Harmoniser ses données Annexe I

Cas de données du MNHN

Plan de la présentation

- Le MNHN et la directive INSPIRE
- Principe de l'harmonisation des données
- Étapes de la transformation
 - Analyser le schéma source
 - Analyser le schéma cible et préparer les données
 - Procéder à l'harmonisation
 - Visualiser les données transformées
- Conclusions et perspectives

Le MNHN et la Directive INSPIRE

Guillaume Grech - MNHN

Base nationale *Espaces protégés*

Inspire définit le thème *sites protégés* : « Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives » :

Correspond à l'intégralité de la base Espaces protégés + sites Natura 2000 (DH et DO)...

Base de donnée dont le Muséum est gestionnaire et responsable
Intègre, consolide, certifie la conformité par rapport à la méthodologie et diffuse des données en provenance des DIREN / DREAL (APB, RNN / RNC, PN, PNR, RAMSAR), de l'ONF (RBD), de l'ONCFS (RNCFS), du MAB et du CdL (sites acquis).

En 2010, mandat du ministère pour constituer la réponse de la France à Inspire, sur ce thème, à partir de cette base :

- Métadonnées accessibles sur le Géocatalogue
- Données disponibles via web-services WxS (Carmen)
- Prochaine étape : diffusion des données dans les modèles spécifiés et rapprochement du projet Nature SDI+

Principe de l'harmonisation

Principe générique

Les étapes

Attribute: siteProtectionClassification

Value type:	ProtectionClassificationValue
Definition:	The classification of the protected site based on the purpose for protection.
Description:	The site may have more than one classification.
Multiplicity:	1..*
Stereotypes:	«voidable»

5.2.2.3 Enumerations and code lists

5.2.2.3.1 ProtectionClassificationValue

ProtectionClassificationValue	
Definition:	The protected site classification based on the purpose of protection.
Status:	Proposed
Stereotypes:	«enumeration»
Value: natureConservation	
Definition:	The Protected Site is protected for the maintenance of biological diversity.
Value: archaeological	
Definition:	The Protected Site is protected for the maintenance of archaeological heritage.

Le format GML 3.2.1

- GML = Geography Markup Language
- Langage dérivé du XML pour encoder, manipuler et échanger des données géographiques.
- Standard développé par l'Open Geospatial Consortium pour garantir l'interopérabilité des données dans le domaine de l'information géographique et de la géomatique
- Version 3.2.1 date de 2007

Exemple d'un fichier GML

```
-<gml:featureMember>
  -<ps:ProtectedSite gml:id="FR3400003">
    -<ps:geometry>
      +<gml:Polygon srsName="urn:ogc:def:crs:EPSG::4258" gml:id="LOCAL_ID_0"></gml:Polygon>
    </ps:geometry>
    +<ps:inspireID></ps:inspireID>
    <ps:legalFoundationDate>1967-03-23T00:00:00Z</ps:legalFoundationDate>
    +<ps:legalFoundationDocument></ps:legalFoundationDocument>
    +<ps:siteDesignation></ps:siteDesignation>
    +<ps:siteName></ps:siteName>
    <ps:siteProtectionClassification>natureConservation</ps:siteProtectionClassification>
  </ps:ProtectedSite>
</gml:featureMember>
-<gml:featureMember>
  -<ps:inspireID>
    -<base:Identifier>
      <base:localId>FR3400003</base:localId>
      <base:namespace>FR</base:namespace>
      <base:versionId nilReason="" xsi:nil="true"/>
    </base:Identifier>
  </ps:inspireID>
```

Analyser le schema source et préparer les données

Exemple de la couche des Parcs Nationaux du MNHN

The screenshot displays the QGIS 1.5.0-Tertius interface. The main map area shows several national parks highlighted in light blue. An attribute table window titled 'Table d'attributs: Parcs_nationaux (10 entités)' is open, showing the following data:

ID_SPN	ID_DIREN	NOM	SUPERFICIE	DATE_
0	FR3300001	Normandie (11a)	4.3299000000e+004	04/07/1963
1	FR3300002	Port-Cros	2.4750000000e+003	14/12/1963
2	FR3300003	Pyénées occidentales (11a)	4.5707000000e+004	23/03/1967
3	FR3300004	Cévennes (11a)	9.1279000000e+004	02/09/1970
4	FR3300005	Ecône (11a)	9.1800000000e+004	27/03/1973
5	FR3300006	Mercentor (11a)	6.8900000000e+004	18/08/1979
6	FR3400001	Normandie (aire d'adhésion)	1.4363700000e+005	06/07/1963
7	FR3400003	Pyénées occidentales (aire d'adhésion)	2.0635200000e+005	23/03/1967
8	FR3400004	Cévennes (aire d'adhésion)	2.2972600000e+005	02/09/1970
9	FR3400005	Ecône (aire d'adhésion)	1.7867300000e+005	27/03/1973

The interface also shows a toolbar, a layer list with 'Parcs_nationaux' selected, and a coordinate system of 'EMM1 OSN'. The status bar at the bottom indicates the current coordinates as 536314,6546902 and a scale of 1:96127476084.

Le schéma source

Données disponibles, mais pas localisées dans les mêmes tables / schémas...et pas toujours du même niveau

Préparation des données

On construit une vue rassemblant tous les attributs obligatoires

GEO	ID_SPN	VERSION	TXT_SOURCE	TYPE_PROT	DESIG_VALUE	PERCENTAGE	NAME_STATUS_VALUE	NATIVENESS_VALUE	SOURCE_OF_NAME	SCRIPT	NOM	PROT_CLASS_VALUE
(2003::(1:1003:1:.....))	FR3300001	2010	http://www.legifrance.gouv.fr/texteconsolide/UPHJX.htm	nationalPark	UICN	100	official	endonym	unknown	Letn	Vanoise [clur]	natureConservation
(2003::(1:1003:1:.....))	FR3300002	2010	http://www.legifrance.gouv.fr/texteconsolide/UPHJW.htm	nationalPark	UICN	100	official	endonym	unknown	Letn	Port-Cros	natureConservation
(2003::(1:1003:1:.....))	FR3300003	2010	http://www.legifrance.gouv.fr/texteconsolide/UPHJY.htm	nationalPark	UICN	100	official	endonym	unknown	Letn	Pyrénées occidentales [clur]	natureConservation
(2007::(1:1003:1:21619;2003:1:218))	FR3300004	2010	http://www.legifrance.gouv.fr/texteconsolide/UPHJZ.htm	nationalPark	UICN	100	official	endonym	unknown	Letn	Cévennes [clur]	natureConservation
(2003::(1:1003:1:.....))	FR3300005	2010	http://www.legifrance.gouv.fr/texteconsolide/UPHKA.htm	nationalPark	UICN	100	official	endonym	unknown	Letn	Ecirins [clur]	natureConservation
(2003::(1:1003:1:.....))	FR3300006	2010	http://www.legifrance.gouv.fr/texteconsolide/UPHKB.htm	nationalPark	UICN	100	official	endonym	unknown	Letn	Mercantour [clur]	natureConservation
(2007::(1:1003:1:19339;1003:1:.....))	FR3400001	2010	http://www.legifrance.gouv.fr/texteconsolide/UPHJX.htm	nationalPark	UICN	100	official	endonym	unknown	Letn	Vanoise [aire d'adhésion]	natureConservation
(2003::(1:1003:1:.....))	FR3400003	2010	http://www.legifrance.gouv.fr/texteconsolide/UPHJY.htm	nationalPark	UICN	100	official	endonym	unknown	Letn	Pyrénées occidentales [aire d'adhésion]	natureConservation
(2007::(1:1003:1:54219;2003:1:547))	FR3400004	2010	http://www.legifrance.gouv.fr/texteconsolide/UPHJZ.htm	nationalPark	UICN	100	official	endonym	unknown	Letn	Cévennes [aire d'adhésion]	natureConservation
(2007::(1:1003:1:6511;2003:1:.....))	FR3400005	2010	http://www.legifrance.gouv.fr/texteconsolide/UPHKA.htm	nationalPark	UICN	100	official	endonym	unknown	Letn	Ecirins [aire d'adhésion]	natureConservation
(2007::(1:1003:1:24727;1003:1:.....))	FR3400006	2010	http://www.legifrance.gouv.fr/texteconsolide/UPHKB.htm	nationalPark	UICN	100	official	endonym	unknown	Letn	Mercantour [aire d'adhésion]	natureConservation

Mise en place de Geoserver

Installation de Geoserver 2.1+ plugin pour la connexion à Oracle

The screenshot shows the GeoServer web interface in a browser window. The address bar shows the URL: `http://localhost:8080/geoserver/web/?wicket:bookmarkablePage=:org.geoserver.web.demo.MapPreviewPage`. The browser's menu bar includes 'Fichier', 'Edition', 'Affichage', 'Favoris', and 'Outils'. The browser's address bar shows 'GeoServer: Prévisualisation de la couche'. The main content area is titled 'Prévisualisation de la couche' and contains the following text: 'Liste toutes les couches configurées dans GeoServer et fournit plusieurs modalités d'affichage pour chaque couche.' Below this text is a table with the following structure:

Type	Nom	Titre	Formats usuels	Tous les formats
☒	inspire:PN_INSPIRE	PN_INSPIRE	OpenLayers KML GML	Choisir une couche

The table also includes navigation controls: '<< < | > >>' and 'Résultats 1 à 1 (sur 1 possibles)'. The left sidebar contains a navigation menu with sections: 'Serveur' (État du service, GeoServer Logs, Information sur le point de contact, À propos de GeoServer), 'Données' (Prévisualisation de la couche, Espaces de travail, Entrepôts, Couches, Aggrégations de couches, Styles), 'Services' (WCS, WFS, WMS), and 'Settings' (Globale, GeoWebCache). The top right corner of the interface has a 'Conn' link.

Diffusion en WFS de la couche

- Récupération du schéma de données
- Récupération de la donnée en GML 3.1

The image displays two screenshots of a web browser window showing the output of a WFS service. The browser address bar indicates the URL: `http://localhost:8080/geoserver/inspire/ows?service=WFS&version=1.0.0&request=GetFeature&typeName=inspire:PN_INSPIRE3ma:Features=50`.

Left Screenshot (DescribeFeatureType response):

```
<?xml version="1.0" encoding="UTF-8" ?>
<wfs:FeatureCollection xmlns="http://www.opengis.net/wfs" xmlns:wfs="http://www.opengis.net/wfs" xmlns:gml="http://www.opengis.net/gml"
xmlns:inspire="http://localhost:8080/geoserver/web/" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://localhost:8080/geoserver/web/
http://localhost:8080/geoserver/inspire/wfs?service=WFS&version=1.0.0&request=DescribeFeatureType&typeName=inspire:PN_INSPIRE3ma:Features=50
http://localhost:8080/geoserver/schemas/wfs/1.0.0/WFS-basic.xsd">
  <gml:boundedBy>
    <gml:null unknown/>
  </gml:boundedBy>
  <gml:featureMember>
    <inspire:PN_INSPIRE fid="PN_INSPIRE.fid-3c553399_12fbf2cb48c_-7f4e">
      <inspire:GEO>
        <inspire:ID_SPN>FR3300001</inspire:ID_SPN>
        <inspire:VERSION>2010</inspire:VERSION>
        <inspire:TXT_SOURCE>http://www.legifrance.gouv.fr/texteconsolide/UPHJX.htm</inspire:TXT_SOURCE>
        <inspire:TYPE_PROT>nationalPark</inspire:TYPE_PROT>
        <inspire:DESIQ_VALUE>UICN</inspire:DESIQ_VALUE>
        <inspire:PERCENTAGE>100</inspire:PERCENTAGE>
        <inspire:NAME_STATUS_VALUE>official</inspire:NAME_STATUS_VALUE>
        <inspire:NATIVENESS_VALUE>endonym</inspire:NATIVENESS_VALUE>
        <inspire:SOURCE_OF_NAME>unknown</inspire:SOURCE_OF_NAME>
        <inspire:SCRIPT>Latn</inspire:SCRIPT>
        <inspire:NOM>Vanoise [coeur]</inspire:NOM>
        <inspire:PROT_CLASS_VALUE>natureConservation</inspire:PROT_CLASS_VALUE>
      </inspire:PN_INSPIRES>
    </gml:featureMember>
  </gml:featureMember>
  <inspire:PN_INSPIRE fid="PN_INSPIRE.fid-3c553399_12fbf2cb48c_-7f4d">
    <inspire:GEO>
      <gml:Polygon srsName="http://www.opengis.net/gml/srs/epsq.xml#2154">
        <gml:outerBoundaryIs>
          <gml:LinearRing>
            <gml:coordinates xmlns:gml="http://www.opengis.net/gml" decimal="." cs="," ts=">1003330.0247,6503573.522 1003321.9519,6503593.0527
            1003305.7164,6503634.9766 1003281.9057,6503661.3976 1003260.0472,6503675.3238 1003222.004,6503697.4034 1003208.8867,6503715.3751
            1003197.0105,6503732.6491 1003192.2572,6503752.1511 1003187.5117,6503772.5687 1003182.7296,6503788.751 1003174.778,6503809.082
            1003166.7468,6503833.4202 1003164.3486,6503847.2924 1003162.9156,6503866.88 1003157.3323,6503883.0694 1003154.1675,6503900.9549
            1003142.8826,6503919.712 1003128.3509,6503933.6893 1003112.9952,6503945.0409 1003099.295,6503949.2806 1003087.9549,6503948.463
            1003072.6317,6503937.148 1003063.6537,6503931.502 1003048.1234,6503922.7075 1003023.807,6503917.1942 1003010.7222,6503913.1865
            1002992.0794,6503901.9004 1002978.1308,6503890.6881 1002960.1609,6503877.7936 1002946.4403,6503866.4648 1002936.5248,6503858.3085
            1002928.2429,6503840.5221 1002918.5435,6503830.8757 1002911.1115,6503818.6912 1002900.5472,6503801.726 1002890.7333,6503792.0806
            1002875.1891,6503781.6835 1002858.8635,6503773.5826 1002844.2271,6503762.2618 1002833.9394,6503750.7889 1002822.509,6503739.5549
            1002817.5156,6503731.3559 1002815.9154,6503718.434 1002810.1078,6503708.7539 1002804.3719,6503694.1509 1002796.968,6503685.2859
            1002787.14,6503673.9235 1002780.6307,6503662.5323 1002779.7178,6503649.6046 1002778.796,6503635.7611 1002775.458,6503620.4503
            1002767.3114,6503605.0667 1002755.8523,6503590.5131 1002746.0374,6503580.7533 1002738.663,6503575.2078 1002733.0323,6503572.7382
            1002716.0298,6503565.788 1002695.802,6503569.7407 1002666.5374,6503574.4586 1002628.3255,6503577.0789 1002590.2073,6503577.2945
            1002557.698,6503577.4615 1002520.3532,6503574.465 1002499.221,6503566.5203 1002473.9532,6503556.8942 1002454.75,6503546.9867
            1002429.2241,6503547.2077 1002408.8353,6503545.7815 1002392.6529,6503540.9992 1002376.3144,6503531.4103 1002364.9969,6503521.6643
            1002348.5366,6503509.5571 1002335.5315,6503501.542 1002316.8839,6503489.6836 1002272.2202,6503487.5518 1002231.5837,6503487.7891
            1002195.8901,6503490.3877 1002162.3675,6503492.5095 1002132.3763,6503492.6547 1002108.7606,6503488.7381 1002098.375,6503484.1254
            1002083.4788,6503477.5094 1002064.687,6503462.218 1002048.3846,6503443.5852 1002031.1674,6503425.0748 1002018.8506,6503404.0037
            1002006.5624,6503386.2519 1001999.2379,6503373.2651 1001989.4681,6503355.4917 1001964.0246,6503325.605 1001949.3883,6503314.2842
            1001931.4264,6503293.2854 1001910.2425,6503276.6796 1001884.8924,6503252.5782 1001874.4531,6503229.6486 1001855.8298,6503200.6162
            1001838.8298,6503176.8298 1001824.8298,6503153.8298 1001810.8298,6503130.8298 1001796.8298,6503107.8298 1001782.8298,6503084.8298
            1001768.8298,6503061.8298 1001754.8298,6503038.8298 1001740.8298,6503015.8298 1001726.8298,6502992.8298 1001712.8298,6502969.8298
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            1001348.8298,6502371.8298 1001334.8298,6502348.8298 1001320.8298,6502325.8298 1001306.8298,6502302.8298 1001292.8298,6502279.8298
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            1000998.8298,6501796.8298 1000984.8298,6501773.8298 1000970.8298,6501750.8298 1000956.8298,6501727.8298 1000942.8298,6501704.8298
            1000928.8298,6501681.8298 1000914.8298,6501658.8298 1000900.8298,6501635.8298 1000886.8298,6501612.8298 1000872.8298,6501589.8298
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            999318.8298,6500000.8298 999304.8298,6500000.8298 999290.8298,6500000.8298 999276.8298,6500000.8298 999262.8298,6500000.8298
            999248.8298,6500000.8298 999234.8298,6500000.8298 999220.8298,6500000.8298 999206.8298,6500000.8298 999192.8298,6500000.8298
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            999038.8298,6500000.8298 999024.8298,6500000.8298 999010.8298,6500000.8298 998996.8298,6500000.8298 998982.8298,6500000.8298
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            998898.8298,6500000.8298 998884.8298,6500000.8298 998870.8298,6500000.8298 998856.8298,6500000.8298 998842.8298,6500000.8298
            998828.8298,6500000.8298 998814.8298,6500000.8298 998800.8298,6500000.8298 998786.8298,6500000.8298 998772.8298,6500000.8298
            998758.8298,6500000.8298 998744.8298,6500000.8298 998730.8298,6500000.8298 998716.8298,6500000.8298 998702.8298,6500000.8298
            998688.8298,6500000.8298 998674.8298,6500000.8298 998660.8298,6500000.8298 998646.8298,6500000.8298 998632.8298,6500000.8298
            998618.8298,6500000.8298 998604.8298,6500000.8298 998590.8298,6500000.8298 998576.8298,6500000.8298 998562.8298,6500000.8298
            998548.8298,6500000.8298 998534.8298,6500000.8298 998520.8298,6500000.8298 998506.8298,6500000.8298 998492.8298,6500000.8298
            998478.8298,6500000.8298 998464.8298,6500000.8298 998450.8298,6500000.8298 998436.8298,6500000.8298 998422.8298,6500000.8298
            998408.8298,6500000.8298 998394.8298,6500000.8298 998380.8298,6500000.8298 998366.8298,6500000.8298 998352.8298,6500000.8298
            998338.8298,6500000.8298 998324.8298,6500000.8298 998310.8298,6500000.8298 998296.8298,6500000.8298 998282.8298,6500000.8298
            998268.8298,6500000.8298 998254.8298,6500000.8298 998240.8298,6500000.8298 998226.8298,6500000.8298 998212.8298,6500000.8298
            998198.8298,6500000.8298 998184.8298,6500000.8298 998170.8298,6500000.8298 998156.8298,6500000.8298 998142.8298,6500000.8298
            998128.8298,6500000.8298 998114.8298,6500000.8298 998100.8298,6500000.8298 998086.8298,6500000.8298 998072.8298,6500000.8298
            998058.8298,6500000.8298 998044.8298,6500000.8298 998030.8298,6500000.8298 998016.8298,6500000.8298 998002.8298,6500000.8298
            997988.8298,6500000.8298 997974.8298,6500000.8298 997960.8298,6500000.8298 997946.8298,6500000.8298 997932.8298,6500000.8298
            997918.8298,6500000.8298 997904.8298,6500000.8298 997890.8298,6500000.8298 997876.8298,6500000.8298 997862.8298,6500000.8298
            997848.8298,6500000.8298 997834.8298,6500000.8298 997820.8298,6500000.8298 997806.8298,6500000.8298 997792.8298,6500000.8298
            997778.8298,6500000.8298 997764.8298,6500000.8298 997750.8298,6500000.8298 997736.8298,6500000.8298 997722.8298,6500000.8298
            997708.8298,6500000.8298 997694.8298,6500000.8298 997680.8298,6500000.8298 997666.8298,6500000.8298 997652.8298,6500000.8298
            997638.8298,6500000.8298 997624.8298,6500000.8298 997610.8298,6500000.8298 997596.8298,6500000.8298 997582.8298,6500000.8298
            997568.8298,6500000.8298 997554.8298,6500000.8298 997540.8298,6500000.8298 997526.8298,6500000.8298 997512.8298,6500000.8298
            997498.8298,6500000.8298 997484.8298,6500000.8298 997470.8298,6500000.8298 997456.8298,6500000.8298 997442.8298,6500000.8298
            997428.8298,6500000.8298 997414.8298,6500000.8298 997400.8298,6500000.8298 997386.8298,6500000.8298 997372.8298,6500000.8298
            997358.8298,6500000.8298 997344.8298,6500000.8298 997330.8298,6500000.8298 997316.8298,6500000.8298 997302.8298,6500000.8298
            997288.8298,6500000.8298 997274.8298,6500000.8298 997260.8298,6500000.8298 997246.8298,6500000.8298 997232.8298,6500000.8298
            997218.8298,6500000.8298 997204.8298,6500000.8298 997190.8
```

Mapping avec HALE

- Réception d'un flux WFS contenant le schéma source :

Mapping avec HALE

- Chargement du XSD INSPIRE : schéma cible

The screenshot displays the Schema Explorer interface, which is used for mapping XML schemas. It is divided into two main panes: 'Source' and 'Target'.

Source Pane: Shows the source schema structure. The root is `http://localhost:8080/geoserver/web/`, which contains an `AbstractFeatureType` element. This element has a child `PN_INSPIRE`, which in turn contains several properties: `DESIG_VALUE:<string>`, `GEO:<GeometryPropertyType>`, `ID_SPN:<string>`, `NAME_STATUS_VALUE:<string>`, `NATIVENESS_VALUE:<string>`, `NOM:<string>`, `PERCENTAGE:<decimal>`, `PROT_CLASS_VALUE:<string>`, `SCRIPT:<string>`, `SOURCE_OF_NAME:<string>`, and `TYT_SOURCE:<string>`.

Target Pane: Shows the target schema structure. The root is `urn:x-inspire:specification:gmlas:ProtectedSites:3.0`, which contains an `AbstractGMLType` element. This element has a child `AbstractFeatureType`, which in turn contains a `ProtectedSite` element. The `ProtectedSite` element contains several properties: `geometry:<GeometryPropertyType>`, `inspireID:<IdentifierPropertyType>` (which has a child `Identifier:<IdentifierType>`), `legalFoundationDate:<? extends dateTime>`, `legalFoundationDocument:<? extends AbstractFeatureType>`, `siteDesignation:<?>`, `siteName:<?>`, `siteProtectionClassification:<? extends ProtectedSite>`, and `boundedBy:<BoundingShapeType>`.

A blue arrow icon is visible between the two panes, indicating the direction of the mapping.

Mapping avec HALE

- Définition des correspondances entre champs

The screenshot shows a software window titled "Identifier Definition" with the subtitle "Configure the content of your INSPIRE identifier urn." The window contains several input fields for defining an identifier:

- Namespace:** A section with a link to "namespace" and the text "The namespace is constructed from the following information:". It includes three sub-fields: "Country Code" with the value "fr", "Provider Name" with the value "crenlr", and "Product Name" with the value "species".
- Local ID:** A field with a link to "localid" and the value "rnrgg_especes_vegetales_pointType.ID_ENTITE".
- Version:** A field with a link to "versionId" and the value "1".
- nilReason:** A dropdown menu with the value "unknown".

At the bottom of the window, there are two buttons: "Cancel" and "Finish".

Mapping avec HALE

- Génération du GML 3.2.1
 - Chargement de la donnée via le flux WFS
 - Sauvegarde de la donnée en GML 3.2.1

```
-<gml:featureMember>
  -<ps:ProtectedSite gml:id="FR3400003">
    -<ps:geometry>
      +<gml:Polygon srsName="urn:ogc:def:crs:EPSG::4258" gml:id="LOCAL_ID_0"></gml:Polygon>
      </ps:geometry>
    +<ps:inspireID></ps:inspireID>
    <ps:legalFoundationDate>1967-03-23T00:00:00Z</ps:legalFoundationDate>
    +<ps:legalFoundationDocument></ps:legalFoundationDocument>
    +<ps:siteDesignation></ps:siteDesignation>
    +<ps:siteName></ps:siteName>
    <ps:siteProtectionClassification>natureConservation</ps:siteProtectionClassification>
  </ps:ProtectedSite>
</gml:featureMember>
-<gml:featureMember>
```

Visualisation de la donnée dans TatukGIS

- On accède à l'ensemble des attributs mais la hiérarchie est non visible

De nombreuses limites...

- Génération du schéma source : peu complexe pour les thèmes de l'annexe I, il sera nécessairement « imbriqué » pour les thèmes de l'annexe III
- Difficulté à générer un fichier arborescent complexe de type GML 3.2.1 : nécessite aujourd'hui le recours à toute une série de logiciels
- Comment diffuser du GML 3.2.1 (WFS 2.0 nécessaire) ?

- Peu de logiciels sont capables de prendre en charge ce format (en libre : TatukGis)
- Validation de la donnée difficile : beaucoup de logiciels, peu de validations identiques

Mais...

- Des solutions (souvent imparfaites) existent déjà, elles évolueront
 - Ex : extension app-schema de Geoserver qui permet de créer des GML imbriqués complexes
 - Financement de l'IGN pour intégrer le WFS 2.0 dans Geoserver
- Les principaux éditeurs sont fortement impliqués dans INSPIRE (et donc dans son application)

Merci de votre attention