European Network of
Transmission System Operators
for Electricity

SECURITY ANALYSIS RESULT PROFILE SPECIFICATION

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APPROVED DOCUMENT
VERSION 2.2

This document is maintained by the ENTSO-E CIM WG. Comments or remarks are to be provided at cim@entsoe.eu

NOTE CONCERNING WORDING USED IN THIS DOCUMENT

The force of the following words is modified by the requirement level of the document in which they are used.

- SHALL: This word, or the terms “REQUIRED” or “MUST”, means that the definition is an absolute requirement of the specification.
- SHALL NOT: This phrase, or the phrase “MUST NOT”, means that the definition is an absolute prohibition of the specification.
- SHOULD: This word, or the adjective “RECOMMENDED”, means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
- SHOULD NOT: This phrase, or the phrase “NOT RECOMMENDED”, means that there may exist valid reasons in particular circumstances when the particular behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label.
- MAY: This word, or the adjective “OPTIONAL”, means that an item is truly optional.

Revision History

Version	Release	Date	Paragraph	Comments
1	0	2021-03-22		Document for SOC approval
2	0	2021-10-12		For CIM EG review. No major update. Due to modification of the extensions some elements may have different descriptions.
2	0	2022-02-16		SOC approved.
2	1	2022-09-21		SOC approved.
2	2	2023-03-24		For review.
2	2	2023-05-10		ICTC approved.

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1 Introduction

The security analysis result profile is a profile to exchange a security analysis result.

The security analysis result is output data for security analysis.

The security analysis result includes each limit violation detected for each assessed element and for a given contingency. The limit violation has a direct association to operational limit and contingency. The association to the operational limit provides information on the following:

- The terminal (the end of the equipment) where the limit is defined
- The equipment to which the limit is related
- The type of the limit e.g. PATL, TATL, etc including the relevant time phase and other conditions

The association to the contingency provides information which contingency was simulated when this limit violation was detected.

2 Application profile specification

2.1 Version information

The content is generated from UML model file CIM100_CGMES31v01_501-20v02_NC22v95_MM10v01.eap.

This edition is based on the IEC 61970 UML version 'IEC61970CIM17v40', dated '2020-08-24'.

- Title: Security Analysis Result Vocabulary
- Keyword: SAR
- Description: This vocabulary is describing the security analysis result profile.
- Version IRI: http://entsoe.eu/ns/CIM/SecurityAnalysisResult-EU/2.2
- Version info: 2.2.0
- Prior version: http://entsoe.eu/ns/CIM/SecurityAnalysisResult-EU/2.1
- Conforms to: urn:iso:std:iec:61970-600-2:ed-1|urn:iso:std:iec:61970-301:ed-7:amd1|file://iec61970cim17v40_iec61968cim13v13a_iec62325cim03v17a.eap|urn:iso:std:iec:61970-401:draft:ed-1|urn:iso:std:iec:61970-501:draft:ed-2|file://CGMES-30v25_501-20v01.eap
- Identifier: urn:uuid:7d53a1b2-0dcc-4556-b868-6ed099bd9ac9

2.2 Constraints naming convention

The naming of the rules shall not be used for machine processing. The rule names are just a string. The naming convention of the constraints is as follows.

"{rule.Type}:{rule.Standard}:{rule.Profile}:{rule.Property}:{rule.Name}"

where

rule.Type: C – for constraint; R – for requirement rule.Standard: the number of the standard e.g. 301 for 61970-301, 456 for 61970-456, 13 for 61968-13. 61970-600 specific constraints refer to 600 although they are related to one or combination of the 61970-450 series profiles. For NC profiles, NC is used.

rule.Profile: the abbreviation of the profile, e.g. TP for Topology profile. If set to “ALL” the constraint is applicable to all IEC 61970-600 profiles.

rule.Property: for UML classes, the name of the class, for attributes and associations, the name of the class and attribute or association end, e.g. EnergyConsumer, IdentifiedObject.name, etc. If set to “NA” the property is not applicable to a specific UML element.

rule.Name: the name of the rule. It is unique for the same property.

Example: C:600:ALL:IdentifiedObject.name:stringLength

2.3 Profile constraints

This clause defines requirements and constraints that shall be fulfilled by applications that conform to this document.

This document is the master for rules and constraints tagged "NC". For the sake of self-containment, the list below also includes a copy of the relevant rules from IEC 61970-452, tagged "452".

- C:452:ALL:NA:datatypes

  According to 61970-501, datatypes are not exchanged in the instance data. The UnitMultiplier is 1 in cases none value is specified in the profile.

- R:452:ALL:NA:exchange

  Optional and required attributes and associations must be imported and exported if they are in the model file prior to import.

- R:452:ALL:NA:exchange1

  If an optional attribute does not exist in the imported file, it does not have to be exported in case exactly the same data set is exported, i.e. the tool is not obliged to automatically provide this attribute. If the export is resulting from an action by the user performed after the import, e.g. data processing or model update the export can contain optional attributes.

- R:452:ALL:NA:exchange2

  In most of the profiles the selection of optional and required attributes is made so as to ensure a minimum set of required attributes without which the exchange does not fulfil its basic purpose. Business processes governing different exchanges can require mandatory exchange of certain optional attributes or associations. Optional and required attributes and associations shall therefore be supported by applications which claim conformance with certain functionalities of the IEC 61970-452. This provides flexibility for the business processes to adapt to different business requirements and base the exchanges on IEC 61970-452 compliant applications.

- R:452:ALL:NA:exchange3

  An exporter may, at his or her discretion, produce a serialization containing additional class data described by the CIM Schema but not required by this document provided these data adhere to the conventions established in Clause 5.

- R:452:ALL:NA:exchange4

From the standpoint of the model import used by a data recipient, the document describes a subset of the CIM that importing software shall be able to interpret in order to import exported models. Data providers are free to exceed the minimum requirements described herein as long as their resulting data files are compliant with the CIM Schema and the conventions established in Clause 5. The document, therefore, describes additional classes and class data that, although not required, exporters will, in all likelihood, choose to include in their data files. The additional classes and data are labelled as required (cardinality 1..1) or as optional (cardinality 0..1) to distinguish them from their required counterparts. Please note, however, that data importers could potentially receive data containing instances of any and all classes described by the CIM Schema.

- R:452:ALL:NA:cardinality

  The cardinality defined in the CIM model shall be followed, unless a more restrictive cardinality is explicitly defined in this document. For instance, the cardinality on the association between VoltageLevel and BaseVoltage indicates that a VoltageLevel shall be associated with one and only one BaseVoltage, but a BaseVoltage can be associated with zero to many VoltageLevels.

- R:452:ALL:NA:associations

  Associations between classes referenced in this document and classes not referenced here are not required regardless of cardinality.

- R:452:ALL:IdentifiedObject.name:rule

  The attribute “name” inherited by many classes from the abstract class IdentifiedObject is not required to be unique. It must be a human readable identifier without additional embedded information that would need to be parsed. The attribute is used for purposes such as User Interface and data exchange debugging. The MRID defined in the data exchange format is the only unique and persistent identifier used for this data exchange. The attribute IdentifiedObject.name is, however, always required for CoreEquipment profile and Short Circuit profile.

- R:452:ALL:IdentifiedObject.description:rule

  The attribute “description” inherited by many classes from the abstract class IdentifiedObject must contain human readable text without additional embedded information that would need to be parsed.

- R:452:ALL:NA:uniqueIdentifier

  All IdentifiedObject-s shall have a persistent and globally unique identifier (Master Resource Identifier - mRID).

- R:452:ALL:NA:unitMultiplier

  For exchange of attributes defined using CIM Data Types (ActivePower, Susceptance, etc.) a unit multiplier of 1 is used if the UnitMultiplier specified in this document is “none”.

- C:452:ALL:IdentifiedObject.name:stringLength

  The string IdentifiedObject.name has a maximum of 128 characters.

- C:452:ALL:IdentifiedObject.description:stringLength

  The string IdentifiedObject.description is maximum 256 characters.

- C:452:ALL:NA:float

  An attribute that is defined as float (e.g. has a type Float or a type which is a Datatype with .value attribute of type Float) shall support ISO/IEC 60559:2020 for floating-point arithmetic using single precision floating point. A single precision float supports 7 significant digits where the significant digits are described as an integer, or a decimal number with 6 decimal digits. Two float values are equal when the significant with 7 digits are identical, e.g. 1234567 is equal 1.234567E6 and so are 1.2345678 and 1.234567E0.

- R:NC:ALL:Region:reference

  The reference to the Region is normally a reference to the capacity calculation region, which is identified by “Y” EIC code of the capacity calculation region.

- R:NC:ALL:SystemOperator:reference

  The reference to the System Operator is normally identified by “X” EIC code of TSO.

- C:NC:SAR:PowerFlowResult:value

  PowerFlowResult.value and PowerFlowResult.absoluteValue are required attributes if the association end PowerFlowResult.OperationalLimit is provided.

- C:NC:SAR:PowerFlowResult:ApparentPowerLimit

  PowerFlowResult.valueVA is required attribute if an ApparentPowerLimit is referenced by the association end PowerFlowResult.OperationalLimit.

- C:NC:SAR:PowerFlowResult:ActivePowerLimit

  PowerFlowResult.valueW is required attribute if an ActivePowerLimit is referenced by the association end PowerFlowResult.OperationalLimit.

- C:NC:SAR:PowerFlowResult:ReactivePowerLimit

  PowerFlowResult.valueVAR is required attribute if a ReactivePowerLimit is referenced by the association end PowerFlowResult.OperationalLimit.

- C:NC:SAR:PowerFlowResult:VoltageLimit

  PowerFlowResult.valueV is required attribute if a VoltageLimit is referenced by the association end PowerFlowResult.OperationalLimit.

- C:NC:SAR:PowerFlowResult:VoltageAngleLimit

  PowerFlowResult.valueAngle is required attribute if a VoltageAngleLimit is referenced by the association end PowerFlowResult.OperationalLimit.

- C:NC:SAR:PowerFlowResult:CurrentLimit

  PowerFlowResult.valueA is required attribute if a CurrentLimit is referenced by the association end PowerFlowResult.OperationalLimit.

2.4 Metadata

ENTSO-E agreed to extend the header and metadata definitions by IEC 61970-552 Ed2. This new header definitions rely on W3C recommendations which are used worldwide and are positively recognised by the European Commission. The new definitions of the header mainly use Provenance ontology (PROV-O), Time Ontology and Data Catalog Vocabulary (DCAT). The global new header applicable for this profile is included in the metadata and document header specification document.

The header vocabulary contains all attributes defined in IEC 61970-552. This is done only for the purpose of having one vocabulary for header and to ensure transition for data exchanges that are using IEC 61970-552:2016 header. This profile does not use IEC 61970-552:2016 header attributes and relies only on the extended attributes.

2.4.1 Constraints

The identification of the constraints related to the metadata follows the same convention for naming of the constraints as for profile constraints.

- R:NC:ALL:wasAttributedTo:usage

  The prov:wasAttributedTo should normally be the "X" EIC code of the actor (prov:Agent).

2.4.2 Reference metadata

The header defined for this profile requires availability of a set of reference metadata. For instance, the attribute prov:wasGeneratedBy requires a reference to an activity which produced the model or the related process. The activities are defined as reference metadata and their identifiers are referenced from the header to enable the receiving entity to retrieve the "static" (reference) information that is not modified frequently. This approach imposes a requirement that both the sending entity and the receiving entity have access to a unique version of the reference metadata. Therefore, each business process shall define which reference metadata is used and where it is located.

3 Detailed Profile Specification

3.1 General

This package contains the security analysis result profile.
This profile is not intended to replace the Topology (TP) and State Variables (SV) profiles. Its intention is to exchange power flow result that is relevant for security optimization, either through violation or through a loading threshold. Systems should not use this profile for dumping a full database. The modeling is optimized to have the minimum size in addition to a well defined value definition (e.g. active power, apparent power,etc.).
Recommendation: If the terminals are connected with zero impedance, it is recommended to export only one terminal with a voltage (e.g. the terminal of a BusbarSection).
The connection between Contingency and Remedial Action is given by the Remedial Action Profile. The connection between AssessedElement and PowerFlowResult is given by the OperationalLimit.

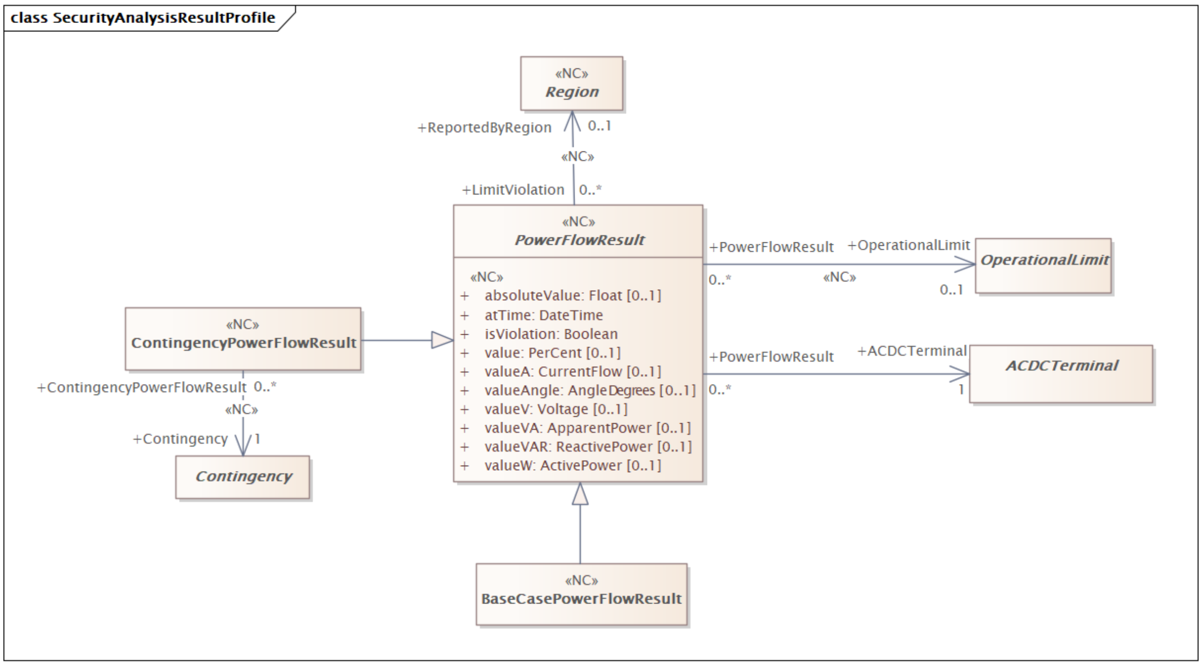

Figure 1 – Class diagram SecurityAnalysisResultProfile::SecurityAnalysisResultProfile

Figure 1: The diagram contains the main classes used in the profile.

3.2 (abstract) ACDCTerminal root class

An electrical connection point (AC or DC) to a piece of conducting equipment. Terminals are connected at physical connection points called connectivity nodes.

3.3 (NC) BaseCasePowerFlowResult

Inheritance path = PowerFlowResult
Base case power flow result for a given terminal.
Table 1 shows all attributes of BaseCasePowerFlowResult.

Table 1 – Attributes of SecurityAnalysisResultProfile::BaseCasePowerFlowResult

name	mult	type	description
value	0..1	PerCent	(NC) inherited from: PowerFlowResult
absoluteValue	0..1	Float	(NC) inherited from: PowerFlowResult
atTime	1..1	DateTime	(NC) inherited from: PowerFlowResult
isViolation	1..1	Boolean	(NC) inherited from: PowerFlowResult
valueW	0..1	ActivePower	(NC) inherited from: PowerFlowResult
valueVA	0..1	ApparentPower	(NC) inherited from: PowerFlowResult
valueV	0..1	Voltage	(NC) inherited from: PowerFlowResult
valueAngle	0..1	AngleDegrees	(NC) inherited from: PowerFlowResult
valueA	0..1	CurrentFlow	(NC) inherited from: PowerFlowResult
valueVAR	0..1	ReactivePower	(NC) inherited from: PowerFlowResult

Table 2 shows all association ends of BaseCasePowerFlowResult with other classes.

Table 2 – Association ends of SecurityAnalysisResultProfile::BaseCasePowerFlowResult with other classes

mult from	name	mult to	type	description
0..*	OperationalLimit	0..1	OperationalLimit	(NC) inherited from: PowerFlowResult
0..*	ReportedByRegion	0..1	Region	(NC) inherited from: PowerFlowResult
0..*	ACDCTerminal	1..1	ACDCTerminal	inherited from: PowerFlowResult

3.4 (abstract) Contingency root class

An event threatening system reliability, consisting of one or more contingency elements.

3.5 (NC) ContingencyPowerFlowResult

Inheritance path = PowerFlowResult
Contingency power flow result on a given terminal for a given contingency.
Table 3 shows all attributes of ContingencyPowerFlowResult.

Table 3 – Attributes of SecurityAnalysisResultProfile::ContingencyPowerFlowResult

name	mult	type	description
value	0..1	PerCent	(NC) inherited from: PowerFlowResult
absoluteValue	0..1	Float	(NC) inherited from: PowerFlowResult
atTime	1..1	DateTime	(NC) inherited from: PowerFlowResult
isViolation	1..1	Boolean	(NC) inherited from: PowerFlowResult
valueW	0..1	ActivePower	(NC) inherited from: PowerFlowResult
valueVA	0..1	ApparentPower	(NC) inherited from: PowerFlowResult
valueV	0..1	Voltage	(NC) inherited from: PowerFlowResult
valueAngle	0..1	AngleDegrees	(NC) inherited from: PowerFlowResult
valueA	0..1	CurrentFlow	(NC) inherited from: PowerFlowResult
valueVAR	0..1	ReactivePower	(NC) inherited from: PowerFlowResult

Table 4 shows all association ends of ContingencyPowerFlowResult with other classes.

Table 4 – Association ends of SecurityAnalysisResultProfile::ContingencyPowerFlowResult with other classes

mult from	name	mult to	type	description
0..*	Contingency	1..1	Contingency	(NC) The contingency that has this power flow result.
0..*	OperationalLimit	0..1	OperationalLimit	(NC) inherited from: PowerFlowResult
0..*	ReportedByRegion	0..1	Region	(NC) inherited from: PowerFlowResult
0..*	ACDCTerminal	1..1	ACDCTerminal	inherited from: PowerFlowResult

3.6 (abstract) OperationalLimit root class

A value and normal value associated with a specific kind of limit.
The sub class value and normalValue attributes vary inversely to the associated OperationalLimitType.acceptableDuration (acceptableDuration for short).
If a particular piece of equipment has multiple operational limits of the same kind (apparent power, current, etc.), the limit with the greatest acceptableDuration shall have the smallest limit

value and the limit with the smallest acceptableDuration shall have the largest limit value. Note: A large current can only be allowed to flow through a piece of equipment for a short duration without causing damage, but a lesser current can be allowed to flow for a longer duration.

3.7 (abstract,NC) PowerFlowResult root class

Power flow result including any operational limit violation.
Table 5 shows all attributes of PowerFlowResult.

Table 5 – Attributes of SecurityAnalysisResultProfile::PowerFlowResult

name	mult	type	description
value	0..1	PerCent	(NC) The value of the limit violation in percent related to the value of the operational limit that is violated. For instance, if the operational limit is 1000 A and the current flow is 1100 A the value is reported as 110 %.
absoluteValue	0..1	Float	(NC) Absolute value from a power flow calculation on a given terminal related to a given operational limit. For instance, if the operational limit is 1000 A and the current flow is 1100 A the absoluteValue is reported as 1100 A.
atTime	1..1	DateTime	(NC) The date and time of the scenario time that was studied and at which the limit violation occurred.
isViolation	1..1	Boolean	(NC) True if the power flow result is violating the associated operational limit. False if it is not violating the associated operational limits.
valueW	0..1	ActivePower	(NC) Active power value from a power flow calculation on a given terminal.
valueVA	0..1	ApparentPower	(NC) Apparent power value from a power flow calculation on a given terminal.
valueV	0..1	Voltage	(NC) Voltage value from a power flow calculation on a given terminal.
valueAngle	0..1	AngleDegrees	(NC) Voltage angle value from a power flow calculation on a given terminal.
valueA	0..1	CurrentFlow	(NC) Current from a power flow calculation on a given terminal.
valueVAR	0..1	ReactivePower	(NC) Reactive power value from a power flow calculation on a given terminal.

Table 6 shows all association ends of PowerFlowResult with other classes.

Table 6 – Association ends of SecurityAnalysisResultProfile::PowerFlowResult with other classes

mult from	name	mult to	type	description
0..*	OperationalLimit	0..1	OperationalLimit	(NC) The operational limit that has this limit violation.
0..*	ReportedByRegion	0..1	Region	(NC) The region which reports this limit violation.
0..*	ACDCTerminal	1..1	ACDCTerminal	ACDC terminal where the powerflow result is located.

3.8 (abstract,NC) Region root class

A region where the system operator belongs to.

3.9 UnitMultiplier enumeration

The unit multipliers defined for the CIM. When applied to unit symbols, the unit symbol is treated as a derived unit. Regardless of the contents of the unit symbol text, the unit symbol shall be treated as if it were a single-character unit symbol. Unit symbols should not contain multipliers, and it should be left to the multiplier to define the multiple for an entire data type.

For example, if a unit symbol is "m2Pers" and the multiplier is "k", then the value is k(m**2/s), and the multiplier applies to the entire final value, not to any individual part of the value. This can be conceptualized by substituting a derived unit symbol for the unit type. If one imagines that the symbol "Þ" represents the derived unit "m2Pers", then applying the multiplier "k" can be conceptualized simply as "kÞ".

For example, the SI unit for mass is "kg" and not "g". If the unit symbol is defined as "kg", then the multiplier is applied to "kg" as a whole and does not replace the "k" in front of the "g". In this case, the multiplier of "m" would be used with the unit symbol of "kg" to represent one gram. As a text string, this violates the instructions in IEC 80000-1. However, because the unit symbol in CIM is treated as a derived unit instead of as an SI unit, it makes more sense to conceptualize the "kg" as if it were replaced by one of the proposed replacements for the SI mass symbol. If one imagines that the "kg" were replaced by a symbol "Þ", then it is easier to conceptualize the multiplier "m" as creating the proper unit "mÞ", and not the forbidden unit "mkg".

Table 7 shows all literals of UnitMultiplier.

Table 7 – Literals of SecurityAnalysisResultProfile::UnitMultiplier

literal	value	description
none	0	No multiplier or equivalently multiply by 1.
k	3	Kilo 10**3.
M	6	Mega 10**6.

3.10 UnitSymbol enumeration

The derived units defined for usage in the CIM. In some cases, the derived unit is equal to an SI unit. Whenever possible, the standard derived symbol is used instead of the formula for the derived unit. For example, the unit symbol Farad is defined as "F" instead of "CPerV". In cases where a standard symbol does not exist for a derived unit, the formula for the unit is used as the unit symbol. For example, density does not have a standard symbol and so it is represented as "kgPerm3". With the exception of the "kg", which is an SI unit, the unit symbols do not contain multipliers and therefore represent the base derived unit to which a multiplier can be applied as a whole.

Every unit symbol is treated as an unparseable text as if it were a single-letter symbol. The meaning of each unit symbol is defined by the accompanying descriptive text and not by the text contents of the unit symbol.

To allow the widest possible range of serializations without requiring special character handling, several substitutions are made which deviate from the format described in IEC 80000-1. The division symbol "/" is replaced by the letters "Per". Exponents are written in plain text after the unit as "m3" instead of being formatted as "m" with a superscript of 3 or introducing a symbol as in "m^3". The degree symbol "°" is replaced with the letters "deg". Any clarification of the meaning for a substitution is included in the description for the unit symbol.

Non-SI units are included in list of unit symbols to allow sources of data to be correctly labelled with their non-SI units (for example, a GPS sensor that is reporting numbers that represent feet instead of meters). This allows software to use the unit symbol information correctly convert and scale the raw data of those sources into SI-based units.

The integer values are used for harmonization with IEC 61850.

Table 8 shows all literals of UnitSymbol.

Table 8 – Literals of SecurityAnalysisResultProfile::UnitSymbol

literal	value	description
none	0	Dimension less quantity, e.g. count, per unit, etc.
A	5	Current in amperes.
deg	9	Plane angle in degrees.
V	29	Electric potential in volts (W/A).
W	38	Real power in watts (J/s). Electrical power may have real and reactive components. The real portion of electrical power (I^2R or VIcos(phi)), is expressed in Watts. See also apparent power and reactive power.
VA	61	Apparent power in volt amperes. See also real power and reactive power.
VAr	63	Reactive power in volt amperes reactive. The “reactive” or “imaginary” component of electrical power (VIsin(phi)). (See also real power and apparent power). Note: Different meter designs use different methods to arrive at their results. Some meters may compute reactive power as an arithmetic value, while others compute the value vectorially. The data consumer should determine the method in use and the suitability of the measurement for the intended purpose.

3.11 ActivePower datatype

Product of RMS value of the voltage and the RMS value of the in-phase component of the current.
Table 9 shows all attributes of ActivePower.

Table 9 – Attributes of SecurityAnalysisResultProfile::ActivePower

name	mult	type	description
multiplier	0..1	UnitMultiplier	(const=M)
unit	0..1	UnitSymbol	(const=W)
value	0..1	Float	

3.12 AngleDegrees datatype

Measurement of angle in degrees.
Table 10 shows all attributes of AngleDegrees.

Table 10 – Attributes of SecurityAnalysisResultProfile::AngleDegrees

name	mult	type	description
value	0..1	Float	
unit	0..1	UnitSymbol	(const=deg)
multiplier	0..1	UnitMultiplier	(const=none)

3.13 ApparentPower datatype

Product of the RMS value of the voltage and the RMS value of the current.
Table 11 shows all attributes of ApparentPower.

Table 11 – Attributes of SecurityAnalysisResultProfile::ApparentPower

name	mult	type	description
multiplier	0..1	UnitMultiplier	(const=M)
unit	0..1	UnitSymbol	(const=VA)
value	0..1	Float	

3.14 CurrentFlow datatype

Electrical current with sign convention: positive flow is out of the conducting equipment into the connectivity node. Can be both AC and DC.

Table 12 shows all attributes of CurrentFlow.

Table 12 – Attributes of SecurityAnalysisResultProfile::CurrentFlow

name	mult	type	description
multiplier	0..1	UnitMultiplier	(const=none)
unit	0..1	UnitSymbol	(const=A)
value	0..1	Float	

3.15 PerCent datatype

Percentage on a defined base. For example, specify as 100 to indicate at the defined base.

Table 13 shows all attributes of PerCent.

Table 13 – Attributes of SecurityAnalysisResultProfile::PerCent

name	mult	type	description
value	0..1	Float	Normally 0 to 100 on a defined base.
unit	0..1	UnitSymbol	(const=none)
multiplier	0..1	UnitMultiplier	(const=none)

3.16 ReactivePower datatype

Product of RMS value of the voltage and the RMS value of the quadrature component of the current.

Table 14 shows all attributes of ReactivePower.

Table 14 – Attributes of SecurityAnalysisResultProfile::ReactivePower

name	mult	type	description
value	0..1	Float	
unit	0..1	UnitSymbol	(const=VAr)
multiplier	0..1	UnitMultiplier	(const=M)

3.17 Voltage datatype

Electrical voltage, can be both AC and DC.

Table 15 shows all attributes of Voltage.

Table 15 – Attributes of SecurityAnalysisResultProfile::Voltage

name	mult	type	description
multiplier	0..1	UnitMultiplier	(const=k)

name	mult	type	description
unit	0..1	UnitSymbol	(const=V)
value	0..1	Float	

3.18 Boolean primitive

A type with the value space "true" and "false".

3.19 DateTime primitive

Date and time as "yyyy-mm-ddThh:mm:ss.sss", which conforms with ISO 8601. UTC time zone is specified as "yyyy-mm-ddThh:mm:ss.sssZ". A local timezone relative UTC is specified as "yyyy-mm-ddThh:mm:ss.sss-hh:mm". The second component (shown here as "ss.sss") could have any number of digits in its fractional part to allow any kind of precision beyond seconds.

3.20 Float primitive

A floating point number. The range is unspecified and not limited.

3.21 String primitive

A string consisting of a sequence of characters. The character encoding is UTF-8. The string length is unspecified and unlimited.

Annex A (informative): Sample data

A.1 General

This Annex is designed to illustrate the profile by using fragments of sample data. It is not meant to be a complete set of examples covering all possibilities of using the profile. Defining a complete set of test data is considered a separate activity to be performed for the purpose of setting up interoperability testing and conformity related to this profile.

A.2 Sample instance data

Test data files are available in the CIM EG SharePoint.