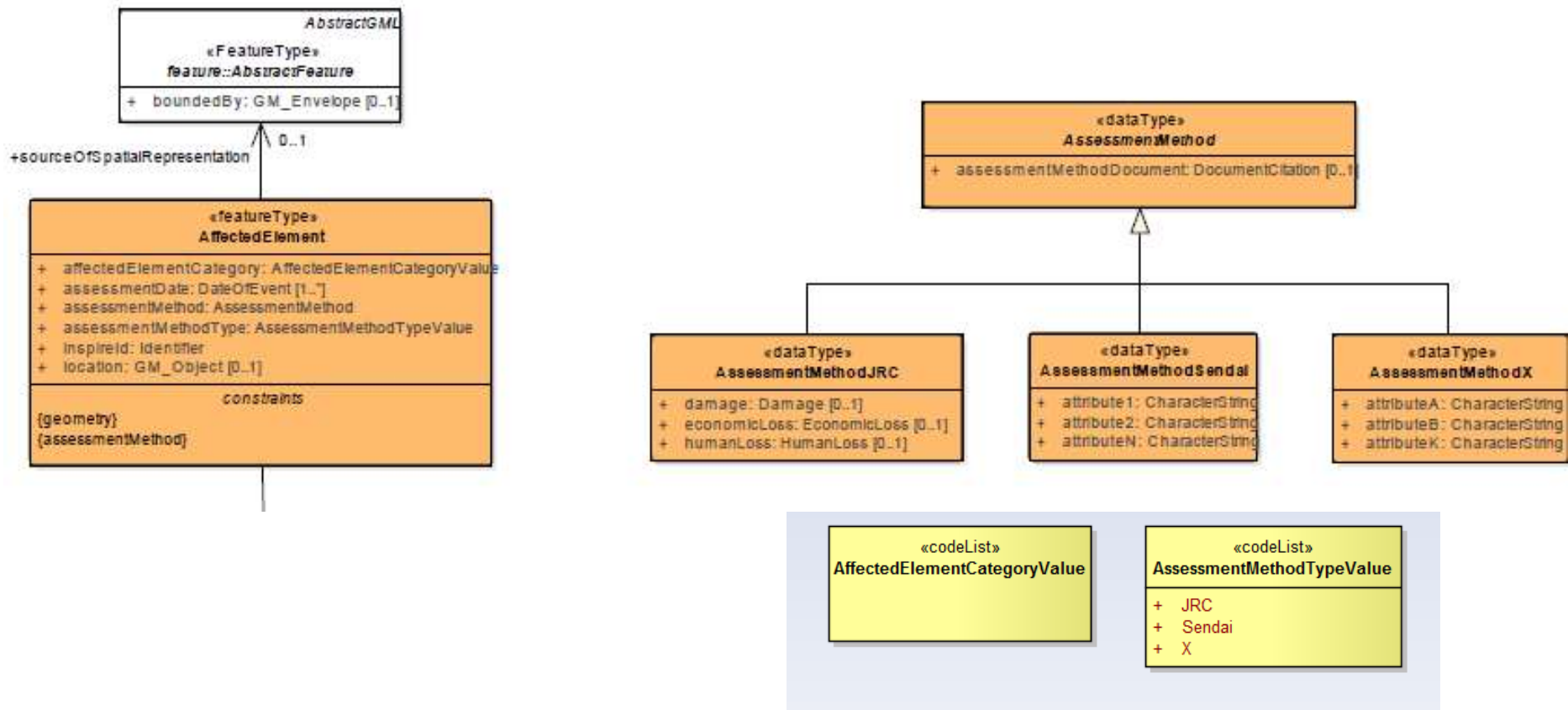
1. Recording of damage & loss data after an event
 - Focus on the damage/economic/human losses recording
2. Provision/maintenance of past event information
 - Focus on the natural hazard event register (landslides, floods, earthquakes..)

Common data model



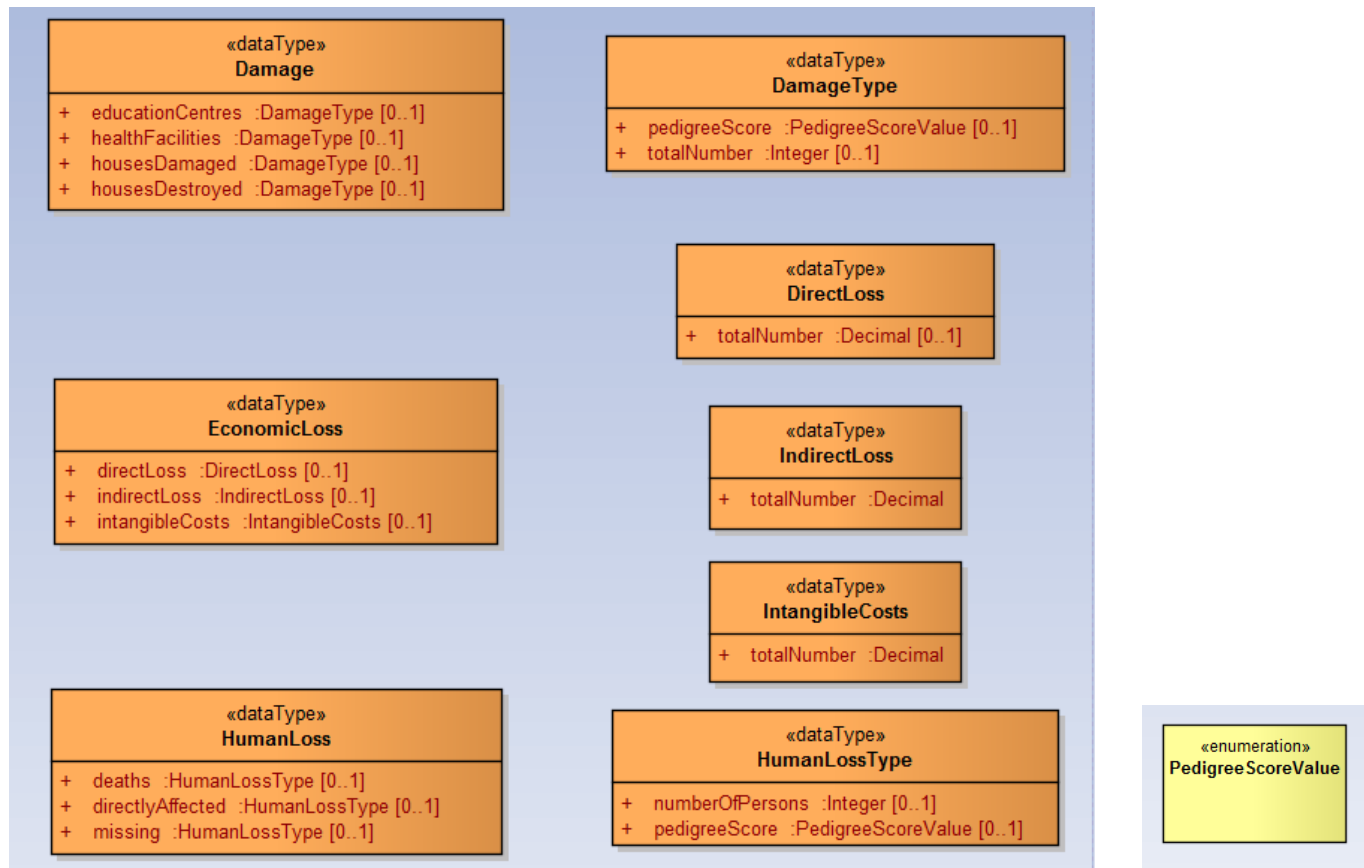
Common data model

Affected Elements, Assessment Method



Common data model

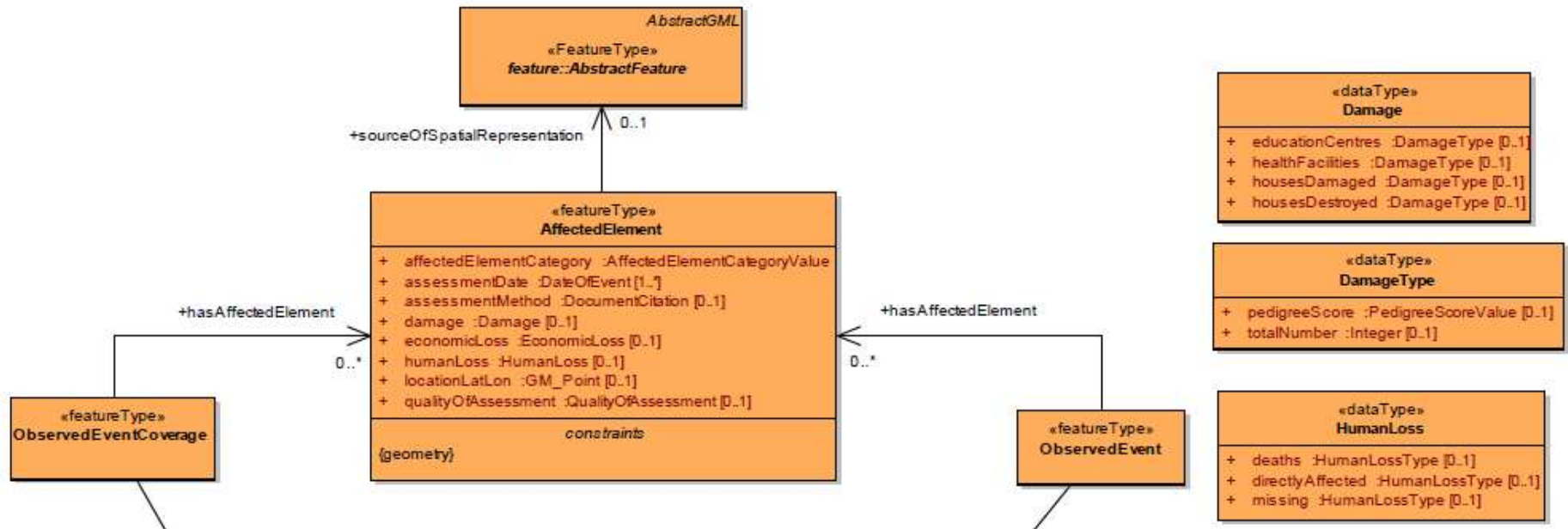
JRC Assessment Method for D&L recording



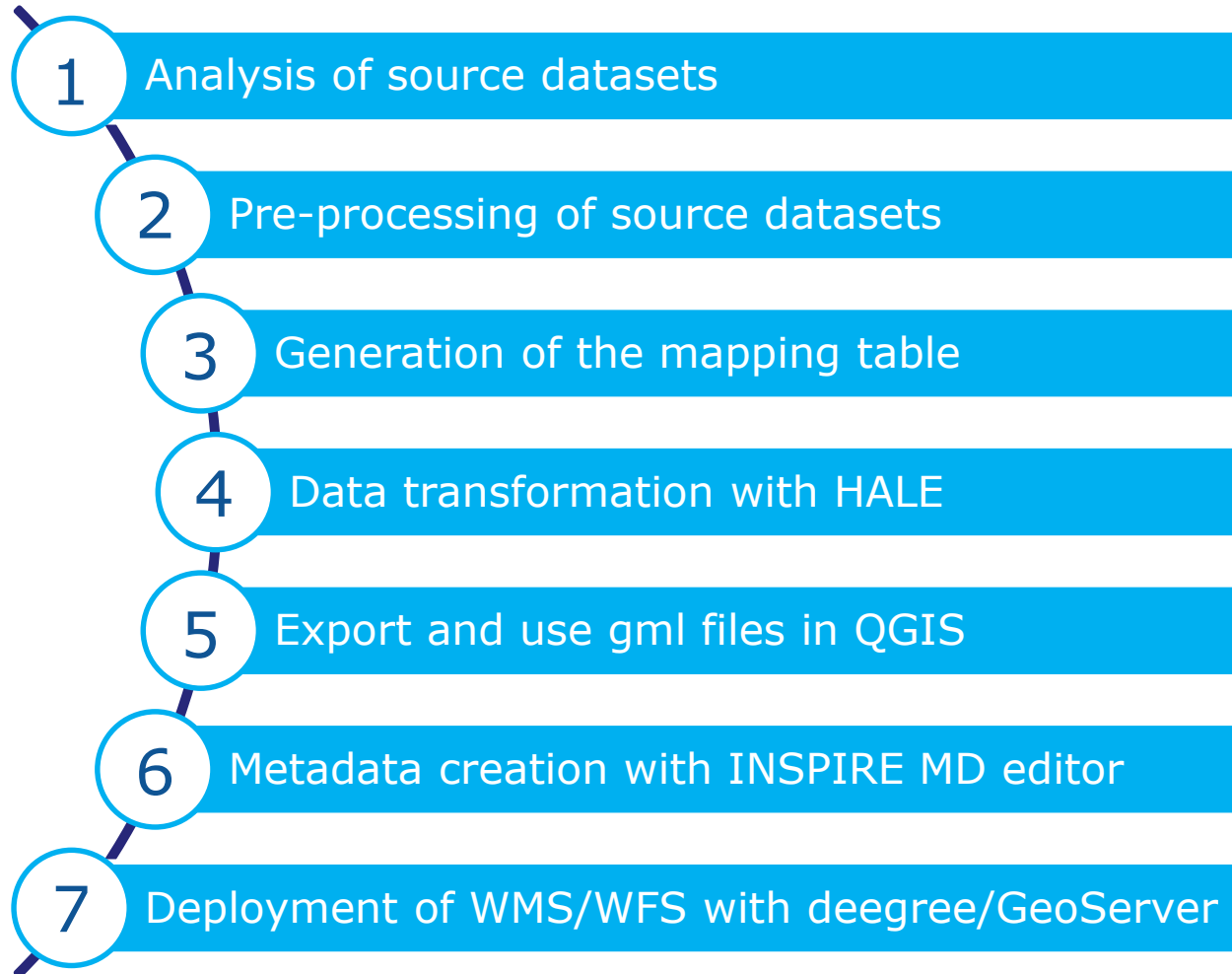
Flexibility of the model

- Geolocation and granularity of the damage & loss data
 - Asset level (object referencing or direct geometry recording)
 - Aggregated / statistical information
- Assessment method used
 - JRC Guidance on D&L Recording
 - Sendai (not yet provided)
 - ...
- Versioning of assessments
- Reliability of data and/or assessment of source
 - PedigreeScore
 - ...
- Use of MD and/or object level information
- Scale of the D&L recording

Common data model – alternative option



Data harmonization/publication workflow



Regione Lombardia Civil Protection use case

- Gml encoding choice
 - Transformation of “Damages” dataset according to L&D target data model, addressing the related phenomenon through “by-internal-reference” encoding of the “isAffectedBy” association
 - Transformation of “Phenomena” dataset mapping to the ObservedEvent FT available in L&D data model
 - Production of 1 gml (containing Damages and Phenomena as 2 different Feature Types at the same level of hierarchy)

Regione Lombardia Civil Protection use case

```
<gml:featureMember>
  <ldm:AffectedElement gml:id="AffectedElement_id_77eb9bd6-6bff-4809-9e3c-21d8492be779"
    <gml:descriptionReference
      xlink:title="Entità e tipo di danno desunti dagli allegati dell'Ordinanza"
    <gml:name>Cod.RASDA 19040-Provv.OCDCPC 226/2015</gml:name>
    <ldm:isAffectedBy xlink:href="#PHEN_RLOMB_7625550f-5764-4327-8194-a2a60698869e"
      xlink:title="ALLUVIONE_Po_11-18_Novembre_2014_Fen.:INONDAZIONE A MEDA"/>
    <ldm:location>
      <gml:Point gml:id="_1e426aa6-1477-4df9-a350-fbac8bca52ff"
```

```
<gml:featureMember>
  <nz-core:ObservedEvent gml:id="PHEN_RLOMB_7625550f-5764-4327-8194-a2a60698869e">
    <nz-core:beginLifeSpanVersion>2017-02-16T23:00:00Z</nz-core:beginLifeSpanVersion>
    <nz-core:inspireId>
      <base:Identifier>
        <base:localId>PHEN_RLOMB_7625550f-5764-4327-8194-a2a60698869e</base:localId>
        <base:namespace>events_20140101_20141230_lombardia</base:namespace>
      </base:Identifier>
    </nz-core:inspireId>
    <nz-core:nameOfEvent>ALLUVIONE_Po_11-18_Novembre_2014_Fen.:INONDAZIONE A
      MEDA</nz-core:nameOfEvent>
    <nz-core:typeOfHazard>
      <nz-core:NaturalHazardClassification>
        <nz-core:hazardCategory
          xlink:href="http://inspire.ec.europa.eu/codelist/NaturalHazardCategoryValue/flood"
          xlink:title="ALLUVIONE_Po_11-18_Novembre_2014"/>
        <nz-core:specificHazardType
          xlink:href="http://inspire.ec.europa.eu/codelist/SpecificHazardTypeValue"
          xlink:title="INONDAZIONE A MEDA"/>
      </nz-core:NaturalHazardClassification>
```

Regione Lombardia Civil Protection use case

```
<gml:featureMember>
  <ldm:AffectedElement gml:id="AffectedElement_id_77eb9bd6-6bff-4809-9e3c-21d8492be779"
    <gml:descriptionReference
      xlink:title="Entità e tipo di danno desunti dagli allegati dell'Ordinanza"
    <gml:name>Cod.RASDA 19040-Provv. OCDPC 226/2015</gml:name>
    <ldm:isAffectedBy xlink:href="#PHEN_RLOMB_7625550f-5764-4327-8194-a2a60698869e"
      xlink:title="ALLUVIONE_Po_11-18_Novembre_2014_Fen.:INONDAZIONE A MEDA"/>
    <ldm:location>
      <gml:Point gml:id="_1e426aa6-1477-4df9-a350-fbac8bca52ff"

```

Deegree transforms the internal #reference in a WFS query

```
- <wfs:member>
- <ldm:AffectedElement xmlns:ldm="http://www.epsilon-italia.it/public/LossDataModel/schemas/1.0" gml:id="AffectedElement_id_77eb9bd6-6bff-4809-9e3c-21d8492be779">
  <gml:descriptionReference/>
  <gml:name>Cod.RASDA 19040-Provv. OCDPC 226/2015</gml:name>
  <ldm:isAffectedBy xmlns:xlink="http://www.w3.org/1999/xlink" xlink:href="http://localhost:8080/services/ldm_WFS?SERVICE=WFS&VERSION=2.0.0&REQUEST=GetFeature&OUTPUTFORMAT=application%2Fgml%2Bxml%3B+version%3D3.2&STOREDQUERY_ID=urn:ogc:def:query:OGC-WFS::GetFeatureById&ID=PHEN_RLOMB_7625550f-5764-4327-8194-a2a60698869e#PHEN_RLOMB_7625550f-5764-4327-8194-a2a60698869e"/>
- <ldm:location>
  <!--Inlined geometry '_1e426aa6-1477-4df9-a350-fbac8bca52ff'-->
  <gml:Point gml:id="_1e426aa6-1477-4df9-a350-fbac8bca52ff"

```

Regione Lombardia Civil Protection use case

The screenshot displays the QGIS 2.18.7 desktop environment. The main map area shows a layer named 'AffectedElement' with several green circular markers. A 'WFS 2.0 Client - Version 0.9.8 beta' dialog box is open, showing the following configuration:

- WFS 2.0 OnlineResource:** `http://localhost:8080/services/Idm_WFS?`
- Authentication required
- Buttons: `List FeatureTypes`, `List StoredQueries`
- Feature Types:** `Idm:AffectedElement` (selected in dropdown), `Idm:AffectedElement` (in text field)
- Buttons: `Metadata`, `Show Extent`
- Use current Extent as Bounding Box Filter
- FeatureLimit: `100`
- SRS: `urn:ogc:def:crs:EPSG::4258`
- Button: `GetFeature(s)`

The status bar at the bottom shows coordinates `8.9704, 45.5744`, scale `1:191.230`, magnifier `100%`, rotation `0,0`, and SRS `EPSG:4258`.

Regione Lombardia Civil Protection use case

Informazioni risultati

Geometria	Valore
AffectedElement	
name	Cod.RASDA 18098-Provv.OCDPC 208/2014
(Derivato)	
(Azioni)	
gml_id	AffectedElement_id_041998ed-e5f6-4a48-b59c-feb7d6366664
name	Cod.RASDA 18098-Provv.OCDPC 208/2014
ObservedEvent_nz-core	http://inspire.ec.europa.eu/schemas/nz-core/4.0
ObservedEvent_id	PHEN_RLOMB_0798f801-4bd0-4d67-8681-40c3bddcf052
beginLifeSpanVersion	2017-02-16T23:00:00Z
Identifier_base	http://inspire.ec.europa.eu/schemas/base/3.3
localId	PHEN_RLOMB_0798f801-4bd0-4d67-8681-40c3bddcf052
namespace	events_20140101_20141230_Lombardia
nameOfEvent	ALLUVIONE_Provincia_Milano-08/07/2014_Fen.:INONDAZIONE A MILANO
hazardCategory_xlink	http://www.w3.org/1999/xlink
hazardCategory_href	http://inspire.ec.europa.eu/codelist/NaturalHazardCategoryValue/flood
specificHazardType_xlink	http://www.w3.org/1999/xlink
specificHazardType_href	http://inspire.ec.europa.eu/codelist/SpecificHazardTypeValue
validFrom	2014-07-08T12:00:00Z
validTo	2014-07-08T12:00:00Z
qualitativeValue	Pièe rapide e improvvise o repentine (FLASH FLOODS)
quantitativeValue_nil	1
quantitativeValue_uom	
assessmentMethod_nil	1
Identifier_base_	http://inspire.ec.europa.eu/schemas/base/3.3
inspireId Identifier localId	DAM_RLOMB_ad00d196-02ee-4a3a-97d0-04231a3856c1
inspireId Identifier namespace	EV_f09de7ba-8ce7-4b0a-972e-e769c0a83637
DocumentCitation_base2	http://inspire.ec.europa.eu/schemas/base2/2.0
DocumentCitation_id	_54873e87-f108-4217-b0e0-e869899ca987
identifier_codeSpace	ISBN
identifier	978-92-79-47452-1
assessmentMethod Assessment...	Guidance for Recording and Sharing Disaster Damage and Loss Data
CI_Date_gmd	http://www.isotc211.org/2005/gmd
Date_gco	http://www.isotc211.org/2005/gco
Date	2015
CI_DateTypeCode_codeList	http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/codelist/gmxCodeLists.xml#CI_DateTypeCode
CI_DateTypeCode_codeListValue	publication
CI_DateTypeCode	publication
link	http://drr.irc.ec.europa.eu/Portals/0/Loss/JRC_guidelines_loss_data_recording_v10.pdf
totalNumber	900000
DateOfEvent_bu-base	http://inspire.ec.europa.eu/schemas/bu-base/4.0
anyPoint	2014-07-07T22:00:00Z
isAffectedBy_xlink	

Modalità Tutti i livelli Apri modulo automaticamente

Vista Albero Guida

European Commission

Next steps

- Identification of use cases showing a multi-actor cooperation scenario, e.g.
 - harmonization of past events and damages datasets coming from two different organisations
 - better risk assessment
 - harmonization of source datasets from other regions/MS
 - fast assessment of damages and losses of an event comparing damages and losses of past events in the same area and with similar characteristics.

More information

INSPIRE

- <http://inspire.jrc.ec.europa.eu/>

INSPIRE Thematic Clusters

- <https://themes.jrc.ec.europa.eu/>

INSPIRE GeoPortal

- <http://inspire-geoportal.ec.europa.eu/>

INSPIRE Registry

- <http://inspire.ec.europa.eu/registry/>

INSPIRE data specifications

- <http://inspire-regadmin.jrc.ec.europa.eu/dataspecification/>

Towards a cross-domain interoperable framework hazards and disaster risk reduction information

(Tomas R, Barredo J, Harrison M, et al. 2015; DOI: DOI: 10.1007/s11069-015-1786-7)

