



# Validation of OGC API services in the INSPIRE Reference Validator

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*INSPIRE 2020 Online Conference – June 9, 2020*

# INSPIRE Reference Validator

- Reasons to develop a common validator:
  - help Member States data providers **test resources** (metadata, data sets and network services) against INSPIRE requirements
  - help INSPIRE coordinators (DG ENV, JRC & EEA) and national coordinators **check INSPIRE implementation progress** in Member States & across Europe
    - support Monitoring and Reporting
  - help solution providers **check their software solutions** against INSPIRE requirements
  - **align existing validation services** in JRC and some Member States
    - need for consistent results & exploit synergies
- Supported by **ARE3NA & ELISE actions** under ISA/ISA<sup>2</sup> programmes.

# INSPIRE Reference Validator – Components

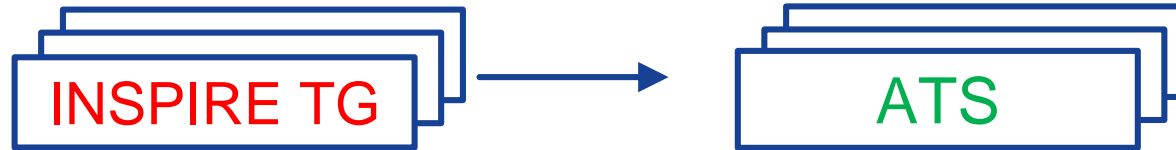


**INSPIRE Technical Guidelines (TG)**  
requirements for all INSPIRE resources

# INSPIRE Reference Validator – Components

## Abstract Test Suites (ATS)

high-level descriptions of test cases



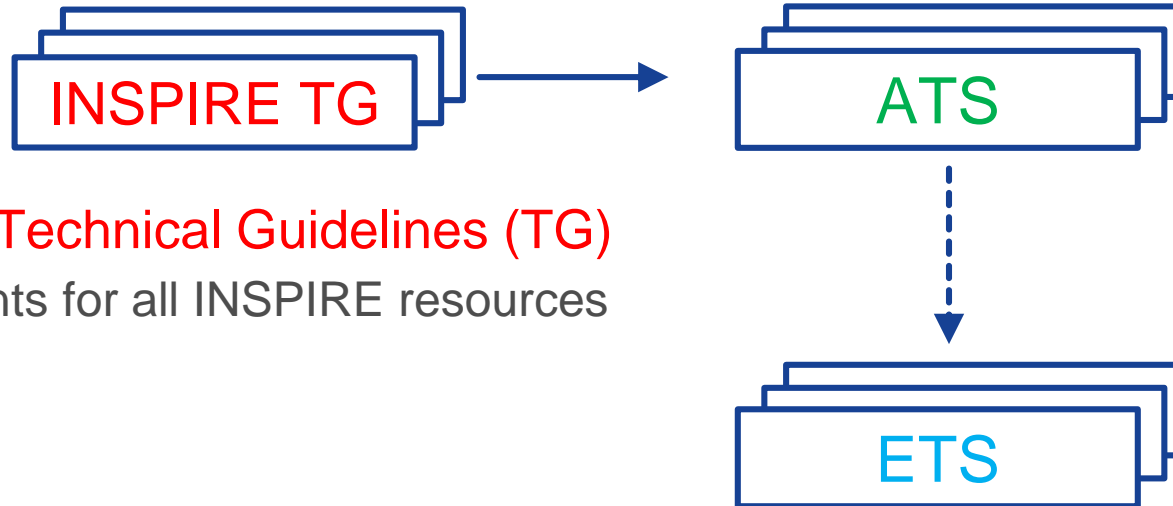
## INSPIRE Technical Guidelines (TG)

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# INSPIRE Reference Validator – Components

## Abstract Test Suites (ATS)

high-level descriptions of test cases



## INSPIRE Technical Guidelines (TG)

requirements for all INSPIRE resources

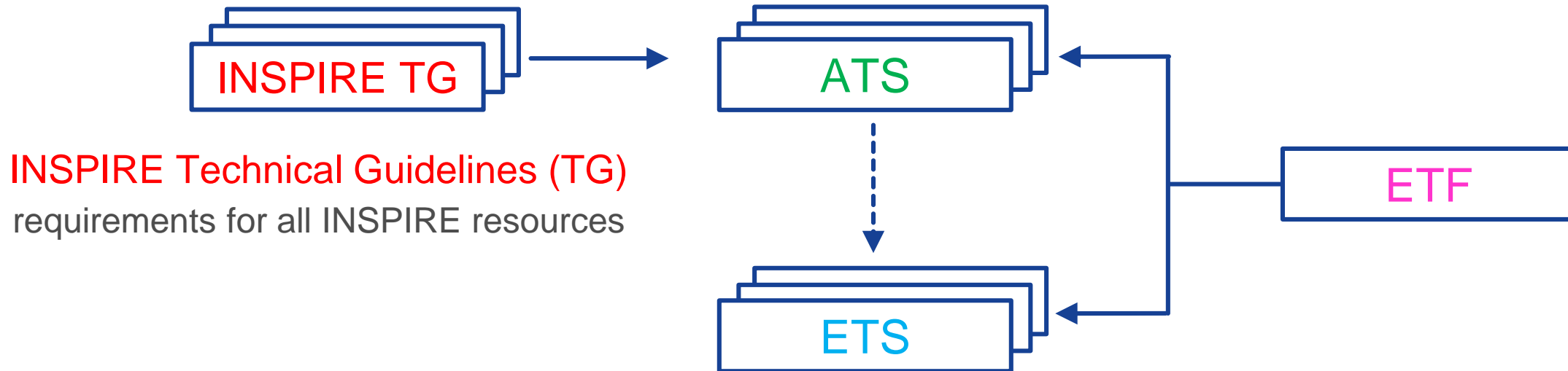
## Executable Test Suites (ETS)

lower-level descriptions of test cases

# INSPIRE Reference Validator – Components

**Abstract Test Suites (ATS)**  
high-level descriptions of test cases

**Testing Framework (ETF)**  
software where ETS are run

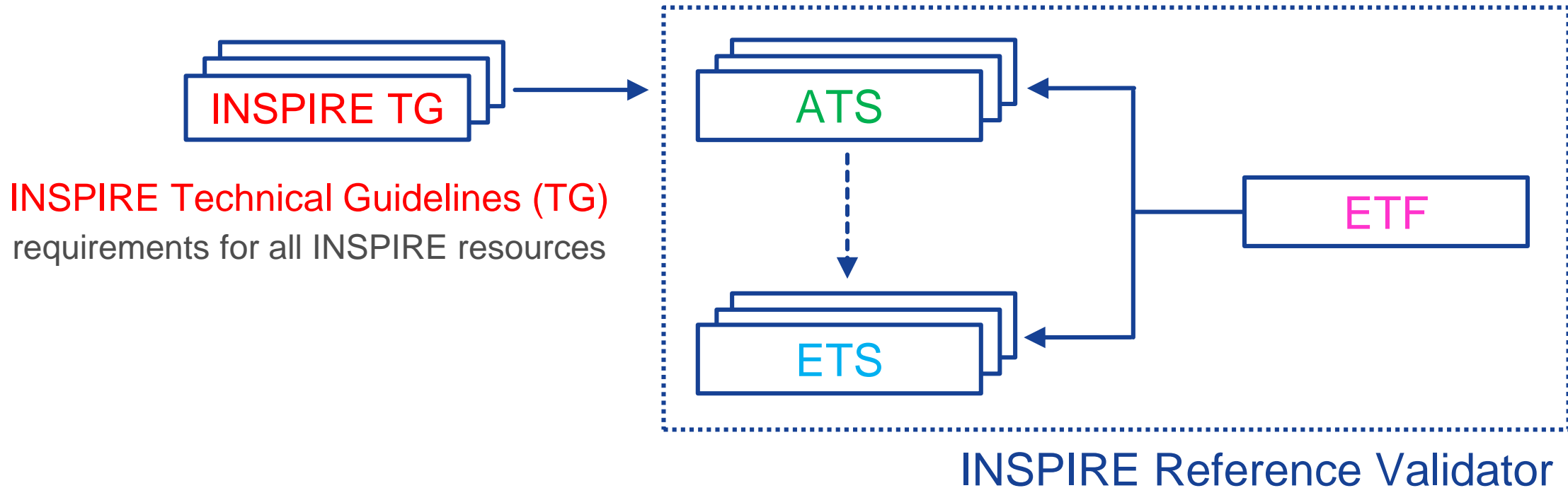


**Executable Test Suites (ETS)**  
lower-level descriptions of test cases

# INSPIRE Reference Validator – Components

**Abstract Test Suites (ATS)**  
high-level descriptions of test cases

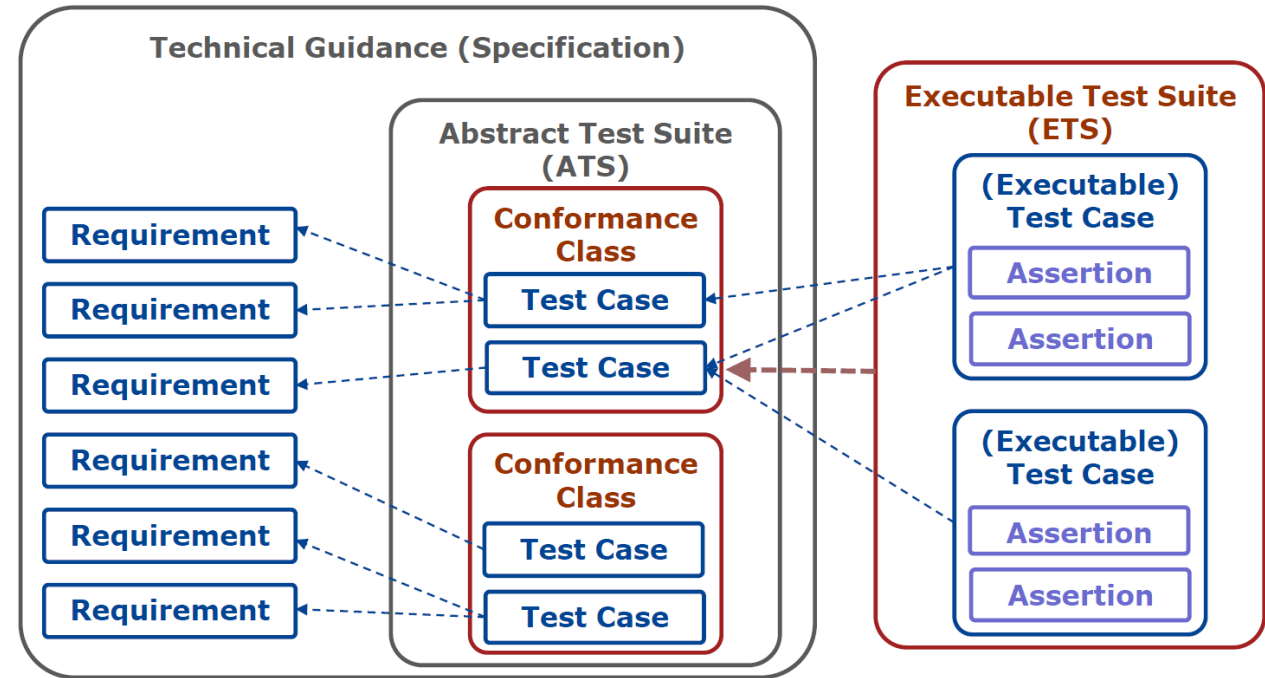
**Testing Framework (ETF)**  
software where ETS are run



**Executable Test Suites (ETS)**  
lower-level descriptions of test cases

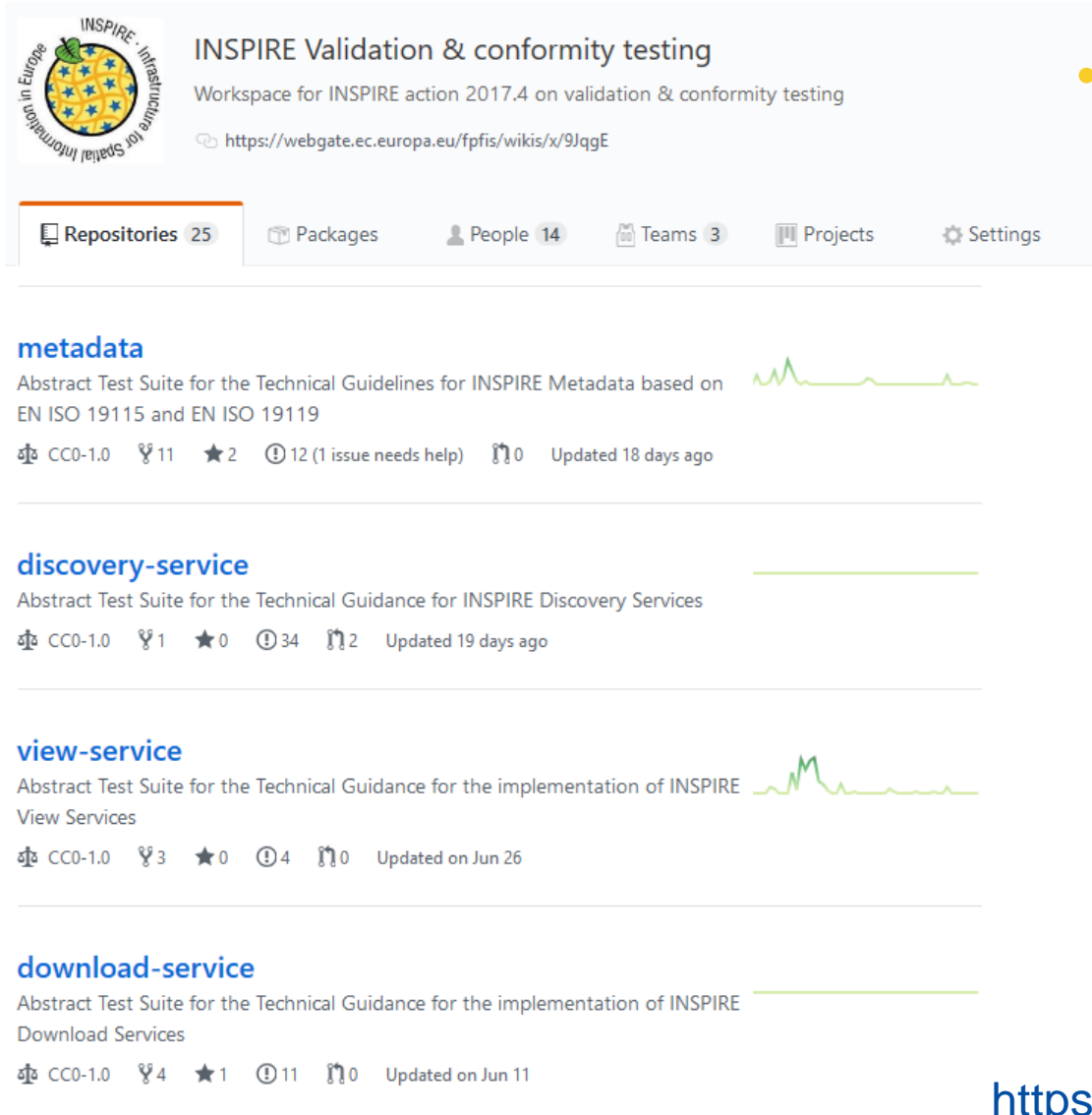
# Abstract & Executable Test Suites (ATS, ETS)

- Test cases covering all requirements of INSPIRE TG are organized in ATS:
  - grouped in Conformance Classes
- Executable tests implemented for the agreed ATS:
  - testing all assertions included in each test case
- Agreed by the MIG-T through sub-group 2017.4 on validation and conformity testing





# Abstract Test Suites (ATS)



The screenshot shows the GitHub repository page for "INSPIRE Validation & conformity testing". The repository is described as a "Workspace for INSPIRE action 2017.4 on validation & conformity testing" and has a URL of <https://webgate.ec.europa.eu/fpfis/wikis/x/9JqgE>. The repository has 25 Repositories, 14 Packages, 14 People, 3 Teams, and 0 Projects. The repository is licensed under CC0-1.0 and has 11 forks, 2 stars, and 12 issues (1 issue needs help). It was updated 18 days ago.

**metadata**  
Abstract Test Suite for the Technical Guidelines for INSPIRE Metadata based on EN ISO 19115 and EN ISO 19119  
CC0-1.0 11 forks 2 stars 12 (1 issue needs help) 0 updates Updated 18 days ago

**discovery-service**  
Abstract Test Suite for the Technical Guidance for INSPIRE Discovery Services  
CC0-1.0 1 fork 0 stars 34 issues 2 updates Updated 19 days ago

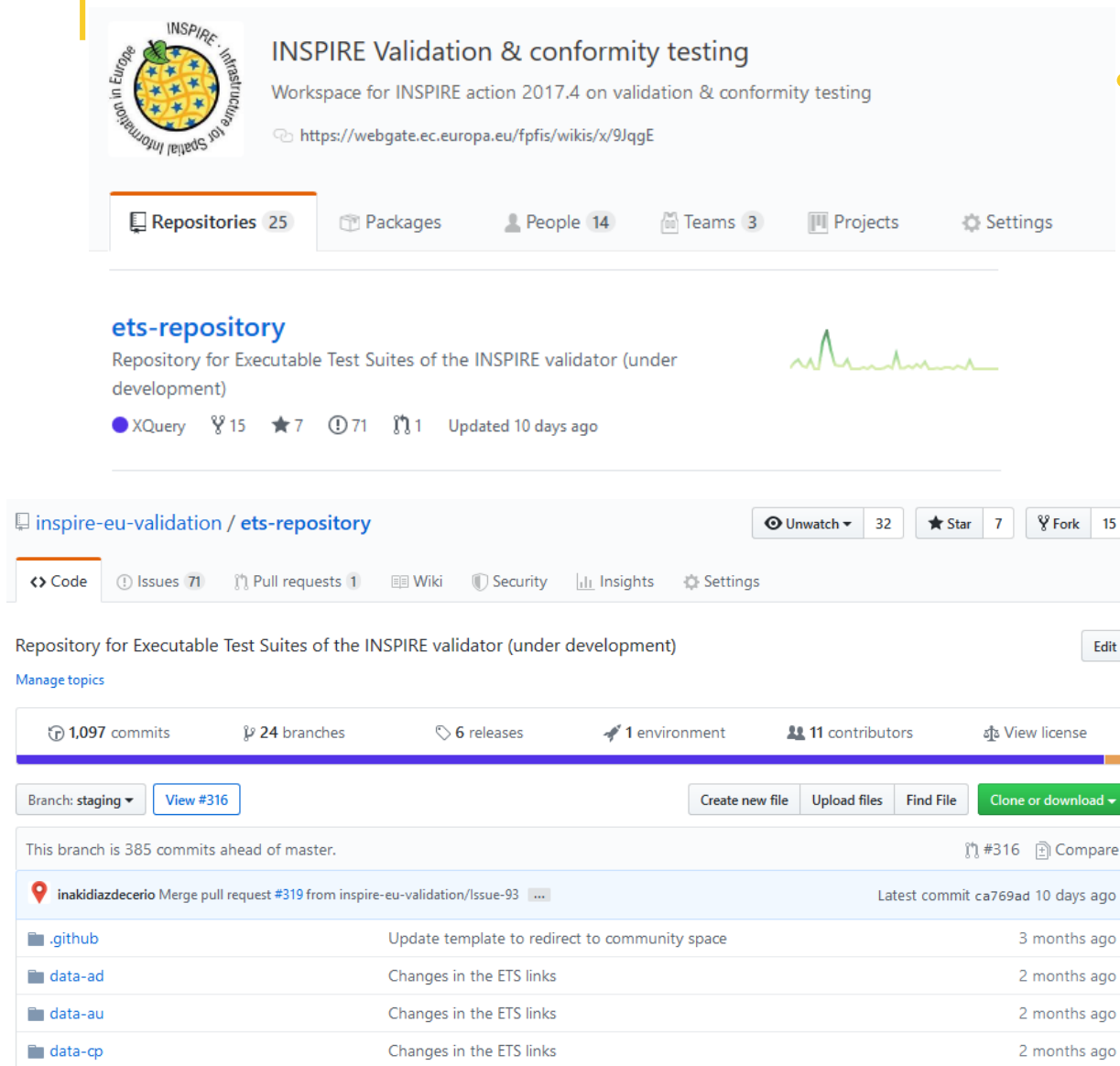
**view-service**  
Abstract Test Suite for the Technical Guidance for the implementation of INSPIRE View Services  
CC0-1.0 3 forks 0 stars 4 issues 0 updates Updated on Jun 26

**download-service**  
Abstract Test Suite for the Technical Guidance for the implementation of INSPIRE Download Services  
CC0-1.0 4 forks 1 star 11 issues 0 updates Updated on Jun 11

- All the ATS are maintained on GitHub, licensed under **CC0**:
  - Metadata (TG 1.3, TG 2.0)
  - Discovery Services (CSW)
  - View Services (WMS, WMTS)
  - Download Services (WFS, Atom, WCS, SOS)
  - Data specifications
  - Data encoding
  - Annex I data specifications
  - Annex II/III data specifications **ONGOING**

<https://github.com/inspire-eu-validation>

# Executable Test Suites (ETS)



The screenshot shows the GitHub repository page for 'INSPIRE Validation & conformity testing'. The repository is named 'ets-repository' and is described as 'Repository for Executable Test Suites of the INSPIRE validator (under development)'. It has 15 forks, 7 stars, and 71 issues. The repository is maintained by 'inspire-eu-validation' and is currently on the 'staging' branch. The commit history shows several recent updates, including 'Update template to redirect to community space' and 'Changes in the ETS links'.

INSPIRE Validation & conformity testing  
Workspace for INSPIRE action 2017.4 on validation & conformity testing  
<https://webgate.ec.europa.eu/fpfis/wikis/x/9JqgE>

Repositories 25 Packages People 14 Teams 3 Projects Settings

**ets-repository**  
Repository for Executable Test Suites of the INSPIRE validator (under development)  
XQuery 15 ★ 7 ! 71 1 Updated 10 days ago

inspire-eu-validation / ets-repository  
Unwatch 32 Star 7 Fork 15

<> Code Issues 71 Pull requests 1 Wiki Security Insights Settings

Repository for Executable Test Suites of the INSPIRE validator (under development) Edit

Manage topics

1,097 commits 24 branches 6 releases 1 environment 11 contributors View license

Branch: staging View #316 Create new file Upload files Find File Clone or download

This branch is 385 commits ahead of master. #316 Compare

inakidiazdecerio Merge pull request #319 from inspire-eu-validation/Issue-93 Latest commit ca769ad 10 days ago

File	Commit Message	Time
.github	Update template to redirect to community space	3 months ago
data-ad	Changes in the ETS links	2 months ago
data-au	Changes in the ETS links	2 months ago
data-cp	Changes in the ETS links	2 months ago

- All the ETS are maintained on GitHub, licensed under **EUPL v1.2**:
  - Metadata (TG 1.3, TG 2.0)
  - Discovery Services (CSW)
  - View Services (WMS, WMTS)
  - Download Services (WFS, Atom, WCS, SOS)
  - Data specifications
  - Data encoding
  - Annex I data specifications
  - Annex II/III data specifications **ONGOING**

<https://github.com/inspire-eu-validation/ets-repository>

# Testing Framework (ETF)



- A **Testing Framework** is a software to run ETS.
- The **INSPIRE Validator** makes use and further extends ETF:
  - a testing framework to validate data, metadata & web services in SDIs
  - developed since 2010
  - open source under **EUPL v1.2**
  - current version: 2.0 (January 2019), next version planned for July 2020
  - ETF design goals:
    - user-friendly
    - consistent with the **standards** (ISO/OGC)
    - capable of testing all resources in an SDI
  - manuals for users, developers & admins (<http://docs.etf-validator.net>)

# Testing Framework (ETF)



- Any ETF deployment is composed of:
  - a **database**, one or more **test engines**, a **servlet container**
- Currently supported test engines to execute ETS are:
  - **SoapUI** for testing web services (to be discontinued)
  - **BaseX** for testing sets of XML documents
  - **TEAM Engine** – the tool used by the OGC CITE tests
- ETF can be used by:
  - a responsive **web application** (<https://github.com/etf-validator/etf-webapp>)
  - a REST API ([http://docs.etf-validator.net/v2.0/Developer\\_manuals/WEB-API.html](http://docs.etf-validator.net/v2.0/Developer_manuals/WEB-API.html))
- The easiest way to deploy ETF is a **Docker** container.

# INSPIRE Validator – Web application

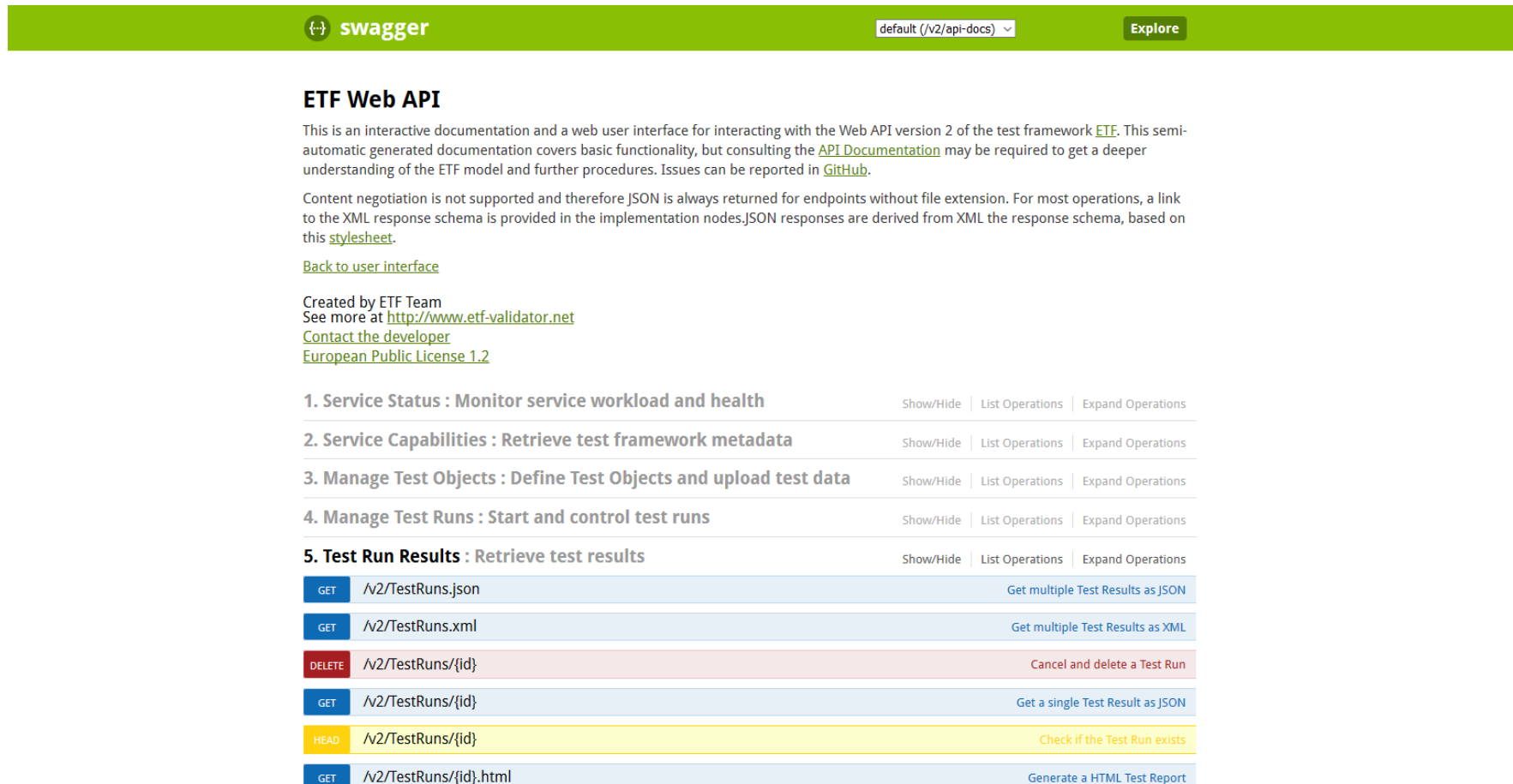
- 2 instances:
  - staging instance (<http://staging-inspire-validator.eu-west-1.elasticbeanstalk.com/etf-webapp>)
    - includes **bug fixes & latest features** for testing purposes
  - production instance (<http://inspire.ec.europa.eu/validator>)
    - includes only **consolidated developments**
- Both instances deployed **on the cloud**

<https://inspire.ec.europa.eu/validator>

<http://staging-inspire-validator.eu-west-1.elasticbeanstalk.com/etf-webapp>

# INSPIRE Validator – REST API

- Documented using OpenAPI:



**ETF Web API**

This is an interactive documentation and a web user interface for interacting with the Web API version 2 of the test framework [ETF](#). This semi-automatic generated documentation covers basic functionality, but consulting the [API Documentation](#) may be required to get a deeper understanding of the ETF model and further procedures. Issues can be reported in [GitHub](#).

Content negotiation is not supported and therefore JSON is always returned for endpoints without file extension. For most operations, a link to the XML response schema is provided in the implementation nodes. JSON responses are derived from XML the response schema, based on this [stylesheet](#).

[Back to user interface](#)

Created by ETF Team  
See more at <http://www.etf-validator.net>  
[Contact the developer](#)  
[European Public License 1.2](#)


<b>1. Service Status : Monitor service workload and health</b>	Show/Hide	List Operations	Expand Operations
<b>2. Service Capabilities : Retrieve test framework metadata</b>	Show/Hide	List Operations	Expand Operations
<b>3. Manage Test Objects : Define Test Objects and upload test data</b>	Show/Hide	List Operations	Expand Operations
<b>4. Manage Test Runs : Start and control test runs</b>	Show/Hide	List Operations	Expand Operations
<b>5. Test Run Results : Retrieve test results</b>	Show/Hide	List Operations	Expand Operations

GET	/v2/TestRuns.json	Get multiple Test Results as JSON
GET	/v2/TestRuns.xml	Get multiple Test Results as XML
DELETE	/v2/TestRuns/{id}	Cancel and delete a Test Run
GET	/v2/TestRuns/{id}	Get a single Test Result as JSON
HEAD	/v2/TestRuns/{id}	Check if the Test Run exists
GET	/v2/TestRuns/{id}.html	Generate a HTML Test Report

<http://inspire.ec.europa.eu/validator/swagger-ui.html>

# INSPIRE Validation community

- The central place of interaction for the INSPIRE community:
  - helpdesk
  - release planning
  - changelog of past releases
  - training material & sample resources

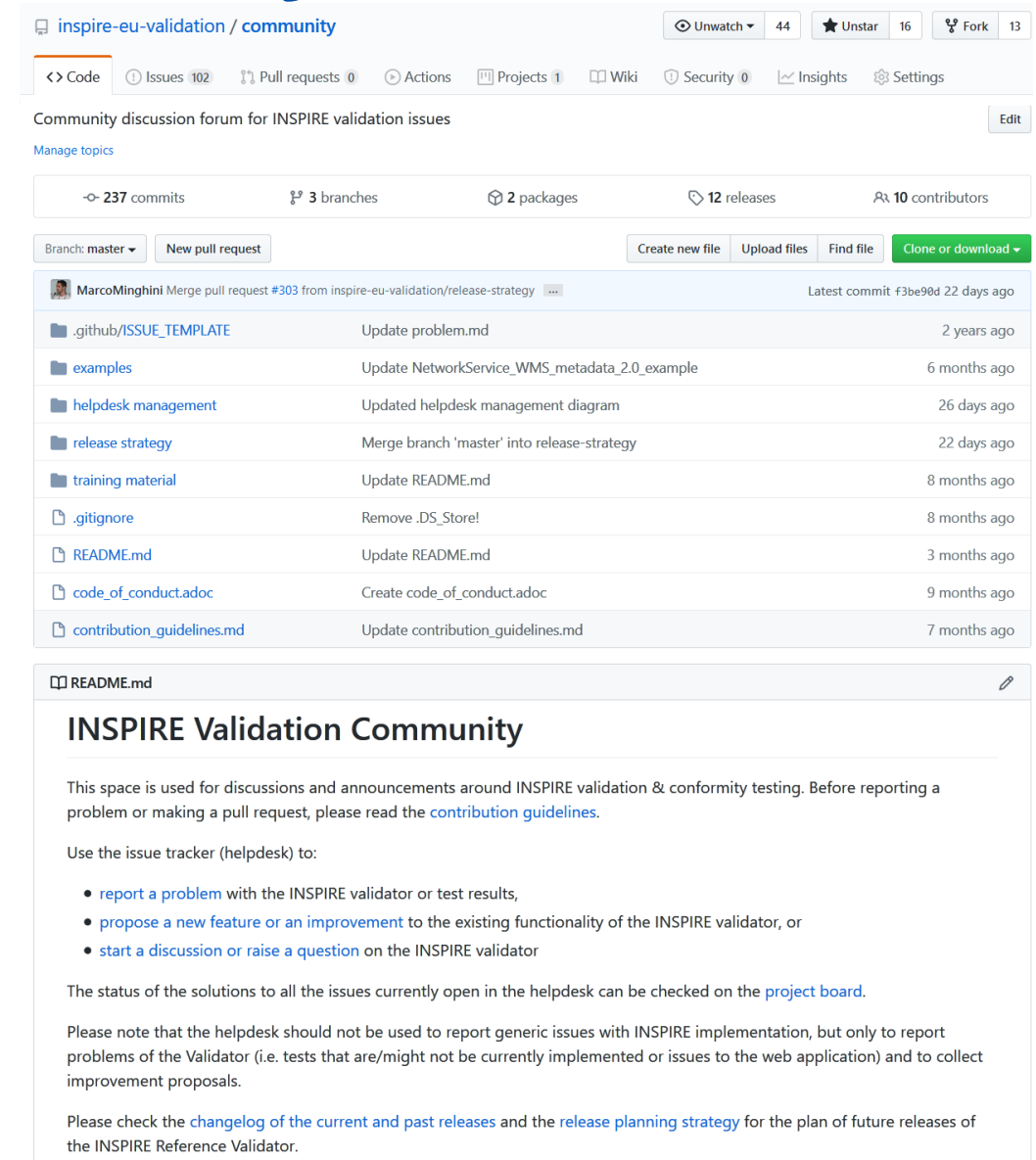


**INSPIRE Validation & conformity testing**  
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<https://webgate.ec.europa.eu/fpfis/wikis/x/9lqqE>

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**community**  
Community discussion forum for INSPIRE validation issues  
🔗 7 ★ 8 ⓘ 65 🛠 2 Updated 16 days ago

<https://github.com/inspire-eu-validation/community>



inspire-eu-validation / community

<> Code 102 Issues 0 Pull requests 0 Actions Projects 1 Wiki Security 0 Insights Settings

Community discussion forum for INSPIRE validation issues

Manage topics

237 commits 3 branches 2 packages 12 releases 10 contributors

Branch: master New pull request Create new file Upload files Find file Clone or download

MarcoMinghini Merge pull request #303 from inspire-eu-validation/release-strategy Latest commit f3be90d 22 days ago

.github/ISSUE_TEMPLATE	Update problem.md	2 years ago
examples	Update NetworkService_WMS_metadata_2.0_example	6 months ago
helpdesk management	Updated helpdesk management diagram	26 days ago
release strategy	Merge branch 'master' into release-strategy	22 days ago
training material	Update README.md	8 months ago
.gitignore	Remove .DS_Store!	8 months ago
README.md	Update README.md	3 months ago
code_of_conduct.adoc	Create code_of_conduct.adoc	9 months ago
contribution_guidelines.md	Update contribution_guidelines.md	7 months ago

README.md

## INSPIRE Validation Community

This space is used for discussions and announcements around INSPIRE validation & conformity testing. Before reporting a problem or making a pull request, please read the [contribution guidelines](#).

Use the issue tracker (helpdesk) to:

- [report a problem](#) with the INSPIRE validator or test results,
- [propose a new feature or an improvement](#) to the existing functionality of the INSPIRE validator, or
- [start a discussion or raise a question](#) on the INSPIRE validator

The status of the solutions to all the issues currently open in the helpdesk can be checked on the [project board](#).

Please note that the helpdesk should not be used to report generic issues with INSPIRE implementation, but only to report problems of the Validator (i.e. tests that are/might not be currently implemented or issues to the web application) and to collect improvement proposals.

Please check the [changelog of the current and past releases](#) and the [release planning strategy](#) for the plan of future releases of the INSPIRE Reference Validator.

# INSPIRE Validation community – Release planning

## Annual releases

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- **v2020.1 - 15/03/2020:** it includes both breaking and non-breaking changes.
- **v2020.2 - 15/06/2020:** it includes both breaking and non-breaking changes.
- **v2020.3 - 15/09/2020:** it only includes non-breaking changes, so that any INSPIRE resource passing the test in the previous release automatically passes the same test in this release. This release is the one used for the end-of-year Monitoring process.
- **v2021.b - 15/09/2020:** it includes both breaking and non-breaking changes which are planned to become effective (for Monitoring purposes) in the following year.
- **v2021.0 - 15/01/2021:** it includes both breaking and non-breaking changes, including those available in the beta instance of the previous year.



# ETS for INSPIRE services – Status

- Current ETS implementation for INSPIRE services:
  - View Services
    - [WMS](#) / [WMTS](#): SoapUI test driver
  - Download Services
    - [Atom](#), [WCS](#), [SOS](#): SoapUI test driver
    - [WFS](#): SoapUI test & TEAM Engine test drivers
  - Discovery Services
    - [CSW](#): SoapUI test driver

# ETS for INSPIRE Download Services based on OGC API - Features

- ETS can be implemented through different strategies:
  - using the current [SoapUI test driver](#)
  - re-using the OGC ETS and writing a [new test driver](#) for it
  - using a new test driver (based on a DSL) under discussion & development by the ETF Steering Group

# ETS based on the SoapUI test driver

- SoapUI:
  - open source framework for **testing web services** automatically
    - performs automatic calls to HTTP endpoints and analyze responses
  - used in the INSPIRE Reference Validator for View and Download Services
    - specific TestDriver for the integration of the ETS to reuse dependencies from SoapUI
    - all response checks need to be **manually coded**
  - OGC API - Features can be queried through this
    - **new ETS can be developed** and status codes & response contents can be performed in the same manner

# ETS re-using OGC ETS

## Scope

This executable test suite (ETS) verifies that an OGC API - Features instance conforms to [OGC API - Features - Part 1: Core](#) (OGC 17-069r3) and related standards. Conformance testing is a kind of "black box" testing that examines externally visible characteristics or behaviors of the SUT and is independent of any implementation details.

Several conformance classes are defined in the principal specifications. The ones listed below are covered by this test suite:

- Core
  - The Core specifies requirements that all OGC API - Features instances have to fulfill.
- ETS directly [distributed from OGC](#) as a standalone application:
  - JAR format
  - Docker image
    - in any case, [a new TestDriver would need to be developed](#) to interact with the responses of this application

<https://opengeospatial.github.io/ets-ogcapi-features10/>  
<https://github.com/opengeospatial/ogcapi-features>

# ETS based on a new test driver

- New test driver to overcome SoapUI issues & limitations:
  - unclear future
  - limitations in usability, efficiency, maintainability, portability, functionality
- Based on a **Domain-Specific Language** (DSL) to define tests & Java code generated automatically from DSL definitions:
  - functional descriptions rather than code
  - easy to understand test descriptions & result messages
  - less redundancy & improved code reusability
- **Alphabet** based on:
  - terms from the geo-IT web service / API specifications
  - terms from the ETF model like Test Case
- Expressions based on the **Given-When-Then** pattern

# Thank you!



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# Slido session 2

*INSPIRE 2020 Online Conference – June 9, 2020*