INSPIRE: Interoperability in Practice

An On-line Executable Test Suite to Validate Annex I-II-III INSPIRE Datasets

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SUMMARY

- Service main features
- Cooperation with OGC CITE
- Data centric validation
- Examples of Schematron validation
- Guidelines to the execution of a manual test
- The eENVplus Validation Service in the context of INSPIRE MIWP5 (MIG Working Group 5 Validation and Conformity Testing)
- Providing an online framework for AQD schematron validation

Service main features

- Purpose:
  - To provide an Executable Test Suite (ETS) implementing the Abstract Test Suite (ATS) contained in the INSPIRE Data Specifications
- Environment:
  - Ubuntu operating system
  - Apache Tomcat 7.0.52 web server

Service main features

- Access:
  - via web browser
    - http://cloud.epsilon-italia.it/eenvplus_new/
  - via REST APIs
    - http://cloud.epsilon-italia.it:8081/teamengine/rest/suites/gml32/3.2.1-r18/run?gml=gml filename&sch=schematron filename

Service main features

- The eENVplus Validation Service is based on the customized use of the free testing facility GML 3.2 (ISO 19136:2007) Conformance Test Suite, developed as part of the OGC Compliance Program (CITE).

Service main features

- The Test, Evaluation, And Measurement (TEAM) Engine, the official test harness used by OGC Compliance Program, and the GML testing facility have been
  - checked out from GitHub OGC repositories
    - TEAM Engine version 4.0.5 – GML Suite release r17
  - installed on cloud server
  - customized (in terms of user interface)
  - enriched with theme-specific schematron rules provided by the eENVplus team

Cooperation with OGC

- Ongoing cooperation with OGC-CITE team to improve readability of the GML 3.2 test suite report interfaces: agreed mockups for the reporting of the validation process results.
- Testing new releases of the GML 3.2 test suite.

Cooperation with OGC

- Issues reported by eENVplus team leading to bug-fixing:
  - Remove assertion requiring metadata property value to be in application namespace: - fixed in release r16
  - Not performing assertion checking that a polygon is closed - fixed in release r20

Data-centric validation

- Abstract Test Suite (ATS) included in the Annex A of the INSPIRE Data Specifications is the starting point for the conformance testing process of datasets.
  - Annex A - Part 1 (Normative)
  - Annex A – Part 2 (Informative)

INSPIRE Data Specification ATS

Conformance Class	Tests
A.1 Application Schema Conformance Class	A.1.1 Schema element denomination test
	A.1.2 Value type test
	A.1.3 Value test
	A.1.4 Attributes/associations completeness test
	A.1.5 Abstract spatial object test
	A.1.6 Constraints test
	A.1.7 Geometry representation test
A.2 Reference Systems Conformance Class	A.2.1 Datum test
	A.2.2 Coordinate reference system test
	A.2.3 Grid test
	A.2.4 View service coordinate reference system test
	A.2.5 Temporal reference system test
	A.2.6 Units of measurements test
A.3 Data Consistency Conformance Class	A.3.1 Unique identifier persistency test
	A.3.2 Version consistency test
	A.3.3 Life cycle time sequence test
	A.3.4 Validity time sequence test
	A.3.5 Update frequency test
A.4 Data Quality Conformance Class	A.4.1 Data quality target results test
A.5 Metadata IR Conformance Class	A.5.1 Metadata for interoperability test
A.6 Information Accessibility Conformance Class	A.6.1 Code list publication test
	A.6.2 CRS publication test
	A.6.3 CRS identification test
	A.6.4 Grid identification test
A.7 Data Delivery Conformance Class	A.7.1 Encoding compliance test
A.8 Portrayal Conformance Class	A.8.1 Layer designation test
A.9 Technical Guideline Conformance Class	A.9.1 Multiplicity test
	A.9.1 CRS http URI test
	A.9.2 Metadata encoding schema validation test
	A.9.3 Metadata occurrence test
	A.9.4 Metadata consistency test
	A.9.5 Encoding schema validation test
	A.9.6 Coverage multipart representation test
	A.9.7 Coverage domain consistency test
	A.9.8 Style test

Part 1 - normative

Part 2 - informative

eENVplus Validation Service

The **eENVplus Validation Service** provides **Executable Test Suites (ETS)** implementing the Abstract Test Suites **(ATS)** which are included in the **Annex A** of the **INSPIRE Data Specifications** and contain a set of tests to be applied on a dataset to evaluate whether it fulfils the INSPIRE requirements.

ATS

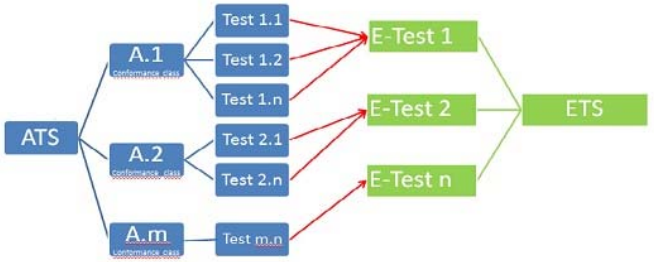
Annex A - Part 1: includes tests aiming at assessing the conformity of GML datasets to "COMMISSION REGULATION (EU) No 1089/2010 of 23 November 2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial datasets and services" and its successive amendment "COMMISSION REGULATION (EU) No 1253/2013 of 21 October 2013".

Annex A - Part 2: includes tests aiming at assessing conformity of GML datasets to relevant INSPIRE Data Specifications - Technical Guidelines (TG) requirements.

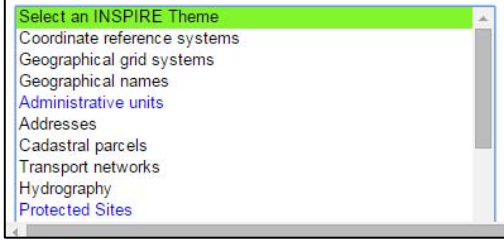
The requirements to be tested are grouped in several **Conformance Classes**.
Each of these classes covers a specific aspect: for example A.1 conformance class contains tests related to the requirements on the application schema, A.2 conformance class contains tests related to the requirements on the reference systems, etc …
In order to be **conformant** to a specific Conformance Class, a dataset has **to pass all tests defined for that Conformance Class**.
If a dataset is not yet conformant with all requirements of the Data Specification, **conformity to individual Conformance Classes can be claimed**.

ETS

In order to execute abstract tests associated to Conformance Classes, an **Executable Test Suite(ETS)**, containing a physical implementation of the abstract tests, has to be derived from the ATS.
For those tests that cannot be automated the ETS contains guidelines to manual execution.
A single executable test can cover different abstract tests.



Tests included in the **ATS** vary according to the different data themes.
Select the **INSPIRE Theme** from the underlying dropdown list to display the **ATS** included in the Annex A of the relevant **INSPIRE Data Specifications** and have access to the associated **ETS**.



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ATS

Annex A - Part 1: includes tests aiming at assessing the c
2007/2/EC of the European Parliament and of the Council
1253/2013 of 21 October 2013".

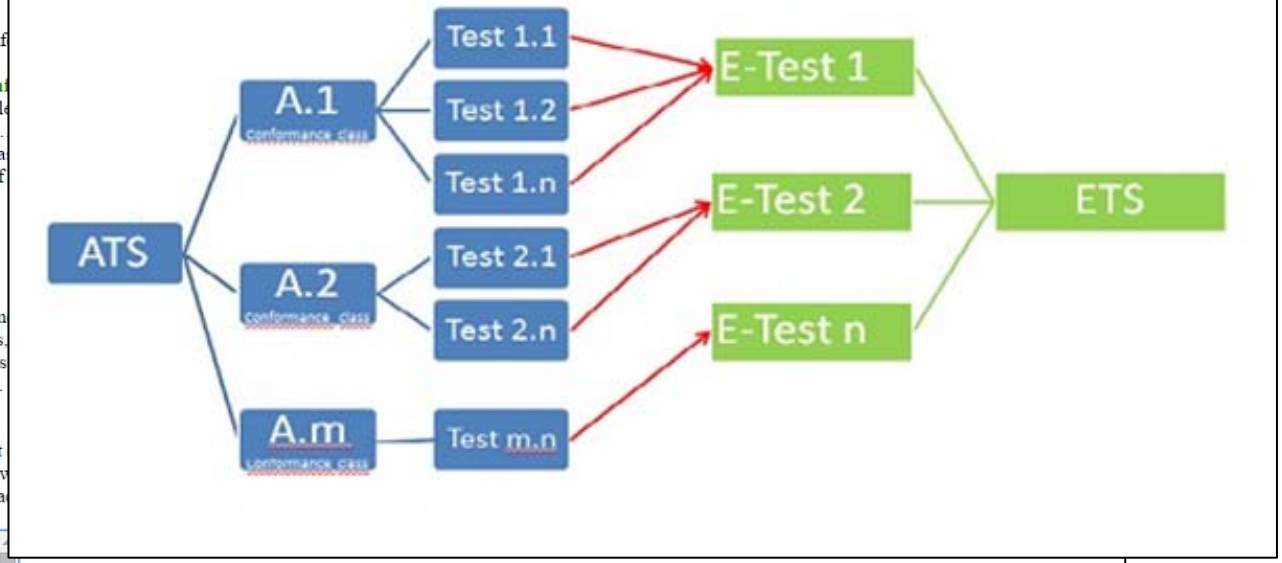
Annex A - Part 2: includes tests aiming at assessing conf

The requirements to be tested are grouped in several **Conf**
Each of these classes covers a specific aspect: for example
related to the requirements on the reference systems, etc .
In order to be **conformant** to a specific Conformance Cla
If a dataset is not yet conformant with all requirements of

ETS

In order to execute abstract tests associated to Conforman
containing a physical implementation of the abstract tests.
For those tests that cannot be automated the ETS contains
A single executable test can cover different abstract tests.

Tests included in the **ATS** vary according to the different
Select the **INSPIRE Theme** from the underlying dropdov
of the relevant **INSPIRE Data Specifications** and have a



Select an INSPIRE Theme
Coordinate reference systems
Geographical grid systems
Geographical names
Administrative units
Addresses
Cadastral parcels
Transport networks
Hydrography
Protected Sites

eENVplus Validation Service

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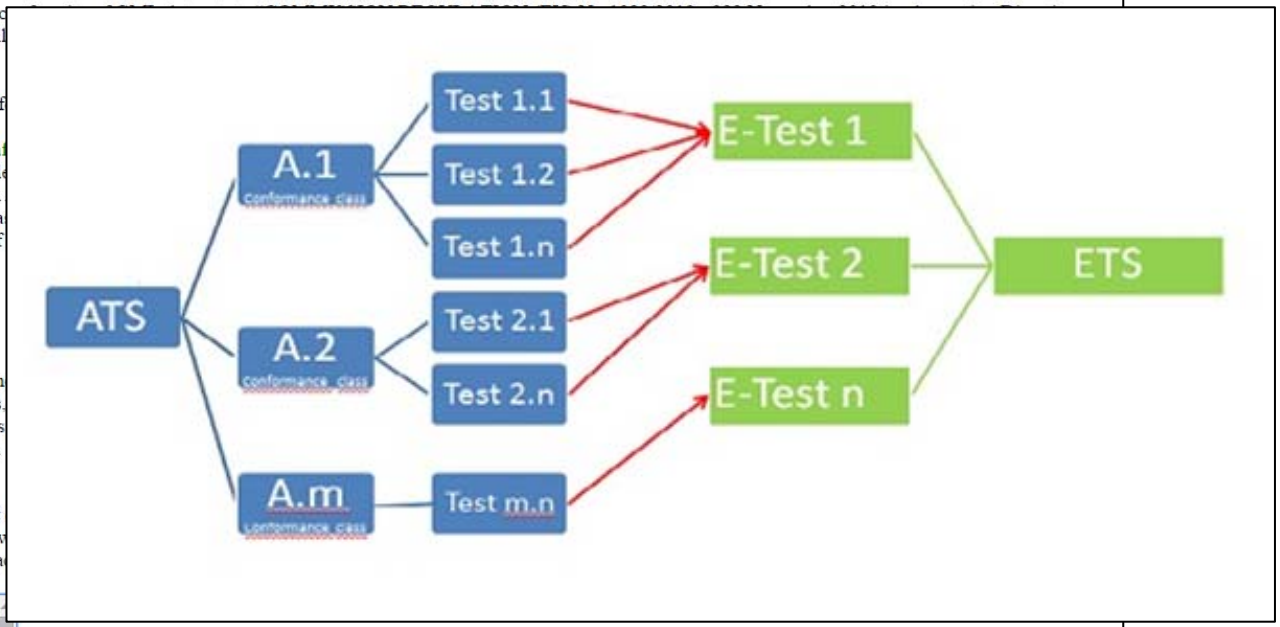

Select an INSPIRE Theme
Coordinate reference systems
Geographical grid systems
Geographical names
Administrative units
Addresses
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Transport networks
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Tests included in the ATS vary according to the different data themes.

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Annex A - Part 1: includes tests aiming at assessing the c
2007/2/EC of the European Parliament and of the Council
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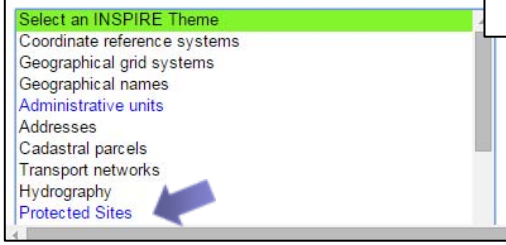
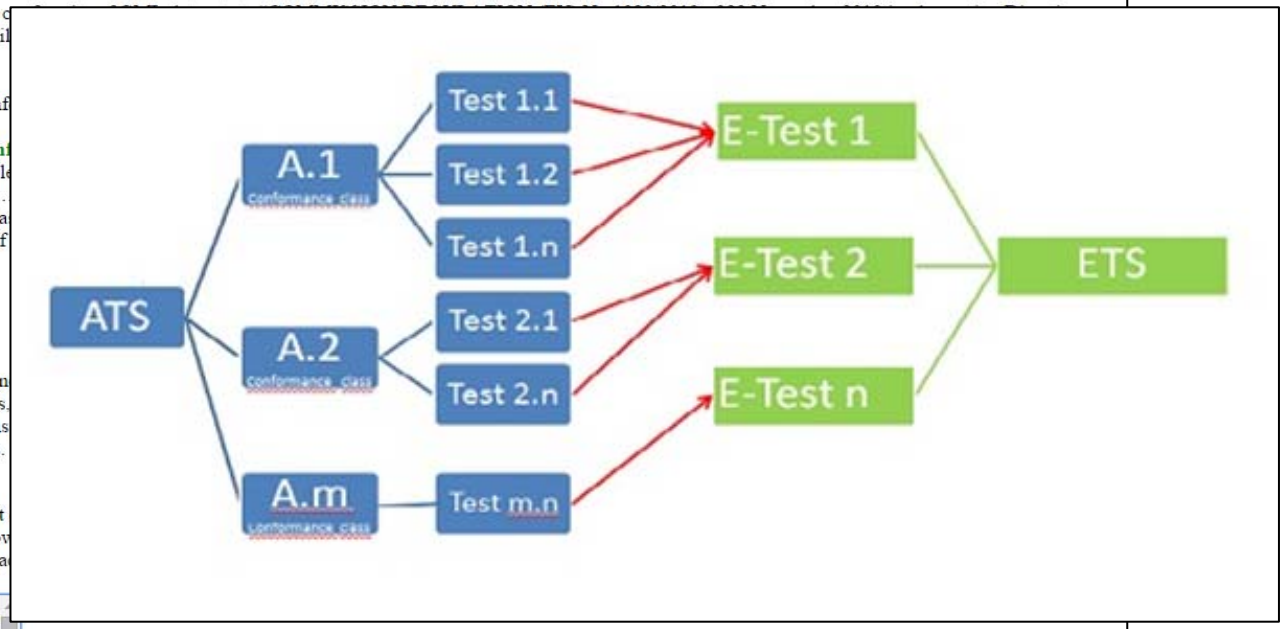




Tests included in the ATS vary according to the different data themes.

Example of implementation of ETS for the Protected Sites theme

eENVplus Validation Service

The ATS table below contains a detailed list of the abstract tests includ[ed] the **ATS** for the **Protected Sites** and relevant **Exec[utable] Tests (ET)** provided by the **eENVplus Validation Service**. Abstract tests marked by "*" make use of [Schem]atron files developed by eENVplus team.
Click links in the list of **Available Executable Tests of the GM[L] Data Validation ETS** to access the relevant **Executable Tests** or **Click** [the] arrow icon to go back to the HOME page

ATS	Conformance classes	Abstract Tests	Related ET	Available Executable Tests of the GML Data Validation ETS
Part 1 (normative)	A.1 Application Schema Conformance Class	A.1.1 Schema element denomination test	E.1	**E.1- Automated Validation :** A.1: all tests - A.2.1: Datum test, A.2.2: Coordinate Reference System test - A.5.2: CRS publication test, A.5.3: CRS identification test - A.6.1: Encoding compliance test - A.8.1: Multiplicity test, A.8.6 Encoding schema validation test
		A.1.2 Value type test	E.1	
		A.1.3 Value test *	E.1	
		A.1.4 Attributes/Associations completeness test	E.1	
		A.1.5 Abstract spatial object test	E.1	
		A.1.6 Constraints test *	E.1	
		A.1.7 Geometry representation test*	E.1	
	A.2 Reference Systems Conformance Class	A.2.1 Datum test *	E.1	**E.2- Guideline to Manual Validation :** A.2.3: View service CRS test, A.2.4:Temporal reference system test, A.2.5:Units of measurements test
		A.2.2 Coordinate reference system test *	E.1	
		A.2.3 View service CRS test	E.2	
		A.2.4 Temporal reference system test	E.2	
		A.2.5 Units of measurements test	E.2	
	A.3 Data Consistency Conformance Class	A.3.1 Unique identifier persistency test	E.3	**E.3- Guideline to Manual Validation :** A.3: all tests
		A.3.2 Version consistency test	E.3	**E.4- Guideline to Manual Validation :** A.4: all tests
		A.3.3 Update frequency test	E.3	**E.5- Guideline to Manual Validation :** A.5.1: Code list publication test
	A.4 Metadata IR Conformance Class	A.4.1 Metadata for interoperability test	E.4	**E.6- Guideline to Manual Validation :** A.7: all tests
	A.5 Information Accessibility Conformance Class	A.5.1 Code list publication test	E.5	**E.7- Guideline to Manual Validation :** A.8.2: CRS http URI test
		A.5.2 CRS publication test *	E.1	**E.8- Guideline to Manual Validation :** A.8.3: Metadata encoding schema validation test, A.8.4: Metadata occurrence test, A.8.5: Metadata consistency test
		A.5.3 CRS identification test *	E.1	**E.9- Guideline to Manual Validation :** A.8.7: Style test
	A.6 Data Delivery Conformance Class	A.6.1 Encoding compliance test	E.1	
	A.7 Portrayal Conformance Class	A.7.1 Layer designation test	E.6	

Automated validation and Manual guidelines to validation

Not all the tests contained in the ATS can be executed automatically (by means of software tools), and for some of them the manual intervention is not avoidable. Therefore the Validation Service provides

- an automated validation (namely the E.1 Test) for those abstract tests that can be executed automatically
- guidelines to manual validation for those abstract tests that cannot be automated (namely E2 ..E9 executable tests)

Automated validation: E.1 Executable Test

Protected Sites

E.1 Automated Validation

A.1: all tests - A.2.1 Datum test, A.2.2 Coordinate Reference System test - A.5.2 CRS publication test, A.5.3 CRS identification test - A.6.1 Encoding compliance test - A.8.1 Multiplicity test, A.8.6 Encoding schema validation test

The **eENVplus E.1 Automated Validation Test** is based on the use of the free testing facility **GML 3.2 (ISO 19136:2007) Conformance Test Suite**, developed by OGC, which verifies the conformance of GML data with respect to

- ISO 19136:2007 (GML 3.2.1)
- Supplementary data constraints by means of schematron rules.

Automated Validation of tests related to INSPIRE requirements on application schema structure and dataset encoding - namely tests A.1.1, A.1.2, A.1.4, A.1.5, A.6.1, A.8.1, A.8.6 - is provided by the **OGC GML 3.2 Test Suite** used as is, while
Automated Validation of tests that lay beyond the reach of an XML Schema grammar - i.e. the obligation to use only the allowed code list values for the classification of Protected Sites (namely tests A.1.3 and A.1.6), the requirements related to CRS (namely tests A.2.1, A.2.2, A.5.2 and A.5.3) and requirements related to geometry representation (test A.1.7)- is implemented by means of schematron rules developed by eENVplus team. Therefore these tests will be executed only if the user selects the Protected Sites schematron file from the dropdown list when required.

GML dataset files to be tested can be uploaded from:

- local resource
- web resource
- WFS (GetFeature request)

Should **eENVplus E.1 Test** execute with no failures, after having specified PS schematron file,

1. Conformance to **A.1 - Application Schema Conformance Class** can be claimed
2. Coordinate Reference System tests - **A.2.1**, **A.2.2** , **A.5.2**, **A.5.3** - are successfully passed.
   Be aware that only the Coordinate Reference Systems listed in Table 3 of PS Data Specification (page 40)are allowed. CRS identifiers can be expressed as OGC urn: or http:// ("urn:ogc:def:crs:EPSG::4258" and "http://www.opengis.net/def/crs/EPSG/0/4258" are examples of valid CRSs)
3. Conformance to **A.6 - Data Delivery Conformance Class** can be claimed
   The use of GML-encoded files assures the required dataset encoding conformance to EN ISO 19118
4. Tests **A.8.1**, **A.8.6** are successfully passed.

A.1 Application Schema Conformance Class	A.1.1 Schema element denomination test
	A.1.2 Value type test
	A.1.3 Value test *
	A.1.4 Attributes/associations completeness test
	A.1.5 Abstract spatial object test
	A.1.6 Constraints test *
	A.1.7 Geometry representation test *
A.2 Reference Systems Conformance Class	A.2.1 Datum test *
	A.2.2 Coordinate reference system test *
A.5 Information Accessibility Conformance Class	A.5.2 CRS publication test *
	A.5.3 CRS identification test *
A.6 Data Delivery Conformance Class	A.6.1 Encoding compliance test
A.8 Technical Guideline Conformance Class	A.8.1 Multiplicity test
	A.8.6 Encoding schema validation test

Abstract tests covered by E.1

Login to the eENVplus E.1 Automated Validation Test

Automated validation: E.1 Executable Test

Protected Sites

A.1 Application Schema Conformance Class	A.1.1 Schema element denomination test
	A.1.2 Value type test
	A.1.3 Value test *
	A.1.4 Attributes/associations completeness test
	A.1.5 Abstract spatial object test
	A.1.6 Constraints test *
	A.1.7 Geometry representation test *
A.2 Reference Systems Conformance Class	A.2.1 Datum test *
	A.2.2 Coordinate reference system test *
A.5 Information Accessibility Conformance Class	A.5.2 CRS publication test *
	A.5.3 CRS identification test *
A.6 Data Delivery Conformance Class	A.6.1 Encoding compliance test
A.8 Technical Guideline Conformance Class	A.8.1 Multiplicity test
	A.8.6 Encoding schema validation test

Abstract tests covered by E.1

iance test - A.8.1 Multiplicity test, A.8.6 Encoding schema validation

oped by OGC, which verifies the conformance of GML data with respect to

provided by the **OGC GML 3.2 Test Suite** used as is,

(namely tests A.1.3 and A.1.6), the requirements related to CRS (namely tests
e these tests will be executed only if the user selects the Protected Sites

urn:ogc:def:crs:EPSG::4258" and

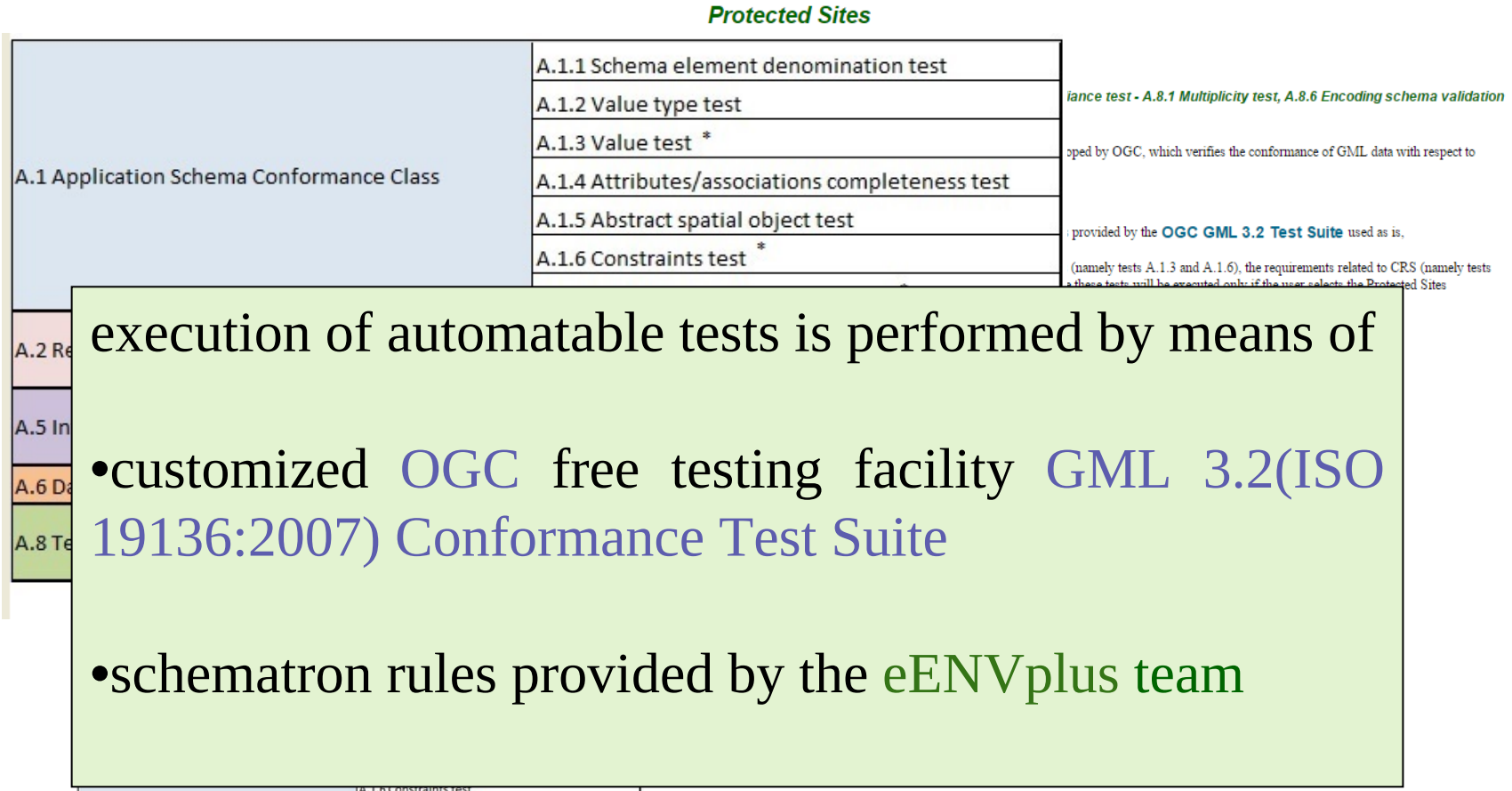
4. Tests **A.8.1**, **A.8.6** are successfully passed.

A.1 Application Schema Conformance Class	A.1.1 Schema element denomination test
	A.1.2 Value type test
	A.1.3 Value test *
	A.1.4 Attributes/associations completeness test
	A.1.5 Abstract spatial object test
	A.1.6 Constraints test *
	A.1.7 Geometry representation test *
A.2 Reference Systems Conformance Class	A.2.1 Datum test *
	A.2.2 Coordinate reference system test *
A.5 Information Accessibility Conformance Class	A.5.2 CRS publication test *
	A.5.3 CRS identification test *
A.6 Data Delivery Conformance Class	A.6.1 Encoding compliance test
A.8 Technical Guideline Conformance Class	A.8.1 Multiplicity test
	A.8.6 Encoding schema validation test

Abstract tests covered by E.1

Login to the eENVplus E.1 Automated Validation Test

Automated validation: E.1 Executable Test



execution of automatable tests is performed by means of

- customized OGC free testing facility GML 3.2(ISO 19136:2007) Conformance Test Suite
- schematron rules provided by the eENVplus team

Automated validation: E.1 Executable Test

Protected Sites

A.1 Application Schema Conformance Class	A.1.1 Schema element denomination test
	A.1.2 Value type test
	A.1.3 Value test *
	A.1.4 Attributes/associations completeness test
	A.1.5 Abstract spatial object test
	A.1.6 Constraints test *

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execution of automatable tests is performed by means of

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- schematron rules provided by the eENVplus team

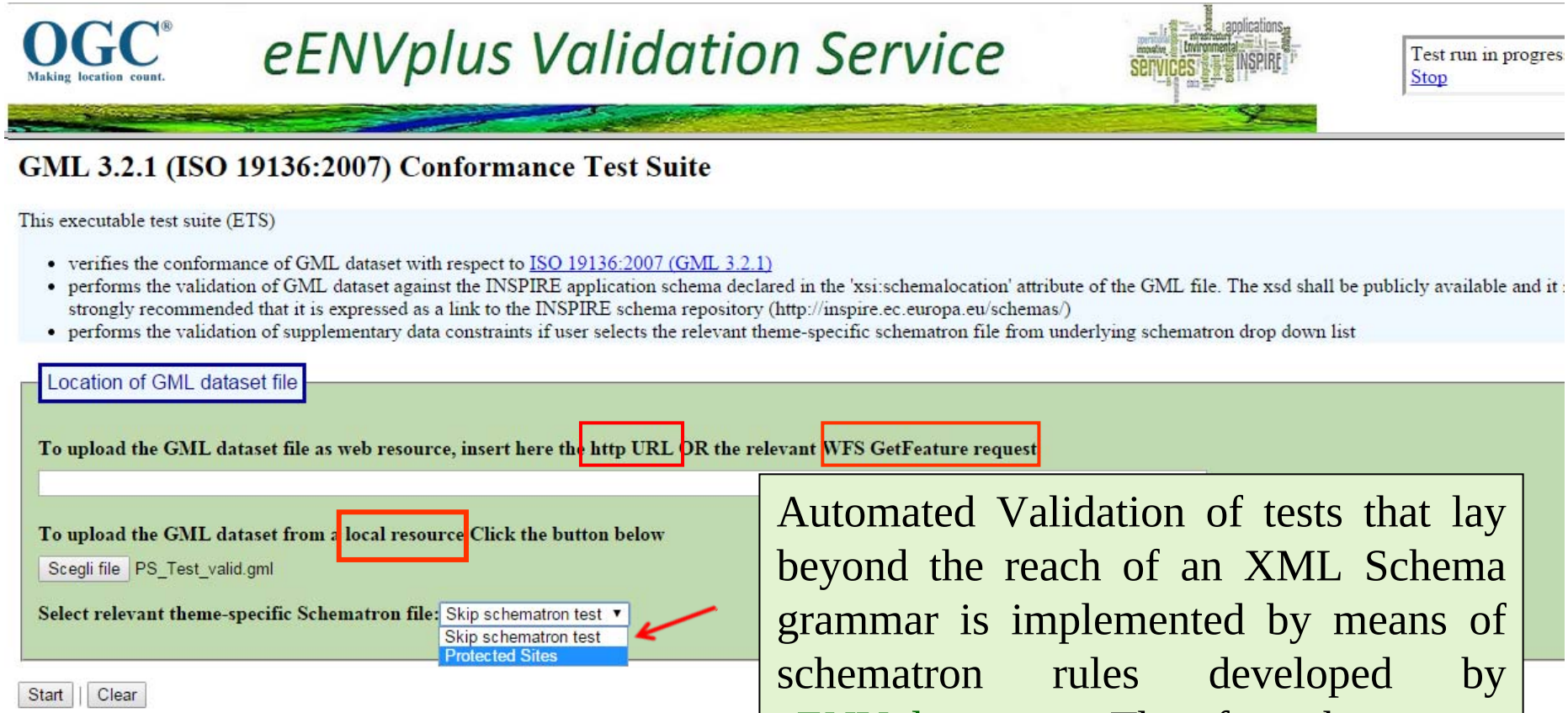
	A.1.6 Constraints test
	A.1.7 Geometry representation t
A.2 Reference Systems Conformance Class	A.2.1 Datum test *
	A.2.2 Coordinate reference syste
A.5 Information Accessibility Conformance Class	A.5.2 CRS publication test *
	A.5.3 CRS identification test *
A.6 Data Delivery Conformance Class	A.6.1 Encoding compliance test
A.8 Technical Guideline Conformance Class	A.8.1 Multiplicity test
	A.8.6 Encoding schema validation test

Abstract tests covered by E.1

Login to the eENVplus E.1 Automated Validation Test

Login to the eENVplus E.1 Automated Validation Test

Automated validation: E.1 Executable Test



Automated Validation of tests that lay beyond the reach of an XML Schema grammar is implemented by means of schematron rules developed by eENVplus team. Therefore these tests will be executed only if the user selects theme-specific schematron file from the dropdown list when required.

Schematron validation: simple feature requirement

```
(global)
1
2 <sch:schema xmlns:sch="http://purl.oclc.org/dsdl/schematron" xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:xlink="http://www.w3.org/1999/xlink" xml:lang="en">
3
4 <!-- this schematron includes also assertion from https://github.com/52North/common-xml/blob/master/52n-ogc-schema/src/main/resources/META-INF/xml/gmlsfProfile/2.0/gmlsfL2.sch
5 -->
6     <sch:title>Schematron for testing simple geometry - CRS - code list values  </sch:title>
7     <sch:ns prefix="sch" uri="http://purl.oclc.org/dsdl/schematron"/>
8     <sch:ns prefix="gml" uri="http://www.opengis.net/gml/3.2"/>
9     <sch:ns prefix="xlink" uri="http://www.w3.org/1999/xlink"/>
10
11
12 <!-- IR Requirement Article 12 -  Other Requirements & Rules
13 The value domain of spatial properties defined in this Regulation shall be restricted to the Simple Feature spatial schema
14 as defined in Herring, John R. -OpenGIS® Implementation Standard for Geographic information  -->
15
16 <!--Simple feature access Rule to exclude spatial topology types.
17 Non-linearly interpolated curves are not included in the OpenGISÂ® Implementation Specification for Geographic information - Simple feature access - Part 1: Common architectur
18 [OGC 06-103r3] specification.   -->
19
20 <sch:pattern name="Non-linearly interpolated curves not included">
21
22         <sch:rule context="/*//*">
23
24             <sch:assert
25                 test="not(self::gml:Node|self::gml:Edge|self::gml:Face|self::gml:TopoSolid|self::gml:TopoPoint|self::gml:TopoCurve|self::gml:TopoSurface|self::gml:TopoVolume|s
26                 Spatial properties are limited to the set of geometric
27                 types consisting of point, curve with linear and/or
28                 circular arc interpolation, planar surface, or aggregates
29                 thereof. Spatial topology is excluded.
30             </sch:assert>
31
32
33             <sch:assert
34                 test="not(self::gml:Curve) or self::gml:Curve/gml:segments[gml:LineStringSegment]">
35                 ERROR DESCRIPTION:Curves (standalone or within surfaces) must have linear
36                 interpolation (LineString)
37             </sch:assert>
38
39
40             <!-- Rule for constraints on planar surfaces -->
41             <sch:assert
42                 test="not(self::gml:OrientableSurface|self::gml:CompositeSurface|self::gml:PolyhedralSurface|self::gml:Tin|self::gml:TriangulatedSurface)">
43                 ERROR DESCRIPTION: Planar surface types are restricted to Polygon or MultiSurface
44                 elements.
45             </sch:assert>
46             <!-- Rule for constraints on GeometryPropertyType -->
47             <sch:assert
48                 test="not(self::gml:Solid|self::gml:MultiSolid|self::gml:CompositeSolid|self::gml:CompositeCurve|self::gml:Grid)">
49                 ERROR DESCRIPTION: Supported geometry types are restricted to point, curve with
50                 linear and/or circular arc interpolation, planar surface,
51                 or aggregates thereof.
52             </sch:assert>
53             <!-- Rule for geometry coordinates of points and circles by
```

Schematron validation: simple feature requirement

```
(global)
1
2 <sch:schema xmlns:sch="http://purl.oclc.org/dsdl/schematron" xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:xlink="http://www.w3.org/1999/xlink" xml:lang="en">
3
4 <!-- this schematron includes also assertion from https://github.com/52North/common-xml/blob/master/52n-ogc-schema/src/main/resources/META-INF/xml/gmlsfProfile/2.0/gmlsfL2.sch
5 -->
6     <sch:title>Schematron for testing simple geometry - CRS - code list values  </sch:title>
7     <sch:ns prefix="sch" uri="http://purl.oclc.org/dsdl/schematron"/>
11
12 <!-- IR Requirement Article 12 -  Other Requirements & Rules
13 The value domain of spatial properties defined in this Regulation shall be restricted to the Simple Feature spatial schema
14 as defined in Herring, John R. -OpenGIS® Implementation Standard for Geographic information  -->
15
18 [OGC 06-103r3] specification.   -->
19
20 <sch:pattern name="Non-linearly interpolated curves not included">
21
22         <sch:rule context="/*//*">
23
24             <sch:assert
25                 test="not(self::gml:Node|self::gml:Edge|self::gml:Face|self::gml:TopoSolid|self::gml:TopoPoint|self::gml:TopoCurve|self::gml:TopoSurface|self::gml:TopoVolume|s
26                 Spatial properties are limited to the set of geometric
27                 types consisting of point, curve with linear and/or
28                 circular arc interpolation, planar surface, or aggregates
29                 thereof. Spatial topology is excluded.
30             </sch:assert>
31
32
33             <sch:assert
34                 test="not(self::gml:Curve) or self::gml:Curve/gml:segments[gml:LineStringSegment]">
35                 ERROR DESCRIPTION:Curves (standalone or within surfaces) must have linear
36                 interpolation (LineString)
37             </sch:assert>
38
39
40             <!-- Rule for constraints on planar surfaces -->
41             <sch:assert
42                 test="not(self::gml:OrientableSurface|self::gml:CompositeSurface|self::gml:PolyhedralSurface|self::gml:Tin|self::gml:TriangulatedSurface)">
43                 ERROR DESCRIPTION: Planar surface types are restricted to Polygon or MultiSurface
44                 elements.
45             </sch:assert>
46             <!-- Rule for constraints on GeometryPropertyType -->
47             <sch:assert
48                 test="not(self::gml:Solid|self::gml:MultiSolid|self::gml:CompositeSolid|self::gml:CompositeCurve|self::gml:Grid)">
49                 ERROR DESCRIPTION: Supported geometry types are restricted to point, curve with
50                 linear and/or circular arc interpolation, planar surface,
51                 or aggregates thereof.
52             </sch:assert>
53             <!-- Rule for geometry coordinates of points and circles by
```

Schematron validation: codelist values requirement

*schematron-linear-common.xml | schematron-PS.xml

(global)

```
<!-- ATS test
     A.1.3  Value test
     Purpose:  Verify  whether  all  attributes  or  association  roles  whose  value  typ e  is  a  code  list  or enumeration take the values set out therein.
         A.1.6  Constraints test
     Purpose:  Verification  whether  the  instances  of  spatial  object  and/or  data  types  provided  in  the dataset adhere to the constraints specified
     in the target application schema(s).
     Designation constraint : Sites must use designations from an appropriate designation scheme, and the designation code value must agree with the designation scheme.   -->

      <sch:p>The value of the designation code shall be contained in the relevant designation scheme codelist.</sch:p>

      <sch:rule context="ps:DesignationType">
      <sch:let name="designationschema_name" value="ps:designationScheme"/>
      <sch:let name="designation_name" value="ps:designation"/>
         <sch:assert test="
         not ( (ps:designationScheme='IUCN')  or (ps:designationScheme='natura2000') or (ps:designationScheme='UNESCOWorldHeritage') or (ps:designationScheme='ramsar') or (ps:

         or


         (ps:designationScheme='IUCN' and ((ps:designation='managedResourceProtectedArea') or (ps:designation='nationalPark') or (ps:designation='naturalMonument') or (ps:desi
         or (ps:designation='habitatSpeciesManagementArea')  or (ps:designation='protectedLandscapeOrSeascape')
         or (ps:designation='wildernessArea')))
         or
          (ps:designationScheme='natura2000' and ((ps:designation='proposedSiteOfCommunityImportance') or (ps:designation='proposedSpecialProtectionArea') or (ps:designation='

        or
        (ps:designationScheme='UNESCOWorldHeritage' and ((ps:designation='cultural') or (ps:designation='mixed') or (ps:designation='natural')))

         or
         (ps:designationScheme='ramsar' and ((ps:designation='ramsar')))

         or
         (ps:designationScheme='UNESCOManAndBiosphereProgramme' and ((ps:designation='BiosphereReserve')))

         or
         (ps:designationScheme='nationalMonumentsRecord' and ((ps:designation='agricultureAndSubsistence') or (ps:designation='civil') or (ps:designation='commemorative') or (

             ">

           ERROR DESCRIPTION:
           Protected sites must be labeled according to codelists !
           Erroneous designation value ' <sch:value-of select="$designation_name"/> ' found for the  <sch:value-of select="$designationschema_name"/> designation schema.
         </sch:assert>
      </sch:rule>
   </sch:pattern>
```

```
Testing suite tns:ets-gml32-3.2.1-r17 in Test Mode with defaultResult of Pass ...
Testing tns:Main type Mandatory in Test Mode with defaultResult Pass (s0004)...
      Assertion: The GML application schema or data set satisfies all
      relevant constraints.
      Test suite: gml32-3.2.1-r18
      ======== Test groups ========
      All GML application schemas
          Passed: 7 | Failed: 0 | Skipped: 0
      GML application schemas defining features and feature collections
          Passed: 2 | Failed: 0 | Skipped: 0
      GML application schemas defining spatial geometries
          Passed: 0 | Failed: 0 | Skipped: 2
      GML application schemas defining time
          Passed: 0 | Failed: 0 | Skipped: 2
      GML application schemas defining spatial topologies
          Passed: 0 | Failed: 0 | Skipped: 2
      GML Documents
          Passed: 5 | Failed: 1 | Skipped: 10


      See detailed test report in the TE_BASE/users/Stefania/s0004/html/ directory.
      Test method checkSchematronConstraints:
                  2 schema validation error(s) detected.
       <svrl:schematron-output xmlns:svrl="http://purl.oclc.org/dsdl/svrl"
                               xmlns:iso="http://purl.oclc.org/dsdl/schematron"
                               xmlns:gml="http://www.opengis.net/gml/3.2"
                               xmlns:ps="urn:x-inspire:specification:gmlas:ProtectedSites:3.0"
                               xmlns:xhtml="http://www.w3.org/1999/xhtml"
                               xmlns:schold="http://www.ascc.net/xml/schematron"
```

```
<svrl:active-pattern document="file:/home/user/TE_BASE/users/Stefania/s0004/one_IUCN_no_crs_pnx.gml"/>
<svrl:fired-rule context="gml:Polygon"/>
<svrl:failed-assert test="(self::gml:Polygon/@srsName) or (ancestor::gml:MultiSurface/@srsName) or (preceding::gml:boundedBy/gml:Envelope/@srsName)"
                    location="/*[local-name()='SpatialDataSet']/*[local-name()='member']/*[local-name()='ProtectedSite']/*[local-name()='geometry']/*[
   <svrl:text>

            ERROR DESCRIPTION:
            Coordinate reference system missing !!!

      </svrl:text>
</svrl:failed-assert>
```

```
      <svrl:failed-assert test="not ( (ps:designationScheme='IUCN') or (ps:designationScheme='natura2000') or (ps
                          location="/*[local-name()='SpatialDataSet']/*[local-name()='member']/*[local-name()='Pr
         <svrl:text>

            ERROR DESCRIPTION:
            Protected sites must be labeled according to codelists !
            Erroneous designation value ' strictReserve ' found for the  IUCN designation schema.
         </svrl:text>
      </svrl:failed-assert>
```


OGC
Making location count.
eENVplus Validation Service
services
applications
INSPIRE
Test run in progress...
Stop
Executing tests...

eEnvPlus Validation Servic | TestNG Results | Nuova scheda

cloud.epsilon-italia.it:8081/teamengine/reports/Stefania/s0004/html/

App | Panoramica - eENV... | Geosmartcity | schematron | TEAM engine | INSPIRE | NZ | Epsilon Italia | W3Schools Online ... | Analytics | online Help - HALE | metadata xsd

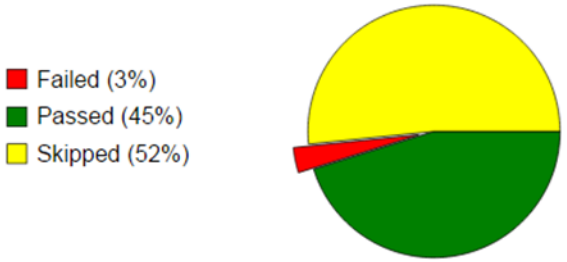
TestNG Results

Results overview
Reporter output

gml32-3.2.1-r18 45%
0 Groups
1 / 14 / 16 / 31

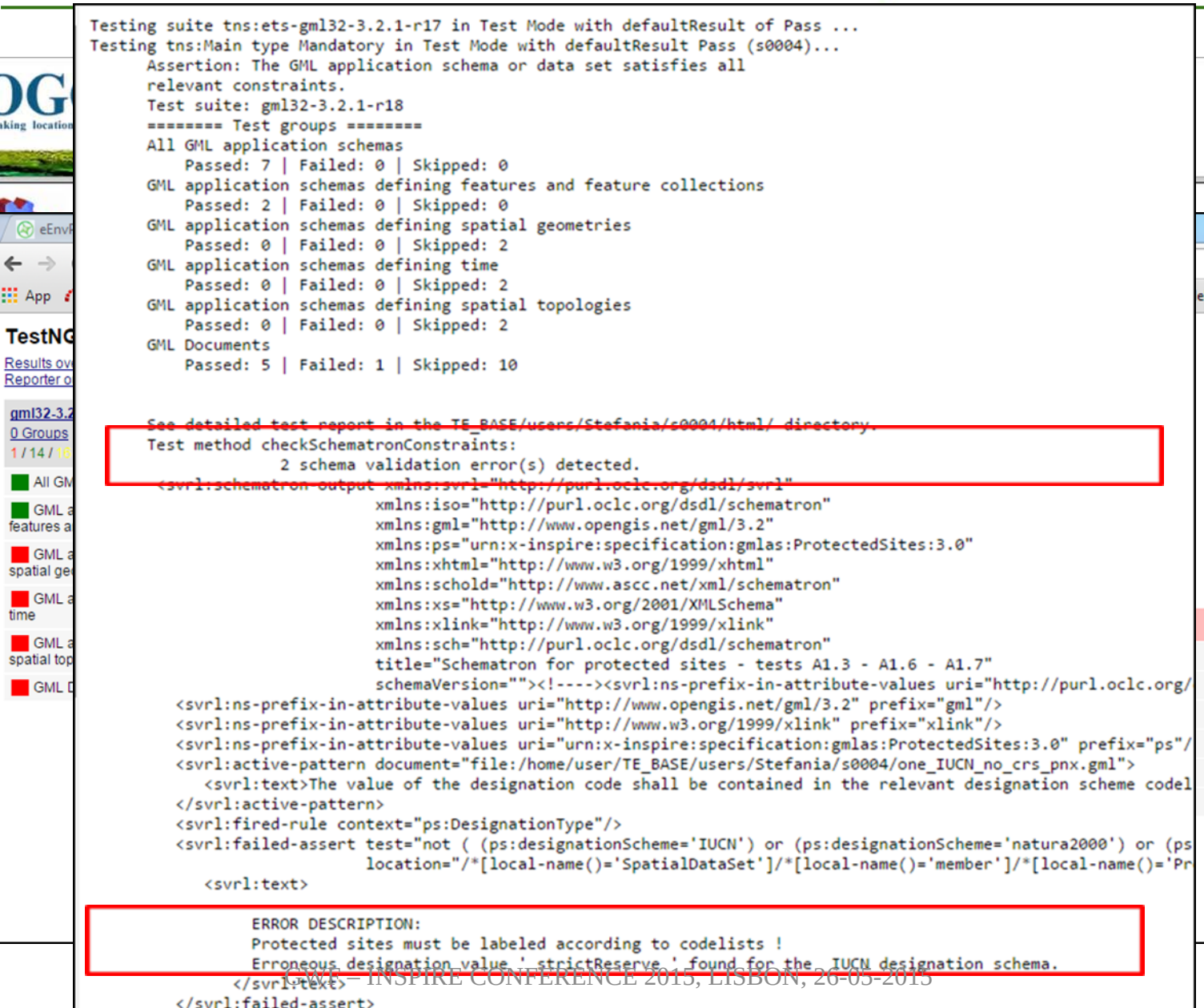
- All GML application schemas
- GML application schemas defining features and feature collections
- GML application schemas defining spatial geometries
- GML application schemas defining time
- GML application schemas defining spatial topologies
- GML Documents

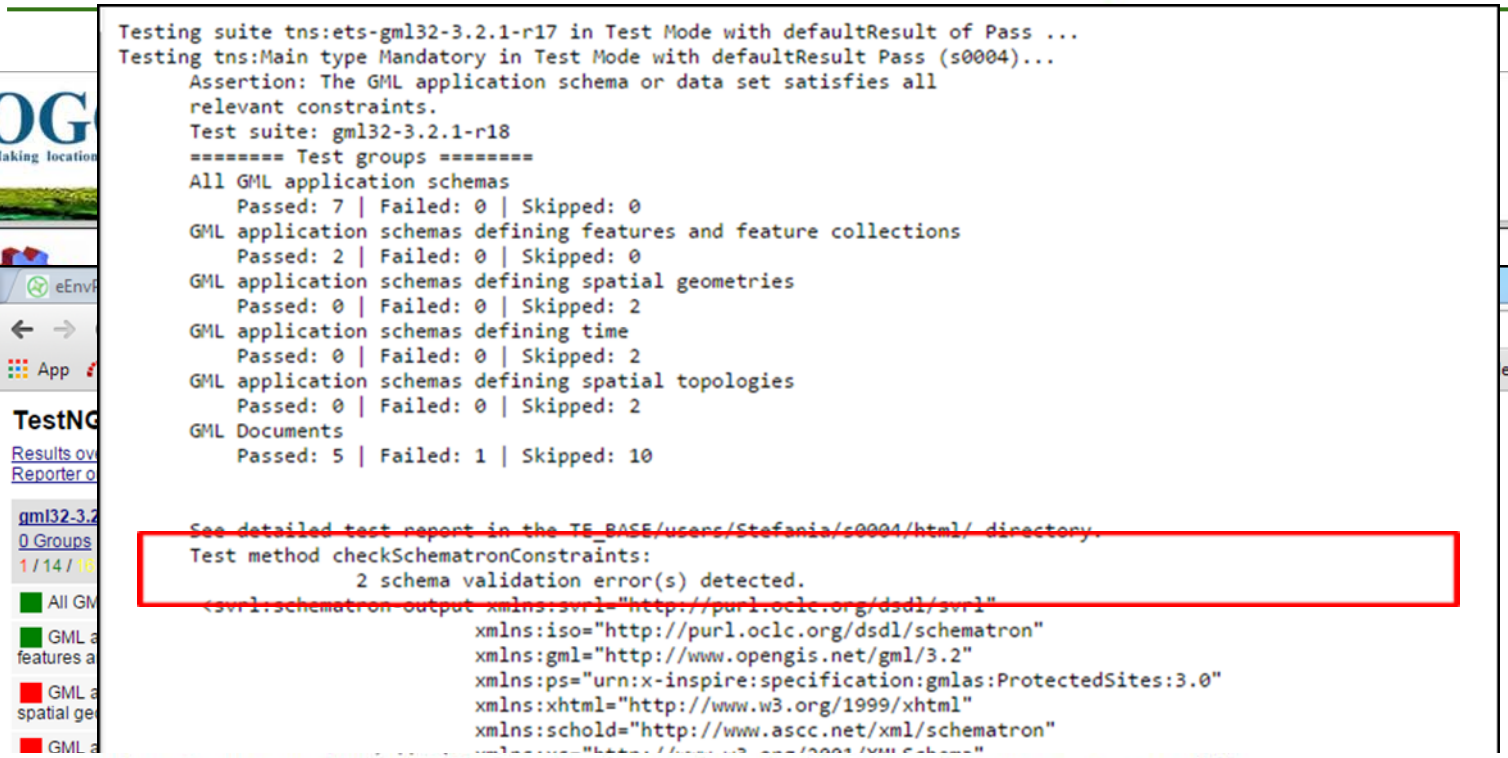
Test suites overview



gml32-3.2.1-r18	1	14	16	31	45%
All GML application schemas	0	7	0	7	100%
GML application schemas defining features and feature collections	0	2	0	2	100%
GML application schemas defining spatial geometries	0	0	2	2	%
GML application schemas defining time	0	0	2	2	%
GML application schemas defining spatial topologies	0	0	2	2	%
GML Documents	1	5	10	16	31%

Generated with TestNG XSLT


Testing suite tns:ets-gml32-3.2.1-r17 in Test Mode with defaultResult of Pass ...
Testing tns:Main type Mandatory in Test Mode with defaultResult Pass (s0004)...
Assertion: The GML application schema or data set satisfies all
relevant constraints.
Test suite: gml32-3.2.1-r18
======== Test groups ========
All GML application schemas
Passed: 7 | Failed: 0 | Skipped: 0
GML application schemas defining features and feature collections
Passed: 2 | Failed: 0 | Skipped: 0
GML application schemas defining spatial geometries
Passed: 0 | Failed: 0 | Skipped: 2
GML application schemas defining time
Passed: 0 | Failed: 0 | Skipped: 2
GML application schemas defining spatial topologies
Passed: 0 | Failed: 0 | Skipped: 2
GML Documents
Passed: 5 | Failed: 1 | Skipped: 10
See detailed test report in the TE_BASE/users/Stefania/s0004/html/ directory.
Test method checkSchematronConstraints:
2 schema validation error(s) detected.
<svrl:schematron-output xmlns:svrl="http://purl.oclc.org/dsdl/svrl"
xmlns:iso="http://purl.oclc.org/dsdl/schematron"
xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns:ps="urn:x-inspire:specification:gmlas:ProtectedSites:3.0"
xmlns:xhtml="http://www.w3.org/1999/xhtml"
xmlns:schold="http://www.ascc.net/xml/schematron"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:sch="http://purl.oclc.org/dsdl/schematron"
title="Schematron for protected sites - tests A1.3 - A1.6 - A1.7"
schemaVersion=""><!----><svrl:ns-prefix-in-attribute-values uri="http://purl.oclc.org/
<svrl:ns-prefix-in-attribute-values uri="http://www.opengis.net/gml/3.2" prefix="gml"/>
<svrl:ns-prefix-in-attribute-values uri="http://www.w3.org/1999/xlink" prefix="xlink"/>
<svrl:ns-prefix-in-attribute-values uri="urn:x-inspire:specification:gmlas:ProtectedSites:3.0" prefix="ps"/
<svrl:active-pattern document="file:/home/user/TE_BASE/users/Stefania/s0004/one_IUCN_no_crs_pnx.gml">
<svrl:text>The value of the designation code shall be contained in the relevant designation scheme codel
</svrl:active-pattern>
<svrl:fired-rule context="ps:DesignationType"/>
<svrl:failed-assert test="not ((ps:designationScheme='IUCN') or (ps:designationScheme='natura2000') or (ps
location="/*[local-name()='SpatialDataSet']/*[local-name()='member']/*[local-name()='Pr
<svrl:text>
ERROR DESCRIPTION:
Protected sites must be labeled according to codelists !
Erroneous designation value ' strictReserve ' found for the IUCN designation schema.
</svrl:text>
</svrl:failed-assert>
Test run in progress...
Stop
14 16 31 45%
7 0 7 100%
2 0 2 100%
0 2 2 %
0 2 2 %
0 2 2 %
5 10 16 31%


Testing suite tns:ets-gml32-3.2.1-r17 in Test Mode with defaultResult of Pass ...
Testing tns:Main type Mandatory in Test Mode with defaultResult Pass (s0004)...
Assertion: The GML application schema or data set satisfies all
relevant constraints.
Test suite: gml32-3.2.1-r18
======== Test groups ========
All GML application schemas
Passed: 7 | Failed: 0 | Skipped: 0
GML application schemas defining features and feature collections
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Passed: 0 | Failed: 0 | Skipped: 2
GML application schemas defining time
Passed: 0 | Failed: 0 | Skipped: 2
GML application schemas defining spatial topologies
Passed: 0 | Failed: 0 | Skipped: 2
GML Documents
Passed: 5 | Failed: 1 | Skipped: 10
See detailed test report in the TE_BASE/users/Stefania/s0004/html/ directory.
Test method checkSchematronConstraints:
2 schema validation error(s) detected.
xmlns:iso="http://purl.oclc.org/dsdl/schematron"
xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns:ps="urn:x-inspire:specification:gmlas:ProtectedSites:3.0"
xmlns:xhtml="http://www.w3.org/1999/xhtml"
xmlns:schold="http://www.ascc.net/xml/schematron"
Test run in progress...
Stop
App
elp - HALE
metadata xsd
TestNG
Results ov
Reporter o
gml32-3.2
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1 / 14 /
All GM
GML a
features a
GML a
spatial ge
GML a
<svrl:active-pattern document="file:/home/user/TE_BASE/users/Stefania/s0004/one_IUCN_no_crs_pnx.gml"/>
<svrl:fired-rule context="gml:Polygon"/>
<svrl:failed-assert test="(self::gml:Polygon/@srsName) or (ancestor::gml:MultiSurface/@srsName) or (preceding::gml:boundedBy/gml:Envelope/@srsName)"
location="/*[local-name()='SpatialDataSet']/*[local-name()='member']/*[local-name()='ProtectedSite']/*[local-name()='geometry']/*[
<svrl:text>
ERROR DESCRIPTION:
Coordinate reference system missing !!!
</svrl:text>
</svrl:failed-assert>
<svrl:failed-assert test="not ((ps:designationScheme='IUCN') or (ps:designationScheme='natura2000') or (ps
location="/*[local-name()='SpatialDataSet']/*[local-name()='member']/*[local-name()='Pr
<svrl:text>
ERROR DESCRIPTION:
Protected sites must be labeled according to codelists !
Erroneous designation value ' strictReserve ' found for the IUCN designation schema.
</svrl:text>
</svrl:failed-assert>

Example of Guidelines to manual validation: ATS test A.4.1

eENVplus Validation Service

Protected sites

E.4 Guideline to Manual Validation

A.4.1 - Metadata for interoperability Test

Purpose of A.4.1 test is "Verify whether the metadata for interoperability of spatial data sets and services described in 1089/2010 Commission Regulation have been created and published for each dataset related to the PS data theme".
Figure below lists the **Metadata for interoperability of spatial data sets and services** described in Commission Regulation 1089/2010 and its successive amendment Commission Regulation 1253/2013.

IR Requirement
Article 13
Metadata required for Interoperability

The metadata describing a spatial data set shall include the following metadata elements required for interoperability:

1. Coordinate Reference System: Description of the coordinate reference system(s) used in the data set.
2. Temporal Reference System: Description of the temporal reference system(s) used in the data set.

   This element is mandatory only if the spatial data set contains temporal information that does not refer to the default temporal reference system.
3. Encoding: Description of the computer language construct(s) specifying the representation of data objects in a record, file, message, storage device or transmission channel.
4. Topological Consistency: Correctness of the explicitly encoded topological characteristics of the data set as described by the scope.

   This element is mandatory only if the data set includes types from the Generic Network Model and does not assure centreline topology (connectivity of centrelines) for the network.
5. Character Encoding: The character encoding used in the data set.

   This element is mandatory only if an encoding is used that is not based on UTF-8.
6. Spatial Representation Type: The method used to spatially represent geographic information.

To pass the test, at least the following three mandatory metadata for interoperability elements must be available in a published metadata file for your dataset

- **coordinate reference systems**
- **encoding**
- **spatial representation type**

Moreover if your dataset contains temporal information that does not refer to the default temporal reference system,also the metadata describing the **temporal reference system** must be present. If an encoding is used that is not based on UTF-8, also the metadata describing the **character encoding** must be present.

While not explicitly required by any of the INSPIRE Implementing Rules, making all metadata of a dataset available together and through one service simplifies implementation and usability. So it is recommended you create and publish a single metadata file containing both discovery metadata file (required by INSPIRE Metadata Regulation 1205/2008) and the metadata for interoperability.

It's noteworthy to mention here the **eENVplus Metadata Editor** which helps the creation of INSPIRE compliant metadata file containing both **discovery metadata** and **metadata for interoperability**. Moreover it allows the publication of your metadata on the GeoNetwork Catalogue

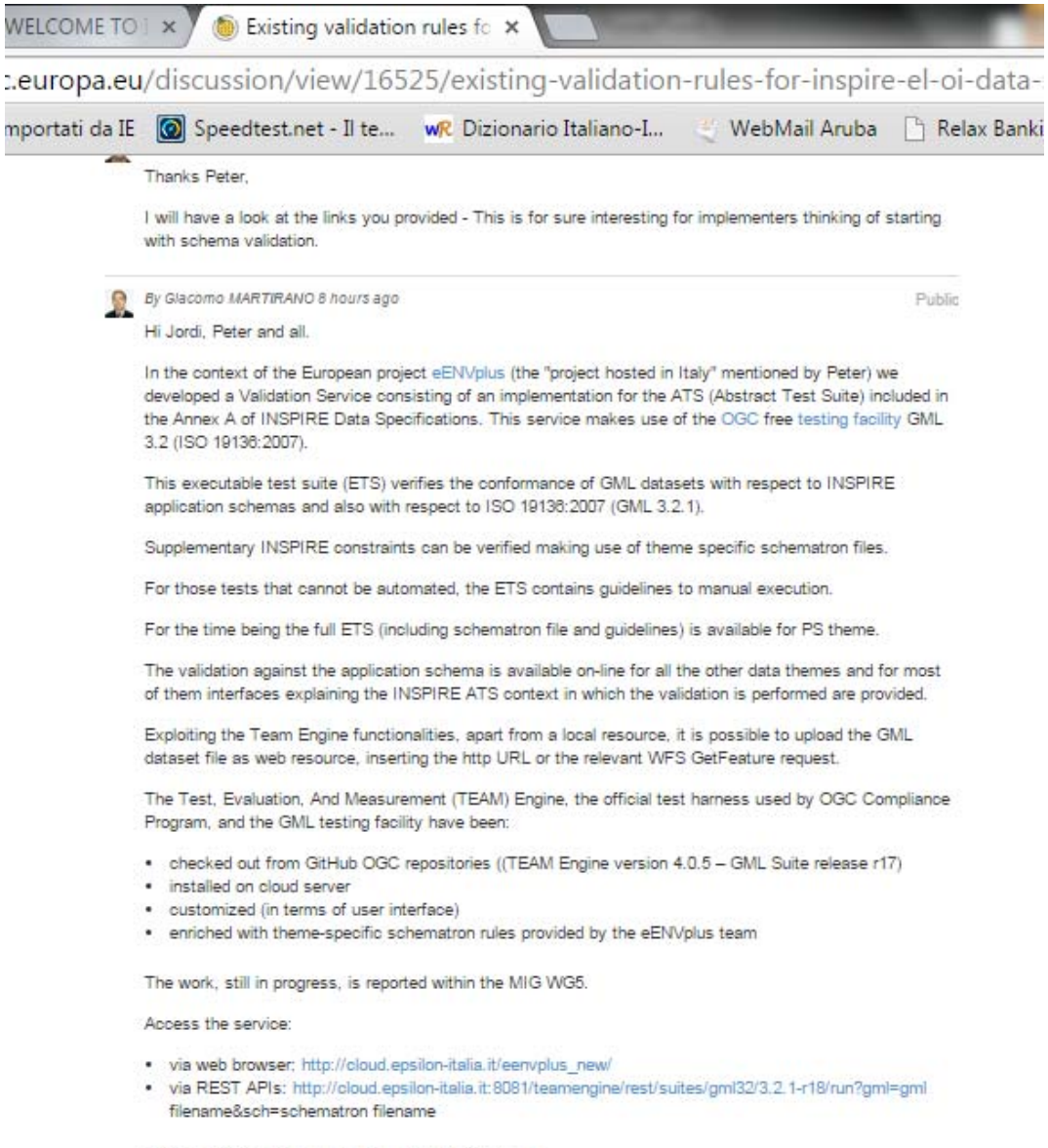
Should test A.4.1 be successfully passed,conformance to **A.4 Metadata IR Conformance Class** can be claimed.

NOTE:
Guidelines to the creation of INSPIRE compliant metadata can also be retrived in the smeSpire Best Practice Catalogue.

MIWP5 context

- INSPIRE Maintenance and Implementation Group (MIG), as part of INSPIRE Maintenance and Implementation Framework (MIF) (http://inspire.ec.europa.eu/index.cfm/pageid/5160)
- Working Group (or sub-project) 5: Validation and Conformity Testing
- Pool of experts
- Contributions from activities of the EU Member States and from EU funded projects (e.g. eENVplus www.eenvplus.eu)

- One of the MIG WG5 task is to identify a «certification process» to be applied to the INSPIRE components
- Regarding datasets, the eENVplus validation service is one of the “candidate implementations”
- Focus on a pilot case in cooperation with EEA
- JRC-OGC MoU



WELCOME TO | Existing validation rules fc

.europa.eu/discussion/view/16525/existing-validation-rules-for-inspire-el-oi-data-

mportati da IE | Speedtest.net - Il te... | Dizionario Italiano-I... | WebMail Aruba | Relax Banki

Thanks Peter,

I will have a look at the links you provided - This is for sure interesting for implementers thinking of starting with schema validation.

By Giacomo MARTIRANO 8 hours ago Public

Hi Jordi, Peter and all.

In the context of the European project eENVplus (the "project hosted in Italy" mentioned by Peter) we developed a Validation Service consisting of an implementation for the ATS (Abstract Test Suite) included in the Annex A of INSPIRE Data Specifications. This service makes use of the OGC free testing facility GML 3.2 (ISO 19136:2007).

This executable test suite (ETS) verifies the conformance of GML datasets with respect to INSPIRE application schemas and also with respect to ISO 19136:2007 (GML 3.2.1).

Supplementary INSPIRE constraints can be verified making use of theme specific schematron files.

For those tests that cannot be automated, the ETS contains guidelines to manual execution.

For the time being the full ETS (including schematron file and guidelines) is available for PS theme.

The validation against the application schema is available on-line for all the other data themes and for most of them interfaces explaining the INSPIRE ATS context in which the validation is performed are provided.

Exploiting the Team Engine functionalities, apart from a local resource, it is possible to upload the GML dataset file as web resource, inserting the http URL or the relevant WFS GetFeature request.

The Test, Evaluation, And Measurement (TEAM) Engine, the official test harness used by OGC Compliance Program, and the GML testing facility have been:

- checked out from GitHub OGC repositories ((TEAM Engine version 4.0.5 – GML Suite release r17)
- installed on cloud server
- customized (in terms of user interface)
- enriched with theme-specific schematron rules provided by the eENVplus team

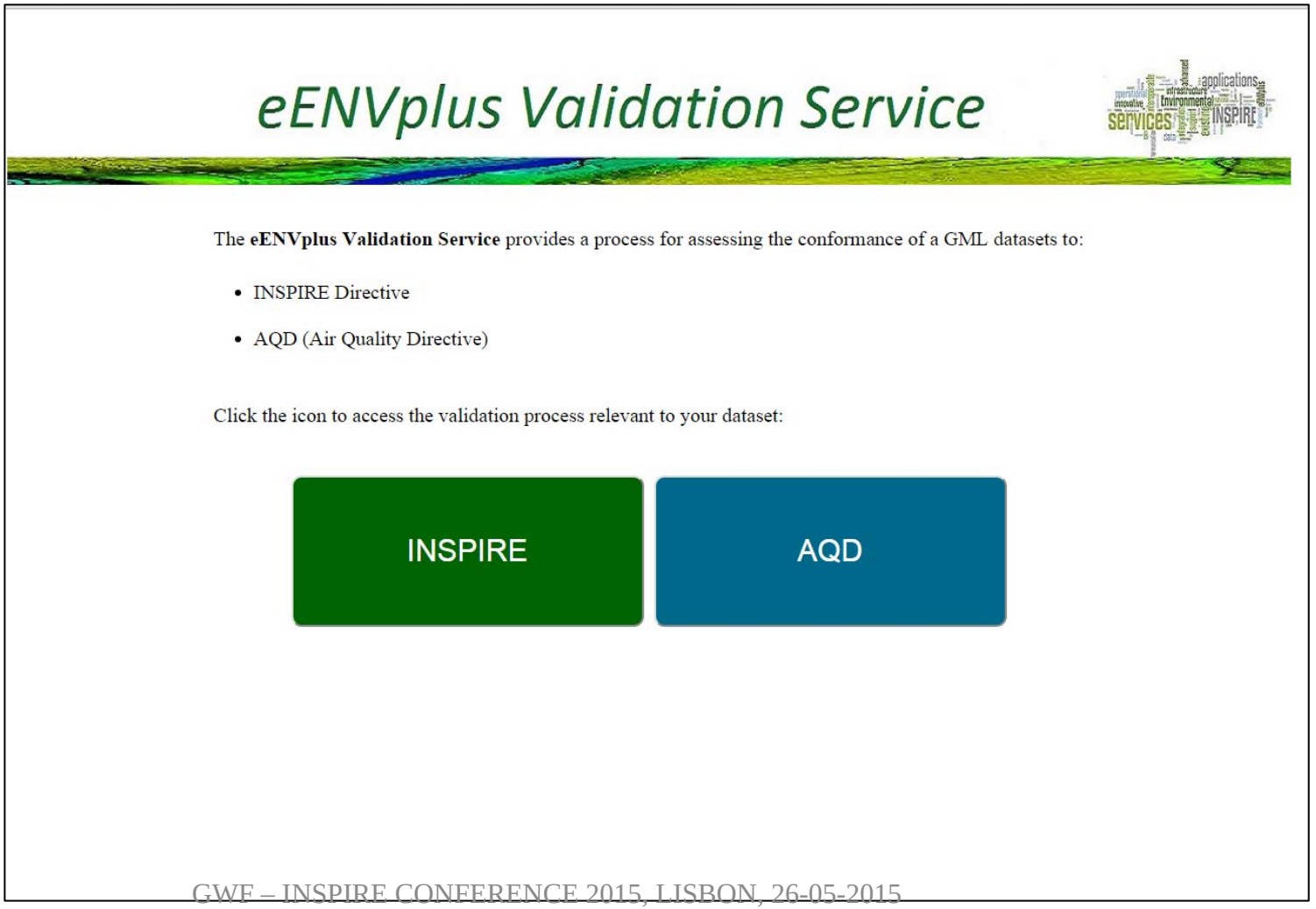
The work, still in progress, is reported within the MIG WG5.

Access the service:

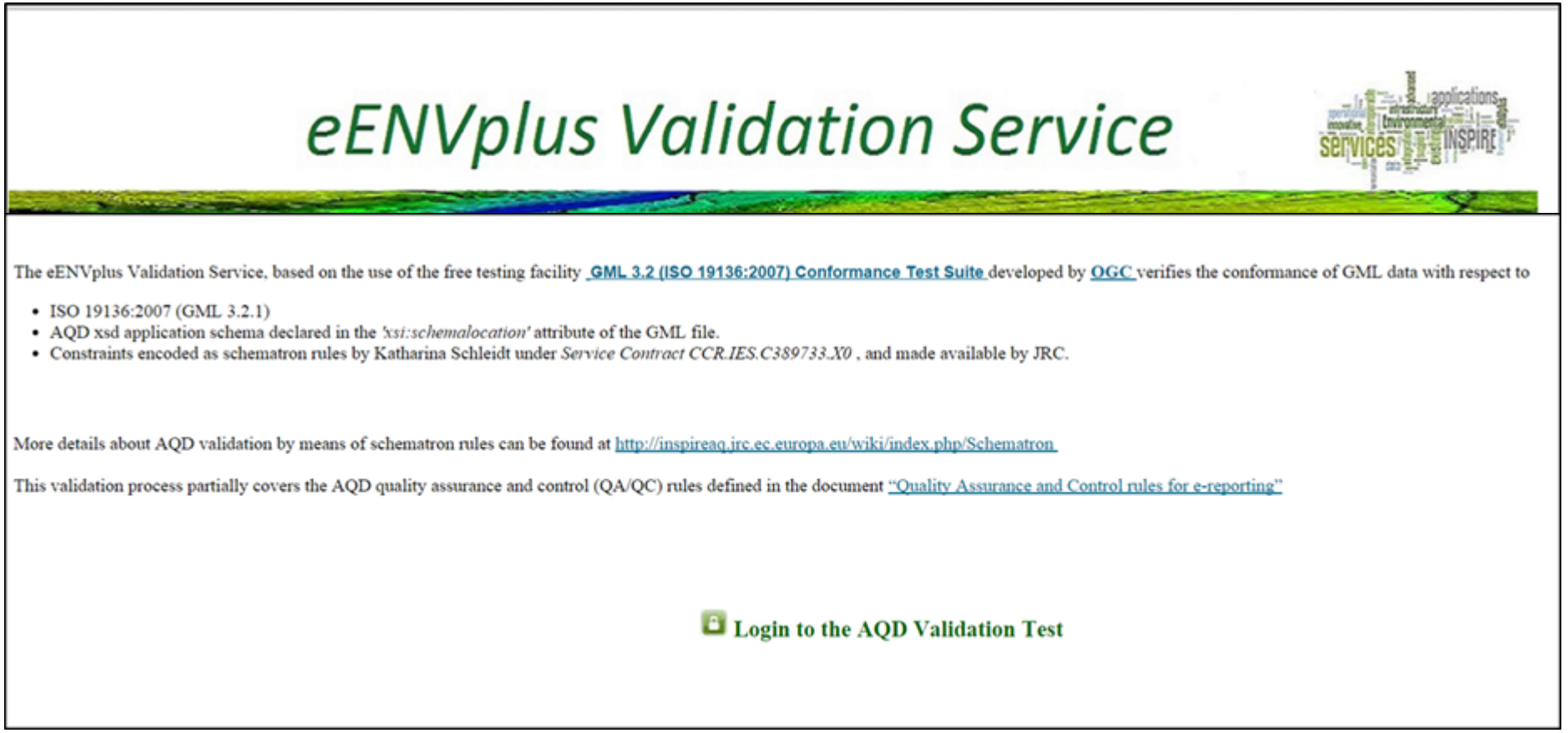
- via web browser: http://cloud.epsilon-italia.it/eenvplus_new/
- via REST APIs: http://cloud.epsilon-italia.it:8081/teamengine/rest/suites/gml32/3.2.1-r18/run?gml=gml filename&sch=schematron filename

Grateful to those of you willing to send any feedback

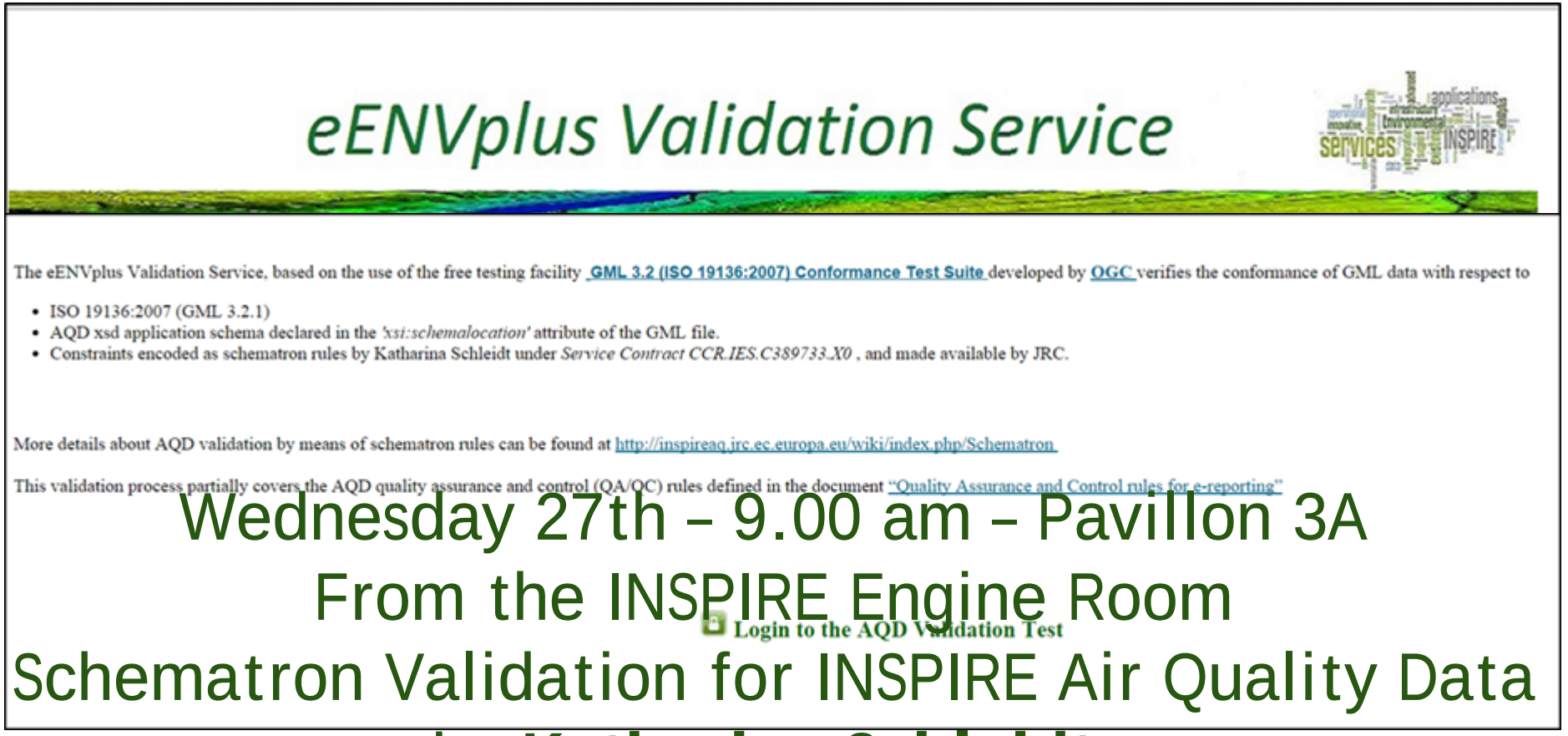
More than just INSPIRE validation



Providing an online testing facility for AQD schematron validation



Providing an online testing facility for AQD schematron validation



Wednesday 27th – 9.00 am – Pavillon 3A

From the INSPIRE Engine Room

Schematron Validation for INSPIRE Air Quality Data

by **Katharina Schleidt**

Thank you!

Questions?

Giacomo Martirano, Fabio Vinci, Stefania Morrone (Epsilon Italia)
g.martirano@epsilon-italia.it, f.vinci@epsilon-italia.it, s.morrone@epsilon-italia.it

Luis Bermudez (OGC)
lbermudez@opengeospatial.org