Validation of OGC API services in the INSPIRE Reference Validator

Carlos Palma Zurita & Marco Minghini

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[2] programmes.

http://inspire.ec.europa.eu/validator/about

European Commission

INSPIRE Reference Validator – Components
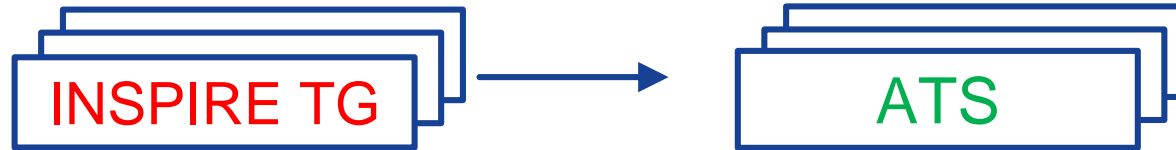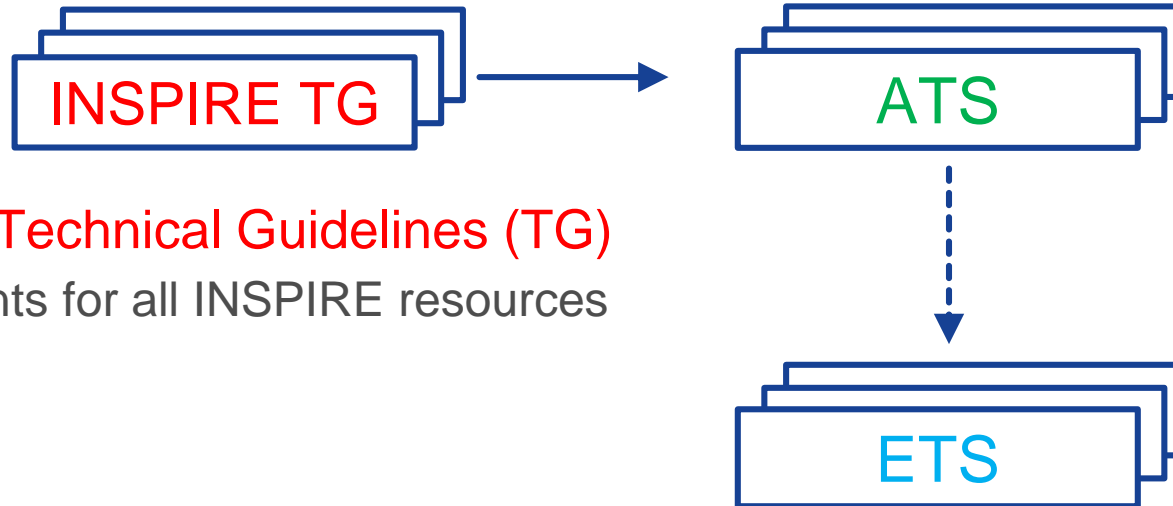
INSPIRE TG

INSPIRE Technical Guidelines (TG)

requirements for all INSPIRE resources

European Commission

INSPIRE Reference Validator – Components

Abstract Test Suites (ATS)

high-level descriptions of test cases

INSPIRE TG → ATS

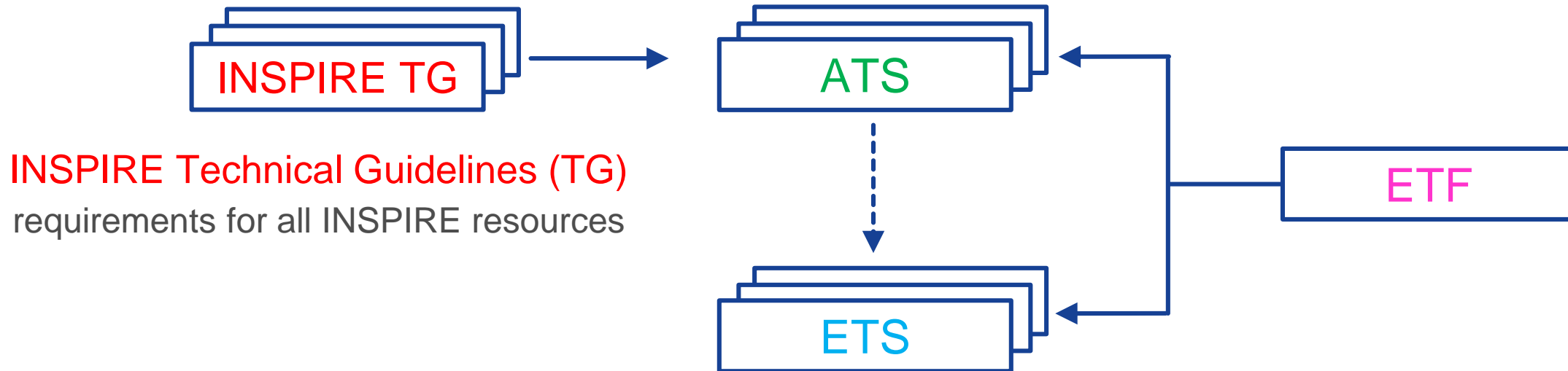INSPIRE Technical Guidelines (TG)

requirements for all INSPIRE resources

European Commission

INSPIRE Reference Validator – Components

Abstract Test Suites (ATS)

high-level descriptions of test cases

INSPIRE TG → ATS

ATS ⇢ ETS

INSPIRE Technical Guidelines (TG)

requirements for all INSPIRE resources

Executable Test Suites (ETS)

lower-level descriptions of test cases

European Commission

INSPIRE Reference Validator – Components

Abstract Test Suites (ATS)

high-level descriptions of test cases
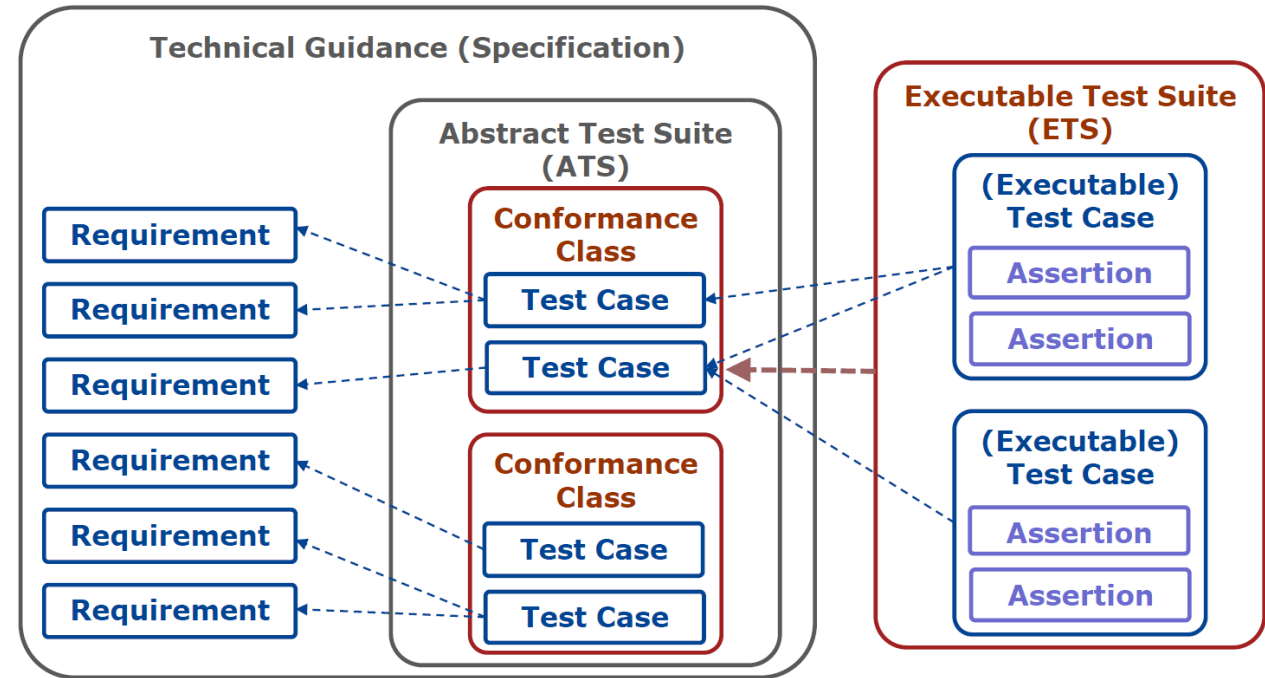
Testing Framework (ETF)

software where ETS are run

INSPIRE TG

ATS

INSPIRE Technical Guidelines (TG)

requirements for all INSPIRE resources

ETF

ETS

Executable Test Suites (ETS)

lower-level descriptions of test cases

European Commission

INSPIRE Reference Validator – Components

Abstract Test Suites (ATS)

high-level descriptions of test cases

Testing Framework (ETF)

software where ETS are run

INSPIRE TG

INSPIRE Technical Guidelines (TG)

requirements for all INSPIRE resources

ATS

ETF

ETS

INSPIRE Reference Validator

Executable Test Suites (ETS)

lower-level descriptions of test cases

European Commission
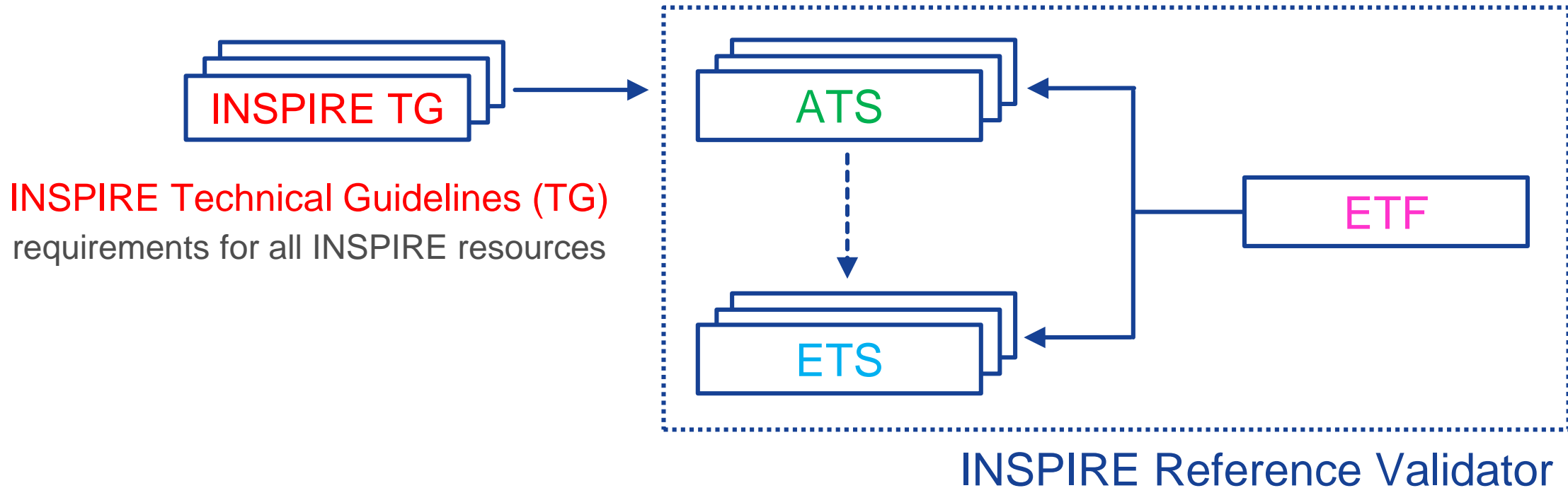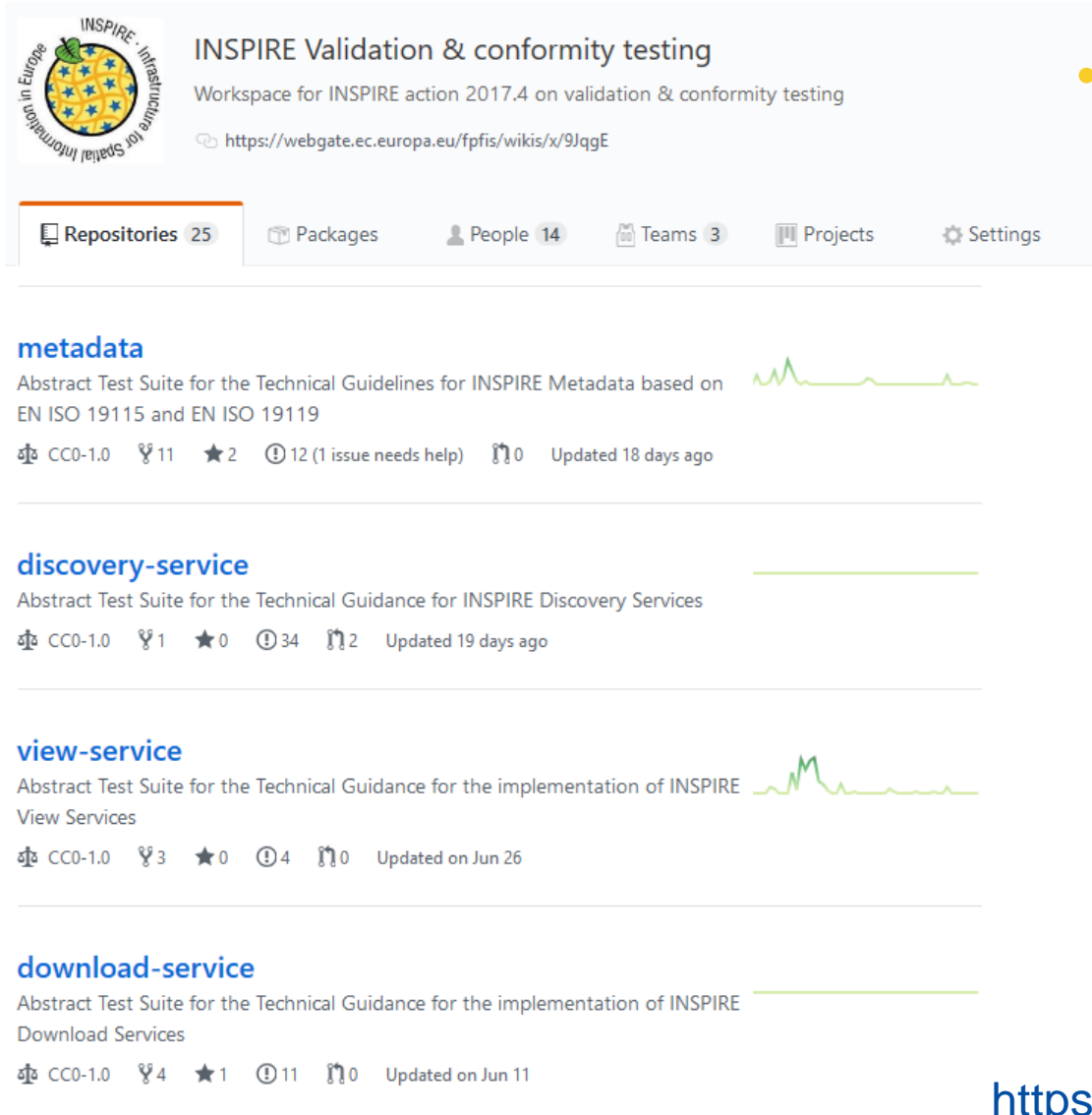
Abstract & Executable Test Suites (ATS, ETS)

- **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

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

Abstract Test Suites (ATS)

- 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)

- 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)

- The easiest way to deploy ETF is a Docker container.
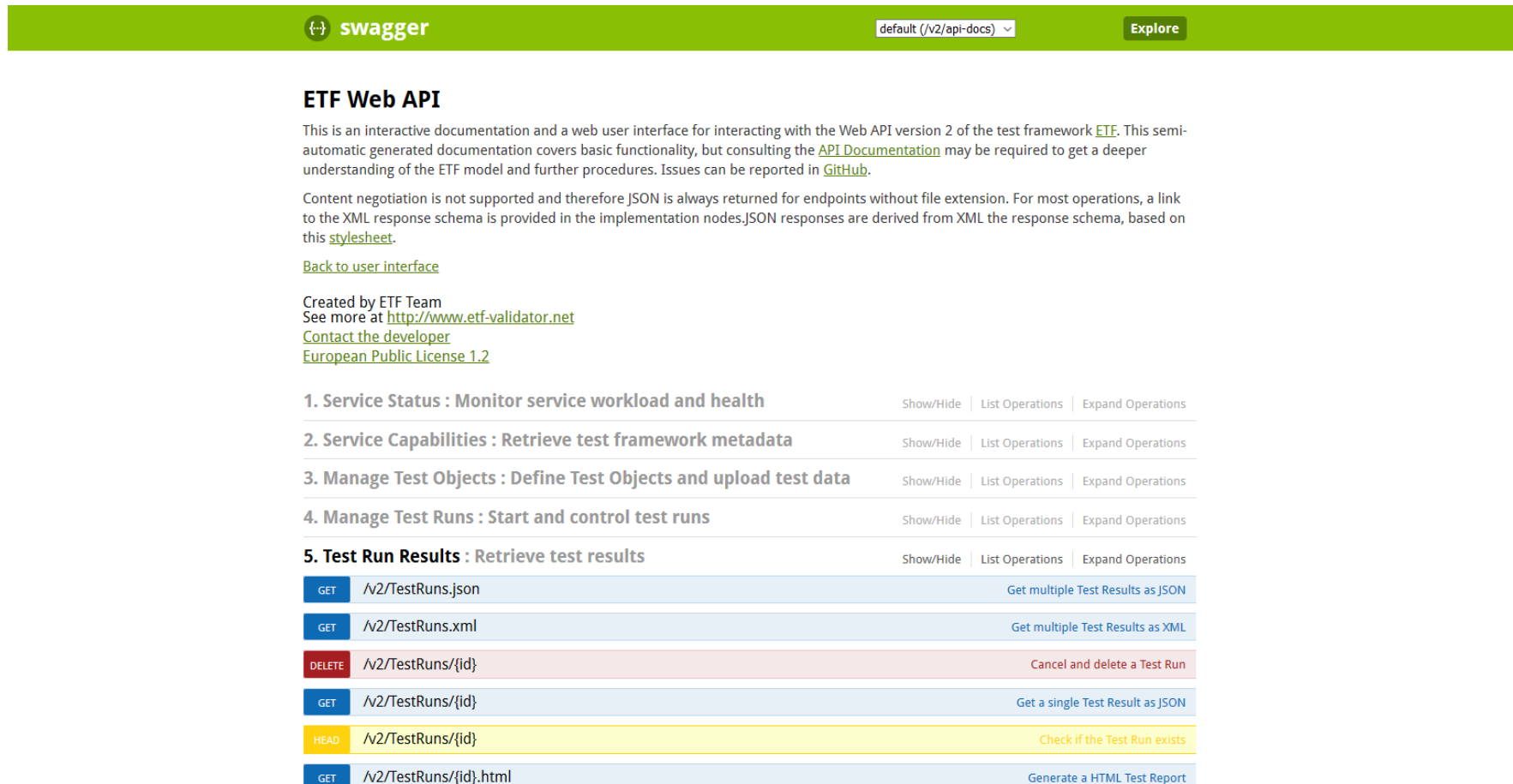
INSPIRE Validator – Web application

- 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

European Commission

INSPIRE Validator – REST API

- Documented using OpenAPI:

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
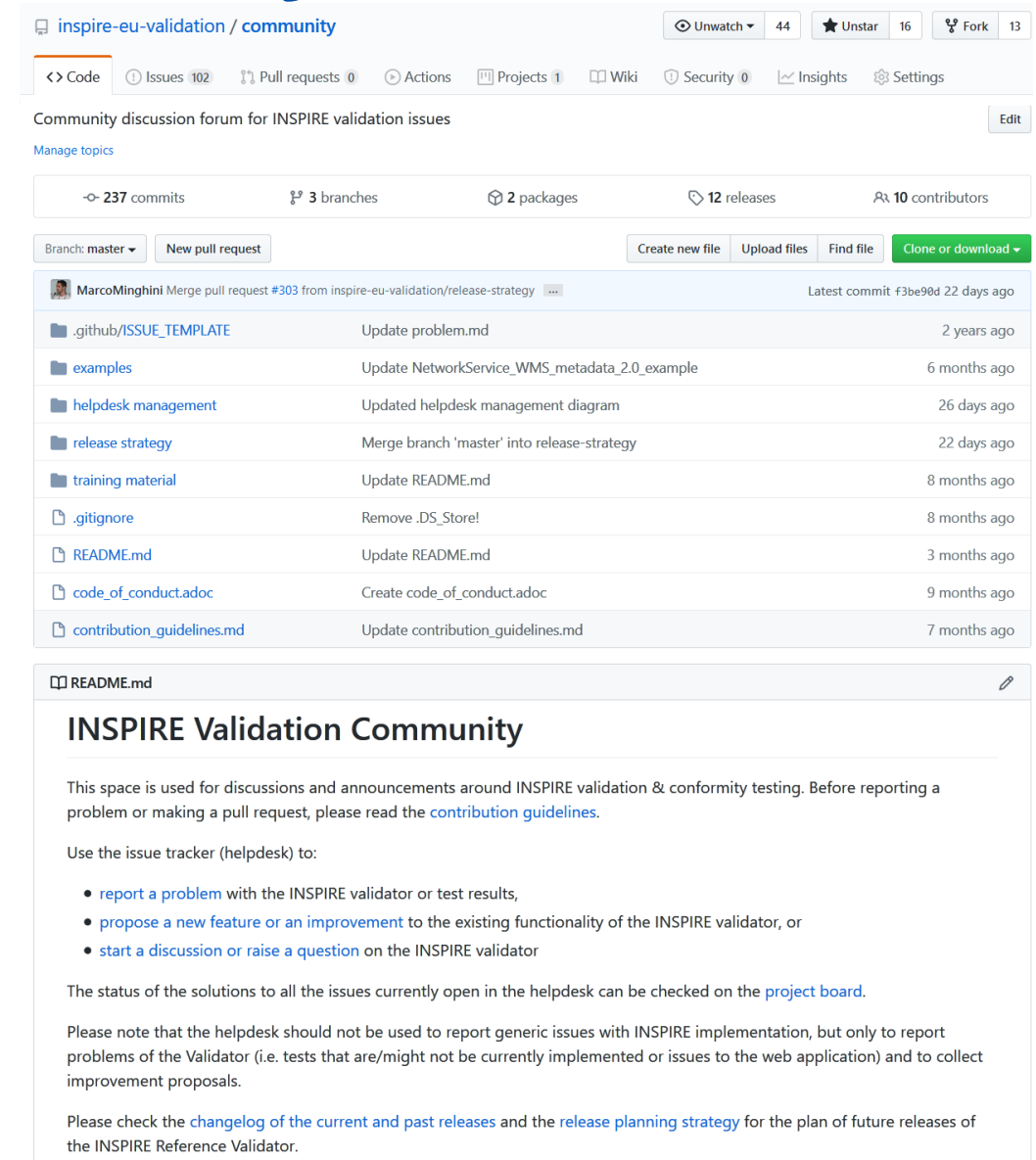
  - training material & sample resources

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

INSPIRE Validation community – Release planning

Annual releases

- **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.

https://github.com/inspire-eu-validation/community/tree/master/release%20strategy

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

European Commission

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

https://github.com/inspire-eu-validation/ets-repository/blob/master/service/ds-wfs-direct-soapui-project.xml#L193

European Commission

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

https://github.com/etf-validator/governance/issues/77

Thank you!

✉ marco.minghini@ec.europa.eu

European Commission

Slido session 2

INSPIRE 2020 Online Conference – June 9, 2020