

Network Code (NC) profiles

Release 2.4

Document Version 1.0.2

CIM WG agreed on 10 June 2026

Document Version 1.0.1

CIM WG agreed on 09 March 2026

Document Version 1.0.0

ICTC approved on 11 September 2025

Release notes

ENTSO-E updated the CIM-based Network Code Profiles (NCP) extensions and relevant artifacts—*Application Profiles* (RDFS and SHACL) available on the [CGMES Library](#)—to consider new use cases and correct identified bugs.

Release 2.4.2

- The following profiles changed and they are versioned individually (refer to specifications per profile):
- EquipmentReliabilityThe following profiles did not change with respect to release 2.4.1 but there are changes in the application library to fix issues as explained further down:
 - ObjectRegistry
 - AssessedElement
 - Contingency
 - ImpactAssessmentMatrix
 - NetworkCodeRelatedCanonicalExtensions
 - PowerSchedule
 - RemedialAction
 - RemedialActionSchedule
 - SecurityAnalysisResults
 - StateInstructionSchedule
 - SteadyStateHypothesisSchedule
 - SteadyStateInstruction
 - AvailabilitySchedule

- GridDisturbance
- MonitoringArea
- PowerSystemProject
- SensitivityMatrix
- Changes magnitude: patch
 - EquipmentReliability profile: ExternalNetworkInjection attributes are deleted and the class is stereotyped with description
- Changes nature: specifications, information model (UML) and Application Profiles (RDFS, SHACL) change.
 - Header information of SHACL constraints updated. owl:versionIRI updated to include the full URI. There is no instance data impact. It is alignment of SHACL artifacts. The change is in comits: [Change of the versionIRI · entsoe/application-profiles-library@7a8ed6e](#), [Update of the versions · entsoe/application-profiles-library@2437e1e](#)
 - DatasetMetadata profile:
 - Change of some attributes to be exchanged as rdf:resource instead of literal. The UML is not changed. SHACL constraints were modified in commit: [Update of datatype validation of properties that are of datatype URI... · entsoe/application-profiles-library@73e4531](#)
 - Fix sh:order that has 2 integer values: [Fix sh:order that has 2 integer values · entsoe/application-profiles-library@d3435db](#)
 - Correct RDFS for NCP dataset metadata to remove the record <rdfs:domain rdf:resource="http://www.w3.org/ns/dcat#Dataset"/> for literal attributes with datatype <cims:datatype rdf:resource="#URI"/>: [Correct RDFS for NCP dataset metadata to remove the record <rdfs:do... · entsoe/application-profiles-library@489c5c5](#)
 - EquipmentReliability profile.
 - Fix of a complex SHACL constraint which was not functioning: [issue fix #17 · entsoe/application-profiles-library@1cbf2b8](#)
 - Update of the SHACL – Simple for ER profile to match release 2.4.1: [issue fix #16 · entsoe/application-profiles-library@46f8081](#)
 - Update ER RDFS and SHACL issue EquivalentNetworkInjection: [Update ER RDFS and SHACL - issue #55 · entsoe/application-profiles-library@3fdfb06](#)
 - Remedial action profile:
 - SHACL constraint bug fix Fix ra:TopologyAction.Switch-valueType issue [#54, Fix ra:TopologyAction.Switch-valueType issue #54 · entsoe/application-profiles-library@64bdeed](#)
 - State Instruction Schedule profile
 - Complex SHACL constraint bug fix: [Fix of issue https://github.com/entsoe/relicapgrid/issues/266 · entsoe/application-profiles-library@1241833](#)
 - SHACL of all profiles:
 - Update sh:targetNode cc:ClassCount to sh:targetClass dcat:Dataset as not all SHACL engines are executing the targetNode properly: [Update sh:targetNode cc:ClassCount to sh:targetClass dcat:Dataset as ... · entsoe/application-profiles-library@86ae2ad](#) and [Update SHACL constraints - fix issue #56 · entsoe/application-profiles-library@49118aa](#)
 - Fix property shapes for IdentifiedObjectStringLength to use correct path and targetSubjectsOf instead of sh:targetNode: [Fix property shapes for](#)

[IdentifiedObjectStringLength to use correct p... · entsoe/application-profiles-library@9a9d316](#)

- Fix property shapes for DanglingReferences to use correct path and targetSubjectsOf instead of sh:targetNode: [Fix property shapes for DanglingReferences to use correct path and ta... · entsoe/application-profiles-library@bebf03b](#)
- Various application-profile-library enhancements
 - Creation of PROF for DatasetMetadata as it was missing: [Update the header of the RDFS Dataset Metadata. Create PROF for Datas... · entsoe/application-profiles-library@78a004e](#)
 - Updating PROF for profiles to include header references: [Update of PROF to include references to the header · entsoe/application-profiles-library@a92624f](#)
 - Fixing a typo on a repository structure: [Rename folder Enchanced to Enhanced · entsoe/application-profiles-library@bafcf2](#), [Fix of issue #12 · entsoe/application-profiles-library@11d8d93](#)
 - Improving readMe: [Update read me - issue #4 · entsoe/application-profiles-library@57c8168](#), [Update read me - issue #31 · entsoe/application-profiles-library@e5aa5bb](#), [Update read me - issue #31 · entsoe/application-profiles-library@b9f1113](#), [Update read me - issue #29 · entsoe/application-profiles-library@10da4c2](#), [Add PROF-to-SHACL validation flow documentation to README · entsoe/application-profiles-library@fb265cc](#), [Merge pull request #44 from Haigutus/doc/validation-guide · entsoe/application-profiles-library@91710f9](#)

•

Release 2.4.1

- The following profiles changed and they are versioned individually (refer to specifications per profile):
 - EquipmentReliability
 - ObjectRegistry
- The following profiles did not change with respect to release 2.4.0:
 - AssessedElement
 - Contingency
 - ImpactAssessmentMatrix
 - NetworkCodeRelatedCanonicalExtensions
 - PowerSchedule
 - RemedialAction
 - RemedialActionSchedule
 - SecurityAnalysisResults
 - StateInstructionSchedule
 - SteadyStateHypothesisSchedule
 - SteadyStateInstruction
 - AvailabilitySchedule
 - GridDisturbance
 - MonitoringArea
 - PowerSystemProject

- SensitivityMatrix
- Changes magnitude: minor
 - Bug Solving | BiddingZoneBorder.FromBiddingZone cardinality change.
 - BiddingZone.FromBiddingZoneBorder multiplicity changed from 1..n to 0..n.
 - BiddingZone.SchedulingArea multiplicity changed from 1..n to 0..n.
 - SchedulingArea.BiddingZone multiplicity changed from 1 to 0..1.
 - Items IdentifiedObject.energyIdentCodeEic namespace changed from <https://cim.ucaiug.io/ns#> to <https://cim.ucaiug.io/ns/eu#>.
 - Change of cardinality: BiddingZoneBorder (0...*) <-> (0..1) TieCorridor.
- Changes nature: specifications, information model (UML) and Application Profiles (RDFS, SHACL) change.
- Changes' description:
 - New Chapter 3 Namespaces presented in Network Code Related Canonical Extensions.

Release 2.4

- The following profiles changed and they are versioned individually (refer to specifications per profile):
 - AssessedElement
 - Contingency
 - EquipmentReliability
 - ImpactAssessmentMatrix
 - NetworkCodeRelatedCanonicalExtensions
 - PowerSchedule
 - RemedialAction
 - RemedialActionSchedule
 - SecurityAnalysisResults
 - StateInstructionSchedule
 - SteadyStateHypothesisSchedule
 - SteadyStateInstruction
- The following profiles did not change with respect to release 2.3.2:
 - AvailabilitySchedule
 - GridDisturbance
 - MonitoringArea
 - ObjectRegistry
 - PowerSystemProject
 - SensitivityMatrix
- Changes magnitude: minor.
 - Many functionalities are added in a backward compatible manner.

- Nevertheless, some changes may be considered as breaking changes (not backwards compatible) like changes in attributes/classes names or addition of new ones.

The technical agreement is to tag the release as a minor release due to the fact that there is no real implementation of v2.3 of NC profiles at regional level and the expected impact of release 2.4 is not major.

- The structural part of the data does not change. However, there are new behaviours of the information model in comparison to the previous version.
- Addition of functionalities.
- Change in the way the classes attributes in the information model (UML) are used and interlinked.
- Addition of use cases: implementers add new reasons to use the standard.
- Addition of test use cases: implementers add/provide test models to showcase such functionalities.
- Changes nature: specifications, information model (UML) and Application Profiles (RDFS, SHACL) change.

The release 2.4 of the Network Code Profiles features the following main changes. For a complete and machine-readable list of the changes, please refer to the difference dataset (*DIFF file*) that ENTSO-E will publish on the [CGMES Library](#).

- Changes' description:
 - RemedialActionDependency.normalEnabled attribute description changed to "If true, the remedial action dependency within a group shall be considered under normal operating conditions."
 - More guidance on how to define granularity of activation and shutdown costs
 - PowerBidScheduleTimePoint.price description changed to "Price given in the time point."
 - activationCost and shutdownCost added to PowerBidScheduleTimePoint
 - in SIS profile PowerBidScheduleTimePoint.p was made optional in order to allow for the SHACL constraints.
 - Association between PowerCapacity class and SchedulingArea class in EquipmentReliability profile to enable capacity calculation studies for long-term market studies.
 - The use of the *TriggerCondition* class in *RemedialActionSchedule* profile was deprecated.
 - RangeConstraint.valueKind attribute in SteadyStateInstruction profile is made mandatory.
 - Making *shutDownCost* attribute on *GeneratingUnit* class available in a scheduled (hourly) basis:
 - Added *GeneratingUnit.costCurrency* in extensions.
 - Changed the datatype to *GeneratingUnit.normalStartupCost*, *.normalWarmStartupCost*, *.shutdownCost*, *.warmStartupCost* to Decimal.
 - *GeneratingUnit.normalShutdownCost* added to extensions.
 - *GeneratingUnit.normalShutdownCost* added to ER together with *.costCurrency*; *GeneratingUnit.shutdownCost* was deleted in ER. Money datatypes were changed to Decimal. Money datatype deleted in ER.
 - *GeneratingUnit.costCurrency* added to SSI and the datatype of *.warmStartupCost* was changed to Decimal. Money is kept in the profile as it is used by *startupCost* which is CIM attribute.
 - shutdownCost is added to SSI.
 - shutdownCost in added SIS (in UnitCostTimePoint class).

- Reviewing the concepts of *Money* and *Currency*:
 - *PowerSchedule.currency* added to extensions.
 - *PowerSchedule.currency* added to RAS and PS profiles as optional attribute.
 - Added *UnitCostSchedule.currency* in the extensions and updated SIS profile.
 - Changed *UnitCostSchedule.startupCost* and *UnitCostSchedule.warmStartupCost* to Decimal and updated SIS profile.
 - Deleted Money datatype from SIS as it is not used anymore.
- The *PowerBidDependency* class now includes *delayKind*, *runtime* and *runtimeKind* attributes enabling the modelling of Core TSOs' use cases "parent-child must run", "child delay", "parent must be active" and "parent-child duration activation relation".
- Attributes *isCombinableWithContingency* and *isCombiablwWithRemedialAction* are kept optional but the description has changed to "If not provided, the default meaning is true, i.e. the assessed element is combinable".
- Introduced InfeedLimit SHACL rule for restricting usage of attributes.
- Description of *MobileElectricalUnit* class change to support demand response modelling.
- Fixing SMOperatingModePConsistency and SMNullP
 - Fixing inconsistency, *cim:SynchronousMachine* with *cim:SynchronousMachine.operatingMode* equal to "motor", *cim:RotatingMachine.p* shall be greater than or equal to zero.
 - Fixing inconsistency, *cim:SynchronousMachine* with *cim:SynchronousMachine.operatingMode* equal to "generator", *cim:RotatingMachine.p* shall be lesser than or equal to zero.
 - Fixing inconsistency, for *cim:SynchronousMachine*, if *cim:RotatingMachine.p* equals zero and *cim:RotatingMachine.q* is different than zero the *cim:SynchronousMachine.operatingMode* shall be equal to "condenser"
 - Added *GeneratingUnit.isRamping*. The attribute is added as required attribute in SSI
 - Added *operatingMode* to the *ReactiveCapabilityCurve* in extensions. The attribute is added as optional in ER
- The attribute *GateInputPin.logicKind* in RA profile was changed to optional.
 - Some of *GateInputPin*'s child classes, e.g. *PinGate* or *PinContingency*, do not compare anything.
 - As the value *none* does not exit in the enumeration *LogicalOperatorsKind*, the attribute *logicKind* attribute is made optional.
 - However, SHACL constraints ensure that the attribute *logicKind* is required for *GateInputPin* some child classes.
- *RangeConstraint.valueKind* attribute in *SteadyStateInstructionProfile* is made mandatory
- Impact assessment for a group of Remedial Actions: Remedial Actions might be depending on each other (gathered in a group). One could make an assessment of this group and for the sake of completeness, the class *RemedialActionOutputValue* and *RemedialActionImpact* are now associated with to *RemedialActionGroup*.
 - *RemedialActionGroup* class is added in *ImpactAssessmentMatrix* profile.
 - Association added between *RemedialActionGroup* and *RemedialActionOutputValue*.
 - Association added between *RemedialActionGroup* and *RemedialActionImpact*.
 - Cardinality in association between *RemedialAction* and *RemedialActionOutputValue* is relaxed (changed to 0 to 1).
 - Cardinality in association between *RemedialAction* and *RemedialActionImpact* is relaxed (changed to 0 to 1).
 - Introduction of SHACL constraints to require that *RemedialActionOutputValue* instance is only associated with *RemedialAction* or *RemedialActionImpact* (but not both).
- Assessed Element with different limits between base case and contingency analysis
 - *BaseCaseCurrentLimit* added to CIM extensions, AE profile, SSI profile, and SIS profile

- SHACL constraints are defined:
 - To check that the base case limit is lower than the contingency limit value.
 - To check that the BaseCaseCurrentLimit association is set only when the inBaseCase attribute in the AssessedElement class is set to TRUE.
- Participation factor in SSI profile classes as optional
 - The participation factor is made optional for the following classes: EnergyBlockOrder, EnergyConsumer, EnergyGroup, GeneratingUnit, HydroPump, PowerElectronicsUnit, ScheduleResource.
- Modelling of Conventional and Renewable Generation from Underlying Network
 - Added EquivalentGeneratingUnit class in ER profile
 - SHACL constraint C:NC:ER:RotatingMachine.GeneratingUnit:associationApplicability is added
 - An EquivalentGeneratingUnit shall not be referenced by a RotatingMachine via the association end RotatingMachine.GeneratingUnit.