European Network of Transmission System Operators for Electricity

entsoe

2027 Standard Vetting Interoperability Test (SV-IOP)

ENTSO-E CIM Extension *Network Code Profiles* for Regional Coordination Processes

ENTSO-E Mission Statement

Who we are

ENTSO-E, the European Network of Transmission System Operators for Electricity, is the association for the cooperation of the European transmission system operators (TSOs). The 39 member TSOs, representing 35 countries, are responsible for the secure and coordinated operation of Europe's electricity system, the largest interconnected electrical grid in the world. In addition to its core, historical role in technical cooperation, ENTSO-E is also the common voice of TSOs.

ENTSO-E brings together the unique expertise of TSOs for the benefit of European citizens by keeping the lights on, enabling the energy transition, and promoting the completion and optimal functioning of the internal electricity market, including via the fulfilment of the mandates given to ENTSO-E based on EU legislation.

Our mission

ENTSO-E and its members, as the European TSO community, fulfil a common mission: Ensuring the security of the inter-connected power system in all time frames at pan-European level and the optimal functioning and development of the European interconnected electricity markets, while enabling the integration of electricity generated from renewable energy sources and of emerging technologies.

Our vision

ENTSO-E plays a central role in enabling Europe to become the first climate-neutral continent by 2050 by creating a system that is secure, sustainable and affordable, and that integrates the expected amount of renewable energy, thereby offering an essential contribution to the European Green Deal. This endeavour requires sector integration and close cooperation among all actors.

Europe is moving towards a sustainable, digitalised, integrated and electrified energy system with a combination of centralised and distributed resources. ENTSO-E acts to ensure that this energy system keeps consumers at its centre and is operated and developed with climate objectives and social welfare in mind.

ENTSO-E is committed to use its unique expertise and system-wide view – supported by a responsibility to maintain the system's security – to deliver a comprehensive roadmap of how a climate-neutral Europe looks.

Our values

ENTSO-E acts in solidarity as a community of TSOs united by a shared responsibility.

As the professional association of independent and neutral regulated entities acting under a clear legal mandate, ENTSO-E serves the interests of society by optimising social welfare in its dimensions of safety, economy, environment, and performance.

ENTSO-E is committed to working with the highest technical rigour as well as developing sustainable and innovative responses to prepare for the future and overcoming the challenges of keeping the power system secure in a climate-neutral Europe. In all its activities, ENTSO-E acts with transparency and in a trustworthy dialogue with legislative and regulatory decision makers and stakeholders.

Our contributions

ENTSO-E supports the cooperation among its members at European and regional levels. Over the past decades, TSOs have undertaken initiatives to increase their cooperation in network planning, operation and market integration, thereby successfully contributing to meeting EU climate and energy targets.

To carry out its legally mandated tasks, ENTSO-E's key responsibilities include the following:

› Development and implementation of standards, network codes, platforms and tools to ensure secure system and market operation as well as integration of renewable energy;

› Assessment of the adequacy of the system in different timeframes;

› Coordination of the planning and development of infrastructures at the European level (Ten-Year Network Development Plans, TYNDPs);

› Coordination of research, development and innovation activities of TSOs;

› Development of platforms to enable the transparent sharing of data with market participants.

ENTSO-E supports its members in the implementation and monitoring of the agreed common rules.

ENTSO-E is the common voice of European TSOs and provides expert contributions and a constructive view to energy debates to support policymakers in making informed decisions.

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BRIEF OVERVIEW AND TOPICS

Standard Vetting Interoperability tests (SV-IOP) are an essential part for ensuring that data exchange standards and specifications fit for the purpose of business requirements and to enable semantic interoperability between applications. The SV-IOP tests support early detection of errors, bugs, or issues in the standard itself, in the product implementation of the standard, as well as in the test configurations and datasets.

These kinds of initiatives aim to fostering implementation efficiency and model quality improvement. Readers are recommended to go through the 2026, 2025 and 2024 SV-IOP reports to get a better understanding of what the SV-IOP testing is about.

ENTSO-E agreed to organise the SV-IOP annually with the objective of facilitating the standardisation process of Regional Coordination Processes (RCP) related data exchange and its subsequent implementation in the business processes.

This directly reduces software vendors'[1] efforts to implement the standard and contributes to the utilities' (TSOs, RCCs, DSOs, etc.) comprehension of the tools' capabilities. For this reason, ENTSO-E strongly recommends utilities to encourage their software vendors to participate as the SV-IOP is the first big step towards a successful conformity assessment.

In the Regional Coordination Processes Data Exchange Specification (RCP DES) and in the 2027 SV-IOP edition, ENTSO-E focuses on the necessary data exchanges supporting the Coordinated Security Analysis (CSA) business process as defined in the EU Regulation (EU COM 2017/1485). This is achieved using the ENTSO-E CIM extension known as the Network Code Profiles (NCP), which builds on top of the CGMES[2] defined in the IEC 61970-600-1 and IEC 61970-600-2 standards.

Additionally, ENTSO-E released the **ReliCapGrid** **open-source**, fictional reference test model. The RCP DES now uses this model to exemplify the expected data exchange in CIMXML. We will work through the GitHub repositories to enable asynchronous collaboration. This means that contributors do not need to participate in every meeting in order to follow the work, provide input, or contribute to the development.

NCP 2.5 supports all Regional Coordination Process (RCP) business processes. The current test cases primarily focus on Coordinated Security Analysis (CSA). As additional test cases and data become available, the testing can be extended to cover the profiles and data relevant to the other regional coordinated processes, including Coordinated Capacity Calculation (CCC), Outage Planning Coordination (OPC), and Short-Term Adequacy (STA).

During SV-IOP 2026, the possibility of supporting two versions in parallel was raised. At the time, the response was that neither the tooling nor the available resources were sufficient to support this. We now believe that parallel support is feasible and therefore plan to work with CGMES 3.0 + NCP 2.5 alongside CGMES 3.1 + NCP 3.0. The general direction is to move the more mature and stable parts of NCP 2.5 into CGMES 3.1, while keeping NCP 3.0 smaller and focused on the less stable or still-evolving extensions.

[1] *Vendors should be understood as proprietary product vendor, open-source implementers, and TSOs' internal implementers.*
[2] *Common Grid Model Exchange Standard (2021)*

The SV-IOP will focus on validating practical implementations of Network Code Profiles (NCP) and promoting knowledge sharing on current and future ENTSO-E CIM-based data exchange standards, with a particular focus on:

1. **Validate and document test use cases and test configurations.**
    - Hear firsthand from TSO and RCC experts and understand their real use cases implemented using the stable **CGMES 3.0 + NCP 2.5** specifications.
    - Validate and test these use cases against the **ReliCapGrid** open-source fictional test model that models real requirements.
    - Test the use cases to check conformity of tools.
    - Run the power flow.
    - Understand participants' practical deployment challenges.
    - The main focus will be on **Coordinated Security Analysis (CSA)** use cases, while selected **Coordinated Capacity Calculation (CCC)** and **Outage Planning Coordination (OPC)** use cases will also be introduced.
    - Discuss technical issues, implementation experiences, and required functionalities.
    - Present and discuss ongoing developments towards **CGMES 3.1 + NCP 3.0.**

2. **Knowledge sharing** on CIM-based data exchanges.
    - Close the knowledge gap on how to model, use and understand the ENTSO-E CIM extensions known as the Network Code Profiles (NCP).
    - Collaborate back-to-back with ENTSO-E CIM experts developing the draft release of the Regional Coordination Processes Data Exchange Specification version and the Network Code Profiles.

REGISTRATION & COLLABORATION

Participants need to fill the online form by **30 November 2026**. This will register them to for the **preparation calls** as below where ENTSO-E will share more details on the 2027 SV-IOP organisation.

The SV-IOP is composed of two phases:

1. **Preparation calls**

    - December – April: a one-hour meeting every two weeks.
    - April – May: a one-hour meeting every week.
    - On Tuesdays from 16:00 to 17:00 (CET, Brussels time) as initial option.
        i. Note that other options will be offered as an alternative for agreement with final participants.
    - The meetings will focus on discussing issues and providing information necessary for performing the tests. Regular topics will be:

i. Q&A, issues, requirements on the NC profiles and RCP DES
ii. Test Use Cases
iii. Improvement of ReliCapGrid open-source test configuration.

2. **Physical event**

- During the week of the **24th of May 2027** (final dates to be agreed with participants).
- At ENTSO-E premises in Brussels.
- A more detailed agenda of the event will be built along with participants.
- General expected outcomes:

  i. Confirmation on the maturity of version 2.5 of the RCP Data Exchange Specification. Proposals for amendments in case issues are found.

  ii. Proposals for issue resolutions related to ENTSO-E NC Profiles v2.5 and draft next version, review planned modifications/enhancements.

  iii. Validation of the test use cases that will be integrated in the NC profiles conformity assessment scheme.

  iv. Validation of test configurations and/or propose additional test configurations.

For further inquiries or details, do not hesitate to contact the ENTSO-E Secretariat by sending an email to cim@entsoe.eu.

BENEFITS FOR PARTICIPANTS

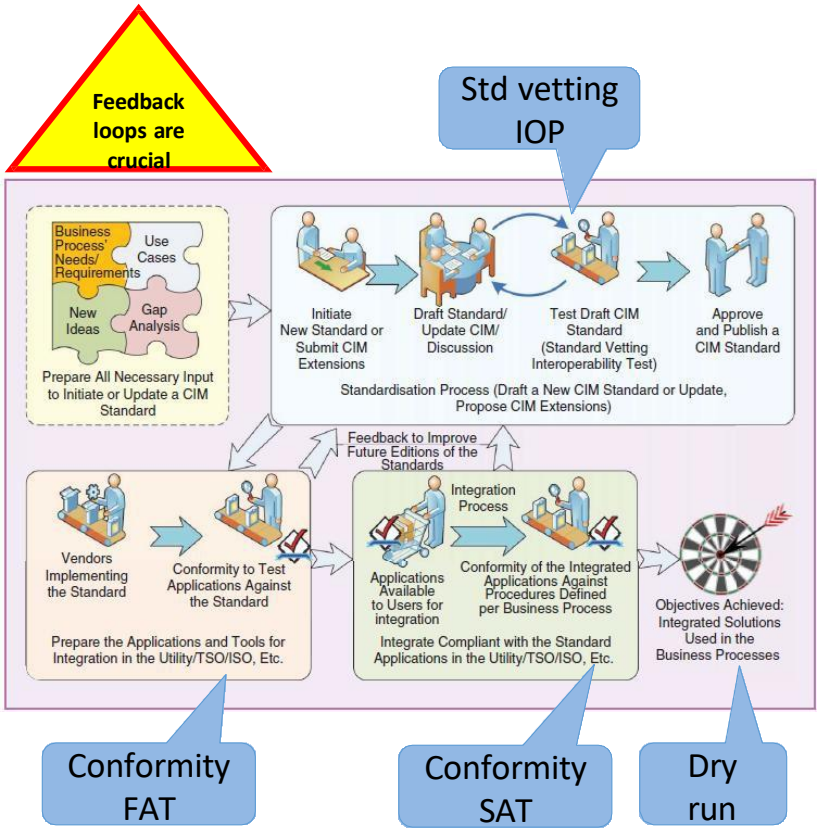
Participating in the preparation calls brings various benefits. Participants will receive the latest information on the RCP DES and related profiles' specifications. Together with an overview of the state-of-the-art technologies to support flexible data exchange services, this will be relevant for the design and planning of the Regional Coordination Processes' implementation projects.

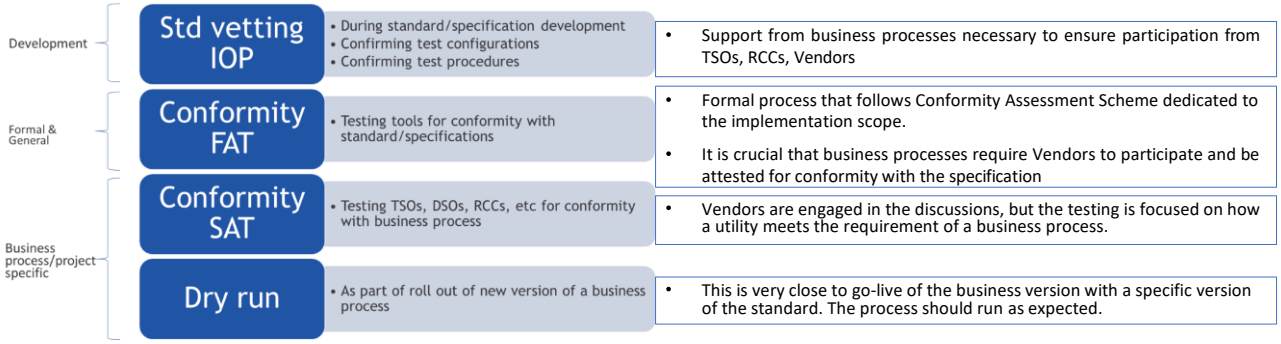
On the other hand, vendors will receive updates on upcoming industry needs and early access to test data (test configurations). They will also be able to challenge specifications by prototyping key parts of the overall complex data exchanges and exercise implementation of version transitions in their products. Vendors will also be able to promote their products via direct interactions and eventually as part of a concluding SV-IOP report which will include information on tooling that was used in the tests. Finally, a vendor's participation in the SV-IOP is the first big step facilitating and speeding up a successful conformity assessment for their product(s).

Overall, this event intends to help provide a clearer picture of gaps and expectations towards development for the next years as well as clarifying areas where standards should be enhanced.

ANNEX A: GENERAL INFORMATION ON INTEROPERABILITY TESTS

The following figures illustrate the overall process and indicate in which stages interoperability tests are crucial.





Usual format of the test is 3-5 days depending on the scope which is agreed depending on the business needs.

Benefits in performing standard vetting interoperability tests are:

- Support TSOs, RCC, Vendors in understanding requirements and how they are addressed in the standardisation process. Close gaps due to misinterpretations.
- Collect community opinion on the feasibility to implement the standard. Standard can be modified based on the feedback based on prototype (pilot) implementations that occur in the process to prepare for the IOP.
- Vendors would better understand the need and the challenge in different business processes in scope for a given IOP (e.g., it could be TYNDP, CGM building, CSA, CCC, OPC, STA etc.).
- Assess interoperability challenge and set the right test use cases for conformity as well as verify necessary test data that are basis for development of conformity process.
- Development of good specification/standard is a complex process. Different milestones are important, and the process needs to be followed strictly to minimise risks in implementation of business processes. If a step is skipped the risk should be assessed. The role of different actors is important.

Business units (e.g., units that implement business processes and need to conform to them) are requested to:

- To take care of requirements, requesting vendors to be active.
- Be part of the decision making and taking.
- Require conformity testing.

plan implementation and transition

Standardisation units (units responsible for the standardisation activities translating business requirements to standards) are requested to:

- Translate business requirements into the specification.
- Gather community of TSOs, Vendors, etc.
- Challenge requirements when not clear or difficult to harmonise.
- Organise interoperability testing and prepare conformity testing.
- Support business units in planning assessing feasibility and differences between versions.